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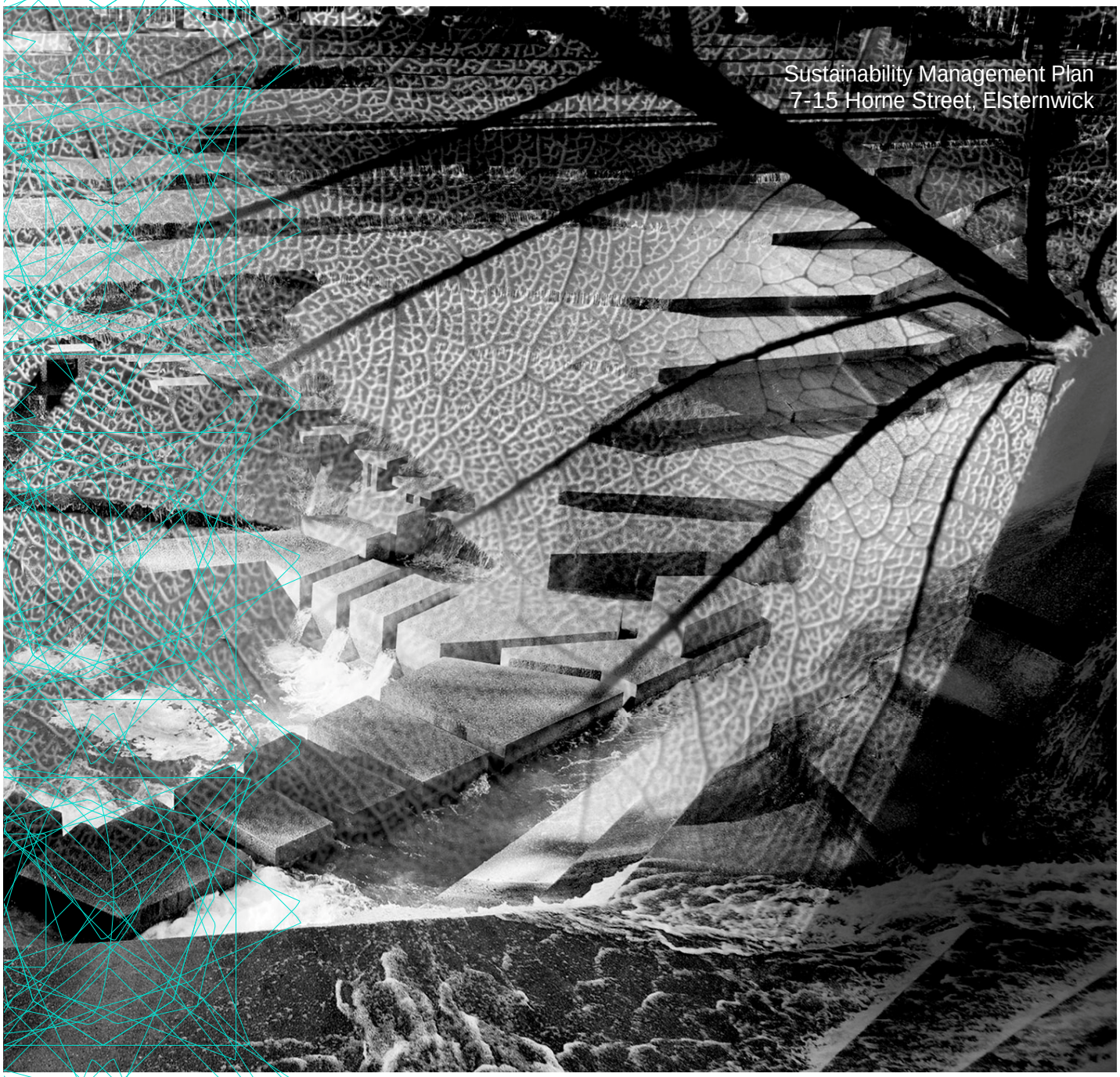

Sustainability Management Plan
7-15 Horne Street, Elsternwick

SUSTAINABLE DEVELOPMENT
_CONSULTANTS

Proposed Mixed-Use Development
7-15 Horne Street, Elsternwick

Sustainability Management Plan

December 2020

S3234 SMP.V4

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Version	Date of Issue	Description	Author	Reviewed	Approved
V1	24-10-2018	For submission	AB	JB/LR	LR
V2	1-11-2018	Updated – Parking spaces and Landscaping	AB	LR	LR
V3	21-11-2019	Response to Planning Permit Conditions	LS	AR	AR
V4	18-12-2020	Updated – Reduction in commercial spaces	TJ	JB	LR

1. Introduction

This Sustainability Management Plan (SMP) has been prepared to assist the design, construction and operation of the proposed mixed-use development at 7-15 Horne Street, Elsternwick, to achieve a range of best-practice sustainable development objectives.

Sustainable Development Consultants have assessed the proposed plans and coordinated with the project team to incorporate ESD initiatives to ensure that the development meets the expectations of the Glen Eira City Council and Clause 58 *Apartment Developments* of the Glen Eira Planning Scheme.

The assessment of this development has been carried out based on the architectural drawings provided by CBG Architects.

1.1 Site and Development Description

The site at 7-15 Horne Street, Elsternwick, is located approximately 10km south-east of the Melbourne CBD, just east of the Nepean Highway. The site is situated with a lane to one side and the rear of the property, and abuts a single story commercial property. The site is within walking distance to numerous amenities along Glen Huntley Road, including Elsternwick Village and Elsternwick Railway Station, and is within close proximity to Elsternwick Park and Elwood Beach. The site is comprised of three properties and is currently occupied by a single-storey warehouse and double-storey commercial buildings, which will be demolished to allow for the construction. The proposed development consists of an 9-storey mixed-use building incorporating apartments and ground floor retail/commercial spaces.

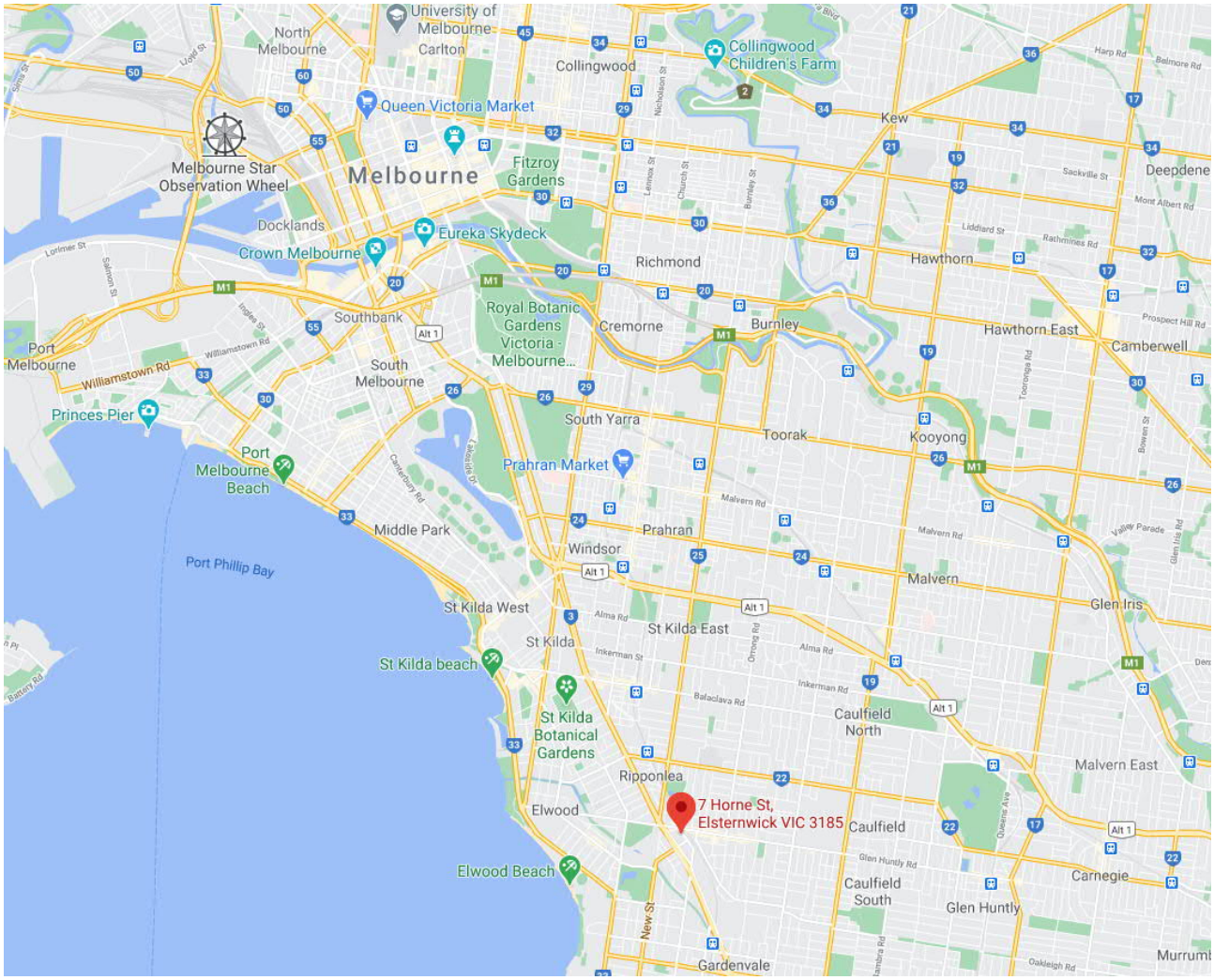

Figure 1: Location of the site at 7-15 Horne Street, Elsternwick, in relation to the Melbourne CBD (Source: Google Maps)

Figure 2: Aerial view of the site at 7-15 Horne Street, Elsternwick (Source: Nearmap)

The development summary is as follows:

Element	Inclusions
Site Area	1,239m^2
Basement 1&2	59 x car parking spaces 17 x bike parking spaces
Ground Level	2 x Retail 4 x car parking spaces 43 x bike parking spaces (indoor) + 10 x bike parking spaces (outdoor)
Level 1 - 8	Resident's Lounge 43 x Apartments; 86 Bedrooms • 10 x SDA Apartments • 2 x 1-Bedroom • 26 x 2-Bedroom • 5 x 3-Bedroom

1.2 City of Glen Eira Requirements

The City of Glen Eira encourages new developments to incorporate sustainable practices and be designed, built and maintained at a level that reflects best practice outcomes. The Glen Eira City Council typically requires new development projects within their municipality to include as part of the town planning permit application a Sustainability Management Plan (SMP). This SMP captures initiatives and addresses relevant objectives within Clause 58 *Apartment Developments* of the Glen Eira Planning Scheme.

1.3 ESD Assessment Tools

There are a number of calculators and modelling programs available in Victoria to assess proposed developments against benchmarks set by the Victorian government, local councils and the Building Code of Australia. Different tools are used to assess different aspects of the development including the:

- FirstRate 5 which covers the energy efficiency performance of the building fabric; and
- The Stormwater Treatment Objective – Relative Measure (STORM) calculator, which addresses stormwater quality considerations for the entire development.

All tools have minimum compliance requirements. FirstRate 5 and STORM assess requirements that are mandatory for Victoria.

1.3.1 FIRSTRATE 5

The energy efficiency of the dwelling's thermal envelope has been assessed using FirstRate 5, which is an energy modelling software program to rate dwellings on a 10-Star scale. The tool uses the AccuRate engine to rate dwellings based on climate zone, materials used in a structure, positioning, orientation and building sealing. Higher scores are achieved primarily through better material selection, improvements in glazing, and insulation. It is noted that the 2016 BCA (Building Code of Australia) will apply to this development.

A preliminary assessment sample of 21 out of 43 dwellings has been conducted to predict the average heating and cooling energy use of the development. Results of the FirstRate assessment can be found in Appendix 1of this SMP.

1.3.2 MELBOURNE WATER STORM TOOL

Melbourne Water has developed the Stormwater Treatment Objective – Relative Measure (STORM) Calculator to simplify the analysis of stormwater treatment methods. This calculator is designed for the general public to be able to assess simple Water Sensitive Urban Design (WSUD) measures on their property and has been developed specifically for small residential and industrial developments. The STORM Calculator displays the amount of treatment that is required to meet best practice targets, using WSUD treatment measures. The tool is capable of calculating the performance of a range of commonly implemented treatment measures including, rainwater tanks, ponds, wetlands, rain gardens, infiltration systems, buffers and swales[1].

Results of the STORM assessment can be found in Appendix 2 of this SMP.

[1] The STORM tool provides only the most basic of options for a typical detached urban development. For more information visit http://library.melbournewater.com.au/content/wsud/using_STORM.pdf

2. Sustainability Initiatives

The following sections, as well as nominating the sustainability initiatives, also identify the party/parties responsible for implementation of the initiative, and the stage at which implementation will be demonstrated. 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

2.1 Indoor Environment Quality

The development will aim to create a healthy and comfortable indoor environment free from toxins and with ample supply of daylight and outside air.

Design Requirements	Responsibility & Implementation	Project Stage
Volatile Organic Compounds (VOCs)		
All paints, adhesives and sealants and flooring will not exceed limits outlined in Appendix 3. Alternatively, products with no VOCs will be selected. Paints such as eColour (or similar) will be considered for use within the development.	Architect / Builder	Construction Documentation
Formaldehyde Minimisation		
All engineered wood products will have 'low' formaldehyde emissions, certified as E0 or better. Emissions limits are listed in Appendix 3. Alternatively, products with no formaldehyde will be specified. Products such as Ecological Panel – 100% post-consumer recycled wood (or similar) will be considered for use within the development.	Architect / Builder	Construction Documentation
Daylight Access – Windows		
All bedrooms and living areas will be provided with external facing window or sliding door, with no saddle bag rooms or habitable rooms with borrowed light. This helps to achieve the daylight objectives set out by Clause 58-07 Standard D26 of the Glen Eira Planning Scheme. Additionally, all retail spaces will be provided with external facing window(s) with high quality views.	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Daylight Access – Room Depth		
All single aspect bedrooms are less than 5m deep and ceiling-height is at least 2.7m; therefore, all single aspect rooms do not exceed a room depth of 2.5 times the ceiling height. All open plan (combined kitchen, living and dining) spaces have more than one aspect to the space; therefore, are deemed to have adequate daylight. This helps to achieve the adequate daylight objectives set out by Clause 58-07 Standard D25 of the Glen Eira Planning Scheme.	Architect	Design Development
Daylight Improvement		
Daylight penetration through windows/openings will be enhanced with the use of light internal colours, allowing for better internal reflection of daylight.	Architect	Construction Documentation
Double Glazing		
All dwellings will be fitted with double glazed windows. The double glazing can bring multiple benefits to the dwellings such as a better acoustic insulation[2] and a better thermal performance.	Architect	Construction Documentation
Mechanical Ventilation		
All kitchens will have a separate dedicated exhaust fan (range hood) which will not be recycled to any enclosed space within the building; it will be ducted directly outside.	Mechanical Engineer	Design Development
Natural Ventilation		
All dwellings will have access to natural ventilation through the provision of operable windows. 60% of dwellings achieve effective cross-ventilation, exceeding the minimum objectives set by the Glen Eira Planning Scheme of 40%. The remaining dwellings are single-sided and are designed with significant openings to provide effective natural-ventilation. This helps to achieve the natural ventilation objectives set out by Clause 58-07 Standard D27 of the Glen Eira Planning Scheme.	Architect	Design Development

2.2 Energy Efficiency

The development will aim to minimise energy use through efficient hot water systems, heating and cooling systems, lighting, and a best practice building envelope.

Design Requirements	Responsibility & Implementation	Project Stage
Building Envelope (Residential)		
The development will achieve a minimum 6.0 Star average rating with no apartment dwelling achieving less than 5.0 Stars. Additionally, all sample dwellings demonstrate the ability achieve cooling loads <30MJ/m^2 which, for Climate Zone 21 Melbourne, complies with Clause 58.03 Standard D6 of the Glen Eira Planning Scheme. This will be achieved with the nomination of appropriate building fabric elements in accordance with those recommended within the preliminary sample energy report provided as Appendix 1.	Architect	Construction Documentation

[2] Acoustic properties of glazing to be confirmed by Acoustic Consultant.

Design Requirements	Responsibility & Implementation	Project Stage
Heating and Cooling Systems		
Heating and cooling in the dwellings and commercial/retail spaces will be provided via energy efficient air conditioning systems (within one star energy rating of the best available for residential; COP≥3.5 for commercial/retail).	Mechanical Engineer	Design Development
Hot Water Systems		
Hot water for the development will be provided by a central solar boosted gas hot water system. Hot water will be supplied via a ring main to all dwellings and commercial/retail premises. All pipework will be insulated to minimise distribution heat losses.	Service Consultant	Design Development
Indoor Lighting		
Lighting in the development will be LED lighting and be designed to achieve a 20% reduction from BCA maximum lighting power densities. This will involve limiting lighting levels to: • 4W/m^2 – apartments; • 7W/m^2 – office; • 16W/m^2 – retail; • 6W/m^2 – common corridors; • 5W/m^2 – carpark (excludes entry zone).	Electrical Engineer	Design Development
External Lighting		
External lighting will be LED and have controls (e.g. occupancy sensors and timers) to minimise consumption during off-peak times.	Electrical Engineer	Design Development
Energy Efficient Appliances		
Any appliances provided in the development as part of the base building works will be selected within one energy efficient star of best available.	Developer	Construction Documentation
Basement Ventilation		
Basement car park ventilation will be designed to best practice energy efficiency; carbon monoxide (CO) sensors will be installed throughout the basement car parking areas and connected to mechanical exhaust equipment to lower operational time while maintaining good air quality.	Mechanical Engineer	Construction Documentation
Energy Efficient Lift		
The lift specified for the development will be designed to be energy efficient. The following design aspects will be adhered to in the specification of the lift: • Suspension specifically designed to reduce friction; • Variable speed drive motors; • No machine room; • Gearless or planet drive gears to reduce drive losses; and • Measures to specifically reduce stand-by consumption such as: o Switching off control devices when the lift is not in motion; o Using more efficient power supply units (e.g. switched units, transformers); and o LED displays and lighting.	Mechanical Engineer	Construction Documentation

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 2016 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 louvres or dampers to exhaust fans.	Contractor	Design Development

2.3 Water Efficiency and Stormwater Management

The development will aim to use water efficiently through efficient fixtures and fittings, and on-site rainwater reuse which helps to reduce mains water demand as well as divert stormwater runoff from the local drainage system.

Design Requirements	Responsibility & Implementation	Project Stage
Water Fixtures and Fittings		
The development will include efficient fittings and fixtures to reduce the volume of mains water used in the townhouses. The following Water Efficiency Labelling Scheme (WELS) star ratings will be specified: • Toilets – 4 Star; • Taps (bathroom and kitchen) – 5 Star; and • Showerheads – 3 Star (≤7.5L/min).	Architect	Design Development
	Services consultant	Design Development
Rainwater Collection and Reuse (STORM Requirement)		
Runoff will be harvested from the roof and a portion of terrace areas on the third floor, filtered, and stored in rainwater tank(s) with an effective storage capacity of 15,000L. Collected water will be used for toilet flushing for retail/commercial spaces on the ground floor, along with first and second floors apartments. Connections to the equivalent demand of 660L/day (40 occupants) are required as a minimum. A filtration system will be required due to water collection from trafficable surface (terrace). Please refer to Appendix 2 for detailed STORM assessment result.	Civil / Hydraulic Engineer	Design Development
Stormwater Management (STORM Requirement)		
The development's rainwater tank(s) will reduce the volume of stormwater being discharged from the site, minimising the associated impacts on the receiving catchment by helping to reduce the volume of stormwater being discharged from the site. This helps to achieve the stormwater management objectives set out by Clause 58-03 Standard D13 of the Glen Eira Planning Scheme. Please refer to Appendix 2 for detailed STORM assessment result.	Civil / Hydraulic Engineer	Design Development
Water Efficient Landscaping		
Landscaping will be designed and constructed in accordance with water efficiency principles, including low water use plant selection and use of mulch. Water efficient irrigation systems will be used (e.g. drip irrigation with timers and rain sensors). Alternatively, landscaping will use drought tolerant plant species and no irrigation system will be provided.	Landscape Architect	Design Development/ Construction Documentation

2.4 Building Materials

The development will aim to minimise the environmental impacts of materials by reducing the use of virgin materials and promoting the use of materials with lower embodied energy and the responsible sourcing of products.

Design Requirements	Responsibility & Implementation	Project Stage
Insulation Recycled Content		
Any bulk insulation installed in the development will have a minimum 20% post-consumer recycled material content.	Architect	Construction Documentation
Non-Toxic Durable Materials		
Materials used in the dwellings will have longer warranties (≥7 years desired) where possible and will be non-toxic.	Architect / Builder	Construction Documentation
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 manufacturer/supplier that adheres to the Green Building Council of Australia's *Best Practice Guidelines for PVC in the Built Environment*.	Services Consultant	Construction Documentation
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.	Contractor/ Architect	Construction Documentation

2.5 Building Management, Construction and Waste Management

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

Design Requirements	Responsibility & Implementation	Project Stage
Metering and Monitoring		
Separate smart utility meters (water, gas and electricity) will be provided for apartment dwellings and commercial/retail premises. All common area services (e.g. common lighting and lifts) will be separately sub metered.	Services Consultant	Construction Documentation
Construction Waste Management		
A site-specific waste management plan will be prepared for the pre-construction, civil works and construction phases. This should include the following:	Builder	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
• 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. The waste management plan will include a requirement for not less than 80% of all demolition, civil works and built form construction waste to be recycled or re-used.		
Construction Environmental Management Plan		
A Construction Environmental Management Plan (CEMP) will be prepared and implemented for the development. This will identify all environmental risks and include relevant management strategies.	Builder	Construction Documentation
Operational Waste Storage		
Dedicated waste storage areas are provided for the development via two communal bin rooms located on the ground floor, one each for the residential and commercial/retail components of the development. A separate recycling and waste chutes are provided for all residential floors. Provisions will also be made for the inclusion of both waste and recycling receptacles within dwellings to help encourage residents to separate their waste at the point of disposal.	Architect/ Building Owner	Design Development/ Post Occupancy

2.6 Urban Ecology

The development will aim to promote initiatives which help to maintain and enhance liveability for people, flora and fauna.

Design Requirements	Responsibility & Implementation	Project Stage
Ecological Value		
The site is on land that has previously been developed; therefore the proposed development will maintain its current ecological value.	Architect	Design Development
Communal Spaces		
The development incorporates a resident's lounge and outdoor terrace located on the third floor. This will function as a communal meeting space for residents of the development, and will encourage and facilitate social interaction.	Architect	Design Development
Vegetation		
The development incorporates planters along the perimeter of third floor terraces as well as some planters on upper level balconies. Plantings are also included in the landscape design along street/laneway frontages. These landscaped areas will be designed to provide occupants with a pleasant environment surrounding the building, and will help to improve the green space of the proposed development.	Architect / Landscape Architect	Design Development

2.7 Transport

The development 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 provides a numerical score of between 1 and 100, with 1 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. Walk Scores of 90+ indicate that the building occupants can complete daily errands without a car.

The site at 7-15 Horne Street, Elsternwick, achieves a score of 97 out of 100, which is classified as "Walker's Paradise."

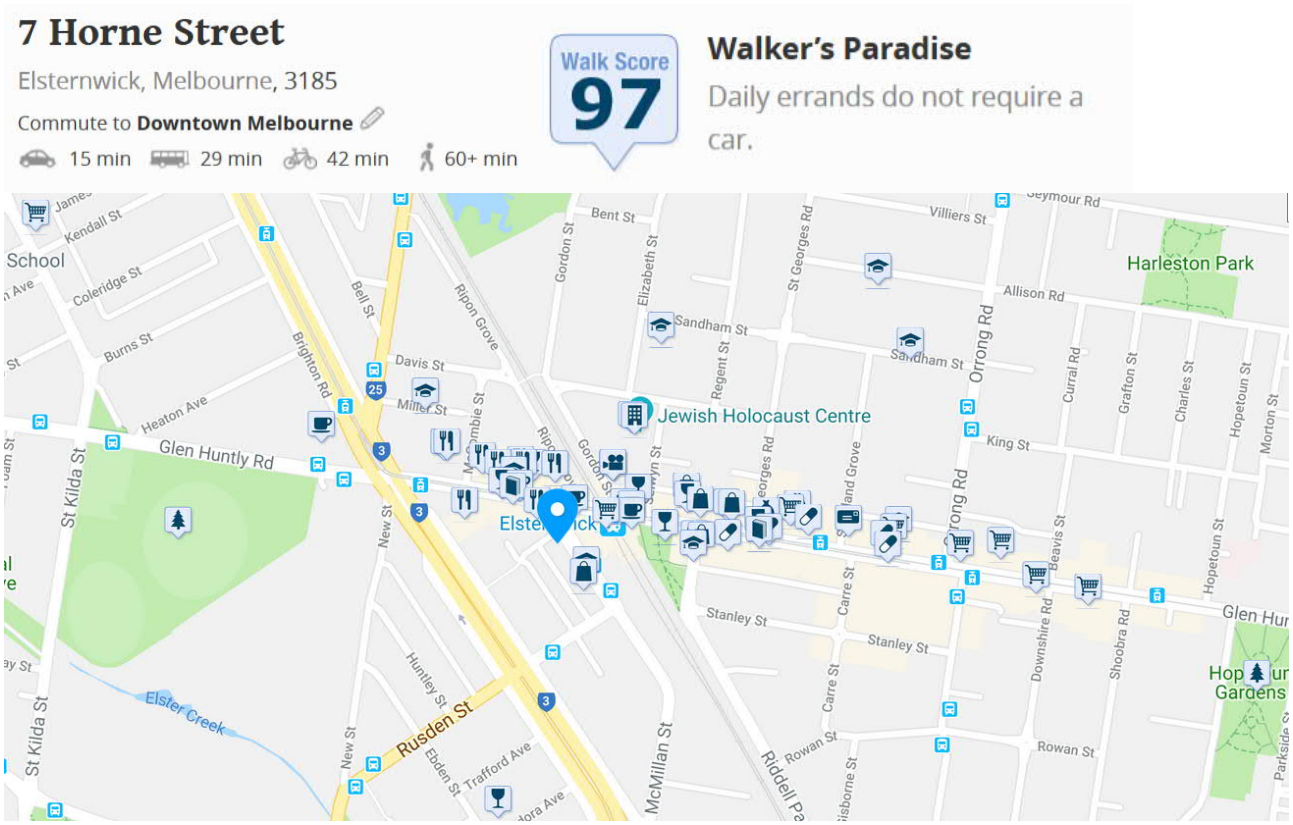

Figure 3: Walk Score results and map showing amenities surrounding the site (Source: walkscore.com)

Design Requirements	Responsibility & Implementation	Project Stage
Public Transport		
The proposed development has direct access within 1km walking distance to the following public transport options: Train: • Sandringham Line: via Elsternwick Railway Station Tram: • 67: Melbourne University – Carnegie Bus: • 216: Clifton Hill – Elsternwick • 246: Brighton Beach – Sunshine Station • 219: Gardenvale – Sunshine South • 220: Gardenvale – Sunshine • 625: Elsternwick – Chadstone • 978/979: Elsternwick Station – Dandenong	NA - Inherent in Location	

Design Requirements	Responsibility & Implementation	Project Stage
Cycling Facilities		
A total of 43 secure indoor bicycle parking spaces will be provided for residents at ground level. 4 bicycle parking spaces will be provided externally for staff of the retail facilities in the development. Additionally, a total of 6 bike spaces (3 hoops) will be provided for retail/residential visitors to the development, located along Horne Street. This exceeds the minimum requirement for bicycle facilities set out by Clause 52-34 of the Glen Eira Planning Scheme.	Architect	Design Development

3. Conclusion

As set out in this SMP, the proposed mixed-use development at 7-15 Horne Street, Elsternwick, will meet the City of Glen Eira's expectations, including Clause 58 *Apartments* of the Glen Eira Planning Scheme by including:

- Overall development weighted average energy rating of 6.0 Stars minimum and no apartment with cooling load over 30MJ/m^2;
- Energy efficient HVAC within one star of best available or COP≥3.5;
- A central solar pre-heated gas hot water system;
- Water efficient fixtures, fitting, and appliances within one star of best available;
- 15,000L rainwater tank connected to all toilets in ground to level 2 dwellings and commercial spaces;
- Dwellings designed to provide both effective cross-ventilation and adequate daylight;
- A communal residence lounge and outdoor terrace to help create resident amenity;
- Use of materials that are responsibly sourced, durable, non-toxic and have low or no VOC / formaldehyde content; and
- Bicycle parking spaces exceeding the minimum planning requirements.

The initiatives that have been included within this SMP all have a proven track record of serving their individual purpose and can be easily maintained with any failures obvious to the occupants of the development. This helps to ensure the ongoing sustainability of the development as the systems installed in the beginning are maintained for purpose throughout the life of the building.

The implementation of this SMP requires a clear process that will include:

- Full integration with architectural and building services plans and specifications;
- Endorsement of the SMP Report with town planning drawings; and
- SMP Report initiatives to be included in plans and specifications for building approval.

Appendix 1 – FirstRate 5 Sample Energy Rating Results

The FirstRate energy rating program is the primary modelling method used in Victoria to indicate the required energy for heating and cooling based on the building's thermal envelope. It does not take into account any heating or cooling systems installed; it only assesses walls, roof and floor materials; levels of insulation, building orientation, glazing and the area layout.

The development is located in Climate Zone 21 (Melbourne) and is required by the Building Code of Australia (BCA) to achieve an average energy rating of 6.0 stars (114MJ/m2) across the development, with no apartment rating less than 5 Stars. Additionally, apartments must not exceed a cooling load of 30MJ/m^2 for Climate Zone 21 as set out by Clause 58.07-1 Standard D6 of the Glen Eira Planning Scheme.

Table 1: Sample apartment scores

Sample	Star Rating	Energy Use (MJ/m^2)	Heating Energy (MJ/m^2)	Cooling Energy (MJ/m^2)	Net Conditioned Floor Area (m^2)
1.01	5.5	130.9	122.1	8.8	94.6
1.04	6.4	99.3	84.4	14.9	60.6
1.06	6.4	99.3	85.6	13.7	86.4
1.07	5.4	134.7	124.7	10.0	84.3
2.02	6.4	98.1	70.6	27.5	86.9
2.03	6.7	91.4	63.2	28.2	92.5
2.05	7.9	57.8	46.1	11.7	74.8
2.06	7.1	78.6	62.7	15.9	106.6
2.08	6.9	83.9	70.5	13.4	91.5
3.01	5.9	116.1	88.1	28.0	89.1
3.02	8.2	48.9	24.4	24.5	81.0
3.03	5.1	146.2	117.0	29.2	97.9
3.04	6.9	83.3	60.0	23.3	72.9
4.01	6.9	83.5	55.3	28.2	80.3
5.05	5.9	117.1	89.1	28.0	50.4
6.03	7.9	55.0	31.5	23.5	80.5
6.04	5.7	125.4	104.2	21.2	82.1
8.01	6.2	106.0	77.2	28.8	106.7
8.02	6.7	92.7	64.2	28.5	87.3
8.03	6.8	90.0	68.1	21.9	91.7
8.04	5.7	125.7	101.0	24.7	108.5
Average	**6.5**	**98.3**	**76.7**	**21.6**	**86**

Thermal groups are shown in table 2 below:

Table 2: Thermal groupings and justification

Sample	Thermally Similar Apartments	Justification	Star Rating
1.01	2.01	Type 2D	5.5
1.04	2.04	Type 1A	6.4
1.06		Type 2F	6.4
1.07	2.07	Type 2C	5.4
2.02	1.02	Type 2P	6.4
2.03	1.03	Type 2B	6.7
2.05	1.05	Type 2A	7.9
2.06		Type 3C	7.1
2.08	1.08	Type 2E	6.9
3.01		Type 2L	5.9
3.02		Type 2G	8.2
3.03		Type 2H	5.1
3.04		Type 2I	6.9
4.01	5.01 & 6.01	Type 2M	6.9
5.05	4.05 & 6.05	Type 1B	5.9
6.03	4.03 & 5.03	Type 2N	7.9
6.04	4.04 & 5.04	Type 2K	5.7
8.01	7.01	Type 3B	6.2
8.02	4.02, 5.02, 6.02 & 7.02	Type 2J	6.7
8.03	7.03	Type 2O	6.8
8.04	7.04	Type 3A	5.7
Weighted Average			**6.5**

The above has been achieved with the building elements as per the specifications outlined below.

Building Fabric Element	Description
External Walls	External walls modelled as 150mm concrete panel with R2.5 insulation added. All spandrel areas modelled as lightweight construction with R2.5 insulation added.
Party Walls	Party walls separating dwellings from common corridor areas modelled as stud with R2.0 insulation added. Party walls separating residences from the stairwell /lift cores and

Building Fabric Element	Description
	services (including bins) are modelled as concrete with R2.0 insulation added. Party walls separating respective dwellings (and separating dwellings and residence lounge) modelled as double stud with R2.0 insulation added to each side (R4.0 total).
Internal Walls	Internal walls with no added insulation.
Floors	Floors between levels are modelled as 200mm suspended concrete slab. Where floors of apartments are elevated above car parking and services areas on ground floor (this includes all areas except Retail and Lobby spaces) R1.1 insulation is required to be added.
Floor Coverings	Carpet to bedrooms, tiles to all wet areas and floating timber to kitchen/living room and all other spaces.
Roof / Ceiling	Ceiling modelled as 200mm suspended slab between levels. Ceiling exposed to the outside, including below balcony, modelled with R2.5 insulation added. Roof slab (Level 8) modelled as 200mm suspended slab with R4.0 insulation added.
Ceiling Height	Floor-to-ceiling height modelled as 2700mm.
Windows and Glazing	**Level 1 to Level 7** **Façade Awning** are required to have window system thermal performance values of: Glazing Properties - U value = 4.91, SHGC =0.34 **Façade Fixed** are required to have window system thermal performance values of: Glazing Properties - U value = 3.59, SHGC =0.49 **Façade Sliding Doors (Level 3 only)** are required to have window system thermal performance values of: Glazing Properties - U value = 3.81, SHGC =0.42 These above façade values are based on Viridian V-float Bronze double glazed Argon-filled glazing with aluminium frames. **Balcony Sliding doors** are required to have window system thermal performance values of: Glazing Properties - U value = 4.1, SHGC =0.52 **Balcony Awning windows** are required to have window system thermal performance values of: Glazing Properties - U value = 4.1, SHGC =0.47 These above balcony values are commonly found in double glazed Argon-filled Low E windows with aluminium frames. **Level 8 only** **Façade Awning** are required to have window system thermal performance values of:

Building Fabric Element	Description
	Glazing Properties - U value = 3.0, SHGC =0.27 **Façade Fixed** are required to have window system thermal performance values of: Glazing Properties - U value = 3.0, SHGC =0.26 These values are commonly found in double glazed Argon-filled low solar gain low-e (tint) windows with thermally broken aluminium frames. **Balcony Sliding doors** are required to have window system thermal performance values of: Glazing Properties - U value = 2.9, SHGC =0.51 These values are commonly found in double glazed Argon-filled Low E windows with thermally broken aluminium frames. **Notes** • The window systems to be installed are required to have a U-Value equal to or less than U values stated above and the window systems SHGC values must be within ±5% of values stated above. • All balcony windows/sliding doors modelled as 2700mm height. • All façade glazing modelled as 2700mm height.
External Blinds	Apt 3.01 (Type 2L) requires external blinds to all windows
Building Sealing	All doors, windows, exhaust fans and openings will be sealed so as to not allow for air infiltration in the apartments. Exhaust fans are modelled in all kitchens, bathrooms, and ensuites.
Downlights	All recessed down light fittings that have openings allowing air to pass through to a ceiling cavity (e.g. Adjustable down lights) shall be fitted with a cover that allows for ceiling insulation to closely enclose the sides and top of the down light.

Note that while the building elements above may vary as the plans are refined for building approval, the overall building energy rating performance will not be less than 6.0 Stars (average) for the development.

Appendix 2 - STORM Assessment & 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.

Glen Eira City Council has recognized the importance on stormwater management in Clause 53.18 '*Stormwater Management in Urban Development'* of the Glen Eira Planning Scheme. The main objectives for WSUD policy are:

- To achieve the best practice water quality performance objectives set out in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999 (or 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 re-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 development.
- 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 well-being.

New developments must also incorporate treatment measures that improve the quality of water and reduce flow of water discharged into waterways (such as collection and reuse of rainwater/stormwater on site), and 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 STORM tool – which is an industry accepted tool – was used to determine the treatment effectiveness of these initiatives.

Site Characteristics

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

- Site area of 1,239m^2.
- Roof catchment area of 613m^2 (blue);
- Outdoor terrace areas (Apartments 3.01, 3.03 & 3.04) of 282m^2 (orange);
- Remaining site of 344m^2, assumed impervious (unshaded).

Figure 4: Site delineation

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. The initiatives to manage stormwater flows for the building area will underpin the overall performance of the building and its ability to meet stormwater management objectives.

Table 3: List of areas and their stormwater treatment measures

Surfaces	Area (m^2)	Required Treatment
Roof catchment plus terrace catchment	895m^2	Runoff from all roof and outdoor terraces (including planters) of Apartments 3.01, 3.03 and 3.04 will be diverted to rainwater tank(s) with an effective storage capacity of 15,000L. The stored water will be used for toilet flushing on the ground to second floor (inclusive). Connections to the equivalent demand of 660L/day (40 occupants) are required as a minimum. A filtration system will be required due to water collection from trafficable terrace surfaces and runoff from planters with a Pure Rain or similar filtration device. This is to be specified by the

Surfaces	Area (m^2)	Required Treatment
		hydraulic engineer at detailed design. Overflow from the tank(s) will be diverted to the Legal Point of Discharge (LPD).
Remaining site	344m^2	All remaining impervious areas runoff will be diverted directly to the LPD onsite.

Daily Demand:

The minimum occupancy required to achieve sufficient treatment (the equivalent of 40 occupants, or 660L per day) was used as input for the STORM tool, as this demonstrates the sufficiency of the proposed stormwater reuse system to utilise stormwater entering the site and prevent it from polluting downstream receptors. This occupancy has been estimated based off the number of bedrooms on floors one and two, along with the predicted occupancy of the retail/commercial tenancies on the ground floor. Any additional water demand for toilet flushing above this will serve to provide more effective treatment.

Results:

The impervious surfaces and recommended treatments have been applied to the STORM tool and as a result, the proposed development has achieved a score of 101%.

Melbourne Water **STORM Rating Report**

TransactionID:	1081980	
Municipality:	GLEN EIRA	
Rainfall Station:	GLEN EIRA	
Address:	7-15 Horne Street	
	Elsternwick	
	VIC	3185
Assessor:	SDC	
Development Type:	Residential - Mixed Use	
Allotment Site (m2):	1,239.00	
STORM Rating %:	101	

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof and terrace area for RWT collection	895.00	Rainwater Tank	15,000.00	40	140.40	74.00
Remaining impervious area	344.00	None	0.00	0	0.00	0.00

Figure 5: Results of STORM assessment

Stormwater Filtration System

Rainwater Filter[3] (e.g. Pure-Rain or similar)

The Pure-Rain E-series features four stages of sterilisation and cleaning treatment. This includes removal of large particles, activated carbon filter to remove colour, taste and odour.

As a minimum, two inspections should be scheduled every year. The first scheduled maintenance event each year should involve general routine maintenance (including but not limited to the items outlined in the table below) in addition to an assessment of the products condition. This information will then inform the extent and urgency of the second scheduled maintenance for the year (i.e. whether the filter components are expected to need replacing). In addition to the two scheduled maintenance events, inspection of the equipment should occur following major storm events. Please refer to the manufacturer's maintenance manual for detailed and specific instructions.

Figure 6: Example of rainwater reuse filtration package for toilet flushing with additional removal of colour and odour (source: AKS Industries)

Stormwater System Maintenance

Filtration System

Task	When?	Requirement
Inspection/Minor Maintenance	Every 6 months; and after major storm events	-Assess filter externally for observable defects/problems -Check filter is functioning correctly -Clear filter of debris and provide detail clean when required -Take notes and document external and internal filter conditions -Make arrangements for filter replacement at next scheduled maintenance event if required
Major Maintenance	Yearly or When necessary	Examples of major maintenance could include: -Replacement of filter due to end-of-life or unexpected damage -Removal of sediment build-up

[3] http://www.aksindustries.com.au/product/purerain-rainwater-reuse/

Rainwater Tank Maintenance

Inspections of roof areas and gutters leading to the tank(s) should take place every 3-6 months. The following key items for inspection have been sourced from City of Port Phillip's "Maintenance Manual - Rainwater Tanks".[4]

7.1.1 LEAF LITTER/DEBRIS IN GUTTERS

Inspect the gutters for presence of litter/debris.

7.1.2 BLOCKED DOWNPIPE

Check if water is spilling from the edge of the gutters and ensure that the downpipes are not blocked.

7.1.3 FIRST FLUSH DIVERTER CLOGGING

To ensure the diverters function properly, clean out by unscrewing the cap at the base of the diverters and remove the filter. Wash the filter with clean water as well as the flow restrictor inside the cap.

7.1.4 DEBRIS ON THE MESH COVER OVER INLETS/OUTLETS

Ensure that the mesh cover over inlets and outlets are clean of leaves and debris.

7.1.5 DIRT AND DEBRIS AROUND THE TANK BASE OR SIDE

Keep leaf build-up, sticks, and other items off the lid of the rainwater tanks and ensure there is no debris on the base, bottom lip and walls of the tanks.

7.1.7 PUMP

Ensure the pumps are operating regularly by monitoring the sound. Check that pumps are kept clear of surface water (flooding), vegetation, and have adequate ventilation.

7.1.8 MAINS BACKUP OR PUMP OPERATION

If the mains backup switching device fails, it may not be noticed for a long time. Consider a manual operating system to ensure continuous operation.

7.1.9 OVERFLOW

Check that the overflow is not blocked and that there is a clear path for water to safely spill from the tank through the overflow pipe when full. Check that a clean mesh screen is safely in place to prevent mosquitoes entering the tank.

7.1.10 SEDIMENT/DEBRIS BUILD-UP IN TANK

Inspect the sludge build-up in the bottom of the tank, and ensure that it is no more than 20mm thick. When the sludge builds up to be more than 20mm, the rainwater tank can be emptied and washed with a high-pressure washer or hose.

7.1.11BASE AREA

Tanks must be fully supported by a flat and level base. Check for any movement, cracks or damage to the slab or pavers. If damage is observed, empty the tank and have the fault corrected to prevent further damage.

7.1.12 MONITORING THE WATER LEVEL

Ensure the monitoring system (be it digital or a simple float system) is functioning properly by checking the water level in the rainwater tanks.

The rainwater will flow through the proposed filtration system before entering the rainwater tank(s). With the leaf blocking system installed, the roof and gutters onsite should be checked, maintained and cleaned annually to avoid blockages from occurring.

[4] From the City of Port Phillip website: www.portphillip.vic.gov.au/Maintenance_Manual_Rainwater_Tank.pdf

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. 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, appropriate construction stormwater management measures will be considered and implemented by the project, including methods such as:

- Gravel Sausage Filters: These may be placed at the entrance of pits/side stormwater inlets. These permeable sacks 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.
- 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 help to heavily minimise the amount of soil/dirt deposited on local roads where it can be washed (by rainfall or other means) into the stormwater drains.

More information is available from EPA Victoria[5] which provides resources for best-practice guidelines, including "*Keeping Our Stormwater Clean – A Builder's Guide*" by Melbourne Water and *"Construction Techniques for Sediment Control"* by EPA Victoria.

[5] Website available at https://www.epa.vic.gov.au/business-and-industry/guidelines/water-guidance/building-sites-and-stormwater.

Appendix 3 - Green Star VOC and Formaldehyde Limits

The following tables are sourced from the Green Building Council Australia – Green Star Design & As-Built v1.2 Manual.

Table 4: Maximum Volatile Organic Compound Levels for construction materials

Product Type/Sub Category	Max TVOC Content (g/L of ready-to-use-product)
Paints, Varnishes and Protective Coatings	
Walls and ceilings – interior semi-gloss	16
Walls and ceilings – interior low sheen	16
Walls and ceilings – interior flat washable	16
Ceilings – interior flat	14
Trim – gloss, semi-gloss, satin, varnishes, and wood stains	75
Timber and binding parameters	30
Latex primer for galvanised iron and zincalume	60
Interior latex undercoat	65
Interior sealer	65
One and Two pack performance coatings for floors	140
Any solvent-based coatings whose purpose is not covered in table	200
Adhesives and Sealants	
Indoor carpet adhesive	50
Carpet pad adhesive	50
Wood flooring and laminate adhesive	100
Rubber flooring adhesive	60
Sub-floor adhesive	50
Ceramic tile adhesive	65
Cove base adhesive	50
Dry wall and panel adhesive	50
Multipurpose construction adhesive (includes fire/waterproofing sealants)	70
Structural glazing adhesive	100
Architectural sealants	250
Carpets	
Total VOC limit	0.5mg/m² per hour
4-PC (4-Phenylcyclohexene)	0.05mg/m² per hour

Table 5: Maximum Formaldehyde levels for processed wood products

Formaldehyde emission limit values for different testing methods			
Test Method	**E1**	**E0**	Super E0
AS 2098.11 for plywood	<1.0mg/L	<0.5mg/L	<0.3mg/L
AS 4266.16 for particle board For MDF	<1.0mg/L <1.5mg/L	<0.5mg/L	<0.3mg/L
JIS A1460 not applicable to plywood	<1.0mg/L	<0.5mg/L	<0.3mg/L
JAS 233 for plywood	<1.0mg/L	<0.5mg/L	<1.0mg/L
EN 120 for particle board and MDF For plywood	<9.0mg/(100g) <6.0mg/(100g)	<6.0mg/(100g) <9.0mg/L	
DIN EN 717 1	<0.12mg/m³h	<0.08mg/m³h	<0.04mg/m³h
DIN EN 717 2 not applicable to MDF	<0.12mg/m³h	<0.08mg/m³h	<0.12mg/m³h