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Stormwater Management Report

244 MT MORTON RD, BELGRAVE



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Belgrave Heights Senior Learning Centre

ref: 20799

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PREPARED BY MILLAR MERRIGAN ON BEHALF OF:

Belgrave Heights Christian School

FORMAL LAND DESCRIPTION:

Lot 244 on PC374040N

PROPOSAL:

Belgrave Heights Senior Learning Centre

RESPONSIBLE AUTHORITY:

Yarra Ranges Council

DOCUMENT STATUS:

Version: Date	Description	Prepared by	Checked by
No 1: September 2022	Stormwater Management Report	[REDACTED]	
No 2: May 2024	Updated Layout and Stormwater Management Report		

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1 BACKGROUND & CONTEXT

Millar Merrigan has been engaged by Belgrave Heights Christian School to prepare a Stormwater Management Report for 244 Mt Morton Rd, Belgrave. The purpose of this report is to address the Belgrave Heights Christian School's application to manage stormwater runoff generated by the this developed area of the site.

The intent of this report is to demonstrate correlation with Environmentally Sustainable Design (ESD) and Water Sensitive Urban Design (WSUD) principles and guidelines, as adopted by the drainage authority and Council. The constraints of the specific site have been evaluated in determining practical outcomes.

This report assesses the following.

- How major and minor stormwater events are managed.
- How Best Practice Environmental Management Guidelines (BPEMG) for water quality are to be addressed.
- Stormwater re-use potential.

Accompanying this report is hydrological and hydraulic modelling outputs as follows:

- OSD4W for calculating detention volume(s)
- Melbourne Water STORM Rating Report for calculating WSUD results.

We note that Council requests minimum WSUD treatment on development sites and allows offset contributions payable to Melbourne Water in lieu of treatment to supplement any shortfall. In this case WSUD will be carried on site for proposed impervious areas related to proposed building and pavement works.

Detailed analysis has been undertaken for this site to evaluate the best alternatives and combination of measure for this specific site.

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2 PROPOSED STRATEGY

2.1 MAJOR AND MINOR STORMWATER NETWORK

The subject site is located within local catchment jurisdiction of Yarra Ranges Council, an extract of the Legal Point of Discharge is shown below in figure 1.

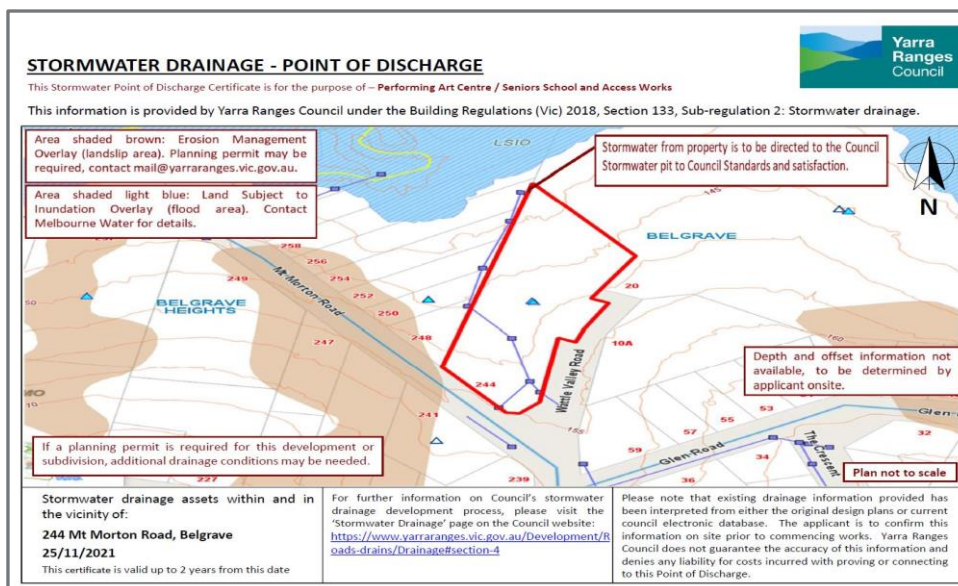


Figure 1 Legal Point of Discharge (Extract)

The Legal Point of Discharge (LPOD) is indicated to direct drainage to the existing swale situated within the easement in the north-west of 244 Mt Morton Rd, Belgrave. As there is an existing council drain through this section of the site to the west and north of the proposed building, consideration of any surcharge from this piped drain has been considered. This could be along the proposed driveway or within the vicinity of the driveway area.

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2.2 STORMWATER TREATMENT (QUALITY)

The aim of stormwater treatment is to protect surrounding waterways by meeting Best Practice Environmental Management Guideline (BPEMG) objectives on site where practicable.

The ideal theoretical outcome of treatments is to achieve 100% BPEMG, which targets the removal of 80% total suspended solids, 45% total phosphorus, 45% total nitrogen and 70% gross pollutants.

While achieving 100% water treatment with the proposed design, for practical applications the methods may be varied, due to constructability or unforeseen circumstances. However the developed site will result in 100% water treatment.

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TREATMENT PROPOSAL

For this site, it is proposed to implement the following combination of treatment solutions.

Rainwater Tanks

The purpose of the rainwater tank is to capture and use rainwater that falls on the roof and potentially direct it to internal uses that could be toilet, laundry, or irrigation. This reduces stormwater runoff volumes and pollutants reaching downstream waterways. All developments can utilise rainwater tanks but developments with large roof areas see the greatest benefits.

Rainwater Gardens

Rainwater gardens will be built throughout the development to treat 100% of the rainwater that runs off the surface, protecting the quality of water that is outlet into the downstream creek.

TREATMENT OUTCOMES

Based on the above treatments used on the site we have calculated a score of 100% using the STORM rating report. We believe that what we have proposed will be sufficient to satisfy council.

2.3 STORMWATER DETENTION

We note that the site is low in the catchment and would not usually require stormwater detention. In this instance we have suggested that detention be included so as not to increase flows into the creek from this area of development on the site. The aim of stormwater detention is to temporarily capture rainwater and slowly release/direct the water towards the legal point of discharge, thereby avoiding overloading the downstream external drainage pipes. There are two types of detention systems that can be used on this site: above ground detention using tanks, and underground detention using tanks, pits and/or pipes. We will be using underground tanks to ensure that both flows from surface ground water and the roof catchment areas are being detained efficiently.

Based on the Yarra Ranges Council Engineering Guidelines, by using the Rational Method and OSD4W this site will need to detain approximately 71.77m³ to treat a 1% storm event, this will prevent any additional water flow running off into the downstream creek and neighbours. The following is how we propose the flow should be detained.

- 79.18 m³ detention in underground tank.
 - Additional detention included for uncontrolled flow.

This is not necessarily what will be denoted on the final detailed drainage design but gives a good guide to what could be expected, as detention is being included.

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3 OBJECTORS RESPONSE

We have included a clause in this instance to give neighbours and objectors a design overview that covers items raise in objections.

The engineering design will include elements to capture and treat storm water. The resultant design will not increase stormwater flows into creek from area to be developed on the site. An underground stormwater detention tank is proposed. Other elements will treat the water quality of water from all paved and roof areas of the area to be developed on the site. This includes re-use tanks connected to tanks and other fixtures and raingardens collecting water from paved areas. Provided will be various raingardens throughout and along the proposed driveway, allowing the site to achieve 100% WSUD treatment, ensuring that the water that is outlet into the creek isn't at a reduced quality.

There will be a 79,000-litre underground detention tank installed to detain any additional flows from the proposed driveway and building roof area, so as not to increase flows to the existing creek.

Additionally, we have pits and trench grates spread across the site to capture overland flow, leading it to the below ground detention system. These elements in addition to a bund (earth mound) that will be built up along the west side of the proposed driveway/carparking, will direct overland flow to the existing channel where the existing council drainage outlets at the rear of 256 Mt Morton road.

A Construction Management Plan must be implemented during construction of the works to prevent stormwater overland flows from work areas, impacting surrounding neighbouring properties and the existing creek.

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4 CONCLUSION

The following considerations and measures are recommended to be adopted for the basis of the detailed engineering design for submission to and approval by Council.

- The site lies within local jurisdiction of Yarra Ranges Council and the major drainage authority is Melbourne Water which provides water quality offset levies.
- Internal drainage will be via traditional below ground pipes discharging to a swale situated in the north-west corner and rear of the site.
- Overland flow paths for the development will be directed to lot 244's north corner
- A bund (earth mound or the like) would be proposed to the west of the proposed driveway and parking. It may be that the best location for the proposed bund is to the west of the existing large piped underground drain, so surcharge from the existing pits is contained on the surface to the east of existing large pipe. This would direct surface flows away from the neighbouring properties west of the site.
- To be included in the drainage design is rainwater tank/s for re-use:
 - Total site volume of 27000 litres.
 - A minimum roof area of 862 m² to be connected to the reuse tank/s.
 - The above ground tank/s overflows could be dropped down to a pit connecting to the underground detention system if additional detention is needed in these tanks.
 - Reuse above ground tank must be connected to the toilets.

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- Raingardens have been proposed to treat 100% of the water that runs off the development, so as not to impact the water quality of the current water out letting into the creek from the site.
- Product WSUD treatment systems may be installed in lieu of raingardens
- Total site volume of 71.77m³ of detention storage could be included in the drainage design.
- All private drainage systems and rainwater gardens to be maintained with a three-monthly maintenance schedule, along with additional maintenance schedule post any major storm event.
- This drainage design is indicative and may vary depending on various aspects including but not limited to, variations to the layout.

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