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CIVIL

264-268 Pennant Hills Road, Carlingford – Stormwater Management Principles

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1. INTRODUCTION

It is proposed to redevelop the BaptistCare retirement village at 264-268 Pennant Hills Road, Carlingford, NSW. The village currently serves as a self-contained community housing and aged care facility providing a range of services and amenities. The site is being redeveloped into high quality residential flat building and multi-dwelling housing development.

AJ+C Architects and Scape Design Landscape Architects have prepared a feasibility study for the site, showing the concept site layout including structures, open spaces, access roads and path ways.

Calibre Consulting has been commissioned to participate in creating an integrated and effective stormwater management concept for the site to complement the overall objectives of the development. The following report outlines the principles to be applied to the proposed development in relation to stormwater management, including rainwater harvesting and reuse, detention, treatment drainage.

2. SITE STORMWATER MANAGEMENT

Stormwater management measures for the site shall be designed in accordance with Parramatta City Council and Australian Rainfall and Runoff guidelines with particular considerations to incorporate Water Sensitive Urban Design (WSUD) principles.

The site is part of the Vineyard Creek catchment, at the top end of the catchment. It has not been identified as being affected by flooding or major overland flows. The existing 375mm diameter drainage line in Martins Lane is considered to be the site's legal point of discharge based on preliminary inquiries with Council's engineers.

a. Rainfall Return Periods

Building and sub-surface drainage systems shall be designed for the peak flow from a 1:20-year Average Recurrence Interval (Q20) storm event. Where trapped areas are unavoidable, the piped drainage system shall be designed with enough capacity for the 1:100yr ARI storm event.

Where building drainage is designed to a higher ARI standard than road drainage, the excess flow will be designed to flow down roadways without entering buildings.

Overland flow paths shall be provided throughout the development and directed along the access roads. These shall be designed to accommodate the difference between the capacity of the underground piped system and the peak flow from a 100-year Average Recurrence Interval (Q100) storm event.

b. Onsite Stormwater Detention

Onsite Stormwater Detention (OSD) shall be provided in accordance with Council standards to ensure that post-development peak flows from the development do not exceed pre-development peak flows. This will ensure that there is no increase in stormwater discharge from the site affecting downstream flooding levels.

c. Freeboard

The design freeboard above peak flood and overland flow water levels shall be as follows:

- Minimum 300mm for basement ramps and thresholds
- Minimum 500mm for habitable floors and storage rooms.

d. Roadway Trafficability

Gully pits shall be located along access roads at intervals which will ensure that all roads are trafficable during the Q100 storm event. The width of overland flows down roadways during that storm event will be limited to 2.5 metres along the low side of each road carriageway. Access roads and drainage shall be designed to ensure that the depth of ponding during the Q100 storm event will not exceed the top of kerb level.

3. WATER SENSITIVE URBAN DESIGN

Water Sensitive Urban Design is a land planning and engineering design approach which integrates the urban water cycle, including potable water, stormwater, groundwater and wastewater management, into urban design to minimise environmental degradation without sacrificing aesthetic and recreational appeal.

Close collaboration between the various design and engineering disciplines will be required across the entire development to maximise the benefits of WSUD. WSUD principles shall be incorporated within the building design as well as in the design of the external landscape and civil infrastructure in order to reduce peak stormwater discharge and runoff volume, improve stormwater runoff quality and reduce demands on potable water. These measures provide benefits not only to the proposed development, but also the surrounding areas and downstream natural watercourses.

a. Rainwater Harvesting

It is encouraged to harvest and re-use rainwater from the residential building roofs for landscape irrigation, toilet flushing and clothes washing to reduce demands on potable water. Rainwater tanks shall be provided in accordance with BASIX and Council requirements.

b. Surface Permeability

Deep soil zones, soft landscaping and other permeable surfaces shall be provided where practicable to maximise rainfall infiltration and groundwater recharge opportunities.

Surface permeability may be increased through the use of permeable pavements, gravel/pebble surfacing and soft landscaping over deep soil zones. Some stormwater treatment measures such as bio-retention swales and basins, rain gardens and filter trenches also increase surface permeability.

c. Onsite Stormwater Detention

Further to Section 2.b, OSD is to be provided to reduce peak stormwater discharge and runoff volume. This is to ensure that the proposed development does not adversely affect the performance of downstream stormwater drainage systems and does not increase flooding downstream

d. Stormwater Quality Improvement Devices and Treatment Measures

A combination of Stormwater Quality Improvement Devices (SQID) and treatment measures such as bio-retention swales and basins, rain gardens, litter baskets, Gross Pollutant Traps (GPT), and fine particle (tertiary) filter systems shall be incorporated throughout the drainage system to treat stormwater at various points along the system and improve stormwater quality as it leaves the site. These shall be appropriately sized and located to achieve Council's treatment rates and water quality targets prior to discharging into Council's stormwater drainage system in Martins Lane.

e. Soil and Water Management During Construction

Stormwater runoff treatment, soil erosion, sedimentation and dust controls and shall be implemented during construction in accordance with Council's guidelines and Landcom's "Managing Urban Stormwater - Soils and Construction"

4. Discussion

This report outlines the stormwater management principles intended to be applied for the proposed development. The feasibility study and concept plans prepared by the architect and landscape architect have been reviewed and, with the incorporation of the principles and measures set out above, is considered to have the appropriate provisions to ensure that the development will be able to prevent adverse effects to the downstream stormwater drainage system and flood behaviour.

Any redevelopment of the site will require stormwater drainage and treatment measures to be designed to incorporate WSUD principles in order to reduce peak stormwater discharge and runoff volume, improve stormwater runoff quality and reduce demands on potable water. Measures to achieve these aims could include overland flow paths and in-ground drainage systems, Onsite Stormwater Detention (OSD), rainwater harvesting and re-use, gross pollutant traps and bio-retention systems.