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Dear Philip

**461-495 VICTORIA ROAD, GLADESVILLE
PROPOSED WATER MANAGEMENT FOR THE SITE**

This report has been prepared to support the Planning Proposal for 461-495 Victoria Road, Gladesville by providing information on the proposed water management for the site.

Site Description

The site is located at 461-495 Victoria Road, Gladesville (also known as 22-24 College Street, Gladesville) and is bounded by Victoria Road to the south, College Street to the north and Frank Street to the west (refer Figure 1).

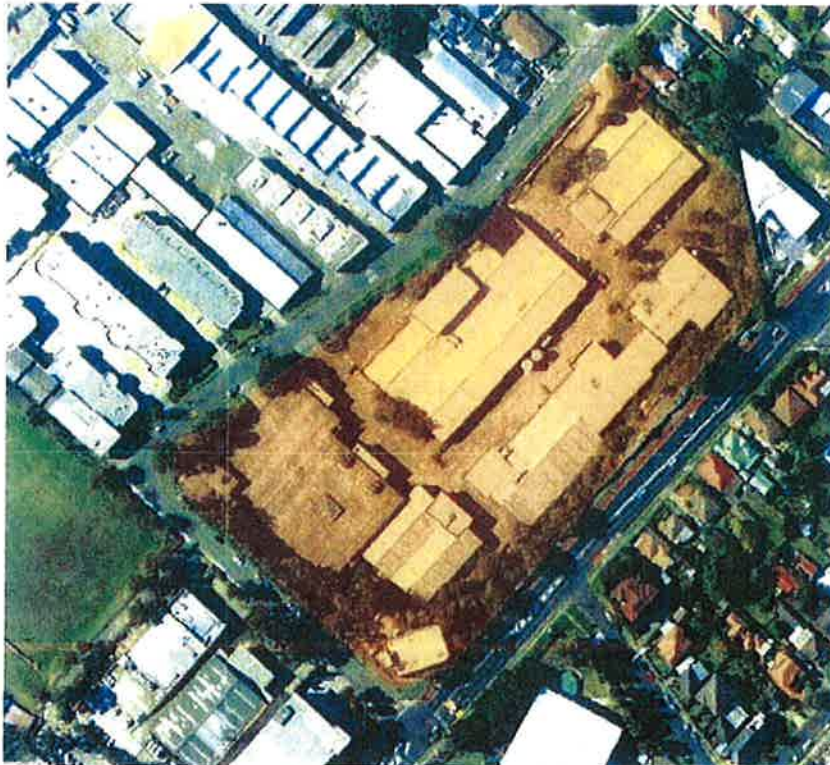


Figure 1 – Aerial View of Site

The site is currently fully developed with several large warehouse structures across the site and associated roads and car parking areas. There is also a multi-storey commercial building on the corner of Victoria Road and Frank Street.

There is limited vegetation on the site mostly in the form of small landscape and garden areas.

The entire site is significantly lower than the surrounding roads. The site is up to 14m lower than Victoria Road and Frank Street and up to 10m lower than College Street.

Existing Stormwater Drainage and Flooding

As mentioned in the site description, the entire site is significantly lower than the surrounding roads.

Currently the site drains via a low level (deep) stormwater drain which runs from the northern part of the site, across College Street and then through the private property (via an easement) to the north to Buffalo Road (refer Figure 2).

Given that the site is lower than all surrounding roads, there is no overland flow path available from this site in its current configuration. This creates the following risks for the site in its current configuration:

1. If the stormwater drain is blocked or damaged downstream of the development site, there is potential for stormwater to backup in the system and surcharge from low level pits upstream of the blockage or damage.
2. Section 1.1(b) of the Deed of Covenant and Indemnity (see below) infers that the stormwater drain has been designed with a capacity of a 1 in 10 year Average Recurrence Interval (ARI) storm event. Any storm events that exceed a 1 in 10 year ARI would have the potential to surcharge the drain similar to Point 1 above.

Without an overland flow path from the site, there is no way for stormwater to discharge from the site under the above circumstances and flooding of the site would occur. Even if stormwater was pumped up to College Street and into the drainage network it would re-surge again into the site.

It is worthwhile noting that there is a Deed of Covenant and Indemnity on the subject site between Council and the land owner (and any future owners) due to the above risks.

Redevelopment of the site will enable the above flooding issue to be alleviated by setting the podium level for the development at a level higher than the lowest street level in College Street. This will enable an overland flow path from the site to be established. Low level inlets and pits at the site would also be disconnected from the aforementioned stormwater drain preventing the possibility of surcharge.

If modelling of the overland flow path is required, we envisage that HEC-RAS will be a suitable model for this particular application as the flow path is generally 1-dimensional. The catchment hydrology and estimated overland flow would likely be determined using DRAINS as the existing and proposed drainage systems could be incorporated into the model to provide a better estimate of the likely overland flow that could be expected.

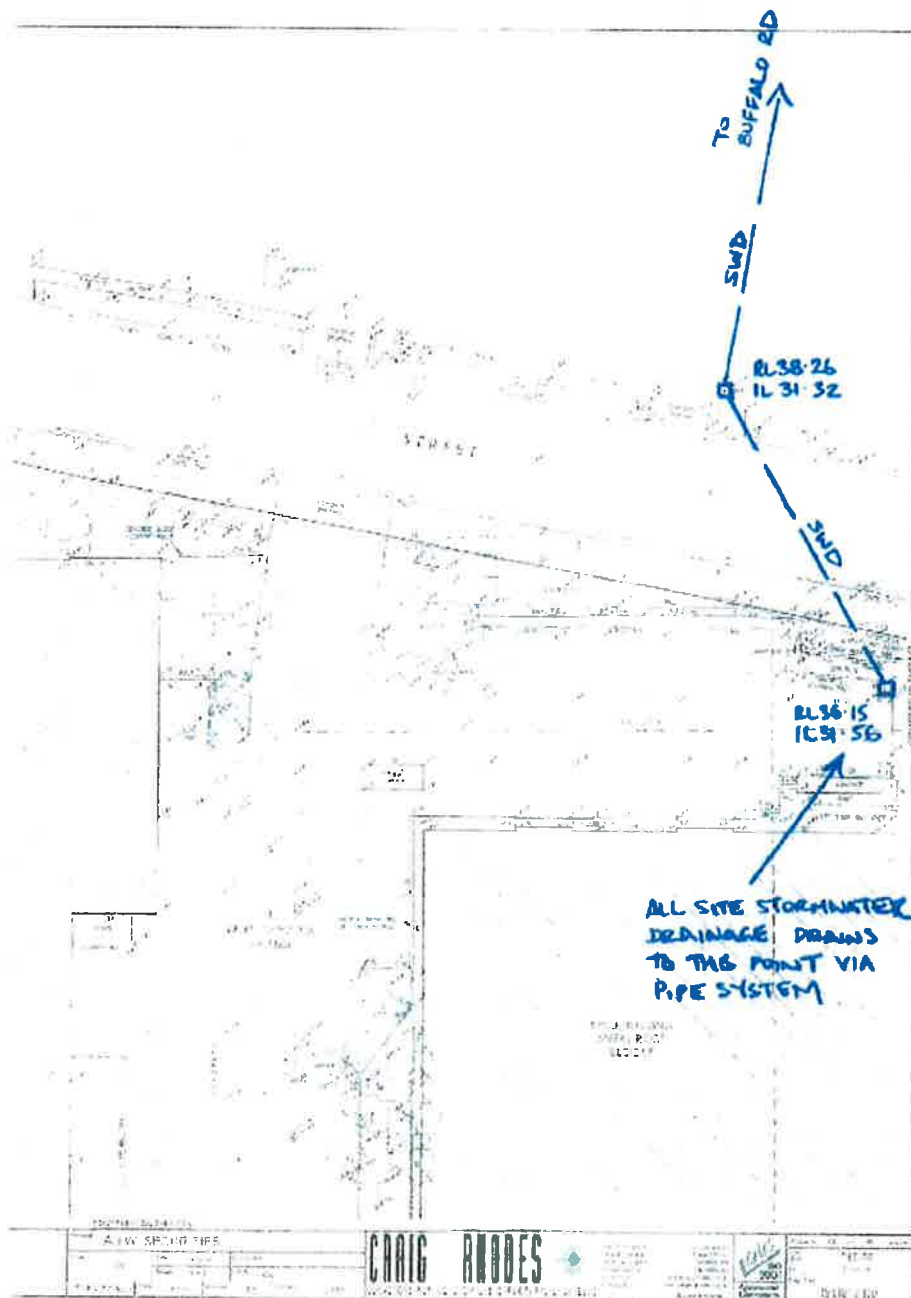


Figure 2 - Survey of Drain

Proposed Stormwater Management

The proposed development of the site would be completed in accordance with the relevant Ryde City Council Development Control Plan(s) (DCP). Council's DCP requires that the development be adequately drained without detriment to downstream waterways and properties.

On-site Stormwater Detention (OSD)

OSD will be required as part of any redevelopment of this site. Ryde Council's policy for large redevelopment sites of a commercial or industrial nature is that no credit is given for existing impervious surfaces and the permissible site discharge for the development is limited to the peak flowrate from the site in its "state of nature" or "greenfield" condition. Our preliminary calculations indicate that an OSD storage volume in the order of 2,000m³ will be required for this site. Due to the nature of the site, this storage volume may need to be split over several detention storages.

We envisage that either DRAINS or XP-RAFTS will be used for future modelling of the catchment hydrology and determination of the appropriate size of the on-site stormwater detention system as part of any future Development Applications for the site.

Rainwater Harvesting and Reuse

Rainwater harvesting from the main roof, retention of rainwater in a storage tank and rainwater re-use system within the development. Typically the rainwater would be used toilet flushing, watering of the outdoor nursery and further watering of external landscape areas.

Stormwater Quality

Stormwater quality is also an important factor to consider. For this development, the Stormwater Quality Improvement Devices (SQID's) would typically be provided to remove the majority of total suspended solids and sediment in the stormwater and will also be very effective at capturing and retaining very fine suspended solids, petroleum hydrocarbons and nutrients such as nitrogen and phosphorous which we expect will be the major types of stormwater pollution from any proposed development. Several devices may be required depending on whether the drainage system is split over several detention storages and/or discharge points.

We envisage that MUSIC will be used for future modelling to determine the effectiveness of the proposed stormwater treatment systems as part of any future Development Applications for the site.

We trust that the above provides a summary of the existing and proposed drainage conditions for the site. However, should you have any further queries please don't hesitate to contact the undersigned.

Yours faithfully



Anthony Mancone
Civil Engineer – Director
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