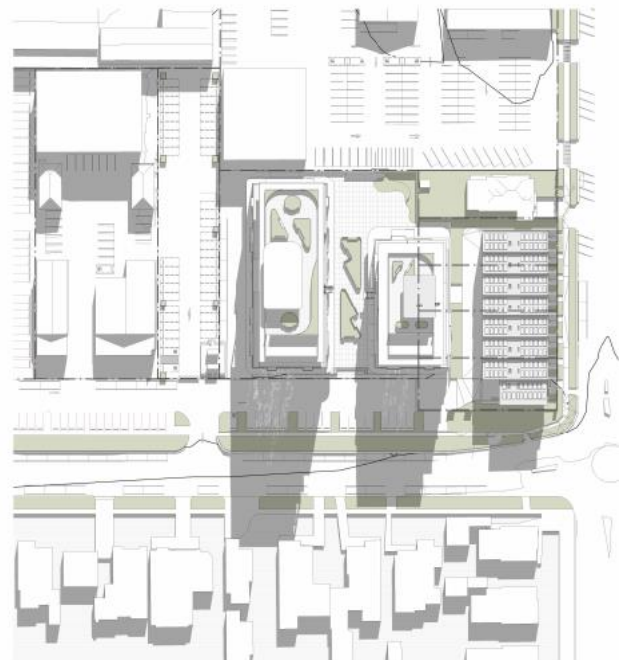


Stormwater Management Report

Civitas - Stage 3 Development

October 2024

23-0762



October 2024

Prepared for Damasa Pty Ltd



Orion Group

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Document Control

Revision	Prepared	Reviewed	Approved	Date	Description
Rev A	Elise Luu	-	-	25.01.2024	review
Rev B	Elise Luu	-	-		review
Rev C	Stephen Brain	Stephen Brain	Stephen Brain	23.10.2024	DA Submission
Rev D	Stephen Brain	Stephen Brain	Stephen Brain	31.10.2024	DA Submission

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1 Introduction

Dear Manuel Donebus,

This report has been prepared to support the Development Application (DA) for the Civitas Stage 3 development site located between Morgan and Murray Street, Wagga Wagga. The preliminary stormwater modelling has been undertaken to assess existing and proposed stormwater flow conditions for the subject site, and outlines proposed stormwater management strategies in line with engineering best practices.

The scope of this assessment includes the following:

- Review of existing stormwater flow conditions for the site;
- Ensure post-development flow conditions satisfy Council requirement;
- Design an appropriate stormwater network to convey minor storm flows through the in-ground system.

1.1 Site Description and Proposed Development

The subject site is located within Wagga Wagga CBD and falls within the Wagga Wagga city council LGA. The existing site has been zoned as MU1 for mixed use, currently comprising of commercial and residential buildings. The development proposal includes the construction of new high density residential buildings and townhouses. Topographic data for the site was sourced from survey plans prepared by Rivland Surveyors. Due to the natural topography, the site is generally quite flat but slightly grades towards the west.

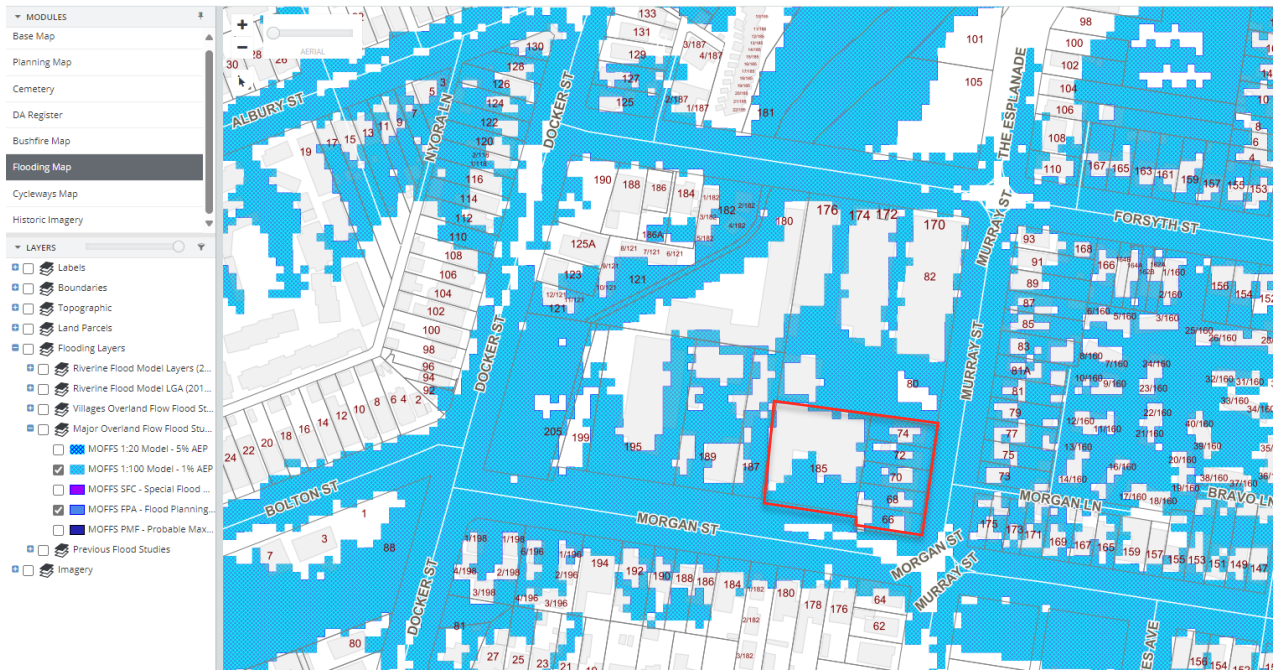


Figure 1 – Site flood extents

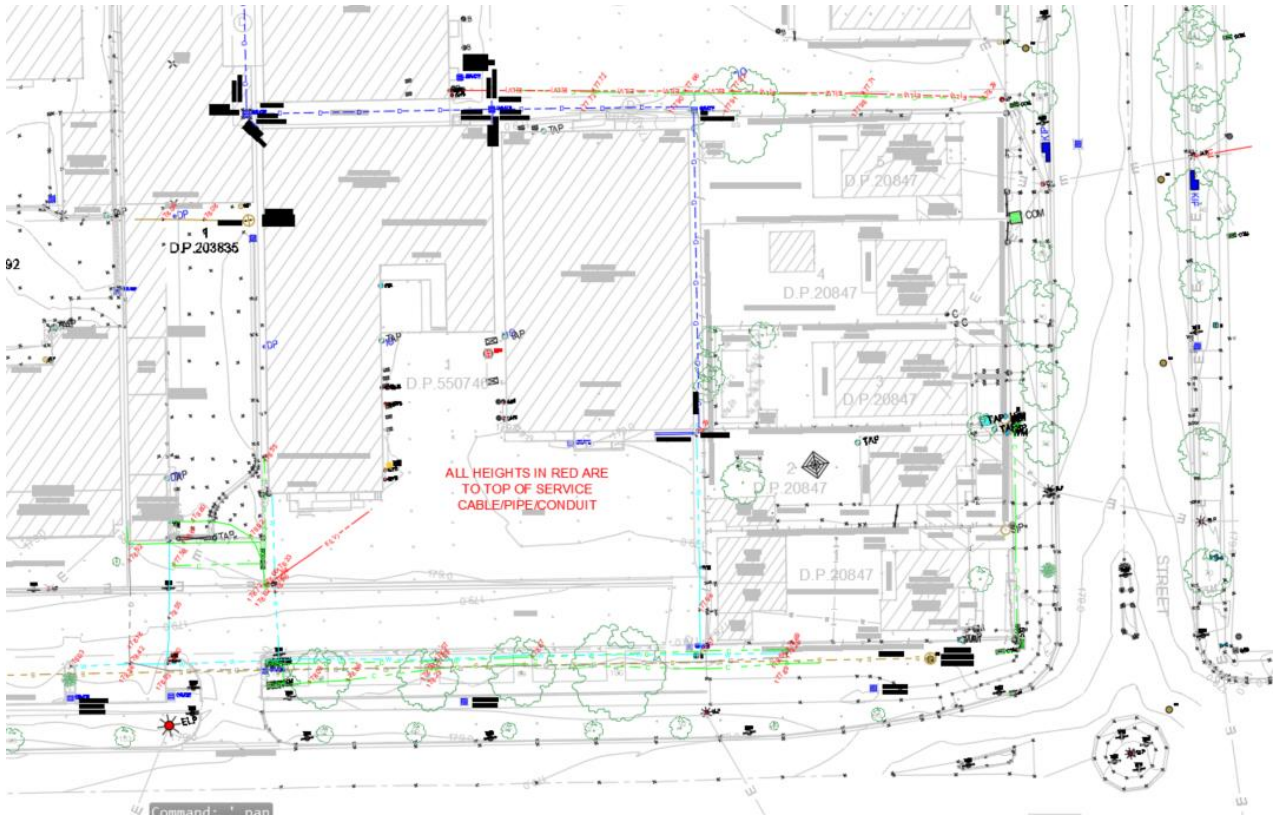


Figure 2 Site Survey

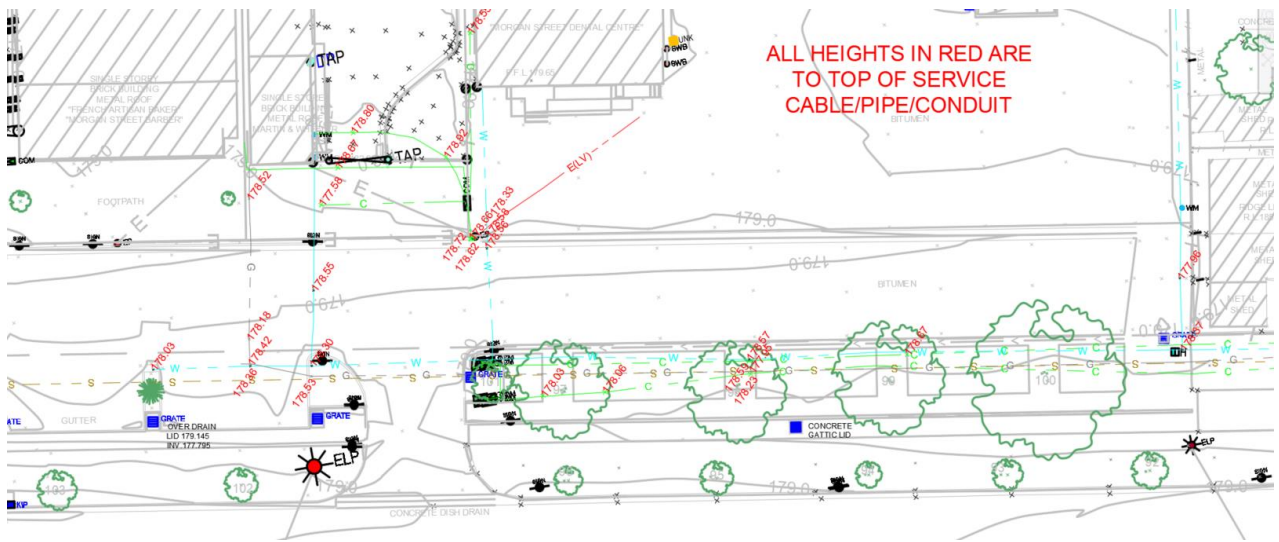


Figure 3 Receiving Invert

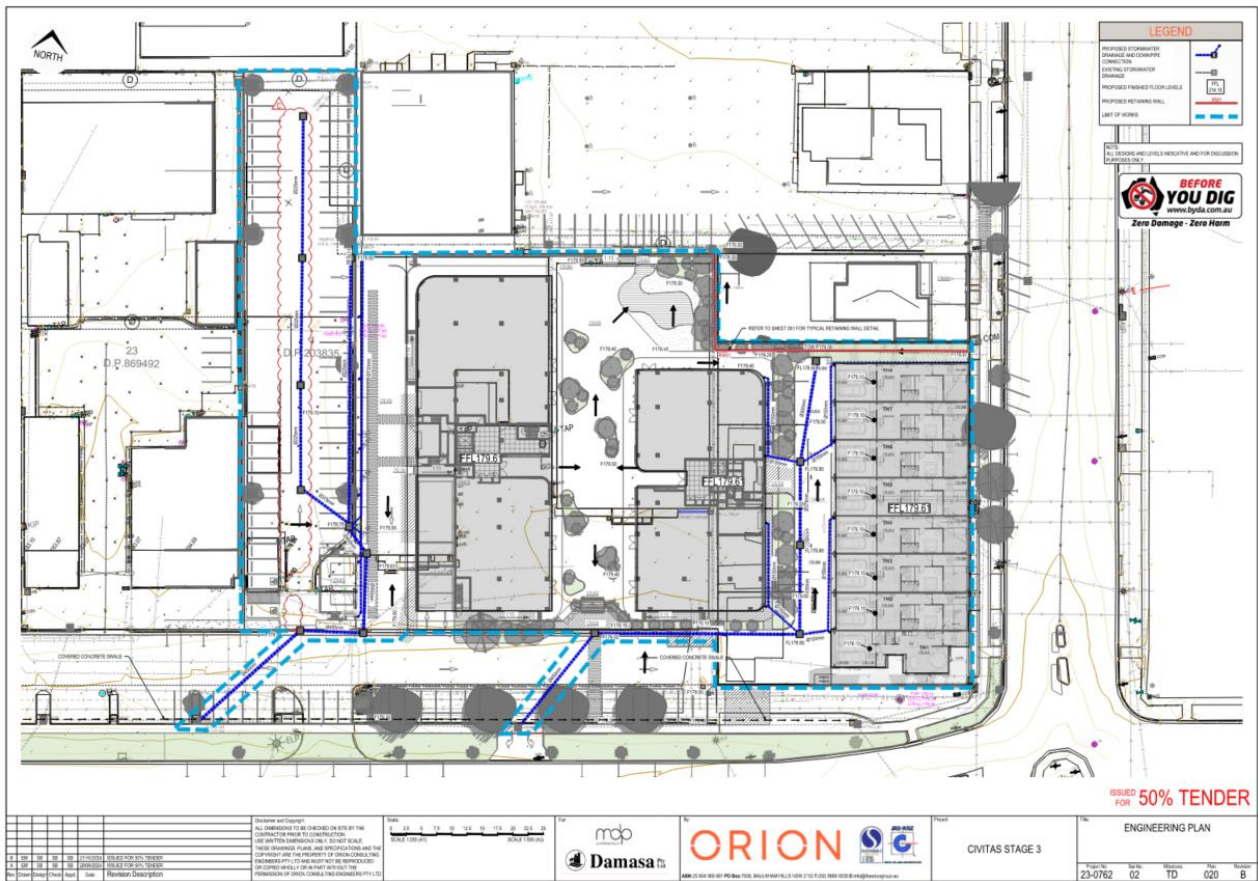


Figure 4 - Proposed stormwater system – Note the podium and building B drain to the east to the laneway drain, building A drains to the west

2 Stormwater Modelling

2.1 Design Guidelines

The proposed stormwater design complies with the following controls and guidelines:

- Wagga Wagga Local Environment Plan (2010)
- Wagga Wagga Development Control Plan (2010)
- Environmental Planning and Assessment Act (1979)
- Wagga Wagga City Council - Engineering Guidelines for Subdivisions and Development Standards (2017)

2.2 DRAINS Modelling

DRAINS software was used to perform hydrological modelling, using the ILSAX hydrology method to assess the performance of the design stormwater configuration. Modelling has been undertaken for sizing of the proposed in-ground pit and pipe network to sufficiently convey stormwater flows during design storm events. A minor storm event of 20-year ARI was selected to capture higher volume of flows in the underground pipe system, resulting in reduced overland flows in the 100-year ARI major storm event.

Table 1 – DRAINS Model Parameters

Parameter	Value
Paved depression storage	1 mm
Supplementary depression storage	0 mm
Grassed depression storage	5 mm
Soil type	3
Rainfall data	ARR 1987 (Council IFD Data)
Catchment fraction impervious	0.85

The DRAINS model has been developed based on the following assumptions:

- IFD data was obtained from Council’s “Engineering Guidelines for Subdivisions and Development Standards”.
- The proposed development will comprise of medium to high density residential dwellings, and a catchment fraction impervious of 0.85 has been adopted.
- An indicative pit and pipe network was designed to connect to the existing drainage system, invert levels have not been provided and are to be confirmed with detailed site survey during a later phase of the project.

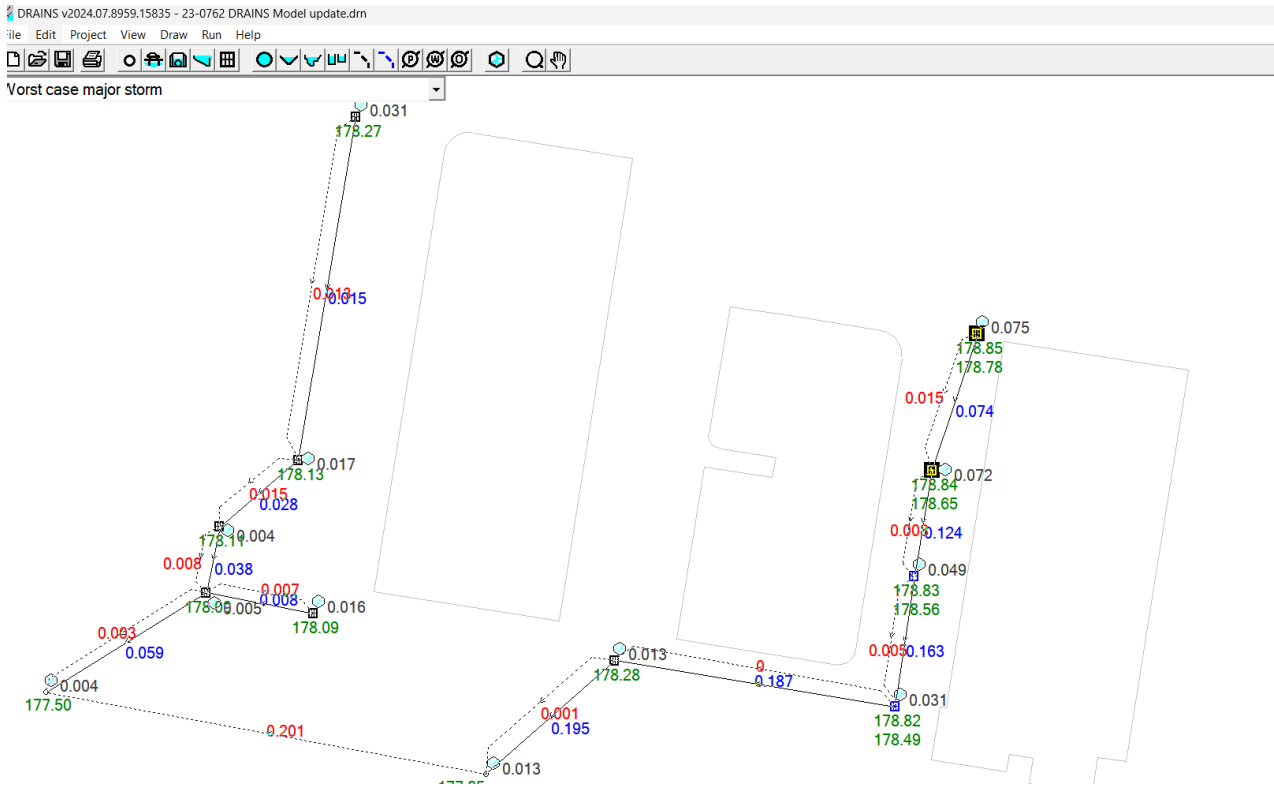


Figure 2 – DRAINS Model

2.3 DRAINS Results

The proposed piped drainage system has been designed to convey flows in the 1 in 100-year ARI event, which discharges into the existing stormwater network. A provision for overland flows greater than the 1 in 100-year ARI event were also considered.

The preliminary results from the DRAINS modelling indicates that the proposed stormwater network has the capacity to accommodate flows from the development site catchment for the minor storm event, with safe provision for major system flows.

3 Conclusion and Recommendations

Based on preliminary modelling results, the design network adequately conveys stormwater in the minor storm event and allows for safe overland flows in the major storm event.

Yours sincerely,

Stephen Brain – Technical Director
Orion Group