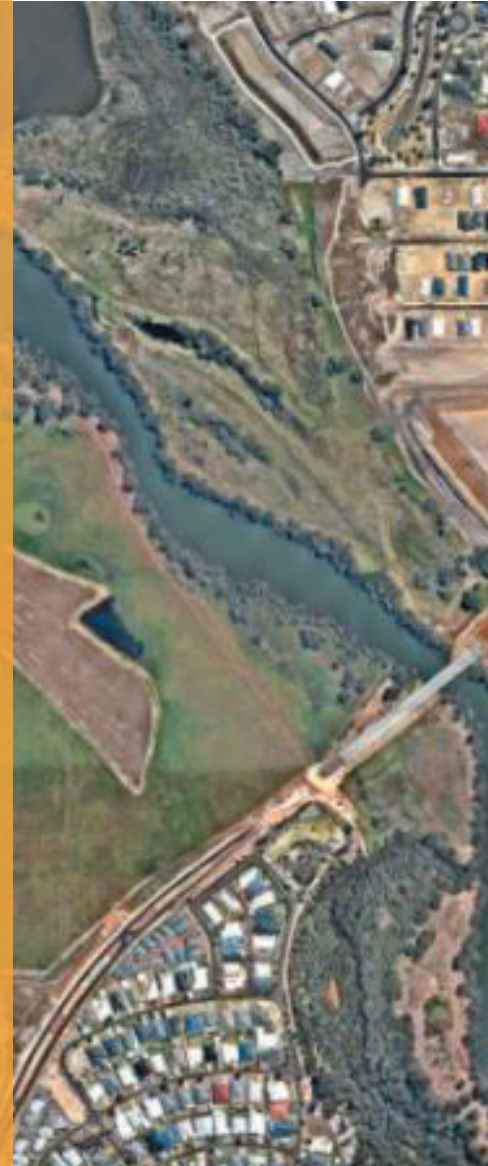


ENGINEERING SERVICING REPORT

Lot 9004 Eaton Drive,
Eaton



PREPARED FOR PARKRIDGE GROUP PTY LTD

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
A	13 Mar 18	For Review	Natalie Adams	Gary Barbour	
B	14 Mar 18	For inclusion in Structure Plan Report	Natalie Adams	Gary Barbour	

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1 Introduction

Parkridge Group Pty Ltd has engaged Calibre Professional Services Pty Ltd (Calibre) to undertake the initial investigations and reporting on servicing constraints for the potential redevelopment of Lot 9004 Eaton Drive, Eaton.

The site is a previously undeveloped site which consists of Lot 9004 subdivided into three stages of residential lots as shown in the Structure Plan extract in Figure 1 below. The proposed Structure Plan boundary sits within the Lot 9004 boundary with the intention to commence the Development in 2018.

This area of land sits approximately 2km upstream of the estuary along the Collie River flood plain.

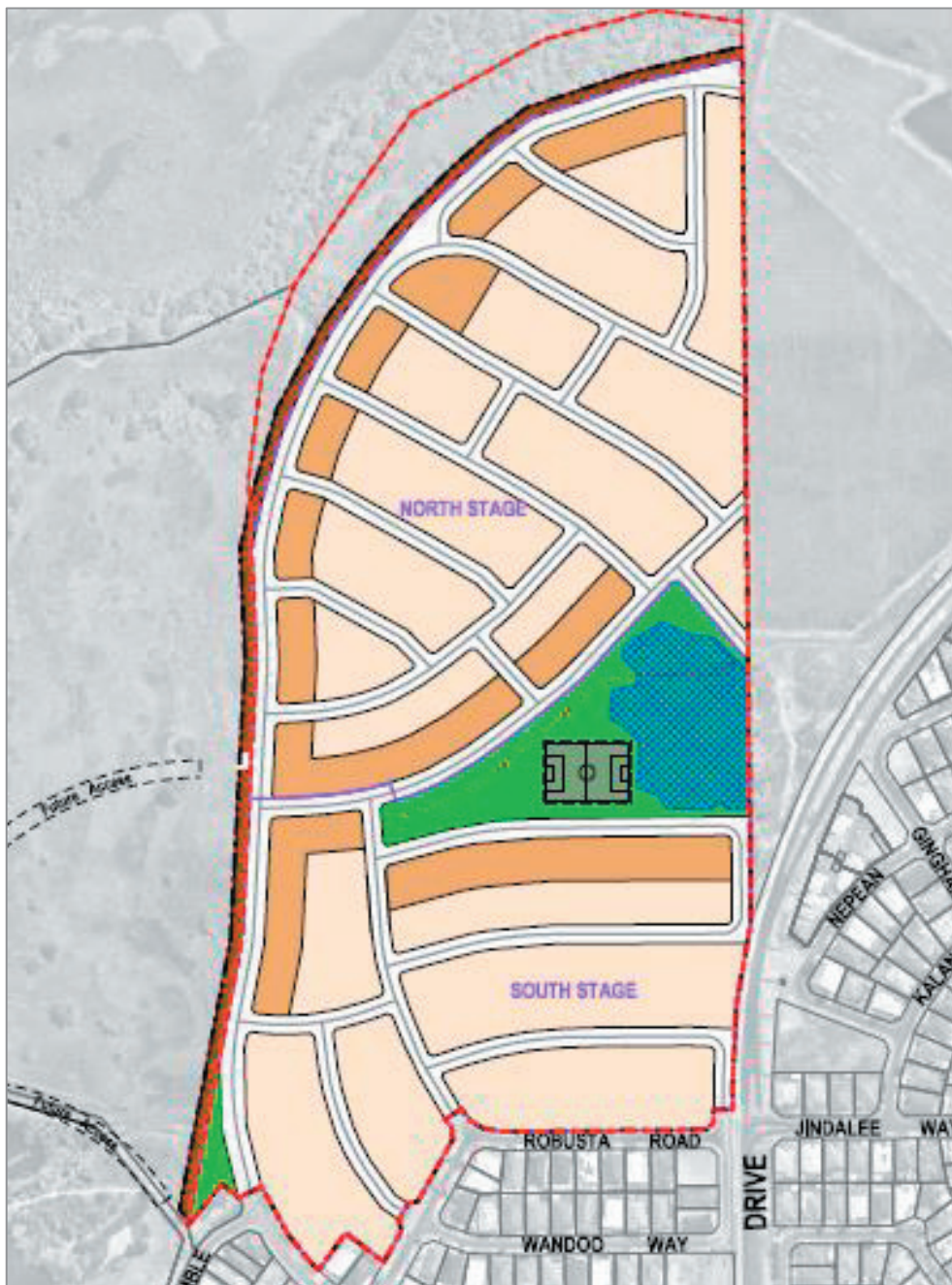


Figure 1: Proposed Structure Plan, Lot 9004

An historical aerial photograph of the site is shown below to depict the extent of the surrounding developments.

The residential developments to the south and east represent the extent of services.



Figure 2: Aerial Imagery of Surrounding Area, Nearthmaps 2018

2 Topography and Vegetation

The Site is adjacent to the east side of the Collie River and is bounded by Leicester Reserve to the north. Wandoo Way to the south and Eaton Drive to the east have the roads that bound the extent of the existing residential developments.

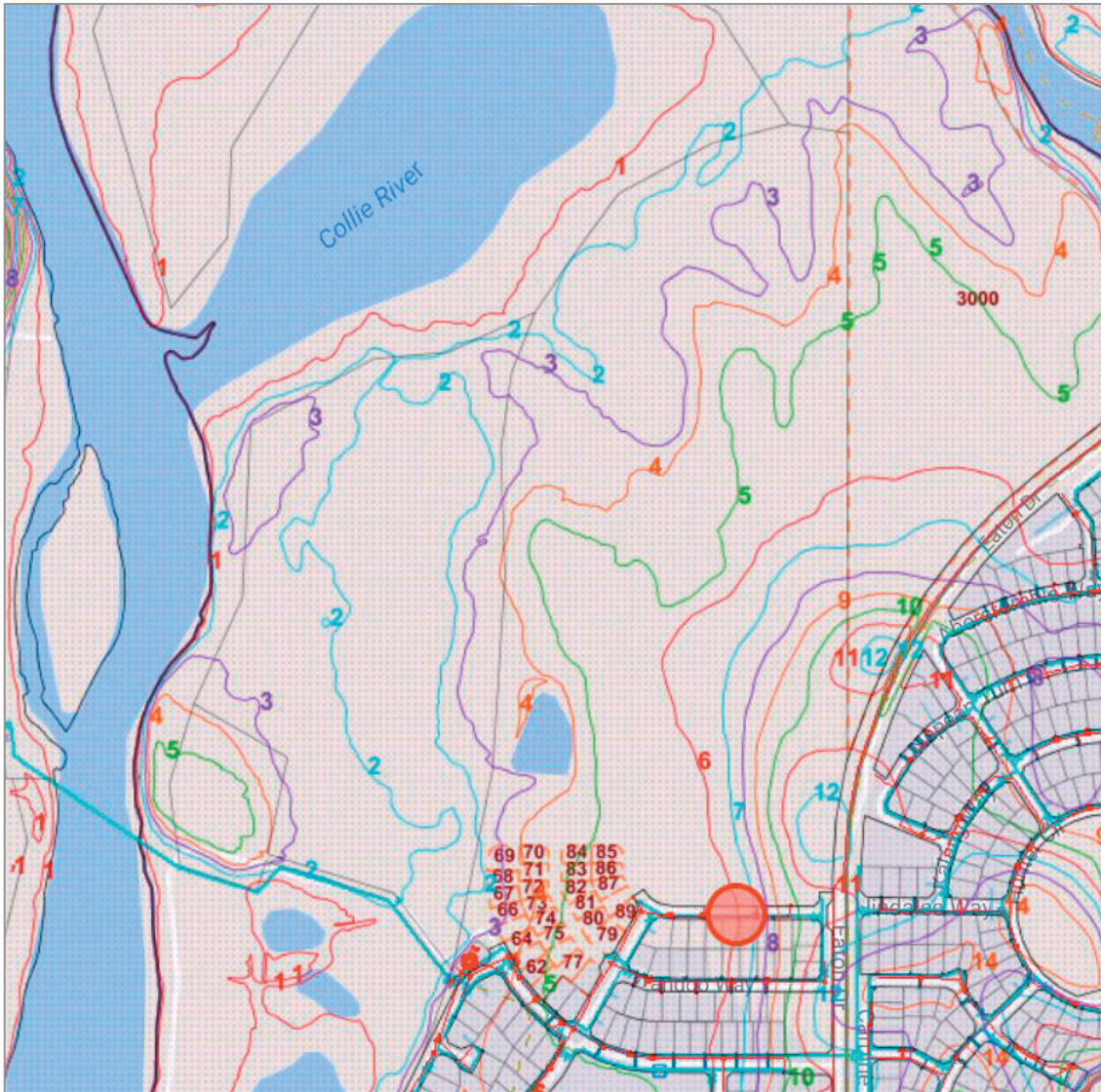


Figure 3: Contours of Site, Esinet Data, Water Corporation 2018

3 Existing Site Conditions

Approximately 51,500m³ of fill has been accessed from the area between December 2004 and November 2005.

The existing contours (predevelopment) show that the Site grades from an RL of 10m AHD in the south-eastern area down to approximately 3m AHD on the western side of the development.

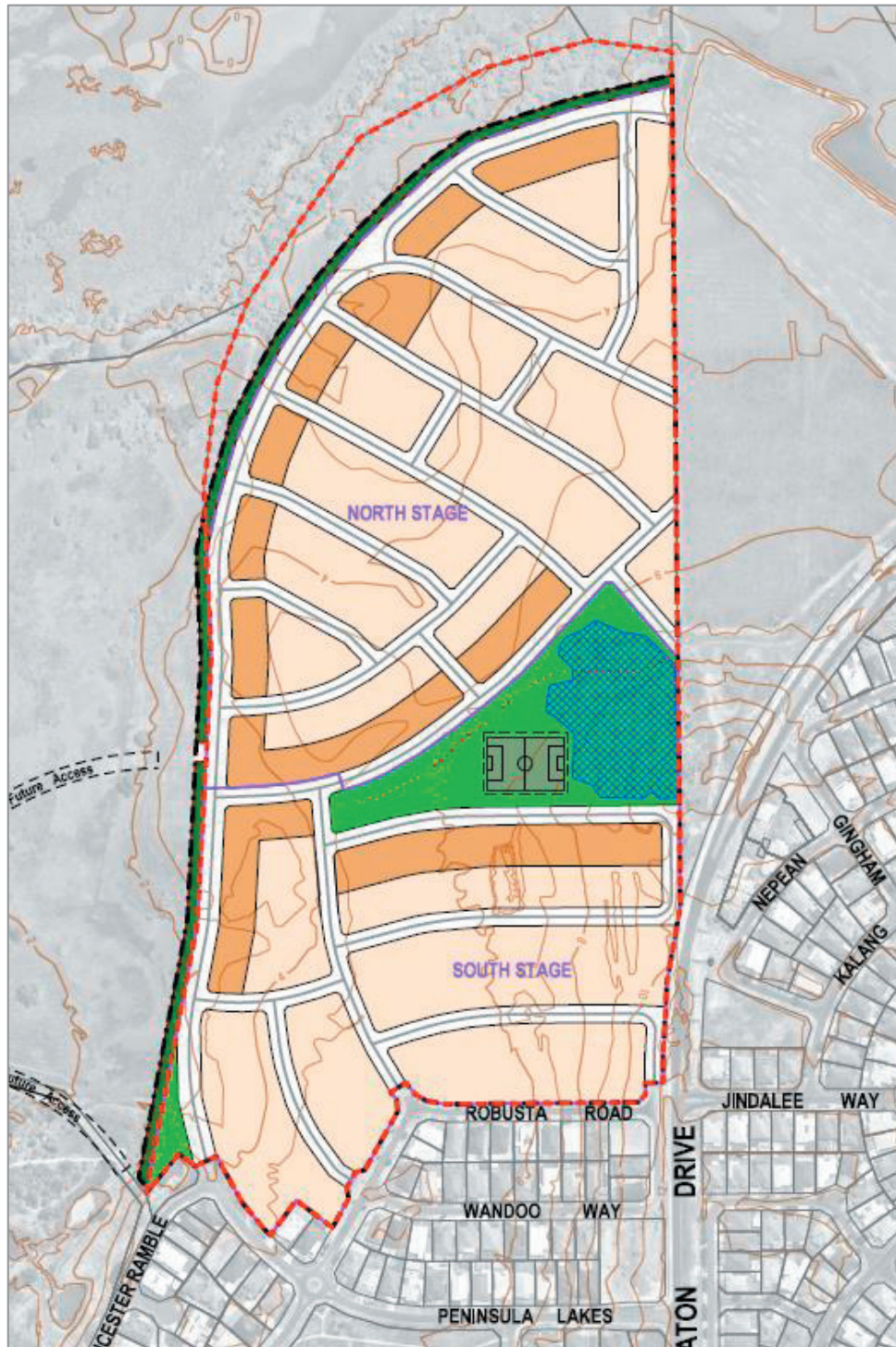


Figure 4: Proposed Subdivision Plan with Contours

4 Geotechnical Review

4.1 Site Classification

Assuming that recommended earthworks are implemented across the Site, site classifications of Class A and Class M can be expected to be achieved.

4.2 Groundwater Assessment

The geotechnical review advises that the groundwater level generally at and within 1m of the natural surface level should be allowed for in the design and during construction (excludes flood level requirements).

4.3 Acid Sulphate Soils

A preliminary assessment of acid sulphate soils (ASS) was conducted in December 2005 by Golder Associates. The results of this preliminary assessment showed that generally across the Site, actual ASS (AASS) can be expected to be encountered at depths of 3m or more. As shown in Figure 5, there is AASS at surface through to depths of 1.25m. Potential ASS has been encountered elsewhere throughout the geological profile.

Based on the geotechnical assessment, an Acid Sulphate Soils Management Plan will need to be prepared and implemented during any earthworks and construction.

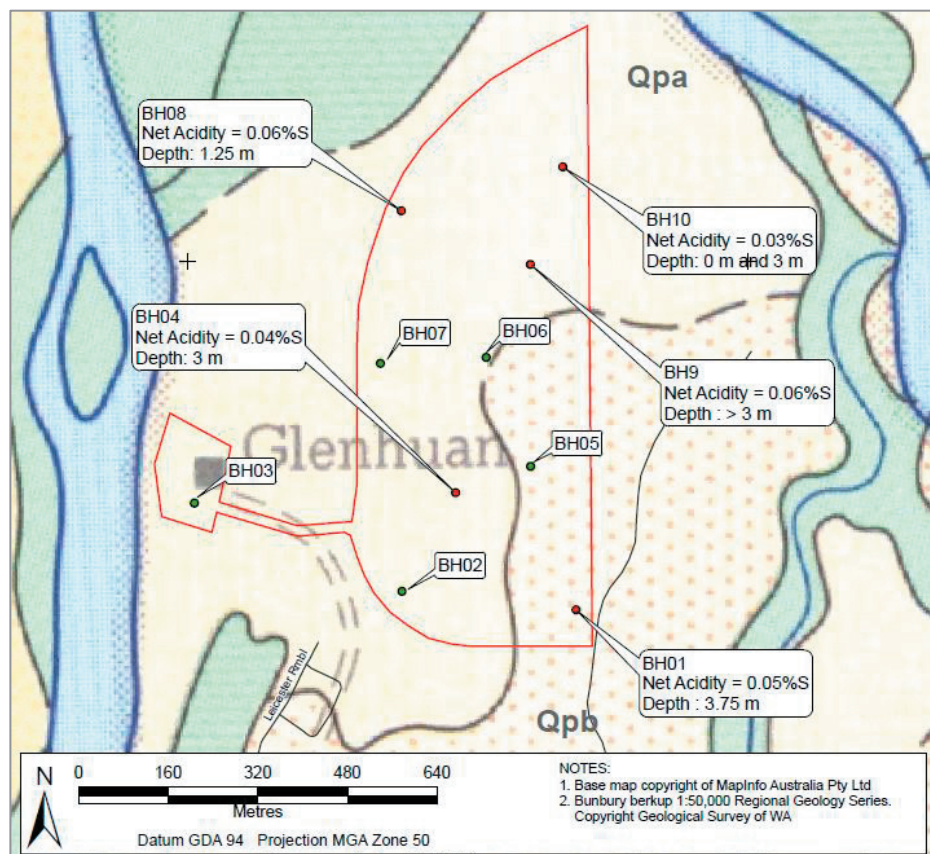


Figure 5: Results of ASS Testing, Golder Associates Report 2005

5 Roads and Pavement

The geotechnical assessment has advised that the pavement design should accommodate the relatively poor drainage conditions across the Site.

The existing pavement of Eaton Drive and the roads to the south are asphalted, kerbed roads. Major access to the southern stage of the proposed development will be via Robusta Road, Wandoo Way and Peninsula Lakes Road. There is currently no access shown off Eaton Drive for the north or southern stages.

The southern accesses are not expected to create any future traffic or safety issues. Should any future access points be required off Eaton Drive, a traffic study will be required to assess the safety and suitability of the access points.

There are back-of-kerb paths provided along Eaton Drive and Peninsula Lakes Drive and offset kerbs on the other residential streets. Additional paths would be expected as a result of development of the site.

6 Drainage Considerations

Stormwater disposal over the Site has been identified as a potential issue due to the low availability of free draining material and observed groundwater level.

Earthworked fill levels have been covered under Section

It is anticipated that a Drainage Management Plan will be requested for the site as a planning condition. This will require approval by Department of Water (DW).

6.1 Minor System

The minor drainage system is designed to cater for the 1 in 5 year rainfall event. Where possible, soakwells, rain gardens or shallow swales should be placed in road reserves to cater for this requirement. Road reserve widths should be designed to cater for this infrastructure.

The collection/storage nodes are to be connected by way of pipe (or swale in flatter areas) and discharged into compensation basins in the foreshore (adjacent lot - as in previous stages). These basins (as well as previously mentioned soakage structures) will not only ensure balance between pre and post development runoff volumes, but provide treatment chains to increase runoff water quality.

6.2 Major System

The 1 in 100 year rainfall event defines the major drainage system requirements. Road reserves and PAWs (in the event of trapped lows) will convey the major runoff events through to the foreshore. Adjacent lots and road gradients are to be designed to provide adequate capacity and freeboard for these events.

7 Hydraulic Modelling

A review of the hydraulic modelling was undertaken in April 2007 by SKM to investigate the impact of different development scenarios against a base line scenario as defined by the (WA) Department of Water. The concern that the development areas lie within the 1 in 100 year flood inundation area was shown to be unfounded and that there was no appreciable impact on the development/1 in 100 year event interface.

8 Earthworks Strategy and Considerations

All lot levels are to be above the 1 in 100 year flood level. Due to the presence of a clayey subgrade, the importation of additional fill is likely to be required to achieve the required separation between the AAMGL and the finished lot levels.

9 Sewer

The Site is currently serviced by a surrounding 150mm PVC sewer from Peninsula Lakes Drive at varying invert levels. This southern part of the proposed development will be directed to the existing sewer reticulation network via the gravity sewer. This part of the catchment will be directed to the existing wastewater pump station located in the south-western area of the Site.

The remainder of the Site will be directed to the vacuum sewer that services this part of the Site via Millbridge. The Water Corporation has confirmed that this strategy is the intention. The Water Corporation has confirmed that no prefundable infrastructure is required for the vacuum sewer area.

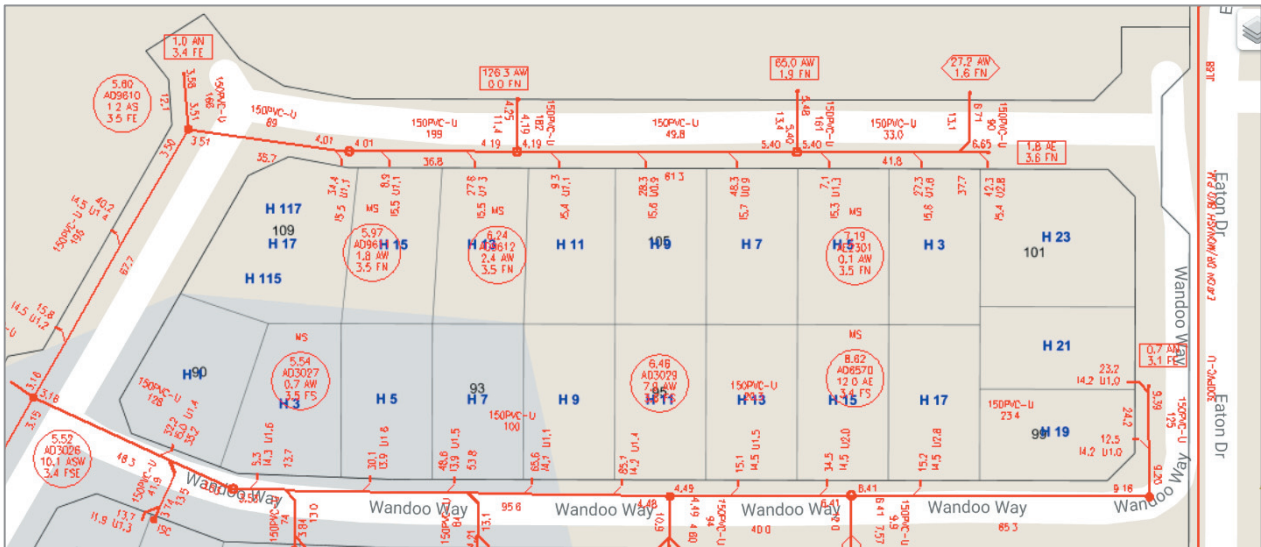


Figure 6: Existing Sewer Reticulation, Esinet Data, Water Corporation 2018



Figure 7: Sewer Plan, Water Corporation

10 Water

The proposed subdivision is likely to be connected to the existing 150P-12 reticulation capped ends that are shown in the extract from Esinet below.

A 600mm diameter water main was installed along Peninsula Lakes Drive in the first half of 2007. This main connects to a 375mm truck main on the eastern verge of Eaton Drive.

Water Corporation confirms that adequate water capacity exists to serve the proposed development.

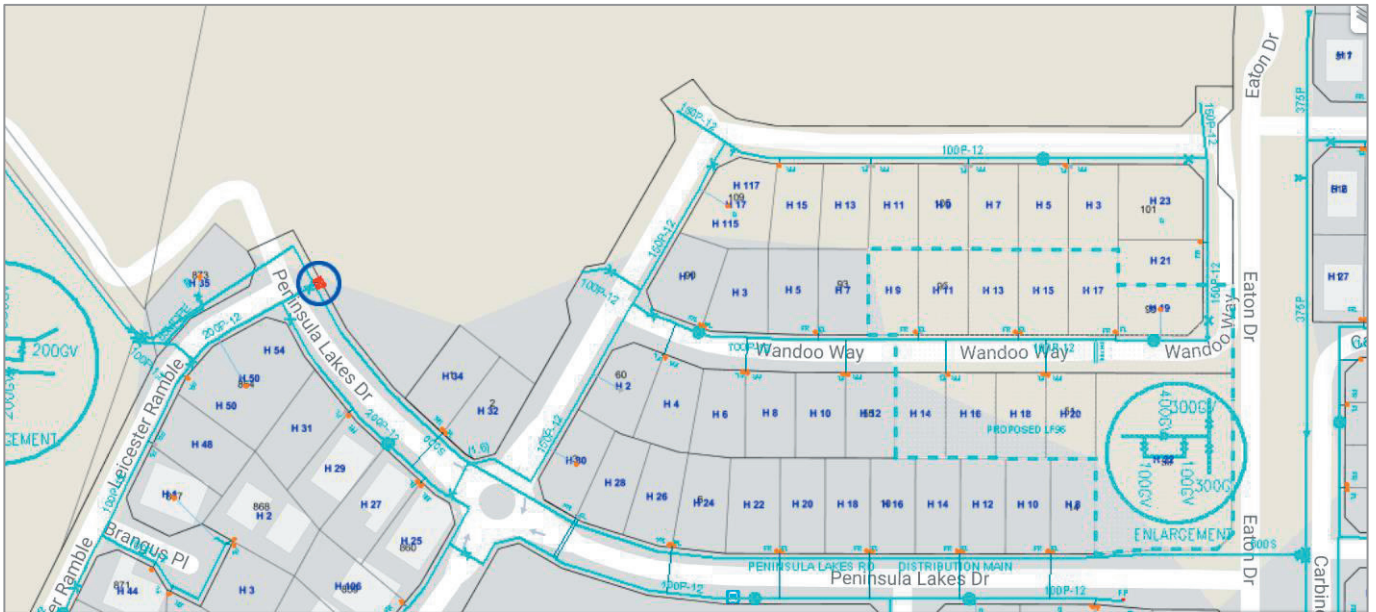


Figure 8: Existing Water Reticulation, Esinet Data, Water Corporation 2018

11 Gas Reticulation

According to information supplied by ATCO Gas, there is existing 63PE 1.5 MP 70kPa gas reticulation in the existing southern development. These stubs are likely to be the connection points for the proposed subdivision’s gas reticulation.

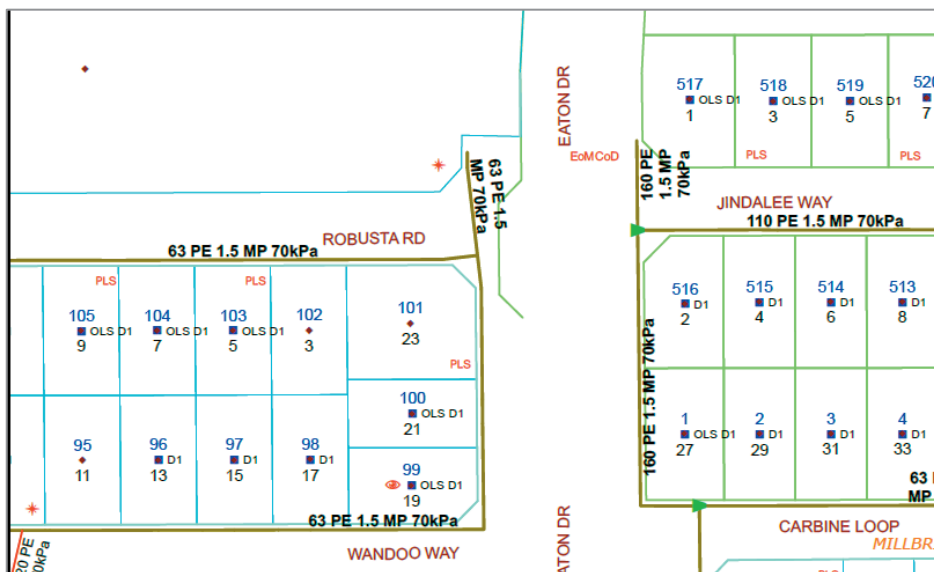


Figure 9: Existing Gas Reticulation, ATCO Gas 2018

12 Power

The HV concept plan will need to be revisited to ensure that alternative feeds are available and that the ringmain is maintained after every second transformer is installed. The HV concept plan will also be dependent on the stage sizes, location and timing to ensure compliance with WP requirements.

Underground power is to be provided to the development via the two High Voltage feeders available in Eaton Drive. No supply challenges are anticipated. All future developments are Option B (ie Western Power no longer supply cables and clearance can only be obtained on handover of infrastructure).

13 Telecommunications

It is expected that the telecommunications will be connected to the existing services available in Eaton Drive and to the south along Wandoo Way.

It is not expected that there will be a requirement for additional hubs or upgrades or backhaul to existing services for the telecommunications, but any backhaul requirements are unknown until a formal application is made.



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