Bendigo Regional Employment Precinct - Utility Servicing Assessment

Utility Servicing Assessment Report

Victorian Planning Authority

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Executive summary

Aurecon has been engaged by the Victorian Planning Authority (VPA) to undertake a desktop Utility Servicing Assessment (Report) for the Bendigo Regional Employment Precinct (BREP) and Marong Western Freight Corridor (MWFC) Investigation Area. This Report includes the identification of Service Authorities, their existing infrastructure, and proposed servicing strategies for the BREP.

This analysis has been undertaken in consultation with key Utility Service Authorities across potable water, recycled water, sewerage, stormwater drainage, electricity, gas and telecommunication services. Based on the analysis of the existing services, it has been found that there are predominantly no service offerings within the BREP area, with most services situated in the neighbouring township of Marong. The capacities within these networks, as advised by the Utility Service Providers (USPs), are noted below. Varying levels of information have been obtained from USPs and the capacity constraints are not available for all services, given some future demand requests and costs estimates will require future applications, such as Powercor.

A summary of the conclusions and recommendations resolved through the analysis are detailed below.

Utility Service	Conclusions and Recommendations
Water Supply and Recycled Water	<u>Potable Water Supply</u> The existing water supply in the vicinity of the BREP is provided by Coliban Water within the Marong Township. However, there are no existing water services within the BREP or the MWFC Investigation Area. To accommodate the requirements of the BREP, there may be a need for a larger upgrade or it may bring forward the subsequent upgrade of Bendigo Water Treatment Plant. The current 11km pipeline design does not factor in provisions for the BREP. However, upsizing pipeline sections and a second water tank are required to support the BREP, resulting in a peak-day supply capability of up to 4ML. This includes: ▪ Upsizing the pipeline between Specimen Hill Reservoir and Edwards Road, Maiden Gully from 375mm to 450mm ▪ Upsizing the pipeline between Edwards Road, Maiden Gully and the Calder Alternative Highway in Marong from 300mm to 375mm ▪ A second tank at Marong. Note the capacity of tank yet to be determined. ▪ Upsizing the pipeline within Marong to meet demand. However, pipe sizing assessment at the local scale is yet to be undertaken. <u>Recycled Water Supply</u> There are no operational recycled water services within and surrounding the BREP and the MWFC Investigation Area To provide recycled water to the BREP, Coliban Water suggests considering a connection to Lake Neanger in Eaglehawk, specifically at the Cockatoo Channel offtake. The viability of this connection requires an understanding of the BREP's recycled water demand profile and ensuring it does not surpass the capacity provided by the recycled water pipe serving the Cockatoo Channel customers. If there are limitations in the Cockatoo Channel offtake's capacity, alternative solutions include provision of a local recycled water tank. However, additional consideration and assessments are required to understand viability.
Sewerage	The existing sewerage system surrounding the BREP is limited to the local sewer services within the adjoining Marong township and there are no existing sewer services within the BREP or MWFC Investigation Area. Coliban Water have recommended a dedicated sewer system west of Marong to service the BREP and any potential Marong Township growth. Connecting to the Bendigo Water Reclamation Plant is forecasted to exceed $25 million given the required reticulation length is approximately 17km (straight line distance) and terrain is undulating. However,

	the details and feasibility of the localised sewer treatment system is yet to be determined and requires additional coordination and assessment. In the interim, the City of Greater Bendigo and early BREP developers can access temporary sewerage services for a limited duration, with the specific amount determined during the application. Initial assessments indicate that a total of 0.25ML for up to five years for the entire BREP is feasible. Access capacities will be periodically reviewed to prevent excessive subscription.
Stormwater Drainage	The existing stormwater infrastructure surrounding the BREP is limited to the local sewer services within the adjoining Marong township and there are no existing drainage infrastructure services within the BREP or MWFC Investigation Area The City of Greater Bendigo are unable to provide an indication of the required stormwater works without undertaking a site-specific drainage study. No details are provided on any drainage considerations such as retarding basins, culvert crossing, minimum immunity flood levels, overland flowpaths and flood prone areas needed to service the BREP.
Electricity	There are existing electricity services situated within the BREP. This includes existing 22kV service lines within O'Sullivans Road, running along the north to the northwest boundary of the BREP and 12.7kV lines crossing Cemetery Road at the southeast boundary of the precinct. There is also an existing 12.7kV service line that traverses the MWFC Investigation Area. There is currently approximately 1MW of spare capacity to potentially service the BREP. Any load above 1MW may require additional augmentation of the upstream Powercor network. Powercor would be required to extend the current network inside the BREP. Another option for Powercor is to supply a much larger load (>8 to 10MW) within the BREP by extending the 66kV line along the proposed freight corridor to the BREP northwest boundary. This option would also require Powercor to build a new Zone Substation, with an estimated 1-hectare site required for this. Powercor were unwilling to coordinate with VPA without a formal and paid application. Future Electrical Servicing Strategies therefore were not explored due to a lack of Powercor inputs. Overall, the capacity for the existing electrical network to service the forecasted growth is unknown. The requirement, tipping points and timing of network augmentations have not been identified. It is recommended that Powercor is engaged as part of future works to develop the electrical servicing requirements for the BREP future urban development.
Gas	There are no existing gas services within the BREP and MWFC Investigation Area by any USP. There is gas supply is located in local towns such as Marong and Maiden Gully. The gas network in the Marong Township and in Maiden Gully was originally designed to service the nearby low density residual and light commercial demands and has limited capacity to service the BREP. The nearest potential connection at Golden Square presents a challenge to develop a feasible gas servicing strategy given the substantial distance. AusNet have recommended the exploration of alternative energy options such as supplementing gas usage with electricity. However, this approach may reduce the attractiveness of the BREP, especially for specific niche industrial developments that are still reliant on gas for business operations. Additional consideration would need to be made to the provision of electrical services, as electrical demand may be higher than other similar industrial precincts. It is recommended that Powercor is engaged as part of future works to develop the electrical servicing requirements for the BREP future urban development, which supplements gas servicing.

Telecommunication	There are no existing telecommunication services identified within the BREP, although there are NBN services within the adjoining Marong township. NBN's proposed servicing involves extending fibre reticulation from the existing NBN FAN site at Darling St, Eaglehawk, approximately 12km (straight line distance) away from the BREP. Required works would generally involve the installment of the new BREP service connections to utilise a combination of existing Telstra ducts, new NBN builds, and developer-supplied shared trenching arrangements. Any new build, involving multiple conduits, to the BREP are planned to connect via Wimmera Hwy and Calder Alternative Hwy at the northern end. These lead-in works would then extend throughout the BREP via provision of additional pit and pipe infrastructure. Telstra are yet to respond with the works required to support the BREP. While there is an understand that the BREP's telecommunication requirements can be serviced by NBN, further assessments are yet to be undertaken to understand if Telstra is able to service the BREP more efficiently.
Other (Roads)	Currently, there are no road connections within the BREP. The MWFC Investigation Area is situated along McCreddons Rd, but continuous road coverage does not span its entire area. A comprehensive understanding of arterial road and path networks is crucial for informing the location of utility service infrastructure and assessing its impact on the adjoining Marong township. Providing details on proposed arterial roads and all roads within both the BREP and the MWFC Investigation Area to the Service Authorities is recommended. This information would be valuable in planning for future infrastructure needs, including alignment locations.

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1 Introduction

Aurecon has been engaged by the VPA to undertake a desktop Utilities Analysis for the Bendigo Regional Employment Precinct and Marong Western Freight Corridor (MWFC) Investigation Area. The intent of this assessment is to inform the VPA of the existing utility infrastructure and proposed servicing strategies within and surrounding the BREP and the MWFC Investigation Area. The MWFC Investigation Area is an investigation area as defined by the City of Greater Bendigo through their Marong Township Structure Plan. This alignment is not a determined alignment of the Department of Transport and Planning (DTP), and any future potential alignment will be subject to separate and detailed investigations undertaken by DTP.

Aurecon met with the VPA and the City of Greater Bendigo as part of the project inception meeting, to discuss the BREP site overview and applicable updates within the precinct area. Clarification of the project scope, expectations, communication protocols and growth area details, were raised and discussed.

The latest projections provided by the VPA forecast the BREP is expected to deliver a combined total of approximately 6,000 jobs, with 3,000 jobs within the precinct boundary. VPA confirmed that these latest growth projections should inform all Utility Service Providers (USP) to enable their forward asset planning to be targeted.

The Situational Analysis Report (Phase 1) highlights the extent of the existing utility services within the BREP, the MWFC Investigation Area, and the nearby townships. This was achieved by utilising data sourced from the USPs. This Report, the Final Utilities Servicing Assessment (Phase 2) pinpoints existing constraints and potential opportunities for the future delivery of utilities infrastructure. This Report also thoroughly explores and outlines servicing constraints that could impact the development of BREP. Furthermore, it highlights the servicing strategies for the BREP, and associated areas, included in the scope.

1.1 Background

The VPA has commenced precinct structure planning for BREP as defined in **Figure 1** below. It encompasses 294ha of existing rural land comprised of 13 separate land titles. The City of Greater Bendigo owns six of these land titles equating to 155ha, within the precinct.

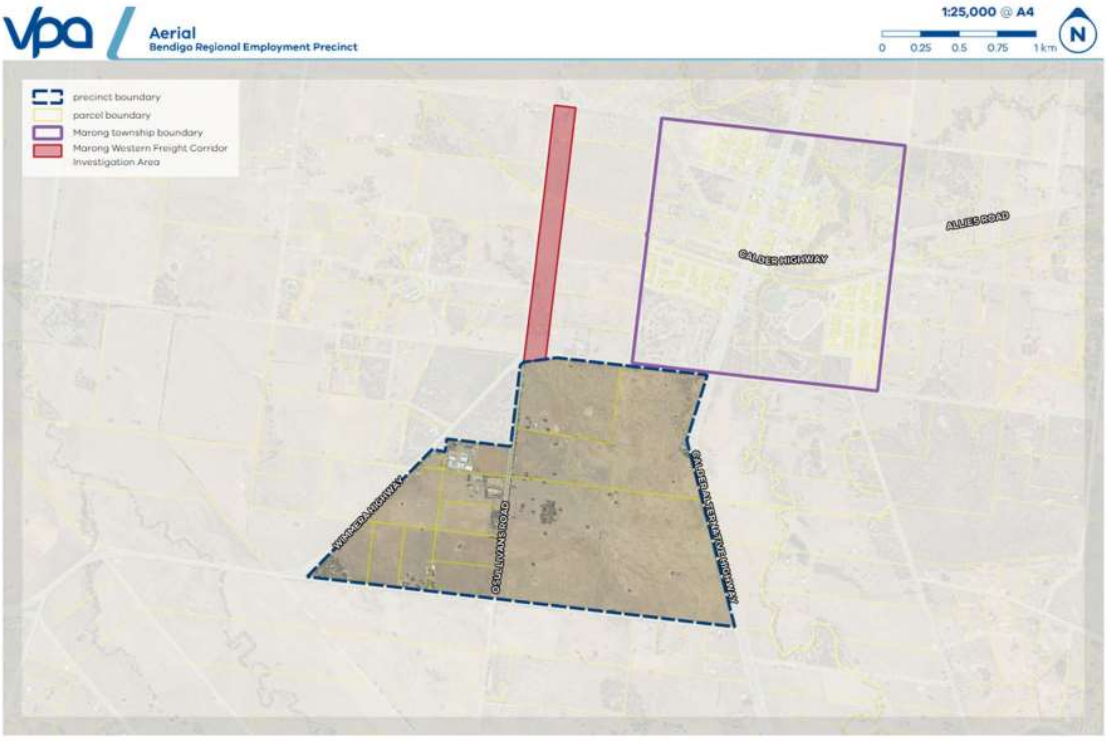


Figure 1: BREP boundary, MWFC Investigation Area and adjoining township.

Currently no existing site layout plans are available to inform the future urban structure of the BREP. However, approximately 294ha within the BREP is proposed to be developable, based on the assumptions adopted within **Appendix A**.

The BREP has been identified as an appropriate site for industrial land in the context of the Marong Township Structure Plan, Loddon Campaspe Economic Development Strategy and Loddon Mallee South Regional Growth Plan. The VPA are working with the City of Greater Bendigo to deliver a Precinct Structure Plan (PSP) for the BREP.

An assumption for this Report is that the BREP may consist of generally industrial and commercial land use zones, that will support manufacturing industry including storage and distribution of goods, and limited retail opportunities, including convenience stores and associated shops. The location and selection of these zones will be refined through the PSP process.

1.2 Scope of Assessment

This Report provides an overview of existing utility service infrastructure impacting the BREP and the MWFC Investigation Area. It details a high-level assessment of options to meet the utility service for the future industrial development of this precinct.

The Situational Analysis, completed as Phase 1, incorporates:

- The latest spatial data identifying the location, size and pipe material type for all existing underground and above ground infrastructure provided by key USP.
- GIS plans of existing key utility infrastructure within the precinct.
- Utility services implications directly affecting the VPA's precinct planning.
- Identified further analysis required for the utility servicing opportunities.
- Recommendations and conclusions to proceed to completing a Utilities Servicing Assessment, as Phase 2.

The Utilities Servicing Assessment portion of the Report, completed as Phase 2, incorporates:

- Documenting the servicing arrangements and requirements for the precinct as noted by the individual USPs, including potential service sizing, capacity, and alignment.
- Identifying potential connection points based on preferred development fronts.
- Land and easement need.
- Recommendations and conclusions to inform the precinct planning infrastructure requirements for BREP.

1.3 Utility Service Providers

After completing a dial before you dig (DBYD) request to confirm the USPs with existing services within BREP, and the VPA providing notification to relevant USPs advising of the work Aurecon will be undertaking on behalf of the VPA. Aurecon liaised directly with the key stakeholders in **Table 1** below for this Report.

Table 1: Key Stakeholders

Service Infrastructure	Key Service Authorities	Other Stakeholders
Water	Coliban Water	
Recycled Water	Coliban Water	
Sewerage	Coliban Water	
Stormwater drainage	City of Greater Bendigo	
Electricity	Powercor	*Australian Energy Market Operator (AEMO)
Gas	Tas Gas c/o Gas Network Victoria	AusNet Gas Services

Telecommunications	NBN Co and Telstra	

**Note: AEMO were contacted by Aurecon, at the request of VPA.*

1.4 General Assumptions and Limitations

This Report is limited based on the assumptions and qualifications provided throughout. The following general assumptions and limitations apply:

- The relevant USPs have been determined based on a DBYD enquiry and the locations of existing above ground and underground services. Any associated easements are approximate based on spatial data provided by the service authorities and relevant stakeholders.
- The service locations should not be relied upon for any detailed planning or design works, or for construction activities. Physical access constraints have been identified where data has been provided. However, this should be confirmed by site visits prior to any nearby works occurring.
- Spatial data including pipe sizes, pipe material and levels is current as of October 2022 to February 2023 and is also based on spatial data provided by the service authorities. Where updated spatial information has not been received it has been assumed that any recent changes to infrastructure will have negligible impact on this study.
- Where spatial data requested has not been provided or received, service location obtained via the DBYD process has been utilised.
- This assessment has not included any site inspections, service proving or other reviews of existing infrastructure condition.
- Action items raised that still require further analysis from the USPs at the time of writing this Report, have been identified as an analysis in progress.
- Detailed assumptions used for the utilities servicing assessment Report are shown in **Appendix A**.

2 Methodology

The following is a brief description of the process undertaken by Aurecon for the Final Utility Service Assessment Report (Phase 3). **Table 2** below outlines the sequencing of deliverables and shows how the final deliverable will be built.

Table 2: 2Report Phases

Report Phase	Utility Services Assessment	Status
Phase 1	Situational Analysis	Completed
Phase 2	Draft Utility Services Assessment	Completed
Phase 3	**Final Utility Service Assessment**	**Completed (this Report)**

2.1 Inception Meeting

An inception meeting with the VPA and City of Greater Bendigo was held on 24th October 2022 to discuss the precinct site overview and updates from agencies and landowners. The BREP job growth projections and PSP timeline were also discussed.

The handover of existing VPA GIS and development data for work already undertaken on the BREP was requested by Aurecon, who had confirmed the USPs via a DBYD. Aurecon then proceeded to engage with these Service Authorities and their key contacts.

To facilitate timely stakeholder engagement with the relevant Service Authorities, Aurecon requested VPA to notify relevant Service Authorities that Aurecon would be undertaking a Utility Servicing Assessment on their behalf.

2.2 Communication with Service Authorities

Each USP was contacted and provided with the BREP growth projections, lot yield and industrial zone assumptions as noted in **Appendix A** and GIS spatial data requirements. The following data was requested from the Service Authorities:

- Existing servicing infrastructure:
  - GIS data with all current existing service infrastructure and any associated easements within the BREP and MWFC Investigation Area and directly adjoining areas.
    - The location, offsets, and material type of existing underground (including depth) and/or above-ground infrastructure.
    - Indicative location of possible future servicing infrastructure identified.
  - Information on current access to existing service infrastructure and any access constraints.
  - Information on current capacity of all existing service infrastructure.
    - Network Planning details and plans for future development and any augmentation works identified.
    - Any key opportunities and constraints for future development.
- Details of existing capital and maintenance programs.
- Details of existing strategies including relevant staging of work programs.
- Alternative Servicing Infrastructure.

Some of the Service Authorities provided part of the information requested, whilst others required confidentiality and data sharing agreements to be entered into prior to providing their requested information.

3 Situational Analysis

A summary of the data collected and obtained from the Service Authorities and the research outcomes determined by Aurecon for each of the utility infrastructure services is shown within Section 3. Overall recommendations and conclusions are provided in Section 23.

3.1 Potable Water & Recycled Water

The key potable water and recycled water stakeholders engaged are shown in **Table 3**.

Table 3:3 Water Service Providers

Service Providers
Coliban Water

3.1.1 Existing Services

Water Supply

The existing water supply in the vicinity of the BREP is provided by Coliban Water within the Marong Township. However, there are no existing water services within the BREP or the MWFC Investigation Area. The water supply pipes in the Marong Township vary in diameter, ranging from 75mm to 400mm.

The nearest existing water supply network to the BREP and MWFC Investigation Area is a 180mm diameter watermain along Calder Alternative Highway, situated approximately 170m northeast of the BREP border. This connects to an existing 225mm main in Malone Park Road, as detailed in **Appendix D**.

Coliban Water's upcoming projects include the Maiden Gully Marong Water System Augmentation plan, scheduled for implementation between 2023 and 2033 (refer to **Appendix C**). As part of the Augmentation works, Coliban Water plans necessary upgrades to the Bendigo Water Treatment Plant in response to the forecasted capacity limit expected within the next five years. A preliminary estimate suggests that the anticipated capacity increase of 40ML/day would incur costs around $35 million. There is a possibility of incorporating additional upgrades to service the BREP, considering the Maiden Gully Marong Water System Augmentation plan is currently in the pre-design phase. However, funding and implementation strategies are yet to be determined.

Coliban Water is currently addressing water pressure challenges in the Marong Township. This includes delivering a 3ML water reservoir in Marong (already delivered) and 11km pipeline from the Specimen Hill Reservoir in Golden Square to Marong via Edwards Road (design completed and currently in various stages of procurement).

Recycled Water Supply

There are no operational recycled water services within and surrounding the BREP and the MWFC Investigation Area as shown in **Appendix D**.

3.1.2 Service Implications

Water Supply

Depending on the final estimated water demand for the BREP, additional upgrades to the Bendigo Water Reclamation Plant may be needed. Any additional upgrades related to the BREP will be carried out at the cost of the development.

It has been planned to up size the 11km pipeline extending from Specimen Hill Reservoir to Marong by one pipe size to accommodate the BREP as shown in **Appendix E**. The cost of this upsizing is being prepared and the City of Greater Bendigo have been asked to pay for the full cost of the upsizing.

Recycled Water Supply

The nearest recycled water supply connection is approximately 13km away at Lake Neangar in Eaglehawk, where the Cockatoo Channel offtake is located. A recycled water tank constructed at the BREP could address potential peak capacity constraints to the Cockatoo Channel intake shown in **Appendix E**.

Since the Marong Business Park is at the head of the catchment sewer mining will only be possible in the presence of a substantial and reliable sewer discharge from the BREP itself. The nearest potential sewer mining location, the Schumaker's Lane pump station, is approximately 10km away (straight line distance). Coliban Water lacks a suitable site for installation, making it the City of Greater Bendigo's responsibility to secure and manage rezoning for a future facility.

Overall, viability of sewer mining is dependent on the BREP's sewer discharge profile. Sewer opportunities become viable if there is a substantial and reliable amount of sewer discharge which can be treated to serve as an alternative water source.

3.2 Sewer

The key sewerage stakeholders engaged are shown in **Table 4**:

Table 4:4 Sewer Service Providers

Service Providers
Coliban Water

3.2.1 Existing Services

The existing sewerage system surrounding the BREP is limited to the sewer services located within the adjoining Marong Township as shown in **Appendix D.** There are no existing sewer services within the BREP or MWFC Investigation Area. The closest existing sewer services to the BREP and MWFC Investigation Area are listed below.

- Sewer pump stations
  - Malone Park Recreation Reserve approximately 730m north-east from the BREP area.
  - Ormond Rd approximately 700m north of the BREP and 850m east from the MWFC Investigation Area.
- Sewer pipelines
  - 150mm diameter along Calder Alternative Highway approximately 170mm north-east of the BREP.
  - 150mm diameter along Carlin Way approximate 150m north from the BREP.
  - 150mm diameter along Landry Lane approximately 250m north from the BREP and 690m east of the MWFC Investigation Area.

The Bendigo Water Reclamation Plant has reached its capacity and capacity upgrades are required imminently. The Coliban Water's Water Augmentation Project scope includes the upgrade of the Bendigo Water Reclamation Plant. This will increase capacity from about 25ML average dry weather flow, to about 36ML average dry weather flow.

Furthermore, the sewer systems in Maiden Gully, located downstream of the Marong Township, is currently operating at full capacity. Design for enhancing the sewer services has commenced and will be completed by 2025, as indicated in **Appendix C**.

3.2.1 Services Implications

The tender documents for upsizing the Water Reclamation Plant are under preparation, so inclusion of further expansion specifically for BREP will be challenging and would require commitment for funding of the expanded

capacity. While the proposed sewer system will initially be oversized due to staging and odour management considerations, Coliban Waters emphasized that providing additional capacity for BREP is not practical.

The ultimate solution for BREP is a dedicated sewer. As the straight-line access to the Bendigo Water Reclamation Plant is more than 17 km shown in Appendix E. The construction of this asset is expected to be more than $25M at the time of writing. For this reason, the City of Greater Bendigo has been advised to explore the possibility of a localised treatment plant. This is especially relevant when considered in conjunction with the upgrades to the Water Reclamation Plant. On the basis that there is no opportunity to amend Water Reclamation Plant designs to include capacity for BREP. Coliban Water has advised that it may be prudent to build a new localised treatment plant to the west of Marong. This would also enable reuse options either within the BREP itself, the Marong community or with local farmers. Alternatively, the BREP development could be expected to provide forward funding for the cost of the next upgrade. This would occur through a dedicated New Customer Contribution or through direct funding. The quality and volume of discharges would be managed through Trade Waste agreements.

While an ultimate sewer solution is being delivered, the City of Greater Bendigo and other developers for the BREP will be offered temporary sewerage services for a limited time. Early indications are that 0.25ML for a period of up to five years is feasible under current circumstances. Access capacities will be reviewed in future to ensure that the asset is not over subscribed.

3.3 Stormwater and Drainage

The key stormwater and drainage stakeholders engaged are shown in **Table 6**.

Table 5: 5Stormwater and Drainage Service Providers

Service Providers
City of Greater Bendigo

3.3.1 Existing Services

The existing stormwater drainage system surrounding the BREP is limited to the services within the adjoining Marong Township. There are no existing stormwater drainage services within the BREP as shown in **Appendix D**. The closest services are listed below.

- RCP drainage pipelines
  - 300mm diameter along Calder Alternative Highway approximately 170m north-east of the BREP.
  - 300mm diameter along Evermore Drive approximately 150m north of the BREP and 690m east of the MWFC Investigation Area.
  - Some areas around Bullock and Fletchers Creeks to the east and northeast of BREP are flood prone. Parts of the land are very flat and providing adequate stormwater drainage to the area may be a challenge.

3.3.2 Services Implications

A drainage study for the West Marong Township directly north of the BREP, was prepared for the City of Greater Bendigo in 2015. This study indicated that for critical storm events which produced the most severe flooding in the catchment:

- Flood extents show that the critical storm for the Upper Catchment was the 2-hour storm.
- Flood extents show that the critical storm for the Lower Catchment in the 100-year ARI event was the 3-hour storm.
- Flood extents show that the critical storm for the Lower Catchment in the 10-year ARI event was the 6-hour storm.

Modelling of the catchment listed above showed that overland flow from the area south of Marong Links, including the golf course, is directed northwest via a constructed channel along the boundary of the golf course.

To reduce the flooding risk, high quality infrastructure is provided to improve the quality of water flowing into Bullock Creek. Through the incorporation of best practice Water Sensitive Urban Design (WSUD) for new developments, the impact to the environment and community will be reduced.

In lieu of a BREP specific drainage study, findings from the West Marong Township study could be used to indicatively inform drainage considerations such as retarding basins, culvert crossing, minimum immunity flood levels, overland flowpaths and flood prone areas. Furthermore, an order of magnitude indication of infrastructure sizing can be inferred based on a pro rata/ proportional assessment of contributing catchments.

However, a BREP specific drainage study is still recommended to confirm existing network capacities, required infrastructure sizing and other drainage considerations. Furthermore, sensitivity assessments are recommended given potential impacts of changes of legislation and design guidelines between the West Marong Township study (2015) and current standards such as the Australian Rainfall and Runoff guideline in 2019.

3.4 Electricity

The key electricity stakeholder engaged is shown in **Table 6**.

Table 6: 6Electricity Service Providers

Service Providers
Powercor Australia Ltd

3.4.1 Existing Services

There are some existing electricity services situated within the BREP. This includes existing 22kV service lines within O'Sullivans Road, running along the north to the northwest boundary of the BREP and 12.7kV lines crossing Cemetery Road at the southeast boundary of the precinct. There is also an existing 12.7kV service line that traverses the MWFC Investigation Area. Details of the existing electrical services are shown in **Appendix D**.

3.4.2 Services Implications

Powercor provided a high-level review on their existing electrical network infrastructure in the area, including current capacity within their network shown in Figure 2 below.

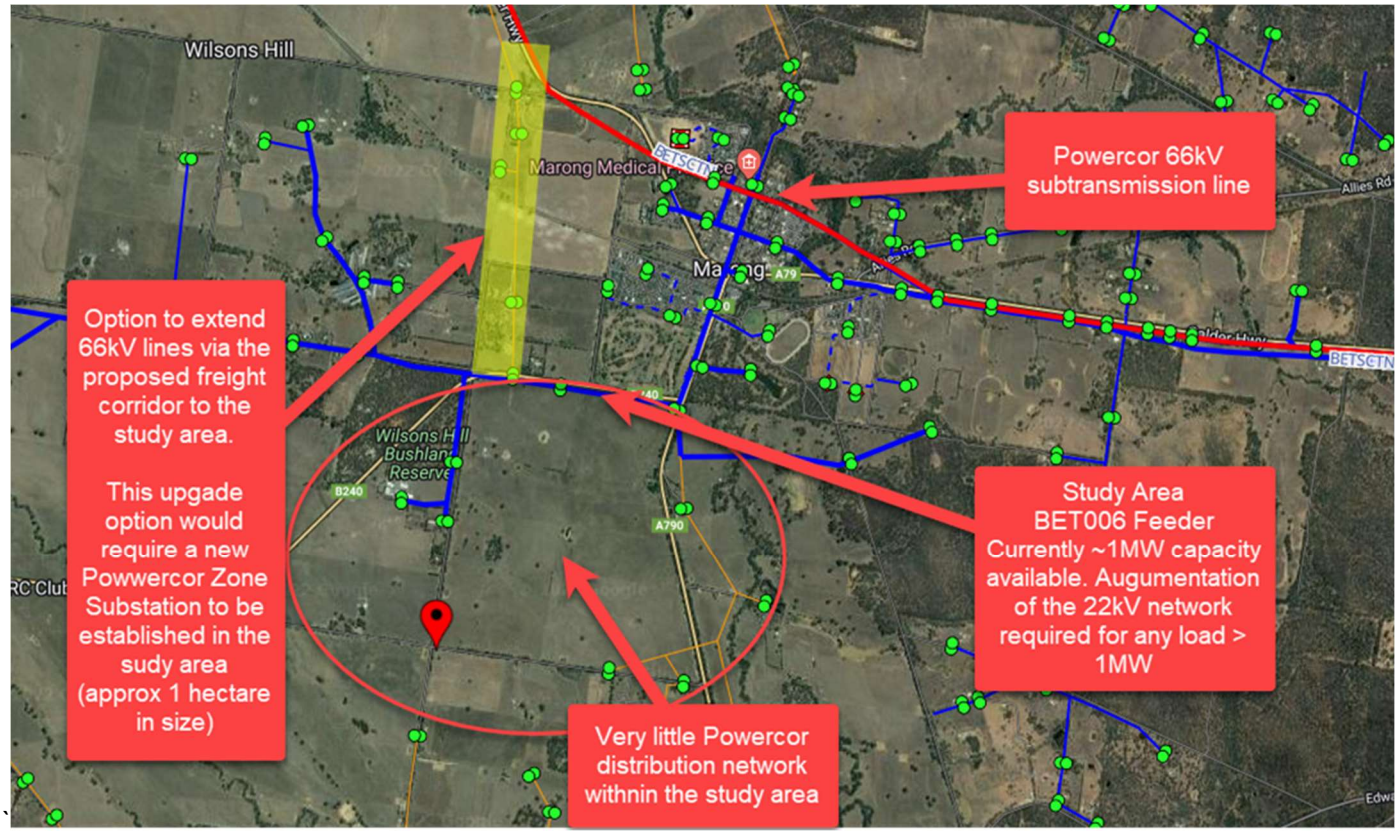


Figure 2: Existing Electrical Capacity (Powercor)

There is currently approximately 1MW of spare capacity to potentially service the BREP. Any load above 1MW may require additional augmentation of the upstream Powercor network. Powercor would be required to extend the current network inside the BREP. Another option for Powercor is to supply a much larger load (>8 to 10MW) within the BREP by extending the 66kV line along the proposed freight corridor to the BREP northwest boundary. This option would also require Powercor to build a new Zone Substation, with an estimated 1-hectare site area requirement.

Design of the services would be dependent on the forecasted electrical demand profile and subdivision layouts within the precinct.

3.5 Gas Service

The key gas stakeholder engaged is shown in **Table 7**.

Table 7: 7Gas Service Providers

Service Providers
Tas Gas

3.5.1 Existing Services

There are no existing gas services within the BREP and MWFC Investigation Area. The nearest existing gas networks area located in local towns such as Marong, Maiden Gully and Golden Square.

Aurecon liaised with Tas Gas and have not received the requested response in relation to their existing service information within the Marong Township. Details of their existing gas services within the Marong township were obtained via a DBYD request (Gas Network Victoria Services C/O Tas Gas) as detailed within **Appendix D**. The existing services include High-Density Polyethylene gas mains servicing existing properties, with the closest gas mains located within approximately 500m of the BREP boundary across the Marong Golf course.

AusNet were also identified through the DBYD process as a USP within the BREP and were contacted by Aurecon. The nearest AusNet Services gas supply mains are in Maiden Gully, approximately 6km east of the subject site as shown in **Appendix D**.

3.5.2 Services Implications

The Tas Gas gas network in Marong Township and the AusNet gas network in Maiden Gully was originally designed to service the nearby low density residual and light commercial demands of the respective towns. As such, little to no consideration being made for neighbouring developments and there is limited capacity to service nearby developments such as the BREP.

The closest high-pressure network connection, which may have potential available capacity, is in Golden Square, about 11km away as shown in **Appendix E**. However, the distance between the BREP and nearest potential connection point presents challenges in providing a feasible and economic approach to gas servicing.

3.6 Telecommunications

The key telecommunication stakeholders engaged are shown in **Table 8**.

Table 8:8 Telecommunication Service Authorities

Service Authorities
NBN
Telstra

3.6.1 Existing Services

NBN

NBN has not provided their existing service information within the Marong Township due to security protocols and confidentiality reasons. Details of their existing communication services within the Marong Township were obtained via a DBYD request.

There are no existing telecommunication services identified within the BREP, although there are NBN services within the adjoining Marong Township. Included in NBN's Strategic notes for BREP, the development is located within the wireless and satellite footprint of the NBN network shown in **Appendix D**.

The current extent of the NBN network in the Marong Township spans 21.5 km of cables with planned NBN network extensions of approximately 0.7km to further service the local township.

Telstra

The nearest Telstra connection is located within Evermore Drive, approximately 500m from the BREP boundary and across the Marong Golf Course. It includes 20mm and 100mm diameter conduits. Some proposed NBN services were also identified.

The current extent of the Telstra network in the Marong Township spans 14.1 km of cables with planned Telstra network extensions of approximately 0.1km to further service the local township

The BREP also has varying levels of regional telecommunications mobile coverage such as full 4G Telstra Coverage but no 5G Telstra Coverage as shown in Figure 3 and Figure 4.

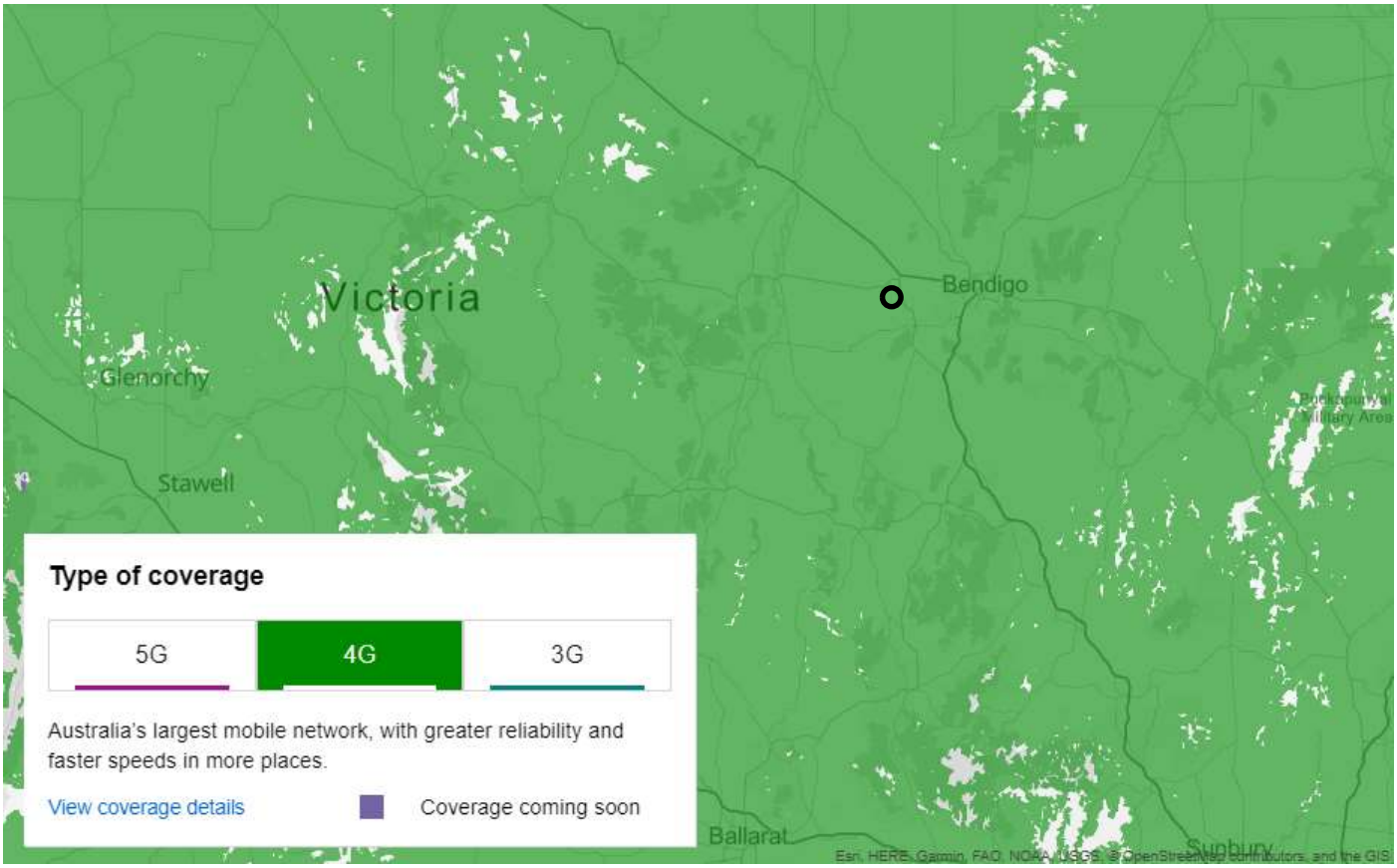


Figure 3: Extent of 4G coverage around BREP

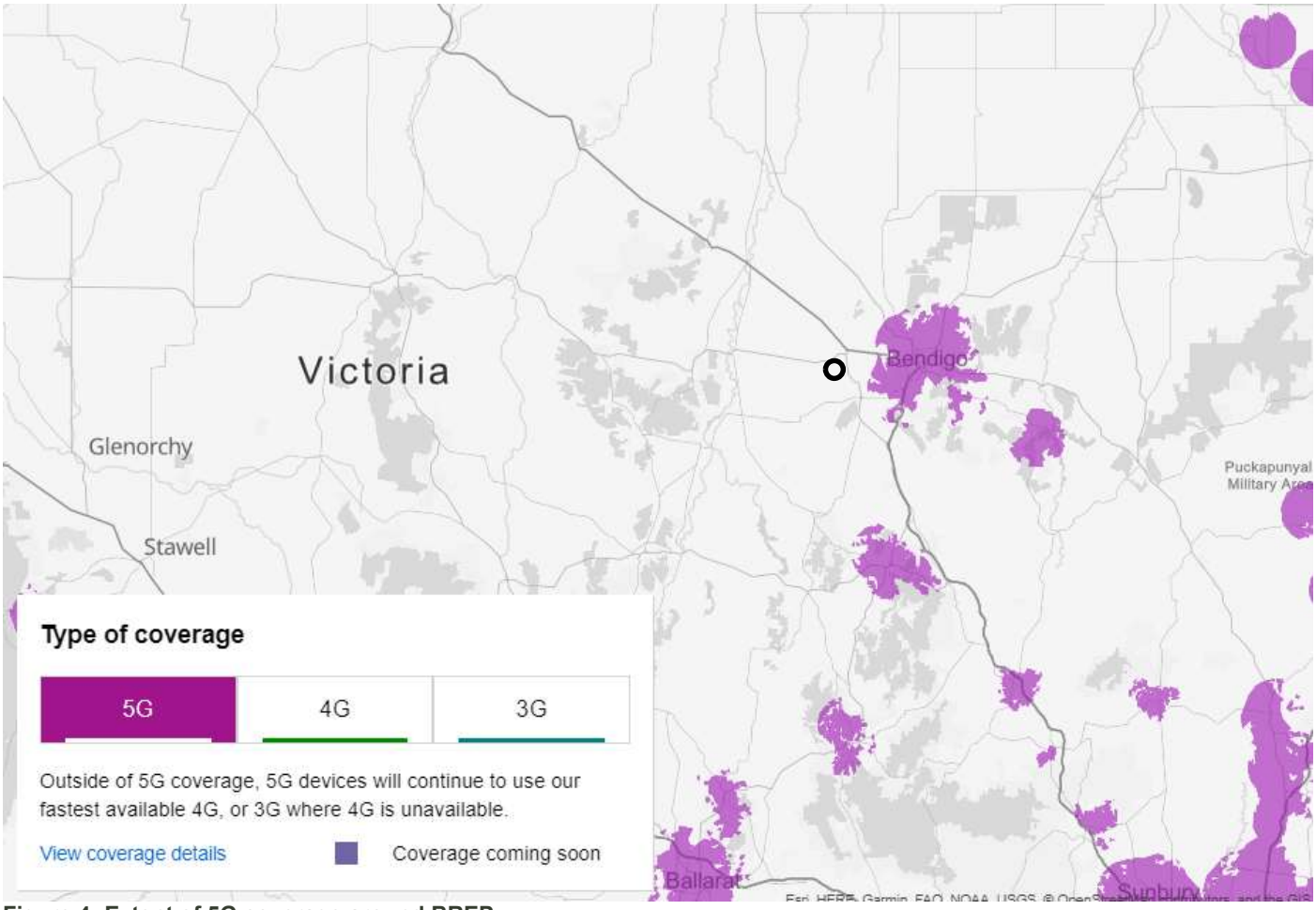


Figure 4: Extent of 5G coverage around BREP

3.6.2 Services Implications

Based on NBN's guidance outlined in Section 4.6 regarding FAN sites on Darling Street as the nearest recommended connection, it can be inferred that the existing network within the Marong Township is unable to support the proposed BREP. However, there is potential to facilitate the initial phases of BREP by establishing temporary connections with Marong to utilise any residual network capacity. However, additional coordination and assessments are required to understand the extent of residual capacity and implications on BREP development staging.

4 Utilities Servicing Assessment

4.1 Water and Recycled Water

4.1.1 Water Supply

To accommodate the growth requirements of the BREP, there may be the need for a larger upgrade or it may bring forward the subsequent upgrade of Bendigo Water Treatment Plant. Details of the capacity upgrade and required timing are yet to be determined and subject to further assessment and profiling of potable water demands. The current 11km pipeline design also does not factor in provisions for the BREP. However, upsizing pipeline sections and a second water tank are required to support the BREP, resulting in a peak-day supply capability of up to 4ML. This includes:

- Upsizing the pipeline between Specimen Hill Reservoir and Edwards Road, Maiden Gully from 375mm to 450mm
- Upsizing the pipeline between Edwards Road, Maiden Gully and the Calder Alternative Highway in Marong from 300mm to 375mm
- A second tank at Marong. Note the capacity of the tank is yet to be determined.
- Upsizing the pipeline within Marong to meet demand. However, pipe sizing assessment at the local scale are yet to be undertaken.

Refer to **Appendix E** for the Proposed Potable Water Services Plan. Details such as potential connect points and easement requirements are yet to be provided by Coliban Water.

Coliban Water have requested a commitment from the City of Greater Bendigo for the funding of this asset given procurement is imminent and the opportunity window to consider supplying the BREP via the Maiden Gully Marong Water System Augmentation plan is limited.

4.1.2 Recycled Water

To provide recycled water to the BREP, Coliban Water suggests considering a connection to Lake Neanger in Eaglehawk, specifically at the Cockatoo Channel offtake. The viability of this connection requires an understanding of the BREP's recycled water demand profile and ensuring it does not surpass the capacity provided by the recycled water pipe serving the Cockatoo Channel customers. If there are limitations in the Cockatoo Channel offtake's capacity, alternative solutions include provision of a local recycled water tank. However, additional consideration and assessments are required to understand viability. Refer to **Appendix E** for the Proposed Recycled Water Services

Details such as pipe sizing, capacity, potential connect points and easement requirements are yet to be provided by Coliban Water.

4.2 Sewer

Coliban Water have recommended a dedicated sewer system west of Marong to service the BREP and any potential Marong Township growth. Connecting to the Bendigo Water Reclamation Plant is forecasted to exceed $25 million given the required reticulation length is approximately 17km (straight line distance) and terrain is undulating. However, the details and feasibility of the localised sewer treatment system is yet to be determined and requires additional coordination and assessment. Refer to **Appendix E** for the Proposed Recycled Water Services Plan

In the interim, the City of Greater Bendigo and early BREP developers can access temporary sewerage services for a limited duration, with the specific amount determined during the application process. Initial assessments indicate that a total of 0.25ML for up to five years for the entire BREP is feasible. Access capacities will be periodically reviewed to prevent excessive subscription.

4.3 Stormwater and Drainage

The City of Bendigo are unable to provide an indication of the required stormwater works without undertaking a site-specific drainage study. No details are provided on any requirement for and detailing of infrastructure such as retarding basins, culvert crossing, minimum immunity flood levels, overland flowpaths and flood prone areas need to service the forecasted growth as per the BREP's assumptions in **Appendix A** is unknown beyond the indicative commentary noted in Section 3.3.

It is recommended that the City of Bendigo is engaged as part of future works to undertake a site-specific drainage study and develop a stormwater strategy to support the co-ordinated development of the BREP.

4.4 Electricity

Powercor were unwilling to coordinate with VPA without a formal and paid application, which includes a Mutual Confidentiality Agreement. Future Electrical Servicing Strategies therefore were not explored due to a lack of Powercor inputs beyond what is noted in Section 3.4. Overall, the capacity for the existing identified electrical network to service the forecasted growth as per the BREP's assumptions in **Appendix A** is unknown. The requirement, tipping points and timing of network augmentations have not been identified.

It is recommended that Powercor is engaged as part of future works to develop the electrical servicing requirements for the BREP future urban development.

4.5 Gas

As noted in Section 3.5, the distance between the BREP and nearest potential connection point at Golden Square is approximately 11km away as shown in Appendix E. Given the significant distance, AusNet's initial expectations are that the approach is unfeasible. However, in-depth assessments are yet to be undertaken to confirm this.

AusNet have recommended the exploration of alternative energy options such as supplementing gas usage with electricity. This contributes to achieving a net-zero outcome but also aligns with Victoria's Climate Change Strategy and its associated climate action targets. However, this approach may reduce the attractiveness of the BREP, especially for specific niche industrial developments that are still reliant on gas for business operations. Additional consideration would need to be made to the provision of electrical services as electrical demand may be higher than other similar industrial precincts.

It is recommended that Powercor is engaged as part of future works to develop the electrical servicing requirements for the BREP future urban development, which supplements gas servicing.

4.6 Telecommunication

NBN's proposed servicing involves extending fibre reticulation from the existing NBN Fibre Access Note (FAN) site at Darling St, Eaglehawk which is approximately 12km straight line distance away from BREP as shown in **Appendix E**. The existing exchange site's capacity is noted to be sizeable and sufficient to service the BREP's telecommunication's needs. Servicing new BREP service connections is generally assessed on a case-by-case application basis, primarily in response to customer-initiated demand. Required works would generally involve the install of the new BREP service connections that utilise a combination of existing Telstra ducts, new NBN builds, and developer-supplied shared trenching arrangements. Any new build, involving multiple conduits, to the BREP are planned to connect via Wimmera Hwy and Calder Alternative Hwy at the northern end. These lead-in works would then extend throughout the BREP via provision of additional pit and pipe infrastructure.

Details such as conduit arrangements, capacity, potential connection points and easement requirements are yet to be provided by NBN.

Telstra are yet to respond with the works required to support the BREP. Telecommunication servicing strategies, beyond NBN's inputs, are yet to be explored due to a lack of inputs by Telstra. While there is an understanding that the BREP's telecommunication requirements can be serviced by NBN, further assessments are yet to be undertaken to understand if Telstra is able to service the BREP more efficiently.

It is recommended that Telstra is engaged as part of future works to develop more robust telecommunications servicing strategies to support the BREP.

5 Utilities Servicing Assessment Summary

5.1 Recommendations

A summary of the recommendations resolved through the assessment are detailed in Table 13 below.

Table 13: Summary of Recommendations

Utility Service	Recommendations
Water Supply and Recycled Water	<u>Potable Water Supply</u> The existing water supply in the vicinity of the BREP is provided by Coliban Water within the Marong Township. However, there are no existing water services within the BREP or the MWFC Investigation Area. To accommodate the requirements of the BREP, there may be a need for a larger upgrade or it may bring forward the subsequent upgrade of Bendigo Water Treatment Plant. The current 11km pipeline design does not factor in provisions for the BREP. However, upsizing pipeline sections and a second water tank are required to support the BREP, resulting in a peak-day supply capability of up to 4ML. This includes: ■ Upsizing the pipeline between Specimen Hill Reservoir and Edwards Road, Maiden Gully from 375mm to 450mm ■ Upsizing the pipeline between Edwards Road, Maiden Gully and the Calder Alternative Highway in Marong from 300mm to 375mm ■ A second tank at Marong. Note the capacity of tank yet to be determined. ■ Upsizing the pipeline within Marong to meet demand. However, pipe sizing assessment at the local scale is yet to be undertaken. <u>Recycled Water Supply</u> There are no operational recycled water services within and surrounding the BREP and the MWFC Investigation Area To provide recycled water to the BREP, Coliban Water suggests considering a connection to Lake Neanger in Eaglehawk, specifically at the Cockatoo Channel offtake. The viability of this connection requires an understanding of the BREP's recycled water demand profile and ensuring it does not surpass the capacity provided by the recycled water pipe serving the Cockatoo Channel customers. If there are limitations in the Cockatoo Channel offtake's capacity, alternative solutions include provision of a local recycled water tank. However, additional consideration and assessments are required to understand viability.
Sewerage	The existing sewerage system surrounding the BREP is limited to the local sewer services within the adjoining Marong township and there are no existing sewer services within the BREP or MWFC Investigation Area. Coliban Water have recommended a dedicated sewer system west of Marong to service the BREP and any potential Marong Township growth. Connecting to the Bendigo Water Reclamation Plant is forecasted to exceed $25 million given the required reticulation length is approximately 17km (straight line distance) and terrain is undulating. However, the details and feasibility of the localised sewer treatment system is yet to be determined and requires additional coordination and assessment. In the interim, the City of Greater Bendigo and early BREP developers can access temporary sewerage services for a limited duration, with the specific amount determined during the application. Initial assessments indicate that a total of 0.25ML for up to five

	years for the entire BREP is feasible. Access capacities will be periodically reviewed to prevent excessive subscription.
Stormwater Drainage	The existing stormwater infrastructure surrounding the BREP is limited to the local sewer services within the adjoining Marong township and there are no existing drainage infrastructure services within the BREP or MWFC Investigation Area The City of Greater Bendigo are unable to provide an indication of the required stormwater works without undertaking a site-specific drainage study. No details are provided on any drainage considerations such as retarding basins, culvert crossing, minimum immunity flood levels, overland flowpaths and flood prone areas needed to service the BREP.
Electricity	There are existing electricity services situated within the BREP. This includes existing 22kV service lines within O'Sullivans Road, running along the north to the northwest boundary of the BREP and 12.7kV lines crossing Cemetery Road at the southeast boundary of the precinct. There is also an existing 12.7kV service line that traverses the MWFC Investigation Area. There is currently approximately 1MW of spare capacity to potentially service the BREP. Any load above 1MW may require additional augmentation of the upstream Powercor network. Powercor would be required to extend the current network inside the BREP. Another option for Powercor is to supply a much larger load (>8 to 10MW) within the BREP by extending the 66kV line along the proposed freight corridor to the BREP northwest boundary. This option would also require Powercor to build a new Zone Substation, with an estimated 1-hectare site required for this. Powercor were unwilling to coordinate with VPA without a formal and paid application. Future Electrical Servicing Strategies therefore were not explored due to a lack of Powercor inputs. Overall, the capacity for the existing electrical network to service the forecasted growth is unknown. The requirement, tipping points and timing of network augmentations have not been identified. It is recommended that Powercor is engaged as part of future works to develop the electrical servicing requirements for the BREP future urban development.
Gas	There are no existing gas services within the BREP and MWFC Investigation Area by any USP. There is gas supply is located in local towns such as Marong and Maiden Gully. The gas network in the Marong Township and in Maiden Gully was originally designed to service the nearby low density residual and light commercial demands and has limited capacity to service the BREP. The nearest potential connection at Golden Square presents a challenge to develop a feasible gas servicing strategy given the substantial distance. AusNet have recommended the exploration of alternative energy options such as supplementing gas usage with electricity. However, this approach may reduce the attractiveness of the BREP, especially for specific niche industrial developments that are still reliant on gas for business operations. Additional consideration would need to be made to the provision of electrical services, as electrical demand may be higher than other similar industrial precincts. It is recommended that Powercor is engaged as part of future works to develop the electrical servicing requirements for the BREP future urban development, which supplements gas servicing.
Telecommunication	There are no existing telecommunication services identified within the BREP, although there are NBN services within the adjoining Marong township. NBN's proposed servicing involves extending fibre reticulation from the existing NBN FAN site at Darling St, Eaglehawk, approximately 12km (straight line distance) away from the

	BREP. Required works would generally involve the installment of the new BREP service connections to utilise a combination of existing Telstra ducts, new NBN builds, and developer-supplied shared trenching arrangements. Any new build, involving multiple conduits, to the BREP are planned to connect via Wimmera Hwy and Calder Alternative Hwy at the northern end. These lead-in works would then extend throughout the BREP via provision of additional pit and pipe infrastructure. Telstra are yet to respond with the works required to support the BREP. While there is an understand that the BREP's telecommunication requirements can be serviced by NBN, further assessments are yet to be undertaken to understand if Telstra is able to service the BREP more efficiently.
Other (Roads)	Currently, there are no road connections within the BREP. The MWFC Investigation Area is situated along McCreddons Rd, but continuous road coverage does not span its entire area. A comprehensive understanding of arterial road and path networks is crucial for informing the location of utility service infrastructure and assessing its impact on the adjoining Marong township. Providing details on proposed arterial roads and all roads within both the BREP and the MWFC Investigation Area to the Service Authorities is recommended. This information would be valuable in planning for future infrastructure needs, including alignment locations.

5.2 Conclusion

Overall, the existing networks surrounding the BREP have limited capacity to service the BREP. Extensive lengths of lead-in reticulation are required to meet the BREP's servicing requirements for the proposed landuses and underlying utility demand. The servicing strategies noted above may have significant cost implications and potentially impact overall project feasibility.

Based on the limited detail provided by a few USPs, further coordination and ongoing consultation with the USPs is recommended to resolve the following items:

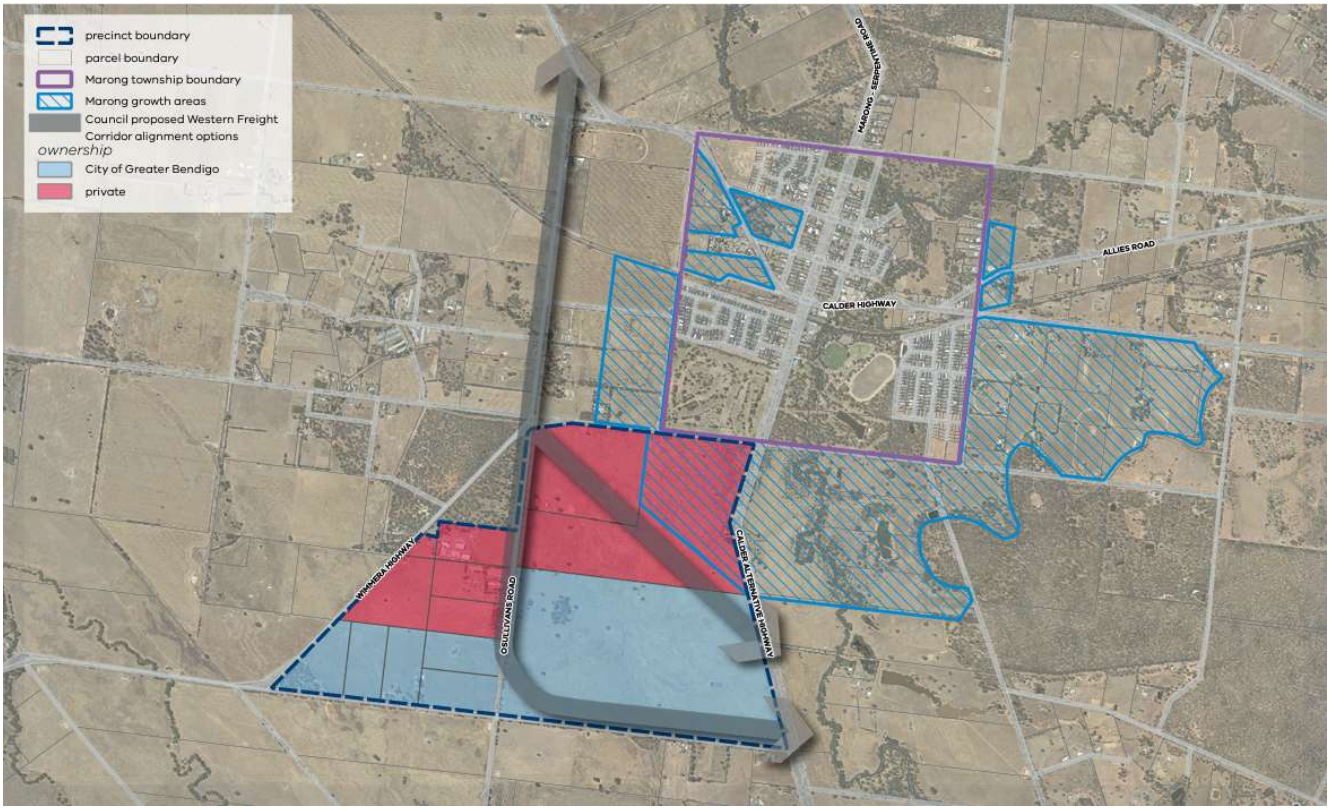
- Extracting and assessing the electrical, stormwater, gas and telecommunication detail underlying the future servicing strategies required to support the BREP.
- Explore potential alternative servicing strategies to optimise and improve the servicing strategy's efficiency.
- Refine the utilities servicing assessment following resolution of the MWFC. This includes provision of detail such as road cross-sections, alignment, construction timing and potential staging considerations.
- Collaboration with USPs as an integrated working group to explore infrastructure co-location to ultimately optimise the overall land take and easement requirements for infrastructure.

Appendix A: BREP place-based plan assumptions

The utilities servicing assessment report is based on the following assumptions:

Total area: 294ha

- Total private lot area: 205.8ha - 220.5ha (70-75%).
  - Proposed lot sizing: Indicatively 1.1ha - 1.5ha each.
  - Assume 8-10ha (2.7% - 3.4) for the future freight corridor.
  - Assume 249.9ha (85%) for the net developable area (removing all easements, drainage, open space etc).
  - Total local and collector road area: 29.4ha (10%)
  - Non-developable area (drainage areas, open spaces, other infrastructure etc.): 44.1ha (15%)
  - Marong Western Freight Corridor (MWFC) assumed to have an indicate footprint of 10ha, typical arterial road cross section and alignment as per the image below. Note that the MWFC details are yet to be determined at this point of time and the details noted are indicatively and solely used for the purpose of progressing the utilities servicing assessment. The servicing strategy is likely to be refined upon resolution of the MWFC.



- Proposed land uses:
  - Freight and logistics
  - Heavy industry
  - Food processing and manufacturing
  - Other manufacturing
  - Mining support industries
  - Waste collection, treatment, and disposal
  - Building construction
  - Commercial laundries
  - Car and truck wash

- Proposed zoning: Mostly IN1Z with a small portion of IN3Z.
- Forecasted employment growth: 3000 jobs within BREP area and 3000 additional indirect jobs.
- VPA are unable to confirm a preferred alignment for the freight improvement corridor. Both alignments below need to be considered. Note that the corridor alignments are not DTPendorsed and current work underway may change in the future.

Appendix B: Contour Plan

Source: ESRI Basemap, VPA, Coliban Water and Aurecon (2023)

Date: 7/12/2023 Version: 3

Path: C:\Users\Ling.Hsu\Aurecon Group\SAVI Spatial - Documents\Project Work\J0196_522775_Regional_Bendigo_Utility_Assessment\Project\P522775_BREP_mapping\P522775_BREP_mapping.aprx

Author: Ling.Hsu

A3 scale: 1:15,000

0 250 500 Metres

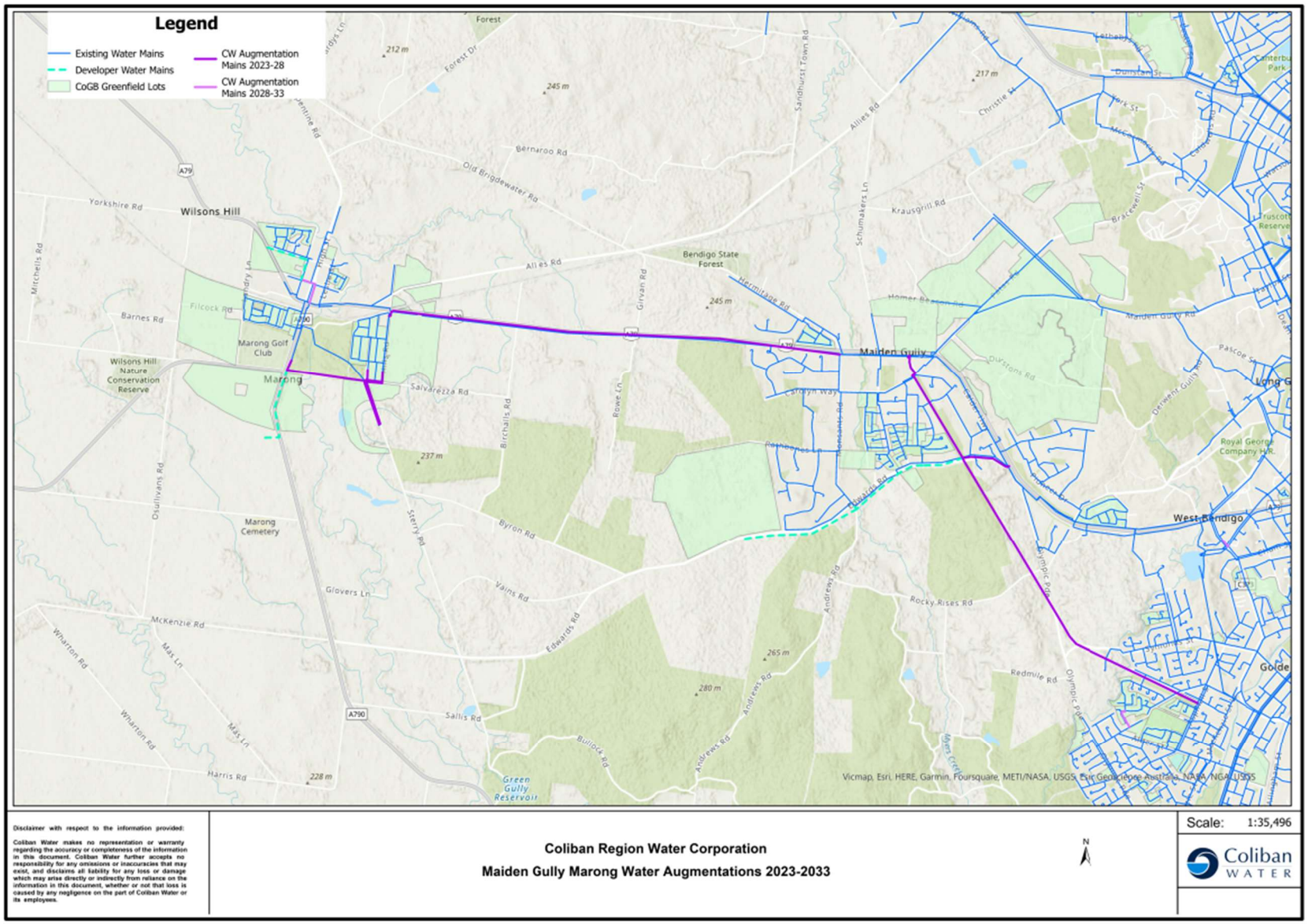
Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Contour Plan

Appendix C: Coliban Water - Maiden Gully Marong Augmentation plan (2023-2033)


Legend
Existing Water Mains
Developer Water Mains
CoGB Greenfield Lots
CW Augmentation Mains 2023-28
CW Augmentation Mains 2028-33
Wilsons Hill
Marong
Maiden Gully
West Bendigo
Bendigo State Forest
Marong Golf Club
Wilsons Hill Nature Conservation Reserve
Marong Cemetery
Green Gully Reservoir
Bernaroo Rd
Old Bridgewater Rd
Allies Rd
Salvarezza Rd
Byron Rd
Vains Rd
Glovers Ln
McKenzie Rd
Sallis Rd
Harris Rd
Rocky Rises Rd
Redmile Rd
Vicmap, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS, Esri Geographics Australia, NASA, NGA, USGS
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Coliban Region Water Corporation
Maiden Gully Marong Water Augmentations 2023-2033
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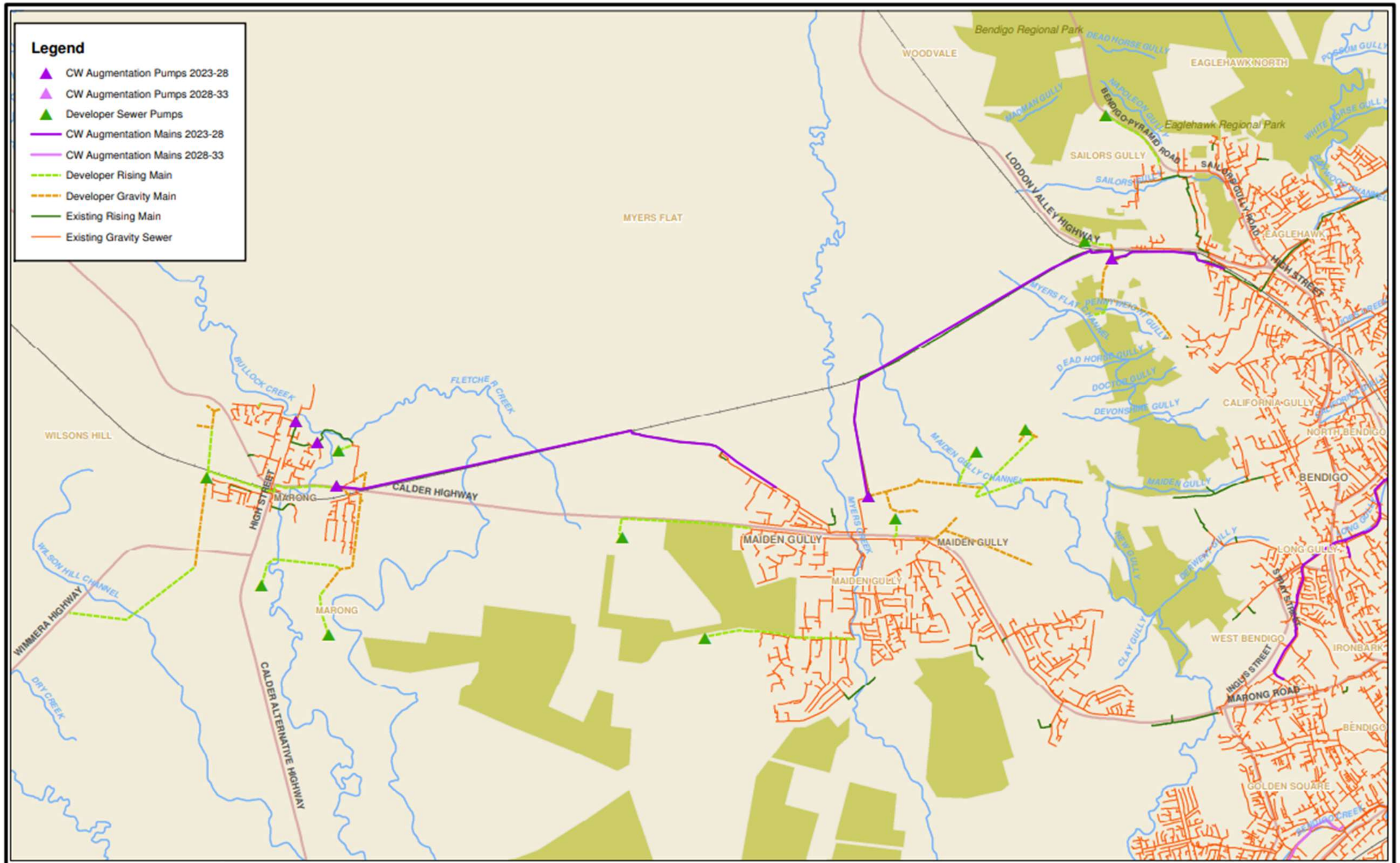
Scale: 1:35,496
Coliban WATER



Disclaimer with respect to the information provided:

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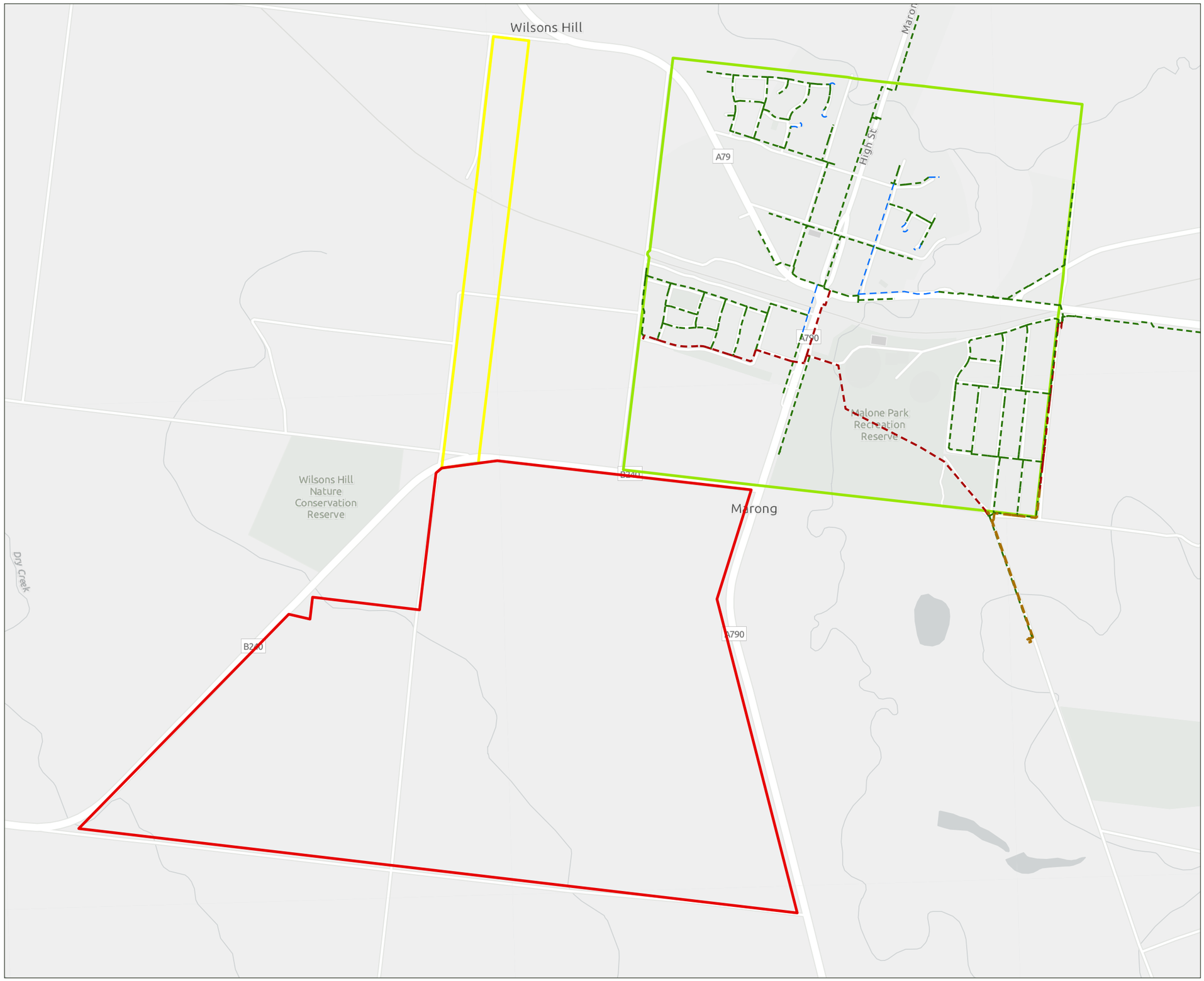
Coliban Region Water Corporation

Maiden Gully/Marong Sewer Augmentations 2023-33

Scale: 1:35,384 (A3)

Appendix D: Existing Services Plans



Legend

- Precinct Boundary
- Marong Township
- Marong Western Freight Corridor Investigation Area

Potable Water - Coliban Waters

- < 100 mm
- 100 - 200 mm
- 200 - 300 mm
- 300 - 400 mm

Source: ESRI Basemap, VPA, Marong Council and Aurecon (2023)

Date: 7/12/2023 Version: 3

A3 scale: 1:15,000

0 250 500 Metres

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Existing Potable Water Services

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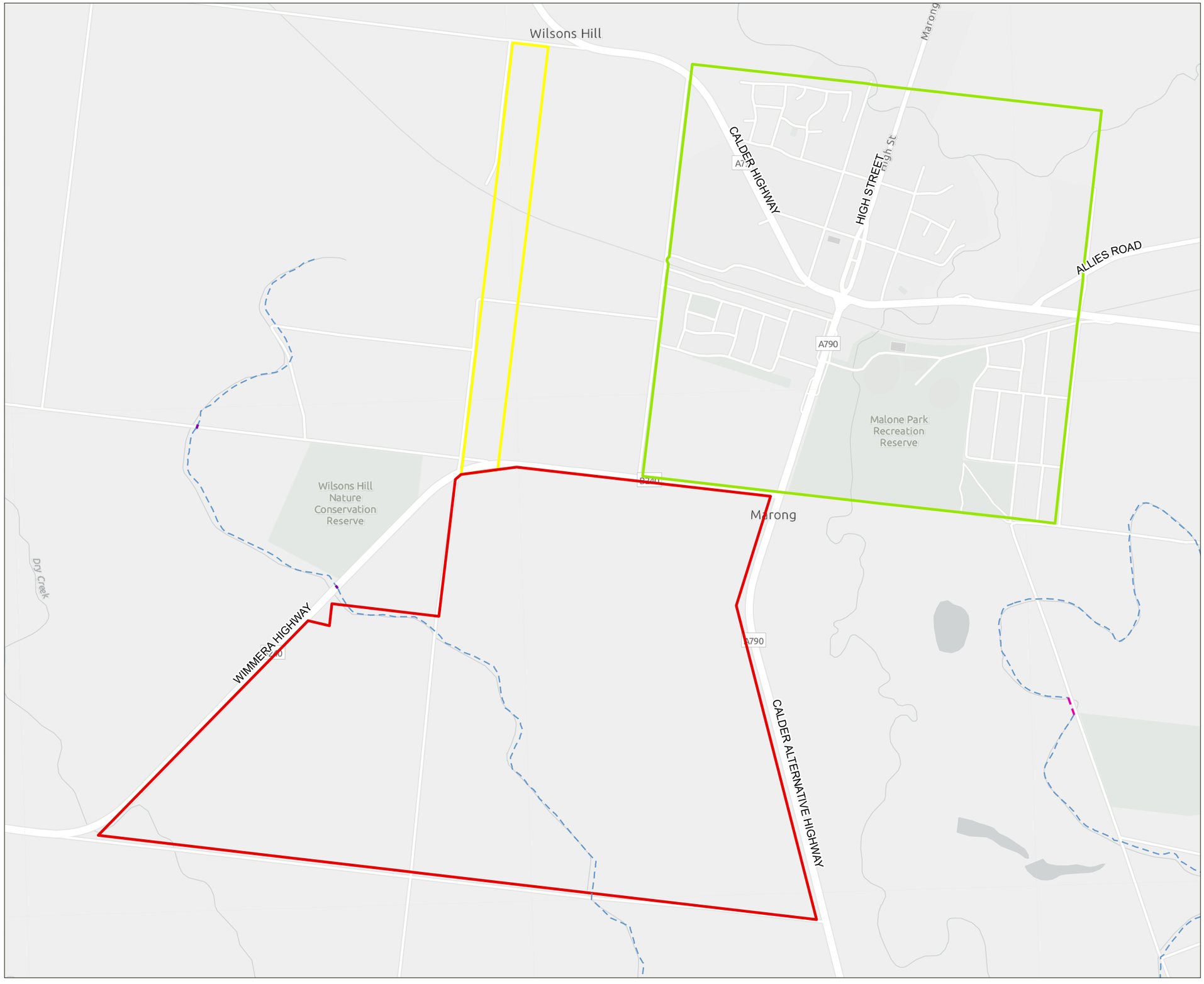
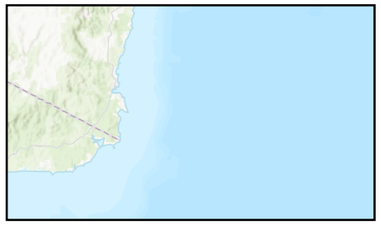
Author: Ling.Hsu





Legend

- Precinct Boundary
- Marong Township
- Marong Western Freight Corridor Investigation Area

Recycled Water - Coliban Water

- < 100 mm
- 520 mm
- 600 mm

Source: ESRI Basemap, VPA, Marong Council and Aurecon (2023)

Date: 7/12/2023 Version: 3

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Author: Ling.Hsu

A3 scale: 1:15,000

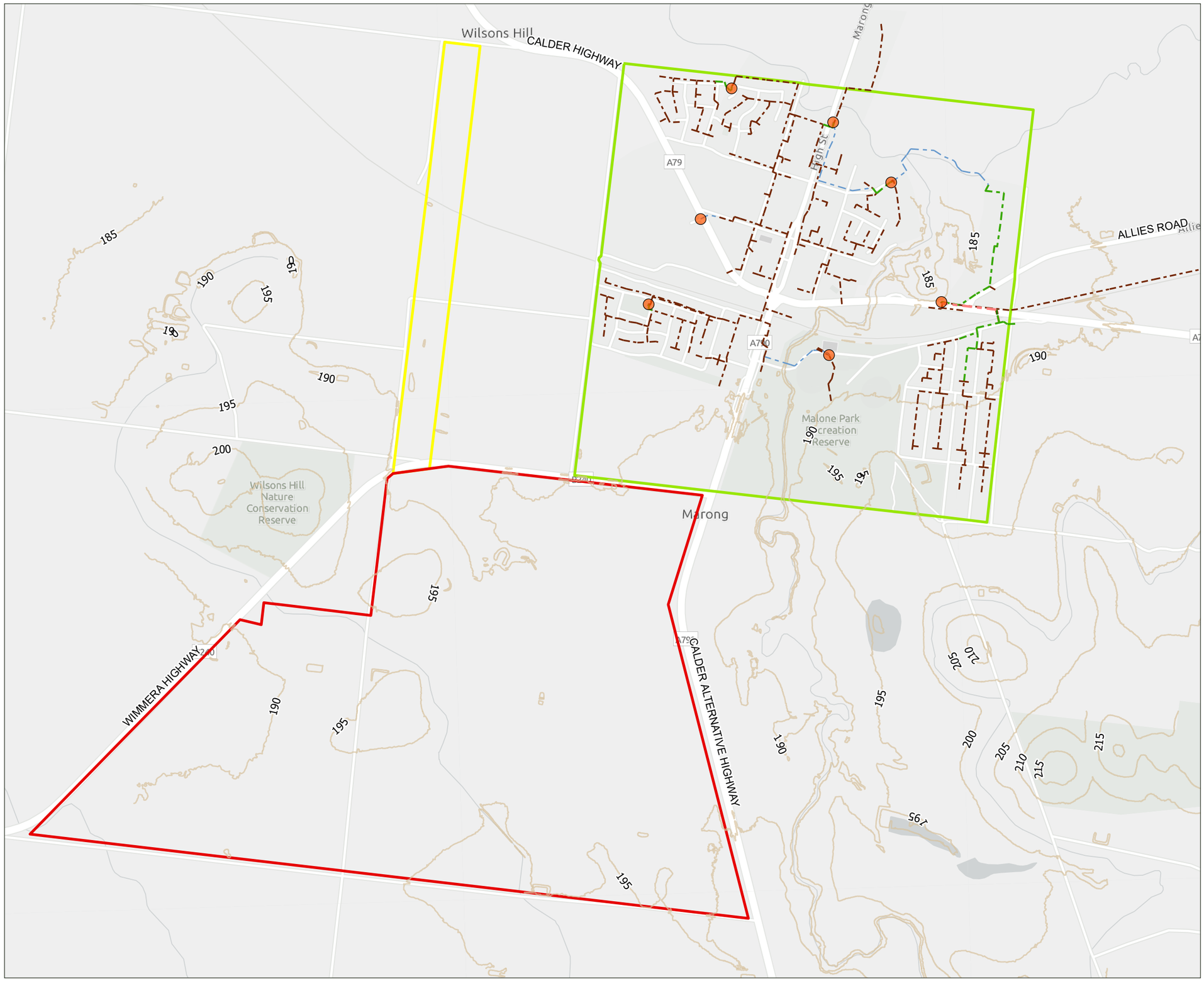
0 250 500 Metres

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Existing Recycled Water Services



Legend

- Precinct Boundary
- Marong Township
- Marong Western Freight Corridor Investigation Area
- Contour (5m)
- Sewer Pump - Coliban Water

Sewer - Coliban Water

- < 100 mm
- 100 - 200 mm
- 200 - 300 mm
- 300 mm
- 400 - 500 mm
- 500 - 600 mm

Source: ESRI Basemap, VPA, Coliban Water and Aurecon (2023)

Date: 7/12/2023 Version: 3

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Author: Ling.Hsu

A3 scale: 1:15,000

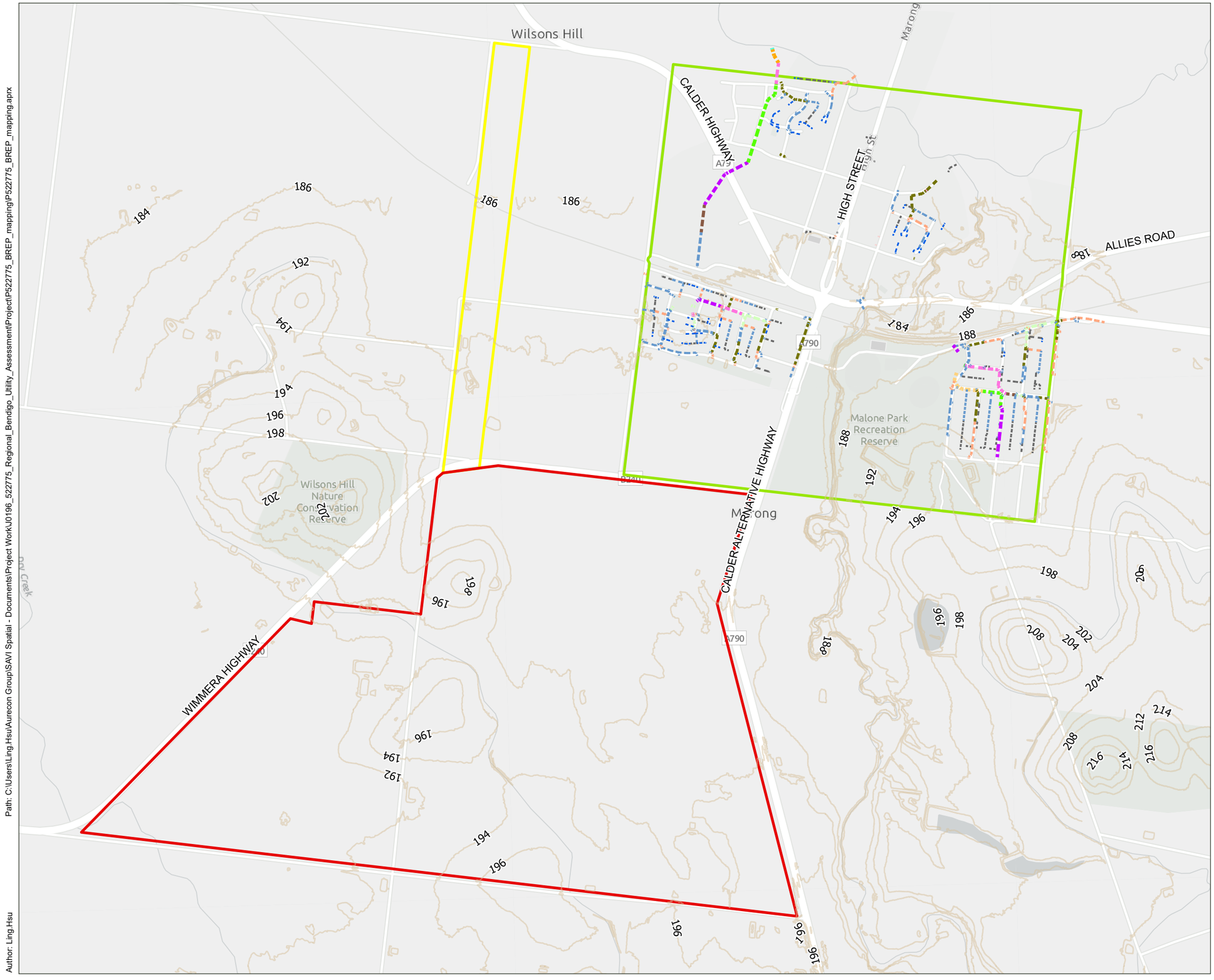
0 250 500 Metres

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Existing Sewer Services



aurecon

Legend

- Precinct Boundary
- Marong Township
- Marong Western Freight Corridor Investigation Area
- Contour (2m)

Drainage - City of Greater Bendigo

- 100 mm
- 150 mm
- 225 mm
- 300 mm
- 375 mm
- 450 mm
- 525 mm
- 600 mm
- 675 mm
- 750 mm
- 825 mm
- 900 mm
- 1050 mm
- 1200 mm
- 1800 mm

Source: ESRI Basemap, VPA, Coliban Water and Aurecon (2023)

Date: 16/11/2023 Version: 3

A3 scale: 1:15,000

0 250 500 Metres

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Existing Drainage Services

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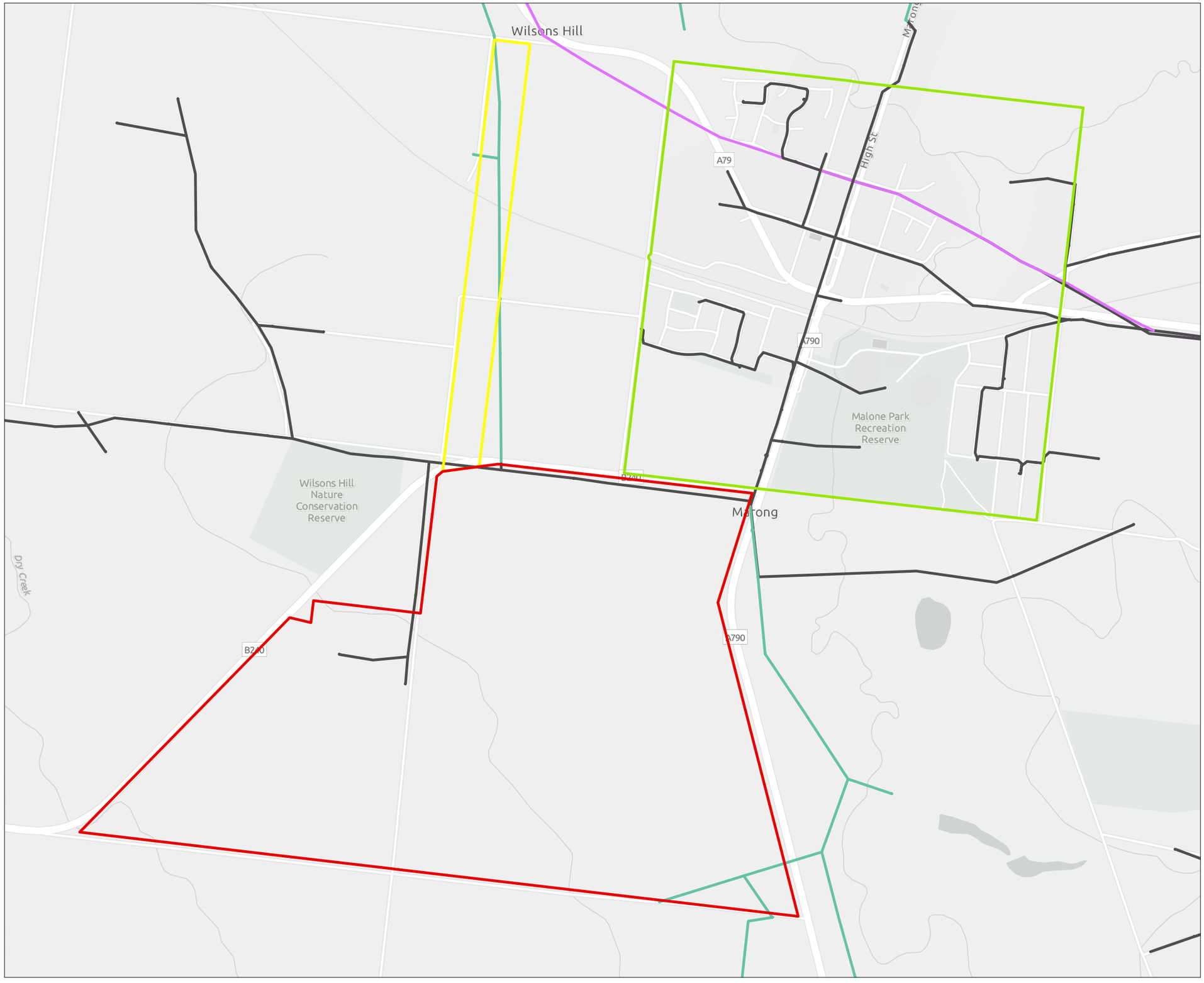
Author: Ling.Hsu



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Author: Ling.Hsu

aurecon

Legend

- Precinct Boundary
- Marong Township
- Marong Western Freight Corridor Investigation Area

Electricity - Powercor

Voltage

- 12.7kV
- 22kV
- 66kV

Source: ESRI Basemap, VPA, Marong Council and Aurecon (2023)

Date: 13/12/2023 Version: 3

A3 scale: 1:15,000

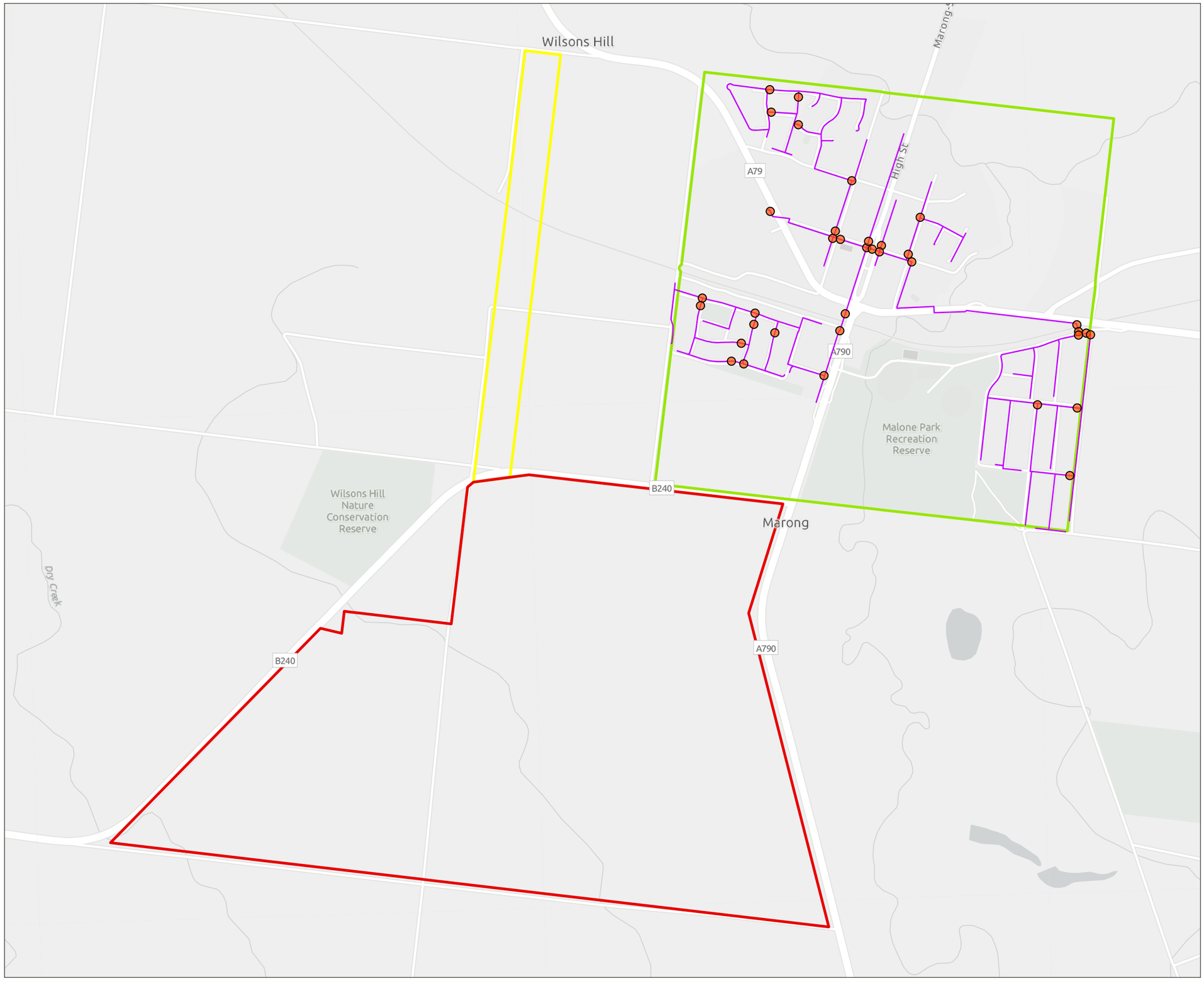
0 250 500 Metres

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Existing Electricity Services



aurecon

Legend

- Precinct Boundary
- Marong Township
- Marong Western Freight Corridor Investigation Area
- Gas Mains HDPE SDR17
- Valve

Source: ESRI Basemap, VPA, Coliban Water and Aurecon (2023)

Date: 7/12/2023 Version: 3

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Author: Ling.Hsu

A3 scale: 1:15,000

0 250 500 Meters

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

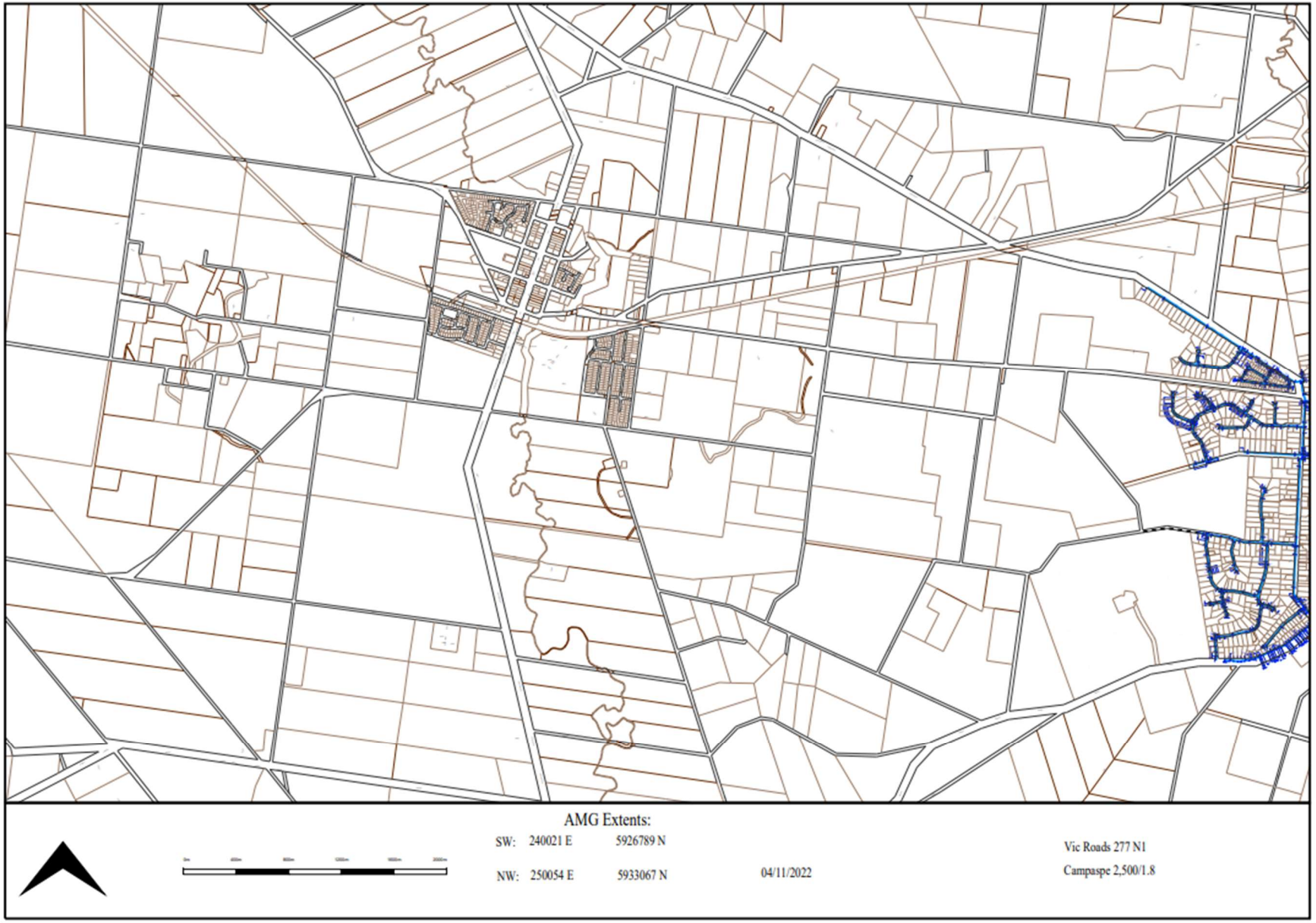
Regional Bendigo Utility Servicing Assessment

Existing Gas Services

TasGas Network plan

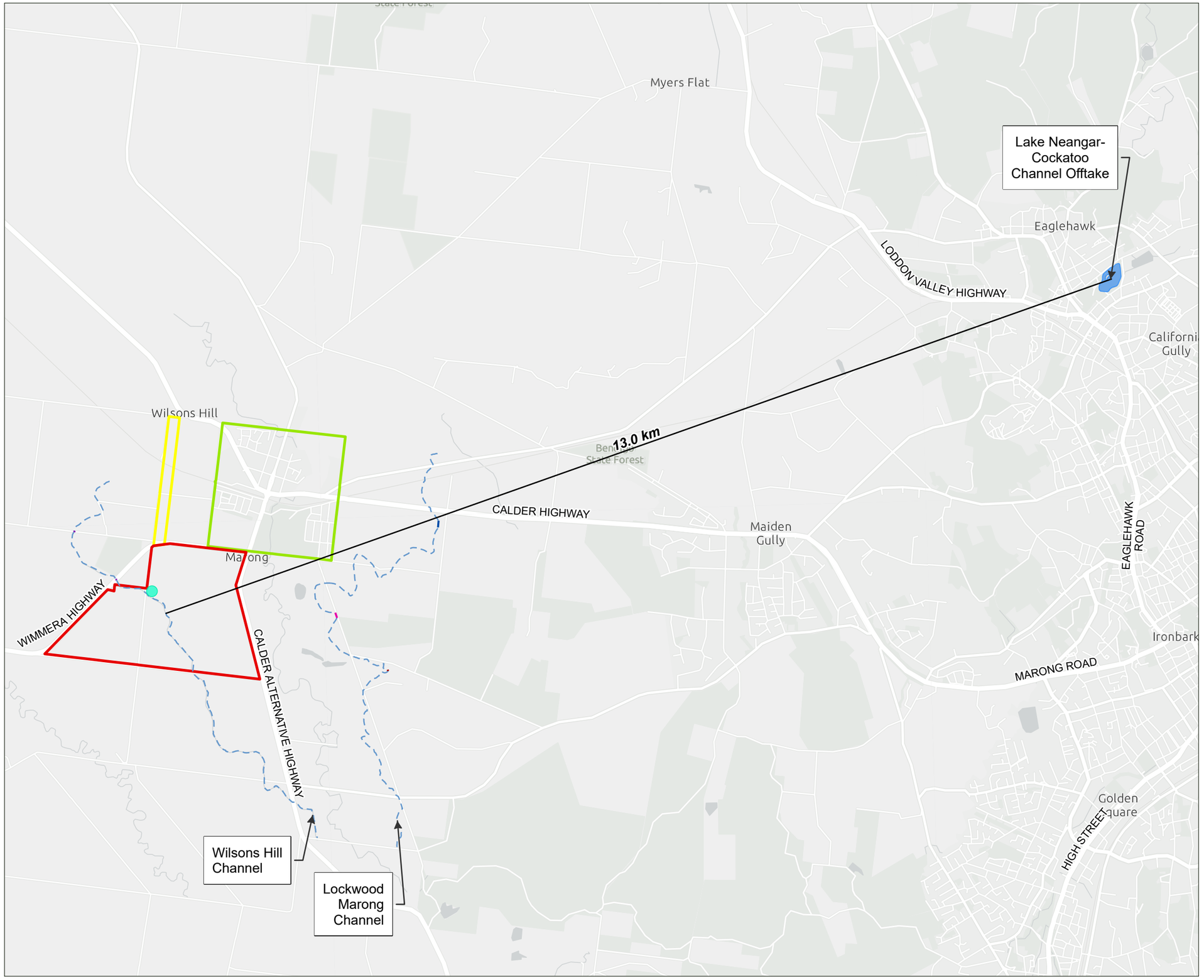
(Note: Compiled from Dial Before You Dig Plans)

AusNet Network plan



NBN Service Fixed Wireless/Satellite map

Appendix E: Proposed Services Plans



Legend

- Precinct Boundary
- Marong Township
- Marong Western Freight Corridor Investigation Area
- Potential Recycled Water Tank

Recycled Water - Coliban Water

- < 100 mm
- 200 - 300 mm
- 450 mm
- 520 mm
- 600 mm

Source: ESRI Basemap, VPA, Greater Western Water and Aurecon (2023)

Date: 7/12/2023 Version: 3

A3 scale: 1:50,000

0 1 2 Kilometers

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Proposed Recycled Water Services

Path: C:\Users\Ling.Hsu\Aurecon Group\SAVI Spatial - Documents\Project Work\J0196_522775_Regional_Bendigo_Utility_Assessment\Project\P522775_BREP_mapping\P522775_BREP_mapping.aprx

Author: Ling.Hsu

Myers Flat State Forest

Myers Flat State Forest

LODDON VALLEY HIGHWAY

Woodvale

Myers Flat

Planned upgrade to coliban water reclamation plant to increase capacity to 35ml/day. Upgrade does not include BREP requirements.

Eaglehawk

California Gully

17.0 km

Wilsons Hill

Bendigo State Forest

CALDER HIGHWAY

Maiden Gully

Marong

WIMMERA HIGHWAY

Indicative location of a potential localised sewer treatment plant for BREP

CALDER ALTERNATIVE HIGHWAY

North Bendigo

EAGLEHAWK ROAD

NAPIER STREET

MCCRAE STREET

MCIVOR ROAD

Ironbark

DON STREET

PALL MALL

MARONG ROAD

HIGH STREET

Flora Hill

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Author: Ling.Hsu

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ctoria

Melbourne

Legend

- Precinct Boundary
- Maiden Gully Township
- Marong Township
- Marong Western Freight Corridor Investigation Area
- Potential Sewer Treatment Plant
- Coliban Water Treatment Plant
- Input Existing Sewer
- Maiden Gully Marong 2023-28 sewer pump
- Maiden Gully Marong 2023-28 sewer main upgrade

Sewer - Coliban Water

- < 100 mm
- 100 - 200 mm
- 200 - 300 mm
- 300 mm
- 400 - 500 mm
- 500 - 600 mm

Source: ESRI Basemap, VPA, Greater Western Water and Aurecon (2023)

Date: 7/12/2023

Version: 3

A3 scale: 1:60,000

0 1 2 Kilometers

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Proposed Sewer Services

Gas network within Marong has no spare capacity

Gas network within Maiden Gully has no spare capacity

High pressure gas mains in Golden Square may have additional capacity

12.0 km

Wilsons Hill

Marong

Bendigo State Forest

Maiden Gully

Eaglehawk

California Gully

North Bendigo

Ironbark

Golden Square

Lockwood

Crusoe Reservoir

Legend

- Precinct Boundary
- Marong Township
- Marong Western Freight Corridor Investigation Area
- Maiden Gully Township
- Golden Square
- Gas Mains HDPE SDR17
- Valve

Source: ESRI Basemap, VPA, Coliban Water and Aurecon (2023)

Date: 7/12/2023 Version: 3

A3 scale: 1:55,000

0 1 2 Kilometers

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Proposed Gas Services

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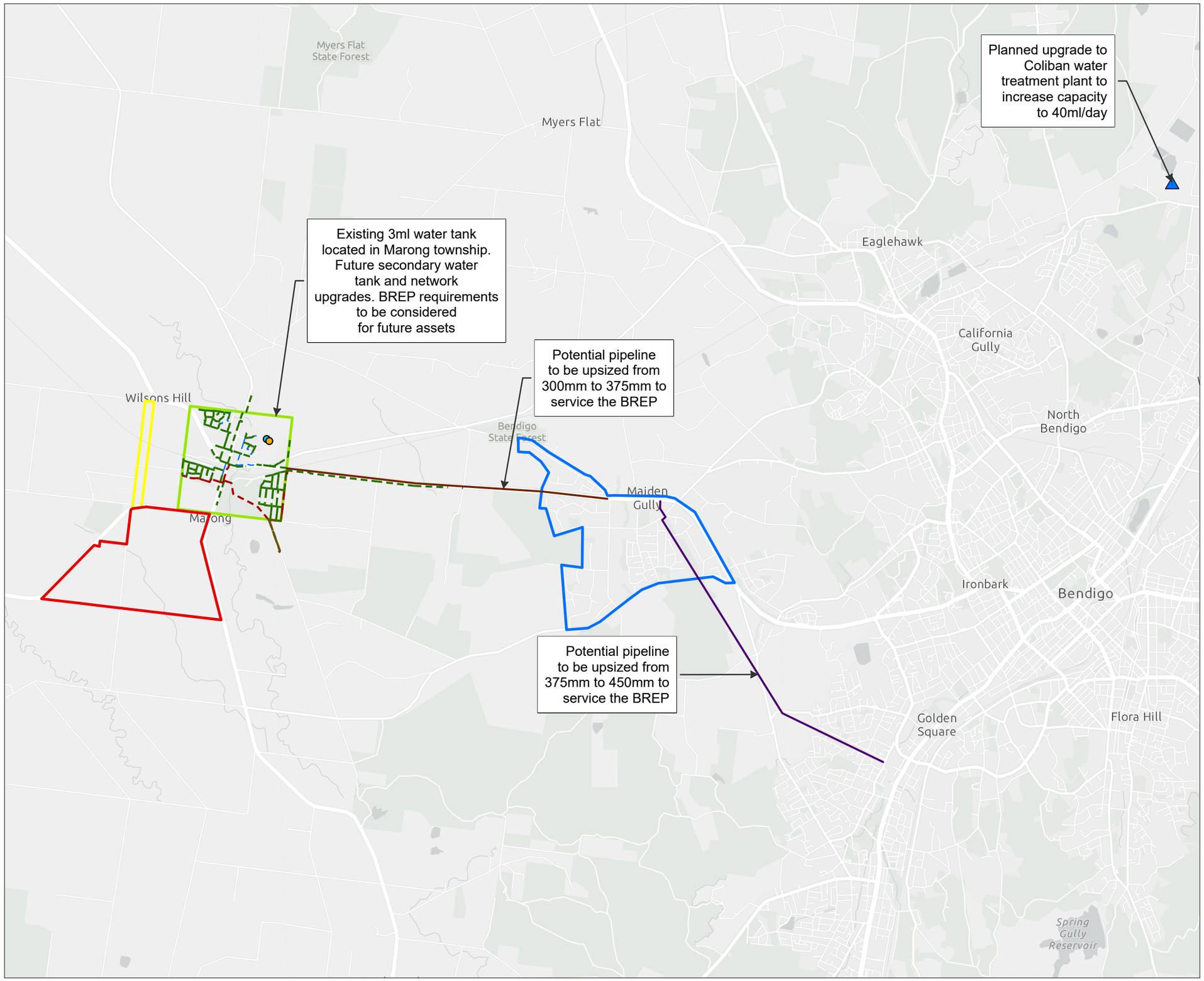
Author: Ling.Hsu



Legend

- Precinct Boundary
- Maiden Gully Township
- Marong Township
- Marong Western Freight Corridor Investigation Area
- Coliban Water Treatment Plant
- Indicative location of existing water tank
- Indicative location of proposed water tank

Potable Water - Coliban Waters

- < 100 mm
- 100 - 200 mm
- 200 - 300 mm
- 300 - 400 mm

Proposed Water Pipeline

- Coliban water - Water main upgrade project B
- Coliban water - Water main upgrade project C
- Label

Source: ESRI Basemap, VPA, Greater Western Water and Aurecon (2023)

Date: 7/12/2023 Version: 3

A3 scale: 1:60,000

0 1 2 Kilometers

Job No: 522775

Coordinate System: GDA2020 MGA Zone 55

Regional Bendigo Utility Servicing Assessment

Proposed Potable Water Services

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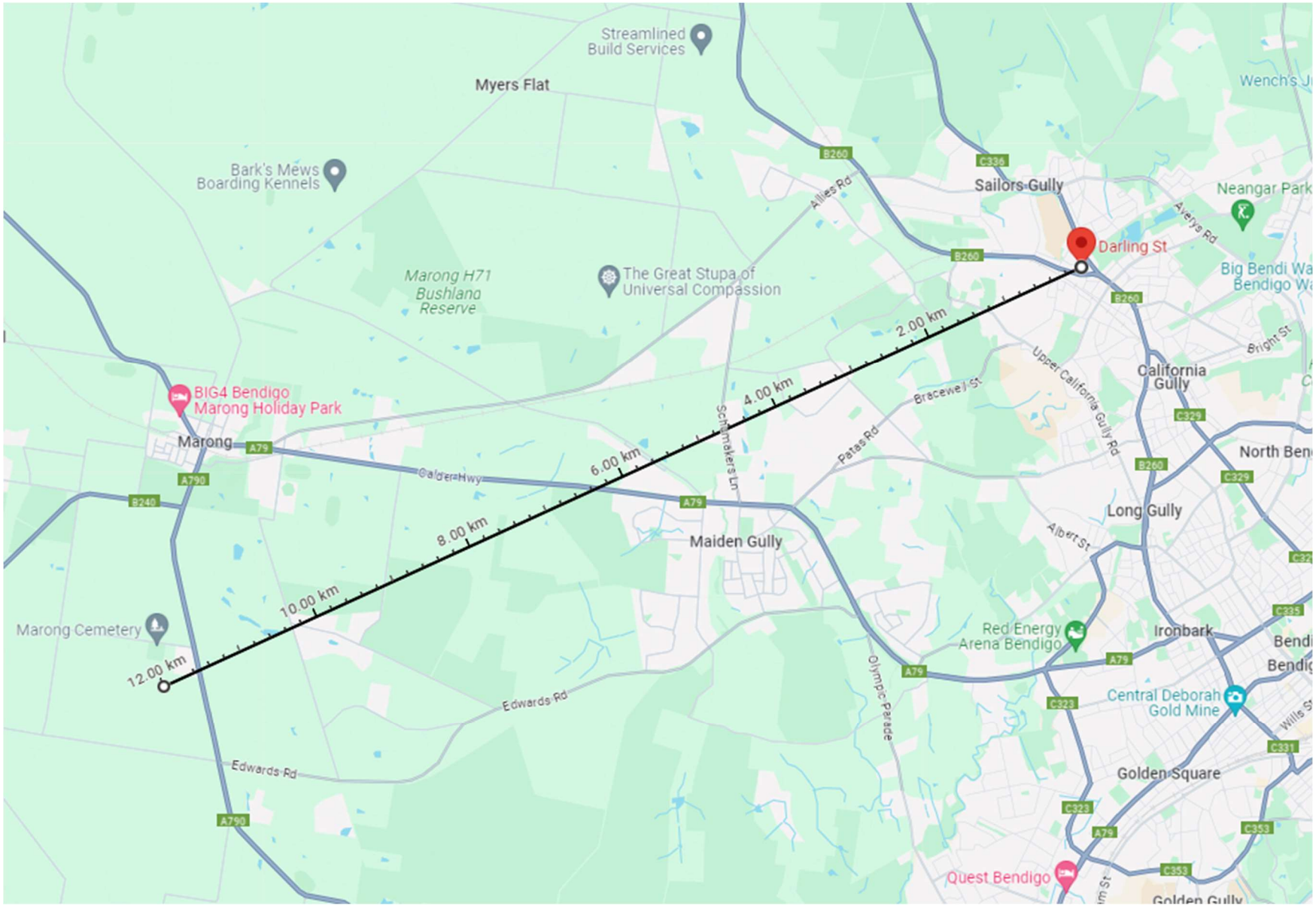
Author: Ling.Hsu

Distance of NBN Fan Site From BREP



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