



CLIENTS | PEOPLE | PERFORMANCE

Growth Areas Authority Report for Utilities Capacity Assessment Tarneit Precinct Structure Plan Area

Consultancy Services

July 2011



This Utilities Capacity Assessment for the Tarneit Precinct Structure Plan Area ("Report"):

- 1. has been prepared by GHD Pty Ltd ("GHD") for Growth Areas Authority (GAA);*
- 2. may only be used and relied on by Growth Areas Authority;*
- 3. must not be copied to, used by, or relied on by any person other than Growth Areas Authority without the prior written consent of GHD;*
- 4. may only be used for the purpose of Information and Forward Planning (and must not be used for any other purpose).*

GHD and its servants, employees and officers otherwise expressly disclaim responsibility to any person other than Growth Areas Authority arising from or in connection with this Report.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by GHD in connection with preparing this Report:

- were limited to those specifically detailed in this report;*

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions"), including (but not limited to):

- Nil*

GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation and may be relied on until 3 months, after which time, GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.



Contents

1.	Introduction	3
2.	Methodology	4
3.	Existing Services and Proposed Infrastructure Advice	5
3.1	General	5
3.2	Electricity	5
3.3	Telecommunications	8
3.4	Gas	9
3.5	Sewer	11
3.6	Water	12
3.7	Recycled Water	13
4.	Conclusion	15
	Table 4.1 Key Findings for the Provision of Services	
	Table 4.2 Overview of Trunk Infrastructure within PSPs	

Appendices

- A Existing Services Plans
- B Proposed Services Plan

1. Introduction

GHD has been commissioned by Growth Areas Authority (GAA) to undertake a Utilities Capacity Assessment for the Tarneit Precinct Structure Plan Area (PSPs 88, 89, 90 and 91) in the City of Wyndham, Victoria. The Tarneit area has been divided into four indicative PSP areas, with a total area exceeding 4,600 hectares. The site location of these PSPs is illustrated in Figure 1.1 below.

The proposed development area is bordered to the north by Boundary Road and extends as far south as Shaws Road. Plans for Melbourne's future Outer Metropolitan Ring Road (OMR) indicate the site will eventually be bordered to the northwest by this proposed road network.

Although masterplans for the development area have not been finalised, it is understood that the majority of the PSPs' development will primarily comprise of residential development occupying approximately 15 lots per hectare. GAA has provided an estimate of 50,000 residential lots proposed for the Tarneit PSPs development area. Each PSP is likely to include standard provisions of education facilities and community infrastructure including schools and shopping centres.

This report provides high level detail of GHD's infrastructure investigation for the four PSPs in question. Existing trunk infrastructure, proposed servicing strategies and service constraints and opportunities for each PSP, have been investigated and reported on.

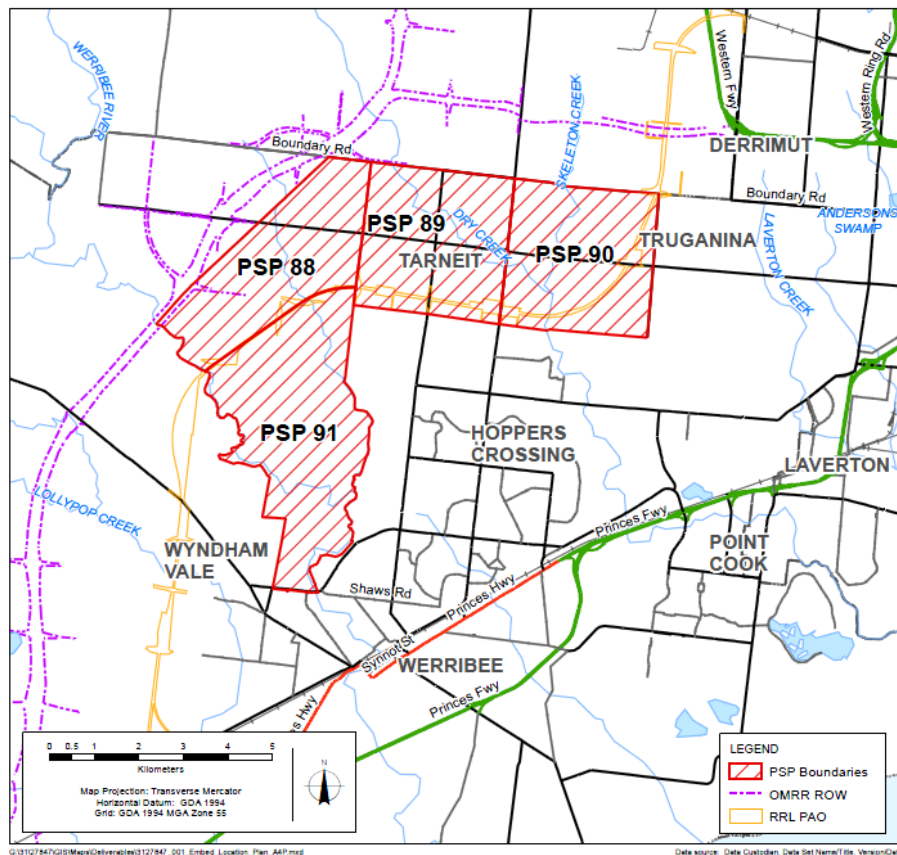


Figure 1.1: Site Location Sketch



2. Methodology

GHD conducted a general servicing location enquiry for all relevant services via Dial Before You Dig in early June 2011, and has received existing services plans from all relevant authorities. Upon receipt of these plans, brief discussions were held with each service authority to determine relevant contacts to provide further advice regarding the proposed future development. Digital copies of services plans were requested and used to create existing services plans shown in Appendix A. Previously prepared reports and information supplied by GAA were also reviewed to determine the requirement for further information.

Formal requests for further servicing advice were issued to all relevant authorities and subsequent meetings were held with a number of the stakeholder authorities. Phone and email discussions were followed to confirm and expand on all relevant servicing information.

A detailed review and analysis of the available service authority information was undertaken and broad high level service capacity and strategy advice was obtained from all service providers listed under Section 3.1 of this report. Meetings were held with the following service authorities in addition to receiving formal servicing information:

- Powercor
- SP Ausnet
- City West Water (CWW)

It is noted that an investigation into the stormwater drainage infrastructure is being undertaken by others and does not form part of this report.



3. Existing Services and Proposed Infrastructure Advice

3.1 General

GHD has contacted all relevant service authorities to obtain plans and details of existing services in the Tarneit PSP areas, with specific reference to the immediate area bound by the proposed development site.

The following asset owners and service providers were contacted:

- Electricity Distribution - Powercor ;
- Electricity Transmission - SP Ausnet;
- Telecommunications - Telstra;
- Telecommunications - NBN Co;
- Gas Reticulation - SP Ausnet;
- Gas Transmission - APA Group;
- Sewer, Water and Recycled Water - City West Water.

The location of all known existing trunk services is detailed below and existing services plans are provided in Appendix A.

Available service capacity, infrastructure strategies and high level costing advice received from the authorities has been gathered and detailed in the following sections.

Importantly, the Regional Rail Link (RRL) reserve exists within all four PSPs and provides a key development constraint for future servicing. Generally, service authorities have informed that further consultation is required when a functional RRL design is complete to ensure service strategies are amended to include the provision of Victoria's RRL in this area.

3.2 Electricity

Powercor is the authority responsible for the distribution of electricity to the area surrounding the Tarneit PSPs. In order for Powercor to deliver electricity to end users, power must be downgraded to a useable state from 220 kV transmission power to 0.4 kV. This occurs through a number of step-down processes. Victoria's power stations transmit high voltage electricity of 220 kilovolts (kV) to terminal stations via overhead transmission powerlines. SP Ausnet owns and maintains the terminal stations throughout western Melbourne, including the Altona Terminal Station. Terminal stations downgrade 220 kV power to 66 kV and is transferred through voltage lines (feeders) to Powercor's zone substations. Zone substations further downgrade power from 66 kV to 22 kV, which then transmit the electricity to either kiosk substations, pole substations or transformers, often located within road reserves. Finally, these smaller substations and transformers downgrade power to a useable residential voltage of 0.4 kV supplied to end users.



A meeting with Powercor was held on 27 June 2011, to discuss their proposed servicing strategy for the Tarneit site.

3.2.1 Existing Services and Assets

Powercor has advised the two nearest existing zone substations present in the Tarneit area are the Laverton Zone Substation (LV) and the Werribee Zone Substation (WBE). The LV zone substation is located on the corner of Sayers and Marquands Road, southeast of PSP 90, and is currently supplying the surrounding area in Point Cook, Hoppers Crossing, Tarneit, Truganina and Laverton. The maximum load this zone substation can cater for is approximately 100 MVA. The LV zone substation is 30 to 40 years old and consequently, it is highly sensitive. Powercor advised that any additional load on the LV zone substation could potentially result in failure.

The WBE zone substation is located on the corner of Shaws and Tarneit Road, southeast of PSP 91, and is currently servicing the Werribee, Wyndham Vale and Hoppers Crossing areas. The maximum load this zone substation can supply is approximately 120 MVA. The existing supply contribution from the WBE zone substation has the potential to service the Wyndham Vale area of PSP 91 for the proposed future development.

The nearest existing terminal station is the Altona Terminal Station located to the east of the PSP development area in Laverton North. A major 66 kV feeder extends west from this terminal station and exists within PSPs 89 and 90, located along Dohertys, Tarneit and Boundary Road. Figure 1 in Appendix A shows the approximate locations of the existing electricity feeders, zone substations and terminal stations.

Advice from Powercor suggests there will be insufficient capacity over the next few years to service the proposed development. The LV feeder currently has spare capacity of approximately 2-5 MVA, whilst the WBE feeder has approximately 10-15 MVA spare capacity.

SP Ausnet has advised they own a 55 m wide transmission power easement located within PSPs 88 and 89 which contains two 220 kV overhead transmission lines, referred to as the Kielor to Geelong transmission line. Figure 1 in Appendix A also identifies the approximate location of this easement.

3.2.2 Proposed Servicing Advice

Powercor has advised that major augmentation of existing infrastructure along with construction of new infrastructure is necessary to service the Tarneit development area. As such, two new zone substations, for Truganina and Tarneit, are required to provide electrical supply to the four PSPs. The Truganina (TNA) zone substation is planned for Robinsons Road (northeast of PSP 90) in 2016. Powercor advised this time frame can be brought forward if necessary for development. Prior to construction of the TNA zone substation, the Laverton 22 kV feeders may supply the initial development stages of PSP 90 while existing feeders from the WBE zone substation may service the initial stages of PSP 91.

Powercor intends for the Tarneit (TRT) Zone Substation to be located at the corner of Tarneit and Dohertys Road where an existing 66 kV feeder currently exists. Construction is scheduled some time between 2020 and 2025. New zone substations will require approximately 1 hectare of land and are necessary to downgrade power from 66 kV to 22 kV. The cost of a new zone substation is estimated between \$15 and \$20 million.



Funding of new zone substations is based on incremental revenue versus incremental cost to build the zone substation and generally, Powercor funds zone substation installations. Any new project however, is based on a case-by-case basis and Powercor has advised this may not be the case with every installation. It should be noted that current Powercor modelling practices may change by the time of construction for the area in question.

Powercor suggests an estimated 170 MVA will be required to supply approximately 50,000 residential lots within all four PSPs. This estimation is based on the assumption that 2.3 kVA is required per lot. Powercor's initial estimate does not make an allowance for any commercial infrastructure including facilities such as schools and shopping centres.

SP Ausnet has proposed a future terminal station for Deer Park in 2016 to ensure 220 kV can be downgraded to 66 kV. Powercor and SP Ausnet have advised an additional terminal station may be required within the next 20 to 30 years in PSP 89. The exact location has not been confirmed but it is likely to exist along the current transmission power easement. Smaller terminal stations occupy approximately 10 hectares, but more typically a terminal substation in this location is likely to occupy between 30 and 60 hectares. SP Ausnet has advised the location of a future terminal station within PSP 89 will be dependant on whether land is available and if landowners are willing to sell.

Locations of the proposed zone substations and terminal stations are detailed on Figure 5 in Appendix B.

3.2.3 Key Development Opportunities and Constraints

The cost difference between the provision of overhead power and underground power is significant. One kilometre of 22 kV cable is estimated to cost \$200,000 for overhead infrastructure and approximately \$400,000 for underground construction. On an even larger scale, one kilometre of 66 kV cable costs approximately \$400,000 for overhead while for underground 66 kV feeders, the cost is approximately \$4 million. The exact cost of underground power will vary depending on trenching conditions and a number of other factors.

Under Powercor's current policy arrangement, Powercor will fund the cost of High Voltage (HV) materials (for 22 kV overhead or underground provision) within a continuous medium density development as well as contribute towards the cost of Low Voltage (LV) materials. This contribution amount is calculated for each stage and considers the expected revenue over a 30 year period for the number of lots being connected against the capital costs and ongoing maintenance of the assets installed.

Powercor will also need to satisfy the restrictions imposed by the RRL development. Future easements and cable relocation works may be required, pending RRL construction. The proposed RRL and existing rivers and drainage channels provide a significant constraint for Powercor if required to cross electrical cables beneath rail corridors or natural stormwater paths. A number of natural stormwater channels and creeks exist throughout the development areas in Tarneit as shown on Figure 1 in Appendix A.

While Powercor funds the cost for new HV materials within a continuous medium density development, relocation of existing 66 kV or 22 kV infrastructure underground, or construction of new 66 kV infrastructure underground, may be borne by the developer. Powercor has advised however, there have been instances when Powercor has covered the cost for shared trunk underground infrastructure. The cost for relocation or installation of major trunk infrastructure underground is determined based on a case-by-case basis and although unlikely, there may be instances where Powercor will contribute to these costs.



3.3 Telecommunications

Telstra is the authority responsible for the existing supply and reticulation of telecommunication services within the established areas of the Tarneit region. Telstra has specified that the provision of telecommunications infrastructure to the proposed development will be the responsibility of NBN Co, who will deliver a wholesale-only, open access broadband network to customers.

Discussions with both Telstra and NBN Co suggest limited information regarding the provision of communications infrastructure to future developments is being shared between the two organisations, proving difficult for external parties to obtain site specific servicing strategies. As such, any servicing advice provided by these parties has not been conclusive and can only be considered as potential servicing opportunities.

3.3.1 Existing Services

Plans provided by Telstra indicate telecommunications infrastructure is present throughout the adjacent developments and within PSPs 88, 89 and 90. A Telstra cable route exists along Derrimut Road at the boundary of PSPs 89 and 90. A Telstra cable route also exists along Boundary Road and extends south into PSP 88 continuing east along Dohertys Road for approximately 1 km. A heads of agreement has been signed between NBN Co and Telstra which will allow NBN Co access to Telstra's existing infrastructure. However, this access is still subject to the ACCC's acceptance and a Telstra Shareholder vote. Telstra has advised the existing telecommunications network is inadequate to service the future growth within PSPs 88 to 91 and will require significant upgrades.

NBN Co do not currently own telecommunications infrastructure within the vicinity of the four PSPs.

Nextgen owns a major fibre optic cable that passes through Davis Road and is located within PSPs 88, 89 and 91. This cable route is linked between Melbourne and Adelaide and will not be used to service the PSP development area.

Figure 2 in Appendix A provides an overview of existing telecommunications infrastructure in the area.

3.3.2 Key Opportunities and Constraints

Telstra has informed that any provision of their infrastructure would be with regards to commercial development and Telstra may overlay infrastructure in the area to reach specific customers including businesses or government properties. It is expected that Telstra would not be responsible for providing interim mobile services if there are delays in the NBN fibre construction.

NBN Co is the designated "infrastructure provider of last resort" and as such, opportunities exist for NBN Co to provide telecommunications infrastructure to the development area. NBN Co has stated it will provide network infrastructure and capacity where a developer enters into an agreement with NBN Co ensuring that residents in the first stage of a development are able to connect services. In addition, the PSP development area must meet the new development policy requirement, which is stated on NBN Co's website (URL: <http://www.nbnco.com.au/getting-connected/new-developments.html>) as "new developments of 100 premises (dwellings/units) or more, released over a three year period, which have received Stage Five approval (relating to civil works) after 1 January 2011, within the NBN fibre footprint." In cases where new developments are less than 100 premises, the developer will need to request broadband infrastructure from Telstra or any other telecommunications provider.



The cost of headworks to the development boundary as well as any fibre infrastructure within the development will be covered by NBN Co. However, it is the developer's responsibility to design, trench for and install pit and pipe infrastructure within the development at their own cost. This cost is variable as it is up to a developer or their agents to procure such services.

NBN Co has advised that it is too early to recommend staging and easement requirements, as this will depend upon whether developers apply to NBN Co for infrastructure.

Works directly over, under or parallel to Nextgen's fibre route will require protection of their asset. Protection works deemed necessary by Nextgen for their major FO telecommunications link will be undertaken by Nextgen's contractors at the developer's cost.

3.4 Gas

SP Ausnet is the authority responsible for gas reticulation infrastructure in the areas surrounding the four PSPs. Transmission pressure gas pipelines in the area are owned by APA. Generally, transmission pressures operate between 2,800 kPa and 10,000 kPa and are far too high to directly service end-users. As a result, transmission pressures must be downgraded to distribution pressures in order to service end-users. This process is generally achieved via an off-take (or tapping) connected to the transmission pressure main. This tapping includes a gas city-gate, custody transfer meter (CTM) and regulator heater. The CTM measures the quantity of gas extracted from the supply transmission pipe while a regulator heater is also necessary to offset the temperature decrease experienced when pressures are lowered. SP Ausnet is responsible for the city-gates, CTMs and heaters.

A meeting was held on 28 June 2011 with SP Ausnet, to discuss their strategic servicing plan for the proposed development area.

3.4.1 Existing Services and Assets

Gas plans reveal there is currently no distribution gas infrastructure within the four PSPs. The nearest existing distribution gas is situated south of Leakes Road and east of Davis Road. SP Ausnet has advised this infrastructure is nearing capacity and may therefore be inadequate to service ongoing development in the adjacent PSPs.

The nearest existing city-gates are situated south-east of the development area adjacent to Princes Highway along APA's transmission gas pipeline. There are currently three city-gates along this transmission main. In addition, a new city-gate was commissioned on 27 June, 2011 on Ballan Road, south of PSP 91, which services the surrounding area of Wyndham Vale. This newly commissioned city-gate services approximately 2,000 lots with some spare capacity for nearby existing and future development.

A 500 mm diameter transmission pressure gas main is located along the north-western boundary of the precinct and runs through PSP 88. This main is the Brooklyn to Lara section of pipeline connected to the Iona gas processing plant near Port Campbell and is owned and operated by APA. The transmission main currently services the Western district of Melbourne. SP Ausnet intends to use APA's asset to downgrade pressure and distribute gas to end users.

SP Ausnet advised a new gas off-take was constructed along APA's existing transmission main to the north of PSP 90 on Hopkins Road. However, this off-take may not be commissioned for use pending a



VicRoads decision to have APA's transmission pipeline relocated to avoid the OMR (refer to Section 3.4.3 of this report for more detail).

Figure 3 in Appendix A details existing gas infrastructure within the Tarneit region.

3.4.2 Proposed Servicing Advice

SP Ausnet has advised that at least two additional city-gates are required to service development within the four PSP areas. If construction begins along the south side of PSP 90, closest to existing services, it may be possible to extend existing gas infrastructure into the early stages of development. However, once demand exceeds available supply, a new city-gate will be required. If development of PSP 91 were to begin to the south, there is potential to service some of the initial stages via the newly constructed Ballan Road city-gate, provided there is spare capacity.

3.4.3 Key Development Opportunities and Constraints

The commissioning of new city-gates will provide opportunities to expand the gas supply distribution network. The approximate cost to build and house a city-gate is between \$1 and \$3 million which includes the CTM and heater, and is paid by the distribution gas company and passed on to the developer. Approval from APA and the Department of Primary Industries for a new city-gate would most likely take up to 12 months.

SP Ausnet is currently negotiating with APA over the preferred areas to construct future connections to APA's transmission pipeline and is hopeful that land can be purchased within these areas. However, initial requests for land acquisition with current landowners to the north and northwest of PSPs 88 and 89 have not been met favourably.

Approximately half a kilometre north of APA's transmission gas main is a piece of land owned by SP Ausnet for the future Deer Park Terminal Station (refer to Section 3.2.2 of this report) which could potentially house a new city-gate. Unfortunately, the construction of a new city-gate at this location will require duplicate mains to be laid, including one transmission gas main to the city-gate from APA's pipeline, and one distribution main back to development areas. SP Ausnet has stated they own minimal transmission pressure pipelines and believe APA would not be willing to take ownership of this proposed transmission main.

Another opportunity may be to construct new transmission gas pipelines from the existing Princess Highway transmission pressure main and connect to the PSP development area. This however is not desirable due to the associated high costs, risks and pressure losses that may occur in the pipe.

Discussions with SP Ausnet and APA reveal that VicRoads has advised APA to relocate their gas transmission pipeline wherever it exists within the OMR reserve. This presents a potential problem for SP Ausnet with regards to future gas connections. Future city-gate connections to APA's gas main will need to be in areas where the transmission line will not be relocated due to OMR construction. It is understood that APA's transmission main will be relocated to the north wherever it interferes with VicRoads' OMR development. The easement requirement for APA's gas transmission pipeline is 20 metres in width with a minimum offset of 7 metres from one side of the easement boundary to the pipeline. These widths cannot be reduced due to the possible duplication of the existing pipelines in these easements in the future. APA has advised that public open space (i.e. green space) is favoured for easement locations. Linear roads over easements would also be allowed although this option is less preferred.



3.5 Sewer

CWW is the authority responsible for the provision of sewer reticulation within the Tarneit precinct. A meeting with CWW was held on 29 June, 2011, to discuss CWW's strategic servicing plan for the proposed development site.

3.5.1 Existing Services and Assets

Sewer plans provided by CWW indicate no sewer infrastructure exists within any of the four PSP areas. Gravity sewers exist adjacent to Skeleton Creek and along its minor distributaries to the south of PSPs 89 and 90. A 300 mm diameter branch sewer extends from Leakes Road south along the east side of Skeleton Creek and increases in size to a 600 mm diameter branch, continuing along Skeleton Creek south of Sayers Road. The network eventually connects to the Western Trunk sewer main located to the south east of the subject PSP development area. This sewer network currently services existing development in the Hoppers Crossing and Tarneit region, south of Leakes Road. CWW has advised these sewers have limited capacity to take additional flows from new development north of Leakes Road.

Existing 450 mm gravity branch sewer also exists to the east of the PSP 91 boundary and services development east of Davis Road. This sewer upgrades to a 600 mm diameter main as it heads south towards Shaws Road, before transferring flows to the Western Trunk sewer main. There is some spare capacity in this network for new development east of PSP 91, however CWW has advised that a new branch sewer will be constructed to service future development demand within PSPs 88 and 91.

Figure 4 in Appendix A presents an overview of CWW's existing sewer infrastructure surrounding PSPs 88 to 91.

3.5.2 Proposed Servicing Advice

CWW believe the four PSP development zones can be serviced by gravity with no need for new rising mains or pumping. Sewer from PSPs 89 and 90 and the eastern part of PSP 88 will be transported south to Leakes Road and east along Leakes Road via a future sewer to the Western Trunk Sewer at Sayers Road Shaft located east of Truganina. Sewer construction from the Western Trunk Sewer to Leakes Road is scheduled to be built as part of Stocklands development, located to the southeast of PSP 90. CWW has advised they will pay for capital sewer works along Leakes Road. Figure 5 in Appendix B details the approximate location of this proposed sewer infrastructure. Trunk sewer reticulation within the PSP boundary has not been confirmed, but is likely to be located alongside Skeleton Creek and the major road networks.

PSP 91 and the majority of PSP 88 will be serviced via a future gravity sewer network draining to the south via Davis Road to Davis Creek and the Werribee River. As development increases in these PSPs, the Davis Road trunk sewer network will be upgraded in stages to cope with additional demand. Subsequent development will create the need for a staged extension of the Davis Rd sewer to the south. The Davis Road sewer outlet will extend south of the Werribee River through Wyndham Vale to inside the Western Treatment Plant and culminate as a lift station at the treatment plant inlet channel. Sewer will then be pumped east to the Werribee Treatment Complex. It is estimated the final stages of the gravity sewer main to be constructed approximately 15 to 20 years away.



3.5.3 Key Development Opportunities and Constraints

Generally, there are no key constraints in providing sewer infrastructure to all four PSPs. CWW believes there is limited capacity in the existing adjacent sewer networks to take further development north of Leakes Road and west of Davis Road, however, stringent long-term planning suggests development within the four PSPs can be serviced via gravity-fed sewer networks. CWW has a preference for development to be staged so that new development begins along the southeast boundary of PSP 91 and/or along the southern boundary of PSP 90.

3.6 Water

CWW is the authority responsible for providing potable water to residents and industries in the Tarneit precinct. CWW's strategic water servicing plan for the proposed development site was also discussed in the meeting held on 29 June, 2011. Melbourne Water owns trunk water infrastructure in the Tarneit and Truganina area which transports water to elevated tanks via their Melbourne to Geelong supply network.

3.6.1 Existing Services and Assets

Melbourne Water owns an existing 1150 mm trunk potable water pipeline located within PSP 90, extending from Palmers Road to the east of PSP 90, southwest to the existing Cowies Hill (Werribee) Reservoir tanks on Tarneit Road. These tanks are elevated to approximately 67 m and currently service the surrounding Werribee and Hoppers Crossing areas. Melbourne Water has advised this 1150 mm pipeline exists within a 10 m wide Melbourne Water owned pipe reserve. The location of this 1150 mm is shown on Figure 4 in Appendix A.

Provision of the water supply from the Cowies Hill elevated tank to the surrounding development is the responsibility of CWW. CWW plans show potable water mains throughout existing development south of Leakes Road, but do not identify any CWW owned infrastructure within the four PSPs. Plans show privately owned 50 mm diameter trunk services exist along Tarneit Road, Derrimut Road and Woods Road, north of the Melbourne Water 1150 mm trunk main.

CWW has advised there is limited spare capacity in the Cowies Hill elevated tank system and new provisions for potable water supply have been considered to service future development in the Tarneit PSP area.

3.6.2 Proposed Servicing Advice

Due to rapid development in the area, CWW has advised that new tanks are required to support further development in West Werribee. Proposed water tanks are planned at a future Greek Hill tank site for sometime after 2015, located within PSP 88 along Dohertys Road. A future Greek Hill tank site could require up to 3 to 4 hectares of land.

Additional supply will be transferred to these proposed tanks via future Melbourne Water pipelines, potentially located along Marquands Road and connecting to the existing 1150 mm potable pipeline. This is scheduled for sometime between 2014 and 2015. New potable water pipelines will be subsequently located between the existing Cowies Hill tank site and future Greek Hill tank site. Refer to Figure 5 in Appendix B for the location of proposed potable water infrastructure.

Early planning suggests two tanks will be required at the Greek Hill tank site including one ground level tank and one elevated tank, however it is too early for CWW to confirm these provisions. The



approximate cost for an elevated water tank is in the vicinity of \$5 million and for a ground tank, approximately \$10 million. CWW advised the cost for proposed capital works and shared water assets including the Greek Hill tanks and future trunk supply mains will be paid for by the water authorities. Developers will be required to pay a developer contribution fee to CWW of approximately \$500 per lot.

West of PSP 91, a future Werribee West tank site is proposed to supply new developments within the Manor Lakes area and is scheduled for construction 2013-2014. CWW has informed that proposed water pipes are planned to extend from the future Greek Hill tank site to the future Werribee West tank site. Temporary elevated tanks presently service new development in the area to the southwest of PSP 91.

3.6.3 Key Development Opportunities and Constraints

The future Greek Hill tanks will have capacity to supply potable water to all four PSPs. If development begins prior to the commission of the Greek Hill tanks, there is opportunity for temporary elevated water tanks to be built to cater for the interim supply. The Greek Hill Tank Site is planned for commission sometime after 2015, and if demand for water due to new development exceeds existing supply capacity before this time, elevated tanks may be erected. Temporary elevated water tanks would be required in a suitable location in accordance with the developer's requirements and CWW's approval. The cost to install and supply elevated tanks is likely to be borne by the developer.

Melbourne Water owns a 10 m wide pipe reserve which extends the full length of their 1150 mm diameter pipeline between the Cowies Hill Reservoir tank site and Palmers Road. Melbourne Water has advised that no development can occur within this 10 m pipeline reserve. Any future development in the vicinity of Melbourne Water's major pipeline will require approval from Melbourne Water. It is possible to relocate Melbourne Water's 1150 mm diameter main to a new alignment to enhance development opportunities and create a more functional development zone within PSP 90, however, CWW has advised this substantial relocation cost would be at the developer's expense and is not the authorities' preferred option. Further negotiation with Melbourne Water and CWW is required to explore the potential relocation opportunity.

3.7 Recycled Water

CWW is the authority responsible for the supply of Class A recycled water to existing residents in the Werribee and Tarneit areas. Existing developments in this Werribee and Tarneit precinct benefit from access to Class A recycled water from the Melbourne Water Western Treatment Plant.

3.7.1 Existing Services and Assets

The Melbourne Water Western Treatment Plant is located approximately 25 km to the southeast of Tarneit. It supplies Class A recycled water with 1000 mg/L Total Dissolved Solids. Much of this water is sold through contractual agreements to a variety of water users. The water which CWW provides to its customers undergoes a salt reduction (reverse osmosis) process and is diluted to bring the Total Dissolved Solids down to 500 mg/L.

There is no recycled water infrastructure located within any of the four PSPs. CWW plans show recycled water mains throughout existing development south of Leakes Road. The provision of recycled water to new development within the four PSPs will be the responsibility of CWW and future sources of recycled water supply to the area have been proposed by CWW.



3.7.2 Proposed Servicing Advice

A future Ravenhall Treatment Plant is planned along Robinsons Rd, north of Middle Road in Truganina. This treatment plant, to be located to the northeast of PSP 90, is scheduled for construction sometime after 2015. CWW intends to capture flows from the surrounding northern area and transfer flows to the proposed Ravenhall treatment facility, before treating the water and distributing south to the Greek Hill tank site located within PSP 88. A potential route for this major recycled water transfer may exist along Dohertys Road within PSPs 88, 89 and 90. The Greek Hill tank site will house both potable and recycled water tanks. It is estimated that approximately 14 ML per day will be available to treat at the Ravenhall Treatment Plant. Refer to Figure 5 in Appendix B for the location of proposed recycled water infrastructure.

An additional Treatment Plant will be located within Melbourne Water's Western Treatment Plant. Recycled water will supply Manor Lakes and areas south and southwest of PSP 91. Recycled water pipelines will extend from this Western Treatment Plant to the future Werribee West tank site. Recycled water pipes are also planned to extend from the Greek Hill site to the Werribee West tank site in the future.

3.7.3 Key Development Opportunities and Constraints

The future Greek Hill tanks will have capacity to supply recycled water to all four PSPs. If development begins prior to the commission of the Greek Hill tanks however, CWW's preference is for third pipe installation to transport potable water in the interim prior to recycled water becoming available. CWW informs recycled water supply is not mandatory for the Werribee and Tarneit precinct. However, CWW can mandate third pipe supply for an area of development if necessary, and development conditions regarding third pipe construction can be placed on the developer when applying for a planning permit.

4. Conclusion

The provision of trunk services to the four PSPs in the Tarneit development site has been investigated and a general summary of the findings is presented in Table 4.1. Trunk services investigated include electricity, telecommunications, gas, sewer, water and recycled water. An investigation into the service of stormwater drainage was not part of the scope for this servicing assessment and will be investigated by others.

Table 4.1: Key Findings for the Provision of Services

Service	Key Findings
Electricity Powercor (Distribution) SP Ausnet (Transmission)	Powercor suggests there will be inadequate spare electricity capacity to service the expected future development of the area. Major augmentation of existing infrastructure along with construction of new infrastructure is necessary to service the Tarneit development area. Two new zone substations, Truganina and Tarneit, are required to provide electrical supply to the four PSPs. A future terminal station is proposed for within PSP 89 sometime in 20 to 30 years. With exception of the PSP 89 future terminal station, generally no major development constraints exist.
Telecommunications Telstra NBN Co	The existing Telstra network infrastructure is inadequate to service the future growth within PSPs 88 to 91 and will require significant upgrades. Future telecommunications to the proposed development will be the responsibility of NBN Co provided that developers enter into an agreement with NBN Co. and that NBN Co's new development requirements are met.
Gas SP Ausnet (Distribution) APA Gasnet (Transmission)	APA owns a high pressure transmission gas main passing through PSP 88. No existing distribution infrastructure is located within the PSPs but there are opportunities to service the proposed future development through construction of new gas city-gate tapplings. It may be possible to extend existing gas infrastructure into the early stages of PSP 90. There is also potential to service some of the initial stages of PSP 91 via the newly constructed Ballan Road city-gate. A key constraint is VicRoads' requirement for APA's gas transmission pipeline to relocate wherever it exists within the OMR reserve. SP Ausnet is currently negotiating with APA as to the most suitable points of gas connection and whether land is available for new city-gate infrastructure.

Table 4.1: Key Findings for the Provision of Services (continued)

Service	Key Findings
Sewer City West Water (CWW)	CWW sewer plans indicate no sewer infrastructure within any of the four PSPs The sewer network to the south of Leakes Rd has limited capacity to take additional flows from new development. All four PSP development zones can be serviced by gravity sewer. Sewer from PSPs 89 and 90 and the eastern part of PSP 88 will be transported to the Western Trunk Sewer at Sayers Road Shaft located east of Truganina. PSP 91 and the majority of PSP 88 will be serviced via gravity sewer to the south along Davis Road to Davis Creek and the Werribee River. Generally there are no key constraints in providing sewer infrastructure to all four PSPs.
Water CWW	Melbourne Water owns an existing 1150 mm trunk potable water pipeline located within PSP 90. This 1150 mm pipeline exists within a 10 m wide Melbourne Water owned pipe reserve. No CWW owned infrastructure exists within any of the four PSPs. New elevated and ground water tanks are required to support further development in West Werribee. New tanks are planned for a future Greek Hill tank site located within PSP 88 along Dohertys Road. There is opportunity for temporary elevated water tanks to be built to cater for the interim supply if development proceeds ahead of the commission of the Greek Hill tank site.
Recycled Water CWW	There is no recycled water infrastructure located within any of the four PSPs. A future Ravenhall Treatment Plant is planned northeast of PSP 90. CWW intends to distribute flows south to the Greek Hill tank site located within PSP 88. An additional Treatment Plant will be located within Melbourne Water's Western Treatment Plant. The future Greek Hill tanks will have capacity to supply recycled water to all four PSPs.

Table 4.2 provides an alternative summary indicating the key existing and proposed trunk infrastructure within the individual PSP areas, and an overview of the funding requirements for proposed trunk infrastructure.

Table 4.2: Overview of Trunk Infrastructure within PSPs

PSP	Existing Infrastructure	Proposed Infrastructure	Funding
88	55 m wide SP Ausnet transmission power easement 66 kV feeder along Boundary Road 20 m wide APA gas easement along the western boundary - Nextgen major fibre optic (FO) cable route along Davis Road	- Greek Hill tank site (up to 3-4 ha) - Recycled water and potable water trunk mains within road reserve along Dohertys Road - Tarneit zone substation proposed at corner of Tarneit and Dohertys Road for 2020-2025	- CWW to fund Greek Hill tank site and all trunk water and recycled water shared infrastructure - Developer to fund pit and pipe telecommunications infrastructure - Developer to fund protection works for Nextgen's FO cable if required - Generally, Powercor funds zone substation installations
89	55 m wide SP Ausnet transmission power easement 66 kV feeder along Boundary, Tarneit, Dohertys and Leakes Road - Nextgen major fibre optic cable route along Hopkins Road crossing PSP diagonally to Davis Road - Telstra cable route along Derrimut Road	- Future Terminal Station (2030-2040) in the vicinity of the Tarneit and Dohertys Road intersection - Recycled water and potable water trunk mains within road reserve along Dohertys and Tarneit Road	- SP Ausnet to fund future terminal station and Powercor to pay for connection - CWW to fund Greek Hill tank site and all trunk water and recycled water shared infrastructure - Developer to fund pit and pipe telecommunications infrastructure - Developer to fund relocation of SP Ausnet transmission power easement if approved by authorities

Table 4.2: Overview of Trunk Infrastructure within PSPs (continued)

PSP	Existing Infrastructure	Proposed Infrastructure	Funding
90	66 kV feeder along Dohertys and Leakes Road 1150 mm dia water supply main within 10 m wide Melbourne Water owned pipeline reserve - Telstra cable route along Derrimut Road	- Recycled water trunk mains within road reserve along Dohertys Road and to north towards Boundary Road - Potable water trunk supply main within road reserve along Marquands Road - Trunk sewer main within road reserve along Leakes Road and potentially extending north adjacent to Dry and Skeleton Creeks	- CWW to fund trunk water and recycled water shared infrastructure - CWW to fund capital sewer works along Leakes Road - Developer to fund temporary elevated water tanks if required - Developer to fund pit and pipe telecommunications infrastructure - Developer to fund relocation of Melbourne Water supply main if approved by authorities
91	Nextgen Major Fibre Optic Cable along David Road	Trunk sewer main within road reserve along Davis Road and potentially extending north and west adjacent to Davis Creek	- CWW to fund capital sewer works along Davis Road - Developer to fund temporary elevated water tanks if required - Developer to fund pit and pipe telecommunications infrastructure



Due to the significantly large area occupied by the proposed 4,600 hectare development in Tarneit, service providers are limited in providing advice on exact staging requirements for the four PSPs until further detailed demand estimates and master-planning are undertaken. Generally, service providers have advised it would be beneficial for initial stages of development within the precinct to begin adjacent to existing infrastructure to allow an extension of existing services at minimal costs and upgrades. This suggests that servicing should commence from PSPs 90 and 91 and eventually progress into PSPs 88 and 89.

Generally, there are no insurmountable constraints in the provision of initial trunk infrastructure to PSPs 88, 89, 90 and 91. Recent developments with VicRoads, APA and SP Ausnet however, indicate a limitation may arise relating to SP Ausnet's potential tapping locations with city-gates along APA's transmission pipeline. Negotiations between SP Ausnet and APA to resolve this issue were underway at the time this report was written.

Should existing infrastructure capacity become insufficient to service the entire PSP area, infrastructure augmentation and extensions will be necessary to ensure adequate supply to the development. Such expansion of services must take into account the underlying constraints involving high costs associated with augmenting services, the presence of other major conflicting developments such as the Outer Metropolitan Ring Road and the Regional Rail Link as well as the ownership and availability of land that service providers can use to house their future services and assets.

Appendix A

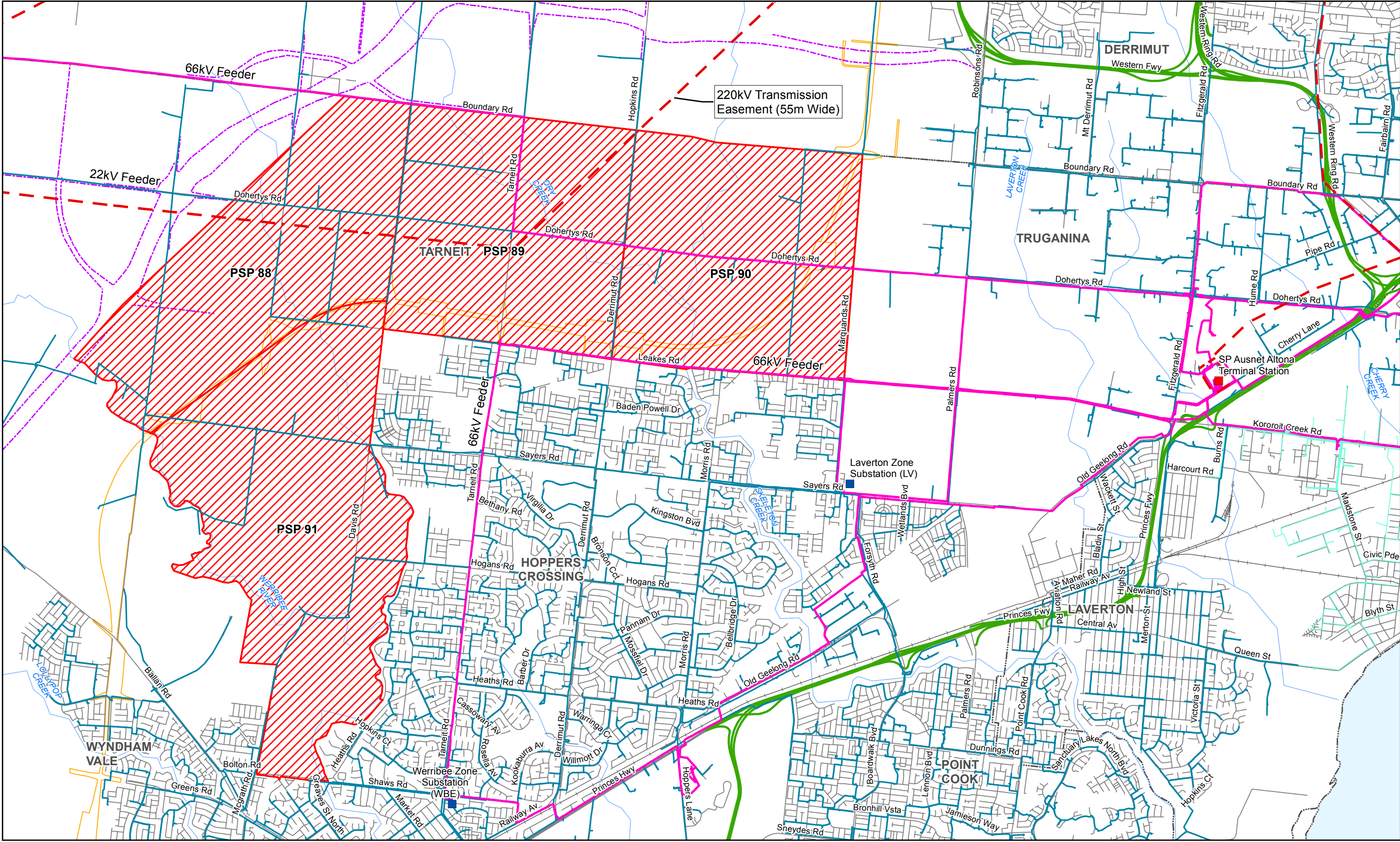
Existing Services Plans

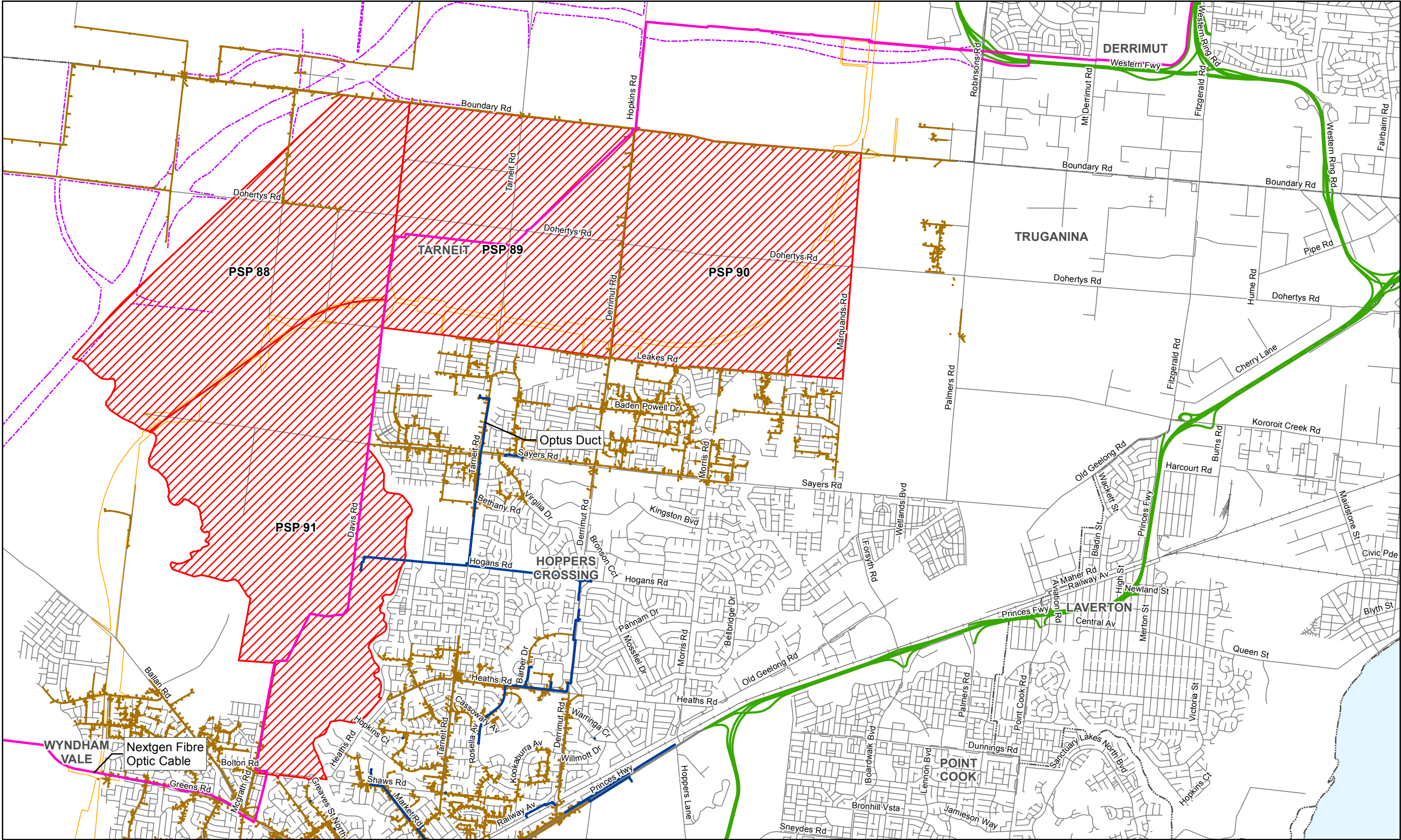
Figure 1: Powercor Infrastructure

Figure 2: Telecommunications Infrastructure

Figure 3: APA and SP Ausnet Infrastructure

Figure 4: CWW Infrastructure

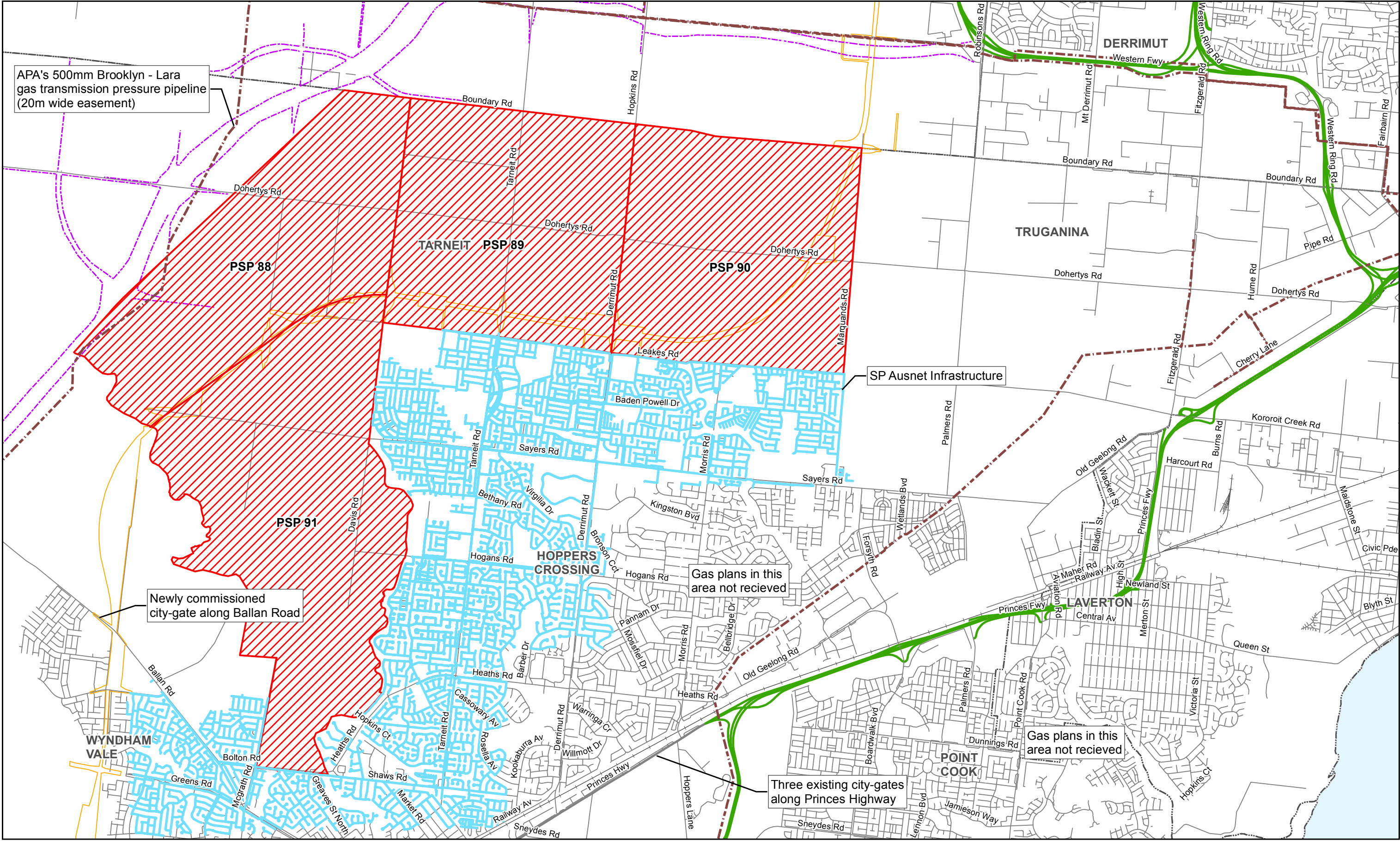


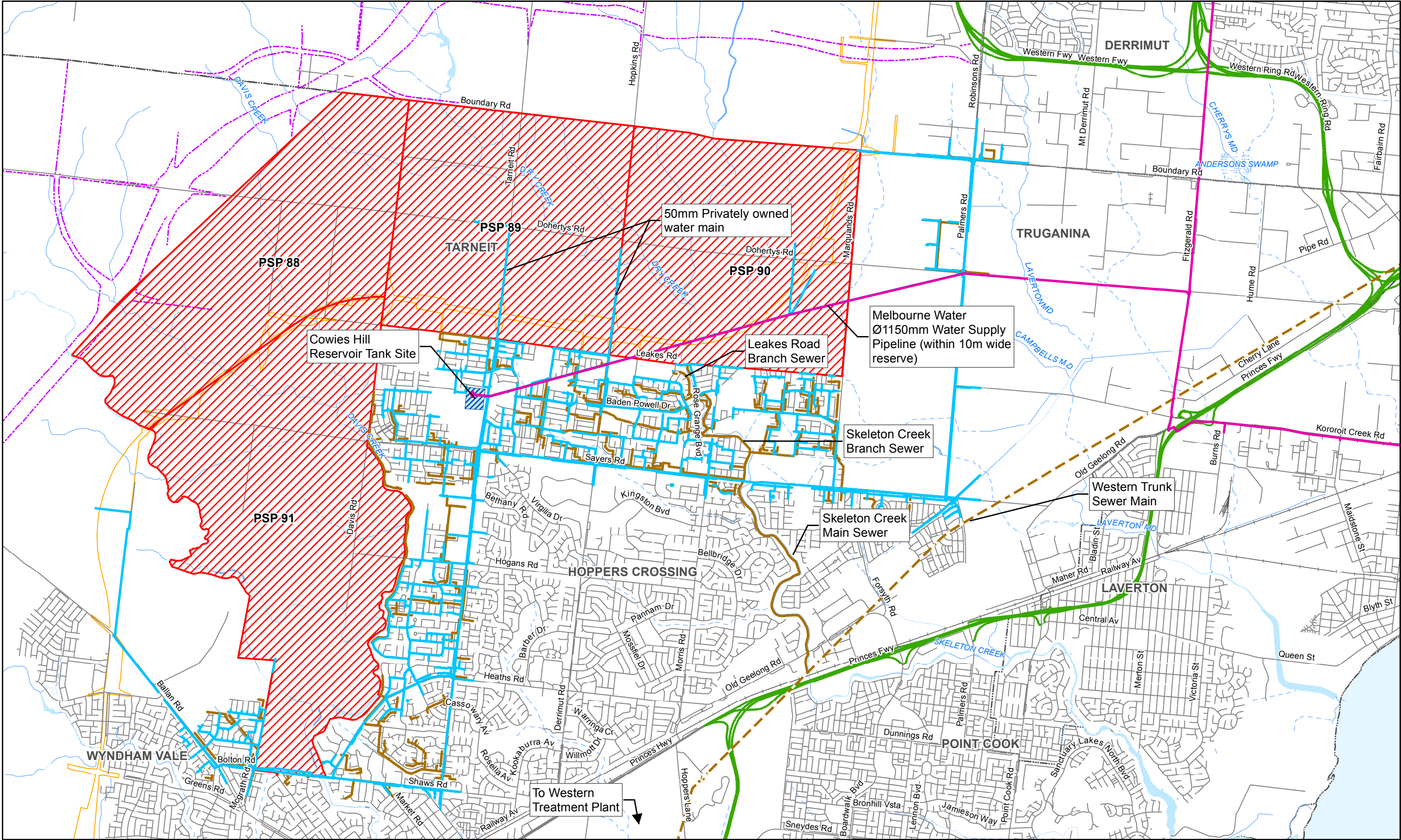


G:\3127847\GIS\Maps\Deliverables\3127847_002_Telecommunications_A3L.mxd

© 2011. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

Data source: DSE, VicMap, 2011; Telstra, 2011; Optus, 2011; Visionstream, 2011. Created by:splaird

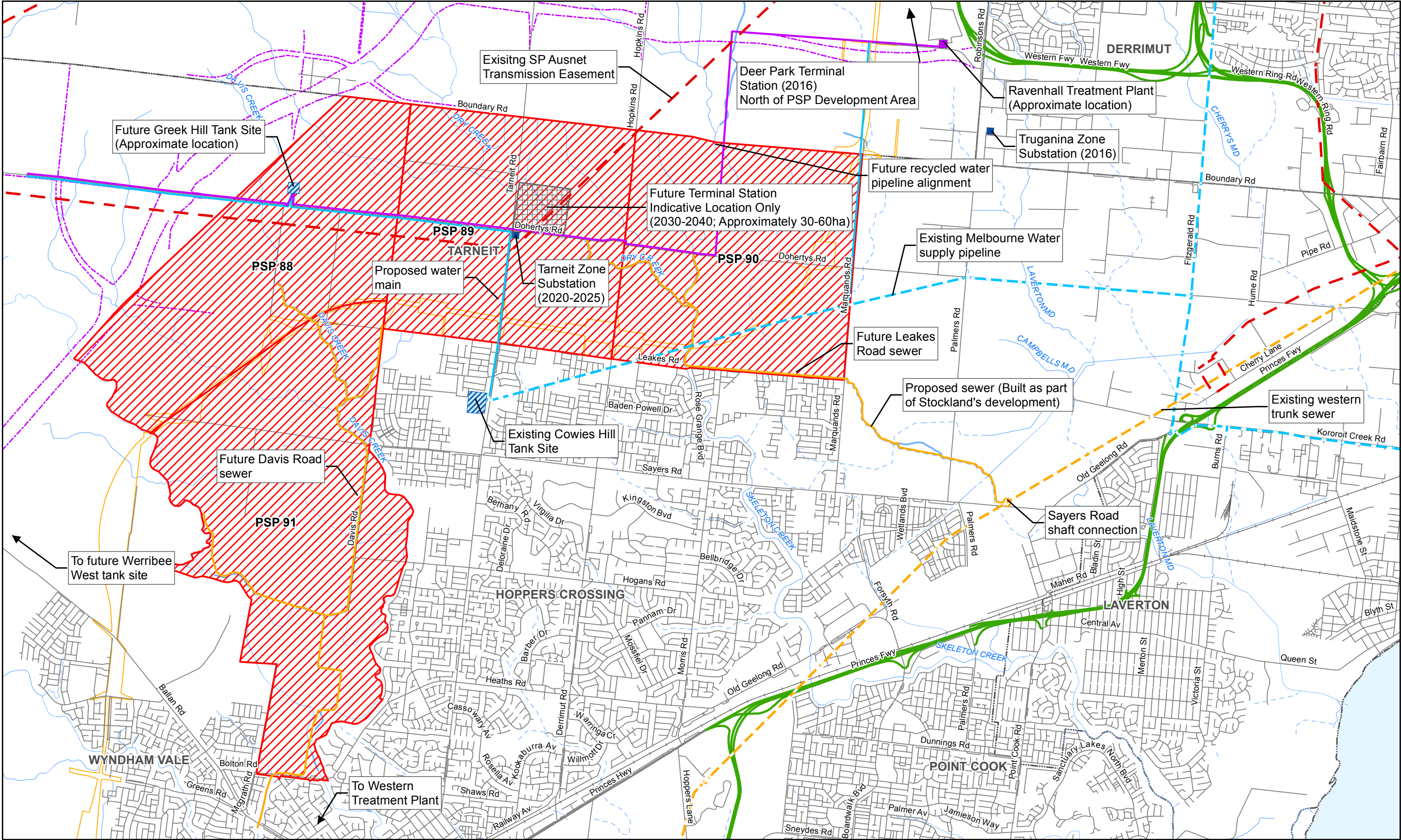




Appendix B

Proposed Services Plan

Figure 5: Proposed Infrastructure



G:\31\27847\GIS\Maps\Deliverables\3127847_006_Proposed_Infrastructure_A3L.mxd

© 2011. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

Data source: DSE, VicMap, 2011; Powercor, 2011; Melbourne Water, 2011; SP Ausnet, 2011. Created by: splaird

GHD

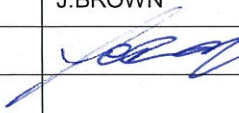
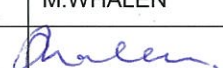
180 Lonsdale Street
Melbourne, Victoria 3000

T: (03) 8687 8000 F: (03) 8687 8111 E: melmail@ghd.com.au

© GHD 2011

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	V.YOUNG	J.BROWN	J.BROWN*	M.WHALEN	M.WHALEN*	14.7.11
2	V. YOUNG	J. BROWN		M. WHALEN		27.7.11