

ABERLINE TO HORNE GROWTH CORRIDOR

INFRASTRUCTURE/SERVICING ASSESSMENT
FEBURARY 2018

This report has been prepared by the office of Spiire

Level 2, 10 Moorabool Street, PO Box 4032, Geelong Victoria 3220 Australia

Issue Date	Revision No.	Author	Checked	Approved
Oct 17	A	A. Gorfine	N. Green	N. Green
Feb 18	B	A. Gorfine	N. Green	N. Green

© Spiire

The information contained in this document is intended solely for the use of the client named for the purpose for which it has been prepared and no representation is made or is to be implied as being made to any third party. Other than for the exclusive use of the named client, no part of this report may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of Spiire.

Contents

1. Introduction	4
2. Background	5
3. Existing Site Conditions.....	6
4. Service Infrastructure.....	7
4.1 Roads.....	7
4.1.1 Existing Road Infrastructure.....	7
4.1.2 Proposed Road Infrastructure.....	7
4.1.3 Internal Roads.....	7
4.2 Drainage.....	9
4.2.1 Existing Drainage Infrastructure.....	9
4.2.2 Proposed Drainage Infrastructure.....	11
4.3 Sewer Reticulation	12
4.3.1 Existing Sewer Infrastructure	12
4.3.2 Proposed Sewer Infrastructure	12
4.4 Potable Water Supply	13
4.4.1 Existing Potable Water Infrastructure	13
4.4.2 Proposed Potable Water Infrastructure.....	13
4.5 Roof Water Harvesting.....	15
4.5.1 Existing Roof Water Harvesting Infrastructure.....	15
4.5.2 Proposed Roof Water Harvesting Infrastructure	16
4.6 Electricity Supply.....	18
4.6.1 Existing Electricity Infrastructure.....	18
4.6.2 Proposed Electricity Infrastructure	19
4.7 Gas Supply.....	20
4.7.1 Existing Gas Infrastructure.....	20
4.7.2 Proposed Gas Infrastructure	20
4.8 Telecommunications Network.....	21
4.8.1 Existing Telecommunications Infrastructure	21
4.8.2 Proposed Telecommunications Infrastructure	21
5. Conclusion.....	22

1. INTRODUCTION

Spiire Australia Pty Ltd has been engaged by Warrnambool City Council to prepare an Infrastructure/Servicing Assessment Report to inform the servicing requirements of the proposed Aberline to Horne Growth Corridor (AHGC) on the northeast fringe of the Warrnambool Township.

The purpose of this report is to identify the location of existing service infrastructure and discuss how utility services may be provided to facilitate residential development of the land.

This report is limited to investigating the following services;

- ▶ Sewerage reticulation
- ▶ Potable water supply
- ▶ Roof water harvesting
- ▶ Electricity supply
- ▶ Gas reticulation
- ▶ Telecommunications



Figure 1 - Site Location

2. BACKGROUND

In 2013 Warrnambool City council prepared a housing strategy that forecasted population growth within the municipality up until 2031. As a result of this it was identified that the population is set to grow from current levels to 44,000 people by 2031. In order to meet the increased demand for housing caused by this population growth approximately 225 new dwellings per year. The Aberline to Horne Corridor has been identified as Councils future urban growth area.

The corridor is bounded by Wangoom Road to the north, Aberline Road to the east, Dales Road to the south and extends approximately 400m east of Horne Road. The site is currently zoned for farming and is rural in nature, with urban residential development to the southwest and the Horne Road Industrial Precinct on the southeast corner of the site. The growth area comprises 360 hectares of land and 25 titles in multiple ownership.

The Warrnambool City Council intend on collating background information reports and providing a community consultative approach to determine the extent and nature of the development within the precinct. As such the expected residential development density and land use within the area are yet to be confirmed.

Council will undertake community consultation and other studies such as traffic and stormwater strategy investigations. Drainage and Traffic are only briefly discussed in this report as it is understood that these will be investigated in more detail through a Drainage and Hydraulic Assessment and Traffic Impact Report.

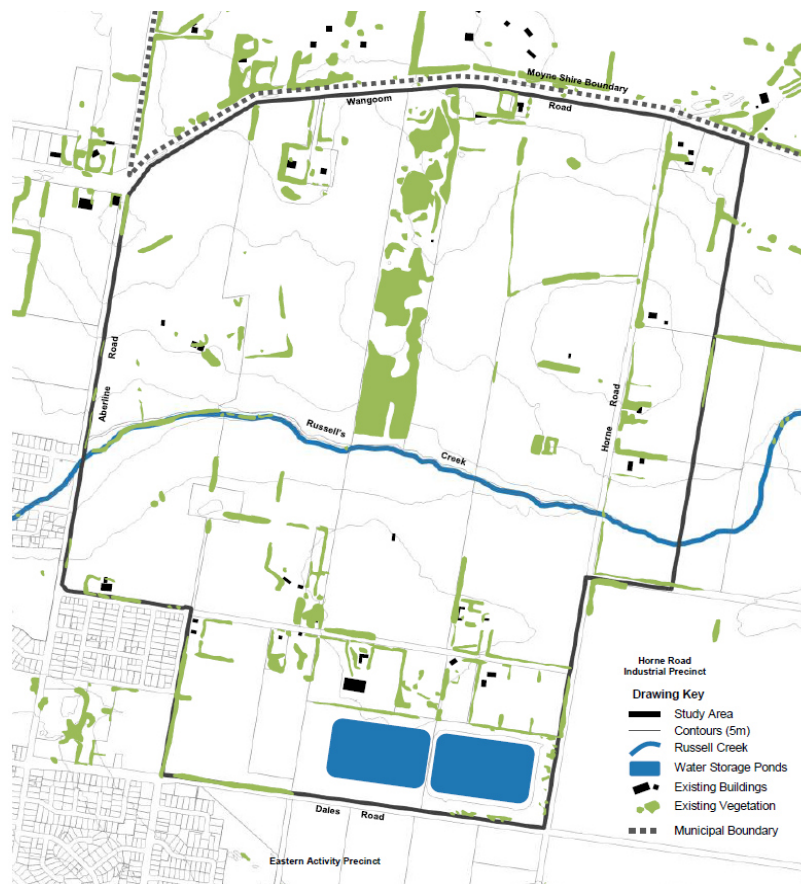


Figure 2 - Growth Area

3. EXISTING SITE CONDITIONS

The area is generally bound by the Dales Road to the south, Horne Road to the east, Wangoom Road to the north, and Aberline Road to the west. All roads generally have a rural cross section with sealed pavement and overland drainage.

The land is currently zoned Farming Zone (FZ), with the exception of As small area to the south where two Wannon Water basins are located which is Public Use Zone (PUZ). In the middle of the site from Wangoom Road in the North heading south to Russels Creek is Tozer reserve which is considered to have significant Flora and Fauna values. As such Tozer reserve will be maintained through future development meaning services will need to be constructed around it rather than through.

The area other than Tozer Reserve has been generally utilised for farming purposes and is predominantly cleared of native vegetation. Some native vegetation can be found along the gullies in steeper areas and windrows of exotics exist along some fence lines. There are a few small sites that have previously been used as quarries.



Figure 3 – Looking south from Wangoom Road

4. SERVICE INFRASTRUCTURE

4.1 Roads

Although not specifically required as a part of this report, the following provides a brief commentary on the existing road access to the area and potential requirements to facilitate urban development in the area. It is anticipated that a detailed traffic report will be undertaken as a separate report.

The Warrnambool City Council is the responsible authority for local road network within the growth corridor area, however Wangoom Road is the boundary between Warrnambool City and Moyne Shire and as such responsibility is shared between the two councils.

Wangoom Road is a Road Zone Category 2 road and a key link in the road hierarchy.

4.1.1 Existing Road Infrastructure

Access to the area currently exists off Aberline Road, Horne Road, Wangoom Road, Dales Road and Boiling Down Road.

Aberline Road is a designated collector road and is the responsibility of Warrnambool City Council. The road currently has been upgraded through its southern section adjacent to recent development to the west. It is anticipated that the rest of Aberline Road will be required to be upgraded as part of the development of this area.

Horne Road is a future link road that is zoned Road Zone Category 2 and is the responsibility of Warrnambool City Council. The road fully constructed at the southern end of the precinct and partially constructed heading north to Wangoom Road. Upgrades to Horne road from the Horne Road Industrial Precinct south have already commenced and it is anticipated that remainder will be required to be upgraded as part of the development of this area.

Wangoom Road that abuts the growth corridor is zoned Road Zone Category 2 and identified as a link road in Council's road hierarchy. Wangoom Road is on the boundary of Warrnambool City and Moyne Shire and as such falls under the joint responsibility of both councils. By agreement it is currently maintained by Moyne Shire.

4.1.2 Proposed Road Infrastructure

It is expected that access to proposed development will come off the main three roads bounding the site, Aberline Road, Wangoom Road, Horne Road and Dales Road.

Due to the increase in traffic resulting from the proposed development, road network augmentations external to the site may be necessary. These will be required to be assessed when the density and nature of the development are further understood.

Within Urban Growth Areas, the delivery of significant road infrastructure such as major intersections, signalised intersections, bridges, and upgrades of existing roads are typically delivered through a Developer Contributions Plan (DCP).

The delivery of major road infrastructure identified within a DCP may be provided as "Works in Kind" by the developer, who in turn is provided with credits against DCP liability for their development.

4.1.3 Internal Roads

As the structure plan is refined, specific traffic engineering reporting will be undertaken to inform road cross sectional requirements. Typical road cross sections that may be considered for the development are:

Local access street adjoining parkland.

Roads within residential area and comprise one-sided development.

Road Reserve width of 12.0 – 13.5 metres

Carriageway width of 5.5 metres with parking one side only

Verge width on developed side of road of 5.5 metres with pedestrian path

Verge width on parkland side of road of 1.0 metres.

Local Access Street.

Roads within residential areas with parking both sides & footpaths both sides.

Road Reserve width of 16.0 metres

Carriageway width of 7.3 metres allowing for parking both sides

Verge width of 4.4 metres.

Neighbourhood Connector Street Type 1.

Roads within residential areas with parking both sides & footpaths both sides.

Kerbside parking delineated by kerb extensions or street tree planting.

Road Reserve width of 18.0 or 20.0 metres.

Carriageway width of 9.6 or 10.6 metres.

Verge width of 4.2m or 4.7m

Neighbourhood Connector Street Type 3 (increased traffic & bicycle path)

Roads within residential areas with parking both sides & footpaths both sides.

Kerbside parking delineated by kerb extensions or street tree planting.

Road Reserve width of 26 metres.

Central landscaped median of 4.0 metres that may include WSUD swale.

Dual Carriageway, pavement width either side of 6.6 metres including bicycle lane.

Verge width of 4.4 metres.

Dual Carriage Way Entrance

Two main entrances to the development are proposed.

Road Reserve width of approximately 27 metres.

Central landscaped median of 6 metres, possibly including WSUD swale.

Pavement width either side of 5.5 metres.

Verge width of 4.5 - 5.0 metres.

Laneways

Laneways to provide access to higher density pockets of lots.

Road reserve width is 6 metres.

Possible concrete paved surface minimum width of 4.5m.

It should be noted that road verge widths should be designed such that logical service locations are achievable and service separation provides adequate clearance in accordance with authority requirements.

The layout of the road network should be cognisant of the topography and provide road reserves along and or adjacent to drainage flow paths. Roads parallel to contours in steeper areas may require retaining walls on the high side.

All roadworks will be required to be designed and constructed in accordance with Warrnambool City Council or VicRoads requirements at the cost of the developer, with major infrastructure such as signalised intersections, bridges and major road upgrades potentially being items to be included within a Development Contributions Plan (DCP).

4.2 Drainage

Although not specifically required as a part of this report, the following provides a brief commentary on the stormwater drainage and potential requirements to facilitate urban development in the area. It is understood that a detailed stormwater management report and flood assessment will be undertaken as separate report.

The Warrnambool City Council is the responsible authority for drainage for the growth area and the Glenelg Hopkins Catchment Management Authority (GHCMA) is the floodplain management authority for the region.

4.2.1 Existing Drainage Infrastructure

There is little formal drainage infrastructure within the AHGC area. A number of dams provide storage of runoff for agricultural purposes, and pipe culverts are located under Aberline Road and Horne Road at Russell Creek.



Figure 5 Existing Culvert under Aberline Road

Russels Creek, a tributary of the Merri River, will be the receiving waterway of all stormwater runoff from the development area. The topography within the growth corridor provides a reasonably clear indication that all catchments fall towards Russell Creek as shown in Figure 6.

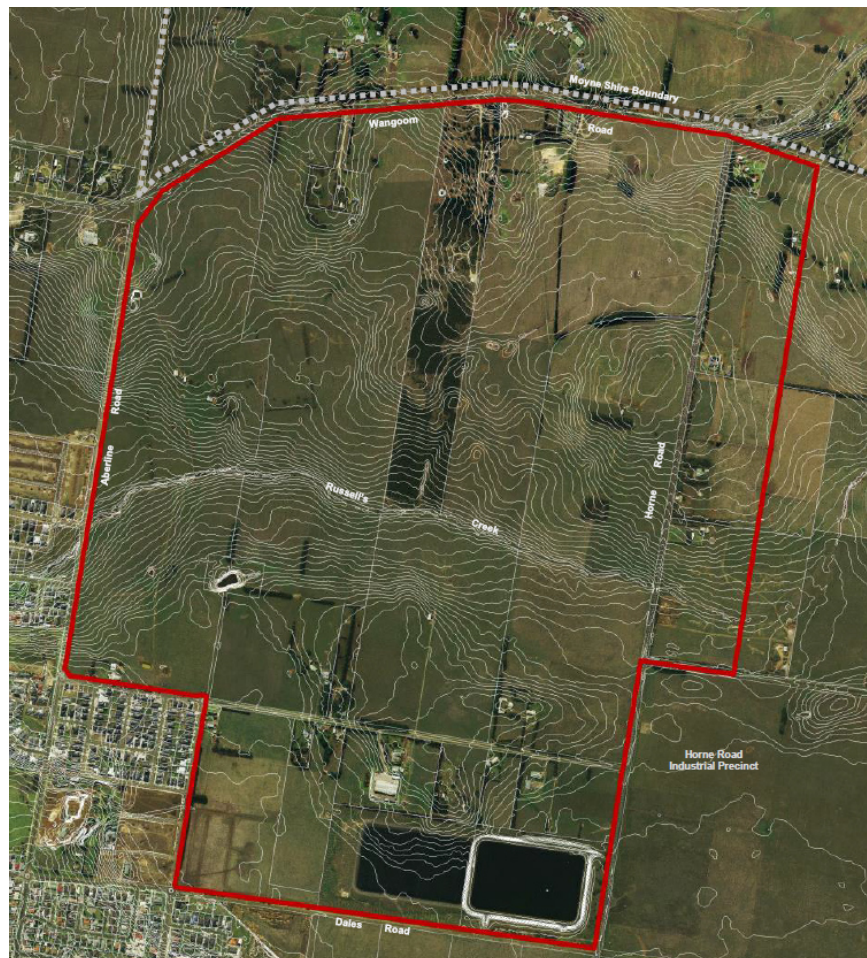


Figure 6 Growth Area Topography

4.2.2 Proposed Drainage Infrastructure

All drainage assets will be required to be designed and constructed in accordance with Warrnambool City Council requirements at the cost of the developer.

Council indicate that a separate report analysing drainage options and associated infrastructure requirements along with flood modelling and analysis of Russell Creek are being undertaken separately to this report. It is anticipated that these reports will provide information that will be adopted within a Site Stormwater Management Plan (SSMP) for the growth area.

Typical drainage infrastructure for urban development areas will require a combination of minor and major infrastructure. This will include an underground pipe network typically designed for a 5 year ARI event, with roads and drainage reserves being designed to cater for the conveyance of 100year ARI events in a safe manner.

The stormwater discharge into Russell Creek should be controlled through retardation such that peak flows within Russell Creek are not increased, and that water quality treatment measures are installed such to meet the requirements of best practice.

It is anticipated that developed catchment discharge flows up to Q100 will be required to be retarded back to pre-development conditions through the provision of onsite retention such as retarding basins.

The SSMP will incorporate hydraulic, hydrological and pollutant modelling to determine existing flow conditions and inform conveyance and treatment modelling of developed conditions to determine water quality and retardation requirements.

Due to the slow anticipated development across the growth corridor area, the location and nature of the drainage infrastructure adopted should be assessed at a functional level to ensure land area requirements and integration into the urban design can be appropriately and safely managed, and that the designs are cognisant of environmental outcomes such as retention of significant trees and ecological significant areas.

Within Urban Growth Areas, the delivery of major drainage assets such as large culverts, retarding basins, wetlands, floodways and their associated landscape improvements are typically delivered through a Developer Contributions Plan (DCP).

The delivery of major drainage infrastructure with a DCP may be provided as “Works in Kind” by the developer, who in turn is provided with credits against DCP liability for their development.

Roof water harvesting will be implemented throughout the growth area in line with Wannon Water’s future planning requirements. This will need to be accounted for in the SSMP and is discussed in detail below.

4.3 Sewer Reticulation

Wannon Water is the responsible authority for sewer reticulation within the growth corridor area.

4.3.1 Existing Sewer Infrastructure

There is existing reticulated sewer infrastructure adjacent to the growth corridor area on the west side of Aberline Road as well as to the south of Boiling Down Road. A stub has been built across Aberline Road close to the Russell Creek culverts as a part of previous development. Wannon Water advise that the existing sewer network does not have capacity for the proposed development area and will require a new pump station and rising main.

4.3.2 Proposed Sewer Infrastructure

The existing stub across Aberline Road would be the logical place to make the first connection from the development to the existing sewer network. However the existing trunk sewer will not have capacity for the entire growth area. It is recommended that further investigations in conjunction with Wannon Water be undertaken to determine how much if any development can be connected into this existing network. This will allow timing requirements of new infrastructure to be more accurately determined and planned.

Advice from Wannon Water suggests that there is limited capacity in the existing trunk sewer system and a new rising main to the Warrnambool Water Reclamation Plant will need to be constructed to service the growth area. The alignment of this rising main is yet to be determined but it is recommended that this be determined in conjunction with Wannon Water as early as possible in the planning process.

Development within the study area will require key infrastructure including:

- ▶ A new sewerage pump station (SPS) located as shown on Figure 7.
- ▶ A new dedicated rising main to transfer the sewage to the Warrnambool Water Reclamation Plant
- ▶ A new sewer trunk main along Russell Creek connected to the SPS

The new SPS will need to be located close to where Russell Creek crosses Aberline Road. It will need to be sized so that it has the capacity and depth to service the whole growth area. To convey flows through the development to the new SPS, a 225-300dia trunk sewer will need to be constructed along Russell Creek. A key consideration in the design of this Trunk sewer will be the location of crossings of Russell Creek and any significant flora/fauna sites that will influence this location. It may be preferable to construct a trunk sewer along each side of the creek and have one crossing close to Aberline Road as the crossing location will drive the sewer deeper. The site generally grades from east to west so the trunk sewer will follow the natural contours of the land.

4.4 Potable Water Supply

Wannon Water is the responsible authority for potable water supply within the Growth Corridor area.

4.4.1 Existing Potable Water Infrastructure

Currently there are reticulation mains in Aberline Road, Boiling Down Road and the southern section of Horne Road. Wannon Water have indicated that these mains do not have capacity to service the Growth Corridor and new infrastructure will be required.

4.4.2 Proposed Potable Water Infrastructure

The existing pumps at the Tozer Road Water Pump Station will need to be upgraded in order to enable transfer water from the Warrnambool Water Treatment Plant via a new dedicated water main along the east side of Aberline Road to a new elevated water storage (water tower). The tower, location yet to be determined, is required to provide adequate water supply and pressure to the Growth Corridor. A ground level tank will also be required to ensure that there is adequate supply in times of peak demand and provide a secure water supply to the area. The size and capacity of both the tower and storage tank will need to be determined by further modelling and advice from Wannon Water.

The key new water infrastructure required to service the area will include the following:

- ▶ Upgrade to Tozer Road Water Pump Station (WPS).
- ▶ New high level water tower and ground level tank at the area (highlighted in a blue circle “Proposed Tank Location”) on Figure 7.
- ▶ New dedicated water main between the upgraded Tozer Road WPS and the proposed Water Tower. This main will be located on the east side of Aberline Road.

Reticulated water supply will be designed and constructed in accordance with Wannon Water and Water Services Association of Australia standards and requirements and will be provided by the developer at the time of development. Potable water supply pipelines will be located within road reserves or easements vested to the responsible authority.

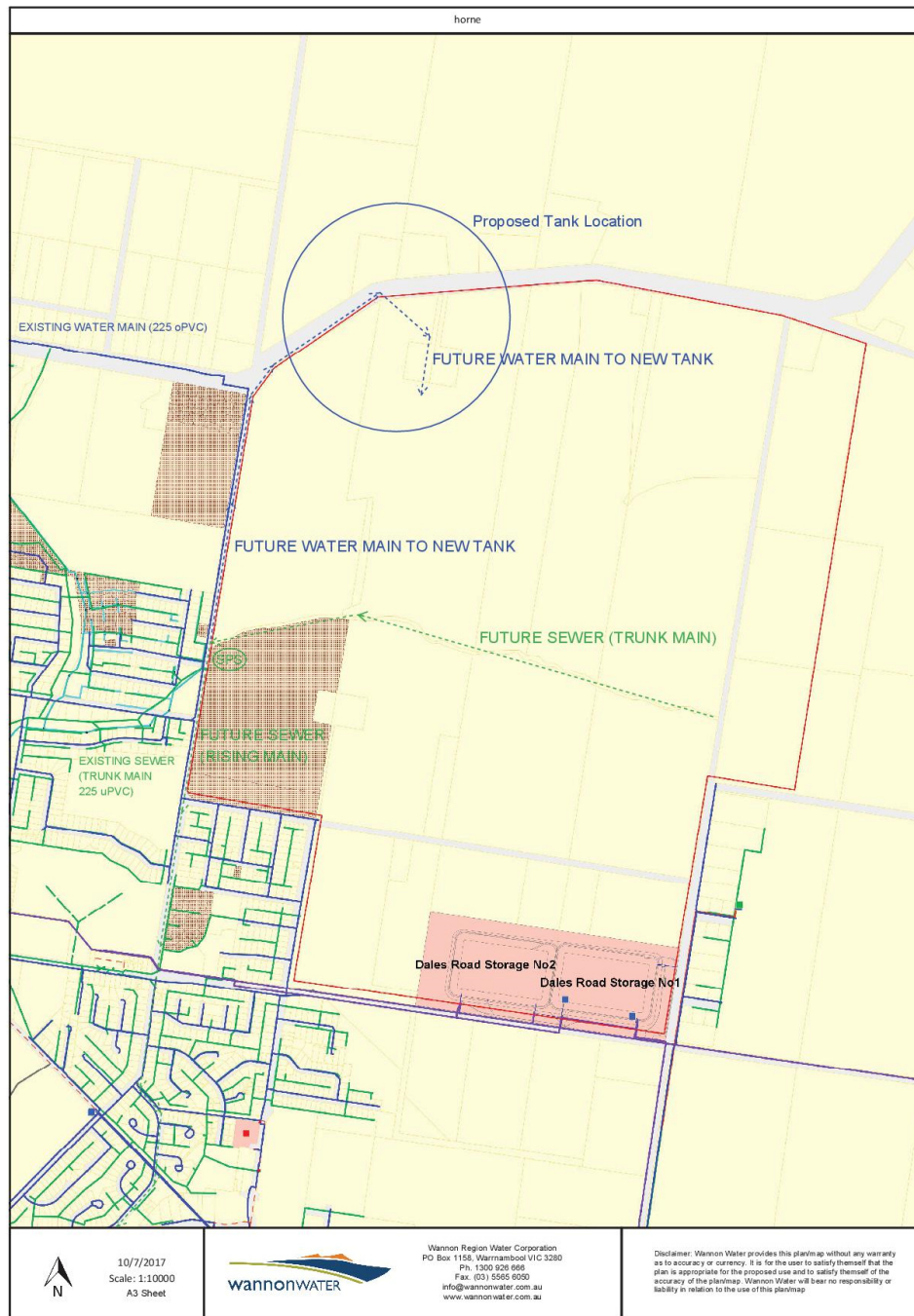


Figure 7 – Water and Sewer Infrastructure Requirements (provided by Wannon Water)

4.5 Roof Water Harvesting

Wannon Water are exploring roof water harvesting as an initiative to reuse stormwater runoff within the growth corridor.

Roof water Harvesting forms a major part of Wannon Water's future strategy. The main water supply for Warrnambool comes from the Gellibrand River approximately 100 kilometres away in the Otway Ranges. Roof water harvesting has been implemented throughout recent adjacent developments and has proved very successful in making use of locally available water sources and reducing the need to import water from the Gellibrand system.

The harvesting of roof water from all new dwellings is achieved by installing a dedicated pipe network in addition to the conventional stormwater system. This network collects storm water runoff from roof catchments only and is designed to convey all flows up to 1 in 1 year rainfall events. Overflows from this system are directed to the conventional stormwater network. Buffer tanks are installed within the subdivision to allow 1 in 1 year events to be collected without installing large downstream trunk mains. The location of buffer tanks needs to be determined early on in the development planning process in consultation with Wannon Water to ensure all areas are adequately serviced.

4.5.1 Existing Roof Water Harvesting Infrastructure

Roof water harvesting has been successfully implemented in developments to the west and south of the growth corridor area.

A 560mm trunk main runs along the Russell Creek corridor and a stub has been provided on the eastern side of Aberline Road. This stub will provide the connection point for the growth area back into the existing network.

Roof water harvested in the existing Aberline Road residential growth corridor drains by gravity to Brierly Basin, a 50ML raw water storage in the Otway Supply System that, along with the 600ML Dales Road storage basins, supplies water to the Warrnambool Water Treatment Plant. The Dales Road Service Basins are not part of the roof water harvesting scheme for the residential growth area. However the neighbouring Horne Road industrial development also has a small roof water harvesting scheme that will be pumped into the Dales Road storage. The roof water mixes with raw water from the Otways in these basins.

The Brierly Basin and Dales Road Storages provide reserves of water to meet peak demand over summer months and provide security in the event of a pump station or pipeline failure between the Otways and Warrnambool.

Figure 8 (below), identifies the existing roof water pump station (shown in blue), adjacent to the existing SPS (shown in green).



Figure 8 – roof water pump station shown in blue, adjacent to the existing SPS shown in green (provided by Wannon Water)

4.5.2 Proposed Roof Water Harvesting Infrastructure

The 560mm trunk main will need to be extended along the Russell Creek corridor through the growth area. The site generally slopes towards Russell Creek and as such the roof water harvesting network will follow the natural contours of the land towards the creek where it will be collected in the trunk main, refer to figure 9.

As a part of early development planning the location and number of detention tanks will need to be determined with Wannon Water to ensure that the network is not overloaded.

An important consideration when installing roof water harvesting is ensuring that the system is safe from external contaminants. The system is generally installed within rear easements running parallel to sewer mains. Designers need to take this into consideration when determining system levels and manage the risk accordingly.

Roof water harvesting reticulation within the development, will be required to be designed and constructed in accordance with Wannon Water requirements at the cost of the developer.

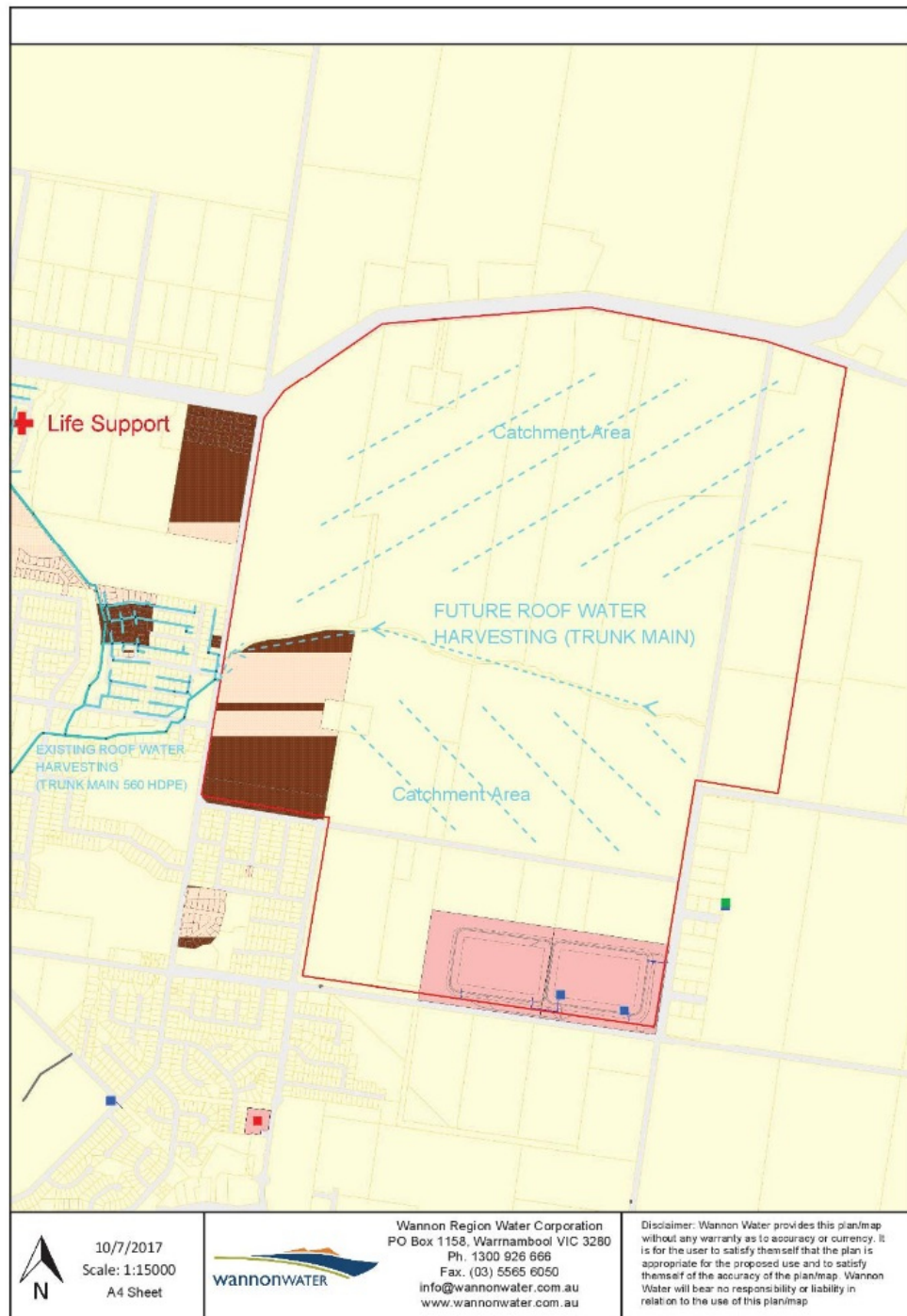


Figure 9 – Roof Water Harvesting Infrastructure Requirements (provided by Wannon Water)

4.6 Electricity Supply

Powercor is the responsible authority for electricity supply within the growth corridor area.

4.6.1 Existing Electricity Infrastructure

22KVa underground power supply is located on the west side of Aberline Road, overhead on the east side of Horne Road and Low Voltage (LV) overhead along Boiling Downs Road east of Gateway Road and underground west of Gateway Road.

Advice from Powercor indicates there are currently two existing High Voltage (HV) feeder cables within the vicinity of the growth corridor. One of these HV feeders is currently operating close to maximum capacity and will soon be maxed out by current development. The other has capacity for a further 3-4 stages of development (approx. 100 lots) before being maxed out. At this point a new HV feeder and potentially zone substation will be needed to be provided to the growth area.

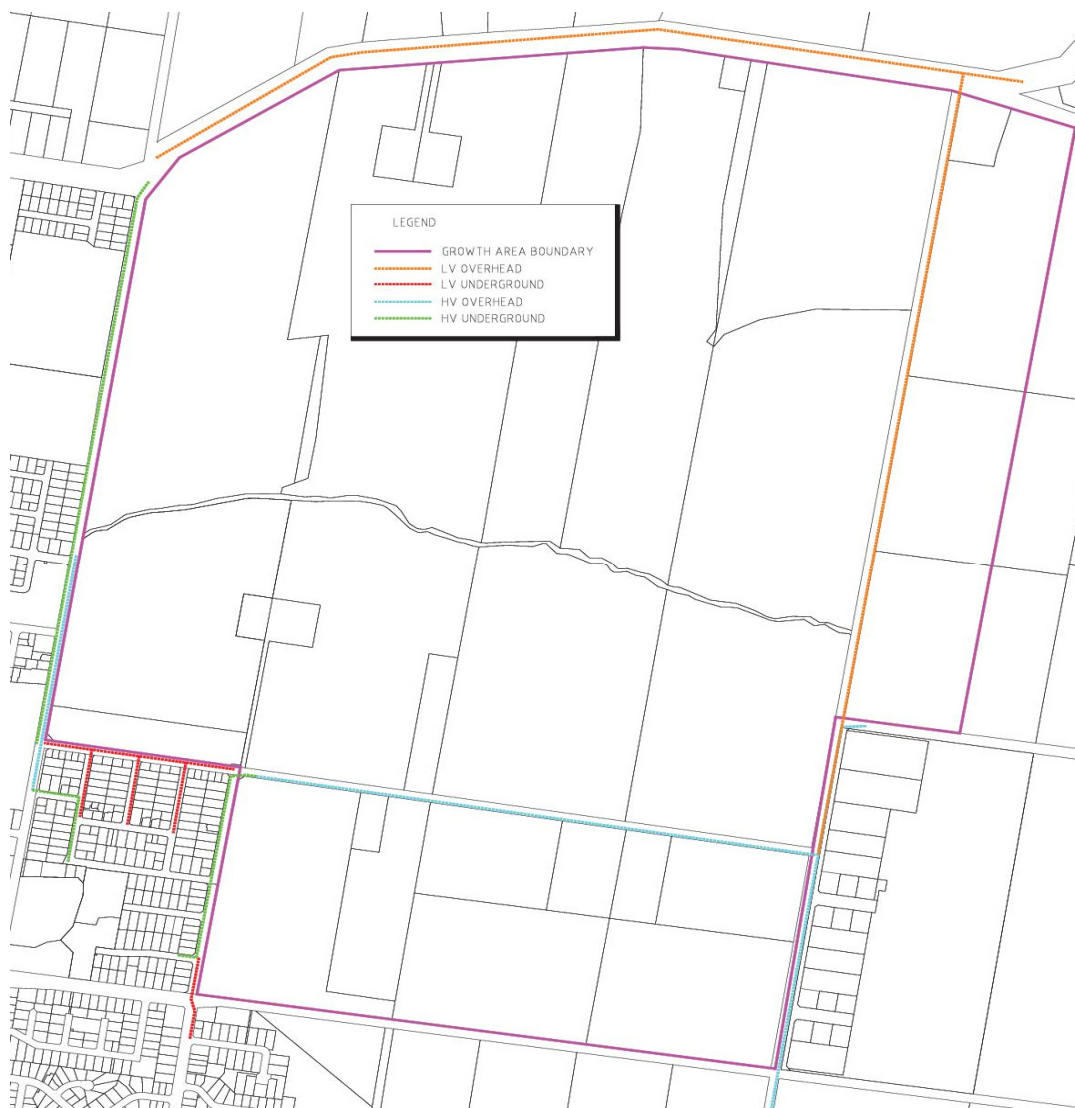


Figure 10 – Existing Electrical Network

4.6.2 Proposed Electricity Infrastructure

Powercor currently have no plans in place to increase power supply in the growth area. Average power consumption for a residential lot in the Warrnambool region is approximately 4KVa meaning that the fully developed requirement for the growth corridor would be in the order of 20MVA. Powercor's network will need to be significantly upgraded in order to meet this demand. This development would equate to approximately 20 x 1000KVa kiosks to be installed along with a large HV and LV underground network.

Application for the provision of electrical supply will be required to be made through Powercor at the time of development. Powercor's preference for the initial development connections are to be from conductors mentioned above that currently have capacity to provide supply to development. Further modelling will need to be undertaken by Powercor prior to development starting to determine the nature and level of external infrastructure upgrades required.

Underground electrical infrastructure will be required to be provided as part of the development. This will involve the installation of pits, conduits and public lighting by the developer. As underground services are provided, overhead assets may be progressively retired.

Electrical substations (or kiosks) are required to be installed throughout a development. As such it is expected that a substation kiosk and an appropriate reserve would be required as part of the development of the area. During the permit application process, it is suggested that an overall servicing arrangement be undertaken by Powercor, to determine the preferred location of any substation. Reserves are required to be provided for this and have dimensions of approximately 3m x 5m.

Electrical infrastructure will be required to be designed and constructed in accordance with Powercor Australia requirements and at the cost of the developer.

New Customer rebates back to the developer may be applicable to the development subject to Powercor undertaking financial modelling of its revenue vs cost structures. If applicable, these rebates may be sought by the developer from Powercor post tie in of the new infrastructure to the existing electrical network by Powercor.

New technologies are becoming available, such as solar to battery storage, which can be implemented on a lot level or as part of the wider network infrastructure. Alternatives such as these may be explored further by Council or development proponents to determine the precise requirements and commercial and or sustainability benefits. In addition, sustainable energy options can be investigated through more detailed structure planning for the growth corridor.

4.7 Gas Supply

Ausnet Services is the responsible authority for gas supply within the growth area.

4.7.1 Existing Gas Infrastructure

There is an existing 125mm diameter gas pipeline located within Aberline Road as well as Boiling Down Road which are the largest supply mains in the area. There is also gas supply assets to the west of Aberline Road within the existing developed area, and on the south side of Boiling Down Road.

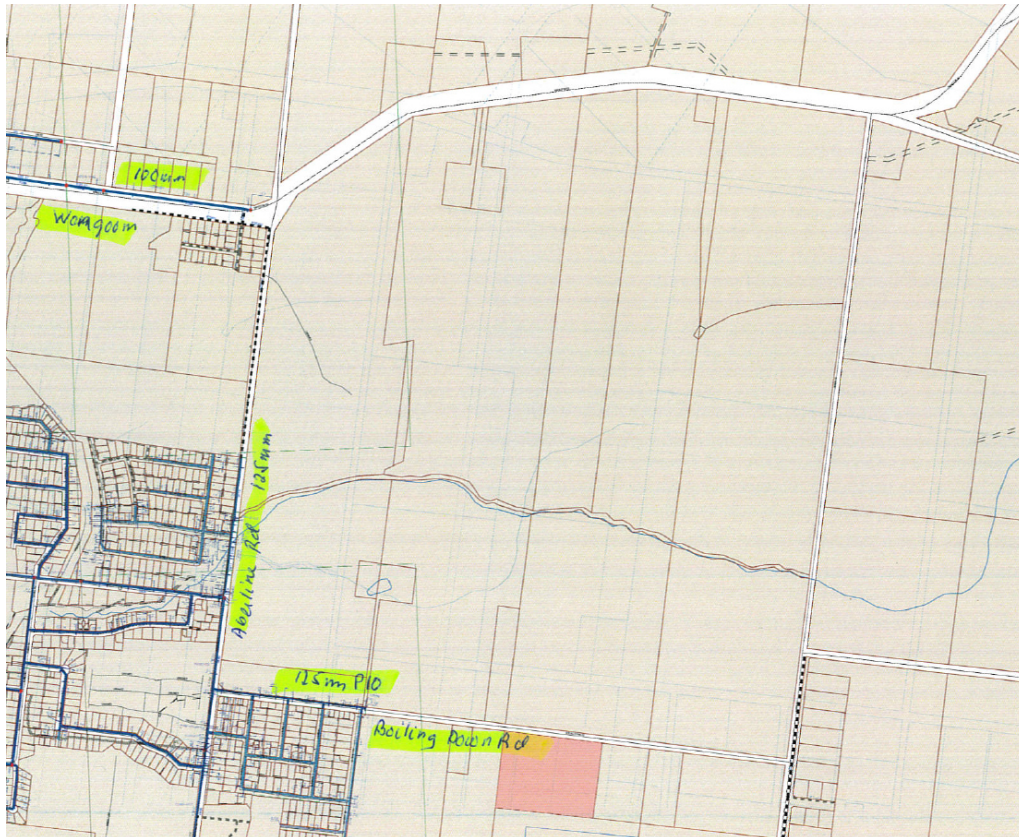


Figure 11 – Existing Gas Infrastructure (provided by Ausnet Services)

4.7.2 Proposed Gas Infrastructure

Ausnet Services have advised that their existing infrastructure, shown above in Figure 11, is in close enough proximity and has capacity to supply the initial stages of development. Once the growth area nears half completion further modelling will need to be undertaken of the remaining site and any development within surrounding areas to determine any external augmentation works.

Upon receipt of development staging plans, Ausnet Services will undertake detailed modelling and network layout designs as needed.

It is expected that gas infrastructure within the development will be provided based on current Ausnet Services requirements. Current policy of Ausnet Services is such that a revenue vs capital infrastructure cost calculation model determines the cost to development of any particular stage.

Gas reticulation is typically provided during the construction phase of the development process through coordination of works at the time of water reticulation construction. Under current policy gas reticulation costs to the development are limited to the trenching costs that are over and above that of potable water reticulation. Ausnet Services typically provides the pipeline and installation into the excavated trench free of charge. These cost should be further refined or determined during the development application process.

4.8 Telecommunications Network

The provision of telecommunication infrastructure to development is a commercial decision between development and communications providers. Typically Telstra and NBN Co. have been providers of telecommunications infrastructure, however there are also alternative providers on the market. For the purpose of this servicing assessment, it has been assumed that the development would be serviced by NBN Co. due to the proximity to existing services and the nationwide roll out of the NBN network.

4.8.1 Existing Telecommunications Infrastructure

Existing optic fibre networks exist throughout the Warrnambool Township to the west and south of the growth area. Construction of fibre has also commenced within the Horne Road Industrial Precinct.

Fixed wireless coverage is currently available to the development area. This is where data travels from a transmission tower to the premises via a rooftop antenna that needs to be installed by an approved NBN Co. contractor. This method would likely be the least preferable when fixed line services are available within the area.

4.8.2 Proposed Telecommunications Infrastructure

NBN have rolled out services to surrounding developments and have indicated that the logical start point for development would be near the Russel Creek crossing near Aberline Road as it requires the smallest backhaul.

NBN Co. typically require developments to be over 100 lots, however given the proximity to NBN Co. fibre network in adjoining development it is considered that NBN Co. would be the provider of choice and would enable connection to its network. This would be required to be confirmed through formal application to NBN Co.

Under current NBN Co. Policy, the developer is required to provide pit and pipe infrastructure as part of the development of the site, and NBN will provide the cabling at the time of first applications for connection of dwellings to the development. Backhaul charges are a shared cost between the developer and NBN Co.

Backhaul charges apply when the development is more than one kilometre from the nearest Fibre Access Node (FAN). A detailed list of charges and rates can be found on the NBN Co. website as they are reviewed on regular basis. It is assumed that the AHGC will be serviced from the NBN tower on the Wannon Water basin site in the south east corner of the site. Depending on the initial location of development this may exceed the one kilometre threshold.

At the time of this report, fees associated with development of the site include a \$600 per lot charge for single dwelling sites and \$400/dwelling charge for higher density developments. Backhaul charges may apply, however as the surrounding residential development has service, these charges would be expected to be negligible and should be confirmed at the time of application.

NBN Co. also offer additional services such as cable television service, which may be considered to remove the requirement for roof top antennas within the PSP area.

Wannon Water have made a specific request that telecommunication infrastructure not be located on any of their sites as they have had issues with this previously. It is therefore advised that land within the growth area be set aside early in the planning process if required by NBN Co. to ensure that their assets do not need to be located on Wannon Water sites.

5. CONCLUSION

This report has assessed the availability and requirements for the provision of the following service infrastructure required within the Aberline to Horne Growth Corridor area;

- ▶ Sewer reticulation
- ▶ Potable water supply
- ▶ Roof water harvesting
- ▶ Electricity supply
- ▶ Gas supply
- ▶ Telecommunications network

The growth area has access to the above existing infrastructure, but it is clear that the authorities need to put plans in place for the provision of increased supply to this area. As such there are limits to the initial development of the area for residential purposes until such time as the authorities put long term plans into place.

The logical staging of development would be from west to east so that trunk gravity infrastructure such as main sewers and outfall drainage are extended upstream with development.

The location of trunk service infrastructure should be cognisant of environmental factors such as minimising impact to areas of high ecological value and significant trees for retention. Base drawings indicating tree protection zones and environmentally significant areas should be utilised to inform service infrastructure alignments that minimise impact to these areas. Where services are required to be constructed within these areas construction methodology that minimises impact should be adopted. I.e. boring or directional drilling.

Timing of infrastructure will generally be dependent on the timing of application for staged development within the area. Should applications be “out of sequence” authorities have the ability to provide infrastructure, potentially with additional bring forward charges past on the development applicant.

Costs associated with the provision of infrastructure will generally be borne by the developer, with larger trunk infrastructure being funded under the relevant authorities capital works programs.

The provision of drainage and road infrastructure requires further investigation at this time, however the delivery of major road and drainage infrastructure will likely be via a Development Contributions Plan (DCP) associated with the Precinct Structure Plan.