thecivilgroup

TAYLOR BURRELL BARNETT

City of Armadale
Kelmscott Activity Centre
Structure Plan

Engineering Aspects – Interim Report

01 July 2022

REVISION STATUS

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1. Introduction

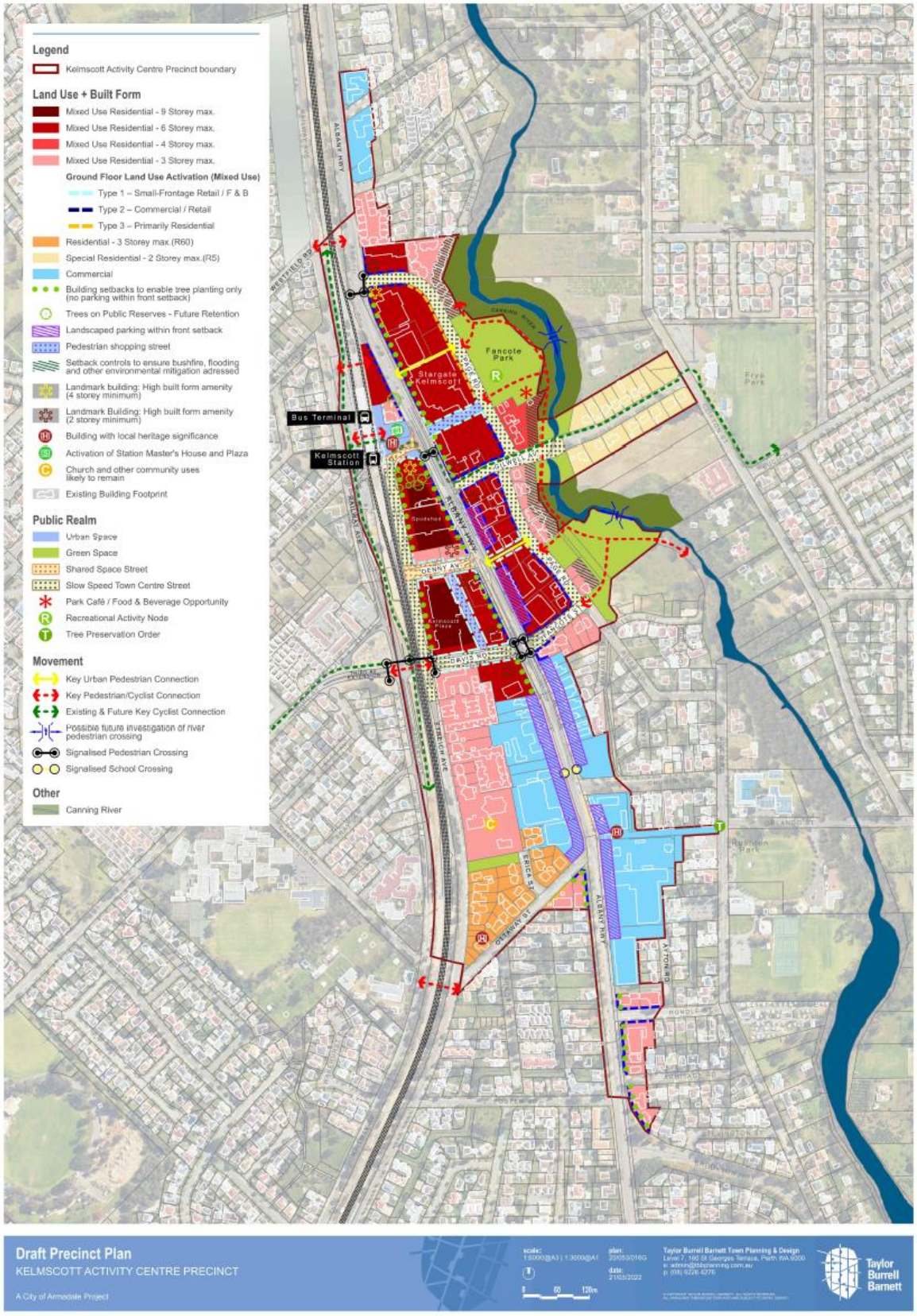
This report with its comments about the utilities and related infrastructure and their capacity within the Kelmscott Activity Centre of the City of Armadale (the City) supports the Structure Plan being prepared by the Town Planner, Taylor Burrell Barnett.

The Kelmscott Activity Centre is located along two sides of a 1.5km length of Albany Highway and contains a range of uses including residential, retail, office, commercial, medical and community type uses, primarily in the vicinity of Albany Highway. The area subject of this investigation is shown below in Figure A and includes:

- Town Planning Scheme No.4 ('TPS No.4') District Centre zone
- The area currently being developed by Development WA (Kelmscott Town Centre)

The population is anticipated to grow within the Kelmscott Activity Centre area, resulting in increased pressure on infrastructure and transport facilities. Anticipated population and growth, and both state and local government strategies and planning frameworks has identified the need for planning renewal.

Figure A – Study Area



2. Geotechnical considerations

The site is situated within the Swan Coastal Plan, with most of it within the Pinjarra Plain. A small portion of the southern corner is in the Piedmont Zone geomorphological unit (Gozzard 1986). The Swan Coastal Plain Environmental geology for the site has been mapped by the Geological Survey of Western Australia (Gozzard 1986) and this indicates that the site is underlain by:

• S8 – Sand - white to pale grey at surface, yellow at depth, fine to medium-grained, moderately sorted, subangular to subrounded, minor heavy minerals, of eolian origin.
• Cs – Sandy clay - white, grey to brown, fine to coarse-grained, subangular to rounded sand, clay of moderate plasticity gravel and silt layers near scarp.
• Csg – Gravelly sandy clay – variable, with lenses of silt and gravel, quartz sand, subangular with eolian rounded component, heavy minerals common, gravel rounded, of colluvial origin.
• Ms4 – Sandy Silt - cream to pale brown alluvium, clayey in part, fine to medium-grained sand, of alluvial origin.

The site is identified in mapping as having a “moderate to low risk of ASS occurrence within three metres of the natural ground surface”.

No detailed geotechnical investigation was carried out as part of the study as the area is fully developed. Developers of individual projects within the study area will need to carry out a site-specific detailed site investigation by geotechnical engineers to determine the nature of the soil on site and to determine design parameters for foundations, fill, road pavements etc.

3. Water Supply

The Water Corporation is reviewing the water and sewerage schemes for the Kelmscott area which is anticipated to be completed by the end of July 2022. This will determine in more detail if upgrades to services are required. The rate of the proposed development will also determine whether the Water Corporation will need to include some of the planned upgrades to water and sewer infrastructure in their Capital Investment Programme. It is noted that a number of upgrades to Water Corporation infrastructure were already progressed through the Denny Avenue Level Crossing Removal Project.

The Kelmscott area is well serviced with a water supply to support development within the Kelmscott Activity Centre.

The Wungong Trunk Main is located in Albany Highway from the south to the corner of Albany Highway and Ottoway Street. From there distribution sized mains are located in Albany Highway to the north (915mm diameter steel), Orlando Street (915mm diameter steel and the 760mm diameter steel (to the east), and an offtake in Westfield Road (460mm diameter steel) to the west.
The Water Corporation advised that the existing reticulation sized mains through the area are predominantly cast-iron mains ranging from 205mm to 100mm diameter. Given the proposed density, the type of buildings may trigger the need for larger fire services. The proponents would be required to fund any upgrades of these reticulation mains to suit the individual developments. The upgrades will be directly triggered at the building stage by the required flow demands and fire flow requirements fronting the potentially undersized mains.

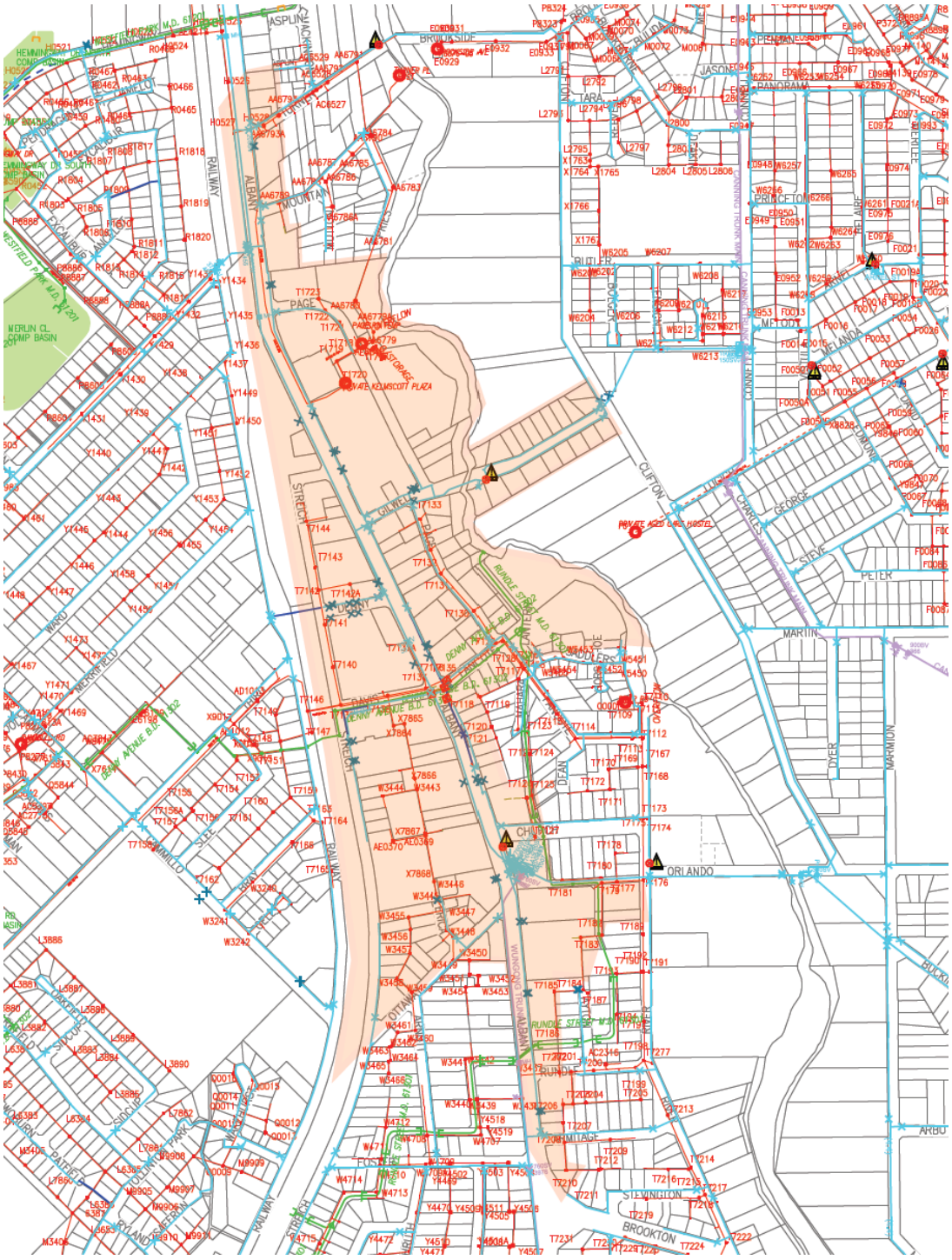
The Water Corporation will assess individual applications for development and advise at that stage if any upgrading to distribution mains will be required. It is likely that some of the older infrastructure may also need to be replaced by the proponents.

At this stage, the Water Corporation does not have any planned upgrades for the water supply in their Capital Investment Programme (CIP) and any required upgrades will need to be funded by individual developers.

Proposed developments will be assessed by the Water Corporation at the time when proponents and developers initiate those discussions and submissions directly with the Water Corporation. The Water Corporation will advise the developers of any modifications or upgrades required to service their development.

The existing water and sewer reticulation pipes are shown in Figure 1 below.

Figure 1 – Existing Water Reticulation and Sewers



The existing water mains are shown in blue and the existing sewers in red.

4. Wastewater

All wastewater collected in the study area is directed by gravity flow to a number of wastewater pumping stations (WWPS) located in Page Road (temporary), Brookside Avenue, Turner Place, Hemingway Drive and River Road.

The Water Corporation advised that the sewer networks may ultimately be constrained by the DN225 sewer in Fancote Street as well as the River Road WWPS. Upgrades to this pumping station are currently planned for 2035, which will be reviewed depending on the rate of development and will be funded by the Water Corporation. If the rate of development triggers the upgrade of the Fancote Street DN225 gravity sewer, the Water Corporation will need to review/fund an upgrade as part of its Capital Investment Programme or arrange funding by the developer.
The Water Corporation will assess individual applications for sewer connections submitted to it by proponents and advise if any upgrades to existing infrastructure will be required and also if any major upgrades need to be included in the Capital Investment Programme.

There is also a potential issue for commercial land on land previously zoned residential. The minimum size of a sewer for commercial development is 225mm diameter whereas they are 150mm diameter in residential land. This may result in developers having to upgrade the existing sewers.

This is not a constraint to development, however, development proponents will need to submit individual applications for commercial development to the Water Corporation for assessment at that time to determine if the sewer needs to be upgraded to 225mm diameter. An extract from the Water Corporation standards states:

The minimum size of sewers serving industrial, light industrial, large commercial areas and large shopping centres shall be DN225 with the following exceptions:

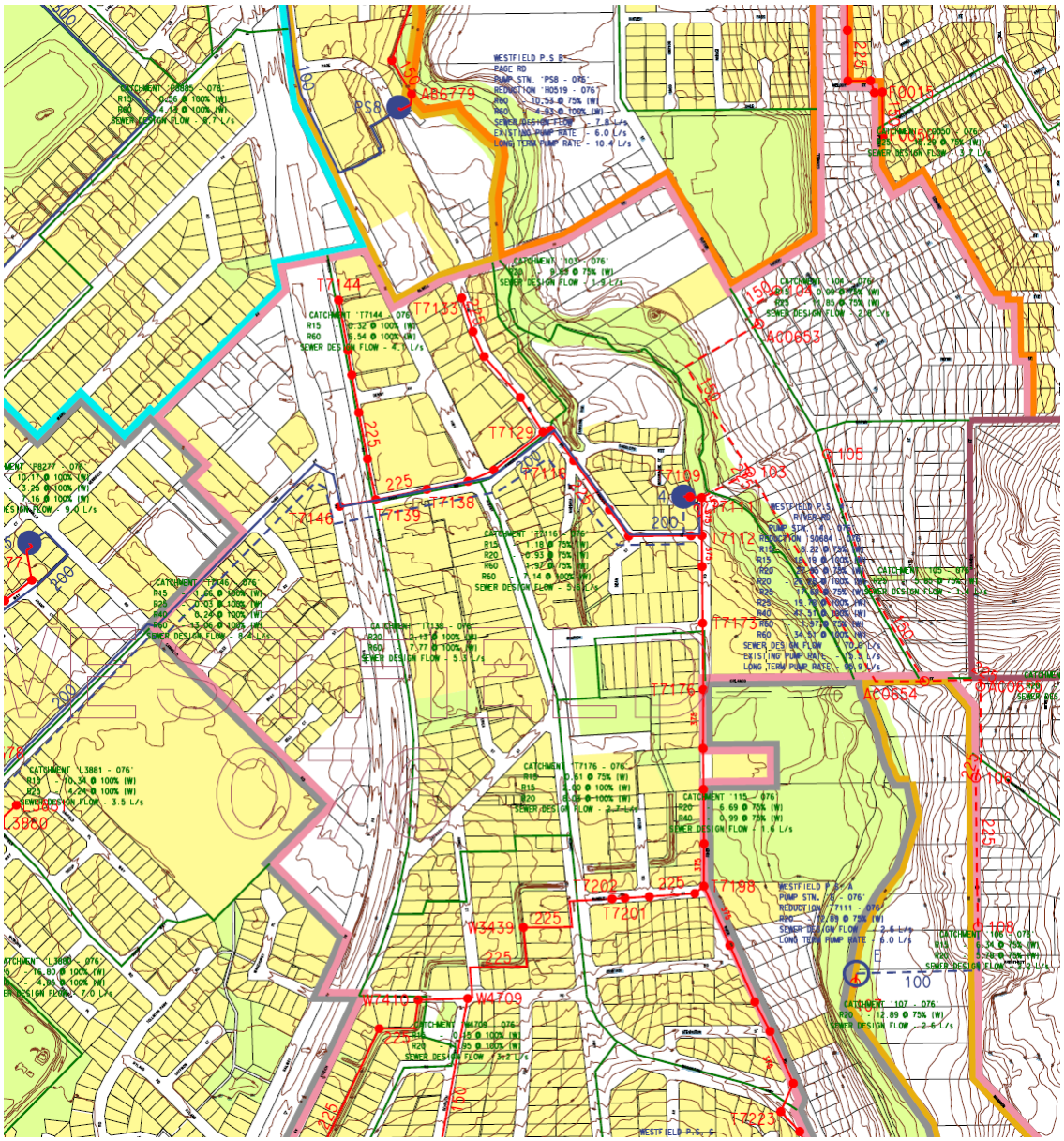
i. Single lots in industrial and commercial subdivisions can be served by a DN150 sewer provided that the area of the single lots does not exceed 0.5 hectares.

ii. A DN150 sewer can serve two industrial or commercial lots or an industrial and a commercial

Some of the reticulation sized sewers in the residential areas are located mid-block. These will most likely need to be relocated to road reserves if land is amalgamated and developed into higher density developments. The Water Corporation will assess individual applications and advise of any upgrades or relocations that may be required.

The locations of the existing wastewater pumping stations are shown in Figure 2 below.

Figure 2 – Extract from Westfield District Sewer Scheme



The gravity sewers are shown in red and the pump stations as blue circles.

5. Water Corporation planned upgrades to water and wastewater

The Water Corporation's approach to the upgrading of larger infrastructure items is usually as follows:

- Planned and Funded: This is where the Water Corporation has planned and secured funding for upgrades. These items are shown on their Capital Investment Programme (CIP). Currently, they do not have any planned and funded infrastructure upgrades on the CIP within the Kelmscott Town Centre area.

- Planned and Unfunded: This is where the infrastructure is shown on the planning, but they have not secured funding and it is not on the CIP. In this case, developers initiating the need for the upgrades can usually negotiate a prefunding arrangement with the Water Corporation whereby the developer pays for it and is reimbursed over a period of time.

- Unplanned and Unfunded: This is infrastructure that is not planned and therefore no funds have been allocated. Any upgrading in this category is entirely funded by the developer requiring it.

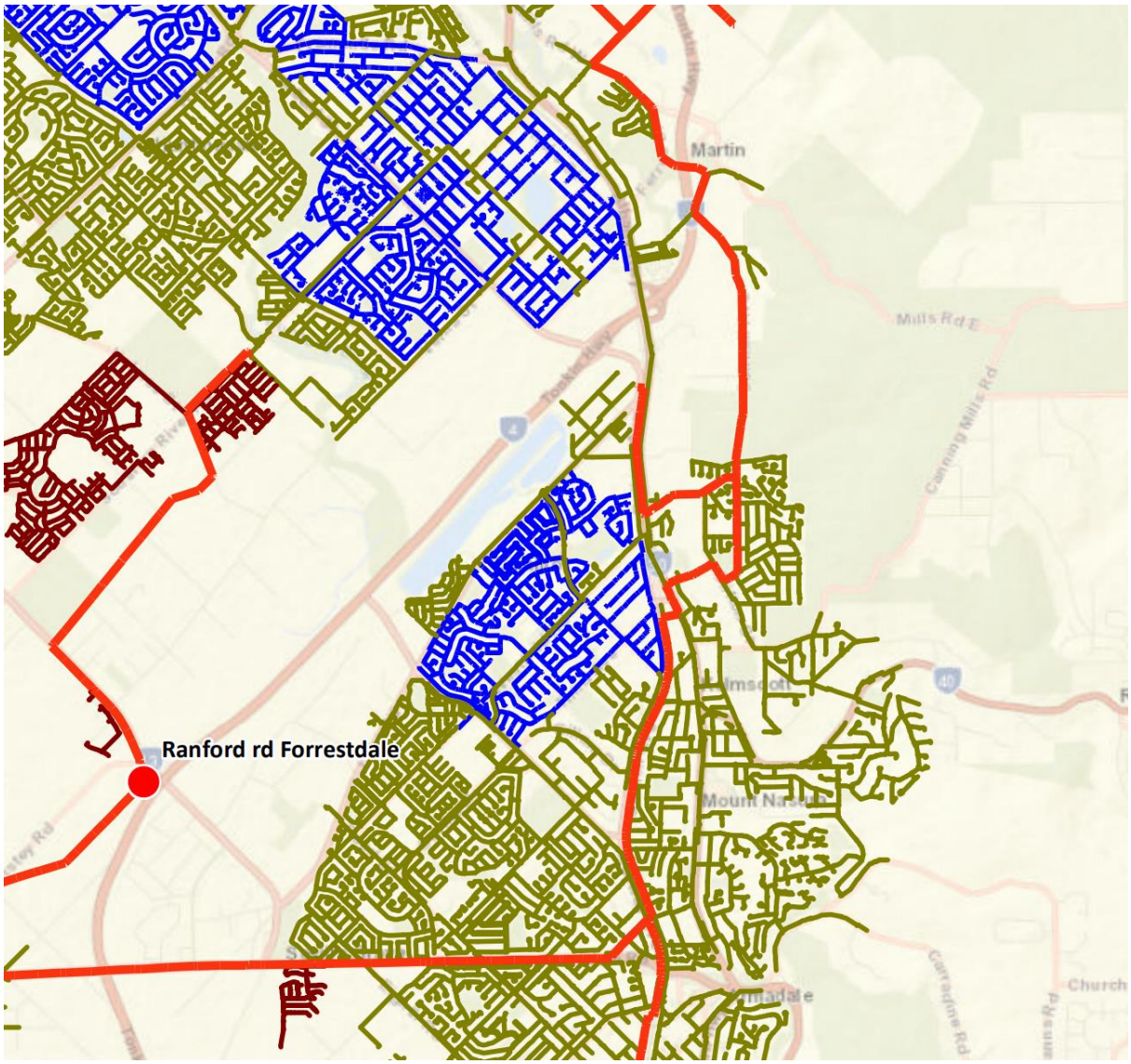
In the case of large developments such as Metronet, any upgrades required as part of the development assessment are customer delivered at the developer's cost and are required for the specific development.

A review of the water and sewer planning for the Kelmscott area and the actual rate of development within the Town Centre will provide the Water Corporation with enough information for them to assess whether the upgrading of any infrastructure items should be included in their CIP.

6. Gas Supply

Reticulated gas is available throughout the study area, – refer Figure 3 - supplied from a network of medium-low pressure (blue), medium pressure pipes (orange) and high-pressure pipes (red).

Figure 3 – ATCO Gas Network



Medium pressure gas mains are shown in orange. Medium-low pressure gas mains are shown in blue.

Although gas is not an essential or required service there appears to be sufficient supplies and networks in place and there may be no capacity issues that will prevent development. If mains are to be upgraded, it will be progressive and supported from the network of high-pressure mains.

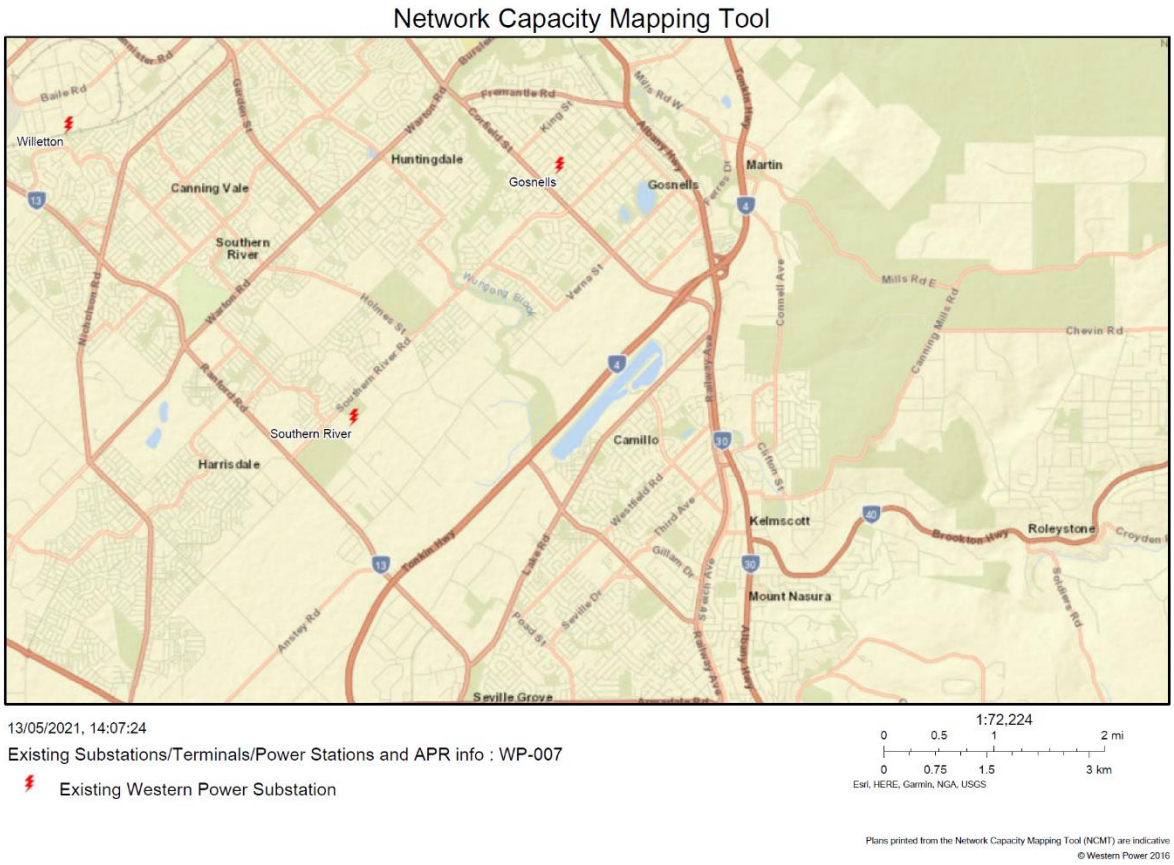
ATCO Gas advised that, at this point in time, they do not have any planned upgrades to their gas network in the study area of the Kelmscott Town Centre. Since they do not have the relevant information with respect to number and staging of lots/developments/required gas demand, they

are not able to provide an answer as to whether there may be potential capacity issues when the development happens. This will be assessed into the future as detailed information becomes available.

7. Electricity

Western Power has substations located as shown in Figure 4 below. There are no planned substations within the area.

Figure 4 – Existing substations



Extracts from Western Power's Network capacity mapping tool are provided below for the years 2021 (Figure 5) and 2036 (Figure 6).

Figure 5 – Network Capacity 2021

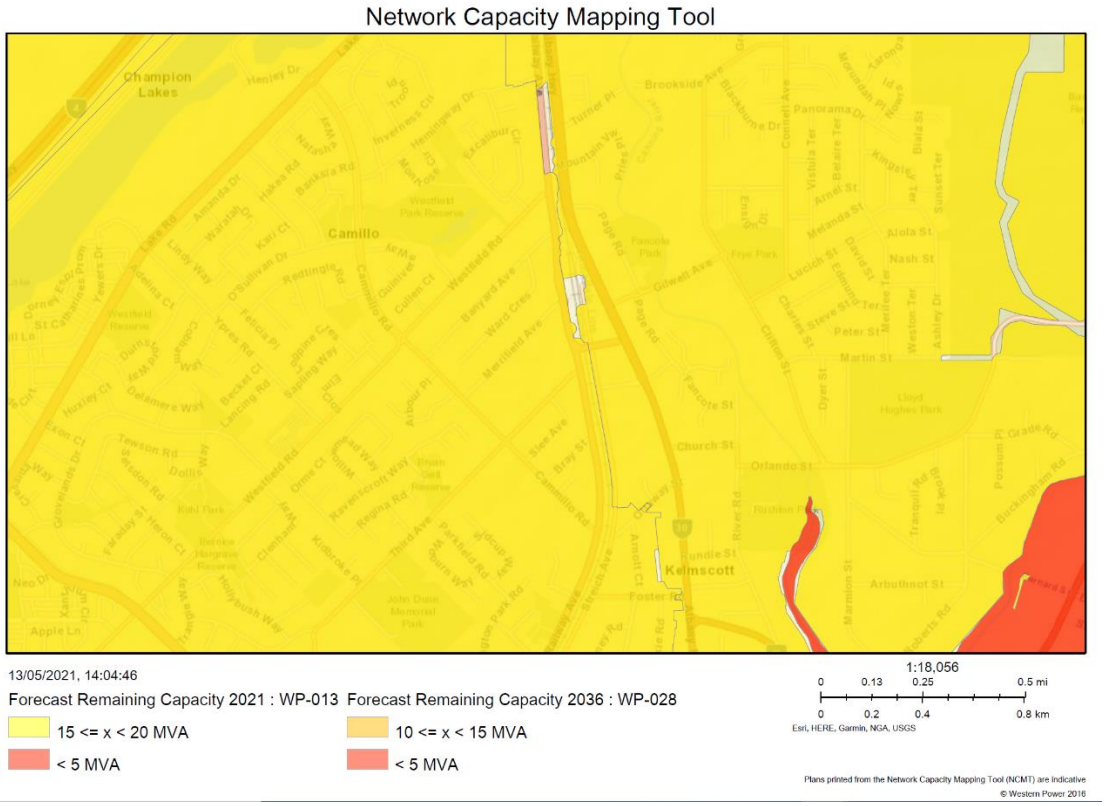
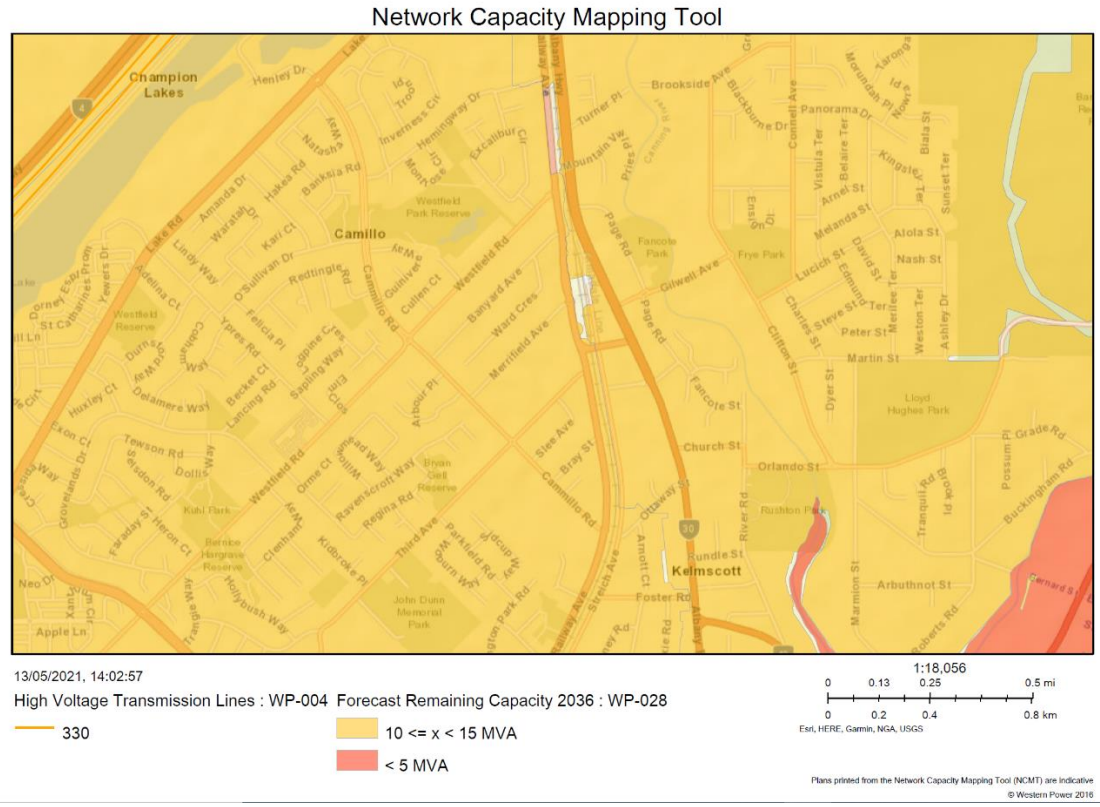


Figure 6 – Network Capacity 2036



This Tool provides a forecast of the available capacity at Western Power's zone substation. It is forecasted that for the next 15 years; the area has between 10 and 15 MVA of capacity remaining (where MVA means mega-volt-amps being a measure of electrical power). This is equivalent to the supply needed for about 2,000 to 3,000 dwellings. This means that potentially, significant development can proceed in the area without the need for zone substation upgrades. Western Power will need to confirm this through further studies once the zoning and densities have been set.

It is Western Power's responsibility to ensure the power transmission (i.e. delivery of high voltage to the zone substations) keeps up with demand. But it will not step in to deliver system upgrades beyond the Zone Substations via feeders or distribution cables.

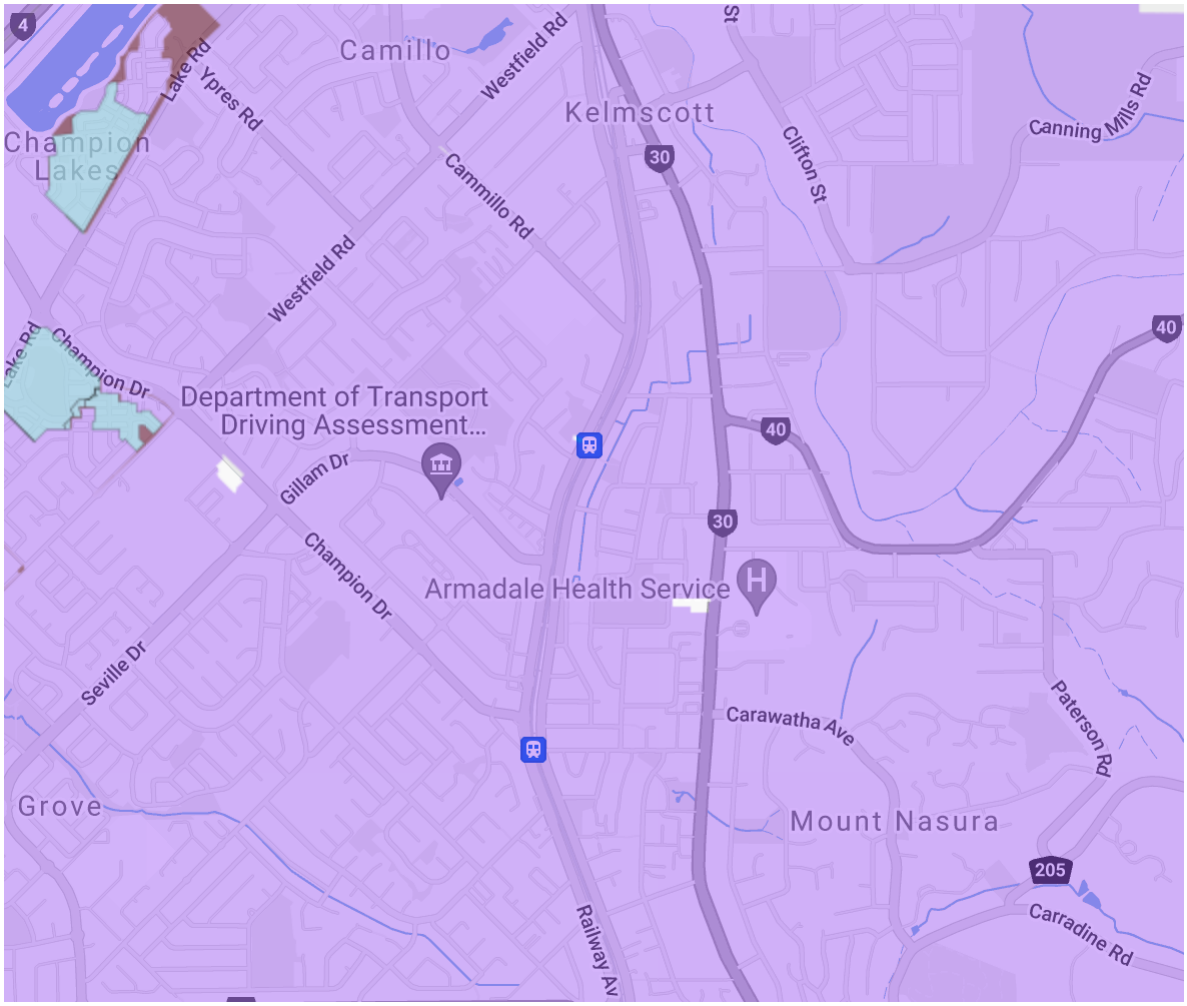
High costs for upgrading can be incurred by developers when there are insufficient high voltage feeders from the zone substations to serve larger scale developments. Unfortunately, at present the only way for Western Power to advise if a development triggers an upgrade to a High Voltage feeder is through multiple precinct type feasibility studies, which must not only be paid for by the developer but be based on an assumed development programme and staging. Such staging is almost impossible to predict now.

Due to current and future technological advancements in power generation and storage, Western Power will have some difficulty predicting future power requirements. The current available capacity in the network will be reduced over time by development. At some point in time this will trigger upgrades to Western Power's high voltage system, however this is dependent on the rate of development, ongoing sustainability/technological advancements and power generation self-sufficiency of new developments.

8. Communications

The NBN coverage is shown in Figure 7 below. The entire area is covered by NBN fibre optic cables.

Figure 7 – Extract from NBN Rollout Map



The purple area shows the availability of NBN.

It is not expected that broadband capacity will be a burden to future development.

There are also communication cables operated by Optus and TPG in the study area.

9. Stormwater

The densification of areas within the area will not [as per LWMS and emerge advice] lead to a significant increase in stormwater runoff from buildings and paved areas. The Water Corporation and the City will, however, generally not allow additional runoff into their drainage systems. Additional lot scale on-site storage will therefore need to be considered whenever and wherever higher density development is proposed. This may need to include surface-based Water Sensitive Urban Design (WSUD) measures and infiltration, where permitted. Drainage matters are further considered in the Local Water Management Strategy.

The current road drainage network will be retained; further WSUD elements may be considered as part of any future road network upgrades.

The Water Corporation has indicated they have several Main Drains under their control in the Town and will need to evaluate capacity once the densification and zoning has been determined. The Water Corporation's piped network discharging into the Rundle Street Main Drain provides an opportunity to adopt the Water Corporation/Department of Water and Environmental Regulation 'Drainage for Liveability' approach to significantly improve water quality discharged into the Canning River (refer to the Local Water Management Strategy).

10. Summary

The planned redevelopment outcomes and residential and commercial land use intensification in the study area are intended to deliver on State Government densification and/or infill targets. Implementation of the Structure Plan will potentially impact on capacities of existing infrastructure. This will need to be assessed in more detail once the Structure Plan has been referred to the servicing authorities. If the proposed rate of development triggers the need for infrastructure upgrades, the relevant servicing authorities will need to consider the staging and scope of upgrade works for delivery by those authorities. In the case of the Water Corporation, this should result in the inclusion of the upgrading of water and sewer infrastructure on their CIP.

Infrastructure upgrades that are not planned and funded by the servicing authorities will need to be implemented by individual proponents at their cost

In the case of incremental redevelopment, the burden of any upgrades usually falls to the first developer, with subsequent developers benefiting without contributing. To avoid this scenario, orderly service upgrades by the relevant servicing authorities are the preferred means of achieving suitable infrastructure in a timely manner to support the Structure Plan outcomes.