Rockingham Strategic Centre Infrastructure and Servicing Strategy

Rockingham Strategic Centre Precinct Structure Plan

CW1181500

Prepared for

Hames Sharley

16 December 2021

Cardno

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Executive Summary

Cardno has been engaged by Hames Sharley on behalf of the City of Rockingham to assist in preparing a Local Infrastructure and Servicing Strategy for the Rockingham Strategic Centre (RSC).

This study includes a review of the State Governments Planning Framework for RSC which includes the *Rockingham Strategic Regional Centre – Centre Plan (2010), Town Planning Scheme No.2* and a series of precinct based Local Planning Policies for sectors within the study area.

The Study Area is within the City of Rockingham. The RSC is bordered by Ennis Avenue to the east, Rae Road to the south, Read Street to the west and the Rockingham foreshore to the north.

The purpose of this study is to:

- Review the existing infrastructure and its current condition; and
- Identify any planned infrastructure upgrades and their impact to current assets

Stakeholder Engagement

Targeted stakeholder engagement was undertaken to ensure the desktop assessment for this project was based on the most current information available. Stakeholders contacted include:

> GAS - ATCO Gas;

> POWER - Western Power

> COMMUNICATIONS - AARnet Pty Ltd WA, NBN Co, Nextgen, Optus,Telstra, TPG and Vocus.

> POTABLE WATER - Water Corporation

> WASTEWATER - Water Corporation

> STORMWATER - City of Rockingham

Key Findings

Information on the RSC existing and planned infrastructure was collected and reviewed against the predicted demand to determine if further servicing infrastructure is required. The RSC precinct is divided into eight (8) Sectors, each with an associated Development Policy Plan (DPP). Utilities for each sector were investigated in addition to the utility requirement for the precinct as a whole.

It was found that significant gas, power, communications, water, wastewater and stormwater infrastructure will be required for proposed development within the City Centre (Precinct 1) and TOD Village (Precinct 4) due to vacant land being converted into medium to high-density mixed-use areas, carparks, urban squares, new roads and transit systems.

The mains utility infrastructure within the Waterfront Village (Precinct 2), Education (Precinct 7), Southern Residential (Precinct 6) and Coastal Lots (Precinct 3) sectors is typically consistent with the proposed development plans. An increase in capacity of utilities for the upgrade of residential and commercial capacity with the incorporation of medium to high-density mixed-use areas within some of these sectors will need to be investigated with relevant authorities upon development. Stormwater upgrades will be required for new roads and carparks within the Waterfront Village and Education precincts.

The City Park (Precinct 5) and Dixon Road (Precinct 8) sectors currently have no DPPs and hence future servicing requirements will need to be investigated further when these become available.

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Abbreviations

- CoR – City of Rockingham
- DPP – Development Policy Plan
- HV – High Voltage
- IDP – Indicative Development Policy
- LV – Low Voltage
- MVA – Megavolt Amperes
- NCMT – Network Capacity Mapping Tool
- POS – Public Open Space
- RSC – Rockingham Strategic Centre
- RSRC – Rockingham Strategic Regional Centre
- Scmh – standard cubic metres per hour
- TOD – Transit Orientated Development
- WAER – West Australian Electrical Requirements

1 Background

1.1 General

Cardno has been engaged by Hames Sharley on behalf of the City of Rockingham to prepare an infrastructure and servicing strategy for the Rockingham Strategic Centre (RSC). This document identifies the existing local infrastructure and servicing strategy for the RSC area and identifies potential future requirements for the *RSC Precinct Plan* which will replace the current *Rockingham Strategic Regional Centre (RSRC) Centre Plan.*

The scope of works includes:

- Review of existing utility infrastructure within the existing Rockingham Strategic Regional Centre and associated town planning zoning;
- Identification of potential infrastructure upgrades for the new Rockingham Metropolitan Strategic Centre and updated town planning zoning, accounting for the regional perspective only as it relates to the Rockingham precinct
- Review and update of infrastructure upgrades previously determined for Rockingham Strategic Centre against the latest Town Planning Scheme and subsequent Local Structure Plan, accounting for the regional perspective only as it relates to the Rockingham precinct.;
- Assessment of the infrastructure to inform the City on decisions around the long-term provision of electrical energy, potable water and sewage disposal, natural gas, along with high-speed data/telecommunications and stormwater drainage for the RSC precinct.

The findings and advice presented in this report is based on Cardno's observations, experience from similar projects and responses from various service providers and stakeholders.

1.2 Methodology

The methodology followed for this study included:

- Engaging with key stakeholders;
- Reviewing available data and identifying proposed works;
- Investigating existing infrastructure capacity; and
- Investigating and assessing future servicing requirements as per RSC Precinct Plan.

1.3 Literature and Documents Reviewed

The documents reviewed include:

- Rockingham Strategic Regional Centre – Centre Plan (CoR[1], 2010);
- City of Rockingham Town Planning Scheme No. 2 (CoR[4], 2004);
- City of Rockingham Planning Policies:
  - 3.2.1 – City Centre Sector (CoR[5], 2014)
  - 3.2.2 – Smart Village Sector (CoR[6], 2010)
  - 3.2.5 – Waterfront Village Sector (CoR[7], 2019)
  - 3.2.6 – Northern Waterfront Village Sector (CoR[8], 2014)
  - 3.2.8 – Campus Sector (CoR[9], 2014)
  - 3.2.9 – Eastern Sector (CoR[10], 2014)
  - 3.2.12 – Southern Gateway and Rockingham Station Sectors (CoR[11], 2016)
- Rockingham City Centre Transit System (CoR[3], 2010)

2 Study Area

2.1 Location

The Rockingham Strategic Centre (RSC) precinct plan is located 38km south, south-west of the Perth Central Business District and falls under the local government jurisdiction of the City of Rockingham (the City). The RSC precinct covers an area of approximately 600Ha, within the bounded geographic perimeters of Read Street, Rockingham Beach, Victoria Street, Patterson Road, Ennis Avenue and Rae Road. The area incorporates Rockingham Rail Station, Rockingham Beach, Rockingham Waterfront Village, the joint campus of Murdoch University and Rockingham College of TAFE, the Dixon Road commercial and light industrial area, regional recreation reserves and related residential area. The regional location and boundary of the Rockingham Strategic Centre can be seen below in Figure 2-1.

Figure 2-1 Rockingham Strategic Centre and Regional Location

2.2 Rockingham Strategic Centre (RSC) Precinct Plan

The RSC Precinct Plan will replace the Rockingham Strategic Regional Centre – Centre Plan dated 2010, and includes a vision of a modern, distinctly coastal centre offering a wide range of mixed uses. These uses will include retail, commercial, office, civic, residential, education and recreation areas within an accessible and highly interconnected, urban-scaled townscape, comprising of a major activity centre and related urban villages.

The RSC is divided into eight (8) distinct precincts which provide a higher level of detail to assist in the preferred use of each area. This detail includes residential densities, building heights and frontages for urban development as well as carparking requirements and other urban design requirements. These precincts are identified in Figure 2-2.

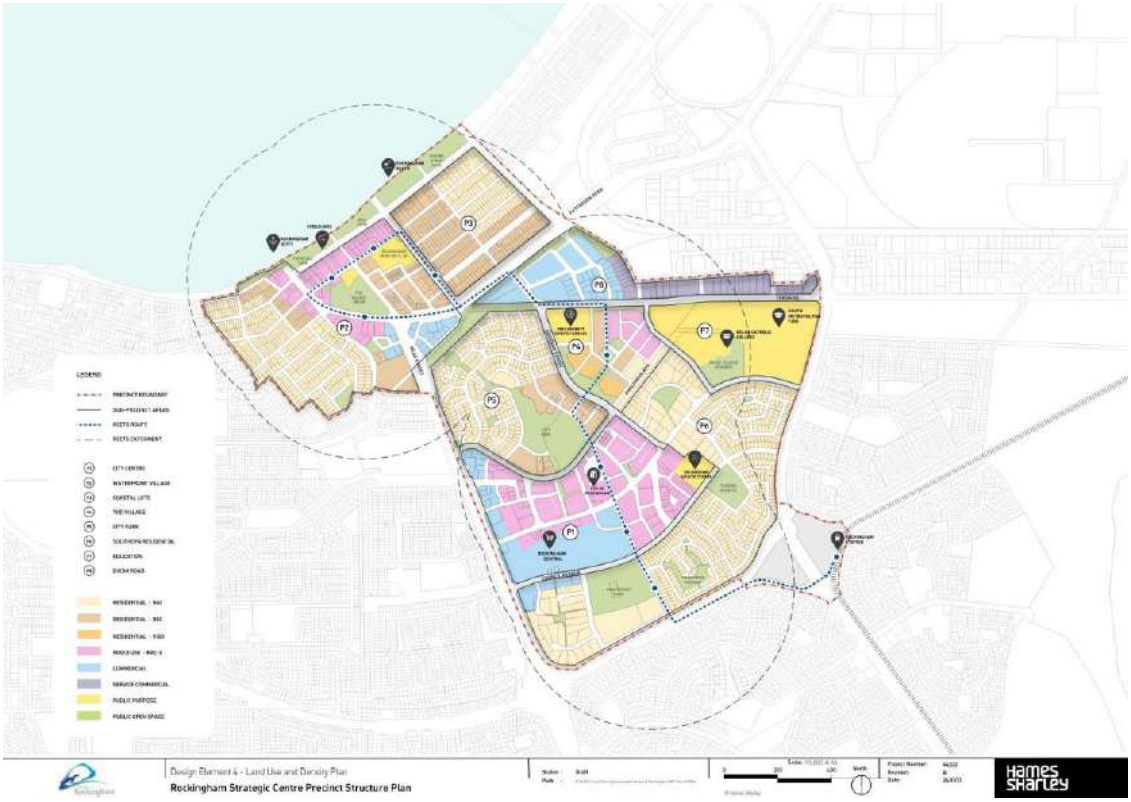

Figure 2-2 Land Use and Density Plan (*Source: Hames Sharley)*

The City's Town Planning Scheme No. 2 with complementary Development Policy plans have provided zoning classifications for each sector. They are identified in Table 2-1 below.

Table 2-1 Sector Zoning Classifications

Sector	Existing Zoning	Proposed Zoning	Adopted
Precinct 1 – City Centre	City Centre Area	Primary Centre City Centre	2010
Precinct 2 – Waterfront Village	City Centre Area	Primary Centre Waterfront Village	2012
Precinct 3 – Coastal Lots	City Centre Area	Primary Centre City Living	2013
Precinct 4 – TOD Village	City Centre Area	Primary Centre Urban Village	2012
Precinct 5 – City Park	City Centre Area	-	Ongoing
Precinct 6 – Southern Residential	City Centre Area	Primary Centre Urban Living	2015/10
Precinct 7 – Education	City Centre Area	Primary Centre Campus	2014
Precinct 8 – Dixon Road	Industrial	General and Light Industrial	Not Commenced

2.3 Proposed Future Development

The proposed urban structure plan for RSC can be seen in Appendix A to gain an understanding of the potential future infrastructure and servicing requirements. The following sections provide a summary of the Indicative Development Plans (IDPs) in relation to each Sector with the RSC Precinct Plan.

2.3.1 Precinct 1 – City Centre

Anchored by the shopping centre and civic precinct, the City Centre will provide the primary economic and employment focus of the RSC. Higher density housing and new commercial development creates a critical mass of people who enjoy a highly permeable and walkable urban structure, that connects major public spaces with public transport on Contest Parade. New development provides a positive and well-defined street interface, where pedestrians and cyclists enjoy priority over vehicles.

2.3.2 Precinct 2 – Waterfront Village

The Waterfront Village will continue its transformation into a regionally significant beachfront hub with further redevelopment of under–utilised public and private properties. An attractive mix of medium to high density residential and short–stay accommodation, hospitality–focussed retail, offices and recreation uses will combine to make this a priority destination on the Rockingham coastline for locals and tourists alike.

2.3.3 Precinct 3 – Coastal Lots

High-quality medium density development supports quality urban infill outcomes along the RCCTS. A combination of grouped and multiple dwelling typologies enable an increased density, balanced with generous street setbacks and open space to ensure improved tree canopy.

2.3.4 Precinct 4 – TOD Village

Extension of the RCCTS represents a strategic TOD opportunity that provides for contemporary higher density development opportunities, which integrate with the existing landscape and retained Mike Barnett Sporting Complex. The transit stop includes a well landscaped central park and local centre that creates a destination and amenity to support growth in the precinct.

2.3.5 Precinct 5 – City Park

The Autumn Centre is expanded and existing single detached dwellings are largely retained, with the framework supporting future long-term growth and development through infill. New development is focussed primarily on Goddard and McNicholl Streets providing density along the RCCTS.

2.3.6 Precinct 6 – Southern Residential

High-quality medium density development support sensitive and quality urban infill outcomes, primarily in the form of grouped dwellings and small scale apartment typologies. Heights are generally between two-three storeys, and generous street setbacks align with the existing character of the area.

Existing areas with high concentrations of strata properties are highly unlikely to change in the near term.

The rail station is serviced by park and ride car parks located on either side of Ennis Avenue, with long-term redevelopment aspirations on the western-most car park presenting possible opportunities to increase density in close proximity to the station.

2.3.7 Precinct 7 – Education

Existing campuses are linked by an internal link road which enhances connectivity between the Education and City Village precincts. Sufficient capacity for new development ensures large spaces are provided between buildings supporting the establishment of greenery and tree planting, which creates an attractive place to work and recreate.

2.3.8 Precinct 8 – Dixon Road

A gateway statement at the corner of Dixon Road and Ennis Avenue frames the entry into the RSC. Enhancement of the streetscape supports a green buffer which screens the light industrial and commercial development to the north. The bushland south of Patterson Road is developed in the long-term, with a flexible urban structure supporting a range of commercial and employment generating land uses.

2.4 Transit Orientated Development (TOD)

2.4.1 Background

The Rockingham City Centre Transit System (RCCTS) connects the Rockingham Train Station with the City Centre, education campuses and the beachfront. The route of the street-based transit system is being developed initially in shuttle-bus mode with the understanding that it will be upgraded to an electric streetcar or light rail operation once a more supportive level of development has been achieved along the route.

The City of Rockingham is committed to achieving the vision of a fixed route, streetcar transit system as the focus of a corridor of high intensity, mixed use development between the train station and the beachfront.

Accordingly, a review of the Centre Plan was commissioned on the understanding that it would demonstrate the application of sustainable development principles with a particular emphasis on TOD (DPP 2.3.2, CoR 2010).

Figure 2-3 shows the location and extent of vacant and under-utilised land in the Centre Plan area. Within the TOD catchment, between Council Avenue and Rockingham Beach, this land comprises a total area of approximately 82 hectares. Of this total area, approximately 54 hectares is situated in the core of the City Centre to the north and east of the shopping centre and extends northwards across existing (soon to be relocated) playing fields through to Dixon Road.

Figure 2-3 Under Utilised Land with Development Potential (Rockingham DPP 3-2-1)

From Figure 2-3, there are eight sites that have been identified as significant land parcels with TOD potential (DPP 3.2.1, CoR 2010):

- **Site 1**- privately owned land that is located adjacent to the transit route within the City Centre Precinct. It can be readily developed for a wide range of inner-city uses, including offices and high-density residential development.
- **Site 105** - the remaining portion of the City of Rockingham superlot bounded by Civic Boulevard, Central Promenade, Whitfield Street and Chalgrove Avenue. The transit route passes through the super-lot that already houses the Rockingham Courthouse and Police Station, the Civic Administration Centre, Council Chambers, City Square and other arts and community buildings. Subdivided mixed use sites are well-suited to TOD.
- **Sites 26 to 35** - privately owned and part of the shopping centre portfolio. They fall within the City Centre Precinct and collectively have ‘Main Street’ frontage to Civic Boulevard and Central Promenade. They are close to the transit route and are readily developable for a mix of inner-city uses.
- **Site 99** - owned by the WAPC. It is close to the transit route and lies opposite Sites 79 and 90 in the TOD Village Precinct where a comprehensive TOD is envisaged.

- **Site 25** - privately owned and part of the shopping centre portfolio. It adjoins the transit route and is within the City Centre Precinct and can be readily developed for a wide range of mixed uses, including high density offices, serviced accommodation and residential.
- **Sites 37 to 40** - privately owned and fall within the City Centre Precinct. They are close to the transit route and are readily developable for a mix of inner-city uses.
- **Site 103** - Department of Housing site that has direct frontage to the transit route and has already been identified as a demonstration TOD project which will be initiated once the adjoining transit route is commissioned.
- **Site 70** - privately owned property adjacent to a church owned aged person's complex. It is well-suited to higher density residential development given its prominent location overlooking the City Park.

2.5 Development Yields

The most recent development yields and land use areas provided by Hames Sharley are summarised in Table 2-2 and Table 2-3 below.

Table 2-2 Residential Density *(Source: Hames Sharley)*

Sub-Precinct	Existing	Residential Dwellings Target
P1 City Centre	432	4248
P2 Waterfront Village	1097	3787
P3 Coastal Lots	536	1762
P4 TOD Village	0	1205
P5 City Park	347	1665
P6 Southern Residential	1555	3299
P7 Education	0	0
P8 Dixon Road	0	0
Total	**3967**	**15966**

Table 2-3 Land Use *(Source: Hames Sharley)*

Land Use	PSP Area Ha
Residential R60	133
Residential R80	44
Residential R100	3
Mixed Use	47
Commercial	40
Public Purpose	40
Service Commercial	11
Public Open Space	60

3 Services

3.1 ATCO Gas

The gas network servicing RMSC is installed, owned and operated by ATCO Gas, who provided information on the existing infrastructure within the study area.

3.1.1 Existing Infrastructure

The existing reticulated gas mains within the Study Area and its surrounds can be found in Figure B1, Appendix B. The network consists of arterial gas main lines with additional servicing pipes. There are also number of abandoned gas mains which have also been identified in the Figure B1.

3.1.2 Planned Future Upgrades

ATCO Gas was contacted in June 2021 to identify planned future gas infrastructure upgrades, future network requirements and demands for development upgrades for residential, commercial and industrial areas as well as standard dwelling consumption rates for residential, commercial and industrial areas. This information could not be confirmed by ATCO however, gas services are typically built to match development requirements rather than forward planned. Therefore, any future developments require ATCO to be contacted to confirm necessary utility upgrades and network additions.

3.1.3 Future Development Requirements

Based on the current gas infrastructure network and the proposed development outlined in the Rockingham DPPs, the follow gas network upgrades are predicted as outlined in Table 3-1.

Table 3-1 Future Development Requirements - GAS

Sector	Future Required Infrastructure
Precinct 1 – City Centre	The following areas (as identified in Figure 2-3) will require significant gas infrastructure including: ▪ Site 1 – gas mains and property connections to residential and commercial dwellings ▪ Site 105 – mains and property connections to High-density mixed-use areas ▪ Site 26 to 35 - gas mains and property connections to residential and commercial dwellings ▪ Site 37 to 40 - gas mains and property connections to residential and commercial dwellings ▪ Site 25 - property connections to high-density mixed-use areas ▪ Site 103 – mains and property connections to medium to high-density mixed-use area ▪ Site 70 – no new infrastructure required
Precinct 2 – Waterfront Village	▪ Mains lines will meet future requirements ▪ Property connections required for staged redevelopment of Challenger lodge sites to the South
Precinct 3 – Coastal Lots	▪ Gas network satisfactory for future requirements
Precinct 4 – TOD Village	▪ Significant gas main network required Residential and commercial property connections required
Precinct 5 – City Park	Currently no DPP to assess future gas requirements
Precinct 6 – Southern Residential	Gas network satisfactory for future requirements
Precinct 7 – Education	▪ Gas mains sufficient ▪ Further property connections required
Precinct 8 – Dixon Road	Currently no DPP to assess future gas requirements

Note the required gas infrastructure identified in Table 3-1 is indicative only based on proposed development planning policies. It is advised to contact ATCO Gas to confirm proposed infrastructure to meet development requirements.

The estimated future residential gas demand for the RSC is provided in Table 3-2. These figures are based on peak and diversified gas load (per hour) not overall usage, as per ATCO Gas advice. The current standard dwelling consumption for RSC is assumed 0.35 scmh (standard cubic metres per hour).

Table 3-2 Future Residential Gas Demand

Precinct	Dwellings	Residential Gas Demand
RSC	15966	5588.1 scmh

*With TOD

3.2 Power

Western Power owns and operates all electricity supply network assets within the development area and therefore all new electricity supply equipment and cables will need to be installed in accordance with Western Power, WAER (West Australian Electrical Requirements), and AS3000 specifications and standards.

3.2.1 Existing Infrastructure and Current Planning

3.2.1.1 Existing High Voltage

The existing Western Power High Voltage (HV) distribution network within the proposed redevelopment area consists of 22kV distribution lines that are supplied from the 132kV/22kV Rockingham Zone Substation located approximately 1km west of Read Street. The network can be seen in Figure C1, Appendix C.

3.2.1.2 Current and Forecast Remaining Network Capacity

Western Power's Network Capacity Mapping Tool (NCMT) shows that there is limited network capacity to provide the proposed loading required for this redevelopment. Additionally, based on our understanding of the limitations of Western Power's network in the vicinity of the development, it is crucial that prior to commitment to any firm power supply arrangements, Western Power undertake an internal review of the current and proposed connections in the area. Refer to Figure 3-1.

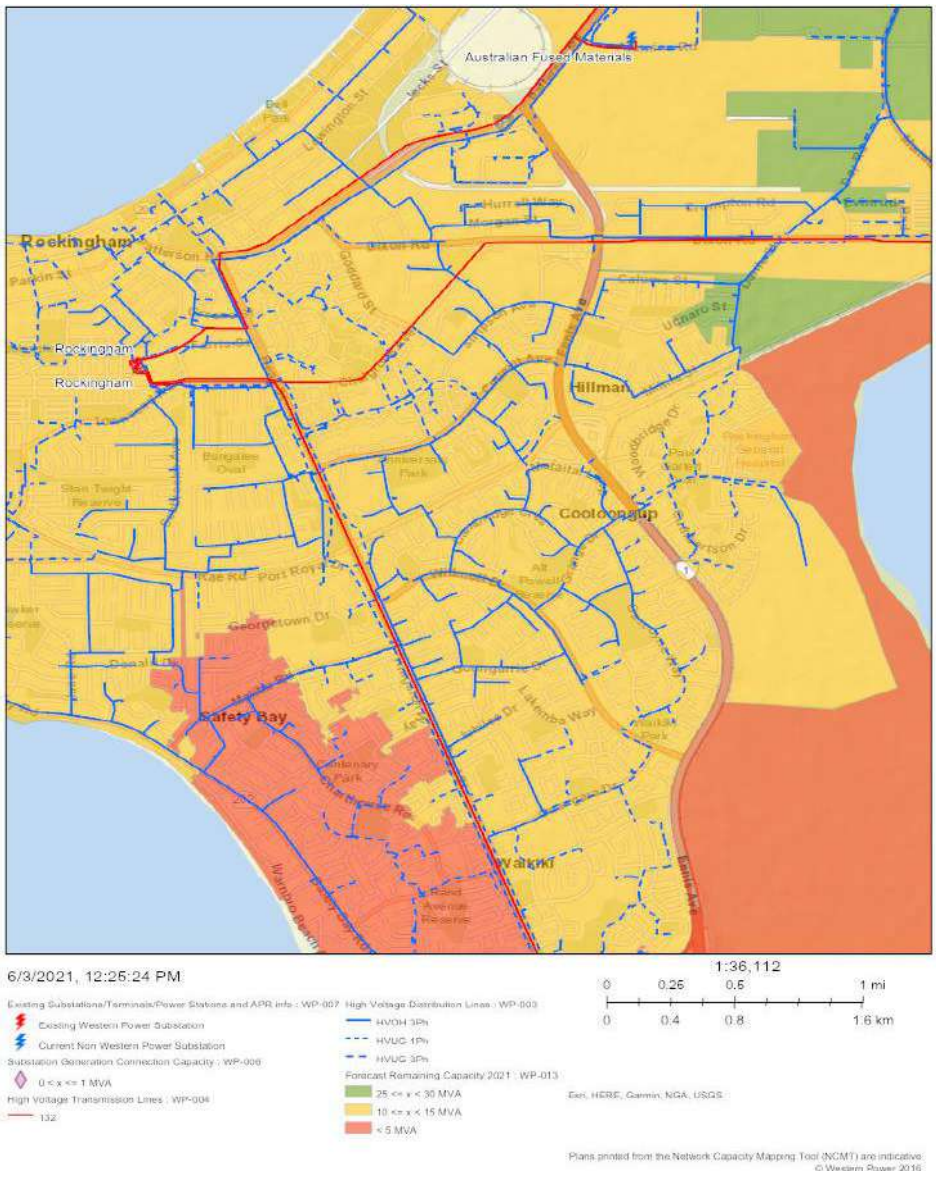

Figure 3-1 Current remaining Network Capacity (Networks Capacity Mapping Tool, WP 2021)

The future forecast network remaining capacity measured in Megavolt Amperes (MVA) can be seen below in Table 3-3.

Table 3-3 Remaining Network Capacity

Year	Remaining Capacity
2021	10 <= x < 15 MVA
2026	5 <= x < 10 MVA
2031	5 <= x < 10 MVA
2036	< 5 MVA

The remaining substation capacity is identified on the Western Power NCMT is identified in Table 3-4 below.

Table 3-4 Remaining Substation Generation Capacity

Year	Remaining Substation Capacity
2021	0 < x <= 1 MVA

Furthermore, due to the location of the development in relation to Western Power's Rockingham Substation, coupled with the dwindling network capacity, it is likely that augmentation will be required to the 22V and 132kV HV network to accommodate the anticipated load increase.

3.2.2 Transmission Network

There are three major Western Power 132kV transmission assets contained within the RSC precinct. Specifically, with the Read Street road reserve on the western boundary of the development, Chalgrove Avenue and Dixon Road road reserve through precincts 5 and 8; and Patterson Road road reserve through precincts 2, 3 and 5.

The overhead 132kV power lines include a typical exclusion zone of 20m (10m from centreline) but this will require detailed assessment to confirm actual values.

Although it is not anticipated that the overhead 132kV lines will impact the development further detailed assessments will be required to confirm.

3.2.2.1 Development Load

The exact electrical load requirements for the development are difficult to determine due to the early stage of planning and lack of detailed information available. When further planning of each sector is undertaken, it is recommended to contact Western Power directly to gain a better understanding of specific network requirements.

3.2.3 Proposed Power infrastructure

The NCMT currently shows no future planned substations, terminals or power stations within the study area.

3.2.4 Future Development Requirements

Based on the current power infrastructure network and the proposed development outlined in the Rockingham DPPs, the follow transition network and power infrastructure upgrades are predicted as outlined in Table 3-5.

Table 3-5 Future Development Requirements - POWER

Sector	Future Required Infrastructure
Precinct 1 – City Centre	The following areas (as identified in Figure 2-3) will require significant power infrastructure including: ▪ Site 1 – extension of distribution lines required for proposed street for medium to high mixed-use area ▪ Site 105 – current infrastructure satisfactory for future use ▪ Site 26 to 35 - extension of distribution lines required for proposed street for medium to high mixed use and towns square area ▪ Site 37 to 40 - extension of distribution lines required for proposed street for medium to high mixed-use area ▪ Site 25 - current infrastructure satisfactory for future use ▪ Site 103 – extension of distribution lines required for proposed street for medium to high mixed-use areas ▪ Site 70 – no new infrastructure required
Precinct 2 – Waterfront Village	▪ Mains lines distribution network will meet future requirements
Precinct 3 – Coastal Lots	▪ Power distribution network infrastructure satisfactory for future requirements
Precinct 4 – TOD Village	▪ Significant additional distribution network required Residential and commercial property connections required
Precinct 5 – City Park	Currently no DPP to assess future power requirements
Precinct 6 – Southern Residential	▪ Power distribution network infrastructure satisfactory for future requirements
Precinct 7 – Education	▪ Power mains sufficient Further property connections required
Precinct 8 – Dixon Road	Currently no DPP to assess future power requirements

Note: the required power infrastructure identified in Table 3-5 above is indicative only based on proposed development planning policies. It is advised to contact Western Power to confirm proposed infrastructure to meet development requirements.

3.3 Communications

A number of communication service providers have infrastructure in the Study Area. AARnet, NextGen, NBN Co, Telstra, Vocus and Optus. All have infrastructure servicing properties within the precinct.

3.3.1 Existing Infrastructure and Current Planning

3.3.1.1 AARnet

AARnet provides internet services to the Australian education and research communities and their research partners.

Currently, AARnet have assets that run from the south east of the Rockingham Train Station, outside the precinct area, along Ennis Avenue road reserve, turning into Simpson Avenue and Dowling Street, running along the boundaries of Precinct 7 – Campus and Precinct 6 - Eastern and coming to an end at Kolbe Catholic College (see Figure 3-2). The existing infrastructure is a P63 and P50 pipe type. At this stage there is no requirement for current or future upgrades.

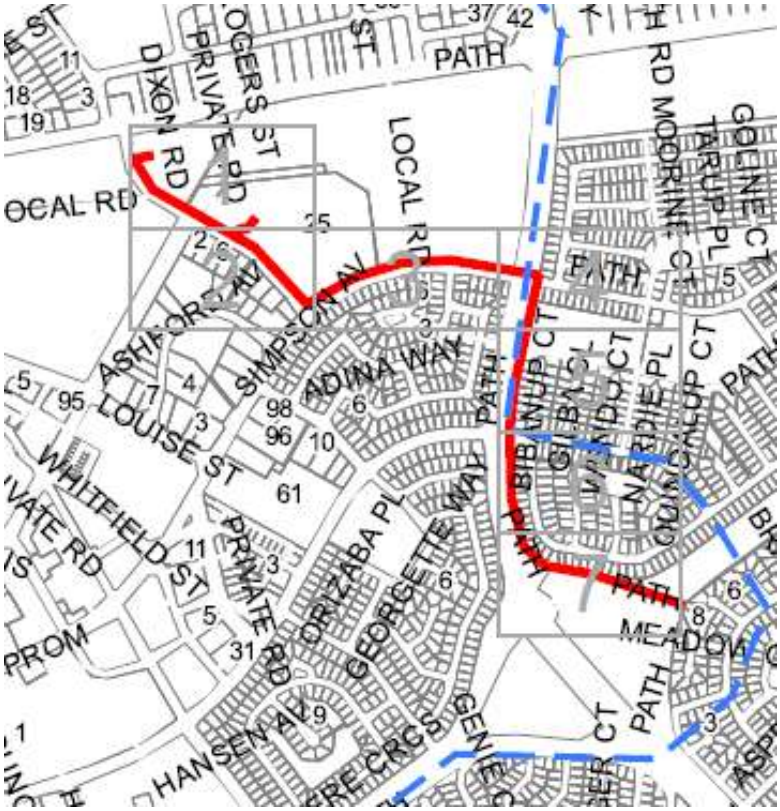

Figure 3-2 AARnet Existing Service

3.3.1.2 Telstra/NBN Co.

3.3.1.2.1 Existing Infrastructure and Current Planning

Currently, there are significant NBN assets within the Study Area as seen in Figure 3-3. The majority of the assets consist of a pit and pipe network within the precinct area.

3.3.1.2.2 Proposed Development Requirements

Future connections are contingent on the developer's communication requirements and communications arrangement preference. Given that multiple properties potentially will be amalgamated as part of redevelopment, multiple existing services will need to be disconnected and resupplied by NBN. It is expected that a new NBN pit and pipe network may be required to provide an efficient supply of service to the amalgamated properties. In addition to this, an assessment by the NBN Planning team will be required to assess the servicing capacity of the existing fibre network and determine if any network reinforcement will be required. At this stage there is no requirement for current or future upgrades.

Figure 3-3 Telstra/NBN Existing Services.

3.3.1.3 Vocus

Based in Sydney, New South Wales, Vocus provides international telecommunications for retail, wholesale and corporate companies. The current network owned and controlled by Vocus can be seen in Figure 3-4 below.

Currently, Vocus have assets that run along Ennis Avenue road reserve and service Precinct 8 – Dixon Road commercial/light industrial area along Seamton Way. This line also services business outside the precinct area to the east of Ennis Avenue. Additionally, a line within Precinct 1 – City Centre and Precinct 6 – Southern Gateway, running through Leghorn Street, Chalgrove Avenue, Civic Boulevard and Central Promenade. At this stage there is no requirement for current or future upgrades.

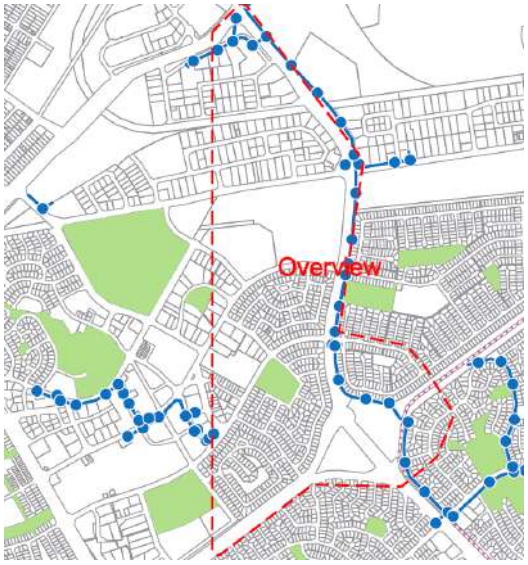

Figure 3-4 Vocus Existing Service

3.3.1.4 NextGen

A subsidiary of Vocus Group, Nextgen provides telecommunications with their network displayed in Figure 3-5 below. Currently, Nextgen runs from the North East of the precinct area in Precinct 8 – Dixon Road along Patterson Road, through Precinct 3 – TOD Village and Precinct 1 – City Centre, along Goddard Street and Central Promenade and through Precinct 6 – Southern Residential along Contest Parade, Kilson Street and out on to Rae Rd. At this stage there is no requirement for current or future upgrades.

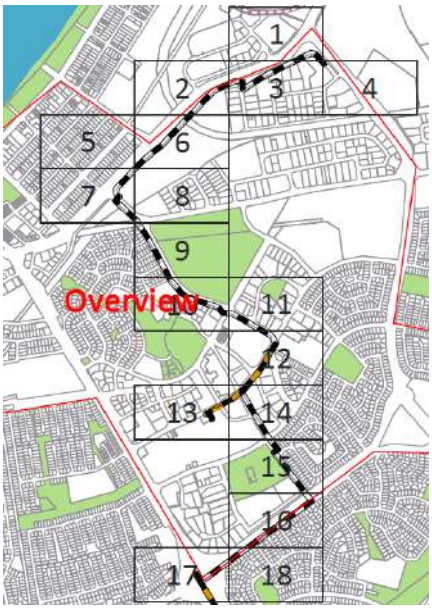

Figure 3-5 Nextgen Existing Service

3.3.1.5 Optus

Currently, Optus has fibre located in the precinct area via its own conduits and third-party conduits (approximately 35-40%) as seen in Figure 3-6 below.

Optus, through its own conduits runs from Precinct 8 – Dixon Road along Ennis Avenue past Precinct 7 – Campus and turns west along Simpson Avenue through Precinct 6 – Southern Residential, following Louise Street and Chalgrove Avenue on to Central Promenade through Sector 1 – City Centre.

Additionally, Optus has optic fibre located in third party conduits, that follows the same path as its own optic fibre conduits. However, continues north along Read Street along McMahon Street, Houston Street and Parkin Street through Precinct 2 – Waterfront Village. At this stage there is no requirement for current or future upgrades.

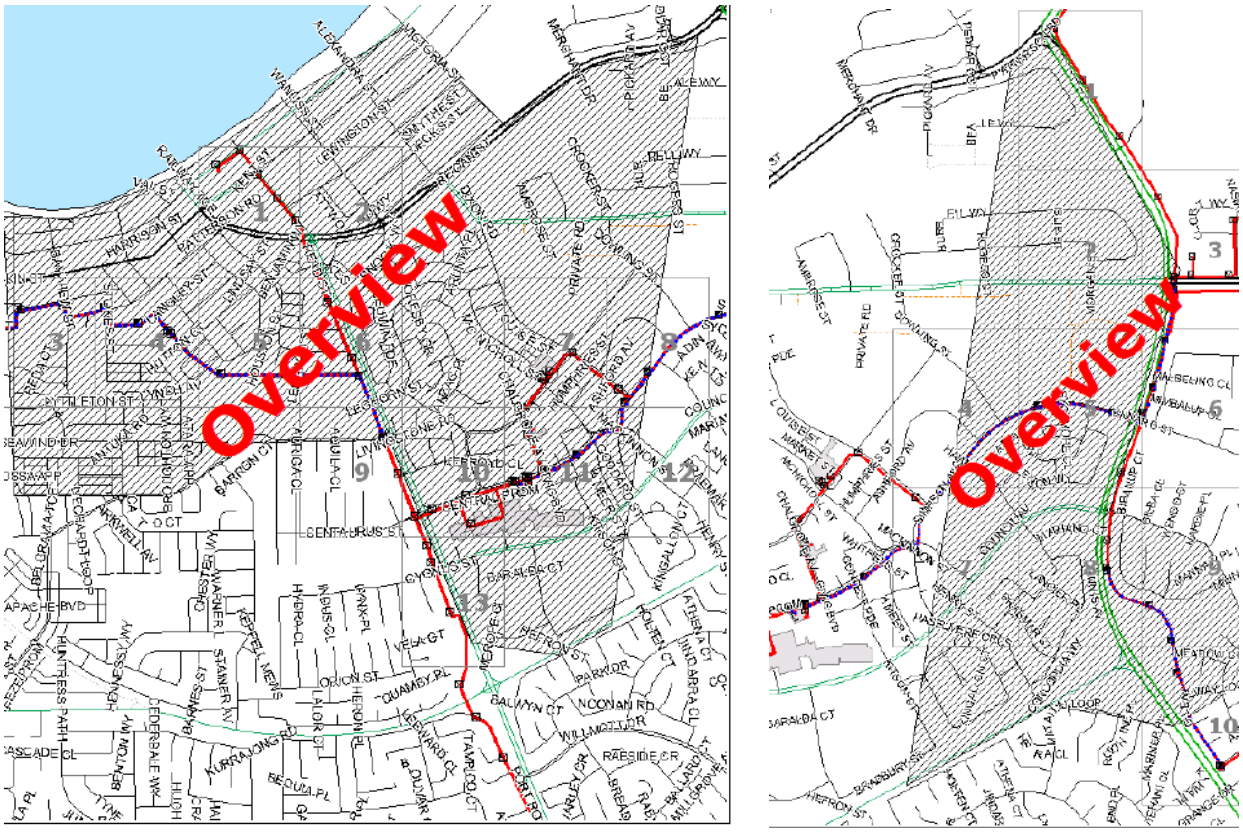

Figure 3-6 Western Side and Eastern Side Optus Existing Services

3.4 Water

Water Corporation is the state authority regulating the distribution infrastructure for water reticulation within the study area.

3.4.1 Existing Infrastructure

The existing water mains within the Study Area and its surrounds can be found in Appendix D Figure D1. The network consists of an arterial network of mains made from various materials including cast iron, steel, ductile iron, PVC and Polyethylene pipe. The mains network typically follows roadways and is contained within the road reserve. The water network also consists of numerous property connections to residential and commercial dwellings.

Table 3-6 Existing Water Mains Infrastructure

Sector	Existing Mains Infrastructure
Precinct 1 – City Centre	760S, 205CI, 150CI, 150P-12
Precinct 2 – Waterfront Village	535S-5, 150CI, 100RC,
Precinct 3 – Coastal Lots	535S, 205CI, 150CI, 100RC
Precinct 4 – TOD Village	305S, 205CI, 150CI, 100RC
Precinct 5 – City Park	200DI, 150DI, 150P-12, 100P-12
Precinct 6 – Southern Residential	150CI, 150DI, 205CI, 100RC
Precinct 7 – Education	150DI
Precinct 8 – Dixon Road	700S-5, 200P-12, 150P-12

3.4.2 Current Planning

Water Corporation provides a spatial dataset representing the spatial extent of the Water Corporation's 5-year capital investment program. All future water capital investment projects that are growth driven are represented. This is to enable effective response for future infrastructure plans/ enquiries, greater inter-government planning coordination and to facilitate the development industry's planning. Water Corporation infrastructure mapping has **not** identified any future upgrades within the precinct area.

3.4.3 Future Development Requirement

Based on the current water infrastructure network and the proposed development outlined in the Rockingham DPPs, the follow water network upgrades are predicted as outlined in Table 3-7.

Table 3-7 Future Development Requirements - WATER

Sector	Future Required Infrastructure
Precinct 1 – City Centre	The following areas (as identified in Figure 2-3) will require significant water infrastructure including: ▪ Site 1 – water mains and property connections to residential and commercial dwellings ▪ Site 105 – water network satisfactory for future requirements. Potential property connections required ▪ Site 26 to 35 - Water mains and property connections to residential and commercial dwellings ▪ Site 37 to 40 – water mains and property connections required for urban square and medium to high-density mixed-use areas. ▪ Site 25 - property connections to High-density mixed-use areas ▪ Site 103 – mains and property connections to medium to high-density mixed-use area ▪ Site 70 – no new infrastructure required
Precinct 2 – Waterfront Village	▪ Water Main lines will meet future requirements ▪ Property connections required for Staged redevelopment of Challenger lodge sites to the South
Precinct 3 – Coastal Lots	▪ Water network satisfactory for future requirements

Precinct 4 – TOD Village	▪ Significant water main network required Residential and commercial property connections required
Precinct 5 – City Park	Currently no DPP to assess future water requirements
Precinct 6 – Southern Residential	▪ Water network satisfactory for future requirements
Precinct 7 – Education	▪ Water mains location sufficient. Potential upgrade in size required to cater for enhanced vegetated street scapes Further property connections required
Precinct 8 – Dixon Road	Currently no DPP to assess future water requirements

Note: the required water infrastructure identified in Table 3-7 is indicative only based on proposed development planning policies. It is advised to contact Water Corporation to confirm proposed infrastructure to meet development requirements.

The estimated future water demand for the RSC are provided in Table 3-8. These requirements are based on the probable simultaneous demand for multiple dwellings from AS3500.1 - plumbing and drainage part 1.

Table 3-8 Projected Probable Simultaneous Demand (Water) for Residential

Number of Dwellings	Proposed Development Flow (L/s)
15,966	598.57

Table 3-9 Projected Probable Simultaneous Demand (Water) for Commercial

Commercial/Retail Area (m^2)	Average Demand ($L/m^2/s$)	Flow L/s
400,000	4.09×10^{-5}	16.36

3.5 Wastewater

The Water Corporation is the state authority regulating the distribution, storage and disposal infrastructure for wastewater in the area. The Water Corporation has provided information on current and future planned wastewater supply infrastructure for the area.

3.5.1 Existing Infrastructure and Current Planning

The existing reticulated wastewater network within the Study Area and its surrounds can be found in Appendix E, Figure E1. The network consists of an arterial network of mains made from various material including cast iron, steel, ductile iron, PVC and Polyethylene pipe. The mains network typically follows roadways and is contained within the road reserve. The sewer network also consists of numerous property connections to residential and commercial dwellings. The pressure main infrastructure identified in Appendix E is summarised in Table 3-10 below.

Table 3-10 Existing Wastewater Mains Infrastructure

Sector	Existing Infrastructure
Precinct 1 – City Centre	610RCPL, 375VC, 230VC, 225PVC-U
Precinct 2 – Waterfront Village	560HDPE, 225PVC-U, 150PVC-U
Precinct 3 – Coastal Lots	200PVC-U,150PVC-U
Precinct 4 – TOD Village	225PVC-U
Precinct 5 – City Park	1400S
Precinct 6 – Southern Residential	230VC, 150VC, 80MDPE, 460RCPL
Precinct 7 – Education	150PVC-U, 80MDPE
Precinct 8 – Dixon Road	1400S, 450PVC-U, 225PVC-U, 80MDPE

3.5.2 Planned Wastewater Infrastructure

Water Corporation provides a spatial dataset representing the spatial extent of the Water Corporation's 5-year capital investment program. All future wastewater capital investment projects that are growth driven are represented. The intent of this dataset is to enable effective response for future infrastructure plans/ enquiries, greater inter-government planning coordination and to facilitate the development industry's planning.

Currently, there is pump station planned for construction in 2027 on Rockingham Beach Road NE of Precinct 3 – Coastal Lots. There is also a pressure main planned for construction between 2026 and 2028 at the East Rockingham Waster Water Plant located approximated 2km NE of the RSC boundary. Water Corporation infrastructure mapping has not identified any future upgrades within the precinct area.

3.5.3 Proposed Development Requirements

Based on the current water infrastructure network and the proposed development outlined in the Rockingham DPPs, the following water network upgrades are predicted as outlined in Table 3-11.

Table 3-11 Future Development Requirements – WASTEWATER

Sector	Future Required Infrastructure
Precinct 1 – City Centre	The following areas (as identified in Figure 2-3) will require significant sewer infrastructure including: ▪ Site 1 – sewer mains and property connections to medium to high-density mixed-use areas ▪ Site 105 – sewer network satisfactory for future requirements. Potential property connections required ▪ Site 26 to 35 - sewer mains and property connections to residential and commercial dwellings in proposed medium to high-density mixed-use areas ▪ Site 37 to 40 – sewer mains and property connections required for high-density mixed-use areas. ▪ Site 25 - property connections to high-density mixed-use areas

	▪ Site 103 – mains and property connections to medium to high-density mixed-use area ▪ Site 70 – no new infrastructure required
Precinct 2 – Waterfront Village	▪ Sewer Main lines will meet future requirements ▪ Property connections required for Staged redevelopment of Challenger lodge sites to the South
Precinct 3 – Coastal Lots	▪ Sewer network satisfactory for future requirements
Precinct 4 – TOD Village	▪ Significant sewer network required ▪ Existing Pressure Mains line satisfactory but may need upgrade/upsize with new development loads Residential and commercial property connections required
Precinct 5 – City Park	Currently no DPP to assess future sewer requirements
Precinct 6 – Southern Residential	▪ Sewer network satisfactory for future requirements
Precinct 7 – Education	▪ Gravity main lines not displayed in available data. Further confirmation of existing network from Water Corporation required. Further property connections required
Precinct 8 – Dixon Road	Currently no DPP to assess future sewer requirements

Note the required sewer infrastructure identified in Table 3-11 is indicative only based on proposed development planning policies. It is advised to contact Water Corporation to confirm proposed infrastructure to meet development loads and requirements.

3.6 Stormwater

The City of Rockingham is the local authority that owns, controls and manages stormwater drainage in the precinct area.

3.6.1 Existing Infrastructure

The existing stormwater system within the Study Area and its surrounds can be found in Appendix F.

The precinct area primarily consists of a pit and pipe network with a number of retention and detention basin capturing stormwater runoff. These basins are typically located within or adjacent to public open spaces (POS) and sporting fields. There are two significant open channels owned by Water Corporation running from the precinct's Western side of the precinct (McMahon St and Read Street) to Lake Richmond.

3.6.2 Planned Upgrades

3.6.2.1 City of Rockingham

Due to current flooding issues and the expansion of impervious areas from development, the addition of detention and retention basins, swales and stormwater storage cells is being investigated.

Currently, there are two stormwater drainage upgrades planned for Rockingham Beach Road and Victoria Street. These include diverting road drainage into underground drainage cells for up the 5-year ARI, as identified in Figure 3-7 below.

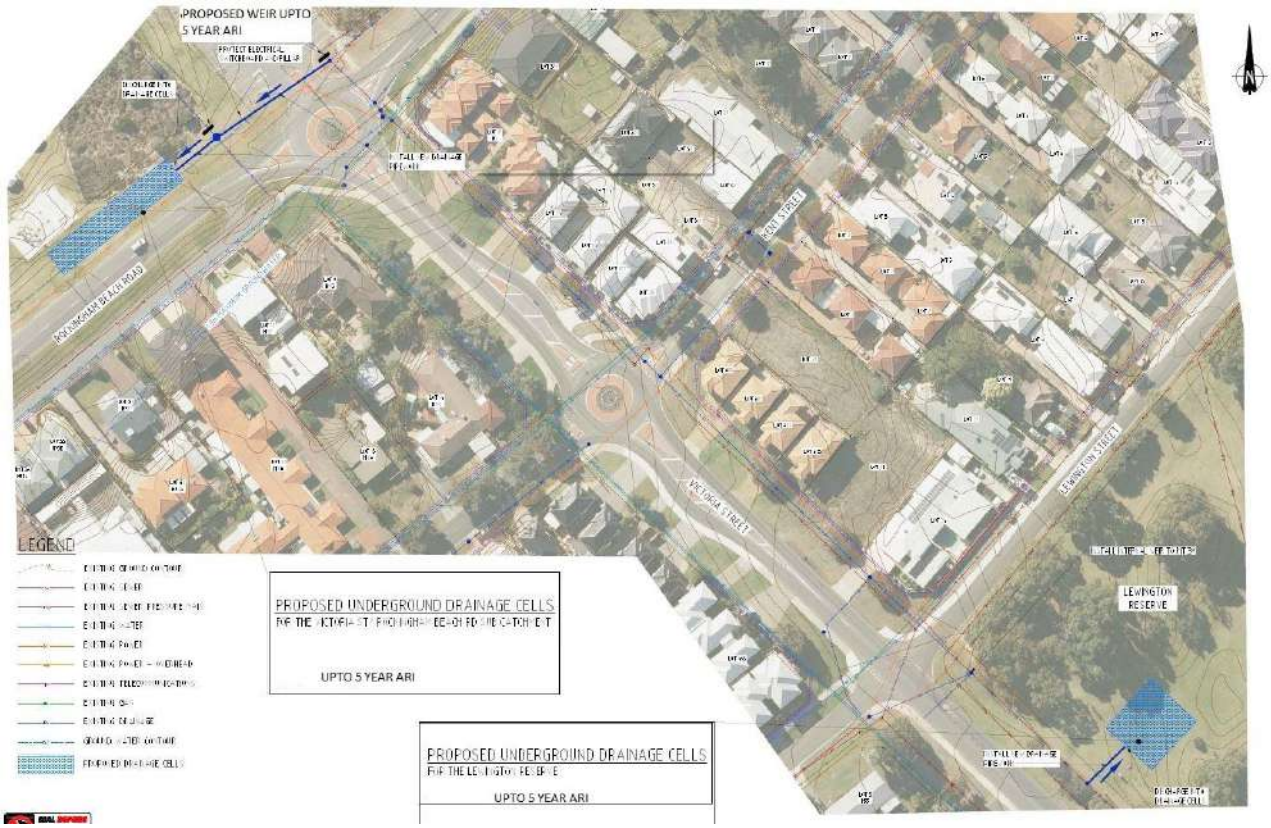

Figure 3-7 City of Rockingham Future Drainage Works.

3.6.2.2 Water Corporation

Water Corporation's spatial dataset representing the spatial extent of their 5- year capital investment program shows a planned pump station for a rising main at Calume Street to the East however, Water Corporation infrastructure mapping has not identified any future upgrades within the precinct area.

3.6.3 Future Development Requirements

Based on the current stormwater network and the proposed development outlined in the Rockingham DPPs, the following stormwater network upgrades are predicted and have been identified in Table 3-12 below.

Table 3-12 Future Development Requirements - STORMWATER

Sector	Future Required Infrastructure
Precinct 1 – City Centre	The following areas (as identified in Figure 2-3) will require the following stormwater upgrades: ▪ Site 1 – no new infrastructure required ▪ Site 105 – significant stormwater infrastructure required to cater for new roads and other impervious surfaces including medium and high-density mixed-use areas. Downstream pit, pipe and storage network will also have to be upgraded to compensate for new impervious runoff loads. ▪ Site 26 to 35 - significant stormwater infrastructure required to cater for new roads and other impervious surfaces including high-density mixed-use areas and a trafficable urban square. Downstream pit, pipe and storage network will also have to be upgraded to compensate for new impervious runoff loads. ▪ Site 37 to 40 - significant stormwater infrastructure required to cater for new roads and high-density mixed-use areas. Downstream pit, pipe and storage network will also have to be upgraded to compensate for new impervious runoff loads. ▪ Site 25 - no new infrastructure required ▪ Site 103 – stormwater infrastructure required to cater for new roads and medium to high-density mixed-use areas. Downstream pit, pipe and storage network will also have to be upgraded to compensate for new impervious runoff loads. ▪ Site 70 – no new infrastructure required
Precinct 2 – Waterfront Village	▪ Current network will meet future requirements ▪ Potential upgrade of pipes at Staged redevelopment of Challenger lodge sites to the South (further assessment required)
Precinct 3 – Coastal Lots	▪ Stormwater network satisfactory for future requirements. Possible upgrade of existing pit and pipe system required if developed from medium to high density.
Precinct 4 – TOD Village	Significant stormwater network required to cater for new roads, car parks and residential and commercial areas
Precinct 5 – City Park	Currently no DPP to assess future stormwater requirements
Precinct 6 – Southern Residential	Stormwater network satisfactory for future requirements
Precinct 7 – Education	Stormwater network required to the North to cater for new roads, car parks and campus facilities
Precinct 8 – Dixon Road	Currently no DPP to assess future stormwater requirements

Note: the required stormwater infrastructure identified in Table 3-12 is indicative only based on proposed development planning policies. It is advised to contact the City of Rockingham to confirm proposed infrastructure to meet stormwater runoff, storage and development requirements.

4 Summary

Cardno was commissioned by Hames Sharley on behalf of the City of Rockingham to provide high-level advice on engineering servicing for the proposed future development of the Rockingham Strategic Centre. Cardno have assessed the precincts existing utility infrastructure attributes and values and identified areas where future utility infrastructure will be required if development occurs as per the Rockingham Strategic Centre Planning Framework and relevant Development Policy Plans for each Sector within the precinct.

4.1 Recommendations

The key utility infrastructure recommendations are:

- *Precinct 1 – City Centre*
  - Significant Gas, Power, Communications, Water, Wastewater and Stormwater Infrastructure required within the 'underutilised land parcels' identified within the City Centre Development Planning Policy (3.2.1). These parcels of land are currently open POS areas which as part of the RSC precinct plan are to be developed into trafficable urban square, commercial, car park, main street development, medium density mixed use and high-density mixed-use areas.
- *Precinct 2 – Waterfront Village*
  - An increase of gas, power, communications, water and sewer main line capacity will be required to accommodate future medium and high-density areas, contemporary residential apartments and transit terminal. There is also staged development of Challenger lodge sites to the South of the Sector which will require future utility infrastructure. The extent of future infrastructure will need to be confirmed with relevant authorities prior to development.
- *Precinct 3 – Coastal Lots*
  - The current mains infrastructure is consistent with that proposed in the development policy plan and hence no major utility service upgrades are required within this sector. There is potential for medium and high-density residential apartments, major streetscape enhancement and marina development which will require future investigation of servicing requirements.
- *Precinct 4 – TOD Village*
  - Precinct 4 will require the most significant utility infrastructure upgrades within the RSC precinct plan. Currently, this parcel of land is predominately vacant with the indicative development proposing new roads, recreation centres, high-density mixed-use areas, terrace style medium density areas, carparks and a Transit system route. New infrastructure will be required for all utilities with the extent and demand to be confirmed with relevant authorities.
- *Precinct 5 – City Park*
  - The development policy plan is currently not available for this sector and hence future servicing requirements will need to be confirmed upon release. There is opportunity to progressively lift residential capacity and introduce an urban built form within this sector which will require utility service upgrades to be assessed.
- *Precinct 6 – Southern Residential*
  - The current mains infrastructure is consistent with that proposed in the development policy plan and hence no major utility service upgrades are required within this sector. Opportunity to progressively upgrade residential capacity and introduce an urban built form will require further investigation of servicing requirements.
- *Precinct 7 – Education*
  - The current infrastructure is mostly consistent with that proposed in the development policy plan with predominantly refurbishment occurring to existing structures. There is an education/training campus and campus square proposed which will require minor utility upgrades but no changes to the existing main lines. A proposed low speed access road running North to South through the Sector will also require stormwater infrastructure.
- *Precinct 8 – Dixon Road*

- The development policy plan is currently not available for this sector and hence future servicing requirements will need to be confirmed upon release. Areas within the sector are planned to be consolidated for commercial uses which will require future utility infrastructure.

5 References

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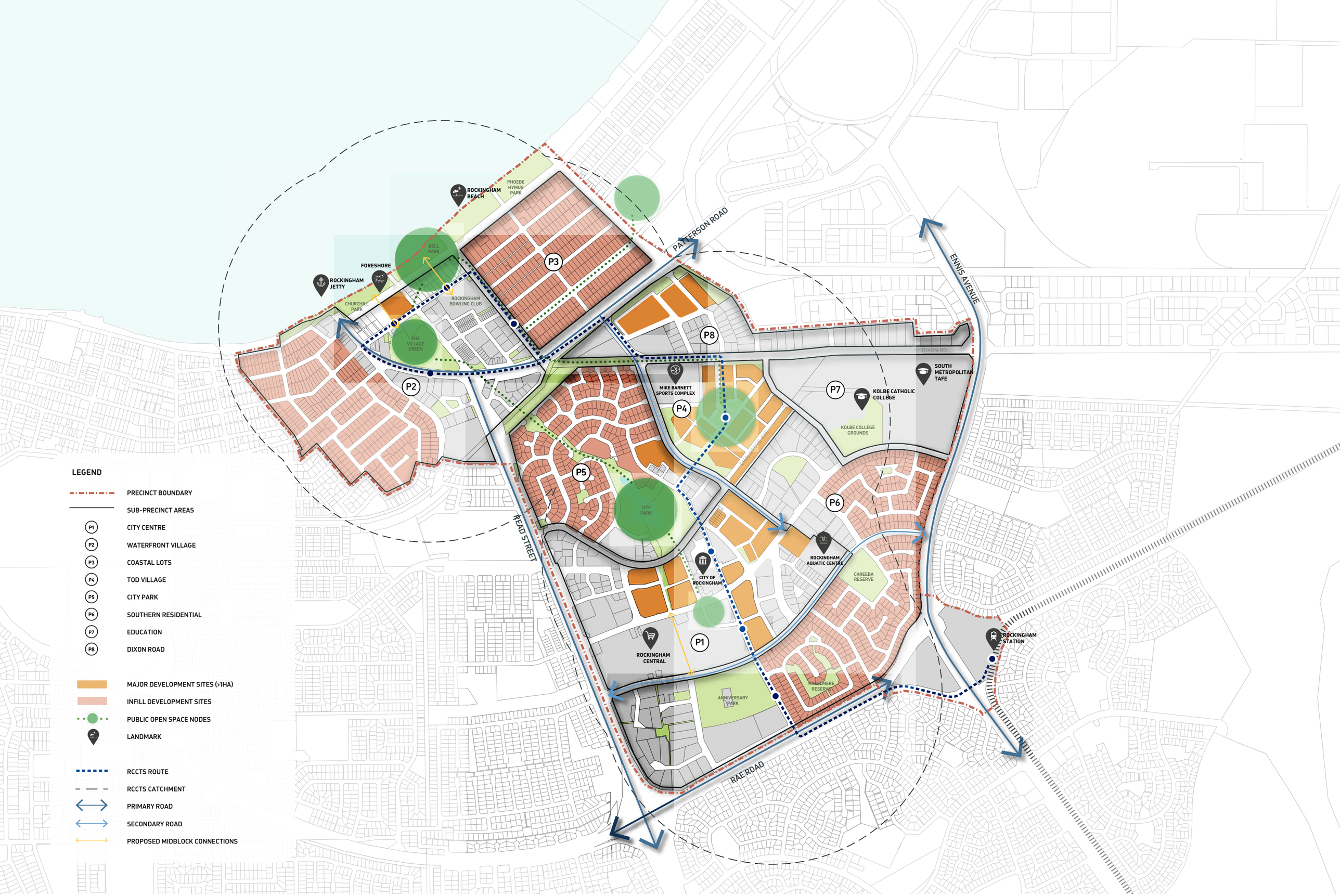
APPENDIX

A

URBAN STRUCTURE PLAN



Design Element 2 - Urban Structure Plan

Rockingham Strategic Centre Precinct Structure Plan

Status : Draft

Path : P:\44322 Local Planning Framework Review & Rockingham SRC Precinct Plan

Scale: 1:15,000 @ A3

0 300 600

North:

Project Number: 44322

Revision: B

Date: 26/11/21

APPENDIX

B

EXISTING GAS NETWORK

Existing Gas Network

FIGURE B1

N

1:18,924.504999 Scale at A3

km

4 0 4 8

Cardno

Map Produced by <Division> (<BU>)
Date: 2021-7-26
Coordinate System: [% get_crs(@layer_name)%]
Project: <Job Number>_<Phase #>
Map: Existing Power Network.qgz <REV #>

APPENDIX

C

EXISTING POWER NETWORK

Existing Power Network

FIGURE C1

N

1:16,000 Scale at A3

km

4 0 4 8

Cardno

Map Produced by <Division> (<BU>)
Date: 2021-7-26
Coordinate System: [% get_crs(@layer_name)%]
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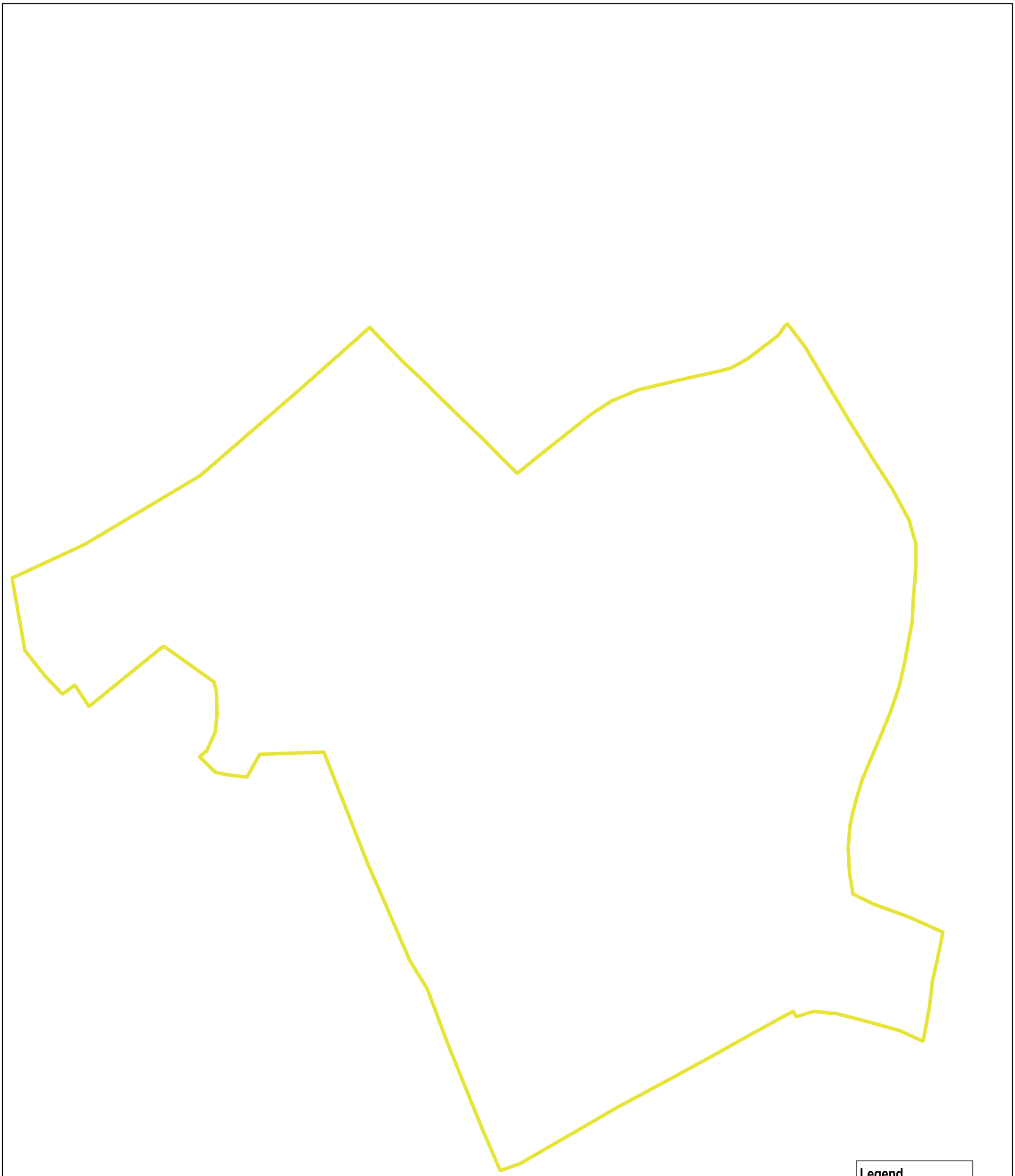
APPENDIX

D

EXISTING WATER NETWORK



Existing Water Network

FIGURE D1

N

1:16,000 Scale at A3

km

4 0 4 8

Cardno

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Project: <Job Number>_<Phase #>
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APPENDIX

E

EXISTING SEWER NETWORK

CS03069

Legend

- RSC Boundary
- Existing Sewer Gravity Pipe
- Existing Sewer Pressure Main
- Proposed Pump Station (2027)

N

1:16,000 Scale at A3

km

4 0 4 8

Existing Sewer Network

FIGURE E1

Cardno

Map Produced by <Division> (<BU>)
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Coordinate System: [% get_crs(@layer_name)%]
Project: <Job Number>_<Phase #>
Map: RSMC Utilities Network.qgz <REV #>

APPENDIX

F

EXISTING STORMWATER NETWORK

Legend

RSC Boundary

WC - Drainage Open Channel

CoR - Stormwater Pipe Network

N

1:16,000 Scale at A3

km

4 0 4 8

Existing Drainage Network

FIGURE F1

Cardno

Map Produced by <Division> (<BU>)
Date: 2021-7-28
Coordinate System: [% get_crs(@layer_name)%]
Project: <Job Number>_<Phase #>
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About Cardno

Cardno is a professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX: CDD].

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