

# ADDRESSING WHEATBELT DEVELOPMENT CONSTRAINTS

June 2023





Wheatbelt  
Development  
Commission



DevelopmentWA

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## EXECUTIVE SUMMARY



The Wheatbelt is a valued and economically significant part of Western Australia, however there are considerable growth considerations and challenges. The Wheatbelt's growth is being constrained by a lack of housing and serviced residential and industrial land,

While it may appear there is plenty of available land, either zoned or in Local Planning Strategies, this land is often difficult to develop or is undevelopable. This is due to factors including service capacity constraints, feasibility and often a lack of market interest.

Land values are overall low in the Wheatbelt to facilitate investment. The cost of developing many proposed residential and industrial lots, in the Wheatbelt, will not be recovered from future lot sales. Accordingly, there are growth challenges to subdivide land to create additional lots in the Wheatbelt and in attracting investment. The existing situation is characterised by market failure.

While there are growth challenges in the Wheatbelt, local governments and communities are not powerless in addressing issues. To address challenges, this report has undertaken technical investigations relating to servicing and built form to assist with decision making and lowering built form costs. Preparation of architectural plans and concept planning, for case study sites, visually shows possible development forms to facilitate more cost-effective development.

There is a need to facilitate new housing, workforce accommodation/short-stay accommodation, industrial lots and fit-for-purpose and cost-effective servicing including power supplies in the Wheatbelt. While there is no single simple solution, for addressing development constraints in the Wheatbelt, this report considers possible solutions through:

1. **Reviewing opportunities to more effectively use existing serviced land which is supported by undertaking an audit of vacant and underutilised land and buildings.**
2. **Supporting a wider range of accommodation that addresses short and longer term housing demands including for workforce accommodation/short-stay accommodation and affordable housing.**
3. **Promoting modular housing that takes into account the area's context and planning framework.**
4. **Encouraging local governments to strategically consider and plan for development/growth including reviewing current and required 'hard' infrastructure capacity, preferred development sites and the planning framework.**

5. **Setting out options and a decision-pathway to provide power which is fit-for-purpose and supports a lower carbon footprint.**
6. **Outlining a Regional Housing and Land Activation Toolbox (Appendix 1) which sets out various options for local communities along with informing next-step actions over the short, medium and long-term.**
7. **Identifying case studies that may be eligible for the DevelopmentWA Regional Development Assistance Program (RDAP).**
8. **Targeting funding assistance from the Federal Government and State Government relating to the provision of key worker housing and addressing infrastructure capacity constraints to facilitate development.**
9. **Promoting working in partnership and adopting effective governance structures.**

**Addressing market failure and growth challenges requires a sustained, strategic and intentional approach from different levels of government, the private sector, not-for-profits and the community.**



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**PART**

**1**

**DEVELOPMENT  
CAPACITY  
ASSESSMENT**

## 1.1 INTRODUCTION

This report considers Wheatbelt development constraints, options and solutions. In particular, the report:

- Outlines some of the key planning and servicing issues impacting Wheatbelt development which is informed by technical investigations;
- Considers four case study towns at Narrogin, Pingelly, Kellerberrin and Narembeen (the towns are shown in [Figure 1](#));
- Sets out solutions to facilitate growth in regional towns including through land use planning, servicing, design, building types and construction, legislative and policy changes, tenure, governance/partnerships, and financing; and
- Formulates a Regional Housing and Land Activation Toolbox of options, opportunities and solutions (see [Appendix 1](#)) to promote development, address servicing constraints and facilitate more cost-effective development.

Wheatbelt communities have different sizes, growth pressures and different servicing infrastructure needs and solutions. The solution for each community may consist of one or multiple options provided in this report.

The methodology used in preparing this report has incorporated the following:

- **Literature review;**
- **Context analysis;**
- **Meeting with local governments and site inspections of the case study towns;**
- **Liaising with stakeholders - which included exploring options, opportunities and possible solutions with key stakeholders;**
- **Development scenarios/options;**
- **Concept plans;**
- **Preparing technical reports – these provide the evidence base for development costs, and options and solutions for energy provision, and built form options and solutions;**
- **Preparation of cost models; and**
- **Developing the Regional Housing and Land Activation Toolbox.**



## 1.2 THEMES & ANALYSIS

### 1.2.1 OVERVIEW

Issues associated with housing availability and affordability, 'hard' infrastructure availability and development costs for residential and industrial lots in Western Australia and in the Wheatbelt are well known and set out in various publications.<sup>1,2</sup> There is also evidence of housing market failure in the Wheatbelt which is set out in recent reports commissioned by DevelopmentWA and the Wheatbelt Development Commission (WDC) including *Housing Solutions for the Wheatbelt*<sup>3</sup> and *Key Worker Housing Analysis* 2023.<sup>4</sup>

In summary, some of the issues include:

- Many local businesses struggle to attract and retain workers in part due to housing shortages. This has resulted in some workers undertaking drive-in drive-out (DIDO);
- Shortage of serviced residential land and a suitable supply of affordable housing, including for key workers;

- There are infrastructure constraints in various towns limiting growth and many infrastructure upgrades are expensive or cost prohibitive to the private sector;
- Land assembly, housing solutions, and pricing are impediments to population growth and economic activity;
- There is market failure in creating new residential and industrial lots including service capacity constraints, feasibility and often a lack of private market interest;
- Addressing housing supply and affordability are critical for growth in the region;
- The Wheatbelt's building and construction industry operates at a high level; and
- There is a shortage of home builders in the Wheatbelt. This has been exacerbated by construction demands in Perth and other areas of Western Australia.

### 1.2.2 MARKET FAILURE

Market failure is defined as 'a situation in which a market does not operate as it should, for example where the supply of a product is not related to the level of demand for it'.<sup>5</sup>

Market failure is evident in large parts of the Wheatbelt industrial and housing market. Noting the costs of creating new industrial and residential lots ([Appendix 3](#)), the sale price in large parts of the Wheatbelt is well below the servicing costs. Servicing costs for residential lots are often above \$100,000 per lot, while sale price for vacant lots can often be considerably lower. For instance, in Narrogin, for the 12-month period ending April 2023, the average price for a medium sized residential lot (400m<sup>2</sup> – 700m<sup>2</sup>) was \$30,000.<sup>6</sup>

In relation to industrial land, market failure is evident where the cost of servicing exceeds the land value.

**HIGH DEVELOPMENT COSTS**  
**LOW SALES PRICES**  
**TRADE LABOUR SHORTAGES**

<sup>1</sup> Wheatbelt Development Commission, 2015, *Wheatbelt Blueprint*

<sup>2</sup> Infrastructure Western Australia, July 2022, *State Infrastructure Strategy – Foundations for a Stronger Future*

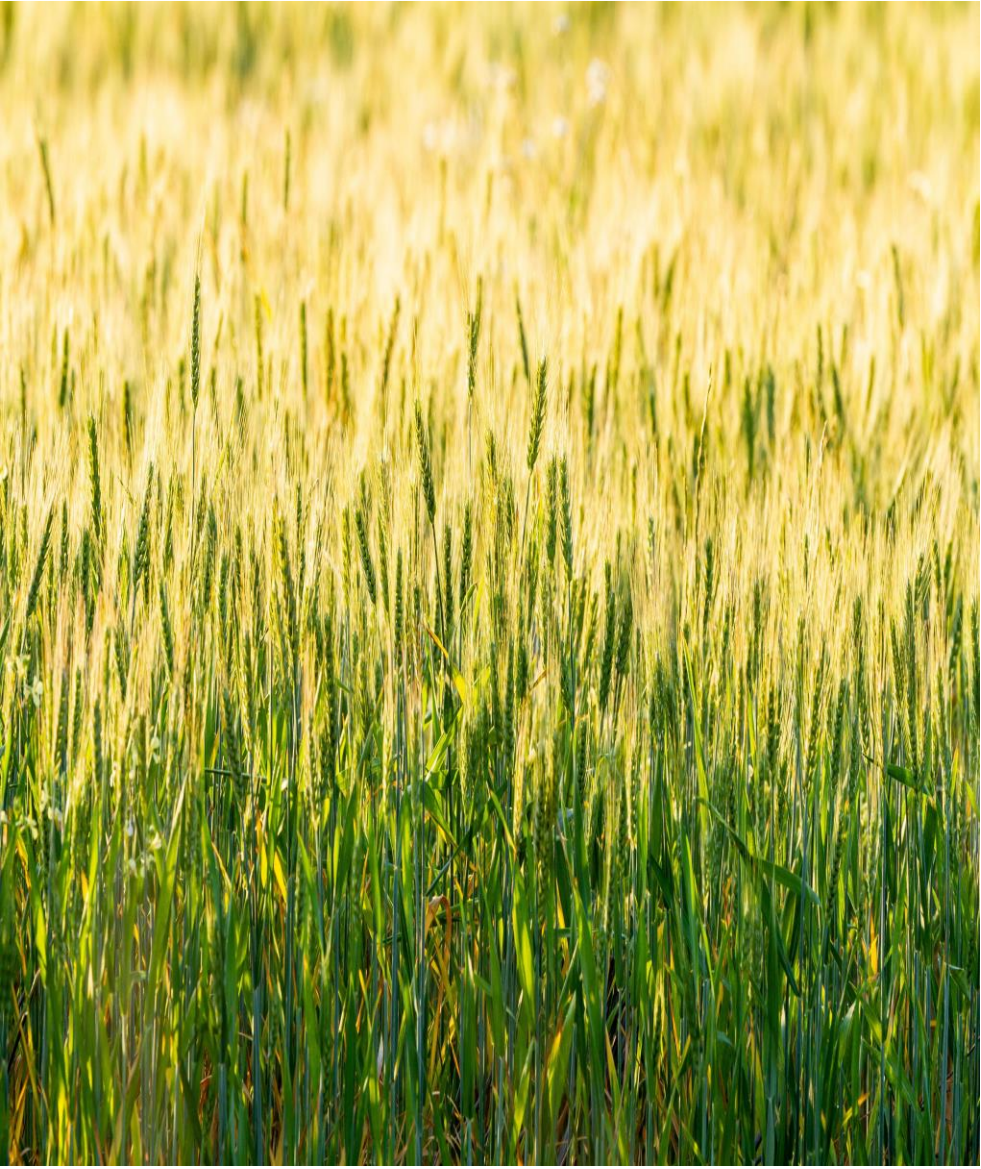
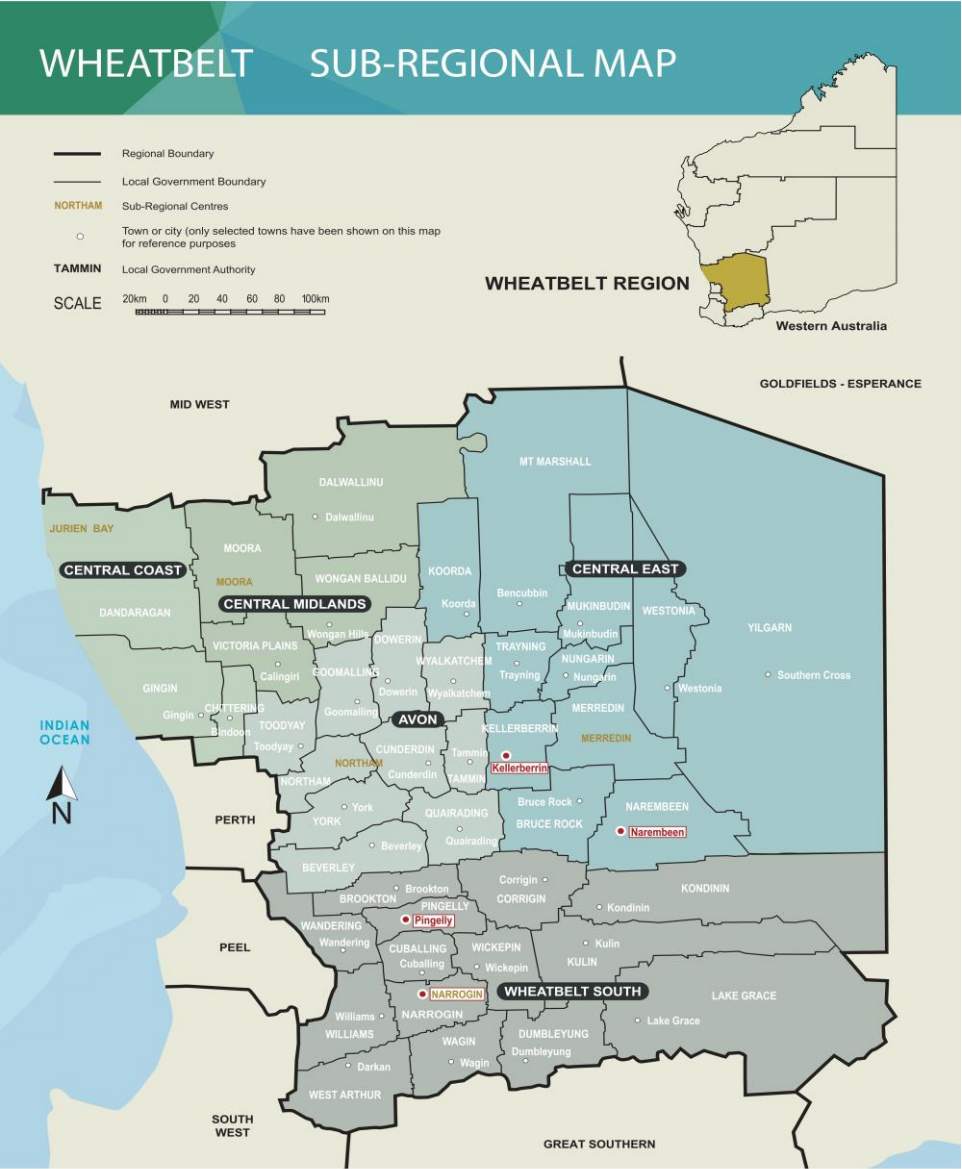
<sup>3</sup> CDP Town Planning & Urban Design, 2022, *Housing Solutions for the Wheatbelt – A Case Study for the Shires of Dandaragan & Moora*

<sup>4</sup> JE Planning and Econisis, 2023, *4WDL Key Worker Housing Analysis* 2023

<sup>5</sup> <https://dictionary.cambridge.org/dictionary/english/market-failure>

<sup>6</sup> <https://www.realestate.com.au/buy/property-land-in-narrogin,+wa+6312/list-1?misc=ex-no-display-price>

FIGURE 1: WHEATBELT SUB-REGIONAL MAP



In relation to housing, features of market failure include:



- The development cost of creating a new residential lot is often less than the sale price of the lot;
- Underinvestment in new housing and in the provision of a range of housing;
- Historic low capital growth and negative equity;
- Low sale prices for dwellings relative to build costs;
- Lending has higher risks and banks may offer lower loan to value ratios;
- Low volume of housing sales;
- Service capacity issues or requirements for expensive service upgrades;
- The private sector is unlikely to undertake medium to larger subdivisions due to feasibility, risks, servicing costs and land holding costs;
- The scale of development, with proponents usually seeking to create an additional 1 to 5 lots, does not have the economies of scale to warrant the servicing costs; and
- Trade labour shortages.

Given the context, a range of approaches are required to address the challenges. Where projects are not commercially viable but are necessary services or for social development or economic development reasons, government responses include providing infrastructure, providing grant funding or a commitment to purchasing housing for key workers.

DevelopmentWA receives a modest annual subsidy from the State Government to undertake land developments on behalf of regional local governments where a demand for new land exists and where the private sector is not responding. Local governments can apply through DevelopmentWA's Regional Development Assistance Program (RDAP) for a project to be undertaken by DevelopmentWA on their behalf. There are associated guidelines relating to RDAP.

To determine if market demand for additional housing or industrial land exists, some key questions to ask are outlined in [Figure 2](#).

## FIGURE 2: KEY QUESTIONS IF A COMMUNITY NEEDS ADDITIONAL HOUSING OR ADDITIONAL INDUSTRIAL LAND

### General – market supply & demand

1.1	What is the community/market need, and can the private sector deliver intended outcomes?
1.2	Are there existing empty buildings or vacant or underutilised land that can be used? Has an audit been undertaken on land supply, including 'lazy land' and existing infrastructure provision?
1.3	Is the local planning framework sufficiently flexible and proactive and has the local government strategically considered and planned for development/growth?
1.4	Are there opportunities for the development to progress without creating additional freehold lots? E.g. ancillary dwellings, grouped dwellings.
1.5	Are there opportunities to consider alternative tenure rather than freehold subdivision? E.g. lease, strata title or community title.

### General – site suitability

1.6	If additional sites are required, is the housing or industry appropriately located which is consistent with the planning framework or does the planning framework need to be updated?
1.7	Is the site near existing services and is there is service capacity (including as necessary for power, reticulated sewerage and reticulated water)?
1.8	Subject to lot size, number of lots and site conditions, is there scope for on-site sewage disposal?
1.9	Has a preliminary engineering service assessment, with probable costs, being undertaken?
1.10	What power infrastructure delivery model is suitable for the development?
1.11	Does the site contain environmental or heritage assets?
1.12	Is there a fatal flaw that prohibits development of the site? E.g. flame zone bushfire rating, emergency access, shallow rock, topography etc.
1.13	If there is market failure: <ul style="list-style-type: none"> <li>a) Has the local government has commissioned a business plan?</li> <li>b) Is there evidence of firm commitments from buyers for the residential or industrial lots?</li> <li>c) Has there been consideration as to how the partnership, joint venture or project is intended to be delivered including commitments from the local government? E.g. the provision of freehold land from the local government.</li> <li>d) Has the local government previously lodged an RDAP application to DevelopmentWA?</li> </ul>

### Need additional housing?

2.1	What type of housing and tenure are required?
2.2	Can a broader range of housing be provided to what is currently available?
2.3	Are there opportunities for a partnership approach to deliver housing?
2.4	Are there opportunities to review the planning framework including increasing residential densities in relevant areas? E.g. dual density coding or an ancillary dwelling policy.
2.5	Are there opportunities for different construction forms that address local amenity?
2.6	Is the site flat to gently sloping land, with favourable geotechnical conditions, to minimise site preparation and earthworks (with minimal or no retaining walls)?
2.7	Is the site within a bushfire prone area or will development have a low Bushfire Attack Level (BAL) rating?
2.8	Is the site suitably orientated to reduce on-going energy costs and has the accommodation design maximised a passive solar outcome?

### Need additional industrial land?

3.1	What type of industrial land is required?
3.2	In addition to zoning industrial areas, does the community support certain industrial, storage and logistic uses on rural zoned land?
3.3	What kind of servicing is required and how much will it cost?
3.4	Is the existing road system suitable for the additional traffic and type of traffic from the proposed subdivision/development?
3.5	Are soil and geotechnical conditions suitable for building construction and stormwater detention?
3.6	Is the site subject to contamination?

### 1.2.3 PLANNING & GOVERNANCE FRAMEWORK

Development in the Wheatbelt is influenced by a range of planning, servicing, economic and governance frameworks at a National, State, regional and local level. Some of these are outlined in [Appendix 2](#).

### 1.2.4 HOUSING



Discussions with the case study local governments reveal:

- There is market failure in producing new residential lots. The cost to service and create new residential lots is usually greater than the sale price;
- The lack of housing has economic and social impacts on communities;
- There is a need for a range of housing for permanent/long-term residents;
- There is a lack of housing diversity including 1 and 2 bedroom dwellings;
- There is a need to deliver more fit-for-purpose affordable housing;
- Land release for housing is a key component in addressing the lack of affordable housing;
- There are recognised labour and building material supply shortages and high construction costs; and
- Off-site construction is increasingly seen as a solution for delivering housing.



### 1.2.5 WORKFORCE ACCOMMODATION/ SHORT-STAY ACCOMMODATION

Discussions with the case study local governments reveal:

- There is considerable demand for workforce accommodation/short-term accommodation. Some businesses, for example, have long term bookings in caravan parks to house workers. The lack of accommodation impacts various sectors;
- Additional workforce accommodation and short-stay accommodation are needed to provide housing for contract workers, visitors and tourists. The accommodation could vary in quality, size and facilities. The length of stay can vary for individuals, businesses and projects;
- To promote feasibility, consider designing accommodation that is flexible to account for changing markets and demands including both for workforce accommodation and short-stay accommodation;
- It is expected that much of the accommodation will be provided in a modular/transportable format;
- Seek to encourage increased spending in the local communities rather than the alternative DIDO model; and
- While noting the Western Australian Planning Commission (WAPC) guidance on workforce accommodation<sup>7</sup>, some local planning schemes do not address or support workforce accommodation in relevant zones.



### 1.2.6 INDUSTRIAL LAND



Discussions with the case study local governments reveal:

- There is market failure in producing new industrial lots. The cost to service and create new industrial lots is usually greater than the sale price;
- There is a need for a range of appropriately serviced industrial lots and land including for light, general, industry-rural and logistic purposes;
- Some local governments have made considerable progress with the availability of industrial land through their own developments or through working in partnership with DevelopmentWA. This includes overcoming obstacles. Other local governments are working to improve their supply of industrial land by endorsing private development of new industrial lots;
- The project brief required an assessment of industrial needs and solutions at Narembeen. This, in part, this was to service contractors supporting the nearby gold mine. Meetings with the Shire revealed there is sufficient industrial zoned land and no known or reported servicing constraints; and
- To address high servicing costs, options to lower costs include a reduced power model or reviewing.

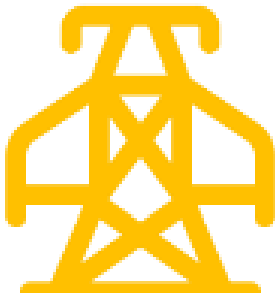
<sup>7</sup> Western Australia Planning Commission, January 2018, *Position Statement: Workforce Accommodation*

## 1.2.7 INFRASTRUCTURE

Discussions with the case study local governments reveal:

- There are considerable infrastructure legacy issues and under-investment. There has been a lack of investment in hard infrastructure which impacts development costs and feasibility;
- It is critical there is effective and sustained asset management by service providers, local government and other entities for buildings and infrastructure. A strategic approach to long-term asset management assists to establish a vision of what is needed to maintain and enhance the performance of existing assets, which reduces the need for new assets;
- Parts of the Wheatbelt have insufficient capacity and/or unreliable power supplies;
- There can be expensive costs for businesses or developers in seeking to extend and/or increase power supplies. In some cases, the cost estimate from Western Power will make the project unfeasible;
- The Wheatbelt has considerable potential for renewable energy including opportunities for off-grid solutions and community energy schemes;
- There is increased use of solar PV generation and battery storage which assists in achieving net zero emissions by 2050; and
- There are significant changes in the energy market including energy sources, network design and regulatory changes.

It was noted there are now various community energy projects in Western Australia and in the eastern states including at Yackandandah.<sup>8</sup>



## 1.3 DEVELOPMENT COST MODEL

### 1.3.1 WHEATBELT DEVELOPMENT CONSTRAINTS: DEVELOPMENT COST MODEL

Porter Consulting Engineers have prepared a Development Cost Model which is outlined in [Appendix 3](#). This sets out indicative costs to create residential and industrial lots in the Wheatbelt. The model:

- Assists to understand issues, identify constraints and opportunities for possible residential and industrial developments in the Wheatbelt;
- Sets out various assumptions, noting a number of variables apply across the Wheatbelt;
- Was influenced by the construction and development sectors in 2022 which were experiencing a high workload along with supply and resourcing constraints further exacerbated by COVID-19 resulting in pricing volatility from construction contractors;
- Introduces three typical development scenarios development costs incorporating a 20% construction cost contingency and a 10% administrative cost contingency;
- Highlights that actual costs will be based on constraints for each individual site at the time of development;
- Sets out the indicative development cost to create a new industrial lot is \$134,971;
- Outlines the indicative development cost to create a new residential lot within a 'brownfields' setting (land within a townsite or sometimes called 'infill' development) is \$107,047; and
- Calculates that the indicative development cost to create a residential lot within a 'greenfield' setting (land on or near the edge of a townsite) is \$112,259.

Based on the above, it is clear there is market failure as many industrial lots and residential lots sell below the above in parts of the Wheatbelt.

Subject to service availability, the model outlines there can be a modest reduction of costs for brownfield (infill) development compared to greenfield development.

The Development Cost Model ([Appendix 3](#)) provides important base line information to assist in determining broad development costs and servicing considerations. It is highlighted that each site is unique, and some development costs will be higher or lower than set out in [Appendix 3](#). Development costs are impacted by a range of factors including:

- Proximity and capacity of services, whether service extensions are required and headwork costs;
- Road conditions and whether any road extensions or upgrades are required;
- Environmental factors such as whether any clearing of native vegetation is proposed;
- Topography including slopes and the extent of retaining;
- Soil conditions such as rock or peat and whether any clean fill is required. Relating to this, the availability of nearby sand or consideration of alternative built form construction;
- Number of lots – there is scale based on the proposed number of lots;
- Proximity to Perth – there can be location factors based on proximity to Perth; and
- Staging.

## TECHNICAL EVIDENCE FOR DEVELOPMENT SERVICING COSTS

<sup>8</sup> Totally Renewable Yackandandah, March 2017, *Creating the Yackandandah Community Mini Grid*

### 1.3.2 WHEATBELT RESIDENTIAL & INDUSTRIAL DEVELOPMENT: POWER INFRASTRUCTURE DELIVER MODEL OPTIONS REPORT

Underground Power Development (UPD), in association with Sunrise Energy Group have prepared a Power Infrastructure Delivery Model which is outlined in [Appendix 4](#). The report:

- Provides analysis of the economic, technical, regulatory and environmental benefits of power infrastructure delivery models for industrial and residential developments in the Wheatbelt. This includes information on the South West Interconnected System (SWIS);
- Outlines significant changes are underway in the energy market, with more expected to come. This includes progressively moving to a lower carbon energy footprint;
- Confirms some parts of the Wheatbelt have constrained power capacity;
- Sets out six power infrastructure delivery models which are explained and analysed based on appropriateness for potential developments in the Wheatbelt. This includes the most likely development cases. The models are:
  - **Standard Network Delivery Model**
  - **Reduced Power Delivery Model**
  - **Microgrid Delivery Model**
  - **Strata Title / Community Title Delivery Model**
  - **Off-Grid Microgrid Delivery Model (multiple consumers)**
  - **Stand Alone Power System Delivery Model (single consumer)**
- Incorporates a delivery model decision tree – this assists to consider options, provide a model which is fit-for-purpose, consider feasibility and promote options to support a lower carbon footprint; and
- Includes case studies for a residential infill development project (24 Glyde Street, Narrogin) along with industrial estate development at Kellerberrin (further details are outlined in section 3.4).

The Power Infrastructure Delivery Model report sets out, in relation to the Reduced Power Delivery Model, that 200kVA/ha is the current minimum design requirement for non-residential loads according to the Western Power Underground Distribution Schemes (UDS) Manual. To use a lower design value, such as 50kVA/ha, will require dispensation from Western Power.

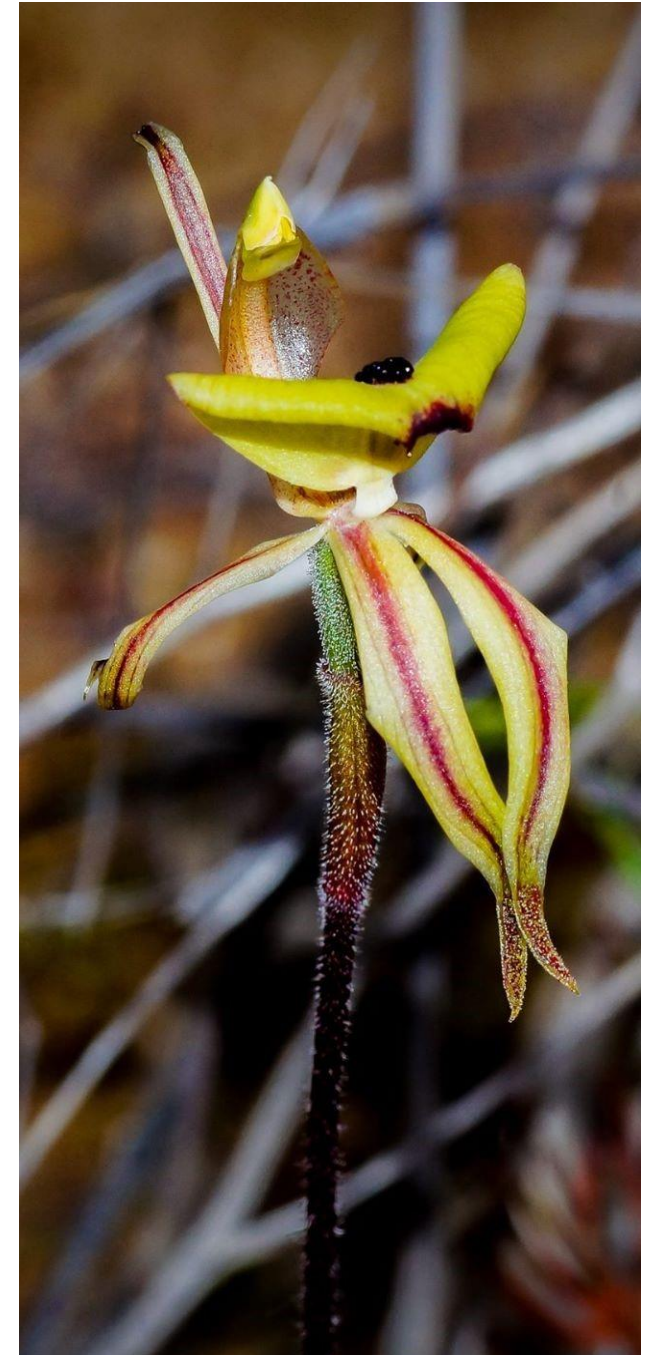
The report notes the WAPC have previously approved the Reduced Power Delivery Model on a case-by-case basis and outline there is scope to extend it more broadly where it meets the selection criteria. In cases where it is accepted by Western Power, the WAPC will impose a notification (e.g. in the form of a 'power classification/category') on the title relating to power availability. The suggested steps to progress the Reduced Power Delivery Model:

- Confirm reduced load density (e.g. 50kVA/ha) with Western Power;
- Get concept approved by WAPC and classifications/applications defined;
- Relevant parties to sign off on the reduced power concept; and
- Update Western Power meters (standards to reflect alternative classification).

In relation to the Microgrid Delivery Model, the report notes it is generally more feasible for larger general industry/commercial subdivisions or larger residential developments (preferably including a mix of retail/local business) with grid connection close by, but where grid connection has limited or no capacity. Key selection criteria include a total load at end of the development phase greater than 20MWh/day, predominately daytime load profile, 'green-titled' lots proposed, network connection available and limited capacity available from the SWIS.

Subject to the preferred delivery model, the report highlights the need to account for time for Western Power to progress from the application process to energisation.

**VARIOUS  
POWER INFRASTRUCTURE  
MODELS  
ARE AVAILABLE**



## 1.4 BUILT FORM & CONSTRUCTION

H+H Architects, in association with Chris O'Keefe Quantity Surveyor, have prepared a Proposed Housing and Built Form Strategy which is set out in [Appendix 5](#). The strategy focuses on proposed residential built form in Kellerberrin, Narembreen, Pingelly and Narrogin. The strategy provides suggestions for an economical and flexible built form which can meet the accommodation needs of these towns. In-turn, there is wider applicability throughout the Wheatbelt. The strategy:

- Outlines varied solutions designed to provide adaptability to suit the varying challenges of material transport distances and skills availability in regional areas;
- Sets out architectural solutions to promote affordability which can complement the amenity of local communities. This includes:
  - Promoting modest scaled housing, with constrained architectural form, which can be built using different construction techniques including modularised construction;
  - Selected materials are chosen to suit local availability and to suit generally available trades thereby avoiding specialised trade-import for future maintenance and repairs;
  - Seeking a low maintenance approach. Construction systems and materials selection are biased toward addressing climatic conditions, low maintenance and simplicity of construction;
- Summarises construction system options to favour lower built form costs across the Wheatbelt. This includes outlining advantages and disadvantages for wall types including external cladding and steel versus timber frame wall structure, flooring types, and modular versus conventional on-site construction. This includes outlining the common off-site construction types for framed construction of pure modular construction (pre-manufactured buildings), light gauge steel framing (off-site manufactured), and timber framing (off-site fabricated);
- Provides three concept designs, with aesthetic suggestions, for freestanding 2 and 3 bedroom homes suitable for a variety of lot configurations generally with a minimum lot size. The enclosed area of the homes varies from 80m<sup>2</sup> to 93m<sup>2</sup> plus they have various combinations of verandahs and carports. The designs have been applied to a 16 dwelling site at 24 Glyde Street, Narrogin (also refer to section 3.2.4 of this report);

- Sets out that two concept designs have been subject to a preliminary cost estimate from a quantity surveyor based on conventional construction, flat pack construction and modular/transportable construction;
- Includes a typical standard off-the-shelf modular plan to take advantage of the cost efficiency of standard design and compares construction costs;
- Proposes solutions that strive to balance development potential, cost, affordability, aesthetics, energy efficiency and liveability. The design solutions set out construction types that can be delivered in both conventional construction as well as in varying degrees of prefabrication to suit local conditions and skill availability. Where possible, these developments should aim to create employment in the regions;
- Sets out the design response is flexible to achieve the optimum site response, in different contexts, in the Wheatbelt; and
- Provides a preliminary cost estimate for conventional construction, flat pack construction and modular construction subject to various assumptions to building in Narembreen. The estimates reveal that modular construction is 10.5% less expensive than conventional construction and flat pack construction. The cost estimate indicates that conventional construction and flat pack construction are similar in cost.

### OPPORTUNITIES TO LOWER HOUSING COSTS

### MODULAR HOUSING HAS TIME & POSSIBLE COST SAVINGS

In addition to promoting modest scale modular housing, the strategy outlines architectural site planning and design considerations to assist with affordability. Various physical attributes contribute to lower site works costs, time required on site and can lower project delivery costs. Ideal lot attributes, that to contribute to economic regional developments (and assist with affordability), include:

- Site fall or slope – lots are flat or have a minimum fall of around 1:80. Seek to minimise cut to fill ground works to create level dwelling pads;
- Soil conditions – seek favourable soil conditions which permit standard slab on ground solutions and thereby reduce cost and widen opportunities for local skills. Where possible avoid reactive (heaving) clays, acid sulphate soils and other poor founding conditions as these generally contribute to higher site works costs. Where unavoidable, consider whether soil conditions can be mitigated through importing and compacting a sand pad or using prefabricated concrete slabs or prefabricated timber floor cassettes;
- Orientation – to assist with passive solar design and promote natural light harvesting into deep spaces, support lots that are orientated north/south or east/west;
- Smaller lot sizes - to promote affordability, feasibility and a broader range of housing, provide smaller lots such as relating to R40 in the Residential Design Codes; and
- Bushfire Attack Levels – either the lot is located outside of the designated Bushfire Prone Areas or has a modest BAL rating.

## 1.5 RECOMMENDATIONS: INFRASTRUCTURE DELIVERY MODELS

### 1.5.1 AUDIT LAND SUPPLY AND EXISTING INFRASTRUCTURE PROVISION

Prior to contemplating new residential or industrial lots, undertake an audit to identify vacant lots, underutilised land and review available services. This is with a goal of focusing development on existing vacant lots that are or can be readily serviced.

The land supply audit could include a 'lazy land' assessment which considers the useability and development suitability of Shire managed reserves, other reserves and Vacant Crown Land. There may be opportunities for local government or the State Government to acquire land that is vacant, rather than create new lots through the subdivision process.

There may be opportunities for local governments to convert Shire managed reserves or other Crown land into a freehold title and to then swap unserviced or constrained freehold land to Crown land.

The South-West Native Title Settlement offers significant opportunities for Aboriginal people, especially if the offered land for housing or industry is appropriately serviced.

Support strategies to maximise existing infrastructure capacity. Seek to get more out of assets wherever possible and practical, and avoid or delay major new investment.

Local government can facilitate development by undertaking a strategic assessment of service availability. This could identify excess capacity in existing infrastructure so that development can be directed to areas that can support additional growth, making the most of infrastructure investments. The strategic service assessment can assist in delineating growth areas (development investigation areas) where development is encouraged (subject to other relevant planning considerations being suitably met).

### 1.5.2 RESIDENTIAL & INDUSTRIAL SUBDIVISION

Following on from [Appendix 3](#), review opportunities to provide suitable new residential and industrial lots and land in locations and with a design that promotes lower development costs. [Figure 2](#) sets out key questions.

Other options to reduce development costs are outlined in this report and in [Appendix 1](#).

The model ([Appendix 3](#)) also highlights the importance of locating new subdivisions in areas where development constraints are lower, early liaising with servicing authorities and obtaining order of probable costs early on in the development process.



### 1.5.3 ALTERNATIVE TENURE AND MODELS TO SUBDIVISION: RESIDENTIAL & INDUSTRIAL DEVELOPMENT

Noting there is often market failure to subdivision, consideration should be given to considering the suitability of alternative tenure models such as leasing industrial, lay down and storage land. This includes alternative housing models including co-living and tiny houses, community land trust, build to rent, rent to buy, and social housing.<sup>9</sup> There is also leasing including 'lease for life.'

## OPPORTUNITIES TO ADDRESS CHALLENGES

### 1.5.4 SERVICING REPORT

Other than small scale subdivisions, such as subdividing one residential lot into two lots (which are adjacent to services), there is merit in commissioning a consulting engineer to prepare a servicing assessment and order of probable costs. This could be complemented with an upfront preliminary geotechnical assessment.

### 1.5.5 RESIDENTIAL LAND

There is considerable merit in undertaking an audit to identify vacant residential lots and land and review available services. It is suggested focus development on existing vacant lots that are or can be readily serviced.

Local governments, possibly on a sub-regional basis, are encouraged to review housing markets and demand for housing.

### 1.5.6 INDUSTRIAL LAND

#### Industrial land supply & demand

Local governments are encouraged to review industrial land supply and demand. This could be undertaken on a local government or sub-regional basis. Ideally, there is sufficient industrial land zoned, which is serviced or capable of being readily serviced, to accommodate demands over a 10-year period. Expressions of interest can assist to better understand industrial land demand. It is expected the WDC and Department of Planning, Lands and Heritage can assist with this assessment.

In addition to sufficient industrial lots and land, it is also considered beneficial in understanding the known and likely future industries including light, general, rural-industry and logistics.

<sup>9</sup> JE Planning and Econisis, 2023, *4WDL Key Worker Housing Analysis 2023*

### Flexible & proactive planning framework

In addition to zoning industrial areas, consider whether the community supports certain industrial, storage and logistic uses being located on rural zoned land. Utilising existing land may save considerable cost and time, rather than creating new lots. If there is support, ensure the planning framework (including the local planning scheme) has sufficient flexibility to enable these uses to be considered on their merits via a Development Application (rather than initially requiring a scheme amendment).

If a local government adopts a flexible and proactive planning framework, it should also consider having criteria or guidelines relating to matters an applicant needs to appropriately address. This includes buffers, appropriate servicing and suitable and safe access.

Consider opportunities for the continued streamlining and fast tracking of land release and development approval in the Wheatbelt.

## REVIEW WAYS TO LOWER DEVELOPMENT COSTS

### Servicing

There are various ways to lower development costs. This includes:

- For existing lots, consider opportunities to go off-grid;
- For larger new lots, consider opportunities to be self-sufficient with servicing;
- Promoting fit-for-purpose servicing including water supply and on-site sewage disposal; and
- There may be opportunities for some industrial developments, on larger existing lots, to go off-grid.

### Leasing land

An alternative or interim solution, to creating new industrial lots through the subdivision process, is to offer leases. This could work for a certain industries, storage, lay down and logistics uses. This can be a cost-effective approach compared to creating new industrial lots. It allows a business to take a lower risk approach with less upfront capital costs. This can also provide time for the business to demonstrate its commercial viability in the Wheatbelt community and to 'fine tune' their potential long-term land needs.

There are challenges in developing industrial land, in some towns, including in Pingelly and Narembeen. Consideration of a leasing option, on Crown/reserved land, offers the potential for uses that do not require in-situ buildings.

### Industry investment prospectus

Support the WDC, or sub-regional groups, preparing or updating an industry investment prospectus relating to available industrial lots, zoned industrial land or if there is a flexible local planning framework.

## 1.5.7 ADDRESSING MARKET FAILURE: RESIDENTIAL & INDUSTRIAL DEVELOPMENT

To enable new housing, particularly for key workers, there is a need for government intervention to address market failure. This includes by local government, the State Government and the Federal Government to assist in different capacities.

Similarly, the creation of new residential and industrial lots in many cases will require government intervention to address market failure.

Noting that government funding has limitations, the form of government intervention is expected to vary between projects. This is expected to be based on considerations including:

- Degree of market failure;
- Cost-benefit analysis;
- Partnership approach and inputs from different stakeholders;
- Land tenure and on-going governance model; and
- Whether it is social housing, for key worker accommodation or for other groups.

## 1.5.8 POWER SUPPLIES

### Power infrastructure delivery model

Any power infrastructure delivery model, which assists to provide sufficient and reliable power with a lower carbon energy footprint, is supported. To achieve this, it is expected there will be considerable changes to the regulatory and policy framework to facilitate the servicing of new lots and new development. This could increasingly see microgrid operators and other licensed service providers being increasingly prominent and operating in a more certain and favourable regulatory framework.

The Microgrid Delivery Model, Strata Title / Community Title Delivery Model, Off-Grid Microgrid Delivery Model (multiple consumers) and Stand-Alone Power System Delivery Model (single consumer) all have merit, subject to context and market demands. These models are promoted where feasible and where the project meets selection criteria.

### Reduced Power Delivery Model

The Reduced Power Delivery Model is supported for relevant light industry, general industry and logistic uses in the Wheatbelt where it meets selection criteria. This would seek to modify the Western Power Underground Distribution Schemes (UDS) where the minimum design requirement for non-residential loads is changed from 200kVA/ha to 50kVA/ha. Any subdivision approval would require a notification or restrictive covenant on the Certificate of Title highlighting the lot has a reduced power service and setting out its power classification/category. To progress this model, it is expected that various matters are required to be worked through by Western Power and the WAPC. This may require Western Power meters to be updated with standards to reflect alternative classification.



### Delivery model decision tree

The delivery model decision tree, outlined in [Appendix 4](#), can be used to assist in considering options, identify a model which is fit-for-purpose, consider feasibility and promote options to support a lower carbon footprint.

### Modify State Planning Policy 2.5 Rural Planning

It is suggested the WAPC consider modifying *State Planning Policy 2.5 Rural Planning* and the associated guidelines.<sup>10</sup> In particular, the WAPC to support lots above 4 hectares (rural smallholding) being created without requiring connection to the grid. Any subdivision approval would require a notification or restrictive covenant on the Certificate of Title highlighting the lot is not serviced by the grid and alternative energy generation is required.

### Timing to receive Western Power quotes

Seek changes as to when Western Power can provide a quote for servicing to connect lots or development to power or to upgrade the power supply. Additionally, it would be helpful if Western Power's quote provided information as to how the quoted sum was arrived at.

## 1.5.9 REVIEW FIT-FOR-PURPOSE SERVICING

It is noted that while WAPC policy has been re-cast to provide 'off the grid' solutions outside of townships, in towns, the current policy settings usually require network services.

With a goal of addressing market failure, it is recognised that circumstances may exist where innovative forms of servicing could be reasonable where relevant planning, environmental, human health and operational matters are suitably addressed. This could be applied using a risk based approach noting the overall modest scale of development in parts of the Wheatbelt. This could include:

- Supporting on-site servicing e.g. power, water supply and sewage disposal on appropriately sized properties;
- Subject to building in resilience for climate change and reviewing other water resource opportunities, decreasing the lot size where lots are not required to be connected to the reticulated water system (possibly from 1 hectare to 4000m<sup>2</sup>);
- Reuse of treated sewage;

- Grey water reuse;
- Stormwater capture and re-use;
- Hybrid sewerage disposal schemes – septic tanks and off-site solutions (if feasible);
- Solar PV and battery; and
- Considering mandatory provision of rainwater tanks.

Related to this, is reviewing opportunities to gain Economic Regulatory Authority approval for service providers (including local government authorities) to be established and to operate servicing systems.

## 1.5.10 REVIEWING HEADWORKS IN THE WHEATBELT

Given there is market failure, there is a need to review standard headworks charges in the regions in general and in the Wheatbelt in particular, compared to the Perth-Peel metropolitan region. Without this, there is a need to increase funding to RDAP, Royalties for Regions and potentially establish and fund a Wheatbelt Investment Fund or Wheatbelt Housing Fund.

## 1.5.11 REGIONAL DEVELOPMENT ASSISTANCE PROGRAM

RDAP is an effective program delivered by DevelopmentWA which is regionally targeted to address growth challenges, to assist local governments build communities and to address market failure.

It is recommended that RDAP continue to be funded ideally with increased budget allocation given the critical need to support economic development and address market failure. This includes a specific allocation of funding that is based on project merit and responding to anticipated development and not economic cost recovery for sale prices.

Some criteria to prioritise RDAP projects could be:

- No private development market in the township (evidence of market failure);
- Under 20 lots (the number could be adjusted) i.e. if the intent is to limit, other than in exceptional circumstances, to a certain number to ensure other towns in the funding pool get funding;

- The township has a growth requirement that can be demonstrated (i.e. increase in agricultural or mining development); and
- Service provision restrictions.

As part of the audit assessment, DevelopmentWA will consider the following:

- That the local government has reviewed opportunities to more effectively use existing serviced land including it has undertaken an audit of vacant and underutilised land;
- That the local government has strategically considered and planned for development/growth. This could, as appropriate, include a preliminary review of current and required 'hard' infrastructure capacity, preferred development sites and how the funding request relates to the planning framework;
- There is market analysis of demand including firm commitments from buyers for the residential or industrial lots or that the local government has commissioned a business plan; and
- An understanding of how the local government wants to be involved. This could include commitments from the local government e.g. the provision of freehold land, or a possible joint venture.

In some cases, RDAP funding may be utilised to engage a consulting engineer to undertake a review of the project to determine its feasibility including determining probable costs. Examples of this are provided in the report.

**RDAP ASSISTS  
TO ADDRESS  
MARKET FAILURE**

<sup>10</sup> Western Australia Planning Commission, December 2016, *State Planning Policy 2.5 Rural Planning Guidelines*

### 1.5.12 INFRASTRUCTURE DEVELOPMENT FUND

The State Government's recent creation of the Infrastructure Development Fund is welcome and is a positive first step in assisting to remove barriers to producing housing for key workers in regional areas.<sup>11</sup> This targets investments to address water, wastewater and electricity infrastructure constraints and support the delivery of much needed accommodation for essential workers. It is hoped the fund can be made permanent, extended or complemented with a Wheatbelt specific fund that attracts a suitable capital investment.

### 1.5.13 WHEATBELT REGIONAL INVESTMENT FUND

Subject to not duplicating other programs such as RDAP, Infrastructure Development Fund, Government Regional Officers Housing (GROH) and Housing Australia Future Fund, promote the establishment of a Wheatbelt Investment Fund or Wheatbelt Housing Fund to provide transformational investment and to assist in addressing market failure in the Wheatbelt.

The fund could review businesses cases, provide a source of competitive finance or assist with funding support for the provision of new housing, industrial land development and overcoming servicing constraints. If initially suitably funded, the intention in time could be to provide funding out of interest and dividend income.

In addition to State Government funding, there is a need to determine the implications of the fund being partly funded by resources royalties, superannuation investments, philanthropic donations or other possible sources.

Further details on the Wheatbelt Housing Fund are outlined in other publications.<sup>12</sup>



## 1.6 RECOMMENDATIONS: BUILT FORM & CONSTRUCTION

### 1.6.1 PROMOTE HOUSING ON EXISTING VACANT LOTS OR UNDERUTILISED LOTS

Promote housing and other forms of accommodation on existing vacant or underutilised lots (which are serviced or close to services). As part of this, undertake a land supply assessment (including reviewing 'lazy land').

The local government to collate information, contact key land owners, seek to understand why the buildings or land are vacant, outline opportunities, and encourage development. There are related opportunities for local government and others to work with landowners to understand potential uses or review changes to the planning framework.

### 1.6.2 PROMOTE ADAPTIVE REUSE

Subject to feasibility, there may be scope to reuse buildings that are vacant or underused in suitable locations for housing. To encourage reuse and infill development, there may be a need to review opportunities for density bonuses, potentially reducing parking requirements or consider a short-term rate rebate.

For heritage sites, the cost of adaptive re-use can be significant, however the end result can be transformative and can provide a point of difference and promote increased visitation e.g. Dome's food offering and accommodation in Northam and Katanning.

### 1.6.3 PROMOTE DEVELOPMENT ON SUITABLE LAND

Where possible, seek or create housing and other forms of accommodation that addresses the key questions in [Figure 2](#).

The above applies to where land intensification is proposed such as increasing R-Codes to facilitate a greater range of housing and facilitate smaller lots.

<sup>11</sup> <https://www.mediastatements.wa.gov.au/Pages/McGowan/2023/0>  
ADDRESSING WHEATBELT DEVELOPMENT CONSTRAINTS

[2/\\$80-million-headworks-fund-to-boost-infill-and-regional-housing.aspx](#)

<sup>12</sup> CDP Town Planning & Urban Design, 2022, *Housing Solutions for the Wheatbelt – A Case Study for the Shires of Dandaragan & Moora*

## 1.6.4 PROMOTE A GREATER RANGE OF HOUSING & LOT SIZES

Seek to provide a wide range of housing types that are affordable to different income levels. A mix of different housing types (e.g. rental and for sale, large family homes and one and two bedroom dwellings) can accommodate people in different life phases, from starting out in the workforce to raising a family to retiring.

To promote affordability, feasibility and a broader range of housing, consider the suitability of increasing R-Code densities where appropriate, particularly close to the town centre. This can assist to facilitate the provision of aged and dependent person's dwellings, one and two bedroom dwellings and smaller lots. Subject to addressing relevant considerations, including the lots are connected to the reticulated sewerage system, they are not located in a heritage area or in a special control area, there could be scope for the R-Coding being in the order of R40.

There are opportunities, on most residential lots, for ancillary accommodation (granny flats) along with opportunities for tiny houses (non-moveable options). Subject to changes to local planning frameworks, there may be scope in certain areas for tiny houses on wheels.<sup>13</sup>

Subject to market demand, there may be scope for alternative tenure such as cooperative housing or using community titles.

### SUPPORT PILOT HOUSING PROJECTS



## 1.6.5 PROMOTE MODULAR HOUSING & OFF-SITE CONSTRUCTION

The investigations, in [Appendix 5](#), reveal, that modular construction is 10.5% less expensive than conventional construction and flat pack construction for the Narembeen example. The cost estimate indicates that conventional construction and flat pack construction are similar in cost.

Noting the trade labour shortages in parts of the Wheatbelt, modular construction and off-site construction processes will be quicker than conventional on-site construction.

There is considerable merit in developing pilot/demonstration projects to implement and showcase recommended modular and other off-site construction built form solutions.

To promote affordability and the timely provision of housing, there is support for increased provision of modular housing in the Wheatbelt subject to meeting agreed local amenity considerations.

There may be cost savings through seeking economies of scale such as commissioning a number of dwellings for a townsite as part of the same contract. This could be progressed by the Department of Communities, local government, not-for-profit organisations, or a private developer.

## 1.6.6 PROMOTE NEW HOUSING TO LOWER ENERGY COSTS

Compared to much of the existing housing stock, new dwellings will be considerably more energy efficient and have lower on-going energy costs. This combined with PV solar panels assists to address affordability.

## 1.6.7 PROMOTE FIT-FOR-PURPOSE PLANNING FRAMEWORK

It is recommended that local planning frameworks are fit-for-purpose, positive and retain sufficient flexibility to facilitate development in appropriate locations. This includes promoting zoning that is flexible enough to adjust to changing market conditions. This can assist a community to weather economic downturns and take advantage of opportunities.

Adopting a strategic planning approach can set out where development is promoted (ideally aligning with available services) along with setting out where highly capable agricultural land or environmental assets should be conserved. Identifying key locations for greenfield development and redevelopment of infill sites can be highlighted in Local Planning Strategies. As local government prepare their Local Planning Strategy or review their Local Planning Scheme, there is scope to review potential development sites including as required reviewing the density codes to facilitate development.

There may be a need to review development standards to promote development by reviewing and revising development standards to allow, encourage, or require desired building types, land uses, and density. Changes might include reduced minimum lot sizes, setbacks, or car parking.

There may be opportunities to review existing permit and approval processes, and increasingly seek to adopt a 'can do' culture. This could include reviewing opportunities to expedite approval processes to shorten the timeline and reduce development costs.

<sup>13</sup> Shire of Esperance, 2023, *Tiny House on Wheels Information Sheet*, [https://www.esperance.wa.gov.au/sites/default/files/publication/files/tiny\\_houses\\_0.pdf](https://www.esperance.wa.gov.au/sites/default/files/publication/files/tiny_houses_0.pdf)

## 1.6.8 PROMOTE EFFECTIVE PLANNING ASSESSMENT

Where house typologies and the associated construction systems (as outlined in [Appendix 5](#)) for a single house address the deemed-to-comply requirements of the Residential Design Codes, it is recommended these proceed to the Building Application approval stage.

To facilitate modular construction, some Local Planning Schemes and local planning policies may need to be modified. It is noted that various forms of modular construction produce built form outcomes (in particular the external appearance) similar to conventional construction. These forms of modular construction should be assessed the same as conventional dwellings. In many cases, unless the property is within a Special Control Area or Heritage Place within a Local Planning Scheme, a single house may be exempt from requiring development approval if it complies with the deemed-to-comply requirements in the Residential Design Codes.

There are other forms of construction, defined as 'repurposed dwellings' which use sea containers, dongas or similar. Most local planning schemes require a Development Application for a repurposed dwelling, especially within townsites. Unless the external appearance of the repurposed dwelling is suitably modified, which can include recladding, adding a roof or verandah, these can create amenity impacts.

## 1.6.9 PROMOTE LOCAL CHARACTER

As part of promoting new housing, it will be important to take into account the distinctive character of local towns and landscapes while also allowing for growth in appropriate areas. There is opportunity to create a Wheatbelt Vernacular Handbook (or sub-regional handbook) with materials and designs of buildings that are appropriate to the climate and context. This can assist to ensure that the new housing stock is climate and context appropriate.

Subject to local circumstances, local planning strategies and local planning policies could include built form, landscaping, and street tree guidance.

## 1.6.10 PROVIDE KEY WORKER HOUSING

There is a need to provide additional key worker housing. There are already different key worker housing projects operating in the Wheatbelt and in other parts of regional Western Australia. This includes Mortlock Gardens run by the Avon Community Development Foundation.<sup>14</sup>

Subject to which entity operates the housing, such as GROH, local government, not-for-profits or other entities, there may be different governance and tenure models.

There are opportunities for a partnership approach. This includes, for instance, the State Government or local government gifting the land or providing a low-interest loan to a not-for-profit organisation to operate the housing.

## PROMOTE KEY WORKER HOUSING & WORKFORCE ACCOMMODATION

## 1.6.11 PROMOTE WORKFORCE ACCOMMODATION & ASSOCIATED FLEXIBILITY

There are various opportunities for developments, not proposing subdivision, including workforce accommodation/short-stay accommodation. In many cases, not subdividing may assist with feasibility in reducing headworks along with increased potential for on-site servicing.

Unless the workforce accommodation is provided as part of a farming operation, which is well-removed from other properties, it is expected that workforce accommodation will

be located in and around townsites. Accordingly, the building design and facility should not impact local amenity. It is expected that local communities will seek a built form that does not resemble a 'mining camp' but a higher standard built form. There are now considerable design options for cabins and associated accommodation that should address most local government requirements (including in [Appendix 14](#) and [Appendix 16](#)).

For short term accommodation requirements, a cost-effective way of providing additional accommodation is via expanding an existing caravan/holiday park or potentially developing a new caravan/holiday park.

Subject to local requirements and how long accommodation is intended to remain on site, it is suggested that workforce accommodation/short-stay accommodation is designed to enable different users to promote sustainability and viability. Over time, there may be different demands. This is particularly relevant to regional areas where lower demand may not support a single-use facility. The case studies outlined in sections 3.3.2 and 3.3.3 promote accommodating workers, visitors, and tourists (subject to effective management).

## 1.6.12 HOUSING MARKET STUDY

It is suggested that local governments or sub-regions consider the need to prepare a fit-for-purpose housing market study to identify what housing types are available, what is required and how local governments and partners could assist to meet existing and future housing needs.

## 1.6.13 RURAL RESIDENTIAL

Rural Residential lots are between 1-4 hectares.<sup>15</sup> They offer a way to increase the range of lots and often are more feasible to develop than fully serviced residential lots. Rural residential lots, if well located and designed, are often popular and are well received by the market. The reduced standards of servicing (no connection to reticulated sewerage) and often the comparatively higher prices for a 'lifestyle lot' can assist to attract developers and landowners to this low density and lower risk land development option. Replicating this form of development, to address future housing needs, will however consume large tracts of land and place future residents further away from services. They accordingly offer part of the solution.

<sup>14</sup> <https://www.wheatbelt.wa.gov.au/news/northam-worker-accommodation-open/>

<sup>15</sup> Western Australian Planning Commission, December 2016, *State Planning Policy 2.5 Rural Planning*

### 1.6.14 OVERCOMING BARRIERS TO INFILL DEVELOPMENT

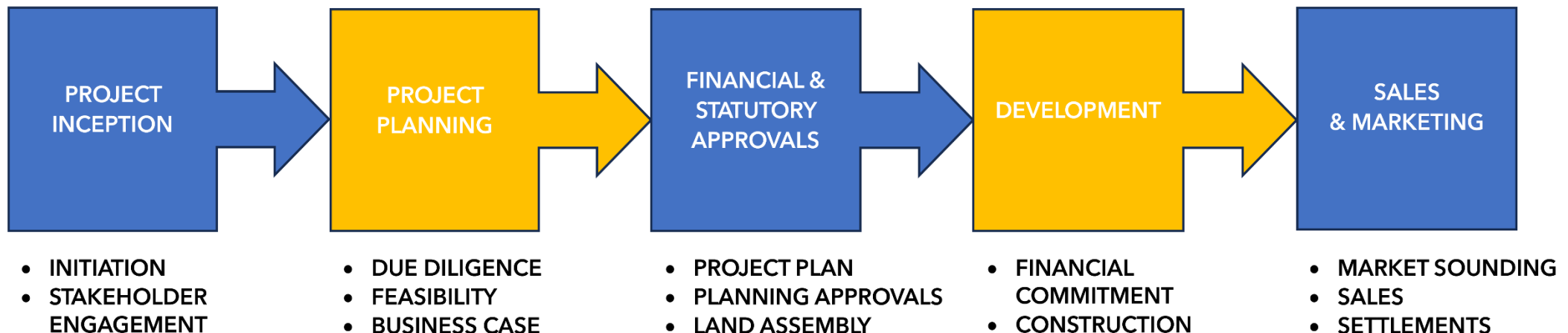
The density of development can influence project feasibility along with shaping the character of a community. Densities vary through market preferences, available servicing, and planning controls. In reviewing housing options, there is a need to consider conserving or enhancing a sense of place and to understand the context. There may be a need in appropriate areas to increase densities to provide more cost-effective services and infrastructure, and to enhance viability.

### 1.6.15 LAND DEVELOPMENT PROCESS

Land development is not straightforward and there are various risks. It is recommended development options and risks are appropriately and systematically considered.

As outlined in the land development process bar (Figure 3), projects have initiation and due diligence phases. A business case can support this, consider other options, and advance the land development process. Additional work is required to confirm that the land parcel(s) identified in a business case can be developed in the manner proposed, before advancing to the financial/statutory approvals, development and sales and marketing stages.

**FIGURE 3: LAND DEVELOPMENT PROCESS**



## 1.7 CONCLUSION

This report outlines opportunities to address growth challenges, outlines options and solutions, and considers key requirements to deliver effective implementation. This report notes the existing situation of development in the Wheatbelt is characterised by market failure.

Addressing market failure and growth challenges requires a sustained, strategic, and intentional approach from different levels of government, the private sector, not-for-profits and the community.

While there are growth challenges in the Wheatbelt, local governments and communities are not powerless in addressing issues. There are various opportunities to facilitate new housing, workforce accommodation/short-stay accommodation, industrial lots and fit-for-purpose and cost-effective servicing. This includes reviewing opportunities to more effectively use existing serviced land, promoting modular housing and more affordable housing, reviewing opportunities from the Regional Housing and Land Activation Toolbox, retaining and expanding RDAP, seeking targeted funding assistance from the Federal Government and State Government and promoting working in partnership.

The challenge now, is for stakeholders to back positive change, to use their capabilities and resources to deliver

well-coordinated, proactive changes that solve development constraints. In-turn, this will result in economic and social benefits to Wheatbelt communities and to Western Australia.



**PART**

**2**

**DELIVERING  
SOLUTIONS**

## 2.1 HOW THE TOOLBOX IS APPLIED

A central part of the report is a Regional Housing and Land Activation Toolbox ([Appendix 1](#)). The toolbox is intended to assist and promote development and guide decision makers, including local government, to address key planning and servicing issues.

The toolbox provides priority actions, grouped around themes, along with setting out the lead entity and timeframe for action. Actions are grouped under high level themes, near-term actions: 6-12 months, medium-term actions: 1-2 years, and long-term (strategic) actions: 3 years or more. The timeframe for action is indicative only. Some actions relate to an advocacy or lobbying role.

The toolbox sets out ideas, options, and possible solutions to overcome constraints and support development outcomes for Wheatbelt communities. Some options propose modest changes to servicing agency or State Government policy or operational practice while others require further consideration and research. The toolbox is intended to be comprehensive. Accordingly, it is expected that most local governments and other stakeholders would only be adopting some of the actions.

The toolbox encourages local government and others to consider a range of opportunities, constraints, solutions and risks. This includes from conventional freehold subdivision to considering alternative approaches and tenure.

Relevant actions and ideas in the toolbox could be added to or be implemented through documents such as a Local Planning Strategy and Strategic Community Plan. It is suggested there are various opportunities to align economic development aspirations to create community benefits.

Toolbox actions, specifically relevant to the case study towns, are outlined in section 3.

## THE TOOLBOX SETS OUT OPTIONS & SOLUTIONS

## 2.2 PROMOTING CHANGE

### 2.2.1 OVERVIEW

Given the range of challenges, including market failure in creating new residential and industrial lots, promoting desired change and new development in the Wheatbelt will take substantial and proactive effort from key stakeholders. No single organisation is able, for instance, to develop new housing and industrial lots on its own. Accordingly, there is a requirement for a shared commitment and effective leadership which supports the delivery of agreed priority actions.

Some of the ways to promote change and address development constraints are outlined in the Regional Housing and Land Activation Toolbox ([Appendix 1](#)).



### 2.2.2 PARTNERSHIPS

Effective sustained partnerships are essential in delivering new housing, new industrial land and addressing servicing constraints. Coordination and partnership between all three levels of government (Federal, State and local government), the private sector, not-for-profits and community groups, are required to facilitate public and private investment in the Wheatbelt. This in part requires shared priorities, being strategic, addressing market failure and leveraging resources.

Ideally, there is a strong and united regional voice to lobby effectively for the resources required to build the critical infrastructure and housing the Wheatbelt needs.



### 2.2.3 IMPLEMENTATION GROUP

It is recommended that the WDC, in partnership with the Department of Planning, Lands and Heritage, Western Australian Local Government Association (WALGA) and others, establish an Implementation Group. This group to monitor implementation of the agreed priority actions set out in the toolbox and in the Regional Blueprint<sup>16</sup> and to identify future regional infrastructure and built form needs and potential solutions. It is suggested the Implementation Group would seek to coordinate strategies and programs to align delivery partners, attract funding and facilitate action and investment to achieve a regional vision for growth.

Over time, the Action Plan's list of projects will change. Projects will emerge and be considered on merit. This includes reviewing project prioritisation and implementation processes to achieve implementation.



<sup>16</sup> Wheatbelt Development Commission, 2015, *Wheatbelt Blueprint*  
ADDRESSING WHEATBELT DEVELOPMENT CONSTRAINTS

## 2.2.4 ROYALTIES FOR REGIONS FUND & WHEATBELT INVESTMENT FUND/ WHEATBELT HOUSING FUND

Support the continuation of the Royalties for Regions Fund and the recently established Infrastructure Development Fund.

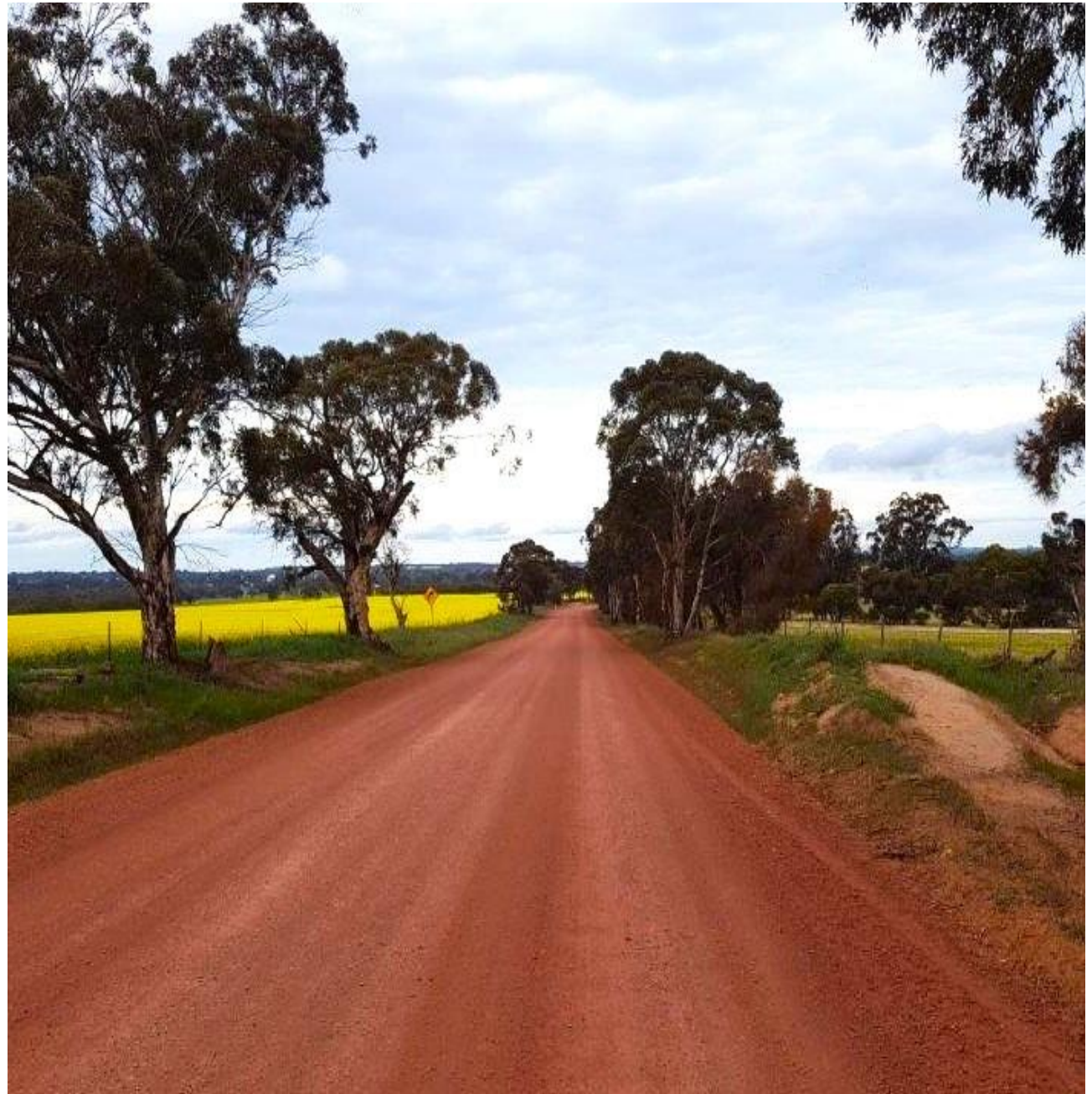
Further to section 1.5.13 and subject to not duplicating other programs, promote the establishment of a Wheatbelt Investment Fund or Wheatbelt Housing Fund to provide transformational investment and to assist in addressing market failure in the Wheatbelt.



## 2.2.5 REGIONAL OR SUB-REGIONAL INVESTMENT PROSPECTUS

Promote and review a regional or sub-regional investment prospectus for industrial land and major residential sites. The prospectus to be responsive to the priorities identified in the Regional Investment Blueprint and Regional Infrastructure Audit. The prospectus to take a regional or sub-regional coordinated, market focused approach to investment, promotion and implementation.

**SUSTAINED FUNDING IS  
NEEDED FOR EFFECTIVE  
IMPLEMENTATION**



**PART**

**3**

**THE**

**CASE**

**STUDIES**

## 3.1 CASE STUDY TOWNS

Figure 1 shows the four case study towns of Narrogin, Pingelly, Narembeen, and Kellerberrin.

The case study towns were identified by the WDC as towns which provide examples of servicing and planning issues along with setting out ways in which matters can be addressed in other parts of the Wheatbelt. The towns are a mix of sizes and have different development pressures. There are a range of development constraints on the case study towns. A summary of engineering servicing is outlined in Appendix 6.

The case studies include development scenarios/options, concept plans, technical reports and cost models. The case study information is outlined in Appendices 6 – 22.

The report summarises the process in each case study town and sets out a suggested way forward to address development constraints. The lessons learnt from the case studies have applicability in various other Wheatbelt towns.

## 3.2 NARROGIN: PROMOTING HOUSING

### 3.2.1 OVERVIEW

Table 1 summarises background, lessons learnt and applicability for other towns and key actions for Narrogin relating to housing.



**TABLE 1: NARROGIN HOUSING**

#### Background

- Background context on housing issues and opportunities are outlined in various documents.<sup>1</sup> Noting Appendix 3, there is market failure. For the 12-month period ending April 2023, the average price for a medium sized residential lot (400m<sup>2</sup> – 700m<sup>2</sup>) was \$30,000.<sup>1,1</sup>
- There is a lack of housing, a lack of diversity in housing, a lack of higher amenity affordable housing and a lack of rental accommodation. This has implications on affordability and promoting economic development.
- A housing supply assessment is provided in Appendix 7. This reveals there is considerable land including various opportunities for housing on infill sites, using Shire and Crown land and on appropriate greenfield sites which are consistent with the Local Planning Strategy. There is however less serviced residential land that is available to the market.
- Three development options were prepared to illustrate housing opportunities for reuse development, infill development and greenfield development:
  - **Development Option 1: 28 Havelock Street – reuse development (section 3.2.3).**
  - **Development Option 2: 24 Glyde Street – medium density infill development (section 3.2.4).**
  - **Development Option 3: Lot 123 Golf Course Parade – large greenfield development (section 3.2.5).**

#### Lessons learnt & applicability for other towns

- There is market failure. Options to lower risks and enhance feasibility include ancillary dwellings, tiny houses and reviewing opportunities for workforce accommodation.
- Seek to provide greater housing choice and to capitalise on existing infrastructure. There are opportunities for a pilot project for medium density using modular construction.
- The Shire is assisting to promote a greater range of housing through increasing densities near the town centre in areas that are near services.
- Undertaking a land supply assessment, including reviewing 'lazy land,' assists to provide a better understanding of existing conditions, constraints and future opportunities.
- Three development options were prepared to illustrate housing opportunities for reuse development, infill development and greenfield development.
- Subject to service capacity, infill sites which adjoin services, sealed roads and are gently sloping offer a practical way to increase housing stock in a cost-effective manner.
- Where towns require more substantial new housing, they will require a combination of both infill development and greenfield development.
- Reuse of existing buildings requires a careful understanding of project risks and probable costs to determine feasibility.
- Noting section 1.5.11, consider an RDAP application to address market failure.

#### Key actions for Narrogin

- Shire to work with the owner of Lot 1689 (No. 28) Havelock Street to review re-use opportunities and feasibility for residential building, guesthouse or workforce accommodation purposes.
- Recode Lot 623 (No. 24) Glyde Street from 'Residential R12.5' to 'Residential R40'.
- WDC to liaise with DevelopmentWA to target Infrastructure Headworks funding for service capacity upgrades for Lot 623 (No. 24) Glyde Street.
- Once a scheme amendment is well advanced, lodge a Development Application for Lot 623 (No. 24) Glyde Street for grouped dwellings.
- Shire to commission a business plan for subdividing Lot 123 Golf Course Parade and seek expressions of interest for a demonstration grouped housing product. The business case to set out the preferred model for development such as gifting the freehold land to DevelopmentWA.
- Shire to lodge an RDAP application to DevelopmentWA for Lot 123 Golf Course Parade.
- Shire or DevelopmentWA to commission supporting technical investigations to support a structure plan and subdivision application for Lot 123 Golf Course Parade.
- Shire to promote opportunities, on appropriate sites, for workforce accommodation.
- Shire to promote opportunities for infill development including ancillary accommodation and tiny houses.
- Shire to review the residential land supply and approach key land owners setting out opportunities.
- Shire to progress opportunities for the relocation of the speedway to facilitate substantial long term residential development.
- Review opportunities for partnerships/incentives to facilitate new housing.
- Review land assembly and addressing headworks and servicing upgrades/extensions.

### 3.2.2 LAND SUPPLY

Appendix 7 outlines there is considerable zoned and allocated residential and rural living land. While noting this, there are significant challenges in creating additional new residential lots. The housing supply assessment includes reviewing 'lazy land' and outlines future opportunities. The assessment sets out opportunities with lower risks and which are more likely to be feasible to achieve additional housing in the shorter term including ancillary accommodation. For major projects, there is expected to be a need for government assistance to address market failure.

### 3.2.3 DEVELOPMENT OPTION 1: 28 HAVELOCK STREET: REUSE DEVELOPMENT

This property contains the former Westrail workers accommodation. The buildings have been unoccupied for many years. Subject to addressing structural and feasibility issues, the site has the potential for longer stay (residential building), short-stay or workforce accommodation. Appendix 8 shows photographs of the current state of buildings, while Appendix 9 sets out a site concept plan and concept illustrations showing the buildings being restored and reused.

### 3.2.4 DEVELOPMENT OPTION 2: 24 GLYDE STREET: MEDIUM DENSITY INFILL DEVELOPMENT

Appendix 10 shows a site plan of 16 dwellings (R40 density) along with architectural concept plans. It is supported by a servicing investigation report and opinion of probable costs (Appendix 11).

The architectural solutions seek to promote affordability which can complement the amenity of the area. This includes promoting modest scaled housing, with a constrained architectural form, which can be built using different construction techniques including modularised construction.

The servicing investigation report (Appendix 11) reveals the development costs of \$64,640 per dwelling (including GST) are relatively low for this infill site compared to costs set out in Appendix 3.

### 3.2.5 DEVELOPMENT OPTION 3: LOT 123 GOLF COURSE PARADE: LARGE GREENFIELD DEVELOPMENT

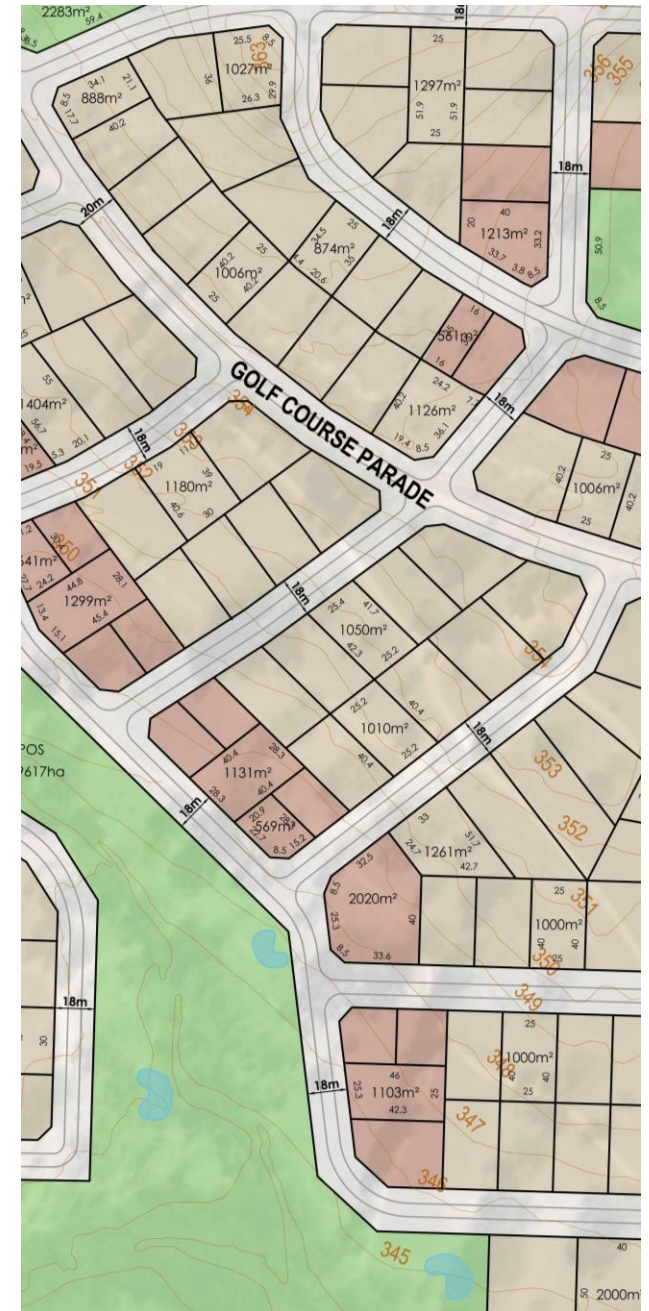
The investigations included a context, opportunities and constraints plan and a concept plan (Appendix 12) and a servicing investigation report with an opinion of probable costs (Appendix 13).

The concept plan shows 180 lots which could support around 240 dwellings. R-Codes vary between R5 (2000m<sup>2</sup> lots) to R30 (300m<sup>2</sup> lots). Subject to considering market demands and addressing off-site buffers, there is scope for additional lots in the south-east section where lots are proposed to be 2000m<sup>2</sup>. The medium density lots (R30) offer the potential for a range of housing which could include demonstration/pilot projects.

The servicing investigation report makes some recommendations including on staging and reviewing development in the western section. The isolated western section adds significant costs to the project. The average development costs per residential lot of \$146,528 (including GST) would be reduced if the western lots were not part of the development.

Given the site is owned by the Shire, and is near services, there is considerable merit in the Shire lodging an RDAP application for review by DevelopmentWA.

**HOUSING  
DEVELOPMENT OPTIONS  
PROMOTE AFFORDABILITY  
AND NEW INVESTMENT**



**TABLE 2:  
PINGELLY WORKFORCE ACCOMMODATION/SHORT-STAY ACCOMMODATION**

**Background**

- While Pingelly has not been known for tourist and short-stay purposes in recent decades, this is changing. Background is outlined in the *Shire of Pingelly Tourism Strategy*.<sup>1</sup>
- A transformational project that has enhanced the local economy and which is an impetus for short-stay accommodation is the Pingelly Recreation and Cultural Centre (PRACC).<sup>1</sup> This is a multi-purpose facility for regional sport events, conferences and large functions.
- Pingelly currently has approximately 16 beds of accommodation for visitors to the town. Caravans can be accommodated in the caravan park (22 bays), the overflow RV area or on the overflow camp ground. All short-term accommodation options are in demand. Recently the roadhouse accommodation underwent renovations.
- The Shire would like to set up boutique short term accommodation solutions (glamping or similar) to attract higher paying tourists given some of the corporate market are making inquiries to use the PRACC.
- To provide a range of more cost-effective workforce accommodation/short-stay accommodation options, concepts were provided for 3 sites. The investigations considered servicing availability development costs and acceptability of the sites for workforce accommodation and/or short-stay accommodation. The sites are considered acceptable for a range of accommodation.
- Three development concepts were prepared, for Shire managed reserves, to illustrate workforce accommodation/short-stay accommodation opportunities:
  - **Development Option 4: Reserve 23688 Stratford Street – motel/guesthouse development (section 3.3.2).**
  - **Development Option 5: Reserve 23983 – cabin development (section 3.3.3).**
  - **Development Option 6: Reserve 34570 – glamping & RV bays (section 3.3.4).**

**Lessons learnt & applicability for other towns**

- Pingelly provides a positive example of creating and growing the tourism industry.
- Various local governments hold land in freehold title or can review the tenure and use of reserve land.
- Three development options were prepared to illustrate workforce accommodation/short-stay accommodation opportunities for motel/guesthouse, cabin and glamping/RV bays. The cabin development ([Appendix 16](#)), in particular, could be readily replicated in other towns. This form of development can be staged.
- The case study sites are well located for workforce accommodation/short-stay accommodation. The lack of suitable and modern key worker accommodation is a constraint in attracting and retaining population.
- If the planning system is flexible and the site is well located, there is scope for modular or similar forms of development.
- Unlike residential subdivision, there is increased scope for workforce accommodation/short-stay accommodation to go 'off grid' or consider innovative servicing solutions.
- To enhance project feasibility and adapt to changing market needs, consider provision of housing that is adaptable (including providing universal access).
- Promote workforce accommodation as outlined in section 1.6.11. This includes promoting housing that is flexible for a range of users including workers and visitors.
- To address headwork costs, consider an RDAP application (section 1.5.11).
- Prepare a *Wheatbelt Tourism Strategy* to focus investment, build capacity and product and market the region.<sup>1</sup> The destination branding, promotion of festivals and events and other initiatives can assist to sustain the tourism industry.

**Key actions for Pingelly**

- Rezone or reclassify Reserve 23688 Stratford Street and Reserve 23983 to facilitate development. This, in part, will be influenced as to the preferred tenure and management of the sites including the possible on-going role of the Shire and/or the private sector.
- Subject to determining the preferred management of Reserve 34570, review tenure including seeking the power to lease.
- Shire to commission a business plan for developing the sites.
- Shire to promote opportunities, on appropriate sites, for workforce accommodation.
- Review opportunities for partnerships/incentives to facilitate new workforce accommodation/short-stay accommodation.
- Promote workforce accommodation as outlined in section 1.6.11. This includes promoting housing that is flexible for a range of users including workers and visitors.
- To address headwork costs, consider an RDAP application (section 1.5.11).

## 3.3 PINGELLY: PROMOTING WORKFORCE ACCOMMODATION/ SHORT-STAY ACCOMMODATION

### 3.3.1 OVERVIEW

[Table 2](#) summarises background, lessons learnt and applicability for other towns and key actions for Pingelly relating to workforce accommodation/short-stay accommodation.

### 3.3.2 DEVELOPMENT OPTION 4: RESERVE 23688 STRATFORD STREET: MOTEL/GUESTHOUSE DEVELOPMENT

Reserve 23688 was the former Pingelly Hospital which has now been demolished. The site is now vacant. The centrally located site is close to the town centre and adjoins the Avon River South. [Appendix 14](#) shows the Concept Plan for motel/guesthouse (indicatively showing 59 units) and various illustrations.

A servicing report from Porter Consulting Engineers is provided in [Appendix 15](#). This reveals the estimated servicing costs appear supportive of facilitating development (59 units) for workers accommodation/short-stay accommodation (\$16,104 per unit including GST). This is a well located site with appropriate features which provides a cost-effective way of addressing site development costs.

**SEEK AFFORDABLE  
AND  
WELL DESIGNED  
WORKFORCE/SHORT-STAY  
ACCOMMODATION**

### 3.3.3 DEVELOPMENT OPTION 5: RESERVE 23983: CABIN DEVELOPMENT

Reserve 23983 adjoins the PRACC and the key recreation facility in Pingelly. The site is a mix of parkland cleared vegetation and cleared areas.

Appendix 16 shows the Concept Plan for cabins which includes some indicative elevations. The Concept Plan proposes cabin accommodation which can be provided through modular construction. The Concept Plan shows a mix of individual cabins and dual key access cabins. Depending on the needs of guests, the dual key access cabins can be separated into separate units. Given the potential for dual key access, the 32 cabins provide accommodation for 41 units. The development could be readily staged.

The servicing report in Appendix 17 reveals this is a well located site with appropriate features which provides a cost-effective way of addressing site development costs (\$36,071 per unit including GST).

### 3.3.4 DEVELOPMENT OPTION 6: RESERVE 34570: GLAMPING & RV BAYS

Reserve 34570 adjoins the Avon River South. It contains a mix of cleared, parkland cleared and vegetated areas.

Appendix 19 shows the Concept Plan for glamping and RV bays. The concept seeks to retain native vegetation subject to addressing bushfire risks. It is expected this form of nature-based tourism is well suited to visitors on a short term basis. The glamping will provide a point of difference compared to existing accommodation provided locally.

A business case is required, particularly for the glamping, to consider feasibility, preferred tenure and on-going management.

## 3.4 KELLERBERRIN & NARROGIN: PROMOTING POWER SOLUTIONS

Table 3 summarises background, lessons learnt and applicability for other towns and key actions for Kellerberrin and Narrogin relating to promoting power solutions.



## TABLE 3: KELLERBERRIN INDUSTRIAL AREA & NARROGIN RESIDENTIAL INFILL DEVELOPMENT

### Background

- The *Wheatbelt Residential & Industrial Development: Power Infrastructure Delivery Model Options Report* is provided in [Appendix 4](#) and key points are outlined in section 1.3.2. This includes information on the South West Interconnected System (SWIS).
- Significant changes are underway in the energy market, with more expected to come. This includes progressively moving to a lower carbon energy footprint.
- Information on what is a microgrid is outlined in [Appendix 4](#).
- Case studies were prepared for industrial development at Kellerberrin and a residential infill development project (24 Glyde Street, Narrogin). This included opportunities for a microgrid and associated feasibility.
- The Kellerberrin industrial area is shown in [Appendix 21](#).
- Background on 24 Glyde Street is provided in section 3.2.4 and in [Appendix 10](#) and [Appendix 11](#).
- A summary of servicing for Kellerberrin and Narrogin are outlined in [Appendix 6](#).

### Lessons learnt & applicability for other towns

#### Industrial development, Kellerberrin

- The power supply model for the Kellerberrin development is to provide electricity connections for 7 industrial lots. The area covered by these lots is a total of 23.7ha (average lot size of 3.38ha).
- Considered modelling/sizing of several different solar and battery size combinations.
- The development has characteristics which fit the selection criteria for a renewable microgrid power delivery model:
  - Total load greater than 20MWh/day;
  - Predominately daytime load profile;
  - 'Green-titled' lots with relatively close proximity to each other; and
  - Network connection with limited capacity and network upgrades required for a standard power delivery model approach.
- It is possible for a developer to provide a microgrid power delivery model for green title industrial development with a full 200kVA/ha connection. This would bypass the Western Power constraints and costs for network modification that would have been associated with a standard network connection power delivery model and with all of the microgrid development costs borne by the microgrid operators.
- Possible to achieve with commercial owners of the industrial development paying the equivalent of the Synergy L1 business tariff and without any contribution from the developer towards the initial capital investment.
- It is expected that the microgrid operator would achieve a reasonable return on their investment following a 7 year period. The estimated Return on Investment is 14%.
- Assumes a battery energy storage solution would be via a single common 'large' battery servicing all of the lots.
- Invest in innovative power solutions with a lower carbon footprint.
- Implement pilot projects.

#### 24 Glyde Street, Narrogin (infill residential development)

- A concept site plan, floor plans and elevations for 16 dwellings are provided in [Appendix 10](#).
- Considered modelling/sizing of several different solar and battery size combinations.
- It is possible for a developer to provide a renewable energy supply for the strata title development in Narrogin at no additional cost to themselves.
- The microgrid operator would cover upfront costs. It is expected that the microgrid operator would achieve a reasonable return on their investment following a 7 year period. The estimated Return on Investment is 14%.
- The residents to pay the equivalent of the State Government's uniform tariff, on the basis that the return over a 7 year period on the investment for the installation and operation of the solar/battery system, would be sufficient to attract a microgrid operator that could implement this.
- Assumes a battery energy storage solution would be via a single common 'large' battery servicing all 16 dwellings on the strata title.
- Invest in innovative power solutions with a lower carbon footprint.
- Implement pilot projects.

### Key actions for Kellerberrin & Narrogin

#### Industrial estate development, Kellerberrin

- Liaise with the WAPC relating to the wording of subdivision conditions and the clearing entity relating to power supply.
- Consider and progress opportunities for a microgrid model.

#### 24 Glyde Street, Narrogin (infill residential development)

- Refer to relevant actions in section 3.2.1.
- Liaise with the WAPC relating to the wording of subdivision conditions and the clearing entity relating to power supply.
- Consider and progress opportunities for a microgrid model.
- Lodge a RDAP application or headworks assistance application.



**PART**

**4**

**APPENDICES**

# APPENDIX 1



# REGIONAL HOUSING & LAND ACTIVATION TOOLBOX

June 2023



## REGIONAL HOUSING & LAND ACTIVATION TOOLBOX

### 1.0 HIGH-LEVEL THEMES

Strategic Focus Area & Intervention Approach		Priority Action	Lead Entity	Timeframe for Action & Key Steps
<ul style="list-style-type: none"> <li>Governance</li> <li>Planning</li> <li>Advocacy</li> <li>Investment Attraction</li> </ul>	1.1	Seek a regionally coordinated approach to securing investment required for implementation. Support the Wheatbelt Development Commission undertaking region-wide infrastructure planning and contributing to the State Infrastructure Strategy process.	Wheatbelt Development Commission (WDC)	Ongoing
	1.2	Promote governance arrangements, including devolving responsibilities and decision making to the regional and local levels, with appropriate funding, resourcing, and accountability arrangements ensure strategic plans are increasingly translated into tangible local outcomes.	WDC, State Government, local government (LG)	Ongoing
	1.3	Challenge the status quo including reviewing policies and regulations that stifle a community's efforts to dream and implement new ideas.	WDC, LG	Ongoing
	1.4	Note that no single organisation is able to kick-start economic development on its own. Promoting and facilitating development will take substantial, energised, and proactive effort. A shared commitment and leadership are required to support the delivery of intended outcomes.	Private sector, State Government, WDC, LG	Ongoing
	1.5	Raise awareness that local governments can apply through DevelopmentWA's Regional Development Assistance Program (RDAP).	WDC, DevelopmentWA	Ongoing
	1.6	Raise awareness of the Wheatbelt and the sub-region to investors and host investment tours to showcase the region.	WDC	Ongoing
	1.7	Tell the world you're open for business and outline business investment opportunities.	LG, private sector	Ongoing
	1.8	Support the development of appropriate and timely social infrastructure, including education, childcare and recreation, to maintain and improve the liveability of the Wheatbelt.	LG	Ongoing
	1.9	Engage with Aboriginal people to support social and economic development and their connection to their culture and country.	Department of Planning, Lands and Heritage (DPLH), WDC, LG	Ongoing
	1.10	Western Power to collaborate with regional communities including the provision of greater renewables into the network and promote solar power on premises and battery storage.	Western Power (WP)	Ongoing

### 2.0 NEAR-TERM ACTIONS: 6-12 MONTHS

Strategic Focus Area & Intervention Approach		Priority Action	Lead Entity	Timeframe for Action & Key Steps
<ul style="list-style-type: none"> <li>Planning</li> <li>Land Activation</li> <li>Housing Supply</li> <li>Investment Attraction</li> <li>Governance</li> </ul>	2.1	Undertake a 'lazy land' audit including reviewing Crown land, Unallocated Crown Land, Shire owned land and Shire managed reserves.	LG	<ul style="list-style-type: none"> <li>6-12 months</li> <li>Land-use/development activity audit for respective Local Government scheme areas.</li> <li>Collaborate with DevelopmentWA regarding RDAP direction and priorities.</li> <li>Complete local and sub-regional market analysis and preliminary feasibility to inform due diligence for targeted projects and investment attraction.</li> </ul>
	2.2	Contact owners of vacant or underutilised properties in locations suitable for development regarding their aspirations, timing or potential to sell. Review opportunities to buy this land rather than create new lots through the subdivision process.	LG	
	2.3	Undertake an audit of existing building stock, consider ways to incentivise re-use and convert/upgrade existing buildings.	LG	
	2.4	Review strategic sites and consider the reasons for a lack of investment.	DevelopmentWA, WDC, LG	
	2.5	Encourage housing infill development and review and seek to address barriers to housing infill.	LG, DPLH, WDC	
	2.6	Review opportunities to develop without subdividing including redevelopment and leasing.	LG, WDC, private sector	
	2.7	Review R-Codes/lot sizes on serviced land with a goal of promoting infill development.	LG	
	2.8	WDC to support local government to apply for funding of 'shovel ready' projects through the RDAP application process.	WDC, DevelopmentWA	
	2.9	Review opportunities for direct marketing to investors and consumers.	WDC, LG	
	2.10	Adopt a 'fix-it-first' approach to asset management and infrastructure spending.	LG	
	2.11	Western Power to review costs and benefits in transmission costs and improving resilience.	WP	
	2.12	Consider energy supply options when the infrastructure system is 'maxed out' and what the trigger is to get the next steps happening. Consider 'bolt on' solutions including microgrids and a generator in a sea container.	WP, WDC, LG, private sector	

### 3.0 MEDIUM-TERM ACTIONS: 1-2 YEARS

Strategic Focus Area & Intervention Approach	Priority Action		Lead Entity	Timeframe for Action & Key Steps
<ul style="list-style-type: none"> <li>Planning</li> <li>Land Activation</li> <li>Housing Supply</li> <li>Investment Attraction</li> <li>Governance</li> <li>Economic Development</li> <li>Regional Infrastructure</li> </ul>	<b>Land Audit, Asset Management and Facilitating Development</b>			
	3.1	Review public land, including public open space, that is no longer required and progress to secure a change of tenure to facilitate housing or related uses.	LG, DPLH	Medium Term 1-2 years
	3.2	Review and revise development standards, zoning, building, and safety codes to encourage adaptive reuse of existing buildings.	LG, DPLH	Medium Term 1-2 years
	3.3	Support co-working spaces including leasing spaces for industrial operations.	LG, private sector	Medium Term 1-2 years
	3.4	Offer existing buildings or land below cost for sale or lease subject to agreed investments occurring within a specified timeframe.	LG, not-for-profit sector	Medium Term 1-2 years
	3.5	Develop and update the Regional Investment Prospectus and take a regionally coordinated, market focused approach to investment prospecting, promotion and implementation.	WDC	Medium Term 1-2 years
	3.6	Review local planning strategies and local planning schemes to support economic development. This includes identifying development investigation areas where development/subdivision is encouraged, and create strategies that direct development into those areas including based on infrastructure availability.	LG, DPLH	Medium Term 1-2 years
	3.7	Review development standards and prepare land use policies to help shape development patterns to assist the community get the type of development it wants in appropriate locations.	LG, DPLH	Medium Term 1-2 years
	3.8	Review opportunities to streamline development and other permitting processes.	LG, DPLH	Medium Term 1-2 years
	3.9	Consider preparing 'visioning' style master plans/structure plans for development to assist in de-risking development sites to entice developers/investors to the Shire.	LG	Medium Term 1-2 years
	3.10	Increase R-Code densities where appropriate, particularly close to the town centres, and where there is infrastructure capacity and there are no heritage, bushfire or other planning considerations.	LG, DPLH	Medium Term 1-2 years
	3.11	Local government to assist applicants fill out permit applications or reduce permit fees to encourage more development in appropriate locations.	LG	Medium Term 1-2 years
	3.12	Promote effective asset management to better utilise existing land, buildings and infrastructure.	LG	Medium Term 1-2 years
	<b>Servicing and Headworks</b>			
	3.13	Prioritise addressing legacy issues from past infrastructure under-investment to facilitate economic and social development.	WDC, servicing agencies	Medium Term 1-2 years
	3.14	Incorporate servicing assessments and probable costs to inform the review and selection of preferred development sites.	LG	Medium Term 1-2 years
	3.15	Review standard headworks charges in the regions. Consider whether a different approach to headworks charges in the Wheatbelt/designated areas is required compared to the metropolitan region.	State Government, WDC	Medium Term 1-2 years
	3.16	Review current and future infrastructure capacity.	LG, WDC, private sector	Medium Term 1-2 years
	3.17	Review the appropriateness of developer contributions.	DPLH, LG	Medium Term 1-2 years
	3.18	Undertake an inventory of existing wastewater infrastructure, determine whether planned growth can be accommodated and update this inventory regularly.	WC, LG	Medium Term 1-2 years
	3.19	Promote lots and development within townsites or which adjoin existing reticulated mains where there is capacity to facilitate development.	LG, DPLH, WDC	Medium Term 1-2 years
	3.20	Consider reducing servicing requirements including water pressure or flow rates to enable development to proceed.	Water Corporation (WC), DPLH, LG	Medium Term 1-2 years
	3.21	Water supply: review local water resources and opportunities to supply on-site or a hybrid of on-site plus connection to the reticulated water supply.	WC, DPLH, LG	Medium Term 1-2 years
	3.22	Review site context and characteristics including the location of environmental assets such as watercourses and address nutrient loads in sewage sensitive areas.	LG, DPLH, private sector	Medium Term 1-2 years
	3.23	Review opportunities to use water effectively. Where possible, adopt water-sensitive design, including grey water and storm water capture into new developments.	LG, private sector	Medium Term 1-2 years
	3.24	Review regulatory standards for planning and housing specifications that mandate water efficiency (grey water, rainwater capture, water sensitive planting).	LG, DPLH	Medium Term 1-2 years
	3.25	Review and extend community service obligations for Western Power and Water Corporation.	State Government, WDC, WP, WC	Medium Term 1-2 years

<b>Economic Development</b>			
3.26	Compile a list of Federal and State funding sources and resources.	Commonwealth Government, State Government	Medium Term 1-2 years
3.27	Establish a Wheatbelt Investment Fund or Wheatbelt Housing Fund to provide transformational investment to assist in addressing market failure in the Wheatbelt.	State Government, WDC	Medium Term 1-2 years
3.28	Review, implement and monitor a coordinated approach to lobby and advocate for key regional infrastructure which enables economic growth.	WDC	Medium Term 1-2 years
3.29	Support a coordinated and proactive approach to secure Federal, State and private investment in infrastructure. Sustain a strong and united regional voice to lobby effectively for funds to build critical infrastructure.	WDC	Medium Term 1-2 years
3.30	Identify opportunities to secure National Housing Finance and Investment Corporation funds.	WDC, LG	Medium Term 1-2 years
3.31	Consider tax incentives that promote living, working and investing in the regions including the Wheatbelt. Review the fringe benefits tax exemption for those working close to or within regional towns.	Commonwealth Government, State Government, WDC, LG	Medium Term 1-2 years
<b>Economic Regulation Authority</b>			
3.32	Review how Western Power and the Economic Regulatory Authority address servicing which crosses lot boundaries (freehold and survey-strata) and key governance arrangements to support the changes (including easements and how on-going management/maintenance could be addressed).	Economic Regulation Authority (ERA), WP	Medium Term 1-2 years
3.33	Review opportunities to simplify gaining ERA approval for service providers, including local government authorities, to establish and operate servicing systems.	ERA, State Government	Medium Term 1-2 years
<b>Energy</b>			
3.34	Audit power supplies at a sub-regional and district level. Review latent capacity in the electrical distribution network and review Western Power imposing upgrading costs on a land developer under its 'user pay' principles.	WP, WDC, State Government	Medium Term 1-2 years
3.35	Promote alternative, micro-grid or on-site power solutions. Review and progress towards an efficient, reliable and cost-effective energy supply that promotes investment and growth.	WP, LG, private sector	Medium Term 1-2 years
3.36	Support the installation of a mix of solar, batteries and other energy resources, including community energy, to provide reliable power supply (energy security) and build energy resilient communities.	WP, DevelopmentWA, LG	Medium Term 1-2 years
3.37	Provide education and assist households and businesses with access to clean energy technologies.	WP, LG, WDC	Medium Term 1-2 years
3.38	Identify and cost options for the delivery of power to lots including micro-grid technology.	WP, WDC, private sector	Medium Term 1-2 years
3.39	Explore ways to enhance power for small scale projects through at-source solutions, rather than upgrading poles and wires where there are feasibility, capacity and/or reliability issues.	DevelopmentWA, WDC, private sector	Medium Term 1-2 years
3.40	Review the timing and level of information that Western Power provide in quotes.	WP, State Government, WDC	Medium Term 1-2 years
3.41	Support the Western Australian Planning Commission to extend the exemptions for connection to electricity services as set out in State Planning Policy 2.5 Rural Planning.	Western Australian Planning Commission	Medium Term 1-2 years
3.42	Support the working group, between DPLH and Western Power, to work co-operatively and seek solutions.	DPLH, WP	Medium Term 1-2 years
3.43	Promote demand site management including smart electricity meters.	WP, State Government, private sector	Medium Term 1-2 years
3.44	Review the requirement for street lighting, other than at key intersections, in new subdivisions.	WP, DPLH, LG	Medium Term 1-2 years
3.45	Review Western Power (micro-grids) and the Office of Energy regarding legislative changes regarding supply issues (such as a microgrid supplying more than 5 homes or lots) but also how they regulate tariffs back into the grid.	WP, Office of Energy	Medium Term 1-2 years
<b>Built Form Design/Housing</b>			
3.46	Consider adaptive reuse of buildings including review development standards and building codes.	LG	Medium Term 1-2 years
3.47	Assist in the delivery of diverse and affordable housing for the Wheatbelt region.	LG, DPLH, DevelopmentWA, private sector	Medium Term 1-2 years
3.48	Acknowledge the role of workers' accommodation including workers villages. Preferably locate workers accommodation adjoining townsites to better integrate with town and support existing services and facilities.	LG, DPLH	Medium Term 1-2 years
3.49	Review built form, design, building types and construction options to promote affordability and implementation.	LG, DPLH	Medium Term 1-2 years
3.50	Support pre-fab and modular housing where it addresses the local planning framework.	LG, private sector, not-for-profit sector	Medium Term 1-2 years
3.51	Promote awareness raising of the potential for ancillary development (granny flats) on most residential properties.	LG	Medium Term 1-2 years
3.52	Promote 'tiny' houses.	LG, DPLH	Medium Term

				1-2 years
	3.53	Commission a housing market study. The study to identify what housing types are available and how the Shire and its partners could meet existing and future housing needs.	LG, WDC	Medium Term 1-2 years
	3.54	Promote housing pilot/demonstration housing projects.	WDC, LG, not-for-profit sector, private sector	Medium Term 1-2 years
	3.55	Review opportunities to provide additional social and key worker housing.	State Government, WDC, LG, private sector	Medium Term 1-2 years
	3.56	Review the capacity for local government to fund housing development or to undertake a joint venture (such as the local government contributing the land) to the not-for-profit or private sector.	LG, not-for-profit sector, private sector	Medium Term 1-2 years
	3.57	Seek not-for profit sector investment and management of relevant housing stock.	Not-for-profit sector	Medium Term 1-2 years
	3.58	Review development options, commission servicing reports, undertake development feasibility and prepare a business plan to support subdivision proposals.	WDC, LG, private sector	Medium Term 1-2 years
	3.59	Consider co-operative housing to attract people who are seeking a greater sense of community.	LG, not-for-profit sector	Medium Term 1-2 years
	3.60	Review housing affordability in State/regional and local strategies and seek detailed and specific plans that focus on effective implementation.	DPLH, WDC, LG	Medium Term 1-2 years
	3.61	Consider developing a Wheatbelt Vernacular Design Handbook or similar, to promote sustainability and a sense of place in built form outcomes.	WDC, DPLH, LG	Medium Term 1-2 years
	3.62	Set targets for affordable and social housing to be maintained in the community.	State Government	Medium Term 1-2 years
	3.63	Promote an appropriate mix of housing types to better meet the needs of a diverse population and to contribute to an area's sense of place.	LG, Department of Communities (DoC)	Medium Term 1-2 years
	3.64	Review opportunities to attract a housing contractor to build a number of speculative homes. The attraction for the builder could be the assured market for Government Regional Officer Housing and the Department of Communities houses as well as the potential for other home sales.	Government Regional Officer Housing, DoC	Medium Term 1-2 years
	3.65	Not-for-profits and local government to review the availability and demand for aged units including on a 'lease for life' approach.	Not-for-profit sector, LG	Medium Term 1-2 years
	<b>Short-Stay Accommodation</b>			
	3.66	Promote and facilitate short-stay accommodation in appropriate locations and review the planning frameworks as required.	LG, DPLH	Medium Term 1-2 years
	3.67	Review/audit current short-stay accommodation and facilities including overflow recreation vehicle areas.	LG	Medium Term 1-2 years
	3.68	Consider establishing boutique short term accommodation solutions such as glamping or similar.	LG, private sector	Medium Term 1-2 years
	3.69	Promote recreational vehicle facilities and investing in upgrading and/or expanding caravan parks. Increase their capacity for visitors and accommodating workers.	LG, private sector	Medium Term 1-2 years
	3.70	Support region-wide collaboration to develop a more co-ordinated short-stay market.	WDC	Medium Term 1-2 years
	<b>Industrial Development</b>			
	3.71	Identify and set aside sufficient and suitably located land for industry.	LG, DPLH	Medium Term 1-2 years
	3.72	Review opportunities for the Shire, in partnership with DevelopmentWA, to provide adequately zoned industrial land.	LG, DevelopmentWA	Medium Term 1-2 years
	3.73	Consider leasing industrial sites as an interim step for business start-ups to demonstrate their longer-term commercial viability in the town and to 'fine tune' their potential long-term land needs.	LG, private sector	Medium Term 1-2 years
	3.74	Ensure planning policies for industrial development are commensurate with its role for light industry, general industry or other purposes.	LG, DPLH	Medium Term 1-2 years

## 4.0 LONG-TERM (STRATEGIC) ACTIONS: 3 YEARS +

Strategic Focus Area & Intervention Approach		Priority Action	Lead Entity	Timeframe for Action & Key Steps
<ul style="list-style-type: none"> <li>Planning</li> <li>Land Activation</li> <li>Housing Supply</li> <li>Investment Attraction</li> <li>Governance</li> <li>Economic Development</li> <li>Regional Infrastructure</li> </ul>	<b>Strategic Planning, Governance and Economic Development</b>			
	4.1	Promote governance, planning and engagement frameworks at the strategic rather than project level.	LG, WDC	Longer-Term
	4.2	Review and develop an integrated approach to settlement planning and service provision.	LG, DPLH, servicing agencies	Longer-Term
	4.3	Note the South-West Native Title Settlement offers Aboriginal people land for housing and other uses as part of the settlement package subject to addressing servicing, planning and associated issues. Encourage the Noongar Booja Trust to review Unallocated Crown Land it is allocated through the South West Settlement Package and progressively seek to development appropriate land.	Noongar Booja Trust, DPLH	Longer-Term
	4.4	Review the role of State and local government to facilitate economic development through de-risking strategic investment opportunities. Encourage State and local government to provide the conditions for the private (for-profit) and not-for-profit sectors to invest.	WDC, LG	Longer-Term
	4.5	Adopt a place-based approach given a 'one-size-fits-all' approach throughout the Wheatbelt will not always be applicable.	WDC, LG	Longer-Term
	4.6	The community, private sector, government and not-for-profits to increasingly work together on finding solutions including raising capital.	Private sector, LG, State Government	Longer-Term
	4.7	Strengthen regional investment decisions by introducing a transparent investment prioritisation framework and robust evaluation framework for funding proposals.	WDC	Longer-Term
	4.8	Consider and adapt 'City Deals' in regional areas to bring together the three levels of government, the private sector and community groups to set priorities and direction in the Wheatbelt.	Commonwealth Government, State Government, WDC, LG	Longer-Term
	4.9	Provide site-selection assistance to growing local businesses, new or relocating businesses, to locate in suitable areas. This could include maintaining a regularly updated inventory of available industrial or commercial land and providing investment tours.	LG, WDC	Longer-Term
	4.10	Create spaces for business start-ups.	LG, Private sector	Longer-Term
	4.11	Promote and implement modifications to government policy or changes to operational practice that enhance development.	LG, DPLH	Longer-Term
	4.12	Consider the need for a Parliamentary Enquiry into servicing costs in regional areas and impacts on regional development.	WDC, State Government	Longer-Term
	4.13	Determine which areas are safer over the long term (less or lower risk hazards) to inform land use planning, infrastructure provision and asset management. Integrate with the community's hazard mitigation plan.	LG, DPLH	Longer-Term
	4.14	Promote zoning that is flexible enough to adapt to changing market conditions. In particular, to promote resilience so businesses and communities can weather economic downturns and take advantage of opportunities.	LG, DPLH	Longer-Term
	4.15	Planning frameworks to be strategic, flexible and responsive to changing needs.	LG, DPLH	Longer-Term
	4.16	Designate areas where growth/development makes the most sense and which allows the provision of infrastructure more cost effectively.	LG, DPLH, WPC	Longer-Term
	4.17	Avoid 'leapfrogging' of residential and commercial development into rural areas unless there is clear strategic or economic benefits and it is clear who funds infrastructure upgrades.	LG, DPLH	Longer-Term
	4.18	Facilitate housing in a variety of types, sizes, and price ranges.	LG, DPLH, private sector	Longer-Term
	4.19	Lower Western Australian Planning Commission fees for subdivision applications and review other development application fees in the Wheatbelt.	DPLH, Western Australian Planning Commission, LG	Longer-Term
	4.20	Review opportunities for low-interest loans to construct dwellings for key workers and have long-term lease agreements that will achieve payback over an agreed timeframe.	State Government	Longer-Term
	<b>Servicing</b>			
	4.21	Review the role of government in investing in infrastructure in the Wheatbelt to create sustainable communities including reviewing how areas move towards being increasingly self-sustaining.	State Government, WDC	Longer-Term
	4.22	Coordinate regional advocacy and lobbying efforts regarding highest priority 'hard' and 'soft' infrastructure investment needs.	WDC	Longer-Term
	4.23	Monitor the delivery of the Regional Infrastructure Audit to identify and prioritise hard (physical) and soft (social) infrastructure needs of the Wheatbelt.	WDC, LG	Longer-Term
	4.24	Leverage State and Federal Government initiatives to secure investment required to maintain and upgrade regional infrastructure which facilitates economic growth.	WDC, LG	Longer-Term
	4.25	Review and enhance the tool and data sets used to understand the current and future capacity of infrastructure networks and make better use of existing assets	LG, WDC	Longer-Term
	4.26	Adopt a 'fix it first' policy where a community invests in fixing and maintaining existing infrastructure before it spends money on constructing new infrastructure.	LG	Longer-Term
	4.27	Make efficient use of existing infrastructure when directing growth to designated areas.	Servicing agencies, LG	Longer-Term

4.28	Continue to subsidise regional areas, by the metropolitan region, through headworks and service provision.	State Government	Longer-Term
4.29	Promote education or incentive-based policy tools for energy and water efficiency within the home and businesses.	State Government, servicing agencies	Longer-Term
4.30	Review hybrid sewerage disposal schemes (septic tanks and off-site solutions).	WC, LG, State Government	Longer-Term
<b>Energy</b>			
4.31	Consider lowering the Renewable Energy Target liability threshold which takes a more strategic and integrated approach to renewable energy planning in the Wheatbelt.	State Government	Longer-Term
4.32	Introduce legislation into the federal parliament to mandate community-ownership of regional renewables projects and set up a dedicated Australian Local Power Agency. The Australian Local Power Agency to support regional communities to develop and invest in their own renewable energy projects.	Commonwealth Government	Longer-Term
4.33	Formulate a government plan, across the three levels of government, to promote community-owned energy.	Commonwealth Government, State Government, WDC, LG	Longer-Term
4.34	Encourage Western Power to proactively consider and work with local communities on energy options to increase reliability and expand energy supply.	WP, WDC	Longer-Term
4.35	Review Western Power connection costs and whether increased oversight is required.	State Government	Longer-Term
<b>Economic Regulation Authority</b>			
4.36	Review the energy regulatory frameworks, commercial practices and environmental practices to lower energy costs and lower the carbon footprint.	ERA	Longer-Term
<b>Housing</b>			
4.37	Lobby the Department of Communities to increase its housing stock and commit to a forward capital works/build program.	DoC	Longer-Term
4.38	Support an investment/capital works program by State Government agencies, servicing agencies, local government and other entities to increase the number of key worker, affordable and other forms of housing.	State Government, DoC, WDC, LG	Longer-Term

# APPENDIX 2



## APPENDIX 2 – PLANNING & GOVERNANCE FRAMEWORK

Development in the Wheatbelt is influenced by a range of planning, servicing, economic and governance frameworks at a National, State, regional and local level. Some of these include:

- *State Planning Strategy 2050*
- *Planning and Development Act 2006*
- *Infrastructure Western Australia Act 2019*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *State Planning Policy (SPP) 1 State Planning Framework Policy*
- *SPP 2.0 Environment and Natural Resources Policy*
- *SPP 2.5 Rural Planning*
- *SPP 2.9 Water Resources*
- *SPP 3.0 Urban Growth and Settlement*
- *SPP 3.6 Infrastructure Contributions*
- *SPP 3.7 Planning in Bushfire Prone Areas*
- *SPP 7.0 Design of the Built Environment*
- *SPP 7.3 Residential Design Codes*
- *Foundations for a Stronger Tomorrow - State Infrastructure Strategy*
- *Government Sewerage Policy*
- *EPA Guidance Statements*
- *Guidelines for Planning in Bushfire Prone Areas*
- *Stormwater Management Manual*
- *Better Urban Water Management*
- *WAPC development control policies (including residential subdivision and industrial subdivision) and position statements (including workforce accommodation)*
- *Wheatbelt Regional Plan, Regional Development Australia*
- *Wheatbelt Regional Planning and Infrastructure Framework*
- *Wheatbelt Regional Blueprint*
- *Sub-regional economic strategies*
- *Local planning strategies and local planning schemes*
- *Local government strategic community plans*
- *Local structure plans*
- *Local planning policies*

# APPENDIX 3





# **WHEATBELT DEVELOPMENT CONSTRAINTS DEVELOPMENT COST MODEL**

PREPARED FOR DEVELOPMENTWA

**REPORT PREPARED FOR**  
**DEVELOPMENTWA**  
**c/o EDGE PLANNING & PROPERTY**

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## 1.0 INTRODUCTION

DevelopmentWA (DevWA) and the Wheatbelt Development Commission (WDC) are seeking information that would assist and guide them to understand, identify constraints and opportunities for possible industrial and residential developments in the Wheatbelt region of Western Australia.

This Development Cost Model report presents a number of typical development scenarios and their respective development costs in the Wheatbelt. This Development Cost Model is expected to form part of a 'toolbox' that will present potential options to assist local governments, agencies and other stakeholders to make informed decisions to welcome new investments into the communities.

### 1.1 Background

Most towns in the Wheatbelt have for decades experienced population stagnation or decline. In recent years, various Wheatbelt towns have experienced economic development and resulting demand for housing, additional industrial land and pressures to extend/upgrade infrastructure. Some towns are again growing with short term (often resource based projects) and/or permanent population. Providing essential services for communities and fit-for-purpose accommodation is essential to the social and economic fabric of those towns and for retaining key public sector workers, visiting specialists, trades, and labourers. Land assembly, housing solutions, and pricing continue to be impediments to population growth and new economic activity (or growth in existing activity) can further exacerbate the issues.

The Wheatbelt region has had difficulty attracting urban investment to the towns due to most services currently running at or near capacity and prohibitive costs being incurred to expand or upgrade those services. The local governments and the WDC are facing issues that arise from potential private sector decision-making in the region; have immediate impacts on regional communities, and often leave lasting legacies due to the inability of stakeholders to put in place more permanent solutions.

## 2.0 DEVELOPMENT SCENARIOS

Industrial and residential developments within the Wheatbelt region do tend to have similar issues and constraints. Therefore, three typical development scenarios have been considered to inform the baseline development cost:

- i. New industrial lots;
- ii. New residential lots within a brownfields setting; and
- iii. New residential lots within a greenfields setting.

### 3.0 INDUSTRIAL DEVELOPMENT SCENARIO

New industrial developments in the Wheatbelt region tend to typically up to a 20 lot yield development that could occur over one or multiple stages, with lot sizes typically ranging from 2,000m<sup>2</sup> to around 20,000m<sup>2</sup> (2.0 hectares).

New industrial developments tend to be extensions of the town's existing industrial area, which would have appropriate road access to the industrial area. However, the new industrial development would typically require an extension of the road network and services to front the new lots.

To inform the cost model the following assumptions have been applied which are typical of industrial developments in the Wheatbelt:

#### 3.1 Lot Arrangement

For the purpose of an industrial development cost model, **Figure 1** illustrates a typical industrial layout to inform the indicative development costs, which is for a proposed industrial development in Narembeen.



**Figure 1: Indicative layout of an industrial development in the Wheatbelt region (16 lots + 1 drainage lot)**

#### 3.2 Earthworks

Industrial developments in regional towns tend to occur in areas where the topography is generally flat or favourable gradients across the site. Often the development occurs on former agricultural land which has already been cleared of significant vegetation. Therefore, minimal clearing, site preparation, and earthworks would be expected.

However, should development occur in areas of steep, vegetation, and rocky areas, additional costs would be expected.

### **3.3 Electrical Servicing**

The industrial development will be serviced with electricity as an extension of the existing surrounding network. Available spare capacity within the electrical network of regional towns can vary greatly, an industrial development of up to 10 lots would not typically trigger a need to upgrade the zone network.

For the purpose of this cost model, three transformers and one switchgear is expected to be required to support a 16 lot industrial development, along with street lighting for the road network. Each lot would be provided with a low voltage supply.

Separately, alternative electrical solutions such as solar/renewable off-grid systems are being reviewed, but in the short-term developments are required to connect to the Western Power's integrated south-west grid and therefore, a standard power solution is required at present.

### **3.4 Communication Servicing**

Regional towns in the Wheatbelt area are serviced with NBN services either by fibre to the node/kerb, fixed wireless (data transmitted radio signal from a nearby tower), or a satellite service (Sky Muster satellite service).

If the new development is to be serviced with fibre to the node/kerb then an NBN pit and pipes would be reticulated throughout the development as an extension of the surrounding NBN network without the need for a long backhaul to a suitable connection point.

If the development is to be serviced by fixed wireless or a satellite service, then no in-ground communication infrastructure will be required. We expect this is the most likely communication delivery method for new industrial developments.

For the cost model, it is assumed fibre to the kerb will be deployed with communication pit and pipes reticulated throughout. Even in the event satellite services are provided, the cost to install communication pit and pipe infrastructure is relatively low and would be installed for possible future fibre connections.

### **3.5 Gas Servicing**

Reticulated gas is typically unavailable in regional towns located in the Wheatbelt region. Therefore, no allowance has been made for a gas supply.

### **3.6 Water Servicing**

A 150mm diameter water main will be reticulated throughout the development.

### **3.7 Water Main Extensions / Upgrades**

For some industrial developments, it may be necessary to install a water mains extension from the proposed development to a suitable connection point to support. For the purpose of the cost modelling, it is assumed that a 250m long water mains extension to a suitable connection point will be required to support the reticulation of water mains throughout the development.

### 3.8 Wastewater Servicing

Typically, regional industrial areas are not serviced with scheme reticulated sewers due to concerns of potential industrial trade waste entering the sewers and disrupting the biological processes at the wastewater treatment plan. Therefore, industrial lots often utilise onsite wastewater treatment systems (i.e. Aerobic Treatment Units) and effluent disposal systems (i.e. leach drains) which would be installed as part of the built-form works to the respective lot. Hence, the cost model does not include reticulated sewers.

### 3.9 Roads

WAPC policy<sup>1</sup> for industrial subdivisions notes that 10m wide sealed carriageway pavements are favourable, however, it is common practice for regional local governments to accept narrower carriageways to a minimum width of 7.4m with typical widths of 8m. Some industrial developments require a higher level of service to suit Restricted Access Vehicles which typically cater for long road trains, however, instances of such requirements tend to be rare within the Wheatbelt. Therefore, for the cost model, an 8m sealed carriageway pavement with 1m unsealed shoulders has been assumed.

A typical industrial pavement profile of a 200mm subbase and 150mm thick base course with primer seal and 40mm asphalt has been assumed.

In general terms, industrial developments in regional towns have unkerbed carriageways, however, some developments do utilise kerbing. An unkerbed carriageway without a footpath has been assumed.

### 3.10 Stormwater Drainage

Industrial developments in regional towns often have unkerbed roads with stormwater drainage typically conveyed by roadside swales to a downstream drainage structure usually in the form of a basin or some form of detention structure.

### 3.11 Fencing

No allowance has been made for the installation of fencing to the lot as this is typically installed as part of the built-form of the lot.

### 3.12 Landscaping

No allowance has been made for estate landscaping to verges as industrial developments in regional towns often do not have landscaping applied to the development.

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<sup>1</sup> WA.org.au, *Development control policy 4.1 - Industrial subdivision*, viewed 23 March 2022, <  
<https://www.wa.gov.au/government/publications/development-control-policy-41-industrial-subdivision>>

## 4.0 INDUSTRIAL DEVELOPMENT INDICATIVE COSTS

The cost model for an indicative industrial development within the Wheatbelt region is presented in **Table 1** with a more detailed summary included in **Attachment 1** based on the noted assumptions. Actual costs will be based on constraints for each individual site at the time of development.

Due to the indicative nature of the development and cost model, a 20% construction contingency and 10% administrative contingency (ie, fees and charges) have been applied.

**Table 1: Cost Model for an Indicative Industrial Development**

Typical Industrial Development (16 lots)	Development Costs (Wheatbelt area)
Construction Costs	\$1,600,500
Development fees and charges	\$362,720
<b>Sub total</b>	\$1,963,220
GST	\$196,322
<b>Total costs</b>	\$2,159,542
<i>Cost per lot</i>	<i>\$134,971</i>

## 5.0 RESIDENTIAL DEVELOPMENT WITHIN BROWNFIELDS SETTING

Brownfields residential developments within a Wheatbelt townsite tend to have low lot yields (up to 10 lots) that would typically front an existing road, with lots typically in the order of 750m<sup>2</sup> to 1,000m<sup>2</sup> in area.

To inform the cost model of a residential development within a brownfield setting the following assumptions have been applied:

### 5.1 Lot Arrangement

Although residential lots within the Wheatbelt typically are 1,000m<sup>2</sup> in area, the cost model could be applicable for lots within the 750m<sup>2</sup>-1,200m<sup>2</sup> size, with the development likely to be fronted by an existing road and some utility services.

For the purpose of a cost model for a brownfields residential development, **Figure 2** illustrates a nominal layout to inform the indicative development costs.



**Figure 2: Indicative layout of a brownfields residential development in the Wheatbelt region (7 lots shown in purple)**

### 5.2 Earthworks

Due to the generally flat terrain of Wheatbelt towns, extensive earthworks would not be expected. However, clearing and levelling earthworks are likely to be required.

### 5.3 Electrical Servicing

Although the existing road fronting the development is likely to have existing overhead power lines, it has been assumed that lots will be supplied with an underground supply.

---

## **5.4 Communication Servicing**

Regional towns in the Wheatbelt area are typically serviced with NBN services either by fibre to the node, fixed wireless (data transmitted radio signal from a nearby tower), or a satellite service (Sky Muster satellite service).

For the cost model, it is assumed fibre to the kerb will be deployed with communication pit and pipes reticulated throughout. Even in the event satellite services are provided, the cost to install communication pit and pipe infrastructure is relatively low and would be installed for possible future fibre connections.

## **5.5 Gas Servicing**

Reticulated gas is typically unavailable in regional towns located in the Wheatbelt region. Therefore, no allowance has been made for a gas supply.

## **5.6 Water Servicing**

It is assumed that an existing water main is within 50m of the proposed development.

## **5.7 Water Main Extension / Upgrades**

As brownfields residential developments often have a low lot yield, these additional lots do not warrant upgrades to existing water infrastructure. However, liaison with the Water Corporation or licenced water supplier to the town would be required to confirm any upgrade requirements and water supply constraints.

## **5.8 Wastewater Servicing**

A brownfields residential development of a low lot yield unlikely to warrant upgrades to the existing wastewater infrastructure. However, liaison with the Water Corporation or licenced wastewater operator to the town would be required to confirm any upgrade requirements and supply constraints.

Note: Some regional towns have a Shire-owned and operated wastewater scheme in lieu of a Water Corporation scheme.

If the site is not serviced by a scheme wastewater system, then each individual home will manage and dispose of the wastewater by use of an onsite ATU or septic system which would be installed as part of the built-form works when the home is built.

For the purpose of this cost model, it has been assumed that there are existing scheme sewers immediately abutting the brownfields development site to readily service the development, with only needing sewers to be reticulated among the new lots.

## **5.9 Roads**

The Local Government authority should be contacted to confirm if any road upgrades are expected.

It is assumed that the existing road fronting the development is an existing rural unkerbed road which will be upgraded to a typical 6m wide urban standard of new kerb and footpaths, drainage pits, and pipe.

It is assumed that the existing road pavement is in sound condition to not warrant reconstruction or resealing of the pavement.

## **5.10 Stormwater Drainage**

It is expected that as part of the roadworks upgrade that pit and pipe drainage will be installed. On occasions, installation of lot drainage or lot swales may be required for lot drainage. As this is not always required it has not been included within the base cost.

### **5.11 Fencing**

No allowance has been for the installation of fencing to the lot as this is typically installed as part of the built-form when the home is built.

### **5.12 Landscaping**

For small residential developments, landscaping of the road reserve does not typically occur.

## 6.0 BROWNFIELDS RESIDENTIAL DEVELOPMENT INDICATIVE COSTS

The cost model for an indicative brownfields development within the Wheatbelt region is presented in **Table 2** with a more detailed summary included in **Attachment 2** based on the noted assumptions for a 7 lot development. Actual costs will be based on constraints for each individual site at the time of development.

Due to the indicative nature of the development and cost model, a 20% construction contingency and 10% administrative contingency (ie, fees and charges) have been applied.

**Table 2: Cost Model for an Indicative Brownfields Residential Development**

Typical Brownfields Residential Development (7 lots)	Development Costs (Wheatbelt area)
Construction Costs	\$550,250
Development fees and charges	\$130,960
<b>Sub total</b>	\$681,210
GST	\$68,121
<b>Total costs</b>	\$749,331
<i>Cost per lot</i>	<i>\$107,047</i>

## 7.0 RESIDENTIAL DEVELOPMENT WITHIN GREENFIELDS SETTING

Greenfields residential developments within a Wheatbelt townsite often have a lot yield of up to 30 lots, with lots typically in the order of 1,000m<sup>2</sup> in area as an extension of the development front for the town.

To inform the cost model of a residential development within a greenfields setting in a Wheatbelt town, the following assumptions have been applied:

### 7.1 Lot Arrangement

Although residential lots within the Wheatbelt typically are 1,000m<sup>2</sup> in area, the cost model could be applicable for lots within the 750-1,200m<sup>2</sup> size.

For the purpose of a cost model for a greenfields residential development,

**Figure 3** illustrates a nominal stage with a 15 lot yield which is part of a larger future development.



**Figure 3: Indicative layout of a greenfields residential development in the Wheatbelt region (15 lots shown in purple)**

## **7.2 Earthworks**

Due to the generally flat terrain of Wheatbelt towns extensive earthworks would not be expected however some levelling earthworks would likely be required. As the development is to occur within greenfields setting clearing of vegetation from the lots, along with clearing the surrounding area to reduce the Bushfire Attack Level (BAL) to an acceptable level (typically BAL12.5 to BAL29) would be expected.

If sand building pads are required for the home, the pads would typically be installed as part of the built-form works to suit the general footprint of the house. If the sand pad was to be included as part of the subdivisional works, this can add significant cost to the development and should be assessed on a case-by-case basis, in conjunction with site conditions, drainage, and wastewater servicing requirements.

Due to the generally flat terrain of Wheatbelt towns extensive earthworks would not be expected but some levelling earthworks would likely be required.

## **7.3 Electrical Servicing**

Underground power will be reticulated throughout the development. Depending on the site specific conditions for respective developments, there may be a need to extend a high voltage feeder from an existing nearby transformer to the development site. Therefore, for the purpose of this cost model, it has been assumed that a 300m long HV feeder cable extension is required from a nearby transformer to the site.

It is expected that one transformer and switchgear will be required.

## **7.4 Communication Servicing**

Regional towns in the Wheatbelt area are typically serviced with NBN services either by fibre to the node, fixed wireless (data transmitted radio signal from a nearby tower), or a satellite service (Sky Muster satellite service).

For the cost model, it is assumed fibre to the kerb will be deployed with communication pit and pipes reticulated throughout. Even in the event satellite services are provided, the cost to install communication pit and pipe infrastructure is relatively low and would be installed for possible future fibre connections.

## **7.5 Gas Servicing**

Reticulated gas is typically unavailable in regional towns located in the Wheatbelt region. Therefore, no allowance has been made for a gas supply.

## **7.6 Water Servicing**

A 100mm diameter water main will be expected to be reticulated throughout the development.

## **7.7 Water Main Extension / Upgrades**

As some regional towns do have water supply constraints, contact should be made with the Water Corporation or licensed water supplier to confirm the water servicing requirements, as the servicing requirements can be highly variable.

For the purpose of this cost model, we have assumed a 100mm water main extension is required for a 200m length to reach the development site with reticulation mains throughout.

## **7.8 Wastewater Servicing**

Liaison with the Water Corporation or licenced wastewater operator to the town would be required to confirm any wastewater upgrade requirements and supply constraints.

If the site is not serviced by a scheme wastewater system, then each individual home will manage and dispose of the wastewater by an onsite in accordance with Government Sewerage Policy (Schedule 2). Subject to a land capability assessment for onsite wastewater disposal, lots greater than 1000m<sup>2</sup> may be able to dispose of wastewater onsite via use of an appropriate treatment unit (i.e. ATU or septic system) which would be installed as part of built-form works when the home is constructed.

For the purpose of this cost model, it has been assumed that a 200m mains extension of scheme wastewater reticulation will be required to reach the greenfields development and the sewers reticulated throughout.

No allowance has been made for digging in rock, dewatering, or acid sulphate soils management. An assessment will need to be made on a site by site basis to determine if additional cost allowances should be made.

## **7.9 Roads**

Allowance has been made for a sealed 6.0m wide kerbed urban standard road with a 2.0m wide footpath with pit and pipe drainage, which is the current urban road standard. Older roads in Wheatbelt towns may have wider road widths (i.e. 7.4m wide)

## **7.10 Stormwater Drainage**

It is expected that as part of the roadworks that pit and pipe drainage will be installed to convey stormwater to a proposed drainage basin.

## **7.11 Fencing**

No allowance has been made for the installation of fencing to the lot as this is typically installed as part of built-form works when the home is constructed.

## **7.12 Landscaping**

No allowance for Public Open Space landscaping has been made on the basis that the development is being undertaken by the Shire or in association with the Shire, with alternative Public Open Space being provided elsewhere in the townsite.

## 8.0 GREENFIELDS RESIDENTIAL DEVELOPMENT INDICATIVE COSTS

The cost model for an indicative greenfields development within the Wheatbelt region is presented in **Table 3** with a more detailed summary included in **Attachment 3** based on the noted assumptions. The costs represent a typical baseline cost for a residential stage development of 15 lots. Actual costs will be based on constraints for each individual site at the time of development.

Due to the indicative nature of the development and cost model, a 20% construction contingency and 10% administrative contingency (ie, fees and charges) have been applied.

**Table 3: Cost Model for an Indicative Greensfield Residential Development**

Typical Greenfields Residential Development (15 lots)	Development Costs (Wheatbelt area)
Construction Costs	\$1,265,250
Development fees and charges	\$269,490
<b>Sub total</b>	\$1,534,740
GST	\$149,138
<b>Total costs</b>	\$1,683,878
<i>Cost per lot</i>	<i>\$112,259</i>

## 9.0 CONCLUSION

Actual development costs can vary significantly and are subject to site-specific constraints which should be assessed on a site by site basis. However, the noted development cost model is intended to provide a baseline cost model as a probable minimum development cost for industrial and residential brownfields and greenfields developments within the Wheatbelt region.

Many factors influence the development costs, and consideration should be had to the following:

- i. The construction and development sectors in 2022 are currently experiencing a high workload tempo along with supply and resourcing constraints further exacerbated by COVID-19 related issues resulting in pricing volatility from construction contractors.
- ii. Smaller developments or stage yields will increase the cost per lot for the development.
- iii. Where a common road abuts an adjoining developer or landowner, the development may be subject to a Section 159 (Planning and Development Act 2005) claim and costs to share costs for the construction of the common abutting road.
- iv. The development may be within a Developer Contribution Scheme area, whereby the Developer is required to provide a cost contribution towards community infrastructure (ie, significant roads, schools, or community infrastructure such as libraries). However, such schemes are not common in the Wheatbelt area.

## **APPENDIX A - Industrial Development Cost model (T050.22)**

---

**Project** Typical Industrial Development in Wheatbelt  
**Option** 16 lot development  
**Number of Lots** 16  
**Client** Edge Planning & Property  
**Engineer** Michael Cook  
**Job Number** 21-09-135  
**Date** 30 March 2022  
**File Name** T050.20  
**Revision** A  
**Reference Document** R010.22 - Industrial development cost option



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INDICATIVE DEVELOPMENT COSTS - INDUSTRIAL DEVELOPMENT		
CONSTRUCTION COSTS	TOTAL COST ex Perth	TOTAL COST ex Wheatbelt Regional Indices of 1.25
Preliminaries	\$ 112,000	\$ 140,000
Earthworks and Siteworks	\$ 92,600	\$ 115,750
Water Reticulation	\$ 45,200	\$ 56,500
Water extension / upgrade (250m)	\$ 51,700	\$ 64,625
Drainage	\$ 29,500	\$ 36,875
Roads and Paths	\$ 316,800	\$ 396,000
Fencing	\$ 6,600	\$ 8,250
Underground Power	\$ 386,400	\$ 483,000
Communications	\$ 25,600	\$ 32,000
Landscaping	\$ -	\$ -
Construction Contingency (20% of construction)	\$ 214,000	\$ 267,500
		\$ -
<b>CONSTRUCTION TOTAL</b>	<b>\$ 1,280,400</b>	<b>\$ 1,600,500</b>
DEVELOPMENT FEES AND CHARGES	TOTAL COST	TOTAL COST
Water Corporation Standard Sewer Infrastructure Contribution	\$ -	\$ -
Water Corporation Standard Water Infrastructure Contribution	\$ 40,920	\$ 40,920
Water Corporation Standard Drainage Infrastructure Contribution	\$ -	\$ -
Local Authority Fees	\$ 5,600	\$ 5,600
Water Corporation Fees	\$ 28,500	\$ 28,500
Western Power Fees	\$ 78,100	\$ 78,100
Communications Headworks and Backhaul Charges	\$ 9,600	\$ 9,600
WAPC and Landgate Fees	\$ 7,000	\$ 7,000
Professional Fees	\$ 160,000	\$ 160,000
Developer Contribution Scheme	\$ -	\$ -
Cost Sharing for Common Infrastructure (Section 159 of the Planning Act)	\$ -	\$ -
Administration Contingency (10% of fees/charges)	\$ 33,000	\$ 33,000
<b>DEVELOPMENT FEES AND CHARGES TOTAL</b>	<b>\$ 362,720</b>	<b>\$ 362,720</b>
<b>SUB TOTAL COSTS</b>	<b>\$ 1,643,120</b>	<b>\$ 1,963,220</b>
<b>GST</b>	<b>\$ 160,220</b>	<b>\$ 196,322</b>
<b>TOTAL COSTS</b>	<b>\$ 1,803,340</b>	<b>\$ 2,159,542</b>
<b>COST PER LOT (including GST)</b>	<b>\$ 112,709</b>	<b>\$ 134,971</b>

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.

## **APPENDIX B - Brownfields Residential Cost Model (T053.22)**

---

**Project** Wheatbelt Development Constraints-Cost model  
**Option** Development of 7 brownfield lots in a typical wheatbelt town  
**Number of Lots** 7  
**Client** Edge Planning & Property  
**Engineer** Michael Cook  
**Job Number** 21-09-135  
**Date** 4 April 2022  
**File Name** T053.22  
**Revision** A  
**Reference Document** R010.22



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INDICATIVE DEVELOPMENT COSTS - RESIDENTIAL BROWNFIELDS DEVELOPMENT		
CONSTRUCTION COSTS	TOTAL COST (ex Perth)	TOTAL COST ex Wheatbelt town Regional indices x 1.25
Preliminaries	\$ 41,500	\$ 51,875
Siteworks	\$ 26,500	\$ 33,125
Earthworks	\$ 104,400	\$ 130,500
Retaining Walls	\$ 48,400	\$ 60,500
Sewer Reticulation	\$ 30,300	\$ 37,875
Water Reticulation	\$ 16,900	\$ 21,125
Drainage	\$ 23,000	\$ 28,750
Roads	\$ 20,100	\$ 25,125
Underground Power	\$ 43,900	\$ 54,875
Construction Contingency (20% of construction)	\$ 74,000	\$ 92,500
<b>CONSTRUCTION TOTAL</b>	<b>\$ 440,200</b>	<b>\$ 550,250</b>
DEVELOPMENT FEES AND CHARGES	TOTAL COST	TOTAL COST
Water Corporation Standard Sewer Infrastructure Contribution	\$ 21,770	\$ 21,770
Water Corporation Standard Water Infrastructure Contribution	\$ 17,290	\$ 17,290
Water Corporation Standard Drainage Infrastructure Contribution	\$ -	\$ -
Local Authority Fees	\$ 1,100	\$ 1,100
Water Corporation Fees	\$ 5,800	\$ 5,800
Western Power Fees	\$ 10,500	\$ 10,500
Communications Headworks and Backhaul Charges	\$ 4,200	\$ 4,200
WAPC and Landgate Fees	\$ 5,300	\$ 5,300
Professional Fees (15%)	\$ 55,000	\$ 55,000
Administration Contingency (7.5% of fees/charges)	\$ 10,000	\$ 10,000
<b>DEVELOPMENT FEES AND CHARGES TOTAL</b>	<b>\$ 130,960</b>	<b>\$ 130,960</b>
<b>SUB TOTAL COSTS</b>	<b>\$ 571,160</b>	<b>\$ 681,210</b>
<b>GST</b>	<b>\$ 57,116</b>	<b>\$ 68,121</b>
<b>TOTAL COSTS</b>	<b>\$ 628,276</b>	<b>\$ 749,331</b>
<b>COST PER LOT (including GST)</b>	<b>\$ 89,754</b>	<b>\$ 107,047</b>

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.

## **APPENDIX C - Greenfields Residential Cost Model (T054.22)**

---

**Project** Wheatbelt Development-Cost model  
**Option** 15 lot Greenfields residential development  
**Number of Lots** 15  
**Client** Edge Planning & Property  
**Engineer** Michael Cook  
**Job Number** 21-09-135  
**Date** 6 April 2022  
**File Name** T054.22  
**Revision** A  
**Reference Document** R01.22



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INDICATIVE DEVELOPMENT COSTS - RESIDENTIAL GREENFIELD DEVELOPMENT		
CONSTRUCTION COSTS	TOTAL COST (ex Perth)	TOTAL COST (ex Wheatbelt town with Regional Index of 1.25)
Preliminaries	\$ 106,000	\$ 132,500
Clearing for lots	\$ 20,200	\$ 25,250
Earthworks	\$ 89,500	\$ 111,875
Sewer Reticulation	\$ 96,000	\$ 120,000
Water Reticulation	\$ 42,900	\$ 53,625
Drainage	\$ 31,000	\$ 38,750
Roads and Paths	\$ 93,600	\$ 117,000
Fencing	\$ -	\$ -
Clearing for BAL rating and firebreaks	\$ 110,700	\$ 138,375
Underground Power	\$ 229,300	\$ 286,625
Communications	\$ 24,000	\$ 30,000
Landscaping	\$ -	\$ -
Construction Contingency (20% of construction)	\$ 169,000	\$ 211,250
		\$ -
<b>CONSTRUCTION TOTAL</b>	<b>\$ 1,012,200</b>	<b>\$ 1,265,250</b>
DEVELOPMENT FEES AND CHARGES	TOTAL COST	TOTAL COST
Water Corporation Standard Sewer Infrastructure Contribution	\$ 50,235	\$ 50,235
Water Corporation Standard Water Infrastructure Contribution	\$ 38,355	\$ 38,355
Local Authority Fees	\$ -	\$ -
Water Corporation Fees	\$ 3,200	\$ 3,200
Western Power Fees	\$ 52,500	\$ 52,500
Communications Headworks	\$ 9,000	\$ 9,000
WAPC and Landgate Fees	\$ 6,800	\$ 6,800
Professional Fees 9(10%)	\$ 84,400	\$ 84,400
Administration Contingency (10% of fees/charges)	\$ 25,000	\$ 25,000
<b>DEVELOPMENT FEES AND CHARGES TOTAL</b>	<b>\$ 269,490</b>	<b>\$ 269,490</b>
<b>SUB TOTAL COSTS</b>	<b>\$ 1,281,690</b>	<b>\$ 1,534,740</b>
<b>GST</b>	<b>\$ 119,310</b>	<b>\$ 149,138</b>
<b>TOTAL COSTS</b>	<b>\$ 1,401,000</b>	<b>\$ 1,683,878</b>
<b>COST PER LOT (including GST)</b>	<b>\$ 93,400</b>	<b>\$ 112,259</b>

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.



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# APPENDIX 4



# Wheatbelt Residential & Industrial Development: Power Infrastructure Delivery Model Options Report

Document Version 4.0\_FINAL

Dated: 26/05/2023



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Attachment - Delivery Model Decision Tree

#### Disclaimer

Sunrise Energy Group recommends that solutions addressing energy requirements should be assessed on their own merit, accounting for the conditions specific to the particular case.

Sunrise Energy accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this document by any third party.

## 1. Introduction

This report has been prepared by Underground Power Development (UPD) with the assistance of Sunrise Energy Group (Sunrise) for DevelopmentWA and the Wheatbelt Development Commission (WDC). The purpose of the report is to provide analysis of the economic, technical, regulatory, and environmental benefits of power infrastructure delivery models for industrial and residential developments. The analysis of the delivery models is specifically focussed on possible industrial and residential developments in the Wheatbelt region of Western Australia (WA).

The following six (6) power infrastructure delivery models have been explained and analysed based on appropriateness for potential developments in the WA Wheatbelt region.

- Standard Network Delivery Model
- Reduced Power Delivery Model
- Microgrid Delivery Model
- Strata Title / Community Title Delivery Model
- Off-Grid Microgrid Delivery Model (multiple consumers)
- Stand-alone Power System Delivery Model (single consumer)

Attached at the end of the report is a delivery model decision tree to aid in the selection of the most appropriate model for the development under consideration.

## 2. Background

To help understand and put into context the power infrastructure delivery models, the following sections of this report provide information on the SWIS electricity grid and an overview of power generation in the SWIS. As alluded to in the following sections, significant changes are underway in the energy market, and with more expected to come.

It is important to understand the current and expected power generation in the future so that when considering an electricity delivery model for Wheatbelt developments, an appropriate model can be selected. Selection criteria will depend on things such as the size of the grid connection required, the proximity to a connection point, the expected load profile and load density (kVA/ha) of the proposed development and the connection density (ie. the proximity of individual connection points to each other within a development).

### 2.1 Western Australian Planning Commission (WAPC)

Electricity delivery models for subdivisions will require approval by the WAPC and any conditions they set as part of the development process.

### 2.2 Overview of Power Generation in the South West Interconnected System (SWIS)

Power generation in the SWIS is currently made up of coal and gas fired generation, residential rooftop solar photovoltaics (PV) (which is Distributed PV), wind, Utility PV (which is solar farms) and other (landfill gas etc).

As illustrated in figure 2.2-1, in the last twelve (12) months as of February 2023, gas and coal fired power stations provided the highest portion of generation, closely followed by wind and Distributed PV.

Although coal is currently providing just over a quarter of the required generation for the SWIS electricity grid, the Government of WA has issued media statements to advise it plans to retire all coal fired generators by 2029. This is an effort to reduce carbon emissions and achieve the WA Governments goal of eighty (80) percent reduction of carbon emissions by 2030. Therefore, over the next seven years there will be a total capacity of 1,628 MW of coal fired power generation removed from the grid. This means gas fired generators and renewables will need to provide most of the power for the State's electricity grid.

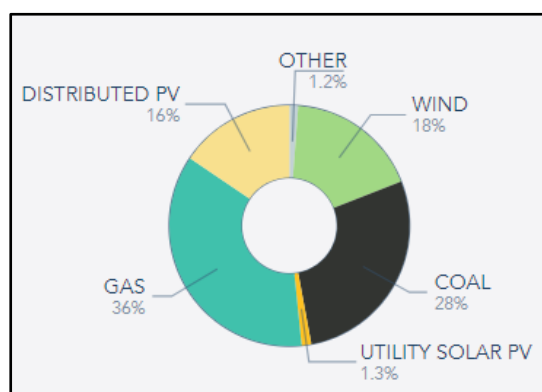


Figure 2-2-1: Extract from the AEMO Website showing the fuel mix over the last 12-months in the SWIS

Western Australia is however fortunate to have high quality renewable energy resources (solar and wind) and this has led to a particularly high uptake in residential rooftop solar PV (Distributed PV). Distributed PV has now become so common for residential homes that it now comprises a total capacity of around 2,000MW. In the 2022 Electricity Statement of Opportunities report by The Australian Energy Market Operator (AEMO) it is projected that by 2030 rooftop solar will exceed a total capacity of 4,000MW.

One of the issues associated with the high uptake of distributed PV is that it has now contributed to there being excess power generation during the day. Figure 2-2-2 below shows the mix of generation in the SWIS

during a week in January 2023. Rooftop solar PV (Distributed PV) generation is shown in yellow; the pie chart shows the overall mix of generation for the week while the graph displays the half-hourly data. You can see the period between 6:30-7:00pm on the 20<sup>th</sup> of January has been selected on the graph with the corresponding generational data for this period displayed as the key metrics. You can see from the graph that during peak times (5pm to 9pm) there is little to no generation from distributed PV. Over the course of the week residential distributed PV provided nineteen (19) percent of the energy required whereas utility scale (solar farms) PV systems only provided just over two (2) percent and commercial and industrial solar PV generation is too low to factor into the overall numbers.

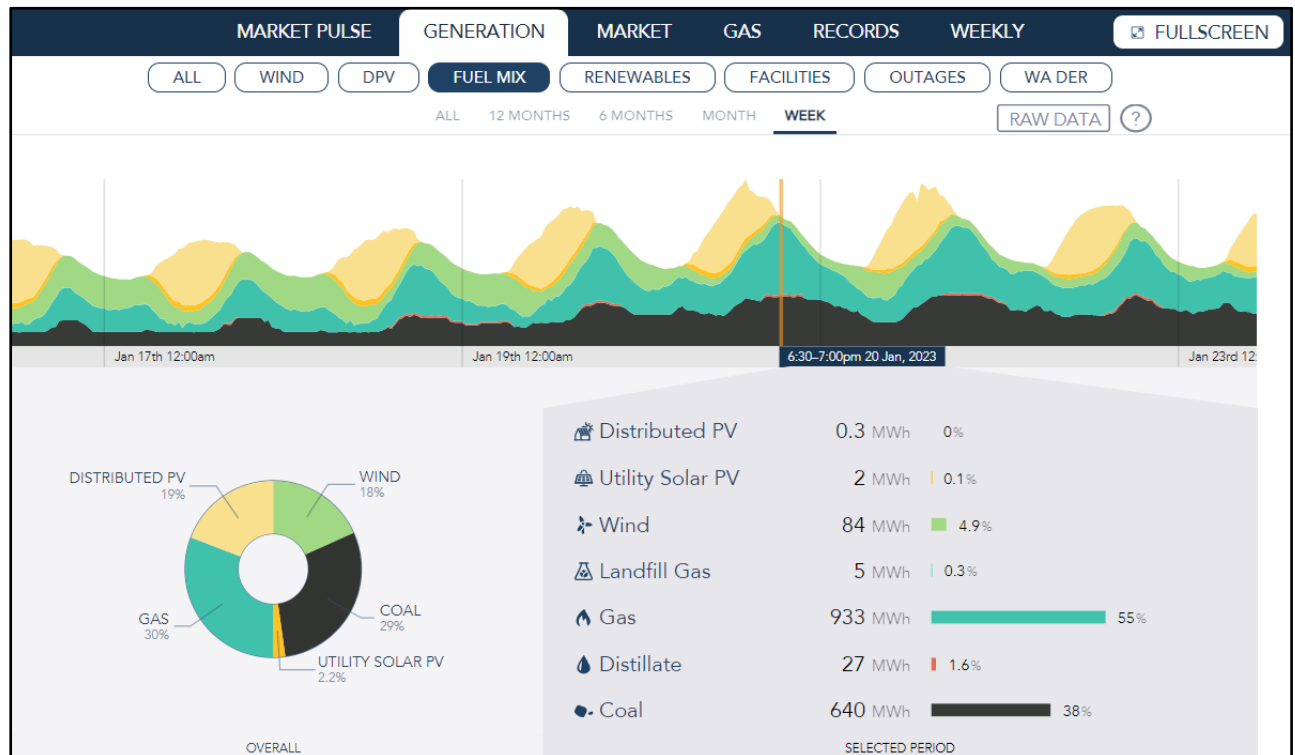


Figure 2.2-2: Extract from the AEMO website showing weekly generation fuel mix for 16/01/23 to 23/01/23.

## 2.3 Electricity Grid for the Wheatbelt Region

The electricity grid that services the Wheatbelt region in Western Australia is called the South West Interconnected System (SWIS) and is operated by Western Power (WP).

The SWIS is geographically and electrically isolated, with no interconnections to other transmission systems. It was planned and developed around centralised, large-scale, dispatchable generation. Figure 2-1-1 below shows the transmission network of the SWIS in each region of the State.

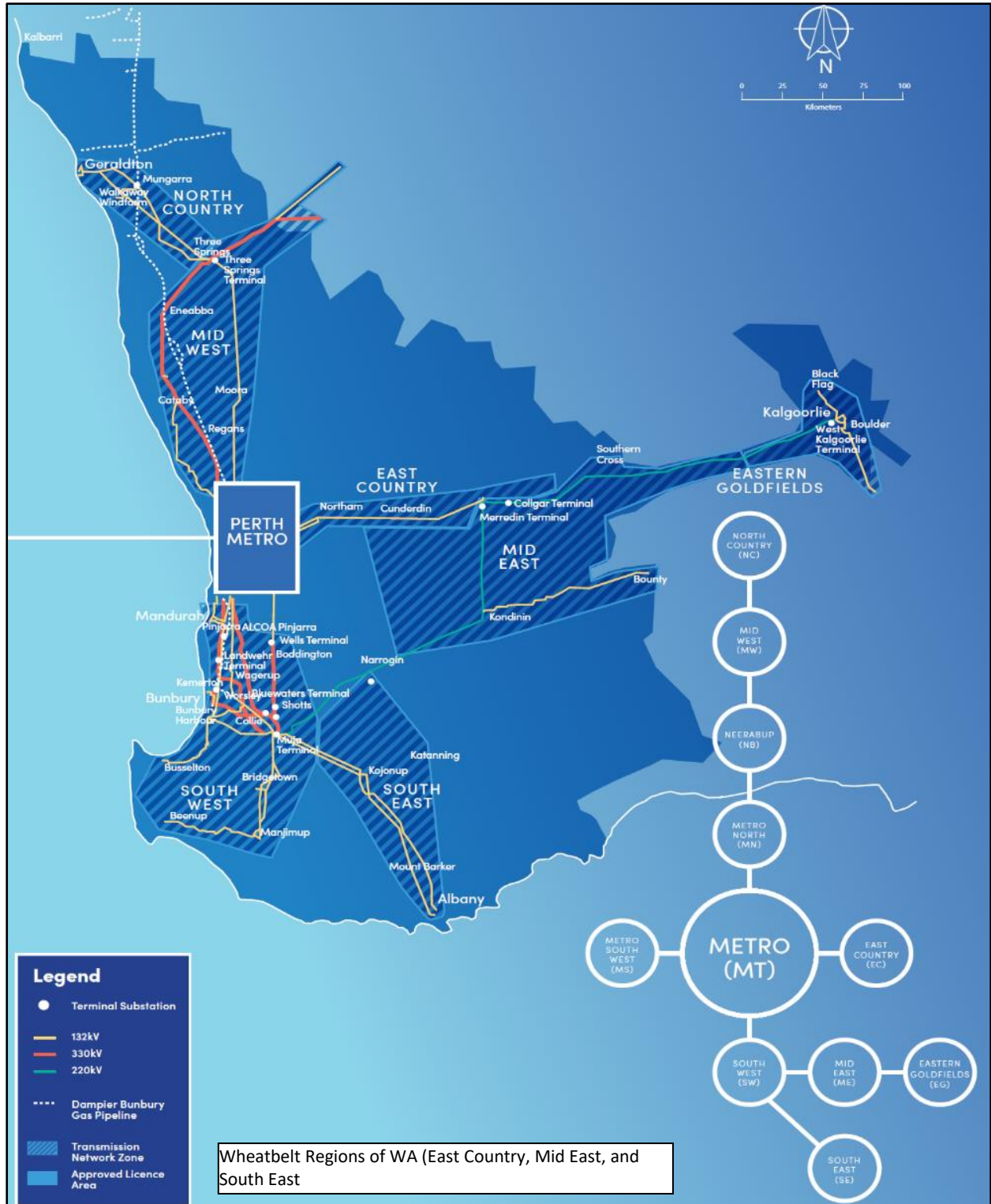


Figure 2-1: Map of the SWIS and Transmission Network and Zones (Taskforce, 2020)

Understanding the constraints of the SWIS is important to planning and establishing electricity delivery models. Figure 2-1-2 below shows the forecast capacity of the SWIS in 2027, anything shown in red has a forecast capacity of less than 5MVA. Most of the Wheatbelt region of WA is forecast to have less than 5MVA in 2027 with the area around Kondinin showing a forecast capacity of between 15 to 20 MVA.

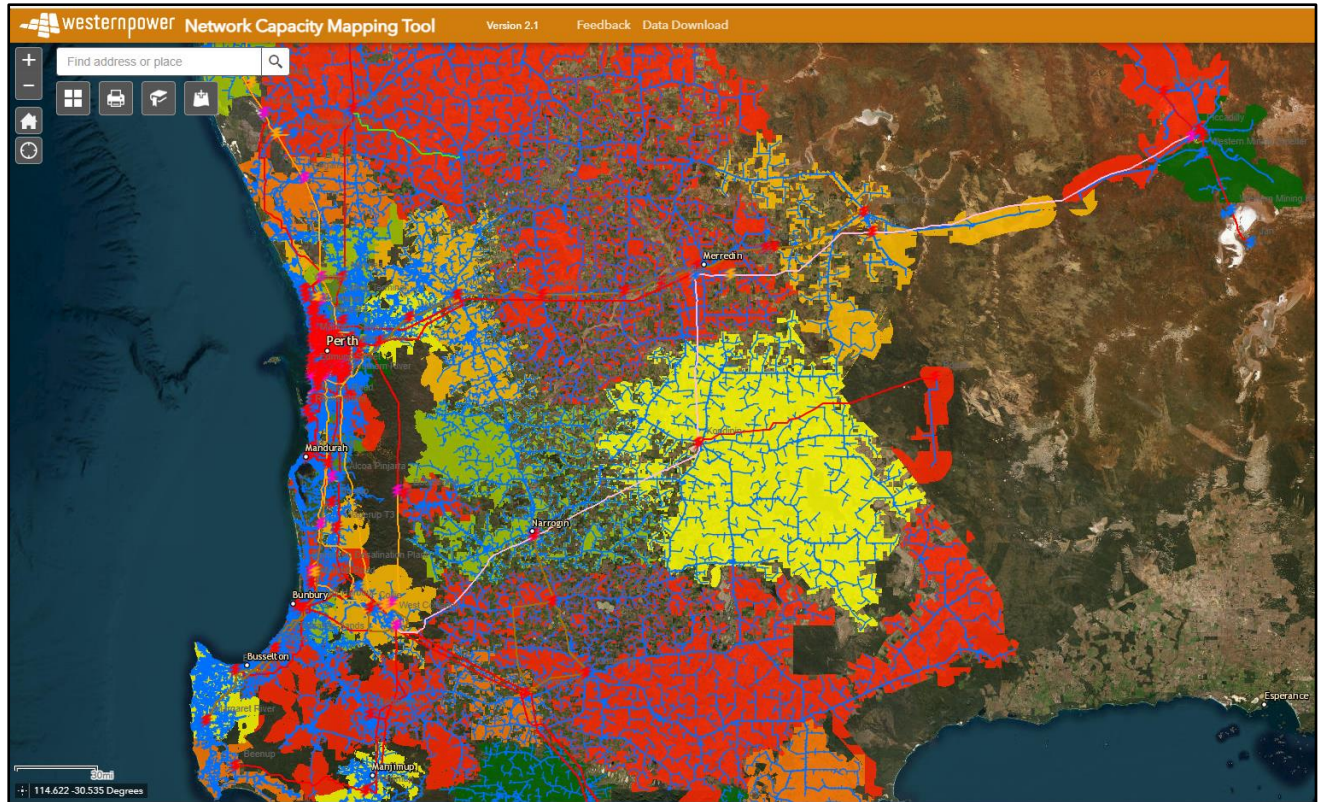


Figure 2-2: Extract from the WP Network Capacity Map Tool (WP - Network Mapping, 2023))

To put the 5MVA capacity into context, a residential estate consisting of 1,000 homes, would roughly require 4.7kVA of capacity per home (ref. Table 1), a total of 4.7MVA for the estate. With most areas forecast to only have a 5MVA capacity in 2027, this does not provide a lot of support for major developments that rely solely on a new connection to the SWIS.

Table 1: Western Power Design After Diversity Maximum Demand (DADMD) values (WP - Max Demand, 2023)

Lot price / dwelling	Single to quadruplex	Less than 10 units	More than 10 units
\$512,000 or less	4.7 kVA	3.5 kVA	3.1 kVA
\$512,001 to \$1,024,000	6.2 kVA	4.4 kVA	4.0 kVA
Above \$1,024,000	8.7 kVA	5.9 kVA	5.4 kVA

## 2.4 Renewable Generation

Understanding that Solar PV and wind are able to provide varying power generation profiles, dictated by natural resources, is important when considering an appropriate power delivery model. An example of this that is quite common is how solar PV generates during the day when the sun is shining, however it is often a common occurrence that wind turbines will often provide more power at night when its windy, however this is location dependant. Where wind resources are good, such as the WA coastline, you can experience wind turbines generating during the day and night. However, periods of low or no generation should be expected at all times.

The Collgar Wind Farm (CWF) and Albany Wind Farm (AWF) is one such example of wind turbines providing different generation patterns in different locations around the state of WA. The AWF is able to provide

greater power generation between peak periods (5pm to 9pm) compared to the CWF. Table 1 below shows that the AWF is providing nearly thirty (30) percent of its power during the peak period and the CWF is providing just over ten (10) percent. Power generated during peak periods enables that asset to claim additional revenue in the form of capacity credits as part of the reserve capacity mechanism (RCM). The RCM is operated by the Australian Energy Market Operator (AEMO) who assigns certified reserve capacity (CRC) to facilities / generators to ensure that there is sufficient generation capacity in the SWIS to meet peak demand.

Table 2: Extract table from the AEMO ESOO (source: ESOO)

Facility	Energy Source	Maximum Capacity (MW)	Energy Generated		Capacity Credits		Percentage of Capacity Credits to Plants Maximum Capacity
			GWh	Share (%)	MW	Share (%) <sup>B</sup>	%
INVESTEC_COLLGAR_WF1	Wind	218.500	667.764	3.79%	22.894	0.48%	10.48%
ALBANY_WF1	Wind	21.600	56.925	0.32%	6.434	0.13%	29.79%

The benefit of having generation between these peak periods, is due to the fact that large loads that consume greater than 50MWh are subject to electricity capacity fees in peak periods. So, if a development is expected to have high demand and consumption during peak periods, having power generation or storage available during these times can help reduce electricity fees associated with consumption and the network connection.

### 3. Standard Network Delivery Model

The standard model for delivery of power to new developments is based on connecting to the existing Western Power SWIS network and extension of the SWIS within the development providing a single connection to each freehold lot (ref. Figure 3-1).

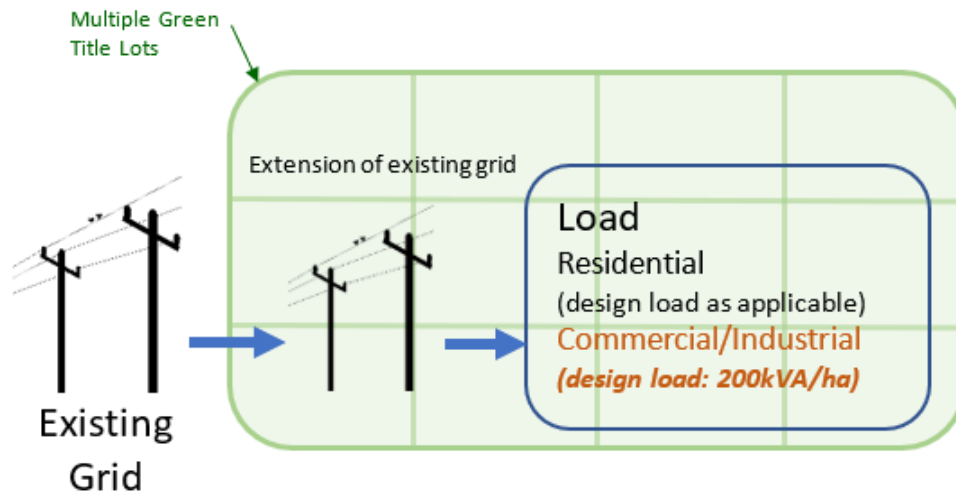


Figure 3-1: Graphical representation of a Standard Network Arrangement

#### 3.3 Most Likely Applicable Use Cases

Smaller (in relation to total load) general industry/commercial subdivisions or smaller residential developments (with high connection density) with grid connection close by that has sufficient capacity.

#### 3.4 Selection Criteria

- Total load at end of the development phase less than 20MWh/day.
- “High” load density for commercial/industrial developments, allowance of up to 200kVA/ha.
- Network connection available close by without a requirement for network capacity augmentation.
- No capacity constraint on the SWIS for the load proposed.

#### 3.5 Typical Deployment Costs

- Western Power connection application (\$25k-\$50k)
  - Establishing the new network within the development (costs subject to the specific development).
  - Connection of the new network to the existing grid. Cost will typically be based on a kVA charge formula known as the Distribution Low Voltage Connection Scheme (DLVCS), ref. Figure 3-2 for costs based on load. Connections that meet the following criteria will be charged according to the DLVCS:
    - New low voltage connections
    - Within 25km of a WP zone substation
    - Pass the economics test (pass when proportion of customer cost of works is not more than the DLVCS cost for the connection plus \$120k (WP - DLVCS, 2023))
- If the DLVCS is not applicable (where DLVCS base charge plus exclusion threshold less than forecast cost of works) then likely charged the full cost of works to supply power to the development.

- “Gifting tax”<sup>1</sup> levied by Western Power on handover of an industrial/commercial development network – not applicable on residential developments (13.9% of Network establishment capital cost, and not recoverable).

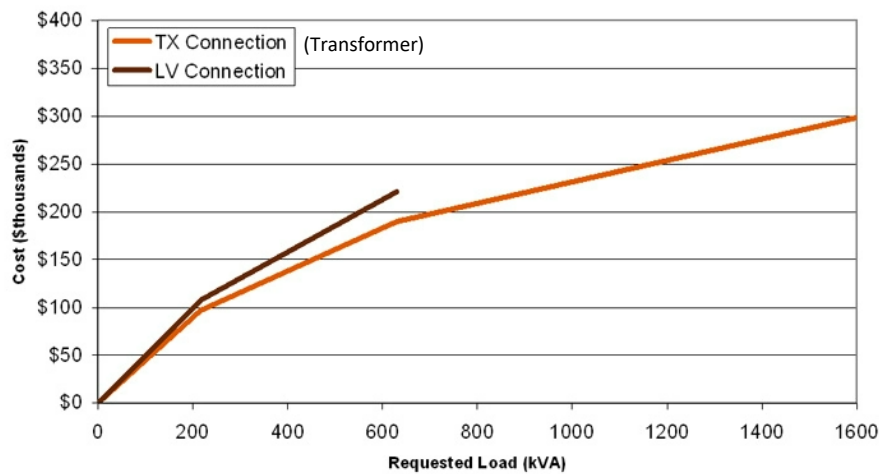


Figure 3-2: Total DLVCS cost versus load per connection (WP - DLVCS, 2023)

### 3.6 Typical Deployment Time Frame

The published timeframe given by Western Power for their application process is given in Figure 3-3 below. This suggests a possible timeframe, from application to energisation, of about 5 months. There is however a COVID-19 caveat associated with this stating there can be unexpected delays of between 6-12 months, and this more closely resembles what is still being experienced today.

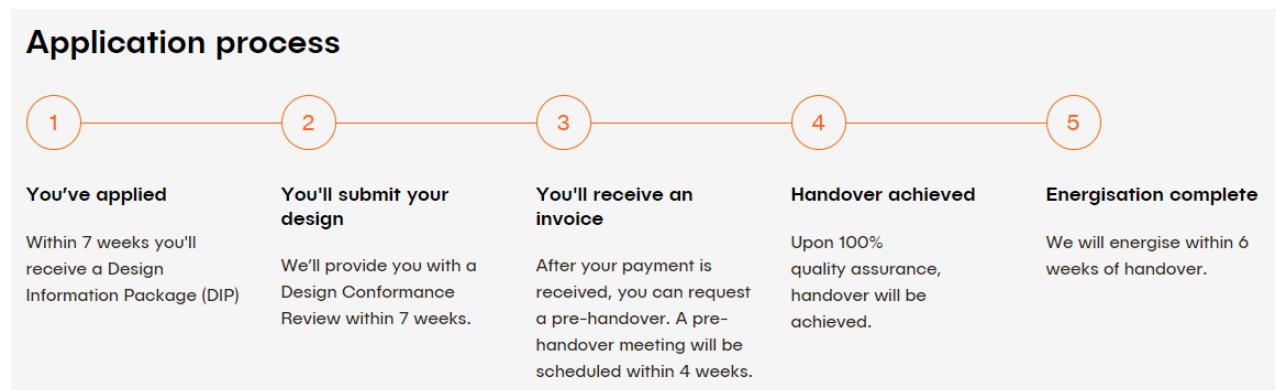


Figure 3-3: Western Power's published application process (WP - Application Process, 2023)

Based on recent experiences, timeframes are more in the order of:

- Design information package (3-4 months).
  - Design approval and quotes (3-6 months).
  - Connection Works or New Works (Western Power) (3-6 months)
- Giving estimated actual TOTAL deployment time in the order of 9-16 months.

<sup>1</sup> Capital contributions (such as network assets) that are gifted to WP are treated as assessable income that WP must pay tax on. The “gifting tax” levied by WP is their means of recovering the tax they pay on gifted assets.

## 4. Reduced Power Delivery Model

The reduced power delivery model is essentially the same as the standard, except that it is for application to commercial/industrial developments which have a lower load density requirement compared to the standard 200kVA/ha – with the proposal to reduce this to a nominal 50kVA/ha (managed through the fuse sizes in the main switchboard). This can provide a more economically viable development for lots that don't actually require the high load allowance of a standard connection.

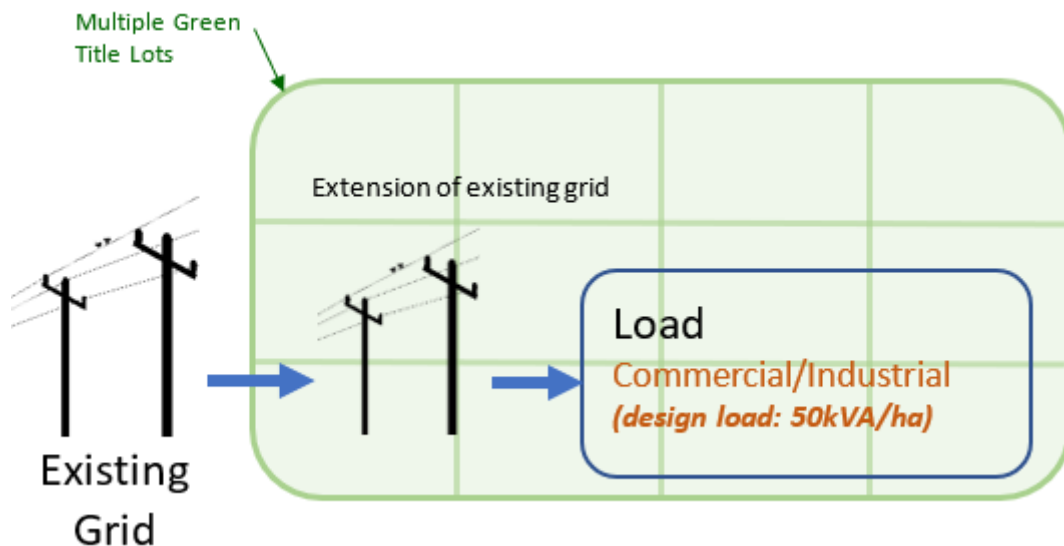


Figure 4-1: Graphical representation of a Reduced Network Arrangement

### 4.1 Most Likely Applicable Use Cases

Smaller (in relation to total load) general industry/commercial subdivisions (with low connection density or where individual lots have lower load requirements), e.g. light industry and transport logistics, with grid connection close by that has sufficient capacity.

### 4.2 Selection Criteria

- Total load at end of the development phase less than 20MWh/day.
- “Reduced” load density, allowance of up to e.g. 50kVA/ha.
- Network connection available without a requirement for network capacity augmentation.
- Limited capacity available from the SWIS
- Loads are established with a high degree of certainty - this will allow WP to manage their future risk and enable them to consider the possibility of accepting a reduced load density.

### 4.3 Typical Deployment Costs

Same as for Standard Network Delivery Model except:

- the connection cost would come down, ref. Figure 3-2 for comparison of 200kVA/ha versus 50kVA/ha.
- Given the energy density would be lower, it is reasonable to expect the network establishment cost would also be lower (how much lower would be subject to the specific development)

### 4.4 Typical Deployment Time Frame

Same as for Standard Network Delivery Model

#### 4.5 Other Features / Considerations

200kVA/ha is the current minimum design requirement for non-residential loads according to the Western Power Underground Distribution Schemes (UDS) Manual (WP - UDS Manual, 2015). To use a lower design value, such as 50kVA/ha, would therefore require dispensation from Western Power.

WAPC have previously approved this model on a case-by-case basis and there is scope to extend it more broadly where it meets the selection criteria. In cases where this is accepted by Western Power, WAPC will impose notification (e.g. in the form of a “power classification/category”) on the title relating to power availability. The steps that would likely be involved in this are:

1. Confirm reduced load density (e.g. 50kVA/ha) with Western Power.
2. Get concept approved by WAPC and classifications/applications defined.
3. Relevant parties sign off on the reduced power concept.
4. Update Western Power meters (standards to reflect alternative classification).

## 5. Microgrid Delivery Model

For the purpose of this report, the following microgrid definition has been adopted (ref. *Figure 5-1*).

A microgrid:

- is an embedded network<sup>2</sup> connected to the SWIS (grid) behind a master meter. Energy can be drawn from and transferred to the grid.<sup>3</sup>  
(Typically operates across more than one title, however can also be applied to single strata / community titles, resulting in some subtle differences, ref. Section 6 for details)
- has the ability to be islanded as an autonomous system
- includes local renewable generation and storage behind the master meter

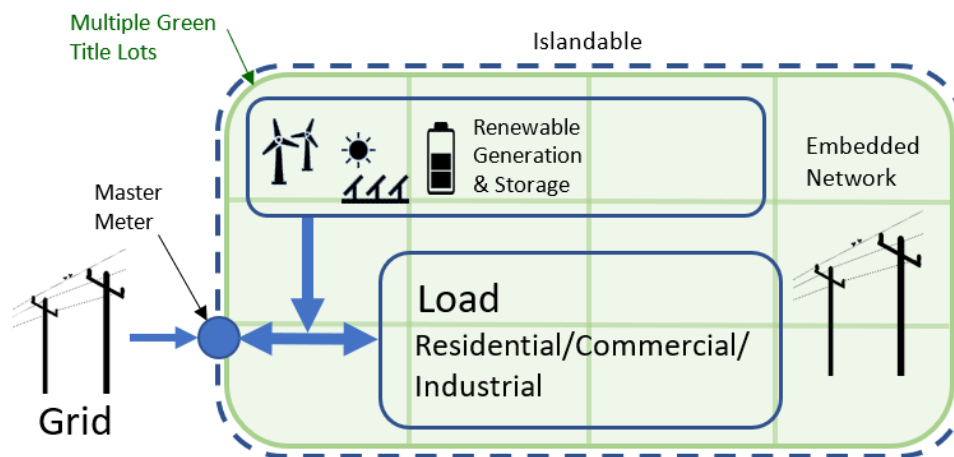


Figure 5-1: Graphical representation of a Microgrid

The discussion here will be on greenfield microgrids. A brownfield microgrid involves “conversion” of an existing Western Power network and is initiated by Western Power. Prior to considering a microgrid solution in the vicinity of an existing Network, it is recommended to check with Western Power there are no plans for a brownfields microgrid development. A brownfields microgrid would typically facilitate new development and possibly negate the requirement to set up an independent greenfield microgrid.

### 5.1 Most Likely Applicable Use Cases

Larger general industry/commercial subdivisions or larger residential developments (preferably including a mix of retail/local business) with grid connection close by, but where grid connection has limited or no capacity.

### 5.2 Key Selection Criteria

- Total load at end of the development phase greater than 20MWh/day.
- Predominately daytime load profile.
- High connection density, ie. consumers in close proximity to each other.
- Land being developed will produce ‘green-titled’ lots.
- Network connection available.
- Limited capacity available from the SWIS.
- No existing Western Power infrastructure within proposed land development area e.g. within road reserves.

<sup>2</sup> Private electricity network that is physically connected to the distribution network of the main grid, but is operated as a separate entity.

<sup>3</sup> Point a) not applicable to off-grid microgrid as per Section 7

### 5.3 Typical Deployment Costs

- Establishing the embedded network (marginally higher than a WP network, but avoids the WP ‘gifting tax’ associated with a WP network).
- Western Power Connection Application (\$25k-\$50k)
- Connection of the embedded network to the grid, WP costs & the associated hardware (in the order of \$500k – includes switchgear, protection, controls and automation).
- Procurement of Private Microgrid Operator (MO). At present there is only a single microgrid developer implementing microgrids in WA. If a land developer doesn’t go direct to them and goes out for tender, this will incur a cost (that cost is dependant on the procurement approach to securing tenders).
- Development of a legal contract with the MO for delivery and operation of Microgrid (\$50k+).
- Possibly a financial contribution towards the initial generation capital investment – to de-risk the project for the MO (would be evaluated on a case by case basis and include key considerations of likely load uptake in terms of size and timing).

### 5.4 Typical Deployment Time Frame

- 6 months for direct appointment of MO. Would require 12 months via tender process.
- 6 months for MO to secure their network and retail licenses. Required before the network can be constructed/energised).
- 12 months to build network and secure grid connection, procure and install generation/storage and connect to grid.

Giving TOTAL deployment time in the order of 24 months (or 30 via MO tender process).

### 5.5 Other Features / Considerations

- The MO will currently need a Distribution and Retail License from the ERA (note: could change after implementation of the States proposed Alternative Energy Supply (AES) Framework).
- A legal contract will generally need to be developed with the MO and the land owner (developing the land) to give legal agency for the MO to establish the microgrid.
- Lower cost power can often be delivered to microgrid customers.
- Higher renewable energy content can generally be delivered to microgrid customers.
- The land owner will generally need to make available some land (typically via lease agreement) for the MO to initially install solar panels if renewable energy is required for the land release.
- If the land release requires customer roof space to be made available to the MO for continued expansion of the generation footprint for future stages, this can be leased from customers but provision for this will need to be made in the land sales agreements.
- Customers of a licenced MO enjoy the full customer protections as on the SWIS with Synergy and same technical performance (or better) than on the SWIS with Western Power.
- The developer is responsible for the installation of the subdivision network which will be gifted to the private MO instead of WP.
- A mechanism needs to be developed to prevent monopoly positions from being created with respect to power pricing. This can be achieved by a bilateral contract in which the MO facilitates the provision of power by another retailer, should this ever be requested by a customer.
- Private land owners will invariably need to allow a small easement around a lot’s connection point in order for the MO to read the meter etc.
- The sub-division application to WAPC will need to have the electrical clearance conditions changed to accommodate clearance by the MO, as opposed to Western Power. (Development WA has already established these and should be requested when lodging the subdivision application with WAPC).
- Easements will generally be required from local shires (in road reserves), in order for the MO to legally access power infrastructure buried/installed in road reserves.
- WAPC changed its clearance obligation from having “approval from WP” to having “a licensed network provider” and in doing so essentially demonstrated its acceptance of the Microgrid Delivery Model.

- The microgrid solution could be deployed more easily if:
  - A simpler 'microgrid operator' license could be created by Energy Policy WA (EPWA) specifically for the reduced application that MO's require. These would typically allow for:
    - The same privileges to access network infrastructure in road reserve and private properties that Western Power enjoy under the Energy Operators Act, without easements.
    - The removal/simplification of the Metering Code and Network Access Code.
  - The above could be addressed within the AES framework and therefore streamline the process of becoming an MO.
- There are essentially two avenues for mitigating risks associated with possible bankruptcy of the MO:
  1. It is covered in the contract between the MO and the developer, typically with financial guarantees designed to prevent a bankruptcy in the first instance.
  2. For Microgrids, including Strata/Community Microgrids, which would come under The AES Framework (so not Off-Grid Microgrids), the draft AES legislation is looking to address Network Operator and Retailer of last resort (as would be required in the event of an MO bankruptcy event). The expectation is that Western Power and Synergy would fill these roles respectively.

## 6. Strata Title / Community Title Delivery Model

The delivery model for strata title / community title is essentially the Microgrid Model with the main difference being that it currently falls under a licence exemption (but in the future is expected to be a code participant) because power is not being distributed across a number of different titles (ref. Figure 6-1). Another key difference is that the Strata Company can administer the generation as opposed to having to appoint an MO).

Energy Policy WA (EPWA) administers licence exemptions and will decide on the conditions of operation, subject to the specific features of the development. In general however, this approach is a cheaper path than that required for a licenced operation.

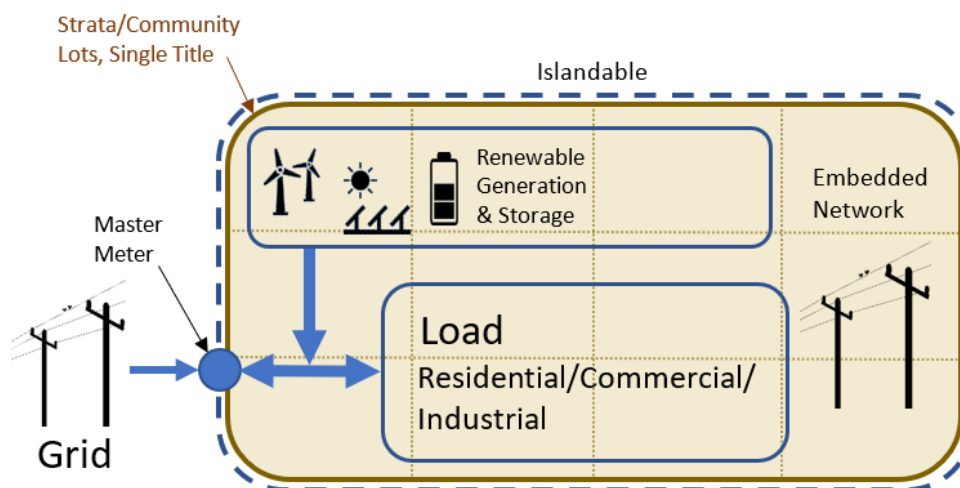


Figure 6-1: Graphical representation of a Strata/Community Title Microgrid

### 6.1 Most Likely Applicable Use Cases

General industry/commercial/residential strata title or community title developments with grid connection close by, but where grid connection has limited or no capacity.

### 6.2 Key Selection Criteria

Same as for standard microgrid however the general benchmark of a minimum 20MWh/day load to economically develop a microgrid can be lowered. What it can be lowered to would be subject to assessment of the specific conditions of the strata development and conditions of the licence exemption set by EPWA.

### 6.3 Typical Deployment Costs

Similar to a standard microgrid. The MO operator would have savings based on obtaining a licence exemption. It's likely some of this could be passed onto the developer in the form of a reduced financial contribution to the MO.

### 6.4 Typical Deployment Time Frame

Similar to a standard microgrid except that due to a licence exemption the estimated 6 months for MO to secure their licences could potentially be reduced to 3 months to secure the exemption and associated conditions.

Giving TOTAL deployment time in the order of 21 months (or 27 via MO tender process).

### 6.5 Other Features / Considerations

It is possible that the full customer protections offered under a licenced MO may not be available under a licence exemption framework, however as long as this is understood upfront, it would generally not be an

issue. It is also possible that this will be addressed by the AES Framework if EPWA require entities to be code (AES) participants.

## 7. Off-Grid Microgrid Power Delivery Model

An off-grid Microgrid is essentially a permanently islanded Microgrid (ref. Figure 7-1). The implications of this are that it will need more infrastructure than for a standard Microgrid with an equivalent load. This will usually be in the form of firm-generation (e.g. diesel generators), a larger battery, more renewable generation and preferably more diversity of renewables, to achieve a more complimentary renewable generation mix. An off-grid microgrid is subject to technical and regulatory requirements similar to a standard Microgrid.

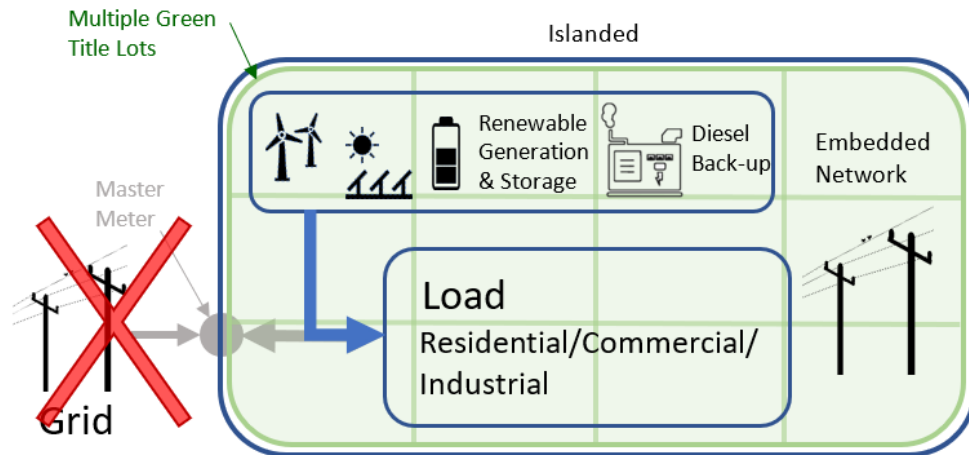


Figure 7-1: Graphical representation of an Off-Grid Microgrid

### 7.1 Most Likely Applicable Use Cases

Larger general industry/commercial subdivisions or larger residential developments (preferably including a mix of retail/local business) with grid connection not possible or possible but prohibitively expensive.

### 7.2 Key Selection Criteria

The key selection criteria is based on access to the network. If there is no electricity grid connection available and / or it is not economically feasible to install the electrical infrastructure to provide a new electricity grid connection, then there is little choice other than to go off-grid. The viability of the development is then likely to come down to the economics of the off-grid solution and the key criteria for establishing this is the ability to match a renewable generation profile to the load profile. Given most readily available renewable generation resource in the wheatbelt is solar, this means that ideally a large portion of the load will occur predominately during the day.

### 7.3 Typical Deployment Costs

These will be similar to the standard Microgrid. There will be some savings for the capital cost of not having to connect to the grid, however the developer may contribute this saving to the MO, given the MO will have to build larger and more reliable generation/storage which would have to be recouped by higher power costs for the end customer(s). A financial contribution from the developer to the MO could help reduce the per kWh power cost to the customer.

### 7.4 Typical Deployment Time Frame

The deployment time frame would be comparable to a standard microgrid, however the risk to the schedule present in a standard microgrid, from having to interface with Western Power for the grid connection, would be removed.

### 7.5 Other Features / Considerations

- Of the other features/considerations defined for a standard Microgrid, a lower cost power (than obtained from the grid) is not necessarily likely because of the extra costs for generation/storage assets to support off-grid operation.

- Without connection to the grid there is also no possibility to facilitate the provision of power by another retailer and so greater consideration may need to be given towards agreeing parameters around setting long term power rates
- Off-grid Microgrids would have exposure to the risk of MO bankruptcy, in a similar way to what off-grid power consumers using independent power providers, e.g. mining operations, would have today.

## 8. Stand-alone Power System Delivery Model

A Stand-alone Power System (SPS) is an off-grid system that services only one title (ref. Figure 8-1). Western Power have been installing SPS's at remote properties in order to disconnect them from the grid. The existing SWIS network that supplies power to remote properties is expensive to maintain and typically has poor reliability. Western Power aren't currently offering SPS's for new connections and so as a delivery model for new developments, the assumption is the developer would nominate the use of SPS with deployment by an SPS delivery partner (subject to WAPC approval), configured in accordance with the end user's needs.

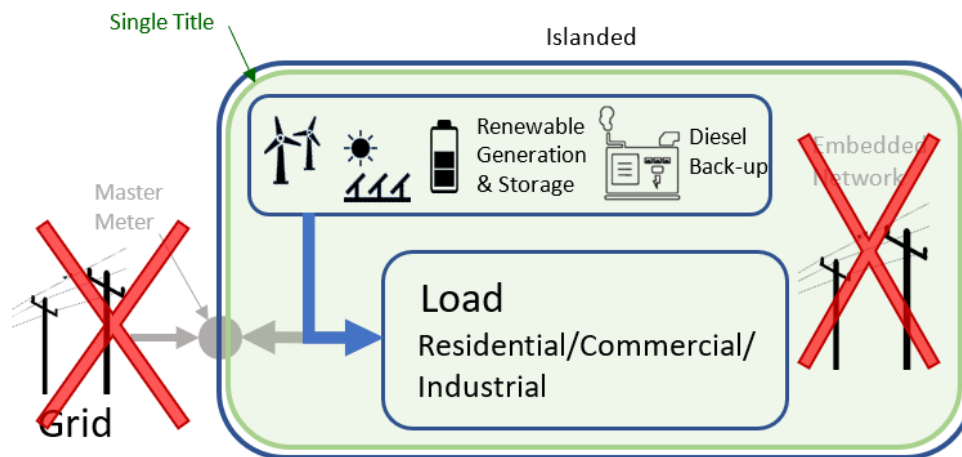


Figure 8-1: Graphical representation of a SPS

### 8.3 Most Likely Applicable Use Cases

Rural subdivision with significant acreage.

### 8.4 Key Selection Criteria

- Single land titles, typically consuming less than 100kWh/day (typically \$150k-\$250k upfront cost per SPS).
- Low load density.
- Grid connection not possible.
- Grid connection possible but prohibitively expensive and/or unreliable.
- Load profile favourable towards renewable generation. Without renewable generation, operating costs can be significant and so may want to re-evaluate against cost for a grid connection.

### 8.5 Typical Deployment Costs

The deployment costs will be the capital cost of the SPS system. For a system to support a maximum 50kW peak load, such as for a large rural property, the cost for an SPS would be in the order of about \$250k. An SPS such as this would comprise of something like 40kW of Solar Generation, a 50kW/100kWh battery and 50kVA genset.

### 8.6 Typical Deployment Time Frame

TOTAL deployment time for an SPS would be in the order of 5-6 months.

### 8.7 Other Features / Considerations

- Solar generation needs to be installed in accordance with Clean Energy Council (CEC) requirements in order to be eligible for STC (small-scale technology certificates) rebates.
- No regulatory requirements applicable other than installation by licensed electrical contractor in accordance with Australian Standards, hence relatively quick solution with little risk for hold-ups.
- Given the load is reasonably matched to the renewable generation profile, ie. not excessive consumption at night, then the operating costs would be relatively low.
- WAPC need to impose notification on title relating to the power model.

## 9. Opportunities for Improvement

### 9.1 Aspects of Electricity Delivery Models

There is room for improvement in how some of the Power Infrastructure Delivery Models are implemented. For the most part this is associated with existing regulations that were written prior to the existence of these new delivery models, meaning there is the potential to update regulations so as to better facilitate the deployment of these newer delivery models.

Implementation of regulatory reforms either through changes in the specific codes (or via the application of a new AES framework) is likely to reduce the time and cost to developers in implementing a microgrid solution and also improve the economics for an MO, both of which would facilitate the uptake of microgrids for rural developments. It is expected that this could cut development times and Microgrid operating costs. It would also have the benefit of freeing up Western Power resources, hopefully improving turn around times for those delivery methods that could be impacted by WP connection delays.

### 9.2 Other Opportunities

- If there are utility requirements (other than power) that are cost prohibitive for a development then the relatively cheap and accessible energy from a local renewable energy microgrid solution can sometimes facilitate the removal of constraints to improve the overall economics, e.g. where access to water was a constraint, cheaper locally generated power from a microgrid may make the case for a co-located desalination plant economically feasible.

The following two opportunities are more direct opportunities for businesses however can also be an opportunity for developments associated with such businesses.

- Commercial businesses in rural networks with large loads can be exposed to large line loss costs, so solutions with local generation would provide the opportunity to reduce these costs. In such cases, the further down a radial network a large load is, the more economic justification there is to have a microgrid at the end of that network.
- Where a business requires access to a heating source, solar thermal may be able to improve the economics of the solution by displacing gas bullets or electric heating. Solar thermal (most applicable to daytime operations) can provide heating up to 100degC, but even where higher temperatures are required using solar thermal for pre-heating could still produce an improved commercial outcome.

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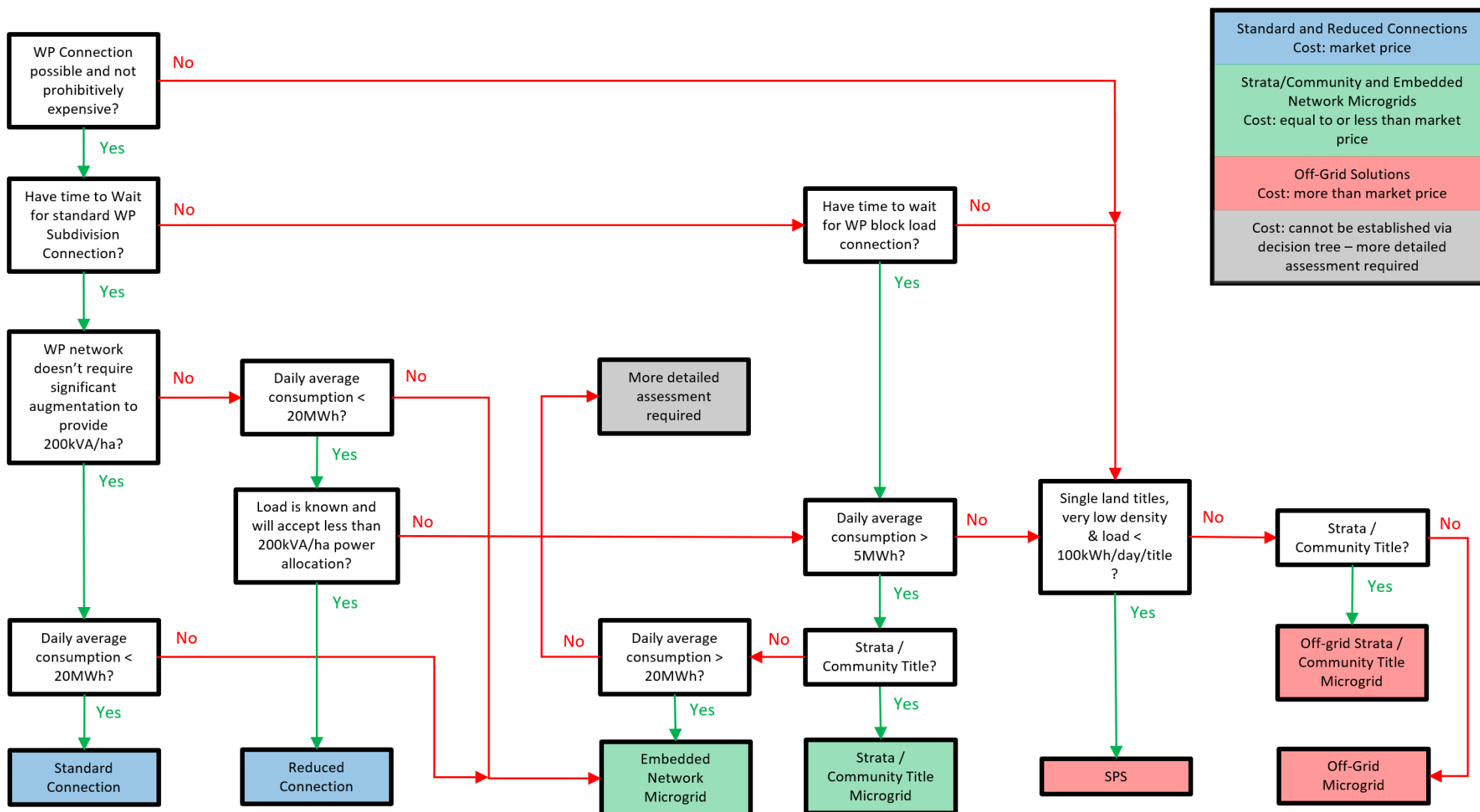
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**ATTACHMENT**  
**Delivery Model Decision Tree**

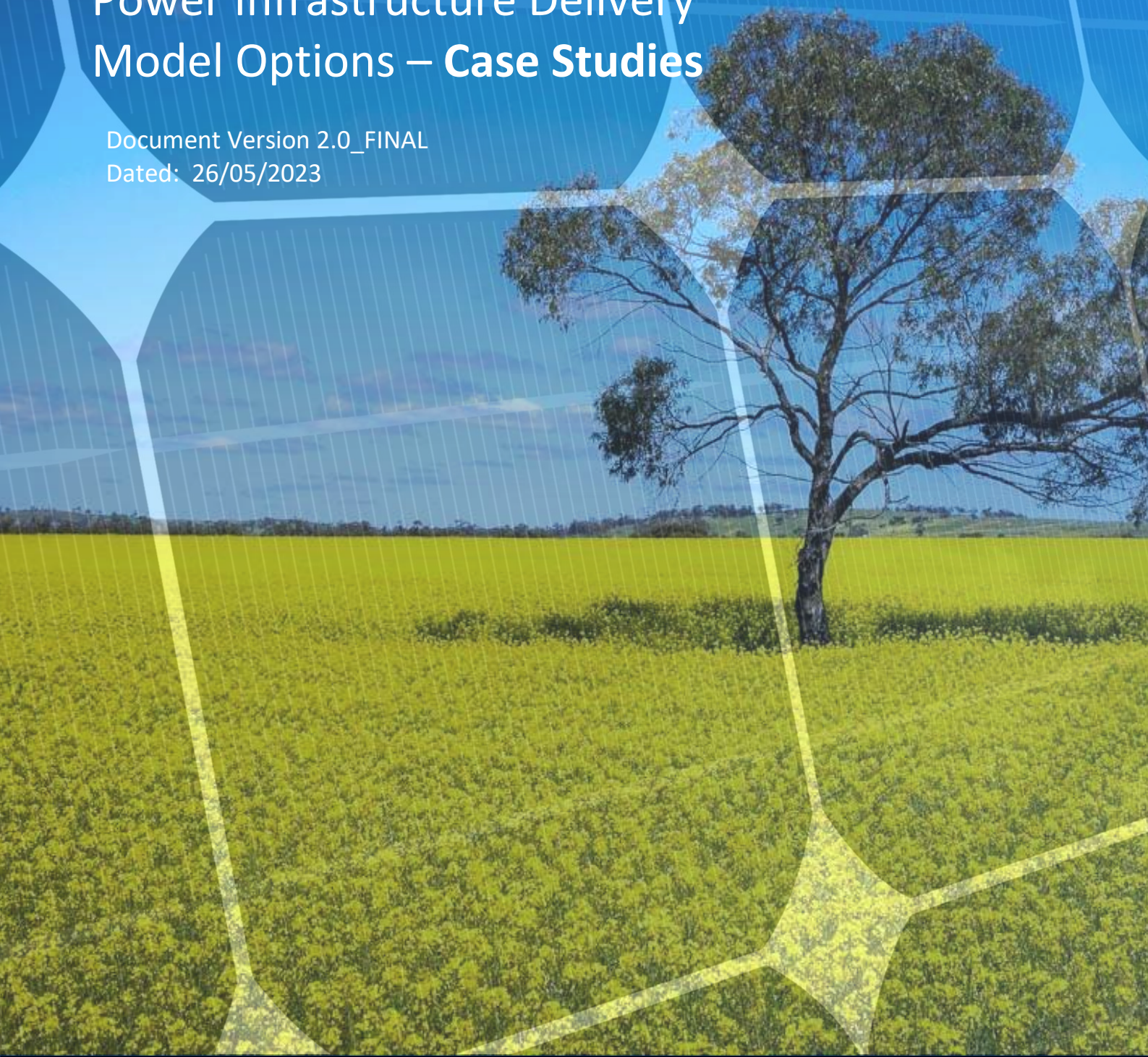
## Delivery Model Decision Tree



# Wheatbelt Residential & Industrial Development: Power Infrastructure Delivery Model Options – Case Studies

Document Version 2.0\_FINAL

Dated: 26/05/2023



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### Disclaimer

These case studies have been prepared by Sunrise Energy Group solely to assist in understanding the implementation of some of the power infrastructure delivery models described in the “Wheatbelt Residential & Industrial Development: Power Infrastructure Delivery Model Options Report”.

The case studies are based on cost estimates, published tariffs and regulations valid as of the date of this document and so should only be considered in that context.

Sunrise Energy Group recommends all microgrid projects should be assessed on their own merit, accounting for the conditions specific to the particular project.

Sunrise Energy accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this document by any third party.

## Abbreviations

BESS	Battery Energy Storage System
CAPEX	Capital Expenditure
CO2e	Carbon Dioxide Equivalent
IRCR	Individual Reserve Capacity Requirement
LGC	Large Scale (renewable) Generation
MO	Microgrid Operator
OPEX	Operating Expenditure
PV	Photovoltaic
ROI	Return on Investment
STC	Small Scale (renewable) Technology

## 1. Introduction

These cases studies are supplementary to the “Wheatbelt Residential & Industrial Development: Power Infrastructure Delivery Model Options Report” (Sunrise Energy Group, 2023) delivered earlier. The report identified a number of different power delivery infrastructure models. The basis of the case studies is to demonstrate via a worked example how a couple of these models would be applied in a specific real life scenario.

The case studies presented include the application of a Strata Title Delivery Model to a residential development in Narrogin and the application of a green titled Microgrid Delivery Model to an Industrial Estate development in Kellerberrin.

## 2. Narrogin

### 2.1 Basis

The Narrogin development is for sixteen dwellings (mix of 3x1 and 2x1) on a single strata title, ref. Figure 2-1 below. The case study is therefore based on a strata based renewable microgrid power delivery model.



Figure 2-1: Narrogin Development Site (H+H Architects, 2022)

Assumptions and basis for the model include the following:

- The grid connection is sufficient to handle the battery/solar exports during low consumption periods behind the meter.
- Dwelling loads are based on approximate 4.7kVA peak load per dwelling.
- Typical Sunrise Energy in-house residential load profile applied (ref. sample in Figure 2-2) applied across all 16 dwellings, ie. presented as one load profile within the model with total annual load

of 114MWh, ie. average of 312kWh per day (which equates to an average 19.5kWh per dwelling per day).

- Solar generation provided by placement of equal sized rooftop system on each dwelling.
- Battery energy storage solution (BESS) would be via a single common “large” battery servicing all 16 dwellings on the strata title, located on common property (space requirement approximately 4m<sup>2</sup> with adequate ventilation for cooling).
- Residents would pay the equivalent of the Synergy (A1) Residential Tariff.
- The electricity service provider to the Strata (Microgrid Operator – MO) would pay the Synergy Business Time of Use (R1) Tariff.
- The MO would be paid the STC rebate for installation of the rooftop solar.
- It is not economically viable to deliver 100% renewable (net zero) electricity via installation of solar PV and battery and so to achieve essentially a net zero solution the MO will purchase LGC certificates to cover the electricity imported from the grid. Note purchase of LGC certificates to cover grid supplied electricity also applies to the baseline scenario of zero solar/battery where all electricity is from the grid.
- The MO would be responsible for the complete CAPEX and OPEX costs of the solar/battery installation.
- The Strata developer would be responsible for the embedded network and connection costs.
- 7 year period for the MO to achieve a reasonable return on their investment.

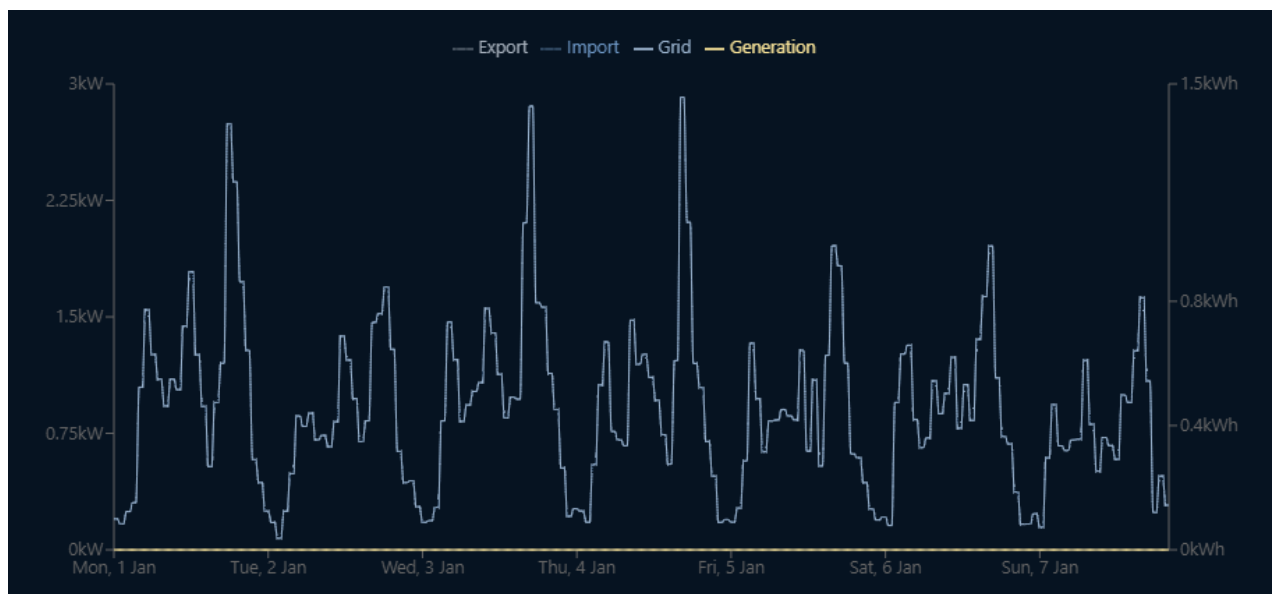


Figure 2-2: 7 day sample of load profile from January for a single dwelling.

## 2.2 Modelling/Sizing

Entering the above basis/assumptions from above into the modelling software GridCog, several different solar and battery size combinations were evaluated (40, 60 & 80kW total Solar and 0, 50, 100 or 150kWh battery).

The results from the different combinations of these assets are compared to a baseline scenario of no solar/battery installation and are shown in Figure 2-3. From here it can be seen how the relative high capital cost of batteries, results in zero battery solutions ranking amongst the highest in terms of ROI. The inclusion of batteries however enables a greater uptake of renewable generation and therefore a greater reduction in emissions. The battery solution that provides the highest ROI seems to be a reasonable compromise between economic and emissions performance. As seen from Figure 2-3 this is the 40kW Solar (2.5kW per

rooftop) and 50kWh battery solution providing an ROI of 24% and 250 tonnes CO<sub>2</sub>e in emissions reduction and is the recommended solution for this assessment.

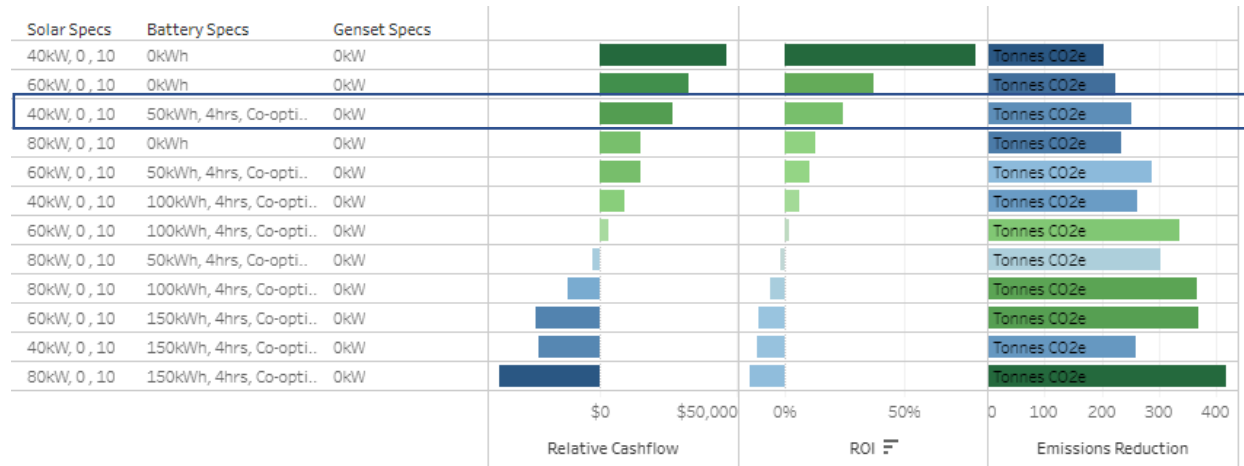


Figure 2-3: Ranking of different solar/battery combinations on the basis of ROI (Return on Investment)

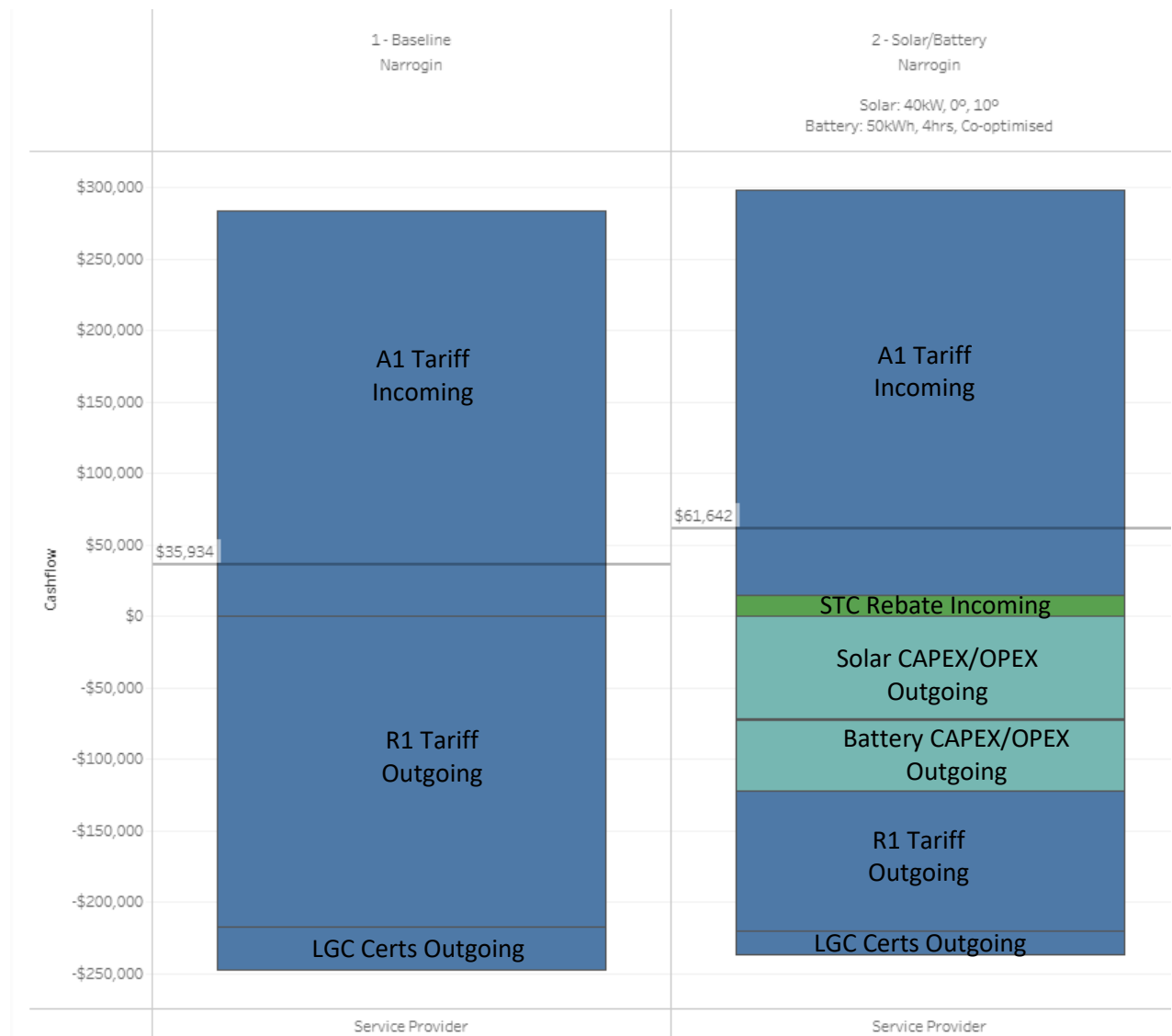


Figure 2-4: Cashflows for selected 40kW Solar and 50kWh Battery solution over 7 years

Figure 2-4 represents the cashflows for the selected solution versus the base case scenario over the total 7 years and Figure 2-5 is the breakdown for each year.

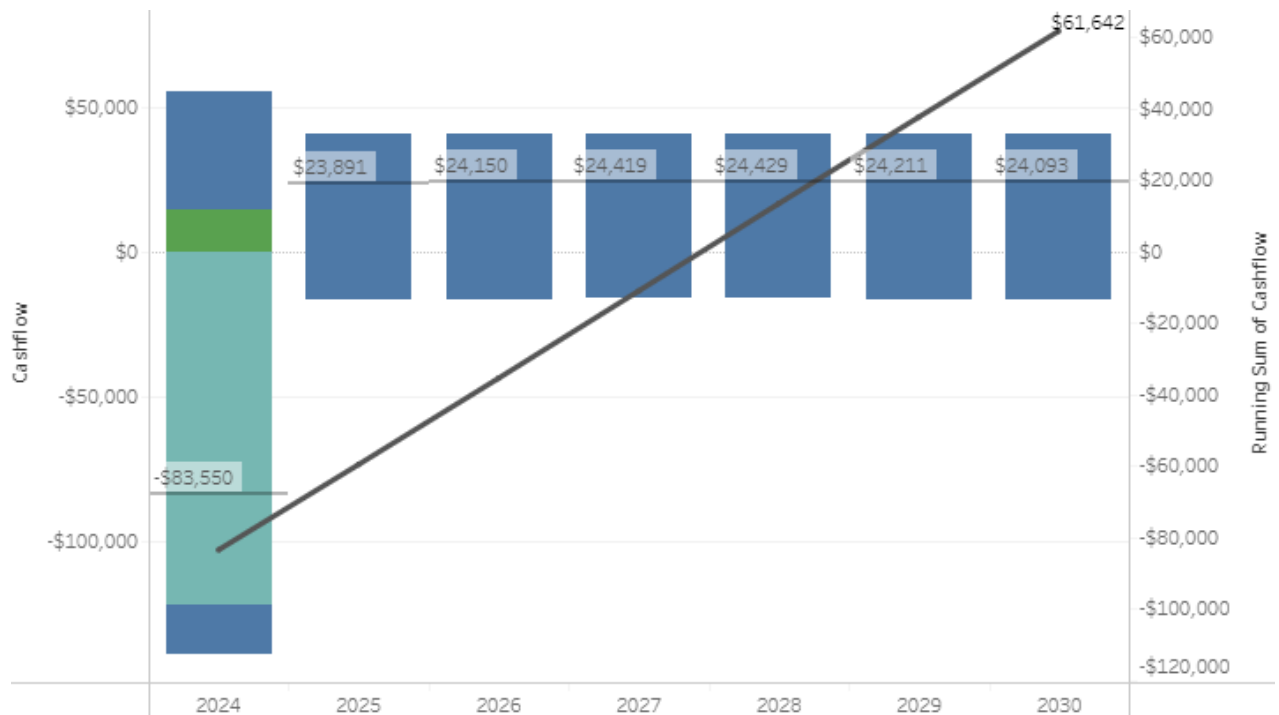


Figure 2-5: Cumulative Cashflow for the MO over the 7 year investment period

In terms of how the solar generation and battery storage configuration for the selected solution impact on the grid consumption on a daily basis, this is represented in a comparison of Figure 2-6 and Figure 2-7, both based on an arbitrary week (in this case week 5) in the year. Figure 6 reflects the base case and so the grid consumption represented just follows the load profile. In Figure 2-7 We see how the battery (purples) charges during the day during when solar is available and then discharges during peak consumption times in the evening when solar output is down. We also see how during the day in high solar (yellow) periods how the excess generation, after accounting for battery charging is exported to the grid, ie. where grid consumption (in blue) drops below zero. For how this looks in terms of overall solar generation, grid consumption and grid export over a whole year on a monthly basis, ref. Figure 2-8.

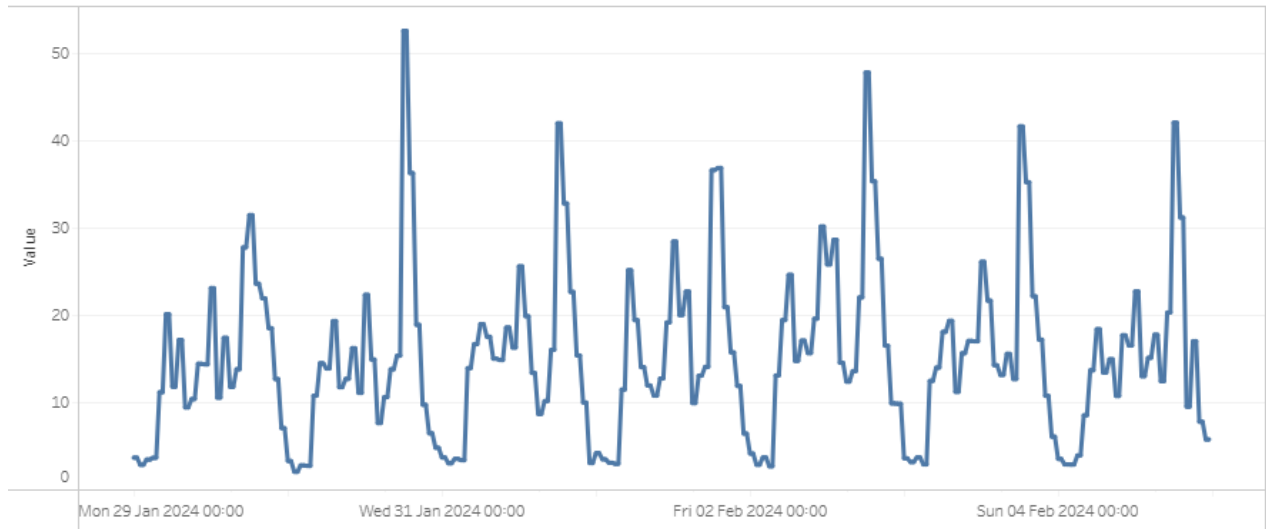


Figure 2-6: Grid consumption (kW) for week 5.

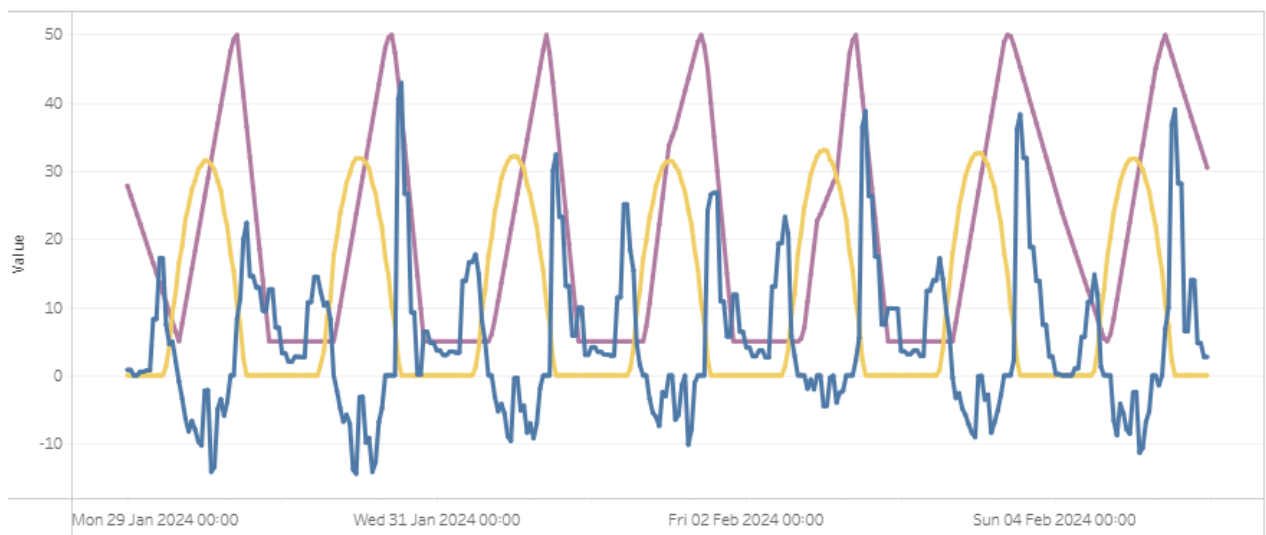


Figure 2-7: Modified grid consumption (blue, kW) after installation of solar (yellow, kW) and battery (purple, kWh) in week 5.

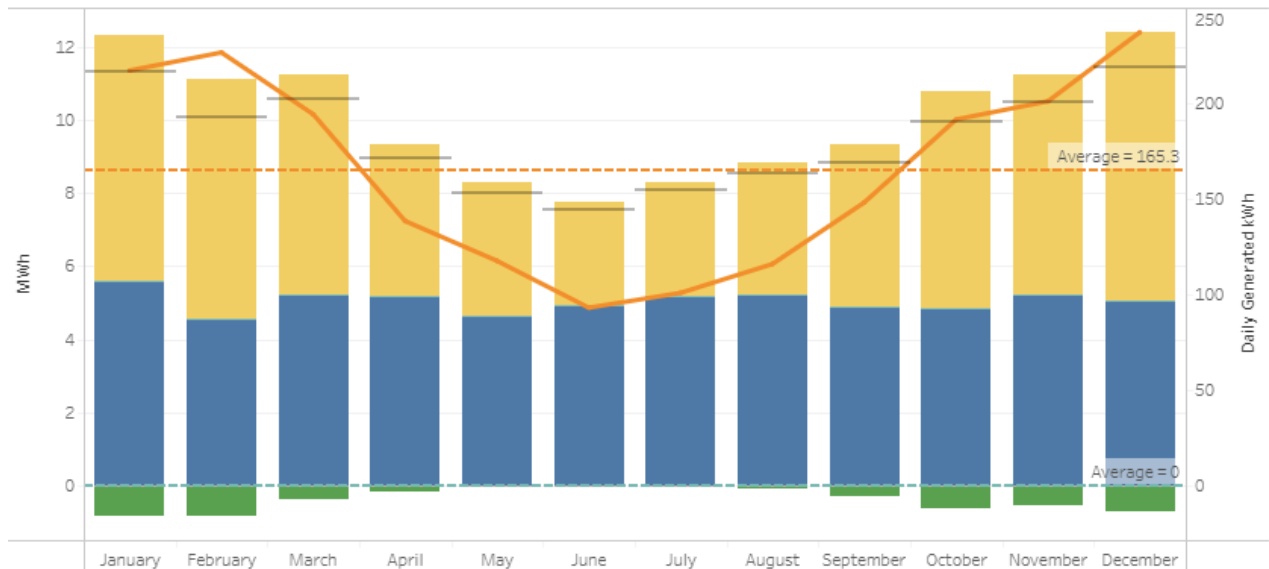


Figure 2-8: Monthly Energy, Solar generation (yellow), grid consumption (blue), Export to grid (green), average daily generation per month (orange)

### 2.3 Conclusion

The conclusion is that it is possible for a developer to provide a 100% renewable energy supply for the strata title development in Narrogin at no additional cost to themselves and with the residents paying the equivalent of the states uniform tariff, on the basis that a return, in the order of 24% over a 7 year period, on the investment for the installation and operation of the solar/battery system, would be sufficient to attract a Microgrid Operator that could implement this.

### 3. Kellerberrin

#### 3.1 Basis

The power supply model for the Kellerberrin development was to provide electricity connections for 7 industrial lots as per Figure 3-1.

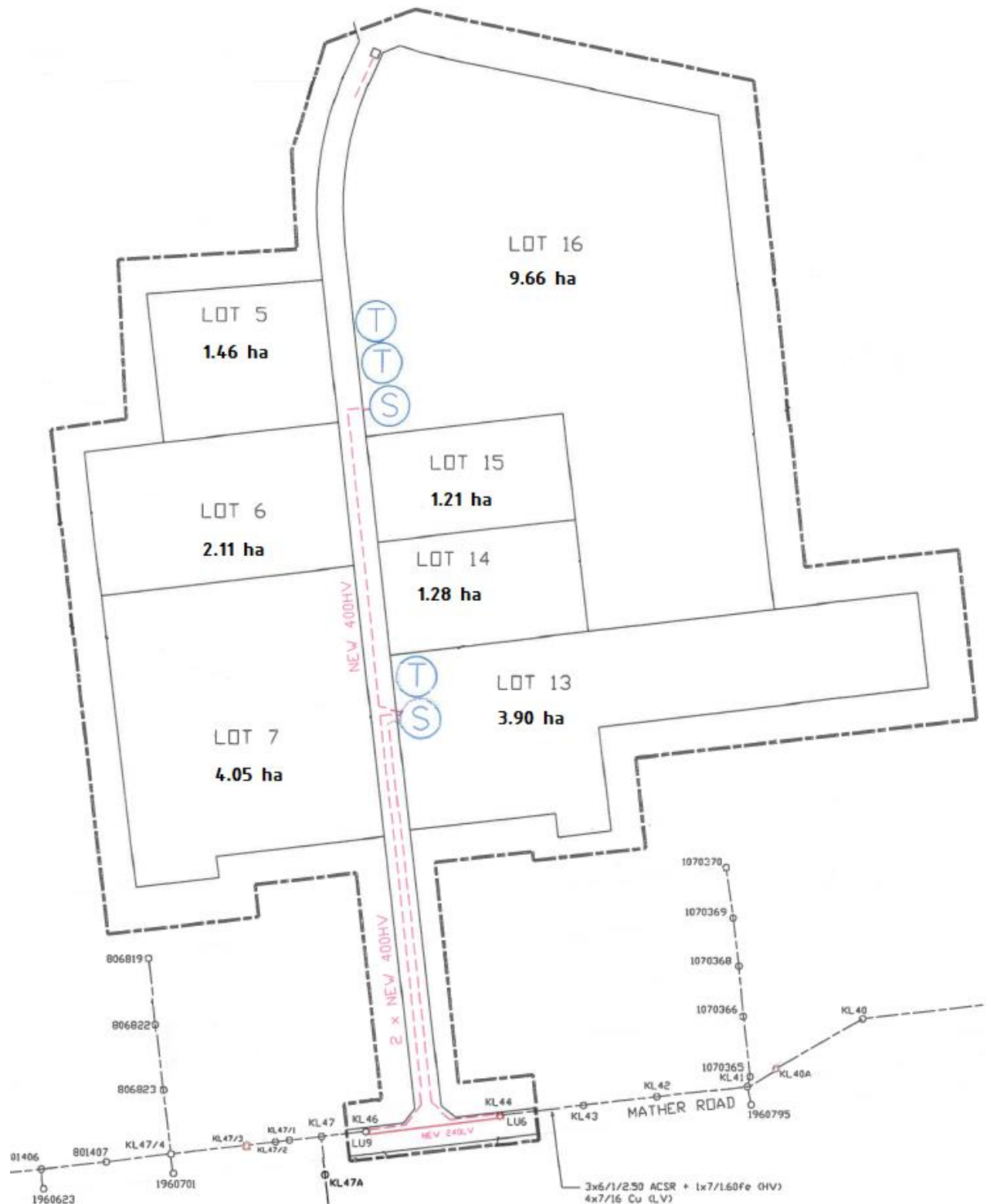


Figure 3-1: Industrial Lots in Kellerberrin development requiring power connection, extract from Western Power distribution drawing (Western Power, Distribution Design Services, 2010)

The area covered by these lots is a total of 23.7ha. Based on the Western Power requirement of 200kVA allowance per hectare this equates to design supply of max 4.74MVA. Assuming a load profile based around weekday, daytime operations, this equates to an annual load of about 7659MWh, ie. 21MWh/day (according to Sunrise Energy generic industrial load profile, ref. Figure 3-2).

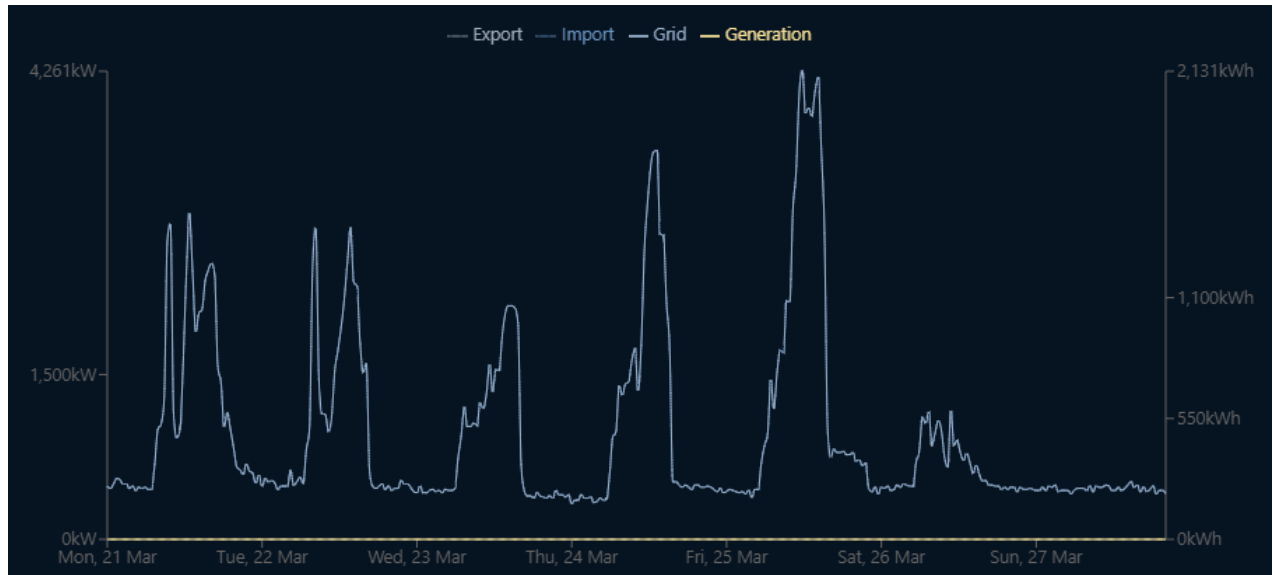


Figure 3-2: 7 day sample of load profile from March for the 7 lots (combined).

The Kellerberrin development therefore has the following characteristics which fit the selection criteria for a Renewable microgrid power delivery model:

- Total load greater than 20MWh/day.
- predominately daytime load profile.
- “green-titled” lots with relatively close proximity to each other.
- Network connection with limited capacity and network upgrades required for a standard power delivery model approach.

Assumptions and basis for the model include the following:

- The grid connection has a 2MW import limit and 1MW export limit.
- Solar generation provided by single solar array (single-axis tracking) servicing all of the lots and located somewhere within the development area. Land utilised by the solar array leased by the MO at \$10,000/ha/year.
- Battery energy storage solution (BESS) would be via a single common “large” battery servicing all of the lots.
- Customers would pay the MO the equivalent of the Synergy (L1) Business Tariff.
- The MO earns income from the excess LGC certificates beyond the statutory target.
- The MO pays for power based on the balancing market price and RT5 network tariff,
- The MO pays the market fees, LGC&STC charges and IRCR charges.
- The MO would be responsible for the complete CAPEX, OPEX costs of the solar/battery installation and grid connection costs.
- The land developer would be responsible for the embedded network costs.
- 7 year period for the MO to achieve a reasonable return on their investment.

### 3.2 Modelling/Sizing

Entering the basis/assumptions from above into the modelling software GridCog, several different solar and battery size combinations were evaluated (3, 4 & 6MW total Solar and 4, 6, 8 & 10 MWh battery).

The results from the different combinations of these assets are compared, as shown in Figure 3-3, where they are ranked from highest to lowest based on their calculated ROI over the 7 years. Scenarios with a red cross against them represent invalid cases where the solar/battery combination was not capable of satisfying the load demand because of the grid import constraint. The first valid case with best ROI (of 13% before corporate costs) is that with 4MW of solar generation with a 6MWh battery.

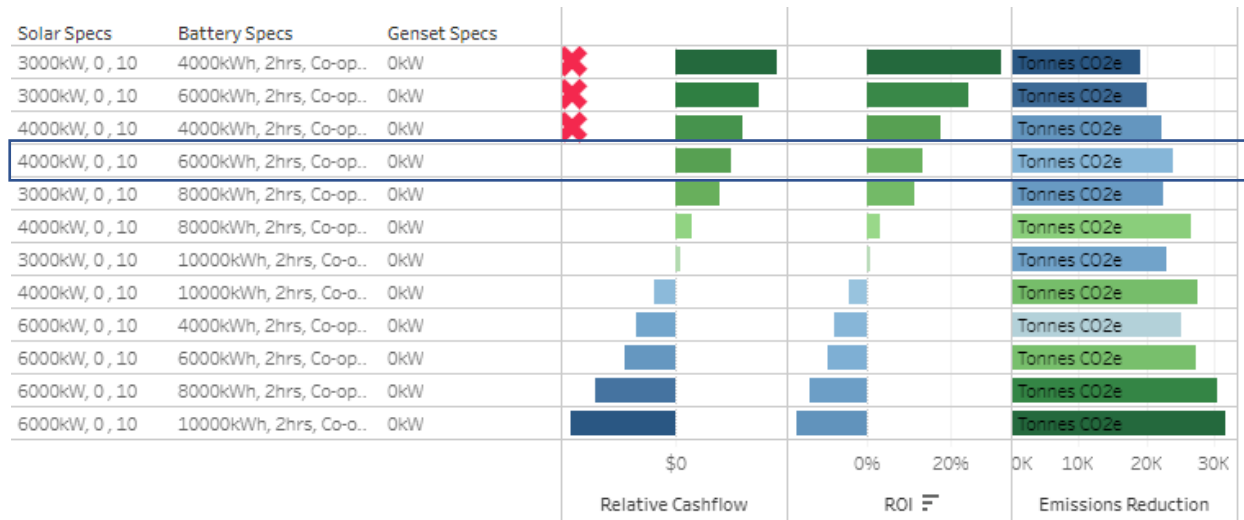


Figure 3-3: Ranking of different solar/battery combinations on the basis of ROI (Return on Investment)

If there were no constraints, it is evident there would be alternative solar/battery configurations that could produce a better ROI for the MO. There is a trade-off between ROI and amount of renewable content and so renewable content could be increased by sacrificing the level of return, through retaining some or all of the LGC certificates.

Figure 3-4 represents the cashflow breakdown for the selected solution over the total 7 years and Figure 3-5 is the breakdown for each year.

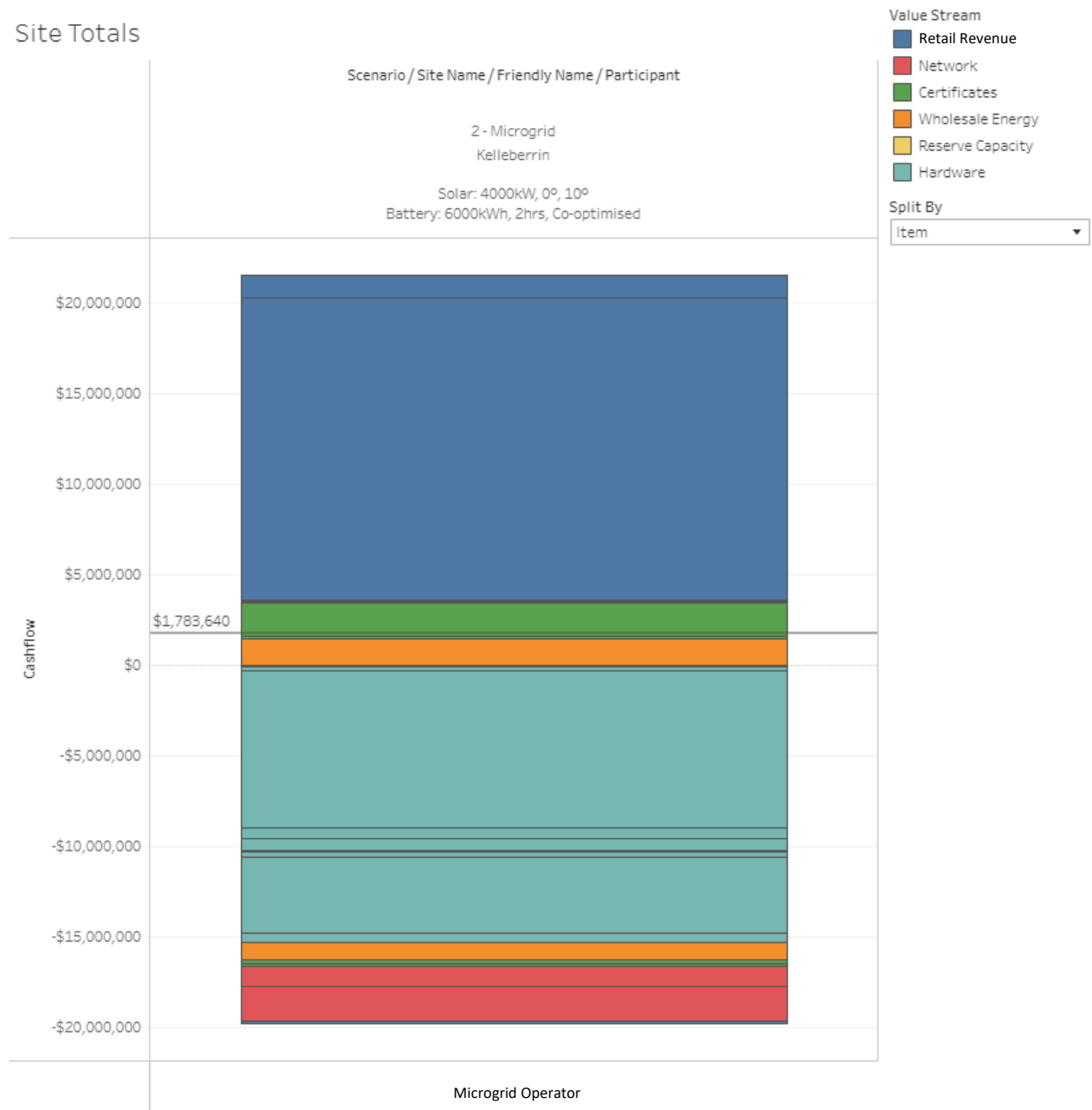


Figure 3-4: Cashflow breakdown for selected 4MW Solar and 6MWh Battery solution over 7 years

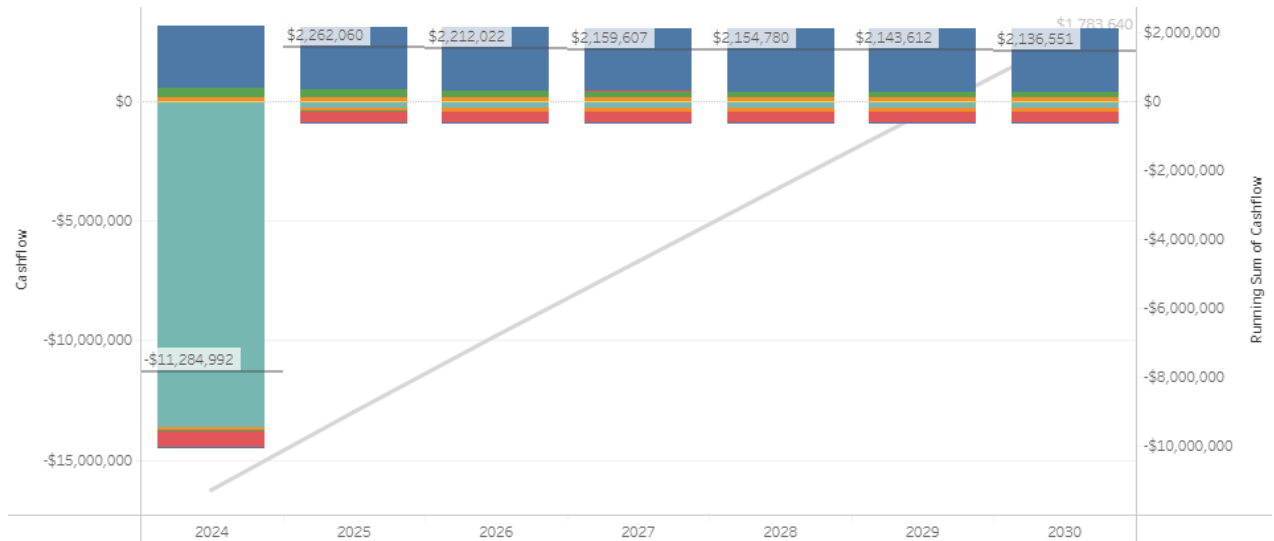


Figure 3-5: Cumulative Cashflow for the MO over the 7 year investment period

In Figure 3-6 it can be seen how the solar generation (yellow) is serving the load and charging the battery (purple), and then any excess generation is available for export which is when the grid consumption (blue) drops below zero. How this looks in terms of overall solar generation, grid consumption and grid export over a whole year on a monthly basis is shown in Figure 3-7, where the impact of the grid export limit is represented by the excess generation (in grey) that can't be exported.

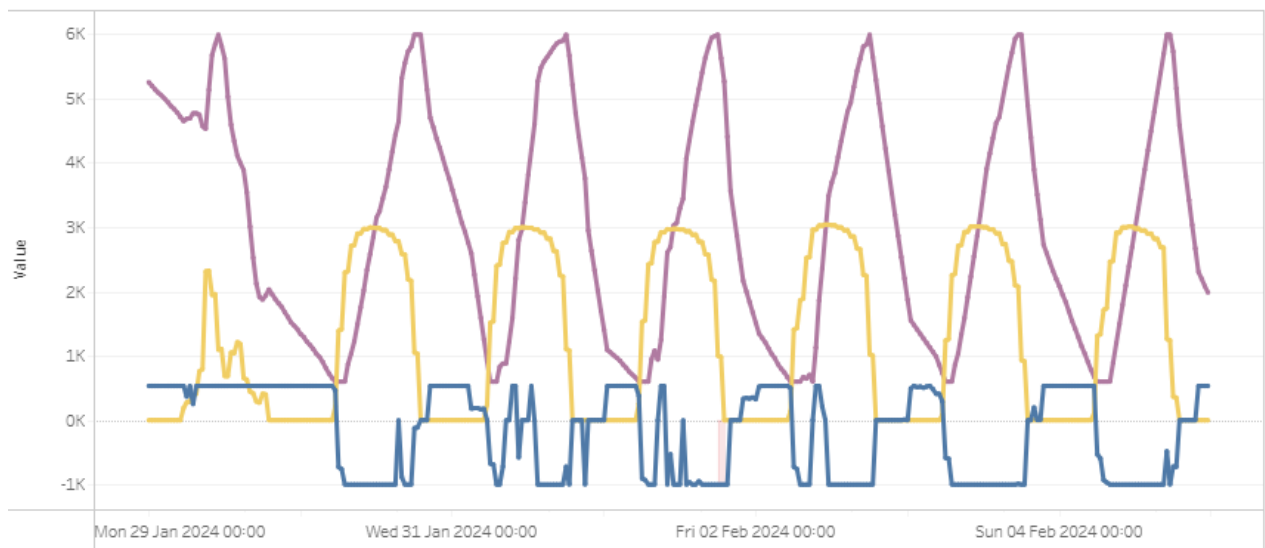


Figure 3-6: Modified grid consumption (blue, kW) after installation of solar (yellow, kW) and battery (purple, kWh) in week 5

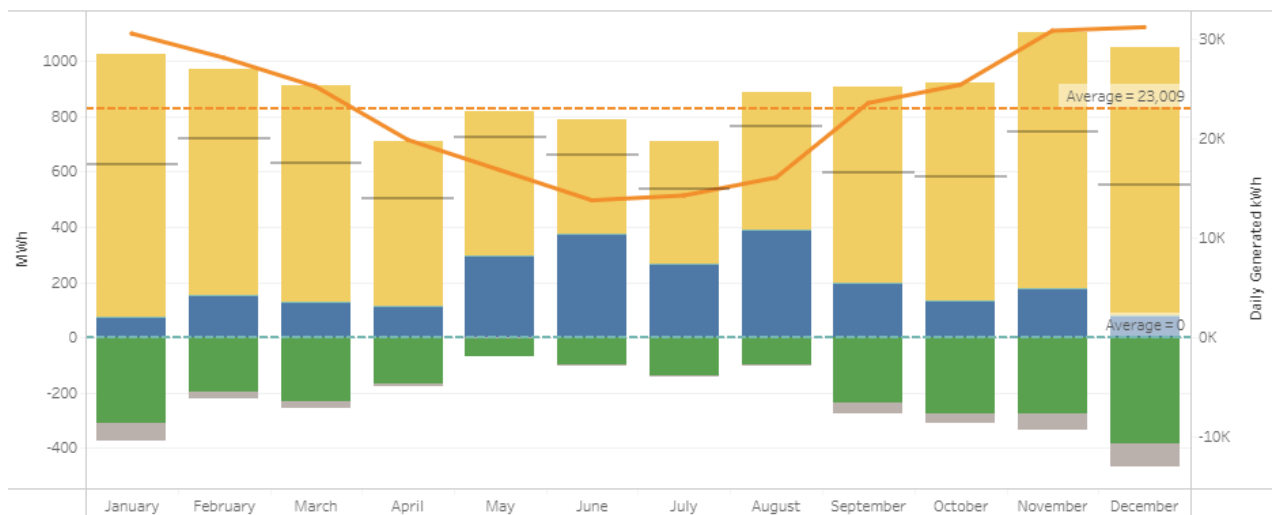


Figure 3-7: Monthly Energy, Solar generation (yellow), grid consumption (blue), Export to grid (green), Excess generation that could not be exported due to export limit (grey) and average daily generation per month (orange)

### 3.3 Conclusion

The conclusion is that it is possible for a developer to provide a renewable microgrid power delivery model (with 69% self supply, but renewable content held constant with grid % of renewables) for the Kellerberrin green title industrial development with a full 200kVA/ha connection, bypassing the Western Power constraints and costs for network modification that would have been associated with a standard network connection power delivery model and with all of the Microgrid development costs born by the Microgrid Operators. This is possible to achieve with commercial residents of the industrial development paying the equivalent of the Synergy L1 business tariff and with a return (of approximately 13%, excluding corporate costs) over a 7 year period on the microgrid investment sufficient to attract the interest of a Microgrid Operator (and without any contribution from the developer towards the initial capital investment).

The only additional expenses born by the developer to execute this form of a power delivery model over a standard connection model would be those associated with engaging the services of the Microgrid Operator, typically in the order of \$50k+.

#### 4. References

- H+H Architects. (2022, Nov). Development WA - Wheatbelt Housing, Glyde Street, Narrogin. Proposed Site Plan.
- Sunrise Energy Group. (2023). *Wheatbelt Residential & Industrial Development: Power Infrastructure Delivery Model Report*. Perth, WA: Sunrise Energy Group.
- Western Power, Distribution Design Services. (2010, Jun). Kellerberrin Industrial Land, DOP Drawing NS010470.

# APPENDIX 5



## **Wheatbelt Development Study – Development WA Proposed Housing and Built Form Strategy**

Project no 0239-21  
June 2023

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### Appendices –

#### Appendix 1 -

24 Glyde Street, Narrogin - proposed site plan  
House designs Type 1;2;3  
Modular WA 'Johnston' plan

#### Appendix 2 -

Quantity Surveyor cost estimates for residences in Narembreen

## 1.0 INTRODUCTION

H+H Architects have been engaged for architectural consultancy advice on proposed residential built form in Wheatbelt towns of Kellerberrin, Narembeen, Pingelly and Narrogin. Our aim is to provide suggestions of economical and flexible built form which can meet the accommodation needs of these towns.

We appreciate that that each town is unique in that the extent of their ability and skills base will vary with respect to building construction mainly due to population and distance from the Metropolitan area. The varied solutions provided are designed to provide adaptability to suit the varying challenges of material transport distances and skills availability in regional areas.

## 2.0 EXISTING REGIONAL SMALL TOWN HOUSING MARKET CHALLENGES

With reference to the *CDP Housing Solutions for the Wheatbelt Case Study for Dandaragan & Moora* dated August 2022 we note their mention of systemic challenges facing many regional small towns. These towns have small housing markets and infrequent property sales. Added to this, newly built units are rarely sold, resulting in most of the housing sales being from older, run down housing stock. This reduces forecast valuations, often to below cost, and therefore reduces the amount borrowable.

In addition, the aforementioned report asserts, in paragraph 7.1 pg 21,22, that these smaller communities are more susceptible to external economic impacts which increases the risk of lending. The net result of this is that banks offer lower Loan to Value Ratios (LVRs) in small towns. This means that residents in these towns can only borrow a third to half as much as their city counterparts, requiring more than 5 times the deposit to secure a loan.

Given these challenges it is unlikely that developers will find it worthwhile to purchase greenfield tracts of land for housing development due to the difficulty in finding buyers and the likely long term holding costs of the land (serviced or unserviced) while they wait for buyers.

The proposed solution lies in a hybrid delivery suggestion where new dwellings (for which there is demand) are constructed on existing vacant or underutilised lots (which are serviced or close to services). In addition, these new dwellings would provide more appropriately planned homes for the expected markets and vastly more energy efficient structures to suit current and future energy costs.

## 3.0 DESIGN OBJECTIVES AND CRITERIA

The aim of the project is to establish concept designs for freestanding 2 and 3 bedroom homes suitable for a variety of Lot configurations, but with a minimum lot size. The design has been applied to a 16 dwelling site at 24 Glyde Street, Narrogin which is complemented with a servicing report prepared by Porter Consulting Engineers. Two designs outlined in Appendix 1 have been subject to a preliminary cost estimate from a quantity surveyor based on conventional construction, flat pack construction and modular/transportable construction.

The intention is to design new homes that are modern, energy efficient and fit for purpose for all user groups, whilst also ensuring they are adaptable for varying degrees of modular construction. This will facilitate construction delivery in locations where conventional construction procurement is not readily available.

The proposed concept designs in this document includes three plan types tailored for specific minimum lot sizes and provides aesthetic suggestions for each. We have also included a typical standard off-the-shelf modular plan to take advantage of the cost efficiency of standard design.

## 4.0 HOUSING TYPOLOGIES

### 4.1 Existing Architectural Context

Examples of the typical residential built form are illustrated below for each of the towns i.e. Kellerberrin; Narembreen; Narrogin; Pingelly. These generally depict the variety in aesthetics, styles and construction typologies present in these areas. Architectural simplicity and economy of form remain a common thread for residential built form throughout these towns, as their proximity to building material supplies remains a cost challenge. The variation in construction material types is likely related to the transient trades and skills that were available locally at the time of construction.

#### 4.1.1 Existing Built Form Examples

##### Kellerberrin – Existing Built Form Examples



Moore Street



James Street



Moore Street



Hammond Street

**Narembeen – Existing Built Form Examples**



Churchill Street



Churchill Street



Currall Street



Churchill Street

**Narrogin – Existing Built Form Examples**



Glyde Street



Furnival Street



Glyde Street



Falcon Street

**Pingelly – Existing Built Form Examples**



Sharow Street



Sharow Street



Sharow Street



Pasture Street

## 5.0 ARCHITECTURAL SITE PLANNING & DESIGN

### 5.1 Ideal lot attributes to contribute to economic regional developments

While it is difficult to procure ideal lots, certain physical attributes contribute to lower cost site works and time required on site. Both impact project delivery costs.

#### Site fall or slope

The intended dwellings will be flat floored with no steps appropriate for accessibility.

For this reason, lots selected should ideally be close to flat with a minimum fall of around 1:80 to naturally move surface water to on-site soakwells. Steeper sites should be avoided as these will require expensive cut to fill ground works to create level dwelling pads. If this is unavoidable, then steeper natural site falls can be mitigated by building construction methodology where floors are raised and supported above the sloping ground. Prefabricated concrete slabs or prefabricated timber floor cassettes can provide fast alternatives to traditional raised-floor construction. It is important to note that raised floors will require a measure of access modification such as ramps or ramped pathways to render them accessible, as much of the slab will be at least one step height above surrounding finished ground levels.

#### Soil conditions

Common poor founding conditions encountered in the WA regional context are reactive (heaving) clays and will generally contribute to higher site works costs. These expand and shrink significantly as they become wet or dry out and will cause damage to buildings not designed for these conditions. Generally structural engineers will solve the problem by founding the building in an imported and compacted sand pad. Failing this they may found the slab in the existing unfavourable ground and heavily engineer slabs to act as rigid rafts, effectively cancelling out differential movement cracking in slabs and walls. This is costly compared to imported sand fill from a materials and site duration viewpoint. Prefabricated concrete slabs or prefabricated timber floor cassettes can provide fast alternatives to traditional raised-floor construction which seeks to avoid effects of poor soil conditions by separating themselves from the ground.

Other poor founding conditions can include high water table areas where acid sulfate soils and soils where high organic contents are often present in layers of organic silts; soils prone to liquefaction under favourable conditions; sites located over old fly tip areas or old waste sites where voids, contamination and unregulated compaction occur to significant depths.

In summary favourable soil conditions permit standard slab on ground solutions and thereby reduce cost and widen opportunities for local skills.

Geotechnical investigation of potential development sites is an essential first step in the investigative process.

#### Orientation

Traditionally the ideal orientation would provide the longest boundaries to the north and south sides. This is rarely possible to guarantee and dwelling-yield proportional to the land area generally predicts that narrower N/S boundary lots favour economic efficiency.

The designs we have produced reflect narrow north/south boundaries and explore natural light harvesting into deep spaces in spite of this orientation. This represents the most difficult design and energy efficiency scenario and will make other orientations or lot shapes less challenging by comparison.

## 5.2 Proposed Lot sizes

To promote affordability, feasibility and a broader range of housing, lot sizes of 240m<sup>2</sup> are identified which relates to R40 in the Residential Design Codes. R40 has been adopted by the Shire of Narrogin in parts of the Narrogin townsite. In-turn, R40 is applied to the case study of 24 Glyde Street.

The lot configuration selections are as follows –

Design type	Street side	Street boundary	Side boundary	Rear boundary
Lot Type 1	North	12m	20m	12m
Lot Type 2	South	12m	20m	12m
Lot Type 3	South	10m	20m	10m

The appended plans are based on the above typical lot proportions to explore and establish liveable home designs on economical lot shapes. It should be noted that clerestory windows are employed to mitigate the disadvantages of narrow plan layout resulting from the narrower lots. These provide natural light and low incident winter sun penetration into living areas which would otherwise be too close to boundaries to achieve beneficial solar gain, or on the southern side of the lot where no northern solar gain would otherwise be possible.

## 5.3 Proposed Architectural Solutions

### Architectural language –

The proposed architectural form has been deliberately constrained. This will allow these homes to fit into any town suburban fabric without necessarily referencing a particular style to avoid devaluation of the existing suburban environment into which they are inserted. Colour and trims can vary to suit immediate surrounding structures or suburban fabric. The proposed style will carry a more modern feel mainly due to the low roof pitches and clerestory windows.

### Appropriate construction materials and methodology -

Using this language also suits modularised construction and economises on materials generally. Selected materials are chosen to suit local availability and to suit generally available trades thereby avoiding specialised trade-import for future maintenance and repairs.

### Low maintenance approach –

Construction systems and materials selection is to be biased toward low maintenance and simplicity of construction. The degree of pre-finish is to be discussed with local communities, so that it is correctly understood. Prefinished materials on the roof and trims should be considered for cost, quality of finish and durability.

In regional areas wall finishes are often more practical as on-site finished to enable easy repairs or refinishing if damaged by harsh weather conditions or vandalism. It has to be recognised that all paint finishes for walls, prefinished or on-site finished, have a limited service life span after which they begin to break down and will require overcoating. Even standard powdercoated aluminium windows generally carry a powdercoat warranty of only around 10 years. Higher warranty coatings come with disproportionately higher cost.

For example fibre cement wall cladding is applied in panel or plank form and matching replacement material is readily available, even years after construction. On-site painting permits ease of recoating where sun damage or bore/dust/moisture staining may have occurred. Even in regional areas, the trades for these repairs can be found.

**Design flexibility –**

The designs depicted below are based on small lots and are an exercise in compact plan design. Available land parcels and lot sizes will likely vary across the Wheatbelt towns. Using the current principles and cues, the design response to these can be flexible to achieve the optimum site response.

**Bushfire Attack Levels and design response –**

It is likely that many of the selected lots will fall within the designated DFES Bushfire Prone Areas and will therefore require BAL assessments which may mandate BAL rated construction. Where management of existing flora is not possible, the materials and construction systems suggested herein are adaptable enough to ensure compliance with BAL Low up to BAL40 ratings with some additional interventions. Construction systems and types would need to be carefully selected to ensure fundamental compliance with the determined BAL rating and AS3959.

**Planning assessment –**

House typologies investigated and the associated construction systems suggested should be subject to local government planning approval processes.

Where residential dwellings, including house typologies investigated, are compliant with the Deemed Provisions Part 7 Clause 61 of the R-Codes, these can proceed to Building Application approval stage.

### 5.3.1 Accommodation Schedule of H+H House Types

AMENITY	SIZE	COMMENTS
<b>Type 1 – North entry 3 bedrooms</b>	93m <sup>2</sup> enclosed area	
Dining; Living areas	24m <sup>2</sup>	North/south orientation
Kitchen	10m <sup>2</sup>	North side overlooking carport to support surveillance
Outdoor living area – north side	9m <sup>2</sup>	Paved area with pergola over
Outdoor living area – south side	10m <sup>2</sup>	Paved area, roofed
Bedroom 1	11m <sup>2</sup>	Built in robe
Bedroom 2	7m <sup>2</sup>	Robe in Hall adjacent
Bedroom 3	7m <sup>2</sup>	Robe in Hall adjacent
Bathroom	6m <sup>2</sup>	Shared
Entry Hall	6m <sup>2</sup>	Side of dwelling. Pergola provides entry language and visual direction
Hall 2	5m <sup>2</sup>	Robe and study nook space
Shielded bin store		Street side, opens into Carport.
Store	4m <sup>2</sup>	Opens into Carport
Double Carport	34m <sup>2</sup>	Roofed as part of main roof
<b>Type 2 – South entry 2 bedrooms</b>	93m <sup>2</sup> enclosed area	
Dining; Living areas	24m <sup>2</sup>	North/south orientation
Kitchen	10m <sup>2</sup>	North side overlooking carport to support surveillance
Outdoor living area – south side	9m <sup>2</sup>	Paved area with pergola over
Outdoor living area – north side	10m <sup>2</sup>	Paved area, roofed
Bedroom 1	17m <sup>2</sup>	Built in robe and vanity bench
Bedroom 2	11m <sup>2</sup>	Built in robe
Bathroom	6m <sup>2</sup>	Shared
Entry Hall	6m <sup>2</sup>	Side of dwelling. Pergola provides entry language and visual direction
Shielded bin store		Street side opens into Carport.
Store	4m <sup>2</sup>	Opens into Carport
Double Carport	34m <sup>2</sup>	Roofed as part of main roof
<b>Type 3 – South entry 2 bedrooms</b>	80m <sup>2</sup> enclosed area	
Dining; Living areas	22m <sup>2</sup>	North/south orientation
Kitchen	10m <sup>2</sup>	North side overlooking carport to support surveillance
Outdoor living area – south side	7m <sup>2</sup>	Paved area with pergola over
Outdoor living area – north side	8m <sup>2</sup>	Paved area, roofed
Bedroom 1	11m <sup>2</sup>	Built in robe
Bedroom 2	9m <sup>2</sup>	Built in robe
Bathroom	5m <sup>2</sup>	Shared
Entry Hall	7m <sup>2</sup>	Side of dwelling. Pergola provides entry language and visual direction
Shielded bin store		Street side, opens into Carport.
Store	4m <sup>2</sup>	Opens into Carport
Single Carport	23m <sup>2</sup>	Roofed as part of main roof

## 5.4 Construction system options to favour lower built form costs across the Wheatbelt.

### 5.4.1 Materials and systems selection

#### 5.4.1.1 Wall types

Economical and energy efficient construction can be achieved with 90mm wide, single leaf, insulated, load bearing framed construction utilising timber or steel frame.

External cladding options		
Material	Advantages	Disadvantages
<b>Through colour fibre cement</b>	Low maintenance	High material cost
	No recoating required	Exposed fixings
		Must be pre-cut before finishing. On site measuring errors cause cladding delays
		Should not be cut on site – results in exposed edges
		Difficult to remove graffiti
<b>Face brick veneer</b>	Low maintenance	High labour cost
	No recoating required	High material volume
	High impact resistance	Slow construction
		Thicker walls due to internal frames leaf – causes increase of floor slab area
		Mass results in long duration high thermal retention – not good for hot climate areas
		Unsuitable for off-site construction options
<b>On-site painted fibre cement</b>	Economical	Shorter coating lifespan
	Readily available	
	Concealed fixing	
	Easy to replace and recoat	
	Familiar to local trades	
<b>Colorbond profiled sheet cladding</b>	Most economical	'Prefabricated' appearance
	Readily available	Limited impact resistance
	Easy to replace	
	Familiar to local trades	
	Long coating lifespan	

Steel vs timber frame wall structure		
Material	Advantages	Disadvantages
<b>Steel framing</b>	Light weight	Less favoured by small town locals due to more specialised tools required
	Can be made up as modular framing panels	Thermal break required
		Requires hot works for cutting – problem during fire bans
		Steel price has escalated rapidly over the last 2 years
<b>Timber framing</b>	Favoured by smaller town locals due to ease of use	Timber supply shortages
	Can be made up as modular framing panels	
	Better insulated – no thermal break required	

#### 5.4.1.2 Flooring Types

There are various suitable floor types to choose from as tabulated below. The selection of these will depend on site geotechnical conditions and site location. Generally the building superstructure plan layout is not affected by the flooring system selected.

Pre-manufactured floor systems		
Material	Advantages	Disadvantages
Framed timber cassette type floors	Can be modularised	Higher cost
	Light weight and on-site time and cost saving.	Required to be insulated due to being raised
	More resilient structures over extremely poor soil conditions.	
	May avoid soil importation required to improve founding conditions	
	Options such as screw piles can be applied	
	Cost effective on sloping sites where cut to fill can largely be avoided	
Precast concrete floors	Can be modularised	Higher cost
	On-site time on-site time and cost saving.	High transport weight
	Limited foundations required	Limited by transport size
	High concrete quality and strength	
	Not prone to termite damage	
	Some systems are 200mm thick and are steel edged so can be welded together once placed on site to create more continuous floor bed (Dallcon)	
	Thermal mass advantages – ground connected	
In-situ concrete floors	Least expensive Adaptable to any shape required	Cannot be modularised
		On site labour intensive therefore slow due to placing and curing times
		Quality of concrete finish reliant on trade skills available
		Concrete batching plant required nearby

#### 5.4.2 Modular vs conventional on-site construction –

**Appropriate, flexible construction typology** - The aim of any modularisation concepts reviewed for this project is to ensure that the construction system selected can be partially modularised or conventionally constructed from unitary materials delivered to the building site.

For this reason, systems such as Structural Insulated Panels (SIPs) as well as conventional steel skin insulated panels such as traditional transportables, as well as Bondor systems have been discounted. None of these typologies suit wholly on-site construction.

Both steel and timber can be utilised on site or can be modularised i.e. constructed off-site. Both materials and systems permit conventional design freedom as opposed to true modular construction where design is governed by transportation size constraints.

The common off-site construction types for framed construction of this type are as follows –

Modular vs on-site construction		
System type	Advantages	Disadvantages
<b>Pure modular construction – pre-manufactured buildings</b>		
This definition refers to the fully prefabricated modular buildings which are transported ‘whole or partially whole’ to their destinations. Their sizing is generally determined by maximum road transport widths and heights.		
	Dramatically reduced time on site	Standardised designs
	Consistent workmanship quality	High transport costs due to oversize regulations
	‘Locality loading’ is reduced due to the fabrication taking place in the Metro	Elements such as pergolas and carport are not included and have to be sourced separately
		Very low utilisation of local skills and trades
<b>Light gauge steel (LGS) framing – Off-site manufactured</b>		
These systems are engineered by framing fabrication specialist companies like Modstruct to produce steel framed wall panels and roof trusses delivered to building sites to be erected by the builder.		
Further economies - With both framing systems, improved economies arise from simplicity and repetition. If designs can be repeated over a short period, then the fabricators tool-up once and complete a run of fabrication resulting cost economy.		
	Reduced time on site therefore ‘locality loading’ is reduced due to the fabrication taking place in the Metro	Steel price has escalated rapidly over the last 2 years
	Design flexibility	Thermal bridging to be overcome in wall design
	Same system for roof framing results in an engineered wall and roof system	Regional carpenters less familiar with steel framing
<b>Timber framing – Off-site fabricated</b>		
Same as previously mentioned system, but applicable to timber wall and roof framing. This system is well suited to this project.		
	Reduced time on site	Timber supply shortages
	Design flexibility	
	Same system for roof framing results in an engineered wall and roof system	
	Frame erection completes in a few days	
	No thermal bridging	
	Regional carpenters familiar with timber framing	

## 6.0 ENERGY EFFICIENCY

The proposed construction solutions will enable NatHERS ratings of 7 Stars or higher. In addition to the energy efficiency inherent in the proposed construction fabric, it is suggested that roof top PV systems are considered to augment daytime energy consumption. These systems' inverters should be 'battery ready' in case of future deep cycle battery additions.

Windows and glazing –

High performance laminated single glazing will likely suffice for the Star rating being considered. Additional window shading may be required when the energy analysis is carried out. Window frames in either uPVC or powder coated aluminium would be considered, with uPVC being the more energy efficient due to reduced thermal bridging.

Heating and cooling –

Considering PV systems may be included, then reverse cycle air conditioning should be allowed for to provide heating and cooling. Given that these buildings will be more energy efficient, the need for high heating and cooling energy input should be sharply reduced in comparison to the existing housing stocks.

## 7.0 STORMWATER MANAGEMENT

Discarded site stormwater to be managed as far as possible using WSUD (Water Sensitive Urban Design) principles. For these dwellings rainwater harvesting should be encouraged in the form of roof collection ground mounted rainwater tanks where it can be utilised for various non-potable water uses such as irrigation or for emergency use should the need arise.

## 8.0 COST

A preliminary cost estimate is provided for each of the following construction types. Note that the Quantity Surveyor areas provided include the areas of the carport and covered outdoor areas. See appendices at the end of this document.

QS Costs estimates are broken down as follows –

- Summary
- Full elemental summary
- Trade breakup

Below is a varied interpretation of sq.m rates based on the QS Estimate to illustrate the cost rates of the enclosed areas i.e., building area measured across external walls. Not including open covered areas.

To compare prices with the offer from Modular WA, elements such as floor coverings and air conditioning are included with the conventional construction and flat pack construction costs. There is scope for cost savings with all construction forms (not installing floor coverings or landscaping upfront) and reviewing opportunities to operational efficiencies e.g., constructing a few similar dwellings in a townsite at the same time.

Construction Cost Summary		
Conventional construction <b>H+H Unit Type 1</b>	Flat pack construction <b>H+H Unit Type 1</b>	Modular construction <b>Modular WA 'The Johnston'</b>
Enclosed floor area 93m <sup>2</sup>	Enclosed floor area 93m <sup>2</sup>	Enclosed floor area 88m <sup>2</sup>
\$3,655/m <sup>2</sup> enclosed area construction cost	\$3,612/m <sup>2</sup> enclosed area construction cost	\$3,386/m <sup>2</sup> enclosed area construction cost
<b>Building and external works - \$393,000</b> excl GST.	<b>Building and external works - \$389,000</b> excl GST.	<b>Building and external works - \$351,000</b> excl GST.

The prices above indicate that conventional construction and flat pack construction are similar in cost. The modular (transportable) unit is not the same design as Unit Type 1, but pricing indicates that this product is 10.5% less expensive per than the other 2 alternatives. We do not have detail on exact building materials used on the modular unit – these may differ from Unit 1 construction materials.

Note that the figures above are estimates and exclude a regional location allowance.

## 9.0 SUMMARY

The proposed solutions illustrated in this report strive to balance development potential, cost, affordability, aesthetics, energy efficiency and liveability in their relative importance. They strive to ensure that the construction types can be delivered in both conventional construction as well as in varying degrees of prefabrication to suit local conditions and skill availability. Where possible these developments would aim to create employment in the regions.

The most cost-effective construction type investigated is the Modular WA style transportable building unit. While the main building component is constructed on its concrete floor slab off site, all covered outdoor areas, pergolas, site fences, carports, driveways and the like are constructed on site, resulting in significant local trade opportunities.

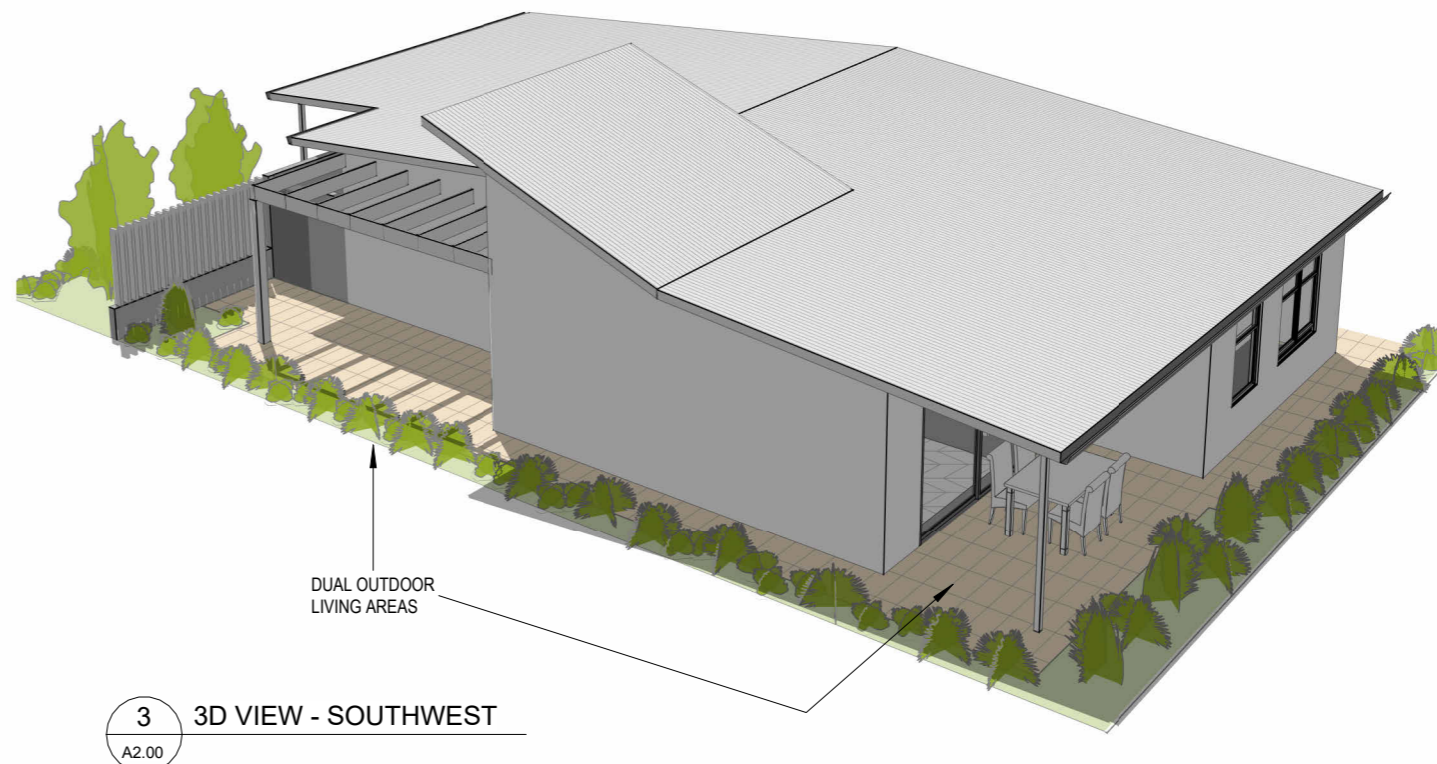
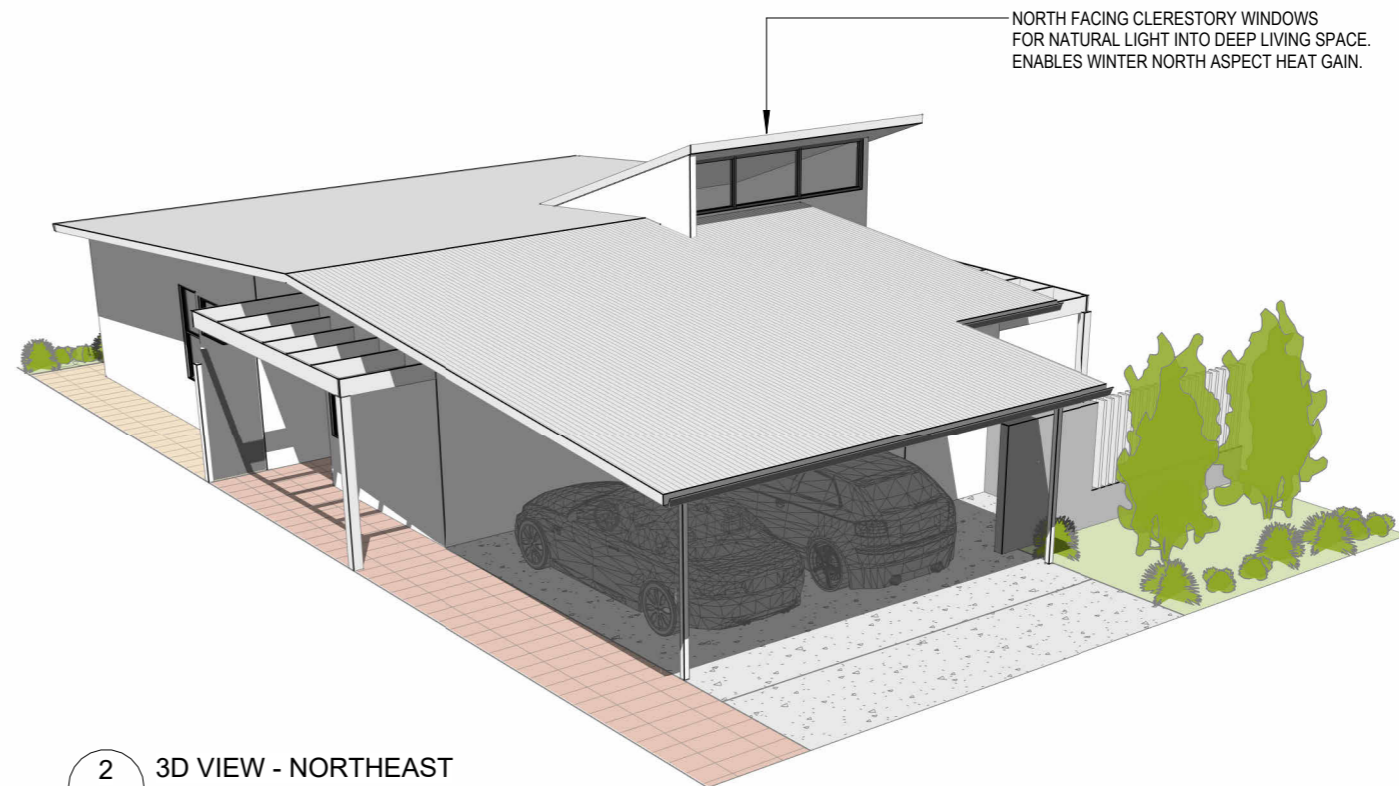
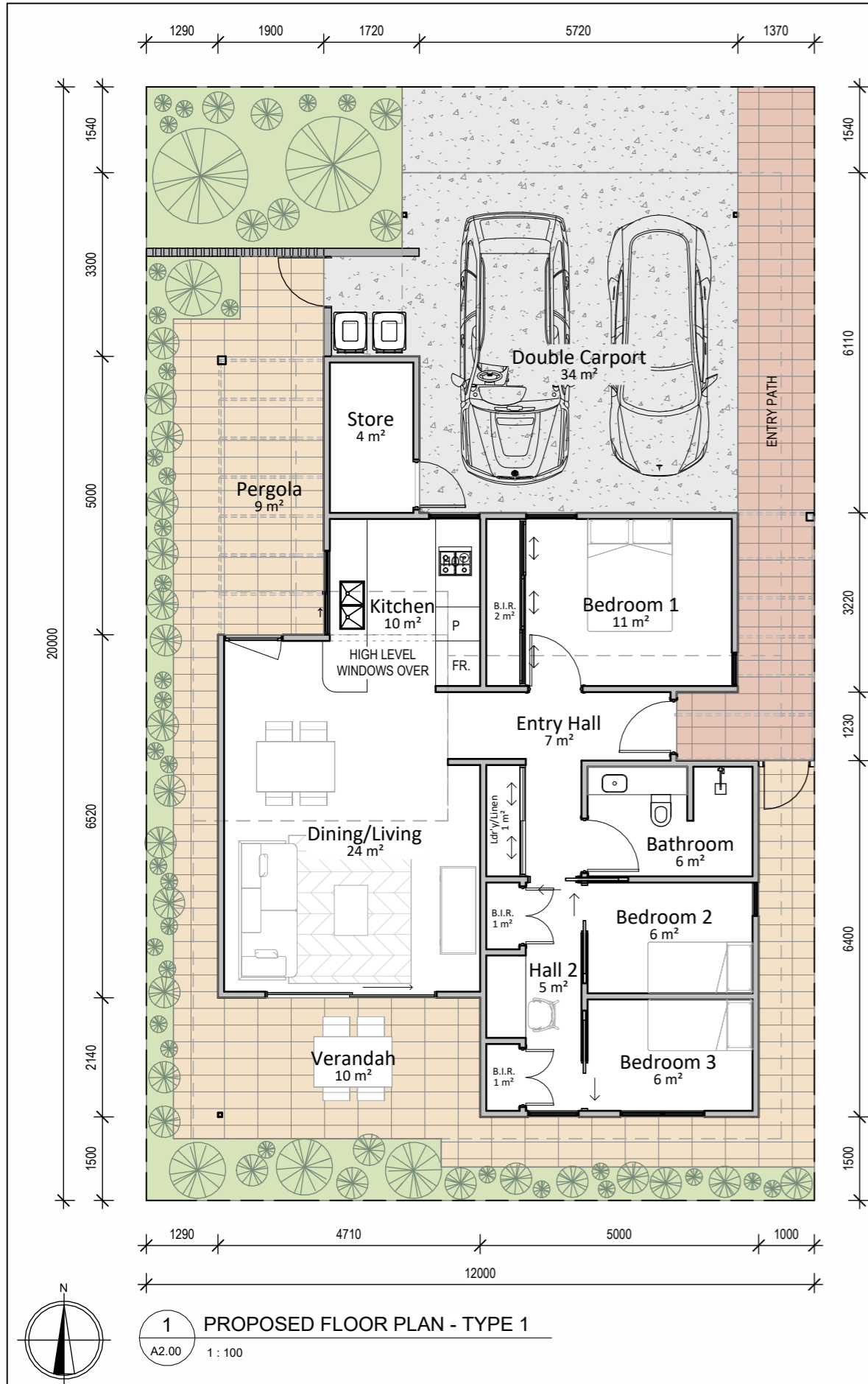
It is important to note these are standard units and Lots will have to be found or subdivided to suit their standard building shape and size configurations.

Based on the investigations, the report's recommendations are:

- Promote modular housing that takes into account the area's context and planning framework.
- Review, or as required, consider the need for design guidance for preferred housing architectural character.
- Promote housing on land with suitable characteristics to lower earthworks and construction costs.
- Review opportunities for infill development on suitable sites.
- Promote modest scale housing, including one- and two-bedroom dwellings, to achieve a greater range of housing.
- Promote pilot projects for well-designed affordable housing.

*This report presents general advice based on H+H Architects experience relating to current residential and commercial projects across regional WA. Note that the construction market, particularly in the regional areas, remains volatile and is experiencing unpredictable trades availability which continues to affect the outcomes of projects regarding cost/viability and construction time frames. Since 2019 we have observed an increase in construction costs of around 30% in the tenders received across the board for projects we have been involved with. Construction costs provided by the QS are best estimates based on the current market conditions and rates.*





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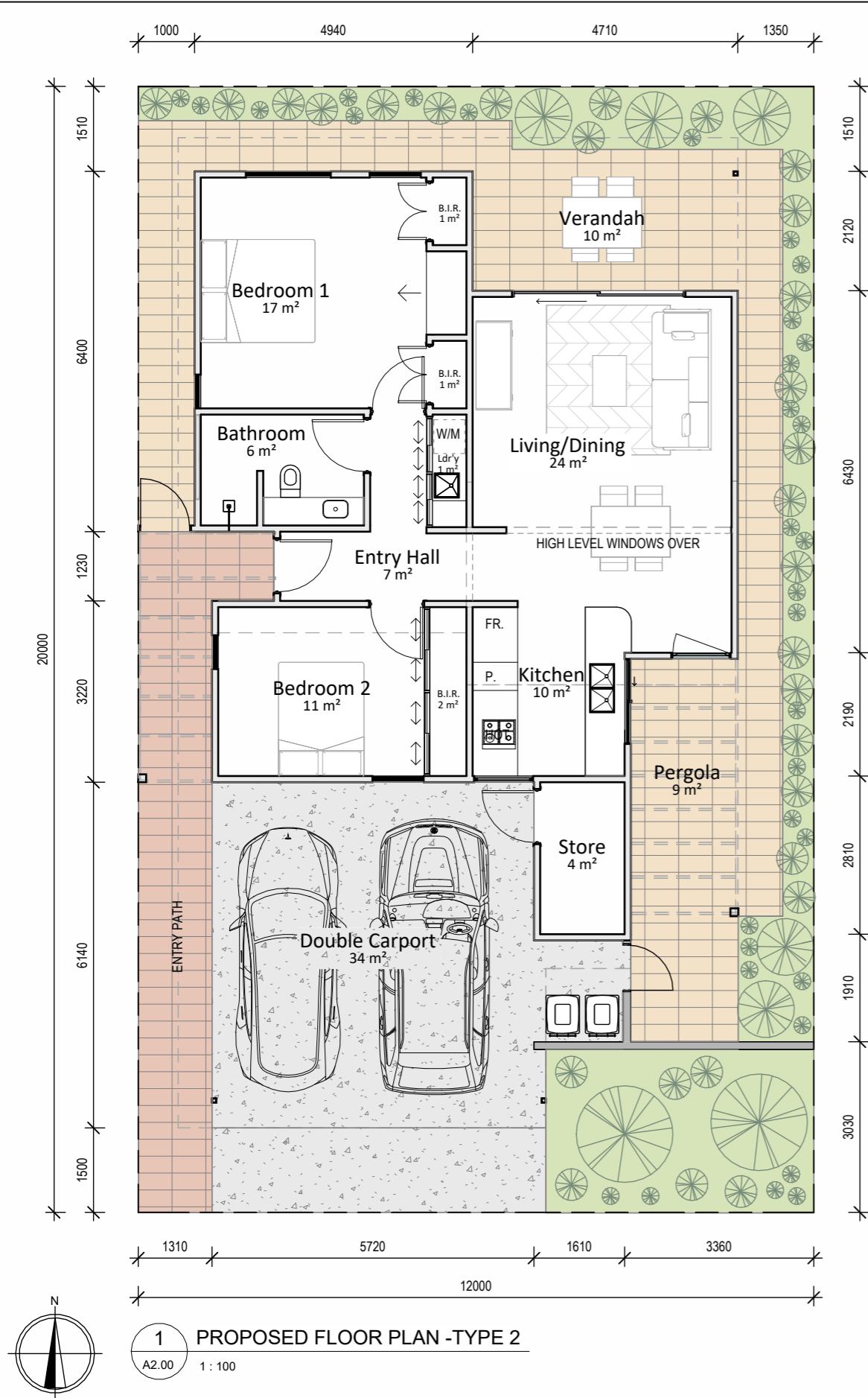
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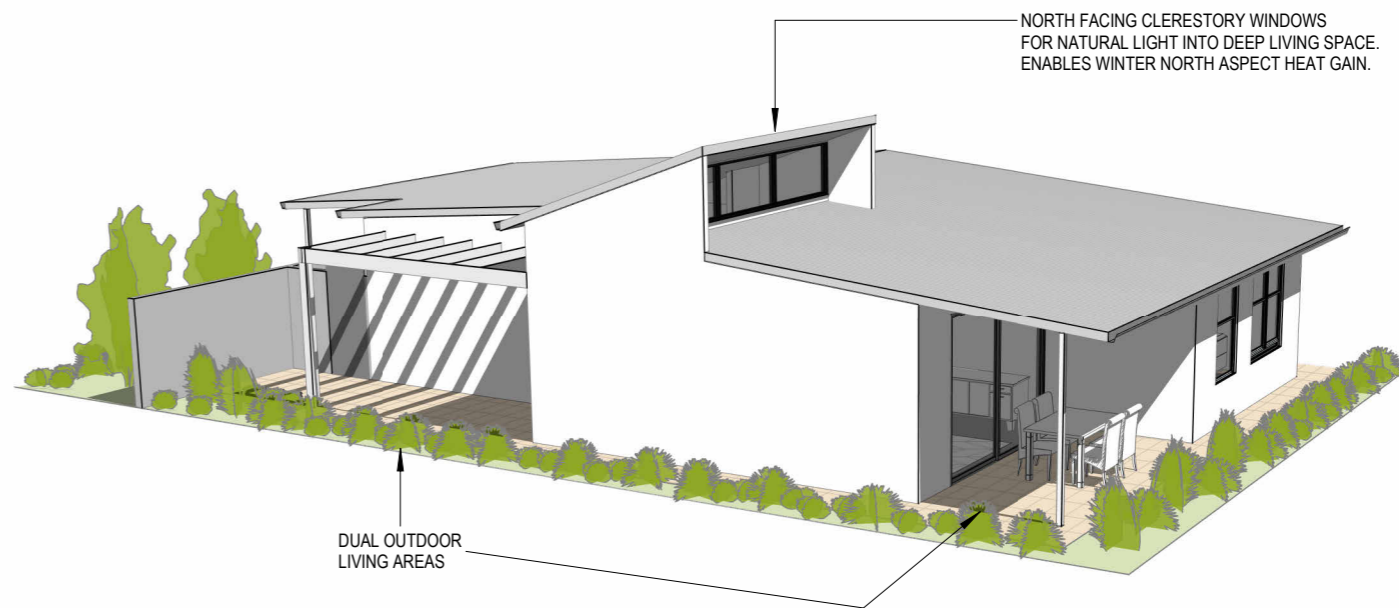
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WHEATBELT DEVELOPMENT STUDY

REV	DATE	DESCRIPTION
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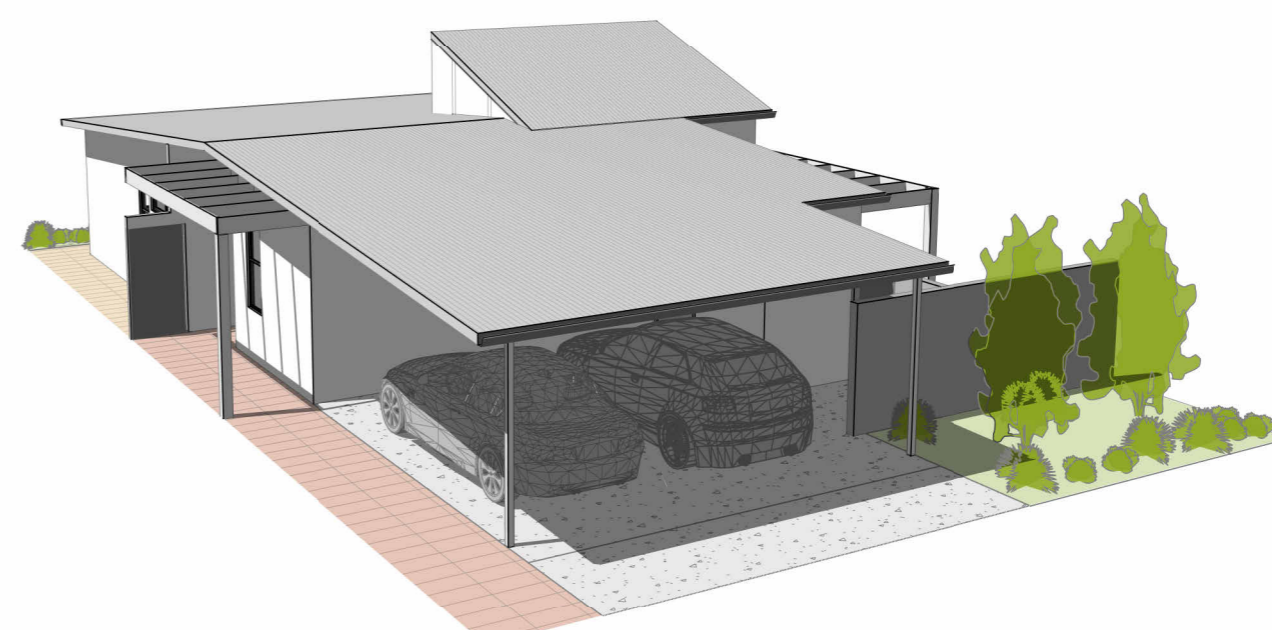
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DRAWING			DWG No. REV.
FLOOR PLAN & 3D VIEWS			A2.00 1
			DATE: 21/10/2022



1 PROPOSED FLOOR PLAN - TYPE 2  
A2.00 1 : 100



2 3D VIEW - NORTHEAST  
A2.00



3 3D VIEW - SOUTHWEST  
A2.00

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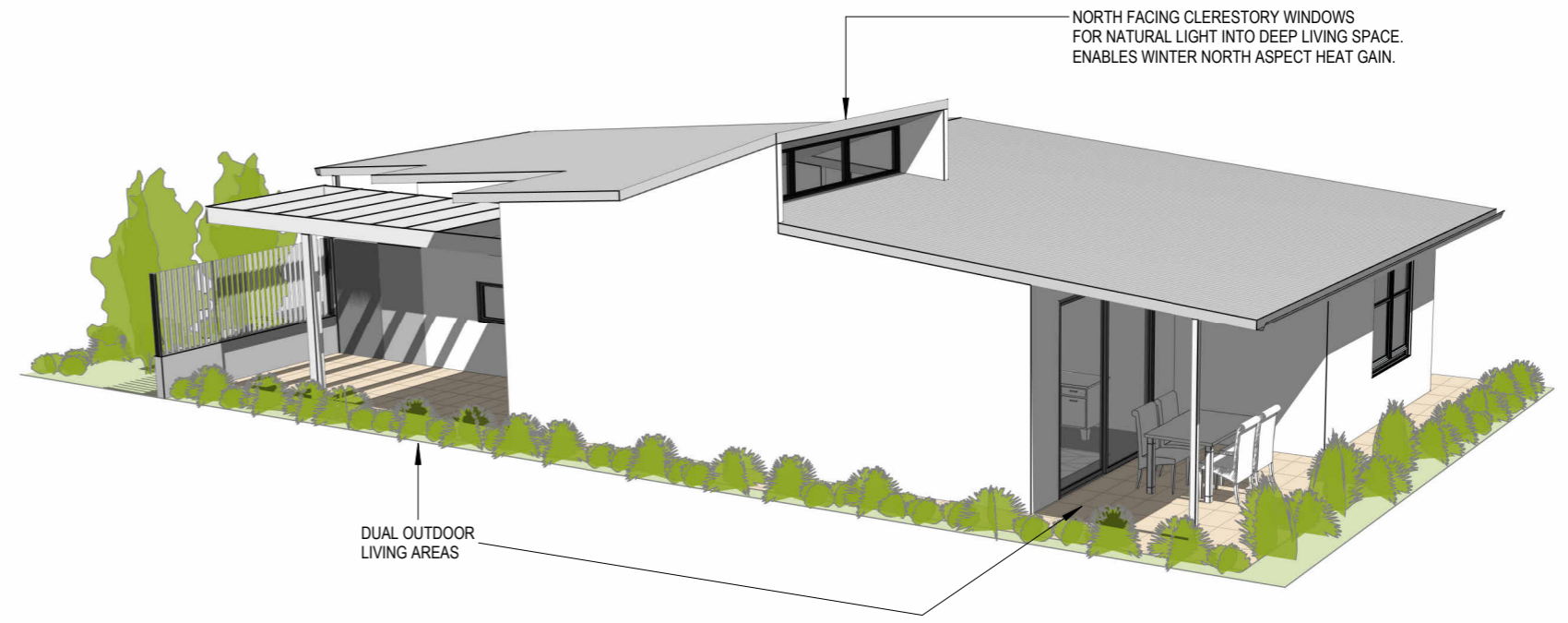
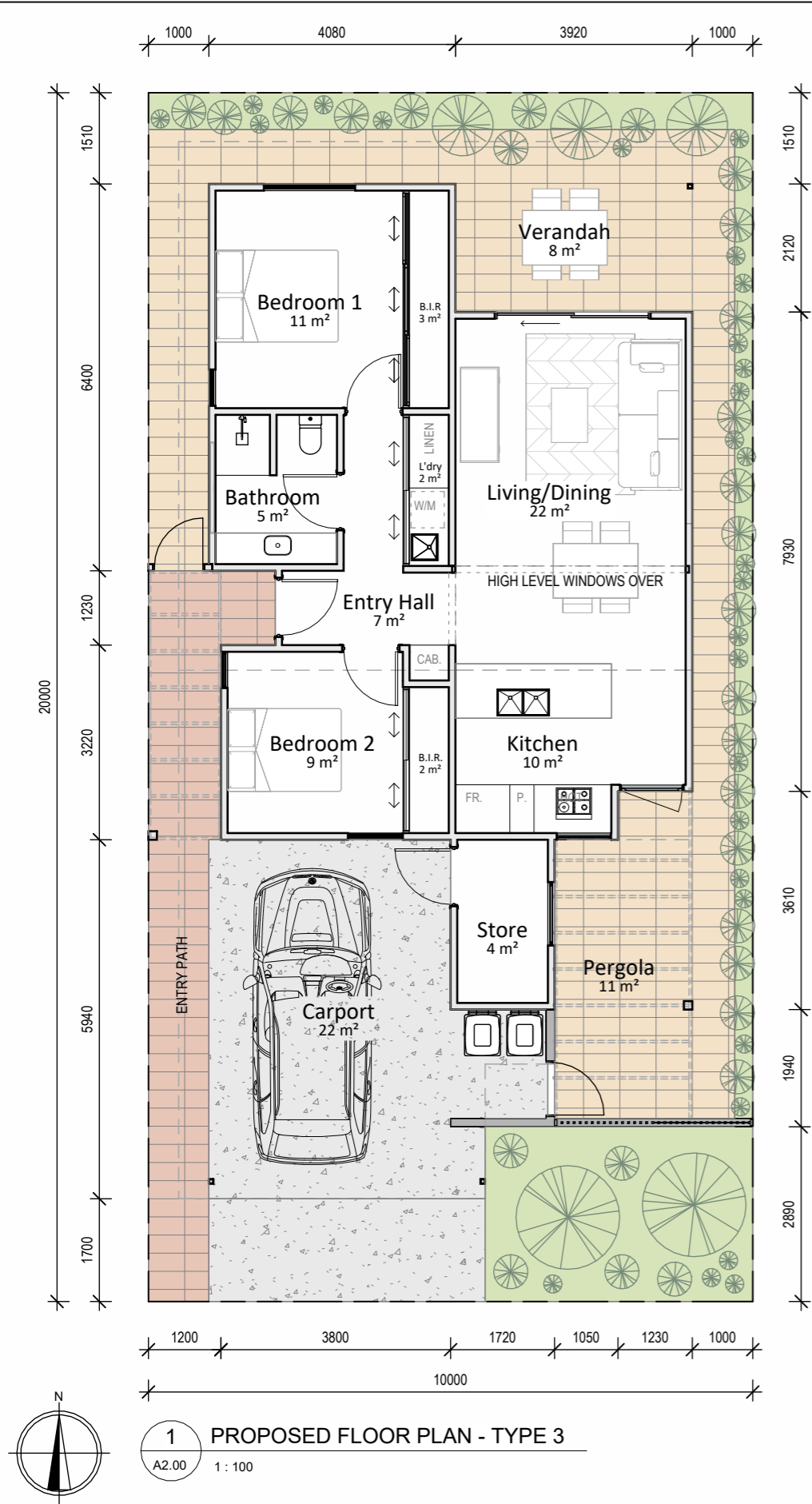
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WHEATBELT DEVELOPMENT STUDY	

REV	DATE	DESCRIPTION
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DRAWING		
FLOOR PLAN & 3D VIEWS		

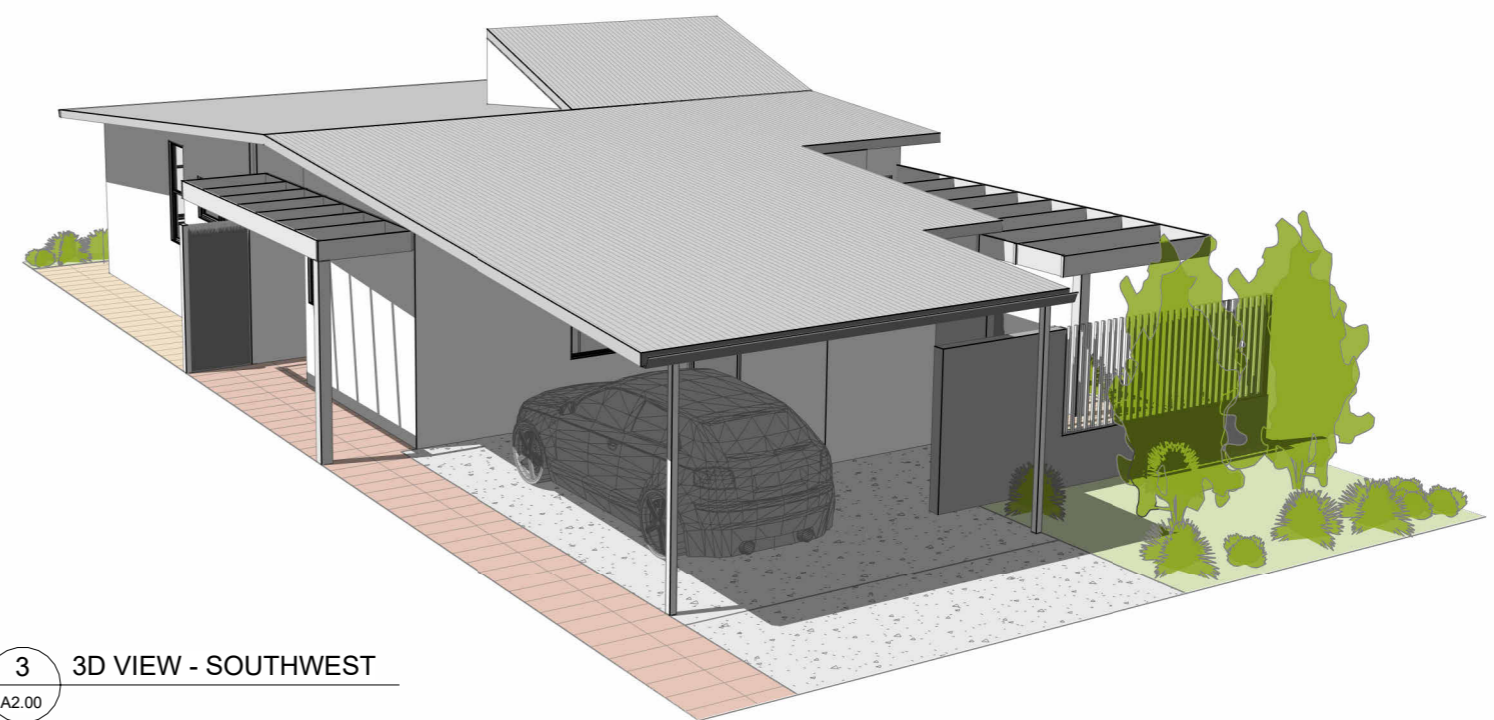
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DATE: 21/10/2022	

PRELIMINARY



2 3D VIEW - NORTHEAST

A2.00



3 3D VIEW - SOUTHWEST

A2.00

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PROJECT  
WHEATBELT DEVELOPMENT STUDY

REV	DATE	DESCRIPTION
1	21/10/22	ISSUE FOR CLIENT REVIEW

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DRAWING FLOOR PLAN & 3D VIEWS		DWG No. REV. A2.02 1
DATE: 21/10/2022		

PRELIMINARY

# The Johnston



\* Elevation is for illustration purposes only

**Combining form and function within a clever ergonomic three bedroom, one bathroom design, The Johnston is both practical and stylish, with a real family-home feel.**

Bedrooms:	3
Bathrooms:	1
WC:	1
Area:	88.56m <sup>2</sup> (including Porch)
Overall Dimensions:	12.30m Wide x 7.20m Deep
Elevations:	3 options (traditional elevation depicted)

## Why Choose Modular WA?

At Modular WA, you'll find more than just exceptional modular homes. You'll learn that we offer is more than high specification fixtures, fittings and finishes as standard. Here, you'll find fresh ideas. You'll meet a team that will inspire and guide you. And you'll discover the value of integrity - from the concrete pad beneath every Modular WA home, to the proven systems and processes that enable us to deliver the home you want, anywhere in WA, faster.



### visit us

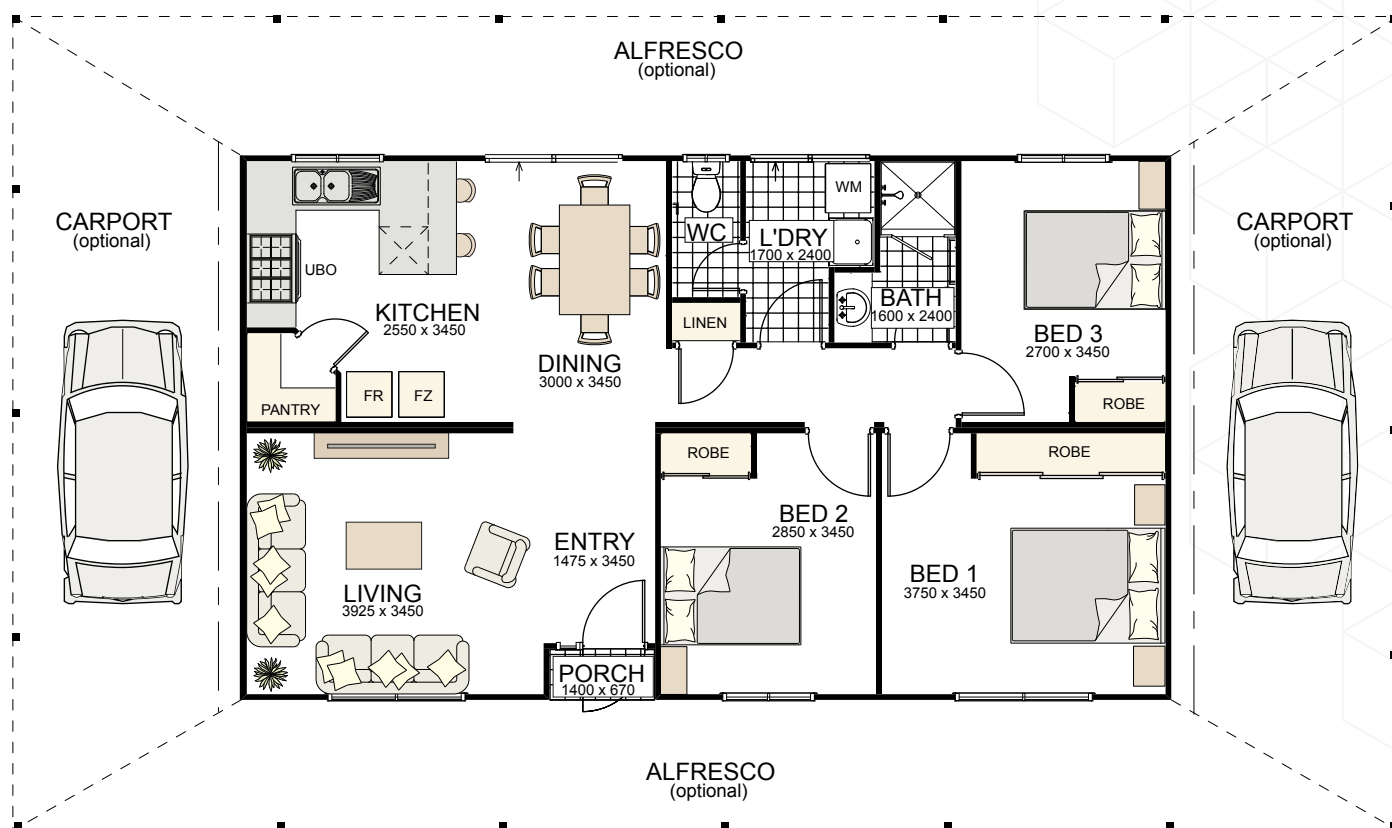
31 Challenge Boulevard  
Wangara WA 6065

### contact us

(08) 6454 0919  
sales@modularwa.com.au  
modularwa.com.au

# The Johnston

Overall Dimensions:  
12.30m Wide x 7.20 Deep



#### visit us

31 Challenge Boulevard  
Wangara WA 6065

#### contact us

(08) 6454 0919  
sales@modularwa.com.au  
modularwa.com.au

# **ORDER OF COST ESTIMATE**

## **WHEATBELT DEVELOPMENT STUDY CONVENTIONAL CONSTRUCTION**

**H + H ARCHITECTS**

**CHRIS OKEEFE CONSTRUCTION COST CONSULTANT**

**May-23**

**WHEATBELT DEVELOPMENT STUDY  
CONVENTIONAL CONSTRUCTION**

**Ref : A1322**

**ORDER OF COST ESTIMATE**

**15/05/2023**

**PROJECT COST SUMMARY**

<b>Total Cost Conventional Construction from Summary</b>	<b>\$ 340,000</b>
<b>Total Cost External Works &amp; Services from Summary</b>	<b>\$ 53,000</b>
<b>Subtotal</b>	<b>\$ 393,000</b>
<b>District Allowance For Wheatbelt - Average 20%</b>	<b>\$ 78,600</b>
<b>Subtotal, EX GST</b>	<b>\$ 471,600</b>
<b>GST</b>	<b>\$ 47,160</b>
<b>TOTAL ORDER OF COST ESTIMATE</b>	<b>\$ 518,760</b>

**Exclusions :**

Unknown ground conditions  
Cost escalation to date of tender  
Loose furniture & equipment  
Headworks costs  
Constuction contingency  
Professional fees

# Full Elemental Summary

<b>Job Name :</b>	<u>A1322 - CONVENTIONAL</u>	<b><u>Job Description</u></b>
<b>Client's Name:</b>	<u>Development WA</u>	UNIT TYPE 1 ON SITE CONSTRUCTION

Elem. Code	Elemental Description	% B.C.	Cost/m2	Elem. Qty	Elem. Unit	Elem. Rate	Sub Total	Mark Up %	Elemental Total
SB	Substructure	5.51	139.93				18,750		18,750
CL	Columns	0.84	21.31				2,855		2,855
RF	Roof	19.25	488.40				65,445		65,445
EW	External Walls	13.80	350.26				46,935		46,935
WW	Windows	5.43	137.69				18,450		18,450
ED	External Doors	3.66	92.91				12,450		12,450
NW	Internal Walls	7.64	193.81				25,970		25,970
ND	Internal Doors	2.53	64.18				8,600		8,600
WF	Wall Finishes	0.81	20.49				2,745		2,745
FF	Floor Finishes	3.45	87.65				11,745		11,745
CF	Ceiling Finishes	2.91	73.88				9,900		9,900
FT	Fitments	6.29	159.63				21,390		21,390
SE	Special Equipment	1.32	33.58				4,500		4,500
SF	Sanitary Fixtures & Plumbing	6.03	152.99				20,500		20,500
AC	Air Conditioning	2.06	52.24				7,000		7,000
LP	Electric Light and Power	5.29	134.33				18,000		18,000
PR	Preliminaries	13.17	334.07				44,765		44,765
<b>GFA: 134 m2.</b>		<b>100.00</b>	<b>2,537.31</b>				<b>340,000</b>		<b>340,000</b>

**Final Total : \$ 340,000**

# Elemental Breakup

Job Name : A1322 - CONVENTIONAL

Job Description

Client's Name: Development WA

UNIT TYPE 1

ON SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : <b>1 <u>Substructure</u></b>							
1	Reinforced concrete pad footings including excavation, compaction & formwork		4.00	No	300.00		1,200.00
2	Reinforced concrete strip footings and thickenings including excavation, compaction & formwork		9.00	m3	750.00		6,750.00
3	100 reinforced concrete ground slab including excavation, compaction, termite treatment, w/proof membrane & formwork		90.00	m2	120.00		10,800.00
<u>Substructure</u>						Total :	18,750.00
Trade : <b>2 <u>Columns</u></b>							
1	90 x 90 x 2.5 SHS column		0.07	t	18,000.00		1,260.00
2	Attached connections		0.02	t	18,000.00		360.00
3	M16 chemical anchors fixed into footing		12.00	No	35.00		420.00
4	120 x 120 timber pergola post including galv stirrup		1.00	No	440.00		440.00
5	Paint to columns		5.00	m2	75.00		375.00
<u>Columns</u>						Total :	2,855.00
Trade : <b>3 <u>Roof</u></b>							
1	Colorbond roof sheeting fixed on and including framing complete with cappings, flashings & insulation		178.00	m2	285.00		50,730.00
2	Hardiflex eaves & soffit lining including framing & paint		81.00	m2	115.00		9,315.00
3	Colorbond gutter/fascia		22.00	m	75.00		1,650.00
4	RWP including paint		15.00	m	50.00		750.00
5	Timber pergola including paint		10.00	m2	300.00		3,000.00
<u>Roof</u>						Total :	65,445.00
Trade : <b>4 <u>External Walls</u></b>							
1	Stud framed wall lined externally with James Hardie Fine Texture FC cladding and internally with plasterboard including insulation & paint		149.00	m2	315.00		46,935.00
<u>External Walls</u>						Total :	46,935.00
Trade : <b>5 <u>Windows</u></b>							
1	Powdercoat aluminium framed double glazed windows		16.00	m2	950.00		15,200.00
2	Selected blinds		13.00	m2	250.00		3,250.00

# Elemental Breakup

**Job Name :** A1322 - CONVENTIONAL

**Job Description**

**Client's Name:** Development WA

UNIT TYPE 1

ON SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : <b>5 <u>Windows</u></b> <span style="float: right;">(Continued)</span>							
					<u>Windows</u>	<b>Total :</b>	<b>18,450.00</b>
Trade : <b>6 <u>External Doors</u></b>							
1	Single solid core door entry door including frame, security door, hardware & paint		1.00	No	1,800.00		1,800.00
2	Single solid core door including frame, hardware & paint		1.00	No	1,200.00		1,200.00
3	Powdercoat aluminium framed double glazed sliding door		7.00	m2	1,100.00		7,700.00
4	Selected blinds		7.00	m2	250.00		1,750.00
					<u>External Doors</u>	<b>Total :</b>	<b>12,450.00</b>
Trade : <b>7 <u>Internal Walls</u></b>							
1	Stud framed wall lined both sides with plasterboard including insulation & paint		98.00	m2	265.00		25,970.00
					<u>Internal Walls</u>	<b>Total :</b>	<b>25,970.00</b>
Trade : <b>8 <u>Internal Doors</u></b>							
1	Single cavity sliding door including frame, hardware & paint		3.00	No	1,200.00		3,600.00
2	Single door including frame, hardware & paint		2.00	No	1,000.00		2,000.00
3	Double door including frame, hardware & paint		2.00	No	1,500.00		3,000.00
					<u>Internal Doors</u>	<b>Total :</b>	<b>8,600.00</b>
Trade : <b>9 <u>Wall Finishes</u></b>							
1	Ceramic wall tiles		9.00	m2	250.00		2,250.00
2	Ceramic skirting tile		11.00	m	45.00		495.00
					<u>Wall Finishes</u>	<b>Total :</b>	<b>2,745.00</b>
Trade : <b>10 <u>Floor Finishes</u></b>							
1	Ceramic floor tiles to wet areas		6.00	m2	300.00		1,800.00
2	Vinyl sheet flooring		49.00	m2	120.00		5,880.00
3	Carpet		25.00	m2	85.00		2,125.00
4	MDF skirting including paint		56.00	m	30.00		1,680.00
5	Concrete sealer		4.00	m2	65.00		260.00

# Elemental Breakup

Job Name : A1322 - CONVENTIONAL

Job Description

Client's Name: Development WA

UNIT TYPE 1

ON SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
<u>Floor Finishes</u> Total :							11,745.00
Trade : 11 <u>Ceiling Finishes</u>							
1	Plasterboard ceiling fixed on framing including insulation & paint		90.00	m2	110.00		9,900.00
<u>Ceiling Finishes</u> Total :							9,900.00
Trade : 12 <u>Fitments</u>							
1	Kitchen bench cupboard/counter		1.00	No	5,000.00		5,000.00
2	Kitchen bench cupboard		1.00	No	2,500.00		2,500.00
3	Kitchen pantry cupboard		1.00	No	2,000.00		2,000.00
4	Bed 1 built in robe		1.00	No	3,000.00		3,000.00
5	Linen cupboard		1.00	No	2,000.00		2,000.00
6	Bed 2 & 3 built in robe		2.00	No	1,000.00		2,000.00
7	Bath vanity bench cupboard		1.00	No	1,500.00		1,500.00
8	Laundry bench cupboard		1.00	No	1,000.00		1,000.00
9	Hall bench		1.00	No	1,000.00		1,000.00
10	Towel rails		2.00	No	160.00		320.00
11	Mirror		1.00	No	350.00		350.00
12	Toilet paper holder		1.00	No	75.00		75.00
13	Clothes line		1.00	No	645.00		645.00
<u>Fitments</u> Total :							21,390.00
Trade : 13 <u>Special Equipment</u>							
1	Gas hot plate		1.00	No	1,000.00		1,000.00
2	Electric under bench oven		1.00	No	1,500.00		1,500.00
3	Rangehood		1.00	No	500.00		500.00
4	Dishwasher		1.00	No	1,500.00		1,500.00
<u>Special Equipment</u> Total :							4,500.00
Trade : 14 <u>Sanitary Fixtures &amp; Plumbing</u>							
1	WC		1.00	No	4,000.00		4,000.00
2	Vanity basin		1.00	No	3,000.00		3,000.00
3	Shower		1.00	No	2,500.00		2,500.00

# Elemental Breakup

**Job Name :** A1322 - CONVENTIONAL

**Job Description**

**Client's Name:** Development WA

UNIT TYPE 1

ON SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : <b>14 <u>Sanitary Fixtures &amp; Plumbing</u></b>							(Continued)
4	Laundry trough		1.00	No	3,000.00		3,000.00
5	Single bowl kitchen sink & drainer		1.00	No	3,500.00		3,500.00
6	Gas instantaneous hot water unit		1.00	No	4,500.00		4,500.00
<u>Sanitary Fixtures &amp; Plumbing</u> Total :							<b>20,500.00</b>
Trade : <b>15 <u>Air Conditioning</u></b>							
1	Packaged reverse cycle air conditioning unit		2.00	No	3,500.00		7,000.00
<u>Air Conditioning</u> Total :							<b>7,000.00</b>
Trade : <b>16 <u>Electric Light and Power</u></b>							
1	Allowance for electric light & power			Item			18,000.00
<u>Electric Light and Power</u> Total :							<b>18,000.00</b>
Trade : <b>17 <u>Preliminaries</u></b>							
1	Allowance for preliminaries			Item			44,765.00
<u>Preliminaries</u> Total :							<b>44,765.00</b>

# **ORDER OF COST ESTIMATE**

## **WHEATBELT DEVELOPMENT STUDY FLAT PACK CONSTRUCTION**

**H + H ARCHITECTS**

**CHRIS OKEEFE CONSTRUCTION COST CONSULTANT**

**May-23**

**WHEATBELT DEVELOPMENT STUDY  
FLAT PACK CONSTRUCTION**

**Ref : A1322**

**ORDER OF COST ESTIMATE**

**15/05/2023**

**PROJECT COST SUMMARY**

<b>Total Cost Flat Pack Construction from Summary</b>	<b>\$ 336,000</b>
<b>Total Cost External Works &amp; Services from Summary</b>	<b>\$ 53,000</b>
<b>Subtotal</b>	<b>\$ 389,000</b>
<b>District Allowance For Wheatbelt - Average 20%</b>	<b>\$ 63,400</b>
<b>Subtotal, EX GST</b>	<b>\$ 452,400</b>
<b>GST</b>	<b>\$ 45,240</b>
<b>TOTAL ORDER OF COST ESTIMATE</b>	<b>\$ 497,640</b>

**Exclusions :**

Unknown ground conditions  
Cost escalation to date of tender  
Loose furniture & equipment  
Headworks costs  
Contract contingency  
Professional fees

# Full Elemental Summary

<b>Job Name :</b>	<u>A1322 - FLAT PACK</u>	<b><u>Job Description</u></b>
<b>Client's Name:</b>	<u>Development WA</u>	UNIT TYPE 1 FRAMED OFF SITE CONSTRUCTION

Elem. Code	Elemental Description	% B.C.	Cost/m2	Elem. Qty	Elem. Unit	Elem. Rate	Sub Total	Mark Up %	Elemental Total
	Offsite Framing	22.62	567.16				76,000		76,000
SB	Substructure	5.58	139.93				18,750		18,750
CL	Columns	0.85	21.31				2,855		2,855
RF	Roof	10.40	260.75				34,940		34,940
EW	External Walls	5.99	150.11				20,115		20,115
WW	Windows	3.11	77.99				10,450		10,450
ED	External Doors	2.46	61.57				8,250		8,250
NW	Internal Walls	5.40	135.30				18,130		18,130
ND	Internal Doors	2.56	64.18				8,600		8,600
WF	Wall Finishes	0.82	20.49				2,745		2,745
FF	Floor Finishes	3.50	87.65				11,745		11,745
CF	Ceiling Finishes	2.57	64.48				8,640		8,640
FT	Fitments	6.37	159.63				21,390		21,390
SE	Special Equipment	1.34	33.58				4,500		4,500
SF	Sanitary Fixtures & Plumbing	6.10	152.99				20,500		20,500
AC	Air Conditioning	2.08	52.24				7,000		7,000
LP	Electric Light and Power	5.36	134.33				18,000		18,000
PR	Preliminaries	12.91	323.81				43,390		43,390
<b>GFA: 134 m2.</b>		<b>100.00</b>	<b>2,507.46</b>				<b>336,000</b>		<b>336,000</b>

**Final Total : \$ 336,000**

# Elemental Breakup

Job Name : A1322 - FLAT PACK

Job Description

Client's Name: Development WA

UNIT TYPE 1

FRAMED OFF SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : <b>1 <u>Offsite Framing</u></b>							
	<u>Offsite Prefabricated Building Elements</u>						
1	Offsite Quotation for the following ( Ex Perth ) :			Item			72,000.00
2	External stud framed walls lined externally with James Hardie Fine Texture FC cladding						
3	Internal stud framed walls						
4	Window frames installed						
5	Framed skillion roof cassettes						
	<u>Builder's Work &amp; Costs Associated with Offsite Building Elements</u>						
6	Transport to site			Item			2,500.00
7	Craneage			Item			1,500.00
<u>Offsite Framing</u>						Total :	<b>76,000.00</b>
Trade : <b>2 <u>Substructure</u></b>							
1	Reinforced concrete pad footings including excavation, compaction & formwork		4.00	No	300.00		1,200.00
2	Reinforced concrete strip footings and thickenings including excavation, compaction & formwork		9.00	m3	750.00		6,750.00
3	100 reinforced concrete ground slab including excavation, compaction, termite treatment, w/proof membrane & formwork		90.00	m2	120.00		10,800.00
<u>Substructure</u>						Total :	<b>18,750.00</b>
Trade : <b>3 <u>Columns</u></b>							
1	90 x 90 x 2.5 SHS column		0.07	t	18,000.00		1,260.00
2	Attached connections		0.02	t	18,000.00		360.00
3	M16 chemical anchors fixed into footing		12.00	No	35.00		420.00
4	120 x 120 timber pergola post including galv stirrup		1.00	No	440.00		440.00
5	Paint to columns		5.00	m2	75.00		375.00
<u>Columns</u>						Total :	<b>2,855.00</b>
Trade : <b>4 <u>Roof</u></b>							
1	Erect on site framed skillion roof cassettes (Supplied Ex Perth)		178.00	m2	20.00		3,560.00
2	Colorbond roof sheeting fixed on supplied framing complete with cappings, flashings & insulation		178.00	m2	105.00		18,690.00
3	Hardiflex eaves & soffit lining including paint		81.00	m2	90.00		7,290.00

# Elemental Breakup

Job Name : A1322 - FLAT PACK

Job Description

Client's Name: Development WA

UNIT TYPE 1

FRAMED OFF SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : <b>4 <u>Roof</u></b>							(Continued)
4	Colorbond gutter/fascia		22.00	m	75.00		1,650.00
5	RWP including paint		15.00	m	50.00		750.00
6	Timber pergola including paint		10.00	m2	300.00		3,000.00
					<u>Roof</u>	Total :	<b>34,940.00</b>
Trade : <b>5 <u>External Walls</u></b>							
1	Erect on site stud framed wall lined externally with James Hardie Fine Texture FC cladding (Supplied Ex Perth)		149.00	m2	10.00		1,490.00
2	Plasterboard fixed to stud framing including insulation & paint		149.00	m2	95.00		14,155.00
3	Paint to Fine Texture FC cladding		149.00	m2	30.00		4,470.00
					<u>External Walls</u>	Total :	<b>20,115.00</b>
Trade : <b>6 <u>Windows</u></b>							
1	Powdercoat aluminium framed double glazed windows		16.00	m2	450.00		7,200.00
2	Selected blinds		13.00	m2	250.00		3,250.00
					<u>Windows</u>	Total :	<b>10,450.00</b>
Trade : <b>7 <u>External Doors</u></b>							
1	Single solid core door entry door including frame, security door, hardware & paint		1.00	No	1,800.00		1,800.00
2	Single solid core door including frame, hardware & paint		1.00	No	1,200.00		1,200.00
3	Powdercoat aluminium framed double glazed sliding door		7.00	m2	500.00		3,500.00
4	Selected blinds		7.00	m2	250.00		1,750.00
					<u>External Doors</u>	Total :	<b>8,250.00</b>
Trade : <b>8 <u>Internal Walls</u></b>							
1	Erect on site stud framed wall (Supplied Ex Perth)		98.00	m2	10.00		980.00
2	Plasterboard fixed to stud framed wall including insulation & paint		98.00	m2	175.00		17,150.00
					<u>Internal Walls</u>	Total :	<b>18,130.00</b>
Trade : <b>9 <u>Internal Doors</u></b>							

# Elemental Breakup

Job Name : A1322 - FLAT PACK

Job Description

Client's Name: Development WA

UNIT TYPE 1

FRAMED OFF SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
<i>Trade : 9 <u>Internal Doors</u></i>							
1	Single cavity sliding door including frame, hardware & paint		3.00	No	1,200.00		3,600.00
2	Single door including frame, hardware & paint		2.00	No	1,000.00		2,000.00
3	Double door including frame, hardware & paint		2.00	No	1,500.00		3,000.00
<u>Internal Doors</u>						Total :	8,600.00
<i>Trade : 10 <u>Wall Finishes</u></i>							
1	Ceramic wall tiles		9.00	m2	250.00		2,250.00
2	Ceramic skirting tile		11.00	m	45.00		495.00
<u>Wall Finishes</u>						Total :	2,745.00
<i>Trade : 11 <u>Floor Finishes</u></i>							
1	Ceramic floor tiles to wet areas		6.00	m2	300.00		1,800.00
2	Vinyl sheet flooring		49.00	m2	120.00		5,880.00
3	Carpet		25.00	m2	85.00		2,125.00
4	MDF skirting including paint		56.00	m	30.00		1,680.00
5	Concrete sealer		4.00	m2	65.00		260.00
<u>Floor Finishes</u>						Total :	11,745.00
<i>Trade : 12 <u>Ceiling Finishes</u></i>							
1	Plasterboard ceiling including insulation & paint		84.00	m2	95.00		7,980.00
2	Plasterboard ceiling fixed on framing including insulation & paint		6.00	m2	110.00		660.00
<u>Ceiling Finishes</u>						Total :	8,640.00
<i>Trade : 13 <u>Fitments</u></i>							
1	Kitchen bench cupboard/counter		1.00	No	5,000.00		5,000.00
2	Kitchen bench cupboard		1.00	No	2,500.00		2,500.00
3	Kitchen pantry cupboard		1.00	No	2,000.00		2,000.00
4	Bed 1 built in robe		1.00	No	3,000.00		3,000.00
5	Linen cupboard		1.00	No	2,000.00		2,000.00
6	Bed 2 & 3 built in robe		2.00	No	1,000.00		2,000.00
7	Bath vanity bench cupboard		1.00	No	1,500.00		1,500.00

# Elemental Breakup

Job Name : A1322 - FLAT PACK

Job Description

Client's Name: Development WA

UNIT TYPE 1

FRAMED OFF SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : <b>13 <u>Fitments</u></b>							(Continued)
8	Laundry bench cupboard		1.00	No	1,000.00		1,000.00
9	Hall bench		1.00	No	1,000.00		1,000.00
10	Towel rails		2.00	No	160.00		320.00
11	Mirror		1.00	No	350.00		350.00
12	Toilet paper holder		1.00	No	75.00		75.00
13	Clothes line		1.00	No	645.00		645.00
<b><u>Fitments</u></b>						<b>Total :</b>	<b>21,390.00</b>
Trade : <b>14 <u>Special Equipment</u></b>							
1	Gas hot plate		1.00	No	1,000.00		1,000.00
2	Electric under bench oven		1.00	No	1,500.00		1,500.00
3	Rangehood		1.00	No	500.00		500.00
4	Dishwasher		1.00	No	1,500.00		1,500.00
<b><u>Special Equipment</u></b>						<b>Total :</b>	<b>4,500.00</b>
Trade : <b>15 <u>Sanitary Fixtures &amp; Plumbing</u></b>							
1	WC		1.00	No	4,000.00		4,000.00
2	Vanity basin		1.00	No	3,000.00		3,000.00
3	Shower		1.00	No	2,500.00		2,500.00
4	Laundry trough		1.00	No	3,000.00		3,000.00
5	Single bowl kitchen sink & drainer		1.00	No	3,500.00		3,500.00
6	Gas instantaneous hot water unit		1.00	No	4,500.00		4,500.00
<b><u>Sanitary Fixtures &amp; Plumbing</u></b>						<b>Total :</b>	<b>20,500.00</b>
Trade : <b>16 <u>Air Conditioning</u></b>							
1	Packaged reverse cycle air conditioning unit		2.00	No	3,500.00		7,000.00
<b><u>Air Conditioning</u></b>						<b>Total :</b>	<b>7,000.00</b>
Trade : <b>17 <u>Electric Light and Power</u></b>							
1	Allowance for electric light & power			Item			18,000.00
<b><u>Electric Light and Power</u></b>						<b>Total :</b>	<b>18,000.00</b>

# Elemental Breakup

Job Name : A1322 - FLAT PACK

Job Description

Client's Name: Development WA

UNIT TYPE 1

FRAMED OFF SITE CONSTRUCTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : 18 <u>Preliminaries</u>							
1	Allowance for preliminaries			Item			43,390.00
						<u>Preliminaries</u> Total :	<b>43,390.00</b>

# **ORDER OF COST ESTIMATE**

## **WHEATBELT DEVELOPMENT STUDY TRANSPORTABLE**

**H + H ARCHITECTS**

**CHRIS OKEEFE CONSTRUCTION COST CONSULTANT**

**May-23**

**WHEATBELT DEVELOPMENT STUDY  
TRANSPORTABLE**

**Ref : A1322**

**ORDER OF COST ESTIMATE**

**15/05/2023**

**PROJECT COST SUMMARY**

<b>Total Cost Transportable Construction from Summary</b>	<b>\$ 298,000</b>
<b>Total Cost External Works &amp; Services from Summary</b>	<b>\$ 53,000</b>
<b>Subtotal</b>	<b>\$ 351,000</b>
<b>District Allowance For Wheatbelt - Average 20%</b>	<b>\$ 32,200</b>
<b>Subtotal, EX GST</b>	<b>\$ 383,200</b>
<b>GST</b>	<b>\$ 38,320</b>
<b>TOTAL ORDER OF COST ESTIMATE</b>	<b>\$ 421,520</b>

**Exclusions :**

Unknown ground conditions  
Cost escalation to date of tender  
Loose furniture & equipment  
Headworks costs  
Contract contingency  
Professional fees

# Full Elemental Summary

<b>Job Name :</b>	<u>A1322 -TRANSPORTABLE</u>	<b><u>Job Description</u></b>
<b>Client's Name:</b>	<u>Development WA</u>	TRANSPORTABLE OPTION

Elem. Code	Elemental Description	% B.C.	Cost/m2	Elem. Qty	Elem. Unit	Elem. Rate	Sub Total	Mark Up %	Elemental Total
	Transportable House	65.44	1,274.51				195,000		195,000
SB	Substructure	2.82	54.90				8,400		8,400
CL	Columns	2.44	47.55				7,275		7,275
RF	Roof	12.21	237.81				36,385		36,385
WW	Windows	1.09	21.24				3,250		3,250
ED	External Doors	0.59	11.44				1,750		1,750
EW	External Walls	2.43	47.35				7,245		7,245
FF	Floor Finishes	3.11	60.49				9,255		9,255
ED	External Doors	0.40	7.84				1,200		1,200
SE	Special Equipment	0.50	9.80				1,500		1,500
SF	Sanitary Fixtures & Plumbing	1.26	24.51				3,750		3,750
AC	Air Conditioning	2.35	45.75				7,000		7,000
LP	Electric Light and Power	0.84	16.34				2,500		2,500
PR	Preliminaries	4.53	88.17				13,490		13,490
<b>GFA: 153 m2.</b>		<b>100.00</b>	<b>1,947.71</b>				<b>298,000</b>		<b>298,000</b>

**Final Total : \$ 298,000**

# Elemental Breakup

Job Name : A1322 -TRANSPORTABLE

Job Description

Client's Name: Development WA

TRANSPORTABLE OPTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
<i>Trade : 1 <u>Transportable House</u></i>							
	<u>Transportable Buildings (No 2)</u>						
1	Modular WA - The Johnston transportable units (No 2)			Item			190,000.00
	<u>Builder's Work &amp; Costs Associated with Offsite Building Elements</u>						
2	Transport to site (Included in cost up to 200km from Perth)			Note			
3	Craneage			Item			5,000.00
<u>Transportable House</u>						Total :	195,000.00
<i>Trade : 2 <u>Substructure</u></i>							
1	Reinforced concrete pad footings including excavation, compaction & formwork		12.00	No	300.00		3,600.00
2	100 reinforced concrete ground slab including excavation, compaction, termite treatment, w/proof membrane & formwork		40.00	m2	120.00		4,800.00
<u>Substructure</u>						Total :	8,400.00
<i>Trade : 3 <u>Columns</u></i>							
1	90 x 90 x 2.5 SHS column		0.07	t	18,000.00		1,260.00
2	Attached connections		0.02	t	18,000.00		360.00
3	M16 chemical anchors fixed into footing		12.00	No	35.00		420.00
4	120 x 120 timber pergola/verandah post including galv stirrup		9.00	No	440.00		3,960.00
5	Paint to columns		17.00	m2	75.00		1,275.00
<u>Columns</u>						Total :	7,275.00
<i>Trade : 4 <u>Roof</u></i>							
1	Colorbond roof sheeting fixed on and including framing complete with cappings, flashings & insulation		77.00	m2	285.00		21,945.00
2	Hardiflex eaves & soffit lining including framing & paint		76.00	m2	115.00		8,740.00
3	Colorbond gutter/fascia		26.00	m	75.00		1,950.00
4	RWP including paint		15.00	m	50.00		750.00
5	Timber pergola including paint		10.00	m2	300.00		3,000.00
<u>Roof</u>						Total :	36,385.00

# Elemental Breakup

Job Name : A1322 -TRANSPORTABLE

Job Description

Client's Name: Development WA

TRANSPORTABLE OPTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : 5 <u>Windows</u>							
1	Selected blinds		13.00	m2	250.00		3,250.00
						<u>Windows</u> Total :	3,250.00
Trade : 6 <u>External Doors</u>							
1	Selected blinds		7.00	m2	250.00		1,750.00
						<u>External Doors</u> Total :	1,750.00
Trade : 7 <u>External Walls</u>							
1	Stud framed wall lined externally with James Hardie Fine Texture FC cladding and internally with plasterboard including insulation & paint		23.00	m2	315.00		7,245.00
						<u>External Walls</u> Total :	7,245.00
Trade : 8 <u>Floor Finishes</u>							
1	Vinyl sheet flooring		39.00	m2	120.00		4,680.00
2	Carpet		31.00	m2	85.00		2,635.00
3	MDF skirting including paint		56.00	m	30.00		1,680.00
4	Concrete sealer		4.00	m2	65.00		260.00
						<u>Floor Finishes</u> Total :	9,255.00
Trade : 9 <u>External Doors</u>							
1	Single solid core door including frame, hardware & paint		1.00	No	1,200.00		1,200.00
						<u>External Doors</u> Total :	1,200.00
Trade : 10 <u>Special Equipment</u>							
1	Dishwasher		1.00	No	1,500.00		1,500.00
						<u>Special Equipment</u> Total :	1,500.00
Trade : 11 <u>Sanitary Fixtures &amp; Plumbing</u>							
1	Connect the following fixtures to on site plumbing :						
2	WC		1.00	No	750.00		750.00
3	Vanity basin		1.00	No	500.00		500.00
4	Shower		1.00	No	500.00		500.00

# Elemental Breakup

Job Name : A1322 -TRANSPORTABLE

Job Description

Client's Name: Development WA

TRANSPORTABLE OPTION

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : <b>11 <u>Sanitary Fixtures &amp; Plumbing</u></b>							(Continued)
5	Laundry trough		1.00	No	500.00		500.00
6	Single bowl kitchen sink & drainer		1.00	No	500.00		500.00
7	Gas instantaneous hot water unit		1.00	No	1,000.00		1,000.00
<u>Sanitary Fixtures &amp; Plumbing</u> Total :							<b>3,750.00</b>
Trade : <b>12 <u>Air Conditioning</u></b>							
1	Packaged reverse cycle air conditioning unit onsite connection		2.00	No	3,500.00		7,000.00
<u>Air Conditioning</u> Total :							<b>7,000.00</b>
Trade : <b>13 <u>Electric Light and Power</u></b>							
1	Allowance connection to onsite electric light & power			Item			2,500.00
<u>Electric Light and Power</u> Total :							<b>2,500.00</b>
Trade : <b>14 <u>Preliminaries</u></b>							
1	Allowance for preliminaries			Item			13,490.00
<u>Preliminaries</u> Total :							<b>13,490.00</b>

# Full Elemental Summary

<b>Job Name :</b>	<u>A1322 - EXTERNAL</u>	<b>Job Description</b>
<b>Client's Name:</b>	<u>Development WA</u>	EXTERNAL WORKS & SERVICES

Elem. Code	Elemental Description	% B.C.	Cost/m2	Elem. Qty	Elem. Unit	Elem. Rate	Sub Total	Mark Up %	Elemental Total
XP	Site Preparation	9.28					4,920		4,920
XR	Roads, Footpaths, Paved Areas	24.68					13,080		13,080
XN	Boundary Walls, Fencing, Gates	20.21					10,710		10,710
XL	Landscaping and Improvements	15.85					8,400		8,400
XK	External Stormwater Drainage	4.72					2,500		2,500
XD	External Sewer Drainage	3.77					2,000		2,000
XW	External Water Supply	1.89					1,000		1,000
XE	External Electrics	5.66					3,000		3,000
PR	Preliminaries	13.94					7,390		7,390
		<b>100.00</b>					<b>53,000</b>		<b>53,000</b>

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**Final Total : \$ 53,000**

# Elemental Breakup

Job Name : A1322 - EXTERNAL

Job Description

Client's Name: Development WA

EXTERNAL WORKS & SERVICES

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
Trade : <b>1 <u>Site Preparation</u></b>							
1	Site clearance		240.00	m2	3.00		720.00
2	Site cut/fill		120.00	m3	35.00		4,200.00
<u>Site Preparation</u> Total :							<b>4,920.00</b>
Trade : <b>2 <u>Roads, Footpaths, Paved Areas</u></b>							
1	100 reinforced concrete paving slab including excavation, compaction, termite treatment, w/proof membrane & formwork		49.00	m2	120.00		5,880.00
2	Block paving		72.00	m2	100.00		7,200.00
<u>Roads, Footpaths, Paved Areas</u> Total :							<b>13,080.00</b>
Trade : <b>3 <u>Boundary Walls, Fencing, Gates</u></b>							
1	Colorbond fence		52.00	m	150.00		7,800.00
2	Timber screen fence including sealing		6.00	m	360.00		2,160.00
3	Timber gate including hardware & sealing		1.00	No	750.00		750.00
<u>Boundary Walls, Fencing, Gates</u> Total :							<b>10,710.00</b>
Trade : <b>4 <u>Landscaping and Improvements</u></b>							
1	Planting including topsoil & mulching		36.00	m2	150.00		5,400.00
2	Automatic reticulation system		1.00	No	3,000.00		3,000.00
<u>Landscaping and Improvements</u> Total :							<b>8,400.00</b>
Trade : <b>5 <u>External Stormwater Drainage</u></b>							
1	Allowance for external stormwater drainage (Provisional)			Item			2,500.00
<u>External Stormwater Drainage</u> Total :							<b>2,500.00</b>
Trade : <b>6 <u>External Sewer Drainage</u></b>							
1	Allowance for external sewer drainage (Provisional)			Item			2,000.00
<u>External Sewer Drainage</u> Total :							<b>2,000.00</b>
Trade : <b>7 <u>External Water Supply</u></b>							
1	Allowance for external water supply (Provisional)			Item			1,000.00

# Elemental Breakup

Job Name : A1322 - EXTERNAL

Job Description

Client's Name: Development WA

EXTERNAL WORKS & SERVICES

Item No.	Item Description	+/- %	Quantity	Unit	Rate	Mark Up %	Amount
<u>External Water Supply</u> Total :							<b>1,000.00</b>
Trade : <b>8</b> <u>External Electrics</u>							
<b>1</b>	Allowance for external electrics (Provisional)			Item			3,000.00
<u>External Electrics</u> Total :							<b>3,000.00</b>
Trade : <b>9</b> <u>Preliminaries</u>							
<b>1</b>	Allowance for preliminaries			Item			7,390.00
<u>Preliminaries</u> Total :							<b>7,390.00</b>

# APPENDIX 6



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## TECHNICAL NOTE

**Project:** Wheatbelt Development Constraints **Date Issued:** 26 Nov 2021

**Issued to:** Steve Thompson (Edge Planning Consultants)  
Robert Fenn (Senior Development Manager,  
DevWA), Jennifer Abraham (Development  
Manager, DevWA) **Job Number:** 21-09-135

**Subject:** Summary of engineering servicing constrains **Revision:** A

---

### Wheatbelt Development Constraints as of 29 November 2021

#### 1. Kellerberrin

<u>Utility service</u>	<u>Status</u>	<u>Comments</u>
Electrical (Western Power)	No reported power supply issues arising from meeting with LGA on 9 Nov 2021.  The Western Power Network Capacity Mapping Tool indicates that less than 5MVA remaining capacity which is forecast to remain at this level till 2036.	Depending on the size and nature of proposed development, consideration will need to be had on the limited remaining capacity.
Communications (NBN)	NBN service available.  Fibre to the Kerb within the township area. NBN Satellite service available beyond existing township.	
Gas (ATCO)	No gas network in the region.	
Scheme Water (Water Corporation)	The existing water supply is sufficient as advised by Water Corp.	
Scheme Sewerage (Water Corporation)	There is no scheme sewerage reticulation in the surrounding area.	Onsite wastewater treatment and disposal to be considered.
Stormwater drainage		

## 2. Narembeen

<u>Utility service</u>	<u>Status</u>	<u>Comments</u>
Electrical (Western Power)	The WP Network Capacity mapping tool indicates has currently 10-15 MVA remaining capacity and forecast to remain at this level to 2036.	Given remaining capacity in the network, supply is not likely to be an issue. Cost only a factor based on distance to nearest HV network supply.
Communications (NBN)	NBN service available with NBN Satellite service to the township and beyond.	
Gas (ATCO)	No gas network in the region.	
Scheme Water for Townsite (Water Corporation)	Adequate water supply to Townsite with some spare unquantified capacity as advised by Water Corporation.	
Scheme Water for industrial area south of Townsite (Water Corporation)	As advised by Water Corp, the industrial area south of the townsite is outside the water zone, but is serviced via the Service By Agreement (SBA) arrangements off an 80mm AC farmland main.  Water Corp has advised that the 16 lot industrial development (WAPC158008) is likely to trigger the upgrade of the water supply to a 150mm main for this area back to Latham Road, some 930m to the north.	
Scheme Sewerage for Townsite (Water Corporation)	No specific mention of wastewater servicing constraints to the townsite by Water Corp, and would be subject to the number of proposed lots with any future residential development.	
Scheme wastewater for industrial area south of Townsite (Water Corporation)	The industrial area to the south of the townsite is not sewerred.  The WAPC158008 development does not have a sewer condition, so wastewater would need to be managed and disposed onsite.  However, Water Corporation has prepared a concept plan to demonstrate this industrial area could be served with scheme gravity sewers to a small wastewater pumping station back to the townsite sewers, should the area seek reticulation scheme sewers.	If DevWA intends to pursue this option, they should approach the Corporation's Headworks Team Leader (Russell Nelson) as soon as possible to determine if and when the WWPS can be funded.  This WWPS is likely to be outside of the current 5 year pre-funding program
Stormwater drainage		

### 3. Narrogin

<u>Utility service</u>	<u>Status</u>	<u>Comments</u>
Electrical (Western Power)	The WP Network Capacity mapping tool indicates has currently 20-25 MVA remaining capacity and forecast to remain at this level to 2036.	Given remaining capacity in the network, supply is not likely to be an issue. Cost only a factor based on distance to nearest HV network supply.
Communications (NBN)	NBN service available with a 'Fibre to the Node' to the township. 'Fixed Wireless' is available to the extremities of the township and beyond.	
Gas (ATCO)	No gas network in the region.	
Scheme Water (Water Corporation)	No water servicing constraints noted.	
Scheme Sewerage (Water Corporation)	<p>The Narrogin wastewater network has capacity in a number of locations.</p> <p>The DN150 gravity sewer along Gregory Street has hit capacity. As well as this the DN225 gravity sewer along Federal St and the DN300 gravity sewer along Hartog St are also close to capacity.</p> <p>The Proposed Industrial Development areas south of Narrogin along Graham Road and Mokine Road are outside the current Narrogin wastewater scheme. Onsite wastewater disposal would be required.</p>	A network review will need to be undertaken by Water Corp to allow further development. Water Corp indicates that a wastewater network review likely in the 2022/2023 financial year.
Stormwater drainage		

## 4. Pingelly

<u>Utility service</u>	<u>Status</u>	<u>Comments</u>
Electrical (Western Power)	The WP Network Capacity mapping tool indicates has currently 20-25 MVA remaining capacity and forecast to remain at this level to 2036.	Given remaining capacity in the network, supply is not likely to be an issue. Cost only a factor based on distance to nearest HV network supply.
Communications (NBN)	NBN service available with a 'Fibre to the Node' to the township. 'Fixed Wireless' is available to the extremities of the township and beyond.	
Gas (ATCO)	No gas network in the region.	
Scheme Water (Water Corporation)	<p>If the proposed additional lots/dwellings are within the townsite area and adjoin existing retic. mains, then there should be the capability and capacity to serve this growth.</p> <p>Any development that is distant from the existing networks will require mains extensions at the proponent's cost and will likely need prior planning investigations to determine if and how the land can be serviced.</p>	<p>The Pingelly townsite area is served with water from the Pingelly Service Tank which has a maximum top water level of around 252mAHD. Elevated land above around 230mAHD and with increasing distance from the tank cannot be supplied with water at minimum complying pressures. In general terms, if the additional development/subdivision proposed by DevelopmentWA is to be located within the existing townsite water zone and close to an existing water main, there should be a way to service the growth by extension and possibly by some localised retic main upgrade.</p>
Scheme Sewerage (Water Corporation)	<p>If the proposed additional lots/dwellings are within the townsite area and adjoin existing retic. mains, then there should be the capability and capacity to serve this growth.</p> <p>Any development that is distant from the existing networks will require mains extensions at the proponent's cost and will likely need prior planning investigations to determine if and how the land can be serviced.</p>	The Pingelly WWTP and associated treated wastewater reuse system is scheduled for process and capacity upgrades between 2028 and 2031.
Stormwater drainage		

# APPENDIX 7



# NARROGIN LAND SUPPLY ASSESSMENT



By Edge Planning & Property for the  
Wheatbelt Development Commission and DevelopmentWA

April 2023

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## NARROGIN LAND SUPPLY ASSESSMENT

### 1.0 INTRODUCTION

#### 1.1 Setting the scene

This assessment reviews residential land supply in the Narrogin townsite including infill, greenfield and 'lazy land' (Shire and Crown land) opportunities. It also sets out some considerations for the provision of additional residential land and promoting increased housing diversity in Narrogin.

The report is complemented with work undertaken for the *Addressing Wheatbelt Development Constraints* report.<sup>1</sup> This includes servicing assessments and order of probable costs from Porter Consulting Engineers, design work and assessments from H+H Architects, and order of probable costs from Chris O'Keefe Quantity Surveyor. The *Addressing Wheatbelt Development Constraints* report included assessments for a large greenfield site (Lot 123 Golf Course Parade), an infill site (24 Glyde Street) and a redevelopment site (28 Havelock Street).

#### 1.2 Methodology

The report methodology included:

- Liaising with the Shire who provided an invaluable audit of vacant land via a spreadsheet and plan for various sites and who undertook extensive ground truthing;
- Reviewing the planning framework including the Local Planning Strategy and Local Planning Scheme. Narrogin's population growth forecast, for this project is based on the residential and rural residential development areas in the Local Planning Strategy, infill development and opportunities to use vacant and lazy land. The Local Planning Strategy sets the 'development footprint' for the assessment;
- Reviewing preliminary servicing advice from Porter Consulting Engineers; and
- A desk top review of key planning, bushfire, environmental and land tenure considerations.

#### 1.3 Assessment limitations

While ground truthing was undertaken by the Shire, the report is essentially a desktop assessment. A detailed assessment has not been undertaken for each site relating to opportunities and constraints, the highest and best use, infrastructure availability and associated development feasibility.

### 2.0 WHERE ARE WE AT?

#### 2.1 Background

Narrogin is within the Wheatbelt region of Western Australia and is approximately 200 km south-east of Perth. Narrogin is a sub-regional centre providing administrative, retail, social, educational and cultural facilities for its hinterland of approximately 12,500 people.<sup>2</sup>

The Australian Bureau of Statistics (ABS)<sup>3</sup> sets out the Narrogin townsite has a population of 3745 with a further 1034 people residing within the remainder of the Shire of Narrogin. The Shire of Narrogin is a multicultural community with more than 29% of residents born overseas. The median population age is 42 years.

#### 2.2 Housing characteristics and housing stock

Some of the characteristics of housing in Narrogin include:

- Overall, most housing and properties are well maintained. There is a sense of pride in the community which is reflected in the built form. There are only small sections of Narrogin that suffer from 'urban blight';

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<sup>1</sup> Edge Planning & Property, 2023, *Addressing Wheatbelt Development Constraints*

<sup>2</sup> LandCorp and Wheatbelt Development Commission, 2015, *Greater Narrogin – An Economic Development and Implementation Strategy*

<sup>3</sup> <https://abs.gov.au/census/find-census-data/search-by-area> - Narrogin urban area 2021 Census QuickStats

- The housing stock varies considerably in terms of its age, style, construction materials and quality. Traditionally, housing in the townsite has been single storey detached dwellings on generous sized lots;
- In the 2021 Census there were 1746 dwellings in Narrogin of which 89.9% were separate houses, 9.1% were semi-detached, row or terrace or townhouses, 0.4% were flats or apartments and 0.5% were other dwellings<sup>4</sup>;
- There is a lack of 1 and 2 bedroom dwellings;
- The zoned and available land, for residential development, is a mix of private sector, Crown or Shire owned/managed land;
- The State Government (via the Department of Communities) and not-for-profits manage some housing stock;
- Virtually all rental accommodation and affordable housing stock has been consumed; and
- The costs of producing new residential lots is generally unfeasible. There is clear evidence of market failure.

### 2.3 Market factors

Local real estate agent advice indicates that there is a limited number of vacant lots and houses for sale in Narrogin. Vacant residential lots currently range in price from \$29,000 (728m<sup>2</sup>) to \$165,000 (2011m<sup>2</sup>).<sup>5</sup> For the 12-month period ending April 2023, the average price for a medium sized lot (400m<sup>2</sup> – 700m<sup>2</sup>) was \$30,000.<sup>6</sup> Noting the indicative cost to create an infill residential lot is \$107,047 and the indicative cost to create a greenfield residential lot is \$112,259, there is clear evidence of market failure.<sup>7</sup>

The median price for a residential property containing a house for the 12-month period ending April 2023 was \$230,000, with the median price of a three-bedroom house being \$255,000.<sup>8</sup> There is a limited range of product on offer. Three-bedroom houses are currently on the market from \$100,000 to \$375,000 with four-bedroom houses ranging between \$249,000 to \$340,000.

Securing private sector interest, in delivering residential lots in Narrogin, is challenging. The lack of interest by the private sector to release existing englobe zoned residential land is evident. Due to market failure, there is a need for government intervention. Any new larger scale subdivision is therefore likely to be delivered by DevelopmentWA or through other infrastructure headworks funding schemes.

### 2.4 Preliminary servicing assessment

A preliminary engineering servicing constraints assessment for Narrogin is set out in **Appendix A**. This reveals that most of Narrogin is not constrained by service availability however there are considerable feasibility issues. **Appendix B** outlines sewer and water catchments/boundaries. To facilitate planned longer term development in Narrogin, there is a requirement for infrastructure extensions and upgrades.

### 2.5 Planning framework

The upcoming new Local Planning Scheme No. 3 proposes to increase residential densities in various parts of the townsite. The Scheme aims to provide a range of housing from medium-density within the town centre and in selected areas, with lower densities in other areas.

### 2.6 Development footprint

The development footprint is outlined in **Appendix C**.

### 2.7 Land supply

The distribution of vacant lots in Narrogin, which provide opportunities for additional housing, is shown on **Appendix D**. This is based on an audit of vacant and underutilised land overlaying the Local Planning Strategy Land Use Plan.

<sup>4</sup> <https://abs.gov.au/census/find-census-data/search-by-area> - Narrogin urban area 2021 Census QuickStats

<sup>5</sup> <https://www.realestate.com.au/buy/property-land-in-narrogin,+wa+6312/list-1?misc=ex-no-display-price>

<sup>6</sup> <https://reiwa.com.au/suburb/narrogin/>

<sup>7</sup> Porter Consulting Engineers, 2021, *Wheatbelt Development Constraints – Development Cost Model*

<sup>8</sup> <https://reiwa.com.au/suburb/narrogin/>

A review of various datasets has shown that the Shire of Narrogin holds significant freehold land. DevelopmentWA has freehold titles to a small number of residential lots within Narrogin and there is also Unallocated Crown Land (UCL) within the town. The private sector holds numerous freehold titles which are vacant or contain underutilised land.

**Appendix E** sets out a land supply table which reveals there is scope for approximately 1091 new dwellings. The table takes into account factors such as heritage, environmental and/or infrastructure constraints based on a desk-top review. There are a number of assumptions including the need to gain relevant approvals, market requirements and project feasibility.

It is highlighted that **Appendix D** and **Appendix E** are indicative only and are subject to further detailed site planning and opportunities and constraints analysis. They should not be used to guide development potential on a site by-site basis.

There are approximately 261ha of land zoned for residential purposes in and around the Narrogin townsite. There is currently 206ha of land considered to be developed and 54ha (20%) considered to be undeveloped or unrated.<sup>9</sup>

There is approximately 15ha of 'Rural Residential' zoned land and 613ha of land zoned as 'Special Rural' within the Shire, mostly located near the Narrogin townsite. Of this land, the majority (90%) of the Rural Residential land is considered to be already developed.<sup>10</sup>

As noted above, there is considerable privately held land parcels that have been identified for future residential development. These sites are currently suitably zoned and can be developed for residential purposes. Notwithstanding that the zoning is in place for development or subdivision, the landowners to date have not progressed with subdivision or development due to feasibility and/or lifestyle choices.

**Appendix D** shows there are some significant sized development sites. Additionally, there are various smaller areas of undeveloped land zoned for residential purposes throughout Narrogin.

In addition to subdivision and grouped dwelling housing developments, if there is market interest, there is scope for ancillary dwellings on many lots in the townsite. This can add to housing stock in a more cost-effective manner with lower risk.

## 2.8 Constraints in creating new residential lots

There are a range of constraints in creating new residential lots and residential development including:

- Feasibility;
- Headworks and required extensions and upgrades to hard infrastructure;
- A need to gain relevant approvals including structure planning, bushfire and environmental assessments; and
- Housing affordability with significant land development and housing construction costs.

## 3.0 WHERE DO WE WANT TO GO?

Based on the planning and economic development framework, State agencies and the Shire have adopted a positive outlook regarding Narrogin's population growth. The Wheatbelt Development Commission have an aspirational goal that the Greater Narrogin Region (Cuballing, Highbury and Narrogin) have a population of approximately 20,000 by 2050.<sup>11</sup>

As outlined in **Appendix E** it sets out the current land supply could provide in the order of 1091 new dwellings. This equates to an additional population of 2400 assuming 2.2 people per dwelling. If fully developed, Narrogin's population would be approximately 6,000 people.

The Shire seeks to expand its economic base. To achieve this, there is a need for additional housing including increasing housing diversity and addressing affordability.

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<sup>9</sup> Shire of Narrogin, 2020, *Shire of Narrogin Local Planning Strategy*

<sup>10</sup> Shire of Narrogin, 2020, *Shire of Narrogin Local Planning Strategy*

<sup>11</sup> LandCorp and Wheatbelt Development Commission, 2015, *Greater Narrogin – An Economic Development and Implementation Strategy*

Based on the diversity of economic activity within the Shire, including agriculture, mining, education and other value-adding activities, Narrogin has positive and tangible growth prospects.

## 4.0 HOW DO WE GET THERE?

### 4.1 Discussion

Given the context and the housing market:

- There is a sufficient stock of zoned residential land for the long term. This supply has the capacity to support a total population of approximately 6,000;
- New housing should generally focus on existing serviced land;
- There are considerable issues associated with development feasibility to address planned growth and create new residential lots;
- Due to market failure, the creation of new lots will be difficult without support from agencies such as DevelopmentWA;
- There is a need to promote alternate housing including encouraging medium density; and
- There is a need to ensure an adequate supply of appropriately zoned and serviced residential lots in the short to longer term with a variety of lot sizes and housing types.

There are various opportunities to increase housing supply including as outlined in the Regional Housing and Land Activation Toolbox.<sup>12</sup> This includes:

- Scope to lower financial risk for developments including ancillary dwellings and tiny houses;
- Scope to modify some reserves and Unallocated Crown Land (UCL) for residential use subject to consultation with the community and stakeholders; and
- Developing workforce accommodation, residential buildings and caravan parks with a different tenure than freehold subdivision.

There is a need to review the constraints and determine ways to address them. Some options and solutions are set out in *Addressing Wheatbelt Development Constraints* report and in the below sections.

### 4.2 Providing a greater range of housing

There are opportunities for an increased role from not-for-profit organisations, the Department of Communities and others to provide fit-for-purpose affordable accommodation. A suggested pilot/demonstration project is 24 Glyde Street subject to recoding the residential density.

### 4.3 Lot 123 Golf Course Parade

#### Overview

The Shire owns Lot 123 Golf Course Parade as a freehold lot. The site forms part of the old golf course which is located to the north of the town centre.

Due to market failure in the Narrogin housing market, it is expected that DevelopmentWA will be requested to assist to provide residential lots. The large greenfield site offers considerable potential for a transformational project.

The site is a greenfield subdivision option with the potential to deliver a mix of residential lot sizes and housing for different market needs and prices. It could promote new urban housing solutions for the town and stimulate housing growth. There are also opportunities for a pilot/demonstration project for grouped dwellings and other forms of housing.

A preliminary design has been prepared (**Appendix F**) that indicates the site could produce approximately 180 lots (ranging in area from 507m<sup>2</sup> to 2464m<sup>2</sup>) which could yield approximately 260 dwellings.

Given the size of the property, it has the potential to satisfy different market segments. The Shire sees the site as playing a significant role in supporting Narrogin's growth.

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<sup>12</sup> Edge Planning & Property, 2023, *Addressing Wheatbelt Development Constraints*

The development offers the potential to create high amenity lots due to the site's characteristics. It is likely attract a higher level of housing investment to what is currently experienced in parts of Narrogin. The site is located within cycling distance of Narrogin's town centre, and it is well located near schools, recreation and other services.

The development of 180 new residential lots, on the former golf course site, is considered the most acceptable development option for transforming the housing market in Narrogin.

The development would assist to deliver on the various strategic objectives and allow Narrogin to expand its role as a sub-regional centre and attract economic opportunities to the town. The cost of undertaking the development, separately outlined in the *Addressing Wheatbelt Development Constraints* report, requires external funding and support to address market failure.

#### SWOT analysis

The following SWOT analysis applies to the former golf course site development:

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Site held in freehold title by Shire.</li> <li>• Site close to town centre and has high amenity.</li> <li>• Narrogin is experiencing economic growth and new employment opportunities.</li> <li>• Higher quality lots can be developed to better retain market value.</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• There is vacant residential land for sale in Narrogin.</li> <li>• Lot prices are likely to be higher than the current market due to quality of the site and servicing standards.</li> <li>• Expenditure is not expected to be recovered by future sales and requires external funding.</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Will likely provide high amenity environment.</li> <li>• Will provide a greater diversity of lot sizes.</li> <li>• Alternate housing options can be accommodated in the subdivision design.</li> <li>• Provide pilot/demonstration projects including for medium density.</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Additional lots and additional housing need to be delivered in Narrogin. Without this, projected population levels will not be achieved and there will be lower economic development.</li> </ul>

#### Project staging

Following preparation of a business case, it is suggested the concept plan (**Appendix F**) is refined which is supported by technical studies.

The land is required to be rezoned (recoded) to the satisfaction of both the Shire and the WAPC. Following this, then seek subdivision approval from the WA Planning Commission.

The initial feedback indicates that the Shire seeks to achieve a mix of lot sizes and housing types within the development site.

The business case is likely to also review the number of stages. The first stage could also release to the market several multiple unit development sites to test the appetite of the market and building industry to provide new housing products. Future stages will be guided by the market.

Porter Consulting Engineers suggest the development could be staged commencing from the east and likely developed in 6 stages. A copy of the engineer's servicing report and order of probable costs have been provided in the *Addressing Wheatbelt Development Constraints* report.

There is a need to consider what the Shire of Narrogin contributes to the project, such as the land, and whether the delivery agency (likely to be DevelopmentWA) accepts the risks via consideration of a Regional Development Assistance Program (RDAP) application.

#### **4.4 Ancillary accommodation**

As outlined earlier, this provides a lower risk option in creating dwellings up to 70m<sup>2</sup> in area.

#### 4.5 Affordable/social housing

The State Government, or not-for-profit organisations, are encouraged to review opportunities and deliver additional affordable/social housing. Various sites are available that are currently owned or managed by the State Government or the Shire.

#### 4.6 Workforce accommodation

In addition to creating serviced residential lots, there is scope to develop suitably located and designed workforce accommodation. This could be designed to be flexible for a range of users, over time, including a retirement village and short stay accommodation. There are often cost savings in creating these forms of development compared to creating freehold lots.

#### 4.7 Re-use/redevelopment

Subject to feasibility, there are various re-use and redevelopment sites. An example is 28 Havelock Street (former Westrail workers accommodation). Details are outlined in the *Addressing Wheatbelt Development Constraints* report.

#### 4.8 Rural residential

There is approximately 15ha of 'Rural Residential' zoned land and 613ha of land zoned as 'Special Rural' within the Shire, mostly located near the Narrogin townsite.<sup>13</sup>

Rural living (rural residential and rural smallholding) is usually popular with the market, however there are limits in the amount of land that can be provided noting WAPC policy. WAPC policy sets out that rural living estates must be carefully planned, as they can be an inefficient means of accommodating people. **Appendix D** outlines there is scope for additional rural living lots near Narrogin.

There may also be opportunities for the re-subdivision of some Rural Residential zoned land subject to relevant planning considerations being suitably met.

#### 4.9 Staging

Staging of new housing will be influenced by a range of factors including vacant serviced lots, feasibility, market requirements, servicing authority decisions and government policy. The Shire and relevant State Government agencies can influence staging through planning controls, investment decisions and addressing market failure through an application to DevelopmentWA's Regional Development Assistance Program (RDAP).

Staging of new residential subdivisions/development is expected to be informed by:

- Focusing short to medium term development near available services or where modest service extensions are required;
- Where sites require more significant service extensions and/or upgrades, it is expected they will be developed in the longer term (other than perhaps the former golf course site – Lot 123 Golf Course Parade);
- Land tenure;
- Environmental and bushfire considerations;
- Land use compatibility; and
- Other planning and servicing considerations.

Staging should consider and seek to provide an adequate supply of serviced residential and rural residential land to ensure the timely release of new housing.

#### 4.10 Future opportunities and strategies

Future opportunities and strategies include:

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<sup>13</sup> Shire of Narrogin, 2020, *Shire of Narrogin Local Planning Strategy*

- A key long-term opportunity is the potential relocation of the speedway (currently on the eastern fringes of Narrogin). This would open up substantial residential land in the eastern part of the townsite;
- Need to consider future housing needs having regard for anticipated population growth, declining household sizes and an ageing population;
- Need to plan for and accommodate demand for higher density housing including a greater range of 1 and 2 bedroom dwellings;
- Address the strong demand for but limited supply of high quality, low maintenance rental accommodation; and
- Review all opportunities to provide additional affordable/social housing. This includes Department of Communities and not-for-profit organisations refurbishing the existing housing stock and providing additional housing.

#### **4.11 Recommended actions**

The following summaries recommended actions:

- The Shire to prepare a RDAP application to DevelopmentWA for the large greenfield site (Lot 123 Golf Course Parade);
- Subject to a scheme amendment, develop 24 Glyde Street as a pilot project for affordable housing using modular construction;
- Promote suitable sites for workforce accommodation provided the external design suitably addresses local amenity and local planning considerations;
- De-risk Crown and Shire land that has housing potential, including changing the tenure and gaining necessary approvals;
- Canvass local landowners, setting out ancillary dwelling and tiny house opportunities;
- Canvass key local landowners and ascertain realistic development opportunities for excess land to made available for development sites;
- Work with servicing agencies to address servicing constraints; and
- Progress discussions with the speedway club to find an alternative appropriate location and address matters to enable future long-term use of the land for residential development.

---

# APPENDIX A

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## TECHNICAL NOTE

**Project:** Wheatbelt Development Constraints **Date Issued:** 26 Nov 2021

**Issued to:** Steve Thompson (Edge Planning Consultants)  
Robert Fenn (Senior Development Manager,  
DevWA), Jennifer Abraham (Development  
Manager, DevWA) **Job Number:** 21-09-135

**Subject:** Summary of engineering servicing constrains **Revision:** A

---

### Wheatbelt Development Constraints as of 29 November 2021

#### 1. Kellerberrin

<u>Utility service</u>	<u>Status</u>	<u>Comments</u>
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Gas (ATCO)	No gas network in the region.	
Scheme Water (Water Corporation)	The existing water supply is sufficient as advised by Water Corp.	
Scheme Sewerage (Water Corporation)	There is no scheme sewerage reticulation in the surrounding area.	Onsite wastewater treatment and disposal to be considered.
Stormwater drainage		

## 2. Narembeen

<u>Utility service</u>	<u>Status</u>	<u>Comments</u>
Electrical (Western Power)	The WP Network Capacity mapping tool indicates has currently 10-15 MVA remaining capacity and forecast to remain at this level to 2036.	Given remaining capacity in the network, supply is not likely to be an issue. Cost only a factor based on distance to nearest HV network supply.
Communications (NBN)	NBN service available with NBN Satellite service to the township and beyond.	
Gas (ATCO)	No gas network in the region.	
Scheme Water for Townsite (Water Corporation)	Adequate water supply to Townsite with some spare unquantified capacity as advised by Water Corporation.	
Scheme Water for industrial area south of Townsite (Water Corporation)	As advised by Water Corp, the industrial area south of the townsite is outside the water zone, but is serviced via the Service By Agreement (SBA) arrangements off an 80mm AC farmland main.  Water Corp has advised that the 16 lot industrial development (WAPC158008) is likely to trigger the upgrade of the water supply to a 150mm main for this area back to Latham Road, some 930m to the north.	
Scheme Sewerage for Townsite (Water Corporation)	No specific mention of wastewater servicing constraints to the townsite by Water Corp, and would be subject to the number of proposed lots with any future residential development.	
Scheme wastewater for industrial area south of Townsite (Water Corporation)	The industrial area to the south of the townsite is not sewerred.  The WAPC158008 development does not have a sewer condition, so wastewater would need to be managed and disposed onsite.  However, Water Corporation has prepared a concept plan to demonstrate this industrial area could be served with scheme gravity sewers to a small wastewater pumping station back to the townsite sewers, should the area seek reticulation scheme sewers.	If DevWA intends to pursue this option, they should approach the Corporation's Headworks Team Leader (Russell Nelson) as soon as possible to determine if and when the WWPS can be funded.  This WWPS is likely to be outside of the current 5 year pre-funding program
Stormwater drainage		

### 3. Narrogin

<u>Utility service</u>	<u>Status</u>	<u>Comments</u>
Electrical (Western Power)	The WP Network Capacity mapping tool indicates has currently 20-25 MVA remaining capacity and forecast to remain at this level to 2036.	Given remaining capacity in the network, supply is not likely to be an issue. Cost only a factor based on distance to nearest HV network supply.
Communications (NBN)	NBN service available with a 'Fibre to the Node' to the township. 'Fixed Wireless' is available to the extremities of the township and beyond.	
Gas (ATCO)	No gas network in the region.	
Scheme Water (Water Corporation)	No water servicing constraints noted.	
Scheme Sewerage (Water Corporation)	<p>The Narrogin wastewater network has capacity in a number of locations.</p> <p>The DN150 gravity sewer along Gregory Street has hit capacity. As well as this the DN225 gravity sewer along Federal St and the DN300 gravity sewer along Hartog St are also close to capacity.</p> <p>The Proposed Industrial Development areas south of Narrogin along Graham Road and Mokine Road are outside the current Narrogin wastewater scheme. Onsite wastewater disposal would be required.</p>	A network review will need to be undertaken by Water Corp to allow further development. Water Corp indicates that a wastewater network review likely in the 2022/2023 financial year.
Stormwater drainage		

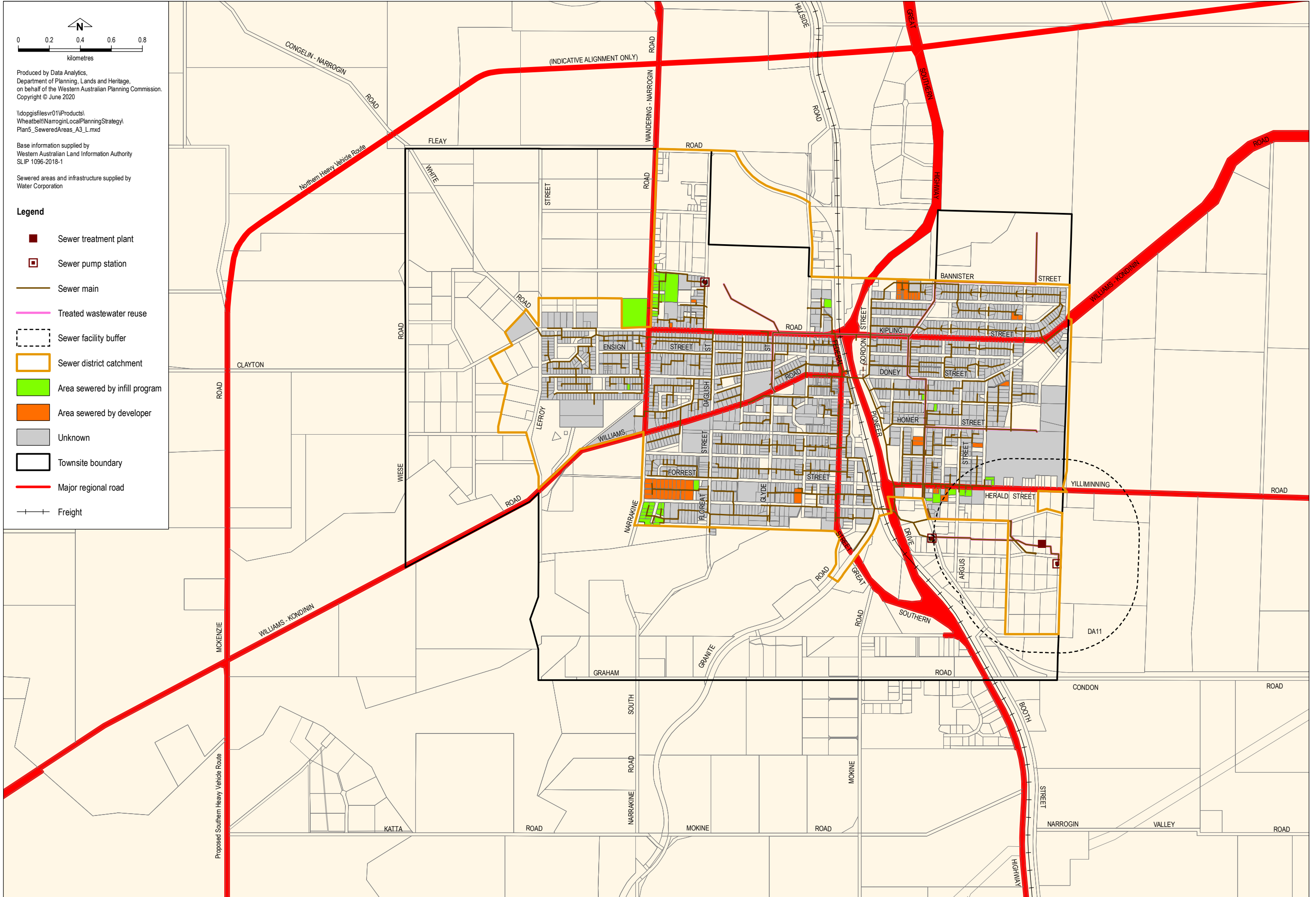
## 4. Pingelly

<u>Utility service</u>	<u>Status</u>	<u>Comments</u>
Electrical (Western Power)	The WP Network Capacity mapping tool indicates has currently 20-25 MVA remaining capacity and forecast to remain at this level to 2036.	Given remaining capacity in the network, supply is not likely to be an issue. Cost only a factor based on distance to nearest HV network supply.
Communications (NBN)	NBN service available with a 'Fibre to the Node' to the township. 'Fixed Wireless' is available to the extremities of the township and beyond.	
Gas (ATCO)	No gas network in the region.	
Scheme Water (Water Corporation)	<p>If the proposed additional lots/dwellings are within the townsite area and adjoin existing retic. mains, then there should be the capability and capacity to serve this growth.</p> <p>Any development that is distant from the existing networks will require mains extensions at the proponent's cost and will likely need prior planning investigations to determine if and how the land can be serviced.</p>	<p>The Pingelly townsite area is served with water from the Pingelly Service Tank which has a maximum top water level of around 252mAHD. Elevated land above around 230mAHD and with increasing distance from the tank cannot be supplied with water at minimum complying pressures. In general terms, if the additional development/subdivision proposed by DevelopmentWA is to be located within the existing townsite water zone and close to an existing water main, there should be a way to service the growth by extension and possibly by some localised retic main upgrade.</p>
Scheme Sewerage (Water Corporation)	<p>If the proposed additional lots/dwellings are within the townsite area and adjoin existing retic. mains, then there should be the capability and capacity to serve this growth.</p> <p>Any development that is distant from the existing networks will require mains extensions at the proponent's cost and will likely need prior planning investigations to determine if and how the land can be serviced.</p>	The Pingelly WWTP and associated treated wastewater reuse system is scheduled for process and capacity upgrades between 2028 and 2031.
Stormwater drainage		


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# APPENDIX B

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## Plan 5 – Sewer District Catchment & Treated Wastewater Refuse Mains (Narrogin Town and Surrounds)



0      0.2      0.4      0.6      0.8

kilometres








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Department of Planning, Lands and Heritage,  
on behalf of the Western Australian Planning Commission.  
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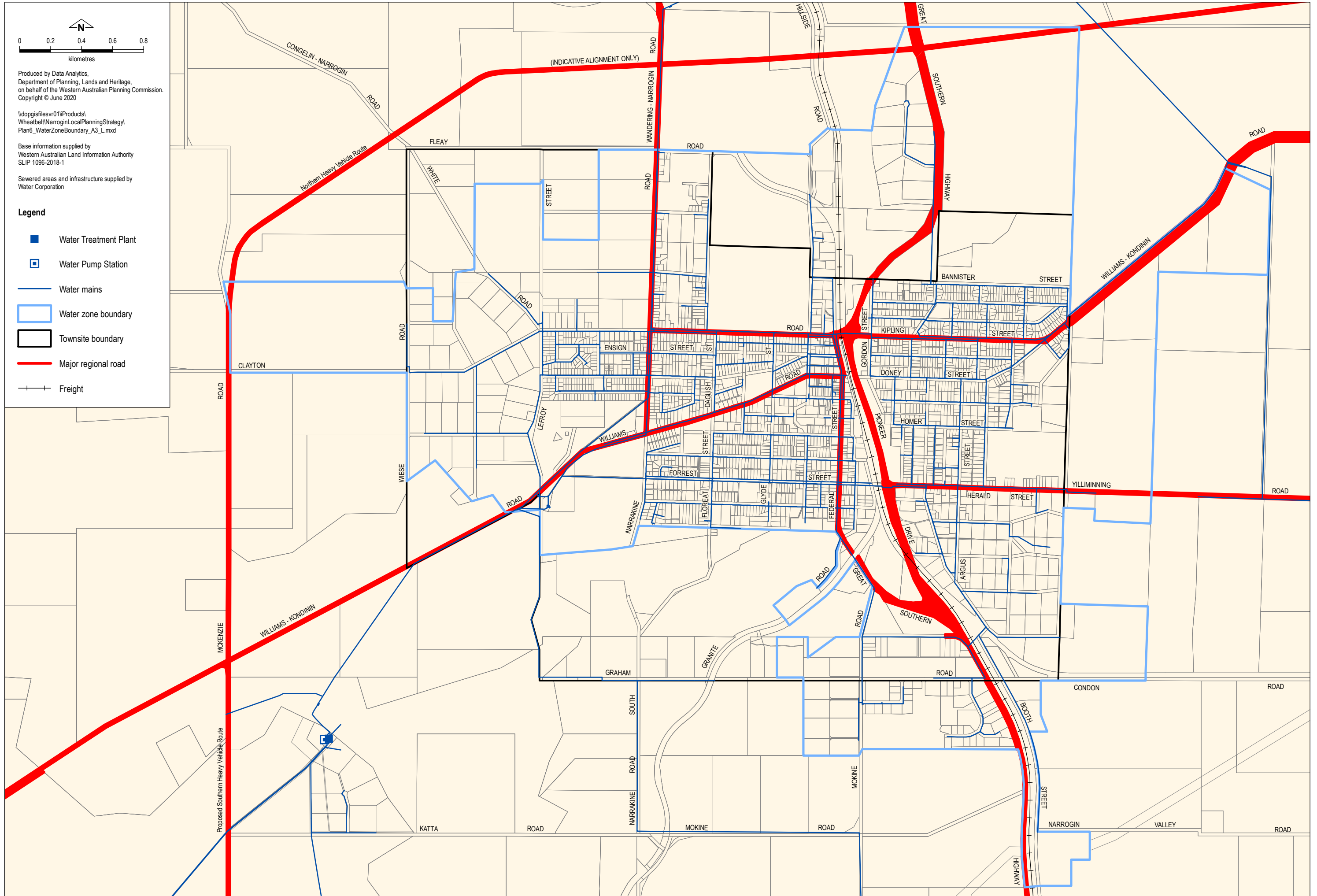
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Wheatbelt\Narogin\LocalPlanning\Strategy\  
Plan6\_WaterZoneBoundary\_A3\_L.mxd

Base information supplied by  
Western Australian Land Information Authority  
SLIP 1096-2018-1

Sewered areas and infrastructure supplied by  
Water Corporation

### Legend

-  Water Treatment Plant
-  Water Pump Station
-  Water mains
-  Water zone boundary
-  Townsite boundary
-  Major regional road
-  Freight



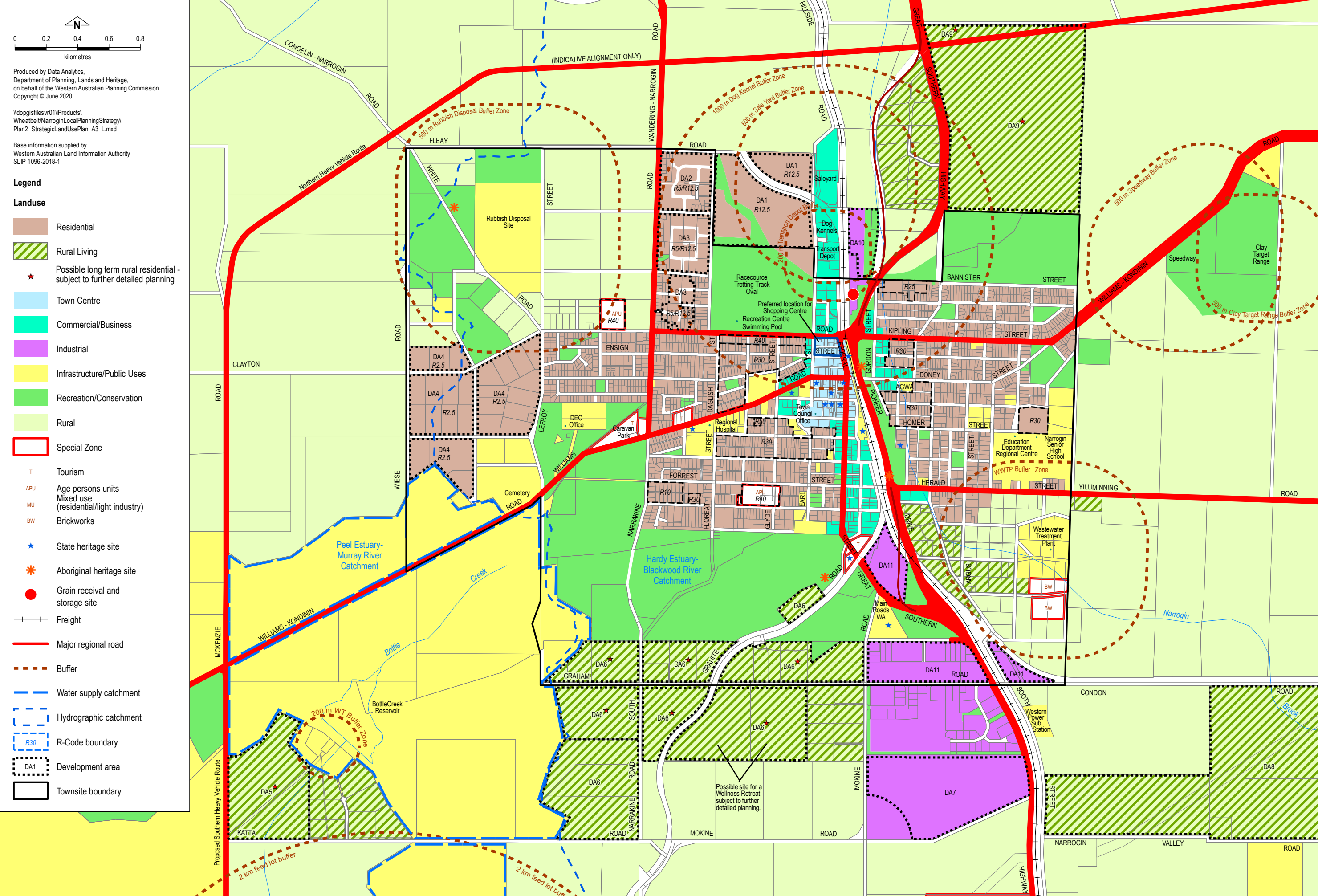
## Plan 6 – Water Zone Boundary (Narrogin Town and Surrounds)

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# APPENDIX C

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# Shire of Narrogin Local Planning Strategy



## Plan 2 - Strategic Land Use Plan (Narrogin Town and Surrounds)

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# APPENDIX D

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## STRATEGIC LAND USE PLAN (NARROGIN TOWN AND SURROUNDS)

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# APPENDIX E

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## Narrogin Land Supply

Map reference	Lot	House No.	Street	Land size (m <sup>2</sup> )	TPS2 Zoning/ R-Code	Strategic Land Use Plan Zoning/R-Code	Comments	Dwelling Yield
1	85	6	Andrews Street	720	Residential R12.5	Residential R12.5	Vacant	1
2	1687	24	Ashworth Crescent	792	R12.5	R12.5	Vacant	1
3	1303	60	Bannister Street	892	R12.5	R12.5	Vacant	1
4	2	19	Barron Street	725	R12.5	R12.5	Vacant	1
5	928	22	Butler Street	2011	R12.5	R12.5	Vacant	2
6	930	26	Butler Street	2011	R12.5	R12.5	Vacant	2
7	12	4	Clark Street	728	R12.5	R12.5	Vacant	1
8	874	49	Clayton Road	1012	R12.5	R40	Vacant	4
9	81	76	Clayton Road	1286	R12.5	R12.5	Vacant	1
10	491	90	Clayton Road	10778	R12.5	R5/R12.5	Vacant	13
11	53	104	Clayton Road	822	R12.5	R12.5	Vacant	1
12	8	127	Clayton Road	1834	R12.5	R12.5	Vacant	2
13	81	133	Clayton Road	802	R12.5	R12.5	Vacant	1
14	991	10	Cresswell Street	1315	R12.5	R12.5	Vacant	1
15	992	12	Cresswell Street	1176	R12.5	R12.5	Vacant	1
16	175	8	Doney Street	1214	R12.5	Commercial/ Business	Vacant. Assume R30.	4
17	174	10	Doney Street	1214	Shops and Offices	Commercial/ Business	Vacant. Assume R30.	4
18	47	49	Doney Street	1095	R12.5	R12.5	Vacant	1
19	48	53	Doney Street	2190	R12.5	R12.5	Vacant	2
20	997	78	Doney Street	1277	R12.5	Recreation	Vacant. Assume R12.5.	1
21	998	82	Doney Street	675	R12.5	Recreation	Vacant. Informal road and bush on site. Assume R12.5.	1
22	2	66	Earl Street	1012	R12.5	Commercial/ Business	Vacant. Assume R30.	3
23	39	3	Elliot Street	1012	R12.5	R12.5	Garden and shed on site.	1
24	4	54	Fairway Street	1263	Other Commercial A10	Commercial/ Business	Assume R12.5.	1
25	22	85	Ensign Street	911	R12.5	R12.5	Vacant. Used as part of No. 87	1
26	18	101	Ensign Street	1126	R12.5	R12.5	Vacant. Bush on site.	1
27	17	103	Ensign Street	1110	R12.5	R12.5	Vacant. Bush on site.	1
28	24	104	Ensign Street	816	R12.5	R12.5	Vacant	1

29	26	108	Ensign Street	1041	R12.5	R12.5	Vacant	1
30	100	115	Ensign Street	3692	R12.5	R12.5	Vacant. Bush on site.	4
31	47	96A	Ensign Street	1207	R12.5	R12.5	Vacant. Trees and white sand on site.	1
32	8	19	Falcon Street	1002	R12.5	R30	Vacant	3
33	221	80	Felspar Street	3625	R30 Other Residential	R30	Vacant. Key opportunity.	12
34	26	7	Fleay Road	94114	R12.5	R5/R12.5	Vacant. Part used by Nicholls Coaches.	117
35	10	21	Floreat Street	1592	R12.5	R12.5	Vacant	1
36	1676	50	Floreat Street	1335	R12.5	R12.5	Vacant. Bush on site.	1
37	4	31	Forrest Street	809	R12.5	R12.5	Vacant	1
38	3	33	Forrest Street	827	R12.5	R12.5	Vacant	1
39	1734	16	Falcon Street	1191	Community	Infrastructure/ Public Uses	Vacant. Assume R50.	7
40	206	97	Forrest Street	1594	R10	R10	Vacant	1
41	23	25	Fox Street	1024	R12.5	R12.5	Vacant	1
42	24	27	Fox Street	1024	R12.5	R12.5	Vacant	1
43	25	29	Fox Street	1024	R12.5	R12.5	Vacant	1
44	1405	74	Fox Street	893	R12.5	R12.5	Partly developed	1
45	1407	78	Fox Street	893	R12.5	R12.5	Partly developed	1
46	3	61	Furnival Street	1638	R12.5	R12.5	Vacant	2
47	2	63	Furnival Street	1621	R12.5	R12.5	Vacant	2
48	1426	23	Garfield Street	971	12.5	R12.5	Vacant	1
49	623	24	Glyde Street	4052	12.5	R12.5	Vacant. Key opportunity. Detailed planning shows 16 dwellings subject to Scheme amendment.	16
50	1306	3	Goldsmith Street	873	R12.5	R12.5	Vacant	1
51	1305	5	Goldsmith Street	873	R12.5	R12.5	Vacant. Pad on site.	1
52	999	9	Grant Street	364	R12.5	Recreation	Vacant	1
53	986	67	Hansard Street	1378	R12.5	R12.5	Vacant	1
54	988	71	Hansard Street	1492	R12.5	R12.5	Partly developed. Used with 69.	1
55	403	7	Hartoge Street	664	R12.5	R30	Vacant	2
56		28	Havelock Street	4108	R25	R12.5	Former Railway Barracks. Key opportunity.	10
57	3	41	Havelock Street	607	R12.5	R12.5	Partly developed	1
58	233	17	Herald Street	2146	Community	Infrastructure/ Public Uses	Vacant. Assume R12.5.	2

59	239	44	Havelock Street	4108	Other Commercial	Commercial/ Business	Vacant with bush. Assume R12.5.	5
60	965	81	Herald Street	1214	R12.5	R12.5	Vacant	1
61	1226	26	Homer Street	1097	R12.5	R12.5	Vacant	1
62	72	6	Hough Street	746	R12.5	R12.5	Partly developed	1
63	27	37	Hough Street	938	R12.5	R12.5	Vacant	1
64	26	39	Hough Street	781	R12.5	R12.5	Vacant	1
65	25	41	Hough Street	781	R12.5	R12.5	Partly developed	1
66	23	45	Hough Street	781	R12.5	R12.5	Vacant	1
67	83	6	James Street	804	R12.5	R12.5	Sea container on site	1
68	14	5	Keally Street	711	R12.5	R12.5	Vacant	1
69	508	9	Kipling Street	1017	R12.5	R12.5	Partly developed	1
70	4	27	Lefroy Street	728	R12.5	R12.5	Vacant	1
71	1701	31	Lefroy Street	728	R12.5	R12.5	Vacant	1
72	17	52	Lock Street	1846	R12.5	R12.5	Vacant	2
73	16	54	Lock Street	1846	R12.5	R12.5	Vacant	2
74	37	68	Lock Street	728	R12.5	R12.5	Vacant	1
75	2	93	Lock Street	842	R12.5	R12.5	Vacant	1
76	1	95	Lock Street	855	R12.5	R12.5	Vacant	1
77	29	25	May Street	784	R12.5	R12.5	Vacant	1
78	4	33	May Street	8273	R12.5	R5/R12.5	Vacant	10
79	13	69	May Street	809	R12.5	R5/R12.5	Vacant	1
80	1572	81	May Street	1687	Recreation	R5/R12.5	Vacant	2
81	923		May Street	13298	R12.5	R5/R12.5	Vacant	16
82	33	4	McCormick Way	812	R12.5	R12.5	Partly developed	1
83	39	7	McCormick Way	675	R12.5	R12.5	Partly developed	1
84	28	8	McCormick Way	1378	R12.5	R12.5	Vacant	1
85	17	13	Narrakine Road	809	R12.5	R5/R12.5	Vacant	1
86	53	131	Narrakine Road	815	R12.5	R12.5	Vacant	1
87	12	141	Narrakine Road	713	R12.5	R12.5	Vacant	1
88	85	147	Narrakine Road	1045	R12.5	R12.5	Vacant	1
89	202	183	Narrakine Road	1579	R10	R10	Vacant	1
90	56	91A	Narrakine Road	5596	R12.5	R5/R12.5	Vacant	6
91	518	24	Northwood Street	1012	R12.5	R12.5	Sea container on site	1
92	1428	34	Northwood Street	941	R12.5	R12.5	Vacant	1
93	1431	40	Northwood Street	941	R12.5	R12.5	Partly developed	1
94	1447	48	Northwood Street	893	R12.5	R12.5	Vacant	1
95	1397	51	Northwood Street	893	R12.5	R12.5	Vacant	1
96	1392	61	Northwood Street	893	R12.5	R12.5	Vacant	1
97	1665	73	Northwood Street	1786	Community	R12.5	Vacant	2
98	1476	80	Northwood Street	893	R12.5	R12.5	Vacant	1

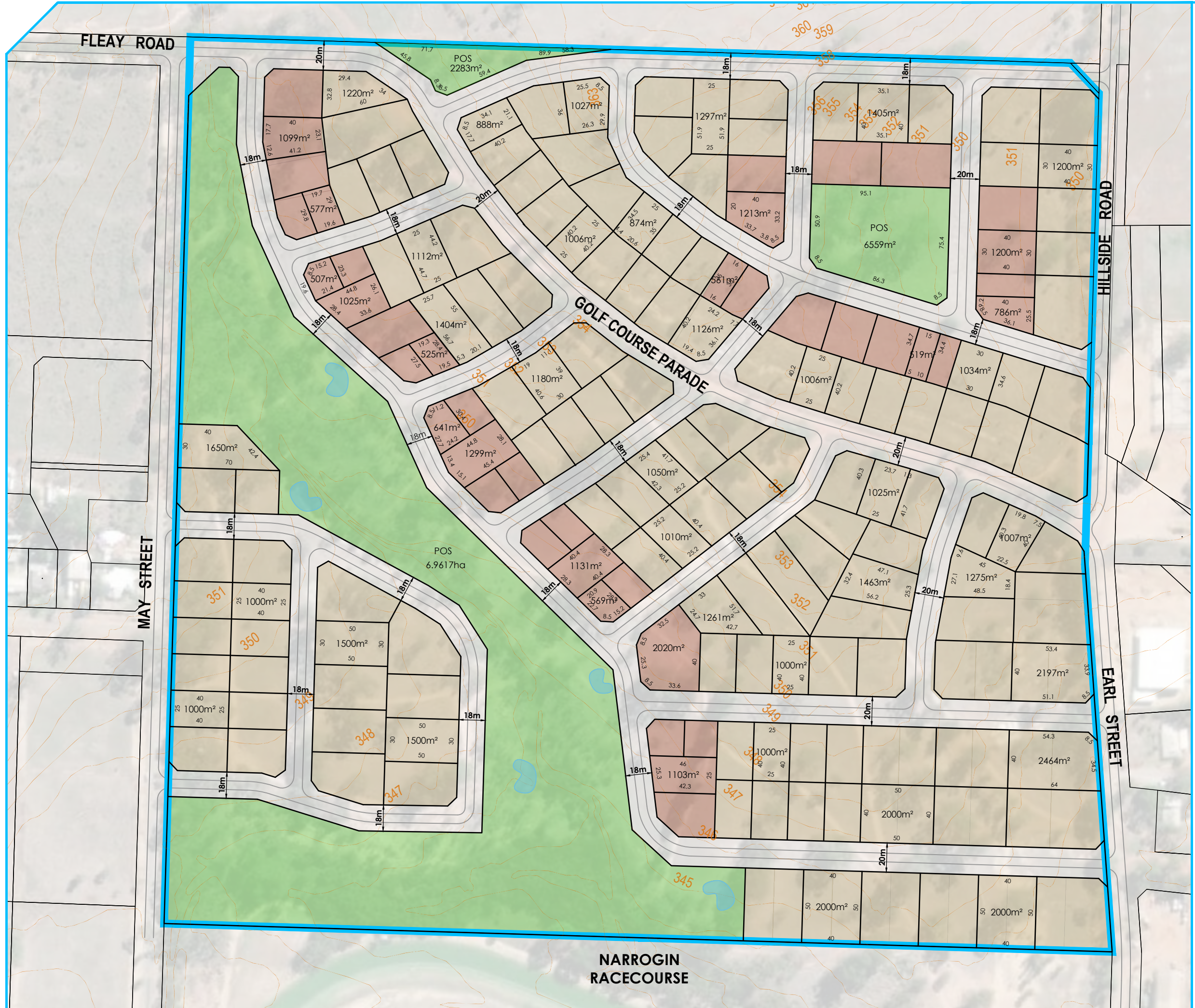
99	889	81	Northwood Street	1711	R12.5	R12.5	Partly developed	2
100	922		Quigley Street	2026	R12.5	R5/R12.5	Vacant	2
101	473		Quigley Street	15377	R12.5	R5/R12.5	Vacant	19
102	1481	3	Roe Street	873	R12.5	R12.5	Vacant	1
103	1480	5	Roe Street	873	R12.5	R12.5	Vacant	1
104	11	6	Short Street	728	R12.5	R12.5	Vacant	1
105	76	37	Sydney Hall Way	704	R12.5	R12.5	Vacant	1
106	9	8	Tuohy Street	837	R12.5	R12.5	Vacant	1
107	1	40	Fairway Street	768	Other Commercial	Commercial/ Business	Assume R12.5	1
108	1615	Reserve 36959	Near Ensign Street	886	R12.5	R12.5	Vacant. Reserve R36959.	1
109	14	4	Gregory Street	14565	Carpark	Town Centre	Storage material. Key opportunity. Assume R50.	72
110	1562	78	Felspar Street	1151	Recreation	R30	Vacant. Key opportunity.	3
111	32	29	Egerton Street	344	Central Business	Town Centre	Vacant. Assume R50.	1
112	601		Harris Street	304	Central Business	Town Centre	Vacant. Informal carpark. Assume R50.	1
113	712	14	Fathom Street	1156	R12.5	R12.5	Vacant. Informal carpark.	1
114	501	95	Earl Street	5264	Central Business	Town Centre	Partly developed. Assume R30.	17
115	5	56	Fairway Street	1250	Other Commercial A10	Commercial/ Business	Assume R12.5	1
116	123	2	Golf Course Parade	34ha	R12.5/ Recreation	Residential/ Recreation	Vacant and parkland cleared. Key opportunity.	260
117	Various	Various	Quigley Street, Narrakine Road, Dellar Street	7.7ha	R12.5/ Recreation	R5/R12.5	Mix of vacant land and existing development.	70
118	Various	Various	Dellar Street, Clayton Road	4.2ha	R12.5/ Recreation	R5/R12.5	Mix of vacant land and existing development.	45
119	Various	Various	Clayton Road, Wiese Road, George Street, Lefroy Street	54ha	Rural	R2.5	Mix of vacant land and existing development. Number of landowners makes co-ordination difficult.	50
120	Lot 2 & Lot 20	29 & 59	Katta Road, Cooraminning Road	35ha	Farming	Rural living	Existing development and a mix of vacant land and vegetated areas.	10
121	Various	Various	Graham Road, Narrakine Road South, Mokine Road	176.4ha	Special Rural & Farming	Rural living	Existing development and a mix of vacant land and vegetated areas. Number of	60

							landowners makes co-ordination difficult.	
122	Lots 153, 804 & 805 (part)		Great Southern Highway	109ha	Farming	Rural living	Vacant and largely cleared. Likely longer- term development.	40
123	Various	Various	Booth Street, Narrogin Valley Road, McDougalls Road, Condon Road	188ha	Special Rural & Farming	Rural living	Vacant and largely cleared. Likely longer-term development.	45
124	Various	Various	Gordon Street, Fox Street, Bannister Street	2.3ha	R12.5	R25	Mix of existing development and underutilised land.	5
125	Various	Various	Kipling Street, Garfield Street, Grant Street	2.5ha	R12.5	R30	Currently developed	5
126	Various	Various	Doney Street, Havelock Street, Homer Street, Hartage Street, Brown Street, Hansard Street, Martin Street, Heath Street	11.4ha	R12.5	R30	Currently developed	10
127	1656	43	Gray Street	3ha	R25	R30	Existing student accommodation.	5
128	Various	Various	Clayton Street, Earl Street, Williams Road, Glyde Street, Jersey Street, Johnston Street, Daglish Street, Watt Street	9.7ha	R12.5	R30/R40	Currently developed	10
129	Various	Various	Fathom Street, Earl Street, Falcon Street, Furnival Street, Glyde Street, Floreat Street, Johnson Street	11.8ha	R12.5	R30/R50	Currently developed	10
130	Various	Various	Forrest Street, Narrakine Road, Felspar Street	3.2ha	R10	R10	Currently developed and some underutilised land.	2
131	221	80	Felspar Street	3625	R30	R30	Vacant and largely cleared.	10
							<b>TOTAL</b>	<b>1091</b>

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# APPENDIX F

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# CONCEPT PLAN

Lot 123 Golf Course Parade  
Narrogin  
Shire of Narrogin

**LEGEND**

- Subject Area
- Existing Contours
- Proposed Lot Boundary
- Proposed Public Open Space
- Proposed Residential R5 - R12.5
- Proposed Residential R30
- Proposed Roads
- Indicative Drainage Basin

**CURRENT LOTS**

Lot 123	34.5743ha
Lot 300 (Vacant Crown Land)	2.2207ha
Golf Course Parade	1.5227ha
<b>TOTAL</b>	<b>38.3177ha</b>

**SUBDIVISION SUMMARY**

No. Lots	180
Total Area Lots	215818m <sup>2</sup>
Avg Area Lots	1199m <sup>2</sup>
Min Lot Area	507m <sup>2</sup>
Max Lot Area	2621m <sup>2</sup>
POS Contribution	7.8460ha (20.5%)
Subject Area	38.3177ha

**NOTES:**

- 1) Sewerage and other services to be extended.
- 2) Various R30 lots can be resubdivided.

B REVISED DESIGN  
A BASE PLAN  
REV DESCRIPTION

edge  
PLANNING & PROPERTY

Edge Planning & Property  
134 Hare Street, Mount Clarence  
ALBANY WA 6330  
E: steve@edgeplanning.com.au  
M: 0409 107 336

220923 ST  
220501 ST  
Y Y M M D D A P P R V D

DRAWING NUMBER  
EP 220501 02

REV  
B

SCALE 1:2500  
SHEET A/3

50m

# APPENDIX 8



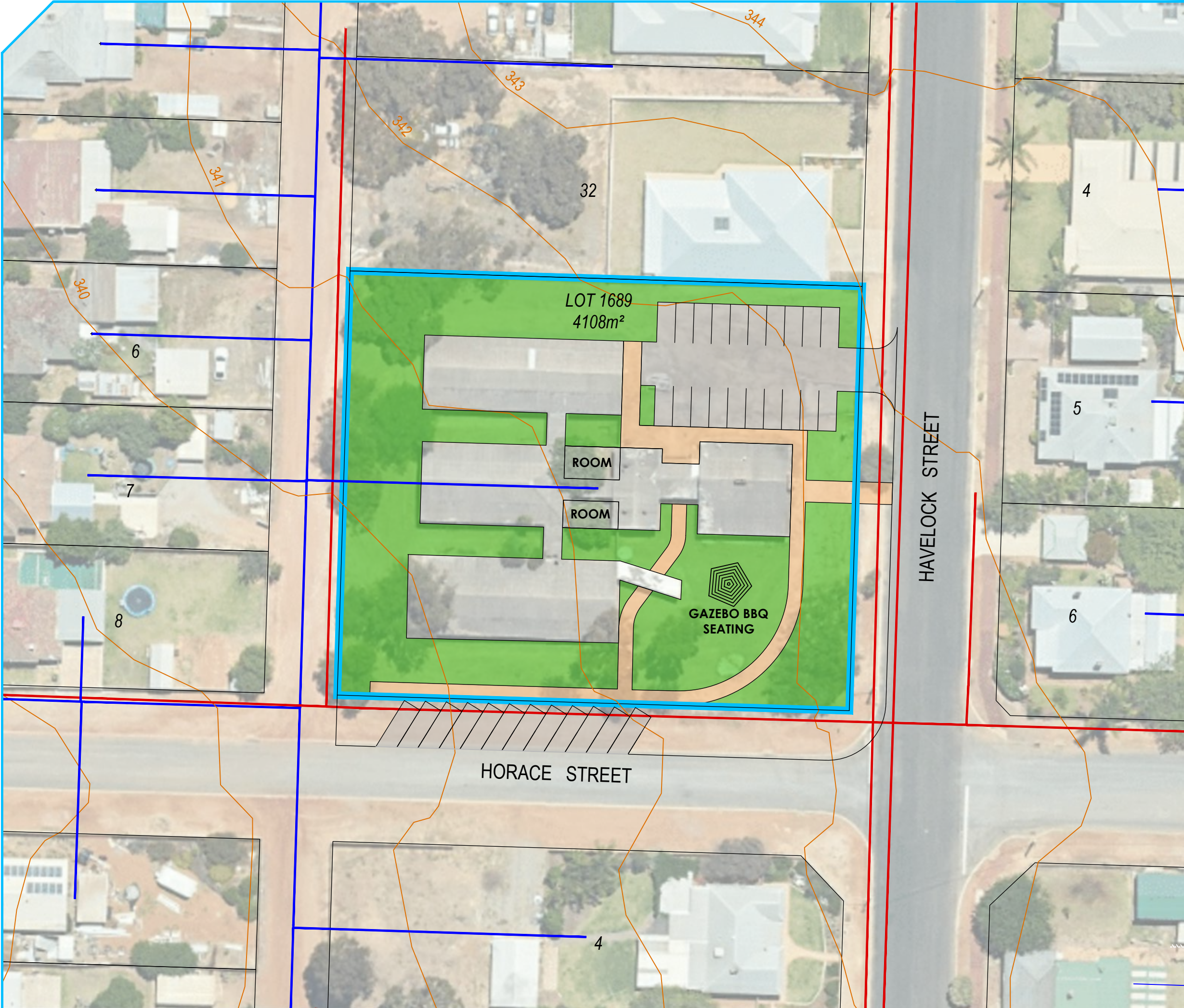
## Disused Westrail accommodation

Havelock Street, Narrogin



# APPENDIX 9





**CONCEPT PLAN**  
Lot 1689 (House No. 28)  
Havelock Street  
Narrogin  
Shire of Narrogin

**LEGEND**

- Subject Area
- Lot Boundary
- Water Service
- Sewer Service
- Contours
- CONCEPT**
- Possible Improvements
- Proposed Car Parking
- Proposed Open Space / Landscaping
- Proposed Footpath

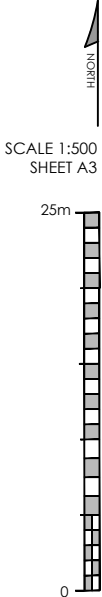
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REV	DESCRIPTION	YYMMDD	APPRVD

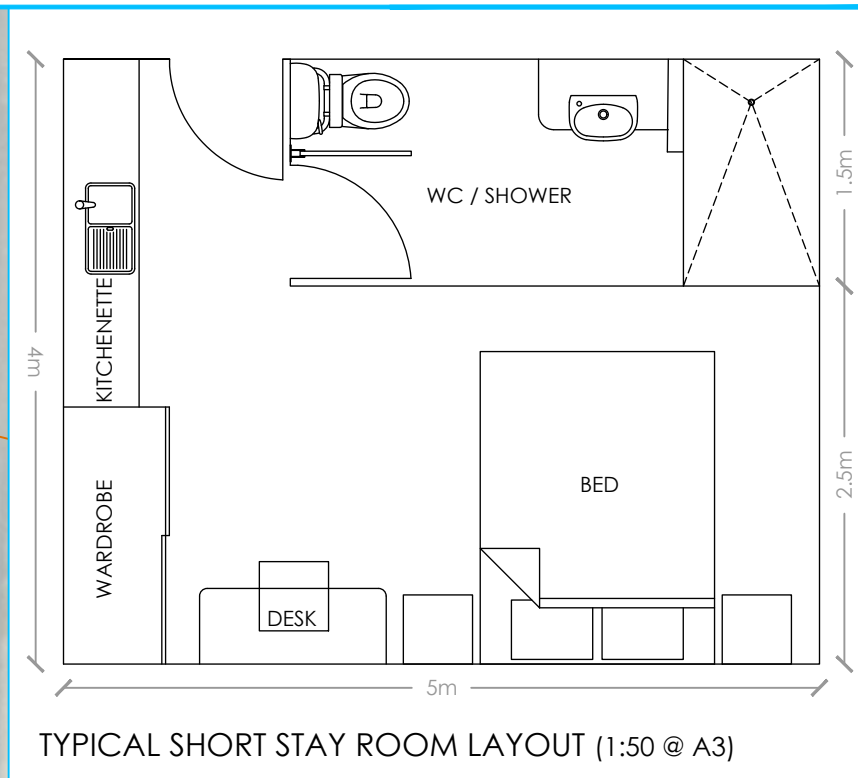
Edge Planning & Property  
134 Hare Street, Mount Clarence  
ALBANY WA 6330  
E: steve@edgeplanning.com.au  
M: 0409 107 336

DRAWING NUMBER  
EP 220501 05

REV  
A

Issued for design intent only.  
All areas and dimensions are  
subject to detail design + survey.





## CONCEPT FLOORPLAN

Lot 1689 (House No. 28)  
Harelock Street  
Narrogin  
Shire of Narrogin

### LEGEND

- Subject Area
- Lot Boundary
- Contours

### CONCEPT

- Car Parking
- Open Space / Landscaping
- Proposed Footpath
- External Doorway
- Short-stay Room

ADDED VERANDAH

ADDED ROOMS

GAZEBO BBQ SEATING

SCALE 1:500  
SHEET A3

0 25m

REV	DESCRIPTION	DATE	BY	CHKD
A	BASE PLAN	220607	ST	
REV	DESCRIPTION	Y Y M M D D	APPRVD	

**edge**  
PLANNING & PROPERTY

Edge Planning & Property  
134 Hare Street, Mount Clarence  
ALBANY WA 6330  
E: steve@edgeplanning.com.au  
M: 0409 107 336

DRAWING NUMBER  
EP 220501 08

REV  
A

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All areas and dimensions are  
subject to detail design + survey.







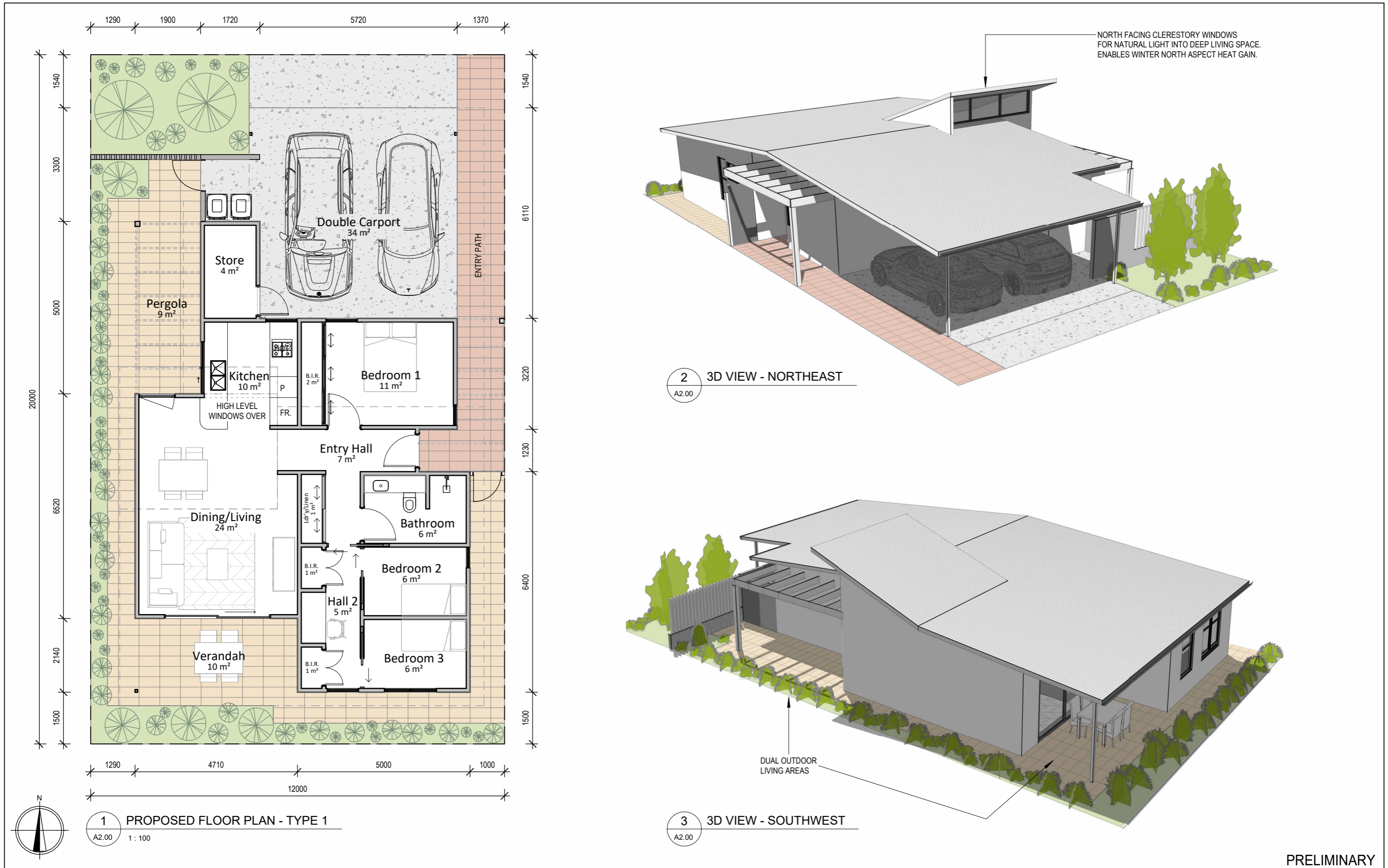




# APPENDIX 10







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**H+H architects**

**ALBANY**  
9842 5558

**KALGOORLIE**  
9022 4015

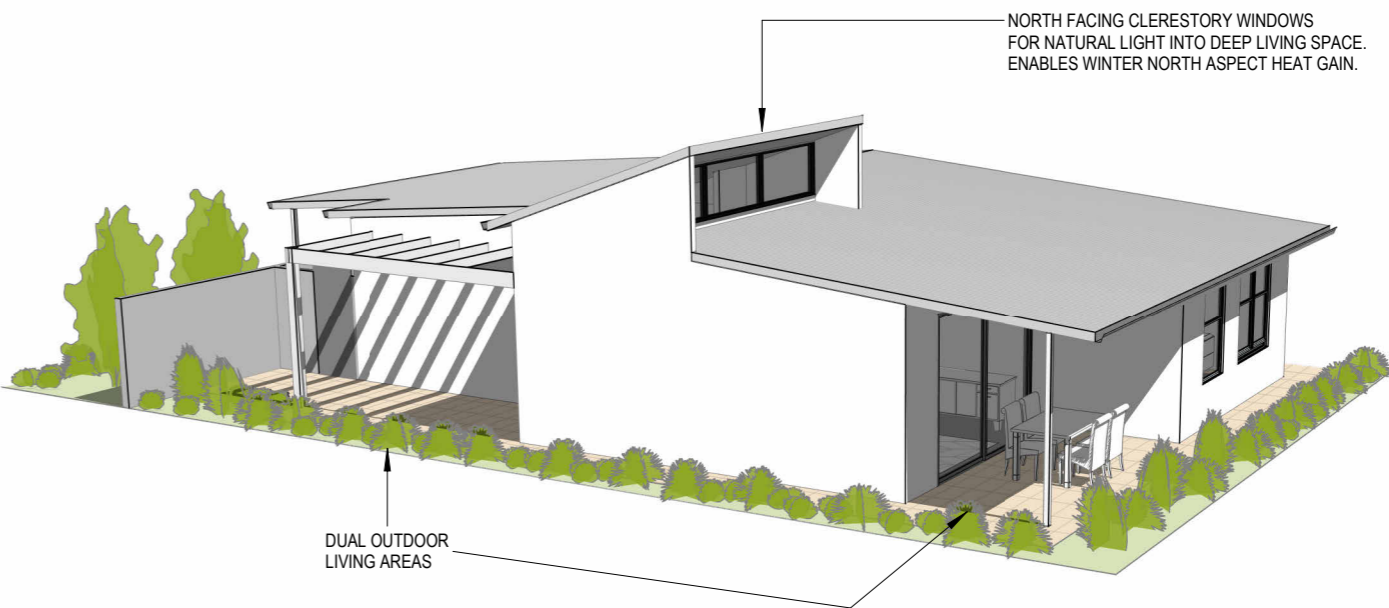
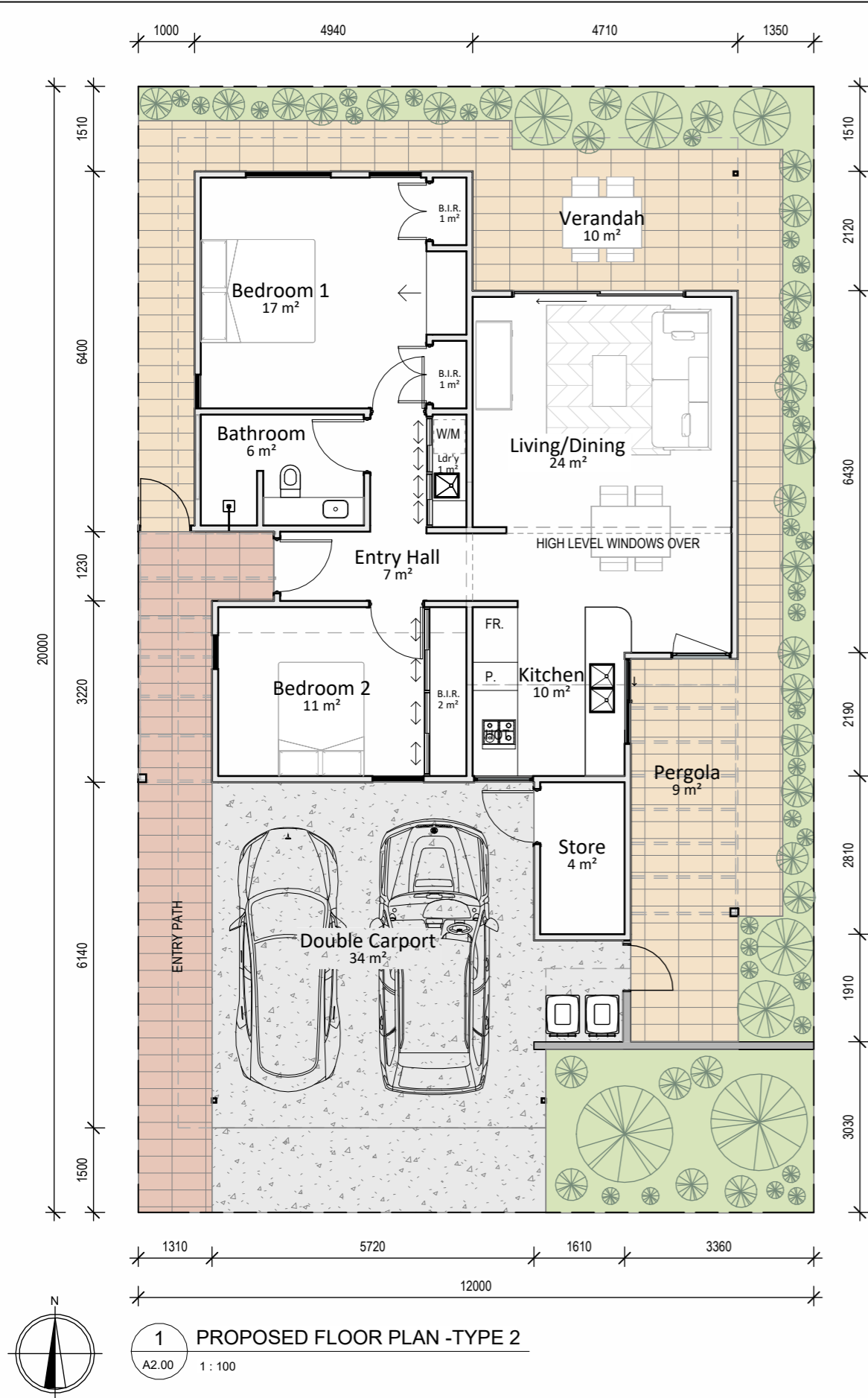
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PROJECT  
WHEATBELT DEVELOPMENT STUDY

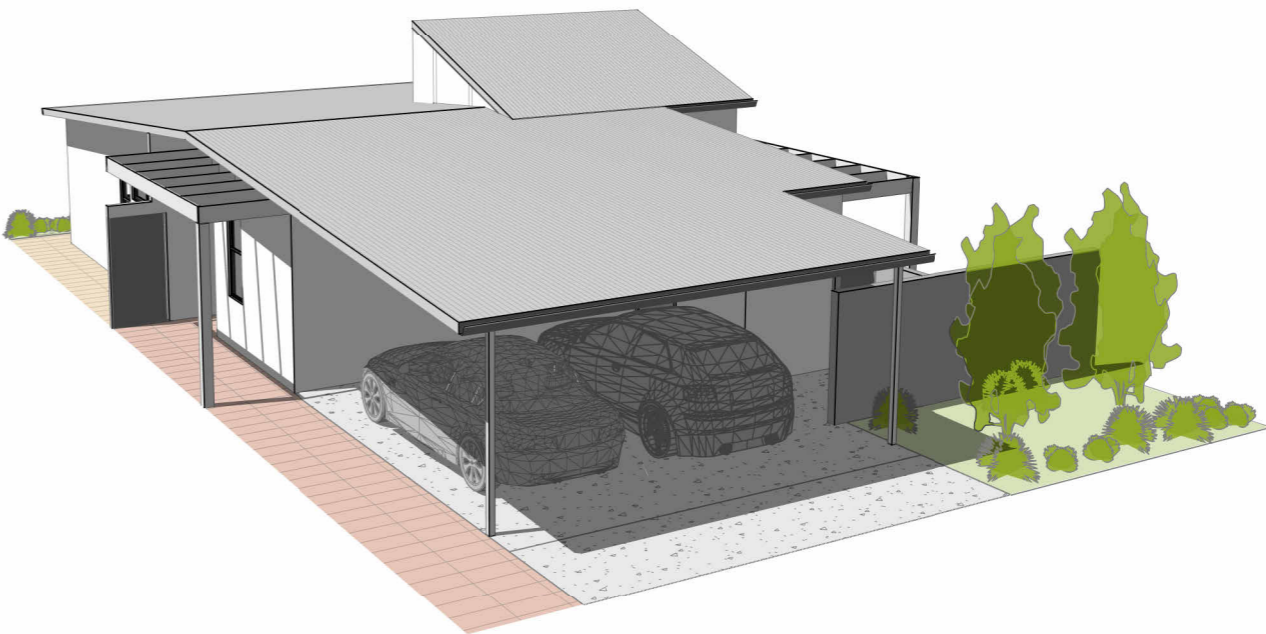
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DRAWING	FLOOR PLAN & 3D VIEWS	DWG No.	REV.
		A2.00	1
		DATE:	21/10/2022

PRELIMINARY



2 3D VIEW - NORTHEAST  
A2.00



3 3D VIEW - SOUTHWEST  
A2.00

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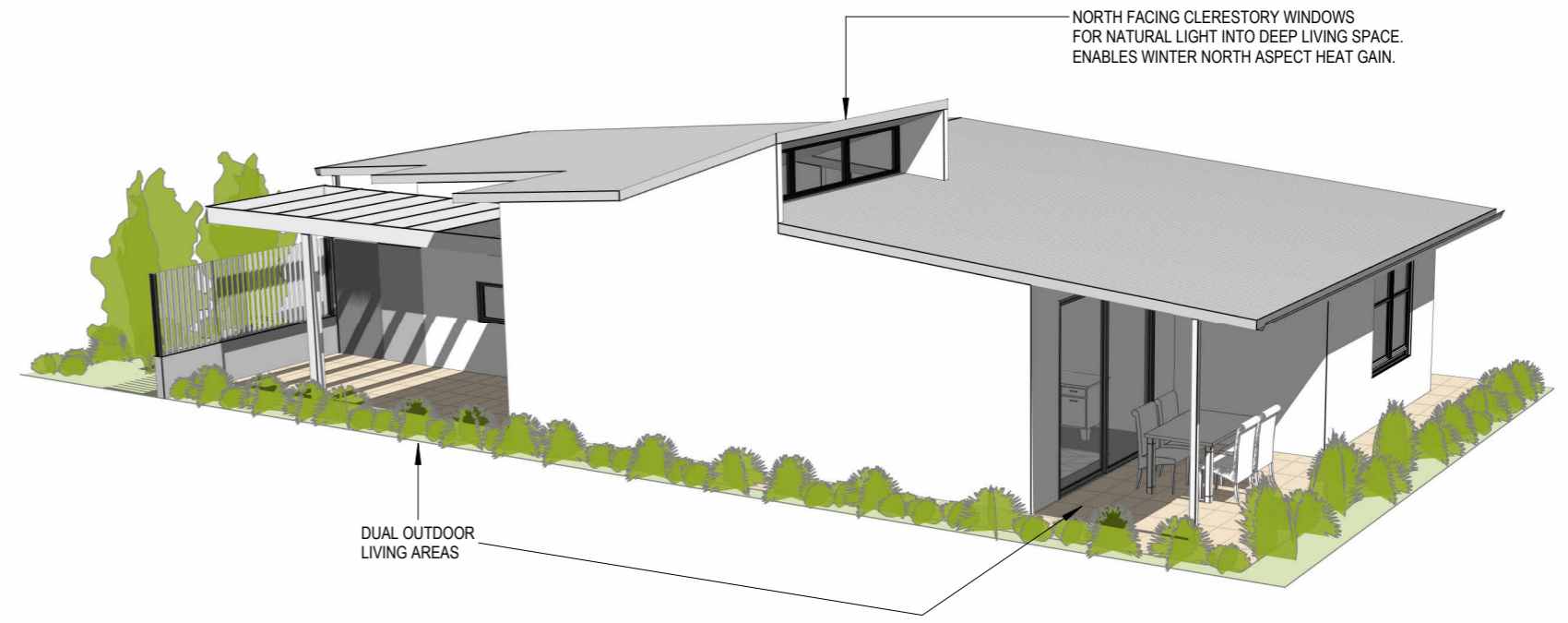
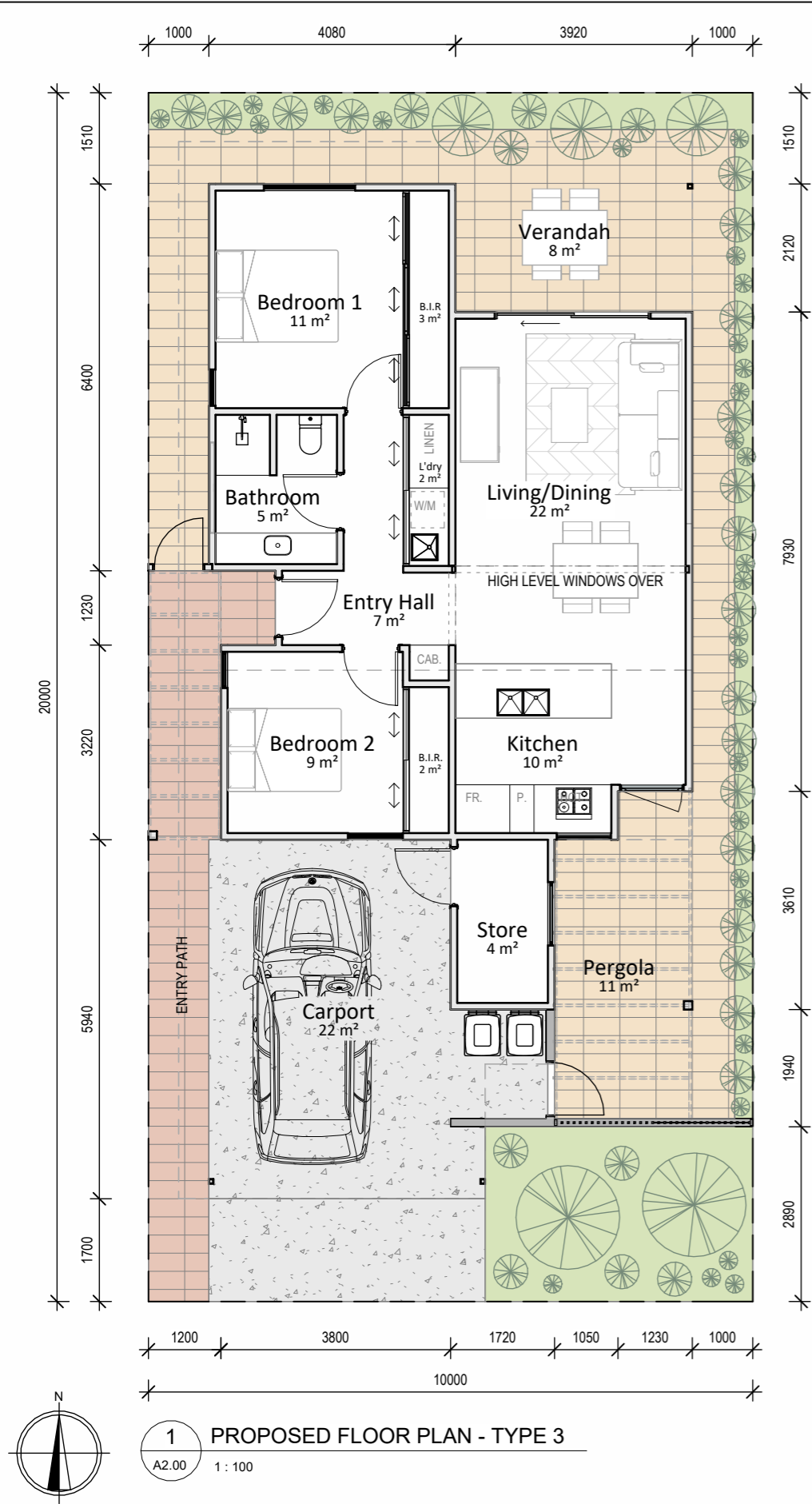
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BUNBURY  
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PROJECT  
WHEATBELT DEVELOPMENT STUDY

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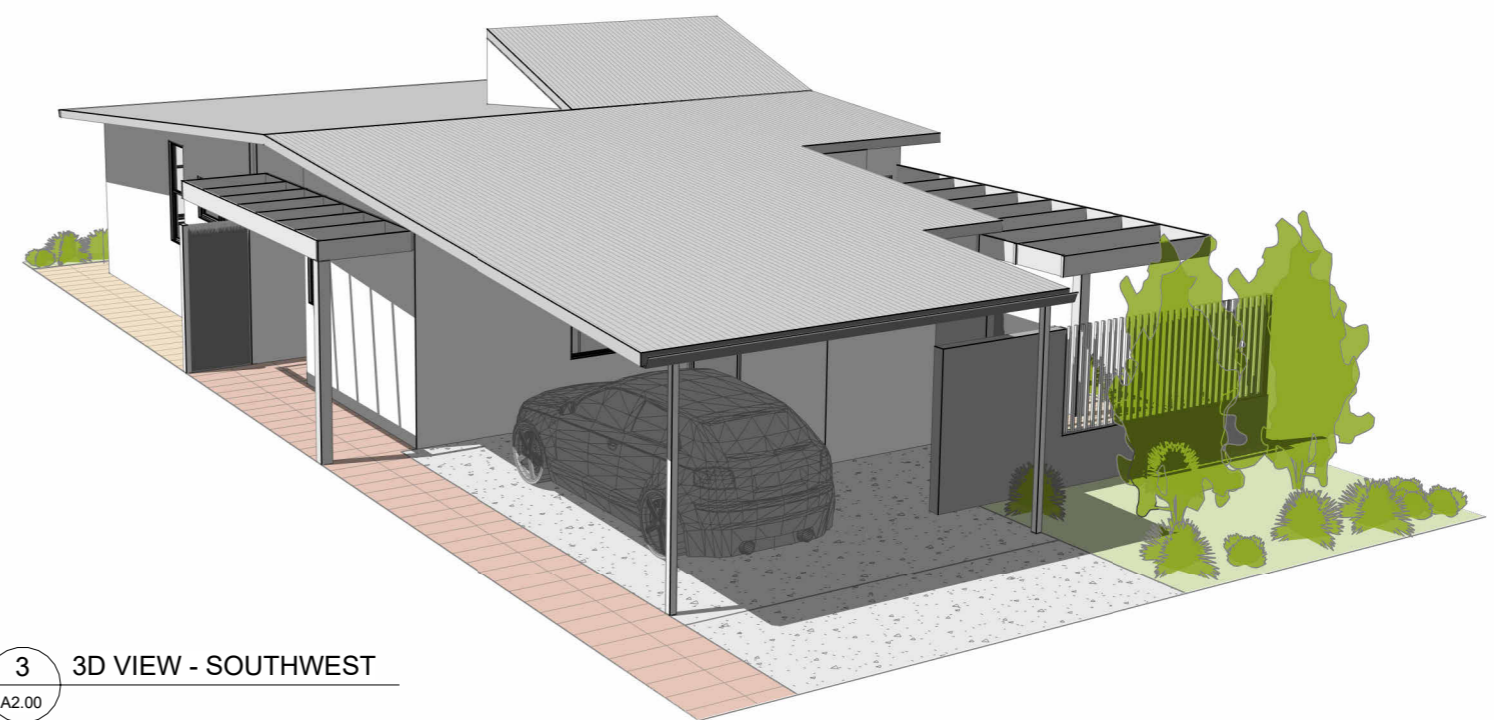
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PRELIMINARY



2 3D VIEW - NORTHEAST

A2.00



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ALBANY 9842 5558  
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PROJECT  
WHEATBELT DEVELOPMENT STUDY

REV	DATE	DESCRIPTION
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PRELIMINARY

# APPENDIX 11



SERVICING INVESTIGATION  
AND OPINION OF PROBABLE  
COSTS

24 GLYDE STREET,  
NARROGIN

RESIDENTIAL DEVELOPMENT

# Porter



**REPORT PREPARED FOR**  
**EDGE PLANNING & PROPERTY**

Prepared by	<b>Porter Consulting Engineers</b>
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Date	16 June 2023
Our reference	R02.23
Job Number	21-09-135
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Rev B	16/06/2023	R Thomson / M Cook	Edge Planning & Property	2nd submission (incorporating review updates)

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**ATTACHMENT 1 – Development Layout**

**ATTACHMENT 2 – Before You Dig Information**

**ATTACHMENT 3 – Indicative Costs Summary (T004.23)**

## 1.0 INTRODUCTION

Porter Consulting Engineers (PCE) has been engaged by Edge Planning and Property to undertake a servicing investigation for a proposed residential development in Narrogin located within the Shire of Narrogin, 192 kms southeast of Perth.

The development site is located at 24 Glyde Street as shown in

**Figure 1** for a proposed 16 dwelling survey strata development. Much of the town's rental accommodation and affordable housing stock has been consumed with very little stock remaining, and development costs for green-title sites are typically unaffordable. Therefore, the Shire is seeking a solution to drive the delivery of housing diversity and affordability with this site being selected for further investigation.



**Figure 1: 24 Glyde Street, Narrogin (bound in red)**

## 2.0 PLANNING

The proposed subdivision layout for a 16 dwelling survey strata residential development is presented in **Attachment 1**.

## 3.0 LANDFORM

The site is cleared with little to no vegetation present. Topsoil is expected to be stripped during the earthworks phase and respread upon the earth-worked lots as a dust suppression measure.

Based on online mapping information<sup>1</sup> the site has an approximate 5% grade from the western boundary of 356m AHD to 353.5m AHD on the eastern boundary by Glyde Street. A topographical feature survey should be procured to confirm ground levels and inform further designs.

A geotechnical investigation of the site was not available at the time of this review. A geotechnical investigation should be undertaken to confirm the insitu soils and inform further designs. The Geological Survey of WA<sup>2</sup> mapping notes the sub-surface conditions as follows:

- Q<sub>d</sub>- Eolian and alluvial deposits: silt and sand in sheets and dunes; gypsiferous near playa lakes.

Based on a Groundwater study of the Narrogin townsite<sup>3</sup>, groundwater levels are expected to be 2-3m below existing ground levels and not anticipated to impact the proposed development.

The Town of Narrogin is noted as being within a threatened ecological community. As no clearing works are proposed to facilitate the development, it is not anticipated to be an issue.

## 4.0 SERVICING

The Site is generally readily serviceable as there is existing electrical, communication, water and sewer infrastructure immediately abutting the site to allow connections to be made upon request. However, specific considerations need to be had with regards to internal servicing which is discussed below to facilitate the proposed 16 survey strata development.

### 4.1 Electrical

Based on the Western Power Capacity Mapping Tool<sup>4</sup>, the current capacity for 2023 is 20-25 MVA and is expected to remain at this level beyond 2030. Although there appears to be capacity in the network at present, the feasibility of servicing the development can only be confirmed with a more detailed assessment of the network, such as a feasibility study or a Design Information Package application.

---

<sup>1</sup> <https://www.mngaccess.com.au/> viewed 6 January 2023

<sup>2</sup> Geological Survey of Western Australia 1985, *Corrigin Sheet SI 50-3*, Geological Mapping Section, Department of Mines, 1:250,000

<sup>3</sup> Crossley, E K. (2004) Groundwater study of the Narrogin townsite. Department of Primary Industries and Regional Development, Western Australia, Perth. Report 256.

<sup>4</sup> <https://westernpower.maps.arcgis.com/> viewed 6 January 2023

Existing Western Power mapping shows there is existing low voltage overhead power infrastructure along the western verge of Glyde Street. With no high voltage power in the immediate vicinity, a HV feed<sup>5</sup> will need to be installed from the site to an existing transformer near the intersection of Glyde Street and Forrest Street some 180m away.

Whilst it is expected that a new transformer is not required to service the 16-dwelling development, a Site Main Switchboard will be required as part of the built-form works and installation of private internal electrical cabling to each dwelling. As part of further design development an area will need to be nominated to accommodate the Site Main Switchboard. The private internal electrical cabling to the dwellings is to be placed within a 1m wide easement.

It is expected the costs for the HV feed from Forrest Street and any necessary upgrades to the existing transformer will be eligible to cost offsets under the Distribution Low Voltage Connection Scheme (DLVCS<sup>6</sup>). However, the time period for reimbursement of the offset costs can tend to be protracted, therefore, the full cost of the install this HV feed from Forrest Street is included with a separate line item for the cost offset via the Distribution Low Voltage Connection Scheme.

Sufficient time should be allowed for Western Power to process the design application and procurement of any upgrades to the transformer, with this process currently taking up to 18 months to complete.

There are two existing power poles located along the eastern verge of Glyde St. The existing power pole that fronts dwelling #6 conflicts with the proposed driveway as shown in **Figure 2**.

To remedy this conflict there are two options:

1. Dwelling #6 could be to mirror the house setout such that the crossover abuts the northern lot boundary so that it will avoid the existing power pole as shown in **Figure 3**.
2. Reorient dwelling #6 and #7 such that the driveway faces the proposed internal road as shown in **Figure 4**.

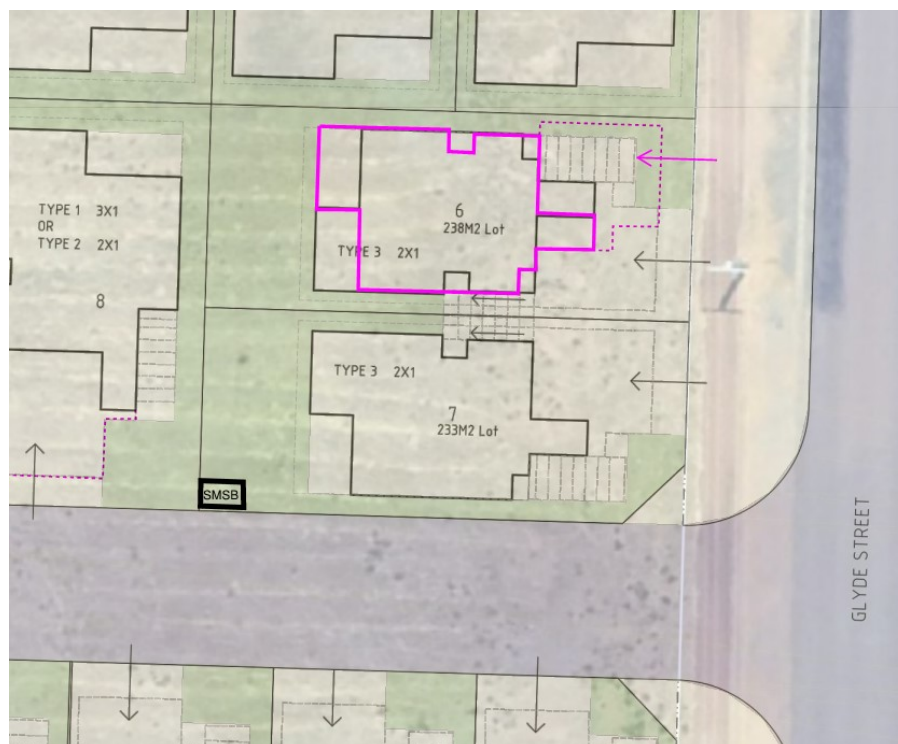
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<sup>5</sup> Mr B. Ellett, 2020, pers Comm, 3 March

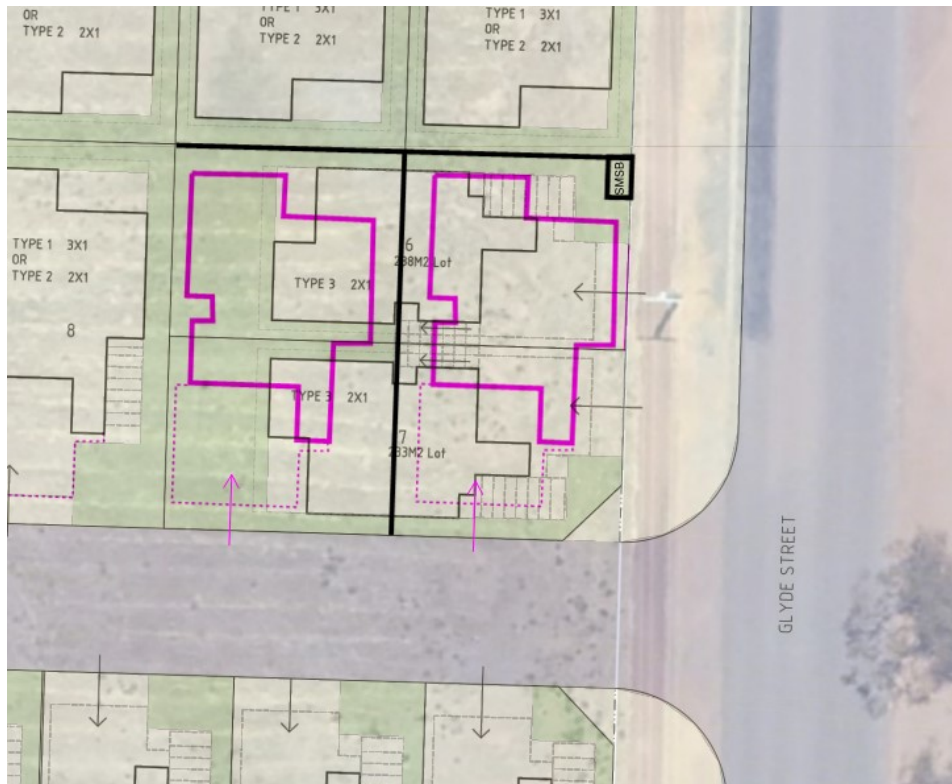
<sup>6</sup> Western Power, *Distribution Low Voltage Connection Scheme (DLVCS)*, viewed 22 March 2023, <<https://www.westernpower.com.au/industry/distribution-low-voltage-connection-scheme-dlvcs/>>



**Figure 2: Existing power pole conflicts with dwelling #6**



**Figure 3: Mirror the house setout to dwelling #6 to avoid clash of the proposed crossover to the existing power pole**



**Figure 4: Reorient dwelling #6 and #7 to face the proposed internal road to avoid a clash with the existing power pole**

## 4.2 Communications

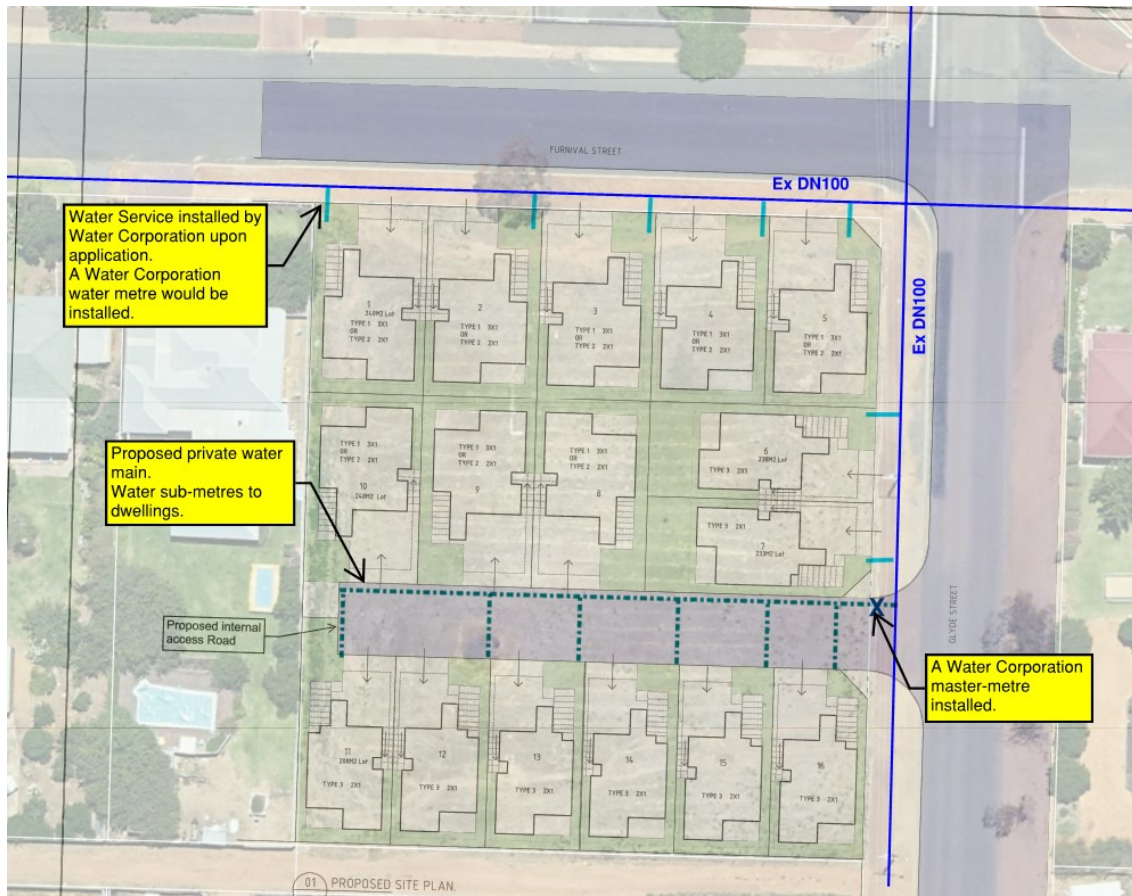
BYD records<sup>7</sup> shows there is existing NBN & Telstra in-ground infrastructure along the frontage of Glyde Street and extends partially across the lot frontage on Furnival Street. An extension of the existing network is required to service the proposed subdivision.

It is expected that new communications pit and pipe conduits will be installed along the perimeter of the site in Furnival Street and Glyde Street to service the proposed dwellings that front these roads. A pit and pipe would also be installed to the proposed internal road to service the dwellings that front this internal road. Ownership of the pit and pipe system within the internal road would be retained by the body corporate of the development with an exclusive access agreement between the body corporate and NBN.

## 4.3 Water

There are existing DN100 Water Corporation water mains in Furnival Street and Glyde Street which will allow for water services to be installed upon application for the dwellings that front these streets. The Developer will pay the headworks charges for the water services to the dwelling that front Furnival Street and Glyde Street, but the Water Corporation would physically install the water service once a building application has been received as part of the built-form works to construct the dwelling.

<sup>7</sup> Before You Dig, obtained 27/7/2022 <[www.byda.com.au](http://www.byda.com.au)>



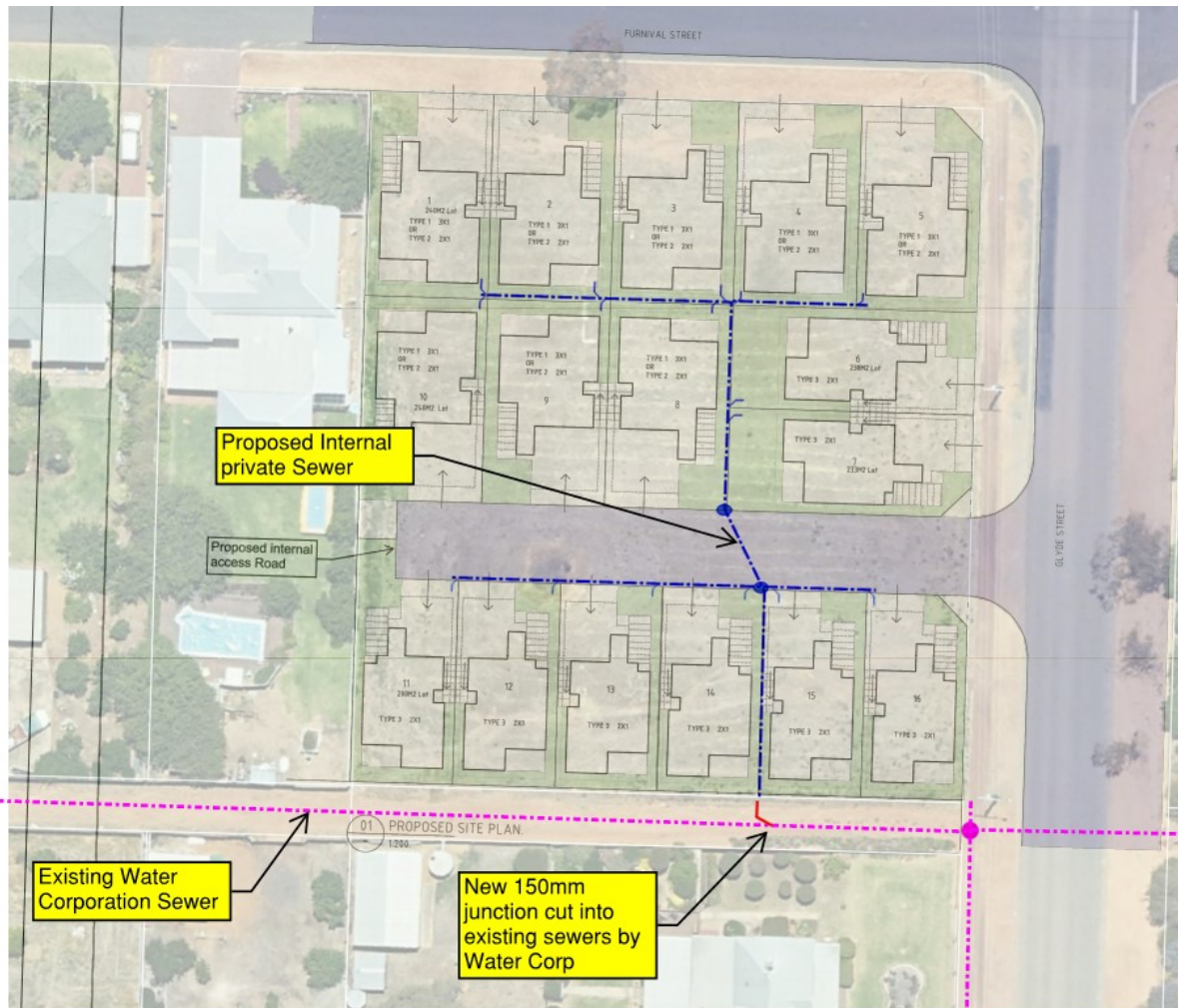
**Figure 5: Indicative water Servicing sketch**

For the dwellings that front the proposed internal road, a private water main will be installed within the road, with a master meter and sub-meters to the dwellings.

**Figure 5** illustrates the expected water servicing arrangement for the development.

#### 4.4 Wastewater

BYD shows an existing DN150 wastewater main along the southern boundary of the site. The most cost-effective solution is to have all the dwellings serviced via private internal sewers to a new cut-in junction to the sewers within the laneway along the southern boundary as shown in **Figure 6**.



**Figure 6: Indicative Sewer Servicing Sketch**

## 4.5 Roads

The R-Codes stipulate that the minimum width of a vehicle accessway that serves more than four dwellings and allow two-way access is a 4m with the driveway to be at least 500mm offset from side lot boundaries to allow for utilities and stormwater management.

For the purpose of this assessment, it is assumed that the internal roadway reservation of 6m wide to allow a 5m wide paved accessway which is 500m clear of the lot boundaries.

Proposed dwellings fronting Furnival Road and Glyde Street will have driveway crossover constructed as part of the built form works.

The existing right of way along the southern boundary of the site is currently unsealed. As no increase in vehicle access is anticipated as a result of the development, the existing unsealed right of way is expected to remain unaltered.

No upgrade works or new path installation is expected to the surrounding roads of Glyde Street and Furnival Street.

## 4.6 Stormwater Drainage

The Shire has advised<sup>8</sup> the typical stormwater management they would expect for a development site like this is that soakwells be utilised where possible with a permitted overflow from the dwelling to the abutting roads. Porter Consulting Engineers would expect at least one soakwell be installed for each dwelling with an overflow at the driveway crossover to drain to the abutting road. The soakwells would typically be installed as part of the built form works during the house construction.

The proposed private road will have drainage inlet pits with soakwell bases, which will overflow to Glyde Street.

## 4.7 Siteworks / Earthworks

Based on the site's existing topography of a 5% gradient, it is expected that low elevation (nominally 500mm high) retaining walls will be required between the dwellings to achieve flat and level lot as shown in **Figure 7**.

For the purpose of this report, it has been assumed that a panel and post retaining wall system will be utilised. But as part of future detailed designs, other retaining systems could be considered, such as reconstituted limestone/granite retaining wall blocks or retaining plinths as part of fencing installations.

Consideration should also be had to mirror lot 8 so that the driveway is on the eastern side of the lot which will improve gradients to the crossover of lot 8.

## 4.8 Fencing

It is expected 1.8m high colourbond style fencing will be installed along the dwelling allotment boundaries.

## 4.9 Bushfire Management

As there is no significant vegetation in the vicinity, a Bushfire Management Plan is not expected to be required.

## 4.10 Landscaping

It is expected any landscaping and irrigation works will be undertaken as part of the built form works, and therefore no such costs have been allowed for in the servicing costs.

---

<sup>8</sup> Mr J. Warborton 2023, pers. Comm, 11 April



**Figure 7: Indicative Earthworks Levels**

## 5.0 INDICATIVE COSTS

### 5.1 Preliminaries

Allowance has been made for the Contractor's costs for supervision, mobilisation, site facilities, insurances, locating existing services, dilapidation surveys, preparing and implementing management plans, and accommodation. Allowance has been made for a **10-week** construction period to undertake the subdivisional servicing works of earthworks, external electrical and communications servicing, internal servicing and roadway, retaining walls and fencing,

### 5.2 Local Government Fees

The 1.5% Local Government supervision fee is not expected to be payable, as there no new roadworks or drainage works proposed. Furthermore, the Shire is likely to waive any associated fees.

### 5.3 Professional Fees

Costs have been included to cover professional fees such as but not limited to engineering (civil, electrical, geotechnical), planning, and survey services. These costs have been set at a nominal 12.5%.

### 5.4 Developer Contribution Schemes

The Shire of Narrogin<sup>9</sup> does not have any Developer Contribution Schemes, so none would be applicable.

A new WAPC Operational policy came into effect on December 2022 whereby a Primary School Education contribution is to be levied to any new subdivision development later than 5 lots in the Metropolitan, Peel or Bunbury Region Scheme areas. As this site is not within these scheme areas, the Primary School Education contribution is not applicable.

### 5.5 Contingency

A 20% contingency of the construction cost is included due to the preliminary nature of this investigation. A 5% administration contingency is also included.

### 5.6 Indicative Development Costs

This review is based on servicing the proposed lots with electricity, communications, wastewater, water, drainage, earthworks, retaining walls, and fencing has been undertaken as a desktop study of existing services, aerial imagery, previous studies, and information readily available online.

In summary, the indicative development costs are outlined in the table below with a further detailed summary provided in **Attachment 5**.

Items	Amount (Ex Narrogin with 1.2 regional index)
<b>Servicing Construction Costs</b>	
Preliminaries	\$113,760
Earthworks & Siteworks	\$54,840
Retaining Walls	\$84,000
Fencing	\$61,200
Sewer Reticulation	New sewer junction covered in Water Corp sewer infrastructure contributions
Sewer servicing (internal sewers)	\$36,360
Water Reticulation (external servicing)	\$10,800
Water servicing (internal water servicing)	\$31,320
Drainage (external)	Nil.
Drainage (internal roadway)	\$7,200
Roads (internal private road)	\$48,360
Underground Power (180m external servicing from existing transformer of Forrest St)	\$73,920
Electrical servicing (internal servicing)	\$85,320

<sup>9</sup> Steward. D, E: *Golf Course Parade engineering servicing report*, email to Thompson. S, 8 June 2023, <steve@edgeplanning.com.au>

Communications (external servicing)	\$9,360
Communications (internal servicing)	\$7,200
Construction Contingency 20%	\$79,200
<b>Construction Costs Total</b>	<b>\$702,840</b>
Servicing Development Fees and Charges	\$237,380
<b>Sub total</b>	<b>\$940,220</b>
GST	\$94,022
<b>Total Costs incl. GST</b>	<b>\$1,034,242</b>
<b>Servicing costs per dwelling (incl GST)</b>	<b>\$64,640</b>
<b>Other costs to consider</b>	
Landscaping and irrigation	<i>To be determined by a Landscape Architect</i>
Dwelling building works	<i>To be determined by an Architect</i>
Dwelling soakwells installed as part of dwelling built-form works (one soakwell per dwelling)	\$48,000
Cost offset under the Distribution Low Voltage Connection Scheme (DLVCS)	\$73,920 (credit)

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property acquisition costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.

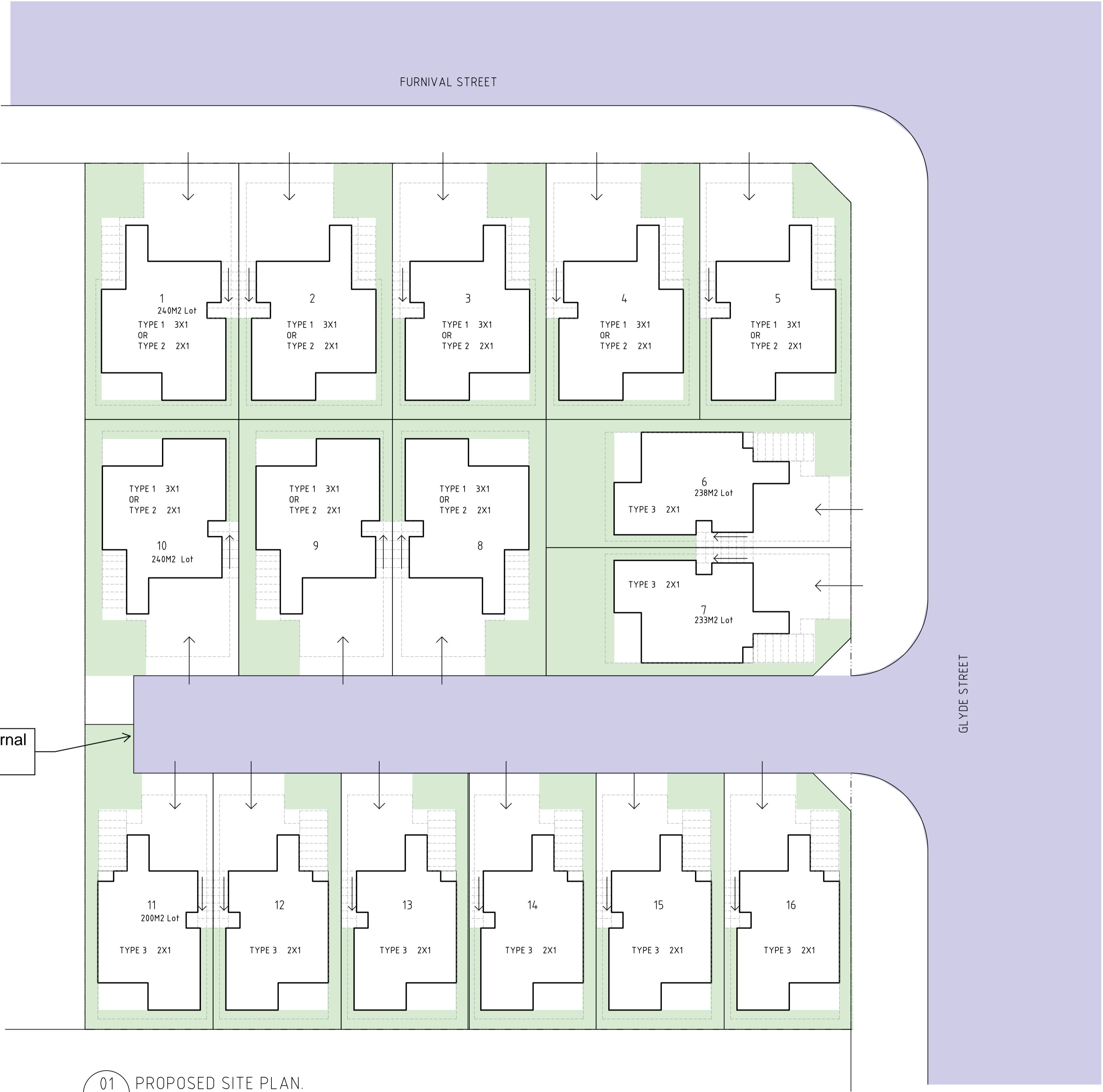
## 6.0 CONCLUSION

Based on the information reviewed, there does not appear to be any factors that would prevent the development of the proposed residential site. However, further evaluation and assessments would need to be made to consider:

- i. Feature survey and geotechnical to inform further designs.
- ii. Formal application to service authorities to confirm capacity and extent of upgrades required.
- iii. Undertake further design development.
- iv. Early liaison with Western Power to confirm electrical servicing requirements either via a Feasibility Study or Design Information Package, due to the protracted timeframes with Western Power.
- v. Designate an area for a site main switchboard.
- vi. Consider reorientation of dwelling 6 & 7 to avoid a clash with existing power pole.
- vii. Consider reorientation of dwelling 8 to allow for improved gradients to the crossover.
- viii. Adjust the strata development layout for a 6m wide private roadway reservation to accommodate a 5m wide pavement with 500mm clearance either side.

## **ATTACHMENT 1 – Development Layout**

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01 PROPOSED SITE PLAN.  
1:200.

NOT FOR CONSTRUCTION

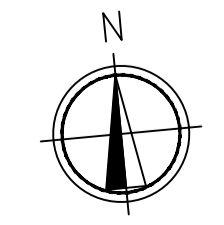
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H+H architects

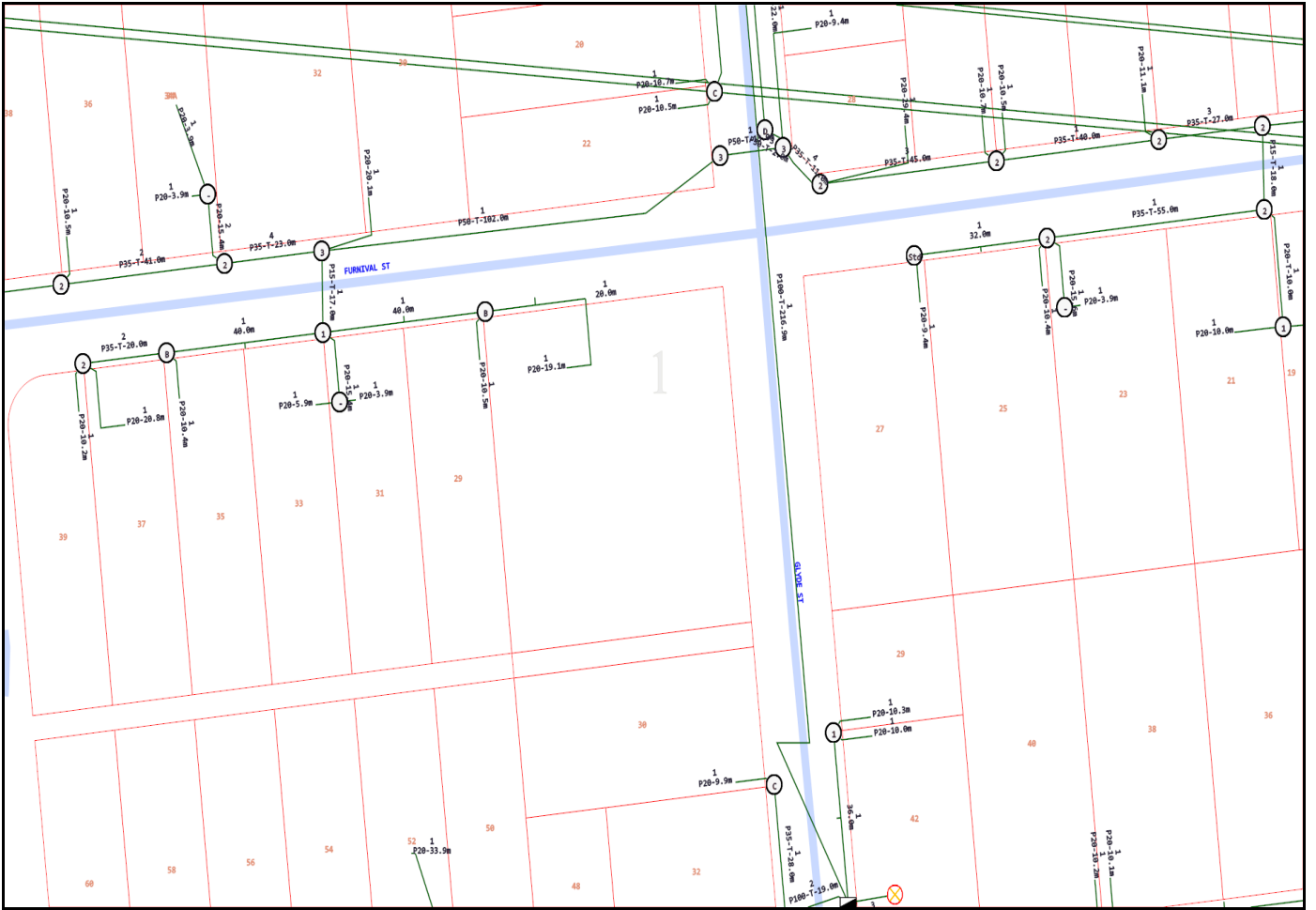
58 SERPENTINE RD, ALBANY WA 6330  
PO BOX 5427, ALBANY WA 6332  
ADMIN@HHARCHITECTS.COM.AU  
WWW.HHARCHITECTS.COM.AU  
08 9842 5558

ARCHITECTURAL.  
DEVELOPMENT WA - WHEATBELT HOUSING  
GLYDE STREET, NARROGIN  
PROPOSED SITE PLAN.

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## **ATTACHMENT 2 – Before You Dig Information**

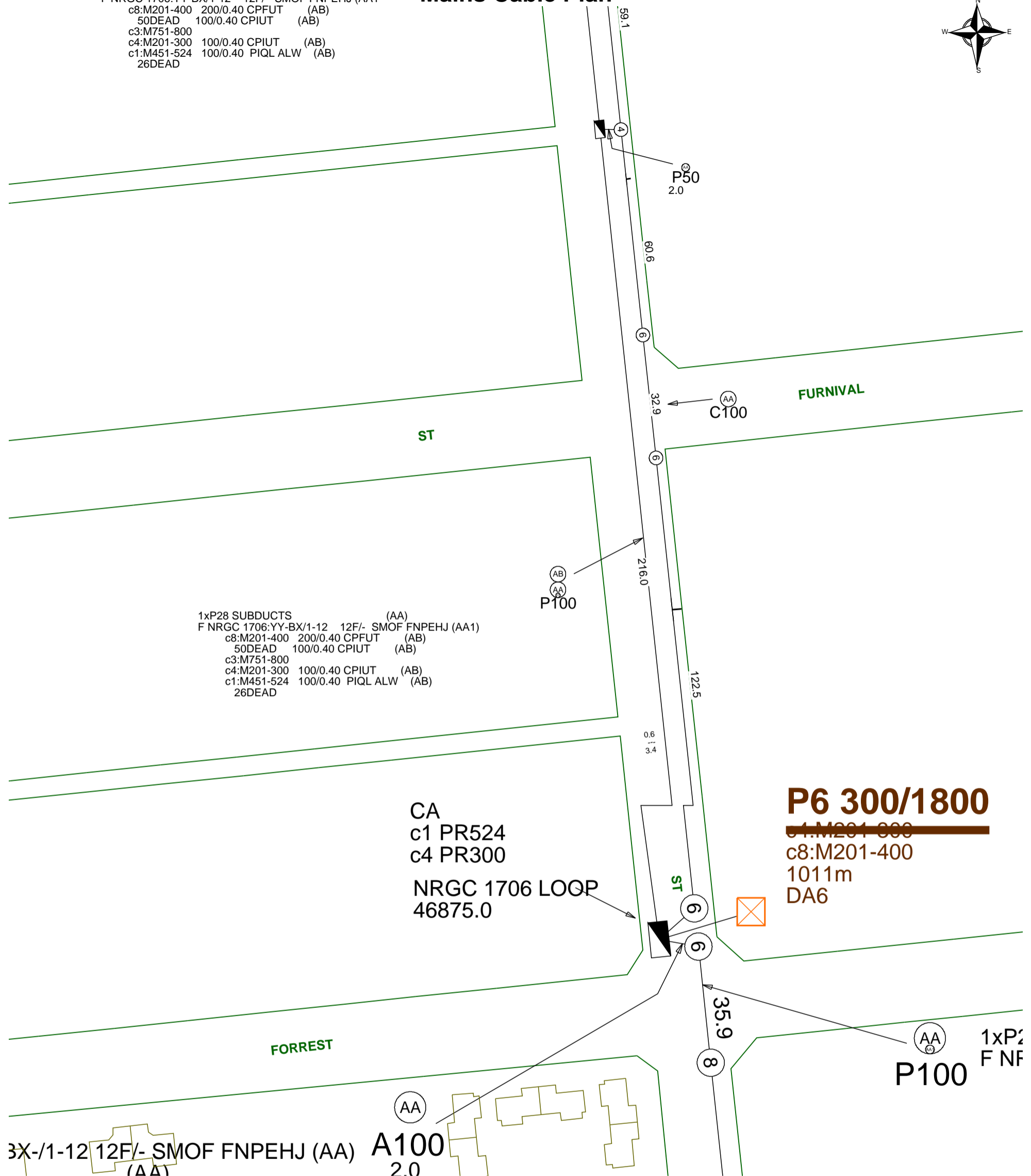
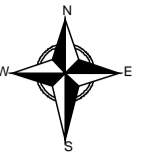


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50DEAD 100/0.40 CPIUT (AB)  
c3:M751-800  
c4:M201-300 100/0.40 CPIUT (AB)  
c1:M451-524 100/0.40 PIQL ALW (AB)  
26DEAD

## Mains Cable Plan



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See the Steps- Telstra Duty of Care that was provided in the email response.





### UNDERGROUND LEGEND

Structures	
Pillar	UG Crossing *
Metal Pole	Ring Main Unit
Transformer Site	LV Distribution Frame

Distribution Cables	
High Voltage Cable (1kV - 33kV)	Low Voltage Cable (< 1kV)
Street Light Circuit (< 1kV)	Street Light Pilot (< 1kV)
Earth Wire	

Cable Pole Terminations	
HV Termination	LV Termination

Proposed Construction Assets	
Design Area *	High Voltage Underground Cable
Low Voltage Underground Cable	Metal Pole
Pillar	HV Termination
Transformer site	LV Termination

State Underground Power Project	
CURRENT Work Area *	COMPLETED Area *

Feature	
Area of Interest	

**\* Please refer to coversheet**

**Privately owned cables NOT SHOWN (including house services)**

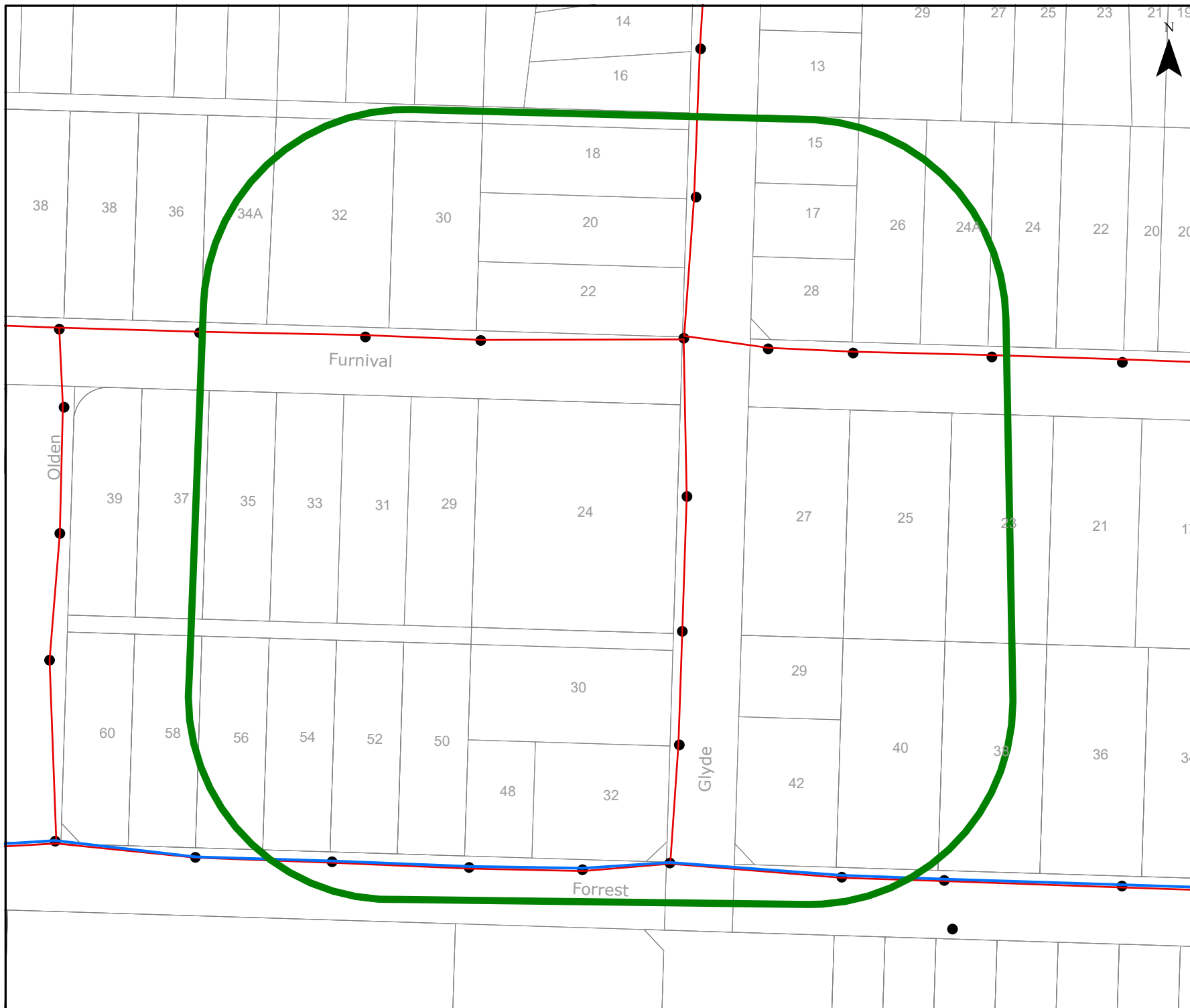
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Hand exposure via pothole method is **MANDATORY**.


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Mon to Fri - 08:00 to 16:30

Information valid for 30 days from date of issue

A4	Scale : 1:1500
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**WARNING! Look out for overhead power lines**





### OVERHEAD LEGEND

Structures	
● Power Pole	■ Transmission Poles

Transmission Overhead Powerline	
Transmission (33kV - 330kV)	

Distribution Overhead Powerline	
High Voltage (1kV - 33kV)	
Low Voltage (< 1kV)	

Proposed Construction Assets	
Design Area *	
High Voltage Overhead Powerline	
Low Voltage Overhead Powerline	
Power Pole	

Communications Assets	
Overhead Pilot Cable	

Feature	
Area of Interest	

**\* Please refer to coversheet**

**Privately owned cables NOT SHOWN (including house services)**

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Check that you have enough clearance from the **DANGER ZONES** near overhead powerlines.

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A4	Scale : 1:1500

**WARNING! Look out for overhead power lines**





## **ATTACHMENT 3 – Indicative Costs T04.23**

**Project** Glyde St Residential  
**Option** 16 lots with private access road  
**Number of Dwellings** 16  
**Client** Edge Planning & Property  
**Engineer** Rachel Thomson / Michael Cook  
**Job Number** 21-09-135  
**Date** 16 June 2023  
**File Name** T004.23  
**Revision** B  
**Reference Document** R02.23



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INDICATIVE DEVELOPMENT COSTS		
SERVICING CONSTRUCTION COSTS	TOTAL COST (ex Perth)	TOTAL COST (ex Narrogin with Regional Index of 1.2)
Preliminaries	\$ 94,800	\$ 113,760
Earthworks and Siteworks	\$ 45,700	\$ 54,840
Retaining Walls	\$ 70,000	\$ 84,000
Fencing works	\$ 51,000	\$ 61,200
Sewer Reticulation (external servicing)	New sewer junction covered in Water Corp sewer infrastructure contributions	New sewer junction covered in Water Corp sewer infrastructure contributions
Sewer Servicing (internal sewers)	\$ 30,300	\$ 36,360
Water Reticulation (external servicing)	\$ 9,000	\$ 10,800
Water Servicing (internal water)	\$ 26,100	\$ 31,320
Drainage (external)	\$ -	\$ -
Drainage (internal roadway)	\$ 6,000	\$ 7,200
Drainage (dwelling soakwells installed as part of built form)	Expected to be part of built-form works	Expected to be part of built-form works
Roads (internal private road)	\$ 40,300	\$ 48,360
Underground Power (180m external servicing from existing transformer of Forrest St)	\$ 61,600	\$ 73,920
Electrical servicing (internal servicing)	\$ 71,100	\$ 85,320
Communications (external servicing)	\$ 7,800	\$ 9,360
Communications (internal servicing)	\$ 6,000	\$ 7,200
Landscaping	Expected to be part of built-form works	Expected to be part of built-form works
Construction Contingency (20% of construction)	\$ 66,000	\$ 79,200
<b>SERVICING CONSTRUCTION TOTAL</b>	<b>\$ 585,700</b>	<b>\$ 702,840</b>
SERVICING DEVELOPMENT FEES AND CHARGES	TOTAL COST	TOTAL COST
Water Corporation Standard Sewer Infrastructure Contribution	\$ 54,630	\$ 54,630
Water Corporation Standard Water Infrastructure Contribution	\$ 37,650	\$ 37,650
Local Authority Fees	\$ -	\$ -
Water Corporation Fees	\$ 13,400	\$ 13,400
Western Power Fees	\$ 28,800	\$ 28,800
Communications Headworks and Backhaul Charges	\$ 6,400	\$ 6,400
WAPC and Landgate Fees	\$ 7,500	\$ 7,500
Professional Fees	\$ 77,000	\$ 77,000
Developer Contribution Scheme	\$ -	\$ -
Cost Sharing for Common Infrastructure (Section 159 of the Planning Act)	\$ -	\$ -
Administration Contingency (5% of fees/charges)	\$ 12,000	\$ 12,000
<b>SERVICING DEVELOPMENT FEES AND CHARGES TOTAL</b>	<b>\$ 237,380</b>	<b>\$ 237,380</b>
<b>SUB TOTAL COSTS</b>	<b>\$ 823,080</b>	<b>\$ 940,220</b>
<b>GST</b>	<b>\$ 82,308</b>	<b>\$ 94,022</b>
<b>TOTAL COSTS</b>	<b>\$ 905,388</b>	<b>\$ 1,034,242</b>
<b>COST PER DWELLING (including GST)</b>	<b>\$ 56,587</b>	<b>\$ 64,640</b>

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.



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# APPENDIX 12

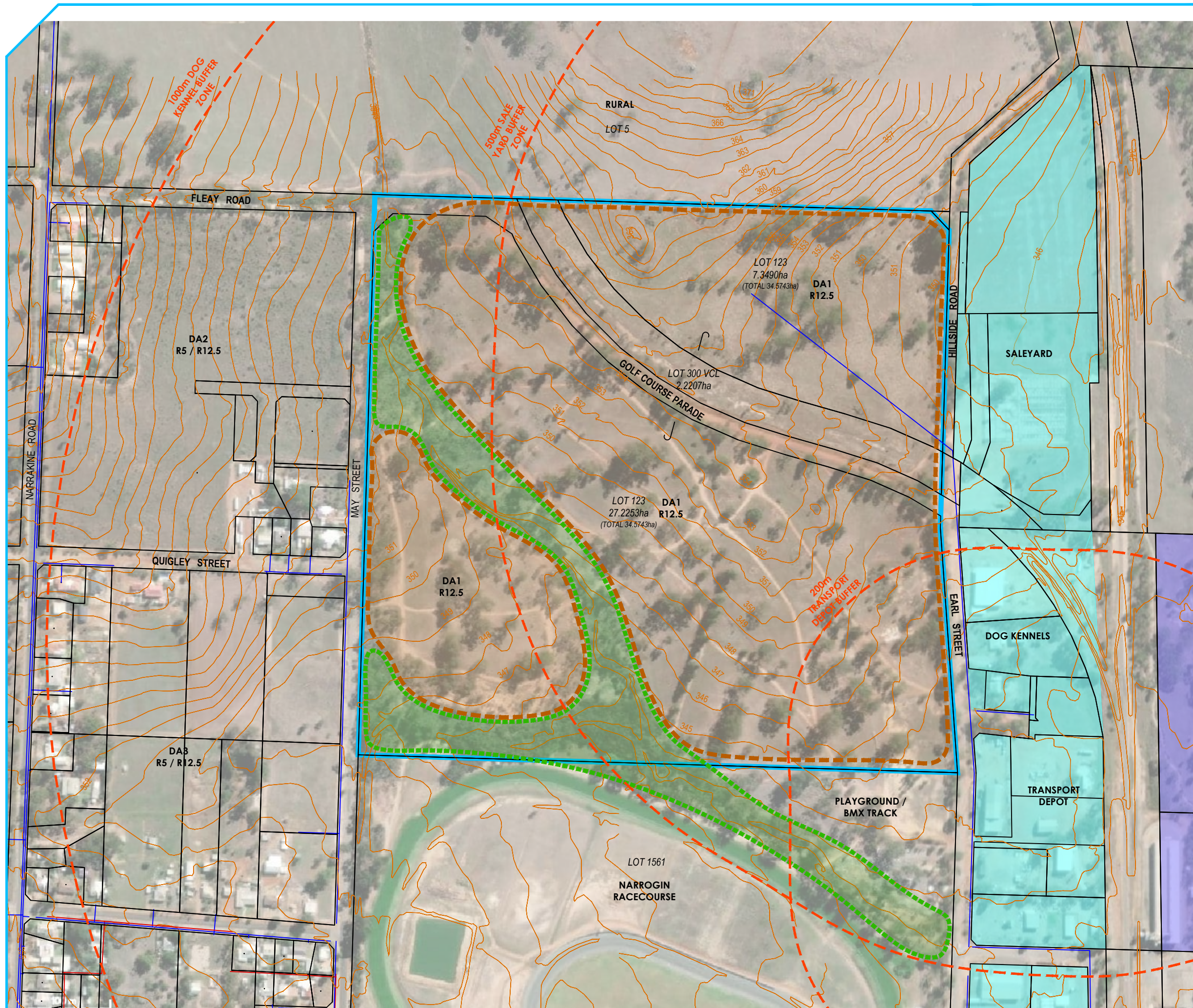


# CONTEXT, OPPORTUNITIES AND CONSTRAINTS

Lot 123 Golf Course Parade  
Narrogin  
Shire of Narrogin

## LEGEND

-  Subject Area
-  Existing Lot Boundary
-  Existing Contours
-  Existing Water Service
-  Existing Sewer Service
-  Concept Area generally available for Residential Development
-  Concept Area for Public Open Space
-  Commercial Business (LPS Strategy)
-  Industrial (LPS Strategy)
-  Buffer (LPS Strategy)



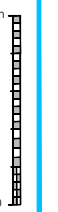
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A BASE PLAN 220501 ST  
REV DESCRIPTION YMMDD APPRVD

**edge**  
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DRAWING NUMBER  
EP 220501 03  
REV  
B

Issued for design intent only.  
All areas and dimensions are  
subject to detail design + survey.

SCALE 1:4000  
SHEET A3



Lot 123 Golf Course Parade  
Narrogin  
Shire of Narrogin

-  Subject Area
-  Existing Contours
-  Proposed Lot Boundary
-  Proposed Public Open Space
-  Proposed Residential R5 - R12.5
-  Proposed Residential R30
-  Proposed Roads
-  Indicative Drainage Basin

Lot 123	34.5743ha
Lot 300 (Vacant Crown Land)	2.2207ha
Golf Course Parade	1.5227ha
<b>TOTAL</b>	<b>38.3177ha</b>

No. Lots	180
Total Area Lots	215818m <sup>2</sup>
Avg Area Lots	1199m <sup>2</sup>
Min Lot Area	507m <sup>2</sup>
Max Lot Area	2621m <sup>2</sup>
POS Contribution	7.8460ha (20.5%)
Subject Area	38.3177ha

- 1) Sewerage and other services to be extended.
- 2) Various R30 lots can be resubdivided.

SCALE 1:2500  
SHEET A3

DRAWING NUMBER      REV  
EP 220501 02      B

Issued for design intent only.  
All areas and dimensions are  
subject to detail design + survey.

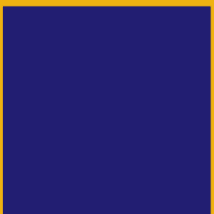
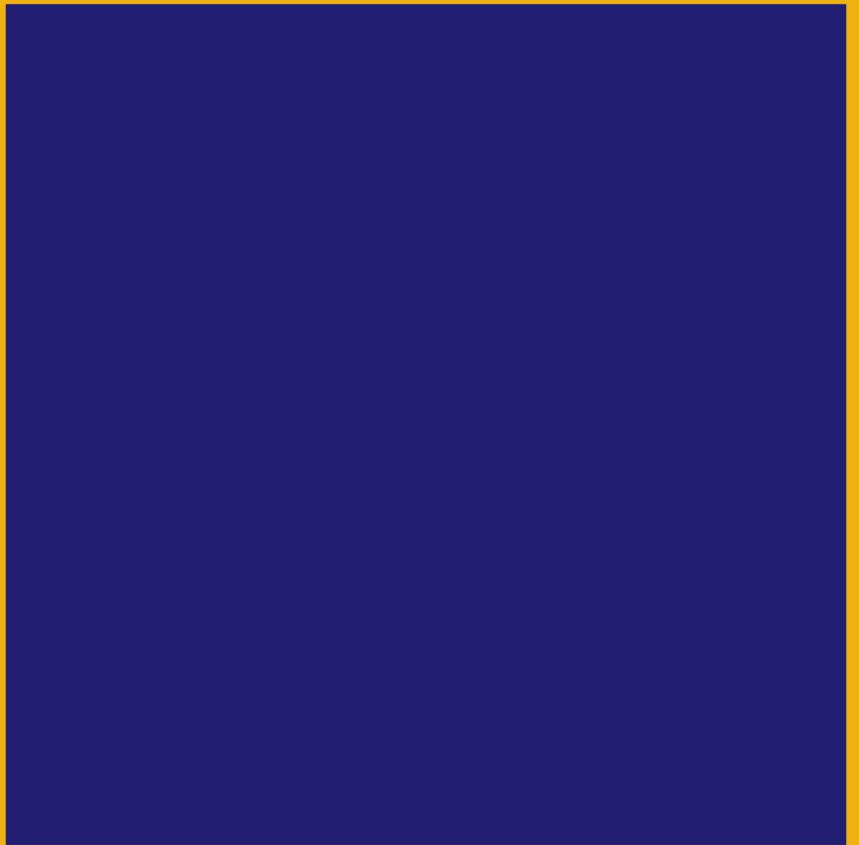
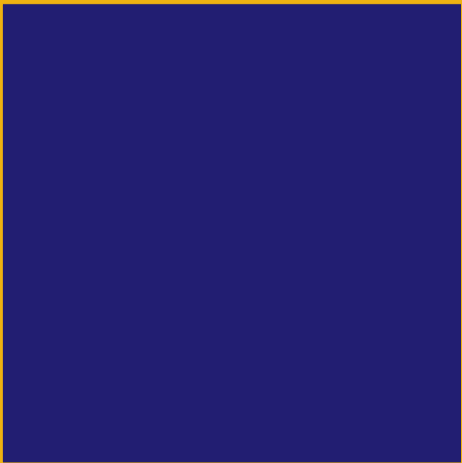
# APPENDIX 13



SERVICING REPORT  
AND OPINION OF  
PROBABLE COSTS

LOT 123 GOLF COURSE  
PARADE, NARROGIN

# Porter



**REPORT PREPARED FOR**  
**EDGE PLANNING & PROPERTY**

Prepared by	<b>Porter Consulting Engineers</b>
Postal address	PO Box 1036 Canning Bridge WA 6153
Phone	(08) 9315 9955
Email	office@portereng.com.au
Date	15 June 2023
Our reference	R42.23
Job Number	21-09-135
Checked	<i>BH</i>

**HISTORY AND STATUS OF THE DOCUMENT**

Revision	Date issued	Author	Issued to	Revision type
Rev A	26-05-2023	M Cook	Edge Planning & Property	1 <sup>st</sup> submission
Rev B	15-06-2023	M Cook	Edge Planning & Property	2 <sup>nd</sup> submission (update based on review comments)

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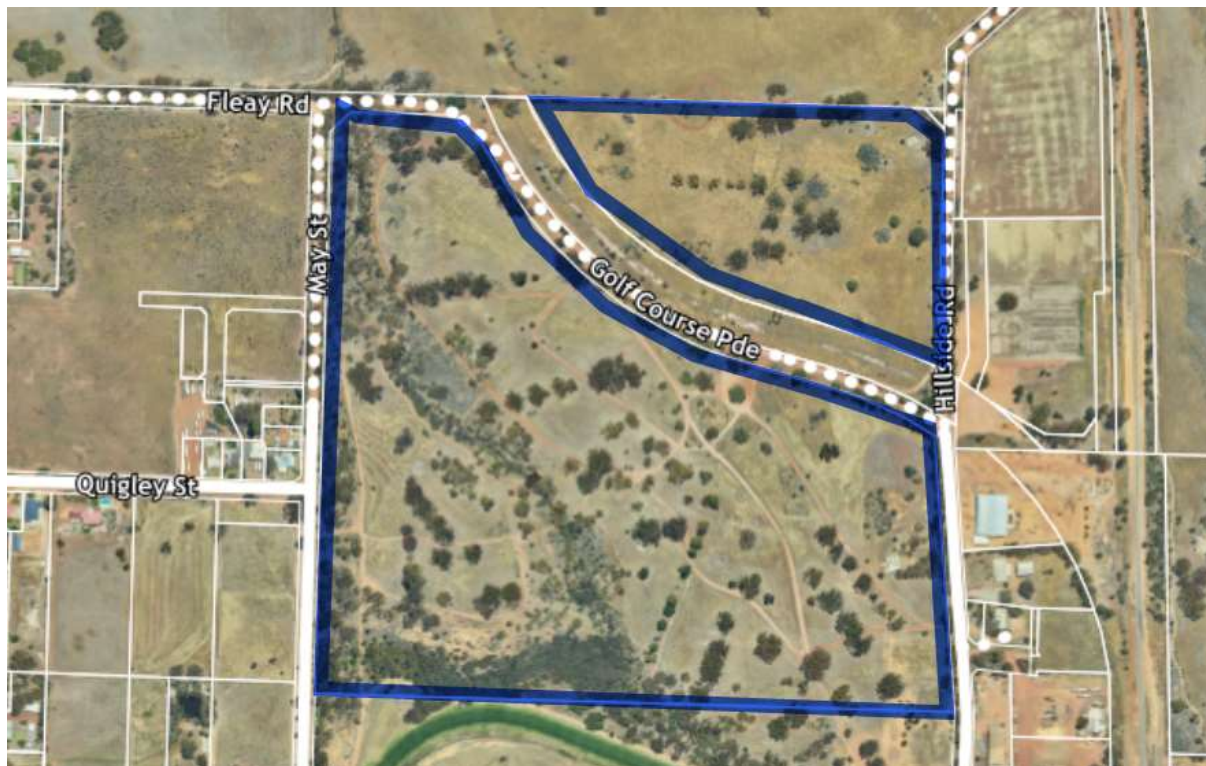
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## 1.0 INTRODUCTION

Porter Consulting Engineers (PCE) has been engaged by Edge Planning and Property to undertake a servicing investigation for a proposed residential development in Narrogin located within the Shire of Narrogin, 190 km southeast of Perth.

The development site is located at Lot 123 (#2) Golf Course Parade, Narrogin (the “Site”) which is bound by May Street to the west, the Narrogin horse race track to the south, Hillside Road and Earl Street to the east, and agricultural lands to the north as shown **Figure 1**. The site seeks to develop a proposed 180 lot residential green title development as shown in **Appendix A**.



**Figure 1: Lot 123 (#2) Golf Course Parade, Narrogin (bound in blue)**

## 2.0 PLANNING

The Shire of Narrogin New Local Planning Scheme (No.3) came into effect<sup>1</sup> on 3 May 2023, which replaced former Town Planning Schemes of the former Town of Narrogin and former Shire of Narrogin.

The Local Planning Schemes<sup>2</sup> currently zone the Site as “Urban Development”. It is understood the site was a former golf course and the land is under the ownership of the Shire of Narrogin.

<sup>1</sup> Shire of Narrogin, *Media Release - Shire of Narrogin Local Planning Scheme No 3 now in Force*, viewed 23 May 2023, < <https://www.narrogin.wa.gov.au/news/media-release-shire-of-narrogin-local-planning-scheme-no-3-now-in-force/11157> >

<sup>2</sup> MNG, *MNG Access*, viewed 17 May 2023, < <https://www.mngaccess.com.au/> >

The development seeks to have a mix of R5 (2000m<sup>2</sup> dwelling allotment) to R12.5 (800m<sup>2</sup> dwelling allotment) and R30 (300m<sup>2</sup> dwelling allotment) zoned residential lots as shown in **Appendix A**. It is expected that the R30 lots are likely to be group housing lots.

The Site is located within a number of buffer zones as shown in the Opportunities and Constraints mapping in **Appendix B**.

- The Site is within the 1000m dog kennel buffer zone
- The 500m sale yard buffer zone intersects the site.
- The 200m transport depot buffer zone intersection the south-east corner of the site.

The eastern boundary of the site is 190m from a railway line. It is expected that quiet house design principles will need to be applied to dwelling design and construction.

### 3.0 LANDFORM

Based on online mapping information (MNG Access), the topography of the site falls from approximately 360m at the northern boundary to 346m by the southern boundary, yielding an average gradient of approximately 2.5%.

The most prominent feature of the site is a gully to the western portion of the site which is part of the Narrogin Brook Catchment which has an upstream catchment of 2430 hectares<sup>3</sup>. Thick vegetation lines the gully with clusters of trees throughout the remainder of the site.

A geotechnical investigation of the Site was not made available at the time of this review. A geotechnical investigation should be undertaken to confirm the insitu soils and inform further designs. The Geological Survey of WA mapping notes the sub-surface conditions as:

- Age: Biotite granite and adamellite, medium and coarse, even-grained, locally foliated.

The Department of Primary Industries and Regional Development (MNG Access) information describes the soil as being:

- Soils Are Red and Brown Loams, Clays, Sandy and Loamy Duplexes.

Based on the Groundwater study of the Narrogin Townsite, it can be inferred that the approximate maximum groundwater levels range from 348m AHD at the western boundary to 344m AHD at the eastern boundary of the site. The Groundwater study does note “*In June 2002, groundwater was within 1.5 m of ground level in all bores adjacent to the Narrogin Brook, north of the racetrack.*”. Therefore, groundwater is not expected to impact the proposed development other than groundwater dewatering as needed. The Site is not mapped (MNG Access) to be within an Acid Sulphate Soil management area.

The whole of the Narrogin townsite including this development site is noted (MNG Access) as being within a threatened ecological community. Enquires should be made with the Department of Biodiversity, Conservation and Attractions for further information regarding the threatened ecological community

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<sup>3</sup> Crossley, E. K (2004), *Groundwater study of the Narrogin townsite*, Department of Primary Industries and Regional Development, Western Australia, Perth, Report 256.

A search of the Contaminated Sites Database<sup>4</sup> did not identify any known recorded contamination to the site.

## 4.0 HERITAGE

### 4.1 Local Heritage

Mapping (MNG Access) has identified part of the site as Local Heritage (Place number: 4733) with a place name of “Golf Course / Clubhouse (second)”. Whilst we do not anticipate this local heritage identification to impact the proposed development, contact should be made with the Heritage Council for more information.

### 4.2 Aboriginal Heritage

Whilst there were no Aboriginal Heritage records noted to the Site, there is a record immediately west of the site identified as a Ceremonial, camp (Place ID: 28290) as shown in **Figure 2**.



**Figure 2: Aboriginal Heritage identification area (shown in pink) outside of the subject Site (bound in blue)**

Coming into effect on 1 July 2023 is the Aboriginal Cultural Heritage Act 2021 that replaces the old Act (1972) which requires the Site to be assessed and subsequent management plans prepared

<sup>4</sup> Department of Water and Environmental Regulation, *Contaminated Sites Database*, viewed 17 May 2023.

as necessary. Consultation should be had with suitable heritage consultants to assess the site and preparation of any management plans.

More information regarding the Aboriginal Cultural Heritage Act 2021 can be found at <https://www.wa.gov.au/government/document-collections/aboriginal-cultural-heritage-act-2021>

## **5.0 SERVICING**

### **5.1 Electrical**

The online Western Power Network Capacity Mapping Tool indicates there is currently between 20 to 25 MVA spare capacity to the zone substation indicating minimal risk for network capacity constraints at the zone substation. Although there appears to be sufficient capacity in the network at present, the feasibility of servicing the Site can only be confirmed with a more detailed assessment of the network.

For the portion east of Narrogin Brook, the development will need to connect to the existing Western Power HV at the intersection of Earl Street and Sales Street, requiring a 250m HV extension along Earl Street.

Western Power will likely require the development to be supplied with a further HV feed to the western portion of the site to provide a completed ringed HV supply. The nearest HV feed to the western portion of the site is from an existing pole-top transformer fronting 9 Dellar Street, which requires a 440m extension along May Street.

Within the development underground HV and LV will be reticulated throughout from an estimated two new transformers.

It is recommended that as part of ongoing design development, a Western Power feasibility study be undertaken to confirm the requirements for servicing the site. The study typically costs \$10,000 plus GST. Timeframes are currently longer than 12 months for feasibility studies.

### **5.2 Communications**

There is existing Telstra and NBN pit and pipe infrastructure in Earl Street and May Street.

Whilst the NBN rollout map indicates that the area is served by NBN fixed wireless technology which utilises data transmitted over radio signals to connect premises to the NBN network, the development will need to install communication pit and pipe infrastructure to be made fibre ready as per the developer's obligations under the Telecommunications Act 1997.

As there is already existing NBN infrastructure adjacent to the site, it is expected that backhauling of the network will not be required.

### 5.3 Water

There is an existing 100mm AC water main in May Street which currently terminates near Quigley Street which will allow the lots on the western side of the development to connect without a need for water main extensions further north on May Street.

There is an existing 100mm AC water main at the intersection of Earl Street / Myers Place and an 80mm AC main on Hillside Road. Water Corporation has advised<sup>5</sup> that the development can connect to the existing 100mm main in Earl Street. It is expected that an extension of this 100mm water main will be required from Earl Street northwards into Hillside Road to replace the 80mm main.

100mm sized mains will be reticulated throughout the development.

### 5.4 Wastewater

There are existing DN150 Water Corporation reticulation sewers on Earl Street near the intersection of Exeter Street. Based on a preliminary analysis, the sewer inverts of 339.70m AHD at chamber 0573 appears to be sufficiently deep enough to allow for a 450m long sewer extension northwards along Earl Street to service the development. Water Corporation has advised that the first 250m of sewers from chamber 0573 should be DN225 sewers to ensure adequate cover is achieved. The remainder of the extension should be able to be DN150.

As there are several existing trees in the western verge of Earl Street along the northern portion of this 450m long sewer main extension, allowance has been made to utilise approximately 200m of trenchless technique sewer installation methods to avoid the need for removal of trees.

Whilst Water Corporation has advised<sup>6</sup> there are several wastewater network capacity constraints within the Narrogin network, the Corporation has advised that this portion of the network can accept the additional flows from the proposed development.

DN150 sewer mains will be reticulated throughout the development. It is expected that a sewer will need to be bored under Narrogin Brook to service the proposed lots on the western side of the site.

### 5.5 Earthworks and retaining walls

Due to the varied size of the lots from 500m<sup>2</sup> to 2000m<sup>2</sup>, it is expected that the R30 zoned lots (average 300m<sup>2</sup> dwelling allotment) will be constructed as flat and level lots due to the smaller dwelling allotment. For the R5 (2000m<sup>2</sup> allotment)-R12.5 (800m<sup>2</sup>) zoned lots, it is expected that the lots will generally follow the existing topography with graded lots.

---

<sup>5</sup> Ridgwell, S, *SF0009652 - Golf Course Pde, Narrogin - Water & Sewer Servicing Feasibility*, email to Cook, M, 18 May 2023, <michael@portereng.com.au>

<sup>6</sup> Calabro, M, *RE: 21-09-135: Narrogin: seeking water and wastewater servicing advice*, email to Cook, M, 19 October 2021, <mcook@portereng.com.au>

Therefore, in general terms retaining walls are expected for the R30 zoned lots to create flat and level lots, and rear boundary walls required for the R5 (2000m<sup>2</sup> allotment)-R12.5 (800m<sup>2</sup>) zoned lots.

## **5.6 Stormwater drainage**

It is expected that the proposed road network will utilise a kerb, pit and pipe drainage system to convey stormwater to proposed drainage swales and basins by the Narrogin Brook. Whilst most of the site naturally grades to Narrogin Brook, the far eastern portion of the site does drain eastwards away from the Brook. Consideration should be had to relocate the 6559m<sup>3</sup> Public Open Space from the northern portion of the site to the south-eastern portion. By having this 6559m<sup>2</sup> Public Open Space at the south-eastern portion of the site, it will allow for stormwater from the eastern portion to be conveyed to the POS for treatment and detention, minimise impacting the existing drainage networks along Earl Street.

An Urban Water Management Plan will need to be prepared, but we generally would expect pit and pipes discharging into basins or swales within the buffer zone of the Narrogin Brook, and an overflow into the Brook.

## **5.7 Roadworks and access**

May Street is on the western border of the site which has an approximately 10m wide sealed pavement south of the Quigley Street intersection. North of Quigley Street, the May Street pavement becomes an unsealed gravel road. For the sealed portion of May Street, the road is kerbed on the western verge but unkerbed on the eastern verge. It is expected that improvements to May Street will need to be undertaken as part of the development works to provide a sealed road, kerbing with pit and pipe drainage.

Earl Street is on the eastern border of the site which has an approximately 10m wide sealed pavement with kerbing to both sides. No upgrades of Earl Street are expected to be required.

Hillside Road is an unsealed 6m wide gravel rural style road. It is expected that Hillside Road will need to be upgraded to have a kerbed and sealed pavement of 8m to 10m wide as the road abuts the sale yards. Discussions should be had with the Shire to confirm pavement width expectations for Hillside Road. For the purpose of this report, a 10m wide sealed pavement has been assumed to be consistent with Earl Street.

Golf Course Parade intersects the site to provide connectivity from May Street to Earl Street and Hillside Road. Golf Course Parade is an unsealed 7m wide gravel rural style road within a 20m wide reservation. It is expected that Golf Course Parade to a 7.4m wide sealed kerbed urban standard road, with pit and pipe drainage.

Other proposed roads within the Site are expected to be a 6m wide sealed kerbed urban standard road with pit and pipe drainage.

## **5.8 Fencing**

It is expected that as part of the subdivisional works, the following fencing will need to be installed:

- Rural style fencing installed along the northern boundary.
- Conservation style fencing installed along the POS boundary of Narrogin Brook.

As the proposed lots front May Street, Earl Street and Hillside Road, estate uniform fencing is not expected to be required. Fencing to individual lots will be undertaken as part of the home built-form works.

## **5.9 Bushfire management**

Due to extensive tree vegetation by Narrogin Brook, a Bushfire Management Plan will be required. It is expected the lots fronting the Brook will need to be subject to a Bushfire Attack Level due to the close proximity of the vegetation by the Brook. The Bushfire Management Plan will outline what measures will need to be undertaken as part of the home built-form works to protect the buildings against the risk of bushfires.

## **5.10 Irrigation**

Should POS areas require reticulation irrigation, early investigations should be undertaken to confirm if groundwater extraction licence allocations are available to service the development. Whilst we do not expect licence limitations, early investigation should be had.

## **5.11 Landscaping**

Allowance has been made for rehabilitation landscaping works to the Narrogin Brook which is expected to include de-weeding and rehabilitation planting along the Brook.

A nominal allowance has also been made for landscaping of the two Public Open Space areas.

## **5.12 Staging of the Development works**

With the sewers to be extended from Earl Street, the staging development front should progress from the east (Earl Street) and then westwards. Based on nominal 30 lot stages, it is expected that the development will be constructed within 6 stages.

## **5.13 Cost sharing of common road infrastructure (Section 159 of Planning Act)**

In accordance with Section 159 of the Planning Act 2005, an 'Original Subdivider' may recover one-half of the 'costs of providing a road', which has a common boundary, from a 'Later Subdivider'.

In this instance, the 'Original Subdivider' would be the proponent (Shire of Narrogin) undertaking the road upgrades to Hillside Road and May Street to an urban standard, and the 'Later Subdivider' being the land owners that front the upgraded portion of Hillside Road and May Street.

Whilst Section 159 of the Planning Act does allow an opportunity to recover costs of providing a road, the expected timeframe of the 'Later Subdivider' undertaking further subdivisional works is not likely to occur within the next 20-30 years. Therefore, no allowance has been made for cost recovery of providing a road.

## **5.14 Developer Contribution Schemes**

The Shire of Narrogin<sup>7</sup> does not have any Developer Contribution Schemes, so none would be applicable.

A new WAPC Operational policy came into effect on December 2022 whereby a Primary School Education contribution is to be levied to any new subdivision development later than 5 lots in the Metropolitan, Peel or Bunbury Region Scheme areas. As this site is not within these scheme areas, the Primary School Education contribution is not applicable.

## **6.0 INDICATIVE SERVICING COSTS**

### **6.1 Preliminaries**

Allowance has been made for Contractor's costs for supervision, mobilisation, site facilities, insurances, locating existing services, dilapidation surveys, preparing and implementing of management plans.

Allowance has been made for 6 development stages being 18 weeks lot to construct approximately 30 lots per stage.

### **6.2 Local Government Fees**

It is expected that arising from the proposed roadworks and drainage, Local Government fees of 1.5% of the roadworks construction cost and associated drainage would typically be payable. But as the land is owned by the Shire of Narrogin, the Shire is likely to waive this fee. Therefore, no allowance has been made for Local Government fees.

### **6.3 Professional Fees**

Costs have been included to cover professional fees such as planning, environmental, heritage, survey, geotechnical, engineering and technical consultancy services, set at a nominal 10%.

### **6.4 Contingency**

Due to the high level nature of this assessment, a 12.5% contingency of the construction costs is included along with a 5% administration contingency.

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<sup>7</sup> Steward, D, E: *Golf Course Parade engineering servicing report*, email to Thompson, S, 8 June 2023, <steve@edgeplanning.com.au>

## 6.5 Indicative Costs

This review is based on servicing the development with earthworks, retaining walls, rural and conservation fencing, electricity, communications, water, sewers, drainage and roadworks via a desktop study of existing services, aerial imagery, previous studies and information readily available online.

Whilst the subdivisional layout shown in **Appendix A** tables 180 proposed residential lots, the linework within the drawing illustrates 195 lots. Therefore, the costs are based on 195 lots. The concept plan provides scope to re-subdivide various lots in the south-east section subject to addressing buffers.

A summary of the development costs is tabled below with a more detailed summary noted in **Appendix C**.

Item	Amount (ex Narrogin with Regional Index of 1.2)
Construction Costs	\$22,261,920
Development Fees and charges	\$3,713,470
<b>Subtotal</b>	<b>\$25,975,390</b>
GST	\$2,597,539
<b>Total</b>	<b>\$28,572,929</b>
<i>Cost per lot (based on 195 lots)</i>	<i>\$146,528</i>

The isolated 24 lots on the western side by May Street adds significant cost to the project with a high proportion of single frontage lots, upgrade of May Street and extension of services. The average development cost would reduce if these lots were not part of the development. Should the 24 lots on the western side be excluded from development, the costs could be reduced in the order of \$2.35 million plus GST. Whilst it is expected that the Shire will elect to upgrade May Street so that a sealed and kerbed road is provided to the intersection of Fleay Road and Golf Course Parade, a further \$300,000 plus GST saving could be gained by not upgrading May Street.

## 7.0 CONCLUSION

Based on the information reviewed, there does not appear to be any factor that would prevent the proposed residential development by Golf Course Parade in Narrogin.

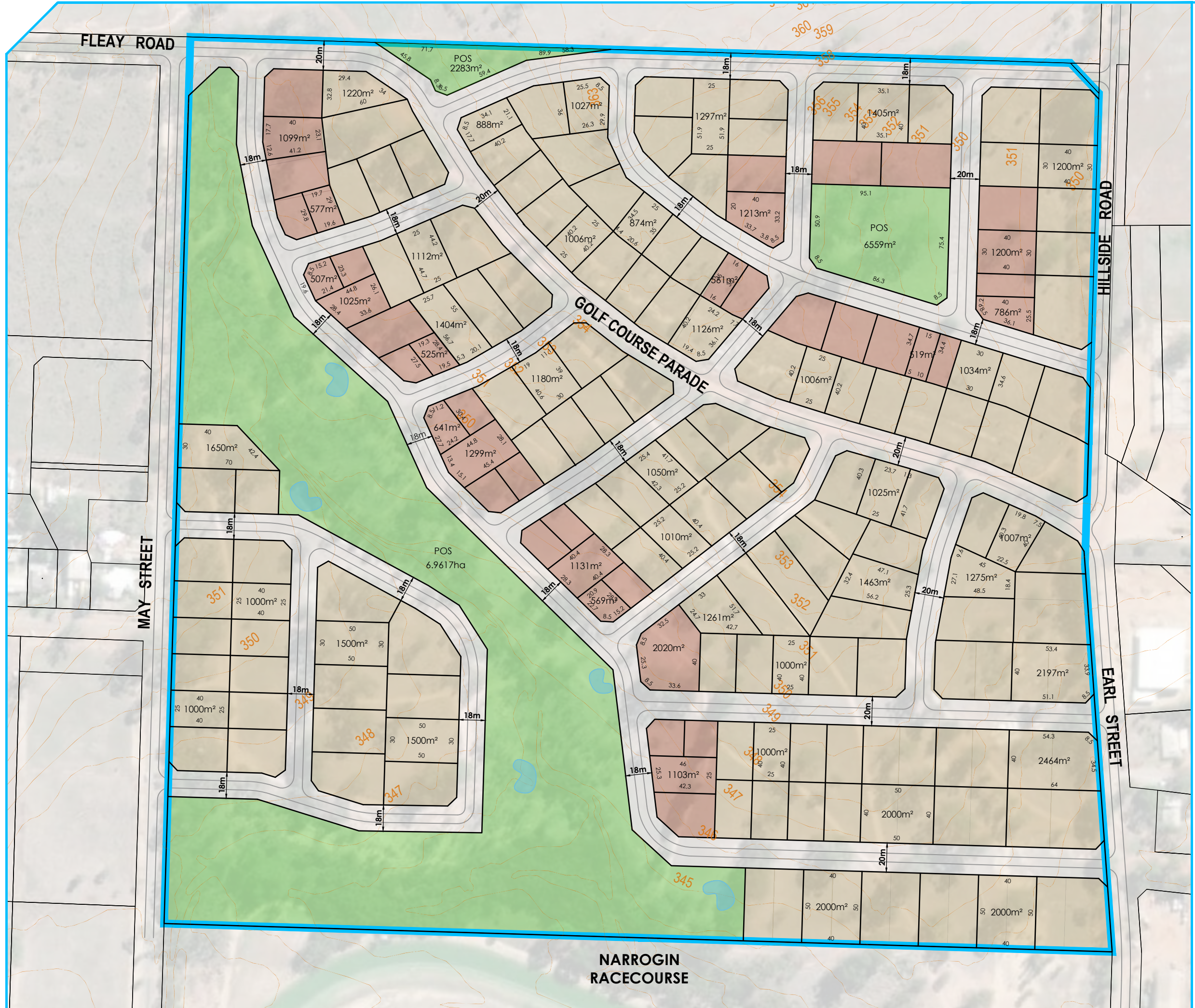
However, as part of ongoing design development, the following should be considered:

1. Obtain a feature survey of the site to better inform further design development.
2. Prepare a preliminary earthworks design to better inform earthwork and retaining wall costs due to the significant cost of these items.
3. Enquiries should be made with the Department of Biodiversity, Conservation and Attractions for further information regarding the threatened ecological community.

4. Whilst we do not anticipate this local heritage identification to impact the proposed development, contact should be made with the Heritage Council for more information.
5. Undertake early enquires with a suitable environmental/heritage consultant regarding Aboriginal Heritage assessments and preparation of management plans in accordance with the Aboriginal Cultural Heritage Act 2021.
6. Obtain a geotechnical investigation to the site to better understand the ground conditions and site preparation requirements.
7. Consideration should be had to relocate the 6559m<sup>2</sup> Public Open Space from the northern portion of the site to the south-eastern portion. By having this 6559m<sup>2</sup> Public Open Space at the south-eastern portion of the site, it will allow for stormwater from the eastern portion of the site to be conveyed to the POS for treatment and detention to minimise impacting existing drainage networks along Earl Street.
8. Discussions should be had with the Shire to confirm pavement width expectations for Hillside Road.
9. Should POS areas require reticulation irrigation, early investigations should be undertaken to confirm if groundwater extraction licence allocations are available to service the development. Whilst we do not expect licence limitations, early investigation should be had.
10. Consider obtaining a Western Power feasibility study to better understand the electrical servicing requirements. A feasibility study typically costs in the order of \$10,000 plus GST and can take longer than 12 months to obtain.
11. The isolated 24 lots on the western side by May Street adds significant cost to the project with a high proportion of single frontage lots, upgrade of May Street and extension of services. The average development cost would reduce if these lots were not part of the development.

**APPENDIX A - Residential Development Layout**

---



# CONCEPT PLAN

Lot 123 Golf Course Parade  
Narrogin  
Shire of Narrogin

- LEGEND
- Subject Area
  - Existing Contours
  - Proposed Lot Boundary
  - Proposed Public Open Space
  - Proposed Residential R5 - R12.5
  - Proposed Residential R30
  - Proposed Roads
  - Indicative Drainage Basin

CURRENT LOTS

Lot 123	34.5743ha
Lot 300 (Vacant Crown Land)	2.2207ha
Golf Course Parade	1.5227ha
TOTAL	38.3177ha

SUBDIVISION SUMMARY

No. Lots	180
Total Area Lots	215818m <sup>2</sup>
Avg Area Lots	1199m <sup>2</sup>
Min Lot Area	507m <sup>2</sup>
Max Lot Area	2621m <sup>2</sup>
POS Contribution	7.8460ha (20.5%)
Subject Area	38.3177ha

- NOTES:
- 1) Sewerage and other services to be extended.
  - 2) Various R30 lots can be resubdivided.

B REVISED DESIGN  
A BASE PLAN  
REV DESCRIPTION

edge  
PLANNING & PROPERTY

Edge Planning & Property  
134 Hare Street, Mount Clarence  
ALBANY WA 6330  
E: steve@edgeplanning.com.au  
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220923 ST  
220501 ST  
Y Y M M D D A P P R V D

DRAWING NUMBER  
EP 220501 02

REV  
B

SCALE 1:2500  
SHEET A/3

50m

## **APPENDIX B - Opportunity & Constraints map**

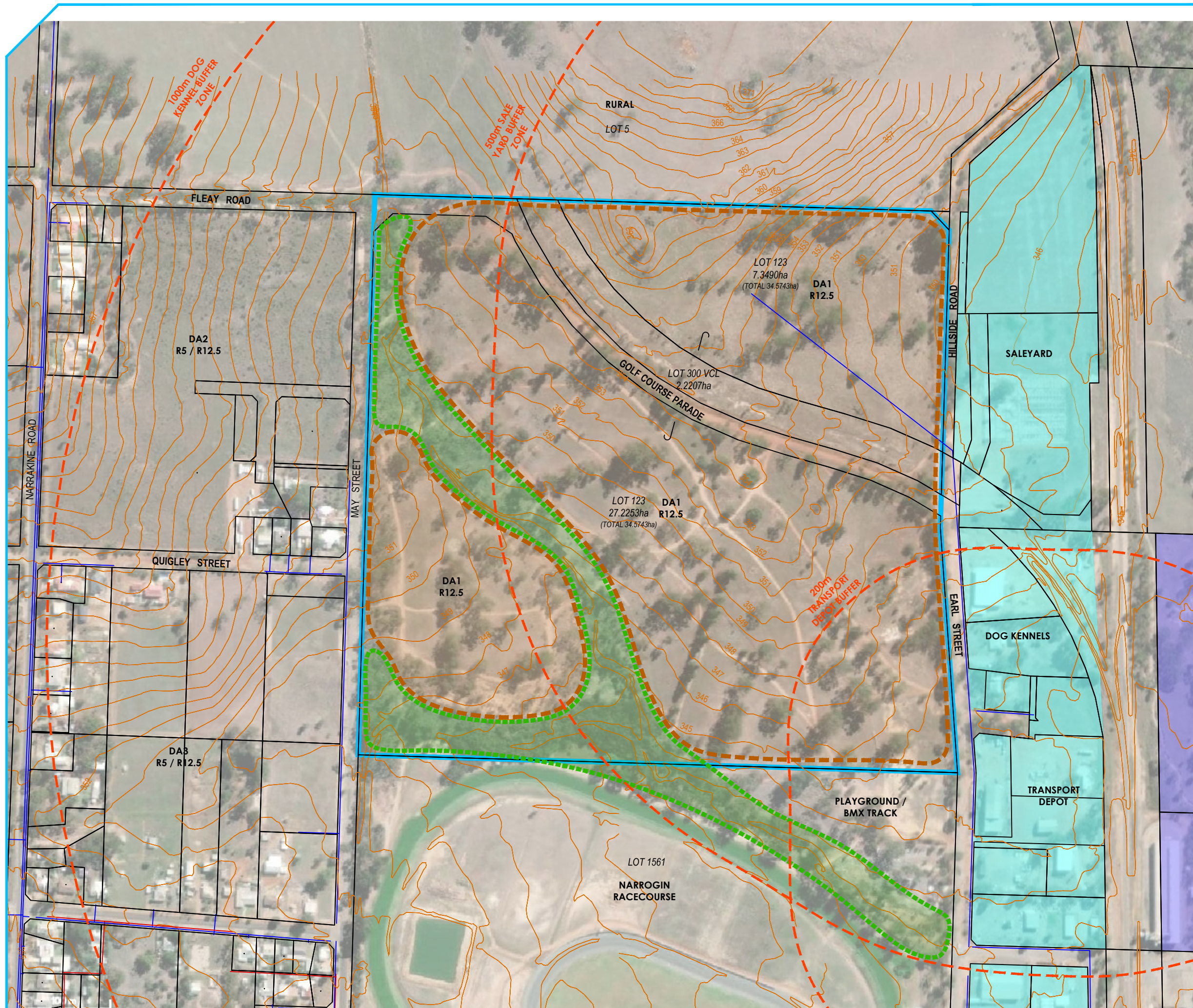
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# CONTEXT, OPPORTUNITIES AND CONSTRAINTS

Lot 123 Golf Course Parade  
Narrogin  
Shire of Narrogin

## LEGEND

-  Subject Area
-  Existing Lot Boundary
-  Existing Contours
-  Existing Water Service
-  Existing Sewer Service
-  Concept Area generally available for Residential Development
-  Concept Area for Public Open Space
-  Commercial Business (LPS Strategy)
-  Industrial (LPS Strategy)
-  Buffer (LPS Strategy)



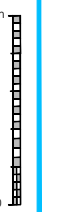
B ADD PLAYGROUND 220923 ST  
A BASE PLAN 220501 ST  
REV DESCRIPTION YMMDD APPRVD

**edge**  
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DRAWING NUMBER  
EP 220501 03  
REV  
B

Issued for design intent only.  
All areas and dimensions are  
subject to detail design + survey.

SCALE 1:4000  
SHEET A3



## **APPENDIX C - Indicative Costs (T072.23)**

---

**Project** Lot 123 Golf Course Parade, Narrogin (Wheatbelt Constraints investigation)  
**Option** Refer Edge Planning & Property drawing EP 220501 02-Rev B  
**Number of Lots** 195  
**Client** Edge Planning & Property  
**Engineer** Michael Cook  
**Job Number** 21-09-135  
**Date** 15 June 2023  
**File Name** T072.23  
**Revision** B  
**Reference Document** R42.23-Rev B



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INDICATIVE DEVELOPMENT COSTS		
CONSTRUCTION COSTS	TOTAL COST	TOTAL COST (ex Narrogin with regional indice of 1.2)
Preliminaries	\$ 1,681,300	\$ 2,017,560
Earthworks and Siteworks	\$ 1,884,200	\$ 2,261,040
Retaining Walls	\$ 2,346,200	\$ 2,815,440
Sewer Reticulation (within the development & Hillside Rd)	\$ 1,393,100	\$ 1,671,720
Sewer extension along Earl St (near Exeter St)	\$ 768,900	\$ 922,680
Water Reticulation	\$ 570,700	\$ 684,840
Drainage	\$ 1,124,100	\$ 1,348,920
Hillside Rd road upgrades	\$ 267,300	\$ 320,760
May St road upgrades	\$ 244,000	\$ 292,800
Roads (internal)	\$ 2,871,600	\$ 3,445,920
Fencing (rural & conservation fencing)	\$ 141,100	\$ 169,320
Underground Power	\$ 1,647,200	\$ 1,976,640
250m HV extension along Earl St	\$ 36,800	\$ 44,160
440m HV extension along May St to Dellar St	\$ 62,800	\$ 75,360
Communications	\$ 341,300	\$ 409,560
Landscaping (POS areas)	\$ 619,000	\$ 742,800
Landscaping (rehabilitation planting to Narrogin Brook)	\$ 490,000	\$ 588,000
Construction Contingency (12.5% of construction)	\$ 2,062,000	\$ 2,474,400
<b>CONSTRUCTION TOTAL</b>	<b>\$ 18,551,600</b>	<b>\$ 22,261,920</b>
DEVELOPMENT FEES AND CHARGES	TOTAL COST	TOTAL COST
Water Corporation Standard Sewer Infrastructure Contribution	\$ 665,730	\$ 665,730
Water Corporation Standard Water Infrastructure Contribution	\$ 458,840	\$ 458,840
Local Authority Fees	\$ -	\$ -
Water Corporation Fees	\$ 39,500	\$ 39,500
Western Power Fees	\$ 351,000	\$ 351,000
Communications Headworks and Backhaul Charges	\$ 117,000	\$ 117,000
WAPC and Landgate Fees	\$ 49,200	\$ 49,200
Professional Fees (10%)	\$ 1,855,200	\$ 1,855,200
Developer Contribution Scheme	\$ -	\$ -
Cost Sharing for Common Infrastructure (Section 159 of the Planning Act)	\$ -	\$ -
Administration Contingency (5% of fees/charges)	\$ 177,000	\$ 177,000
<b>DEVELOPMENT FEES AND CHARGES TOTAL</b>	<b>\$ 3,713,470</b>	<b>\$ 3,713,470</b>
<b>SUB TOTAL COSTS</b>	<b>\$ 22,265,070</b>	<b>\$ 25,975,390</b>
<b>GST</b>	<b>\$ 2,226,507</b>	<b>\$ 2,597,539</b>
<b>TOTAL COSTS</b>	<b>\$ 24,491,577</b>	<b>\$ 28,572,929</b>
<b>COST PER LOT (including GST)</b>	<b>\$ 125,598</b>	<b>\$ 146,528</b>

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.

# APPENDIX 14





# CONCEPT PLAN

Lot 855 (Reserve 23668)  
Stratford Street  
Pingelly  
Shire of Pingelly

## LEGEND

- Subject Area
- Lot Boundary
- Water Service
- Sewer Service
- Avon River South
- CONCEPT
- Footpath
- Vehicle Access / Parking
- Open Space / Landscaping
- Short Stay / Workers Accommodation



B	REMOVE TENTS	220923	AT
A	BASE PLAN	220501	ST
REV	DESCRIPTION	YYMMDD	APPRVD



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DRAWING NUMBER  
EP 220501 01

REV  
B

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subject to detail design + survey.















# APPENDIX 15

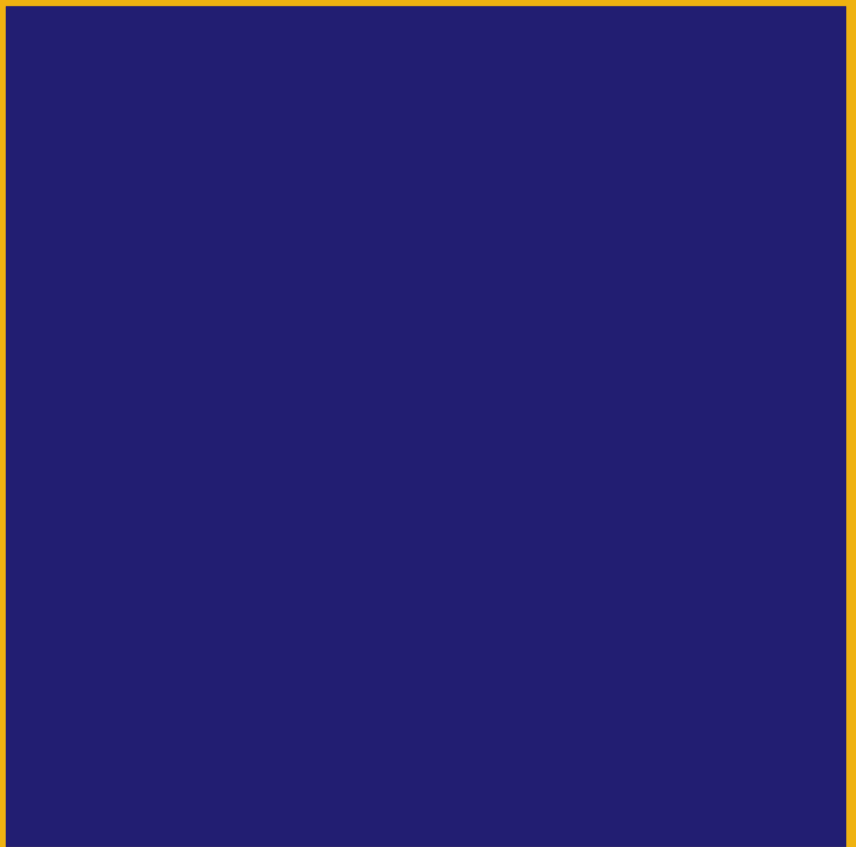
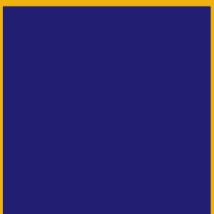
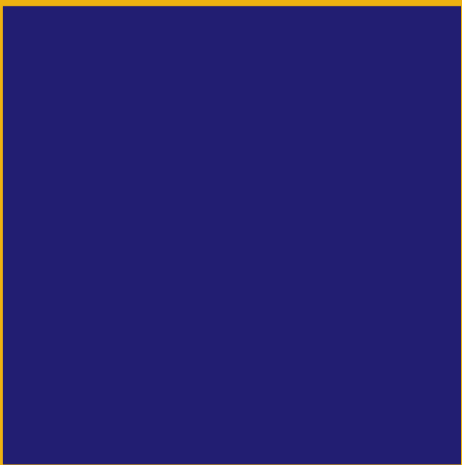


ENGINEERING SERVICING  
REPORT

LOT 855 STRATFORD  
STREET, PINGELLY

SHORT STAY/WORKERS  
ACCOMMODATION (MOTEL/  
GUESTHOUSE)

# Porter



## **REPORT PREPARED FOR**

### **Edge Planning & Property**

Prepared by	<b>Porter Consulting Engineers</b>
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Date	16 June 2023
Our reference	R090.22
Job Number	21-09-135
Checked	MC

### **HISTORY AND STATUS OF THE DOCUMENT**

Revision	Date issued	Author	Issued to	Revision type
Rev A	8 May 2023	R Thomson	Edge Planning & Property	1 <sup>st</sup> issue
Rev A	16 June 2023	R Thomson / M Cook	Edge Planning & Property	2 <sup>nd</sup> issue (incorporating review comments)

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## 1.0 INTRODUCTION

Porter Consulting Engineers has been engaged by Edge Planning & Property to undertake an engineering service investigation for a proposed short stay workers accommodation development located at Lot 855 Stratford Street, Pingelly within the Shire of Pingelly.

The proposed development (the “Site”) will be constructed on the former hospital site of the town, as shown on **Figure 1** below. The Site is bound by Stratford Street to the east and Brown Street to the south. An existing state development is located along the northern boundary, with Avon River and open space to the west.

Demolition of the former hospital building has taken place with isolated trees remaining on the site.



Figure 1: Proposed development site (bound in red)

## 2.0 PROPOSED DEVELOPMENT

The development site will be Short Stay/ Workers Accommodation with office, storages areas and associated parking. The concept layout shown 59 units as presented in **Attachment 1**.

## 3.0 SERVICING INVESTIGATION

### 3.1 Landform

Based on online mapping information<sup>1</sup> the Site topography has a 7.5% gradient from east to west, with a high of 302m AHD on the eastern boundary and low of 296m AHD along the western boundary. Street view imaging shows that there is a level section across the majority of the site with a steep embankment to the Avon River. A topographical survey is required to confirm the site levels.

Based on geological survey mapping for this area<sup>2</sup>, the expected soils are Colluvium and minor alluvium – silt, sand and gravel derived from underlying and adjacent laterite and bedrock. A geotechnical investigation report was not made available for review.

Groundwater monitoring information<sup>3</sup> for the area shows shallow groundwater could be present on the low western area of the site, given the proximity to the Avon River. Consideration to groundwater separation requirements should be made during the design stage with appropriate investigations.

Noise emanating from the nearby rail line east of Parade Street may impact the site. An acoustic investigation may be required as part of the development approvals process, however, there are several residential developments nearby which suggests the noise from the railway may not be an issue for residential/ accommodation developments, due to the expected low frequency of trains on the track.

The Site is located within a live mining tenement. This is not expected to impact on the proposed development given the location within the Town.

The Site is recorded as being within a threatened ecological community area. An Environmental study may be required; however, this is unlikely to be an issue due to the presence of the existing building.

The development Site is documented as having local heritage status. Further information is required; however, it would be assumed that this is no longer applicable as the existing building has been demolished.

---

<sup>1</sup> <https://www.mngaccess.com.au/map#-32.5319518,117.0863473,19z> (Viewed 5 January 2023)

<sup>2</sup> Smurthwaite A.J. 1989 Corrigan part Sheets SI 50-3. Perth Metropolitan Region, Environmental Geology Series, Geological Survey of Western Australia

<sup>3</sup> Department of Agriculture and Food, *Water Management Plan for the Town of Pingelly*, February 2010

## 3.2 Electrical

Western Power Network Capacity Mapping Tool<sup>4</sup> shows the Site is located within an area that has around 20-25 MVA remaining capacity within the network. Western Power Records show that there is an existing overhead high voltage power present along the southern border, with an existing 3 phase supply connected servicing the former hospital which has now been demolished.

Based on the above details, there are no concerns with the power infrastructure available to service the proposed development. No allowance for street lighting relocation has been included within the indicative costs provided as they appear to be in a suitable position for the proposed development.

The initial electrical review<sup>5</sup> of the site shows an existing Western Power substation within a existing brick building. It is assumed that this building is to remain based on the latest available aerial mapping imaging as shown in **Figure 2** below.

It is likely that the existing Site Main Switch Board to the substation inside the brick building will need to be upgraded to comply with current electrical standards. A new electrical switchboard will be required as part of the built-form works to facilitate the 59-unit development along with reticulation of internal electrical cabling to the units, at an order of magnitude cost of \$82,500 plus GST

A provision allowance for \$15,000+GST has been included within the probable costs provided for the Site Main Switchboard Upgrade



**Figure 2: Existing substation location**

Connecting the proposed development to the adjacent existing electrical network is far more cost effective than establishing a microgrid considering that the electrical demands for the

<sup>4</sup> <<https://westernpower.maps.arcgis.com/apps/webappviewer/index.html?id=21af5edc59034456b59c35be31365cdf>> (Viewed 5 January 2023)

<sup>5</sup> UPD, Reserve 23668 Stratford St/ Brown St, Pingelly Initial Servicing Advice Power Report, UPD 9867 PIN, March 2023

development is expected to be below the 20MWh/day which is a key selection criteria<sup>6</sup> for microgrids. However, opportunities do exist for the installation of solar panels to the roofs of the units to reduce day time electrical demands and deliver a lower carbon footprint.

### 3.3 Communication

Communication service provider records<sup>7</sup> show there are multiple communication services within proximity to the Site located on Stratford Street. A review of NBN roll out<sup>8</sup> information shows that the area has Fibre to the Node technology.

It is unlikely that there should be any backhaul charges to service the proposed development due to the presence of fixed line technology adjacent to the Site. However, it is to be confirmed via an application to the communication services provider where they will assess the development and provide written advice.

It is expected that communication pit and pipe infrastructure will be reticulated within the development to each unit as part of the built-form works, which would become the under the ownership of the lot owner or body corporate, with an exclusive access agreement between the body corporate and NBN. The order of magnitude cost for the internal reticulation of the communication pit and pipe infrastructure is \$44,200 plus GST

### 3.4 Water

There is an existing DN100 Water Corporation watermain located within Stratford Street. An existing hydrant is located near the development site. It is likely that the site will require a new service connection and meter to service the site with water.

It is expected that the site would be serviced with a water service as a ‘deferred’ water service, such that the Developer will pay the headwork charges for the water services to be installed, but Water Corporation would physically install the water service once a building application has been received as part of the built-form works. The size of the water service will be based on the expected hydraulic demand of the development.

Internal water plumbing will be reticulated within the development to each unit as part of the built-form works, at an order of magnitude cost of approximately \$96,750 plus GST.

Cost allowances have been made for a fire water services as it is expected a dedicated fire service will be required.

### 3.5 Gas

There is no known gas infrastructure service in the area.

---

<sup>6</sup> Sunrise Energy Group, *Wheatbelt Residential & Industrial Development: Power Infrastructure Delivery Model Options Report*, 03 April 2023 Version 2.0

<sup>7</sup> <https://www.byda.com.au/> Information downloaded on 27 July 2022

<sup>8</sup> <https://www.nbnco.com.au/learn/rollout-map>, Information viewed on 5 January 2023

### 3.6 Siteworks/ Earthworks

Post demolition of the existing building on the Site, a level earth pad was created across the former building and former carpark footprint. Upon completion of the final design layout for the proposed development, a review of the available existing pad area should be carried out to determine if additional earthworks are required to facilitate the proposed development.

A provisional sum of \$20,000 + GST to undertake limited additional earthworks should it be required.

### 3.7 Stormwater Drainage

The stormwater runoff from roads in the area appears to run via overland flow to the Avon River. The proposed runoff generated from the development site and associated on street parking is expected to be able flow via overland flow to the River following detention and treatment in accordance with the requirements of the Authorities. An allowance for construction of swales and stone pitching has been included within the indicative cost provided.

A flood risk study<sup>9</sup> carried out shows that low lying areas of the Town are at risk of flooding during the 50- and 100-year storm events. As the site is at a higher elevation than the western bank, it is unlikely that flooding will impact the proposed development. The site should be designed at the higher level to reduce the chance flooding. Refer to **Figure 3** below.

It is expected that soakwells will be utilised to manage and detain stormwater roof runoff from the units, with a permitted overflow onto the sounding ground or carpark area. It is expected that at least one soakwell be installed to service two units.



**Figure 3: Street View Image**

### 3.8 Access and Carparking

Existing on-street angled parking bays on Stratford Street shall remain with an allowance within the costs for partial repair of asphalt and kerbing as required. Additional parking will be provided within the proposed development. A new crossover will be provided on Stratford Street near the intersection with Brown Street. A turn area is required at the end of the proposed parking aisle within the site to provide provision for vehicles to turn around within the parking area.

<sup>9</sup> Crossley, EK 2001, Groundwater study of the Pingelly townsite. Agriculture Western Australia, Resource Management Technical Report 219.

A review of existing services and the proposed crossover layout shows little impact on the existing service locations. Minor relocations of an existing Telstra pit may be required to facilitate the proposed crossover. The existing Western Power poles may require protection which could be provided in the form of kerbing.

The existing crossover located on the north end of the site at Stratford Street is to be removed along with the gravel access track to the northern Lot 856. Costs for these works have been included within the indicative cost review provided.

### 3.9 Wastewater

Water Corporation records<sup>10</sup> show an existing DN150 sewer within the south-west corner of the lot with an existing junction which will be suitable to service the development.

Historical plumbing records<sup>11</sup> obtained show the existing building in Lot 856, north of the Site as shown in **Figure 4** below, discharges to the existing Water Corporation sewer through the proposed Site. Efforts should be made to physically locate this sewer line from the existing building to confirm the line does not clash with the proposed buildings.

A copy of the historical plumbing mapping information to the existing building is presented in **Attachment 2**.



**Figure 4: Existing building within Lot 856 boundary to remain. Sewer servicing information unknown.**

<sup>10</sup> Esinet-mw.waercorporation.com.au, information viewed on 5 January 2023

<sup>11</sup> <https://ascon.commerce.wa.gov.au/ascon-database-web/find-ascons> , information viewed 29 March 2023

### **3.10 Bushfire Management**

The site is situated within a bushfire prone area<sup>12</sup>. An assessment should be carried out as part of ongoing design development to determine any protection requirements and/ or restrictions for the proposed development as part of bushfire management. It is anticipated that the additional costs associated with bushfire management will be implemented as part of the built-form works to protect the buildings against the risk of bushfire.

### **3.11 Retaining Walls**

No retaining walls are expected to be required on this development based on existing site levels and the current proposed development layout.

### **3.12 Fencing**

It is expected that the development will have some sort of fencing installed to all 4 sides of the development. For the purpose of determining an approximate fencing cost, it is assumed 1.2m tubular style fencing will be installed as part of the built-form works for an order of magnitude cost of \$25,000 plus GST.

### **3.13 Aboriginal Cultural Heritage**

Coming into effect on 1 July 2023 is the Aboriginal Cultural Heritage Act 2021 which replaces the old act 1972 and will require the Site to be assessed and subsequent management plan as necessary.

### **3.14 Building Works**

No allowance for building works is included in the indicative costs provided. This includes footings, structure, roofing, building fit-out and associated services within the building envelope.

### **3.15 Preliminaries**

Allowance has been made for the Contractor's costs for supervision, mobilisation, site facilities, insurances, locating existing services, dilapidation surveys, preparing and implementing management plans, and accommodation. Allowance has been made for a 10-week construction period to construct works not undertaken by the Shire.

### **3.16 Local Government Fees**

The 1.5% Local Government supervision fee is not expected to be payable as no municipal roads or drainage assets are being constructed.

### **3.17 Professional Fees**

Costs have been included to cover professional fees such as engineering, planning, and survey services. These costs have been set at a nominal 10%.

---

<sup>12</sup> <https://maps.slip.wa.gov.au/landgate/bushfireprone/>, viewed 5 January 2023

### 3.18 Contingency

A 20% contingency of the construction cost is included due to the preliminary nature of this investigation and changes experienced in construction material costs throughout recent months. A 5% administration contingency is also included.

### 3.19 Indicative Development Costs

This review is based on servicing the proposed development and has been undertaken as a desktop study of existing services, aerial imagery, previous studies, and information readily available online.

The indicative development costs are outlined in the table below with a further detailed summary provided in **Attachment 3**.

Items	Amount (Ex Pingelly with 1.2 regional index)
<b>Construction Costs</b>	
Preliminaries	\$46,560
Earthworks	\$42,360
Retaining Walls	Nil, not expected to be required.
Perimeter Fencing	\$25,440
Sewer Reticulation	Nil, as all private internal sewer
Internal sewer servicing	\$64,440
Water Reticulation (Meter Upgrade)	\$5,040
Internal Water Servicing	\$37,200
Drainage (external)	Nil.
Drainage (internal roads & unit soakwells)	\$132,360
External Road Repairs	\$12,600
Road + Paths (Internal)	\$186,240
Underground Power (external servicing)	Nil, existing lot supply expected to be suitable
Electrical servicing (internal)	\$56,640
Communications (external servicing – Pit Relocation at crossover)	\$12,000
Communications (internal servicing)	\$30,240
Landscaping	Subject to detailed design
Dwelling building works	Subject to detailed designs
Internal Fencing	Subject to detailed designs
Construction Contingency 20%	\$131,000
<b>Construction Costs Total</b>	<b>\$782,120</b>
Development Fees and Charges (external)	<b>\$81,640</b>
<b>Sub total</b>	<b>\$863,760</b>
GST	<b>\$86,376</b>
<b>Total Costs incl. GST</b>	<b>\$950,136</b>
<b>Cost per short stay unit dwelling incl. GST</b>	<b>\$16,104</b>

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property acquisition costs. The reader should be

satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.

## 4.0 CONCLUSION

Based on the information reviewed, there does not appear to be any factors that would prevent the development of the proposed 59 unit short stay workers accommodation. However, further evaluation and assessments would need to be made to consider:

- i. Verify the position of the private internal sewer to the retained building at the northern portion of the site.
- ii. Obtain a Feature survey to better inform further designs.
- iii. Progress applications with service authorities
- iv. Investigate condition of existing transformer and Site Main Switchboard within the retained brick building at the southern end of the site.
- v. Acoustic assessment due to nearby rail line.
- vi. Geotechnical investigation.
- vii. Environmental study due to threatened ecological community area
- viii. Investigate further local heritage status and potential impacts.
- ix. Undertake further enquiries and investigation regarding upcoming new requirements of the Aboriginal Cultural Heritage Act 2021 which comes into effect 1 July 2023. Consultation should be made with suitable environmental and planning consultants.
- x. Bushfire assessment to inform management and mitigation requirements to be implemented in the built-form works.

## **ATTACHMENT 1 – Development Layout**

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**CONCEPT PLAN**  
Lot 855 (Reserve 23668)  
Stratford Street  
Pingelly  
Shire of Pingelly

**LEGEND**

- Subject Area
- Lot Boundary
- Water Service
- Sewer Service
- Avon River South
- CONCEPT**
- Footpath
- Vehicle Access / Parking
- Open Space / Landscaping
- Short Stay / Workers Accommodation

B	REMOVE TENTS	220923	AT
A	BASE PLAN	220501	ST
REV	DESCRIPTION	YYMMDD	APPRVD

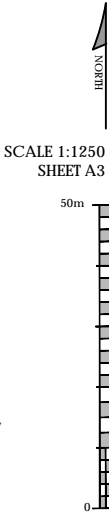


Edge Planning & Property  
134 Hare Street, Mount Clarence  
ALBANY WA 6330  
E: steve@edgeplanning.com.au  
M: 0409 107 336

DRAWING NUMBER  
EP 220501 01

REV  
B

Issued for design intent only.  
All areas and dimensions are  
subject to detail design & survey.



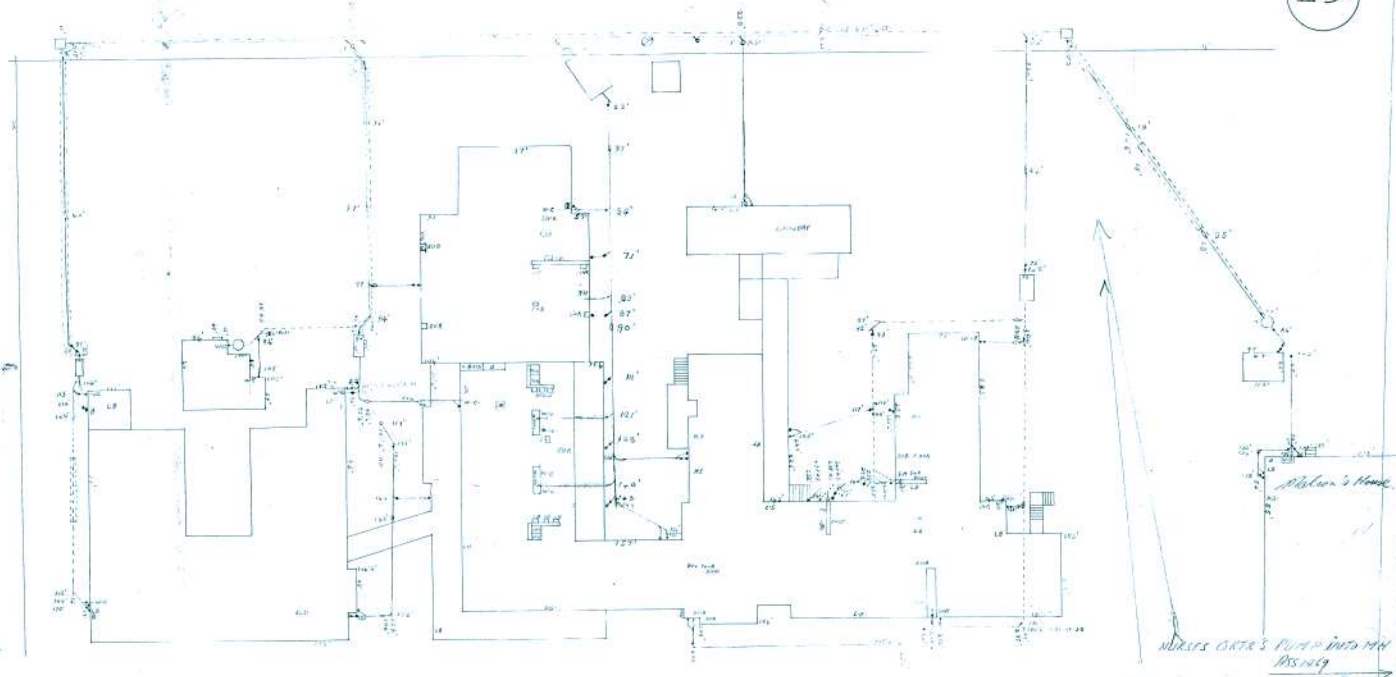




## **ATTACHMENT 2 – Existing Lot Sewer Layout**

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19

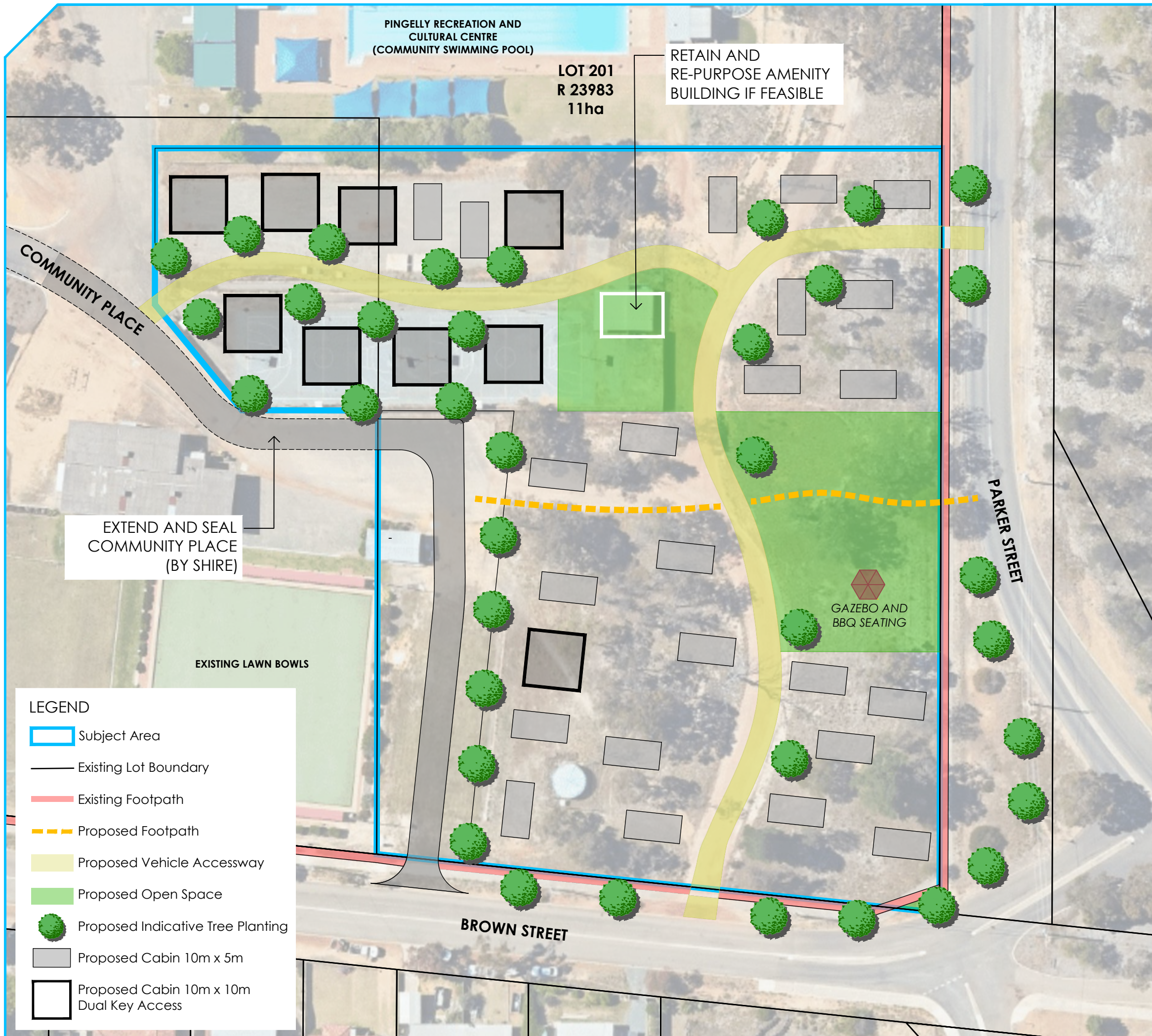


PINGELLY HOSPITAL

Lot No. 852 House No. ☒  
 Street: Stratford St  
 Suburb: PINGELLY  
 Account No. 9807 780 280  
 PIN: 41602

# APPENDIX 16





## CONCEPT PLAN

Lots 201 and 204  
(Reserve 23983)  
Parker Street  
Pingelly  
Shire of Pingelly

C REVISED CONCEPT 230117 ST  
B EXPANDED CONCEPT 221130 ST  
A CONCEPT PLAN 221130 ST  
REV DESCRIPTION YYMMDD APPRVD

**edge**  
PLANNING & PROPERTY

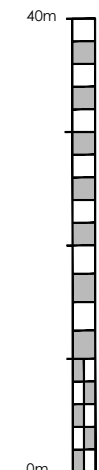
Edge Planning & Property  
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E: steve@edgeplanning.com.au  
M: 0409 107 336

DRAWING NUMBER  
EP 220501 19

REV  
C

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All areas and dimensions are  
subject to detail design & survey.

SCALE 1:750  
SHEET A3



## MODULAR, AFFORDABLE BUILT-FORM EXAMPLES



# APPENDIX 17

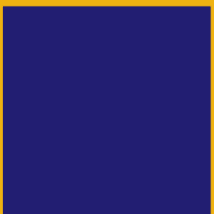
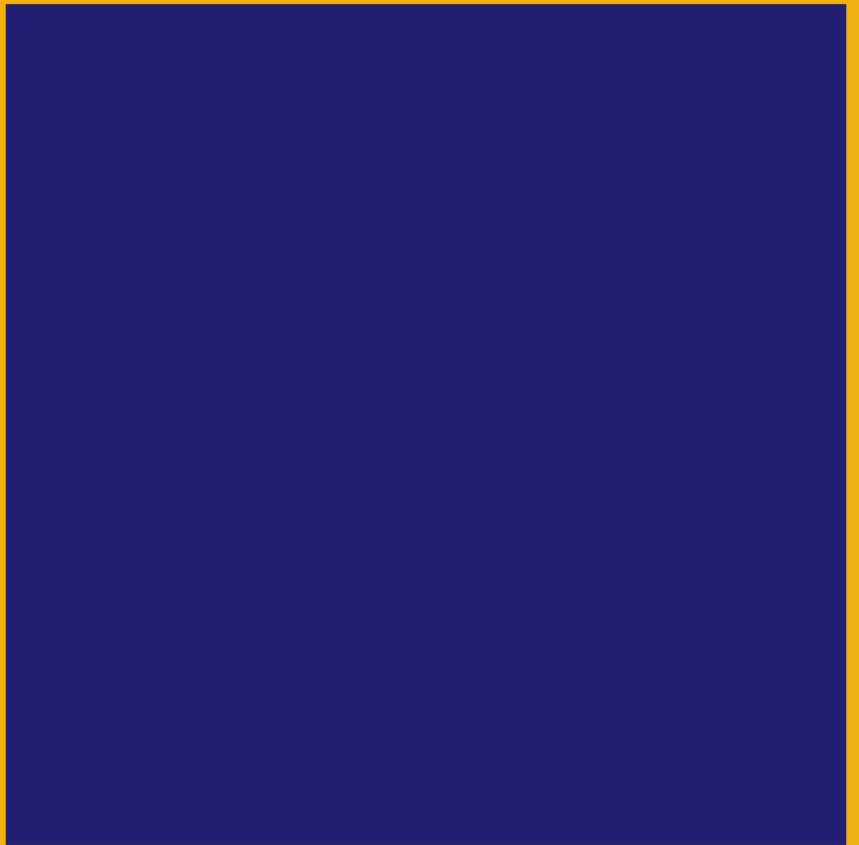
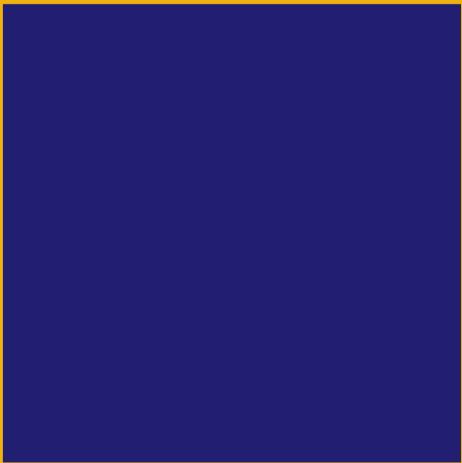


SERVICING  
INVESTIGATION REPORT

LOT 203 & 204  
(RESERVE 23983)  
PINGELLY

22 BROWN STREET,  
PINGELLY

# Porter



**REPORT PREPARED FOR**  
**EDGE PLANNING & PROPERTY**

Prepared by	<b>Porter Consulting Engineers</b>
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Date	16 June 2023
Our reference	R08.23
Job Number	21-09-135
Checked	<i>BH</i>

**HISTORY AND STATUS OF THE DOCUMENT**

Revision	Date issued	Author	Issued to	Revision type
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Rev B	16-06-2023	M. Cook	Edge Planning & Property	2 <sup>nd</sup> Issue (update based on review comments)

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## 1.0 INTRODUCTION

Porter Consulting Engineers (PCE) has been engaged by Edge Planning & Property to undertake a servicing investigation for a proposed unit short stay / workers accommodation development in Pingelly, located within the Shire of Pingelly, located 155km southeast of Perth. The development seeks to have 32 units that included 9 dual key cabins that could accommodate 41 short stay and/or worker accommodation units.

The proposed development area (the “Site”) is bound by Parker Street to the east, Brown Street to the south, an aquatic centre to the north, and community lawn bowls facility to the west as shown in **Figure 1**. The proposed development spans across Lot 201 (4 Somerset Street), Lot 202, Lot 203 (10 Community Place) and Lot 204 (Brown Street) which form Reserve 23983. The proposed development layout is shown in **Appendix A**.



**Figure 1: Subject site (Reserve 23983) bound in pink**

## 2.0 SERVICING INVESTIGATION

### 2.1 Landform

Based on aerial online mapping<sup>1</sup>, there are two outdoor basketball courts and several small sheds and water tank structures, along with a number of isolated trees on the site.

<sup>1</sup> MNG, *MNG Access*, viewed 24 January 2023, <mngaccess.com.au>

The online mapping indicates that there is a 3% falling gradient from south to north across the site, with approximately RL318m AHD by Brown Street and RL314m AHD at the northern boundary of the site. A feature survey will be required to confirm the topography and features across the site.

A geotechnical investigation report was not made available for review. However, based on geological survey mapping for this area<sup>2</sup>, the expected soils are:

- Q<sub>c</sub>: Colluvium and minor alluvium – silt, sand and gravel derived from underlying and adjacent laterite and bedrock.

Based on groundwater monitoring information<sup>3</sup>, the groundwater is expected to be 2m to 3m below the surface and not likely to impact the proposed development.

The Site is located within a live mining tenement. This is not expected to impact the proposed development given the location within the Town.

The Site is recorded as being within a threatened ecological community area. An Environmental study may be required; however, this is unlikely to be an issue due to the presence of existing structures on the proposed development site.

A search on the Contaminated Sites Database<sup>4</sup> did not identify any known contamination on the site.

## 2.2 Demolition

To facilitate the proposed development, the outdoor basketball courts will need to be demolished and an existing water tank to be relocated. There is a small building to the east side of the basketball courts which the Shire has indicated is to be retained and repurposed as an amenity building for use as part of the accommodation development.

If there is an electrical supply to the water tank, basketball court lighting and the small building, the electrical supply feed would need to be removed or modified such that the electrical feed does not cross cadastral boundaries.

Whilst costs have been allowed for the removal of the basketball court and water tank, no allowance has been made for repurposing costs to the small building, which is expected to take place during the built-form works.

## 2.3 Electrical

Based on the Before You Dig information, along Brown Street and Parker Street there are high-voltage overhead lines abutting the site. There is an existing pole top transformer on Parker Street fronting the site.

---

<sup>2</sup> Smurthwaite A.J. 1989 Corrigan part Sheets SI 50-3. Perth Metropolitan Region, Environmental Geology Series, Geological Survey of Western Australia

<sup>3</sup> Department of Agriculture and Food, *Water Management Plan for the Town of Pingelly*, February 2010

<sup>4</sup> Department of Water and Environmental Regulation, *Contaminated Sites Database*, viewed 24 January 2023, <<https://www.der.wa.gov.au/your-environment/contaminated-sites>>

A review<sup>5</sup> of the existing electrical network indicates that there may be sufficient capacity in the Western Power electrical network to support the first stage development of approximately 10 units without a need for a new onsite transformer. However, subsequent stages are expected to require a new onsite transformer to facilitate the development.

The cost of the new transformer is likely to be wholly borne by the development as it is not likely to be eligible to cost offsets under the Distribution Low Voltage Connection Scheme (DLVCS<sup>6</sup>) as the site is greater than 25km from the nearest Western Power zone substation.

Removal of the overhead power lines is not expected to be required.

Within the costings, we have applied the Western Power Gifted asset charge of 13.9%, as this charge is applied to commercial/industrial developments, as this short term accommodation development is expected to be classed as commercial.

Sufficient time should be allowed for Western Power to process the design application process and procurement of a new transformer, with this process currently taking up to 18 months to complete.

A new electrical switchboard will be required as part of the built-form works to facilitate the 41 units along with reticulation of internal electrical cabling to the units, at an order of magnitude cost of \$190,000 plus GST.

Connecting the proposed development to the adjacent existing electrical network is far more cost effective than establishing a microgrid considering that the electrical demands for the development is expected to be below the 20MWh/day which is a key selection criteria<sup>7</sup> for microgrids. However, opportunities do exist for the installation of solar panels to the roofs of the units to reduce day time electrical demands and deliver a lower carbon footprint.

## 2.4 Communication

There is existing NBN and Telstra pit/pipe infrastructure within the surrounding roads to allow suitable connection. It is expected that communication pit and pipe infrastructure will be reticulated within the development to each unit as part of the built-form works, which would become the under the ownership of the lot owner or body corporate, with an exclusive access agreement between the body corporate and NBN. The order of magnitude cost for the internal reticulation of the communication pit and pipe infrastructure is \$50,000 plus GST.

## 2.5 Water

There is a 100mm AC water main in Brown Street and Parker Street that will provide convenient connection points to service the site with scheme water. A new water service will be installed upon request as part of the built-form works, and will be sized based on the expected demand from the development.

---

<sup>5</sup> Mr B. Ellett, 2020, pers. Comm. 3 March)

<sup>6</sup> Western Power, *Distribution Low Voltage Connection Scheme (DLVCS)*, viewed 22 March 2023, <<https://www.westernpower.com.au/industry/distribution-low-voltage-connection-scheme-dlvcs/>>

<sup>7</sup> Sunrise Energy Group, *Wheatbelt Residential & Industrial Development: Power Infrastructure Delivery Model Options Report*, 03 April 2023 Version 2.0

Internal water plumbing will be reticulated within the development to each unit as part of the built-form works, at an order of magnitude cost of approximately \$85,000 plus GST.

Cost allowances have been made for a fire/water services from the mains scheme water as it is expected a dedicated fire service will be required which is a separate service to the lot, in addition to the potable water service.

## 2.6 Wastewater

There are no Water Corporation scheme sewers that immediately abuts the site, with the nearest existing sewers approximately 100m south of the site (Chamber 0161) near the intersection of Parker Street and Shire Street. This existing sewer is too shallow to allow for a new gravity sewer from the development site to connect to the existing sewer.

Based on the Water Corporation sewer scheme planning<sup>8</sup>, should the site seek to be connected to scheme gravity sewers, then a 500m sewer mains extension would need to be installed from the existing sewer at the intersection of Raglan Street and New Street.

Therefore, the available options for wastewater disposal are:

- Undertake a 500m sewer main extension from the intersection of Raglan Street and New Street.
- Onsite wastewater treatment and disposal.

The Water Corporation has advised<sup>5</sup> that downstream headwork infrastructure is not able to facilitate a private pumping station and pressure main from the site to discharge into existing sewers.

### 500m sewer main extension

A 500m sewer main extension from the intersection of Raglan Street and New Street to the development site boundary would involve installing DN150 sewers along New Street, Shannon Street and Brown Street. An order of magnitude cost to undertake the works would be in the order of \$250,000 to \$300,000 plus GST, which would include driveway and road reinstatement works.

Based on the likely costs, it is expected that this option of a sewer mains extension would not be supported by the project development team.

### Onsite wastewater treatment and disposal

Based on a high-level preliminary desktop assessment, the ground conditions appear to be suitable for the onsite treatment and disposal of wastewater. It would appear a majority of the surrounding homes and the immediate abutting community facility disposes of wastewater onsite.

Should the development seek to treat and dispose of wastewater onsite, a typical wastewater treatment system consists of an Aerobic Treatment Unit (ATU) and an effluent disposal system. The size of the ATU and effluent disposal system is based on the expected daily hydraulic load.

---

<sup>8</sup> Pittard, A, SF0009566\_Sewer connection enquiry\_204, 22, Brown Street, Pingelly, email to Cook, M (mcook@portereng.com.au), 3 February 2023

There are several effluent disposal systems that could be deployed, such as soakwells, leach drains, flatbed leach drains (where cover and clearance to groundwater are constraints) and sub-surface irrigation. Sub-surface irrigation disposal systems can be utilised to irrigate grassed areas.

There are restrictions to the use of irrigated systems, which are identified by the Department of Health, Western Australia as:

- Have warning signs displayed that effluent is being used and is not suitable for human contact or consumption.
- Achieve minimum setbacks from certain features such as buildings and paved areas, to avoid human exposure to the effluent.
- Not be altered or reduced in size without approval.
- Be maintained so that irrigation lines are accessible for maintenance.
- Be planted out with salt and nutrient-resistant plants to avoid puddling or runoff effluent.

Subject to further review, either effluent disposal system could be considered to support this development, with the potential to utilise a sub-surface irrigation system within the open space/planted areas within the development.

The expected order of magnitude cost for the supply and installation of an ATU and effluent disposal system (ie, flatbed leach drains) would typically be in the order of \$50,000 plus GST, with ongoing service maintenance every 3-4 months at a typical cost of \$3,000-\$5,000 per visit.

The ATU and effluent system would be installed as part of the built-form works and therefore no cost allowances have been made to the servicing costs.

A typical land area needed for an ATU system to service this size of development is generally 6.5m by 2.5m and 8m by 2.5m for a flat bed leach drain effluent disposal with appropriate offsets as required by the Department of Health. Based on the development layout, it is expected that the development will be able to readily accommodate the ATU and effluent disposal system.

As part of the built-form works, internal wastewater plumbing will be reticulated throughout with piping from the units directed to the ATU at an order of magnitude cost of \$90,000 plus GST.

## **2.7 Roads**

Parker Street is a kerbed 7.2m wide road with a 1.8m wide footpath that abuts the site. Brown Street is a kerbed 9.2m wide road with a footpath that abuts the site. Both roads and footpaths appear to be in sound condition and should not require upgrading.

Community Place is a kerbed 7.2m wide road that is expected to be extended to Brown Street as part of the proposed development and provides an access point for the proposed internal roads of the development. The Shire has indicated that they will construct the extension of Community Place with their own plant, equipment and workforce. Therefore, no construction costs have been noted for the extension of Community Place. However, if the extension of Community Place was to be undertaken by a road building Contractor, the cost would be in the order of \$140,000 plus GST.

The proposed internal roads within the development are expected to be an unkerbed 4m wide pavement sealed with 0.5m gravel shoulders to allow for two-way vehicle movement. The sealed pavement will provide longevity and minimal maintenance to the internal roads. The proposed internal roads are expected to be built as part of the built-form works in the order of \$90,000 plus GST, therefore no allowance has been noted within the costings.

It is expected that pedestrian walkways interlink the accommodation units throughout the development, in the form of a 1.5m wide unsealed gravel base material. It is expected that the walkways will be installed as part of the built-form works, in the order of \$10,000 plus GST, therefore no allowance has been noted within the costings.

## **2.8 Stormwater drainage**

Stormwater drainage runoff from the extension of Community Place is expected to either flow to existing drainage infrastructure within Community Place or Brown Street. Subject to onsite soil permeability testing, stormwater roof runoff from the accommodation units could possibly be plumbed to soakwells. For major storm events, the Shire has also identified that there is an existing drainage basin nearby (towards the northwest of the site) which could also receive flows from the development.

It is expected the Shire will install the drainage infrastructure to the extension of Community Place as part of undertaking the roadworks with their own Shire plant and equipment. Therefore, no costs have been allowed for drainage infrastructure to Community Place. However, should a Contractor install the drainage infrastructure to the extension of Community Place, the cost would be in the order of \$40,000 plus GST.

As the proposed internal roads are not expected to be kerbed, stormwater runoff from the internal roads can shed into the surrounding landscape areas to infiltrate or disperse.

## **2.9 Siteworks / earthworks**

Due to the mild 3% gradient topography of the site, it is expected that the general topography will be retained. It is assumed that the unit dwellings will be of modular style construction method that can be founded on screw piles or stilt footings which will allow for the topography of the site.

It is expected that a limited number of trees will need to be removed to accommodate the units and internal roadway with the majority of the existing trees being retained.

It is expected that topsoil stripping will be limited to the internal roads and footpaths, with the topsoil to be carted to a nearby Shire nominated location for reuse or disposal. Consideration could be had to also reuse the topsoil and respread within the development area.

## **2.10 Fencing**

Allowance has been made for 1.2m tubular style fencing along the Parker Street, Brown Street and Community Place frontage, and a 1.8m high colourbond fencing that abuts the aquatic centre along the northern boundary. It is expected that the fencing will be installed as part of the built-form works for an order of magnitude cost of \$110,000 plus GST.

## 2.11 Landscaping

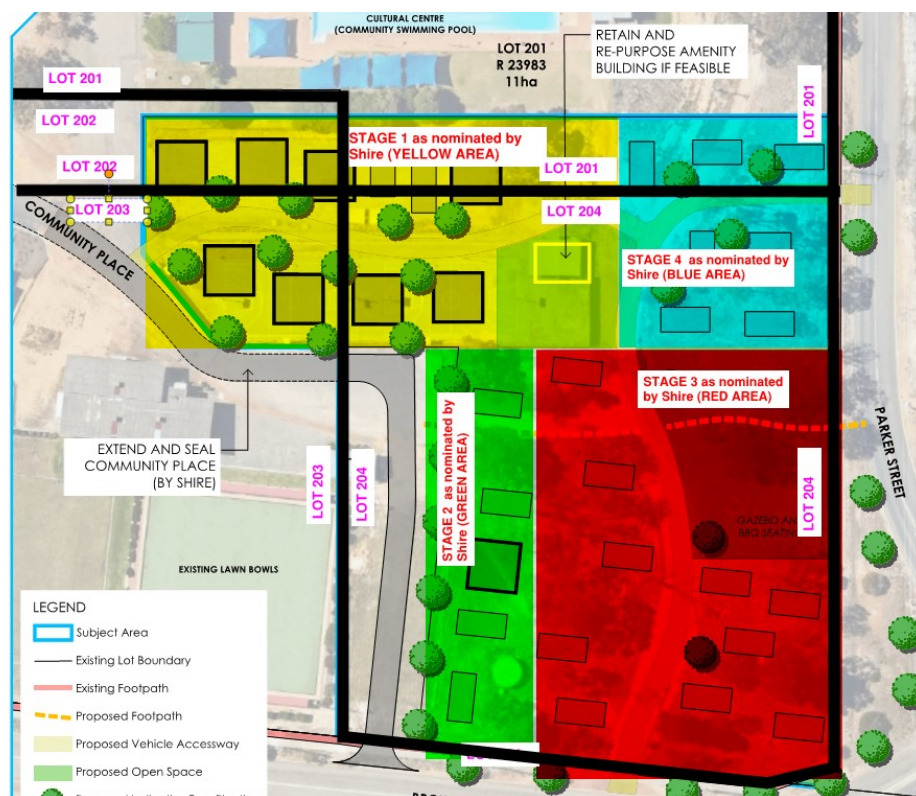
No allowance has been made for irrigation or landscaping works as this is expected to take place as part of the built-form works.

## 3.0 PLANNING

### 3.1 Cadastral boundaries

The proposed 41 unit development appears to be spread across a number of existing allotments, being lots 201, 202, 203, and lot 204 as shown in **Figure 2**.

To facilitate the development, it is recommended the lots be subdivided and amalgamated so a single lot is created for the proposed 41 unit site. This will avoid complications and issues that arise when services cross over cadastral boundaries, in particular for electrical and water servicing.



**Figure 2: Proposed 41 unit development across various allotments (lots 201, 202, 203, and 204)**

### 3.2 Staging of the development

The Shire has nominated a possible staging sequence to roll out the development over several years as shown in **Appendix B**, subject to budgets and demands for the accommodation. However, due to the proposed development crossing multiple allotment boundaries (see **Figure 2**)

there may need to be a reconsider the staging sequence if the creation of a single lot has not been finalised at the time of commencing the development works.

From a servicing infrastructure perspective, it would be more advantageous to develop the area bound in red first to connect to services readily in the abutting roads and then develop the green area. And once the single green title lot has been created, the blue or yellow area could be developed. It is not possible to develop the yellow and blue areas until a single titled lot has been created that encompasses the whole development so that internal services do not cross cadastral boundaries.

## **4.0 INDICATIVE COSTS**

### **4.1 Local Government Fees**

As it has been indicated that the Shire will construct the extension of Community Place, the Local Government Supervision fee of 1.5% of the roads and drainage construction cost will not apply.

### **4.2 Professional Fees**

Costs have been included to cover professional fees such as engineering, planning, and surveying services. These costs have been set at a nominal 10%.

### **4.3 Contingency**

A 10% contingency of the construction cost is included along with a 5% administration contingency which is also included.

The construction sector is currently experiencing an extremely high workload tempo and a number of capacity constraints due to COVID-19 economic stimuli and macro-economic factors, which has resulted in construction pricing volatility. A further 10% contingency of the construction costs has been applied to account for the current pricing volatility, particularly in regional areas.

### **4.4 Indicative costs**

Allowance has been made for the Contractor's costs for supervision, mobilisation, site facilities, insurances, locating services, dilapidation surveys, preparing and implementing management plans. A 4 week construction period has been allowed to undertake the demolition, siteworks, minor earthworks, electrical installation works, communications connections, and perimeter fencing.

This review is based on servicing the site with electricity, communication, water (upon application), with onsite wastewater management and disposal (installed as part of the built-form works). The costs have been derived by referencing Porter's historical database of project costs and relevant sources as necessary.

In summary, the indicative costs are outlined in the table below, with a more detailed summary provided in **Appendix C**.

Items		Amount (ex-Pingelly with 1.2 regional index)
Servicing Construction Costs:	Preliminaries	\$72,600
	Clearing, Demolition & Siteworks	\$27,000
	Earthworks	\$9,480
	Drainage (extension of Community Place)	Shire will construct
	Roads (extension of Community Place)	Shire will construct
	Internal footpath (1.5m gravel path)	Will be part of built-form works
	Internal roads (4m unkerbed sealed road)	Will be part of built-form works
	Fencing (perimeter)	Will be part of built-form works
	Underground Power	\$165,560
	Communications	\$960
	Landscaping	Will be part of built-form works
	Construction Contingency (10%)	\$28,800
	Covid Contingency (10%)	\$28,800
	<b>Servicing Construction Costs Total</b>	<b>\$305,400</b>
		<i>\$7,449 (Servicing Cost per unit)</i>
<b>Servicing Development Fees and Charges</b>		<b>\$174,080</b>
		<i>\$4,246 (fees &amp; charges per unit)</i>
<b>Other costs to consider as part of the Built-Form works</b>		
Internal electrical servicing (including Site Main Switchboard)		\$190,000
Internal communications servicing		\$50,000
ATU and effluent disposal system		\$50,000
Internal wastewater		\$90,000
Internal water		\$85,000
Internal footpaths		\$10,000
Internal roadways		\$90,000
Landscaping (basic standard)		\$300,000
Dwelling unit construction & fitout		To be determined by Architect
<b>Built-Form Costs: Subtotal</b>		<b>\$865,000 (excludes cost of units &amp; fitout)</b>
		<i>\$21,098 (Built-form costs per unit)</i>
Sub total		\$1,344,480
GST		\$134,448
<b>Total Costs incl. GST</b>		<b>\$1,478,928</b>
<b>Total cost per unit (41 units) inc GST</b>		<b>\$36,071</b>

## 5.0 CONCLUSION

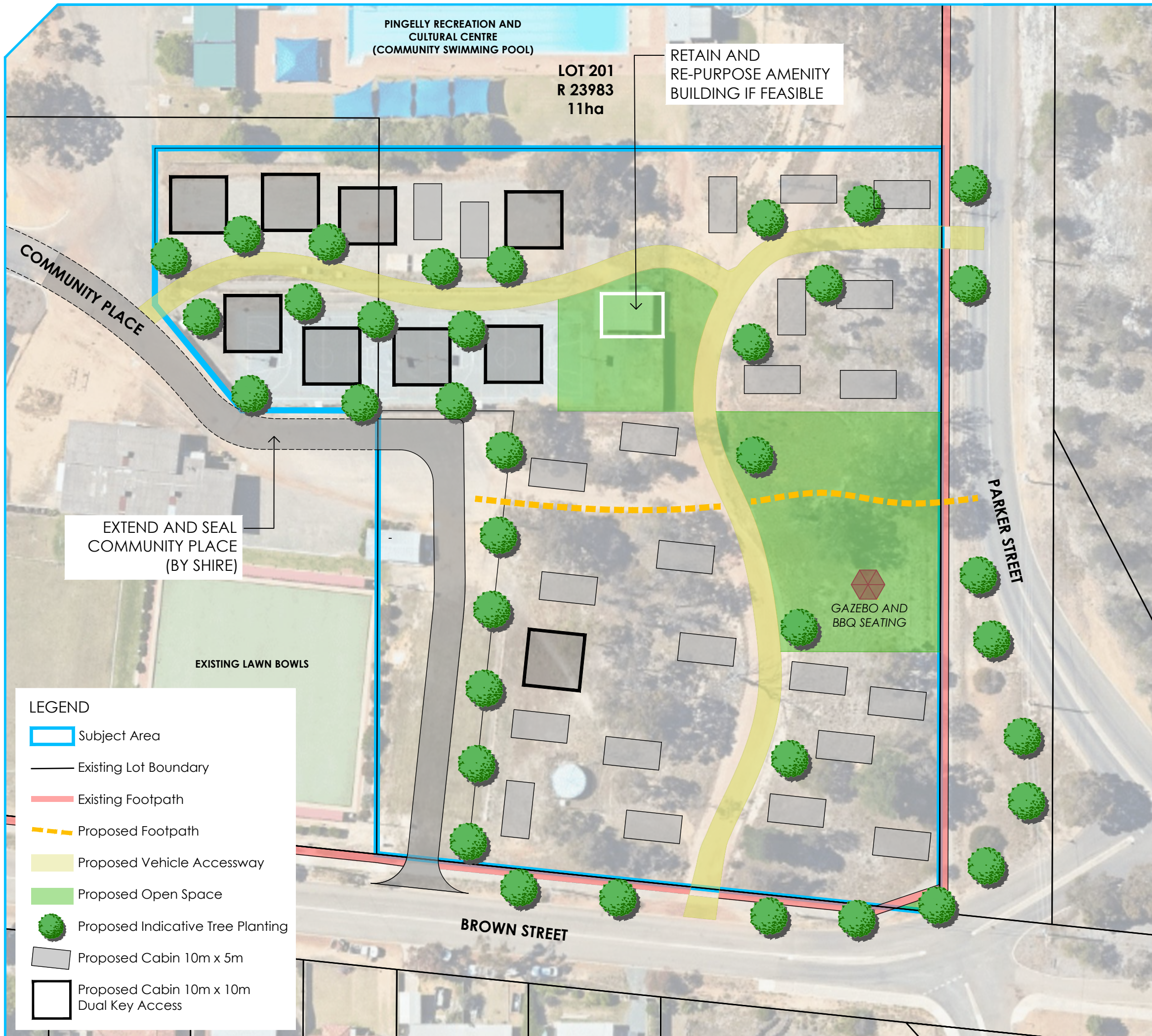
Based on the information reviewed, there does not appear to be any infrastructure servicing factor that would prevent the proposed 41 unit short stay/workers accommodation development. However, further consideration should be made as part of ongoing design development:

- Obtain a feature survey of the site (indicative \$3k+GST survey fee).
- Obtain a geotechnical investigation of the site (indicative \$7k-10k+GST geotech fee).
- Early application of designs with Western Power (indicative \$10k+GST design fee) and procurement of long lead items.
- Amend the allotment boundaries facilitate the development in a timely manner to create a single green title lot (Indicative \$3k+GST planning consultant fee).

- Reconsider the stage sequencing of the development.
- Liaise with an Architect to determine indicative costs for construction and fitout of the units (Indicative \$2k+GST Architect fee).
- Liaise with a Landscape Architect to refine landscaping costs (Indicative \$2k+GST Architect fee).

## **APPENDIX A - Proposed Development Layout**

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## CONCEPT PLAN

Lots 201 and 204  
(Reserve 23983)  
Parker Street  
Pingelly  
Shire of Pingelly

C REVISED CONCEPT 230117 ST  
B EXPANDED CONCEPT 221130 ST  
A CONCEPT PLAN 221130 ST  
REV DESCRIPTION YYMMDD APPRVD

**edge**  
PLANNING & PROPERTY

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134 Hare Street, Mount Clarence  
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M: 0409 107 336

DRAWING NUMBER  
EP 220501 19

REV  
C

Issued for design intent only.  
All areas and dimensions are  
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SCALE 1:750  
SHEET A3

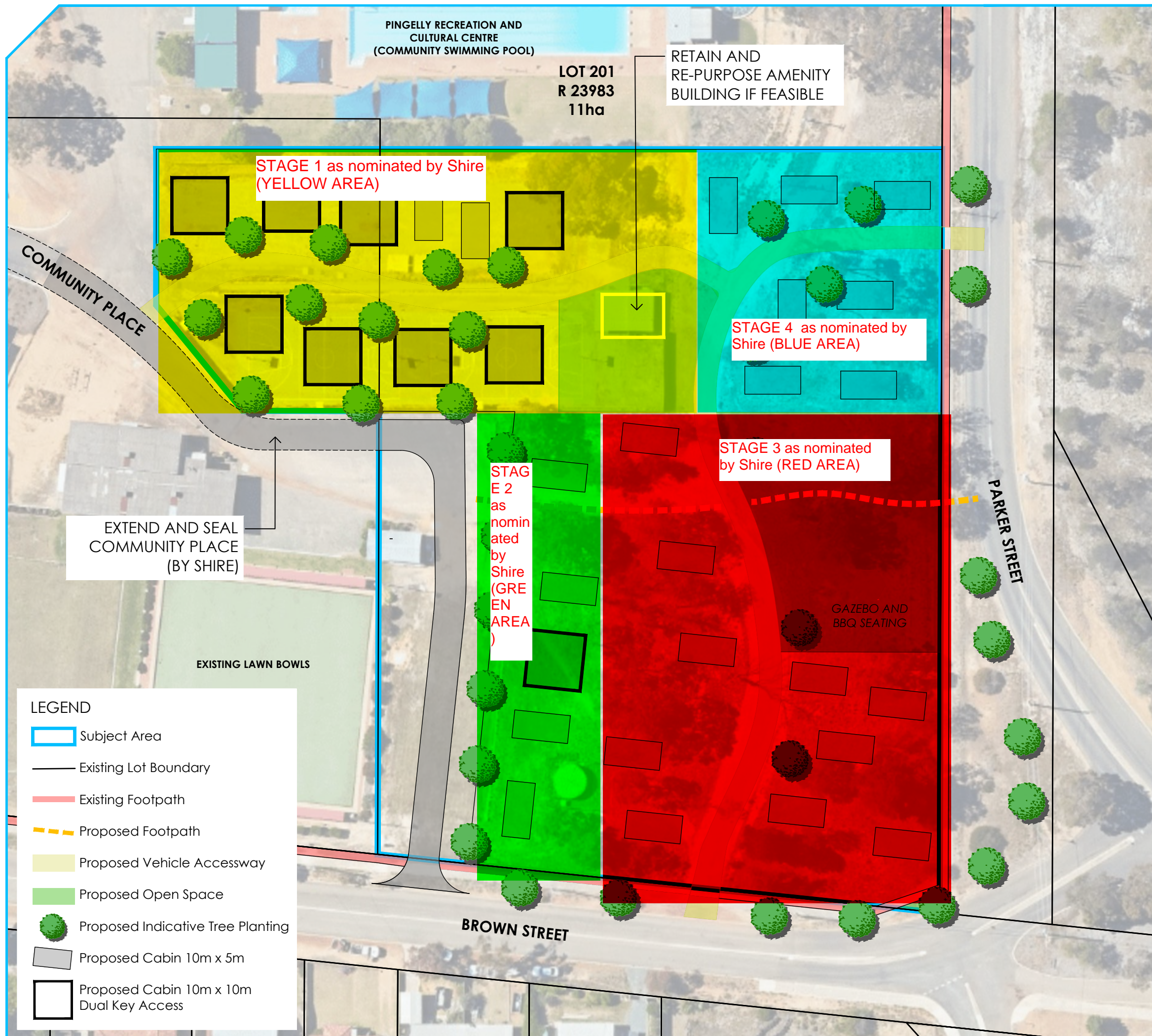
40m

0m

## MODULAR, AFFORDABLE BUILT-FORM EXAMPLES



## **APPENDIX B - Development Staging Plan**



**LEGEND**

- Subject Area
- Existing Lot Boundary
- Existing Footpath
- Proposed Footpath
- Proposed Vehicle Accessway
- Proposed Open Space
- Proposed Indicative Tree Planting
- Proposed Cabin 10m x 5m
- Proposed Cabin 10m x 10m Dual Key Access

# CONCEPT PLAN

Lots 201 and 204  
(Reserve 23983)  
Parker Street  
Pingelly  
Shire of Pingelly

C	REVISED CONCEPT	230117	ST
B	EXPANDED CONCEPT	221130	ST
A	CONCEPT PLAN	221130	ST
REV	DESCRIPTION	YYMMDD	APPRVD



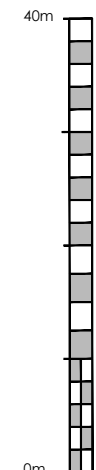
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EP 220501 19

REV  
C

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SCALE 1:750  
SHEET A3



## MODULAR, AFFORDABLE BUILT-FORM EXAMPLES



**APPENDIX C - Indicative Costs Summary**

---

**Project** Reserve 23983 Pingelly (Lot 203 & Lot 204)22 Brown Street, Pingelly  
**Option** Developed via 4 stages  
**Number of Lots** 41  
**Client** Edge Planning  
**Engineer** Michael Cook  
**Job Number** 21-09-135  
**Date** 16 June 2023  
**File Name** T038.23  
**Revision** B  
**Reference Document** R08.23-Rev B



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INDICATIVE DEVELOPMENT COSTS		
SERVICING CONSTRUCTION COSTS	TOTAL COST	TOTAL COST (ex Pingelly with 1.2 regional index)
Preliminaries	\$ 60,500	\$ 72,600
Clearing, Demolition & Siteworks	\$ 22,500	\$ 27,000
Earthworks	\$ 7,900	\$ 9,480
Drainage (extension of Community Place)	Shire will construct	Shire will construct
Roads (extension of Community Place)	Shire will construct	Shire will construct
Internal footpath (1.5m gravel path)	Will be part of built-form works	Will be part of built-form works
Internal roads (4m unkerbed sealed road)	Will be part of built-form works	Will be part of built-form works
Fencing (perimeter)	Will be part of built-form works	Will be part of built-form works
Underground Power (external servicing)	\$ 138,800	\$ 166,560
Communications (external servicing)	\$ 800	\$ 960
Landscaping	Will be part of built-form works	Will be part of built-form works
Construction Contingency (10% of construction)	\$ 24,000	\$ 28,800
Covid / Macro-economic factor Contingency (10% of fees/charges)	\$ 24,000	\$ 28,800
<b>SERVICING CONSTRUCTION: TOTAL</b>	<b>\$ 254,500</b>	<b>\$ 305,400</b>
DEVELOPMENT FEES AND CHARGES	TOTAL COST	TOTAL COST
Water Corporation Standard Sewer Infrastructure Contribution	\$ -	\$ -
Water Corporation Standard Water Infrastructure Contribution	\$ 96,480	\$ 96,480
Local Authority Fees	\$ -	\$ -
Water Corporation Fees	\$ 4,000	\$ 4,000
Western Power Fees	\$ 21,100	\$ 21,100
Communications Headworks and Backhaul Charges	\$ 16,400	\$ 16,400
WAPC and Landgate Fees	\$ 4,000	\$ 4,000
Professional Fees	\$ 23,100	\$ 23,100
Administration Contingency (5% of fees/charges)	\$ 9,000	\$ 9,000
	\$ -	\$ -
<b>SERVICING DEVELOPMENT FEES AND CHARGES: TOTAL</b>	<b>\$ 174,080</b>	<b>\$ 174,080</b>
OTHER COSTS TO CONSIDER AS PART OF BUILT-FORM WORKS		
Internal electrical servicing (including Site Main Switchboard)	\$ 158,333	\$ 190,000
Internal communications servicing	\$ 41,667	\$ 50,000
ATU and effluent disposal system	\$ 41,667	\$ 50,000
Internal wastewater	\$ 75,000	\$ 90,000
Internal water	\$ 70,833	\$ 85,000
Internal footpaths	\$ 8,333	\$ 10,000
Internal roadways	\$ 75,000	\$ 90,000
Landscaping (basic standard)	\$ 250,000	\$ 300,000
Dwelling unit construction & fitout	To be determined by Architect	To be determined by Architect
<b>BUILT-FORM COSTS: TOTAL</b>	<b>\$ 720,833</b>	<b>\$ 865,000</b>
<b>SUB TOTAL COSTS</b>	<b>\$ 1,149,413</b>	<b>\$ 1,344,480</b>
<b>GST</b>	<b>\$ 114,941</b>	<b>\$ 134,448</b>
<b>TOTAL COSTS</b>	<b>\$ 1,264,355</b>	<b>\$ 1,478,928</b>
<b>COST PER DWELLING UNT (including GST)</b>	<b>\$ 30,838</b>	<b>\$ 36,071</b>

We stress that these costs are indicative only and are reflective of current construction costs in the area. No allowances have been made for property costs. The reader should be satisfied that the costs are appropriate for their purpose. Porter Consulting Engineers does not accept responsibility or liability for their interpretation or use.

# APPENDIX 18



GLAMPING TENT OPTION



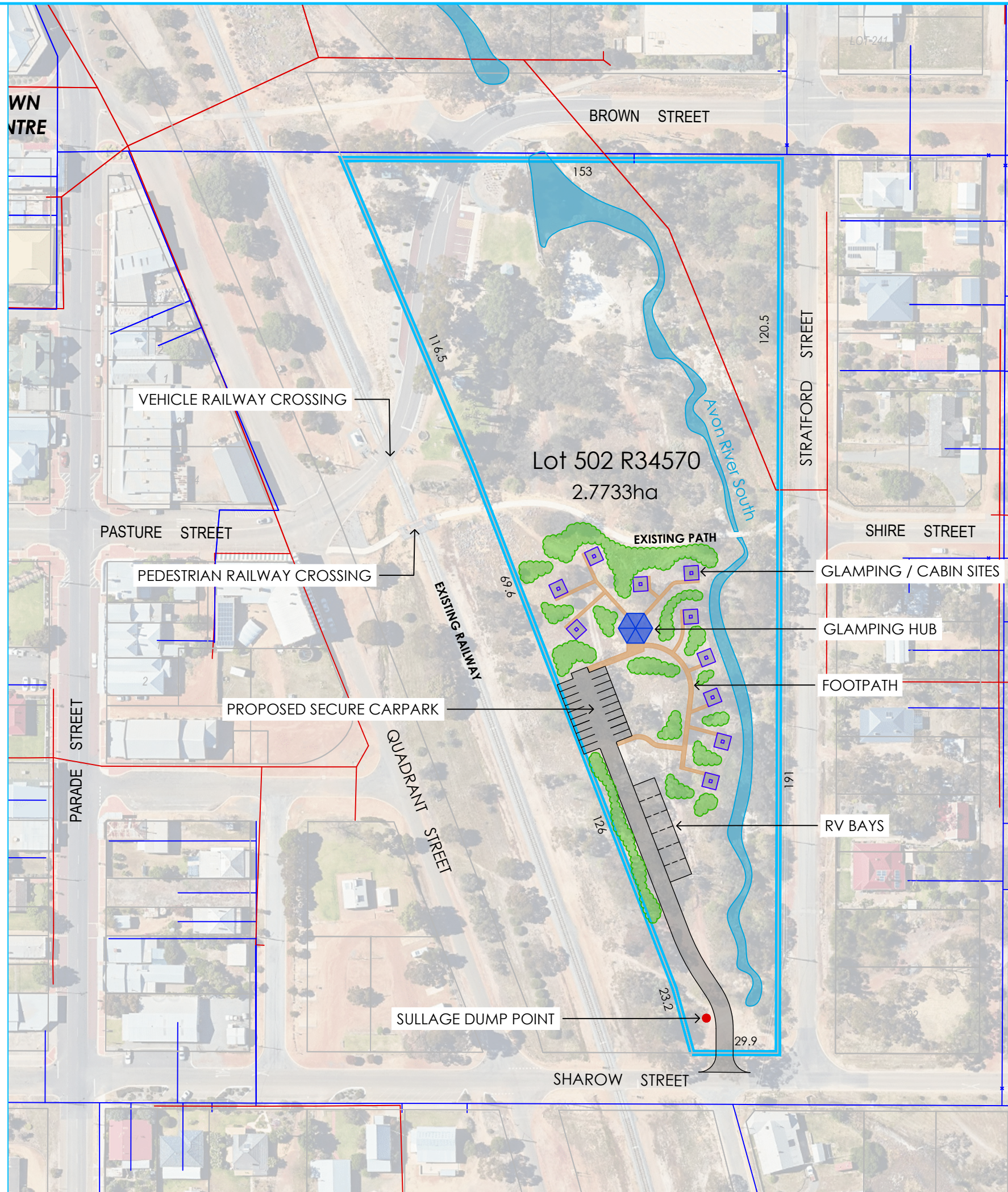
GLAMPING TENT OPTION



CONVERTED TRAIN OPTION



CONVERTED TRAIN OPTION



## CONCEPT PLAN

Lot 502 (Reserve 34570)  
Stratford Street  
Pingelly  
Shire of Pingelly

### LEGEND

- Subject Area
- Lot Boundary
- Water Service
- Sewer Service
- Avon River South
- CONCEPT
- Footpath
- Vehicle Access / Parking
- Landscaping
- Glamping / Cabin Site (with ensuite)
- Glamping Hub / Common Facilities + WiFi

NOTE:  
Glamping area and RV parking area will be fenced.

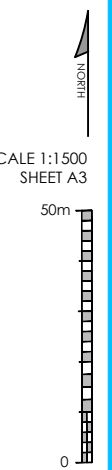
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A BASE PLAN 221111 ST  
REV DESCRIPTION YMMDD APPRVD

**edge**  
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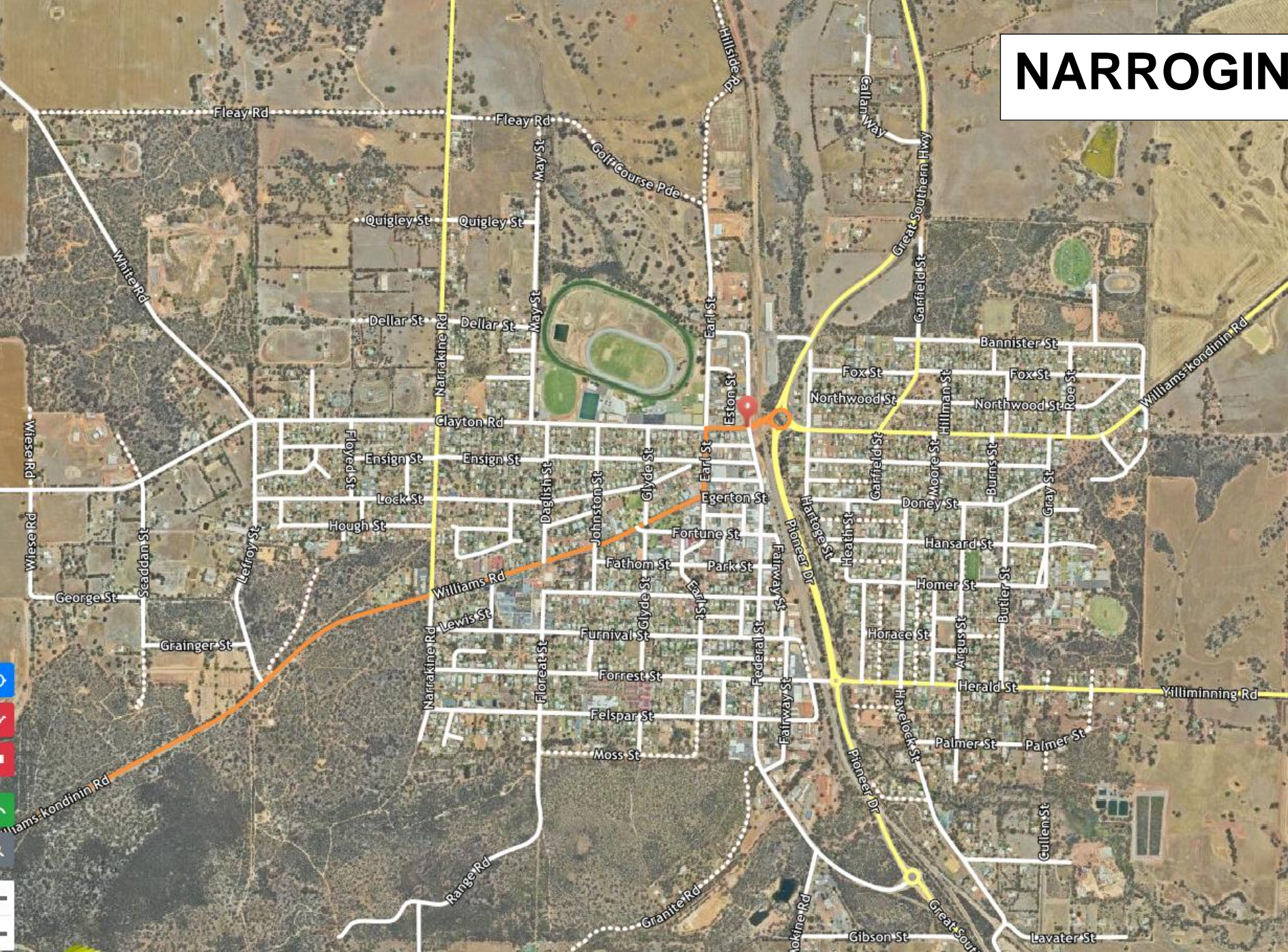


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SHEET A3

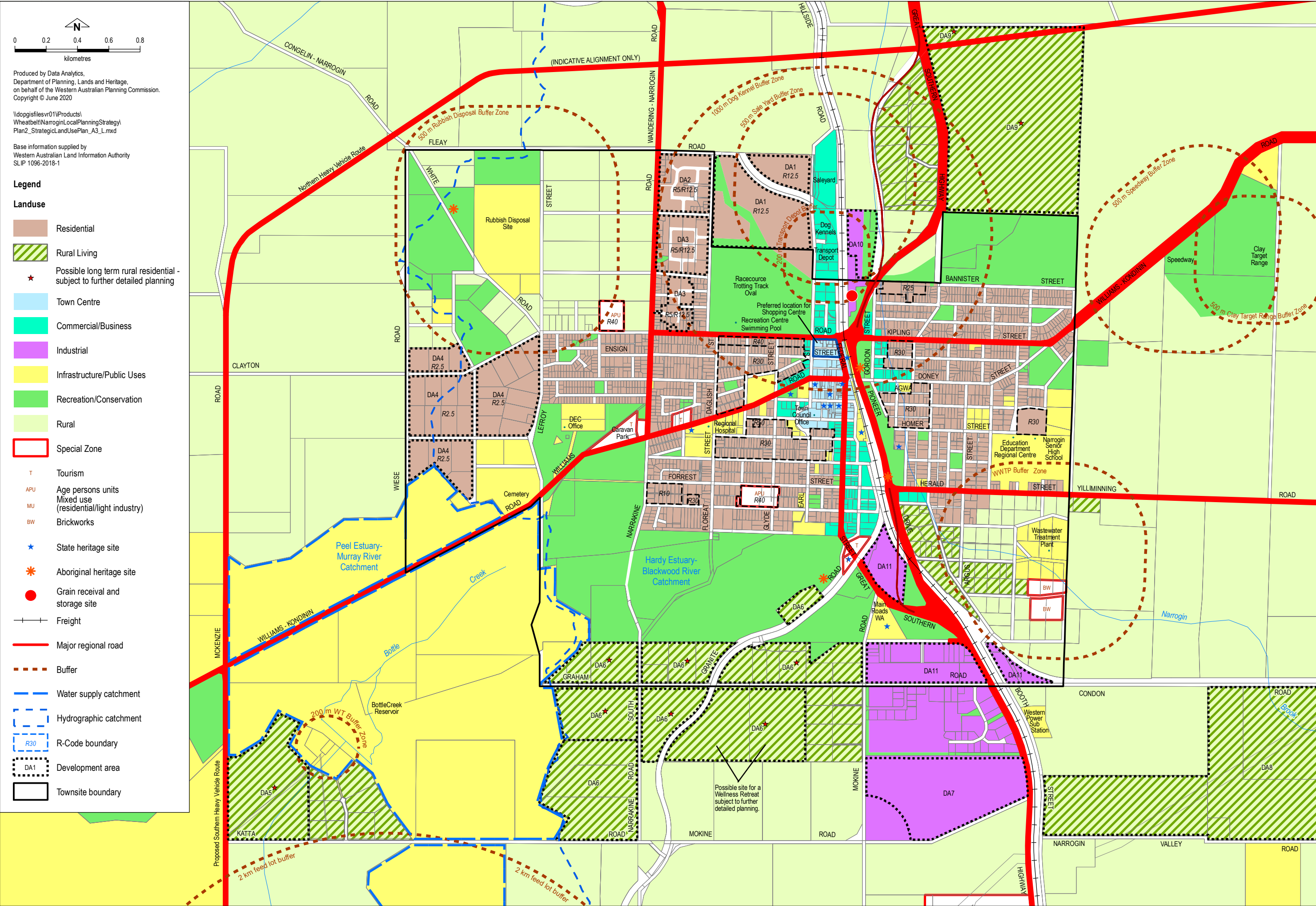
# APPENDIX 19



# NARROGIN



Shire of Narrogin Local Planning Strategy



# APPENDIX 20





**PINGELLY**

# APPENDIX 21

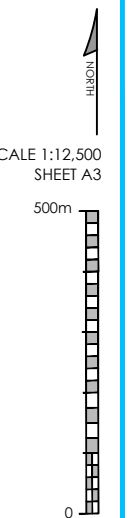
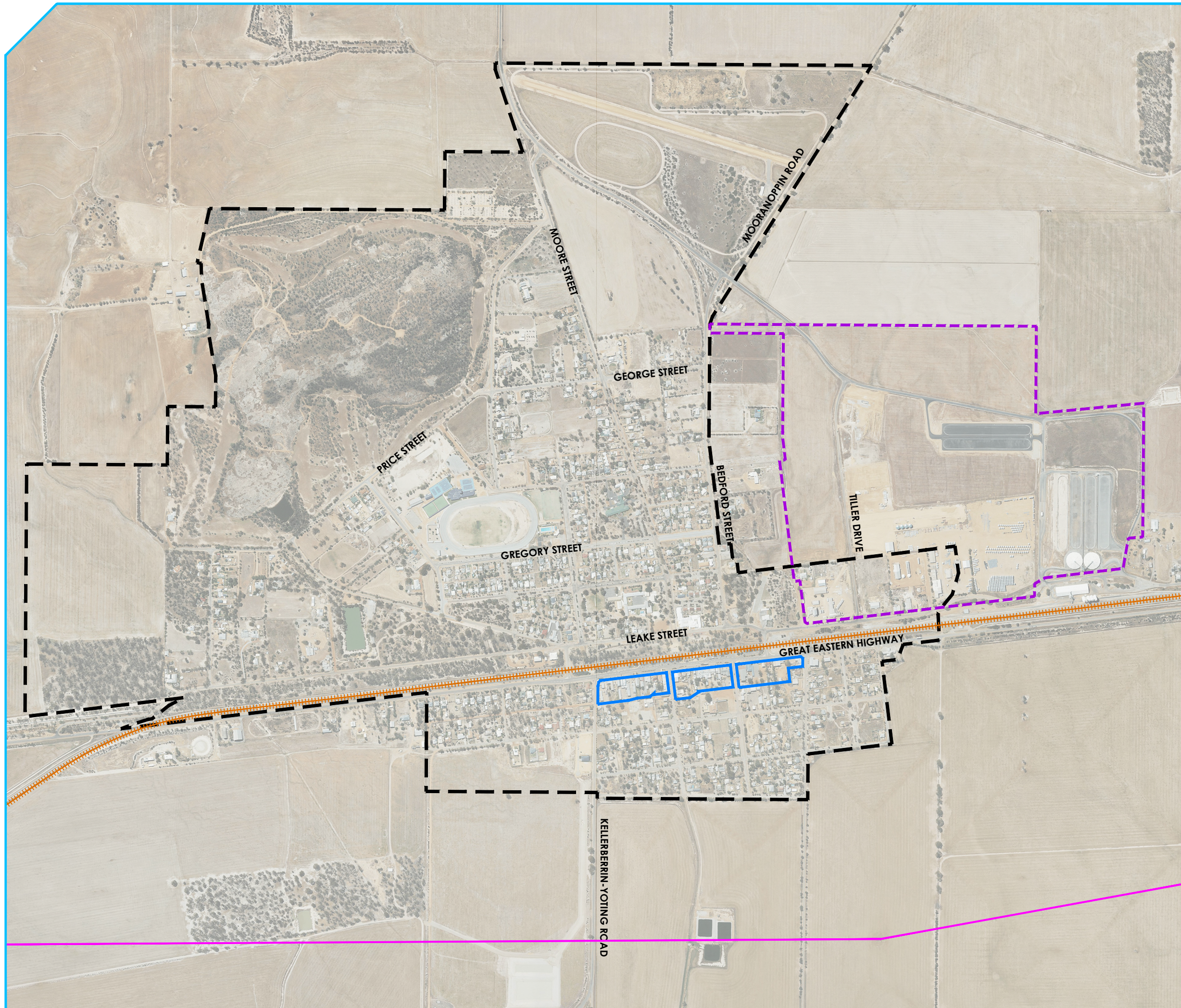


# KELLERBERRIN TOWNSITE

Kellerberrin  
Shire of Kellerberrin

## LEGEND

-  Kellerberrin Townsite
-  Zoned Town Centre
-  Industrial Local Scheme Zone
-  Railway Line
-  Transmission Overhead Powerline



SCALE 1:12,500  
SHEET A3

A	BASE PLAN	221214	ST
REV	DESCRIPTION	YYMMDD	APPRVD

**edge**  
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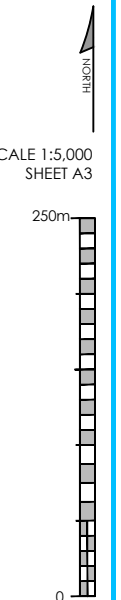
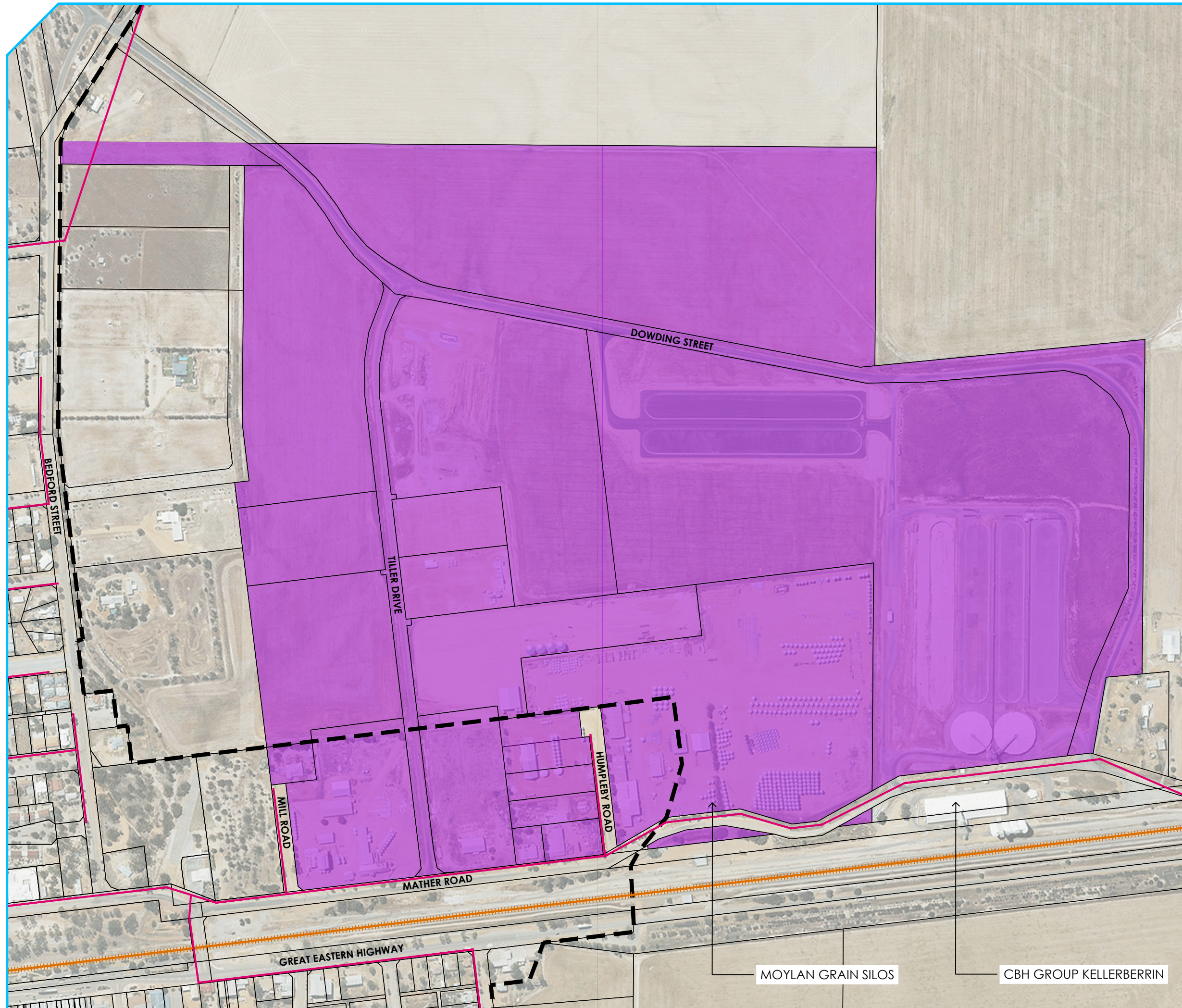
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# KELLERBERRIN INDUSTRIAL AREA

Kellerberrin  
Shire of Kellerberrin

## LEGEND

-  Kellerberrin Townsite
-  Industrial Local Scheme Zone
-  Railway Line
-  Distribution Overhead Powerline



SCALE 1:5,000  
SHEET A3

A	BASE PLAN	221214	ST
REV	DESCRIPTION	YYMMDD	APPRVD
		DRAWING NUMBER	REV
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# APPENDIX 22

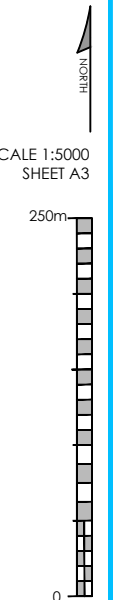


# NAREMBEEN TOWNSITE

Shire of Narembeen

## LEGEND

-  Zoned Town Centre
-  Industrial Local Scheme Zone
-  Railway Line



B	SCALE	230614	ST
A	BASE PLAN	230126	ST
REV	DESCRIPTION	YYMMDD	APPRVD



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