Government of **Western Australia**
Department of the **Premier and Cabinet**

Perth and Peel Green Growth Plan for 3.5 million

Strategic Assessment of the Perth and Peel Regions

Draft Action Plan C: Infrastructure

December 2015

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Abbreviations

Abbreviation	Description
BRM	basic raw materials
CCW	Conservation Category Wetlands
DER	Department of Environment Regulation
Directions 2031	*Directions 2031 and Beyond – Metropolitan Planning beyond the Horizon*
DoP	Department of Planning
DoW	Department of Water
EELS	Economic and Employment Lands Strategy
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
IAWG	Infrastructure Agencies Working Group
LA Act	*Land Administration Act 1997*
LRV	Light Rail Vehicle
LGR	Local Government Road
Main Roads	Main Roads Western Australia
MNES	Matter(s) of National Environmental Significance
MRS	Metropolitan Region Scheme
OEPA	Office of the Environment Protection Authority
ORR	Other Regional Roads
Parks and Wildlife	Department of Parks and Wildlife
P&D Act	*Planning and Development Act 2005*
P&R	Parks and Recreation
PDWSA	Public Drinking Water Source Area
POS	Public Open Space
PRR	Primary Regional Roads
PRS	Peel Region Scheme
PTA	Public Transport Authority
ROS	Regional Open Space
Strategic Assessment	Strategic Assessment of the Perth and Peel Regions
WAPC	Western Australian Planning Commission
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

1 Introduction

1.1 OVERVIEW OF THE INFRASTRUCTURE ACTION PLAN

This Action Plan has been prepared in the context of the Strategic Assessment of the Perth and Peel Regions (Strategic Assessment) that has been undertaken by the Western Australian Government under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Strategic Assessment addresses the impacts on matters of national environmental significance (MNES) and State environmental values from future development of the Perth and Peel regions, including urban, industrial, rural residential and infrastructure development, harvesting of pines and basic raw materials (BRM) extraction.

The Plan addresses the future construction and upgrade of transport (including heavy, freight and light rail and Primary Regional Roads and Other Regional Roads), electricity and water infrastructure. It also describes co-location arrangements such as shared infrastructure corridors and shared sites. Other services such as gas and telecommunications infrastructure have been excluded from this Class of Action as priority has been placed on working with government agencies and trading enterprises, given government's prime role in the overall planning and use of infrastructure corridors. Engagement with major operators of gas and telecommunications providers will occur outside of the Strategic Assessment process.

Also described in this Action Plan is the enabling legislative and planning framework which will ensure that development occurs in a sustainable way whilst supporting future growth. Where necessary, regulations, policies and processes will be revised or developed in order to implement this Action Plan and facilitate effective delivery of the objectives and commitments set out in the *Strategic Conservation Plan for the Perth and Peel Regions* (Strategic Conservation Plan). Until such time, existing regulatory and policy mechanisms will continue to apply.

The Action Plan will be reviewed every five years and updated to reflect any changes while continuing to deliver the objectives and commitments set out in the Strategic Conservation Plan.

1.2 RELATIONSHIP TO THE STRATEGIC CONSERVATION PLAN

A key output of the EPBC Act strategic assessment process is the endorsement of a 'Plan, Program or Policy' by the Commonwealth Minister for the Environment. The 'Plan, Program or Policy' is the document that sets out the commitments that the State will deliver to protect MNES in the Strategic Assessment Area and enable development to be approved.

As part of progressing the Strategic assessment, a single plan has been developed that addresses both MNES and State environmental values – the Strategic Conservation Plan. It includes:

- the conservation outcomes, objectives and commitments that will be endorsed by the Commonwealth under the EPBC Act strategic assessment process; and
- the commitments for State environmental values as relevant to the EPA's advice under section 16(e) of the *Environmental Protection Act 1986* (EP Act).

As part of the Strategic Conservation Plan, a series of Action Plans has been developed to assist with implementation of the Strategic Conservation Plan. The Structure of the Strategic Conservation Plan and the supporting Action Plans is shown in Figure 1.

1.3 RELATIONSHIP TO STRATEGIC PLANNING FOR THE PERTH AND PEEL REGIONS

The Strategic Assessment has been progressed in consideration of major planning frameworks for the Perth and Peel regions.

Western Australia has a population of over 2.57 million people (Australian Bureau of Statistics 2014). Of this number, more than 2 million live in the Perth and Peel regions, which are located within one of the world's 35 biodiversity hotspots. As a strategic approach to long-term urban planning, the Department of Planning (DoP) and the Western Australian Planning Commission (WAPC) in 2010 released *Directions 2031 and Beyond – Metropolitan Planning Beyond the Horizon* (Directions 2031) which is a high level strategic plan and associated spatial framework to guide development policy and planning to accommodate an additional half a million people by 2031. It outlines a vision for future land uses and a more liveable, prosperous, connected and sustainable community.

To realise the vision encompassed in Directions 2031, the WAPC has developed a series of detailed draft sub-regional planning frameworks with a unified, long-term growth strategy for land use and infrastructure required to support a population of 3.5 million in the Perth and Peel regions. This series of draft planning frameworks, titled *Perth and Peel@3.5million*, was released for public consultation in May 2015 and includes:

- *Draft North-West Sub-regional Planning Framework;*
- *Draft North-East Sub-regional Planning Framework;*
- *Draft Central Sub-regional Planning Framework; and*
- *Draft South Metropolitan Peel Sub-regional Planning Framework.*

It is intended that once finalised, these draft sub-regional planning frameworks will support the projected growth of the Perth and Peel regions in a sustainable manner.

The Strategic Conservation Plan is complementary to the draft sub-regional planning frameworks and provides alignment across government on a land use plan to support the growth of the Perth and Peel regions to 3.5 million people.

1.4 STRUCTURE OF THIS DOCUMENT

The structure of this document is as follows:

Section 2: provides an overview of how the Infrastructure Action Plan was developed.

Section 3: provides a detailed description of the Infrastructure Class of Action, including information on the types of infrastructure, its location, design, zoning and timeframes.

Section 4: describes how the infrastructure areas will be regulated and rolled out into the future. The section includes:

- a description of the legislative and planning framework designed to administer this Action Plan;
- information on the internal planning processes that will be followed by relevant agencies and organisations during planning, construction and operations;

- information on how this Action Plan relates to other Action Plans;
- how the assurance framework in the Strategic Conservation Plan covers this Action Plan; and
- funding arrangements for the implementation of this Action Plan.

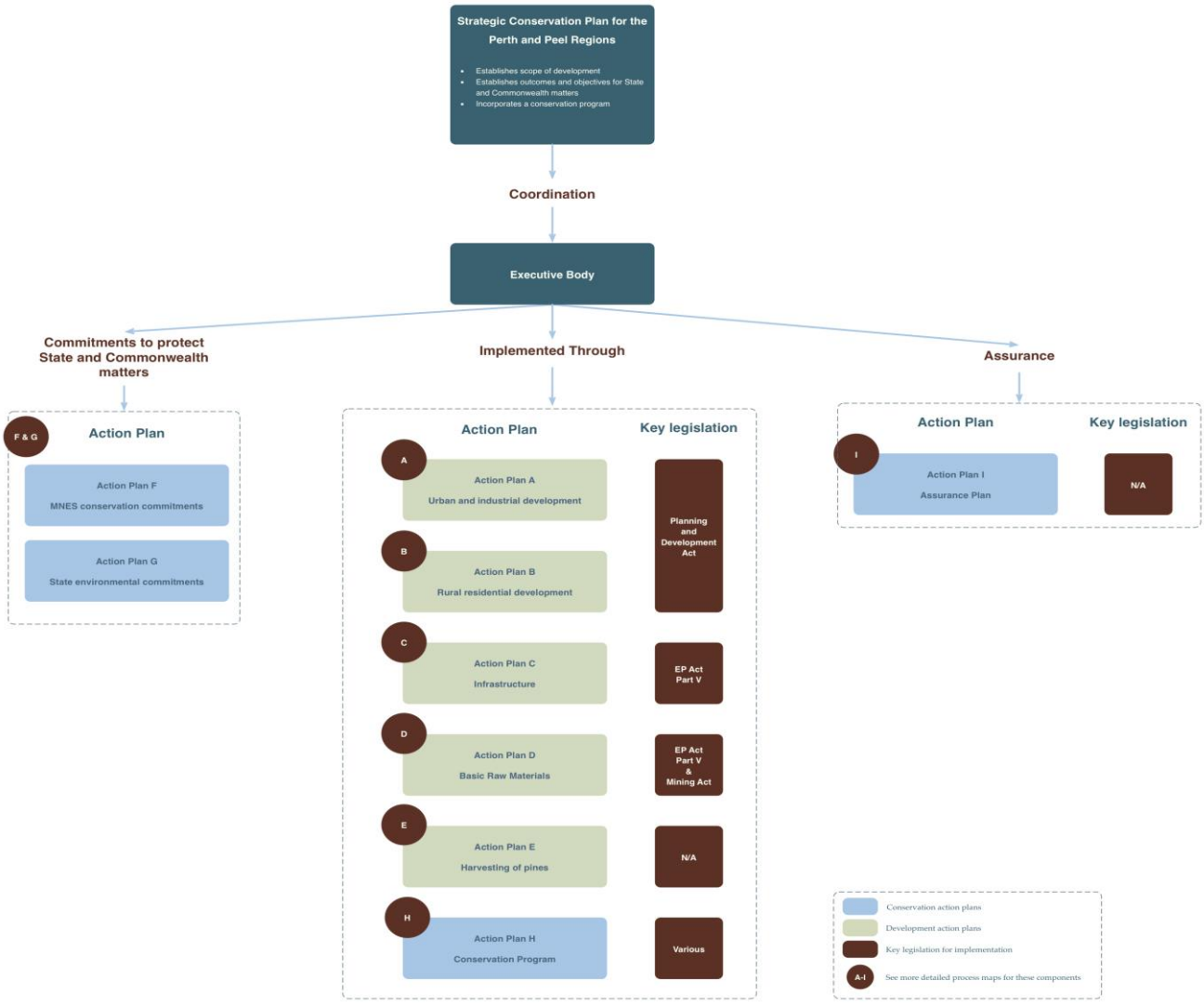


Figure 1: Structure of the Strategic Conservation Plan and the supporting action plans

2 Background to the development of this Action Plan

The State has commenced a process of integrated infrastructure planning for the future development of Perth supporting an increase in population to 3.5 million people. The planning for this infrastructure is at various stages and the proposed infrastructure network is largely conceptual at the moment.

The Infrastructure Class of Action incorporates the future construction and upgrade of:

- transport (including heavy rail, light rail, freight rail, Primary Regional Roads and Other Regional Roads);
- electricity; and
- water infrastructure.

The infrastructure is to service new urban, industrial and rural residential areas as well as increase the capacity of the existing network to handle planned infill and increases in population in already developed areas. The Infrastructure Class of Action also incorporates a scoping of issues related to co-location arrangements for shared infrastructure corridors and sites.

This Class of Action does not include gas and telecommunications infrastructure as priority has been placed on working with government agencies and trading enterprises, given government's prime role in the overall planning and use of infrastructure corridors. Engagement with major operators of gas and telecommunications providers will occur outside of the Strategic Assessment process. This Class of Action deals with drinking water and wastewater management infrastructure but not solid waste management.

Developmental work under this Class of Action has been undertaken by the Infrastructure Agencies Working Group (IAWG). The Group includes representatives from Main Roads WA, Water Corporation, Western Power, the Public Transport Authority, Environmental Protection Authority and the Departments of the Premier and Cabinet, Transport, Planning, Water, and Lands.

The appropriate providers will undertake implementation and management of infrastructure:

- Public Transport Authority (PTA) (heavy and light rail and bus infrastructure).
- Main Roads Western Australia (Main Roads) (Primary Regional Roads, also known as 'red' roads in regional planning schemes).
- Local Government Authorities (Other Regional Roads also known as 'blue' roads in regional planning schemes).
- Western Power (electricity infrastructure)
- Water Corporation as the major water service provider (water infrastructure).

The WAPC also plays a key role in governing the location and alignment of infrastructure assets through its administration of the *Planning and Development Act 2005* (P&D Act). Similarly, where Crown land is involved, the Department of Lands may be called upon to facilitate appropriate tenure to secure infrastructure under the *Land Administration Act 1997* (LA Act), whilst also administering land use within the Dampier-Bunbury Natural Gas Pipeline (DBNGP) corridor, under the Dampier-Bunbury Pipeline Act 1997, and on behalf of the DBNGP Land Access Minister.

The spatial mapping of infrastructure corridors undertaken by the IAWG is the basis for the indicative locations and alignments of infrastructure shown in this Action Plan (see Section 3) that are currently proposed under the Infrastructure Class of Action. It is important to note that the final location and alignment of infrastructure is subject to a future process of refinement through detailed planning and design of individual pieces of infrastructure. However, in undertaking the infrastructure mapping, the IAWG has been guided by the principles of avoid, minimise, mitigate, offset, with the highest priority being given to avoidance. The IAWG has sought to identify opportunities for co-location, sharing of infrastructure corridors and avoidance of areas of environmental significance.

2.1 CO-LOCATION

Co-location of infrastructure involves placing different types of compatible infrastructure in the same area or corridor. Co-location mainly refers to linear infrastructure corridors, although the term can also apply to site-based infrastructure such as water treatment plants and electricity sub-stations. Examples of co-location in Perth include the Joondalup and Mandurah railways, located largely within the Mitchell and Kwinana Freeways respectively. There are many other examples of co-location and sharing of corridors in the Perth-Peel region, with providers following the Utility Providers Code of Practice for assets located in road reserves.

For larger-scale infrastructure, each agency has tended to plan and operate infrastructure corridors for its own purposes. Sharing has occurred, but on an informal basis between agencies, in the absence of an overall Government policy framework. In some cases, co-operation has been hampered by legislation which, at the time of drafting, did not envisage an across-agency approach to the many regulatory, governance and operational issues that arise when co-location is considered.

Infrastructure co-location offers a range of potential benefits, including:

- reduced planning costs for infrastructure providers;
- opportunities to have joint agency submissions for planning approval;
- opportunities to share technical data during planning studies;
- reduced environmental and social impacts with greater financial and organisational capacity to provide management and mitigation measures;
- reduced impacts on private property owners and the wider community;
- preservation of more land for other community benefits; and
- shared maintenance costs.

The Strategic Assessment has worked with relevant State transport and utilities agencies in exploring a more coordinated and integrated approach to infrastructure planning and implementation in order to minimise the environmental and other impacts from infrastructure development and to create efficiencies in the use of Government resources.

The IAWG has reviewed existing co-location processes and opportunities to share infrastructure corridors. Three typical arrangements for the sharing of corridors include:

- the current process, where there are multiple separate access arrangements under a range of tenures, with limited coordination amongst providers;
- multiple parallel reservations, with separate parallel alignments managed and maintained by individual asset providers; and
- fully integrated shared corridors, with a single reservation shared by providers and an independent or central management/coordinating body.

A more structured approach to co-location and the planning, governance and sharing of corridors and sites raises a range of complex issues. Scoping these in the context of technical, operational and safety considerations is a first step towards achieving a more co-ordinated and efficient approach to infrastructure planning and implementation.

As part of this process, the IAWG has developed a matrix (Figure 2.) showing levels of co-location compatibility between the major infrastructure assets. While technical and operational requirements have informed the matrix, there are three guiding principles that need to underpin decisions about levels of compatibility between, and co-location of, infrastructure assets. These are:

- public safety;
- employee safety; and
- public disruption.

The matrix takes into account incompatibilities between various types of infrastructure, such as current induction due to proximity of steel water pipes and power lines. Safety to both staff and the public must be a prime consideration in identifying whether assets can be co-located. For example, the matrix acknowledges the potential dangers of co-locating freeways with water and wastewater ferrous pipes under pressure, because of safety issues and difficulty of access for construction and for maintenance and repairs during peak periods.

Public disruption has also been a major consideration within this process. Where there would be significant public disruption for maintenance, or major disruption if failure of an asset were to occur, it was deemed not suitable for assets to be co-located.

It should be noted that where co-location is not economically feasible (due to the high cost of mitigation), or desirable (due to safety concerns or public disruption), there can still be significant benefit gained from locating infrastructure in adjacent, or parallel alignments.

Co-location is strongly encouraged in the implementation of the Infrastructure Class of Action (see Section 4).

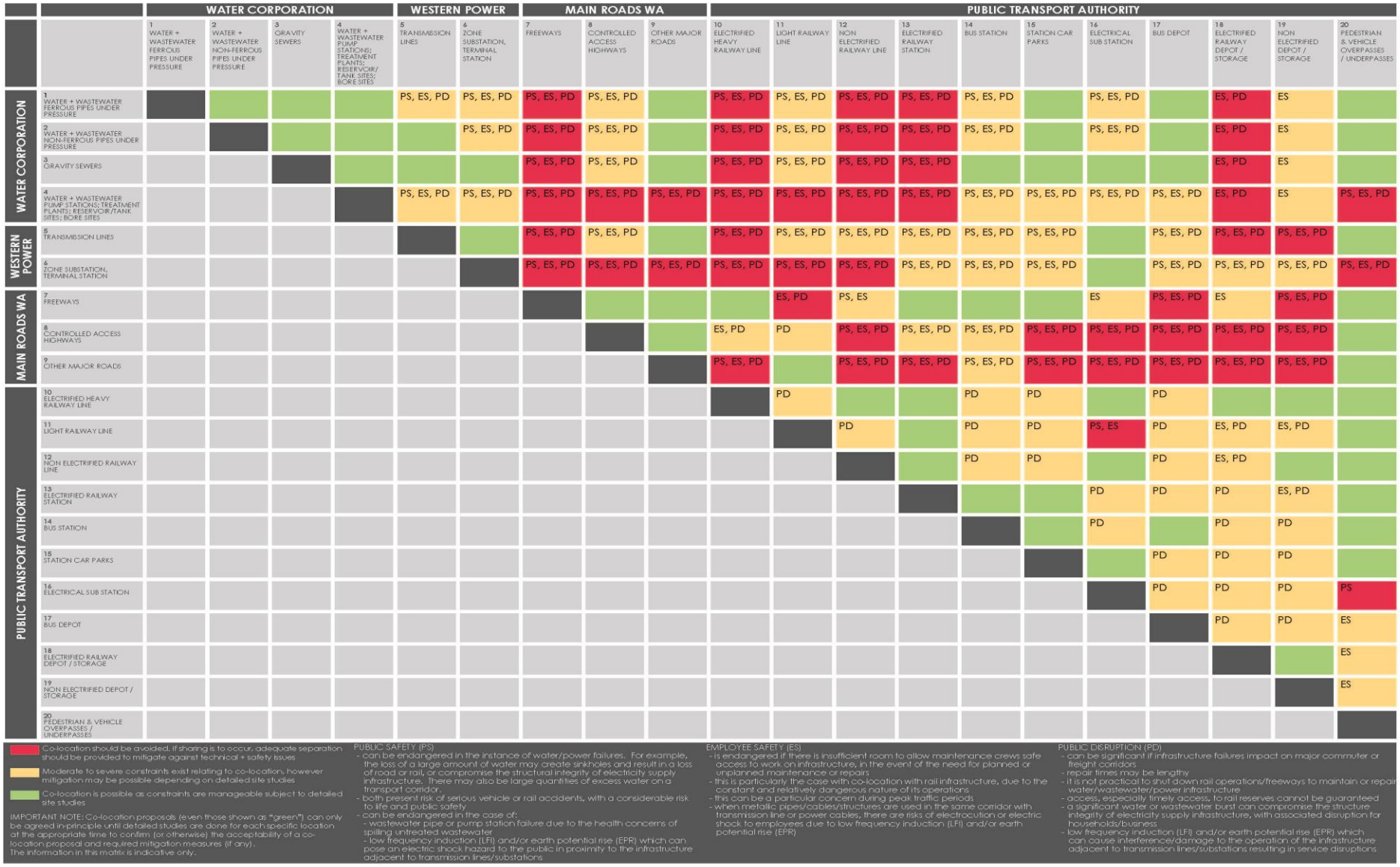


Figure 2: Co-location matrix

2.2 AVOIDANCE OF IMPACTS

Development of the Strategic Conservation Plan has offered the opportunity to undertake significant avoidance of impacts to Commonwealth and State environmental values, including Bush Forever sites and Peel Regionally Significant Natural Areas. Planning at the scale of the Strategic Assessment has enabled and will continue to provide for holistic consideration of avoidance measures in the context of the overall landscape and regional values. This is often not practical through a site by site development process at the local scale.

There are three key components to avoidance:
1. avoidance through the planning phase for the Infrastructure Class of Action;
2. avoidance through the impact assessment phase; and
3. ongoing avoidance during the implementation of the Strategic Conservation Plan and action plans.

A master planning process has enabled infrastructure agencies to identify opportunities to share corridors and avoid areas of environmental significance

Prior to this process, the OEPA identified for particular attention, the most significant intersects between the agencies' infrastructure footprints and mapping of environmental values. The master planning resulted in a number of changes, such as a 330 kV transmission line corridor being relocated outside Brixton Street Wetlands (Bush Forever Site 387) and a 132 kV transmission line being relocated outside Ningana Bushland (Bush Forever Site 289).

A further example of avoiding impact on a Bush Forever site occurred where a Water Corporation water treatment plant was proposed to be developed in a Yanchep/Two Rocks Bush Forever site zoned public purpose in the Metropolitan Region Scheme (MRS). An outcome of the master planning process was the decision not to develop it and to co-locate the water treatment plant with a reservoir site to the north-east.

In another instance, bisecting a Bush Forever site was avoided through the re-location of Western Power's proposed substation site near Yanchep. It was agreed that the proposed substation be moved outside of the Bush Forever site, with a preference for it to be located near a possible future railway line and load centre. As such, the relocation of this asset contributed to a reduced environmental impact by infrastructure in the State and Commonwealth impact assessments.

The master planning also resulted in appropriate justification being provided for other intersects such as the location of a wastewater pipeline adjacent to an existing pipeline and cycle path through Bush Forever Site 346 (Henderson/Naval Base) and a proposed reservoir adjacent to the existing reservoir in Bush Forever Site 383 (Neerabup), which provides the necessary topography for this infrastructure.

Where co-location of assets was deemed not feasible, agencies were required to provide an explanation as to why. For example, some assets require particular elevation, and a Water Corporation reservoir was unable to be relocated due to the elevation required to provide adequate water pressure to development within the area.

Overall, infrastructure agencies have worked collaboratively, seeking co-location opportunities and promoting avoidance of environmental impacts by proposed infrastructure development.

2.3 FINALISATION OF INFRASTRUCTURE DESIGN AND LOCATION

The responsibility for implementing the Strategic Conservation Plan lies with the Western Australian Government. Implementation will be coordinated by an overarching Executive body, reporting to a select group of State Government Ministers. It will have responsibility for the implementation, review and revision of the action plans of the Strategic Conservation Plan.

The final location and alignment of infrastructure will generally be subject to a future process of refinement following detailed planning, design and ongoing review to further avoid and minimise impacts to environmental values, including MNES. For this reason, initially most proposed infrastructure is considered as 'requiring investigation' (refer section 4.2.1), and will be represented as 'amber' in future versions of this Action Plan.

Some Infrastructure projects will be considered 'able to proceed' and will be represented as 'green' in future versions of this Action Plan. These are projects which the Executive body is satisfied all reasonable and practicable measures have been considered to avoid and minimise impacts, and that can be developed consistent with the conservation and environmental objectives and commitments of the Strategic Conservation Plan and Action Plans F and G.

The related planning and approvals processes for infrastructure are described in Section 4.

3 Detailed description of the Infrastructure Class of Action

This Section provides an overview of the infrastructure that is covered by this Action Plan and summarises the foreseeable transport, power and water projects.

3.1 INFRASTRUCTURE OVERVIEW

Short description	The Strategic Conservation Plan provides for the designation, development and operation of transport, power and water infrastructure.
Key Characteristics	The Infrastructure Class of Action incorporates major transport and public utility infrastructure likely to be constructed or upgraded across the Perth and Peel regions to support an increase in population to 3.5 million. The development of infrastructure will occur in both greenfield and brownfield (already cleared) locations. The planning for this infrastructure is at various stages and the proposed infrastructure network is largely conceptual at this stage. Exact siting will depend on environmental, social, engineering and economic constraints identified during the detailed planning phases of each project. For this reason, this Action Plan incorporates the key planning and approvals framework the State will apply to deliver and manage the infrastructure, ensuring development is consistent with the conservation objectives of the Strategic Conservation Plan while supporting future growth in the regions. This Action Plan also includes some existing infrastructure upgrades that may involve expansion within existing reserves/corridors/sites or widening into areas adjacent to the existing infrastructure. The development and upgrade of infrastructure will require access for, and activities associated with, installing/building and operational inspection and maintenance of the infrastructure components. These will take place within a designated development footprint, being either defined by specific site dimensions or infrastructure corridor widths. The size of this development footprint and the required disturbance within the footprint varies for different infrastructure types and whether it is in an already developed area and/or a shared site/corridor. This Action Plan includes, but is not limited to the construction, upgrade and operation of the following infrastructure: **Transport** infrastructure, consisting of: o Passenger and freight heavy rail, including new stations, and road and pedestrian bridges to cross new rail. o Light passenger rail, including new stations and depots. o Major roads, including new and upgraded Primary Regional Roads (PRRs) and Other Regional Roads (ORRs); shared use footpaths and associated infrastructure such as drainage, bridges and tunnels. o Bus infrastructure, including new bus depots. Note, new bus lanes are incorporated within existing or new roads. o Inter modal terminals for transfer of freight, which depending on location, may be

	on industrial land. **Power** Infrastructure, consisting of: o High voltage (330 kV and 132 kV) transmission lines, including permanent access tracks and inspection and maintenance areas. o Substations, including provision for their buffers. o Terminals including provision for their buffers. **Water** infrastructure, consisting of: o Wastewater treatment plants (WWTP). o Treated wastewater disposal pipelines. o Major wastewater pump stations. o Wastewater pressure mains. o Large diameter gravity sewers. o Water recycling treatment plants o Recycled water pipelines. o Water treatment plants (WTP). o Water reservoirs and tanks. o Borefields and borefield collector mains. o Water trunk and distribution mains. Over the life of the Strategic Conservation Plan it can be expected that technology advancements and improved design may result in the introduction of different or alternative infrastructure elements to those described in this action plan. Refer to Appendices A, B and C for more details about projects.
Spatial Extent	The indicative locations and alignments of infrastructure are shown in Figure 3. The final location and alignment of infrastructure is subject to a future process of refinement following detailed planning and design to further avoid and minimise impacts to State and Commonwealth environmental values.

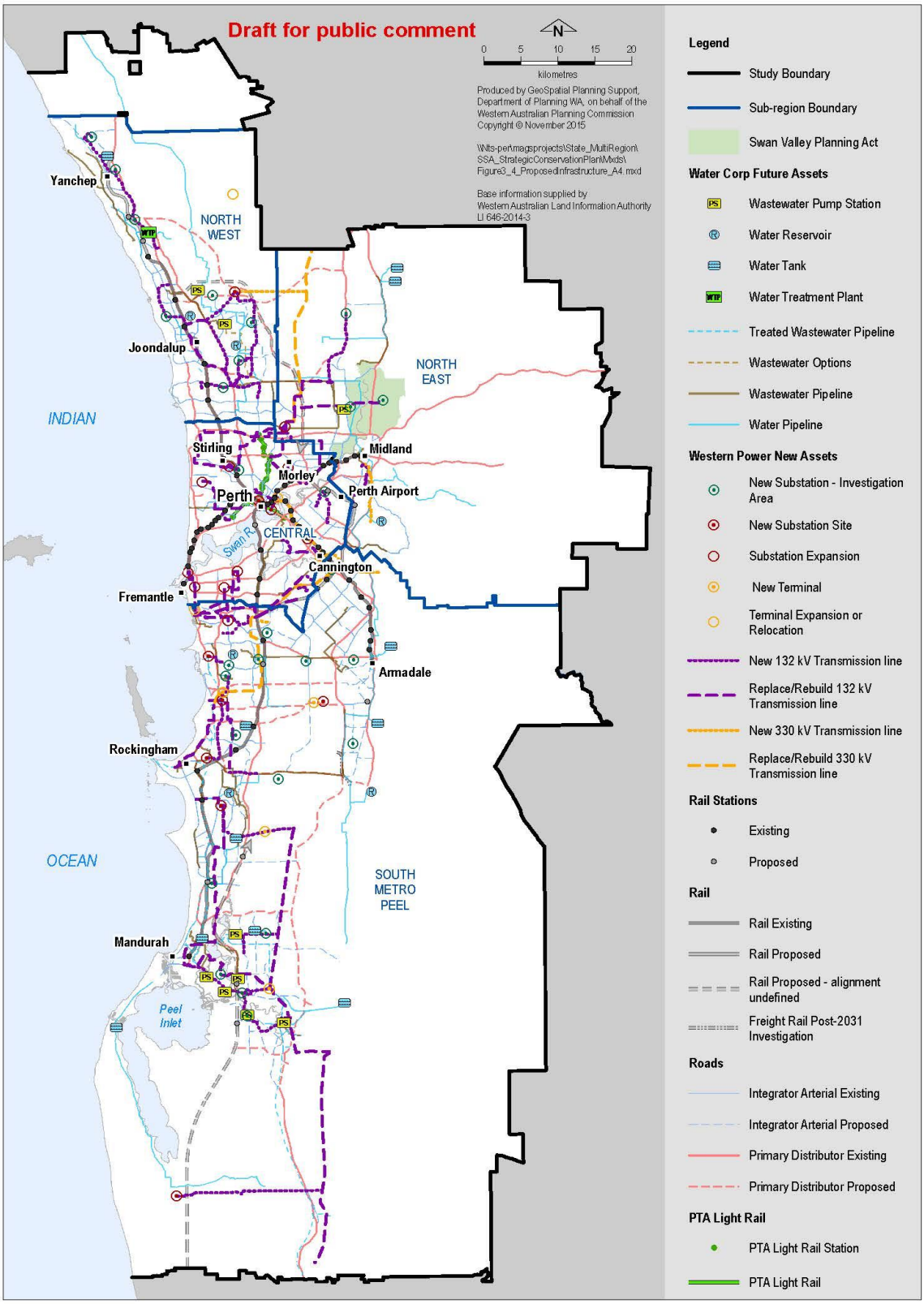


Figure 3: Proposed infrastructure – indicative locations and alignment

3.2 TRANSPORT

The major new transport infrastructure proposed to service the future metropolitan area includes heavy freight and passenger rail, light rail, public buses, and major roads.

3.2.1 Heavy rail

As the population of Perth is expected to reach 3.5 million around 2050, a significant investment in additional transport infrastructure is required. While there is the ability to utilise and improve capacity within the current rail network, continued urban growth has created demand beyond the system's current limits and future capacity.

To address this issue the Public Transport Authority is planning for the following expansions to the passenger rail network subject to all required approvals (refer to **Appendix A** for details):

- Extension of the Joondalup line from Butler to Yanchep.
- Extension of the Thornlie line to Cockburn Central.
- Construction of a new line – East Wanneroo Rail Link

Light rail infrastructure and bus priority lanes are also proposed to deal with future growth.

3.2.2 Light rail

Light Passenger Rail can be any rail system which is created to serve a small passenger load. Unlike heavy rail, it is intended as a way of creating a network, and connecting people throughout an area. The term light rail varies significantly with location and era, and is seen in varied forms around the world. Light rail can (but is not limited to) include sharing a road with other vehicles.

Light rail rarely has grade separations, and is more often seen running parallel to roads. While having rigid routes similar to heavy rail, the stopping patterns are more similar to that of a bus, stopping at stations with several roadside stops between. To account for the risks when interfacing with roads and pedestrians, slower speeds and more rigid manual controls are used.

MAX Light Rail

The proposed Perth MAX Light Rail Route encompasses two major transit corridors:

- Central Northern Corridor (CNC) – from Mirrabooka to the Perth city centre (13km); and
- Central Business District (CBD) corridor – from Victoria Park to Queen Elizabeth II Medical Centre (QEII MC) (9km).

Thirty initial light rail stops are proposed, with provision for four additional stops to be added in the future. These stops are at approximately 800 metre intervals providing access to major centres of population, employment and other services along the route.

A maintenance depot is required as part of the MAX Light Rail project and will need to allow for a number of operational requirements including:

- stabling, inspection and cleaning of light rail vehicles (LRVs);

- staff facilities and operators' offices;
- shunt siding and cripple siding (short, dead end tracks used for storing LRVs, to let other LRVs pass, or to temporarily stable vehicles requiring maintenance); and
- bogie lifting and storage areas.

Subject to further assessment, the preferred location of the depot site is on the eastern side of Mirrabooka Ave across from Polytechnic West Balga site. The site is 7.4 ha and would accommodate all stabling and maintenance facilities until 2031.

Refer to **Appendix A** for details.

3.2.3 Freight rail

Into the future, freight rail will continue to serve as a critical link in the movement of freight across the Metropolitan region and abroad. The freight rail is protected under the Metropolitan Region Scheme (MRS) through reservation which largely provides enough scope for systematic maintenance and routine upgrades. Where these upgrades are required, only minimal changes to the overall footprint of the rail will be experienced.

There are two long-term proposals for investigation. The first is the realignment of the freight rail from within the Midland town centre to a new route to the south. The proposed realignment is designed to remove segregation and impacts on existing and future development. The second is the realignment of the freight rail from within the proposed Mundijong urban cell to a new route to the west. The purpose of this realignment is to remove the segregation, level crossing issues and noise impacts of rail through the Mundijong urban cell.

Both of these projects are long term proposals for consideration depending on potential need and development pressure.

3.2.4 Public Buses

Current planning includes a new bus depot between the rail reserve and the airport at Jandakot, with further depots incorporated into rail developments. Karnup bus depot (at station) and depots at Alkimos (in Water Corporation land to the west of Alkimos Town Centre) and Yanchep (east of the train station) would all be developed as part of the associated rail developments that are proposed. Placement of the depots will include consideration of land use compatibility, noting that bus depots and railway stations are incompatible with Priority 1 (P1) and Priority 2 (P2) Public Drinking Water Source Areas. Other bus depots are planned for the region although specific detail on these is not yet available.

Any dedicated lanes or busways currently planned are within existing road reserves. No re-zonings are proposed for bus infrastructure at this time.

3.2.5 Major Roads

Roads are defined based on their administration arrangements and function. There are three major types of management arrangement and function:

- Primary Regional Road (PRRs): These are administered and managed by MRWA and include freeways and other primary distributors. These are the most important of the roads of regional significance in the planned road network, and are currently, or proposed to be declared under the *Main Roads Act 1930*.
- Other Regional Roads (ORRs): These are Local Government roads although are administered by the Department of Planning. These are roads of regional significance in the planned road network.
- Local Government Roads (LGRs): These are administered and managed by Local Governments. See Action Plan A for more information.

Existing and planned PRRs and ORRs, as well as LGRs that will in future be classified as either a PRR or ORR, have been included in this Infrastructure Class of Action. Detailed descriptions and future plans for PRRs and ORRs are provided in **Appendix A**.

Primary Regional Roads

The reservations required for the future expansion of the State Road Network (SRN) within the Perth and Peel regions have been protected as 'Primary Regional Roads' within the MRS and the Peel Region Scheme (PRS). The future expansion of the SRN will include (inter alia) widening/duplication of existing roads and bridges, upgrading of existing intersections including construction of grade-separated interchanges, and construction of new road sections including intersections, grade-separated interchanges, bridges and Principal Shared Paths.

Following the release of the *Perth and Peel@3.5 million* strategic land use planning documentation, the Transport Portfolio is in the process of preparing a Perth Transport Plan identifying the road infrastructure requirements to service the proposed development for a Perth and Peel regions population of 3.5 million. Additional PRRs and associated reservations that have already been identified as necessary to meet the transport needs of 3.5 million people are discussed below. Note that PRR reservations already exist for certain PRRs that will be extended in future, such as Mitchell Freeway and Perth-Adelaide National Highway.

Whiteman – Yanchep Highway

The Whiteman-Yanchep Highway (WYH) is a planned freeway-standard road linking Tonkin Highway with Mitchell Freeway at Pipidinny Road. This will be a major freight route, linking industrial areas within the North-West sub-region with Perth's main industrial areas, including Kewdale and Welshpool. The reservation required for the WYH has not been included in the MRS.

Perth - Darwin National Highway (Tonkin Highway to Muchea)

The Perth Darwin National Highway (Tonkin to Muchea), which is funded for construction, is a planned freeway-standard road which will link Tonkin Highway with Great Northern Highway / Brand Highway at Muchea. This highway will replace the section of Great Northern Highway to Muchea as the primary freight link between the Perth metropolitan area and the north west of the State. The reservation required for the southern section between Tonkin Highway and Ellenbrook has not been included in the MRS.

Tonkin Highway Southern Extension including the Pinjarra Bypass

The current PRR reservation for the Tonkin Highway extension terminates at Mundijong Road. The need for a further southern extension to Pinjarra, bypassing Pinjarra to the south and linking back to

Forrest Highway at Greenlands Road has been identified. This southern extension will service planned development in the Peel region, provide additional north-south capacity to reduce demand on Kwinana Freeway and provide an alternative to Kwinana Freeway for regional trips between Perth and areas to the south. Detailed planning for the route is yet to be undertaken and the reservation has not been included in the MRS.

Fremantle / Rockingham Controlled Access Highway

The Fremantle Rockingham Controlled Access Highway (FRCAH) is a planned regionally important north-south transport route. The reservation was originally gazetted in the MRS in 1981, terminating at Ennis Avenue in Rockingham. More recent planning has identified the need to connect the FRCAH to Mundijong Road at Kwinana Freeway, providing a continuous freight route between the Fremantle Inner Harbour, Kwinana industrial area, Outer Harbour and the marine facilities in the Henderson and Kwinana Freeway to the south. This section of the FRCAH has not yet been included in the MRS.

Rowley Road Extension

Rowley Road extends from Kwinana Freeway to Tonkin Highway and is currently a local road under local government control. In future, Rowley Road will be the principal freight access route to the proposed new container port facilities in Kwinana. The road will be extended to the west from its existing terminus at Kwinana Freeway to Latitude 32 Industry Zone and then to the coast, connecting with the northern end of the offshore island port via a bridge.

Southern Link Road (SLR)

The Southern Link Road concept connects the Brookton, Albany and South Western Highways with Tonkin Highway at Mundijong Road. The link road will provide improved access for regional exporters travelling from the Great Southern and the Central Wheatbelt regions to the metropolitan area, particularly to the new container port facilities in the Outer Harbour as well as to the broader Western Trade Coast area. An alignment for the Southern Link Road has not been resolved and no reservation is protected in the MRS.

Future Additional River Crossings

Future additional river crossings may be required to service the proposed development planned for Perth and Peel over the next 40 years. This is subject to further planning.

Other Regional Roads

Other Regional Roads (ORR) are shown coloured blue on region schemes and provide the second tier of the regional road network to Primary Regional Roads (coloured red). A number of ORRs that could potentially be converted to Primary Regional Roads are currently under review by Main Roads.

ORRs would typically be categorised as Integrator Arterial (IA) type “A” or “B” roads under the Liveable Neighbourhoods (LN) movement network classification that corresponds to District Distributor (DD) “A” or “B” under MRWA’s functional road hierarchy. It should be noted that not all regional roads that are designated and function as IAs (or DDs) are or should be reserved as ORRs in region schemes.

ORRs should attract regional through traffic away from local roads and in particular should provide a route that reduces the need for cut-through on residential streets. ‘Through traffic’ is defined as non-stopping traffic other than at intersections and pedestrian crossings.

Traffic volumes on ORRs would normally be expected to be higher than volumes on the highest level local roads (Local distributors). The level of traffic volumes alone is not justification for selection of a regional road to be reserved as an ORR in a region scheme. It is the type of functions of the road that primarily needs to be considered.

Not all regional roads that function as Integrator Arterials (or District Distributors) in the metropolitan regional road network are reserved as ORRs in region schemes. When considering whether a regional road (IAs or DDs) should be considered as an Other Regional Road in region schemes it is concluded that the following general criteria should be met:

- The road should provide a major link to regional facilities, such as town centres, major activity centres etc.
- Daily traffic volumes should be greater than 7,000 vehicles per day and should comprise a higher level of regional through traffic movement (more than 50% of the traffic flow, being trips of a distance greater than 3 to 5km).
- The road should link to other regional roads identified in the region schemes (PRRs or ORRs).
- Adjacent land uses should be predominantly commercial in nature. It is undesirable to route regional traffic through residential land uses.
- Intersections should be controlled where appropriate and there is a need to control access along the ORR routes.

There is a need to reserve land to cater for future road improvements and increased demand from new land use developments within the vicinity of the route. Refer *WAPC SPP 3.6 Development contributions for infrastructure, 2009*, which sets out the principles and considerations that apply to development contributions for the provision of infrastructure in new and established urban areas.

Maps indicating proposed roads infrastructure for the Perth-Peel regions are contained in **Appendix A**.

3.3 ELECTRICITY

In this Action Plan, Western Power has identified its electrical transmission[1] infrastructure requirements to support the proposed development presented in the Department of Planning's draft North-west, North-east, South Metro-Peel and Central Sub-regional Planning Frameworks and has collaborated with the DoP to develop a Spatial Plan identifying these requirements.

Western Power's Transmission Network Development Plan (TNDP) and Long-term Network Development Plans (LNDPs) provide the strategic vision, over a 25 year horizon, required to ensure the efficient development of various load areas on the network. Western Power is currently preparing and reviewing its TNDP and LNDPs for transmission infrastructure contained in the Perth and Peel regions and across its entire network.

[1] Western Power defines transmission voltage as 66,000 volts (66 kV) and above.

Western Power's future network augmentation plans are fundamentally based around an increased utilisation of the 330 kV bulk transmission network, thus allowing for high levels of electricity transmission over the long distances required and freeing some capacity on the existing 132 kV transmission network through network augmentation. In planning the network, key considerations include:

- maintaining quality of supply to the appropriate standard;
- catering adequately for future growth to facilitate economic development, where it is economically prudent to do so;
- the responsible management of environmental impacts through formal approval processes and adherence to internal and external environmental management requirements; and
- community and stakeholder expectations, impacts and related plans.

3.3.1 Western Power's proposed electricity infrastructure

Network assets proposed for each of the sub-regional planning frameworks are presented in **Appendix B**. Importantly, this information is indicative and subject to change, given the long planning timeframes.

Changes to the way the network is developed are driven by a number of factors including new customers and customer funded projects; changing generation locations; policy change; changing land use and emerging and new technologies. There is also a continuing need to demonstrate to customers, stakeholders, (such as the Economic Regulation Authority and possibly the Australian Energy Regulator in the future) and communities impacted by new/upgraded infrastructure that Western Power has fully considered a range of options to meet electricity demand.

As part of future expansion of the transmission network, new line routes, substations and terminals will be required. Line routes include the establishment of a corridor to support the transmission lines and associated:

- towers, poles and the associated foundations;
- conductors and insulators;
- access tracks;
- pole and tower site inspection and maintenance areas;
- electrical safety and fire safety clearance standards;
- brake/winch sites approximately every 10km; and
- other ancillary infrastructure such as washdown bays and communication infrastructure sites.

Corridor design is essentially influenced by required span lengths, number of circuits, configuration of circuits, structure height, conducted types and insulator type. Substations and terminals provide multiple functions, including transformation of electricity from high to low voltage or vice versa, or provision of a switching point for a number of transmission lines. Both corridors and site requirements are fundamentally influenced by technical and economic considerations, and also by environmental and community impacts as part of an options analysis process.

Higher voltage transmission line infrastructure is typically located within designated easements across a variety of tenure and zonings under the Metropolitan and Peel Region Schemes.

In some cases, Western Power owns land that has been earmarked as a possible future site for a substation. Over time, the suitability of these locations may change, and in order to best meet the customer needs in an economically prudent manner, Western Power may be required to seek alternative sites.

Further detail on short, medium and long-term proposed transmission infrastructure for the four sub-regions that comprise the Strategic Assessment is provided in **Appendix B.**

The level of certainty for the asset proposals relates to, among other factors, the timeframes identified for each proposal, with certainty reducing as the timeframe extends. While the asset proposals identified will be required as the load and transfer needs eventuate, the timing of the proposals is still influenced by population growth, peak demand, etc. Further context regarding asset proposal timeframes and their certainty is as follows:

- **0-3 years - High Certainty:** The Network Investment Plan is refreshed annually which allocates funding from State Treasury across its short term forecast spend to each individual project based upon priority.
- **3-10 years – Moderate Certainty:** Ten Year Transmission Network Development Plan (TNDP) and Network Management Plan which inform the Western Power Network Investment Plan and ERA Access Arrangement submission.
- **10-25 years – Low Certainty:** Long Term Network Development Plans (LNDPs) are primarily to support major project funding submissions to the ERA and State Treasury, also to inform the preparation and update of the TNDP. Some asset proposals identified in this timeframe are estimates based upon Department of Planning (DoP) draft urban expansion/population forecast information. LNDPs are subject to ongoing review.
- **25+ years – Very Low Certainty:** Estimates based upon DoP urban expansion/population forecast information. These asset proposals are highly uncertain and will be progressively refined throughout the sub-regional planning frameworks process and its revisions over time as more detail can be factored into Western Power's forecasting methodologies.

The scope, timing, capacity, approval and location of the assets proposed, can be subject to change due to influence from external dependencies. These asset proposals as well as any associated land acquisition and design are influenced by, but not limited to:

- definition of proposed regional and district transport corridors and infill levels and urban interface to electricity infrastructure;
- demand for electricity increasing from expansion and consolidation of urban development; and consequent asset upgrades or development of new lines and/or substations;
- location of generation;
- greater generation within certain areas (especially as forecast within the Mid-West) then transmitting to and through the metropolitan area, requiring upgrades to existing assets and development of new assets to cater for this increased electrical capacity;
- asset age and condition requiring asset replacement or new corridor/site selection if no longer considered optimal location;
- energy policy and regulation and non-network developments;

- opportunities arising for shared infrastructure corridors and sites with other infrastructure providers and major public/private projects;
- conflicts between competing land use or co-location of utilities and public services;
- environment protection (including water resources such as public drinking water source areas), heritage and land access constraints;
- community and stakeholder issues as determined through project-specific investigations and proactive engagement; and
- advances and uptake of emerging technologies including improved battery energy storage, electric cars, increased efficiencies in domestic and commercial power use and continued uptake and larger scale development of distributed generation such as solar photovoltaic cells.

The exact electrical transmission corridors and substation sites of most of the proposed assets are not yet defined. The corridor and site selection process is generally undertaken when projects move into the current Access Arrangement period (i.e. 0-5 years), but will depend, among other things, on the nature of the project.

3.4 **WATER**

The Department of Water is responsible for protecting public drinking water source areas (PDWSAs), which supply drinking water to people in the Perth and Peel regions. These sources, including Gnangara and Jandakot groundwater protection areas, need to be protected in accordance with the Australian Drinking Water Guidelines, WA water legislation and bylaws, and relevant state planning policies.

The Department of Water assigns priority areas (priority 1, 2 or 3) and protection zones within PDWSAs. For groundwater sources, wellhead protection zones surround bores that supply drinking water, with a radius of 500 m in priority 1 areas, and a radius of 300 m in priority 2 and 3 areas. They are protected under the *Metropolitan Water Supply, Sewerage, and Drainage By-laws 1981*. These wellhead protection zones not only protect the drinking water source from immediate contamination threats, but also assist to protect the Water Corporation's infrastructure. The Department of Water and Water Corporation have a shared responsibility to protect drinking water quality in PDWSAs.

Water Corporation is committed to providing reliable and cost-effective water and wastewater services to its current and future customers. To address the challenges of a drying climate, increasing population and minimising environmental impact, the Water Corporation has developed long term *Water Forever* plans to manage supply and demand. *Water Forever* provides a portfolio of options to reduce water use, increase water recycling and develop new sources.

Water Forever has guided the planning for water and wastewater services in the Perth and Peel regions for the future. This ensures that assets are expanded in a sustainable way which minimises costs to the Western Australian community while achieving high environmental, social and heritage outcomes. These essential water services are developed to provide a high level of reliability to minimise the potential for service disruption.

The asset types included in this action are:

- wastewater treatment plants;
- treated wastewater disposal pipelines;

- major wastewater pump stations;
- wastewater pressure mains;
- large diameter gravity sewers;
- water recycling treatment plants;
- recycled water pipelines;
- water treatment plants;
- water reservoirs and tanks;
- borefields and borefield collector mains; and
- water trunk and distribution mains.

The total development area for this infrastructure is 2,500ha of which approximately 30% is within existing/already developed urban areas.

This action does not include the smaller capacity assets provided as part of the normal land servicing associated with subdivision. This includes:

- smaller diameter gravity sewers (reticulation sewers, branch sewers, connecting sewers);
- smaller capacity wastewater pump stations; and
- smaller diameter water mains (reticulation and smaller diameter distribution mains).

Water Corporation assets included in this action will be located in areas with varying land tenures. Asset types which will usually be located on land owned by Water Corporation include:

- **Wastewater treatment plants (WWTP)**: a WWTP treats the wastewater produced by homes and businesses conveyed from the sewerage system. Wastewater treatment is a series of processes that remove the pollutant material from wastewater, to the required level. Wastewater is treated to a level suitable for recycling or to be returned to the environment generally via an ocean outfall. Wherever possible, waste water will be reused and recycled for other local beneficial uses, consistent with relevant policies.
- **Wastewater pump stations:** a wastewater pump station pumps wastewater from a collection point to a WWTP for treatment. The pump stations can include a number of pipes and pumps and tanks to store wastewater in the event of a power failure.
- **Water recycling plants:** water recycling plants are generally located at or close to a WWTP. The plants receive treated wastewater and process the water to use in recycled water schemes (e.g. irrigation of public open space, industrial processes).
- **Water treatment plants (WTPs):** WTPs produce drinking water for public water supply. This could include treating surface water from dams, groundwater or desalinating seawater. Seawater desalination uses reverse osmosis to remove salts and other contaminants from the seawater to make it suitable for use as drinking water. Groundwater and surface water treatment plants could include some or all of the following processes:
    - aeration in tanks to aid in iron removal;
    - clarification in tanks to remove organics and make the water less coloured;
    - filtration either in cylindrical pressure filters or through sand filters; and

  - disinfection with chlorine.
- **Water reservoirs and tanks:** Water reservoirs and tanks are man-made structures used for storing water. Tanks and reservoirs are often located at points of high elevation to provide gravity flows, reducing reliance on pumping.

All other assets listed in this action could be located on land with a range of different tenure including:

- land owned by Water Corporation, generally reserved in the regional scheme as 'public purpose';
- easements over private land; or
- road reserves.

Some of the major assets included in this action are:

- Woodman Point WWTP transfer main and ocean outfall duplication;
- Subiaco WWTP ocean outfall duplication;
- Maida Vale main sewer;
- Ellenbrook wastewater pressure main;
- Nambeelup wastewater treatment/recycling plant;
- Perth Groundwater Replenishment Stage 2 (from Beenyup WWTP);
- Subiaco Groundwater Replenishment (Subiaco WWTP);
- Eglinton WTP and borefield;
- Yanchep/Two Rocks WTP and borefield; and
- Yanchep/Two Rocks reservoir;

A full list of current planned development is detailed in **Appendix C**.

4 Implementation framework

This Section describes the implementation framework for delivering infrastructure projects in a manner that is consistent with the outcomes and objectives of the Strategic Conservation Plan. It includes:

- a description of the relevant legislation and policy;
- details about the planning and approval processes that will apply to infrastructure;
- an overview of the relationship of this Action Plan with the implementation of other Action Plans; and
- a summary of funding arrangements for the Strategic Conservation Plan.

4.1 LEGISLATION AND POLICY

There are many government and private organisations involved in the planning and delivery of infrastructure. Their activity is governed by numerous pieces of legislation which interact in complex ways and are administered by infrastructure and other agencies. Under this framework, many agencies are empowered to acquire land for their particular infrastructure assets. In addition there are State Planning Policies, Treasury's Strategic Asset Management Framework, guidance statements, codes of practice and agencies' own policies which impact on land acquisition and the planning and use of infrastructure corridors.

The Western Australian Government is engaging with infrastructure agencies to examine how current use, planning and development of corridors can be done more cooperatively and efficiently to overcome the range of issues that form a constant backdrop to the present informal sharing and co-location process. Under the Strategic Assessment, an initial scoping of issues has been done as the first stage of developing a Government policy to support a more co-ordinated, collaborative and efficient approach to infrastructure planning and implementation.

Under the Strategic Assessment, it is intended that the primary legislative mechanisms for managing environmental impacts for the Infrastructure Class of Action are the *Planning and Development Act* 2005, and Part V Division 2 of the *Environmental Protection Act 1986* (EP Act). The former is administered by the WAPC and governs infrastructure asset locations and alignments; the latter regulates clearing of native vegetation, and is administered by the Department of Environment Regulation (DER).

For infrastructure proposals, some streamlining of approvals processes will be possible through the early consideration of environmental matters and cumulative impacts in the development of the infrastructure spatial footprint and the Strategic Conservation Plan and in the provision of the EPA's strategic advice under section 16(e) of the EP Act. It is proposed that the EPA will make a judgement about the acceptability of the future development of the Perth and Peel regions in its final section 16(e) advice and will recognise the potential for other regulatory processes to manage environmental impacts to meet the EPA's environmental objectives.

To ensure that the environmental outcomes are achieved under the Strategic Assessment, in some cases, proposals may still need to be assessed by the EPA under Part IV of the EP Act where the infrastructure development cannot be designed to meet the requirements of the Strategic Conservation Plan.

In addition, some infrastructure contemplated under Action Plan C may require tenure under the LA Act to secure it. In practice, the associated (Crown) land "assembly" will be the responsibility of the Department of Lands (DoL).

Legislation that has a significant impact on the planning, establishment and management of infrastructure in WA includes the following:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Land Administration Act 1997*.
- *Western Australian Land Authority Act 1992*.
- *Conservation and Land Management Act 1984*.
- *Public Works Act 1902*.
- *Metropolitan Water Supply, Sewerage, and Drainage Act 1909*

4.2 PLANNING AND APPROVAL PROCESSES

4.2.1 Use of Action Plan C to determine planning and approval requirements

There will be increased certainty for environmental approvals for infrastructure projects that are proposed in Action Plan C and are consistent with the conservation and environmental objectives of the Strategic Conservation Plan, and related Action Plans F and G (see Section 4.3). This will generally require a further process of review and refinement of the proposed location and alignment of these projects to provide for the avoidance or minimisation of impacts to environmental values, including MNES. Infrastructure projects will be categorised as either:

1. 'able to proceed' (GREEN), having demonstrated:
    - that all reasonable and practicable means have been taken to avoid or minimise impacts on a regional scale;
    - local avoidance and mitigation efforts can be applied through the environmental approvals process;
    - the scale and significance of impacts are acceptable and will not affect other infrastructure priorities; and
    - it is able to be implemented consistent with conservation objectives and commitments; or

2. 'requiring investigation' (AMBER) meaning it:
    - has the potential to significantly affect MNES or State values;
    - is conceptual and needs further consideration at the appropriate time in the future, for example prior to creation of a reserve or easement; and
    - is to be subject to a further site/alignment review to ensure conservation and environmental objectives are met.

Representation of infrastructure projects as 'green' or 'amber' will be included in future versions of this Action Plan.

In developing Action Plan C, infrastructure agencies have gone through an initial process of evaluation to identify indicative sites and alignments for proposed infrastructure (see Section 2). This has included efforts to avoid MNES and State values. As a result, there are proposed infrastructure projects that already avoid or are likely to have acceptable impacts to MNES or State values and can clearly be implemented consistent with the objectives of the Strategic Conservation Plan and commitments of Action Plans F and G (see Section 4.3). These are indicatively considered 'able to proceed', subject to required approvals (Section 4.2.3), and will be shown as green in the maps in Appendices A – C. They do not require any further review of siting or alignments unless for other than environmental reasons. All other proposed infrastructure projects in Action Plan C are considered as 'requiring investigation' and will be shown as amber in Appendices A – C.

An example of the further investigation required for projects deemed 'amber' is the need to include consideration of land use compatibilities particularly in relation to Public Drinking Water Source Areas. This requires having regard to policies and guidelines under the State's drinking water source protection policy framework.

Infrastructure that has the potential to affect the MNES or State values indicated in Table 1, which have specific commitments in Action Plans F and G to avoid and/or minimise impact, would be considered, at least initially, to require further investigation.

Table 1: MNES and State factors to be prioritised for avoidance and minimisation of impacts

MNES (and relevant Action Plan F commitment)	**Details**	**Data source**
Caladenia huegelii Grand Spider Orchid (49) *Conospermum undulatum* Wavy-leaved Smokebush (55) *Synaphea sp. Pinjarra* (R. Davis 6578) (Club-leafed synaphea) *Synaphea stenoloba* Dwellingup Synaphea (72)	Known populations	WA Herbarium and Parks & Wildlife Threatened species database
Assemblages of plants and invertebrate animals of tumulus (organic mound) springs of the Swan Coastal Plain (9) Claypans of the Swan Coastal Plain (12) *Corymbia calophylla - Kingia australis* woodlands on heavy soils of the Swan Coastal Plain (15) *Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain (18) Sedgelands in Holocene dune swales of the southern Swan Coastal Plain (21) Shrublands and Woodlands of the eastern Swan Coastal Plain (24) Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain (27)	Known occurrences	Parks & Wildlife Threatened ecological communities database
Carnaby's Cockatoo	Known Carnaby's Cockatoo breeding sites	Parks & Wildlife Carnaby's Cockatoo habitat mapping
State values (and relevant Action Plan G commitment)		
Austrostipa jacobsiana (22) *Eremophila glabra* subsp. *chlorella* (23)	Known populations	WA Herbarium and Parks & Wildlife Threatened species

MNES (and relevant Action Plan F commitment)	Details	Data source
Synaphea sp. Pinjarra Plain (24) *Synaphea* sp. Serpentine (25)		database
Banksia attenuata and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (15) *Banksia attenuata* woodland over species rich dense shrublands (16) *Melaleuca huegelii - Melaleuca acerosa* (currently *M. systena*) shrublands on limestone ridges (17) *Eucalyptus calophylla - Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (18) *Banksia ilicifolia* woodlands (20) *Casuarina obesa* association (P2) vegetation community (21)	Known occurrences	Parks & Wildlife Threatened ecological communities database
Conservation Category Wetlands (CCWs)	CCW and buffer as determined by Wetland Buffer Policy, except those with no reasonable or practicable alternative	Geomorphic Wetlands Database
Bush Forever sites	Bush Forever sites except those with no reasonable or practicable alternative	DoP Bush Forever site boundary data
Vegetation complexes < 30% remaining	Remnant vegetation representative of Heddle complexes < 30% remaining	Remnant vegetation mapping and Heddle vegetation complex data
Public Drinking Water Source Areas (PDWSAs)		GIS theme PDWSA – DoW

For those infrastructure projects that are considered as 'able to proceed, the required planning and approvals processes will be streamlined (Section 4.2.3).

The following sections describe the internal planning and regulatory approval processes to be applied to infrastructure developments implemented under the Strategic Conservation Plan.

4.2.2 Internal impact assessment and planning processes to review infrastructure siting and alignments

Each infrastructure agency has its own internal planning processes to review the appropriateness of proposed sites or alignments of its respective infrastructure. The common components of these processes are evaluation of alternatives and selection of preferred sites or alignments based on

consideration of numerous factors including cost, efficiency, servicing, engineering, and social, economic and environmental costs and benefits. Infrastructure agencies are to integrate consideration of the conservation and environmental objectives of the Strategic Conservation Plan and commitments to avoid and minimise impacts to MNES and State values (as per Action Plans F and G) into their planning processes. Infrastructure agencies must consider all reasonable and practicable measures to avoid all MNES and State values. These measures include consideration of co-location opportunities, such as shared corridors with other existing or future planned infrastructure, and considering alternative sites and alignments.

Internal planning and review processes for infrastructure would typically consist of the following phases:

1. Identification of the need and timing for infrastructure.
2. Confirmation that infrastructure is proposed in Action Plan C (shown on maps in Appendices A, B and C) or that it replaces or is equivalent to an infrastructure development proposed in Action Plan C.
3. On-ground biological surveys (if not already available) of the preferred site/alignment and/or associated options to clarify presence and extent of MNES and State environmental values.
4. Site/alignment review and evaluation:
    - confirm appropriateness of site/alignment based on current information;
    - identify new or further co-location/shared corridor alignments;
    - review ability to avoid and minimise impacts to known MNES and State values with reference to Action Plan C avoidance criteria; and
    - stakeholder/agency consultation (depending on scale of project).

Documentation reporting the above process and outcomes would be required for submission to the Executive body (see Section 2.3) if the infrastructure agency determines that a site or alignment different to that currently proposed in Action Plan C should be pursued and/or if the infrastructure project is currently indicated in Action Plan C as ‘requiring investigation’. This process is described in Section 4.2.3.

The Executive body will prepare guidance for infrastructure agencies for evaluating the consistency of the proposed infrastructure with the Strategic Conservation Plan. This will be provided to help determine:

- the appropriateness of proposed infrastructure projects;
- consistency with the Strategic Conservation Plan; and
- the avoidance, mitigation and offset measures that are required to be considered in the planning, design and construction of infrastructure covered by Government approvals and endorsements of the Strategic Conservation Plan.

The assessment of the final outcome needs to establish that the infrastructure project is consistent with the Strategic Conservation Plan. It is critical that the project is consistent with the outcomes and objectives for MNES and State factors that are presented in Chapter 4 of the Strategic Conservation Plan.

The following is an indicative outline of such guidance:

To make a decision as to whether the proposed infrastructure is consistent with the Strategic Conservation Plan, the following questions should be considered:

1. Has every effort been made to co-locate the project with other current or proposed infrastructure projects?
2. Are there MNES or State factors in the vicinity of the proposed infrastructure project (noting that the project area is broader than the immediate location where the project is undertaken; consider also whether there are any MNES or State environmental values adjacent to the immediate location that may potentially be impacted)?
3. Considering the proposed infrastructure project at its broadest scope (that is, considering all stages and components of the project and all related activities), is there potential for direct or indirect impacts on MNES or State environmental values?
4. Has every reasonable and practicable option been considered to avoid impacts to MNES or State environmental values (e.g. micro-alignment or design alterations)?
5. Can appropriate mitigation measures be applied in the design and in the preparation for construction to manage potential indirect impacts (e.g. controls on water and sediment run-off, dust control measures, noise abatement, fauna clearance etc)?
6. Following the application of avoidance and mitigation measures, are there residual impacts from the project on MNES or State environmental values?
7. If there are residual impacts that cannot be avoided or mitigated, are they within the extent of that already anticipated under the Strategic Conservation Plan and have appropriate offsets been calculated and applied in accordance with Action Plan H?
8. Is the final outcome of the project acceptable (i.e. delivers on the outcomes, objectives and commitments of the Strategic Conservation Plan)?

Infrastructure agencies should document the information used and assessments undertaken and provide this material as part of internal reporting of planning processes and in its application for approval of infrastructure under the Strategic Conservation Plan (see Section 4.2.3). This material may also form part of the regular reporting to the Commonwealth Government.

4.2.3 Planning and regulatory processes for approval of infrastructure

The Strategic Conservation Plan proposes a streamlined approval process for classes of action. Under that Plan, infrastructure developments will not be required to be referred to the Commonwealth under the EPBC Act. In addition, the intention is for an expedited State environmental approval or permitting process for infrastructure developments that are shown in Action Plan C as ‘able to proceed’ including those found to be consistent with the Strategic Conservation Plan following ‘further investigation’ (see Section 4.2.1 for explanation of these categorisations).

Infrastructure proposals would typically also require either an appropriate regional and/or local scheme reservation or easement granted on subject land to be able to proceed. The process to secure an appropriate reservation or easement through the P & D Act or LA Act respectively would be expedited for those proposals indicated as ‘able to proceed’. Similar to the Urban and Industrial Class of Action

outlined in Action Plan A, it is proposed that EPA referral would not be mandatory for those scheme and scheme amendments that are compliant with the Strategic Conservation Plan and this Action Plan. As such the WAPC and DoL would make a determination of consistency of the infrastructure proposal with Action Plan C before progressing the amendment or granting of easement.

Where impacts are related to the clearing of native vegetation, the outcomes of the Strategic Conservation Plan for infrastructure actions will be principally implemented through the clearing provisions under Part V Division 2 of the EP Act administered by the Department of Environment Regulation (DER) (Figure 4). Infrastructure proposals which clear native vegetation, and for which a state-wide purpose permit is in place, will submit the information required under the permit to DER, with the addition of:

- consistency of proposed site or alignment with that shown in Action Plan C; and
- confirmation that the infrastructure proposal is able to proceed under the Strategic Conservation Plan (i.e. indicated as such in Action Plan C or as advised by the Executive body).

The CEO of DER, as the decision maker, would have regard to the outcomes of the Strategic Conservation Plan in deciding on clearing permit applications relating to infrastructure actions. This may include attaching conditions to a clearing permit that are necessary or convenient for the purposes of preventing, controlling, abating or mitigating environmental harm.

Other management and regulatory requirements may be relevant, including for acid sulphate soils, dewatering, or health and amenity issues such as noise, and water and air quality.

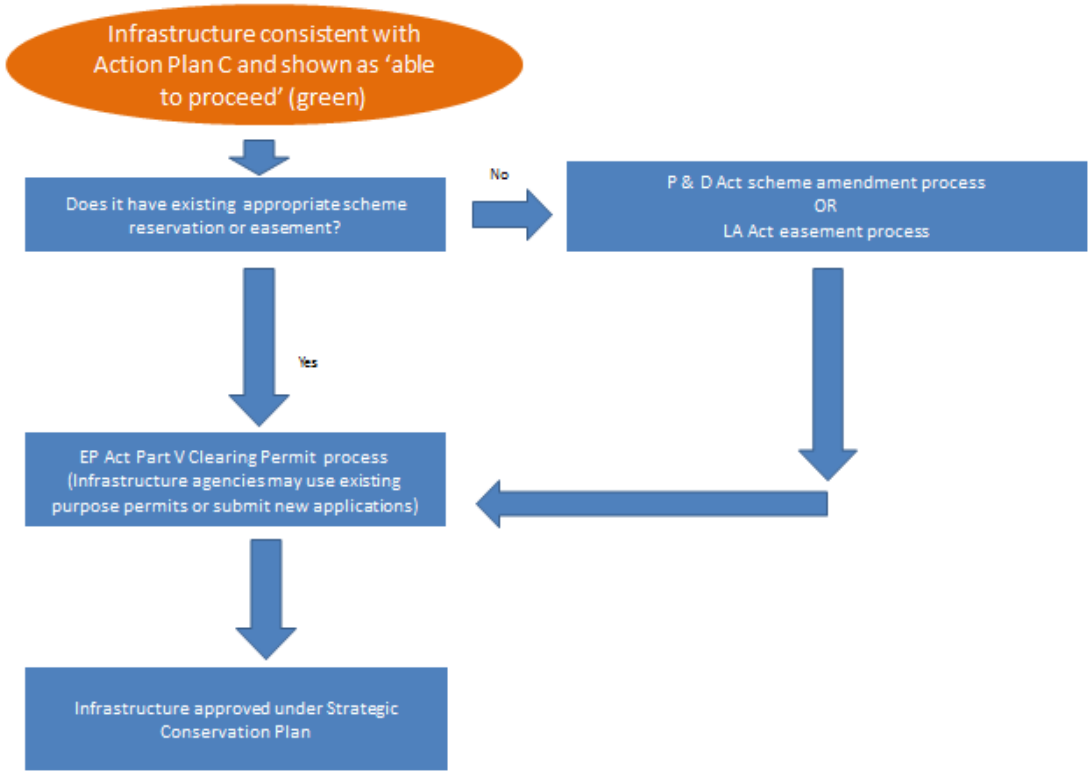


Figure 4: Expedited infrastructure planning and approval pathway under the Strategic Conservation Plan

Where the proposed infrastructure site or alignment is different to that currently proposed in Action Plan C, the Executive body would provide advice on whether Action Plan C could be revised (see Section 4.2.4). No decisions on clearing permit applications would be made unless Action Plan C is amended to include the new site or alignment and it is indicated as 'able to proceed'.

For an infrastructure project to be considered 'able to proceed' under the Strategic Conservation Plan, which also incorporates a change to the proposed infrastructure site or alignment, infrastructure agencies will be required to demonstrate to the Executive body that it is consistent with the conservation and environmental objectives of the Strategic Conservation Plan and with the commitments to avoid and minimise impacts to MNES and State values (Figure 5). If an infrastructure agency cannot avoid all MNES and State values, it must be able to demonstrate its internal planning processes have considered all reasonable and practicable measures to do so. These measures include consideration of co-location opportunities, such as shared corridors with other existing or future planned infrastructure, and consideration of alternative sites and alignments.

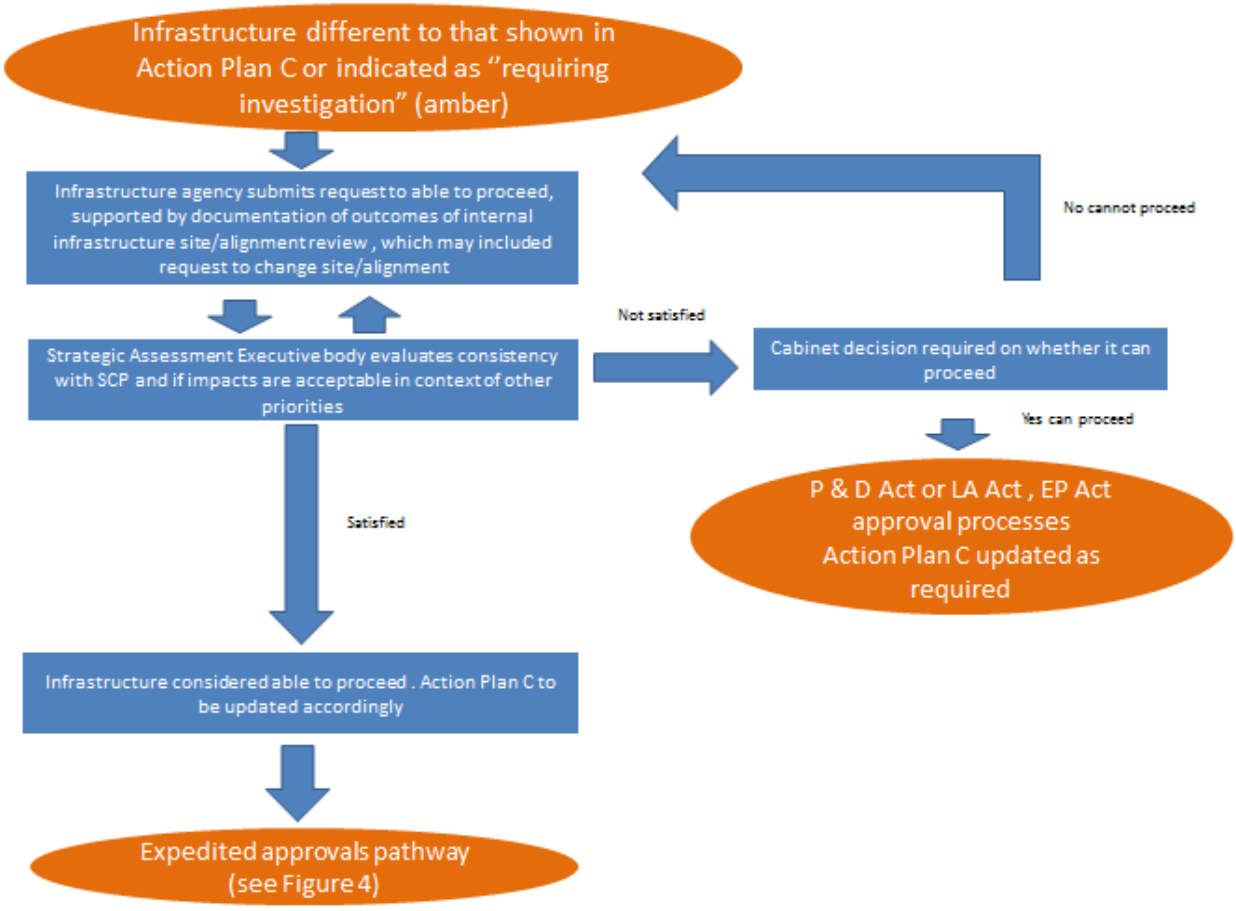


Figure 5: Process to evaluate whether infrastructure is able to proceed under the Strategic Conservation Plan and related approvals pathway

In determining whether to deem the infrastructure proposal able to proceed, the Executive body would evaluate whether:

- it has been demonstrated that all reasonable and practicable means have been taken to avoid or minimise impacts;
- it can be developed consistent with conservation objectives and commitments; and
- the scale and significance of impacts are acceptable and will not affect other government development priorities.

If the Executive body determines that it meets these criteria, it would follow the expedited infrastructure planning and approval process under the Strategic Conservation Plan (Figure 4) and Action Plan C would be subsequently updated to reflect it is no longer 'requiring investigation' (amber) and is now 'able to proceed' (green) (see Section 4.2.1).

If the Executive body finds that it does not clearly meet these criteria and may affect the ability to proceed with other priorities under the Strategic Conservation Plan, the matter would be referred to Cabinet for a decision (Figure 5). If Cabinet decides to proceed with the infrastructure proposal, it would likely then proceed through the required planning and approvals process, including potential assessment under Part IV of the EP Act by the EPA.

4.2.4 Review and revision of Action Plan C

For an infrastructure proposal to be approved under the Strategic Conservation Plan, its spatial extent and specifications need to be consistent with Action Plan C. Action Plan C may be revised via two triggers:

1. Executive body approval of a request from an infrastructure agency to modify Action Plan C to reflect change in infrastructure siting or alignment and/or for infrastructure proposal to proceed under the Strategic Conservation Plan (Section 4.2.3); and

2. regular five yearly strategic review of Action Plan C.

The Executive body will instigate a strategic review of Action Plan C every five years as part of the overall review of the Strategic Conservation Plan. This review will be undertaken in collaboration with the various infrastructure agencies. The purpose of the review is to:

- ensure the proposed infrastructure meets current planning and development needs;
- consider new information on MNES and State values;
- evaluate whether improvements in the outcomes for MNES and State values can be gained through new technologies or construction methods, new co-location opportunities, and other changes to locations or alignments not previously considered or practicable.

Similar to a change to Action Plan C requested by infrastructure agencies, any changes arising from the strategic review will have to have an overall similar or better outcome for MNES or State values.

4.2.5 Consideration of infrastructure outside of the Strategic Conservation Plan

There is potential for major infrastructure projects not anticipated in the Strategic Assessment or proposed in Action Plan C to be pursued by infrastructure agencies. In such a case, the State will require the relevant infrastructure agency to advise the Executive body in regards to the nature of the project and the potential environmental impacts. The Executive body will evaluate the potential for the project to compromise the achievement of the conservation and environmental objectives under the Strategic Conservation Plan. It will provide advice to the infrastructure agency on required changes to ensure these objectives can still be met.

Should the proposal be approved by the Executive body, Action Plan C will be updated accordingly. Action Plans H and I may need to be updated in response to these changes (for example, if there are additional impacts, these may need to be counterbalanced through the Action Plan H).

4.3 RELATIONSHIP TO IMPLEMENTATION OF OTHER ACTION PLANS

The implementation of this Action Plan is closely related to the implementation of a number of other Action Plans. In particular, the following Action Plans contain elements that are relevant to infrastructure:

- Action Plan F – MNES conservation commitments.
- Action Plan G – State factors conservation commitments.
- Action Plan H – Conservation Program.
- Action Plan I – Assurance Framework.

Any changes in these Action Plans will automatically apply to the Infrastructure Action Plan (where relevant).

4.4 FUNDING ARRANGEMENTS

Funding mechanisms for implementation of the Strategic Conservation Plan and Action Plans are being developed. Funding measures are likely to include contributions from proponents applied through the approval processes that apply to each class of action under Action Plans A to D.

Further information on funding mechanisms relating to the implementation of the Strategic Conservation Plan and Action Plans will be released for public comment over the coming months.

References

State Planning Policy 3.6: Development contributions for infrastructure, WAPC 2009,

Utility Providers Code of Practice for Western Australia, Utility Providers Services Committee 2010

Development Control Policy 1.9: Amendment to region schemes, WAPC 2010

North-West Sub-regional Planning Framework, WAPC 2015

North-East Sub-regional Planning Framework, WAPC 2015

Central Sub-regional Planning Framework, WAPC 2015

South Metropolitan Peel Sub-regional Planning Framework, WAPC 2015

Perth and Peel@3.5million, WAPC 2015

Perth and Peel @ 3.5 million: Environmental impacts, risks and remedies, EPA 2015

Appendix A – Transport proposals

Table 2: Proposed Transport Infrastructure

Type	Description	Name
Heavy Rail (See Figures 6-9)	Heavy rail includes an electric railway system that has the capacity to handle a heavy volume of traffic.	Extension of the Joondalup line from Butler to Yanchep.
		Extension of the Thornlie line to Cockburn Central.
		Construction of a new line – East Wanneroo Rail Link
Max Light Rail (and associated depot site)	Light Passenger Rail can be any rail system which is created to serve a small passenger load. Light rail can, but is not limited to, sharing a road with other vehicles. Light rail rarely has grade separations, and is more often operated running parallel to roads. The proposed Perth MAX Light Rail Route encompasses two major transit corridors.	Central Northern Corridor (CNC) – from Mirrabooka to the Perth city centre (13km); and
		Central Business District (CBD) corridor – from Victoria Park to Queen Elizabeth II Medical Centre (QEIIMC) (9km).
		The preferred site for the depot is the eastern side of Mirrabooka Ave across from Polytechnic West Balga site. The depot is 7.4 hectares in area
New Public Bus Depots (See Figure 10.)	Bus depots typically include a large hardstand area for the storage of buses, a maintenance shed, office and staff amenities building, bus cleaning facilities and bus refuelling infrastructure.	Alkimos bus (in Water Corporation land to the west of Alkimos Town Centre)
		Armadale South
		Ashfield
		Balcatta
		Baldivis
		Bayswater (extension to current depot)
		Beenyup
		Bibra Lake
		Claremont
		Cockburn Central
		East Wanneroo
		Eglinton
		Ellenbrook (extension to current depot)
		Forrestfield

Type	Description	Name
		Jandakot (current planning includes a new bus depot between the rail reserve and the airport)
		Kalamunda (extension to current depot)
		Karnup bus depot (at station)
		Maddington
		Mirrabooka
		Pinjarra
		Port Kennedy
		Redcliffe
		Two Rocks
		Two Rocks
		Wangara (extension to current depot)
		Yanchep
		Yanchep bus (east of the train station)
		Yunderup
Busways	Busways typically feature up to a 10m width of asphalt surface. These are planned in existing road reserves.	No specific detail available.
Upgrading of existing Primary Regional Roads (See Figure 11 to Figure 14)	Primary Regional Roads are administered and managed by MRWA and include freeways and other primary distributors. These are the most important of the roads of regional significance in the planned road network, and are currently, or proposed to be declared under the *Main Roads Act 1930*. Existing Primary Regional Roads will require upgrading as required to accommodate increasing transport demand. This includes, inter alia, widening/duplication/extension of existing roads and bridges, and upgrading of existing intersections including construction of grade-separated interchanges.	Albany Highway
		Armadale Road
		Brookton Highway
		Canning Highway
		Causeway
		Cockburn Road
		Curtin Avenue
		Ennis Avenue
		Graham Farmer Freeway
		Great Eastern Highway and Great Eastern Highway Bypass

Type	Description	Name
		Great Northern Highway
		Guildford Road
		Karrinyup Road / Morley Drive
		Kenwick Link
		Kwinana Freeway and Forrest Highway
		Leach Highway / High Street
		Mandjoogoordup Drive
		Mandurah Road
		Marmion Avenue
		Mitchell Freeway
		Old Coast Road
		Orrong Road
		Patterson Road
		Perth Adelaide National Highway
		Perth Darwin National Highway (Tonkin Highway to Muchea)
		Pinjarra Road
		Reid Highway
		Rockingham Road
		Roe Highway
		Shepperton Road
		South Street
		South Western Highway
		Stephenson Highway
		Stirling Highway
		Stock Road and Fremantle-Rockingham Controlled Access Highway
		Thomas Road
		Tonkin Highway

Type	Description	Name
		Toodyay Road
		Tydeman Road / Port Beach Road
		Welshpool Road
		Wanneroo Road
Additional Primary Regional Roads (See Figure 11 to Figure 14)	Primary Regional Roads are administered and managed by MRWA and include freeways and other primary distributors. These are the most important of the roads of regional significance in the planned road network, and are currently, or proposed to be declared under the *Main Roads Act 1930*.	Whiteman – Yanchep Highway
		Perth – Darwin National Highway (Tonkin Highway to Muchea)
		Tonkin Highway Southern Extension, including Pinjarra Bypass
		Fremantle / Rockingham Controlled Access Highway
		Rowley Road Extension;
		Southern Link Road
		Future Additional River Crossings (undefined)
Possible conversion of existing local roads to Primary Regional Roads	As above	Anketell Road
		Neaves Road
		Rowley Road
		Welshpool Road East / Canning Road
Possible conversion of Other Regional Roads to Primary Regional Roads	As above	Abernethy Road
		Anketell Road
		Flynn Drive
		Lakes Road
		Mundijong Road
		Ocean Reef Road
		Thomas Road
		Welshpool Road East / Canning Road
New Other Regional Roads (See Figure 11 to Figure 14)	Other Regional Roads are Local Government roads, although they are administered by the Department of Planning. These are roads of regional significance in the planned road network.	Neaves Road (possible conversion to PRR)
		Rutland Road (missing)
		Wattle Avenue West (subject to further study)
		Pinnacle Drive (subject to further study)

Type	Description	Name
		Cooper Road (already on the list but shown as red)
		Henderson Road
		Rogers Road
		South Western Highway (realignment)
		Lakes Road (already on the blue road list, possible conversion to PRR)
Upgrades to Other Regional Roads	As above	Nicholson Road (Duplicating carriageway)

Figure 6: PTA Proposed infrastructure – Central sub-region

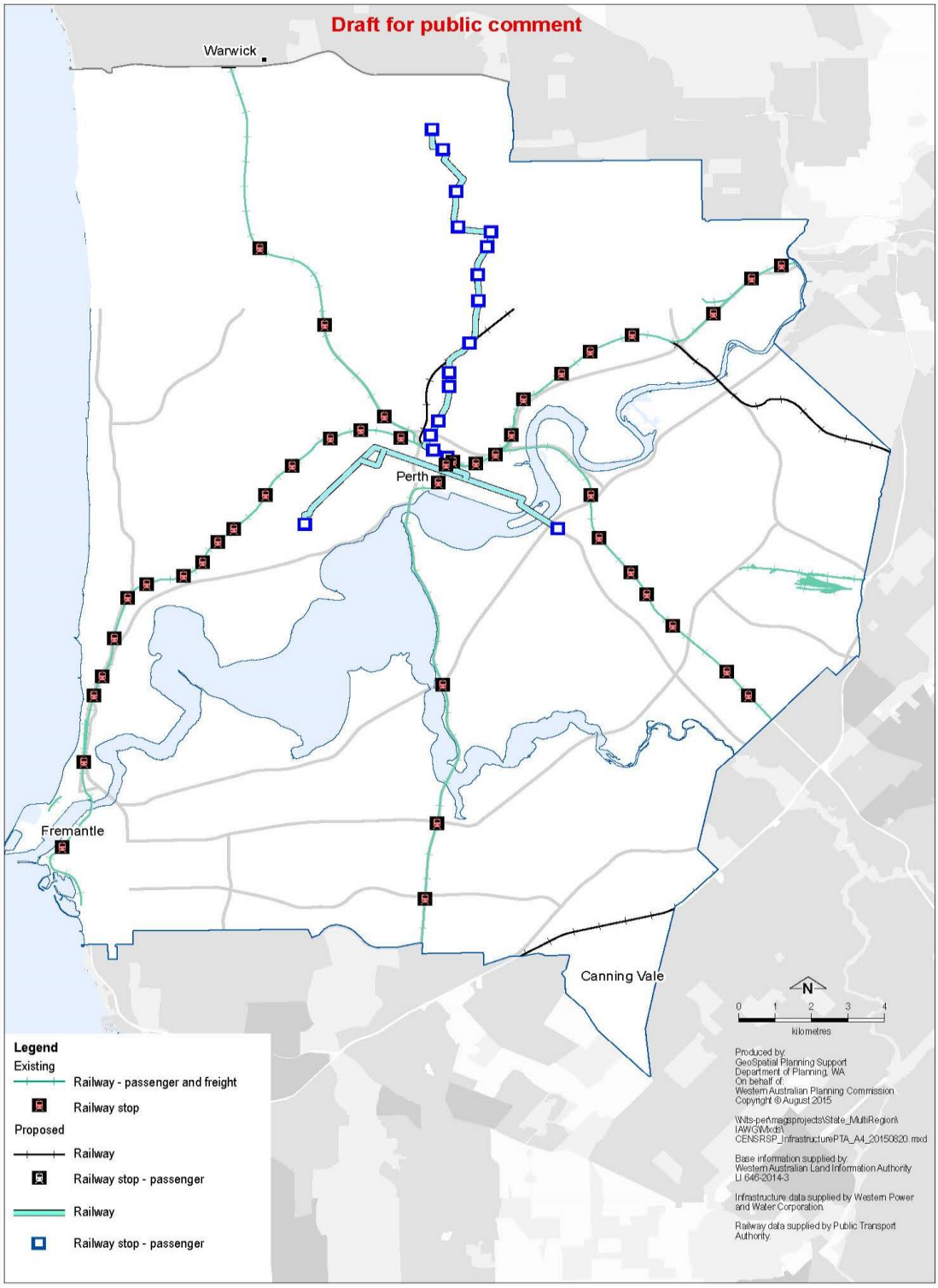


Figure 7: PTA Proposed infrastructure – North-East sub-region

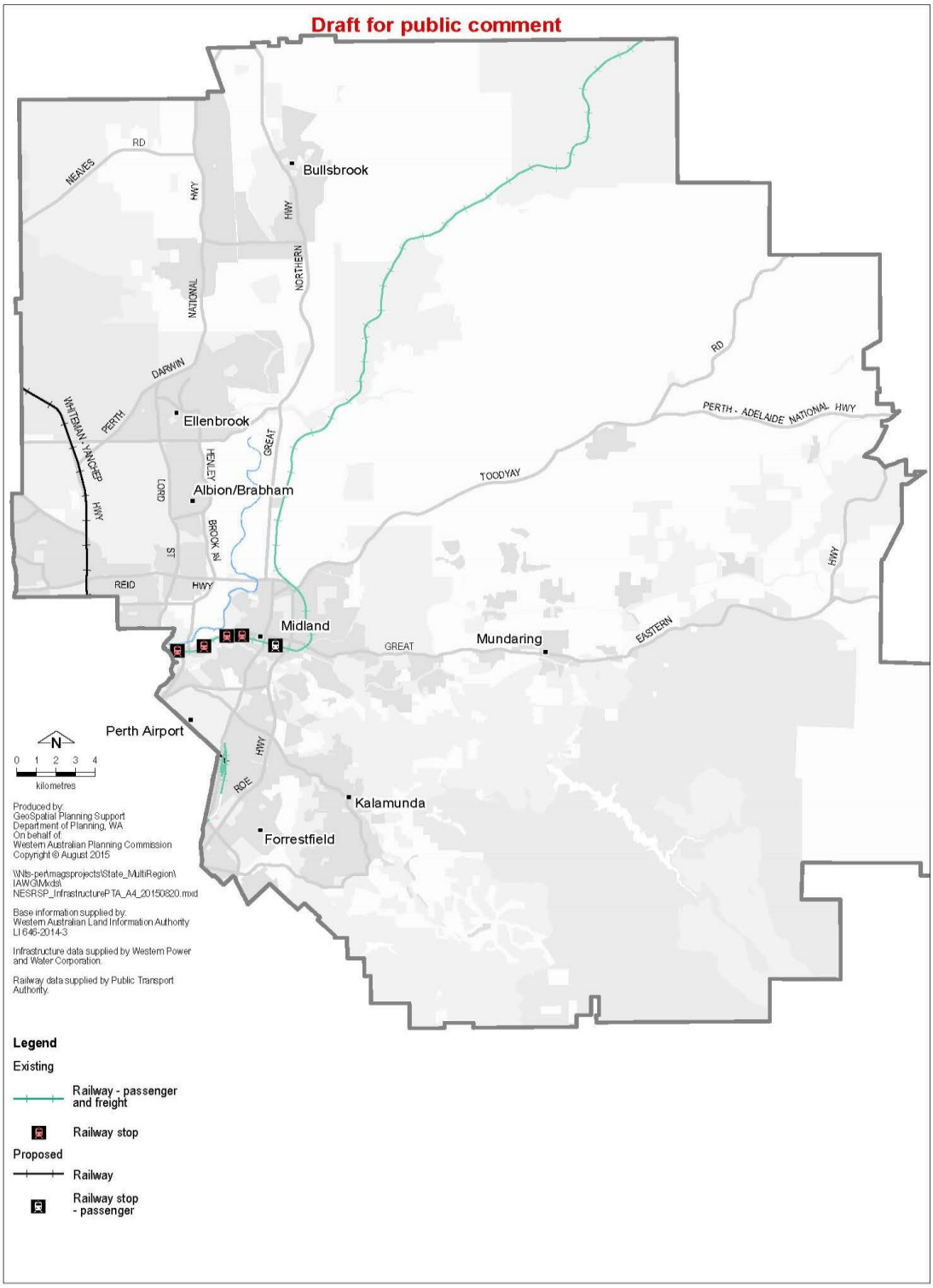


Figure 8: PTA Proposed infrastructure – North-West sub-region

Figure 9: PTA Proposed infrastructure – South Metropolitan Peel sub-region

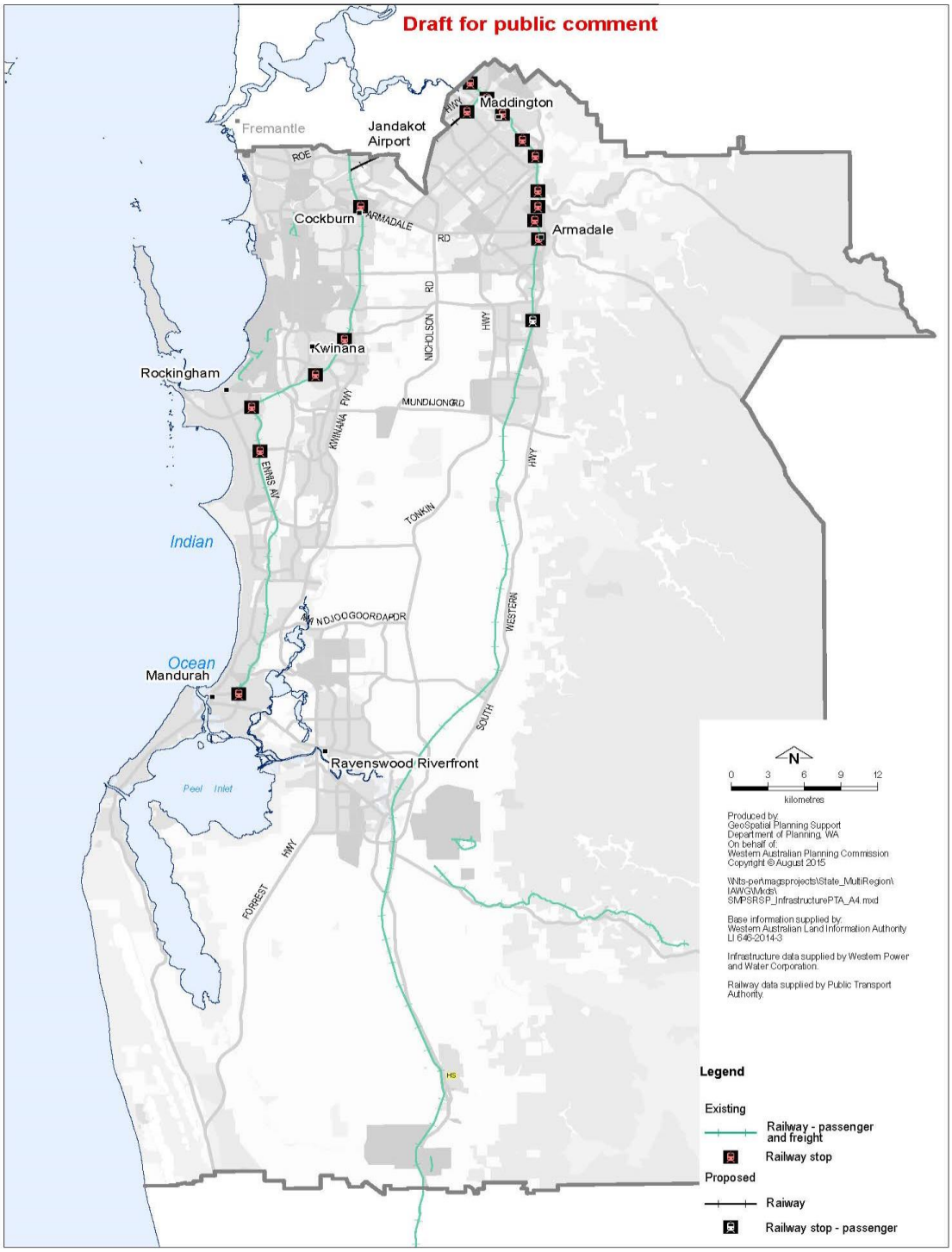


Figure 10: Transperth – proposed bus depot locations

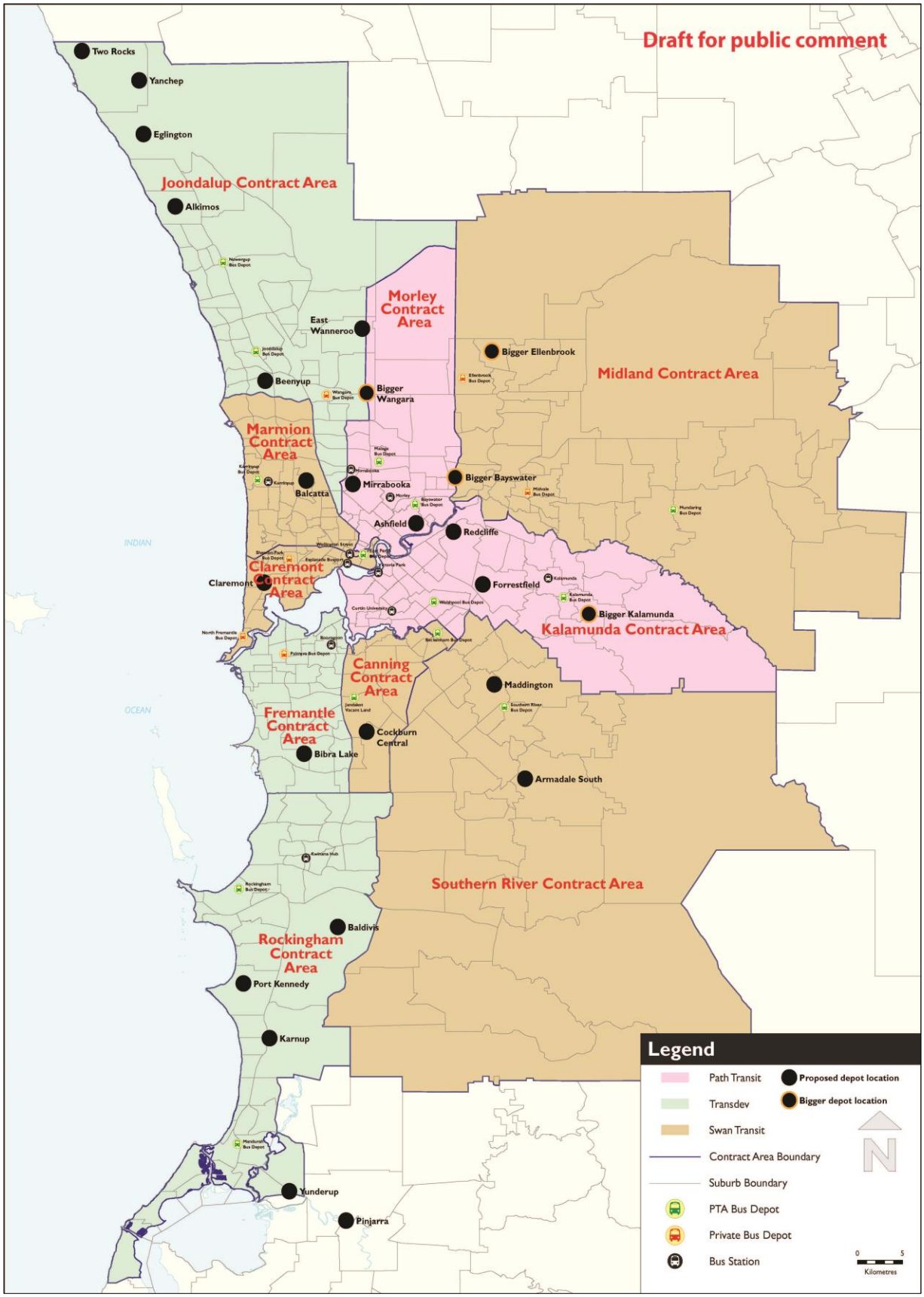


Figure 11: Proposed infrastructure – roads (Central sub-region)

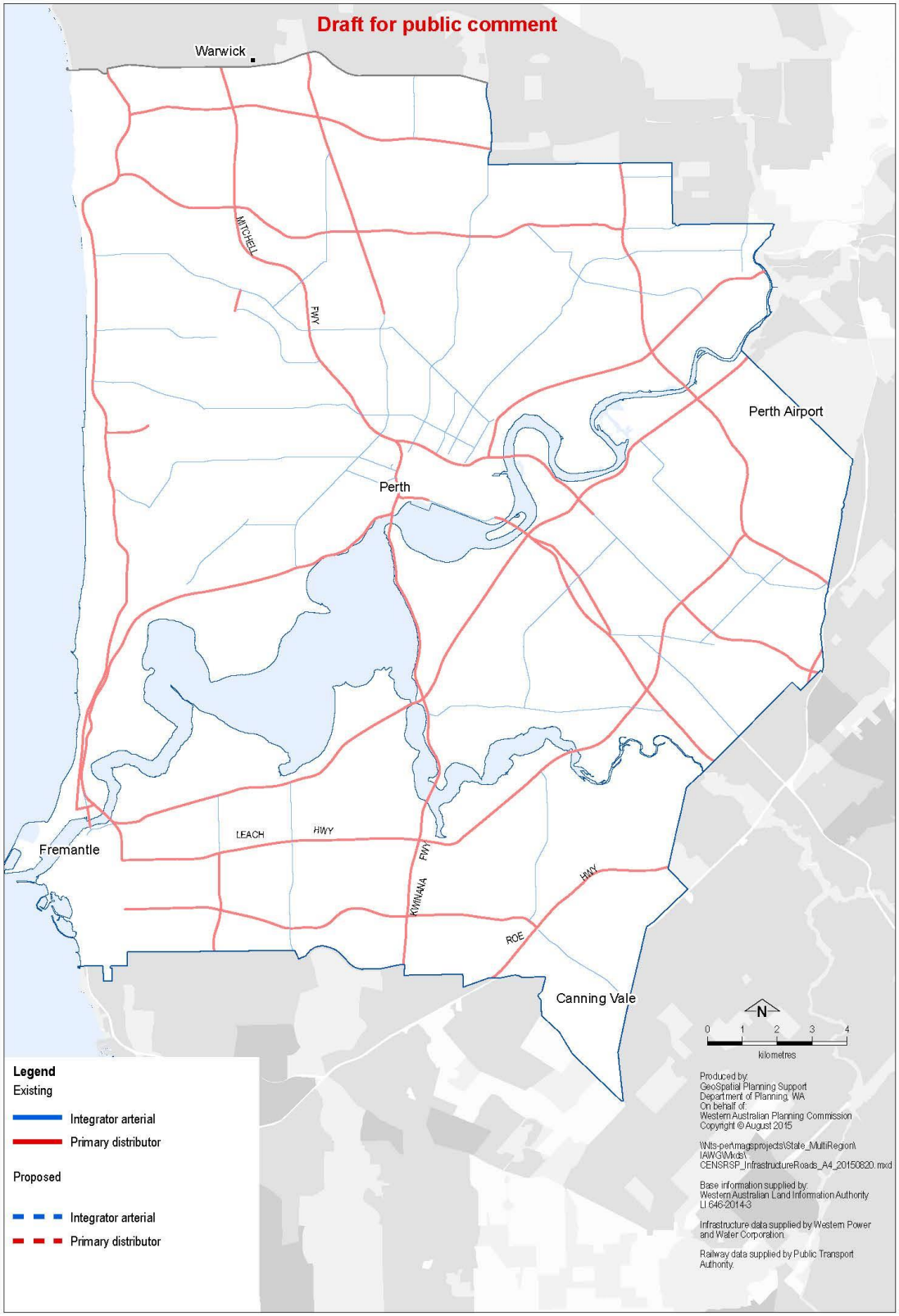


Figure 12: Proposed infrastructure – roads (North-East sub-region)

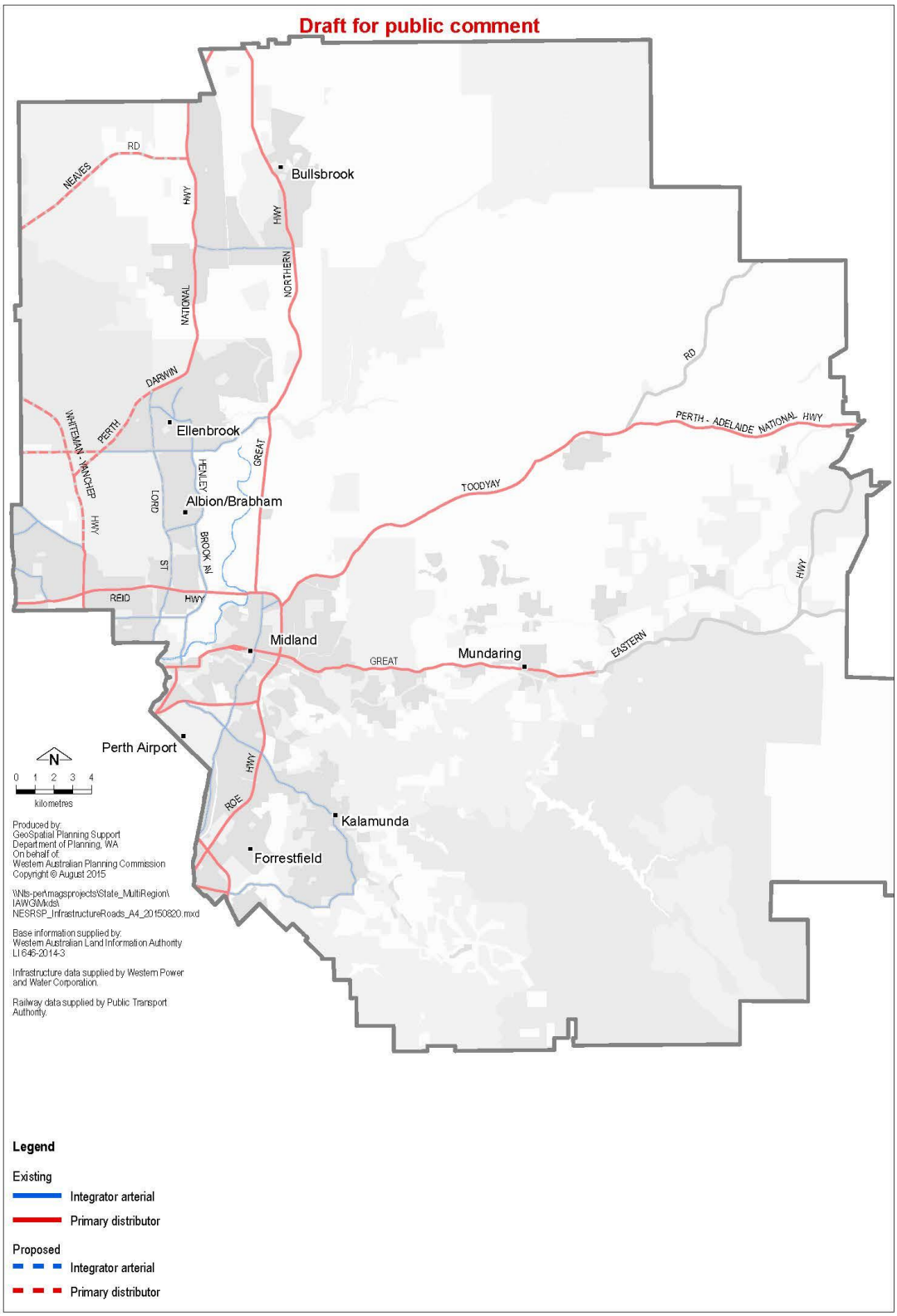


Figure 13: Proposed infrastructure – roads (North-West sub-region)

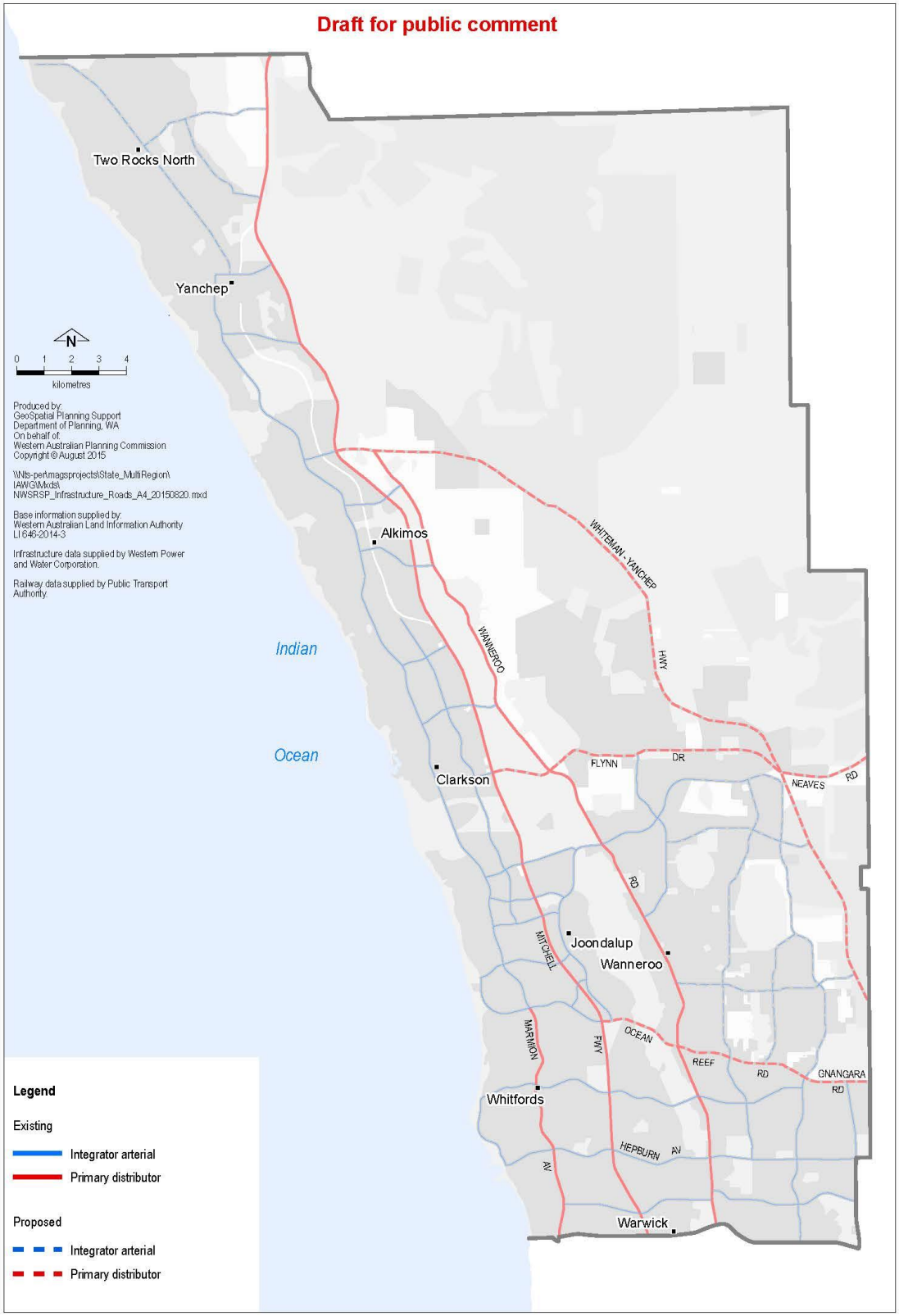
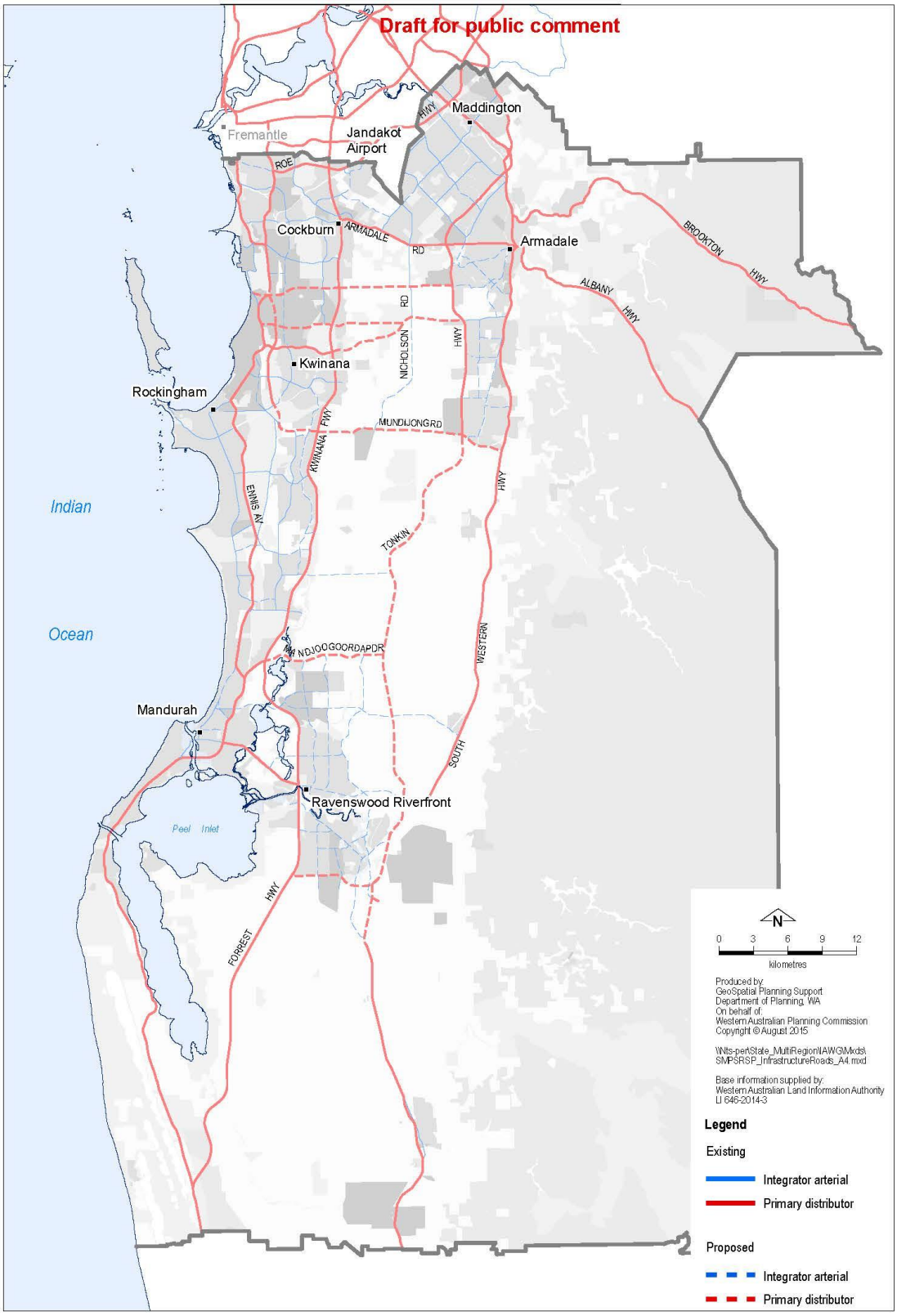


Figure 14: Proposed infrastructure – roads (South Metropolitan Peel sub-region)



Appendix B – Electricity proposals

Table 3: Proposed Electricity Infrastructure

(The projects listed in this table and their timing are indicative only and are subject to electricity demand and further detailed analysis. This more detailed work will occur closer to the time of need for the projects and will include consultation with the community and stakeholders.)

Type	Description	Name	Timeframe
New 132 kV infrastructure – Substations (See Figure 17 to Figure 20)	Substations and terminals provide multiple functions, including transformation of electricity from high to low voltage or vice versa, or provision of a switching point for a number of transmission lines. See Table 4	Alkimos	Medium term
		Albion/Brabham area	Long term
		Armadale (Champion Lakes)	Long term
		Baldivis	Medium term
		Belmont area	Medium term
		Burns Beach	Medium term
		Cardup	Long term
		CBD – Bennett St	Medium term
		CBD – James St	Long term
		East Rockingham	Medium term
		Forrestdale area	Long term
		Furnissdale	Medium term
		Golden Bay	Long term
		Henderson	Long term
		Herne Hill	Long term
		Hocking area	Long term
		Jandakot Airport area	Medium term
		Joondanna area	Medium term
		Kensington	Medium term
		Lake Clifton	Long term
		Latitude 32 (Hope Valley-Wattleup) Substation No. 1	Long term

Type	Description	Name	Timeframe
		Latitude 32 (Hope Valley-Wattleup) Substation No. 2	Long term
		Latitude 32 (Hope Valley-Wattleup) Substation No. 3	Long term
		Mariginiup/East Wanneroo area	Medium term
		Nambeelup	Long term
		Neerabup (Mather Drive)	Long term
		North Ellenbrook	Long term
		Oakford/Oldbury	Long term
		Padbury/Wangara/Mullaloo/North Beach/Landsdale area	Medium term
		Parmelia	Medium term
		Ravenswood	Long term
		Success	Long term
		Thornlie	Long term
		Two Rocks	Long term
		West Pinjarra	Long term
		Yanchep Town	Long term
New 132 kV infrastructure - Line route See Table 5.	See Table 5. Line routes include the establishment of a corridor to support the transmission lines and the following associated infrastructure: - towers, poles and the associated foundations; - conductors and insulators; - access tracks; - pole and tower site inspection and maintenance areas; - electrical safety and fire safety clearance standards;	Alkimos to Two Rocks	Long term
		Belmont to new Belmont	Medium term
		Burns Beach to Clarkson	Medium term
		Cannington/ Meadow Springs/ Pinjarra Line to Nambeelup	Long term
		East Perth Terminal to Bennett Street	Medium term
		Hay Street to Milligan Street	Short term
		Henderson to Cockburn Cement	Long term
		Henley Brook to North Ellenbrook	Long term
		Kensington to Bentley	Medium term
		Kewdale to new Belmont	Medium term
		Kwinana Terminal to Latitude 32 No. 2	Long term
		Lake Clifton to Alcoa/Pinjarra/Wagerup	Long term

Type	Description	Name	Timeframe
	- brake / winch sites approximately every 10km; and - other ancillary infrastructure such as washdown bays and communication infrastructure sites	Mandurah to Furnissdale to Ravenswood	Medium term
		Mason Rd to Kwinana	Long term
		Medina to East Rockingham	Medium term
		Neerabup to Wangara to Landsdale	Short term
		Neerabup to Wanneroo, Mullaloo and Wangara	Long term
		Padbury to Wangara	Medium term
		Ravenswood to Pinjarra Terminal	Long term
		Ravenswood to West Pinjarra	Long term
		Southern Terminal to Byford/Southern River	Long term
		Thornlie to Cannington Terminal and Gosnells	Long term
		Waikiki to Cannington Terminal to Meadow Springs/Pinjarra Terminal	Long term
		West Pinjarra to Alcoa Pinjarra/Pinjarra Line	Long term
		Western Terminal to Cook Street	Medium term
		Yanchep to Alkimos	Medium term
Upgrade Existing (or 66kV to) 132 kV infrastructure – Substation See Table 5.	See terminal and substation descriptions above. See Table 4.	Australian Paper Mills	Medium term
		Edmund Street	Medium term
		Morley	Medium term
		Myaree	Medium term
		North Fremantle	Medium term
		O'Connor	Medium term
		Osborne Park	Medium term
		South Fremantle (rebuild or possible relocation)	Medium term
		Tate Street or Victoria Park	Medium term
		Wembley Downs	Medium term
Upgrade Existing (or 66kV to) 132 kV	See line route descriptions above. See Table 5.	Wanneroo to Joondalup and Mullaloo	Medium term
		Alcoa Pinjarra to Pinjarra	Long term

Type	Description	Name	Timeframe
infrastructure – Line Route See Table 5.		Alcoa Pinjarra to Wagerup	Long term
		Balcatta to North Beach	Medium term
		Beechboro to Hadfields	Medium term
		Bentley to Cannington Terminal	Medium term
		Cannington Terminal to Meadow Springs/Pinjarra	Long term
		Cannington Terminal to Tate Street or Victoria Park	Medium term
		East Perth Terminal to Hay Street	Medium term
		East Perth Terminal to North Perth	Medium term
		Guildford Terminal to Forrestfield	Long term
		Guildford Terminal to Hazelmere	Long term
		Hadfields to Morley	Medium term
		Kwinana to Medina	Long term
		Manning Street to North Beach	Medium term
		Mason Road to Rockingham	Medium term
		North Fremantle to Edmund Street, North Fremantle to Amherst Street	Medium term
		Northern Terminal to Balcatta	Medium term
		Northern Terminal to Brabham to Herne Hill	Long term
		Northern Terminal to Henley Brook	Long term
		Northern Terminal to Joondanna	Medium term
		Northern Terminal to Morley	Medium term
		Osborne Park to Manning Street	Medium term
		Osborne Park to Yokine	Medium term
		Portion Southern Terminal to Cannington Terminal	Medium term
		Rebuild section of 132 kV line from Northern Terminal to Beechboro Substation to double circuit 132 kV	Medium term
		Shenton Park to Medical Centre	Medium term

Type	Description	Name	Timeframe
		South East Terminal to Oakford substation	Long term
		South Fremantle Terminal to Edmund Street	Medium term
		South Fremantle to O'Connor, to Myaree, to Australian Paper Mills to South Fremantle	Medium term
		South Fremantle to Southern Terminal	Medium term
		Southern Terminal to Willetton	Medium term
		Waikiki to Mandurah	Long term
		Western Terminal to Wembley Downs	Medium term
New 330 kV infrastructure – Terminal See Table 5.	See terminal and substation descriptions above. See Table 4.	Cannington	Medium term
		East Perth	Medium term
		Hopeland area	Long term
		Kwinana	Long term
		Pinjarra	Long term
		Pinjar Terminal	Long term
		South East	Long term
New 330 kV infrastructure – Line Route See Table 5.	See line route descriptions above. See Table 6, Figure 15 and Figure 16.	Cannington Terminal to East Perth Terminal	Medium term
		Cannington Terminal to Kenwick Link	Medium term
		Cannington Terminal to Southern Terminal/Guildford Terminal	Medium term
		Moora/ Muchea/ Northern Terminal line	Medium term
		Neerabup to Northern Terminal/Muchea line	Medium term
		Portions of Southern Terminal to Guildford Terminal	Medium term
		Southern Terminal (Bibra Lake) to Kwinana Terminal	Long term
Upgrade existing 330 kV infrastructure – Line Route See Table 5.	See terminal and substation descriptions above. See Table 4.	Southern Terminal to Kenwick Link	Medium term

Table 4: Overview of Terminal and Zone Substation Design

Aspect	Terminal Design	Zone Substation Design
Approximate Land Area	600m x 600 m 36ha	120m x 120m 1.44ha
Clearance (safety and vegetation screen)	Site specific - taken from fence of 330kV and 132kV switchyards.	Minimum 10m - taken from fence of switchyard. Sites are typically located in cleared areas but a vegetated buffer that has environmental significance can be an option.
Approximate Vegetation Clearing/Impact	Full site - internal functional substation area (100%)	Full site - internal functional substation area (100%)
Site Specifics (i.e. Design Requirements)	Flat, Sandy Subsoil, above the 1:100 years regional flood level. Avoid environmental issues, integrate with local development plans. Western Power seeks to avoid environmental issues wherever possible within technical, economic and community constraints. Lighting masts.Configuration can either be regular (Northern Terminal) or long (Southern Terminal) to allow for line entry/exit for particular circumstance (MRS/PRS/GBRS reservation required to protect from competing land uses. Western Power or State Government ownership required.	Flat, Sandy Subsoil, above the 1:100 years regional flood level. MRS/PRS/GBRS reservation required to protect from competing land uses. Western Power or State Government ownership required, or alternatively major customer ownership if wholly servicing.

Table 5: Overview of 132kV Corridor Design

Aspect	132kV Corridor Design
Standards	*AS/NZS 7000:2010*
Approximate Land Dimensions	Typically 30m - 40m width (private lands), 15.5m - 20m width (road reserve)
Clearance (safety and vegetation screen)	The land dimensions provided above specify the easement or restriction zone within which restrictions apply to certain activities.
Approximate Vegetation Clearing / Impact	**Standard: 80%** Tower Footprint: 40m x 40m (15m x 15m of this to be permanent clearing only) Pole Footprint: 30m x 20m (5m x 5m of this to be permanent clearing only) Access Track: 6m (4m of this to be permanent clearing only)

	Brake/Winch Sites: 70m x 30m/50m x 40m (alternating locations every approx. 10km - temporary clearing only) Miscellaneous: Wash down bays, communications sites, etc areas make up a minority of the remainder of clearing required (majority of this to be temporary clearing only) Line Clearance: All vegetation must be maintained to be a minimum of 6m clearance to lines (this may vary due to voltage and other specifications)
Site Specifics (i.e. Design Requirements)	Vegetation clearing and pruning and unconstrained access within corridor are required for line construction and maintenance. In most cases, the understory of vegetation can be left uncleared in the corridor, with vegetation over 3m requiring removal. Corridor design and route is influenced by final design factors such as span length, number of circuits, configuration of circuits, structure height, conductor type and insulator type and community and stakeholder consultation. Safety clearances apply to the majority of land uses, development and subdivision to avoid induction, safety issues and interference with maintenance (emergency and regular).

Table 6: Overview of 330kV Corridor Design

Aspect	**330kV Corridor Design**
Standards	*AS/NZS 7000:2010*
Approximate Land Dimensions	Typically 60m-75m width
Clearance (safety and vegetation screen)	The land dimensions provided above specify the easement or restriction zone within which restrictions apply to certain activities.
Approximate Vegetation Clearing/Impact	**Standard: 75%** Tower Footprint: 60m x 60m (15m x 15m of this to be permanent clearing only) Access Track: 6m (4m of this to be permanent clearing only) Brake / Winch Sites: 70m x 30m/50m x 40m (alternating locations every approx. 10km - temporary clearing only) Temporary clearing often means that it is for construction only, then during operation (up to 60 years) it is allowed to regenerate or regenerate to near typical condition (e.g. it may still need pruning to meet clearances). Miscellaneous: Wash down bays, communications sites, etc areas make up a minority of the remainder of clearing required (majority of this to be temporary clearing only as explained in the paragraph above.) Line Clearance: All vegetation must be maintained to be a minimum of 6m clearance to lines (this may vary due to voltage and other specifications) **See** Figure 15 and Figure 16.

Site Specifics (i.e. Design Requirements)	Corridor design is influenced by final design factors such as span length, number of circuits, configuration of circuits, structure height, conductor type and insulator type. Corridor route will also be influenced by community and stakeholder consultation, to ensure ideas and preferences of directly impacted community members are taken into account. Safety clearances apply to the majority of land uses, development and subdivision to avoid induction, safety issues and interference with maintenance (emergency and regular). Vegetation clearing and pruning; and unconstrained access within corridor are required for line construction and maintenance. In most cases, the understory of vegetation can be left uncleared in the corridor, with vegetation over 3m requiring removal. Angles in lines require larger structures due to the forces applied to the structure. Planning controls (i.e. Planning frameworks identification and Planning Scheme reservation) required to ensure referral of any land use, development and subdivision proposal within a certain clearance to lines for WP to determine suitability of interface (largely safety and unconstrained maintenance access). Structures to be outside of falling height to rail reserves. Clearance for structures from road pavement is determined by site specific speeds and traffic volumes, and a minimum clearance of 1.6m exists for structures from within the edge of road reserves to adjoining land uses. Some key corridors within established urban areas (only minor amount) may require MRS/PRS/GBRS reservation to protect from competing land uses. Easements are required over private lands to ensure suitable controls of the land for safety and maintenance access.

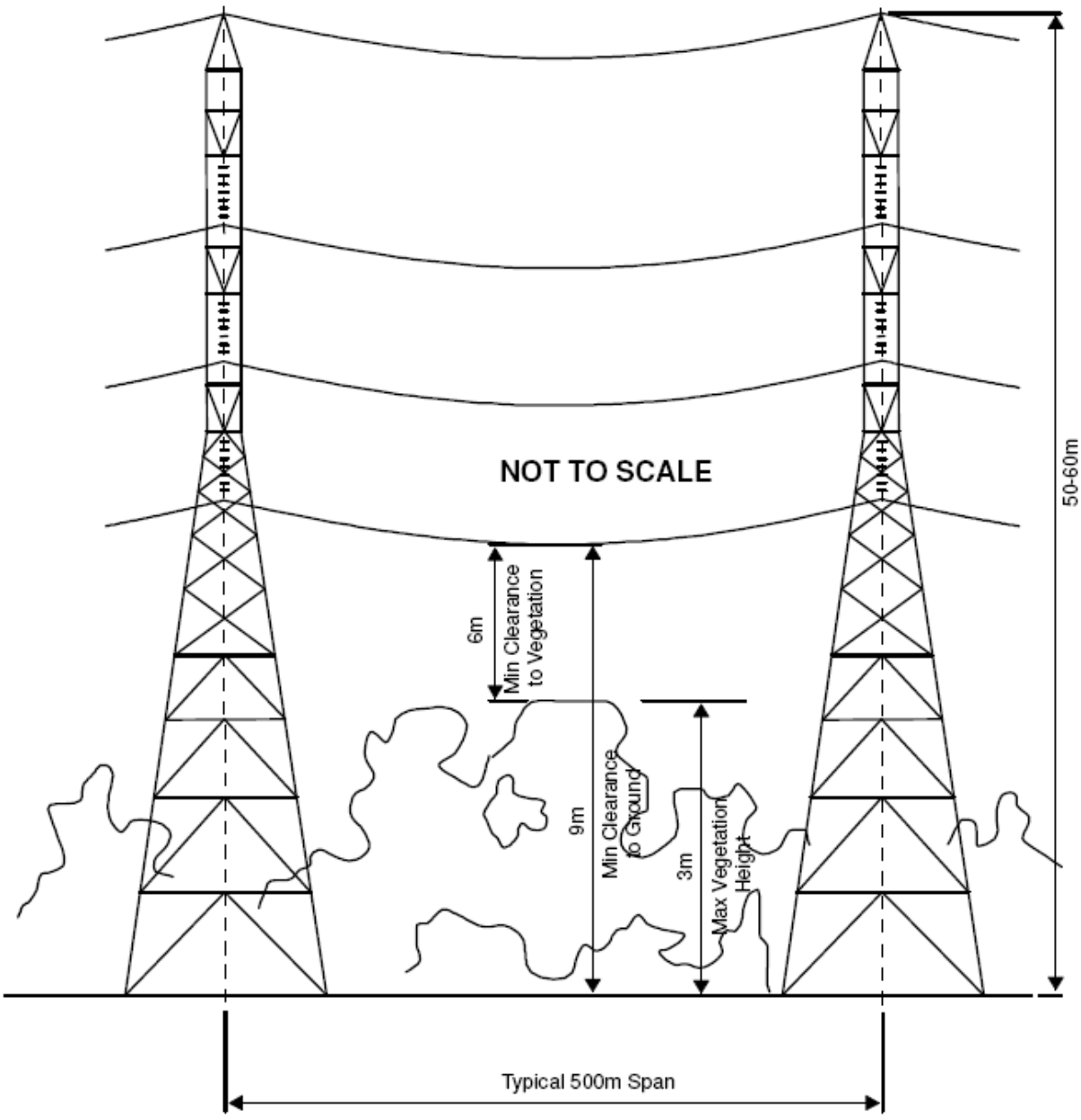


Figure 15: Example of a typical 330kV Transmission line and the associated Vegetation Clearing Profile

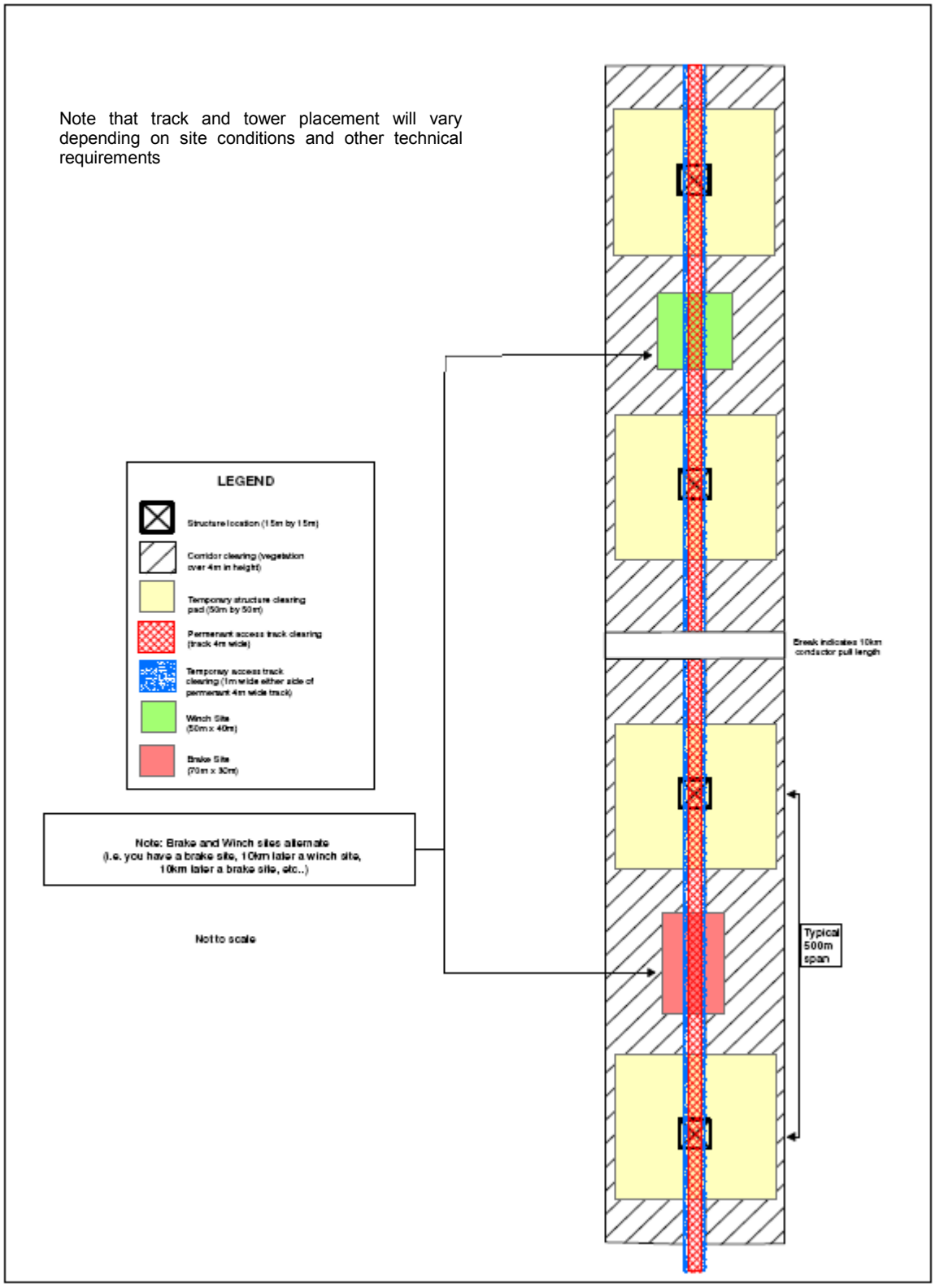


Figure 16: Example of a Typical 330kV Transmission Line with Tower sites, Winch/Brake Drum sites and Track clearing areas

Figure 17: Proposed infrastructure - Western Power (Central sub-region)

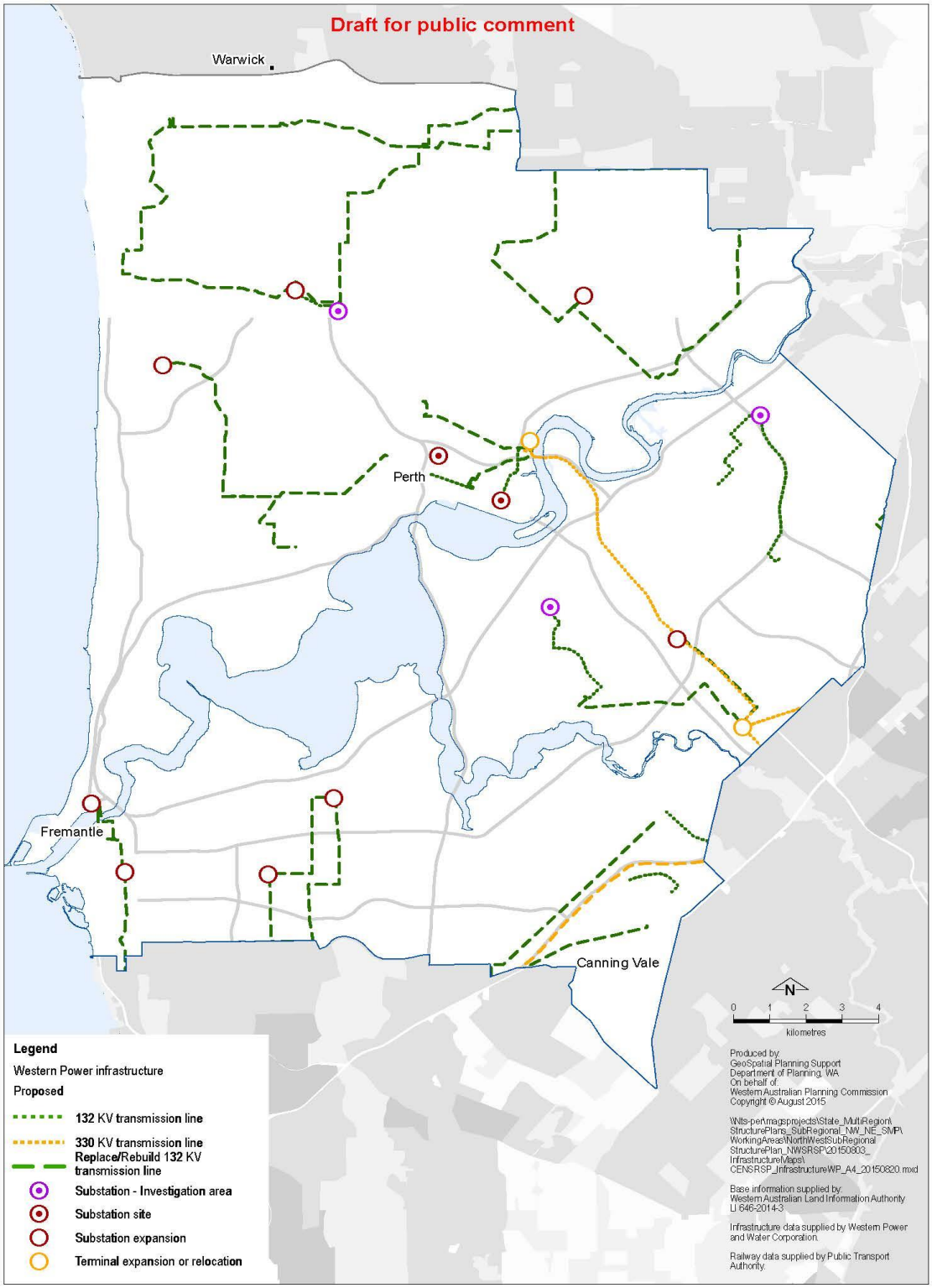


Figure 18: Proposed infrastructure - Western Power (North-East sub-region)

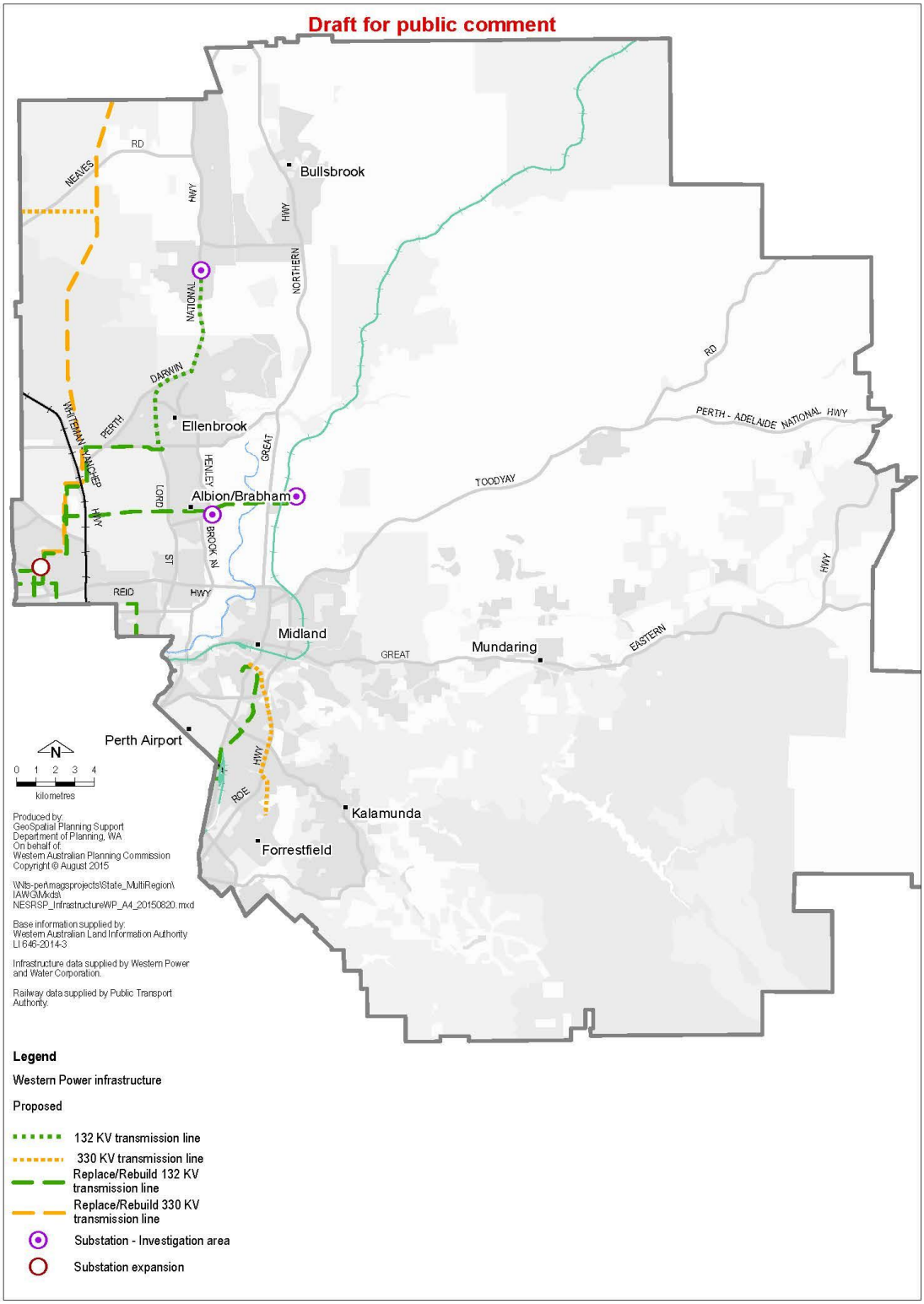


Figure 19: Proposed infrastructure - Western Power (North-West sub-region)

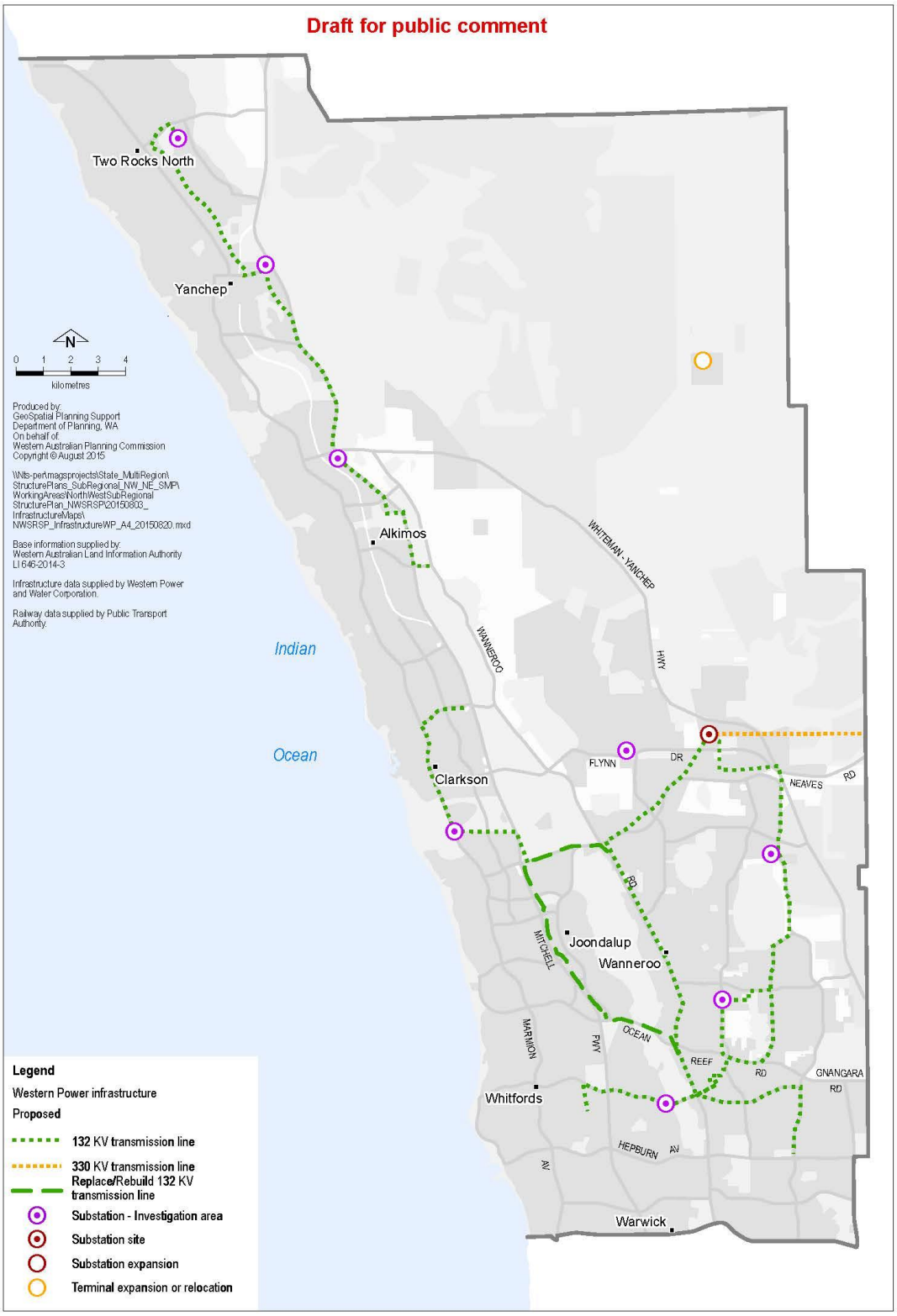
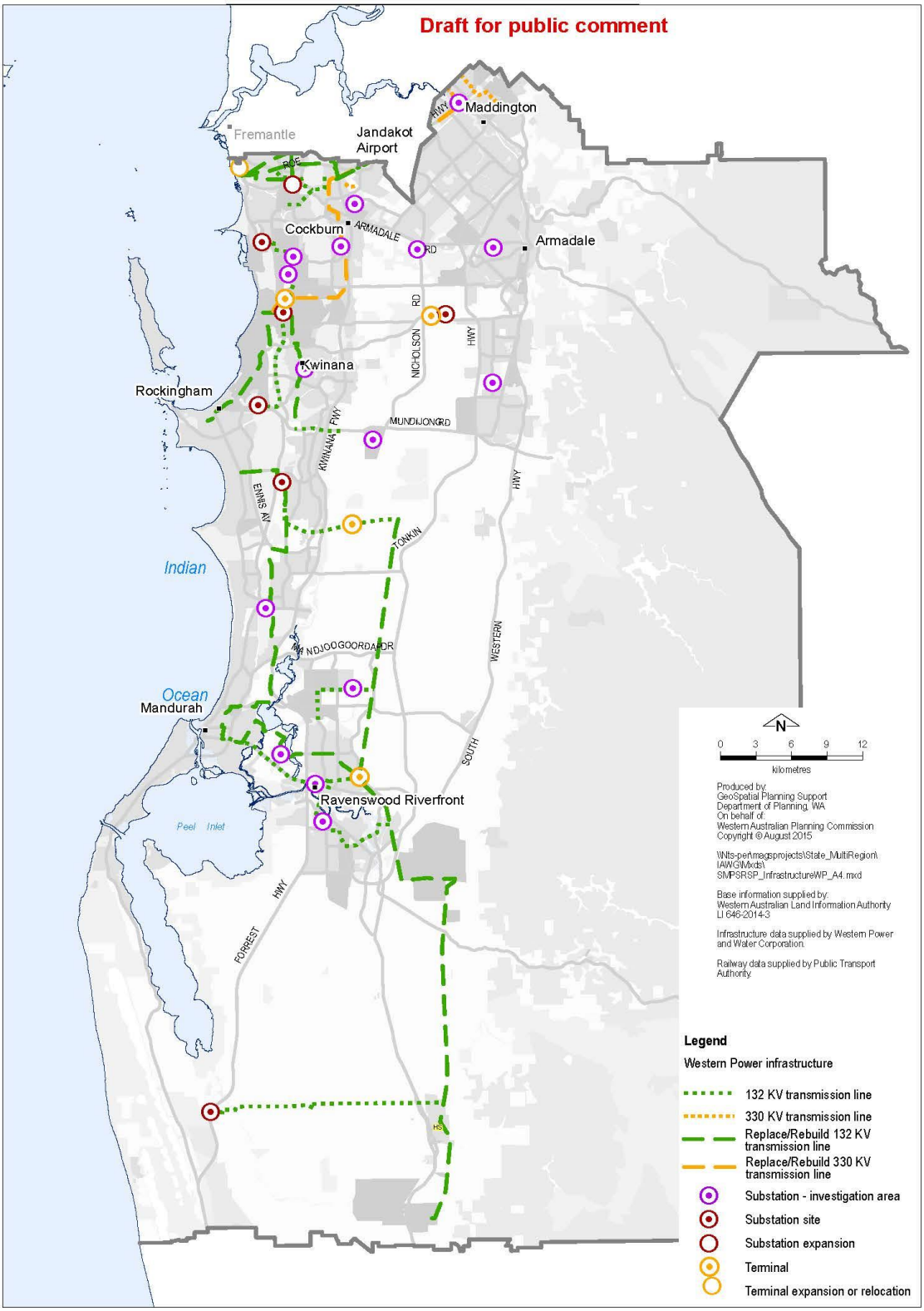


Figure 20: Proposed infrastructure - Western Power (South Metropolitan Peel sub-region)



Appendix C – Water proposals

Table 7: Proposed Water Infrastructure

Type	Description	Name	Map reference to Figs 21-24	Timeframe
Wastewater (See Figure 21 to Figure 24)	This includes: - Wastewater treatment plants. - Treated wastewater disposal pipelines. - Major wastewater pump stations. - Wastewater pressure mains. - Large diameter gravity sewers. - Water recycling treatment plants.	Armadale Main Sewer	76	Short Term
		Armadale Pressure Main	77	Short Term
		Armagh Street Pressure Main Duplication	36	Long Term
		Baldivis Main Sewer	46	Medium Term
		Baldivis North Pressure Main	54	Medium Term
		Baldivis South Pressure Main	55	Long Term
		Barragup East Pressure Main	56	Medium Term
		Barragup East Wastewater Pump Station	56	Short Term
		Barragup West Pressure Main	95	Medium Term
		Barragup West Wastewater Pump Station	95	Medium Term
		Bennett Street Pressure Main Duplication	57	Long Term
		Bullsbrook Transfer Pressure Main	38	Short Term
		Byford Pressure Main to East Rockingham Wastewater Treatment Plant	58	Medium Term
		Ellenbrook Pressure Main	100	Short Term
		Ellenbrook Pressure Main Duplication	39	Long Term
		Ellenbrook Pressure Main Duplication	39	Long Term
		Ellenbrook Pressure Main Duplication and Extension	85	Short Term
		Forrestdale Branch Sewer	49	Short Term
		Gordon Road Wastewater Treatment Plant Effluent Pipeline	73	Short Term
		Gordon Road Wastewater Treatment Plant Effluent Pipeline to Port Kennedy	96	Medium Term

Type	Description	Name	Map reference to Figs 21-24	Timeframe
		Hopkinson Road Pressure Main	60	Medium Term
		Jandabup Gravity Sewer	41	Medium Term
		Jandabup Pressure Main	45	Long Term
		Jandabup Wastewater Pump Station	45	Short Term
		Keralup South Wastewater Pump Station	83	Short Term
		Maida Vale Main Sewer	50	Medium Term
		Maida Vale Main Sewer	50	Long Term
		Midland Pressure Main	50	Long Term
		Nambeelup Treatment Plant	80	Long Term
		Nambeelup Wastewater Transfer Main	74	Medium Term
		Neerabup Pressure Main	44	Long Term
		Neerabup Wastewater Pump Station	44	Medium Term
		North Mandurah Pressure Main Duplication	63	Short Term
		Peel-Harvey Reuse Transfer Main	72	Long Term
		Peelhurst Pressure Main Duplication	97	Short Term
		Pinjarra Pressure Main	65	Short Term
		Pinjarra Wastewater Pump Station	65	Short Term
		Quinns Main Sewer	40	Short Term
		Richmond Street Pressure Main Duplication	37	Medium Term
		Rockingham Gravity Sewer	51	Short Term
		Rockingham Pressure Main	66	Short Term
		Sepia Depression Ocean Outlet Landline (SDOOL) Transfer Main Duplication	71	Medium Term
		Subiaco Wastewater Treatment Plant Outfall Duplication	90	Medium Term
		Two Rocks Pressure Main	98	Short Term
		Walter St Pressure Main Duplication	53	Short Term

Type	Description	Name	Map reference to Figs 21-24	Timeframe
		Wanneroo Road Pressure Main Duplication	84	Medium Term
		Warnbro Pressure Main	67	Short Term
		Waterworks Pressure Main Duplication	70	Long Term
		Wattleup Main Sewer	47	Medium Term
		West Murray Wastewater Pump Station	68	Long Term
		West Murray, West Pinjarra and Barragup Pressure Mains	68	Medium Term
		West Pinjarra Pressure Main	69	Long Term
		West Pinjarra Wastewater Pump Station	69	Long Term
		West Swan Pressure Main	99	Medium Term
		West Swan Wastewater Pump Station	99	Medium Term
		Westfield Treatment Plant	82	Medium Term
		Yanchep Main Sewer	42	Medium Term
Water See Figure 21 to Figure 24	This includes: - Water treatment plants. - Water reservoirs and tanks. - Borefields and borefield collector mains. - Water trunk and distribution mains.	Armadale- Kelmscott (Canns Road)Trunk & Distribution Mains	12	Medium Term
		Armadale-Kelmscott (Canns Road) Tank	12	Medium Term
		Bullsbrook Distribution Main Stage 1	2	Short Term
		Bullsbrook Distribution Main Stage 2	4	Long Term
		Bullsbrook Tank Stage 1	2	Short Term
		Bullsbrook Tank Stage 2	4	Long Term
		Bullsbrook Trunk Main	61	Long Term
		Byford Distribution Main	8	Medium Term
		Byford Tank	8	Medium Term
		Caddadup Distribution Main	11	Long Term
		Caddadup Tank	9	Short Term
		Canning Trunk Main Duplication	94	Long Term
		Dandalup Trunk Main Duplication	13	Medium Term

Type	Description	Name	Map reference to Figs 21-24	Timeframe
		East Perth Distribution Main Extension	89	Medium Term
		Eglinton Carabooda Trunk Main	29	Short Term
		Eglinton Groundwater Source Development	29	Short Term
		Eglinton Groundwater Source Development	29	Short Term
		Forrestfield Reservoir	26	Long Term
		Jandakot Groundwater Bores	35	Long Term
		Jandakot Groundwater Mains	35	Long Term
		Karnup Distribution Mains	92	Medium Term
		Karnup Tank	14	Medium Term
		Medina Tank	23	Medium Term
		Mundaring Trunk Main Duplication Stage 1	86	Short Term
		Mundaring Trunk Main Duplication Stage 2	87	Long Term
		Mundaring Trunk Main Duplication Stage 3	88	Long Term
		Mundijong Reservoir	20	Medium Term
		Mundijong-Tamworth Hill Trunk Main	17	Medium Term
		Nambeelup Distribution Mains	18	Medium Term
		Nambeelup Tank	18	Medium Term
		Neerabup Groundwater Expansion	30	Short Term
		Neerabup Reservoir	6	Long Term
		North Mandurah Distribution Mains	19	Medium Term
		North Mandurah Tank	19	Medium Term
		Perth Groundwater Replenishment Scheme Stage 2	28	Short Term
		Perth Groundwater Replenishment Scheme Stage 2	28	Short Term
		Perth Northern Pipeline Corridor	1	Long Term
		Pinjarra (Morrell) Distribution Mains	16	Short Term

Type	Description	Name	Map reference to Figs 21-24	Timeframe
		Pinjarra (Morrell) Tank	16	Short Term
		Pinjarra Distribution Mains	16	Medium Term
		Port Kennedy potential Treatment Plant	79	Long Term
		Serpentine-Wungong Trunk Main	20	Medium Term
		Stirling-Caddadup Trunk Main	10	Short Term
		Subiaco Groundwater Replenishment Scheme (GWRS)	27	Long Term
		Subiaco Groundwater Replenishment Scheme (GWRS)	27	Long Term
		Tamworth Distribution Main Upgrade	91	Long Term
		Tamworth Hill Reservoir	24	Long Term
		Thomsons Reservoir	22	Long Term
		Wanneroo Reservoir	7	Long Term
		Wanneroo South Groundwater Expansion Stage 1	31	Short Term
		Wanneroo South Groundwater Expansion Stage 2	32	Long Term
		Wanneroo West Groundwater Expansion	33	Long Term
		Wungong Trunk Main	21	Short Term
		Yanchep Groundwater Expansion	5	Medium Term
		Yanchep Groundwater Expansion	34	Medium Term

Figure 21: Proposed water and wastewater infrastructure (Central sub-region)

Figure 22: Proposed water and wastewater infrastructure (North-West sub-region)

Figure 23: Proposed water and wastewater infrastructure (North-East sub-region)

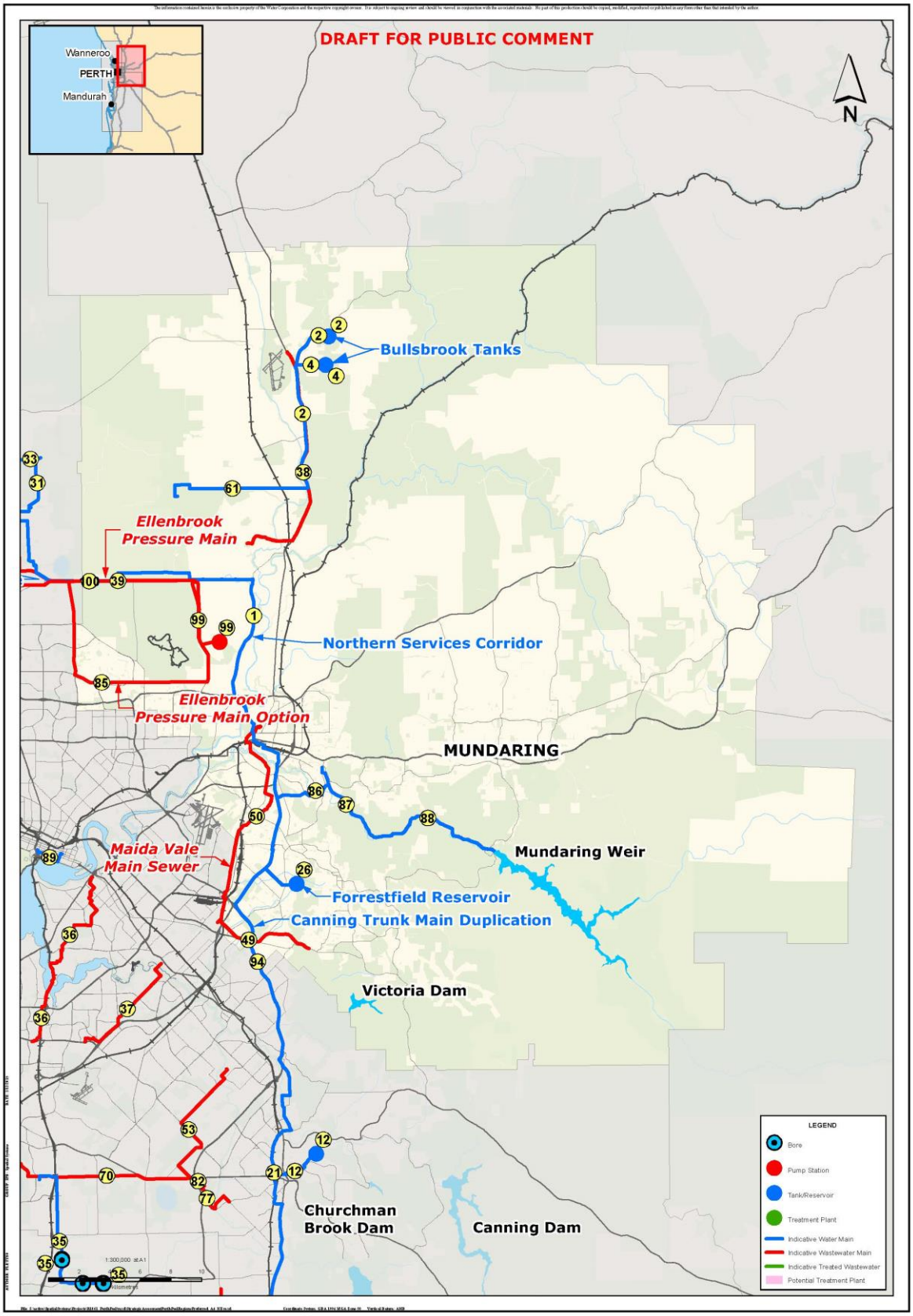


Figure 24: Proposed water and wastewater infrastructure (South Metropolitan Peel sub-region)