Department of Jobs, Tourism, Science and Innovation

Department of Jobs, Tourism, Science and Innovation ARUP

Western Trade Coast Infrastructure Strategy

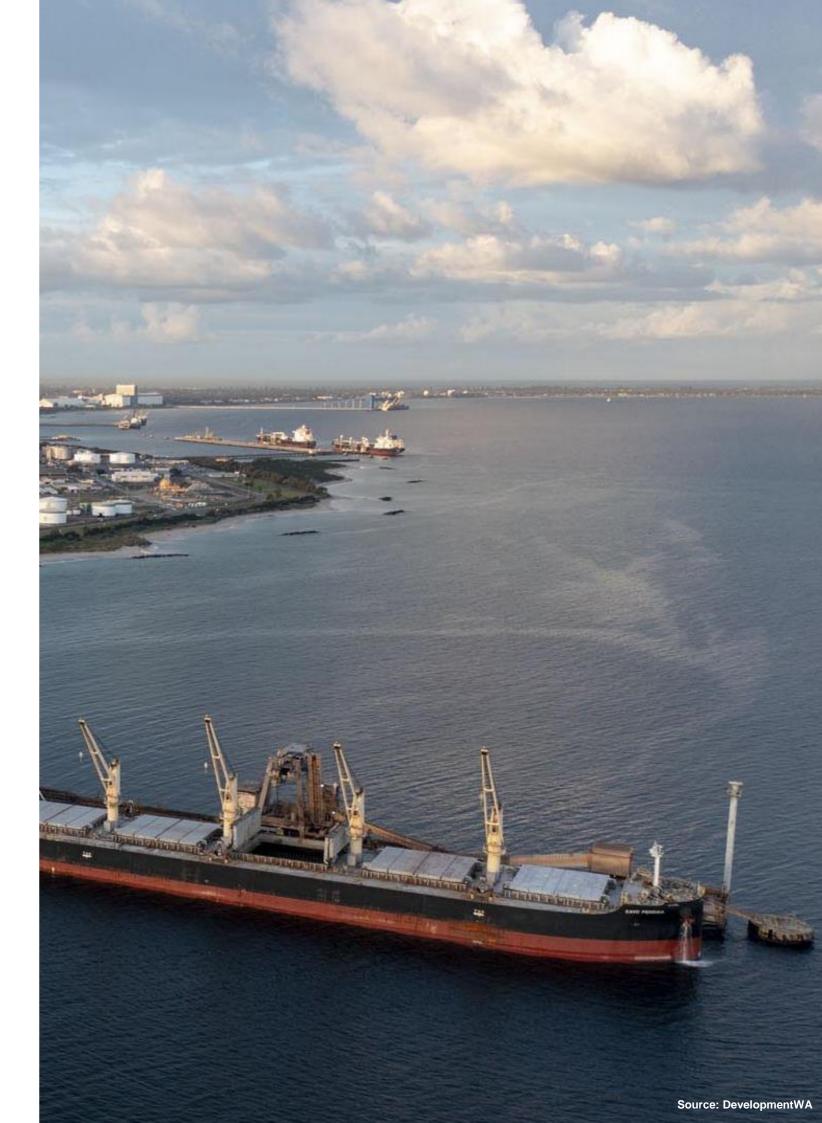






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Glossary

Term	Definition
ACCC	Australian Competition and Consumer Commission
AMC	Australian Marine Complex
ANI	Australian Naval Infrastructure
ARTC	Australian Rail Track Corporation
BESS	Battery Energy Storage System
BRT	Bus Rapid Transit
CBD	Central Business District
CUF	Common User Facility
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DMA	Decision Making Authority
DoT	Department of Transport
DWER	Department of Water and Environmental Regulation
EPA	Environment Protection Authority
ERWWTP	East Rockingham Wastewater Treatment Plant
ESG	Environmental, Social and Governance
FCEV	Fuel Cell Electric Vehicles
FPA	Fremantle Ports Authority
GAIH	Global Advanced Industries Hub
GTE	Government Trading Enterprise
IMT	Intermodal Terminal

Term	Definition
IRG	Industry Reference Group
IWSS	Integrated Water Supply Scheme
JTSI	The Department of Jobs, Tourism, Science and Innovation
KBB	Kwinana Bulk Berth
KBJ	Kwinana Bulk Jetty
KBT	Kwinana Bulk Terminal
KIA	Kwinana Industrial Area
KIC	Kwinana Industries Council
KWRP	Kwinana Water Reclamation Plant
LAF	Lead Agency Framework
LGA	Local Government Area
LVDD	Large Vessel Dry Dock
MAR	Managed Aquifer Recharge
MCA	Multi-Criteria Assessment
MOF	Material Offloading Facility
NBN	National Broadband Network
NSDDR	North-South District Distributor Road
PGP	Parmelia Gas Pipeline
PPA	Power Purchase Agreement
R&D	Research and Development

Definition	
Rapid Current State Assessment	
Rockingham Industry Zone	
Supply Chain Integrated Design	
Sustainable Development Goals	
Sepia Depression Ocean Outfall Landline	
Strategic Industrial Area	
Strategic Information and Land Use Plan	
Subject Matter Expert	
South West Interconnected Network	
South West Interconnected System	
South West Interconnected System Demand Assessment	
United Nations	
Western Australia	
Water Corporation	
Western Power	
Water Resource Recovery Facility	
Western Trade Coast	
Western Trade Coast Infrastructure Strategy	
Waste Water Treatment Plant	







Executive summary

Background

The Western Trade Coast (WTC) is an industrial area to the south of Perth, Western Australia (WA) that includes the Kwinana Industrial Area (KIA), Rockingham Industry Zone (RIZ), Australian Marine Complex (AMC), and Latitude 32 General Industrial Area (Latitude 32).

The WTC, as shown in Figure 0-1, supports a range of community and industrial activities, is one of the world's best examples of industrial symbiosis, and makes a substantial contribution to WA's economic vitality and trade.

As the amount of available land reduces and supporting infrastructure (including transport, utilities, and maritime) approach capacity, the WTC approaches a developmental crossroad.

These pressures threaten to inhibit the WTC's comparative advantages and its ability to build upon the unique opportunity presented.

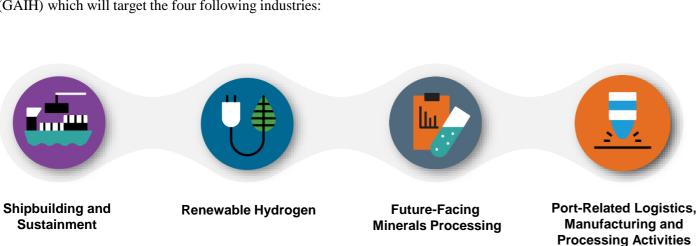
Concurrently, the government's economic agenda is shifting towards investment diversification and decarbonisation, as seen in initiatives like Diversify WA and the WA Climate Policy.

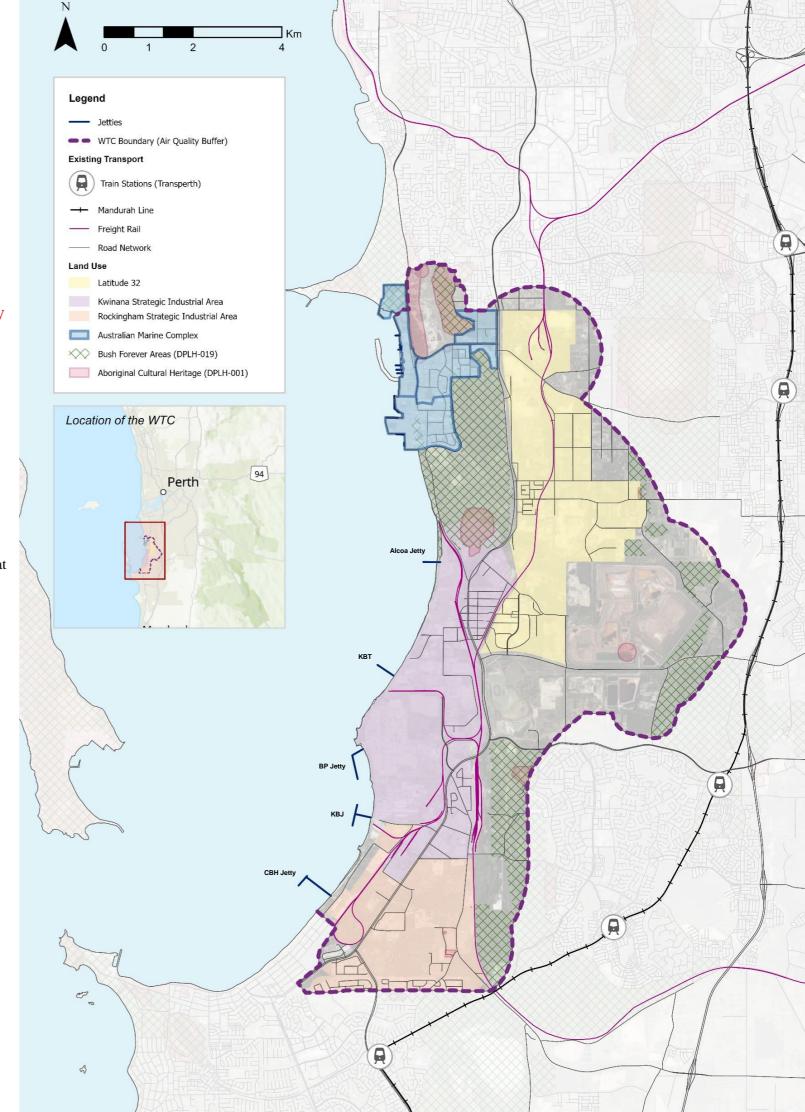
As part of this step change, The Government has pledged to turn the WTC into a Global Advanced Industries Hub (GAIH) which will target the four following industries:

The significant potential of the region, alongside its present and anticipated challenges, underscores the opportunity to create a Western Trade Coast Infrastructure Strategy (WTCIS) in collaboration with government and external stakeholders to guide its future.

The WTCIS will have been a success if, in 5+ years, the WTC has the following characteristics:

- New proponents within the four target industries (see Figure 0-1) are choosing to locate their facilities at the WTC.
- Existing proponents are able to adapt their facilities in response to market opportunities.
- · Existing proponents are not constrained by infrastructure.
- The WTC is an attractive destination for the workforce.
- The existing industrial ecosystem remains synergistic and effective.











Executive summary

Approach

A multi-stage process encompassing project planning, current state analysis, future state projections, constraint identification, option development, and then strategy consolidation has been undertaken over a 12-month period to develop the WTCIS.

The WTCIS seeks to realise the aims of the GAIH through 12 specific strategies which have been grounded in an extensive evaluation of current and future constraints.

Noting the intent to simultaneously tackle multiple constraints while delivering a range of benefits, each strategy proposed is:

- resilient to a spectrum of future scenarios,
- responsive to industry and able to drive coherence across service authorities, and
- a driver for attracting the four target industries to the WTC (renewable hydrogen, future-facing minerals processing, shipbuilding and sustainment, and portrelated logistics, manufacturing and processing activities).

Recommendation

The recommendations of the WTCIS encompass various measures to enhance transportation, utilities, maritime, and land use aspects within the region.

These include addressing road network congestion, improving heavy vehicle networks, increasing rail capacity and efficiency, enhancing port infrastructure, improving electricity availability, promoting renewable energy sources, upgrading wastewater networks, expanding water supply options, activating industrial areas, safeguarding utility corridors, and improving road utility and connections between precincts.

The overarching recommendation of the WTCIS is to action each strategy so the WTC can both fulfil its objectives, but also remain adaptable to a range of future scenarios.

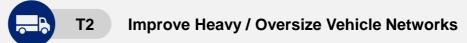
In the subsequent chapters, a set of 12 consolidated strategies, each with discrete and tangible project options, are explored in detail.

These strategies are comprised of infrastructure options and non-infrastructure supportive mechanisms to both dec-constrain the WTC and facilitate the transformation into a GAIH. These have been described and mapped in the WTCIS.

The following pages showcase this process diagrammatically, including summary maps that illustratively depict how the infrastructure options will fit together across the WTC.

Transport Strategies







Maritime Strategies



Increase Capacity, Resilience and Efficiency of Port Infrastructure

Utility Strategies









Land Use Strategies







Policy & Regulatory Framework Strategies



Streamline Approvals Processes

Constraints to Strategies to Options

Lack of Publicised KPI for Approvals Timeframes

The diagram illustrates Arup's strategic approach to overcoming constraints and advancing towards the objectives of the Global Advanced Industry Hub. It begins with a comprehensive review of constraints, followed by the development of an overarching strategy. This strategy encapsulates various options tailored to address specific constraints, each translated into actionable projects. These projects are depicted in a roadmap, outlining the sequential steps towards implementation. The aim is to significantly alleviate constraints, aligning with the overarching goals of the Global Advance Industry Hub.

By understanding the constraints of the WTC

onstraints	Worsening Freight and Passanger Vohicle Boad Congestion		
Transport (Road)	Worsening Freight and Passenger Vehicle Road Congestion		
(Itoau)	Lack of Available Car Parking Mason Rd / Rockingham Rd Congestion		
	Patterson Rd / Rockingham Rd Congestion		We can address these in a number
	Poor Active Transport Infrastructure		of broad strategies
	Poor Public Transport Connectivity		Strategies
	Russell Rd / Rockingham Rd Congestion		
	Thomas Rd / Rockingham Rd Geometry and Congestion		
	Anketell Rd Capacity Constraints		
	Road Acess and Congestion Durin Major Construction		
	Cockburn Rd / Rockingham Rd Congestion		
	Congested North-South Roads within Lat 32 (Wattleup, Rowley, Russell)		T1: Address Road Network Congestion
	Kwinana Beach Rd / Patterson Rd Congestion		Network congestion
	No Cycling Infrastructure in Proximity of WTC		
	Operations Overlap on Congested Road Network (Emergency Services, Wide Vehicles, Commuters) Rowley Rd Congestion - Mix of Residency and Industry Troffic		
	Rowley Rd Congestion - Mix of Residency and Industry Traffic		
	Stock Rd Congestion		
	AMC Pavement Insufficient for Heavy Vehicles		T2: Improve Heavy / Oversize Vehicle Networks
	Constrained Road Networks for Heavy/Wide Loads		Oversize vehicle Networks
	Restricted Vehicle Height at Rockingham Rd / Cockburn Rd due to Power Lines		T3: Increase Capacity and
	Road Access and Congestion During Major Construction		Efficiency of Rail Networks
	Operations Overlap on Congested Road Network (Emergency Services, Wide Vehicles, Commuters)		
Гransport (Rail)	Kwinana Rail Loop Planning Considerations		M1: Increase Capacity, Resilience and Efficiency of
(Itali)	Freight Rail Capacity Constraints		Port Infrastructure
Maritime	AUKUS - Restricting Marine Access	<u> </u>	
	Encroachment of Outer Harbour on AMC		
	Constrained Port Layout and Operations Limiting Movement of Trade	_//////	U1: Improve Electricity
	Insufficient Channel Depth for Large Vessels	_{/////////////////////////////////////	Availability
	Kwinana Bulk Jetty at Max Capacity	_///////////	U2: Increase the Supply of Renewable
	Kwinana Bulk Terminal at Max Capacity	/////////	Electricity and Fuels
	Ageing KBT and KBJ Infrastructure - Minimal Residual Asset Life	(///////	U3: Improve Capacity of
	Limited Jetty Length Impeding Larger Vessels	(/////////	Wastewater Network
	Limited Resilience of Shipping Channels	(///////	
	Limited Material offloading facility capacity		U4: Increase Availability of Water
Utilities	Electricity Supply Constrained		Supply Options
(Energy)	Limited Substation Capacity at Mason Rd		
	Limited Transmission Capacity of Existing Powerlines		L1: Activate Latitude 32
	Limited Available Land for Future WP Assets		
	Lack of Renewable Energy Supply to the SWIS		
	Lack of Common User Renewable Energy Infrastructure		
	Limited Access to Liquid Hydrogen / Renewable Fuels		L2: Establish and Maintain Common
Utilities	Limited Sewer Network within AMC		User Services Corridors
(Water)	Limited Industry Effluent Returns to SDOOL		
	Limited Sewer Network Within WTC Generally	/////////////////////////////////////	
	Constrained Recycled Water Network Capacity	/////////////////////////////////////	
	Insufficient Recycled Water Supply	/////////////////////////////////////	
	Lack of Groundwater Availability	<u> </u>	
Latitude 32 \	Underutilised Latitude 32 precinct		L3: Optimise Land Usage
Constraints			
Other -	Lack of Formal Pipeline Governance	/////////////////////////////////////	
Policy	Ramsar Wetlands Constraining Land	<u> </u>	
Process &	Mining Tenements and Related Material Extraction Requirements Restricting Development	'//////////////////////////////////	
Regulatory Frameworks	Land Availability		P1: Streamline
	Mining Tenements Constraining Land / Restricting Development	(//////////////////////////////////	Approvals Process
	The state of the s		
	DoT Land within AMC - Blocker to Expansion	////////////////////////////////////	
		 ///////////////////////////////////	
	DoT Land within AMC - Blocker to Expansion	_//////////////////////////////////////	
	DoT Land within AMC - Blocker to Expansion Lack of Large Land Parcels for Strategic Business Growth	<u> </u>	
	DoT Land within AMC - Blocker to Expansion Lack of Large Land Parcels for Strategic Business Growth Lack of Strategic Land Use Plan		
	DoT Land within AMC - Blocker to Expansion Lack of Large Land Parcels for Strategic Business Growth Lack of Strategic Land Use Plan Presence of Naval Base Shacks		
	DoT Land within AMC - Blocker to Expansion Lack of Large Land Parcels for Strategic Business Growth Lack of Strategic Land Use Plan Presence of Naval Base Shacks Buffer Zone Not Fit for Purpose for Some Potential Industrial Activities Fragmented Zoning / Sub-optimal Land Use		
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By suggesting a range of clear tangible projects that could be feasibly let to market **Tranche of Rockingham Road Intersection Upgrades** Rowley Road Extension Grade-Separation of at-grade Rail Crossings (between Westport and the Cockburn Triangle) **Develop an Integrated Public Transport Strategy North-South District Distributor Road Anketell-Thomas Road Freight Corridor Install Active Transport Infrastructure Build Heavy Vehicle Staging Areas into the WTC Road Network Duplication of Main Line** (Cockburn Triangle to Kwinana Triangle) **Install Alternative Kwinana Rail Loop Alignment** Improve Cockburn Triangle Configuration **Installation of Passing Loops** Westport Preferred Option (Navigation Channel, Breakwater, Terminal and Tug Harbour) **AMC North Common User Facility Development AMC South Expansion Strategy for Expansion of Material Offloading Capacity** New KBT **Tier 1 WP Upgrades** Tier 2 WP Upgrades **Tier 3 WP Upgrades Strategic Plan for Connecting New Tenants Common User Renewable Power Supply from Outside the WTC Installation of an Industry BESS** Common User Hydrogen / Low Carbon Fuel Station **Joint Power Purchase Agreements** SDOOL expansion **Extend WC Domestic Sewer Network throughout WTC** Expansion of KWRP (Tier 1) / KWRP (Tier 2) **Common User Raw Seawater Supply Scheme New Centralised Water Reclamation Plant** Managed Aquifer Recharge Infrastructure **Decentralised Treated Wastewater Reuse Scheme Review and Reallocate Groundwater Licences Extend WC Potable Water Network within Latitude 32** Implement Initiatives and Developments that Stimulate Economic Growth and Development in the Latitude 32 **Industrial Areas Safeguard Existing Corridors Seek Opportunities to Establish New Corridors**

Road and Utility Connection between Precincts

"Lead Agency Framework" and "Significant Development Pathway" to Consider Capacity Constraints and Relative Priorities Against all Projects to Support an Overarching Delivery Framework that Efficiently **Streamlines Approval Pathways for the WTC**

Approving Agencies Acting Under Their Own Mandate / Approval Responsibility

Government Undertake Continuous Improvement on Approval Streamlining and Coordination Consistent with

Streamline WA's Charter for the Council of Regulators'

Development Bottlenecks Identify and Consolidate Overlapping Approval Processes and Strengthen Collaboration between Regulators,

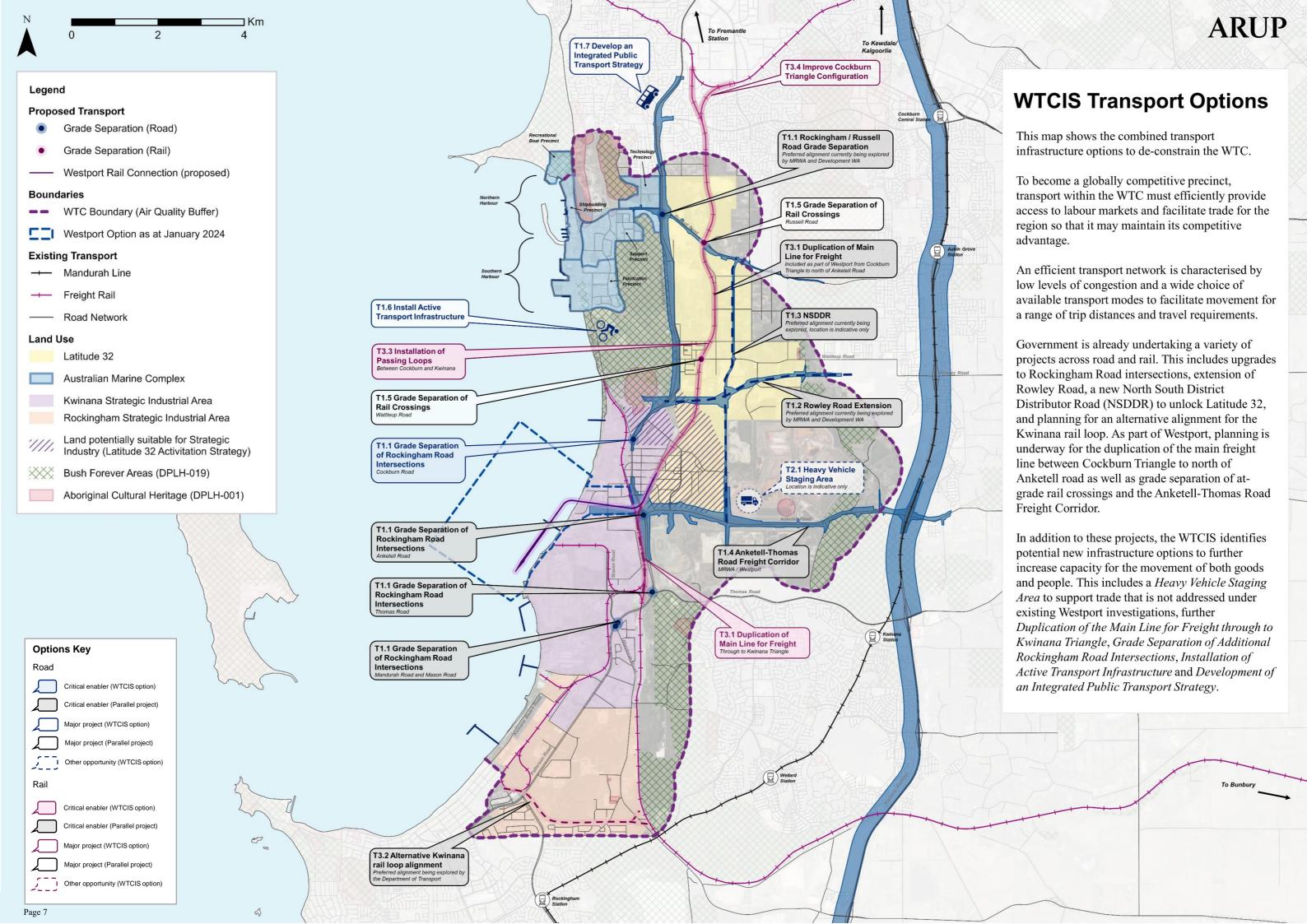
Implementation of Pre-set Conditions to Approval Requirements that Support Defined Infrastructure

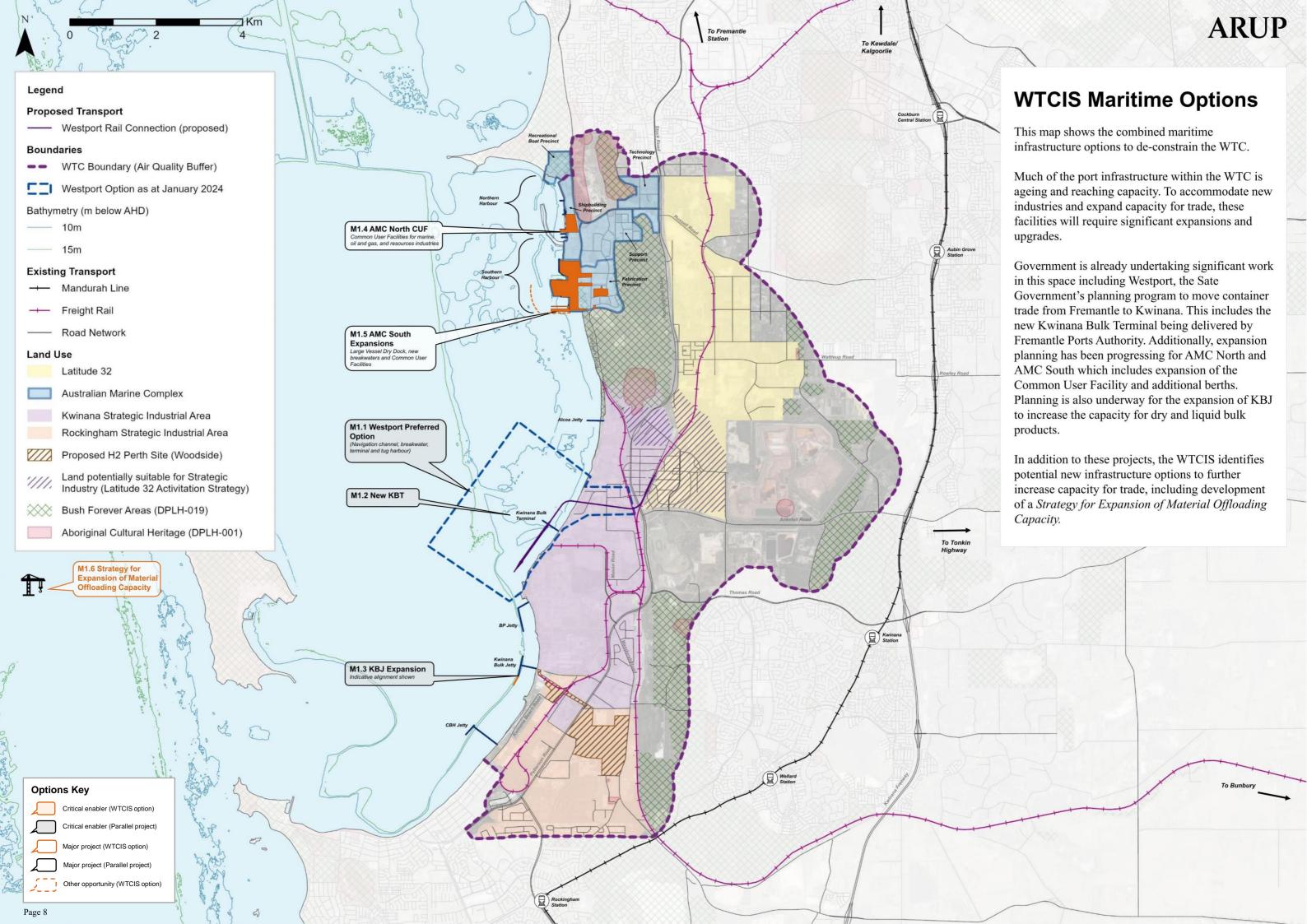
including Local Government Authorities

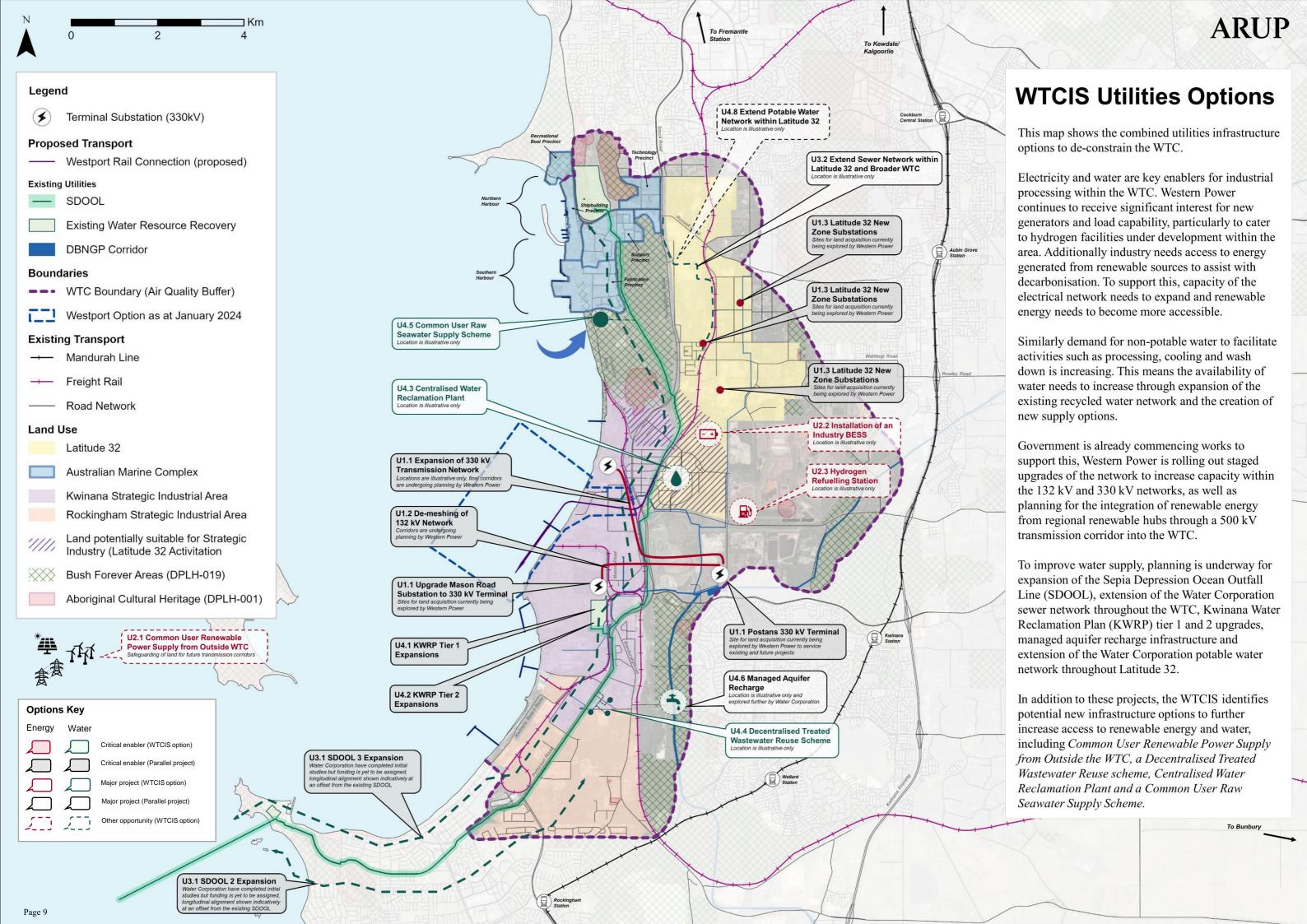
Categorisation of Approvals based on Level of Complexity

Time-bound and Tracked Approvals

Continue to Expand Functionality Under "Streamline WA" and Related "Approvals WA" Initiatives and Publish **Comprehensive Flowcharts for Approval Pathways**













About the Strategy

The WTCIS takes the following form:

Chapter 1

Background and Approach

Setting the scene for the WTCIS and an overview of the development process for the WTCIS, including key stakeholder engagement activities.

Chapter 2

Current State

Overview of the existing key infrastructure assets within the WTC and their associated constraints, gathered from research, stakeholder liaison and industry feedback.

Chapter 3

Parallel Projects

Summary of the projects already being explored by Government to de-constrain the WTC and how they relate to the proposed strategies.

Chapter 4

Foresight

Exploration of possible future states for the WTC to inform the development of resilient strategies and infrastructure options.

Chapter 5

Strategies and Options

Overarching strategies and targeted infrastructure options to de-constrain the WTC.

Chapter 6

Policy and Regulatory Settings

Overarching strategies and targeted non-infrastructure options to de-constrain the WTC.

Chapter 7

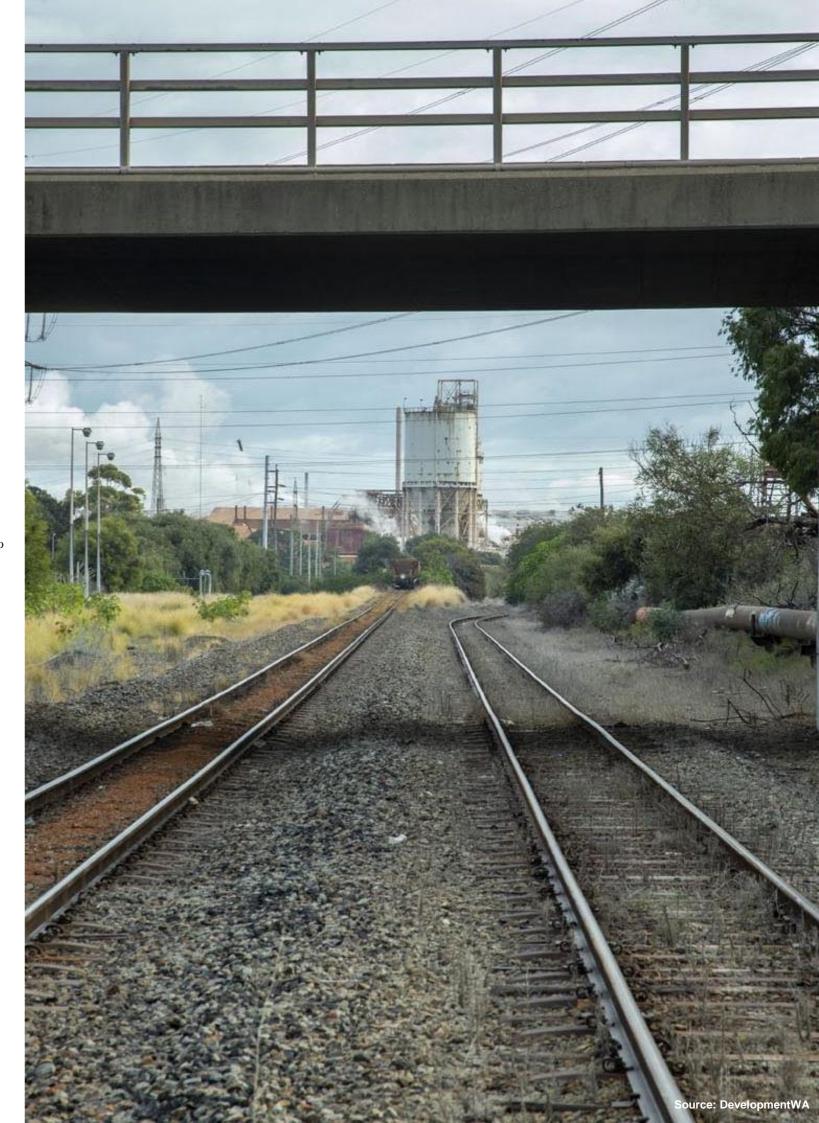
Implementation Plan

A plan for the implementation of the proposed infrastructure options in the WTC.

Chapter 8

Next Steps

A summary of practical next steps for the progression of the WTC towards the GAIH.











Background and Approach

1.1 What is the Western Trade Coast (WTC)?

The WTC (shown in Figure 1-2) is an industrial area to the south of Perth, WA that includes the KIA, RIZ, the AMC, and Latitude 32.

- KIA Serves as a hub for traditional heavy industrial operations, including petroleum and mineral refineries, power stations, chemical plants, cement works, and various ancillary industries. Designated as a Strategic Industrial Area (SIA).
- **RIZ** Initially conceived as a supplement to the Kwinana SIA to handle overflow, it services heavy industrial activities such as chemical, fertiliser and bitumen manufacturing, as well as general industrial land for freight movement and logistics. Designated as a SIA.
- AMC Catering to the defence, resources, and marine sectors, the AMC facilitates both heavy and general industrial activities through its Northern Harbour, Southern Harbour and Common User Facilities. Organised into five precincts: shipbuilding, fabrication, support, technology, and recreational boating.
- Latitude 32 Designed to complement the Kwinana and Rockingham SIAs, and AMC, Latitude 32 provides land to support major heavy and special industrial projects. It is the last remaining connected piece of land available in the WTC for development and is the subject of the Latitude 32 Activation Strategy.

1.2 GAIH Context and Objectives

WA's economy, historically reliant on mineral resources and downstream processing, aims to diversify as outlined in DiversifyWA, a strategy focusing on broadening industry investment for job creation.

Within this framework, the government is transforming the WTC into a GAIH, with "Land and Infrastructure" as a key focus area under the WTC Activation Strategy. The GAIH Initiative, led by a Ministerial Taskforce chaired by the Premier and advised by an Industry Reference Group, has six core success factors shown in Figure 1-1.

Figure 1-1: Critical success factors



Critical success factors supporting industrial development in the WTC

Available Land

Availability of developable industrial land and industry buffers to support strategic industry development.

Established Infrastructure

Established transport infrastructure providing pathways to market, and energy and water infrastructure providing critical electricity, gas and water supplies to support industry.

Skilled Local Workforce

A skilled, local and available workforce to support industry by virtue of its location within the greater Perth Metropolitan Region.

Regulatory Certainty

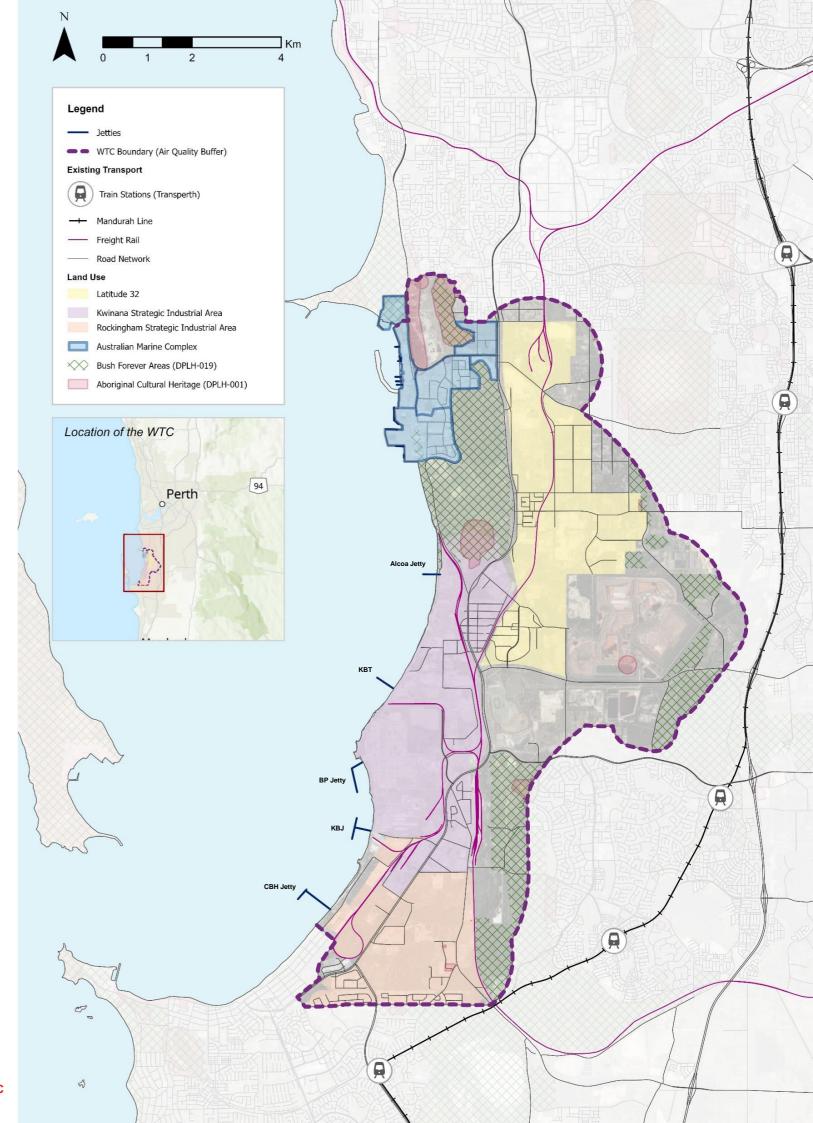
A stable policy and regulatory environment, allowing for the establishment of a heavy industrial area within the Perth Metropolitan Area.

Industrial Synergies

The symbiotic industry relationships provide a source of supply for key inputs, products and by-products for industries operating in the region.

Market Proximity

Strategically located within the Perth Metropolitan Area, with established freight infrastructure providing an efficient pathway to market for industries operating in the WTC.







Background and Approach

1.3 WTCIS Development Approach

The WTCIS has been delivered through a five-phase approach as shown in Figure 1-3.

Phase 1 | Inception and Project Planning

This phase involved the collation and assessment of background information, capturing the work done to date and its relevance to the WTCIS. This is tied to a database of relevant information, which was developed from deep stakeholder engagement with industry and Government subject matter experts (SMEs), used to inform the project methodology for efficient stakeholder engagement strategies.

Phase 2 | Current State Analysis and Future State Projections

Phase 2 involved conducting a current state analysis and developing future state projections.

- To understand the current state of the WTC a literature review was conducted, along with a data collection exercise, several site visits and stakeholder engagement sessions, particularly with Government Trading Enterprises (GTEs).
- In addition to the current analysis, Arup undertook comprehensive foresight work to inform future scenarios for strategic decision-making on infrastructure options in the WTCIS. This involved extensive research and stakeholder engagement to ensure resilience amidst evolving conditions, leading to well-informed sustainable solutions.

This phase served as the foundation for the development of wider project insights and focused largely on roads and rail, ports, and utilities (including gas, electricity, water, and wastewater).

Phase 3 | Constraints and Opportunities

The purpose of Phase 3 was to identify current and future constraints within the WTC and then suggest infrastructure solutions and non-infrastructure mechanisms that would allow the WTC to develop into its desired future state. This involved coordinating with government and industry stakeholders to pinpoint:

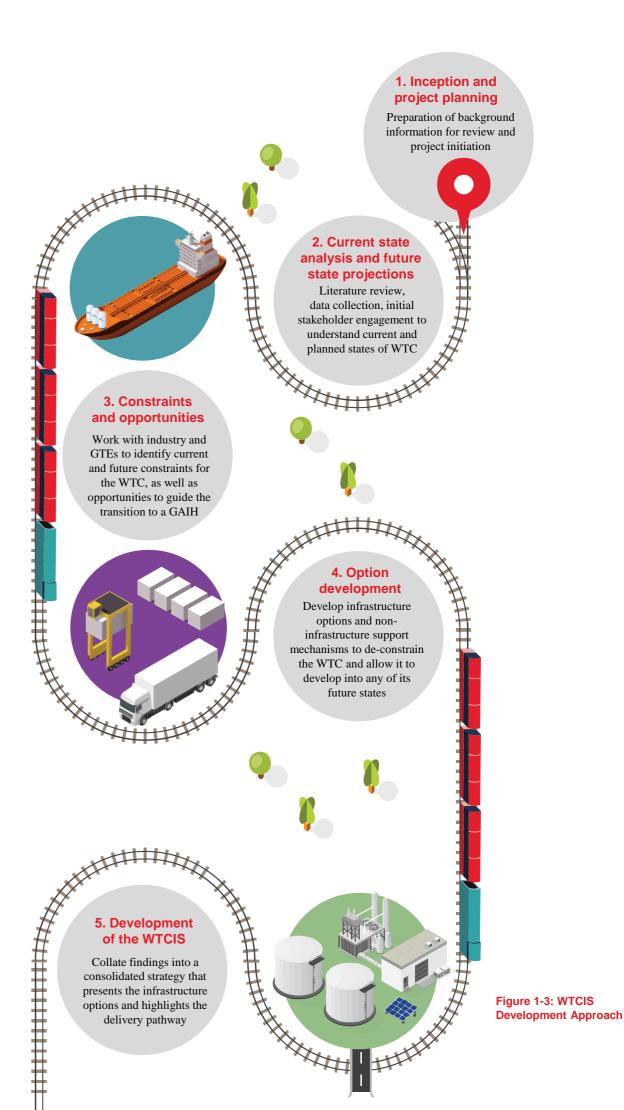
- Policy, regulatory, and economic barriers.
- Land assembly and non-infrastructure conditions, including environmental considerations, heritage sites and land contamination.
- Infrastructure-related constraints including road congestion, access to power and water, and the capacity of port infrastructure.

Phase 4 | Options Development

During Phase 4, a longlist options infrastructure and non-infrastructure solutions was formulated to effectively address the identified constraints and facilitate the transition to a GAIH.

Phase 5 | Development of the WTCIS

Phase 5 consisted of collating findings into a consolidated strategy that presents a shortlist of infrastructure options and highlights the recommended delivery pathway.









Background and Approach

1.4 Developing Strategies and Options

The core output of the WTCIS is a clear list of infrastructure options that works to de-constrain the WTC. The majority of these options were developed during Phase 4 of the workflow, as follows:

Considering the constraints:

Through extensive stakeholder discussions, desktop reviews, and research, various constraints hindering the WTC's potential as a Global Advanced Industries Hub were identified in Phase 3 and served as a core input into Phase 4.

As an example – the below data (gathered through Workshop B) showed a clear weighting towards the need to address transport issues in the WTC as part of Phase 4.

Activity 1 Activity 2 Maritime Road Rail Energy Utilities Multi Land Allocation Policy Environment

Workshop B Activity 1

asked attendees to outline any perceived constraints within the WTC. When triaged and categorized the constraints broke down across sectors as above.

Workshop B Activity 2

asked attendees to propose infrastructure options to deconstrain the WTC – when triaged and categorised the constraints broke down across sectors.

Grouping and analysis to inform strategies:

Once the depth and breadth of constraints were understood, they were grouped by discipline and a method of reverse summarisation was employed to identify a number of possible "fixes" to constraints.

For example, a strong message that came through was that the roads in the WTC are congested – so in simple terms, a core strategy for the WTC should be to address this road network congestion.

Infrastructure options development:

Once the goals of each overarching strategy began to emerge, these were then met with the identification of infrastructure proposals which would contribute to the overall goal.

For example, to reduce road network congestion there are multiple changes that would need to be made via a range of options. Each of these options were documented.

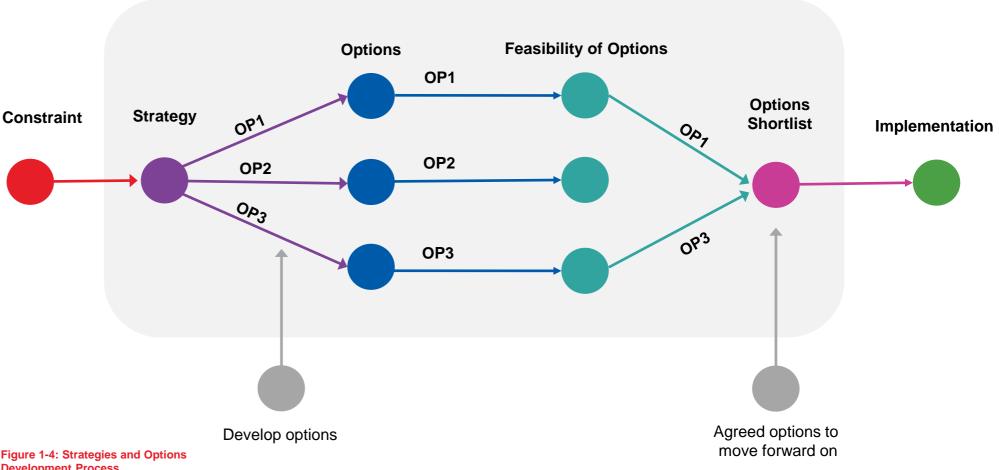
Arriving at this initial long list involved application of industry best practice reviews and consultation with subject matter experts.

Options shortlisting:

A first pass, fatal flaw analysis was conducted, evaluating all options to determine their viability.

Of those that still presented as looking likely to provide benefits, high level assessment were undertaken to test potential benefits, ease of implementation and resilience to future scenarios.

Those projects which stood out against each core review criteria were recognised as crucial for further study to unlock the region's potential and form the basis of options outlined in the WTCIS.



Development Process





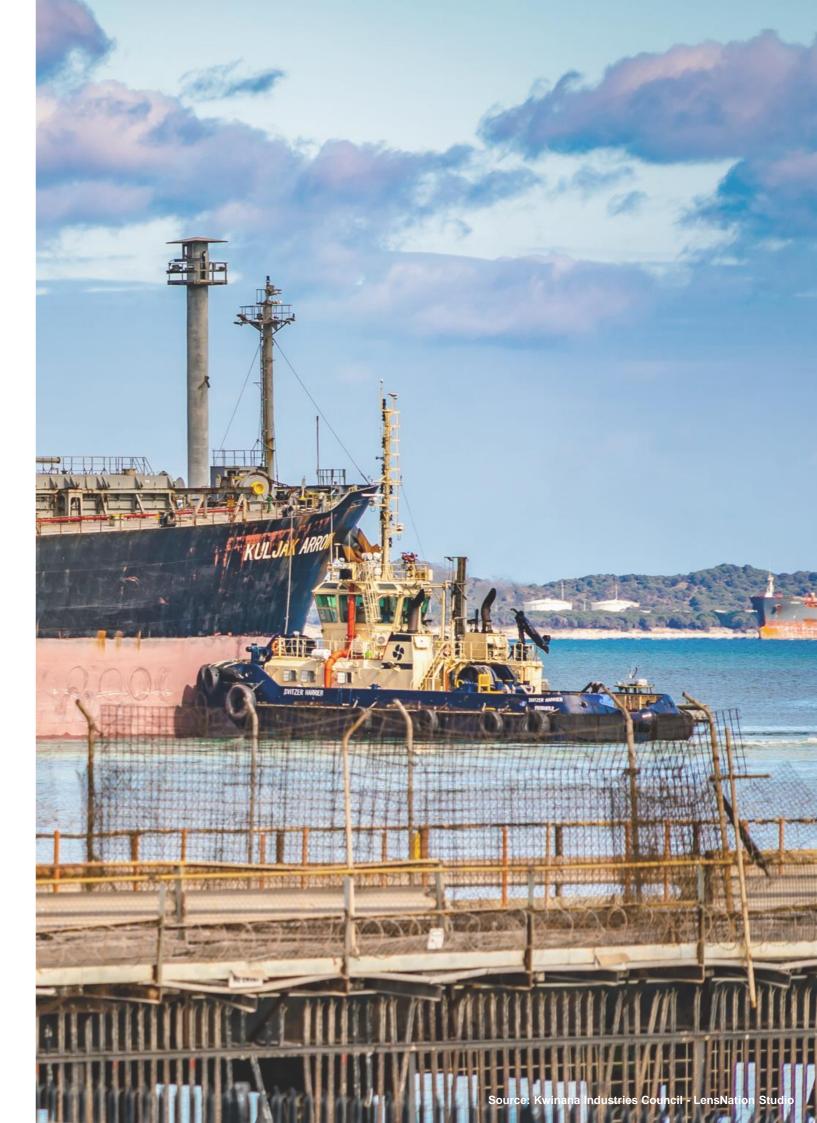
Background and Approach

1.5 Definitions

The terms outlined in Table 1-1 are used throughout the WTCIS with specific intent. Definitions for each term are provided for clarity and consistency.

Table 1-1: Definitions

Item	Definition	
Constraint	A limitation, restriction, or condition that acts as a hindrance to the current operations of the WTC and / or represents an obstacle to achieving the goals of the GAIH.	
Strategy	An overarching and aspirational strategy for de-constraining the WTC and facilitating its transition to the GAIH. Each Strategy consists of a series of related "Options".	
Option	An intervention which would help meet the aspiration of its associated strategy. Each Option is a tangible project which, could feasibly be delivered as a single package of works.	
Infrastructure	Physical infrastructure such as roads, bridge, pipelines, and ports.	
Non-Infrastructure	Non-physical infrastructure such as policies, processes and frameworks.	
Priority projects	Options which are yet to be assessed by Government.	
Parallel projects All proposed options that are currently being, or have previously been, studied by government. These projects have varying levels of government commitment, and a delivery timeframes. The WTCIS does not program these projects, rather it serves repository of the project specifics which can then be used by government to assess pipeline of capital projects.		
Current infrastructure	A project which physically exists today or will/has gained funding and is intended to be under construction within the next 4 years.	
Critical Enabler An Option that is considered fundamental to achieving the aims of a particular strat or a project that would need to be completed to allow other options to be deployed meaningfully.		
Major Project	A subsequent large-scale project that will significantly de-constrain the WTC.	
Other Opportunity	A potential avenue for additional development, improvement or diversification that will deconstrain the WTC and facilitate the transformation into a GAIH.	







Background and Approach

1.6 Stakeholder Engagement

The WTC has a rich and complex stakeholder environment reflective of the region's economic importance to WA.

Acknowledging that existing stakeholders have an intimate understanding of the WTC's current and future operations, the WTCIS has sought to be informed by the views of public and private stakeholders as much as possible.

To paint a clear picture of the constraints and how these might be addressed, Arup facilitated several workshops with key stakeholders (including the Industry Reference Group) and attended a site tour with Kwinana Industries Council. Arup also utilised the findings of previous studies that were directed and shaped by the Industry Reference Group (IRG). Inputs into these workshops included documents such as the GAIH Critical Issues Summary document.

In addition to the constraints, many of the recommended options identified in the WTCIS are based on input from stakeholders, industry and Government Trading Enterprises (GTEs).

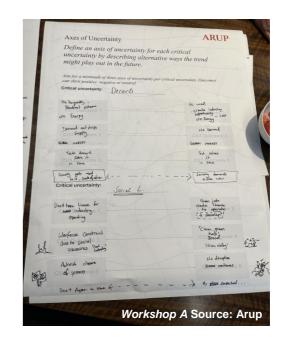
The success of the WTCIS is dependent on the collective "buy-in" of the WTC stakeholder community and as such, the study has endeavoured to be transparent and collaborative with all parties involved.

The main engagement activities conducted as part of the WTCIS are outlined in Table 1-2.

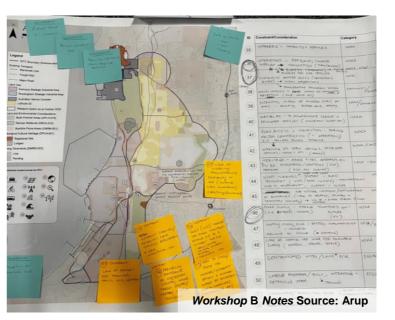
Table 1-2: Key Stakeholder Activities

Table 1-2: Key Stakeholder Activities				
Workshop/ Engagement	Purpose and activities	How did the outcomes inform the WTCIS?		
Workshop A	On 31st August 2023, 25 representatives from organisations within the WTC joined Arup and JTSI to discuss, assess, and prioritise external factors most likely to impact the future operating context of the area.	Considering external factors alongside known opportunities and constraints forms a rich picture capturing immediate issues and likely shifts in the WTC's external environment.		
Workshop B	On 19 th October 2023, industry representatives were given the opportunity to input into Phase 3 of the WTCIS. Participants considered critical land and infrastructure-based constraints impacting industrial development in the WTC and the possible options and opportunities to de-constrain these.	The additional constraints identified by industry were added to the final constraints map in Chapter 2. These were used to develop the strategies and infrastructure/non-infrastructure options presented in Chapter 5.		
GTE Liaison and Review Periods	Arup liaised with GTEs at key phases of the project's program. In August and September 2023, Arup worked with GTEs to confirm the current state of their respective networks and their long-term planning. In November and December 2023, Arup worked with GTEs to explore potential Options. In February 2024, GTEs had the opportunity to review the report's findings.	The GTE liaison process has supported the WTCIS in two ways. Firstly, it has ensured that the study has a thorough understanding of the current state of the WTC and secondly, it has validated the proposed options and ensured that they are generally aligned with long term planning.		
KIC Site Tour	Arup conducted a two-hour tour of the WTC on Wednesday, 9 August 2023, accompanied by CEO of Kwinana Industries Council, Mr Chris Oughton, to visually assess the constraints affecting the region. This opportunity also provided first-hand insight into several of the constraints confronting the area.	The first-hand, visual understanding, gained from the tour, coupled with direct insights into the region's constraints, directly informed the development of the strategy, by enabling Arup to discuss how we can tailor solutions aimed at deconstraining the region.		
Meetings	Arup undertook strategic planning meetings with the Ministerial Taskforce, Steering Committee, IRG and Land and Infrastructure Advisory Group (LIAG).	Provided crucial insights and recommendations which in turn guided the formulation of the WTCIS to comprehensively address regions challenges.		



















Background and Approach

1.7 Aboriginal Cultural Heritage

Effective Aboriginal engagement stands as a cornerstone to the successful implementation of the WTCIS. The recommendations within the WTCIS must operate as an interdependent system, with a central emphasis on the incorporation of Aboriginal knowledge. This integration will form a fundamental part of the next stages, ensuring enduring partnerships and positive community sentiment.

Aboriginal culture has a history dating back some 60,000 years and stands as the oldest living culture globally. Deeply woven into the fabric of the WTC region, this heritage holds profound significance for Aboriginal peoples.

In an endeavour to honour and integrate this cultural heritage, Aboriginal representatives from Whadjuk Aboriginal Corporation and Gnaala Karla Booja Aboriginal Corporation were included throughout the development of the WTCIS. Through active participation in workshops, key representatives were able to provide reflections on strategy discussions.

Specific feedback, particularly from Workshop B, emphasised:

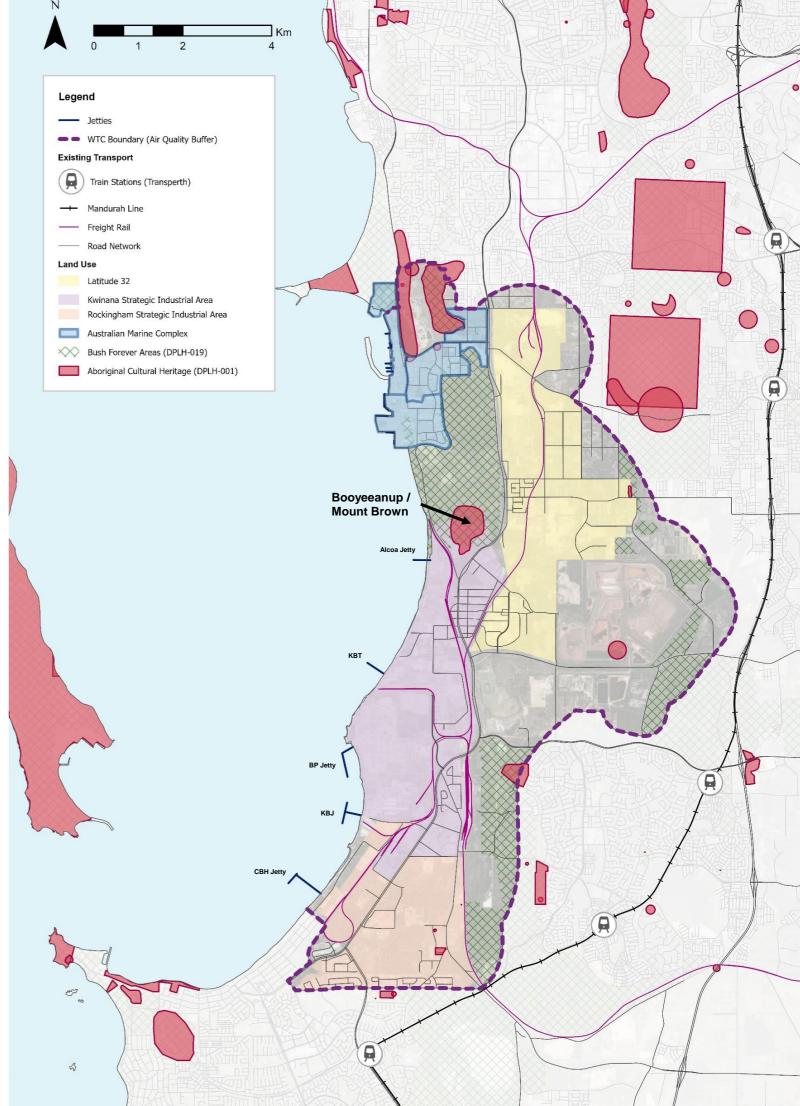
- The importance of utilising Aboriginal names for heritage places and safeguarding culturally significant areas like Booyeeanup / Mount Brown.
- A desire to provide Aboriginal training opportunities to meet the increasing workforce demands. This is a suggestion aligned with the parallel GAIH Skills and Workforce Workstream.

Further to the specific engagements, the WTCIS has included Aboriginal cultural considerations in the mapping exercise by referencing publicly available data sets such as the Aboriginal Heritage Places (DPLH-001) from the DPLH (Department of Planning, Lands and Heritage).

1.8 Next Steps

Ensuring respect for the area's heritage while addressing infrastructure needs effectively, will require early and ongoing engagement, as well as considered partnering with Traditional Owners in the decision-making

As such, it is recommended that the trajectory set forth by the WTCIS continues, with a clear focus on deepening culturally-sensitive discussions and integrating indigenous perspectives into all future infrastructure endeavours.











Current State

2.1 Introduction

To inform the WTCIS, Arup completed a Current State Analysis of the WTC which focused on existing infrastructure and non-infrastructure assets. This analysis involved a literature review of previous studies completed to date and provided an update to the Rapid Current State Assessment completed in May 2023. The objective of this analysis was to gain a thorough comprehension of the strengths, areas for enhancement, and primary challenges faced by the WTC.

These findings were integrated with industry and stakeholder feedback gathered during consultations to formulate the long list of constraints and considerations. This list will be addressed by the WTCIS.

This chapter provides a summary of the findings from Arup's Current State Analysis and the key constraints identified across transport, utilities and maritime.

2.2 Mapping

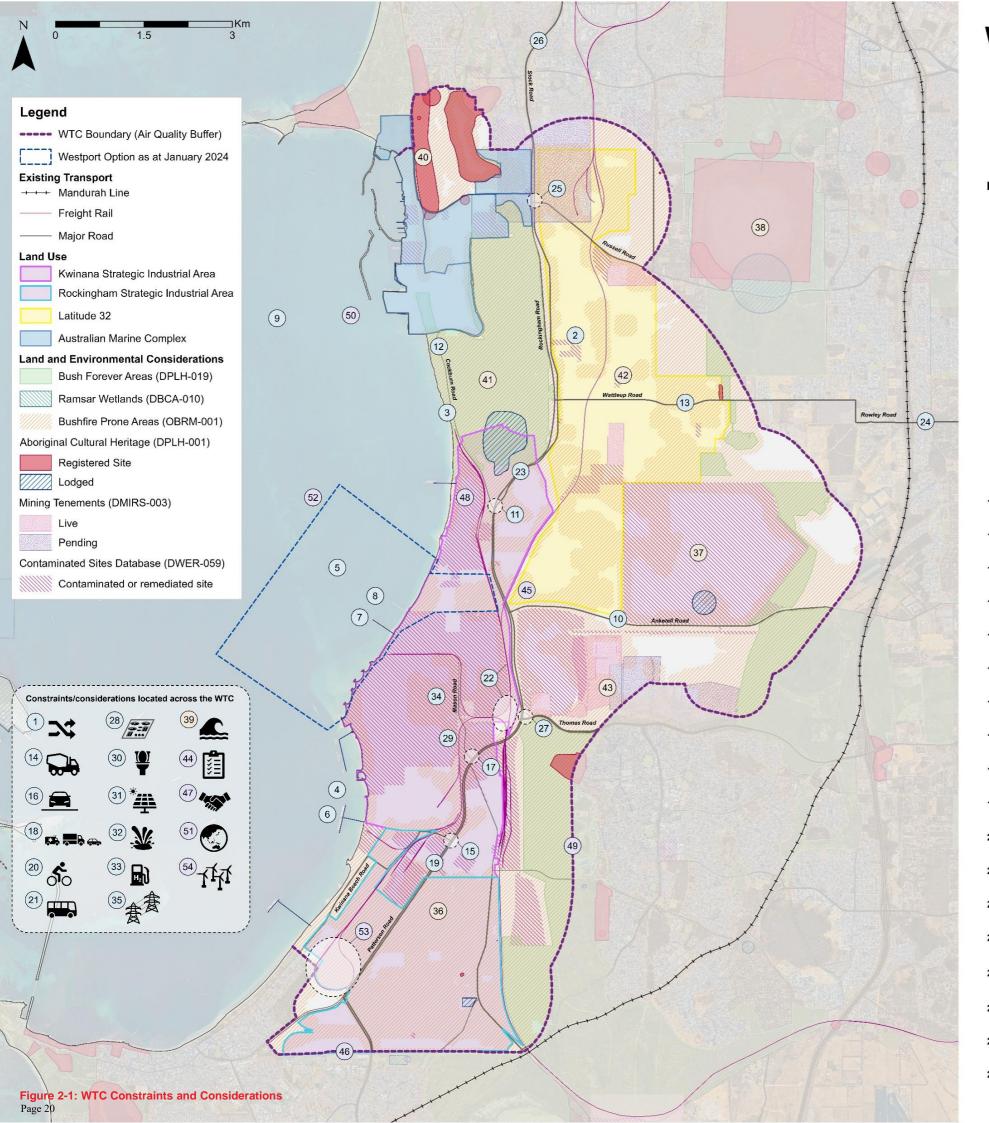
The WTC Constraints and Considerations map on the following page spatially illustrates the constraints and considerations while providing a visual representation of the context of surrounding infrastructure development. It outlines infrastructure constraints, such as existing road and rail networks, maritime channels, and utility corridors, which pose challenges for expansion and optimisation.

The map also highlights crucial land and environmental considerations, delineating areas of environmental sensitivity, protected habitats, and potential sites for sustainable development. Governmental and regulatory constraints are clearly depicted, indicating zones subject to specific regulations, planning restrictions, and permitting requirements.

With over 50 identified items, ranging from environmental protection areas to zoning regulations, the map serves as a comprehensive tool for understanding the multifaceted factors shaping the current state of the WTC.

Navigating the complexities of infrastructure development within the WTC requires a thorough understanding of the interplay between various constraints and considerations. The map not only serves as a visual guide but also as a strategic planning tool for stakeholders involved in the region's development.





WTC Constraints and Considerations $\ ARUP$

Type

Infrastructure Constraint

Land and Environmental Consideration

Governance and Regulatory Constraint

ID	Constraint/Consideration	Category	ID	Constraint/Consideration	Category
1	Lack of common user pipeline corridors	Land	28	Capacity constraints of recycled water assets	Utilities
2	Latitude 32 is disconnected and constrained	Land	29	Insufficient recycled water supply	Utilities
3	Presence of Naval Base Shacks	Land	30	Lack of available sewer network in the AMC and WTC generally	Utilities
4	Ageing KBT and KBJ infrastructure	Maritime	31	Lack of common user renewable energy infrastructure	Utilities
			32	Lack of groundwater supply	Utilities
5	Insufficient channel depth for large vessels Kwinana Bulk Terminal and Kwinana Bulk	Maritime	33	Limited access to liquid Hydrogen / renewable fuels	Utilities
6	Jetty operating at max capacity	Maritime	34	Substation capacity at Mason Road	Utilities
7	Limited jetty length impeding larger vessels	Maritime	35	Transmission capacity of existing powerlines	Utilities
8	Limited material offloading facility capability	Maritime			
9	Limited resilience of shipping channels	Maritime	36	Bushfire risk	Environmer
10	Anketell Rd capacity constraints	Transport	37	Contaminated sites constraining land use	Environmer
11	Cockburn Rd / Rockingham Rd congestion	Transport	38	Ramsar Wetlands	Environmen
12	Cockburn Rd congestion	Transport	39	Sea Level Rise	Environmer
13	Congested roads within Latitude 32 (Wattleup, Rowley, Russell)	Transport	40	Aboriginal Heritage	Land
14	Constrained road networks for heavy/wide loads	Transport	41	Bushforever sites	Land
15	Kwinana Beach Rd / Patterson Rd congestion	Transport	42	Limited remaining industrial land within WTC	Land
16	Lack of available car parking	Transport	43	Mining tenements and related material extraction requirements restricting development / constraining land	Land
17	Mason Rd / Rockingham Rd congestion	Transport	44	Approvals complexity for environmental	Governance and Regulat
18	Mixed operations on already congested road network (emergency services, wide vehicles,	Transport	45	Approvals complexity for new pipelines in rail corridors	Governance and Regular
19	commuters) Patterson Rd / Rockingham Rd congestion	Transport	46	Lack of action to preserve existing industrial interface zone	Governance and Regulat
20	Poor active transport infrastructure	Transport	47	Lack of cohesion from Cities of Kwinana, Rockingham and Cockburn to approve applications	Governance and Regulat
21	Poor public transport connectivity	Transport	48	Restriction of by-product reuse opportunities	Governance and Regulat
22	Rail between Cockburn and Kwinana capacity constraints	Transport	49	Industrial interface zone not fit for purpose for some potential industrial activities	Land
23	Restricted Vehicle Height at Rockingham Rd / Cockburn Rd due to Power Lines	Transport	50	AUKUS restricting marine access	Maritime
24	Rowley Rd congestion	Transport	51	Lack of international knowledge about WTC	Other
25	Russell Rd / Rockingham Rd intersection congestion	Transport	52	Uncertainty regarding Westport	Other
26	Stock Rd congestion	Transport	53	Kwinana Rail Loop planning considerations	Transport
27	Thomas Rd / Rockingham Rd intersection geometry and congestion	Transport	54	Lack of renewable energy supply to the SWIS grid	Utilities







Current State

2.3 Transport Infrastructure

The location of the WTC is in part determined by its role as a freight transport hub. It facilitates trade at the confluence of deep-sea access via Fremantle's Outer Harbour and inland freight corridors, both rail and road. As the function of the area evolves, the transport infrastructure needs to be maintained, renewed, and enhanced to meet changing demand, evolving supply chains and people movement.

Recommendations to address current and future constraints on transport infrastructure need to be cognisant of the status of the Westport project and its transport infrastructure enhancement works. Furthermore, infrastructure upgrades need to be targeted towards the competing demands of workforce access and freight movement.

Creating a clear strategy that addresses the needs of these competing transport demands is essential in the planning and provision of efficient transport infrastructure.

2.3.1 Roads

The road network has the dual task of facilitating trade via heavy vehicle movements and the movement of employees during commuting peaks. Both of these functions are currently impacted by traffic congestion. The road network in the WTC area contains heavy vehicle roads classified by the *Restricted Access Vehicle* (RAV) tandem ratings as illustrated in Figure 2-1.

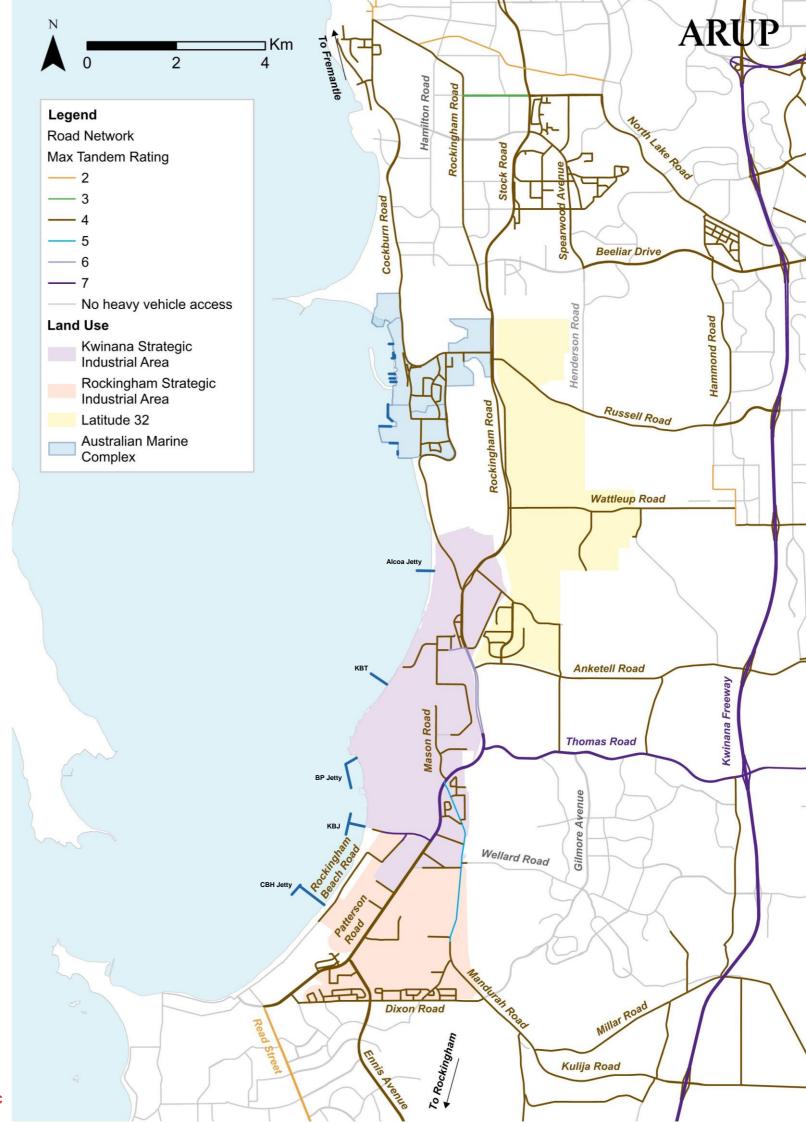
The broader strategic network of the WTC area comprises several arterial roads that function as key connectors and traffic distributors critical for multiple transport modes, in particular freight movements. These north-south and east-west connectors link the WTC to significant destinations across the state, and provide daily commuting routes for the workforce within the WTC. These are supported by the smaller road networks within the WTC that connect the precincts.

Kwinana Freeway runs along the eastern extent of the WTC area and provides key north-south connectivity to Perth CBD, other Perth industrial areas and the state's North (via Roe Highway) and the South West (continuing on as Forrest Highway). Several strategic network roads run east-west, connecting Kwinana Freeway to industrial zones within the WTC. These roads include Thomas Road, Anketell Road, Wattleup Road and Russell Road.

The Melville-Mandurah Highway, which comprises of Stock Road, Rockingham Road and Patterson Road provides the primary north-south arterial route through the WTC. It is well documented that this highway experiences heavy congestion, perpetuated by the mixed traffic demands from workforce commute, residential movements and heavy vehicles carrying goods.

Public transport services are provided via two bus routes (548 and 549). Both travel between Rockingham and Fremantle stations. The low frequency of services, poor patron amenity at bus stops, and the lack of connectivity results in low public transport patronage in the area.

In addition to road demands for movement, it has also been identified that the parking of vehicles is a significant issue at many locations across the WTC area. The parking issues are mainly associated with on-street and verge parking of employee vehicles on local access roads near to places of employment.









Current State

Active Travel

The low urban density of the WTC area and its surrounds leads to large distances between places of interest. Combined with a lack of walking and cycling infrastructure this results in low volumes of active travel users.

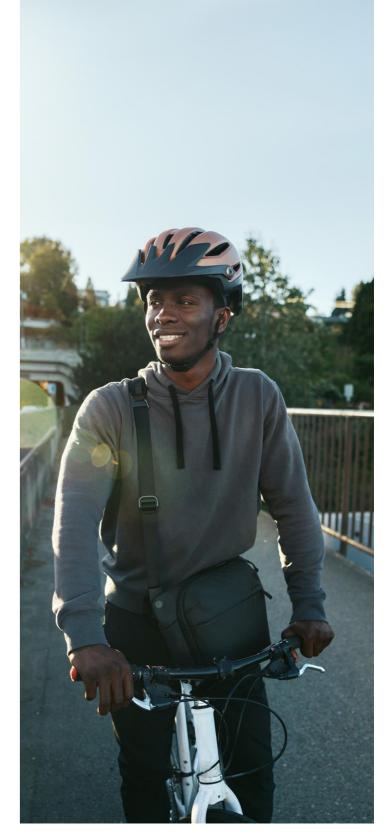
Summary

Based on the findings of the Current State Analysis and the feedback gained from industry during stakeholder consultation, 17 constraints related to road infrastructure were identified.

The constraints mostly relate to traffic congestion at key intersections and along corridors, as well as the mixed use of existing roads by residential traffic, heavy vehicles and worker commuting. This congestion impacts travel time reliability for businesses and workers and subsequent productivity inefficiencies. These constraints are summarised in Table 2-1.

Table 2-1: Road infrastructure Constraints

Constraint	Description
Anketell Road Capacity Constraints	Traffic congestion along Anketell Road impacting travel times, including workforce commuting.
Cockburn Road / Rockingham Road Congestion	Traffic congestion at the Cockburn Road and Rockingham Road intersection impacting travel times.
Cockburn Road Congestion	Traffic congestion along Cockburn Road impacting travel times.
Congested Roads Within Lat 32 (Wattleup, Russell) Traffic congestion along Wattleup Road and Russell Road within Latitude 32 impacting times.	
Constrained Road Networks for Heavy / Wide Loads	Traffic congestion as well as pavement strength of existing roads are unsuitable for heavy and wide load vehicles.
Kwinana Beach Road / Patterson Road Congestion	Traffic congestion at the Kwinana Beach Road and Patterson Road intersection impacting travel times.
Lack of Available Car Parking	Lack of on-site parking availability, road safety concerns and heavy vehicle accessibility impacts.
Mason Road / Rockingham Road Congestion	Traffic congestion at the Mason Road and Rockingham Road intersection impacting travel times.
Operations Overlap on Congested Road Network (Emergency Services, Wide Vehicles, Commuters)	Road safety concerns and congestion created by mixed journey types on the same road networks including residential traffic, WTC worker commuting, emergency services and heavy vehicles.
Patterson Road / Rockingham Road Congestion	Traffic congestion at the Patterson Road and Rockingham Road intersection impacting travel times.
Poor Active Transport Infrastructure	Limited footpath provision and discontinuity between existing paths. Lack of cycling facilities within the industrial areas of the WTC and shared use of key cycling routes such as Cockburn Road and Rockingham Road with high volumes of fast-moving traffic (including heavy vehicles).
Poor Public Transport Connectivity	Low service frequency of 548 and 549 bus routes, combined with limited amenities (such as benches and shelter) at bus stops. Routes do not align with where employees reside or with timing of work patterns, leading to longer travel time and preferences for passenger vehicles.
Restricted Vehicle Height at Rockingham Road / Cockburn Road Due to Power Lines	Clearance between road and electricity transmission lines too low for vehicles with high chassis and tall loads.
Rowley Road Congestion- Mix of Residential and Industry Traffic	Traffic congestion along Rowley Road impacting travel times, especially due to the higher proportion of residential traffic.
Russell Road / Rockingham Road intersection congestion	Traffic congestion at the Russell Road and Rockingham Road intersection impacting travel times.
Stock Road congestion	Traffic congestion along Stock Road impacting travel times, especially due to the higher proportion of residential traffic.
Thomas Road / Rockingham Road intersection geometry and congestion	Traffic congestion at the Thomas Road and Rockingham Road intersection impacting travel times.









Current State

2.3.2 Rail Infrastructure

Rail infrastructure provides a significant transport function for the inbound and outbound flows of goods within the WTC area. Figure 2-3 highlights both the freight network and passenger network in the region south of Perth. Generally, the freight rail network is separate from passenger services. There are exceptions at the Swan River crossing in Fremantle, where freight services share one of the two passenger tracks on the bridge, and on the South West Main Line where Perth to Bunbury (Australind) services share the line with freight services.

Freight Rail

Page 23

Fremantle Port has the highest rail mode share for container movements in Australia. Hundreds of bulk and container trains utilise Perth's freight rail network each week. ARC Infrastructure is the operator and access provider of the freight rail network in Perth. The highest freight rail activity occurs in the Kwinana Triangle servicing the WTC. The Kwinana Triangle serves as the only entry point into the KIA and RIZ and is already at capacity. Trains from both the north and south currently converge at the triangle with outbound trains within the WTC, resulting in congestion. The existing rail infrastructure requires upgrades to facilitate the future growth of the freight supply chain and rail operations planned for the WTC.

The section of track between the Cockburn Triangle and the Kwinana Triangle is also heavily congested. The single track (dual gauge) provides key access to the WTC from Fremantle, Kewdale, the Wheatbelt region and the Eastern States via the Australian Rail Track Corporation (ARTC) network to the east of Kalgoorlie.

Passenger Rail

There is no passenger rail line within the WTC. The Mandurah Line runs parallel to the WTC's eastern boundary. As shown on Figure 2-2, the following five stations are in the vicinity of the WTC:

- Cockburn Central Station
- Aubin Grove Station
- Kwinana Station
- · Wellard Station
- Rockingham Station

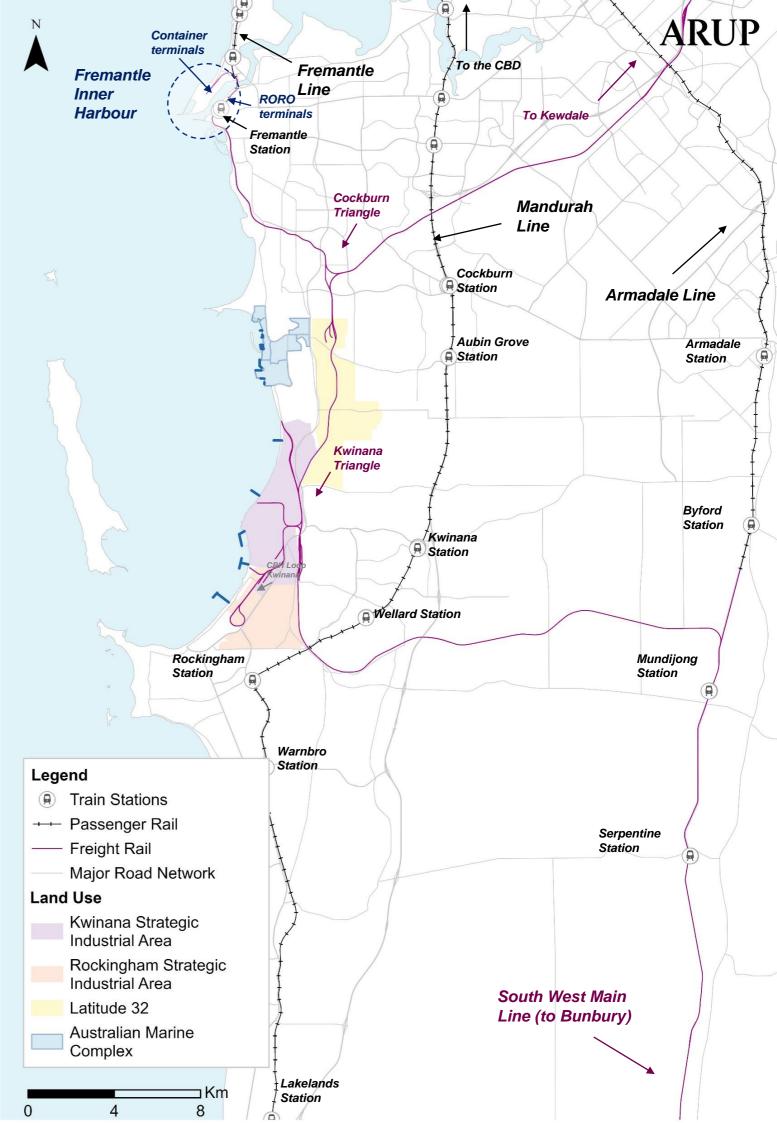
Summary

Based on the feedback gained from industry during stakeholder consultation, three constraints related to rail infrastructure have been identified. These constraints are summarised in Table 2-2:

Table 2-2: Rail infrastructure Constraints

Constraint	Description
Rail between Cockburn and Kwinana capacity constraints	Freight rail network between Cockburn and Kwinana operating at capacity and requires intervention to support future growth.
Kwinana Rail Loop planning considerations	The previous alignment identified by the 2016 working group raised issues for residential areas and industry. As part of Westport a new alignment is being explored.
Poor public transport connectivity	Poor connectivity between WTC and Mandurah passenger rail limiting modal choices for workforce commuters.

Figure 2-3: WTC Rail Network and Surrounds









Current State

2.4 Utilities

2.4.1 Electricity

Electricity is critical to industrial activities within the WTC, providing power to support the array of manufacturing and production processes, as well as essential functions such as lighting and thermal control for workplace settings. As proponents look to decarbonise their operations in line with net zero emission targets, the source of generation for electricity becomes equally as important as access. Therefore, future infrastructure works for electricity will need to target not only electricity availability, but also renewable energy generation.

The WTC is connected to the South West Interconnected System (SWIS). The South West Interconnected Network (SWIN) within the SWIS is owned and operated by Western Power. Over the last 20 years the network has been transitioning to renewable energy, primarily through the uptake of rooftop solar including by tenants in the

WTC. While renewable energy has been increasing as a proportion of total generation, the SWIS is still predominantly fossil-fuel based, as shown in Figure 2-4. Strategies for decarbonisation of the SWIS are outlined in the SWIS Demand Assessment (SWISDA), which highlights that 2 GW of electricity demand growth would come from industries within the Kwinana Industrial Area seeking to decarbonise through the electrification of operations via a grid connection.

The existing electrical network within the WTC is shown in Figure 2-5. It consists of several gas-fired power plants, government-owned substations, large scale battery storage and a network of 66 kV, 132 kV and 330 kV transmission lines. Due to the heavily meshed nature of the 132 kV network, the grid is at capacity and requires network augmentation. The 330 kV network is currently under-utilised in the area.

Annual SWIS generation output

Fuel ● Coal ● Gas ● Diesel ● Other renewables ● Solar ● Wind ● Distributed solar

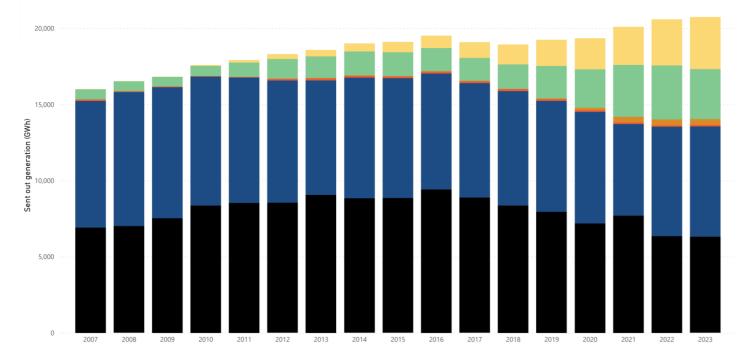


Figure 2-4: Annual SWIS Generation Output (source: Energy Policy WA using Australian Energy Market Operator and Clean Energy Regulator data)

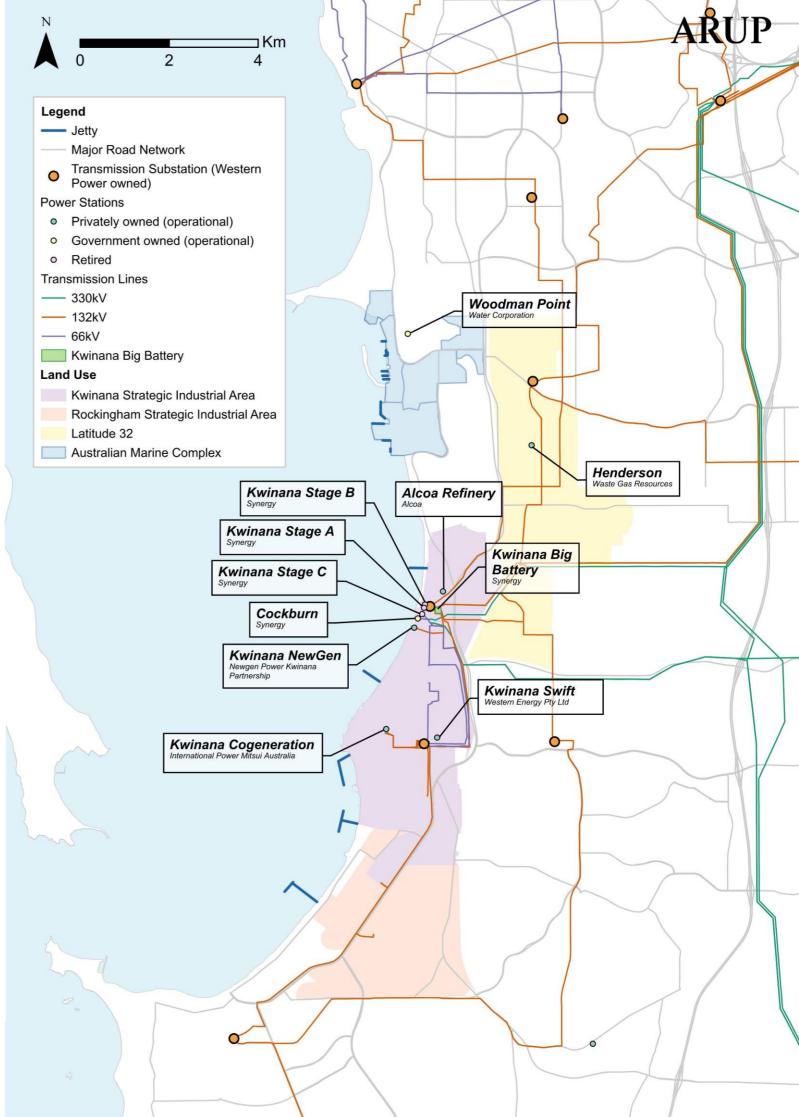


Figure 2-5: WTC Electrical Network







Current State

Summary

Based on the findings of the Current State Analysis and the feedback gained from Government and industry during stakeholder consultation, five constraints related to Electricity Infrastructure were identified. These are summarised in Table 2-3.

Table 2-3: Electricity infrastructure Constraints

Constraint	Description
Lack of common user renewable energy infrastructure	Lack of renewable electricity supply limits the ability for proponents to achieve their decarbonisation targets.
Limited access to liquid hydrogen / renewable fuels	Lack of access to common user renewable fuel facilities limits the ability for stakeholders to decarbonise their fleets (especially for heavy vehicles).
Substation capacity at Mason Road	Limited capacity remaining at Mason Road substation (132 kV) which limits the ability for new connections.
Transmission capacity of existing powerlines	Limited capacity remaining in the 132 kV network which makes it unsuitable for connection to new generation assets without augmentation.
Lack of renewable energy supply to the SWIS grid	Lack of renewable energy supply (particularly overnight) in the SWIS limits the ability for tenants to decarbonise their industrial activities.









Current State

2.4.2 Water and wastewater

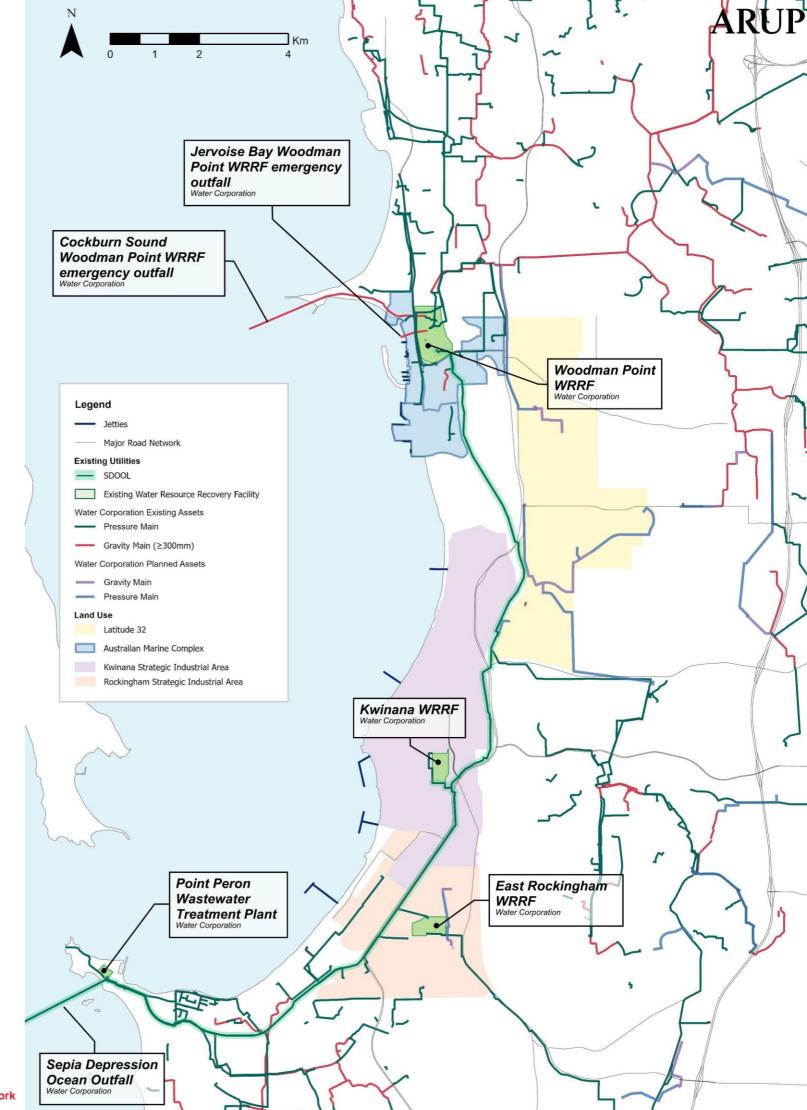
The WTC is historically a region of intensive water use, with industry using water for a variety of activities including industrial processing, cooling, wash down, potable use and dust suppression.

Previous studies have projected that water demand at the WTC will continue to increase as new major projects commence operations and existing facilities expand. Furthermore, two of the target industries for the GAIH Initiative, Hydrogen Production and Future-Facing Minerals Processing require very large volumes of water for cooling, industrial processing, or as a feedstock. As such, securing and delivering fit for purpose water supplies to industry is considered a fundamental requirement for delivering the GAIH Initiative's objectives.

According to a 2016 study by DWER, water at the WTC is primarily supplied from groundwater (57%), recycled water (17%), potable scheme water (13%) and other sources (including stormwater re-use, 12%).

Wastewater in the WTC consists of a combination of domestic sewer and industrial wastewater disposal. Wastewater is generally conveyed via the Water Corporation network to a series of treatment plants. Treated wastewater is ultimately conveyed via the Sepia Depression Ocean Outfall Line (SDOOL) to the Cape Peron Outfall where it is disposed offshore. Some of this treated wastewater is taken from the SDOOL and treated for industrial use. In turn, industry also returns effluent streams to the SDOOL.

As recycled water is a significant component of the region's water supply network, the water and wastewater networks at the WTC are intrinsically linked. The wastewater network within the WTC is shown in Figure 2-6.









Current State

Groundwater

Groundwater is a relatively low-cost water supply source for industry and as such, is in high demand within the WTC. However, the available supply is very limited with the current Cockburn Groundwater Allocation Plan identifying that "Groundwater resources in the plan area are now either fully or over-allocated. It is unlikely that the department will grant more water from a fully or over-allocated."

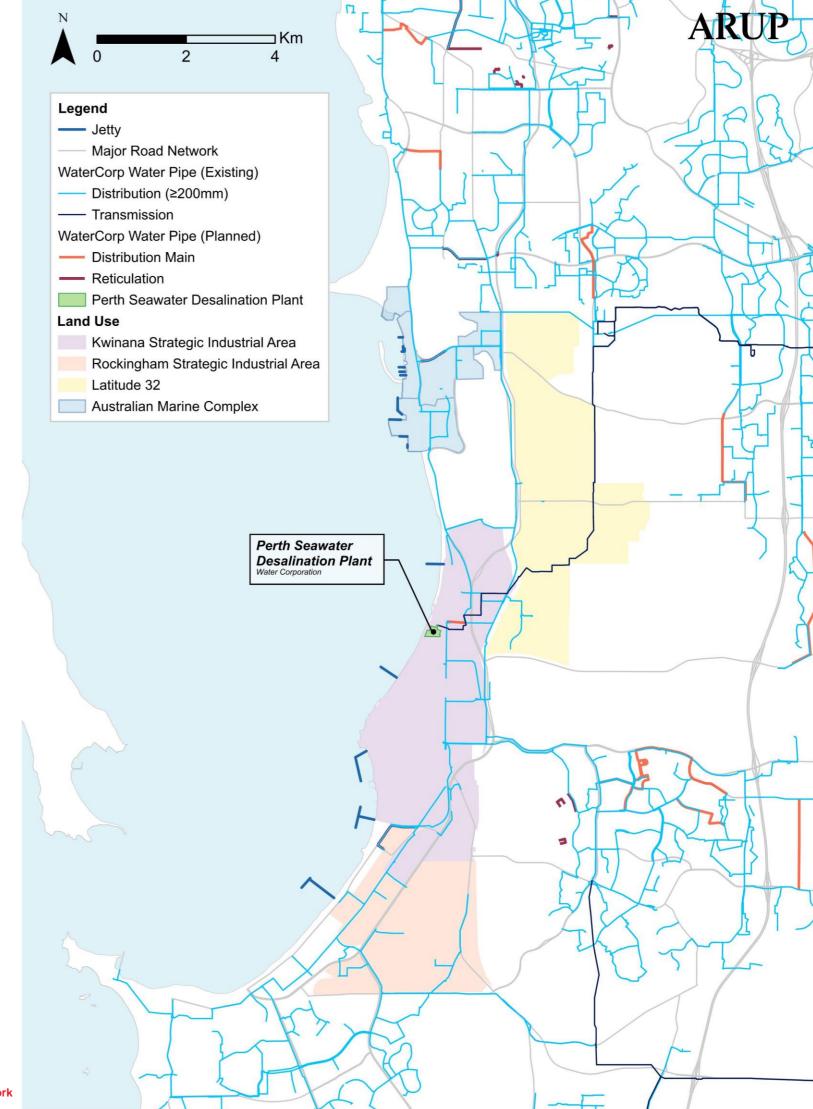
Potable Scheme Water

Potable quality water throughout the WTC is provided via the Water Corporation's Integrated Water Supply Scheme which serves much of the South West of WA. The Integrated Water Supply Scheme (IWSS) is made up water sourced from desalinated seawater, treated groundwater, dams and groundwater replenishment. Within the WTC, there is a robust network of distribution and reticulation mains supplied predominantly by Tamworth Reservoir in Baldivis (to the south) and Thompsons reservoir to the Northeast of Kwinana.

Water from WC's supply scheme is of a higher quality than groundwater or recycled water supply but is more expensive per kL. It is understood that due to the lack of available groundwater and recycled water supply, potable water is used for many industrial activities in the WTC even when lower quality water would suffice.

Water Corporation's Perth Seawater Desalination Plant (PSDP) is located within WTC and currently produces 50 GL / year of water for the IWSS. This is a critical asset for the wider metropolitan region's water supply. Water Corporation have plans to double the capacity of this plant through their PSPD2 project. Whilst this upgrade is critical for securing supply for the wider Water Corporation network, it is not considered an "Option" for the purposes of this study as the primary issue currently at the WTC is the availability of alternatives to potable water.

The WTC potable water network is shown in Figure 2-7.









Current State

Wastewater / Recycled Water Networks

Wastewater is conveyed via a network of gravity-fed mains and pressure mains to several water resource recovery facilities (WRRFs) in the region. The Sepia Depression Ocean Outfall Landline (SDOOL) runs northsouth through the centre of the WTC and currently conveys a total of approximately 70 GL / year of wastewater. There are four treatment plants in the vicinity of the WTC plus the Kwinana Water Reclamation Plant which produces recycled water.

Recycled Water is non-potable scheme water used for industrial purposes in WTC. The Water Corporation currently delivers approximately 3.2 – 3.5 GL / year of scheme recycled water to several proponents within the Kwinana area through their Kwinana Water Reclamation Plant (KWRP) and its associated recycled water pipe network.

The wastewater network in the WTC is shown in Figure 2-8.

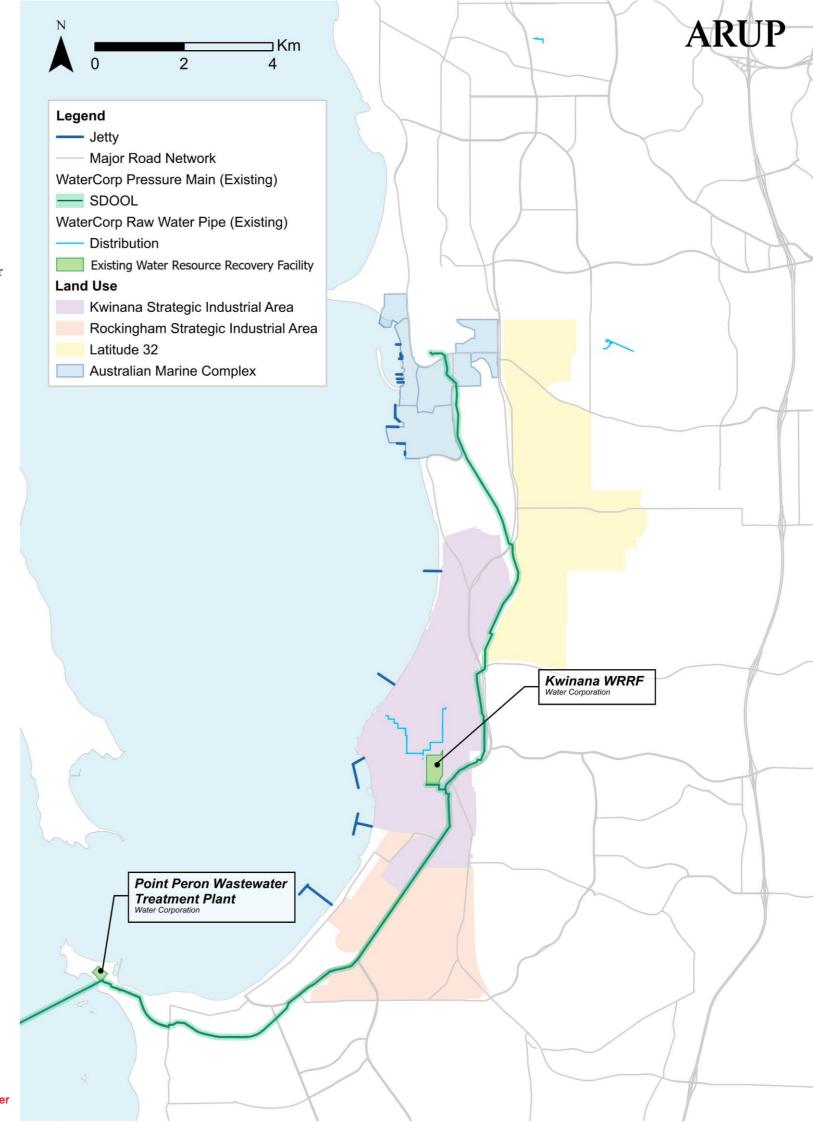
Summary

Based on a review of previous studies, liaison with Water Corporation and, workshops with Government and industry representatives, four constraints have been identified relating to the provision of water and wastewater at the WTC. These are summarised in Table

Table 2-4: Water and wastewater infrastructure constraints

Constraint	Description
Limited sewer network within the AMC and WTC generally	Due to insufficient access to the Water Corporation sewer network, a limited number of proponents are required to treat their own domestic waste on site.
Constrained wastewater network capacity	The SDOOL is nearing capacity as well as some of the existing WRRFs. This may be restricting the wastewater volumes that particular industries can convey into Water Corporation's network.
Insufficient recycled water supply	The supply of recycled water to proponents throughout is limited by the capacity of KWRP, the quality of the treated wastewater in the SDOOL and the extent of the recycled water network. There is industry demand for additional recycled water in the WTC as it is cheaper than potable scheme water
Lack of groundwater availability	Groundwater resources within the WTC are fully allocated. Industry demand for groundwater is high given its cheaper cost.

Figure 2-8: WTC Wastewater Page 28









Current State

2.4.3 Natural Gas

Large users of natural gas within the WTC receive their supplies primarily from the following networks:

- Dampier to Bunbury Natural Gas Pipeline (DBNGP) owned and operated by Dampier Bunbury Pipeline which is part of Australian Gas Infrastructure Group (AGIG);
- Parmelia Gas Pipeline (PGP) owned and operated APA group; and
- ATCO Gas Network supplied via the DBNGP or PGP, the ATCO network supplies gas to consumers throughout the Perth metropolitan area.

The WTC natural gas network is mapped in Figure 2-9.

DBNGP

The DBNGP pipeline runs northwest-southeast to the intersection of Thomas Road and Abercrombie Road where CS10 is located. It consists of three different pipes ranging in diameter from 200 mm to 500 mm. The pipeline branches into BP-KW and BP-RK to serve the users at the WTC. The pipeline delivers gas to outlet points at Alcoa Kwinana, Cockburn Power Station, NewGen Kwinana CCG1, HEGT, and to outlet points supplying the distribution systems at Barter, Thomas, Mason Roads and Burton Place.

PGP

The PGP is owned and operated by APA Group. The pipeline transports gas from the Perth basin gas field near Dongara (south of Geraldton), the Carnarvon Basin (via DBNGP) and APA's Mondarra Gas Storage Facility. It services BP and Alcoa.

Summary

Based on liaison with APA and AGIG, there are some concerns regarding the availability of land if industry demand or technological shifts dictate augmentation of their existing networks. These constraints are summarised in Table 2-5.

Table 2-5: Natural Gas infrastructure constraints

Constraint	Description	
Lack of land availability for expansion	Lack of corridor space within the WTC may restrict the ability of AGIG / APA to upgrade or re-purpose their assets.	
Approvals complexity for new pipelines in rail corridors	Governance of infrastructure corridors interacts with existing gas assets and may inhibit the ability to upgrade gas networks.	

ARUP ⊐Km Legend Jetty Major Road Network Major Gas Users Gas Station ATCO Distribution Network — Existing High Pressure Gas Main — Proposed High Pressure Gas Main National Gas Pipelines — Parmelia Piepline (APA) — DBNGP (AGIG) Other Laterals **Land Use** Kwinana Strategic Industrial Area Rockingham Strategic Industrial Area Latitude 32 Australian Marine Complex Alcoa Refinery Cockburn **Power Station** Kwinana NewGen Compressor Station 10







Current State

2.5 Maritime

The WTC is an important maritime hub for both military and freight, serving as a critical connection point for local industries to global markets. It is also the proposed location for Westport, Western Australia's new container port which would relocate operations from Fremantle Port as it approaches its capacity. Key maritime areas within the WTC shown in Figure 2-10 include:

- Kwinana Bulk Terminal (KBT)
- Kwinana Bulk Jetty (KBJ)
- Privately owned jetties (Alcoa, BP and CBH)
- AMC North and South Harbours

2.5.1 Westport

The State Government established the Westport Taskforce and resultant Westport office to oversee optioneering, rapid BCR and subsequent full business case for a potential new container port to service Western Australia's needs for at least 50 years. The land-backed container terminal location at the extension of the Anketell Road corridor was identified by Government in 2020. A preferred design was announced at the end of 2023, which impacts and requires rebuild of the Kwinana Bulk Terminal.

Much of the jetty infrastructure within the WTC is ageing and reaching capacity. A new shipping channel will be dredged as part of the Westport project to accommodate access for larger vessels in the future.

2.5.2 Kwinana Bulk Terminal

KBT is owned and operated by Fremantle Ports and is used for the import and export of dry-bulk commodities / products including cement clinker, silica sands, gypsum, nut coke and slag. One of the major assets at KBT is the Kwinana Bulk Berth 2 (KBB2) jetty which houses multiple mobile plants to facilitate ship loading and unloading operations. The KBB2 jetty is approaching the end of its service life and suitable alternatives are being investigated. In addition, shortterm investments into extending the service life of its infrastructure and equipment will be necessary until Westport and the adjacent new KBT is commissioned. Current demand (2.31 M tonnes per annum) exceeds capacity. For 2022 - 2023 the average wait days/month at KBT was 5.82 days, which equates to approximately 139 hours of waiting time per month total.

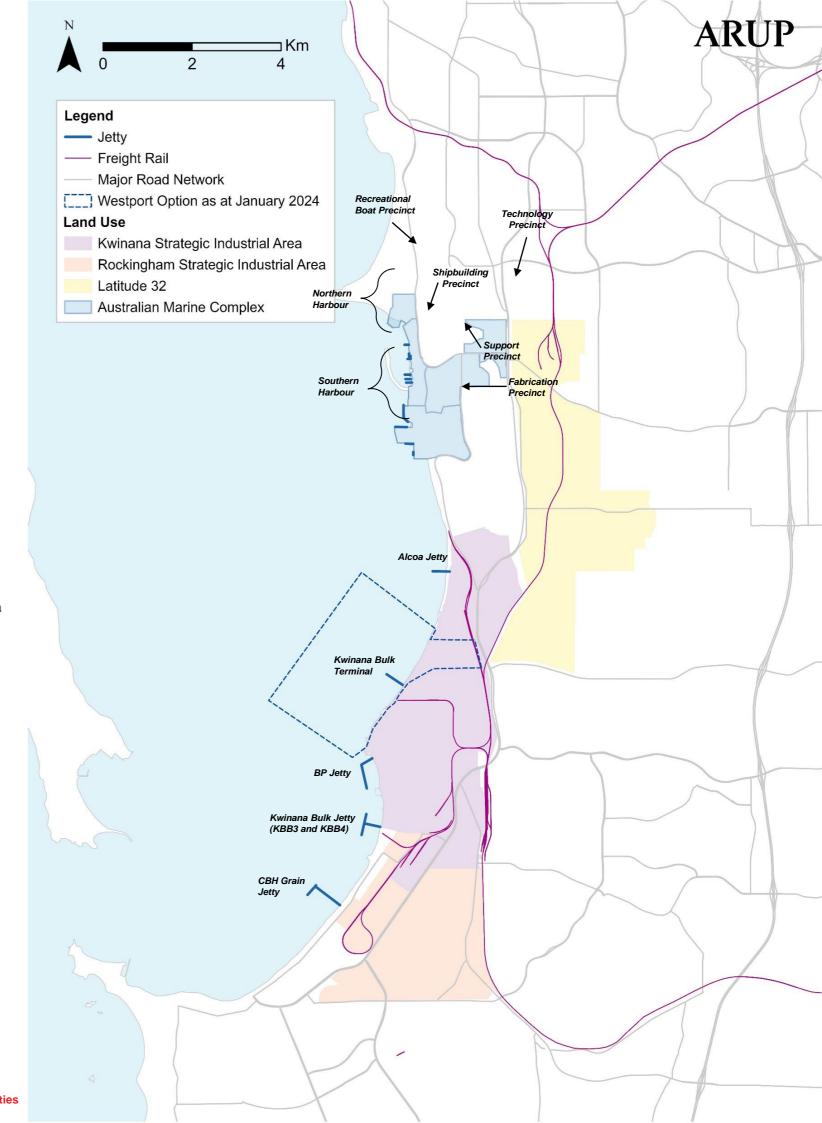
2.5.3 Kwinana Bulk Jetty

Kwinana Bulk Jetty (KBJ) is owned by Fremantle Ports, and Kwinana Bulk Berth 3 (KBB3) and Kwinana Bulk Berth 4 (KBB4) are operated by approved third parties for the import and export of dry and liquid bulk products including fuel, sulphur, anhydrous ammonia, bitumen and fertiliser.

Total trade at the Kwinana Bulk Jetty in 2021 – 2022 was 2.8 M tonnes. This current demand exceeds capacity, resulting in long vessel wait times, loss of supply chain efficiency and trade being declined. For 2022 – 2023 the average wait in days/month was 2.66 days, equating to approximately 63.8 hours per month. Fremantle Ports is working with the State Government to address these challenges and to support the future requirements for liquid and dry bulk trade in the region. In early 2024, the landside operations of KBJ were impacted by fire. Berth operations remained operational, however landside assets will need to be rebuilt.

An expansion of KBJ would provide additional capacity to support growth of both existing and new trades in the region, such as Phase 1 of the Woodside H2Perth Project (hydrogen and ammonia export).

Figure 2-10: WTC Maritime Facilities Page 30









Current State

2.5.4 Privately owned jetties

The WTC also hosts a number of private jetties which connects tenants to the global trade market. Alcoa operates a berth at the north of the KIA that supports the import of bulk caustic soda for use at the Kwinana and Pinjarra refineries, and the export of refined alumina to overseas markets. In 2023, Alcoa announced their Kwinana smelter will be curtailed, which creates an opportunity for Alcoa to revitalise and possibly repurpose the land adjacent to their jetty.

BP operates a jetty north of the KBJ. Following the closure of their oil refinery, they have announced plans to upgrade the site into a Green Hydrogen Hub and are considering the future use of the jetty as an import terminal / green hydrogen hub (H2Kwinana).

CBH Group also operates a jetty to the south of the KBJ which is connected via freight rail on the landside area. This jetty accommodates ships loading bulk grain.

2.5.5 AMC

The AMC is a centre for manufacturing, fabrication, assembly, technology, repair and maintenance activities of the marine, defence and resource industries. The five key precincts are the Shipbuilding Precinct, Technology Precinct, Support Industry Precinct, Fabrication Precinct (including the Common User Facility) and the Recreational Boat Precinct. These precincts are serviced by a North Harbour and a South Harbour shown in Figure 2-11.

The AMC's Strategic Information and Land Use Plan (SILUP) identifies the potential requirement to develop both the northern and southern harbours.

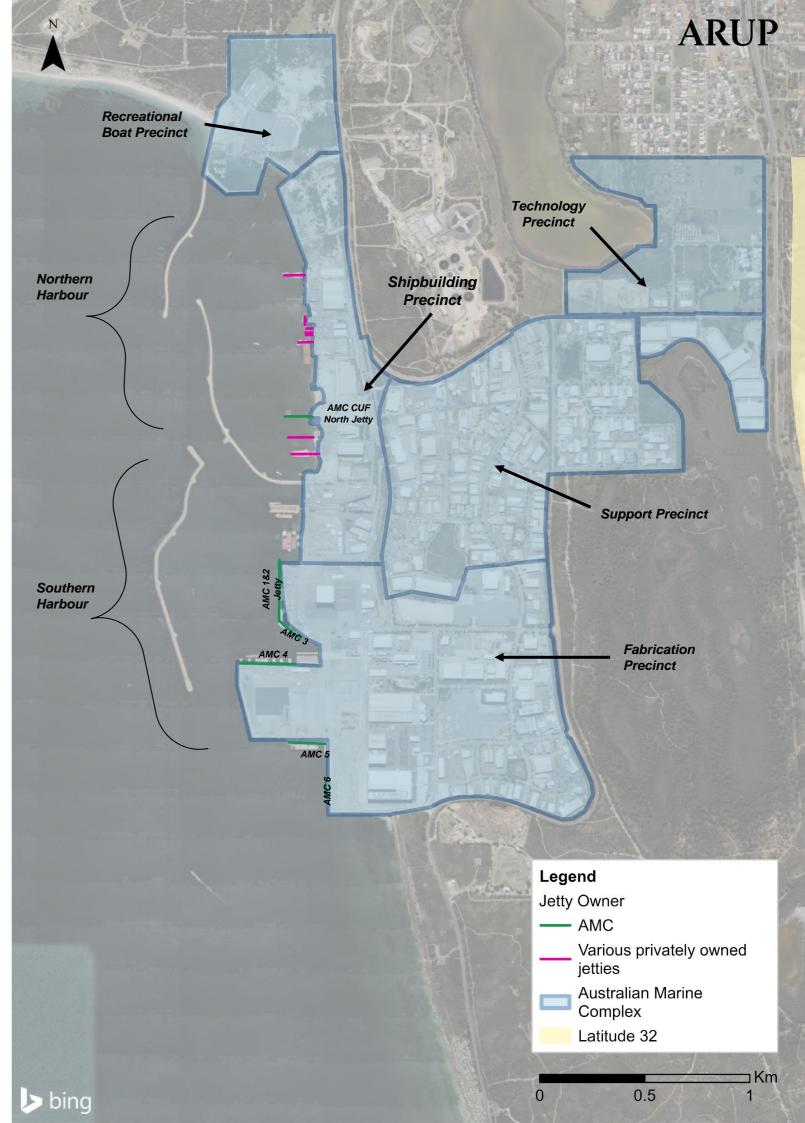
The Common User Facility (CUF) includes laydown areas, a fabrication hall, workshops, offices, off-load and load-out wharves and vessel berths.

Summary

Based on the findings of the Current State Analysis and the feedback gained from industry during stakeholder consultation, seven constraints related to Maritime Infrastructure were identified. These constraints are summarised in Table 2-6.

Table 2-6: Maritime infrastructure constraints

Constraint	Description	
Ageing KBT and KBJ infrastructure	Both jetties are approaching the end of their operational life and will require significant upgrades.	
Insufficient channel depth for larger vessels	Channel depth at any of the jetties is currently limited and cannot accommodate large vessels.	
Kwinana Bulk Terminal and Kwinana Bulk Jetty operating at max capacity	Current demand exceeds capacity, resulting in long vessel wait times, loss of supply chain efficiency and trade being declined.	
Limited jetty length impeding larger vessels	Berth lengths are not large enough to accommodate large vessels.	
Limited material offloading facility capability	There are no dedicated common user Marine Offloading Facilities (MOFs) within the WTC which restricts the ability for tenants to expand their operations.	
Limited resilience of shipping channels	Both jetties are approaching the end of their design life and will require significant upgrades.	
Defence operations restricting marine access to the AMC	Wharf upgrades and expansion of capacity at the AMC will restrict marine access.	











Parallel Projects

For the purpose of the WTCIS, parallel projects are considered initiatives that the State or Commonwealth Government are either undertaking or investigating.

Identifying these projects during the development of the WTCIS has confirmed their importance and highlighted the need for coordinated implementation and efficiency measures. This is especially crucial given the operational challenges major projects may present at the WTC during construction. It emphasizes the importance of an approach mindful of interdependencies with other projects in the region, both in government and industry sectors.

These parallel projects are listed in Table 3-1. Each option is shown on the maps across the following pages, categorised into the following themes:



Transport (Road)



Transport (Rail)



Maritime



Utilities (Energy)



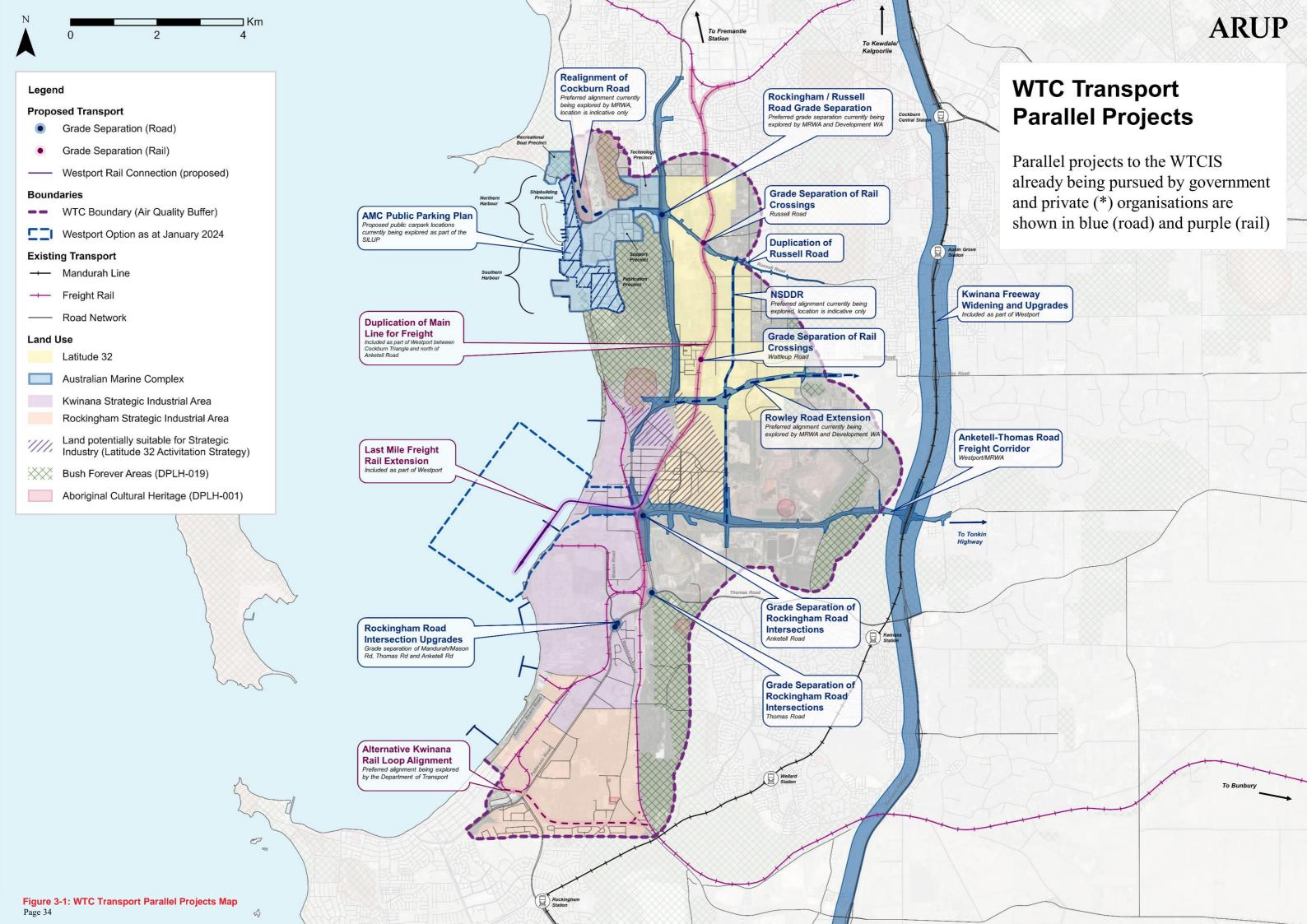
Utilities (Water and wastewater)

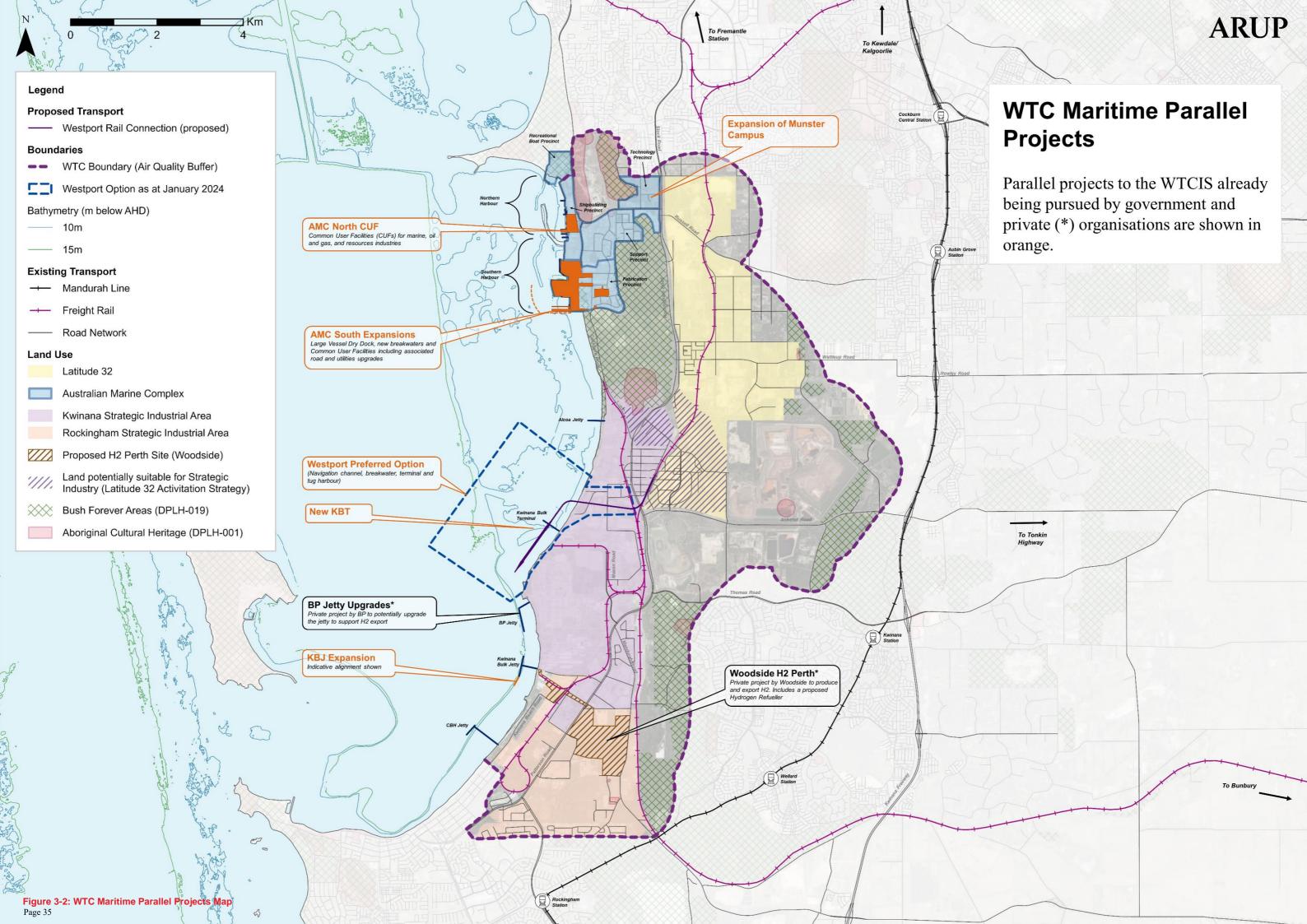
Please note that:

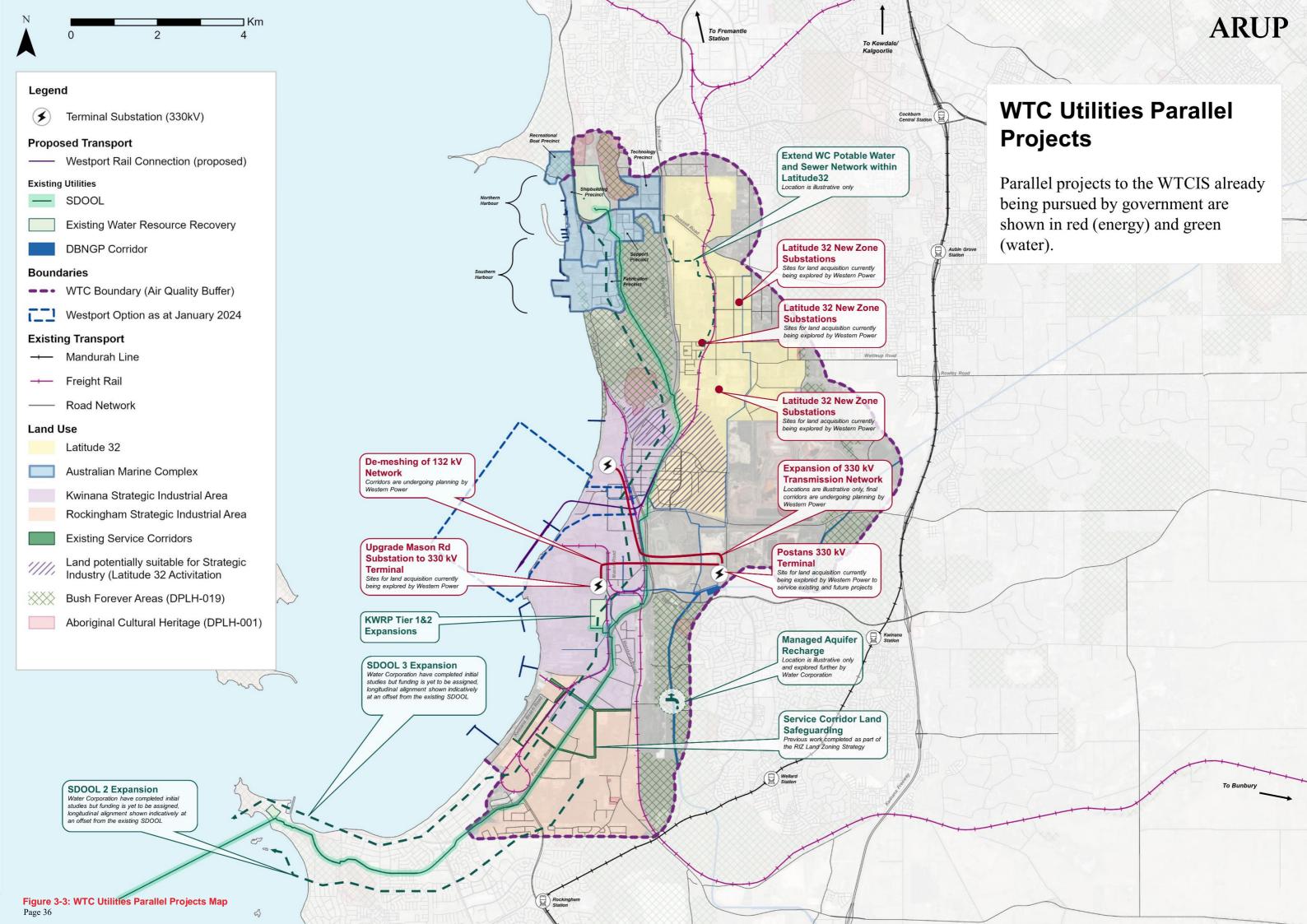
- The parallel projects identified have varying levels of government commitment and therefore some delivery schedules are still to be determined. Expected delivery dates referenced in the WTCIS have been provided by JTSI and other relevant parties.
- Smaller-scale LGA projects, such as road safety blackspot program improvements, are not included in this documentation.

Table 3-1: Parallel Projects to the WTCIS

Discipline	Parallel Project	Organisation
	Tranche of Rockingham Road Intersection Upgrades	Main Roads WA
Transport (Road)	Extension of Rowley Road	Main Roads WA / DevelopmentWA
	Grade-separation of at-grade Rail Crossings (between Cockburn Triangle and Westport)	Westport / Public Transport Authority
	Build North-South District Distributor Road within Latitude 32	DevelopmentWA / Main Roads WA
	Anketell-Thomas Road Freight Corridor (ATRFC) West	Westport / Main Roads WA
Transport (Rail)	Duplication of Main Line (between Cockburn Triangle and north of Anketell Road)	Westport / Public Transport Authority
	Install Alternative Kwinana Rail Loop Alignment	Department of Transport
Maritime	Westport preferred option (Navigation channel, breakwater, terminal and tug harbour)	Westport
	KBT Relocation	Fremantle Ports Authority
	Expansion / redevelopment of KBT for various import / export trade (dry and liquid bulk)	Fremantle Ports Authority
	Expansion of KBJ (development of new KBB5 jetty) for various import / export trade (dry and liquid bulk)	Fremantle Ports Authority
	Development of AMC North Common User Facility (for non-defence industries)	DevelopmentWA
	AMC South Upgrades (Vessel Transfer Path, additional berths)	DevelopmentWA
	Large Vessel Dry Dock (LVDD)	Australian Naval Infrastructure (ANI)
	Expansion of Munster campus	DevelopmentWA
Utilities (Energy)	New High Voltage Infrastructure (WP Tier 1)	Western Power
	WP Tier 2	Western Power
	WP Tier 3	Western Power
Utilities (Water and wastewater)	Expansion of the SDOOL	Water Corporation
	Extend WC Sewer Network to all stakeholders within WTC	Water Corporation
	KWRP Tier One Upgrade	Water Corporation
	KWRP Tier Two Upgrade	Water Corporation
	Managed Aquifer Recharge Infrastructure	Water Corporation
	Extend WC Potable Water Network within Latitude 32	Water Corporation















Foresight

In parallel to a review of the current state covered in Chapter 2, Arup undertook a significant foresight workstream with the intent of informing a range of future scenarios that could be used as a framework to inform strategic decision making around the infrastructure options presented in the WTCIS.

To do this Arup conducted a comprehensive research and stakeholder engagement initiative, with the insights gained instrumental in ensuring the resilience of infrastructure options against shifts in the broader operating context of the WTC. This comprehensive approach improved the understanding of the factors impacting the region, directly and indirectly, and led to well informed inputs when considering sustainable and adaptable solutions.

The foresight activities centred on the following two aspects:

- 1. **Drivers of change:** a factor or force that significantly influences and propels alterations in various aspects of an individual, organisation, or society which in this context may impact the WTC particularly on land demand and common-user needs.
- 2. Critical uncertainties: A key variable or factor whose future state is uncertain, and its resolution has a substantial impact on the WTC.

These two aspects were used to develop four future scenarios that provided a lens to assess the resilience of options.

4.1 Key drivers of change

It was determined via consultation with industry, government and Arup's subject matter experts that of the 45 drivers of change there was broad consensus on which 15 were likely to be most impactful in delivering the vision for the WTC. Clusters emerged around the key drivers as summarised in Figure 4-1.

Figure 4-1: Key Drivers of Change



Key drivers of change

Changing environmental regulations and targets impacting on approvals timelines.

The need for greater economic resilience and industry diversification to shore up WA's future prosperity and attractiveness.

Flow-on effects of geopolitical shifts shaping feasible trade routes / free trade, logistics and value chains.

Navigating land use and availability constraints in and around the WTC.

The need to attract and retain a high-calibre blue- and white-collar workforce to service transformational markets and drive competitiveness of the WTC.

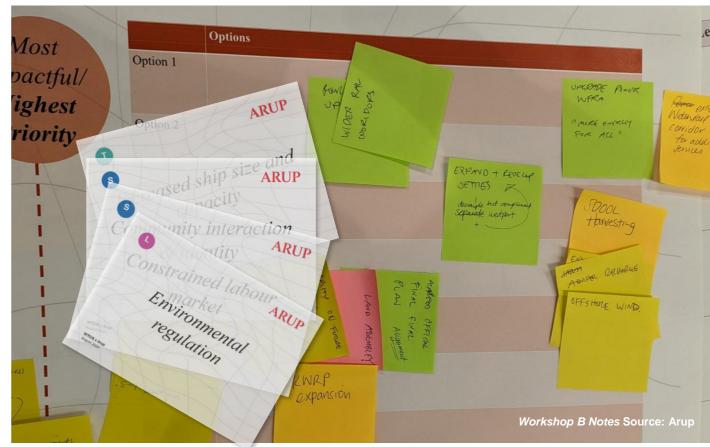
The complexities of **decarbonisation** from the demand and supply for renewables to effects of net zero targets and the climate adaption / resilience of the WTC.

The value of coordinated and collaborative governance, investment and delivery between government and industry.

Social license was initially considered somewhat impactful and less uncertain. However, over the course of the workshops, it became clear that community sentiment at local, national and international scales would be a primary driver of other macro forces.

Shifting sentiments towards Net Zero 2050 and subsequent impacts on policy.











Foresight

4.2 Critical Uncertainties

Further to the drivers of change, this strategy considered alternative ways critical uncertainties might plausibly play out in the future. Acknowledging uncertainties has also helped the WTCIS prepare for a range of possible outcomes, enhancing the adaptability and resilience of each strategy. Through consultations with industry, government officials, and subject matter experts from Arup, the following 15 critical uncertainties were identified:



Constrained labour market

Given the labour shortage and remoteness of WA, to what degree will the WTC be able to attract and develop a sufficiently skilled and sized workforce to fulfil its economic ambitions?



New fuel sources

How industry will respond to evolving technological advancements in new fuel sources, their market dynamics, and regulatory shifts.



Environmental regulation

How environmental regulations will shape industry decisions and infrastructure. This lies in the evolving nature of policy frameworks, making it difficult for businesses to predict and plan for the future.



Geopolitical tensions and polarisation of global trade

The unpredictability of geopolitical tensions and how they will influence industry decisions, infrastructure development and trade restrictions. This underscores the need for flexibility within the WTC to navigate a volatile global landscape.



Climate adaption/resilience

How will the WTC future-proof operations from changing climate conditions, given the land is at highrisk of climate hazards such as sea level rise and bushfires.



Dominance of materials processing

To what degree can Australia and WTC position itself to be not just a competitive producer of critical minerals, but also a competitive processor as well?



Decarbonisation

Australia is targeting Net Zero emissions by 2050, and 2035 emission reduction targets. How can WTC industries align with these targets and continue to prosper economically?



Drive for economic resilience

Australia's export profile is poorly diversified and lacking products that require deep, technical and specialised knowhow. These characteristics makes the economy more fragile and exposed to changes in the global economy.



Private investment into common user infrastructure

How can the WTC foster an environment that allows private investment into infrastructure with collaboration from government that will increase the efficiency of operation and alleviate common constraints?



Critical minerals demand

How will the WTC capitalise on the increasing mineral demand and WA's mineral endowment, in a way that supports regional development but minimises land use and carbon impact?



Defence decisions

The degree to which industry will be able to adapt and service the priorities, land allocation and energy use for the Department of Defence.



Land constraints and associated infrastructure / utility requirements

How will industry grow, develop and adapt to changing future demands in an area with limited land availability?



Changing trade routes & free trade

How well positioned is WTC to take advantage of changing trade routes and trade diversification resulting from Australia's global pursuit of free trade agreements, and where is WTC potentially vulnerable to the impacts of such agreements?



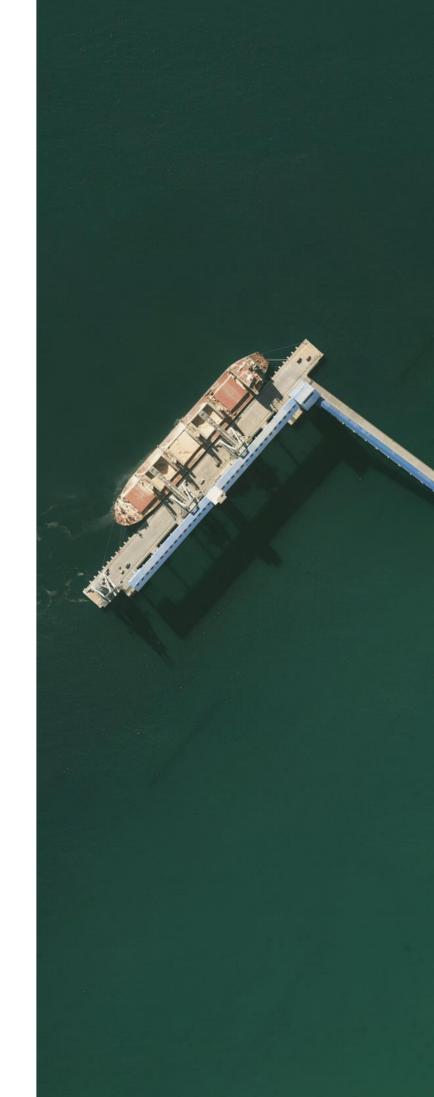
Community interaction & identity

The level of acceptance and support that the WTC receives from the surrounding community and how society will respond to the growth and development of industry within the WTC.



Net zero targets

Net Zero targets are ambitious and the process to achieve Net Zero within the WTC is ambiguous.









Foresight

4.3 Future Scenarios

With the drivers of change and critical uncertainties for the WTC identified, Arup developed four key future scenarios for the WTCIS which provide a framework for understanding and preparing for a range of potential outcomes. The scenarios are shown in Figure 4-2 and described below.

- Scenario 1: "Business As Usual," depicts a world where the WTC experiences incremental growth without a unified spatial plan, leading to challenges in transportation, infrastructure constraints, and limited residential expansion.
- Scenario 2: "Industry-Led," industry investment drives economic recovery, resulting in organic development with some roadblocks in common-user infrastructure investment and coordination.
- Scenario 3: "Defence-Led," is characterised by defence-driven decisions, prioritising national security.
- Scenario 4: "Clean Collective," showcases a
 collaborative approach between industry and
 government, emphasising sustainability, community
 engagement, and a commitment to clean energy and
 circular economy practices for the overall development
 of the WTC.

These scenarios are fictitious but plausible stories of the future. They are plausible because they have some basis in reality; we can see signs and signals today of how these different futures might emerge. Effective strategy and planning considers multiple different futures as the future is unpredictable. The value of scenario planning is not in making accurate predictions or focusing on one scenario that seems more likely.

4.3.1 Basics of Scenarios:

- The future is likely to be a combination of all four scenarios.
- They are intended to stimulate strategic conversations, holistic planning and decision-making.
- Scenarios don't have to be 'right' to be useful.
- Encourage 'what-if' conversations that can shine a light on blind spots, taken-for-granted assumptions, and differences of opinion between and within stakeholder groups about what could or should happen.



Industry-Led

WTC is moving ahead through private investment and industry-led infrastructure. Duplication is seen as a necessary price to pay for timely delivery. The need for reactive planning has sharpened community engagement by both government and industry. Genuine collaboration with communities led to fortuitous renewable energy industry development.





Clean Collaboration

WTC is a global exemplar of industry-government collaboration and local economic vigour. Communities are partners in sustainable economic development, embracing WTC's many opportunities for developing new skills and starting new enterprises. Proactive planning and investment in key industries have yielded several industrial synergies and exchanges.

Governance & regulations



Business As Usual

WTC is progressing steadily with legacy strength industries. Poor connectivity continues to undermine confidence. Inefficient and inflexible infrastructure has limited industry responsiveness to new markets. Companies consider relocation outside of WTC to maintain financial viability. Nearby communities suffer from various poor outcomes.



Defence-Led

WTC is a key geostrategic industrial location. Defense priorities have shaped a system of top-down governance that focus on productive manufacturing and energy security. Buffer zones are reconsidered to give way to megaprojects in a bid to boost productivity and defense capabilities.

Low















Foresight

This foresight research to date has proven invaluable, providing crucial insights into future trends and the preferred operating context for the future WTC. It is crucial that the strategies developed in following chapters not only function effectively within a clean collaborative future but also actively contribute to driving this future.

Furthermore, it's essential to emphasize governance for common user infrastructure, ensuring seamless industry and government cooperation in planning and delivering projects with sustainability principles at the forefront.

Therefore, the strategies in this document must align with this vision and should support initiatives that advance industries crucial to the region's future, such as shipbuilding, renewable energy, and critical minerals processing.

To effectively plan for an evolving WTC, it's essential to grasp global economic trends, as they shape the future of mobility and materials. With this understanding, identifying common elements required for ports and industrial areas like the WTC to remain relevant in the future becomes possible.

It is imperative for the WTCIS to consider the relevant drivers of change to ensure that its strategies remain adaptable and responsive to evolving external factors. While the specific infrastructure needs may vary across scenarios, some common elements that could be required in all four scenarios include:

- Transportation Infrastructure: Improving and expanding transportation networks to address road congestion and connectivity issues within the WTC, ensuring efficient movement of goods and people.
- Critical Infrastructure Upgrades: Enhancing critical infrastructure, such as water and power systems, to support the expansion of companies and meet market demand, particularly for the three target industries.
- Common-User Infrastructure: Investing in common-user infrastructure to overcome roadblocks in development, fostering collaboration among industry stakeholders and ensuring sustainable growth.

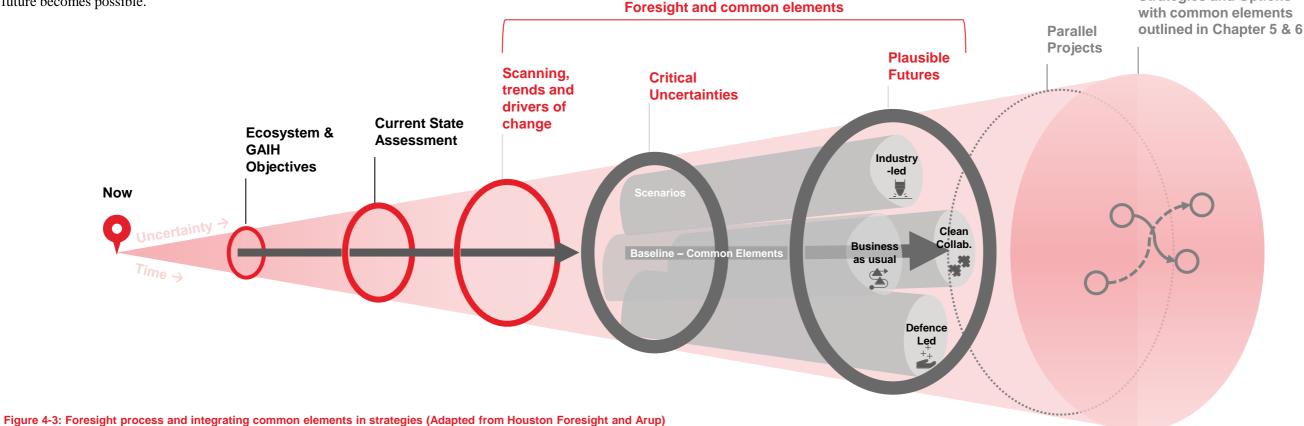
- Community Engagement Platforms: Developing innovative community engagement platforms, to address community concerns and enhance public participation in decision-making processes.
- **Defensive Infrastructure:** In the scenario driven by defence priorities, infrastructure supporting national defence and regional stability, including facilities for the manufacture of nuclear-powered submarines and other defence-related assets.
- Sustainable and Green Infrastructure: Promoting sustainability through the development of green projects, and renewables-based power grids, aligning with clean energy goals in Scenario 4.

• Innovation Hubs and Training Centres:
Establishing government-industry-university
innovation hubs and industry training centres to attract
talent, promote innovation, and provide hands-on
career pathways for key industries, as seen in the

These insights were used to assist in the development of the WTCIS strategies.

"Clean Collective" scenario.

Strategies and Options











Strategies and Options

5.1 Strategy Development

By employing a method that treats the interconnected components and relationships within the larger WTC as a cohesive system, an overarching analysis was conducted, considering social, environmental, economic, and political factors. This systems thinking approach transcends isolated infrastructure constraints, allowing for a broader contextual understanding.

This holistic approach not only aids in identifying interconnections and predicting impacts but also paves the way for the development of integrated, multidimensional solutions.

By addressing multiple aspects of the Western Trade Coast's infrastructure challenges simultaneously, the strategies can effectively manage risks, foster innovation, and ultimately, lead to more sustainable and resilient outcomes, laying the foundation for a thriving and adaptable trade ecosystem.

Drawing upon common elements from various scenarios, 11 overarching strategies were developed. The strategies, summarised on the right, provide practical solutions for easing constraints and facilitating the transition to a GAIH.

Categorised into transport, maritime, utilities, and land use, these strategies organise constraints from Chapter Two into interconnected systems. Infrastructure options under each strategy take a holistic perspective, addressing multiple constraints and integrating both novel solutions developed within the WTCIS and existing parallel projects discussed in Chapter Three, thereby charting a unified path forward for the WTC.

Each option is described as either a:

- Critical enabler: A gateway project that must go ahead to enable other projects and will significantly de-constrain the WTC. It acts as a catalyst for future works by providing necessary supporting infrastructure.
- Major project: A subsequent large-scale project that will significantly de-constrain the WTC.
- Other opportunity: A potential avenue for additional development, improvement or diversification that will de-constrain the WTC and facilitate the transformation into a GAIH.

Transport Strategies





Address Road Network Congestion: Improves traffic flow to / from / within the WTC for workforce commuting and the efficient movement of goods and freight to support industries' operations (largely heavy vehicles), while also improving connectivity for public and active transport. Additionally addresses restricted access heights and road access congestion during major construction.



T2

Improve Heavy / Oversize Vehicle Networks: Addresses constrained road networks for heavy and wide loads and operations overlap of commuters, emergency services and wide vehicles.



Increase Capacity and Efficiency of Rail Networks: Aims to improve rail capacity and resilience of the freight network and better connect the passenger rail line to the WTC.

Maritime Strategies





Increase Capacity, Resilience and Efficiency of Port Infrastructure: Addresses limited space availability in the AMC, insufficient channel depth and access for large vessels, capacity constraints and ageing infrastructure at KBT and KBJ, limited jetty length impeding larger vessels and limited material offloading facilities.

Utility Strategies



Improve Electricity Availability: Aims to improve electricity supply and capacity of existing substations and transmission networks.



U2

Increase the Supply of Renewable Electricity and Fuels: Aims to support the increase of renewable energy supply and low carbon fuels to the WTC industries.



Improve Capacity of Wastewater Network: Addresses the limited sewer network within the AMC and WTC generally.



Increase Availability of Water Supply Options: Seeks to improve capacity of the water network and recycled water supply as well as groundwater availability.

Land Use Strategies





Latitude 32 Activation Strategy: Implement initiatives and developments that stimulate economic growth and development in the Latitude 32 industrial areas.









Optimise Land Usage: Aims to facilitate the growth of the WTC in a coordinated manner, helping to overcome fragmented zoning and inefficiencies in the supply chain.





Strategies and Options

5.2 How to read the strategies







Chapter 5

Infrastructure Strategies and Options

Critical Enabler

Option T1.1 - Tranche of Rockingham Road Intersection Upgrades

Rockingham Road provides the main north-south arterial connection to and within the WTC area. The intersections act as bottlenecks as multiple industrial sites are directed to a limited number of access points. Significant congestion occurs along the corridor as the intersections operate beyond capacity. The congestion observed at these access points has consistently been cited in feedback from industry as a significant constraint to existing WTC operations and this is likely to be exacerbated as the WTC develops further.

· Peak hour congestion is caused by capacity constraints. Increasing the capacity at key intersections would reduce congestion and travel times, increasing labour market access and improving productivity

Intersection upgrades to allow free flow priority to Rockingham Road (maintained as four lane cross section) through replacement of at-grade intersections with grade-separated intersections at the following locations:

- · Mandurah Road / Mason Road
- Thomas Road
- · Anketell Road (forms part of the ATRFC)
- · Cockburn Road

Intersections shown in bold are already being investigated by Main Roads. While grade-separation in favour of Rockingham Road with Rockingham Road passing over the intersecting road is assumed for most intersections, early concept designs for the Anketell-Thomas Road Freight Corridor (ATRFC) indicate in favour of Anketell Road passing overing Rockingham Road. Due to the strategic designation of the corridor, it is likely that the grade separation height will need to accommodate High and Wide Loads (HWL) or consider alternative HWL movement through the

Future stages could look at the demand and viability of grade-separating Beard Street / Lee Road, although this presents engineering challenges.

Limitations / Challenges /

- Traffic disruption during construction would be significant, therefore additional cost may be incurred to adapt construction methods which could mitigate
- · Increased intersection footprints will require underground services relocation.
- Availability of planning, design and delivery resources is constrained in the highway infrastructure sector.
- High capacity (330 kV) utility infrastructure located close to Rockingham Road / Russell Road

Required

- Transport network upgrades are interdependent with land-use policy changes, ensuring that any changes to the current land-use do not negate the need for upgrades.
- Upgrades to intersections may require land-take if corridors have not been protected. If not protected there may be interdependencies with other
- Wider network assessment may be required to determine if capacity is adequate.
- Road network upgrades are planned as part of the Westport project. This interdependency will need to be managed to ensure upgrades tie-in with future network plans.

Figure 6-2: Option T1.1: Transhe of Rookingham Road Intersection Upgrades

ARUP Westport Option as at January 202-**Existing Transport** - Mandurah Line - Freight Rail Continue Control I Latitude 32 Australian Marine Complex Kwinana Strategic Industrial Area Rockingham Strategic Industrial Area dutte Se /// Land potentially suitable for Strategic Industry (Latitude 32 Activitation Strategic Grade Separation of Grade Separation of Grade Separation of Grade Separation of nterceptions WTCIS option Paratel projec 8 Type Effort Timeframe Medium Infrastructure Medium

- 1 Option name and ID.
- **2** The context provides background to the option and the associated constraint.
- The scope outlines the work required to deliver the recommendation option.
- Summarises the benefits of the recommended option.
- Summarises the limitations, challenges and risks of the recommended option.
- Outlines the interdependencies and concept-level land requirements for the recommended option.
- **7** Type is defined by:
 - **Infrastructure:** physical structures and systems.
 - Non-infrastructure: intangible assets and institutions.
- 8 Effort is defined by:
 - Low: Low cost, easy to implement, small number of stakeholders required to achieve.
 - **Medium:** Moderate cost, requires co-operation with multiple stakeholders to implement.
 - **High:** High cost, requires dedicated long-term investment and cooperation with a high number of stakeholders.
- Timeframes are not fixed; they are used to provide an indication of the scale of the project only. The timeframes are defined by:
 - Short term: construction could plausibly start
 - **Medium term:** construction could plausibly start by 2033.
 - Long term: construction could plausibly start by 2040.







Strategies and Options

Transport Strategies

This section contains three strategies aimed at de-constraining the transport network within the WTC across road and rail.



Address Road Network Congestion

Seven Options



Improve Heavy / Oversize Vehicle Networks

One Option



Increase Capacity and Efficiency of Rail Networks

Four Options



T1 – Address Road Network Congestion

To improve traffic flow and connectivity between precincts and identified pinch points







Strategies and Options

Transport: T1 - Address Road Network Congestion

Strategy T1 – Address Road Network Congestion seeks to improve traffic flow and connectivity between precincts and identified pinch points.

Existing Context

The road network in the WTC comprises several arterial roads that function as key connectors and traffic distributors critical for multiple transport modes as well as smaller road networks that connect precincts.

The main north-south and east-west arterial roads link the WTC to significant destinations across the state and provide daily commuting routes for the workforce within the WTC.

Kwinana Freeway is one of the main arterial roads that runs along the eastern extent of the WTC area and provides key north-south connectivity to Perth CBD, as well as other Perth industrial areas. Several strategic network roads run east-west, connecting Kwinana Freeway to industrial zones within the WTC. These roads include:

- · Thomas Road,
- Anketell Road,
- Wattleup Road, and
- · Russell Road.

The Melville-Mandurah Highway, which comprises of Stock Road, Rockingham Road and Patterson Road makes up the central spine of the WTC network, facilitating major north-south movements. This arterial road links the industrial areas of the MAC and Latitude 32 in the north to the RIZ and KIA in the south. It helps support and distribute traffic fed through the key eastwest links of Thomas Road, and regional distributors of Russell Road, Wattelup Road and Anketell Road, connecting the WTC area to the Kwinana Freeway and the major industrial hubs to the east.

It is well documented that both the Kwinana Freeway and the Melville-Mandurah Highway experience heavy congestion, perpetuated by the mixed traffic demands from workforce commute, residential movements and heavy vehicle.

A transport demand assessment of the AMC area undertaken by Cardno in 2022 demonstrated the peak hour congestion impacts on travel times along popular routes within the WTC area. The following key roads and intersections were identified to be significant congested during these peak times:

- Rockingham Road / Patterson Road / Mandurah Road / Mason Road
- Rockingham Road / Thomas Road
- · Rockingham Road / Russell Road
- · Anketell Road

Two bus routes service the WTC area. These are the 548 and 549. Both buses travel north-south through the WTC area, between Fremantle and Rockingham stations. Neither route deviates from the primary corridor into the industrial zones, and both have low service frequencies.

A passenger rail service is also provided along the Mandurah Line, it operates along the eastern extent of the WTC, however neither bus route connects with the closest stations on the line, Kwinana and Aubin Grove.

Overall, access to public transport presents a challenge in the WTC area. Low public transport patronage in the area is mainly caused by:

- Low density large site areas which require considerable walking distance to access individual businesses,
- Employee shift times (as early as 5:30 a.m.) may not align with bus service times,
- Routes do not align with where employees reside, meaning longer travel time journeys and employees choosing alternative modes of travel,
- Congestion and network constraints in the broader network reducing the reliability of bus services, and
- Poor footpath amenity to bus stops. Improvement will not itself improve public transport use but is necessary to support this mode of travel.

In addition to road demands for movement, parking is a significant consideration. In the WTC parking is provided in the form of dedicated open-air parking lots, on-site parking facilities provided for employees and visitors, and both formal and informal on-street and verge parking accessible via the local access road networks.

Common concerns about parking are mainly centred around impacts to on-site parking availability, road safety and heavy vehicle accessibility which have an adverse flow on effect to industry productivity and operational efficiency.

While the infrastructure improvements focus on road network upgrades, it should also be recognised that road network congestion ultimately needs to be dealt with via policies that promote a mode-shift away from private vehicles. To encourage this behavior shift we have also included projects which promote active travel and public transport.

Known Constraints Addressed

To become a globally competitive precinct, transport within the WTC must efficiently provide access to labour markets and facilitate trade for the region so that it may maintain its competitive advantage.

An efficient transport network is characterised by low levels of congestion and a wide choice of available transport modes to facilitate movement for a range of trip distances and travel requirements.

There are 18 known road network constraints that are addressed by the options under *Strategy T1*. Table 5-1 on the following page demonstrates how each option addresses the known constraints.







Strategies and Options

Transport: T1 – Address Road Network Congestion

Table 5-1: Constraint to Option mapping for T1 – Address Road Network Congestion

	Critical Enablers			Major Projects		Other Opportunities	
Constraints Addressed	T1.1 Tranche of Rockingham Road Intersection Upgrades	T1.2 Rowley Road Extension	T1.3 North-South District Distributor Road	T1.4 Anketell-Thomas Road Freight Corridor (ATRFC)	T1.5 Grade-Separation of At-Grade Rail Crossings	T1.6 Install Active Transport Infrastructure	T1.7 Develop an Integrated Public Transport Strategy
Worsening Freight and Passenger Vehicle Road Congestion	•				•		
Lack of Available Car Parking							
Mason Road / Rockingham Road Congestion	•				•		
Patterson Road / Rockingham Road Congestion	•						
Poor Active Transport Infrastructure						•	
Poor Public Transport Connectivity							•
Russell Road / Rockingham Road Congestion	•						
Thomas Road / Rockingham Road Geometry and Congestion	•						
Anketell Road Capacity Constraints				•			
Road Access and Congestion During Major Construction	•			•			
Cockburn Road / Rockingham Road Congestion	•		•	•			
Congested Roads Within Lat 32 (Wattleup, Rowley, Russell)			•				
Kwinana Beach Road / Patterson Road Congestion						•	
No Cycling Infrastructure in Proximity of WTC						•	
Rowley Road Congestion - Mix of Residential and Industry Traffic		•					







Strategies and Options

Transport: T1 - Address Road Network Congestion



An efficient transport network is characterised by low levels of congestion and a wide choice of available transport modes to facilitate movement for a range of trip distances and travel requirements.

This strategy seeks to achieve this vision through a series of infrastructure options that include intersection upgrades, road and rail grade separations, road expansion works, active transport infrastructure and expansion of public transport opportunities.

Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.
- 6.2 Infrastructure development and operations are sustainable and reflective of industry requirements bespoke to the geography of the WTC.



Options

Critical Enablers:

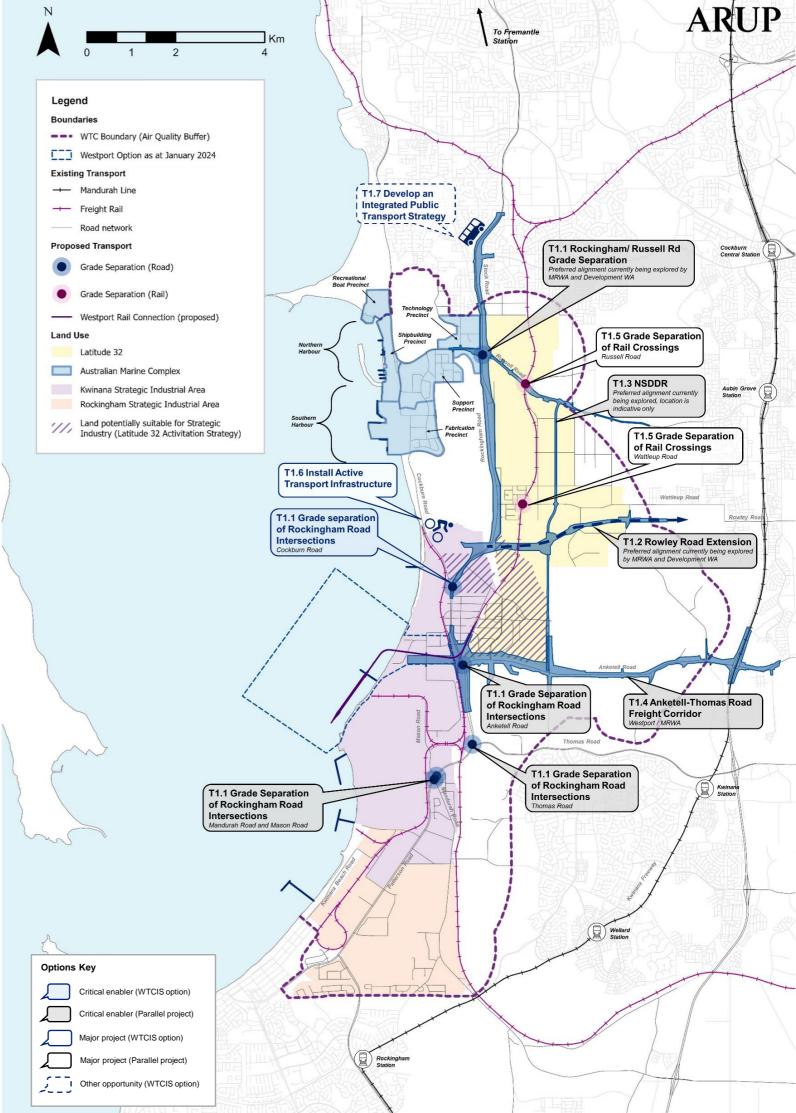
- T1.1 Tranche of Rockingham Road Intersection
- T1.2 Rowley Road Extension
- T1.3 North-South District Distributor Road
- T1.4 Anketell-Thomas Road Freight Corridor (ATRFC)

Major Projects:

- T1.5 Grade-separation of At-grade Rail Crossings
- T1.6 Install Active Transport Infrastructure

Other Opportunities:

 T1.7 Develop an Integrated Public Transport Strategy









Strategies and Options

Transport: T1 - Address Road Network Congestion

Alignment with Government Objectives

The **WA State Infrastructure Strategy** makes 60 targeted recommendations to deliver high-impact infrastructure upgrades, particularly those which carry freight movements and / or have high impact such as strategic corridors that serve the WTC area.

When preparing the proposed options we have consulted transport network strategy documents, prepared for the Perth and Peel @ 3.5 million plan. This identifies major transport infrastructure projects such as the Rowley Road extension, Anketell Road upgrades, and the Rockingham Road improvements.

Impact on Target Industry Opportunities

Addressing road network congestion will have a positive impact on all target industries.

Table 5-2: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Positive
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Positive



Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



Constrained labour market



Decarbonisation



Community interaction & identity









Strategies and Options

Critical Enabler

Option T1.1: Tranche of Rockingham Road Intersection Upgrades

Context

Rockingham Road provides the main north-south arterial connection to and within the WTC area. The intersections act as bottlenecks as multiple industrial sites are directed to a limited number of access points. Significant congestion occurs along the corridor as the intersections operate beyond capacity. The congestion observed at these access points has consistently been cited in feedback from industry as a significant constraint to existing WTC operations and this is likely to be exacerbated as the WTC develops further.

Implementation Considerations Benefits

 Peak hour congestion is caused by capacity constraints. Increasing the capacity at key intersections would reduce congestion and travel times, increasing labour market access and improving productivity.

Scope

Intersection upgrades to allow free flow priority to Rockingham Road (maintained as four lane cross section) through replacement of at-grade intersections with grade-separated intersections at the following locations:

- · Mandurah Road / Mason Road
- · Thomas Road
- Anketell Road (forms part of the ATRFC)
- Cockburn Road

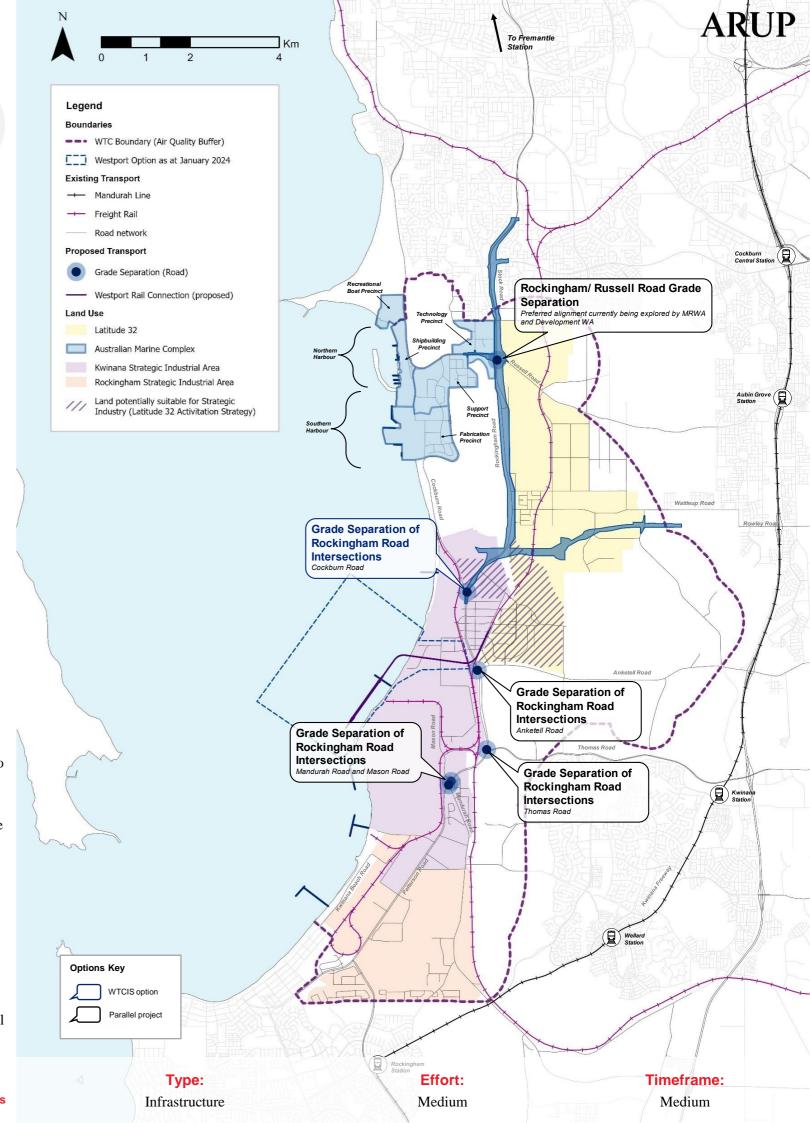
Intersections shown in bold are already being investigated by Main Roads. While grade-separation in favour of Rockingham Road with Rockingham Road passing over the intersecting road is assumed for most intersections, early concept designs for the Anketell-Thomas Road Freight Corridor (ATRFC) indicate in favour of Anketell Road passing overing Rockingham Road. Due to the strategic designation of the corridor, it is likely that the grade separation height will need to accommodate High and Wide Loads (HWL) or consider alternative HWL movement through the intersections.

Future stages could look at the demand and viability of grade-separating Beard Street / Lee Road, although this presents engineering challenges.

Limitations / Challenges / Risks

- Traffic disruption during construction would be significant, therefore additional cost may be incurred to adapt construction methods which could mitigate disruptions.
- Increased intersection footprints will require underground services relocation.
- Availability of planning, design and delivery resources is constrained in the highway infrastructure sector.
- High capacity (330 kV) utility infrastructure located close to Rockingham Road / Russell Road intersection.

- Transport network upgrades are interdependent with land-use policy changes, ensuring that any changes to the current land-use do not negate the need for upgrades.
- Upgrades to intersections may require land-take if corridors have not been protected. If not protected there may be interdependencies with other utilities.
- Wider network assessment may be required to determine if capacity is adequate.
- Road network upgrades are planned as part of the Westport project. This interdependency will need to be managed to ensure upgrades tie-in with future network plans.









Strategies and Options

Critical Enabler

Option T1.2: Rowley Road Extension

Context

- Strategic movements via Roe Highway require a connection to Kwinana Freeway.
- Currently, the main east-west connections are Thomas Road (located to the south), Russell Road (located to the north) and Anketell Road.
- Russell Road is a circuitous route resulting in Thomas Road carrying the majority of traffic to Kwinana Freeway.
- Rowley Road is proposed as a new corridor facilitating east-west movements to allow for greater connection to and from the north (including Perth) and the WTC area.

Scope

Create a four-lane carriageway between Rockingham Road and Kwinana Freeway intersections. This would require:

- · Modification of Kwinana Freeway Interchange, and
- · Creation of a new Rockingham Road interchange.

There is a proposed corridor for the Rowley Road extension which is currently under review by MRWA and Development WA. This is shown in Figure 5.3 but may be subject to change in the future.

Implementation Considerations

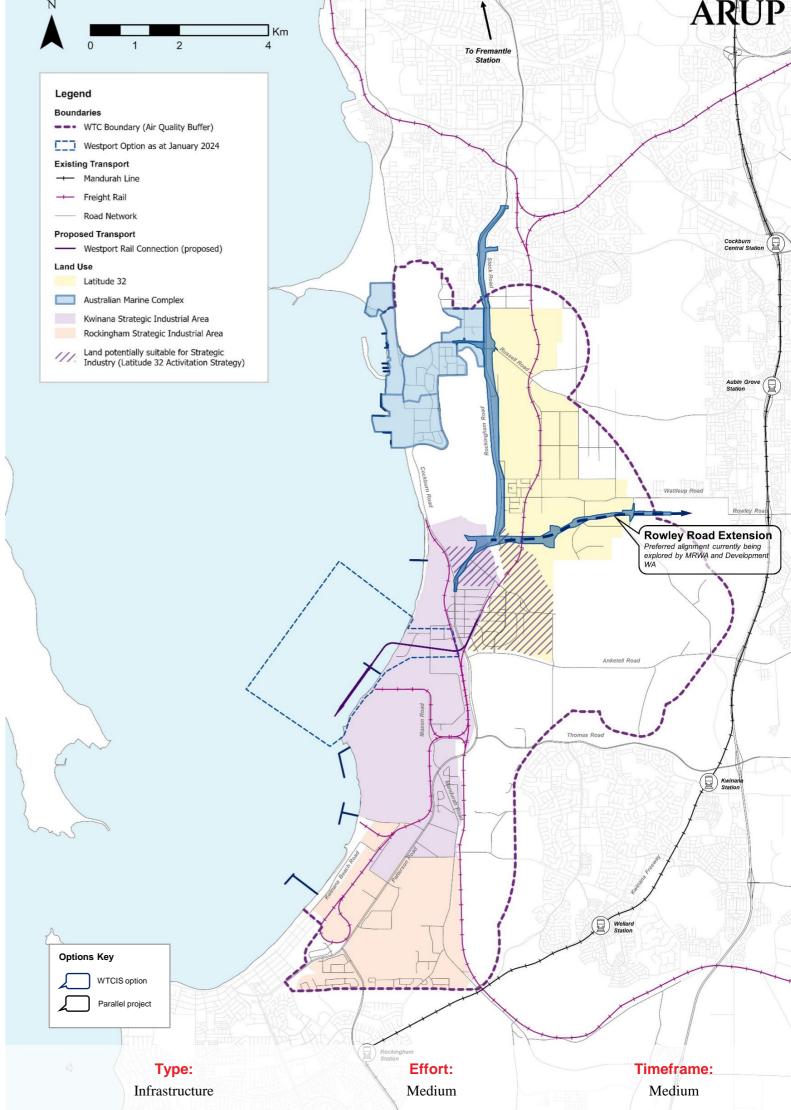
Benefits

- Provide a more direct route from the WTC to the north and east on to Tonkin Highway, reducing traffic volumes on Thomas Road.
- An increase in classification will also facilitate the movement of dangerous goods. This provides network resilience benefits for these movements, which are currently restricted to Thomas Road.

Limitations / Challenges / Risks

- The proposed corridor passes through numerous property boundaries.
- Availability of resources for planning, design and delivery is currently constrained.
- Significant environmental protections would need to be addressed as part of the planning.
- · Corridor protection within Latitude 32.

- Transport network upgrades are interdependent with land-use policy changes, ensuring that any changes to the current land-use do not negate the need for upgrades.
- Will require land-take if corridors have not been protected. If not protected there may be interdependencies with other utilities.
- Road network upgrades are planned as part of the Westport project, this interdependency will need to be managed to ensure upgrades tie-in with future network plans.









Strategies and Options

Critical Enabler

Option T1.3: North-South District Distributor Road

Context

As part of the DevelopmentWA-led development of Latitude 32, further road links are proposed in this area. This proposed option would provide north-south connectivity between Russell Road and Anketell Road through installation of a Distributor Road.

Scope

Currently. the North-South District Distributor Road (NSDDR) is proposed to ultimately be a future Other Regional Road (ORR) constructed as a four-lane divided carriageway, consisting of:

- Two 7 m carriageways with a 0.5 m sealed shoulder.
- Wide central median separation.
- Left and right-turning pockets at all access points.

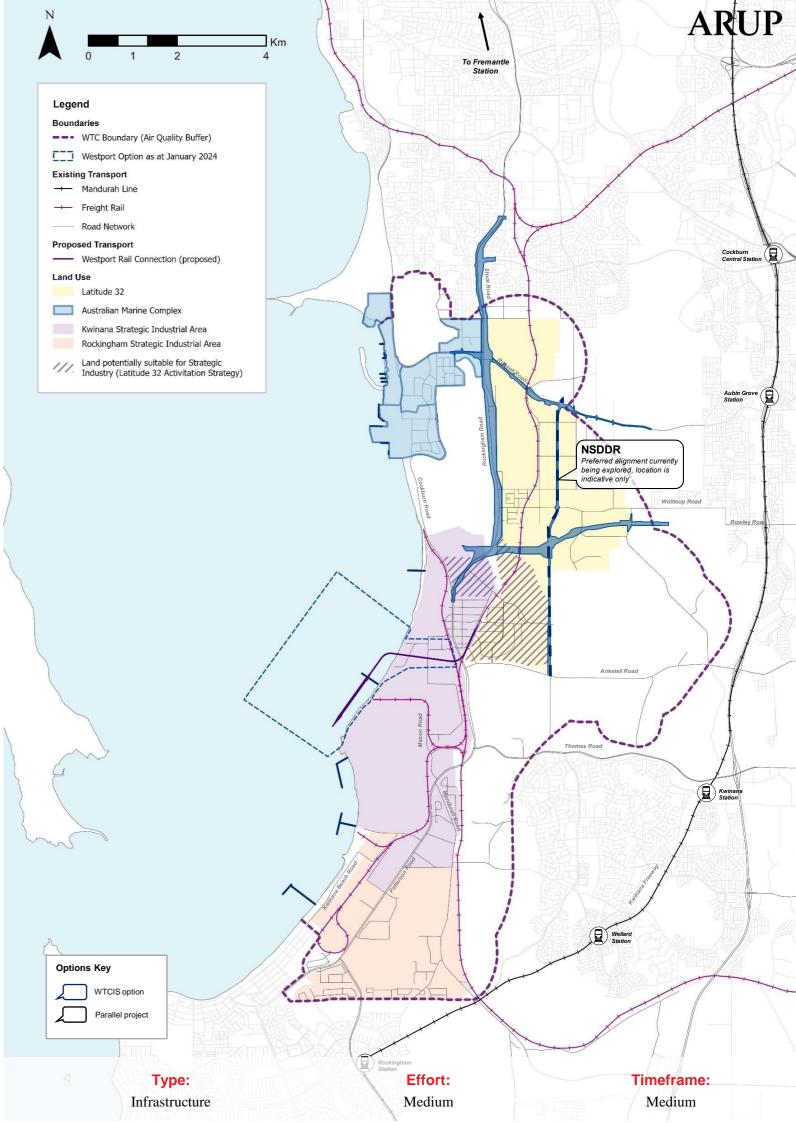
Implementation Considerations Benefits

- Access to north-south movement from Latitude 32 developments, with additional benefits by relieving some traffic from the Rockingham Road-Cockburn Road intersection.
- Allows for greater and easier vehicle movement within the Latitude 32.

Limitations / Challenges / **Risks**

· Corridor protection within Latitude 32 area, services relocation and hazards associated with industrial land.

- · Construction works will need to be coordinated with the Rowley Road extension to Rockingham Road.
- Land corridor preservation maintained.









Strategies and Options

Critical Enabler

Option T1.4: Anketell-Thomas Road Freight Corridor (ATRFC)

Context

East-west freight and commuter connectivity from the Western Trade Coast to Tonkin Highway is currently constrained by the capacity of Anketell Road, which is currently a single undivided carriageway with two lanes.

The Anketell-Thomas Road Freight Corridor (ATRFC) is the government's long-term plan for de-constraining this corridor between the future Westport terminal and Tonkin Highway in Oakford.

Westport and MRWA are currently progressing the planning phase of the ATRFC West section between Leath Road and the Kwinana Freeway. There is currently no schedule or funding for this project.

It is noted ATRFC East is planned for Stage 2 (Kwinana Freeway to Tonkin Highway). However this sits beyond the bounds of the WTC and is therefore not part of the WTCIS.

Scope

MRWA's concept for the ATRFC includes upgrading Anketell Road to four lanes between Kwinana Freeway and Leath Road. This will include:

- New interchanges at Armstrong Road and Rockingham Road.
- New intersections at Mandogalup Road, McLaughlan Road, Abercrombie Road and Leath Road.

Implementation Considerations

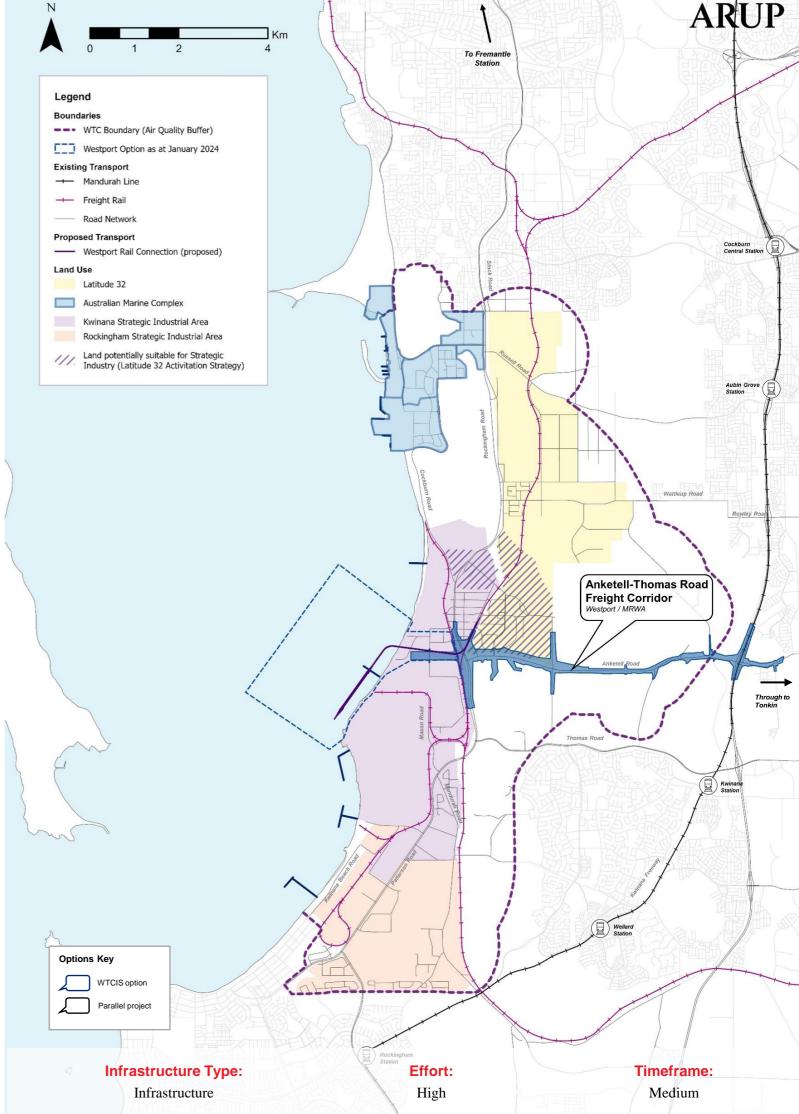
Benefits

- Improved road safety.
- Facilitates the planned Westport Terminal.
- Supports further industrial development in Kwinana and Rockingham.
- Addresses west-east congestion issues caused by increasing population and economic growth in the region.

Limitations / Challenges / Risks

- Land acquisition required to create corridor.
- Disrupted freight and commuter movements during construction phase.
- Corridor adjacent to significant servicing infrastructure including the DBNGP, 330kV transmission lines and sewer pressure mains.

- · Land acquisition required.
- Interfaces with the Rockingham Road upgrade project.
- Adjacent to proposed Westport Rail extension.
- Anketell Road is an important services corridor route and safeguarding land for existing and future services such as power, water and gas is critical.









Strategies and Options

Major Project

Option T1.5: Grade-Separation of At-Grade Rail Crossings (between **Cockburn Triangle and Westport)**

Context

The rail freight network crosses the road network at-grade at several locations within the WTC. The characteristics of freight trains in this area results in long delays for vehicles, which in turn contributes to road network congestion.

Scope

Priority has been given to locations that act as primary access routes, thus nominating three locations to gradeseparate with rail passing under the road. The rail clearance height (7.3 m) will need to allow for future double stacking of containers. At each of the locations the following additional tie-in works will be required:

- Wattleup Road
- Russell Road constrained site with new road alignment likely required.

Each of the sites would require road over rail treatments to remove delays caused by at-grade crossings. These are all being explored as part of Westport.

Future stages could look at the demand and viability of grade-separating Mason Road, Kwinana Beach Road and Hope Valley Road although these present engineering challenges.

Implementation Considerations Benefits

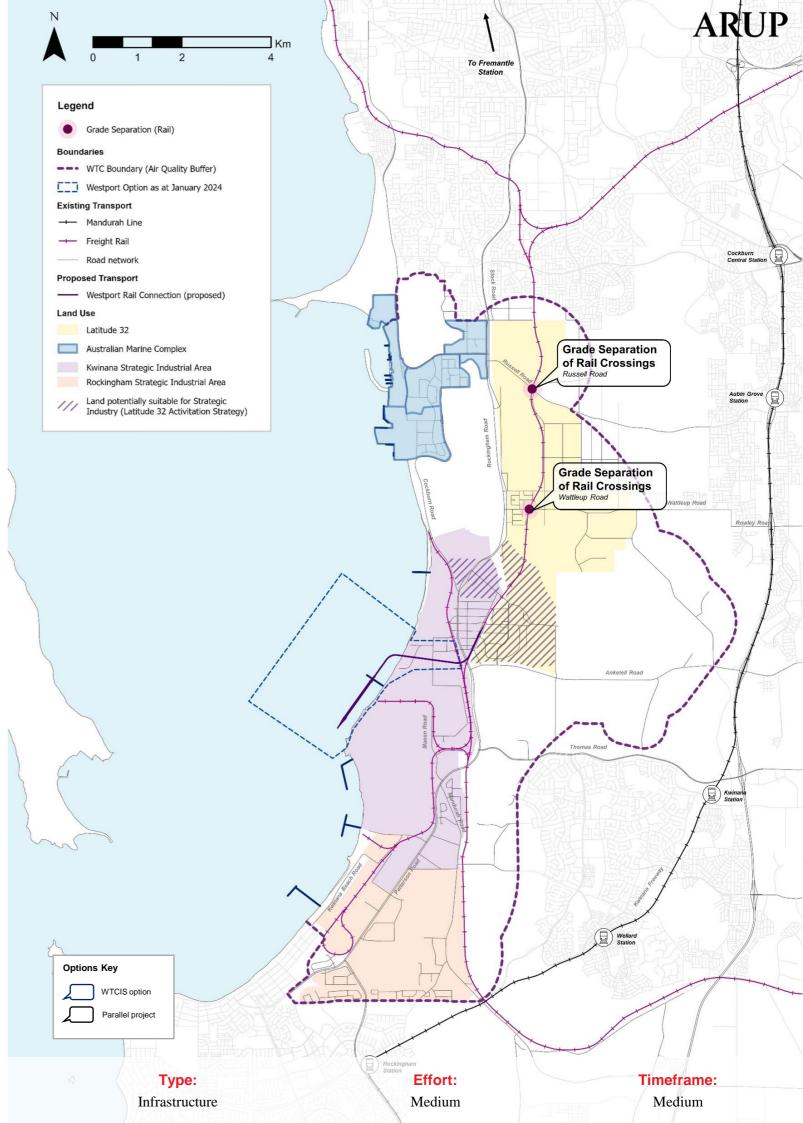
- Remove delays for vehicles, improving journey time reliability, increasing accessibility and access to labour markets.
- Increased safety through removal of conflict point between vehicles and rail operations.

Limitations / Challenges / **Risks**

• Geometry of road layout may require additional land to allow site access points located near the current crossing to be reconnected to the realigned road.

Interdependencies / Land Required

• Future-proofing against any proposed future rail gauge requirements or capacity increases.









Strategies and Options

Major Project

Option T1.6: Install Active Transport Infrastructure

Context

Congestion on the road network is caused by excessive demand from people choosing to drive private vehicles. As with the Park and Ride investment, this option seeks to address congestion by improving alternative choices for commuters.

Providing safe and direct active transport routes improves the likelihood that short-distance trips can be undertaken either on foot or via bicycle. This frees space on the road network for long-distance and strategic vehicle trips to use the road network, maximising the benefits of investments road network infrastructure investments.

In addition to the safety benefits of segregated active transport routes, active travel also provides health benefits to individuals and to the wider population through reductions in vehicle emissions.

Scope

Create a network of PSPs within the WTC that connect major employment sites in the Kwinana SIA, Rockingham SIA and AMC areas. This network should connect with strategic activity centres surrounding the WTC such as Rockingham, Fremantle and Kwinana Town Centre, and the existing active travel corridors.

This infrastructure should also form part of a broader active transport strategy that seeks to support new strategic road links (such as the NSDDR) and public transport access points. The active transport strategy should consider the safety challenges of combining road users with heavy industrial land uses, with good separation a priority.

Implementation Considerations

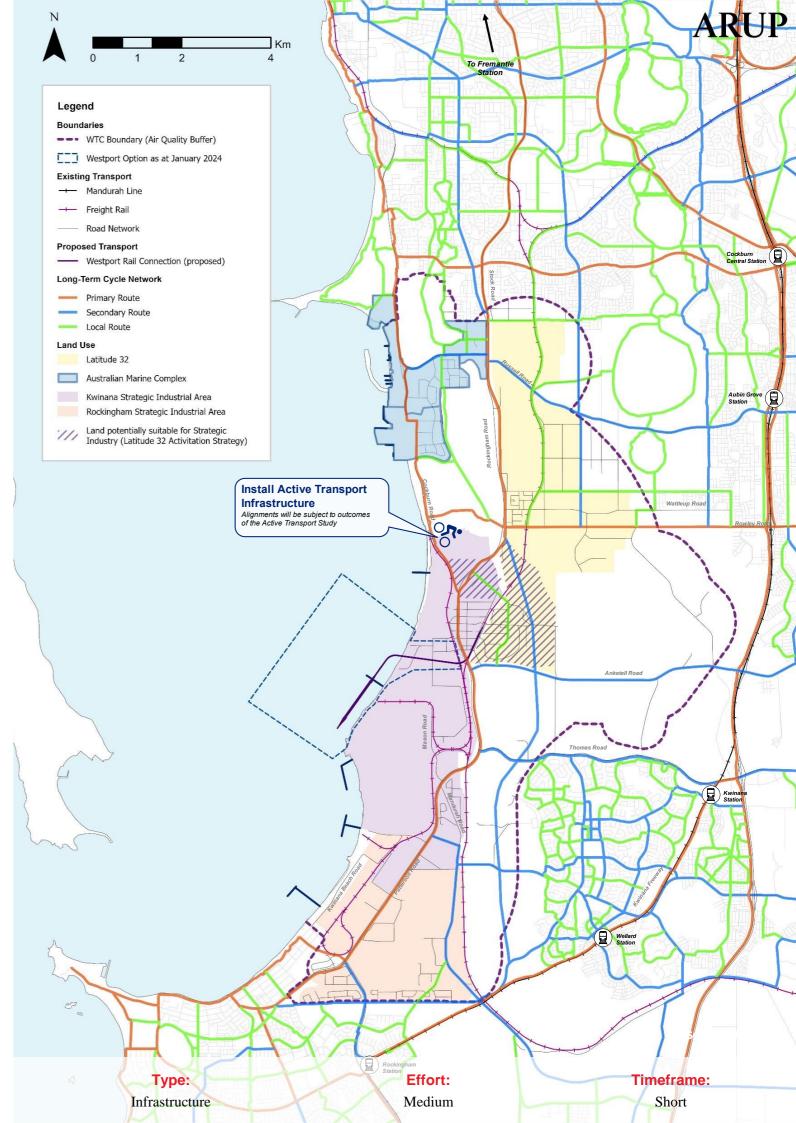
Benefits

- Mode shift away from private vehicles reduces congestion.
- · Active travel also creates health benefits for users.

Limitations / Challenges / Risks

- Extensive length of network required.
- High-capacity roads need further investigation to explore protection requirements.

- · Additional land required in constrained road corridor.
- Active transport infrastructure provide "last-mile" connections for public transport, supporting mode-shift away from private vehicles.
- Need to develop broader Active Transport Strategy for the area to ensure infrastructure aligns with broader network.
- Grade separations of at grade crossings.









Strategies and Options

Other Opportunity

Option T1.7: Develop an Integrated Public Transport Strategy

Context

The WTC area is currently serviced by two low frequency service bus routes (548 and 549), neither of which deviate from the primary corridor into the industrial zones. The Mandurah Line passenger rail service operates along the eastern extent of the WTC with limited connectivity to the two services buses.

Poor public transport connectivity to / from and within the WTC limits accessibility for commuters and reduces the desirability of the region as a place of employment.

Scope

The development of an integrated public transport strategy that would help to increase connectivity and accessibility for commuters. This would involve the investigation of options including shuttle bus services, park and ride facilities and links to the Mandurah rail line as well as to/ from Fremantle and Rockingham.

Implementation Considerations Benefits

- Mode shift away from private vehicles reduces congestion.
- Improved accessibility for commuters.
- Improved road safety.
- Supports the decarbonisation of transport.

Limitations / Challenges / **Risks**

- Demand for Public Transport may not be high given the distances between employment centres.
- High-capacity roads need further investigation to explore protection requirements.
- · Low density large site areas with considerable distances to individual businesses.

- · Strategy to consider interdependence with active transport infrastructure.
- Strategy to consider GAIH Skills and Workforce Workstream.





T2 – Improve Heavy / Oversize Vehicle Networks

To improve the safety and efficiency of freight moved via the road network





Strategies and Options

Transport: T2 - Improve Heavy / Oversize Vehicle Networks

Strategy T2 – Improve Heavy / Oversize Vehicle Networks seeks to improve the safety and efficiency of freight moved via the road network.

Existing Context

Freight movements underpin the industrial activities within the WTC and are complex supply-chains which define the area, requiring large movements of freight vehicles.

While a significant volume of trade is carried by rail, and there is an opportunity to shift more of the freight task to rail, there remains a need to increase the efficiency of the road-freight network.

The road transport network in the WTC currently also serves heavy vehicle movements. The Restricted Access Vehicle (RAV) network classifications define the vehicle categories permitted on each road link

The road network classifications within the WTC are primarily Class 3, Category 4 and 7. These relate to A-Double and AB-Triple road-train configurations, respectively.

The RAV 7 network provides access to the Western Trade Coast area via Kwinana Freeway and Thomas Road. Additional network connectivity is provided for the RAV 4 network via Rockingham Road, Cockburn Road, Anketell Road, Wattleup Road, Russel Road and Mandurah Road.



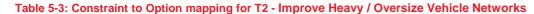
Freight networks require additional consideration beyond addressing congestion due to several factors, including:

- Freight vehicles create additional road safety risks.
- The road network restricts access to heavy vehicles based on weight, height and axel combinations.
- · Freight operations require additional support facilities (such as rest and storage areas).

Without careful long-term planning there is a risk that the freight network could become disjointed, with additional costs passed onto industry. Ensuring that freight needs are met now and into the future is critical to providing an industrial strategy that can connect with the wider regional outside of the WTC.

Known Constraints Addressed

There are two known constraints that are addressed by the option under Strategy T2. Table 5-3 demonstrates how each option addresses the known constraints.



	Other Opportunity
Constraints Addressed	T2.1 Heavy Vehicle Staging Area
Constrained Road Networks for Heavy / Wide Loads	•
Operations Overlap on Congested Road Network (Emergency Services, Wide Vehicles, Commuters)	•









Strategies and Options

Transport: T2 - Improve Heavy / Oversize Vehicle Networks

Aim

This strategy looks to provide dedicated staging areas for heavy vehicles to alleviate the strain caused by trucks stopping on road shoulders. This promotes a humancentred transport system within the WTC that sees safety prioritised, in line with the Australian Government's Vision Zero policy ahead of the stated timeframe of

Through this option, the strategy targets the following GAIH Initiative Aims, in particular:

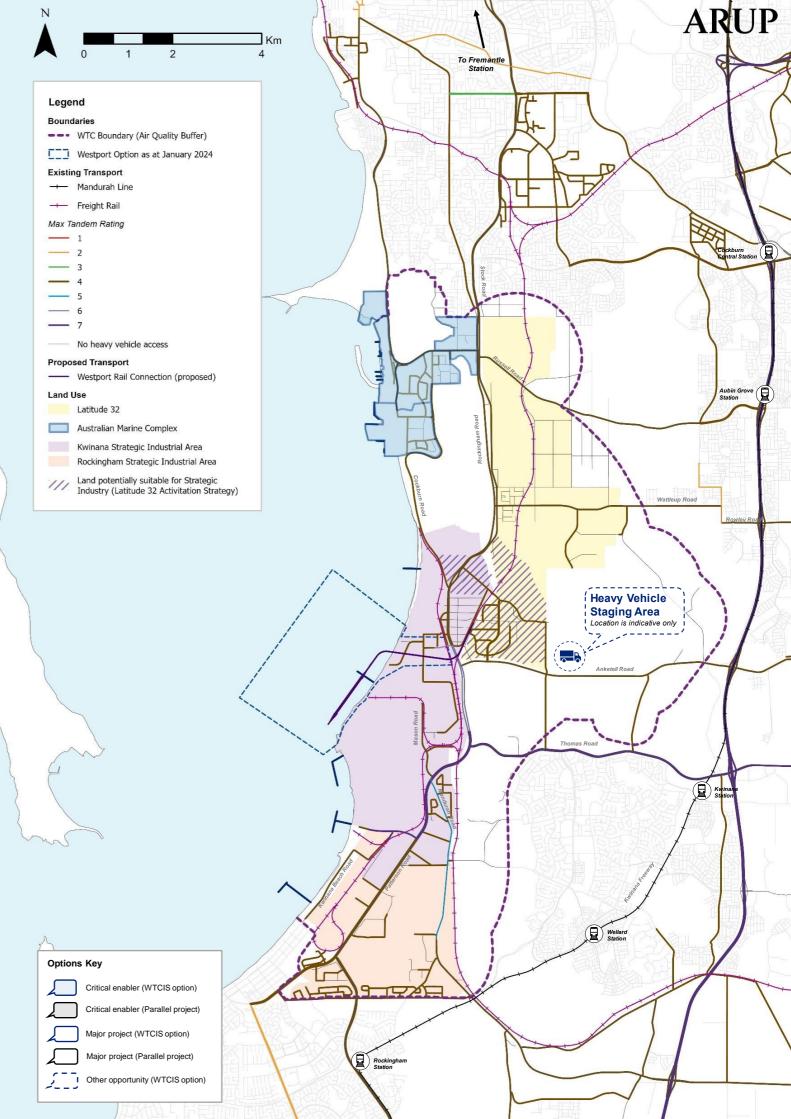
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.
- 6.2 Infrastructure development and operations are sustainable and reflective of industry requirements bespoke to the geography of the WTC.

Options

Other Opportunities:

T2.1 Heavy Vehicle Staging Area











Strategies and Options

Transport: T2 - Improve Heavy / Oversize Vehicle Networks

Alignment with Government Objectives

The WTC area is well served by freight networks and features heavily in proposals to expand corridors in the South Metropolitan region of Perth, within the Perth and Peel @ 3.5million plan. When proposing options of new corridors we have ensured these align with these strategic corridors.

Beyond the defined corridors, there is also broader support for measures which improve freight efficiency within the State Infrastructure Strategy (Recommendation 60). These corridors have been aligned with the State commitment to relocating the container port facilitate as part of the Westport project.

The WTCIS transport options are aligned with the state infrastructure strategy intent to investigate the feasibility of long-term projects.

Impact on Target Industry Opportunities

Improving the heavy / oversized vehicle networks will have positive impact on all target industries.

Table 5-4: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Positive
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Positive



Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



Constrained labour market



Community interaction & identity









Strategies and Options

Other Opportunity

Option T2.1: Heavy Vehicle Staging Area

Context

The large industrial zones within the WTC generate significant demand for heavy goods vehicle trips. Large combination trucks occupy more road space and present a hazard when operating on smaller road networks. In addition to this, when parked on the verge, the heavy vehicle trailers present a significant safety risk.

A shared freight consolidation yard located within the centre of the WTC that can be used to disconnect large combination vehicles and store additional trailers while making individual logistics calls.

Main Roads WA operates a number of staging areas across Western Australia to help manage heavy vehicle movements. An example of one such site is within the Kewdale industrial area.

Scope

The infrastructure associated with a Heavy Vehicle Staging Area can be varied in scope, responding to demand and the available land. As a minimum the facility should provide hard-stand area, with sufficient turning circles for RAV-7 road trains. Expansions on this options could provide additional localised sites to alleviate known hot-spots or temporary requirements for additional heavy vehicle storage.

Positioning nearer the Anketell Road / Rockingham road intersection would pick up traffic coming across the ATRFC.

Implementation Considerations

Benefits

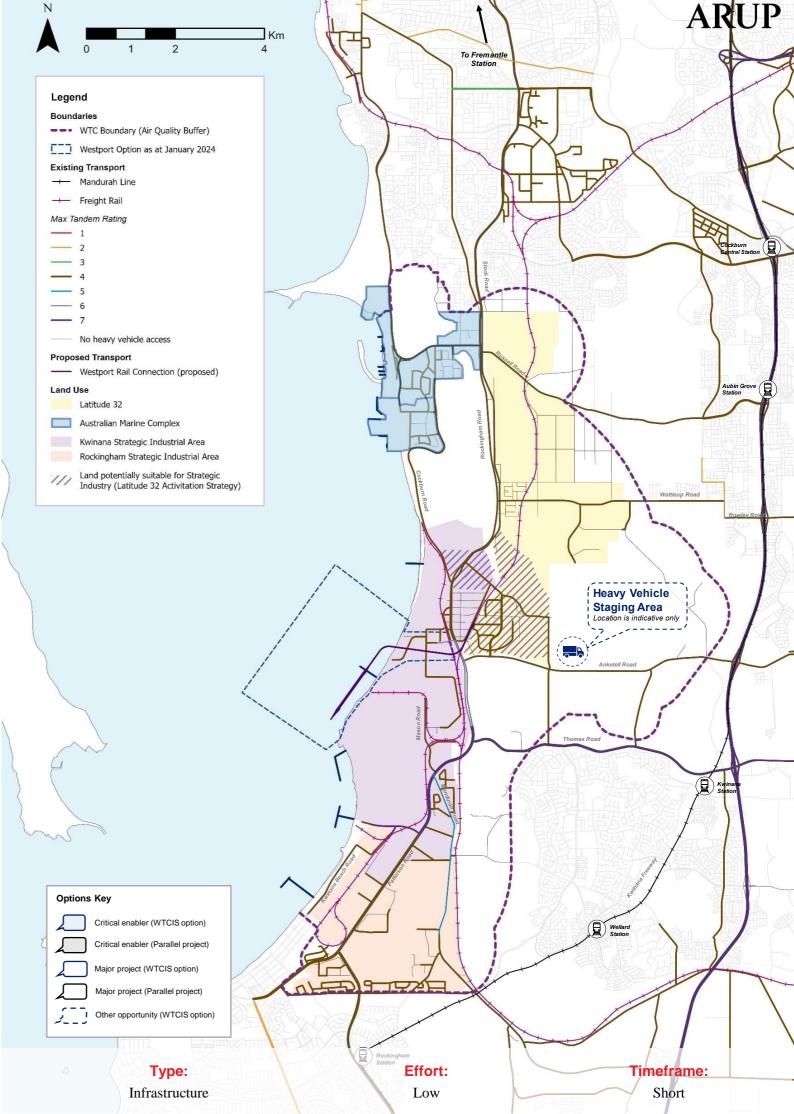
• Providing a staging area where multiple combinations can be divided and held while independent drops are made can improve safety, reduce road space requirements, and reduce congestion.

Limitations / Challenges / Risks

• The large scale of the WTC may reduce the effectiveness of the consolidation area.

Interdependencies / Land Requirements

· Land is required with sufficient connections to the strategic road network.





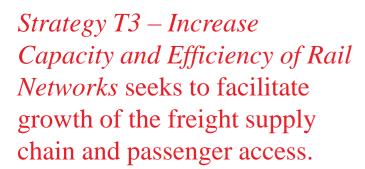
T3 – Increase Capacity and Efficiency of Rail Network

To facilitate growth of the freight supply chain and passenger access



Strategies and Options

Transport: T3 - Increase Capacity and Efficiency of Rail Networks



Existing Context

Rail infrastructure provides a significant transport function for industry located within the WTC area. Hundreds of bulk and container trains utilise Perth's freight rail network each week, with the highest freight rail activity occurring in the Kwinana Triangle servicing the WTC.

Significant volumes of bulk and containerised goods travel via the rail network to the WTC. The rail corridor serves both import and export flows via jetty facilities, as well as upstream and downstream products linked to manufacturing facilities within the area.

The South West Main Line

The South West Main Line services the Armadale frequent passenger rail service operated by Transperth between Perth and Armadale, and the Australind rural passenger train service operated by TransWA running north-south between Perth and Bunbury. The Australind service has four services a day – two northbound, and two southbound.

The main line intersects with the single track section of the freight rail network that accommodates rail freight movements from Kwinana to Bunbury Port. This track runs west-east from Kwinana to the town of Mundijong, before joining back onto the main line to continue south towards Bunbury. This freight line services the Alcoa and Boddington mining areas and connects to the Kwinana Strategic Industrial Area and ultimately, port facilities on the western coast.



The Kwinana Triangle

High volumes of dual-gauge traffic from the north and narrow-gauge traffic from the south pass through the Kwinana Triangle providing access to the various port terminals, industrial terminals and siding facilities including access to the CBH Loop in Kwinana and East Rockingham within the WTC. The South West Main Line (Kwinana-Mundijong) passes through the Kwinana Triangle via narrow-gauge rail from the south to Alcoa Jetty in the north. The Kwinana Triangle also services the Kwinana-Cockburn freight route connecting to the Cockburn Triangle in the north.

The Cockburn Triangle

The Cockburn Triangle is formed by three freight rail corridors that connects the north, east and south freight routes to this triangle junction providing an interchange and transfer of bulk freight from one line to another. The three corridors include:

- The Cockburn to Port Jetty freight route to the north.
- The Cockburn to Forrestfield freight route to the east.
- The southern freight route connects the Cockburn Triangle to the Kwinana Triangle.

The Mandurah Line

The Mandurah Line provides a frequent passenger rail service at 12 stops, and connection between Perth and Mandurah and is operated by Transperth. To ensure smooth operation and productivity of both passenger and freight rail services, grade-separated structures have been provided at two locations along the Mandurah Line where the passenger rail crosses over two freight rail corridors. The passenger rail line intersects with the single-track section of South West Main Line (freight rail) that runs along Mandurah Road and is separated by a rail-over-rail structure south-east of Dixon Road.

The section of the Mandurah Line that shares the same transport corridor as Kwinana Freeway intersects with the Cockburn-Forrestfield freight rail corridor located between Murdoch and Cockburn Central Stations and is separated by road over rail structure.

The rail infrastructure in the WTC is heavily utilised with constraints relating to access and availability of rail freight services. Key to these constraints are the at-grade rail junctions, particularly the Kwinana Triangle and the Cockburn Triangle.

The Kwinana area is an important strategic section of the rail freight network and an outflow point for highquantities of freight in WA.. A significant choke point occurs due to single line working and the diverse industrial users of the infrastructure. Many sites within the WTC have private access and sidings which further complicate the rail operations.

Known Constraints Addressed

Improving freight movements via rail has a number of strategic advantages including lower transportation costs for industry, higher availability of goods movement at large scales, reduced distances travelled by road vehicles, which in turn reduces emissions and accident risks.

There are three known constraints that are addressed by the options under Strategy T3. Table 5-5 below demonstrates how each option addresses the known constraints.

Table 5-5: Constraint to Option mapping for T3 - Increase Capacity and Efficiency of Rail Networks

	Critical Enablers			Major Projects
Constraints Addressed	T3.1 Duplication of Main Line	T3.2 Alternative Kwinana Rail Loop Alignment	T3.3 Installation of Passing Loops	T3.4 Improve Cockburn Triangle Configuration
Kwinana Rail Loop Planning Considerations		•		
Rail Capacity Constraints	•	•	•	•
Single rail access to Kwinana Triangle	•			







Strategies and Options

Transport: T3 - Increase Capacity and Efficiency of Rail Networks

Aim

Rail network limitations are a significant barrier for industry growth and investment by new industries into the WTC.

This strategy identifies discrete options for increasing connectivity, freight rail network access and capacity within the WTC. The duplication of critical lines and the installation of new alignments would allow increased network efficiency and stronger incentives for growth.

Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

- 1.1 WTC's growth is enabled.
- 3.1 Support investment from companies who have synergies with existing and target sectors for the WTC.
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.



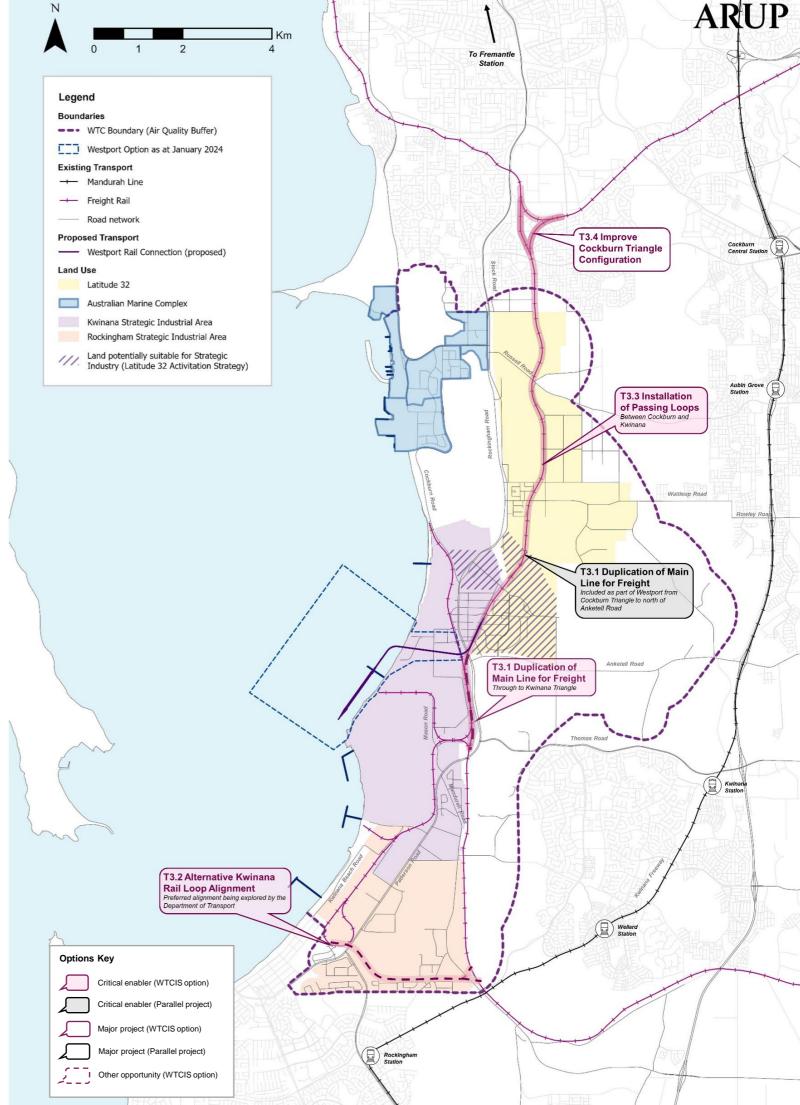
Options

Critical Enablers:

- T3.1 Duplication of Main Line
- T3.2 Alternative Kwinana Rail Loop Alignment
- T3.3 Installation of Passing Loops

Major Projects:

• T3.4 Improve Cockburn Triangle Configuration









Strategies and Options

Transport: T3 - Increase Capacity and Efficiency of Rail Networks



The State Infrastructure Strategy specifically highlights the need to support long-term investment in the rail freight network in Recommendation 69, with the WA agricultural supply chain highlighted as an example requiring further investigation, as Kwinana handles a significant proportion of the grain export traffic via the CBH terminal.

Enhancements to the rail freight network are identified in the Perth and Peel @ 3.5 million plan, with further corridor enhancements required as part of the state Westport project.

Impact on Target Industry Opportunities

Increasing capacity and efficiency of rail networks within the WTC will have a positive impact on Future-Facing Minerals Processing and Port-Related Logistics, Manufacturing and Processing Activities and neutral impact to Renewable Hydrogen and Shipbuilding and Sustainment target industries.

Table 5-6: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Neutral
Renewable Hydrogen	Neutral
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Positive

Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



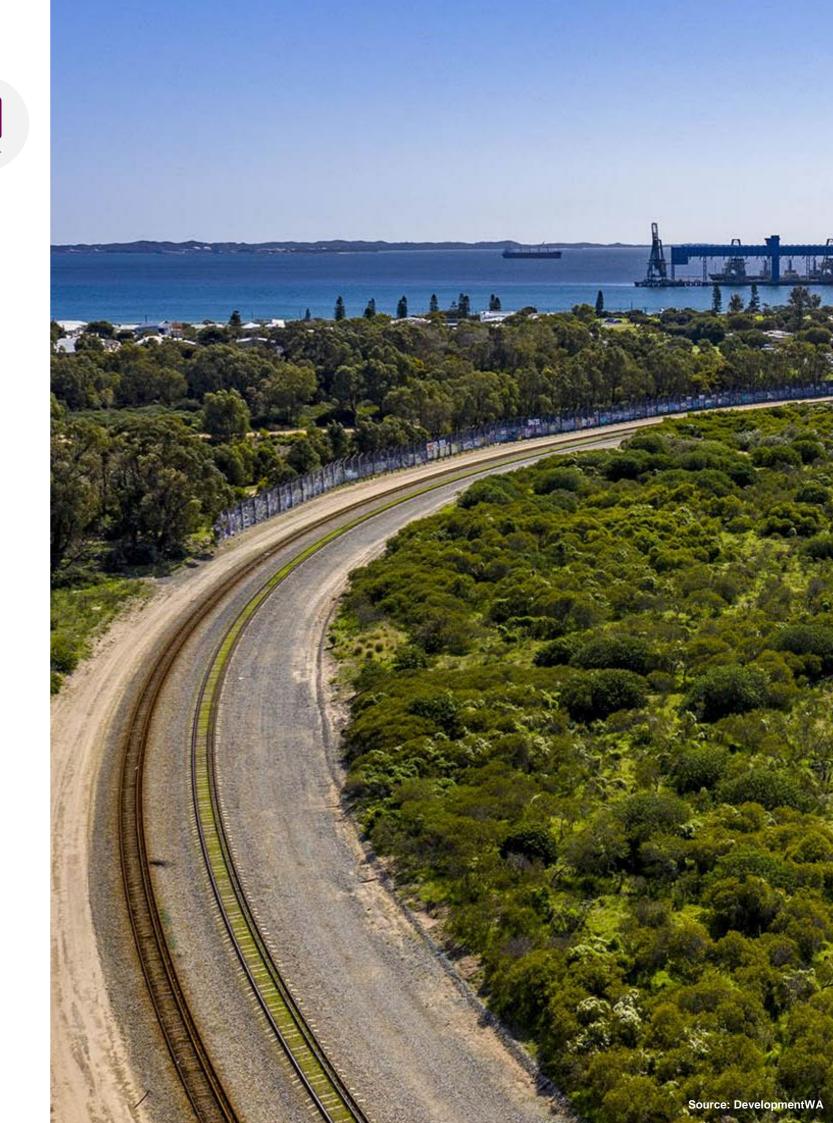
Critical minerals demand



Dominance of materials processing



Land constraints and associated infrastructure / utility requirements









Strategies and Options

Critical Enabler

Option T3.1: Duplication of Main Line (Cockburn Triangle to Kwinana Triangle)

Context

The freight rail network currently handles a mix of traffic including containers, dry and liquid bulk trains that serve both logistic hubs and specific sites within the WTC.

The rail freight network operates as a single line in most locations within WA, and includes the corridor linking Kwinana to Cockburn Triangle. This creates a bottleneck for services operating to both Fremantle and Kewdale.

An increase in rail network capacity is required to alleviate road congestion and reduce transport costs for industry.

Scope

Duplication of the heavy rail network between Cockburn Triangle and the Westport Junction. There is approximately 12 km of existing track to duplicate. The 8.5km section of track between the Cockburn Triangle and the Westport Rail Connection north of Anketell road is currently being explored as part of Westport.

Additional scope should be considered that includes the remaining southern section, duplication up to (and including) the Kwinana Triangle, shown by the dashed line on the map to the right. The delivery body for this work would be different to Westport.

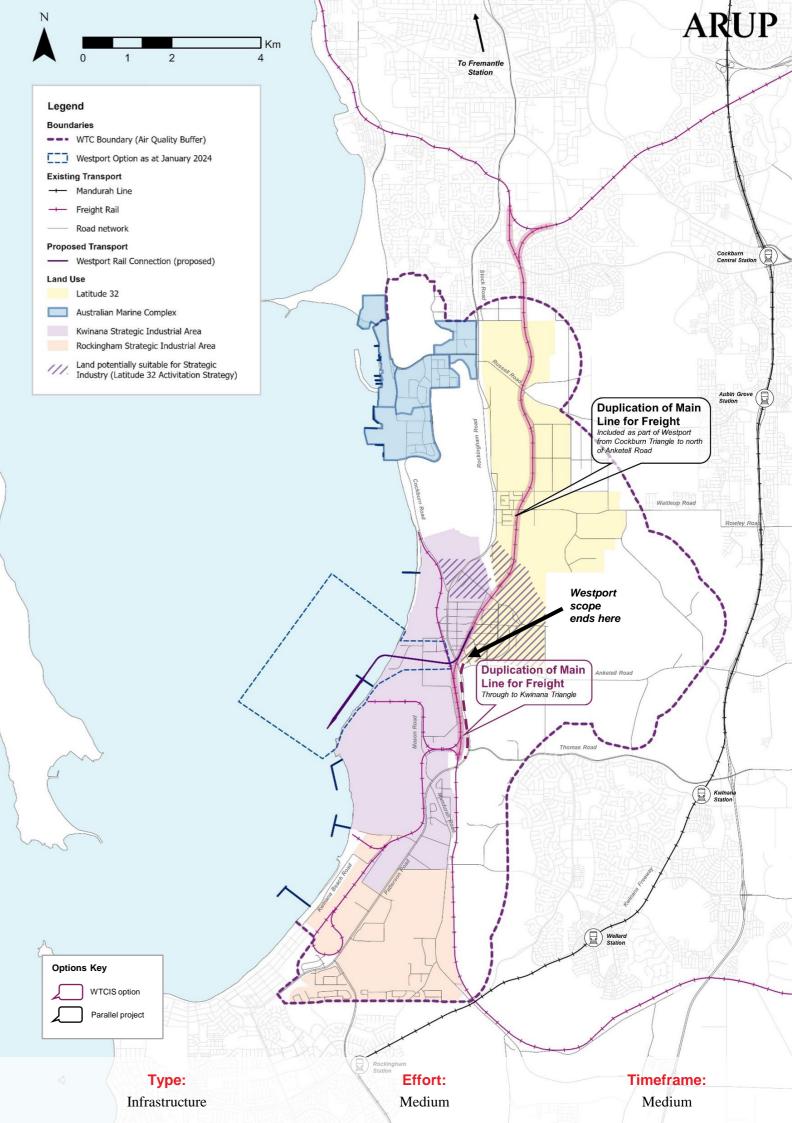
Implementation Considerations Benefits

· Increase the capacity of freight network.

Limitations / Challenges / Risks

• Infrastructure is currently leased to Arc Infrastructure, and investment would require high coordination with this external party.

- Interdependent on level crossing removals, and the proposal to add passenger services.
- May require additional land along corridor.
- Can supersede prior passing loop infrastructure.
- May be restricted by Rockingham Road bridge height clearance.









Strategies and Options

Critical Enabler

Option T3.2: Alternative Kwinana Rail Loop Alignment

Context

The Kwinana Triangle currently handles all rail movements into the KIA and the RIZ and is heavily congested.

Scope

Construct an extension of the Kwinana Freight Railway from the balloon loop to the Kwinana-Mundijong Freight Railway, approximately 3.5 km of new single-track alignment.

The preferred alignment is currently being explored by the Department of Transport (DoT) and is shown in the figure on the right.

Implementation Considerations Benefits

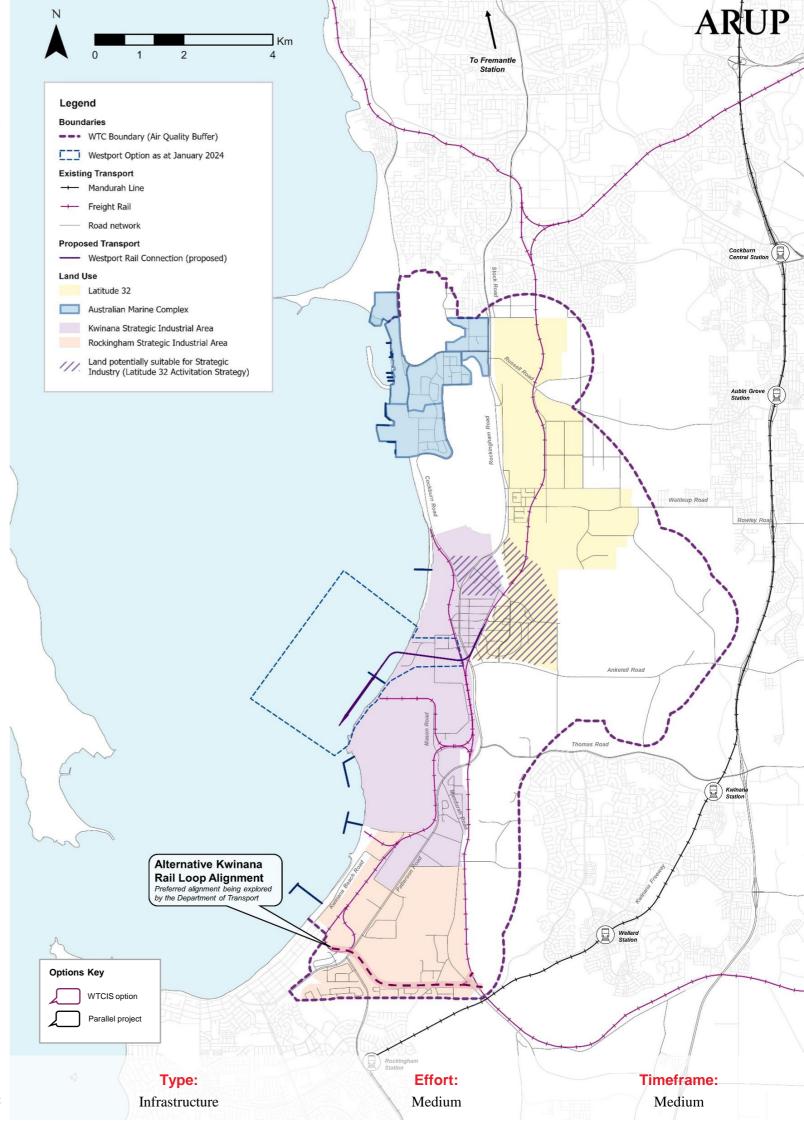
• Allows freight movements to access rail storage yard without the need to pass through the Kwinana triangle. Locomotives would also not be required to 'run-around' the length of the train to take a circuitous route back to the Kwinana Freight Railway, instead having the option to turn back using the Mundijong Freight Railway, re-entering the freight network below the Kwinana

Triangle.

Limitations / Challenges / Risks

- Requires land to create the new rail spur.
- Grade-separation requirements over Patterson Road, Mandurah Road and Day Road. Including consequential upgrade of Patterson Road and Ennis Avenue (including intersection).
- · Potential remediation of contaminated sites surrounding the alignment (including the former Rockingham landfill).
- MRS Amendment to reserve railway alignment.

- · Westport network development projects associated with rail freight access work being progressed by DoT.
- Reservation of land for the new alignment in the metropolitan region scheme.









Strategies and Options

Critical Enabler

Option T3.3: Installation of Passing Loops

Context

The rail freight network operates as a single line in most locations within WA, this includes the corridor linking Kwinana to Cockburn Triangle. Single line working restricts capacity significantly.

Passing loops create more opportunities for bi-directional freight movements, allowing more train paths to serve industrial sites in Kwinana.

Scope

Freight passing loops to be installed on-line between Kwinana and Cockburn. This could consist of several passing loops each approximately 2 km in length. This length aligns with existing passing loops on the WA rail network. Future-proofing activities should be enacted which protect the duplication land requirement, allowing longer passing loops ultimately becoming dual line operations.

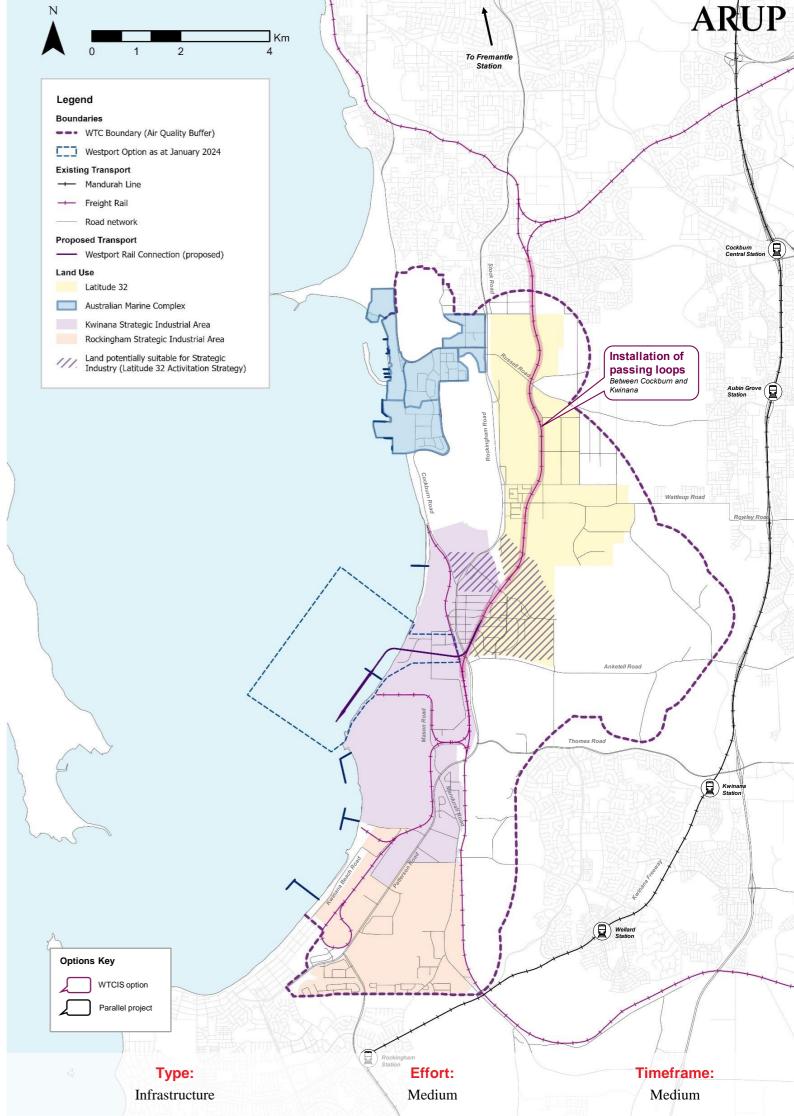
Implementation Considerations Benefits

• Increases capacity of single line track without the need for full line duplication.

Limitations / Challenges / **Risks**

- Number and location of passing loops needs to be coordinated with the forecast demand to ensure efficient use of infrastructure.
- Trains still required to stop in the passing loop, causing delays.
- The freight network is currently leased to Arc Infrastructure, creating significant governance challenges to implement upgrades.

- Project could be abortive if double track option pursued.
- · Westport proposed rail movements.
- Passing loops can be staging works for full duplication.









Strategies and Options

Major Project

Option T3.4: Improve Cockburn Triangle Configuration

Context

The Cockburn triangle acts as a bottleneck as it is utilised by rail services operating between Fremantle, Kewdale, and Kwinana.

Scope

There is scope for two stages of upgrades at the Cockburn Triangle. The first would involve the double tracking of the through route between Fremantle and Kewdale, approximately 1 km of additional track along existing alignment. The second would supplement this by gradeseparating the movement from Kwinana to Kewdale over the Fremantle-Kewdale route, approximately 5 km of vertical track realignment. Vertical clearance is 7.4 m.

Implementation Considerations Benefits

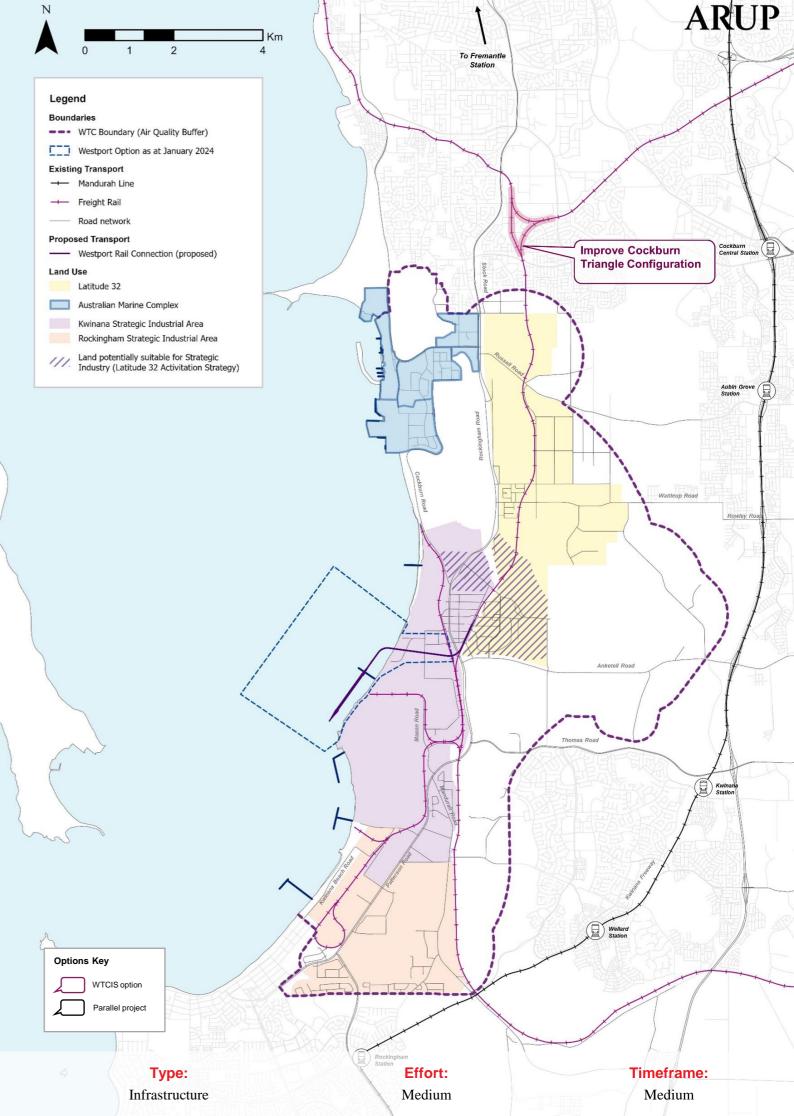
• Removing conflicts between up and down line movements increases capacity.

Limitations / Challenges / **Risks**

- · Benefits may not be fully realised until rail corridor is upgraded to double track.
- · Lack of certainty about Cockburn Triangle-Fremantle Corridor following closure of Fremantle Inner Harbour.

Interdependencies / Land Requirements

• Double track proposal for the main line between Cockburn and Kwinana is included as part of Westport. This could make this option abortive.









Strategies and Options

Maritime Strategies

This section contains one strategy aimed at de-constraining port infrastructure within the WTC.



Increase Capacity, Resilience and Efficiency of Port Infrastructure

Six Options



M1 – Increase Capacity, Resilience and Efficiency of Port Infrastructure

To create opportunities for new industries and increased trade







Strategies and Options

Maritime: M1 - Increase Capacity, Resilience and Efficiency of Port Infrastructure

Strategy M1 – Increase
Capacity, Resilience and
Efficiency of Port
Infrastructure seeks to create
opportunities for new industries
and increased trade.

Existing Context

The WTC comprises critical port infrastructure for both military and freight. The maritime areas within the WTC currently serve as key connection points between local industries and global markets. The maritime areas include:

- AMC North and South Harbours
- Kwinana Bulk Terminal
- Kwinana Bulk Jetty
- Privately Owned Jetties (Alcoa, BP and CBH)

The Australian Marine Complex (AMC), is a centre for manufacturing, fabrication, assembly, technology, repair and maintenance activities of the marine, defence and resource industries. The five key precincts are the Shipbuilding Precinct, Technology Precinct, Support Industry Precinct, Fabrication Precinct, including the Common User Facility, and the Recreational Boat Precinct. The Common User Facility (CUF) includes laydown areas, a fabrication hall, workshops, offices, offload and load-out wharves and vessel berths.

Kwinana Bulk Terminal (KBT) is owned and operated by Fremantle Ports and is used for the import and export of dry-bulk commodities / products including cement clinker, silica sands, gypsum, nut coke and slag. One of the major assets at KBT is the Kwinana Bulk Berth 2 (KBB2) jetty which houses multiple mobile plants to facilitate ship loading and unloading operations.

Kwinana Bulk Jetty (KBJ) is owned and operated by Fremantle Ports. Some operations at Kwinana Bulk Berth 3 (KBB3) and Kwinana Bulk Berth 4 (KBB4) are operated by approved third parties for the import and export of dry and liquid bulk products including fuel, sulphur, anhydrous ammonia, bitumen and fertiliser.

The private jetties support different industries. The Alcoa Jetty supports the import of bulk caustic soda for use at the Kwinana and Pinjarra refineries and the export of refined alumina to overseas markets. The BP Jetty was previously accommodating tanker loading and unloading of bulk petroleum products for the now closed BP Oil Refinery. The CBH facility accommodates ships loading bulk grain.

Much of the port infrastructure within the WTC is ageing and reaching capacity. To accommodate new industries and expand capacity for trade, these facilities will require significant expansions and upgrades.

Offshore wind construction was considered as a new opportunity for the maritime sector within the WTC, during development of the WTCIS. However, following the Minister's announcement of the proposed area for offshore wind in Bunbury, the ports within WTC are less favourable than the Port of Bunbury.

Known Constraints Addressed

This strategy looks to provide firm options for such upgrades. The suggested options target upgrades across all maritime areas. The widening and dredging of the existing channels, and the extension of jetties are key suggestions that would allow for larger vessel access and increased diversity of trade.

There are 10 known constraints that are addressed by the options under Strategy M1. Table 5-7 below demonstrates how each option addresses the known constraints.

Table 5-7: Constraint to Option mapping for M1 - Increase Capacity, Resilience and Efficiency of Port Infrastructure

	Critical Enablers			Major Projects		
Constraints Addressed	M1.1 Westport Preferred Option	M1.2 New KBT	M1.3 KBJ Expansion	M1.4 AMC North Common User Facility Development.	M1.5 AMC South Expansion	M1.6 Strategy for Expansion of Material Offloading Capacity
AUKUS - Restricting Marine Access	•					
Encroachment of Outer Harbour on AMC				•		
Constrained port layout and operations limiting efficient movement of trade	•			•		
Insufficient Channel Depth for Larger Vessels	•			•		
Kwinana Bulk Jetty at Max Capacity			•			
Kwinana Bulk Terminal at Max Capacity	•	•				
Ageing KBT and KBJ Infrastructure – Minimal Residual Asset Life	•	•	•			
Limited Jetty Length Impeding Larger Vessels	•		•			
Limited Resilience of Shipping Channels	•			•		
Limited Material offloading facility capacity					•	•







Strategies and Options

Maritime: M1 - Increase Capacity, Resilience and Efficiency of Port Infrastructure

Aim

Much of the port infrastructure within the WTC is ageing and reaching capacity. To accommodate new industries and expand capacity for trade, these facilities will require significant expansions and upgrades.

Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

- 1.1 WTC's growth is enabled.
- 1.2 WA economy becomes less reliant on a small number of key industries.
- 3.4 The WTC is viewed globally as a key investment location.

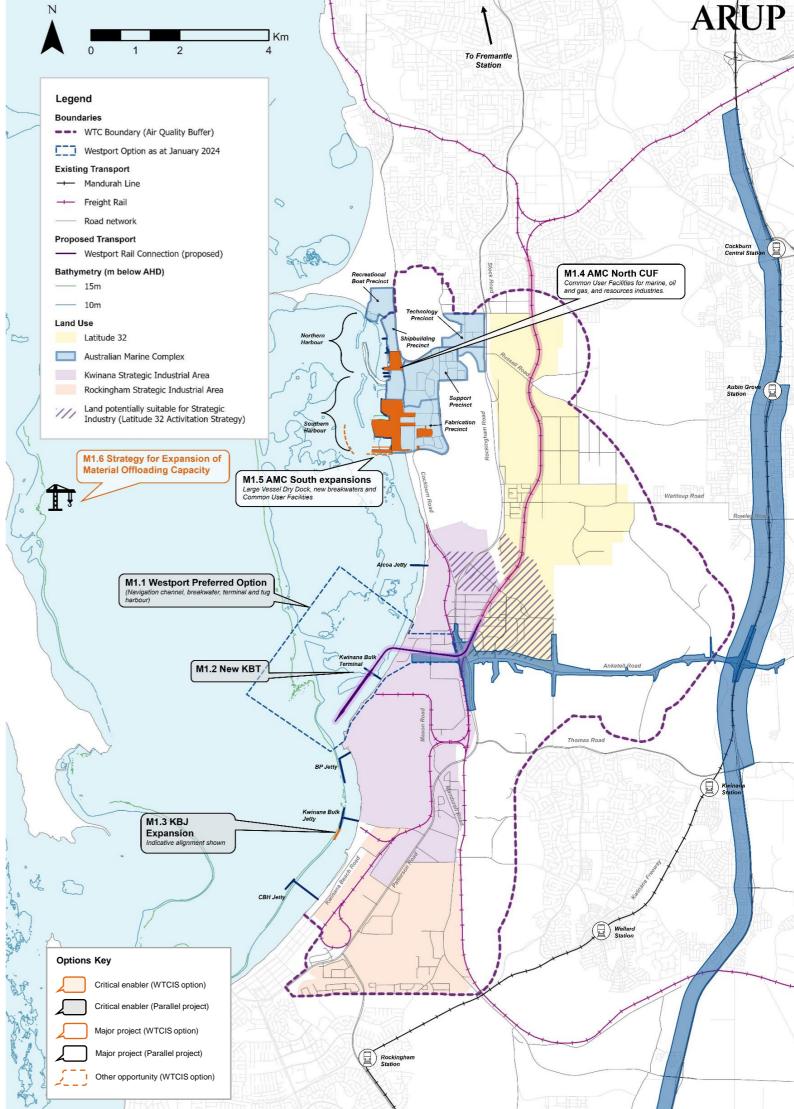
Options

Critical Enablers:

- M1.1 Westport Preferred Option
- M1.2 New KBT
- M1.3 KBJ Expansion

Major Projects:

- M1.4 AMC North Common User Facility Development
- M1.5 AMC South Expansion
- M1.6 Strategy for Expansion of Material Offloading Capacity









Strategies and Options

Maritime: M1 - Increase Capacity, Resilience and Efficiency of Port Infrastructure

Alignment with Government Objectives

The State Infrastructure Strategy specifically speaks to the development of Westport and Fremantle Inner Harbour. These projects are anticipated to increase productivity and freight for key export industries while creating opportunities for supply-chain cost efficiencies. While Westport has been the focus of planning, Fremantle Inner Harbour and Outer Harbour will require further investment and strategic planning.

Further infrastructure investment in the Australian Marine Complex is mentioned as a specific strategy that will help cater to forecasted industry demand and economic and employment growth. It is also aligned with the WA Government's economic diversification policies.

Impact on Target Industry Opportunities

Increasing capacity, resilience and efficiency of port infrastructure will have positive impact on all target industries.

Table 5-8: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Positive
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Positive

Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



New fuel sources



Geopolitical tensions and polarisation of global trade



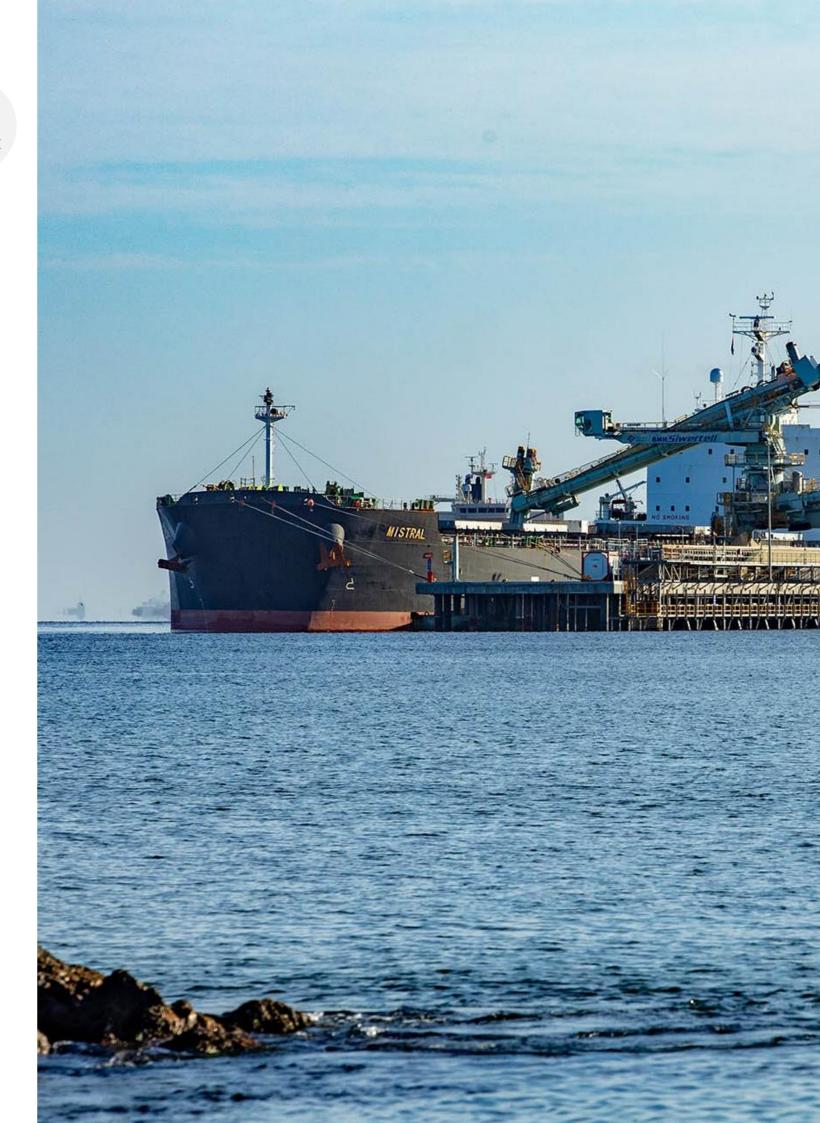
Critical minerals demand



Defence decisions



Changing trade routes & free trade









Strategies and Options

Critical Enabler

Option M1.1: Westport Preferred Option (navigation channel, breakwater terminal and tug harbour)

Context

The business case is under development for the relocation of container trade from Fremantle to Kwinana, unlocking significant development potential at Fremantle.

To achieve this, the existing channel will be required to be widened / duplicated to accommodate the future design vessel.

Scope

Refer to the Westport Supply Chain Integrated Design (SCID) Project and Business Case outputs for the full details of the proposal.

- Capital dredging to provide a second channel / increased channel width.
- Dredging to provide a channel suitable for future container design vessel capacity.
- · Breakwater.
- Terminal and tug harbour.

Implementation Considerations Benefits

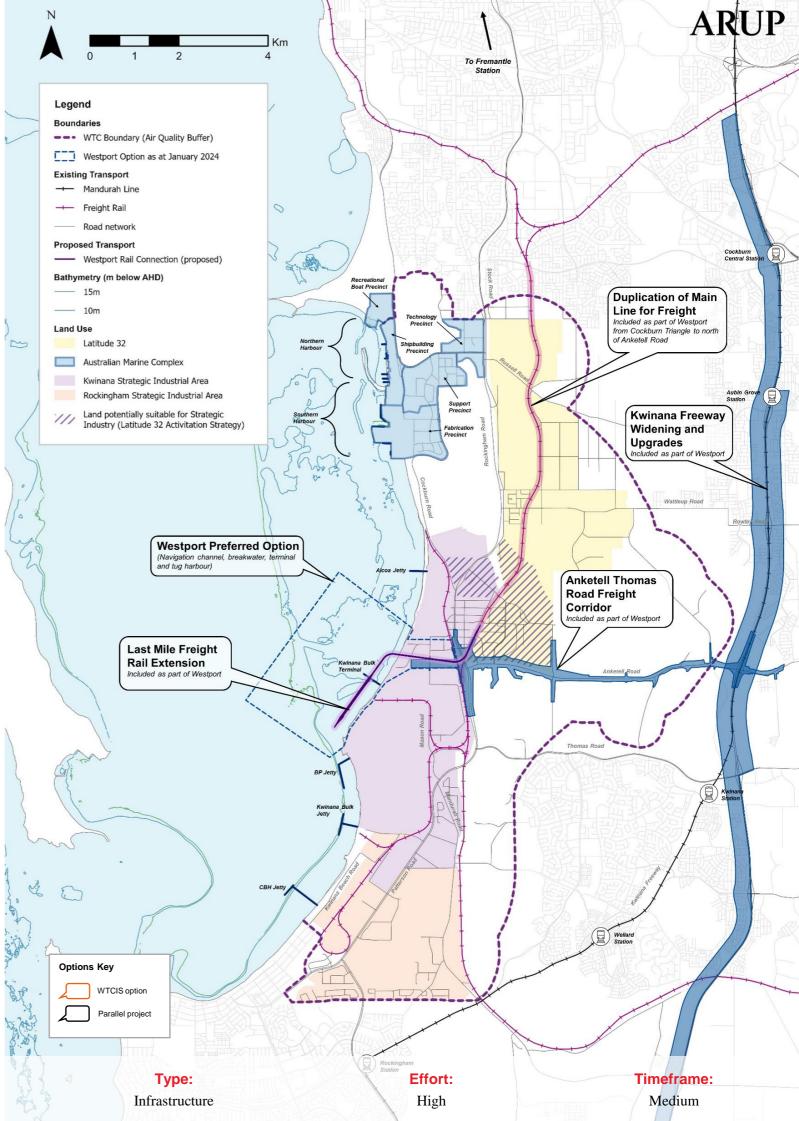
- Decreased congestion leading to more efficient berthing and safer navigation.
- Shared benefits for non-container vessels in WTC which include bulk and navy vessels.

Limitations / Challenges / Risks

- Project of significant scale and complexity with many stakeholders.
- Environmental impacts of increased dredging in Cockburn Sound.
- Social license / impact to local communities.
- Risk to feed seawater to PSDP1 for drinking water production resulting from dredging turbidity. Intake pre-treatment may be required for PSDP1, depending upon pipeline routes in maps.

Interdependencies / Land Requirements

- Footprint encroaches on existing KBT which will be decommissioned once new KBT has been commissioned and is operational to ensure continuity of trade.
- Requires reclamation and landside infrastructure.
- Road / rail connectivity and IMT networks.
- Support change to infrastructure for drinking water supply security.









Strategies and Options

Critical Enabler

Option M1.2: New KBT

Context

The provision of a new bulk terminal within the Westport footprint is needed. KBT is reaching the end of its service life and new infrastructure is required. KBT is set to be replaced and relocated and will be delivered by FPA and Westport. To ensure continuity of trade, construction will be staged to maintain operation of the existing KBT. KBT will only be decommissioned following the commissioning and operation of the new terminal as part of Westport which is expected to be delivered in 2031.



Scope

Refer to the Business Case outputs:

• KBT to include import and export jetty catering for Handymax to Panamax vessels.

Implementation Considerations Benefits

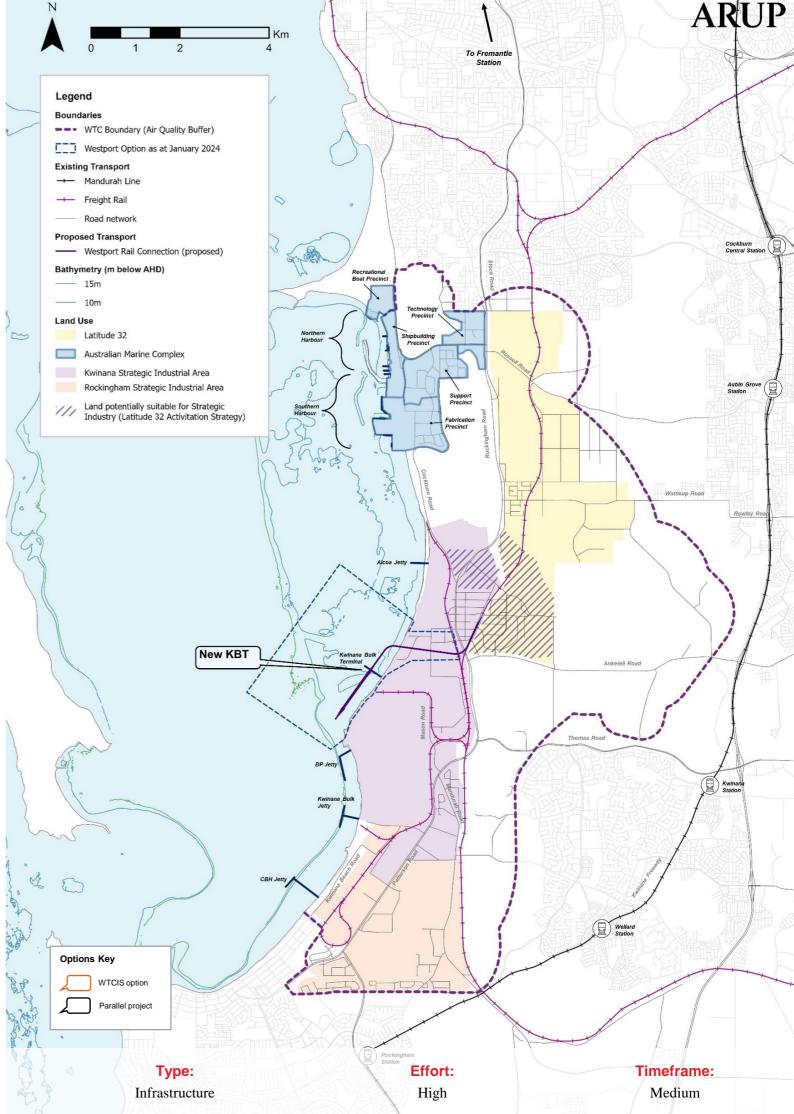
• Shared benefits for non-container vessels in WTC which include bulk and navy vessels.

Limitations / Challenges / **Risks**

- Project of significant scale and complexity with many stakeholders.
- Social license / impact to local communities.

Interdependencies / Land Requirements

- Footprint encroaches on existing KBT which will be decommissioned once new KBT has been commissioned and is operational to ensure continuity of trade.
- Road / rail connectivity.









Strategies and Options

Critical Enabler

Option M1.3: KBJ Expansion

Context

Kwinana Bulk Jetty (KBJ) is a vital trade facility supporting the import and export of dry and liquid bulk products essential for the Western Australian economy, such as fuel, fertiliser, sulphur, phosphates, and potash. Existing berths at KBJ are operating near or at maximum practical capacity and will not be able to accommodate future trade volumes. There is an opportunity to develop a new KBJ (KBB5) to address capacity constraints.



Scope

A new dedicated bulk liquids berth, KBB5 to be located south of existing KBB3 and KBB4. The berth will be fitted with specialised equipment to handle liquids and connected to landside infrastructure that is flexible and fit for the future.

Implementation Considerations

• Increased berthing capacity for dry and liquid bulk trade.

Benefits

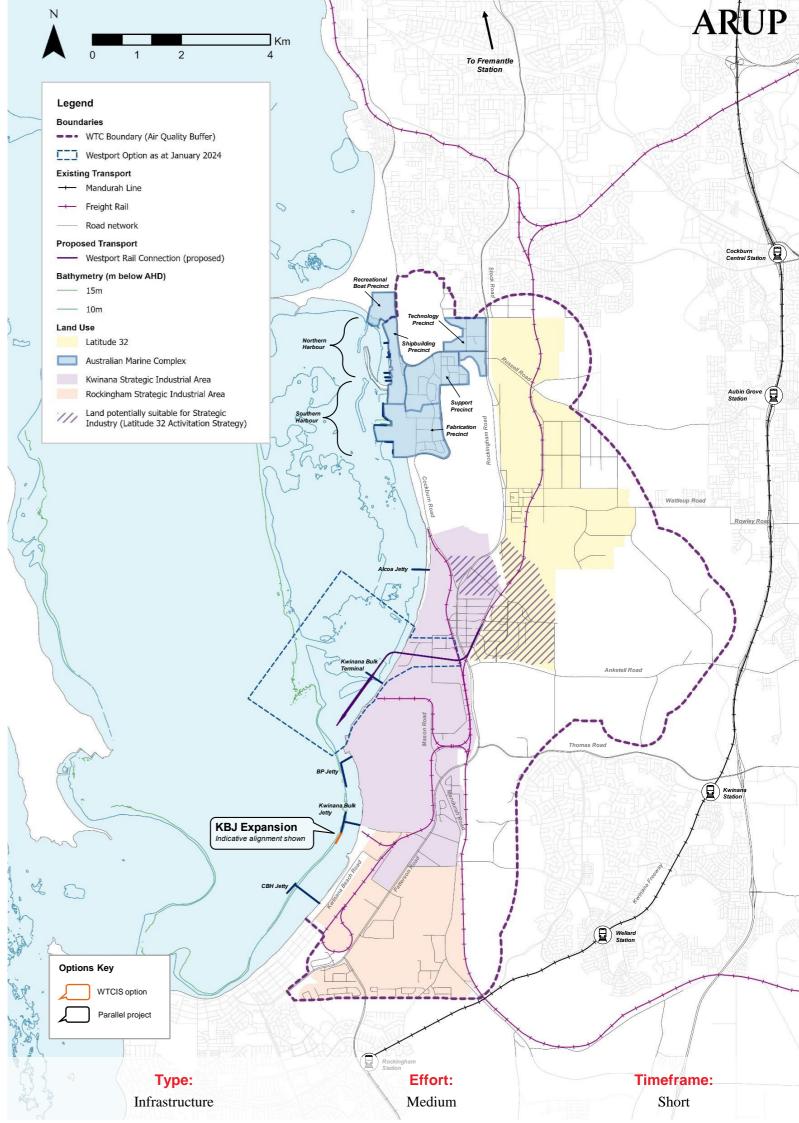
- Customer proximity to KBJ results in higher levels of efficiency and reduced carbon footprint as it reduces the use of trucks to transport cargo and reduced vessel waiting times.
- More efficient facilities (such as fuel loading arms) increase productivity and safety.

Limitations / Challenges / **Risks**

• Environmental impacts to Cockburn Sound, Broad stakeholder groups, including local communities and Traditional Owners, Coordinated construction/integrated planning with Westport and KBT works.

Interdependencies / Land Requirements

• Landside requirements dependent on future trade. The land surrounding KBJ includes land owned or leased by Fremantle Ports and third parties. The facilities constructed on this land make a significant contribution to the state's economy and fuel security.









Strategies and Options

Major Project

Option M1.4: AMC North Common User Facility Development

Context

Future planning for expansion of AMC includes extension of the vessel transfer path from the Southern Harbour to Austal and includes CUF North, providing access to the BAE and CUF ship lift facilities.

The AMC North Common User Facility (CUF) is a 7.5 ha integrated heavy engineering and fabrication facility providing access for multiple users from various industries. The CUF has been operational since 2003 and currently comprises of over 150 businesses. Currently the AMC North CUF is constrained due to space limitations.

Scope

Refer to Business Case documentation (designed by FPA/AECOM in 2019).

Implementation Considerations Benefits

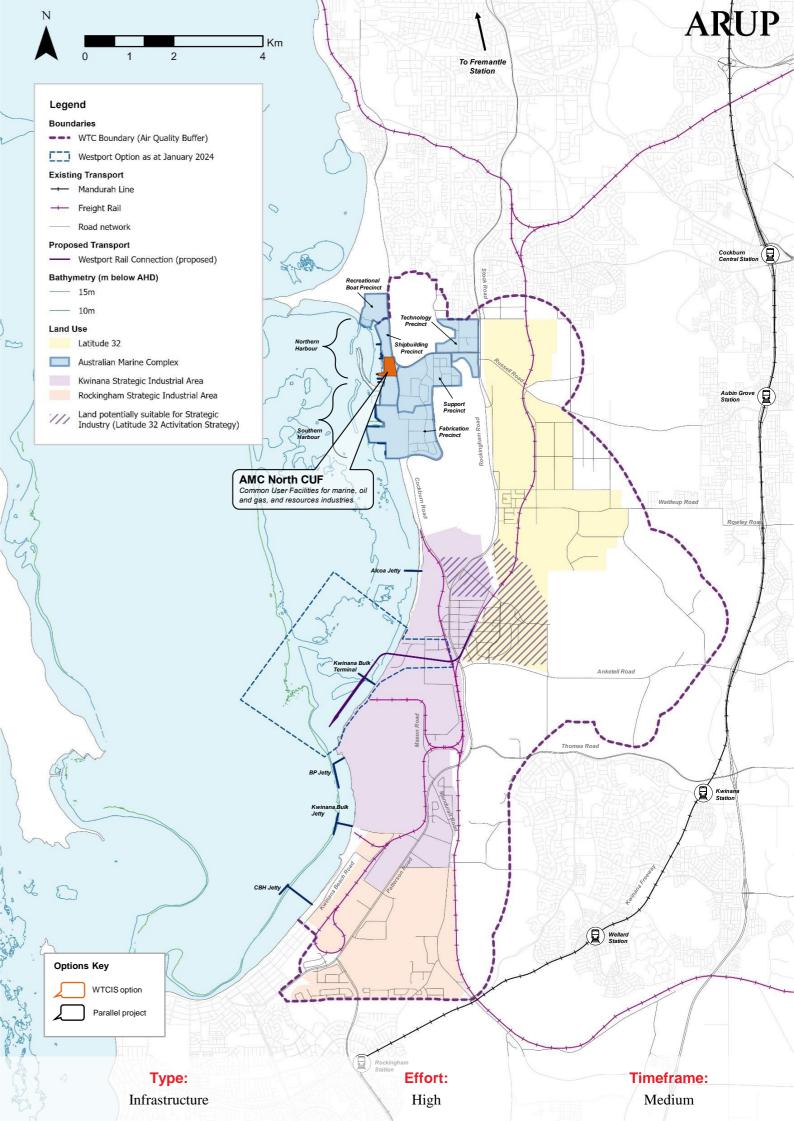
• Increased capacity at AMC North.

Limitations / Challenges / Risks

- Increased traffic in Cockburn Sound.
- Limited landside area available (approx. 12.8 ha laydown area).
- Additional dredging in Cockburn Sound - environmental impacts.
- Greater Defence investment in the future which could result in reconfiguration of non-defence activities in the AMC.

Interdependencies / Land Requirements

• Landside requirements dependent on future trade.









Strategies and Options

Major Project

Option M1.5: AMC South Expansion

Context

Additional berths are required to increase capacity beyond existing Berths 4, 5, and 6. This may include a new finger jetty providing two to four additional berths, perpendicular to AMC 1 and 2 and / or additional berths.



Scope

- Refer to Advisian AMC Strategic Infrastructure and Land Use Plan.
- At AMC South provision of two additional priority berths for Defence.
- · Construction of additional breakwaters to create a southern sheltered harbour.
- Upgrades to AMC Berth 5 to provide one additional berth for common use.
- Localised dredging to create a channel to a new large dry berth.
- Development of a large vessel dry berth, with supporting facilities and cranage.

Implementation Considerations Benefits

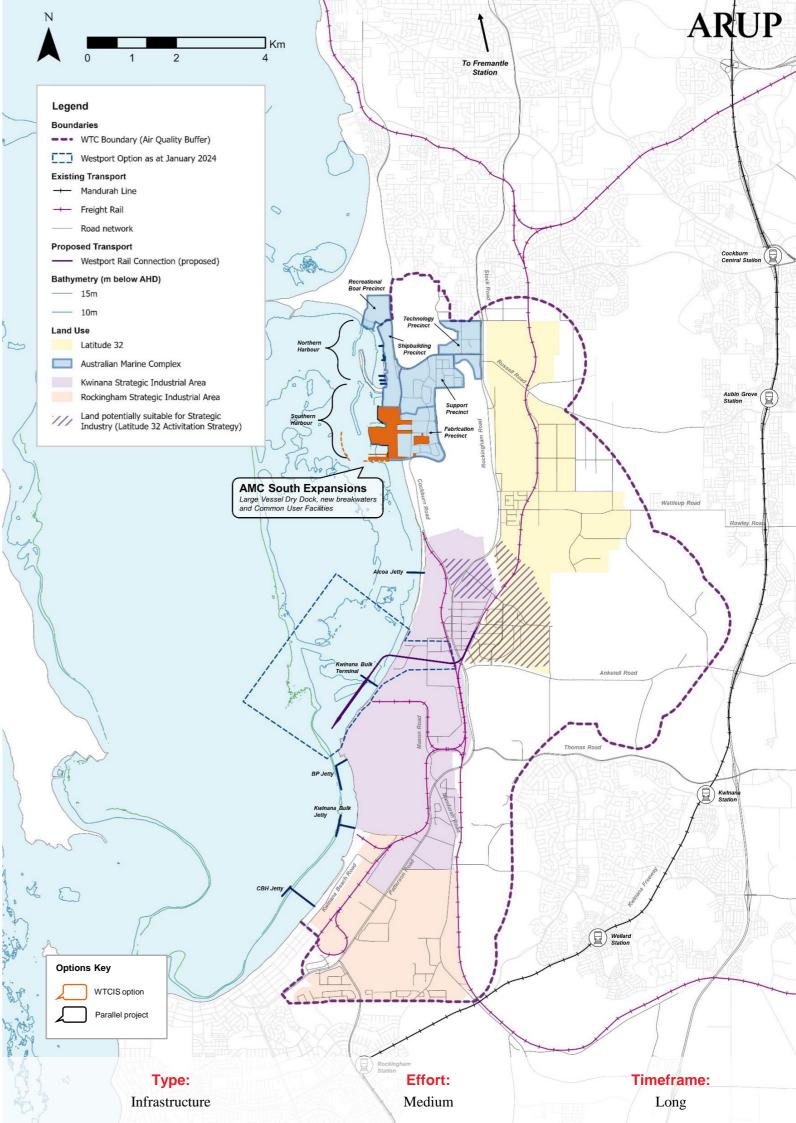
• Increased capacity and flexibility to support major construction projects.

Limitations / Challenges / **Risks**

- Space constraints and limited landside area available.
- Greater Defence investment in the future which could result in reconfiguration of non-defence activities in the AMC.

Interdependencies / Land Requirements

• Dependent on project-specific requirements.







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Chapter 5

Strategies and Options

Major Project

Option M1.6: Strategy for Expansion of Material Offloading Capacity

Context

At workshops with Industry Stakeholders, drivers of change and critical uncertainties for the WTC were identified. One of the critical uncertainties raised was the degree to which industry will be able to adapt and service the priorities, land allocation and energy use for defence driven decisions which prioritise national security.

In a future scenario driven by defence priorities, infrastructure to support national defence, regional stability and related manufacturing may require Government to consider alternative marine infrastructure upgrades, to increase capacity beyond the common user facility at the AMC, to improve resilience and continue to support the identified target industries for the region.

The Government could consider development of a business case to explore options for diversification and expansion of the WTC marine capacity, for material offloading facilities. These facilities are crucial for import and laydown of construction materials for critical construction projects identified for the region.

Scope

This option looks to develop a business case that would explore how to diversify and expand capacity for material offloading within the WTC.

The business case could investigate:

- Options such as the establishment of a Material Offloading Facility (MOF) at an alternate entry point to the AMC. Possible locations could include:
 - · Between CBH Jetty and KBJ,
 - · Between KBJ and BP Jetty, or
 - Integration with other planned development within the WTC.
- The future demand and functional requirements for a common user MOF.

Implementation Considerations Benefits

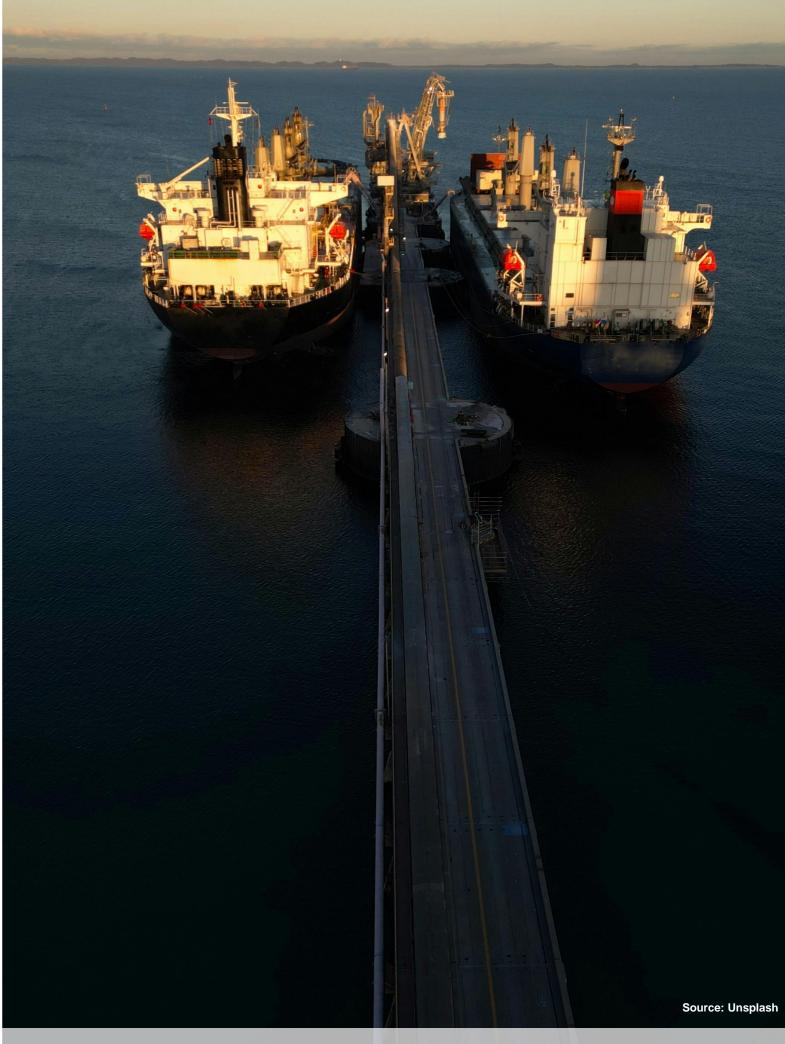
- Reduce requirement for temporary MOFs on a projectspecific basis.
- Increased capacity and resilience by providing an alternative entry point to the AMC.
- Indirect cost-savings due to greater efficiencies during construction phase.

Limitations / Challenges / Risks

- Forecasting of future trade demand.
- Future functional requirements (consideration of specific components required to support local manufacturing industry and energy transition).

Interdependencies / Land Requirements

- Consideration of WA's planned infrastructure timeline and supply chain, including the transition to renewables.
- Sequencing of major construction projects to evaluate whether future demand justifies a MOF within the WTC.
- Consider integration of MOF with other planned development in WTC.









Strategies and Options

Utilities Strategies

This section contains one strategy aimed at de-constraining utilities including electricity and water within the WTC.



Improve Electricity Availability

Four Options



U2

Increase Supply of Renewable Energy

Four Options



U3

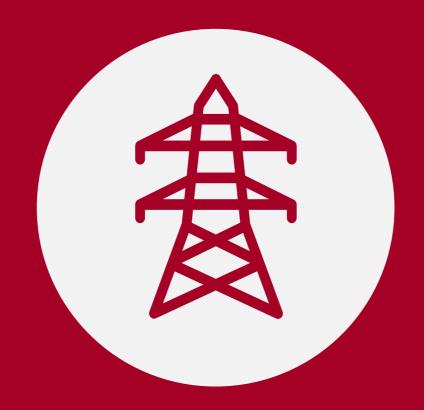
Improve Capacity of Wastewater Network

Two Options



Increase Availability of Water Supply Options

Eight Options



U1 – Improve Electricity Availability

To reinforce the transmission network to allow for an increased uptake of clean energy and connection options for new tenants





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Chapter 5

Strategies and Options

Utilities: U1 - Improve Electricity Availability

Strategy U1 – Improve Electricity Availability seeks to reinforce the transmission network to allow for an increased uptake of clean energy and connection options for new tenants.

Existing Context

Electricity is a key enabler for industrial processing within the WTC and is also vital to supporting the decarbonization of industrial activities.

The WTC is connected to the South West Interconnected System (SWIS) which is owned and operated by Western Power. The existing electrical network within the WTC consists of a several gas fired power plants, government owned substations, large scale battery storage and a network of 132 kV and 330 kV transmission lines.



The WTC has historically been a critical site for new generation connections at both 132 kV and 330 kV. According to the Transmission System Plan – 2023, Western Power continues to receive significant interest for new generators and loads, particularly hydrogen facilities, within the area. It is expected that Kwinana will remain a key generation hub into the future.

Due to the heavily meshed nature of the 132 kV network, the grid is at capacity and requires network augmentation. In its current state this network is highly constrained and limits the ability for tenants to create new connections (including connections to Mason Road substation). Despite the constraints on the 132kV network, the 330 kV network remains underutilised.

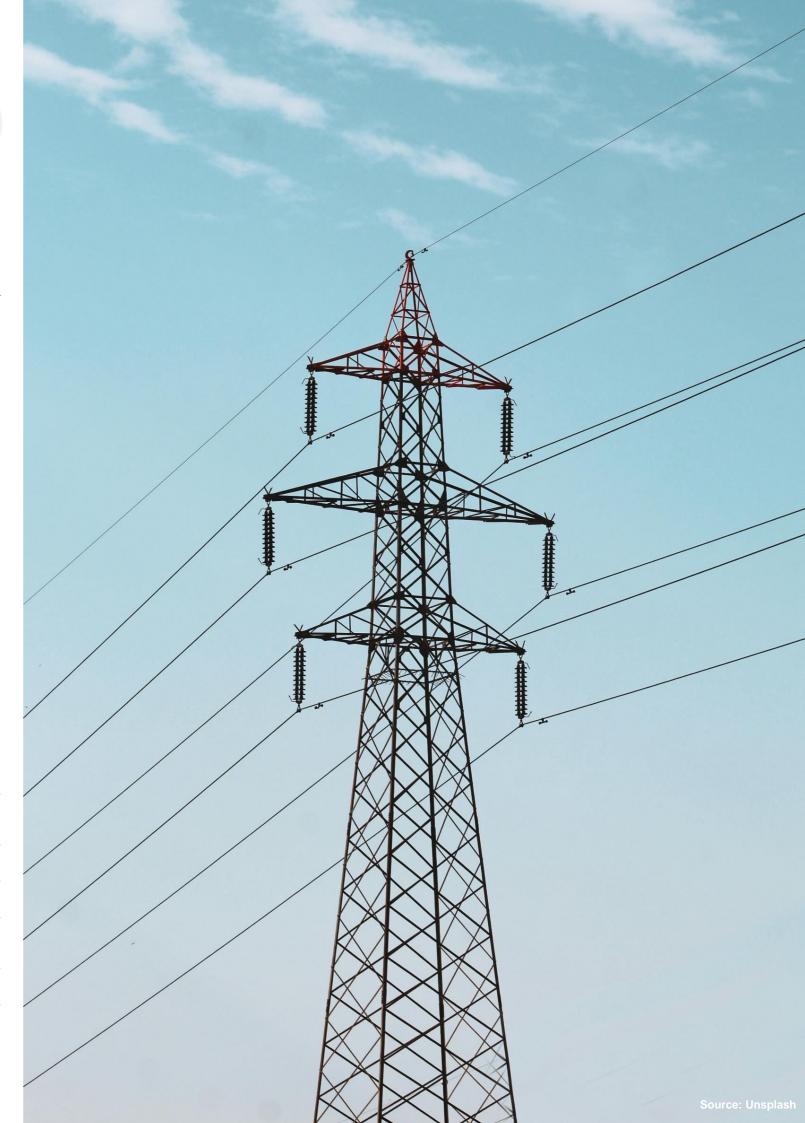
Known Constraints Addressed

Feedback from WTC's proponents indicates that an increase in power supply is needed to support their future activities. Having access to sufficient land and / or transmission easements is required to enable WP to deliver the electrical upgrades to meet these power requirements.

There are four known constraints that are addressed by the options under Strategy U1. Table 5-9 below demonstrates how each option addresses the known constraints.

Table 5-9: Constraint to Option Mapping for U1 - Improve Electricity Availability

		Other Opportunities		
Constraints Addressed	U1.1 Tier 1 WP Upgrades	U1.2 Tier 2 WP Upgrades	U1.3 Tier 3 WP Upgrades	U1.4 Strategic Plan for Connecting New Tenants
Electricity Supply Constrained	•	•	•	
Limited Substation Capacity at Mason Road		•		
Limited Transmission Capacity of Existing132 kV Powerlines		•		
Limited Available Land for Future WP Assets				•









Strategies and Options

Utilities: U1 - Improve Electricity Availability

Aim

The SWIS Demand Assessment 2023 to 2042 (SWISDA) outlines the State Government's plans for a future ready grid, including a three-stage network augmentation plan that would see upgrades to the existing SWIS network and new large scale transmission infrastructure built to facilitate the transition to renewables. To align with the SWISDA, the options under this strategy outline the foundational infrastructure upgrades needed to allow renewable power to be brought into the WTC from generation sources in regional areas.

Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

- 1.1 WTC's growth is enabled.
- 2.1 Industry located within the WTC have access to the infrastructure to support decarbonisation activities, ensuring they maintain favourable status with key trading
- 2.2 Ensure private investment to the WTC is aligned to Environmental, Social and Governance (ESG) opportunities benchmarked against the United Nations (UN) Sustainable Development Goals.
- 3.1 Support investment from companies who have synergies with existing and target sectors for the WTC.
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.



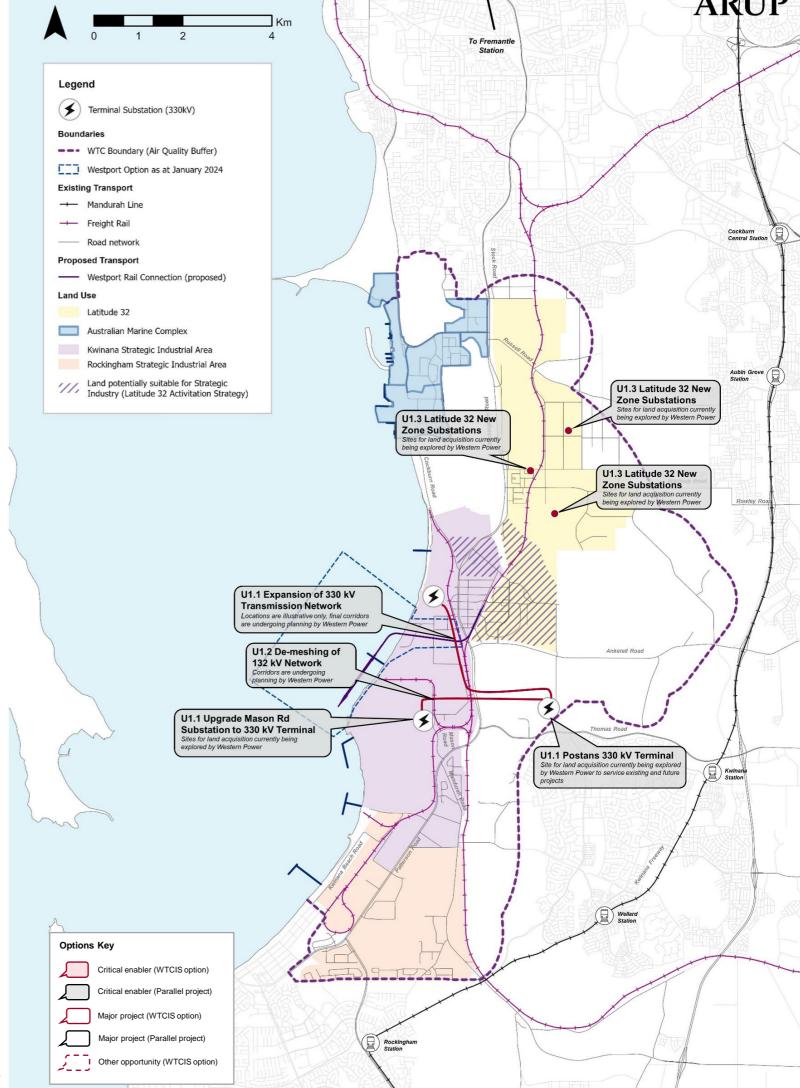
Options

Critical Enablers:

- U1.1 Tier 1 WP Upgrades
- U1.2 Tier 2 WP Upgrades
- U1.3 Tier 3 WP Upgrades

Other Opportunities:

• U1.4 Strategic Plan for Connecting New Tenants









Strategies and Options

Utilities: U1 – Improve Electricity Availability

Alignment with Government Objectives

The SWISDA indicates additional network capacity will be needed to support industrial activities in the Kwinana area. Undertaking these upgrades will support near and long-term growth, while also supporting the decarbonisation of the SWIS network.

Impact on Target Industry Opportunities

Improving electrical availability will have positive impact to Renewable Hydrogen and Future-Facing Minerals Processing industries and neutral impact to Shipbuilding and Sustainment as well as Port-Related Logistics, Manufacturing and Processing Activities.

Table 5-10: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Neutral
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Neutral



Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



New fuel sources



Decarbonisation



Net zero targets









Strategies and Options

Critical Enabler

Option U1.1: WP Upgrades (Tier 1)

Context

The capacity of the 132 kV electrical networks within the WTC is constrained and requires augmentation. Western Power (WP) has progressed planning for solutions to bring more power to the WTC area through a combination of system upgrades and new infrastructure construction. The proposed upgrades for WTC have been split into three tiers which would be deployed in response to the future power requirements of WTC tenants. This first option (Tier 1) describes the base level of infrastructure understood to be required by WP to meet the electrical demands of known future tenants and existing customers seeking to expand.

Implementation Considerations Benefits

 These works would provide an additional 1 GW of capacity to support the anticipated needs of current tenants.

Scope

The minimum infrastructure required to meet future demands of the existing tenants includes three key terminals:

- Kwinana terminal: existing 330 kV.
- Mason Road terminal: to be upgraded from the existing 132 kV substation with a new 330 kV terminal located on the land adjacent to the existing station. This terminal will cover the short-term power demands for WTC. This will require ~ 400 m x 500 m of land space for the new terminal. The upgrade works will also require cut-ins for the new 132 kV lines.
- Postans terminal: new 330 kV terminal to be located near the quarry on Abercrombie Road. This station will form the stepping stone for Tier 3 and connect to the future 500 kV line coming from the Renewables Hubs outlined in the SWISDA. Will require ~ 400 x 500 m of land space for the new terminal.

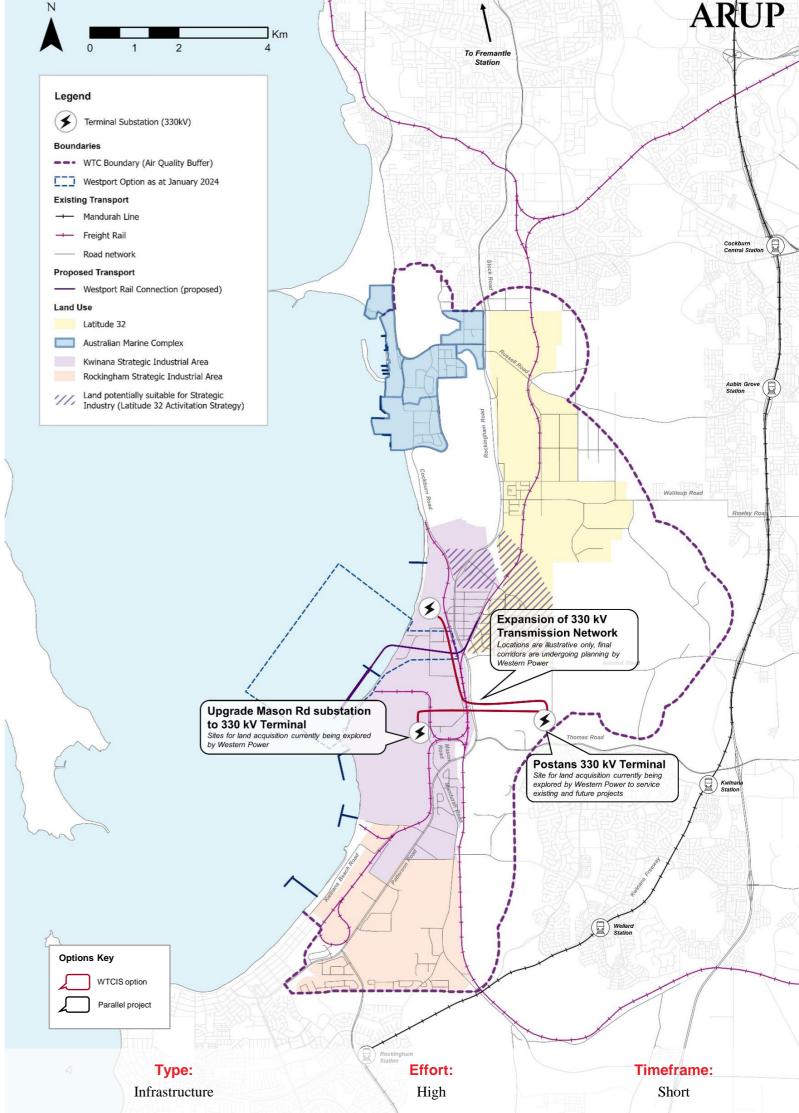
These terminals would need to be connected by five new 330 kV transmission corridors, which each require a 60-70 m easement widths. These are shown indicatively in Figure 5-27. Although routes have not been finalised based off the early planning completed to date it is likely 20-30 km of new transmission lines will be needed.

Limitations / Challenges / Risks

• Land availability is a key challenge for WP. For the transmission cables, the more diverse the routes, the better the reliability of the electrical network. However, given the constrained land availability in WTC, this is difficult to achieve. The easements can be shared with other utilities such as road and water, but are less easily shared with gas utilities. Up to two circuits can be located on the same tower, but any more than this leads to efficiency problems with current. Therefore, pairs of circuits need to be separated from each other on a second set of towers and cannot share the same transmission corridor.

Interdependencies / Land Requirements

• The two new terminal substations each require 400 m x 500 m of land. The five 330 kV transmission corridors each require 60 – 70 m corridor easement widths.









Strategies and Options

Critical Enabler

Option U1.2: WP Upgrades (Tier 2)

Context

This option assumes Tier 1 upgrades have been implemented. It describes de-meshing works that can be completed to gain additional capacity out of the existing network (up to 30%), equating to a total 1.3 GW of additional capacity if completed after the Tier 1 upgrade works.



Scope

The existing 132 kV network would need to be demeshed. This would require line relocation works and new 132 kV corridors according to Figure 5-28.

Implementation Considerations

Benefits

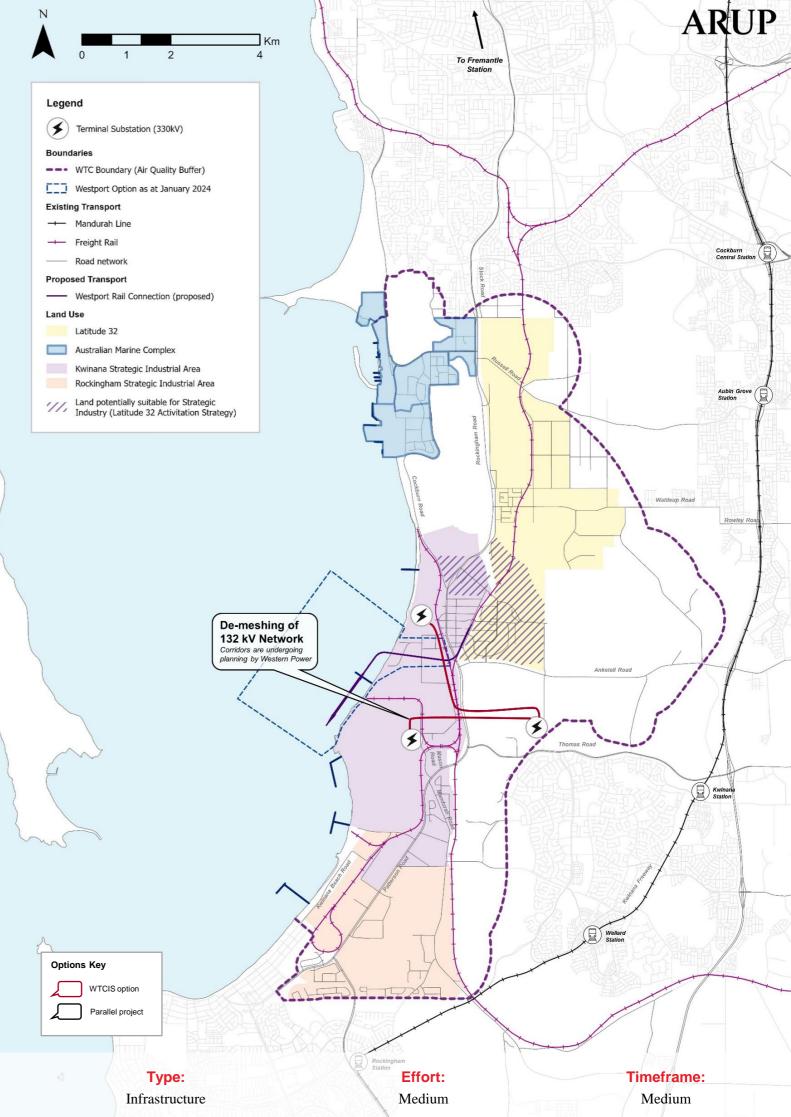
• These works support a 30% increase in capacity of the network without requiring significant construction works.

Limitations / Challenges / **Risks**

• Same as above, land availability for the new 132 kV circuit corridors is a key challenge.

Interdependencies / Land Requirements

• The new 132 kV lines each require 45 – 60 m corridor easement widths. This option requires the WP Tier 1 upgrades to be implemented prior.









Strategies and Options

Critical Enabler

Option U1.3: WP Upgrades (Tier 3)

Context

This option describes the ultimate case outlined in the SWISDA that would see renewable energy from renewables hubs carried into the WTC via a new 500 kV line. This would bring the total capacity in the network to 2.2 GW if completed after S5.1 and S5.2.



Scope

A new 500 kV line would need to be connected to Postans terminal from regional renewables hubs to bring in extra power supply to the area. This would require a 120–160m easement. The length of this cable is too difficult to determine as it is highly subjective to the location of the renewables hubs.

Implementation Considerations

Benefits

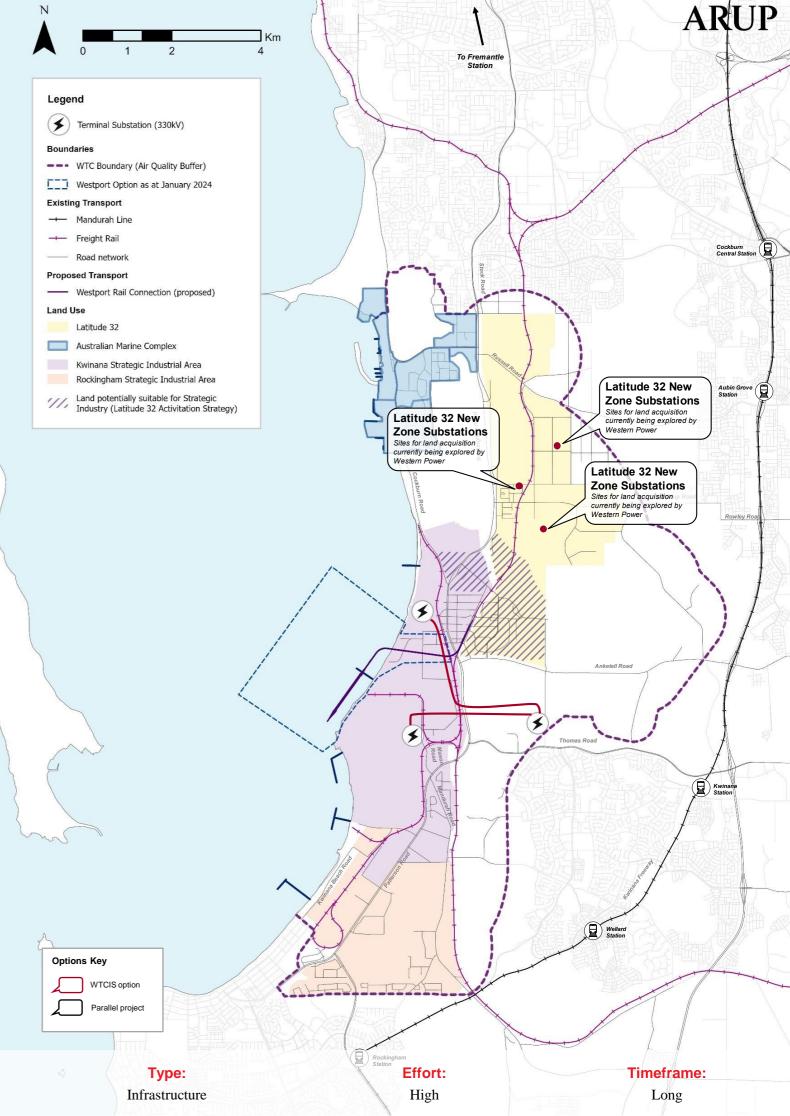
• These works will help facilitate the decarbonisation of the SWIS and help to meet the electrical demands of both current and future tenants, including those with high power demands for Hydrogen production.

Limitations / Challenges / Risks

• Same as above, land availability for the new 500 kV line is a key challenge. This option considers the transmission infrastructure required to improve electricity availability at the WTC, but it hinges on parallel works to install power generation assets outside of the WTC such as the renewables hubs. Currently, there are several uncertainties regarding the location and nature of these renewable hubs as they are in the early stages of planning and therefore, this option is not well established.

Interdependencies / Land Requirements

• The new 500 kV line will require a 120 -160 m easement. This option is dependent on the completion of the WP Upgrades Tier 1 and 2.









Strategies and Options

Other Opportunity

Option U1.4: Strategic Plan for Connecting New Tenants

Note: This is regional view of power connections rather than by individual customer

Context

During stakeholder consultation, WP highlighted that their biggest challenge is the coordination and sequencing of upgrades, as their systems only allow them to facilitate updates for individual customers.

Scope

The Strategic Plan for connecting new tenants would be developed by Government in consultation with WP. Having an overarching view and planning framework for the WTC would streamline the connections approvals process for individual customers and ensure greater outcomes for the area. This could take the form of capacity targets tied to spatial zones of the WTC or form part of a broader streamlined single entity approvals process. This option would see Government play a key role in facilitating a collaborative approach for transmission-connected customers.

Implementation Considerations Benefits

• By providing a strategic outlook for future capacity needs across the WTC, WP can ensure new customers are connected in a timely and efficient manner which will help to entice new industries to the area.

Limitations / Challenges / **Risks**

Interdependencies / Land Requirements

• To plan, approve and construct the infrastructure, Government will require project locations, MW capacity, timing/staging and agreed funding models.





U2 – Increase Supply of Renewable Electricity

To support industries within the WTC to decarbonise their operations







Strategies and Options

Strategy U2 – Increase the Supply of Renewable Electricity and Fuels seeks to support industries within the WTC to decarbonise their operations.

Existing Context

The WTC is connected to the South West Interconnected System (SWIS) which is owned and operated by Western Power. Over the last 20 years the network has been transitioning to renewable energy, primarily through the uptake of rooftop solar including by proponents in the WTC. However, the grid is still predominately fossil fuel powered, especially overnight when solar is unavailable.

Electricity is critical to industrial activities within the WTC, providing power to support the array of manufacturing and production processes as well as essential functions such as lighting and thermal control for workplace settings. As proponents look to decarbonise their operations in line with Net Zero emission targets, the source of generation for electricity becomes equally as important as access.

This power needs to be flexible, equitable, available twentyfour hours a day and could come either from the mains grid or from common user renewable power infrastructure.



There are three gas turbine power stations within the WTC – Cockburn Power Station, NewGen Power Station and the Kwinana Swift Power Plant. All three primarily function as supporting plants to supply electricity during peak demand periods. These stations will likely continue to play an important role in the decarbonisation of the SWIS, by providing resilience during times of intermittence from renewable solar and wind generation.

Currently there are no commercial scale renewable energy generation sources within the WTC. However, two waste to energy projects (Kwinana and East Rockingham) will contribute to the supply of baseload renewable power to the WTC and wider SWIS network once they come online. However, their power supply will only be partly renewable and will be insufficient to meet the total demand of the WTC, meaning support from additional renewable generation sources is required.

Known Constraints Addressed

Industrial tenants have indicated that they need a reliable supply of renewables to decarbonise their activities and meet their net zero emission targets.

There are four known constraints that are addressed by the options under Strategy U2. Table 5-11 below demonstrates how each option addresses the known constraints.

Table 5-11: Constraint to Option mapping for U2 – Increase the Supply of Renewable Electricity and Fuels

	Other Opportunities					
Constraints Addressed	U2.1 Common User Renewable Power Supply from Outside WTC	U2.2 Installation of an Industry BESS	U2.3 Common User Hydrogen / Low Carbon Fuel Station	U2.4 Joint Power Purchase Agreements		
Lack of Renewable Energy Supply to the SWIS	•	•		•		
Lack of Common User Renewable Energy Infrastructure	•	•				
Limited Access to Liquid Hydrogen / Renewable Fuels			•			









Strategies and Options

Utilities: U2 - Increase the Supply of Renewable Electricity and Fuels

Aim

In order to meet the decarbonisation targets of individual tenants and align with WA's net zero target of 2050, power within the WTC will need to come from a mix of renewables that are supported by flexible, dispatchable power from storage technologies and reciprocating gas.

To achieve the objectives of the GAIH Initiative, this strategy seeks to support the decarbonisation of industry within the WTC, while also supporting the increase of renewable power supply to the broader SWIS grid.

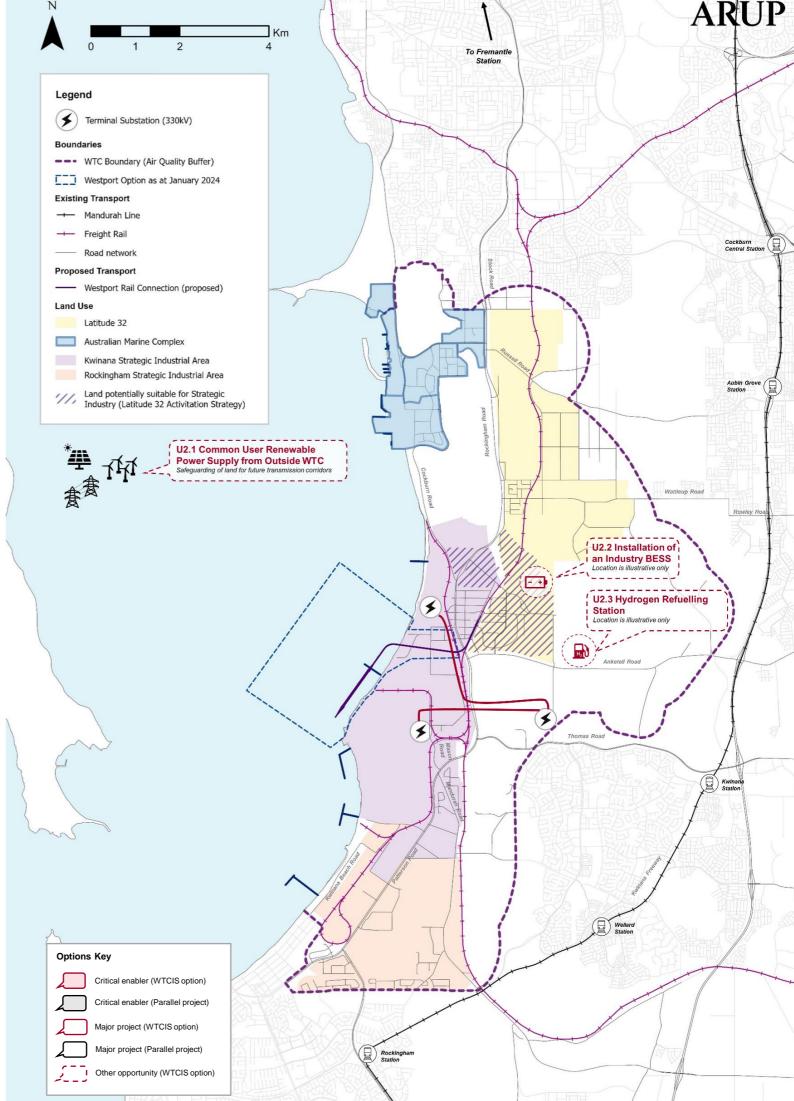
Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

- 2.1 Industry located within the WTC have access to the infrastructure to support decarbonisation activities, ensuring they maintain favourable status with key trading partners.
- 2.2 Ensure private investment to the WTC is aligned to Environmental, Social and Governance (ESG) opportunities benchmarked against the United Nations (UN) Sustainable Development Goals.
- 3.1 Support investment from companies who have synergies with existing and target sectors for the WTC.
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.
- 6.2 Infrastructure development and operations are sustainable and reflective of industry requirements bespoke to the geography of the WTC.

Options

Other Opportunities:

- U2.1 Common User Renewable Power Supply from Outside WTC
- U2.2 Installation of an industry BESS
- U2.3 Common User Hydrogen / Low Carbon Fuel Station
- U2.4 Joint Power Purchase Agreements









Strategies and Options

Alignment with Government Objectives

The SWISDA and Whole of System Plan indicate significant renewables generation will be required to meet net zero targets by 2050. Through guiding the provision of enabling infrastructure to both generate, store and utilise renewable energy and fuels within the WTC, the WTCIS also aligns with the Western Australian Climate Policy and target of net zero emissions by 2050.

Impact on Target Industry Opportunities

Increasing the availability of renewable electricity and fuels will have a positive impact on all target industries.

Table 5-12: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Positive
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Positive

Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



New fuel sources



Decarbonisation



Private investment into common user infrastructure



Net zero targets









Strategies and Options

Other Opportunity

Option U2.1: Common User Renewable Power Supply from Outside WTC

Context

In order for tenants within the WTC to reach their net zero targets, they need electricity from renewable energy sources. Currently, the SWIS grid is predominantly fossil fuel powered, especially overnight when solar is unavailable. Industry feedback gathered during stakeholder workshops indicated that tenants would benefit from common user renewable power supplied directly to the WTC to lower the Scope 2 emissions associated with their activities. Given the highly constrained land, generation from a source outside the WTC was identified as a more viable option.

Scope

Government supports the integration of renewable energy sources from regional areas, such as wind and solar to be connected to the WTC. This would involve safeguarding land for transmission corridors (330 kV or 500 kV depending on the location of the generation site) into the WTC and support for development of renewable generation sources in regional areas including:

- · Onshore wind
- · Offshore wind
- Solar

Implementation Considerations Benefits

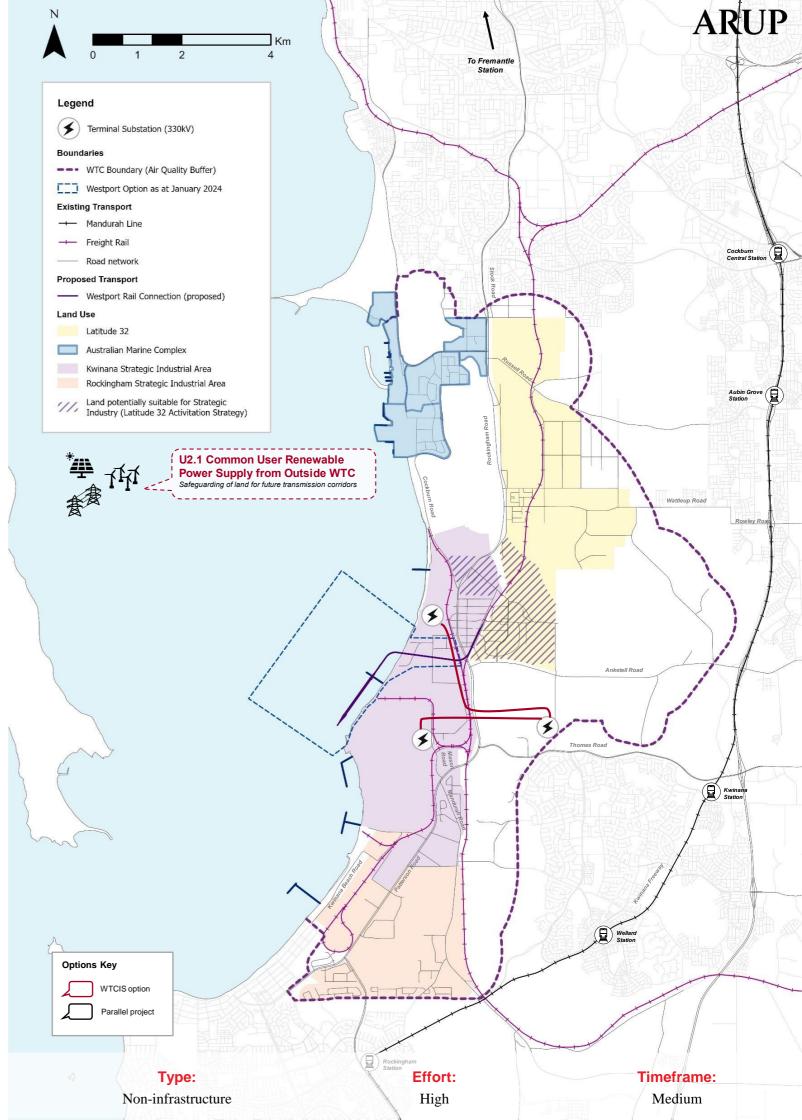
- Supplying renewable energy to the WTC is critical to meeting the sustainability objectives of the GAIH Initiative aims and decarbonizing industrial activities.
- Safeguarding land for future transmission corridors will help facilitate decarbonisation of the wider SWIS network in like with the SWISDA.

Limitations / Challenges /

- The ability for renewable energy generators to connect into the WTC is highly constrained both onshore and offshore. Onshore connections to the Mason Road or Postans substations from regional hubs would necessitate new 330 kV or 500 kV transmission corridors, competing for limited available land.
- Alternatively, offshore renewable generation sources (such as offshore wind) could connect directly to the WTC via an offshore export cable to the Mason Road terminal, but this requires navigating around the constrained Garden Island precinct.

Interdependencies / Land Requirements

• For common user supply (i.e. connection in the grid) this is reliant on a suitable 330 kV or 500kV connection point and would require the WP Tier 1, Tier 2 and Tier 3 upgrades to occur prior. The new / upgraded terminal at either Mason Road or Postans will require minimum 400 m x 500 m land.









Strategies and Options

Other Opportunity

Option U2.2: Installation of an Industry BESS

Context

Many tenants within the WTC have already adopted rooftop solar. While rooftop solar provides access to renewable energy during the day, it requires batteries to supply renewable power overnight to support 24/7 industrial processes. Battery Energy Storage Systems (BESS) allow excess energy generated from rooftop solar during the day to be stored and then shared during peak periods and overnight.

This would allow tenants within the WTC to back feed from renewable energy generation into a shared battery.

Scope

Scope could include the release of a tender for construction of a BESS to be used as part of a joint power purchase agreement with industrial tenants. The optimum size and location would be subject to further study and assessment of proponent demand.

Implementation Considerations

Benefits

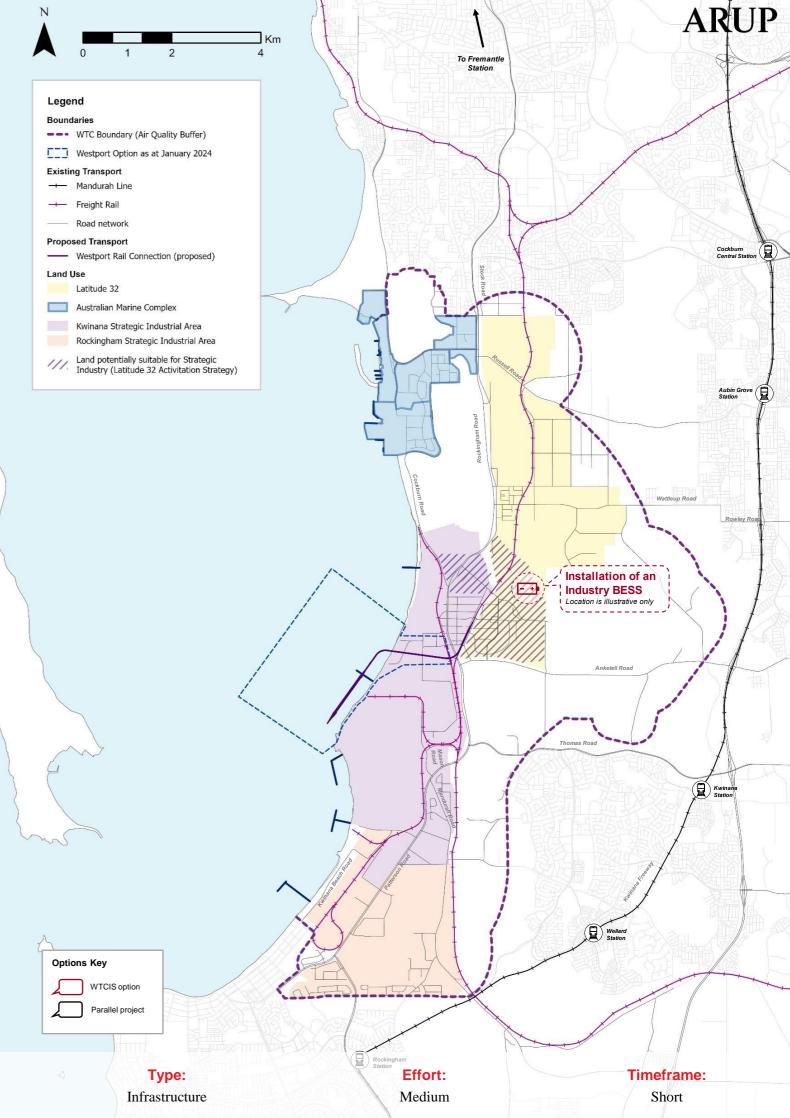
• The implementation of a BESS within the WTC can reduce the high cost of upgrading existing power infrastructure to accommodate demand during peak hour. The scheme also helps to reduce electricity bills and allows tenants who cannot install solar panels to have access to renewable energy.

Limitations / Challenges / Risks

• The constructability and appetite for a BESS needs to be studied further. Additionally, there are a number of complexities associated with BESS, in particularly ownership. The ownership model has an impact on stakeholder participation and service provision models.

Interdependencies / Land Requirements

• Depending on the scale of the system, BESS can have significant land requirements.









Strategies and Options

Other Opportunity

Option U2.3: Common User Hydrogen/Low Carbon Fuel Station

Context

The decarbonisation of heavy vehicles to hydrogen fuel cell electric vehicles (FCEVs) is difficult for businesses without incentives and supporting infrastructure. During Workshop B, industry raised that the establishment of a common user hydrogen / low carbon fuel station within the WTC would support the uptake of hydrogen FCEVs.

Scope

Government could fund the construction of a common user hydrogen fuel station. Alternatively, Government could look to fund a grant within the Renewable Hydrogen Fund for the development of a hydrogen / low carbon refuelling station within the WTC and the subsidisation of consumer fuel prices to encourage uptake.

Implementation Considerations Benefits

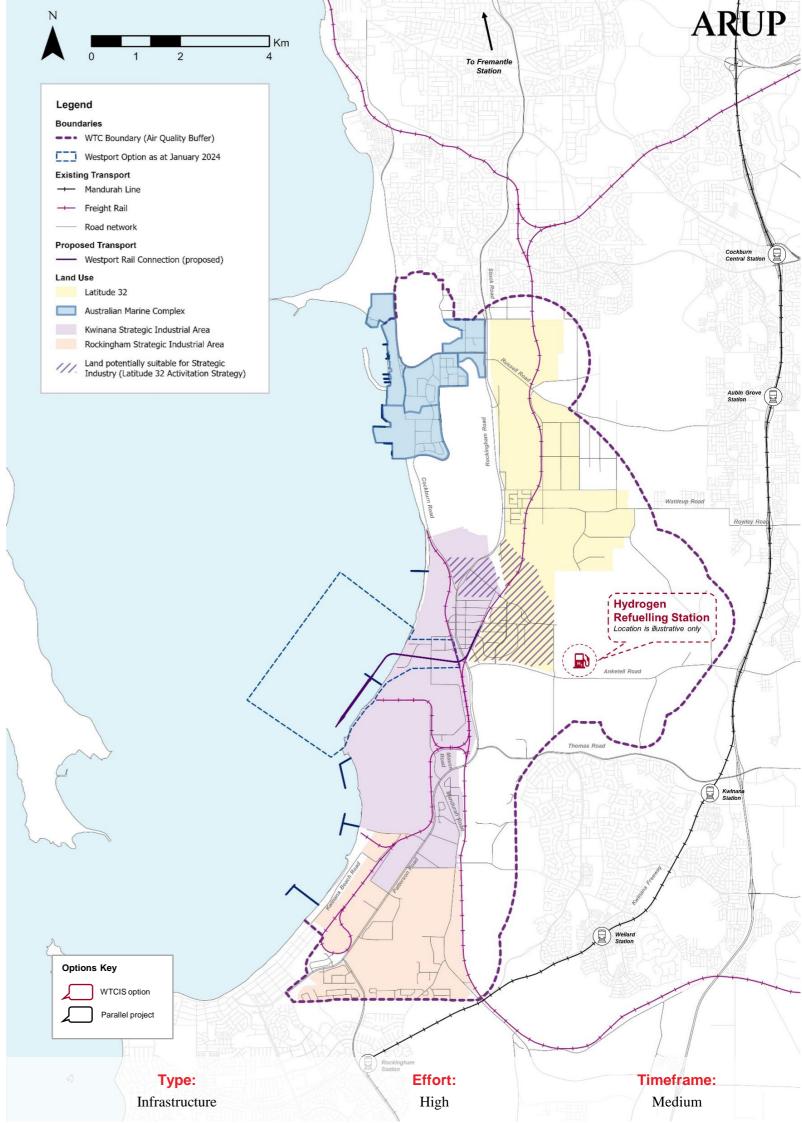
• Facilitates the decarbonisation of local businesses and the growth of the WA hydrogen industry.

Limitations / Challenges / **Risks**

• A key challenge will be to ensure the cost of refuelling is market competitive.

Interdependencies / Land Requirements

• Relies on a hydrogen source (local or imported) and likely ~ 400 m² land, using Alcoa as a benchmark, depending on desired number of terminals and location of fuel manufacture.









Strategies and Options

Other Opportunity

Option U2.4: Joint Power Purchase Agreements

Context

Joint power purchase agreements (PPAs) will allow groupings of businesses within the WTC to secure wholesale power prices for electricity over an extended period. The PPA scheme would allow local businesses to benefit from not being subject to price fluctuations from the market and allow the agreed price to be more competitive. PPA's will also provide security of load to a prospective renewable energy generator.

Scope

Coordination of a joint PPA for interested tenants. Government could establish an application process and assist in the development of a coordinated financial plan.

Implementation Considerations Benefits

• Lowers the cost of electricity for tenants within WTC and improves access to renewable energy. Also supports the decarbonisation of the SWIS through supporting renewable energy generators.

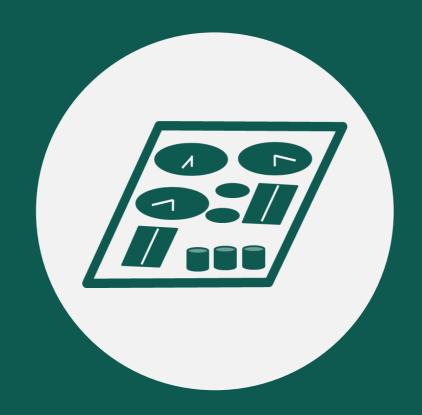
Limitations / Challenges / **Risks**

• Large PPAs are complex and will require significant stakeholder engagement and coordination.

Interdependencies / Land Requirements

Requires an electricity generator large enough to produce the electricity required over the timeframe of the PPA.





U3 – Improve Capacity of Wastewater Network

To improve amenity conditions and operational costs for local proponents







Strategies and Options

Utilities: U3 – Improve Capacity of Wastewater Network

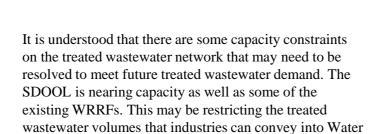
Strategy U3 – Improve Capacity of Wastewater Network seeks to improve amenity conditions and operational costs for local proponents.

Existing Context

Domestic and Industrial wastewater within the WTC is currently managed by Water Corporation's (WC) wastewater network. This network uses gravity and pressure-fed mains to convey wastewater to treatment facilities within the region. The predominant pressure main for the movement of treated wastewater through the WTC is The Sepia Depression Ocean Outfall Landline (SDOOL). The SDOOL runs north-south through the centre of the WTC and currently conveys a total of approximately 70 GL / year of treated wastewater.

There are four WRRFs currently within the vicinity of the WTC - Point Peron Wastewater Treatment Plant, East Rockingham WRRF, Kwinana WRRF and Woodman Point WRRF.

Ultimately, wastewater that is not recovered is sent to the Point Peron Transition Tower where it is conveyed into the ocean via the Sepia Depression Ocean Outfall.



There is also limited sewer network access within the AMC and WTC. Industry stakeholders have identified that some proponents do not have direct access to the WC sewer network, particularly within the AMC. These proponents are required to treat their domestic effluent through on-site treatment and tankering in lieu of a water corporation connection. This increases their operational costs and is not desirable from an amenity perspective.

Furthermore, the existing wastewater network does not extend to serve the Latitude 32 precinct. This may serve as a barrier to development in that precinct.

Known Constraints Addressed

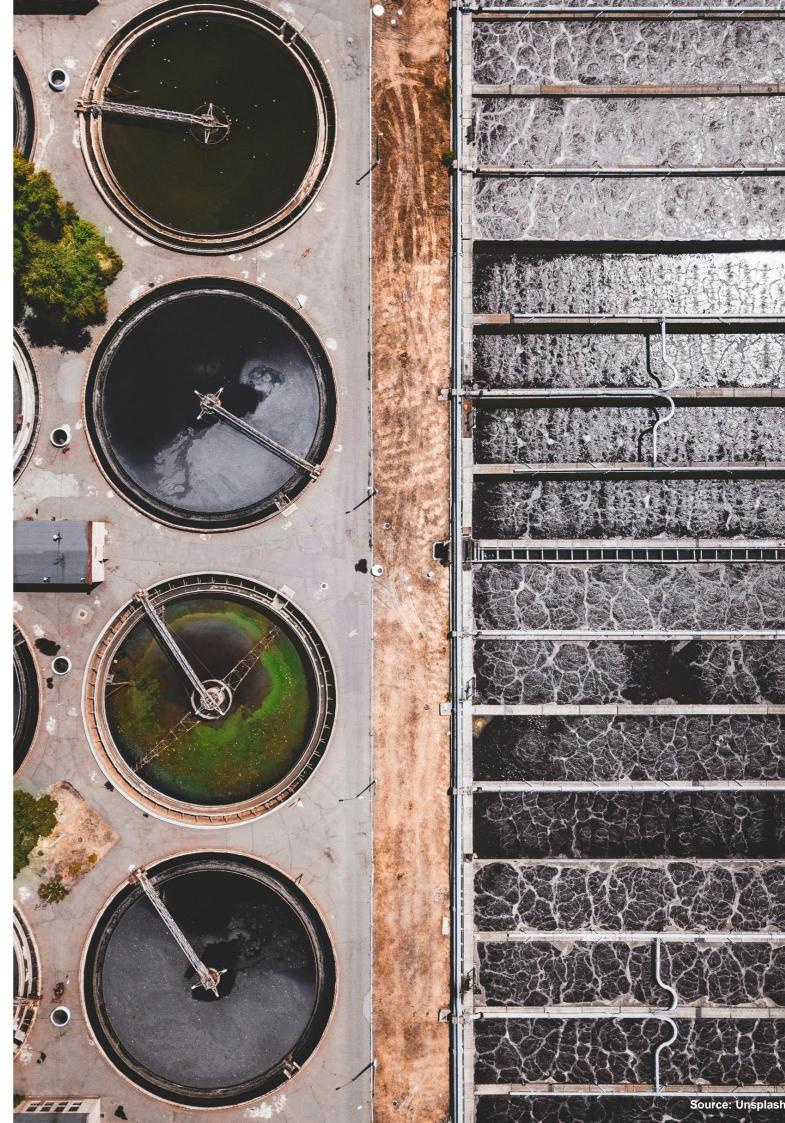
Corporation's network.

There are two known constraints that are addressed by the options under Strategy U3. Table 5-13 below demonstrates how each option addresses the known constraints.

Table 5-13: Constraint to Option Mapping for U3 - Improve Capacity of Wastewater Network

	Critical Enablers	Major Projects
Constraints Addressed	U3.1 SDOOL Expansion	U3.2 Extend WC Sewer Network Throughout WTC
Limited Sewer Network within AMC		•
Limited Sewer Network Within WTC Generally		•
Limited Industry Effluent Returns to SDOOL	•	











Strategies and Options

Utilities: U3 - Improve Capacity of Wastewater Network

Aim

It is understood that there are some capacity constraints on the wastewater network that may need to be resolved to meet future treated wastewater demand. This strategy seeks to de-constrain this through upgrades and / or extensions of the existing wastewater network.

Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

- 1.1 WTC's growth is enabled.
- 1.4 Minimise the impact on existing utilities and businesses located within the WTC.
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.
- 6.2 Infrastructure development and operations are sustainable and reflective of industry requirements bespoke to the geography of the WTC.



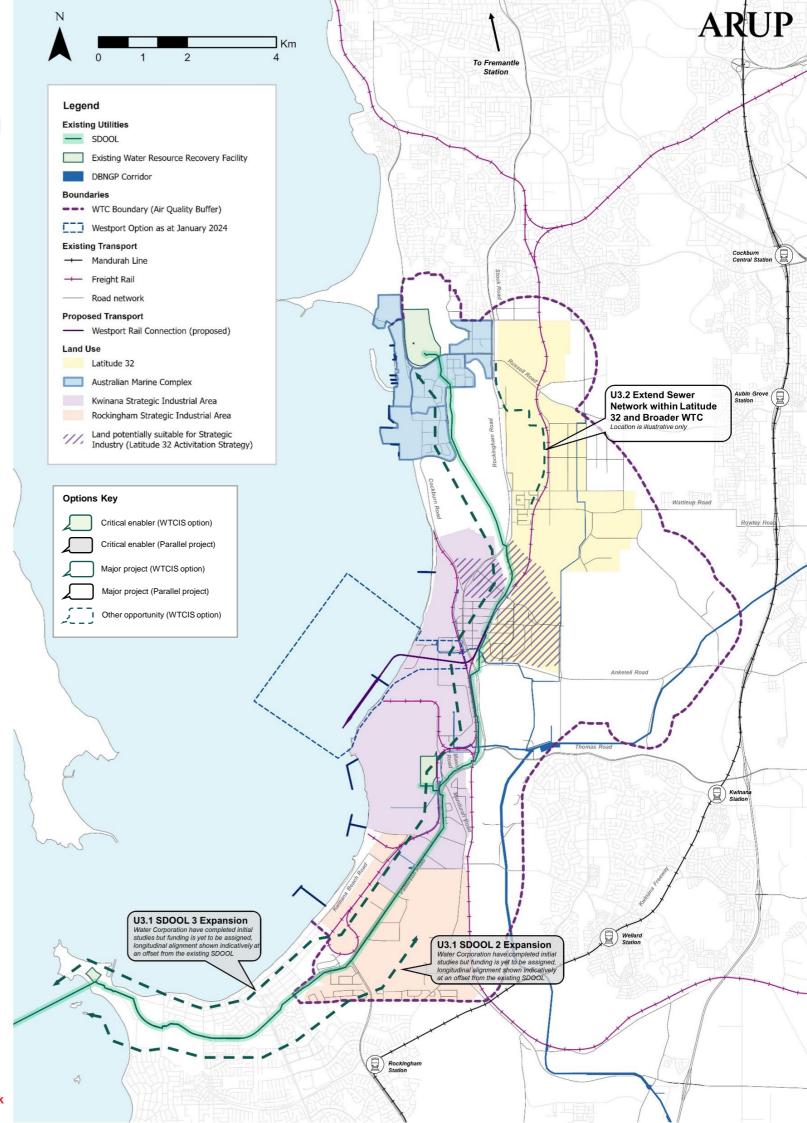
Options

Critical Enablers:

• U3.1 SDOOL Expansion

Major Projects:

• U3.2 Extend WC Sewer Network throughout WTC









Chapter 5: Strategies and Options

Utilities: U3 – Improve Capacity of Wastewater Network

Alignment with Government Objectives

The State Infrastructure Strategy aspires for a coordinated, resilient and integrated water sector including wastewater services which protect public health and the environment. This in in line with the recommendations of the 10-Year Industrial Lands Strategy, which recommends that sewers are provided "existing general industrial estates" and a new approach "for the provision of sewer in future industrial areas".

Impact on Target Industry Opportunities

Improving capacity of the wastewater network in the WTC will have positive impact to Renewable Hydrogen and Future-Facing Minerals Processing industries and neutral to Shipbuilding and Sustainment as well as Port-Related Logistics, Manufacturing and Processing Activities.

Table 5-14: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Neutral
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Neutral

Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



Land constraints and associated infrastructure / utility requirements



Private investment into common user infrastructure









Strategies and Options

Critical Enabler

Option U3.1: SDOOL Expansion

Context

WC have advised that the SDOOL will need to be upgraded in the future to accommodate increased treated wastewater flows in the region.

A route planning study was undertaken by GHD in 2015 for SDOOL2, between East Rockingham WRRF and the ocean outlet, and for SDOOL3, between Woodman Point WRRF and the ocean outlet. Note that funding has not yet been committed for this project.

Scope

Scope is as per SDOOL Route Planning Report.

Implementation Considerations Benefits

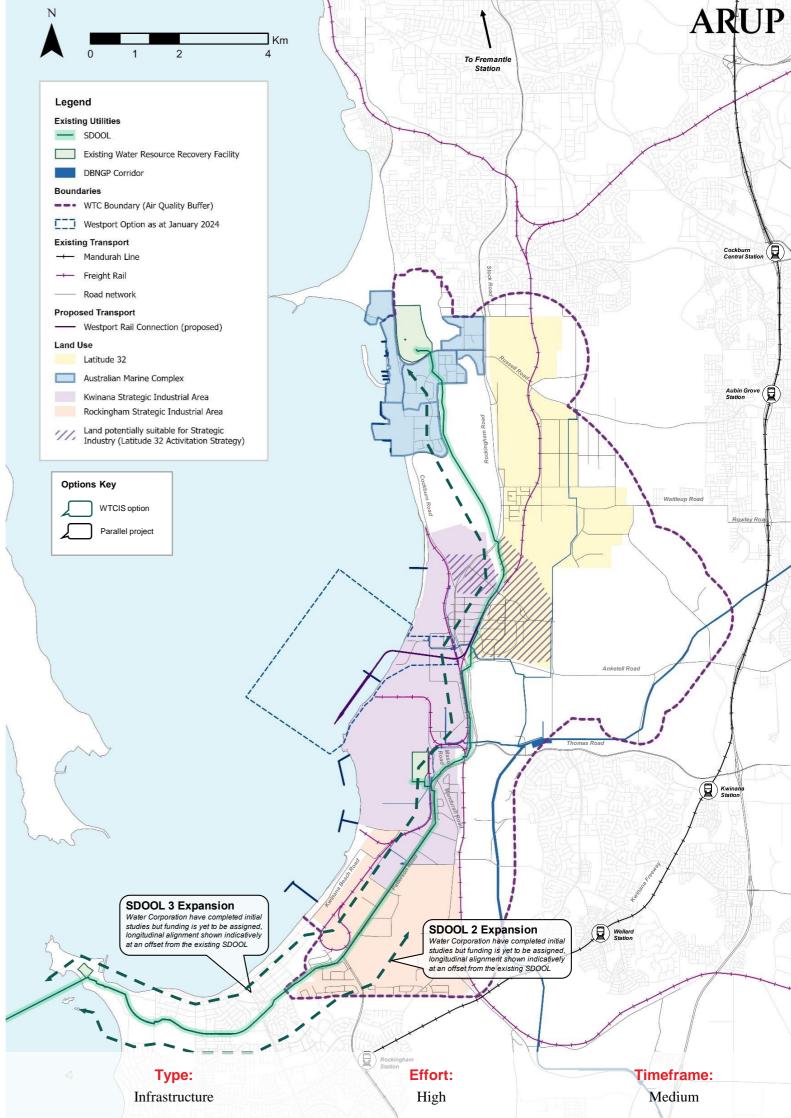
- Increases reliability and capacity of treated wastewater network within WTC. Some option definition exists in the existing route planning report.
- Provides ability to connect industry recycling facilities for reuse, and for connection of used water returns.

Limitations / Challenges / Risks

- No studies undertaken since 2015 so feasibility and details are not well defined.
- Capacity of the ocean to absorb discharge from the Sepia Depression Ocean Outfall has a finite environmental limit.

Interdependencies / Land Requirements

• Extensive length of new pipework required which will need extensive land acquisition.









Strategies and Options

Major Projects

Option U3.2: Extend WC Sewer Network throughout WTC

Context

Based on industry stakeholder feedback, it is understood that a large proportion of users within the WTC are not connected to the domestic sewer network and instead rely on private septic tanks. This increases their operational costs and is not desirable from an amenity perspective.

The specific limitations of the WC sewer network within the WTC have not been established in this study.

The WC sewer network within Latitude 32 is very limited which represents a barrier to private development.

Scope

Further studies and liaison with WC and industry would be required to establish the scope of new wastewater infrastructure.

Alternative to proactive WC-led installation of wastewater infrastructure would be government subsidisation of private headworks contributions.

Implementation Considerations Benefits

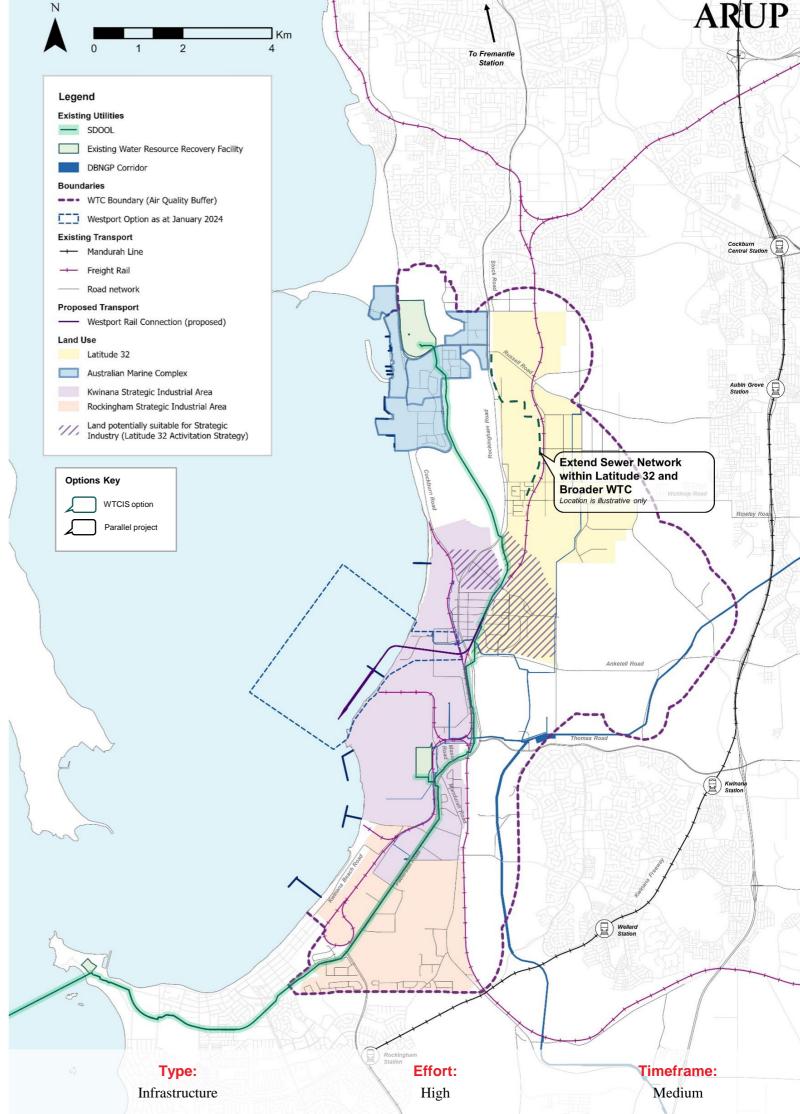
- Reduces reliance on septic tanks.
- Provides amenity betterment.
- Could help the activation of Latitude 32.

Limitations / Challenges / Risks

- Poorly understood option with no previous work undertaken.
- Will require augmentation of the sewer network beyond just new pipework.
- Industry demand for solution is not well understood. Costs unlikely to justify benefits.
- This is an atypical model for WC infrastructure deployment. There is inherent risk associated with installing infrastructure in advance of development. Water infrastructure is typically planned based on the known demands of committed stakeholders to ensure suitability.

Interdependencies / Land Requirements

- Spatial constraints within road reserves, particularly in Kwinana and AMC.
- Should be relatively unconstrained within Latitude 32.





U4 – Increase Availability of Water Supply Options

To secure and deliver fit for purpose water supplies to industries within the WTC







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Chapter 5

Strategies and Options

Utilities: U4 - Increase Availability of Water Supply Options

Strategy U4 – Increase
Availability of Water Supply
Options seeks to secure and
deliver fit for purpose water
supplies to industries within the
WTC.

Existing Context

As a heavy industrial area, the WTC is a region of intensive water use. Industrial water-intensive activities within the WTC include processing, cooling, wash down, potable use and dust suppression. The primary supply of this water is from groundwater with other sources including recycled water, potable water and other including stormwater re-use. The water supply considered in this strategy is for non-drinking purposes only, hence the IWSS network including PSDP1/PSDP2 have not been considered as part of this strategy.

Groundwater resources in Western Australia are managed by the Department of Water and Environmental Regulation. Most of the WTC area sits within the Cockburn Groundwater area which is managed by the Cockburn Groundwater Allocation Plan. Groundwater is a relatively low-cost water supply source for industry and as such, is in high demand with the WTC. Groundwater sources servicing the WTC are currently fully or over-allocated which is impacting industrial growth and external investment. Furthermore, groundwater availability in the long term is threatened by climate change and saltwater intrusion into the region's aquifers

The supply of recycled water to proponents throughout the WTC is limited by the capacity of Kwinana Water Reclamation Plant (KWRP), the quality of the treated wastewater in the SDOOL and the extent of the recycled water network.

The recycled water network currently only supplies recycled water to four proponents. There is capacity within the potable IWSS network but for a lot of industrial operations, this is of a higher quality than is required and therefore more expensive.

Feedback from WTC's industrial proponents indicates that increasing the availability of fit-for-purpose non-potable water supply options is critical to WTC's industrial operations remaining cost-competitive.

Known Constraints Addressed

There are three known constraints that are addressed by the options under Strategy U4. Table 5-15 below demonstrates how each option addresses the known constraints.

Table 5-15: Constraint to Option mapping for U4 – Increase Availability of Water Supply Options

	Critica	al Enablers	Major Projects			Other Opportunities		
Constraints Addressed	U4.1 Expansion of KWRP (Tier 1)	U4.2 Expansion of KWRP (Tier 2)	U4.3 New Centralised Water Reclamation Plant	U4.4 Decentralised Treated Wastewater Reuse Scheme	U4.5 Common User Raw Seawater Supply Scheme	U4.6 Managed Aquifer Recharge Infrastructure	U4.7 Review and Reallocate Groundwater Licences	U4.8 Extend WC Potable Water Network Within Latitude 32
Constrained Recycled Water Network Capacity	•	•	•	•	•	•		
Insufficient Recycled Water Supply	•	•	•	•	•			•
Lack of Groundwater Availability						•	•	







Strategies and Options

Utilities: U4 - Increase Availability of Water Supply Options

Aim

This strategy seeks to provide discrete options for increasing water supply availability across the WTC, with a particular focus on providing proponents with nonpotable water for industrial usage. The options include expansion of the existing water reclamation plant, new reclamation plants, the implementation of wastewater or seawater supply schemes, groundwater recharge infrastructure or the reallocation of groundwater licences.

Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

- 1.1 WTC's growth is enabled.
- 2.2 Ensure private investment to the WTC is aligned to Environmental, Social and Governance (ESG) opportunities benchmarked against the United Nations (UN) Sustainable Development Goals.
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.
- 6.2 Infrastructure development and operations are sustainable and reflective of industry requirements bespoke to the geography of the WTC.



Critical Enablers:

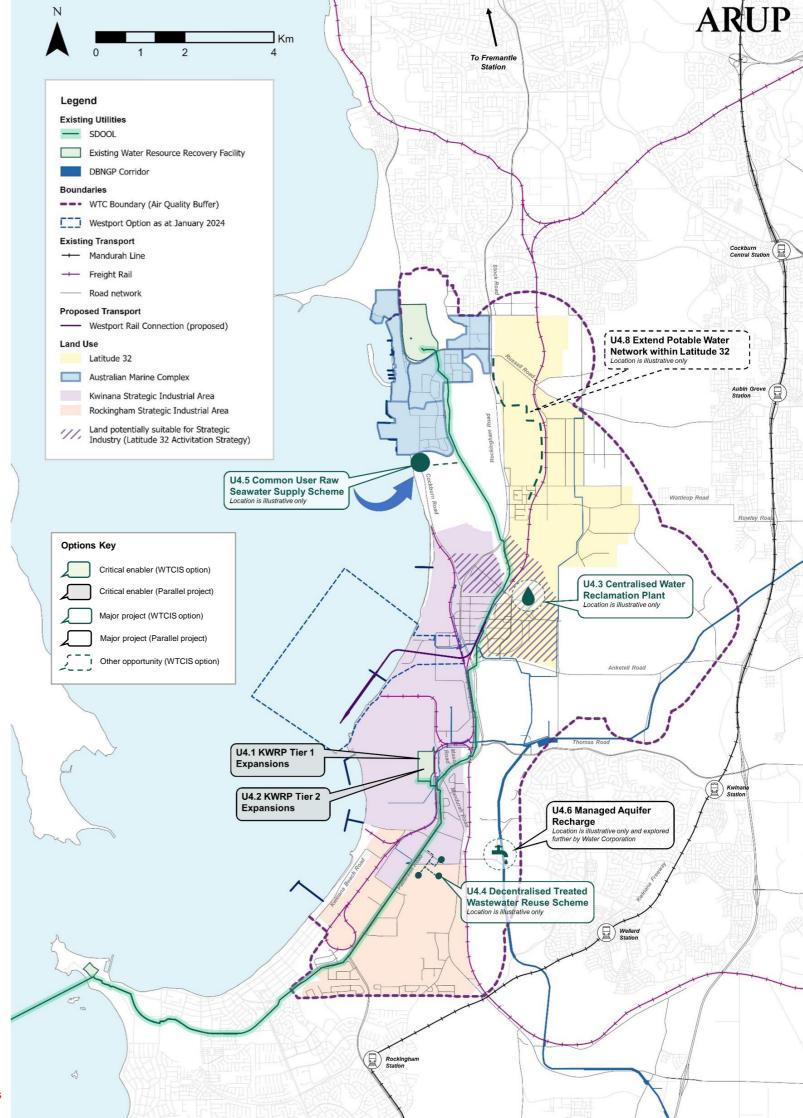
- U4.1 Expansion of KWRP (Tier 1)
- U4.2 Expansion of KWRP (Tier 2)

Major Projects:

- U4.3 New Centralised Water Reclamation Plant
- U4.4 Decentralised Treated Wastewater Reuse Scheme
- U4.5 Common User Raw Seawater Supply Scheme
- U4.6 Managed Aquifer Recharge Infrastructure

Other Opportunities:

- U4.7 Review and Reallocate Groundwater Licences
- U4.8 Extend WC Potable Water Network within Latitude 32









Strategies and Options

Utilities: U4 - Increase Availability of Water Supply Options

Alignment with Government Objectives

- The Industrial Land Steering Committee's 10-year Industrial Land Strategy (2021) identified "Water Access" at Kwinana as a medium urgency project on its Physical Infrastructure Priority List. Specifically, it considers the expansion of the recycled water network citing: "Expansion of the Kwinana Wastewater Recycling Plant and pipeline network to meet the demand for non-potable water for existing and future industries".
- Water Corporation (WC) have a commitment to recycle 30% of treated wastewater by 2030. WC also strongly favour the installation of "climate independent" water sources.
- Perth and Peel @ 3.5 Million identified that "recycling of treated wastewater is still an underused climate resilient resource and initiatives for increase recycling require ongoing support".

Impact on Target Industry Opportunities

Improving capacity of the non-potable water networks in the WTC will have positive impact to Renewable Hydrogen and Future-Facing Minerals Processing industries and neutral impact to Shipbuilding and Sustainment as well as Port-Related Logistics, Manufacturing and Processing Activities.

Table 5-16: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Neutral
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Neutral



Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



Climate adaption / resilience



Dominance of materials processing



Critical minerals demand



Land constraints and associated infrastructure / utility requirements



Private investment into common user infrastructure









Strategies and Options

Critical Enabler

Option U4.1: Expansion of KWRP (Tier 1)

Context

Upgrading the Kwinana Water Reclamation Plant (KWRP) to increase availability of recycled water in the WTC is an option that has been identified in previous studies including The Industrial Lands Strategy, by industrial proponents and by WC during the liaison process.

This option only considers the expansion of KWRP up to a 26.7 ML / day threshold. This is aligned with the potential Water Corporation KWRP upgrade that is the subject of a current Treasury business case. Expansion beyond the 26.7 ML / day threshold is the subject of KWRP Tier 2.

Scope

WC have identified that the KWRP's output cap can be feasibly increased from 16.7 ML / day to 26.7 ML / day. This upgrade would require the following works:

- · Treatment component including additional microfiltration and reverse osmosis.
- Construction of a 3 km supply pipeline from the precinct to the south to current industries, including offtakes for future industries (sized for ultimate flows).
- · Increased balancing storage.

Implementation Considerations

Benefits

- This solution is relatively well developed and pre-feasibility studies by WC have established that this is a viable solution up to an output capacity of 26.7 ML / day.
- Current consumers of the KWRP recycled water pay less per kL than those served by the potable IWSS.
- The solution is climate independent and would divert some treated wastewater flows from the SDOOL, reducing the overall volume of treated wastewater ultimately being disposed of into the ocean.

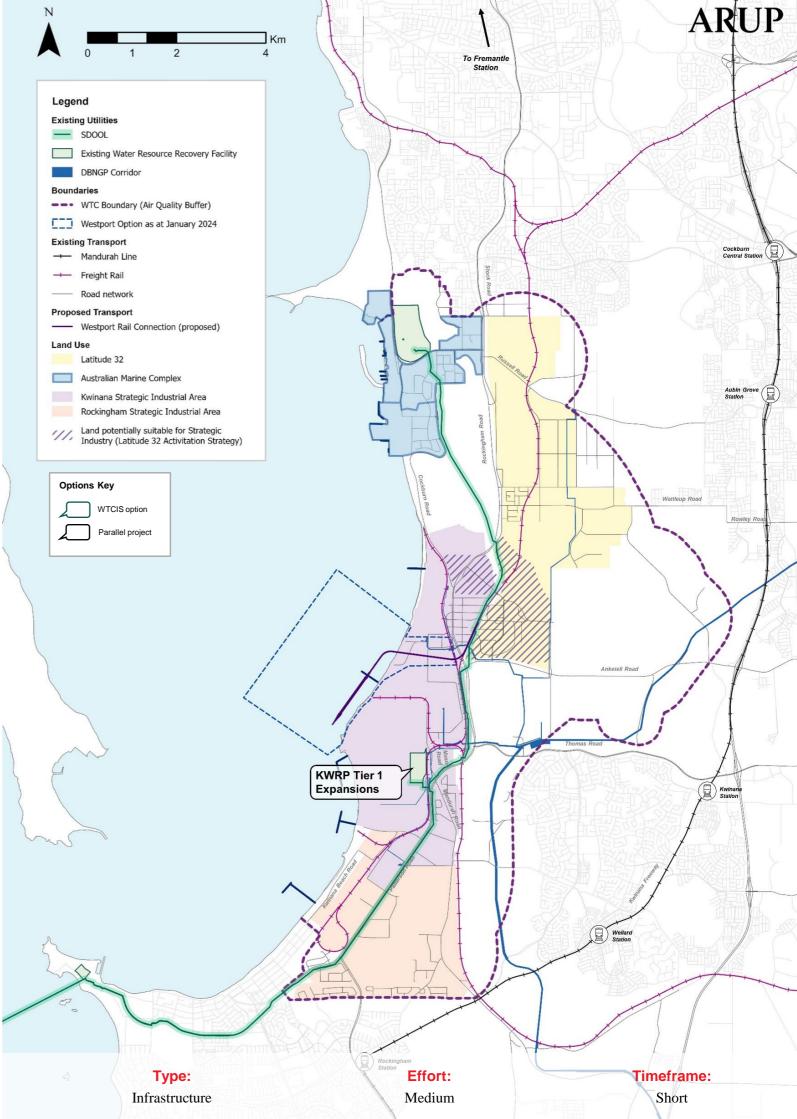
Limitations / Challenges / **Risks**

• It is understood that the incremental supply increase of 10 ML / day is only capable of meeting the demands of existing recycled water consumers that are in proximity to the KWRP. This Option would not provide wholesale benefit to the wider WTC in the long term.

Interdependencies / Land Requirements

• Additional land is required to enable expansion of the KWRP.











Strategies and Options

Critical Enabler

Option U4.2: Expansion of KWRP (Tier 2)

Context

To supply more than an additional 10 ML / day of recycled treated wastewater to WTC industry, further expansion of the KWRP and its associated distribution network would be required. This option assumes that Tier 1 has been undertaken.

WC have advised that GHD are currently investigating the feasibility of expanding the KWRP beyond the 26.7 ML / day.

Scope

The Expansion of KWRP (Tier 2) Scope includes:

- · Expansion of KWRP.
- Extension of existing recycled water distribution network.
- Further upgrades, including feed and return mains and pump stations.

Implementation Considerations

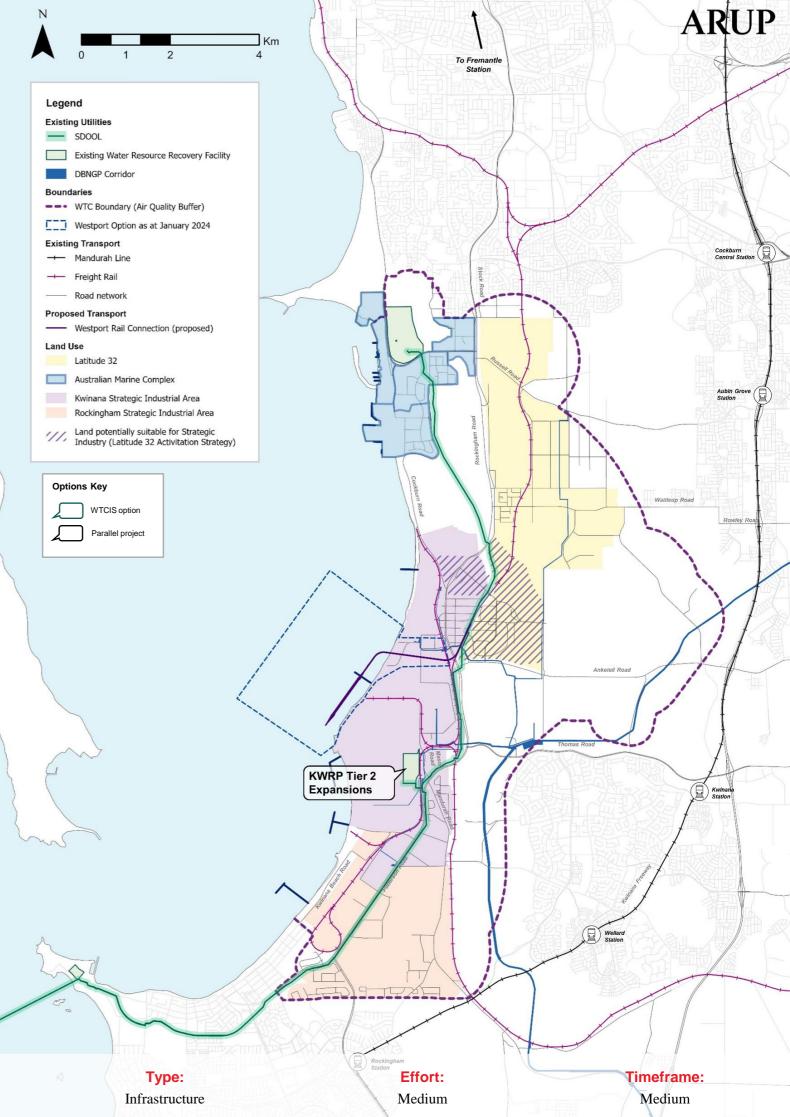
Benefits

- Desirable water source.
- Cheaper than scheme water.
- Established existing operations.

Limitations / Challenges / Risks

- WC have advised that further expansion of the KWRP (beyond 26.7 ML / day) is constrained by:
- Poorly understood hydraulic feasibility of supply/return branches from/to SDOOL and recirculation.
- May reduce SDOOL outfall volumes, however this may be offset by industrial effluent return in higher concentration.
- · Impacts on downstream SDOOL treated wastewater quality.
- Unclear maximum capacity that could be achieved.

- Dependent on completion of KWRP Expansion (Tier 1).
- Land constraints expansion and additional pipeline network.









Strategies and Options

Major Project

Option U4.3: New Centralised Water Reclamation Plant

Context

Given the uncertainty of KWRP's (Tier 2) feasibility, construction of a new water reclamation plant may be the most suitable means of increasing the recycled water supply to proponents within the WTC.

This option has not previously been identified or investigated.

Scope

A new water reclamation plant of similar scale to the existing KWRP (post upgrade Tier 1). Optimal location has not been assessed. It also includes:

- Acquisition of 5 10 ha land in proximity to the SDOOL
- SDOOL Connection
 - · Treated wastewater feed pipework.
 - Treated wastewater return pipework.
- Installation of water reclamation plant with an output of approximately 20 ML / day.
- Installation of distribution network and associated return mains.

Implementation Considerations Benefits

• In theory, this option allows for the increase of recycled water supply beyond what would be capable from the KWRP. Opportunity for new/existing industries to receive water that is cheaper than potable scheme

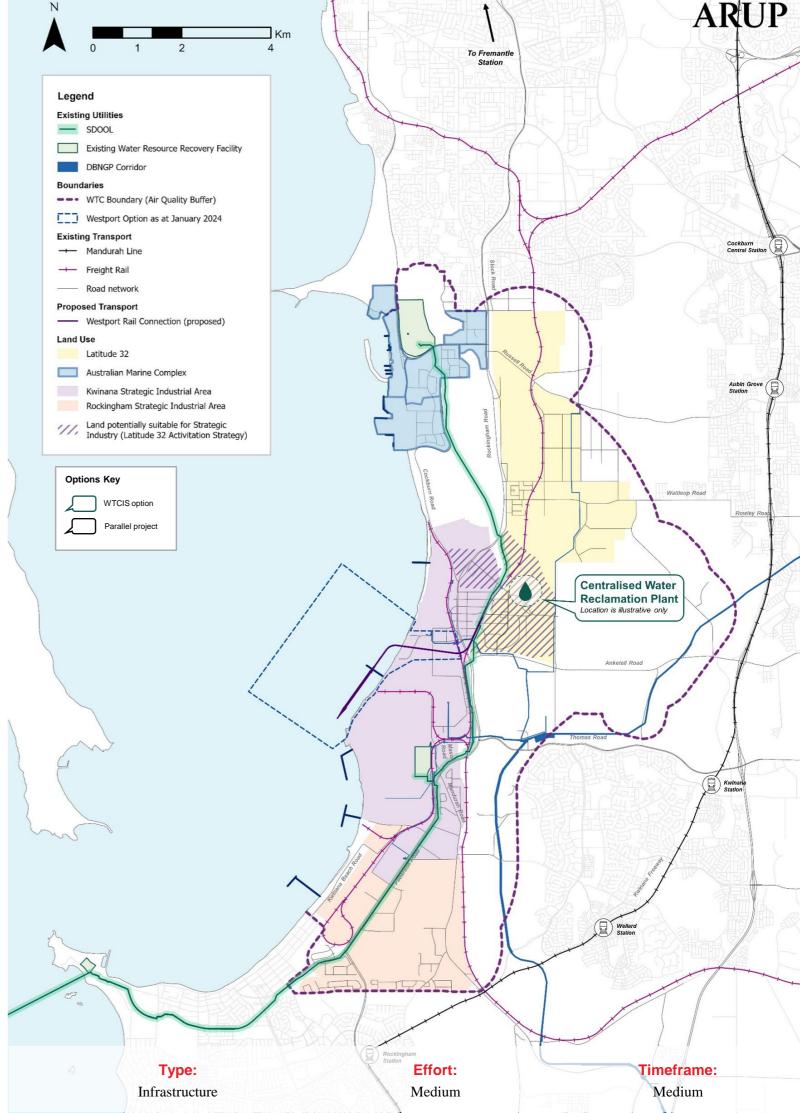
water.

- Location could be chosen in proximity to consumers, reducing the length of new distribution pipework that would be required.
- Re-uses wastewater that would otherwise be disposed into the ocean via the SDOOL.

Limitations / Challenges / **Risks**

- This option has not been previously investigated and as such, its feasibility is poorly understood.
- Constrained land availability in proximity to the SDOOL alignment for a new plant.
- · Available corridors for additional feed/return mains and distribution pipework.
- Wastewater downstream of KWRP is of a lower quality, reducing the efficiency of the required recycling process. KWRP feedstock is treated wastewater from the SDOOL and its output is more concentrated.
- If upstream of KWRP, it will compromise the treated wastewater quality input of the KWRP.

- · Additional land would be required for the WRP itself. Note that WC are currently in discussions with JTSI and DevelopmentWA regarding the acquisition of 6ha of land from Lot 105 Mandurah Road.
- New pipework will require space within existing road reserves.
- May require wholesale upgrades of the SDOOL (see SDOOL Expansion U3.1).









Strategies and Options

Major Project

Option U4.4: Decentralised Treated Wastewater Reuse Scheme

Context

An alternative to supplying recycled wastewater to industry would be to distribute treated wastewater from the SDOOL directly to industry with the further treatment of that supplied treated wastewater being the responsibility of individual proponents. In theory, this would allow proponents to optimise the level of water treatment to suit their specific water quality needs.

This option has not been previously identified and is therefore not well understood.

Scope

This project would involve the installation of a series of feed and return mains from the SDOOL to individual proponents. Feed mains would convey raw wastewater and return mains would convey the wastewater byproducts from those proponents back to the SDOOL, typically at a lower quality than the intake.

The feasibility of this option is not understood and its scope would be dependent on which proponents are provided with a direct SDOOL connection. As such, it is not possible to define a scope for this option. Further study required.

Implementation Considerations

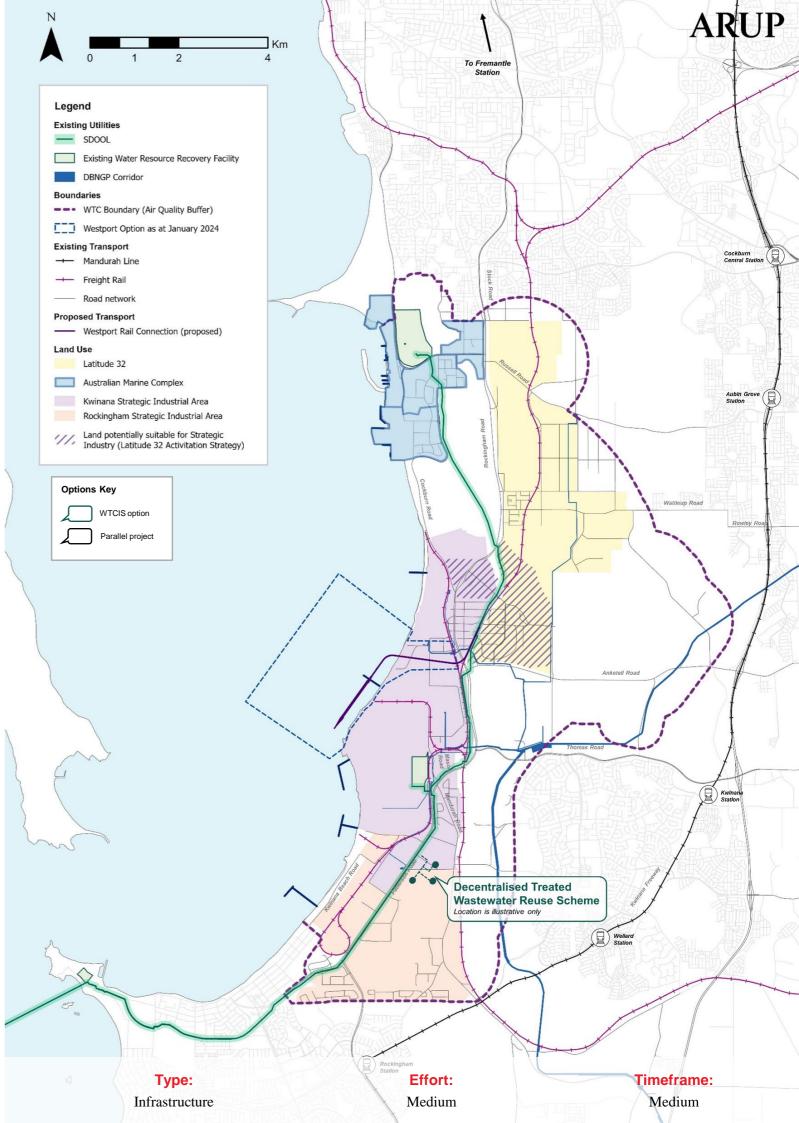
Benefits

- Optimisation of treatment by individual proponents.
- Minimal new infrastructure required.

Limitations / Challenges / Risks

- Regulation of emissions from private WRRFs.
- May not lead to a reduction in effective water supply costs for proponents.
- · Corridor land availability.
- Feasibility of solution poorly understood.
- Industry desire for this solution unknown.
- · Reduces water quality downstream.

- · Additional treated wastewater pipework would require space within road reserves.
- May require wholesale upgrades of the SDOOL.









Strategies and Options

Major Project

Option U4.5: Common User Raw Seawater Supply Scheme

Context

Raw seawater can be used in various industrial processes, including as a cooling medium and as a feedstock for chemical manufacturing. Installation of a seawater supply scheme would involve the extraction and distribution of raw seawater directly to industrial proponents. Proponents could choose to treat some or all of their seawater supply via on-site treatment (i.e. decentralised desalination).

This solution would also involve installation of a common user brine discharge network which would convey the concentrated saline discharge from industry to an ocean outfall. There is precedence for this option at Burrup Peninsula in the Pilbara, WA.

Scope

This project would involve the installation of:

- · Seawater intake assets,
- · Raw seawater distribution pipelines,
- · Brine Disposal mains, and
- · Ocean outfall brine disposal main including diffuser.

The feasibility of this option is not understood and its scope would be dependent on which proponents are provided with raw seawater and their demands. As such, it is not possible to define a scope for this option and further study is required.

Implementation Considerations

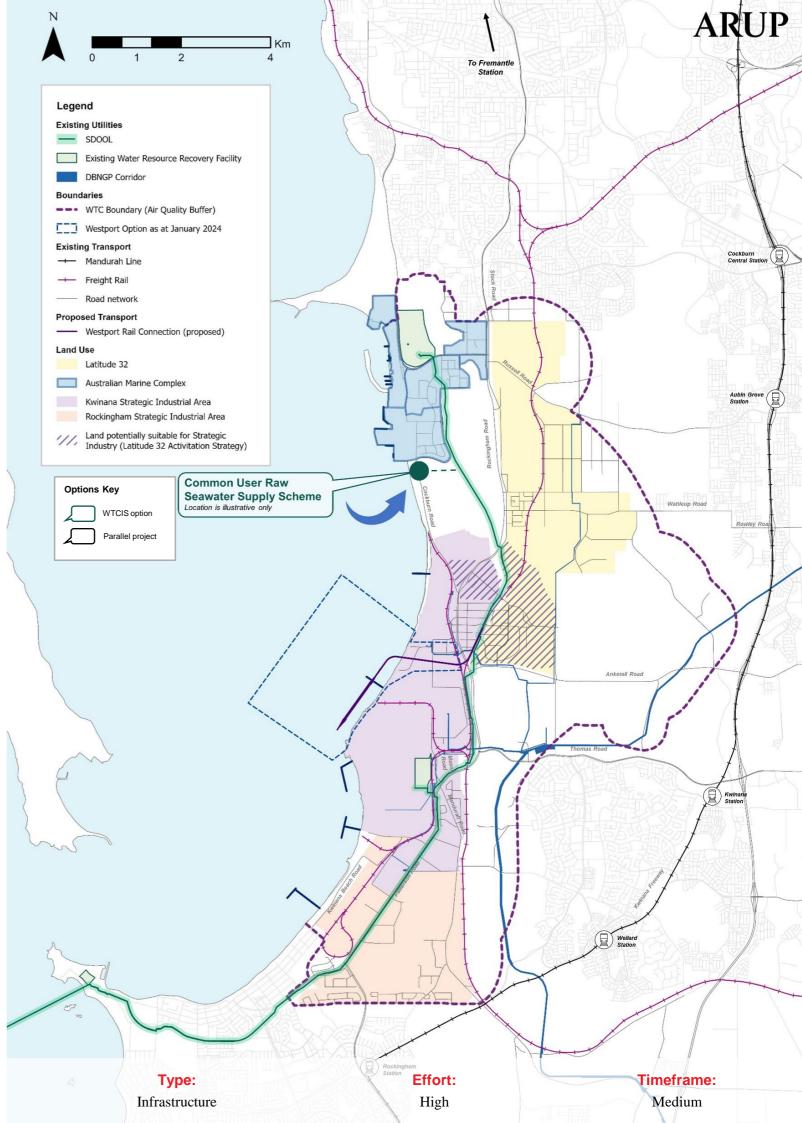
Benefits

- Potentially a low-cost water source that is fit for purpose for some industrial processes.
- Proponents have the flexibility of using raw seawater directly or treating it to their own water quality requirements via on-site treatment. This would allow them to optimise cost versus water quality.

Limitations / Challenges / Risks

- New seawater intake infrastructure – environmental impacts / licenses etc.
- · Poorly understood viability.
- · Requires land corridors.
- · Poorly understood market demand.

- · Land required for the seawater intake facility (dependent on capacity).
- · Requires space within road reserves for distribution and brine return pipework.









Strategies and Options

Major Project

Option U4.6: Managed Aquifer Recharge Infrastructure

Context

Currently, groundwater within the WTC is a significant water supply source for industry, yet groundwater demand greatly exceeds available groundwater capacity. Managed Aquifer Recharge (MAR) involves the recharging of existing aquifers using recycled treated wastewater. This would increase the volume of groundwater that could be allocated to industry.

The feasibility of a MAR scheme in the WTC was the subject of a study undertaken in 2019 by GHD for the National Water Infrastructure Development Fund.

Scope

Consistent with the GHD MAR report, a feasible location for the MAR facility may be a 6ha site located adjacent to the north west corner of the Kwinana Golf Course. This would be supplied with treated wastewater from the East Rockingham WWTP.

Implementing a 10 ML / day MAR scheme (as per the GHD report) at the WTC would require the following:

- Acquisition of approximately 5 10 ha of land.
- Treated Wastewater Pump Station.
- Treated wastewater pipeline from ERWWTP to tertiary treatment plant.
- Treated wastewater return pipeline.
- Recycled Water Pipeline from tertiary WRRF to MAR facility.
- MAR pre-treatment facility.

Implementation Considerations

Benefits

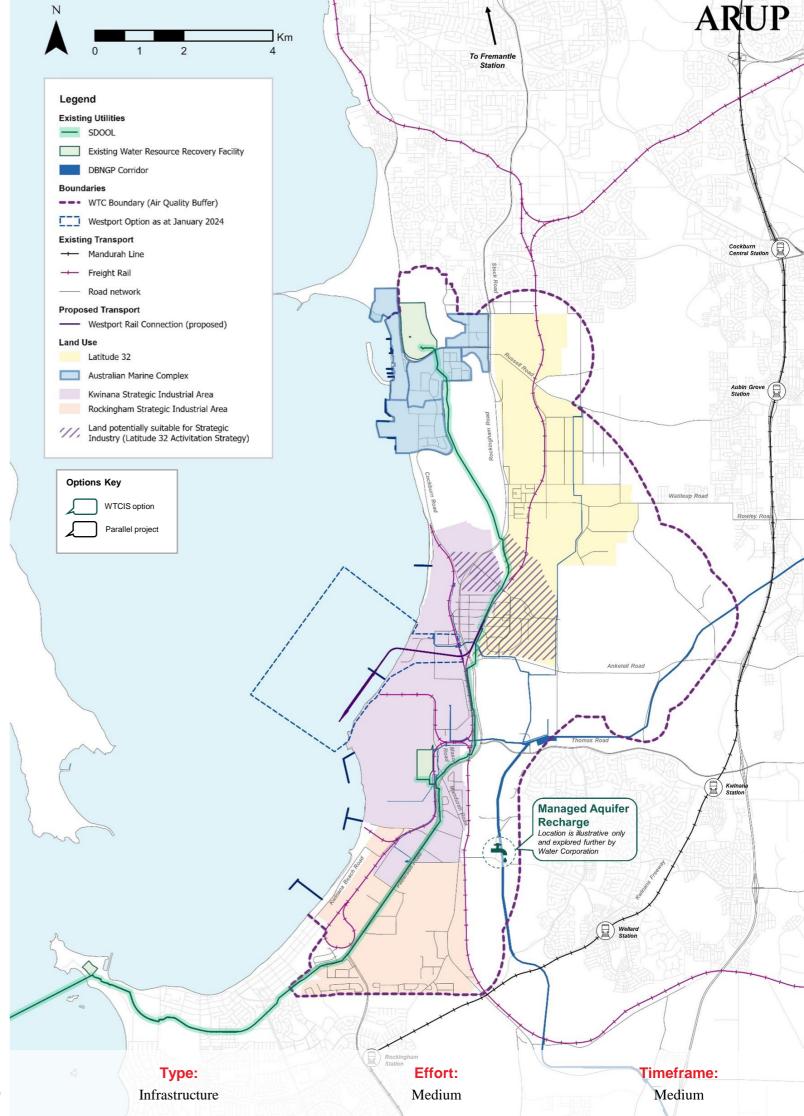
- Groundwater is generally a low cost water source.
- Proponents are able to treat the groundwater to the quality they require.
- Improves recycling of treated wastewater.

Limitations / Challenges / Risks

- · Feasibility not established.
- · Environmental considerations including contaminated sites, proximity to environmentally sensitive areas including Cockburn Sound and Wetlands.
- Financial viability at risk without committed consumers.
- Re-use recovery limited to aquifer pressurised MAR management zone. Beyond that, bore water mains would be required to reach end use destinations.

Interdependencies / Land Requirements

· Land acquisition required for MAR facilities and pipework.









Strategies and Options

Other Opportunity

Option U4.7: Review and Reallocate Groundwater Licences

Context

As established in Chapter 2 and confirmed by the Department of Water and Environmental Regulation (DWER), demand at the WTC already exceeds the available groundwater capacity of the WTC area. As per DWER advice, "the aquifers are currently fully allocated or have limited availability and therefore there is generally no water available for new applications".

DWER have advised that there may be "some opportunity for redistribution of recouped unused entitlements or trades, and transfers of entitlements".

The option of reviewing and reallocating groundwater licences was also identified during stakeholder liaison.

Scope

Further study is required to quantify current usage of existing groundwater licences, and industrial demand for groundwater.

Implementation Considerations

Benefits

- Optimises use of minimal available groundwater.
- · Minimal capital investment required.
- Provides cheaper options for industry.

Limitations / Challenges / **Risks**

- · Marginal gains.
- Not a climate independent water source. Water allocation limits are variable.
- Reluctance of licence holders to waive their current agreements.
- · Limited instruments to force reallocation.









Strategies and Options

Other Opportunity

Option U4.8: Extend WC Potable Water Network Within Latitude 32

Context

To support the activation of the Latitude 32 precinct, there may be benefit in WC extending their potable water network along key routes within Latitude 32 in advance of private development. This would serve to reduce the headworks contributions initial proponents would be required to pay to extend the network to their site. Alternatively, there may be consideration given to government subsidising the headworks contributions of proponents.

Scope

WC have some planning in place for the extension of the IWSS to and within Latitude 32, but the exact sizing and configuration of the network is subject to the demands of prospective proponents.

Alternative to proactive WC-led installation of new mains would be the subsidisation of private headworks contributions.

Implementation Considerations Benefits

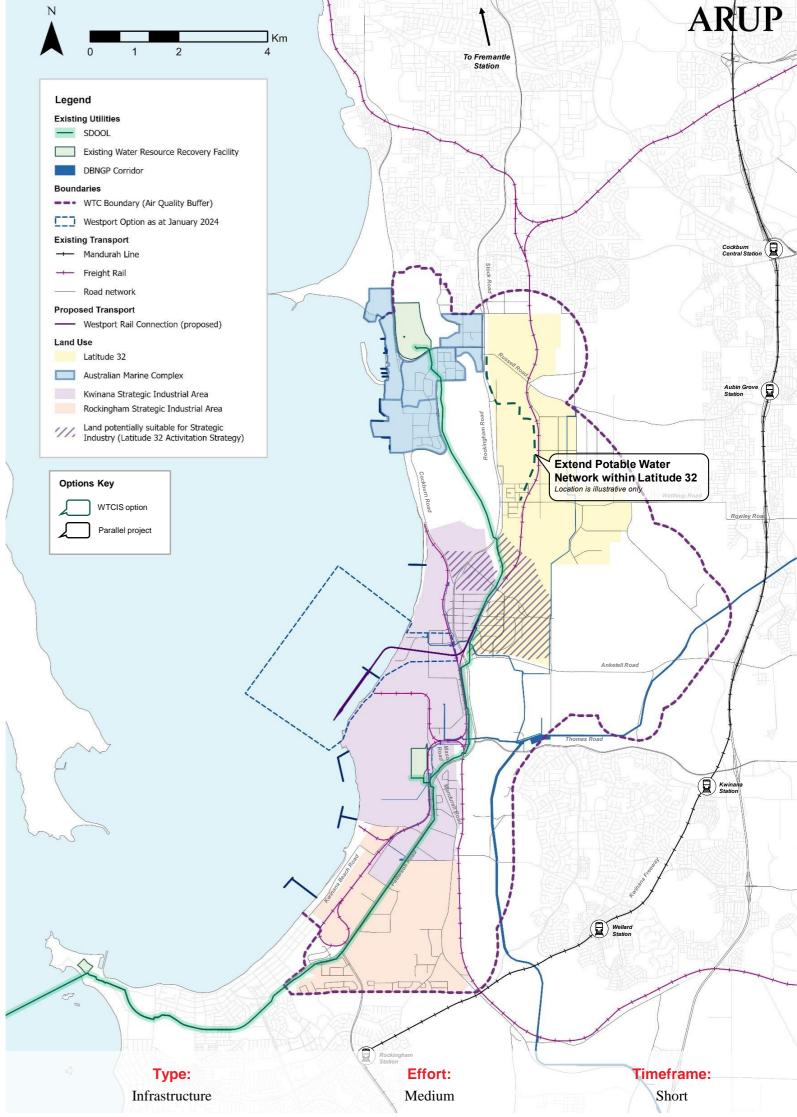
• This would serve to reduce the headworks contributions required by early proponents at Latitude 32. This may help to reduce the barriers to development.

Limitations / Challenges / Risks

- This is an atypical model for WC infrastructure deployment.
- There is inherent risk associated with installing infrastructure in advance of development. Water Infrastructure is typically planned based on the known demands of committed proponents to ensure suitability.
- PSDP1 / PSDP2.

Interdependencies / Land Requirements

• Minimal land take envisaged. Pipework typically installed within the road reserve which is relatively unconstrained within Latitude 32.









Strategies and Options

Land Use Strategies

This section contains three strategies aimed at coordinating land use within the WTC.



Latitude 32 Activation Strategy One Option



Establish and Maintain Common User Services Corridors

Two Options



Optimised Land Usage

Two Options



L1 – Latitude 32 Activation Strategy

To provide land assembly and acquisition options to unlock general and strategic industrial land within Latitude 32







Strategies and Options

Land Use: L1 - Latitude 32 Activation Strategy

Strategy L1 – The Latitude 32 Activation Strategy seeks to provide land assembly options to unlock general and strategic industrial land within Latitude 32.

Existing Context

Latitude 32 activation is structured around the following context:

- There is currently a strong demand for industrial land within Latitude 32, evidenced through the strong uptake of land in Flinders Estate and Orion Industrial Park.
- The proximity of Westport container terminal in the Kwinana Outer Harbour and associated road infrastructure upgrades is expected to fuel demand for industrial land in Latitude 32.
- There is significant existing government ownership within Latitude 32, with approximately 20% of land currently owned by DevelopmentWA, and 15% under ownership of other State government agencies.

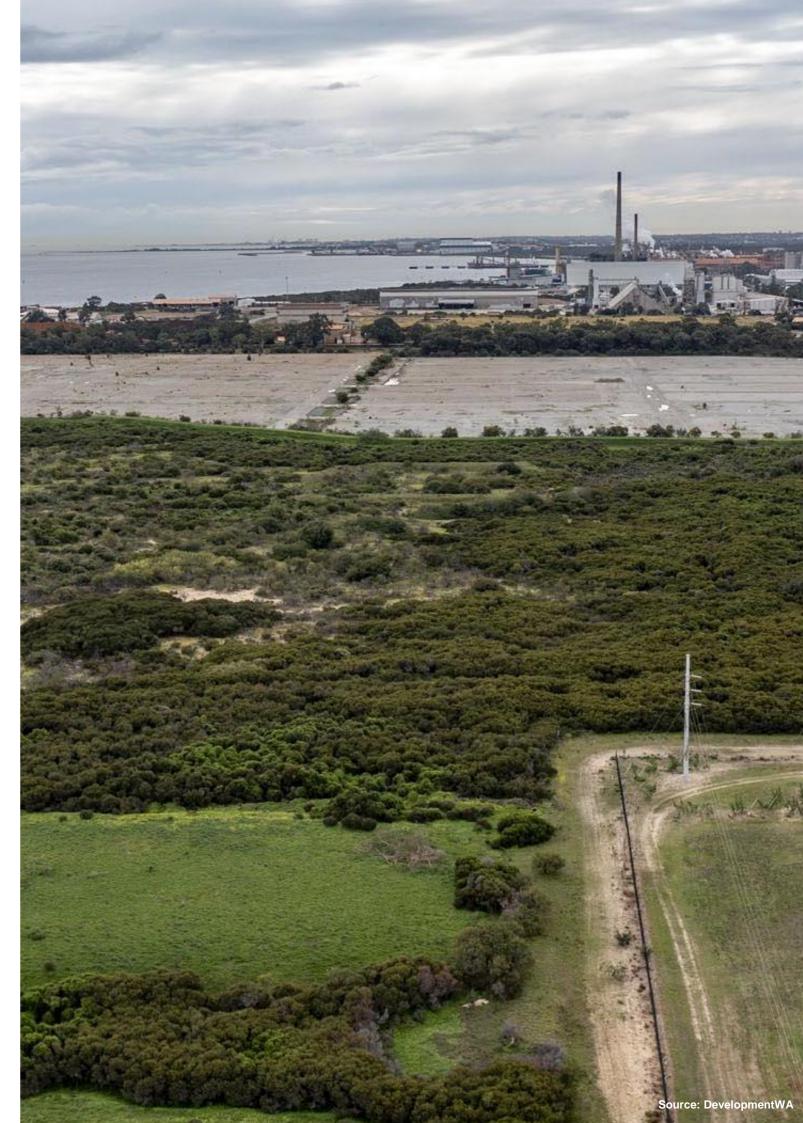
- The land is constrained by significant fragmentation, with over 60% of lots being 2ha size on average. This presents a barrier to land coordination, requiring individual industrial operators to negotiate with multiple landowners.
- Latitude 32 is located in proximity to sensitive uses, including residential uses.
- Environmental assets within Latitude 32, which reduce the volume of useable industrial land.
- Insufficient existing road networks, which are largely designed to rural standard (6-8m road reservation widths). These existing road alignments are not sufficient to support Restricted Access Vehicles (RAV).

Known Constraints Addressed

There is one known constraint that is addressed by the options used to support Latitude 32 Activation. Table 5-19 below demonstrates how each all considerations in L1 addresses the known constraint.

Table 5-19: Constraint to Option Mapping for L1 – Activate Latitude 32

	Options to support Latitude 32 Activation				
Constraints Addressed	Road Delivery	Strategic Industrial Area	General Industrial Area	Remove Sensitive Uses	Strategic External Land
Underutilised Latitude 32 precinct	•	•	•	•	•









Strategies and Options

Land Use: L1 - Latitude 32 Activation Strategy

Aim

The Latitude 32 Activation Strategy has been carefully designed to capitalize on the area's opportunities while effectively addressing its constraints, resulting in a practical and cost-efficient activation plan.

Themes

The approach to Latitude 32 activation is centred around the following themes:

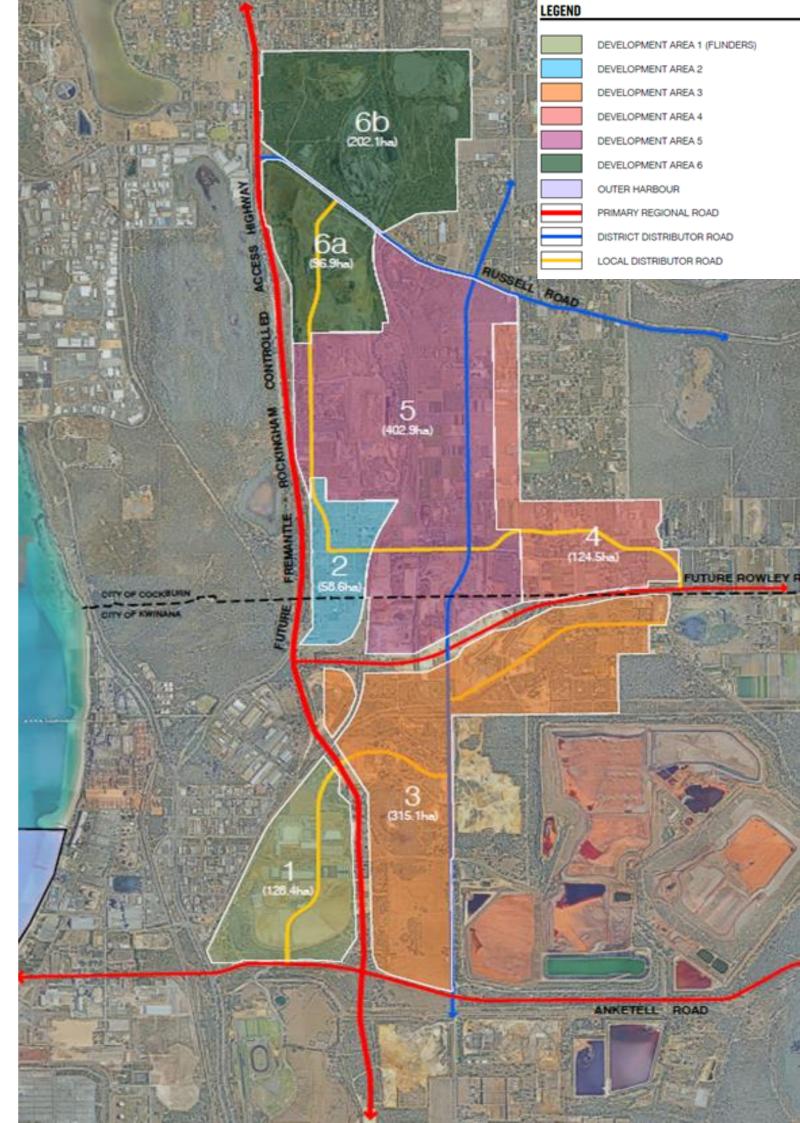
- Land assembly to protect and deliver future infrastructure corridors. Specifically, the study sought to consider land to deliver the future Rowley Road, and North South District Distributor Road connections.
- The opportunity to **leverage existing government** land ownerships in areas of greatest benefit within Latitude 32. This includes consideration of options external to Latitude 32, which provide a logical extension with the Kwinana Industrial area.
- The need to establish and secure sufficient separation distances from nearby residential properties.
- The **suitability of the planning framework** to deliver these industrial areas, as well as the immediate and future planning initiatives intended to simplify and guide the planning approvals process for Latitude 32.



Options to Support Latitude 32 Activation

In exploring the activation of Latitude 32, 5 strategic options have been identified, each with distinct objectives aimed at enhancing infrastructure and land utilization within the precinct.

- 1. Activation Through Road Delivery: With the main objective being to leverage land for strategic road connections, being Rowley Road and the North South District Distributor Road.
- 2. Activation via Strategic Industrial Area **development:** With the main objective being to review private landholdings suitable for a Strategic Industrial Area. The key criteria for this option was achieving a minimum of 2km separation distance from external residential and sensitive land uses.
- 3. Activation via General Industrial Area **developments:** With the main objective being to review private landholdings suitable for a General Industrial Area. The key criteria for this option was achieving a minimum 1 km separation distance from external residential areas.
- **Activation via the review of Sensitive Uses:** With the main objective being to identify longstanding residential dwellings within Latitude 32 for consideration.
- 5. Activation via consideration of Strategic External **Land:** Which identifies residential land parcels outside of Latitude 32, with the objective of increasing the quantity of Strategic Industrial Area within Latitude 32.











Strategies and Options

Land Use: L1 - Latitude 32 Activation Strategy

With activation of Latitude 32 being centred around the previous 5 options – the wider activation of the WTC also presents as a complimentary initiative.

Given this, Table 5-20 has been developed to illustrate an overview of how each WTC strategy applies to Latitude 32 generally.

Key points of interaction include intersections with major roads, connection points to utility lines, and borders with adjacent precincts.

By analysing these interactions, the potential impact of each strategy on the development and operation of Latitude 32, can be better understood ensuring efficient integration and sustainable growth within the broader infrastructure framework outline.

Definition of 'Impact'

In the context of the below table, the impact column can be defined as follows

- Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
- **Indirect Benefit:** Infrastructure Option provides a broader strategic benefit to Latitude 32.
- Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.

Table 5-20: Infrastructure Options Impact to Latitude 32

Option Index	Infrastructure Options relevant to Latitude 32	Description	Impact
T1.1	Tranche of Rockingham Road Intersection Upgrades	Improves access for general traffic as well as RAV vehicles.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
T1.2	Rowley Road Extension	Creates direct access from Kwinana Freeway and Tonkin Highway.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
T1.3	North-South District Distributor Road	Creates direct access from Anketell Road through to Rockingham Road and alternative north south access to Rockingham Road.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
T1.4	Anketell-Thomas Road Freight Corridor (ATRFC)	Located south of the Latitude 32 boundary.	Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
T1.5	Grade-Separation of at-grade Rail Crossings (between Cockburn Triangle and Westport)	Improves accessibility for general traffic as well as RAV vehicles.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
T1.6	Install Active Transport Infrastructure	Provides alternative forms of transport for workforce.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
T1.7	Develop an Integrated Public Transport0 Strategy	Provides alternative forms of transport for workforce.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
T2.1	Heavy Vehicle Staging Area	Improves access options for RAV vehicles.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
T3.1	Duplication of Main Line	Improves the overall freight network creating market benefits.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
T3.2	Alternative Kwinana Rail Loop Alignment	Improves the overall freight network creating market benefits.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
T3.3	Installation of Passing Loops	Improves the overall transport options for freight and logistics creating market benefits, although may be seen as a negative to Latitude 32 as it may compete with other land uses.	Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
T3.4	Improve Cockburn Triangle Configuration	Improves the overall freight network creating market benefits.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.







Strategies and Options

Land Use: L1 – Latitude 32 Activation Strategy

Option Index	Infrastructure Options relevant to Latitude 32	Description	Impact
M1.1	Westport Preferred Option	Improves the overall freight network creating market benefits.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
M1.2	New KBT		Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
M1.3	KBJ Expansion	Improves the overall transport options creating market benefits.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
M1.4	AMC North Common User Facility Development	Increases demand for synergistic landholdings.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
M1.5	AMC South Expansion		Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
M1.6	Strategy for Expansion of Material Offloading Capacity		Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
U1.1	Tier 1 WP Upgrades	Creation of a resilient power supply.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
U1.2	Tier 2 WP Upgrades	Creation of a resilient power supply.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
U1.3	Tier 3 WP Upgrades	Creation of a resilient power supply.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
U1.4	Strategic Plan for Connecting New Tenants	Increase market attraction, supports demand for industrial landholdings.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
U2.1	Common User Renewable Power Supply from Outside WTC	Creation of a resilient diversified fuel supply.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
U2.2	Installation of an Industry BESS	Creation of a resilient diversified power supply.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
U2.3	Common User Hydrogen / Low Carbon Fuel Station	Creation of a resilient diversified fuel supply.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
U2.4	Joint Power Purchase Agreements	Creation of a resilient power supply	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
U3.1	SDOOL Expansion	Will assist in maximising the use of land for strategic industry	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
U3.2	Extend WC Sewer Network Throughout WTC	No reticulated sewer currently available in Latitude 32. Will remove the need for tinkering.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.
U4.1	Expansion of KWRP (Tier 1)		Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
U4.2	Expansion of KWRP (Tier 2)		Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
U4.3	New Centralised Water Reclamation Plant		Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
U4.4	Decentralised Treated Wastewater Reuse Scheme		Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
U4.5	Common User Raw Seawater Supply Scheme		Neutral: Infrastructure Option provides no discernible direct or indirect benefit to Latitude 32.
U4.6	Managed Aquifer Recharge Infrastructure	Indirect benefit for non-potable water supply.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
U4.7	Review and Reallocate Groundwater Licences	Indirect benefit for non-potable water supply.	Indirect Benefit: Infrastructure Option provides a broader strategic benefit to Latitude 32.
U4.8	Extend WC Potable Water Network Within Latitude 32	Has the potential to bring forward the development front.	Positive Direct Benefit: Infrastructure Option provides a direct and tangible benefit to the activation of Latitude 32 or immediate surrounds.







Strategies and Options

Land Use: L1 – Latitude 32 Activation Strategy

Alignment with Government Objectives

- The 10-year Industrial Lands Strategy notes that the "availability of serviced industrial land, both SIA and GIA, plays a crucial role in enabling economic growth".
- The ten-year Industrial Lands Strategy recommends prioritising "the finalisation of land assembly" of SIAs.

Impact on Target Industry Opportunities

Activating Latitude 32 will have positive impact on all target industries.

Table 5-21: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Positive
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Positive



Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



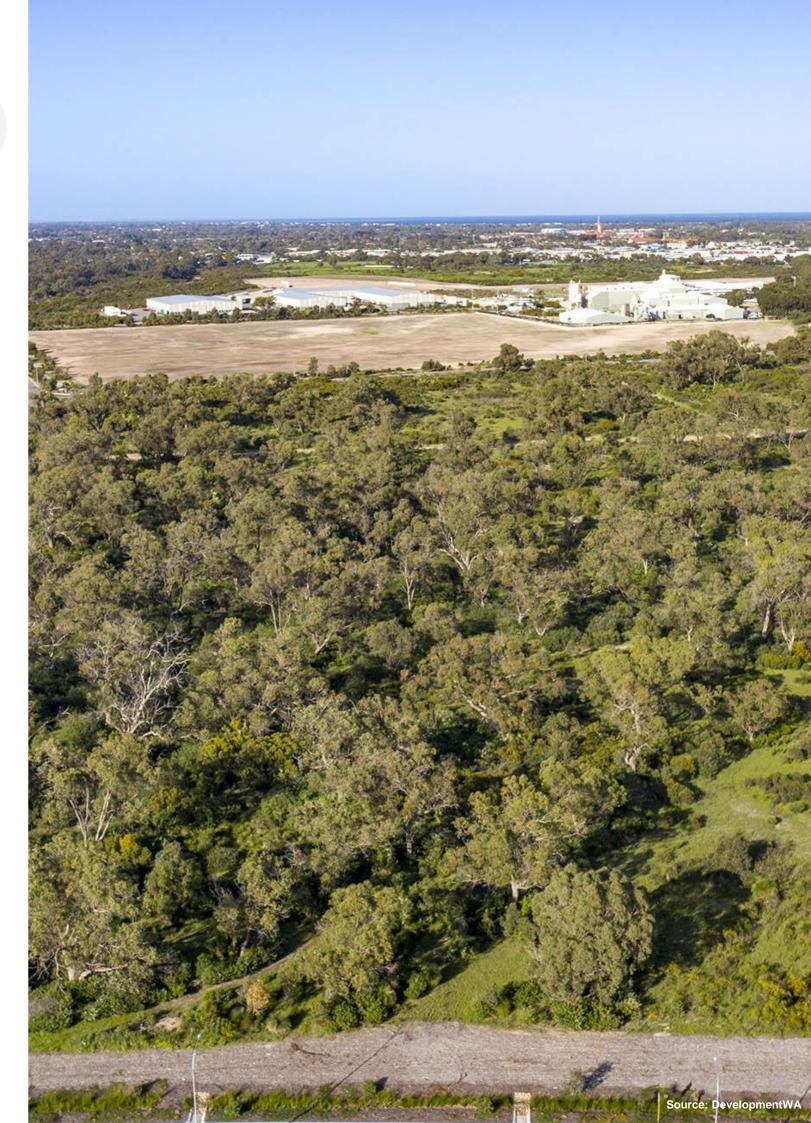
Land constraints and associated infrastructure / utility requirements



Community interaction & identity



Constrained labour market





L2 – Establish and Maintain Common User Services Corridor

to establish new and maintain existing corridors to facilitate existing and future servicing and synergies







Strategies and Options

Land Use: L2 - Establish and Maintain Common User Services Corridors

Strategy L2 - Establish and Maintain Common User Services Corridors seeks to establish new and maintain existing corridors to facilitate existing and future servicing and synergies.

Existing Context

The Western Trade Coast's historic success and current desirability as an industrial precinct is, in part, due to the "industrial symbiosis" that has developed organically within and between the distinct regions of the Western Trade Coast.

Heavy processing industries within the WTC require a range of input products such as energy, water, chemicals, precursors and fluxes. Furthermore, there are a range of by-products that are maintained and re-used within the area. The conveyance of inputs and outputs is dependent on the corridors which facilitate the movement of freight, services and goods.

As land has become constrained within the WTC, available land for services corridors has diminished. This puts at risk the continued development of the WTC, particularly as the types of industries (and their associated dependencies) within the region change.

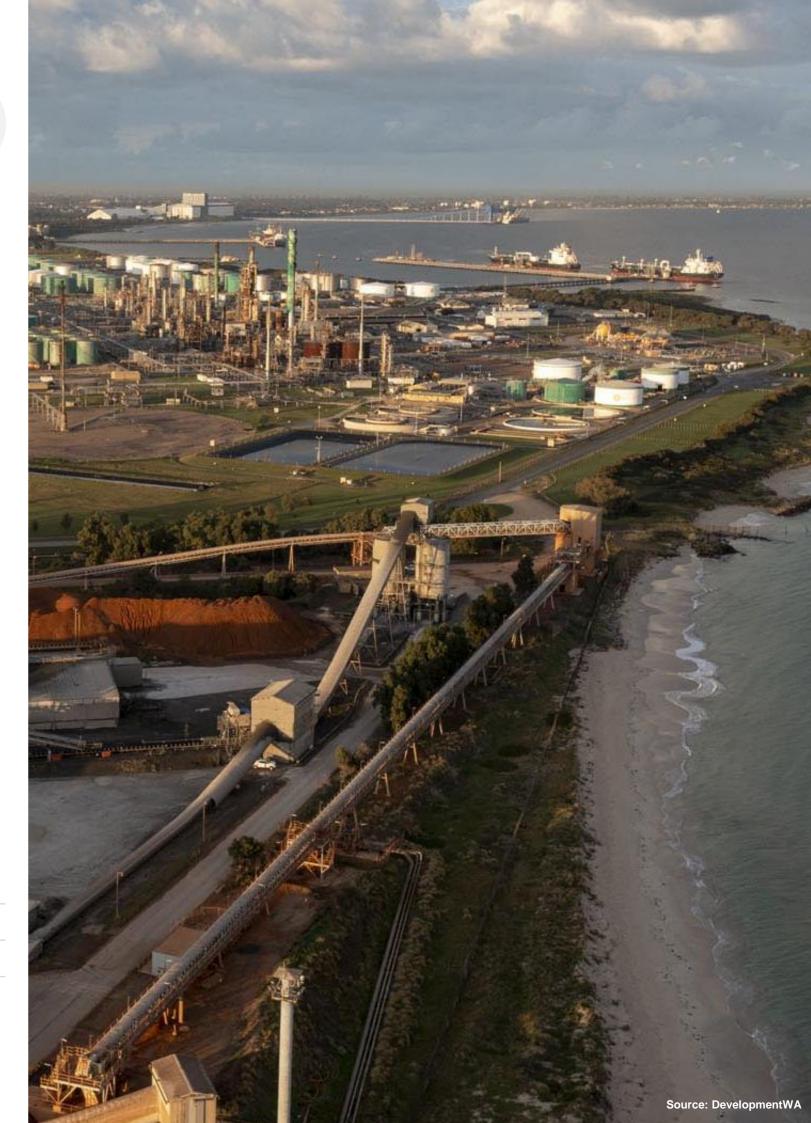
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Known Constraints Addressed

There is 1 known constraint that is addressed by the options under Strategy U5. Table 5-22 below demonstrates how each option addresses the known constraint.



	Critical Enablers	
Constraints Addressed	L2.1 Safeguard Existing Corridors	L2.2 Seek Opportunities to Establish New Corridors
Limited Available Land for Future WP Assets	•	•





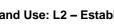




Aim

Strategies and Options

Land Use: L2 - Establish and Maintain Common User Services Corridors



Maintaining existing and facilitating new industrial synergies is considered vital to the region's ongoing success and its ability to pivot to new markets. This strategy recognises the importance of corridors in facilitating these synergies and aims to preserve existing and create new corridors in the WTC.

Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

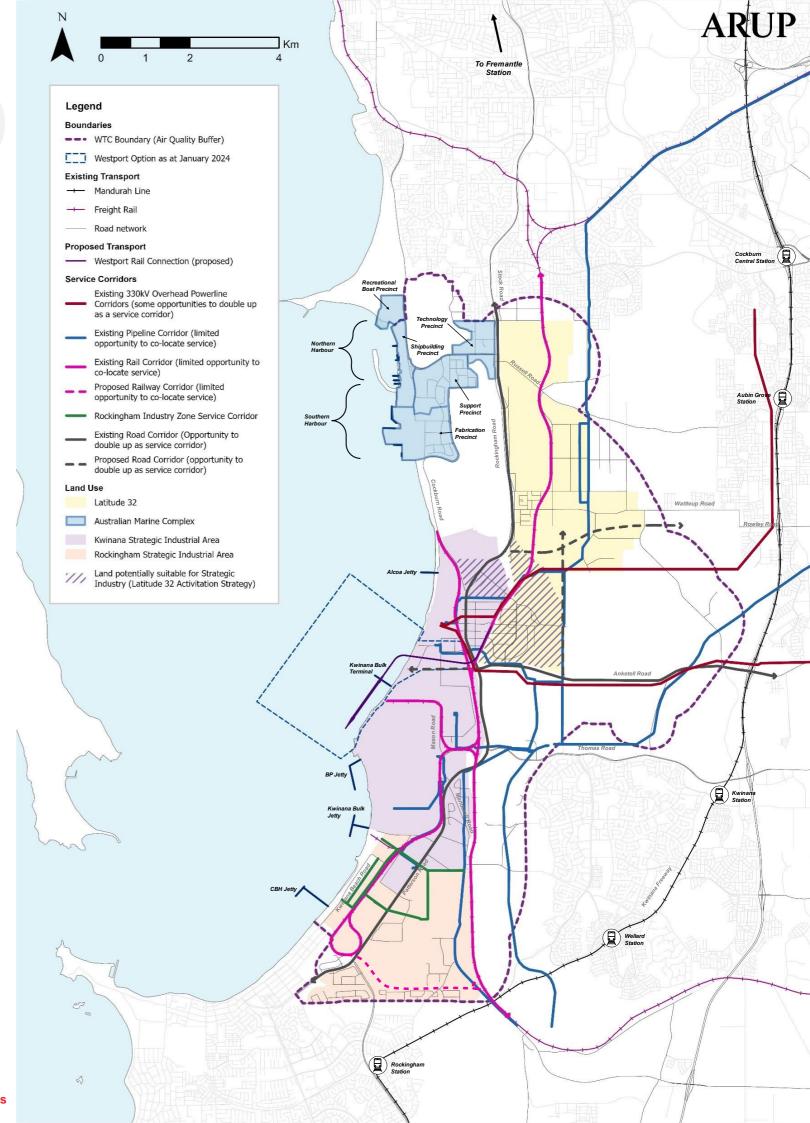
- 1.1 WTC's growth is enabled.
- 1.2 WA economy becomes less reliant on a small number of key industries.
- 2.1 Industry located within the WTC have access to the infrastructure to support decarbonization activities, ensuring they maintain favourable status with trading partners.
- 3.1 Support investment from companies who have synergies with existing and target sectors for the WTC.
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.
- 6.2 Infrastructure development and operations are sustainable and reflective of industry requirements bespoke to the geography of the WTC.



Options

Critical Enablers:

- L2.1 Safeguard Existing Corridors
- L2.2 Seek Opportunities to Establish New Corridors









Strategies and Options

Land Use: L2 - Establish and Maintain Common User Services Corridors

Alignment with Government Objectives

- 10-Year Industrial Lands Strategy notes that "continued demand for heavy industrial land will require consideration for additional strategic industrial land, with good access to port infrastructure via road a services corridors".
- Perth and Peel @ 3.5 million identified a core principle for delivering a connected city is "maximising the use of existing and future infrastructure, particularly through shared infrastructure corridors"
- The State Infrastructure Strategy recommends reform to effect meaningful change with respect to "identification and security of key infrastructure sites and corridors providing certainty for service providers and the community that land will be available for critical infrastructure needs"

Impact on Target Industry Opportunities

Establishing and maintaining common user services corridors in the WTC will have positive impact to Renewable Hydrogen, Future-Facing Minerals Processing and Port-Related Logistics, Manufacturing and Processing target industries while having neutral impact to Shipbuilding and Sustainment.

Table 5-23: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Neutral
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Positive

Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



Dominance of materials processing



Critical minerals demand



Drive for economic resilience



Land constraints and associated infrastructure / utility requirements



Private investment into common user infrastructure









Strategies and Options

Critical Enabler

Option L2.1: Safeguard Existing Corridors

Context

The extensive network of existing private pipelines and public utilities is currently located in various types of corridors:

- Road corridors most notably:
 - · Rockingham Road for north-south conveyance.
 - Anketell Road for east-west conveyance.
- · Rail corridors.
- Dedicated service corridors such as the dedicated RIZ corridors, the DBNGP, various transmission line routes and private pipeline easements.

The safeguarding of these corridors to allow for new servicing infrastructure and additional synergistic private pipelines is critical to allowing the continued development of the WTC.

Scope

This option primarily requires a land-use governance solution whereby existing services corridors are not diminished because of the footprint of new projects (such as Westport) or due to the desire to release more industrial land.

Implementation Considerations

Benefits

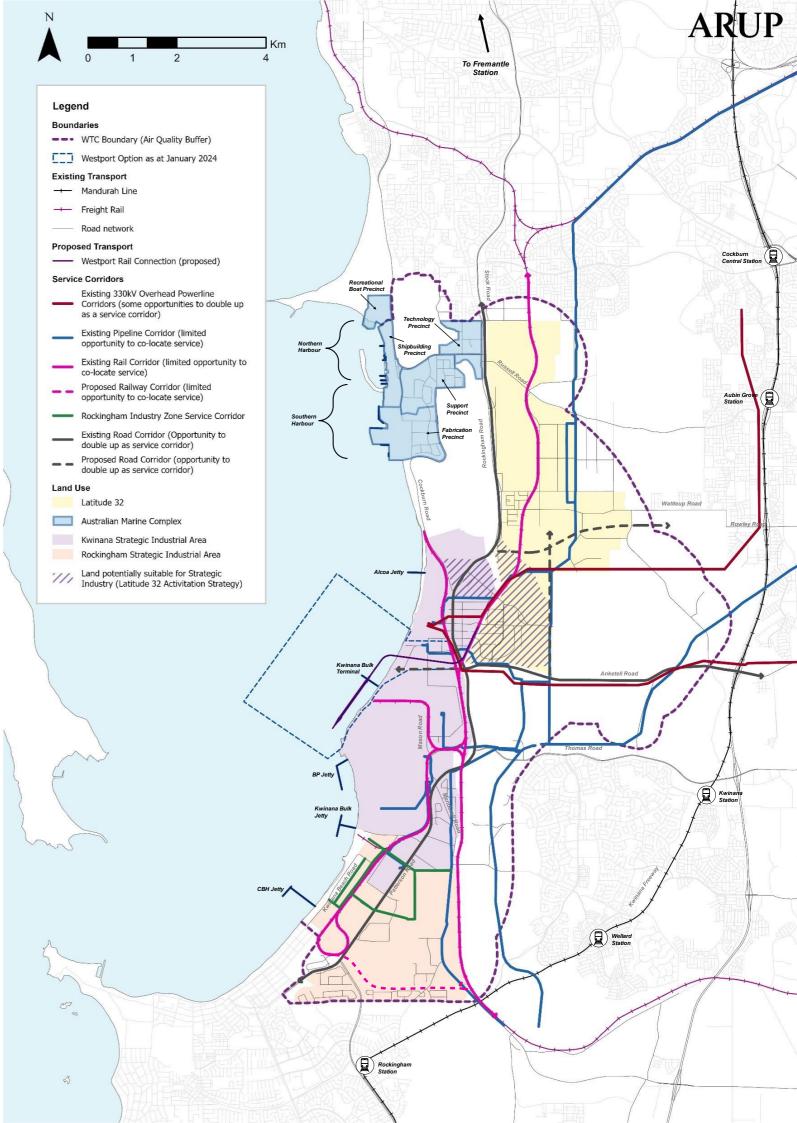
- Existing industrial synergies are not threatened.
- The current level of servicing to WTC proponents can at least be maintained at a minimum.
- Avoids costly re-routing of major services.

Limitations / Challenges / Risks

• The organic nature of some corridors may mean that that they are not up to current compliance standards (security, fire, explosion risk etc).

Interdependencies / Land Requirements

Some services corridors such as the freight rail line in Kwinana or the transmission lines along Anketell Road represent costly barriers to other infrastructure projects (rail duplication and Anketell Road upgrade, respectively).







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Chapter 5

Strategies and Options

Critical Enabler

Option L2.2: Establish New Services Corridors

Context

As the servicing demands of the WTC change and as new industrial synergies form, there is a need to provide more corridor space. This is particularly critical for the future of the Latitude 32 precinct, which is ideally suited to house proponents that support the heavy industry operations in Rockingham and Kwinana.

Opportunities for new service corridor space come in two forms:

- Better utilise existing opportunities including existing roads and established corridors such as WP transmission line routes.
- Build corridors into any new roads or as part of road upgrades.

Scope

Opportunities for new service corridor space come in two forms:

- Better utilise existing opportunities including existing roads and established corridors such as WP transmission line routes.
- Build corridors into any new roads or as part of road upgrades. Key opportunities include Rowely Road, Anketell Road (as part of Wesport) and the proposed North-South road through Latitude 32.

Implementation Considerations

Benefits

- Existing industrial synergies are not threatened and new synergies can be supported.
- Increase level servicing to WTC proponents can be supported including additional power.
- May help avoid the need to acquire land at a later date
- May help to activate Latitude 32 precinct.

Limitations / Challenges / Risks

· Land is constrained, particularly in Kwinana which limits corridor options.

Interdependencies / Land Requirements

• To be considered as part of other major infrastructure projects, particularly major road upgrades.





L3 – Optimise Land Usage

to facilitate the growth of the WTC in a coordinated manner









Strategies and Options

Land Use: L3 – Optimise Land Usage

Strategy L3 - Optimise Land Usage seeks to facilitate the growth of the WTC in a coordinated manner.

Existing Context

The current land assembly, development, and leasing model is not aligned with the goals of the GAIH. As such, the WTC encounters obstacles such as limited land availability, development restrictions imposed by mining tenements and other landowners, insufficient land allocation, and suboptimal land utilization that deviates from GAIH objectives. Fragmented zoning and inefficiencies in the supply chain further worsen the situation, consequently, these factors collectively restrict growth and investment prospects within the WTC.

Known Constraints Addressed

There are 16 known constraints that are addressed by the options under Strategy L3. Table 5-24 demonstrates how each option addresses the known constraints.

Table 5-24: Constraint-to-Option Mapping for L3 – Optimise Land Usage

	Critical Enabler
Constraints Addressed	L3.1 Road and Utility Connection Between Precincts
Ramsar Wetlands Constraining Land	
Presence of Contaminated Sites (inc. Alcoa) Constraining Land Use	•
Land Availability	•
Mining Tenements and related material extraction requirements constraining land / restricting development	
DoT land within AMC - blocker to expansion	•
Lack of large land parcels for strategic business growth	
Lack of Strategic Land Use Plan	•
Poorly Allocated Land within AMC	•
Presence of Naval Base Shacks	
Buffer zone not fit for purpose for some potential industrial activities	•
Fragmented zoning / sub-optimal land use	•
Wells Park restricting Developable Land	
Different chemicals/products have varying requirements - incompatibilities	
Fragmentation of Industry - Supply chain inefficiency and sub optimal land use	•







Strategies and Options

Land Use: L3 - Optimise Land Usage

Aim

The strategy of optimising land usage includes recommendations to improve and enhance road connectivity between industrial precincts and develop a precinct-wide plan for land zoning and infrastructure development.

These recommendations aim to support industrial symbiosis; meet demands for products like reticulated hydrogen; align with broader industrial ecology ambitions for the WTC requiring early government engagement; help to prevent encroachment; and preserve the integrity of the industrial precinct.

Through these mechanisms, the strategy targets the following GAIH Initiative Aims in particular:

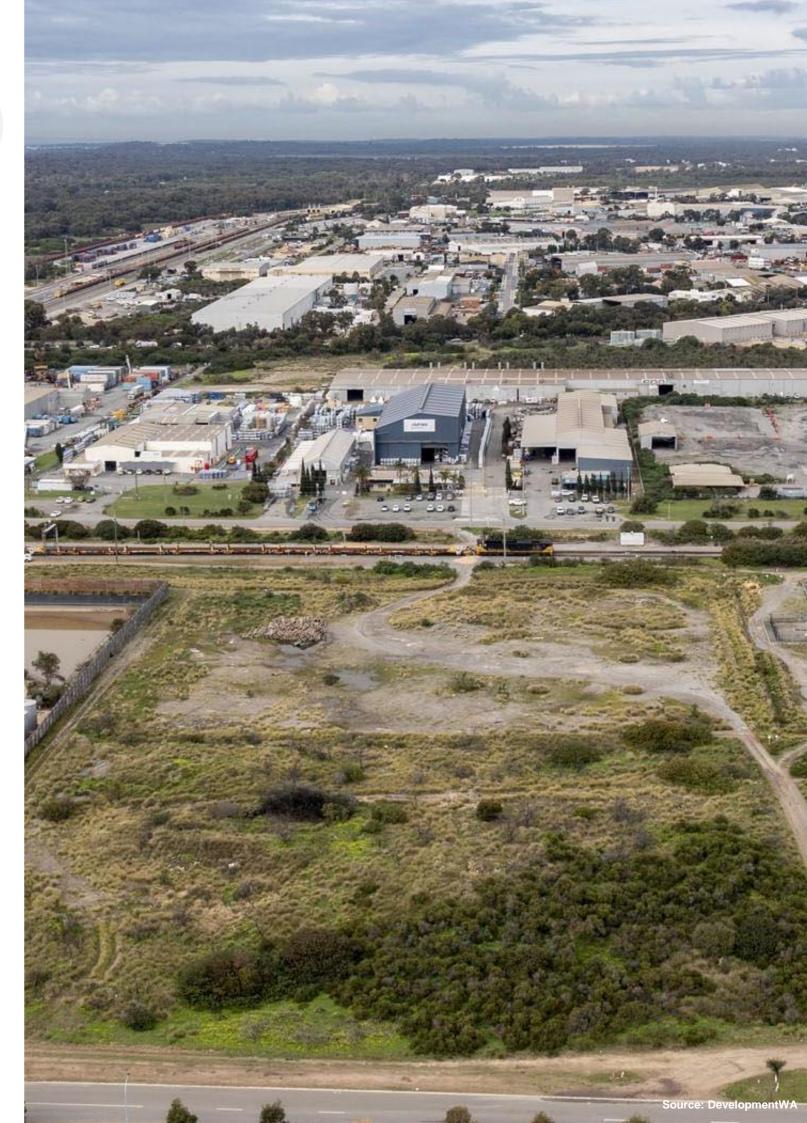
- 1.1 WTC's growth is enabled.
- 2.2 Ensure private investment to the WTC is aligned to Environmental, Social and Governance (ESG) opportunities benchmarked against the United Nations (UN) Sustainable Development Goals.
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.
- 6.2 Infrastructure development and operations are sustainable and reflective of industry requirements bespoke to the geography of the WTC.



Options

Critical Enablers:

L3.1 Road and Utility Connection Between









Strategies and Options

Land Use: L3 - Optimise Land Usage

Alignment with Government Objectives

- 10-Year Industrial Lands Strategy notes that "continued demand for heavy industrial land will require consideration for additional strategic industrial land, with good access to port infrastructure via road a services corridors"
- The State Infrastructure Strategy recommends reform to effect meaningful change with respect to "improving the integration of land-use and infrastructure planning".

Impact on Target Industry Opportunities

Optimising land usage in the WTC will have positive impact to all target industries.

Table 5-25: Impact on Target Industry Opportunities

Target Industry	Impact
Shipbuilding and Sustainment	Positive
Renewable Hydrogen	Positive
Future-Facing Minerals Processing	Positive
Port-Related Logistics, Manufacturing and Processing Activities	Positive

Relevant Critical Uncertainties

The relevant critical uncertainties addressed by this strategy include:



Land constraints and associated infrastructure / utility requirements



Private investment into common user infrastructure



Defence decisions



Dominance of materials processing



Changing trade routes & free trade









Strategies and Options

Critical Enabler

Option L3.1 Road and Utility Connection Between Precincts

Context

To support the development of WTC, it is critical that its industrial precincts are linked within the WTC and surrounding regions. This includes road connectivity and infrastructure corridors that are aligned to zoning plans and existing infrastructure such as pipelines. This recommendation aims to support industrial symbiosis, meet demands for products like reticulated hydrogen, and align with broader industrial ecology ambitions for the WTC, requiring early government engagement.

Scope

Evaluate and enhance connectivity of regional roads linking industrial precincts in the WTC. Examine internal road networks, identify critical connections, and establish infrastructure corridors in line with zoning plans and existing pipelines.

Implementation Considerations Benefits

- · Improved regional and internal connectivity.
- Enhanced transportation efficiency within industrial areas.
- · Facilitated industrial symbiosis through critical infrastructure corridors.
- Support for broader industrial ecology ambitions for the WTC.

Limitations / Challenges / Risks

- Challenges aligning corridors with zoning plans and pipelines.
- Potential disruptions and costs associated with road upgrades.
- · Environmental and regulatory considerations.
- Dependency on government engagement and approval.

- Interconnection between regional and internal road networks.
- Alignment of corridors with zoning plans and existing pipelines.
- Integration with the WTCIS plan, including Transport and Common-User Infrastructure Corridors.
- Dependency on early government engagement for approvals.











Policy and Regulatory Settings

6.1 Non-Infrastructure Strategies and **Opportunities Overview**

The policy and regulatory context for the WTC is complex as the planning and delivery of many of the necessary services (e.g. electricity supply) are undertaken on a statewide basis. This makes it harder to plan, coordinate and deliver what is needed across interfacing agencies, decision making authorities and industry for a precinct like the WTC.

Additionally, the precinct area encompasses three Local Government Authorities (LGAs); several active State Agreements; and the policy and regulatory environment is dynamic - it is changing in response to global trends like decabonisation. This adds further complexity to the industry operating environment.

Provision of a stable policy and regulatory environment is longstanding WA Government objective and an important setting to support ongoing industrial development within the WTC as it transitions to a GAIH. This is a key aim of the GAIH Program to: "Promote coordinated planning and approvals for land and infrastructure to enable industrial activation".

To achieve coordinated services planning and deliver on the WTCIS in the context of the complexities above, principles are needed to guide effort. These have been derived taking into account the challenges and opportunities identified through stakeholder feedback during the development of the WTCIS and with consideration to the GAIH Program outputs. Described as 'enabling principles', these are:

- regulatory certainty,
- · coordination and precinct leadership, and
- collaborative practices.

These principles are described in more detail in Table 6-1.

The WA Government's economic development agenda and the need to support investment, diversification and decarbonisation has led to a number of recent initiatives directed at supporting the WTC transition to a GAIH.

These align with the enabling principles and are detailed in the next section of this Chapter along with further opportunities, informed by stakeholder feedback, and identified as part of the WTCIS development.

These seek to reinforce best practice through:

- project prioritisation based on agreed metrics and sought outcomes,
- · transparent and accountable systems,
- avoidance of duplication,
- · ability to be implemented, and
- · commitment to timely decision making.







Policy and Regulatory Settings

Policy Context, Reforms and Initiatives

Under 'Streamline WA' and announced public reform initiatives, the WA Government is making widespread legislative and process changes and investing in capability and incentives to support infrastructure investment, industrial diversification and transformation.

Recent announcements include:

- Appointment of a Coordinator General function, reporting to Cabinet, for projects of State Significance, which includes the establishment of a project management office in JTSI.
- \$18 million allocation to support project approval efficiency measures across government, including engaging external technical support.
- Enhancing the online interface with WA regulatory frameworks, e.g, Approvals WA.
- Agreement on the implementation of recommendations published in the Vogel-McFerran Review into the environmental approvals process.

- Reviewing the LGA planning and approvals for the Cities of Kwinana, Cockburn and Rockingham's Local Planning frameworks, including Planning Schemes and Policies to facilitate improvements in zoning, land use permissibility and development standards across the WTC.
- \$134 million allocated to support Statewide decarbonisation, including;
 - support for the "Green Approvals Units", established to fast-track approvals for major clean energy projects,
 - the Investment Attraction Fund New Energies Industries and Clean Energy Future Fund.
- \$160 million in incentives for major project developments in the State's Strategic Industrial Areas.

Table 6-1: WTCIS Non-Infrastructure Enabling Principles

Policy, Process & Regulatory Framework Enabling Principles

Regulatory Certainty

Opportunities that addresses this enabling principle are built on government delivering clear, consistent, and unambiguous policies and regulatory frameworks that support long-term investment decisions. Regulatory frameworks continue to be streamlined and adjusted as needed to remain fit-for-purpose. There is a commitment to continuous improvement. Decision-making is transparent with open and clear communication between regulators, industry and relevant stakeholders.

Coordinated Precinct Leadership

Opportunities that address this enabling principle are built on a clear and coordinated leadership role for government, informed by relevant stakeholders. The principle addresses the requirements for clear and open communication, and the alignment of goals and objectives to deliver strategic planning frameworks, policy and processes that are sufficiently flexible to be able to respond to emerging trends, and economic, environmental and infrastructure requirements that enable the WTC to transition to the GAIH.

Collaborative Processes

Opportunities that address this enabling principle are built on a collaborative approach to the transition of the WTC to a GAIH that recognises the importance of stakeholder input to the process. Stakeholders may include, though are not limited to, industry, local, state, and federal tiers of government, Traditional Owners, unions and the community, working together to achieve a transition to the GAIH. This principle prioritises stakeholder engagement, transparency and open communication, monitoring and feedback, while seeking to maximise synergies.









Policy and Regulatory Settings

6.2 Alignment to WA Government Strategic Priorities

Numerous strategies and policies exist to support WA's economic development through diversification, positioning the economy for the opportunities of the energy transition, and providing clear direction on priorities to inform industry activities and investment.

The Government's objective to transform the WTC into the GAIH forms a geographical nexus for the implementation of these strategies and policies, as summarised in Table 6-2. Considered altogether this supports a mandate for the prioritisation of initiatives that address infrastructure and non-infrastructure constraints in the WTC.

Table 6-2: Strategic Priorities and WTC Transformational Alignment

Strategy / Policy / Priority	Overview	Relevance to WTCIS
Diversify WA + Future State	State's strategic policy and economic development framework to diversify the types of economic activity in the State; identifying priority sectors for strategic development that aligns WA's unique strengths with global trends to achieve growth across the economy e.g., decarbonisation which is driving significant demand for clean energy resources.	+ Supports continued development and investment attraction for diverse industries, which relies on enabling infrastructure to efficiently operate.
10-year Industrial Lands Strategy	Identifies the 'strategic conglomeration' of the two Strategic Industrial Areas (Kwinana Industrial Area and Rockingham Industrial Zone), Australian Marine Complex and Latitude 32 Industrial Estate. Strategic industrial areas, generally, are critical assets for economic activity as they provide a mechanism for the creation and preservation of heavy industrial land.	 + Aligns with the driver for more optimal land allocation within the WTC, noting a shortage of suitably sized and available industrial land. + Aligns with firming up desired use for Latitude 32 and subsequent enabling activities.
State Infrastructure Strategy	Outlines the understanding of the State's needs, priorities, solutions in terms of infrastructure up to 2042. Additionally, six strategic economic opportunities are identified to facilitate WA's long-term economic diversification to enable growth; out of which four are imbedded in the transition of the WTC to the GAIH.	+ Strong alignment to sustainable growth and development for infrastructure in WA.
WA Climate Policy	State's commitment to achieve net zero by 2050. The Policy outlines Development WA's Industrial Land Authority's role in the planning designing and delivery of land and infrastructure, as well as technology precincts to facilitate the transition to net zero emissions.	+ Aligns to the target industries, Renewable Hydrogen and Future-Facing Minerals Processing, and infrastructure required to support the development of these industries.
AMC Strategic Infrastructure & Land Use Plan (SILUP)	Identifies infrastructure enhancements needed for the AMC to reach a nationally significant industrial zone with regard to its defence, marine and resources industries.	+ Infrastructure investment across the WTC should be coordinated with Defence requirements and industry or proponent specific needs in the AMC.
Westport	State's future container port in Kwinana with integrated road and rail networks.	+ Connecting infrastructure that will support the future movement of containers in/out of Kwinana.
Future Battery Industry Strategy	Outlines investment attraction, project facilitation, research and development, and adoption of new battery technologies in order to grow and transform WA's battery industry into an economic hub.	 + Aligns to the target industries and the need for infrastructure that better services this industry. + Enabling and common use infrastructure to attract investment and expertise to the WTC.
Renewable Hydrogen Strategy and Roadmap	Provides an overview of the State's strategic areas of focus to facilitate the development of the Hydrogen industry, by utilising WA's renewable resources, expansive land and expertise in international export.	+ Direct alignment to infrastructure needs to facilitate growth of target industry.
Defence and Defence Industries Strategic Plan	Outlines the following six schemes to enhance and diversify WA's defence industry, and its economic contribution: (1) supporting a strong and enduring defence presence, (2) growing the State's defence industry capability and contribution, (3) developing strategic infrastructure, (4) building research and innovation partnerships, (5) advancing education, training and skilling, and (6) supporting veterans and families.	+ Supports infrastructure development in the WTC, particularly as it relates to any Defence-related activity (e.g. shipbuilding and sustainment).







Policy and Regulatory Settings

Policy & Regulatory Framework Strategies

This section contains one strategy aimed at providing policy and regulatory framework strategies that de-constrain the WTC.



Streamline Approvals Processes

Nine Options



P1 – Streamline Approvals Processes

to mitigate barriers to infrastructure development







Policy and Regulatory Settings

Policy & Regulatory Frameworks: Issues and Constraints

Non-infrastructure issues and constraints have been identified through industry, government and community feedback.

Existing Context

Table 6-3 identifies the key non-infrastructure issues and constraints identified through stakeholder feedback, as detailed in the process described in Chapter 2 and the review and assessment of best practice considerations for regulatory frameworks and practices.

The identification of key issues and constraints enables consideration by government as it undertakes reforms to strengthen and improve processes and the regulatory framework. These issues and constraints along with key enabling principles help to inform the opportunities identified in the next section and that build on and support recent announcements by government.

These opportunities are grouped under a key theme P1-Streamline Approvals Processes.

Table 6-3: Non-infrastructure Issues and Constraints

Approvals Complexity for new pipelines in existing

Approvals Complexity - Council Approvals

Approvals Complexity - Environmental

Restriction of By-Product Reuse Opportunities

Lack of logical classification or categorisation of approvals of different complexity

Cumulative environmental impacts (required for approvals) difficult to measure

Approvals complexity at State level - multiple touchpoints, lack of coordination

Lack of visibility and transparency of approvals submissions

Lack of clear way for common user infrastructure requirements to be progressed

Lack of publicised KPI for approvals timeframes

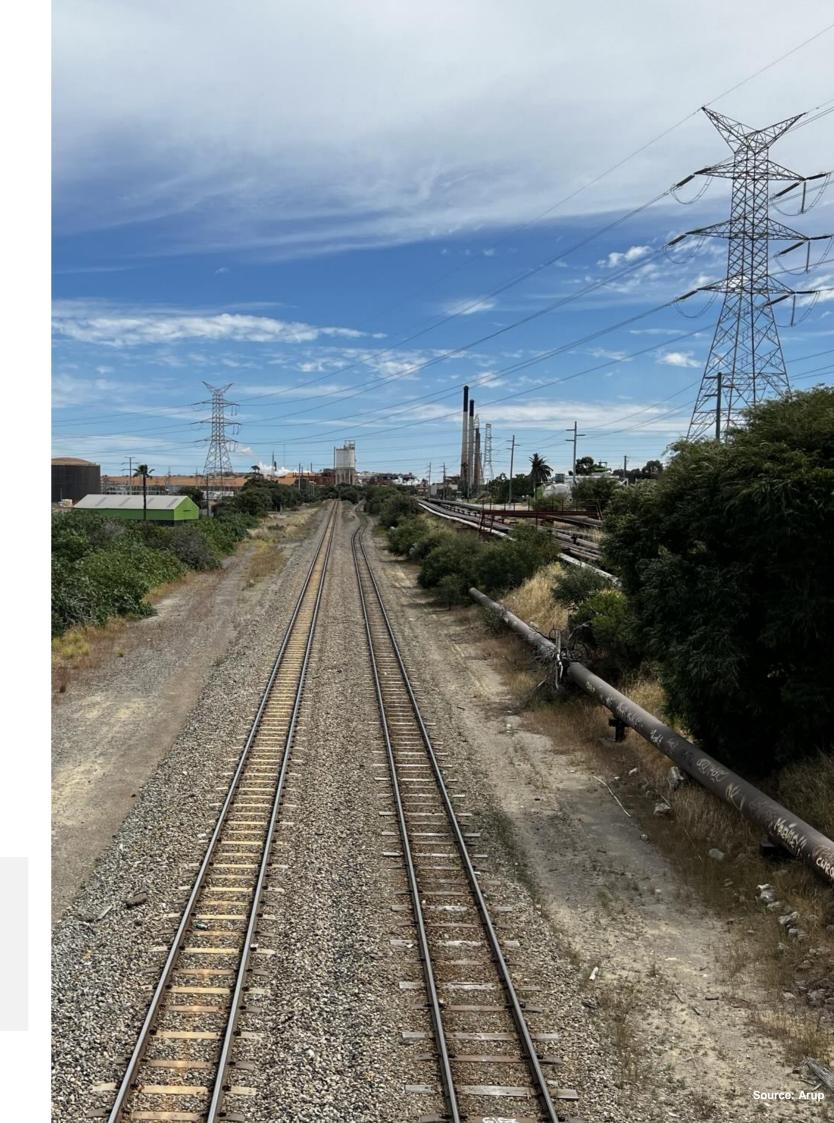
Improved governance framework required for common user facilities, freight/pipeline networks, renewable energy, decarbonisation incentives/grants

Policy & Regulatory Framework Strategies



Streamline Approvals Processes

Addresses coordination of, and prioritisation for significant projects, local government authority planning frameworks, approvals complexity for infrastructure in existing corridors, environmental/council/state approvals complexity and duration, lack of visibility and transparency of approvals submissions, lack of pathway for common user infrastructure requirements to be progressed, and publicised KPI for approvals timeframes.











Policy and Regulatory Settings

Policy & Regulatory Framework: P1 – Streamline Approvals Processes

Aim

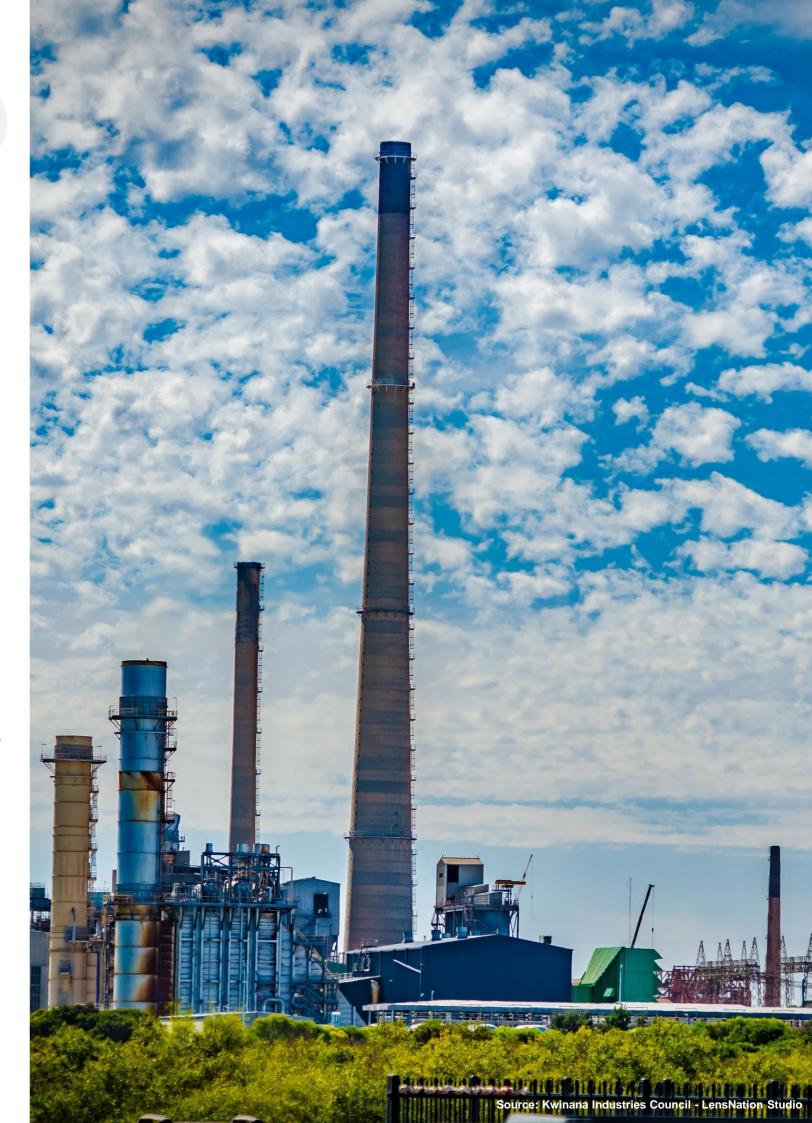
This strategy aims to provide opportunities for streamlining approvals processes within the WTC precinct by modifying frameworks to prioritise WTC objectives, simplifying approvals pathways, removing/minimising pre-requisites for negotiation or submission of approvals, implementing continuous improvement strategies, and providing comprehensive proponent education on policies and approvals relevant to development within the WTC.

Through these mechanisms, the Strategy P1 targets the following GAIH Initiative aims:

- 1.1 WTC's growth is enabled.
- 2.2 Ensure private investment to the WTC is aligned to Environmental, Social and Governance (ESG) opportunities benchmarked against the United Nations (UN) Sustainable Development Goals.
- 6.1 A strategic and coordinated plan proposing solutions to land, infrastructure and utilities constraints in the WTC.
- 6.2 Infrastructure development and operations are sustainable and reflective of industry requirements bespoke to the geography of the WTC.

Opportunities

- P1.1 "Lead Agency Framework" and "Significant Development Pathway" to consider capacity constraints and relative priorities against all projects to support an overarching delivery framework that efficiently streamlines approval pathways for the WTC.
- P1.2 Approving agencies acting under their own mandate/approval responsibility.
- P1.3 Government undertake continuous improvement on approval streamlining and coordination consistent with Charter for the Council of Regulators.
- P1.4 Implementation of pre-set conditions to approval requirements that support defined infrastructure development bottlenecks.
- P1.5 Identify and consolidate overlapping approval processes and strengthen collaboration between regulators, including local government authorities.
- P1.6 Categorisation of approvals based on level of complexity.
- P1.7 Time-bound and tracked approvals.
- P1.8 Continue to expand functionality under "Streamline WA" and related "Approvals WA" Initiatives and publish comprehensive flowcharts for approval pathways.









Policy and Regulatory Settings



Opportunity P1.1: "Lead Agency Framework" and "Significant Development Pathway" to consider capacity constraints and relative priorities against all projects to support an overarching delivery framework that efficiently streamlines approval pathways for the WTC

Context

For infrastructure development within the WTC, a better coordinated platform or process for approvals that minimises the need for multiple touch points across government agencies may support a more efficient regulatory framework and decision-making process.

Enabling Principles

- **Regulatory Certainty**
- Coordination and Precinct Leadership
- Collaborative Practices

Implementation Considerations

Benefits

- Integrates 'Streamline WA' with WTC/GAIH development objectives.
- Prioritisation supports WT/GAIH development objectives.
- Selection of facilitation frameworks for projects considers 'whole of state' development priorities balanced against resourcing and capacity.
- Projects assigned under Government prioritisation / facilitation programs are 'right-fit'.

Platforms or processes to streamline approval management needs to give consideration to relative priority and capacity within government agencies to support more efficient regulatory framework and decision-making process. Identify and simplify approval pathways that are common to a SIA/WTC.

Supportive actions taken by Government

- · Coordinator General role to better coordinate and fast-track priority approvals across government with responsibility to report to Cabinet on progress of major projects and opportunities for further regulatory reform.
- · Acceptance of recommendations made under the Vogel-McFerran Review into the environmental approvals process.
- Establishment of "Green Energy" assessment and facilitation teams in DWER and JTSI and advice coordination roles in DEMIRS, DPLH and DBCA.
- Part 11B Significant Development Pathway, operational on 1 March 2024 provides a tailored assessment option for complex and significant development.

Limitations / Challenges / Risks

- · Clearly established prioritisation criteria is required to minimise potential inefficiencies in overall approval prioritisation / facilitation processes and initiatives.
- · Define clear guidance and implement required training for each agency so as not to complicate the process further or impinge on future developments at the WTC, e.g., Westport.
- Upfront assessment of relative benefits of approval pathway selection required against project development requirements.













Opportunity P1.2: Approving agencies acting under their own mandate/ approval responsibility

Context

For infrastructure development within the WTC, a better coordinated platform or process for approvals that minimises the need for multiple touch points across government agencies may support a more efficient regulatory framework and decision-making process.

Enabling Principles

- Regulatory Certainty
- Collaborative Practices

Implementation Considerations

Benefits

- Integrates 'Streamline WA' with WTC/GAIH development objectives.
- Right sized resourcing to different approvals.
- Facilitates better resource management (manage capacity constraints) for agencies.

Scope

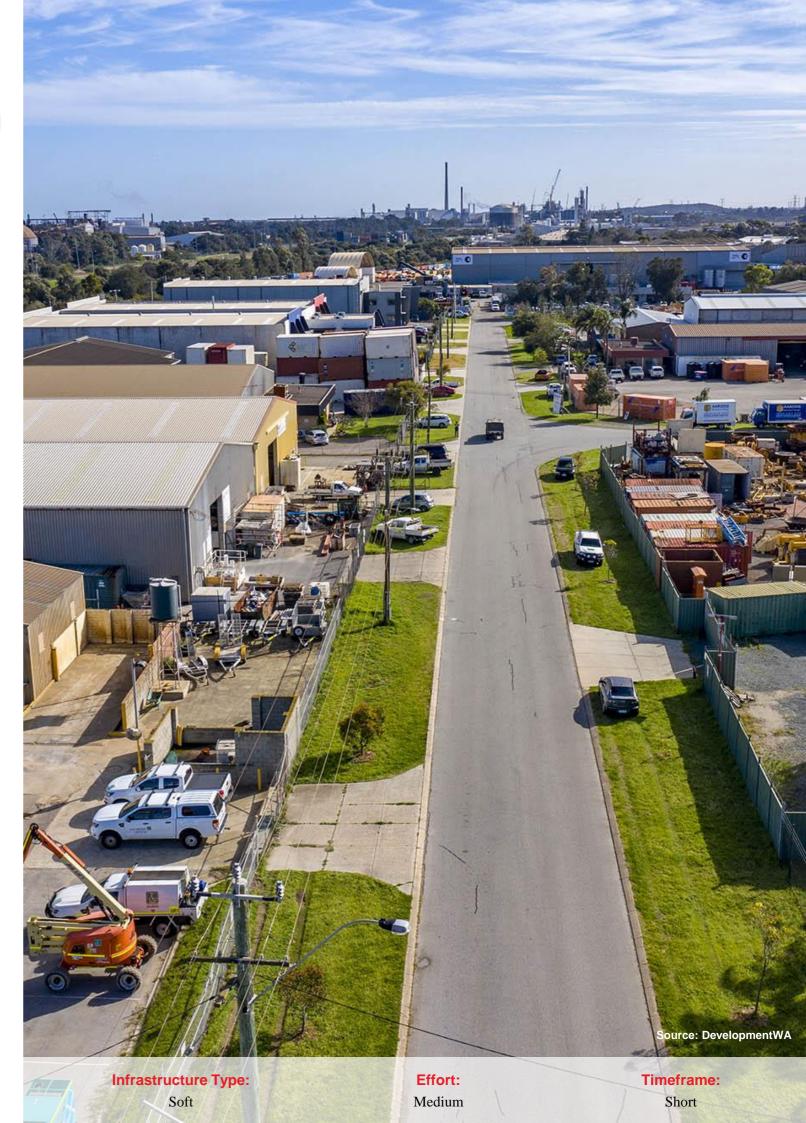
Remove / minimise the requirement for some approvals to be granted as a prerequisite to the giving of another approval. Facilitate expedited approval process by allowing e.g., primary approval requirements to be set as a conditions precedent to the provision of another approval. This will facilitate parallel approval processing.

Supportive actions taken by Government

- Coordinator General role to better coordinate and fasttrack priority approvals across government with responsibility to report to Cabinet on progress of major projects and opportunities for further regulatory reform.
- · Acceptance of recommendations made under the Vogel-McFerran Review into the environmental approvals process, in particular recommendation 27(a) concerning parallel approvals by DMAs.
- Establishment of "Green Energy" assessment and facilitation teams in DWER and JTSI and advice coordination roles in DEMIRS, DPLH and DBCA.

Limitations / Challenges / Risks

• DMA's need to consider how approvals that sit within a supply-chain, but not necessarily based within the WTC location boundaries are included in efficiency measures that recognise their importance to overall GAIH development priorities.









Policy and Regulatory Settings



Context

For infrastructure development within the WTC, a better coordinated platform or process for approvals that minimises the need for multiple touch points across government agencies may support a more efficient regulatory framework and decision-making process.

Enabling Principles

- Regulatory Certainty
- Coordination and Precinct Leadership
- Collaborative Practices

Implementation Considerations

Benefits

Integrates "Streamline WA" with WTC/GAIH development objectives, including "Right sized resourcing to different approvals" and "Facilitates better resource management (manage capacity constraints) for agencies."

Scope

Government regulators (including GTEs) undertake continuous improvement on approval streamlining and coordination, including development of agreed frameworks that commit approvers to infrastructure approval planning, decision timing and pathways for prioritised project delivery that delivers the infrastructure outcomes sought within the WTC.

Supportive actions taken by Government

- · Streamline WA; Charter for the Council of Regulators, including Approvals WA initiatives.
- Coordinator General role to better coordinate and fast-track priority approvals across government with responsibility to report to Cabinet on progress of major projects and opportunities for further regulatory reform.
- · Acceptance of recommendations made under the Vogel-McFerran Review into the environmental approvals process.
- Establishment of "Green Energy" assessment and facilitation teams in DWER and JTSI and advice coordination roles in DEMIRS, DPLH and DBCA.

- Define clear guidance and implement required training for each agency so as not to complicate the process
- DMA's need to consider how approvals that sit within a supply-chain, but not necessarily based within the WTC location boundaries, are included in efficiency measures that recognise their importance to overall GAIH development priorities.
- · Quality and substantiation of submissions from industry required to assist DMA decision-making.













Context

Implementation of pre-set conditions to approval requirements that support defined infrastructure development bottlenecks.

Specific example identified in stakeholder workshop -Approval processes for pipelines in an existing corridor must still follow detailed approvals process even though it's already an identified corridor. Process does not differentiate complexity of infrastructure proposals.

Enabling Principles

- Regulatory Certainty
- Coordination and Precinct Leadership
- Collaborative Practices

Scope

More efficient grant of pipeline licenses within defined pipeline corridors. Provide proponents with a comprehensive understanding of requirements and avoid unnecessary delays.

Note this links in with recommendations that fast-track and coordinate approvals related to SIAs.

Supportive actions taken by Government

- Coordinator General role to better coordinate and fast-track priority approvals across government with responsibility to report to Cabinet on progress of major projects and opportunities for further regulatory reform.
- · Acceptance of recommendations made under the Vogel-McFerran Review into the environmental approvals process.

Implementation Considerations

Benefits

- Focuses approval streamlining and priority setting to infrastructure constraints identified by WTC industry stakeholders.
- Can deliver other government sought outcomes, such as supporting submissions for infrastructure that provides common-user benefit.

- Detailed review and documentation of approval requirements needed, followed by agreed approval process.
- Ongoing current state analysis to ensure conditions are fit for purpose.
- · Need to account for rights and obligations that exist within legislation and as granted.
- Safety is a priority and co-location of infrastructure will require appropriate separation and complementarity of use.
- Any approach undertaken by responsible land planning agencies would be designed to consider and engage with existing stakeholders, e.g., Westport.







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Chapter 6



Policy and Regulatory Settings

Opportunity P1.5: Identify and consolidate overlapping approval processes and strengthen collaboration between regulators, including local government authorities

Context

This will support efficiencies and reduce the administrative burden on both proponents and regulators / decision makers consistent with Streamline WA objectives and initiatives to improve LGA planning schemes and policies to better support GAIH development.

Enabling Principles

- Regulatory Certainty
- Coordination and Precinct Leadership
- Collaborative Practices

Implementation Considerations

Benefits

- Removes regulatory burden and waste within industry and government caused by duplication.
- Increases regulator and industry productivity.
- Integrates "Streamline WA" with WTC/GAIH development objectives.
- Improves LGA coordination where overlapping boundaries exist.

Identify and consolidate overlapping approval processes and strengthen collaboration between regulators, including Local Government Authorities.

Supportive actions taken by Government

- · Streamline WA; Charter for the Council of Regulators, including Approvals WA initiatives.
- Public Consultation open on Mandogalup Improvement Scheme No.1.
- Coordinator General role to better coordinate and fast-track priority approvals across government with responsibility to report to Cabinet on progress of major projects and opportunities for further regulatory reform.
- Acceptance of recommendations made under the Vogel-McFerran Review into the environmental approvals process, particularly recommendation 16.
- DPLH initiated review of three LGAs to optimise planning standards and policies for consistent application across the WTC.

- Duplication needs to be well established, and agreement is needed between regulators on where administrative responsibility exists for the regulated outcome being sought if regulatory roles and/or processes are modified.
- Consideration to potential degradation of regulatory
- Need to manage LGA decision making role for major projects.











Policy and Regulatory Settings

Opportunity P1.6: Categorisation of approvals based on level of complexity

Context

This will support increased efficiency within the approvals process and ensure the correct resource is allocated to each case, resulting in higher quality and faster approval timelines.

Enabling Principles

- Regulatory Certainty
- Coordination and Precinct Leadership
- Collaborative Practices

Scope

Define a simple categorisation for approvals that distinguishes level of complexity and can generically apply to each agency. Classify an approval submission at the first 'gate' so that an appropriate resource can be assigned and it has a right-sized expected timeframe turnaround defined.

Supportive actions taken by Government

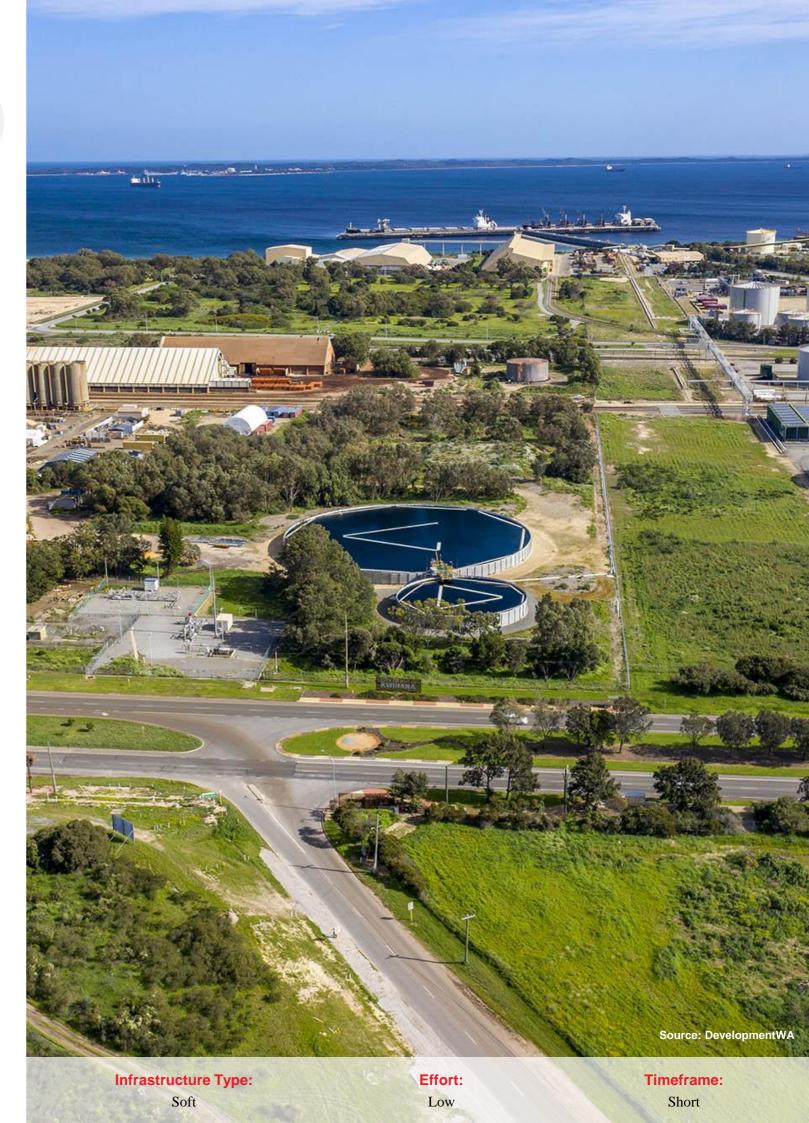
- Streamline WA; Charter for the Council of Regulators, including Approvals WA initiatives.
- Coordinator General role to better coordinate and fast-track priority approvals across government with responsibility to report to Cabinet on progress of major projects and opportunities for further regulatory reform.
- · Acceptance of recommendations made under the Vogel-McFerran Review into the environmental approvals process, particularly recommendations 15(a-c).

Implementation Considerations

Benefits

- Right-sized resourcing to different approvals.
- Facilitates better resource management (manage capacity constraints) for agencies.

- · Need to define clear guidance and implement required training for each agency so as not to complicate the process further'.
- Requires alignment with other approval prioritisation policies and initiatives, e.g., Lead Agency Framework and Green Energy Initiative.
- May remove any 'first through the gate' principles applied to approvals' submission.
- Any approach undertaken by responsible land planning agencies would be designed to consider and engage with existing stakeholders, e.g., Westport.









Policy and Regulatory Settings

Opportunity P1.7: Time-bound and tracked approvals

Context

Real-time tracking of submissions throughout the approval process across key government regulators and GTEs. Provide proponents with up-to-date information on the status of applications, reducing uncertainty and enabling better planning.

Note: WA Government announcement in December 2023 included allowing the Environment Minister to direct the Environment Protection Authority (EPA) to assess a project of State significance within a specified timeframe; as well as commitment by the WA Government to investigate options to streamline appeals processes including statutory timeframes.

Enabling Principles

- Regulatory Certainty
- Coordination and Precinct Leadership
- Collaborative Practices

Implementation Considerations

Benefits

- Supports government and industry planning and resourcing decisions. Facilitates better resource management (manage capacity constraints) for agencies.
- Prioritisation is given to approvals that support WTC development objectives. Prioritisation is geographically confined. Integrates and broadens 'Streamline WA' with WTC / GAIH development objectives.

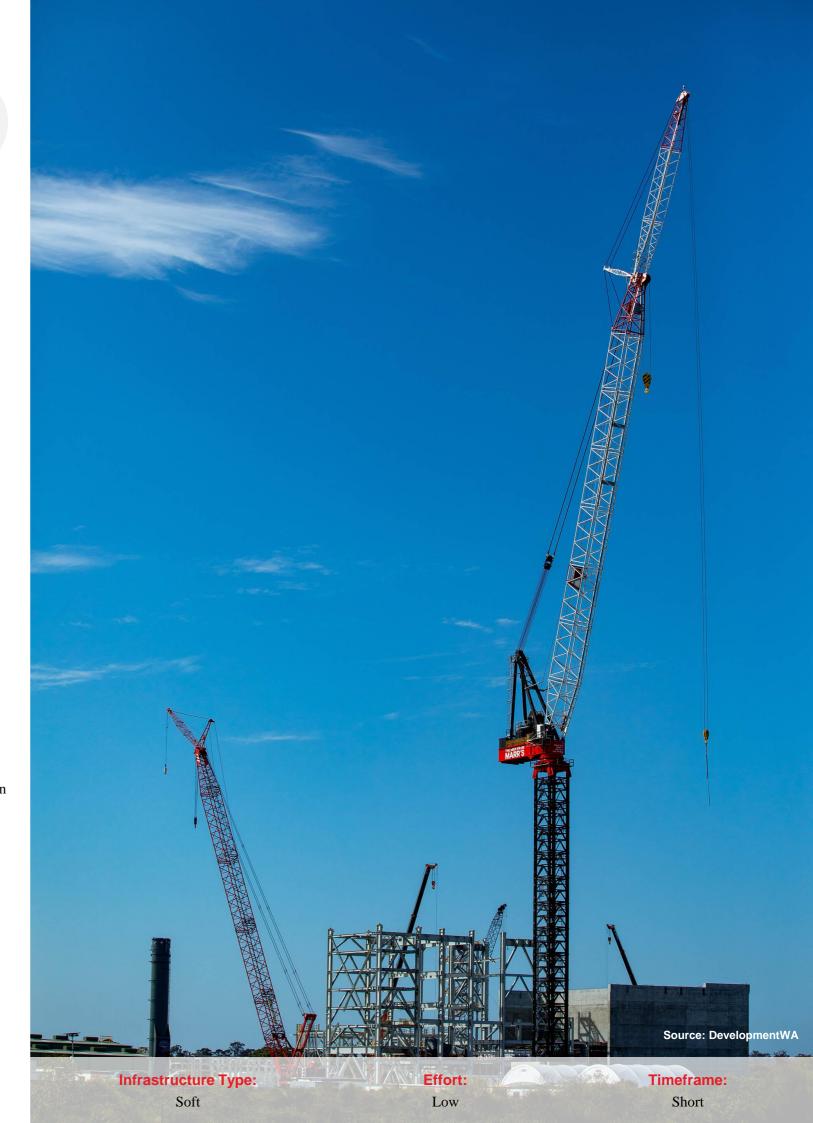
Scope

Time-bound approvals establish clear expectations on timeframes for approvals and can be monitored by both regulatory authorities and proponents. This supports a sense of urgency and accountability, ensuring that approvals are processed efficiently and without undue delays. This can be strengthened with the addition of KPIs

Supportive actions taken by Government

- Streamline WA; Charter for the Council of Regulators, including Approvals WA initiatives.
- Coordinator General role to better coordinate and fast-track priority approvals across government with responsibility to report to Cabinet on progress of major projects and opportunities for further regulatory reform.
- Acceptance of recommendations made under the Vogel-McFerran Review into the environmental approvals process, specifically recommendations 14(a) and (b).

- Potential variation to operating regulations / legislation to codify change.
- Potential regulatory burden to manage time-bound decisions with multiple stakeholder inputs to the approval process, that is not always within the control of the regulator.
- Clear submission guidelines and expectations are needed to inform submission preparation and content, to ensure submissions are of sufficient quality to enable proper assessment.











Policy and Regulatory Settings

Opportunity 1.8: Continue to expand functionality under "Streamline WA" and related "Approvals WA" Initiatives and publish comprehensive flowcharts for approval pathways

Context

This supports clarity and facilitates informed decisionmaking. Consider centralising portal information for 'infrastructure' approvals to improve information accessibility and understanding.

Enabling Principles

- Regulatory Certainty
- Coordination and Precinct Leadership
- Collaborative Practices

Implementation Considerations

Benefits

- Improved understanding of process and submission requirements.
- Better communication and expectation setting between industry, regulators, GTEs, and other relevant stakeholders.

Continue to expand functionality under 'Streamline WA' and related 'Approvals WA' initiatives and publish comprehensive flowcharts for approval pathways.

Supportive actions taken by Government

- Streamline WA; Charter for the Council of Regulators, including Approvals WA initiatives.
- Coordinator General role to better coordinate and fast-track priority approvals across government with responsibility to report to Cabinet on progress of major projects and opportunities for further regulatory reform.
- Part 11B Significant Development Pathway, operational on 1 March 2024 provides a tailored assessment option for complex and significant development.
- Establishment of "Green Energy" assessment and facilitation teams in DWER and JTSI and advice coordination roles in DEMIRS, DPLH and DBCA.

- Maintenance of up-to-date approval pathways needs to be reflected in flowcharts is a burden on resourcing.
- Upfront assessment of relative benefits of approval pathway selection required against project development requirements.











Implementation

7.1 Context

The options identified and described in the WTCIS represent a shortlist of possible government-led interventions that may be beneficial in addressing the constraints of the WTC and supporting the delivery of the GAIH's objectives.

7.2 Options List:

The Arup study has identified 12 strategies made up of 40 options which would all serve to deconstrain the region and meet the needs of the GAIH. All projects presented represent a shortlist of valid projects. These are considered priority projects because they:

- 1. Exhibit significant positive impact toward achieving the strategic objectives of the GAIH,
- Address constraints within the WTC,
- Have general stakeholder support,
- Demonstrate urgency through location on the indicative critical path,
- Demonstrate some kind of initial feasibility, eg be a plausible possible project, and
- Not be a project covered by government elsewhere (For clarity – if a project is in train with government it is defined as a parallel project (see definitions outlined in section 1.5).

7.3. Options Prioritisation

Each project is assigned a priority based on its impact to the WTCIS and scheduled interdependency against other options. The three priorities are as follows:

- Priority 1 | Critical Enablers: An option that is considered fundamental to achieving the aims of a particular strategy and/or a project that would need to be completed to allow other options to be deployed meaningfully.
- Priority 2 | Major Projects: A subsequent large-scale project that will significantly de-constrain the WTC.
- Priority 3 | Other Opportunities: A potential avenue for additional development, improvement or diversification that will deconstrain the WTC and facilitate the transformation into a GAIH.

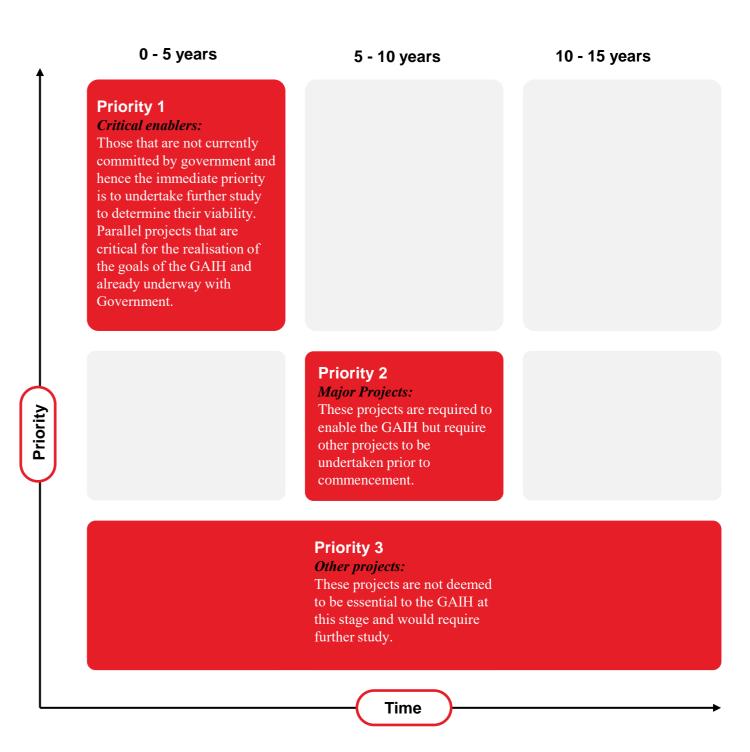


Figure 6-1: Options Categorisation by Priority and Time





Implementation plan

7.4 Prioritisation Summary

The following three tables provide a breakdown of each option according to priority group. Many of the critical enabler options (priority 1) have already been picked up as parallel projects through government. These projects are critical to the WTCIS and should be prioritised for short-term strategic planning.

Priority 2 options are largely a mix between parallel and WTCIS projects. These projects which are largely transport, maritime and water utilities projects would play a significant role in de-constraining the WTC although are dependent on the completion of priority 1 projects.

Priority 3 options comprise of "nice to have" transport, electricity and water utility projects, most of which are WTCIS derived options.

Table 6-1: Project / Initiative Prioritisation

Priority 1 | Critical Enablers

Type of project	ID	Project/Initiative	Organisation
Parallel Project	T1.1	Tranche of Rockingham Road Intersection Upgrades	Main Roads WA
Parallel Project	T1.2	Rowley Road Extension	Main Roads WA / DevelopmentWA
Parallel Project	T1.3	North-South District Distributor Road	DevelopmentWA / Main Roads WA
Parallel Project	T1.4	Anketell-Thomas Road Freight Corridor (ATRFC)	Westport / Main Roads WA
Parallel Project/	T3.1	Duplication of Main Line	Westport / PTA (between Cockburn Triangle and North of Anketell Road)
WTCIS Option		(Cockburn Triangle to Kwinana Triangle)	PTA (south of Westport rail spur through to Kwinana Triangle)
Parallel Project	T3.2	Alternative Kwinana Rail Loop Alignment	Department of Transport
WTCIS Option	T3.3	Install Passing Loops	Public Transport Authority
Parallel Project	M1.1	Westport Preferred Option	Westport
Parallel Project	M1.2	New KBT	Fremantle Ports Authority / Westport
Parallel Project	M1.3	KBJ Expansion	Fremantle Ports Authority
Parallel Project	U1.1	Tier 1 WP Upgrades	Western Power
Parallel Project	U1.2	Tier 2 WP Upgrades	Western Power
Parallel Project	U1.3	Tier 3 WP Upgrades	Western Power
Parallel Project	U3.1	SDOOL Expansion	Water Corporation
Parallel Project	U4.1	Expansion of KWRP (Tier 1)	Water Corporation
Parallel Project	U4.2	Expansion of KWRP (Tier 2)	Water Corporation
WTCIS Option	L1	Latitude 32 Activation	DevelopmentWA
WTCIS Option	L2.1	Safeguard Existing Corridors	GTEs and relevant service providers
WTCIS Option	L2.2	Seek Opportunities to Establish New Corridors	Varies
WTCIS Option	L3.1	Road and Utility Connection Between Precincts	Varies

Priority 2 | Major Projects

Type of project	ID	Project/Initiative	Organisation				
Parallel Project	T1.5	Grade-Separation of at-grade Rail Crossings (between Westport and the Cockburn Triangle)	Westport / Public Transport Authority				
WTCIS Option	T1.6	Install Active Transport Infrastructure	Varies				
WTCIS Option	T3.4	Improve Cockburn Triangle Configuration	Public Transport Authority				
Parallel Project	M1.4	AMC North Common User Facility	DevelopmentWA				
Parallel Project	M1.5	AMC South Expansion	DevelopmentWA				
WTCIS Option	M1.6	Strategy for Expansion of Material Offloading Capacity	Varies				
Parallel Project	U3.2	Extend WC Sewer Network Throughout WTC	Water Corporation				
WTCIS Option	U4.3	New Centralised Water Reclamation Plant	Water Corporation				
WTCIS Option	U4.4	Decentralised Treated Wastewater Reuse Scheme	Water Corporation				
WTCIS Option	U4.5	Common User Raw Seawater Supply Scheme	Water Corporation				
Parallel Project	U4.6	Managed Aquifer Recharge Infrastructure	Water Corporation				

Priority 3 | Other Opportunities

		-						
Type of project	ID	Project/Initiative	Organisation					
WTCIS Option		Develop an Integrated Public Transport Strategy	Public Transport Authority					
WTCIS Option	T2.1	Heavy Vehicle Staging Area	Main Roads WA / Department of Transport					
WTCIS Option	U1.4	Strategic Plan for Connecting New Tenants	Government					
WTCIS Option	U2.1	Common User Renewable Power Supply from Outside WTC	Varies					
WTCIS Option	U2.2	Installation of Industry BESS	Varies					
WTCIS Option	U2.3	Common User Hydrogen / Low Carbon Fuel Station	Varies					
WTCIS Option	U2.4	Joint Power Purchase Agreements	Varies					
WTCIS Option	U4.7	Review and Reallocate Groundwater Licences	Department of Water and Environmental Regulation					
Parallel Project	U4.8	Extend WC Potable Water Network within Latitude 32	Water Corporation					

Note: "Varies" denotes the involvement of multiple government agencies and/or GTEs







Next Steps

The WTCIS has been an initial step in considering infrastructure needs collectively for the entire area and within the context of transforming the WTC to a GAIH. Infrastructure measures have been developed to be synergistic and complement non-infrastructure measures. The strategies and options have been developed through extensive stakeholder engagement and are presented here with a level of endorsement enabling them to be further progressed understanding feasibility, benefits, costs, investment potential, risks and community feedback.

To date the WTCIS journey has been characterised by collaboration and discovery – a testament to the shared commitment of all stakeholders to realising the full potential of the WTC.

While the options and strategies presented here are an initial step, it is acknowledged that the status of the options and strategies vary with several projects listed on Government Infrastructure Priority Lists.

AMC Infrastructure Capacity was added to the Federal Government Infrastructure Priority list in February 2021 with a Stage 1 (early stage proposal) assessment completed and ascribed with a problem timeframe of 0 to 5 years. It was noted by IA that the "infrastructure capacity improvements for the AMC should be considered in relation to the other key areas and infrastructure demands within the WTC". This WTCIS has provided the broader context review of infrastructure needs, a level of prioritisation and high-level costings. To progress to Stage 2 of the Infrastructure Australia's Assessment Framework potential investment options need to be analysed to ultimately lead to a business case.

Perth Active Travel Improvements have also been identified on the Infrastructure Priority list (problem timeframe 0 to 5 years) which has been informed by the Department of Transport's Long Term Cycle network plan. The Department is working through prioritisation and implementation of network upgrades which include significant north-south and east-west primary routes classified as non-existing / inadequate through the WTC.

Westport (Perth container terminal capacity and land transport access) which encompasses wider marine, road and rail infrastructure upgrades within the WTC was added to the Infrastructure Priority List in 2023 (problem timeframe 0 to 5 years) and is being progressed through a full business case (Stage 3) for submission mid 2024.

The determination of the Westport business case in terms of whether the project is supported and funded or needs further work will be pivotal for understanding the rollout of infrastructure such as the rail duplication that unlock capacity and greater potential across the wider WTC.

Other infrastructure projects identified in the WTCIS are at their infancy and require greater definition of the problem, exploration of options and feasibility studies in order to progress to Stage 2 and ultimately full business case (investment ready proposal).

As the intricacies of each project are delved into over the next phase, it is important these remain mindful of the interconnected nature of infrastructure development and the ongoing identification and prioritisation of critical land and infrastructure corridors, alongside key stakeholders to ensure seamless integration.

While JTSI's immediate path forward will likely involve pinpointing specific projects for deeper exploration, it's important to recognize that the vision outlined in the WTCIS extends beyond individual projects.

It serves as an overarching masterplan—a blueprint for sustainable growth that addresses regional challenges and seizes emerging opportunities. This masterplan should serve as the guiding beacon for the region, steering its development accordingly. An appropriate policy, process and regulatory framework identified in this WTCIS needs to be established as a key step enabling agencies to work together to drive the strategies and options forward to meet the wider, shared needs of the WTC to transform to a GAIH rather than individual projects / proponents competing for resources and government funding. This collaborative approach is characterised by greater data sharing between agencies, using datasets that are a single source of truth (such as strategic transport network traffic forecasts) and avoiding stakeholder and community engagement fatigue, through consistent and easy to navigate public information on the status of the strategies and options.

The Next Steps Matrix on the following page serves as a tool to guide progress and create alignment with the overarching strategies proposed in the WTCIS. These actions set forth the "where to now" on this transformative journey – one where challenges become opportunities, and aspirations become reality driven by a shared determination to ensure the WTC shines brightly on the global stage.









Next Steps

			STRATEGIES ADDRESSED											
No.	ACTIONS	RESPONSIBLE PARTY	T1: Address Road Network Congestion	T2: Improve Heavy/ Oversize Vehicle Networks	T3: Increase Capacity and Efficiency of Rail Networks	M1: Increase Capacity, Resilience and Efficiency of Port Infrastructure	U1: Improve Electricity Availability	U2: Increase the Supply of Renewable Electricity and Fuels	U3: Improve Capacity of Wastewater Network	U4: Increase Availability of Water Supply Options	U4: Establish and Maintain Common User Services Corridors	L1: Activate Latitude 32	L2: Establish and Maintain Common User Services Corridor	L3: Optimise Land Usage
1.	Identify the specific projects for which feasibility studies are required.	Government	•	•	•	•	•	•	•	•	•	•		
2	For those projects identified in part 1 - develop a robust business case for the including feasibility analysis, cost-benefit assessment, and risk management.	Government	•	•	•	•	•	•	•	•	•	•		
3.	Assessment of priorities in line with other government proposals e.g., The WA Government will make an investment decision and determine next steps, including possible timing, after Westport's Business Case submission in mid-2024.	Government	•	•	•	•	•	•	•	•	•	•	•	•
4.	Conduct comprehensive feasibility studies to assess the viability of the projects considering factors such as interconnectedness, environmental impact and cost.	Government	•	•	•	•	•	•	•	•	•	•		
5.	Undertake detailed study to determine nature of infrastructure corridors and prioritise reservation of land corridors for utilities where most critical.	Government					•	•	•	•	•	•	•	•
6.	Initiate discussions and collaborations with utility providers to understand their needs and ensure alignment with the reserved land corridors.	Gov Land Planning Team, Utility Providers Liaison					•	•	•	•	•	•	•	•
7	Engage stakeholders and community members in the decision-making process, soliciting feedback and ensuring alignment with local needs and priorities.	Government	•	•	•	•	•	•	•	•	•	•	•	•
8	Evaluate potential funding sources and financing mechanisms to support the implementation of the preferred options, ensuring financial sustainability and feasibility.	Government	•	•	•	•	•	•	•	•	•	•	•	•
9.	Government to undertake detailed assessment of the transport challenges and projects required to de-constrain the WTC to be undertaken by delivery agencies.	Government	•	•	•	•	•	•	•	•	•	•	•	•
10.	Engage with Infrastructure WA and Infrastructure Australia on the status and progress of current projects on the Infrastructure Priority list and the approach to progressing other projects listed in the WTCIS to similar status.	Government	•	•	•	•	•	•	•	•	•	•	•	•
11.	Post review of the WTCIS consolidate all priority projects into a cohesive framework and outline a preliminary masterplan for the immediate future of the Region inc. clear timelines, ownership and funding.	Government	•	•	•	•	•	•	•	•	•	•	•	•
12.	Prioritize Aboriginal stakeholder involvement in infrastructure by co-creating an Aboriginal Participation (engagement) Strategy with relevant representatives, aiding in an informed decision-making processes.	Government	•	•	•	•	•	•	•	•	•	•	•	•





Credits

About Arup

Arup is the creative force at the heart of many of the world's most prominent projects in the built environment and across industry. Working in more than 140 counties, the firm's designers, engineers, architects, planners, consultants and technical specialists work with our clients on innovative projects of the highest quality and impact.

Contributors

Arup acknowledge the valuable contribution of PWC in informing and developing strategies for policy and regulatory frameworks within the WTC.

Arup also acknowledges the contribution of Urbis in the analysis and development of options to support the activation of the Latitude 32 precinct.

Arup appreciates the input from Turner and Townsend during initial feasibility and rough order of magnitude discussions.

About JTSI

The Department of Jobs, Tourism, Science and Innovation (JTSI) drives the creation of local jobs and a stronger, more diverse Western Australian economy. JTSI delivers initiatives on behalf of the WA Government that support the full spectrum of economic activity in WA, from large-scale mining and industrial operations, to innovate startups and small to medium businesses across the state. JTSI also promote the state nationally and internationally to increase trade and attract investment.

Contributing Stakeholders

- · Academic and thought leaders
- Importers and exporters
- Industry groups and associations (including freight and logistics, energy, commerce and industry, shipping, and ports sectors)
- · Industry and recreational users of Cockburn Sound
- · Investors
- Kwinana industry
- Local Governments
- Marine service providers
- Other ports (national and international)
- Quarantine services/Boarder Force
- Rail and IMT operators
- · Road transport operators
- State Government Agencies
- Shipping lines
- Stevedores and port operators
- Traditional Owners

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