

7.0 Integrated Transport Plan

7.1 Delivering Integrated Land Use and Transport Decision Making for Cockburn Coast

7.1.1 Introduction

The purpose of this section is to summarize the recommendations of the Integrated Transport Plan (ITP) for the Cockburn Coast development project. It also describes the process used to develop the recommendations. The ITP supports the preparation of Cockburn Coast DSP Part 2. The Cockburn Coast District Structure Plan (DSP) was endorsed by the Western Australian Planning Commission (WAPC) in August 2009. The DSP is a high level, strategic guiding document that recognized significant additional effort was needed with regards to transport serving Cockburn Coast.

This ITP reflects the outcome of a collaborative effort of a number of stakeholders. As such, the ITP:

- Incorporates the views of the many project stakeholders and takes account of relevant state and local government planning strategies impacting on the region
- Outlines timely and achievable outcomes to provide local and regional planning certainty
- Optimises the economic potential of the Cockburn Coast development to influence regional development and growth for integrated outcomes
- Contains sufficient road and public transport system capacity to accommodate shifts and increases in travel demand
- Balances the safety, efficiency and effectiveness of the local and regional transport network in a way that is appropriate and consistent with the approved DSP and transport network in a way that is appropriate and consistent with the approved DSP and
- Provides clarity and certainty for Precinct Based Planning to proceed.

7.2 Approach

The following steps were undertaken by the Project Transport Group to complete the ITP.

1. Scope
2. Framework
3. Issues and Givens
4. Principles and Measures
5. Land Use Integration
6. Tools, Scenarios and Score Card
7. Recommendations

Each step is discussed in greater detail.

7.2.1 Project Charter

The PTG jointly developed and agreed to a formal Project Charter that creates a collaborative framework for the development of an ITP that is supported

and endorsed by the key planning stakeholders. The partners to the Charter are the:

- Department of Planning (DoP)
- Department of Transport (DoT)
- City of Cockburn (CoC)
- City of Fremantle (CoF)
- Public Transport Authority (PTA)
- Main Roads Western Australia (MRWA) and
- LandCorp

7.2.2 Workshop Process

During the period of July 2010 to December 2010, the PTG conducted five half-day workshops to develop the ITP. The key aspect of each workshop is as follows.

7.2.2.1 Workshop No. 1

The initial workshop focused on the definition of project scoping and schedule as well as the PTG approach to working together (subsequently formally adopted in the PTG Charter).

The Framework Working Paper which explored alternative philosophies to the development of an ITP was also discussed. The paper explored emerging critical thinking and best practices for linking land use and transport decisions. It also considered illustrative case studies, such as Vauban, Germany for integrated transport and land use planning practices.

7.2.2.2 Workshop No. 2

The PTG discussed key principles and measures of success to support the ITP framework. Using seven themes for integrated transport planning, 17 principles and 32 measures of success were identified. Several of the principles and measures were unconventional as they aimed to improve integrated transport outcomes in comparison to typical transport studies. However, based on the DSP aspirations and the ITP scope and issues identified by the PTG, it was apparent that a new approach was required.

The principles and measures were intended to encourage the exploration of solutions that improve upon existing practices and standards. These solutions may be both improvements to the design of physical infrastructure as well as measures to manage the use and delivery of infrastructure.

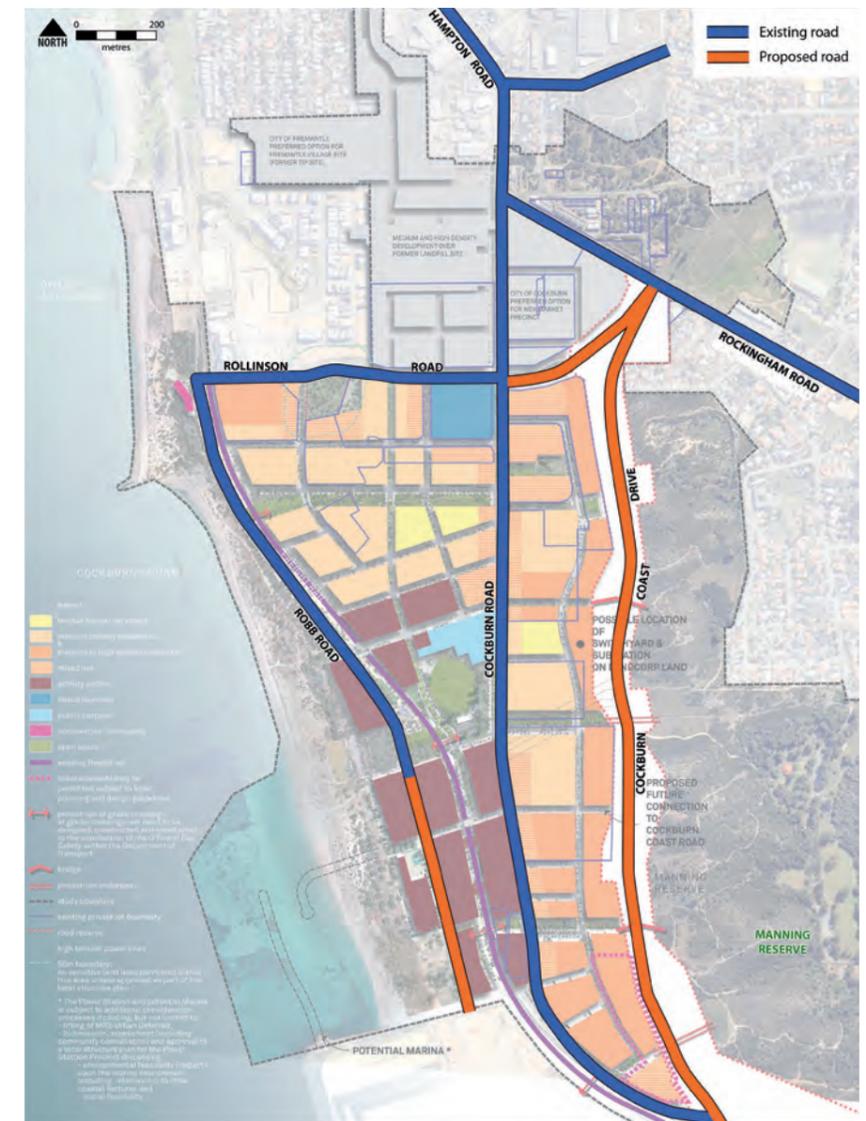


Figure 66_Key Road Network

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7.2.2.3 Workshop No. 3

The two alternative land use scenarios were discussed and the preferred scenario (i.e., coastal nodes) was confirmed with the PTG. This allowed for the integration of the ITP principles to be incorporated.

The potential types of actions or tools to attain the desired results (land uses, principles and measures of success) were identified.

In addition, the principles and measures were assigned maximum potential scores to assess the alternative integrated land use and transport scenarios developed in the next workshop.

Workshop No. 4

More specific detail regarding the potential tools (i.e., transport solutions) was determined. The tools were also bundled into two alternative scenarios for integrating land use and transport. The scenarios were developed jointly with the Project Transport Group (PTG) Workshop No. 4.

Additionally, the results of the Light Rail Transit (LRT) Indicative Patronage Forecast as well as a review of the potential role and benefits of LRT was presented and discussed.

7.2.2.4 Workshop No. 5

A scorecard of the alternatives was reviewed and a preferred set of tools was selected. The results of this workshop are presented as the recommendation in this ITP report.

Following completion of the workshop process, a draft version of this ITP was prepared and distributed to the PTG for review and comment. Responses to the comments were then prepared and provided in draft version to the PTG members that submitted such. Revisions were made to the responses as appropriate and those revisions have been incorporated into this final version of the ITP. Some of the comments requested information that will be provided in the next steps.

7.3 Framework

7.3.1 Integrated Land Use and Transport Decisions

The current trend in planning and governance is toward stronger integration of transport and land use with each other. In effect, the relationship between the two is a feedback loop as discussed below. The ITP builds on this co-dependency to improve upon conventional planning practices in Greater Perth.

Transport is derived from our need to undertake other tasks, such as travelling to our place of employment or education, operating a business, visiting family and friends, and shopping. In turn, land use planning influences where we travel as well as our travel distances, times and how we travel.

Strategic transport decisions not only play a critical role in managing land uses, they determine the impact of infrastructure on the environment and people, efficient movement of goods and our ability to meet changing needs due to economic or environmental conditions.

Conversely, land use planning can:

- Encourage land development in locations to reduce the need for motorized travel
- Improve freight access to terminals and protect significant national and state corridors
- Reduce the negative impact of freight transport on nearby land uses

Integration of land use and transport decisions can also help to provide a positive influence on shaping our cities and regions through:

- Improving travel time reliability, improving safety and managing congestion
- Reducing the required investment in infrastructure
- Reducing greenhouse gas emissions, improving air quality and reducing energy use

Land use planning that does not sufficiently consider wider transport and infrastructure impacts typically results in expanded and unnecessary investments. An approach that better balances development demand with infrastructure supply, and reflects an understanding of the implications of that supply, is more sustainable.

Successful integration requires a non-mode specific (mode neutral) integration system and strategic planning that cuts across the land use and infrastructure divide, as well as across specific modes of transport infrastructure.

The aim of this integrated approach is to find the most effective way to meet a broad range of community needs and objectives. It requires planning for a range of transport modes as well as changes to land use patterns and designs to make activities easier or more desirable to reach use. It also means using non-transport actions, such as telecommunications and

financial incentives, to attain desired outcomes. The result is a more sustainable form of development, better prioritisation and optimal investment for the future.

The framework for creating integrated decisions for land use and transport in the Cockburn Coast and with the surrounding region is presented below.

7.3.2 National Charter of Integrated Land Use and Transport Planning (2003)

The ITP for Cockburn Coast reflects the intent of the National Charter of Integrated Land Use and Transport Planning. The National Charter is a high level agreement between transport and planning Ministers committing to an agreed set of good planning practices and committing to working together to achieve better outcomes. The National Charter is designed to support existing and future planning mechanisms by providing a national commitment to a framework for responsive planning, consistent decision-making, and good design and management. All states, territories, and the Commonwealth Government have collaborated to develop this National Charter.

The National Charter notes that 'land use and transport planning has a key role to play in delivering social, economic, and environmental sustainability.' While it acknowledges that 'roads will continue to dominate as the means of movement for the majority of people and freight in Australia in the foreseeable future' it also finds that by shaping the pattern of development and influencing the location, scale, density, design, and mix of land uses, planning can help to facilitate an efficient transport and land use system by:

1. Reducing the need to travel
2. Reducing the length of journeys
3. Making it safer and easier for people to access services
4. Reducing the impact of transport on communities
5. Improving freight access to key terminals and improved freight flows
6. Providing for the efficient distribution of goods and services to business and community
7. Providing a choice of travel modes
8. Ensuring flexibility to meet the demands of a changing economy and market environments

The National Charter also concludes that 'planning of transport and land use must also be robust in the face of changes in technology, social conditions, values, resource constraints, and other key factors.' It is in light of the changes facing Western Australia, such as peak oil, climate change and evolving social values that the innovative planning practices for Cockburn Coast should be incorporated.

In addition, the Western Australia Parliament is currently considering the implementation policies of this charter as developed by the Australia Transport Council. These practices were considered in the development of the ITP for Cockburn Coast.

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7.3.3 Globally - Emerging Thinking

Current and emerging best practice clearly recognizes that land use and transport are inextricably linked as shown in the discussion of integrated land use and transport decision-making above. There are 10 key concepts emerging globally that were considered in the Cockburn Coast context, including:

1. Solve the right problem (not just congestion)
2. Select comprehensive measures of success
3. Recognize added capacity grows and induces traffic
4. Forecast growth realistically
5. Understand true economic benefits of added highway capacity
6. Acknowledge external costs of road way capacity and additional traffic
7. Compare roadway expansion with other transportation improvement options
8. Prioritise smart growth
9. Promote the trip not taken
10. Use transit to catalyse TODs



Seattle's South Lake Union Streetcar has real estate development success over the last eight years in spite of the recession: \$2.4 billion in investment within three blocks of the line, amounting to 2,500 housing units and 12,500 jobs (South Lake Union Investment Analysis, City of Seattle Department of Transportation 2009).

7.4 Issues and Givens

7.4.1 Issues

The following issues were raised in PTG and were used to frame the givens, principles and measures.

1. The ITP must be provocative and thought provoking (parking strategies, lane usage, dedicated facilities) and go beyond best practice.
2. The Cockburn Coast Vision identifies the current transport solution in the DSP as a start point for discussion.
3. The ITP will identify and propose a preferred transport network solution for Cockburn Coast Drive based upon the contribution this project makes to the regional issues. The DoP will undertake the more detailed work to address the regional transport issues.
4. The ITP must be a "Plan" not a study.
5. The ITP will provide direction with regard to public transport annual recurrent running costs.
6. The development of an ITP is a great start but we need a commitment from government to invest in the resultant outcomes.
7. There will be land take implications with the resultant solutions. Rockingham Road and Cockburn Road with bus lanes, cycling, verge, turning pockets and other provisions will not fit within the existing 20m road reserve.
8. East west connectivity is another matter to be resolved and potentially through the Roe Highway road reserve.
9. The study area is a regional link and must be considered in the regional context as shown in the Structure Plan.
10. Funding of Cockburn Coast Drive is not included within Main Roads forward estimates and funding needs to be considered if it is to be brought forward.
11. Developer Contribution deliberations will be contentious and need good Council involvement. Councils would need to see the ability of LandCorp to fund the de-risking of the land.
12. Identify and resolve key bus routes and other link functionality to address MRWA concerns.
13. The ITP should clarify how the transport solution will work from the beginning. What is the total solution – bus, light rail, heavy rail, interface management, etc?
14. Safety is a key consideration and a "safe and flexible" solution is needed. Funding will be an issue to achieve the transport solutions sought. Flexibility is needed because the jobs won't be there from day one and the public transport will probably develop over time provided the space is reserved for this purpose.
15. Port operations and freight role needs to be confirmed for the future with increases in the freight rail usage likely. Increases in port container TEU's will see major freight rail increases possibly beyond the 30% targets.
16. City of Fremantle's Strategic Plan promotes regional goals and focusing on revitalisation and commercial/residential activity.

17. Main Roads is not supportive of the MRS Amendment as proposed north of Rollinson Road and is consistent with the recent DoP network study. There is no final recommendation to provide the link as such; Main Roads proposes that Cockburn Coast Drive link to Hampton Road may be appropriate but a more detailed network study is needed to consider it.
18. Traffic solutions are needed for movement through, to and around the Cockburn Coast development as a destination in its own right especially around the Power Station as a regional icon.
19. Some long standing issues have not been resolved in the DSP (eg, turning capacity at intersection of Rockingham Road and Cockburn Coast Drive)
20. Need to determine the potential need to construct Cockburn Coast Drive prior to making the transitional land uses along Cockburn Road to separate regional movements from Cockburn Road with space constraints at Rockingham Cockburn intersection.
21. May not be able to act upon all opportunities to reduce or grade separate existing rail crossings.
22. If the resultant plan is dependent upon the construction of Cockburn Coast Drive it may jeopardise the whole project if there isn't supporting political will or associated funding provision.
23. Satisfying transport needs from inception if a high level of public transport is not available at project initiation. What is the staged solution over time and what does it do for travel patterns and behaviours?

7.4.2 Givens

Based on the PTG's agreed study scope, the ITP Framework, related studies and plans (See Appendix B) and the issues above, the following 'givens' were identified.

1. In addition to the earlier focus on regional mobility, the ITP will emphasize local accessibility.
2. The priority focus will be on local travel and connections to major regional activities.
3. Congestion is an acceptable tool for promoting travel behaviour change.
4. The congestion cycle cannot be resolved due to generated and induced demand.
5. Cockburn Coast will be the first step towards change and will not rely on a 'predict demand and provide capacity' approach.
6. The ITP will support what is reasonable on a local needs and opportunities basis.
7. Safety starts with protection of the pedestrian and cyclists.
8. Alternative transport will be given a travel cost advantage where feasible.
9. The Cockburn Coast is not entirely responsible for regional transport needs but will work with the Department of Transport (DoT) to resolve regional road network planning provisions.
10. Solving the missing links for cars cannot have unacceptable impacts on Cockburn Coast and Fremantle and the overall Perth regional infill strategy.
11. The freight rail line will not be used for LRT.

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12. The number of at grade crossings of the freight rail is limited to the number in the current DSP.
 13. The nexus between the supply, location and price of parking and the amount of driving will be used to manage travel.
 14. Parking has a major role in managing demand for private motor vehicle travel and financing alternative travel.
 15. Given increase competition for limited infrastructure dollars, the project will seek to generate new transportation infrastructure revenues.
 16. The ITP will:
 - Move people and goods not motor vehicles
 - Support development of a transit oriented community
 - Forecast growth realistically
 - Minimize generated and induced demand
 - Cannot wait for resolution of regional mobility issues
 - Use comprehensive measures of success and
 - Assess whether if for a relatively small reduction in system performance for peak hour drivers, a system that is much better for all modes throughout the day can be developed.
 17. The DSP target of 60 percent of dwellings within 800 metres of public transport should be replaced with a target of 100 percent.
 18. The resultant ITP and precinct plans must be generally in accordance with the intent of the DSP.
 19. There may be given arising from previous local government resolutions and needs to be confirmed through the Cockburn Coast Steering Committee.
 20. The DSP must meet the requirements for the lifting of the area's urban deferred land use planning status.

7.5 Principles and Measures

The principles determined by the PTG are presented below and organized by themes set forth in the 1995 Metropolitan Transport Strategy. The theme of health was added by the PTG to the Safety theme to reflect the growing recognition of the relation between active transport and public health.

Each theme is presented with associated principles and measures which were used in the assessment of prospective tools.

7.5.1 Safety and Health

1. Prioritise pedestrian movement, safety and security.
 - Percent of streets with pedestrian controlled design speeds
 - Pedestrian safety and security -based on quality of pedestrian environment and Crime Prevention Through Environmental Design principles
2. Improve public health.
 - Increase in percent mode share for active transport
3. Provide for safety of all road users in a mixed transport environment.
 - Overall average design speed

7.5.2 Environment

1. Reduce greenhouse gas emissions.
 - Greenhouse gas emissions per resident
 - Private motor vehicle kilometre travelled (VKT)
 - Percent participation in car sharing, non-car ownership contracts, parking management program or other program innovations which contribute to green house gas reductions
2. Recognize that space is required for multi-modal solutions but seek to minimize physical footprint of transport infrastructure.
 - Land area used for roads and parking
 - Number of car parking bays per capita
 - Number of links to and from key regional destinations

7.5.3 Social

1. Promote public transport, walking and cycling over private vehicle usage.
 - Number of private motor vehicle trips per capita for journey to work (compared over time)
 - Number of private motor vehicle trips per capita for households (compared over time)
2. Reduce the amount time a resident will spend driving by decreasing number and length of trips.
 - Private motor vehicle hours per capita
 - Level of land use diversity and amenity
3. Provide high level of equitable access and choices for all.
 - Number of key destinations directly accessible by public transport, walking and cycling.

7.5.4 Economy

1. Improve access to jobs and other regional economic activities.
 - Residential density and employment around transit nodes
 - Percent of area within 10 minute walking distance to high quality public transport (eg 800 metre catchment)
 - Percent of area served by various transit frequencies
2. Maximize land use efficiency while optimising the associated investment and recurrent costs.
 - Area dedicated for transport usage

7.5.5 Efficiency

1. Shift emphasis to improving movement of people rather than movement of vehicles.
 - Travel distance and time by mode
 - Car share take up rate
2. Allow congestion to promote mode choice while minimizing impacts on local road network.
 - Decrease in number of intersections exceeding capacity
 - Decrease in intersection delay

7.5.6 Effectiveness

1. Attract riders choosing to use the public transport network.
 - Ratio of patronage on public transport to private motor vehicle trips
 - Suitability of the public transport options to serve regional destinations
2. Decrease motorized private vehicle use
 - Private motorized vehicle mode share
 - Impact of on and off street parking controls
 - Number of private motorized vehicle trips to and from the area
3. Prioritise access provisions to align with precinct priorities (e.g. parking uses and types).
 - Consistency with the precinct planning priorities for all modes of transport

7.5.7 Robustness

1. Build in flexibility to meet changing needs and promote mode and route choice.
 - Intersection density per square kilometre
2. Use public transport to catalyse infill development.
 - Magnitude of development (number of residents, percent attached dwellings and number of jobs)

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7.6 Land Use

A preferred land use concept was developed by HASSELL, LandCorp, other property owners and key stakeholders (including the PTG) concurrently with the preparation of the ITP. The development of the preferred concept used the aspirations of the DSP as a starting point and considered two alternative land use scenarios to achieve the DSP's objectives.

One land use concept retained the highest concentration and mix of uses along Cockburn Road as presented in the DSP. The alternative, and preferred concept, shifted these core areas westward towards the coast. This concept is presented in Figure 65.

The 'coastal nodes' concept was selected to take advantage of proximity to the coast for scenic views and physical access to the foreshore. It also allowed for the first stage of development, which would occur on land owned predominantly by LandCorp, to create a high quality main street.

From a transport perspective, the coastal nodes offered a significant benefit. By relocating the main street activities to other streets, it created more flexibility for the future of Cockburn Road as an interim through route for regional traffic. While ultimately Cockburn Coast Drive will take on this function; completion of Cockburn Coast Drive is unfunded and its construction date is uncertain. Without the pressure of transforming this roadway from its current function, conflicts between competing roles can be minimized. This is particularly important given the significance of the Cockburn Road as a point of access for freight movement for the existing businesses within the study area.

The preferred land use concept also gave strong consideration to the ITP principles, measures and tools. For example, care was taken to ensure that block face lengths were minimal, while respecting existing property boundary lines, to create more walkable travel routes.

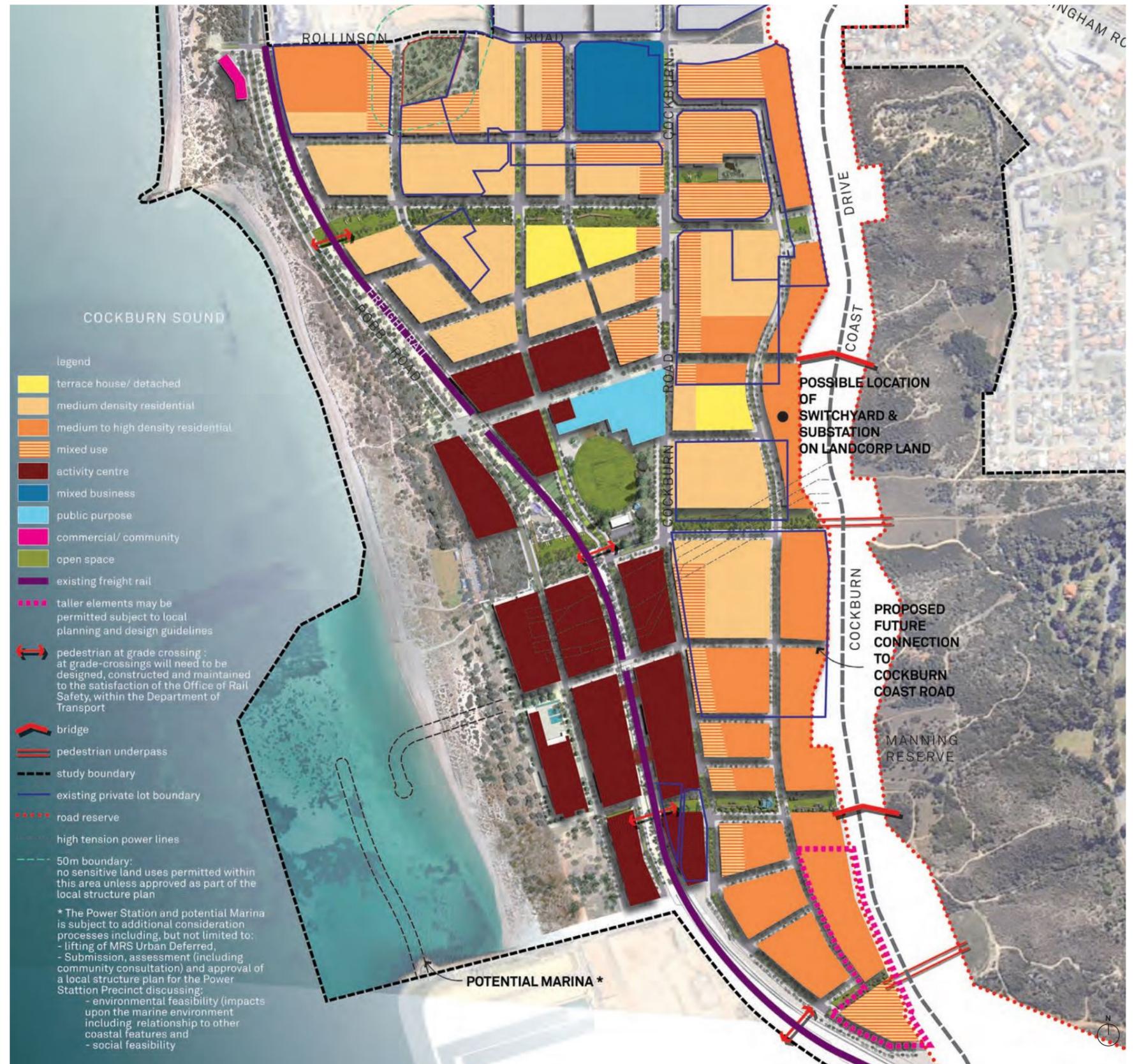


Figure 67_Preferred Land Use Concept

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7.7 Tools, Scenarios and Score Card

7.7.1 Tools

A comprehensive list of potential tools for improving transport outcomes and delivering an appropriate Integrated Transport Plan was considered by the PTG for application in the Cockburn Coast project.

A summary of the key tools follows.

7.7.2 Foot Power

- Pedestrian priority at intersection crossings
- Highly textured pavement material
- Share zones
- Car free or parking restricted areas
- Permeable walking and cycling network, with visual and physical connectivity to other streets and places
- Generous pedestrian crossing provisions
- Pedestrian friendly urban design principles (e.g., maximum block face lengths)



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7.7.3 Security

- Selective choice of location and type of plantings
- Adequate lighting provisions
- Avoid creation of tunnels, underpasses, overpasses
- Create an 'open' environment
- Creation of clear visual links between streets + places
- Sensitive choice of street furniture



7.7.4 Pedal Power

- Bike share program
- Higher minimum bike storage and locker facility requirements for commercial uses
- Bike friendly intersection designs
- Bike boulevard grids
- Bike boulevard grids
- Cycle-tracks (European style bike facilities)



7.7.5 Public Transport

- High quality public transport services and closely spaced stops (e.g., 900 series bus service with 15 minute peak hour frequency and dedicated bus lanes)
- Design and operate public transport for maximum mode share (e.g., higher frequency)
- Dedicated running ways in congested corridors
- Services and running ways penetrate key travel markets
- Introduce light rail (or interim bus rapid transit) prior to development
- Link public transport to connect with regional network
- Use mobile phone real time transit tracking applications for public transport



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7.7.6 Parking

- Limit off-street parking
- High turnover parking spaces to minimise all day parking
- Set parking fees at a premium
- Sell parking separate from units
- Apply reduced parking provisions at shopping destinations
- Use maximum parking ratios
- Community pool of SMART cars
- Car-sharing
- Wayfinding system - possibly supported by technology



7.7.7 Private Motor Vehicles

- Utilize grid network with short block lengths (e.g. 100 m in town centres)
- Manage design speed
- Set signalised intersection phasing for optimal performance levels
- Channelise traffic flows
- Set targets for ratios of public /private vehicle trips
- Remove capacity to suppress demand
- Conservative maximum spacing for traffic control devices



7.7.8 Travel Management

- Maximize person-flow on roadways
- Limit provisions/capacity for motorised transport
- Allow congestion
- Cluster common destinations and locate within walkable distances from residences
- Encourage mixed modal use of the road space
- Multi-modal road hierarchy
- Increase number of intersections linking surrounding road network
- Allowing side friction on roads



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7.7.9 Scenarios and Score Card

Two scenarios were developed by the PTG as part of the ITP process for applying the potential transport management tools to the Cockburn Coast development. For each tool, the scenarios illustrated practices that would be 'Better than Business as Usual' and 'Notably Better than Business as Usual' in the Greater Perth context.

The scenarios were developed initially for each tool individually. However, effort was made to integrate each of the tools with the others to ascertain the overall picture for each scenario.

The two scenarios were assigned a relative score. The intent was not to compare the scenarios with one another. Instead, the aim was to allow the PTG to assess the cumulative impact of their decisions regarding individual tools compared to conventional practices in Greater Perth.

7.7.10 Scoring Basis

Scoring is based on the comparison of each scenario against the other relative to the potential full scale application of the tool. Therefore, the maximum score was only achieved in circumstances where global best practice is theoretically attained. In other instances, additional application or enhancements to a tool could help to improve its score (i.e. there is room for improvement). The scoring does not reflect the relative costs of the tools which will be subject to more detailed investigation in the next phase of the project.

7.7.11 CCAP Precinct Assessment and Design Tool

In order to quantify some of the measures for the Cockburn Coast, an analysis was undertaken using Kinesis' CCAP Precinct Assessment and Design Tool. The assessment was conducted based on the preferred land use Concept Plan and provided quantitative analyses of five of the measures of success for the ITP Scorecard including:

- Greenhouse gas emissions
- Vehicle kilometres travelled
- Private motor vehicles hours per capita
- Walk Score
- Car share uptake potential

The CCAP Precinct analyses the sustainability performance of new development projects. The tool establishes a common language and methodology to measure and quantify the sustainability of a precinct using available data and comprehensive mathematical calculations across energy, transport, water, embodied emissions and household affordability.

In general, the transport assessment focuses on residential related transport associated with Cockburn Coast. The assessment factors are based on key spatial land use and socio-demographic variables such as land use mix, housing density, local employment, distance to regional centre(s), walk and wait time to nearest public transport and household vehicle ownership.

For context, transport related greenhouse gas emissions contribute approximately 60% of Cockburn Coast resident's potential greenhouse gas emissions. Due to the scale of the development and the local land use mix and employment provided in the Concept Plan, private vehicle use can be expected to be slightly lower than the Perth metropolitan average.

The primary variation between the scenarios is due to the mode and frequency of the local public transport service. The light rail option can be expected to allow lower car parking rates which can be achieved through the provision of car share. Car share refers to vehicle rental services intended to substitute for private vehicle ownership. Car share makes occasional use of a vehicle more affordable, even for low-income households, while providing an incentive to minimise driving and rely on alternative travel options as much as possible. Car share is currently not active in Perth. Such a scheme, if viable in Cockburn Coast, may provide leverage to reduce private parking in residential buildings. The analysis predicts that, if implemented, approximately 12% of the development's residents would be expected to join a car share scheme.

7.7.12 Scenario Scores

The cumulative score for the two alternative scenarios is provided below. Although not shown in Table 10 below, it is assumed that "business as usual (BAU)" would have reference score of zero.

Maximum Potential Score	Slightly Better than BAU Scenario	Notably Better than BAU Scenario
100.0	47.5	76.1

Table 10 – Total Scores

Table 11 below and right, provides the potential maximum scoring and scoring for individual tools within each scenario.

Tool	Maximum Score	Slightly Better	Notably Better
Greenhouse gas emissions	14.0	3.5	10.0
Private motor vehicles hours per capita	14.0	7.0	10.0
Number of intersections linking to network	4.0	0.5	0.5
Maximum block face lengths	4.0	4.0	4.0
Timing of PT installation	4.0	2.5	4.0
Separate sale of parking	4.0	2.5	3.0
Vehicle kilometres travelled	3.5	2.0	2.5

Table 11 – Score Chart

Tool continued	Maximum Score	Slightly Better	Notably Better
Private motor vehicle trips per capita	3.5	2.0	3.0
Transit alignment via core	3.5	2.5	3.5
High quality public transport	3.5	1.0	3.0
Walk Score	3.0	2.5	2.5
Dedicated running way (entirety)	3.0	2.0	1.0
Mode share targets	3.0	2.0	3.0
Pedestrian crossings	3.0	1.5	2.0
Limit design speed	2.5	1.5	2.5
Pedestrian priority	2.0	1.0	1.5
Car share potential	2.0	0.0	1.5
Real time tracking of PT	2.0	1.5	2.0
PT access to regional destinations	2.0	1.5	1.0
Operate PT for maximum mode share	2.0	0.5	1.0
Remove intersection capacity	1.5	0.0	0.5
Side friction	1.5	0.5	1.0
Bike friendly intersections and grid	1.0	0.5	0.9
Intersection phasing for AT and PT	1.0	0.5	1.0
Permeable network	1.0	0.5	1.0
Bike hire scheme	1.0	0.5	0.9
Bike storage, etc	1.0	0.5	1.0
Person flow on roadways	1.0	0.5	1.0
Dedicated running ways (in congestion)	1.0	1.0	0.5
Pavement to Parkland	1.0	0.0	1.0
Minimize parking	1.0	0.5	1.0
High turnover parking	1.0	0.5	1.0
Parking restrict areas	1.0	0.5	0.7
Parking fare premium	1.0	0.5	1.0
Shared Zones	0.5	0.0	0.5
Allow congestion	0.5	0.0	0.4
Maximum signal spacing	0.5	0.3	0.5
Mixed modal use of roads	0.5	1.0	0.4
Textured pavement	0.5	1.0	0.4
TOTAL SCORE	100	47.5	76.1

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7.8 Recommendations

The following actions are recommended by the PTG to support the principles and measures of success.

7.8.1 Foot Power

The ITP aims to make the most out of walking. Recommended features include:

- Grid street network layout (with relatively short block faces (eg 100m-125m), proportional building heights to street widths, and minimal building setbacks from foot paths)
- Lower overall design speed
- Pedestrian priority at street crossings
- Shared streets in key high activity zones (e.g., Main Street)
- Double sided foot paths entire street network
- East-west greenways linking the coast and Manning Reserve
- Coastal greenway connecting the existing Principal Shared Pathway (PSP) network to the north and south of Cockburn Coast

The ITP calls for the creation of a permeable walking and cycling network, with connectivity to other streets and places (especially visual). It is envisioned that the on and off-road network will celebrate fantastic amenities and features, present visual contact to the coast, provide invitations to play along the way, instil a sense of comfort and security and signal that Cockburn Coast is a very different place from conventional development in Western Australia.

7.8.2 Posted Speed

Streets should be designed to promote slower than conventional vehicular travel speeds throughout the Cockburn Coast. Excepting Cockburn Coast Drive and Cockburn Road, design speeds should not exceed a 30 kilometre per hour threshold. This is the point at which the severity of impact of motor vehicles on pedestrians and cyclist, as well as the resultant level of fatalities, diminishes significantly.

It is further recommended that the shared zones for the two Main Streets, two residential areas and along east west greenways be given consideration for a 10 km/hr design speed.

The recommended design speed for Cockburn Coast Drive is 70 km/hr and Cockburn Road is to be 50 km/hr (excepting the school zone on to be 30 km/hr during school times).

An issue remains with regard to the preferred design speed for the transit spine along the north south Douro Road Connector. The DoT has expressed a preference to operate buses at a speed in excess of 30 km/hr and this will need resolution in the next steps. The premise is that long haul bus routes, such as that connecting Rockingham and Fremantle, will be unnecessarily impeded by slowing within the Cockburn Coast development.

The potential desirable posted speeds for the streets within Cockburn Coast are shown on Figure 66. Generally, 40km/hr is the lowest area speed zone that has been adopted in Metropolitan Perth. In addition, 10km/hr speed zones have been used in isolation, but this would be the first network of shared and pedestrian priority streets in the area.

7.8.2.1 Give Way Streets

The ability to control vehicular speed is enhanced through the use of narrow street sections with parking allowed intermittently on one side. This layout requires on coming vehicles to slow and yield to one another as illustrated in the local streets section in Figure 68.

7.8.2.2 Textured Pavement

The design speeds are to be supported by the use of textured pavement and flush mounted streets extensively throughout the Cockburn Coast locations (e.g., Main Streets, local streets on approaches to pedestrian crossing points, raised tables, shared streets). Provision will also be made for cycling friendly surfaces within the textured pavement.

7.8.2.3 Side Friction

It is the intent of the ITP to promote side friction on all streets other than Cockburn Coast Drive to reduce effective design speed such as through the use of street furniture, landscaping, on-street parking (at selected locations), alternative surface markings for bicycle lanes and bus stops. Narrow street sections, as shown in Figures 54 and 62 further below and extensive use of shared streets/zones will help to increase side friction.

7.8.2.4 Next Steps – Posted Speed

In addition to the fact that the ITP recommends the first network of pedestrian priority streets in greater Perth, issues related to the recommended posted speeds for specific streets will need further study and resolution, including the Douro Road Connector, Rollinson Road and Cockburn Road. Main Roads is responsible for determining speed zones and more analysis will be required to address concerns. However, the intent of the ITP is to establish key aspirations and provide early collaboration so that approving agencies understand and can 'buy in' on the recommendations.

The impact of the recommended design speed along the preferred alignment for the transit spine (see Figure 68) will need to be determined. From an operational perspective, public transport links need to be higher than 30km/hr may be better suited to improve regional journey time. Alternatively, while inconsistent with the recommendation of the PTG that the LRT and bus service be co-located on the same street, regional bus service may be better served along Cockburn Road. The impact of the travel speeds on patronage should be a key determinant when making a speed zoning decision.

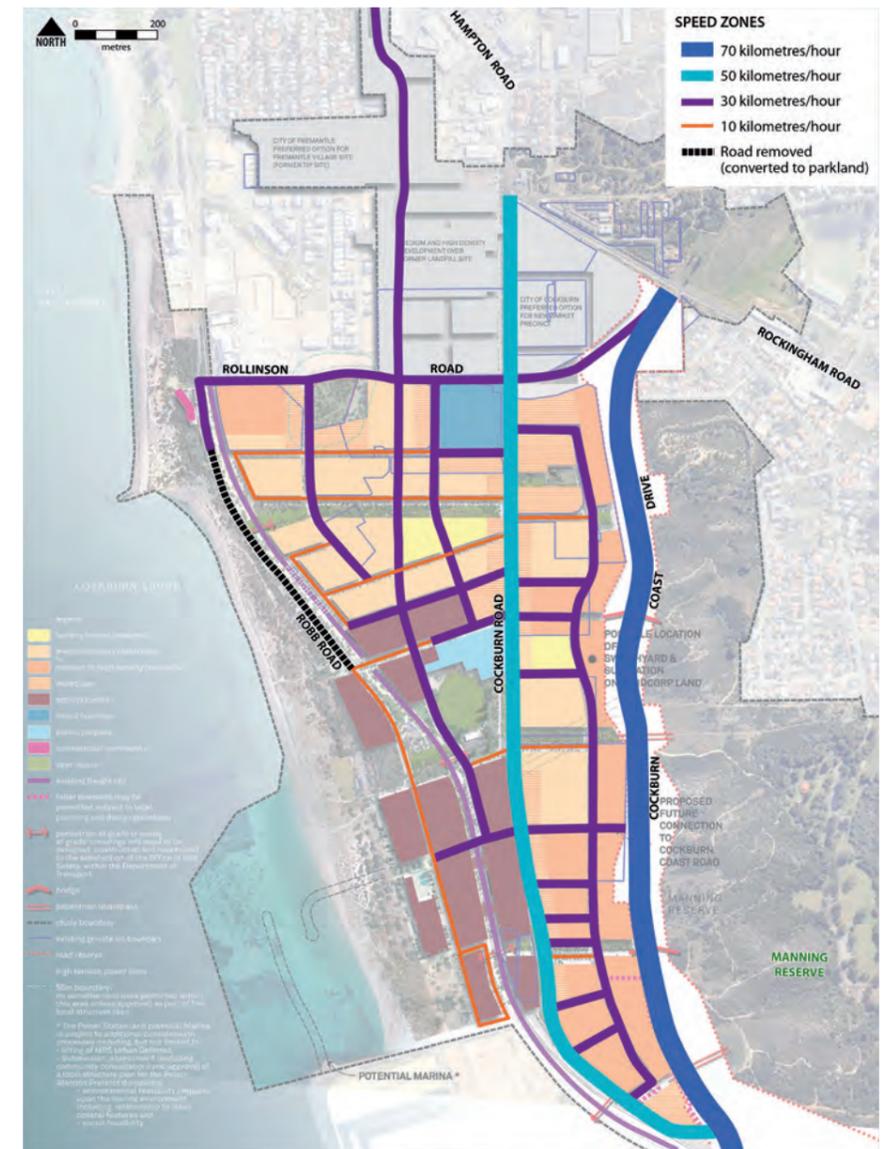


Figure 68 – Recommended potential design speeds for improving pedestrian safety

Main Roads has also indicated that the length of the Douro Road connector and Rollinson Road are 'quite long' and the recommended is 30 km/hr doubtful. Consideration should be given to determining if portions of the roadways are suitable for pedestrian priority speed zoning.

Main Roads has noted that if the intent is for the existing Cockburn Road to remain under their control until Cockburn Coast Drive is constructed, the existing posted speed should be retained. They are further of an opinion that existing posted speed would remain subsequent to construction of Cockburn Coast Drive.

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7.8.3 Pedestrian Priority

As important as the features above, the ITP recommends that priority be given to pedestrian at key street crossings and in the overall design speed of streets. There are relatively few areas, such as Queen Street in Fremantle, in Greater Perth where priority is given to pedestrians.

Cockburn Road will have the highest vehicular traffic volumes within the Cockburn Coast development. As such, it has the potential to segregate the neighbourhoods to its east and west side from each other for pedestrians and cyclists. The emphasis along this corridor will be for vehicular traffic to yield to pedestrians crossing Cockburn Road. Due to the integrated nature of the ITP recommendations, the concept for Cockburn Road is not dependent on the provision of Cockburn Coast Drive.

The aim of shifting priority to pedestrians and cyclists is to encourage desired behaviours and outcomes expressed in the principles and measures of success. The additional benefit of these measures will also be to suppress the growth in vehicular travel by removing capacity from the road network.

Overall, six traffic signals and one zebra crossing are to be located along Cockburn Road. Locations of the devices are shown in Figure 67. The locations of these crossings complement the pedestrian and cycling greenways that facilitate east west movement between the coast and Manning Reserve to the east. These vegetated reserves also provide an alternative to on-street travel for pedestrians and cyclists. Three pedestrian activated crossings for the southern three 'green way' crossings on Cockburn Road are recommended.

Signalise intersections are to be located at three locations including the two east west roads (Rollinson Road and McTaggart Cove Road) which access the Cockburn Coast Drive. A third signal is to be located at the Main Street access to Cockburn Road adjacent to the school site. The signals are to be pedestrian activated and signal phase timing should increase green time for pedestrian crossings rather than vehicular operations.

Zebra crossings, which require an all yield to pedestrians, are to be used throughout the residential streets which cross the east west greenways (combined with raised tables/crossings in strategic locations for additional traffic calming). A zebra crossing is to be also provided at the northern green way crossing of Cockburn Road.

7.8.3.1 Next Steps – Pedestrian Priority

As a next step, the transport assessment will need to consider the warrant for the signals – cars, pedestrians or other. In addition, the impact of the recommendations on public transport is to be assessed to ensure that they do not unnecessarily delay public transport.

As part of the individual traffic assessments for the precinct plans, reduced green times for key movements and turn restrictions should be incorporated to promote pedestrian activity and to suppress motor vehicle demand.



Figure 69 - Pedestrian priority locations

Main Roads has concerns with regards to the feasibility of four way intersections along McTaggart Cove Road east of Cockburn Road due to steep topography. As an alternative, it may be more desirable to create north and south facing legs for pedestrians and cyclists only. In addition, the agency has indicated concerns with the location of a signalise intersection at the southern most greenway (connecting North Coogee, study area and Manning Reserve) within the study area due to its close proximity to the signalized intersection of Cockburn Coast Drive and Cockburn Road. Alternatively, a pedestrian activated crossing could be considered.

7.8.4 Changing Gears

In order to attain the principles and measures of success, Cockburn Coast should be transformed into a 'cyclers' paradise.' The PTG identified the need to allow for commuter, recreational and family cycling needs in appropriate locations. It promotes a shift from motor vehicles to both on and off road cycling as a primary strategy for moving people.

7.8.4.1 Bike Network

Building on the street network and regional connections described in Foot Power and in Figure 69, the ITP recommends:

- Off road shared pedestrian/cycle network, including connections along the coastal greenway and the east-west greenways and school ovals.
- On road cycle network: extensive north-south and east-west connections. This includes wide outside lanes along Cockburn Road, Rollinson Road and McTaggart Cove Road, shared zones in key activity areas, and speed controlled street that forms a bike boulevard grid.

The recommended cycling network is illustrated on Figure 69.

7.8.4.2 Bike Priority

Similar to the priority given pedestrians, it emphasizes priority measures for cyclists at signalized intersections, such as bike boxes to allow 'head starts' for cyclists.

The network should incorporate bike friendly intersection design and bike boulevard including:

- Advance stop lines on all signal approaches
- Cycle crossing incorporated in zebra crossings (toucan)
- Traffic calming on local streets to promote cycle access/use of network
- Push bike attenuated traffic signals
- Bike boxes at signalise intersections

7.8.4.3 Bike Hire Scheme

A bike hire scheme should be entered into for both the Cockburn Coast and as of the surrounding region. This will require the project sponsors to partner with other regional services such as the proposed City of Fremantle bike hire scheme. Provisions should be made for hire stations located within the Cockburn Coast as well as along the coast up to Fremantle. The scheme should also provide for cargo bikes to assist in the individual transport of small goods.

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7.8.4.4 Bike Storage

End of trip and bike parking facilities should be mandated at the following thresholds. The Cockburn Coast should utilize minimum bike storage, lockers and other end of trip facility requirements for commercial uses. It is recommended that provisions for storage meet a minimum of 5% of building staff with incentives or encouragement to 10%. The latter target would attain 100% of the Green Star requirements for full point award. In addition, for commercial buildings, the following apply.

- Accessible showers (based on one per 10 bicycle spaces provided or part thereof)
- Changing facilities adjacent to showers
- One secure locker per bicycle space in the changing facilities

7.8.4.5 Next Steps - Cycling

As it is anticipated that the recommended light rail transit (LRT) will operate in a street running environment, an education strategy should be developed to help familiarize cyclists with proper cycling techniques along the light rail grooves.

It is also recommended that future planning consider the need to set thresholds (vehicles per day or other) for creating off road cycling facilities (i.e., European style cycle tracks) facilities along major streets such as Cockburn Road.

7.8.5 'City Building' Transit

Making transit 'matter' is a key theme of the ITP. Current mode share for public transport in the greater Perth region is about 6 percent of all trips. One aspect of the ITP is to increase the overall mode share for public transport. What cannot be overlooked is that the ITP seeks to use public transport to attain other desirable outcomes such as fostering desired infill development and attaining the aspirations of the Directions 2031 Plan for Greater Perth.

7.8.5.1 High quality public transport

The ITP recommends the introduction of a Bus Rapid Transit (BRT) and LRT along the Cockburn Coast corridor. The corridor would extend from the Fremantle Train Station to the Cockburn Coast. The alignment was chosen to ensure transit is aligned with the highest density and greatest mix of uses within the Cockburn Coast. The initial extent of the transit service beyond these locations would also potentially include the Spearwood vicinity in the City of Cockburn and the East End in the City of Fremantle. The transit corridor and its recommended alignment, as shown in Figure 66 are supported by the ITP as the focus for further development subject to technical and financial feasibility. It is recommended that these studies be initiated in the near term.

The alignment of the transit corridor was considered by the PTG in concert with the land use alternatives. Alternatives included locating the transit corridor along Cockburn Road or along the Douro Road connector, as recommended.

It was concluded early in the ITP process that transit was not viable along the freight line. The PTG recommended that the corridor be located within the core of the activity centres, which are west of Cockburn Road. A further advantage is that the western alignment 'frees up' lane capacity on Cockburn Road.

It was further found that short segments of transit in a mixed operating environment, especially on low traffic volume streets such as the Douro Road connector, would not necessarily reduce patronage by slowing operating speeds. Frequency of service for BRT and LRT as well as integration with other transit modes has been shown to affect patronage as significantly.

7.8.5.2 Alignment

The public transport service in the corridor would be reinforced by the provision of two local bus services along the LRT alignment, including the Fremantle Rockingham line.

Other key characteristics include:

- Alignment to follow new Douro Road connector, joins Cockburn Road at the south of the site (Figure 70)
- BRT/LRT stops to be located approximately every 400-600m (typical walk up catchment is 800m)
- Bus/LRT interchange (at each end of the site)
- Shared running way with general traffic in Fremantle CBD and low volume streets within Cockburn Coast
- Provide onward journey/connection information at stops and interchanges (maps)
- Park and ride lots at bus/LRT interchanges as interim uses (i.e., land banks)

The recommended alignment was selected instead of Cockburn Road as it:

- Provides a central corridor within the Cockburn Coast and fronts on the highest density and greatest mix of land uses (this is consistent with the ITP principle that public transport be aligned through the core of density and employment)
- Allows for Cockburn Road to manage regional road and freight traffic initially (i.e., addresses uncertainty of when Cockburn Coast Drive will be funded and built)
- Provides for the greatest amount of property value capture by co-locating highest density with alignment
- Reduces impacts for existing local business

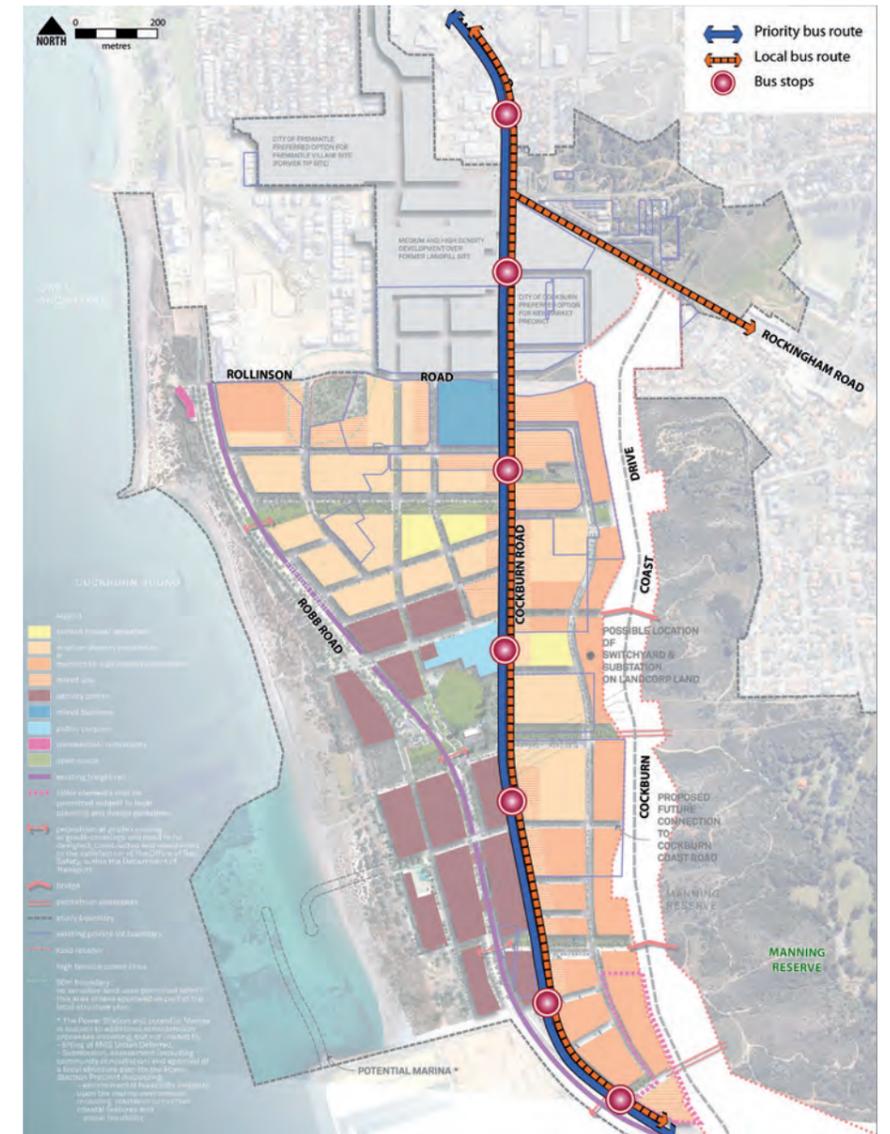


Figure 70 - Recommended Transit and Core Areas Alignment

It is important to note that the BRT/LRT is not just transport infrastructure and is seen as a tool for activating or enhancing the vibrancy of the core areas of the Cockburn Coast while providing greater regional access.

The ITP recommends that the State and project participants 'push the boundaries' in terms of thinking about the role of and requirements for LRT. In particular, decisions regarding future support for BRT/ LRT should be about more than ridership alone.

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7.8.6 Incremental Transit

Increasingly, cities are looking at LRT as ‘catalytic infrastructure’ since development ‘follows the rails.’ Ideally the LRT would be installed early in the development of the Cockburn Coast project as a measure to encourage and attract the desired level of development. However, due to the long planning lead time to develop and fund the LRT, the ITP recognizes that there is a need to begin with a high quality bus based system prior to the LRT. In addition, the initial patronage estimates do not meet the State’s criteria for LRT investment.

Alternatively, an incremental approach is to plan and grow a quality transit network, starting with enhancements to conventional bus services and evolving over time to a BRT and ultimately to include LRT services.

From a conventional bus based perspective, potential services include bringing existing and future potential routes onto the identified transit corridor to create a very high frequency (e.g., 5 minute) bus service between the study area and Fremantle CBD. Currently, the area between Fremantle and Rockingham is served by two main bus routes, as well as a number of local bus routes. The 920 runs Fremantle-Rockingham Road-Kwinana Town Centre-Rockingham. The 825 runs Fremantle-Cockburn Road-Henderson-Rockingham, through the future Cockburn Coast development and improved frequencies on this route may be viable.

In addition, a new route 513 could be introduced which would run Fremantle-Cockburn Coast – Phoenix Road Shops – Murdoch University – Murdoch Station. This route would connect Cockburn Coast to Murdoch with rail connections to Perth.

The combination of these existing or future routes would help activate the transit spine through the development while connecting to multiple activity centres (e.g., Fremantle, Rockingham and Murdoch) and the Fremantle and Mandurah rail lines.

The conventional bus services discussed above can be enhanced to create a high quality BRT system. Additional measures (e.g., branding) and facilities (dedicated running ways, high quality shelters, real time information) be developed to establish the permanence of the transit corridor. The definition of BRT can vary significantly when comparing to different examples across the world. BRT can be in various forms, ranging from very simple to complex improvements.

However, the elements that identify BRT over standard bus services is the higher quality of service provided to passengers, improved reliability and reduced travel times. BRT systems often provide users with more frequent services over a long period of time and greater capacity to move larger volumes of passengers. BRT provide fast and efficient public transport services which are able to get passengers to their destinations while providing flexibility in relation to routes, services and capacity. More complex BRT systems have been referred to as “light rail on rubber tyres”.

	Stations	Roadway	Service Plan	Vehicles	Systems
Simplest	‘Super’ stops shelter	Mixed traffic, queue jumpers	Single all-stops line	Buses with unique route IDs, head signs	Radios, electronic fare boxes
Most Complex	High platforms, P/R, amenities services	Fully grade separated transitway	All stops On-line expresses, feeder/line-haul	Hybrid, guided, specialised vehicle	Central control room, TSP, CAD, Smart Cards proof of payment

Table 12

Source: S Zimmermann, World Bank

The level of BRT for the Cockburn Coast corridor would be investigated in a subsequent study.

7.8.6.1 Frequency - Maximising Use of Public Transport

The LRT would be operated as a high frequency service, such as every 10 minutes, to promote ridership and travel behaviour change rather than to simply respond to existing demand. Frequency of service can have an equal, if not greater, impact on patronage than the speed of service.

While 15 minutes is currently considered high frequency in some cities the ITP supports a higher frequency. However, the ultimate frequency will need to reflect linking or connecting public transport services including the frequency of co-located local bus services.

7.8.6.2 Dedicated Running Way

The LRT is recommended to operate in a mixture of running environments. In highly congested segments of roadway, the LRT should operate in a dedicated running way.

It is recommended that the LRT be operated in a shared running way with cyclists and motor vehicles through the site and in the Fremantle CBD. Consideration will need to be given during transition to LRT will need to be reflected so that the build up of bus based transit patronage is not lost during development and construction of the LRT.

Priority for LRT should also be provided at congested intersections and turning movements for LRT.

7.8.6.3 Real Time Tracking of PT

Allowing for potential future emergence and use of enabling communication and technology for real time tracking with trial planned for Karrinyup soon.

- Real time information at bus/LRT stops
- Mobile phone application for real time tracking of bus/LRT services
- Open source data available to application developers



Bus and platform along Eugene, Oregon EmX BRT line

7.8.6.4 Next Steps – Transit Delivery

Two parallel and integrated studies are recommended to advance the provision of high quality, public transport related to Cockburn Coast. A broader, high level study which considers the sub-regional transit network for the Cities of Fremantle, Cockburn and Melville is recommended to consider priority destinations, potential corridors, network connectivity, patronage and other key issues. The study would assist with thinking and acting strategically in justifying an investment for light rail investment.

It also provides an opportunity for collaboration to underpin a such a business case justification. In turn, the study would also better ascertain the role that the Cockburn Coast transit corridor would play in the regional context.

A more rigorous assessment and study of several aspects of the LRT is required, including:

- Patronage
- Corridor, alignment and running way selection
- Public transport integration and service planning
- Network connectivity
- Technical design
- Costs and
- Benefits (including wider economic benefits and value capture)

As the analysis progresses, the consideration should be given to both a bus-based and LRT transit system to allow comparison and transition/staging as appropriate. In this regard, an Interim Bus Rapid Transit (BRT) Design has been commissioned to examine transition opportunities.

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88 This is critical since light rail may not be shown to be viable in this context from a DoT perspective. Indications are that criteria may be set forth requiring at least 10,000 riders per day at a single point along the line (as opposed to the entire line) for support of LRT.

An initial indicative patronage forecast was prepared as part of the ITP and identified that approximately 11,000 passengers per day for the proposed line (as opposed to a single location) could be anticipated under certain assumptions regarding travel choice between bus and LRT. Additional patronage forecasting under alternative bus and LRT scenarios should be completed to assess future patronage and development potential.

The criteria may also require a dedicated running way for the entire corridor and straight alignments based on the premise that operating speed is paramount (from a DoT perspective) for maximum ridership. The LRT recommended herein is inconsistent with both of these criteria. As a result, analysis should be undertaken to understand and demonstrate travel time differences and impacts on patronage.

It is anticipated the 20 Year Transit Plan will assess the implications of the threshold criteria for the viability of a more extensive regional LRT network (e.g., Knowledge Arc). This information would be useful to help inform the planning of the Cockburn Coast LRT as well as the viability of future connection such as along South Road to Murdoch University or from Spearwood to Cockburn Central. If a number of Greater Perth's potential segments cannot meet the emerging criteria, then it may be more desirable to focus on LRT in the Cockburn Coast as a pilot project for long term 'short haul' systems rather than as the initial segment of a larger regional system.

Another key investigation is the engineering feasibility (geotechnical and structural) and cost of extending the BRT/LRT through the former Fremantle tip site and the adjoining caravan park. Further remediation of the tip site will also have major cost implications. Depending on the results of these assessments, the transit corridor may need to divert to Cockburn Road/ Hampton Road and the implications of such will require further investigation.

The ITP focused principally on providing integrated transport solutions including the BRT/LRT corridor, alignment and running way (level of priority) within the Cockburn Coast. Additional analysis is needed to determine the similar aspects for the BRT/LRT north and south of Cockburn Coast. Subsequent to that assessment, future investigations should consider and analyse impacts to traffic operations and person flows in the corridor.

The City of Fremantle has expressed a desire for further investigation of LRT for the segment within its boundaries and it is recommended the PTG undertake a joint process to determine a preferred concept for the Cockburn Coast in light of the subregional network strategy.

7.8.7 Parking

A fundamental strategy for the ITP is to minimise the amount of car parks provided to promote public and active transport.

7.8.7.1 Supply

It is anticipated that reduced parking rates will be more stringent than current Council practices. While cognizant of intent for reducing overall car supply, concerns have been raised with impacts of reducing the supply (such as market response and spill over parking). Therefore, a strategy will be developed to define the initial parking ratios with a transition strategy to reduce the maximum parking ratio over the project duration.

The following overall average parking supply rates are aspired to as the maximum for off-street parking at project completion.

Residential

- 1 per dwelling (regardless of size), including visitor bays, within 400 m of quality public transport
- 1 per dwelling (regardless of size), plus 1 visitor bay per 4 units, greater than 400 m from quality public transport

Retail/Commercial/office

- 1:75 m2 GFA, within 400 m of quality public transport
- 1:50 m2 GFA, greater than 400 m from quality public transport

Other Uses

- 25% better than current council policy
- Allow developers to investigate ways to limit or remove car parking at their discretion with up to 1 per dwelling maximum.

The standards are generally more restrictive than typical standards in the Greater Perth area. While even more stringent parking restrictions were considered by the PTG, the recommended standards were selected to reflect current purchaser and tenant expectations in the Greater Perth real estate market. In addition, it was considered that the area will likely not be served by LRT initially, therefore increasing dependency on private motor vehicles. It is recommended that the standards be revisited subsequent to the introduction of higher quality public transport to assess if further reductions can be made to the standards.

The City of Cockburn has noted their preference for using the R-Code Multi Unit Housing Code as the initial standard. The code varies rates by the area size of the unit and its distance from a train station. The limitation is reinforced by the use of alternate, on-sided parking along streets to reinforce a 'give way' traffic calming effect.

In residential streets, the ITP recommends providing a limited number of on-street (indented) parking bays for visitors (locations on Figure 71).

7.8.7.2 Sale

The ITP recommends further investigation requiring the sale of a portion of residential car parking physically separate from residential units. This would improve household affordability by allowing those who choose not to own a car the ability to avoid paying for parking in their home purchase. It would also allow parking to be located at the perimeter of the Cockburn Coast, including the introduction of shared parking schemes, thereby reducing vehicle travel within the area.

The investigation should pursue this strategy as an option but it should not be mandated. It would be difficult for local government to mandate, and thus should be encouraged but voluntary, and allowed to evolve over time as public transport investment and other measures are implemented.

7.8.7.3 Location of On-Street Parking

Based on the anticipated level of development at the time of preparing the ITP, two scenarios for off-site parking have been prepared to illustrate the potential magnitude of off-site, separate title parking. The investigation should consider where parking to accommodate these spaces could be best integrated into the development. Ideally, the sufficient off-site parking facilities would be provided so that a maximum of 5 minutes walking distance between homes and parking would be achieved.

Scenario 1

- Residential off-site parking at 20 percent of overall project requirement
- Commercial off-site parking at 50 percent of overall requirement
- 5000 residential and 1167 commercial spaces overall (6167 total spaces)

Outcome: 1000 residential and 583 commercial spaces off-site (1583 spaces)

Scenario 2

- Residential off-site parking at 50 percent of overall requirement
- Commercial off-site parking at 75 percent of overall requirement
- 3750 residential and 583 commercial spaces overall (4333 total spaces)

Outcome: 1875 residential and 438 commercial spaces off-site (2313 spaces)

7.8.7.4 Pricing

The ITP recommends that a pricing strategy for visitor and employee parking be developed. Above average to premium rates are encouraged to the degree that the rates do not discourage desired visitation, but which encourage alternative mode use. The pricing needs to reflect available travel alternatives especially high frequency light rail or bus rapid transit. In the absence of high quality transit alternatives, pricing should reflect conventional rates.

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The pricing strategy will need to reflect the land use intent within each precinct and will vary accordingly. For example, a higher degree of visitor parking and recreational parking at the Power Station is needed than in other precincts. In addition, beach side parking is free elsewhere but the strategy should consider the application of parking fees here.

In addition, the pricing strategy should consider the role of a parking levy to fund operation of the enhanced public transport. The levy revenue needs to be visibly invested in locally delivered public transport and branded as such.

Low cost, shared use on weekends of park'n'ride lots may also be beneficial.

7.8.7.5 Duration

Generally, in high activity areas, such as retail nodes, on street parking spaces are to be high turnover spaces to promote the appearance of good access for small businesses and to minimise all day parking.

7.8.7.6 Restricted Areas

As shown in Figure 71, in some residential shared streets, no on-street parking bay should be provided. Provision must be on or off site for visitors.

7.8.7.7 Next Steps - Parking

The parking strategies identified above will need to be more fully developed in the Precinct Plans and incorporated into the relevant Design Guidelines. The detailed planning should identify opportunities to apply the recommended strategies with flexibility rather than uniformly across the full project area.

The City of Cockburn has noted that road corridor treatments and limitation of off and on street parking will need to adequately consider service vehicles, builders during the construction stage and trade persons and utility service persons thereafter, accessing the properties or on street utilities.

Additional issues include ensuring access for waste collection trucks or the creation of traffic grid lock on account of the lack of side of road parking for these operations. Council is also seeking to ensure that it does not inherit a major impost in the issuing of traffic parking infringements, on account of persons illegally parking in verge areas and alike. This concern extends to parking provisions for employees and visitors to the area including those using the coastal public open space. Among the next steps is a requirement for the identification of form and location of adequate off street parking (paid or otherwise) to cater for these visitations. Council or privately operated multi story car parks need to be investigated as part of the parking strategy.



Figure 71 – Location of on-street parking

7.8.8 Additional Tools and Steps

7.8.8.1 Mode Share Targets

The number of trips and mode share split is a key consideration in determining the success of changing travel behaviour to meet the ITP principles and measures of success. Accordingly, specific targets that are substantially improved compared to the current Greater Perth averages (e.g., reduce car driver mode to less than the current regional average of 51 per cent overall trips) should be developed as part of the Precinct Plans to reflect the future population and achievable mode share in this context.

7.8.8.2 Person Flow on Roadways

The ITP recommends that future traffic assessments to support the preparation of Precinct Plans utilize the concept of person flows in lieu of vehicle flows to examine intersection and mid-block capacities. Application of this principle will require investigation into its implications as part of a planned and balanced package of transport solutions.

7.8.8.3 Allowing Congestion

The ITP supports the concept of accepting low- to moderate congestion based on the supporting concepts presented in the ITP Framework. This tool is to be applied within the Cockburn Coast but to ensure regional links are operating as effectively as possible. Examples of techniques to support this concept include:

- Manage number of intersections providing access to the external road network
- Provide additional green time to pedestrian crossings
- Reduce traffic speeds
- Speed control devices (traffic management)

7.8.8.4 New Links

The ITP supports the creation of new links to better connect the Cockburn Coast and surrounding communities.

Another new key link is the extension of a new roadway from Douro Road in South Fremantle across the Fremantle tip site and the caravan park to Rollinson Road. This roadway would extend south through Cockburn Coast and the neighbourhood activity centre at Main Street to McTaggart Cove Road. This roadway, termed the Douro Road Connector, would ideally serve as the alignment for the LRT and bus routes. It would serve as a low capacity roadway for north south travel for all modes and may relieve capacity pressures on Cockburn Road, Hampton Road and Cockburn Coast Drive.

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7.8.8.5 At-Grade Vehicular Rail Crossings

The ITP recommends three such rail crossings (i.e. existing Rollinson Road, new Main Street/Robb Jetty Road and relocated McTaggart Cove Road).

Westnet Rail is currently looking for a passing loop opportunity (South Beach and near the Anchorage at Port Coogee). The plan recognizes the need to liaise with them to resolve this issue with rail crossing location implications. It is recommended that the passing loop not be located between Rollinson Road and the southern end of the Power Station precinct. This will help to minimize the perceived gulf between land uses and activities on each side of the rail corridor.

A fourth crossing was considered at the southern end of the Cockburn Coast to link with the Port Coogee development. The site is the former crossing of Cockburn Road before the road was relocated to the east. Reopening of this crossing is dependent upon the public transport route south of Cockburn Coast and the potential inclusion of a future light rail stop at or near this location. It may not be retained in the future other than for pedestrian and cycling access.

Grade separation was considered but dismissed by the PTG due to the future double stacking of containers on freight trains.

7.8.8.6 Freight Rail Noise

As planning proceeds, noise studies related to freight rail operations will be required and fed into local area structure planning. Noise attenuation will likely be required. A solution that allows for built form and public domain is needed.

7.8.8.7 Freight Traffic

An assessment of the current and forecast freight traffic generated by existing businesses within the study area, as well as a staging strategy to accommodate such traffic over the next 15-20 years, should be performed subsequent to the completion of the ITP. The purpose of the freight study is focus on staging of network connections and will not change the recommended road network within the ITP study area. For example, consideration should be given to the timing of an extension of Rollinson Road east to Rockingham Road and any necessary intersection improvements at the intersection of Rollinson Road and Cockburn Road. It is noteworthy that this study was requested by the landowners during the DSP Part 2 and ITP process.

7.8.8.8 West of Stock Road Assessment

There is currently an on-going assessment of the regional road network adjacent to and northeast of the Cockburn Coast study area. This assessment is being done subsequent to the West of Stock Road Transport Assessment prepared by ARRB Group on behalf of Department of Planning.

The Assessment recommends a new east-west link between Cockburn Coast Drive and Stock Road. The Assessment presented the alignment of this link as an incremental extension of the Roe Highway starting with the leg between the existing Roe Highway and Stock Road (Network A), then to Carrington Street (Network B) and then to Cockburn Coast Drive (Network C). The Assessment also recommended the extension of Cockburn Coast Drive north to Hampton Road at Clontarf Road (Network B). The general orientation of the two key potential roadway links is illustrated on Figure 72.

The Assessment is a parallel study and is not directly part of the ITP. It is aimed at identifying the limits of a potential MRS amendment to preserve the transport corridor connections. However, future planning and design for the Cockburn Coast transport network should be coordinated with the current evaluation of options to extend Cockburn Coast Drive north of Rockingham Road to Hampton Road and to connect the east west link to Rollinson Road (or other suitable location).

The City of Cockburn has raised objections to any contemplation of further changes to regional road reservations which may come out of any further study (such as the West of Stock Road Study). The City's formal position on record is opposed to Roe Highway Stage 9 and any associated Forrest Road bypass. This is the current position of Council.

The City's formal position is supportive of the need for Cockburn Coast Drive within the existing MRS amendment as a critical piece of infrastructure for the DSP. The Council has further expressed that any land take outside the current primary regional road reservation would not be supported nor desired. The Council does not support extend Cockburn Coast Drive to the West of Stock Road infrastructure at this stage.

Alternatively to this point, Main Roads and Department of Planning have posited that Cockburn Coast Drive should be constructed with a link to Hampton Road to avoid geometry constraints of Rockingham Road/Cockburn Road intersection. Thus, there remains an issue about the extent of the Cockburn Coast Drive alignment to be resolved.



Figure 72 – Key road network