Cockburn Coast Integrated Transport Plan

PB 125 YEARS® PARSONS BRINCKERHOFF

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Delivering integrated land use and transport decision making for the Cockburn Coast

1. INTRODUCTION

Background

Purpose

The purpose of this document 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 the Master Plan for the Cockburn Coast development. The Master Plan provides an integrated and comprehensive guide to the development of Cockburn Coast based on the ideas and framework set forth in the Cockburn Coast District Structure Plan (DSP).

The Cockburn Coast District Structure Plan (DSP) was endorsed by the Western Australian Planning Commission (WAPC) in August 2009. The DSP is shown in Figure 1 below. It is a high level, strategic guiding document that recognized significant additional effort was needed with regards to transport serving Cockburn Coast.

Following the endorsement of the DSP the WAPC initiated an amendment to the Metropolitan Region Scheme (MRS) to rezone the Cockburn Coast project area from Industrial to Urban Deferred. The WAPC indicated that one of the critical requirements for lifting the Urban Deferred zoning is the finalisation of an agreed regional transport solution that is supported by the key project stakeholders.

The initial role of the Master Plan was to assemble the Infrastructure Master Plan, District Water Management Strategy, and statutory framework in order to seek lifting of the urban deferred status under the Metropolitan Region Scheme. The Western Australian Planning Commission has since moved to lift the urban deferred status, except for the power station precinct, and therefore the role of this Master Plan has evolved.

The purpose of the Master Plan is to provide an integrated and comprehensive guide to the development of Cockburn Coast based on the ideas and framework laid out in the Cockburn Coast District Structure Plan. This Master Plan applies to the Cockburn Coast project area south of Rollinson Road only. It excludes the Newmarket and Fremantle Village Precincts, which were included in the District Structure Plan, as these precincts are subject to separate planning policy being prepared and facilitated by the relevant local authorities.

The Master Plan illustrates the next layer of detail, and describes a grounded approach to the provision of local roads, key infrastructure, public open space network, drainage, land use and built form; as a precursor to the preparation of local structure plans. The Master Plan provides a strategic approach to the equitable and logical distribution of key infrastructure, open space and development across the whole project area. The ITP supports the Master Plan by further refining the development of Cockburn Coast transport infrastructure.

Local Structure Plans developed in the next phase for land areas within Cockburn Coast should refer foremost to the DSP as the overarching statutory document and secondly, have regard to the Masterplan report which provides a coordinated approach to the provision of infrastructure, movement, built form and district scale water management. The Master Plan provides a strategy for the provision of key infrastructure not previously defined in the DSP and therefore, should also be referred to in the preparation of local structure plans. It may also inform subsequent amendments to the statutory framework, in particular the City of Cockburn's Town Planning Scheme, and in this regard, may form part of a future Scheme Amendment.

This ITP reflects the outcome of a collaborative effort of a number of stakeholders (see Chapter 2). 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.

Place

The Cockburn Coast project area is located approximately 18 kilometres south-west of the Perth CBD (Figure 2), and four kilometres south of Fremantle (Figure 3). It shares its boundaries with both the City of Cockburn and the City of Fremantle.

The project area is approximately 330 hectares (ha) and is "abutted" to the north and south by the South Beach and Port Coogee urban renewal projects.

Project charter

The project area includes the 92 hectare industrial strip that formerly included an assortment of industries, including the manufacture of munitions, an abattoir and the South Fremantle power station. There are a number of current light industrial uses in the area that will require consideration for the maintenance of freight movement in the Integrated Transport Plan.

The project area also includes the South Fremantle landfill site which is subject to future remediation due to groundwater and soil contamination.

The project area contains a number of State government and private landholdings. In total, 446 landholdings are contained within the project area, including land owned by eight State government agencies, two local government authorities and 182 private landowners (as of September 2009).

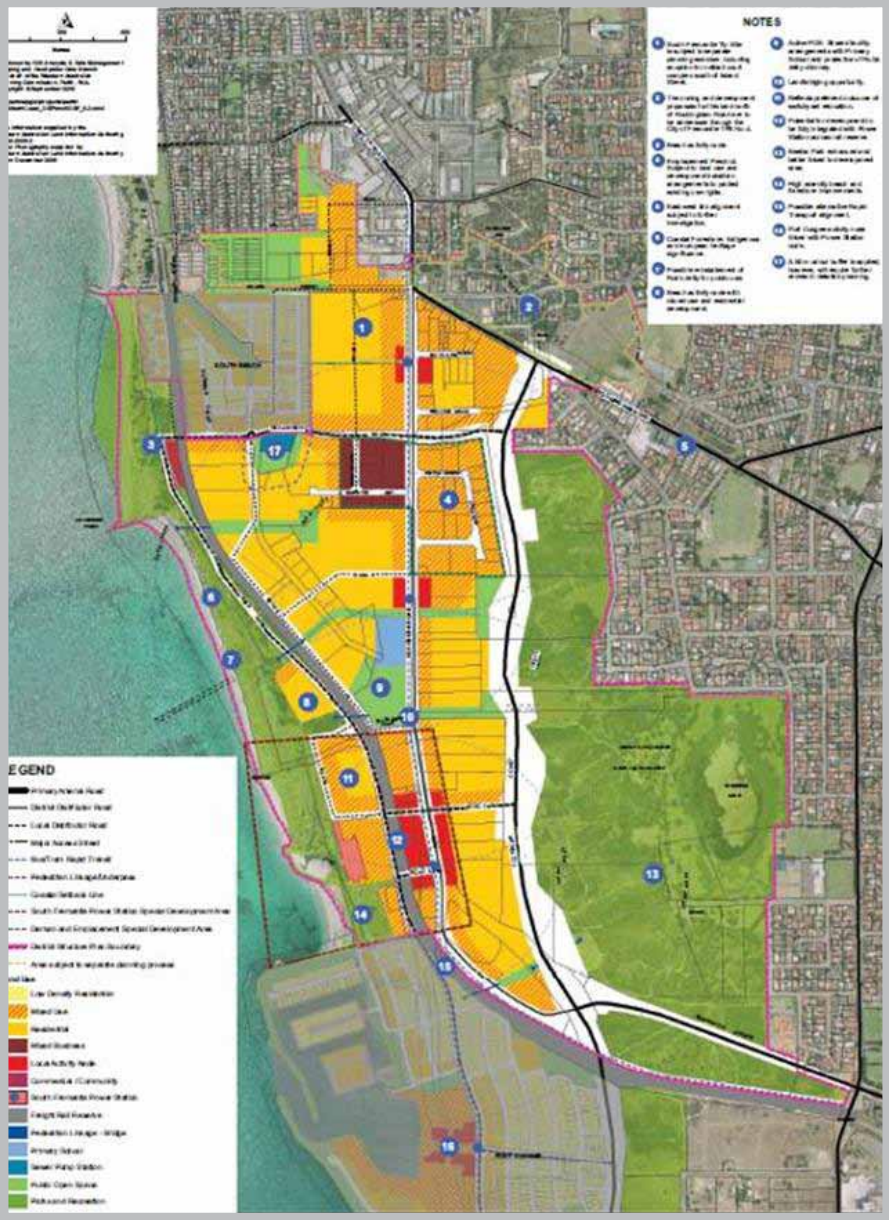


Figure 1 – District Structure Plan

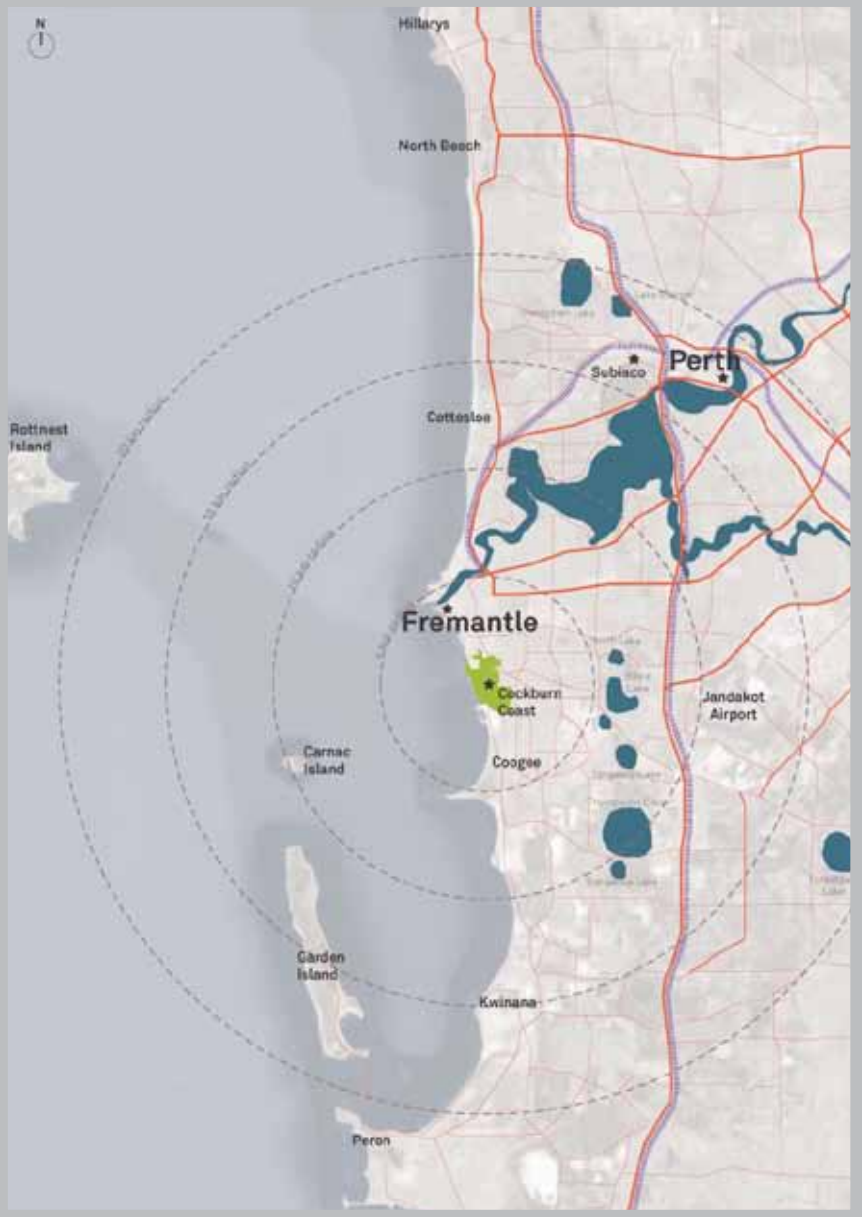


Figure 2 – Regional Location (source: Hassell)

Figure 3 – Regional Location

Scope

The ITP scope includes the Cockburn Coast project as defined in the DSP but is informed by regional destinations and links. The regional context includes links in both the north-south and east-west direction for centres including:

- Fremantle
- Rockingham
- Cockburn Central
- Murdoch
- Kwinana
- Booragoon
- Rockingham Road/Carrington Street interchange

The ITP also was undertaken in an effort to attain a new benchmark in integrated land use and transport solutions that achieve the DSP land use and urban form objectives and targets.

In addition, the ITP is intended to:

1. Understand long term future transport opportunities and needs (2031 or full development in the region).
2. Make provision for quality transit to, through and around the Cockburn Coast including public transport, walking and cycling.
3. Seek parking solutions that contribute to travel demand management outcomes.
4. Gain approval of the ITP by the Project Transport Group (PTG).
5. Seek funding investment and commitment as part of an agreed staging plan through supporting mechanisms including a Development Contribution Scheme.

The City of Cockburn has empahsised that point number 2 above should focus on both north south and east west movement.

District structure plan

The Department of Planning (DoP), formerly the Department of Planning and Infrastructure (DPI), is the project sponsor for the preparation of the 2009 Cockburn Coast District Structure Plan. The DSP served as the basis for development of this ITP. While some recommendations of the ITP vary from those of DSP as described below, the general intent is still met.

The DSP set forth three primary transport aspirations:

- Promote efficient public transport
- Develop a transit oriented community
- Balance local and regional travel demand

Each of the transport aspirations has a significant potential impact on the composition of the Cockburn Coast as well as the surrounding regional transport network.

The DSP for the Cockburn Coast identified the immediate need for a sub regional integrated transport strategy for the study area, with a particular emphasis on public transport

Road network

Figure 4 illustrates the key roads within and adjoining the Cockburn Coast. The DSP provided for the creation of Cockburn Coast Drive along the eastern edge of the study area, linking Rockingham Road at the northern end of the study area with Cockburn Road at the southern end. The DSP also recommended the transformation of Cockburn Road from a major arterial to a local road to serve as the central spine of the compact, transit oriented development.

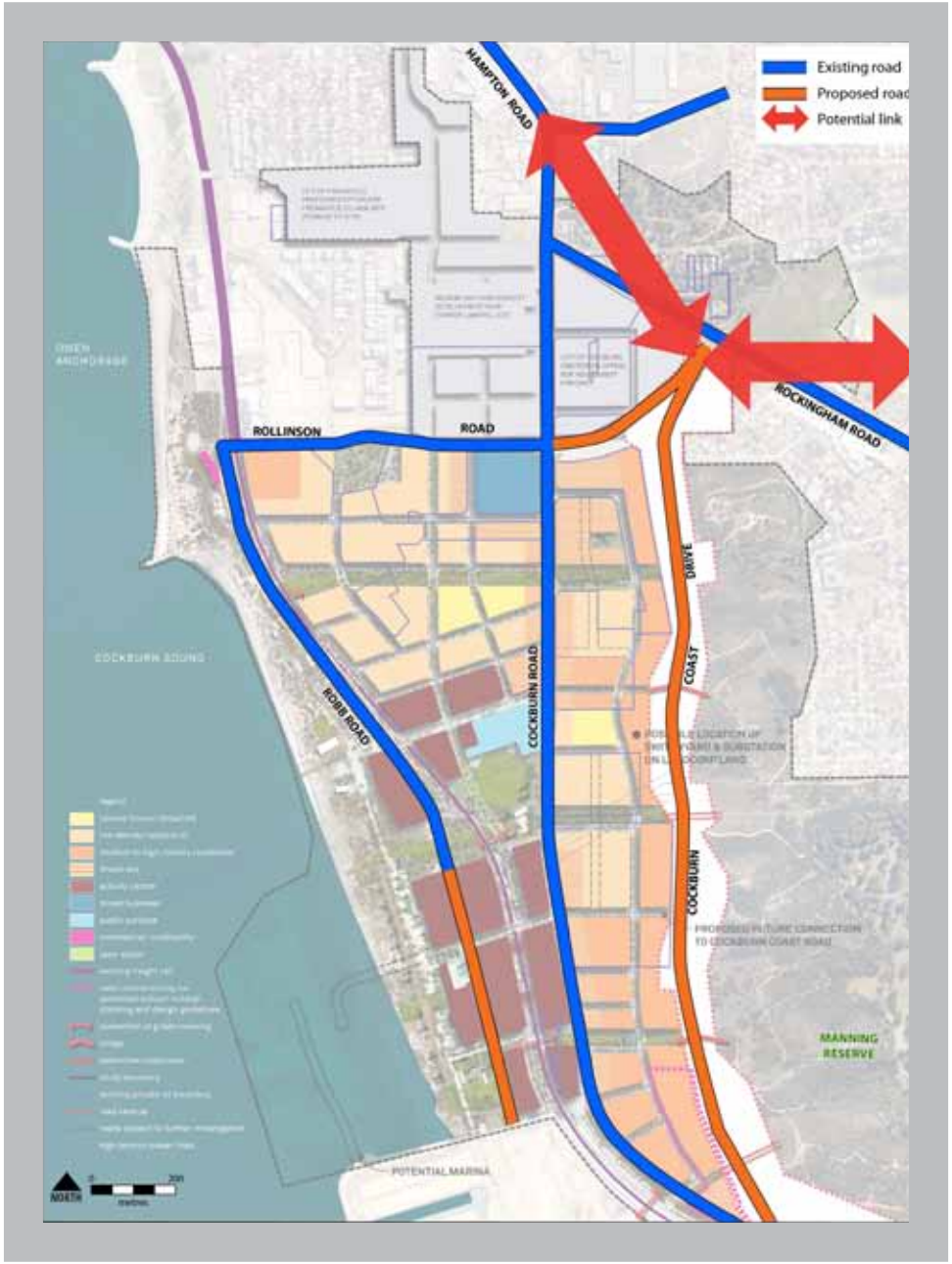


Figure 4 – Key road network

As discussed in Chapter 8 herein (Recommendations), the timing and extent of Cockburn Coast Drive as well as the role of Cockburn Road until Cockburn Coast Drive is constructed are unresolved.

Targets

In addition to the objective that the development be a transit oriented community, the DSP sets forth a number of social, economic and environmental 'key project targets'. Within the DSP, there are four key minimum targets related to the Integrated Transport Plan including:

- a resident population of 10,000 residents
- 85% multiple or grouped dwellings
- 60% of dwellings within 800 metres of public transport and
- 3600 jobs.

While the DSP did not set forth any explicit quantified transport targets, it did promote the creation of a 'higher order' transit corridor (e.g., bus rapid transport and/or light rail) along the Hampton Road/Cockburn Road corridor. This connection is not to be designed as a high-speed through-traffic route.

Public transport

The DSP recommended the creation of a Bus Rapid Transit system (BRT) focussed on Cockburn Road and Hampton Road connecting to the Fremantle CBD and train station with the project area.

The DSP recommended that public transport links be fostered with key activity centres. In the short to medium term, the flexibility of bus rapid transit (BRT), its ability to offer the service quality of rail (speed, reliability and comfort) and to provide certainty through investment in infrastructure while still being cost effective, resulted in BRT being the favoured approach to servicing the Cockburn coast and surrounding communities.

The BRT has the potential for the extension of the service further south or to the east in the future (potentially linking through to Rockingham or Cockburn Central, which have been identified as major activity centres). Public transport alignment options north to Fremantle and extensions further south or to the east of the project area will be a key consideration of the integrated transport strategy.

To facilitate the BRT system, the DSP concluded that transit priority must be secured along the length of Hampton Road and Cockburn Road (through the centre of the project area). It is particularly important to extend a transit corridor along the section of this road between Douro Road and Rockingham Road. A wider road reservation in this section may be necessary to accommodate transport growth.

Summary

The initial DSP was based, in part, on a transportation analysis prepared in 2007 by Worley Parsons on behalf of the DPI. A critical area of concern in this assessment was the introduction of additional vehicles generated by the proposed Cockburn Coast development to the existing congestion on the current road network, particularly Hampton Road between Douro and Rockingham Road.

The DSP aspirations, targets and supporting studies were reviewed early in the ITP process along with the transport planning and decision making context, which includes ongoing regional transport studies being undertaken by others.

Sustainable urban renewal, such as at Cockburn Coast, and the intensification of activity within existing centres assumes a shift in how people move around, from an almost complete reliance on the private motor vehicle, to greater reliance on non-vehicle transport modes including public transport, walking and cycling. It requires a shift from a planning focus on “moving cars” to “moving people, goods and minds.”

The DSP targets broadly align with this concept and provide for the introduction of a dedicated high frequency public transport network. However, the transport analysis prepared to support the DSP was limited to a conventional assessment of vehicle traffic and its potential impacts rather than developing a strategy to emphasize alternative transport.

The aim of this ITP is to further refine the transport and land use concepts to support the desired change in travel behaviour. Its scope is discussed further ahead.

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 below.

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.

The Project Charter is provided in Appendix A.

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.

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.

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 (*See Appendix B*).

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.

Workshop No. 3

Prior to this workshop, the Master Plan team conducted a separate workshop process with property owners to develop alternative land use scenarios and the creation of a preferred scenario based on a 'coastal nodes' focus for the centres of activity. The two alternative land use scenarios were discussed in PTG Workshop No. 3 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. Additional detail regarding the land use options and key strategies are provided in Section 6 below.

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.

Workshop No. 5

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

3. FRAMEWORK

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 and
- 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 and
- 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.

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 and
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.

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.

Additional discussion of each concept is provided in Appendix C.

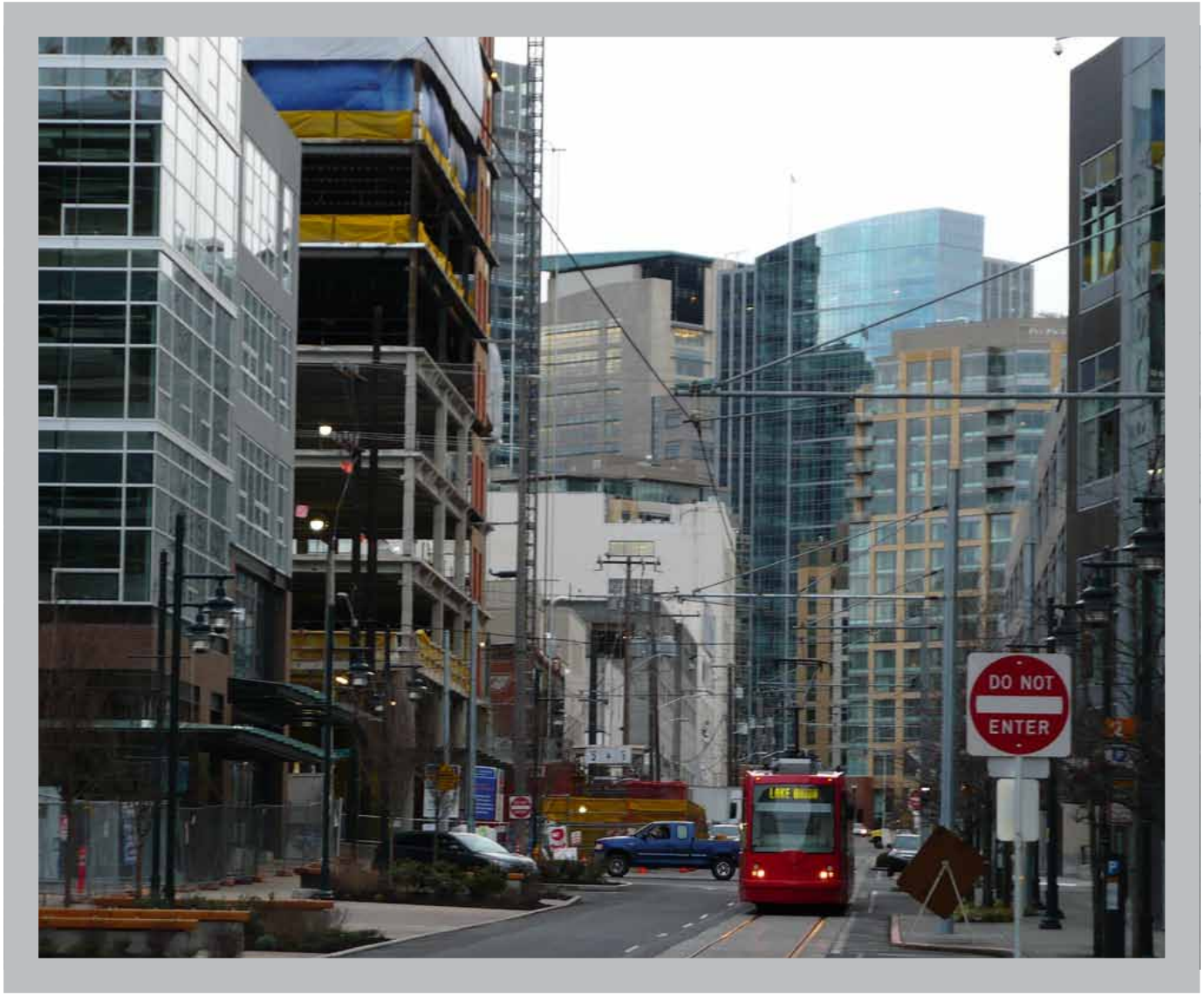


Figure 5 – Seattle's South Lake Union Streetcar has undergone real estate success over the last eight years $2.4 billion of investment within three blocks of the line, amounting to 2,500 housing units and 12,500 jobs (South Lake Union Investment Analysis, Seattle Department of Transportation 2009).

4. ISSUES + GIVENS

During Workshop No. 1, a range of issues and givens were raised by PTG members. It is important to note that some of the issues were stated from the unique perspective of individual members of the PTG and are not representative of all members. In addition, the significance of some issues varied from the beginning to the end of the planning process.

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 Main Roads 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 activity 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 (e.g., 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?

Givens

Based on the PTG's agreed study scope, the ITP Framework, related studies and plans (*See Appendix D*) 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 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.
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
    - minimise 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 givens 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.

5. PRINCIPLES + 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.

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 transport
3. Provide for safety of all road users in a mixed transport environment.
    - Overall average design speed

Environment

4. 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
5. 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

Social

6. 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)
7. 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
8. Provide high level of equitable access and choices for all.
    - Number of key destinations directly accessible by public transport, walking and cycling.

Economy

9. 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
10. Maximize land use efficiency while optimising the associated investment and recurrent costs.
    - Reduction in land area dedicated for transport usage

Efficiency

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

Effectiveness

13. 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
14. 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
15. 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

Robustness

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

6. LAND USE

A preferred land use concept was developed by 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 6.

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.

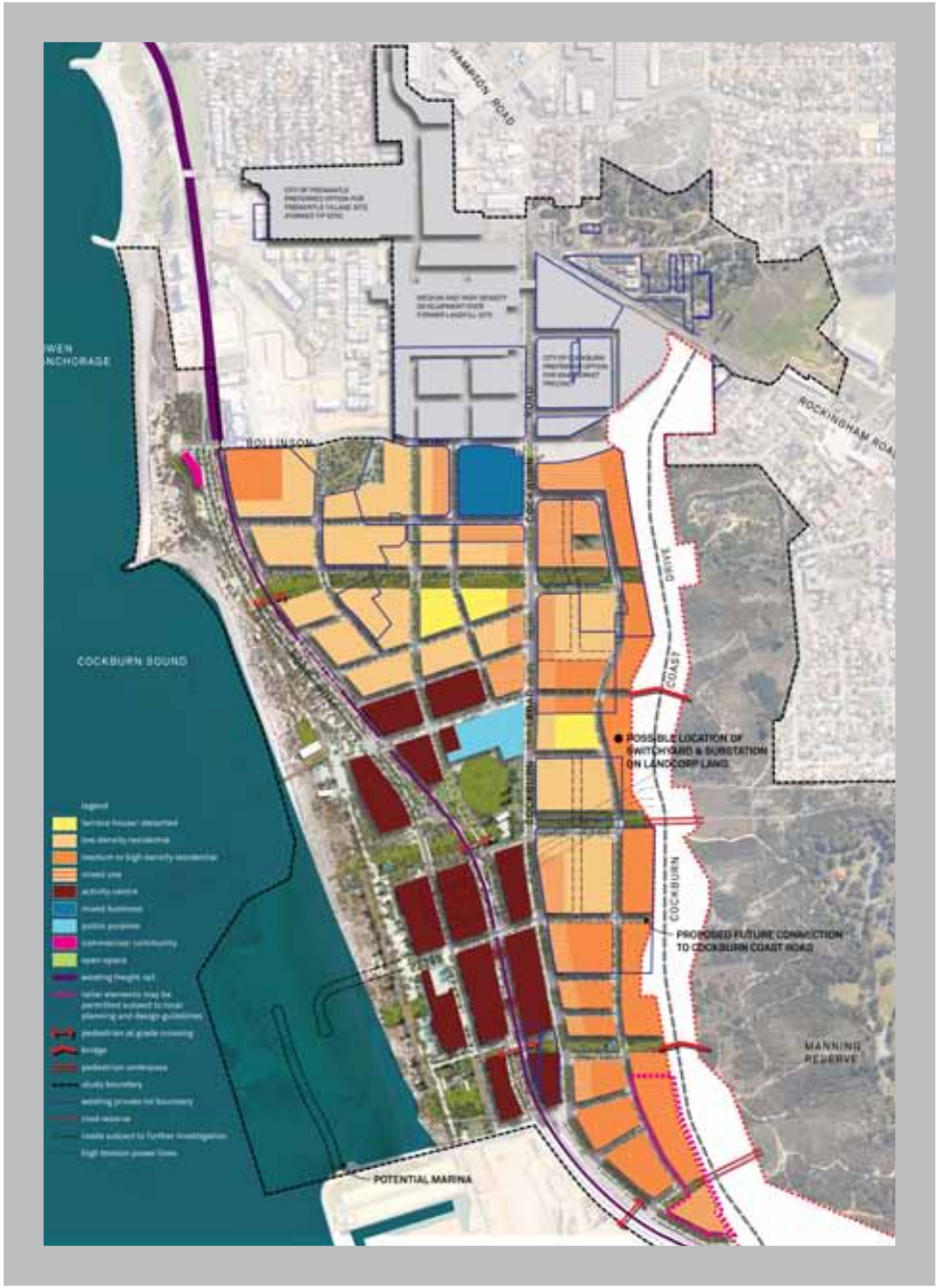


Figure 6 – Preferred Land Use Concept

7. TOOLS, SCENARIOS + SCORE CARD

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 below. More detail regarding the specific recommended aspects of each tool are provided in Chapter 8.

Foot power

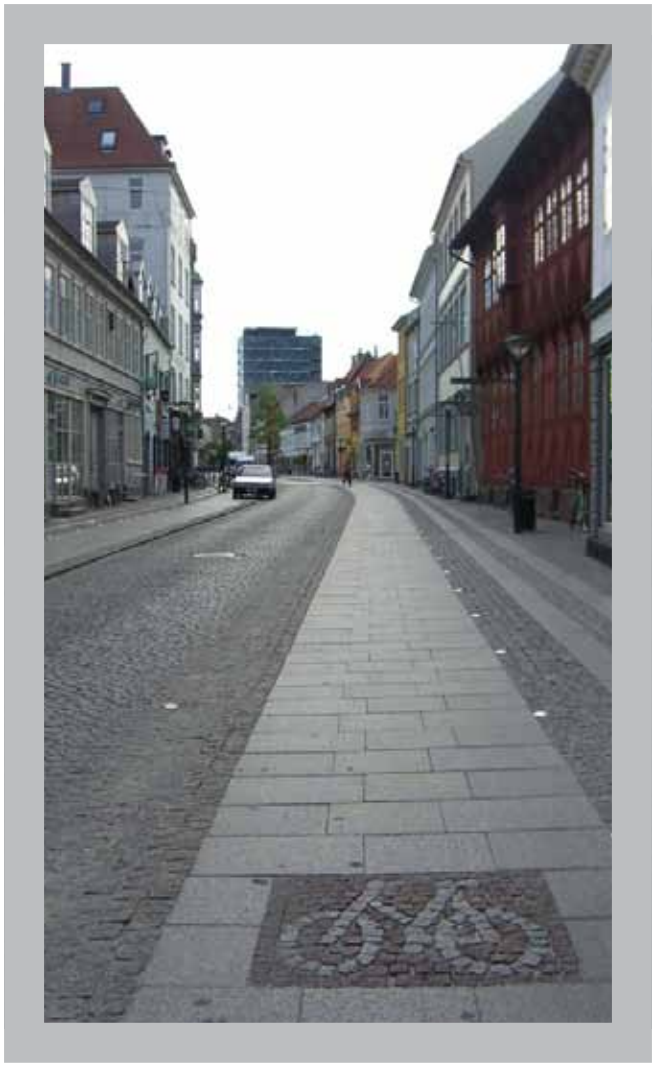
- Pedestrian priority at intersection crossings
- Highly textured pavement material
- Share zones
- Car free or parking restricted areas
- Permeable walking and cycling network, with visual and physical connectivity to other streets and places
- Generous pedestrian crossing provisions
- Pedestrian friendly urban design principles (e.g., limit block face lengths to less than 125 metres)

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 and places
- Sensitive choice of street furniture

Pedal power

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

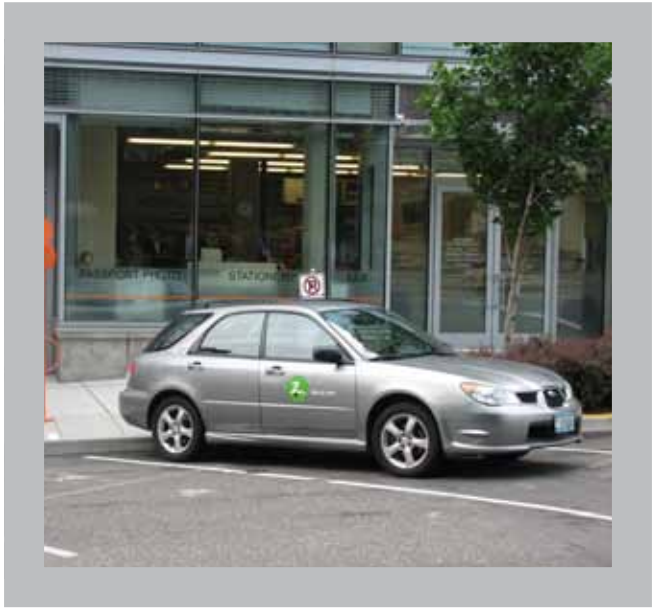


Public transport

- 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 prior to development
- Link public transport to connect with regional network
- Use mobile phone real time transit tracking applications for public transport

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

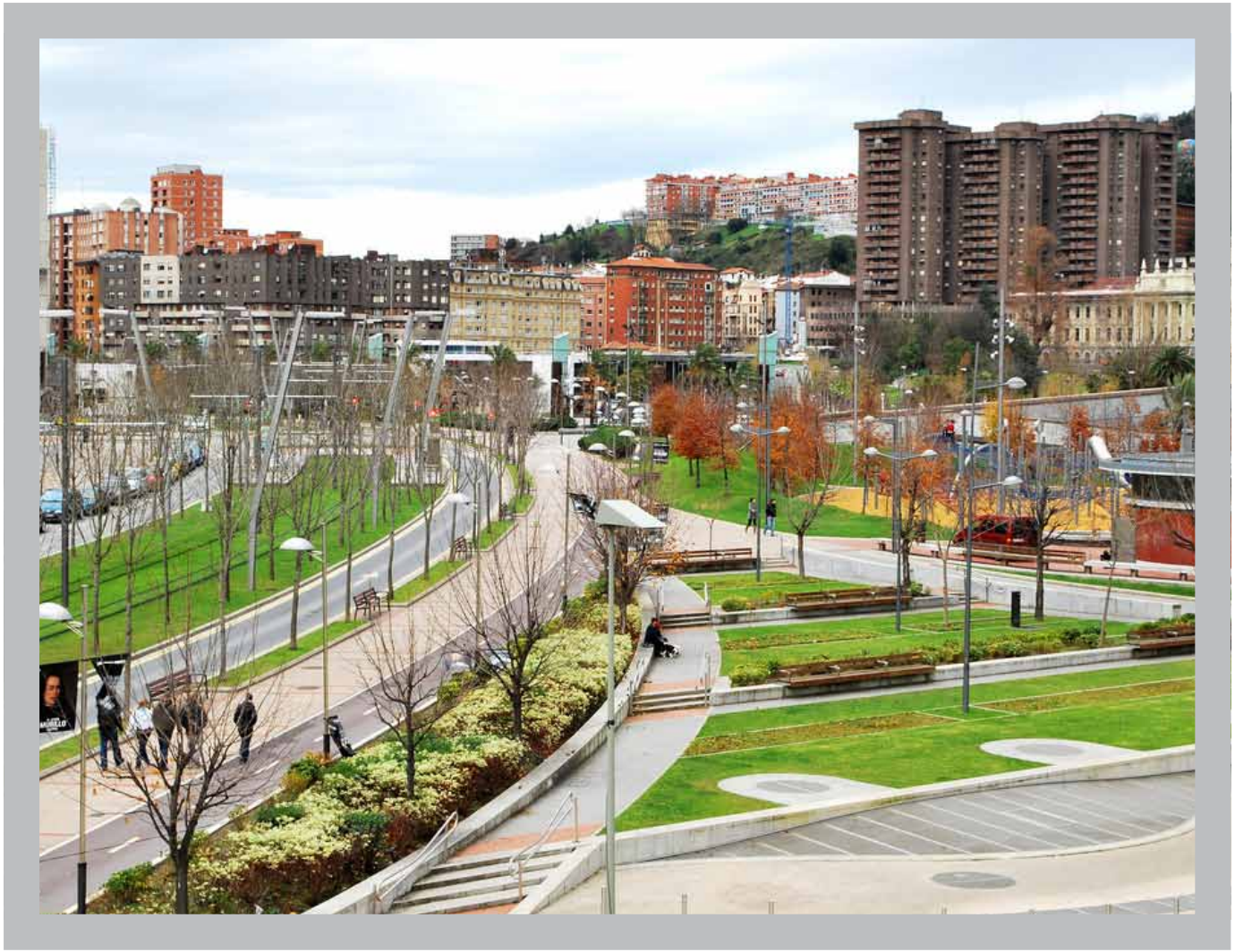


Private motor vehicles

- Utilize grid network with short block lengths (e.g.,100m 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

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



Scenarios + 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.

The Tools and Scenarios Working Paper is provided in Appendix E.

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). Additional notes are provided to explain the rationale for the scoring, and are included in Appendix E. 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.

CCAP Precinct Assessment + 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.

Scenario scores

The cumulative score for the two alternative scenarios is provided below. Although not shown in Table 1 below, it is assumed that "business as usual (BAU)" would have reference score of zero.

Table 2 provides the potential maximum scoring and scoring for individual tools within each scenario. The measures and the related scores obtained from the CCAP Assessment and Design Tool are indicated in red and bold.

Table 1 – Total score

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

Table 2 – Scenario score

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 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**
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 (entirely)	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 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

Tool	Maximum Score	Slightly Better	Notably Better
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	0.1	0.4
Textured pavement	0.5	0.1	0.4
TOTAL SCORE	**100**	**47.5**	**76.1**

8. RECOMMENDATIONS

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

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 and
- 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.

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, posted speeds should not exceed a 30 kilometre per hour (km/hr) 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 posted 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 7. 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.

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 15 at the report end.

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.

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 10-16 further below and extensive use of shared streets/zones will help to increase side friction.

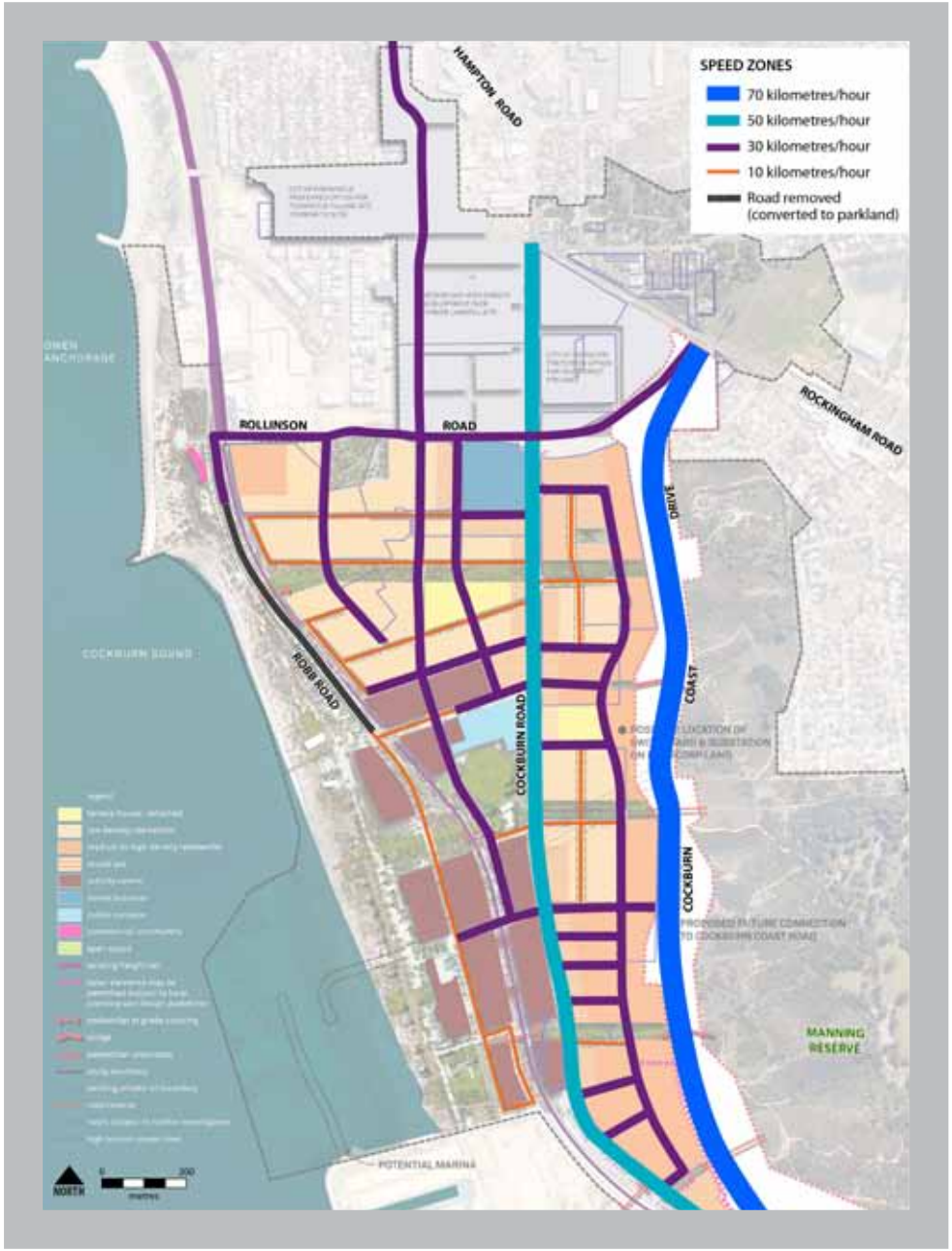


Figure 7 – Recommended potential design speeds for improving pedestrian safety

Figure 8 – Pedestrian priority locations

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 8) 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.

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.

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 8. 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.

Signalised intersections are to be located at three locations including the two east west roads (Rollinson Road and McTaggert 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.

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.

Main Roads has concerns with regards to the feasibility of four way intersections along McTaggert 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 signalized 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.

Changing gears

In order to attain the principles and measures of success, Cockburn Coast should be transformed into a 'cycler's 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.

Bike network

Building on the street network and regional connections described in Foot Power and in Figure 8 above, 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 McTaggert 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 8, page 34.

Bike priority

Similar to the priority given pedestrians, it emphasizes priority measures for cyclists at signalised 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 signalised intersections

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.

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.

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.

'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.

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 9 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.

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 9)
- 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 and
- reduces impacts for existing local business

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.

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. As shown in Table 3, page 40, 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”.

Figure 9 – Recommended potential design speeds for improving pedestrian safety

Table 3 – Bus Rapid Transit Spectrum

	Stations	Roadway	Service Plan	Vehicles	Systems
Simplest	"Super" Stops, Shelter	Mixed Traffic, Queue Jumpers	Single All-Stops Line	Buses with Unique Route ID's, 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, Specialized Vehicle	Central Control Room, TSP, CAD, Smart Cards Proof of Payment

Source: S Zimmermann, World Bank

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

Frequency – Maximising use of public transport

The BRT/ LRT would be operated as a high frequency service, such as every 10 minutes or more frequently, 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.

Dedicated running way

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

It is recommended that the lines be operated in a shared running way with cyclists and motor vehicles through the Cockburn Coast 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 BRT/LRT should also be provided at congested intersections and turning movements for BRT/LRT.

Real time tracking of PT

Allowing for potential future emergence and use of enabling communication and technology for real time tracking is a key tool for increasing mode share.

- 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.

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

Figure 10 – Bus and platform along Eugene, Oregon EmX BRT line.

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 Cockburn Coast BRT/LRT transit corridor is also 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 BRT and LRT transit system to allow comparison and transition/staging as appropriate.

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.

Parking

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

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

RETAIL/COMMERCIAL/OFFICE

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

OTHER

- 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, one-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 11).

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.

Figure 11 – Location of on-street parking

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.

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)

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.

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.

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.

Restricted areas

As shown in Figure 11, in some residential shared streets, no on-street parking bay should be provided. Provision must be on or off site for visitors.

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 tradespersons 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.

Additional tools + steps

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 59 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.

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.

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).

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 McTaggert 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.

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 McTaggert 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.

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.

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

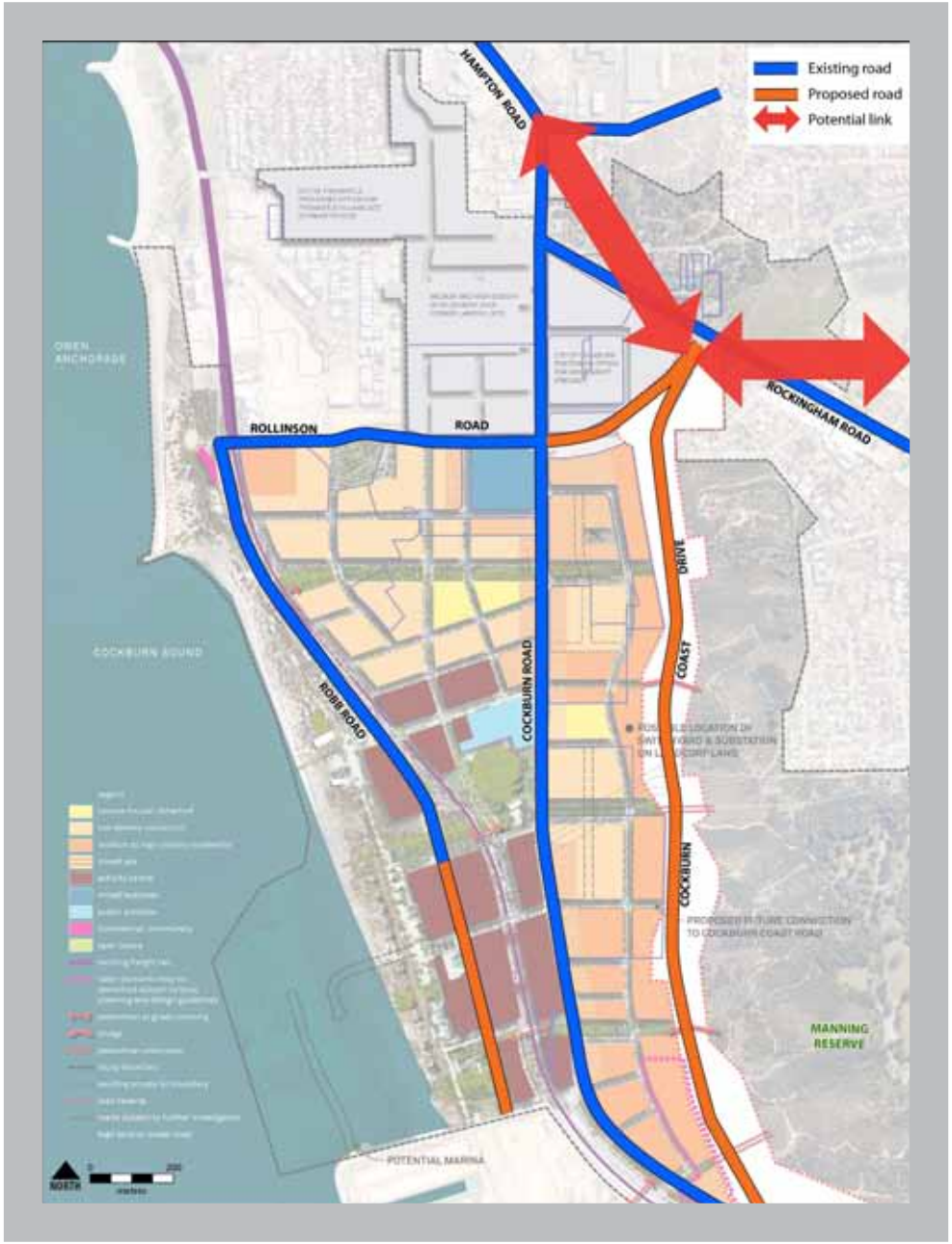


Figure 12 – Key road network

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 Master Plan and ITP process.

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 12, page 47.

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.

Proposed cross sections

Figures 13-20 (source: Hassell) illustrate the recommended cross sections for the following key linkages:

- Cockburn Road
- Robb Jetty Road (Main Street)
- Rollinson Road and McTaggert Cove Road
- Douro Road Connector
- Local roads
- Shared zones (parking and no-parking)

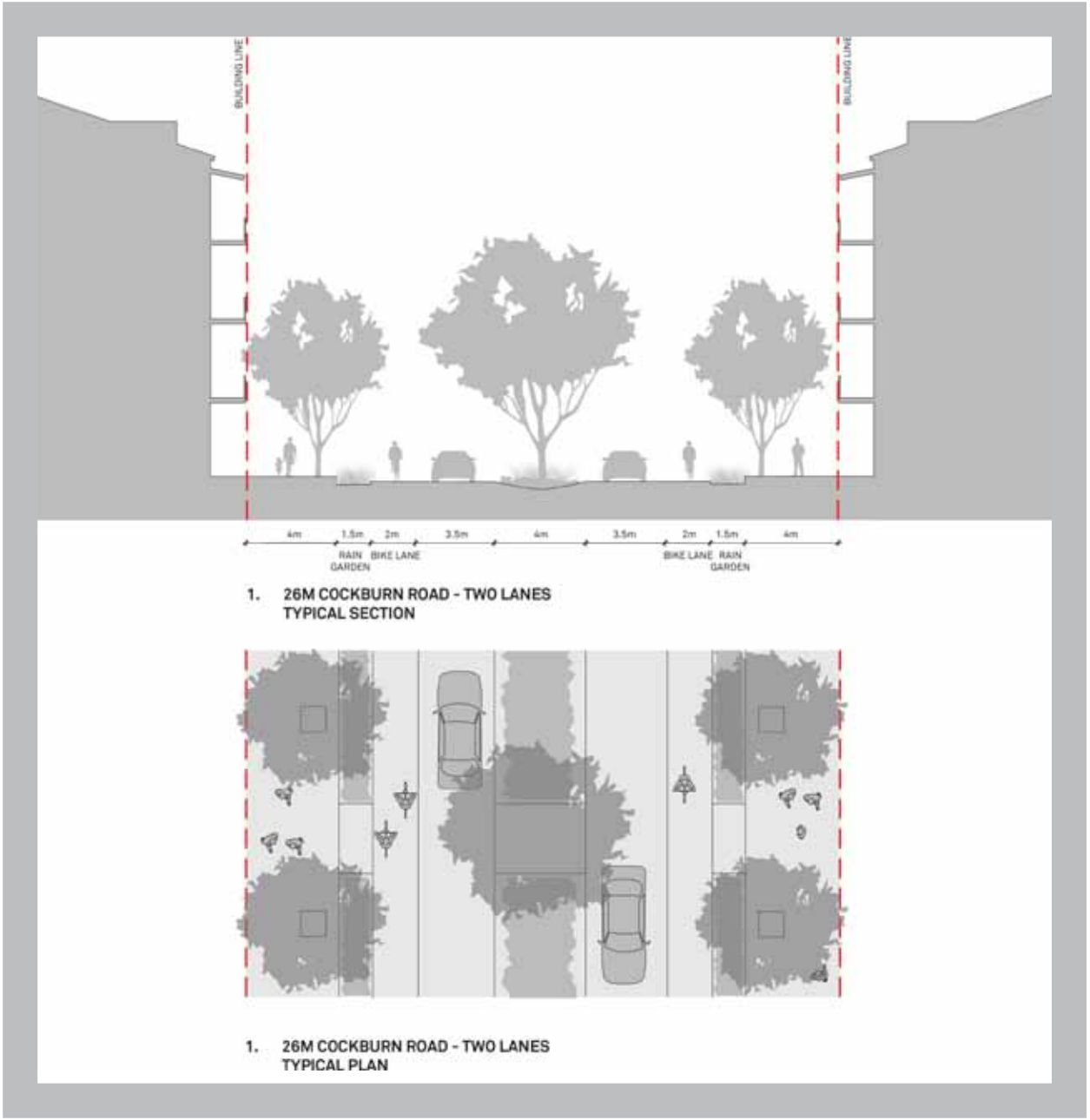
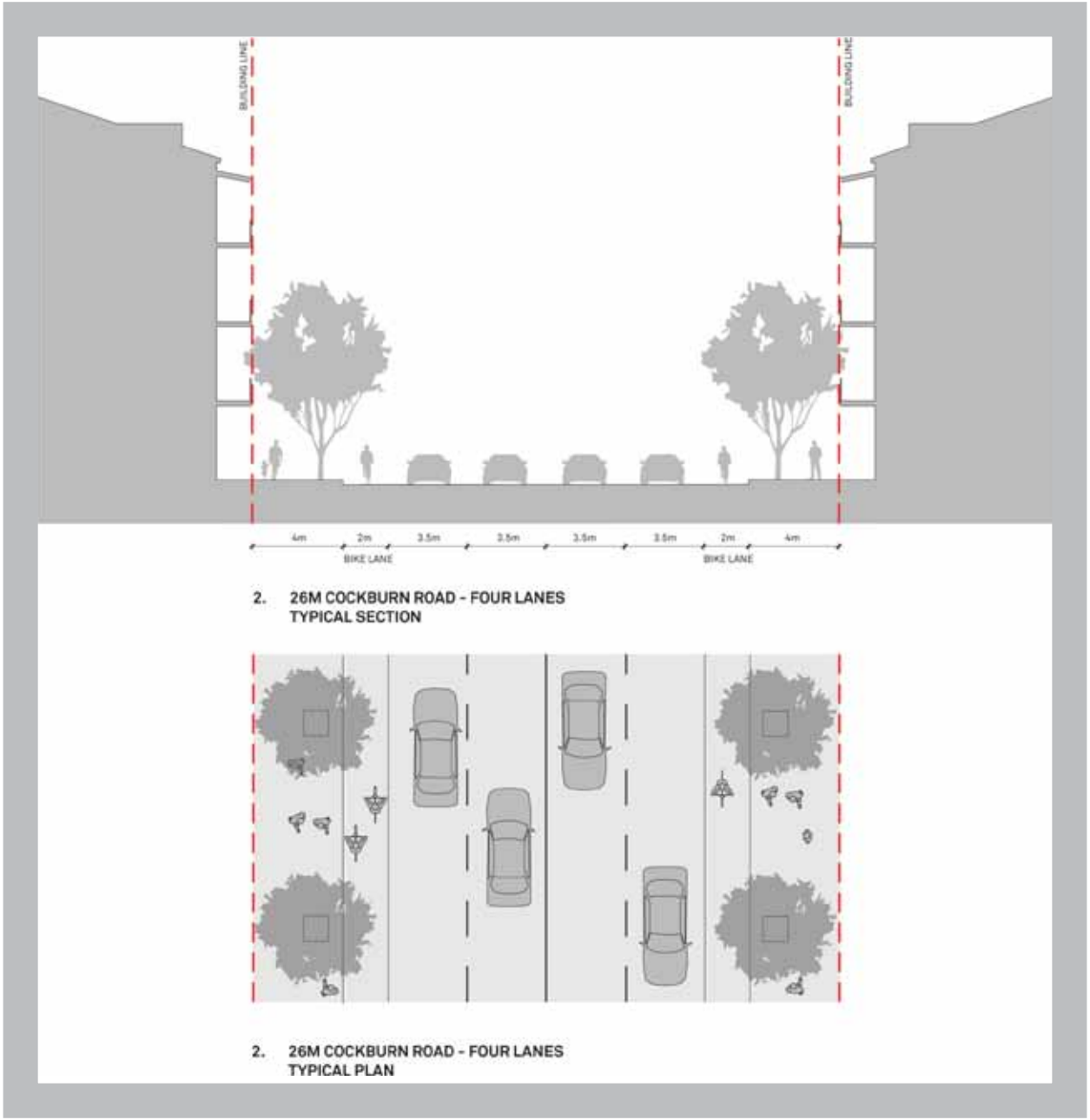


Figure 13 – Cockburn Rd cross section



Cockburn Road

Generally, the cross-sections reflect a 2 lane road configuration throughout the site. Cockburn Road is currently 2 lanes and is envisioned to remain such in the near future. If Cockburn Coast Drive is not constructed by such time as traffic along the 2 lane Cockburn Road approaches saturation, it is recommended that Cockburn Road be widened to four lanes. The configurations shown in Figure 13 are illustrative of how the transition could be accomplished while maintaining a constant right of way width and setting the kerbs and drainage once.

As planning proceeds, consideration should be given to ensuring that the provision of 4 lanes on Cockburn Road does not impede the desired pedestrian and cycling friendly character. The ITP recognizes that the current free flow north-south through traffic may be affected by the multiple signalised crossing points.

Figure 14 – Interim Cockburn Rd cross section

Main Roads has noted that a median should be provided to improve pedestrian accessibility as part of the four lane configuration. This will require additional design consideration in future planning stages.

It is envisioned that it would be reconstructed as a 2 lane road once Cockburn Coast Drive is funded and constructed. This would allow for the introduction of vegetated median to improve pedestrian crossing and aesthetics as well as kerbside rain gardens to improve stormwater management. The added benefit of this approach is that the northern portion four lane Cockburn Road could potentially serve a 'backup' alignment for the transit spine should the costs of crossing the Fremantle Caravan Park and former tip site be prohibitive.

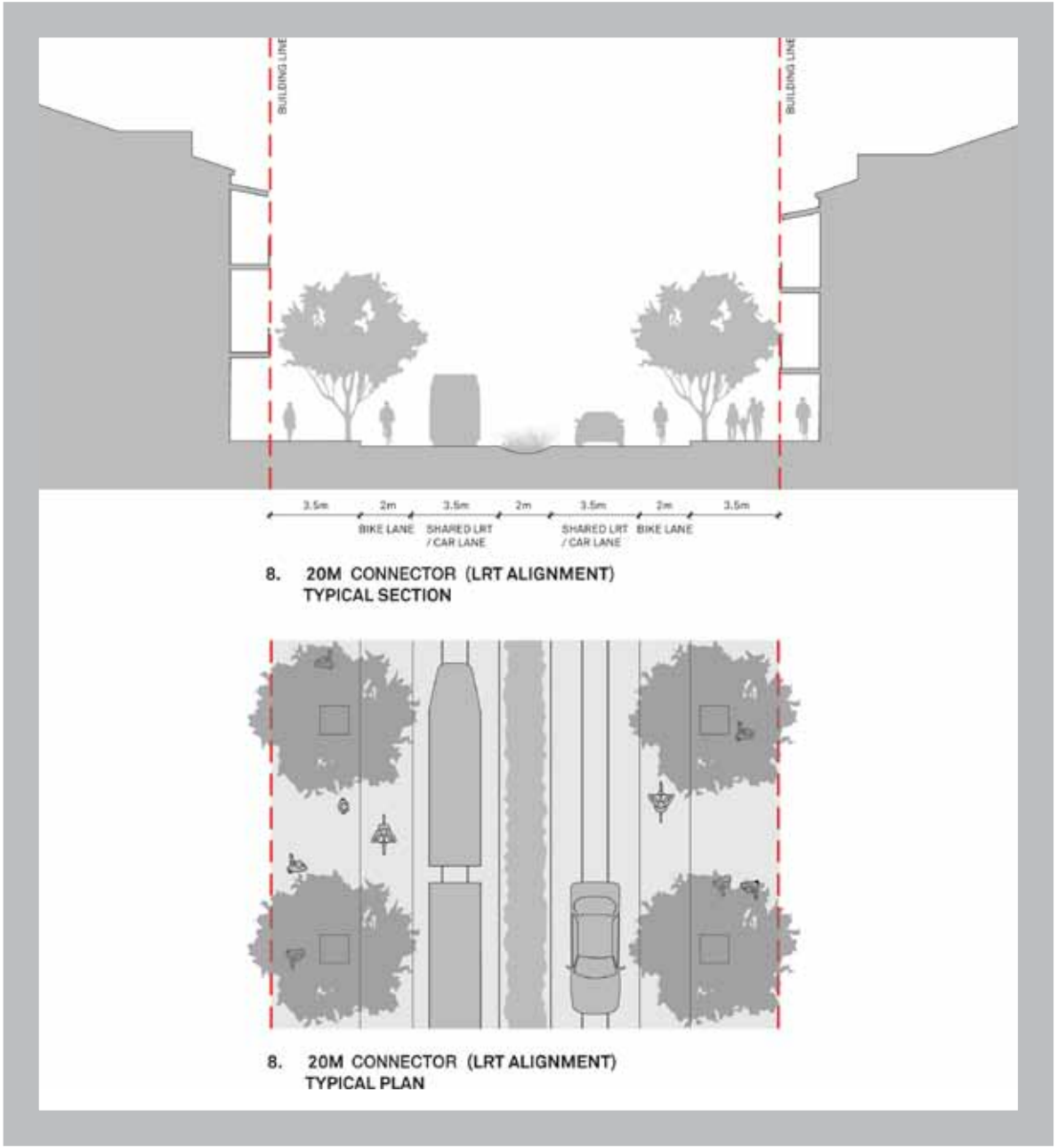


Figure 15 – Duoro Rd connector cross section

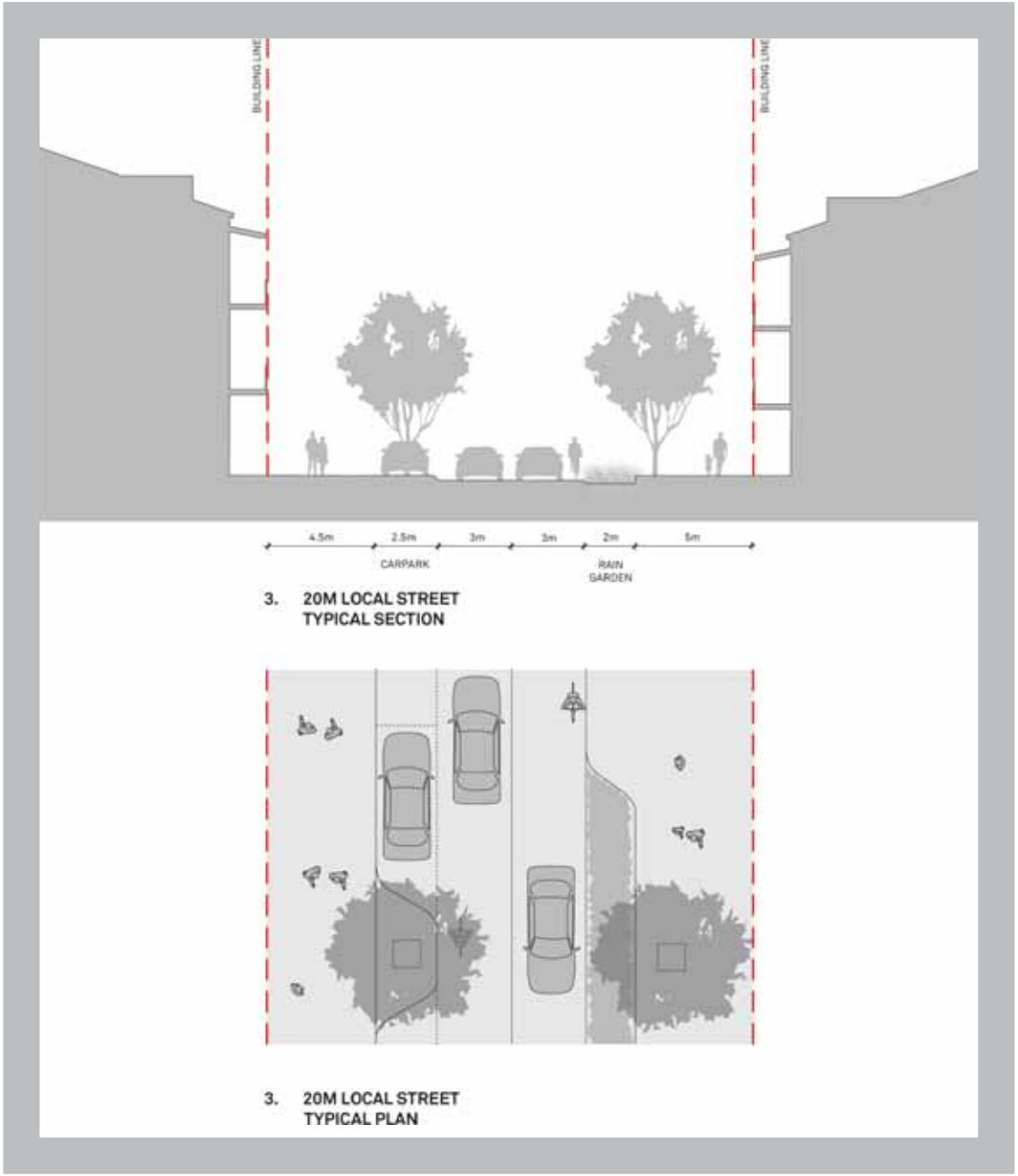


Figure 16 – Local street cross section

Cockburn Coast Drive

Cockburn Coast Drive would benefit the Cockburn Coast project and north-south road users, including freight traffic. However, the issue was raised during the ITP process that a solution to traffic generated by Cockburn Coast was needed on the basis that it is not likely that Cockburn Coast Drive would be constructed early in the development of Cockburn Coast. There was recognition from the PTG that construction of Cockburn Coast Drive is a medium to long term proposition. In addition, Cockburn Coast Drive is a part of the regional road network and is subject to separate investigation, design, funding and construction.

Consequently, the ITP recommends a very comprehensive suite of tools to minimize local traffic generation and provides an alternative strategy to accommodating local and regional travel until Cockburn Coast Drive is resolved and built.

On the basis of the items above, further discussion regarding the staging and composition of the regional road network is required as part of the local structure planning process. This should also include potential extension of Rollinson Road to Rockingham Road.

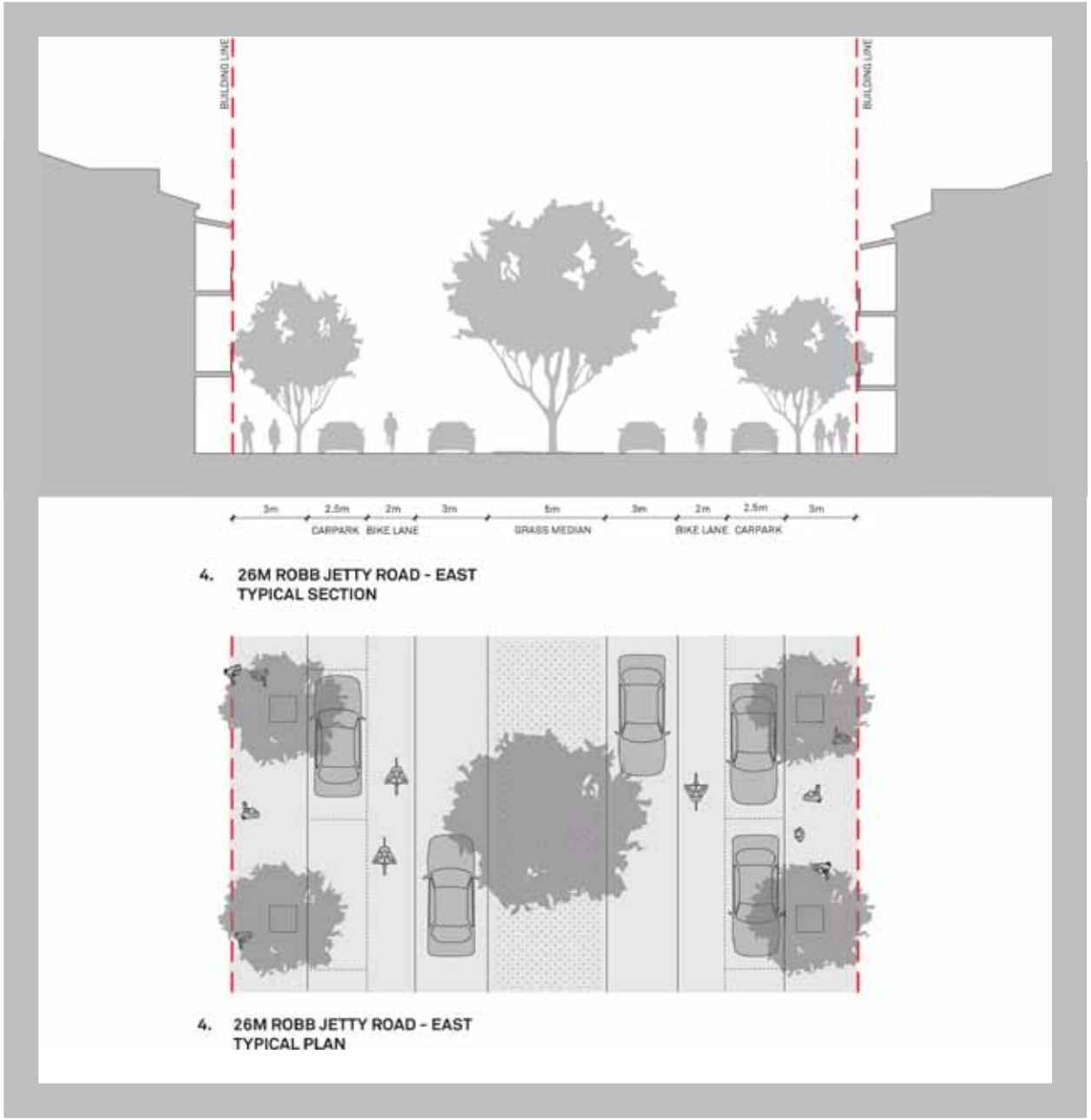


Figure 17 – Robb Jetty Rd – East cross section

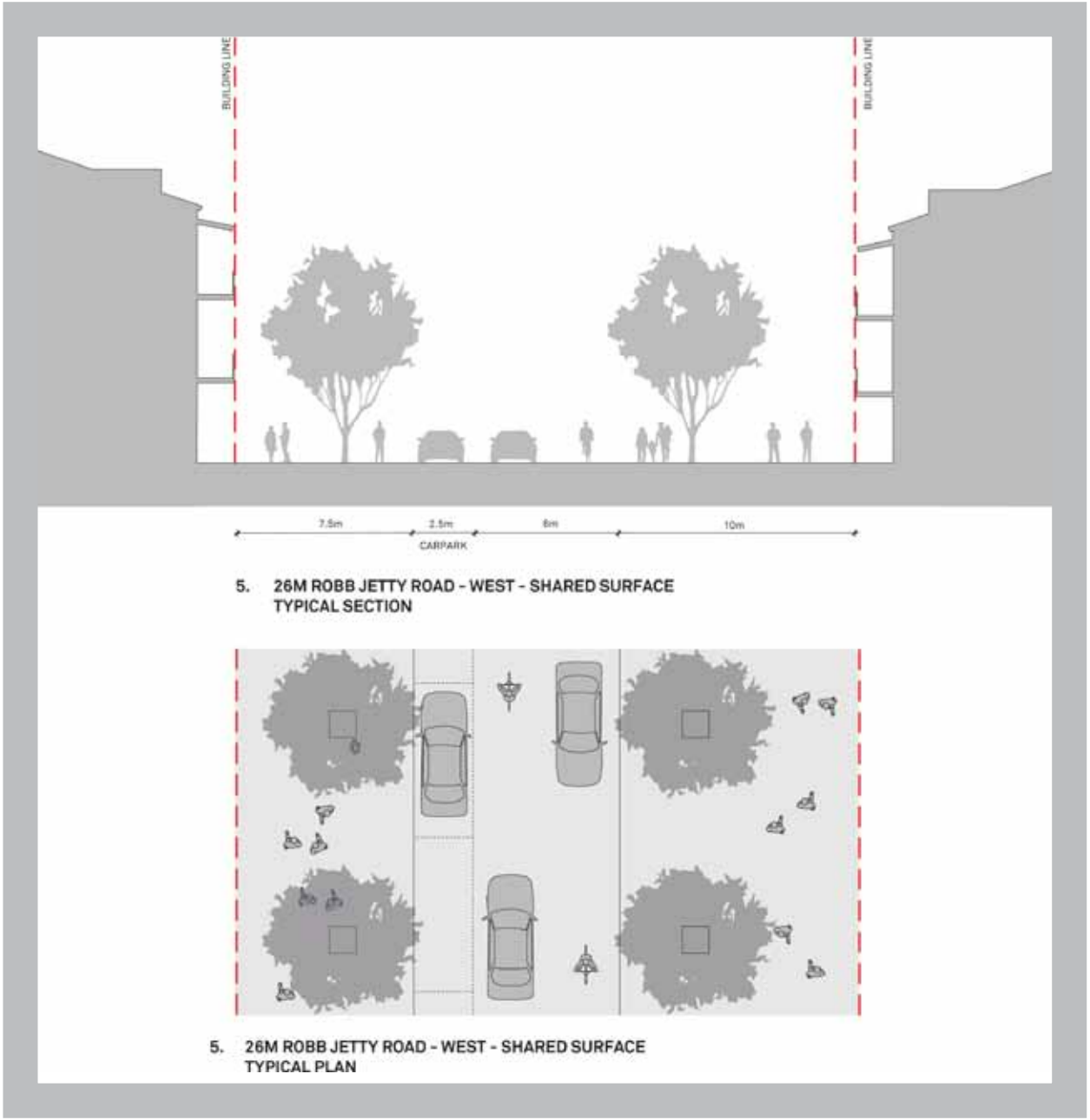


Figure 18 – Robb Jetty Rd – West cross section

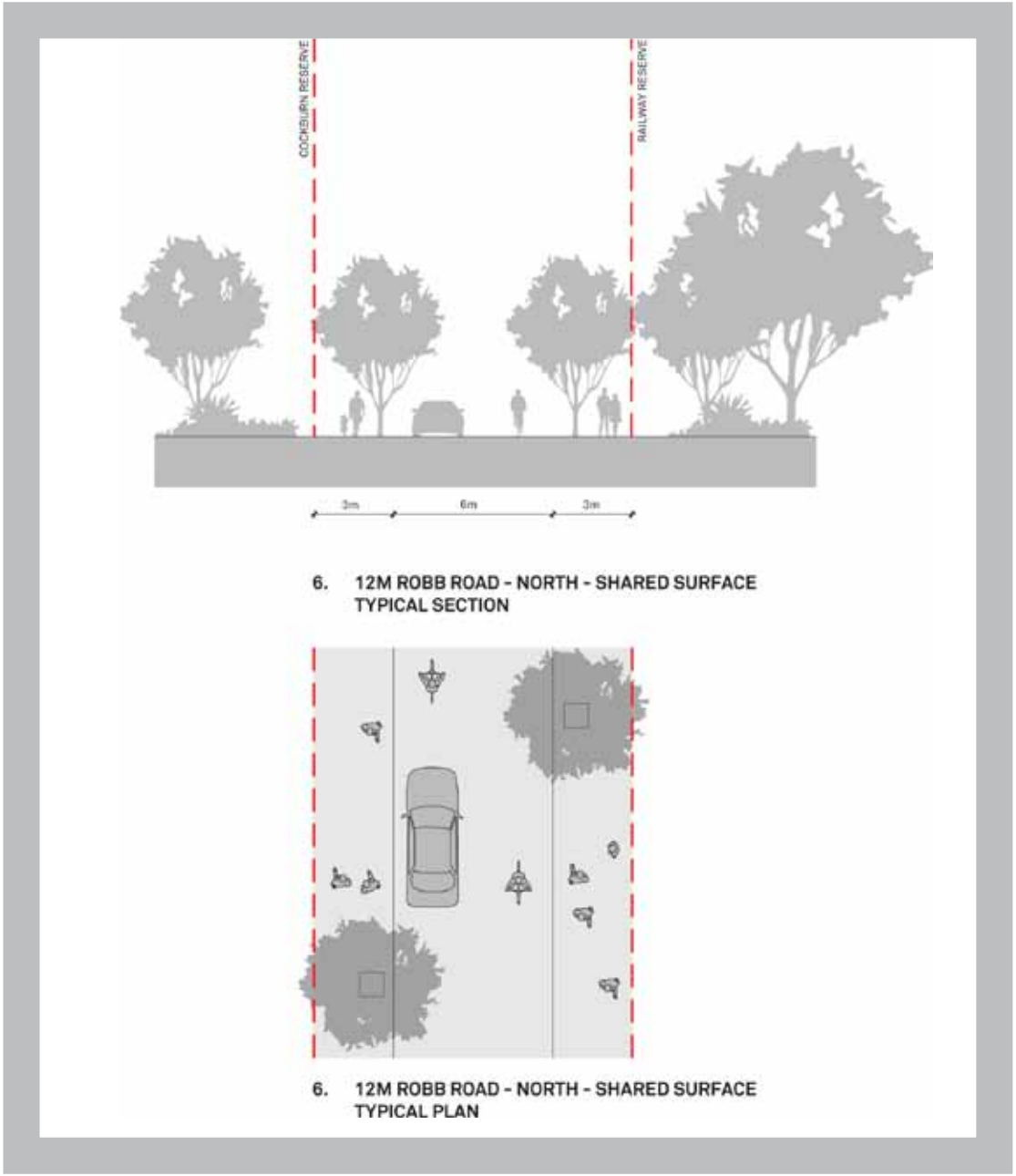


Figure 19 – Robb Rd – North cross section

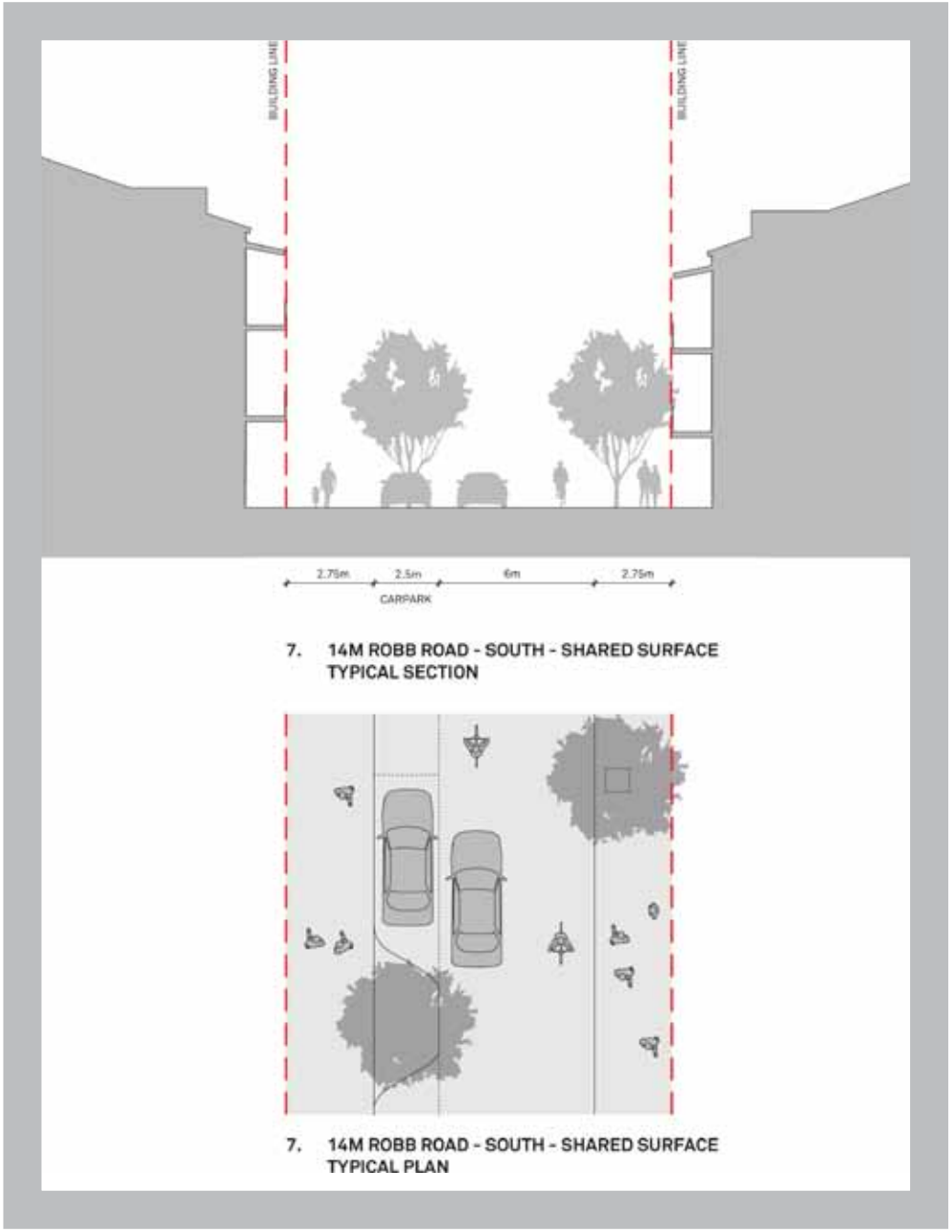


Figure 20 – Robb Rd – South cross section

Appendices

Appendix A

Project Charter for the Development and Implementation of the Integrated Transport Plan for the Cockburn Coast Project

Between

Department of Planning

Department of Transport

The City of Cockburn

The City of Fremantle

Public Transport Authority

Main Roads Western Australia and LandCorp

August 2010

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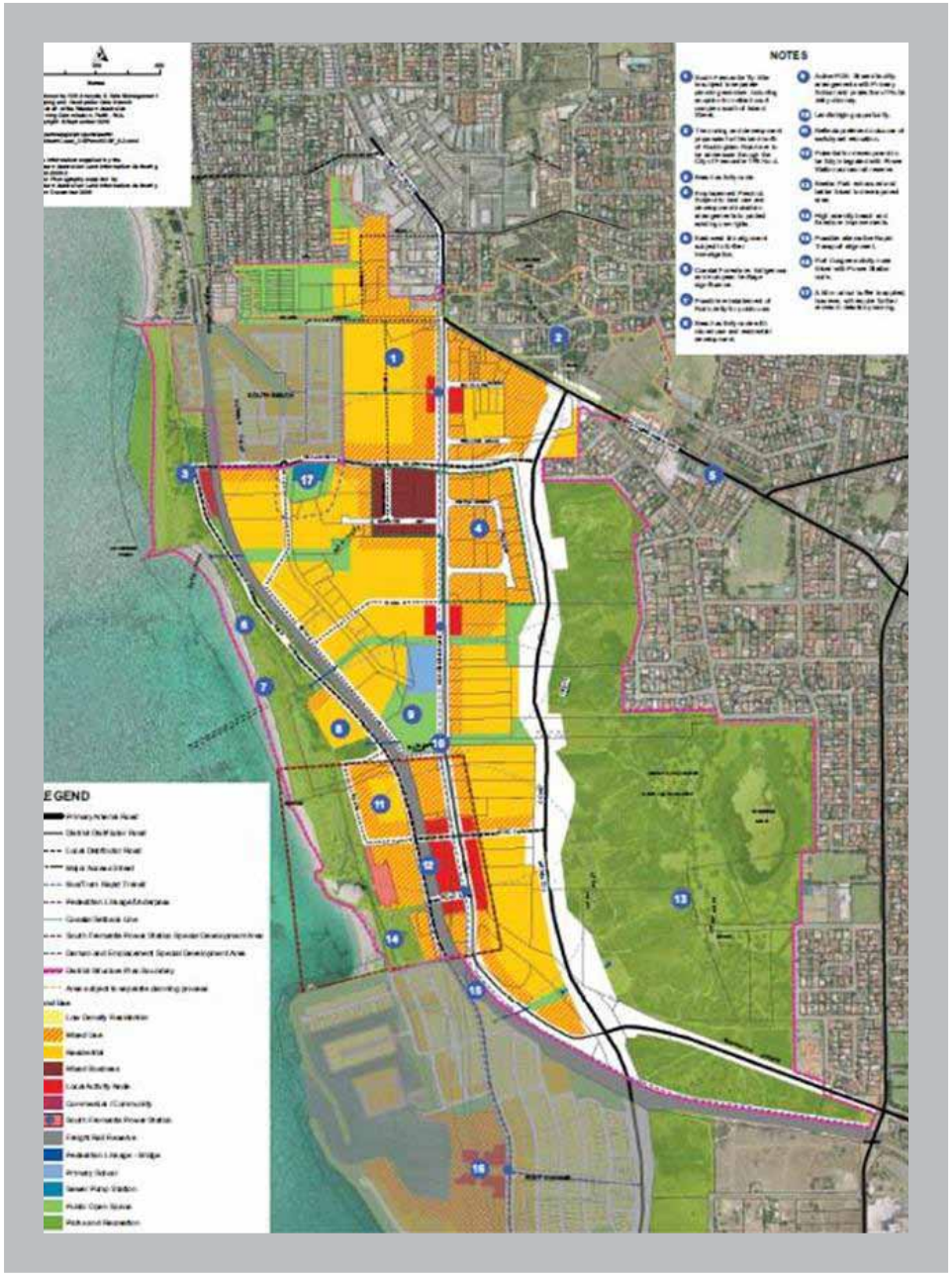
1. INTRODUCTION AND BACKGROUND

The Cockburn Coast District Structure Plan was endorsed by the Western Australian Planning Commission (WAPC) in August 2009. Following the endorsement of the District Structure Plan (DSP) the WAPC initiated an amendment to the Metropolitan Region Scheme (MRS) to rezone the Cockburn Coast project land from Industrial to Urban Deferred. The comment period for the MRS amendment concluded in May 2010 and the process is expected to conclude by the end of the year. The WAPC have indicated that one of the critical requirements for lifting the Urban Deferred zoning is the finalisation of an agreed regional transport solution that is supported by the key project stakeholders.

The realisation of the plan offers significant benefits to all parties to this agreement and will contribute significantly to state and local government planning policies and goals.

This Project Charter creates a collaborative framework for the development of an Integrated Transport Plan (ITP) that is supported and endorsed by the key planning stakeholders.

The Cockburn Coast District Structure Plan is shown right.



2. PARTNERS TO THIS CHARTER

The partners to this 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

Other partners to this charter may be included subject to the agreement of all parties or contribute to the deliberations of the group through their invited participation in the development and implementation of the Integrated Transport Plan.

The deliverable of the parties to the Charter is an agreed ITP as a critical and essential component in:

- Rezoning the project area to Urban under the MRS to allow for development to occur in accordance with the DSP;
- Creating an environment for collaborative support for the resultant regional transport solution;
- Providing clarity and certainty for Precinct Based Planning to proceed.

3. OBJECTIVES OF THE INTEGRATED TRANSPORT PLAN

The objectives of this initiative are to develop a co-ordinated and agreed Integrated Transport Plan that:

- Is consistent with and contributes positively to the realisation of the Cockburn Coast DSP;
- Addresses local transport and influence regional transport needs;
- Incorporates the views of the many project stakeholders and takes account of relevant state and local government planning strategies impacting on the region;
- Results in timely and achievable outcomes to provide local and regional planning certainty;
- Optimises the economic potential of the Cockburn Coast development and influence regional development and growth;
- Contains sufficient road and public transport system capacity to accommodate shifts and increases in travel demand; and
- Optimises the safety, efficiency and effectiveness of the local and regional transport network in a way that is appropriate and consistent with the approved DSP.

4. SCOPE OF THE INTEGRATED TRANSPORT PLAN

The project scope extends to include the Cockburn Coast project as defined in the District Structure Plan and informed by regional destinations and links. The project scope includes:

- Development of this project with an understanding of the regional context and implications (not just in the north/south direction) for centres including:
    - Fremantle
    - Rockingham
    - Cockburn Central
    - Murdoch
    - Kwinana
    - Booragoon
    - Rockingham Road/Carrington Street interchange
- Seeking a new benchmark in integrated land and transport usage solutions that achieve our land use and urban form objectives and targets for the future.
- Understanding long term (2031 or full development in the region) future transport opportunities and needs;
- Making provision for quality transit to, through and around the Cockburn Coast including public transport, walking and cycling;
- Seeking parking solutions that contribute to travel demand management outcomes.
- Preparing and gaining approval of a resultant Integrated Transport Plan;
- Seeking funding investment and commitment as part of an agreed staging plan through supporting mechanisms including a Development Contribution Scheme.

5. TIMEFRAME

This Project charter is established for the period from July 2010 until the 31st of December 2010.

At the end of 2010 the need to reform and extend the life of this Charter will be considered to reflect the current project status.

A more detailed Project Management Plan outlines the process to be followed and milestones to ensure the timely completion of the project.

6. PRINCIPLES

The parties to this Charter aspire to:

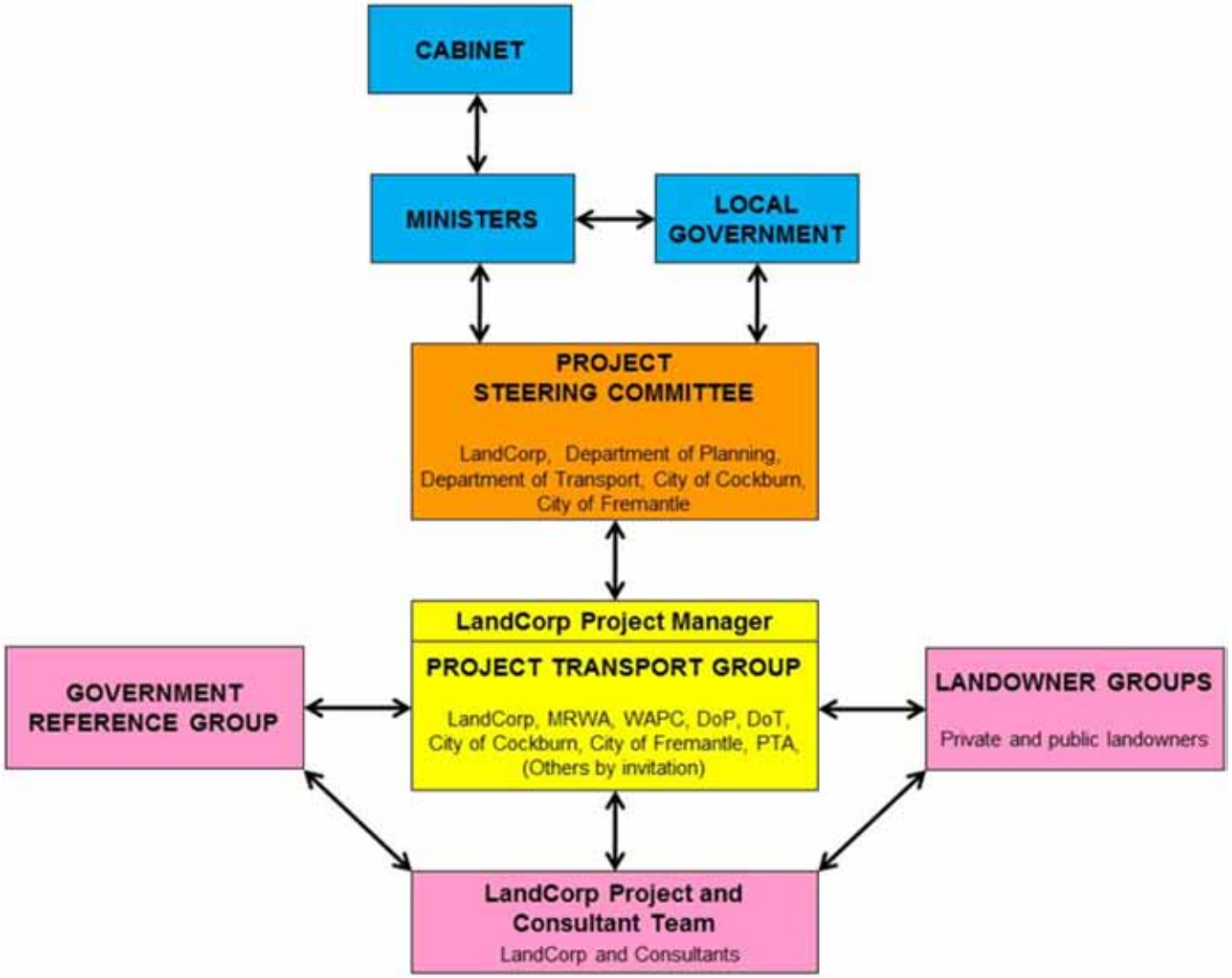
- Take collective ownership for developing and implementing an agreed ITP for the Cockburn Coast project;
- Work toward common goals as a seamlessly integrated team;
- Develop trusting, collaborative relationships based upon ethical behaviour and leadership;
- Develop and implement collaborative solutions that potentially go beyond best practice as it is currently known;
- Invite, listen and respect the varied contributions of all parties with open and honest communications and information sharing;
- Meet project challenges to deliver timely and balanced solutions;
- All parties recognise the opportunity presented to achieve collective and agency interests in facilitation the implementation of the Cockburn Coast project;
- The parties will bring their respective complementary skills and resources to this project; and
- Support the resultant outcomes at agency level.
- All parties recognise the opportunity presented to achieve collective and agency interests in facilitation the implementation of the Cockburn Coast project.
- Our collective aim is to meet the objectives of the Local Government, State Government and the community including the realisation of sustainable solutions.

7. GOVERNANCE

The development of an Integrated Transport Plan for the Cockburn Coast project that is supported by key project stakeholders is potentially controversial and likely to attract significant interest with considerable associated complexity.

Effective governance is essential to ensure sound outcomes that are informed by the different perspectives of the various project stakeholders.

The following governance model is proposed.



A brief description of the key groups and their roles is provided below.

7.1 Project Steering Committee (PSC)

A Project Steering Committee (PSC) chaired by LandCorp provides overarching strategic guidance and leadership to all aspects of the project. The group has an ongoing role to guide and lead the overall project.

The group functions as a collaborative and well integrated senior management group to align the goals and priorities of the key stakeholder organisations.

PSC representatives are high level contacts from local and state government departments. The role of the committee can be summarised as follows:

- Direction
- Guidance
- Integration
- Collaboration
- Decision making

7.2 Project Transport Group (PTG)

The role of the Project Transport Group is to respond to integrated transport planning matters only. Workshop participants agreed that the Project Transport Group will lead the project on a day to day basis and work collaboratively as a single team to deliver the ITP. The Terms of Reference for the group are to:

- Provide leadership across all elements of the Integrated Transport Plan;
- Provide strategic, operational and planning leadership and advice;
- Function collaboratively to drive innovation;
- Enable and facilitate the associated agency responses and approvals;
- Champion the resultant solutions at agency level;
- Enable and facilitate outstanding results;
- Transfer collective learning to benefit all partners for future projects;
- Ensure agency resources are available to support the associated input required;
- Contribute positively to the resultant Business Case/s; and
- Ensuring appropriate communications within and between the partner agencies.

The PTG will include senior representatives of all parties to this agreement and will be filled by people representing the core business of the Department.

7.3 Landowner Group

The Landowner Group (LG) consists of all government and non-government landowners in the project area. This group was involved in various forms during development of the DSP. Their engagement in the project will be monitored through the LandCorp project team at critical stages of the development process. This is likely to take the following form:

- Direct dialogue with LandCorp team.
- nclusion in critical stages of the project – i.e. Masterplan and Precinct Planning, both of which will include findings of the PTG as this work is progressed.
- Direct dialogue with State and Local Government representatives.

7.4 LandCorp and the Project Team

LandCorp is a major land owner in the Cockburn Coast precinct and has taken the lead role for implementing the Cockburn Coast project on behalf of government.

LandCorp has established a Project Team with consultants appointed for all relevant disciplines to inform the project and address relevant matters. The purpose of LandCorp and the Project Team is to:

- Provide specialist input and skills to assist in the delivery process;
- To manage the day to day project development tasks;
- o consult with and manage the expectations of landowners in the project;
- To lead the delivery of key project deliverables.
- To receive input and advice from the PTG through development of the ITP.

8. REPORTING AND ACCOUNTABILITY

Having a stake in The project owners are all participating agencies with LandCorp taking the lead agency role in project development and implementation. These parties have established a funding arrangement for this project to date.

Include in governance.

8.1 Role of the Minister for Lands:

As lead agency LandCorp will report to the Minister as required through the relevant channels and agency protocols.

The Minister may, if required take a role in addressing and resolving any unresolved issues that are put before him.

8.1 Role of the Minister for Transport:

LandCorp will report to the Minister as required through the relevant channels and agency protocols.

The Minister may, if required take a role in addressing and resolving any unresolved issues that are put before him.

8.2 Role of the Minister for Planning:

LandCorp will report to the Minister as required through the relevant channels and agency protocols.

The Minister may, if required take a role in addressing and resolving any unresolved issues that are put before him.

8.4 Role of the City of Cockburn and City of Fremantle

LandCorp will report to the two participating Local Government Authorities as required through the relevant channels and agency protocols.

The two Local Government Authorities will, if required take a role in addressing and resolving any unresolved issues that are put before them.

9. FINANCE, COST SHARING AND RESOURCING

LandCorp will fund the preparation of the ITP for the Cockburn Coast project.

Any costs deemed redeemable in accordance with State Planning Policy 3.6 - Developer Contributions for Infrastructure will be pursued by LandCorp and incorporated in the project Development Contribution Scheme or other value capture scheme. Can this be removed or clarified?

If additional studies are required of a regional nature the responsible agency will be required to fund this study either in full or part thereof. All regional transport studies currently underway will continue with the agency responsible to continue funding the study. This needs to be better understood under agreed and where appropriate shared costing models.

10. PROCUREMENT OF RELEVANT SERVICES

LandCorp is responsible for the management of the procurement of all consultants for the preparation of the ITP.

Procurement will be undertaken under various agency procurement methodologies and mechanisms including Panel Contracts and other transparent and accountable procurement innovations.

11. MEDIA COMMUNICATIONS

All verbal communications with, or enquires from the media, in relation to the project, will be taken under advisement and referred initially to LandCorp. LandCorp will work with media officers from all agencies to respond to such enquiries.

Any statement made on behalf of any Agency will require authority from the relevant agency personnel.

12. SIGNATORIES

Signatories to the Alliance Agreement are:

- The CEO of LandCorp;
- The CEO of the City of Cockburn;
- The CEO of the City of Fremantle;
- The Director General of Transport;
- The Director General of Planning;

Additional parties and signatories to this agreement will be considered where an appropriate need is identified.

Appendix B – Case studies

In order to identify potential issues and givens, recent and concurrent studies and plans have been reviewed by the PTG. The relevant studies and plans include the following.

South Metropolitan and Peel Region Integrated Land Use and Transport Study

A South Metropolitan and Peel Region Integrated Land Use and Transport Study is underway by the DoP. The plan will consider road and public transport needs and at the time of this study's report is around 50% complete and allows for 3 land uses scenarios:

- 2031 Consolidated
- 2031 High Growth and
- Business As Usual

Since the study will not be completed during the timeframe for the Cockburn Coast DSP approval, it will provide limited input to the ITP.

Road Network Study West of planned Stock Road/ Roe Highway Interchange

The transport study by the DoP for the area west of Stock Road is now complete and endorsed by the West Australia Planning Commission (WAPC) The study was prepared to address major issues including:

- Capacity at Stirling Bridge, Douro Road, Hampton Road and its use as a bus corridor
- Population growth and increased traffic due to Cockburn Coast and growth of freight traffic
- Impacts of planned developments in the wider area (e.g., Latitude 32).
- Potential loss of connectivity along Stock Road at Forest Road and Phoenix Road.

The study finds that north-south traffic generally moves westward onto the new network as it is developed. Similarly, east west traffic moves onto the new central connection between Stock Road and Hampton Road. It also finds that the existing public transport route along Hampton Road and the route along Rockingham Road will reduce the capacity of the proposed network.

The study provides limited input to this study for the following reasons:

- The study illustrates the outcomes of progressively adding roadways and roadway capacity to the existing network. Rather than model actual alternatives as options, the analysis is restricted to the staging of one set of improvements. For example, the study results provided to date do not show the impacts of a 'no build' scenario, alternative modal infrastructure and mode shifts, alternative fuel costs scenarios and alternative road improvements such as the widening of Stock Road in lieu of these improvements.
- Additionally the actual need for the improvements is not documented. Analysis of the generated and induced demand by the network is also not provided. Without such, the benefits of proposed network improvements are unclear.
- The traffic outcomes are largely dependent on a hypothetical roadway link between Rollinson Road and South Terrace. As this alignment would require resumption of recently developed land and homes, the study concludes this link has a low probability. Forecasts for Stages B, C and D without this link were not provided.

20 Year Public Transport Plan

The Perth Public Transport Plan is nearing completion and is likely to go to government in 011 The Plan identifies key public transport provisions and needs as opposed to specific public transport modes. It also identifies public transport route corridors and links. The Fremantle Cockburn corridor is identified in the plan as a potential bus rapid transit (BRT) or light rail transit (LRT) corridor. It is anticipated that plan will not identify LRT along this corridor as a priority for the first 10 year planning horizon.

City of Fremantle Light Rail Study

The City of Fremantle is finalising a light rail transit study to identify better quality public transport in the future that go beyond conventional bus services. The Council is currently considering which corridor, to recommend for use as a LRT alignment. The alignment study does not forecast potential patronage for any of the alignments. Consequently, patronage forecasting for the corridor will be needed to assess the viability of LRT serving the Cockburn Coast development.

Additional studies

Additional studies that will be reflected in the DSP include:

- Directions 2031
- The Cockburn Coast Drive Route Definition Report (prepared for DoP by Worley Parsons)
- The transport analysis prepared in support of the DSP (prepared for DoP by Worley Parsons)
- The Greens Light Rail Study – Senator Scott Ludlum and
- The Metropolitan Region Scheme (MRS) removal of the Fremantle Eastern Bypass report prepared by Robyn White presenting alternative transport solutions.

Appendix C – 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:

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

Some of the economic concepts presented below have been adapted from the following reports by the Victoria Transport Policy Institute (VTPI):

- Smart Congestion Reductions – Re-evaluating the Role of Highway Expansion for Improving Urban Transportation (2010) and
- Smart Congestion Reductions – Re-evaluating the Role of Public Transport for Improving Urban Transportation (2010).

Both monographs are available on the VTPI web site (www.vtpi.org).

Solve the right problem

We often assume that traffic congestion is the most significant transport problem. Cities exist because they promote social interactions and economic transactions. Congestion occurs where lots of people pursue these activities within limited space. Empty streets are a sign of failure. While congestion is an unfortunate consequence of prosperity, it is not a cause of economic decline and urban decay. A larger number and wider variety of activities can be accommodated in cities in suburbs or rural communities. At the end of the day, congestion may be worth the wait.

Traffic congestion is only a small proportion of the average car cost per vehicle kilometre. A much higher magnitude of costs is attributable to vehicle ownership, crash damages, parking subsidies, vehicle operation or roadway costs. Environmental costs, roadway land value, residential parking, fuel externalities or traffic services are each only slightly lower than congestion costs. Thus, it is not cost effective to reduce congestion costs if it raises other costs even slightly. In turn, a more desirable strategy may be to identify congestion reduction strategies that reduce other costs, even slightly.

In addition, there are other potential problems traditional transportation approaches have typically overlooked. Travel behaviour research has shown that transfer and waiting times, such as walking from the car to the office, or waiting for a bus, comprise a large share of trip times and are viewed by travellers as far more onerous than in-vehicle travel time. Most travellers would rather reduce transfer and waiting times by five minutes than in-vehicle travel on congested roadways by five minutes.

Recognize added capacity grows and induces traffic

Even if congestion was the right problem, there is doubt that congestion can be solved. It is increasingly evident that expanding roadways tends to generate traffic and induce travel (increase total vehicle mileage) compared with what would otherwise occur. Traffic grows when roads are uncongested, but growth rates decline as congestion develops, reaching a self-limiting equilibrium. If network capacity is added, traffic growth continues until it reaches a new equilibrium. The additional peak period vehicle travel that results is called generated traffic. This results from a shift in time and route. The growth that consists of absolute increases in vehicle travel as measured by additional mileage is 'induced travel'.

New road network capacity will attract more cars because of the reduced travel time costs. Travel time costs refer to the cost of both time spent on actual travel as well as waiting time. It is one of the largest categories currently "counted" of transportation costs and its reduction is typically promoted as the primary benefit of a transportation project improvement.

When capacity is added on a congested road, delay is reduced in the short term and traffic speeds increase. Increased speed reduces the time cost of a trip, making the route more attractive. Travellers who previously used other modes or routes due to congestion, begin to use the route. As a result, the facility gradually becomes congested again. Absent some corresponding increase in the monetary price of a trip, any change that reduces delays and travel times is subject to this effect.

Congestion tends to maintain equilibrium. If congestion increases, people change route, destination, travel time and mode to avoid delay.

If congestion declines, they take additional peak-period vehicle trips. Reducing the point of equilibrium is the only way to reduce long-term congestion.

Studies show that the majority of additional capacity is filled with new traffic within 5 years. It was also shown that each 1% increase in highway lane miles increased vehicle miles travelled by 0.65%. In summary, additional capacity causes people to both travel more and further. Ultimately each increase in vehicle kilometres travelled (VKT) of 1% has been shown to increase delays by 1%. (VTPI)

Select comprehensive measures of success

Conventional transport assessment practices undervalue strategies that provide multiple benefits. In part this is an outcome of the lack of integrated planning among infrastructure providers. For example, road transport agencies are responsible for improving vehicle flow. Transit agencies are responsible for providing mobility to non-drivers. Environmental agencies are responsible for reducing pollution emissions. This results in organizations implementing solutions to problems within their mandate that may actually exacerbate other problems.

Forecast growth realistically

The prognostic capability of regional travel demand models is increasingly coming into question. The growth forecasts produced by these models may be overestimated since the model extrapolates past trends which may no longer be applicable in future years.

For example, the use of motor vehicles has grown tremendously in the past due to relatively inexpensive fuel costs, declining vehicle operating costs and increasing vehicle travel speeds. But these trends are unlikely to continue. Per capita vehicle ownership and mileage have peaked in the US, while demand for alternative travel is still increasing. However, many transport models still forecast increases in both factors. In addition, as a likely result of peak oil and global competition for fuel resources, fuel prices are likely to increase significantly over time. This will have a significant impact on rates of driving.

In addition, the forecast growth in regional models does not recognize the constraints of the existing road network. As existing road networks typically have insufficient capacity to accommodate forecast growth, the forecast growth is not likely to occur.

Understand diminishing economic benefits of added highway capacity

Chronic congestion is a symptom of inadequate accessibility options that force people to drive for every trip and that in turn often encourage more dispersed land use patterns that also increase travel distances. New road capacity may reduce symptoms over the short term but exacerbate problems over the long term.

Continually expanding congested roadways tends to be inefficient. The first highways in an area often provide large economic returns, but marginal benefits diminish as more capacity is added. The initial projects tend to be selected based on the principles of maximizing benefits and minimizing costs.

As a result, less cost effective improvements are left for subsequent implementation.

Inter-regional highways (those connecting cities) tend to provide greater economic benefits and have lower unit costs than local highway expansion due to numerous conflicts and high land costs in urban areas. Adding capacity tends to provide declining user benefits since consumers are smart enough to prioritise trips. If highways are congested, travellers organize their lives to avoid peak automobile period trips. As highway capacity increases, they travel more during peak periods, perhaps driving across town during rush hour for an errand that would be deferred, or moving further away from their work site. Each additional vehicle mile provides smaller user benefits since the most valued vehicle mile trips are already taken.

There is increasing evidence that the forecast congestion reduction impacts and economic benefits of additional roadway capacity are exaggerated. For example, according to a survey performed by HDR Consulting with the Missouri Department of Transportation (http://www.gatewaystreets.org/2010/03/economic-impact-of-highway-removal-is.html), the two year closure of Interstate 64 had no discernable economic impact on businesses near the highway compared to businesses elsewhere in the Saint Louis region. It further concluded that any economic impacts had more to do with the general economic downturn than the highway closure. It raises the question, that if additional highway capacity has significant economic benefit, how does highway removal not create a similar economic decline?

A potential range of broader benefits includes:

- Roadway cost savings
- Parking savings
- Consumer cost savings
- Transport choice
- Mobility for non-drivers
- Improved traffic safety
- Reduced pollution
- Energy conservation
- Efficient land use (support of the strategic plan)
- Improved fitness and health

Where feasible, the measures are intended to allow for a comparison across modes rather than defaulting to a single mode. This requires a shift away from some of the traditional measures of success, such as relief of automobile congestion.

For example, high quality transit services reduce per capita congestion costs. When expressed as a 'person' rather than vehicle, congestion management allows for a very different outcome than conventional transport planning.

In this example, this does not mean cities with quality transit lack congestion. In fact, congestion, measured by the conventional roadway level of service or average traffic speeds can be particularly intense in some cities with excellent transit. However, people in these cities have travel options available on the congested corridor, and tend to drive fewer trips and shorter distances, and so they experience fewer annual hours of congestion delay. In turn cities are shown to expend less infrastructure investment on transport when they have a well balanced transport system.

Indicators such as vehicular measures of delay often ignore delay reductions when people shift to transit, and from TODs that reduce travel distances. These vehicular travel time measures focus on mobility by motor vehicle rather than overall accessibility.

As more objectives or measures of success are considered the value of alternative transport investment increases. For example, rail transit tends to reduce per capita vehicle ownership and use and encourage more compact, walkable development patterns, which can provide a variety of other externalized benefits that are not measured.

Acknowledge external costs of road way capacity and additional traffic

There is a growing awareness of the hidden costs associated with additional roadway capacity and car ownership. Whereas environmental impacts have been recognized, adverse health, socio and economic impacts s Among the concern are increased contributions of carbon dioxide, poor urban air quality, noise, accidents, demand for impervious surface (roads and parking), suburban sprawl (land consumption) and decline in healthy active transport (walking and biking).

Increased car ownership and use also incurs economic costs related to retail activity due to the resultant growth in dispersed large retail centres. In addition to the closure of local shops and resultant vacant property dereliction and amenity loss, 'food deserts' have been created. These are areas where low income families with no car are unable to access fresh food. Social impacts such as vandalism and increased social marginalisation and segregation are also produced.

There are also substantial unrecognised costs to households, especially in car dependent areas. Recent research (2009) conducted by Parsons Brinckerhoff in conjunction with the Curtin University Sustainability Policy (CUSP) Institute found that the cost of both on private and public transport operations for green field development is around $18,000 per household per year more than that for urban redevelopment.

Compare roadway expansion with other transportation improvement options

With a mature roadway system, it may be better to increase transport diversity and encourage efficiency rather than continuing to expand highway capacity.

For example, it has been found that congestion delay declines in cities as rail transit mileage increases. Conversely, delay increases as bus transit mileage increases. Causes attributed to this include that buses attract fewer motorists, contribute to congestion and do little to increase land use accessibility.

It has also been found that congestion growth rates tend to decline in cities after light rail service begins. For example, Baltimore's congestion index increased at an average of 2.8% annually before light rail but only 1.5% after. Sacramento's index grew 4.5% annually before light rail, but only 2.2% after. Between 1998 and 2003, Portland's population grew 14%, but per capita congestion delay did not increase, due to rail transit investments that significantly increased ridership during that period.

When a road is congested, even small reductions in traffic volume can significantly increase travel speeds. For example, on a highway lane with 2000 vehicles per hour, a 5% reduction in traffic volumes will typically increase travel speeds by almost 20 miles per hour and eliminate stop and go conditions. Similar benefits occur from traffic volume reductions on congested surface streets.

When transit is faster than driving, a portion of motorists shift until the highway reaches a new equilibrium (until congestion declines so transit's time advantage attracts no additional motorists).

The number of motorists who shift may be small, but it can be enough to reduce delays. Studies have found that the faster the transit service, the faster the travel speeds on parallel highways. Comparisons between cities also indicate that total congestion delay tends to be lower in areas with good transit service.

For areas with relatively similar densities, travel behaviour can vary significantly by providing additional dedicated transit. As shown in the 2006 Census data, for example, neighbourhoods in greater Perth located within close proximity of high frequency and dedicated public transport routes have a much higher proportion of journey to work trips by public transport than the Perth regional average.

Prioritise smart growth

Climate change and peak oil have risen to the forefront of our awareness of the challenges before us. But, there are a number of other concerns, such as the rise of infectious disease, collapse of fisheries, loss of forests and biodiversity, and depletion of water supplies and growing demand for agricultural production, which relate to our land use and transport decisions.

Some cities consider these issues urgent and significant enough, particularly the greenhouse gas emissions associated with vehicular travel, to require a focus on smart growth. Smart growth gives priority to urban infill and compact development linked to alternative travel. It also promotes travel independence so those that cannot or choose not to drive have sufficient options.

This approach can produce a 'green dividend' as well. A study by the CEO for Cities in 2010, for example, found that as a result of Portland, Oregon smart growth strategies, area residents travel 20 fewer miles each day and save $2.6 billion (US) in transport and time costs each year. Portland's strategy is also noteworthy due to its limitation on additional highway capacity.

Smart growth emphasizes several of the approaches set forth in the National Charter for ILUTP listed above. In particular it promotes reducing the need for travel, reducing trip lengths and providing mode choices. A recent study by Reid Ewing and Robert Cervero (2010) found that accessibility and reduced trip lengths had the strongest impact on reducing the overall amount of travel distance.

As discussed earlier, roadway capacity tends to increase trip distances, this is an important consideration in the Cockburn Coast context as travel reduction was selected as a measure of success. In addition, walking activity is most strongly related to measures of land use diversity, intersection density and the number of destinations within walking distance.

Smart growth also puts 'people and place' before congestion relief and transit operations. The creation of a vibrant, mixed use community that attains the broad range of benefits provided by transit-oriented development (TOD) is a distinguishing feature of smart growth. The success of TODs is generally reliant on a high level of amenity and quality of public spaces and streets that overcome the perceived benefits associated with conventional development and traffic management.

The convenience and quality of the travel experience within and to/from the development can be a critical amenity to attracting people to live and work in smart growth communities.

As shown in the discussion below, smart growth creates a trip that is as 'desirable as the destination.'

Concentrated urban activity, such as proposed for the Cockburn Coast, can create more efficient transit service and a service frequency that makes transit an attractive choice for people. However, the focus of a TOD is not transit design based on regional mobility. Instead, it requires a design that contributes to the sense of amenity and vibrancy. This is referred to as development oriented transit (DOT).

For example, station areas should be highly connected and central to the place. This station placement at the centre rather than the edge is needed to ensure connectivity. It also requires both physical and visual access across the tracks and surrounding streets. The gateway site must serve by the needs of the transit user and the users of the adjoining neighbourhood.

Stations should be about more than about getting on or off the train. This is particularly challenging since design has to satisfy operational demands of the transit and convenience demands of transit users. However, for accessibility purposes, transit service providers and infrastructure owners need to accept less than optimal operational efficiencies to prioritise pedestrians and placemaking.

In many cases of DOT, there is a place-making element such as public plazas. These plazas are part of the sequence through which transit patrons pass as the access the various modes or services at a station. They are also shared spaces with other groups from the surrounding uses. The resulting activity helps to create a feel or identity that helps attract tenants and residents to the place. A second supportive design approach is to minimize the footprint required by the station and the transit related uses such as a bus interchange and park and ride.

The placemaking element helps to improve transit ridership. Studies have shown that the quality of the station has a significant effect on the perceived penalty of transferring between transit modes rather than having a 'one seat' ride. This will be an important consideration in planning for connectivity to the Fremantle train line.

Promote the trip not taken

Simply put, this means reducing the need to make trips by powered modes and attracting people to willingly choose to travel by alternative modes when trips are required. As a best practice, it places much more emphasis on accessibility as opposed to mobility. It also introduces the philosophy of 'development oriented transit'.

Mobility refers to the ability of individuals or vehicles to move around the network with minimal impediment. Mobility planning focuses on saving time and substitutes ease of vehicle movement in place of actual outcome improvements, such as business efficiency. It is also the basis of single mode planning.

Accessibility refers to the ability of individuals or businesses to efficiently meet their needs. Its aim is to improve the quality of how and where we spend our time.

In addition to the obvious mixing of uses at key locations and more intense development in a compact area, the following factors are key planning factors for accessibility:

- how the building meets the street
- character and quality of the public realm that is formed by the spaces between buildings and layout and design of the streets

These are significant factors in that streets comprise nearly a third of the development area. If we can produce the desired outcomes, then we have not only immensely contributed to the Cockburn Coast but to the overall surrounding area.

Cockburn Coast will be designed to promote walking and biking and create transit ridership. It will create a level of intensity at the Power Station Precinct and Main Street Precinct that puts riders near the station and shortens the distance between the origins and destinations of transit users as well as residents and workers within the station area.

Quality transit environment and service can reduce 'travel time costs' to people who shift mode. Even if transit takes more minutes, many travellers consider their cost per minute lower than driving if transit service is attractive and comfortable (passengers have a seat, vehicles and stations are clean and safe), allowing passengers to work or relax. This is potentially a critical aspect for a short-distance connection between Cockburn Coast and the Fremantle CBD and train station.

The quality of travel options affects the level of congestion equilibrium. If alternative modes are inferior, motorists will resist shifting modes until congestion becomes more severe. If alternatives are attractive, motorists will more readily shift mode,

reducing the congestion equilibrium. Improving travel options can therefore reduce delay for both the travellers who shift modes and those who continue to drive (if only cartoon).

To attract motorists, alternative travel must offer a travel time cost advantage. For longer distance trips, this can be done through prioritisation. For shorter trips, such as between Cockburn Coast and the Fremantle CBD and train station, attracting choice riders (travellers who could drive), transit must be comfortable, convenient, reliable and affordable. Although bus service is excellent for serving dispersed locations, on major urban corridors rail tends to be more effective at attracting such riders. In particular, light rail vehicles tend to offer a more comfortable and stable ride and are propelled by quieter electric motors than internal combustion engines.

Use transit to catalyse TODs

Rail transit can stimulate transit oriented developments (TODs) which are compact, mixed-used walkable urban villages. Residents in TODs tend to own fewer cars and drive less compared to automobile-dependent communities. Households often reduce their vehicle travel when they move to transit oriented locations.

Public transport is one of the most critical factors to attaining the aspirations for Cockburn Coast and to creating the value uplift required to create the requisite level of amenity. While the DSP provides for the provision of high quality bus service through the study area from Hampton Road, it leaves the issue of light rail transport (LRT) to be resolved separately.

However, the ITP recognizes that LRT is potentially the single most important aspect that distinguishes Cockburn Coast from being a conventional development. In addition to fostering a successful, dynamic urban renewal outcome by attracting more developer interest and providing for better integration with adjoining land use than BRT, properties in proximity to LRT stations have significantly higher values.

In addition, the success in attaining the DSP aspirations depends heavily on the level and mode of public transport. LRT can provide a much stronger basis for reducing auto-dependence and increase the flexibility in balancing local and regional trips at Cockburn Coast. When linked to a land use development strategy, the definition of a successful public transport can be broader than ‘efficient’ or strictly in terms of numbers of riders.

Instead, success can be measured in terms of land use outcomes caused by the infrastructure investment. The link between transportation and land use is inextricable. The kind of communities we live and work in directly affect the way we get around, and vice versa. Yet that line of reasoning, no matter its self evidence, has escaped transportation policy over the years.

For example, in the past, when it came to public transportation, the US federal government encouraged cities build train and bus corridors that shuttled people over long distances as quickly as possible. However, recent success in using LRT to catalyse the desired type of infill development to produce shorter trips, the Portland Streetcar (tram), is evidence of the economic uplift and infill potential of short haul systems. Between 1997 and 2008, it attracted over $3.5 billion in investment within three blocks of the line, translating to over 10,000 housing units and 500,000 square metres of commercial space (Streetcar-Development Linkage: The Portland Streetcar Loop, E.D. Hovee & Associates 2008).

As a result, the emerging federal transport policy in the US now emphasizes use of LRT to create dense neighbourhoods where people perform most of their activities within a small area. This is return to the adage that ‘development follows the rails.’

This new emphasis on transportation that creates denser, walkable neighbourhoods is a sounder investment in the long term than seemingly high-ridership projects that fit into cost-benefit criteria. These areas are more likely to result in people not needing to take as many trips using motorized transportation. A step forward could in some ways involve moving less.

Appendix D – Concurrent studies

Freiburg, Germany

The focus of the Freiburg Integrated Transport Strategy is to make private motor vehicle travel less attractive while making alternative transport (walk, bike and public transport). In Freiburg, this is done by the following aims:

1. Mix uses
2. Become a city of short distances
3. Promote active transport
4. Restrain traffic
5. Channelise individual private motor vehicle traffic

The City seeks to make private motor vehicle use less attractive through the following.

1. Restrain traffic to improve safety and attract families. Measures include:
    - Percent of streets less than 30 kilometres per hour
    - Percent of streets less than 15 kilometres per hour
2. Channelise traffic.
    - Measures include percent of motor vehicle travel trips on arterials
    - Tools include car free zones, all parking sold separately and pick up and drop off zones only in residential areas
3. Manage parking
    - Percent of street face for on street parking
    - Contract for car free living (40 Percent Participation)

It seeks to promote active transport by creating separate lanes and paths for each mode.

- Measures include percent of transport network with cycling lanes, paths and cycling friendly streets
- Tools include open one way streets to contra flow bike travel

Vauban, Germany

Within the City of Freiburg, the Vauban development, a city of 4,000 residents, has had a global impact on transport planning. Vauban has used the following principles.

1. Promote culture change – motto is to 'remake the world in a way we find appealing'
2. Promote shared facilities – theme is 'one element – many functions'
3. Secure the infrastructure needed for success
4. Support community interaction
    - Residential urban realm should not be a car park and keep motorized speed low.
5. Prioritise ease of local movement
    - Differential permeability for walking, biking and cars and
    - Streets are open, green and overlooked.
6. Pay attention to public transport (PT)
    - PT is designed and run for maximum mode share
    - Make PT the natural choice
    - PT is an essential advance infrastructure
    - PT is the backbone
    - Public control over PT

Development is not allowed to proceed until the PT line was operational. Eighty percent of the population lives within 300 metres of the line.

Appendix E – Scenario Options Scoring

Background

A key component of the master planning and local structure planning process being developed by LandCorp for the Cockburn Coast District Structure Plan area is the preparation of an Integrated Transport Plan (ITP). The following tables outline two scenarios developed by the PTG as part of the ITP process for applying the potential transport management tools to the Cockburn Coast development. The scenarios illustrate measures that would be Better than 'Business as Usual' and Notably Better than 'Business as Usual' in the Greater Perth context. The scenarios were developed jointly with the Project Transport Group (PTG) Workshop No. 4.

The individual measures and the two scenarios have been assigned a relative score. The intent is not to compare the scenarios with one another. Instead, the aim is to allow the PTG to assess the cumulative impact of their decisions regarding individual tools. Once a preferred set of tools has been selected in Workshop No.5 (which is the primary aim of this workshop), a relative cumulative score can be obtained. This will indicate whether the project is moving towards 'business as usual', 'slightly better than business as usual' or 'notably better than business as usual'.

The scenarios were developed initially for each tool individually. Effort was made to integrate each of the tools with the others to ascertain the overall picture for each scenario. Figures 1-5 illustrate several of the proposed tools and are provided following the matrices below.

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 will only be 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). Additional notes are provided to explain the rationale for the scoring. The scoring does not reflect the relative costs of the tools which will be subject to more detailed investigation in the next steps.

Cumulative comparative totals – Scenarios

The cumulative score for the two alternative scenarios is provided below. Tables 1–13 provide the potential maximum scoring and scoring for individual tools within each scenario.

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

Table 1 Health and safety – Improve public health (7 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Increase in percent mode share for active transport)		
Walk Score (Kinesis Model) Max score: 3.0 / Better: 2.5 / Notably better: 2.5 Note: (scoring pending). Theoretical maximum score is 100. Scenario scoring is based on percentage of potential maximum score. Considers land use mix, housing density and local employment.	• Kinesis walkability score of 70	• Kinesis walkability score of 70.
Create a permeable walking and cycling network, with connectivity to other streets and places (especially visual) (See Figures 3a and 3b) Max score: 1.0 / Better: 0.5 / Notably better: 1.0 Note: Based on geographic extent of the network within the study area and connectivity to the Perth Cycling Network	• Off road shared pedestrian/cycle network ('greenways'). Includes connections to the east • On road cycle lanes on Cockburn Road, Rollinson Road, McTaggart Cove Road and in Main Streets • Double sided foot paths entire street network	• Off road shared pedestrian/cycle network ('green ways' and 'cycle tracks'). Includes connections to the east • On road cycle network: extensive north-south and east-west connections (additional roads can form bike boulevards rather than on road dedicated lanes) • Cycle tracks (European style bike facilities) along LRT route • Shared zones in Main Streets • Double sided foot paths entire street network
Bike Share/Hire scheme Max score: 1.0 / Better: 0.5 / Notably better: 0.9 Note: Based on geographic extent.	• Hire stations only within the DSP site	• Hire stations located within the DSP site as well as along the coast up to Fremantle • Provide cargo bikes within Cockburn Coast

Table 1 Health and safety – Improve public health (7 Points) continued

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Establish higher minimum bike storage, lockers and other end of trip facility requirements for commercial uses Max score: 1.0 / Better: 0.5 / Notably better: 1.0 Note: Based on Green Star attainment.	• 50% Green Star requirements for full points award Retail: • cyclist facilities are provided for 5% of building staff Commercial: • secure bicycle storage for 5% of building staff (based on one person per 15m^2 of NLA) • 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.	• 100% Green Star requirements for full points award Retail: • cyclist facilities are provided for 10% of building staff Commercial: • secure bicycle storage for 10% of building staff (based on one person per 15m^2 of NLA) • 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.
Incorporate bike friendly intersection design and bike boulevard grids Max score: 1.0 / Better: 0.5 / Notably better: 0.9 Note: Based on geographic extent of the network within the study area and connectivity to the Perth Cycling Network	• advance stop lines on major signal approaches • Continue on-road cycle lanes through roundabouts	• 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 signalised intersections.

Table 2 Health and safety – Safety of all road users in a mixed transport environment (7 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Overall average design speed (2.5 Points)		
Use shared zones in key areas Max score: 0.5 / Better: 0.0 / Notably better: 0.5 Note: Based on geographic coverage.	• Not provided • Main Streets speed limit 40 km/hr	• Shared zones for 2 Main Streets, two residential areas and along east west greenways (see Figure 4) • 10 km/hr speed limit
Allow congestion Max score: 0.5 / Better: 0.0 / Notably better: 0.4 Note: Based on geographic extent in lieu of level of service since traffic modelling not being conducted for this study.	• No provision	• 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) • Replacement of Robb Road north of Main Street with greenway
Apply conservative maximum spacing for traffic control devises Max score: 0.5 / Better: 0.3 / Notably better: 0.4 Note: Based on geographic extent of share zones and other modal integration on additional streets.	• On road cycle lanes on key links	• On road cycle lanes extensively throughout the site (or combination of on road cycle lanes and bike boulevards) • Shared zones for Main Streets • Shared zones for selected residential streets • LRT on shared running way with general traffic

Table 2 Health and safety – Safety of all road users in a mixed transport environment (7 Points) continued

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Adopt a highly textured pavement material Max score: 0.5 / Better: 0.1 / Notably better: 0.4 Note: Based on geographic extent.	• Limited locations (Main Streets only)	• Extensive locations (Main Streets, local roads on approaches to pedestrian crossing points, raised tables, shared streets)
Increase the level of pedestrian priority (See Figures 3a and 3B) Max score: 2.0 / Better: 1.0 / Notably better: 1.5 Note: Based on geographic extent and level of priority.	• Pedestrian actuated signals outside the school on Cockburn Road • Zebra crossings on the green way at Cockburn Road • Pedestrian refuges at other 'green way' crossing points • Pedestrian refuges / dropped kerb crossings used throughout the residential streets • Crossings at all signalised intersections (all movements)	• Pedestrian actuated signals outside the school on Cockburn Road • Zebra crossings used throughout the residential streets (combined with raised tables in strategic locations) • Pedestrian actuated crossings for the southern two 'green way' crossings on Cockburn Road • Zebra crossings on the remaining green way at Cockburn Road • Zebra crossings at other 'green way' crossings • Crossings at all signalised intersections (all movements)

Table 2 Health and safety – Safety of all road users in a mixed transport environment (7 Points) continued

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'

Limit design speed
 	
Max score: 2.5 / Better: 1.5 / Notably better: 2.5
 	
Note: Based on overall extent of pedestrian controlled design speeds and overall design speed.
	• 2 lane road configuration throughout the site (4 lanes for Cockburn Coast Drive)
	• Impose speed limits (see Figure 2a):
	  • Cockburn Coast Drive 70 km/hr
	  • Cockburn Road 60 km/hr
	  • Rollinson Road 50 km/hr
	  • Robb Road 50 km/hr
	  • Robb Jetty Road 40 km/hr
	  • Power Station Road 50 km/hr
	  • Local streets 40 km/hr
	  • School zone on Cockburn Road 40 km/hr (during school times)
		• 2 lane road configuration throughout the site
		• Impose speed limits (See Figure 2b):
		  • Cockburn Coast Drive 70 km/hr
		  • Cockburn Road 50 km/hr
		  • Rollinson Road 30 km/hr
		  • Robb Road 30 km/hr
		  • Duoro Road Connector (Transit corridor) 50 km/hr to the north of Rollinson Road
		  • Duoro Road Connector (Transit corridor) 30 km/hr to the south of Rollinson Road
		  • Robb Jetty Road East 30 km/hr
		  • McTaggart Cove Road 30 km/hr
		  • Local streets 30 km/hr
		  • Shared zones 10/km/hr
		  • School zone on Cockburn Road 40/25 km/hr (during school times)
		• Road closures (Robb Road north)
		• Traffic calming/control devices (locations on Figure 3B)

Table 3 Environment – Reduce greenhouse gas emissions per resident (14 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Reduce greenhouse gas emissions per resident (Kinesis Model) Max score: 14.0 / Better: 3.5 / Notably better: 10.0 Note: Based on results of Kinesis model compared to Perth average. Model reflects land use mix, density, local employment, distance to Fremantle CBD, household vehicle ownership, and walk and wait time to nearest high frequency public transport. Scoring assumes a general maximum reduction of 50 percent better than Perth average.	• 12 percent better than Perth average	• 36 percent better than Perth average

Table 4 Social – Reduce the amount of time a resident will spend driving by decreasing number and length of trips (14 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Private motor vehicle hours per capita (Kinesis Model) (14 Points) Max score: 14.0 / Better: 7.0 / Notably better: 10.0 Note: Based on results of Kinesis model compared to Perth average. Model reflects land use mix, density, local employment, distance to Fremantle CBD, household vehicle ownership, and walk and wait time to nearest high frequency public transport. Scoring assumes an average of XX hours travelled in private motor vehicles per person per week.	• 4.8 hours travelled in private motor vehicles per person per week	• 3.5 hours travelled in private motor vehicles per person per week

Table 5 Economy – Improve access to job and other regional economic activities (7 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Residential density and employment around transit nodes (7 Points)		
Align high quality transit through core of density and employment Max score: 3.5 / Better: 2.5 / Notably better: 3.5 Note: Based on proximity to highest density and greatest mix of uses. In addition, LRT alignment reduces conflict with existing truck based businesses in the study area during 20 year transition period.	• BRT corridor passes through eastern half of the DPS site • Bus services operating along Cockburn Road corridor (with bus lanes/priority). Corridor sits within eastern side of the DSP area • Bus stops to be located approximately every 400 m (typical walk up catchment is 400m)	• LRT passes through site (even distribution east-west), also penetrates the main activity node • LRT operating along Duoro Road Connector and Cockburn Road, providing access to the activity nodes • Local buses follow LRT alignment • Signal priority where changing alignment
Provide high quality public transport service Max score: 3.5 / Better: 1.0 / Notably better: 3.0 Note: Based on potential mode share and frequency.	• Quality bus service (900 series) • 15 min peak frequencies • 2 local bus services also accessing site • Priority provided along Hampton Road/Cockburn Road (primary corridor), on road bus lanes (Figure 1a) • Existing bus patronage • Bus stops to be located approximately every 400 m (typical walk up catchment is 400m) refer to graphic	• Light rail service • 10 min frequency • Priority provided at intersections • 2 local bus services along LRT alignment • Alignment to follow new Douro Road connector, joins Cockburn Road at the south of the site (Figure 1b) • LRT stops to be located approximately every 400-600 m (typical walk up catchment is 800m) refer to graphic • Bus/LRT interchange (either end of the site) • Park and ride lots at bus/LRT interchanges as interim uses (land banks).

Table 6 Economy – Maximise land use efficiency while optimising the associated investment and recurrent costs (7 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Area dedicated for transport users (3.0)		
Maximise person-flow on roadways for critical congested links and intersections Max score: 1.0 / Better: 0.5 / Notably better: 1.0 Note: Based on potential capacity given transit service and mode scenarios above. Also assumes LRT attracts slightly higher mode share than BRT.	• BRT (dedicated lane) • On road cycle lanes on key links to encourage cycling	• LRT (dedicated running way in congested roadway) • Extensive cycle tracks and shared streets to encourage cycling
Dedicated running ways in congested corridors Max score: 1.0 / Better: 1.0 / Notably better: 0.5 Note: Based on length and extent of dedicated running way.	• BRT. Connect to existing bus lanes on Hampton Road using dedicated bus lanes on Cockburn Road	• LRT. Maintain shared running way through the site. Level of priority through to Fremantle needs to be assessed.
Adopt 'pavement to parkland' Max score: 1.0 / Better: 0.0 / Notably better: 1.0 Note: Based on roads without building frontages (excepting Cockburn Coast Drive).	• Not provided	• Partial removal of Robb Road (section between Rollinson Road and Robb Jetty Road), road space to be converted to parkland and active transport.

Table 6 Economy – Maximise land use efficiency while optimising the associated investment and recurrent costs (7 Points) continued

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Number of parking bays per capita (4.0)		
Minimise car parks provided to promote public and active transport Max score: 1.0 / Better: 0.5 / Notably better: 1.0 Note: Based on lowest resultant parking supply.	Residential • 1 per dwelling (regardless of size), including visitor bays, within 400m of quality public transport • 1 per dwelling (regardless of size), plus 1 visitor bay per 4 units, greater than 400m from quality public transport Retail/Commercial/office • 1:75 m^2 GFA, within 400m of quality public transport • 1:50 m^2 GFA, greater than 400m from quality public transport Other uses • 25% better than current council policy • In residential streets provide limited number of on-street (indented) parking bays for visitors (locations on graphic)	Residential • 0.75 per unit (regardless of size), including visitor bays, within 400m of quality public transport • 0.75 per dwelling (regardless of size), plus 1 visitor bay per 4 units, greater than 400m from quality public transport Retail/Commercial/office • 1:150 m^2 GFA, within 400m of quality public transport • 1:100 m^2 GFA, greater than 400m from quality public transport Other uses • 50% better than current council policy • In core residential streets provide no on-street parking bays for visitors, provision must be on or off site (locations on graphic) • Centralise parking facilities • Shared parking • Separate purchase of parking spaces for residential

Table 6 Economy – Maximise land use efficiency while optimising the associated investment and recurrent costs (7 Points) continued

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Parking spaces provided are high turnover spaces to minimise all day parking Max score: 1.0 / Better: 0.5 / Notably better: 1.0 Note: Based on geographic extent.	• Balance of time restrictions	• More short term bays nearer high activity areas (retail and activity nodes) • Extend restriction zones
Create parking restricted areas Max score: 1.0 / Better: 0.5 / Notably better: 0.7 Note: Based on lowest resultant parking supply.	• In residential streets provide limited number of on-street (indented) parking bays for visitors (see Figure 5a)	• In some residential shared streets provide no on-street parking bays for visitors, provision must be on or off site (see Figure 5b) • Intermittent with landscape and streetscape features
Parking fare structure Max score: 1.0 / Better: 0.5 / Notably better: 1.0 Note: Based on overall cost of parking.	• Above average rates	• Premium rates

Table 7 Efficiency – Allow congestion to promote mode choice while minimising impacts on local road network (14 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Increase in number of intersections exceeding capacity (4.5 Points)		
Manage number of intersections connecting the development to the surrounding road network Max score: 4.0 / Better: 0.5 / Notably better: 0.5 Note: Pending results of West of Stock Road assessment.	• X connections to Cockburn Coast Drive, Rockingham Road, Hampton Road (To be determined pending West of Stock Road Assessment)	• X connections to Cockburn Coast Drive, Rockingham Road, Hampton Road (To be determined pending West of Stock Road Assessment)
Reduce effective road link capacity (3.0 Points)		
Remove intersection capacity to suppress demand Max score: 1.5 / Better: 0.0 / Notably better: 0.5 Note: Based on whether measures are incorporated and to what degree.	• No provision	• Reduced green times for key movements • Turn restrictions
Allow side friction on roads to reduce effective capacity, e.g. through street furniture, landscaping, on-street parking (at selected locations), bicycle lanes and bus stops, for example. Max score: 1.5 / Better: 0.5 / Notably better: 1.0 Note: Based on whether measures are incorporated and to what degree.	• On street parking provided on both sides of streets in all precincts • Limited on road cycle lanes and shared bus/bike lane on Cockburn Road. • Street furniture (plantings etc)	• Narrower street sections and extensive use of shared streets/zones • Extensive on-road cycle network (shared zones, cycle tracks, bike boulevards) • Street furniture (plantings etc) • Traffic calming in local streets

Table 7 Efficiency – Allow congestion to promote mode choice while minimising impacts on local road network (14 Points) continued

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Decrease intersection delays for public transport and active transport users (7 Points)		
Introduce dedicated running way and phasing to support use of public transport Max score: 3.0 / Better: 2.0 / Notably better: 1.0 Note: Based on extent of dedicated running way and level of signal priority.	• Dedicated bus lanes along Cockburn Road, connecting to Hampton Road • No signal priority	• LRT corridor through the site (to be shared with general traffic) • Signal priority where alignment changes at intersection
Apply generous pedestrian crossing provisions Max score: 3.0 / Better: 1.5 / Notably better: 2.0 Note: Based on geographic extent.	• Pedestrian actuated signals outside the school on Cockburn Road • Zebra crossings on the green way at Cockburn Road	• Pedestrian actuated signals outside the school on Cockburn Road • Shared zones in Main Streets • Zebra crossings on the green way at Cockburn Road • Zebra crossings at other 'green way' crossings • Car free streets (Robb Road)
Set signalised intersection phasing to achieve desirable intersection performance levels for active and public transport Max score: 1.0 / Better: 0.5 / Notably better: 1.0 Note: Based on green time allocation and level of priority.	• Standard green times applied to signalised intersections • No priority for BRT since provided dedicated lanes	• Increase green time for pedestrians at signals located on key desire lines • Priority for LRT at congested intersections and turning movements for LRT.

Table 8 Effectiveness – Attract riders choosing to use the public transport network (7 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Ratio of patronage on public transport to private motor vehicle trips (3.0 Points)		
Set targets for private vehicle, active transport, and public transport participation Max score: 3.0 / Better: 2.0 / Notably better: 3.0 Note: Base on target mode share assuming current of 51 % car driver share in Perth metropolitan area..	• Reduction to 45%-50% private vehicle mode share (current is 51%)	• Reduction to < 40% private vehicle mode share (current is 51%)
Suitability of the public transport to serve regional destinations (4.0 Points)		
Provide sufficient public transport services and closely spaced stops to ensure public transport is an attractive and viable alternative to the private car (e.g., 900 Series Bus Service and dedicated bus lanes) Max score: 2.0 / Better: 1.5 / Notably better: 1.0 Note: Based on geographic coverage and route flexibility.	• Rapid bus service (900 series) • Dedicated bus lanes through the site (connect to the Hampton Road bus lanes) • Bus stops to be located approximately every 400 m (typical walk up catchment is 400m) • Provide onward journey/connection information at stops (maps)	• LRT service • Alignment to follow new Douro Road connector, joins Cockburn Road at the south of the site • Shared running way with general traffic in Fremantle CBD and low volume streets within Cockburn Coast. • LRT stops to be located approximately every 400-600 m (typical walk up catchment is 800m) • •Provide onward journey/connection information at stops and interchanges (maps)

Table 8 Effectiveness – Attract riders choosing to use the public transport network (7 Points) continued

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Design and operate public transport for maximum mode share (e.g., higher frequency BRT or LRT) Max score: 2.0 / Better: 0.5 / Notably better: 1.0 Note: Base on target mode share assuming current of 51 % car driver share in Perth metropolitan area..	• Bus frequency 15 min in peak period • Interchange with Fremantle Rail Station	• LRT frequency 10 min • Interchange with bus at north and south end of Cockburn Coast Drive to allow access to and from busses. • Park and Ride at interchanges as interim use. • Interchange with Fremantle Rail Station

Table 9 Effectiveness – Decrease motorised private vehicle use (7 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Reduction in private vehicle kilometres travelled		
Max score: 3.5 / Better: 2.0 / Notably better: 2.5 Note: Based on results of Kinesis model. Model reflects land use mix, density, local employment, distance to Fremantle CBD, household vehicle ownership, and walk and wait time to nearest high frequency public transport. Scoring is based on a per capita average not overall reduction since lower parking standards in notably better scenario may result in more residents than slightly better scenario.	• 27 % reduction versus Perth average per capita	• 35 % reduction versus Perth average per capita
Reduction in number of private motor vehicle trips to and from are		
Max score: 3.5 / Better: 2.0 / Notably better: 3.0 Note: No traffic assessment modelling was performed for the project. Assumes that some reduction will be attained due to greater mix and density of uses. The lower yield in the better scenario will likely produce overall fewer trips but notably better scenario will perform better on a per capita basis.		

Table 10 Robustness – Build in flexibility to meet changing needs and promote mode and route choice (4 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Intersection density per square kilometre		
Set maximum block face lengths Max score: 4.0 / Better: 4.0 / Notably better: 4.0 Note: Even score since using the same grid street system. The system generally uses block faces less than 125 metres maximum (recommended best practice).	• Already incorporated in land use plan	• Already incorporated in land use plan.

Table 11 Robustness – Use public transport to catalyse infill development (4 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Magnitude of development (number of residents, percent attached dwellings and number of jobs)		
Introduction of priority public transport Max score: 4.0 / Better: 2.5 / Notably better: 4.0 Note: Even score since using the same grid street system. The system generally uses block faces less than 125 metres maximum (recommended best practice).	• Introduce after some development uptake (say 50%)	• Introduce prior to development uptake

Table 12 Robustness – Prioritise access provisions to align with precinct priorities (e.g. parking uses and types) (4 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Consistency with precinct planning priorities for all modes of transport		
Require sale of car parking physically separate from residential units Max score: 4.0 / Better: 4.0 / Notably better: 4.0 Note: Based on overall supply of parking provided in remote, centralized locations.	• Residential off-site parking at 20 percent of overall. • Commercial off-site parking at 50 percent of overall • 5000 residential and 1167 commercial spaces overall (6167 total spaces) • 1000 residential and 583 commercial spaces off-site (1583 spaces)	• Residential off-site parking at 50 percent of overall. • Commercial off-site parking at 75 percent of overall • 3750 residential and 583 commercial spaces overall (4333 total spaces) • 1875 residential and 438 commercial spaces off-site (2313 spaces)

Table 13 Robustness – Promote innovative travel management programs (4 Points)

Measure/Tool	Better than 'Business as Usual'	Notably better than 'Business as Usual'
Potential car share take up greater than 10 percent Max score: 2.0 / Better: 0.0 / Notably better: 1.5 Note: Based on Kinesis mode and minimum requirement of service providers (i.e., 10 percent).	• Mixed use precincts only (cater for more business use) • BRT service • Reduced parking supply • Sample provider company: http://www.goget.com.au	• All precincts (residents and commercial uses) • Targets for residential take up of scheme (yet to be set) • Min walking distance to parking bay (example 5 min, yet to be determined) • Space requirements within off-street parking facilities • LRT service • Highly reduced parking supply • Achieves 12 percent potential take up
Real time tracking for public transport Max score: 2.0 / Better: 1.5 / Notably better: 2.0	• Real time information at bus/LRT stops	• 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.

Figure 1a

Figure 1b

Figure 2a

Figure 2b

Figure 3a

Figure 3b


Shared streets
Raised intersection or entry treatment
Road closed (converted to parkland)
HAMPTON ROAD
ROCKINGHAM ROAD
ROLLINSON
ROAD
ROSE ROAD
COCKBURN ROAD
COAST
DRIVE
COCKBURN
MANNING RESERVE
POTENTIAL MARINA
NORTH

Figure 4

Figure 5a

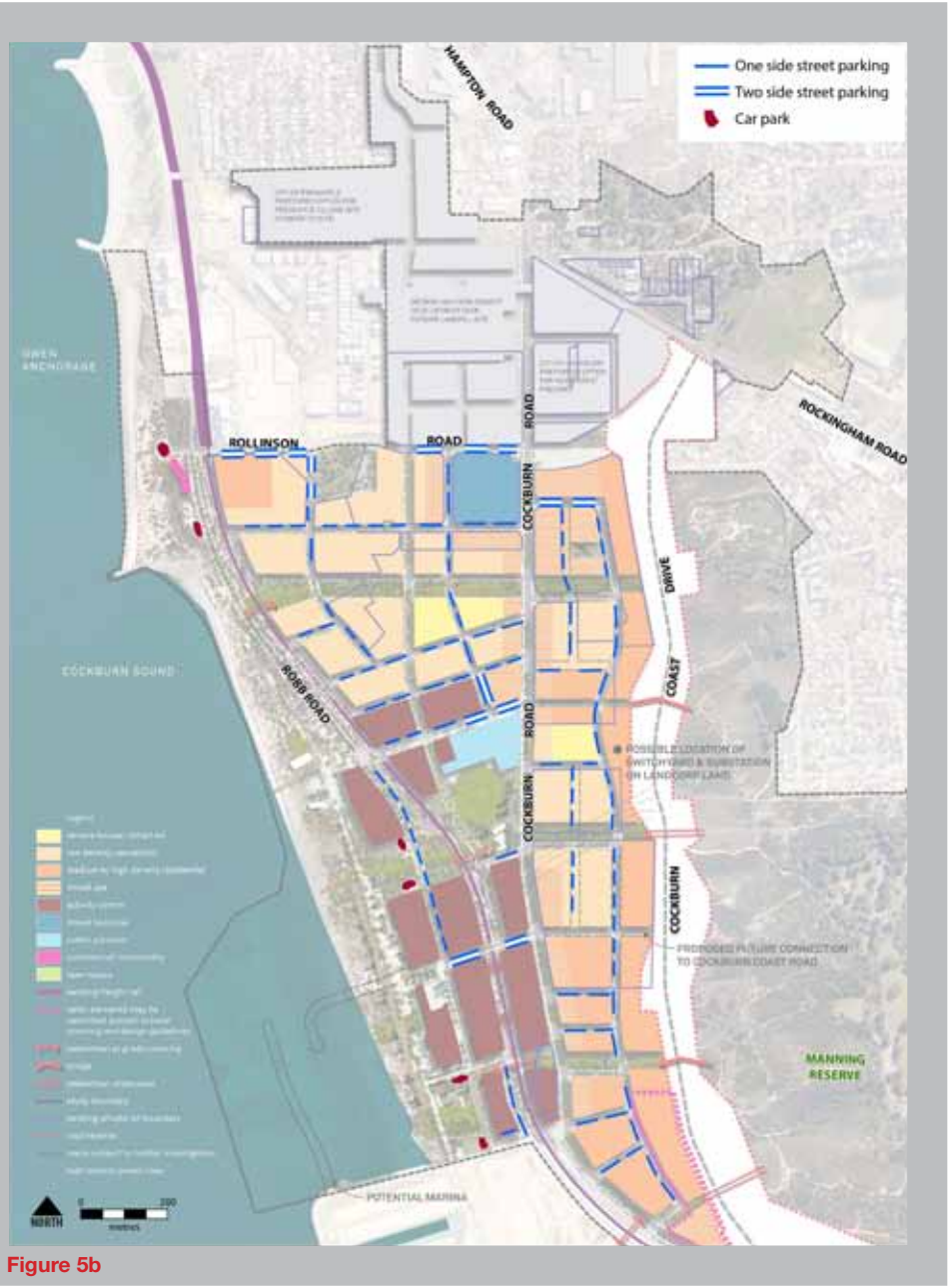


Figure 5b