ARCADIS Design & Consultancy for natural and built assets

MOREE SPECIAL ACTIVATION PRECINCT

Assessment of refined land use – transport and traffic plan

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Transport and traffic plan

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EXECUTIVE SUMMARY

The Department of Planning, Industry and Environment (DPIE) has engaged Arcadis Australia Pacific to prepare a series of traffic and transport studies, including a Transport and Traffic Plan (this report) to support the Moree Special Activation Precinct (SAP) Structure Plan. This report assesses the land use Structure Plan from the final Enquiry by Design (EbD) workshop from a transport and traffic perspective.

Following a series of scenario assessments and EbD workshops, the proposed land use for the Moree SAP Structure Plan occupies a total developable area of 1,485 hectares. The land use mix is predominately made up to horticulture (520 hectares) and energy producing precincts (1500 hectares) aimed to capitalise on the strong agricultural heritage of Moree and purposed with a self-sufficient precinct. The land uses are also supported by value-add agriculture, resource recovery, and two intermodal precincts. A trip generation assessment was undertaken for the land use proposed by the Structure Plan, which forecasts that a daily total of 7,476 trips would be generated for the ultimate scenario. Peak hour trip generation reflects the critical scenario, and a conservative assumption was adopted where all employees of the precinct drive to work during the peak hour, resulting in a forecast of 759 trips generated during the peak hour.

To accommodate the 40-year vision for the Moree SAP, various road network provisions are proposed to service the developments within the SAP. Those include a new rail overpass, realignment of Bullus Drive to create a north-south connection, a future East-West Connector extending to Gwydir Highway, and a network of internal road and intersections with the existing network to provide local access to future SAP industries.

A high-level capacity assessment was undertaken of the Newell Highway between the Moree township and the access to the Moree SAP, under the assumption that future road upgrades would provide new overtaking lanes in each direction. During both morning and evening peak hours, spare capacity on the Newell Highway is expected to be sufficient during both peak periods operate with no traffic performance or congestion issues.

Two new intermodal terminals are proposed by the Structure Plan to assist in the movement of freight. The southern intermodal terminal is to be located east of the Newell Highway and proposed to connect into the existing Mungindi Line. The north-east intermodal terminal is proposed to be located north of an investment driven rail loop connection to the Inverell Line, expected to be completed within the next 10 years. Road network upgrades would be implemented in the initial 10 years to support the operation of both intermodal terminals. 20 to 40 years after the initial implementation of the SAP, an east-west corridor road link between the Gwydir Highway east and west of Moree via the Moree Intermodal Overpass would be implemented, and a realignment of the Inland Rail (currently passing through the Moree township) is proposed to be completed on a 40-year time horizon.

While shared paths are provided within the Moree township, active transport provisions in the surrounding network are minimal due to the rural nature of the region. New active transport links to support the SAP have been proposed, including a new connection between the Moree township and Moree railway station and routes between residential precincts and the potential road network within the SAP. Footpaths would allow direct connections within the SAP from the regional enterprise precincts to the commercial hub and end of trip facilities would be provided at the regional hub and for businesses with higher numbers of employees. The active transport provisions are intended to encourage active transport as a mode for travel to work, as well as recreational trips along Halls Creek.

The SAP would be supported by the on-demand bus service currently servicing Moree, and an additional internal bus network between the hub and the regional enterprise precincts is also proposed, utilising the proposed overpass and the Gateway loop road, which would connect between the two sides of the Newell Highway.

With the planned runway extension for Moree Regional Airport, a connected road network to the Moree Gateway Precinct and the airport access through Blueberry Road enables a smooth movement of commodities aimed for air freight between the SAP industries and Moree township, and Moree Regional Airport.

The Travelling Stock Route (TSR) has a strong historical connection to the heavy agricultural heritage of the Moree township. As such, the current TSR alignment would be mainly maintained in the Structure Plan, with a proposed realignment of the route south of the northern regional enterprise precinct.

1 INTRODUCTION

On 3 December 2019, the NSW Government declared Moree a Special Activation Precinct (SAP) investigation area, delivered by the $4.2 billion Snowy Hydro Legacy Fund.

With a renowned, Australia-wide reputation and heritage of agriculture and farming, this SAP places the Moree region as the highest productive grain region in the country, capitalising on existing road and air freight, and the future Inland Rail.

The NSW Department of Planning, Industry and Environment (DPIE) is leading the master planning process of the SAP. Accordingly, DPIE has engaged Arcadis Australia Pacific (Arcadis) to prepare a series of traffic and transport studies, including a Transport and Traffic Plan (this report) for the Moree SAP, which focuses on the mobility component of the Master Plan.

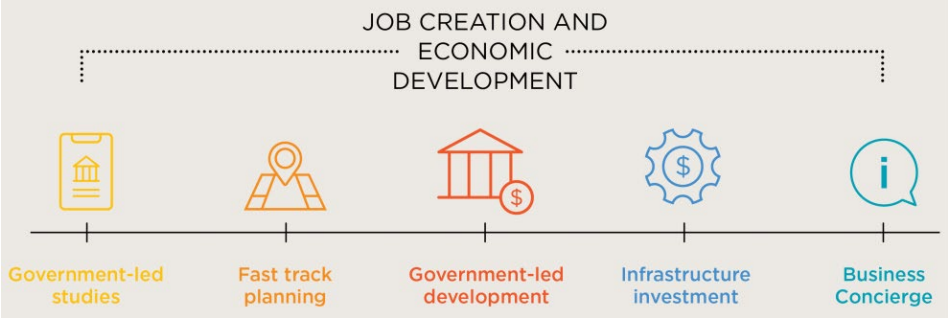
Two Enquiry by Design (EbD) workshops were organised as part of the SAP master planning process. A preliminary EbD was held on the 14 and 15 September 2020 to develop three initial land use scenarios. Following an interdisciplinary assessment of the three scenarios, a final EbD workshop was held between 17 and 20 November 2020 to study the interdisciplinary constraints of the three scenarios and identify and develop a preferred land use Structure Plan.

This report assesses the land use Structure Plan from the final EbD workshop from a transport and traffic perspective.

1.1 Moree Special Activation Precinct

The establishment of SAPs is a joint Government Agency initiative by the Department of Regional NSW, DPIE and the Regional Growth NSW Development Corporation (RGDC) as part of the *20-Year Economic Vision* for Regional NSW. SAPs are a new way of planning and delivering infrastructure projects in strategic regional locations in NSW to 'activate' State or regionally significant economic development and jobs creation. They will be delivered as part of the $4.2 billion Snowy Hydro Legacy Fund.

Job creation and economic development through SAPs are underpinned by five core components (Figure 1-1).



Source: NSW Government, 2019

Figure 1-1 SAP key elements

Moree was chosen as it has a rich agricultural tradition dating back to the establishment of the initial pastoral land more than 150 years ago. There have been several step changes since, with the introduction of wheat, pecan nuts in the 1960s and cotton in the 1970s.

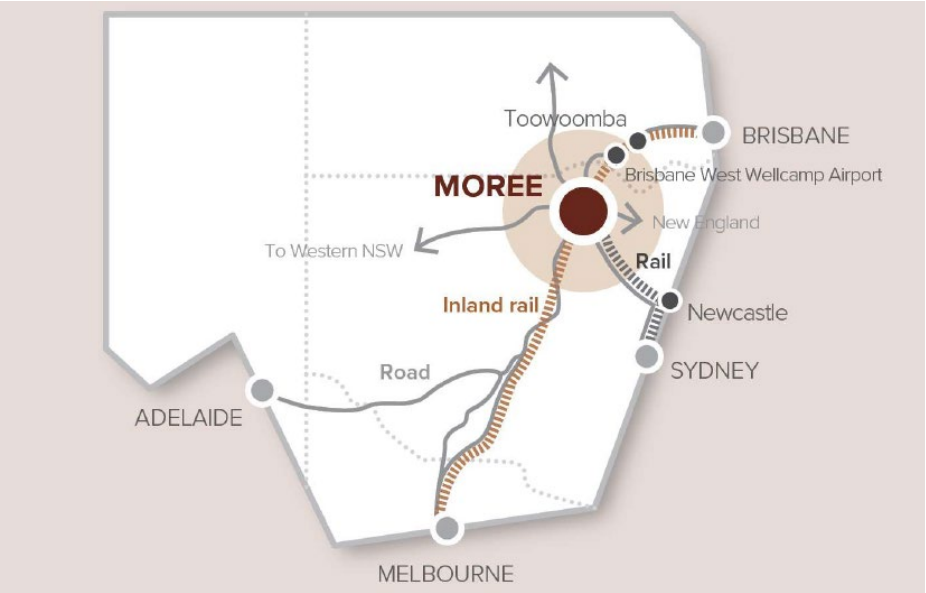
Moree is well placed in the freight network to be an intermodal freight hub as it is intersected by the Newell, Carnarvon and Gwydir Highways in addition to being located on the Inland Rail.

The Moree SAP objectives include:

- Increase the volume of freight mode shift to rail
- Enable a broader cluster of freight and logistics-related activity
- Make Moree an attractive precinct for value-adding agribusiness
- Enable businesses to establish on appropriate sites that would benefit from efficient access to freight and logistics networks
- Enable businesses to establish that require access to a high quality and secure water supply

- Provide increased economic and enhanced social outcomes for the broader community with a focus on the local Indigenous population.

The completion of Inland Rail is expected by 2025 has the potential to dramatically improve the efficiency of freight transport between Moree and key seaports, as well as large population centres (Figure 1-2). Moree is located on the Narrabri and North Star (N2NS) section and would provide more immediate freight savings.



Source: NSW Government 2019

Figure 1-2 Moree transport connectivity

The presence of Inland Rail combined with the existing assets that Moree offers would enable for a more diverse range of industries to be established and for the national economy and Moree economy to be more productive and more resilient. Freight movements are primarily focused to the port of Newcastle with other movements to Port Botany and Port Kembla.

Inland Rail would also enable access to Brisbane Port and other northern markets for bulk and containerised freight. The Moree SAP provides an innovative and effective program to capitalise on this potential.

Moree is located approximately 640 kilometres northwest of the Sydney CBD, in north-western New South Wales. Moree has a population of approximately 9,400 and an Indigenous resident population making up 21.6 per cent of the total population. Moree Plains has long been the ancestral home of the Gamilaroi people who, as traditional custodians, are members of the second largest Indigenous group in Australia.

The primary road transport routes in Moree are the Newell Highway, a National Highway and a significant freight link connecting Victoria with Queensland, the Gwydir Highway which connects Grafton in the east with Walgett in the west via Moree, and the Carnarvon Highway, which extends to the southern Queensland border. Figure1-3 shows the boundaries of the investigation area for the Moree Special Activation Precinct.

Figure 1-3 Moree Special Activation Precinct Investigation Area

1.2 Vision statement and mobility aspirations

The vision for the Moree SAP is an evolving statement covering both vision and aspirations for the precinct. The Moree SAP Vision is as follow:

With national and global connections, the Moree Special Activation Precinct enables diversification of Moree's proud agricultural economy by building on its strong connection to Country and sustainable water endowments and energy infrastructure. The Special Activation Precinct fosters world class opportunities to value-add, embrace new technologies and develop innovative energy solutions.

For mobility and multimodality for the SAP, the following aspirations have been recognised for the success of the precinct:

- Leverage transport connections through air road and rail to drive exports and economic growth
- Design efficient and equitable transport connections that reduce traffic, travel times and increases road safety
- Enable effective linkages between Moree Township and the precinct with access through equitable transport choices
- Enable effective linkages between the precinct and Moree Regional Airport to facilitate growth in trade and value-add products.

1.3 Report structure

The remainder of this report is structured as follows:

- **Section 2 Strategic context** – Understanding the local, regional, and state-wide context of Moree and the study area, and the regulations and policies related to the Moree region
- **Section 3 Methodology** – The process of undertaking this study thus far and the steps completed to reach the Master Plan
- **Section 4 Key findings** – Includes the baseline analysis and current transport conditions
- **Section 5 Stakeholder liaison** – Identifies all stakeholder liaison undertaken during the preparation of the SAP reports
- **Section 6 Structure Plan** – Review of the Structure Plan against the relevant context, framework and evidence for the specific aspect
- **Section 7 Transport assessment** – Assessment of various road network upgrades and intermodal terminal locations
- **Section 8 Recommended objectives and controls** – Master Plan – A highlight of the proposed aims and performance measures of the proposed transport network
- **Section 9 Measures and delivery plan** – Recommended provisions suitable for inclusion in a Delivery Plan
- **Section 10 Conclusions**.

2 STRATEGIC CONTEXT

2.1 Policy overview and analysis

The management and control of land use within Moree Plains Shire are guided by several strategic and regulatory policies and plans. Council has day to day decision making powers and Council's statutory planning functions are exercised in line with the *Local Government Act 1993 (NSW)* and *Environmental Planning and Assessment Act 1979 (NSW).* Council is the relevant Consent Authority for Development Applications.

2.1.1 Federal Government

2.1.1.1 National Freight and Supply Chain Strategy

The *National Freight and Supply Chain Strategy* (Transport and Infrastructure Council, August 2019) set an agenda for coordinated and well-planned government and industry action across all freight modes over the next 20 years. The Strategy seeks to provide regional and remote Australia with the infrastructure capable of connecting regions and communities to major gateways, through land links, regional airports, or coastal shipping.

The Strategy commits to action in four areas:

- Smarter and targeted infrastructure investment
- Enable improved supply chain efficiency
- Better planning, coordination, and regulation
- Better freight location and performance data.

The primary pieces of infrastructure in Moree relevant to this Strategy are Newell Highway and Carnarvon Highway for road freight, Inland Rail for future rail freight, and the planned Moree Intermodal Park.

2.1.2 State Government

There are a number of relevant state government plans, policies and strategies that outline the policy, vision and objectives for the New England North West region encompassing Moree. These relate to infrastructure investment, planning development growth and managing transport networks.

2.1.2.1 20-Year Economic Vision for Regional NSW and Future Transport 2056

The *20-Year Economic Vision for Regional NSW* (2018) and Transport for NSW's *Future Transport 2056* (2018) strategies are the overarching State Government plans to guide better delivery of Government services and provides priorities for action.

The *20-Year Economic Vision for Regional NSW* brings together long-term planning strategies including the *Future Transport 2056* strategy and *NSW State Infrastructure Strategy (SIS) 2018-2038*, and regional plans to provide a vision for regional people and businesses. It aims to support sustainable, thriving regional communities that have a strong local identity, attract younger generations, and offer valued alternatives to city living.

The *Future Transport 2056* strategy is an update of the *NSW Long Term Transport Master Plan* (2012) and notes Moree as a hub to support travel in the New England North West region, with funding committed for the planning of heavy vehicle pavement upgrades to the Newell Highway between Narrabri to Moree and north of Moree. The Strategy also outlines proposed infrastructure improvements for throughput enhancement on Inland Rail in addition to intermodal rail investigations.

2.1.2.2 Regional NSW Services and Infrastructure Plan

The Regional NSW Services and Infrastructure Plan (RNSIP) is the NSW Government's proposal for mobility in the regional areas of NSW to 2056. The RNSIP defines the strategies, transport users, and their needs and outcomes that the government will use to advise transport planning in each region and support its future decision making. It also details service and infrastructure initiatives by region.

Specific to the New England North West region, the Plan recognises future success of the region is to support efficient transport connections to, from and within the region. This plan recognises the function Moree plays within the region as a hub and refers to Moree as a 'Regional Centre Transport Hub'.

Figure 2-1 highlights the proposed regional improvements in the New England North West Region. There are a number of initiatives planned for Moree including:

- Newell Highway, Mungle Back Creek to Boggabilla Heavy Duty Pavement (State and Federal Funded)
- Newell Highway Heavy Vehicle Pavement Upgrades – Narrabri-Moree, North of Moree (Planning)
- Inland Rail Intermodal Facility investigations
- Support the delivery of Inland Rail.

2.1.2.3 NSW Freight and Ports Plan 2018-2023

The *NSW Freight and Ports Plan 2018–2023* is a plan for the direction of the NSW Government investment to support freight and ports in NSW. It projects the volume of exports and imports to grow substantially and outlines key actions to enable regional growth and the future operation of critical freight infrastructure.

Economic activity in regional NSW is becoming increasingly specialised, with the regions producing fewer types of goods and focusing on exporting outside of their region.

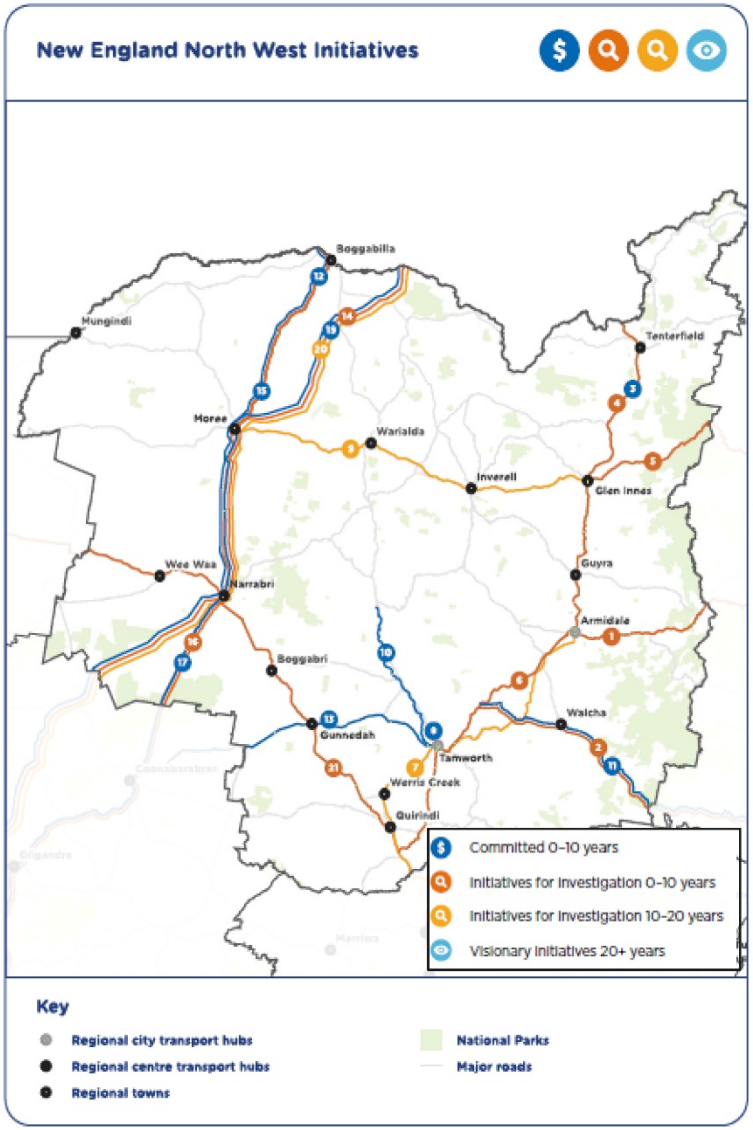
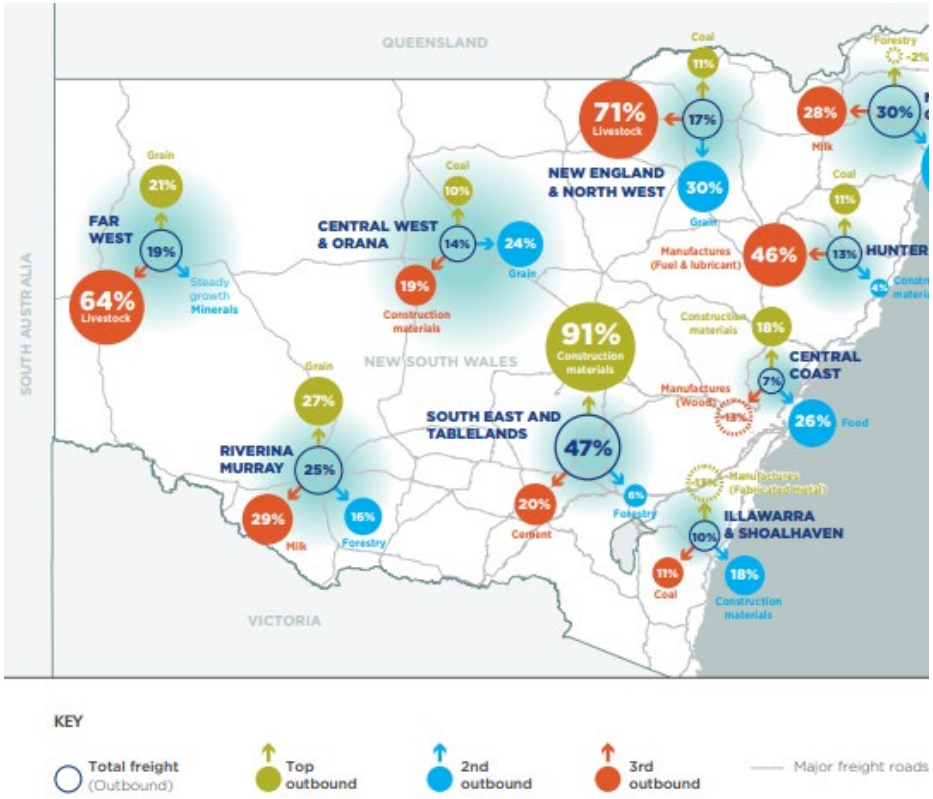


Figure 2-1 New England North West RNSIP Initiatives

Figure 2-2 demonstrates the significant forecast growth in livestock (71 per cent), grain (30 per cent) and coal (11 per cent) in the New England North West region to 2036.



Source: NSW Government 2018

Figure 2-2 Map showing forecast growth in the three highest volume outbound freight commodities in each NSW region

Relevant to Moree are the NSW Government Actions set out in the Plan to address the goal of Improved Road Freight Access which include:

- Implementing the *NSW Heavy Vehicle Access Policy Framework* that establishes roads across the whole of NSW that can be used by higher productivity vehicles reducing the need for Performance Based Standard fleets to obtain permits on a case-by-case basis. Various truck-and-trailer combinations designed for specific freight tasks could move more freight more efficiently between transport hubs.
- Funding infrastructure improvements to increase higher productivity vehicle access through the Fixing Country Roads program and Regional Road Freight Corridor Fund.
- Assisting local councils in making higher productivity vehicle access decisions through timely information on bridge and pavement capacity for performance based standard vehicles.

2.1.2.4 Road Safety Plan 2021 (Towards Zero)

The *Road Safety Plan 2021* features targeted, evidence-based strategies to drive progress towards road safety goals, including an ambitious goal of zero fatalities and serious injuries on our roads by 2056. It aims to address, assess, and understand key trends, risks and the types of crashes on NSW roads and highways.

Reducing fatalities on country roads is one of the biggest challenges identified and is a strong focus of this plan.

A key action of the plan is to work with the heavy vehicle industry to develop a new heavy vehicle strategy to improve operational safety and increase the uptake of safety technology.

2.1.2.5 NSW Heavy Vehicle Access Policy Framework

The *NSW Heavy Vehicle Access Policy Framework* outlines a strategic, staged approach to heavy vehicle access in NSW for both state and council roads. The framework identifies a vision for future heavy vehicle access in NSW and priorities in metropolitan areas as well as on strategic regional routes.

The framework recognises that local council engagement in heavy vehicle access policy and priority freight corridors is vital to achieving heavy vehicle access gains. It also acknowledges that most freight journeys start or finish on Local Roads and local councils currently manage approximately 90 per cent of the NSW road network.

The framework provides a number of policy objectives for heavy vehicle access across a national regulatory framework, safety, public amenity and road infrastructure.

2.1.2.6 New England North West Regional Plan 2036

The latest and most relevant plan to the Moree SAP and New England North West region with regards to transport and infrastructure is the *New England North West Regional Plan 2036* (DPIE, 2017). The New England North West Regional Plan 2036 is underpinned by a number of transport relevant State Government policies and plans including:

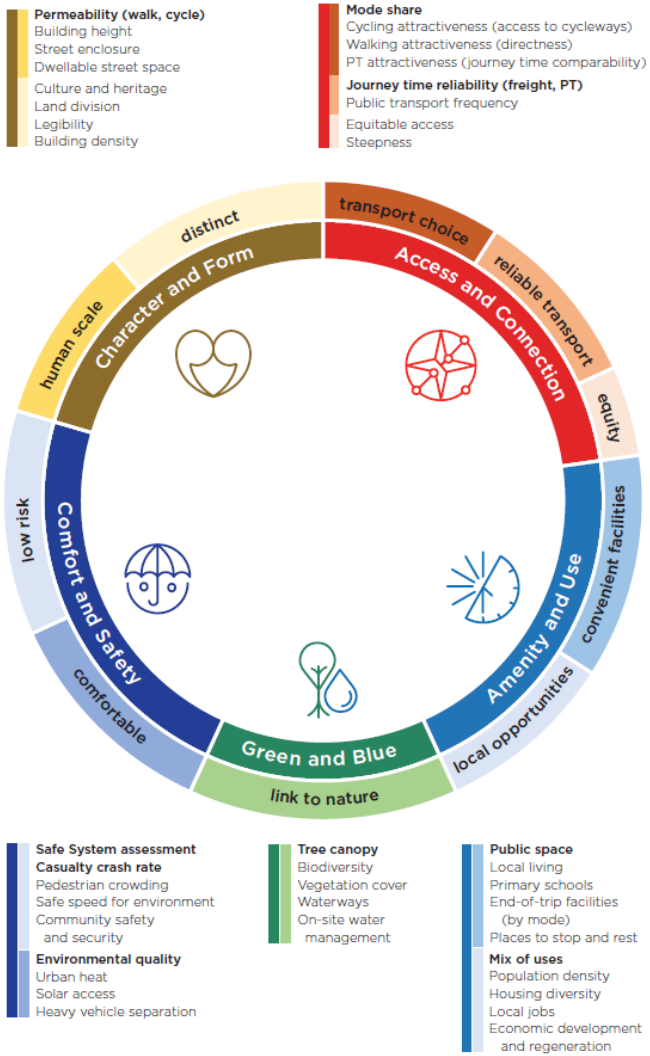
- Future Transport 2056 (2018)
- State Infrastructure Strategy 2018
- Newell Highway Corridor Strategy 2019.

In the State Infrastructure Strategy 2018, Infrastructure NSW identifies the importance of an efficient freight transport network to ports and markets. It recommends improvement of existing road and rail networks, including freight productivity improvements along four critical corridors (the Newell, Golden, New England and Great Western Highways).

The Newell Highway Corridor Strategy sets out how the NSW Government will manage road transport along the Newell Highway in the long term (over 20 years), from Tocumwal on the Victorian border to Goondiwindi on the Queensland border. An update to the New England NW Regional Plan is proposed for 2021.

2.1.2.7 Practitioner's Guide to Movement and Place

The Practitioner's Guide to Movement and Place is a collaborative effort by Government Architect NSW (GNSW) and Transport for NSW (TfNSW) to implementing movement and place approaches for core placemaking projects, understanding what constitutes place and movement, and establishing evaluating performance and criteria for successful places.



Source: *Practitioner's Guide to Movement and Place*

Figure 2-3 The built environment performance indicators are grouped under five themes, linked to ten user outcomes.

2.1.2.8 Net Zero Plan Stage 1: 2020 – 2030

The Net Zero Plan Stage 1 represents the preliminary stage of the State's action on climate change and net zero missions target by 2050. The document serves as the blue print for the SW Government economic and environmental strategy for the decade.

With a target of 35 per cent emissions reductions by 2030 from their reported levels at 2005, the plan aims at initiatives for electricity, energy, electric vehicles, hydrogen, and organic waste.

With sustainable development vision to empower current and future businesses, develop electric vehicle infrastructure, and improve the quality of life for the Moree township residents, the transport strategy for the Moree SAP is actioned to increase electric vehicle uptake and utilise prospective hydrogen production to power the next generation of bus fleets.

2.1.3 Local Government

The Local Strategic Planning Statement (LSPS) was developed in consultation with key stakeholders and is the overarching local strategic planning document for Moree Plains Shire. It sits within an integrated local strategic planning framework (Figure 2-3) and is underpinned by previous strategic work contained in the *Moree Plains Shire Growth Management Strategy 2009* and *Moree Plains 2017-2027 Community Strategic Plan*.

The *2017-2027 Moree Plains Community Strategic Plan* underpins the LSPS. It is a 10-year plan in Moree Plains Shire Council's (MPSC) integrated planning and reporting framework that sets out to balance the Shire's interests in quality of life, enterprise business, agricultural pursuits and natural resources. It identifies the outcomes and long-term strategic responses needed to achieve the agreed directions in line with the long-term aspirations of the Moree Plains community.

Source: MPSC 2019

Figure 2-4 Local government strategic planning framework

The purpose of the LSPS is to guide land use planning for the next 20 years and aims to:

- Identify the Shire's strengths and weaknesses
- Identify the Shire's economic, environmental, infrastructure and social opportunities
- Develop land use objectives for the Shire from 2020 to 2040
- Coordinate future development to align with the community's aspirations
- Identify any changes to planning provisions and documents that need to be made
- Identify any additional planning provisions and documents that need to be made
- Plan how the planning priorities listed in this LSPS will be implemented and monitored.

Regarding transport and infrastructure, the LSPS aims to provide reliable infrastructure and transport networks for a connected future (Goal 3). The

LSPS also aims to identify suitable planning frameworks for sustainable and green industries, intensive agriculture, food processing and other agribusiness activities to avoid land-use conflicts.

The LSPS is also intended to help inform land-use zones and development standards in the LEP and Moree Plains Development Control Plan 2013 (DCP).

Under Direction 1.1, 1.7, 1.6 and 3.3 in the LSPS, there are a number of critical priorities related to planning outcomes and actions to guide the development of the Moree SAP and maximise the benefits, particularly from a transport perspective.

As mentioned in Section 1.1.3, Local Government land uses statutory planning mechanisms are controlled through the MPSC LEP 2011. It aims to control, permit and prohibit development through identification of land use zones, subdivision requirements, use of land and demolition.

2.2 United Nations Sustainable Development Goals

The Sustainable Development Goals are the blueprint for achieving a better and more sustainable future for all. There are 17 interconnected goals that intend to address challenges related to poverty, inequality, climate change, environmental degradation, peace and justice. These goals are shown in Figure2-4.

Figure 2-5 UN Sustainable Development Goals

The Moree SAP will seek opportunities to align the Master Plan with these goals. The key goals that will inform the traffic and transport component of the Master Plan are:

GOAL 2: Zero hunger

This goal involves increasing investment in rural infrastructure, agricultural research and extension services. The investment in the Moree SAP will include enhanced rural transport infrastructure including access, roads and ancillary infrastructure to support agriculture development.

GOAL 3: Good health and well-being

This goal includes targets around reducing the number of deaths and injuries caused by road traffic crashes and promoting health and well-being globally. The traffic and transport component of the Moree SAP will seek to provide a safe transport system and opportunities to promote active transport to improve the health and well-being of the whole Moree community.

GOAL 8: Decent work and economic growth

Goal 8 targets development of productive activities, job creation, entrepreneurship, creativity and innovation. The Moree SAP will enable jobs generation, particularly in the construction phase for infrastructure in the short term, while reducing the proportion of youth not in employment, education or training in Moree Plains Shire.

GOAL 9: Industry, Innovation and Infrastructure

Goal 9 promotes development of “quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being”. The Moree SAP will invigorate the industry in Moree as well as the wider region while supporting innovation and greater infrastructure resilience.

Goal 11: Make cities and human settlements inclusive, safe, resilient, and sustainable

This goal highlights the importance of transport in sustainable and resilient cities. It aims to provide access to safe, affordable, accessible and sustainable transport systems including improving road safety and expanding public transport.

The Moree SAP will aim to deliver this in addition to other targets, including:

- Providing safe, inclusive and accessible, green public spaces
- Supporting positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.

3 METHODOLOGY

The methodology adopted for the Structure Plan was informed significantly by the Enquiry by Design (EbD) process, a planning tool used to allow for key stakeholders to collaborate on the development of a vision for the Moree SAP. Figure 3-1 shows the forecast timeline of the Moree SAP project from commencement to completion of the Final Master Plan.

The following two EbD workshops were held:

- Preliminary EbD workshop – To develop three initial land use scenarios, which would then be further developed in an interdisciplinary assessment
- Final EbD workshop – To study the interdisciplinary constraints and opportunities of each scenario and develop a final land use Structure Plan based on the assessment.

The main participants in the workshops were:

- DPIE
- Regional Growth NSW Development Corporation (RGDC)
- Moree Shire Plains Council (MPSC)
- Technical consultants
- State agencies, including Transport for NSW (TfNSW)
- Australian Rail Track Operation (ARTC) - Final EbD only.

The EbD workshop process enabled the development of the Master Plan scenarios, established the interdisciplinary understanding of their constraints and opportunities, progressed the agreement on the final Structure Plan.

This report assesses the land use Structure Plan from the final EbD workshop from a transport and traffic perspective and would be used as input to the Draft Master Plan.

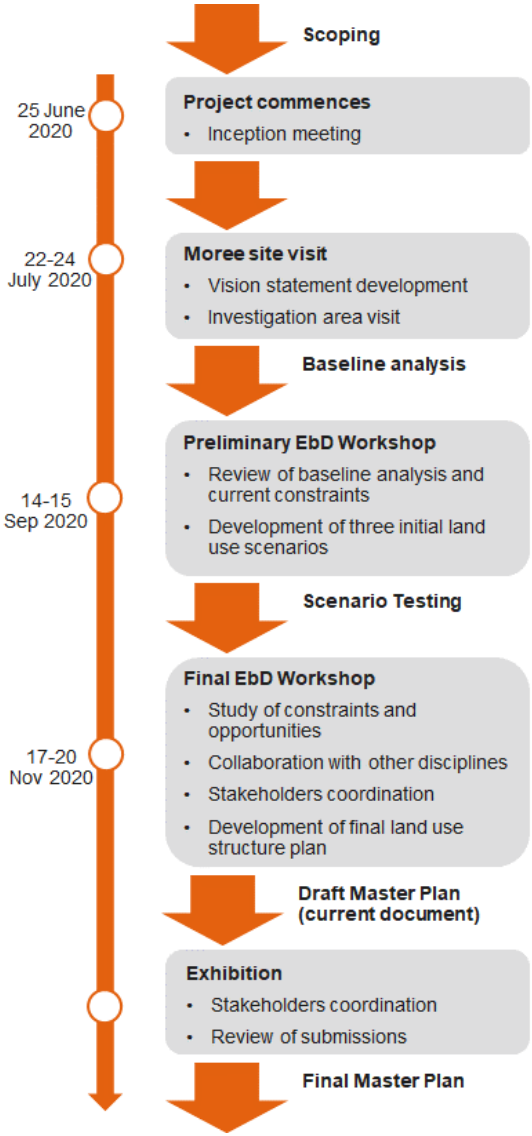


Figure 3-1 Methodology and timeline

During the EbD workshops, inter-disciplinary participants and subject-matter-experts worked collaboratively together with all stakeholders, to present results of respective analyses, to provide input, to constructively debate ideas and options, to critique and challenge thinking, and to discuss the advantages and disadvantages of the various scenarios considered.

Interdisciplinary elements were recognised and incorporated to create robust, evidence-based reporting, as well as to challenge the status quo and to promote innovative and flexible ideas to challenging issues facing the SAP.

Overall, the streamlined approach to Master Planning enabled the contributions from all participants to be duly considered and resulted in the recommendation of a robust Structure Plan and a proposed transport network that embodies all of the inputs, considerations, constraints, suggestions and requirements from all respective parties.

The outcome of the final EbD is a Structure Plan that is well aligned with the Moree SAP vision and aspirations.

Of particular note, the outcomes from the discussions during the Final EbD which are reflected in the Structure Plan include:

- Identification of a suitable location and orientation for the proposed Inter-Modal Terminal
- Long-term rail line relocation and routing, within the broader transport network
- Measures to protect biodiversity and heritage artifacts including preservation of the TSR
- Determination of water volumes and sourcing to satisfy the increased demands from the SAP, including certainty regarding water availability to meet first movers into the SAP
- Measures to create early employment opportunities and priorities to create jobs for locals including Indigenous workers
- Staged land use development strategy to take advantage of existing infrastructure
- Allocation of sufficiently large land areas for new solar farms in the SAP to achieve a net-zero outcome
- Proposed servicing and new supporting infrastructure development strategy for the SAP.

The outcomes of the various traffic and transport studies, which were undertaken by Arcadis, and the analyses of the strengths, weaknesses, opportunities, and constraints of the respective options that were identified and examined, were tendered during the EbD workshops. The traffic and transport studies supported various disciplines of the SAP investigation area, and active discussions were held around:

- The internal road network, enabling works, and mitigations for rail/ road conflicts
- The Moree Intermodal Overpass location and connectivity to internal and state long term road network
- Recommendations on the different intermodal options, their location relative to the road network, and long-term suitability with rail alignments
- Recommendation on Inland Rail impact on town severance and resolutions for active transport
- Estimates on trip generation based on the projected number of employees, new businesses, and the area of the SAP
- Recommended infrastructure staging plan.

The outcome and discussions held during the final EbD have been captured throughout this report.

4 KEY FINDINGS

A review of the existing connections across Moree was undertaken to provide an understanding of the current and prospective transport network users across the road and rail network, including active and public transport modes as well as freight connections. The review of the baseline conditions enables the projection of current travel and freight patterns in the region for the masterplan evaluation, and provides an overview of the current opportunities and weaknesses in and around the SAP borders.

4.1 Road safety and crash history

An analysis of historical crash information on the State and regional corridors running through Moree was performed of the five-year period between 2014 and 2018 sourced from the publicly available TfNSW interactive crash statistics explorer.

Figure 4-1 and Figure 4-2 show the locations of crashes that occurred along major corridors of Moree and within the Moree township, respectively.

Over the assessed five-year period, a total of 43 crashes occurred in road network surrounding Moree, two of which resulted in fatal injuries. 16 per cent of all crashes resulted in serious injury, 30 per cent in moderate injury and seven per cent in minor injury. 42 per cent of crashes were non-casualty crashes. Table 4-1 summarises the crashes by severity by year.

Table 4-1 Accidents by the degree of crashes

Degree of crash	2014	2015	2016	2017	2018	Total
Fatal				1	1	2
Minor/ other			2	1		3
Moderate	4	4	1	1	3	13
Non-casualty	6	4	5	1	2	18
Serious	1	3	1	2		7
Total	**11**	**11**	**9**	**6**	**6**	**43**

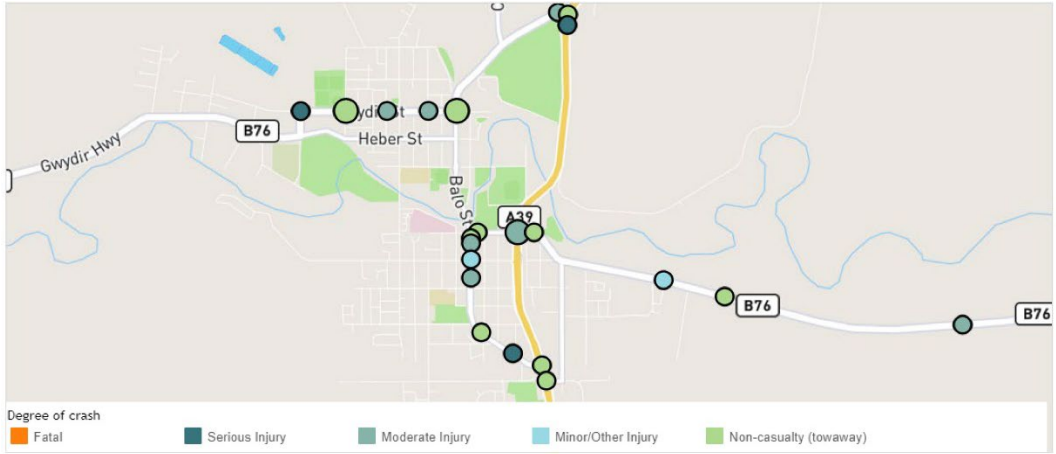


Figure 4-1 Crashes in the Moree township

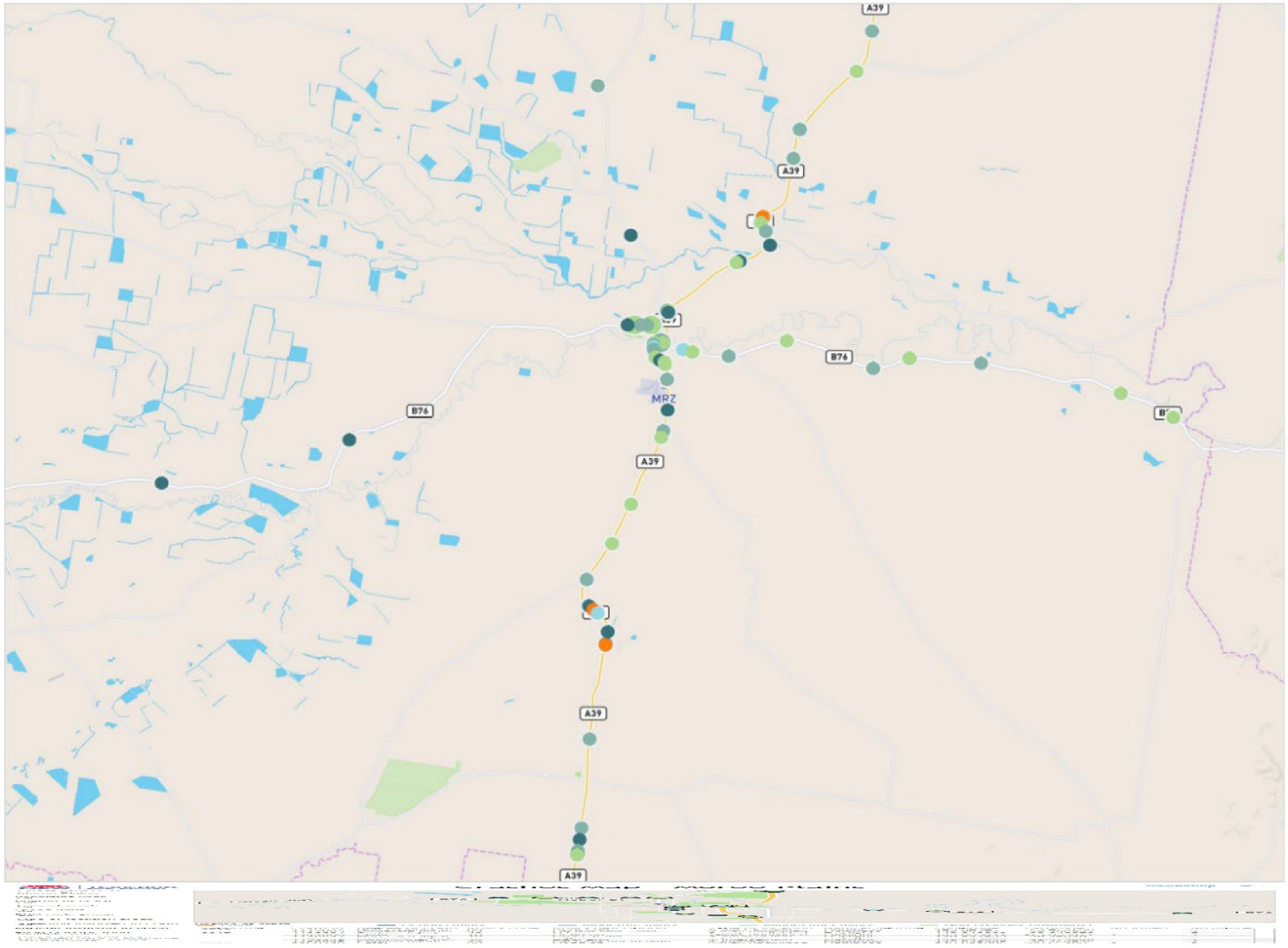


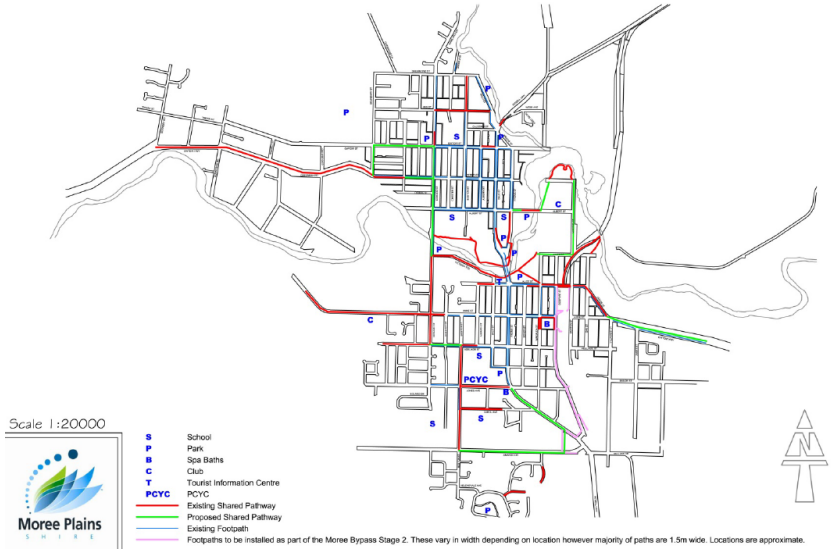
Figure 4-2 Crashes along the major corridors in Moree

4.2 Active transport

4.2.1 Current infrastructure and proposed expansion

Moree has a bicycle network (shared pathway), which includes paths along the river and the local road network. MPSC adopted the *Moree Bike Plan 2014-2024* which aimed to guide the future expansion of the cycling network.

MPSC also adopted the *Moree Shared Pathway Plan 2014-2024* which supports the work completed in the Bike Plan and provides the framework necessary to link the existing shared pathways together, therefore, increasing not just bicycle but also pedestrian safety in Moree. Proposed shared pathways and bicycle paths are captured in Figure 4-3.



Source: MPSC 2014

Figure 4-3 Existing and Proposed Shared Pathway Network Map

Proposed paths focus on increasing the potential to support the ability to walk or ride for transport rather than only for recreation and leisure purposes.

4.2.2 Active transport snapshot

An analysis of Journey to Work data collected during the 2016 Census shows that 4.9 per cent of work trips made by employees of Moree are completed through active transport, despite 81.6 per cent of employees of Moree also living in Moree. It should be noted that the climate and heat in Moree, particularly during the summer months, are key consideration factors that decrease the proportion of journeys to work made by active transport. Journey to work information based on the 2011 Census show similar patterns, where 5.8 per cent of all work journeys are completed via active transport.

In April 2016, MPSC undertook active transport surveys at Dr Hunter Bridge for 1.5-hour periods for five weekdays (8, 14, 15, 18 and 20 April 2016). The bridge crosses over the Mehi River, connecting the northern and southern sides of Moree. Moree Public School and TAFE NSW (to the north), and Moree East Public School (to the south) are all within 600 metres radius of the bridge.

Figure 4-4 shows the location of Dr Hunter Bridge in the context of the educational institutions.

The survey shows up to approximately 81 active transport users using the eastern and western walkways during the surveyed 1.5 hours, out of which 35 per cent are bicycle and scooter riders. An additional 10 pedestrians were reported crossing the bridge.

For all the sum of all survey periods, of all path users at this location, 69.2 per cent were adults, 16.1 per cent were high school aged, and the rest were at primary school age and younger. Additionally, 82 per cent of those counts were pedestrians, with the rest are bicycles and scooters.

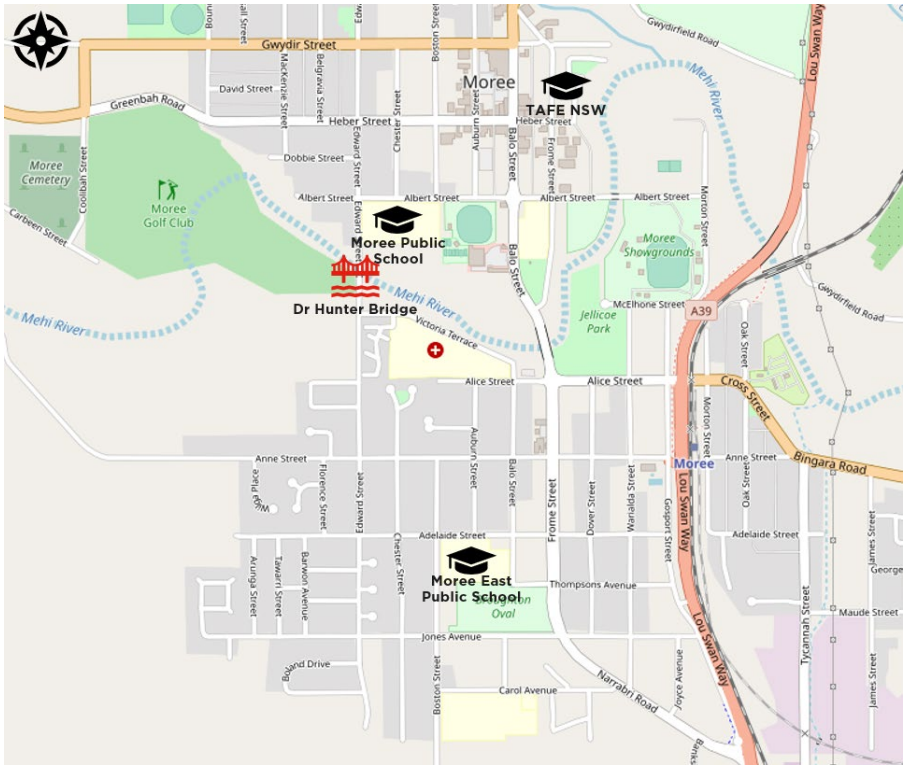


Figure 4-4 Active transport survey location

4.3 Buses

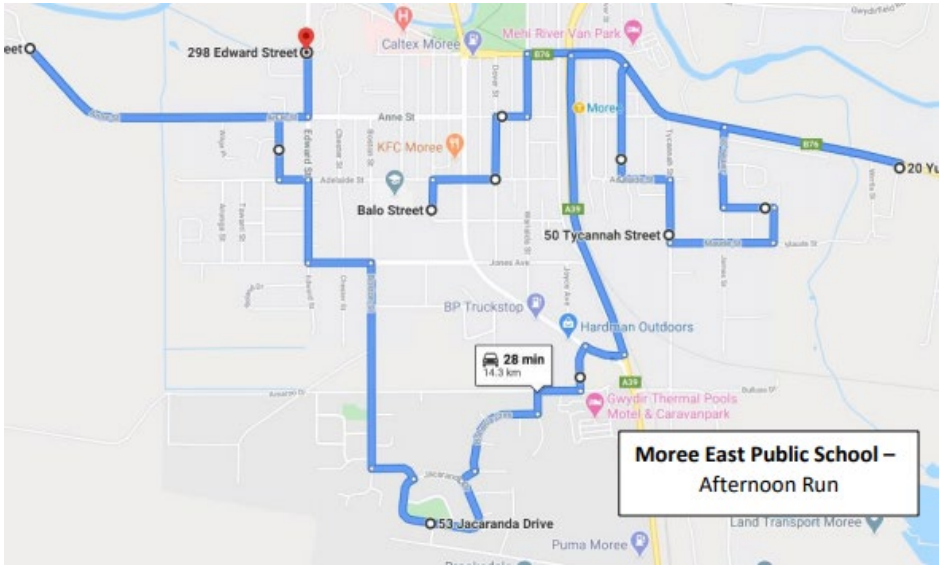
4.3.1 Local connectivity

The Moree Town Bus Service operated in Moree until November 2018. The Moree on-demand bus service has now replaced the town bus service. The on-demand bus service is a trial service operated by Reynolds Fogarty. Discussion with TfNSW and MPSC indicated that plans for expanding the on-demand bus services are currently ongoing, with expansion to major employment areas around the township.

The on-demand bus services align with Customer Outcome 2: Embracing new technology in the *Regional NSW Services and Infrastructure Plan* with regards to investigating flexible or demand responsive transport and adapting to and embracing new technology.

There is a twice-daily route service (7:35am and 6:05pm to meet the morning and evening train services) in addition to the on-demand services, seven days a week (excluding public holidays). Journey to Work data collected during the 2011 Census indicate that only 0.3 per cent of work trips were made by public transport.

Reynolds Fogarty also operates an afternoon only service for Moree East Public School (Figure 4-5).



Source: Reynold Fogarty 2020

Figure 4-5 Moree East Public School bus service route

4.3.2 Regional connectivity

Regional bus services operate from Moree Railway Station, Gosport Street servicing Moree to Grafton (Figure 4-6).

- Regional bus service number 141 operates between Grafton – Glen Innes – Inverell – Moree three days a week on Tuesday, Thursday and Saturday from Moree Town stop
- Regional bus service number 142 operates between Moree – Inverell – Glen Innes – Grafton three days a week on Monday, Wednesday Friday from Moree Town stop.

NSW TrainLink also operates a service between Moree and Walgett on Wednesday and Thursday each week.

Source: NSW Government 2019

Figure 4-6 North Western NSW regional train and coach network

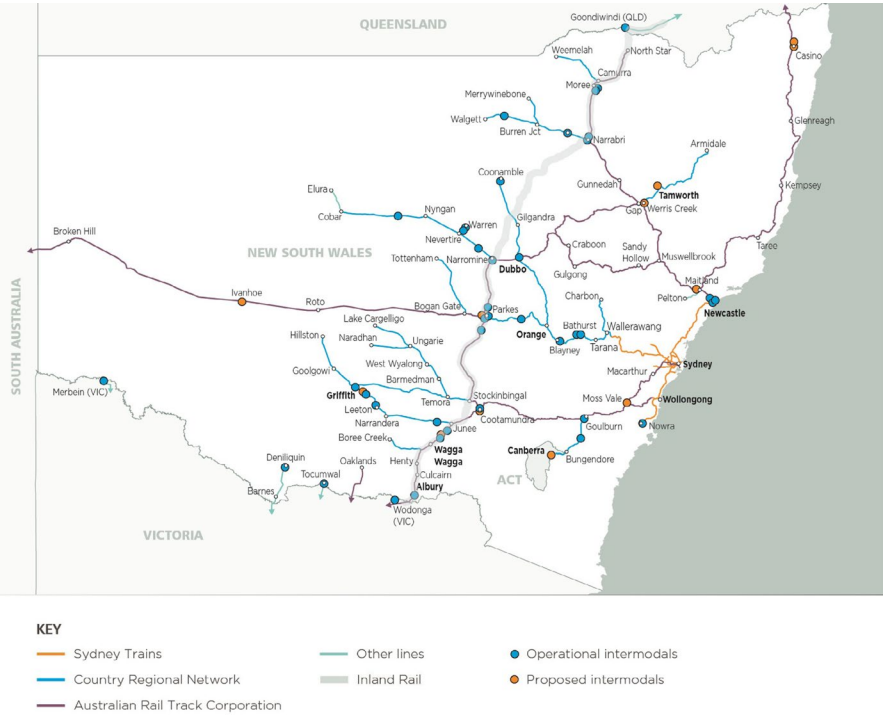
Other regional coach services operated by Crisps coaches provide connectivity to Brisbane and Toowoomba (via Warwick).

4.4 Rail

The NSW TrainLink passenger rail network in the New England North West region connects Moree Railway Station as well as Armidale, Tamworth and the Upper Hunter with Newcastle (Broadmeadow), the Central Coast and Sydney (Central) daily (refer to Figure 4-7).

Moree Railway Station is located on the North West NSW line and is serviced by NSW TrainLink.

- Regional train service 243 operates between Sydney (Central) – Werris Creek – Moree seven days a week
- Regional train service 244 operates between Moree – Werris Creek – Sydney (Central) seven days a week.



Source: NSW Government 2018

Figure 4-7 NSW existing railway network

4.5 Vehicle

The primary mode of travel in Moree is the private vehicle, with about 82 per cent of all work trips being undertaken with the use of a private vehicle. The high mode share accounted for by vehicles can be partially attributed to the low proportion of active transport users, likely due to the climate and heat in Moree.

4.5.1 Road network

This section describes the classification of the road network in the study area. The information was obtained from the Schedule of Classified Roads and Unclassified Regional Roads and Alpha Numeric Route Number System.

Moree is located at the junction of three highways, including Gwydir Highway (B76) and Carnarvon Highway (B55) which are classified State highways, and the Newell Highway (A39) which forms park of the AusLink National Land Transport Network.

Figure 4-8 provides an overview of the key road and rail networks connecting Moree in a state-wide perspective.

Source: MPSC, 2019

Figure 4-8 Road and Rail Freight Network State-wide Coverage

Surrounding the SAP Investigation Area, Figure 4-9 highlights the road and rail network.

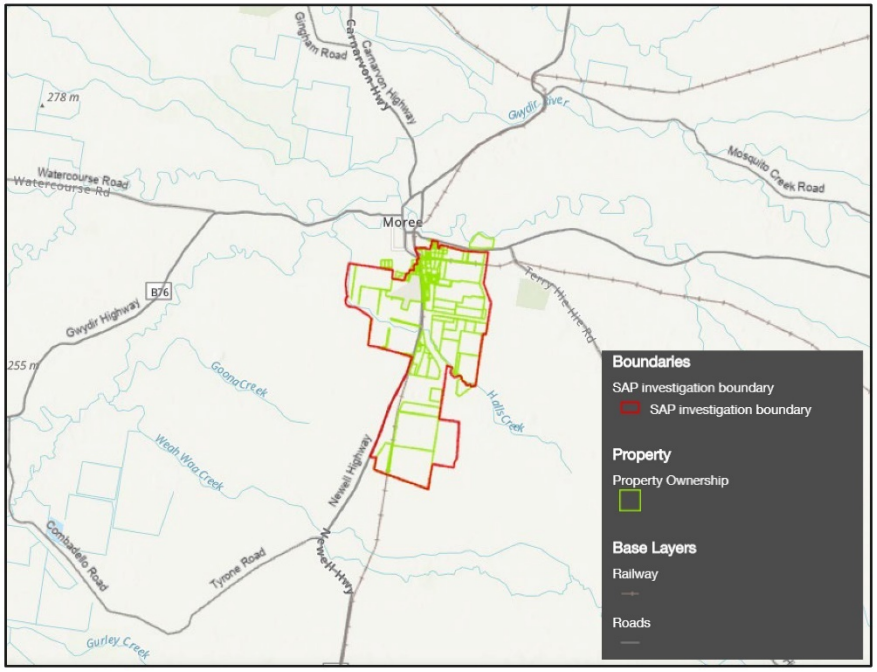


Figure 4-9 Rail and road network surrounding the SAP investigation network

4.5.1.1 National roads

4.5.1.1.1 Newell Highway

As mentioned in Section 3.4 Freight connectivity and journeys, Newell Highway is a significant artery traversing regional NSW and performs an important role in the movement of road freight. For Moree, the highway contributes to the competitiveness of the region's agricultural sectors, opening up access to essential freight networks and ports in NSW and Queensland.

4.5.1.1.2 Moree township bypass

The Moree township bypass involved the construction of a 4.4-kilometre realigned Newell Highway between Bulluss Drive to the south of the Moree Township to Moree Racecourse to the north east of Moree Township.

Following the completion of the Moree Bypass Stage 2 (Figure 4-10) in 2015, trucks have been mostly removed from Moree's commercial area in Balo Street (1,700 heavy vehicles a day travelled through the township of Moree, the equivalent of one truck per minute during the day and one truck every one and a half minutes at night), significantly increasing local road network safety and promoting the efficient movement of freight on the Newell Highway south of the town.

Source: TfNSW (formerly NSW Roads and Maritime Services), 2009

Figure 4-10 Moree township bypass

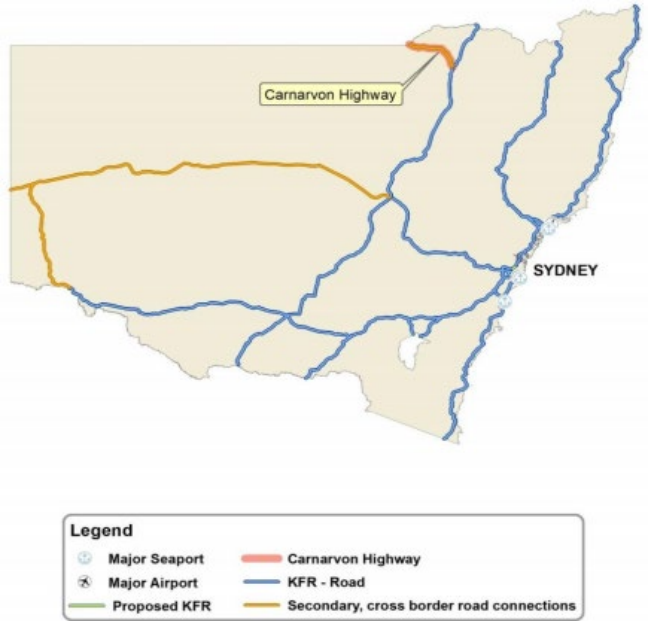
4.5.1.2 State roads

Road transport currently dominates the freight task for agricultural commodities in Moree Plains Shire.

State roads intersecting Moree include the Carnarvon Highway and Gwydir Highway.

4.5.1.2.1 Carnarvon Highway

The Carnarvon Highway is a State highway, providing a crucial secondary link to the north-west of NSW into southern Queensland linking Moree to Rolleston in Central Queensland. It is categorised by the Transport Infrastructure Council as a secondary key freight route and accommodates livestock, grains, and containers and general freight to Moree Plains Shire predominantly.

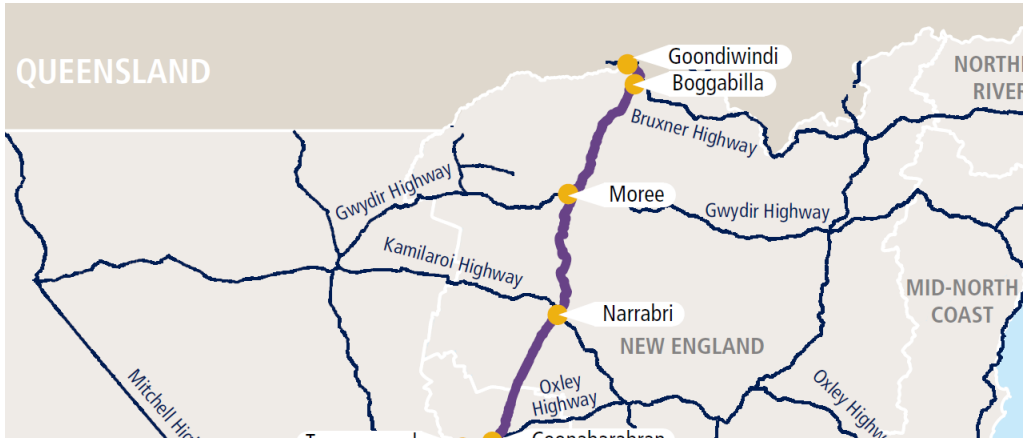


Source: Transport Infrastructure Council 2017

Figure 4-11 NSW key road freight routes - Carnarvon Highway

4.5.1.2.2 Gwydir Highway

The Gwydir Highway provides an important east-west freight link across the Great Dividing Range and connects a series of interstate highways and important interregional corridors with inland urban centres. It links Grafton west to Walgett via Glen Innes, Inverell, Warialda and Moree.



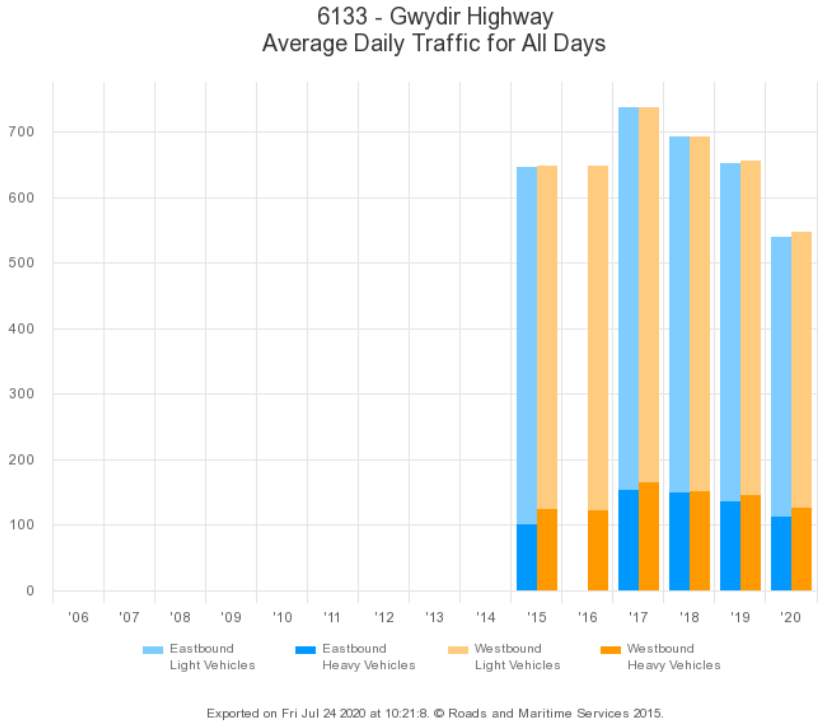
Source: NSW Government 2015

Figure 4-12 Gwydir Highway intersecting Newell Highway

The Gwydir Highway follows Greenbah Road, Coolibah Steet, Gwydir Street, Balo Street, Boggabilla Road and onto Cross Street and Alice Street. It also provides an east-west connection from the Newell Highway at Moree to the Pacific Highway at Grafton.

Gwydir Highway to the west of Moree forms part of a key freight link between Perth/Adelaide and Brisbane. A large portion of the heavy vehicles traveling from the west will travel through Moree and north to Brisbane. The Gwydir Highway is the only B-Double (25-26 metres) route between the North East – North West Region and the NSW North Coast.

Average daily traffic (ADT) on the Gwydir Highway (at Inverell) is shown in Figure 4-13.



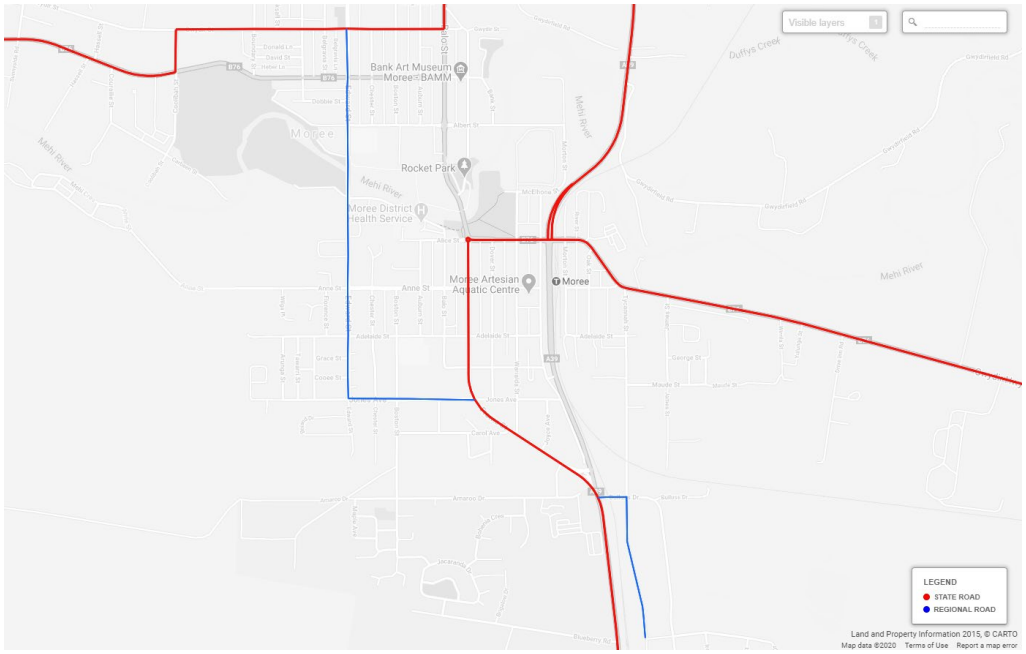
Source: TfNSW, 2020

Figure 4-13 Gwydir Highway (at Inverell) ADT

4.5.1.3 Regional roads

There are several roads within the township of Moree that are classified as regional roads (Figure 4-14) including:

- Edward Street
- Jones Avenue (part)
- Bulluss Drive (part)
- Tycannah Street (part).



Source: TfNSW, 2020

Figure 4-14 Moree State and Regional roads

4.5.1.4 Local roads

Moree Plains Shire Council received $3.4 million as part of the Fixing Local Roads program in 2020 to go towards seven infrastructure projects in the region. These projects include:

- The sealing of curves on SR108 Burrington Road
- Sub arterial road sealing of 5.8 kilometres of Terry Hie Hie Road
- Intersection upgrades with state highways (three projects)
- The sealing of bridge approaches on local roads (across three projects)
- The sealing of curves on SR1 Watercourse Road.

Additional funding was received through alternate sources and put towards the North-South Link – Stage 1 of the Moree Intermodal Park (MIP). These upgrades would support improved access around the MIP.

Gosport Street, Warialda Street and Dover Street are north-south streets which run parallel to, and to the east of, the Newell Highway (Frome Street) and to the west of the railway line. Anne Street, Adelaide Street, Thompsons Avenue and Jones Avenue are east-west streets which run parallel and to the south of Alice Street. These connect the Newell Highway and the streets to the west of it to Gosport Street and Moree Railway Station. Joyce Avenue is located between Warialda Street and Gosport Street, and connects Jones Avenue in the north with Frome Street in the south. Joyce Avenue enables connection for businesses in Joyce Avenue that attracts Restricted Access Vehicles with Frome Street.

4.5.1.4.1 Level crossings

Four major level rail crossings exist within the SAP Investigation Area (Figure 4-15).

- Gwydir Highway (the main vehicles impeded by the Gwydir Highway are private vehicles entering and exiting the Moree township)
- Tycannah Street
- Bulluss Drive
- Bullington Road.

Figure 4-15 Rail level crossings

The Bulluss Drive and Burrington Road level crossings impact freight trucks. Consultation with MPSC and TfNSW indicated long queues extending on Newell Highway, especially during peak harvest seasons and maximum freight demands.

With the Bulluss Drive and Gwydir Highway level crossings distanced at 1,200 metres, and with Inland Rail trains extending to 1,800 metres (and ultimately 3,600 metres), a real constraint is mitigating the crossings to minimise the impact on the road network in the future.

The distance between the crossings and nearest intersections has a significant impact on freight traffic during peak harvest seasons. The Bulluss Drive crossing is located 60 metres away from Newell Highway, and 100 metres from the intersection with Tycannah Road. Similarly, the impact of the Gwydir Highway crossing needs to be considered for any proposed road upgrades for Moree and the SAP investigation area.

4.5.1.4.2 Unsealed roads

Accessing residential regions and industrial areas within the greater region is typically done through unsealed roads, though unsealed roads in the Moree township service as urban service road, as shown in Figure 4-16. Out of the 2,850 kilometres of public roads in the Moree Plains Shire, close to 2,000 kilometres of streets and corridors are unsealed or dirt roads. Within the Moree SAP investigation area and the area south-west of the Moree Regional Airport, access to major industries such as the Moree Waste Management Facility and Moree Solar Farm is a combination of MPSC sealed and unsealed roads, as shown in Figure 4-17.

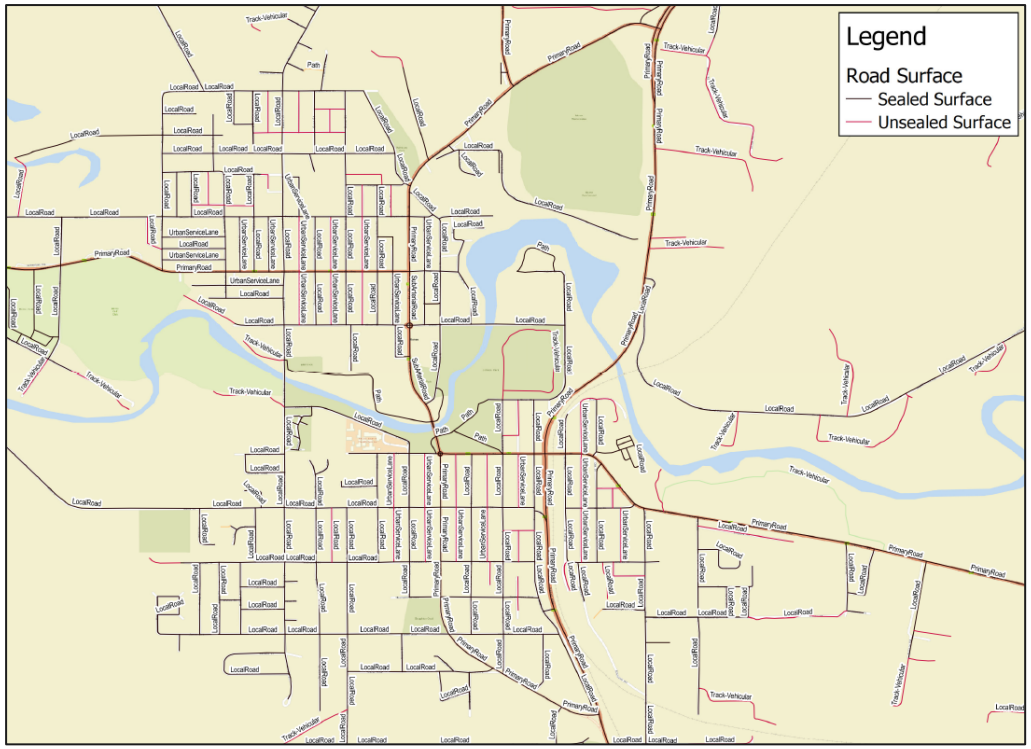


Figure 4-16 Sealed and unsealed roads in Moree township

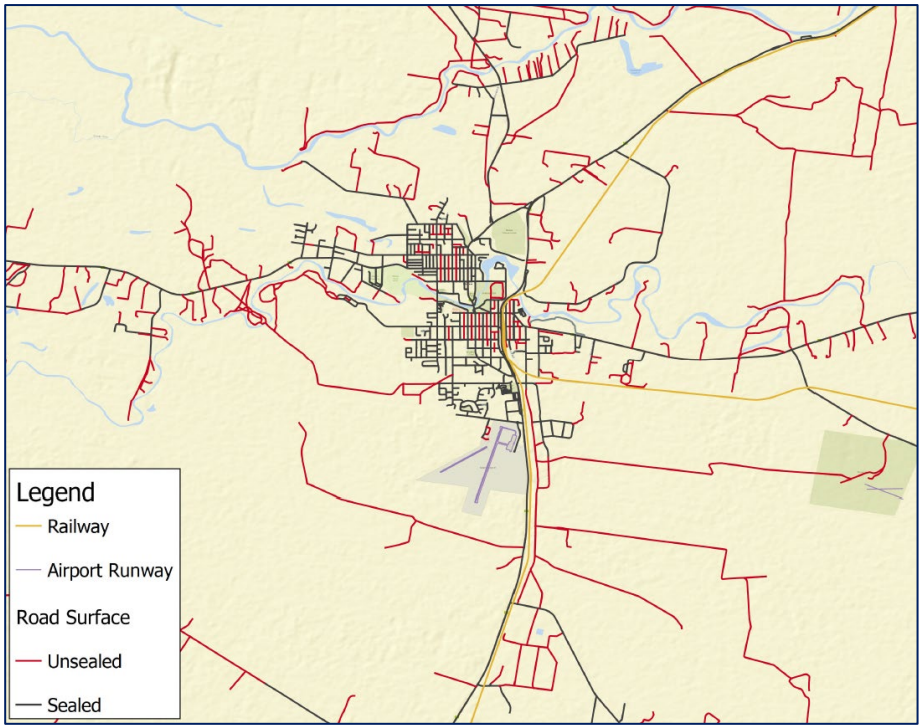


Figure 4-17 Sealed and unsealed roads in Moree and SAP investigation area

4.5.2 Point to point

Taxi services operate in the Moree Township, with the on-demand bus service providing wider connectivity to the local population. Taxi services still play an important role in Moree, particularly for trips to and from the airport, and after-hours trips (i.e. after 7pm when the on-demand bus service ends).

4.6 Freight connectivity and journeys

Moree is a major agricultural centre in NSW, contributing to almost 18 per cent of the State's gross agricultural value, and renowned for its mix of agrarian commodities, which, at a regional scale, include cereal and cotton crops. On the other hand, cattle, oilseeds, and pecan nuts contribute significantly to the local economy.

As such, the role of freight in mobilising these products and its importance to the Moree economy are high priorities for the vision of the SAP investigation area.

4.6.1 Agricultural output and freight patterns

Agriculture is the main engine industry within the Upper North West Region; the region is one of the most productive agricultural areas in Australia. In 2015-16, the value of the region's agricultural output (excluding processing) was $1.6 billion (Australian Bureau of Statistics [ABS] Agricultural Census, 2015-16).

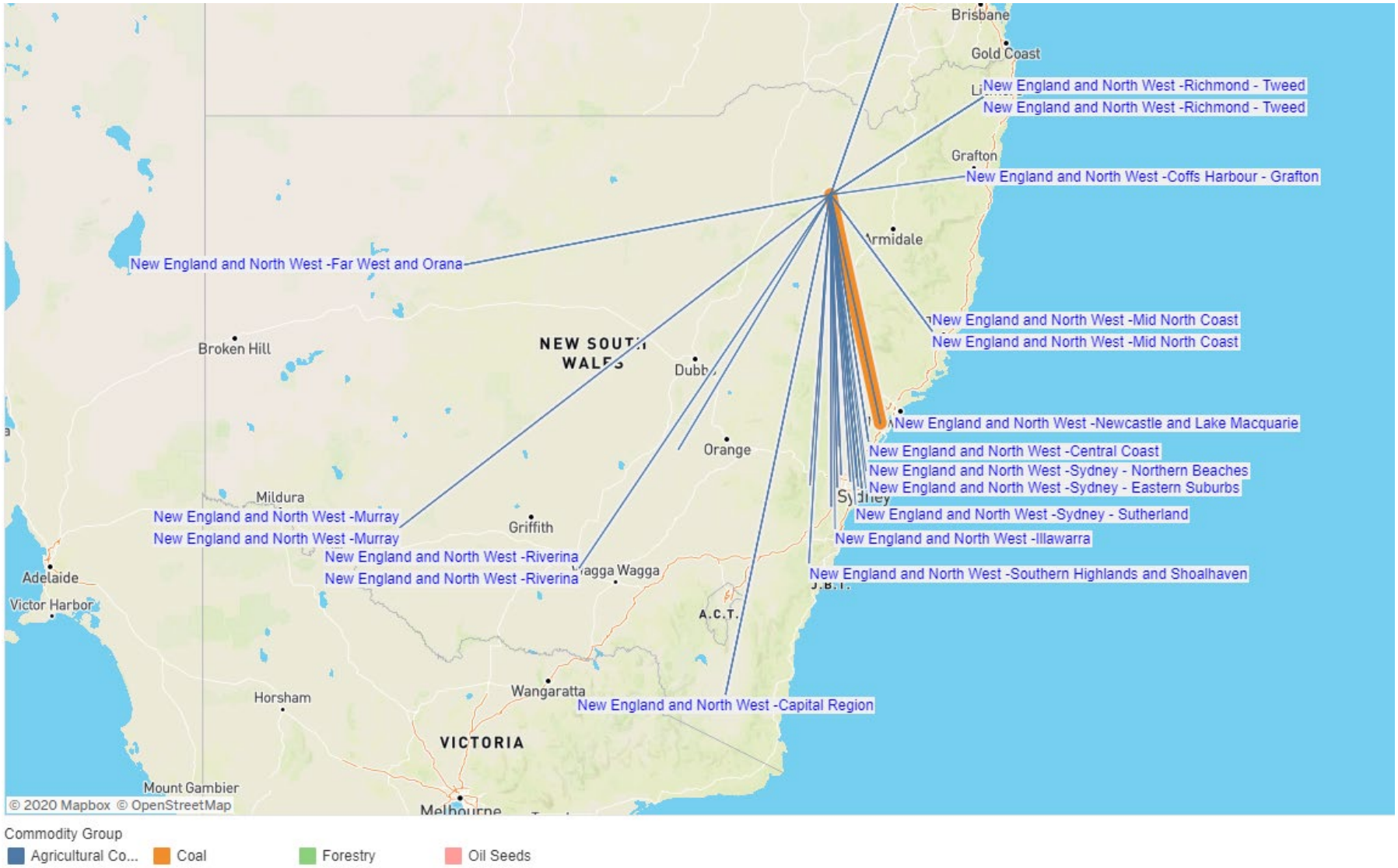
For Moree, details of the agricultural output by commodity is shown in Table 4-2. In 2015-16, cropping accounted for 92.8 per cent of the value of agricultural production ($866 million) within Moree Plains area, with livestock contributing 6.7 per cent ($64 million) and horticulture (fruit, vegetables and nuts) five per cent ($5 million). Cropping is the dominant activity in the Moree Plains area.

Table 4-2 Moree agriculture output

Agricultural commodity	Value of output ($ million)	Percentage of total output
Cereal crops for Grain	406	42.5%
Cotton	208	21.8%
Other crops	272	28.5%
Fruit, nuts, vegetable	5	0.5%
Cattle	51	5.3%
Sheep - meat and wool	12	1.3%
Other livestock	1	0.1%
Total cropping	886	92.8%
Total horticulture	5	0.5%
Total livestock	64	6.7%
Total	**955**	**100.0%**
Value per hectare	**$498**	

Source: Upper North West Regional Economic Strategy 2018 - 2022

Figure 4-18 shows the destination of agricultural commodities originating in New England North West (SA4), and Figure 4-19 shows the origin of all commodities arriving in New England North West (SA4) by commodity type in 2016.



Source: NSW Government 2018

Figure 4-18 Strategic freight commodity origin map, New England and North West 2016

Source: NSW Government 2018

Figure 4-19 Strategic freight commodity destinations map, New England and North West 2016

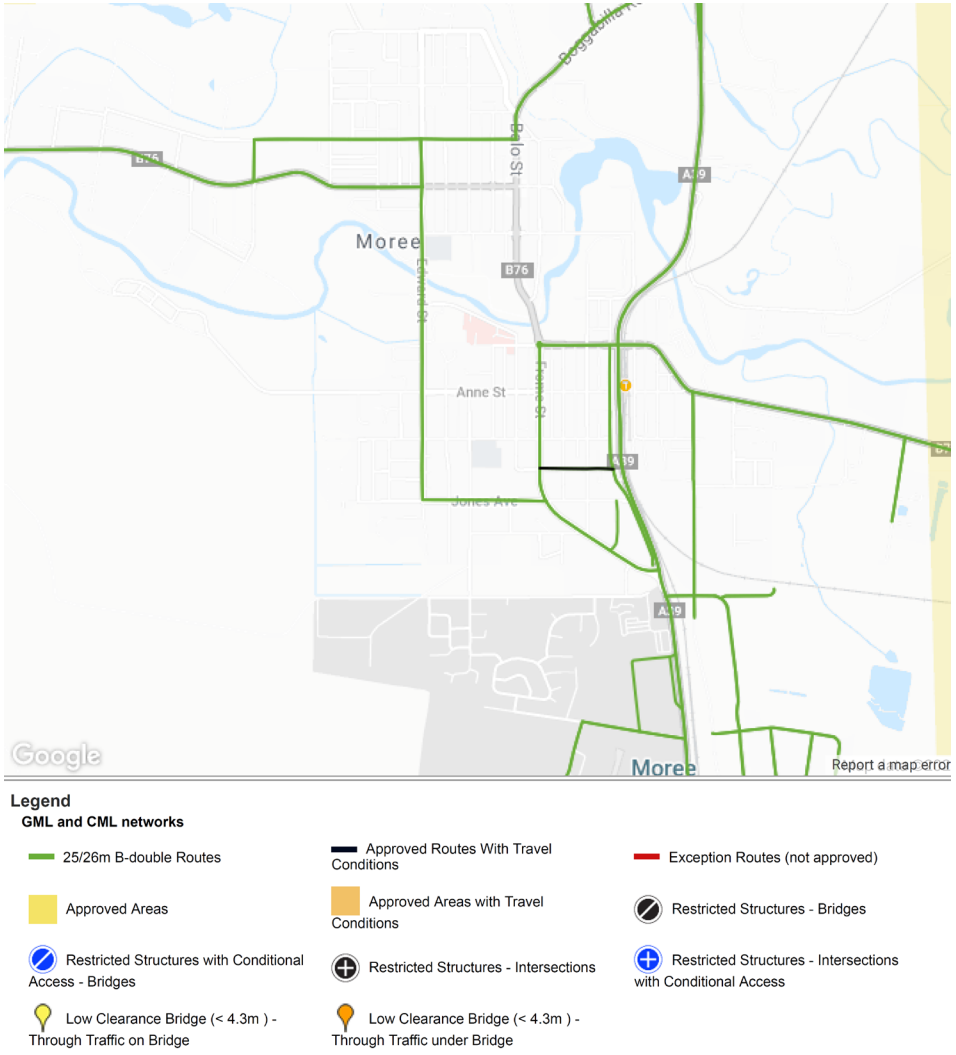
4.6.2 Road freight

The Newell Highway is the longest highway in NSW and connects south-eastern Queensland and Victoria via central NSW. It is a crucial national freight route that is nominally a two-lane, two-way single carriageway road and utilised for an increasing number of freight movements connecting producers in western NSW to interstate capital cities. Freight on this highway includes food products, agricultural commodities, general freight and manufactured goods.

Source: NSW Government 2015

Figure 4-20 Newell Highway and key intersecting highways

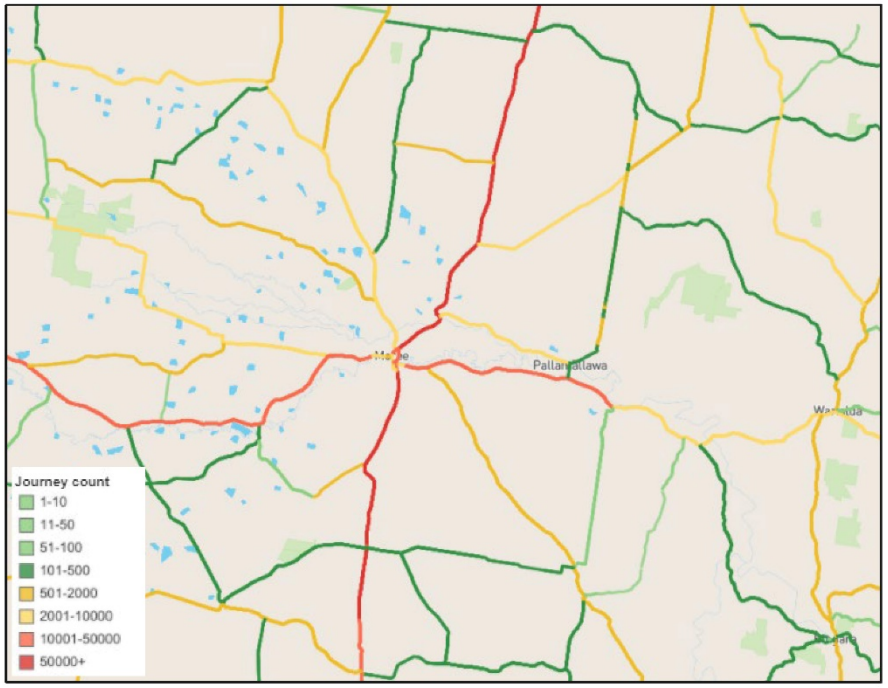
Twenty-six metre B-doubles are permitted along the entire length of the Newell Highway, except through the West Wyalong urban commercial centre. Road trains are permitted along the majority of the Newell Highway. B-triples and AB-triples are permitted between Narrabri to Goondiwindi. Additionally, the Newell Highway is being upgraded to accommodate PBS 3A vehicle combinations. The General Mass Limit and Concessional Mass Limit network in Moree is shown in Figure 4-21.



Source: Transport for NSW, 2020

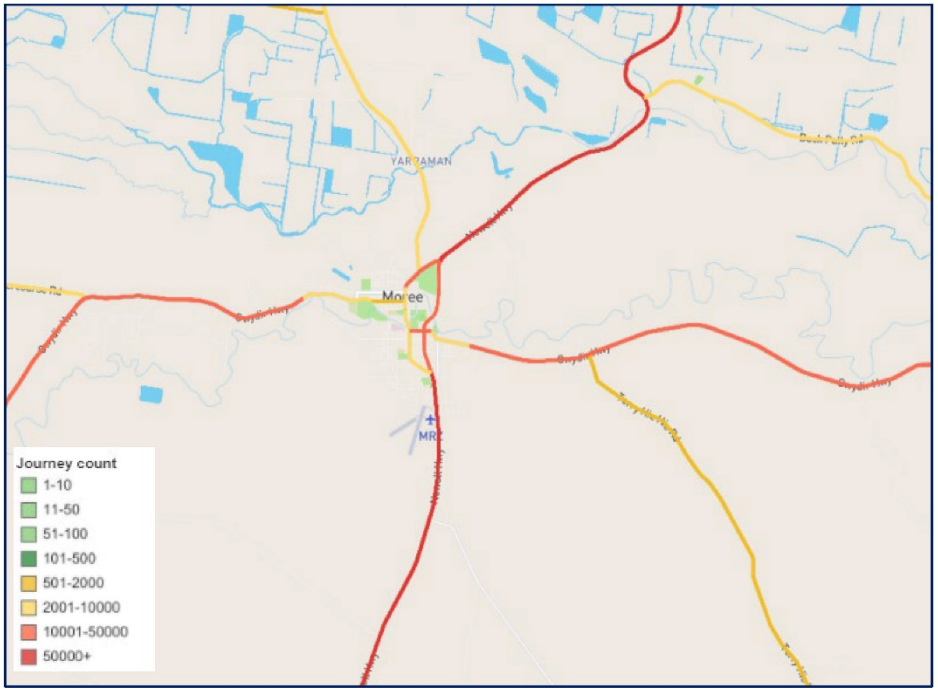
Figure 4-21 General and Concessional Mass Limit networks in Moree

Freight journeys in the Moree Plains region for vehicles in the Intelligent Access Program in 2018 are highlighted in Figure 4-22. Newell Highway carried 65,427 freight journeys. Figure 4-23 highlights freight trips passing by Moree township.



Source: NSW Telematics 2018

Figure 4-22 Freight journeys in Moree Plains region



Source: NSW Telematics 2018

Figure 4-23 Freight journeys passing Moree township

The percentage of heavy vehicles in rural areas of the Newell Highway corridor in 2011 ranged from 26 to 52 per cent of total traffic volumes. Moree to Boggabilla was observed to have the highest of rural highway section with the percentage of heavy vehicles (52 per cent) in 2015 (ARTC, 2015).

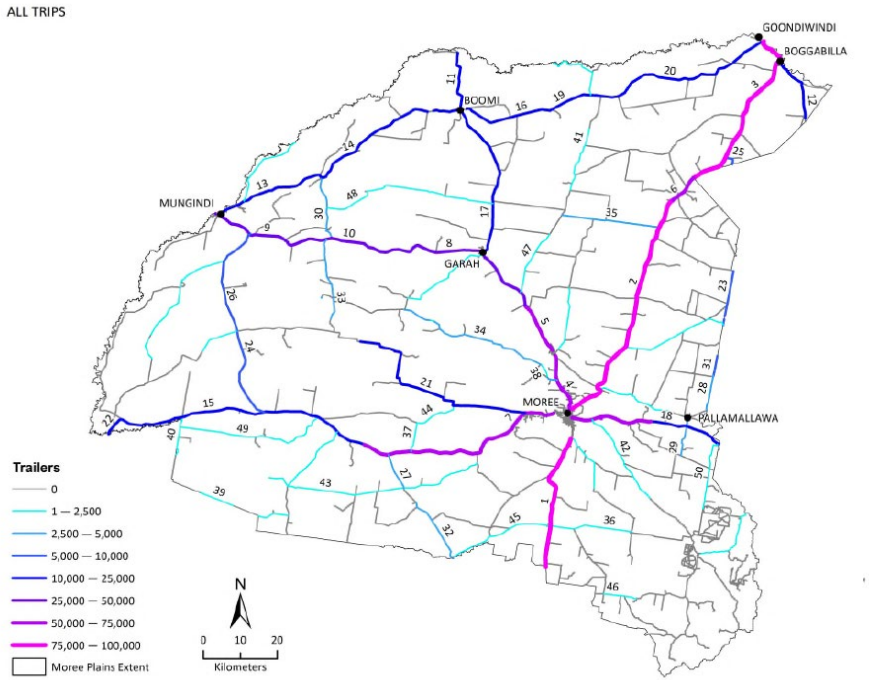
Survey daily traffic volume data shows that almost half of daily annual average daily traffic (AADT) northbound and southbound are observed to be heavy vehicles.

Table 4-3 2012 traffic volume – Narrabri to Boggabilla

Statistic	Narrabri to Moree	Moree to Boggabilla
Daily Traffic		
AADT	2,924	2,533
%Heavy vehicles (two-way) [1]	40.5%	47.7%
Typical Peaking Characteristics		
Northbound peak (11:00am)	127	113
Opposing flow	106	93
%Heavy vehicles (two-way)	32.5%	36.2%
Southbound peak (2:00pm)	109	94
Opposing flow	118	96
%Heavy vehicles (two-way)	35.7%	40.4%

Source: RMS 2012

As shown in Figure 4-24, most freight flows in the Moree region are carried on the Newell Highway.



Source: CSIRO, 2019

Figure 4-24 Freight flows for all movements in the Moree region

4.6.2.1 Grain Harvest Management Scheme (GHMS)

The GHMS is a scheme which allows trucking operators to make use of an overloading tolerance of up to five per cent per load on regional and local roads across Australia.

MPSC has enrolled in the scheme with the following conditions:

- Approval to travel on 25/26m B - Double and road train (A-Double and AB-Triple) routes that have been published in the gazette

- General Mass Limit (GML)/ Concessional Mass Limit (CML) AB-triple - Approved for access on the GML/CML Type 1 A-double network
- Higher Mass Limit (HML) AB-triple - Approved for access on the HML AB-triple network
- Gravel and dirt roads are to be used in dry weather only
- Approval applies to the period 1 October 2016 to 30 June 2021
- Maximum 80 km/h speed on all unsealed roads
- The scheme will be reviewed after each harvest period on receipt on the yearly harvest report for the scheme.

Under the GHMS, the following participating grain receiver sites in Moree were approved:

- Broadbent
- Moree-Haddad's
- Graincorp
- Manildra Group
- Louis Dreyfus Commodities

4.6.3 Rail freight

4.6.3.1 Existing freight rail

Moree is located on the Mungindi line, which is currently part of the ARTC heavy vehicle network, branching from the Great Northern Railway at the major rail centre of Werris Creek, and heading north to the remote town of Mungindi, on the Queensland border. This line would form part of the N2NS section of Inland Rail. The line is currently utilised for almost its entire length for grain transport, and for coal from the Preston and Gunnedah collieries.

Existing rail facilities from Moree to Narrabri are restricted and can currently generally only accommodate 800-metre trains carrying a total of 2,300 tonnes of grain. Inland Rail would accommodate 1,800-metre long double-stacked trains with a 21-tonne axle load at a maximum speed of 115 km/h.

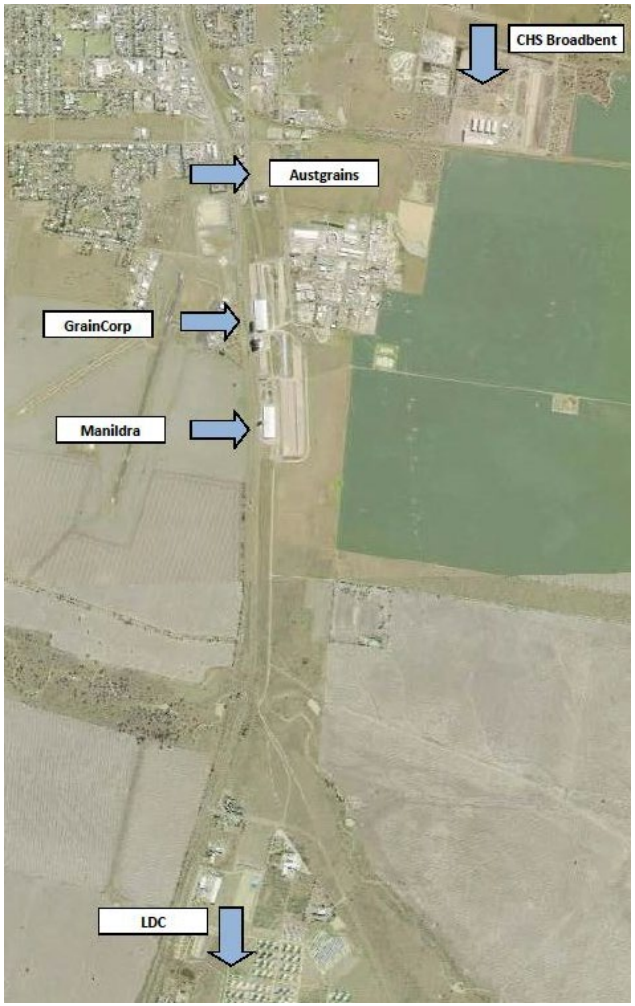
4.6.3.2 Existing intermodal facilities

Moree currently has a number of intermodal facilities (MPSC, 2020) including:

- Louis Dreyfus Company (LDC) provides bulk grain and cotton storage, handling and shipping. There is limited container "pick and place" operations and is utilised largely for blended grain products. It should be noted that LDC owns a private rail siding
- Manildra Grain provides bulk grain storage, handling and shipping. Manildra Grain utilises dedicated trains with grain utilised in the company's internal operations. It should be noted that Manildra has access to an ARTC managed rail siding
- GrainCorp provides bulk grain storage, handling and shipping. It should be noted that GrainCorp has access to an ARTC managed rail siding
- Austgrains provides silo-based grain storage, handling and shipping. It should be noted that Austrgrains have access to an ARTC managed rail siding
- CHS Broadbent provides bulk grain storage, handling and shipping. It should be noted that Broadbent utilise a rebuilt section of the Inverell Line, which is ARTC managed.

The location of the existing intermodal facilities is shown in Figure 4-25.

The MPSC *Greenfield Intermodal Facility and Associated Road Access multi-criteria analysis* (MCA) (2020) identified that with the exception of the Louis Dreyfus Company, none of the current operators have capacity for containerised freight. It also identified "that demand for a greenfield intermodal is dependent on a significant modal shift from road to rail including grains, cotton and legumes. Although current demand would not require a greenfield facility, it is important from a long-term strategic planning perspective to identify potential sites, including rail and road access to those sites" (MPSC, 2020).



Source: MPSC, 2020

Figure 4-25 Indicative location of existing intermodal facilities

4.6.3.3 Inland Rail and freight forecasts

Inland Rail will be a 1,700-kilometre rail line between Melbourne and Brisbane via regional Victoria, New South Wales and Queensland that will provide freight producers and regional centres with efficient rail access to domestic and international trade gateways. The N2NS section of Inland Rail is expected to be completed by 2023.

Forecast weekly train numbers on Inland Rail is provided in Table 4-4 .

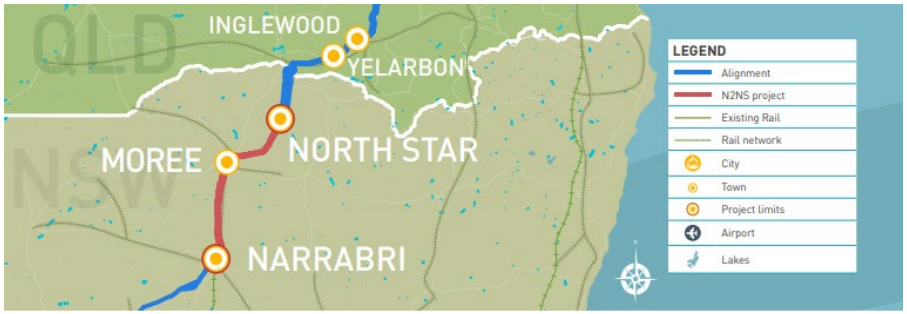
Table 4-4 Forecast Inland Rail train numbers (round trips)

Train type	Trains per week					
	2024-2025	2029-2030	2034-2035	2039-2040	2044-2045	2049-2050
Inter-capital/ intermodal	36	43	51	36	42	49
Grain	15	15	16	17	18	19
Coal	58	87	87	87	87	87
Others (including steel, mineral and general freight	15	16	17	19	20	22
Total	**123**	**162**	**171**	**158**	**166**	**174**

Source: ARTC, 2015

Note: Assumes maximum inter capital/intermodal train lengths of 1,800 metres with 50 per cent double stacking of containers (net payload 1,470 tonnes), increasing to 3,600 metres from 2,039–2,040 (net payload 2,938 tonnes); 800-metre bulk agriculture trains reflecting an assumed range of 650 metres for a narrow gauge to 900 metres for standard gauge trains (net payload 2,010 tonnes) and 1,010 metre coal trains (net payload 4,250 tonnes). Reference train payloads have been adjusted by ARTC to reduce from theoretically efficient trains for planning purposes. Train numbers reflect the maximum across all line sections. Totals may not sum due to rounding.

Inland Rail is a project that will catalyse and increase the rate of growth of the agricultural sector in Moree Plains Shire. As the most productive agricultural shire in Australia, and as a key transport junction of road and rail, Moree is well-positioned to be the transport and logistics hub of North West NSW. Moree is located on the N2NS section of Inland Rail enabling efficient rail freight between Moree and key seaports, as well as large population centres such as Newcastle.



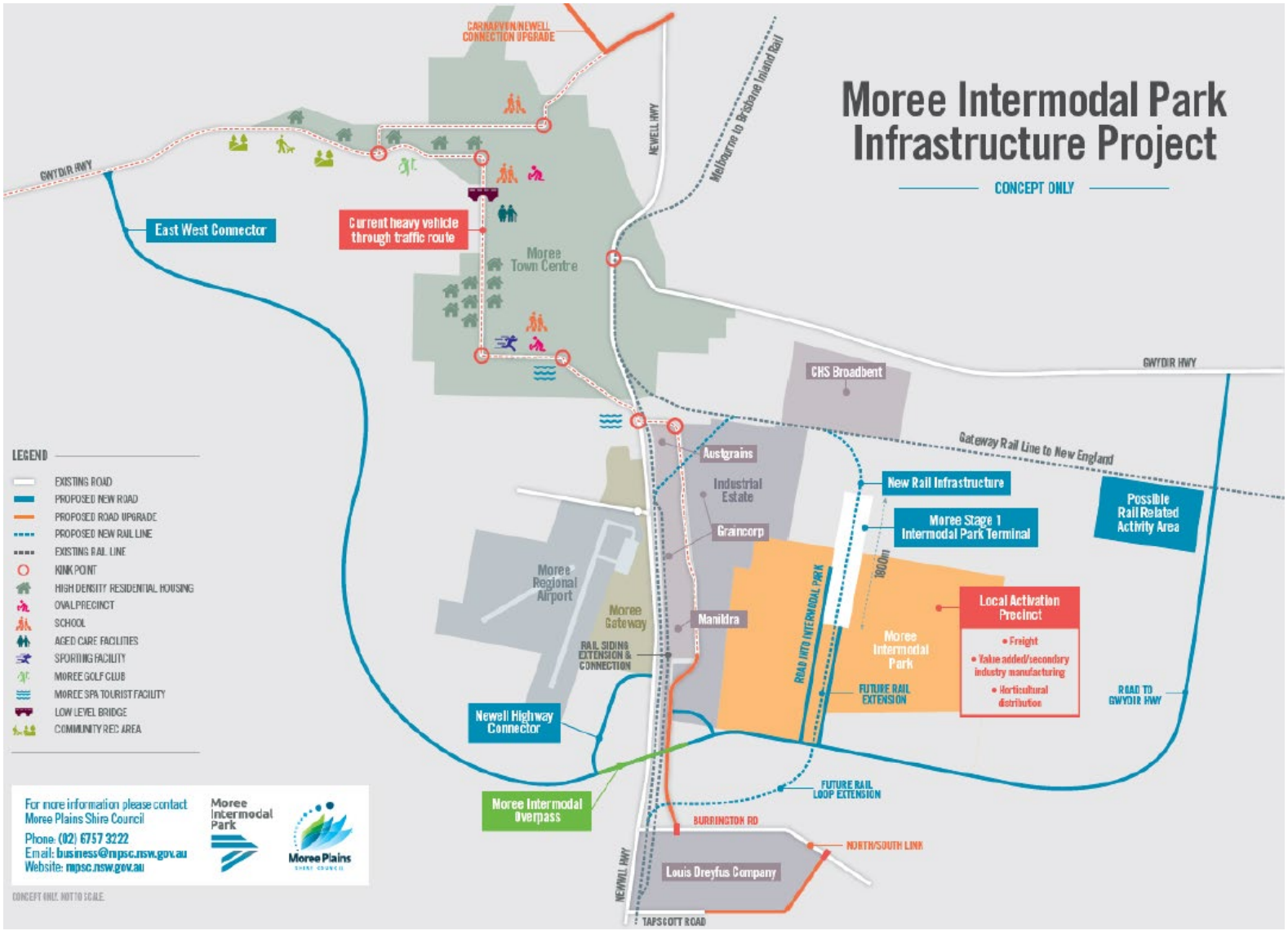
Source: ARTC, 2019

Figure 4-26 Narrabri to North Star Inland Rail Alignment

The N2NS project involves 188 kilometres of track upgrade within the existing rail corridor and construction of approximately 1.6 kilometres of new rail track to accommodate future planning for 1,800-metre double-stacked freight trains. N2NS construction is expected to commence in March 2021.

4.6.3.4 Moree Intermodal Park

Moree SAP is MPSC's long-term vision to maximise the benefits of Inland Rail and improve efficiency in the Shire's key economic driver of agricultural business. The Moree Intermodal Park forms part of this vision and interfaces with the Weemelah rail network and Inverell New England Line providing opportunities for region-wide freight activation. It centres on an area of Moree that currently hosts a range of bulk commodity and low volume containerised logistics providers. Each provider has a different form and quality of access to Inland Rail. However, all cannot currently conduct fast outload operations for bulk commodities and have limited 'pick and place' capability for containerised freight. Further plans to develop the Moree Intermodal Park through the SAP will increase Inland Rail freight throughput and enable productivity improvement.



Source: MPSC, 2019

Figure 4-27 Previously Developed Conceptual Overlay – Moree Intermodal Park

4.6.4 Air freight

The Moree Freight Services via the Moree Regional Airport has two components – Qantas and Toll Priority. Prior to COVID-19, these services operated as below:

- Qantas:
  - The Qantas freight services from Moree operated twice daily:
    - The daily morning flight was for livestock
    - The daily evening flight was for bank bags
  - Medical supplies to Moree and emergency freight operated weekly from the airport
- Toll Priority:
  - The Toll Priority air freight route covers Moree, Armidale, and Sydney, for an overnight stay in Moree
  - Peak hours for Toll Priority freight are in the Christmas and harvest periods.

4.7 Air services

Moree Regional Airport is an important gateway for business, tourism, and personal travel. For freight, the airport serves as an opportunity for high-value commodities. It also provides services for workers and access to specialist health, education, and commercial facilities.

The Moree Regional Airport Master Plan 2014 highlighted the types of activities occurring in the airport. The regional airport primarily provides general aviation services, facilities and maintenance for agricultural aviation but also operates twice-daily services to Sydney by QantasLink, as shown in Figure 4-28. Discussion on air freight is highlighted in Section 1.1.1.

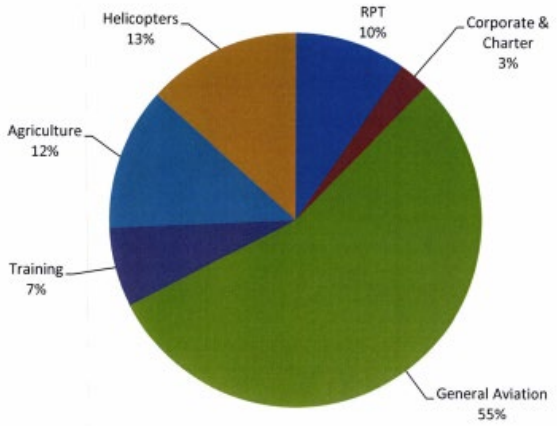


Figure 4-28 2012 Aircraft movements by activity

4.8 Mode share

Journey to work data collected during the 2016 Census was analysed as a proxy for understanding the broader travel mode share across Moree. The analysis was based on Statistical Area Level 2 (SA2) areas. The dominant mode of travel for all work journeys (including full-time, part-time and casual employees) to Moree is the private vehicle, accounting for 81.6 per cent of all work journeys, followed by active transport at 4.9 per cent.

Of all work trips to Moree, 81.3 per cent originate within Moree, and a further 16.9 per cent from the wider Moree region. The remaining 1.8 per cent originate from other regional towns such as Narrabri, Tamworth and Walgett. Table 4-5 shows the work journeys made with a destination in Moree.

Table 4-5 Mode of travel to Moree

Mode	Trips	Mode share percentage
Vehicle	2861	81.6%
Active transport	171	4.9%
Public transport	9	0.3%
Other mode	14	0.4%
Worked at home or did not go to work	395	11.3%
Mode not stated	53	1.5%
Total	**3505**	**100%**

Due to the high proportion of residents in Moree who also work within the town, a similar modal split can be observed when considering work trips from Moree. Table 4-6 shows the mode share of work trips made by residents of Moree.

Table 4-6 Mode of travel from Moree

Mode	Trips	Mode share percentage
Vehicle	2,528	81.5%
Active transport	167	5.4%
Public transport	9	0.3%
Other mode	11	0.4%
Worked at home or did not go to work	341	11.0%
Mode not stated	48	1.5%
Total	**3,100**	**100%**

4.9 Summary of existing transport

The existing transport network around the Moree SAP area can be summarised as follows:

- Moree has provisions for pedestrian and bicycle movements through the township with numerous proposals to close the gaps in the existing network, but low levels of provisions outside of the township. The active transport network is underutilised, with only 5.3 per cent of work trips being completed via an active transport mode despite census data showing that 80.3 per cent of work trips to the Moree Statistical Area originate within the same region. A major challenge in increasing active transport mode share is the heat and climate in Moree, particularly during the summer months.
- Buses in Moree primarily operate as on-demand bus services, for which TfNSW and MPSC has indicated plans for expanding upon. Moree is also serviced by a twice-daily route service which coincides with morning and evening train services. Moree has regional bus and coach services operating between Grafton – Glen Innes – Inverell – Moree as well as Toowoomba and Brisbane in Queensland.
- Regional train services operate daily, seven days a week by TrainLink between Moree – Werris Creek – Sydney (Central). The rail services are times to coincide with twice-daily bus services running through Moree.
- Three major highways connect via Moree, with the Newell Highway providing a major north-south link, and Gwydir Highway and Carnarvon Highway providing east-west connections south and north of Moree, respectively.
- There are four roads classified as regional roads in Moree including Edward Street, Jones Avenue (part), Bulluss Drive (part) and Tycannah Street (part).
- A high proportion of trips made by residents of Moree are by car, with 79.7 per cent of all work journeys being undertaken using a private vehicle.

- Moree is a major agricultural centre in NSW attributing to almost 18 per cent of the State's gross agricultural value, resulting in high volumes of freight movements from the precinct.
- 26-metre B-Doubles are permitted along the Newell Highway, Gwydir Highway and Carnavon Highway, which connect to the township. The Newell Highway and Gwydir Highway are the most heavily used routes, carrying over 65,400 and 13,200 freight vehicles per year, respectively. In 2011, Moree had the highest percentage of heavy vehicle use of rural highways.
- Moree's rail freight is serviced by the Mungindi line, branching from the Great Northern Railway at Werris Creek and is predominantly utilised for almost its entire length for grain transport, and for coal. The line will form part of the 1,700-kilometre Inland Rail line between Melbourne and Brisbane, expected to be completed in 2023.
- Moree Regional Airport functions as a gateway for business, tourism and personal travel, with twice-daily services to Sydney. The airport additionally services air freight through twice-daily flights, with increased aircraft volumes during the peak demand around Christmas and the harvest period.
- Three major level rail crossings exist within the SAP Investigation Area.
- Recent approved funding to upgrade the local road network and North South Link will support the development of the Moree Intermodal Park.
- The baseline analysis of the mobility network provides an assessment of the current opportunities and threats to the development of the SAP, and enables the projection of the existing conditions to evaluate the impact of the SAP on the road and active transport network.

5 STAKEHOLDER LIAISON

At the project initiation phase and during the site visit in July 2020, several stakeholders were identified for SAP collaboration and master planning coordination. In addition to DPIE, TfNSW, MPSC, and ARTC provided input on several infrastructure decisions that were considered as part of the EbD workshops and scenarios and Master Plan development process.

5.1 Transport for NSW

Consultation with TfNSW was undertaken from the site visit stage of the project to the final EbD workshop, and it was focused on the transport constraints in the study area, current and projected freight patterns, future transport strategies in the region, and proposed infrastructure upgrades. The outcomes of the discussions are as follows:

- TfNSW is currently undertaking road upgrades and constructing overtaking lanes on Newell Highway between Narrabri and Moree.
- With the estimated completion and operation of the Inland Rail in Moree, accesses to the internal road network from Newell Highway, through Burrington Road, would be closed.
- Moree currently experiences two types of freight movements. A standard, harvest supply chain, which is predominantly agricultural grains, starting from Moree and destined to Brisbane, NSW West, and New Castle, and a reverse supply chain, for freight vehicles, starting from Melbourne and stopping in Moree.
- The design of internal road infrastructure and the Moree Intermodal Overpass (MIO) needs to consider what is best for freight accessibility.
- Emergency access to the SAP through a proposed east-west overpass needs to be considered in the analysis.
- Active transport connectivity on Newell Highway remains a dangerous manoeuvre. TfNSW would like to provide a short term and long-term active transport vision for the Moree township and the SAP.

Targets for active transport and public transport mode shares need to align with TfNSW regional guidelines.

5.2 Moree Plains Shire Council

MPSC provided Arcadis and DPIE with previous studies for traffic and transport studies and reports, as well as MPSC's future strategies and plans. Discussions with MPSC were centred around the following:

- Road network:
  - On-going and future committed network upgrades to pave unsealed roads within the SAP investigation area, including the sealing and realignment of Bullus Drive, Burrington Road, and Tapscott Road, and the formation of the North South Link.
  - The location of the MIO, its connections to the potential road network within the SAP, and the future extension of the East-West Connector to Gwydir Highway.
- Active transport:
  - MPSC adopted the *Moree Bike Plan 2014-2024* which aimed to guide future expansion of the cycling network. The bike plan includes the current shared pathway network.
  - MPSC wants to mitigate pedestrian severance between the eastern and western side of the township and introduce active transport links to the SAP regional enterprise plots.
- Public transport:
  - An on-demand bus service replaced the Moree Town Bus Service, and the current trail of the service has been terminated. MPSC is looking for new trials and long-term plans to reactivate the service.

5.3 Australian Rail Track Corporation (ARTC)

Considering the opportunity Moree has to capitalise on the Inland Rail running through Moree, ARTC were consulted during the final EbD workshop. The following discussion points were considered:

- ARTC provided insights on the proposed southern intermodal, with the proposed construction of a siding, which is likely to occur in the initial phase of the SAP development.
- The potential Inland Rail alignment bypass of the Moree township could occur sometime in the distant future. This was therefore considered and discussed to ensure that the plan for the SAP did not preclude this opportunity.
- Inputs on the location of the northern intermodal terminal from an operational and rail network perspective.

6 STRUCTURE PLAN

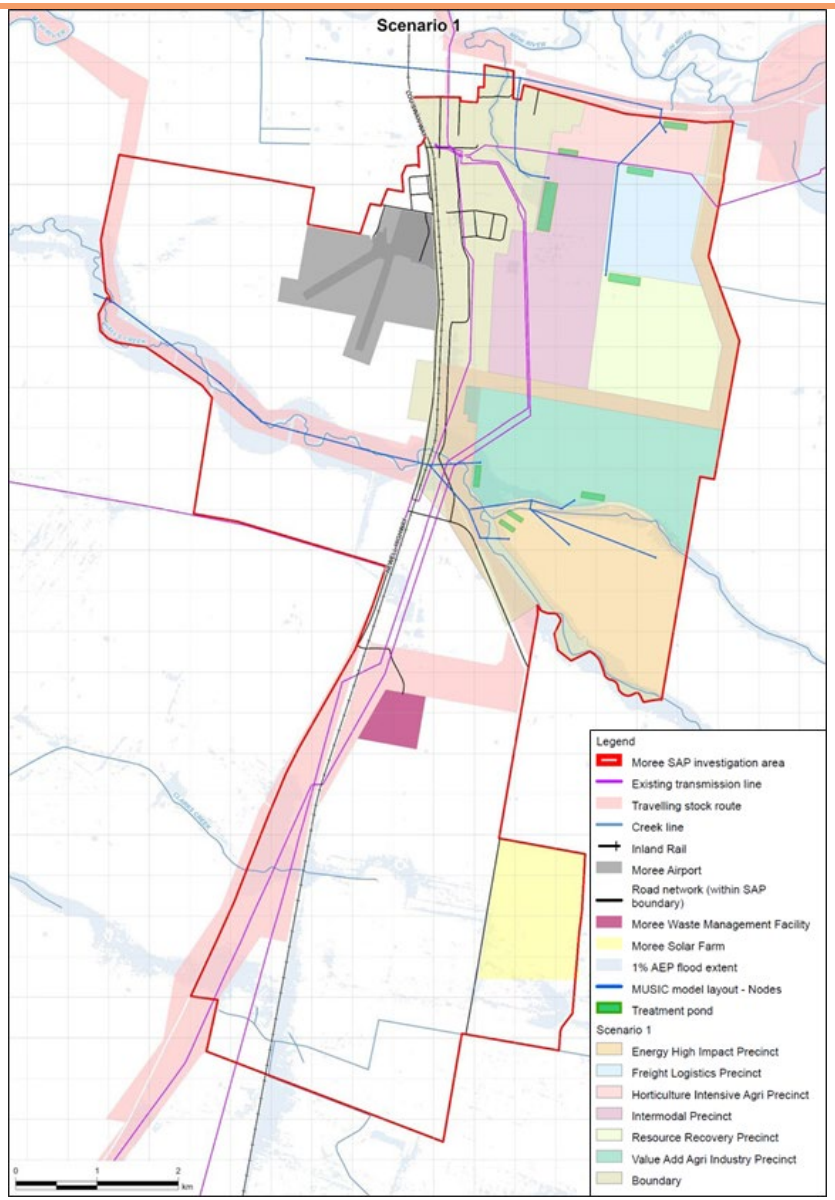
6.1 Initial land use scenarios

A two-day preliminary EbD workshop was held on 14 and 15 September 2020. As a result of the workshop, three land use scenarios were developed and refined by the various discipline consultants. The three scenarios included the following:

- Scenario 1 “Low growth scenario”: capitalising on the proposed northern intermodal terminal, Scenario 1 focuses all industries within the northeast direction of the SAP investigation area.
- Scenario 2 “Medium growth scenario”: In addition to the development area for Scenario 1, Scenario 2 expand the development nearby the Moree Regional Airport and occupies the northern region of the SAP investigation area.
- Scenario 3 “High growth scenario”: Proposed development across the entire SAP investigation area.

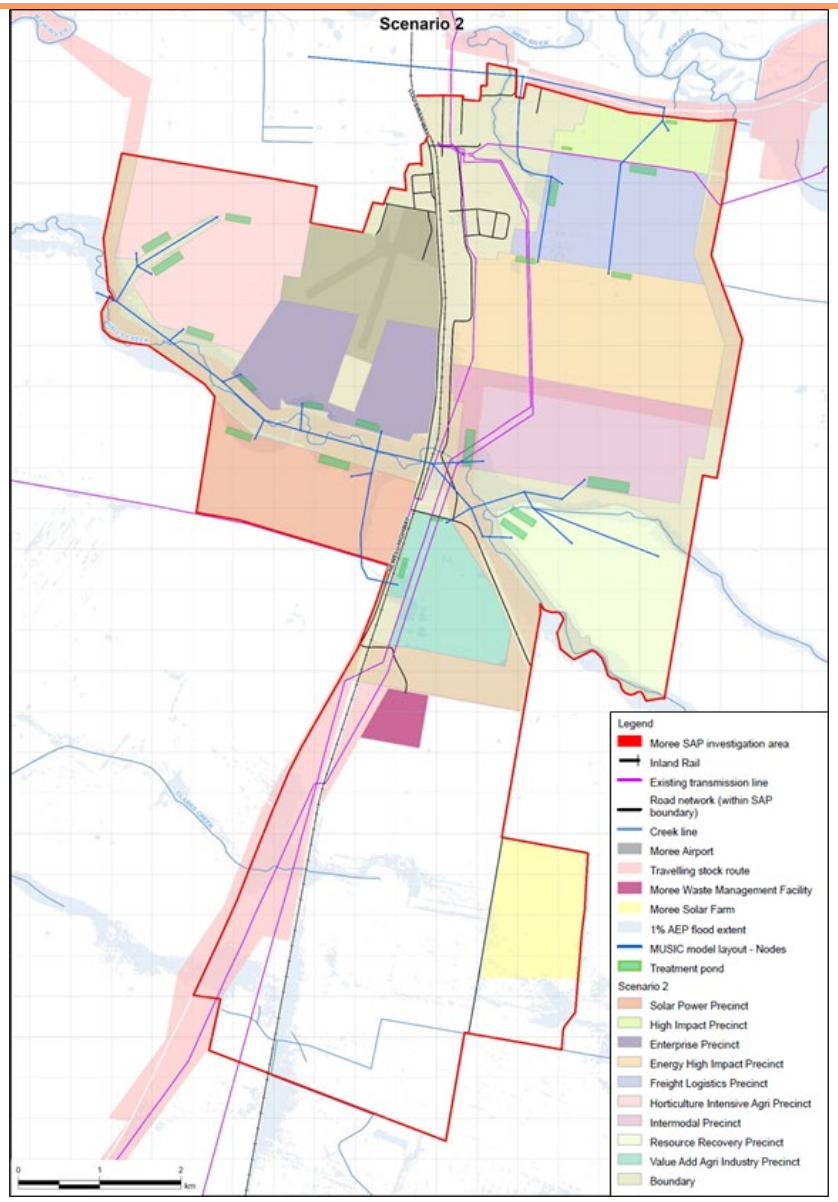
6.2 Land use maps

The land use maps for the low, medium and high growth scenarios prepared by the Structure Plan team are shown in Figure 6-1, Figure 6-2 and Figure 6-3, respectively. The figures show the proposed land use for each scenario, along with their respective yields in hectares.



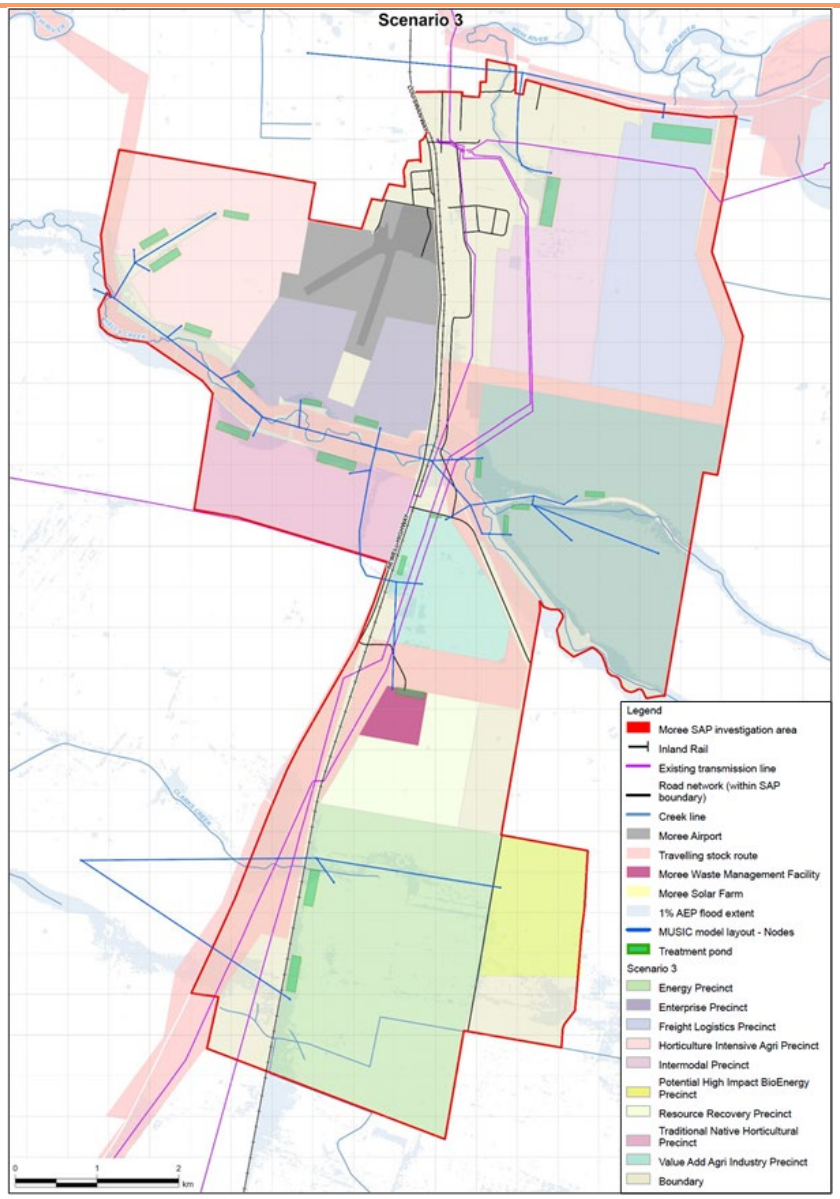
Land parcel name	Scenario 1 (hectares)
Intermodal	312.83
Freight and logistics	147.45
Horticulture and intensive agriculture	113.61
Traditional native horticulture	N/A
Resource recovery	222.45
Value add agriculture	371.38
Bioenergy/ high impact	330.86
Energy/ solar	N/A
Enterprise/ industrial	N/A
Hub	35.67
Total	**1534.25**

Figure 6-1 Scenario 1 land use map and proposed yields



Land parcel name	Scenario 2 (Hectares)
Intermodal	363.58
Freight and logistics	271.32
Horticulture and intensive agriculture	395.89
Traditional native horticulture	N/A
Resource recovery	330.86
Value add agriculture	197.98
Bioenergy/ high impact	574.48
Energy/ solar	283.84
Enterprise/ industrial	257.33
Hub	35.67
Total	**2710.95**

Figure 6-2 Scenario 2 land use map and proposed yields



Land parcel name	Scenario 3 (Hectares)
Intermodal	385.94
Freight and logistics	436.58
Horticulture and intensive agriculture	395.89
Traditional native horticulture	283.84
Resource recovery	226.71
Value add agriculture	197.96
Bioenergy/ high impact	678.45
Energy/ solar	1005.89
Enterprise/ industrial	258.1
Hub	35.67
Total	**3905.03**

Figure 6-3 Scenario 3 land use map and proposed yields

6.3 EbD Master Plan

Following the scenario assessment phase and reporting, a final EbD workshop was held in Moree at the MPSC premises between 17 and 20 November 2020 to develop the Master Plan for the investigation area. The workshop enabled an atmosphere of interdisciplinary collaboration to ensure the environmental, infrastructure, and social constraints and opportunities were considered in the development of the preferred Master Plan layout.

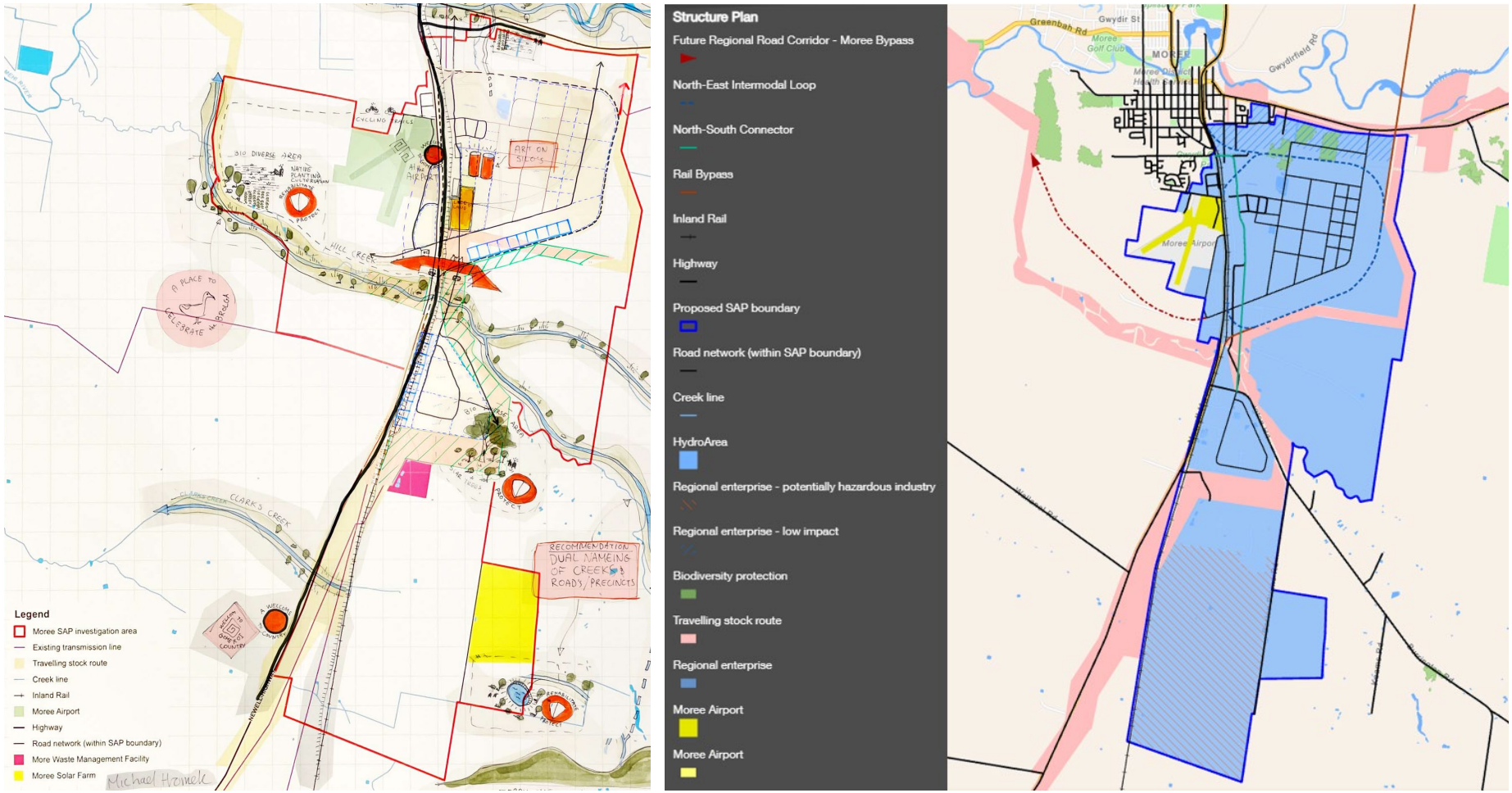


Figure 6-4 95% master plan (Elton/WSP layout, GIS layout)

6.4 Final Master Plan

Following the development of the Master Plan of the investigation area during the final EbD workshop, the insights and technical reports produced during the process were used alongside information from the market sounding undertaken by The CIE, to further refine land use and employment scenarios. The final technical economic report *Moree Special Activation Precinct Responding to the Final Enquiry by Design* (The CIE, 2021) provides evidence-based recommendations in relation to land area and employment across all types of land uses and industry categories envisaged for the Moree SAP.

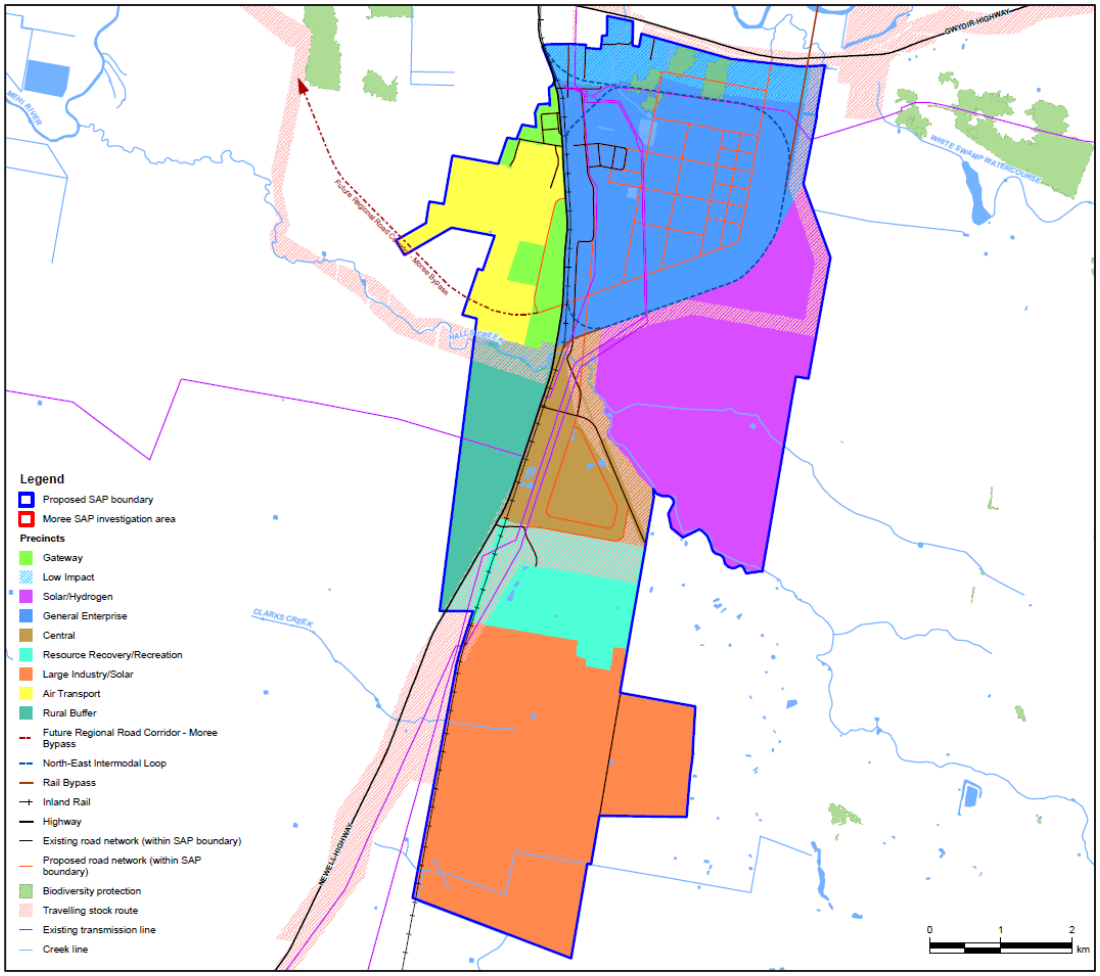


Figure 6-5 Master Plan update responding to the Final Enquiry by Design (WSP layout)

6.5 Land use type and size

As per the *Moree Special Activation Precinct Responding to the Final Enquiry by Design* (The CIE, 2021), the proposed SAP land uses, net developed area for 40 years, and the proposed employment figures are summarised in Table 6-1. The net developable regional enterprise has been revised to 1,485 hectares.

Table 6-1 Proposed land use and employment with indicative staging

Land use type	Total land allotment (Hectares)	Employment
Building on water and land availability		
Aquaculture	5	300
Outdoor horticulture	150	81
Undercover horticulture	365	1993
Building on grain/ cotton advantage		
Increasing value from the supply chain	25	50
Early-stage processing	25	78
Grain ethanol	30	24
Reducing reliance on imported inputs		
Diesel replacement (methanol) — Gas to liquids	0	0
Chemicals manufacture/mixing	15	15
Fertiliser mixing— Urea ammonium nitrate	10	10
Building on location		
Intermodal terminal (public access)	30	15
Freight and logistics	20	10
Abattoir	0	0
Circular economy		
Resource recovery (tyres and plastics)	60	20
Waste to energy — Biogas	30	10
Solar electricity	700-2100	4-12
Hydrogen production	10	4
Supporting/ service industries		
Light industry/ commercial	10	25
Total	**1485-2885**	**3732**

7 TRANSPORT ASSESSMENT

7.1 Road network

This section estimates the quantity of vehicular trips that would be generated by the SAP and assesses the potential traffic impact on the surrounding road network.

7.1.1 Traffic generation

An indication of the peak hour traffic generation potential of the future development within the Moree SAP has been based on the trips generated for other existing comparable land use areas such as:

- Horticultural trip generation rates have been based on a farm located in Guyra NSW, which spans about 40 hectares and includes glasshouses and a propagation nursery.
- Industrial trip generation rates have been based on the peak hour trips generated by an industrial estate located within Greater Western Sydney, spanning over 300 hectares.
- Circular economy land use is expected to generate employee trips only, and a conservative assumption is adopted that all staff drive to and from work in a typical day.

The trip generation rates applied for each land use type for the complete development scenario in 2062 are summarised in Table 7-1.

Table 7-1 Trip generation rates by land use

Land use type	Trip generation rate		
	AM peak	**PM peak**	**Daily**
Horticulture	1.56 trips/ ha	0.91 trips/ ha	6.59 trips/ ha
Industrial	3.2 trips/ ha	3.5 trips/ ha	12.8 trips/ ha
Circular economy	0.25 trips/ employee	0.25 trips/ employee	1 trip/ employee

The following assumptions are applied in estimating traffic generation within the SAP:

- Trip generation of existing businesses and land use (including future job growth) is assumed to be included in the baseline assessment, based on forecast volumes between Moree and Narrabri based on the trendline of linear growth, provided by TfNSW for the purpose of this study. The trip generation assessment was applied for the final development year in 2062.
- No changes are assumed to trip generation by surrounding areas with unchanged land use. Trips to these areas are assumed to be included within existing traffic volume information.
- Heavy vehicle volumes generated by the horticultural land are assumed to be consistent with the farm in Guyra, accounting for 12.23 per cent of total trips.
- Heavy vehicle volumes generated by the industrial developments are assumed to account for 27.6 per cent of total trips, in line with the 2,062 forecast daily traffic on the Newell Highway between Moree and Narrabri and based on the trendline of linear growth, provided by TfNSW for the purpose of this study.
- Daily trip rates for the industrial areas are assumed to be about four times that of peak hour trips, consistent with horticulture calculations and the Wagga Wagga SAP
- Solar and energy precincts are non-trip generating areas.
- The commercial area is assumed to service internal trips only due to it servicing workers of the precinct.
- By 2062, the Moree SAP would have developed such that active and public transport modes would account for a greater proportion of mode share. It is assumed that of the total trips generated, eight per cent would be redirected to walking, and five per cent redirected to each cycling and public transport.
- With the opening of the Inland Rail in 2060, a proportion of the freight demand would shift from the road network and to the rail network, resulting in a reduction in heavy vehicle volumes of up to 20 per cent.

Table 7-1 highlights the projected peak hour trips for the final land use scenario in 2062, taking into account the impacts of modal shift and the opening of the Inland Rail.

Table 7-2 Trip generation by land use

Land use type	AM peak trips	PM peak trips	Daily trips
Building on water and land availability			
Aquaculture	6	4	26
Outdoor horticulture	186	109	791
Undercover horticulture	454	266	1924
Building on grain/cotton advantage			
Increasing value from the supply chain	62	68	248
Early-stage processing	62	68	248
Grain ethanol	75	81	298
Reducing reliance on imported inputs			
Diesel replacement (methanol) — Gas to liquids	0	0	0
Chemicals manufacture/mixing	37	41	148
Fertiliser mixing— Urea ammonium nitrate	25	27	99
Building on location			
Intermodal terminal (public access)	75	81	298
Freight and logistics	49	54	198
Abattoir	0	0	0
Circular economy			
Resource recovery (tyres and plastics)	4	4	16
Waste to energy — Biogas	2	2	8
Solar electricity	2	2	10
Hydrogen production	1	1	3
Supporting/service industries			
Light industry/commercial	-	-	-
Total	**1040**	**809**	**4317**

It is likely that due to the size of the proposed SAP, improvements to the Newell Highway and the Gwydir Highway will be required to accommodate the trip generation and the proposed intersections/ interchanges. While road widening will most likely be required for all the scenarios, intersection design will vary in size and allowances of free movements based on the trip generation and distribution.

7.1.2 Trip distribution

The proposed final Master Plan contains an infrastructure spine that traverses through the precincts. The proposed developments are focused on the part of the SAP investigation area that lies to the east of the Newell Highway.

A new north-south corridor would form a spine road through the SAP, connecting between the Newell Highway and the southern intermodal terminal via the north-east intermodal terminal. An additional East-West Connector would be completed between the Gwydir Highway and run south-west through land zoned for regional enterprise, connecting to the Newell Highway and west of Moree Regional Airport.

Through analysis of Journey to Work data surveyed during the 2016 Census, it can be noted that 81.3 per cent of all people who work in Moree also live within the township.

Heavy vehicle and freight journeys are expected to travel primarily via the Newell Highway. Based on the NSW Freight and Ports Plan 2018-2023 (TfNSW, 2018), NSW Freight Commodity Demand Forecasts (TPA, TfNSW,

2018), and TfNSW Freight Hub, the following patterns are projected for freight movements for 2056 for agricultural commodities:

- North – 9 per cent exports and 3 per cent imports
- South – 23 per cent exports and 5 per cent imports
- West – One per cent exports and 14 per cent imports
- East – Two per cent exports and 1 per cent imports.

Figure 7-1 Study region of agricultural commodities imports and exports

High-level directional assumptions were made based on the *Application of TraNSIT to the Moree Plains Transport and Intermodal Study* (CSIRO, Updated 2019), which reports on results from modelling performed in the Transport Network Strategic Investment Tool developed by CSIRO. The baseline analysis, most recently updated to reflect 2019 freight flows, provides insight on the heavy vehicle movements in and around the proposed Moree SAP region.

The modelled annual freight flows for vehicles with an origin or destination in Moree are reported for major road sections in Table 7-3.

Table 7-3 Annual freight movements with an origin or destination in Moree

Road section	Total freight flows (veh)	Percentage of total traffic (%)
Newell Highway (south)	53,882	18%
Newell Highway (north)	64,499	21%
Carnavon Highway	59,726	19%
Gwydir Highway (east)	64,119	21%
Gwydir Highway (west)	64,119	21%
Total	**306,346**	**100%**

These existing heavy vehicle distributions from the Moree region are assumed to be representative of the distribution of trips generated by the SAP. The distribution of forecast 2062 peak hour and daily trips are shown in

Table 7-4 Distribution of trips generated by Moree SAP

Road section	AM peak	PM peak	Daily trips
Newell Highway (south)	231	181	960
Newell Highway (north)	277	217	1149
Carnavon Highway	257	201	1064
Gwydir Highway (east)	275	215	1142
Gwydir Highway (west)	275	215	1142
Total	**1,316**	**1,029**	**5,457**

7.1.3 Trip assignment

The trips calculated from the trip generation and direction assumptions were assigned to the road network on top of the baseline traffic projections for the opening year 2022, and future years 2042 and 2062. The baseline traffic projections were based on traffic volume forecasts produced by TfNSW (formerly Roads and Maritime Services) for the following two midblock locations:

- Newell Highway north of Moree
- Newell Highway south of Moree.

Baseline design year traffic volumes were estimated by applying historical growth rates to traffic surveys undertaken in 2012, under the assumption that the Inland Rail's completion in 2025 would reduce heavy vehicle volumes on the road network by 20 per cent. The SAP trip generation was applied for the land use change beyond what was already assumed in the baseline model to avoid double counting.

The SAP increase in trips was assigned to the road network using the most direct route that used highways or arterial/ sub-arterial roads where possible. The SAP traffic was then added on top of the baseline traffic volumes to obtain a final estimate of traffic volumes on the road network with the SAP.

A road capacity assessment has been performed of the network based on lane capacity parameters for uninterrupted single-lane flow outlined in *Austroads Guide to Traffic Management Part 3, Transport Study and Analysis Methods*, the results of which are shown in Table 7-2. In assessing the midblock capacity, the volume to capacity ratio (V/C) is used to show the proportion nominal capacity accounted for by traffic demand. A V/C of one would reflect conditions where no spare capacity is available for vehicular throughput, while a V/C value lower than one shows that the road network has sufficient capacity to accommodate the demand.

The capacity of a lane is calculated as:

$$C = \frac{k_j V_f}{4}$$

Where:

C = capacity (passenger cars per hour (pc/h)

V_f = free speed (km/h)

k_j = jam density (pc per km).

The following has been assumed in forecasting and assigning trips:

- It has been assumed that 18.4 per cent of daily vehicle trips generated by the development are heavy vehicles, based on trip generation assumptions. With the opening of the Inland Rail, the daily heavy vehicle volumes on the road network reduce to 3.7 per cent
- The travel direction is assumed to be 80 per cent in and 20 per cent out of all facilities during the AM peak for light vehicles and reversed in the PM peak
- Heavy vehicles account for three passenger car units on average
- The free speed on the Newell Highway has been assumed to be equal to the posted speed of 100 kilometres per hour due to the proposed provision of an overtaking lane in each direction
- The jam density (maximum density for stopped traffic) is assumed to be 7.5 passenger cars per kilometre.

Table 7-2 shows the results of the final year road capacity assessment. The analysis shows that the Newell Highway traffic environment is expected to be acceptable and have sufficient capacity for the 40-year design, with a V/C ratio equal or less than 0.11 for morning and afternoon peak hours in both northbound and southbound directions. Therefore, there are no upgrades required on the Newell Highway to accommodate the traffic anticipated to be generated by the Moree SAP.

Table 7-5 Final year road capacity assessment (2062)

Peak hour	Directional peak one hour	Capacity	Demand (pc/h)	V/C ratio
AM peak	Northbound	3,767	329	0.09
	Southbound	3,767	399	0.11
PM peak	Northbound	3,767	403	0.11
	Southbound	3,767	288	0.08

7.1.4 Road network performance and upgrade

In addition to the changes proposed to the road network by the Structure Plan and land-use changes, the demands on the network are expected to be further affected by the completion of various other projects. A high-level assessment of planned upgrades to the road network near Moree has been undertaken, and has been summarised in Table 7-3.

Table 7-6 Moree planned upgrades

Timeframe	Upgrade
0-10 years	• Newell Highway heavy duty pavements, Narrabri to Moree • North Moree heavy duty pavements • Newell Highway Program Alliance – overtaking lanes north of the Moree township • The Washpool Flood Mitigation project on the Gwydir Highway east of Moree • Transport Access Program (TAP) Moree Station upgrade, including upgrades to footpaths, bus stops and vehicle pick up and drop off areas.

7.1.5 Moree Intermodal Overpass (MIO) location

Following the preliminary EbD workshop, a high-level analysis of potential locations for the Moree Intermodal Overpass was undertaken to compare six overpass connection options. The MIO is a committed future infrastructure initiative that would enhance the operation of the intermodal facility proposed for the SAP, reduce freight traffic traversing the Moree township, and integrate with a future east-west connection.

Relying on previous studies undertaken by the MPSC, six MIO options were assessed in a qualitative multi criteria assessment (MCA), in collaboration with DPIE, MPSC, and TfNSW. The six options were as follows:

- **Anne Street** – Extends on both sides of the Newell Highway, and connects to the Gwydir Highway east of Moree Station
- **Jones Avenue** – An option of an overpass across the Newell Highway road and rail corridors
- **Amaroo Drive –** Located south of the Moree township, the Amaroo Drive, it provides the advantage of avoiding existing urban roads with urban development fronting
- **Blueberry Road –** North of the Moree Regional Airport, and is located close to DieselGas Moree
- **Airport South** – Located south of the Moree Regional Airport, the proposed overpass option avoids the Moree township and allows for further, longer future east-west connecter
- **Wallanol Road –** Located 10 kilometres from the Moree township, it is the furthest option considered in this analysis.

The assessment considered the following criteria and descriptors:

- Highway connectivity – Suitability of access to traffic to the Newell Highway to the SAP
- Freight access – Freight accessibility to intermodal terminals and SAP precincts
- Emergency access – Current and projected response times and entries/ exits from the precinct

- Travel time savings – High-level and long-term benefits of the proposed option and movement efficiency
- Alignment and integration with MPSC's future town planning – Minimises impact on the township social amenity
- Heritage impact – Minimising impact on Aboriginal and non-Aboriginal heritage
- Biodiversity – Minimising impacts on biodiversity in the SAP and Moree township
- SAP integration – Ability to activate land, improve traffic functionality in the SAP, and provide benefit to the SAP when constructed.

The assessment criteria were allocated weightings based on the collective agreement of the relative importance of each criterion, based on previous studies carried out by MPSC, as well as the role and vision for the Moree SAP.

The options were then qualitatively scored based on their ability to meet the criteria using a traffic light system, where green represents the ability to best achieve the criterion and red for options that do not meet the criterion. For options that partially met, or by comparison to another option did not meet the criterion as well, was scored orange.

7.1.5.1 Analysis outcomes

Based on the weighted scores, three routes emerged as preferred being; Airport South, followed by Blueberry Road then Amaroo Drive. The Airport South MIO option was selected for the Structure Plan, since it met the criteria the best out of the options and aligns with the vision and objectives for the Moree SAP.

7.1.6 Indicative road layouts

7.1.6.1 East-West Connector and spine roads

The proposed East-West Connector serves as a freight access point from Gwydir Highway and a spine road to the grid local road networks. The proposed layout is a four-lane divided road to accommodate the projected trip generation and freight volumes. The design considerations of the cross-section (Figure 7-2) are as follows:

- The East-West Connector links to the proposed MIO.
- Alignment with Austroads Guide to Road Design for urban arterial road design to maximise road capacity, including:
  - A general traffic lane of 3.5 metres wide
  - A wide kerbside lane of 4.2 metres wide to optimise tracking capability accessing side streets for high-efficiency vehicles such as multi-combination trailers.
- Limit direct property accesses from the East-West Connector and arterial roads.
- Separated right turn auxiliary lanes at intersecting roads to reduce flow interruption to the road network. Right turning movements to occur at traffic signals.
- Spatial provision for footpath and shared path appropriately set-back from the road.

7.1.6.2 Local collector roads

The local road network within the Moree SAP would provide access to driveways and blocks entrances, and generally be a two-way/ two-lane cross-section (Figure 7-3).

Design considerations of a local road in the SAP are as follows:

- To guide the geometric road design, a lower posted speed limit (up to 60 km/h) for efficient and safer operations of the road network. Lower

posted speed limit may be considered in high-activity areas with the aid of more constrained road geometry and traffic calming devices.

- Traffic lane widths to be suitable to accommodate high productivity vehicles (HPV) as per Austroads Guide to Road Design.
- On-street parking to be considered in high-activity areas, which include the Gateway sub-precinct.
- Minimum turning radii into access driveways or side streets to manage entry/exit speed and conflict at footpaths/ shared paths.
- Consideration of verge width to provide suitable space for ancillary facilities.

Figure 7-2 Major arterial and spine road cross-section

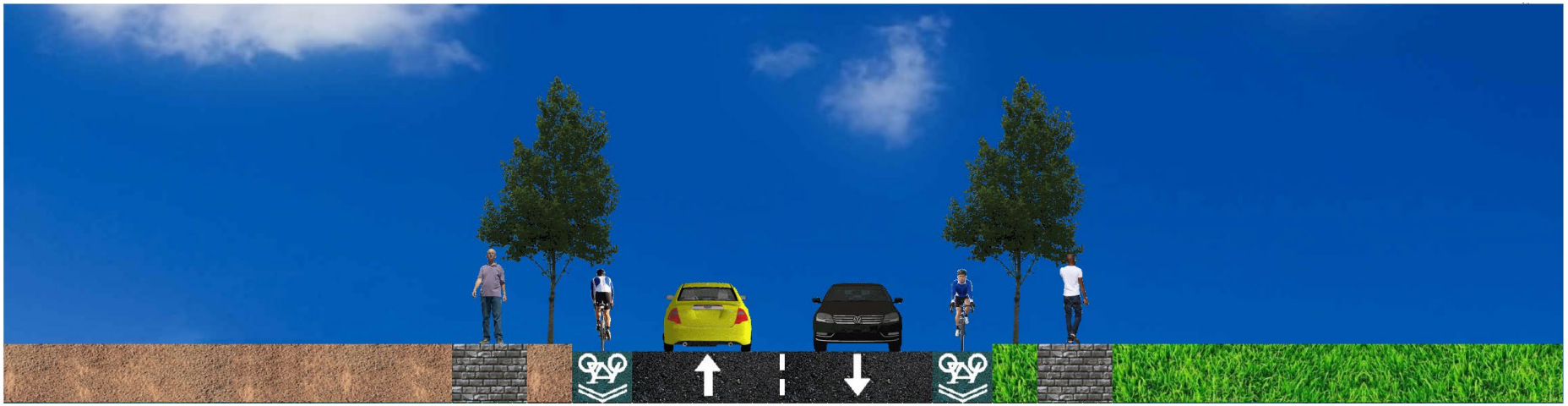


Figure 7-3 Local roads cross-section

7.2 Rail and intermodal terminals

Rail forms a critical component of transporting freight within the Moree SAP. The final Structure Plan proposes to build upon the existing rail network, which currently runs north-south through Moree, parallel to the Newell Highway. The N2NS section of the Inland Rail project would provide additional capacity for rail freight, and is proposed to be completed by 2023, which would connect Melbourne and Brisbane via Moree. When complete, the Inland Rail would span 1,700 kilometres and allow for fast and efficient movement of freight to and from the Moree SAP. Where the existing rail facilities can accommodate only 800-metre long trains, the Inland Rail will accommodate for 1,800-metre long double-stacked trains.

Two new intermodal terminals are proposed, the first being the southern intermodal terminal, to be located east of the Newell Highway and proposed to connect into the existing Mungindi Line. The north-east intermodal terminal is proposed to be located north of an investment driven rail loop connection to the Inverell Line, expected to be completed within the next 10 years.

7.2.1 Northern intermodal terminal location

A discussion on the intermodal terminal's proposed location for the northern regional enterprise precinct occurred during the final EbD workshop. The two options shortlisted for the discussion centred on the orientation of the intermodal terminal, and subsequent location, and they are:

- A vertical, north-south option: This scenario places the terminal in the middle of the regional enterprise precinct, with future rail line connecting and bisecting the precinct.
- A diagonal option: This option places the terminal on the southern border of the regional enterprise precinct.

Figure 7-4 highlights the intermodal location options cosnidered.

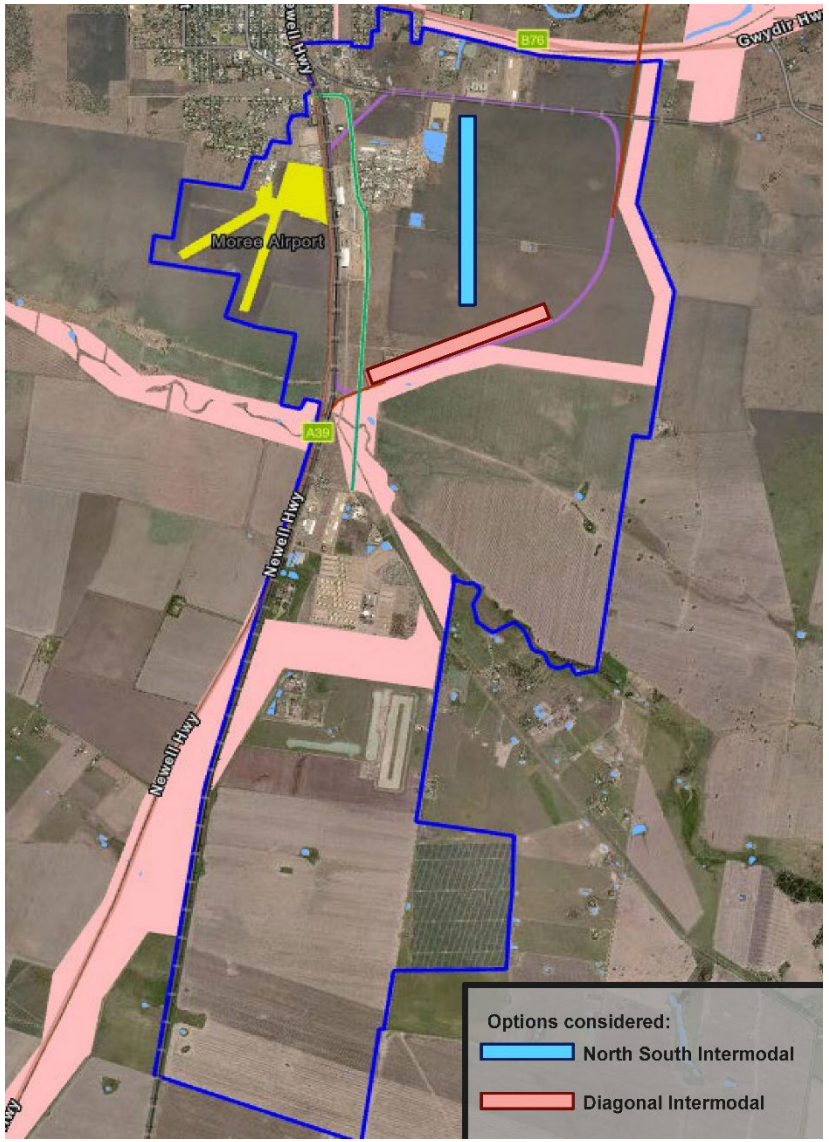


Figure 7-4 Intermodal Locations Options

The following were the assessment criteria considered for determining the preferred location for the proposed northern intermodal terminal:

- Rail connectivity and operations – Ease of rail operations, for example, the requirement for shunting trains to enter or exit the facility
- Services connection costs/ ease
- Constructability – Flood levels, staging and construction delivery, construction complexity
- Minimises road/ rail conflicts – The option with the least number of rail/ road conflicts
- Maintenance
- Capital cost (total) – Construction and operation cost (including consideration for travel time)
- Environmental impacts – Impact on the surrounding environment, including the Travelling Stock Route (TSR) and biodiversity
- Proximity to road connections – Vicinity to proposed potential road network within the SAP, and highways
- Minimising fragmentation of land – Decreasing impact on potential land segmentation imposed by the proposed facility
- Facilitates preservation of potential future Moree rail bypass – Maintains a vision for a potential long-term Moree rail bypass to the east of the Moree SAP and township
- Amenity impacts
- Marketability – Market potential attract businesses/ developers to the Moree SAP based on the location of the proposed intermodal terminal.

The diagonal terminal option was chosen based on the overall scoring and weighted criteria scores following a deliberation from TfNSW, ARTC, RGDC, and MPSC. This option scored better overall across the criteria compared with the north south orientation of the intermodal. In particular, the diagonal intermodal terminal orientation allows for:

- Better operational potential with no shunting required for trains entering or exiting the facility
- Better access to the existing and proposed road network, including the proposed MIO
- More flexibility in the development of land parcels within the SAP, with less potential segmentation of land
- Should the future rail bypass of Moree township come to fruition, this alignment could be maintained as a siding to the potential Inland Rail alignment, which would mean the intermodal terminal can adapt and be easily incorporated into this long-term plan.

The impact of the diagonal option on the existing TSR was discussed in detail with the biodiversity team and it was agreed that this portion of the TSR that is proposed to be regenerated would need to be realigned to accommodate the proposed intermodal terminal. This is discussed in Section 7.8.

7.3 Active transport

Shared paths are provided within the Moree township, and additional proposals have been made to close the existing network gap. However, due to the rural nature of the land use outside of the township, active transport provisions in the surrounding network are minimal.

Additionally, the potential road network within the SAP is provisioned for a connected footpath network to ensure walking and cycling mode share opportunities with the SAP.

In addressing the shift for better active transport connectivity for the SAP and the Moree township, it is essential to address the severance caused by Newell Highway and the proposed short-term Inland Rail alignment.

The Structure Plan aims to provide safer, grade-separated linkages between areas of residential concentration in the Moree township to both the Moree train station and the SAP road infrastructure. Early investigations of the proposed linkages propose connections to Bullus Drive and Anne Street (with pedestrian ramps to Moree Station) for pedestrian and cyclists from and to the SAP.

Additionally, the proposed spine road and local streets within the SAP are expected to serve multimodal trips, with cycling lanes and broader footpaths provided on both ends.

As part of the Structure Plan, the following upgrades have been proposed to improve the connectivity of the active transport network:

- Active transport links between the Moree township and Moree Railway Station, over the Newell Highway
- Active transport route between Stanley Village, Amaroo Residential Precinct, and the potential road network within the SAP, over Newell Highway and the Inland Rail line
- Recreational active transport linkages along Halls Creek and the TSR
- Footpaths would provide direct connections within the SAP from the regional enterprise precincts to the commercial hub, located on the western side of the Newell Highway
- Capitalising on opportunities to expand walking and cycling networks to areas of heritage importance and billabongs
- Wide footpaths with bike racks and appropriately designed intersection crossings
- End of trip facilities located at businesses with higher number of employees in the SAP and the regional hub.

7.4 Public transport

As highlighted in Section 4.3, the Moree on-demand bus service is a trial service that replaced Moree Bus Service. Various stakeholders indicating plans for expanding the on-demand bus services are currently ongoing to expand to major employment areas around the township.

With the vision of a 24/7 precinct driving the SAP Regional Enterprises' development, there is a significant challenge in building a fixed route service with hourly timetables. The renewal and expansion of the on-demand bus service allow for the flexibility of a public transport operation, which can be assisted with bus mobility infrastructures, such as shelters and seats. An internal bus network between the hub and the regional enterprise precincts is also proposed, utilising the MIO and the Gateway loop road to connect the two sides of the Newell Highway.

7.5 Mode share

As highlighted in the Baseline Analysis report, the *Regional NSW Services and Infrastructure Plan* (TfNSW, 2018) highlights aspirational mode share targets for regional areas of the state. It is assumed that of the total SAP trips, eight per cent would be redirected to walking, and five per cent redirected to each cycling and public transport. Those mode share percentages can be achieved with more active transport infrastructure, and bus services are introduced to the transport network.

To encourage the capturing of the mode share, and increase safety in the township, it is encouraged to build active transport linkages over the Newell Highway and the Inland Rail corridor at the enabling work stage of the SAP development.

7.6 Impact of future technology

7.6.1 Electric vehicles

With a 40-year vision for the SAP, it is recognised that the future of mobility is likely to evolve significantly from the finalisation of the Master Plan to build out. As per the Net Zero Plan Stage 1: 2020 – 2030, transport is the second highest contributor to emissions, with 28 million tonnes of carbon dioxide equivalent ($MtCO_2$-e). The Net Zero Plan highlights the strategy to develop a vehicle infrastructure and model availability program to fast-track the electric vehicle (EV) market growth.

The SAP strategy does not preclude the implementation of EVs and connected, autonomous vehicles (CAVs) for the proposed infrastructure. However, it is acknowledged that measuring potential technology uptake, especially for regional and rural areas of the state, and its impact on journey to work patterns and general travel behaviour, is challenging. As such, the SAP aims to safeguard the proposed road network by ensuring their preparedness for the future of mobility. It is recommended that charging

stations are provided at heavy employment areas and the Gateway Precinct.

7.6.2 Hydrogen vehicles

As hydrogen production aimed as one of the primary energy production land uses in the Moree SAP, there is a substantial opportunity to shift to hydrogen-operated buses as a viable, sustainable public transport service for the Moree SAP and the township residents.

In line with the clean technology program highlighted in the Net Zero Plan, hydrogen can transform mobility with cleaner energy and lower supply costs.

7.7 Air transport

With the planned runway extension for Moree Regional Airport, a connected road network to the Moree Gateway Precinct and the airport access through Blueberry Road enables a smooth movement of commodities aimed for air freight between the SAP industries and Moree township, and Moree Regional Airport.

7.8 Livestock and Travelling Stock Route

The TSR has a strong historical connection to the heavy agricultural heritage of the Moree Township, with its need likely to continue in the future with expanded livestock and horticultural businesses projected for the SAP. As such, the current TSR alignment would be majorly maintained in the Structure Plan, with a proposed realignment of the route south of the northern regional enterprise precinct. Figure 7-2 highlights the TSR realignment. The TSR along Halls Creek would be maintained and widened to allow for an activated walking corridor along the creek.

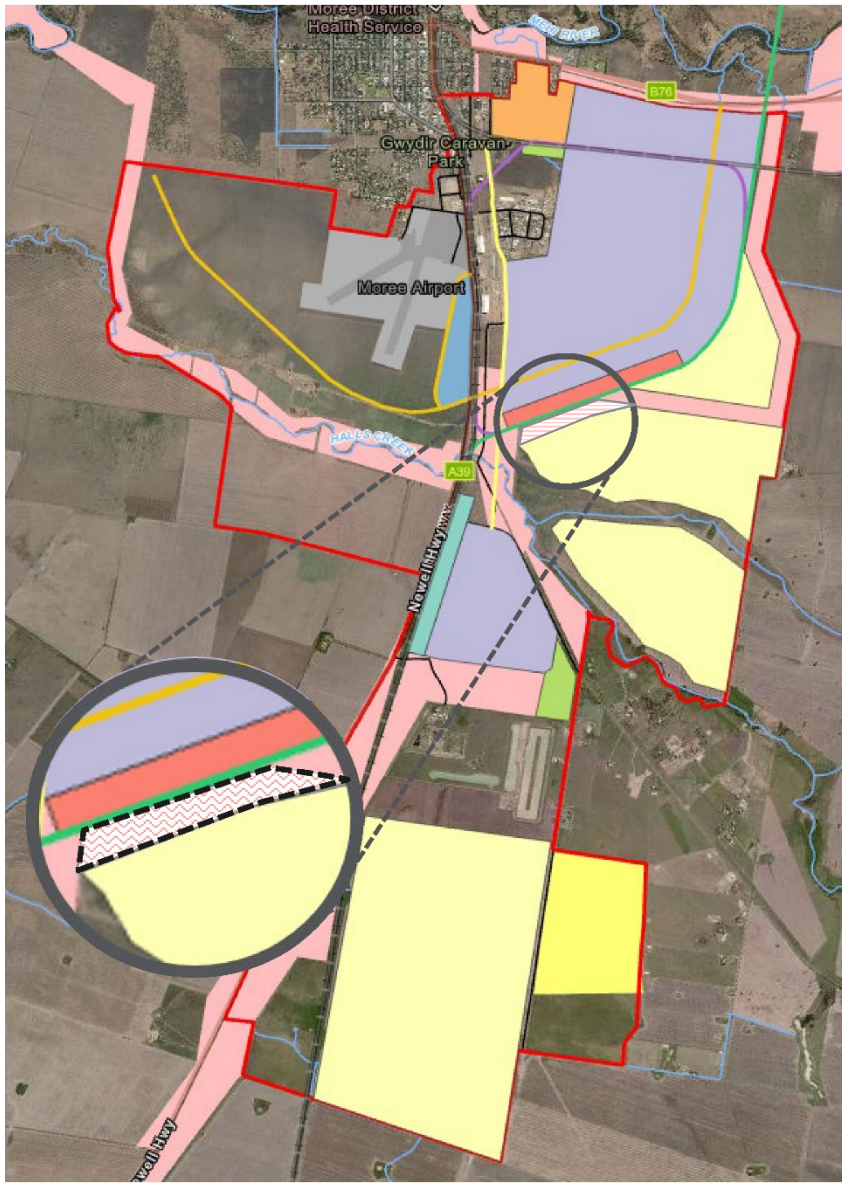


Figure 7-5 Proposed realignment of Travelling Stock Route

8 RECOMMENDED OBJECTIVES AND CONTROLS – MASTER PLAN

Moree has robust transport access by road, via the Newell Highway and the Gwydir Highway, rail, via the future Inland Rail, and air, via the Moree Regional Airport. The existing and future infrastructure enables good connectivity to major Australian cities and seaports (mainly Newcastle, Brisbane and Sydney).

Accordingly, several ongoing, planned, and aspirational infrastructure projects are proposed to the transport network around the Moree township and the SAP.

8.1 Private transport and freight mobility

Aims

- To ensure safe freight accessibility and internal network movement to the SAP sites
- To provide safe access for all transport users to the Moree SAP
- To deliver a connected precinct with industrial and commercial spaces linked with multimodal infrastructures.

Performance criteria

- The internal street network and connections to existing highways would be augmented and expanded over the life cycle of the SAP to ensure the effective servicing, active transport opportunities and orderly operation of the precinct.
- Any connections to the Newell Highway will be designed in accordance with TfNSW and Austroads guidelines.
- Developments must provide operational access and egress for emergency services and occupants, and ensure all roads are through roads. Ample spacing for walking and cycling modes must be considered.

8.2 Active and public transport

Aims

- To provide safe and continuous active transport linkages connecting the Moree SAP to the Moree township
- To minimise the disruption of the existing highways and rail line on walking and cycling trips
- To promote public transport as a mode for work trips
- To encourage recreational active transport trips to heritage and tourist sites in and around the SAP area.

Performance criteria

- Reduce car dependency to access the SAP, diversify transport modes for work trips, and increase active and public transport mode share.
- Walking mode share target: four to eight per cent, as per Regional NSW Services and Infrastructure Plan, 2018.
- Cycling mode share target: two to five per cent as per Regional NSW Services and Infrastructure Plan, 2018.
- Enhance opportunities for recreation for the SAP employees and visitors.
- Ensure Movement and Place success factors are considered in major SAP hubs, the proposed Gateway, and buffer areas This is achieved by supporting the creation of connected, active transport places and links, and reducing vehicular traffic in local streets.
- Provide public transport infrastructure to support uptake of bus transport and future on-demand mobility schemes.

9 MEASURES FOR DELIVERY PLAN

The delivery plan for transport infrastructure is highly dependent on the proposed development plan for land use lots within the Moree SAP. Embedded with the 40-year vision for the precinct, the construction and progression of the multimodal transport network in and surrounding the SAP boundaries would rely on the development of the SAP industries and the uptake of employment, and the role of the intermodal terminals in increasing freight mobility.

Enabling infrastructure would be required on site at the initial stages of the SAP to capitalise on the existing investment in the area and maximise the early economic opportunities of the precinct.

Discussions with DPIE and various stakeholders indicated that the rail siding alongside the proposed Southern Intermodal Terminal, being implemented by ARTC, would be completed in 2023. As such, the potential road network within the SAP for the southern regional enterprise, mainly comprised of the sealed Burrington Road and the upgraded Tapscott Road, would be required for the enabling of the proposed land uses.

The MIO and the Gateway precinct access roads, committed by MPSC, would be the first stages of the proposed East West Connector and would provide free freight access from the Newell Highway. The completion of the East West Connector from Gwydir Highway (west of Moree) to the MIO and Newell Highway does not fall within the scope of the SAP.

Table 9-1 highlights the road upgrade timeline for the Moree SAP.

The location and type of upgrade works from the stage of enabling works up to 40 years after the initial implementation of the Structure Plan are shown chronologically from Figure 9-1 to Figure 9-4.

Table 9-1 SAP upgrade timeline

Timeframe	Upgrade
Enabling works	• Moree Intermodal Overpass and associated link roads to Bullus Drive and Newell Highway. Enabling junction to future East West Connector (west) and the Moree Airport. • Expansion of Industrial Drive Network • North-South Link • Southern Intermodal Terminal • Road network to southern regional enterprise area (including North South Link) – Burrington Road upgrade – Closure of Burrington Road access from Newell Highway – Tapscott Road upgrade – Newell Highway intersection with Gateway precinct
0-10 years	• Northern Intermodal Terminal • Rail line to Northern Intermodal Terminal • Road network to northern regional enterprise area • North-South Connector at-grade level crossing with proposed rail line • Active transport connections over Newell Highway and the Inland Rail • East West Connector from Gwydir Highway (West of Moree) to MIO and Newell Highway • New and/or improved bus services

Timeframe	Upgrade
10-20 years	• North-East intermodal loop rail line connection to the Inverell Line • North-South connector grade separation upgrade over rail line • Second Stage of East West Connector road link from the Moree Intermodal Overpass to the Gwydir Highway east of Moree
20-40 years	• Potential realignment of the Inland Rail to the east of the SAP to bypass Moree township, should this be considered in the future.

9.1 Structure Plan and workshop outcomes

The collaborative process of the final EbD workshop, driven by validating the vision of the Moree SAP and optimising the three land use scenarios, helped to achieve the workshop outcomes in delivering a 95 per cent Master Plan and shape the Structure Plan as follows:

- Developing the road network in conjunction with land and intermodal delivery plans for the SAP, starting with the North-South Link and the Central sub-precinct road network.
- Delivering the potential road network within the SAP to suit the potential block sizes and upcoming business requirements for each sub-precinct:
  - The General Enterprise sub-precinct, located north of the northern intermodal terminal, is expected to host horticulture businesses, grain and cotton value add businesses, and the northern intermodal terminal itself. As such, with expected higher number of ventures, the road network is a grid, providing local access to entrances and driveways.
  - The Central Enterprise sub-precinct is expected to host freight and logistics businesses, and circular economy plots. Accordingly, the road network is spine, with lesser ventures and bigger block sizes projected for the sub-precinct.
  - The potentially hazardous areas are proposed near the existing Moree solar farm and would have minimal access from the potential road network within the SAP.

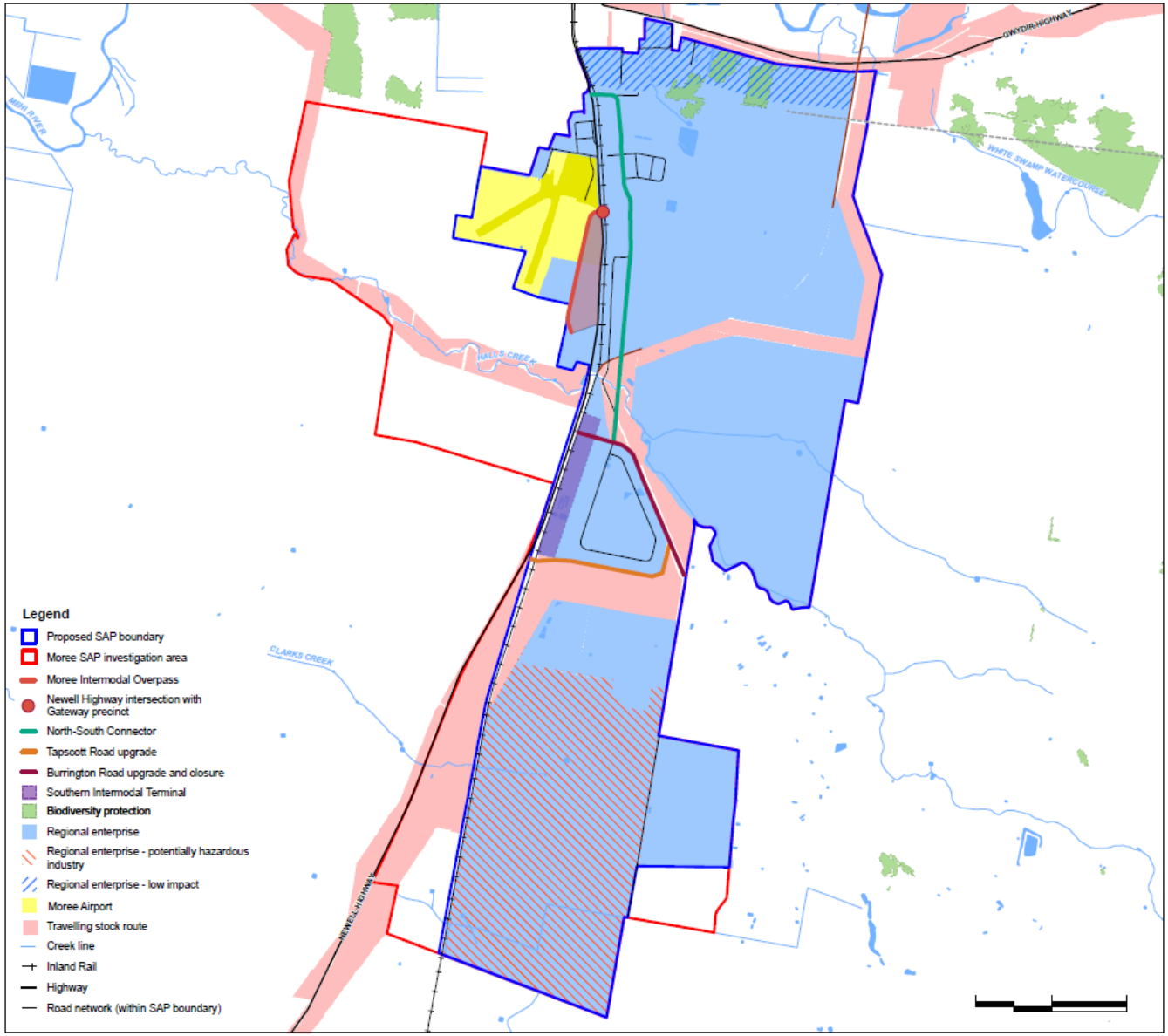


Figure 9-1 Upgrades to be implemented as enabling works

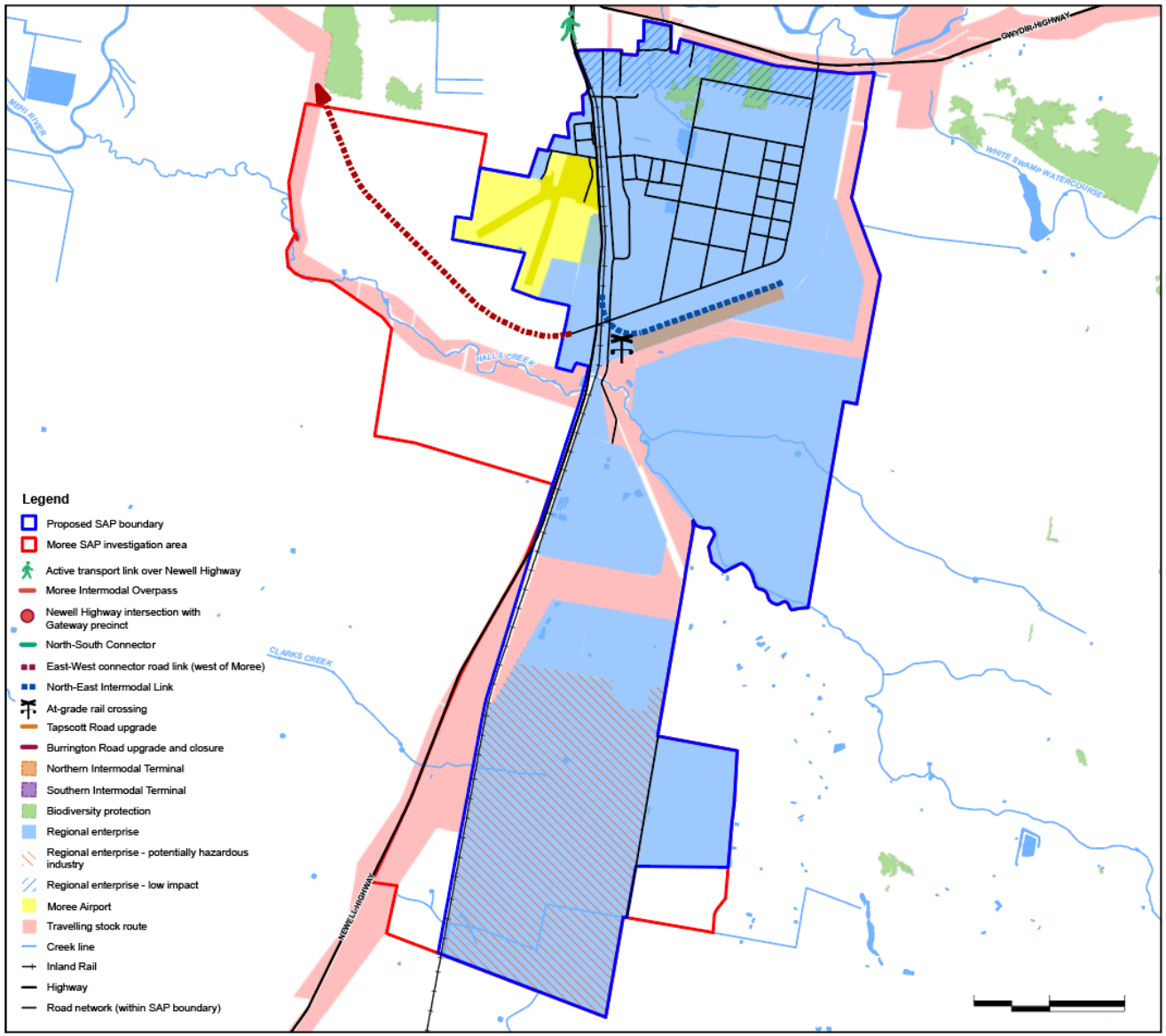


Figure 9-2 Upgrades to be implemented in 0-10 years

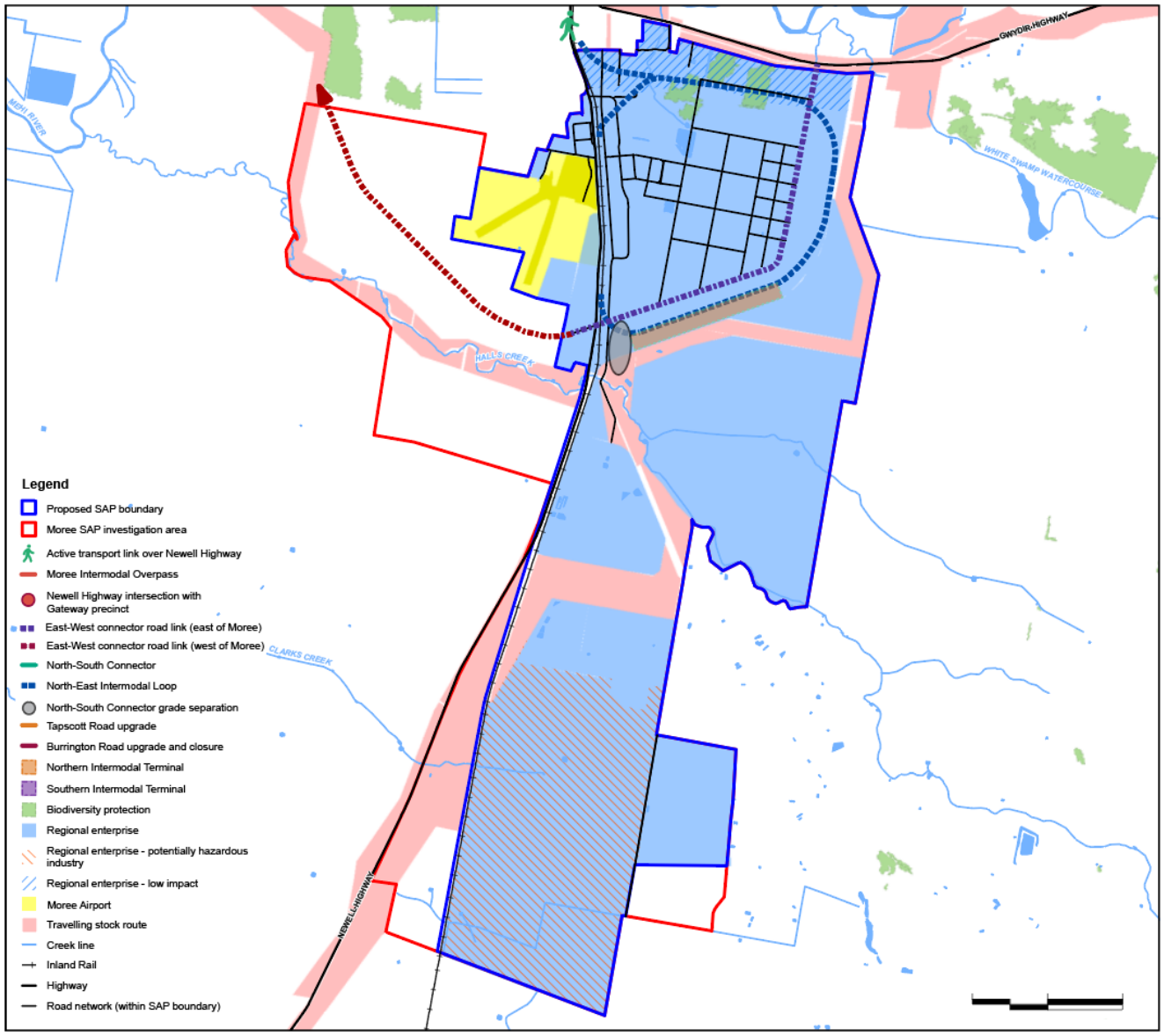


Figure 9-3 Upgrades to be implemented in 10-20 years

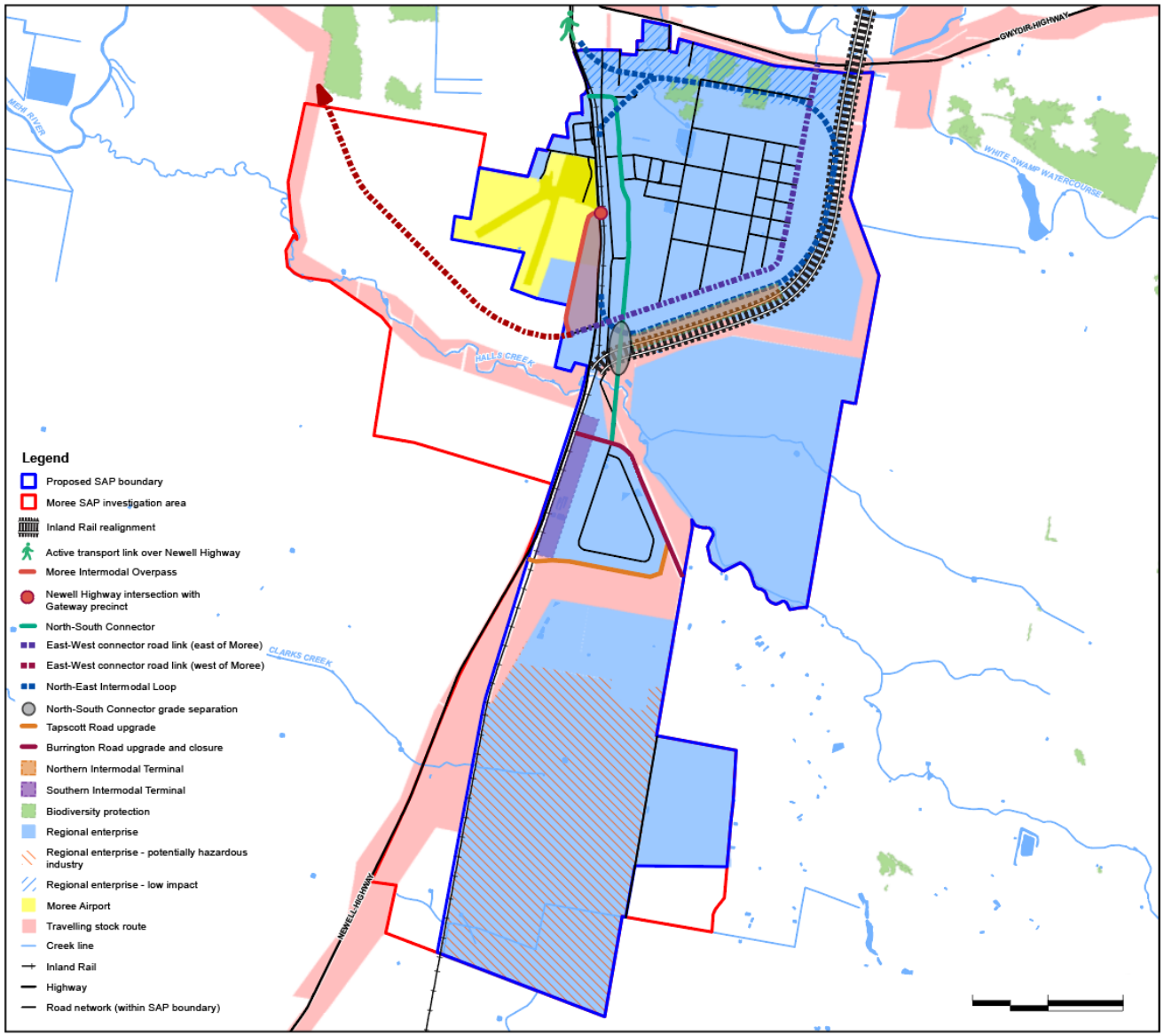


Figure 9-4 Upgrades to be implemented in 20-40 years

10 CONCLUSION

The traffic and transport plan for the Structure Plan focuses on delivering a safe, accessible multimodal transport network for the Moree SAP. Capitalising on current road investments, and the upcoming Inland Rail in Moree, the Structure Plan aims to deliver the following:

- An improved freight access to current and future industries and intermodal terminals in the SAP boundary with the MIO.
- Enabling infrastructure and staged delivery of transport upgrades in the SAP to synchronise with the land development and industry interest in the Moree SAP.
- A potential road network within the SAP with shared mobility and wider footpaths to allow for higher active transport mode share.
- Active transport linkages from the Moree township and Amaroo Residential Village to the Moree Station and the potential road network within the SAP.
- The renewal of the on-demand public transport scheme in Moree and the provision of bus service network and infrastructure.
- Alignment with current TfNSW and MPSC road upgrades on the Newell Highway, the Gwydir Highway, and existing sealed and unsealed roads in the SAP.
- A staged delivery of the Inland Rail and intermodal terminals, with corridor preservation for the future potential rail bypass in the long-term should it be considered sometime in the future.
- Preserving the TSR where possible, with a realignment of the path south of the northern regional enterprise precinct.

APPENDIX A – LIST OF ABBREVIATIONS

Abbreviation	Description
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
ARTC	Australian Rail Track Corporation
CAV	Connected Autonomous Vehicle
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCP	Development Control Plan
GA	General Aviation
GANSW	Government Architect New South Wales
LDC	Louis Dreyfus Company
LEP	Moree Plains Shire Council Local Environmental Plan 2011
LSPS	Local Strategic Planning Statement
MaaS	Mobility as a Service
MCA	Multi-criteria Analysis
MIO	Moree Intermodal Overpass
MIP	Moree Intermodal Park
MPSC	Moree Plains Shire Council
N2NS	Narrabri and North Star
NLTN	National Land Transport Network
NSW	New South Wales
RAV	Restricted Access Vehicle
RGDC	Regional Growth Development Corporation
RMS	Roads and Maritime Services
SA	Statistical Area
SA3	Statistical Area Level 3
SAP	Special Activation Precinct
SEPP	State Environmental Planning Policy
SIS	NSW State Infrastructure Strategy 2018-2038
SLA	Statistical Local Area
TfNSW	Transport for New South Wales
TSR	Travelling Stock Route