# Tonkin Highway North Ellenbrook Interchange Project: Annual Report Sustainability 2025

This annual report covers the financial year period covering 2024/25.

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# About this Report

This report has been prepared by the GHD Sustainability Project team on behalf of Main Roads Western Australia. This report forms part of Main Roads' annual sustainability reporting which is integrated into its Annual Report. The report content is prepared in accordance with GRI principals. Material topics reported in this report have been determined through a materiality process that adheres to Infrastructure Sustainability Council (ISC).

The Tonkin Highway North Ellenbrook Interchange (THNEI) Project is aligned with the Infrastructure Sustainability (IS) version (v) 2.1 Planning rating scheme.

## Introduction

As part of the 2022-23 State Budget, the McGowan Labor Government committed to the construction of a new interchange on Tonkin Highway, north of Ellenbrook, to unlock housing opportunities to meet current and future demand. This commitment has been supported by the Federal Government contributing $50 million, the State Government $25 million and an additional $25 million from private investors.
The Tonkin Highway North Ellenbrook Interchange will be located approximately 30km north-east of the Perth CBD; a major infrastructure project aimed at providing accessibility and connectivity between the North Ellenbrook (east and west) District Structure Plans. It is expected that the North Ellenbrook (east and west) District Structure Plans will provide for urban development for approximately 15,400 new homes, with an expected population growth of 40, 000 to 51, 000 people over the next 20 years.

The Project involves the construction of a grade-separated interchange over Tonkin Highway, positioned approximately 1.2km north of Maralla Road and 1.3km south of Warbrook Road (Figure 1); the grade separation of the existing PSP along the eastern side of Tonkin Highway and shared path connectivity between the east and west District Structure Plans.

This strategic investment aims to provide seamless transportation infrastructure that accommodates future growth while improving overall accessibility and traffic efficiency in the north-east metropolitan region.

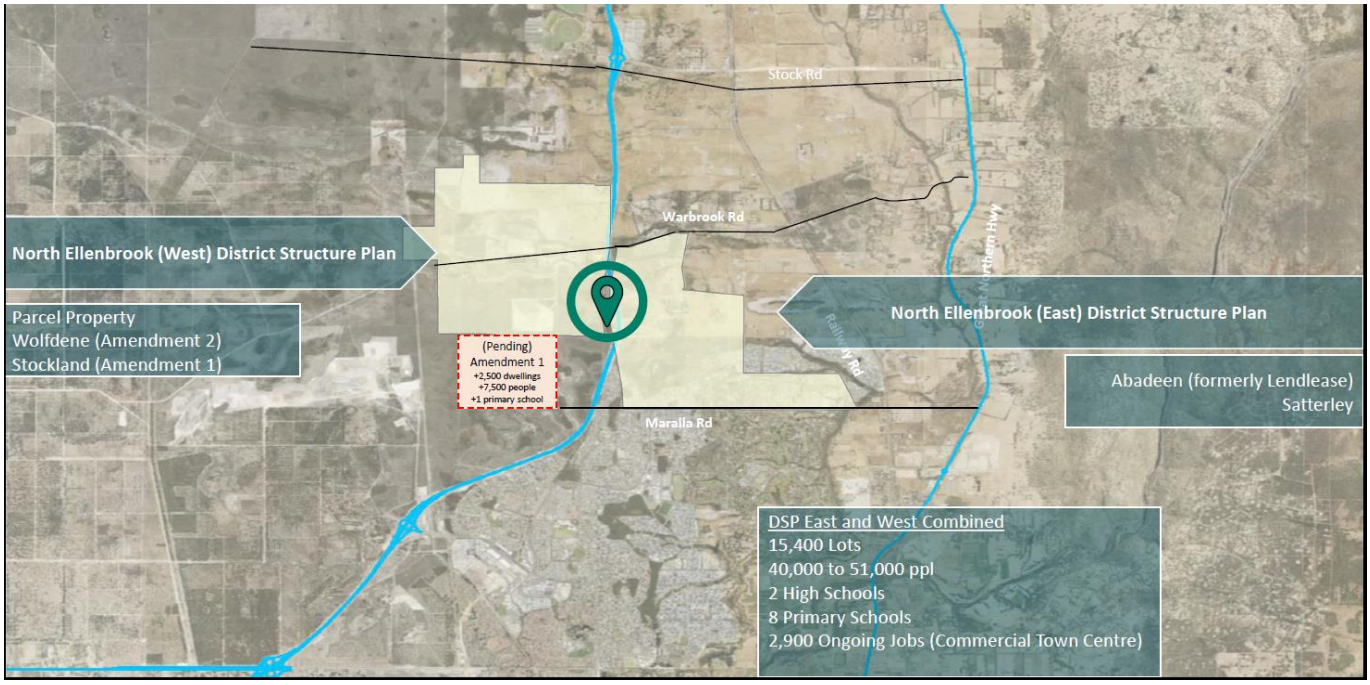


*Figure 1 Tonkin Highway North Ellenbrook Interchange Location*

## Highlights

Key sustainability milestones achieved so far during the planning phase include:

- Completion of sustainability workshops with the Project team and internal stakeholders, fostering collaboration and shared goals.
- Development of a comprehensive Sustainability Management Plan and opportunities register to identify and maximize environmental and social benefits.
- Establishment of project planning targets with ongoing tracking to ensure alignment with sustainability objectives.
- Completion of environmental surveys to assess and mitigate potential impacts to environmental areas of significance.
- Continuous engagement with stakeholders and community to deliver clear and transparent communication whilst acknowledging and incorporating feedback in decision making processes.

# Project Overview

Designed to facilitate efficient access and connectivity for future land development in North Ellenbrook, the Tonkin Highway North Ellenbrook Interchange (THNEI) will adopt a Single Point Urban Interchange (SPUI) configuration over Tonkin Highway at Project Case and ultimately providing a future overpass north of the SPUI interchange and widening of Tonkin Highway by 2051.

The location of the future overpass has been investigated at Warbrook Road, however since receiving Amendment 2 of the North Ellenbrook (west) District Structure Plan whereby land was originally set aside for light industrial, it has been requested to rezone the land between Warbrook Road and Chitty Road to urban. The rezoning of this land requires further investigation by Main Roads when determining the location of the future overpass.

The confirmed project scope for the Project Case design includes:

- Grade separated SPUI configuration over Tonkin Highway.
- Grade separation of the existing PSP along the eastern side of Tonkin Highway.
- At-grade shared path network between the North Ellenbrook (east and west) District Structure Plans.

The key project objectives of the THNEI are:

- Support future growth within the North Ellenbrook Structure plans.
- Improve accessibility for all modes of transport
- Improve connectivity for both regional and local traffic
- Meet future traffic demands and alleviate congestion

The release of land to the community is dependent on the construction timeframes of the interchange. Main Roads Senior Management agreed that to meet the construction completion timeframe of late 2027, procurement will need to be undertaken in parallel to development deliverables.
Subject to statutory approvals, construction work is expected to commence in 2026 under a Design and Construct (D&C) contract arrangement.

The current project development deliverables and environmental approvals are due late September 2025. The procurement schedule is:

- EOI – late July 2025
- RFP – October 2025
- Contract Award – March 2026
- Construction to start – August / September 2026
- Construction completion – late 2027.

The Project webpage has been launched on the Main Roads website providing current and transparent communication to the community and stakeholders.
Website link: Tonkin Highway North Ellenbrook Interchange | Main Roads Western Australia

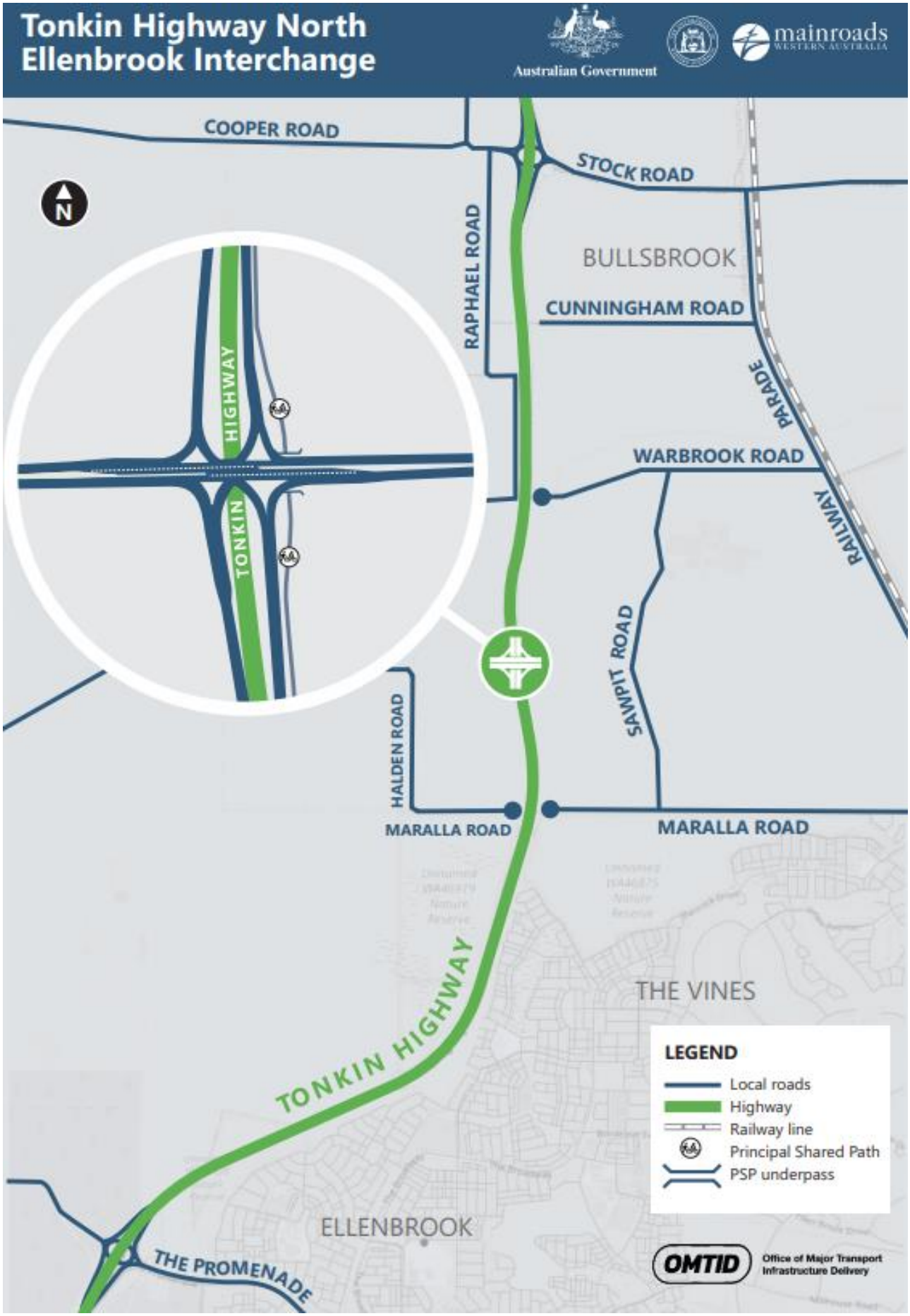


*Figure 2 Tonkin Highway North Ellenbrook Interchange Planning Concept*

## Overall approach to Sustainability in Project Development

Main Roads has formally registered the THNEI Project for a Planning rating under the ISC Infrastructure Sustainability (IS) v2.1 rating tool, demonstrating its commitment to sustainable infrastructure development.

The Project team has developed a comprehensive Sustainability Management Plan, which establishes a structured framework for integrating sustainability into all aspects of project activities. This plan also outlines a clear pathway to achieving an IS rating, with a Silver rating (35-54.9) as the targeted benchmark.

The Project is led by a dedicated Sustainability Lead, an Infrastructure Sustainability Accredited Professional (ISAP), who reports directly to the Main Roads Project Manager. The Sustainability Lead is part of the integrated Project team and is supported by a team of sustainability professionals.

## Material Sustainability Issues

Key sustainability issues for THNEI were identified and prioritised as part of a multi-disciplinary Materiality Assessment Workshop held on 13 June 2024.

Based on the outcomes of this process, the THNEI Project Team has developed Sustainability Focus Areas and objectives (Figure 3) for the THNEI Project to guide sustainability efforts. In line with the agreed project governance structure, the Project Team has reported quarterly to the Project Control Group within Main Roads on progress towards targets and initiatives. In recent months this has also been communicated to other groups within the governance structure and to the OMTID Delivery Team to expedite procurement schedules.

The following key identified material sustainability topics were identified, based on the significance of impact and their importance to stakeholders:

- Protect ecological and environmental values
- Community inclusiveness and well-being
- Enhance safety and connectivity
- Resource efficiency and carbon reduction
- Design for today and the future

A list of the Planning phase targets and their current status is provided within Table 1. Outcomes for targets not yet fully complete will be published upon finalisation.

*Table 1 Planning phase sustainability targets and status*

| Objective | Target | % Target complete | Outcome |
|---|---|---|---|
| Avoid impact to Bush Forever sites and Threatened and or Protected Ecological Communities | Investigate one opportunity to avoid impact to Bush Forever sites and Threatened and or Protected Ecological Communities.<br>Develop an offset strategy for the asset. | 100% | The Ultimate and Project Case Design Footprint has been finalised, with all environmental impact minimisation measures systematically recorded in the Decision Register.<br>An offset strategy for this asset is not required, as existing offsets identified through the NorthLink project fully satisfy the necessary environmental obligations. |

| Objective | Target | % Target complete | Outcome |
|---|---|---|---|
| Minimize impacts to Threatened fauna and its habitats | Investigate one opportunity to minimize impact to threatened fauna and its habitat specifically the Western Swamp Tortoise. | 80% | The project team is exploring ecological design opportunities to minimise impacts on the threatened Western Swamp Tortoise and its habitat, including:<br>• Bioretention systems to improve water quality before discharge into gullies and creeks<br>• Living stream construction near Sawpit Gully to enhance and expand local habitat<br>• PSP bridge/platform design over Sawpit Gully to preserve ecological integrity and protect environmental values |
| Enhance heritage values | Identification of (2) opportunities to enhance heritage values in the area. | 80% | The Main Roads Heritage Team conducted a site walk to assess heritage values, confirming none within the project footprint. Heritage opportunities are being explored through the Urban Design Landscape Framework, including:<br>• Aboriginal art integration along the Principal Shared Path (PSP), featuring sculptures and design elements that reflect local heritage and environmental character<br>• Environmental and historical storytelling through urban design, with potential to embed cultural and natural features into the interchange and surrounding landscape |
| Minimize noise, vibration, air quality, light and visual impacts to the community | Identify a minimum of 2 reduction measures to mitigate noise, vibration, air quality, light and visual impacts. | 80% | Environmental impact assessments are actively progressing to support informed project planning and mitigation strategies. Noise monitoring and modelling are underway to evaluate potential acoustic impacts on the surrounding environment. Visual and lighting assessments will commence once the draft Project Case Design is complete, with adaptive lighting options being explored for Principal Shared Paths (PSPs), particularly at ecologically sensitive areas like Sawpit Gully, to reduce light intrusion. Construction activities such as earthworks, asphalting, and heavy machinery use are expected to generate minor, temporary vibrations with negligible long-term effects. Emissions will occur during both construction and operational phases, with dust identified as the primary concern during construction. This will be managed through targeted dust suppression techniques. No significant emissions of other pollutants are anticipated, and impacts on both human and ecological receptors are expected to be minimal. |

| Objective | Target | % Target complete | Outcome |
|---|---|---|---|
| Build and maintain existing and future community trust and support | Identify and implement targeted stakeholder engagement activities, including identification of high priority stakeholder issues. | 90% | Stakeholder engagement is underway, with key stakeholders and service providers actively involved. Consultation with private landowners has been successful with private landowners praising Main Roads for their open and transparent communication on the interchange project. Formal public engagement will follow once the project design is finalized. Monthly meetings with the Technical Advisory Group (TAG), PCG, and PWG ensure ongoing coordination, and fortnightly debriefs with the City of Swan support transparent decision-making. |
| Design, build and operate the interchange to enhance connectivity and sustainable active transport | Develop Accessibility and Connectivity Strategy for all road users (including the vulnerable) | 80% | A high-level Access and Connectivity Strategy has been established to guide movement throughout the project area. Further connectivity opportunities are being refined within the Urban Design Landscape Framework currently in development, ensuring integration with broader urban and environmental objectives. |
| Prioritise safety during project life cycle to ensure end user safety during operational phase. | Identify measure to improve safety for users through the design and delivery phases. | 80% | The Ultimate Planning Concept Design has been completed, providing a strategic foundation for the project. A Safety in Design Workshop will be completed as part of the Project Case Design, ensuring key safety considerations are integrated early in the design decision making process. |
| Undertake appropriate material sourcing and reduce embodied carbon | Develop Resource efficiency strategy.<br>Investigate (4) opportunities to reduce material use and/or replace the use of virgin materials.<br>Investigate (4) waste minimisation and recycling opportunities on the project. | 80% | The project team is actively evaluating resource efficiency initiatives aimed at reducing environmental impact throughout the design and construction phases. Key opportunities under consideration include the use of green steel, selected for its low-emission manufacturing processes, and the incorporation of up to 20% Reclaimed Asphalt Pavement (RAP) to lessen reliance on virgin materials. Crumb rubber is being assessed for dense graded asphalt applications, offering both performance benefits and waste repurposing. Additionally, Supplementary Cementing Materials (SCMs) such as fly ash and slag are being reviewed for concrete mix designs to lower carbon intensity and support more sustainable construction outcomes. |
| Reduce project water requirements | Investigate (3) opportunities to reduce water use or improve water efficiency. | 80% | A water reduction assessment has been undertaken for the project, targeting practical and high-impact strategies to improve efficiency across the project. Key opportunities being explored include reusing dewatering water and deploying solutions to reduce evaporation and conserve water resources. |

| Objective | Target | % Target complete | Outcome |
|---|---|---|---|
| Achieve net zero carbon footprint for Scope 1 and 2 GHG emissions | Develop a net zero target strategy for the project. | 90% | A Net Zero Strategy is currently being developed to guide the project's approach to emissions reduction and sustainability. As part of this effort, the team is investigating energy-saving and renewable energy opportunities, including adaptive lighting for Principal Shared Paths (PSPs), the use of electric vehicles and equipment during construction, and the deployment of solar lighting towers and generators to reduce reliance on conventional energy sources. |
| Consider climate change and natural hazards | Undertake Climate Change and Natural Hazard Assessment. Incorporate adaptation options into design for all "High" or above climate change and natural hazard risks. | 90% | The Climate Change and Natural Hazards Assessment Workshop was completed in September 2024, leading to the finalisation of the Climate Change and Natural Hazards Register. Adaptation measures identified through this process have been integrated into both the Ultimate and Project Case Designs, where possible. Key climate change and natural hazard risks identified for the project include storms, cyclones, bushfires, and extreme precipitation. |
| Demonstrate best-practice and challenging business as usual | Investigate three best practice planning and/or design opportunities. | 80% | Planning and design opportunities are being actively pursued, with a clear focus on enhancing user experience, minimising environmental impacts, and strengthening asset resilience. Central to this effort is the development of the Urban Landscape Design Framework, which will evaluate CPTED strategies around the Pedestrian Underpass while also improving connectivity across the site.<br>To ensure transparency and informed decision-making, all environmental impact mitigation measures have been systematically recorded in the Decision Register. In addition, flood modelling has been completed using Version 4.2 Climate Change provisions, helping to future-proof the design against extreme weather events and hydrological challenges. |

## United Nations (UN) Sustainable Development Goals (SDGs)

Key material sustainability topics and associated Project objectives have been mapped to relevant UN SDGs and are provided within Figure 3


*Figure 3 Project objectives and material sustainability topics mapped against UN SDGs*

# Environmental Aspects

## At a glance

### Environmental context

The THNEI Project is situated within the Perth subregion of the Swan Coastal Plain bioregion. The surrounding landscape is predominantly rural but contains consolidated areas with environmental values throughout. Significant environmental values in the proximity of the Project include:

- Wetlands and Waterways – The Project intersects Sawpit Gully, a non-perennial minor watercourse and is adjacent to two conservation category wetlands.
- Fauna Habitat – The Project contains vegetation that is foraging habitat and potential breeding habitat for the threatened Carnaby's (Endangered) and Forest Red-tailed (Vulnerable) Black Cockatoos. Sawpit Gully also has suitable characteristics to provide habitat for the Western Swamp Tortoise (Critically Endangered), but a targeted assessment indicated the species is highly unlikely to occur.
- Flora and Vegetation – The Project is adjacent to vegetation identified as Commonwealth-listed 'Banksia Woodlands of the Swan Coastal Plain' Threatened Ecological Community (TEC) and two State-listed Priority Ecological Communities (PECs): 'Banksia Woodlands of the Swan Coastal Plain' and 'Swan Coastal Plain Banksia attenuata – Banksia menziesii woodlands (FCT 23b)'.
- Conservation areas – The Project is adjacent to and intersects a small portion of Bush Forever Site 13.

A comprehensive list of threatened and protected areas of environmental significance and potential interface project initiatives is provided within **Appendix 1.**

A comprehensive list of protected fauna and flora species and habitats is provided in **Appendix 2**.

A summary of environmental performance and aspects for the Project are detailed in Table 2.

*Table 2 Summary of Environmental Aspects*

| Environmental Aspect | Total for Project |
|---|---|
| Clearing planned (ha) | 7.90 |
| Planned impact to Bush Forever Sites (ha) | 0.17 |
| Planned impact to Carnaby's Black Cockatoo Foraging Habitat (ha) | 7.50 |
| Planned impact to Forest Reed-tailed Black Cockatoo Foraging Habitat (ha) | 5.70 |
| Planned impact to Black Cockatoo potential breeding trees:<br>• Number of trees with suitable DBH | 87 |
| • Number of trees with suitable DBH and confirmed unsuitable breeding hollows | 3 |
| • Number of trees with suitable DBH and suitable breeding hollows | 0 |

## Environmental Management

A desktop assessment was undertaken of potential interchange locations and used to identify potential significant environmental constraints and inform the MCA workshops. The current location was selected as it provided the best compromise between environmental impacts and maximising connectivity, road safety and efficiency for the THNEI.

Once the Project location was confirmed a biological survey of the project area and surrounds was undertaken to identify significant vegetation, flora, and fauna values. An additional assessment of potential Black Cockatoo breeding hollows in the project area was also undertaken. The results of these investigations have informed the refinement of the proposal concept design. Other investigations that have been undertaken or are underway include a targeted survey for significant aquatic fauna, dieback survey, geotechnical investigation (including acid sulfate soils assessment) and a traffic noise assessment. These investigations will inform an Environmental Impact Assessment (EIA) for the concept design as well as informing future stages of design and management practices.

An environmental approvals strategy was developed using the desktop assessment of potential environmental impacts. Tonkin Highway was constructed under the *Environmental Protection Act 1986* Ministerial Statement 1036 and *Environmental Protection and Biodiversity Conservation Act 1999* approval EPBC 2013/7042. Construction of THNEI on Tonkin Highway is broadly consistent with the proposal authorised under these approvals and therefore amending these approvals to include THNEI was determined to be the most appropriate approval pathway. The following environmental or heritage approvals, permits, or licences are needed for implementation of the Project:

- Amendment of MS1036 under s45C of the Environment Protection Act 1986
- Notifying the Department of Climate Change, Energy, the Environment and Water of the amendment under Condition 1(c) and 1(d) of EPBC 20113/7042
- *Rights In Water and Irrigation Act 1914* (RIWI Act) Bed and Banks Permit
- Development Approval

Other approvals that may be required include:

- RIWI Act s5C licence – for construction dewatering or abstraction of construction water
- Fauna handling licence under the *Biodiversity Conservation Act 2016*

The need for these licences will be assessed as design and planning for construction progress.

The Project has incorporated strategies to minimise impacts on significant environmental values, material sourcing, water and energy use, as well as resource consumption and disposal during project lifecycle. Opportunities identified during the development phase have been documented in registers for use in the next Project stage.

Comprehensive Environmental Management Plans (EMPs) are under development for the THNEI Project, in accordance with Main Roads' certified Environmental Management System (EMS), before the construction phase commencing. This will include any specific management plans required by the environmental approvals as well as a construction environmental management plan to manage all other potential environmental impacts associated with construction.

## Water Management

Effective water management will be essential during the design and construction phases of the Project, particularly given its proximity to Sawpit Gully and conservation Category Wetlands. The Project will be designed to minimise upstream and downstream impacts to surface water. Sawpit Gully currently passes under Tonkin Highway through a culvert at the location of the new interchange. The Project will result in a modification to the flow path of Sawpit Gully through a new culvert. The new culvert and realignment of Sawpit Gully will be designed to minimise impacts to Sawpit Gully and ensure there is no change to the hydrological regime or water quality because of this change.

Road drainage infrastructure will be designed to minimise hydrological impacts upstream and downstream of the project. The drainage systems will be designed to:

- Minimise changes existing surface water flow paths and support the existing flow regime and water balances.
- Prevent scour, erosion, and include appropriate treatment to reduce sediment transport and ensure no changes to existing water quality.

Where possible drainage basins will be planted with native species appropriate to the local conditions and functional purpose of the basins. This vegetation will help reduce water velocity, enhance the settlement of suspended sediments, and provide a level of biofiltration. The Project has also identified the opportunity to incorporate living streams into the drainage design that complement the existing environmental values of Sawpit Gully. This opportunity will be investigated as design progresses.

To promote water efficiency and the use of sustainable water sources during construction, the Project team has conducted a comprehensive review of available water sources and potential water reduction strategies. Specific water saving initiatives that are being explored, include on site water storage adequate cover to minimize evaporation losses and reuse of dewatering water. The investigation outcomes will be shared with the design and construction teams as an information document to assist their own water source and optimisation opportunities. These opportunities will be further investigated during detailed design and construction phases, and all adopted reduction measures will be documented within appropriate delivery documents.

## Carbon Emissions & Energy

The THNEI Project has conducted preliminary calculations to assess energy requirements and greenhouse gas (GHG) emissions across both the construction and operational phases.
Utilizing available project designs and key assumptions, the estimates account for emissions from vegetation clearing, construction fuel consumption, electricity usage, and embodied energy (the carbon footprint associated with the manufacturing of various materials).

Key emission sources of Greenhouse Gases (GHGs) for the construction phase will include fuel use of mobile and stationary construction equipment, land clearing of existing vegetation and the associated loss of carbon sink, fuel use for site offices and employee travel to site.

Scope 1 (direct) emissions are released to the atmosphere as a direct result of an activity (from owned or controlled sources). Scope 1 emissions for the Project include:

- Onsite fuel use for plant and equipment and lost carbon sink associated with vegetation clearing.
- Onsite fuel use for electricity generation (generators).

Scope 2 (in-direct) emissions are released from the indirect consumption of an energy commodity (i.e. electricity). Scope 2 emissions for the Project include:

- Onsite grid electricity consumption by plant and equipment, including site offices.
- Onsite grid electricity consumption for lighting, signals and other activities during operation and maintenance.

Scope 3 emissions are all indirect emissions (not included in Scope 2) that occur in the value chain of an organisation, including both upstream and downstream emissions. Scope 3 emissions for the Project include:

- Road user emissions.
- Offsite fuel use associated with the transportation of purchased fuel in construction.
- Transportation of waste.
- Waste generation, including spoil.
- Employees commuting to and from work.
- Extraction, production and transportation of fuels consumed in the generation of electricity.
- Water supply for construction and operation activities.

The table below summarised preliminary calculations for Project Scope 1, 2 and 3 GHG emissions across construction and operation phases.

*Table 3 Project Scope 1,2 and 3 emissions*

| Project phase | Scope 1 $tCO_2e$- | Scope 2 $tCO_2e$- | Scope 3 $tCO_2e$- | Total $tCO_2e$- |
|---|---|---|---|---|
| Construction | 2,480 | - | 356 | 2,837 |
| Operation | 109 | 2,880 | 11,699 | 14,687 |
| Total | 2,589 | 2,880 | 12,055 | 17,524 |

The table below summarised the key project emission contributors across construction and operations.

*Table 4 Key Project Emissions contributors*

| Top contributions (tCO2e-) | % of Total $tCO_2e$- | Project phase | Emission source description |
|---|---|---|---|
| 14,381 | 82.04% | Operations | Asset users |
| 1,651 | 9.42% | Construction | Lost carbon sink |
| 835 | 4.76% | Construction | Fuel use - vehicles, plant, equipment |
| 171 | 1.09% | Operations | Street lighting/traffic signals |
| 162 | 0.92% | Construction | Waste and demolition |
| 129 | 0.74% | Construction | Employee travel |
| 109 | 0.62% | Operations | Pavement maintenance |
| 52 | 0.20% | Construction | Construction water |
| 27 | 0.15% | Operations | Waste transportation |
| 7 | 0.04% | Construction | Waste transportation |
| 0.05 | 0.00% | Operations | Maintenance Water |

Potential energy and carbon emission reduction opportunities were identified for the Project and include photovoltaics or hybrid generators for site offices, use of solar lighting towers/generators and the potential use of adaptive lighting along sections of the PSP alignment at Sawpit Gully. These opportunities will be further investigated during detailed design and construction phases, and all adopted low-emission measures will be documented within appropriate delivery documents.

As part of the Project's commitment to sustainability, a Net Zero Strategy has been developed. Carbon reduction objectives and targets have also been established and will be closely monitored throughout every phase of delivery. At the outset of each stage, these targets will be reassessed to align with current Project conditions and the evolving expectations of stakeholders.

*Table 5 Net Zero Objectives and Targets*

| Objectives | Project phase | Target |
|---|---|---|
| Undertake appropriate material sourcing and reduce embodied carbon | Planning | Develop Resource Efficiency Strategy.<br>Investigate (4) opportunities to reduce material use and/or replace the use of virgin materials.<br>Investigate (4) waste minimisation and recycling opportunities on the project. |
| | Detailed Design | Incorporate opportunities to reduce the use of virgin material and adopt at least two (2), with a stretch target for four (4) opportunities for material reduction/use of recycled products in the detailed design phase. |
| | Construction | Achieve a 15% reduction in asset lifecycle compared to the base case. |
| | Operation | Utilise 5% of non virgin materials for maintenance activities. |
| Achieve net zero carbon footprint for Scope 1 and 2 GHG emissions | Planning | Develop a net zero target strategy for the project. |
| | Detailed Design | Produce detailed monitoring plans for GHG emissions during construction and operation.<br>Achieve a 20% reduction in GHG emissions over the modelled asset lifecycle compared to the base case.<br>Investigate energy efficiency opportunities and implement at least three (3). |
| | Construction | Achieve at least a 5% reduction in energy used or emissions (Scope 1 and 2) created during construction.<br>Develop and finalise a plan to reduce and offset the remaining Scope 1 and 2 GHG emissions for construction and operation. |
| | Operation | Achieve net zero by 2050.<br>Power the site using Green Power from the grid.<br>Implement the plan to reduce and offset the remaining Scope 1 and 2 GHG emissions for construction. |
| Reduce project water requirements | Planning | Investigate (3) opportunities to reduce water use or improve water efficiency. |
| | Detailed Design | Implement (2) of the water efficiency opportunities identified. |
| | Construction | Achieve at least a 5% reduction in total water used on the project (construction and operation) |
| | Operation | Maintain the asset to ensure that water consuming equipment and processes operate efficiently |

## Materials & Recycling

A series of workshops were conducted to explore potential resource efficiency opportunities. These discussions were integrated into the materiality assessment, resource efficiency and framework sustainability workshops, forming the foundation for the Resource Efficiency Strategy (RES).

The identified opportunities for enhancing resource efficiency include use of crumb rubber for dense graded asphalt, use of Supplementary Cementing Materials (SCM) in concrete mix design and use of low carbon steel in place of normal reinforcement steel. The specific volumes of these recycled or replacement materials are still under investigation.

All resource efficiency opportunities to date have been recorded within the Project's Opportunities Register.

The table below summarised preliminary material volumes required for the construction of the interchange.

*Table 6 Project resource input requirements*

| Material Type | Quantity (Tonnes) | % of Total material volume |
|---|---|---|
| Sand / Crushed Rock | 824,732 | 90.60% |
| Concrete | 37,276 | 4.10% |
| Subbase | 26,033 | 2.90% |
| Basecourse | 15,806 | 1.70% |
| Asphalt | 4,779 | 0.50% |
| Steel | 1,453 | 0.20% |
| Limestone | 400 | 0.04% |
| Paint | 199 | 0.02% |
| PVC | 51 | 0.01% |

## Vegetation

The concept design has aimed to avoid significant vegetation and reduce clearing as far as possible while still retaining flexibility to allow for changes in design that may be required in later design phases. Specific elements that have been introduced in the concept design phase to reduce clearing include:

- The use of a retaining wall in the northbound off-ramp to minimise impacts to adjacent significant vegetation.
- The use of cleared areas or degraded vegetation for placement of drainage basins to minimise impacts to vegetation and sawpit Gully.

The vegetation to be cleared is predominantly in degraded or worse condition but includes vegetation that is significant for Black Cockatoos and vegetation associated with Sawpit Gully. Approval will be sought to clear all vegetation within the Project footprint but opportunities to reduce clearing will be considered in future design phases or during construction. Where possible these opportunities should be focussed on retaining vegetation related to black cockatoo foraging, potential breeding trees, or vegetation associated with Sawpit Gully.

## Other Environmental Aspects

The project site is adjacent to significant environmental features and will need to consider the potential for indirect impact to these features during construction. Investigations are underway for aspects such as hygiene (dieback and weeds), acid sulfate soils, and contamination. These will inform future design and construction management and a Project-specific Construction Environmental Management Plan will be developed for the management of potential impacts for these and other aspects related to construction (e.g. Dust, chemical management, construction noise).

## Climate Change and Resilience Assessments

The Project has conducted Climate Change and Resilience workshops to assess potential risks associated with climate change and natural hazards, as well as to integrate resilience strategies into the Project. These sessions facilitated a thorough review of vulnerabilities that could impact key project components.

Following the workshops, the team developed a Climate Change and Natural Hazard Risk Register, and a Resilience Register to systematically identify areas susceptible to risks. The registers outline priority risks, which include storms

and cyclones, extreme heatwaves causing bushfire as well as precipitation, and propose targeted management measures to mitigate potential impacts, ensuring the Project is resilient against future environmental challenges.

# Economic Aspects

## At a glance


## Economic context

The North Ellenbrook West and East District Structure Plans (DSPs) anticipate the construction of approximately 13,500 new homes, supporting a projected population increase of 40, 000 to 51, 000 people by 2051. As this area develops, the THNEI will play a critical role in ensuring efficient transport access, contributing to both residential and economic growth.

Tonkin Highway, a Primary Regional Road, is designed as a four-lane dual carriageway with controlled access, serving as a major transport corridor for Perth's northern expansion.

A summary of economic performance and aspects for the Project are detailed in Table 7.

*Table 7 Summary of Economic Aspects*

| Economic Aspect | Total for Project |
|---|---|
| Funding | $100 million (based on P90 2022/23) |
| Current No. of vehicles per day | 0 (interchange)<br>32,000 (Tonkin Hwy, mainline) |
| Forecast vehicle per day (vpd) | Year 2041<br>46,400 vpd (interchange)<br>62,600 vpd (Tonkin Hwy)<br><br>Year 2051<br>66,200 vpd (interchange)<br>98,600 vpd (Tonkin Hwy) |
| Forecast Increase in cycling and pedestrian facilities (i.e. increase in PSP length) | New shared path at interchange ~2440m added along North Ellenbrook Rd (northern and southern sides). No increase to existing PSP length (localised diversion only at interchange) |

## Key Economic Outcomes

The THNEI will be the primary access point for both the east and west DSPs, positioning itself as a fundamental wayfinding and placemaking feature for the region. Its grade-separated design will enhance traffic flow, safety, and overall connectivity, ensuring seamless integration with the area's long-term development strategy.

Beyond facilitating commuter access, the THNEI will play a crucial role in economic development, providing light industry and commercial enterprises with streamlined connectivity to Tonkin Highway and broader transport networks. This improved access will unlock opportunities for local businesses, reduce transportation costs, and enhance logistics efficiency, fostering an attractive environment for investment and job creation.

Additionally, the interchange complements other major infrastructure projects in the area, reinforcing North Ellenbrook as a well-connected and strategically planned urban expansion.

## Options Assessment

Decision-making during the planning and development phase plays a crucial role in shaping the THNEI Project's long-term success. The options assessment follows a structured framework that ensures a thorough evaluation of environmental, economic, social, and technical factors. This approach fosters well-informed, balanced outcomes by incorporating diverse perspectives.

To determine the preferred interchange location and form, Main Roads conducted two major Multi-Criteria Analysis (MCA) workshops. The first, held on 28 August 2024, brought together 31 stakeholders from internal and external groups to evaluate potential interchange locations. Following the discussion, it was agreed that all development works would proceed based on Location 1/2 (LO1/2).

The second MCA, completed in November 2024, focused on interchange configurations and resulted in the selection of a Single Point Urban Interchange (SPUI) at the intersection of Tonkin Highway and the future North Ellenbrook road.

The cost of carbon was included as a criterium in both Multi-Criteria Analysis (MCA), ensuring carbon impacts were weighed alongside economic, technical, and social factors, promoting a more sustainable infrastructure outcome.

## Sustainable Procurement and Buy local

Sustainable procurement and Buy Local are requirements set out in the EOI (Section 12.1) and RFP procurement contract agreements for the Project.

The EOI documentation clearly states:
2.3 Project Objectives:
(viii) meeting or exceeding the sustainability targets for the Project.

12.1 A Proposal in the RFP Stage of the Procurement Process will only be accepted from a Proponent who:
(c) has included information to enable application of the State's Buy Local Policy.

# Social Aspects

## At a glance

## Social context

The Project area is primarily located within the suburb of Bullsbrook, with Ellenbrook located to the south, and Muchea located to the north. The area is dominated by rural properties and reserves. The Project is located within the City of Swan.

North Ellenbrook is identified as a future urban growth area approximately 30km northeast of Perth city. Demand for residential land in the northeast corridor continues to be strong and projections show a shortfall in home lots going forward. The North Ellenbrook (East and West) District Structure Plans (DSP) have been approved and combined the DSP's (including Amendment 1) will accommodate the following:

- 15,400 Lots
- 40, 000 to 51, 000 people
- 2 high schools
- 8 Primary Schools, and
- 2,900 ongoing jobs (commercial precinct).

A second amendment (Amendment 2) has been received by DPLH and Main Roads, whereby the previously identified light industrial area north of Warbrook Road has now been requested to change to urban.

Within Bullsbrook the population is 5, 605 people of which 2.0 per cent identify as Aboriginal/Torres Strait Islander representation (Australian average is 3.2 %) and the predominant language at home is English (88.5% of homes) followed by Afrikaans (0.5%).

Data from the 2021 Census Community Profiles from the Australian Bureau of Statistics paints a comprehensive picture of the transportation habits within the area. Notably, private cars serve as the predominant mode of transport (69.5% of people who commute to work do so by car). Public transport (2.8%) walked only (3.1%), truck (2.1%) and bus (1.4%) are the choices of a small minority.

Social elements ranked as key issues during stakeholder engagement for the THNEI included local access and connectivity and urban and landscape design.

## Communications & Stakeholder Engagement

Stakeholder engagement has been underway for THNEI since 2024/25 and has been strategically informed by a Communications and Stakeholder Engagement Strategy. The strategy has been developed to:

- Improve collaboration and transparency with stakeholders to achieve mutually beneficial, sustainable outcomes.
- Enable proactive risk identification and management leading to enhanced reputation and standing with identified stakeholders.
- Improve organisational performance through increased knowledge, social and relationship capital, and social license to operate.

In 2024 engagement between government and private land developer groups, which make up the majority of adjacent stakeholders, occurred to discuss and identify a preferred location and interchange form for the future interchange. As are result of these interactions it was formally agreed, that Main Roads would construct the THNEI north of Maralla Road and south of Warbrook Road, with a Single Point Urban Interchange (SPUI) as the preferred form.

During 2025 Main Roads is continuing planning and development investigations to complete a Project Case Reference Design in preparation for procurement and delivery of the interchange. Main Roads will be conducting engagement to socialise the Project with wider stakeholders, identify and address any issues regarding the interchange form and footprint design, ensuring alignment with Project constraints and informing the future delivery process.

Stakeholder engagement is continuing with:

- State and Federal governments – Commonwealth and State Treasury, EPA
- State government agencies - DWER, DPLH, WAPC
- Local government – City of Swan
- Environmental regulators
- Private Landowners
- Service providers – Western Power, Water Corporation, NBN Group, ATCO Gas
- Emergency services - DFES.

A comprehensive list of stakeholders is provided within **Appendix 3 – List of Stakeholders to the Project**.

## Addressing community concerns

A comprehensive list of key stakeholder requirements has been identified through stakeholder meetings and issues/sustainability workshops. These continue to be reviewed during project development, to mitigate potential issues and to inform the Project's Scope of Works and Technical Criteria (SWTC). To support stakeholder engagement a range of communication activities have/will be implemented to socialise the Project and facilitate two-way dialogue during project development, pre-construction, and construction stages. Mechanisms for communications will be chosen to best reach the target audience in the most efficient and cost-effective way.

Examples of these may include (but are not restricted to):

*Table 8 Mechanisms for communications*

| Channel | Elements |
|---|---|
| Communication | |
| Government Agencies | • Ministerial Briefing notes<br>• Federal and State Ministerial media statements<br>• Minister and local member briefings<br>• Minister and local member social media |
| Static and Electronic Signage | • Static project signage – Federal and State<br>• VMS |
| Internal communication | • Project Team meetings<br>• Intranet Communications / project highlights<br>• DG & MD Updates |
| Email / Click Dimensions | • All subscribers from CONNECT database<br>• Invitation to register contact details on the website to populate database<br>• Community requesting information (via phone/email) added to database<br>• This forms basis for dissemination of roadworks information and project updates |
| Direct mail to catchment area | • Project area for communication with nearby residents<br>• Delivery of newsletters / updates / notice of works distributed to this area<br>• To be communicated to surrounding suburbs as necessary |
| Publications | • Project Updates and News letters<br>• Construction Updates<br>• Frequently Asked Questions<br>• Fact Sheets<br>• Road Works Updates<br>• Project Related Maps<br>• Minutes of Reference Group of Focus Group meetings, where applicable |
| Media | • Road Network Operations Centre (RNOC)<br>• Main Roads website<br>• Building for Tomorrow campaigns including Reshaping WA Report<br>• Ministerial media statements<br>• Newspaper advertising<br>• Urgent construction communications |
| Website | • Main Roads dedicated project page<br>• Main Roads website News<br>• Building for Tomorrow Project Page<br>• Main Roads Travel Map<br>• LGA websites<br>• Contractor will provide regular updates and information about traffic and commuter impacts. |
| Social media | • Facebook Project page<br>• You Tube<br>• Twitter / Instagram / LinkedIn |
| Third party information channels | • Private investment entity channels<br>• Local Government Authority newsletters and websites/social media |

| | |
|---|---|
| | • Special interest publications (e.g., West Cycle website) |
| FAQs | • Provided to the Customer Information Centre (CIC) and Traffic Operations Centre (TOC) prior to the public announcement, unusual congestion, or traffic impacts.<br>• Follow up information circulated if required. |
| Engagement | |
| Addressed mail to landowners/businesses | • All property impacting communications must be by registered mail. |
| Briefings / meetings / displays | • Minister's Office<br>• State Government Agencies<br>• Local Members<br>• Local Government<br>• Special interest stakeholder briefings<br>• Local landowners<br>• Alignment walks (site walks)<br>• Local area information displays<br>• Information sessions – drop in style (only if relevant) |
| Community Liaison / Reference / Focus Group | • If appropriate during development |
| Stakeholder Working Group | • Private investment entities, if appropriate / required during planning |
| Technical Working Group | • Identify any unforeseen issues with the design |
| Events | • Project commencement - groundbreaking ceremonies<br>• Project completion - opening ceremonies<br>• Funding announcements<br>• Major milestone announcements |
| Public contact | • 24/7 Telephone (138 138)<br>• Email – enquiries@mainroads.wa.gov.au<br>• Web form on Main Roads Website<br>• Face to face<br>• Community Drop in session<br>• Consultation focus groups |
| Partnering workshop | • Project Team and the successful contractor go through all project requirements, risks, and commitments to ensure community and stakeholder engagement is at the forefront of the project considerations. |
| Digital | • MySay Transport communications and stakeholder engagement platform, including online surveys / interactive mapping<br>• Website<br>• Social media |
| Partnering workshop | • Project team and the successful contractor go through all project requirements, risks, and commitments to ensure community and stakeholder engagement is at the forefront of project considerations. |

Key topics raised as part of stakeholder engagement to date, include:

- Emergency access
- Project timing
- Project legislative and regulatory approval requirements and deadlines
- Project funding
- Property access requirements for planning investigations and construction
- Form and location of the interchange
- Provision of traffic access to future residential developments
- Local connectivity

- Construction traffic access
- Livestock access / safety

## Heritage

Most of the project area has previously been subject to Aboriginal heritage surveys conducted in 2005 and 2014 for the NorthLink/Perth-Darwin National Highway. Although the project area lies within the DPLH restricted buffer of a registered site, consultation with DPLH confirmed that the site itself will not be impacted. Further surveys were not considered necessary. No additional consultation with Traditional Owners has been undertaken, as the Proposed Amendment will not disturb a known Aboriginal heritage site. Therefore, a section 18 consent to impact upon an Aboriginal site under the *Aboriginal Heritage Act 1972* is not required.

## Road Safety

The interchange selection has been a key focus area during the multi-criteria assessment (MCA) with the Main Roads Road Safety Branch providing a supportive role in assessing the interchange types through the ROSMA process.
The SPUI interchange will make roads safer by providing access and connectivity for all transport modes. The road safety benefits include (but not limited to):

- Efficient traffic flow through the interchange to access the east and west district structure plans.
- Provide alternative grade separated connections to and from Tonkin Highway.
- Provide connections between regional and local roads, in turn easing congestion and reducing risks.
- Provide alternative transport infrastructure that will support vulnerable road users.

## Workforce Safety

Workforce Safety is covered under requirements set out in the EOI and RFP contract agreements for the Project.

Under Section 3.5 Project Requirements of the EOI it clearly states the following:
Section (b) Safety
(i) Main Roads is committed to conducting its business in a way that promotes the safety and health of all persons.
(ii) The Contractor will be required to ensure that the Project achieves a high level of proactive occupational

## Community Amenity

The Urban and Landscape Design Framework (ULDF) provides an assessment of the spatial and visual design of the road infrastructure and associated works for the THNEI Project. The ULDF will set objectives, for the urban design aspects of the Project works; guides decision-making on the appropriate context sensitive design response for the Project location with the aim to deliver the best possible urban design outcomes for the local environment, road users, and the community.

Josh Byrne & Associates have been engaged by Main Roads Project Development to undertake the ULDF for the THNEI Project. Key considerations within the ULDF will include (but not limited to):

- Management of environmental areas of significance (threatened and protected flora and fauna).
- Significance of waterways and the natural water flows in the North Ellenbrook area.

- Planning and management of urban and landscape design related factors.
- Provide guidance with design and specifications.
- Influence decision making for the detailed design and construction phases.
- Influence sustainable long-term legacy initiatives.

## Diversity

Main Roads is committed to increase the representation of diversity groups and foster a truly representative workforce by providing a safe, respectful, and inclusive workplace culture.

The THNEI Project will use the Main Roads Diversity, Equity and Inclusion (DEI) Framework which will outline the structure that supports our DEI journey and details our commitment statement, governance structure and the principles we have adopted.

Throughout the project development phase, the THNEI Project team has had an even 50% male and 50% female representation on the Project. Female representation has been higher for the management of the project by both Main Roads and Industry combined during this phase.

The THNEI Project endeavours to meet Main Roads targets and expected performance for workforce diversity on the Project. This includes committing to 4.5% Aboriginal Business spend and an 8% Aboriginal Employment throughout the project's construction phase from industry.

## Workforce Development

The THNEI Project is located in North Ellenbrook, a growing urban area within Perth's north-east corridor. Identified as a future development hub, North Ellenbrook is expected to play a key role in meeting housing and infrastructure demands for the expanding population.

The City of Swan, which includes North Ellenbrook, has a forecasted population of 177,823 in 2025, projected to grow to 298,965 by 2051. This significant growth highlights the need for strong transport links, including access to major road networks and planned infrastructure improvements.

With a focus on sustainable growth, North Ellenbrook is set to accommodate new residential developments, supporting Perth's broader urban expansion strategy. Employment in the area is diverse, with opportunities spanning education, retail, and industrial sectors. Future planning aims to enhance local services, improve connectivity, and create a well-integrated community that balances urban development with environmental considerations.

A workforce assessment has been completed for the Project to support workforce planning and management for the delivery of THNEI, while also identifying workforce opportunities.

# Appendix 1 - List of Protected Areas Project interfaces with:

The following table lists state or commonwealth protected environmental areas that the that the project interfaces with.

| Protected Area | Proximity | Potential interface |
|---|---|---|
| Bush Forever Site 13 (State Planning Policy 2.8) | Intersects and adjacent to project area. | The project intersects with 0.17 ha of Bush Forever Site 13. This area consists of:<br>• 0.04 ha of *Jacksonia* tall open shrubland over *Regelia*, *Xanthorrhoea* and *Macrozamia* in 'Completely Degraded' condition<br>• 0.13 ha of C1 *Corymbia* (Marri) open forest over *Xanthorrhoea* spp. over *Hypolaena* and *Lomandra* spp. In 'Good to Degraded' condition. |
| Class A Nature Reserves 46919 and 46875 - 'Lexia Wetlands' (Conservation and Land Management Act 1984)<br><br>Bush Forever Site 300 (State Planning Policy 2.8) | 480 m south of project area. | The project is not expected to have any impact on this area. |
| Conservation Category Wetland UFI 8798 | 20 m west of project area. | The project is not expected to have indirect impacts on this area. The wetland is adjacent to an area where development already occurred for the existing Tonkin Highway drainage and there is limited construction proposed. |
| Conservation Category Wetland UFI 8798 | 4 m east of project area. | The project is not expected to have indirect impacts to this wetland.<br>Construction in proximity of the wetland is limited to areas that have previously been disturbed as part of construction of Tonkin Highway.<br>Existing drains that flows into this wetland will be modified but the project will ensure the water quantity and quality is maintained. |

# Appendix 2 - Protected fauna and flora species and habitat

The following list identifies significant flora/vegetation, fauna, ecological communities or habitat that were recorded within the project area by the Tonkin Highway North Ellenbrook Interchange Options Biological Survey completed by Biota in 2025.

Protected flora species:

- No protected flora species were identified in the project area.

Protected fauna species:

- Forest Red-tailed Black Cockatoo (Calyptorhynchus banksii naso) – Vulnerable (WA and Commonwealth)
- Carnaby's Black Cockatoo (*Zanda latirostris*) – Endangered (WA and Commonwealth)

Protected Ecological Communities

- No protected ecological communities were identified in the project area.

Protected Habitat

- Foraging and breeding habitat for the following Black Cockatoo species:
    - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – Vulnerable (WA and Commonwealth)
    - Carnaby's Black Cockatoo (*Zanda latirostris*) – Endangered (WA and Commonwealth)

# Appendix 3 – List of Stakeholders to the Project

| Stakeholder |
|---|
| **Federal Government**<br>• Federal Minister for Infrastructure, Transport and Regional Development |
| **State Government**<br>• Minister for Transport |
| **Government Agencies**<br>• Public Transport Authority (PTA)<br>• Department of Transport and Major Infrastructure<br>• Environmental Protection Authority<br>• Department of Planning, Lands and Heritage<br>• Department of Fire and Emergency Services (FESA)<br>• Development WA<br>• Department of Biodiversity, Conservation and Attractions (DBCA)<br>• Department of the Environment (Federal)<br>• Service providers e.g., Water Corp, Western Power, NBN Group, ATCO |
| **Other Emergency Services**<br>• St John Ambulance<br>• FESA<br>• DFES<br>• WA Police (WAPOL) |
| **Local Government**<br>• City of Swan |
| **Businesses**<br>• **TBC** |
| **Local resident organisations**<br>• Ellenbrook Community Collective |
| **Special interest groups (environmental)**<br>• Urban Bushland Council<br>• Wildflower Society of Western Australia<br>• Conservation Council<br>• Various Friends of City of Swan Groups.<br>• Bullsbrook Bridle Trail/Landcare Group |
| **Residents adjacent (including tenants) Landowners**<br>Landowners directly impacted by the interchange location as well as within the prescribed locality. |
| **Active Transport**<br>• Westcycle |
| **Developer Technical Advisory Group**<br>• Department of Lands Planning and Heritage – Mathew Selby<br>• Department of Lands Planning and Heritage – John Gildenhuys<br>• Main Roads Representative – Gary Manning<br>• Abadeen (formerly Lend Lease) – Scott Vanson<br>• Parcel Property – Ryan Hunter<br>• Satterley- David Williams<br>• Stockland – Tom Barry<br>• Wolfdene – Mitch Brown |

| Stakeholder |
| --- |
| **Developers**<br>• Satterley<br>• Stockland<br>• Parcel Property<br>• Abadeen (formerly Lendlease)<br>• Wolfdene |
| **Road and regional users** |

# Appendix 4 – Glossary of Terms

| Term | Definition |
|---|---|
| CSE | Communications and Stakeholder Engagement |
| DEI | Diversity, Equity and Inclusion |
| D&C Contract | Design and Construct Contract |
| DFES | Department of Fire and Emergency Services |
| DPLH | Department of Planning, Lands and Heritage |
| DWER | Department of Water and Environmental Regulation |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| EMS | Environmental Management System |
| EOI | Expression of Interest |
| EPA | Environmental Protection Authority |
| EPBC Act | Environment Protection and Biodiversity Conservation Act |
| GHG | Greenhouse Gas |
| GRI | Global Reporting Initiative |
| ILUA | Indigenous Land Use Agreement |
| ISAP | Infrastructure Sustainability Accredited Professional. |
| ISC | Infrastructure Sustainability Council |
| IS Rating | Infrastructure Sustainability Rating |
| MCA | Multicriteria assessment |
| MRWA | Main Roads Western Australia |
| OMTID | Office of Major Transport Infrastructure Delivery |
| PEC | Priority Ecological Community |
| RAP | Recycled Asphalt Pavement |
| RFP | Request for Proposal |
| RIWI Act | Rights in Water and Irrigation Act 1914 |
| SCM | Supplementary Cementing Material |
| SPUI | Single Point Urban Interchange |
| SWTC | Scope of Works and Technical Criteria |
| TEC | Threatened Ecological Community |
| THNEI | Tonkin Highway North Ellenbrook Interchange |
| ULDF | Urban and Landscape Design Framework |
| UN SDGs | United Nations Sustainable Development Goals |
| WA | Western Australia. |
| WAPC | Western Australian Planning Commission |