



Australian Government



mainroads
WESTERN AUSTRALIA

BUILDING OUR FUTURE



Great Northern Highway Muchea to Wubin Stage 2 Upgrade: Annual Project Sustainability Report 2020

This annual report covers the period from July 2019 to June 2020. A previous annual sustainability report was prepared for the project for 2014/15, 2015/16, 2016/17, 2017/18 and 2018/19 financial years.

Dana Jump (+61 8 9469 5025) - Sustainability Lead for the project at the time of reporting and the point of contact for information pertaining to this report.

James Nelson (1800 820 366) - Communications Manager for the project and the point of contact for broader project queries.

About this Report

This report has been prepared by the Great Northern Highway Muchea to Wubin Stage 2 Upgrade (GNHM2W) (the project) Integrated Project Team (GNH IPT) on behalf of Main Roads Western Australia (Main Roads). This report forms part of Main Roads' annual sustainability reporting which is integrated into its Annual Report. Material topics reported in this report have been determined through a materiality process that adheres to Infrastructure Sustainability Council of Australia (ISCA) Design and As Built Infrastructure Sustainability (IS) Rating v1.2 framework.

This report outlines the environmental, economic, and social aspects relating to the project, and their performance over the last financial year. Each section outlines the aspect's relevant objectives and targets, their general initiatives, and their initiatives over the past financial year.

Introduction

The project comprises a program of works to upgrade sections of the existing Great Northern Highway (GNH) to improve road safety, increase freight efficiency, improve network reliability, enhance travel wellbeing, contribute to sustainable and viable communities, and enhance the environment. Sustainability has been incorporated into the project by identifying key priority areas in safety, ecology, community and resourcing during the planning stage of the project. This has included incorporating efficiencies into the design, developing and implementing sustainability clauses for construction contracts, trial of Aboriginal employment targets, engagement with local communities and investing in local businesses during the construction phase.

The project is registered with ISCA as a program of works for an IS rating for both the Design and As Built phases. These IS ratings will incorporate each of the individual construction contracts (also termed packages) delivered under the project. The project is the first registered IS rating for Main Roads that is applying the IS rating framework to 'construct only' contracts as part of an overall program of works. The project achieved an 'Excellent' ISCA rating for Design and the final As Built rating is on schedule for submission in early 2021.

An overview of the project packages and their progress at the time of reporting is provided in Table 1 below.

Table 1 Overview of the Project Packages and their Current Progress Status

Package	Contract Number	Progress Status
New Norcia Bypass	WP06/CN01	Construction completed 2016. Final completion May 2017.
Miling Straight	WP09/CN02	Construction completed 2017. Landscaping undertaken in the 2018/19 financial year.
Pithara	CN04	Construction completed June 2019
Miling Bypass	CN05	Construction completed April 2019

Package	Contract Number	Progress Status
Muchea North	CN03	Construction completed 2020.
Dalwallinu to Wubin	CN06	Construction deferred except for Wubin Town Works.
Walebing	CN07	Construction commenced November 2019. Expected completion December 2020.

Highlights

Key sustainable highlights for the 2019-2020 year include:

An 'Excellent' Design rating was achieved, with a score of 52 points from ISCA. The project is the first Main Roads regional project to achieve an ISCA sustainability rating.

The project is achieving >99% non-potable water use for all layers of the road construction, where typically potable water is required and used. The water is being sourced from groundwater bores and natural soaks of varying quality and blended to match the water quality requirements for construction. This saves precious drinking water from being used for construction.

Aboriginal Participation initiatives are delivering results. This financial year Muchea North construction package has proceeded with a significant component of the works awarded to an Aboriginal owned business under an incentivised sub-contracting arrangement. The Dadaru Garli Joint Venture (DGJV) is sub-contracting to the main Contractor and is responsible for the construction of works to the value of approximately \$6.3 million. The incentivised sub contract arrangement replaces the contractual targets and incentives originally tendered on the package and is providing significantly greater economic and employment outcomes than planned. Further, Tyrelle Davis, a trainee on two GNH packages, was nominated for 'Trainee of the Year' by Nudge. Starting her traineeship on Pithara with Highway Construction/Albem Operations Joint Venture (HAJV), Tyrelle has completed a Certificate III Civil Construction Traineeship over two construction packages on the GNH project. In 2018 her work crew at Pithara was awarded 'Work Crew of the Year' by Nudge for as recognition of their commitment and focus to Aboriginal training and employment through their supportive approach toward trainees.

The sustainability highlights are listed in Table 2 below.

Table 2 2019-2020 Sustainability Highlights for the Project

Highlight	Highlight details
IS Design Rating delivered	Achieved an 'Excellent' rating
Replacing 20% (as a minimum) of potable water use demand with suitable quality non-potable water sources.	Achieving >99%
Aboriginal Enterprise Spend (to date – local and non-local)	\$15,704,631
No. of Aboriginal development employees and apprentices on the project	7

Overview

In 2014, the Australian and Western Australian governments announced that detailed planning was underway for a \$384.75 million upgrade of the 218 km section of Great Northern Highway (GNH) between Muchea and Wubin. An additional \$29.8 million was funded separately for the New Norcia Bypass. The Great Northern Highway Muchea to Wubin Stage 2 Upgrade (GNHM2W) project is a planning, design and construction program being delivered collaboratively by an Integrated Project Team (IPT), comprised of Main Roads and industry partner, the Arup Jacobs Joint Venture (ASJV).

The project is a program of works that has prioritised a series of road upgrade packages over a 218km stretch through the Western Australian Wheatbelt, with several of these construction packages already completed or underway. The scope of the GNHM2W includes contract packages for upgrades for New Norcia Bypass, Miling Straight, Miling Bypass, Pithara, Muchea North, and Walebing. Construction for Dalwallinu to Wubin has been deferred except for Wubin town works.

Key stakeholders have been identified for this project and are listed in Appendix 3.

This program of works will improve road safety, increase freight efficiency, improve network reliability, enhance travel wellbeing, contribute to sustainable and viable communities and enhance the environment. The GNH IPT has outlined objectives for the project's success. These are listed in Table 3 below. In delivering these objectives, the GNH IPT and construction contractors are pursuing sustainable and environmentally sensitive initiatives that achieve the best value for money and meet community expectations.

The sustainability focus for the 2019-2020 financial year has primarily been to support contractors to execute sustainability on site during construction to meet the GNH project objectives and effectively contribute to an IS As Built Rating. This was a busy year, with the project achieving an 'Excellent' Design rating from ISCA, as well as seeing the completion of Muchea North construction contract, and Walebing contract being executed.

Table 3 Project Objectives

Objective	Indicator
Improve road safety	Safer route that reduces the risk of death, serious injury and damage
Increase freight efficiency	Increased efficiency in terms of vehicle loads (mass and size) and reduced delays for all traffic
Improve network reliability	Improved reliability with more consistent and predictable travel times and improved network access
Enhance travel wellbeing	Improved roadside amenities for rest and driver information
Contribute to sustainable and viable communities	Balance community concerns against the economic, community safety and network access issues
Enhance the environment	Undertake practices to help retain and enhance the environmental values of roadsides

The project webpage can be found at www.m2w.com.au.

Overall approach to Sustainability

The project's sustainability strategy recognises and aligns with the Main Roads' Sustainability Policy and the GNHM2W project objectives (**Table 3**).

The GNHM2W project objectives were used in early project planning to identify key areas of focus. From this early planning the GNH IPT developed a Sustainability Management Plan. Across program delivery, from planning through design and construction, the GNHM2W project has focussed on achieving sustainable outcomes through:

- Incorporation of efficiencies into design and material selection;
- Achieved environmental outcomes through road alignment selection and corridor revegetation strategy;
- Developing and implementing sustainability clauses for construction contracts;
- Trialling of Aboriginal employment and business-spend targets;
- Engagement with local communities; and
- Investing in local businesses during the construction phase.

The final As Built rating is on schedule for submission in early 2021. At the time of writing, five construction packages have been completed, and a sixth construction package is under construction.

Environmental Aspects Performance

This section details the project's environmental performance including any relevant objectives, general initiatives, and initiatives over the past financial year. The highlighted environmental aspects for the project this year were:

- Enhancing the Environment - Undertake practices to help retain and enhance the environmental values of roadsides'
- Contributing to sustainable and viable communities
- Reducing the project's carbon emissions
- Reducing haulage distances

Overview of environmental aspects at a glance

Table 4 Environmental Aspects at a glance

Environmental aspect	2019-2020	Total to-date for Project
Planned native vegetation clearing (ha)	None	117.8
Actual native vegetation clearing (ha)	8.1	90.14
Rehabilitation/revegetation planned (ha)	None	423.61
Actual rehabilitation/revegetation (ha)	None	392.9
Environmental offset via monetary contribution actual (\$)	0	255,372
Total Water Consumption to date (kL)	101,935	622,620
Total GHG emissions (scope 1 & 2) (t CO ₂ -e)	3,801	18,721
Total energy consumption (MJ)	53,076,530	263,435,506
Total quantity of recycled content used in project (t)	None	67,761
Total imported materials used in project (t)	367,135	2,853,502
Total waste generated by project	671.1	213,176.62

Environmental context

The project area has historically been subject to high rates of vegetation clearing, primarily for agricultural purposes. Remnant vegetation in this region is, therefore, of an elevated ecological value and the ecological communities present are protected by both State and Commonwealth legislation; the Biodiversity Conservation Act 2016 (BC Act) and the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) respectively. Some clearing of this remnant vegetation has been required for the Project. However, impacts have been minimised during the planning stage. EPBC Act and BC Act listed flora and fauna species and ecological communities that will be impacted by the Project are listed in Appendix 1.

The GNH is also adjacent to a number of protected areas including State managed reserves that are listed in Appendix 2.

The highway spans a number of waterways that are not expected to be impacted by project works. Beds and Banks permits have been obtained from the Department of Water and Environmental Regulation (DWER) for areas located within proclaimed water source areas. This includes the Muchea North, Miling Straight, and Pithara packages.



Figure 1 Pithara typical water soak

Environmental Management

The importance of environmental management to the project is reflected by the project objective of 'Enhance the Environment - Undertake practices to help retain and enhance the environmental values of roadsides'. Environment is a key component of the project delivery structure and an integral part of the design development.

During 2019-2020 construction contractors were subject to environmental and sustainability contractual specifications that required management measures to be undertaken to meet environmental legal obligations and implement efficiency measures to reduce energy, water, materials, and waste footprints. The contractors had submitted Environmental Management Plans and Sustainability Management Plans for review and approval prior to commencement of work. The contractors were audited by GNH IPT on behalf of Main Roads to ensure compliance to the specifications and management plans. Contractors were also required to undertake weekly

inspections and internally audit their performance for both environment and sustainability onsite.

Water Management

By aligning to the GNHM2W project objective to 'contribute to sustainable and viable communities', contractors are required to scope and implement water efficiency and non-potable water initiatives. Contractors reported monthly on their water usage, including sources of water for their contract.

Water balance estimates were completed by GNH IPT for each contract, to establish a benchmark and reference case from which to measure contractor improvement of water use. The main water uses on the project are:

- Embankment construction
- Pavement construction; and
- Dust suppression.

The water balance calculations were provided to contractors to inform their water use and planning for water efficiency in the construction phase. During construction in 2019-2020, 101,935,121 litres of water was used on the project.

Construction water sources and consumption for each of the packages are summarised in Table 5 below.

Table 5 Volumes of Water Used (litres) by Each Package from Various Water Sources

Water Source	Package	2019-2020 (L)	Total for project (L)
Water purchased from the scheme in litres	New Norcia Bypass	N/A	513,000
	Miling Straight	N/A	202,000
	Pithara	N/A	2,379,000
	Miling Bypass	N/A	101,000
	Muchea North*	N/A	N/A
	Walebing	121	121
Groundwater: water pumped from bores in litres	New Norcia Bypass	N/A	82,914,000
	Miling Straight	N/A	144,430,000
	Pithara	N/A	94,213,000
	Miling Bypass	N/A	87,350,000
	Muchea North	11,061,000	70,786,000
	Walebing	0	0
	New Norcia Bypass*	N/A	N/A

Water Source	Package	2019-2020 (L)	Total for project (L)
Surface water: water pumped from rivers, lakes or harvested in litres	Miling Straight	N/A	37,051,000
	Pithara*	N/A	N/A
	Miling Bypass*	N/A	N/A
	Muchea North	44,115,000	55,922,000
	Walebing	46,759,000	46,759,000

*Water source not utilised for this package.

Carbon Emissions & Energy

A carbon footprint has been estimated for the project prior to construction of the packages based on the road design, materials selection and source, construction equipment emissions, vegetation clearing, road operations and maintenance over a 50-year asset life.

The GNH IPT and construction contractors have sought to reduce carbon emissions and energy use across the asset lifecycle through three key areas of focus:

1. Increased freight efficiency through design: Improving freight efficiency through road design will have the flow on effect of reducing emissions associated with freight movements for the life of the asset. The design of each project package aims to achieve reductions in operational carbon emissions and energy use by designing for a maximum desirable grade of 3% over longer uphill distances, which improves road user fuel efficiency
2. Minimisation of vegetation clearing: a significant focus on minimising vegetation clearing during the design of the project has reduced the amount of carbon loss that results from vegetation removal during construction
3. Construction contractor initiatives: energy reduction initiatives have been identified by contractors during the construction phase to reduce their energy footprint. These include:
 - o Reducing the impact of their materials by reducing haulage distances
 - o Choosing work camp locations close to site and carpooling
 - o Choosing energy sources with less emissions such as higher quality diesel, and grid electricity over diesel generators
 - o Selecting construction methods that improves construction efficiency

At the end of construction of all of the packages, the carbon footprint will be recalculated based on the energy consumed during construction, the final as built road design, and the traffic forecast. During the 2019-2020 financial year, 53,076,530 MJ was used for the project.

The energy consumed during construction of the project to date is summarised in Table 6.

Table 6 Energy Use by Each Package (MJ)

Source	Construction Package	2019-2020	Total for project
From fuel (MJ)	New Norcia Bypass	N/A	30,056,807
	Miling Straight	N/A	89,579,638
	Pithara	N/A	42,749,423
	Miling Bypass	N/A	45,548,074
	Muchea North	30,383,415	32,279,018
	Walebing	22,540,167	22,540,167
From electricity (Grid) (MJ)	New Norcia Bypass	Diesel generation (included in fuel use above)	
	Miling Straight	N/A	214,132
	Pithara	Diesel generation (included in fuel use above)	
	Miling Bypass	N/A	267,955
	Muchea North	146,689	194,033
	Walebing	6,259	6,259

Clearing

A key environmental success of the GNHM2W project has been the integration and consideration of environmental values in selecting preferred upgrade alignment options. The project has achieved a smaller native vegetation clearing footprint and reduced levels of impact to key biodiversity values such as Carnaby's black cockatoo habitat.

The native vegetation clearing statistics to-date for the project are listed in Table 7 below.

Table 7 Native Vegetation Clearing Statistics for the Project

Site	Total clearing to-date (ha)
New Norcia Bypass	0.36
Miling Straight	18.85
Pithara	4.72
Miling Bypass	9.48
Muchea North	49.49
Walebing	7.24

Materials & Recycling

Due to the regional location of the construction sites, sourcing of construction materials is a key consideration for the project. Reducing haulage distances through choosing locally sourced materials is an important sustainability focus for GNHM2W.

Contract specifications require contractors to assess opportunities to improve their materials footprint by selecting different material types and material sources and reducing haulage of materials. Construction contractors have developed initiatives to source materials locally to reduce haulage distances. Some of these initiatives undertaken in 2019-2020 include:

- Muchea North – The contractor sourced recycled crushed rock and recycled fencing to build their temporary site offices.
- Walebing – Multiple sources were investigated, and pavement and fill material are being sourced within approximately 5km of Walebing site boundary.

In 2019-2020, the project imported a total of 3,66,931t of material for construction. A breakdown of the materials is below in Table 8.

Table 8 Materials Use for Each of the Construction Packages by tonne

Material	Construction Package	2019-2020	Total for project
Sand (t)	New Norcia Bypass	N/A	381,400
	Miling Straight	N/A	232,332
	Pithara	N/A	94,457
	Miling Bypass	N/A	108,944
	Muchea North	0	0
	Walebing	65	65
Gravel (t)	New Norcia Bypass	N/A	145,600
	Miling Straight	N/A	534,448
	Pithara	N/A	414,270
	Miling Bypass	N/A	367,457
	Muchea North	245,544	353,058
	Walebing	115,865.2	115,865.2
Crushed Rock (t) (Recycled material)	New Norcia Bypass*	N/A	N/A
	Miling Straight*	N/A	N/A
	Pithara	N/A	63921

Material	Construction Package	2019-2020	Total for project
	Miling Bypass*	N/A	N/A
	Muchea North	0	1300
	Walebing	0	0
Aggregate (t)	New Norcia Bypass*	N/A	4,983
	Miling Straight	N/A	4,000
	Pithara	N/A	4,184
	Miling Bypass	N/A	1582
	Muchea North	0	0
	Walebing	839.6	839.6
Asphalt	New Norcia Bypass	N/A	100
	Miling Straight*	N/A	N/A
	Pithara*	N/A	N/A
	Miling Bypass*	N/A	N/A
	Muchea North	204	204
	Walebing	986.7	986.7
Concrete (t)	New Norcia Bypass	N/A	2340
	Miling Straight	N/A	3130
	Pithara	N/A	619
	Miling Bypass	N/A	1666
	Muchea North	159.2	492
	Walebing	502.8	502.8
Steel (t)	New Norcia Bypass	N/A	180
	Miling Straight*	N/A	N/A
	Pithara	N/A	25
	Miling Bypass	N/A	72
	Muchea North	0	0

Material	Construction Package	2019-2020	Total for project
	Walebing	105	105
Precast concrete (t)	New Norcia Bypass ⁺	N/A	N/A
	Miling Straight	N/A	1,963
	Pithara	N/A	587
	Miling Bypass	N/A	1297
	Muchea North	271	1153
	Walebing	670	670
Emulsion (t)	New Norcia Bypass ⁺	N/A	N/A
	Miling Straight	N/A	154
	Pithara	N/A	209
	Miling Bypass [*]	N/A	N/A
	Muchea North	0	0
	Walebing	1.3	1.3
Bitumen cutter (t)	New Norcia Bypass ⁺	N/A	N/A
	Miling Straight	N/A	98
	Pithara	N/A	1
	Miling Bypass	N/A	99
	Muchea North	0	0
	Walebing	6.6	6.6
Bitumen (t)	New Norcia Bypass	N/A	479
	Miling Straight	N/A	383
	Pithara	N/A	184
	Miling Bypass	N/A	186
	Muchea North	0	0
	Walebing	95.3	95.3
	New Norcia Bypass ⁺	N/A	N/A

Material	Construction Package	2019-2020	Total for project
Cement Stabiliser (t)	Miling Straight ⁺	N/A	N/A
	Pithara	N/A	2196
	Miling Bypass	N/A	2,142
	Muchea North (m ³)	273	923
	Walebing	1,342.4	1,342.4

Waste Avoidance

WA's Waste Avoidance and Resource Recovery Strategy 2030 applies the waste hierarchy, which is a tool to facilitate better waste management. At the top of the waste hierarchy is avoidance. Avoiding generating waste is a high priority for the project through design and construction. This was achieved on the project through the following design initiatives:

- Balancing the project cut/fill requirements in design;
- Using geotextile fabric to stabilise unsuitable (wet) ground conditions, and allow overlying road construction (avoiding excavation and disposal of unsuitable material);
- Revegetating old sections of road by leaving the old section of road in place, ripping and seeding the surface; and
- Retaining old sections of road for Shire and landowner access

Construction waste reduction initiatives for 2019-2020 included:

- Using lunch boxes, crockery and metal utensils instead of disposable items for site offices and crib rooms;
- Electronic solutions such as using iPads and software in the field for inspections, reporting daily activities etc; and
- Re-embroidering uniforms when the company branding changed.

Waste Recovery

Recovery sits below avoidance on the waste hierarchy. Recovery initiatives for the project diverted >78% of inert material (spoil, construction and demolition, and site office waste) from landfill disposal. These initiatives included:

- Reusing green waste on site as mulch during revegetation;
- Utilising spoil to rehabilitate borrow pits and other land surfaces on local landowner properties; and
- Demolition waste e.g. bricks, fencing etc, made available to the local community for reuse.

Over 514 t of waste was diverted from landfill in 2019-2020, as shown in Table 9.

Table 9 Construction Waste Date (t)

Waste to Landfill	2019-2020 (t)	Total for project (t)
Diverted	514.9	165,649.23
Not-Diverted	156.2	47,527.39

Environmental Case Study – Non-Potable Water Use

Due to the project region's scarce availability of water for construction, it was deemed necessary that water management strategies should be implemented to utilise non-potable water. For water to be considered acceptable for use during pavement construction it must meet the Main Roads specification 'Water to be used in Pavement Construction'. A key requirement of this specification is that water used during construction of the basecourse and sub-base layers of the pavement, does not exceed 3,000ppm Total Soluble Salts (TSS) (freshwater).

The water quality requirements for road construction in WA are outlined in Table 10.

Table 10 Allowable Total Soluble Salts (TSS)

Source	Allowable TSS ppm
Good Drinking Water	<1,000
Hard Water	<1,500
Fresh Water for Construction	<3,000
Stock Water	<5,000
Limit of Stock Water	<8,000
Sea Water	<30,000
Salt Lakes/Ground Water	<80,000
Water in Mines	<150,000

In order to avoid the use of large quantities of WA's limited potable fresh water for construction, contractors challenged the Main Roads specification. Contractors on Pithara looked to relax the requirement for potable water use. The use of non-potable fresh water <3,000ppm TSS for basecourse and non-potable saline water <8,000ppm TSS for sub-base was proposed.

Following this, the construction contractors proposed the initiative to achieve the specifications required for construction of the basecourse and sub-base layers of the road by diluting saline groundwater with fresher non-potable water. As a result, the contractors were able to successfully utilise local non-potable water sources to create 'fit for use' water.

At Milling Straight, rain-fed turkey nest dams were topped up with saline water in order to satisfy the Main Roads construction specifications. This resulted in the avoidance of precious potable water and reduced costs associated with using Water Corporation infrastructure.

At Pithara, a bore was intercepted in order to top up an unused Water Corporation dam, containing untreated but freshwater, with saline water. In this case Water Corporation infrastructure was used; however, no licenses or permits were required. This again resulted in the avoidance of precious potable water.

Over the life of the project, over 50,000 kL of saline water was diluted with fresh non-potable water to meet the required specifications for the sub-base and basecourse layers of pavement construction.

Economic Aspects Performance

This section details the project's economic performance including any relevant objectives, general initiatives, and initiatives over the past financial year. The highlighted economic aspects for the project this year were:

- Upgrade the National Highway Network;
- Improve freight efficiency (including catering for 53.5m vehicles);
- Local job creation; and
- Opportunities for Aboriginal enterprises, and local contractors and businesses.

At a glance

Table 11 Economic Highlights

Economic Aspect	2019-2020	Total for Project
Funding	\$48,734,606.63	\$335,900,000
Aboriginal Enterprise Spend	\$13,060,155	\$16,032,558

Economic context

Throughout the past financial year, the project has provided opportunities for multiple suppliers, subcontractors and businesses to be engaged in delivery, including:

- Major construction work management and delivery;
- Minor construction work management and delivery (such as fencing or service relocation);
- Supply of materials, plant and equipment;
- Office support services (e.g. printing, catering); and
- Construction support services (e.g. waste management).

Delivery of the main construction phases of the project is being undertaken via the procurement and execution of individual construct only contracts using the Main Roads Major Works (AS2124) contract model. A Sustainable Procurement Initiative (SPI) has been established by the GNH IPT where local suppliers have been able to register their services. The GNH IPT has also been delivering a program of 'early works' managing smaller construction lead items such as service relocations, fencing and farm accommodation works. This has increased local engagement, with local contractors identified through the SPI having been invited by the GNH IPT to tender for early works scopes.

The project has also focused on increasing engagement of Aboriginal businesses, both local and non-local. Aboriginal Business Spend targets have been incentivised in the Major Works contracts for each package.



Figure 2 Pithara Gold Mine

Sustainable Procurement and Buy Local

The WA Buy Local Policy aims to generate economic growth within WA through a requirement for government agencies to consider local content in projects in excess of \$750,000. By adopting this and implementing a sustainable procurement approach through the SPI, the project has prioritised sourcing local products and services. This has included suppliers not just from within WA, but from the local communities neighbouring the project packages. As shown in Table 11 above, in excess of \$13 million has been invested in local Aboriginal businesses by the project in the 2019-2020 financial year alone.

Economic Initiatives

Construction contractors are constantly encouraged to seek and propose initiatives that could have economic benefits for those communities local to the project. These initiatives are also taken into consideration for the program's IS rating with ISCA. Contractors regularly explore new opportunities for utilising local resources such as labour, plant, and materials.

Examples of local business engagement/opportunities on the project during the 2019-2020 financial year include:

- Use of local haulage companies;
- Use of local concrete suppliers;
- Use of natural gravels sourced from local landowners rather than importing crushed rock; and
- Purchase of water from local landowners and licenced bore holders.

Aboriginal Enterprise

Each of the construction contracts includes targets (see Table 12) for Aboriginal business spend, which aim to increase local Aboriginal business expenditure on the project. These targets have been tailored to each contract (and their associated local communities) and have evolved based on the feedback received and lessons learnt during the execution of previous contracts.

Table 12 Targeted Aboriginal enterprise spend

Package	Total Targeted Aboriginal Business Spend	Total Targeted Local Aboriginal Business Spend
Miling Straight	5%-10%	2%-8%
Pithara	Minimum spend \$350,000	Minimum spend \$250,000
Miling Bypass	Minimum spend \$350,000	Minimum spend \$250,000
Muchea North	Minimum spend \$350,000	Minimum spend \$250,000
Walebing	2%	2%^

This financial year Muchea North construction package was completed with a significant component of the works awarded to an Aboriginal owned business under an incentivised sub-contracting arrangement. DGJV is sub contracted to the main Contractor and is responsible for the construction of works to the value of approximately \$6.3 million. The incentivised sub-contract arrangement replaces the contractual targets and incentives originally tendered on the package and is providing significantly greater economic and employment outcomes than planned.

As shown in Table 13 below, in excess of \$16 million has been spent on Aboriginal business services across the project. In excess of \$13 million was spent in the 2019-2020 financial year alone.

Aboriginal participation targets for increasing the number of local and non-local Aboriginal persons employed on the project are discussed in further detail in the Social Aspects Performance section.

Table 13 Aboriginal business spend

Package	Total Actual Aboriginal Business Spend	Total Actual Local Aboriginal Business Spend
Miling Straight	3.04%	2.12%
Pithara	\$602,487	\$430,629
Miling Bypass	\$849,630	\$722,993
Muchea North		\$12,027,697
Walebing	12.0%	1.0%
		\$1,399,122

Sustainable Transport

There is limited public transport and no public rail infrastructure within the project Area. This is largely due to the remote location of the GNH. Where there are public transport facilities opportunities have been taken to increase user accessibility. This includes a regional bus parking area in Pithara and the incorporation of existing informal school bus stopping areas into the Muchea North alignment (with appropriate pull-off distances and turn-around areas where necessary). Footpaths have also been upgraded within several towns as part of the project, and pedestrian access and a scenic outlook have been incorporated into the New Norcia Bypass package.

On the project, the construction contractors have utilised and/or upgraded local camp sites and other accommodation facilities in proximity to work sites during construction. This supports local business, increases local amenity, reduces travel time to project sites, and reduces resource

consumption and clearing needed to establish new accommodation. In addition, contractors have been encouraged to consider carpooling initiatives to reduce the number of vehicles travelling to site.

Economic Case Study – Aboriginal Enterprise Spend

Targets and incentives for construction contractors were developed in the early planning phase for each package to ensure Aboriginal enterprises were engaged on the Project. Targets were developed in collaboration with not for profit, purpose charity Nudge, who conducted a demographic consultation with local Aboriginal communities to identify the skill base available. This consultation informed the targets used for the contracts.

As there are six work packages, there has been opportunity to trial a variety of contractual delivery mechanisms to gauge the influence of incentives on contractors to achieve Aboriginal Participation targets, including:

1. An incentive scheme, with no pain for not achieving the targets.
2. Pain/gain system for meeting (or not meeting) targets.
3. Incentive introduced for contractors that achieve levels beyond the mandated participation level (to upper limit)
 - o A minimum level for employment and businesses (in FTE equivalent / \$ of sub-contract value) mandated; and,

Aboriginal Participation is monitored during the delivery of each package against the contractual targets. The contractors are audited for contractual compliance. The contractors report to the Superintendent monthly. Review of this data allows the IPT the opportunity to flag to the Superintendent if performance against the contract is slipping. This monitoring demonstrates Main Roads' commitment to sustaining local Aboriginal economic growth.

The final two packages, constructed in the 2019-2020 financial year, are far exceeding the targets set. The Muchea North construction package is particularly noteworthy, demonstrating outstanding success. The construction package proceeded with a significant component of the works awarded to an Aboriginal owned business under an incentivised sub-contracting arrangement. The DGJV is sub contracted to the main contractor and is responsible for the construction of works to the value of approximately \$6.3 million.

Social Aspects Performance

This section details the project's social performance including any relevant objectives, general initiatives, and initiatives over the past financial year. The highlighted social aspects for the project this year were:

- Addressing community concerns
- Improving road safety
- Promoting workforce diversity across the project
- Engaging Aboriginal contractors and employees

At a glance

Table 14 Social Aspects Performance at a Glance

Social Aspect	Total for project
Number of HSE incidents	38
% Aboriginal Workforce	16%
% Local Aboriginal Workforce	9%
No. of Aboriginal development employees and apprentices on the project	7 trainees
% Women gender representation	16%

Social context

The project spans a number of communities and towns along its 218km length. These communities range from the smaller land holdings and mixed agricultural businesses surrounding Bindoon at the southern end of the alignment (approximately 60km from Perth) to communities surrounded by broadacre pastoral and cropping properties at the northern end of the alignment. The project area extends across five Local Governments; Shire of Chittering, Shire of Moora, Shire of Gingin, Shire of Victoria Plains and Shire of Dalwallinu. The various communities within the vicinity of the project area vary greatly with regard to employment opportunities, community demographic, type of work found locally, concern for the environment and desire to upgrade the GNH. An indicative list of community stakeholders is provided in Appendix 3.



Figure 3 Emergency services training at Pithara

Community & Stakeholder Engagement

Consultation and stakeholder engagement is vital to all public infrastructure projects. As such, early consultation was undertaken for the project with a number of stakeholders to obtain input and feedback to inform the initial corridor alignment review and planning activities. The purpose of many of the early consultation activities was to identify issues of importance to the community and other stakeholders.

A project wide communication and stakeholder management strategy has been implemented. This identifies key stakeholders and communication strategies, as well as mitigation strategies for stakeholder risk. In addition to a regularly updated webpage (available at: <https://project.mainroads.wa.gov.au/home/gnhmucheatowubin/Pages/about.aspx>) detailing key project objectives, milestones and progress, regular updates are provided to different communities along the alignment through development of brochures, council meetings, and targeted stakeholder meetings.

The type of engagement processes has evolved significantly over the length of the project as different construction packages have progressed from concept, to design, to construction and ultimately to completion and handover. Accordingly, different community groups across the length of the project area have widely different expectations for communications depending on the status of the road upgrades in the vicinity of their communities.

Addressing community concerns

During the design of the road for each of the packages, the GNH IPT worked closely with the local communities to understand their concerns and listen to their ideas. The GNH IPT has collaborated with the local community and the Shires, to identify opportunities for improving town infrastructure, including additional roads, footpaths, community parks and other facilities being proposed and upgraded.

Issues raised by the community and stakeholders have been considered as part of the design process. A key concern raised by the communities adjacent to the project area was the continued viable access to the GNH by the community, which has been addressed by careful consideration of the placement of intersections and driveways along the alignment to facilitate ongoing farm vehicle and stock movements. Other impacts which were considered in planning and design include reducing the number and impacts of land severance, accommodation works undertaken to replace affected infrastructure, protection or replacement of government and privately-owned utilities and services and planning for changes of access to properties and towns. Ongoing liaison continues with all stakeholders (landowners, local shires, government agencies) to make sure that individual impacts are minimised during design and construction.

Heritage

The GNH IPT engaged with the Whadjuk and Yued Traditional Owners through the South West Aboriginal Land and Sea Council (SWALSC). The SWALSC coordinated claimant group meetings throughout the project. Topics discussed at these meetings and engagement sessions reflect common issues raised by the traditional owners for development projects, including:

- The preservation of documented heritage sites;
- Opportunities for indigenous advancement through contracting and work opportunities;
- Participation in heritage studies;
- Section 18 approvals process/progress; and

- Project updates and progress reports.

This past financial year, an Aboriginal Heritage Management Plan (AHMP) has been established to streamline the engagement of heritage monitors during construction of the Walebing package (for ground disturbing activities in proximity to the Walebing Reserve).

The objective of the AHMP is to facilitate collaborative relations between Main Roads, contractors engaged by Main Roads (including utility providers) and the native title claimant group for the area being the Yued people, clearly define all areas that shall be marked as exclusion zones and those subject to active monitoring during construction.

Aboriginal monitors were engaged by the Contractor following consultation and nomination by SWALSC. Monitors were engaged and managed by both the main Contractor and by heritage service provider Archae Aus who managed the monitoring associated with the utility's component (Telstra and Western Power). Several artefacts and a potential burial site were identified during the monitoring activities and an archaeologist (Brad Goode and associates) was provided by Main Roads to work collaboratively with the Aboriginal monitors and review finds. None of the findings made were deemed to be of such a nature that would establish a site under the Heritage Act.

Road Safety

Safety in Design

Road safety is a key part of the project, as reflected by the project objective to 'Improve road safety'. Improving road safety has been an integral part of the planning and design phase, and a number of strategies and design approaches impacting road safety have been developed across the project. These include:

- Safety in Design workshops - these are held for each contract package at three stages of the design phase (15%, 85% and 100%);
- Constructability workshops – these are held for each package to consider constructability aspects and potential design optimisation; and
- Road Safety Audits – these are undertaken at 15%, 85% and post construction and are a requirement for each package.

The specific safety design elements that have been adopted across the project include:

- Alignment improvements;
- Wide centreline treatment;
- Truck stopping bays/rest areas;
- Overtaking lanes;
- Pavement marking;
- Access to properties adjacent to GNH; and
- Stock crossings of GNH.

Workforce Safety

The project has a Health Safety and Environmental (HSE) Management Plan (MP) that applies to all activities and staff (including GNH IPT, contractors, sub-contractors etc.) involved in project delivery. Some of the key requirements of the HSE MP are that all parties have a designated project HSE representative, that weekly toolbox talks are held on safety, that regular safety forums are held (approximately every 6 months), and that Leadership Safety Walks are undertaken to observe safe

behaviours and encourage safety conversations. In addition, the HSE MP stipulates the need for an HSE audit schedule and details the incident management framework.

All members of the GNH IPT are represented and supported by formal health and safety committees through their respective parent organisations. Safety during construction works is managed by the construction contractor in accordance with the applicable Main Roads Major Works (AS2124 or NEC3) contract. This includes traffic management. Safety Stand-downs have also been held with the superintendents' and project manager's teams to raise overall awareness of safety on-site.

Driving is one of the most critical risks on the project and the GNH IPT have implemented procedures to ensure the safety of project personnel whilst driving to/from site and whilst driving onsite. Specifically:

- A project induction package for the GNH IPT is in use and construction contractors have developed site specific induction packages
- The 'Step Back' tool has been introduced to the GNH IPT for use on site for personal risk assessments.
- All journey management plans (JMPs) for GNH IPT staff must be reviewed by the GNH IPT Management;
- To combat driver fatigue there must be a minimum of two drivers for each vehicle; and
- Drivers must have emergency communication devices (e.g. satellite and Telstra phones).

General workforce safety themes that were focussed and reported on each month of 2019-2020 included:

- Jun 2020 Safe working practices
- Apr 2020 General awareness and clear communication
- Mar 2020 COVID-19
- Feb 2020 Bushfire awareness
- Dec 2019 Bushfire awareness
- Nov 2019 Defensive driving
- Oct 2019 General awareness and planning of works
- Sep 2019 General awareness and planning of works
- Aug 2019 Roadside hazards in work zones
- Jul 2019 Assessment of changing work tasks

A summary of IPT safety incidents that have occurred over the last year and the subsequent learnings are summarised below:

Table 15 Summary of IPT Safety Incidents 2019-2020

Month	Incident	Learning
September	Traffic accident. No injuries sustained.	
December	Muchea North end tipper trailer detached from chassis.	Report back on resulting actions implemented on site (i.e. rigorous plant

Month	Incident	Learning
		inspections)
December - January	Bushfire safety theme as eastern states suffered a catastrophic fire season	<ul style="list-style-type: none"> Decision to avoid fire-risk earthworks on hot, windy days Walebing contractor went through evacuation plan with staff at morning toolbox "Fire practice to survive a fire" guide was issued to all sites and project personnel Wool/burnover blankets investigated for all project vehicles
March	<p>Traffic Incidents:</p> <ul style="list-style-type: none"> Traffic Controllers allowed traffic in both directions on a single-lane contraflow after radio confusion as scheduled OSOMs traversed through the site. One group of traffic was corralled into a side road and traffic incident was avoided Member of Public approached a Stop/Slow point too fast and needed to take evasive action to avoid collision 	<ul style="list-style-type: none"> GNH safety messages have ensued regarding safety planning and vigilance when working near general traffic Acknowledgement that traffic controllers are the most at risk on the road upgrade jobs. Precise planning and care is required for them to safely perform their role
May	Fencing contractor struck live electrical service Muchea North	Found this could have been avoided if correct procedures were followed. Sub-contractor was stood down by the main Contractor. "Safe Working Practice" theme for GNH project initiated by Nigel Scott for June 2020
January - June	High blood alcohol level readings at Walebing/Wubin site	

Unique challenges for workforce safety were presented by COVID-19 and its impacts. Given the need to promote social distancing in an attempt to restrict spread of COVID-19, Main Roads, IPT and the roadworks contractors established their Business Continuity Plans in order to maintain operations. These include:

- Main Roads and IPT restricted the number of people travelling in site vehicles
- The need for site visits was carefully reviewed and where required, were achieved by performing mobile inspections from vehicles
- Contractors established staggered shifts and break times to maximise social distancing
- Meetings were held outside or via telephone/video conference

Community Amenity

A project-wide strategy was developed to incorporate aspects of community amenity such as providing rest areas and landscape designs which provide nature surveillance/lookouts, enhance the local landscape and providing inviting stopping/rest areas.

For the Pithara package, which was completed in the past financial year, the construction workforce was housed in facilities constructed adjacent to the existing Pithara Tavern. To accommodate the workers camp and site office, upgrades were made to the existing sewage system of the tavern to prevent overflow or disruption to the existing facilities. These upgrades serve to enhance the ongoing amenity of the existing facility.

The Pithara construction contractor ran a simulated emergency response exercise (see Figure 3) with the local fire, ambulance and police, most of which were volunteers. The simulated incident involved a loader driving into a public vehicle with four casualties requiring attention. The exercise took over an hour to cut the doors and roof of the vehicle and extract the "injured". The exercise was a great community event and was followed by a BBQ.

During bushfire season, the construction contractors have been able to assist with bushfire emergency response in areas adjacent to the project area by using their water trucks to supply water to fire trucks and firefighting units controlling bushfires.

Diversity

The GNH IPT has committed to promoting workforce diversity across the project. Two focus areas include increasing opportunities for Aboriginal people (both local and non-local), and for increasing gender representation for women.

Aboriginal Participation

Each of the construction contracts includes Aboriginal employment targets, which aim to ensure Aboriginal workers and trainees are hired and retained on the project. Table 16 outlines the targets and the project's performance against them.

Muchea North, which completed construction in the past financial year, have engaged DGJV as an incentivised sub contract to the main contractor. This arrangement replaced the contractual targets and incentives originally tendered for employment of local and non-local Aboriginal people. This arrangement is providing far greater employment opportunities than expected.

Further, GNH IPT was nominated for the Main Roads Managing Director's Award for Sustainability for Aboriginal Participation in 2016 and 2018, winning in 2016.

Table 16 Aboriginal Participation Targets and Performance

Package	Target Total Aboriginal Engagement	Actual Total Aboriginal Engagement	Target Total Local Aboriginal Engagement	Actual Total Local Aboriginal Engagement
Miling Straight	10-20%	13.9%	5%-15%	5.9%
Pithara	5 FTE	5 FTE & 2 trainees	3 FTE & 1 trainee	3.67 FTE & 2 trainees

Package	Target Total Aboriginal Engagement	Actual Total Aboriginal Engagement	Target Total Local Aboriginal Engagement	Actual Total Local Aboriginal Engagement
Miling Bypass	5 FTE	9.61 FTE & 2 trainees	3 FTE & 1 trainee	7.28 FTE & 2 trainees
Muchea North	5 FTE	48*	3 FTE	48*
Walebing	> 12%	26.0%	>5%	7.0%

*Refers to both full-time and part-time employees.

Specific employment statistics for each package for the 2019-2020 financial year are shown in Table 17 below.

Table 17 Project Workforce Statistics – Aboriginal Participation

Activity	Site	Total for project (%)
% Aboriginal Workforce	New Norcia Bypass	9%
	Miling Straight	14%
	Pithara	11%
	Miling Bypass	16%
	Muchea North	21%
	Walebing	26%
% Local Aboriginal Workforce	New Norcia Bypass	3%
	Miling Straight	6%
	Pithara	7%
	Miling Bypass	11%
	Muchea North	21%
	Walebing	7%

Gender Diversity

Indicatively, Engineers Australia have measured the engineering industry norm for women's gender representation as only 12%¹. Women's gender representation has varied across the various stages of the program cycle and within individual packages on the project. Table 18 below breaks down the different teams and % gender diversity by stage and package.

Over the life of the project (Planning, Design, Construction Execution), the GNH IPT has consistently

¹ *Diversity in Engineering: 12% of women is not enough*. Engineering Australia (2019). <https://www.engineersaustralia.org.au/News/diversity-engineering-12-women-not-enough>

performed well on gender balance within the team.

The representation of women in management/senior positions, while better than the industry benchmark, is still far from desired. The construction workforce is also lagging in gender diversity.

Table 18 Project Workforce Gender Diversity Statistics

Measure	Site	Total for project
% Women in Construction Workforce	New Norcia Bypass	8%
	Miling Straight	10%
	Pithara	9%
	Miling Bypass	6%
	Muchea North	5%
	Walebing	4%
% Women in Main Roads Site Management Teams	New Norcia Bypass ⁺	-
	Miling Straight ⁺	-
	Pithara	60%
	Miling Bypass	20%
	Muchea North	20%
	Walebing	33%
% Women in GNH IPT (Planning, Design and Construction Execution)	GNH IPT	45%
% Women in management / senior positions	GNH IPT	27%

⁺ Data not collected.

Workforce Development

All employees within the GNH IPT are part of the larger organisations of Main Roads, Jacobs or Arup. Through their respective home companies, 100% of personnel engaged in the GNH IPT have access to career development pathways, appraisals and training opportunities. In addition, training has been provided for specific project requirements (i.e. first aid course, 4WD course and NEC3 contract training).

Muchea North, Walebing, Miling Bypass and Pithara contractors have incorporated training programs to provide work opportunities to local Aboriginal people new to the workforce. These training programs are being delivered with the support of organisations such as Nudge and Midwest

Training Group. The program participants are mentored and supported by colleagues on the project, as well as the support organisations.

Case Study – Aboriginal Participation

Local Aboriginal employment was raised as a key concern by the local community at the outset of consultation for the project. To address the community concern, Aboriginal participation targets were developed and implemented to promote local Aboriginal employment. The initiative aimed to maximise traditional land-owner participation during the construction phase by way of nominating targets for traditional land-owner employment and business opportunities and maximising the employment of the local traditional land-owner group.

Employment targets and incentives for construction contractors were developed in the early planning phase for each package to ensure Aboriginal workers and trainees were hired and retained on the project. These were developed in collaboration with Nudge to identify the skill base available in the local community.

As there are six work packages, the project has been able to trial a variety of contractual delivery mechanisms to gauge the influence of incentives on contractors to achieve Aboriginal Participation targets, including:

1. An incentive scheme, with no pain for not achieving the targets
2. Pain/gain system for meeting (or not meeting) targets
3. Incentive introduced for contractors that achieve levels beyond the mandated participation level (to upper limit):
 - o A minimum level for employment and businesses (in FTE equivalent / \$ of sub-contract value) mandated; and,
 - o Additional requirement for Trainee (local Aboriginal person)

The Aboriginal engagement targets were first trialled on the New Norcia Bypass package and have continued to evolve throughout the project. This approach has been progressively implemented over the length of the project; incorporating learnings from earlier contracts.

Aboriginal Participation is monitored during the delivery of each package against the contractual targets. The contractors are audited for contractual compliance and the contractors report to the Superintendent monthly. Review of this data allows the IPT the opportunity to flag to the Superintendent if performance against the contract is slipping. This monitoring ensures that the project is leaving a good legacy in the community and demonstrates Main Roads' commitment to sustaining local Aboriginal economic growth and personnel upskilling.

Appendix 1 - Protected fauna and flora species and habitat

- Barracca Nature Reserve (A Class reserve managed by the Department of Parks and Wildlife);
- Reserve 209 (C Class reserve managed by the Shire of Chittering);
- Nugadong Nature Reserve (A Class reserve managed by the Department of Parks and Wildlife);
- Buntine-Marchagee Recovery Catchment (not formally protected);
- Crown Reserves 248, 24671 and 17262 (C Class reserve managed by the Department of Water);
- Nugadong Nature Reserve (Class A);
- Crown Reserve 248;
- Crown Reserve 4484;
- Crown Reserves 24671 and 17262.

Appendix 2 - List of Protected Areas Project interfaces with

Protected fauna species and habitat:

- Carnaby's Black Cockatoo breeding and foraging habitat;
- Forest Red-tailed Black Cockatoo foraging habitat;

Protected flora species and habitat:

- *Acacia isoneura* subsp. *nimia* (P3);
- *Acacia scalena* (P3);
- *Chamelaucium* sp. Wongan Hills (P3);
- *Frankenia glomerata* (P3);
- *Grevillea asparagoides* (P3);
- *Stylidium squamellosum* (P2);
- *Acacia drummondii* subsp. *affinis* (P3);
- *Verticordia serrata* var. *linearis* (P3);
- *Verticordia lindleyi* subsp. *lindleyi* (P4);
- *Acacia drummondii* subsp. *affinis* (P3);
- *Eucalyptus caesia* (Caesia) (P4);
- *Haemodorum loratum* (P3);
- *Eremophila pinnatifida* (Critically Endangered);
- *Acacia isoneura* subsp. *nimia* (P3);
- *Chamelaucium* sp. Wongan Hills (P3);
- *Chamelaucium* sp. Wongan Hills (P3);
- *Chamelaucium* sp. Wongan Hills (P3);
- *Frankenia glomerata* (P3);
- *Grevillea asparagoides* (P3)
- Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community (Critically Endangered).
- Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Critically Endangered)

Appendix 3 – List of Stakeholders to the project

Great Northern Highway Upgrade Project: Stakeholder List	
Minister for Transport, Western Australia	<ul style="list-style-type: none"> • Through Strategy and Communications Directorate
Main Roads Western Australia	<ul style="list-style-type: none"> • Commissioner • Infrastructure Delivery Directorate • Strategy and Communications Directorate • Planning and Technical Services • Heavy Vehicle Operations • Property Management Branch • Wheatbelt Region • Mid West – Gascoyne Region
State and Federal Elected Members	<ul style="list-style-type: none"> • Agricultural Region of the WA Legislative Council • WA Legislative Assembly –Moore • Federal Electorate of Durack • Federal Electorate of Pearce
Local Governments (CEOs and Presidents) and Associations	<ul style="list-style-type: none"> • Shire of Chittering • Shire of Gingin • Shire of Dalwallinu • Shire of Moora • Shire of Victoria Plains • WALGA Avon-Midland Country Zone
Local Environmental Advocacy Groups	<ul style="list-style-type: none"> • Chittering Landcare Group • Wildflower Association
Transport Industry	<ul style="list-style-type: none"> • Heavy Vehicle Liaison Group • Western Roads Federation • Arc Infrastructure • Selective Individual Transport companies
Landowners	<ul style="list-style-type: none"> • Directly and indirectly affected
Community Groups	<ul style="list-style-type: none"> • Bindoon Bypass Reference Group • Wheatbelt Development Commission • Chittering Tourist Association • Safe Roads Committee
Selective Major Businesses	<ul style="list-style-type: none"> • CBH • Feedlots

Great Northern Highway Upgrade Project: Stakeholder List	
	<ul style="list-style-type: none"> • Higher intensity agriculture
State Government Agencies	<ul style="list-style-type: none"> • Department of Planning/WAPC • Department of Water and Environmental Regulation • Environmental Protection Authority • Department of Primary Industries and Regional Development • Public Transport Authority
Federal Government Agencies	<ul style="list-style-type: none"> • Department of Infrastructure, Regional Development and Cities • Department of Industry, Innovation and Science • Department of Environment and Energy
Traditional Owners	<ul style="list-style-type: none"> • SWALSC • Yued Working Group
Emergency Response Agencies	<ul style="list-style-type: none"> • Council Emergency Management Groups • Police • Department of Fire and Emergency Services/Bushfire Control • Ambulance
Construction Companies	<ul style="list-style-type: none"> • Various

Appendix 4 – Glossary of Terms

AHMP	Aboriginal Heritage Management Plan
ASJV	Arup Jacobs Joint Venture
BC Act	Biodiversity Conservation Act 2016
CRB	Crushed Road Base
DGJV	Dadaru Garli Joint Venture
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessments
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FTE	Full-Time Employee
GNH	Great Northern Highway
GNHM2W	Great Northern Highway Muchea To Wubin
GRI	Global Reporting Initiative
HAJV	Highway Construction and Albem Operations
HSE	Health, Safety and Environment
IPT	Integrated Project Team
IS rating	Infrastructure Sustainability rating
ISCA	Infrastructure Sustainability Council of Australia
JMP	Journey Management Plans
MRWA	Main Roads Western Australia
NEC3	New Engineering Contract
PPM	Parts Per Million
SPI	Sustainable Procurement Initiative
SWALSC	South West Aboriginal Land and Sea Council
TSS	Total Soluble Salts