



Bayswater Level Crossing Removal Project

Sustainability Report

July 2017

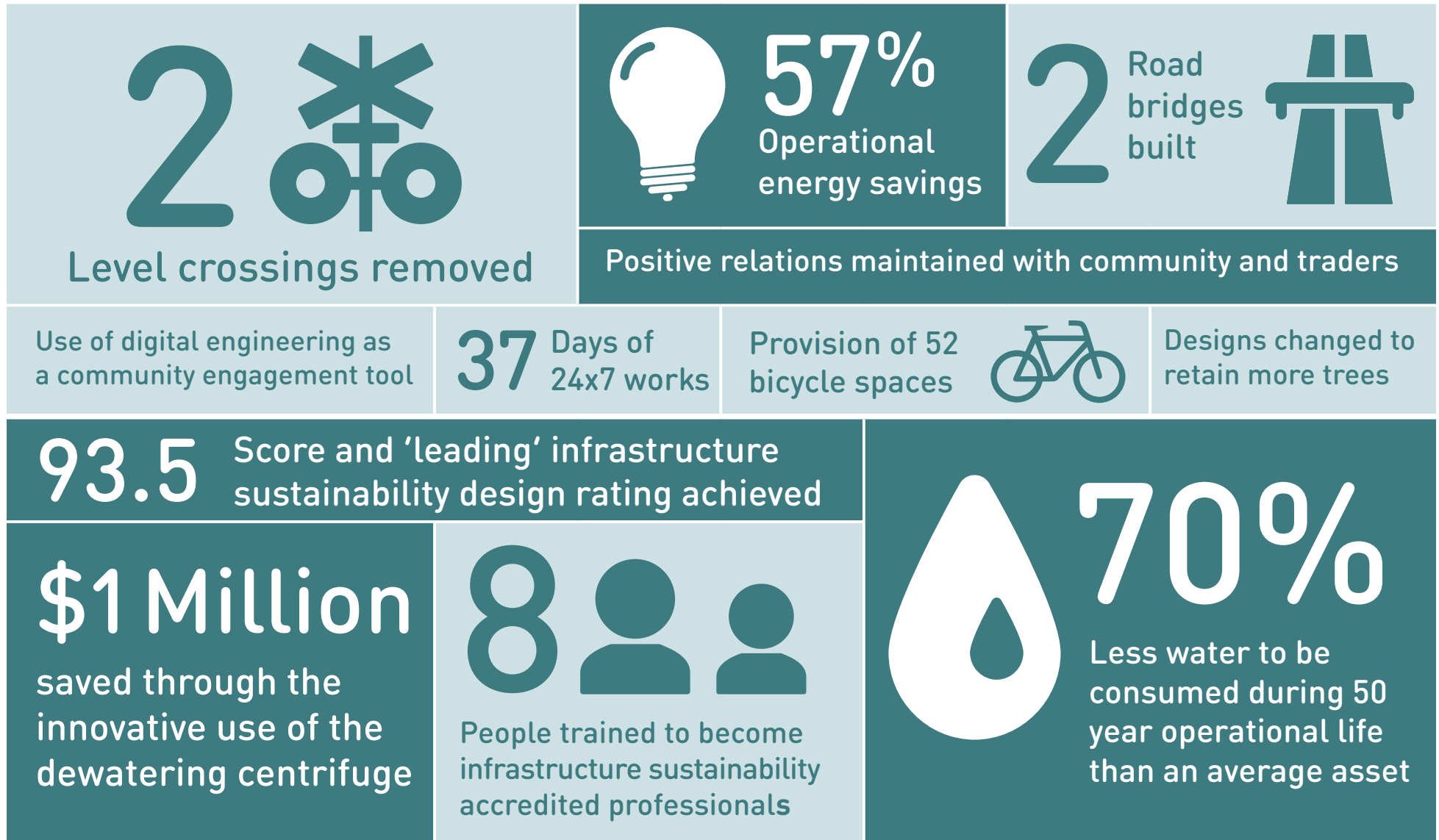
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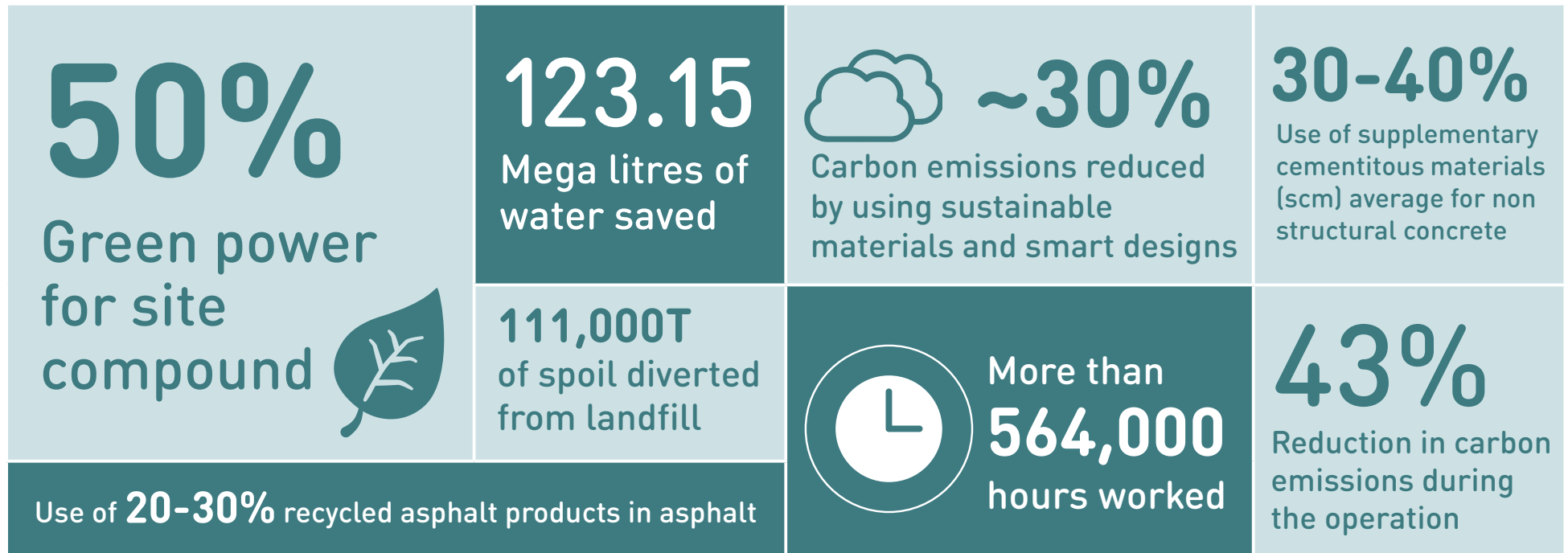


Contents

Foreword – Alliance General Manager	3	Our Finances	14
Executive Summary	5	Our Community	16
Project Overview	5	Communications and Stakeholder Engagement	16
What is Sustainability	6	Social Outcomes	19
Sustainability Approach	8	Crime Prevention	19
Our Commitment to Sustainability	9	Conclusion	20
Our Environment	11		
Energy & Carbon	11		
Water	12		
Materials Lifecycle Impact	12		
Emissions, Pollution and Waste	12		
Ecology	14		

BLCRP at a glance





Foreword-Alliance General Manager



We acknowledge the custodians of this land, the Wurundjeri, Bunurong, and Boon Wurrung people, and their elders, past and present. We acknowledge and respect their continuing culture and the contribution they make to the life of this city and this region.

The Bayswater Level Crossing Removal Project was delivered by a project team comprising Laing O'Rourke, Fulton Hogan and AECOM, in an alliance with Public Transport Victoria, Metro Trains Melbourne and VicRoads. Achieving sustainability is an integral part of fulfilling the Alliance's vision of 'Proudly Creating Bayswater's Future'.

The concept of sustainability is complex, even more so when it is applied to major infrastructure projects such as the Level Crossing Removal Program. The Alliance recognised sustainability as a key project objective and central to its vision; however, with no tangible goals, measuring success was going to be a challenge.

The Alliance identified the best way to establish a goal, formalise the process, remove industry myths and misconceptions and improve understanding of sustainability was to adopt the accepted industry standards in sustainability rating tools - the Infrastructure Sustainability Council of Australia (ISCA) and Green Building Council of Australia (GBCA) Frameworks.

For the Alliance, sustainability meant providing positive environmental, social and economic outcomes throughout the project, for the community.

At the start of the project, the Sustainability Lead analysed and anticipated the challenges for sustainability across the industry. The findings inspired the Alliance to take a different approach to enable the project to maximise sustainable outcomes, simplify the application of the sustainability rating tools on the project, and build a positive culture of and an ethical approach for sustainability. These new approaches shaped the sustainable direction for the Alliance, increased appreciation of sustainability and helped lead the project to sustainability success.

Adopting the ISCA and GBCA framework helped guide the project to capitalise on a broader range of key sustainability elements. Achieving a high score for the ISCA and GBCA rating tools was not the intention. The goal was to create an ethical approach to sustainability where the project could reach its maximum sustainability performance by taking a broader and deeper focus to all elements in the tools rather than simply doing the absolute minimum to meet contract sustainability requirements. This ethical approach to the rating tools helped create a strong sustainable design, innovative construction, operationally efficient and people-centred infrastructure.

To create a culture of sustainability, the Alliance chose personnel to lead and champion sustainability, to become IS and Green Star accredited, and introduced a suite of sustainability initiatives to improve understanding, and keep sustainability front of mind at the project.

Introducing a key result area (KRA) for sustainability helped embed a sustainable focus within the Alliance Management Team, across the project team, and with all of the project delivery partners, including contractors and suppliers. Improving sustainability outcomes for major transport infrastructure projects, like the Bayswater Level Crossing Removal Project, requires a shift in attitudes and approach which can result in better decision making to save resources now and in the future.

The Project's 'Leading' score for the IS Design Rating and the team's achievement of the IS Project Achievement Award at the 2016 Sustainability in Infrastructure Awards confirms that the Alliance's vision has translated into infrastructure assets which have been delivered and operate more efficiently.

The Bayswater Level Crossing Removal Project was the first project completed under the Level Crossing Removal Program certified with a sustainability rating and has set new benchmarks in sustainable delivery for the rest of the industry to follow.

The Project Delivery Team is actively sharing the positive experiences and outcomes with other businesses to enlighten and inspire them to get on the path of sustainability - and this is just the start of a sustainable revolution in the construction industry.

I am extremely proud of the sustainability team and the wider project team who worked tirelessly to achieve outstanding sustainability outcomes and results on this challenging project.

Andrew Ackerman

BLCRP Alliance General Manager



Mountain Highway Opens

Executive summary

The removal of the level crossings at Mountain Highway and Scoresby Road, Bayswater is part of the Victorian Government's Level Crossing Removal program to remove 50 dangerous and congested level crossings across Melbourne.

In late 2015, an Alliance consisting of Laing O'Rourke, Fulton Hogan, AECOM, the Level Crossing Removal Authority, VicRoads, Public Transport Victoria and Metro Trains Melbourne formed to start construction of the \$177 million Bayswater Level Crossing Removal Project (LCRP).

The project included:

- Lowering the rail line and raising the road at Mountain Highway and Scoresby Road
- Rebuilding Bayswater Train Station and creating a new forecourt and public area
- Reconstructing the bus interchange and train station car park
- Constructing a grade-separated shared-use path
- Modifying the streetscape along Mountain Highway

To solidify the commitment to sustainability, generate ownership and a focus for sustainability across the project team, the Alliance introduced a key result area (KRA) for sustainability. To formalise this process, the Alliance pledged to create a culture of sustainability and achieve tangible sustainability performance recognised by the Infrastructure Sustainability (IS) and Green Star Rating schemes.

The Alliance's actions to help create a culture of sustainability and take a broader more holistic approach with the sustainability rating tools helped the project find sustainable solutions that provided direct environmental, social, and economic benefits to the project and local community.

Environmental performance indicators were used to measure energy usage, carbon emissions, water consumption, waste, lifecycle impacts of materials and discharges to land, air and water. The Alliance established many sustainability initiatives to generate a reduction in the project's energy and carbon footprint, ensure operational efficiency of infrastructure assets whilst changing the way we work. Examples include project wide LED lighting, altered rail track alignment, use of a dewatering centrifuge to reduce water consumption, and selection and use of high performing sustainable materials.

The sustainability initiatives delivered on this project helped to debunk many myths around the ability to achieve sustainable outcomes on major transport infrastructure projects. The sustainability team was able to prove that sustainable initiatives, methods and alternative materials were cost effective. By exploring financial paybacks on sustainable initiatives introduced in design and engineering, and by better understanding capabilities and services within our supply chain, the team learnt there are many cost effective untapped sustainable solutions and innovations available in the market. The use of a dewatering centrifuge unit is an excellent example of an initiative which had an economic and environmental driver associated to reducing waste volumes and reusing clean water generated in waste fluids.

Active engagement with the community and local stakeholders helped the project team understand their needs and prioritise key issues to focus on. Actively listening to the concerns and opportunities of commuters and other stakeholders, the design team was able to provide smart solutions to improve safety for commuters, access and inclusion of people living with a disability, active flow of transport and community connectivity. During construction, the project team also engaged with the community to answer any questions about the design using innovative digital



ISCA Awards

engineering technology. By actively engaging with the community and listening to their needs, the Alliance was able to construct a productive and open environment for the community.

The Bayswater Level Crossing Removal Project was the first project completed under the Level Crossing Removal Program certified with a sustainability rating. The project received a 'Leading' IS Design Rating with an unprecedented score of 93.5 out of 110 and has set a new benchmark in sustainable delivery for the rest of the industry to follow.

This sustainability report has been prepared in line with the triple bottom line framework to provide the reader with information on the environmental, economic and social performance indicators and performance outcomes achieved on the Bayswater Level Crossings Removal Project.

Project Overview

The Victorian State Government has committed to removing 50 dangerous and congested level crossings across Melbourne. The Bayswater Level Crossing Removal Project was part of this initiative, to remove dangerous and congested level crossings across Melbourne in order to deliver significant safety improvements.

In late 2015, an Alliance consisting of Laing O'Rourke, Fulton Hogan, AECOM, the Level Crossing Removal Authority, VicRoads, Public Transport Victoria, and Metro Trains Melbourne formed to start construction of the \$177 million Bayswater Level Crossings Removal Project.

The project included:

- Lowering the rail line and raising the road at Mountain Highway and Scoresby Road
- Rebuilding Bayswater Train Station and creating a new forecourt and public area
- Reconstructing the bus interchange and train station car park
- Constructing a grade-separated shared-use path
- Modifying the streetscape along Mountain Highway

For the Alliance, this project was always more than a level crossing removal project – the team wanted to create a dynamic, attractive space that would deliver direct economic benefits to stakeholders, and create a productive, open environment for the community.

The design strengthens the quality of the public realm by drawing on the character of the existing place, elevating the priority of pedestrians and cyclists, and establishing a more sustainable

and comfortable environment. The urban design planning and development has resulted in a solution that complements the local environment, including carefully integrated, locally-inspired materials and landscaping to create a high quality public realm that is unique to Bayswater.

The new station is centrally located within the heart of the Bayswater Activity Centre, allowing immediate activation of the area. The project has created a vibrant centre for the community, with free-flowing traffic, improved pedestrian and cyclist access and

excellent connections to the new station precinct.

By the end of 2016, the Alliance had successfully removed the two dangerous and congested level crossings at Mountain Highway and Scoresby Road and constructed a brand new Bayswater Station with a modern transport interchange. This Project was completed in mid-2017 as planned.

[Watch a video](#) showing 200,000 hours of work at the BLCRP.

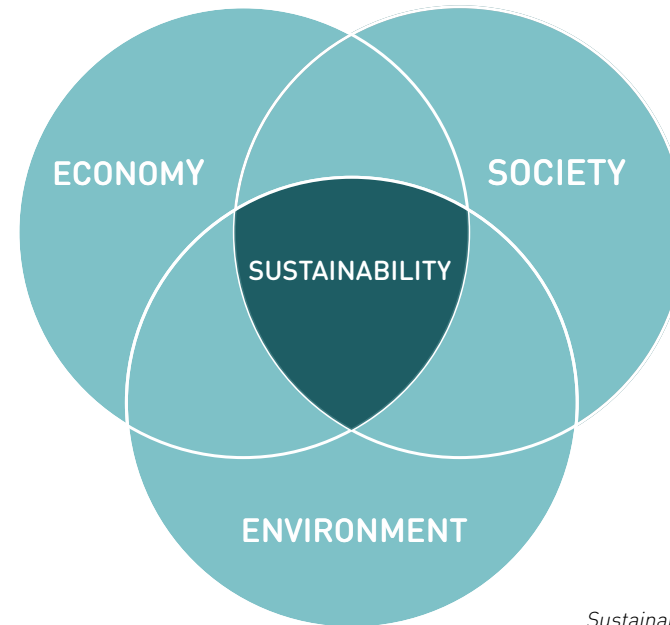


What is Sustainability?

There are numerous misconceptions about sustainability including that it is all about the environment, it is expensive, and it requires curbing existing standards of living. As cities around the world continue to experience frequent and extreme weather events, there is a need to future proof the world. Resilient cities are built on the foundation of sustainability principles.

Sustainability is a concept that sees the triple bottom line implemented while conducting business. Triple bottom line is a framework that is not limited to making profits and includes taking into account the social and environmental aspects. The most well-known and agreed definition of sustainability is *"to meet the needs of the present without compromising the ability of the future generations to meet their own needs"* (UN Brundtland Commission, 1987).

Infrastructure sustainability is infrastructure designed, constructed and operated to optimise environmental, social and economic outcomes. The Sustainability Policy Adopted by the Level Crossing Removal Authority helped guide the Bayswater LCRP to set up sustainability goals and targets.



Sustainability Venn Diagram

Sustainability Rating Tools

Sustainability rating tools are the most effective and efficient metrics to measure sustainability on infrastructure projects.

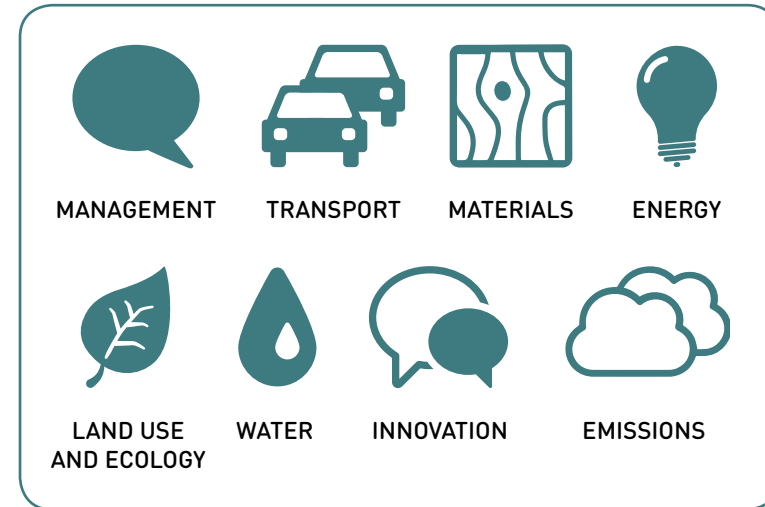
The Project introduced the Infrastructure Sustainability (IS) Rating and Green Star Rating tools to help guide and apply sustainability. The IS rating is suited for infrastructure assets being constructed in the project (rail, roads, and bridges) and Green Star is suited to the building assets such as the station building.



Infrastructure Sustainability (IS) rating tool

The ISCA IS Rating Tool is an industry-compiled voluntary sustainability performance rating scheme evaluating planning, design, construction and operation of infrastructure assets. The IS Rating Tool assesses projects on environmental, social, economic, and governance aspects. The application of the tool is to align the project with best practice performance for sustainability in infrastructure. The IS Rating tool consists of the following six themes and categories:

1. Management and Governance
 - Management systems
 - Procurement and Purchasing
 - Climate Change Adaptation
2. Using Resources
 - Energy and Carbon
 - Water
 - Materials
3. Emissions, Pollution and Waste
 - Discharges to Air, Land and Water
 - Land
 - Waste



4. Ecology
 - Community Health, Wellbeing & Safety
 - Heritage
 - Stakeholder Participation
 - Urban & Landscape Design
6. Innovation

Green star rating tool

The Green Star Rating Tool has been developed by the Green Building Council of Australia (GBCA).



green building council australia

The Rating Tool is intended for use by project teams, contractors and other interested parties to validate sustainability initiatives of the design and construction phases of eligible projects.

Green Star is an internationally recognised rating system that delivers independent verification of sustainable outcomes throughout the life cycle of the built environment.

The GBCA aims to transform the built environment by encouraging practices that:

- Reduce the impact of climate change
- Enhance the health and quality of life of inhabitants and the sustainability of the built environment
- Restore and protect the planet's biodiversity and ecosystems
- Ensure the ongoing optimum operational performance of buildings
- Contribute to market transformation and a sustainable economy.



Sustainability Approach

From the outset of the project, the Bayswater LCRP had made a commitment to ensure sustainability was central to all components of the project and more importantly, to formalise a meaningful sustainability target by seeking an IS rating with the Infrastructure Sustainability Council of Australia and a Green Star rating with the Green Building Council Australia.



To embed sustainability on the project, a Key Result Area (KRA) for sustainability and urban design was established to encapsulate the vision and values of the Alliance.

The Alliance's commitment to sustainability and embracing the IS and Green Star rating tools helped create sustainable outcomes across all aspects of the project and transform industry practices. By creating a culture of sustainability and exploring every best-practice initiative in the tools, the project found sustainable solutions that provide direct environmental, social, and economic benefits to the project and local community, as well as setting a new industry benchmark.

The KRA for sustainability pledged to:

- Create a culture of sustainability
- Deliver tangible sustainable performance recognised by ISCA accreditation

Sustainability KRA targets:

- 65 ISCA Rating or greater
- 4 Star Green Star rating on the Station Building

The KRA for urban design pledged that the project:

- Creates the place
- Is more than a grade separation
- Delivers and improves on the promise

To deliver on the pledge to create a culture of sustainability, the Alliance worked to improve the team's understanding of sustainability and the sustainability rating tools. The Alliance chose personnel with a commitment to sustainability to champion the KRAs and lead the project's IS and Green Star submissions, both of which have been central to the project's overall sustainability success. The Alliance selected eight project team members across design, commercial, operational and construction to become IS Accredited Professionals (ISAP) and champion ISCA in their respective areas. At the start of the project, all staff attended a sustainability induction to learn about the key result area and sustainability rating tools. A suite of sustainability workshops were also held to maintain interest, improve understanding, and keep sustainability front of mind. Aligning with the Alliance group's objective to communicate and share information for sustainability, the Alliance implemented a knowledge sharing process to describe how the project would communicate and share information about sustainability, and the desired outcome linked to each communication (Link to Man-7 Knowledge sharing Case study).

To achieve the optimal sustainability performance outcome for the project and achieve an ISCA accreditation, the Alliance created an ethical approach to sustainability where the project could

reach its maximum sustainability performance by taking a broader and deeper focus to all elements in the sustainability rating tools rather than simply doing the bare minimum to meet the targets. This included adopting a holistic sustainability approach across design, procurement, construction, urban planning, operation, and the local community. By exploring every initiative in the IS and Green Star rating tools, which allowed the project to capitalise on a broader range of key sustainability elements to create a strong sustainable design, innovative construction, operationally efficient and people-centred infrastructure.

The Alliance also introduced initiatives such as plain English translations of all technical information, and methods to build a workplace sustainability culture. For example, the plain English concept translated technical information in the sustainability rating tools into a usable format to ensure the entire project team had a clear understanding of requirements and their responsibilities. These new techniques set up a point of difference in the industry on how to deliver ratings and generate sustainable outcomes on projects.

Our Commitment to Sustainability

Sustainability requirements and initiatives were embedded into the project management system. This ensured that sustainability performance was monitored and reported on in order to resolve any sustainability issues and continuously improve on sustainability outcomes.



A project launch workshop and sustainability forum was held in the project development phase to set the sustainability vision for the project. The sustainability vision was initiated by the key result area for sustainability with a pledge to create a culture of sustainability and achieve tangible sustainability performance recognised by an IS and Green Star accreditation.

Following the introduction of the sustainability key result area, the team took the time to research the challenges in the industry acting as barriers to deliver our sustainability KRA pledge.

The challenges identified by the Alliance included:

- Myths and misconceptions for sustainability. Poor understanding, education and training for sustainability.
- Sustainability rating tools are complex, indigestible and designed for sustainability professionals.
- No system or framework to guide designers and engineers on how they can contribute to sustainability.
- Poor understanding of the supply chains capabilities and services to support sustainable outcomes.
- No sustainability ratings delivery experience from the Alliance organisations.

- No brand or communications for sustainability across project to help improve engagement for sustainability.

Understanding the challenges allowed the Alliance to shape a sustainable direction in line with the Alliance's sustainability vision and set up appropriate commitments to ensure high sustainability performing outcomes.

The Alliance sustainability commitments for the project included:

- Provide sustainability education and awareness across the project team and workforce.
- Tangible outcomes achieved for key sustainability areas, including:
 - Energy and carbon – A target to reduce carbon emissions by over 25%
 - Material lifecycle impacts – A target to reduce the carbon intensity associated to life cycle impacts of materials by 30%
- Integrate the sustainability accreditation requirements into the project business model, including setting up a sustainability in design and sustainability in procurement framework understanding design and procurement has the greatest contribution to sustainability.

- Translate the sustainability rating tools into 'plain English', delegate ownership of the credits within the project team and set up a programme to complete deliverables.
- Create a brand for sustainability to shape a positive image for sustainability that will attract the project team and workforce.

The commitments to sustainability were integrated into the Alliance's policies and management plans. The Alliance policies and management plans for sustainability outlined the governance obligations that the project team and workforce had to comply with in order to design and deliver the project in a sustainable manner.

For example, the LXRA sustainability policy ensured the principles of environmental, social, and economic sustainability were included in all of the Victorian Government's level crossing removal projects. The policy requires all contractors to have the appropriate approvals and certifications, to undertake climate change risk assessments, minimise the use of potable water where possible and minimise waste by using the waste hierarchy.

The key governance commitments outlined in the Alliance's sustainability policy and sustainability management plan for the project were to:

- Design and construct infrastructure and building assets which optimise environmental, social, cultural, governance and economic outcomes
- Minimise negative consequences of our activities and maximise positive opportunities through smart design and construction innovation
- Build a sustainable culture to create and improve sustainable outcomes for the project
- Develop sustainability best practices throughout all phases of the project to improve project sustainability performance
- Successfully achieve a target 'Excellent' IS accreditation rating for Design and As-built with the Infrastructure Sustainability Council of Australia
- Successfully achieve a 4 Green Star accreditation rating for the Railway Station
- Establish excellent and proactive relationships with key stakeholders, the local community and rail passengers
- Incorporate environmental, social and economic sustainability considerations into procurement and purchasing decisions for the project
- Promote and facilitate education and knowledge sharing relating to infrastructure sustainability within the project team and supply chain
- To leave behind a positive legacy for sustainability at Bayswater.



Station entrance night



Environmental indicators are measures used to help track the state of the environment. Environmental performance indicators allow an organisation to calculate and report on the impact its operations has on the environment.

They are critical to the success of environmental monitoring and reporting as they provide the basis for objective performance assessment and provide a framework to present environmental performance information in a consistent, comparable and understandable format.

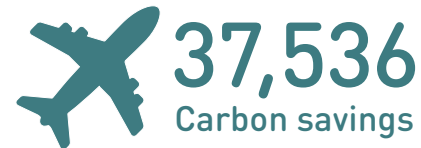
Energy and Carbon

The approach adopted to measure energy performance of the project consisted of modelling energy and carbon of the project's proposed detailed design against a base case. The environmental performance indicators used to measure energy use and carbon emissions included stationary and transport fuel consumption, land and vegetation clearing, and electricity consumption.

The Alliance's target was to reduce carbon emissions by over 25% compared to the reference design footprint. The modelled performance outcomes showed a 57% reduction in energy and 43% reduction in carbon over the projects whole of infrastructure life cycle.

Initiatives introduced by the project to reduce energy use included:

- Reduced electricity for operation of trains by changing the design of the track alignment to reduce braking and acceleration through the rail corridor.



- Use of biodiesel and energy efficient generators.
- Design improvements to reduce earthworks and cutting reducing plant and equipment fuel consumption.
- Site wide LED lights, including LED lighting for arterial road lighting.
- Use of solar PVs for bus shelter advertising.
- Purchase of 50% Green Power for the site compound.

With these and other initiatives introduced on the project, the Alliance achieved carbon emissions savings equivalent to approximately 37,536 one way economy flights between Melbourne and Los Angeles. [Click here](#)

Water

With a history of severe drought in Victoria, the sensible use and consumption of water was a key focus of the project. The environmental performance indicators used to model the water consumption included, water use sources during construction, site compound water use, and operational water usage. The modelled performance outcome illustrates that during its 17 month construction phase and fifty year operational life, the project will consume approximately 70% less drinking water than an average infrastructure project. The following initiatives were undertaken by the project to reduce water consumption:

- Use of an innovative dewatering centrifuge unit to separate waste and reuse water generated from waste fluids.
- Installation of a rainwater harvesting tank under the Train Station Building to service water for toilets, irrigation and station wash-down during operation.
- Rainwater harvesting tanks installed at the site compound during construction phase to provide a significant amount of non-potable water to service site compound toilets.
- Installation of high rated WELS fixtures and fittings for tap ware and toilets in the Train Station Building.

- Implementing sub-surface drip irrigation methods for landscaping.
- Planting native and drought tolerant plants around the station precinct.



Mega liters of water saved which is equal to approximately 50 Olympic sized pools.

Material life cycle impact

The carbon intensity of materials equates to over 70% of all emissions for infrastructure projects. The project's target was to reduce the carbon intensity associated to life cycle impacts of materials by 30%. The project met this target by reducing the amount of materials required for the project and switching to sustainable materials where possible.

Design initiatives introduced by the project to reduce material quantities were:

- The drain design re-developed eliminating the need for concrete base slabs where track level is below normal ground water level. This enabled a saving of approximately 8,903 m³ of concrete.
- The culvert lengths were optimised, resulting in a reduction of 219 tonnes of precast concrete.
- The bridge levels were raised closer to the existing road surfaces, the extent of road works on all road sections approaching the bridges were shortened. This reduced the total surface area of road works and in turn reduced total asphalt by 3,400 tonnes.

- Raising of the rail track and bridge levels significantly reduced the amount of Class 3 fill by 9,060 tonnes and 20mm crushed rock by 20,068 tonnes.
- Mountain Highway road drainage system was diverted under the rail line just north of the station platform rather than to the Dandenong Creek, reducing the length of the nominal 750mm diameter reinforced concrete pipe by approximately 300 metres.
- Underground detention tank changed to surface detention swale at outlet of Scoresby Road cutting system which removed the need for a 125 m³ reinforced concrete, underground detention tank.

Additionally, the project selected high sustainable performing materials such as:

- 20 to 30% recycled asphalt products in asphalt
- 25% supplementary cementitious materials (SCM) average for structural concrete including piling, retaining walls, flowing, soil nails etc.
- 30-40% SCM average for non-structural concrete including shared user paths, kerbs and gutters.



By selecting sustainable materials and smart designs, the project reduced carbon emissions by approximately over 30% or 6603t compared to the base case which is equivalent to approximately 1,395 cars off the road for one year [Greenhouse Gas Equivalencies Calculator](#).

Emissions, Pollution & Waste

The Alliance aimed to reduce energy, water and material usage, along with discharges to air, land and water. To accomplish this, the Alliance developed an approach for incorporating sustainability into design and engineering work methodologies at all stages of the development process to maximise the achievement of the environmental and sustainability objectives.

Water

In the case of water discharges the following initiatives were taken to minimise discharges:

- Use of precast pits to reduce waste and water use during construction
- The stormwater drainage system was designed to ensure that there is no increase to water levels or peak flows discharging from the project site
- Despite the site environmental constraints in the rail corridor and arterial roads, opportunities to improve local receiving water quality at the car park and station precinct were identified. Water sensitive rail and road design (WSRD) elements such as rainwater tank under the Bayswater station building, bio-retention system at the station forecourt and vegetated swales within

north section of the carpark were incorporate. The elements of the WSRD provide significant pollutant reduction for the car park and station precinct.

Noise and vibration

During construction, the project implemented the following initiatives to minimise noise impact on the surrounding residences:

- The hours of construction were restricted to approved working hours unless otherwise justified and approved (i.e. unavoidable works during rail occupations)
- When works were required out of hours (i.e. during rail occupations), the Communications and Stakeholder Manager notified relevant stakeholders and residents prior to works
- Where disruptive works were planned for two consecutive nights or more, the Alliance provided alternative accommodation to nearby residents on a case by case basis
- Where static noise-generating activities could not be adequately controlled, noise barriers or localised acoustic shielding was installed
- Construction site personnel were made aware of all community attitudes and noise complaints



Asphalt works Scoresby Road

- The most appropriate plant and equipment to minimise noise and vibration generation were selected for the Project.

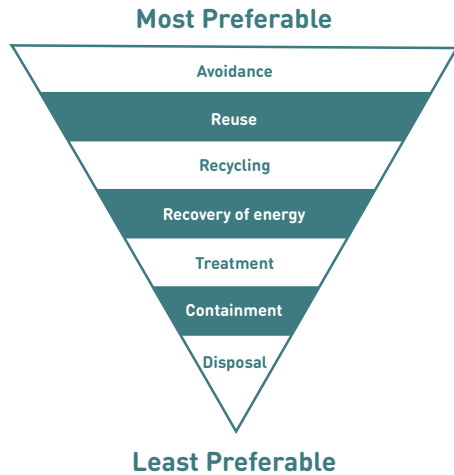
Waste

The Project team committed to reduce the amount of waste generated and used the waste's hierarchy as a key guiding principle, with avoidance being the most preferred option and disposal being the least.

The project identified possible waste streams before construction started to better manage them. This helped the Project team to reduce 111,000t of bulk excavation waste by changing the design

of the track alignment which was a major win for the project. In addition to this, the following strategies were implemented on the construction site to minimise the generation of waste:

- Green waste from the removal of trees was mulched
- Paper, cardboard, aluminium cans and similar recyclable materials from offices and site facilities were separated at source and recycled
- Cardboard packaging was segregated and recycled
- The site sheds were made from recycled materials.



Ecology

Being a brown field site, more than 75% of the land area of the project was previously disturbed. The Alliance was still committed to retaining the ecological value of the site even though the project site did not qualify as an ecologically sensitive site. A biodiversity management plan for the ecological value and biodiversity on the site was developed and implemented. The Alliance created several opportunities to make ecological value improvements to the site which include:

- A design change to keep the new station building, platform and track on top of the existing location allowing the project to retain existing vegetation within the car park area.

- Site wide landscaping design was optimised to include 3404m² of native vegetation.
- The combined services route on select areas was realigned to retain vegetation that would otherwise have been removed.
- Change in construction methodology to use of hand excavation works, and an excavation borer to excavate underneath the root system to retain and protect significant trees that would originally have required removal. The Alliance identified locally significant trees that the Council and Knox Environmental Society (KES) wanted retained and made considerable design and construction methodology changes and financial outlays (purchasing the excavation borer and hand digging equipment) to accommodate the protection of these species.
- Collection and propagation of seeds from significant trees where removal was unavoidable.
- A broad range of indigenous plant species will be grown from the seeds collected and propagated to enhance the local vegetation values.
- Jute matting of embankments to prevent erosion, promote better plant growth and limit weed invasion.

- The project offset more than 20% biodiversity credits for ecological values removed from the site.

The Alliance carried out extensive ecological works to ensure the design and delivery of the project retains, maintains, and protects existing vegetation where available in the project footprint. All the initiatives introduced by the Alliance to maintain and enhance the ecological value of the project precinct demonstrates that the Alliance implemented best practice methods.



Our Finances

Financial indicators measure direct financial performance of the business and the economic impacts of the business. Financial performance indicators include financial performance of the project, economic measures of success, procurement practices, indirect economic impacts and measures of efficiency and financial sustainability.

Innovative design, construction and engineering methodologies introduced on the Bayswater Level Crossing Removal Project as sustainability initiatives, changed the way we delivered the works and resulted in cost reductions.

The change in the final design of the rail track alignment not only helped retain significant trees it also reduced the need to excavate 111,000t of bulk fill, leading to savings in cost for excavation, transportation and disposal of the spoil.

The installation of LED lights on arterial roads under the Ausnet Vesi Scheme will provide approximately 70% energy and cost savings during operation. The most significant cost saving sustainability initiative was the use of the dewatering centrifuge which is used to reduce slurry waste into fill and clean water. This initiative saved the use of approximately 5.6ML of water, 100 travel trips for offsite waste water disposal, saving an estimated \$1 Million in waste disposal, haulage and water use. These and many other sustainability initiatives implemented on the project contributed to the reduction in whole of life costs.

It is often assumed that introducing and implementing sustainable measures will cost more than business as usual methods. This mentality can be attributed to short term thinking.



Dewatering Centrifuge

Sustainability initiatives might not deliver a gain in the immediate present but they do lower whole of life costs, influence the supply chain and captivates an audience of the entire pool of personnel involved in the project and the client.

The overall goal was to continue to explore sustainability initiatives and practices and to take the opportunities to demonstrate our culture towards sustainability in responding to community and client drivers not just delivering a project for a price.

Part of the mindset has to be that it costs no more and delivers future benefit to our business with our clients and the market place.

We continue to improve our processes, innovate, explore alternatives with our subcontractors, and engage with contractors in our supply chain and monitoring the impacts of our works.

The Alliance recognised that to provide the best outcome, it had to understand the needs of the local community and key stakeholders.

The Alliance prepared a Communication and Stakeholder Engagement Plan which identified the impacts of construction on the community, and what would be required to effectively communicate and engage with the community. The effectiveness of the consultation with the community was monitored via community surveys. (Link to Case Study- Man-6: Incorporating community participation into sustainability Management)

The community health and wellbeing issues identified as priority areas for the Bayswater Level Crossing Removal Project included - the active flow of transport, community connectivity, negative image to the community, safe and secure access to public transport, safe sustainability transport connectedness, improve sustainable performance across the community, and access and inclusion of people with disabilities.

The project team provided sustainable design solutions for the issues identified. The design solutions included:

- New on-road bicycle lanes and shared user path. The shared user path having an angled bridge crossing the railway line in the primary direction of travel and an underpass at Mountain Highway.

Both initiatives make for a more efficient active transport route.

- New fully integrated railway station and bus interchange.
- Increased width of pedestrian walkways and increases road crossing points to allow free flow of pedestrian movement.
- Provision of 52 bicycle spaces.
- Design of on-road cyclist lanes to connect road cyclists to local bicycle trails, the new Bayswater station and the local activity area.
- The relocation of the new Bayswater station closer to the activity area and positioned in an elevated location providing a visible centrepiece of Bayswater with increased passive surveillance.
- The new station was architecturally designed to represent the folding nature of the mountains behind. This theme is repeated throughout the project represented in the use of screens and retaining walls.

Community and Stakeholder Engagement

For any project to be a success, it needs the support of the local community and key stakeholders. The City of Bayswater will experience significant growth in the next few decades, as the population of Metropolitan Melbourne is projected to grow from 4.5 million to almost 8 million by 2051. Although the outcome of this project is great for a growing population, the construction of the new station, and the removal of the two level crossings meant inevitable disruption for the existing community members. The project team made it a priority to work with the local community to support them throughout the construction phase of the project.

[Watch a video](#) of a local resident visiting the Bayswater Project.

Open for business

The Communications and Stakeholder Engagement team, launched an “Open for Business” marketing campaign to support the businesses on Mountain Highway and Scoresby Road, by encouraging the community to continue to ‘shop local’ throughout the construction phase. The “Open for Business” campaign had a wide outreach through advertisements in local newspapers and distribution of pamphlets with special deals from all participating stores in the area.



Use of digital engineering

Digital Engineering (DE), Augmented Reality (AR) and Virtual Reality (VR) was used as an engagement tool for community and stakeholder engagement. DE proved to be a powerful tool in illustrating and explaining the project design and end result to the community. It made it easier for people to understand what the final outcome would look like and the changes made to connectivity through design in the area. The community and stakeholder team organised regular DE ‘pop ups’ at the info sessions, local shopping centre and the library.

[Take a virtual tour of the Project here](#)

Organised site visits

Throughout the life of the project, site visits were organised for local community groups such as schools, the local scout group, local businesses and residents. During these site visits, the team gave the visitors an overview of the project, safety managers took

them on a walk around the site through safe viewing points and the digital engineers introduced them to DE.

[Watch a video](#) of Bayswater Scouts receiving Scoresby Road boom gate.





Community mural

The Level Crossing Removal Authority (LXRA) worked with the Bayswater Council Community and Public Arts Officer who engaged three indigenous artists to undertake a community mural underneath the new Mountain Highway Bridge. The program engaged with students from the local Bayswater Secondary College where they learned about indigenous art from the three local Indigenous tribes that make up the Kulin Nation. There are three pictures in the mural representing art from the three different tribes. Each tribe had a representative artist and each created one of the concepts in the mural. The three artists were Mandy Nicholson (Wurundjeri), Adam Magennis (Bunurong), and Gheran Steel (Boon Wurrung). They worked

with the students, explained their stories and helped them paint it.

[Watch the making of the mural here.](#)

Heritage

Heritage, both Indigenous and non-Indigenous, is a cultural asset and is of importance to the community. For the Alliance it was essential to protect any items or locations with heritage significance to ensure they remain the same for future generations. The Bayswater Level Crossing Removal Project site has Aboriginal cultural significance and outside of the project site sensitive area, a number of state heritage items exist.

During the planning phase the heritage site investigations for Aboriginal heritage

and European heritage were undertaken. Whilst several stone artefacts were identified, the project boundary was determined to be a Low Density Artefact Distribution and considered to be of a low significance as per the Aboriginal Heritage Act 2006. No artefacts of European Heritage significance were identified.

A cultural heritage survey and plan was undertaken and prepared by qualified archaeologists and cultural heritage advisors. The project team was advised to remove the artefacts from the project footprint for the duration of the construction period due to the nature of the works. The artefacts were removed with care, from the construction site by qualified archaeologists from Ecology Heritage Partners. In order to comply with the *Aboriginal Heritage Act 2006* the

stone artefacts recovered from this site were individually labelled and packaged with reference to their original provenance. The artefacts were stored within Ecology and Heritage Partners secure lab facility with copies of the artefact catalogue, assessment documentation, management plan and results of the analysis. The artefacts were repatriated to the site after project completion.

Additionally, the project team identified and implemented a number of opportunities to enhance heritage values. For example, the Alliance worked in collaboration with traditional Aboriginal owners and Art in Public Spaces students from Bayswater Secondary College to incorporate cultural heritage values into the project's detailed designs.



Social outcomes

The Communications and Stakeholder team collaborated with social enterprises, Nadrasca and Yarra View Nursery throughout the project. Nadrasca is a social enterprise and its purpose is to provide a range of services and employment for people with special abilities. Nadrasca printed and distributed all collateral on the project, such as the bi-monthly newsletter and local Construction Works Alerts.

[Watch the Bayswater LXRA team and Nadrasca Partnership video here.](#)

The Alliance procured plants from Yarra View Nursery for the landscaping along the Bayswater Station Precinct. Yarra View Nursery is a social enterprise providing quality plants, it employs staff with special abilities.

Crime Prevention

Crime prevention through environmental design (CPTED) is a key objective for new developments to reduce the likelihood of crime. Its use in design is articulated in the *Bayswater Structure Plan* and *Knox Community Safety Plan* developed by Knox City Council. The CPTED principles, goals, and actions implemented on the project included:

- Increasing natural surveillance of spaces at all times of the day and night
- Reducing crime by increasing community usage of public places during daytime and evening

- Reducing crime by achieving connection and integration of streets and public places
- Improving the quality of life for the community by improving perceptions of public places
- Providing a safer environment by installing new lighting and CCTV camera's in the new station, platform, car park and bus interchange.
- Improving passive surveillance by providing good sight lines from station staff and waiting areas, increasing visibility throughout the station precinct.
- Providing uninterrupted sightlines, with low walls to ramps and raised terraces to the forecourt and station approach.



Conclusion

The Bayswater Level Crossing Removal Project is the first project completed under the Level Crossing Removal Program certified with a sustainability rating. The project set new benchmarks in sustainable delivery for the construction and infrastructure industry to follow.

The Project explored several sustainability innovations in the design phase of the project which had a significant positive impact on the environment through the reduced use of materials, water and fossil fuels. Significant innovations included the use of a dewatering centrifuge unit for the first time in the rail sector which helped reduce water usage and brought about monetary savings for the project. Digital engineering was used for the first time in Australia to engage with the community. The use

of LED lighting for arterial roads of the project precinct and the use of recycled and sustainable materials were innovations that helped reduce the project's carbon footprint.

In 2016, the Project was awarded the highest IS design score in Australia and New Zealand. The project team has raised the standard for sustainability in infrastructure projects to follow.

The project team faced extensive challenges to accomplish the set sustainability targets however after intensive awareness and support of sustainable initiatives by the management team, each person working on the project recognised they had an important role to play in the sustainability story. The team is proud of its achievements and the positive impact it has had in Bayswater, on the environment and the community.





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