



Sustainability Report 2020



Acknowledgment of Country

Sydney Metro pays respect to Aboriginal peoples as the Traditional Owners and Custodians of the land on which we work and live, we acknowledge Elders past and present and recognise the continued connection to the land and water ways.

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About this report

This is Sydney Metro's third sustainability report. The Sydney Metro Sustainability Report 2020 outlines our performance against our sustainability objectives and targets, from **1 July 2018 to 30 June 2020**.

The report builds on the performance data of the Sustainability Report 2018, and highlights our approach to delivering sustainable outcomes across our activities. All data in this report covers the period from 1 July 2018 to 30 June 2020, unless otherwise stated.

Through the use of case studies, this report:

- reflects on the final delivery phase sustainability outcomes achieved on the Metro North West Line
- focuses on the Sydney Metro City & Southwest project, currently under design and construction
- touches on the new areas of focus for Sydney Metro West and Sydney Metro – Western Sydney Airport projects.

Sydney Metro measures success through tracking and reporting on performance against sustainability objectives and targets identified at the outset of a project and verifying performance against industry benchmarks. Key achievements to date are outlined in Section 2.

1 Foreword from the Chief Executive

Sydney Metro is Australia's biggest public transport project, revolutionising the way Australia's largest city travels. In 2024, Sydney will have 31 metro stations and more than 66 kilometres of new metro rail, with the network expanding to include 46 stations and over 113 kilometres of rail by the end of the decade.

With such a significant Government investment, it is imperative that Sydney Metro ensures the assets we deliver drive positive social, environmental and economic outcomes for the people of NSW.

With this in mind and in line with best practice, Sydney Metro has adopted a triple bottom line approach to sustainability by balancing social, environmental and economic aspects as we proactively strive to remain at the forefront of this rapidly evolving area.

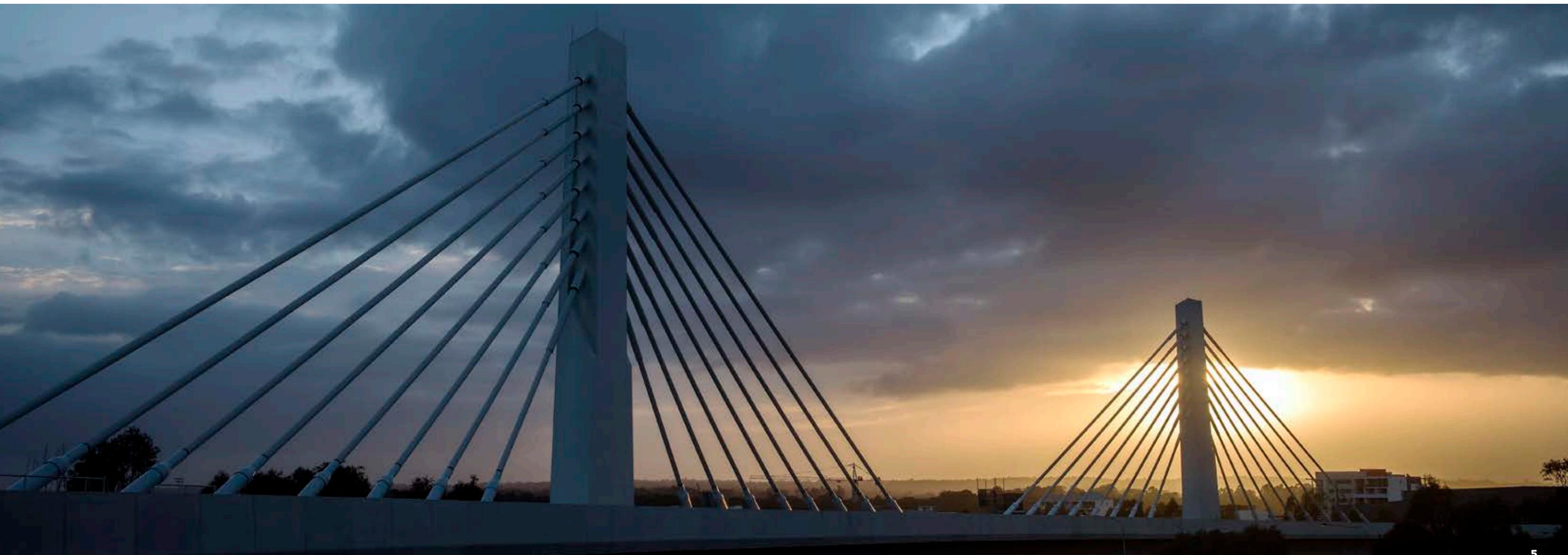
This report reflects on our sustainability performance over the past two years and provides an overview of our planned approach to sustainability over the next year to ensure we continue to deliver resilient and sustainable assets into the future.

We are proud of the great sustainability achievements Sydney Metro has achieved to date and look forward to continuing to cement our position as an industry leader.



Peter Regan PSM
Chief Executive, Sydney Metro

Metro North West Line cable-stayed bridge at sunrise.

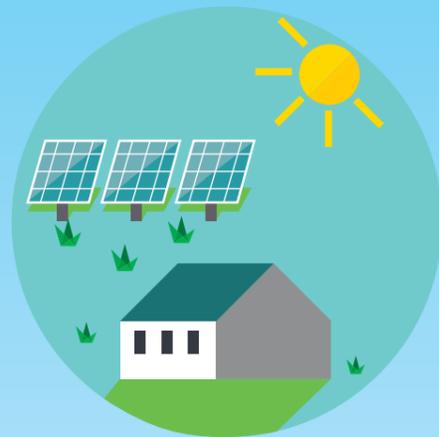


2 Sustainability highlights

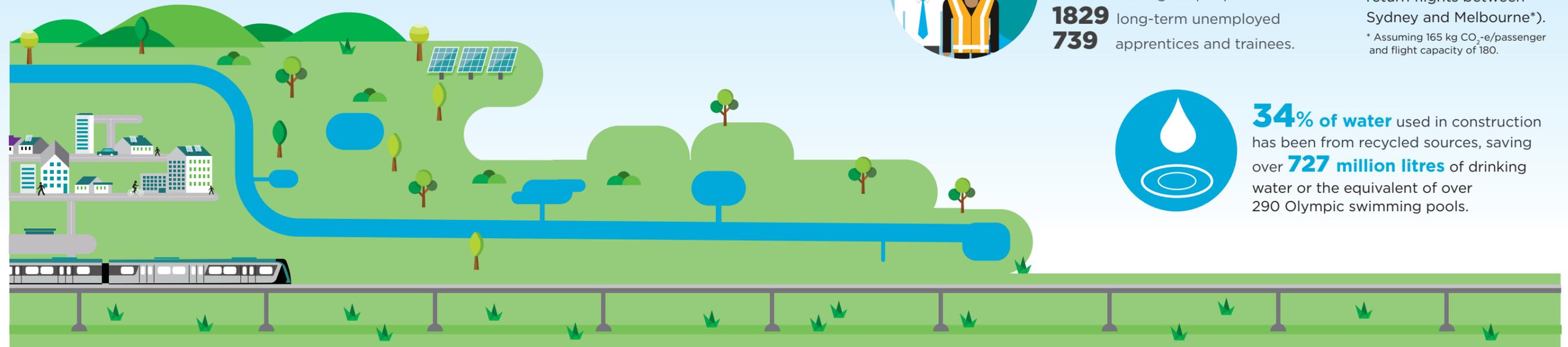
Sydney Metro operational sustainability



↑ Increased 33% Public transport usage increased by approximately one third, post the opening of the Metro North West Line. This means less private vehicle use and a reduction in associated emissions.



Beryl Solar Farm has been constructed and commissioned, and **offset 100%** of the carbon emissions associated with the operational electricity of the Metro North West Line, **saving 88,800 tonnes** of CO₂-e to date. This is equivalent to offsetting the annual carbon emissions from nearly **10,700 homes**.



Sustainability in construction of Metro North West Line and City & Southwest project



100% of clean spoil beneficially reused – over **11.6 million tonnes**.



97% of construction and demolition waste recycled – **348,986 tonnes** of landfill avoided.



1014 small to medium enterprises have been engaged on Sydney Metro projects.



Over 41,470 people have worked across the Sydney Metro projects to date, including
730 Aboriginal people
1829 long-term unemployed
739 apprentices and trainees.



5 significant Aboriginal and non-Aboriginal heritage finds – Kellyville, Blues Point, Barangaroo, Central and Waterloo.



124,000 tonnes of carbon emissions avoided through the use of low-carbon recycled materials in concrete (equivalent to over 4000 return flights between Sydney and Melbourne*).

* Assuming 165 kg CO₂-e/passenger and flight capacity of 180.



34% of water used in construction has been from recycled sources, saving over **727 million litres** of drinking water or the equivalent of over 290 Olympic swimming pools.

3 About Sydney Metro

Sydney Metro is Australia's biggest public transport project.

The Metro North West Line, opened on 26 May 2019, is Australia's first fully automated railway line. It is currently being extended into the city and beyond to Bankstown by 2024, when Sydney will have 31 metro stations and a 66-kilometre stand-alone metro railway.

Sydney Metro, an agency within the NSW Government's Transport cluster, is also delivering the:

- Sydney Metro West project, linking Greater Parramatta to the Sydney central business district (CBD)
- Sydney Metro - Western Sydney Airport project, which will become the new transport spine for Greater Western Sydney, connecting communities and travellers with the new Western Sydney International (Nancy Bird Walton) Airport and the growing region.

For further information about the organisation and each project, refer to the latest **Sydney Metro Annual Report** and our website.

3.1 Our approach to sustainability

Sydney Metro, hand-in-hand with our delivery partners, is shaping the future growth of Australia's busiest city for generations to come. Sustainability forms an integral part of Sydney Metro's vision to transform Sydney with a world class metro. Since 2011, driving environmental and socio-economic outcomes has been fundamental to the success of Sydney Metro.

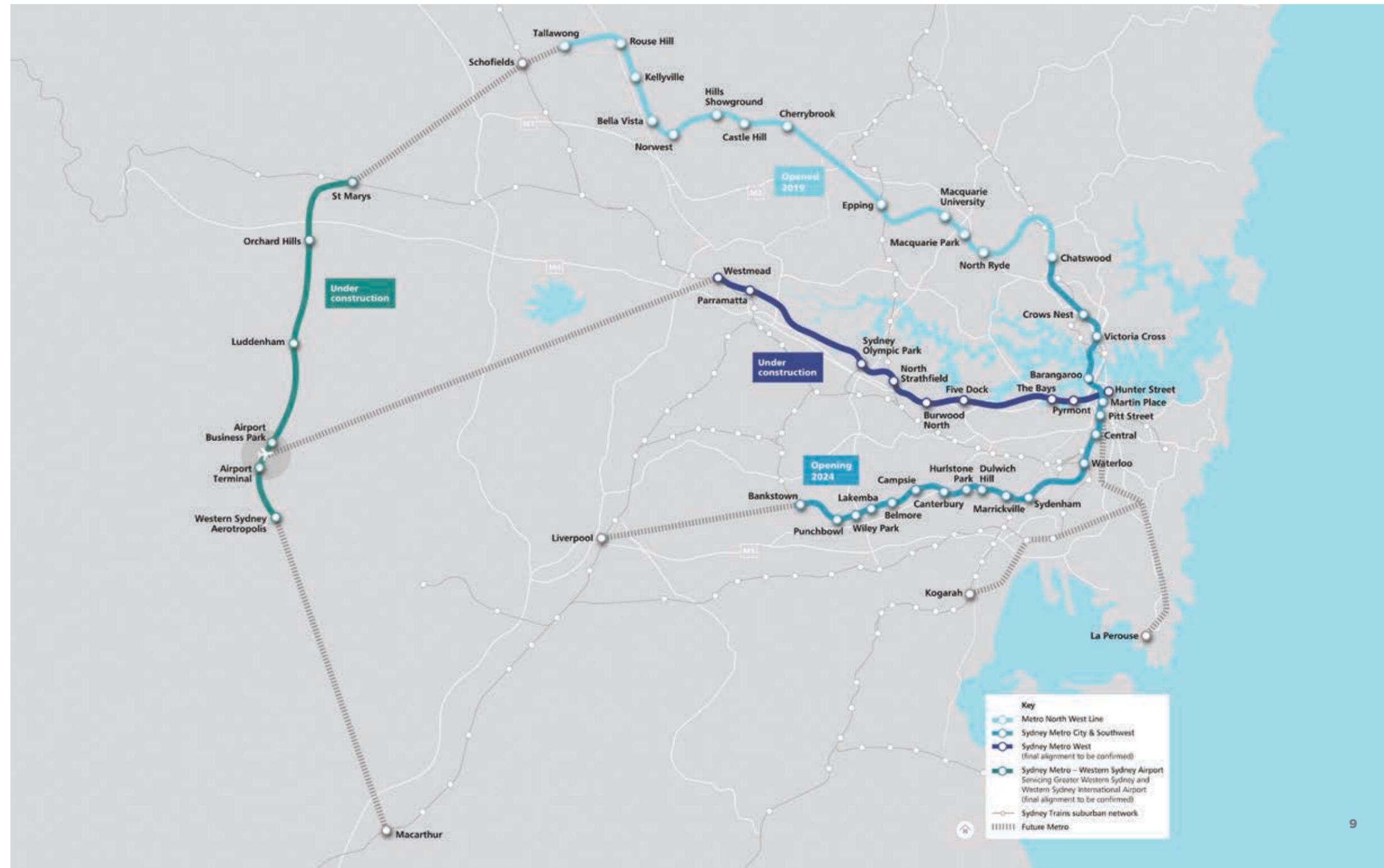
We are committed to the respectful stewardship of the environment in which we work and operate, ensuring a responsible approach to delivering positive outcomes for the environment, the community and our customers.

Our aim is to integrate sustainability considerations into the work that we do to support the development, delivery and operation of projects. Six principles underpin how we embed and deliver on our sustainability commitments to the community, our customer and our key partners.

These six principles will form the basis of the Sydney Metro Sustainability Framework. During the reporting period, work commenced on development of the Framework, including considering how we align with the United Nations Sustainable Development Goals (UN SDGs). The Sydney Metro Sustainability Framework will be made public during the next reporting period.

Figure 1: Sydney Metro Sustainability Principles.

 Demonstrate leadership	Deliver a world-class metro that is environmentally and socially conscious; share knowledge and demonstrate innovation in sustainability
 Tackle climate change	Integrate a comprehensive climate change response, and drive excellence in low-carbon solutions
 Manage resources efficiently	Achieve whole-of-life value through efficient use and management of resources
 Drive supply chain best practice	Collaborate with key stakeholders to drive a lasting legacy in workforce development, industry participation and sustainable procurement
 Value community and customers	Respond to community and customer needs; promote heritage, liveable places and wellbeing for current and future generations
 Respect the environment	Minimise impacts and take opportunities to provide environmental improvements.



Sydney Metro alignment map.

4 Demonstrating leadership

4.1 Measuring performance against sustainability targets and objectives

Sustainability is fundamental to project delivery and operations at Sydney Metro. Bespoke project sustainability plans form an integral part of project business cases to ensure sustainability is effectively integrated across the project lifecycle. Project sustainability strategies have guided activities on the Metro North West Line and the Sydney Metro City & Southwest project, with project sustainability plans in development for Sydney Metro West and Sydney Metro – Western Sydney Airport that align with the six principles outlined in Figure 1.

Project sustainability plans use a data-based approach to establish objectives and targets that address lessons learned and drive improvement across our projects. Embedding these sustainability requirements into contracts across the project lifecycle is key to Sydney Metro's success in developing and implementing best-practice standards.

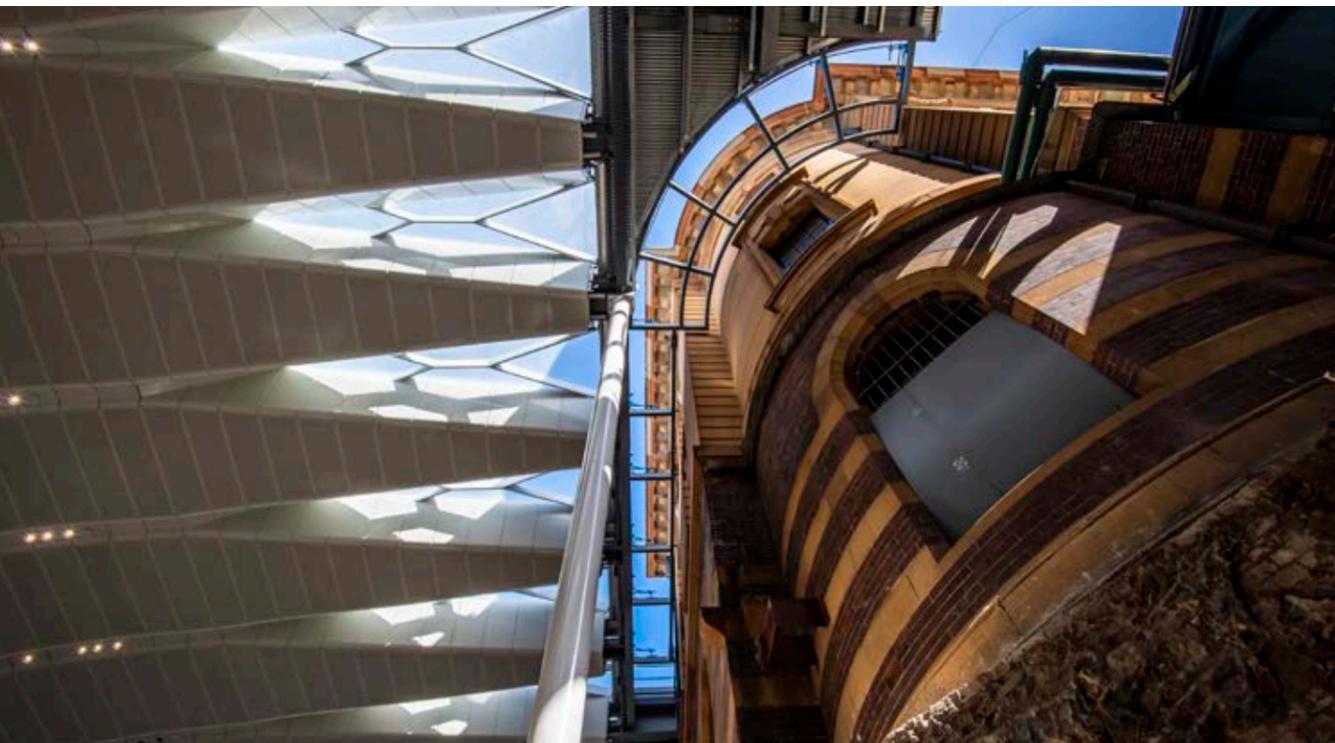
We work collaboratively with our delivery partners to ensure successful delivery, with our sustainability performance being measured against targets set out in the project sustainability plans. Our delivery partners are required to report back on their performance. This data is collated and reported to the Sydney Metro Executive and communicated publicly through this report and other corporate publications.

This approach provides a robust framework to quantify performance and holds Sydney Metro and its delivery partners accountable for meeting their environmental and social sustainability obligations.

The following case study provides a summary of some of the final sustainability highlights from delivery of the Metro North West Line. Systems to capture operational sustainability data are currently under review, with the intention of reporting further operational data in future reports.

The Sydney Metro City & Southwest project is on track to meet at least 90 per cent of its ambitious sustainability targets, set out in the project's **Sustainability Strategy 2017–2024**. Figure 2 provides a snapshot of performance against these targets.

The new Central Station northern concourse roof will capture rainwater to supply the station amenities and cleaning facilities.



Case study

Celebrating the Metro North West Line sustainability achievements



Beryl Solar Farm, Gulgong NSW.

On 26 May 2019, the Metro North West Line commenced its first passenger services. Running between the new Tallawong Station at Rouse Hill and Chatswood and serviced by eight new and five refurbished stations, the new 36-kilometre line provides commuters with a journey of under 40 minutes across the full length. Key sustainability achievements during delivery include the following:

- A whole-of-project Infrastructure Sustainability (IS) As-Built rating of 'Leading' was achieved – the first mega infrastructure project in Australia to receive this rating.
- A full 100 per cent of clean spoil was beneficially reused.
- Over 96 per cent of construction and demolition waste was recycled.
- A total of 88 hectares were landscaped, including nearly one million new plants.
- Over 1000 long-term unemployed people were employed on the project.

The Metro North West Line's outstanding sustainability performance continues into operations, with 100 per cent of its emissions from operational electricity use being offset. This has been achieved through a Green Products Purchase Agreement to procure large-scale generation certificates from a new build solar farm – Beryl Solar Farm, in Gulgong NSW. Securing the operational offset has not only resulted in a direct environmental benefit through the reduction of carbon emissions, but also social and economic benefits for the local community of Gulgong with the creation of 150 local jobs during construction as well as ongoing full-time positions. Since commencement of operations the operational offset has resulted in a saving of over 83,000 tonnes of carbon dioxide equivalent (CO₂-e)¹.

During operations, Sydney Metro continues to promote a diverse and inclusive workforce, with 57 per cent of the Metro Trains Sydney's (MTS) workforce being from culturally and linguistically diverse backgrounds and 26 per cent of supervisory roles being held by women. Skills development also remains a high priority with 80 per cent of MTS' employees completing units of competency.

¹ Carbon dioxide equivalent (CO₂-e) is a metric used for comparing greenhouse gases i.e. – the equivalent amount of carbon dioxide with the same global warming potential.

Figure 2: Sydney Metro City & Southwest (CSW) project sustainability targets and performance, as of 30 June 2020.

Demonstrate leadership		Tackle climate change		Manage resources efficiently		Drive supply chain best practice		Value community and customers		Respect the environment		
CSW sustainability theme alignment						CSW sustainability theme alignment						
Highlight						Highlight						
100 point 'Leading' ISCA Design rating awarded to the Tunnels, Stations and Excavation contractor.	Estimated whole-of-life saving of \$300,000 per year per station as a result of reductions in modelled energy use.	25 per cent of the electricity needs for construction offset for all completed contracts.	All 'high' level climate risks to date have been mitigated.* * No 'extreme' climate risks were identified.	100 per cent of usable spoil (5,266,049 tonnes) beneficially reused. 98 per cent (220,468 tonnes) of construction and demolition waste diverted from landfill.	449,602 kL of potable water saved during construction.	All principal contractors have sustainable procurement strategies in place.	7218 people have undertaken accredited training supporting upskilling and mitigating skill shortages.	Detailed heritage interpretation plans for all Southwest Corridor stations completed.	Approximately 1000 cycle spaces to be provided.	32 community benefit initiatives implemented.	Vegetation clearing minimised.	Zero major pollution incidents.
Target performance						Target performance						
On track	On track	On track	On track	On track	On track	On track	On track	On track	On track	On track	On track	On track
<ul style="list-style-type: none"> A high level of attainment (minimum ISCA IS Rating of 65 'Excellent') for relevant infrastructure. 5 Star Green Star ratings for relevant buildings. Align with a high rating using the TfNSW Sustainable Design Guidelines. 	<ul style="list-style-type: none"> Consider adopting a whole-of-life costing model to maximise sustainability benefits. Optimise development opportunities for residual land. Capture sustainability benefits in the business case for the projects. 	<ul style="list-style-type: none"> Achieve at least a 20 per cent reduction in carbon emissions associated with construction, when compared to business as usual.* Offset 25 per cent of the electricity needs for the construction phase of the project. Maximise the capture and reuse of energy generated from braking trains. Design buildings (stations and stabling buildings) to achieve at least a 15 per cent improvement over performance requirements set out in Section J of the National Construction Code. Source 5-20 per cent of the low voltage electricity required at above-ground stations from onsite renewable energy sources where feasible. 	<ul style="list-style-type: none"> Mitigate all extreme and high level risks. Mitigate a minimum of 25 per cent of medium level risks. 	<ul style="list-style-type: none"> Reduce the environmental footprint of materials used on the project by at least 15 per cent compared to business as usual.* Use concrete which has an average Portland cement replacement level of more than 25 per cent. 100 per cent beneficial reuse of usable spoil. Recycle or reuse 90 per cent of recyclable construction and demolition waste. Recycle or reuse 60 per cent of office waste during the construction phase. 60 per cent of reinforcing steel is produced using energy-reducing processes in its manufacture. 	<ul style="list-style-type: none"> Reduce water use by at least 10 per cent compared to business as usual.* Source at least 33 per cent of the water used in construction from non-potable sources. Implement rainwater harvesting and reuse systems at construction sites and feasible above ground stations. 	<ul style="list-style-type: none"> All principal contractors develop and implement sustainable procurement strategies. 	<ul style="list-style-type: none"> Increase opportunities for employment of local people, participation of local businesses and participation of SMEs. Enable targeted and transferable skills development which resolves local and national skills shortages, supports industry to compete in home and global markets, and embeds a health and safety culture within all induction and training activities, promoting continuous improvement. Increase workforce diversity and inclusion: <ul style="list-style-type: none"> - Target Aboriginal workers and businesses - Target female representation in non-traditional trades - Target long-term unemployed. Inspire future talent and develop capacity in the sector: <ul style="list-style-type: none"> - Engage young people via education and work experience - Collaborate with higher education institutions to provide programs responding to rapid transit and other infrastructure requirements - Support vocational career development through apprenticeships and traineeships. 	<ul style="list-style-type: none"> Prepare a Heritage Strategy, including engagement with relevant stakeholders. Implement the Heritage Strategy during design and delivery, to conserve and activate. Maximise opportunities for archaeological research and future interpretation of archaeological finds. Opportunities for heritage interpretation identified and implemented at appropriate station precincts. 	<ul style="list-style-type: none"> Station interchanges designed in accordance with the Interchange Access Plans and modal hierarchy. Stations and precincts designed in accordance with the Sydney Metro Design Guidelines. Promote access by cycling, through provision of bicycle parking, and safeguard for future expansion of bicycle facilities. 	<ul style="list-style-type: none"> Implement initiatives which will provide tangible benefits to local community groups during the construction period. Implement initiatives which will provide tangible benefits to the broader local community beyond the construction period. Identify key drivers for affordable housing and work with other lead agencies to identify opportunities and develop an appropriate response. 	<ul style="list-style-type: none"> Minimise vegetation clearing. 	<ul style="list-style-type: none"> Zero major pollution incidents.
		Not applicable*		Non-compliant							At risk	At risk
		<ul style="list-style-type: none"> Achieve at least a 20 per cent reduction in carbon emissions associated with operations, when compared to business as usual.* Offset 100 per cent of the electricity needs for the operational phase of the project. Mitigate all extreme and high level risks. 		<ul style="list-style-type: none"> Source 100 per cent reused, recycled timber or responsibly sourced timber.^ 							<ul style="list-style-type: none"> Native landscaping targets to be established. 	<ul style="list-style-type: none"> New emission standards will be identified and applied to diesel equipment and vehicles during construction.

* Note: 'Business as usual' (BAU) is defined as that which is used in the applicable rating scheme for the respective target (e.g. ISCA Rating Tool, Green Star and TfNSW CERT).

^ There has been one non-compliance in relation to timber, with one contractor being unable to confirm compliance for a small quantity of timber used on site. A systems improvement notice was issued and the contractor is on track to comply for 96.8 per cent of timber used (the non-compliance relates to less than 27 tonnes of timber).

+ Not applicable to project stage

4.2 Measuring performance against industry benchmarks

Sydney Metro continues to recognise the importance of third-party rating tools in verifying the sustainability performance of our projects against recognised industry benchmarks. The Infrastructure Sustainability (IS) and Green Star rating tools have been applied across the Metro North West Line and Sydney Metro City & Southwest project.

Six industry ratings have been awarded during this reporting period to Sydney Metro projects across the Metro North West Line and Sydney Metro City & Southwest. These included two industry firsts:

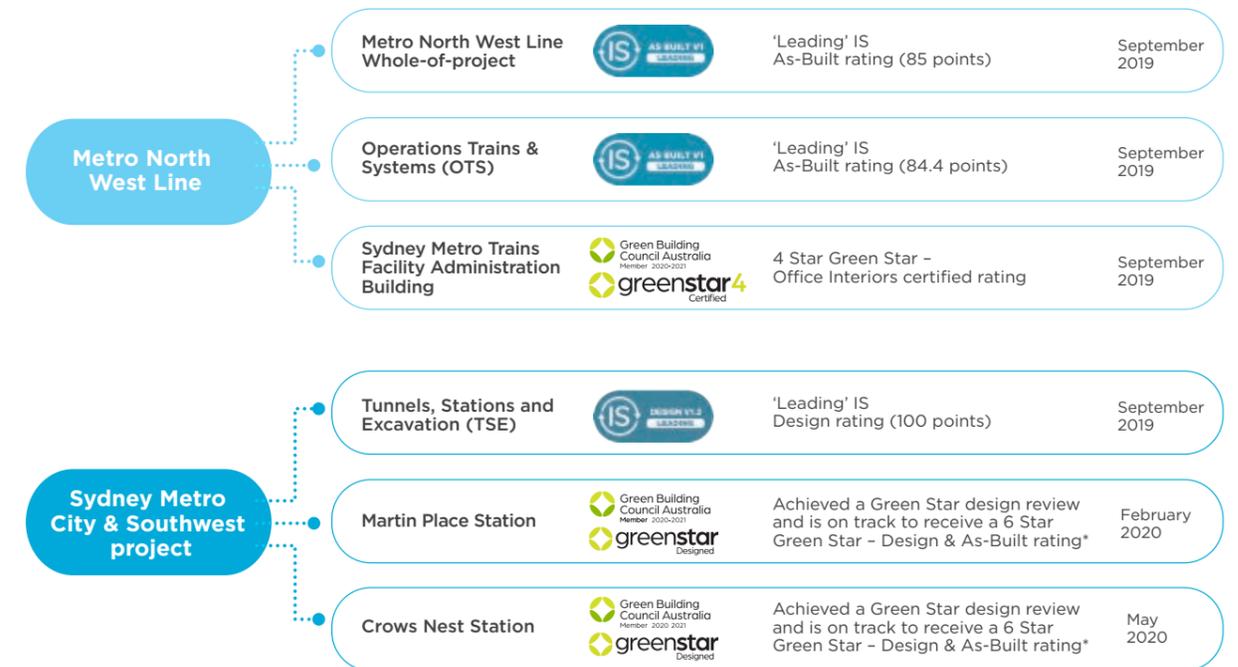
- The Metro North West Line achieved a whole-of-project IS As-Built rating of 'Leading' which is a reflection of Sydney Metro's sustainability leadership.
- Sydney Metro City & Southwest Tunnels, Stations and Excavation (TSE) contractor not only achieved an IS Design rating of 'Leading', but this is the only project to be awarded the full 100 points available to entrants under the rating scheme. This resulted in the TSE contract receiving the Outstanding Achievement in Infrastructure Sustainability Award (Design) at the Infrastructure Sustainability Council of Australia (ISCA) 2019 Awards night. The Award recognises the IS project that achieved the highest design rating score.

Figure 3: Sydney Metro sustainability-related industry memberships.



* Note prior to 2018, Sydney Metro was covered by TfNSW's ISCA membership

Figure 4: Industry ratings awarded to Sydney Metro, as of 30 June 2020.



Note: Barangaroo Station and Victoria Cross Station both completed a round-one design submission during the reporting period, confirming their required minimum target rating was achieved. Final design ratings for these stations is subject to a round-two design submission.

* Martin Place and Crows Nest Stations are required to achieve a minimum 5 Star Green Star - Design & As-Built rating.

4.3 Collaborating with industry

Sydney Metro actively engages with industry to deliver sustainability outcomes across our activities. We work together with government, our delivery partners and broader industry to drive efficiencies, encourage innovative thinking and address common sustainability challenges and opportunities.

An example of this effective cross-government collaboration is our Heritage Working Group, which provides advice and guidance to Sydney Metro and its project teams in respect to non-Aboriginal heritage matters. Participation across planning, heritage and transport agencies helps ensure that key stakeholders are aligned in expectation and assists in streamlining heritage approval processes.

Sydney Metro will also collaborate closely with the Office of the Government Architect to pilot the Connect with Country framework on its Sydney Metro West and Sydney Metro - Western Sydney Airport projects. The pilot is aimed at increasing cultural awareness and improving cultural, social and economic outcomes for Aboriginal communities.

In order to facilitate open collaboration and knowledge share across our delivery activities, Sydney Metro hosts a quarterly Sydney Metro Contractor Sustainability Forum.

'The Sydney Metro Contractor Sustainability Forum is a great initiative for everyone leading sustainability across Sydney Metro. There is a vast amount of knowledge and experience in the room from sustainability colleagues working for major construction companies. The forum provides an opportunity to share knowledge and tap into lessons learned across the Sydney Metro City & Southwest project, as we all seek to find sustainable solutions to common challenges.'

Nick Clarke, Laing O'Rourke.

Sydney Metro also facilitates sustainability knowledge share more broadly across industry through participating in and presenting at various industry forums and through partnering with a number of industry associations that work to improve industry sustainability performance. In June 2020, the Deputy Chief Executive joined the ISCA / Roads Australia Webinar 'Resilience in an Integrated network', to share knowledge on Sydney Metro's approach to ensuring the resilience of the Sydney Metro network.

Case study

Delivering against the Green Star Sydney Metro rating tool

Green Star is an internationally recognised voluntary rating scheme used in the commercial sector to indicate the level of sustainable design a build has achieved. In early 2018, Green Star released a bespoke tool for Sydney Metro, which has been tailored to suit the requirements of both above ground and underground stations.

During the reporting period, the bespoke tool has been applied to the seven Sydney Metro City & Southwest underground stations between Crows Nest and Waterloo (inclusive). A minimum 5 Star rating is being targeted across the project, which demonstrates an equivalent performance to Australian Excellence.

Sydney Metro has been working hand-in-hand with both the Green Buildings Council of Australia and our delivery partners to ensure the tool is being effectively applied across relevant sites and that cross-project efficiencies are being identified and implemented wherever possible. Sydney Metro successfully introduced a Green Star working group with our delivery partners, to promote knowledge sharing and help streamline the application of the tool across the Sydney Metro City & Southwest project.

Case study

Working collaboratively to streamline and improve industry practices



IS Awards night: Stuart Hodgson, Laura Pritchard and Hugh Chapman.

At the 2018 ISCA Conference IS Awards night, Laura Pritchard, Sustainability Manager at Sydney Metro, was awarded the inaugural IS Emerging Leader Award. The award celebrates a person aged 30 years or younger best demonstrating leadership in infrastructure sustainability. Laura was recognised for her collaborative approach to streamlining the application of the ISCA rating tool on Sydney Metro City & Southwest, which involved engaging across projects, with delivery partners and ISCA to understand lessons learnt and develop a best-practice approach for application to the Sydney Metro City & Southwest project.

She was also recognised for driving social outcomes in partnership with Social Traders and working with industry to understand how Sydney Metro can apply low carbon concrete and best-practice supply chain management (in relation to modern slavery risk) to our projects.



Right: Tunnel boring machine Mum Shirl breaks through at Barangaroo Station.

5 Tackling climate change

5.1 Ensuring climate resilient assets

Sydney Metro is aligned with the NSW Government's commitment to taking effective action on climate change and to making NSW more resilient to a changing climate.

For Sydney Metro, resilience is the capacity of Sydney Metro and the individuals, communities, institutions and businesses it supports to survive, adapt and respond, no matter what kinds of chronic stresses and acute shocks they experience – including extreme weather events.

From the outset, Sydney Metro has focused on ensuring the resilience of the network to climate change. Our approach is to ensure the design and delivery of the Sydney Metro systems address the likely impacts of climate risk over the life of an asset, and builds in appropriate resilience and future flexibility.

The designs for Sydney Metro City & Southwest stations have adopted relevant requirements and features from the Metro North West Line that are aimed at mitigating climate risk and adapted these to suit the urban environment in which the City & Southwest project is being constructed. Key features of the City & Southwest design related to climate change include:

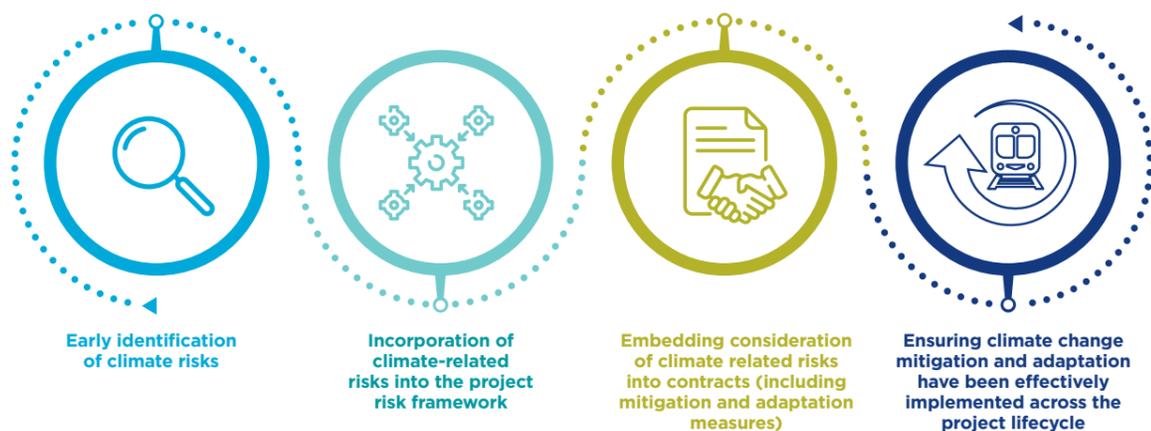
- ensuring drainage is designed to accommodate increased rainfall and sea level rise where applicable

- considering climate change projections and undertaking sensitivity analysis as part of flood modelling when designing station entries, tunnel portals, underground access points, precincts, interchanges and equipment and infrastructure
- ensuring critical equipment and tunnel and station ventilation systems are designed to be able to maintain station temperatures during periods with higher ambient temperatures
- incorporating passive design measures such as provision of shading and tree planting around stations.

Looking forward, Sydney Metro West will service the City of Parramatta, where addressing urban heat has been identified as a key priority. Sydney Metro – Western Sydney Airport will service Greater Western Sydney, an area where there is less access to cooling sea breezes. As such, it is anticipated that Sydney Metro's climate change response will continue to focus on minimising urban heat, amongst other climate risks such as flooding.

With the commencement of Metro North West Line operations, Sydney Metro also plays a vital role in supporting and enabling liveability, productivity and connectivity across Greater Sydney. As such, Sydney Metro has taken a proactive approach to ensuring our network is resilient to a changing climate, undertaking a review our practices in addressing climate change. The review will enable us to prioritise actions to strengthen the overall resilience of the network over the coming years.

Figure 5: Sydney Metro's approach to addressing climate change.



5.2 Reducing our emissions

Recognising that Transport accounts for over 42 per cent of NSW's total energy consumption², Sydney Metro is taking proactive steps to reduce its energy consumption and overall carbon footprint where possible.

Sydney Metro ensures energy efficient design by requiring stations to achieve a minimum 10-15 per cent reduction in total annual energy consumption when compared to minimum compliance with Section J of the National Construction Code of Australia.

Additionally, Sydney Metro aims to utilise on-site renewable energy where feasible. A solar photovoltaic (PV) system was installed at Sydney Metro Trains Facility (SMTF) at Rouse Hill to supply over six per cent of the low voltage energy demand for the Metro North West Line. Across the Sydney Metro City & Southwest project, solar PV systems are being designed at Central Station, Sydenham Station, SMTF South and on new services buildings along the Bankstown Line.

Sydney Metro also aims to minimise energy and embodied carbon associated with materials used on our projects through a number of initiatives. For further information on reducing embodied carbon in materials refer to **Section 6: Managing resources efficiently**.

Greenhouse gas emissions (fuel, electricity and materials) were tracked against a carbon budget during the delivery of the Metro North West Line, from commencement of construction to project completion. As shown Figure 6, the overall carbon emissions during delivery came in below the targeted carbon budget.

Similarly, greenhouse gas emissions tracking has commenced on the Sydney Metro City & Southwest project with emissions up until June 2020 tracking 15 per cent below the nominated carbon target, as shown in Figure 7.

Figure 6: Metro North West Line construction-related carbon emissions 2013-19.

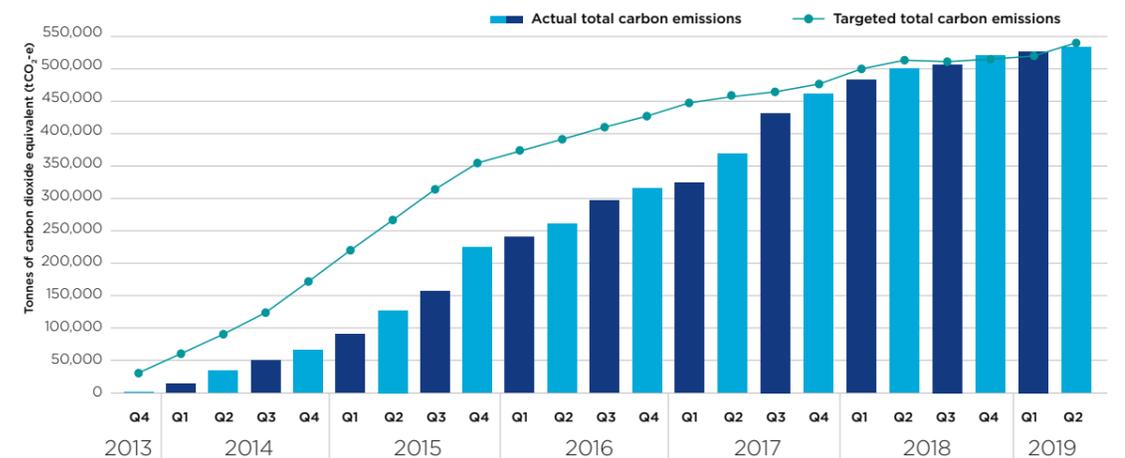
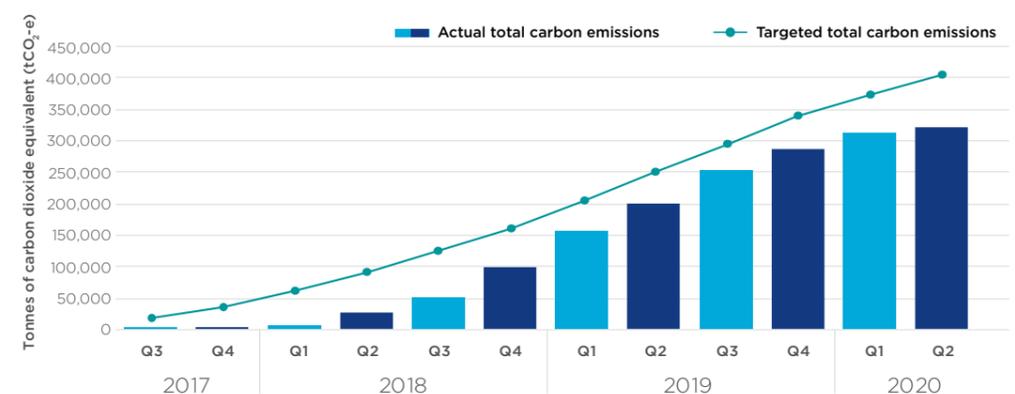
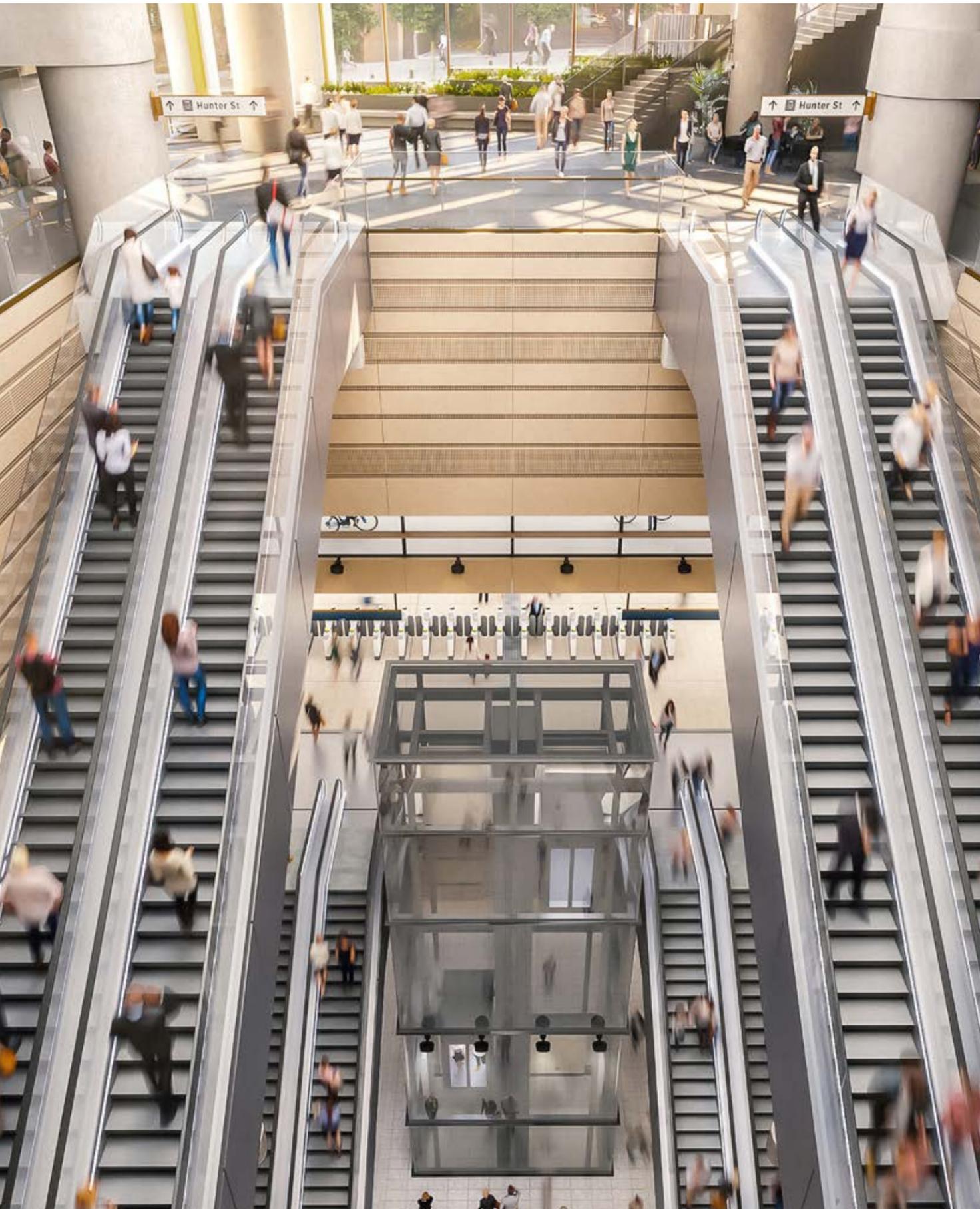


Figure 7: Sydney Metro City & Southwest construction-related carbon emissions 2017-19.



² Transport for NSW, Future Transport Strategy 2056. <https://future.transport.nsw.gov.au/>



Case study

Designing to reduce our energy consumption

Operations of escalators can contribute up to 20 per cent of underground station energy demand. The escalators to be installed on the Sydney Metro City & Southwest project have been designed to include a number of energy saving features. Key features include an automatic reduction in speed when there are no passengers and the ability to capture and reuse energy generated through braking (regenerative braking).

When modelled, these features demonstrate an improvement of 33 per cent in energy efficiency. With approximately 130 escalators being installed across the City & Southwest CBD stations, these savings contribute significantly to Sydney Metro reducing its carbon footprint.

Sydney Metro projects are also required to offset 20–25 per cent of carbon emissions associated with construction electricity. As of June 2020, this has been achieved on all completed Metro North West Line and Sydney Metro City & Southwest project contracts.

Some project sites have also used solar PV systems to power site facilities, with the Tunnels, Stations and Excavation (TSE) contractor installing such a system at the truck marshalling yard at White Bay.

The 14.2 kilowatt (kW) system comprised 40 solar PV panels and lithium-based battery storage with power generated by the system being used to power the site office, crib room, amenities and street lighting at the site. It is estimated that the initiative generated 21,000 kilowatt-hour (kWh) of energy per year and saved 12,200 litres of diesel fuel.

Since the commencement of operations in 2019, 100 per cent of the operational electricity used to power the Metro North West Line has been offset by Beryl Solar Farm. Similar offset commitments have been made for the Sydney Metro City & Southwest project.



Above: An artist's impression of escalators at Victoria Cross Station.

Left: An artist's impression of Martin Place Station.

6 Managing resources efficiently

6.1 Conserving natural resources

Sydney Metro is committed to resource efficiency and places a heavy focus on materials efficiency as well as recovery, reuse and recycling of waste on projects.

Through appropriate design and construction, Sydney Metro aims to minimise potable (mains) water consumption by reducing overall water demand and identifying and implementing opportunities to substitute potable water with water from non-potable sources, including maximising opportunities for reuse.

The Sydney Metro City & Southwest project includes a target to reduce potable water consumption by 33 per cent for both construction and operation. Although the design for some underground stations has not been able to meet the 33 per cent potable water reduction due to site and operational constraints (such as limited space for rainwater capture), the design for Barangaroo Station has been able to capitalise on its unique project context

to achieve a significant reduction in modelled operational potable water use of 90 per cent (refer to the following case study).

Since commencement of construction, the Sydney Metro City & Southwest project has achieved a 39 per cent reduction in potable water consumption for construction. With 62 per cent of the Tunnels, Stations and Excavation (TSE) contractor's water demand being used for cooling of the tunnel boring machine (TBM), a key construction initiative to reduce potable water use was the recirculation of water during tunnelling. Using a closed loop system which recirculates water and is periodically topped up with potable water helped achieve a 40 per cent reduction in potable water use across all the tunnelling contractor's activities, saving almost 500,000 kiloLitres (kL) of potable water.

Similar potable water targets will be set for Sydney Metro West and Sydney Metro - Western Sydney Airport.



Marrickville Spoil Removal – 100 per cent of usable spoil generated during construction has been beneficially reused.

6.2 Using low impact materials

Sydney Metro takes a lifecycle approach to assessing and mitigating the impacts associated with material use on the projects.

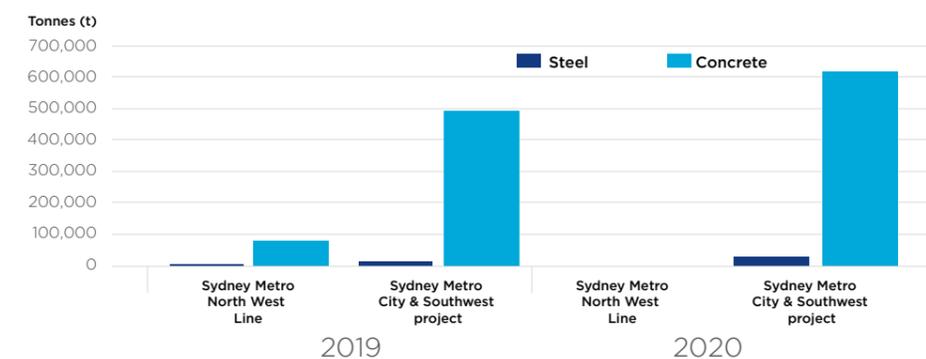
Concrete and steel make up the majority of materials used on Sydney Metro projects. The Metro North West Line and the Sydney Metro City & Southwest project have together used 1,997,145 tonnes of concrete and 112,535 tonnes of steel³ since the commencement of the program of works. Figure 8 below identifies the amount of concrete and steel used on Sydney Metro projects during the reporting period.

Recognising the high embodied carbon associated with steel and concrete, Sydney Metro has maximised opportunities to reduce our emissions. We have been:

- replacing Portland cement with low-carbon supplementary cementitious materials (SCMs)
- requiring at least 60 per cent of structural steel to be sourced from suppliers that use energy reducing processes.

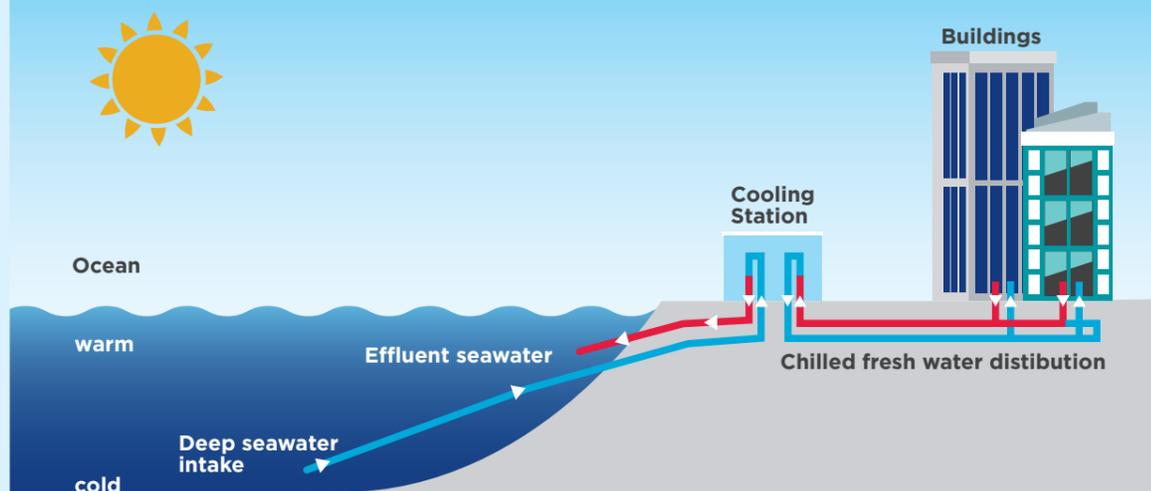
On average across the City & Southwest project to date, Sydney Metro has achieved a 39 per cent Portland cement replacement, exceeding our 25 per cent target and saving over 33,500 tonnes of carbon dioxide equivalent (CO₂-e).

Figure 8: Steel and concrete usage for the 2019 and 2020 financial years.



³ It is noted that the Sydney Metro Sustainability Report 2018 reported a higher cumulative steel value. This was due to an error in the data previously reported. This error has since been rectified and this report includes the correct and most up-to-date value.

Case study Optimising water efficiency at our stations

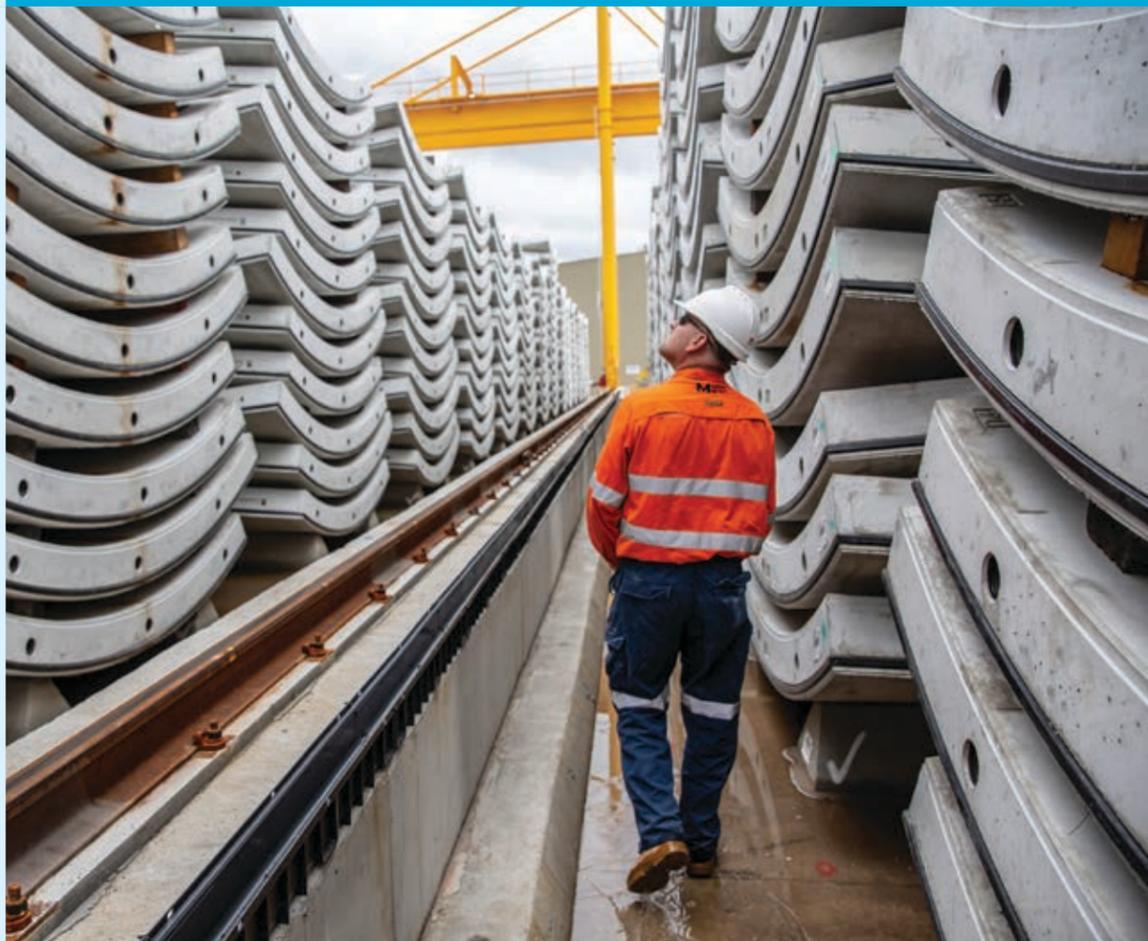


The new Sydney Metro City & Southwest station at Barangaroo will capitalise on its close proximity to Sydney Harbour to reduce the potable water demand associated with cooling the station during operations. A seawater-based heat rejection system has been included into the station design. The system will draw seawater from Sydney Harbour, which will be used to remove heat from the cooling system before it is returned to the harbour.

The unique system results in a reduction in estimated potable water consumption of over 10,000 kiloLitres per year compared with a business-as-usual heating, ventilation and air conditioning (HVAC) system. Additionally, the enhanced efficiency of heat transfer saves an estimated 14 megawatt hours (MWh) of electricity per year compared with a business-as-usual system.

Case study

Reducing carbon emissions through concrete initiatives



Concrete tunnel segments at Marrickville precast facility.

With 151,001 cubic metres of concrete being used to make over 99,000 segments for the Sydney Metro City & Southwest project tunnel lining, a significant opportunity existed to reduce carbon emissions associated with the project through innovative concrete mix design.

The Tunnels, Stations and Excavation (TSE) contractor developed a concrete mix design for the tunnel segments that contained 34 per cent supplementary cementitious material (SCM). This resulted in approximately 19,000 tonnes of Portland cement being replaced and a saving of over 38,000 tonnes of CO₂-e. This was equivalent to achieving a 46 per cent reduction in carbon emissions when compared with a business-as-usual approach. The environmental performance of the tunnel lining was further improved by using recycled water in concrete production, rather than mains water. More than 80 per cent of water used in the concrete was from recycled sources.

The TSE contractor also used BarChip in the application of almost 30,000 cubic metres of shotcrete across the project. BarChip is an environmentally friendly alternative to traditional steel fibre reinforcement in shotcrete. Made with recycled materials, this initiative improved durability and performance while achieving an 85 per cent reduction in carbon footprint when compared with traditional shotcrete.

6.3 Managing waste

Sydney Metro actively looks for opportunities to divert waste away from landfill, including through design solutions to reduce the amount of waste generated, reuse initiatives and recycling.

As of June 2020, Sydney Metro projects have generated 359,042 tonnes of construction and demolition (C&D) waste, of which 97 per cent (348,986 tonnes) has been recycled. This exceeds Sydney Metro's target of 90 to 95 per cent (depending on the project).

Sydney Metro also requires all contractors to beneficially reuse 100 per cent of clean spoil. To date, over 11.6 million tonnes of spoil has been beneficially reused across Sydney Metro and other projects, including industrial, housing developments and environmental restoration projects.

During the reporting period, the TSE contractor completed tunnelling with 4,165,580 tonnes of clean spoil reused at over 80 different sites.

Figure 9: Sydney Metro waste management during construction, 2019 and 2020 financial years.

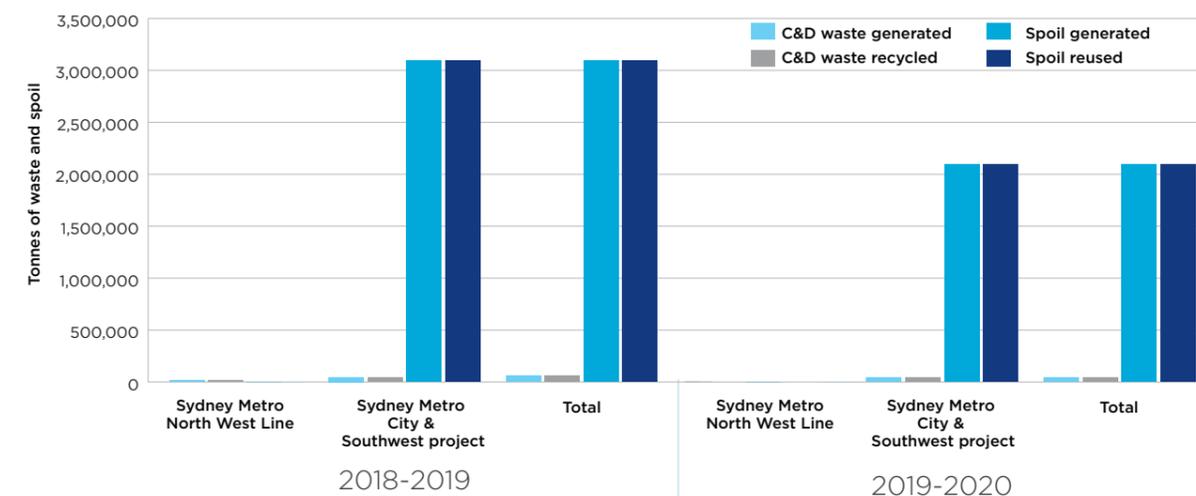
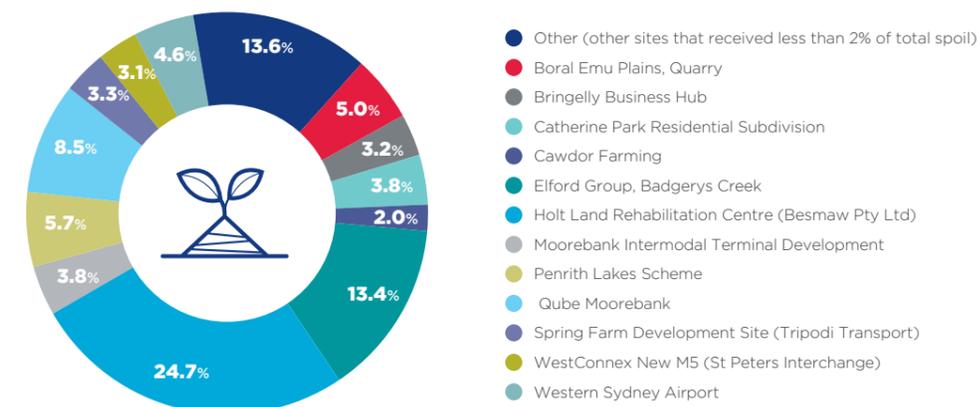
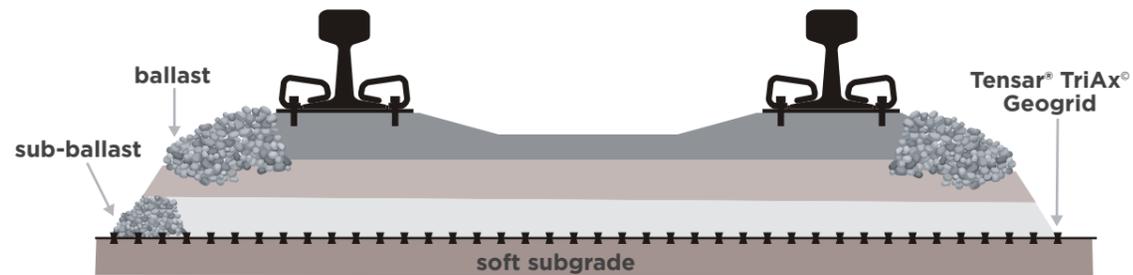


Figure 10: Reuse sites for spoil from the Sydney Metro City & Southwest tunnelling works.



Case study

Managing waste through design at Sydenham Station (GeoGrid track stabilisation)



Works at Sydenham Metro Upgrade includes the reconditioning of the existing track formation. This process would usually require the removal of 350-500 millimetres of the track subgrade material and replacement with imported rock fill.

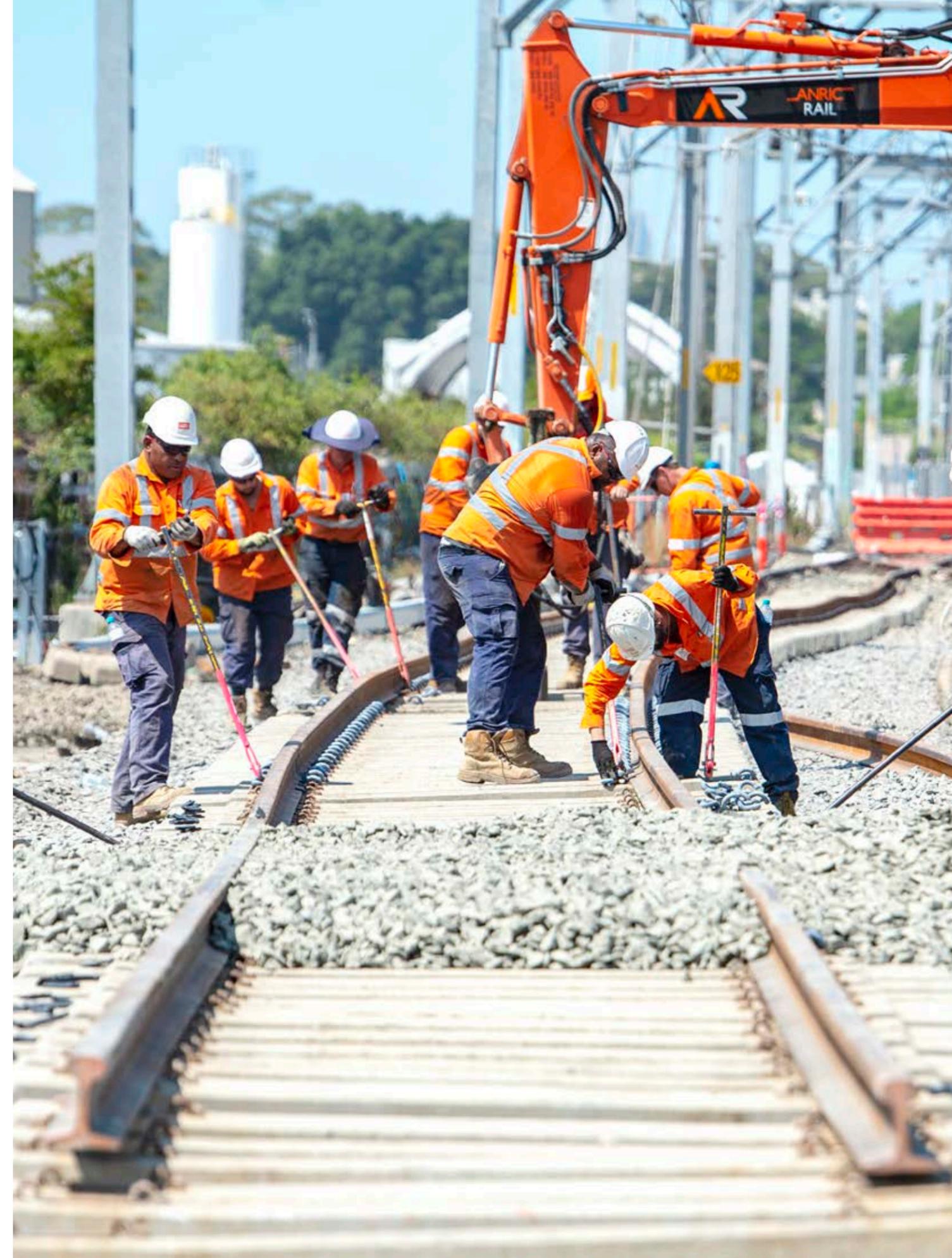
Instead of using traditional methods, the principal contractor proposed an alternate design that used a geo-composite membrane ('Geogrids') between the track subgrade and capping layer.

The first-time application on the TfNSW network eliminated the need to remove and replace over 8000 tonnes of material (16,000 tonnes in total). This reduced:

- spoil waste by over 8000 tonnes - with the spoil that would have required removal likely to be unsuitable for reuse
- truck movements by approximately 490
- embodied greenhouse gas emissions associated with the materials by approximately 88 tonnes of CO₂-e.

Additional benefits of the initiative included:

- reducing the number of track closures required to undertake the works and associated community impacts
- extending the design life of the track formation, meaning there are less maintenance requirements and reduced whole-of-life costs
- improving the flood resilience of the track formation.



Right: Track laying at Sydenham Station.

7 Driving supply chain best practice

7.1 Ensuring ethical procurement

Sydney Metro, through our delivery partners, has an extensive and complex supply chain of goods and services. Sydney Metro has a duty of care to ensure that our activities and the activities of our contractors and suppliers are undertaken in an environmentally and socially responsible manner that observes basic human rights and local labour laws.

The complex nature of our supply chain and the fact that the procurement of construction materials is outside our direct sphere of influence presents a heightened potential for environmental and social impacts and risks. To manage this risk, Sydney Metro requires its principal contractors to:

- prepare and implement a sustainable procurement policy and practices, in line with international standards such as ISO 20400:2017 Sustainable Procurement guidance
 - identify and provide training for potentially high impact suppliers
 - proactively manage risks where potentially high impact materials are sourced from a developing country.
- Key contractor activities over the reporting period have included:
- exercising a risk-based screening of suppliers
 - implementing audits of overseas suppliers where appropriate
 - working with suppliers to resolve any non-compliances.

Case study

Improving industry practices through effective supply chain management

The Sydney Metro City & Southwest project requires a risk-based approach to procurement, taking account of supply chain compliance to the International Labour Organisation's (ILO) fundamental conventions, the Principles of the United Nations (UN) Global Compact, and local laws and regulations. This approach is particularly associated with offshore supply chains.

A principal contractor on the Sydney Metro City & Southwest project developed a Materials Management Plan and carried out a full environmental and social risk assessment of all its procurement categories.

During the procurement of some high-performance structural steel, the principal contractor was advised by its Australian supply-chain partner that numerous constraints, including manufacturing lead times, would require the steel to be sourced from a steel mill in Indonesia. The mill complied with all the Sydney Metro environmental, quality, and safety certifications; however the principal contractor also arranged a 'social audit' to better understand compliance to aspects of ILO and UN Global Compact, such as human and labour rights, safety and environment.

The principal contractor engaged an auditor to visit the Indonesian steel mill. The audit included an inspection of the shop floor and on-site worker accommodation, and included worker interviews and a review of human resources and employment process. No labour or human rights breaches were identified; however 19 improvement opportunities were identified during the audit. The steel mill took steps to address all audit actions or provided clarifications to close out all audit findings and improve management practices.

As a result of corrective actions implemented, site practices were improved and the principal contractor was able to rate the mill as posing a low risk of non-compliance with social and environmental requirements.



MATES in construction '2020 Stronger Together' campaign launch.

7.2 Engaging our supply chain

Sydney Metro and its delivery partners are committed to enabling supply chain diversity through working to increase participation of small to medium enterprises, including recognised Aboriginal businesses and social enterprises. This is achieved through contractual mechanisms as well as principal contractor procurement initiatives, which encourage capacity and capability building.

The NSW Government has also established policies which support industry participation, such as the

NSW Aboriginal Procurement Policy. To date, on the Sydney Metro City & Southwest project, 690 small to medium enterprises have been engaged with 12.5 per cent (86) of those being recognised Aboriginal businesses.

During the reporting period, Sydney Metro has also partnered with Social Traders to facilitate better engagement with social enterprises. Engaging with social enterprises in the supply chain is a cost-neutral method of leveraging Sydney Metro projects to deliver social benefit to disadvantaged people.

Case study

Sydenham Metro Upgrade Supplier Sustainability Day

In August 2018, the Sydenham Metro Upgrade project hosted a Supplier Sustainability Day to provide subcontractors with information and guidance.

The event was chaired by the Supply Chain Sustainability School of Australia - a free learning environment that aims to create more sustainable supply chains for the property, construction and infrastructure industries in Australia.

Relevant stakeholders, including the Sydney Metro Upgrade Project Director, Sustainability Manager and Sydney Metro presented to over 100 attendees about requirements around sustainability, including:

- reducing environmental impacts of materials and resource consumption during construction
- providing social benefit through social enterprises
- creating opportunities for Aboriginal and apprentice participation.



Sydney Metro pre-employment program participants.

7.3 Leaving a workforce legacy

Sydney Metro provides a significant opportunity to support jobs and skills for a more diverse and inclusive workforce and supply chain. Sydney Metro's Workforce Development and Industry Participation Plan sets out how these priorities will be delivered while addressing key Australian and NSW Government policies and skills challenges. This commitment aligns with and supports points 9 and 10 in the 'NSW Government Action Plan: A ten point commitment to the construction sector' and the NSW Infrastructure Skills Legacy program.

Priorities

These include the following:

Industry participation

Increase opportunities for employment of local people and participation of small and medium enterprises including recognised Aboriginal businesses, and support industry to compete in both home and global markets through active participation in client-led programs.

Workforce skills development

Enable targeted and transferable skills development in areas with local and national skills shortages, support changing job roles and increase skill requirements, and embed transferable skills in the workforce.

Diversity and inclusion

Establish initiatives to increase diversity within the workforce and supply chain through collaborative partnerships with a key focus on Aboriginal participation.

Inspiring future talent and developing capacity

Engage young people via education and work experience and support vocational career development through apprenticeships and traineeships.

Collaboration

Sydney Metro will continue to collaborate with organisations that have a shared interest in driving skills, diversity, jobs and industry capacity through infrastructure projects.

These priorities are achieved through contractual arrangements and collaborative, client-led programs, strategic advisory groups with government and industry representatives and are complemented by initiatives from our contracting partners.

Initiative outcomes

The following data details the outcomes of some of these initiatives to date across the Sydney Metro projects.

Outcomes of workforce initiatives 2013-June 2020.

Industry participation



Over **41,470** people have worked across the Sydney Metro projects to date



5039 people employed in new sustainable jobs



1014 small to medium enterprises



467 work experience and graduate placements

Workforce skills development



Over **11,412** people have undertaken accredited training supporting upskilling and mitigating skill shortages



Over **15,600** units of competence delivered through Sydney Metro Industry Curriculum (SMIC)

Diversity and inclusion

Sydney Metro is committed to developing a diverse and inclusive workforce and supply chain.



5551 young people under 25



534 young people not in education and training



126 people with a registered disability



730 Aboriginal people



1829 long-term unemployed people



4304 people from culturally and linguistically diverse backgrounds

Inspiring future talent and developing capacity



342 new apprentices and trainees engaged for over 20 weeks



Over **739** apprentices and trainees have worked across Sydney Metro program of works



84 apprentices and trainees have participated in the Sydney Metro Apprentice and mentoring program

Sydney Metro Industry Curriculum (SMIC)* Case Study
 Sydney Metro Pre-employment Program (PEP)* Case Study
 * For further information refer to the Sydney Metro Sustainability Report 2018.

Sydney Metro Northwest Case Study
 Sydney Metro Infrastructure Skills Legacy Pilot Case Study

8 Valuing community and customers

8.1 Creating liveable cities

In addition to the delivery of a world-class metro service, Sydney Metro is also committed to objectives that improve liveability, accessibility, productivity and sustainability. These objectives are proposed to be achieved through the transformation of urban and suburban precincts, by improving place amenity through transport-led place making and urban renewal. The vision is for Sydney Metro station precincts to be a centre for communities. This has been achieved through:

- making a commitment to early and enduring place making and activation from day one operation of Metro services
- integrating station precincts with adjoining precinct areas, enabling better interface with adjoining developments, and contributing to an active public domain
- providing opportunities for others to enhance adjacent existing public spaces
- facilitating legible, safe and convenient interchange opportunities
- implementing design that contributes to a sense of place.

The urban design vision recognises that each station precinct is its own place, woven into its immediate context and wider neighbourhood. Accordingly, design strategies have been developed to maintain and enhance the relationship of stations to their context and community.

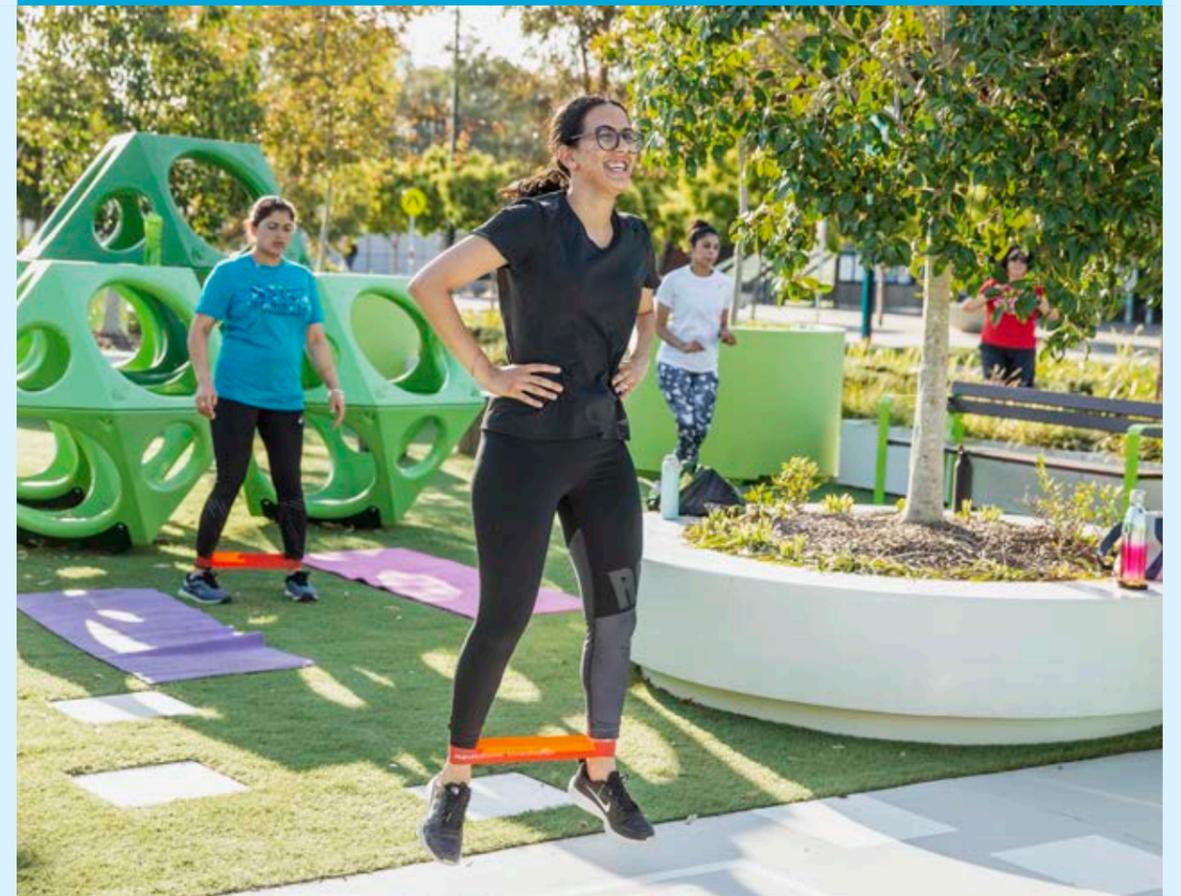
Over the past 18 months, Sydney Metro has developed place and precinct outcomes that enhance the public domain, create new places for jobs and housing, and safeguard future aspirations for broader precinct renewal and aspirations.

Leveraging Metro investment and to deliver sustainable station precincts, Sydney Metro has developed partnerships with local communities and stakeholders. This works to facilitate the process of place stewardship through activation and collaborative delivery of permanent place outcomes like parks, open spaces and community facilities.



Case study

Creating great public spaces in the Northwest



Tallawong Station pocket park.

Sydney Metro and Landcom have led the rezoning of residual lands around the Sydney Metro North West Line. Working collaboratively across government, future needs and opportunities have been identified for each precinct to ensure the needs of existing and future communities are met.

At Tallawong, Rouse Hill, a permanent park at the centre of the community has been identified as the priority for the precinct and will be the first part of the site completed.

In the meantime, a 300-square-metre pocket park has been delivered directly opposite the metro station from day one of the Metro North West Line operations, activating the site and encouraging a sense of community.

The pocket park not only provides the public with a space to use for activities and to rest, but also provides an interim space for the site developer (Deicorp), to test and trial uses and activities for the permanent park design.

The pocket park includes hardstand and utilities for events and pop-up retailers, children's play equipment, shade structure, seating, landscaping and rotating hoarding artwork content. The space has hosted a number of community activities since opening.

Left: An artist's impression of Church Square at Waterloo.

Case study

Waterloo Metro Quarter and Dulwich Hill Plaza



An artist's impression of Cope Street Plaza: A new community public space in the centre of the Waterloo Metro Quarter precinct.

The 'Waterloo Metro Quarter' will include development above and next to the metro station and will revitalise the broader Waterloo precinct as a strategic centre for jobs and homes in Sydney's inner city area. It will support the continued renewal of the Waterloo, Redfern and Alexandria areas, providing key connections to the Australian Technology Park as well as Redfern Station. The metro station will provide further capacity to develop and expand the Global Economic Corridor between the Sydney CBD, Green Square and Sydney Airport.

The over station development will revitalise Waterloo as it delivers new workplaces and homes, including residential apartments, affordable and social housing, and student accommodation supported by ground-floor retail and public space. The community will benefit from the changes to the local area with access to a range of job opportunities, shops, cafes, community facilities and a welcoming and engaging plaza – all with easy access to the Waterloo metro station.



An artist's impression of Dulwich Hill Station.

The station plaza designed for the upgraded Dulwich Hill Station will be open to Wardell Road and Ewart Lane, making it visible from the street and creating an inviting new public space. It will be a place to stop, rest and relax as well as enable access to the new southern station entry, and will be a catalyst for broader renewal in the precinct. A mix of native and deciduous trees will provide for summer shade and winter sun, while also building on remnant vegetation around the station and creating an urban canopy in the precinct.

8.2 Promoting active transport

With nearly every public transport journey starting or ending with a walking trip and cycling helping to extend public transport catchments, walking and cycling are an increasingly integral part of the transport system.

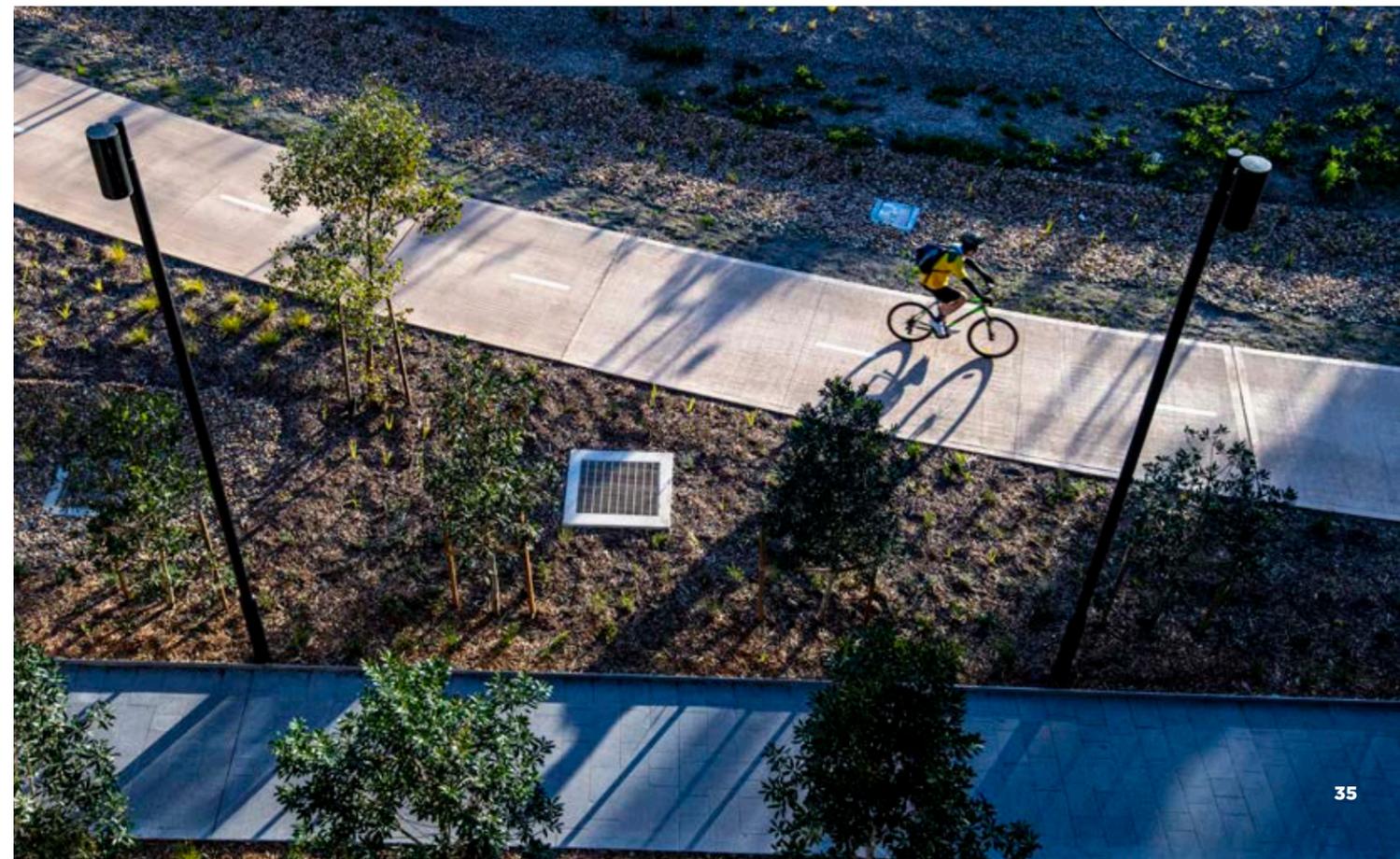
More people travelling by this 'active transport' improves network outcomes overall (such as reducing road congestion) in addition to delivering positive health, wellbeing and environmental outcomes. Sydney Metro is committed to enabling and encouraging people to walk or cycle as part of their everyday travel, whilst supporting customers with limited mobility.

As part of its City & Southwest project, Sydney Metro is delivering a Sydenham to Bankstown Walking and Cycling Strategy to help promote walking and cycling as a preferred mode of travel within the corridor. The Walking and Cycling Strategy provides a response to Condition of Approval E53 and Revised Environmental Mitigation Measure TO3, and helps to inform how Sydney Metro can contribute towards improving accessibility to and within the 11 station precincts that form part of the project.

The Walking and Cycling Strategy aims to support the delivery of key objectives identified in relevant NSW Government strategies such as the 'Greater Sydney Region Plan' and Future Transport 2056', and Local Strategic Planning Statements published by Inner West Council and City of Canterbury Bankstown. To achieve this, it captures opportunities to improve walking and cycling infrastructure that provide the highest value in promoting active transport trips.

A key opportunity identified by the Walking and Cycling Strategy is a connected series of new and upgraded shared paths and cycle routes that improve walking and cycling access between Sydenham and Bankstown. Sydney Metro is continuing design investigations in consultation with councils and other key stakeholders to improve the east-west pedestrian and cycling connections along the alignment.

The Walking and Cycling Strategy also recommends minimum bicycle parking provision at interchanges to meet forecast demand in 2026 and 2036, and Sydney Metro is ensuring that the project meets or exceeds these requirements. There are higher levels of bicycle parking (including secure facilities) provided at Sydenham, Campsie and Bankstown stations due to their roles as a Strategic Centre and/or transport hub.



Right: Cycle paths around Kellyville Station.

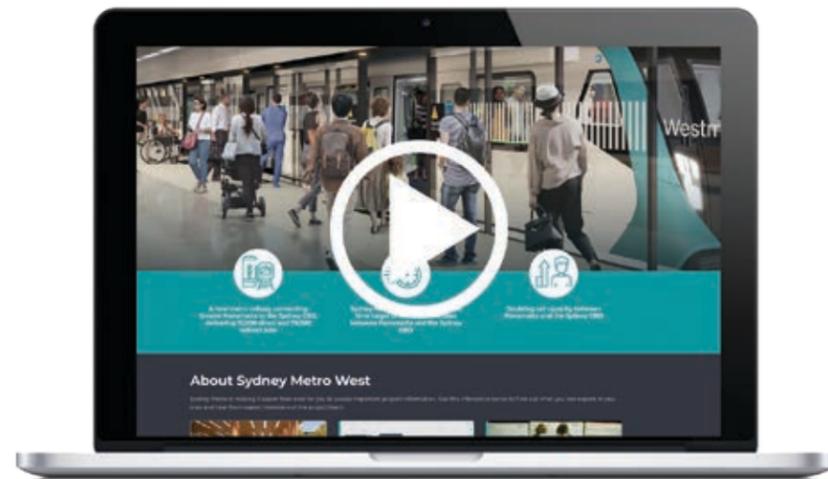
8.3 Engaging with the community and customer

Sydney Metro proactively engages with the community and customers across the project lifecycle – including through the environmental assessment process.

An example of where Sydney Metro went above and beyond to ensure a high standard of community engagement was for the Sydney Metro West Westmead to The Bays and Sydney CBD – Environmental Impact Statement (EIS). The EIS was released in April 2020 shortly after the implementation of restrictions in NSW in response to the COVID-19 pandemic. With face-to-face engagement unworkable, Sydney Metro adapted to the changing circumstances by modifying its engagement approach so the community could learn about the project, have their questions answered and understand how to have their say while the EIS was on exhibition. The modified approach included building an interactive portal and engaging communities and businesses through a program of proactive stakeholder outreach services.

Interactive portal: Sydney Metro launched an interactive portal to provide an informative and accessible way for the community to view and access the Environmental Impact Statement and project information. Community members were able to explore interactive maps and learn what to expect from the project in their area.

Virtual information room: The interactive portal was also used to host Sydney Metro's first virtual information room which gave the community and stakeholders the opportunity to 'walk around', read information boards and hear from the experts. The virtual information room hosted over 4727 visitors over a period of four weeks during the second half of the public exhibition period.



Sydney Metro Interactive portal.

Over the reporting period, Sydney Metro also conducted a number of research projects which will inform the design and requirements of future projects. Research has focused on a broad range of topics, ranging from vertical transport to internal carriage design. One such research piece involved conducting surveys between 20 June and 17 July 2019 to understand customer views on social and environmental responsibility. This formed part of a collaborative research piece and will help shape future sustainability initiatives.

8.4 Enhancing Aboriginal participation

Sydney Metro acknowledges the importance of understanding cultural perspectives, and collaborating with and providing opportunities for Aboriginal people as part of our project development, delivery and operations.

We acknowledge the traditional custodians of the land, and provide a platform for our Aboriginal communities to share invaluable knowledge of Country and allow for opportunities for involvement on our projects. During the early project development on Sydney Metro West, local Aboriginal communities were invited to take part in a number of workshops. These workshops provided an opportunity for local Aboriginal cultural knowledge to be shared in a safe environment with the understanding that Sydney Metro recognises the importance of cultural narratives, histories and values.

In 2018, TfNSW launched its Reconciliation Action Plan (RAP), which defines key targets in relation to making a positive difference to Aboriginal peoples in areas such as employment, empowerment and economic development.

The TfNSW RAP is aligned with the NSW Premier's Priorities, the Public Service Commission Aboriginal Employment Strategy and wider NSW Government policies such as the Aboriginal Procurement Policy (APP). Sydney Metro actively participates in the TfNSW Reconciliation Advisory Committee project team and will support the implementation of the TfNSW RAP.

8.5 Conserving our heritage

With Sydney Metro's geographical reach across Sydney our interaction with built heritage and Aboriginal and non-Aboriginal archaeology is ongoing.

Recognising and conserving Aboriginal cultural heritage is a significant part of Sydney Metro's heritage program. As part of our planning approval documentation, Sydney Metro prepares Aboriginal Cultural Heritage Assessment Reports which provide an assessment of likely cultural heritage and archaeology and methodologies for consulting with the Aboriginal community and managing Aboriginal heritage. Sydney Metro also develops site-specific interpretation related to Aboriginal culture and heritage at each of our metro stations.

The works at Central Station and a number of other sites at which works have been undertaken have also uncovered Aboriginal stone artefacts. This work was carried out in consultation with Registered Aboriginal Parties who are involved at all stages of the archaeological investigation program. It is anticipated that Sydney Metro West and Sydney Metro – Western Sydney Airport will address Aboriginal culture and heritage further and preparation for this has commenced, including exploring the potential to develop Aboriginal cultural design principles for application on the projects.

A number of non-Aboriginal heritage finds have also been uncovered through the Sydney Metro City & Southwest archaeological program. In addition to our extensive archaeological program, Sydney Metro together with our delivery partners is working carefully to protect heritage items adjacent to or above our construction sites. Figure 11 provides a snapshot of some of the more significant non-Aboriginal heritage finds occurring during the reporting period, as well as initiatives to protect heritage along the alignment.



Smoking ceremony at Marrickville.

Conserving Sydney's heritage



White Hart Inn

The White Hart Inn was listed as significant on the State Heritage Register, Sydney Metro's first State Significant item. Artefacts associated with the White Hart Inn were also provided to the Faculty of Arts at Macquarie University for ongoing research and display.



Blues Point

Work at the TBM retrieval site uncovered footings of several 19th century houses and associated artefacts on the shores of Sydney Harbour. One of the earliest houses on the site (pre 1857) is associated with John Stevens, who acquired the site from the estate of Billy Blue, after who Blues Point is named. In 1817 Billy Blue had arrived as a convict and was the official ferryman for the North Shore, with rowing services from Dawes Point to Blues Point. His ferry service was the first major transport link to open up Sydney's North Shore.



Barangaroo

In 2018, an excavation site uncovered the remains of a 10-metre long clinker built boat. The boat is the oldest known vessel of its type and of State and potential national heritage significance. It was discovered sandwiched between the remains of 1850s and 1830s stone jetties. Sydney Metro and its consultants are currently conserving the remains of the boat and analysing its archaeological context.



Martin Place

Sydney Metro provides monitoring of the adjacent State Heritage Listed 50 Martin Place. Sydney Metro has undertaken detailed engineering assessments and ongoing monitoring of the building to ensure it is not impacted by our work.



Central Station

Central Station was originally built on Sydney's oldest colonial burial grounds, Devonshire Street Cemetery. The Sydney Metro archaeological program uncovered human remains, vault structures, grave cuts and grave plates. One mid-19th century grave cut identifies the interred as Joseph Thompson. Sydney Metro is consulting with Mr Thompson's descendants about the find and is planning with them an appropriate commemorative ceremony.



Waterloo

The excavation of the station box for Waterloo Station site also uncovered remnants of mid-19th century housing as well as a range of fascinating artefacts including an internal floor made of inverted stoneware bottles.



Marrickville Station

Sydney Metro and its delivery partners work carefully to protect heritage items adjacent to or above our construction sites including the existing southwest stations.

Case study

Uncovering our maritime history



Century boat uncovered at Barangaroo Station site.

In September 2018, excavation works at Barangaroo Station uncovered the unexpected find of a timber vessel. The boat was located next to the archaeological remains of the Langford's and Cuthbert's boatyards on the eastern edge of Darling Harbour. The significance of this discovery soon became clear as it was determined that the boat was possibly the earliest clinker-built timber vessel found in archaeological contexts in Australia.

The boat was covered with marine sediment and appears to have been dumped or abandoned next to the boatyards. Inside the boat were fragments of leather, rope and loose timbers.

Given the rarity of the find, careful consideration was given to the ways in which it could be removed from the construction area while maintaining its physical condition and significance. The options considered ranged from lifting the vessel whole to dismantling it piece by piece. Eventually the boat was disassembled, first removing the items within it and then carefully taking it apart, recording each element to allow for its later reconstruction.

Treating the boat in the field required the advice of archaeologists, engineers and conservators. All of the timbers had to be kept safe, intact and moist once uncovered and during their transport to an offsite storage facility.

The remains of the boat are estimated to be around 8.6 metres long and about 3 metres wide. It may have had a tonnage of between 7 and 12 tonnes.

Today the remains of the timbers are undergoing careful conservation. The boat has been disassembled and the timbers placed in large pools. The next stages of conservation will see the timbers chemically treated so that they retain their form when the slow process of drying them out commences in coming years. It is anticipated that the boats and the artefacts found with it will be put on display in the future and will form a lasting archaeological legacy from the Sydney Metro project.

8.6 Promoting social outcomes and community benefits

Together with our delivery partners, Sydney Metro seeks to make a positive contribution to community health and wellbeing. This means proactively seeking improvements beyond managing and mitigating our impacts.

Over the 2019–20 financial year, Sydney Metro staff participated in a number of fundraising events to support the homeless and those living in poverty including the St Vincent de Paul's Vinnies CEO Sleepout and Oxfam Trailwalker (2018 and 2019).

In August 2019, Sydney Metro's participation in the Oxfam Trailwalker, along with teams from Rolling Stock Delivery, saw TfNSW cross the finish line as the highest corporate fundraiser – raising over \$45,000 for the event.

At a project level, Sydney Metro has established targets with our contractors for identifying and completing projects that benefit local communities. This includes the delivery of both construction-stage and longer-term initiatives to establish immediate benefit as well as a lasting positive legacy. It is anticipated that these opportunities will increase as the City & Southwest project construction phase ramps up. Some of the initiatives undertaken by our delivery partners during the reporting period include the following:

- The TSE contractor rolled out a 'Return and Earn' container deposit scheme to improve recycling, partnering with social enterprise Citizen Blue which provides a collection service. The proceeds of the scheme go toward supporting seriously ill children via charity Bear Cottage.
- The Sydenham Metro Upgrade contractor donated items that would otherwise be sent to landfill to local community groups and charities, including excess stock to local charity Reverse Garbage, which specialises in reuse and recycling of materials, and 270 hay bales to Little Oak Farm Sanctuary.
- The Central Station contractor has partnered with two homeless charities, developing a program of works with both.
- Contractors participated in Clean Up Australia Day, Movember and the Vinnies CEO Sleepout.
- Contractors contributed to food and clothing drives for various charities.

Case study

Sleeping out to support homeless

Each year the St Vincent de Paul Society holds the Vinnies CEO Sleepout, aimed at raising awareness of the growing issue of homelessness. Business and community leaders across the country are challenged to sleep rough for a night, while raising vital funds to provide services to those who are homeless or at risk of being homeless.

On 18 June 2020, the Sydney Metro City & Southwest Project Director, Hugh Lawson, supported by various leaders across the business, took part in the annual Vinnies CEO Sleepout, raising nearly \$20,000 for the homelessness charity, almost double the original fundraising target.

'Participating in the Vinnies CEO Sleepout was certainly an enlightening experience, giving me just a small insight into what it might be like to sleep rough. The experience certainly made me more grateful for some of the things I take for granted day to day. With the impact of COVID-19 on friends and family, it has really brought into focus for me just how vulnerable we all are to potentially becoming homeless – I am truly thankful to the whole Sydney Metro team for supporting this worthy cause.' **Hugh Lawson**

Case study

Delivering community benefits around Central Station

The Central Station contractor, Laing O'Rourke, identified two local charities to support through a range of activities including regular fundraising, volunteering of time and resources for repairs, and undertaking upgrades to facilities and donating food and clothing. These charities are:

- **Salvation Army's Foster House** – provides crisis accommodation for approximately 125 homeless men each night as well as support services including living skills training, recreational pursuits, case management, medical centre and detoxification unit.
- **Women's and Girls' Emergency Centre (WAGEC)** – delivers a range of crisis and early intervention accommodation and support services to women, children and families who are experiencing, or are at risk of, homeless and/or domestic and family violence.

Through ongoing discussions with each charity, Laing O'Rourke has identified and implemented appropriate community benefit initiatives that suited the needs of each organisation. Examples include:

- Laing O'Rourke's annual food drive for WAGEC, with project team members donating food, hygiene products and preloaded Opal cards. Similarly, a Toy Drive is organised annually ahead of Christmas time to empower mothers to choose their gifts from the donated toys, or alternatively go shopping with the donated voucher cards.
- In partnership with sub-contractors, Rapid Construction and NASS, Laing O'Rourke volunteered time and resources to undertake a facility upgrade of one of the accommodation dormitories at Foster House. The project included designing and installing dividers between beds to provide dignity and privacy to overnight residents as well as make space for an extra bed space, which now provides crisis accommodation for an additional homeless man every night. The initiative also included the replacement of over 200 ceiling panels that were worn or damaged. As people respond to the environment around them, key outcomes of the initiative included improved self-value and mental health among residents through the creation of spaces with improved comfort, privacy and emotional safety.

Case study

Promoting employment opportunities to disadvantaged people through social enterprises

The Sydenham Metro Upgrade team has engaged social enterprise Clean Force to provide cleaning services to the site office. Clean Force is a not-for-profit professional commercial cleaning service providing meaningful jobs and support for people who have a disability or experience other barriers to employment. They also assist the project with their recycling efforts through a 'Return and Earn' scheme. By recycling via Clean Force, the project generates funds that help keep more disadvantaged staff in employment and leads to increased positive social outcomes in the community.

Clean Force has undertaken an independent Social Return on Investment study, which concludes that for every \$1 invested, \$6.10 is returned in social economic value. The independent report concluded that six key stakeholder groups benefit from their operations, including supported employees, open employees, parents/primary carers of supported employees, case managers of supported employees, employers and government.

'The John Holland Lang O'Rourke JV had the foresight to look past the mainstream cleaning companies and engage a not for profit disability enterprise for their cleaning requirements which has employed two disadvantaged people to work on their project full time. They are the first in NSW to do so and we look forward to building our great relationship on future infrastructure projects.'

Tony Daoud, Operations Manager, Clean Force Property Services.



Right: Sydney Metro pre-employment program.

9 Respecting the environment

9.1 Our approach to environmental management

To ensure we optimise environmental outcomes, Sydney Metro takes a lifecycle approach to managing our environmental impacts, influencing our projects from early development through to construction and operation.

This ongoing commitment is evident through our sustainability principles, environmental management system and construction frameworks, which all aim to minimise environmental impacts to the environment and surrounding communities. During the reporting period, Sydney Metro commenced certification of our environmental management system to the International Standard for Environmental Management Systems ISO 14001:2015, with certification anticipated in the next reporting period.

As Sydney Metro plans for the future projects – Metro West and Sydney Metro – Western Sydney Airport – we are continuously reviewing and adapting our systems to ensure the highest level of environmental outcomes.

9.2 Project environmental performance

Sydney Metro is committed to best-practice environmental management. Key environmental management outcomes over the reporting period include the following:

- No significant environmental incidents have occurred across the Sydney Metro program to date. Of the 159 environmental incidents reported, 158 were classified as Class 3 (the lowest level) and one was classified as Class 2.
- Audits and inspections identified a total of 61 non-compliances (0.02 per 100 requirements) against our planning approval requirements, resulting in over 99 per cent compliance with planning approvals.

All non-compliances have had corrective actions implemented and have been, or are in the process of being, closed out.

Figure 12: Environmental compliance rate, 2019 and 2020 financial years.



9.3 Minimising our impacts

Sydney Metro is committed to minimising environmental impacts associated with our activities and working to achieve environmental improvements. We actively identify and implement initiatives to minimise our impacts both during and post construction.

One way in which Sydney Metro aims to minimise our impacts is through the inclusion of plantings and green infrastructure across the project to support the implementation of the NSW Premier's Priorities for a Better Environment. Tree planting on the Sydney Metro City & Southwest project is to commence shortly with provision of green infrastructure and urban tree canopy likely to be a focus on Sydney Metro – Western Sydney Airport and Sydney Metro West.

The incorporation of plantings also assists in improving visual amenity. The Southwest Metro Early Works contractor applied a product called Eco-Blanket to embankments adjacent to the Cooks River where works had previously been undertaken. Eco-blanket is a soil stabilisation product containing a native seed mix that is easily applied to exposed soil. It is anticipated that the initiative should provide some improved visual amenity improvements as the native grasses and shrubs contained in the mix begin to grow.

Case study Improving local amenity around our construction sites



Local artists Joanne Casady, Georgia Hill, Dan O'Toole and Tim de Haan used the hoarding around the Marrickville dive site for a temporary mural.

As part of the works undertaken by the Tunnels, Stations and Excavation contractor at the Marrickville dive site, a section of construction hoarding was transformed with a temporary mural, designed to visually integrate with the local community.

The Tunnels, Stations and Excavation contractor took the opportunity to transform a 125-metre stretch of hoarding with a 3-metre high mural. The mural was commissioned by the tunnelling contractor, as part of its positive legacy program to support the local community and enhance the amenity of the area.

The diverse group of four artists, all with links to the local area, collaborated to create one harmonious mural which celebrates the unique qualities of the Inner West. The artwork explores the ideas of identity, First Nations people, native flora and fauna and street art culture.

The mural wraps around the site from Murray Street, along Edinburgh Road and onto Sydney Steel Road, providing an attractive feature along a popular thoroughfare for pedestrians, cyclists and motorists near the Marrickville Metro shopping centre, Sydenham train station and businesses in the industrial area.

10 The year ahead

Looking forward – with one project in operations, one in construction and two in procurement – our sustainability activities over the next year will be focused across almost the entire project lifecycle.

Other key areas of focus over the next year will include:

- embedding sustainability considerations into the design and procurement activities for Sydney Metro West and Sydney Metro – Western Sydney Airport
- ensuring a continued high level of performance against the Sydney Metro City & Southwest sustainability targets

- reviewing and monitoring operational sustainability performance on the Metro North West Line;
- attaining and maintaining ISO 14001 accreditation of our Environmental Management System
- reviewing our approach to climate resilience and identifying and implementing areas for improvement
- exploring opportunities to enhance ecological outcomes.

Figure 13: Sustainability-related activities over the project lifecycle.



Planning and early stage design

- Assessment of environmental and social impacts during the early decision making stage
- Climate Change Risk Assessment to inform decision making and project development
- Identify and address project specific challenges and opportunities e.g. – spoil reuse, revegetation, urban heat island effect
- Develop and refine sustainability requirements and embed into project contracts
- Work with the design team to optimise energy and water efficiency, use low impact materials and optimise social outcomes.

Detail design

- Review and refine designs for sustainability performance
- Incorporate climate change mitigation measures
- Support achievement of sustainability ratings
- Advocate for best-practice design solutions
- Host contractor knowledge share sessions or guide and support contractors to improve sustainability performance.

Construction

- Report resource consumption and waste management
- Manage procurement/ supply chain risk
- Identify and implement community benefit initiatives
- Engage social enterprises in the supply chain
- Finalise as built sustainability ratings.

Operations

- Procure operational carbon offset
- Electricity consumption management
- Customer engagement
- Public reporting.

End of life

- Manage disposal of assets through promoting reuse and recycling options wherever possible.



Right: An artist's impression of Crows Nest Station.

Appendices

Appendix A: Sustainability data breakdown

Data	Unit of measure	Sydney Metro City & Southwest project				Metro North West Line				Sydney Metro
		Target	FY 2018-19	FY 2019-20	Cumulative to date	Target	FY 2018-19	FY 2019-20	Cumulative to date	Cumulative to date
Project construction data										
Project construction carbon emissions	Tonnes CO ₂ -e	No target	184,599	143,498	363,198	No target	33,116	N/A	536,667	899,865
Construction electricity offset	% of construction electricity offset for completed contracts	25%	N/A	N/A	25%	20%	N/A	N/A	20%	N/A
Total construction and demolition waste generated	Tonnes		46,669	44,849	224,118		15,872	N/A	134,924	359,042
Construction and demolition waste reused/recycled	Tonnes		44,278	43,735	220,468		15,499	N/A	128,518	348,986
	% of total waste generated	90%	95%	98%	98%	95%	98%	N/A	97%	97%
Usable spoil generated	Tonnes		3,091,695	2,094,018	5,266,049		0	N/A	6,416,099	11,682,148
Usable soil beneficially reused	Tonnes		3,091,695	2,094,018	5,266,049		0	N/A	6,416,099	11,682,148
	% of usable spoil generated	100%	100%	100%	100%	100%	N/A	N/A	100%	100%
Total water consumption	kL		415,294	805,789	1,278,378		12,291	N/A	889,283	2,167,661
Water sourced from non-potables sources	kL		188,385	308,449	308,449		0	N/A	227,738	727,340
	% of total water consumption	33%	45%	38%	39%		0%	N/A	26%	34%
Steel use	Tonnes	No target	13,579	28,319	47,447	No target	1,097	0	60,308	107,755
Concrete use	Tonnes	No target	491,430	618,239	1,177,455	No target	80,108	0	1,478,756	2,656,211
Major pollution incidents	No. of major pollution incidents	0	0	0	0	0	0	0	0	0
Operational data										
Operational electricity consumption	kWh		N/A	N/A	N/A		12,002,785	86,753,302	98,756,087	98,756,087
Operational electricity offset	kWh		N/A	N/A	N/A		12,002,785	86,753,302	98,756,087	98,756,087
	% of total operational electricity consumption	100%	N/A	N/A	N/A	100%	100%	100%	100%	100%
Carbon emissions offset	CO ₂ -e		N/A	N/A	N/A		8,888	79,992	79,992	88,880

N/A: Not applicable

Appendix B: Industry awards

Award	Date	Award description	Awarded to
2019 Green Globe – Climate Change Leadership Award	November 2019	Celebrates those who are working to minimise the impacts of climate change. This award recognises exceptional work that is leading in the field of climate change and adaptation in New South Wales. Taking us closer to net-zero emission and making our state more resilient to a changing climate	Sydney Metro Northwest team
2019 Green Globe – Climate Change Leadership Award	November 2019	Celebrates those who are working to minimise the impacts of climate change. This award recognises exceptional work that is leading in the field of climate change and adaptation in New South Wales. Taking us closer to net-zero emission and making our state more resilient to a changing climate	Sydney Metro Northwest team
2018 ISCA – IS Emerging Leader Award	October 2018	The award celebrates the person aged 30 years or younger demonstrating leadership in infrastructure sustainability	Laura Pritchard, Sustainability Manager at Sydney Metro

Appendix C: Global Reporting Initiative

Sydney Metro recognises the importance of international best-practice reporting frameworks such as the Global Reporting Initiative (GRI) Standards. As such, in preparing this report Sydney Metro has used the GRI, but only as a guidance tool.

The topic areas within the GRI framework that are material to Sydney Metro were determined based on work undertaken in 2018. Given changes to Sydney Metro as an organisation since 2018, Sydney Metro will look to review the material topics to inform future sustainability reports.

No verification or external assurance has been undertaken on this report.

