

# Protect our natural endowments

08



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## Strategic directions

- ▶ Foster sustainable use of natural resources and construction materials through reuse and recycling
  - ▶ Embed a strategic and practical approach to managing biodiversity
  - ▶ Capitalise on blue-green infrastructure opportunities
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Infrastructure decisions made today will have a tangible, enduring impact on NSW's ability to meet environmental priorities now and into the future. While the transition to Net Zero has taken centre stage, it is only one part of a broader set of closely interlinked environmental challenges involving resource use, waste and the natural environment.

Infrastructure that is environmentally sustainable protects and enhances the natural environment. It enables the efficient use of resources, mitigates pollution and contributes to liveable and resilient places. The State's infrastructure can contribute to environmental sustainability by:

- ▶ meeting environmental and sustainability standards and benchmarks in delivery
- ▶ enabling environmental sustainability outcomes such as waste reduction or biodiversity conservation.

Environmental sustainability has often been a secondary consideration when developing and delivering infrastructure, but this is changing rapidly. Higher community expectations, increasing

environmental pressures and the potential impacts of a changing climate mean that environmental sustainability must be elevated among NSW infrastructure delivery priorities.

### 8.1 Sustainable infrastructure development

Investor interest in sustainable infrastructure is increasing, driven by environmental, social and governance (ESG) expectations and demands for high performing assets. Sustainable assets typically attract commercial premiums and often have lower whole-of-life costs.<sup>293</sup>

There is also increasing demand for sustainable finance. The first TCorp issue of the NSW Sustainability Bond Program was oversubscribed and other Australian jurisdictions are following suit. Green and sustainability bonds can make an important contribution to financing future infrastructure needs and lowering borrowing costs.

### Adopting industry-standard sustainability metrics

Infrastructure and building sustainability standards, ratings and benchmarks have increased the uptake of sustainable and low carbon building materials and improved energy efficiency, in addition to reducing water use and waste materials. Higher upfront costs traditionally associated with these initiatives are becoming less material, with the NSW Chief Scientist noting the construction cost differential between a 6-star Green Star rated building and a 5-star one is approximately 1.5%.<sup>294</sup> Several projects in NSW, such as Parramatta Light Rail, have already achieved high sustainability standards.

The routine adoption of industry-standard sustainability metrics will improve asset performance and investment attraction. These include Infrastructure Sustainability Council's IS Ratings, Green Star Ratings, the National Australian Built Environment Rating Scheme (NABERS) and GRESB (the global ESG benchmark for financial markets).<sup>295</sup> These metrics objectively measure and enable consistent reporting of sustainability performance of infrastructure assets, and are used by private sector investors to make investment decisions.

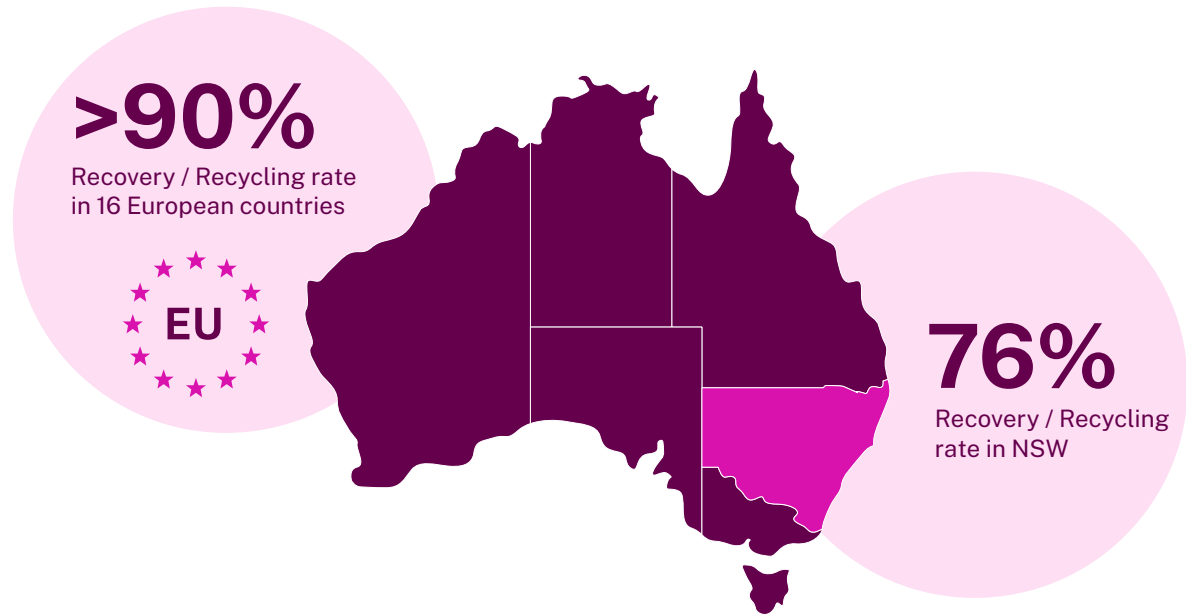
The NSW Government will benefit from improving the sustainability performance of infrastructure assets through increased investment attraction, higher asset performance and reduced operational expenses and should adopt industry standards where feasible. For example, new or retrofitted sustainably designed social housing will have improved energy efficiency, thermal performance and water use – reducing operational expenses for government, as well as reducing financial pressures on tenants.<sup>296</sup>

Adoption of sustainability metrics in project development and delivery is not standard NSW practice. This should change, and the use of these metrics should become standard practice for all major infrastructure projects, as well as NSW’s social housing stock. Standards should prescribe measurable outcomes rather than methods, design or materials, and allow for certification of innovative approaches on a flexible basis.

**Supporting a sustainable infrastructure industry**

Infrastructure is resource-intensive. While the construction and demolition sectors in NSW (which include infrastructure) have relatively high recovery/recycling rates,<sup>297</sup> many countries in Europe, including the UK, report considerably higher rates, as shown in Figure 8.1.<sup>298</sup> The construction sector is the single largest contributor to waste in NSW, with waste volume growing by almost 6% a year between 2016 and 2020.<sup>299</sup> Current levels of recycling are inadequate to support NSW’s transition to a circular economy.

**Figure 8.1 – Recovery/ recycling rates in Australian and European construction and demolition sectors**



Source: Infrastructure NSW, based on NSW Environment Protection Authority (2021) and NSW Government (2020) data

Sustainability challenges associated with infrastructure projects include:

- ▶ carbon intensive building materials and construction processes
- ▶ levels of resource consumption/re-use
- ▶ amount of waste production
- ▶ management of hazardous materials and linear supply chains
- ▶ complex and expensive construction and demolition waste diversion
- ▶ avoiding, mitigating and offsetting impacts on biodiversity.

The Government Resource Efficiency Plan already commits the NSW Government to demonstrate sustainability outcomes in its infrastructure program in the procurement of related goods and services. The need for this is reinforced by advice from the NSW Chief Scientist who has noted the important role governments can play by using procurement levers to drive the development and adoption of sustainable infrastructure, both within government and by industry. This includes measures to:<sup>300</sup>

- ▶ grow the market for efficient and modular designs that are more resource efficient and incorporate sustainable materials
- ▶ grow local supply chains in sustainable, reused and recycled construction materials
- ▶ increase re-use and recycling of building materials and construction and demolition waste
- ▶ foster new markets for ecosystem services and sustainable land use practices.

Increased utilisation of existing assets, for example through renovation or re-use, can reduce the resources that would otherwise be needed through a new build.<sup>301</sup> In addition, there is increasing recognition and adoption of circular economy concepts in infrastructure business cases, such as the adoption of renewable energy and resource use in waste management systems.<sup>302</sup>

There are also solutions emerging through new technology (such as blockchain-enabled material passports) that can verify the origin of construction materials, better track and measure their performance and foster exchange and re-use of materials between projects.

There is emerging leadership in this area. The NSW Government has joined industry partnerships such as the Materials & Embodied Carbon Leaders' Alliance (MECLA). NSW Government infrastructure agencies are also engaging with their supply chains on ways to incorporate sustainability measures as standard practice through contracting arrangements. Private sector delivery partners are also increasingly improving the sustainability of their own supply chains due to investor-driven ESG considerations.

With recent strategies, the NSW Government is committed to embedding circular economy principles in decision making and can lead the nation in increasing the sustainability of infrastructure projects.<sup>303</sup>

## 8.2 Waste policy for a circular economy

The NSW Government recently published the NSW Waste and Sustainable Materials Strategy (NSW Waste Strategy) 2041 which establishes short- and long-term targets to be achieved over the next 20 years.

The key objectives of the NSW Waste Strategy are to:

- ▶ meet future infrastructure and service needs
- ▶ reduce carbon emissions through better waste and materials management
- ▶ build on existing work to protect the environment and human health from waste pollution.

The NSW Waste Strategy and related documents establish a framework to target key waste streams, guides infrastructure investment to meet demand for residual waste management and recycling, and achieve zero emissions from organic waste by 2030.

### Waste management creates circular economy opportunities

NSW generates around one-third of Australia's total waste. In 2019–20, total waste generated per capita in NSW was 2.65 tonnes.<sup>304</sup> Over the next 20 years, NSW waste volumes are forecast to grow from 21 million tonnes in FY2021 to nearly 37 million tonnes in FY2041 (see Figure 8.2).

**Figure 8.2 – Waste volumes in NSW**



**2.65 tonnes**

of waste was produced  
**per person** in NSW in **2019**

**21m tonnes**

of waste produced in NSW in **2021**

**37m tonnes**

of waste projected in NSW by **2041**

Source: Infrastructure NSW, based on NSW Environment Protection Authority data (2021)

The Australian Government commenced a ban on waste exports on 1 January 2021. By July 2024, bans will be in place for glass, mixed plastics, used tyres, single resin/polymer plastics and mixed unsorted paper and cardboard. The materials on the export ban list represent 32% of the 4 million tonnes of waste exported each year from Australia.

Managing the waste that was previously exported presents a significant challenge but also opportunities to adopt circular economy solutions.

The circular economy presents opportunities to build NSW's material waste self-sufficiency. This has the potential to promote manufacturing waste self-sufficiency. For example, a large part Australia's exported waste is metal, including metals from wiring and e-waste, which comprises copper, gold, platinum and nickel.<sup>305</sup> In 2019-20, it is estimated that more than \$500 million worth of precious and semi-precious metals was exported as waste.<sup>306</sup> This waste could be re-used locally giving rise to new industries that would support the Net Zero transition.

With enough scale and efficiency, recycling of critical materials can reduce the need for new materials, replacing them with materials already in circulation.

### **Future demands for waste infrastructure**

Even with increased rates of waste reduction and landfill diversion under a circular economy, future landfill capacity will be needed.<sup>307</sup> For example, in Greater Sydney, at the current rate of waste generation and recycling, the putrescible (waste containing organic matter) landfills will reach capacity by 2036, and non-putrescible landfills will reach capacity in 2028.<sup>308</sup>

While improving waste reduction and landfill diversion may delay the need for imminent investment, a strong pipeline of investment in waste-related services and infrastructure will be needed to cater for a growing State.

With the waste sector predominantly serviced by the private sector,<sup>309</sup> the NSW Government should continue to play a role in ensuring that investments are made in the right place and at the right time. Accordingly, the NSW Government should, as noted in the NSW Waste Strategy, take a more active role in strategic planning to identify and reduce planning risk on sites for future waste infrastructure. The location and timing of waste infrastructure should align with the Greater Sydney Region Plan and District Plans, as well the Industrial Lands Policy Review, and may require preserving land in the near term for use in the long term.

### 8.3 Planning for energy from waste

Energy from waste could play an important role in the future in NSW, as it does in other locations worldwide. Consistent with the circular economy principles outlined in the NSW Waste Strategy, NSW Government policy is that recovering energy from waste, while a better alternative to disposal to landfill, should be explored only after options to avoid, reduce, reuse and recycle have been exhausted.<sup>310</sup>

Within this context, and to provide near term certainty for communities and proponents of energy from waste facilities, in 2021 the NSW Government released an updated Energy from Waste Policy Statement. This outlines the latest advice on the environmental and emissions standards with which energy from waste facilities must accord to ensure that NSW's air emissions standards meet and exceed global best practice.

The policy statement also sets out the framework for the operation of new purpose-built facilities and other existing facilities and governs the NSW Government's assessment of energy from waste proposals. This statement provides the policy certainty needed for proponents of energy from waste facilities to understand their environmental performance objectives and the NSW Government's approach to assessing any new proposals.

NSW EPA analysis suggests that there will be a need for strategically located energy from waste infrastructure in NSW but that communities need to be well informed and consulted on how social, economic and environmental needs are being met. Initial locations under investigation include the West Lithgow Precinct, Parkes Special Activation Precinct (SAP), Richmond Valley Regional Jobs Precinct and the Southern Goulburn Mulwaree. Various other proposals in different locations across NSW are also under consideration by the NSW Government.<sup>311</sup>

In the longer term, as other pathways are fully developed, energy from waste may play a greater role. As new technologies and environmental monitoring regimes advance, confidence in and acceptance of energy from waste infrastructure may improve. As with the location of any waste infrastructure, strategic consideration should be given to the proximity of waste generation and receipt locations, as well as transport routes. In addition, as with any significant shift in practice or technology transition, an effort to engage with and inform the community will be essential.

#### Regional Special Activation Precincts present opportunities

A key opportunity outlined in the NSW Waste Strategy is the co-location of complementary industries, particularly the opportunities offered by regional precincts located on arterial transport routes. These have the potential to become circular economy precincts. For example, a network of energy from residual waste, water recycling and other resource recovery activities could create jobs and drive innovation.

Regional precincts may also have decentralised industries, energy and water sectors that can benefit from using local resources to minimise transport costs.

The Parkes SAP has been identified as a potential site to host a circular economy precinct, and market sounding has commenced. The precinct has the potential to become Australia's first United Nations Industrial Development Organisation (UNIDO) eco-industrial precinct.

Overall, a circular built environment could save 3.6 million tonnes of CO<sub>2</sub> per year across Australia and deliver \$29 billion in direct economic benefits to NSW per year by 2040.<sup>312</sup>

## 8.4 Managing biodiversity impacts of new infrastructure

Like the elevation of climate risks to the global policy agenda, the economic and social risks of biodiversity loss are becoming a more prominent concern.<sup>313</sup> This includes Australia's commitment to halt and reverse forest loss and land degradation by 2030.<sup>314</sup> In addition to the natural environment's intrinsic worth, biodiversity and blue-green infrastructure provide financial and cultural benefits.

NSW's system of managing biodiversity impacts has an established legislative framework through the *Biodiversity Conservation Act 2016*. The Act has an objective to maintain a healthy, productive and resilient environment – natural capital – for the greatest wellbeing of the community, now and into the future, consistent with the principles of ecologically sustainable development.

The loss of biodiversity is examined as part of standard project planning and assessment practice in NSW. This includes considering an individual project and cumulative impacts<sup>315</sup> across both infrastructure delivery and operation. Biodiversity impacts can be avoided or minimised through sensitive design features and increasingly, there are ways to ensure that infrastructure is nature positive (see Box 8.1 below).

NSW has a mature system of managing biodiversity impacts; however, in practice the system is proving somewhat mechanistic and is increasingly creating outcomes that may be unnecessarily expensive. The NSW Biodiversity Offsets Scheme provides a way of measuring biodiversity loss and gain as part of a transparent and robust system that applies throughout NSW. It is applied at all scales, from small sites through to large infrastructure projects. Infrastructure proponents use the Biodiversity Assessment Methodology to understand and avoid impacts as part of project approval documentation. If approved, offset obligations are set out in development approvals.

Private and public sector infrastructure proponents can meet offset obligations by:

- ▶ purchasing credits on the market established by landholders who enter 'in perpetuity' biodiversity stewardship agreements to manage land for conservation
- ▶ transferring credit obligation to the Biodiversity Conservation Trust by paying into the Biodiversity Conservation Fund (BCF)
- ▶ creating biodiversity stewardship agreements on land directly owned by the proponent.

However, the current supply of credits does not meet the scale of offsets needed for major projects in NSW. The supply of offsets could potentially be addressed by more strategic purchasing and by addressing supply constraints in advance of projects to increase liquidity, reduce costs and reduce delays to infrastructure delivery.

There are other challenges identified by stakeholders:

- ▶ The calculation of credits in the Biodiversity Offsets Payment Calculator, and their application to different species and subregions, can be quite complex.
- ▶ The costs of offsets and barriers to individual projects can be prohibitive, even where there are highly compelling reasons to pursue the project.
- ▶ The options available to acquit biodiversity offset obligations may be too restrictive. In particular, the potential to enrich and expand National Parks may be overlooked as a source of offsets.



These challenges have resulted in several major projects generating significant biodiversity offset costs which, in certain cases, were as much or higher than the estimated construction costs. In many cases, the viability of otherwise worthy projects is put at risk. It is also often the case that biodiversity offset costs are not known until the later stages of project planning. A more timely and strategic approach to biodiversity management would lead to better outcomes.

### **Protecting natural capital while bringing certainty to project costs and timelines**

Responding to these concerns, DPE is scoping options to increase credit availability, liquidity and confidence to support market development and reduce risk to producers and consumers of offsets (including for government projects). This will be underpinned by a strategic approach to biodiversity management. An investable fund could provide a bank or inventory of 'advance' biodiversity credits to meet expected demand from the forecast future pipeline of infrastructure investment. DPE is exploring how this could be part-financed by proponents and institutional investors. This could increase the natural capital stock available while supporting NSW infrastructure to achieve a nature positive outcome (see Box 8.1).

Upfront investment in a bank of biodiversity credits could streamline offsets for a future pipeline of major projects, with main benefits being:

- ▶ offset efforts targeted in areas that will help to achieve better biodiversity outcomes – and opportunities for funding new National Parks using capital expenditure
- ▶ faster, easier and potentially lower cost ways for major projects to meet offset obligations
- ▶ increased certainty for landholders establishing Biodiversity Stewardship Agreements (certainty over demand for credits)
- ▶ increased credit supply for major projects, while also generating interest in the scheme to increase supply for other types of development
- ▶ a more strategic approach to targeting investment in green infrastructure.

### **Box 8.1**

#### **Case study: UK commitment for Nationally Significant Infrastructure Projects to achieve biodiversity net gain**

In response to the UK Treasury-commissioned Dasgupta Review on The Economics of Biodiversity, the UK Government has committed to the delivery of a 'nature positive' future. This requires all new Nationally Significant Infrastructure Projects to provide a net gain in biodiversity and habitats for wildlife. This includes all future transport and energy projects.

A nature positive approach enriches biodiversity, stores carbon, purifies water and reduces pandemic risk. In short, a nature positive approach aims to enhance the resilience of the planet and societies.

Through DPE's work to review approaches to biodiversity management practice, there is the opportunity to explore taking a similar approach in NSW where infrastructure projects can increase net biodiversity, rather than only offsetting impacts.

These proposals are at an early stage, Infrastructure NSW supports the approach proposed by DPE but notes that past reforms in biodiversity policy have been protracted in delivery. Success will require a focus on program design with significant private sector input and a tight timeframe for finalising arrangements, as well as clear objectives in terms of reliability and cost of credits for projects and ongoing evaluation to ensure benefits are being realised. If successful, development of this market-based approach could be applied to other nature-related markets – such as those that provide resilience benefits in wetlands or coastal dune environments (such as the Reef Credits Scheme in Queensland – see Box 8.2).<sup>316</sup>

This worthwhile initiative could also be part of broader changes to increase the options for meeting biodiversity goals, especially where a project is particularly compelling from a community needs perspective.

### Box 8.2

#### Reporting nature-related risks

Globally, the Taskforce on Nature-related Financial Disclosures (TNFD) has been set up to build on the work of the Taskforce on Climate-related Financial Disclosures (TCFD) and provide decision-grade data that can support investment, lending and compliance activities in financial markets. The TNFD is due to complete its work and begin piloting its approach in 2023.<sup>317</sup>

Work is already underway in the NSW Government through the Biodiversity Conservation Trust to determine how natural capital can be valued and subsequently incorporated into standard financial decision practices.

Integrating this work with global movements in financial markets and applying it to the infrastructure sector may provide opportunities to develop natural capital markets (such as the Reef Credits Scheme<sup>318</sup> – an innovative market-based approach for water quality management at the Great Barrier Reef), create net-positive infrastructure and take a natural environment conservation leadership role.

## 8.5 Blue-green infrastructure can support biodiversity and the natural environment

Blue-green infrastructure and other nature-based assets (see Box 8.3) can complement traditional ‘grey’ infrastructure (such as roads, rail and buildings) to support biodiversity and environmental outcomes. Blue-green infrastructure serves multiple ecosystem, economic, liveability and resilience benefits. These can include:

- ▶ atmospheric cooling effects through tree canopy and waterways in urban areas
- ▶ integrated water cycle management from natural waterways in urban areas
- ▶ improved air quality and carbon sequestration and storage.

### Box 8.3

#### What is blue-green infrastructure?

Blue-green infrastructure is the network of green spaces, natural systems and semi-natural systems. This includes waterways and wetlands, bushland, tree canopy and green groundcover, parks and open spaces that are strategically planned, designed and managed to support biodiversity, natural systems and broader liveability.

Benefits from blue-green infrastructure are greatest when delivered as a network of related assets, corridors and ecosystems. This can be achieved by improving government land and open space, partnering with local government and linking private landowner assets. 'Grey' infrastructure can also serve as links and nodes within a network of blue-green infrastructure assets.

Integrating blue-green infrastructure into new 'grey' infrastructure assets is not typically a primary consideration during project planning and design, but should be explored in the future. In doing so, there is the potential to reduce the impacts of linear infrastructure (such as transport corridors) and vertical infrastructure (such as hospitals, schools and housing) on biodiversity loss.

There may also be other opportunities to enhance blue-green networks in unused or minimally used transport corridors that often present issues with land management, including pest management. A costly maintenance process for transport could become an opportunity for natural assets in the hands of other parties.

It will also be essential to enhance blue-green infrastructure networks through initiatives such as streetscape revitalisation, public open space improvements, precinct and place-based development, and local and regional plans.

Finally, land owned by local Aboriginal land councils may present blue-green infrastructure opportunities that could play a role in delivering important ecosystem outcomes, including carbon offsets, biodiversity outcomes, coastal and wetland regeneration, and local community development, among others.<sup>319</sup>

Taking a strategic, statewide approach to planning and delivering blue-green infrastructure – as is routinely the case with other infrastructure asset classes – is important and necessary to achieve these network outcomes. This should include setting strategic priorities and measurable targets for blue-green infrastructure outcomes (such as canopy targets or urban cooling objectives).

Work underway by DPE that includes expanding key aspects of *A 50-year Vision for Greater Sydney's Open Space and Parklands* on a statewide basis and development of the Valuing Green Infrastructure and Public Spaces Sector Specific Valuation Framework to accompany the NSW Cost Benefit Analysis Guidelines are good foundations for a more strategic, whole-of-state approach. Along with providing certainty of funding on a year-to-year basis, having a statewide strategic approach in place will ensure that government capability increases, a pipeline of projects is developed and beneficial projects are delivered.

## 8.6 Recommendations

No	Recommendations	Implementation timeframe	Lead agency
33	<p><b>Improve sustainability throughout the infrastructure lifecycle</b></p> <p>a. Adopt sustainability standards for major infrastructure projects developed and/or delivered by the NSW Government.</p> <p>b. Support industry development in sustainable construction materials and practice through project procurement.</p>	Immediate Priority	Planning and Environment
34	<p><b>Expedite development of a NSW Biodiversity Strategy and Biodiversity Holding Fund to strategically manage NSW biodiversity assets and improve the offset system</b></p>	Immediate Priority	Planning and Environment
35	<p><b>Promote the development of a blue-green infrastructure network across NSW</b></p> <p>a. Develop blue-green infrastructure strategies as a fundamental part of place-based initiatives.</p> <p>b. Incorporate blue-green infrastructure as an integral part of the delivery of linear and vertical infrastructure, and convert unused transport corridors to blue-green infrastructure where possible.</p>	Extended Program	Planning and Environment & Transport
36	<p><b>Identify and plan for future waste infrastructure needs as part of the Greater Sydney Region Plan and Regional Plans</b></p>	Immediate Priority	Planning and Environment