

30 September 2019

Katarina Nossal  
Director, Strategy and Reform  
Department of Planning, Industry and Environment  
c/o 20yws@dpie.nsw.gov.au

Dear Ms Nossal,

**Sydney Water's feedback to inform 20-year Waste and Resource Recovery Strategy**

Thank you for the opportunity to provide feedback to inform the development of a 20-year Waste and Resource Recovery Strategy for NSW, led by the Department of Planning, Industry and Environment, including the Environment Protection Authority.

In providing water, wastewater, recycled water and stormwater services to more than five million people, one of Sydney Water's key responsibilities is managing the water cycle. This includes managing solid waste streams produced and recovering resources such as nutrients and energy. Sydney Water is a leader in contributing to a more 'circular economy' in our operations, including innovative use of trucked food waste streams to increase the amount of energy generated at our wastewater treatment plants. We continue to invest efficiently in infrastructure for our growing cities and adapt our services to better meet customer needs, while keeping our prices affordable.

In the future, the increasing density and accelerating urbanisation of cities could further increase the size of waste streams but also create opportunities to capture and recover these resources more effectively. Innovative resource recovery from organic waste and the design of new urban systems that integrate water services with other waste management infrastructure will help stimulate a circular economy. There are challenges to overcome and the 20-year Waste and Resource Recovery Strategy could facilitate a collaborative process to find solutions to the current dilemma of wasting valuable resources.

Our response to the feedback questions is attached. Sydney Water would welcome the opportunity to share our work to date on the circular economy and continue to have further input into the issues paper and draft strategy. Should you have any queries regarding our comments, please contact Freya Hartley, Principal Policy Advisor on 8849 4632 or [freya.hartley@sydneywater.com.au](mailto:freya.hartley@sydneywater.com.au).

Yours sincerely



Helen Liossis  
Head of Corporate Strategy and Business Planning

Attached: Sydney Water's Response to Feedback Questions

## **ATTACHMENT: Sydney Water's Response to Feedback Questions**

### **1. What are the key issues facing the NSW waste system?**

Current patterns of resource use in NSW are no longer sustainable, and current resource recovery policies and technologies are no longer fit for purpose. In addition, emerging future challenges of urban growth and changing resource consumption patterns, also present significant challenges for the NSW waste system. Within Sydney, housing density is increasing in some suburbs, and the city's footprint is also expanding into the western city, with the airport and the Aerotropolis as key catalysts for development.

The Waste and Resource Recovery Strategy will need to address the growth in organics waste streams from both homes and businesses in the Sydney region and changed community expectations for how waste is disposed or reused. Key urban environmental and policy problems associated with this waste stream include impacts on landfill capacity and management, greenhouse emissions and carbon intensity, water demand and regional food security. Integrated management of wastewater and organics can provide solutions for a variety of these issues. These opportunities are brought to life through the concept of 'biorefineries', which receive and refine organic waste streams into high quality recycled water, biogas, energy, fertilizers and other products.

### **2. What are the main barriers to improving the NSW waste system?**

Improving the waste system and achieving an effective organics and water circular economy in Sydney is possible – but must be underpinned with better waste stream separation and control, effective reuse product regulation and market development, customer and community support for funding resource recovery, and smart urban planning and co-location of compatible industries. The Waste and Resource Recovery Strategy will need to address these barriers as follows:

- **Waste stream separation and control** – With current waste practices, separating and beneficially using food waste from households and small businesses is challenging because of high contamination rates, especially from single use plastic packaging. Community support and behavior change as well as better regulation will be essential for reducing waste stream contamination.

For Sydney Water, if consumer product requirements were better controlled, such as transparency of chemicals being used and greater restrictions on contaminants of concern or materials that cannot be reused or naturally biodegrade within a timely manner, this would help to improve the quality of our wastewater products and beneficial use opportunities.

Household products disposed of to the wastewater system and illegal dumping in our wastewater systems also present contaminant problems that impact the sustainability, reliability and affordability of wastewater services. For example, Sydney Water has recognised the growing problem of wet wipes causing havoc in our wastewater system and impacting the environment. Household rubbish that goes down drains and toilets can block both household plumbing and the wider wastewater system, increasing the risk of breaks and overflows to our local creeks or customers' homes. Litter deposited in gutters and storm and poor management of construction and development sites can result in waste and sediment entering our stormwater systems.

- **Reuse product regulation, market development and incentives** – Market conditions for beneficial use of organics waste/resources also need to be improved, to enable reuse to be a more viable option for businesses and consumers and other incentives should be investigated. Regulation is important to ensure that waste produced is handled appropriately to protect environment and human health and are not contaminated to the extent that treatment is no longer feasible. Regulatory barriers that make opportunities for reuse difficult should be investigated.
- **Funding resource recovery infrastructure and services** – The Waste and Resource Recovery Strategy will need to consider customer and community support for investment and consider "who pays". Currently council ratepayers and residents pay the costs of household solid waste management through waste levies – and all residents of Sydney bear the opportunity costs of losing resources from our region. Sydney Water invests efficiently in infrastructure for our growing cities and adapts our services to better meet customer needs, while keeping prices for customers

affordable. Assessment of true market value of better waste management and recovered resources could help show the practical and economic benefits of new policy measures and prioritise infrastructure investment, supported by customer willingness to pay studies where appropriate.

- **Urban planning and co-location of compatible industries** – In the Sydney region, planning for future recycling and resource recovery sites is challenging due to issues such as odour, noise and truck movements and existing facilities need to be protected from residential encroachment. Carefully considered land use planning can be used to incentivise the right industry and appropriately zone and buffer compatible industrial and urban services land to enable better support for waste/organics processing infrastructure through government and community.

In green field areas or significant infill developments there is a big opportunity to design new urban systems differently, in a way that is sympathetic to and which stimulates a circular economy such as through reducing cost or behavioural barriers to avoidance and recycling. The development of new precincts with individual characteristics, may also enable the development of innovative precinct-scale solutions. This would link waste products to resource needs in a hub or precinct, aligned with the objectives of the Greater Sydney Region Plan and District Plans. Management of organic waste resources via regional biorefinery hubs can provide the economies of scale, process reliability and operational efficiencies to turn a regional waste and landfill problem into a resource and innovation solution.

### 3. How can we best reduce waste?

Water utilities can play a key role in working with customers to educate and build more sustainable behaviours, while also working with government to help deliver the vision for our cities. We have an important role to play in providing services that reduce organics waste and return nutrients to farms and recovering energy and higher value products. For example, Sydney Water's successful pilots at our Cronulla and Shellharbour wastewater treatment plants, demonstrate the success at importing clean (non-contaminated) food waste, and boosting energy generation through co-digestion. The growth in the Western Parkland City, and in Greater Parramatta Olympic Peninsula, presents the opportunity to work with new customers and Sydney Water's wastewater management capacity and expertise to capture the organics and energy resource potential of our growing region in new generation "biorefineries". Some opportunities that have been identified include co-located facilities, smart waste collection systems and recycled water for parkland city outcomes.

Sydney Water would welcome the opportunity to further discuss our experience and how we could support the Waste and Resource Recovery Strategy including through:

- **Customer education to reduce plastic waste from bottled water** – Sydney Water is educating our customers about the benefits of drinking Sydney's high-quality tap water, saving plastic waste from bottled water. For example, over the past three and a half years, we've engaged with millions of people at different community events. These programs have distributed around 1.3 million litres of water, which we estimate saved over 20,000 kg of plastic waste from landfill, 3.2 million litres of water and 1.5 million kWh of energy being used to produce and supply bottled water. We are supporting community groups to raise awareness of the fact that drinking tap water is a simple way we can all personally reduce our reliance on single use plastics in our 'beat the bottle' campaign launched in 2018. We conduct qualitative research to understand customer perceptions around drinking water. We are partnering with local councils and community events to provide portable water refill units. Alignment of messaging, including on the container deposit scheme, will help build sustained behavioural change.
- **Biosolids beneficial use for agriculture and soil improvement** – Sydney Water beneficially uses 100% of biosolids collected from wastewater - incorporated into soils to improve soil structure and fertility, to remediate mine sites, and used in commercial composting facilities. We produce biosolids that are land applied by farmers in the west of NSW to boost agricultural production as an organic alternative to dwindling fertiliser rock. In the future, biosolids that are suitably treated could play a role in improving local soil condition and reducing runoff to local waterways, potentially benefiting soils in Western Sydney. Plant upgrades and technology improvements could see a rise in the amount of biosolids captured from wastewater. Sydney Water and its partners have made a substantial investment of at least \$5 million over five years in research projects focused on

investigating more efficient and sustainable ways of producing and beneficially using biosolids, including CRC for Low Carbon Living projects. Future challenges include product improvements that reliably reduce volume and odour to lessen the social and environmental impacts from biosolids transport and management. Challenges also include biosolids regulation and guidelines creating an overly risk-averse environment for biosolids land application, thus constraining beneficial uses in agriculture and for soil improvement.

- **Food waste to energy** – Co-generation enables Sydney Water to generate up to 20 percent of a plant's energy needs. This process can be "supercharged" by augmenting it with other organic resource streams. This connects food waste businesses with a more sustainable and cost-effective alternative disposal route compared to landfill. Following successful trials with the support of the EPA, Sydney Water is operating a commercial scale Food Waste to Energy trial plant at Cronulla using existing assets. Benefits include around 10 kL/day of pulped fruit and vegetable waste converted into electricity, increasing electricity generation by around 7% and providing a more environmentally sustainable option to dispose of organic waste. We have opened a co-digestion research facility at our Shellharbour wastewater treatment plant to research the co-digestion of various food waste streams with sewage sludge. Results of this project could provide future waste disposal opportunities for other organisations and waste types, delivering more circular economy outcomes. Challenges faced include the levels of contamination of food waste streams and sensitivity of co-digestion to this risk, regulation around land application and suitability of commercial models for these services and products.
- **Recovery of other products** – Sydney Water is actively involved in research and innovation in recovery of other products and is implementing opportunities where the benefits are clear. We have undertaken a pilot to co-digest up to 600,000 L of glycerol with wastewater sludge at our Bondi wastewater treatment plant. Glycerol is the waste by-product from the production of biodiesel. This work delivered promising results to support the business case for commercial expansion. As food waste is more commonly combined with wastewater processes particular opportunities will emerge such as the increased opportunity to capture phosphorus, cellulose and particular chemicals, through to opportunities not yet identified. Sands extracted from our processes can be cleaned and used as input to materials such as asphalt, road base, bricks or pavers replacing natural resources. We are currently working with industry to use some of our stormwater silts to replace natural sands in asphalt production but could do more. Challenges include the value of recovered resources compared to raw materials, and support for research and innovation in higher-value reuse, product trials and research on community attitudes and behaviours.
- **Contaminant control at source** – Sydney Water, through its trade waste and business efficiency programs, has experience in managing source separation and reuse options at point sources and has effective relationships with nearly 18,000 commercial and industrial customers. Household products disposed of to the wastewater system by our residential customers also present contaminant problems. To educate people on what shouldn't be flushed, Sydney Water has worked with social media, the Water Services Association of Australia (WSAA) and utility partners to raise awareness of the issue with our customers and nationally, and to develop standards around these products. Sydney Water continues to monitor our wastewater systems to see if there is any increase in activity discharging wastes to sewer resulting from measures designed to change recycling behaviour. Emerging contaminants of concern will continue to present challenges in organics resource recovery and we will need to be prepared to respond. Challenges include better control on the use of chemicals of concern in consumer product manufacture, improvements of construction site wastes and reduction in illegal dumping of wastes. There are opportunities to engage with commercial customers on optimum management of pre-treatment wastes, such as fats, oils and grease wastes.
- **Collection of organics** – Potential actions such as mandatory separation of food and garden organics for all householders and mandatory separation and collection for all businesses that generate food waste over a certain amount. These policy shifts would provide a significant shift in how food and broader organic waste might be managed in Sydney and provides opportunities for collaboration with water utilities. There are social as well as practical limitations to the collection of food and organic wastes in a single green lid bin, such as for multi-unit dwellings. Sydney Water suggests the Waste and Resource Recovery Strategy considers a range of infrastructure options for food waste collection and treatment to reduce contamination to minimum, as part of new precinct

developments and urban renewal projects. In 2017 Sydney Water partnered with the EPA to fund a study of organic waste management opportunities in the Pyrmont Ultimo precinct. In 2014, Sydney Water also partnered with Randwick Council to fund a desktop study of the potential for source separated food waste to be co-digested with sewage sludge at our Malabar wastewater treatment plant. The Sydney District Plans identify that in higher-density neighbourhoods, innovative precinct-based waste collection, reuse and recycling would improve efficiency, reduce truck movements and boost the recycling economy.

#### 4. How can we recycle better?

Key NSW Government activities to support the recycling industry could include:

- **Support methods to encourage households and business to keep resource streams clean at source** – With current waste practices, separating and beneficially using food waste from households and small businesses is challenging because of high contamination rates, especially from single use plastic packaging. In the long term, wastewater treatment plants could become biorefineries for the recovery of energy and valuable materials for various industry sectors, potentially accepting household organic waste for processing. Sydney Water is actively investigating innovation in source separation of food waste from residential and commercial properties so it can be used in anaerobic digesters to generate energy and high-quality compost (co-digestion). Sydney Water's facilities have significant potential for increased organics processing, provided material is sourced free of contaminants that inhibit anaerobic digestion.
- **Create consumer demand for recycled products such as incentives through pricing, community attitudes and acceptance** – Finding markets willing to work with recovered products as alternatives to newly made products presents very real challenges. A key issue will be dimensions of scale, quality control, efficient delivery and customer acceptance.
- **Reduce economic and regulatory barriers to resource separation, recycled products and use of recycled materials in building and infrastructure** – There are a range of pricing and regulatory issues that make it difficult to implement cost-effective recycling initiatives. These should be tailored to relevant local government areas but also set consistent expectations across the Greater Sydney region. For example, regulation makes it difficult to handle waste onsite or in near proximity to construction sites. By handling waste at source, it reduces contamination and would allow a cleaner more valuable resource to be generated.
- **Educate and communicate to householders and business the importance of waste stream recycling and appropriate disposal** – Educating the community in a way they understand is essential. For example, householders can receive confusing messaging about what to do with their recycling and household wastes (including disposal to bins and drains) and what happens to it. Future recycling improvements will also depend on community attitudes and acceptance of recycled products and sustainable behaviour.
- **Specify products containing recycled material** – An increased focus on requiring products to contain recycled material and discouraging single use products unless they can be effectively captured, and the resource be returned to the cycle is recommended.
- **Manage waste in major infrastructure projects and services** – NSW Government activities present opportunities for developing and demonstrating leading practice in reducing waste, recycling and beneficial use of materials, soil, water and other resources, provided environmental protection requirements can be met. State Owned Corporations such as Sydney Water also make significant infrastructure and purchasing decisions. For example, our supply chain includes significant purchasing of bulk water, chemicals, minerals and equipment and management of waste related to the construction, operation and maintenance of water infrastructure, as well as office resources and vehicle fleet and as well as electricity to power our operations.

## **5. What are the main opportunities for improving the NSW waste system?**

Sydney Water suggests the following opportunities are considered in the Waste and Resource Recovery Strategy:

- Whole of Government commitment to embed waste and circular economy strategies in Government policies, plans and drive implementation across all sectors.
- Collection methods to encourage households and businesses to keep food and organics resource streams clean at source, supported by regulation of consumer product manufacture.
- Funding support for projects that produce a higher value resource use, not limited to diversion from landfill.
- Clarity on pricing regulatory frameworks for water utilities to operate in organic waste management.
- Clarity on resource recovery guidelines that allow reprocessed organics materials to be used as a resource.
- Continue to support innovation into food waste co-digestion, biosolids and biogas quality, explore uses for inorganic residuals, such as effective reuse in construction materials. Support research to further develop high tech resource recovery, such as to recover residual metals and nutrients
- Facilitating product trials such as through grants or supported projects, to build partnerships and experience to enable scaling of organics resource collection and to minimise contamination and enhance recovery in the future.
- Ongoing education to maintain consumer trust and acceptance and support market conditions for recovered products.
- Incentives to keep material in circulation and recognise resource efficiency, such as regulation to discourage obsolescence and rating schemes.
- Land use planning to support the co-location of synergistic industries while maintaining sympathetic surrounding land uses, enable connecting infrastructure, design of smart urban waste collection systems and efficient investment in infrastructure to meet resource recovery needs over time.
- An effective lead resource manager responsible for each waste region to set outcomes and facilitate contestable market entry for providers with innovative and cost-effective approaches.
- Improved policy certainty and pricing on waste levy, carbon emissions and energy markets
- Effective regulation to manage pollution at source, control resource recovery processes and ensure quality of end uses. This is needed to protect community and environmental health, and drive high standards of waste management, while enabling innovation and the recognising the overall resource, environmental and community benefits of organic resource management.

## **6. Are there any additional views or information you would like to provide about waste in NSW?**

Sydney Water valued the opportunity to participate in the 20-year Waste Strategy Focus Groups in May 2019 and suggests that the feedback from this is considered. We would welcome the opportunity to further discuss with the Department our experiences in resource recovery from organics, current challenges faced from infrastructure capacity, land application regulation and future opportunities. There are many opportunities to redefine organics waste as a resource rather than a problem. The Waste and Resource Recovery Strategy should include as a key initiative the recovery of energy and resources through anaerobic co-digestion of organic wastes. This is providing a higher value alternative to sending food waste to landfill.

Sydney Water is in a strong position to support the Government's proposed Waste and Resource Recovery Strategy and associated policies by better using and augmenting existing assets and/or developing new facilities, creating potential engines for organic circular economy precincts. Sydney

Water is designing wastewater treatment plants for South Creek now and planning Western Sydney's water services through our Western Sydney Regional Masterplan. We are incorporating organics management capability in the siting and design of the plant and our servicing planning.

We are also continuing research into resource recovery opportunities to contribute to a circular economy. Sydney Water is incorporating the lessons learnt from existing pilots and trials in the design and operation of biorefinery plants, and the way we work with customers. We are engaging with our stakeholders to understand opportunities for waste collection market and finding more beneficial uses for food and garden waste, especially when treated in advanced biorefineries.

Sydney Water is actively considering circular economy principles for water and would welcome the opportunity to brief the Department on our most recent work with WB Solutions. Our circular economy vision is to create a greater value from water, materials and energy for future generations. We are looking to achieve this by restoring and regenerating natural systems, by keeping resources in use at their highest value and by designing for circularity. We have used the concept of keeping resources at their highest resource value as a driving force. The Waste and Resource Recovery Strategy needs to rethink the way the waste hierarchy is used - not as a means of moving products to a destination but to one that looks at value. Value needs to be defined, it is not only financial value. To drive a successful circular economy, resources perceived as waste do need to be of value to the 'market'.

Lastly, we recommend waste management in NSW is aligned with national and international directions. Sydney Water supports the United Nations Sustainable Development Goals as a plan of action for people, the planet and prosperity. As providers of essential services, we want to see the realisation of Sustainable Development Goal 6: Clean water and sanitation. We believe universal access to safe water and sanitation is key to creating a better future and we know there is more work to be done. We also support and promote the other Sustainable Development Goals including Sustainable Development Goal 12 which is specifically focused on responsible consumption and production patterns and recommend this is a key objective of the Waste and Resource Recovery Strategy. This is following recent documents that encourage a national approach to waste policy and build on learnings from international case studies:

- Institute for Sustainable Futures University of Technology report prepared for Sydney Water identifying innovative precincts around the world using industry best practice wastewater and organics treatment. These illustrate how a circular economy that is based on advanced organics treatment could operate in Sydney.  
[https://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mja2/~edisp/dd\\_206045.pdf](https://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mja2/~edisp/dd_206045.pdf)
- International Water Association (IWA) framework report on Water Utility Pathways In A Circular Economy [http://www.iwa-network.org/wp-content/uploads/2016/07/IWA\\_Circular\\_Economy\\_screen-1.pdf](http://www.iwa-network.org/wp-content/uploads/2016/07/IWA_Circular_Economy_screen-1.pdf)
- UK Government Resources and Waste Strategy published last year  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/765914/resources-waste-strategy-dec-2018.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/765914/resources-waste-strategy-dec-2018.pdf)