END OF WASTE FRAMEWORK REVIEW

Project Report

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Queensland Government Department of Environment and Science (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Executive Summary

The End of Waste (EOW) Framework was introduced in 2016 to replace the Beneficial Use Approval (BUA) Framework. The essence of the framework is to facilitate the use of waste derived materials under certain specified conditions. This Report presents the findings of a review of the framework undertaken by SLR Consulting Australia Pty Ltd on behalf of the Queensland Government Department of Environment and Science (the Department), commencing in late 2022, noting that the Waste Reduction and Recycling Act was updated in June 2023. The amended legislation is referenced in this review.

Key findings of the review include:

- There is a high degree of uncertainty across the Queensland Government, Local Government, and Industry stakeholders in relation to the application of the definition of waste, and the various pathways that may create a resource from waste. The recently updated Waste Reduction and Recycling (WRR) Act has introduced a new prospective pathway for defining a waste as not a waste, which requires further clarification.
- There are elements of the current process for nominating and creating codes that could be improved, including potential for registration and participation fees, as well as providing greater clarity around where a code can be developed and the information requirements. There are also areas where the Department could improve clarity of explanation of processes to support industry.
- Stakeholders would welcome further support and training on the applicability, and use of EOW Codes to improve take up and application. This is provided by the Department of Environment and Science (the Department) at present however resources are finite. In some cases, stakeholder engagement could be improved, and training enhanced for regulator staff to ensure clarity and consistency in application.
- Timeframes for delivery of an EOW Code or Approval vary depending on the levels of complexity, as well as information requirements. This has led to an inconsistent delivery of codes. Issues have also arisen from loopholes allowing stockpiling of some wastes that would otherwise be considered an illegal activity.
- There is a lack of a strategic Queensland Government led approach to identifying potential resources that would support the State to meet the targets in the Queensland Waste Management and Resource Recovery Strategy. The current approach is reactive, and industry led, however a proactive approach may see better uptake and a more strategic approach, led by the Office of Circular Economy of the Department, and aligned to strategic policy documents and action plans.
- The waste types considered by the EOW framework can be highly complex and the Department does not always have access internally to the right technical resources, and the use of Technical Advisory Panels under the EOW Framework has caused delay or challenges in developing codes.
- There are a series of other specific issues identified associated with individual codes or alignment. In many cases issues raised by stakeholders would benefit from further engagement with the Department, where there is a solid knowledge base and willingness to support where resources allow.

A total of 37 recommendations are made to improve the EOW process, including providing certainty and clarity on where EOW applies, the definition of waste, how EOW fits within the circular economy, as well as a series of operational and stakeholder engagement opportunities. The EOW Framework, whilst reasonably functional in its current state, could be used to facilitate significantly more reuse and recovery through a more proactive approach, aligned with a broader system-based approach under Queensland's Waste Management and Resource Recovery Strategy.

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1 Introduction

The Department of Environment and Science (the Department) engaged SLR Consulting Australia Pty Ltd (SLR) to undertake a review of the End of Waste (EOW) framework as it is currently legislated and in operation, with the aim to determine its efficacy in driving the circular economy outcomes referenced in Queensland's Waste Management and Resource Recovery Strategy[1]. As Queensland accelerates the transition to circularity, the EOW framework is perceived to have a role to play in allowing the environmentally safe reuse of waste as a resource, in particular getting the highest value from secondary raw materials and avoiding the leakage as waste out of the economy. This report additionally provides recommendations for how implementation of the framework can be modified to further support the states transition to a circular economy and to achieve the overall objectives of the EOW framework.

1.1 Approach

This review is split into three parts:

1. The current state of the EOW Framework
Defined through consultation with the Department and a desktop review, with the aim of determining the founding principles of the framework. In collaboration with the Policy and Regulatory function of the Office of Circular Economy, further clarification was sought regarding the EOW framework, including work undertaken, such as regulatory impact assessments, discussion papers and feasibility studies, as a precursor to the legislative changes. Furthermore, a baseline of the regulatory function's views on the role of the EOW framework was established. This extends to an understanding of the current processes and resources associated with the development of implementing the EOW framework.
2. Interview, stakeholder engagement and further information collection
A review of similar jurisdiction approaches was undertaken. This included consideration of the Resource Recovery Orders and Exemptions under the New South Wales *Protection of the Environment Operations (Waste) Regulation 2014*[2], the Victorian *Environmental Protection Act 2017*[3], the South Australian *Environmental Protection (Waste to Resources) Policy 2010*[4] and the *Environment Protection (Waste Reform) Amendment Act 2017*[5], including relevant subordinate legislation, and the EU End of Waste criteria enabled under the EU *Waste Framework Directive*[6], including recent review documents. Furthermore, the review phase entailed detailed stakeholder engagement, with particular focus on stakeholder views on the purpose of the EOW framework, key issues, or concerns, and what a future state may look for. Feedback was sought regarding key waste streams that would assist in enabling the circular economy through the provision of an EOW code. Consultation with existing registered resource producers and users was also undertaken, with the aim to consolidate their insights on the process, reporting and regulatory requirements, and ongoing obligations. Understanding the experience of existing EOW framework users, including those implementing the legislation, assisted in forming an understanding of the current state, while also shaping the review. Engagement with users, regulators and broader industry stakeholders provided a formative aspect of the potential future state and recommendations on the associated pathways to achieve this.

[1] State of Queensland, 2019. Waste Management and Resource Recovery Strategy, from https://www.qld.gov.au/__data/assets/pdf_file/0028/103798/qld-waste-management-resource-recovery-strategy.pdf
[2] State of New South Wales, Protection of the Environment Operations (Waste) Regulations 2014 https://legislation.nsw.gov.au/view/whole/html/inforce/current/sl-2014-0666
[3] State of Victoria, Environment Protection Act 2017, https://content.legislation.vic.gov.au/sites/default/files/2021-06/17-51aa005%20authorised.pdf
[4] State of South Australia, Environmental Protection (Waste to Resources) Policy 2010 under the Environment Protection Act 1993 https://www.legislation.sa.gov.au/__legislation/lz/c/pol/environment%20protection%20(waste%20to%20resources)%20policy%202010/current/2010.-.auth.pdf
[5] State of South Australia, Environment Protection (Waste Reform) Amendment Act 2017 https://www.legislation.sa.gov.au/lz?path=%2FV%2FA%2F2017%2FENVIRONMENT%20PROTECTION%20(WASTE%20REFORM)%20AMENDMENT%20ACT%202017_45
[6] European Union, 2022. End of Waste Criteria from https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en#end-of-waste-criteria

3. Preparation of review report
The findings and feedback of the review are prepared in this draft report for submission to the Department for discussion and refinement. This includes a series of recommendations to address issues identified or to enhance the performance of the framework.

1.2 Review objectives

The following objectives were identified in the project planning phase:

- Review existing operation of the EOW regulatory framework including identification of interactions and operational conflicts with existing legislation and regulation.
- Assess the extent to which the framework is meeting its original intent and objectives.
- Assessment of the extent to which the EOW framework supports Queensland's transition to a circular economy.
- Review and critically compare the EOW framework in comparison with waste to resource frameworks in other Australian jurisdictions and internationally.
- Engage and consult with a series of stakeholders on the topics of the review.
- Identify potential EOW codes that could be developed to support significant resource recovery, including quantification of the potential resource recovery benefit of each potential code.
- Identify recommendations on how the framework could be improved.

1.3 Stakeholder engagement

Stakeholder engagement formed a core part of the scope of work required to prepare this Report. Consultation was undertaken within different functions within the Department, including the Office of Circular Economy and the Environmental Regulatory Function. Further to this, the Department provided a list of 13 key stakeholders to engage with, while two additional stakeholders were identified and engaged during the review phase. A copy of the Stakeholder Engagement Plan is included in **Appendix A**.

The Department provided a list of registered resource producers for SLR to additionally engage in the review. SLR contacted 16 registered resource producers from the list provided, while feedback was received from 13 producers. From this engagement, a number of resource users were identified and engaged. Seven resource users provided feedback.

Written submissions were provided by 20 stakeholders. 14 stakeholders were engaged via one-on-one calls or provided a summary of issues via email.

1.4 Report structure

This report is structured to present the findings of the review in a logical order, starting with background and contextual information, through the findings of the review, and resulting in a series of observations and recommendations for how the Queensland Government could reform the framework, or other legislation or policy, to facilitate the increased use of materials that have a useful life beyond current management practices.

2 Current state

Before undertaking a review of any legislation, it is important to understand the context within which it operates, i.e., the current state. This section describes the EOW framework including a summary of the framework it replaced, the aims and objectives of the framework, the legislative setting and the broader policy setting within which it is delivered. The setting of the EOW framework is not isolated, and there are several links with other legislation or policy to be considered which can add complexity to the review and any subsequent recommendations.

2.1 The EOW Framework

The EOW framework was introduced into the *Waste Reduction and Recycling Act, 2011* (WRR Act) on 8 November 2016 to replace the Beneficial Use Approval (BUA) framework, which had been in place since 2001.[7] On 2 June 2023 the Queensland Government passed legislation to update the WRR Act which moved the definition (or meaning) of waste from the *Environment Protection Act, 1994* (EP Act) to the WRR Act. Whilst the definition of waste is the same, the insertion of s8AA part 2 confirms a resource is not a waste, and allows the Queensland Government, through regulation, to determine a thing to be not a waste.[8]

Under the WRR Act, waste may be approved as an EOW resource if it meets a range of specific criteria set out by the Department in an EOW approval or code and is used for an approved use also defined under the EOW approval or code. Under these circumstances, a waste is no longer classified as such under the WRR Act, unless it ceases to comply with the requirements of the criteria set out under the EOW approval or code.

Section 8AA of the WRR Act provides the meaning of waste:

(1)	***Waste*** includes anything, other than an end of waste resource, that is— (a) left over, or an unwanted by-product, from an industrial, commercial, domestic, or other activity; or (b) surplus to the industrial, commercial, domestic, or other activity generating the waste. *Example of paragraph (a)—* *Abandoned or discarded material from an activity is left over, or an unwanted by-product, from the activity.*
(2)	However, *waste* does not include- (a) a resource; or (b) a thing prescribed by regulation not to be a waste
(3)	***Waste*** can be a gas, liquid, solid or energy, or a combination of any of them.
(4)	A thing can be waste whether or not it is of value.
(5)	Despite subsection (2), an end of waste resource becomes waste— (a) when it is disposed of at a waste disposal site; or (b) if it is deposited at a place in a way that would, apart from its use under an end of waste code or end of waste approval, constitute a contravention of the general littering provision or the illegal dumping of waste provision under that Act—when the depositing starts.
(6)	The Minister may recommend to the Governor in Council the making of a regulation under subsection (2)(b) (a ***proposed change***) only after- (a) carry out consultation with the public about the proposed change; and

[7] Sinclair Knight Merz, 2013. Assessment of Queensland's Beneficial Use Approval Process, from https://documents.parliament.qld.gov.au/com/AREC-56F5/RN4954PEPO-57E9/TP-10Sep2014.pdf

[8] It is noted that the amendments to the Waste Reduction and Recycling Act which were legislated on 2 June 2023 include changes that are directly relevant to this review, however, were developed and introduced outside the scope of this review. This review report incorporates the legislative changes as current legislation. SLR has not reviewed supporting information for these changes.

(b) considering the following matters-

(i) the results of the public consultation about the proposed change;

(ii) whether making the proposed change is likely to achieve the objects of this Act;

(iii) whether making the proposed change is likely to achieve the object of the Environmental Protection Act

(iv) whether there are other measures that would be more effective in achieving the intended outcome of the proposed change

(7) In this section—

end of waste approval see the Waste Reduction Act, section 159(2).

end of waste code see the Waste Reduction Act, section 159(1).

resource means a resource under the Waste Reduction Act, section 155(2).

waste disposal site see the Waste Reduction Act, section 8A.

Waste Reduction Act means the Waste Reduction and Recycling Act 2011.

This definition provides for relationship with the EOW framework and links between waste as defined under the EP Act and components of the WRR Act. Part 1 specifically allows for end of waste resources with a link to the definition of an end of waste resources as per Chapter 8 *Provisions for end of waste* in s155 of the WRR Act:

155 Purpose of chapter

(1) The purpose of this chapter is to provide for the process by which the chief executive decides when and how waste stops being waste and becomes a resource.

(2) Waste stops being a waste and becomes a resource when, in accordance with an end of waste code or end of waste approval, it stops being waste and becomes a resource.

(3) A person is a resource user while the person uses a resource in a way, or for a purpose, that complies with an end of waste code or end of waste approval.

(4) If a person stops using a resource in a way, or for a purpose, that complies with an end of waste code or end of waste approval—

(a) the person stops being a resource user; and

(b) the resource stops being a resource and becomes waste

An EOW code or EOW approval identifies detailed conditions that must be followed for a waste to become a resource. Specifically, an EOW code can be made for a particular waste to be used as a resource in one or more distinct ways by resource producers and users who have registered with or notified the Department and comply with the requirements of the EOW code. As of 16 June 2023, the Department has released 35 codes for approved resources, with a further two currently under development.[9]

The primary aim of EOW approvals is to gain insight regarding the feasibility of a specific waste identified to be used as a resource and the future application of an EOW code. If a resource under an EOW approval is found to have a market, no adverse environmental or health impacts from the processes involved, and meets other detailed criteria, then an EOW code may be granted. During the limited period in which an EOW approval is applicable, the Department will consider the benefits, sustainability, environmental impacts, and environmental best practice to guide a decision on whether to progress the approval to a code, solidifying the permanency of the new resource.[10]

[9] State of Queensland, 2023. End of Waste Codes, from https://www.business.qld.gov.au/running-business/environment/waste-management/regulated-waste/eow-codes

[10] State of Queensland, 2023. End of Waste Approvals https://www.business.qld.gov.au/running-business/environment/waste-management/regulated-waste/eow-approvals

Following commencement in 2016, there was a period of transition for some BUAs, with a number of former general BUAs now operating under a relevant EOW code. The EOW codes developed to date are largely designed to manage resources that have relatively low volumes but might be classified as regulated wastes where they are not a resource.

2.2 The former beneficial use framework

An assessment of the performance of the BUA framework was commissioned by the Department (then Department of Environment and Heritage Protection) and published in 2013.[7] This review, undertaken by consultants Sinclair Knight Merz (SKM) was similar in scope and nature to this review, with a focus on whether the BUA framework could meet the objectives of the then relatively new WRR Act.

The BUA framework had two key functions. General Beneficial Use Approvals which were issued by the Department for use by industry with anyone able to operate under the approval, provided they were using the resource in accordance with the conditions in the approval. Specific BUAs were applied for directly by industry via an application process to the Department, who had to approve the application. Conditions were then applied specific to the use of the resource between two parties, the waste generator, and the end user. Only wastes that had a beneficial use could be approved, with the criteria for deciding whether to grant a beneficial use for a resource contained within Chapter 8 of the WRR Act which was then titled *Approval of resource for beneficial use* (and has subsequently been replaced by the current *Provisions for end of waste*). Issues identified in the SKM review included:

- Conditions imposed as part of a Specific BUA were often more stringent than for transportation and end use of a resource than if the waste was being managed as a regulated waste.
- Specific BUAs were considered to be too specific, with the number and type of conditions imposed as part of the approval considered onerous by users.
- Overly burdensome regulatory conditions being applied, but a lack of delineation in the legislation between what was a waste and what was a resource.
- Inconsistent application of different regulatory pathways for waste, such as use of BUAs or the Environmentally Relevant Activity Framework.
- A lack of clarity over how to deregulate regulated wastes for reuse.
- Conditions limiting the exchange and use of resources between more than 2 parties.
- Duplication of approvals pathways (BUA and ERA) for the same resource.
- Limitations with General BUA guidance and application process, including limited guidance to resource producers in how to sufficiently create a resource from waste.
- Lack of clarity concerning environmental limits for resources, markets, and associated product standards.
- Lack of confidence in general BUAs resulting in a higher number of specific BUAs being applied for.
- Abandonment of BUA applications due to industry perception of a lack of clarity over the definition between a waste and a resource and an overly regulatory approach to the use of the end product limiting market uptake.
- Limited number of General BUAs developed by the then Department of Environment and Heritage Protection (now DES) for priority waste streams and materials had impacted the ability of industry to pursue further resource recovery.

The recommendations taken forward and summarised in documents supporting regulatory change included:

- To develop more general BUAs to include specific guidance on waste inputs, standards, and end markets for resources.
- Review legislation and structure of provisions across Act and Regulations applicable to BUAs
- Establish Technical Working Groups to help develop general BUAs.
- Develop outcome focussed conditions for BUA applications.
- Improve level of guidance currently included in general BUAs.
- Provide more clarification around whether BUA provisions are regulating activities, the application of the resource or specifying when a waste becomes a resource.
- Review similar mechanisms for the de-classification of waste.
- Review internal processes to support the evaluation and assessment of BUAs.

2.3 Original intent of the EOW framework

The Beneficial Use Arrangements were replaced in Chapter 8 of the WRR Act on 8th November 2016 with the current EOW framework. A number of BUAs transitioned into EOW codes. The introduction of the EOW framework sought to drive the diversion of potential resources from landfill. The proposed policy response to the review of the BUA framework aimed to:

- Replace general BUAs with EOW codes that provide a definitive end point for where a waste ceases to be a waste and under what circumstances.
- Retain the specific approval framework for instances where environmental parameters and processes may be unknown or work is needed on proof of concept – for example, to allow for a pilot project. These would be short-term in duration.
- Reduce duplication across regulatory frameworks (e.g., overlaps between conditioning of development approvals, environmentally relevant activities and BUAs) and streamline the application and approval processes to reduce complexity and cost to business of the BUA process.
- Incorporate technical expertise by introducing technical advisory panels into the process of developing new codes (to be formed of industry, end users, standards authorities, government, and environmental organisations)
- Establish a register of those operating under EOW codes to enable the Department to monitor uptake and compliance with the codes.

The aim of the EOW framework also identified that applicable waste management controls and conditions under the EP Act would only apply up to the point where the waste ceases to be a waste. This sought to provide a definitive point to remove the perception that products using waste input are manufactured to the same standard as products manufactured using virgin materials. Additionally, discussion paper documents suggest that codes would not specify the conditions relating to the activity of treating and/or processing the waste, nor would they govern the suitability of a material for use in a particular application, as performance and user standards would govern this part of the process. There was a view that any further monitoring of the resource in its end use would be managed under applicable non-waste legislation or requirements, and environmental harm managed under a “general environmental duty” and associated environmental harm offences.

2.4 Interaction with other legislation

The head of power for the EOW framework sits within the WRR Act. There are links to other waste management legislation and subordinate legislation at a state level. Issues identified during this review about these interactions will be summarised in the review findings in **Section 4**.

Table 1 Interaction with other legislation

Legislation	Interaction	Relevance to this review
Waste Reduction and Recycling Act 2011	Chp1, Part 2 - Objectives & aims of the WRR Act (s3-s6)	Expected outcomes from WRR Act set the direction for waste & resource recovery outcomes in Queensland. EOW framework should align.
	Chp 1, Part 2, d2 - Key concepts and definitions (s8-s13)	Includes concepts and definitions for terms relevant to EOW including disposal, what constitutes a waste disposal site, and principles associated with waste and resource recovery.
	S8AA– definition of waste	See section 2.1. Definition of when a waste is generated is critical. The definition of waste was moved to the WRR Act in June 2023. This included the introduction of a mechanism for the Queensland Government to regulate a "thing" to not be a waste.
	Chp2 - Waste Management Strategy (s14-s22)	The EOW framework must be aligned with the State Strategy, along with supporting Action Plans and other policy initiatives
	Chp3 – Waste levy	Waste that is reused/recovered/recycled is not affected by the landfill levy. The levy drives positive behaviours to increase diversion from landfill for which EOW is a possible vehicle for reuse, resulting in increased need for the EOW framework. There are interactions with the application of the waste levy on potential resources.
	Chp 4 – Management of priority products and priority waste	Links to priority wastes that could be identified by the Department, which could in turn drive more material into reuse or recovery via the EOW framework. Links also to product stewardship, bans (for plastics) and specific definitions around standards for compostable plastics.
Waste Reduction and Recycling Regulation 2011	Part 3 – Waste levy	Reference to exempt waste, application and rate of waste levy, discounts and other provisions which impact the application of the EOW framework.
Environmental Protection Act	General	Definitions of the environment and its values, contamination (including waste), environmental harm and nuisance, environmental relevant activities, and best practice environmental management. The EP Act also sets penalties for infringements.
	Chp 5 – Environmental authorities, PRC plans and environmentally relevant activities	Provides overarching legislation for definitions under the ERA framework and the process for application. This is relevant as most waste producers utilising the EOW framework have a relevant ERA and there is a relationship between the two to be reviewed.
Environmental Protection Regulation 2019	Chp 3 – Environmentally Relevant Activities and Schedule 2 – Prescribed ERAs and aggregate environmental scores	Sets the overarching framework for site licensing plus provides list of regulated activities that may generate waste, and specifically part 12 *Waste Management* which describes the requirements and thresholds for activities that manage waste.
	Chp 5 -, Part 1 – Categorisation of commercial waste and industrial waste	Sets the definition of regulated waste and categorisation process, including testing for determining the type of waste being managed.
	Chp 5 -, Part 9 – Waste tracking	Provisions for how waste is transported within Queensland with specific reference to transportation of regulated waste, which is relevant to the transport of similar materials under the EOW framework.

Legislation	Interaction	Relevance to this review
	Chp 8 -, Part 5 – Suitably qualified persons and auditors	Defines the type of persons who should be advising on technical submissions associated with the EP Act.

2.5 Interaction with existing policy and strategy

The policy settings in Queensland seek to move towards a zero avoidable waste to landfill future, and in doing so, transition towards a circular economy. The strategic intent is summarised in the following sub-section.

2.5.1 Waste Reduction and Recycling Act objectives

The overarching policy and strategic position for Queensland has a head of power in the WRR Act, which sets the objectives and aims of the state for waste management and resource recovery. The WRR Act was updated on 2 June 2023 to include two new objectives relating to the promotion and facilitation of Queensland's transition to a circular economy (new objective (b)) and promotion of activities to extend the life cycle of products and materials (new objective (c)), both of which support the EOW framework. This review does not consider the rationale for these inclusions. There are now seven objectives (a-g) of the WRR Act:

3 Objects of Act

The objects of this Act are the following-

(a) to promote waste avoidance and reduction, and resource recovery and efficiency actions;

(b) to promote and facilitate Queensland's transition to a circular economy;

(c) to promote activities across government, business, industry and the community that extend the life cycle of products and materials;

(d) to reduce the consumption of natural resources and minimise the disposal of waste by encouraging waste avoidance and the recovery, re-use and recycling of waste;

(e) to minimise the overall impact of waste generation and disposal;

(f) to ensure a shared responsibility between government, business and industry and the community in waste management and resource recovery;

(g) to support and implement national frameworks, objectives and priorities for waste management and resource recovery.

The WRR Act is also guided by the *waste and resource management hierarchy;* and the *polluter pays principle*, the *user pays principle*, *the proximity principle*, and *the product stewardship principle*. Section 5 of the WRR Act makes specific reference to *making end of waste codes and granting end of waste approvals*. In reviewing the EOW framework the principles of the overarching intent of the legislation should be considered.

Whilst the EOW framework has the potential to play a role in all objectives, it is objective (b), (c) and (d) where the EOW framework has direct influence. The acknowledgement of the role of the WRR to facilitate a transition towards a circular economy will help to shape the Queensland Government's policy response. This is discussed further in **Section 2.5.3** of this report. There is a clear role for the framework to support a reduction in natural resources and minimise waste disposal through encouraging waste avoidance and, more specifically relevant, facilitating re-use and recycling of waste. Objective (f) flags the shared responsibility between government, business and industry which demonstrates the need for collaboration in implementing the EOW framework.

2.5.2 Objectives and actions in Queensland's WMRR Strategy

Released in July 2019, the Waste Management and Resource Recovery Strategy (WMRR Strategy) presents actions and targets to achieve a zero waste to landfill goal by 2050. Within this there is a firm commitment to move towards a circular economy and to reduce the amount of waste that goes to landfill.

The objectives of the EOW framework are aligned with those of the WMRR Strategy, notably the identification of potential resources within waste, and driving the reprocessing and remanufacturing of materials that would otherwise have been sent to landfill. There are three key themes in the WMRR Strategy:

- Reducing the impact of waste on the environment and communities.
- Transitioning to a circular economy for waste.
- Building economic opportunity.

Although there is no explicit mention or actions for the EOW framework in the WMRR Strategy, it is implied through several actions including:

- Assess the opportunities of the circular economy model for Queensland.
- Collect and amalgamate data to understand material flows across the economy and address knowledge gaps – it is understood that this has been undertaken for organic materials, textiles, and tyres.
- Develop material-specific action plans for problem wastes – this could include the development of EOW codes for these wastes; action plans have been developed for Plastic Pollution, Organic Waste (including a Strategy and Action Plan) and are currently in development for Textiles and E-Products. None of the published documents specifically refer to the End of Waste Framework however they do discuss market development and establishment where product quality standards are directly relevant.
- Continuously improve and reform waste-related legislative frameworks – relevant to this review.
- Develop proposals for landfill disposal bans – the EOW framework is directly relevant to reuse of wastes that are potentially banned from landfill in the future, i.e., an EOW code might be required to manage waste banned from landfill.
- Investigate alternative end-uses and markets for recycled materials – the role that the EOW framework plays in these recycled materials being reused (or clarification that recycled material sits outside the EOW framework) should be considered.

In permitting waste to be used as a resource under specific conditions and uses, the EOW Framework has a clear role to play in delivering on the objectives of the WMRR Strategy.

2.5.3 Moving towards a circular economy

Noting that the objectives of the WRR Act have now been updated to make reference to the circular economy transition, and the state circular economy approach is presented in the statutory WMRR Strategy (see **Figure 1**), the move towards circularity as an enhanced form of environmental sustainability is also being driven by investor priorities. Increasingly, private business is seeking and driving opportunities to reduce their environmental impact through environmental, social and governance (ESG) goals which align with the goals of a circular economy. This includes both large scale multinational businesses and small and medium-sized enterprises operating in Queensland. With regard to waste, these businesses drive opportunities to avoid or reduce waste. Specific to the EOW framework, companies have already explored and are pursuing opportunities to reuse materials generated through operations that may meet the definition of waste. This review may support the facilitation of reuse of some materials now or in the future.

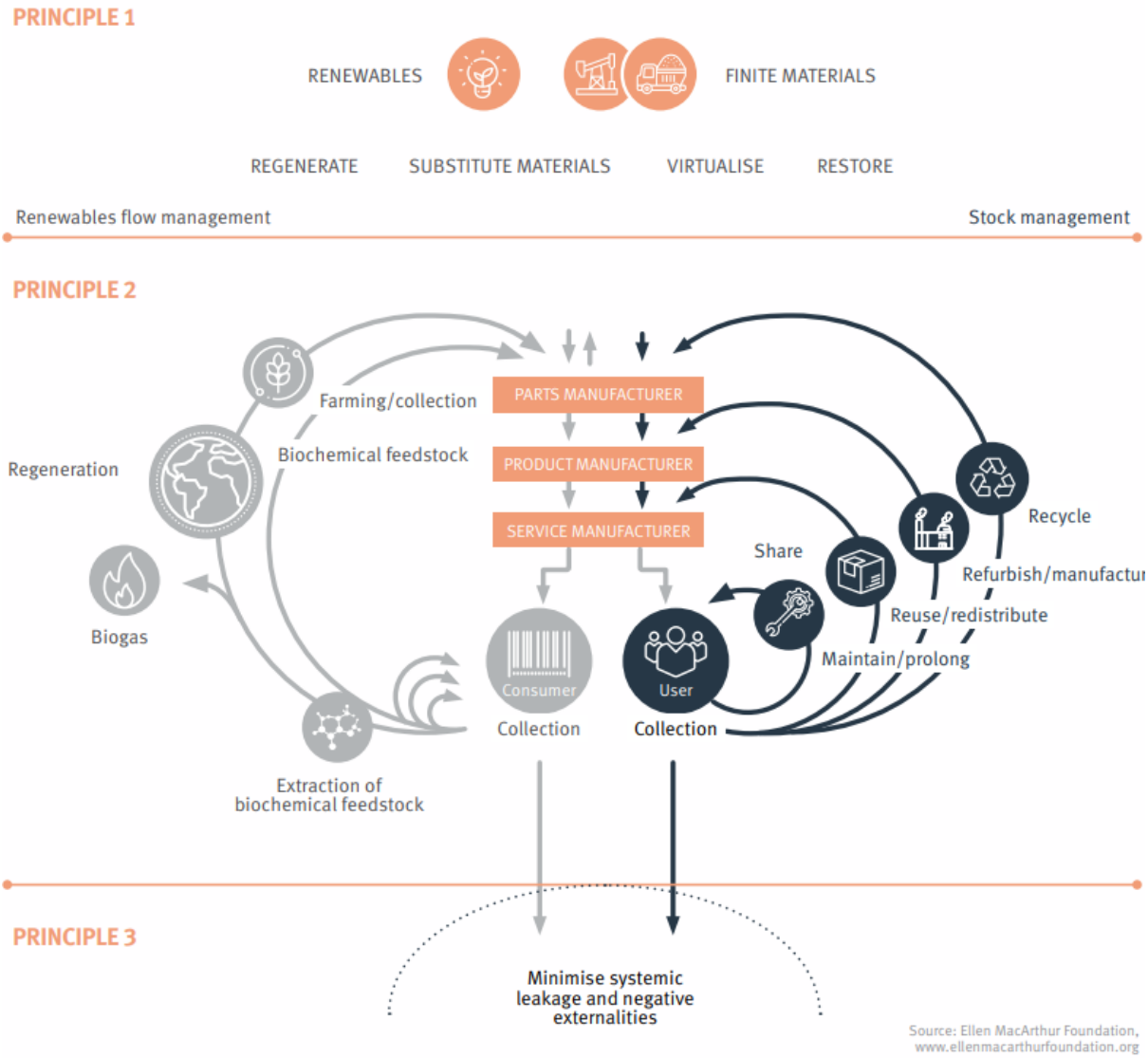

Figure 1 Queensland's Circular Economy – Butterfly Diagram[1]

The term circular economy is now included within a specific objective of the WRR Act. This will allow legislation and policy responses to shape towards achieving a transition towards a circular economy. At this stage however there is no formal circular economy policy for the Queensland Government, although it is understood that various government agencies are promoting circular economy activities. Under a circular economy, the WRR Act forms an important component to support management of waste, recycling, and resource recovery. The circular economy is broader than waste management, and it is not clear whether the intent of the Queensland Government is to focus on circular economy efforts just through the WRR Act or whether other agencies will lead higher order responses. The implementation of the EOW framework in the future will benefit from a circular economy approach, and in particular the Queensland Government adopting a systems-based approach to how waste is addressed (as a leakage) from the circular economy.

2.6 EOW framework Implementation – current status

As of 16 June 2023, there were 35 EOW codes currently active[11] with 234 registered resource producers. There is one active EOW approval. Details on current codes are presented in **Appendix B** and summarised below.

- The Department reports that several codes do not have any registered users. Of these, Amorphous Silica Powder, Blast Furnace Slag, Digestate, Ferronickel Slag, Glass Fines and Silica Fume are relatively new codes. Codes for Used Vegetable Oil and Drilling Muds are longer established and currently have no registered resource producers. Given industry has requested a code be developed with an intended use, it is considered unusual that there are no registered resource producers for all codes. The code for Used Vegetable Oil has 1 registered resource user despite not having any registered resource producers.
- For the remaining codes, the number of registered resource producers per code ranges from 1 to 52.
- Seven codes, including, Carbide Lime, Ferrous Chloride, Ferrous Sulphate Heptahydrate, Oyster Shells, Spent Sulphuric Acid, Sugar Refinery Clarifier Sludge and Water Treatment Residuals, currently have 1 registered resource producer per code.
- Codes for use of resources in construction material typically have the highest numbers of registered resource producers, being:
    - Concrete (liquid washout) (12)
    - Biosolids (15)
    - Coal combustion products (18)
    - Concrete (solid washout) (24)
    - Concrete (returned concrete) (31)
    - Recycled aggregates (52)

High-level analysis of the number of approved uses for codes has been undertaken linking key uses to six summary “approved use” categories. This was undertaken to identify particular types of resource uses that codes have been developed for (noting assumptions were made where resource uses were varied). These use categories are construction materials, feed, fertiliser, soil conditioner or in composting, water supply, and a catchall “specialist” category where the use was considered to be very specific or did not fit with the other uses. This is displayed in **Figure 2**.

[11] State of Queensland, 2022. EoW Codes, Current Codes, accessed from https://www.business.qld.gov.au/running-business/environment/waste-management/regulated-waste/eow-codes#current-codes

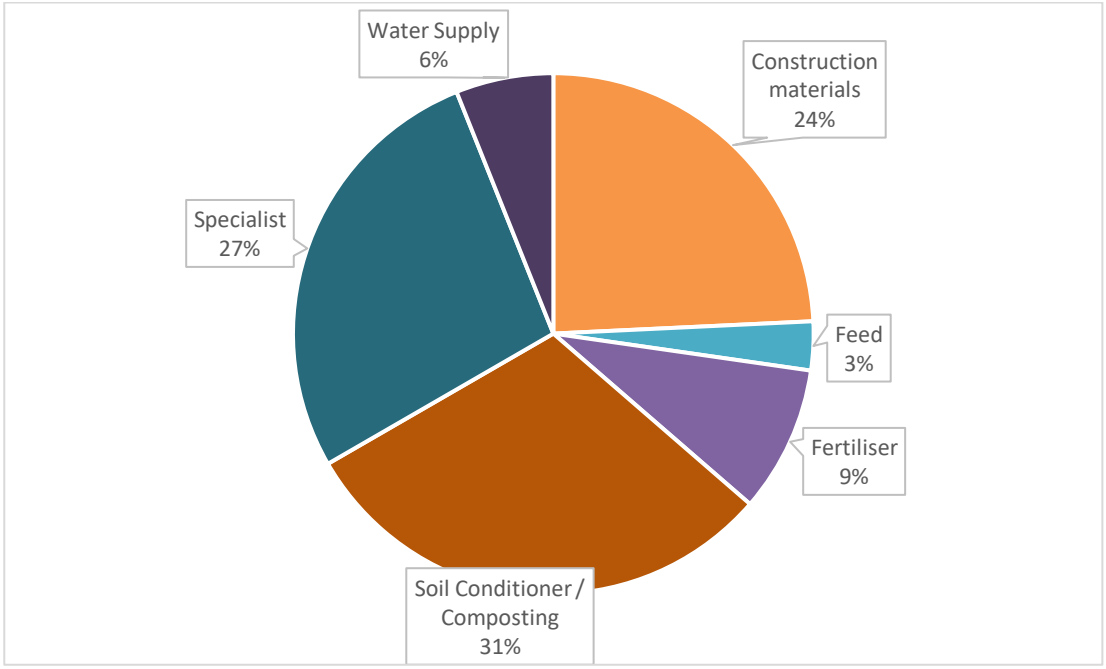

Figure 2 Breakdown of existing EOW code by resource Use

There is also no mechanism to collect data on resource users unless the code explicitly requests resource users to notify the Department prior to use of the resource, such as in the code for Carbide Lime, noting this is not for registration purposes. The impact of this is that no data is collected on resources used under the EOW framework and therefore, overall resource recovery rates reported by the Queensland Government may be less favourable than the reality. This is valuable data in demonstrating both the true resource recovery efforts by the state but also the value of the EOW Framework itself, however proponents may be reluctant to provide this data to the Queensland Government due to the effort required to submit, and suspicion that activities may be more likely to be scrutinised if the data is provided than if not.

3 Jurisdictional review

Several jurisdictions have implemented similar resource recovery and EOW models, with the common goal to address the central barriers to the circular economy, and to encourage new markets for waste-based secondary raw material. While the frameworks have a common aim to apply the waste management hierarchy, the mechanisms of the models differ and are explored in this section. In Australia, New South Wales (NSW), Victoria, Western Australia (WA) and South Australia (SA) were reviewed, with international experienced gathered from the European Union (EU) and the United Kingdom (UK).

Commonalities in each of the frameworks include the aim to:

- Set standards or specifications for the reuse of waste-derived materials.
- Seek to remove or reduce the regulatory constraints of the waste regulatory framework in that jurisdiction for the reuse of waste materials.
- Recapture materials as waste, triggering the waste regulatory framework conditions, if they do not meet the relevant standards and specifications of the waste derived materials required by the framework

3.1 Similar operating jurisdictions

3.1.1 NSW Resource Recovery Framework

The NSW Resource Recovery Framework was implemented in November 2014 under the New South Wales *Protection of the Environment Operations (Waste) Regulation 2014,* replacing the former resource recovery exemption system.[12] Resource recovery orders (orders) and resource recovery exemptions (exemptions) are two integral aspects of the resource recovery framework. For a waste to be classified as a resource recovery waste, there must be corresponding order and exemption documents which are issued together by the EPA.

Orders are relevant to resource generators and processors, who are required to comply with specific conditions in order to supply the waste material for a purpose that is genuine, fit-for purpose and will cause no harm to the environment or human health. Exemptions are applicable to the consumers of the waste material, who must also meet the specific requirements to receive and use the material.

Order conditions may include material specifications, processing specifications, record-keeping, reporting and other requirements, while exemption conditions may include requirements such as how to re-use or apply the waste, as well as record-keeping, reporting and other requirements. By separating the process into this two-document format, the EPA can tailor the provisions for sampling, testing and plant requirements, while transparency and clarity around the relevant requirements for suppliers and consumers is also achieved.

Currently, there are 40 general orders and exemptions in place in NSW for commonly recovered and reused wastes, which may be used by anyone if all conditions are met[13]. Additionally, the EPA may grant a specific order to an individual, alongside an exemption, that applies to anyone using the recovered material. Specific orders and exemptions are reviewed every two years.

[12] NSW EPA, 2015. Resource recovery orders and exemptions. https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wasteregulation/150107-order-exemptions-factsheet.pdf
[13] NSW EPA, 2022. *Current orders and exemptions.* https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/current-orders-and-exemption

A notable difference between the NSW Framework and QLD EOW Framework is that materials that meet the relevant specifications and standards in NSW are still legally classified as waste yet are exempt from the applications of parts of the waste regulatory framework under the nuanced resource recovery waste classification. Under this mechanism, through retaining the definition of waste, it has been argued that there are significant market and regulatory implications that do not promote the objectives of the framework.

An independent review of the NSW Resource Recovery Framework undertaken by Cathy Wilkinson in 2021[14] identified several issues with the existing framework, including:

- A lack of nuance in some practical aspects of the framework to support innovation and a smooth transition to the circular economy.
- A lack of transparency around the creation of and decision-making regarding orders and exemptions and how sampling requirements and contaminants limits are generally determined.
- A lack of guidance and clarity around the application and assessment of orders and exemptions, and the process for the issuing and revocation of general orders and exemptions.
- A lack of technical expertise for certain decisions on resource recovery orders and exemptions.
- The process required for the recovery of common, low risk recoverable materials does not reflect the associated risk level and encourage mass recovery. The framework is too risk averse. It was recommended that investigations should be conducted into whether some activities that use, process and/or store recovered materials should be excluded from certain aspects of the waste regulatory framework.
- Waste regulatory requirements that continue to apply to recovered materials are overly onerous.
- A lack of support for the development, demonstration and assessment of new and innovative technology and processes.
- The definition of waste was considered too broad, and the orders and exemptions were noted to not go far enough in ensuring that recovered materials are removed from the waste framework.

It is noted that following the Independent Review[14] the NSW EPA has considered the recommendations and released a delivery plan,[15] *Towards a Circular Economy: enhancing the NSW resource recovery framework*.[16] Actions under the plan include improving transparency for resource recovery orders and exemptions around decision making, application processes, and technical details around sampling requirements and contaminant limits, and options for internal review of processes. Further recommendations are made around facilitating pathways to enable end-of-waste outcomes for low risk recovered materials and supporting innovation. More broadly other commitments are made to review the role and application of NSWs waste classification system.

[14] Wilkinson, C. 2021. Independent Review of the NSW Resource Recovery Framework. https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/independent-review
[15] State of New South Wales, NSW Environmental Protection Agency, 2023. Towards a Circular Economy: enhancing the NSW resource recovery framework (https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/recycling/23p4430-resource-recovery-framework-delivery-plan) accessed 22 July 2023
[16] New South Wales Environmental Protection Agency, 2023. Independent review of the resource recovery framework; https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/independent-review accessed 24 July 2023

3.1.2 Victoria Waste and Resource Recovery Framework

The Environmental Protection Authority Victoria has recently implemented the *Environmental Protection Amendment Act 2018* and Regulations which came into effect in July 2021.[17] Under the Victorian EP Act, a key requirement is that all industrial waste is deposited, including for the purposes of resource recovery and reuse, at a place that is lawfully able to receive it (a lawful place). The new Act sets out a number of instruments and routes that allow a receiver of industrial waste to be considered a lawful place, with controls in place to ensure the specific route reflects the proportionate level of risk and is tailored and flexible.[18]

Waste determinations are an instrument under Regulation 5(3)(a) that authorise a person, place, or premise to receive industrial waste if they meet a specific set of criteria set out in the determination. The criteria are easily measured and if a waste or site meets the standards and conditions of a determination, a site can be deemed a lawful place for receipt and recovery of the waste without the need to assess, analyse or predetermine if the waste is safe or can be legally used. Waste determinations currently exist for processed organic waste, livestock manures and effluent, recycled construction and demolition aggregates and fill material, excluding soil that has undergone thermal desorption treatment.[19] [20]

Additional tools for resource recovery include declaration of use (DoU) and EPA permissions. A DoU is a low burden tool facilitating an agreement between a producer and receiver for how a specific industrial waste can be directly used. The DoU must describe the waste, assess its risks, and identify legitimate uses. Where a DoU is in place, industry meet the lawful place requirement without the need to go through further regulatory burdens. A DoU may be in effect for up to 12 months before a new declaration form is required.[18]

Regulation 63 also provides several scenarios where a person, place or premise may receive industrial waste without needing permission, determination or DoU. These scenarios are primarily for receipt of a significantly restricted volume of industrial wastes.[18]

The new regulations enact a new regulatory regime underpinned by a new General Environmental Duty, which is expected to allow the proactive identification and management of environmental risk as a shared responsibility of all Victorians. In essence, a person engaging in an activity that may give rise to risk of harm to human health or the environment from pollution or waste must minimise those risks as far as reasonably practicable. Under the new General Environmental Duty provisions offences are risk based rather than outcome based, whether harm actually occurs is not an element of the offence but could be used as evidence of the risk eventuating and the degree of harm caused if that risk eventuated. Proof of breach would not require proof of knowledge, intention or recklessness, and liability for a breach would arise when the relevant event occurs, namely a failure to prevent or minimise risks of harm. General environmental duty exists in Queensland under the EP Act.

[17] State Government of Victoria, 2018. *Environment Protection Amendment Act 2018*. https://content.legislation.vic.gov.au/sites/default/files/79b87865-9bbe-376c-95fa-fc61b1b0d844_18-039aa%20authorised.pdf
[18] State Government of Victoria, EPA Victoria, 2022. *1756.2*: *Summary of waste framework*. https://www.epa.vic.gov.au/about-epa/publications/1756-2
[19] EPA Victoria, 2022. *Determinations.* https://www.epa.vic.gov.au/about-epa/laws/compliance-and-directions/determinations
[20] EPA Victoria, 2021. Waste determinations questions and answers. https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/4216/1431/5395/Waste_determinations_questions_and_answers_-_EPA_publication_1944.pdf

3.1.3 Western Australia Waste Derived Materials Framework

Western Australia (WA) legislation does not currently provide for resource recovery exemptions or risk-based assessments and approvals for waste materials. This lack of legislative support is considered not conducive to the uptake of the waste hierarchy principles and discourages market development for waste derived materials. WA additionally has waste levy regimes in place that are considered ineffective and contradictory without supporting resource recovery legislation in the jurisdiction[21]. Currently, if the department receives requests to approve the use of waste materials under particular circumstances, it does not have the authority to approve such requests, even if the use is beneficial and safe. This provides a lot of uncertainty around WA's resource recovery and markets for waste products contrary to the objectives of typical circular economy resource recovery activities.

In 2014, an End of Waste policy framework was investigated, however, following a review, it was dismissed as a legislative framework was deemed to be instead more effective.[21] In 2020, feedback was sought on a proposed legislative framework for waste derived materials. The review highlighted the need for the framework to address the inadvertent consequences that come with the use of the term waste in 'waste derived materials', clarity around when materials cease to be a waste, and around the initial definition of waste. The next steps involve the preparation of drafting instructions for the legislative changes needed to establish the Waste Derived Materials Framework. The most recent activity in developing this framework was in 2020 with no published updates since.

3.1.4 South Australian Resource Recovery Framework – The Environment Protection (Waste to Resources) Policy 2010

The South Australia Environment Protection Act 1993 and its subordinate legislation, particularly the Environment Protection (Waste to Resources) Policy 2010 are responsible for legislating resource recovery in South Australia. Under the South Australia model, waste or other matter is exempt from being categorised as a waste if it satisfies certain conditions, including:

- It meets a specification or standard determined by the Minister or approved by the SA Environment Protection Authority, or
- The SA Environment Protection Authority declares the material an approved recovered resource, provided the material is dealt with in accordance with that declaration.
- In the absence of a specification or standard, it constitutes a material that is ready and intended for imminent use without the need for further treatment to prevent any environmental harm that might result from such use.

Similar to the QLD EOW Framework, under the SA Framework, when waste-derived materials meet the relevant criteria and standards, they are no longer classified as a waste and are removed from the waste regulatory framework. There are perceived benefits to the dissociation of these materials with the label of waste in that this encourages market creation and avoids regulatory burden. The South Australian model is noted to be less restrictive than the Queensland model according to the NSW Framework Review.[12] One feature of the model that demonstrates this is that a product may be used even if there is no published standard, if it constitutes a material that is ready and intended for imminent use without the need for further treatment to prevent any environmental harm. This means that a waste material may be used as a resource if, upon request, a proponent can demonstrate to the EPA that:

[21] The Department of Water and Environmental Regulation, 2019. Issues paper: Waste not, want not: valuing waste as a resource. https://www.der.wa.gov.au/images/documents/our-work/consultation/Issues%20paper%20-%20Waste%20not,%20want%20not.pdf

- There is an immediate market for the recovered material.
- The recovered material and its use complies with all relevant state and federal legislation including regulations and policies made under relevant laws, Australian Standards, market, or engineering specifications.
- Where relevant, testing by a suitably qualified person demonstrates that environmental harm will not result from the storage, transport, and use of the recovered materials and that the recovered material is suitable for its intended use.

Currently, standards and specifications exist for waste derived fill, refuse derived fuel and waste derived soil enhancer.[22]

3.1.5 European Union Waste Framework Directive and End of Waste

The EU EOW criteria under the Waste Framework Directive (WFD), adopted in 2008, details criteria under which waste can cease to be a waste and becomes a material to be freely traded.[23] The purpose of defining EOW criteria in this instance is to facilitate and promote recycling, whilst ensuring a high level of environmental protection, reducing the consumption of natural resources and the amount of waste sent for disposal. Article 6 of the WFD specifies that certain wastes cease to be a waste when they have undergone a recovery operation (including recycling) and comply with specific criteria, including when:

- The substance or object is commonly used for specific purposes.
- There is an existing market or demand for the waste material
- The use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products)
- The use will not lead to overall adverse environmental or human health impacts

EU wide EOW criteria have only been defined for three waste types and progress on other criteria was often ceased at the proposal stage due to a lack of concurrence between member states regarding the stringency of the criteria. While these three EU criteria for specific wastes remain directly applicable to all member states, the 2018 amendment to Article 6 of the EU WFD[24] also allows member states to introduce their own criteria around when waste ceases to be a waste, so long as criteria does not exist at the EU level for that particular waste stream, unless the national criteria set higher requirements than the EU. This has shifted the responsibility of implementing EOW criteria to member states, with most members further decentralising to local authorities, while some, such as the UK (when it was still in the EU), have developed nationwide EOW criteria.[25,26]

[22] EPA SA, 2021. Waste management. https://www.epa.sa.gov.au/environmental_info/waste_recycling/waste-management
[23] European Commission, 2009. End-of-Waste Criteria. https://publications.jrc.ec.europa.eu/repository/handle/JRC53238
[24] European Commission, 2022. Waste Framework Directive. https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en#end-of-waste-criteria
[25] Forsgren, C. and Johansson, N., 2020. Is this the end of end-of-waste? Uncovering the space between waste and products. https://www.sciencedirect.com/science/article/pii/S0921344919305622
[26] Gustavsson, J. and Lindqvist, J., 2022. Waste as a resource: is there a need for national end-of-waste criteria in Sweden? https://www.lexology.com/commentary/environment-climate-change/sweden/advokatfirman-lindahl/waste-as-a-resource-is-there-a-need-for-national-end-of-waste-criteria-in-sweden

Since 2020, investigation has been ongoing to identify EU wide criteria for additional waste streams that are viable for recovery. The European Commission released the findings of the investigation in March 2022 and identified two potentially suitable streams, textiles, and plastics, for EOW criteria. Investigations into the suitability of these streams will continue through 2023 and likely into 2024. Currently, the three regulations in place enable the recovery of iron, steel, aluminium, copper, and glass scrap. This provides an example of a strategic approach to development of similar EOW processes, aligning with problematic waste streams, which in the context of Queensland could link the EOW framework into action plans developed or under development for plastics, textiles etc.

3.1.6 UK End of Waste Framework

Prior to the UK leaving the European Union in 2020, alongside the EU EOW criteria, the UK had developed national EOW criteria, known as waste quality protocols (QP), for 13 waste types.[26] QPs are end of waste frameworks that industry can volunteer to follow, which set out requirements for when certain wastes can become non-wastes once they have been recovered. Protocols exist currently for aggregate from steel slag, digestate from anaerobic digestion, biodiesel, biomethane from waste, compost, flat glass, poultry litter ash, aggregates from inert wastes, processed fuel oil, recycled gypsum from waste plasterboard, non-packaging plastics, tyre derived rubber material, and pulverised fuel ash and furnace bottom ash.

Progress with the QPs ceased in 2016, due to issues regarding the time-consuming nature of the negotiation required between the authorities, waste producers and potential users. The EOW criteria was found to be too stringent, with few waste types meeting the general conditions required, particularly due to the lack of consideration of the associated benefits, while focus was on the risks. However, in 2020, following the departure from the EU, the EU WFD requirements were transferred into UK law.[27] Since then, reviews of the 13 waste QPs have begun, to decide whether the UK Government will continue to support each QP and republish it as a resources framework, whether a QP needs revising before republishing, or whether support for the QP will be withdrawn.[28]

The revision is to be undertaken in two phases, with an initial review aiming to identify if there are any issues that need to be addressed, and what form the new resources framework should take[26]. Following this initial phase, where required, revision of each QP will be undertaken. This involves the formation of a 'task and finish group' with industry, a technical assessment of what is required to ensure that EOW is met, and consideration of current information, technologies, scientific evidence, and legislation. In Queensland, there is currently no formal mechanism requiring review of the End of Waste Codes.

As of December 2021,[29] six initial phase QP reviews have been completed, with all six requiring a second phase of revision. Second stage reviews for four of the six categories are under way, with the remaining two having missed the deadlines to set up a task and finish group, triggering retraction of support for the QP by the Government. One further initial review has begun as of December 2021, while the remaining six QPs are yet to be assessed.

[27] UK Government, 2020. Explanatory Memorandum to the Waste (Circular Economy) (Amendment) Regulations 2020. https://www.legislation.gov.uk/uksi/2020/904/pdfs/uksiem_20200904_en.pdf
[28] UK Government, 2021. Waste quality protocols review. https://www.gov.uk/government/publications/waste-quality-protocols-review/waste-quality-protocols-review
[29] December 2021 is the publish date for the information source. As of 24 July 2023, this has not had further update.

Under the existing framework the UK Environment Agency provides a discretionary pay for service that provides formal definition of waste opinions. Customers pay an initial fee of around $1,200 when they submit a request for a definition of waste opinion (essentially 6 hours labour cost), which is the minimum amount of time the Agency requires to complete an initial review. Beyond this, the Agency will then provide a cost estimate for further work needed to complete a full technical and legal assessment. It is understood that the Department (in Queensland) provides a similar feedback process for proponents to be given advice on the most appropriate legislative path for reuse of material, although no cost is involved.

3.2 Summary of jurisdictional review

Commonalities across other jurisdictions include setting standards for the reuse of waste-derived materials, an aim to reduce the regulatory burden and encourage reuse of waste derived resources, and also provide a mechanism for that material to be captured as a waste where relevant standards and specifications could not be met, or no longer applied. There is a degree of variability in the pace of development of specific standards and guidance, with the EU and its current (and former) member states in particular seeming to lag significantly.

In the case of challenges with other frameworks, there are a number of points of consistency. In NSW, there are challenges identified as the state moves towards its own circular economy and how the existing resource recovery framework applies, and a lack of guidance for implementation of the policy. In NSW recent review of their own framework has identified that the definition of waste may be too broad.

Simpler system exists in Victoria for direct use of some industrial wastes under declaration of use documents, but requires annual renewals, with some allowances where industrial waste can be received and used without needing permission. The Victorian framework is new, and underpinned by the introduction of general environmental duty, which is legislated for in Queensland.

The approach to waste reuse varies in SA. If a waste derived material is ready and intended for imminent use without the need for further treatment, it may be used without standard or specification, provided a proponent can prove immediate need, compliance with all state legislation, and that environmental harm will not be caused, and the material will in essence be fit for purpose. This puts the onus of proof onto the proponent rather than relying on the Government to provide direction.

4 End of Waste Framework Review

This section presents the findings of a review into the implementation of the Queensland EOW framework, in particular the positioning of the framework in its legislative setting, processes to nominate, develop and implement an EOW code or approval under the existing framework, and implementation. Each section presents the current state, before providing discussion points informed by feedback from stakeholders. Further feedback on specific codes is also incorporated into this section.

4.1 End of Waste and other legislation

Throughout the review there has been a recurring issue raised by officers from the Department, industry stakeholders and resource producers and users, in that there is a lack of certainty regarding where a code could apply or not, and by extension, the need for a code. This subsection explores the key issues raised.

4.1.1 The definition of waste

Waste is defined in s8AA of the WRR Act[30] as:

1) ***Waste*** *includes anything that-*

   (a) If left over, or is an unwanted by-product, from an industrial, commercial, domestic, or other activity; or

   (b) Is surplus to the industrial, commercial, domestic, or other activity generating the waste

The definition of waste in the WRR Act remains broad and inclusive and extends to being a gas, liquid, solid or energy, or any combination. When strictly applied, it is evident that all materials that meet the definition of waste must be managed as a waste unless defined as an EOW resource or be regulated as “no-longer a waste” as introduced under the WRROLA Bill which became law in June 2023. The definition under regulation as to how something will become “no-longer a waste” is still to be defined by the Queensland Government.

The Department applies a strict definition of waste under the ERA Framework and when identifying and managing unlicensed activities. This is also the stated aim of the End of Waste Guideline[31] (EOW Guideline) which clearly states that resource producers and users must comply with the conditions of Codes, including registration and notification, otherwise the material remains a waste. The broadness of the definition of waste was raised by several stakeholders. It was also noted that both at a Queensland level and at a national level, it is not abundantly clear when a waste becomes a waste. The Department identified during consultation that compliance activity under the EOW Framework can be hindered by lack of resources and also useable offences to allow the strict definition of waste to be applied.

[30] It is noted that the definition of waste was moved from the EP Act to the WRR Act during the development of this report.
[31] State of Queensland, 2022. Guideline: End of Waste (EOW), from https://environment.des.qld.gov.au/__data/assets/pdf_file/0029/85790/wr-eow-guideline.pdf

From an EOW perspective, the inference would be that strict application would require numerous EOW codes to be developed, including for low-risk wastes that are commonly and have been historically reused without issue. This would place a significant additional burden on resource producers and users, as well as the Department. The issue this raises is that it introduces ambiguity into how compliance officers should interpret the definition of waste within the Department. Compliance officers are required to make a judgement on the application of the definition of waste, which introduces uncertainty among registered resource producers and registered resource users, and may lead to unequal application, constriction of low-risk recovery or reuse of material, or even prosecution.

4.1.2 Lack of definition of some other terms to define waste

Whilst waste is defined in s8AA of the WRR Act the legislation does not include a definition of key terminology used in the definition. This includes the terms *left over*, *unwanted by-products*, *surplus*, and *activity*. The Department has identified that there is a lack of clarity over the definition of these terms. Furthermore, there is uncertainty as to at what point the definitions are applied – i.e., are they at the point of generation, from the producer perspective, or for the receiver of the by-product/waste. However, the definition of waste seems to clearly apply to the "*industrial, commercial, domestic or other activity generating the waste"* implying the definition of waste is applied at the point of generation and certainly before any material is removed off-site.

It is unclear from this review as to the impact of the lack of definition of these terms. The definition of waste appears to clearly apply to activities within a specific site, and as such these terms refer to potential for the on-site activities to reuse, recycle or recover surplus material or by-products. It appears clear that the definition of waste applies when the waste producer decides to remove these waste materials from their site. The challenge here is finding the appropriate level of regulation to ensure material reuse is not being constrained by the technically correct application of the definition of waste.

4.1.3 When something stops being a waste

Under s8AA of the WRR Act waste is defined to not include:

(a) A resource; or

(b) A thing prescribed by regulation not to be a waste.

4.1.3.1 The definition of a resource

An resource is defined in the WRR Act:

> *Waste stops being a waste and becomes a **resource** when, in accordance with an end of waste code or end of waste approval, it stops being waste and becomes a resource.*

The definition of an resource under the legislation is clear. For a waste to become a resource, it must be used in accordance with an EOW code or EOW approval or defined by regulation as not a waste. It can be inferred that there is no other mechanism for the Department to determine whether a waste could be a resource. It is not clear whether the definition of something as not a waste led to the thing being defined as a resource (in the context of EOW). Conditions for when an EOW resource becomes a waste again are also clearly referenced in the legislation. The definition clearly refers to all waste and does not limit to regulated waste or general waste. Feedback from the Department and review of the list of codes developed suggests that codes have primarily been developed for resources that are higher risk and regulated, although not exclusively.

The challenge the definition of waste and subsequent definition of an end of waste resource create is that because the definitions are so precise, in theory, codes would need to be developed for potentially a very long list of EOW resources to achieve lawful compliance.

4.1.3.2 Prescribing by regulation to be not a waste

Prior to the WRROLA amendments there was no mechanism that allows for the Department to identify whether something is a waste (or not) outside of the application of the EOW Framework. The amendments introduced a mechanism to allow the Queensland Government to prescribe by regulation a thing to not be a waste. The WRROLA bill amendments were made during the development of this review report and as such, are not a specific outcome or recommendation of this report.

During consultation, stakeholders identified the introduction of such a mechanism, with clear and well-defined criteria, could potentially minimise the level of effort required to develop new End of Waste Codes for resources that are considered to have low risk to human health or the environment. Any such changes would need to be supported with clear protocol for how a direct mechanism would be applied, under which criteria, and what information might need to be provided. Item (6) of s8AA of the WRR Act provides legislative support for the steps in defining something by regulation as not a waste including public consultation, feedback and whether the proposed changes are supportive of achieving the objectives of the WRR and EP Act, or if other measures may be more effective.

As these are relatively newly introduced changes to legislation, there remains further detail to be presented in how the Department intends to utilise this ability to define something as not a waste, and the level of effort required by the Department or industry to support the making of regulation. Stakeholders identified issues such as who is responsible for identifying this information, and who covers the cost of technical or legal input for these changes. It is noted that the UK Environment Agency charge an initial assessment fee to consider whether something is a waste or not, before considering the next steps.

4.1.4 The definition of a "resource user"

A resource user is defined in s155 of the WRR Act as:

> (3) A person is a resource user while the person uses a resource in a way, or for a purpose, that complies with an end of waste code or end of waste approval
>
> (4) If a person stops using a resource in a way, or for a purpose, that complies with an end of waste code or end of waste approval –
>
> (a) the person stops being a resource user; and
>
> (b) the resource stops being a resource and becomes waste.

Feedback has indicated that in some cases it can be difficult to identify who the resource user in the process is, and at what point the resource no longer needs to sit within this definition of being used. The example provided by a stakeholder regarding this issue is:

- If pavement recovered from a state-owned road is used as a resource under this Recycled Aggregates End of Waste Code with the resource to be used to construct a local government owned road, it is unclear who would be the resource user. The resource user could be the asphalt manufacturer that accepts the recovered asphalt pavement and inputs it as a resource into their 'new' pavement mix, which they then sell to a contractor that constructs the road for a local council. The Resource User could also be the local council which 'owns' the asset (the road) that the resource was used in.

In this example it is unclear who would be charged with an offense against the legislation if the resource is used in a manner inconsistent with the EOW Code. By extension there is a chain of custody from the Resource Producer to the 1st Resource User, but it is unclear if that chain of custody extends further along to future users of the resource. It could be argued that the end user, in the case of the example above being the local council, would have a duty of care to ensure that engineering specifications are met in materials used to construct the road, but this does not sit within the remit of the EOW Framework. It is understood that where there is uncertainty the Department would typically provide advice on responsibility.

Stakeholders, with specific reference to the recycled aggregates and biosolids EOW codes, queried whether the same entity can be both a resource producer and user and if re-use of a processed material is allowed in the same location as the production. The confusion regarding this issue is not only prevalent among industry, but also evidently the Department, as industry report that they have received differing advice from the Department upon enquiry. This has resulted in the stockpiling of reusable resources, such as recycled aggregates and biosolids, which ends up stockpiled (or disposed of) at waste management facilities.

4.1.5 Interaction between EOW and Environmentally Relevant Activities

The Environmentally Relevant Activities (ERA) Framework sits within the EP Act and subordinate legislation. The framework provides for the regulation of activities that may be potentially harmful to the environment. As part of the planning process, proponents are required to apply for an Environmental Authority (EA) issued by the Department which states the environmental standards an activity is expected to operate under and refers back to the relevant ERA as defined under *Schedule 2* of the *Environmental Protection Regulation: Prescribed ERAs and aggregate environmental scores*. ERAs are numbered consecutively from #1 to #64 however there are several that have been removed since the framework was first introduced.

Activities regulated under an ERA are likely to generate waste or by-products. There are seven waste ERAs which relate specifically to the processing of wastes.

Table 2 Waste related ERAs

ERA (#/title)	Summary of activity
ERA 53 – Organic material processing	Organic material processing consists of operating a facility for processing, by way of composting or anaerobic digestion, more than 200t of organic material in a year.
ERA 54 – Mechanical waste reprocessing	Mechanical waste reprocessing consists of operating a facility for receiving and mechanically reprocessing waste. There are various thresholds for the activity based on the type of waste processed. The minimum threshold for certain wastes is 5000t. There is no minimum threshold for processing other types of waste.
ERA 55 – Other waste reprocessing or treatment	Other waste reprocessing or treatment consists of operating a facility for receiving waste and (a) reprocessing the waste; or (b) treating the waste to render it non-hazardous or less hazardous. There are various thresholds for the activity based on the type of waste processed and there are no minimum thresholds for regulation.
ERA 57 – Regulated waste transport	Regulation of the transport of regulated waste in a vehicle. Regulated waste transport only applies to material that meets the definition of waste; however, it is noted that some materials that may meet the definition of an EOW resource and still demonstrate some or all of the hazardous properties and there may be a need to control the movement of this material even if a resource.
ERA 60 – Waste disposal	Operation of a facility for disposing of a range of wastes as defined under the ERA. The ERA is defined by the type of waste managed (e.g., general, regulated, limited regulated) and by volume disposed of (to landfill) per year. As this is a waste management solution (i.e., end-fate) there is limited current interaction with the EOW framework, however the potential for mining of material disposed of under an ERA60 may be a future consideration and the EOW Framework may be a vehicle for this reuse.

ERA (#/title)	Summary of activity
ERA 61 – Thermal waste reprocessing and treatment	Thermal waste reprocessing and treatment consists of operating a facility for thermally reprocessing or treating waste. There are various thresholds for the activity based on the type of waste processed and there are no minimum thresholds for regulation.
ERA 62 – Resource recovery and transfer facility operation	Operating a facility for receiving and sorting, dismantling, or baling waste, or receiving and temporary storing waste before it is moved to a waste facility. As this ERA is explicitly related to the management of waste there are limited interactions with this ERA and the EOW Framework Review, although it is noted that often ERA62 is held in collaboration with other waste related ERAs.

Waste processing activities under ERA 53, ERA 54, ERA 55, and ERA 61 seek to alter the physical or chemical state of waste received at the facility to render the material less hazardous, or to prepare the waste into an alternative state which may be suitable for reuse or further processing (as a feedstock).

Feedback from both the Department and industry stakeholders is that there is a lack of clarity over the definition of the output of an ERA regulated waste processing approach. Providing certainty over a definitive end point for where a waste ceases to be a waste and under what circumstances was a key driver for the introduction of the EOW framework and is a common issue in other jurisdictions. In the context of the link between the EOW Framework and the ERA Framework there is a clear need for clarity with at what point in the ERA framework a waste stops being a waste, or alternatively if processing of waste does not stop that material being a waste.

Stakeholders also identified that it is unclear whether the Department considers the optimal regulation of waste to be via the EOW Framework or via the ERA Framework and Environmental Authority Conditions.

Stakeholders identified a lack of clarity as to when processed waste stops becoming a waste and becomes a material. For example, where a waste is processed through a specific ERA and the output is a saleable product, does this material cease to be a waste if it meets the specific conditions in the Environmental Authority, or is it still a waste. Whilst waste related ERAs process waste, the output of processing associated with ERA 53 (composting) may be completely different to a process which seeks to render a waste less hazardous. Care is needed in the definition of an output as the use of the term resource may imply regulation under the EOW Framework.

The following subsections consider different approaches to how waste that is processed through an ERA regulated facility could be addressed.

4.1.5.1 Pathway 1 – all ERA processed waste remains a waste

It is understood from consultation that there are conflicting views within the Department on what happens to waste that is processed through an ERA activity. There is nothing in the WRR Act, EP Act or subordinate legislation that changes the definition of the waste material being processed through an ERA activity. The ERA activity may change the physical or chemical state of the waste however under this interpretation the output remains a waste. Under this approach, which is confirmed by the Department to be consistent with internal operational guidance, any waste processed under a Waste Related ERA would still require an EOW code or EOW approval, or be regulated as not a waste, to permit its intended reuse.

If all waste processed under an ERA was still considered a waste, this could be considered counter intuitive and would contradict the current application for materials processed already (e.g., organic waste composted under ERA 53 which becomes a product). Stakeholders identified that this provides a barrier to continued operation, and, assuming EOW codes or EOW approvals could be developed, it would place significant increased burden on resources in the department and cause significant industry disruption.

4.1.5.2 Pathway 2 – Variable pathway depending on the ERA

Under certain ERAs, the output could be determined as a resource or product that is then unencumbered by having to adhere to waste legislation once processed. This approach was within the original intent of the EOW framework. It is apparent that this is the current approach to activities requiring an ERA 53 although there is apparent uncertainty as to whether compost product should continue to be classified as a waste. Under a variable pathway approach outputs from some ERA processes could be classed as a resource without requiring the need for an EOW code, whereas outputs from other ERA processes might still require an EOW code. The challenge with this approach is it presents a variable scenario which does not provide certainty to operators of how the product produced by processing may be utilised. This could vary both in terms of the waste processed through the ERA and the output product quality which may be very difficult to regulate. There may be a high degree of variability in waste feedstock received into ERA authorised sites which would make this approach very difficult to regulate. It also increases the assessment burden on the Department and the evidence generating effort by the waste producer to assess and demonstrate compliance.

4.1.5.3 Pathway 3 - Direct path to transition waste to a resource via processing under an ERA

The most straightforward situation would be to identify the outputs under a waste related ERA automatically as a resource (i.e., a waste). The challenge with this approach is that the ERA framework regulates the risk of the activity and whilst there are limits on the type and quantity of material processed, the ERA framework and associated EAs do not place limits on the quality of output material or its permitted use. Without this control, the only control on output quality would be via the application of input quality, which is typically limited to the classification of waste (i.e., general, regulated) but may also include the identification of specific wastes (e.g., asbestos) that could be accepted or are prohibited. Most environmental authorities that permit waste related processing have specific conditions on waste acceptance, and proponents are required to develop protocols to avoid prohibited waste entering the site, however this does not generally affect output quality. Sites may also have multiple ERAs that permit a range of wastes to be accepted and processed on site lawfully.

From the pathways presented in 4.1.5.1 to 4.1.5.3 Pathway 1 is most consistent with the current approach however elements of Pathway 2 appear to be adopted in certain circumstances. It is evident that the choice of approach is highly complex and depends on the relationship between the input material, the process and the output product or wastes, which will vary across ERAs. With this complexity comes investment of time and resources by both the Department and stakeholders.

There is also a challenge regarding the processing type for each ERA. ERA 53 requires a biological process to breakdown organic waste, but this process does not necessarily breakdown or remove non-organic waste. Therefore, potentially harmful materials passing through an ERA 53 site that are not affected by processing would be present in the output product. Unrestricted use of this material may cause harm to human health and the environment and also allow wastes that should be managed in another manner to be unlawfully managed. The Department uses the model operating conditions for ERA 53 to implement guidance around the risk of feedstock being processed via composting, which in turn seeks to determine the type of technology required. This manages the risk of operation. In this case, it might be possible for determined feedstock risk to also apply to output quality i.e., low risk feedstock processed under ERA 53 could be deemed a low-risk output or even prescribed as “not a waste.” This approach could be applied to other ERAs but there would be a significant level of effort required to review feedstock and risk associated with product quality, and this is not what the ERA Framework is designed to do.

The Department should however provide further clarification and connection between the inputs, the processing, and the outputs although this is complex. ERAs regulate the process and, in some cases, such as with inert recycled aggregate product (RAP), this should be sufficient to manage any risks. In other cases, higher risk materials may go through the same processing equipment and may need an EOW. This suggestion is consistent with the prospective approach under Pathway 2, however further considerations of the risks associated with particular materials should be incorporated to ensure this model is applied effectively. It is likely also much harder to regulate. With the amendments to the WRR Act the ability for a certain thing, which could be an output from an ERA process, to be listed in regulation as not a waste may help this process. Certainty of the "thing" in terms of quality, quantity or use may be required but conditions may be limited to facilitate reuse.

4.1.6 Regulating waste or product quality

Raw materials or secondary raw materials used in manufacturing or remanufacturing processes, might be expected to demonstrate similar material quality as virgin material derived materials, or at least be within product quality standards or specifications. In these circumstances it is the end user who sets the requirements for those materials to be reused. If deployed under an EOW code, then secondary raw material quality might be expected to at least meet code criteria. Several EOW codes link resource user conditions to specific standards, for example, if the resource meets a product quality standard, then it is no longer a waste. It is an operational policy for the Department to use published standards where available and appropriate. Examples of applicable standards include Australian and NZ standards, published guidelines or other standards however these are not always available or used.

This approach provides resource users with comfort that resources derived from waste meet an acceptable standard, although the onus should still be on the resource user to ensure appropriate use. The challenge is that as these standards change, the level of risk or environmental impact may change, although generally changes are based upon new research and development, more stringent guidelines, or detailed review, and so, could be considered to reflect new best practice science. Additionally, the Department would need to be comfortable with existing and changes to national standards before implementation. These links should continue.

4.1.7 Alignment of framework with environmental harm

It is recommended that, in consultation with currently affected resource users and intended resource users, restrictions on the end use of resources are re-aligned with the potential harm associated with the beneficial re-use of the material and red tape is reduced as much as possible. It is understood from the Department that environmental harm is a key consideration in code development and there does not appear to be a clear need to reinforce this given it provides the focus for approval and compliance activities protecting environmental harm.

Additionally, while some codes provide benefits and clarify the expectations for resource management, industry stakeholders identified that they consider some codes require superfluous monitoring without any specified limits to contextualise the quantities, such as in the case of the Draft Amendment of EOW code sugar mill by-products. This increases the cost and administrative burden of implementation for, in the stakeholder opinion, no environmental benefit. The introduction of the ability to define a thing as not a waste may help to streamline the monitoring burden, however the Department has provided feedback that they consider monitoring requirements in existing codes are considered appropriate.

4.1.8 The application of general environmental duty

Section 319 of the EP Act provides regulation around general environmental duty (GED). This is defined as:

A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm (the general environmental duty).

This is effectively a catch-all regulation that allows unlawful activity not governed by other parts of applicable legislation to be penalised. Reasonable and practicable measures to prevent or minimise the harm must have regard to the nature of the harm or potential harm, the sensitivity of the receiving environment, the current state of technical knowledge of the activity, the likelihood of successful application of the different measures that might be taken, and the financial implication of the different measures as they relate to the type of activity.

Several stakeholders identified the role of general environmental duty, similar to its application in South Australia and Victoria as critical to the progression of the EOW framework, particularly with respect to wastes that are considered low risk. The suggestion was that Queensland should adopt a similar approach to other jurisdictions. It is noted that this approach is deployed by the Department for general and lower risk wastes through operational policy, however this does not necessarily provide certainty to industry and operational guidance can be changed. To extend the current operational approach, and as an alternative to developing an EOW code, low risk wastes could be identified and permitted for reuse across a wide range of uses, or even for unlimited use, however this use would be governed by general environmental duty. The difference may be the establishment of a published list of waste types governed by this approach, rather than relying solely on operational guidance within the Department.

This would have the effect of reducing the regulatory burden on the Department from needing to develop and produce EOW codes and also reduce barriers for reuse of low-risk material. An argument could be made to suggest that the Recycled Aggregates and reuse of concrete EOW codes could be deployed under a simplified process relying on general environmental duty. It is noted that standard process for the Department is where industry or other stakeholders enquire as to potential reuse for a certain type of waste, the Department provides advise which legislative tool would apply under the specific scenario. This may include consideration of how low risk wastes may be managed. It is assumed that things defined as not a waste under regulation would still be managed via general environmental duty where necessary.

4.2 EOW code and approval nomination process

The process to nominate, assess the need for and develop an EOW code or approval is managed by the Environmental Regulator function within DES. The WRR Act allows for prospective EOW resources to be nominated at any time of year, however in practice this has been prompted by a nomination period typically identified at the end of each calendar year. It is a statutory requirement to accept nominations at least once during each year hence the annual window. During this window, nominations are welcomed by the Department.

Once a nomination is received the Department reviews the potential applicability of a code being developed. This review identifies whether there is a clear need for a code to be developed. Where a code is not to be developed, the Department notifies the nominating entity. Where a code is to be developed, this is added to the Department website to identify timeframes for development and current status. The Department maintains a list of nominated codes including the rationale for rejecting codes.

4.2.1 Uncertainty over when to apply End of Waste

In deciding whether to nominate a specific resource for development of a EOW Code or EOW Approval, stakeholders have identified a lack of clarity as to when an EOW code may apply, or whether a code is required as a key issue. This is observed in situations where there may be multiple pathways, such as either operating under the conditions of an existing Environmental Authority to manage waste or by-products as opposed to needing to operate under an EOW code. If a direct mechanism for the Queensland Government to determine a waste as "not a waste" is introduced, this may add additional uncertainty if not supported with clear guidance.

The disharmony in the definitions of waste and the lack of clarity around the timing of when a waste becomes a resource, as discussed in section 4.1.4, creates uncertainty among potential registered resource producers regarding whether an EOW code or approval is required. This inhibits the nomination of codes and approvals as organisations are hesitant to invest in the process when there is such confusion around it. This may slow the engagement with the EOW framework and the development of codes, in turn discouraging the uptake and employment of the WRR Act objectives. The uncertainty within industry also creates a bottleneck with ongoing enquiries to the Department, putting a strain on time, resources, and the effectiveness of the framework. The line of risk that triggers the application of the EOW framework needs to be defined to instil certainty into the process to ultimately encourage resource recovery.

It is understood from stakeholder engagement that through inter-agency communication another Queensland Government department stakeholder provided a list of recycled materials that the stakeholder had been using in road construction for several years, and also those materials that were considered potential resources. Feedback from the stakeholder suggested that the advice provided by the Department was conflicting as to whether materials require an EOW code or EOW approval or whether approvals might be appropriate or lawful to accept or handle wastes. A specific example was the development of a new specification by the stakeholder for the use of recycled glass as a resource, where the Department had advised the stakeholder that recycled glass was not a waste and therefore did not need to be used as a resource under the EOW framework. A formal position was requested by the stakeholder on this with a request for recycled glass to have an EOW code developed.

4.2.2 Timeframes for nominations

Section 160 of the Waste Reduction and Recycling Act requires the chief executive to invite the public to make submissions about potential EOW codes at least once every year. Feedback received from stakeholders indicated that the constraints around the timeframe given for resource producers to apply for EOW codes and approvals is a limiting factor. It was highlighted that an application can comprise of multiple technical aspects and processes which may sit outside the government application period. It was recommended that the Department should consider allowing proponents to engage with the Department throughout the year to better accommodate project timelines, however in practice the Department generally accepts recommendations for codes through prelodgement processes at any time during the year and so this is unlikely to provide a barrier. This could perhaps be better communicated.

It was additionally noted that the current deadline to the application window, being in January, is inadequate, given the higher-than-usual levels of absence across the industry and government at that time of year. Given how few applications are received having a fixed term window appears to have little benefit, and the opportunity to engage with the Department at any point during the year, there does not appear to be a significant issue here. Removal of the application window would not meet the statutory requirement although the window could be broadened to effectively be an open period for a whole year without obvious impact.

4.2.3 Identification of potential resources for code development

To date, all codes that have been developed were either committed to by the Department when transitioning from the Beneficial Use Framework to the EOW framework, in other words, the general BUAs were replaced with EOW codes, or as a result of requests from industry. The Department has not specifically identified new prospective EOW codes that could be developed. This is possibly reflective of the responsibility for developing codes being within the Environmental Regulator function in the Department where the primary objective is environmental protection and appropriate deployment of resources. This function within the Department has a low-risk appetite, which may inhibit innovation and identification of potential resources for code development. Noting a separate review is ongoing regarding a separate Environmental Protection Agency[32] within the Queensland Government, consideration would need to be given as to the functions between end of waste policy versus enforcement and regulation.

Due to the resource producer led approach to nominating resources for codes, a common criticism might be that there has been insufficient focus on higher volume waste streams, including those with strategic benefit. At times, it has been unclear where general wastes can become a resource following processing through a waste related environmentally relevant activity (ERA), however certainty against the definition of waste has often been necessary. As the implementation of the Waste Strategy and economic liability across much Queensland of an increasing landfill continues, more processing infrastructure means more wastes are being converted into resources.

Staff resourcing is additionally identified as a constraint to the Environmental Regulator function being more proactive, although during engagement the Environmental Regulator function did identify it was currently undertaking research into similar documentation in other jurisdictions including identification of prospective waste types. It is assumed that this will be undertaken in collaboration with the Office of Circular Economy, policy, and strategy function. A similar approach may also be required for the regulation of a thing not to be a waste, which could be aligned with the EOW process.

4.2.4 Lack of strategic recommendations leading to code development

The Queensland Governments WMRR Strategy identifies a drive towards 90% recovery of materials by 2050 alongside a drive towards a circular economy[33]. The EOW framework has been in place since 2016. It is apparent that alongside the Environmental Regulator, the Office of Circular Economy, which provides the waste strategy function of the Department, has also not nominated any EOW resources for which a code could be developed. The development process has solely been industry driven to date.

This is a missed opportunity to identify a pathway to potential improved resource recovery, particularly when noting the Department collects data on waste arisings across the state and would have the opportunity to shape strategic policy. This includes recommendations for the development of individual action plans that could support the establishment of new circular economy solutions. There is no apparent reason identified as to why the OCE has not initiated the development of EOW codes for high-volume of wastes. Since the WMRR Strategy was released action plans have been developed for plastic pollution and organic waste, with e-products and textiles currently under development. The use of the End of Waste framework is not referenced in these documents, and whilst not a limitation directly, may represent a missed opportunity to strategically reduce barriers to reuse of waste derived resources or drive market development opportunities.

[32] Queensland Government, Department of Environment and Science, 2022. Independent Environmental Protection Agency (EPA) consultation (https://environment.des.qld.gov.au/management/epa-consultation) (accessed 25 July 2023).
[33] Circular economy: A model of production and consumption that avoids waste and depletion of finite resources through the reuse of materials.

4.2.5 Process for reviewing End of Waste code nominations

The Environmental Regulator function of the Department manages the nominations for codes to be developed. Nominations are reviewed when received, including collectively for the annual window process, and have been described as often being large, time-consuming reports to consider. This process is undertaken within the Environmental Regulator function. When received through the nomination window process it is understood the Department reviews each request and decides on the merit of each nomination. Where nominations are unsuccessful, the nominating entity is assumed to be notified and provided rationale for the rejection. The review is undertaken against the criteria requested in s159B of the WRR Act (and presented in the submission form) which requires a document or report detailing:

- The proposed use of the waste
- If the proposed use of the waste may, or is likely to, cause any serious environmental harm, material environmental harm, or environmental nuisance
- Potential market and sustainability of the proposed use of the waste
- How the proposed use of the waste supports waste recovery or reuse
- Relevant standards, guidelines, certifications and/or industry codes including any Australian Standards, ISO Standards, or other industry accepted standards, and
- Details of any investigations or reports that would support the submission.

Existing practice in the Department does however consider intra agency collaboration for specific issues related to conflicts with other provisions such as the waste levy, specific activities or for regulatory issues associated with non-straightforward scenarios. During consultation with the Department, it was noted that the OCE function within the Department is not routinely engaged by the Regulatory Function to assist with the decision-making process. This means that codes that might be in the public interest to develop from a resource recovery perspective are not considered from a policy or strategy perspective. The cause of this is likely associated with competing priorities and the general level of resourcing within the department. This could result in missed opportunities.

The Department noted during consultation that it has existing practices to liaise with other jurisdictions in terms of waste type and reuse concerns. This is typically done on a jurisdiction-to-jurisdiction basis and related to specific issues. Due to inconsistencies in the legal framework between each state this may prove difficult without broader harmonisation of legislation. Going beyond the current approaches to inter-jurisdiction collaboration may also take significant resources. Regardless, collaboration at a national level should be encouraged to seek out opportunities to harmonise approaches where possible.

4.2.6 Decision making and prioritisation of certain wastes for code development

There are no publicly issued criteria that explain how the Department forms a decision on whether an EOW code could be developed. The Department has an existing internal evaluation matrix that is used to quantitatively review nominations for an EOW Code. This considers the key assessment criteria listed in the EOW Guideline as well as the matters for consideration published in legislation. The level of detail available to industry and other stakeholders outside the Department around these criteria is limited, and industry does not have access to the scoring matrix. Nor does a code nominee get provided a copy of the assessment performed. This will help to address the subjectiveness of each assessment although may also lead to challenge from industry.

It was also noted that the Department does not provide clearly defined triggers for requiring independent assessments. Historically, the Department has sought external consultancy support despite the proponent typically being the expert on the material, although it is noted that independence of expertise should also be seen as a positive. The Department also noted during consultation that the proponent also likely has a vested interest in achieving a positive outcome, and typically provides a high degree of knowledge. Technical information is validated by the Department, who do not typically seek support from specialist contractors to provide additional verification. Ultimately the Department needs to be satisfied with the outcomes.

4.2.7 Rejected code nominations

Information provided by the Department to inform this study identified that since commencement, a total of 9 requests for codes to be developed have been rejected. The majority of these were rejected on the basis of insufficient information provided by the requestor. The form itself is a simple-one page document, however it is expected that a requestor provides justification for the code to be developed along the lines of key information (in the form of a document or report) listed in the submission form and linked to s159B of the WRR Act.

Two requests for codes were rejected on the basis of a perceived clash with the Departments Waste Levy Policy. These were for recovered fines, and for process engineered fuel. For recovered fines, the assessment process identified that development of a code may conflict with the intent and integrity of waste disposal levy provisions under the WRR Act. Specifically, it was identified that there was clash between the ability of a proponent to seek exemption under the levy and where this material is to be used as daily cover at waste disposal facilities and the proposed use. For produced engineered fuel, it was considered by the Department to be appropriate to regulate waste derived fuel feedstock under ERA 61 – incineration rather than under the EOW Framework. The rationale for that due to the presence of potential contaminants such as halogens, plastics, and heavy metals that PEF was not considered appropriate for determination as a resource and would be better regulated under ERA 61 that would apply to the facility processing the waste.

The number of rejected codes is generally low and, in the instances where insufficient supporting information is provided in the application, it is understood that the Department goes back to the applicant and requests more information. This may be reflective of a lack of awareness of the code application process from industry, a lack of understanding of what is required, or insufficient understanding of the level of detail required. The application form is very short and links directly to the legislation, which is clear, however it may not be clear to a proponent as to the level of detail actually required to support an application. More detail on the supporting information requirements could be provided in the form or via other guidance to support proponents in providing higher quality information. It is noted that the Department offers prelodgement support and this information could be conveyed in such a meeting.

4.2.8 Codes developed were not appropriate

In one case, stakeholders have raised concerns around the development of some EOW codes that are considered inappropriate for use. An example cited by a stakeholder was the development of EOW codes that allow materials to be used on managed roads where the use did not fit within current highway engineering specifications. Whilst an argument could be made that the regulator design specifications could catchup over time, assuming the use would be deemed fit for purpose, it does highlight an issue particularly for stakeholders looking to operate under the EOW framework, causing confusion and inconsistency. This issue may reflect a lack of broad consultation when developing codes or misunderstanding between the two agencies.

4.3 EOW Code Development

The process to develop a code is led by the Department. The WRR Act allows for the Department to create a "Technical Advisory Panel" under s173G, which can call upon industry expertise to support the development of an EOW code. This approach has been deployed for codes currently in operation, however it is understood that there are currently no Technical Advisory Panels active. Where the Department chooses to develop an EOW code a process is followed to develop the code, utilising internal technical knowledge and expertise, or working directly with the entity nominating the code to be developed.

The Department has observed that the implementation of the Technical Advisory Panel can sometimes be beneficial, but at other times it can make the process more cumbersome. The Panel prepares a draft which is then sent out by the Department for consultation, however on occasion this has resulted in significant modifications to the original draft and back and forth with the Panel. These modifications necessitate the need for another round of consultation, which is resource-intensive and leads the Department to avoid involving the Technical Advisory Panel. Further delays can be introduced as panel members provide advice on a voluntary (non-paid) basis; thus, advisory panel work could be de-prioritised.

During the consultation period, industry also raised concerns with the lack of transparency around the composition and expertise of the Technical Advisory Panels. It was suggested that listing the Technical Advisory Panel with their employment and a dedicated conflict-of-interest register is the only way to demonstrate stakeholders' accountabilities and therefore transparency.

4.3.1 Timeframe for preparation of codes

Feedback from the Department indicates that some codes are developed in a relatively short time-period (e.g., 6-months). Others however can take significantly longer, particularly where there is extensive consultation to support code development. There are no statutory timeframes for a code to be established and no processes in place for accountability regarding timeframes. Timeframes are dependent also on the level of resources and technical knowledge available within the Department at any one time but also responses from stakeholders and requests for information to support code development.

During the stakeholder consultation it was observed that the development of codes can take up to two years and may entail as many as 30 iterations of one code, however this is likely an extreme example. This requires a significant investment of resources. Post-code approval discussions may also be extensive and are dependent on factors such as the complexity of the code and the number of users. There is a perception among some stakeholders that there is a lack of accountability for timeframes in code preparation. In reality, officers from the Department are likely managing multiple other inputs and not dedicated to a specific code. Until an EOW code is finalised, the resource must continue to be managed as a 'waste', restricting opportunities to recycle and in some cases forcing those materials to be disposed of to landfill.

There are a number of factors that could delay code development, including:

- Requests for further information, for example, technical detail from a requestor on the EOW resource quality or quantity, and risks associated with its intended use
- Level of feedback and engagement following issue of a draft document, for example, some EOW codes may be highly complex and require multiple consultations to move towards finalisation of a draft code
- Internal resourcing constraints within the Department
- Absence of statutory timeframes in the process can deprioritise information sourcing, from both technical teams within the Department and provision of information from industry.

It is noted that the introduction of a statutory timeframe or timeframes would require a change in legislation.

4.3.2 Consultation periods and feedback

Feedback from stakeholders has indicated that consultation efforts by the Department during the development phase are insufficient and that upon the initial release of codes, there is a lack of technical knowledge evident within the Department and in turn the codes and approvals. It is noted that there are a wide range of wastes covered by the EOW Framework and as such, technical knowledge may vary. Stakeholders suggest that the lack of technical knowledge manifests in the form of burdensome testing requirements that don't reflect the associated risk level of a waste material. This view is not consistent with feedback from the Department. The view from industry is this issue causes a long process of feedback from industry and is resource intensive. A perception of lack of technical knowledge may be driven by the actual lack of resources in the Department, or due to a lack of availability, or a combination of both. This may necessitate the use of expert inputs which can take longer however is necessary to bridge technical knowledge gaps or obtain external verification.

Additionally, stakeholder comments identified that in previous cases where feedback was provided, the codes either failed to progress to the next stage or were published without any amendments. In the example given by the Department, for Glycerol, which did not progress, the failure to progress was due to the absence of information provided by the proponent, which was critical to further develop the End of Waste Code.

In some cases, stakeholders raised that it had been left to industry to recognise changes or omissions in changes between draft and final codes, and to continuously suggest improvements to the code. It is understood from the Department that key stakeholders and those who comment on codes are contacted at multiple stages of code development including where there are major changes. When a draft code is finalised, a table is provided to submitters as to how submissions have been considered is provided back to commenters. From a transparency perspective it might be prudent for feedback on amendments to be published alongside draft and final Plan to explain to all stakeholders the changes made.

4.3.3 Visibility of codes under development and timeframes

As a legislative requirement (under s159B of the WRR Act), the Department publishes a list of draft codes currently under development and their status. The website (as of 19 June 2023) displays a list of two codes currently in development, namely, glycerol and biochar. Each is marked as having completed the public consultation stage. The code for biochar is proposed for release on 31 July 2023 however there is no proposed date for the glycerol code.

During the consultation with the Department, information was provided on additional codes under assessment that are not reflected on the website. The Department publishes a list online that meets the legislative requirement for publishing the list of codes under development. During engagement, the Department provided a longer list of codes under development based on internal records. This includes codes under assessment, that had been paused, or for modifications to existing codes. Whilst there is not a legislative requirement to publish these, it would be more transparent to present the status of codes currently being considered for development or those being modified. This would avoid proponents requesting codes already being considered or requesting changes to existing codes that have already been submitted.

4.3.4 Availability of technical knowledge to develop codes

Feedback from both the Department and key stakeholders, including those who have worked through code development and implementation have all raised the highly technical nature of the information required to develop some EOW codes. Feedback from some stakeholders identified that there was a feeling that Department lacked the technical knowledge and requested additional and unnecessary consultation to be outsourced by the applicant to validate and trust the information they are receiving in submissions. The Department considers that they have appropriate technical knowledge and skills to execute the services required. The need to obtain external input may place an unnecessary financial and time burden on the applicants, as they, as the resource generator, already possess the required knowledge, however it is acknowledged that the Department has the need to validate this information. It is understood that the Department does not have a budget to procure external advice and is reliant on the proponent doing this.

The perceived lack of technical knowledge within the Department is implied by some stakeholders to have resulted in burdensome and unnecessary requirements within draft codes, codes, and approvals, as the Department, not having the technical expertise to be fully aware of the associated risks, attempt to capture all possible risks. Stakeholders suggested that the resulting overcautious requirements then place an unnecessary strain on registered resource producers and users, even potentially prohibiting or deterring the use of certain wastes as resources. The Department however is of the view that they are best placed to assess and manage environmental risk and that code requirements are considered appropriate.

Whilst there is a facility to develop Technical Advisory Panels, it is apparent that these are infrequently used. One of the objectives of the EOW framework introduction was to “incorporate technical expertise” and whilst panels have been deployed, their use now appears limited and so implementation can be considered limited. The effectiveness of panels in terms of timely response has been hindered by panel member competing priorities, as panel members are not paid. This results in delays and challenges in coordinating meetings. The role and rules around panels may require revisiting.

4.3.5 Transparency in consultation and code development

Stakeholder consultation revealed a perception of insufficient communication and transparency from the Department during the consultation and development stages of code development. Specifically, there have been concerns around the lack of transparency in terms of risk assessments and the environmental rules that applications are being evaluated against. The Department has an internal evaluation criteria and assessment process based on the legislative criteria, as outline in the code nomination submission form. Applications have been denied by the Department with the perception of there not being a clear rationale or an assessment of the associated risks being provided to the applicant. The absence of a published structured framework for conducting external risk assessments is perceived to have resulted in a subjective evaluation process, shaped more by individual perceptions of risk rather than objective and consistent criteria. The Department has provided feedback to suggest that there is a clear risk assessment process in place and that as the environmental regulator, they are best placed to assess the risk. This difference of opinions suggests that there is a need for further transparency in assessment criteria and decision making, however due to the complexity and variability this may need to be addressed on a code-by-code basis.

4.3.6 Engagement during code development

Stakeholders identified a lack of broader consultation during code development beyond the entity nominating a code to be developed. This appears to have led to inefficiencies in code development. For example, there are several EOW codes for concrete-based resources, however this may have benefited from having a single broader code developed. This likely links back to the need for a strategic approach to resource and resource user identification for a range of resources, rather than relying on specific nominations.

4.3.7 Inconsistency of approach to product quality and emerging contaminants

Numerous stakeholders have identified inconsistencies with how active codes address environmental standards. Stakeholders are of the view that the approach to risk management should be consistent, logical, and transparent and should consider the accepted uses of materials before they become wastes and their relative risks. Examples of this inconsistency include:

- Variable resource quality criteria for the variety of material that can be reused in road construction (e.g., codes for recycled aggregates, various concrete types, garnet sand, coal combustion products, tyres, and ferronickel slag). Stakeholders identified that there was no clear reason for this variability in the case of road construction, and it was not clear how the criteria were risk based if all for the same resource use.
- The inconsistency with the application of thresholds or inclusion of PFAS within codes was identified by stakeholders as a key issue. In particular, the presence of thresholds for PFAS or even the requirement for testing. For example, the biosolids EOW Code requires testing but there are no maximum concentrations in the code that prohibit its application as a resource, although there are trigger limits where the resource users are required to notify if PFAS is present. Conversely the EOW Code for Drilling Muds does not require PFAS testing, however evidence suggested by stakeholders implies that PFAS can be present in some drilling muds. Both biosolids and drilling muds are permitted to be applied to land under the relevant EOW code. The agricultural industry is concerned by the lack of consistency, which creates uncertainty and reluctance to use recycled products due to the absence of consistency.

It was recommended by stakeholders that the contaminant levels and sampling requirements specified in the EOW codes and approvals should align with the same requirements as the equivalent EA, so they are consistent with the environmental risk. The original intent of the EOW Framework was to avoid user conditions where possible and put the liability onto the resource producer to ensure the EOW resource met the specified quality. Values used in each specific code therefore relate to the specific resource submitted by the resource producer during code development. It is noted that EA limits may actually relate to the final product whereas EOW limits are related to feedstock, which may explain the difference.

There is a specific process followed by the Department when developing the threshold values for a specific resource and use, including a process to reconcile and assess risk specifically. As it is based on actual resource quality, this leads to variability in values and discrepancy away from standard guideline values used in other forms of risk assessment. The Department recognises the need for consistency, however the process explained appears reasonable as to how it results in different values for what stakeholders may perceive as the similar resources.

4.3.8 Management of risks and disproportionate regulation

The current framework, administration, and approach to resource recovery by the Department is perceived by stakeholders to be a hindrance to maximising the potential of the circular economy. The broad definition of waste in the EP Act captures resources that are unlikely to pose a significant risk to the environment but still require an EOW code for reuse or repurposing, such as recycled aggregate products (RAP), concrete washout and cardboard offcuts. Stakeholders suggest this leads to disproportionate regulation and administrative burden for resource producers with little to no environmental benefit.

The introduction of the EOW framework has resulted in increased regulation and administrative burden, particularly in terms of laboratory testing and record-keeping. The framework creates duplication in regulation when the risks are perceived to be already managed, for example under an EA, and in some cases has caused previously unregulated wastes under former waste frameworks to now be regulated twice. For example, C&D waste, which is considered inert and poses minimal environmental risk, previously only required the relevant waste ERA but now also requires a relevant EOW code in order to sell or use the resource. The additional testing regimes on top of the EA requirements place added costs and administrative burden on resource producers for potentially no environmental benefit. It is noted however that prior to the EOW Code this material in theory should have been being disposed of to an appropriately licensed facility, and so the additional burden for compliance with the code facilitates avoidance of disposal costs.

To better support the recycling industry, stakeholders suggested that the Department take a risk-based approach to the application of the framework and development of codes. Where a waste product becomes a resource with low environmental risk, it should no longer be subject to regulation under the EOW framework, allowing resource producers to better take advantage of market opportunities for their waste products and compete with similar products already available on the market. The Department has suggested that operational policy is not to require EOW Codes to be developed for lower risk general wastes, although this has been noted previously as not consistent with the strict interpretation of legislation.

4.3.9 Verification of approved uses

A key issue identified by a stakeholder during consultation was the alignment and verification of approved resource use with key agencies. The example cited is the publication of the EOW code for Coal Combustion Products which seeks to allow bottom ash from coal combustion to be used in earthworks and pavement applications. The stakeholder flagged that it does not currently permit the use of bottom ash in highways regulated standards as the suitability of its use has not yet been verified. This causes confusion in the supply chain as resource producers can create a resource for used in a defined application under an EOW code which adds legitimacy to the process, however the actual resource use remains limited.

Whilst an argument can be made that code development enables usage, the acceptability of a product from an engineering standpoint is determined by its quality standard and thus sits within the approvals for use procedures. In the example of Coal Combustion Products to earthworks and pavement application, approval to use sits with published standards where if not permitted for use, the resource cannot be used. Therefore, as a major potential user of the resource, it may have been reasonable to consult with these stakeholders of an EOW code to better define supply chains, inputs, and outputs, and to foster collaborative research and development efforts. Through collaboration, particularly in this case between different agencies of the same government, alignment of the release of a code and acceptance of use within specifications would add significant confidence to those producing resources.

4.3.10 Alignment of code development with the circular economy

Feedback received from stakeholders during this review indicated that whilst the directional focus of waste related strategic documents was towards a circular economy, it was not apparent that the Queensland Government had identified what a circular economy would look like for Queensland. It was commented that the list of stakeholders identified for this review was too narrow and could have included the University of Queensland's Sustainable Minerals Institute. It was also noted that the Department of Resources has $5 million budgeted to invest in resources related to circular economy work which could be linked to developing EOW codes for mining and minerals projects specifically.

With the introduction of circular economy into the objectives of the WRR Act, decisions around EOW (and other waste outcomes) can now point to the circular economy, however, there remains an absence of an overarching circular economy strategy across the entirety of a circular economy, as opposed to just waste. Whilst foundational strategic documentation is not critical to this review, it would provide support and steerage for the identification of specific resources for which codes could be developed.

It could be argued the absence of a clear circular economy strategy and holistic (i.e., not just focussed on waste) enabling legislation hampers the development of End of Waste Codes. The challenge with managing the circular economy within waste related legislation is that the circular economy comes before waste, with waste considered a leakage. There would be a clear benefit from a circular economy approach and enabling legislation in Queensland, to which the updated WRR Act can support.

4.4 Post End of Waste code release activities

Once finalised and issued by the Department, an EOW code is live. Resource producers are required to register with the Department. To apply, a form[34] must be filled in and submitted to the Department for review. Once accepted, applicants are added to a register which is held by the Department. Registered resource producers can then lawfully offer the material generated as an EOW resource for sale. At this point a resource user, as defined under the WRR Act, can then utilise the EOW resource under the specific conditions set out in the code. The resource producer must provide information to the resource user as per the specific code operating under, which as a minimum includes the quality of the material. There is no consistent requirement across codes for a resource user to register with the Department, however there are a small number of codes that require resource users to notify the Department of intended use of a resource, and some specific data collection and retention requirements, and provision for the Department to request this information from the resource producer or user.

4.4.1 Costs associated with End of Waste codes

Under the current definition of waste in the legislation, as discussed in section 4.1.1, EOW codes could be interpreted to be required for any waste that is reused or recycled, however it is noted that operational policy within the Department does not require EOW codes for low-risk wastes. If the strict definition of the legislation was applied in practice, this would put a significant additional cost and resource burden on the Department to develop many more codes and monitor their application by industry.

[34] State of Queensland, Department of Environment and Science, 2018. Resource Producer Registration form https://environment.des.qld.gov.au/__data/assets/word_doc/0037/89983/wr-eowc-resource-producer-registration-form.docx

There is no cost recovery specific to registration or use EOW codes. It is understood that there is a budget allocation within the Department for a small number of FTEs to implement the framework. Staff often have competing priorities. This strain will only increase with each new code development, hindering the large-scale implementation required under current legislation. Feedback from stakeholders suggest that the Department is taking a reactive rather than adaptive approach, which is causing issues in the management of the framework. It is noted however that one of the reasons for the change from the BUA framework to the EOW framework was to reduce the cost burden on those seeking to recover resources and so introducing a fee would contradict that aim.

Feedback from stakeholders indicated that there is a perception that strain on the Department's internal resources is having a ripple effect on the industry, leading to difficulties such as onerous testing requirements in codes that provide little environmental risk management or benefit. This exacerbates the situation by imposing additional costs and administrative burdens on those who utilise the framework, owing to shortcomings in management and consultation. Cost recovery however would also increase the burden back on resource producers or users (depending on where the cost was applied) possibly acting as a disincentive to further resource use compared to virgin products, although this may also be dependent on the actual fee. Introducing a fee for registration would require a regulatory impact statement.

4.4.2 Registration of resource users

Feedback provided by the Department has questioned whether resource users might be required to register in a manner similar to resource producers. A handful of EOW codes already request this, for example under the EOW code for biosolids, while others, such as the EOW code for oyster shells, do not. This would give greater oversight of who is using waste derived resources, however, would increase the burden on both the regulator and industry. Where an EOW resource is being deployed as per the code, it should be considered a material and afforded the same regulatory environment as any other product on the market. This presents an argument against registration of all resource users as doing so would increase the burden on resource users, potentially reducing competitiveness against virgin products for which a user would not need to register for.

Stakeholders have raised concern among industry around the lack of visibility regarding registered resource producers, as this lack of easy access to information on their registration status is prohibiting their ability to perform due diligence on the organisations they trade with. It has been suggested that an online register would be beneficial for registered resource producers to ensure they are engaging with registered resource users. This may aid the establishment and growth of markets for resources through the provision of available recovered material listed on the Queensland Government website. By extension the Queensland Government's market development agencies (e.g., Department of State Development, Infrastructure, Local Government and Planning) could also support resource producers to increase offtake and connect with prospective resource users.

4.4.3 Timeframes for use of resources

The intent of the EOW Framework is to not provide an unnecessary burden on resource users, however in some cases the Department has identified resource users not using EOW resources within a reasonable timeframe. The example provided is of an operator with an ERA 60 (waste disposal) and ERA 62 (transfer). The site EA prevents operator from receiving end of life tyres at the facility, however the operator has registered as a resource user under the EOW framework (noting under the EOW Code for End-of-Life Tyres a resource user must register prior to use) which legitimises the use of tyres on the same site, with the intent to use the tyres to build an acoustic barrier. In the example provided, there was no demonstrated need for the sound barrier, however the absence of a timeframe for the intended construction of the barrier essentially permits the long-term stockpiling of tyres on site. A timeframe for reasonable use of a EOW resource would prevent long-term stockpiling or circumventing the intent of the framework (i.e., to encourage reuse of resources) and give the regulator the opportunity to prevent long-term stockpiling of wastes (and risks associated with this).

4.4.4 Post-code issue technical support

The Department has identified that once a code is established and there are registered resource producers and users in place, there often has been a need for post-registration support. Typically, this is in relation to producers or users seeking further clarification on specific implementation of each EOW code as to quality requirements, testing, application, and use. The EOW guideline provides functional explanations which are tied to legislative requirements, but there is the potential for a high degree of variability in interpretation due to the heterogenous nature of waste materials that may fall under the framework.

This support is provided by the Department and places an additional burden on resources which are unlikely to have been considered when the framework was established, and for which there is no additional cost recovery. It is not clear how the existing FTE arrangements for the Department for managing EOW were calculated, or how they are reviewed in a resource constrained environment. Additionally, this can cause frustration for resource producers or users as timeframes for a response from the Department can be slow depending on the level of response required and other commitments. This perhaps reflects on the level of detail provided in codes or the EOW guideline which offer little room for implementation guidance beyond specific requirements. It is assumed the intent of the framework was not to require detailed implementation guidance be provided for each EOW code however it is assumed this support is beneficial both to the Department from ensuring codes are utilised in an appropriate manner and from those using the codes to know how to use them properly.

Resource producers and users could seek the required information on application from other sources (e.g., private sector advisors) however cost of doing this may impact uptake of the resource production or use. Stakeholders suggest that it would be beneficial for the Department to organise an online forum or targeted information sessions post code publication to facilitate consistent application and understanding among industry of the associated requirements. Certainly, in the case of Local Government, several stakeholders were unsure of the application of the EOW framework and did not necessarily have time or technical know-how to seek out and understand codes, hindering potential resource recovery. This is a market development approach that could sit with the market development agencies of the Queensland Government in execution of Queensland's Waste Management and Resource Recovery Strategy. This may reflect the framework focussing on regulation rather than opportunity.

4.4.5 Education for implementation and awareness

Feedback provided by a number of Councils indicated a general lack of understanding of the role of the EOW Framework as it applies to waste managed by local government, typically at their resource recovery or landfill facilities. To facilitate use of more material under the EOW Framework, promotion, and post-release training for how to use certain codes may be beneficial to maximise reuse. It is understood that the Department does offer information sessions and presentations to different industry groups from time to time, specific training or post-issue engagement sessions are not provided by the Department. This is a market development approach that could sit with the market development agencies of the Queensland Government in execution of Queensland's Waste Management and Resource Recovery Strategy or in the OCE in promoting reuse and recovery.

There would be a further resource need to support this. Lack of understanding of application or even availability of a code to recover materials under is considered to dissuade stakeholders from utilising the framework as it generates additional work or places a risk of non-compliance and prosecution if activities are not implemented appropriately, as well as places an additional time burden to seek out this information.

In some cases, Stakeholders suggest the codes are considered ambiguous and inconsistent, with industry peak bodies taking it upon themselves to strive for consistency in the application of codes through hosting sessions with their members. The Department should improve touchpoints with stakeholders to ensure consistent education on code application. It has been noted by stakeholders that the greater onus to ensure consistent application and understanding of requirements should be on the Department.

4.4.6 Public visibility of registered resource producers

Prospective resource users wishing to identify where resource recovered or recycled materials come from rely on the provider of that material. The Department does not currently provide, via the QGov website, a list of registered resource producers as per a list that is maintained internally. Access to this list of approved resource producers under a specific EOW code would give support to the take up of that material and be an easy check point for prospective customers to confirm an appropriate standard is met for the resource. The Department notes it maintains its own internal register of codes and is provided to anyone who requests a list of registered resource producers. This could be improved by creation of a public register for EOW registered resource producers. It is not suggested at this stage that those operating under an EOW Approval would be part of a public register.

It is understood that there are likely a number of resource producers operating under the code but having not registered. Under the legislation this is still considered a waste and as such both Resource Producer and Resource User are operating unlawfully. The introduction of this process would allow for Resource Users to have confidence in the resource they receive, which in turn would support recycling and material markets. There is no obvious identifiable disadvantage from not doing this. There might be a need to introduce an offence for use of a resource obtained from someone who is not a registered resource producer.

It was also recommended that additional support via a forum, material exchange or similar mechanism to connect resource producers to potential resource users could be hosted by state and might promote improved resource recovery.

4.4.7 Review and update of End of Waste codes

EOW codes do not have a fixed expiry or review date. In essence they come into effect and then are maintained unless they are updated or revoked. The previous BUA framework had fixed terms, and this was a consistent criticism from industry. Whilst the lack of end or review date does not specifically imply periods of review or amendment, industry has raised that uncertainty is inherent as the code could be removed from effect by the Department. An example of where this has happened elsewhere was the revocation of the mixed waste organic outputs (MWOO) Resource Recovery Order in NSW in 2018 which happened immediately and according to industry without warning causing significant impact to industry and local government. There is nothing preventing the Queensland Government from pulling a similar lever with EOW codes should new or emerging information be presented around risk and whilst it might be hoped that this would be undertaken with consultation, a code could be removed from operation by the Department. Whilst risk management is important, the waste industry does not operate in an environment where decisions can be made on a daily basis due to the contractual nature of the service offered, and as such, the relationship between the regulator and industry is critical.

Feedback has also identified that the process or trigger for changing existing EOW codes is unclear, in addition to the timeframes for such change. EOW codes should be readily available for modification as new technologies or solutions develop. There is no indication that the Department would refuse a reasonable request for modification, provided sufficient information is provided to support the change, however the process for assessment, as with the first request, is unclear and can be time consuming. Some codes may be intrinsically linked to external standards or research and development.

A suggestion was made by the Department to move to fixed term approval periods for review of EOW codes. Whilst this is logical to provide certainty to resource producers and users, it would potentially increase resourcing loads on the Department to lead these reviews. Long term investors in some elements of resource recovery may consider 5-years too short a period to risk investing and changes to a code over that time. This would also necessitate a review period prior to the expiry of the fixed term and require additional resources from the Department to lead the review, plus additional inputs from stakeholders. It would also have no impact on whether or not the Department may choose to revoke an existing code.

4.4.8 Specificity of codes

Feedback from stakeholders suggested that the high degree of specificity in a number of EOW codes are prohibiting the wider reuse of resources in various instances. Where codes have been developed for a specific use, codes are developed without the ability to expand the code to ensure it is transferable to other users, particularly where the process and environmental risks are similar. This leads to duplicative applications, a waste of resources and prohibits the reuse of materials on a legislative basis. To improve this issue, stakeholders suggested that codes should be developed in a manner that allows them to be utilised by a wider range of resource producer beyond the original applicant, thereby promoting efficiency and resource recovery. The End of Waste framework legislation intends for the development of one code for each individual type of waste, which may limit cross application and mean that the specificity in existing codes is deliberate and appropriate.

4.4.9 Compliance of resource producer or resource user obligations

EOW codes contain a series of obligations for resource producers as well as resource users, including the requirement to collect certain records and data and retain these records for a specific period of time. Feedback received from stakeholders including resource producers and users indicated that specific compliance audits had not been undertaken by the Department. Where EOW compliance issues have previously been identified by the Department this is typically as a result of broader audits of sites with an Environmentally Relevant Activity and EOW compliance issues picked up during the audit.

Stakeholders noted that there is a perception the framework is largely unregulated as users are to self-report issues of non-compliance. Complaints relating to non-compliance may also be received via the Pollution Hotline if they are witnessed or 'experienced' by the public. Ultimately, there is no assessment process by which the Department can impose conditions and enforce compliance, nor are there annual fees to be paid in order to operate, which could assist with a more regular compliance monitoring system.

Feedback from the Department suggests the current reporting system lacks a specific field for capturing EOW enquiries or complaints, leading to imprecise and inconsistent data collection. **Table 3** displays where EOW has been captured 'by chance' such as through a broader audit of sites with as part of environmental authority compliance audits. **Table 4** presents the identified investigation categories of the 33 non-compliance cases reported.

Table 3 Cases recorded in ESR database between 1 April 2020 and 29 June 2022 for EOW compliance cases

Case Status	Finalised	Active	Total
Community response team (all compliance regions)	7	0	7
North Region	1	1	2
Central Region	8	0	8
Southeast Region	4	0	4
Southwest Region	11	1	12
Total	31	2	33

Table 4 Investigation categories of the 33 non-compliance cases

Case Category	Percentage of Cases (approx.)
Waste identification / Tracking	12%
Testing requirements	9%
Exceed limits (Zinc, DO, Salinity)	12%
Exceed PFAS trigger value	24%
Spill	9%
Odour	12%
Tyres	9%
Final product specification	3%
EOW Management Plan	9%

During the same period as the 33 non-compliance cases, three penalty infringement notices were issued for breaches of the EOW codes and approvals. Some stakeholders emphasized the need for strict enforcement and compliance with the EOW codes and approvals, and for the department's reporting systems to be reliable and consistent with that of Environmental Authority holders' data. This however contradicts the original aims of the EOW Framework which were to reduce the regulatory burden on resource users. Resource users are still covered by General Environmental Duty however the ability of the Department to identify unlawful activities is limited by the absence of dedicated compliance activities.

Furthermore, to enforce the application of the EOW codes, there is a condition within the codes that requires registration. However, the offence under s158 of the WRR Act (compliance with EOW), which is responsible for legislative enforcement of the code, only applies to registered resource producers. If an entity supplies a resource as a resource producer, but is not registered (i.e., but is operating under an EOW Code), then there is no provision for offence. Loopholes in the legislative enforcement of the EOW should be reviewed further and closed.

4.5 Process for developing EOW approvals

Under the EOW approvals process, an approval application is made to the Department to allow the approval holder to conduct a trial that demonstrates whether a single type of waste can be used as a resource and is suitable for an EOW code. The approval is issued for the length of time required to undertake the trial with limited potential for extension. The EOW Guideline states that based on the findings of the trial, the Department will decide on whether or not the resource is deemed appropriate for conversion to an EOW code. To support the EOW approval application a report must be provided prepared and signed by a suitably qualified person. Guidance is provided in the EOW Guideline for this written report, including required contents, as well five key requirements and specific requirements for the suitably qualified person to be provided in the application. Information requested includes the aim of the trial, the properties of the waste, details of origin, its proposed use and resulting benefits, quantity estimates and other relevant applicable standards. The key considerations in assessment of an EOW approval by the Department are:

- The objects of the WRR Act and how they are to be achieved
- The waste and resource management hierarchy
- Whether the proposed management of a particular waste or the use of a particular resource is likely to cause any serious or material environmental harm or nuisance; and
- Whether it is reasonable and practicable for an EOW code to be made for the particular waste or resource that is the subject of the application.

4.5.1 General feedback on EOW approvals

Feedback from stakeholders indicated that the EOW approvals process creates uncertainty for companies as there is a lack of clarity in how the trial period is applied, how the trial timeframe is determined and the possibility of the user having to cease the transfer of the resource which has the unintended consequences of stifling the use of innovative practices, impeding investment, and failing to facilitate new market opportunities. Given the relatively small number of approvals this may be the result of a specific trial. It is noted that in developing the approval, the applicant should recommend the trial period, which might reduce this uncertainty, and perhaps this reflects lack of understanding of the process in respect to stakeholder comments.

In order to receive an EOW approval, industry is expected to provide a detailed specification, which is not always feasible given the variability of waste material and the less certain nature of the approval, being a trial. The EOW Guideline clearly states the approval process requires the application to be for a single waste type, and for details on the properties of the waste to be provided, including hazardous properties. It is understandable that the heterogenous nature of waste may at time be challenging to define, particularly to provide certainty over time, however without this certainty it is difficult for the Department to provide approval authorisation. In the spirit of achieving the objectives of the WRR Act, a degree of flexibility may be necessary to encourage the trial of innovative practices. This could be manifested in greater scope to vary timeframes and trial conditions to allow for this variability whilst still maintaining the battery limits of the trial.

It was also observed that there is an appetite among industry for an EOW approval or comparable pathway that offers a permanent route for the transfer of a specific waste, similar to the Beneficial Use Approval (BUA) framework. Feedback from stakeholders suggested there was a belief that the process of obtaining an EOW approval can be excessively bureaucratic, with application costs ranging from $3,000 to $66,000 (most are around $10,000), assessment timeframes of 40 business days and the possibility of extending another 20 business days. There are also expected to be other significant costs associated with a trial such as the proponents time, material and processing costs, consultant fees etc., that a proponent has to consider before applying for an EOW approval. These factors were noted to deter some regional and remote councils along with other stakeholders, from applying for EOW approvals due to insufficient staff time, funding, and expertise. Additionally, as there is no permanent specific waste approval, as discussed in section 4.2.9, industries are deterred from investing in this process as competitors can benefit from the time and resources expended during the approval development phase.

To address this issue, it was recommended by stakeholders that the Department review and simplify the procedures associated with EOW approvals, in consultation with stakeholders including regional and remote councils. In particular, smaller regional councils have expressed a lack of understanding and resources to rely on which hinders their participation. This would help to promote a more efficient and effective EOW approvals process, enabling companies to utilise waste materials in innovative and sustainable ways.

4.5.2 Patent issues

While EOW approvals are client-based options that can only be used by the specific organisation, these are short term trials. Under the EOW framework, the only long-term option for EOW recovery is via an EOW code, which once issued, can be accessed, and used by other organisations, including competitors. The intellectual property developed via the EOW approval process, or proprietary information brought into the trial, may also be accessed through the Right to Information framework. This creates patent issues for organisations who would like to undertake a trial and invest in research without others being able to use this to their benefit once the code has been developed. This mechanism of the framework was noted to deter stakeholders from investing in this process, in turn impeding innovation and the reuse or recycling of waste. It is noted however that this is the same as for an ERA application and therefore, it is possible for an application for EOW approval to be submitted and not include full details of proprietary technology or processes used. The larger concern however appears to relate to the conversion of an approval to a code.

The short-term trial nature of EOW approvals indicates innovation, while an EOW code reflects the results of significant investment in research and investigation. Allowing non-investor operators to "piggyback" on a code transition from a trial demotivates industry from investing in future innovations. In certain cases, such as for one-off uses, patent rights, or commercial in confidence, the Department, industry, and resource recovery objectives could benefit from specific approvals that can be allowed to cover site-specific scenarios. This approach would ensure that the industry's investments in innovation are protected while still allowing for the development of new and innovative solutions in the end-of-waste framework. It is noted that the review of the BUA framework recommended the continuation of similar specific approvals.

There is a clear resource recovery benefit from sharing of this information for broader use, but this may not outweigh the cost and loss of intellectual property for the proponent. An End of Waste Approval may be a significant investment for which there is no provision for reimbursement.

4.5.3 Cost of EOW approval application

Some stakeholders, such as Queensland Resource Council, have historically criticised the fees associated with undertaking EOW approvals, as well as the potential impact on intellectual property or competitive advantage should a proponent led trial transition from an approval to a code (captured above). Fees associated with operating under an EOW approval are currently set between $2,872 and $66,907[35] depending on the type of waste and origin that the approval application applies to. Additional cost recovery is captured through amendments to EOW approvals at 50% of the application fee.

The cost structure implies that there is significant extra cost in assessing an application for using a liquid waste for soil conditioner or fertiliser if the waste is as a result of coal seam gas extraction compared to from another source ($19,121 vs $7,651). There is no apparent explanation for this difference based on the risk or level of effort required. A similar provision is included for biosolids vs other material used from sludge/soil waste to soil conditioner or fertiliser ($2,872 if waste is biosolids vs $7,651 if waste is not biosolids) even though there is an existing EOW Code for Biosolids. There is also an application fee for using any kind of waste as a resource for augmenting a water supply of $66,907. In some cases, these application fees may have been made largely redundant by the release of EOW codes for biosolids, drilling muds etc., It is assumed that these costs accurately reflect the level of effort required by the Department to undertake the assessment, review documentation, and provide input over the trial period.

4.6 General issues raised

Stakeholders identified a number of issues with specific EOW codes or the framework during engagement. Whilst the scope of the review did not undertake a detailed review of each code or approval, issues raised by stakeholders are captured in the following subsections. Issues may be a function of some of the considerations referred to earlier in this section.

4.6.1 Coal Combustion Products

During the consultation, distinct issues between the coal combustion products (CCPs) EOW code and the WRR Act and Regulations and the Waste Levy, were identified. The EOW code for CCPs considers fly ash, furnace bottom ash and cenospheres as resources for approved end use application. All CCPs are currently exempt from the waste disposal levy (until 2024) under a s35 Declaration – Power Station Ash Waste, with a general exemption just for fly ash in place until June 2029.

Several stakeholders flagged concerns with the CPPs code. A key issue was flagged as being able to access CCPs once they have been deposited in an ash dam rather than those CCPs collected directly at the power station for reuse under the EOW code. In this particular example, the issue was linked to a particular power station in Queensland where CCPs were piped to an adjacent mine site (owned by a different subsidiary of the same head company) so the CCPs were being deposited in a site with a separate EA and so meet the definition of waste from the source site. Although power station ash waste is exempt from the levy, with CCPs to 2024 and fly ash to 2029, a concern was raised as to whether it would be lawful to access this material from landfill. At present there is insufficient demand for ash products from CCPs for use in recycled aggregate, however as power stations close in the future, new supply will dwindle and cease, and repositories of ash would become a potential supplier supporting the objectives of the WRR Act.

[35] State of Queensland, Waste Reduction and Recycling Regulation 2011 https://www.legislation.qld.gov.au/view/whole/html/inforce/current/sl-2011-0231

Section 38 of the WRR Act prohibits the removal of waste from a leviable waste disposal site for which the levy has been paid. As power station ash waste is currently exempt, a levy has not been paid and so it would not currently be an offence to remove this ash. The exemptions are time limited however and so if a levy is paid on some ash deposited into the waste disposal site in the future, it is unclear whether a portion of this material, or all would be prevented from extraction for future demand. It appears there is active dialogue here around the implication of exemptions and specifics around CCPs and future reuse. The Department is encouraged to continue to liaise and clarify future position on this matter.

4.6.2 Impact on existing industry from introduction of EOW codes

The lack of consistency with overall approach could also cause an unequal approach resulting in perverse outcomes, such as those identified during engagement. Composters operating under an ERA 53 have costs associated with license conditions including in some cases significant infrastructure to process certain types of organic waste. Under the Abattoir Effluent Pond Sludge and Crust End of Waste Code (ENEW07617019), one of the approved uses for abattoir effluent pond sludge and crust is for land application as a soil conditioner, provided a number of conditions are met. Some stakeholders suggested this inconsistency with how this waste (for example) was dealt with affected market conditions for ERA 53 holders, with facilities that are licensed to take this material, and have incurred the setup and ongoing operational costs of complying with a license, being bypassed for direct land application.

4.6.3 Gaseous wastes and carbon capture utilisation and storage

Further clarity has also been required for gaseous wastes, particularly captured carbon dioxide from energy generation that meets the definition of a waste. Under the definition of waste, gaseous waste, including carbon dioxide captured at a power plant is considered a waste. Captured carbon dioxide may have several uses. It is recognised that carbon capture utilisation and storage schemes are likely to play a significant role in delivering on net zero emissions targets and decarbonisation. This would result in carbon dioxide waste being injected underground into a greenhouse gas storage facility under s41 of the EP regulations. At present, the EP Act prevents waste from being injected into a confined aquifer, unless it is waste derived specifically for a petroleum activity. An EOW code could be developed for carbon dioxide injected as part of a carbon capture and underground storage scheme, however it is unclear if EOW is the preferred approach. There is no specific action on this.

4.6.4 Biosolids

4.6.4.1 PFAS

The EOW code for biosolids has been identified as the second most commonly used code by local governments. Being responsible for wastewater management outside of southeast Queensland, councils have a keen interest in the application of biosolids to land remaining economical and environmentally sustainable. The current national consultation on the National Environmental Management Plan (NEMP) for per- and poly fluoroalkyl substances (PFAS NEMP 3.0) has raised concerns among councils that the already strict regulations under the current EOW code could be even more restrictive following the publication of this updated document. It has been recommended that the Department commits to in depth consultation before a future update to the EOW code for biosolids, to allow for economically sensitive and environmentally sustainable reuse of biosolids in future.

Resource producers were concerned about the impacts the significant PFAS requirements will have on the ability for biosolids to be reused under the existing EOW code and what might change. Opposingly, other stakeholders were concerned with the risk of resources such as biosolids and coal seam gas (CSG) drilling muds being used as agricultural soil conditioners prior to the acceptable environmental guideline levels of PFAS being defined in the PFAS NEMP 3.0. The consequences of using these products on agricultural land could be severe, as the use of PFAS-contaminated resources could result in persistent levels of the chemical in soil and nearby waterways, risking being listed on the contaminated land register and having to cease agricultural production.

Despite evidence that PFAS is commonly present in biosolids[36], and has been found in CSG Drilling Muds[37], the EOW code for CSG Drilling Muds does not require monitoring for PFAS, while the EOW code for biosolids does have monitoring requirements but lacks a maximum concentration value. The lack of clear guidelines and regulations for PFAS in these products is causing uncertainty and reluctance among producers and users, who are seeking alternative solutions for soil fertilization and carbon enrichment. Concerned stakeholders, particularly those in the urban water sector, suggest that effective control of PFAS should start at the source, with the implementation of strict guidelines for the presence of PFAS in products, but also advocate for recognition and support of the sector as the receiver of these chemicals on behalf of the community.

4.6.4.2 Compliance costs specific to the EOW code for biosolids

Industry stakeholders suggest that the compliance requirements outlined in the EOW code for biosolids present a significant financial burden, particularly with regards to the mandatory testing for various analytes and PFAS analysis. This testing must be conducted "at least every 120 tonnes" of the resource, requiring both sampling and analysis of the soil before and after application of the biosolids. These costs are shouldered by water and sewerage service providers (WSPs), which can be a substantial expense, and may even deter smaller WSPs from participating in the beneficial reuse of biosolids outlined in the code due to the associated compliance costs.

Furthermore, stakeholders perceive that compliance costs are increased by unnecessary monitoring such as the sample requirement for extractable organic fluorine. This sampling test is expensive and undertaken by few laboratories and does not provide useful data, as the limits are well above typical fluorine levels, resulting in meaningless results.

4.6.4.3 Clarification on application

The EOW code for biosolids lacks clarity, particularly in its application to smaller wastewater treatment plants (WWTPs). During consultation, it was identified that the code appears to be primarily written for larger WSPs, causing difficulties for smaller WWTPs to adhere to its specific and targeted requirements. For instance, the pathogen reduction processes specified in the code are common for larger WSPs but are disproportionately onerous for smaller WWTPs. Moreover, stakeholders have identified various ambiguities in the code, such as a lack of definition for “air-drying”, and an unclear definition of “extended aeration”. The code continues to lack consistency in that the definition of "undue risk solids" is unclear, and it is not specified what is considered to be a high pathogen risk. The code could benefit from improved transparency and definitions to ensure consistent application.

[36] https://www.awa.asn.au/resources/latest-news/community/public-health/pfas-in-biosolids-a-review-of-international-regulations
[37] Georgina Davis WRIQ, pers.comm.

4.6.4.4 Reference to the NSW Biosolids Guidelines

The EOW code for biosolids cites the NSW Biosolids Guidelines, however it lacks explicit references to the sections being referred to, thus causing confusion. For example, Table 3 in the EOW code states "Refer to Schedule 2 of the NSW Biosolids Guideline", however it is not clear how this schedule is relevant or to be used. Moreover, the EOW code's close references to the NSW Biosolids Guidelines may cause misinterpretation as subtle differences persist in their requirements. In particular, the stabilisation requirements for Biosolids Process Option (Stabilisation B only) in the EOW code and the NSW Guidelines are intentionally different, but the similarity may still lead to confusion. Furthermore, it should be noted that the NSW Guidelines are currently under review and may be revised, so the relationship between the EOW code and the NSW Guidelines requires further examination. It is assumed that an update in the NSW Guidelines would trigger a review as to application in Queensland.

4.6.5 Recycled aggregates

It was raised during consultation that there is confusion around whether a resource producer can also be a user of the product, as discussed previously, which is leading to growing stockpiles of concrete particularly among councils who are, for various reasons, unable to operate under the EOW code for recycled aggregates. While this issue should be addressed directly, stakeholders also raised the potential to regulate recycled aggregates, which are largely inert and possess a low potential to cause environmental harm, under the General Environmental Duty of the EP Act. This method was raised as a measure to encourage resource recovery to the highest order.

Stakeholders suggest that the requirements for the processing of recycled aggregates are inconsistent, causing confusion for operators and resulting in additional bureaucratic processes that add to industry time and costs. The Department has advised that once the waste is received by the operator, it is considered a resource and must be processed under ERA 33, as it is no longer considered a waste and therefore ERA 54 does not apply, whereas the EOW code for Recycled Aggregates indicates that it remains a waste during processing and therefore must be processed under ERA 54. This discrepancy is reported by stakeholders to have resulted in increased difficulties for operators and a need for additional authorisations, without providing any perceived additional environmental protections or reducing any environmental risks. The Department suggests that utilising ERA 54 provides certainty that the output is a consistent aggregate material with clear resource quality criteria.

4.6.6 Oyster shells

The specificity of the EOW code for oyster shells is limiting in terms of the scope of waste materials that can be considered for resource recovery. The code only applies to oyster shells sourced from oyster processing centres and restaurants, leaving out materials that may come from other sources, such as councils seeking to provide circular economy solutions to their communities. This specific restriction prevents the full utilisation of the waste material and results in a missed opportunity for wider community participation and resource recovery efforts. It was suggested that codes such as the oyster shells EOW code be revised to allow for a more inclusive input of waste material, so as to maximise potential community participation in circular economy objectives.

4.6.7 Concrete (liquid washout) and Concrete (solid washout)

Industry highlighted that the concrete liquid washout and solid washout codes impose excessive administrative and testing requirements for waste that is largely inert and poses low environmental risks. This type of waste can already be regulated under the General Environmental Duty of the EP Act. The annual lab testing, for instance, is considered by stakeholders to be unnecessary and adds extra cost and administrative burden.

The Solid Concrete Washout resource is only suitable for three purposes: producing aggregate products, neutralizing acid sulphate soil, or adjusting the pH of acidic pond waters. Stakeholders raised that in many cases, the test results required by the EOW code have no impact on the use of the resource as verification testing is conducted on the end product. For acidic neutralization and pH adjustment, the relevant manual and/or environmental authority provide sufficient regulation, making the EOW code testing unnecessary. The same goes for the Liquid Concrete Washout EOW Code, which can only be used for pH adjustment and is regulated by the relevant EA. Stakeholders consider the testing regime for these resources is redundant and imposes extra costs without any substantial environmental benefits.

It is noted that the Department considers concrete washout waste (both liquid and solid) to be high risk/alkaline waste which requires control on how and where it is used to avoid environmental harm. Stakeholders recommended that the three codes be combined, however it is also noted that at the time of developing the EOW codes for concrete washout products, stakeholders had requested simplicity, and this led to three separate codes being developed, as supported by industry.

4.6.8 Inconsistency of codes

A comparison of five EOW codes, the AS4454 compost, and the NSW and QLD biosolids grades was undertaken by a stakeholder in terms of the specified contaminant thresholds for each. It is evident across these values that there is not a consistent approach to contaminant thresholds across the codes. As two of the codes, Ferrous Sulphate Heptahydrate and Water Treatment Residuals - Alum sludge were developed and approved for use as inputs in the composting process, it is seen as a flaw that these materials would require different threshold limits. It has been recommended that a standard set of contaminant thresholds be developed so industry can compare test results to these specifications and determine if it is below the consistent contaminant threshold and is a suitable input. Stakeholders indicated that there was no apparent reason for, in the case of lead, foundry sand having an upper threshold (for unrestricted use) of 30 mg/kg, ferrous sulphate heptahydrate having an upper limit of 0.171 mg/kg and water treatment residual having a limit of 150 mg/kg, when each of these materials have been approved for a similar resource use. Feedback from the Department indicates that each code is developed individually and is specific to the particular waste type and resource uses. As codes are progressively reviewed and updated, inconsistencies may be addressed as appropriate or as the scientific basis for the values change.

4.6.9 Inconsistent enforcement and advice

The Department face issues with enforcement and consistency in the application of the EOW framework. Feedback from stakeholders indicated that the Department does not have a process for imposing conditions and enforcing compliance, nor does it have the resources to assess the quality of materials or provide guidance on their use. Additionally, the EOW framework does not require organisations to operate under it, and there are no penalties for using a waste unless it is considered a regulated waste or causes harm. It is noted that offences do exist for some offences – such as the placing of waste onto or into the ground as being considered waste disposal[38], which could be applied for resources not lawfully deployed under the end of waste framework. Each of these elements adds a layer of confusion to the operation of the framework and encourages potential framework users to avoid entering the process.

[38] This would be an offence under s426 of the EP Act

Councils have particularly expressed frustration when seeking clarification from the Department, as they are met with contradictory responses throughout the Department and have even been referred to other sections of the Department, only to be turned back to the original section. Specifically, during the consultation, stakeholders noted the Department has provided different views on when concrete waste becomes a resource. This shows a lack of internal and external understanding and clarity around the framework.

Compliance officers across the state are also criticised by stakeholders for their lack of training and knowledge regarding the framework. Previous misapplication and enforcement by compliance officers has led to severely detrimental impacts on resource recovery markets as the incorrect enforcement incites uncertainty among potential resource users. A large-scale example of the potential consequences were highlighted by a stakeholder during the engagement, whereby a compliance officer incorrectly identified an offence for CCPs classified as a resource under the EOW code, as a schedule 1 waste. This impacted a large-scale resource recovery project, as the resource receiving organisation became cautious of potential wrongdoing and backed out of the project.

The subjective nature of the framework, caused by a lack of clear criteria and rules, as well as the lack of compliance checks, have created fear among registered resource producers and users around potential consequences in case of an audit. It is also noted that confusion among audit performing compliance officers increases where a facility is operating under both an EA and an EOW code. Furthermore, the issue of PFAS in biosolids has also led to inconsistencies in enforcement, reducing the use of biosolids in business models. To address these issues, there is a need for more education for the Department officers and greater clarity in the application of the EOW codes. Through delivery of this report, SLR has not established whether the nature of these complaints from industry are widespread or linked to specific EOW resources or compliance regions.

4.6.10 Internal communication

Feedback from the Department indicated that there was a lack of a database for searching EOW codes. This adds to the overwhelming task of managing numerous codes without proper visibility. The Department should aim to improve internal communication and visibility through developing an internal database that allows for tracking of EOW codes and approvals and interactions across other legislation and parts of the Department and more broadly the Queensland Government.

4.7 Potential opportunities

A number of potential opportunities were identified during stakeholder engagement. There are expected to be a significant number of other opportunities that exist or may emerge over time as Queensland develops a firm circular economy strategy.

4.7.1 Power station bottom ash

The recovery of power station bottom ash presents a large opportunity for resource recovery, despite the current issues caused by non-EOW legislative constraints, as previously discussed. Currently, less than 20% of CCPs produced in Queensland annually are recovered at the power plant with the remainder ending up in ash dams via a slurry pipeline. While the EOW code allows for the use of this material in recycled aggregates, the current levy and landfill classification of the ash dams makes recovery of this material difficult. The increasing opportunity for CCPs as a resource comes from the reduction in power and ash produced by coal-fired power stations, and the need for recovered material in cement manufacturing. Though technically classified as such, the question arises whether the material is actually waste in a landfill or a potential resource stockpile.

The issue with accessing the material in the ash dams once it is there is because it is considered a landfill however this material is presently exempt from the landfill levy. This may create future challenges in terms of recovering the ash. Stakeholders suggested during engagement that to prevent future ash from being constrained in ash dams, expansion of the current levy exemption of "fly ash produced by a power station" to include "power station ash and associated wastes" would allow for the recovery of future CCP resources. The latter definition is exempt from the levy until 31 December 2024 under a declaration of exempt waste.[39]

4.7.2 Associated water (mining)

There are currently EOW codes for associated water (including coal seam gas water) and associated water for irrigation (including coal seam gas water). Similar water is produced during the mining process, however as there is no associated EOW code, this substance is classified as a waste. To support similar resource recovery outcomes, a code for mine associated water, or the incorporation of such a product into the existing codes, could be implemented, based on the minimum acceptable water quality for example, to avoid the need for a specific proponent to go through the EOW approval process. It is noted that at the time of reporting existing EOW codes for irrigation of associated water are currently under review. As the EOW Code development process is dependent on the waste type, a separate code is considered likely to be required for a mining associated water specific code.

4.7.3 Food waste and plant biosecurity matter (biofuel)

There is potential to develop an EOW code for recovering food waste and plant biosecurity matter into biofuel, as a renewable energy source. Facilitating the conversion of biomass raw material and supermarket food waste into biofuel would help to ensure resource recovery objectives are met.

4.7.4 EOW code for End-of-life tyres

It was noted that the agriculture industry are interested in utilising recovered carbon black derived from the thermal destruction (thermal energy from waste) of oversized tyres as a fertiliser for rehabilitation purposes. The resulting fertiliser product from this process is advised to be compared to commercial fertilisers, meaning it should be regulated in a similar way, as a resource and not a waste. It was suggested that the current EOW code for End-of-life tyres could be amended to facilitate this, or a separate code developed.

4.7.5 Residual Drilling Mud

It was advised during consultation that there is an opportunity for the development of a code for the use of residual drilling mud (RDM) in construction material. It is understood that preliminary research for an EOW approval has been undertaken and concluded that the use of RDM for construction fill sees no significant impacts, provided that adequate constraints, monitoring, and corrective actions are implemented and maintained. A code has not yet been developed, however.

[39] Queensland Government, Department of Environment and Science, 2023. Exempt Waste – Declaration of Exempt Waste – Power Station Ash Waste (https://www.qld.gov.au/environment/management/waste/recovery/disposal-levy/about/exempt) (accessed 24 July 2023)

4.8 Review of natural capital usage potential in Queensland

Natural capital is defined as the world's stock of natural assets and includes[40] an abundant supply of metals and mineral resources, renewable energy sources, productive agricultural land, diverse water sources, biological diversity, important ecosystems and globally recognised protected areas including World Heritage Areas[41].

Whilst the sustainability report for Queensland identifies a number of activities and policy responses in relation to natural capital, the most relevant to this review are:

- Resource recovery – promoting more sustainable waste management practices that reduce the amount of waste produced by business, industry and households including a transition to a circular economy. To achieve the objectives of the Waste Management and Resource Recovery Strategy and its supporting action plans there may be opportunities to reuse, recycle or recover products that may otherwise require virgin resources to be extracted.
- Mine site development, management, and rehabilitation – progressive closure and rehabilitation of mine sites typically have a demand for materials to fill, cap and cover industrial landforms. The end of waste framework may allow the use of certain recovered materials for rehabilitation.
- Biosecurity management – managing the impact of pests and diseases. The End of Waste Framework needs cognisant of not spreading pests and diseases whilst achieving resource recovery outcomes. This includes reuse of recycled organic wastes and soils.

The term secondary raw materials refers to recycled materials that can be used in manufacturing processes instead of or alongside virgin raw materials.[42] In Europe the circular economy package put forward by the European Commission presented a series of actions for secondary raw materials including:

- The development of quality standards for secondary raw materials, particularly for plastics
- Analysis of policy options to address the interface between chemical, products and waste legislation including how to reduce and improve the tracking of chemicals of concern in products.
- Development of measures to facilitate waste shipment across the EU, including electronic data exchange and development of an EU wide raw materials information system.

There is a clear linkage between quality standards for secondary raw materials and at least the aims and objectives of the EOW framework and the quality of the secondary raw materials being used under an End of Waste Code or Approval.

Through this review, a number of secondary raw materials are identified that, under the End of Waste Framework, are, or could potentially be recycled avoiding the need for extraction of virgin materials, and thus maintaining or reducing the demand on other raw materials.

[40] NSW Department of Planning and Environment, 2023. Natural Capital, from https://www.environment.nsw.gov.au/research-and-publications/our-science-and-research/our-research/social-and-economic/natural-capital
[41] State of Queensland, 2022. Queensland Sustainability Report December 2022. https://s3.treasury.qld.gov.au/files/2022-Queensland-Sustainability-Report-December-2022.pdf
[42] European Parliament, 2023. Legislative Train 01.2023, Strategy for secondary raw materials 2016, from https://www.europarl.europa.eu/legislative-train/carriage/strategy-for-secondary-raw-materials/report?sid=6601

5 Definition of Future State

5.1 Future State

This review has identified a series of recommendations for consideration as to how the EOW framework could be implemented moving forward. Some recommendations are significant and would warrant further detailed policy analysis as to the implication not just with regard to EOW, but to broader waste related environmentally relevant activities and the definition of waste. Other recommendations are for modifications or additions to help improve how the framework could be improved in its current state. Recommendations are based upon the review and information provided by stakeholders.

The expected future state for how recovered resources are managed under the EOW framework should:

- Provide clarity and certainty on the definition of waste including supporting definitions.
- Provide certainty as to when the EOW framework applies compared to other mechanisms including:
    - When an EOW code or EOW approval is required
    - When the EOW framework is not the appropriate framework to use
- Provide a clear mechanism that allows for particular wastes to be considered a resource if:
    - They are generated by a registered resource producer and used under specific conditions in an EOW code or EOW approval.
    - It is a specific waste (quality or properties) that passes through a specific ERA.
    - The waste is defined in regulation as a resource (i.e., no longer a waste) noting the WRR now allows for this mechanism, but its use and implementation is still to be defined.
- In implementing the framework, the Department should:
    - Provide clarity and certainty on how a circular economy will be implemented in Queensland and the relationship between waste legislation.
    - Proactively identify potential resources to be considered as “no longer a waste” or for EOW code development that seek to achieve a circular economy for Queensland.
    - Where necessary, provide consistency across each EOW code to ensure that common resource uses have common threshold values for use.
    - Undertake periodic review of EOW codes to confirm need, potential opportunities for expansion or remove or revise inequalities or inconsistencies in collaboration with stakeholders.
    - Consult broadly on the development of new EOW codes to proactively identify additional uses that could be included, include liaising with resource users to align product quality with EOW code quality.
    - Engage and educate with potential resource producers and potential resource users to identify new and encourage the use of existing codes to improve resource recovery outcomes.
    - Provide sufficient resources to ensure Department staff are sufficiently available and experienced to fulfil the obligations under the framework, including code assessment, development, compliance, and enforcement.

5.2 Recommendations

Recommendations are identified in the following sub-sections grouped into key areas for consideration. Significant or priority recommendations are highlighted in orange. Other recommendations may be less important or reflect relatively straightforward administrative changes.

5.2.1 Definition of waste and resources

R1	Review the definition of waste and its role in the End of Waste Framework, including consideration and clarification of: • Whether under a circular economy the first question should be whether or not something generated by an industrial process should be classed as a material before it is defined as a waste • Whether there are specific resources that can be considered to be of sufficiently low risk that their use can be regulated against general environmental duty rather than requiring a specific End of Waste Code • Where a resource ceases to fall under the End of Waste framework as it passes through a product supply chain
R2	Publish guidance to allow proponents to further understand the terms “left over”, “unwanted by-products”, “surplus” and “activity” alongside the definition of waste
R3	Review use of simplified codes or “declaration” or other for low-risk materials that allow their deployment as “not a waste” including consideration of use of general environmental duty as the environmental control

The EOW framework is reliant on the definition of waste, which was moved in 2023 with the passing of the WRROLA Act from the EP Act to the WRR Act. Whilst the basic definition of waste was unchanged, the WRR Act now includes the ability for regulation to facilitate thing to be prescribed as not a waste. The current definition is very inclusive, and alignment with the EOW framework is interpreted to require any waste to be used as a resource to require an EOW Code or EOW approval, or for that thing to be prescribed in regulation as not a waste.

As Queensland moves towards a circular economy, consideration of whether the definition of a material should come before a waste is recommended (R1). Further clarity would also be welcomed to determine when a waste deployed as a resource under an EOW Code ceases to continue to be regulated under the framework. Adopting a circular approach would see materials defined to promote their use in the economy for as long as possible before they become a waste, however the EOW framework requires this material to be defined a waste before it can become a resource again.

Operational policy within the Department is based on risk and the use of general environmental duty is applied for lower risks rather than requiring a specific EOW Code or Approval, however this warrants the provision of certainty by the Department beyond internal operational policy. Further clarification is also recommended for certain terms and references in the legislation (R2) is required, although not recommended at this stage to require legislative definition.

The WRROLA Act introduced the ability for the Chief Executive of the Department of Environment and Science, to determine a thing to be not a waste under certain conditions. For some wastes, this may allow reuse as a resource which could reduce the need for an EOW Code or Approval for all wastes, however as this legislation has just passed, information on how it will be applied, the process for regulation and conditions are uncertain. This approach should facilitate the streamlining of low-risk wastes, however the detail behind implementing this legislation requires clarity which is not yet available from the Queensland Government. This may utilise the application of General Environmental Duty as an obligation for any entity producing or using a resource, and perhaps limited conditions for use.

5.2.2 Define the interaction between EOW and other regulations

R4	Clearly define at what point these terms and the definition of waste is applied within the waste generation and material management product cycle (including cyclical or entry/re-entry points)
R5	Provide a clear position in published guidance to identify the pathways available to reuse resources whether via the ERA framework, the EOW framework, a direct mechanism, or other approaches, including clarity over application process, information required, cost and timeframes for consideration

There is a need to provide clarity between how EOW is applied in relation to other critical waste related regulation. This will be heightened with the amendments to the WRR Act around defining a thing as not a waste and extends beyond just the scope of the EOW Framework. Stakeholders identified uncertainty over these relationships due to confusion both within the Department and in how stakeholders/users operated under the framework. Notably there is a lack of clarity on the role of some waste related ERAs compared to the EOW, and potential concerns over duplication of purpose between the ERA framework and the EOW framework. As the ERA framework generally regulates the activity, it is challenging to apply output quality standards, although input standards (e.g., waste acceptance limits) are commonly applied. There may be scope to consider the role of the ERA framework in regulating activities that turn a waste into a resource under certain circumstances. The implementation of the WRROLA Act adds an additional potential conflict or tool to support added clarity here.

5.2.3 Improving the EOW process

R6	The Queensland Government should develop and publish clear criteria for: - Where a code could be developed - Specific detailed requirements for the submission of supporting information for code development and evaluation criteria
R7	Investigate formal requirement for resource users to register
R8	Investigate the risks and benefits of implementing a fee for resource producers and resource users beyond the existing fees for EOW approvals under the EOW framework
R9	Provide greater clarity on codes under development, review or under assessment online so there is transparency over what may change for industry and local government
R10	Consider publishing registered resource producers on the DES Website to provide certainty for potential resource users as to registration
R11	Consider implementing an option for 'specific approvals' under the EOW framework which are beyond the End of Waste Approval process but protect intellectual property and commercially sensitive information
R12	Investigate and close loopholes for the legislative enforcement of EOW codes and improve internal compliance reporting systems and processes.

There are a number of recommendations with the aim to improve the mechanisms of the EOW framework. Feedback from stakeholders suggests that there is uncertainty as to when a code may be requested to be developed or required. This links to issues associated with both the definition of waste and interactions with other legislation, but clear guidance was seen as a key action.

Recommendations are included to investigate the potential for registration of resource users to register, as well as the potential for cost recovery for resource producers and/or resource users beyond existing fees for EOW approvals. Feedback from the Department suggested that it might aid regulation of the EOW framework if all resource users were required to be registered. This should be reviewed, noting it would place an additional regulatory burden on resource users they would not have for using equivalent virgin products.

It is recommended that the Department consider if there may be a role for cost recovery associated with the operation of an EOW Code. Whilst additional costs for registration as a resource producer may impact uptake or production of resources, the Department is under resourced in the implementation of the framework. There is currently no fee for registered resource users and registered resource producers, meaning the Department has no perpetual cash flow, creating a greater strain on resources with each new code that is developed. A minimal fee will serve admin costs required with each code and will deter people from registering without proper intent to use the code. There is currently a fee for EOW approvals. If charging registration fees, it would be necessary to find a balance so to not deter use but to fund resourcing to effectively manage the process.

The Department should aim to improve tracking and visibility to ensure a more efficient and effective EOW framework. It might be prudent to publish a list of registered resource producers online to give certainty to those looking to find resources to be redeployed. In some cases, industry peak bodies have had to maintain their own list which adds confusion.

Stakeholders identified a need to have greater clarity over codes under development, review or under assessment. There is a grey area where the Department considers whether a code is required and only published codes or codes actually in development are listed on the Department website. Where confidentiality conflicts can be avoided, it is recommended that requested codes and rejected codes be listed.

A key gap identified by stakeholders appears to be the absence of the ability to have specific EOW codes. These may be appropriate where an EOW approval has been completed but there is intellectual property or commercial in confidence limitations on a broader EOW code being developed. A specific code would be more aligned with the previously specific BUAs, but this approach may result in more trials undertaken and ultimately greater resource recovery.

Other feedback has identified loopholes in relating to the legislative enforcement on registered resource producers rather than resource producers who are not registered that should be addressed. There may also be benefit in reviewing how to simplify the procedures associated with EOW approvals, particularly in how they apply to regional and remote councils to encourage further resource recovery.

5.2.4 Improving internal processes

R13	The Department should develop a process for internal review of nominations for end of waste codes that includes both the regulatory function and the strategy/policy function. This should be sponsored by Senior Officers to ensure alignment with State Strategy and Regulatory Strategy and commitment of resource needs.
R14	Undertake periodic review and consolidation of existing codes to harmonise conditions and avoid duplication
R15	Share and ensure awareness of operational register to allow for clear tracking of EOW codes and approvals

In addition to general recommendations that seek to improve the delivery of the EOW framework, this review identified opportunities to improve internal departmental systems. There would be benefit from improving internal collaboration within the Department through the development of an internal review process to allow for both the regulatory function and OCE to review prospective codes. This would benefit from sponsorship from Senior Officers to ensure alignment with the current WMRR Strategy and future Circular Economy policy.

The Department currently manages an internal database of EOW codes and approvals, including those under development. There is some uncertainty internally as to the availability of this documentation within the Department which adds to the confusion R13 seeks to address. This register is not open to the public and at this stage it is not suggested that this register needs to be made public as EOW Codes are published, and a legislative change would be required to make public as the register may contain commercial in confidence information.

5.2.5 Stakeholder consultation, engagement, training, and guidance

R16	Implement internal training for Department officers to ensure clarity and consistency in the application of the framework
R17	Department to consider technical guidance or support function for codes as a formal service offering to promote use and encourage greater resource recovery
R18	The Queensland Government should offer industry or code sessions to ensure correct and consistent application of the codes to give confidence in potential users of the codes and encourage resource recovery
R19	Introduce a verification process including consultation with relevant stakeholders to ensure that approved uses are fit for purpose and aligned with product specification or standards
R20	Consult with stakeholders, particularly resource users, to realign restrictions on the end use of resources with the potential harm associated with the beneficial reuse of the material.
R21	Consult with stakeholders, including regional and remote councils, to review and simplify procedures associated with EOW approvals
R22	When developing codes, broader stakeholder engagement should be undertaken to maximise input and to avoid the development of inappropriate codes or advice
R23	Provide stakeholders and industry with commentary or briefing on changes in code between draft and Final

It is recommended that the Department should improve external guidance, training, and education on the EOW framework and its application to promote usage of the framework. This includes providing training and awareness for potential users of EOW codes, hosting targeted online forums and information sessions after the approval of each code and clarifying the obligations and rights of resource producers and users. This has a resourcing implication for the Department.

It is also recommended to clarify the interaction between the EOW framework and other regulations and improve touch points to instil confidence in resource producers and users. Additionally, the Department should investigate options to better connect resource producers and users and provide clear guidelines on what waste materials can be used for, rather than just referring to the legislation.

Stakeholders raised a lack of verification between the EOW codes developed and some specific standards, which caused supply chain issues. Whilst this would vary with the complexity of codes, there would be benefit from more structured consultation as codes are identified more strategically with other government agencies. Stakeholders suggested that the approach, feedback, and compliance associated with the implementation of the EOW framework should be more consistent, and there might be an opportunity to implement internal training on the specific obligations of the framework.

Additionally, stakeholders should be heavily involved in the development of codes as industry are often the experts in technical aspects of materials they are producing. This may however require greater investment in validation through independent experts. Collaboration sessions should be held between compliance officers, the Department and industry to promote consistency across the application of the framework. This will lead to improved confidence in the framework and will increase engagement and uptake of the framework by industry, therefore improving circular economy outcomes.

5.2.6 Timeframes

R24	Consider the introduction of a statutory timeframe for the development of codes, or publish targeted guideline timeframes
R25	Consider the introduction of a reasonable timeframe within which a resource user must use a resource (and associated offence) once received to a specific site

The Department should consider removing the application window for nominating EOW codes and introduce a statutory timeframe for the development of codes, or publish targeted guideline timeframes, as these are essential for effective waste management. Removing the application window would enable stakeholders to nominate codes throughout the year, providing greater flexibility and allowing for a more efficient process with little additional burden for the Department.

5.2.7 Strategic approach to application of EOW

R26	Develop strategic approach to identifying key resources for which End of Waste may be applied to seek increased resource recovery and reduced barriers to market entry for products, through: - Undertake strategic forward-looking consultation with stakeholders including peak bodies to identify barriers to resource recovery that could be removed using End of Waste - Undertake inter and intra-agency consultation around the use of the EOW Framework and opportunities for use. - Identify potential codes that support Queensland's transition to a circular economy
R27	Strengthen link between industry proponents supported by the Queensland Government (e.g., via the Department of State Development, Manufacturing, Infrastructure, Local Government and Planning) and potential to support market establishment through the EOW process
R28	Investigate options to better connect resource producers with potential resource users through consultation with stakeholders currently operating under an EOW code.
R29	The Department should continue to liaise and seek to harmonise identified resources and resource uses with other Australian jurisdictions through national steering groups or collaboration

This review has identified an opportunity for a more proactive approach to the use of the EOW framework with a view to encouraging resource recovery. This includes an approach that focuses on the strategic waste and resource recovery agenda of the Department to facilitate reuse and recovery rather than solely focussing on an industry led approach. This presents an opportunity for the Queensland Government to facilitate rather than react. To achieve this, greater engagement will be required with stakeholders, other government agencies and within the Department.

The WRROLA Act has introduced the term circular economy as a key objective of the WRR Act. It is recommended that the Department identify the future state for Queensland in terms of the circular economy, including key resources for EOW application, in order to support the goal of 90% recovery of materials by 2050. The Department should align strategic development goals with ongoing research and develop individual action plans to support the establishment of new circular economy solutions and to ensure the EOW framework is working towards achieving well defined circular economy goals. In the absence of a circular economy framework, policy or enabling legislation that encourages the take up and utilisation of the EOW framework is likely limited but there would be high resource recovery benefit from taking a more strategic approach to identifying resources or things to not be a waste.

Through ensuring EOW code development is strategic and aligned with current research on key resources to be recovered, the EOW framework can provide an effective solution to managing resource recovery in Queensland in line with the circular economy goals.

5.2.8 Technical knowledge

R30	The Department should consider technical requirements as part of the consideration of need for a code to be developed, including consideration of funding for specialist expertise or industry engagement where expertise cannot be found within the Department
R31	The Department to identify how it may develop or access greater technical knowledge to support code development, including broader engagement with stakeholders and industry
R32	The Department to review the role of technical advisory panels and criteria for use

It is recommended that the Department broaden their technical knowledge regarding waste materials and their origins and potential reuses, to ensure development of effective and comprehensive EOW codes and approvals. A lack of technical experience is perceived to have manifested in onerous requirements in existing codes, which is frequently cited as being due to a lack of internal Department understanding of the materials in question.

Accessing greater technical knowledge can help the Department to develop more effective waste management solutions that align with the latest scientific understanding and industry. Reviewing the role of technical advisory panels and criteria for use can ensure that these panels are being utilised effectively and that they are providing valuable insights. It is evident from feedback from the Department that because inputs from panels are voluntary (i.e., no fee is paid for provision of expertise) this limits the response time and priority of panel members, thus slowing the code development process. Establishing a technical guidance or support function for codes can encourage greater resource recovery and promote the use of codes. Finally, deepening its technical knowledge and understanding of risks before casting their net out with excessively risk adverse conditions can help the Department to make informed decisions and to avoid overly restrictive regulations that could impede progress towards sustainable waste management.

5.2.9 Code development, review and update, and specific recommendations

R33	For new Codes, the Department should undertake a holistic review of other potential resource use opportunities (or resource producers) and consult broadly before defining the scope of a code
R34	Review and consult on inequalities in application of EOW compared to required license conditions and seek to find consistency in approach
R35	The Department should consult widely on prospective or required changes to EOW codes affected by the release and finalisation of the PFAS NEMP 3.0 including an impact assessment on resource producers and users

R36	The Department should review the Biosolids code with a view to considering: - Compliance requirements for the Biosolids code and remove unnecessary monitoring constraints - Opportunities to reduce ambiguity and ensure consistency in the code - The relationship between the NSW Biosolids Guidelines and the EOW Code including the release of updated guidelines and relevance to Queensland operations
R37	Revise the EOW code for Oyster Shells to allow for more inclusive input of waste material, to maximise potential community participation in circular economy objectives

It is recommended to explore the extension of current EOW codes and the development of new EOW codes. Under the current framework arrangement, this will allow for a comprehensive framework that covers a wide range of waste materials.

The technical specifications of existing codes should be reviewed to ensure that they are relevant and aligned with the risk level of the material and its intended usage. The Department should also ensure the framework has adequate flexibility, so that resources that clearly transform into products and are similar to commercially available alternatives are not regulated under the EOW framework.

It is also recommended that expansion of codes should be considered where there is potential for community input. Wording of current EOW codes often excludes certain sources of materials, such as those not directly linked to the intended industrial purpose. This is the case for the oyster shell EOW code, which applies only to oyster processing centres and restaurants. The expansion of these codes to include a broader input of waste material will help maximise potential community participation in the circular economy outcomes.

Furthermore, councils have highlighted the lack of appropriate regulation for the usage of compost and other end-products from garden and food waste processing, processed timber, and crushed glass. In response, it is recommended to investigate these gaps to ensure the EOW framework is functioning effectively.

Whilst there are specific issues raised in some recommendations, during consultation stakeholders raised concerns or issues with other codes. Detailed analysis of each specific code is beyond the scope of this review however, feedback has been passed onto the Department. It is recommended that the Department continues to engage with stakeholders and reviews and updates codes as they are found to require update.

Appendix A:

Stakeholder Engagement Plan

END OF WASTE FRAMEWORK REVIEW

Stakeholder Engagement Plan

Prepared for:

Queensland Government, Department of Environment and Science

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Queensland Government, Department of Environment and Science (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
620.31160-R02-v1.1	26 October 2022	Chris Hambling	Chani Lokuge	Chris Hambling
620.31160-R02-v0.2	17 October 2022	Chris Hambling	Chani Lokuge	Chris Hambling

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DOCUMENT REFERENCES

TABLES

1 Introduction

1.1 Project background

The End of Waste Framework (EOW) was introduced into the *Waste Reduction and Recycling Act* 2011 on 8 November 2016 to replace the beneficial use approval (BUA) framework. Waste is defined under the *Environmental Protection Act* 1994, however where the End of Waste Framework is applied, under certain conditions, and in accordance with an EOW code or approval, waste can be approved as an EOW resource. There are specific conditions listed in each code or approval for the resource producer, and the resource can only be used by a resource user for a specific use.

An EOW code is a specific document prepared and authorised by the Department of Environment and Science (DES). As of early July 2022, the Department has released 31 codes for approved resources, with a further six currently under development. EOW approvals are primarily intended to be used where there is a potential market and future demand for a resource, and where an EOW code might be developed in the future. In essence EOW approvals are a trial. Following completion of the approval trial period, the Department will consider whether an EOW code should be developed for that resource or waste type, allowing for an assessment of the benefits, environmental impacts and best practice, and sustainability of the solution.

SLR has been engaged by the DES to undertake a review of the End of Waste Framework. The review will be split into three parts. Firstly, we will seek to refine our current understanding of the EOW Framework by defining the current state. This will seek to understand, in consultation with the Department, the founding principles of the EOW Framework. We will work with both the Policy & Regulatory function of the Office of Resource Recovery to understand the background to the introduction of the EOW framework, including work undertaken, such as regulatory impact assessment, discussion papers and feasibility studies, as a precursor to the legislative changes. We will also baseline the regulatory function (Environmental Services and Regulation - ESR) of DES views on the role of the EOW framework. This will extend to an understanding of the current processes and resources associated with the development of implementing the EOW framework.

The second part of the Project will be associated with further information collection. A review of similar jurisdictional approaches both in Australia and internationally will be undertaken. This will include a review of the use of Resource Recovery Orders and Resource Recovery Exemptions under the New South Wales *Protection of the Environment Operations (Waste) Regulation* 2014, the Victorian *Environmental Protection Act* 2017, the South Australian *Environmental Protection (Waste to Resources) Policy* 2010 and the *Environment Protection (Waste Reform) Amendment Bill* 2017, including relevant subordinate legislation, and the EU End of Waste Directive under the EU Waste Framework Directive, including recent review documents. Furthermore, we will undertake targeted stakeholder engagement throughout the review phase. Consultation will focus on understanding stakeholder views on the purpose of the EOW framework, key issues, or concerns, and what a future state may look for. We will gather feedback on key waste streams that DES could proactively prepare codes for to facilitate a circular economy. We will also engage with existing registered resource producers and users as to the process, reporting and regulatory requirements, and ongoing obligations.

1.2 Purpose of Stakeholder Engagement Plan

A large part of this review is collecting stakeholder views. This includes the views of officers within DES, as well as a broad range of governmental and industry stakeholders, and users of the framework. This plan provides a summary of the approach to engagement for each component, key questions to be raised, and the nature of engagement activity.

2 Approach to engagement

2.1 General approach

The stakeholders identified by DES in the original proposal for this project are presented below.

Table 1 Stakeholder Engagement Matrix

Engagement Group	Stakeholders
Department of Environment and Science	• Office of Resource Recovery – policy & legislation; context over the original policy and legislative intent, alignment with current and future Waste Management Strategy direction and circular economy, plus alignment with other policy functions (e.g., climate change in relevance to EOW framework) • Environmental Regulatory Function – operational policy, development, and implementation of EOW codes, administration of EOW framework, and Environmentally Relevant Activity/Environmental Authority administration, general regulatory function
Key stakeholders	Industry sector representatives including: • Department of Transport and Main Roads (DTMR) • Waste Recycling Industry Association Queensland Inc. (WRIQ) • Australian Organics Recycling Association (AORA) • Waste Management and Resource Recovery Association of Australia (WMRR) • Local Government Association of Queensland (LGAQ) • Ash Development Association of Australia (ADAA) • Queensland Resources Council (QRC) • Australian Petroleum Production and Exploration Association (APPEA) • Association of Mining and Exploration Companies (AMEC) • AgForce • Queensland Farmers Federation (QFF) • Cement Concrete and Aggregates Australia (CCAA) • Queensland Water Directorate (qldwater) • Others as identified during engagement or consultation (e.g., member businesses with specific feedback from peak bodies)
EOW Registered Resource Producers	DES will provide a list of registered resource users across current EOW codes. SLR will identify a minimum of 10 registered resource producers to consult with.
EOW Registered Resource Users	Through consultation with the identified registered resource producers, SLR will identify registered resource users to consult with.

The following sub-sections describe the approach to engagement for each different group, as well as an overall list of questions the overall review is intending to answer.

2.2 Agency engagement

Initial engagement will be internal to DES. This will be aimed at establishing:

- The original intent of the EOW framework through examination of legislation, guidance documents, and other documents available to support the introduction of legislation and regulation, such as Regulatory Impact Statements and Discussion Papers, where available.
- The views of both functions within DES as to the aims and objectives of the EOW framework

- The perception of both functions on the operational implementation of the EOW framework, including each function's role in identifying potential resources, the nomination process, development of EOW codes, managing and administering trials (as EOW approvals).
- Specific to waste related ERAs, the process by which a waste passing through a facility with a relevant recycling or resource recovery ERA is interpreted to become a resource and therefore does not fall within the EOW framework, or clarity on how this definition changes per process.
- The role of both functions in monitoring resources produced and used under the EOW process, including operational resourcing, reporting requirements, data collection and compliance activities undertaken.
- Current resource allocations from both functions of the Department to achieve the current level of service and implementation of the EOW framework, such as the number of FTEs and financial resources (if any).

For efficiency of engagement during this Task we will also engage with officers from the Department to understand the various successes and challenges associated with the implementation of the EOW framework to inform the review. This will include the identification of resources that could assist in enabling the circular economy objectives of the Queensland Government, but that, through confirmation by DES, are confirmed to not yet have an associated EOW code or approval.

These views will be collected through a workshop with each function with follow up calls or meetings as required.

2.3 Engagement with End of Waste Framework users

The second part of stakeholder engagement will be to gather the views and experiences of those working under codes or approvals, split into resource producers and resource users.

At least 10 resource producers will be identified from a list of registered resource producers provided by DES across several codes. Information collection from existing resource producers and resource users will primarily focus on the experiences in registration, usage, record keeping, and interactions with the Department. Key questions to be put to resource producers and resource users will include:

1. An explanation of the role that the resource producer or user plays within the EOW framework (i.e., are they a resource user, what type of resource, what code do they operate under, volumes/type of use etc.,)
2. Experience in operating under the EOW code:
    a. For resource producers – experience in registering, clarity of code for material product quality, ease of record keeping
    b. For resource producers – experience from interactions with the Department in terms of registration, communications, record keeping, any requests or audits undertaken on resource producers.
    c. For resource users – experience in record keeping, information provided by the resource producers (for relevance, accuracy, content, use)
    d. For specific resource users (e.g., the biosolids EOW code) – experience in applying the conditions of use including obtaining professional advice from a SQP, reporting of any exceedances of trigger values, specific guideline values and detailed record keeping
3. Any specific issues or concerns identified in operating under a code (for either producers or users) that hinder its use or opportunities to improve.

2.4 Engagement with stakeholders

Specific and targeted engagement will be undertaken with the 13 stakeholders identified in **Table 1**, with others added as necessary and in agreement with DES. The approach to engagement will be as follows:

- **Step 1 – Written Engagement** – introduce terms of review, approach, key topic areas, process and how stakeholder can be engaged (e.g., telephone, in-person meetings, written response). This stage has been commenced by DES already.
- **Step 2** – **Workshop / Meeting** – we will undertake a meeting to discuss specific feedback and collect information relating to the review. If a written response is provided this may be discussed at the meeting.
- **Step 3 – Follow up meetings** – depending on the nature of the initial meeting or written feedback, we will undertake follow up calls to revisit key themes or explore issues or opportunities in more detail.
- **Step 4** – **Incorporation of feedback into review report** – we will capture feedback within the written report for presentation to DES alongside recommendations.

2.4.1 Initial contact text

To facilitate engagement with key stakeholders, introductory text has been prepared for each stakeholder. This is to build on the original contact by DES. This will be issued, with permission from DES to each stakeholder, as follows:

Dear Stakeholder

Queensland End of Waste Framework Review

SLR Consulting Australia Pty Ltd (SLR) has been engaged by the Queensland Government, Department of Environment and Science to undertake a review of the End of Waste Framework. The scope of the review includes:

1. *Comprehensive review of the operation of the EOW regulatory framework including interactions and operational conflicts with:*

- *Chapter 3 of the Waste Reduction and Recycling Act 2011*
- *Section 13 of the Environmental Protection Act 1994*
- *Schedule 2 Part 12 of the Environmental Protection Regulation 2019.*

2. Assessment of whether the EOW framework is meeting its original intent and objectives.

3. Assessment of the extent to which the EOW framework supports Queensland's transition to a circular economy.

4. Critical comparison of the EOW framework with waste-to-resource frameworks in other Australian and international jurisdictions.

5. Consultation with stakeholders to identify any positive outcomes, opinions, issues, barriers, and limitations with the EOW framework.

6. Consultation with stakeholders to assess their understanding of and conformance with the requirements of EOW codes including but not limited to information provided to resource users each time the resource is supplied for use; record keeping for each load of the resource provided to and received by the resource user; notifications of emergencies, incidents, or breaches; an any records of sampling carried out.

7. Identification of potential EOW codes that could be developed to support significant resource recovery, and quantification of the potential resource recovery benefit of each potential code, where possible.

8. Recommendations on how the EOW framework may be improved to achieve the objectives of the Act and the targets of the Waste Management and Resource Recovery Strategy and deliver greater circular economy benefits for Queensland.

Your organisation has been identified for consultation regarding your, or your members experience in identifying resources, recommendations for code development, the development of codes or approvals, or implementation of the framework and operation of codes. The review is to be finalised in early 2023 and the outcomes may be used to guide future policy development in this area.

We have developed a series of questions for stakeholders to consider. The consultation process is expected to comprise a combination of in-person or MS Teams based meetings, with an opportunity for stakeholders to consider a more formal written response to support the review, particularly where consultation with members is required. Where written submissions are provided, we ask that these are submitted by 21st November 2022. In response to this email, please can you also identify suitable dates for receipt of feedback and discussion via a meeting during the period 24th October to 18th November.

The refined list of topics and questions for stakeholders to consider to be included in the email is:

1. As a stakeholder, are you familiar with the intent of the end of waste framework and the role it plays in seeking to achieve the objectives of Queensland's Waste Management and Resource Recovery Strategy, and Circular Economy objectives?

2. Are there specific experiences associated with the application for codes to be developed, code development, implementation of published codes or developing an End of Waste Approval that demonstrate the success of implementation?

3. Are there any barriers, issues, or limitations to operating under End of Waste codes, as a resource producer or user that result in adverse outcomes or unintended consequences.

4. Within your organisations typical business, are there wastes not currently covered by End of Waste Codes that could/should be developed?

5. For those operating under an End of Waste Code or Approval, are obligations around conformance with implementation of the code or approval clear in terms of guidance for how the resource can be used, record keeping, notification of emergencies, incidents, breaches, or any other records required to be kept?

6. Are there specific areas where reform (of approach, legislation, regulatory approach) could lead to reform resulting and greater alignment with the objectives of the Waste Strategy and a circular economy.

For written submissions, DES may wish to be the named recipient. This should be confirmed prior to the communication (otherwise all submissions will be provided by SLR to DES).

2.5 Key Questions review is seeking to answer

A series of questions have been developed to brief the different stakeholders and allow the preparation of a response, as presented in **Table 2**. In the table, questions considered relevant to the different groups (DES Office of Circular Economy – OCE, DES ESR, STK – Key Stakeholders, and EOW Users

Table 2 Interview topics and questions

#	Question / topic area	DES OCE	DES ESR	STK	EOW UESR
Policy needs and objectives					
1	What was the original intent of the introduction of the EOW framework?	X	X	X	
2	Is the Department's implementation of the EOW framework consistent with the original intent? Are there any unintended consequences?	X	X	X	
3	Has the intent of the implementation of the policy changed since its introduction?	X	X	X	
4	How has the implementation of the EOW framework replaced the BUA framework; what negatives with the BUA framework have been removed?	X	X	X	X
5	Does the EOW framework support the broader objectives of the Waste Management & Resource Recovery Strategy and overall waste agenda?	X	X	X	
Regulatory implementation and controls					
6	Does the legislation provide the Department with an appropriate level of authority, process, and regulation to allow enforcement of the EOW framework	X	X	X	
Interaction with other legislation					
7	Do the EOW framework components of the WRR Act and Regulation complement the implementation of the EP Act and other parts of the WRR Act? Are there any contradictions or areas of inconsistency?	X	X	X	
Identifying wastes which could be resources					
8	Does the way in which the Department creates window for submissions once a year promote an appropriate response to recommendations for code development?	X	X	X	X
9	Are submissions made outside of the submission window, considered. If so, how often?		X		
10	How does DES assess the merits of an EOW code nomination? With what criteria? Who is consulted within DES?	X	X		
11	How many applications have been received compared to codes being developed? How many are rejected?		X		
12	Does DES maintain a register of codes requested for development and the reason for acceptance or rejection?		X		
13	What constraints are there in DES on the development of codes (e.g., resources, other commitments, budget, timing etc.,)		X		
14	Is feedback provided to successful / unsuccessful nominees? How is this delivered?		X		
15	Has the Department undertaken any research and development work to identify waste types that may be suitable for code development? If so, can this be provided?	X	X		
Process for development of End of Waste Codes					
16	What is the typical length of time required to develop a code; how much does this vary?		X		
17	What is the experience of the Department where industry has co-developed or prepared an EOW code?	X	X	X	X

#	Question / topic area	DES OCE	DES ESR	STK	EOW UESR
18	What are the criteria for the Department to identify the need for the establishment of a Technical Advisory Panel (TAP)? How are members selected? Who reviews the output of the TAP for quality?		X	X	
19	When developing a code, does the list of resource uses rely on the applicant recommended uses, or are other uses identified to broaden the scope of the code?		X		
20	Does the Department consider the technical, economic, environmental and practicality of implementation of the code on resource producers and/or users?	X	X		
21	Where deployed, how are criteria developed for ensuring certain water or solid-state chemical is achieved through implementation of an EOW code? How is the scientific basis for this tested within the Department?	X	X	X	X
Process for development of End of Waste Approvals					
22	What level of effort is required by the Department to support the development of an EOW Approval? How much does this vary? How does this compare to an EOW Code?		X		
23	What is the typical length of time required to develop an EOW approval (including trial periods)		X		
24	Is there a specified level of input required from the EOW approval proponent required by DES?		X		
25	How is intellectual property dealt with if an EOW approval was to be converted into a Code?	X	X	X	X
26	How much does an EOW approval cost for a proponent? Has DES received any feedback on these costs?		X	X	X
Use of End of Waste Codes					
27	Is the registration for resource users a paper form, or is there an electronic registration option?		X		
28	Should resource users be required to register with DES?	X	X	X	X
29	How frequently do audits of Registered Resource Producer records occur? Are there any statistics available for compliance vs requirements? What is an appropriate frequency?		X	X	X
30	How is the data for waste becoming resources captured? If the data is not captured, should it be? What data should be collected?	X	X	X	
31	How onerous is the “information to be provided” by a Registered Resource Producer? What is the basis for the provision of this information?		X	X	X
32	How onerous is the record keeping requirements for Registered Resource Producers?		X	X	X
33	How onerous is the record keeping requirements for Registered Resource Users?		X	X	X
Existing End of Waste Codes / Implementation					
34	Does the existing list of EOW Codes provide appropriate coverage of wastes that can be converted to resources in Queensland?	X	X	X	
35	Are there any specific issues associated with existing codes that limit the uptake or result in unintended consequences?	X	X	X	X
36	Are there specific updates to legislation or regulation that have been identified but not yet progressed to improve the framework?	X	X		
37	Are there other wastes that could be candidates for EOW code development?	X	X	X	
38	Do any existing codes create unintended environmental consequences or promote the use of a material in a way that results in a lower order outcome under the waste hierarchy or following a circular economy approach?	X	X	X	

3 Record keeping

SLR will prepare and maintain an excel based engagement register that captures a record of conversations held in the undertaking of this project. This will also include records of attempting to engage with pre-identified stakeholders where engagement, within the required time window, has been unsuccessful. Information captured will include:

- Engagement administration – e.g., date, time, attendees, location/forum etc.,
- Stakeholder, name, contact details, title etc.,
- Key discussion topics, issues, raised.
- Outcomes/recommendations/actions including items for follow up
- Type of engagement (whether written or verbal)

This information will be provided to DES following completion of the Project.

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Appendix B:

Summary of published EOW codes

Table B1 - Summary of existing End of Waste codes (as of 19 June 2023)

Approved resource	EOW code reference	Waste Categorisation (assumed)	Number of registered resource producers	Resource definition	Approved uses	**Approved uses category** SLR added
Abattoir effluent pond sludge and crust	ENEW07617019	Category 2 Regulated Waste	7	Abattoir effluent pond sludge and crust: a) generated from aerobic and anaerobic effluent ponds at an abattoir facility b) contains moisture content of less than or equal to 25%	a) as a soil conditioner on agricultural land; or b) as a feedstock in the manufacturing of compost Note: Resources applied to land require an agronomic assessment as determined by an AQP, plus specific requirements around location of placement with regard to waters and residential dwellings, as well as if applied in compost manufacturing the compost must meet the requirements of AS4454.	Soil Conditioner / Composting
ACQ treated timber shavings	ENEW07607119	Category 1 Regulated Waste	6	Resource produce must ensure resource complies with the following criteria and quality characteristics: a) is sourced from operators operating under a quality management system to ensure the resource meets the specifications in Table B3 of Appendix B of AS1604:1; and b) only contains ACQ wood preservative chemicals as defined in Appendix B of AS 1604.1	Must only be used as a feedstock in the manufacturing of compost and/or mulch in accordance with the EOW code NOTE 1: composting must be done at an appropriately licensed facility in accordance with the EA NOTE 2: If used in composting, must be done in accordance with AS4454 including sampling. Sampling must be done per batch using SPLP to establish potential leachable concentrations of DDAC. Each batch cannot exceed unrestricted use in AS 4454, plus specific concentrations for copper of >150mg/kg limit and requirement to provide a warning label >100mg/kg of copper.	Soil Conditioner / Composting
Amorphous silica powder	EOWC010001220		0	Amorphous silica powder generated by the crushing, milling, grinding, and screening of waste silicon-based soda lime glass and glass cullet with a particle size of 0.01µm-45µm, and a mean particle size of 4-5µm, where the particle size of 80-85% powder is less than 10.48µm.	Approved use is directly as a fertiliser. Note 1: Cross reference to code of practice for labelling of fertilisers is an administrative activity under the biosecurity regulation 2016.	Fertiliser
Associated water (including coal seam gas water)	ENEW07547018	Dependent on testing & source	Not provided	Direct supply of associated water which is part of the extraction process for petroleum and gas. Resource must meet relevant requirements for stated type of use as per *Table 1 - Water quality criteria for the resource*. Specifically, does not apply to the indirect supply of associated water via a stream, weir, river, or other natural watercourse.	According to s8 tables, resource criteria are provided for: - Aquaculture - Coal washing - Dust suppression - Construction - Landscaping and revegetation - Industrial and manufacturing operations - Research and development - Domestic, stock and stock intensive, and incidental land management. Criteria range from meeting the ANZECC guideline values, specific criteria, to no water quality requirements. Additional controls are in place for restricting potential for resource use to cause nuisance or harm. NOTE 1: Table 2 also has conditions for the resource user limiting application of resource (for aquaculture), direct discharge or runoff. NOTE 2: Does not apply for irrigation (separate code)	Water Supply
Associated water for irrigation (including coal seam gas water)	ENEW07546918	Dependent on testing & source	Not provided	Direct supply of associated water which is part of the extraction process for petroleum and gas. Specifically does not apply to the indirect supply of associated water via a stream, weir, river, or other natural watercourse.	Specific water quality requirements: (6.1) If the resource meets standard criteria, can be sold or given away at the point of supply (conditions allowed) (6.2) or if the water quality does not meet requirements, need for an assessment for a RMMP prepared by an AQP and certified by a SQP, and the RMMP provided to the Chief Executive prior to commencement of operation. There are specific details to comply with in the RMMP. NOTE 1: There are extensive testing and monitoring requirements for use of associated water for irrigation. NOTE 2: the EOW code includes transitional arrangements for activities operating under the General BUA.	Water Supply
Biosolids	ENEW07359617	Category 2 Regulated Waste	15	Biosolids - limited to biosolids that meet the criteria in Table 1 - Resource Quality Criteria of the EOW code.	Very detailed resource producer and resource user requirements in the EOW code.	Soil Conditioner / Composting

Approved resource	EOW code reference	Waste Categorisation (assumed)	Number of registered resource producers	Resource definition	Approved uses	**Approved uses category** SLR added
Blast furnace slag	EOWCO10001641	General	0	Generate during manufacture of iron for steel production Process generation when iron ore, a mixture of oxides of iron, silica and alumina, a fuel consisting of coke, natural gas, oxygen and pulverised coal and limestone are fed into a blast furnace.	Bound applications Processed further by grinding to produce ground granulated blast furnace slag Unbound applications (road construction, base/subbase, subgrade, construction sand, filter aggregate, pipe bedding material, as a sealing aggregate, subsoil/subsurface drainage and in other engineered construction works.	Construction materials & specialist
Carbide lime	EOWC010001052	Category 2 Regulated Waste	1	Carbide lime slurry produced through hydrolysis of calcium carbide during production of acetylene. Specific quality criteria are provided for the resource.	Used for: a) neutralisation of low pH waste streams; and/or b) lime stabilisation of biosolids; and/or c) precipitation of inorganics in waste streams; and/or d) control of odour in waste streams; and/or e) saponification of waste oil in wastewater streams; and/or f) in mining and quarrying, application of dried resource to heavy metal and/or acid contaminated soil for land rehabilitation. All activities are required to be carried out at a suitably licensed facility with a) also applicable at a commercial laboratory.	Specialist
Chemically treated solid timber	ENEW07503218	General Waste	3	Chemically treated solid timber which may contain wood preservative chemicals. a) resource must be sourced from operators operating under a quality management system to ensure the resource meets the specification of AS 1604.1 (*Specification for preservative treatment, Part 1 - Sawn and round timber)* b) only contains wood preservative chemical active ingredients limited to those specified in AS 1604.1 and/or approved by the Australian Pesticide and Veterinary Medicines Authority for use in Australia c) is surface dry; and d) does not contain: i) affixed or embedded plastic ii) bandages and wraps for maintenance and iii) surface deposits	Chemically treated timber resource can be used to manufacture the following products: a) engineered wood products b) dimensioned timber products	Specialist
Coal combustion products	ENEW07359717	Category 1 Regulated Waste	18	Coal combustion products sourced from coal fired power stations and coal fired boilers where at least 90% of the fuel source is coal and up to 10% of the fuel source can be biomass material (e.g., wood chip, biosolids) and where no other source of fuel is mixed other than petroleum-based gas or liquid fuel for ignition support. The resource must meet the criteria in s6 of the code including specific quality criteria, including specific combustion temperatures (1100 °C) where biosolids may have been co-fired to mitigate PFAS substances.	Use is in: a) in bound applications (with specific conditions): - asphalt, binder for road stabilisation, cement and cementitious mixes, ceramic products, concrete, geopolymers, insulators, paints, coatings, adhesives, rigid and composite pavement structures, rubbers, and varnishes, plastics, ceramics etc., b) in unbound applications (with specific conditions): - pipe bedding, sub-surface drainage, road pavement, base and sub-base structures, select layers on top of earthworks, and engineer construction works (note there are criteria where the resource cannot be used) c) as a feedstock in the manufacture of soil conditioner (with specific conditions) d) as a feedstock in the manufacture of soil product (with specific conditions) e) in direct land application (with specific conditions)	Construction materials
Coal seam gas drilling mud	ENEW07543018	General Waste	0	Drilling mud sourced from coal seam gas projects located within Queensland. Key characteristics is drilling muds generated from overburden, free from physical or chemical contamination, pest, or vermin, and meets maximum contaminant levels for relevant uses suggested.	Approved uses are: - for manufacturing compost, mulch, or soil conditioners - resource used as a feedstock for compost manufacturing (under AS4454) - Manufacturing compost, mulch, or soil conditions (added to compost to create a final product (aligned with AS4454) - Manufacturing a general-purpose soil in accordance with AS4419	Soil Conditioner / Composting
Concrete (Liquid washout)	ENEW07602719	General Waste	12	Liquid washout waste. Specific quality requirements. Defined as 'water and slurry that is generated from the washing of concrete transport trucks, mixers and chutes, cleaning of agitator bowls and the hosing of yard paving at the site of production, and which is not reused in any concrete batching process (i.e., not reused in production).	Used by resource user in pH adjustment of acidic pond waters in accordance with the conditions of the relevant environmental authority held by the resource user.	Specialist

Approved resource	EOW code reference	Waste Categorisation (assumed)	Number of registered resource producers	Resource definition	Approved uses	**Approved uses category** SLR added
Concrete (Returned concrete)	ENEW07278517	General Waste	31	Returned concrete - any form of concrete product in its hardened or plastic state, and which is not reused in any concrete pour. NOTE - this specifically excludes construction and demolition waste.	Used in the manufacture of aggregate products.	Construction materials
Concrete (Solid washout)	ENEW07602819	General Waste	24	Solid concrete washout. Means returned concrete which is washed out of concrete transport trucks and includes a mixture of fine aggregate (e.g., sand) and coarse aggregate (e.g., gravel and crushed stone) from the original concrete, and contains cement and other cementitious materials or chemicals that give the solid concrete washout resource significant residual alkalinity.	Approved resource use: a) manufacture of aggregate products; b) neutralisation of acid sulphate soil (in alignment with the *Queensland Acid Sulphate Soil Technical Manual)* c) in the pH adjustment of acidic pond waters (in accordance with EA conditions at that site).	Construction materials
Digestate	EOWC010001054	Dependent on testing & source	0	Digestate. Defined as: the nutrient rich by-product of anaerobic digestion process and is a wet mixture that can be separated into solid and liquid digestate components. a) Specific quality criteria (see Table 1) which must not contain more than the 'maximum permissible concentration of impurities for fertiliser under the resource quality criteria. b) only the following materials can be used for the digestate: i) paunch ii) organic material from agricultural and livestock production iii) liquid digestate iv) green waste sourced from municipal kerbside collection schemes v) food waste and food processing waste including pet food and beverage manufacturing waste vi) cardboard and paper waste c) that prior to being applied to land or sold to resource users, the digestate undergoes pasteurisation. Table 1 - Resource Quality Criteria includes testing for total maximum concentrations for metals, pesticide indicators, PCBs, PFAS, Total plastics, Total physical contaminants, and total stones - every 6 months.	Approved uses: a) as a feedstock in the manufacture of compost; and/or b) as a soil conditioner and/or fertiliser on agricultural land (noting specific requirement for b) for land application to be in accordance with the direction of an AQP based on agronomic loading rate. Where used for irrigation (liquid digestate) there are specific further requirements.	Soil Conditioner / Composting
Dunder	ENEW07503118	Category 2 Regulated Waste	5	Dunder is defined as the liquid by-product that has been lawfully generated during the fermentation of molasses. To be a resource, it must meet the following requirements: a) for the approved use as a feed or feed additive, the resource must meet the requirements of the Biosecurity Regulation 2016 b) for the approved use as a colouring agent in solid fertilisers and as a soil conditioner and/or a fertiliser, the resource must not contain more than the 'maximum permissible concentration of impurities' for fertiliser in accordance with the Biosecurity Regulation 2016; c) for the approved use as a coal dust suppressant, the resource must not exceed the total maximum concentration limits in published resource quality criteria for seven heavy metals. Suitability of the resource must be determined by a AQP.	Approved uses: a) feed b) feed additive c) colouring agent in solid fertilisers d) application to land as a soil conditioner and/or fertiliser e) coal dust suppressant.	Specialist
Ferronickel slag	ENEW07576219	Category 1 Regulated Waste	0	Ferronickel slag is defined as the by-product generated during the lawful smelting of nickel ore to produce ferronickel. Quality criteria of resource: a) must be generated by the smelting of nickel ore to produce ferronickel at an electric arc furnace b) has a pH range of 5-10 c) does not exceed the quality criteria listed in Table 1 (heavy metals)	Approved use of the resource: - bound applications where the resource is encapsulated or chemically transformed and incorporated into a final product which complies with relevant Australian standards for that product; - unbound applications where the resource application is limited to the following uses: a) in abrasive blasting b) in road construction c) as base course, sub-base and subgrade d) as filter aggregate e) as pipe bedding material f) as sealing aggregate g) as subsoil and/or subsurface drainage; and/or h) in other engineered construction works. but must not be carried out in: a) land which contains potential acid sulphate soils b) actual acid sulphate soils c) has a soil pH of less than 5.5	Specialist

Approved resource	EOW code reference	Waste Categorisation (assumed)	Number of registered resource producers	Resource definition	Approved uses	**Approved uses category** SLR added
Ferrous chloride	ENEW07530718	Category 2 Regulated Waste	1	Ferrous chloride is a liquid by-product lawfully generated during steel pickling, which is the treatment of manufactured steel with hydrochloric acid to remove surface mill scale and rust prior to the steel undergoing further processing such as rolling, coating, or galvanising. To meet the definition of a resource it must: a) be generated during steel pickling; b) and meeting the quality criteria in the EOW code.	Approved use of the resource: a) as hydrogen sulphide control in water treatment services b) as phosphorous control in water treatment services c) as corrosion control in heat exchangers in energy related services d) as cyanide control in mine tailings at a mining activity	Specialist
Ferrous sulphate heptahydrate	ENEW07597919	Category 2 Regulated Waste	1	Crystalised by-product which has been lawfully generated during steel pickling, which is the treatment of manufactured steel with hydrochloric acid to remove surface mill scale and rust prior to the steel undergoing further processing such as rolling, coating, or galvanising. To meet the definition, it must: a) be generated during steel pickling b) have a purity of >97% ferrous sulphate heptahydrate; and c) not exceed specific resource quality criteria for As, Cd, Pb, Zn, Mn	Approved use of the resource: a) as a supplementary feedstock in the manufacture of compost (meeting requirement of AS4454) b) as a fertiliser (based on AQP/agronomics) and/or c) as an anti-foulant	Soil Conditioner / Composting
Fertiliser wash water and slurry	ENEW07278417	Dependent on testing & source	5	Fertiliser wash water and slurry is generated via: a) cleaning or washing of the fertiliser production plant, relevant equipment used within the plant and fertilise shed floors, either using high pressure water (no detergents or surfactants) or using mechanical means; and/or ii) hygroscopic sorbing of moisture into fertiliser products iii) washing of vehicle wheel treads of vehicles exiting the fertiliser storage and handling areas within the plant b) meeting specific resource criteria if being used as a nutrient supplement c) meeting specific resource quality characteristics if the resource is to be used as irrigation water.	Approved use is only for agricultural applications as a liquid fertiliser and must only be applied as direct irrigation water OR as a nutrient supplement. Specific use controls: a) the resource must only be applied under the direction of an AQP b) the resource application must be conducted at an agronomic loading rate etc., c) pooling and runoff must be limited d) percolation of the resource beyond the root zone must be minimised.	Fertiliser
Fibre cement board	ENEW07359417	General Waste	1	Composite material made of cement, sand and cellulose fibres used as a building material. Waste fibre cement includes waste board, broken down board and process dust (but excludes board sludge generated during production). Generation: a) waste fibre cement board generated during the manufacture of fibre cement board b) meets resource quality criteria registered resource producer must also sample, measure and record the composition of the resource for respirable crystalline silica content in process dust quarterly as a minimum.	Approved use of the resource in bound applications: a) asphalt b) blended manufactured aggregate product c) cement products d) cementitious mixes e) clay bricks and pavers; and f) concrete products.	Construction materials
Foundry sand	ENEW07359617	Category 2 Regulated Waste	6	Ferrous/nonferrous foundry sand recovered from the moulds used in the hot casting of ferrous and non-ferrous metals comprising sand and fine sand rejects from sand recovery systems. Resource must: a) not exceed the quality criteria listed in the EOW code b) not have characteristics contained in List 2 of the Movement of Controlled Waste NEPM (i.e., hazardous properties).	Approved resource can be used in bound or unbound applications, as feedstock for manufacturing of compost, mulch, and soil conditioners (meeting AS4454) or as a feedstock for general purpose soil (AS4419) or in unrestricted applications where the final product complies with the relevant Australian standard for that product.	Construction materials
Garnet sand	EOWC010000731	General Waste	5	Generated from the abrasive blast cleaning of steel surfaces Contains greater than 95% of Almandite garnet and less than 0.5% of crystalline silica (SiO_2). The resource must meet the quality characteristics stated in the EOW code.	Concrete filler material in precast concrete decorative or non-structural construction concrete products.	Construction materials
Glass fines	EOWC010001051	General Waste	0	Sourced from mechanical processing of waste glass.	Used as an aggregate or sand replacement in structural and non-structural civil engineering applications.	Construction materials
Oyster shells	ENEW07278317	Category 2 Regulated Waste	1	Oyster shells sourced from oyster processing centres or restaurants	Constructing structures designed to promote settlement of oyster spat.	Specialist
Paunch	ENEW07597819	Category 2 Regulated Waste	4	Generated from lawful processing of animals for human consumption and contains moisture content <70%	As feedstock in an anaerobic biogas plant As feedstock in the manufacturing of compost; As feedstock in the manufacturing of soil conditioner	Soil Conditioner / Composting

Approved resource	EOW code reference	Waste Categorisation (assumed)	Number of registered resource producers	Resource definition	Approved uses	**Approved uses category** SLR added
Plasterboard	ENEW07618819	General Waste	5	Generated from manufacturing, construction surplus, damaged product, or installation off-cuts; and does not contain various contaminants (plastic, foil, fibre cement, laminated plasterboard, tiles, wallpaper/paint, metal, C&D waste and/or regulated waste.	As a feedstock in the manufacture of compost As a fertiliser and/or soil conditioner on agricultural land	Soil Conditioner / Composting
Recycled aggregates	ENEW07604819	General Waste	52	Resource must: a) comply with any relevant Australian Standard or published technical specification for aggregates for which is appropriate for the use for which the aggregate is destined for at the time it is produced b) All reasonable and practicable measures have been taken to ensure that recycled aggregates are segregated from other waste material.	Used for engineering purposes in building, construction and/or landscaping applications.	Construction materials
Silica fume	EOWC010001828	General	0	Ultra fine solid, amorphous, and highly reactive pozzolan powder material composed mostly of amorphous silica Generated from smelting in the production of silicon and metal silicon alloys where high-purity quartz is reduced by carbon (coke, coal, woodchips) in electric arc furnace.	Use in bound applications where the resource is encapsulated or chemically transformed and incorporated into a final product which complies with the relevant Australian Standards for that project. Requires resource user notification	Construction materials
Spent sulphuric acid (SSA)	EOWC010000394	Category 2 Regulated Waste	1	Generated during the pickling process for steel galvanising Concentration of H_2SO_4 in the SSA is <5% Concentration of zinc in the SSA is at least 5g/L	Use in the zinc smelting process is limited to: a) substitution of process pond water injected into the roasting plant and/or leaching plant under normal operating conditions to recover zinc and sulphuric acid; and b) recovery of other metals in the SSA in the form of zinc cake (including geothite) in the leaching plant and purification plant NOTE: approved use of the resource is only permitted to be carried out at a metal smelter or refinery with an appropriate EA	Specialist
Sugar refinery clarifier sludge	ENEW07576119	Category 2 Regulated Waste	1	a) is generated during the clarification of raw sugar syrup to produce refined sugar; and b) does not contain more than the 'maximum permissible concentration of impurities' for fertiliser in accordance with *Biosecurity Regulation 2016.*	Application to agricultural land as a fertiliser NOTE: requires (7.2-7.3) agronomic assessment by a AQP to determine application need and rates.	Fertiliser
Sugar mill by-products	ENEW07359817	Category 2 Regulated Waste	10	Resource defined in s6 is "Sugar Mill by-products" that meet specific resource quality criteria for N,P,K, S, Ca, Mg and do not contain properties or other contaminants that may cause environmental harm when used in accordance with the EOW code. NOTE 1: Resource quality criteria allows blend of filter mud, boiler ash and/or mill mud. Mud may be wet or dry product. NOTE 2: Monitoring of resource quality must be conducted in accordance with Victoria EPA Industrial Waste Resource Guideline *Sampling and analysis of waters, wastewaters, soils, and wastes*.	If resource complies with quality criteria, can be used for: a) as a soil ameliorant or conditioner on agricultural land b) as a feedstock in composting or soil conditioner manufacturing activities c) as a soil ameliorant or conditioner for use on domestic lawns, gardens or landscaping. NOTE: usage requires "all reasonable and practicable measures to be taken to minimise environmental harm" including specific requirements for agronomic assessment if direct land application and to manage on-site pond storage.	Soil Conditioner / Composting

Approved resource	EOW code reference	Waste Categorisation (assumed)	Number of registered resource producers	Resource definition	Approved uses	**Approved uses category** SLR added
Tyres (End-of-life tyres)	ENEW07503018	Category 2 Regulated Waste	18	Resource meet the following criteria: a) is crumbed, granular or shredded end-of-life tyres lawfully generated in Australia; or b) is whole end-of-life tyres generated in Queensland and is: i. sourced from tyre manufacturers, tyre recyclers and/or tyre transporters ii) sourced from lawfully operated tyre retailers and/or tyre wholesalers iii) sourced from a resource recovery and transfer facility; iv) sourced from a resource recovery area; and/or v) sourced from operators of petroleum activities and mining activities authorised under the *Environmental Protection Act 1994*.	Approved resource uses: a) as acoustic barriers b) for equine applications c) as weights for silage storage systems d) as sediment barriers to prevent erosion e) manufacturing prefabricated rubber products f) as safety barriers in lawful motor racing events g) as storage platforms for manufactured swimming pools h) as fenders and/or bumpers for mooring marine vessels i) in structural and non-structural civil engineering application(s) j) manufacturing bituminous binders used in road making applications; and/or k) use in manufacturing processes and applications which transform and incorporate the resource into a final product that complies with relevant Australian standards for that product.	Specialist
Used vegetable oil	ENEW07611019	Category 2 Regulated Waste	0	Used vegetable oil that DOES NOT contain restricted animal material. - definition "vegetable oil that has been recovered from businesses and industry that use vegetable oil for the purposes of cooking food for human consumption"	Used as a feed additive - must not exceed greater than 3% of total livestock feed - must be stored to avoid impact to stormwater/runoff - storage >15L must have a secondary containment system.	Feed
Water treatment residuals	ENEW07503318	Category 2 Regulated Waste	1	Water treatment residuals that meet the following criteria: a) generated from treatment of water for supply of water for human consumption b) generated from the coagulation processes during treatment of water with aluminium sulphate and/or anionic and cationic polymers; and c) does not exceed total maximum concentrations limited stated in the EOW code for pH, range of metals and TOF	a) application to land as a soil ameliorant b) application to land as a soil conditioner c) as a feedstock in the manufacturing or compost; d) as a feedstock in the manufacturing of soil for landscaping and/or garden use. NOTE: each of these uses has additional sub-criteria including alignment with a number of Australian standards for soils (AS4419) and/or composts (AS4454) and requirements for qualified agronomists to determine loading rates	Soil Conditioner / Composting

Note: EoW codes as of June 2022.

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