Review of the Regulated Waste Classification and Waste-Related Environmentally Relevant Activity (ERA) frameworks

Decision Regulatory Impact Statement

July 2018

Queensland Government

Contents

Glossary

Term	Definition
AES	Aggregate environmental score
AWT	Alternative waste technology
RIS	Regulatory Impact Statement
ERA	Environmentally Relevant Activity
AWT	Alternative waste treatment
EfW	Energy from waste
DEHP	Department of Environment and Heritage Protection
DES	Department of Environment and Science
EPU	Equivalent passenger units
PCB	Polychlorinated biphenyls
ULAB	Used lead acid batteries
WRR Act	*Waste Reduction and Recycling Act 2011*

Executive summary

In Queensland the *Environmental Protection Act 1994* (EP Act) and its subordinate legislation, the *Environmental Protection Regulation 2008* (EP Reg) provide frameworks for classifying waste and regulating associated waste management activities.

High risk wastes are called regulated wastes and are listed in schedule 7, part 1 of the EP Reg. As at 30 June 2018, this schedule listed a total of 71 regulated wastes. Regulated wastes are considered to be higher risk as they contain contaminants or properties that have an increased risk to the environment or human health. Due to this increased level of risk, regulated wastes are subject to an increased level of regulation.

Wastes that are not classified as regulated waste are considered general waste as they pose a lower risk and typically comprise waste arising from municipal solid waste (MSW), construction and demolition (C&D) or commercial and industrial (C&I) waste streams.

In addition, waste management activities generate emissions and have the potential to cause environmental harm. These activities are regulated as environmentally relevant activities (ERAs) and as at 30 June 2018 schedule 2 of the EP Reg lists 12 waste-related ERAs. In most instances, a facility that receives general waste or regulated waste for processing, treatment, recycling or disposal must hold an approval for a relevant waste-related ERA.

These regulatory frameworks have remained largely unchanged since their introduction in the 1990s. Since then there have been significant changes in commercial and industrial waste management practices, coupled with the emergence of new waste management technologies and changes in waste policy and related legislation. As a result, the existing frameworks do not adequately provide for these changes.

To improve the way Queensland classifies and manages waste the Department of Environment and Science (DES) has undertaken a review of these frameworks. A consultation regulatory impact statement (RIS) was released in June 2017 that proposed two policy options:

- Option 1—maintain the status quo
- Option 2—(Preferred) adopt a new rationalised framework with a list of contemporary ERAs and a risk-based regulated waste classification system.

Specifically option 2 proposed:

- rationalising the number of existing waste related ERAs from 12 to 5
- introducing three risk-based regulated waste categories and a not-regulated (NR) category for wastes that were demonstrated to be low risk.

The preferred policy option was developed to improve the coordination between waste classifications and the waste related ERAs to:

- allow the overall risk of waste management activities and wastes to be better quantified
- better apportion regulation to those activities and wastes based upon the level of risk they pose
- provide clearer regulatory requirements and expectations for all waste management activities
- provide greater support for new and emerging technologies
- ensure consistent application of the regulatory requirements across the relevant activities.

The consultation RIS considered the impact of the proposed options to the administering authorities, industry, holders of existing ERA approvals and the community. The consultation RIS was open for comment for a period of 8 weeks and received 36 submissions. This included submissions from individual companies, local governments, utility providers as well as industry bodies representing the waste industry, local government as well as the agricultural and resource sectors.

All submissions supported option 2, however concerns were raised about some elements of the proposal. In response to the consultation RIS feedback the department has further reviewed and amended the preferred policy option 2 proposal. These amendments have resulted in:

- reducing the number of regulated waste categories from three to two
- further review and updating of the waste categorisation hazard parameter limits and default waste categories to align with the new categories
- expanding the regulated waste classification exemptions to include additional items such as used treated timbers, automotive components and treated clinical waste
- increasing the number of ERAs from five to seven to allow for scale-based thresholds for waste processing and treatment ERAs to enable improved risk-based regulation of small, medium and large scale activities
- the inclusion of new ERA thresholds for facilities handling or processing lower-risk inert or non-putrescible general wastes.

The proposed framework will result in a changes to annual fees for almost all existing ERAs. Depending on the nature of the activity the annual fee for holders of existing ERAs may increase or decrease under the proposed risk-based regulations. Due to the subsequent amendments made the ERA framework a re-assessment of activity risk-profiles

has been undertaken and this has resulted in a reduction in the Aggregate Environmental Score (AES) and the associated annual fees for some activities. The impact to government revenue generated through ERA annual fees is forecast to be neutral.

A summary of the key issues raised, the government response, the amended option 2 and accompanying impact assessment is considered in the decision RIS which forms Part A of this document. The decision RIS does not consider option 1 as it was not supported by any of the stakeholder submissions.

Part A - Decision RIS

1.0 Consultation RIS overview

The Department of Environment and Science (the department) (previously the Department of Environment and Heritage and Protection) released a consultation regulatory impact statement (RIS) for public feedback on 30 June 2017. The consultation RIS was open for comment for a period of eight weeks and received 36 submissions. This included submissions from individual companies, local governments, utility providers as well as industry bodies representing the waste industry, local government and the agricultural and resource sectors.

All submissions were in support of option 2 and overall the proposed framework received positive support. In particular, submissions from peak industry and local government bodies provided the following overarching comments:

- The approach to simplify and consolidate ERAs was commended, noting that the emphasis on contaminants of concern would ensure that the regulations would escalate with the level of risk and that waste would be sent to appropriately constructed and managed facilities.
- The government's effort to ensure the currency of the regulatory and licensing framework was welcomed and would ensure that it is fit-for-purpose into the future, given the increasing rate of technology adoption and innovation.
- Local government supported the Queensland Government's commitment to applying regulatory best practice principles to reduce the regulatory burden on local government and the broader waste industry while managing the risk of potential environmental harm.

Despite receiving positive feedback some concerns were raised about specific elements of the proposed regulations. To address these concerns the department has undertaken further work and made several amendments to both the regulated waste and waste-related ERA frameworks. The purpose of this section is to provide:

- an overview of the option 2 proposal contained within the consultation RIS
- a summary of the key comments and feedback received in response to the consultation RIS that have necessitated further changes to the frameworks
- a summary of the subsequent amendments that have been made to the proposed frameworks in response to these comments.

A more detailed summary of the consultation comments, the government response, amendments to the frameworks and the updated impact assessment is provided in Part A section 3.0 of this document.

Submissions also raised issues relating to the contaminated land, end-of-waste code and inter-state waste tracking framework provisions. As these provisions do not fall within the scope of the ERA or regulated waste classification frameworks the comments were noted but were not able to be considered as part of this review.

1.1 Regulated Waste Classification - Consultation RIS proposal

The consultation RIS proposed a new regulated waste classification framework that would enable waste generators to determine whether their waste is regulated and, if so, an appropriate level of risk-based categorisation. Under the proposed system, regulated waste would be classified into one of three regulated waste categories or a not-regulated (NR) category, as follows:

- Category 1 regulated waste (highest risk)
- Category 2 regulated waste
- Category 3 regulated waste
- Not-regulated (NR) (lowest risk).

To establish their particular category, waste generators would have the option of either:

- adopting a default waste category for their waste (similar to the existing regulated waste classification method); or
- sampling and testing for hazard parameters and comparing the results against threshold values for each parameter to determine an appropriate risk-based waste category.

The framework proposed is a significant departure from the existing regulated waste classification system as it allows waste to be tested to determine an appropriate risk-based waste category. This is not possible under the existing framework where all regulated wastes are considered equal, irrespective of the nature or concentration of the hazard parameters it contains.

Further information on the proposed framework is provided in Part B of this document which contains the consultation RIS in full.

1.2 Regulated Waste Classification - Consultation RIS comments

A summary of the key comments received during consultation that resulted in further changes to the regulated waste framework is provided below:

- Submissions suggested that three categories of regulated waste was not necessary. Reducing the number of categories to two would reduce complexity whilst still providing adequate risk-based classification.
- The proposed default waste category for some wastes was considered to be too low. It was noted that this would discourage testing and result in higher risk wastes not being appropriately classified.
- A lack of alignment between the proposed hazard parameter waste category limits with existing landfill waste acceptance criteria was noted. Specifically it was suggested that the proposed waste categorisation testing requirements may overlap with or contradict existing landfill waste acceptance criteria requirements.
- The 'not-regulated' waste category parameter concentrations for some hazard parameters were noted to be very high. Hazard parameters identified as being significantly high included:
    - Arsenic, Chromium (VI), Lead, Mercury, Zinc, Toluene, 1,2- Dichlorobenzene, 1,1-Dichloro- ethylene, Tetrachloro- ethylene, 2,4-Dinitrotoluene, 2,4-D and Electrical conductivity (µS/cm)
- Waste categorisation testing parameters for sodium, boron, per- and poly-fluoroalkyl substances (PFASs), acid sulphate soils (ASS), vanadium and phalates were not included.
- No risk based classification criteria was included for asbestos in the hazard parameter waste categorisation table. Comments proposed that NEPC (2013) HSLs be used to allow asbestos contaminated waste material to be given a risk based category.
- Concerns around the lack of specific classification criteria for liquid wastes was raised.
    - Some submissions suggested that all liquid wastes should be deemed regulated waste by default to ensure adequate traceability from cradle to grave. This was on the basis that liquids are very mobile, difficult to control in the event of a spill and the evidence of their appropriate disposal or management is more difficult to trace.
    - Contrary to the above other comments stated that the categorisation of regulated waste, whether solid or liquid, should be undertaken consistently, with testing and classification being based in accordance with its physical or chemical properties.
- The application of the term general waste to ERA categories was considered to be too broad. Comments noted that inert general waste poses a significantly lower risk than putrescible general wastes and that this needed to be addressed in the framework.
- The proposal to exclude used treated timber power poles was supported however it was requested that this should be expanded to include other used treated timbers.

1.3 Regulated Waste Classification - Decision RIS amendments

In response to the above comments the department has made several changes to the proposed waste classification framework. Some of the changes are minor in nature however others have resulted in rework of some elements of the proposed regulated classification framework. To inform the proposed changes the department engaged a contractor to undertake a review of the proposed waste categories and hazard parameter thresholds.

The outcome of this process has resulted in the following changes:

- Reducing the number of regulated waste categories from three to two. Category 1 has been retained and the proposed categories 2 and 3 have been combined into a single category 2. The proposed categories are now:
    - Category 1 (highest risk)
    - Category 2 (moderate risk)
    - Not-regulated / general waste (lowest risk).
- Adjusting the default waste categories for some wastes from category 2 to category 1.
- The removal of the requirement to undertake laboratory analysis of waste eluates (with samples prepared using either the toxicity characteristic leaching procedure (TCLP) or Australian standard leaching procedure (ASLP) test methodology) for classification of solid wastes. Under this proposal:
    - classification of solid waste will only require testing for totals (T) in mg/kg be undertaken
    - TCLP or ASLP testing for solid waste will only be required if the intended management fate is landfill. In this case the waste generator will be required undertake testing to demonstrate compliance with the relevant landfill's waste acceptance criteria
    - the testing requirements and associated costs for categorising wastes that are not destined for landfill will be reduced.
- All liquid waste will be classified as default category 1 or 2 regulated waste, unless:
    - the waste is otherwise excluded by definition from regulated waste classification; or
    - sampling and testing has been undertaken to demonstrate the hazard parameters fall within the not-regulated category for liquid waste.
- All used treated timbers (excluding treated timber shavings or sawdust) will not be classified as regulated waste.

- Further defining general waste into the following sub-categories:
    - Putrescible waste (wastes containing food or readily decomposable organics).
    - Non-putrescible waste (wastes that do not contain food or other readily decomposable organics, such as paper, cardboard, plastics and timber).
    - Inert waste (inactive materials such as bricks, pavers, ceramics, concrete, glass and scrap steel).

It is important to note that solid or liquid wastes that are tested and demonstrated to fall within the not-regulated category are deemed to be a general waste and must still be managed in accordance with any relevant regulatory requirements relating to their storage, processing, treatment or disposal.

As a result of the above changes Schedule 7 of the *Environmental Protection Regulation 2008* will now comprise 4 parts as shown below. Schedule 7, Parts 1, 2, 3 & 4 are provided in full in Part A, Section 4.0 of this document.

- Schedule 7, Part 1—Default waste categorisation table
- Schedule 7, Part 2—Solid waste hazard parameter waste categorisation table
- Schedule 7, Part 3—Liquid hazard parameter waste categorisation table
- Schedule 7, Part 4—Waste that is not regulated waste.

1.4 Waste-related ERAs - Consultation RIS proposal

The consultation RIS proposed rationalising the number of existing waste-related ERAs from 12 to five. The underlying structure of each ERA considered both the process or activity being undertaken and the classification of waste being managed to determine an appropriate risk based level of regulation. An overview of the five proposed waste related ERAs and the activities to which they relate is provided below, in table 1. Further information on the ERAs proposed in the consultation RIS is included in Part B of this document.

Table 1: Consultation RIS waste-related ERAs

Consultation RIS Waste-related ERA	Description
ERA53 Organic waste processing	Captures facilities that compost or anaerobically digest greater than 200t per annum of organic material.
ERA55 Waste processing or treatment	Captures activities processing or treating by mechanical, thermal or other processes. Includes categories for processing or treating category 1, 2, or 3 regulated waste or general waste. Includes provisions for new and emerging technologies such as pyrolysis and gasification.
ERA57 Waste transport	Transport of regulated waste or tyres. Includes a proposal to capture or general waste transport activities. Proposed a new annual fee structure determined by the number of registered waste transport vehicles.
ERA60 Waste disposal	Retained the existing ERA60 thresholds. Includes a new category with a lower annual fee for closed landfills. Included an updated definition to restrict the disposal of construction and demolition waste without an approval.
ERA62 Waste transfer and resource recovery	Captures low level waste sorting, storing and dismantling activities. Includes categories for category 1, 2 and 3 regulated waste and general waste.

1.5 Waste-related ERAs - Consultation RIS comments

A summary of the key comments received during consultation that have resulted in further changes to the waste-related ERA framework is provided below:

- Submissions requested that anaerobic digestion undertaken at existing ERA63 (sewage treatment plant) facilities should not require a separate approval for ERA53 (organic waste processing) as the associated risks were already adequately managed by the existing activity.
- The agricultural sector requested exemptions be included in ERA53 (organic waste processing) to ensure that the regulations were not restrictive for on-farm composting or anaerobic digestion activities.
- Submissions did not support the proposed increase in annual fees that would apply to existing composting activities.
- Submissions supported the proposed ERA55 (waste processing or treatment) categories, however it was noted that the categories and annual fee did not take into account the scale of the activity. It was requested that scale based thresholds be introduced for fairer regulation of small, medium or large-scale activities.
- Many of the proposed ERAs include a lower risk category for facilities that receive general waste. Submissions noted that the general waste term was too broad as the risks associated with different general waste streams can vary significantly. It was requested that additional general categories be included to delineate between putrescible waste, non-putrescible waste and inert waste streams.
- Submissions noted the new annual fee for crushing, grinding or screening of inert waste or green waste was too high and should be reduced to better align with the associated environmental risk.
- Submissions suggested that the annual fee for treating clinical or related wastes was too high.
- Industry and local government did not support the proposed increases in annual fees for ERA60 (waste disposal) activities, noting that unlike other activities the ERA60 thresholds had not been altered and therefore the risk and annual fee should remain the same.
- Submissions suggest the proposed annual fee for closed landfills was too high and not commensurate with the environmental risks posed by a closed facility or the ongoing administrative and compliance costs incurred by the administering authority.
- Submissions requested separate thresholds for disposal of inert or lower risk general waste streams be included.
- Clarity was sought on how scrap metal or car wreckers that are currently regulated under ERA20 (metal recovery) would be regulated under the new framework, noting that the proposal may result in a significant cost increase for existing ERA20 operators.
- Local government did not support the reduced licensing threshold for ERA62 (waste transfer station) of 2500t or 2500m^3 per annum noting that it would require licensing of a significant number of existing low-risk local government facilities.
- Submissions general supported the proposed general waste transport provisions under ERA57, provided they did not result in an increase in administrative burden or cost.

1.6 Waste-related ERAs - Decision RIS amendments

In response to the above comments the department has made the following changes to the waste-related ERA framework.

- Exemptions have been included so that ERA63 (sewage treatment) facilities can undertake anaerobic digestion without obtaining a separate ERA53 (organic waste processing approval).
- Exemptions have been included in ERA53 to allow farm waste to be composted and re-used on-farm without requiring an approval.
- The annual fee for composting activities has been reduced and is consistent with the annual fee under existing regulations.
- Small, medium and large-scale thresholds have been included in ERA55 (waste processing or treatment). This will ensure a fairer annual fee structure for operators of small and medium scale facilities. Due to the additional complexity this ERA has been split in to 3 separate ERAs:
    - ERA54 Mechanical waste processing or treatment
    - ERA55 Other waste processing or treatment
    - ERA61 Thermal waste processing or treatment.
- Separate categories with a low annual fee for facilities that accept only non-putrescible or inert waste streams have been included within ERA54 (mechanical waste processing or treatment), ERA60 (waste disposal) and ERA62 (waste transfer or resource recovery).
- A separate threshold with a reduced annual fee has been included in ERA54 (mechanical waste processing or treatment) for processing of greater than 5,000t per annum of inert waste or green waste.
- Separate thresholds with a reduced annual fee have been included in ERA55 (other waste processing or treatment) and ERA61 (thermal waste processing or treatment) for facilities that treat clinical and related waste.

- The risk associated with waste disposal activities has been reconsidered and the annual fees for all ERA60 thresholds, including closed landfills, has been reduced.
- A new ERA60 category for disposing of only inert waste has been included. This recognises that these wastes have a significantly lower potential to cause odour nuisance, attract vermin and leach into the environment.
- Scrap metal has been included in the lower risk category for ERA62 (waste transfer and resource recovery). In addition to this automotive components such as car bodies, engines, transmissions and differentials have been excluded from regulated waste classification.
- The waste transfer station exemption has been increased to 11,000t or 11,000m^3 per annum for local government operated facilities. This is consistent with the existing 30t or 30m^3 per day threshold in the existing regulations.
- The general waste transport provisions proposed in ERA57 have been removed following further internal review which identified that it was not practical to implement under the ERA framework and would result in significant ongoing administrative costs. Despite removing the proposed provision the department recognises the need to include licensing requirements for general waste transport and proposes to develop, in consultation with industry, similar and more easily administered provisions under a different regulatory mechanism.

As a result of these changes the waste-related ERA framework now comprises 7 ERAs, which are summarised below in Table 2. The new schedule of ERAs is provided in full in Part A, Section 5.0 of this document.

Table 2: Updated waste-related ERAs

Updated Waste-related ERA	**Description**
ERA53 Organic waste processing	Captures facilities that compost or anaerobically digest greater than 200t per annum of organic material. Includes exemptions for: • on-farm activities; and • activities undertaken at ERA63 (Sewage treatment plant) facilities.
ERA54 Mechanical waste processing or treatment	Captures processing or treatment activities that use mechanical processes such as crushing, milling, grinding or shredding. Includes small, medium and large-scale based thresholds. Includes categories for processing or treating category 1 or 2 regulated waste or general waste. A separate category is included for processing greater than 5,000t per annum of inert waste or green waste.
ERA55 Other waste processing or treatment	Captures processing or treatment activities that use processes other than those defined in ERA53, ERA54, ERA61 or ERA62. For example, bioremediation, chemical fixation, autoclaving of clinical waste or liquid waste processing or treatment. Includes categories for processing or treating category 1 or 2 regulated waste or general waste. Includes small, medium and large-scale based thresholds.
ERA57 Waste transport	Transport of regulated waste or tyres. Retains the vehicle based annual fee structure proposed in the consultation RIS.
ERA60 Waste disposal	Includes new categories for landfills disposing only inert waste. These categories have a lower risk-based annual fee compared to facilities disposing of regulated waste or putrescible wastes. Includes a new category with a lower annual fee for closed landfills. Updated definition to restrict disposal of construction and demolition waste without an ERA approval.
ERA61 Thermal waste treatment or processing	Captures processing or treatment activities that use thermal processes such as incineration, pyrolysis or gasification technology. Includes categories for processing or treating category 1 or 2 regulated waste or general waste; and Includes small, medium and large scale based thresholds.

ERA62 Waste transfer and resource recovery	Captures low level waste sorting, storing, dismantling or baling activities. Includes categories for: • Non-putrescible waste, inert waste, scrap steel or green waste; • General waste; • Category 2 regulated waste; • Category 1 regulated waste; and • End-of-life tyres

2.0 Preferred policy position, benefits and costs

Following the changes made to the frameworks in response to the consultation RIS comments an updated option 2, as detailed in section 4.0 of this document, is presented as the preferred policy option. This option will continue to achieve the stated policy objectives of the review.

1. Improved classification of waste based on the level of risk posed to the environment or human health
2. Management controls for waste ERAs that correspond to the level of risk of posed
3. Development of waste ERAs that support new and emerging technologies
4. Consistency for operators undertaking waste ERAs
5. A regulatory environment that encourages innovation in waste management practices
6. A framework that does not impact on the viability of established industries and encourages capital investment, economic development and employment

In addition to the above the updated option is also expected to provide improved benefits and reduce some of the potential cost impacts to stakeholders. Acknowledging that there will still be costs associated with implementing and transitioning to a new regulatory framework, Table 3 summarises the additional benefits offered by the updated option 2, compared to the benefits and costs identified in the consultation RIS proposal for each stakeholder group.

Table 3: Updated Option 2—cost and benefit summary

Consultation RIS—Preferred option 2			**Decision RIS—updated option 2**
Stakeholder	**Benefits**	**Costs**	**Additional benefits**
Industry	• Annual fees for some activities may decrease. • Provides proportionate regulation for waste related activities. • Clearer regulation and standards for new and emerging technologies, such as thermal treatment. • Fairer playing field. • Increased confidence in the Queensland Government's ability to maintain the contemporaneity of environmental law and management practices. • Requirement for currently unregulated activities to obtain approval.	• Annual fees for some activities may increase. • Increased administration for existing holders in transitioning to a new equivalent ERA and threshold. • New costs associated with the implementation and practice of the new framework including waste transport and management. • Possible delays and costs in implementing the new framework. • Requires education and training to ensure a smooth transition and the benefits of a new framework are realised. • A cultural change for the classification and management of regulated wastes.	• The annual fees have been reduced for the following: ○ Composting, waste disposal and metal recovery activities ○ Small and medium sized waste processing or treatment activities ○ Disposal or processing of inert waste, non-putrescible waste, scrap steel or green waste streams; and ○ Low risk sorting, dismantling or resource recovery activities. • The removal of the requirement to undertake leachability testing (using TCLP or ALSP) for solid waste classification will reduce lab testing costs associated with waste categorisation. • The ability to test and classify liquid wastes as not-regulated will reduce the potential costs associated with managing low-risk liquid wastes. • The reduction in the number of regulated waste categories and associated testing requirements will reduce some of the administrative and technical complexity for waste generators and receiving facilities.
Local government	• Reduction in administration costs, following the transfer of some ERAs to the state.	• Recentralising the management of some ERAs could cause a financial loss to local councils. • Implementation costs associated with transitioning to the new system. • A cultural change for the classification and	• The licensing threshold for local government operated waste transfer stations has been increased to ensure that small scale local government facilities will not require an approval. • The reduction in the number of regulated waste categories and associated testing requirements will reduce some of the administrative, technical and related

		management of regulated wastes which will take time to fully implement. • Change to compliance and licensing workloads.	compliance complexity at local government waste facilities.
Queensland Government	• Contemporary prescribed waste ERAs that are tailored to new and emerging technologies, and that are also flexible enough to capture future technologies. • Improved compliance and assessment capacity due to streamlined ERA regulatory requirements. • Improved environmental outcomes as high risk wastes and activities will be more easily identified through the new regulatory framework allowing improved targeted compliance programs.	• Costs associated with developing and implementing a new framework. • A cultural change for the classification and management of regulated wastes which will take time to fully implement.	• Further improved ability to undertake targeted compliance as the ERA framework changes will enable better identification of high risk activities. For example the ERAs now better identify: o Small, medium and large scale processing or treatment activities; and o Low-risk facilities that accept only inert or non-putrescible waste streams. • The reduction in the number of regulated waste categories and associated testing requirements will reduce some of the administrative, technical and related compliance complexity.
Community	• Increased confidence in government's ability to ensure that environmental risks are appropriately managed. • High risk activities and wastes are more appropriately identified and managed.	• New costs associated with the implementation and operation of the new framework including waste transport and management.	• The benefits to the community will be increased through the improved classification and management of high risk wastes that are based on up-to-date values for the protection of the environment and human health. • Further improved identification of waste management activity risks will improve the compliance capability of the administering authority.

3.0 Decision summary

The department released a consultation RIS on 30 June 2017 for a period of eight weeks that provided two policy options. Option 1 proposed to maintain the current regulatory framework and option 2 (the preferred option) proposed a new rationalised waste classification and waste-related ERA framework. In response to the consultation RIS the department received 36 submissions from individual companies, local governments, utility providers as well as industry bodies representing the waste industry, local government and the agricultural and resource sectors.

All submissions were in support of the preferred policy option 2, however concerns were raised about some elements of the proposal. The following sections provides:

- A summary of the issues or concerns raised by stakeholders (as many submissions were marked as confidential).
- The Queensland Government response, including subsequent changes made in response to comments.
- The amended regulated waste and waste-related ERA frameworks.
- An updated impact assessment that considers the impacts arising from the subsequent framework amendments. This includes an assessment of impacts to:
    - Queensland Government revenue arising from changes to the ERA framework and associated annual fees
    - changes to ERA annual fees for holders of existing waste-related ERA approvals.

3.1 Consultation RIS submission summary - Regulated Waste Classification

Submission points	Government response

The regulated waste framework included in the consultation RIS proposed three categories of regulated waste and a not-regulated waste category, as shown below:
• Category 1 regulated waste (high risk)
• Category 2 regulated waste (moderate risk)
• Category 3 regulated waste (low to moderate risk); and
• Not-regulated waste (low risk).
Submissions noted that the risks posed by the proposed category 2 and category 3 wastes were not significantly different and suggested that reducing the number of regulated waste categories to two would reduce complexity whilst still providing adequate risk-based classification.
	The department noted these comments and agreed that:
	• two categories of regulated waste would provide adequate risk-based classification;
	• The concentration thresholds for all hazard parameters required further review;
	• Limits should be included to enable risk-based classification of liquid wastes; and
	• Further clarity was needed regarding the requirement to undertake TCLP or ASLP testing where the new regulated waste testing criteria was inconsistent with existing landfill waste acceptance criteria.
	
	To make these changes the department engaged a contractor to:
	• Undertake a review of all hazard parameter limits, including hazard parameters that were omitted from the consultation RIS proposal;
	• Develop liquid waste hazard parameter limits; and
	• Update the framework to reflect the reduction in regulated waste categories from three to two. The updated categories are:
	  • Category 1 regulated waste (high risk);
	  • Category 2 regulated waste (moderate risk); and
	  • Not-regulated (NR) or general waste (low risk).
	
	The new regulated waste classification schedule now contains four parts, as below:
	• Schedule 7, Part 1, Default waste categorisation table
	• Schedule 7, Part 2, Solid waste categorisation table
	• Schedule 7, Part 3, Liquid waste categorisation table
	• Schedule 7, Part 4, Waste that is not regulated waste.

The ‘not-regulated’ waste category hazard parameter concentration limits were noted to be too high for the following hazard parameters: • Arsenic, Chromium (VI), Lead, Mercury, Zinc, Toluene, 1,2-Dichlorobenzene, 1,1-Dichloro- ethylene, Tetrachloro- ethylene, 2,4-Dinitrotoluene, 2,4-D and Electrical conductivity (µS/cm). It was suggested that the proposed limits for other hazard parameters should also be reviewed, noting that they were based on outdated values.	
The lack of specific management controls and classification criteria for liquid wastes was noted. • Some submissions suggested that all liquid wastes should be deemed regulated waste by default noting that liquids pose a higher risk as they are very mobile, difficult to control in the event of a spill and the evidence of their appropriate disposal or management is more difficult to trace. • Contrary to the above, other comments stated that the categorisation of regulated waste, whether solid or liquid, should be undertaken consistently, with testing and classification being based in accordance with its physical or chemical properties.	Categorisation of waste by sampling and laboratory analysis now only requires testing for Total (T) values to be undertaken. The requirement to undertake leachability testing using ASLP or TCLP has been removed for waste categorisation purposes as these tests are specific to determining the risks to the water environment for wastes that are disposed to landfill. The department recognises that requiring these tests for wastes that are not destined for landfill is unnecessary and increases the costs associated with laboratory analysis. For solid wastes, where the management fate is landfill, testing for totals and leachability (using either ASLP or TCLP) will be required to demonstrate the material meets the waste acceptance criteria of the receiving facility.

It was noted that the proposed regulated waste classification leaching values are based on ASLP testing, whereas existing landfill acceptance criteria use TCLP testing. This may lead to confusion or result in waste generators conceivably having to undertake two tests.	Using this approach: • reduces the sampling and analysis requirements and costs associated with categorising solid wastes that are not destined for landfill. In these cases only testing for totals is needed • maintains the status quo for wastes that are destined for landfill, that is to say that these wastes will still need to be tested for both total and leachability values to demonstrate compliance with landfill acceptance criteria, as is currently the case • removes inconsistencies and confusion around testing requirements that apply for regulated waste classification and landfill waste acceptance criteria. Specific liquid waste hazard parameter limits have been developed to allow low risk liquid wastes to be tested and classified as not-regulated. Noting that liquid wastes pose a higher risk all liquids will be classified as default category 1 or 2 regulated waste, unless: • the liquid waste is otherwise excluded by definition from regulated waste classification; or • sampling and analysis has been undertaken to demonstrate the hazard parameters fall within the not-regulated hazard parameter limits for liquid waste. It is important to note that liquid wastes that are classified as not-regulated are still considered waste and must still be managed in accordance with all relevant regulatory requirements. For example, treatment, processing or storage of not-regulated liquid waste may only be undertaken at a facility that holds a relevant ERA to do so. The final report that details the rationale and methodology used to derive the updated hazard parameter values for both solid and liquid waste is provided in Attachment H.
It was noted that asbestos has a default regulated waste category of 2 however no risk based criteria for asbestos was included in the hazard parameter waste categorisation table. Submissions requested that health screening levels (HSLs) be incorporated to allow asbestos contaminated waste material to be tested and given a risk based category.	The department notes that the risks associated with asbestos are primarily health based and not environmental. Hazard parameter limits based on HSLs have been included for asbestos for both solid and liquid waste to allow materials with concentrations below HSLs to be classified as not-regulated. It is important to note that: • facilities receiving, storing, processing or disposing of material containing asbestos below HSLs may still be required to hold a relevant ERA to do so, depending on the nature and scale of the activity being undertaken; and • management of the material will need to comply with any relevant workplace health and safety requirements relating to the handling or management of asbestos.
The default waste categorisation table did not include all new and existing waste tracking codes (J120, K200, N140, N160 and A100).	Default categories for these waste tracking codes have been added.
Acid Sulphate Soils (ASS) appeared to be not classified as either a contaminated soil or a regulated waste under the proposed framework.	The classification of ASS has been clarified within the regulated waste classification framework.

Submissions requested that treated clinical waste should not be classified as a regulated waste noting that once appropriately treated the associated risks are significantly reduced.	The department agrees that clinical waste which has been appropriately treated at a licensed facility to render the waste non-hazardous or non-infectious no longer poses a significant environmental risk and that continuing to classify the material as regulated waste in unnecessary. An exemption has been added for treated clinical waste in Schedule 7, Part 4 – waste that is not a regulated waste.
Submissions requested that the proposed used treated timber exclusions for power poles be expanded to also include other treated timbers. Specifically it was noted that: • treated timbers are commonly used in the built environment • the potential for contaminants from treated timbers to leach into the general environment is low • classifying treated timbers as regulated waste would be impractical and costly as it would potentially require skip bins containing treated timber waste to be managed as regulated waste.	An exemption has been added for waste treated timbers in Schedule 7, Part 4 – waste that is not a regulated waste. The exemption does not include sawdust or shavings derived from treated timbers as they pose a higher level of risk arising from their small particle size, increased mobility and leaching potential. Despite the above exemption, treated timbers are still classified as a general waste and are not suitable for all uses. Facilities storing, processing or disposing of treated timber may still be required to hold a relevant ERA to do so, depending on the nature and scale of the activity.
Submissions requested clarity on how automotive equipment, such as vehicles for wrecking or in-tact or partially dissembled engines, transmissions and associated equipment will be classified. These comments noted that towing of crashed vehicles or transport of the above mentioned components would require a regulated waste transport approval and this would add unnecessary costs and regulatory burden that was not proportionate with the level of risk posed.	The department has noted these concerns and added an exemption for automotive equipment in Schedule 7, Part 4 – waste that is not a regulated waste. This will enable automotive equipment to be transported and received as a general waste. Despite this any wastes, such as oils, coolants or other materials, subsequently removed or drained from the automotive equipment will be subject to regulated waste classification criteria.
Concerns were raised that the proposed default waste categories for some wastes may lead to perverse outcomes in instances where the default waste category for a waste may be lower than the waste category that would be determined if the waste was classified using the sampling and testing method. For example, a waste generator may have a waste that contains high levels of mercury that if tested would meet category 1 categorisation levels. As the default category for mercury is category 2 the generator could instead elect to adopt this lower risk default category, which would not appropriately reflect the risk associated with the waste. In these instances generators of highly concentrated regulated wastes may be discouraged from testing and as a consequence the risks may not be adequately identified and managed. Submissions suggested that the risk was more prevalent for higher risk compounds and that a precautionary approach should be adopted to classify these as default category 1 regulated wastes. The responsibility would then	The department agreed with these comments and following further review has reclassified the following as default category 1 regulated waste: • D170 - Antimony and antimony compounds • D290 - Barium compounds, other than barium sulphate • D130 - Boron compounds • D190 - Copper compounds • M210 - Cyanides • D110 - Inorganic fluorine compounds, other than calcium fluoride • M220 - Isocyanate compounds • D220 - Lead and lead compounds including lead acid batteries • D120 - Mercury and mercury compounds; • J100 - Mineral Oils • D210 - Nickel compounds • M150 - Phenols, phenol compounds including chlorophenols • D240 - Selenium and selenium compounds • D270 - Vanadium compounds • D230 - Zinc Compounds • G100 - Ethers

fall to the waste generator to sample and test their waste to determine a lower category where appropriate.	• M260 - Highly Odorous materials including mercaptans • K140 - Tannery Waste
Submissions requested that guidance on waste sampling, testing and reporting requirements be provided prior to implementation of the new classification framework.	Noted. Sampling, testing and reporting requirements will be developed and clarification provided prior to implementation of the regulated waste classification framework.

3.2 Consultation RIS submission summary - Waste-related ERAs

Consultation RIS ERA	Submission points	Government response
General comments	Many of the ERAs proposed in the consultation RIS include a category for facilities that receive general waste. Submissions noted that the risks associated with general waste streams can vary significantly and that providing a single category for sites receiving general waste did not acknowledge this variance. For example, inert waste streams (such as construction and demolition waste or scrap steel) pose a significantly lower risk than putrescible general waste streams (which have much higher odour and leaching potential) yet both would be regulated equally as a general waste. Submissions requested that further categorisation of general waste was required to allow for improved risk-based regulations.	The department acknowledges these comments and has introduced new ERA threshold categories under ERA54 (mechanical waste processing or treatment), ERA60 (waste disposal) and ERA62 (waste transfer and resource recovery) to delineate between facilities that accept: • only inert waste, such as bricks, pavers, ceramics, concrete, glass, steel or other materials that will not biodegrade over time • non-putrescible waste. This is taken to mean general waste that does not contain food, or other readily decomposable organics and would include wastes such clean paper, cardboard or timber • other putrescible general wastes that do not fall within the definition of inert or non-putrescible waste. The inert and non-putrescible waste categories have a reduced AES and annual fee to reflect that they have a lower risk profile, compared to facilities accepting putrescible or regulated wastes.
ERA53 Organic Material Processing	Submissions noted that anaerobic digestion is already commonly undertaken and appropriately managed at existing ERA63 (sewage treatment plant) facilities. The consultation RIS proposal would require holders of existing ERA63 approvals to obtain a separate approval for ERA53. It was requested that the new ERA53 for anaerobic digestion should not be required in instances where the activity is undertaken in a conjunction with, or ancillary to, a sewage treatment plant licensed under ERA63 as the associated risks are already appropriately managed under the existing ERA63.	An exemption has been added to clarify that approved ERA63 facilities undertaking anaerobic digestion ancillary to their main activity will not require a separate ERA53.
	The consultation RIS proposed to retain the existing 200t per year licensing threshold for composting activities.	Noting these submissions the department has retained the existing 200t per annum licensing exemption, noting that: • the threshold equates to approximately 0.6t per day and presents a low environmental risk

Consultation RIS ERA	Submission points	Government response
	Some submissions requested that all composting activities should be required to hold an approval for ERA53 irrespective of the annual volume of material being received at the site. This would require reducing the current licensing limit from 200t per annum to zero. Submissions to the contrary were also received, requesting that the 200t licensing threshold be maintained on the basis that it presented a low environmental risk.	• removing the threshold would increase the administrative and regulatory burden as a significant number of existing low-risk activities would now require an approval.
	Submissions from the agricultural sector requested exemptions be included for on-farm composting and anaerobic digestion activities. Specifically, attention was drawn to instances where it is more practical for waste from multiple farms to be composted at a single farm and then the composted product redistributed for beneficial on-farm uses. Under the current regulations and also the consultation RIS proposal a farm receiving greater than 200t of waste from an off-site source would be required to obtain an ERA53 approval. Submissions noted that the associated risks can be appropriately managed by the farm and that to continue this approach would add unnecessary cost and regulatory burden and discourage beneficial use of the farm generated wastes.	To address these concerns an exemption has been added to exclude on-farm activities from requiring an ERA53 approval. The exemption applies to organic wastes that are produced, processed and subsequently used for on-farm purposes only. The exemption does not extend to include instances where waste is received from or the composted product is provided to off-farm activities or uses. In cases where a farm receives, processes or provides composted product to off-farm entities an ERA approval will be required consistent with requirements applied to other commercial activities.
	The current regulations broadly limit the types of waste that may be accepted at an ERA53 facility to organic materials only. The consultation RIS proposed that the organic waste stream criteria would be retained for composting activities. Conflicting submissions were received regarding this approach: • Several submissions request that ERA53 acceptance criteria be expanded beyond organic waste to also include inorganic regulated waste streams that are demonstrated to be beneficial to the compost product. • Contrary submissions noted that compost manufactured using inorganic regulated waste streams will have a broader range of potential contaminants that present a higher environmental risk that does not align with the ERA53 risk profile, which assumes organic waste inputs only.	The department considers that it is not appropriate to expand the acceptance criteria beyond organic waste streams for ERA53, for the following reasons: • The risk profile and annual fee for ERA53 is comparatively low as it assumes that only organic waste streams will be accepted under this ERA, • Inorganic regulated waste streams may vary significantly in risk and the ERA53 risk profile does not reflect this. • Permitting potentially higher risk inorganic wastes to be accepted at composting facilities is not consistent with the risk based ERA regulations. To ensure consistent regulation is applied any facility that accepts inorganic regulated waste(s) will be required to hold a processing or treatment ERA relevant to the category of waste being received and the activity being undertaken. This approach will ensure that the potential risks of incorporating inorganic waste material in the compost product can be assessed and regulated accordingly.
	It was noted that specifying the purpose in the composting definition i.e. "***composting*** *refers to the process in which microorganisms break down*	The department agreed that this presents a potential loophole and that the associated environmental risks remains the same,

Consultation RIS ERA	Submission points	Government response
	organic material for the purpose of producing compost or soil conditioners" creates a loophole where a site could compost organic material but argues the intention is not to produce compost or soil conditioners and therefore does not require an ERA.	irrespective of the purpose that the activity is being undertaken for. To address this issue the definition has been updated and no longer makes reference to a specific purpose.
	Submitters did not support the proposed annual fee increase for composting activities noting that it did not reflect the risk associated with the activity.	The AES and associated annual fee published in the consultation RIS was due to a transpositional error and has been corrected. The corrected AES is 18 (reduced from 26 as published in the consultation RIS). This equates to an annual fee of $4,716 which is the same fee as under the current regulations. It is also consistent with annual fees for other similar activities under the risk based framework.
ERA55 Waste processing or treatment	Submissions noted the proposed ERA55 did not take into account the scale of the activity, meaning that small and large scale operators will be subject to the same annual fee. Submissions requested separate thresholds should be included to reflect the difference in risk between small, medium and large scale activities.	New scale based thresholds have been introduced. Each new ERA includes tonnage based annual thresholds for processing or treating: • up to 5,000t per annum (small) • 5,000t to 10,000t per annum (medium) • greater than 10,000t per annum (large) Given the extra complexity and number of categories required to account for the increased thresholds ERA55 has been split into the following three separate ERAs: • ERA54 Mechanical waste processing or treatment • ERA55 Other waste processing or treatment • ERA61 Thermal waste processing or treatment
	Under the current regulations crushing, milling, grinding or screening of greater than 5,000t per annum of non-putrescible waste requires an ERA33 approval. The consultation RIS proposed that these activities would be captured under ERA55 (waste processing or treatment) and that: • the 5,000t licensing threshold for these types of activities would be removed; and • processing of any type of general waste, irrespective of whether the waste was inert (lower risk) or putrescible (higher risk), would require an approval for the same ERA. Industry submissions did not support the proposed change as it would result in an increase in annual fee for holder of existing ERA33 approvals that was not commensurate with the level of environmental risk posed.	Crushing, milling, grinding or screening of waste is now captured under ERA54 (mechanical waste processing or treatment). This ERA includes a separate lower risk category for processing greater than 5,000t per annum of non-putrescible waste or green waste. This is consistent with the same waste streams currently permitted to be processed under existing ERA33. The AES proposed in consultation RIS has been reduced from has been reduced from 21 ($5,502) to 8 ($2,096) to reflect the reduced level of risk. While this still represents an increase over the existing ERA33 annual fee (which is $652) the new annual fee is:

Consultation RIS ERA	Submission points	Government response
		• consistent with annual fees for other activities that involve similar processes and waste under the risk based framework; and • only marginally higher than the annual fee of $1,572 for an ERA62 (waste transfer and resource recovery facility) that receives the same type of waste and undertakes no processing (and therefore has reduced potential for noise, dust or other amenity impacts). This will not apply to persons processing non-waste materials or clean earth, which will continue to be regulated under ERA33.
	Waste industry body submissions did not support the proposed 5,000t licensing threshold for mechanical processing of putrescible general wastes. These submissions noted that the current 5,000t limit included within ERA33 only applies to non-putrescible wastes and requested that this should not be expanded to include all putrescible waste streams (other than green waste) as they have increased environmental risks and potential to impact upon community amenity.	The 5,000t licensing lower limit has been removed for wastes other than inert waste or green waste (as discussed in the previous comment). All commercial operations mechanically processing putrescible waste will require an ERA54 approval. The new ERA54 annual fees range between $4,978 (small facilities), $6,550 (medium facilities) to $8,122 (large facilities). Under the current regulatory framework this type of activity requires ERA62 (waste transfer station) which as an AES of 31 ($8,122). The new ERA structure results in an annual fee reduction for small and medium scale activities.
	Regulatory clarity was requested regarding whether oily water separation and dewatering activities would be considered processing. These submissions suggested that oily water separation processes do not sufficiently process or recycle the oil into a product and therefore these types of activities should be considered resource recovery only and therefore be regulated under the proposed ERA62 (waste transfer and resource recovery).	Noted. ERA62 Waste transfer and resource recovery is intended to capture low risk sorting, dismantling and storage activities and does not account for the higher level of risk associated with liquid wastes. The requirement to hold a new processing or treating ERA will be determined based on risks associated with the waste being received and process being undertaken. This requirement is irrespective of whether the outcome is to treat, produce a product or recover resources for further processing. Processing or treatment of liquid wastes, irrespective of the proposed outcome, will generally require either ERA55 (other waste processing or treatment) or ERA61 (thermal waste processing or treatment) depending on the type of process used.
	It was requested that separate risk-based thresholds be provided for treating clinical and related waste, on the basis that:	The department has acknowledged these comments and included separate lower risk thresholds within ERA55 (other waste

Consultation RIS ERA	Submission points	Government response
	• treatment is required to render the material non-infectious and suitable for disposal • the treatment process required is specified in regulation and no other methods can be used • the risks associated with autoclaving of clinical and related waste are well known and present a lower risk than processing of other category 1 regulated wastes.	processing or treatment) and ERA61 (thermal waste processing or treatment) for treating clinical and related waste.
	The proposed vehicle based licensing fee for regulated waste transport was universally supported. Comments noted that it would be particularly beneficial for small or single vehicle operations where the annual fee would reduce from $1,834 per annum to $262.	Noted.
ERA57 Waste transport	The consultation RIS proposed that transport of general waste would be included as an ERA. Unlike the regulated waste transport provisions, the general waste transport provisions proposed that a single fixed fee (irrespective of the number of vehicles on operation) would apply. This provision was proposed to ensure that all commercial waste transport activities were subject to the same level of regulation and performance standards. Submissions from industry and local government generally supported the proposed provisions, providing they did not result in an unreasonable increase in administrative burden or cost.	The general waste transport provisions have been removed from ERA57. An internal review of the proposal undertaken by the department indicated that the inclusion of the general waste transport provisions in the ERA framework could not be practically implemented on the following grounds: • Existing regulated waste transport approvals have a high turnover rate, where operators undertake the activity for short periods before exiting the sector. • Unlike car registration, for example, the ERA licensing framework does not allow an approval to lapse if fees are not paid. • In these instances the department is required to undertake a disproportionate amount of administrative effort to follow up the operator to ensure outstanding annual fees are paid and approvals are surrendered. • The inclusion of general waste transport may potentially result in excess of 1000 new ERA approvals, creating a significant increase in administrative burden, both in issuing and surrendering approvals. The administrative cost burden to both the department and industry cannot be justified for an activity that poses a relatively low environmental risk. Despite the above the department recognises the need to include licensing requirements for general waste transport and instead of introducing an ERA proposes to develop, in consultation with industry, similar and more easily administered provisions

Consultation RIS ERA	Submission points	Government response
		potentially under the *Waste Reduction and Recycling Act 2011* or its subordinate legislation. This work is not within the scope of the waste-related ERA review and will be undertaken as an immediate priority following completion of the ERA review.
	The existing ERA57 (regulated waste transport) only applies to commercial waste transport activities. This requirement was also proposed in the consultation RIS waste transport provisions. Submissions requested further clarity be provided as to make clear what commercial transport was intended to include.	To remove any doubt references to the commercial nature of the activity have been removed from the ERA and an exclusion for 'self-haul transport' of waste has been included. This will require all transport of regulated waste, other than for waste generated at a domestic premises and transported by or on behalf of the person who generated the waste, to require an ERA approval.
ERA60 Waste disposal	Industry and local government do not support the proposed increases in annual fees for waste disposal activities, noting that unlike other activities the ERA thresholds for waste disposal had not been altered and therefore the risk should remain the same.	In undertaking the review the department completed a new risk assessment for all waste related activities, which had not been updated since 2008. The department has noted these comments and has reconsidered the risk profile for waste disposal activities. This has resulted in a decrease in AES for all ERA60 thresholds. Please refer to table 5 for the updated fees.
	Submissions requested that the 50t per annum licensing threshold for disposal of general waste under ERA60(2)(a) be removed to ensure that all commercial waste disposal activities require an ERA and operate to the same performance standards. Specifically the comments suggested that activities of this nature can quickly and easily exceed the 50t limit and without any regulatory oversight have the potential to cause environmental harm.	The 50t licensing threshold for 60(2)(a) has been removed and all waste disposal activities will require an ERA60. This will ensure that all commercial waste disposal activities are subject to the same licensing requirements and performance standards. This requirement will also improve the ability for the administering authority to make licensing requirement determinations as evidence of exceedance of the 50t threshold will no longer be required, which can be challenging at small unlicensed facilities that do not have a weighbridge and are also not required to keep records.
	Submissions suggest the proposed annual fee for closed landfills was too high and not commensurate with the environmental risks posed by a closed facility or ongoing administrative and compliance costs incurred by the administering authority.	The department has noted these concerns and the risks associated with closed landfill has been reconsidered. This has resulted in an AES reduction from 17 ($4,454) to 9 ($2,358).
	Submissions supported the proposed closed landfill category however sought clarity as to when this provision would apply.	Clarification has been included within the ERA. This states that for a waste disposal facility to be considered to be in post closure care it must:

Consultation RIS ERA	Submission points	Government response
		• be closed and no longer accepting waste for the purpose of disposal • have had final capping installed in accordance with the requirements of the relevant Environmental Authority • be undergoing rehabilitation.
	Submissions requested separate thresholds for disposal of inert or lower risk general waste streams noting that the general waste description used was too broad and did not take into account the lower risk associated with inert, non-putrescible wastes. For example, inert material such as bricks, pavers and concrete do not biodegrade, reducing the overall risk as they have minimal potential to cause odour, leachate or landfill gas.	The department acknowledges that disposal of inert waste represents a lower environmental risk and has included additional thresholds for these types of waste. The annual fee associated with the inert waste category thresholds reflect a lower level of environmental risk. Inert waste is taken to include materials such as bricks, pavers, ceramics, concrete, glass, steel or other materials that will not biodegrade over time.
	Submissions supported the proposed definition of 'clean earth' to replace the current definition of 'clean earthen material'. This change will prevent disposal of contaminated construction and demolition waste without a relevant approval. Industry noted that the amended definition will provide the industry with regulatory certainty in the form of an even commercial playing field.	Noted.
	Local government did not support reducing the licensing threshold for waste transfer station activities to 2500t or 2500m^3 per annum. Previously this was 30t or 30m^3 per day. Information provided suggested this could result in a significant increase in the number of low-risk local government facilities that would require an approval.	The proposed threshold reduction was based on annual waste volumes received at a number of small regional council facilities. Consultation feedback indicated that these figures are not indicative of the number of existing small-scale council facilities that would potentially exceed this limit and therefore require an approval. To address this the department has increased the exemption for local government facilities to 11,000t or 11,000m^3 per year. This is equivalent to 30t or 30m^3 per day under the current ERA62 regulations. An annual threshold value has been adopted as it better allows for day-to-day tonnage fluctuations that could on occasion exceed a daily limit and trigger the need to obtain an approval.
ERA62 Waste transfer and resource recovery facility	Submissions strongly supported the removal of the 30t or 30m^3 licensing threshold for commercial waste transfer activities noting that it will provide the industry with regulatory certainty in the form of an even commercial playing field.	Noted.

Consultation RIS ERA	Submission points	Government response
	Local government requested an exemptions for temporary transfer activities resulting from storm clean-up or natural disaster events.	The department acknowledges that following a natural disaster clean up may result in temporary exceedances of storage limits and that this should not trigger the requirement for an ERA. An exemption was added for temporarily storing disaster management waste during a disaster recovery and clean up period.
	The Department of Transport and Main Roads (TMR) requested exemptions be included for government entities and their agents. TMR depots have the potential to temporarily exceed the proposed exemption limits, as a result of maintenance works or roadside abandonment clean-up activities.	Exemption limits have been increased from: • 4t to 6t (general waste) • 2t to 4t (category 2 regulated waste). Additionally, waste stored at a depot in accordance with *in-transit storage* conditions is not counted towards the above limits. The proposed storage limit exemptions may mean that some small scale and low risk storage activities will no longer require an approval, reducing the costs to these operators.

	Industry requested that maximum volume or tonnage limits be applied to waste stored at retail premises or in accordance with product stewardship or take back scheme to minimise the likelihood of these exemptions being abused.	Noted. Limits have been included to:
		• Restrict waste that is being stored in accordance with a product stewardship scheme to a maximum of 28 days; and
		• Limit the maximum storage of waste at a retail premises to:
		  ○ 6t or 6m^3 of general waste;
		  ○ 4t or 4m^3 of category 2 regulated waste; or
		  ○ 1t or 3m^3 of category 1 regulated waste.

	The proposed tyre storage regulations that will require sites storing greater than 4t or 500 equivalent passenger tyre units obtain an ERA approval received broad general support.	Noted.
	There was broad support for the removal of ERA56 (regulated storage) and incorporation of waste storage activities under the waste transfer ERA. These comments noted that waste should not be stored indefinitely and only on a temporary basis until it is sent for treatment, processing, recycling or disposal.	Noted.
	Industry submissions did not support the proposed ERA and annual fee increases for existing ERA20 metal recovery activities on the following grounds:	The risk profile associated with dismantling and recovery of scrap steel has been reconsidered and this activity is now included in the

Consultation RIS ERA	Submission points	Government response
	• Recovery of scrap steel presented a low environmental risk that was not considered consistent with the proposed AES; • Other waste streams that posed a similar level of risk had a lower annual fee; • The annual fee as proposed in the consultation could impact the viability of existing operators in the sector.	lowest risk ERA62 threshold.. This reduces the proposed annual fee from $3,668 (AES 14) to $1,572 (AES 6). While this still represents an increase over the existing ERA20 annual fee (which is $652) it is consistent with the annual fee for other similar activities under the risk based framework.

4.0 Updated regulated waste classification framework

4.1 Schedule 7, Part 1 - Default waste categorisation table

Waste (tracking) code	Waste description	Default waste category
D170	Antimony and antimony compounds	1
D130	Arsenic and arsenic compounds	1
D290	Barium compounds, other than barium sulfate	1
D160	Beryllium and beryllium compounds	1
D310	Boron compounds	1
D150	Cadmium and cadmium compounds	1
T100	Chemical waste arising from research and development or teaching activity, including new or unidentified material and material whose effects on human health or the environment are not known	1
D350	Chlorates	1
D140	Chromium compounds (hexavalent and trivalent)	1
R100	Clinical and related wastes	1
D190	Copper compounds	1
A130	Cyanides (inorganic)	1
M210	Cyanides (organic)	1
G100	Ethers	1
N190	Filter cake, other than filter cake waste generated from the treatment of raw water for the supply of drinking water	1
N140	Fire debris and washwaters	1
N150	Fly ash	1
G150	Halogenated organic solvents	1
M260	Highly odorous organic chemicals including mercaptans and acrylates	1
D110	Inorganic fluorine compounds, other than calcium fluoride	1
M220	Isocyanate compounds	1
D220	Lead and lead compounds	1
M100	Material containing polychlorinated biphenyls (PCBs), polychlorinated napthalenes (PCNs), polychlorinated terphenyls (PCTs) or polybrominated biphenyls (PBBs)	1
D120	Mercury and mercury compounds	1
D100	Metal carbonyls	1
D210	Nickel compounds	1
H110	Organic phosphorus compounds	1
G110	Organic solvents other than halogenated solvents, including, for example, ethanol	1
M160	Organohalogen compounds, other than another substance stated in this schedule	1
-	Oxidising agents	1
D340	Perchlorates	1
R120	Pharmaceuticals, drugs and medicines	1

M150	Phenols, phenol compounds including chlorophenols	1
M170	Polychlorinated dibenzo-furan (any congener)	1
M180	Polychlorinated dibenzo-p-dioxin (any congener)	1
-	Quarantine waste	1
N205	Residues from industrial waste treatment or disposal operations	1
D240	Selenium and selenium compounds	1
K140	Tannery wastes, including leather dust, ash, sludges and flours	1
J160	Tarry residues arising from refining, distillation or any pyrolytic treatment	1
M270	Total fluorinated organic compounds	1
D270	Vanadium compounds	1
A110	Waste from a heat treatment or tempering operation that uses cyanides	1
H100	Waste from manufacture, formulation and use of biocides or phytopharmaceuticals	1
G160	Waste from manufacture, formulation and use of organic solvents	1
F110	Waste from manufacture, formulation and use of resins, latex, plasticisers, glues or other adhesives	1
H170	Waste from manufacture, formulation and use of wood-preserving chemicals	1
R140	Waste from the production and preparation of pharmaceutical products	1
E120	Waste of an explosive nature other than explosives within the meaning of the Explosives Act 1999	1
D230	Zinc compounds	1
B100	Acidic solutions and acids in solid form	2
K100	Animal effluent and residues, including abattoir effluent and poultry and fish processing wastes	2
N220	Asbestos	2
C100	Basic (alkaline) solutions and bases (alkalis) in solid form	2
N160	Encapsulated, chemically fixed, solidified or polymerised wastes	2
K200-	Food processing waste (other than liquid food processing waste)	2
K110	Grease trap waste	2
D330	Inorganic sulfides	2
D220	Lead acid batteries (intact)	2
K200	Liquid food processing waste	2
J100	Mineral oils	2
D300	Non-toxic salts, for example, saline effluent	2
J120	Oil and water mixtures or emulsions, or hydrocarbons and water mixtures or emulsions	2
D360	Phosphorus compounds, other than mineral phosphates	2
K130	Sewage sludge and residues, including nightsoil and septic tank sludge	2
M250	Surface active agents (surfactants), containing principally organic constituents, whether or not also containing metals and other inorganic materials	2
D250	Tellurium and tellurium compounds	2

D180	Thallium and thallium compounds	2
M230	Triethylamine catalysts for setting foundry sands	2
T140	Tyres	2
-	Vegetable oils	2
E100	Waste containing peroxides other than hydrogen peroxide	2
F100	Waste from the manufacture, formulation or use of : inks, dyes, pigments, paints, lacquers or varnish	2
T120	Waste from the manufacture, formulation or use of photographic chemicals or processing materials	2
A100	Waste from surface treatment of metals or plastics	2
K190	Wool scouring wastes	2

4.2 Schedule 7, Part 2 - Solid waste hazard parameter waste categorisation table

Hazard parameter	CAS Registry No.	Revised criteria		
		NR Upper Threshold (mg/kg)	Category 2 Upper Threshold (mg/kg)	Category 1 (mg/kg)
Inorganic Species				
Antimony	**7440-36-0**	9	36	>36
Arsenic	**7440-38-2**	300	1,200	>1,200
Barium	**7440-39-3**	4,500	18,000	>18,000
Beryllium	**7440-41-7**	90	360	>360
Boron	**7440-42-8**	20,000	80,000	>80,000
Cadmium	**7440-43-9**	90	360	>360
Chromium (VI)	**18540-29-9**	300	1,200	>1,200
Copper	**7440-50-8**	220	880	>880
Lead	**7439-92-1**	300	1,200	>1,200
Mercury	**7439-97-6**	80	320	>320
Molybdenum	**7439-98-7**	117	468	>468
Nickel	**7440-02-0**	1,200	4,800	>4,800
Selenium	**7782-49-2**	700	2,800	>2,800
Silver	**7440-22-4**	117	468	>468
Vanadium	**7440-62-2**	117	468	>468
Zinc	**7440-66-6**	400	1,600	>1,600
Anions				
Cyanide (total)	**57-12-5**	240	960	>960
Fluoride	**16984-48-8**	930	3,720	>3,720
Organic Species				
Petroleum hydrocarbons				
C6-C9 petroleum hydrocarbons		950	3,800	>3,800
C10-C36 petroleum hydrocarbons		5,300	21,200	>21,200
Polycyclic aromatic hydrocarbons				
Benzo(a)pyrene	**50-32-8**	3	12	>12
Polycyclic aromatic hydrocarbons (PAHs) (total)[2]		300	1,200	>1,200
Monocyclic aromatic hydrocarbons				
Benzene	**71-43-2**	5	20	>20
Toluene	**108-88-3**	1,470	5,880	>5,880
Ethylbenzene	**100-41-4**	17	68	68
Xylenes (total)	**1330-20-7**	174	696	>696
Styrene (vinyl benzene)	**100-42-5**	1,800	7,200	>7,200
Chlorinated hydrocarbons				

Hazard parameter	CAS Registry No.	Revised criteria		
		NR Upper Threshold (mg/kg)	Category 2 Upper Threshold (mg/kg)	Category 1 (mg/kg)
Carbon tetrachloride	**56-23-5**	2	**8**	>8
Chlorobenzene	**108-90-7**	84	336	>336
Chloroform	**67-66-3**	1	4	>4
1,2-Dichlorobenzene	**95-50-1**	540	2,160	>2,160
1,4-Dichlorobenzene	**106-46-7**	8	32	>32
1,2-Dichloroethane	**107-06-2**	1	6	>6
1,1-Dichloro- ethylene	**75-35-4**	69	276	>276
Dichloromethane (methylene chloride)	**75-09-2**	105	420	>420
1,1,1,2-Tetrachloroethane	**630-20-6**	6	24	>24
1,1,2,2-Tetrachloroethane	**79-35-5**	6	24	>24
Tetrachloroethylene	**127-18-4**	24	96	>96
1,1,1-Trichloroethane	**71-55-6**	2,430	9,720	>9,720
1,1,2-Trichloroethane	**79-00-5**	0.45	1.8	>1.8
Trichloroethylene	**79-01-6**	1	5	>5
Vinyl chloride	**75-01-4**	0.18	0.72	>0.72
Phenols				
2,4,5-Trichlorophenol	**95-95-4**	1,890	7,560	>7,560
2,4,6-Trichlorophenol	**88-06-2**	19	76	>76
Cresol (total)[3]		4,000	16,000	>16,000
Phenols (total)[3]		40,000	160,000	>160,000
Nitroaromatics and ketones				
2,4 -Dinitrotoluene	**121-14-2**	5	20	>20
Nitrobenzene	**98-95-3**	15	60	>60
Methyl ethyl ketone	**78-93-3**	8,100	32,400	>32,400
Specific Persistent Organic Pollutants (POPs)				
2,4-D	**94-75-7**	210	840	>840
Aldrin + dieldrin		10	40	>40
Organochlorine pesticides[4]		50	200	>200
Organophosphate pesticides[4]		250	1,000	>1,000
Polychlorinated biphenyls (PCBs)	**1336-36-3**	2	50	>50
Perfluorooctanesulfonic acid (PFAS)	**1763-23-1**	Not present	n/a	Present[5]
Any other ratified Stockholm – POP7[6]		50	200	>200
Properties / other				
pH		6-10.5	2-6 or 10.5-12.5	<2 or >12.5
Asbestos above 0.01% (w/w)		Not Present	Present	n/a
Wastes for which testing is not relevant				

Hazard parameter	CAS Registry No.	Revised criteria		
		NR Upper Threshold (mg/kg)	Category 2 Upper Threshold (mg/kg)	Category 1 (mg/kg)
Chemical waste arising from research and development or teaching activity, including new or unidentified material and material whose effects on human health or the environment are not known		Not Present	Present	n/a
Clinical and related waste[7]		Not Present	n/a	Present
Oxidising agents		Not Present	n/a	Present
Pharmaceuticals, drugs and medicines		Not Present	n/a	Present
Waste from the production and preparation of pharmaceutical products		Not Present	n/a	Present
Waste of an explosive nature other than explosives within the meaning of the *Explosives Act 1999*		Not Present	n/a	Present
Quarantine waste		Not present	n/a	Present

4.3 Schedule 7, Part 3 - Liquid waste hazard parameter waste categorisation table

Hazard parameter	CAS Registry No.	Revised criteria
		NR Upper Threshold (µg/L)
Inorganic Species		
Antimony	**7440-36-0**	60
Arsenic	**7440-38-2**	200
Barium	**7440-39-3**	40,000
Beryllium	**7440-41-7**	1,200
Boron	**7440-42-8**	3,700
Cadmium	**7440-43-9**	2
Chromium (VI)	**18540-29-9**	10
Copper	**7440-50-8**	14
Lead	**7439-92-1**	34
Mercury	**7439-97-6**	6
Molybdenum	**7439-98-7**	1,000
Nickel	**7440-02-0**	110
Selenium	**7782-49-2**	110
Silver	**7440-22-4**	1
Vanadium	**7440-62-2**	172
Zinc	**7440-66-6**	30
Anions		
Cyanide (amenable)	**57-12-5**	70
Fluoride	**16984-48-8**	30,000
Organic Species		
Petroleum hydrocarbons		
Sum of Total Recoverable Hydrocarbons (TRH)		6000
Polycyclic aromatic hydrocarbons		
Benzo(a)pyrene	**50-32-8**	0.20
Polycyclic aromatic hydrocarbons (PAHs) (total)		0.20
Monocyclic aromatic hydrocarbons		
Benzene	**71-43-2**	20
Toluene	**108-88-3**	16,000
Ethylbenzene	**100-41-4**	6,000
Xylenes (total)	**1330-20-7**	12,000
Styrene (vinyl benzene)	**100-42-5**	600
Chlorinated hydrocarbons		
Carbon tetrachloride	**56-23-5**	60
Chlorobenzene	**108-90-7**	6,000

Hazard parameter	CAS Registry No.	Revised criteria
		NR Upper Threshold (µg/L)
Chloroform	**67-66-3**	4
1,2-Dichlorobenzene	**95-50-1**	30,000
1,4-Dichlorobenzene	**106-46-7**	800
1,2-Dichloroethane	**107-06-2**	60
1,1-Dichloro- ethylene	**75-35-4**	500
Dichloromethane (methylene chloride)	**75-09-2**	220
1,1,1,2-Tetrachloroethane	**630-20-6**	11
1,1,2,2-Tetrachloroethane	**79-35-5**	2
Tetrachloroethylene	**127-18-4**	82
1,1,1-Trichloroethane	**71-55-6**	16,000
1,1,2-Trichloroethane	**79-00-5**	0.82
Trichloroethylene	**79-01-6**	6
Vinyl chloride	**75-01-4**	6
Phenols		
2,4,5-Trichlorophenol	**95-95-4**	2,400
2,4,6-Trichlorophenol	**88-06-2**	200
Cresols (total)[2]		3,000
Phenols (total) [2]		11,600
Nitroaromatics and ketones		
2,4 -Dinitrotoluene	**121-14-2**	5
Nitrobenzene	**98-95-3**	3
Methyl ethyl ketone	**78-93-3**	11,200
Specific Persistent Organic Pollutants (POPs)		
2,4-D	**94-75-7**	600
Aldrin + dieldrin		6
Organochlorine pesticides[3]		0.00011
Organophosphate pesticides[3]		0.035
Polychlorinated biphenyls (PCBs)	**1336-36-3**	0.00074
Perfluorooctanesulfonic acid (PFAS)	**1763-23-1**	Not present
Any other ratified Stockholm – POP7		-
Properties / other		
pH		6.5-9
Conductivity (Electrical) (mg/L)		<1,200
Biological oxygen demand (BOD) (mg/L)		<15
Flash point (°C)		<60.0 and/or contains more than 24% v/v alcohol.
Peroxides (other than hydrogen peroxide) above 0.01% (v/v)		Not Present
Asbestos above 0.01% (w/w)		Not Present

4.4 Schedule 7, Part 4 - Waste that is not regulated waste

1 Intact or partly disassembled televisions
2 Intact or partly disassembled electronic equipment designed to be used with a television, including video players, DVD players, games units and set-top boxes
3 Intact or partly disassembled computers, including desktop computers, notebook computers, laptop computers and tablets
4 Intact or partly disassembled equipment designed to be used with computers, including keyboards, mouses, hard drives, scanners, printers, multi-function devices, speakers and web cameras
5 Intact or partly disassembled internal computer components, including network or graphics cards, motherboards and optical drives
6 Intact or partly disassembled automotive equipment, including vehicles, engines, transmissions and differentials
7 Mobile phones and mobile phone accessories, including chargers
8 Batteries typically used in small electronic devices or handheld devices such as mobile phones, digital cameras, keyboards, toys and torches
9 Whitegoods
10 Used treated timber excluding sawdust or shavings
11 Groundwater or treated groundwater necessarily or unavoidably brought to the surface of the earth as part of an industrial process, if the groundwater - • has a pH of at least 6 but not more than 10.5; and • has an electrical conductivity of less than 15,000 micro-Siemens a centimetre.
12 Tallow
13 Treated clinical and related waste
14 Waste architectural and decorative paints collected, stored and transported in accordance with a product stewardship, unless the paint - • is a bagged render • is texture coating • contains isocyanates • is paint stripper • is an industrial paint • is anti-fouling paint.
15 Containers of waste architectural and decorative paints mentioned in item 14 that are collected, stored and transported in accordance with a product stewardship, unless the paint is in a spray pack

5.0 Updated Waste Related ERAs

53 Organic material processing

(1) Organic material processing (the ***relevant activity***) consists of operating a facility that receives greater than 200 tonnes of organic material in a year for composting or anaerobic digestion

(2) The relevant activity does not include undertaking -
  (a) composting or anaerobic digestion where the -
    (i) organic material is generated from agriculture or livestock production activities;
    (ii) organic material is composted on a site where agricultural or livestock production activities are carried out;
    (iii) composted product is provided for subsequent use on a site where agricultural or livestock production activities are carried out; and
    (iv) organic material is received and any product produced is provided without fee or charge.
  (b) anaerobic digestion at a facility to which section 63 applies

(3) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the activity is carried out.

Threshold	**AES**	**3**
1 processing organic material by -		
(a) composting	18	C
(b) anaerobic digestion	16	C

(4) In this section—
organic material is material that is comprised of plant or animal material, or wastes derived through the processing such materials. To remove any doubt, such material includes organic waste.
organic waste —
  (a) includes the following, or an organic waste of similar characteristics:
    (i) a substance used for manufacturing fertiliser for agricultural, horticultural or garden use;
    (ii) animal manure;
    (iii) biosolids;
    (iv) cardboard and paper waste;
    (v) fish processing waste;
    (vi) food and food processing waste;
    (vii) green waste;
    (viii) poultry processing waste;
    (ix) waste generated from an abattoir; but
  (b) to remove any doubt, organic waste does not include any of the following:
    (i) clinical or related waste;
    (ii) quarantine waste regardless of its composition;
    (iii) any synthetic or artificially synthesised compound, chemical or substance, regardless of its composition;
    (iv) contaminated soil regardless of its composition.

anaerobic digestion refers to the process in which microorganisms break down organic material in the absence of oxygen.
composting refers to the process in which microorganisms break down organic material.

54 Mechanical waste processing or treatment

(1) Mechanical waste processing or treatment (the ***relevant activity***) consists of operating a facility that receives and processes or treats waste or contaminated soil using mechanical processes

(2) The relevant activity does not include -
  (a) baling or compacting clean paper, cardboard, aluminium cans or plastics;
  (b) processing or treating liquid waste; or
  (c) processing clean earth

(3) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the activity is carried out.

Threshold	**AES**	**3**
1 mechanically processing or treating, in a year, more than 5,000t of non-putrescible waste or green waste	8	
2 mechanically processing or treating, in a year, the following quantity of general waste -		

(a) up to 5,000t	19	C
(b) more than 5,000t but less than 10,000t	25	C
(c) 10,000t or more	31	C
3 mechanically processing or treating, in a year, the following quantity of category 2 regulated waste -		
(a) up to 5,000t	29	C
(b) more than 5,000t but less than 10,000t	43	C
(c) 10,000t or more	56	C
4 mechanically processing or treating, in a year, the following quantity of category 1 regulated waste -		
(a) up to 5,000t	32	C
(b) more than 5,000t but less than 10,000t	50	C
(c) 10,000t or more	73	C

(4) In this section—
mechanical processing, in relation to waste, includes using processes such as crushing, milling, grinding, shredding or other mechanised sorting or processing equipment
Examples –
shredding tyres, operating a trommel, glass imploder, concrete crusher or green waste shredder

55 Other waste processing or treatment

(1) Other waste processing or treatment (the ***relevant activity***) consists of operating a facility that receives and processes or treats waste or contaminated soil using processes other than those defined in sections 53, 54, 61 or 62

(2) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the activity is carried out.

Threshold	**AES**	**3**
1 otherwise processing or treating, in a year, the following quantity of general waste -		
(a) up to 5,000t	28	C
(b) more than 5,000t but less than 10,000t	39	C
(c) 10,000t or more	48	C
2 otherwise processing or treating, in a year, the following quantity of category 2 regulated waste -		
(a) up to 5,000t	38	C
(b) more than 5,000t but less than 10,000t	52	C
(c) 10,000t or more	65	C
3 otherwise processing or treating, in a year, the following quantity of category 1 regulated waste -		
(a) up to 5,000t	46	C
(b) more than 5,000t but less than 10,000t	64	C
(c) 10,000t or more	82	C
4 otherwise treating clinical quarantine waste	46	C

(3) In this section—
otherwise processing or treating, in relation to waste, means processing or treating using methods other than those defined in sections 53, 54, 61 or 62
Examples—
Bioremediation, chemical fixation, microwave or autoclave

57 Waste transport

(1) Waste transport (the ***relevant activity***) consists of transporting regulated waste in a vehicle

(2) The relevant activity does not include –

(a) transport of up to 175kg of asbestos;

(b) self-haul transport of up to 250kg of regulated waste

(3) In the following table, the aggregate environmental score (AES), if any, for the relevant activity is the score stated opposite the threshold within which the relevant activity is carried out.

Threshold	**AES**	**3**
1 transporting end-of-life tyres	2	
2 transporting regulated waste	1	

(4) In this section—

vehicle includes the part of an aircraft, boat, rolling stock, semi-trailer, tanker, trailer or truck, used to transport waste

self-haul transport means waste transported from a domestic or commercial premises by or on behalf of the occupier of the premises who generated the waste where there is no fee charged or reward provided or gained for the transport of the waste

60 Waste disposal

(1) Waste disposal (the relevant activity) consists of only one of the following—

(a) operating a facility for disposing of:

(i) regulated waste; or

(ii) regulated waste and any, or any combination, of the following—

(A) general waste;

(B) limited regulated waste;

(C) if the facility is in a scheduled area—no more than 5t of untreated clinical waste in a year;

(b) operating a facility for disposing of:

(i) only general waste; or

(ii) general waste and either, or a combination, of the following—

(A) a quantity of limited regulated waste that is no more than 10% of the total amount of waste received at the facility in a year;

(B) if the facility is in a scheduled area—no more than 5t of untreated clinical waste.

(c) operating a facility for disposing of inert waste only

(d) maintaining a waste disposal facility in post closure care

(2) The relevant activity does not include using clean earth as fill.

(3) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the relevant activity is carried out.

Threshold	**AES**	**3**
1 operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(a)—		
(a) Less than 50,000t	65	C
(b) More than 50,000t but not more than 100,000t	92	C
(c) More than 100,000t but not more than 200,000t	116	C
(d) More than 200,000t	119	C
2 operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(b)—		
(a) Less than 2,000t	18	C
(b) More than 2,000t but not more than 5,000t	27	C
(c) More than 5,000t but not more than 10,000t	37	C
(d) More than 10,000t but not more than 20,000t	45	C
(e) More than 20,000t but not more than 50,000t	56	C
(f) More than 50,000t but not more than 100,000t	65	C
(g) More than 100,000t but not more than 200,000t	82	C
(h) More than 200,000t	107	C
3 operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(c)—		
(a) Less than 50,000t	28	C
(b) More than 50,000t but not more than 100,000t	35	C
(c) More than 100,000t but not more than 200,000t	40	C

(d) More than 200,000t	50	C
4 maintaining a waste disposal facility in post closure care	9	

(4) In this section—

clean earth means natural material such as clay, gravel, sand, soil or rock that is not contaminated with waste or otherwise contaminated with a hazardous contaminant

facility includes a naturally occurring or constructed hollow or pit, including, for example, a gully, mining shaft, quarry, but does not include a hollow or pit on a farm used for receiving and disposing of general waste produced on the farm

inert waste means bricks, pavers, ceramics, concrete, glass, steel or other material that will not biodegrade over time

post closure care refers to a waste disposal facility that is closed, is no longer accepting waste for the purpose of disposal, has had final capping installed in accordance with the requirements of the relevant Environmental Authority and is undergoing rehabilitation

regulated waste for the purpose of this section includes category 1 and 2 regulated waste

61 Thermal waste processing or treatment

(1) Thermal waste processing or treatment (the ***relevant activity***) consists of operating a facility that receives and processes or treats waste or contaminated soil using thermal processes

(2) The relevant activity does not include burning of waste authorised under the *Fire and Emergency Services Act 1990*

(3) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the activity is carried out

Threshold	**AES**	**3**
1 thermally processing or treating, in a year, the following quantity of general waste -		
(a) up to 5,000t	33	C
(b) more than 5,000t but less than 10,000t	39	C
(c) 10,000t or more	45	C
2 thermally processing or treating, in a year, the following quantity of category 2 regulated waste -		
(a) up to 5,000t	43	C
(b) more than 5,000t but less than 10,000t	57	C
(c) 10,000t or more	70	C
3 thermally processing or treating, in a year, the following quantity of category 1 regulated waste -		
(a) up to 5,000t	51	C
(b) more than 5,000t but less than 10,000t	69	C
(c) 10,000t or more	87	C
4 thermally treating clinical or quarantine waste	51	C

(4) In this section—

thermal waste processing or treatment, in relation to waste, means applying heat to the waste that results in a change in its chemical composition

Examples –

gasification, pyrolysis, plasma arc or an incineration facility

62 Waste transfer and resource recovery facility

(1) Resource recovery and transfer facility (the *relevant activity*) consists of operating a facility that receives waste for sorting, dismantling or baling waste.

(2) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the activity is carried out.

Threshold	**AES**	**3**
1 sorting, dismantling, baling or storing -		
(a) inert waste, non-putrescible waste, scrap steel or green waste	6	
(b) general waste	14	C
(c) category 2 regulated waste	26	C
(d) category 1 regulated waste	35	C
2 sorting, baling or storing end-of-life tyres	14	C

(3) In this section –

resource recovery and transfer facility means a facility used for –

(a) receiving, sorting, dismantling or baling waste; and

(b) storing waste before moving it, from the site where the relevant activity is carried out, for recycling, processing, treatment or disposal.

(4) The relevant activity does not include -

(a) in-transit storage

(b) local government operated facilities accepting not more than 11,000t or 11,000m^3 of waste per year;

(c) operating an approved container refund point for the collection of beverage containers only under the Queensland container refund scheme;

(d) sorting and storing disaster management waste during a disaster recovery and clean up period;

(e) storing chemically treated power poles;

(f) waste in accordance with an accredited product stewardship scheme or take-back scheme for a period of up to 28 calendar days;

(g) clinical waste consisting only of sharps in sharps containers that comply with AS 4031 or AS/NZ 4261 for a period of up to 28 calendar days;

(h) otherwise sorting or storing any combination of the following -

(i) not more than 6t or 6m^3 of general waste at any one time;

(ii) not more than 4t or 4m^3 of category 2 regulated waste, including end-of-life tyres, at any one time;

(iii) not more than 1t or 1m^3 of category 1 regulated waste at any one time;

dismantling means to disassemble or take apart into separate pieces

in-transit storage means storing waste for no longer than five days where the waste is not unloaded, decanted or removed from the vehicle or storage container in which it is being transported

end-of-life tyre means a used tyre that has been removed from a vehicle

6.0 Updated Impact Assessment

The new ERA framework results in changes to the annual fees for existing ERAs. This has the potential to impact on the annual fees paid by holders of existing waste-related ERA approvals as well as revenue generated by the department through ERA annual fees. Due to the changes made to the ERA and regulated waste frameworks following the consultation RIS process the potential impacts to both the state government and existing license holders have been re-assessed.

6.1 Queensland Government

As discussed in the consultation RIS, the new annual fee payable cannot be accurately determined for all of the existing waste related ERAs. This is because the new ERA category cannot reliably derived from the existing ERA descriptors and therefore it is difficult to calculate a precise annual fee revenue figure, as the new ERA may be one of several options.

As a result of changes made to the ERA framework following the consultation RIS submissions the annual fee revenue estimates have been recalculated using the same methodology used in the consultation RIS calculations.

As at 20 January 2016, the department administered 1708 existing waste related ERA approvals that account for approximately $9.3 million dollars in annual revenue (based upon the current AES value of $262).

Of existing 1708 ERA approvals the new ERA threshold and annual fee can be determined for 1331. This comprises the following existing ERA approvals:

- 121 x ERA33 Crushing, milling, grinding or screening
- 2 x ERA52 Battery recycling
- 78 x ERA53 Composting or soil conditioner manufacturing
- 829 x ERA57 regulated waste transport
- 296 x ERA60 Waste disposal
- 17 x ERA61 Waste incineration and thermal treatment.

These 1331 approvals can be reliably calculated and will account for approximately $6.5 million in projected revenue under the new framework.

For the remaining 377 ERA approvals the new ERA will need to be determined on a case by case basis, taking into account:

- the category of waste being received at the facility
- the nature of activity or type of process being undertaken
- the scale of the activity being undertaken.

In order to give an indicative figure for these 377 approvals, an estimate of the likely annual fee revenue has been calculated below, under two different scenarios.

Scenario 1—conservative minimum annual revenue estimate

Scenario 1 is a conservative ‘worst case’ baseline. In this scenario each of the 377 approvals is allocated to the ERA threshold option that has the lowest annual fee i.e. the new ERA threshold assumes:

- the lowest risk category of waste;
- the lowest risk activity or process; and
- the lowest scale threshold for the activity.

This scenario estimates approximately $2.4 million in revenue arising from the remaining 377 approvals, which equates to an estimated total annual fee revenue of $8.9 million.

This is not considered a probable scenario as in reality it will not occur.

Scenario 2—more probable annual revenue estimate

Scenario 2 still adopts a conservative approach however it is considered to better reflect a more likely outcome. This scenario apportions 50% of the 377 approvals to the ERA threshold option that has the lowest annual fee (as in Scenario 1).

The remaining 50% of the ERA approvals are then allocated based on the following assumptions:

- For existing ERA approvals that relate to regulated waste, the following:
  - 65% category 2 regulated waste; and
  - 35% category 1 regulated waste.
- An even allocation of approvals across the potentially applicable scale thresholds i.e.
  - 1/3 small (less than 5,000 per annum)
  - 1/3 medium (5,000t to 10,000t per annum) and
  - 1/3 large (greater than 10,000t per annum).

This scenario estimates approximately $3 million in revenue arising from the remaining 377 approvals, which equates to an estimated total annual fee revenue of $9.5 million.

Local government devolved activities

In addition to the existing 1708 approvals, an additional 160 ERA20 metal recovery approvals that are currently devolved to local government will also be administered by the department. The annual fee revenue for these activities is estimated to be $0.75 million (scenario 1) and $1 million (scenario 2).

Scenario summary

Table 4 summarises the estimated number of approvals administered by the department and the annual fee revenue collected under existing framework and scenarios 1 and 2.

Table 4: Estimated Queensland Government ERA annual fee revenue

	No. of ERA approvals	Estimated annual fee revenue	Average annual fee per approval
Existing framework	1708	$9,278,990	$5,333
Scenario 1	1708	$8,903,546	$5,310
Scenario 2	1708	$9,451,126	$5,635
Scenario 1 (with local government devolved activities)	1868	$9,658.106	$5,257
Scenario 2 (with local government devolved activities)	1868	$10,454,586	$5,691

Note: Estimates are calculated based on an Aggregate Environmental Score (AES) value of $262. This has increased from $253.20 (used in the consultation RIS estimates) due to indexation.

6.2 Existing ERA approval holders

There are currently 1868 active waste related ERA approvals administered by the department and local government. Each existing approval will transition to a new equivalent ERA threshold under the new framework. A summary of the new ERAs and the associated annual fee for each ERA threshold is provided in Table 6.

Table 5 summarises the number of existing ERAs and the new ERA annual fee that may apply under the updated ERA framework. Where the new annual fee must be determined on a case by case basis, the minimum and maximum fee that may be applicable is shown. Of the 1868 existing approvals it is known that approximately:

- 41% will have a fee increase
- 57% will have a fee decrease
- 2% may have an increase or decrease that requires a case by case determination (unknown).

Table 5: Existing and new ERA thresholds and annual fees

Existing ERA thresholds	No. of approvals	Existing annual fee	New annual fee		Difference	Existing approval fee impact		
						Fee increase	Fee decrease	Unknown
20-(1) Metal recovery <100t day	166	$652.00	Actual	$1,572.00	$920.00	166		
20-(2a) Metal recovery >100t day or >10000t yr	21	$4,978.00	Min	$1,572.00	-$3,406.00			21
			Max	$9,170.00	$4,192.00			
20-(2b) Metal recovery >100t day or >10000t yr with fragmentiser	3	$13,362.00	Min	$8,122.00	-$5,240.00			3
			Max	$19,126.00	$5,764.00			
33-Crushing, milling, grinding or screening >5000t yr	121	$652.00	Actual	$2,278.80	$1,626.80	121		
52-Battery recycling	2	$652.00	Actual	$6,812.00	$6,160.00	2		

53-Composting and soil conditioner manufacturing >200t yr	78	$4,716.00	Actual	$4,716.00	$0.00		78	
55-(1) Regulated waste recycling or reprocessing	14	$2,358.00	Min	$6,812.00	$4,454.00	14		
			Max	$12,052.00	$9,694.00			
55-(2) Regulated waste recycling or reprocessing	30	$22,270.00	Min	$6,812.00	-$15,458.00		30	
			Max	$21,484.00	-$786.00			
56 Regulated waste storage	121	$5,502.00	Min	$6,812.00	$1,310.00	121		
			Max	$9,170.00	$3,668.00			
57-(1) Regulated waste transport – end-of-life tyres	48	$652.00	Actual	$524.00	-$128.00		48	
57-(2a) Regulated waste transport 1 to 5 vehicles	685	$1,834.00	Min	$262.00	-$1,572.00		685	
			Max	$1,310.00	-$524.00			
57-(2b) Regulated waste transport 6 to 35 vehicles	109	$5,502.00	Min	$1,572.00	-$3,930.00	30	79	
			Max	$9,170.00	$3,668.00			
57-(2c) Regulated waste transport >36 vehicles	18	$11,004.00	Actual	$9,432.00	-$1,572.00		18	
58-Regulated waste treatment	39	$23,580.00	Min	$11,266.00	-$12,314.00		39	
			Max	$21,484.00	-$2,096.00			
59-Tyre recycling	13	$652.00	Min	$11,266.00	$10,614.00	13		
			Max	$14,672.00	$14,020.00			
60-(1a) Waste disposal <50000t yr (1a)	53	$13,100.00	Actual	$17,030.00	$3,930.00	53		
60-(1b) Waste disposal >50000t but <100000t yr (1a)	10	$21,484.00	Actual	$24,104.00	$2,620.00	10		
60-(1c) Waste disposal >100000 but <200000t yr (1a)	5	$26,200.00	Actual	$28,558.00	$2,358.00	5		
60-(1d) Waste disposal >200000t yr (1a)	37	$28,820.00	Actual	$31,178.00	$2,358.00	37		
60-(2a) Waste disposal >50t but <2000t yr (1b)	72	$3,406.00	Actual	$4,716.00	$1,310.00	72		
60-(2b) Waste disposal >2000t but <5000t yr (1b)	34	$5,240.00	Actual	$7,074.00	$1,834.00	34		
60-(2c) Waste disposal >5000t but <10000t yr (1b)	22	$7,598.00	Actual	$9,694.00	$2,096.00	22		
60-(2d) Waste disposal >10000t but <20000t yr (1b)	17	$10,742.00	Actual	$11,790.00	$1,048.00	17		
60-(2e) Waste disposal >20000t but <50000t yr (1b)	15	$13,886.00	Actual	$14,672.00	$786.00	15		
60-(2f) Waste disposal >50000t but <100000t yr (1b)	18	$15,196.00	Actual	$17,030.00	$1,834.00	18		
60-(2g) Waste disposal >100000t but 200000t yr (1b)	7	$19,126.00	Actual	$21,484.00	$2,358.00	7		
60-(2h) Waste disposal >200000t yr (1b)	6	$25,152.00	Actual	$28,034.00	$2,882.00	6		
61-(1) Waste incineration & thermal treatment (green waste, paper, cardboard)	11	$652.00	Actual	Approval not required	-$652.00		11	
61-(2a) Waste incineration & thermal treatment <5000t yr general waste	5	$4,716.00	Actual	$8,646.00	$3,930.00	5		
61-(2b) Waste incineration & thermal treatment >5000t yr general waste	2	$7,860.00	Min	$10,218.00	$2,358.00	2		
			Max	$11,790.00	$3,930.00			

61-(3a) Waste incineration & thermal treatment - clinical	12	$13,362.00	Min	$12,576.00	-$786.00			12
			Max	$13,886.00	$524.00			
61-(3b) Waste incineration & thermal treatment – regulated waste	6	$10,742.00	Min	$11,266.00	$524.00	6		
			Max	$22,794.00	$12,052.00			
62-Waste transfer station operation >30t or 30m^3 day	68	$8,122.00	Min	$1,572.00	-$6,550.00		68	
			Max	$8,122.00	$0.00			
					Total	**776**	**1056**	**36**

Table 6: Updated ERA thresholds, AES and annual fees

Updated ERA thresholds	*AES*	*Annual fee*
53-(1a) processing organic material by composting	18	$4,716
53-(1b) processing organic material by anaerobic digestion	16	$4,192
54-(1) mechanically processing or treating greater than 5,000t of inert, non-putrescible waste or green waste	8	$2,096
54-(2a) mechanically processing or treating up to 5,000t of not-regulated waste	19	$4,978
54-(2b) mechanically processing or treating more than 5,000t but less than 10,000t of not-regulated waste	25	$6,550
54-(2c) mechanically processing or treating greater than 10,000t of not-regulated waste	31	$8,122
54-(3a) mechanically processing or treating up to 5,000t of category 2 regulated waste	43	$11,266
54-(3b) mechanically processing or treating more than 5,000t but less than 10,000t of category 2 regulated waste	43	$11,266
54-(3c) mechanically processing or treating greater than 10,000t of category 2 regulated waste	56	$14,672
54-(4a) mechanically processing or treating up to 5,000t of category 1 regulated waste	37	$9,694
54-(4b) mechanically processing or treating more than 5,000t but less than 10,000t of category 1 regulated waste	55	$14,410
54-(4c) mechanically processing or treating greater than 10,000t of category 1 regulated waste	73	$19,126
55-(1a) otherwise processing or treating up to 5,000t of not-regulated waste	28	$7,336
55-(1b) otherwise processing or treating more than 5,000t but less than 10,000t of not-regulated waste	39	$10,218
55-(1c) otherwise processing or treating greater than 10,000t of not-regulated waste	48	$12,576
55-(2a) otherwise processing or treating up to 5,000t of category 2 regulated waste	38	$9,956
55-(2b) otherwise processing or treating more than 5,000t but less than 10,000t of category 2 regulated waste	52	$13,624
55-(2c) otherwise processing or treating greater than 10,000t of category 2 regulated waste	65	$17,030
55-(3a) otherwise processing or treating up to 5,000t of category 1 regulated waste	46	$12,052
55-(3b) otherwise processing or treating more than 5,000t but less than 10,000t of category 1 regulated waste	64	$16,768
55-(3c) otherwise processing or treating greater than 10,000t of category 1 regulated waste	82	$21,484
55-(4) otherwise treating clinical waste or related waste	48	$12,576
57-(1) transporting end-of-life tyres	2	$524.00
*57-(2) transporting regulated waste (category 1 or 2)	1	$262.00
60-(1a) Waste disposal <50000t yr (regulated waste)	65	$17,030
60-(1b) Waste disposal >50000t but <100000t yr (regulated waste)	92	$24,104
60-(1c) Waste disposal >100000 but <200000t yr (regulated waste)	109	$28,558
60-(1d) Waste disposal >200000t yr (regulated waste)	119	$31,178
60-(2a) Waste disposal <2000t yr (not-regulated waste)	18	$4,716
60-(2b) Waste disposal >2000t but <5000t yr (not-regulated waste)	27	$7,074
60-(2c) Waste disposal >5000t but <10000t yr (not-regulated waste)	37	$9,694
60-(2d) Waste disposal >10000t but <20000t yr (not-regulated waste)	45	$11,790
60-(2e) Waste disposal >20000t but <50000t yr (not-regulated waste)	56	$14,672
60-(2f) Waste disposal >50000t but <100000t yr (not-regulated waste)	65	$17,030
60-(2g) Waste disposal >100000t but 200000t yr (not-regulated waste)	82	$21,484
60-(2h) Waste disposal >200000t yr (not-regulated waste)	107	$28,034
60-(3a) Waste disposal <50000t yr (inert non-putrescible waste)	28	$7,336
60-(3b) Waste disposal >50000t but <100000t yr (inert non-putrescible waste)	35	$9,170
60-(3c) Waste disposal >100000 but <200000t yr (inert non-putrescible waste)	40	$10,480
60-(3d) Waste disposal >200000t yr (inert non-putrescible waste)	50	$13,100
60-(4) Maintaining a waste disposal facility in post closure care	9	$2,358
61-(1a) thermally processing or treating up to 5,000t of not-regulated waste	33	$8,646

61-(1b) thermally processing or treating more than 5,000t but less than 10,000t of not-regulated waste	39	$10,218
61-(1c) thermally processing or treating greater than 10,000t of not-regulated waste	45	$11,790
61-(2a) thermally processing or treating up to 5,000t of category 2 regulated waste	43	$11,266
61-(2b) thermally processing or treating more than 5,000t but less than 10,000t of category 2 regulated waste	57	$14,934
61-(2c) thermally processing or treating greater than 10,000t of category 2 regulated waste	70	$18,340
61-(3a) thermally processing or treating up to 5,000t of category 1 regulated waste	51	$13,362
61-(3b) thermally processing or treating more than 5,000t but less than 10,000t of category 1 regulated waste	69	$18,078
61-(3c) thermally processing or treating greater than 10,000t of category 1 regulated waste	87	$22,794
61-(4) thermally treating clinical waste or related waste	53	$13,886
62-(1a) sorting, dismantling or temporarily storing inert, non-putrescible waste or scrap steel	6	$1,572
62-(1b) sorting, dismantling or temporarily storing not-regulated waste	18	$4,716
62-(1c) sorting, dismantling or temporarily storing category 2 regulated waste	26	$6,812
62-(1d) sorting, dismantling or temporarily storing category 1 regulated waste	35	$9,170
62-(2) sorting or temporarily storing end-of-life tyres	14	$3,668

**Note: $262 per regulated waste transport vehicle registered with the department. Fee capped at $9,432 (equivalent of 36 vehicles).*

Part B - Consultation RIS

1.0 Issues statement

One of the department's core functions is to ensure that commercial and industrial activities, including waste management activities, are regulated to manage their environmental impacts. Regulating waste management activities is particularly complex due to the diverse nature of the wastes generated, the processes associated with the waste related activity and the large range of hazard parameters associated with these wastes.

In Queensland the *Environmental Protection Act 1994* (EP Act) and its subordinate legislation, the *Environmental Protection Regulation 2008* (EP Reg) provide frameworks for classifying waste and regulating associated waste management activities.

High risk wastes are called regulated wastes and are listed in schedule 7, part 1 of the EP Reg. Currently there are 71 regulated wastes listed in this schedule. Regulated wastes are considered to be higher risk as they contain contaminants or properties that have an increased risk to the environment or human health. Because of this increased level of risk regulated wastes are subject to an increased level of regulation.

Wastes which are not classified as regulated waste are considered general waste as they pose a lower risk and typically comprise waste arising from municipal solid waste (MSW), construction and demolition (C&D) or commercial and industrial (C&I) waste streams[1].

In addition, waste management activities generate emissions and have the potential to cause environmental harm. These activities are regulated as environmentally relevant activities (ERAs) and currently there are 12 waste-related ERAs listed in schedule 2 of the EP Reg, which are the subject of this review. In almost all instances, a facility that receives waste for processing, treatment, recycling or disposal must hold an approval for a relevant waste-related ERA. A list of these ERAs is provided in section 3.2.

Both the regulated waste classification system and the waste related ERAs have been in place for more than 10 years. During this time there have been significant changes in waste management practices and the development of new waste management technologies. These include:

- greater knowledge and understanding about wastes and their impacts on human health and the environment
- a global move toward risk-based regulation of hazardous wastes
- the large scale commercialisation of hazardous waste management with a high level of sophistication
- the development and refinement of new alternative waste treatment (AWT) processes and associated energy from waste (EfW) technologies, such as anaerobic digestion, pyrolysis, and gasification.

As a result of these advances the regulated waste classification system and waste ERAs need to be reviewed and relevant changes made. Specifically it has been identified that the current frameworks:

- do not provide a flexible risk based classification framework for wastes
- do not always provide regulation proportionate to the level of environmental risk
- are unclear about the regulatory requirements for some wastes and management activities
- present a real/perceived lack of support for new and emerging technologies.

- [1]Municipal solid waste (MSW) generated by households and usually collected through council kerbside waste collection services
- Construction and demolition waste (C&D) includes inert waste materials such as concrete, steel, pavers or timber arising from construction or demolition activities
- Commercial and Industrial Waste (C&I) is waste that may be generated from a range of activities such as accommodation, retail, administration services, other business activities or manufacturing or industrial processes

2.0 Policy objectives

The department and industry have recognised that the regulation and administration of waste related ERAs, particularly those involving regulated wastes, do not align with current waste management practices. In addition, the system has limited flexibility to cater for emerging waste technologies and innovation, which has resulted in prolonged assessment timeframes, unsatisfactory regulation and inconsistent application of annual fees.

A number of policy objectives were developed to address the shortcomings in the existing system.

1. Improved classification of waste based on the level of risk posed to the environment or human health
2. Management of waste ERAs that corresponds to the risk
3. Development of waste ERAs that support new and emerging technologies
4. Consistency for operators undertaking waste ERAs
5. A regulatory environment that encourages innovation in waste management practices
6. A framework that does not impact on the viability of established industries and encourages capital investment, economic development and employment.

The outcome of the review process is to produce a waste-related ERA management framework and regulated waste classification framework that enables improved risk based regulation. This should also facilitate advancements in technology and improve opportunities for waste recovery and industry growth. The outcomes will also support government's agenda of reducing costs and the regulatory burden currently felt by industry while maintaining a sustainable and strong environment.

3.0 The legislative framework for managing waste in Queensland

In Queensland the *Environmental Protection Act 1994* (EP Act) and its subordinate legislation, the *Environmental Protection Regulation 2008* (EP Reg) define what is and what is not a regulated waste as well as what waste management activities must be regulated to, in order to protect the environment and human health. These are commonly referred to as the regulated waste classification and waste-related ERA frameworks. Combined, these frameworks are intended to ensure that the risks posed by certain waste types and their management activities are identified and appropriately managed.

For waste management activities that are classified as low risk (that is to say they do not require a prescribed ERA), the operator will still need to comply with the General Environmental Duty (GED) under the EP Act (s 319) as well as any other relevant local, state or federal government legislative requirements.

3.1 Regulated waste classification

Section 65 of the EP Reg provides a definition for regulated waste, which states:

(1) ***Regulated waste*** is waste that:
  (a) is commercial or industrial waste, whether or not it has been immobilised or treated; and
  (b) is of a type, or contains a constituent of a type, mentioned in schedule 7, part 1.

(2) Waste prescribed under subsection (1) includes:
  (a) for an element—any chemical compound containing the element; and
  (b) anything that contains residues of the waste.

(3) However, waste is not regulated waste if it is mentioned in schedule 7, part 2.

Schedule 7 of the EP Reg provides a list of items that are considered regulated waste (Part 1), and not-regulated waste (Part 2). Part 1 currently contains 71 items. These items include elements, compounds and physical properties. They also include specific waste types produced from certain processes, such as food processing waste. In accordance with the above definition a commercial and industrial waste containing any of these items, in any quantity or concentration, is considered to be a regulated waste.

Some wastes that would otherwise be classified as a regulated waste are excluded in Part 2. This list has been developed for regulated wastes that are considered to be a lower risk, and to support programs such as stewardship schemes where re-use, recycling or specific disposal options are preferred for these wastes.

3.2 Environmentally Relevant Activities (ERA)

Section 19 of the EP Act states that an activity may be prescribed as an ERA if the Governor in Council is satisfied:

- a contaminant will or may be released into the environment when the activity is carried out; and
- the release of the contaminant will or may cause environmental harm.

ERAs are prescribed within Schedule 2 of the EP Reg. There are currently 12 ERAs that relate to the management of waste, these are:

ERA 20 - Metal recovery
ERA 33 - Crushing, milling, grinding or screening
ERA 52 - Battery recycling
ERA 53 - Composting and soil conditioner manufacturing
ERA 55 - Regulated waste recycling or reprocessing
ERA 56 - Regulated waste storage
ERA 57 - Regulated waste transport
ERA 58 - Regulated waste treatment
ERA 59 - Tyre recycling
ERA 60 - Waste disposal
ERA 61 - Waste incineration and thermal treatment
ERA 62 - Waste transfer station operation.

Facilities that receive waste and undertake one of the above activities must obtain a relevant waste-related ERA approval. However in some cases an ERA approval may not be required where:

- The activity being undertaken is not of a sufficient scale to trigger the requirement for an ERA. For example:
  - ERA 53 (composting and soil conditioner manufacturing) only requires an approval when the activity produces greater than 200t per annum; or
  - ERA 62 (waste transfer station) only requires an approval for facilities accepting greater than 30t or 30m^3 of waste in a day.
- The activity does not meet other requirements or definitions specified within the ERA. For example:
  - ERA 58 (regulated waste treatment) requires approval for facilities that “receive and treat regulated waste”. A facility that processes its own waste, on the site where it is produced would not be captured by this ERA as the site does not ‘receive waste’.

In each instance the requirement to obtain an ERA approval must be determined on a case by case basis by the operator undertaking the activity and the relevant administering authority. The administration of ERAs is generally undertaken by the department, although some activities are currently devolved to local government.

3.3 Issues with the current waste management frameworks

Since the introduction of the regulated waste classification framework in 1995, there have been significant advances in industrial processes, waste management practices, and other waste related technology. As a result of these changes the existing frameworks no longer reflect or properly account for current national and international waste management standards and practices.

As an example, the current method of classifying regulated waste does not take into account the type or concentration of the contaminant(s) in the waste. It also does not consider the risk associated with different contaminants which can vary substantially. For example, food processing waste, oily waters, and polychlorinated biphenyls (PCBs) are all classified and treated equally under the current regulated waste classification system. This means all regulated wastes are considered equal, despite the significant differences in the risks they pose to the environment and human health.

Furthermore the definition does not permit regulated waste to be re-classified even after undergoing a process of immobilisation or treatment to reduce the level of hazard and risk. This reduces the incentive to treat waste to reduce or remove its potential impacts on the environment and human health.

The current list of waste related ERAs is also in need of review, as since they were first introduced in the mid-1990s little has been done to update them. Since this time there have been significant changes in waste management practices and there has been an emergence of new waste management technologies and processes, which the waste related ERAs do not consider. This has resulted in:

- Unclear regulatory requirements or a perceived lack of support for new and emerging technologies.
  - ERA 61 does not clearly account for pyrolysis and gasification. ERA 61 is for incineration or treatment; however pyrolysis and gasification are technically neither of these processes. Similarly ERA 59 - tyre recycling, when originally conceived, only contemplated physical tyre shredding and crumbing. It does not consider processing end-of-life tyres using thermal processes, such as pyrolysis. This lack of support in the current system is likely to incur costs and prohibit resource recovery as opportunities to explore innovative technologies are lost or greatly reduced.

- Regulation of waste management activities that is not always commensurate with the level of risk that an activity poses.
    - Up to 100t of material may be processed in a day under ERA 20 - metal recovery. This material could include automotive components containing oils, heavy metals, and other high risk contaminants. The annual fee for this activity is $630. This fee is significantly disproportionate (in terms of fee value to risk) to holders of ERA 62 - waste transfer station, where the annual fee is $7000 and is required where greater than 30t or 30m^3 of lower risk general waste is received in a day (such as timber, green waste or concrete).
    - Similarly, a site may receive and recycle Used Lead Acid Batteries (ULABs) under ERA 52 Battery recycling. This ERA has an annual fee of $630. In contrast the actual site which receives acid or lead waste components separately (not contained within a battery) must be licensed under ERA 55 or ERA 58, and may be subject to an annual fee as high as $22,788.00.

The failure to recognise and regulate risks effectively could potentially result in negative impacts to the environment and may result in financial costs being incurred to investigate, clean-up, and undertake environmental remediation. These costs could be in addition to the potential health costs (human and financial) as a result of inadequate risk identification and management.

Similarly, the inconsistency of regulation, combined with limited flexibility within the current framework, could be perceived by prospective investors as the state not being open to emerging technologies. This may limit investment and result in revenue losses to the state associated with new products, services and employment.

The following table lists the cost, to industry and other stakeholders, of maintaining the status quo

Table 1: Costs of maintaining the current regulatory framework

Stakeholders	Costs
Industry	• Does not provide proportionate regulation based upon environmental risk. • New and emerging technologies are not clearly captured which creates regulatory un-certainty discouraging investment, uptake and innovation. • The inadequate fit between the regulations and newer technologies can lead to inconsistent application of the regulations, creating an uneven playing field. • Lack of confidence in the Queensland Government's ability to maintain environmental law and contemporary waste management practices. • Does not encourage treatment and immobilisation of wastes. • Minimal incentives for generators to adopt waste minimisation or waste reduction practices.
Local government	• Administrative and regulatory costs associated with devolved ERAs.
Queensland Government	• Difficulties in applying existing waste ERAs to new and emerging technologies, in a consistent way. • Does not achieve the objects of the *Waste Reduction and Recycling Act 2011* (WRR Act). because it does not promote waste avoidance and reduction, and resource recovery and efficiency actions.
Community	• Decreased confidence in the Queensland Government's ability to maintain environmental law and contemporary waste management practices. • Does not achieve the objects of the WRR Act because it does not promote waste avoidance and reduction, and resource recovery and efficiency actions.

4.0 Policy options

Two policy options are presented within this RIS, which are described in sections 4.1 and 4.2.

4.1 Option 1: Maintain the status quo

Option 1 proposes that the existing regulated waste classification and waste-related ERAs, as described in sections 3.1 and 3.2 be retained.

4.2 Option 2: Adopt a new integrated risk-based regulatory framework

Option 2 proposes the adoption of a new integrated risk-based regulatory framework for classifying waste and regulating waste management activities. This option will introduce a new schedule of waste-related ERAs and regulated waste classification. Specifically this option proposes:

- a new system to classify regulated waste based upon the risk posed to the environment and human health
- a new risk-based schedule of five waste-related ERAs that incorporates the new waste classification system.

This option was developed in consultation with industry and other stakeholders. An initial draft framework was developed and released for public consultation in 2015 and feedback from this process together with ongoing consultation and discussion with industry has resulted in the development of the proposed risk-based regulatory framework.

A range of options were considered in the process of developing the framework as it is currently proposed for consultation. These options have not been included for consultation as providing multiple options for each waste-related ERA and regulated waste classification would add considerable complexity to the impact assessment and consultation process. For this reason a single integrated waste-related ERA and regulated waste classification framework option has been presented.

4.2.1 Proposed regulated waste classification system

An important component of the proposed regulated waste classification framework is the ability for waste generators to determine whether their waste is regulated and, if so, an appropriate level of risk-based categorisation. Under this system, regulated waste will be classified into one of three regulated waste categories or a not-regulated (NR) category, as follows:

- category 1 regulated waste (highest risk)
- category 2 regulated waste
- category 3 regulated waste
- not-regulated (NR) (lowest risk).

Each waste category is based upon given threshold values for the identified hazard parameter(s). The threshold values for each waste category are based on national and international standards which are considered to be current best practice. A not-regulated (NR) category is provided for wastes which are below the Category 3 threshold limits. To establish their particular category, waste generators will have the option of either:

- adopting a default waste category for their waste (refer attachment F, table 10); or
- testing for parameters of known constituents, and comparing the results against threshold values for each parameter to determine the waste category (refer attachment G, table 11).

This is a significant departure from the current regulated waste classification system where all regulated wastes are considered equal and there is no opportunity to ‘down-grade’ the category of regulated waste or remove from regulated waste categorisation.

4.2.2 Proposed waste related ERAs

Under this option a new streamlined schedule of five waste-related ERAs will be introduced. The underlying structure of each ERA considers both the process/activity being undertaken and the classification of waste being managed. The waste classification reflects the proposed regulated waste risk classification system, whereby waste is classified as either not-regulated (lowest risk) or category 1, 2 or 3 regulated waste (highest to lowest risk).

Integration of the proposed waste categories with the waste related ERAs allows the overall risk, determined by both the activity and waste type, to be better quantified and proportionate regulation applied. For example, a facility receiving and processing category 3 regulated waste will now have a lower risk profile and annual fee than a facility that processes higher risk category 1 or 2 regulated waste. Similarly thermal processing of a category 2 waste will have a higher risk profile than processing that same waste using lower risk mechanised grinding processes.

Despite the reduction from twelve waste related ERAs to five under option 2, all existing activities will continue to be captured. The new system of waste related ERAs also includes support for new and emerging technologies such as pyrolysis, gasification and anaerobic digestion activities. The five proposed waste related ERAs are:

Proposed ERA	Description
ERA 53 Organic waste processing	Captures all composting and anaerobic digestion activities. All existing ERA 53 approvals for composting or soil conditioner manufacturing will be regulated under this ERA.
ERA 55 Waste processing or treatment	This ERA captures a range of waste processing, recycling and treatment activities. Activities currently regulated under existing ERAs 20, 33, 55, 58, 59, 61 and 62 may be captured within this ERA. Processes such as pyrolysis and gasification will also be captured here.
ERA 57 Waste transport	This ERA will continue to capture all existing regulated waste and tyre transport activities. Operators commercially transporting general waste will also be captured by this ERA.
ERA 60 Waste disposal	All existing ERA 60 waste disposal approvals will remain captured under this ERA.
ERA 62 Resource recovery and waste transfer	ERA 62 captures low level risk waste transfer and resource recovery activities. It allows for sorting, dismantling, baling and the associated temporary storage of waste. Activities currently regulated under existing ERA 20, 56 and 62 may be captured within this ERA. Storage of end-of-life tyres will also be captured under this ERA.

Attachment A provides a full list of the proposed ERAs. It also details the proposed licensing thresholds, activity descriptions, associated definitions and exemptions.

5.0 Regulatory impact assessment

5.1 Option 1: maintain the status quo

Under this option there would be no change to the current waste related ERA and regulated waste classification frameworks. This option presents no immediate impact to existing stakeholders as the existing licensing framework and fee structure will be retained. There will be no changes to approval requirements, annual fees or administration work required under this option and therefore no impact assessment has been undertaken.

5.2 Option 2: Adopt a new integrated risk-based regulatory framework

Option 2 proposes significant changes to the current waste related ERA and regulated waste classification frameworks. This will result in potential direct and indirect impacts to existing ERA approval holders, local government, state government, waste generators and the community, and may include changes to:

- the type of ERA approval required and annual fee payable by existing approval holders
- the number of activities and approvals administered by the department and local governments
- the associated revenue generated by the department and local government through collection of annual fees
- the cost (additional) to waste generators where testing of waste material is required.

In addition to the above, some waste related activities that do not currently require an ERA approval may now be captured, and operators undertaking these activities will be required to obtain an ERA approval.

Costs to the state, from the implementation of Option 2 are most likely to be incurred through;

- updating regulatory tools, such as the department's website and associated record keeping databases
- the upskilling of regulatory compliance staff, teaching and learning the new frameworks
- 'pre-lodgement meetings' to inform approval holders of the new system and its application
- the transition of existing approvals to the new framework
- additional regulatory inspections, particularly of the former local government 'devolved' ERA approvals.

The extent of these impacts has been assessed and summarised in the sections following.

5.2.1 Existing ERA approval holders (industry)

There are currently 1868 active waste related ERA approvals administered by both the department and local government. The preferred option will require that these existing ERA approvals transition to new ERA under the proposed framework. Depending on the individual circumstances the annual fee may decrease, stay the same or increase under the new framework. It is important to note that where a site has approval to undertake multiple ERAs the annual fee payable is determined by the ERA that carries with the highest fee.

Attachment D provides guidance on how to determine the new ERA and threshold applicable for each existing ERA.

Table 2 summarises the number of existing ERAs and the new annual fee that may apply under option 2. Where the new annual fee requires a determination to be made on a case by case basis, the minimum and maximum fee that may be applicable is shown. Of the 1868 existing approvals it is known that approximately:

- 39% will have a fee increase (red shaded cells)
- 53% will have a fee decrease (green cells)
- 8% may have an increase or decrease that requires a case by case determination (orange cells).

The process of transitioning existing ERA approval holders to the proposed framework will predominantly be an administrative process to reflect the new risk-based ERA and annual fee. Beyond this change the conditions of operation imposed under the existing ERA approvals (such as waste acceptance criteria, emission limits, reporting, and monitoring arrangements) will not be altered during the initial transition process and there should be minimal impacts on the day to day operation of these activities.

Table 2: Existing and new ERA thresholds and annual fees

Existing ERA thresholds	No. of approvals	Existing annual fee	New annual fee		Difference	Existing approval fee impact		
						Fee increase	Fee decrease	Unknown
20-(1) Metal recovery <100t day	166	$630.00	Min	$3,544.80	$2,914.80	166		
			Max	$7,342.80	$6,712.80			
20-(2a) Metal recovery >100t day or >10000t yr	21	$4,810.80	Min	$3,544.80	-$1,266.00			21
			Max	$7,342.80	$2,532.00			
20-(2b) Metal recovery >100t day or >10000t yr with fragmentiser	3	$12,913.20	Min	$5,317.20	-$7,596.00		3	
			Max	$11,140.80	-$1,772.40			
33-Crushing, milling, grinding or screening >5000t yr	121	$630.00	Min	$2,278.80	$1,648.80	121		
			Max	$5,317.20	$4,687.20			
52-Battery recycling	2	$630.00	Actual	$6,330.00	$5,700.00	2		
53-Composting&soil conditioner manufacturing >200t yr	78	$4,557.60	Actual	$9,368.40	$4,810.80	78		
55-(1) Regulated waste recycling or reprocessing	14	$2,278.80	Min	$6,076.20	$3,797.40	14		
			Max	$12,666.00	$10,387.20			
55-(2) Regulated waste recycling or reprocessing	30	$21,522.00	Min	$6,076.20	-$15,445.80		30	
			Max	$12,666.00	-$8,856.00			
56 Regulated waste storage	121	$5,317.20	Min	$4,304.40	-$1,012.80			121
			Max	$7,342.80	$2,025.60			
57-(1) Regulated waste transport – end-of-life tyres	48	$630.00	Actual	$506.40	-$123.60		48	
57-(2a) Regulated waste transport 1 to 5 vehicles	685	$1,772.40	Min	$253.20	-$1,519.20		685	
			Max	$1,266.00	-$506.40			
57-(2b) Regulated waste transport 6 to 35 vehicles	109	$5,317.20	Min	$1,519.20	-$3,798.00	30	79	
			Max	$8,862.00	$3,544.80			
57-(2c) Regulated waste transport >36 vehicles	18	$10,634.40	Actual	$9,115.20	-$1,519.20		18	
58-Regulated waste treatment	39	$22,788.00	Min	$6,076.80	-$16,711.20		39	
			Max	$12,660.00	-$10,128.00			
59-Tyre recycling	13	$630.00	Actual	$6,076.80	$5,446.80	13		
60-(1a) Waste disposal <50000t yr (1a)	53	$12,660.00	Actual	$20,762.40	$8,102.40	53		
60-(1b) Waste disposal >50000t but <100000t yr (1a)	10	$20,762.40	Actual	$28,358.40	$7,596.00	10		
60-(1c) Waste disposal >100000 but <200000t yr (1a)	5	$25,320.00	Actual	$32,662.80	$7,342.80	5		
60-(1d) Waste disposal >200000t yr (1a)	37	$27,852.00	Actual	$35,194.80	$7,342.80	37		
60-(2a) Waste disposal >50t but <2000t yr (1b)	72	$3,291.60	Actual	$5,317.20	$2,025.60	72		
60-(2b) Waste disposal >2000t but <5000t yr (1b)	34	$5,064.00	Actual	$7,849.20	$2,785.20	34		

Existing ERA thresholds	No. of approvals	Existing annual fee	New annual fee		Difference	Existing approval fee impact		
						Fee increase	Fee decrease	Unknown
60-(2c) Waste disposal >5000t but <10000t yr (1b)	22	$7,342.80	Actual	$9,874.80	$2,532.00	22		
60-(2d) Waste disposal >10000t but <20000t yr (1b)	17	$10,381.20	Actual	$12,660.00	$2,278.80	17		
60-(2e) Waste disposal >20000t but <50000t yr (1b)	15	$13,419.60	Actual	$17,724.00	$4,304.40	15		
60-(2f) Waste disposal >50000t but <100000t yr (1b)	18	$14,685.60	Actual	$20,762.40	$6,076.80	18		
60-(2g) Waste disposal >100000t but 200000t yr (1b)	7	$18,483.60	Actual	$22,788.00	$4,304.40	7		
60-(2h) Waste disposal >200000t yr (1b)	6	$24,307.20	Actual	$27,852.00	$3,544.80	6		
61-(1) Waste incineration & thermal treatment (green waste, paper, cardboard)	11	$630.00	Actual	NA	-$630.00		11	
61-(2a) Waste incineration & thermal treatment <5000t yr general waste	5	$4,557.60	Actual	$9,621.60	$5,064.00	5		
61-(2b) Waste incineration & thermal treatment >5000t yr general waste	2	$7,596.00	Actual	$9,621.60	$2,025.60	2		
61-(3a) Waste incineration & thermal treatment - clinical	12	$12,913.20	Min	$12,660.00	-$253.20			12
			Max	$15,192.00	$2,278.80			
61-(3b) Waste incineration & thermal treatment – regulated waste	6	$10,381.20	Min	$10,128.00	-$253.20			6
			Max	$15,192.00	$4,810.80			
62-Waste transfer station operation >30t or 30m^3 day	68	$7,849.20	Min	$2,278.80	-$5,570.40		68	
			Max	$5,317.20	-$2,532.00			
					Total	**727**	**981**	**160**

5.2.2 Queensland Government

As at 20 January 2016, reporting data indicated a total of 1868 waste related ERA approvals administered by the department and local government, comprised of:

- 1708* waste-related ERA approvals administered by the department
- 160 devolved waste-related ERA approvals administered by local government.

*This number reflects the total number of waste ERAs administered. It does not take into account instances where multiple ERAs are authorised on a single approval and the number of unique approvals may be less. For example, three waste-related ERAs may be administered under a single approval.

Annual fee revenue

The department currently collects an estimated $9,054,154.80 in annual fees arising from 1708 existing waste related approvals. Under option 2 all waste-related ERAs, including those currently devolved to local government will become the responsibility of the department (with the exception of 11 ERA 61(1) approvals which will no longer require an ERA). This means that the department will be responsible for administering 1857 waste related approvals.

The annual fees associated with each of these existing approvals will also change. This will impact the total number of activities administered by the department and the associated annual fee revenue. In addition to this the department will also be responsible for the ongoing regulation of any new activities that may be captured under the new framework.

As discussed in section 5.2.1, the new annual fee payable cannot be accurately determined for all of the existing waste related ERAs. Therefore it is difficult under the new framework to calculate a precise annual fee revenue figure, as the new annual fee for some existing activities may be one of several options.

A risk evaluation process that considers both the activity being undertaken and the classification of waste being handled has been used, to develop an appropriate aggregate environmental score (AES) for each of the proposed ERAs. The annual fee for each ERA is then derived by multiplying the AES and a fee unit of $253.20 (current as of 01 July 2016). The AES value is designed to reflect the risk associated with an activity, and is used to calculate the annual fee for all ERAs listed in schedule 2 of the EP Reg.

Of the 1868 existing ERA approvals the new ERA threshold is known for 1267 (including 11 approvals that will no longer require an ERA). This leaves 601 approvals where the new ERA will need to be determined on a case by case basis. This will require assessment of the activity (process) being undertaken and the waste category classification of the waste being managed. In order to give an indicative figure, an estimate of the likely annual fee revenue has been calculated below, under two different scenarios.

Scenario 1—conservative minimum annual revenue estimate

Scenario 1 assumes a conservative assessment that allocates each existing approval to the new ERA threshold option that has the lowest annual fee. This scenario produces an estimate of the minimum annual fee revenue.

This scenario is considered to be a minimum baseline and is unlikely to occur.

Scenario 2—more probable annual revenue estimate

Scenario 2 adopts a less conservative approach and apportions existing approvals to new ERA thresholds based upon a percentage breakdown of regulated waste categories, as follows:

- 21% category 3 regulated waste
- 44% category 2 regulated waste
- 35% category 1 regulated waste.

These percentages have been calculated by analysing existing regulated waste tracking code data to ascertain a likely waste categorisation breakdown under the proposed regulated waste classification framework. This gives an indicative estimate of the percentage split of category 1, 2 and 3 regulated wastes.

This is considered to be a more likely scenario than option 1.

Scenario summary

Table 3 summarises the estimated number of approvals administered by and the annual fee revenue collected under the existing framework, and scenarios 1 and 2. Further details of the calculations used to derive these figures are provided in Attachment E, table 9.

Table 3: Estimated Queensland Government ERA annual fee revenue

	No. of approvals	Estimated annual fee revenue	Average annual fee per approval
Existing framework	1708	$9,054,154.80	$5,301.03
Scenario 1	1857*	$9,370,932.00	$5,046.27
Scenario 2	1857*	$10,175,601.50	$5,479.59

**Includes 160 existing approvals currently devolved to local government.*
Excludes 11 existing ERA61(1) approvals that will no longer require an ERA.

5.2.3 New activities

Changes in ERA licensing criteria and thresholds means that some activities that are not currently regulated may now require an ERA approval. As these activities are not captured under the existing regulatory framework, the number of operators or facilities that may now require an ERA cannot be accurately determined. These new activities and the respective ERAs in which they will be regulated are summarised in table 4. Please refer to Attachment A for further information on the licensing details for these activities.

Table 4: Regulation of new activities

New activity	New ERA	Annual fee	New ERA criteria	Known existing activities
Tyre storage	ERA 62(3)	$3,544.80	Storing greater than 4t or 500 equivalent passenger units (EPUs) of tyres at any one time.	This activity is not currently regulated. The number of existing operators that may be captured cannot be determined.
*Anaerobic digestion	ERA 53(2)	$6,076.80	Sites receiving greater than 200t of organic material per year for the purpose of operating an anaerobic digester. Does not capture anaerobic digestion of material produced onsite in relation to an existing ERA such as a waste water treatment plant or abattoir.	This activity is not currently regulated. The number of existing operators that may be captured cannot be determined.
Waste transfer (receiving less than 30t or 30m^3 of waste per day)	ERA 62(2a) or ERA 55(1a)	$3,544.80 - $5,317.20	Waste transfer station facilities receiving less than 30t or 30m3 per day do not currently require an ERA approval. This requirement has been removed and all commercial waste transfer station facilities will require an ERA approval.	This activity is not currently regulated. The number of existing sites that may be captured is not known.
General waste transport	ERA 57(3)	$253.20	Persons commercially transporting general waste in loads greater than 750kg must obtain an approval.	This activity is not currently regulated. The number of existing operators that may be captured cannot be determined.

**Biomethane also known as biogas, is a hydrocarbon gas produced from the breakdown of organic matter in the absence of Oxygen. Biomethane, including gas produced from waste landfills and sewage treatment plant is defined as petroleum and fuel gas under the Petroleum and Gas Act 2004 and the Petroleum and Gas Regulations.*

There are currently 64 active biogas producing facilities, including waste treatment plants, landfills, piggeries, egg production and abattoirs. These operations are regulated by the Department of Natural Resources and Mining (DNRM) under S675 (5) (e) of the *Petroleum and Gas (Production and Safety) Act 2004* and S10 (3) (c) of the *Petroleum and Gas (Production and Safety) Regulation 2004*.

It is not expected that these facilities will require ERA 53 as the organic material is produced onsite in relation to an existing ERA such as a waste water treatment plant or abattoir.

5.2.4 Local government

Under the current waste related ERA framework ERA 20 (metal recovery) and ERA 61 (waste incineration and thermal treatment) activities are devolved to local government. Under the new waste related ERA framework these activities and the associated approvals will transfer to the State. This will result in a decrease in annual fee revenue for some local governments, however this may be potentially offset by a reduced compliance and licensing workload.

This change impacts a total of 160 devolved approvals[#] for ERA 20 metal recovery. Table 5 shows the number of existing ERA 20 approvals and total annual fee revenue, for each impacted local government. There are currently no ERA61 approvals administered by local government.

Table 5: Existing local government devolved activities and annual fees

Local authority	*ERA 20(1) approval holders	**ERA 20(2)(a) approval holders	Total existing fees
Banana Shire Council	1	0	$630.00
Brisbane City Council	24	6	$43,984.80
Bundaberg Regional Council	4	1	$7,330.80
Burdekin Shire Council	2	0	$1,260.00
Cairns Regional Council	9	0	$5,670.00
Cassowary Coast Regional Council	3	0	$1,890.00
Fraser Coast Regional Council	5	0	$3,150.00
Gladstone Regional Council	3	1	$6,700.80
Gold Coast City Council	27	0	$17,010.00
Livingstone Shire Council	1	0	$630.00
Mackay Regional Council	9	3	$20,102.40
Noosa Shire Council	1	0	$630.00
Redland City Council	4	0	$2,520.00
Rockhampton Regional Council	7	0	$4,410.00
Somerset Regional Council	0	3	$14,432.40
South Burnett Regional Council	2	0	$1,260.00
Southern Downs Regional Council	4	3	$16,952.40
Sunshine Coast Regional Council	6	1	$8,590.80
Toowoomba Reginal Council	14	1	$13,630.80
Townsville City Council	9	1	$10,480.80
Western Downs Regional Council	3	0	$1,890.00
Whitsunday Regional Council	4	0	$2,520.00
Total	**142**	**18**	**$185,676.00**

Notes:
*Annual fee for ERA 20(1) is $630.00
**Annual fee for ERA 20(2) (a) is $4810.80
Annual report on the administration of the EP Act 1994 for the 2013 – 2014 financial year

5.2.5 Waste sampling and testing costs

Sampling and testing costs for waste generators are not expected to increase under the proposed regulated waste classification system. It is anticipated that most generators will use the default table (Attachment F) and be automatically categorised into one of the three waste categories or the not regulated waste category, thus avoiding the need to test their waste.

The main exception will be where a generator would like their waste to be reclassified to a category lower than their existing default category. In these cases the generator may elect to have the waste material tested to ascertain the concentration of the hazard parameter(s) and therefore demonstrate a lower waste classification category.

Where a waste generator has a large amount of homogenous or mixed waste and can demonstrate a consistency in the concentration/ type of the hazard parameter(s), ongoing testing may not be required. However, for unmixed or heterogeneous waste, a waste generator may be required to test and ensure that the concentration/ type of the hazard parameter(s) continue to meet the category thresholds for each load of waste.

As a result of the proposed framework there isn't expected to be any increase in costs for a majority of waste generators. Waste generators are only likely to test in order to demonstrate a lower waste classification to reduce the costs associated with transport, disposal, processing or treatment of the waste.

This may not be the case for all wastes and waste generators, and an exact figure is difficult to quantify as there is no way of anticipating the number of generators who may elect to undertaking waste testing.

5.2.6 Implementation and transitional impacts

If adopted, option 2 will require that 1868 existing waste related ERA approvals transition to the new ERA framework. Of these approvals the new waste related ERA category and annual fee is known for 1267 approvals. These approvals will transition directly to a new ERA under the new framework. Transitioning these approvals will require less compliance and administrative effort than those approvals that will need to be determined on a case-by-case basis.

Where a case-by-case determination is required this will require liaison between department officers and the approval holder to determine the applicable new ERA and relevant threshold. This process will require an increased level of administrative and compliance resources of the department. Administrative resources will also be required of local government where devolved approvals are transferred to the department.

5.3 Cost benefit summary

Table 6: Cost and benefit summary (Option 2)

Option 2: Adopt a new integrated risk-based regulatory framework		
Stakeholders	**Benefits**	**Costs**
Industry	• Annual fees for some activities may decrease. • Provides proportionate regulation for waste related activities. • Clearer regulation and standards for new and emerging technologies, such as thermal treatment. • Fairer playing field. • Increased confidence in the Queensland Government's ability to maintain the contemporaneity of environmental law and management practices. • Requirement for currently unregulated activities to obtain approval.	• Annual fees for some activities may increase. • Increased administration for existing holders in transitioning to a new equivalent ERA and threshold. • New costs associated with the implementation and practice of the new framework including waste transport and management. • Possible delays and costs in implementing the new framework. • Requires education and training to ensure a smooth transition and the benefits of a new framework are realised. • A cultural change for the classification and management of regulated wastes.
Local government	• Reduction in administration costs, following the transfer of some ERAs to the state.	• Recentralising the management of some ERAs could cause a financial loss to local councils. • Implementation costs associated with transitioning to the new system. • A cultural change for the classification and management of regulated wastes which will take time to fully implement. • Change to compliance and licensing workloads.
Queensland Government	• Contemporary prescribed waste ERAs that are tailored to new and emerging technologies that are also flexible enough to capture future technologies. • Improved compliance and assessment capacity due to streamlined ERA regulatory requirements. • Improved environmental outcomes as higher risk wastes and activities will be more easily identified through the new regulatory framework allowing improved targeted compliance programs.	• Costs associated with developing and implementing a new framework. • A cultural change for the classification and management of regulated wastes which will take time to fully implement.
Community	• Increased confidence in government ability to ensure that environmental risks are appropriately managed. • High risk activities are appropriately managed. • Requirement for currently unregulated activities to obtain approval.	• New costs associated with the implementation and practice of the new framework including waste transport and management.

5.4 Preferred policy option

Option 2 is the preferred policy option. This option was developed to address the issues and criticisms associated with the existing management frameworks.

Despite the initial administrative costs associated with implementing and transitioning to the new framework, it is envisaged that in the longer term option 2 will achieve all of the stated policy objectives of the review.

1. Improved classification of waste based on the level of risk posed to the environment or human health.
2. Management of waste ERAs that is commensurate to risk.
3. Development of waste ERAs that support new and emerging technologies.
4. Consistency for operators undertaking waste ERAs.
5. A regulatory environment that encourages innovation in waste management practices.
6. A framework that does not impact on the viability of established industries and encourages capital investment, economic development and employment.

Conversely, maintaining the status-quo (option 1) only partially addresses policy objective number 6 (a framework that does not impact on the viability of established industries) and it is therefore not considered to be the preferred policy option.

6.0 Consultation process

6.1 Regulated waste classification framework

Between July 2014 and September 2015, the department carried out preliminary consultation on the proposed regulated waste classification framework and the proposed changes to the waste related ERAs.

Initial consultations commenced in July 2014 when key external stakeholders and government departments were invited to comment on the proposed policies. The feedback was considered by the department and the appointed consultants in preparing the Draft Regulated Waste Classification Framework ('Draft Framework'), which was delivered in March 2015.

The Draft Framework was further consulted on during a series of workshops and face-to-face meetings in South East and Far North Queensland over the period May to July 2015. The department released the Draft Framework for public consultation in September 2015.

6.2 Waste-related ERA framework

The review of the waste related ERAs commenced in 2013 in consultation with industry and other stakeholders. A draft framework was developed and released for public consultation on 06 August 2015 and remained open for comment until 25 September 2015.

During this period submissions were received from 20 stakeholders and the comments provided have been used to inform the development of the final ERA framework that is the subject of this consultation RIS.

7.0 Consistency with other policies and regulation

7.1 Competition principles agreement

The guiding principle of the Competition Principles Agreement, under National Competition Policy, is that legislation should not restrict competition unless it can be demonstrated that:

(a) the benefits of the restriction to the community as a whole outweigh the costs
(b) the objectives of the legislation can only be achieved by restricting competition.

The proposed reform of waste related ERAs will apply equally to all parties concerned and will not restrict competition. Given that one of the key policy objects is to provide consistent regulation for all persons undertaking waste management policies, the competition principles are arguably enhanced.

7.2 Fundamental legislative principles

The fundamental legislative principles under section 4 of the *Legislative Standards Act 1992* were considered during development of the proposed regulatory reforms. In light of these principles, the government does not intend to create inconsistencies with the maintenance of 'the rights and liberties of individuals, and the institution of Parliament' in implementing the new reforms.

8.0 Implementation, evaluation and compliance support strategy

The process of transitioning from the current to the new regulatory framework will likely take more than 12 months to complete. The process is likely to be carried out in stages, and may involve using the ERA approval anniversary date as the time at which an approval's transition will commence. However, the actual transition process and commencement date will be determined following consultation with the relevant regulatory departments and other stakeholders. This will be to ensure that both the administrative authorities and existing approval holders have sufficient time to prepare and make necessary changes that may be needed, particularly in instances where there may be an increase in annual fees.

As stated above, transition is likely to take at least 12 months to complete. As a result a review of completion, required to determine the effectiveness of the process, will be undertaken within 24 months.

Criteria for 'success' could be assessed on the following:

- variance between the projected and actual number of approvals transitioned
- variance between the projected and actual revenue generated
- whether the revenue generated covers the relevant administration costs
- external feedback from industry and stakeholders
- internal feedback from relevant divisions within the department.

Attachment A: Proposed ERA framework

ERA 53 Organic material processing

53 Organic material processing

(1) Organic material processing (the ***relevant activity***) consists of operating a facility that receives greater than 200 tonnes (t) of organic material in a year for composting or anaerobic digestion

(2) The relevant activity does not include undertaking composting or anaerobic digestion where the organic material –
- (i) is generated from agriculture or livestock production activities;
- (ii) processed on a site where agricultural or livestock production activities are carried out; and
- (iii) processed and provided for subsequent use without fee or charge.

(3) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the activity is carried out.

Threshold	**AES**	**3**
1 processing organic material by -		
(a) composting	37	C
(b) anaerobic digestion	24	C

(4) In this section—

organic material is material that is comprised of plant or animal material, or wastes derived through the processing such materials. To remove any doubt, such material includes organic waste.

organic waste —

(a) includes the following, or an organic waste of similar characteristics:
- (i) a substance used for manufacturing fertiliser for agricultural, horticultural or garden use;
- (ii) animal manure;
- (iii) biosolids;
- (iv) cardboard and paper waste;
- (v) fish processing waste;
- (vi) food and food processing waste;
- (vii) green waste;
- (viii) poultry processing waste;
- (ix) waste generated from an abattoir; but

(b) to remove any doubt, organic waste does not include any of the following:
- (i) clinical or related waste;
- (ii) quarantine waste regardless of its composition;
- (iii) any synthetic or artificially synthesised compound, chemical or substance, regardless of its composition;
- (iv) contaminated soil regardless of its composition.

anaerobic digestion refers to the process in which microorganisms break down organic material in the absence of oxygen for the purpose of producing biogas

composting refers to the process in which microorganisms break down organic material for the purpose of producing compost or soil conditioners

Summary

The ERA captures composting and anaerobic digestion activities of organic material. All facilities receiving 200t or more of organic material in a year will be required to obtain an approval.

The ERA is not intended to capture anaerobic digestion or composting activities where the material is processed and subsequently used on the site where it was produced. For example, a wastewater or sewage treatment plant operating an onsite anaerobic digester to process waste produced as a by-product of an existing lawful activity, will not be required to obtain an ERA 53 approval. If however the treatment plant commenced accepting waste from a third party under a commercial arrangement an ERA 53 approval would then be required.

This ERA does not include on-farm composting or anaerobic digestion where:

- the waste is produced, processed and subsequently used on a site where agricultural or livestock activities are carried out; and
- the processing and subsequent supply of the product is provided without fee or charge.

ERA 55 Waste processing or treatment

55 Waste processing or treatment

(1) Waste processing or treatment (the ***relevant activity***) consists of operating a facility that receives waste or contaminated soil for the purpose of –
  (a) processing to extract resources or produce products; or
  (b) treating to render the waste or contaminated soil less hazardous

(2) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the activity is carried out.

Threshold	**AES**	**3**
1. Mechanically processing or treating -		
(a) more than 5000t of general waste in a year	21	C
(b) category 3 regulated waste	24	C
(c) category 2 regulated waste	32	C
(d) category 1 regulated waste or contaminated soil	44	C
2. Thermally processing or treating -		
(a) general waste	38	C
(b) category 3 regulated waste	40	C
(c) category 2 regulated waste	48	C
(d) category 1 regulated waste or contaminated soil	60	C
3. Otherwise processing or treating -		
(a) general waste	28	C
(b) category 3 regulated waste	30	C
(c) category 2 regulated waste	38	C
(d) category 1 regulated waste or contaminated soil	50	C

(3) In this section—
mechanical processing, in relation to waste, includes using processes such as crushing, milling, grinding, shredding or other mechanised sorting or processing equipment
Examples –
shredding tyres, operating a trommel, glass imploder, concrete crusher or green waste shredder
thermally processing or treating, in relation to waste, means applying heat to a waste to change its chemical composition
Examples –
gasification, pyrolysis, plasma arc or incineration facility
otherwise processing or treating, in relation to waste, means processing or treating using methods other than mechanical or thermal as defined in this section
Examples—
bioremediation, chemical fixation or autoclaving

Summary

ERA 55 captures a range of waste processing, recycling and treatment activities. It includes specific categories for processing or treating waste using mechanical or thermal processes. A separate category titled ‘otherwise processing or treating’ is included for processes that do not fall within the mechanical or thermal processing definitions. Each category includes separate thresholds for general waste and category 1, 2 and 3 regulated wastes.

Activities currently undertaken under the following ERAs may now be captured within this ERA:

- ERA 20 metal recovery (with fragmentiser)
- ERA 33 crushing, milling, grinding or screening (of waste material only)
- ERA 55 regulated waste recycling or reprocessing
- ERA 58 regulated waste treatment
- ERA 59 tyre recycling
- ERA 61 waste incineration or thermal treatment
- ERA 62 waste transfer station.

Mechanical processing or treatment

This category captures crushing, shredding, screening or other mechanised processes. Under this category, the following existing activities may now be regulated:

- ERA 20 Metal recovery where a fragmentiser is used
- ERA 59 Tyre recycling, using processes such as shredding or crumbing
- ERA 33 Crushing, milling grinding or screening of waste material
- ERA 52 (battery recycling), ERA 55 (regulated waste recycling or reprocessing) or ERA 58 (regulated waste treatment) activities where processing or treatment is undertaken using processes that fall within the definition of mechanical processing or treating.

- ERA 62 Waste transfer station activities where processing, sorting or screening of material occurs using mechanical equipment such as a trommel, glass imploder or other heavy machinery or mechanised processes.

Up to 5000t per annum of general waste may be mechanically processed without requiring an ERA 55 approval. In cases where less than 5000t of general waste is being processed an ERA 62 waste transfer and resource recovery approval may still be required.

Thermal processing or treatment

The category captures thermal processes such as incineration, pyrolysis and gasification where heat is applied to a waste to change its chemical composition for the purpose of:

- processing to extracting resources or producing products; or
- treating to render the waste or contaminated soil less hazardous.

With the exception of autoclaving, all existing ERA 61 waste incineration or thermal treatment activities will be captured within this category.

Autoclaving is not captured is this category as the process does not alter the chemical composition of the material. It is instead captured under the otherwise processing or treating category within this ERA.

Otherwise processing or treating

This category captures all other waste processing or treatment activities that do not fall within the mechanical or thermal treatment categories within this ERA. This may include bioremediation, chemical fixation or autoclaving activities.

ERA 57 Waste transport

57 Waste transport

(1) Waste transport (the ***relevant activity***) consists of transporting in a vehicle:
  (a) regulated waste; or
  (b) greater than 750kg of general waste

(2) The relevant activity does not include transporting:
  (a) up to 175kg of non-friable asbestos
  (b) on a non-commercial basis any of the following:
    (i) less than 250kg of regulated waste other than asbestos; or
    (ii) any amount of general waste.

(3) In the following table, the aggregate environmental score (AES), if any, for the relevant activity is the score stated opposite the threshold within which the relevant activity is carried out.

Threshold	AES	3
1 transporting end-of-life tyres	2	
2 transporting regulated waste	1	
3 transporting general waste	1	

(4) In this section—
vehicle includes the part of an aircraft, boat, rolling stock, semi-trailer, tanker, trailer or truck, used to transport the regulated waste.
non-commercial for the purpose of this section means self-haul waste from a domestic premises or waste transported on a gratuitous basis.

Summary

Operators transporting any quantity of regulated waste on a commercial basis will be captured under this ERA. Transport of up to 250kg of regulated waste on a non-commercial basis may be undertaken without an approval.

An annual fee of $253.20 will be payable for each regulated waste transport vehicle registered with the department. This is intended to provide a fairer and more equitable fee structure than that provided under the current framework. This will be particularly beneficial for small or single vehicle operations as the minimum annual fee has been reduced to $253.20 for a single vehicle license (previously this was $1712.90 for one to five vehicles). Similarly, a reduced annual fee of $1223.50 will now apply for 5 vehicles.

The maximum fee will be capped at 36 vehicles ($9,115.20) after which additional vehicles can be registered without further increasing the annual fee.

The annual fee for tyre transport is fixed at $506.40, irrespective of the number of vehicles in use.

Asbestos

The requirements for persons to hold a waste transport ERA approval for asbestos material now align with the asbestos removal licensing requirements set by Work Health and Safety Queensland. Under this arrangement, a person will be required to hold a waste transport ERA approval when transporting any amount of friable asbestos or, greater than 175kg of non-friable asbestos.

This approach:

- provides consistency with work health and safety licensing requirements e.g. a person removing asbestos is required to be licensed under work health and safety regulations is also required to hold a waste transport ERA and complete associated tracking documentation
- enables licensing requirements to be determined by the quantity and type of asbestos material removed and not the commercial nature of the activity
- minimises the cost and regulatory requirements associated with lawfully transporting asbestos waste, therefore reducing the incentive to improperly dispose of asbestos waste by:
    - Introducing a lower annual ERA fee for licensed asbestos waste transporters; and
    - Allowing the removal of up to ten square meters of non-friable asbestos without requiring an approval(for both commercial and non-commercial operators)
    - Reducing transport licensing costs for homeowners or commercial tradespersons, such as plumbers and electricians (for whom the primary business is not asbestos removal), to allow the transport of up to ten square meters of non-friable asbestos waste
- means that regardless of any ERA requirements all asbestos material must be appropriately handled and managed in accordance Work Health and Safety handling requirements.

General waste transport

Operators transporting greater than 750kg of general waste on a commercial basis will be required to obtain a waste transport approval. The grounds for this inclusion are that:

- the transport of general waste poses an environmental risk, if not managed properly
- inclusion will ensure that all persons transporting waste are aware of their obligations to properly manage all wastes
- all persons transporting waste will be required to operate within the same environmental standards
- it will help waste generators and industry identify legitimate waste transport operators.

A fixed annual fee of $253.20 is proposed for persons transporting general waste. This is irrespective of the number of vehicles in use and operators will not be required to register vehicle details with the department.

ERA 60 Waste disposal

60 Waste disposal

(1) Waste disposal (the relevant activity) consists of only one of the following—

(a) operating a facility for disposing of:

(i) regulated waste; or

(ii) regulated waste and any, or any combination, of the following—

(A) general waste;

(B) limited regulated waste;

(C) if the facility is in a scheduled area—no more than 5t of untreated clinical waste in a year;

(b) operating a facility for disposing of, in a year, 50t or more of waste consisting of:

(iii) only general waste; or

(iv) general waste and either, or a combination, of the following—

(A) a quantity of limited regulated waste that is no more than 10% of the total amount of waste received at the facility in a year;

(B) if the facility is in a scheduled area—no more than 5t of untreated clinical waste.

(c) maintaining a waste disposal facility in post closure care

(2) The relevant activity does not include using clean earth as fill.

(3) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the relevant activity is carried out.

Threshold	**AES**	**3**
1 operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(a)—		
(a) Less than 50,000t	54	C
(b) 50,000t to 100,000t	85	C
(c) More than 100,000t but not more than 200,000t	111	C
(d) More than 200,000t	121	C
2 operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(b)—		
(a) More than 50t but not more than 2000t	21	C
(b) More than 2000t but not more than 5000t	31	C
(c) More than 50,000t but not more than 10,000t	39	C
(d) More than 10,000t but not more than 20,000t	50	C
(e) More than 20,000t but not more than 50,000t	70	C
(f) More than 50,000t but not more than 100,000t	82	C
(g) More than 100,000t but not more than 200,000t	90	C
(h) More than 200,000t	110	C
3 maintaining a waste disposal facility in post closure care	17	

(4) In this section—

clean earth means natural material such as clay, gravel, sand, soil or rock that is not contaminated with waste or otherwise classified as contaminated soil

facility includes a naturally occurring or constructed hollow or pit, including, for example, a gully, mining shaft, quarry, but does not include a hollow or pit on a farm used for receiving and disposing of general waste produced on the farm

post closure care refers to a waste disposal facility that is closed, undergoing rehabilitation and no longer accepting waste for the purpose of disposal

regulated waste for the purpose of this section includes category 1, 2 and 3 regulated waste

Summary

A new threshold 60 (3) with a lower annual fee has been introduced for waste disposal facilities that are no longer accepting waste and are undergoing post closure care. This is intended to capture landfills that are currently regulated under the ERA framework only. Historic landfills that did not hold or were not required to hold an ERA 60 approval will not be retrospectively captured.

The existing 'clean earthen material' definition has been removed and replaced with a new 'clean earth' definition**.** This is intended to restrict the disposal of C&D waste that was permitted under the current clean earthen material definition without obtaining an approval for ERA 60. This approach recognises that C&D waste is rarely presented without contamination and would not meet the definition of clean earthen material that currently applies. Sites accepting C&D waste material will be subject to the same regulatory requirements as other licensed waste disposal facilities accepting other similar wastes.

ERA 62 Waste transfer and resource recovery facility

62 Waste transfer and resource recovery facility

(1) Resource recovery and transfer facility (the *relevant activity*) consists of operating, on a commercial basis or in the course of carrying on a commercial enterprise, a facility that receives waste for sorting, dismantling, baling or temporary storage.

(2) In the following table, the aggregate environmental score (AES) for the relevant activity is the score stated opposite the threshold within which the activity is carried out.

Threshold	**AES**	**3**
1 baling of clean source separated recyclables	9	C
2 sorting, dismantling or temporarily storing -		
(a) general waste	14	C
(b) category 3 regulated waste	17	C
(c) category 2 regulated waste	25	C
(d) category 1 regulated waste	29	C
3 sorting or temporarily storing end-of-life tyres	14	C

(3) In this section -

resource recovery and transfer facility means a facility used for –

(a) receiving, sorting, dismantling or baling waste; and

(b) temporarily storing waste before moving it, from the site where the relevant activity is carried out, for recycling, processing, treatment or disposal.

(4) The relevant activity does not include:

(a) storing waste in transit;

(b) local government operated facilities accepting not more than 2500t or 2500m^3 of waste per year;

(c) temporarily storing:

(i) not more than 4000L or 4t of general waste or category 3 waste at any one time;

(ii) not more than 2000L or 2t of category 1 or 2 regulated waste at any one time;

(iii) not more than 4t or 500 equivalent passenger tyre units (EPUs), or tyres or parts of tyres at any one time;

(iv) chemically treated power poles;

(v) clinical waste consisting only of sharps in sharps containers that comply with AS 4031 or AS/NZ 4261 for a period of up to 28 calendar days;

(vi) waste in accordance with an accredited product stewardship scheme or take-back scheme; or

(vii) waste at a retail location or service premises where the waste is awaiting removal.

Examples for subparagraph (c)(vi)— a motor vehicle workshop, tyre retailer, repair shop, battery retailer

dismantling means to disassemble or take apart into separate pieces.

in-transit storage means storing waste for no longer than five days where the waste is not unloaded, decanted or removed from the vehicle or storage container in which it is being transported

end-of-life tyre means a used tyre that has been removed from a vehicle

Summary

ERA 62 captures low level risk waste transfer and resource recovery activities. It allows for sorting, consolidating, dismantling, baling and the associated temporary storage of waste. Further processing of waste using mechanised processes such as crushing, shredding or other similar processes will require an additional relevant ERA 55 approval for mechanical processing. This approach allows delineation between smaller (lower-risk) sorting facilities and those undertaking additional processing onsite that presents increased noise, emissions and containment risks.

Regulated waste storage

Existing ERA 56 regulated waste storage activities will be captured under this ERA. The primary point of difference is that regulation under this ERA does not authorise indefinite storage of waste. Instead it is intended to allow associated or temporary storage until such time that sufficient waste is consolidated prior to sending the waste to another facility for disposal, treatment or processing. A timeframe has not been specified given the variability and practicality of applying a reasonable ‘one size fits all timeframe’. Large variances in storage time requirements may be present due to a variety of factors, including:

- processing or disposal facilities may not be available locally
- facilities in regional areas may take longer to consolidate sufficient waste for it to be cost effective to transport off site
- some waste types by nature are less common and may take longer to accumulate sufficient quantities.

Tyre storage

Receiving and consolidating tyres are also captured within this ERA. A separate threshold is provided for facilities that receive and store greater than 4t or 500 equivalent passenger tyre units (EPUs) of end-of-life tyres at any one time. This means that facilities receiving, consolidating and storing tyres have the same level of regulation and operate to the same management standards as other waste facilities.

An end-of-life tyre is said to mean 'a used tyre that has been removed from a vehicle'. This will include any facility receiving and storing greater than 4t or 500 EPUs of end-of-life tyres, irrespective of their potential or perceived reuse value. One EPU is equivalent to 8kg for an end-of-life tyre.

Removal of tonnage based licensing threshold

The 30t or 30m^3 per day threshold no longer applies and all commercial facilities receiving waste will be required to hold an ERA 62 approval, with some exemptions, which are outlined below.

Small scale local government facilities

Local government facilities accepting not more than 2500t or 2500m^3 of waste material per year. Small scale local government facilities are exempted for the following reasons:

- the location of local government facilities are known and advertised, unlike 'rogue' or 'backyard' operators
- records are kept that allow the amount of waste being received at the facility to be determined. E.g. the number and volume of bins collected from each site
- these facilities should not be competing with operators in the commercial waste management sector
- 2500t or 2500m^3 equates to 50 tonnes per week
- the facility is provided by local government as a community service.

Other

Other exemptions apply to low risk waste storage activities, or where the primary purpose is not a waste collection service. Exemptions apply for temporarily storing:

- not more than 4000L or 4t of general waste or category 3 regulated waste at any one time
- not more than 2000L or 2t of category 1 or 2 regulated waste at any one time (includes asbestos)
- not more than 4t or 500 EPUs, or end-of-life tyres or parts of tyres at any one time;
- chemically treated power poles
- clinical waste consisting only of sharps in sharps containers that comply with AS 4031 or AS/NZ 4261 for a period of up to 28 calendar days
- waste in accordance with an accredited product stewardship scheme or take-back scheme
- waste at a retail location or service premises where the waste is awaiting removal, such as at a motor vehicle workshop, tyre retailer, repair shop, battery retailer.

Attachment B: Preferred ERA framework threshold, AES and annual fee summary

Table 7: Proposed ERAs, thresholds and aggregate environmental scores (AES)

Proposed ERA	Threshold	AES	Annual fee
ERA 53 organic waste processing	(1) processing organic material by composting	37	$9,368.40
	(2) processing organic material by anaerobic digestion	24	$6,076.80
ERA 55 waste processing or treatment	(1a) mechanically processing or treating > 5000t yr general waste	21	$5,317.20
	(1b) mechanically processing or treating cat 3 regulated waste	24	$6,076.80
	(1c) mechanically processing or treating cat 2 regulated waste	31	$8,102.40
	(1d) mechanically processing or treating cat 1 regulated waste or contaminated soil	44	$11,140.80
	(2a) thermally processing or treating general waste	38	$9,621.60
	(2b) thermally processing or treating cat 3 regulated waste	40	$10,128.00
	(2c) thermally processing or treating cat 2 regulated waste	48	$12,153.60
	(2d) thermally processing or treating cat 1 regulated waste or contaminated soil	60	$15,192.00
	(3a) otherwise processing or treating general waste	28	$7,089.60
	(3b) otherwise processing or treating cat 3 regulated waste	30	$7,596.00
	(3c) otherwise processing or treating cat 2 regulated waste	38	$9,621.60
	(3d) otherwise processing or treating cat 1 regulated waste or contaminated soil	50	$12,660.00
ERA 57 waste transport	(1) transporting end-of-life tyres	2	$506.40
	(2) transporting regulated waste (cat 1, 2 or 3)	1	$253.20*
	(3) transporting general waste	1	$253.20
ERA 60 waste disposal	(1a) Waste disposal <50000t yr (1a)	82	$20,762.40
	(1b) Waste disposal >50000t but <100000t yr (1a)	112	$28,358.40
	(1c) Waste disposal >100000 but <200000t yr (1a)	129	$32,662.80
	(1d) Waste disposal >200000t yr (1a)	139	$35,194.80
	(2a) Waste disposal >50t but <2000t yr (1b)	21	$5,317.20
	(2b) Waste disposal >2000t but <5000t yr (1b)	31	$7,849.20
	(2c) Waste disposal >5000t but <10000t yr (1b)	39	$9,874.80
	(2d) Waste disposal >10000t but <20000t yr (1b)	50	$12,660.00
	(2e) Waste disposal >20000t but <50000t yr (1b)	70	$17,724.00
	(2f) Waste disposal >50000t but <100000t yr (1b)	82	$20,762.40
	(2g) Waste disposal >100000t but <200000t yr (1b)	90	$22,788.00
	(2h) Waste disposal >200000t yr (1b)	110	$27,852.00
	(3) Maintaining a waste disposal facility in post closure care	17	$4,304.40
ERA 62 resource recovery and transfer facility	(1) baling of clean source separated recyclables	9	$2,278.80
	(2a) sorting, dismantling or temporarily storing general waste	14	$3,544.80
	(2b) sorting, dismantling or temporarily storing cat 3 regulated waste	17	$4,304.40
	(2c) sorting, dismantling or temporarily storing cat 2 regulated waste	25	$6,330.00
	(2d) sorting, dismantling or temporarily storing cat 1 regulated waste	29	$7,342.80
	(3) sorting or temporarily storing end-of-life tyres	14	$3,544.80

*$253.20 per regulated waste transport vehicle registered with the department. Fee capped at $9,115.20 (equivalent of 36 vehicles).

Attachment C: Regulated waste transport annual fee changes

An annual fee of $253.20 will be payable for each regulated waste transport vehicle registered with the department. The maximum fee is capped at $9,115.20 (equivalent to 36 vehicles) after which additional vehicles can be registered without further increasing the annual fee. The annual fee for tyre transport is fixed at $506.40, irrespective of the number of vehicles in use.

Table 8 summarises the new vehicle based fees, comparative to the existing annual fee.

Table 8: ERA 57 regulated transport annual fee summary

Existing annual fee structure		Vehicle based annual fee structure		
ERA Threshold	Current annual fee	No. of vehicles	Proposed annual fee	Change in fee
57(1) Regulated waste transport – end-of-life tyres	$630.00	NA	$506.40	-$119.60
57(2a) Regulated waste transport 1 - 5 vehicles	$1,772.40	1	$253.20	-$1,468.20
		2	$506.40	-$1,223.50
		3	$759.60	-$978.80
		4	$1,012.80	-$734.10
		5	$1,266.00	-$489.40
57(2b) Regulated waste transport 5 - 36 vehicles	$5,317.20	6	$1,519.20	-$3,670.50
		7	$1,772.40	-$3,425.80
		8	$2,025.60	-$3,181.10
		9	$2,278.80	-$2,936.40
		10	$2,532.00	-$2,691.70
		11	$2,785.20	-$2,447.00
		12	$3,038.40	-$2,202.30
		13	$3,291.60	-$1,957.60
		14	$3,544.80	-$1,712.90
		15	$3,798.00	-$1,468.20
		16	$4,051.20	-$1,223.50
		17	$4,304.40	-$978.80
		18	$4,557.60	-$734.10
		19	$4,810.80	-$489.40
		20	$5,064.00	-$253.20
		21	$5,317.20	$0.00
		22	$5,570.40	$253.20
		23	$5,823.60	$489.40
		24	$6,076.80	$734.10
		25	$6,330.00	$978.80
		26	$6,583.20	$1,223.50
		27	$6,836.40	$1,468.20
		28	$7,089.60	$1,712.90
		29	$7,342.80	$1,957.60
		30	$7,596.00	$2,202.30
		31	$7,849.20	$2,447.00
		32	$8,102.40	$2,691.70
		33	$8,355.60	$2,936.40
		34	$8,608.80	$3,181.10
		35	$8,862.00	$3,425.80
57(2c) Regulated waste transport > 36 vehicles	$10,634.40	> 36	$9,115.20	-$1,468.20

Attachment D: New ERA threshold and category determination

The following tables summarise the new ERA, threshold and annual fee that will be applicable for each existing ERA category. Within each table:

- the left hand column shows the existing ERA threshold and annual fee
- the right hand column shows the new ERA threshold and annual fee.

In some instances the right hand columns will show more than one possible new ERA and/or threshold. This is because the new descriptors and thresholds do not align directly with the existing ERA descriptors/ thresholds and as a result all new possible ERA thresholds have been shown. Where the new ERA threshold is known the cells are shaded green. Where the new threshold cannot be determined and there is more than one option, the cells are shaded orange.

For example, existing operations that involve only general waste, will transition to a new ERA threshold for general waste. However where regulated waste is involved the classification of the regulated waste must be known in order to determine the new ERA threshold. This can be determined by either adopting a default waste category (refer to Attachment F) or by undertaking testing of the waste for hazard parameters (refer to Attachment G). For facilities receiving multiple wastes the ERA threshold required will be determined by the waste with the highest risk categorisation.

Where an operator holds an approval to undertake more than 1 ERA the annual fee will be determined by the ERA that carries the highest annual fee.

ERA 20 Metal recovery

Existing ERA 20 metal recovery activities will be regulated under either ERA 55 (waste processing) or ERA 62 (waste transfer and resource recovery). Metal recovery operations that undertake lower risk manual sorting and dismantling activities will transition to ERA 62 (waste recovery facility). Metal recovery operations that involve higher risk mechanical processing (such as operating a fragmentiser) will transition to ERA 55 (waste processing or treatment). The new ERA threshold in both instances is determined by the classification of the waste.

Existing ERA threshold	*AES*	*Annual Fee*
20-(1) Metal recovery <100t day	No score	$630.00
20-(2a) Metal recovery >100t day or >10000t yr	19	$4,810.80
20-(2b) Metal recovery >100t day or >10000t yr with fragmentiser	51	$12,913.20

New ERA threshold	*AES*	*Annual fee*
62-(2a) Sorting, dismantling or temporarily storing general waste	14	$3,544.80
62-(2b) Sorting, dismantling or temporarily storing cat 3 regulated waste	17	$4,304.40
62-(2c) Sorting, dismantling or temporarily storing cat 2 regulated waste	25	$6,330.00
62-(2d) Sorting, dismantling or temporarily storing cat 1 regulated waste	29	$7,342.80
55-(1a) Mechanically processing or treating > 5000t yr general waste	21	$5,317.20
55-(1b) Mechanically processing or treating cat 3 regulated waste	24	$6,076.80
55-(1c) Mechanically processing or treating cat 2 regulated waste	32	$8,102.40
55-(1d) Mechanically processing or treating cat 1 regulated waste or contaminated soil	44	$11,140.80

ERA 33 Crushing, milling, grinding or screening

ERA 33 will now apply to the processing of non-waste material only (such as virgin rock or quarry material). Persons processing non-waste material only will remain regulated under this ERA. Where waste is being processed (such as green waste timber or concrete), an ERA 55(1a) approval will be required (see table 9). ERA 55 also permits processing of non-waste material, and holders of this ERA will not be required to hold an additional ERA 33 approval. Itinerant or mobile approvals may be issued for both ERA 33 and ERA 55 activities.

Existing ERA threshold	*AES*	*Annual Fee*
33-Crushing, milling, grinding or screening >5000t yr	No score	$630.00

New ERA threshold	*AES*	*Annual Fee*
33-Crushing, milling, grinding or screening >5000t yr (non-waste material)	9	$2,278.80
55-(1a) Mechanically processing or treating > 5000t yr general waste	21	$5,317.20

ERA 52 Battery recycling

Existing used lead acid battery (ULAB) dismantling operations will transition to ERA 62-(2c) waste transfer and resource recovery facility. ULABs have default waste categorisation of category 2 regulated waste.

Existing ERA threshold	*AES*	*Annual Fee*
52-Battery recycling	No score	$630.00

New ERA threshold	*AES*	*Annual Fee*
62-(2c) Sorting, dismantling or temporarily storing cat 2 regulated waste	25	$6,330.00

ERA 53 Composting and soil conditioner manufacturing

Existing composting and soil conditioner manufacturing activities will transition to a new ERA 53(1) processing of organic materials by composting threshold.

Existing ERA threshold	*AES*	*Annual Fee*
53-Composting & soil conditioner manufacturing >200t yr	18	$4,557.60

New ERA threshold	*AES*	*Annual Fee*
53-(1) Processing organic material by composting	37	$9,368.40

ERA 55 Regulated waste recycling or reprocessing

Existing ERA 55 approvals will transition to a new ERA 55 waste processing or treatment category. The applicable threshold will be determined by the process being undertaken and the classification of waste.

Existing ERA threshold	*AES*	*Annual Fee*
55-(1) Regulated waste recycling or reprocessing	9	$2,278.80
55-(2) Regulated waste recycling or reprocessing	85	$21,522.00

New ERA threshold	*AES*	*Annual Fee*
55-(1b) Mechanically processing or treating cat 3 regulated waste	24	$6,076.80
55-(1c) Mechanically processing or treating cat 2 regulated waste	32	$8,102.40
55-(1d) Mechanically processing or treating cat 1 regulated waste or contaminated soil	44	$11,140.80
55-(3b) Otherwise processing or treating cat 3 regulated waste	30	$7,596.00
55-(3c) Otherwise processing or treating cat 2 regulated waste	38	$9,621.60
55-(3d) Otherwise processing or treating cat 1 regulated waste or contaminated soil	50	$12,660.00

ERA 56 Regulated waste storage

Existing ERA 56 regulated waste storage approvals will be captured by new ERA 62 waste transfer and resource recovery. ERA 62 permits temporary storage of waste until is it removed from the site for recycling, processing, treatment or disposal.

Existing ERA threshold	*AES*	*Annual Fee*
56 Regulated waste storage	21	$5,317.20

New ERA threshold	*AES*	*Annual Fee*
62-(2b) Sorting, dismantling or temporarily storing cat 3 regulated waste	17	$4,304.40
62-(2c) Sorting, dismantling or temporarily storing cat 2 regulated waste	25	$6,330.00
62-(2d) Sorting, dismantling or temporarily storing cat 1 regulated waste	29	$7,342.80

An ERA 62 approval will not be required for the temporary storage of:

- not more than 2000L or 2t of category 1 or 2 regulated waste at any one time (includes asbestos)
- not more than 4000L or 4t of general waste or category 3 regulated waste at any one time
- not more than 4t or 500 equivalent passenger tyre units
- chemically treated power poles
- clinical waste consisting only of sharps in sharps containers that comply with AS 4031 or AS/NZ 4261 for a period of up to 28 calendar days
- waste in accordance with an accredited product stewardship scheme or take-back scheme
- waste at a retail location or service premises where the waste is awaiting removal.

ERA 57 Regulated waste transport

An annual fee of $253.20 will be payable for each regulated waste transport vehicle registered with the department. The maximum fee will be capped at 36 vehicles ($9,115.20), after which additional vehicles can be registered without further increasing the annual fee.

Transport of end-of-life tyres will attract a flat fee of $506.40, irrespective of the number of vehicles registered.

Operators transporting up to 175kg of non-friable asbestos, in a commercial capacity or otherwise, will no longer be required to hold an ERA 57 approval.

Existing ERA threshold	*AES*	*Annual Fee*
57-(1) Regulated waste transport – end of life tyres	No score	$630.00
57-(2a) Regulated waste transport 1 to 5 vehicles	7	$1,772.40
57-(2b) Regulated waste transport 6 to 35 vehicles	21	$5,317.20
57-(2c) Regulated waste transport >36 vehicles	42	$10,634.40

New ERA threshold	*AES*	*Annual Fee*
57-(1) Transporting end-of-life tyres	2	$506.40
57-(2) Transporting regulated waste (cat 1, 2 or 3)	1	$253.20*

*$253.20 per regulated waste transport vehicle registered with the department. Fee capped at $9,115.20 (equivalent of 36 vehicles).

ERA 58 Regulated waste treatment

Existing ERA 58 regulated waste treatment approvals will transition to a new ERA 55 waste processing or treatment approval. The new ERA threshold will be determined by the process being undertaken and the classification of waste.

Existing ERA threshold	*AES*	*Annual Fee*
58-Regulated waste treatment	90	$22,788.00

New ERA threshold	*AES*	*Annual Fee*
55-(1b) Mechanically processing or treating cat 3 regulated waste	24	$6,076.80
55-(1c) Mechanically processing or treating cat 2 regulated waste	32	$8,102.40
55-(1d) Mechanically processing or treating cat 1 regulated waste or contaminated soil	44	$11,140.80
55-(3b) Otherwise processing or treating cat 3 regulated waste	30	$7,596.00
55-(3c) Otherwise processing or treating cat 2 regulated waste	38	$9,621.60
55-(3d) Otherwise processing or treating cat 1 regulated waste or contaminated soil	50	$12,660.00

ERA 59 Tyre recycling

Existing ERA 59 tyre recycling approvals will transition to a new ERA 55 waste processing or treatment category. Tyres have a default waste categorisation of category 3 regulated waste and the table below assumes that recycling is being undertaken using shredding and grinding (mechanical) processes only.

Existing ERA threshold	*AES*	*Annual Fee*
59-Tyre recycling	No score	$630.00

New ERA threshold	*AES*	*Annual Fee*
55-(1b) Mechanically processing or treating cat 3 regulated waste	24	$6,076.80

ERA 60 Waste disposal

ERA 60 waste disposal approvals will continue to be regulated under the same ERA and threshold.

Existing ERA threshold	*AES*	*Annual Fee*
60-(1a) Waste disposal <50000t yr	50	$12,660.00
60-(1b) Waste disposal >50000t but <100000t yr	82	$20,762.40
60-(1c) Waste disposal >100000 but <200000t yr	100	$25,320.00
60-(1d) Waste disposal >200000t yr	110	$27,852.00
60-(2a) Waste disposal >50t but <2000t yr	13	$3,291.60
60-(2b) Waste disposal >2000t but <5000t yr	20	$5,064.00
60-(2c) Waste disposal >5000t but <10000t yr	29	$7,342.80
60-(2d) Waste disposal >10000t but <20000t yr	41	$10,381.20
60-(2e) Waste disposal >20000t but <50000t yr	53	$13,419.60
60-(2f) Waste disposal >50000t but <100000t yr	58	$14,685.60
60-(2g) Waste disposal >100000t but 200000t yr	73	$18,483.60

New ERA threshold	*AES*	*Annual Fee*
60-(1a) Waste disposal <50000t yr	82	$20,762.40
60-(1b) Waste disposal >50000t but <100000t yr	112	$28,358.40
60-(1c) Waste disposal >100000 but <200000t yr	129	$32,662.80
60-(1d) Waste disposal >200000t yr	139	$35,194.80
60-(2a) Waste disposal >50t but <2000t yr	21	$5,317.20
60-(2b) Waste disposal >2000t but <5000t yr	31	$7,849.20
60-(2c) Waste disposal >5000t but <10000t yr	39	$9,874.80
60-(2d) Waste disposal >10000t but <20000t yr	50	$12,660.00
60-(2e) Waste disposal >20000t but <50000t yr	70	$17,724.00
60-(2f) Waste disposal >50000t but <100000t yr	82	$20,762.40
60-(2g) Waste disposal >100000t but 200000t yr	90	$22,788.00

60-(2h) Waste disposal >200000t yr	96	$24,307.20	60-(2h) Waste disposal >200000t yr	110	$27,852.00

ERA 61 Waste incineration and thermal treatment

Existing ERA 61 waste incineration and thermal treatment approval holders will transition to new ERA 55 waste processing or treatment. The new ERA threshold will be determined by the process being undertaken and the classification of waste.

Existing ERA threshold	*AES*	*Annual Fee*	*New ERA threshold*	*AES*	*Annual Fee*
61-(1) Waste incineration & thermal treatment (green waste, paper, cardboard)	No score	$630.00	Not regulated. Local laws and Queensland Fire and Emergency Service provisions considered sufficient to manage small scale burning of these waste types. However where burning or incineration is of a scale that cannot be authorised through these provisions ERA 55(2a) may be required.		
61-(2a) Waste incineration & thermal treatment <5000t yr general waste	18	$4,557.60	55-(2a) Thermally processing or treating - general waste	38	$9,621.60
61-(2b) Waste incineration & thermal treatment >5000t yr general waste	30	$7,596.00			
61-(3a) Waste incineration & thermal treatment - clinical	51	$12,913.20	55-(2d) Thermally processing or treating cat 1 regulated waste or contaminated soil	60	$15,192.00
			55-(3d) Otherwise processing or treating cat 1 regulated waste or contaminated soil (includes autoclaving)	50	$12,660.00
61-(3b) Waste incineration & thermal treatment – regulated waste	41	$10,381.20	55-(2b) Thermally processing or treating cat 3 regulated waste	40	$10,128.00
			55-(2c) Thermally processing or treating cat 2 regulated waste	48	$12,153.60
			55-(2d) Thermally processing or treating cat 1 regulated waste or contaminated soil	60	$15,192.00

ERA 62 Waste transfer station operation

Existing ERA 62 waste transfer station operations will be regulated under either ERA 55 (waste processing or treatment) or ERA 62 (waste transfer and resource recovery). Waste transfer station operations that undertake lower risk manual sorting and dismantling activities will transition to new ERA 62 (waste transfer and resource recovery). In instances where further (higher risk) processing is undertaken, such as using mechanical sorting or processing equipment, an ERA 55 (waste processing or treatment) approval will be required. Up to 5000 tonnes per year of general waste may be mechanically processed at an ERA 62 approval holding facility without requiring an additional ERA 55 approval.

Existing ERA threshold	***AES***	***Annual Fee***
62-Waste transfer station operation >30t or 30m^3 day	31	$7,849.20

New ERA threshold	***AES***	***Annual Fee***
62-(1) Baling of clean source separated recyclables	9	$2,278.80
62-(2a) Sorting, dismantling or temporarily storing general waste	14	$3,544.80
55-(1a) Mechanically processing or treating > 5000t yr general waste	21	$5,317.20

Attachment E: Queensland Government impacts—number of activities and annual fee estimate

Table 9: Queensland Government annual fee revenue estimates

New ERA and threshold	*Annual Fee*	*Scenario 1*		*Scenario 2*	
		No. of approvals	*Estimated revenue*	*No. of approvals*	*Estimated revenue*
33-Crushing, milling, grinding or screening >5000t yr	$2,278.80	121	$275,734.80	73	$166,352.40
53-(1) Processing organic material by composting	$9,368.40	78	$730,735.20	78	$730,735.20
53-(2) Processing organic material by anaerobic digestion	$6,076.80				
55-(1a) Mechanically processing or treating > 5000t yr general waste	$6,583.20	3	$15,951.60	69	$366,886.80
55-(1b) Mechanically processing or treating cat 3 regulated waste	$7,342.80	96	$583,372.80	30	$182,304.00
55-(1c) Mechanically processing or treating cat 2 regulated waste	$9,368.40			39	$315,993.60
55-(1d) Mechanically processing or treating cat 1 regulated waste or contaminated soil	$12,406.80			29	$323,083.20
55-(2a) Thermally processing or treating - general waste	$13,419.60	7	$67,351.20	7	$67,351.20
55-(2b) Thermally processing or treating cat 3 regulated waste	$14,938.80	6	$60,768.00	1	$10,128.00
55-(2c) Thermally processing or treating cat 2 regulated waste	$15,951.60			3	$36,460.80
55-(2d) Thermally processing or treating cat 1 regulated waste or contaminated soil	$18,990.00			2	$30,384.00
55-(3a) Otherwise processing or treating - general waste	$10,887.60				
55-(3b) Otherwise processing or treating cat 3 regulated waste	$12,406.80				
55-(3c) Otherwise processing or treating cat 2 regulated waste	$13,419.60				
55-(3d) Otherwise processing or treating cat 1 regulated waste or contaminated soil	$16,458.00	12	$197,496.00	12	$197,496.00
57-(1) Transporting end-of-life tyres	$506.40	48	$24,307.20	48	$24,307.20
57-(2) Transporting regulated waste (cat 1, 2 or 3)	$253.20	812	$1,125,474.00	812	$1,125,474.00
57-(3) Transporting general waste	$253.20				
60-(1a) Waste disposal <50000t yr	$20,762.40	53	$1,100,407.20	53	$1,100,407.20
60-(1b) Waste disposal >50000t but <100000t yr	$28,358.40	10	$283,584.00	10	$283,584.00
60-(1c) Waste disposal >100000 but <200000t yr	$32,662.80	5	$163,314.00	5	$163,314.00
60-(1d) Waste disposal >200000t yr	$35,194.80	37	$1,302,207.60	37	$1,302,207.60
60-(2a) Waste disposal >50t but <2000t yr	$5,317.20	72	$382,838.40	72	$382,838.40
60-(2b) Waste disposal >2000t but <5000t yr	$7,849.20	34	$266,872.80	34	$266,872.80
60-(2c) Waste disposal >5000t but <10000t yr	$9,874.80	22	$217,245.60	22	$217,245.60
60-(2d) Waste disposal >10000t but <20000t yr	$12,660.00	17	$215,220.00	17	$215,220.00

New ERA and threshold	*Annual Fee*	*Scenario 1*		*Scenario 2*	
		No. of approvals	*Estimated revenue*	*No. of approvals*	*Estimated revenue*
60-(2e) Waste disposal >20000t but <50000t yr	$17,724.00	15	$265,860.00	15	$265,860.00
60-(2f) Waste disposal >50000t but <100000t yr	$20,762.40	18	$373,723.20	18	$373,723.20
60-(2g) Waste disposal >100000t but 200000t yr	$22,788.00	7	$159,516.00	7	$159,516.00
60-(2h) Waste disposal >200000t yr	$27,852.00	6	$167,112.00	6	$167,112.00
60-(3) Maintaining a waste disposal facility in post closure care	$4,304.40				
62-(1) Baling of clean source separated recyclables	$2,278.80				
62-(2a) Sorting, dismantling or temporarily storing - general waste	$3,544.80	255	$336,756.00	179	$634,519.20
62-(2b) Sorting, dismantling or temporarily storing cat 3 regulated waste	$4,304.40	121	$520,832.40	40	$172,176.00
62-(2c) Sorting, dismantling or temporarily storing cat 2 regulated waste	$6,330.00	2	$12,660.00	80	$506,400.00
62-(2d) Sorting, dismantling or temporarily storing cat 1 regulated waste	$7,342.80			59	$433,225.20
62-(3) Sorting or temporarily storing end-of-life tyres	$3,544.80				
	TOTAL	**1857**	**$9,370,932.00**	**1857**	**$10,175,601.60**

Attachment F: Default waste categorisation table

Table 10: Default waste categorisation table

Waste (tracking) code	Current regulated waste description	Primary hazard	Hazard description	Default waste category
D170	Antimony and antimony compounds	H11	Toxic (delayed or chronic)	1
D130	Arsenic and arsenic compounds	H11	Toxic (delayed or chronic)	1
D290	Barium compounds, other than barium sulfate	H11	Toxic (delayed or chronic)	1
D160	Beryllium and beryllium compounds	H11	Toxic (delayed or chronic)	1
D310	Boron compounds	H11	Toxic (delayed or chronic)	1
D150	Cadmium and cadmium compounds	H11	Toxic (delayed or chronic)	1
T100	Chemical waste arising from research and development or teaching activity, including new or unidentified material and material whose effects on human health or the environment are not known	H6.1	Poisonous (acute)	1
D350	Chlorates	H1	Explosive	1
D140	Chromium compounds (hexavalent and trivalent)	H11	Toxic (delayed or chronic)	1
R100	Clinical and related wastes	H6.2	Infectious substances	1
D190	Copper compounds	H12	Ecotoxic	1
A130	Cyanides (inorganic)	H6.1	Poisonous (acute)	1
M210	Cyanides (organic)	H6.1	Poisonous (acute)	1
G100	Ethers	H3	Flammable liquids	1
N190	Filter cake, other than filter cake waste generated from the treatment of raw water for the supply of drinking water	H11	Toxic (delayed or chronic)	1
N150	Fly ash	H11	Toxic (delayed or chronic)	1
G150	Halogenated organic solvents	H3	Flammable liquids	1
M260	Highly odorous organic chemicals, including mercaptans and acrylates	other	Strong offensive odours at low substance concentrations	1
D110	Inorganic fluorine compounds, other than calcium fluoride	H12	Ecotoxic	1
M220	Isocyanate compounds	H12	Ecotoxic	1
D220	Lead and lead compounds including lead-acid batteries	H11	Toxic (delayed or chronic)	1
M100	Material containing polychlorinated biphenyls (PCBs), polychlorinated napthalenes (PCNs), polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)	H12	Ecotoxic	1
D120	Mercury and mercury compounds	H11	Toxic (delayed or chronic)	1
D100	Metal carbonyls	H6.1	Poisonous (acute)	1
D210	Nickel compounds	H11	Toxic (delayed or chronic)	1
H110	Organic phosphorus compounds	H11	Toxic (delayed or chronic)	1
G110	Organic solvents other than halogenated solvents, including, for example, ethanol	H3	Flammable liquids	1

Waste (tracking) code	Current regulated waste description	Primary hazard	Hazard description	Default waste category
M160	Organohalogen compounds, other than another substance stated in this schedule	H12	Ecotoxic	1
-	Oxidising agents	H5.1	Oxidizing	1
D340	Perchlorates	H1	Explosive	1
R120	Pharmaceuticals, drugs and medicines	H6.1	Poisonous (acute)	1
M150	Phenols, phenol compounds including chlorophenols	H6.1	Poisonous (acute)	1
M170	Polychlorinated dibenzo-furan (any congener)	H11	Toxic (delayed or chronic)	1
M180	Polychlorinated dibenzo-p-dioxin (any congener)	H11	Toxic (delayed or chronic)	1
N205	Residues from industrial waste treatment or disposal operations	H11	Toxic (delayed or chronic)	1
D240	Selenium and selenium compounds	H12	Ecotoxic	1
K140	Tannery wastes, including leather dust, ash, sludges and flours	H11	Toxic (delayed or chronic)	1
J160	Tarry residues arising from refining, distillation or any pyrolytic treatment	H11	Toxic (delayed or chronic)	1
D270	Vanadium compounds	H11	Toxic (delayed or chronic)	1
A110	Waste from a heat treatment or tempering operation that uses cyanides	H11	Toxic (delayed or chronic)	1
H100	Waste from manufacture, formulation and use of the following: a) biocides or phytopharmaceuticals	H11	Toxic (delayed or chronic)	1
G160	Waste from manufacture, formulation and use of the following: c) organic solvents	H3	Flammable liquids	1
F110	Waste from manufacture, formulation and use of the following: e) resins, latex, plasticisers, glues or other adhesives	H11	Toxic (delayed or chronic)	1
H170	Waste from manufacture, formulation and use of the following: f) wood-preserving chemicals	H11	Toxic (delayed or chronic)	1
R140	Waste from the production and preparation of pharmaceutical products	H6.1	Poisonous (acute)	1
E120	Waste of an explosive nature other than explosives within the meaning of the Explosives Act 1999	H1	Explosive	1
D230	Zinc compounds	H12	Ecotoxic	1
B100	Acidic solutions and acids in solid form	H8	Corrosives	2
K100	Animal effluent and residues, including abattoir effluent and poultry and fish processing wastes)	Other	Amenity based	2
N220	Asbestos	H11	Toxic (delayed or chronic)	2
C100	Basic (alkaline) solutions and bases (alkalis) in solid form	H8	Corrosives	2
N160	Encapsulated chemically fixed, solidified or polymerised waste	??	???	2
	Food Processing Waste (other than liquid food processing waste)	Other	Amenity based	2

Waste (tracking) code	Current regulated waste description	Primary hazard	Hazard description	Default waste category
K110	Grease trap waste	Other	Amenity based	2
D330	Inorganic sulfides	H8	Corrosives	2
-	Liquid food processing waste	Other	Amenity based	2
D300	Non-toxic salts, for example, saline effluent	H13	Capable, by any means, after disposal, of yielding another material, e.g., leachate, which possesses any of the characteristics listed above	2
D360	Phosphorus compounds, other than mineral phosphates	H11	Toxic (delayed or chronic)	2
K130	Sewage sludge and residues, including nightsoil and septic tank sludge	Other	Odour amenity	2
M250	Surface active agents (surfactants), containing principally organic constituents, whether or not also containing metals and inorganic materials	H12	Ecotoxic	2
D250	Tellurium and tellurium compounds	H11	Toxic (delayed or chronic)	2
D180	Thallium and thallium compounds	H11	Toxic (delayed or chronic)	2
M230	Triethylamine catalysts for setting foundry sands	H11	Toxic (delayed or chronic)	2
T140	Tyres	Other	Fire (with toxic by-products) and mosquito (health) risk	2
-	Vegetable oils	H3	Flammable liquids	2
E100	Waste containing peroxides other than hydrogen peroxide	H1	Explosive	2
F100	Waste from manufacture, formulation and use of the following: b) inks, dyes, pigments, paints, lacquers or varnish	H3	Flammable liquids	2
T120	Waste from manufacture, formulation and use of the following: d) photographic chemicals or processing materials	H8	Corrosives	2
K190	Wool scouring wastes	Other	Odour amenity	2

Waste (tracking) code	Current regulated waste description	Primary hazard	Hazard description	Default waste category

Attachment G: Hazard parameter waste categorisation table

Table 11: Hazard parameters and waste categories table

Hazard parameters	Waste categories											
	Category 1			Category 2			Category 3			Category NR		
	T (mg/kg)		**L** (mg/L)	**T** (mg/kg)		**L** (mg/L)	**T** (mg/kg)		**L** (mg/L)	**T** (mg/kg)		**L** (mg/L)
Inorganic species												
Arsenic	> 2,000	or	> 2.8	2,000 - 500	or	2.8 - 0.7	< 500	&	0.7 - 0.35	< 500	&	< 0.35
Barium	> 25,000	or	> 280	25,000 – 6,250	or	280 - 70	< 6,250	&	70 - 35	< 6,250	&	< 35
Beryllium	> 400	or	> 4	400 - 100	or	4 - 1	< 100	&	1 - 0.5	< 100	&	< 0.5
Cadmium	> 400	or	> 0.8	400 - 100	or	0.8 - 0.2	< 100	&	0.2 - 0.1	< 100	&	< 0.1
Chromium (VI)	> 2,000	or	> 20	2,000 - 500	or	20 - 5	< 500	&	5 - 2.5	< 500	&	< 2.5
Copper	> 20,000	or	> 800	20,000 – 5,000	or	800 - 200	< 5,000	&	200 - 100	< 5,000	&	< 100
Lead	> 6,000	or	> 4	6,000 – 1,500	or	4 - 1	< 1,500	&	1 - 0.5	< 1,500	&	< 0.5
Mercury	> 300	or	> 0.4	300 - 75	or	0.4 - 0.1	< 75	&	0.1 - 0.05	< 75	&	< 0.05
Molybdenum	> 4,000	or	> 20	4,000 – 1,000	or	20 - 5	< 1,000	&	5 - 2.5	< 1,000	&	< 2.5
Nickel	> 12,000	or	> 8	12,000 – 3,000	or	8 - 2	< 3,000	&	2 - 1	< 3,000	&	< 1
Selenium	> 200	or	> 4	200 - 50	or	4 - 1	< 50	&	1 - 0.5	< 50	&	< 0.5
Silver	> 10	or	> 0.4	10 - 2.5	or	0.4 - 0.1	< 2.5	or	0.1 - 0.05	< 2.5	&	< 0.05
Zinc	> 140,000	or	> 1,200	140,000 – 35,000	or	1,200 - 300	< 35,000	or	300 - 150	< 35,000	&	< 150
Anions												
Cyanide[2]	> 10,000	or	> 14	10,000 – 2,500	or	14 - 3.5	< 2,500	&	3.5 - 1.75	< 2,500	&	< 1.75
Fluoride	> 40,000	or	> 600	40,000 – 10,000	or	600 - 150	< 10,000	&	150 - 75	< 10,000	&	< 75
Organic species												
Petroleum hydrocarbons												
C6-C9 petroleum hydrocarbons	> 2,600		-	2,600 - 650		-	650 - 325		-	< 325		-
C10-C36 petroleum hydrocarbons	> 40,000		-	40,000 – 10,000		-	10,000 – 5,000		-	< 5,000		-

Polycyclic Aromatic Hydrocarbons												
Benzo(a)pyrene	> 20	or	> 0.004	20 - 5	or	0.004 - 0.001	< 5	&	0.001 - 0.0005	< 5	&	< 0.0005
Polycyclic aromatic hydrocarbons (total)[3]	> 400		-	400 - 100		-	100 - 50		-	< 50		-
Monocyclic Aromatic Hydrocarbons												
Benzene	> 16	or	> 0.4	16 - 4	or	0.4 - 0.1	< 4	&	0.1 - 0.05	< 4	&	< 0.05
Toluene	> 12,800	or	> 320	12,800 – 3,200	or	320 - 80	< 3,200	or	80 - 40	< 3,200	&	< 40
Ethylbenzene	> 4,800	or	> 120	4,800 – 1,200	or	120 - 30	< 1,200	&	30 - 15	< 1,200	&	< 15
Xylenes (total)	> 9,600	or	> 240	9,600 – 2,400	or	240 - 60	< 2,400	or	60 - 30	< 2,400	&	< 30
Styrene (vinyl benzene)	> 480	or	> 12	480 - 120	or	12 - 3	< 120	or	3 - 1.5	< 120	&	< 1.5
Chlorinated hydrocarbons												
Carbon tetrachloride	> 48	or	> 1.2	48 - 12	or	1.2 - 0.3	< 12	&	0.3 - 0.15	< 12	&	< 0.15
Chlorobenzene	> 4,800	or	> 120	4,800 – 1,200	or	120 - 30	< 1,200	&	30 - 15	< 1,200	&	< 15
Chloroform	> 960	or	> 24	960 - 240	or	24 - 6	< 240	&	6 - 3	< 240	&	< 3
1,2- Dichlorobenzene	> 24,000	or	> 600	24,000 – 6,000	or	600 - 150	< 6,000	&	150 - 75	< 6,000	&	< 75
1,4- Dichlorobenzene	> 640	or	> 16	640 - 160	or	16 - 4	< 160	&	4 - 2	< 160	&	< 2
1,2- Dichloroethane	> 48	or	> 1.2	48 - 12	or	1.2 - 0.3	< 12	&	0.3 - 0.15	< 12	&	< 0.15
1,1-Dichloro- ethylene	> 480	or	> 12	480 - 120	or	12 - 3	< 120	&	3 - 1.5	< 120	&	< 1.5
Dichloromethane	> 64	or	> 1.6	64 - 16	or	1.6 - 0.4	< 16	&	0.4 - 0.2	< 16	&	< 0.2
1,1,1,2- Tetrachloro- ethane	> 1,600	or	> 40	1,600 - 400	or	40 - 10	< 400	or	10 - 5	< 400	&	< 5
1,1,2,2- Tetrachloro- ethane	> 210	or	> 5.2	210 - 52.5	or	5.2 - 1.3	< 52.5	or	1.3 - 0.65	< 52.5	&	< 0.65
Tetrachloro- ethylene	> 800	or	> 20	800 - 200	or	20 - 5	< 200	or	5 - 2.5	< 200	&	< 2.5
1,1,1- Trichloroethane	> 4,800	or	> 120	4,800 – 1,200	or	120 - 30	< 1,200	or	30 - 15	< 1,200	&	< 15
1,1,2- Trichloroethane	> 190	or	> 4.8	190 - 47.5	or	4.8 - 1.2	< 47.5	or	1.2 - 0.6	< 47.5	&	< 0.6
Trichloroethylene	> 80	or	> 2	80 - 20	or	2 - 0.5	< 20	or	0.5 - 0.25	< 20	&	< 0.25
Vinyl chloride	> 4.8	or	> 0.12	4.8 - 1.2	or	0.12 - 0.03	< 1.2	or	0.03 - 0.015	< 1.2	&	< 0.015
Phenols												

2,4,5- Trichlorophenol	> 64,000	or	> 1,600	64,000 – 16,000	or	1,600 - 400	<16,000	or	400 - 200	< 16,000	&	< 200
2,4,6- Trichlorophenol	> 320	or	> 8	320 - 80	or	8 - 2	< 80	or	2 - 1	< 80	&	< 1
Cresol (total)	> 32,000	or	> 800	32,000 – 8,000	or	800 - 200	< 8,000	&	200 - 100	< 8,000	&	< 100
Phenol total, (non- halogenated)[4]	> 2,200	or	> 56	2,200 - 550	or	56 - 14	< 550	&	14 - 7	< 550	&	< 7
Nitroaromatics and ketones												
2,4-Dinitrotoluene	> 21	or	> 0.52	21 - 5.25	or	0.52 - 0.13	< 5.25	&	0.13 - 0.065	< 5.25	&	< 0.065
Nitrobenzene	> 320	or	> 8	320 - 80	or	8 - 2	< 80	&	2 - 1	< 80	&	< 1
Methyl ethyl ketone	> 32,000	or	> 800	32,000 – 8,000	or	800 - 200	< 8,000	&	200 - 100	< 8,000	&	< 100
Specific persistent organic pollutants (POP)												
2,4-D	> 480	or	> 12	480 - 120	or	12 - 3	< 120	&	3 - 1.5	< 120	&	< 1.5
Aldrin + Dieldrin	> 4.8	or	> 0.12	4.8 - 1.2	or	0.12 - 0.03	< 1.2	&	0.03 - 0.015	< 1.2	&	< 0.015
Organochlorine pesticides[5]	> 50	0	-	< 50	0	2	< 50	&	2 - 1	< 50	&	< 1
Organophosphate pesticides[6]	> 30	or	> 0.8	30 - 7.5	or	0.8 - 0.4	< 7.5	&	0.4 - 0.2	< 7.5	&	< 0.2
Polychlorinated biphenyls	> 50	or	> 0.002	50 - 20	or	0.002 - 0.001	20 - 2	&	<0.001	< 2	&	< 0.001
Any other ratified Stockholm – POP[7]	> 50		-	-		-	-		-	< 50		-
PROPERTIES												
	Category 1			**Category 2**			**Category 3**			**Category (NR)**		
pH	≤ 2.0 or ≥12.5			2 - 4 or 10.5 - 12.5			4 - 6			6 - 10.5		
Electrical conductivity (µS/cm)	N/A			N/A			≥15,000			<15,000		
Biochemical oxygen demand	N/A			N/A			≥20			<20		
Flash point (^{0}C)	≤60.5			N/A			N/A			>60.5		
Peroxides (other than hydrogen peroxide) above 1% (v/v)	Present			N/A			N/A			Not present		
WASTES FOR WHICH TESTING IS NOT RELEVANT												
	Category 1			**Category 2**			**Category 3**			**Category (NR)**		

Chemical waste arising from research and development or teaching activity, including new or unidentified material and material whose effects on human health or the environment are not known	N/A	Present	N/A	Not present
Clinical and related waste[8]	Present	N/A	N/A	Not present
Oxidising agents	Present	N/A	N/A	Not present
Pharmaceuticals, drugs and medicines	Present	N/A	N/A	Not present
Tyres	N/A	N/A	Present	Not present
Waste from the production and preparation of pharmaceutical products	Present	N/A	N/A	Not present
Waste of an explosive nature other than explosives within the meaning of the *Explosives Act 1999*	Present	N/A	N/A	Not present
PROPERTIES				
	Category 1	**Category 2**	**Category 3**	**Category (NR)**
pH	≤ 2.0 or ≥12.5	2 - 4 or 10.5 - 12.5	4 - 6	6 - 10.5
Electrical conductivity (µS/cm)	N/A	N/A	≥15,000	<15,000
Biochemical oxygen demand	N/A	N/A	≥20	<20
Flash point (^{0}C)	≤60.5	N/A	N/A	>60.5
Peroxides (other than hydrogen peroxide) above 1% (v/v)	Present	N/A	N/A	Not present
WASTES FOR WHICH TESTING IS NOT RELEVANT				
	Category 1	**Category 2**	**Category 3**	**Category (NR)**
Chemical waste arising from research and development or teaching activity, including new or unidentified material and material whose effects on human health or the environment are not known	N/A	Present	N/A	Not present
Clinical and related waste[8]	Present	N/A	N/A	Not present
Oxidising agents	Present	N/A	N/A	Not present
Pharmaceuticals, drugs and medicines	Present	N/A	N/A	Not present
Tyres	N/A	N/A	Present	Not present

Waste from the production and preparation of pharmaceutical products	Present	N/A	N/A	Not present
Waste of an explosive nature other than explosives within the meaning of the *Explosives Act 1999*	Present	N/A	N/A	Not present

Notes:

1. mg/kg is expressed on a dry weight basis.

2. Cyanide means:

a) for total concentration analysis (T, mg/kg), Total Cyanide.

b) for leachable concentration analysis (L, mg/L) Cyanide Amenable to Chlorination. Note that the ASLP/ TCLP method is not appropriate for measuring cyanide.

3. Total sum of naphthalene, acenaphthylene, acenaphthene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-c,d)pyrene, phenanthrene and pyrene.

4. Total sum of phenol, 2-methylphenol (o-cresol), 3-methylphenol (m-cresol), 4-methylphenol (p-cresol), 2,4-dimethylphenol, 2.4-dinitrophenol, 2- methyl-4,6-dinitrophenol, 2-nitrophenol, 4-nitrophenol, 2-cyclohexyl-4,6-dinitrophenol and dinoseb.

5. Means laboratory analysis suite of organochlorine pesticides that typically include: Total sum of aldrin, hexachlorobenzene, alpha BHC, beta BHC, gamma BHC (lindane), delta BHC, chlordane, DDT, DDD, DDE, dieldrin, endrin, endrin aldehyde, heptachlor, heptachlor epoxide, methoxychlor and endosulfan (includes endosulfan I, endosulfan II and endosulfan sulphate).

6. Means the list of organophosphate chemicals approved for use in Australia as shown in Appendix 2 of: Organophosphate Pesticides – Hazardous Chemicals Requiring Health Monitoring, Safe Work Australia, 2013 (http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/801/Organophosphate-Pesticides.pdf)

7. Persistent Organic Pollutant, as listed in the Stockholm Convention (http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx) and ratified by the Australian Government (more information at: http://www.environment.gov.au/topics/environment-protection/chemicals-management/pops)

8. Clinical or related waste means wastes arising from medical, nursing, dental, veterinary, laboratory, pharmaceutical, podiatry, tattooing, body piercing, brothels, emergency services, blood banks, mortuary practices and other similar practices, and wastes generated in healthcare facilities or other facilities during the investigation or treatment of patients or research projects, which have the potential to cause disease, injury, or public offence, and includes: sharps, clinical waste, human tissue or body parts, cytotoxic waste, pharmaceutical waste and chemical waste.

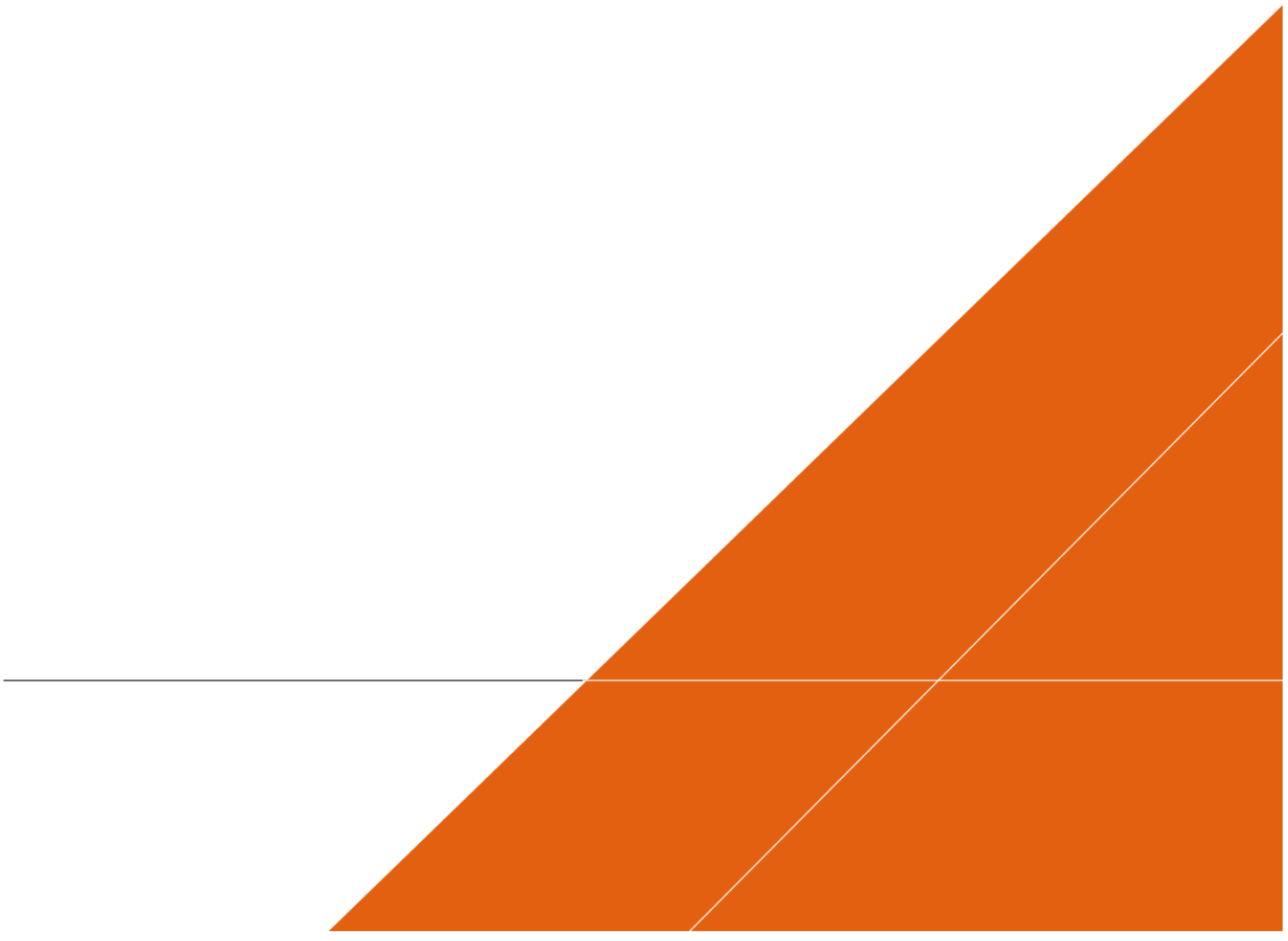
Attachment H: Regulated waste classification framework review (2018) technical report

ARCADIS Design & Consultancy for natural and built assets

DES PHASE 2 REPORT

Regulated Waste Classification Framework Review

15 JUNE 2018



DEPARTMENT OF ENVIRONMENT AND SCIENCE
REGULATED WASTE CLASSIFICATION FRAMEWORK REVIEW

Phase 2

Final

Report No	02
Date	15/06/2018
Revision Text	02

REVISIONS

Revision	Date	Description
01	4/05/2018	Draft Phase 2 Report
02	15/06/2018	Final Phase 2 Report – DES comments addressed

CONTENTS

APPENDICES

GLOSSARY

Term	Acronym	Definition
Acceptable Daily Intakes	ADI	ADI is an estimate of the food additive, expressed on a bodyweight basis that can be ingested on a daily basis without appreciable risk to health.
Australian and New Zealand Environment Conservation Council	ANZECC	The ANZECC is an organisation involved with the compilation of the Guidelines for Fresh and Marine Water Quality. The Guidelines provide government and the community with a framework for conserving ambient water quality in our rivers, lakes, estuaries and marine waters. The most current Guidelines are ANZECC 2000, although a 2018 update will be released and has been referenced in this report where appropriate.
Australian Drinking Water Guidelines	ADWG	The ADWG, produced by the NHMRC, are designed to provide an authoritative reference to the Australian community and the water supply industry on what defines safe, good quality water, how it can be achieved and how it can be assured. The guidelines have been developed after consideration of the best available scientific evidence and provide a framework for good management of drinking water supplies to ensure safety at point of use. The ADWG referred to in this report are the 1996, 2004 and 2011 (with minor revisions in October 2017).
Category 1		Category 1 is the highest hazard category in the Regulated Waste Classification Framework. Category 1 wastes have a quantity, concentration or form of the hazardous substance(s) that presents ***significant risk*** to the environment or human health.
Category 2		Category 2 is the middle hazard category in the Regulated Waste Classification Framework. Category 2 wastes have a quantity, concentration or form of the hazardous substance(s) that presents ***moderate risk*** to the environment or human health.
Commercial and Industrial	C&I	C&I is a term used in this report to describe the source of wastes which require classification through the Regulated Waste Classification Framework, and pertain to wastes generated by businesses or entities.
Department of Environment and Science	DES	The DES (formerly Environment and Heritage Protection, EHP) is responsible for protecting and managing Queensland's Environment, including avoiding, minimising or mitigating impacts to the environment.
Ecological Investigation Levels	EILs	The NEPM provides health and ecological investigation and screening levels for soil and groundwater. Investigation levels and screening levels are the concentrations of a contaminant above which further appropriate investigation and evaluation, is required. The EILs have been derived for common contaminants in soil for the protection of terrestrial ecosystem, based on a species sensitivity distribution (SSD) model developed for Australian conditions.
Environment Protection Act 1994	EP Act	The EP Act is the key act underpinning Queensland's environmental legislation.
Environmental Authority	EA	An EA is needed to undertake an Environmentally Relevant Activity (ERA) in Queensland. Like a licence, an EA lists the conditions under which the ERA will be permitted to operate.
Environmental harm		Environmental harm, as defined in the EP Act, is any adverse effect, or potential adverse effect (whether temporary or permanent and of

Term	Acronym	Definition
		whatever magnitude, duration or frequency), on an environmental value, and includes environmental nuisance.
Environmental value		Environmental value, as defined in the EPA Act is a quality or physical characteristic of the environment that is conducive to *ecological health or public amenity* or safety.
Environmentally Relevant Activity	ERA	ERAs are prescribed activities that are generally industrial or intensive with the potential to release emissions which impact on the environment and surrounding land uses. The proposed Regulated Waste Framework will consist of 5 waste-related ERAs.
General Environmental Duty	GED	The GED is a primary duty that applies to everyone in Queensland, regardless of whether a waste is Regulated or not. It states that a person must not carry out any activity that causes or is likely to cause environmental harm, unless measures to prevent or minimise the harm have been taken.
Hazardous Waste		A hazardous waste is known as a Regulated Waste in Queensland. See definition of Regulated Waste below.
Hazard Parameter		Hazard Parameters are also known as substances, constituents, chemicals or contaminants. They are the individual species for which thresholds have been set in order to classify a waste.
Hazard Property		Hazard Property is a physical property that can be tested for in a waste, such as pH, electrical conductivity (EC), Biological Oxygen Demand (BOD) and flash point. They provide information on the nature of a waste, and can inform the hazardousness of a waste.
Health Investigation Levels	HIL	The NEPM (see below) provides health and ecological soil and groundwater investigation and screening levels. Investigation levels and screening levels are the concentrations of a contaminant above which further appropriate investigation and evaluation is required. The HILs have been developed for a broad range of metals and organic substances and are applicable for assessing human health risk via all relevant pathways of exposure.
Liquid wastes		Liquid wastes are not specifically defined in the legislation in Queensland. For the purposes of this report, the definition of liquid waste provided by NSW EPA has been adopted. This includes consideration of whether a waste is generally not capable of being picked up by a spade or shovel, or becomes free flowing at or below 60 degrees Celsius or when it is transported.
Material Environmental Harm		Material Environmental Harm, as defined in the EP Act, is environmental harm that is not trivial or negligible in nature and causes actual or potential loss or damage to property resulting in considerable cost, greater than the cost of the property amount or $5,000.
Minimal Risk		Minimal risk is used to define a NR waste (see below). In the context of this review, the threshold which quantifies the upper boundary of ***minimal risk*** has been defined as the levels of contaminant exposure that would be acceptable in the worst-case scenario, where a waste may be uncontrolled and not regulated by the ERA framework.
Moderate Risk		Moderate risk is used to define a Category 2 waste. The threshold which quantifies the upper boundary of ***moderate risk*** has been defined as the level of contaminant exposure that would be generally acceptable in

Term	Acronym	Definition
		a Regulated Waste facility, given current knowledge of industry capability to manage hazardous waste in Australia.
National Environment Protection Measure	NEPM	The NEPMs are a set of national objectives designed to assist in protecting or managing particular aspects of the environment. In this review, reference to the NEPM relates to the National Environment Protection (Assessment of Site Contamination Measure), which establishes a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices. There are two versions of this NEPM, the superseded NEPM 1999 (pre-2013 amendment) and the current NEPM 2013.
National Health and Medical Research Council	NHMRC	The NHMRC is Australia's peak body for supporting health and medical research to develop health advice for the Australian community, health professionals and governments. It is responsible for the development of the ADWG.
Non-Hazardous		A non-hazardous waste in the context of the terminology used in the DES framework is known as a Non-Regulated Waste. See definition of Non-Regulated Waste below.
Non-Regulated Waste	NR	Non-Regulated (NR) Waste, which is equivalent to General Waste used in the ERA, is the lowest hazard category in the Regulated Waste Classification Framework. NR Wastes have a quantity, concentration or form of the hazardous substance(s) that presents ***minimal risk*** to the environment or human health.
Reasonable Maximum Exposure	RME	RME of a given receptor to chemicals by a particular pathway can be defined as the maximum exposure that is reasonably expected to occur within a potentially exposed population.
Reference Concentration	RfC	RfC is a term adopted by the USEPA to identify the estimate of the chemical concentration that will not cause noncarcinogenic effects during a specified exposure period.
Reference Doses		A reference dose is the USEPA's maximum acceptable oral dose of a toxic substance.
Regional Screening Levels	RSLs	RSLs are USEPA default screening levels which are set to assist whether levels of contamination found at a site warrant further investigation or site clean-up, or whether no investigation or action may be required.
Regulated Waste		Also known as hazardous wastes. The definition provided in the Environment Protection Regulations 2008 has been adopted in this review, where a Regulated Waste is Commercial and Industrial sourced by nature, and can be defined by the concentration of hazard parameters, as set in the Classification Framework proposed in this review.
Regulated Waste Classification Framework		The Regulated Waste Classification Framework is the risk based, threshold framework that classifies wastes as either being Non-Regulated (NR), Category 2 or Category 1 (in increasing order of hazardousness). The proposed Regulated Waste Classification Framework thresholds are the subject of review in this report.
Regulated Waste Framework		The Regulated Waste Framework is the whole framework (currently undergoing review), of which the Regulated Waste Classification Framework sits within. The overarching Framework, includes the

Term	Acronym	Definition
		permitting and licencing requirements that are enforced on management of Regulated Wastes.
Regulatory Impact Statement	RIS	A RIS is a document created before new government regulation is introduced. It provides information and background on proposed legislation or changes for industry comment.
Residual risk		Residual risk is a category of threat that arises after possible mitigation measures and controls have been applied.
Scheduled Wastes		Scheduled Wastes is defined by the federal Department of Energy and Environment (DoEE) as a material or article containing a chemical, or mixture of chemicals, exceeding the threshold concentration and threshold quantity, which is: • organic in nature, • resistant to degradation by chemical, physical or biological means, • toxic to humans, animals, vegetation or aquatic life • bioaccumulate in humans, flora and fauna, and • listed in Schedule X, which are an agreed list of scheduled wastes.
Serious Environmental Harm		Serious environmental harm, as defined in the EPA Act, is environmental harm that is irreversible, of a high impact or widespread, caused to area of high conservation value such as the Great Barrier Reef or causes actual or potential loss or damage to property resulting in considerable cost, greater than the cost of the property amount or $50,000.
Significant Risk		Significant risk is used to define a Category 1 waste. ***Significant risk*** is quantified by contaminant levels which are above those set by the upper threshold of Category 2. Above these levels, there is uncertainty on industry capability to manage the levels of contaminant exposure in a Regulated Waste facility, and therefore are considered to present a ***significant risk***, and should be managed with a higher duty of care, as Category 1 wastes.
Solid wastes		Solid wastes in the context of this report, are defined as any waste which is not a liquid waste as per the definition provided in this list.
Target Hazard Quotient	THQ	The THQ is the ratio of potential exposure to a substance and the level at which no adverse effects are expected. At a THQ below 1, no adverse health effects are expected as a result of exposure.
Threshold		Threshold in the context of this report, refers to the contaminant levels set that define the upper boundaries of the Non-Regulated and Category 2.
Tolerable Daily Intakes	TDI	TDI is an estimate of the amount of a substance in air, food or drinking water that can be taken in daily over a lifetime without appreciable health risk.
Toxicity Characteristic Leaching Procedures	TCLP	The TCLP is a method developed by the USEPA for determining the mobility of both organic and inorganic analytes present in liquid, solid and multiphasic wastes.

Term	Acronym	Definition
United States Environment Protection Authority	USEPA	The USEPA is the leading agency in the United States responsible for research, monitoring, standard-setting and enforcement activities to ensure environmental protection.
Waste		A waste, as defined in the EP Act, includes anything, other than an end of waste resource, that is left over, or an unwanted by-product, from an industrial, commercial, domestic or other activity; or surplus to the industrial, commercial, domestic or other activity generating the waste.

EXECUTIVE SUMMARY

The Queensland Department of Environment and Science (DES) engaged Arcadis Australia Pacific (Arcadis) to undertake a critical review and analysis of the total contaminant concentration threshold values proposed in the Regulated Waste Classification Framework (the Classification Framework) to categorise Regulated Waste. The proposed Framework features three classification categories based on risk, with total concentration thresholds for 56 solid waste and 46 liquid waste hazard parameters, one solid waste hazard property (pH) and five liquid waste hazard properties (pH, electrical conductivity, biological oxygen demand, flash point and presence of peroxides).

Arcadis undertook this review in two phases. In Phase 1, a review of all parameters was undertaken, involving benchmarking the proposed thresholds against other jurisdictions to highlight anomalies and an evaluation of their derivation and risk to the environment and human health. The review resulted in two key findings:

- While the proposed values are based on the same source references used across a number of States, these were found to be outdated and, at minimum, the required updating with the newest published versions of the same sources
- Although the source references could be identified on most occasions, often the multipliers could not be substantiated or validated for their scientific rigour, and therefore were inappropriate to simply accept in the review.

Phase 2 of the review involved deriving revised thresholds by adopting a set of repeatable and scientifically validated methodologies. This methodology and the resulting values are the focus of this report.

Arcadis established a set of key principles to guide the threshold-derivation process, scoped by the regulatory context and objectives and the accepted definition of the categories. This included:

- Identifying the scenarios where the highest environmental and human health risk would be present and adopting a criteria derivation methodology that would be protective of that scenario in order to define the upper threshold of the Non-Regulated (NR) category.
  - The potential for spills or releases into the environment during transport underpinned conservative assumptions for the proposed NR upper thresholds, based on the requirement to protect potentially sensitive receptors that may be present along transport routes.
- Aiming to quantify the additional risk associated with managing a Category 1 waste compared to a Category 2 waste, by the process used to set the upper thresholds of Category 2.

Using these definitions and the findings from initial review, Arcadis has derived a set of revised thresholds, using the following general principles:

1. Maintaining the reference document and proposed threshold value circulated in the Consultation RIS, if still appropriate for the purpose of this Framework
2. Prioritising national or local reference documents, where appropriate, over international references
3. Prioritising international references over deriving and calculating new values for hazard parameters where no appropriate value is available.

The revised thresholds were derived from the following key sources, which were considered to be appropriate references for defining the thresholds of the Regulated Waste Classification Framework:

- Solids – Scheduled Waste limits, HIL C NEPM 2013, USEPA Residential Soil RSLs
- Liquids – ADWG (NHMRC, 2011), ANZECC 2018 or 2000, USEPA Tapwater RSL and USEPA Freshwater Screening.

While in some cases the revised values present relatively significant changes from the values proposed in the consultation RIS, they represent updated and modern science sourced from current references and provide a consistent methodology that can be adapted and updated in future. Arcadis recommends that DES consider the assumptions and various factors that have been considered in developing the revised thresholds when enforcing the Framework.

1 INTRODUCTION

In 2013, the Queensland Department of Environment and Science (DES) (formerly Department of Environment and Heritage Protection) began a review of its Regulated (hazardous) Waste Framework (the Framework). A draft Regulated Waste Classification Framework (the Classification Framework) was developed proposing a risk-based categorisation that was broadly based on Victoria's Environment Protection (Industrial Waste Resource) Regulations 2009.

In 2017, the proposed Framework was released for public comment as part of a Regulatory Impact Statement (RIS). The feedback highlighted a number of issues. DES subsequently engaged Arcadis Australia Pacific Pty Ltd (Arcadis) to undertake a critical review and analysis of the threshold limits proposed within the Classification Framework.

The proposed Classification Framework features three classification categories based on risk, with total concentration thresholds for 56 solid waste and 46 liquid waste hazard parameters, one solid waste hazard property (pH) and five liquid waste hazard properties (pH, electrical conductivity, biological oxygen demand, flash point and presence of peroxides).

As part of the review, Arcadis:

1. Critically assessed the proposed hazard parameter limits for each risk-based category for solid and liquid wastes, by benchmarking against domestic jurisdictions and the EU and Canada
2. Following the critical review, assessed the validity of the current source references and thresholds, to determine whether there was a need to update the existing threshold, or if it was appropriate as is.
3. Where required, presented a consistent methodology for deriving alternative limits for hazard parameter thresholds, with the intention that the adopted methodology would allow the thresholds to be updated following future scientific refinement.

Arcadis undertook this review in two phases. In Phase 1, a review of all parameters was undertaken, involving benchmarking against other jurisdictions to highlight anomalies (Task 1a) and evaluation of the suitability of thresholds based on their derivation and risk to the environment or human health (Task 1b). The review resulted in two key findings:

- While the proposed values are based on the same source references used across a number of States, these were found to be outdated and, at minimum, the required updating with the newest published versions of the same sources
- Although sources references could be identified on most occasions, often the multipliers could not be substantiated or validated for their scientific rigour, so it was inappropriate to simply accept them in this review.

Following completion of Phase 1, Arcadis proposed approaches to alternative value derivation, for consultation with DES, before commencing Phase 2 and deriving any revised thresholds. The review highlighted a number of parameters that should be updated, and others for which the scientific validity could not be confirmed, but for which an alternative reference source could be identified. Following discussions, Arcadis and DES agreed upon the criteria derivation method and revised hazard parameter thresholds, aligned with the purpose of this Regulated Waste Classification Framework and updated to reflect modern science.

1.1 Scope of this report

The main aim of this report is to present the Phase 2 threshold derivation methodology and recommended values. The report provides the context underpinning the Regulated Waste Classification Framework, which informed the assessment process developed. A summary of the findings of Phase 1 is presented in the body of the report (Section 4.1).

This report is focused on outlining the logic and rationale behind the adopted methodologies and factors for deriving revised thresholds for the Regulated Waste categories.

2 THE QUEENSLAND REGULATORY FRAMEWORK

A clear understanding of Queensland environmental regulatory framework is required to inform the classification review, including how a Regulated Waste is defined and the principles and controls in place for organisations responsible for Regulated Wastes along the management chain. A summary of the key aspects that have informed this review are provided below.

2.1 Environmental Legislative Framework

The supporting environmental legislation in which the Regulated Waste Classification Framework will be embedded needs to be considered. The definition of each Category is inherently linked to this legislation as it defines the controls and potential management outcomes. This section summarises the key issues from the broader environmental legislation as relevant to this review.

2.1.1 Objectives of the Environment Protection Act

The *Environment Protection Act 1994* (EP Act) is the key act underpinning Queensland's environmental management framework. The objective of the EP Act is "to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainability development)".

The following are key interpretations in the EP Act (Part 3) that are of relevance for this assessment:

- Waste includes anything, other than an end of waste resource, that is left over, or unwanted by-product, from an industrial, commercial, domestic or other activity; or surplus to the industrial, commercial, domestic or other activity generating the waste.
- An end of waste resource becomes a waste when it is disposed of at a waste disposal site; or if it is deposited at a place in a way that would constitute a contravention of the general littering provision or the illegal dumping of waste provision under the Act.
- Contamination of the environment is the release (whether by act or omission) of a contaminant into the environment
- Environmental harm is any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency), on an environmental value, and includes environmental nuisance.
- Environmental value is a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety
- Environmental harm may be caused by an activity whether the harm is direct or indirect result of the activity or whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.
- Material environmental harm is environmental harm that is not trivial or negligible in nature and causes actual or potential loss or damage to property resulting in considerable cost, greater than the cost of the property amount or $5,000.
- Serious environmental harm is environmental harm that is irreversible, of a high impact or widespread, caused to area of high conservation value such as the Great Barrier Reef or causes actual or potential loss or damage to property resulting in considerable cost, greater than the cost of the property amount or $50,000.

The EP Act also prescribes the obligations and duties to prevent environmental harm, nuisance and contamination. The two primary duties that apply to everyone in Queensland are:

- **General Environmental Duty (GED):** A person must not carry out any activity that causes or is likely to cause environmental harm, unless measures to prevent or minimise the harm have been taken; and

- **Duty to notify of environmental harm:** A person must inform the administering authority and landowner or occupier when an incident has occurred that may have caused or threatens serious or material environmental harm.

Arcadis has used this interpretation to inform this assessment, to ensure the derived criteria reflect the definition and objectives of the Act and the expected level of control/duties.

2.1.2 Defining Regulated Waste

Throughout this report and in Queensland's environmental regulatory framework, the term Regulated Waste is used to define a hazardous waste. A Regulated Waste is defined as a waste that:

- Is Commercial and Industrial (C&I) waste, whether or not it has been immobilised or treated; and
- Is of a type, or contains a constituent of a type, mentioned in Schedule 7, part 1 of the *Environment Protection Regulations 2008*; and
- Is specifically excluded if mentioned in Schedule 7, part 2.

The current definition is based on an absolute list of wastes in Schedule 7, while the proposed Regulated Waste Framework defines a Regulated Waste through the hazard parameter thresholds within the Classification Framework. Therefore, only the first part of this definition (being commercial and industrial wastes) has been used to define the scope of wastes that would be expected to be managed in the Regulated Waste Framework.

2.1.3 Environmentally Relevant Activities (ERAs)

The *Environment Protection Regulation 2008* prescribes the details for the processes contained in the EP Act and defines 'prescribed Environmentally Relevant Activities (ERAs)'. ERAs are prescribed activities that are generally industrial or intensive with the potential to release emissions which impact on the environment and surrounding land uses.

Waste management activities that generate emissions and have the potential to cause environmental harm are regulated as ERAs. The ERA framework was introduced in 1995 and is undergoing significant reform as part of the broader hazardous waste regulatory reform, including the reduction from 12 specific waste-related ERAs to five broader waste ERAs with more flexible application.

The five ERAs will consider both the process/activity being undertaken and the hazard classification of the waste being managed, which is the focus of this assessment, to determine whether a facility of transportation activity needs to hold an Environmental Authority (EA), which will in turn inform the licence conditions and annual licence fee.

Waste management activities that are classified as low risk are not classified as prescribed ERAs and therefore do not require an associated EA. Table 1 summarises the five proposed waste-related ERAs and their link to the Regulated Waste classification for which an EA would be required.

Table 1: Summary of linkage between the proposed Regulated Waste Categories and the waste-related ERAs

Environmentally Relevant Activity (ERA)	General Waste / Not-Regulated waste	Category 2 Regulated waste	Category 1 Regulated waste
53 Organic Material Processing Composting; or Anaerobic digestion	ERA required if greater than 200t of organic material is receiving and processed on an annual basis. This could include organic wastes that fall within general waste or Category 2 regulated waste classifications.		Not permitted.
54 Mechanical waste processing or treatment includes using processes such as crushing, milling, grinding,	Required if: processing greater than 5,000t per year of inert, non-putrescible waste or green waste	Required regardless of quantity being processed	Required regardless of quantity being processing

Environmentally Relevant Activity (ERA)	General Waste / Not-Regulated waste	Category 2 Regulated waste	Category 1 Regulated waste
shredding or other mechanised sorting or processing equipment	processing any amount of other not-regulated / general wastes		
55 Other waste processing or treatment includes processing or treating using methods other than mechanical or thermal Examples— bioremediation, chemical fixation, neutralisation, autoclave	Required regardless of quantity being processed	Required regardless of quantity being processed	Required regardless of quantity being processed
57 Regulated waste transport	Not-regulated / general waste may be transported without an approval	Required if transporting any amount of Category 2 regulated waste	Required if transporting any amount of Category 1 regulated waste
60 Waste disposal Includes categories for disposing of – inert non-putrescible general / not-regulated waste other general / not-regulated wastes Regulated wastes (category 2 & 1)	Required if disposing of any amount of not-regulated / general waste	Required if disposing of any amount of Category 2 regulated waste	Required if disposing of any amount of Category 1 regulated waste
61 Thermal waste processing or treatment Means applying heat to the waste that results in a change in its chemical composition Examples – incineration, pyrolysis, gasification or autoclave.	Required regardless of quantity being processed	Required regardless of quantity being processed	Required regardless of quantity being processed
62 Waste transfer and resource recovery facility - receiving, sorting, dismantling or baling waste; and temporarily storing waste before moving it, from the site where the relevant activity is carried out, for recycling, processing, treatment or disposal.	Required if receiving and storing greater than 4t or 4,000L of Not-Regulated / general waste at any one time	Required if receiving and storing greater than 2t or 2,000L of Category 2 waste at any one time	Required if receiving and storing any amount of Category 1 regulated waste

Non-Regulated (NR) and General Waste

In addition, Arcadis has used the term NR throughout this report to be consistent with the currently proposed terminology, however it is understood the term is likely to be renamed in order to avoid the

implication of a waste not being formally regulated. The term 'General Waste' would be consistent with existing ERA terminology.

2.2 Regulated Waste Framework

DES has proposed the introduction of a Regulated Waste Classification Framework in response to a need for a framework based on risk, modern science and thresholds independent of landfill acceptance criteria. Under the current approach, wastes are either Regulated or Non-Regulated, with no recognition of a scale of risk according to contaminant concentration.

The proposed categorisation of wastes as Non-Regulated (NR), Category 2 (medium risk) or Category 1 (high risk) is designed to allow DES to implement regulatory and management requirements that are proportionate to the risk.

It should be noted that these categories do not define the level of inherent hazard, i.e. whether a substance may have a detrimental impact on the environment or human health under ***any*** scenario, including in the absence of any action to control or modify the circumstance. The proposed threshold criteria are a quantification of risk, which relates to the hazard in a particular context.

Of importance here is that Arcadis has assumed all wastes are managed and controlled to an appropriate extent, and the criteria are not intended to determine the level of 'hazardousness' under any circumstance. The criteria therefore aims to be protective of scenarios where there is ***least control / regulation***, which presents the highest risk of detrimental impact aligned to the hazard level of the waste, based on concentrations of its chemical constituents.

In the proposed Classification Framework, the NR upper threshold is the boundary between an NR Waste and a Regulated Waste. It is important to note that a waste being categorised as NR does not mean its disposal is uncontrolled, because general waste regulations and legislation will apply (Section 2.1.3).

The threshold values that differentiate between Category 2 and Category 1 are primarily a policy decision rather than a scientific assessment based on hazard. The Category 2 upper threshold values are informed by DES's objectives regarding the level of conservativeness in the framework and its understanding of the maturity of the state's waste industry in handling Regulated Waste along the management chain.

2.2.1 Defining the Categories

Before benchmarking and assessing the validity of the existing thresholds, it is important to clearly define Category 1, Category 2 and Non-Regulated (NR). The proposed Classification Framework is predominately *risk-based*, meaning the thresholds should reflect the level of risk the waste will present from its point of generation through to disposal, which in turn will be mitigated by the expected management controls associated that category of regulated waste.

To define the categories, Arcadis has considered the following:

- What is each Category protective of?
  - If a waste were to be NR, what sort of environment could it be exposed to where it may be uncontrolled (e.g. open space during transportation, confined space at the point of disposal)?
  - The upper threshold of the NR category should be:
    - Protective of the scenario where a NR waste may be uncontrolled and therefore presents **high environmental and human health risk**
    - Not so conservative that all wastes will be classified as Category 2, which may result in unnecessary regulatory controls being placed on wastes.
  - If a waste is Category 2, what additional levels of controls would be expected to be implemented during handling, compared to NR? How can the **additional risk** presented by a Category 1 waste be quantified compared to a Category 2 waste?

- How are the following terms defined in the above context?
  a) What is the **highest level acceptable environmental and human health risk,** to define the upper NR threshold?
  b) What is **additional risk**, to define the upper Category 2 threshold?

What is highest level of acceptable environmental and human health risk of a waste?

Defining the risks associated with wastes is inherently difficult due to the complexities and breadth of waste types, the uncertainty around the exposure scenario and the many risks these scenarios can present (i.e. the risk to a wetland would be different to the risk to a human).

One option to address risk is monetary value. As noted in Section 2.1.1, the EP Act defines material and serious environmental harm in monetary terms by linking it to the costs associated with remediation of the harm or other consequential impacts, such as property value losses. However, the cost of environmental harm can only be known after the event or incident has occurred, and the linkage of financial damage / costs to environmental harm offences is not necessarily relevant to health impacts. Therefore, Arcadis does not consider it a suitable framework to define the categories.

Given the Framework is based on risk rather than the inherent hazard of the waste, risk is assessed in the context of the exposure scenario. The Classification Framework therefore needs to be protective of the 'worst case' scenario, where the waste may be uncontrolled in its handling and there is high and potentially lengthy exposure to human and ecological receptors.

What is additional risk?

Quantifying the higher degree of risk within each category is challenging, particularly between Category 2 and Category 1, and the associated upper threshold value for Category 2.

The existing approach linking thresholds to landfill disposal criteria provides for a conceptually simple risk quantification as it can be linked to an expected factor of increased control, as implemented through the landfill design and operation. However, all Regulated Wastes under the Framework are expected to have some level of controls, and there is no clear definition of the differing levels of controls and permissible management outcomes for Category 2 to Category 1 wastes. As a result, the additional risk from Category 2 to Category 1 cannot be easily quantified through an evidence-based approach.

It is necessary to make assumptions about standard practices within the Queensland waste management sector for Regulated Waste, both to align the level of risk defined in each category and to recognise industry's current ability to transport, treat, store and dispose of Regulated Wastes. The maturity of the industry's practices varies according to the waste type and associated regulations, but in general Queensland transporters and facilities are considered reasonably aligned to the management standards across other states in Australia.

This alignment has also informed Arcadis' use of other Australian jurisdictions to benchmark the multiplier factors used, and to determine the relationship between the respective NR and Category 2 upper thresholds (Section 4.2.1.1).

Proposed standard category definitions

Given consideration of the above, the following qualitative definitions for each category have been developed.

Table 2: DES / Arcadis proposed category definitions

Category	Definition
Non-Regulated	The quantity, concentration or form of the hazardous substance(s) presents ***minimal risk*** to the environment or human health. NR wastes would be considered a 'general waste' under the proposed Environmentally Relevant Activity (ERA) framework, which depending on the quantity being transported or managed may be subject to ERA licensing and control requirements (i.e. under proposed ERA 53 Organic Material Processing, ERA 55 Waste Processing or Treatment, ERA 57 Waste Transport, ERA 60 Waste Disposal, ERA 62 Waste transfer and resource recovery facility).

Category	Definition
	The threshold which quantifies the upper boundary of ***minimal risk*** has been defined as the levels of contaminant exposure that would be acceptable in the worst-case scenario, where a waste may be uncontrolled and not regulated by the ERA framework.
Category 2	The quantity, concentration or form of the hazardous substance(s) potentially presents ***moderate risk*** to the environment or human health. The following conditions are assumed: Once a Category 2 waste is identified, the waste transporter and facility operator will hold an EA relevant for that ERA, which will require controls beyond those applied to NR wastes, with all access to the facility being controlled (i.e. properties are fenced and in commercial or industrial zoned areas). The controls imposed will be implemented to reduce environmental and human health exposure. These will vary according to the nature of the activity and facility, but broadly may include the following principles: • Exposure to human health and the environment is fully contained within site boundary/premises • Restrictions on the waste types that can be accepted • Conditions for the site (e.g. for landfill – specified thickness of cover for waste asbestos, extraction of leachate at the landfill, reference to best practice guidelines). The threshold that quantifies the upper boundary of ***moderate risk*** has been defined as the levels of contaminant exposure that would be generally acceptable in a Regulated Waste facility, given current knowledge of industry capability to manage hazardous waste in Australia.
Category 1	The quantity, concentration or form of the hazardous substance(s) potentially presents a ***significant risk*** to the environment or human health. ***Significant risk*** is quantified by contaminant levels that are above those set by the upper threshold of Category 2. Any exposure is to be strictly avoided and should be managed with a higher duty of care.

3 KEY PRINCIPLES TO DEFINE THE METHODOLOGY

Section 2 provided an overview of the environmental legislation that supports DES's regulation of Regulated Wastes, and the proposed Classification Framework. Arcadis has built on these existing and proposed regulatory structures to develop a set of core principles to inform the approach to this review and the derivation of methodologies for new criteria. The key aspects are:

- The Regulated Waste Framework will apply to wastes (once generated) but is not designed to classify all materials / goods based on their properties. For example, the Australian Dangerous Goods Code regulates hazardous goods. The scope of this Framework is limited to determining whether a waste, as defined in the EP Act, will be NR or Regulated, and if Regulated then will it be Category 2 or 1, based on the definitions in Table 2.
- The proposed Regulated Waste Classification Framework will form part of the broader Regulated Waste Framework. The use of contaminant testing and categorisation through hazard parameter thresholds is one option to the waste generator, but the overall Framework also allows waste generators to classify their waste based on list and properties. The thresholds should be conservative enough to capture any wastes that may present environmental harm, as defined in the EP Act, in case they are not captured through the other processes for classification[1].
- The Regulated Waste Framework is risk-based. The thresholds must adequately reflect the estimated level of risk in each context, based on the expected waste management controls that will be in place for each category.
- Wastes generated by households or within the municipal sector, assumed at small quantities, are automatically considered to be NR as the *Environmental Protection Regulation 2008* defines a Regulated Waste as sourced from commercial or industrial (C&I) activities. Therefore, it is assumed that all municipal sector wastes are not within the scope of the framework.
- Cases of littering, illegal dumping or other illegal waste operations are not captured within regulatory frameworks and the Regulated Waste threshold values should not be set very conservatively to cover risks associated with these operators. Separate regulations and procedures address non-compliance with legislation. As such, the proposed thresholds should be set for activity that is expected to be broadly compliant.
- The Regulated Waste Framework will be linked to the ERA framework, such that the categorisation of a waste will define the level of regulatory control that will be in place. In general, the disposal of almost all wastes are regulated under the ERA framework where they meet the relevant scale thresholds (50 tonnes for NR, see Table 1). The worst-case scenario, is where a waste is categorised as NR and its handling is not subject to management controls. In this case, General Environmental Duty (GED) requirements apply to avoid causing or threatening environmental harm. Examples of uncontrolled scenarios include:
  - During transportation – There is a relatively short potential exposure timeframe and small quantities that permit rapid clean-up, but NR Waste could be transported through sensitive land use areas and on a regular / daily basis. Some minor exposures may occur through dust or debris escaping from the vehicle, or a larger release may occur due to an accident or incident, however clean-up of a spill will be triggered in the event of a large mass release.
  - Mishandling during storage – May occur where activity is not covered by regulations (i.e. less than 4 tonnes of NR or less than 2 tonnes of Category 2 material can be accepted at any one time), or where the waste generator does not apply the guidelines correctly. Material should be relatively contained to the commercial sites (waste generation or storage), limiting exposure.
  - Most other activities involving NR, Category 2 or 1 wastes are regulated. There is potential for exposure to workers at any facility where the waste is accepted, however it is expected that controls to manage wastes and reduce risk would be in place through the Environmental Authority for each ERA.

[1] Refer to the 2015 Queensland Regulated Waste Framework report for an understanding of the full Regulated Waste Framework and other components of the scheme.

4 ASSESSMENT AND DERIVATION METHODOLOGY

This section outlines the methodology applied for reviewing the proposed parameter thresholds, and for deriving methodologies to revise these threshold values.

4.1 Assessment of Proposed Criteria

As part of the Phase 1 assessment, Arcadis reviewed the proposed Classification Framework and thresholds against the following criteria:

- The thresholds and hazard classification systems of other jurisdictions (interstate and international)
- The key discrepancies with Queensland landfill disposal criteria
- The source documents used for the values in the proposed hazard classification thresholds.

A number of complexities were uncovered when comparing thresholds from each State, centring mainly on the variances in category definition. Queensland's proposed values are largely derived from existing Victorian thresholds, using the same key sources and multipliers.

In summary, the proposed DES values are sourced from the following references:

- For solid wastes:
    - 13 parameters based on the Health Investigation Level (HIL) F values from the National Environment Protection Measure (NEPM) 1999 (pre-2013 amendment)
    - 4 parameters based on Dutch Target and Intervention Values 2000 (Dutch, 2000) values
    - 15 parameters based on Australian Drinking Water Guidelines (ADWG) National Health and Medical Research Council (NHMRC) 1996 values
    - 13 parameters based on United States Environment Protection Authority (USEPA) Toxicity Leachability 2012 values
    - Remaining 11 parameters based on other sources or unknown / unable to be identified.
- For liquid wastes:
    - 30 parameters based on ADWG (NHMRC 1996) values
    - 11 parameters based on US EPA 2012 values
    - Remaining 5 parameters based on other sources or unknown / unable to be identified.

A description of the key sources and multipliers is provided below.

- **National Environment Protection (Assessment of Site Contamination) Measure 1999:** The NEPM 1999 HIL F values have been directly applied with no factor. NEPMs are a set of national objectives that are required to be taken into consideration when assessing the protection or management of particular aspects of the environment. Soil criteria Investigation Levels are commonly Health-based (HIL) or Ecologically-based (EILs). HILs have been set for alternative exposure settings, with F being designated for commercial / industrial environments.

  It should be noted that the 1999 NEPM for Contaminated Sites has been superseded by NEPM 2013, which updated a significant number of the HILs in light of update science (as at March 2012). In general, where the scientific information only supported a minor revision of the HIL (by less than 20%) or the new scientific data was not deemed to be adequately robust, the existing HIL had been retained with no change. However, the majority of the NEPM 1999 HIL-F values appear to have been updated in the renamed HIL D in the NEPM 2013.

- **Australian Drinking Water Guidelines, NHMRC 1996:** The NHMRC 1996 (ADWG) health guideline values have been applied with a factor of 4,000 for solid wastes and 50 for liquid wastes, which is an 80x liquid-to-solids ratio. The basis for this multiplier is not documented / identified. The National Health and Medical Research Council Act 1992 (NHMRC Act) requires the NHMRC to develop evidenced based guidelines. The current version is the ADWG (2011), updated November 2016 (minor changes). The ADWG have been developed after consideration

of the best available scientific evidence and are concerned both with safety from a health point of view and with aesthetic quality (health-related guideline value and aesthetic guideline value). They are not mandatory standards.

- **United States Environment Protection Authority (USEPA) 2012:** The USEPA Toxicity Characteristic Leaching Procedure (TCLP) threshold values have been applied with a factor of 40 for solid wastes and 0.5 for liquid wastes, which is also an 80x liquid-to-solids ratio, again without documented / identified justification. The USEPA defines hazardous wastes in several ways, including a designated list and by characteristic. One of the four characteristics that define hazardous wastes is toxicity, which includes the leaching of toxic compounds or elements into groundwater drinking supplies from wastes disposed of in landfills. Regulatory levels for 39 toxic chemicals have been derived through groundwater modelling studies, with toxicity data for a number of common toxic compounds and elements set to these threshold concentration levels.
- **Dutch Intervention Levels 2000:** The Dutch Intervention values have been applied with a factor of 5 for inorganic compounds and 10 for organic compounds to reflect level of protection provided in an engineered landfill. The Dutch soil remediation intervention values are Dutch standards that are environmental pollutant reference values, underpinned by environmental risk analyses and often related to national background concentrations that were determined for The Netherlands.
- **Scheduled Waste Management Plans (WMPs):** Scheduled WMP thresholds have been applied directly where relevant. Australian governments have agreed to implement a national approach to management of three hazardous wastes that have long been regarded as intractable, or difficult to safely dispose of without special technologies and facilities – Polychlorinated Biphenyls (PCB), Hexachlorobenzene (HCB), organochlorine pesticides and germicides (OCPs). Waste Management Plans developed for each of these 'scheduled wastes' set Total Concentration threshold limits.

Category 2 upper threshold values were derived by multiplying NR values by a factor of 4, which is widely used across Australian jurisdictions. While the source of this 4-fold factor is unclear, Arcadis notes that criteria for commercial land use were historically derived by adjusting residential or sensitive land use criteria by a factor of 4 or 5 to account for reduced exposure at a commercial site (i.e. 40 hours per working week compared to 168 hours in a whole week). For example, HIL-Fs in the 1999 NEPM were derived based on the HIL-A x 4. However, it is unknown whether this was the source of the landfill criteria adjustment and there is little evidence to support the scientific validity or appropriateness of this value.

Arcadis notes that Phase 1 findings highlighted that in general across the States, there is little scientific evidence underpinning multipliers used. Furthermore, there appears to be the application of drinking water and leachability thresholds (with a factor) to solid waste thresholds. The use of these numbers (liquid waste thresholds for solid waste thresholds), with no clear scientific understanding as to the use of the multipliers, is considered a significant weakness and should not be relied upon.

4.1.1 Summary of Source Criteria

The criteria proposed for the Classification Framework were largely derived directly from current Victorian waste criteria. A summary of the assumptions and sources used in deriving the proposed framework is presented in Table 3.

Table 3: Summary of key source criteria and assumptions in derivation of the proposed Framework

Proposed Waste Classification	Original Source/s	Purpose of Original Criteria	Key Assumptions in Original Criteria Derivation
Solid Wastes			
Non-Regulated	NEPM (1999) HIL-F Dutch (2000) x 5 / 10 20	Protection of commercial workers	Adult may be exposed to chemical every day at work, with incidental ingestion and dermal contact being the key exposure pathways.

Proposed Waste Classification	Original Source/s	Purpose of Original Criteria	Key Assumptions in Original Criteria Derivation
			The applicability of the Dutch criteria and their factors are not clear or substantiated.
	NHMRC (1996) x 4,000	Drinking water criteria	The source of the 4,000-fold factor as adopted in the original Victorian waste guidance is not specified. Drinking water criteria are protective of an individual drinking 2 litres of water a day. A factor of 4,000 results in an assumed ingestion rate of 0.5 mL / day. Arcadis notes that this factor is likely to be the result of unit conversions and the application of a safety factor, possibly using a multiplier of 4. It may also reflect dilution between landfill and potential potable water extraction points, although these cannot be verified or substantiated.
	USEPA (2012) x 36	Protection of groundwater from leachate at landfill	The source of the 40-fold factor to adjust the leachate value to a solid phase waste criterion is not specified. The US EPA criteria were calculated using a groundwater model to predict a target leachate concentration at landfills for protection of groundwater, based on the Toxicity Characteristic Leaching Procedure (TCLP). The 40-fold factor is slightly less conservative than the 36-factor applied commonly by NSW, which again is not scientifically substantiated.
Category 2	NR criteria x 4	-	The source of the 4-fold factor as adopted in the proposed DES criteria is not known or referenced within any source documents, although Arcadis assumes this may be reflective of 4x being historically used to adjust residential to commercial land use.
Liquid Wastes			
Non-Regulated	NHMRC (2004) x 50	Drinking water criteria	The source of the 50-fold factor to adjust the drinking water value to a liquid waste criterion is not specified. Drinking water criteria are protective of an individual drinking 2 litres of water a day. A factor of 50 results in an assumed ingestion rate of 40 mL / day.
	USEPA (2012) x 0.5	Protection of groundwater from leachate at landfill	The source of the 0.5-fold factor to adjust the leachate value to a Non-Regulated liquid waste value is not specified. The USEPA criteria were calculated using a groundwater model to a predict a target leachate concentration at landfills for protection of groundwater, based on the Toxicity Characteristic Leaching Procedure (TCLP).

4.2 Methodology for Deriving New Criteria

As indicated by the review, the waste criteria currently proposed for use in Queensland were largely taken from relatively old sources, which have been superseded by more current guidance in many cases (e.g. the NEPM 1999 and ADWG, which were updated in 2013 and 2011 respectively, with the ADWG having further minor updates in 2017).

In addition, many of the proposed thresholds have been derived using poorly understood or inadequately justified adjustment factors, and / or have been extrapolated from values not directly applicable to waste streams (e.g. drinking water criteria adjusted to derive solid waste criteria). In light of this review, Arcadis has recommended that all parameters be updated to reflect modern science and source documents be updated to reflect the most up to date references, reviewing the factors or multipliers that have been applied, and ensuring that these align with the purpose of this Regulated Waste Classification Framework.

In general, the principles noted below (in order of preference) have been followed to develop a scientific-based methodology to update and revise the thresholds:

1. Maintaining the current reference document and value if still appropriate for the purpose of this framework
2. Using national or local reference documents where appropriate, over international references.
3. Using international references as preference over deriving and calculating new values for hazard parameters where no appropriate value is available.

In evaluating the appropriateness of the NR upper threshold, Arcadis has considered whether the methodology and source reference provides a threshold that should be protective of potential incidental exposures along transport routes, which as noted in Section 3, was identified as where a waste may be uncontrolled and unregulated and could therefore pose the greatest risk.

4.2.1 Solid Waste Hazard Parameters

The review highlighted that the proposed solid hazard parameter thresholds are based on EPA Victoria landfill disposal total concentration criteria, which in turn largely refer to the NEPM 1999 HIL F values and the use of USEPA 2012 leachability values multiplied by a factor of 36 (the reasoning behind this factor is unsubstantiated). The basis and methodology of the proposed values were not deemed appropriate for the purposes of this framework, and therefore a review of all values was required.

The methodologies adopted, in order of preference are detailed below. It is noted that the hazard parameter thresholds for solid waste were selected from source reference documents that are primarily protective of human health.

1. Using limits already set for Scheduled Wastes.

Values for Polychlorinated Biphenyls (PCBs) and Organochlorine Pesticides (OCPs) in the proposed system are currently based on the values provided in the Scheduled Waste Management Plan. These are believed to be appropriate and are national threshold that all States should look to adopt for consistency. As such no change is suggested for these.

Scheduled Wastes are defined by the federal Department of Energy and Environment (DoEE) as a material or article containing a chemical, or mixture of chemicals, exceeding the threshold concentration and threshold quantity, which is:

- Organic in nature,
- Resistant to degradation by chemical, physical or biological means,
- Toxic to humans, animals, vegetation or aquatic life,
- Bioaccumulate in humans, flora and fauna, and
- Listed in Schedule X, which are an agreed list of scheduled wastes.

Schedule X includes Polychlorinated Biphenyls (PCBs), Hexachlorobenzene (HCB) and Organochlorine Pesticides (OCPs). Three national plans for each of these Scheduled Wastes have been produced, which outline national guidance on safe management and disposal of each of these wastes. HCB is not a listed hazard parameter and therefore has not been considered. For PCBs and OCPs the values have been applied as per the national guidance.

- The Polychlorinated Biphenyls (PCBs) Waste Management Plan 1995 (Revised 2003), defines Scheduled PCB waste as containing PCB above 50 mg/kg and Non-Scheduled PCB was as containing less than 50 mg/kg but above 2 mg/kg. The Plan suggests that Scheduled and Non-Scheduled PCB solid or liquid wastes should not go to landfill. Only wastes with PCB concentration below 2 mg/kg can be disposed of to landfill and are not controlled under the Plan (i.e. PCB free).
- The Organochlorine Pesticides (OCPs) Waste Management Plan 1996, defines Scheduled OCP waste as containing OCPs at levels in excess of 50mg/kg and Non-Scheduled OCP was as containing less than 50 mg/kg but above 2 mg/kg. Only wastes with OCP concentration below 50 mg/kg are not controlled under the Plan.

In accordance with these definitions, the upper threshold for NR classification of PCB and OCP wastes have been set at 2 mg/kg and 50 mg/kg respectively, which defines the threshold quantities at which a waste requires management of to be consistent with the national waste management policy. The Category 2 upper threshold of PCBs has been set at 50 mg/kg as well, aligned with the definition of a Scheduled PCB.

2. Using limits set by the HIL-C National Environment Protection Measure (NEPM) 2013.

A key Phase 1 finding was that the NEPM 1999 HIL F (commercial and industrial) values have been commonly used as the source value for several hazard parameters across a number of jurisdictions. In undertaking this review, Arcadis has firstly considered whether it is appropriate to use the HIL criteria derived in the NEPM as a basis for defining the upper threshold of the NR waste category, and if so, which scenario and set of screening values are most appropriate for this framework.

The updated NEPM 2013 Schedule B1 (Guideline on Investigation Levels for Soil and Groundwater) provides a framework for the use of investigation and screening levels. The framework is based on a matrix of human health and ecological soil and groundwater investigation and screening levels and provides guidance for assessing a range of contaminants. Investigation levels and screening levels are the concentrations of a contaminant above which further appropriate investigation and evaluation is required.

The NEPM states that investigation and screening levels are not clean-up or response levels, nor are they desirable quality criteria. It is noted that, in principle, the use of investigation and screening levels as default remediation criteria may result in unnecessary remediation and that the use of these levels in regulating application of wastes to soils is inappropriate. This implies that, in general, the values are conservative.

The HILs have been developed for a broad range of metals and organic substances and are applicable for assessing human health risk via all relevant pathways of exposure. They are generic to all soil types and apply generally up to a depth of 3 m below the surface for residential use. HILs are science-based, generic assessment criteria. The basic assumptions used for each Scenario in the NEPM 2013 are provided in Table 4.

To make generic estimates of potential human exposure to soil contaminants, science-based assumptions are made about the environment, background exposure levels, human behaviour, the physiochemical characteristics of contaminants, and the fate and transport of contaminants in soil within each of these land use categories. This includes integrating these exposure estimates (ingestion, dermal contact, and inhalation) with toxicity reference values, such as, tolerable daily intakes (TDI), acceptable daily intakes (ADI) and reference doses (RfD), to estimate the soil concentration of a substance that will prevent exceedance of the toxicity reference value under the defined scenario. The toxicity references in most cases are generally based on the known most sensitive significant toxicological effect.

Table 4: Summary of HIL descriptions and assumptions

HIL	Description of Land Use Setting	Summary of key assumptions and land use scenario the criteria are relevant for.
HIL-A *NEPM 1999 Equiv: HIL A*	**Low Density Residential** Residential with garden garden/accessible soil home grown produce <10% fruit and vegetable intake, no poultry, also includes children's day care centres, preschools and primary schools.	Assumes residents, including children, may be present 365 days/yr, 24 hrs/day, for up to 35 years (incl. childhood), with direct contact with impacts daily. Includes fruit and vegetable (F+V) ingestion pathways due to potential backyard F+V gardens.
HIL-B *NEPM 1999 Equiv: HIL D*	**High Density Residential** Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats.	Assumes residents, including children, may be present 365 days/yr, 24 hrs/day, for up to 35 years (incl. childhood), with direct contact with impacts daily. Assumes reduced ingestion and dermal contact relative to HIL-A (by approx. a factor a 4) due to reduced exposure to impacts, from the high-density and built up environment. Has no F+V pathway.
HIL-C *NEPM 1999 Equiv: HIL E*	**Open Space** Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate.	Assumes park users, including children, may be present 365 days/yr, 2 hrs/day, for up to 35 years (incl. childhood), with direct contact with impacts daily. Assumes reduce ingestion and dermal contact relative to HIL-A (by approx. a factor of 3) due to reduced exposure to impacts, but there are greater potential exposure pathways than HIL-B. Has no F+V pathway.
HIL-D *NEPM 1999 Equiv: HIL F*	**Commercial Land Use** Commercial/industrial such as shops, offices, factories and industrial sites.	Assumes workers, who are adults only, may be present 240 days/yr, 8 hrs/day, for up to 30 years, with direct contact with impacts at work only. Assumes same rates of ingestion and dermal contact relative to HIL-C for an adult. Assumes reduced exposed skin area.

Specific limitations that are not considered in the HILs include:

- Not considering additional sources of contamination, for example in groundwater or surface water
- Short-term acute health risks, such as explosive or asphyxiation risks
- Other land use scenarios that are not adequately addressed by the assumptions of the generic land use scenarios (e.g. agricultural land)
- Risks to ecological receptors, for example, terrestrial or aquatic species.

While a number of limitations are noted with regard to the use of the NEPM, on review and balance Arcadis believes the NEPM is a valid and reasonable reference document for defining general hazard solid waste classification. The adoption of the HILs for relevant hazard parameters is also reasonable, for the following specific reasons:

- The use of a generic land-use scenario is required to generate a threshold value for this hazard classification system. This value needs to be representative of protecting the conditions of the assumed scenario and requires the same thought process that has been applied in deriving the NEPM thresholds.
- The NEPM 1999 (pre-2013 amendment) values are a base reference for defining the thresholds of the current proposed system and many of the other states landfill disposal criteria. Aligning the hazard classification with the approach and values in the NEPM will make the system easier to understand and is practical, as industry are generally aware and use the NEPM thresholds to undertake Tier 1 risk assessments of sites.

- The NEPM 2013 values have been updated to reflect modern science and all values that currently reference the NEPM 1999 (pre-2013 amendment) should at a minimum be updated to reflect the most current reference.
- The NEPM HIL values provide a threshold for soils. While Arcadis recognise that not all solid wastes will be soils (i.e. ballast, rocks, rubble), generally soils are potentially quite mobile wastes that are likely to be generated in the hazardous waste stream. As such the adoption of thresholds protective of exposure from hazardous soils will be conservative in the case of a spill or uncontrolled release of a solid waste.

Arcadis and DES both reviewed the assumptions underpinning the derivation of each land-use scenario, to determine whether a direct update of the NEPM 1999 (pre-2013 amendment) HIL F values, to NEPM 2013 HIL-D values, would be most appropriate for this hazard classification system, or whether a different land-use scenario would be more appropriate. The following points were noted in particular:

- HIL-D values are equivalent of the former HIL-F values, and if a direct update were to be undertaken, these values would be adopted. However, there are a number of issues with a direct update of the HIL-D values:
  - There is a substantial increase between the values, with NEPM 2013 HIL-D values are often much higher than the NEPM 1999 (pre-amendment 2013) values, indicating that the former HIL-F values were perhaps overly conservative for the land-use scenario at the time. The updates are reflective of changes in the science associated with the parameters and the current numbers represent a more robust and scientifically supported approach than was adopted in the 1999 HIL-F derivation methodology (i.e. consideration of adult for children body weights, surface areas, ingestion rates, etc.).
  - The 2013 HIL-D are in conflict with existing landfill criteria presented in the DES Model Operating Conditions under ERA-60 Waste Disposal. Their adoption would result in a larger discrepancy and inconsistency between the two criteria. However, Arcadis notes the model landfill criteria are old, and does not recommend this factor be a significant consideration for not changing numbers.
  - HIL-D values are protective of a commercial worker. These may be appropriate for classifying thresholds of risk for waste streams where the waste is controlled at all times, however this hazard classification framework also needs to ensure that the threshold values are protective of events such as an uncontrolled spill or release, which is most likely to occur during transportation. As such the HIL-D values may not adequately address the risks that need to be managed with this framework.
- HIL-A is overly conservative, given the level of expected control that will be in place for the management of all wastes as detailed in Section 2, and would result in many or all wastes being categorised or regulated.
- Therefore, either HIL-B or HIL-C values would be the most appropriate land-use scenario to use for the purposes of this hazard classification system. HIL-C values are more conservative than HIL-B, generally by a factor of 2, as HIL-B assumes reduced exposure pathways due to the built-up environment. While HIL-B could be appropriate, HIL-C values have been selected due to some of the uncertainties surrounding potential exposures that may occur due to transport related releases.
- Adopting HIL-C values does not rectify the issue of having threshold values that are higher than the landfill criteria, but Arcadis does not believe this should be material to this review, and should be considered if the model landfill acceptance criteria are updated in the future.

3. Using limits set by the United States Environment Protection Authority (USEPA) in its Soil Regional Screening Levels (RSLs) 2017, multiplied by a factor of 3.

The USEPA RSLs are default screening levels to assist with determining whether levels of contamination found at a site warrant further investigation or site clean-up, or whether no investigation or action may be required. They are similar to the NEPM investigation and screening values, and provide alignment with the methodology adopted in Point 2. The RSLs, like the HILs, are based on

default exposure parameters that represent Reasonable Maximum Exposure (RME) conditions for long-term/chronic exposures, human health toxicity values, Reference Doses (RfD) and Reference Concentration (RfC). They are a more appropriate surrogate / baseline for comparison than the ADWG values which have been used in the proposed framework for solid waste hazard parameters.

The USEPA screening tables provide RSLs for two Target Hazard Quotient (THQ) scenarios:

- THQ of 0.1, that is generally used and preferred to be used when screening for multiple contaminants
- THQ of 1, that is used when a limited number of contaminants are present at a site.

The values derived for a THQ of 0.1 were conservatively adopted, to allow for consideration of potential cumulative impacts where multiple chemicals may be present.

Similar to the NEPM, the RSLs are provided for two scenarios, residential (equivalent to HIL-A) and non-residential (commercial/industrial) (equivalent to HIL-D). As HIL-C has been adopted as the NEPM scenario most appropriate for this hazard classification framework, the non-residential scenario for the RSLs would not be appropriate. Likewise, the residential RSLs would be too conservative. Therefore, Arcadis has applied a factor of 3 to USEPA Residential RSLs to derive HIL-C equivalent thresholds, as this is approximately equivalent to the factor by which HIL-Cs differ from HIL-As (see **Table 4** above). While the magnitude of change between HIL-A and HIL-C thresholds differs based on the hazard parameter, the approximate difference is consistent with a factor of 3, and this is deemed an appropriate factor to adjust the USEPA RSL residential land use values to provide a value that is consistent with a HIL-C / open space land use criteria.

4. **Where an appropriate value cannot be provided from the process above, Arcadis has individually assessed the parameter to find an appropriate source reference.**

The details of hazard parameters where an alternative source has been used and the justification behind using that value is provided in the Results Section (Section 4). This includes adjusting the thresholds of selected hazard parameters, which may be defined through the approach described, if there is alternative science or a more appropriate reference.

4.2.1.1 Category 2 Upper Threshold

The Category 2 upper thresholds ultimately defines at what contaminant concentrations a waste will require maximum regulation and need to be completely covered within the ERA framework. The desktop assessment highlighted that a factor of 4 has been applied in the proposed Classification Framework, and this is a consistent feature of adjusting the NR equivalent threshold to the Category 2 equivalent thresholds (landfill disposal criteria) in other jurisdictions nationally as well. There is no direct reference to substantiate the validity of this factor, although Arcadis notes that it may be indicative of adjusting a residential or sensitive land-use criteria by a factor of 4, to account for reduced exposure at a commercial site (as discussed in Section 3.1).

Critical to assessing the validity of this factor is understanding what the upper threshold of Category 2 defines. Once above the NR threshold, a waste is within the Regulated Waste Framework. The delineation between a waste being either Category 2 or Category 1 is dependent on quantifying whether the waste presents moderate or significant risk. As this is a risk-based framework, this delineation is highly dependent on understanding the capability of waste facilities to generally manage Regulated Wastes. Arcadis notes that scientifically justifying this limit, whether adjusting the threshold of individual parameters or adjusting the broad multiplier factor is not possible as it is a function of the status of the regulatory and industry context, which is dynamic and varies depending on the waste type produced.

In light of the difficulty associated with quantitatively defining this threshold, Arcadis has undertaken a desktop review to assess whether it may be appropriate to refine or update this generic factor applied across all hazard parameters. However, as expected, there was no evidence found that provides a reference source to justify any change to this factor.

Even if each hazard parameter were to be individually adjusted based on their unique chemical characteristics, detailed knowledge of the expected controls and engineering design of the waste

facilities would be required. Given that this Classification Framework can be applied to any type of waste, a scientific factor or derivation of individual hazard parameter thresholds is not appropriate.

Arcadis has therefore applied a 4-fold factor, providing a consistent method, rather than deriving new values for each hazard parameter or changing the adopted multiplier. Arcadis notes that this is not science-based, but it is a nationally adopted factor for this adjustment and so compatible with magnitudes of conservatism applied in other states.

Arcadis recommends that DES give consideration to the fact that Category 1 wastes are therefore considered four times as hazardous (in principle) than NR wastes, and ensure that regulation and compliance measures enforced on facilities managing Category 1 wastes reflects the need to protect on average four times the risk presented of NR wastes (i.e. consideration when developing conditions of the EAs etc.). Should the regulatory stance become firmer or further refined in defining the technology that can accept a Category 1 or Category 2 waste, this factor should be re-evaluated.

4.2.2 Liquid Waste Hazard Parameters

The review highlighted that the proposed liquid hazard parameter thresholds are based on the EPA Victoria landfill disposal leachability criteria, which in turn largely refers to the NHMRC 2004 (ADWG) values multiplied by a factor of 50 and the use of USEPA 2012 leachability values multiplied by a factor of 0.5 (the reasoning behind this factor is not provided). The basis and methodology of the proposed values was not deemed to be appropriate for the purposes of this framework, and therefore a review of all values was required.

It is noted that while liquid wastes should be disposed of appropriately according to regulations and licensing requirements, they are by their nature more difficult to track through the waste system than general solid wastes.

In addition, if an accidental release of liquid wastes were to occur, it was assumed that such a release would be an isolated event and representative of a one-off incident or release, with appropriate assessment and / or remedial works to mitigate any impacts. Nevertheless, some protection of sensitive receptors is required in the event of a release.

The threshold derivation methods adopted, in order of preference, are detailed below. Both human health and ecological values were considered. The liquid waste thresholds were derived to be protective of incidents that result in isolated releases to the environment, rather than protective of long term, ongoing releases of liquids wastes into the environment (e.g. through ongoing illegal activity).

1. **Using the lesser of either the Australian Drinking Water Guidelines (ADWG 2011) multiplied by a factor of 20, or the Australian and New Zealand Environment Conservation Council (ANZECC) 2000, 95% Freshwater Ecological Criteria multiplied by a factor of 10.**

The ADWG values provide a safe drinking water concentration, while the ANZECC, 95% Protection Level for Freshwater value provides an ecological based threshold where 95% of species are expected to be protected in freshwater bodies (with the 95% protection levels adopted for slightly to moderately disturbed ecosystems).

The proposed factors have been chosen for the following reasons:

- The use of a factor of 20 for the ADWG values adjusts the drinking water criteria to primary contact recreation criteria (protective of waters used for swimming, or up to ingestion of 100 mL per day, in accordance with NHMRC guidance, 2008). This provides adequate conservatism for protection of human health from potential recreational exposures in surface water bodies.
- The use of a factor of 10 for the ANZECC values adjusts the 95% Freshwater Ecological Criteria for dilution between the point of discharge and the receptor, which would be the nearest surface water body. This is a common dilution factor applied in standard fate and transport assessments, and was adopted to account for dilution and the fact that any releases or incidents are isolated in nature and do not represent chronic or long term exposures or risk.

The adoption of the lesser of these two values provides a conservative value that will be protective of human and ecological receptors to define a liquid waste as either NR or Category 1. ANZECC values have been based on the currently available report (ANZECC, 2000). Some review of the draft 2018

ecological criteria (unpublished at the time of writing) values was undertaken, and these draft numbers were adopted where possible (e.g. PFOS). Full details of all individual references are provided in Appendix B.

2. **Using the lesser of either the limits set by the USEPA in the Tapwater Regional Screening Levels (RSLs) 2017 multiplied by a factor of 20, or the USEPA Freshwater Screening Benchmark 2017 multiplied by a factor of 10.**

The USEPA Tapwater RSLs and Freshwater Screening Benchmark values are equivalent to the local ADWG and ANZECC values respectively, and therefore provide alignment with the methodology adopted above. Furthermore, the use of USEPA RSL values provide consistency between the reference sources and methodology used for the solid and liquid hazard parameter classification.

Consistent with the methodology applied for adjusting ADWG values, a factor of 20 has been applied to the USEPA Tapwater RSLs to adjust drinking water criteria to primary contact recreation criteria, and the RSLs for a Target Hazard Quotient (THQ) of 0.1 have been used, aligned with the same criteria and principles applied in using this source reference with the solid waste hazard parameters. Similarly, where a USEPA Freshwater Screening Benchmark value has been used, a factor of 10 has been applied, consistent with the factor used for adjusting the ANZECC values.

3. **Where an appropriate value cannot be provided from the drinking water or ecological protection guidelines, Arcadis has individually assessed the parameter to find an appropriate source reference.**

The details of hazard parameters where an alternative source has been used and the justification behind using that value is provided in the Results section (Section 5). This includes adjusting thresholds of selected parameters, which may be defined through the approach described, if there is alternative science or a more appropriate reference.

4.2.3 Hazardous Waste Properties

Arcadis notes that the solid hazard waste parameter classification list has one waste property (pH), while the liquid hazard waste parameter classification list has five waste properties (pH, electrical conductivity (EC), Biological Oxygen Demand (BOD), Flash Point and Peroxides). The appropriateness of each of these have been considered and discussed in Section 5.

4.2.4 Summary of derivation methodologies

A summary of the proposed tiered approach for deriving criteria for each hazard parameter is presented in Table 5.

Table 5: Threshold derivation methodology / updates

Waste Criteria Upper Threshold	Approach *(in order of preference)*	Justification
Solid Wastes		
NR	Scheduled Wastes limits	Reference source (Scheduled WMP) is a nationally accepted standard, that should be used to be consistent with national hazardous waste legislation and frameworks. The proposed framework and many other jurisdictions have adopted these values for those applicable parameters, and for consistency this should be maintained.
	HIL-C National Environment Protection Measure (NEPM) 2013.	The following are noted: • Reference source (NEPM) is consistent with the approach adopted in the proposed framework and many other jurisdictions landfill disposal criteria. This source was deemed appropriate for this hazard classification system, as it is protective of land uses which

Waste Criteria Upper Threshold	Approach *(in order of preference)*	Justification
		considers health and ecological risks and is a well-known and accepted industry reference. • The NEPM 2013 values have changed from the NEPM 1999 values, reflecting improvements in science. The superseded reference numbers should be updated to the latest NEPM values. • Application of the HIL-C criteria will be protective exposure in a public open space, for a short period of time, which is the most appropriate land-use scenario for this hazard classification system, where the largest risk that should be protected is the uncontrolled release that may occur during unregulated transportation of wastes.
	USEPA Residential Soil RSLs (THQ 0.1) x 3	The following are noted: • The USEPA Soil Regional Screening Levels (RSLs) are default screening levels which are equivalent to the NEPM Screening Levels, and therefore are considered an appropriate reference source that is consistent with the methodology applied in threshold derivation for the NEPM. • The THQ 0.1 RSLs are preferred to be used when screening one contaminant and therefore are most appropriate for this framework. • The Residential Soil RSLs are equivalent to the NEPM HIL-A values. A factor of 3 has been applied to derive HIL-C equivalent thresholds, which is the general magnitude of difference between the HIL-A and HIL-C values in the NEPM.
	Individual Assessment	Any remaining hazard parameters have been assessed separately to source an appropriate reference.
Cat 2	NR x 4	A factor of 4 has been used in the proposed framework and is a consistent feature of adjusting the NR equivalent threshold to the Category 2 equivalent threshold in other jurisdictions nationally. A factor of 4 was used in the NEPM 1999 (pre-amendment 2013) to adjust residential (HIL-A) values to commercial and industrial (HIL-F) values. It would be expected that Category 1 wastes would be managed in a commercial and industrial environment, and that the controls in place would be stringent enough that the threshold should be protective of workers in such an environment Arcadis does not deem it appropriate to adjust each hazard parameter individually. Therefore, in the absence of any evidence to suggest that the factor is no longer appropriate, the 4-fold factor has been retained and considered appropriate to adjust NR wastes to Category 2 upper threshold.
Liquid Waste		
NR	Lower value from each of the following, for use as upper limit values: • Current ADWG (NHMRC, 2011) x 20 • Current 95% Freshwater Ecological Criteria (ANZECC, 2000) x	The following is noted: • The use of national drinking water and ecological protection values represents a combination of values that are protective of human health and ecosystems. • These reflect an appropriate level of protection in case of an uncontrolled release of a liquid waste to the environment. They take into consideration that the liquid will be a waste, and likely diluted

Waste Criteria Upper Threshold	Approach *(in order of preference)*	Justification
	10 (or draft 2018 values adopted where appropriate)	prior to accidental release, and that exposure would likely be short-term, with clean-up undertaken quickly. • The 20-fold factor applied to ADWG is suggested by NHMRC (2008) to adjust drinking water criteria to primary contact recreation criteria (protection of swimming, or ingestion of 100 mL / day). • The 10-fold factor applied to the ecological 95% values has been adopted to adjust for dilution between the point of discharge and the receptor, which would be the nearest surface water body. This factor is a safety factor that is commonly applied in standard risk assessment processes.
	Lower value from each of the following as upper limit values: • USEPA Tapwater RSL (THQ 0.1) x 20 • USEPA Freshwater Screening Benchmark) x 10	The following are noted: • The USEPA Tapwater RSL and Freshwater Benchmarking Screening values are equivalent to the ADWG and ANZECC values respectively, and therefore are considered an appropriate reference source that is consistent with the methodology applied in threshold derivation for the ADWG and ANZECC • The THQ 0.1 RSLs are preferred to be used when screening one contaminant and therefore are most appropriate for this framework. • The factor of 20 and 10 for the Tapwater RSL and Freshwater Screening Benchmark respectively are aligned with the factors applied and justified for adjusting ADWG and ANZECC values.
	Individual Assessment	Any remaining hazard parameters have been assessed separately to source an appropriate reference.

5 RECOMMENDED THRESHOLD VALUES

5.1 Solid Hazard Parameter Criteria

A revised set of criteria thresholds for the NR and Category 2 upper threshold were derived for each hazard parameter, as per the method detailed in Section 3.2.1. A comparison table with the current proposed NR values and the adopted source reference and multiplier if applicable for each provided in Appendix B. Table 6 summarises the justification for the individual parameters that were derived separately, while the revised values of all hazard parameters are provided in Table 7 overleaf.

It should be noted that only the PCB Category 2 upper threshold value was not derived using a multiplier of 4 from the NR threshold, and instead was set to the Scheduled PCB level (50 mg/kg) as per the Scheduled WMP for PCB.

The proposed NR pH property threshold is referenced from Schedule 7, Part 2 of the Environment Protection Regulation 2008. The USEPA has a requirement that if a solid waste is transformed to an aqueous form and has a pH less than or equal to 2 or greater than or equal to 12.5, it is corrosive and hazardous. These limits have been set to define Category 1 waste. The Category 2 threshold is the range of pH in between the NR and Category 1 defined thresholds. The source references and justification underpinning the current proposed pH thresholds are believed to be adequate for solid wastes and have been maintained.

Table 6: Summary of hazard parameters that were individually updated based on alternative sources to those provided in the core methodology

Hazard Parameter	Revised NR Value	Units	Source Reference	Justification Comments
Lead	300	mg/kg	HIL-A (or 50% of HIL-C)	NHMRC lowered the target blood lead level from 10 ug/dL to 5 ug/dL in 2015, subsequent to the HILs being derived. The HILs for lead are therefore superseded by more current science, and should be approximately halved (NHMRC, 2015)
C6-C10	950	mg/kg	HSL-C (F1, Sand, 0-1m)	The HSL-Cs for F1 and F2 (F1 = C6-C10 fraction, F2 = C10-C16) are 'NL', or not limiting. This is based on the vapour intrusion pathway and indicates that saturation of vapours is reached prior to unacceptable risk being likely. The C soil (saturated soil) value has been adopted as a surrogate for the 'NL' value. This is considered highly conservative for adoption as a surrogate for all HIL-C / HSL-C scenarios. (NEPM, 2013)
C10-C16	560	mg/kg	HSL-C (F2, Sand, 0-1m)	
C16-C40	5,300	mg/kg	HSL-C Direct Contact	Direct contact HSLs were derived in the HSL source document but were not carried across to the NEPM for policy reasons. The methodology behind there derivation is consistent with the vapour intrusion HSLs adopted in the NEPM, and the numbers are supported for the assessment of direct contact (incidental ingestion, dermal contact, dust inhalation) pathways. The C16-C34 (F3) value of 5,300 mg/kg is proposed as a conservative sum value for F3 and F4 (F4 = C34-C40). This value is also a similar order of magnitude as the ESLs for F3 and F4 (1,300 and 5,600 mg/kg, respectively for F3 and F4).

Hazard Parameter	Revised NR Value	Units	Source Reference	Justification Comments
				This assumption is for standard petroleum mixes only; other types of organics should be analysed individually.
1,1,2,2-Tetrachloroethane	6	mg/kg	USEPA RSL x 3	1,1,1,2-Tetrachloroethane value adopted as a surrogate (USEPA RSL, 2017)
Organophosphate pesticides	250	mg/kg	HIL-C for Chloropyrifos	Most conservative individual HIL for any organophosphate adopted for assessing sum of all organophosphate pesticides (NEPM,2013)
Zinc	400	mg/kg	ESL for Zinc	The Ecological Screening Level (ESL) for urban residential/public open space (equivalent to HIL-C) has been used. A value representative of the range of soil types has been selected from the ESLs. (NEPM, 2013)
Copper	220	mg/kg	ESL for Copper	The Ecological Screening Level (ESL) for urban residential/public open space (equivalent to HIL-C) has been used. A value representative of the range of soil types has been selected from the ESLs. (NEPM, 2013)
Asbestos – friable	Not Present			Given the level of regulation around management of asbestos (both friable and bonded), including the need for removal licences, the presence of Asbestos in a waste should result in the waste falling within the Regulated Waste Framework, to automatically be categorised as Category 2.

Table 7: Revised solid waste hazard parameter thresholds based on adopted methodology

Hazard Parameter	CAS – Registry No.	Revised Criteria		
		NR Upper Threshold (mg/kg)	Category 2 Upper Threshold (mg/kg)	Category 1 (mg/kg)
Inorganic Species				
Antimony	**7440-36-0**	9	36	>36
Arsenic	**7440-38-2**	300	1,200	>1,200
Barium	**7440-39-3**	4,500	18,000	>18,000
Beryllium	**7440-41-7**	90	360	>360
Boron	**7440-42-8**	20,000	80,000	>80,000
Cadmium	**7440-43-9**	90	360	>360
Chromium (VI)	**18540-29-9**	300	1,200	>1,200
Copper	**7440-50-8**	220	880	>880
Lead	**7439-92-1**	300	1,200	>1,200
Mercury	**7439-97-6**	80	320	>320
Molybdenum	**7439-98-7**	117	468	>468
Nickel	**7440-02-0**	1,200	4,800	>4,800
Selenium	**7782-49-2**	700	2,800	>2,800
Silver	**7440-22-4**	117	468	>468
Vanadium	**7440-62-2**	117	468	>468
Zinc	**7440-66-6**	400	1,600	>1,600
Anions				
Cyanide (total)	**57-12-5**	240	960	>960
Fluoride	**16984-48-8**	930	3,720	>3,720
Organic Species				
Petroleum hydrocarbons				
C6-C9 petroleum hydrocarbons		950	3,800	>3,800
C10-C36 petroleum hydrocarbons		5,300	21,200	>21,200
Polycyclic aromatic hydrocarbons				

Hazard Parameter	CAS – Registry No.	Revised Criteria		
		NR Upper Threshold (mg/kg)	Category 2 Upper Threshold (mg/kg)	Category 1 (mg/kg)
Benzo(a)pyrene	**50-32-8**	3	12	>12
Polycyclic aromatic hydrocarbons (PAHs) (total)[2]		300	1,200	>1,200
Monocyclic aromatic hydrocarbons				
Benzene	**71-43-2**	5	20	>20
Toluene	**108-88-3**	1,470	5,880	>5,880
Ethylbenzene	**100-41-4**	17	68	68
Xylenes (total)	**1330-20-7**	174	696	>696
Styrene (vinyl benzene)	**100-42-5**	1,800	7,200	>7,200
Chlorinated hydrocarbons				
Carbon tetrachloride	**56-23-5**	2	**8**	>8
Chlorobenzene	**108-90-7**	84	336	>336
Chloroform	**67-66-3**	1	4	>4
1,2-Dichlorobenzene	**95-50-1**	540	2,160	>2,160
1,4-Dichlorobenzene	**106-46-7**	8	32	>32
1,2-Dichloroethane	**107-06-2**	1	6	>6
1,1-Dichloro- ethylene	**75-35-4**	69	276	>276
Dichloromethane (methylene chloride)	**75-09-2**	105	420	>420
1,1,1,2-Tetrachloroethane	**630-20-6**	6	24	>24
1,1,2,2-Tetrachloroethane	**79-35-5**	6	24	>24
Tetrachloroethylene	**127-18-4**	24	96	>96
1,1,1-Trichloroethane	**71-55-6**	2,430	9,720	>9,720
1,1,2-Trichloroethane	**79-00-5**	0.45	1.8	>1.8
Trichloroethylene	**79-01-6**	1	5	>5
Vinyl chloride	**75-01-4**	0.18	0.72	>0.72
Phenols				
2,4,5-Trichlorophenol	**95-95-4**	1,890	7,560	>7,560

Hazard Parameter	CAS – Registry No.	Revised Criteria		
		NR Upper Threshold (mg/kg)	Category 2 Upper Threshold (mg/kg)	Category 1 (mg/kg)
2,4,6-Trichlorophenol	**88-06-2**	19	76	>76
Cresol (total)[3]		4,000	16,000	>16,000
Phenols (total)[3]		40,000	160,000	>160,000
Nitroaromatics and ketones				
2,4 -Dinitrotoluene	**121-14-2**	5	20	>20
Nitrobenzene	**98-95-3**	15	60	>60
Methyl ethyl ketone	**78-93-3**	8,100	32,400	>32,400
Specific Persistent Organic Pollutants (POPs)				
2,4-D	**94-75-7**	210	840	>840
Aldrin + dieldrin		10	40	>40
Organochlorine pesticides[4]		50	200	>200
Organophosphate pesticides[4]		250	1,000	>1,000
Polychlorinated biphenyls (PCBs)	**1336-36-3**	2	50	>50
Perfluoro-octane sulfonate (PFOS)	**1763-23-1**	See note[5]		
Perfluoro-octanoic acid (PFOA)	**335-67-1**	See note[5]		
Any other ratified Stockholm – POP7[6]		50	200	>200
Properties				
pH		6-10.5	2-6 or 10.5-12.5	<2 or >12.5
Wastes for which testing is not relevant				
Chemical waste arising from research and development or teaching activity, including new or unidentified material and material whose effects on human health or the environment are not known		Not Present	Present	n/a
Clinical and related waste[7]		Not Present	n/a	Present
Oxidising agents		Not Present	n/a	Present
Pharmaceuticals, drugs and medicines		Not Present	n/a	Present
Waste from the production and preparation of pharmaceutical products		Not Present	n/a	Present

Hazard Parameter	CAS – Registry No.	Revised Criteria		
		NR Upper Threshold (mg/kg)	Category 2 Upper Threshold (mg/kg)	Category 1 (mg/kg)
Waste of an explosive nature other than explosives within the meaning of the *Explosives Act 1999*		Not Present	n/a	Present
Asbestos		Not Present	Present	n/a

Notes

All values are rounded to 1 or 2 significant figures.

Bolded hazard parameters base reference is the NEPM 2013 HIL C. Other parameters base references are as described in Section 4.2.1. Each hazard parameters base reference and multiplier is provided in Appendix A.

2. PAH is adopted from the HIL-C of the NEPM 2013, which is based on sum f 16 PAHs most commonly reported for contaminated sites. Total sum of naphthalene, acenaphthylene, acenaphthene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-c,d)pyrene, phenanthrene and pyrene.

3. Total for Phenols and Cresols provided. Criteria for Phenols and Cresols as adopted from HIL-C of the NEPM 2013 were derived based on toxicity values for pure phenol and cresol. General phenol or cresol waste could include other forms, such as 2-methylphenol (o-cresol), 3-methylphenol (m-cresol), 4-methylphen p-cresol, 2,4-dimethylphenol, 2.4-dinitrophenol, 2- methyl-4,6-dinitrophenol, 2-nitrophenol, 4-nitrophenol, 2-cyclohexyl-4,6-dinitrophenol, which may exhibit variable toxicity. For the purposes of waste classification, the sum of all Phenols or Cresols should remain below the relevant criteria for each, however speciated assessment may be required in the event of a release of waste or any incident.

4. Organochlorine Pesticides: means laboratory analysis suite of organochlorine pesticides that typically include: Total sum of aldrin, hexachlorobenzene, alpha BHC, beta BHC, gamma BHC (lindane), delta BHC, chlordane, DDT, DDD, DDE, dieldrin, endrin, endrin aldehyde, heptachlor, heptachlor epoxide, methoxychlor and endosulfan (includes endosulfan I, endosulfan II and endosulfan sulphate).

Organophosphate Pesticides (OPP): Most conservative indidiual HIL-C for any OPP was adopted for assessing sum of all OPP. Means the list of organophosphate chemicals approved for use in Australia as shown in Appendix 2 of: Organophosphate Pesticides – Hazardous Chemicals Requiring Health Monitoring, Safe Work Australia, 2013 (http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/801/Organophosphate-Pesticides.pdf)

5. Although HIL-Cs are provided in the PFAS NEPM along with landfill disposal upper limit values, it is understood that the waste industry in each state is still uncertain as to how best manage PFAS. All PFAS containing wastes should be considered regulated at this time, until such a time as the science and policy around the management of these compounds is better understood.

6. Persistent Organic Pollutant, as listed in the Stockholm Convention (http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx) and ratified by the Australian Government (more information at: http://www.environment.gov.au/topics/environment-protection/chemicals-management/pops)

7. Clinical or related waste means wastes arising from medical, nursing, dental, veterinary, laboratory, pharmaceutical, podiatry, tattooing, body piercing, brothels, emergency services, blood banks, mortuary practices and other similar practices, and wastes generated in healthcare facilities or other facilities during the investigation or treatment of patients or research projects, which have the potential to cause disease, injury, or public offence, and includes: sharps, clinical waste, human tissue or body parts, cytotoxic waste, pharmaceutical waste and chemical waste.

5.2 Liquid Hazard Parameter Criteria

A revised set of criteria thresholds for the NR and Category 2 upper threshold were derived for each hazard parameter, as per the methodology detailed in Section 4.2.2. The revised values are provided in Table 8 overleaf, with a comparison table with the current proposed NR values and the adopted

source reference and multiplier if applicable for each provided in Appendix C. The units for the liquid waste criteria has been presented in µg/L (compared to mg/L for solid waste), as the magnitudes are more appropriately referenced in smaller units.

All parameters were updated using either ADWG 2011/ANZECC 2018 or 2000, or USEPA Tapwater RSL/Freshwater Screening Benchmark values, except for the sum of Total Recoverable Hydrocarbon (TRH) threshold.

Ecological criteria sourced from Dutch Screening Criteria (Dutch Values, 2000), and human health criteria sourced from the World Health Organisation (WHO) (WHO, 2008) were compared, with the lower of the two selected as the appropriate reference, being the ecological criteria. The reference document refers to the total sum of TRH, rather than limits for C6-C9 petroleum hydrocarbons and C10-C36 petroleum hydrocarbons. To be consistent with the source document and ensure the threshold is reflective of the intended hazard parameter, the hazard parameter has been adjusted to reflect total sum of TRH.

Arcadis also reviewed the liquid waste properties, and notes the following:

- **pH** – Arcadis recommends this be updated to reflect the standard range of values for both drinking water and ecological protection of 6.5 to 9.
- **Electrical Conductivity (mg/L)** – Arcadis recommends this be presented as Total Dissolved Solids (TDS), which is a more common way to measure EC. Units for TDS are mg/L, and therefore it is suggested the current µS/cm be changed to mg/L. Arcadis suggests setting the upper limit as that which is unacceptable for drinking water of 1,200 mg/L. Generally, 20 to 1,000 mg/L are acceptable for ecosystems in most scenarios.
- **Biological Oxygen Demand (BOD) (mg/L)** – Arcadis recommends this be updated to 15 mg/L, the threshold set for protection of ecosystems in ANZECC 2000.
- **Flash Point** – the USEPA use flash point characteristic to determine if a waste is ignitable and therefore hazardous. This requires that the waste is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume and has flash point less than 60 degrees Celsius. It is suggested that the same criteria be adopted only with the above properties.
- **Peroxides** – Arcadis believes it is sensible to have this criteria, as this framework will be applicable for commercial and industrial facilities, such as those that may be producing peroxides, and this criteria will be protective of wastes generated in case of a spillage etc. Where processes generate peroxide containing wastes (other than hydrogen peroxide), at concentrations of greater than 0.01% v/v, based on the technical paper referenced in the original proposed framework (Kelly, 1996) it is reasonable to assume that regulation would be required. However, it is recommended that DES consider this hazard parameter further, in particular broadening this parameter to all oxidizing substances (as there are many oxidising substances that are not peroxides but can cause combustion, particularly with organic materials such as chlorates).

Table 8: Revised liquid waste hazard parameter thresholds based on adopted methodology[2]

Hazard Parameter	CAS – Registry No.	Revised Criteria	
		NR Upper Threshold (µg/L)	Category 1 (µg/L)
Inorganic Species			
Antimony	**7440-36-0**	60	>60
Arsenic	**7440-38-2**	200	>200
Barium	**7440-39-3**	40,000	>40,000
Beryllium	**7440-41-7**	1,200	>1,200
Boron	**7440-42-8**	3,700	>3,700
Cadmium	**7440-43-9**	2	>2
Chromium (VI)	**18540-29-9**	10	>10
Copper	**7440-50-8**	14	>14
Lead	**7439-92-1**	34	>34
Mercury	**7439-97-6**	6	>6
Molybdenum	**7439-98-7**	1,000	>1,000
Nickel	**7440-02-0**	110	>110
Selenium	**7782-49-2**	110	>110
Silver	**7440-22-4**	1	>1
Vanadium	**7440-62-2**	172	>172
Zinc	**7440-66-6**	30	>30
Anions			
Cyanide (amenable)	**57-12-5**	70	>70
Fluoride	**16984-48-8**	30,000	>30,000
Organic Species			
Petroleum hydrocarbons			
Sum of Total Recoverable Hydrocarbons (TRH)		6000	>6000
Polycyclic aromatic hydrocarbons			

[2] The units for the liquid waste criteria has been presented in µg/L (compared to mg/L for solid waste), as the magnitudes are more appropriately referenced in smaller units.

Benzo(a)pyrene	**50-32-8**	0.20	>0.20
Polycyclic aromatic hydrocarbons (PAHs) (total)		0.20	>0.20
Monocyclic aromatic hydrocarbons			
Benzene	**71-43-2**	20	>20
Toluene	**108-88-3**	16,000	>16,000
Ethylbenzene	**100-41-4**	6,000	>6,000
Xylenes (total)	**1330-20-7**	12,000	>12,000
Styrene (vinyl benzene)	**100-42-5**	600	>600
Chlorinated hydrocarbons			
Carbon tetrachloride	**56-23-5**	60	>60
Chlorobenzene	**108-90-7**	6,000	>6,000
Chloroform	**67-66-3**	4	>4
1,2-Dichlorobenzene	**95-50-1**	30,000	>30,000
1,4-Dichlorobenzene	**106-46-7**	800	>800
1,2-Dichloroethane	**107-06-2**	60	>60
1,1-Dichloro- ethylene	**75-35-4**	500	>500
Dichloromethane (methylene chloride)	**75-09-2**	220	>220
1,1,1,2-Tetrachloroethane	**630-20-6**	11	>11
1,1,2,2-Tetrachloroethane	**79-35-5**	2	>2
Tetrachloroethylene	**127-18-4**	82	>82
1,1,1-Trichloroethane	**71-55-6**	16,000	>16,000
1,1,2-Trichloroethane	**79-00-5**	0.82	>0.82
Trichloroethylene	**79-01-6**	6	>6
Vinyl chloride	**75-01-4**	6	>6
Phenols			
2,4,5-Trichlorophenol	**95-95-4**	2,400	>2,400
2,4,6-Trichlorophenol	**88-06-2**	200	>200
Cresols (total)[2]		3,000	>3,000
Phenols (total) [2]		11,600	>11,600

Nitroaromatics and ketones			
2,4 -Dinitrotoluene	**121-14-2**	5	>5
Nitrobenzene	**98-95-3**	3	>3
Methyl ethyl ketone	**78-93-3**	11,200	>11,200
Specific Persistent Organic Pollutants (POPs)			
2,4-D	**94-75-7**	600	>600
Aldrin + dieldrin		6	>6
Organochlorine pesticides[3]		0.00011	>0.00011
Organophosphate pesticides[3]		0.035	>0.035
Polychlorinated biphenyls (PCBs)	**1336-36-3**	0.00074	>0.00074
Perfluoro-octane sulfonate (PFOS)	**1763-23-1**	1	>1.3
Perfluoro-octanic acid (PFOA)	**335-67-1**	2,200	>2,200
Any other ratified Stockholm – POP7		-	-
Properties			
pH		6.5-9	<6 or >9
Conductivity (Electrical) (mg/L)		<1,200	>1,200
Biological oxygen demand (BOD) (mg/L)		<15	>15
Flash point (°C)		<60.0 and/or contains more than 24% v/v alcohol.	>60.0 and/or contains less than 24% v/v alcohol.
Peroxides (other than hydrogen peroxide) above 0.01% (v/v)		Not Present	Present

Notes

All values are rounded to 1 or 2 significant figures.

Bolded hazard parameters base reference are drinking water guidelines (ADWG NHMRC 2011 or USEPA 2017 Tapwater RSL). Other parameters base references are as described in Section 4.2.24.2.1. Each hazard parameters base reference and multiplier is provided in Appendix B.

2. Phenols and Cresols is adopted from the USEPA RSL for Tapwater (THQ 0.1) x 100, pure phenol and cresol. General phenol or cresol waste could include other forms, such as 2-methylphenol (o-cresol), 3-methylphenol (m-cresol), 4-methylphen p-cresol, 2,4-dimethylphenol, 2.4-dinitrophenol, 2- methyl-4,6-dinitrophenol, 2-nitrophenol, 4-nitrophenol, 2-cyclohexyl-4,6-dinitrophenol, which may exhibit variable toxicity. For the purposes of waste classification, the sum of all Phenols or Cresols should remain below the relevant criteria for each, however speciated assessment may be required in the event of a release of waste or any incident.

3. Organochlorine Pesticides: means laboratory analysis suite of organochlorine pesticides that typically include: Total sum of aldrin, hexachlorobenzene, alpha BHC, beta BHC, gamma BHC (lindane), delta BHC, chlordane, DDT, DDD, DDE, dieldrin, endrin, endrin aldehyde, heptachlor, heptachlor epoxide, methoxychlor and endosulfan (includes endosulfan I, endosulfan II and endosulfan sulphate).

Means the list of organophosphate chemicals approved for use in Australia as shown in Appendix 2 of: Organophosphate Pesticides – Hazardous Chemicals Requiring Health Monitoring, Safe Work Australia, 2013 (http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/801/Organophosphate-Pesticides.pdf)

6 LIMITATIONS AND KEY ASSUMPTIONS

In undertaking this review and reflecting on the hazard parameter thresholds derived, it is useful to reconsider some of the key limitations of this review and the Regulated Waste Classification Framework, to assist in identifying areas for future work / research and for consideration by DES when applying the classifications as part of the broader framework:

- The thresholds have been informed by the information provided by DES on the current expected management controls in the Regulated Waste industry and overall regulatory framework. The thresholds should be adjusted if there are changes to the assumed standard management controls and the fate / end destination or if there are updates in science which change the values.
- The proposed Regulated Waste Classification Framework is a risk-based classification that takes into account the controls and mitigation measures in place. Arcadis in consultation with DES has taken measures to define the scenarios which each Category should be protective off, after considering the likely controls that may be in place. DES should consider these scenarios and assumptions when developing conditions in EAs of the waste-related ERAs, related to management of Regulated Wastes.
- Arcadis recommends that DES give consideration to the fact that Category 1 wastes have been considered four times as hazardous (in principle) than NR wastes, and ensure that regulation and compliance measures enforced on facilities managing Category 1 wastes reflects the need to protect, on average, four times the risk presented of NR wastes (i.e. consideration when developing conditions of the EAs etc.). Should the regulatory stance become firmer or further refined in defining the technologies (transport and site) that can accept a Category 1 or Category 2 waste, this factor should be re-evaluated.
- Uncontrolled dumping or risks associated with illegal dumping are not captured in this risk-based framework.
- Overall, the proposed thresholds are deemed to be relatively conservative, given the methodologies used in their derivation, and the expectation that any uncontrolled release or spill, will be managed urgently by DES.

7 CONCLUSION

The Queensland Department of Environment and Science (DES) engaged Arcadis Australia Pacific (Arcadis) to undertake a critical review and analysis of the total contaminant concentration threshold values proposed within the Regulated Waste Classification Framework. The proposed Framework features three classification categories based on risk, with total concentration thresholds for 56 solid waste and 46 liquid waste hazard parameters, and one solid waste hazard property (pH) and five liquid waste hazard properties (pH, electrical conductivity, biological oxygen demand, flash point and presence of peroxides).

Arcadis undertook this review in two phases. In Phase 1, a review of all parameters was undertaken, involving benchmarking against other jurisdictions to highlight anomalies (Task 1a) and evaluation of the suitability of thresholds based on their derivation and risk to the environment or human health (Task 1b). The review resulted in two key findings:

- While the proposed values use the same source references as used across a number of States, these are now outdated and, at a minimum, the proposed values should be updated with the newest published versions of the same sources.
- Although sources references could be identified on most occasions, often the multipliers could not be substantiated or validated for their scientific rigour, so it was inappropriate to simply accept them in this review.

Phase 2 of the review involved deriving revised threshold by adopting a set of repeatable and scientifically validated methodologies. This methodology and the derived values are the focus of this report.

Arcadis established a set of key principles, scoped by the regulatory context and objectives and the accepted definition of the categories, that guided the threshold derivation process. This included:

- Identifying the scenarios where the highest environmental and human health risk would be present and adopting a criteria derivation methodology that would be protective of that scenario in order to define the upper threshold of the Non-Regulated (NR) category.
  - The potential for spills or releases into the environment during transport underpinned conservative assumptions for the proposed NR upper thresholds, based on the requirement to protect potentially sensitive receptors that may be present along transport routes.
- Appropriately quantifying the additional risk associated with managing a Category 1 waste compared to a Category 2 waste, by setting the upper thresholds of Category 2.

Using these definitions and the findings from Phase 1, Arcadis has derived a set of revised thresholds, using the following general principles:

1. Maintaining the reference document and proposed threshold value circulated in the Consultation RIS, if still appropriate for the purpose of this Framework
2. Using national or local reference documents where appropriate, over international references.
3. Using international references as preference over deriving and calculating new values for hazard parameters where no appropriate value is available.

The revised thresholds were derived from the following key sources, which were considered to be appropriate references for defining the thresholds of the Regulated Waste Classification Framework:

- Solids – Scheduled Waste limits, HIL C NEPM 2013, USEPA Residential Soil RSLs
- Liquids – ADWG (NHMRC, 2011), ANZECC 2018 or 2000, USEPA Tapwater RSL and USEPA Freshwater Screening.
- While in some cases the revised values present relatively significant changes from the values proposed in the consultation RIS, they represent updated and modern science sourced from current references and provide a consistent methodology that can be adapted and updated in future. Arcadis recommends that DES consider the assumptions and various factors that have been considered in developing the revised thresholds when enforcing the Framework.

8 REFERENCES

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United States Environment Protection Agency 2017 (USEPA 2006), Freshwater Screening Benchmarks

United States Environment Protection Agency 2017 (USEPA 2017), Regional Screening Levels (RSLs) – User Guide (November 2017).

World Health Organisation (WHO) 2008 (WHO 2008), Petroleum Products in Drinking Water - Background document for development of WHO Guidelines for Drinking

APPENDIX A

Solid Waste Hazard Parameter Summary Table

Hazard Parameter	CAS – Registry No.	Proposed (RIS)	Revised Criteria		
		NR Upper Threshold (mg/kg)	NR Upper Threshold (mg/kg)	Base Reference	Category 2 Upper Threshold (mg/kg)
Inorganic Species					
Antimony	**7440-36-0**	75	9	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	36
Arsenic	**7440-38-2**	500	300	**NEPM 2013 HIL C**	1,200
Barium	**7440-39-3**	6,250	4,500	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	18,000
Beryllium	**7440-41-7**	100	90	**NEPM 2013 HIL C**	360
Boron	**7440-42-8**	15,000	20,000	**NEPM 2013 HIL C**	80,000
Cadmium	**7440-43-9**	100	90	**NEPM 2013 HIL C**	360
Chromium (VI)	**18540-29-9**	500	300	**NEPM 2013 HIL C**	1,200
Copper	**7440-50-8**	5,000	220	**NEPM 2013 EIL**	880
Lead	**7439-92-1**	1,500	300	**NEPM 2013 HIL A or NEPM 2013 HIL C x 0.5**	1,200
Mercury	**7439-97-6**	75	80	**NEPM 2013 HIL C**	320
Molybdenum	**7439-98-7**	1,000	117	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	468
Nickel	**7440-02-0**	3,000	1,200	**NEPM 2013 HIL C**	4,800
Selenium	**7782-49-2**	50	700	**NEPM 2013 HIL C**	2,800
Silver	**7440-22-4**	3	117	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	468
Vanadium	**7440-62-2**	TBD	117	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	468
Zinc	**7440-66-6**	35,000	400	**NEPM 2013 EIL**	1,600
Anions					
Cyanide (total)	**57-12-5**	2,500	240	**NEPM 2013 HIL C**	960
Fluoride	**16984-48-8**	10,000	930	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	3,720
Organic Species					
Petroleum hydrocarbons					
C6-C9 petroleum hydrocarbons		325	950	**NEPM 2013 HSL-C (F1, Sand, 0-1m)**	3,800
C10-C36 petroleum hydrocarbons		5,000	5,300	**NEPM 2013 HSL-C (Direct Contact)**	21,200

Polycyclic aromatic hydrocarbons					
Benzo(a)pyrene	**50-32-8**	5	3	**NEPM 2013 HIL C**	12
Polycyclic aromatic hydrocarbons (PAHs) (total)		50	300	**NEPM 2013 HIL C**	1,200
Monocyclic aromatic hydrocarbons					
Benzene	**71-43-2**	4	5	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	20
Toluene	**108-88-3**	3,200	1,470	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	5,880
Ethylbenzene	**100-41-4**	1,200	17	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	68
Xylenes (total)	**1330-20-7**	2,400	174	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	696
Styrene (vinyl benzene)	**100-42-5**	120	1,800	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	7,200
Chlorinated hydrocarbons					
Carbon tetrachloride	**56-23-5**	12	2	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	**8**
Chlorobenzene	**108-90-7**	1,200	84	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	336
Chloroform	**67-66-3**	240	1	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	4
1,2-Dichlorobenzene	**95-50-1**	6,000	540	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	2,160
1,4-Dichlorobenzene	**106-46-7**	160	8	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	32
1,2-Dichloroethane	**107-06-2**	12	1	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	6
1,1-Dichloro-ethylene	**75-35-4**	120	69	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	276
Dichloromethane (methylene chloride)	**75-09-2**	16	105	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	420
1,1,1,2-Tetrachloroethane	**630-20-6**	400	6	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	24
1,1,2,2-Tetrachloroethane	**79-35-5**	53	6	**USEPA Soil RSL 2017 (THQ 0.1) x 3** Adopted 1,1,1,2 Tetrachloroethane as surrogate	24
Tetrachloroethylene	**127-18-4**	200	24	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	96
1,1,1-Trichloroethane	**71-55-6**	1,200	2,430	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	9,720
1,1,2-Trichloroethane	**79-00-5**	48	0.45	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	1.8

Tricholoroethylene	**79-01-6**	20	1	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	5
Vinyl chloride	**75-01-4**	1	0.18	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	0.72
Phenols					
2,4,5-Trichlorophenol	**95-95-4**	16,000	1,890	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	7,560
2,4,6-Trichlorophenol	**88-06-2**	80	19	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	76
Cresol (total)		8,000	4,000	**NEPM 2013 HIL C**	16,000
Phenols (total)		550	40,000	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	160,000
Nitroaromatics and ketones					
2,4 -Dinitrotoluene	**121-14-2**	5	5	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	20
Nitrobenzene	**98-95-3**	80	15	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	60
Methyl ethyl ketone	**78-93-3**	8,000	8,100	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	32,400
Specific Persistent Organic Pollutants (POPs)					
2,4-D	**94-75-7**	120	210	**USEPA Soil RSL 2017 (THQ 0.1) x 3**	840
Aldrin + dieldrin		1	10	**NEPM 2013 HIL C**	40
Organochlorine pesticides		50	50	**Scheduled Waste WMP**	200
Organophosphate pesticides		8	250	**NEPM 2013 HIL-C Chloropyrifos**	1,000
Polychlorinated biphenyls (PCBs)	**1336-36-3**	2	2	**Scheduled Waste WMP**	50
Perfluoro-octane sulfonate (PFOS)	**1763-23-1**	TBD (inconsistent currently)			
Perfluoro-octanic acid (PFOA)	**335-67-1**	TBD (inconsistent currently)			
Any other ratified Stockholm – POP7		50	50	**General Stockholm POP Threshold Value**	200

APPENDIX B

Liquid Waste Hazard Parameter Summary Table

Hazard Parameter	CAS – Registry No.	Proposed (RIS)	Revised Criteria		
		NR Upper Threshold (µg/L)	NR Upper Threshold (µg/L)	Base Reference	Category 1 (µg/L)
Inorganic Species					
Antimony	**7440-36-0**	1,000	60	**ADWG (NHMRC 2011) x 20**	>60
Arsenic	**7440-38-2**	350	200	**ADWG (NHMRC 2011) x 20**	>200
Barium	**7440-39-3**	35,000	40,000	**ADWG (NHMRC 2011) x 20**	>40,000
Beryllium	**7440-41-7**	500	1,200	**ADWG (NHMRC 2011) x 20**	>1,200
Boron	**7440-42-8**	15,000	3,700	**ANZECC 2000 (95% protected species) x 10**	>3,700
Cadmium	**7440-43-9**	100	2	**ANZECC 2000 (95% protected species) x 10**	>2
Chromium (VI)	**18540-29-9**	100	10	**ANZECC 2000 (95% protected species) x 10**	>10
Copper	**7440-50-8**	100,000	14	**ANZECC 2017 (95% protected species) x 10**	>14
Lead	**7439-92-1**	500	34	**ANZECC 2000 (95% protected species) x 10**	>34
Mercury	**7439-97-6**	50	6	**ANZECC 2000 (95% protected species) x 10**	>6
Molybdenum	**7439-98-7**	2,500	1,000	**ADWG (NHMRC 2011) x 20**	>1,000
Nickel	**7440-02-0**	1,000	110	**ANZECC 2000 (95% protected species) x 10**	>110
Selenium	**7782-49-2**	500	110	**ANZECC 2000 (95% protected species) x 10**	>110
Silver	**7440-22-4**	50	1	**ANZECC 2000 (95% protected species) x 10**	>1
Vanadium	**7440-62-2**	TBD	172	**USEPA Tapwater RSL (THQ 0.1) x 10**	>172
Zinc	**7440-66-6**	150,000	30	**ANZECC 2017 (95% protected species) x 10**	>30
Anions					

Cyanide (amenable)	**57-12-5**	1,750	70	**ANZECC 2000 (95% protected species) x 10**	>70
Fluoride	**16984-48-8**	75,000	30,000	**ADWG (NHMRC 2011) x 20**	>30,000
Organic Species					
Petroleum hydrocarbons					
Sum of Total Recoverable Hydrocarbons (TRH)		Present / visible/odour	6000	**Dutch 2000 x 10**	>6000
Polycyclic aromatic hydrocarbons					
Benzo(a)pyrene	**50-32-8**	1	0.20	**ADWG (NHMRC 2011) x 20**	>0.20
Polycyclic aromatic hydrocarbons (PAHs) (total)		-	0.20	**ADWG (NHMRC 2011) x 20**	>0.20
Monocyclic aromatic hydrocarbons					
Benzene	**71-43-2**	50	20	**ADWG (NHMRC 2011) x 20**	>20
Toluene	**108-88-3**	40,000	16,000	**ADWG (NHMRC 2011) x 20**	>16,000
Ethylbenzene	**100-41-4**	15,000	6,000	**ADWG (NHMRC 2011) x 20**	>6,000
Xylenes (total)	**1330-20-7**	30,000	12,000	**ADWG (NHMRC 2011) x 20**	>12,000
Styrene (vinyl benzene)	**100-42-5**	1,500	600	**ADWG (NHMRC 2011) x 20**	>600
Chlorinated hydrocarbons					
Carbon tetrachloride	**56-23-5**	150	60	**ADWG (NHMRC 2011) x 20**	>60
Chlorobenzene	**108-90-7**	15,000	6,000	**ADWG (NHMRC 2011) x 20**	>6,000
Chloroform	**67-66-3**	3,000	4	**USEPA Tapwater RSL (THQ 0.1) x 100**	>4
1,2-Dichlorobenzene	**95-50-1**	75,000	30,000	**ADWG (NHMRC 2011) x 20**	>30,000
1,4-Dichlorobenzene	**106-46-7**	2,000	800	**ADWG (NHMRC 2011) x 20**	>800
1,2-Dichloroethane	**107-06-2**	150	60	**ADWG (NHMRC 2011) x 20**	>60
1,1-Dichloro- ethylene	**75-35-4**	1,500	500	**USEPA Tapwater RSL (THQ 0.1) x 10**	>500
Dichloromethane (methylene chloride)	**75-09-2**	200	220	**USEPA Tapwater RSL (THQ 0.1) x 10**	>220
1,1,1,2-Tetrachloroethane	**630-20-6**	5,000	11	**USEPA Tapwater RSL (THQ 0.1) x 10**	>11
1,1,2,2-Tetrachloroethane	**79-35-5**	650	2	**USEPA Tapwater RSL (THQ 0.1) x 10**	>2

Tetrachloroethylene	**127-18-4**	250	82	**USEPA Tapwater RSL (THQ 0.1) x 100**	>82
1,1,1-Trichloroethane	**71-55-6**	15,000	16,000	**USEPA Tapwater RSL (THQ 0.1) x 10**	>16,00
1,1,2-Trichloroethane	**79-00-5**	600	0.82	**USEPA Tapwater RSL (THQ 0.1) x 10**	>0.82
Tricholoroethylene	**79-01-6**	250	6	**USEPA Tapwater RSL (THQ 0.1) x 10**	>6
Vinyl chloride	**75-01-4**	15	6	**ADWG (NHMRC 2011) x 20**	>6
Phenols					
2,4,5-Trichlorophenol	**95-95-4**	200,000	2,400	**USEPA Tapwater RSL (THQ 0.1) x 20**	>2,400
2,4,6-Trichlorophenol	**88-06-2**	1,000	200	**ADWG (NHMRC 2011) x 20**	>200
Crestol (total)	**1319-77-3**	100,000	3,000	**USEPA Tapwater RSL (THQ 0.1) x 100**	>3,000
Penols (total)	**108-95-2**	7,000	11,600	**USEPA Tapwater RSL (THQ 0.1) x 100**	>11,600
Nitroaromatics and ketones					
2,4 -Dinitrotoluene	**121-14-2**	65	5	**USEPA Tapwater RSL (THQ 0.1) x 100**	>5
Nitrobenzene	**98-95-3**	1,000	3	**USEPA Tapwater RSL (THQ 0.1) x 100**	>3
Methyl ethyl ketone	**78-93-3**	100,000	11,200	**USEPA Tapwater RSL (THQ 0.1) x 100**	>11,200
Specific Persistent Organic Pollutants (POPs)					
2,4-D	**94-75-7**	1,500	600	**ADWG (NHMRC 2011) x 20**	>600
Aldrin + dieldrin		15	6	**ADWG (NHMRC 2011) x 20**	>6
Organochlorine pesticides		1,000	0.00011	**USEPA Freshwater Screening Benchmarks x 100**	>0.00011
Organophosphate pesticides		200	0.035	**USEPA Freshwater Screening Benchmarks x 100**	>0.035
Polychlorinated biphenyls (PCBs)	**1336-36-3**	1	0.00074	**USEPA Freshwater Screening Benchmarks x 100**	>0.00074
Perfluoro-octane sulfonate (PFOS)	**1763-23-1**	TBD	1	**ANZECC 2017 (95% protected species) x 100**	>1.3
Perfluoro-octanic acid (PFOA)	**335-67-1**	TBD	2,200	**ANZECC 2017 (95% protected species) x 100**	>2,200
Any other ratified Stockholm – POP7		-	-		-

Properties		
pH	6.5-9	<6 or >9
Conductivity (Electrical) (mg/L)	<1,200	>1,200
Biological oxygen demand (BOD) (mg/L)	<15	>15
Flash point (°C)	<60.0 and/or contains more than 24% v/v alcohol.	>60.0 and/or contains less than 24% v/v alcohol.
Peroxides (other than hydrogen peroxide) above 0.01% (v/v)	Not Present	Present