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Dear Sir/Madam,

Department of Environment Regulation's Proposed Amendments to the Waste Avoidance and Resource Recovery Regulations 2008 to Require Record-keeping and Annual Reporting of Waste and Recycling Data

This document has been prepared in response to the Department of Environment Regulation's (DER) request for feedback on the consultation paper relating to the proposed amendments to the *Waste Avoidance and Resource Recovery Regulations 2008* (the Regulations) that was released in July 2016.

Talis welcomes the DER's proposal to amend the Regulations to require waste and recycling data record-keeping and reporting in Western Australia. Talis commends the DER on this significant step to address the lack of available waste data in Western Australia and would assist in advancing waste management planning and investment in the State.

However, the proposed amendments in their current form appear to be focussed on helping to inform the performance of waste diversion against the Waste Strategy targets. Whilst the waste diversion targets are important in providing the DER with an indication of how the State is performing, the currently proposed level of data reporting by liable entities will still not provide a comprehensive picture of waste management in the State, due to the limitations of the information requested. This will constrain the DER and Waste Authority in its ability to interrogate and disaggregate the data further and to track the whole lifecycle of waste from cradle to grave. This is standard reporting requirements for waste data in other advanced countries across the world. By expanding the reporting requirements to include materials types and more detailed information on the geographic source of the waste generated, the data would enable the identification of waste generation, material flow and treatment and/or disposal rates. Identification of these materials, their volumes and geographic sources would provide an evidence base for targeted initiatives from the Waste Authority and enable local governments and the waste industry to prioritise investment in new infrastructure, where it is needed. Indeed, the DER's document states "*improving waste and recycling data will promote well-informed and targeted policies and programs.*".

The Waste Authority's [Pilbara and Broome Waste Data Study](#), undertaken by Talis in 2013, was one of the most comprehensive waste data studies undertaken in the State. The Study gathered waste data from across the Pilbara region from all major waste generators across a number of sectors of the economy. The report and its dataset has helped to guide investment and identify future waste infrastructure capacity gaps and opportunities in the region. As a result of the report, public and private investments have been made in the region to advance the waste management systems and infrastructure resulting in greater outcomes.

More recently, a similar study, the [Goldfields Waste Data and Priorities Study](#) was undertaken in the Goldfields-Esperance region, which was funded by the Goldfields Environmental Management Group and Talis. The study's report was published in July. It led to a series of recommendation to work collaboratively at a regional level with Local Governments and waste generators.

The following sections sets out Talis' comments and recommendations in relation to the above consultation with a focus on:

- Liable Entities; and
- Data capture and Waste Reporting Framework.

1 Liable Entities

The DER sets out the three proposed Liable Entities that will be required to report, namely:

- Local Governments;
- Licensees or occupiers of premises that sort, treat or process solid waste for the purposes of recycling and/or resource recovery and produce 1,000 tonnes or more of recycled or reprocessed products; and
- Licensees or occupiers of landfill premises that receive 20,000 tonnes of solid waste or more in a financial year and are not required to pay the landfill levy.

The following sub-sections set out Talis' comments and recommendations in relation to the proposed Liable Entities.

1.1 Recycling Facilities

The proposed reporting threshold for recycling and/or resource recovery premises is proposed to be 1,000 tonnes or more of recycled or reprocessed products that requires no further processing prior to final use or export. Talis is aware of a number of Material Recovery Facilities in Major Regional Centres that would be unlikely to reach 1,000 tonnes per annum of recycled or reprocessed products. Under the currently proposed thresholds, these facilities would not be required to report. As the intention of the Regulation amendments is to provide waste and recycling data, it would seem counter-intuitive to omit numerous facilities in regional areas because of an arbitrary threshold. **Table 1-1** sets out a number of prescribed premises categories and whether they would be likely to be required to report based on the currently proposed thresholds.

Table 1-1: Examples of Prescribed Premises categories and their likely reporting requirements under proposed thresholds

Category No	Description	Threshold for prescribed premises licensing	Reporting required under proposed requirements?
47	Scrap metal recovery	100 tonnes or more per year	No, unless over 1,000 tonnes
60	Incineration	100kg or more per hour	Dependent on operational hours and total annual throughput but unlikely if close to 100kg per hour throughput.
61A	Solid waste facility	1,000 tonnes or more per year	Yes

Category No	Description	Threshold for prescribed premises licensing	Reporting required under proposed requirements?
62	Solid waste depot	500 tonnes or more per year	No, unless over 1,000 tonnes.

As is shown in **Table 1-1**, a solid waste depot that accepts over 500 tonnes of waste is considered to be a prescribed premises that requires a license under Part V of the *EP Act* but would not be required to report unless it exceeds the 1,000 tonnes threshold.

Given that there are multiple prescribed premises categories that are required to be licensed with throughputs significantly lower than 1,000 tonnes, as shown in **Table 1-1**, Talis would encourage the DER to instead adopt a reporting requirement for all licensed premises within relevant categories.

Based on our industry knowledge, it is Talis' understanding that the majority of scrap metal premises in Western Australia are not licensed premises. Whilst requiring all licensees to report would not address this particular data gap, it is worthwhile highlighting the potential to miss unlicensed premises as part of the reporting given there would be no formal regulatory means for the DER to track these premises and the volumes of recycled materials that they are processing.

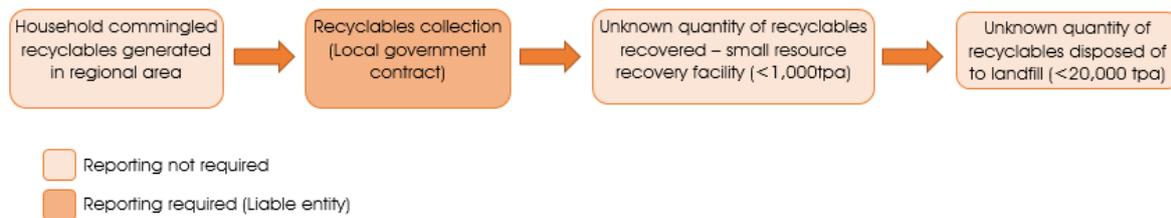
Should the DER wish to retain thresholds for reporting, Talis would strongly encourage the DER to consider revising the thresholds down to a lower level such as 500 tonnes per annum to capture a wider number of licensed waste facilities.

1.2 Landfill Premises

The DER's document states that "*licensees or occupiers of landfill premises that receive 20,000 tonnes of solid waste or more in a financial year but are not required to pay the landfill levy*" will be required to report under the amended Regulations. This requirement clearly applies to non-metropolitan landfills only as all metropolitan landfills are subject to the landfill levy and report as part of the levy obligations. Talis has been working with numerous Local Governments in the regions over recent years and has a strong understanding of regional waste volumes and current waste data capture practices. From our experience, numerous Major Regional Centres in the State do not receive 20,000 tonnes of solid waste in a financial year for disposal to their landfills. Under the proposed thresholds, this would mean that they are not required to report.

There is some ambiguity around whether the threshold applies to total waste received or waste tonnages sent to landfill. By requiring all licensees to report, any uncertainties around reporting requirements would be removed. **Diagram 1-1**, illustrates an example of potential data gaps in using proposed thresholds, where household generated commingled recyclables in a regional area would be collected by a waste service provider, as part of a local government contract. These recyclables could then be sent to a resource recovery facility that recovers less than 1,000 tonnes per year of materials (indicating they are not required to report) and any contaminated processing losses would be sent to landfill, which would also not be required to report if the facility received under 20,000 tonnes per year. This would result in the DER receiving data from the Local Government on the collected recyclables but no further information on what happens to the waste after it is collected. This would result in an incomplete picture of waste management in the regions and significant data gaps in the State's waste and recycling dataset.

Diagram 1-1: Example of potential data gaps from currently proposed level of reporting



There also appears to be ambiguity as to which entity (licensee or operator) would be responsible to report if the licensees do not operate the facility. Talis would suggest the wording is clarified to who the responsibility lies with for premises where licensees lease out operations to other entities. Currently, all regional landfills in the State are owned by Local Government. However, there is the potential in future for private waste service providers to open a landfill in a regional area. As previously mentioned, Major Regional Centres in the State have not historically generated the volumes of waste that would require reporting under the currently proposed thresholds. All of the Major Regional Centres' landfill are currently owned by Local Government however, there is potential in future for private waste service providers to open regional landfill facilities. If the Liable Entity reporting requirements remain as proposed, these privately run landfills would not being required to report their waste data to the DER.

As an alternative to applying tonnage thresholds for reporting, Talis would propose that the DER instead require licensed landfill premises (Categories 63, 64 and 65) to report, regardless of their annual waste acceptance levels. As part of the DER's responsibility under Part V of the *Environmental Protection Act 1986*, requiring licensed premises to report would assist the DER in ensuring that licensees are in compliance with their licence conditions (i.e. not exceeding their approved capacity) and easily identify Liable Entities. The DER could allow for exemptions for specific types of landfill premises such as Category 89 (registered landfills) or sector-specific exemptions such as licensed mining sector landfills, if these are not deemed to be required. Applying this level of reporting would ensure that a comprehensive dataset of waste volumes going to landfills across the State is captured. It is common practice in many other jurisdictions, such as in Europe, for the regulator to require licensees to report this type of information.

Should the DER still wish to proceed with applying waste tonnage thresholds to the landfill premises' reporting requirements, Talis would strongly encourage the DER to consider revising the threshold down from 20,000 tonnes to 5,000 tonnes per annum so as to increase the number of landfills and therefore increase the range of waste data captured in regional areas. Additionally, Talis would recommend the DER further clarify in future guidance whether the thresholds apply to total waste received at a landfill facility or waste tonnages sent to landfill. Many landfills are integrated facilities with a range of functions including stockpiling, materials recovery and landfilling.

Summary of Key Points

- Applying waste tonnage thresholds to reporting requirements for landfill premises will result in significant waste data gaps from the regions due to a number of Major Regional Centres that would not meet the proposed thresholds.
- Talis suggests the DER require all licensed landfill premises to report their waste data, this would avoid any ambiguity around whether a liable entity is required to report and would provide a more comprehensive and robust waste dataset.

- If the DER still wishes to proceed with applying waste tonnage thresholds, Talis would strongly encourage the DER to revise the threshold down from 20,000 tonnes to 5,000 tonnes to enable a greater range of waste data capture from the regions.

2 Data Capture and Waste Reporting Framework

As mentioned earlier, the proposed amendment to the Regulations provides an immense opportunity for the DER to capture comprehensive and robust data from waste managers. In particular, Talis has concerns about the following levels of data capture:

- Sector source of waste;
- Waste material type;
- Geographic source; and
- Reporting method.

2.1 Sector source of waste

Referred to in the consultation document as 'sector source of waste', the three key waste streams of municipal solid waste (MSW), commercial and industrial (C&I) and construction and demolition (C&D) provide a high level indication of the source of the waste but provides limited meaningful information or traceability in terms of the generation source. A further breakdown to the sector of the economy (e.g. mining) or waste material level (e.g. building rubble) would provide more valuable information and allow the data to be 'drilled down' to a greater level of detail but still allow for aggregation of data at the waste stream level for comparison against the Waste strategy targets.

By gathering a greater level of detail in relation to the sector the waste was generated in, the data would provide an evidence base for which sectors of the economy should be targeted. It would then be possible to develop initiatives to target specific economic sectors. For example, if the data showed that the mining sector generates the largest quantities of scrap metals in the State, this would indicate that there would be potential for further investigating the establishment of a scrap metal recycling scheme in collaboration with mining companies.

2.2 Waste material type

The New South Wales Environmental Protection Authority (NSW EPA) requires occupiers of scheduled waste facilities to report on waste streams and waste material types (NSW EPA, 2015).

The reporting requirements set out in 2.2.1-2.2.3 of the document appear to clearly set out the data requirements for high level waste data capture (at the waste sector level). However, Section 4 of the document, which sets out the indicative methods for measuring and estimating data, states that for use of the volume-estimation method, "the volume of each load would be assessed and recorded together with the load's material type". This appears to suggest that liable entities will be required to record waste data down to the material type level. If liable entities are recording to this level of detail, it would seem counter-intuitive to the amendments if these liable entities are not reporting down to the waste material level of detail to the DER.

2.3 Geographic source of waste

The DER has currently proposed the categorisation of geographic source of waste for reporting as:

- Metropolitan;

- Non-metropolitan; or
- Imported.

Talis believes that it would be beneficial to provide more detail on the geographic source of waste beyond these categories. For example, information could be provided at the regional level. This would help to understand where waste is being generated and treated or disposed of. By gathering this level of data, the DER and Waste Authority would be in a unique position to identify opportunities and provide data to assist regional areas in better understanding their waste in a similar way to the Pilbara and Broome Waste Data Study and Goldfields Waste Data and Priorities Study have.

A further detail that could be included within the reporting requirements is the provision of information on the origin of the waste that is being handled. Waste can often be handled by multiple service providers after collection. If the last known point of origin of the waste is not captured, there would be a real risk of double counting waste data that has been reported by two different entities. Further, inclusion of this information would enable interrogation of the data to trace waste movements through its lifecycle from generation to collection, treatment or disposal (see **Diagram 1-2**).

Diagram 1-2: Example of potential double counting of waste data



2.4 Reporting Method

Talis would also encourage the DER to include provision for the reporting method for each entry. This could include provision for each of the approved methods of measuring and estimating waste e.g. Weighbridge, Volume-Estimation Method, etc. This would allow for easy interrogation of the data to determine, which approval method was used for auditing purposes.

Talis has historically captured the reporting method of waste within its Data Collection Sheets used in the Pilbara and Goldfields Waste Data Studies. An example of the Data Collection Sheets is included as an attachment to this response.

2.5 Waste Classification System

In 2013, Talis devised a Waste Classification System in consultation with the Waste Authority as part of the Pilbara and Broome Waste Data Study. The Waste Classification System provides an accurate and consistent framework for reporting waste data. It covers three tiers of waste including waste stream, sector of the economy and waste material type as detailed in **Table 1-2**.

Table 1-2: Waste Classification System Tiers

Tier	Description
1. Waste Stream	Municipal Solid Waste Commercial & Industrial Construction & Demolition

Tier	Description
2. Sector of Economy	Covers major sectors of the economy including domestic, mining and agriculture.
3. Waste Material Type	Reflects the composition of the waste, split into 8 material groups, including Controlled Waste.

Each of the Waste Classification tiers provide a greater level of detail including the waste from the waste stream, to the sector of the economy from which it was generated and, finally, the waste material type, which covers 285 different waste types across eight material groupings including the DER's Controlled Waste Category list.

The Waste Classification System has been used successfully in a number of waste data studies, including the Pilbara and Broome Waste Data Study. Talis has received feedback from a number of stakeholders indicating that they were grateful for a consistent means of reporting and some stakeholders have adopted the Waste Classification into their organisation.

One of the Waste Authority's Strategic Objectives within the Waste Strategy is to "Develop best practice guidelines, measures and reporting frameworks and promote their adoption". The adoption of a Waste Classification System similar to that developed for the Pilbara Waste Data Study would provide a consistent framework for Liable Entities to report and reduce the administrative burden of converting data into a consistent format and for the DER. A copy of the Waste Classification System is included within this response as an attachment.

2.6 Waste Authority Reporting and Information sharing

The Waste Authority has previously acknowledged "the need to invest in the expansion of data collection and dissemination.." (Waste Strategy, 2012) and as part of the Pilbara and Broome Waste Data Study, the Waste Authority affirmed that the "availability of comprehensive, robust and accurate data will contribute to state government, local government and industry together, to plan and deliver future waste management systems, initiatives and infrastructure that will assist improved levels of sustainable waste management".

The consultation document does not provide details of how the data will be used by the DER, and whether the Waste Authority will publish an annual report or disseminate the data publicly. The Waste Authority acknowledges in its 2016-17 Business Plan that it will "provide the industry with timely access to key data collected". The publication of aggregated waste data gathered as part of the proposed reporting would greatly assist Local Governments and the waste management industry in making informed decisions around future waste management planning and investment.

Summary of Key Points

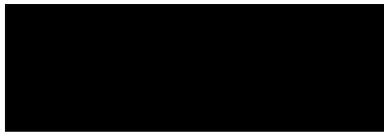
- Talis would recommend the DER include additional details as part of the reporting requirements including:
 - The sector that the waste was generated;
 - Detail of the waste material type; and
 - Expanded information on the geographic source of waste in order to gather a more valuable and comprehensive waste and recycling dataset.
- DER should consider including information on the last known origin of the waste to minimise the risk of double counting of waste that is handled at multiple waste facilities.

- The DER should adopt a reporting framework to capture data in a consistent manner using a similar format to the Waste Classification System used in the Pilbara and Broome Waste Data Study.
- Talis would strongly encourage the DER to publish aggregated data that is gathered as part of the amendments to the Regulation which will be a valuable tool in helping Local Governments and the waste management industry in making informed decisions around future waste management planning and investment.

Conclusion

Please contact me should you wish to discuss any aspect of Talis' consultation response.

Yours sincerely,



Ronan Cullen
Director & Waste Management Section Leader
TALIS CONSULTANTS

e – [REDACTED]
m – [REDACTED]

Encl: 1. *Waste Classification System*
2. *Data Collection Sheet example*
3. *Conversion Factors*

About Talis Consultants

Talis Consultants provide Environmental Services, Waste Management, Asset Management, Civil Engineering and Spatial Science services to both the private and public sector with over 25 years of experience in the WA market.

Waste Classification System- Waste Stream and Sector Descriptions

Waste Classification System- Material Descriptions (Controlled Waste 101-145)

Waste Classification System- Material Descriptions (Controlled Waste 146-192)



Waste Stream and Sector Descriptions			Material Descriptions (Controlled Waste 101-145)			Material Descriptions (Controlled Waste 146-192)												
STREAM CODE	Stream Name	Definition	MATERIAL CODE	MATERIAL TYPE - Controlled Wastes	Existing DER Controlled Waste List			MATERIAL CODE	MATERIAL TYPE - Controlled Wastes	Existing DER Controlled Waste List								
					Category Group	Category Group and Waste Code	Category Group Name			Category Group	Category Group and Waste Code	Category Group Name						
A.	Municipal Solid Waste (MSW)	Residential waste typically managed by local governments including: - kerbside or vergeside collections, or dropped off waste - waste from public places including from road verges, reserves, beaches, litter bins, events and street cleaning - incidental commercial waste collected via kerbside collections	101	Plating and Heat Treatment - Waste resulting from the surface treatment of metals and plastics	A	A100	Plating and Heat Treatment	146	Pesticides - Waste from production, formulation or use of biocides & phytopharmaceuticals	H	H100	Pesticides						
			102	Plating and Heat Treatment - Waste from heat treatment and tempering processes which use cyanide				A110	147				Pesticides - Organic phosphorus compounds					
			103	Plating and Heat Treatment - Inorganic cyanide				A130	148				Pesticides - Waste wood preserving chemicals					
			104	Acids - Acidic solutions or acids in solid form	B	B100	Acids	149	Pesticides - Organochlorine pesticides									
			B.	Commercial & Industrial (C&I)	Waste generated from, or as the direct result of, commercial and industrial operations and that is not MSW or C&D waste.	105	Bases - Basic (alkaline) solutions or bases (alkalis) in solid form	C	C100	Bases	150	Oils - Waste mineral oils unfit for their intended purpose	J	J100	Oils			
						106	Inorganic Chemicals - Metal carbonyls				D100	151				Oils - Waste oil and water mixtures or emulsions, and hydrocarbon and water mixtures or emulsions		
						107	Inorganic Chemicals - Inorganic fluorine compounds (excluding calcium fluoride)				D110	152				Oils - Oil interceptor wastes		
			108	Inorganic Chemicals - Mercury and mercury compounds	D120	153	Oils - Waste tarry residues arising from refining, distillation or pyrolytic treatment											
			C.	Construction & Demolition (C&D)	Materials generated as a result of construction, refurbishment or demolition activities	109	Inorganic Chemicals - Arsenic and arsenic compounds	D	D130	Inorganic Chemicals	154	Oils - Used oil filters	K	K100	Putrescible and Organic Wastes			
						110	Inorganic Chemicals - Chromium compounds				D140	155				Oils - Oil sludge		
						111	Inorganic Chemicals - Tannery waste containing chromium				D141	156				Putrescible and Organic Wastes - Animal effluent and residues		
						112	Inorganic Chemicals - Cadmium and cadmium compounds				D150	157				Putrescible and Organic Wastes - Waste from grease traps		
113	Inorganic Chemicals - Used nickel cadmium batteries	D151				158	Putrescible and Organic Wastes - Sewage waste from the reticulated sewage system											
01.	Domestic	Premises where people reside excluding remote employee camps (only to be used for MSW and C&D)	114	Inorganic Chemicals - Beryllium and beryllium compounds	D	D160	Inorganic Chemicals	159	Putrescible and Organic Wastes - Tannery wastes not containing chromium	L	L100	Industrial Wash Water						
			115	Inorganic Chemicals - Antimony and antimony compounds				D170	160				Putrescible and Organic Wastes - Wool scouring wastes					
			116	Inorganic Chemicals - Thallium and thallium compounds				D180	161				Putrescible and Organic Wastes - Food and beverage processing wastes					
			117	Inorganic Chemicals - Copper compounds				D190	162				Putrescible and Organic Wastes - Septage wastes					
			02.	Mining, exploration, quarrying, physical and chemical treatment of minerals					118	Inorganic Chemicals - Cobalt compounds	D	D200	Inorganic Chemicals	163	Industrial Wash Water - Car and truck wash waters	M	M100	Organic Chemicals
									119	Inorganic Chemicals - Nickel compounds				D210	164			
			03.	Agriculture, horticulture, aquaculture, forestry, fishing, food preparation and processing					120	Inorganic Chemicals - Used nickel metal hydride batteries	D	D211	Inorganic Chemicals	165	Organic Chemicals - Waste substances and articles containing polychlorinated biphenyls (PCBs)	N	N100	Soils and Sludge
									121	Inorganic Chemicals - Lead and lead compounds				D220	166			
			04.	Wood processing and production of panels, furniture, pulp, paper and cardboard					122	Inorganic Chemicals - Used lead acid batteries	D	D221	Inorganic Chemicals	167	Organic Chemicals - Non-halogenated organic chemicals			
									123	Inorganic Chemicals - Zinc compounds				D230	168			
			05.	Petroleum refining, natural gas purification and pyrolytic treatment of coal					124	Inorganic Chemicals - Selenium and selenium compounds	D	D240	Inorganic Chemicals	169	Organic Chemicals - Organohalogen compounds not elsewhere listed			
									125	Inorganic Chemicals - Tellurium and tellurium compounds				D250	170			
			06.	Chemical processing					126	Inorganic Chemicals - Vanadium compounds	D	D270	Inorganic Chemicals	171	Organic Chemicals - Polychlorinated dibenzo p-dioxin (any congener)			
127	Inorganic Chemicals - Barium and barium compounds	D290			172	Organic Chemicals - Cyanides (organic)/nitriles												
07.	Metals processing and thermal processes		128	Inorganic Chemicals - Non toxic salts	D	D300	Inorganic Chemicals	173	Organic Chemicals - Isocyanate compounds									
			129	Inorganic Chemicals - Boron compounds				D310	174	Organic Chemicals - Triethylamine catalysts								
08.	Human/animal healthcare and/or related research		130	Inorganic Chemicals - Inorganic sulfides	D	D330	Inorganic Chemicals	175	Organic Chemicals - Surfactants and detergents									
			131	Inorganic Chemicals - Perchlorates				D340	176	Organic Chemicals - Highly odorous organic chemicals including mercaptans and acrylates								
09.	Other/Mixed Sectors	Commercial and industrial activities not defined within Sectors 2-8 or 10 - 13, and mixed C&I Sectors	132	Inorganic Chemicals - Chlorates	D	D350	Inorganic Chemicals	177	Soils and Sludge - Containers or drums contaminated with residues of controlled waste									
			133	Inorganic Chemicals - Phosphorus compounds excluding mineral phosphates				D360	178	Soils and Sludge - Soils contaminated with a controlled waste								
10.	Employee camps	Remote employee camps directly related to a particular C&I enterprise (only to be used for C&I)	134	Reactive Chemicals - Waste containing peroxides excluding hydrogen peroxide	E	E100	Reactive Chemicals	179	Soils and Sludge - Fire debris or fire wash waters									
			135	Reactive Chemicals - Waste of an explosive nature not subject to other legislation				E120	180	Soils and Sludge - Fly ash excluding fly ash generated from Australia coal fired power stations								
11.	Public Facilities and Institutions	Public institutions (library, schools, universities), recreation	136	Reactive Chemicals - Highly reactive chemicals not otherwise specified	E	E130	Reactive Chemicals	181	Soils and Sludge - Encapsulated, chemically-fixed, solidified or polymerised controlled wastes									
			137	Paints, Resins, Inks and Organic Sludges - Aqueous-based wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish				F	F100	Paints, Resins, Inks and Organic Sludges	182	Soils and Sludge - Filter cake containing controlled waste						
12.	Public Infrastructure Networks	Infrastructure networks designed for public use including transportation (roads, bridges, railways), utility services (power, water, sewage)	138	Paints, Resins, Inks and Organic Sludges - Aqueous-based wastes from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	F	F110	Paints, Resins, Inks and Organic Sludges	183	Soils and Sludge - Industrial waste treatment plant residues									
			139	Paints, Resins, Inks and Organic Sludges - Solvent based-wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish				F120	184	Soils and Sludge - Asbestos								
13.	Solid and Liquid Waste Management Facilities	Residue materials from solid and liquid waste management facilities	140	Paints, Resins, Inks and Organic Sludges - Solvent based wastes from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	F	F130	Paints, Resins, Inks and Organic Sludges	185	Soils and Sludge - Ceramic based fibres with physico-chemical characteristics similar to asbestos									
			141	Organic Solvents - Ethers & highly flammable hydrocarbons				G	G100	Organic Solvents	186	Clinical and Pharmaceutical Wastes - Clinical and related wastes						
14.	Solid and Liquid Waste Management Facilities	Residue materials from solid and liquid waste management facilities	142	Organic Solvents - Non-halogenated organic solvents	G	G110	Organic Solvents	187	Clinical and Pharmaceutical Wastes - Waste pharmaceuticals, drugs and medicines									
			143	Organic Solvents - Dry-cleaning wastes containing perchloroethylene				G130	188	Clinical and Pharmaceutical Wastes - Cytotoxic waste								
15.	Solid and Liquid Waste Management Facilities	Residue materials from solid and liquid waste management facilities	144	Organic Solvents - Halogenated organic solvents not otherwise specified	G	G150	Organic Solvents	189	Clinical and Pharmaceutical Wastes - Waste from production or preparation of pharmaceutical products									
			145	Organic Solvents - Waste from production, use and formulation of organic solvents not otherwise specified				G160	190	Miscellaneous - Waste chemical substances arising from research and development or teaching activities								
								191	Miscellaneous - Waste from production or formulation of photographic chemicals or processing materials.	T	T100	Miscellaneous						
									192				Miscellaneous - Used Tyres	T140				

Waste Classification System- Material Descriptions (201-889)

MATERIAL CODE	MATERIAL TYPE - Other Hazardous		
201	E-waste		510
202	Household and Industrial Batteries - Mixed		511
203	Vehicle and marine batteries - Mixed		512
204	Fluorescent tubes		513
205	Mixed household hazardous waste		514
206	Radioactive waste		515
207	Contaminated Soil- Hydrocarbon		
208	Contaminated Soil- Pesticide		
209	Contaminated Soil- Acid Sulfate		
210	Contaminated Packaging		
211	Biosecurity Waste - (Quarantine Waste)		
212	Batteries- Miscellaneous		
213	Waste Oil		
214	Mixed Commercial Hazardous		
215	Hydrocarbon Contaminated Material		
299	Other Hazardous Not Specified		
MATERIAL CODE	MATERIAL TYPE - Local Government Services		
301	Kerbside Commingled recyclables		
302	Kerbside refuse		
303	Kerbside green waste		
304	Kerbside mixed organics (including kitchen waste)		
305	Vergeside Greenwaste		
306	Vergeside bulk metals		
307	Vergeside Hard waste		
308	Public place refuse		
309	Public place recycling		
310	Street cleaning residues		
311	Special event refuse		
312	Special event recycling		
399	Other LGA waste		
MATERIAL CODE	MATERIAL TYPE - Biodegradable		
401	Food waste		
402	Greenwaste		
403	Mixed organics		
404	Timber - untreated		
405	Timber - treated		
406	Sawdust		
MATERIAL CODE	MATERIAL TYPE - Packaging		
501	Mixed Paper and Cardboard		510
502	Paper		511
503	Cardboard		512
504	Glass Packaging		513
505	Plastic 1 - PET		514
506	Plastic 2 - HDPE		515
507	Plastic 3 - PVC		
508	Plastic 4 - LDPE		
509	Plastic 5 - PP		
MATERIAL CODE	MATERIAL TYPE - Inert		
601	Mixed building rubble		
602	Concrete		
603	Concrete - reinforced		
604	Bricks		
605	Tiles and ceramics		
606	Asphalt		
607	Glazing		
608	Gypsum products		
609	Insulation		
610	Limestone		
611	Rubbers - other		
612	Mixed Soil and sand		
613	Clean fill		
614	Rock		
615	Mixed crushed rock		
616	Tars		
617	Ferrous Metals (non-packaging)		
618	Non-Ferrous Metals (non-packaging)		
619	Mixed Metals (non-packaging)		
620	Roadbase		
621	Aggregates		
622	Mixed Inert		
623	Garnet		
624	Remediated Soil		
699	Other C&D		
MATERIAL CODE	MATERIAL TYPE - Liquid/Solids (not Controlled Waste)		
701	Tailings		
702	Drilling muds		
703	Sludges		
704	Slurry		
MATERIAL CODE	MATERIAL TYPE - Wastes not otherwise specified		
801	Mixed Refuse		
802	Commingled Recyclables		
803	Textiles		
804	Mattresses		
805	Hard waste		
806	Absorbants		
807	Waste gases and containers		
808	Fire extinguishers		
809	Bottom ash		
810	Fly ash		
811	Non-composted waste/off-spec compost		
812	Ash - Miscellaneous		
813	Printer Cartridges		
899	Waste not otherwise specified		

Waste Data Study for the Pilbara Region and Shire of Broome

Data Collection Sheets

MINING and RESOURCES SECTOR

Waste Authority

Waste Data Study for the Pilbara Region and Shire of Broome

Data Collection Sheet- Explanatory notes

Waste Authority

Introduction

The management of waste in remote and regional areas of Western Australia presents a unique challenge. The Western Australian Waste Strategy: *Creating the Right Environment* (2012) (the Waste Strategy) acknowledges that resource development across the northwest of the State is placing pressure on existing waste management systems due to difficulties in regional areas such as transport, infrastructure, access to markets and funding.

The Waste Strategy recognises that appropriate planning and development of waste infrastructure is needed as early as possible, particularly in the regional and remote areas of the State. In order to ensure that this occurs, it is vital that the Waste Authority has access to consistent and comparable data.

A Waste Data Study has been initiated for the Pilbara region and Shire of Broome (Study Area).

To assist in the gathering and reporting of waste data, a Data Collection Sheet (DCS) has been developed for the project. The DCS was developed to achieve the following objectives:

1. Reflect existing waste management practices to allow mapping of waste management activities;
2. Identify the sector of the economy from which the waste is generated, to inform future analysis and policy development;
3. Cover 'cradle to grave' as much as possible;
4. Maintain relevance to waste generation within the whole of Western Australia;
5. Ensure the system is user friendly; and
6. Minimise the potential for double counting.

A description of the DCS structure and user process is provided below.

The DCS Structure

The following gives a breakdown of the DCS structure according to sheet name tabs within the DCS.

Respondent Details

This sheet of the DCS requires the respondent to complete details regarding contact information, and depending on the industry, details regarding future growth. Data on future growth is to be used in projecting future waste streams in the study area.

Waste Registry

The waste registry sheet covers the generation and/or management of waste. The source segment of the waste registry sheet requires the user to fill in details relating to the source of a waste material and the type of waste material that has been generated from this source. The **red**, **blue** and **green** columns of this segment are coloured to correspond with the Waste Classification System (WCS) (see below) that has been developed for the Waste Data Study. This WCS has been included in the DCS for reference when completing this section. The segments on quantity, collection, processing/disposal and transfer facility are segments that cover the quantity and management of the waste types.

DCS Waste Facility Outputs

This sheet of the DCS requires the respondent to provide data related to any waste management facilities over which they have operational control. Data is required on the outputs of these facilities including waste residues (eg ludges) or products that have economic value eg recycling building products or separated recyclables.

Waste Classification System (WCS)

A WCS was developed for the study to assist with the gathering and reporting of data. The DCS has two sheets relating to the WCS. The first is an explanatory guide and the second sheet contains the WCS. The WCS and DCS have matching colours in order to help explain the coding process.

DCS Methodology

The DCS sheets are design to be filled in any manner that is deemed easiest for the respondent. The electronic format of the DCS contains definitions and descriptions of appropriate columns. These are found by allowing the mouse pointer to hover over the column heading. Many columns also contain drop-down menus which should be utilised as much as possible.

Waste Register

Source				
Description of Material Type	Was this material generated from the C&I or C&D stream?	In which Sector was the waste generated?	Where on site was the waste generated?	Material Type Code (if known)

Quantity			
What quantity of waste was accepted?	Units	Data recording system	Over what time period was the waste accepted? (MM/YY - MM/YY)

Collection	
What collection method was utilised?	Frequency of Collection?

Processing/Disposal		
Name of Treatment and/or Disposal Facility?	Please provide the location of the treatment/disposal facility?	How was the Waste Treated or Disposed?

Transfer Facility 1			
Did the waste pass through a Transfer or similar facility?	Please name the transfer facility (name first if more than one)	Please provide the Lot Number and Street Address of that transfer facility?	What process was undertaken at the transfer facility?

Waste Facility Outputs (please list outputs and residues from the various Waste Facilities that the Respondant Operates within the Area of Operation)

Outputs (products and residues)		
Facility	Description of Material Type	Material Type Code (if known)

Quantity of Outputs			
What quantity of Output was generated?	Units	Data recording system	Over what time period was the waste generated? (MM/YY - MM/YY)

Processing/Disposal			
Output generated from which process?	To who/where was the Output sold/disposed?	How was the Output removed from the facility?	Frequency of transportation?

Conversion Factors

Material	Waste Classification Code	Tonnes	Conversion units	Source
20L steel drum	177 or 513	0.0023	t/unit	http://www.nexuspackaging.co.uk/steel-drums.html
Acid (Hydrochloric)	104	0.0000149	t/L	Or 0.00149 per m3 http://www.endmemo.com/convert/kgi.php
Aerosol cans	807	0.000052	t/L	Assume same as whole steel cans
Aluminium cans (flattened)	514	0.087	t/m3	Waste Authority LGA census- conversion sheet
Animal carcass	899	0.7208	t/m3	United States Department of Agriculture, Conservation Practice Standards http://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcsprd340740&ext=docx
Asbestos	184	2.5	t/m3	http://www.densitiestable.com/solids/stones-and-minerals/asbestos
Batteries - Miscellaneous	212	1.125	t/m3	Waste Authority LGA census- conversion sheet
Batteries (Car Battery)	122	0.375	t/m3	Waste Authority LGA census- conversion sheet (1 car battery = 5kg)
Batteries (mixed household and industrial)	202	0.0002	t/unit	http://www.batteryrecycling.org.au/wp-content/uploads/2011/06/Battery-consumption-recycling-and-disposal-in-Australia_Executive-Summary.pdf http://www.sustainability.vic.gov.au/-/media/resources/documents/publications%20and%20research/publications/u%20-%20v/publications%20end%20of%20life%20motor%20vehicles%20oct%202007.pdf
Car body		1.5	t/unit	
Cardboard only (uncompacted)	503	0.055	t/m3	Waste Materials – Density Data, EPA Victoria
Clean fill	613	0.95	t/m3	Waste Materials – Density Data, EPA Victoria
Clinical waste	186	0.17	t/m3	Waste Materials – Density Data, EPA Victoria (hospital and general waste garbage bags)
Co-mingled containers (uncompacted plastic, glass, steel and aluminium cans)	802	0.063	t/m3	Waste Authority LGA census- conversion sheet
Concrete	602	1.5	t/m3	http://www.rentaskip.com.au/skip-bins-size-estimator.aspx
Coolant	142	0.0011	t/L	http://www.dow.com/ethylene glycol/about/properties.htm (average converted from pounds per gallon)
E-waste	201	0.227	t/m3	Waste Materials – Density Data, EPA Victoria
Fluorescent tubes	204	0.285	t/m3	Waste Materials – Density Data, EPA Victoria
Food waste	401	0.5	t/m3	Waste Materials – Density Data, EPA Victoria (medium density for food - kitchen)
General Refuse (compacted)	801	0.5	t/m3	EPA Victoria (food – kitchen, medium density)
General Refuse (uncompacted)		0.4	t/m3	EPA Victoria (food – kitchen, medium density)
Grease	157	0.85	t/m3	Conversion factor used as per Pilbara Waste Data Study
Greenwaste (unprocessed compacted)	303	0.26	t/m3	Waste Authority LGA census- conversion sheet
Greenwaste (unprocessed)		0.15	t/m3	Waste Authority LGA census- conversion sheet
Inert (mixed) waste	622	1.3	t/m3	Waste Authority LGA census- conversion sheet
Intermediate Bulk Container (Plastic - HDPE)	506	0.0155	t/unit	http://www.vanhoelewin.com/en/containers.html
Kerosene	141	0.807	t/m3	http://www.statcan.gc.ca/pub/57-601-x/2010004/appendix-appendice1-eng.htm
Mattress - queen size	804	0.025	t/unit	Waste Authority LGA census- conversion sheet (estimated 20-30kg)
Metals - steel, trimmings	617	1.20000	t/m3	Waste Authority LGA census- conversion sheet
Mixed Metal	619	0.13	t/m3	Talis estimate based on ferrous and non-ferrous metal densities in Waste Materials – Density Data, EPA Victoria
Oil	150 or 213	0.0009	t/L	Waste Authority LGA census- conversion sheet
Oil filters	154	0.26	t/m3	http://www1.eere.energy.gov/manufacturing/resources/steel/pdfs/report_trp_0041.pdf
Oily rags (Hydrocarbon contaminated)	215	0.2	t/m3	Talis estimate based on density slightly greater than textiles
Paper only (uncompacted)	502	0.152	t/m3	EPA Victoria
Mixed paper and cardboard	501	0.1	t/m3	Waste Authority LGA census- conversion sheet
Plastic	512	0.01	t/m3	Waste Authority LGA census- conversion sheet
Plastic drum/cube 20L	509	0.0012	t/unit	http://www.vippackaging.com.au/catalogue/category.php?id=2
Printer Cartridges	813	0.0004	t/unit	Pilbara Waste Data Study or 0.006 per bag
Putrescible (mixed) compacted waste	302	0.425	t/m3	Waste Authority LGA census- conversion sheet
Putrescible (mixed) uncompacted waste		0.3	t/m3	Waste Authority LGA census- conversion sheet
Quarantine waste	211	0.3	t/m3	Assume equivalent to putrescible (mixed) uncompacted waste.
Rubber	611	0.30	t/m3	Waste Authority LGA census- conversion sheet
Rubble	601	1.048	t/m3	Waste Materials – Density Data, EPA Victoria
Sand	612	1.0	t/m3	Waste Materials – Density Data, EPA Victoria
Sludge	703	0.72	t/m3	http://www.aqua-calc.com/page/density-table/substance/sewage-coma-and-blank-sludge
Soil / Contaminated Soil	612 or 207	0.95	t/m3	Waste Materials – Density Data, EPA Victoria
Steel drum (55 gallon - empty)	177 or 513	0.021	t/unit	http://www.thecarcompany.com/containers/steel_drums.html
Textiles	803	0.15	t/m3	Waste Authority LGA census- conversion sheet
Tyres (light truck)		0.009	t/unit	Waste Authority LGA census- conversion sheet
Tyres (mixed)	192	0.4	t/m3	estimate based on 0.12t/m3 (light) and 0.59t/m3 (heavy), based on density of loose <10ft whole tire in http://www.epa.gov/region5/waste/solidwaste/tires/miforum/gray.pdf
Tyres (mixed)		0.03	t/unit	estimate based on unit weights below
Tyres (motorcycle)		0.004	t/unit	Waste Authority LGA census- conversion sheet
Tyres (passenger vehicle)		0.008	t/unit	Waste Authority LGA census- conversion sheet
Tyres (Truck/heavy vehicle)		0.04	t/unit	Waste Authority LGA census- conversion sheet
Oily water	151	0.001	t/L	assume same as water, approx 1kg/L
Wood/timber (treated/untreated)	405	0.3	t/m3	Waste Authority LGA census- conversion sheet