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Office of Environment and Heritage

Resource Recovery Infrastructure Needs Analysis

Summary Report

November 2011

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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1. Introduction

1.1 Background

The *NSW Waste Avoidance and Resource Recovery Strategy 2007* set the following waste recovery targets to be achieved by 2014:

- Municipal Solid Waste (MSW) from 26% (2000) to 66%;
- Commercial and Industrial (C&I) from 28% to 63%; and
- Construction and Demolition (C&D) from 65% to 76%.

The Resource Recovery Infrastructure Needs Analysis project further develops previous work to provide more information for industry and government to make decisions about the future of waste management in NSW with a particular focus on facilitating infrastructure. The project aims to answer the question - What is required to push recovery into the next range?

The reporting for this project is divided into two parts; a brief summary report and a background report that includes the underlying data and calculations. It also extends the scope of analysis to regional areas maintaining the emphasis on municipal and commercial waste but less so on construction waste.

This is the summary report.

1.2 Data Gathering

GHD reviewed a range of documentation including the previous NSW Waste Systems Study Report 2009 as well as other published reviews of the NSW waste industry; *Review of Waste Strategy and Policy in New South Wales – report by the Steering Committee* (the Richmond Report) and *Independent Public Assessment - Landfill Capacity and Demand 2009* (the Wright Report) among others.

GHD also reviewed and analysed data supplied by OEH which detailed waste quantities generated by every council in NSW as well as historical C&I data back to 2002. Data was analysed and results prepared for each of the 14 State Plan Regions as well as regions regulated by the Section 88 levy; the Sydney Metropolitan Area (SMA), Extended Regulated Area (ERA), and Northern Regulated Area (NRA).

2. Domestic Waste

2.1 Existing and proposed infrastructure

Existing and proposed infrastructure in each State Plan region (based on regional waste plans and plans prepared by various councils) is summarised below. Table 3 shows the known infrastructure in each State Plan Region, current waste quantities and diversion rates and expected percent changes in waste quantities in 2036. It also prioritises the regions for action. Prioritisation of regions is based on current diversion, population, projected waste quantities and planned waste recovery infrastructure.

Table 1 Existing and proposed infrastructure by State Plan Region

State Plan Region	Population	Known Existing Infrastructure	Planned Infrastructure	Potential Additional Organics Infrastructure (showing estimated feedstock capacity by 2036)
Northern Rivers	326,500	16 landfills 11 transfer stations 5 resource recovery facilities - 1 various materials, 3 organics, 1 plastics 3 MRFs	1 composting facility extension 2 new MRFs	New composting facility at Tweed Heads-35,000 t. Upgrade existing or develop new composting facilities at Grafton–25,000 t and Byron Bay-10,000 t
Mid-North Coast	224,600	6 landfills 2 separated organics or mixed waste processing facilities 4 organics processing facilities 10 transfer stations 1 MRF	1 new landfill 3 new transfer stations	Upgrade existing or develop new composting facilities at Taree–18,000 t and Kempsey-30,000 t
New England-North West	184,800	64 landfills 15 transfer stations 2 MRFs 2 organics processing facilities	1 new landfill 1 new composting facility 1 new MRF	Upgrade existing composting facility at Tamworth–22,000 t
Orana	122,100	22 landfills[1] 28 transfer stations[2] 2 MRFs 3 organics processing facilities	1 upgrade to regional landfill 1 new composting facility	New composting facility at Mudgee–7,000 t
Riverina Murray	277, 000	69 landfills 10 transfer stations[3] 4 MRFs 9 resource recovery facilities – 8 organics, 1plastics	1 e-waste facility	New composting facilities at Albury-14,000 t and Griffith-7,500 t Upgrade existing composting facilites at Wagga Wagga–18,000 t, Tumut-3,500 t, Corowa-6,000 t, Leeton-5,500 t

[1] May be more

[2] May be more

[3] May be more

State Plan Region	Population	Known Existing Infrastructure	Planned Infrastructure	Potential Additional Organics Infrastructure (showing estimated feedstock capacity by 2036)
Central West	179,600	49 landfills 14 transfer stations 3 MRFs 4 resource recovery facilities – 3 organics, 1 plastics	1 new landfill 1 new landfill or transfer station 1 new composting facility 1 new disposal facility	New composting facilities at Bathurst-20,000 t and Lithgow-8,500 t. Upgrade existing composting facilites at Blayney–6,000 t, and Oberon-2,500 t
South East	216,600	38 landfills 21 transfer stations[4] 5 MRFs 3 organics processing facilities	1 landfill capacity increase 2 new landfills	New composting facilitiy at Bega-25,000 t. Upgrade existing composting facilites at Surf Beach (Eurobodalla)–16,000 t
Hunter	644,300	22 landfills 3 transfer stations 8 resource recovery facilities – 1 mixed waste, 6 organics, 1 plastics 3 MRFs	1 new C&D facility 1 landfill extension 1 new garden organics processing facility 2 new organics processing facility 1 new C&I waste recovery facility	New composting facility at Cessnock/ Maitland/ Singleton-100,000 t Upgrade existing composting facility at Forster/Tuncurry-23,000 t
Far West	22,000	4 landfills 1 organics processing facility	None	None proposed
South Western Sydney	813,500	10 landfills 12 transfer stations 17 resource recovery facilities – 5 organics, 12 plastics 3 MRFs	No firm plans	New composting facilities at Bankstown-50,000 t and Picton or Bargo-13,000 t.
Western Sydney	1.15 million	15 landfills 21 transfer stations 21 resource recovery facilities – 1 commercial food, 1 mixed waste, 1 separated organics and mixed waste, 12 organics, 7 plastics 3 MRFs	1 new organic processing facility and MRF 1 new C&D facility 1 C&D facility expansion 2 new landfills and recovery facilities	Upgrade existing or develop new facilities to provide 140,000 t capacity for The Hills, Blue Mountains and Hawksbury Councils
Sydney	2.23 million	7 landfills 21 transfer stations 5 MRFs 3 resource recovery facilities – 2 paper, 1 organics and C&D, 4 organics, 1 plastics	1 new organics and mixed waste processing facility 1 new C&I mixed waste processing facility 1 new MRF	New facility in Inner West for composting-45,000 t and mixed waste processing-26,000 t New composting facility in Northern Sydney -67,000 t. One or more new facilites in Southern Sydney with capacity for composting-170,000 t and mixed waste processing-115,000 t
Central Coast	316,000	4 landfills 2 MRFs 2 resource recovery facilities – 1 organics, 1 plastics	No firm plans	New composting facility -120,000 t.

[4] May be more

State Plan Region	Population	Known Existing Infrastructure	Planned Infrastructure	Potential Additional Organics Infrastructure (showing estimated feedstock capacity by 2036)
Illawarra	431,000	9 landfills 5 transfer stations 4 MRFs 8 resource recovery facilities – 3 various, 3 organics, 2 plastics	1 new composting facility 1 new MRF 1 new C&D facility	New composting facility at Wollongong-90,000 t.

2.2 Current processing capacity

The current processing capacity of infrastructure within each region is summarised below.

Table 2 Existing infrastructure capacity by State Plan Region

	Separated Organics and Mixed Waste processing facilities	Kerbside Recyclables MRFs	Total
Northern Rivers	N/k[5]	6,000-12,000	6,000-12,000
Mid-North Coast	63,500	N/k	63,500
New England-North West	N/k	N/k	N/k
Orana	N/k	N/k	N/k
Riverina Murray	N/k	N/k	N/k
Central West	N/k	N/k	N/k
South East	N/k	N/k	N/k
Hunter	40,000	15,000	55,000
Far West	N/k	0	N/k
South Western Sydney	90,000	200,000	290,000
Western Sydney	310,000	450,000	760,000
Sydney	100,000	300,000	400,000
Central Coast	0	45,000	45,000
Illawarra	0	N/k	N/k
Total (tonnes per annum)	**603,500**	**1,022,000**	**1,625,500**

2.3 Future Waste Projections

GHD analysed historical data and prepared projections of possible future waste quantities, based on population projections published by the Australian Bureau of Statistics and the NSW Department of Planning and Infrastructure.

2.3.1 By State Plan Region

Future waste projections by State Plan Region are provided in Table 2. Likely increases in recovered waste quantities and decreases in residual waste quantities (to be landfilled) have been taken into account in regions where processing facilities are planned (refer Table 1). The projections shown below are all based on a “business as usual” situation,

[5] Not known

assuming that overall waste generation increases with population growth.

The nominated priority for new resource recovery infrastructure is based upon an assessment of current landfill diversion rates, likely increases in residual wastes and recovered waste quantities, population sizes and likely increases in population by 2036.

Table 3 Infrastructure and Residential Quantities by State Plan Region

	2010 Quantities		2010 Diversion Rate	Estimated Percent Change by 2036		Priority for New Resource Recovery Infrastructure
State Plan Region	**Domestic Residual (t)**	**Domestic Recovered (t)**		**Residual (t)**	**Recovered (t)**	
Northern Rivers	97,215	86,241	47.0%	5.9%	26.1%	**High**
Mid-North Coast	56,205	79,521	58.6%	36.2%	38.2%	Medium
New England-North West	65,660	40,786	38.3%	-9.6%	-7.9%	Medium
Orana	40,055	11,451	22.4%	-8.8%	-11.9%	Low
Riverina Murray	89,199	44396	33.2%	-1.0%	6.0%	**High**
Central West	75,660	23,665	23.8%	-8.3%	31.8%	Medium
South East	70,624	50,306	41.6%	31.8%	32.7%	**High**
Hunter	229,581	108,237	32.0%	37.2%	35.4%	**High**
Far West	17,390	3,936	18.5%	-30.5%	-31.8%	Low
South Western Sydney	143,938	192,380	57.2%	83.3%	48.4%	Medium
Western Sydney	267,234	227,070	45.9%	52.7%	27.3%	Low
Sydney	515,782	434,990	45.8%	15.0%	20.1%	**High**
Central Coast	86,609	99,888	53.6%	38.1%	35.2%	**High**
Illawarra	113,226	116,108	50.6%	22.9%	20.6%	**High**

2.3.2 By Regulatory Region

Future waste projections by Regulatory Region are provided in Table 4. In regions where processing facilities are planned, the likely increases in recovered waste quantities and decreases in residual waste quantities (to be landfilled) have been taken into account. The projections shown below are all based on a “business as usual” situation, assuming that overall waste generation increases with population growth.

Table 4 Waste Projections 2010 to 2036 by Regulatory Region

Region	Material	2010 Tonnes (actual)	2036 Tonnes (predicted)	Percent Change
SMA	Residual	897,201	1,217,349	35.7%
	Recovered	832,349	1,065,362	28.0%
ERA	Residual	408,557	556,695	36.3%
	Recovered	308,400	402,720	30.6%
RRA	Residual	204,031	263,799	29.3%
	Recovered	203,685	251,756	23.6%
NRA	Residual	358,587	358,709	0.0%
	Recovered	174,630	195,439	11.9%
Total	**Residual**	**1,868,376**	**2,396,551**	**28.3%**
	Recovered	**1,519,064**	**1,915,277**	**26.1%**
	Total	**3,387,440**	**4,311,828**	**27.3%**

The table shows that the greatest rate of growth in residual waste will be in the ERA, with the SMA close behind. For recovered waste, the greatest growth is expected in the RRA. In some areas, waste generation is expected to fall.

2.4 Domestic Waste Recovery Targets

Diversion targets for domestic waste by State Plan Area have been calculated, taking into account the current and projected recovered quantities each year and the additional potentially recoverable proportion of the projected quantities of landfilled waste. This additional potentially recoverable proportion of landfilled waste is based on the composition of the domestic waste stream determined by waste audits.

The additional potentially recoverable proportion has been selected as follows:

- 2014 – 25%;
- 2017 – 50%;
- 2020 – 70%; and
- 2036 – 70%.

The additional potentially recoverable proportions of the landfill stream that may be recovered in the future for each year listed have been calculated based on several criteria. In 2014 the additional recovered proportion has been set at 25%. This assumes that

metals, timber, C&D waste and e-waste are recovered using simple technology such as a dirty MRF.

In 2017, the additional potentially recoverable proportion is 50% and assumes that systems have been established for the recovery of compostable organics, paper and cardboard, recyclable containers as well as metals, timber, C&D waste and e-waste.

Diversion provided by processing facilities known to be in advanced stages of planning has been taken into account so this figure only applies to facilities conceived, planned and constructed after 2011. Given the time required to design, plan and construct such facilities, 2016-17 is the earliest that any which are likely to be operating.

In addition once constructed several years may be required to reach maximum operational efficiency, so recovery of the maximum additional potential proportion is not expected to be approached until 2020, which is when the 70% is set. Capping the maximum at 70% assumes that not all of the available material will be recovered.

The resulting potential diversion rates have been calculated and are shown in Table 5 below.

Table 5 Estimated Diversion Rates by State Plan Region

State Plan Region	2010[6]	2014	2017	2020	2036
Northern Rivers	47%	57%	71%	83%	83%
Mid-North Coast	59%	69%	79%	88%	88%
New England-North West	38%	54%	69%	82%	82%
Orana	22%	42%	61%	77%	77%
Riverina Murray	33%	50%	67%	80%	80%
Central West	24%	48%	65%	79%	79%
South East	42%	56%	71%	83%	83%
Hunter	32%	49%	66%	80%	80%
Far West	18%	39%	59%	75%	75%
South Western Sydney	57%	64%	76%	86%	86%
Western Sydney	46%	56%	70%	82%	82%
Sydney	46%	60%	74%	84%	84%
Central Coast	54%	65%	86%	86%	86%
Illawarra	51%	63%	75%	85%	85%
Overall	**45%**	**58%**	**73%**	**83%**	**83%**

These figures can be used as ambitious targets for domestic waste diversion in the case of each State Plan Region.

[6] Actual reported diversion rate

2.5 Domestic waste processing capacity requirements

Table 6 shows the mixed waste processing capacity required to handle the estimated amounts of residual waste and dry recyclables produced in each of the State Plan Regions in future.

If it is assumed that the nominal capacity of each mixed waste processing facility must be approximately 100,000 to 200,000 tonnes per annum for it to be economically viable, this suggests that approximately 21 new facilities would be needed, based on 2010-11 data, and that over time, these facilities would need to be upgraded to cope with extra capacity arising from population growth, and that new facilities would need to be built when an excess capacity situation was reached.

The number of mixed waste processing that need to be built would be able to be reduced if food organics are removed from the domestic waste stream through separate collections, in which case a number of organics only processing facilities would be needed, as well as the mixed waste processing facilities to deal with the residuals.

Table 6 Processing Capacity Required by State Plan Region for Managing Domestic Wastes

	Number of Current/Planned Facilities		Additional Facilities Required in 2014			Total Material requiring Processing (Tonnes)			
State Plan Region	Organics and Mixed Waste Processing	MRFs	Composting Processing	Mixed waste Processing	MRFs	2014	2017	2020	2036
Northern Rivers	4	5	1 new 2 upgraded		1	100,173	129,535	154,996	177,131
Mid-North Coast	6	1	2 upgraded		1	101,357	121,431	139,179	163,490
New England-North West	1	3	1 upgraded		1	55,423	70,964	83,175	79,121
Orana	4	2	1 new		1	20,923	30,495	38,000	35,737
Riverina Murray	8	4	2 new 4 upgraded		1	66,682	89,426	107,882	108,855
Central West	4	3	2 new 2 upgraded		1	46,856	64,561	78,962	79,742
South East	3	5	1 new 1 upgraded		1	72,163	94,107	113,319	131,934

	Number of Current/Planned Facilities		Additional Facilities Required in 2014			Total Material requiring Processing (Tonnes)			
State Plan Region	**Organics and Mixed Waste Processing**	**MRFs**	**Composting Processing**	**Mixed waste Processing**	**MRFs**	**2014**	**2017**	**2020**	**2036**
Hunter	10	3	1 new 1 upgraded		2	187,627	260,075	322,684	367,010
Far West	1	0				7,826	11,524	14,210	11,146
South Western Sydney	5	3	2 new		3	228,463	287,059	343,556	285,509
Western Sydney	16	4	1 new or upgrade		3	295,222	391,296	476,236	574,757
Sydney	6	6	At least 3 new	At least 2 new	2	587,282	731,675	853,806	937,555
Central Coast	1	2	1 new		1	125,801	171,534	178,464	218,767
Illawarra	3	5	1 new		1	147,307	181,565	211,158	237,391
Total	**72**	**46**	**At least 16 new** **At least 13 upgraded**	**At least 2 new**	**10**	**2,045,119**	**2,637,264**	**3,117,647**	**3,410,181**

3. Commercial Waste

3.1 C&I Waste Quantities

Table 7 below shows quantities of C&I waste disposed and recycled in NSW in 2008-2009 and the amounts estimated for 2035-2036. These estimates are based on C&I waste generation trends between 2002-2003 and 2008-2009.

Table 7 Current and Projected C&I Waste Quantities

Region	Disposed (t)		Recovered (t)		Total (t)		Current Diversion	Projected Increase	
	2008-2009	2035-2036	2008-2009	2035-2036	2008-2009	2035-2036		Disposed	Recovered
SMA	1,854,402	1,066,461	1,816,754	5,395,395	3,671,156	6,461,856	54%	-42%	197%
ERA	357,976	506,367	546,633	1,793,731	904,609	2,300,099	63%	41%	228%
NRA	376,257	771,165	472,952	2,243,483	849,209	3,014,649	60%	105%	374%
NSW	**2,588,635**	**2,343,994**	**2,836,338**	**9,432,609**	**5,424,973**	**11,776,603**	**56%**	**-9%**	**233%**

The table shows that the overall quantity of C&I waste disposed of in the SMA is expected to decrease by 2035-2036, while it is expected to increase in the ERA and NRA over the same period. This is based on expected population growth and a “business as usual” scenario, without any new infrastructure being provided.

3.1 C&I Recovery Targets

Diversion targets for C&I waste by Regulatory Region have been calculated by taking into account the current and projected recovered quantities each year and the additional potentially recoverable proportion of the projected quantities of landfilled waste. This additional potentially recoverable proportion of landfilled waste is based on the typical composition of the C&I waste stream.

The additional potentially recoverable proportion has been selected as follows:

- 2014 – 3%
- 2017 – 25%
- 2020 – 50%
- 2036 – 50%

The diversion rates that correspond to the proposed estimated recovery rates are shown in Table 8 below. No separate data is available for the RRA and NRA. In the table, this data is all classified under NRA.

Table 8 Corresponding Diversion Rates by State Plan Region

State Plan Region	2010	2014	2017	2020	2036
SMA	54%	62%	71%	81%	89%
ERA	63%	68%	75%	82%	86%
NRA	60%	66%	73%	80%	83%
Total	**56%**	**64%**	**72%**	**80%**	**87%**

These figures can be used as targets for C&I waste diversion in the case of each Regulatory Region.

3.2 C&I Capacity

Estimates from data provided by OEH suggest that about 3.3 million tonnes per annum of C&I waste (or 56% of all C&I waste generated) is currently being recovered in NSW. Recovery and recycling is mainly achieved through source separation, as there are very few facilities in NSW that can sort mixed C&I wastes, and extract organics and recyclables. Of the balance of 2.5 million tonnes per annum that is not currently being recycled, about 52% (1.3 million tonnes per annum) comprises paper, cardboard and other dry recyclables and 17% (0.4 million tonnes per annum) comprises food and other organics.

The remaining 31% of C&I waste material (0.8 million tonnes per annum) is non-recyclable and is disposed of to landfill at present. Table 9 below shows the estimated amounts of both dry recyclables and organics contained in C&I wastes not being recovered in each of the Regulatory Regions, under a "business as usual" scenario, without any new C&I sorting and resource recovery infrastructure.

Table 9 Dry Recyclables and Organics (t) contained in C&I wastes not currently being recovered

Regulatory Region	Measure	2014-15	2017-16	2020-21	2035-36
SMA	Dry recyclables	1,371,129	1,959,838	2,258,272	3,135,626
	Organics	452,606	646,937	745,449	1,035,061
ERA	Dry recyclables	430,280	600,517	708,873	1,093,278
	Organics	142,034	198,229	233,997	360,888
NRA	Dry recyclables	453,367	678,294	833,531	1,413,542
	Organics	149,655	223,903	275,146	466,606
Total	**Dry recyclables**	**2,254,775**	**3,238,649**	**3,800,676**	**5,642,446**
	Organics	**744,295**	**1,069,069**	**1,254,592**	**1,862,555**

3.2.1 Facilities Required for Sydney

Data used in the 2009 NSW Waste Systems Study identified the main sources of C&I waste in the Sydney region. Nothing found in the research for this report indicates this has changed. Based on these proportions and the updated quantities of C&I waste for the SMA provided by OEH, the table below shows the quantities estimated to be generated in the future and some possible combinations of processing facilities that may be required.

Table 10 shows estimates of the quantities of C&I waste that may require processing in the future and the number and capacity of facilities that may be required to fully extract the amounts of recyclables and organics contained in C&I wastes that are not source separated and recycled.

The table shows that most C&I waste generated in the Sydney area comes from the North West followed by West Central. Up to 27 C&I waste processing facilities would be required by 2014-2015 to process the projected amounts of C&I waste generated. The projections assume that existing facilities could be upgraded to increase capacity. In 2016-2017, nine facilities are estimated to require upgrading and three new facilties would need to be built. In 2020-2021, eight are estimated to require upgrading and three more would need to be built. By 2035-2036, three would require upgrading and an additional 11 would need to be constructed.

Approximately 31% of the C&I stream is not recoverable, based on current composition data. Even if the estimated diversion was achieved, an estimated 538,000 tonnes of C&I waste would require landfill disposal in 2014-2015. This is estimated to fall to 336,000 tonnes by 2035-2036.

Table 10 Projected C&I Quantities and Possible Number of Processing Facilities by Sydney Sub-Region

Sub Region	Percent Generated	2014-2015		2016-2017		2020-2021		2035-2036	
		Estimated Tonnes	Number and Capacity of Facilities	Estimated Tonnes	Number and Capacity of Facilities	Estimated Tonnes	Number and Capacity of Facilities	Estimated Tonnes	Number and Capacity of Facilities
Inner North	1.9%	81,535	1 x 85,000 t	87,981	1 x 90,000 t	93,318	1 x 95,000 t	122,775	1 x 130,000 t
North	3.3%	141,613	1 x 150,000 t	152,809	1 x 155,000 t	162,078	1 x 165,000 t	213,241	1 x 165,000 t 1 x 50,000 t
North East	2.3%	98,700	1 x 100,000 t	106,503	1 x 110,000 t	112,964	1 x 115,000 t	148,623	1 x 150,000 t
North West	33%	1,433,298	6 x 200,000 t 1 x 150,000 t 1 x 100,00 t	1,546,611	6 x 200,000 t 1 x 150,000 t 2 x 100,000 t	1,640,430	6 x 200,000 t 1 x 150,000 t 3 x 100,000 t	2,158,260	8 x 200,000 t 2 x 150,000 t 3 x 100,000 t
South West	8.1%	347,596	1 x 200,000 t 1 x 150,000 t	375,076	1 x 200,000 t 1 x 175,000 t	397,829	2 x 200,000 t	523,410	2 x 200,000 t 1 x 150,000 t
Inner West	4.7%	201,692	1 x 110,000 t 1 x 100,000 t	217,637	1 x 120,000 t 1 x 100,000	230,839	1 x 120,000 t 1 x 110,000 t	303,707	1 x 120,000 t 1 x 110,000 t 1 x 75,000 t
West Central	27%	1,158,654	6 x 200,000 t	1,250,254	6 x 200,000 t 1 x 50,000 t	1,326,096	7 x 200,000 t 1 x 100,000 t 1 x 50,000 t	1,744,701	9 x 200,000 t 1 x 100,000 t 1 x 50,000 t
East	5.6%	240,313	1 x 150,000 t 1 x 100,000 t	259,312	1 x 160,000 t 1 x 100,000 t	275,042	1 x 180,000 t 1 x 100,000 t	361,864	1 x 180,000 t 2 x 100,000 t

Sub Region	Percent Generated	2014-2015		2016-2017		2020-2021		2035-2036	
		Estimated Tonnes	**Number and Capacity of Facilities**	**Estimated Tonnes**	**Number and Capacity of Facilities**	**Estimated Tonnes**	**Number and Capacity of Facilities**	**Estimated Tonnes**	**Number and Capacity of Facilities**
South	6.8%	291,809	2 x 150,000 t	314,879	1 x 170,000 t 1 x 150,000 t	333,980	1 x 170,000 t 1 x 170,000 t	439,406	1 x 170,000 t 1 x 170,000 t 1 x 100,000 t
Sydney City	5.6%	240,313	1 x 150,000 t 1 x 100,000 t	259,312	1 x 160,000 t 1 x 100,000 t	275,042	1 x 175,000 t 1 x 100,000 t	361,864	1 x 175,000 t 2 x 100,000 t
Mixed	1.2%	51,496	1 x 55,000 t	55,567	1 x 56,000 t	58,938	1 x 60,000 t	77,542	1 x 80,000 t
Total	**100%**	**4,291,311**	**27 facilities**	**4,630,572**	**29 facilities**	**4,911,467**	**33 facilities**	**6,461,856**	**46 facilities**

3.2.2 Facilities Required for the ERA and NRA

Table 11 shows estimates of the quantities of C&I waste that may require processing in the future and the number and capacity of facilities that may be required.

The greater area of the NRA means that it would require a larger number of smaller facilities compared to the ERA, where a smaller number of larger facilities could be used. These would be located in the Hunter, Illawarra and Central Coast areas. Facilities in the NRA would need to be located in major centres such as Wagga Wagga, Tweed Heads, Coffs Harbour, Albury, Port Macquarie, Dubbo, Armidale, Lismore, Tamworth and Nowra.

In addition, 31% of the C&I stream is not recoverable, based on current composition data. Even if the estimated diversion was achieved, an estimated 123,000 tonnes of C&I waste would require disposal in the ERA and 146,000 in the NRA in 2014-2015. This is estimated to rise to 159,500 tonnes per annum in the ERA and 243,000 tonnes per annum in the NRA by 2035-2036.

Table 11 Projected C&I Quantities and Possible Number of Processing Facilities for ERA and NRA

Sub Region	2014-2015		2016-2017		2020-2021		2035-2036	
	Estimated Tonnes	**Number and Capacity of Facilities**	**Estimated Tonnes**	**Number and Capacity of Facilities**	**Estimated Tonnes**	**Number and Capacity of Facilities**	**Estimated Tonnes**	**Number and Capacity of Facilities**
ERA	1,214,718	5 x 200,000 t	1,318,087	5 x 200,000 t	1,524,827	6 x 200,000 t	2,300,099	9 x 200,000 t
		1 x 120,000 t		1 x 120,000 t		1 x 125,000 t		2 x 125,000 t
		1 x 100,000 t		2 x 100,000 t		2 x 100,000 t		2 x 100,000 t
								1 x 50,000 t
NRA	1,330,418	6 x 200,000 t	1,490,821	6 x 200,000 t	1,811,627	6 x 200,000 t	3,014,649	9 x 200,000 t
		1 x 150,000 t		1 x 150,000 t		2 x 150,000 t		4 x 150,000 t
				1 x 100,000 t		2 x 100,000 t		1 x 120,000 t
				1 x 50,000 t		1 x 60,000 t		5 x 100,000 t
Total	**2,545,135**	**14 facilities**	**2,808,908**	**17 facilities**	**3,336,453**	**20 facilities**	**5,314,747**	**33 facilities**

4. Recommendations

4.1 Domestic waste

4.1.1 Infrastructure required

Approximately 21 new mixed waste processing facilities would be needed, based on 2010-11 data, if it is assumed that the nominal capacity of each mixed waste processing facility must be approximately 100,000 to 200,000 tonnes per annum for it to be economically viable. Over time, these facilities would need to be upgraded to cope with extra capacity arising from population growth, and that new facilities would need to be built when an excess capacity situation was reached.

The number of mixed waste processing facilities that need to be built would be able to be reduced if food organics are removed from the domestic waste stream through separate collections, in which case a number of organics only processing facilities would be needed, as well as the mixed waste processing facilities to deal with the residuals.

Table 12 Infrastructure and Residential Quantities by State Plan Region

State Plan Region	Mixed waste processing facilities needed	Priority
Northern Rivers	1	**High**
Mid-North Coast	1	Medium
New England-North West	1	Medium
Orana	1	Low
Riverina Murray	1	**High**
Central West	1	Medium
South East	1	**High**
Hunter	2	**High**
Far West	1	Low
South Western Sydney	2	Medium
Western Sydney	3	Low
Sydney	4	**High**
Central Coast	1	**High**
Illawarra	1	**High**

4.2 Commercial and Industrial

4.2.1 Infrastructure required

- Ensure the establishment of waste processing facilities in the SMA as outlined in Table 10 Projected C&I Quantities and Possible Number of Processing Facilities by Sydney Sub-Region.
- Ensure the establishment of waste processing facilities in the ERA as outlined in Table 11 Projected C&I Quantities and Possible Number of Processing Facilities for ERA and NRA.
  - Larger capacity processing facilities should be established in:
    - The Lower Hunter
    - Wollongong
  - Smaller capacity processing facilities should be established in:
    - The Upper Hunter
    - Shoalhaven
    - Central Coast
- Ensure the establishment of waste processing facilities in the NRA as outlined in Table 11 Projected C&I Quantities and Possible Number of Processing Facilities for ERA and NRA.
  - Larger capacity processing facilities should be established in:
    - Wagga Wagga
    - Tweed Heads
    - Coffs Harbour
    - Tamworth
    - Albury
  - Smaller capacity processing facilities should be established in:
    - Port Macquarie
    - Dubbo
    - Nowra
    - Bathurst
    - Lismore