

## Appendices: Modelling and data analysis to inform new waste strategy

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## Appendix A: Key data assumptions

■ **Table1: Assumed non-domestic MSW for 2010-11**

<b>Area</b>	<b>2010-11 tonnage non-domestic MSW generated</b>	<b>2010-11 tonnage non-domestic MSW recycled</b>	<b>% recycled</b>
SMA	751,000	598,000	80%
ERA	359,000	222,000	62%
Combined NRA+RRA	456,000	88,000	19%

■ **Table 2: Key composition figures for domestic MSW, 2010-11**

Material	Overall kerbside composition				Drop-off: organic and dry composition			
	SMA	ERA	RRA	NRA	SMA	ERA	RRA	NRA
Paper and Paper Products - recyclable	19%	18%	18%	17%	7%	12%	18%	11%
Paper and Paper Products - non-recyclable	8%	5%	5%	7%	0%	0%	0%	0%
Food/ Kitchen	23%	19%	17%	21%	0%	0%	0%	0%
Garden/ Vegetation	21%	23%	25%	15%	88%	75%	64%	77%
Other Putrescible	2%	2%	2%	3%	0%	0%	0%	0%
Wood/ Timber	1%	1%	1%	1%	0%	0%	0%	0%
Other organics	3%	3%	3%	4%	0%	0%	0%	0%
Glass - recyclable	9%	11%	11%	11%	3%	8%	12%	8%
Glass - non-recyclable	1%	0%	0%	0%	0%	0%	0%	0%
Plastics - recyclable	6%	7%	7%	8%	1%	2%	3%	2%
Plastics - non-recyclable	1%	2%	1%	1%	0%	0%	0%	0%
Ferrous - recyclable	1%	2%	2%	2%	0%	1%	1%	1%
Ferrous - non-recyclable	0%	0%	0%	0%	0%	0%	0%	0%
Non-Ferrous - recyclable	0%	1%	1%	1%	0%	0%	0%	0%
Non-Ferrous - non-recyclable	0%	0%	0%	0%	0%	0%	0%	0%
Hazardous	1%	1%	1%	1%	0%	0%	0%	0%
Building Waste	1%	1%	1%	1%	0%	0%	0%	0%
Earth Based	2%	2%	2%	3%	0%	0%	0%	0%
E-waste	1%	1%	1%	1%	0%	0%	0%	0%
Miscellaneous	2%	2%	1%	1%	0%	0%	0%	0%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>Note:</b> due to rounding the individual figures may not appear to total 100%.								

■ **Table 3: Assumed C&I composition for 2010-11 (all NSW)**

<b>Material</b>	<b>SMA</b>	<b>ERA</b>	<b>RRA</b>	<b>NRA</b>
Paper & Cardboard	15%	15%	19%	15%
Concrete/Brick/Tiles	9%	10%	1%	1%
Ferrous	15%	19%	10%	13%
Food	8%	15%	9%	12%
Sand/Soil/Rubble	11%	13%	9%	3%
Garden organics	8%	2%	3%	4%
Plastic	8%	5%	5%	9%
Other Organics(d)	3%	9%	31%	27%
Timber	8%	3%	3%	4%
Glass	2%	3%	3%	3%
Non-ferrous	1%	2%	2%	2%
Textiles	2%	1%	1%	1%
Rubber	1%	1%	1%	2%
Plasterboard	0%	0%	0%	0%
WEEE	0%	0%	0%	0%
Other	10%	2%	2%	4%
	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

■ **Table 4: Assumed C&D composition for 2010-11**

<b>Material type</b>	<b>Material</b>	<b>SMA</b>	<b>ERA</b>	<b>RRA + NRA</b>
Major C&D materials	Asbestos (and asbestos contaminated waste)	6%	6%	11%
Major C&D materials	Contaminated soil	5%	5%	10%
Major C&D materials	Concrete products	29%	29%	26%
Major C&D materials	Soil	13%	13%	12%
Major C&D materials	Timber	2%	2%	4%
Major C&D materials	Fines	2%	2%	3%
Major C&D materials	Clay products	16%	16%	13%
Major C&D materials	Natural aggregates	3%	3%	3%
Major C&D materials	Garden and vegetation	1%	1%	1%
Minor C&D materials	Ferrous metals	0%	0%	1%
Minor C&D materials	Plasterboard	0%	0%	1%
Minor C&D materials	Paper/cardboard	0%	0%	1%
Minor C&D materials	Plastic	0%	0%	0%
Minor C&D materials	Textiles	0%	0%	0%
Minor C&D materials	Asphalt	8%	8%	6%
Minor C&D materials	Non-ferrous metal	0%	0%	0%
Minor C&D materials	Glass	0%	0%	0%
Minor C&D materials	Miscellaneous	13%	13%	10%
		<b>100%</b>	<b>100%</b>	<b>100%</b>

■ **Table 5: Waste growth rates (all streams) by year and area**

<b>Area</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>	<b>2021-22</b>
SMA	0.7%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%
ERA	5.3%	0.9%	0.9%	0.9%	0.9%	0.9%	1.1%	1.1%	1.0%	1.0%	1.0%
RRA	-1.4%	1.2%	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
NRA	-0.9%	0.3%	0.3%	0.4%	0.2%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%

## Appendix B: Modelled scenarios' recycling performance outputs

■ **Table 6: Scenario A – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	61%	62%	63%	63%	63%	63%	63%	63%	63%
MSW	ERA	51%	52%	52%	53%	54%	55%	55%	55%	55%	55%	55%	55%
MSW	RRA	38%	39%	40%	40%	41%	42%	42%	42%	42%	42%	42%	42%
MSW	NRA	38%	38%	39%	40%	41%	41%	41%	42%	42%	42%	42%	42%
MSW (domestic)	NSW	49%	49%	50%	51%	52%	53%	53%	53%	53%	53%	53%	53%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	53%	54%	55%	56%	56%	56%	56%	56%	56%	56%
C&I	SMA	52%	52%	53%	53%	54%	54%	54%	54%	54%	54%	54%	54%
C&I	ERA	70%	71%	71%	72%	72%	72%	72%	72%	72%	72%	72%	72%
C&I	RRA	71%	71%	72%	72%	72%	73%	73%	73%	73%	73%	73%	73%
C&I	NRA	55%	55%	56%	56%	57%	57%	57%	57%	57%	57%	57%	57%
C&I	NSW	57%	57%	58%	58%	59%	59%	59%	59%	59%	59%	59%	59%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	64%	65%	65%	65%	65%	65%	65%	65%	65%



■ **Table 7: Scenario B – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	61%	62%	63%	63%	63%	63%	63%	63%	63%
MSW	ERA	51%	52%	52%	53%	54%	55%	55%	55%	55%	55%	55%	55%
MSW	RRA	38%	39%	40%	40%	41%	42%	42%	42%	42%	42%	42%	42%
MSW	NRA	38%	38%	39%	40%	41%	42%	42%	42%	42%	42%	42%	42%
MSW (domestic)	NSW	49%	49%	50%	51%	52%	53%	53%	53%	53%	53%	53%	53%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	53%	54%	55%	56%	56%	56%	56%	56%	56%	56%
C&I	SMA	52%	52%	53%	53%	54%	54%	54%	54%	54%	54%	54%	54%
C&I	ERA	70%	71%	71%	72%	72%	72%	72%	72%	72%	72%	72%	72%
C&I	RRA	71%	71%	72%	72%	73%	73%	73%	73%	73%	73%	73%	73%
C&I	NRA	55%	55%	56%	56%	57%	57%	57%	57%	57%	57%	57%	57%
C&I	NSW	57%	57%	58%	58%	59%	59%	59%	59%	59%	59%	59%	59%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	64%	65%	65%	65%	65%	65%	65%	65%	65%

■ **Table 8: Scenario C – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	61%	62%	63%	64%	64%	64%	65%	65%	65%
MSW	ERA	51%	52%	52%	53%	54%	55%	55%	56%	56%	56%	57%	57%
MSW	RRA	38%	39%	40%	40%	41%	42%	43%	43%	43%	43%	44%	44%
MSW	NRA	38%	38%	39%	40%	41%	42%	43%	43%	44%	44%	44%	45%
MSW (domestic)	NSW	49%	49%	50%	51%	52%	54%	54%	55%	55%	56%	56%	56%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	53%	54%	55%	56%	56%	57%	57%	57%	58%	58%
C&I	SMA	52%	52%	53%	53%	54%	54%	54%	54%	54%	54%	54%	54%
C&I	ERA	70%	71%	71%	72%	72%	72%	72%	72%	72%	72%	72%	72%
C&I	RRA	71%	71%	72%	72%	72%	73%	73%	73%	73%	73%	73%	73%
C&I	NRA	55%	55%	56%	56%	57%	57%	57%	57%	57%	57%	57%	57%
C&I	NSW	57%	57%	58%	58%	59%	59%	59%	59%	59%	59%	59%	59%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	64%	65%	65%	65%	66%	66%	66%	66%	66%

■ **Table 9: Scenario D – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	62%	64%	65%	66%	66%	67%	67%	67%	67%
MSW	ERA	51%	52%	53%	54%	55%	56%	59%	61%	63%	63%	63%	63%
MSW	RRA	38%	39%	40%	41%	43%	44%	45%	46%	47%	47%	47%	47%
MSW	NRA	38%	38%	40%	42%	43%	45%	47%	48%	50%	50%	50%	50%
MSW (domestic)	NSW	49%	49%	51%	53%	54%	56%	58%	60%	61%	61%	61%	61%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	54%	55%	56%	58%	59%	60%	61%	61%	61%	61%
C&I	SMA	52%	52%	53%	53%	54%	54%	55%	55%	55%	55%	55%	55%
C&I	ERA	70%	71%	71%	72%	72%	73%	73%	74%	74%	74%	74%	74%
C&I	RRA	71%	71%	72%	72%	72%	73%	73%	74%	74%	74%	74%	74%
C&I	NRA	55%	55%	56%	56%	57%	57%	58%	58%	58%	58%	58%	58%
C&I	NSW	57%	57%	58%	58%	59%	59%	60%	60%	60%	60%	60%	60%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	64%	65%	66%	66%	67%	67%	67%	67%	67%

■ **Table 10: Scenario E – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	61%	62%	64%	64%	66%	66%	69%	70%	69%
MSW	ERA	51%	52%	52%	53%	54%	55%	55%	55%	55%	55%	55%	55%
MSW	RRA	38%	39%	40%	40%	41%	44%	44%	44%	44%	44%	44%	48%
MSW	NRA	38%	38%	39%	40%	41%	41%	41%	42%	42%	42%	42%	46%
MSW (domestic)	NSW	49%	49%	50%	51%	52%	54%	54%	56%	56%	58%	59%	60%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	53%	54%	55%	56%	56%	58%	58%	59%	60%	61%
C&I	SMA	52%	52%	53%	53%	54%	54%	54%	54%	54%	54%	54%	54%
C&I	ERA	70%	71%	71%	72%	72%	72%	72%	72%	72%	72%	72%	72%
C&I	RRA	71%	71%	72%	72%	72%	73%	73%	73%	73%	73%	73%	73%
C&I	NRA	55%	55%	56%	56%	57%	57%	57%	57%	57%	57%	57%	57%
C&I	NSW	57%	57%	58%	58%	59%	59%	59%	59%	59%	59%	59%	59%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	64%	65%	65%	65%	66%	66%	66%	66%	67%

■ **Table 11: Scenario F – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	61%	62%	63%	63%	63%	63%	63%	63%	63%
MSW	ERA	51%	52%	52%	53%	54%	55%	55%	55%	55%	55%	55%	55%
MSW	RRA	38%	39%	40%	40%	41%	42%	42%	42%	42%	42%	42%	42%
MSW	NRA	38%	38%	39%	40%	41%	41%	41%	42%	42%	42%	42%	42%
MSW (domestic)	NSW	49%	49%	50%	51%	52%	53%	53%	53%	53%	53%	53%	53%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	53%	54%	55%	56%	56%	56%	56%	56%	56%	56%
C&I	SMA	52%	52%	53%	53%	54%	54%	54%	56%	57%	57%	57%	58%
C&I	ERA	70%	71%	71%	72%	72%	72%	72%	72%	72%	75%	75%	77%
C&I	RRA	71%	71%	72%	72%	72%	73%	73%	73%	73%	73%	73%	73%
C&I	NRA	55%	55%	56%	56%	57%	57%	57%	57%	57%	57%	57%	57%
C&I	NSW	57%	57%	58%	58%	59%	59%	59%	61%	61%	62%	62%	63%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	64%	65%	65%	65%	66%	66%	66%	66%	66%

■ **Table 12: Scenario G – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	61%	62%	63%	63%	63%	63%	63%	63%	63%
MSW	ERA	51%	52%	52%	53%	54%	55%	55%	55%	55%	55%	55%	55%
MSW	RRA	38%	39%	40%	40%	41%	42%	42%	42%	42%	42%	42%	42%
MSW	NRA	38%	38%	39%	40%	41%	41%	41%	42%	42%	42%	42%	42%
MSW (domestic)	NSW	49%	49%	50%	51%	52%	53%	53%	53%	53%	53%	53%	53%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	53%	54%	55%	56%	56%	56%	56%	56%	56%	56%
C&I	SMA	52%	52%	53%	54%	55%	56%	57%	60%	61%	62%	62%	64%
C&I	ERA	70%	71%	71%	72%	73%	74%	74%	75%	75%	78%	79%	81%
C&I	RRA	71%	71%	72%	73%	73%	74%	74%	75%	75%	75%	76%	76%
C&I	NRA	55%	55%	56%	57%	58%	59%	59%	60%	60%	60%	61%	61%
C&I	NSW	57%	57%	58%	59%	60%	61%	62%	64%	64%	66%	66%	67%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	64%	65%	66%	66%	67%	67%	67%	67%	68%

■ **Table 13: Scenario H – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	61%	62%	64%	64%	66%	66%	69%	70%	69%
MSW	ERA	51%	52%	52%	53%	54%	55%	55%	55%	55%	55%	55%	55%
MSW	RRA	38%	39%	40%	40%	41%	44%	44%	44%	44%	44%	44%	48%
MSW	NRA	38%	38%	39%	40%	41%	41%	41%	42%	42%	42%	42%	46%
MSW (domestic)	NSW	49%	49%	50%	51%	52%	54%	54%	56%	56%	58%	59%	60%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	53%	54%	55%	56%	56%	58%	58%	59%	60%	61%
C&I	SMA	52%	52%	53%	54%	55%	56%	57%	60%	61%	62%	62%	64%
C&I	ERA	70%	71%	71%	72%	73%	74%	74%	75%	75%	78%	79%	81%
C&I	RRA	71%	71%	72%	73%	73%	74%	74%	75%	75%	75%	76%	76%
C&I	NRA	55%	55%	56%	57%	58%	59%	59%	60%	60%	60%	61%	61%
C&I	NSW	57%	57%	58%	59%	60%	61%	62%	64%	64%	66%	66%	67%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	64%	65%	66%	66%	67%	67%	68%	69%	69%

■ **Table 14: Scenario I – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	62%	63%	66%	66%	70%	71%	74%	75%	76%
MSW	ERA	51%	52%	53%	54%	55%	57%	59%	61%	63%	63%	63%	64%
MSW	RRA	38%	39%	40%	41%	42%	46%	46%	47%	48%	48%	48%	52%
MSW	NRA	38%	38%	40%	42%	43%	45%	46%	48%	49%	49%	50%	54%
MSW (domestic)	NSW	49%	49%	51%	52%	54%	57%	59%	63%	65%	67%	68%	70%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	54%	55%	56%	58%	60%	62%	63%	65%	66%	67%
C&I	SMA	52%	52%	53%	54%	55%	56%	57%	60%	61%	62%	63%	64%
C&I	ERA	70%	71%	72%	72%	73%	74%	74%	75%	75%	78%	79%	81%
C&I	RRA	71%	71%	72%	73%	73%	74%	74%	75%	75%	75%	76%	76%
C&I	NRA	55%	55%	56%	57%	58%	59%	59%	60%	60%	60%	61%	61%
C&I	NSW	57%	57%	58%	59%	60%	61%	62%	64%	65%	66%	67%	68%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	65%	66%	67%	67%	69%	69%	70%	70%	71%



■ **Table 15: Scenario J – modelled recycling performance**

Stream	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MSW	SMA	59%	60%	61%	62%	64%	66%	67%	71%	72%	76%	77%	77%
MSW	ERA	51%	52%	53%	54%	55%	57%	60%	62%	65%	65%	65%	66%
MSW	RRA	38%	39%	40%	41%	42%	46%	47%	48%	49%	49%	50%	54%
MSW	NRA	38%	38%	40%	42%	44%	45%	47%	49%	51%	51%	52%	56%
MSW (domestic)	NSW	49%	49%	51%	53%	54%	58%	60%	64%	67%	70%	71%	73%
MSW (non-domestic)	NSW	58%	59%	59%	60%	60%	61%	61%	61%	61%	61%	61%	61%
MSW	NSW	52%	52%	54%	55%	56%	59%	60%	63%	65%	67%	67%	69%
C&I	SMA	52%	52%	54%	55%	56%	57%	58%	61%	62%	64%	65%	66%
C&I	ERA	70%	71%	72%	73%	73%	74%	75%	75%	76%	79%	80%	82%
C&I	RRA	71%	71%	73%	73%	74%	75%	75%	76%	77%	77%	78%	78%
C&I	NRA	55%	55%	57%	58%	59%	60%	61%	62%	62%	63%	64%	65%
C&I	NSW	57%	57%	59%	60%	61%	62%	63%	65%	66%	68%	68%	70%
C&D	SMA	76%	76%	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%
C&D	ERA	77%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
C&D	RRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NRA	55%	55%	56%	56%	56%	57%	57%	57%	57%	57%	57%	57%
C&D	NSW	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
All streams	NSW	63%	63%	64%	65%	66%	67%	68%	69%	70%	71%	71%	72%

See Appendix E for modelled output data for Scenarios K, L and M for the C&D sector.

## Appendix C: Sources of data

The table below lists sources of data, mostly supplied by the EPA. Some of these sources are referred to by number in the main body of the report.

Number	Source
1	Results of the Keep Australia Beautiful National Litter Index. EPA data analysis – unpublished
2	Keep Australia Beautiful National Litter Index 2010-11. <a href="http://kab.org.au/litter-research/national-litter-index-2/">http://kab.org.au/litter-research/national-litter-index-2/</a>
3	Organics Reprocessing (2010-2011) EPA data unpublished. Older reports available at <a href="http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm">http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm</a> .
4	Tables on NSW paper recovery & reprocessing in NSW, 2010-11. EPA data analysis – unpublished
5	Paper Reprocessing (2010-2011). EPA data unpublished. Older reports available at <a href="http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm">http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm</a>
6	PACIA 2011 National Plastics Recycling Survey (Australia).
7	Organics Processing Industry - annual survey - NSW 2010-11. EPA data sourced from <a href="http://www.recycledorganics.com/">http://www.recycledorganics.com/</a>
8	Glass Reprocessing (2010-2011) EPA data unpublished Older reports available at <a href="http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm">http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm</a>
9	NSW Resource Recovery Industry Survey 2010-11 - C&D, metal, textile & rubber sectors. EPA data unpublished,
10	Household Chemical CleanOut Program - Annual Report, NSW EPA, 2010-2011. <a href="http://www.environment.nsw.gov.au/households/cleanoutguide.htm">http://www.environment.nsw.gov.au/households/cleanoutguide.htm</a>
11	NetWaste Household Chemical Waste Collection Program 2011-12 – summary report. Unpublished
12	Resource Recovery Infrastructure Needs Analysis - Summary Report, Office of Environment and Heritage, 2011. Unpublished
13	Impact of Levy on Recyclers, CIE, 2011. Unpublished
14	Impact of Levy on C&I sector, CIE, 2011. Unpublished
15	EPA Internal Briefing on e-waste Sept 2011. Unpublished
16	Energy from waste - Potential impacts on waste management in NSW, CIE, 2011. Unpublished
17	Australian Battery Recycling Initiative - Analysis of Battery Consumption and Recycling in Australia, 2010
18	NSW Local Government Waste and Resource Recovery Data Report – as reported by councils, 2010-11 <a href="http://www.environment.nsw.gov.au/warr/datareport.htm">http://www.environment.nsw.gov.au/warr/datareport.htm</a>

Number	Source
19	Domestic kerbside waste & recycling in NSW – report on the results of waste audits of household kerbside collection systems 2007-8. Office of Environment and Heritage <a href="http://www.environment.nsw.gov.au/resources/warr/110310ReportonAudits.pdf">http://www.environment.nsw.gov.au/resources/warr/110310ReportonAudits.pdf</a>
20	Total Disposal Tonnages NSW. EPA data analysis - unpublished
21	NSW Waste Avoidance and Resource Recovery Strategy 2007. <a href="http://www.environment.nsw.gov.au/resources/warr/07226WARRreport07.pdf">http://www.environment.nsw.gov.au/resources/warr/07226WARRreport07.pdf</a>
22	Guidelines for Conducting Household Kerbside Residual Waste, Recycling & Garden Organics Audits in NSW LGAs, 2008 - Addendum 2010. <a href="http://www.environment.nsw.gov.au/resources/warr/101053AddenKrbAud.pdf">http://www.environment.nsw.gov.au/resources/warr/101053AddenKrbAud.pdf</a>
23	Waste classifications in Australia – A comparison of Waste Classifications in the Australian Waste Database with current jurisdictional classifications 2011. Department of Sustainability, Environment, Water, Population and Communities <a href="http://www.environment.gov.au/wastepolicy/publications/waste-classifications-comparison.html">http://www.environment.gov.au/wastepolicy/publications/waste-classifications-comparison.html</a>
24	TABLE A1. Population projections, By age and sex, New South Wales - Series A.xlsx Australian Bureau of Statistics
25	TABLE B1. Population projections, By age and sex, New South Wales - Series B.xlsx Australian Bureau of Statistics
26	TABLE C1. Population projections, By age and sex, New South Wales - Series C.xlsx Australian Bureau of Statistics
27	NSW Local Government Waste and Resource Recovery Data Report – as reported by councils, 2009-10. <a href="http://www.environment.nsw.gov.au/resources/warr/110334LGWARR0910.pdf">http://www.environment.nsw.gov.au/resources/warr/110334LGWARR0910.pdf</a>
28	Resource Recovery Infrastructure Needs Analysis - Background Report, Office of Environment and Heritage, 2011. Unpublished
29	NSW Councils by Region List.xlsx EPA data
30	Review of Waste Strategy and Policy in NSW (Richmond review), Dept of Environment, Climate Change and Water NSW, 2010. <a href="http://www.environment.nsw.gov.au/resources/warr/101034RevWasteStrat.pdf">http://www.environment.nsw.gov.au/resources/warr/101034RevWasteStrat.pdf</a>
31	2007-08 Audit Data - 02082012.xlsx EPA data analysis - unpublished
32	2010-11 Audit Data by Region - 02082012.xlsx EPA data analysis – unpublished
33	LG Survey Data Appendix 1-4 2010-11.xlsx data from report at source 18
34	NSW Waste Avoidance and Resource Recovery Strategy Progress Report, Volume 1, 2010. <a href="http://www.environment.nsw.gov.au/resources/warr/110060WARRSPRvolume1.pdf">http://www.environment.nsw.gov.au/resources/warr/110060WARRSPRvolume1.pdf</a>

Number	Source
35	NSW Waste Avoidance and Resource Recovery Strategy Progress Report, Volume 2, 2010. <a href="http://www.environment.nsw.gov.au/resources/warr/110061WARRSPRvolume2.pdf">http://www.environment.nsw.gov.au/resources/warr/110061WARRSPRvolume2.pdf</a>
36	Waste and Recycling in Australia, Hyder Consulting for Department of the Environment, Water, Heritage and the Arts, 2009. <a href="http://www.environment.gov.au/settlements/waste/publications/pubs/waste-recycling2009.pdf">http://www.environment.gov.au/settlements/waste/publications/pubs/waste-recycling2009.pdf</a>
37	Australia - National Waste Report 2010.pdf <a href="http://www.scew.gov.au/archive/waste-management/pubs/wastemgt_nat_waste_report_final_20_fullreport_201005_0.pdf">http://www.scew.gov.au/archive/waste-management/pubs/wastemgt_nat_waste_report_final_20_fullreport_201005_0.pdf</a>
38	2010-11 Generation data.xlsx EPA data analysis - unpublished
39	Table 2 - 2010-11 generation data.docx EPA data analysis - unpublished
40	Report into the Construction and Demolition Waste Stream Audit 2000-2005, DECC NSW, 2007.pdf <a href="http://www.environment.nsw.gov.au/warr/cndwastestream.htm">http://www.environment.nsw.gov.au/warr/cndwastestream.htm</a>
41	Report into the Construction and Demolition Waste Stream Audit 2000-2005, DECC NSW, 2007 - Appendices.pdf <a href="http://www.environment.nsw.gov.au/warr/cndwastestream.htm">http://www.environment.nsw.gov.au/warr/cndwastestream.htm</a>
42	Commercial and industrial waste in Sydney - Report, DECC NSW, 2009.pdf <a href="http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm">http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm</a>
43	Commercial and industrial waste in Sydney - Appendices, DECC NSW, 2009.pdf <a href="http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm">http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm</a>
44	Commercial and industrial waste in Sydney - Overview, DECC NSW, 2009.pdf <a href="http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm">http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm</a>
45	Commercial and Industrial Waste in the Lower Hunter Region, DECC NSW, 2011.pdf <a href="http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm">http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm</a>
46	C&I tonnes and Composition 2010-11.xlsx EPA data analysis - unpublished
47	2010-11 Collected and AWT for SKM - 060812.xlsx EPA data analysis – unpublished
48	NSW Household and dwelling projections, 2006 to 2036. Department of Planning 2008. <a href="http://www.planning.nsw.gov.au/population/pdfs/nsw_household_dwelling_projections_2006_2036_2008release.pdf">http://www.planning.nsw.gov.au/population/pdfs/nsw_household_dwelling_projections_2006_2036_2008release.pdf</a>
49	National Environment Protection Council Annual Report 2010-11. <a href="http://scew.gov.au/publications/annual-report/pubs/nepc-annual-report-2010-11.pdf">http://scew.gov.au/publications/annual-report/pubs/nepc-annual-report-2010-11.pdf</a>
50	Material collected by council.xlsx EPA data analysis - unpublished

Number	Source
51	New South Wales Household and Dwelling Projections, 2006–2036, 2008 release. Department of Planning <a href="http://www.planning.nsw.gov.au/population/pdfs/nsw_household_dwelling_projections_2006_2036_2008release.pdf">http://www.planning.nsw.gov.au/population/pdfs/nsw_household_dwelling_projections_2006_2036_2008release.pdf</a>
52	The NSW economy in 2020 - A foresighting study, Access Economics, 2010. <a href="http://www.business.nsw.gov.au/data/assets/pdf_file/0006/5379/NSWEconomyin2020_Final_100917.pdf">http://www.business.nsw.gov.au/data/assets/pdf_file/0006/5379/NSWEconomyin2020_Final_100917.pdf</a>
53	2010–11 Report to the NSW Environmental Trust Waste and Sustainability Sub-Committee on waste programs. <a href="http://www.environment.nsw.gov.au/resources/grants/110802TrustAR2011.pdf">http://www.environment.nsw.gov.au/resources/grants/110802TrustAR2011.pdf</a>
54	Internal EPA brief on EfW - Att A.docx EPA unpublished
55	Internal EPA brief on EfW Att B.docx EPA unpublished
56	E_waste to be recovered Product Stewardship Scheme.xlsx EPA unpublished
57	Kerbside collections 2000 to 2011.xlsx EPA data analysis - unpublished
58	2010-11 NSW Composition_Recovery data for WS 2012.xls EPA data analysis – unpublished
59	Organics for waste strategy review.xls EPA data analysis - unpublished

## Appendix D: Key data sources for each scenario

The table below lists the key sources of data used within each scenario. The sources are listed cumulatively, since many of the scenarios build on those that have come before. The text for each scenario in the main body of the report provides information on how these sources of data have been used and what the key assumptions are for each scenario.

<b>Scenario A (Business as usual)</b>
9 - NSW Resource Recovery Industry Survey 2010-11 - C&D, metal, textile & rubber sectors.docx
13 - Impact of Levy on Recyclers, CIE, 2011.pdf
24 - TABLE A1. Population projections, By age and sex, New South Wales - Series A.xlsx
25 - TABLE B1. Population projections, By age and sex, New South Wales - Series B.xlsx
26 - TABLE C1. Population projections, By age and sex, New South Wales - Series C.xlsx
28 - Resource Recovery Infrastructure Needs Analysis - Background Report, Office of Environment and Heritage, 2011.pdf
30 - Review of Waste Strategy and Policy in NSW (Richmond review), Dept of Environment, Climate Change and Water NSW, 2010.pdf
32 – 2010-11 Audit Data by Region - 02082012.xlsx
33 - LG Survey Data Appendix 1-4 2010-11.xlsx
35 – NSW Waste Avoidance and Resource Recovery Strategy Progress Report, Volume 2, 2010.pdf
38 – 2010-11 Generation data.xlsx
38 – 2010-11 Generation data.xlsx
40 - Report into the Construction and Demolition Waste Stream Audit 2000-2005, DECC NSW, 2007.pdf
47 – 2010-11 Collected and AWT for SKM - 060812.xlsx
48 - Household and family projections, Australia, 2006 to 2031.xlsx
50 - Material collected by council.xlsx
56 - E_waste to be recovered Product Stewardship Scheme.xlsx
58 – 2010-11 NSW Composition_Recovery data for WS 2012.xls
<b>Scenario B (Waste prevention and avoidance (MSW and C&amp;I))</b>
As for preceding scenario.
<b>Scenario C (Kerbside recycling improvement – dry recyclables (MSW))</b>
As for preceding scenarios.

<b>Scenario D (Food and garden organics diversion improvement (MSW and C&amp;I))</b>
59 - Organics for waste strategy review.xls
Other sources as for preceding scenarios.
<b>Scenario E (Alternative Waste Treatment (MSW))</b>
12 - Resource Recovery Infrastructure Needs Analysis - Summary Report, Office of Environment and Heritage, 2011.pdf
Other sources as for preceding scenarios.
<b>Scenario F (Alternative Waste Treatment (C&amp;I))</b>
As for preceding scenarios.
<b>Scenario G (C&amp;I source segregation)</b>
As for preceding scenarios.
<b>Scenario H (Energy from Waste: Scenarios E &amp; G plus EfW)</b>
As for preceding scenarios.
<b>Scenario I (Combination option (Scenarios A to H excluding F))</b>
As for preceding scenarios.
<b>Scenario J ('Holistic' stretch scenario (scenario I stretched))</b>
As for preceding scenarios.
<b>Scenarios K, L and M - See Appendix E</b>



## **Appendix E: Additional modelling and analysis for construction and demolition waste**

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## Disclaimer

*The sole purpose of this report is to provide forecasts in connection with waste and resource recovery in NSW to support NSW EPA in development of future targets for its Waste and Resource Recovery Strategy. Modelling and forecasting is not a precise science. Forecasts are only an indication of what might happen in the future and they may not be achieved. They rely upon complex sets of input data and assumptions. There is no guarantee that these assumptions will in fact be correct or accurate. SKM has prepared the modelling system and this report in accordance with the usual care and thoroughness of the consulting profession for the sole purpose described above and in consultation with key NSW EPA stakeholders. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, assumptions and forecasts presented in this report, to the extent permitted by law. No responsibility is accepted by SKM for use of any part of this report in any other context. This report has been prepared on behalf of and for the exclusive use of, NSW EPA, and is subject to, and issued in accordance with, the provisions of the agreement between SKM and NSW EPA. SKM accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon this report by any third party.*

# 1. Introduction

## 1.1. Background and context

Waste recycling and recovery in New South Wales (NSW) is addressed in the Waste Avoidance and Resource Recovery Strategy (the 'Waste Strategy'). It is based on the principles of maximising conservation of resources and minimising environmental harm from waste. Developed under the Waste Avoidance and Resource Recovery Act 2001 (the WARR Act), the Waste Strategy is required to be reviewed at least every five years. The first Waste Strategy was developed in 2003, and this was replaced with the current version in 2007, which retained the key result areas and targets of the Waste Strategy 2003.

The NSW Environment Protection Authority (EPA) is reviewing the 2007 Strategy as required by the legislation and preparing a new Strategy for public consultation. Input to the review is being provided by a number of sources, including the Modelling and Data Analysis to inform new Waste Strategy Report (project EN03243), prepared for the EPA by Sinclair Knight Merz, which models a number of future scenarios in relation to potential recycling rates. The work presented here is a further extension of project EN03243 which will be referred to as the Modelling Report.

This report focuses on the construction and demolition (C&D) waste stream only and should be read in conjunction with the Modelling Report. Available data on the C&D stream in NSW was reviewed to identify where possible improvements may exist to increase the recycling performance of this stream in future years. A scenario is provided to illustrate potential future improvement on the C&D waste sector alone (scenario K). The outputs from this modelling are then combined with the modelling outputs from Scenarios I and J from the Modelling Report to show the effect of the C&D improved scenario on the overall NSW recycling performance. For ease of reference, Scenario I from the Modelling Report shows the cumulative effects of all the potential programmes considered (for improving recycling and recovery in the MSW and C&I sectors) and Scenario J shows a further stretch in the targets. The new modelling incorporating further improved performance in the C&D sector is provided in Scenarios L and M, respectively.

## 1.2. Modelling method

As with the Modelling Report for project EN03243, the modelling has been carried out in a spreadsheet-based model and draws on several data sources provided by the EPA. As far as possible the model keeps separate the four geographical areas in NSW (Sydney Metropolitan Area (SMA), Extended Regulated Area (ERA), Regional Regulated Area

(RRA) and Non-Regulated Area(NRA)) and the three main waste streams (Municipal Solid Waste (MSW), Commercial and Industrial (C&I) and Construction and Demolition (C&D)). As for the previous Modelling Report, the baseline inputs for the model are for the year 2010-11.

## 2. Current data on C&D

Table 1 shows the latest available data (2010-11) on C&D generation in NSW by area, while Table 2 shows the latest recycling performance (75%) for C&D.

■ **Table 1: Baseline year (2010-11) C&D tonnages generated by area**

SMA	ERA	RRA	NRA	Total
4,652,803	1,773,718	138,846	339,933	<b>6,905,300</b>

■ **Table 2: Baseline year (2010-11) C&D recycling performance**

Total disposed (tonnes)	Total recycled (tonnes)	Total (tonnes)	% recycled
1,749,406	5,155,893	<b>6,905,300</b>	75%

Available information on C&D in NSW is less detailed than that for other streams (MSW and C&I). The C&D recycling data does not include recovery that occurs on site which is not possible to measure. A large portion of the C&D data is also only collected on a voluntary basis.

To estimate the composition of total waste generated and current diversion, data were combined from several EPA sources.<sup>1</sup> Table 3 shows the assumed overall composition which was generated.

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<sup>1</sup> Sources 38 (2010-11 total generation); 9 (composition of material reprocessed, 2010-11); and 40 (composition of material to landfill, 2004-5). Note that there are risks in combining 2004-5 and 2010-11 data, but this was considered the best approach with available data.

■ **Table 3: Assumed composition of all generated C&D for 2010-11**

Material type	Material	SMA	ERA	RRA + NRA
Major C&D materials	Asbestos (and asbestos-contaminated waste)	5.9%	5.7%	11.0%
Major C&D materials	Contaminated soil	5.1%	5.0%	9.6%
Major C&D materials	Concrete products	29.4%	29.5%	25.9%
Major C&D materials	Soil	13.2%	13.2%	11.9%
Major C&D materials	Timber	2.3%	2.3%	3.7%
Major C&D materials	Fines	1.7%	1.7%	3.3%
Major C&D materials	Clay products	16.1%	16.2%	12.5%
Major C&D materials	Natural aggregates	3.2%	3.2%	2.8%
Major C&D materials	Garden and vegetation	0.8%	0.8%	1.1%
Minor C&D materials	Ferrous metals	0.4%	0.4%	0.8%
Minor C&D materials	Plasterboard	0.4%	0.3%	0.6%
Minor C&D materials	Paper/cardboard	0.3%	0.3%	0.5%
Minor C&D materials	Plastic	0.2%	0.2%	0.4%
Minor C&D materials	Textiles	0.1%	0.1%	0.2%
Minor C&D materials	Asphalt	8.1%	8.2%	6.0%
Minor C&D materials	Non-ferrous metal	0.1%	0.1%	0.1%
Minor C&D materials	Glass	0.0%	0.0%	0.1%
Minor C&D materials	Miscellaneous	12.7%	12.8%	9.6%
		<b>100%</b>	<b>100%</b>	<b>100%</b>

**Note:** None of the figures in this table are zero. Even those showing as rounded to zero (0.0%) are in fact very small non-zero percentages.

### 3. Review of C&D waste streams

The main streams in C&D waste are reviewed below, to assess those that could have potential for increased recycling.

#### 3.1. Asbestos (and asbestos-contaminated waste)

It is assumed that this material (estimated as approximately 427,500 tonnes) will continue to be disposed to landfill. Asbestos waste is a legacy of the period where it was used in construction and manufacturing products as a fire retardant, and this waste stream is generated through building demolition or renovations. Quantities are expected to decrease over the long term as asbestos is replaced with other materials; however no data is available on the amount of asbestos present in previous years and thus the rate of

decline of this waste stream. In the absence of this information the level of asbestos contaminated material generated has not been modelled to show a decline, but instead to remain constant from 2010-11 throughout the life of the model, rather than applying the growth rate which is applied to all other streams – see Table 4 in Section 4.

### 3.2. Contaminated soils

It is assumed that this material (estimated as approximately 375,000 tonnes) will continue to be disposed to landfill. Quantities are expected generally to decrease over the long term as improved treatment technologies are introduced along with methods of on-site reuse of material so to avoid the generation of waste altogether.<sup>2</sup> High-level generalisations of expected average contamination types and therefore recovery rates and cost implications in NSW have not been available.

Estimates of an achievable recovery rate should consider the proposed use for the contaminated soil once contaminants are removed. It is therefore likely that treatment or handling of contaminated soils would require assessment on a case-by-case basis and it is difficult to estimate what a reasonable improvement in NSW might be, and as such no change from the baseline situation has been applied.

### 3.3. Aggregates and soil-based wastes

The following waste streams have been grouped together as they are typically treated at similar aggregate reprocessing and soil washing plants:

- **Concrete products** – Recycling/reuse levels are already relatively high at 85%, although ~300,000 tonnes continue to be disposed to landfill, providing potential for further diversion.
- **Soil** – Recycling/reuse levels are already relatively high at 84%, although ~147,000 tonnes continue to be disposed to landfill, providing potential for further diversion.
- **Natural aggregates** – Recycling/reuse levels are already relatively high at 85%, although ~33,400 tonnes p.a. continue to be disposed to landfill, providing potential for further diversion.

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<sup>2</sup> For example; when soil is contaminated with hydrocarbons or other volatile compounds, (diesel for example) then the soil can be treated through fairly inexpensive methods; combining a bacterial catalyst, aeration and turning, so over a period of time the soil can be made 'safe' for use.

- **Clay products** – This is considered primarily to be brick-related products, with a high recycling/ reuse rate (95.1%). This rate is unlikely to increase significantly, because it is already high, and therefore no increases are assumed.

Overall there is an estimated 3,134,000 tonnes p.a. of Concrete Product, Soil and Natural Aggregates generated, with ~85% of this material currently recycled.

To reach a 90% recycling/reuse level would require an additional 156,000 tonnes to be diverted per annum. To move to this level would require:

- Investment in new facilities (alongside utilising spare capacity at existing facilities). It is understood that one facility is to be upgraded and three new facilities are planned.<sup>3</sup> It is worth noting that the locations and sizes of facilities will need to be considered e.g. a number of small facilities may better serve the market than one large one, as transport costs can be a significant proportion of recycled aggregate costs.
- Promotion of the use and value of recycled aggregate products. For example, there has been a general trend of year-on-year increases in use of recycled aggregates in the UK, which has been encouraged through the development and use of Quality Protocols and clear guidance on their applications, e.g. Aggregain<sup>4</sup> web portal.

These projections are also based on an underlying assumption that the NSW construction sector will continue to grow throughout the strategy period, and that the market will not reach saturation for recycled aggregate products.

Based on the above observations, an assumed increase of 0.5% year-on-year to the current recycling performance from 2013-14 to 2017-18 is applied. This is in addition to the effects of the waste levy (see Table 4) and combines to produce an overall increase in performance from the baseline of 5 percentage points.

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<sup>3</sup> Source 12: further details on the capacity of these facilities and when they will become operational were not available for this report.

<sup>4</sup> <http://aggregain.wrap.org.uk/>

### **3.4. Timber**

According to the data, timber currently has a relatively low combined recycling rate of 23%, leaving 127,000 tonnes of recoverable and non-recoverable material<sup>5</sup> sent to landfill. In the modelling already carried out for the Modelling Report, it was assumed that C&I timber would reach a recycling rate of ~40%, in the SMA and ERA, with the RRA and NRA increasing their rates by 5 percentage points over the effect of the waste levy, by 2021-22. In the absence of other information, it is assumed that the same maximum could be reached for C&D timber, due to the similarities between the materials (in spite of the different sources).

It is assumed that all remaining timber which can reasonably be segregated would then be suitable for diversion to Energy from Waste (EfW) once the capacity becomes available, currently proposed for 2018-19, in line with the previous modelling.

### **3.5. Fines**

An estimated 127,000 tonnes were generated in 2010-11, with no recycling/recovery currently taking place. However, fines are now classified and managed to a greater extent than at the time of the composition report (source 40, 2004-5), and therefore no gains have been assumed for modelling purposes.

### **3.6. Garden and vegetation waste**

This waste stream currently has an estimated recycling rate of ~40% across NSW, with ~33,000 tonnes sent to landfill, which could provide further opportunities for diversion. In the Modelling Report, it is proposed that within C&I, recycling of this stream will be taken to between 47% and 100% (depending on the area), and within MSW to between 40% and 80%. While the source segregation of C&D material is unlikely to be so easily achieved as for residential waste, it is suggested that site clearance material generated prior to heavier C&D activities may allow for an increase in recycling of 10-20%. The modelling therefore applies an increase in recycling rate of 15 percentage points above the effect of the waste levy, between 2013-14 and 2021-22.

### **3.7. Plasterboard**

Approximately 10% of C&D plasterboard is currently recycled or recovered, with approximately 22,700 tonnes disposed to landfill. In Europe and North America, effective

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<sup>5</sup> Table 5 of Source 40 suggests ~21% of timber is unrecoverable.



take-back of off-cuts or excess material by suppliers for reprocessing and plasterboard recycling business has been established. While in the UK this is driven by a ban on gypsum and plasterboard being sent to landfill mixed with biodegradable waste from April 2009 (gypsum, when mixed with biodegradable waste, can produce hydrogen sulphide gas in landfill which is both toxic and odorous), diversion can also be achieved without regulatory instruments. Increased encouragement and promotion of the recycling of plasterboard (in addition to the increasing effect of the waste levy) could be assumed to lead to a 1% year-on-year increase, plateauing at around 20%.<sup>6</sup> The modelling therefore increases the recycling rate of plasterboard at a linear rate until the mark of 20% is reached in all areas in 2021-22.

### **3.8. Textiles, paper and cardboard, plastics**

There is a combined estimated 45,000 tonnes of these material sent to landfill, with no recycling currently taking place.

- **Textiles** – textiles from the C&D stream are likely to be comprised of material from clearance operations, carpets etc.<sup>7</sup> Due to the likely poor quality and often dirty nature of this material, it is suggested that it be targeted for treatment as EfW feedstock.
- **Paper and card and plastics** – It is reasonable to assume that this material will be similar in nature to that of the C&I stream, consisting largely of card packaging, material offcuts, etc. In the absence of other information, it is therefore assumed that it will be possible to reach the same position as the C&I “business as usual” position by 2021-22 from a starting point in 2013-14 of increased promotion and service availability.

While no detailed composition breakdown is available, it is assumed that a significant proportion of the remaining material would be of a high calorific value and therefore suitable for targeting in the future for EfW. It is therefore assumed that this material makes up part of the input to the 100,000tpa facility (for C&D waste) previously proposed by scenario H of the main modelling report.

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<sup>6</sup> Source 64 (Plasterboard Removal – house deconstruction fact sheet), published in NSW in 2010, concludes that the disposal of plasterboard is the most economically viable option; however, reuse and recycling options are recommended because landfill costs are increasing relative to recycling and because of the significant environmental benefits of recycling.

<sup>7</sup> No further composition data are available.

### 3.9. Asphalt

The data suggest that asphalt has a 99% recycling level and therefore recycling of this stream will not be assumed to increase further. The limitations of the available data may be over-estimating the recycling rate for asphalt, however it is still intensively recycled in NSW and a further performance improvement in recovering this material has not been modelled.

### 3.10. Glass, ferrous and non-ferrous materials

The available sources suggest that there is currently virtually no recycling of any of these material streams.<sup>8</sup> With no further breakdown available in current composition data it is difficult to understand the scope for performance improvement.

- **Glass** – It is assumed that the majority of this stream would be flat glass, most of which would be broken during removal and transport activities. The market for glass based aggregate in Australia is far smaller than in some other parts of the world. Combined with the relatively small amount generated (~2,600tpa from ~1.7 million tpa of C&D as a whole), no change in performance has been modelled.
- **Ferrous and non-ferrous metals** – It is unknown whether the metal streams recorded in the composition represent easily available items which could be readily separated for recycling (and if so why there is no current recycling) or if the metal is held as part of composite items, such as window frames and embedded fittings. However, Table 5 from source 40 suggests that ~44% is unrecoverable. Therefore a rate of 50% recycling, (~75% of the recoverable element), has been modelled in 2021-22 with a linear increase to this point from 2013-14.

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<sup>8</sup> NB: The modelling data are based on data taken from landfill facilities; it may be that some recycling takes place at other reprocessors such that material is diverted prior to reaching the disposal sites, or is treated at C&D MRF facilities.

## 4. Other modelling assumptions

In addition to the material specific assumptions covered in Section 3, Table 4 lists the other assumptions applied to the modelling, carried over from the main Modelling Report.

■ **Table 4: Assumptions for C&D in main Modelling Report**

Description of element	Assumption or supporting source
Generated tonnages – C&D	As shown in Table 1: 2010-11 generation data provided by EPA (source 38)
Composition	As shown in Table 3: Estimated by combining data from sources 9, 38 and 40
Growth rates	Calculated from background data in the 2011 Infrastructure Needs Analysis (source 28) – these are waste growth projections which take into account projected population changes. Please refer to the main modelling report for these figures.
Waste levy effect	The waste levy is expected to have mixed effects on recyclers (e.g. source 13, page 74) but overall the waste levy will continue to drive material from landfill to recycling. It is legislated to increase until 2015-16, and while drivers such as consumer price index (CPI) will add a small increase to it each year beyond this, for modelling purposes the influence of the waste levy plateaus after 2015-16, retaining the momentum gained to that point but without any further increase in diversion. For C&D, a small increase in recycling rates is assumed, given likely trends to recycle this material, and this is set at a 0.5 percentage point increase in diversion per year to 2015-16 for each material currently diverted.
MRF rejection rates	Given the nature of the source data, no additional assumptions on rejection rates have been applied (rejection rates are already counted in the source data as the material is processed at the landfill site).
EfW	As per the assumption from scenario H of the main modelling report, the draft EfW policy allows for residuals from C&D resource recovery facilities to be sent to EfW. Therefore one site with a capacity of 100,000t is modelled from 2019-20 to accept C&D sourced refuse-derived fuel. <sup>9</sup>

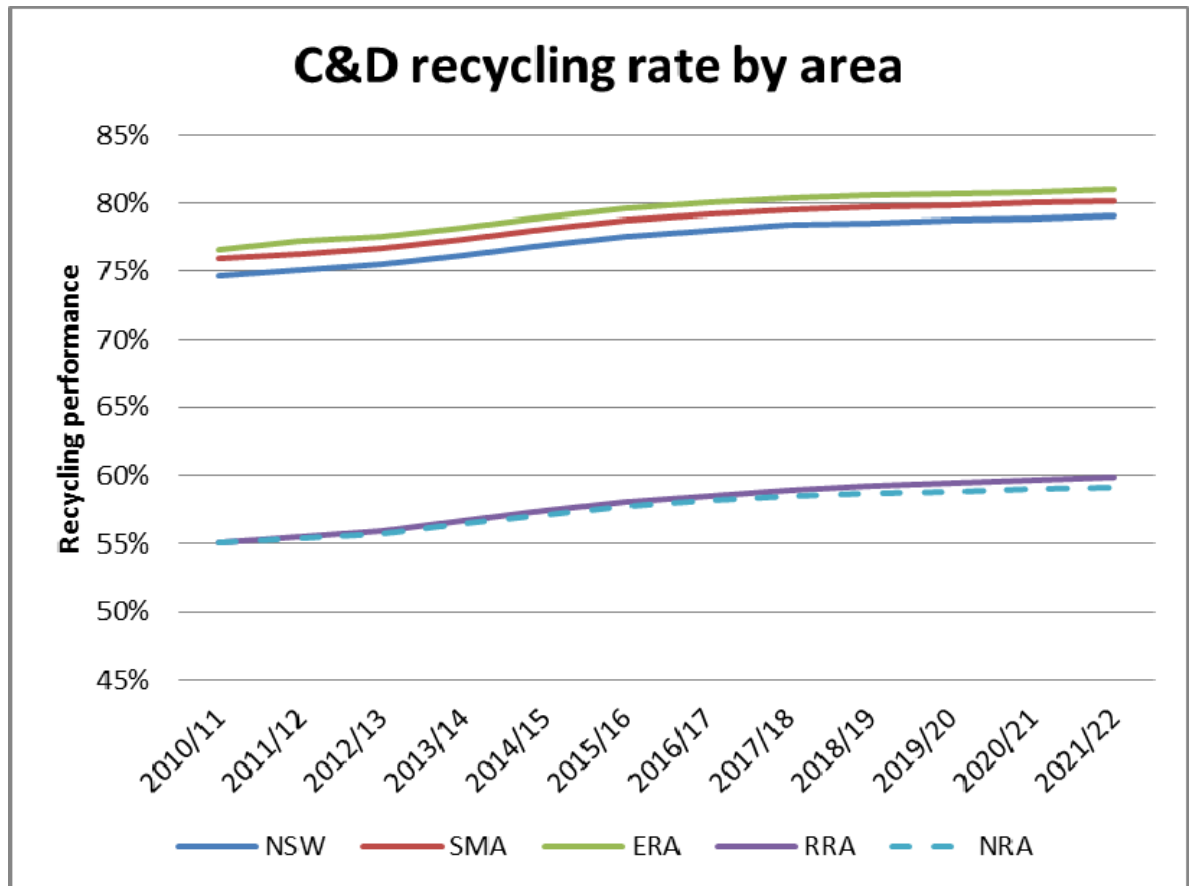
<sup>9</sup> As per the Modelling Report, during year one a commissioning period will reduce the total capacity to 85%. Please see Modelling Report for full details.

## 5. Summary of modelling outputs

### 5.1. Scenario K – Stand-alone C&D Changes

Figure 1 displays the modelling outputs for C&D recycling performance across each of the four NSW areas, as well as a combined performance for NSW. The combined effect of the changes covered in Section 3 increases C&D recycling from 75% to 79%: while a number of individual material streams are increasing their rates quite significantly; the relative size of these streams, when compared to the already well performing materials or those such as asbestos which will continue to require landfill, is quite small.

■ **Figure 1: C&D recycling rate by area and combined NSW**

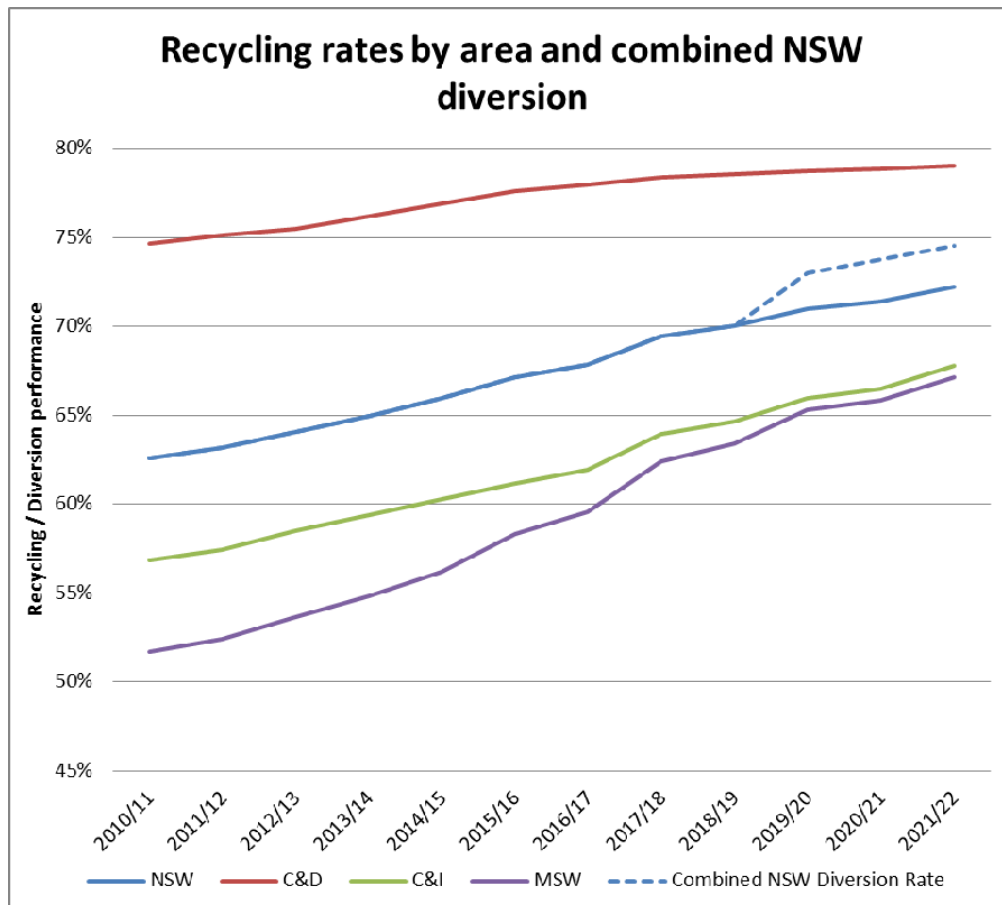


## 5.2. Scenarios L & M – combined scenarios I, J and K

In addition to a stand-alone review of the effects of the changes to C&D performance, the same assumptions have also been applied to scenarios I and J from the analysis in the Modelling Report (the combined review of all other changes (I) with stretched targets applied (J)).<sup>10</sup>

Figure 2 displays the results of combining scenarios I and K (resulting in Scenario L). The overall NSW combined recycling rate in 2021-22 is increased from 71% to 72% (from 'I' to 'L'), while the diversion rate is increased from 74% to 75%. For tabular results, please refer to Appendix I.

■ **Figure 2: Scenario L (combined I and K)**

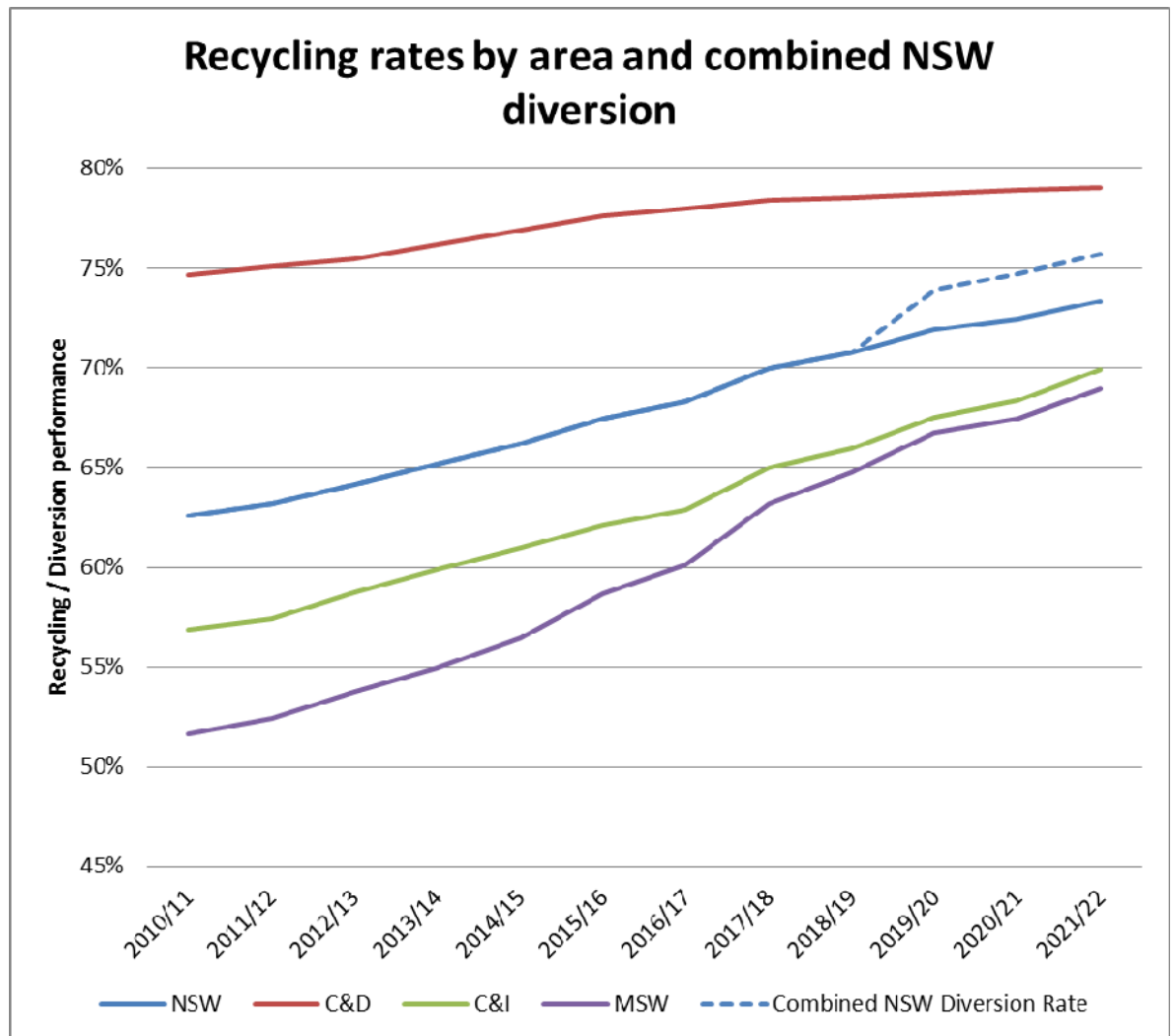


<sup>10</sup> Please see the Modelling Report for details.

### 5.3. Scenario M – combined scenarios J and K

Scenario M assesses the impact of adding the C&D modelling changes in this report to previously modelled Scenario J. The effect of this is to take the overall NSW recycling rate across all streams from 72% in Scenario J to 73% in this scenario (M) in 2021-22. The diversion rate is also increased from 75% to 76%.

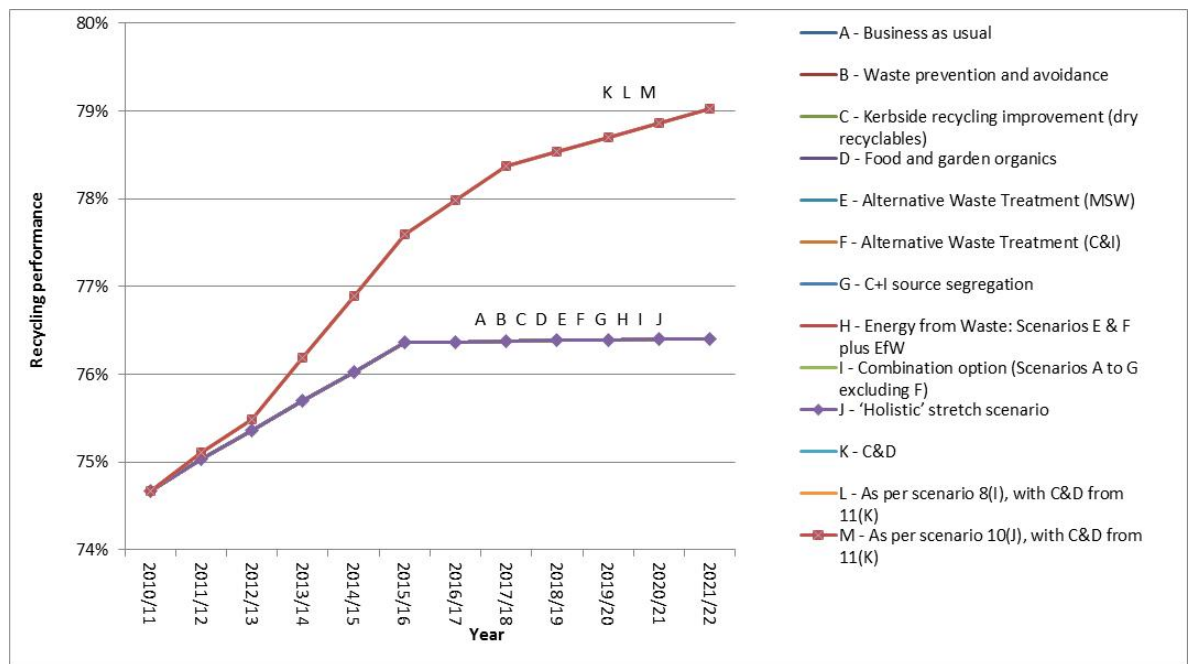
■ **Figure 3: Recycling and diversion rates across all streams following C&D improvements**



## 6. Summary and conclusions

There is already much recycling activity taking place in the C&D sector, which has almost achieved its current recycling target. Available data on the waste generated within the sector and its composition are of mixed age, detail and quality (and do not include recovery that could be occurring on site). Nonetheless, the analysis in this report has highlighted C&D streams for which it is likely that further improvement in performance can be achieved and shown that such improvement could be capable of adding (as summarised in Figure 4) more than two percentage points to the overall C&D recycling rate. Across NSW as a whole, this could add around one percentage point to recycling and diversion levels by 2021-22.

■ **Figure 4: C&D recycling performance by scenario (including those from the Modelling Report)<sup>11</sup>**



<sup>11</sup> NB: Scenarios A to J and scenarios K to M have similar performance profiles for this stream and so the individual lines are overlaid.

# Appendices

## Appendix I: Modelled scenarios' recycling performance outputs

■ **Table 5: C&D Recycling rates**

C&D Recycling rate	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Scenario I/J	75%	75%	75%	76%	76%	76%	76%	76%	76%	76%	76%	76%
Scenario K/L/M	75%	75%	75%	76%	77%	78%	78%	78%	79%	79%	79%	79%

■ **Table 6: Combined NSW recycling rates**

Combined NSW recycling rate	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Scenario I	63%	63%	64%	65%	66%	67%	67%	69%	69%	70%	70%	71%
Scenario J	63%	63%	64%	65%	66%	67%	68%	69%	70%	71%	71%	72%
Scenario K	63%	63%	64%	64%	65%	66%	66%	66%	66%	66%	66%	66%
Scenario L	63%	63%	64%	65%	66%	67%	68%	69%	70%	71%	71%	72%
Scenario M	63%	63%	64%	65%	66%	67%	68%	70%	71%	72%	72%	73%

■ **Table 7: Diversion rates for scenarios L & M**

Scenario L	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Total waste generated (t)	17,743,950	17,878,841	18,015,304	18,184,457	18,367,755	18,550,748	18,733,934	18,916,935
Remaining to landfill (t)	6,045,822	5,881,030	5,790,165	5,556,909	5,509,333	5,005,632	4,920,381	4,817,338
Diversion from landfill	66%	67%	68%	69%	70%	73%	74%	75%

Scenario M	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Total waste generated (t)	17,743,950	17,878,841	18,015,304	18,184,457	18,367,755	18,550,748	18,733,934	18,916,935
Remaining to landfill (t)	5,996,154	5,813,386	5,709,809	5,457,439	5,366,733	4,840,039	4,727,529	4,600,767
Diversion from landfill	66%	67%	68%	70%	71%	74%	75%	76%



## Appendix II: Sources of data

The table below lists sources of data, mostly supplied by the EPA. Some of these sources are referred to by number in the main body of the report.

Number	Source
1	Results of the Keep Australia Beautiful National Litter Index. EPA data analysis – unpublished
2	Keep Australia Beautiful National Litter Index 2010-11 <a href="http://kab.org.au/litter-research/national-litter-index-2/">http://kab.org.au/litter-research/national-litter-index-2/</a>
3	Organics Reprocessing (2010-2011) EPA data unpublished. Older reports available at <a href="http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm">http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm</a> .
4	Tables on NSW paper recovery & reprocessing in NSW, 2010-11. EPA data analysis – unpublished
5	Paper Reprocessing (2010-2011). EPA data unpublished. Older reports available at <a href="http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm">http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm</a>
6	PACIA 2011 National Plastics Recycling Survey (Australia)
7	Organics Processing Industry - annual survey - NSW 2010-11. EPA data sourced from <a href="http://www.recycledorganics.com/">http://www.recycledorganics.com/</a>
8	Glass Reprocessing (2010-2011) EPA data unpublished Older reports available at <a href="http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm">http://www.environment.nsw.gov.au/sustainbus/SustainabilityData.htm</a>
9	NSW Resource Recovery Industry Survey 2010-11 - C&D, metal, textile & rubber sectors. EPA data unpublished
10	Household Chemical CleanOut Program - Annual Report, NSW EPA, 2010-2011 <a href="http://www.environment.nsw.gov.au/households/cleanoutguide.htm">http://www.environment.nsw.gov.au/households/cleanoutguide.htm</a>
11	NetWaste Household Chemical Waste Collection Program 2011-12 - summary report. Unpublished
12	Resource Recovery Infrastructure Needs Analysis - Summary Report, Office of Environment and Heritage, 2011. Unpublished
13	Impact of Levy on Recyclers, CIE, 2011. Unpublished
14	Impact of Levy on C&I sector, CIE, 2011. Unpublished
15	EPA Internal Briefing on e-waste Sept 2011. Unpublished
16	Energy from waste - Potential impacts on waste management in NSW, CIE, 2011. Unpublished
17	Australian Battery Recycling Initiative - Analysis of Battery Consumption and Recycling in Australia, 2010
18	NSW Local Government Waste and Resource Recovery Data Report – as reported by councils, 2010-11

Number	Source
	<a href="http://www.environment.nsw.gov.au/warr/datareport.htm">http://www.environment.nsw.gov.au/warr/datareport.htm</a>
19	Domestic kerbside waste & recycling in NSW – report on the results of waste audits of household kerbside collection systems 2007-8. Office of Environment and Heritage <a href="http://www.environment.nsw.gov.au/resources/warr/110310ReportonAudits.pdf">http://www.environment.nsw.gov.au/resources/warr/110310ReportonAudits.pdf</a>
20	Total Disposal Tonnages NSW. EPA data analysis - unpublished
21	NSW Waste Avoidance and Resource Recovery Strategy 2007. <a href="http://www.environment.nsw.gov.au/resources/warr/07226WARRreport07.pdf">http://www.environment.nsw.gov.au/resources/warr/07226WARRreport07.pdf</a>
22	Guidelines for Conducting Household Kerbside Residual Waste, Recycling & Garden Organics Audits in NSW LGAs, 2008 - Addendum 2010 <a href="http://www.environment.nsw.gov.au/resources/warr/101053AddenKrbAud.pdf">http://www.environment.nsw.gov.au/resources/warr/101053AddenKrbAud.pdf</a>
23	Waste classifications in Australia – A comparison of Waste Classifications in the Australian Waste Database with current jurisdictional classifications 2011. Department of Sustainability, Environment, Water, Population and Communities <a href="http://www.environment.gov.au/wastepolicy/publications/waste-classifications-comparison.html">http://www.environment.gov.au/wastepolicy/publications/waste-classifications-comparison.html</a>
24	TABLE A1. Population projections, By age and sex, New South Wales - Series A.xlsx Australian Bureau of Statistics
25	TABLE B1. Population projections, By age and sex, New South Wales - Series B.xlsx Australian Bureau of Statistics
26	TABLE C1. Population projections, By age and sex, New South Wales - Series C.xlsx Australian Bureau of Statistics
27	NSW Local Government Waste and Resource Recovery Data Report – as reported by councils, 2009-10 <a href="http://www.environment.nsw.gov.au/resources/warr/110334LGWARR0910.pdf">http://www.environment.nsw.gov.au/resources/warr/110334LGWARR0910.pdf</a>
28	Resource Recovery Infrastructure Needs Analysis - Background Report, Office of Environment and Heritage, 2011. Unpublished
29	NSW Councils by Region List.xlsx EPA data
30	Review of Waste Strategy and Policy in NSW (Richmond review), Dept of Environment, Climate Change and Water NSW, 2010 <a href="http://www.environment.nsw.gov.au/resources/warr/101034RevWasteStrat.pdf">http://www.environment.nsw.gov.au/resources/warr/101034RevWasteStrat.pdf</a>
31	2007-08 Audit Data - 02082012.xlsx EPA data analysis - unpublished
32	2010-11 Audit Data by Region - 02082012.xlsx EPA data analysis – unpublished
33	LG Survey Data Appendix 1-4 2010-11.xlsx data from report at source 18

Number	Source
34	NSW Waste Avoidance and Resource Recovery Strategy Progress Report, Volume 1, 2010. <a href="http://www.environment.nsw.gov.au/resources/warr/110060WARRSPRvolume1.pdf">http://www.environment.nsw.gov.au/resources/warr/110060WARRSPRvolume1.pdf</a>
35	NSW Waste Avoidance and Resource Recovery Strategy Progress Report, Volume 2, 2010. <a href="http://www.environment.nsw.gov.au/resources/warr/110061WARRSPRvolume2.pdf">http://www.environment.nsw.gov.au/resources/warr/110061WARRSPRvolume2.pdf</a>
36	Waste and Recycling in Australia, Hyder Consulting for Department of the Environment, Water, Heritage and the Arts, 2009. <a href="http://www.environment.gov.au/settlements/waste/publications/pubs/waste-recycling2009.pdf">http://www.environment.gov.au/settlements/waste/publications/pubs/waste-recycling2009.pdf</a>
37	Australia - National Waste Report 2010.pdf <a href="http://www.scew.gov.au/archive/waste-management/pubs/wastemgt_nat_waste_report_final_20_fullreport_2010_05_0.pdf">http://www.scew.gov.au/archive/waste-management/pubs/wastemgt_nat_waste_report_final_20_fullreport_2010_05_0.pdf</a>
38	2010-11 Generation data.xlsx EPA data analysis - unpublished
39	Table 2 - 2010-11 generation data.docx EPA data analysis - unpublished
40	Report into the Construction and Demolition Waste Stream Audit 2000-2005, DECC NSW, 2007.pdf <a href="http://www.environment.nsw.gov.au/warr/cndwastestream.htm">http://www.environment.nsw.gov.au/warr/cndwastestream.htm</a>
41	Report into the Construction and Demolition Waste Stream Audit 2000-2005, DECC NSW, 2007 - Appendices.pdf <a href="http://www.environment.nsw.gov.au/warr/cndwastestream.htm">http://www.environment.nsw.gov.au/warr/cndwastestream.htm</a>
42	Commercial and industrial waste in Sydney - Report, DECC NSW, 2009.pdf <a href="http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm">http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm</a>
43	Commercial and industrial waste in Sydney - Appendices, DECC NSW, 2009.pdf <a href="http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm">http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm</a>
44	Commercial and industrial waste in Sydney - Overview, DECC NSW, 2009.pdf <a href="http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm">http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm</a>
45	Commercial and Industrial Waste in the Lower Hunter Region, DECC NSW, 2011.pdf <a href="http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm">http://www.environment.nsw.gov.au/warr/commercialindustrialwaste.htm</a>
46	C&I tonnes and Composition 2010-11.xlsx EPA data analysis – unpublished
47	2010-11 Collected and AWT for SKM - 060812.xlsx EPA data analysis – unpublished
48	NSW Household and dwelling projections, 2006 to 2036. Department of Planning 2008

Number	Source
	<a href="http://www.planning.nsw.gov.au/population/pdfs/nsw_household_dwelling_projections_2006_2036_2008release.pdf">http://www.planning.nsw.gov.au/population/pdfs/nsw_household_dwelling_projections_2006_2036_2008release.pdf</a>
49	National Environment Protection Council Annual Report 2010-11. <a href="http://scew.gov.au/publications/annual-report/pubs/nepc-annual-report-2010-11.pdf">http://scew.gov.au/publications/annual-report/pubs/nepc-annual-report-2010-11.pdf</a>
50	Material collected by council.xlsx EPA data analysis - unpublished
51	New South Wales Household and Dwelling Projections, 2006–2036, 2008 release. Department of Planning <a href="http://www.planning.nsw.gov.au/population/pdfs/nsw_household_dwelling_projections_2006_2036_2008release.pdf">http://www.planning.nsw.gov.au/population/pdfs/nsw_household_dwelling_projections_2006_2036_2008release.pdf</a>
52	The NSW economy in 2020 - A foresighting study, Access Economics, 2010. <a href="http://www.business.nsw.gov.au/_data/assets/pdf_file/0006/5379/NSWEconomyin2020_Final_100917.pdf">http://www.business.nsw.gov.au/_data/assets/pdf_file/0006/5379/NSWEconomyin2020_Final_100917.pdf</a>
53	2010–11 Report to the NSW Environment Trust Waste and Sustainability Sub-Committee on waste programs. <a href="http://www.environment.nsw.gov.au/resources/grants/110802TrustAR2011.pdf">http://www.environment.nsw.gov.au/resources/grants/110802TrustAR2011.pdf</a>
54	Internal EPA brief on EfW - Att A.docx EPA unpublished
55	Internal EPA brief on EfW Att B.docx EPA unpublished
56	E_waste to be recovered Product Stewardship Scheme.xlsx EPA unpublished
57	Kerbside collections 2000 to 2011.xlsx EPA data analysis - unpublished
58	2010-11 NSW Composition_Recovery data for WS 2012.xls EPA data analysis - unpublished
59	Organics for waste strategy review.xls EPA data analysis - unpublished
60	Resource Recovery Workshop Flyer 2013 - Waste Contractors & Recyclers Association of NSW
61	International Waste Strategy Benchmarking, SKM Enviros, 2013
62	Training Course - Use of Recycled Materials for Pavements, Earthworks and Drainage 2013, EPA & Sydney Institute of TAFE
63	Material fact sheet - Construction and Demolition – from Waste and resources recovery facilities manual 2012, Waste Contractors & Recyclers Association of NSW
64	Plasterboard Removal - House deconstruction fact sheet - from Waste and resources recovery facilities manual 2012, Waste Contractors & Recyclers Association of NSW

## Appendix F: Glossary

The table below summarises some of the key terms used within this document.

AWT	Alternative Waste Treatment Technologies. This term can refer to one of several technologies applied to separated organics or mixed waste; it is a combination of mechanical, biological and (sometimes) thermal processes to recover resources from waste. For further information please see <a href="http://www.environment.nsw.gov.au/warr/AWT.htm">http://www.environment.nsw.gov.au/warr/AWT.htm</a>
C&D	See Construction and Demolition Waste
Capture Rate	The amount of available material 'captured' by a service. In terms of this report we have used this to refer to the point of collection, i.e. it includes contaminants. E.g. if there were 5,000 tonnes of waste generated in an area and 10% was paper, then the total amount of paper available for 'capture' would be 500t. If a collection scheme 'captured' 250t of this paper, the capture rate would be 50%.
Construction and Demolition Waste	Waste sourced from construction and demolition works, including building and demolition waste, asphalt waste and excavated natural material. For further information please see <a href="http://www.environment.nsw.gov.au/wr/glossary.htm">http://www.environment.nsw.gov.au/wr/glossary.htm</a>
C&I	See Commercial and Industrial Waste
Commercial and Industrial waste	Waste generated by businesses and industries (including shopping centres, restaurants and offices) and institutions (such as schools, hospitals and government offices), excluding construction and demolition waste and municipal waste. For further information please see <a href="http://www.environment.nsw.gov.au/wr/glossary.htm">http://www.environment.nsw.gov.au/wr/glossary.htm</a>
Diversion	The proportion of total waste which doesn't end up in landfill. This includes all recycling, but also material lost through combustion at an EfW plant. E.g. if total waste was 1,000t and it was all sent to EfW, from which 100t of ash was left which was landfilled. The diversion rate would be 90%, but as no recycling took place the recycling rate would be 0%.

E-waste	Computer and electronic waste
ERA	Extended Regulated Area (ERA) ) -refers to a waste levied area under the POEO Act -comprises the Hunter, Central Coast and Illawarra regions (13 councils)
Materials Recovery Facility	A Materials Recovery Facility (MRF) handles a range of recyclables which typically have already been separated from other waste streams (e.g. by householders or businesses at the collection stage); at the MRF the materials are sorted into individual streams before being sent for recycling. Components of the incoming material which are not suitable for recycling will be separated as “contaminants” at the MRF.
MRF	See Materials Recovery Facility
MSW	See Municipal Solid Waste
Municipal Solid Waste.	Municipal Solid Waste. Solid and inert wastes arising from the four waste sub-streams: domestic waste, other domestic waste, other council waste and garden organics. For further information please see <a href="http://www.environment.nsw.gov.au/wr/glossary.htm">http://www.environment.nsw.gov.au/wr/glossary.htm</a>
NRA	Non-Regulated Area (NRA) comprises the parts of the state not covered by the ERA, RRA or SMA
POEO	<a href="#"><u>Protection of the Environment Operations Act 1997</u></a>
Recycling rate	Proportion of an overall waste stream which is sent for recycling. The recycling rate is typically calculated using figures for the material actually recycled rather than the material collected for recycling (e.g. because some of the collected material may be rejected as contamination during sorting at a Materials Recovery Facility).
RRA	Regional Regulated Area (RRA) - refers to a waste levied area under the POEO Act - comprises of coastal councils north of Port Stephens to the Queensland border, and includes the Blue Mountains, Wollondilly and upper Hunter regions (21 councils)
SMA	Sydney Metropolitan Area (SMA) – refers to a waste levied area under the POEO Act - consisting of 38 local council areas. (see waste levy)
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>

Waste Levy	The waste levy is a market-based instrument legislated under the <i>Protection of the Environment Operations Act 1997</i> (POEO Act) that requires licensed waste facilities in NSW to pay a contribution for each tonne of waste received for disposal at the facility. The objective is to reduce the amount of waste being disposed of and promote recycling and resource recovery. It was initially introduced for the Sydney Metropolitan area (SMA), but subsequently extended to certain regional areas.
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