Strategic Waste Infrastructure Planning Project (SWIPP):

- WAWA and DEC initiative
- Plan future waste infrastructure needs for Perth metro & Peel regions
- Identify sustainable & cost-effective SWM infrastructure sites for the next 40 years

<table>
<thead>
<tr>
<th>Year</th>
<th>Population (m)</th>
<th>Waste (mT/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1.85</td>
<td>5.8</td>
</tr>
<tr>
<td>2026</td>
<td>2.44</td>
<td>7.7</td>
</tr>
</tbody>
</table>

- Waste diversion targets 2019/2020
  - Current diversion – 34.5%
    - Hyder 2011 Recycling Activity Report + DEC landfill data.

- MSW Metro – 65%
- MSW Non-Metro – 50%
- C&I – 70%
- C&D – 75%
HYDER’S ROLE IN SWIPP

- Investigate possible waste management infrastructure approaches
  - Cope with future waste generation in the region
  - Meet current targets
- Develop a modeling tool to identify infrastructure needs over the next 40 years (from a 2011 baseline) until 2050.
  - Analyze and compare the effectiveness of different technology combinations to determine which infrastructure scenarios can meet the Waste Strategy diversion targets for the Perth metro & Peel regions.
- Evaluate performance against targets under current strategy and proposed infrastructure
- Need to consider:
  - Changes in population, economy and levels of source separation
  - Lifespans and capacities of infrastructure
- Development of the modelling tool
- Consultation with key stakeholders
  - Regional council organisations
  - Existing facility operators
  - Current proponents of new regional waste management infrastructure
  - Able to inform modelling parameters such as current flows of urban waste, facility annual and lifetime capacity limits, recovery efficiencies and estimated lead times for new facility development
- Compilation of waste flow baseline data
- Analysis of 12 scenario combinations agreed with DEC
- Sensitivity analysis around key variables agreed with DEC
- Scenario comparison
SWM SCENARIOS

MSW
A1: Business-as-Usual
A2: Alternative Waste Treatment
A3: Dirty MRF with Energy from Waste
A4: Dirty MRF with Anaerobic Digestion
A5: Source Separation with Composting

C&I
B1: Business-as-Usual
B2: Alternative Waste Treatment
B3: Dirty MRF with Energy from Waste
B4: Dirty MRF with Anaerobic Digestion
B5: Source Separation with Composting

C&D
C1: Business-as-Usual
C2: Mixed Waste
C3: Source Separated Waste
C4: Mixed Waste with Energy from Waste
C5: Source Separated Waste with Energy from Waste
<table>
<thead>
<tr>
<th>Scenario</th>
<th>MSW</th>
<th>C&amp;I</th>
<th>C&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>A1: BAU</td>
<td>B1: BAU</td>
<td>C1: BAU</td>
</tr>
<tr>
<td>S2</td>
<td>A2: AWT</td>
<td>B1: BAU</td>
<td>C1: BAU</td>
</tr>
<tr>
<td>S3</td>
<td>A2: AWT</td>
<td>B1: BAU</td>
<td>C2: Mixed</td>
</tr>
<tr>
<td>S4</td>
<td>A2: AWT</td>
<td>B1: BAU</td>
<td>C3: SS</td>
</tr>
<tr>
<td>S5</td>
<td>A2: AWT</td>
<td>B2: AWT</td>
<td>C1: BAU</td>
</tr>
<tr>
<td>S6</td>
<td>A2: AWT</td>
<td>B2: AWT</td>
<td>C2: Mixed</td>
</tr>
<tr>
<td>S7</td>
<td>A2: AWT</td>
<td>B5: SS + Compost</td>
<td>C2: Mixed</td>
</tr>
<tr>
<td>S8</td>
<td>A3: EfW</td>
<td>B3: EfW</td>
<td>C2: Mixed</td>
</tr>
<tr>
<td>S8B</td>
<td>A3: EfW-B</td>
<td>B3: EfW-B</td>
<td>C2: Mixed</td>
</tr>
<tr>
<td>S9</td>
<td>A3: EfW</td>
<td>B3: EfW</td>
<td>C4: Mixed + EfW</td>
</tr>
<tr>
<td>S10</td>
<td>A3: EfW</td>
<td>B3: EfW</td>
<td>C5: SS + EfW</td>
</tr>
<tr>
<td>S11</td>
<td>A4: AD</td>
<td>B4: AD</td>
<td>C2: Mixed</td>
</tr>
<tr>
<td>S11B</td>
<td>A4: AD-B</td>
<td>B4: AD-B</td>
<td>C2: Mixed</td>
</tr>
<tr>
<td>S12</td>
<td>A5: SS + Compost</td>
<td>B5: SS + Compost</td>
<td>C5: SS</td>
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</tbody>
</table>
MODELLING SCENARIOS
MODELLING TOOL

DEMONSTRATION
RESULTS

MOST EFFECTIVE SCENARIOS

- Scenarios 8, 9 and 8B
  - New thermal EfW facilities to process residual MSW and C&I waste
  - New mixed C&D recyclers and processing
  - With / without processing of C&D waste through EfW facilities
  - With / without maintenance of existing source separation levels for MSW and C&I
RESULTS

New Facility Capacity Required (between 2012 to 2050)

- Total New Processing Capacity (tpa)
- Total New Putrescible Landfill Void (t)
- Total New Inert Landfill Void (t)
New Facility Capacity Required (between 2012 to 2050)

- Total New Processing Capacity (tpa)
- Total New Putrescible Landfill Void (t)
- Total New Inert Landfill Void (t)

Largest new processing capacity
**RESULTS**

**Diversion Performance - MSW Metro**

Waste Diversion from Landfill (%)

- **Scenarios**: S1, S2, S3, S4, S5, S6, S6B, S7, S8, S8B, S9, S10, S11, S11B, S12

- **2015 Target**: 50%
- **2020 Target**: 50%
- **2020**
- **2050**
RESULTS

Diversion Performance - MSW Metro

- Waste Diversion from Landfill (%)
- Scenarios: S1, S2, S3, S4, S5, S6, S6B, S7, S8, S8B, S9, S10, S11, S11B, S12

- Targets for 2015, 2020, and 2050
- Circles highlighting specific scenarios
RESULTS

Diversion Performance - MSW Peel

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>2015</th>
<th>2020</th>
<th>2050</th>
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<tbody>
<tr>
<td>S1</td>
<td></td>
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<td>S2</td>
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<td>S11</td>
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<td>S11B</td>
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<td>S12</td>
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</tbody>
</table>

Waste Diversion from Landfill (%)
**RESULTS**

Diversion Performance - MSW Peel

- **Scenarios:** S1, S2, S3, S4, S5, S6, S6B, S7, S8, S8B, S9, S10, S11, S11B, S12

- **Waste Diversion from Landfill (%):**
  - 10% to 70%
  - 2015, 2020, 2050 Targets

- **Legend:**
  - 2015: Red
  - 2020: Blue
  - 2050: Green
  - 2015 Target: Red dashed line
  - 2020 Target: Blue dashed line

Scenarios S1, S2, S3, S4, S5, S6, S6B, S7, S8, S8B, S9, S10, S11, S11B, S12 are shown with bars indicating the waste diversion performance over 2015, 2020, and 2050 years.
RESULTS

Diversion Performance - C&I

Waste Diversion from Landfill (%)

Scenarios

- S1
- S2
- S3
- S4
- S5
- S6
- S6B
- S7
- S8
- S8B
- S9
- S10
- S11
- S11B
- S12

- 2015
- 2020
- 2050

- 2015 Target
- 2020 Target
RESULTS

Diversion Performance - C&I

Waste Diversion from Landfill (%)

Scenarios

2015 2020 2050

Target

2015 Target

2020 Target

Scenarios:

- S1
- S2
- S3
- S4
- S5
- S6
- S6B
- S7
- S8
- S8B
- S9
- S10
- S11
- S11B
- S12
RESULTS

Diversion Performance - C&D

Waste Diversion from Landfill (%)

Scenarios

- S1
- S2
- S3
- S4
- S5
- S6
- S6B
- S7
- S8
- S8B
- S9
- S10
- S11
- S11B
- S12

2015
2020
2050

- 2015 Target
- 2020 Target
**RESULTS**

**Overall Diversion Performance**

<table>
<thead>
<tr>
<th>Scenarios Analysed</th>
<th>Waste Diversion from Landfill (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>51.6%  50.9%  53.1%  52.6%  53.4%  50.9%  51.9%  52.5%  51.2%  57.4%  33.3%  33.5%  37.7%  34.3%  34.0%</td>
</tr>
<tr>
<td>2020</td>
<td>79.1%  78.8%  78.3%  76.1%  75.6%  74.6%  74.4%  70.4%  66.5%  63.8%  54.6%  49.8%  44.4%  42.7%  32.9%</td>
</tr>
<tr>
<td>2050</td>
<td>70.7%  71.0%  71.5%  71.7%  71.3%  70.6%  70.5%  65.7%  63.6%  53.6%  47.3%  47.3%  38.5%  39.4%  26.8%</td>
</tr>
</tbody>
</table>
Sensitivity analyses were conducted around the following parameters:

- Population growth over the modelling period
- Baseline waste generation rate and growth in per capita waste generation
- Potential future increases in waste diversion targets
- Recovery efficiency rates of new AWT / Dirty MRF, EfW, AD and C&D facilities
- Material capture rates through source separation

Variations due to: facility technologies selected, scale of facilities, complexity of processing, extent of education programs and technological developments that influence changes in consumption patterns and packaging design.
- Used for report:
  - Waste throughput in 2010/11 then pegged to population increase
- Alternate scenarios:
  - Averaged waste generation per capita over the past 4 years
  - Additional 2% annual waste generation growth in response to economic growth
SUMMARY

- Business-as-usual will not achieve targets
- Source separation strategies unlikely to achieve targets
- AWTs could achieve 2020 targets for MSW and C&I
- EfW + Dirty MRFs could easily achieve 2020 targets
- Mixed processing for C&D could easily achieve 2020 / 2050 targets
RECOMMENDATIONS

- Ensure that current market-driven approach is not relied upon
- Strengthen policy frameworks – AWT, EfW, Dirty MRF, mixed C&D

Future actions:
- Analysis of available land sites
- Logistics modelling for suitable sites
- Re-apply the Hyder modelling tool for these sites
- Cost Benefit Analysis of preferred infrastructure combinations
- Address barriers to investment and planning approval