

**Melbourne Regional Landfill (MRL) Extension  
Works Approval Application (No. 1002191)  
Cleanaway response to section 22(1) Notice to Supply Further Information  
23 September 2016**

EPA request	Cleanaway response
<b>Understanding the Baseline Environment</b>	
The following requests are made:	
1. Further baseline information as set out below to confirm the long term depth of the undisturbed groundwater beneath the proposed landfill extension cells:	
<ul style="list-style-type: none"> <li>provide information to demonstrate that the groundwater contours shown in Figure 5-5 are undisturbed groundwater levels;</li> </ul>	<p>The groundwater levels over the area proposed for the new MRL cells are based on the readings taken in April – May 2014, because this represented the most complete data set at the time of writing the Hydrogeological Assessment (<b>Hydrogeological Assessment</b>) which accompanied the Works Approval Application (<b>WAA</b>). These data were the basis for the water table estimates provided in Table 5-2 of the Hydrogeological Assessment. To assess the validity of these estimates, AECOM have compared the data from four more monitoring events carried out since – on 4th Aug 2015, 20th Nov 2015, 22nd Mar 2016 and 16<sup>th</sup> May 2016. Comparison of the maximum recorded levels during these events in the bores located in the vicinity of the footprint of the new MRL cells (presented in the table below) indicates that the groundwater levels used for the contours in Figure 5-5 of the Hydrogeological Assessment are a reasonable representation of elevated groundwater conditions and the basis for Table 5-2 remains valid.</p>

EPA request	Cleanaway response																																							
	<table border="1" data-bbox="750 263 1086 758"> <thead> <tr> <th>Bore</th> <th>Variation (m)</th> <th>Readings</th> </tr> </thead> <tbody> <tr><td>GW01</td><td>0.00</td><td>8</td></tr> <tr><td>GW02</td><td>0.21</td><td>3</td></tr> <tr><td>GW03</td><td>0.01</td><td>3</td></tr> <tr><td>GW04</td><td>0.00</td><td>8</td></tr> <tr><td>GW04d</td><td>0.68</td><td>7</td></tr> <tr><td>GW05</td><td>0.22</td><td>3</td></tr> <tr><td>GW06</td><td>0.00</td><td>3</td></tr> <tr><td>GW07</td><td>0.00</td><td>2</td></tr> <tr><td>GW08</td><td>0.01</td><td>3</td></tr> <tr><td>GW10</td><td>0.18</td><td>2</td></tr> <tr><td>GW11</td><td>0.00</td><td>2</td></tr> <tr><td>MB03</td><td>0.08</td><td>60</td></tr> </tbody> </table> <p data-bbox="750 766 1825 837">Note that although the readings for GW04d indicated a rise of 0.68m over the additional 7 readings, the levels are still 7 – 8m below the levels in the shallow aquifer monitored by GW04, as shown in Figure A-7 below. The shallow aquifer levels in GW04 are not impacting the liner design level.</p> <p data-bbox="750 877 1960 1061">The groundwater levels are consistent with those portrayed in the regional water table map prepared by SKM for DSE in 2009. The shallow grade of the contours in Figure 5-5 of the Hydrogeological Assessment beneath the central portion of Riding Boundary Road is a result of increased recharge through the floor of the quarried areas of the site. This is consistent with the aquifer hydraulics and was confirmed by groundwater modelling where a recharge rate of 10% of monthly rainfall was applied to achieve calibration.</p>	Bore	Variation (m)	Readings	GW01	0.00	8	GW02	0.21	3	GW03	0.01	3	GW04	0.00	8	GW04d	0.68	7	GW05	0.22	3	GW06	0.00	3	GW07	0.00	2	GW08	0.01	3	GW10	0.18	2	GW11	0.00	2	MB03	0.08	60
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<ul style="list-style-type: none"> <li>provide a map for the area showing long term undisturbed groundwater level contours (in m, AHD); and</li> </ul>	<p data-bbox="750 1093 1982 1189">Figure 5-5 of the Hydrogeological Assessment shows the long term undisturbed groundwater levels in the vicinity of the proposed MRL. This map is consistent with the regional water table levels shown in Figure 3-2 of the Hydrogeological Assessment.</p> <p data-bbox="750 1220 1960 1308">Disturbance has been caused by excavation of the quarry, but since those conditions existed prior to the advent of landfilling, the contours are considered to be most representative of long term undisturbed conditions.</p> <p data-bbox="750 1340 1937 1404">It is noted, however, that the groundwater levels are not static and the hydrographs show they rise and fall in response to seasonal conditions. The most recent groundwater monitoring for the whole site is</p>																																							

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	<p>shown in Figure A-1 of the Hydrogeological Assessment and Figure A-2 shows the hydrographs for the bores in the vicinity of the proposed cells south of Riding Boundary Road, i.e. cells 1 to 7. This figure also shows the influence of seasonal conditions, particularly rainfall, on groundwater levels. The plots show a strong correlation between the Accumulative Monthly Residual Rainfall (AMRR) and the groundwater levels.</p>
<ul style="list-style-type: none"> <li>provide the anticipated base level of the leachate sumps (in m, AHD) for all the cells (Cells 1 to 16).</li> </ul>	<p>The Base Liner level of the landfill in both the North Portion and the South Portion is defined as shown on the Figures attached as Appendix B to the WAA.</p> <p>We draw your particular attention to Figure 6 which presents the floor of the Quarry that is nominally 10m lower than the existing surface. As discussed in Section 13.6.1 of the WAA, the base liner for the landfill cells will be on average approximately 2.5m higher than this quarry floor (i.e. 7.5m below existing ground level).</p> <p><b>Quarry Floor (average 10m below Existing Surface)</b>  As shown on Figure 6 of the WAA, the quarry floor will grade from approximately RL 50m AHD in the South of Cell 1 to approximately RL 70m AHD in the north west corner of Cell 6 within the South Portion. In the North Portion, the quarry floor will grade from approximately RL 65m AHD in the South of Cells 11 and 14 to approximately RL 92m AHD in the North of Cell 10. Further information on individual cells is provided in the following “Table 1 – Summary of Levels Cells 1 to 16”. Due to the size of the cells the floor elevations vary across the cell, with a range provided in Table 1.</p>

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<p><b>Table 1: Summary of Levels (Cells 1 to 16).</b></p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> </tr> <tr> <th>Cell Number</th> <th>Groundwater (Elevation m, AHD)</th> <th>Quarry Floor (RL m, AHD)</th> <th>Base of Leachate Sump (RL m, AHD)</th> <th>Vertical Separation Distance Groundwater to Base of Leachate Sump (m)</th> </tr> </thead> <tbody> <tr> <td colspan="5">South Portion</td> </tr> <tr> <td>Cell 1</td> <td>49 to 51</td> <td>50 to 52.5</td> <td>51 to 53</td> <td>≥2</td> </tr> <tr> <td>Cell 2</td> <td>50 to 52</td> <td>52 to 54</td> <td>52.5 to 54.5</td> <td>≥2</td> </tr> <tr> <td>Cell 3</td> <td>51 to 52</td> <td>54 to 60</td> <td>54.5 to 60.5</td> <td>≥3.5 to 8.5</td> </tr> <tr> <td>Cell 4</td> <td>49 to 52</td> <td>60 to 63</td> <td>60.5 to 63.5</td> <td>11.5</td> </tr> <tr> <td>Cell 5</td> <td>50 to 52</td> <td>60 to 66</td> <td>60.5 to 66.5</td> <td>10 to 14.5</td> </tr> <tr> <td>Cell 6</td> <td>52 to 54</td> <td>63 to 70</td> <td>63.5 to 70.5</td> <td>11.5 to 16.5</td> </tr> <tr> <td>Cell 7</td> <td>53 to 54</td> <td>65 to 68</td> <td>65.5 to 68.5</td> <td>12.5 to 14.5</td> </tr> <tr> <td colspan="5">North Portion</td> </tr> <tr> <td>Cell 8</td> <td>55 to 61</td> <td>69 to 75</td> <td>69.5 to 75.5</td> <td>14.5</td> </tr> <tr> <td>Cell 9</td> <td>55 to 63</td> <td>68.5 to 76</td> <td>69 to 76.5</td> <td>13 to 13.5</td> </tr> <tr> <td>Cell 10</td> <td>63 to 76</td> <td>76 to 92</td> <td>76.5 to 92.5</td> <td>13.5 to 16.5</td> </tr> <tr> <td>Cell 11</td> <td>55 to 60</td> <td>65 to 70</td> <td>65.5 to 70.5</td> <td>10.5</td> </tr> <tr> <td>Cell 12</td> <td>60 to 67</td> <td>70 to 85</td> <td>70.5 to 85.5</td> <td>10 to 18.5</td> </tr> <tr> <td>Cell 13</td> <td>67 to 74</td> <td>85 to 90</td> <td>85.5 to 90.5</td> <td>16.5 to 18.5</td> </tr> <tr> <td>Cell 14</td> <td>55 to 60</td> <td>65 to 73</td> <td>65.5 to 73.5</td> <td>10.5 to 13.5</td> </tr> <tr> <td>Cell 15</td> <td>60 to 66</td> <td>73 to 80</td> <td>73.5 to 80.5</td> <td>13.5 to 14.5</td> </tr> <tr> <td>Cell 16</td> <td>65 to 73</td> <td>80 to 90</td> <td>80.5 to 90.5</td> <td>15.5 to 17.5</td> </tr> </tbody> </table> <p>Notes:            A – Cell No. from Works Approval Application (WAA)            B - Groundwater data from AECOM Hydrogeological Report (Appendix D of WAA), in particular Table 5.2 and Figure 5.5.            C – Quarry Floor from Figure 6 – Quarry Floor Plan (Appendix B of WAA).            D – Base of Leachate Sump based on Figures 8, 11 and 27 (Appendix B of WAA).            E – Vertical Separation Distance from Groundwater (Column B) to Base of Leachate Sump (Column D).</p> <p><b>Base Liner (average 7.5m below Existing Surface)</b>            Hence, in raising the quarry floor by on average 2.5m vertical height to achieve the base liner level of the landfill, the base liner will grade from on average approximately RL 52.5m AHD in the South of Cell 1 to approximately RL 72.5m AHD in the north west corner of Cell 6 within the South Portion. In the North</p>					A	B	C	D	E	Cell Number	Groundwater (Elevation m, AHD)	Quarry Floor (RL m, AHD)	Base of Leachate Sump (RL m, AHD)	Vertical Separation Distance Groundwater to Base of Leachate Sump (m)	South Portion					Cell 1	49 to 51	50 to 52.5	51 to 53	≥2	Cell 2	50 to 52	52 to 54	52.5 to 54.5	≥2	Cell 3	51 to 52	54 to 60	54.5 to 60.5	≥3.5 to 8.5	Cell 4	49 to 52	60 to 63	60.5 to 63.5	11.5	Cell 5	50 to 52	60 to 66	60.5 to 66.5	10 to 14.5	Cell 6	52 to 54	63 to 70	63.5 to 70.5	11.5 to 16.5	Cell 7	53 to 54	65 to 68	65.5 to 68.5	12.5 to 14.5	North Portion					Cell 8	55 to 61	69 to 75	69.5 to 75.5	14.5	Cell 9	55 to 63	68.5 to 76	69 to 76.5	13 to 13.5	Cell 10	63 to 76	76 to 92	76.5 to 92.5	13.5 to 16.5	Cell 11	55 to 60	65 to 70	65.5 to 70.5	10.5	Cell 12	60 to 67	70 to 85	70.5 to 85.5	10 to 18.5	Cell 13	67 to 74	85 to 90	85.5 to 90.5	16.5 to 18.5	Cell 14	55 to 60	65 to 73	65.5 to 73.5	10.5 to 13.5	Cell 15	60 to 66	73 to 80	73.5 to 80.5	13.5 to 14.5	Cell 16	65 to 73	80 to 90	80.5 to 90.5	15.5 to 17.5
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	<p>Portion, the base liner will grade from approximately RL 67.5m AHD in the South of Cell 14 to approximately RL 94.5m AHD in the North of Cell 10.</p> <p><b>Base of Leachate Sump (9.5m below Existing Surface)</b>            The top of clay base liner is presented on Figures 8 and 11 of the WAA. Based on these figures, the top of clay base liner varies from the average elevation +/- 1m in vertical elevation in accordance with BPEM gradients. Further, we have assumed a 1m deep leachate sump, as shown in Figure 27 of the WAA. Hence, the lowest point of the base liner is in the base of the leachate sump, which is estimated to be 9.5m below the Existing Surface.</p> <p><b>General</b>            We consider the minimum 2m depth criteria from the lowest point of the base liner (in the leachate sump) to groundwater level is satisfied. We have relied on AECOM's groundwater levels, as stated in the Hydrogeological Assessment, in particular Figure 5.5 Groundwater contours and Figure 5.6 Estimated Groundwater Depth below Existing Ground Surface.</p> <p>Cleanaway commits to maintain a minimum 2m clearance from groundwater to the lowest point of the base liner in accordance with BPEM criteria.</p>
<p>2. Clarification of how the Boral quarrying activities and the proposed landfill activities will be co-ordinated to ensure the proposed sequence in Table 4 and Figure 21 – 24 of the Information to Support Works Approval Application document is followed? Details of any plans and contingencies in the event that quarrying does not occur as per the proposed sequence should be provided.</p>	<p>Cleanaway and Boral have entered into confidential commercial arrangements to enable Cleanaway to landfill the quarry voids as they are made available by Boral.</p> <p>Boral is obliged to release quarried parcels of land to Cleanaway over time. The timeframes for release allow for cell construction prior to the cell being required for filling. The landfill design is specifically premised on the timing and sequencing release of quarry void parcels to Cleanaway under the agreement.</p> <p>If Boral changes the manner in which it quarries from what it has committed to in the agreement with Cleanaway, there would be various, and significant, contractual and commercial consequences. If Cleanaway was not able to construct the cells in the sequence proposed in the WAA, Cleanaway would bear the risk of not being able to continue landfilling.</p> <p>If the EPA has specific concerns about arrangements between Boral and Cleanaway, we request that it articulate them and the bases on which it considers the concerns are relevant to its consideration of the WAA.</p>

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<p>3. Provision of the most recent six monthly groundwater monitoring data and associated interpretative reports.</p>	<p>Groundwater hydrographs have been updated with the most recent data and are plotted in Figures A-1 to A-7 of the Statement of Expert Evidence of David Ife of AECOM Australia. Each borehole constructed in the shallow basalt sequence shows a correlation with the AMRR, confirming the influence of rainfall as the dominant recharge process.</p>																																																																																																																																																																																																																																																																																																																
<p>4. Provide additional groundwater analytical data and interpretation to demonstrate that levels of contaminants in groundwater are background levels in accordance with SEPP (Groundwaters of Victoria), including off-site up gradient.</p>	<p>The TDS of the groundwater in the proximity of the MRL cells is shown by monitoring of the new groundwater bores GW01 to GW13 and MB03 and MB02A and the data for these bores, from November 2013, is shown in Figure A-8 of the Statement of Expert Evidence of David Ife of AECOM Australia and presented in the table below, as mg/L. The GW bores were drilled after April 2014, hence the reason for selecting this length of record. The table shows that the only bore that exhibited a consistently lower TDS concentration than Segment C (i.e. less than 3,500 mg/L TDS) was GW04d, a deeper piezometer installed in the lower basalt aquifer. The shallow bore at this same site indicated a higher salinity consistent with Segment C. It is the shallower “water table aquifer” that should dictate the beneficial use classification, since this is the aquifer that is susceptible to leachate impact.</p> <table border="1" data-bbox="734 724 1977 1235"> <thead> <tr> <th>Sampled_Date</th> <th>GW01</th> <th>GW02</th> <th>GW03</th> <th>GW04</th> <th>GW04d</th> <th>GW05</th> <th>GW06</th> <th>GW07</th> <th>GW08</th> <th>GW10</th> <th>GW11</th> <th>MB02a</th> <th>MB03</th> <th>GW12</th> <th>GW13</th> </tr> </thead> <tbody> <tr> <td>15/11/2013</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>8000</td> <td></td> <td></td> </tr> <tr> <td>6/02/2014</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>29/04/2014</td> <td></td> <td></td> <td></td> <td>5720</td> <td></td> <td></td> <td>15800</td> <td>22900</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>8/05/2014</td> <td>12800</td> <td>4170</td> <td>6040</td> <td></td> <td>3330</td> <td>7240</td> <td></td> <td></td> <td>24600</td> <td>7270</td> <td>7940</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>19/05/2014</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>20/05/2014</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>8400</td> <td>8100</td> <td></td> <td></td> </tr> <tr> <td>21/05/2014</td> <td>13000</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>27/08/2014</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>28/08/2014</td> <td>14000</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2/09/2014</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>21/11/2014</td> <td>14000</td> <td></td> <td></td> <td>5900</td> <td>3400</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>9500</td> <td></td> <td></td> </tr> <tr> <td>23/02/2015</td> <td>13000</td> <td></td> <td></td> <td>5300</td> <td>3200</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>18/05/2015</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>19/05/2015</td> <td>15000</td> <td></td> <td></td> <td>5700</td> <td>3200</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3/08/2015</td> <td>15000</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>18/11/2015</td> <td>15000</td> <td>3900</td> <td>5500</td> <td>6600</td> <td></td> <td>8400</td> <td>17000</td> <td>26000</td> <td>24000</td> <td>5000</td> <td>11000</td> <td></td> <td>9100</td> <td>16000</td> <td>28000</td> </tr> <tr> <td>22/03/2016</td> <td>15000</td> <td></td> <td></td> <td>7200</td> <td>3000</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>17/05/2016</td> <td></td> <td></td> <td></td> <td>6353</td> <td>3300</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Sampled_Date	GW01	GW02	GW03	GW04	GW04d	GW05	GW06	GW07	GW08	GW10	GW11	MB02a	MB03	GW12	GW13	15/11/2013													8000			6/02/2014																29/04/2014				5720			15800	22900								8/05/2014	12800	4170	6040		3330	7240			24600	7270	7940					19/05/2014																20/05/2014												8400	8100			21/05/2014	13000															27/08/2014																28/08/2014	14000															2/09/2014																21/11/2014	14000			5900	3400								9500			23/02/2015	13000			5300	3200											18/05/2015																19/05/2015	15000			5700	3200											3/08/2015	15000															18/11/2015	15000	3900	5500	6600		8400	17000	26000	24000	5000	11000		9100	16000	28000	22/03/2016	15000			7200	3000											17/05/2016				6353	3300										
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<p>5. Provide information regarding the depth of Skeleton Creek and distance from the site, to confirm the potential for groundwater interaction with</p>	<p>Skeleton Creek is a shallow depression that drains runoff from the surface of the basalt plain. It is an intermittent drainage depression that has not developed a significant erosion scar. The depth of the depression is less than 5m and it is not deeply incised. Groundwater levels range from 12m to more than 20m below surface across the site, indicating there is no surface water – groundwater connectivity on this site.</p>																																																																																																																																																																																																																																																																																																																

EPA request	Cleanaway response
surface waters.	
<b>Design Information</b>	
The following requests are made:	
<p>1. Geotechnical stability of side wall and the side wall liner of the landfill. The supplementary information document (s.13.7) states that "<i>The geotechnical stability of the subgrade and liner will be assessed during detailed design</i>". Details are requested of the measures that will be installed to ensure that the geotechnical stability of side walls and the side wall liner will be maintained.</p>	<p>Based on Golder's experience in landfill design, the proposed side wall of the rock face and the compacted side wall liner are considered to be suitable for this application and can be engineered in a BPEM compliant manner consistent with best practise techniques to provide a stable landfill both during the operational phase and the post closure and final capping phase.</p> <p>The side-wall liner is designed to be supported by either a perimeter bundwall comprising compacted clay and subgrade soils or by the quarry rock wall, in particular refer to the 'Typical Quarry Floor Detail' and the 'Typical Quarry Wall Detail' respectively, as shown on Figure 27 of the WAA.</p> <p>In the case where the side liner is supported by the perimeter bundwall we note the following:</p> <ul style="list-style-type: none"> <li>• The outside batter of the perimeter bundwall will grade at 3H:1V and comprise compacted engineered fill, a combination of clay liner and compacted subgrade, consistent with BPEM criteria.</li> <li>• The bundwall can be constructed in phases or as a whole to support operations.</li> <li>• The internal batter slope is shown indicatively as a 1 horizontal to 1 vertical slope (1H: 1V) on Figure 27 of the WAA. The inside batter slope will be designed to suit specific shear strength criteria for the clay soils used and also is to be based on geosynthetics interface strength and slope stability factors of safety. A detailed design report will be prepared consistent with EPA licencing criteria with each new landfill cell.</li> <li>• Gradients of the perimeter bundwalls will be assessed based on proposed clay and subgrade soils available and engineering technical specifications, drawings and CQA Plans will be prepared and subject to a rigorous review by an Environmental Auditor including with review and approval by EPA in accordance with BPEM criteria and EPA licencing requirements.</li> </ul> <p>In the case where the side liner is supported by the quarry rock face we note the following:</p> <ul style="list-style-type: none"> <li>• A side liner slope will be selected to match the rock face conditions encountered. The side liner is anticipated to be supported by a combination of compacted soil fill and the basalt rock face.</li> <li>• The rock face will be inspected during the detailed design phase to assess conditions for the side liner application.</li> </ul>

EPA request	Cleanaway response
	<ul style="list-style-type: none"> <li>• It is expected that localised sections of loose rock may be encountered on the quarry rock face associated with the quarrying activities.</li> <li>• Methods to secure any loose rock encountered include removal of loose rock, rock bolting and the application of mesh to the rock face to prevent movement during the construction phase of the side liner. These methods have been used extensively in quarry applications.</li> <li>• The side liner will be subject to a rigorous detailed design that will be reviewed by an Environmental Auditor and will be subject to review and approval by EPA.</li> </ul> <p>In both cases the side-wall liner will be constructed using a compacted engineered fill. It is envisaged that engineered fill will be compacted wider than the finished levels and then trimmed to suit to ensure a tight well compacted side-wall liner. We note that compacted clay liner and all engineered compacted fill will be constructed in layers (refer Section 13.6.1 and 13.6.2 of the WAA), and tested in accordance with BPEM requirements (Section 14.1 of the WAA). Level 1 inspections and testing requirements will be implemented as part of the CQA plan (refer Section 12.6 of the WAA). Construction of the sidewalls may be completed in stages as waste filling progresses or a full height may be constructed depending on operational requirements.</p> <p>With respect to the rock face we consider the rock mass can easily support the lateral loads imposed by the landfill.</p> <p>The MRL extension is consistent with elements of the side wall liner that have been constructed on the Existing MRL. We note that parts of the Existing MRL side liner has been constructed to a similar 1H: 1V slope with designs that have been verified and approved by EPA.</p> <p>A detailed design will be undertaken with the proposed construction materials to ensure the design intent and BPEM criteria are satisfied. The designs must be verified by an Environmental Auditor and approved by EPA prior to construction as part of the EPA BPEM procedures.</p>
<p>2. Identification and consideration in a cost benefit analysis, including an assessment of additional environmental benefits, of further design and operational measures to reduce potential off-site landfill gas migration.</p>	<p><b>Proposed Landfill Gas Measures</b></p> <p>Items proposed for the Extension to limit and minimise the potential for lateral gas migration include but are not limited to the following:</p> <ol style="list-style-type: none"> <li>1. modern landfill operations including Audit of operations by an Environmental Auditor and annual reporting of monitoring results;</li> <li>2. BPEM compliant three layer composite base and side liner incorporating clay, GCL and geomembrane liner;</li> <li>3. modern active gas extraction within the waste, both horizontal during filling and vertical once</li> </ol>



EPA request	Cleanaway response
	<p>4. capped, to maximise landfill gas collection; the installation and monitoring of perimeter gas wells in the landscaped separation between the landfill and the site boundary; and</p> <p>5. additionally, there is a continuous leachate gravel layer on the inside of the landfill cell between the waste and the composite base and side liner. You can see this ‘leachate aggregate’ layer as gravel hatching on the Typical Side Liner Detail in the top right hand side of Figure 27 – Typical Detail Sheet 1 of the WAA. This layer is primarily for leachate collection (leachate flows down to the base liner and is collected) but it also allows gas to flow upwards in the gravel layer and provides a further means to collect landfill gas from within the landfill and to prevent lateral migration of landfill gas.</p> <p>The objective of these measures is to prevent uncontrolled lateral migration of landfill gas. These measures are best practise for modern landfills and are currently being phased in for municipal landfills in Victoria. The approach to landfill gas migration prevention for the Extension is current best practice and is fully compliant with the BPEM. Cleanaway does not consider additional measures are required.</p> <p>With respect to the cost and environmental benefits of the proposed landfill gas measures we consider all of the above items are part of the extensive BPEM compliant aspects that are proposed to maximise the efficiency of landfill gas collection at the Extension. The environmental benefits of the proposed system are to maximise landfill gas collection, to maximise electricity production, to minimise greenhouse gas emissions to atmosphere through efficient collection of landfill gas, and to prevent uncontrolled lateral migration of landfill gas, as described in the WAA. The proposed measures provide value for spend on a comparative basis.</p> <p>Cleanaway considers the above measures are best practice and does not believe other measures will be required. Other design measures could be considered if the above are proven inadequate although this would presumably result in the similar requirements across all landfills in Victoria. For example installation of a landfill gas interception system between the rock face and the clay side liner – as an example, the use of geosynthetic gas strip drains between the quarry rock face and the clay side liner. This technique has recently been approved by EPA for a landfill constructed in a former rock quarry where the landfill cells were in close proximity to residences.</p> <p>In the unlikely event of extensive offsite landfill gas migration, it will be detected by monitoring of perimeter gas wells and reported utilising the increased level of reporting and audit of operations expected for this modern BPEM compliant landfill. If migration is detected there are various ways to further mitigate the potential for offsite gas migration, beyond the items proposed and discussed above could include the following:</p>

EPA request	Cleanaway response
	<p>6. Installation of additional landfill gas extraction wells within the landfill cell to further extract landfill gas and to eliminate landfill gas emissions at the source (if this is possible without impacting the influence of the existing wells, and can be shown to improve extraction).</p> <p>7. Intercepting gas within the landscape separation distance between the landfill and the property boundary using methods such as subsurface cut-off walls, or a series of closely spaced extraction wells and similar techniques. These measures can target specific pathways.</p> <p>With respect to a cost benefit analysis we consider:</p> <p>a) The largest environmental benefit is provided by the measures proposed for the Extension for landfill gas collection and treatment, as described in the WAA and discussed in items 1 to 5 above. These measures provide the best value for spend on a comparative basis.</p> <p>b) The next most cost effective is item 6 as it could contain the landfill gas at or near the source and prevent the pathway.</p> <p>c) Item 7 attracts a higher cost when compared to all other measures but is considered a viable option as a mitigation method if there is evidence of landfill gas migration occurring.</p>
<b>Defining the potential impacts to the Receiving Environment</b>	
The following requests are made:	
<p>1. Additional design and management measures. If the information provided in response to (1) Understanding the Baseline Environment above indicates that a 2m separation between waste and the long term undisturbed depth to groundwater is not achieved (for any area within the landfill), please provide additional design and management practices that would be adopted to show compliance of clause 16(2) of the WMP. Note that</p>	<p>We consider the minimum 2m depth criteria from the lowest point of the base liner (in the leachate sump) to groundwater level is satisfied. Refer to Table 1 – Summary of Levels above and EPA request 1, “provide the anticipated base level of the leachate sumps (in m, AHD) for all the cells (Cells 1 to 16)” above.</p>

EPA request	Cleanaway response
those measures must be acceptable to the Authority.	
<p>2. Specific details of the controls and what actions will be taken to control mosquitos, flies, vermin and birds visiting the site. Whilst statements are given that for example mosquitos will be monitored, no information is then given on what actions would be taken to reduce any issues detected. As a minimum the principles of a Vermin Management Plan should be provided.</p>	<p>Please see attached extract from Cleanaway’s Landfill Standards Operations Manual dealing with vermin and birds. This manual applies to all Cleanaway landfill sites.</p> <p>Please also refer to the proposed planning permit condition which requires Cleanaway to prepare an environmental management plan dealing with vermin to the satisfaction of the Responsible Authority.</p>
<p>3. Cross sections of the rehabilitation plan showing final topographical profile of the site after settling and an indicative staging plan for site rehabilitation with approximate timeframes.</p>	<p>Please refer to Appendix M of the WAA, particularly section 8 and Annex C. See also Figures 25 and 26 of the WAA.</p> <p>Rehabilitation will occur progressively following filling and capping of cells (see section 5.7 and Figures 21-24 of the WAA). The timing of rehabilitation will therefore be determined by the rate of filling. In relation to the approximate timing of cell construction and filling, see Table 4: Landfill Sequence Plan in the WAA.</p>
<p>4. Details of any future community liaison group to be initiated to ensure there is a community engagement mechanism to facilitate any future two-way dialogue between Landfill Operations and the local community.</p>	<p>The following activities have occurred since the finalisation of the WAA for lodgement and indicate the on-going commitment by Cleanaway to ensure community engagement:</p> <p>As anticipated in part 5.1.2 of the WAA, letter drops (over 12,000) and advertising occurred to advise surrounding residents of the proposed application and advice of pre-lodgement community information sessions.</p> <p><u>Community information sessions</u> regarding the proposed extension applications were held at various times during the day and evening between 15-19 February at the MRL Community Centre:</p> <ul style="list-style-type: none"> <li>• Approx. 125 residents attended the sessions, as well as Councillors, EPA staff and other interested parties.</li> <li>• Video was presented to all attendees explaining MRL’s relationship with the quarry and the</li> </ul>

EPA request	Cleanaway response
	<p>details of the planning and works approval applications.</p> <ul style="list-style-type: none"> <li>• Diagrams were provided explaining the footprint and future rehabilitation.</li> <li>• Q&amp;As were handed out to provide an overview of the process and details of the application (and made available on Cleanaway's website).</li> <li>• Site tours of the existing operations were provided.</li> </ul> <p>19-20 July 2016: Cleanaway attended <u>EPA/ DELWP public information sessions</u> hosted at Westwaters Hotel in Caroline Springs. Approximately 120 residents and interested parties were briefed on Cleanaway's application and were provided with Q&amp;As summarising the application and call in process.</p> <p><u>MRL Community Consultation Group</u> meetings were held prior to completion of the WAA and afterwards on the following dates:</p> <ul style="list-style-type: none"> <li>• 18 February 2016: the 4th MRLCCG meeting (in this case a special meeting) was convened prior to Cleanaway lodging its planning application to enable the community members within the group to review the details of the application and to ask any questions.</li> <li>• 23 March 2016: 5th MRLCCG meeting held at MRL</li> <li>• 26 May 2016: 6th MRLCCG meeting held at MRL– facilitator resigned citing concerns with behaviours of some members within the group.</li> </ul> <p>As a result of the resignation of the independent facilitator Cleanaway suspended the MRLCCG but has implemented the following process to ensure an MRL community group is restarted and provides a productive forum for community engagement: an independent review (including interviews with participants in the MRLCCG to date) is underway which will consider improvements for the reformed community group; following receipt and consideration of the findings a new facilitator will be engaged, advertisements placed to call for interested parties to become members and membership confirmed.</p> <p>Subject to the review findings, meetings can then resume their quarterly structure. During this period of suspension Cleanaway has continued its other community initiatives as described in the WAA. This includes a dedicated community liaison staff member, a direct email address and the community hotline.</p> <p>Also, the Cleanaway CEO Vik Bansal and senior managers have met with community members and the CEO of the EPA Nial Finegan on 26 July 2016 and 9 August 2016 to answer questions from the community. Other direct communications with community members have also occurred and will continue until the consultation group is back up and running.</p>