

# METROPOLITAN COAL LONGWALL 304

## EXTRACTION PLAN



### ATTACHMENT 3

## PROGRAM TO COLLECT BASELINE DATA FOR FUTURE EXTRACTION PLANS

**Peabody**



**METROPOLITAN COAL**

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**PROGRAM TO COLLECT BASELINE DATA FOR FUTURE EXTRACTION PLANS**

Longwall 304 (the subject of this Extraction Plan) is the fourth longwall within the 300 longwall series. Longwalls 305 to 317 are located to the west of Longwall 304. The program proposed to be undertaken to collect baseline data for the next Extraction Plan (i.e. Longwalls 305 on) is summarised in Table A3-1 and described in detail in Appendices A to F of the Longwall 304 Extraction Plan.

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**Table A3-1**  
**Program to Collect Baseline Data for the Next Extraction Plan (i.e. Longwalls 305 on)**

Aspect of Next Extraction Plan	Proposed Data Collection
Surface Water	<p>Metropolitan Coal will collect surface water baseline data for the next Extraction Plan (i.e. Longwalls 305 on) in accordance with Section 11.1 of the Water Management Plan (WMP) (Appendix A of the Longwall 304 Extraction Plan). In summary:</p> <ul style="list-style-type: none"> <li>• Meteorological data for the next Extraction Plan is available from the existing pluviometers, pan evaporimeter and climate stations (described in Section 8.1 of the WMP).</li> <li>• Streams relevant to the next Extraction Plan include the Waratah Rivulet, Eastern Tributary and the first and second order streams that flow into the Woronora Reservoir (locations shown on Figure 8 in the Extraction Plan Main Text). <ul style="list-style-type: none"> <li>– The baseline visual and photographic surveys of the Waratah Rivulet and Eastern Tributary conducted prior to the commencement of Longwall 20 are provided in Appendices 1 and 2 of the WMP.</li> <li>– Prior to the commencement of Longwall 301, Gilbert &amp; Associates (now Hydro Engineering &amp; Consulting) conducted a visual inspection and photographic survey of streams in the vicinity of Longwalls 301-303 in July 2015.</li> <li>– Hydro Engineering &amp; Consulting (2019) conducted a visual inspection and photographic survey of streams in the vicinity of Longwalls 304-310 (not previously inspected for Longwalls 301-303) in April 2018 (provided in Appendix 5 of the WMP).</li> </ul> </li> <li>• Prior to the commencement of Longwall 305, Metropolitan Coal will investigate the potential to install (refer to Appendix 5 of the WMP [Hydro Engineering &amp; Consulting, 2019] and Figure 18 in the Extraction Plan Main Text for general locations): <ul style="list-style-type: none"> <li>– a pool water level meter in the large pool mapped on the lower reaches of the stream that overlies Longwalls 309 to 311, downstream of Swamp 92;</li> <li>– a pool water level meter in two of the large pools mapped on the lower reaches of the stream that overlies Longwall 311, downstream of Swamp 77;</li> <li>– a small flow measuring flume immediately downstream of Swamp 92 (while no pools have been mapped on the stream immediately downstream of Swamp 92, there may be potential to direct flow from the upland swamp toward a flume);</li> <li>– a small flow measuring flume immediately downstream of Swamp 77 (at the first small pool mapped on the stream by Hydro Engineering &amp; Consulting [2019]); and</li> <li>– a small flow measuring flume immediately downstream of Swamp 76 (noting that the first order stream which overlies Longwalls 313 to 315 has not been subject to detailed stream mapping to date).</li> </ul> </li> <li>• Consideration of the environmental performance and management of the WMP will also inform the appropriate type and frequency of monitoring of water resources and watercourses relevant to the next Extraction Plan.</li> <li>• Surface water quality data for the Woronora Reservoir (site DW01, measurements taken from 0 to 9 m below the water surface level), Nepean Reservoir and Cataract Reservoir will continue to be sourced from WaterNSW.</li> </ul>

**Table A3-1 (Continued)**  
**Program to Collect Baseline Data for the Next Extraction Plan (i.e. Longwalls 305 on)**

Aspect of Next Extraction Plan	Proposed Data Collection
Groundwater	<p>Metropolitan Coal will collect groundwater baseline data for the next Extraction Plan (i.e. Longwalls 305 on) in accordance with Section 11.1 of the Biodiversity Management Plan (BMP) (Appendix C of the Longwall 304 Extraction Plan) and Section 11.2 of the WMP (Appendix A of the Longwall 304 Extraction Plan). In summary:</p> <ul style="list-style-type: none"> <li>• Paired swamp piezometers were installed in Swamp 71a in June 2016 (location shown on Figure 18 in the Extraction Plan Main Text). Prior to the commencement of Longwall 305 Metropolitan Coal will install paired piezometers in Swamp 72. Prior to the commencement of Longwall 306, Metropolitan Coal will assess the logistics and access to Swamps 62, 81, 82 and 89 for the installation of swamp piezometers.</li> <li>• Metropolitan Coal will install soil moisture probes at various depth intervals to monitor the vertical profile of soil moisture in the swamp substrate. Soil moisture probes (linked to a datalogger) will be installed in a selection of Swamps 62, 72, 81, 82 and/or 89 adjacent to paired piezometers. Soil moisture probes will also be installed in control Swamps 101, 137a and 137b. To inform the water holding capacity of the swamps installed with soil moisture probes, a log of the soil profile will be taken at the location of the piezometers/soil moisture probes, and the depth of the swamp substrate across the swamp will be sampled and recorded.</li> <li>• While not subject to the next Extraction Plan, a program to collect baseline data will be specifically designed for the three larger swamps (Swamps 76, 77 and 92) located further to the west using groundwater piezometers and swamp soil moisture probes prior to the commencement of Longwall 306.</li> <li>• Metropolitan Coal will install a post-mining multi-level bore over Longwall 305. The bore will extend to the fracture zone and will assess permeability below the Bald Hill Claystone.</li> <li>• Metropolitan Coal does not anticipate that any additional groundwater monitoring sites will be required for the next Extraction Plan; however, consideration of the environmental performance and management of this WMP will inform the appropriate type and frequency of groundwater monitoring relevant to the next Extraction Plan, and additional groundwater bores may be installed on the basis of the monitoring and modelling results.</li> </ul>
Cliffs and Overhangs, Steep Slopes and Land in General	<p>Metropolitan Coal will collect baseline data in relation to cliffs and overhangs, steep slopes and land in general for the next Extraction Plan (i.e. Longwalls 305 on) in accordance with Section 10 of the Land Management Plan (LMP) (Appendix B of the Longwall 304 Extraction Plan). In summary:</p> <ul style="list-style-type: none"> <li>• Cliffs COH11, COH12 and COH13 (locations shown on Figure 8 in the Extraction Plan Main Text) have been identified by Mine Subsidence Engineering Consultants (2008) adjacent to the Woronora Reservoir over Longwalls 307 and 308. Baseline data has been obtained for Cliffs COH11, COH12 and COH13 (provided in Appendix 1 of the LMP), including: <ul style="list-style-type: none"> <li>- photographic records of each cliff and overhang;</li> <li>- sketches of overhangs; and</li> <li>- mapping of the approximate location of the cliff/overhang face and the rear extent of the overhang/undercut.</li> </ul> </li> </ul>

**Table A3-1 (Continued)**  
**Program to Collect Baseline Data for the Next Extraction Plan (i.e. Longwalls 305 on)**

Aspect of Next Extraction Plan	Proposed Data Collection
Cliffs and Overhangs, Steep Slopes and Land in General (Continued)	<ul style="list-style-type: none"> <li>• Baseline data collection for the next Extraction Plan will also include a description of steep slopes and land in general and a description of the recorded subsidence impacts (i.e. where mining of Longwalls 303 or 304 has resulted in subsidence impacts overlying the next Extraction Plan longwall layout [if any] at the time of Extraction Plan preparation).</li> <li>• Consideration of the environmental performance and management measures of the LMP will also inform the appropriate type and frequency of monitoring for land features relevant to the next Extraction Plan.</li> </ul>
Upland Swamps	<p>Metropolitan Coal will collect baseline data in relation to upland swamps for the next Extraction Plan (i.e. Longwalls 305 on) in accordance with Section 11.1 of the BMP (Appendix C of the Longwall 304 Extraction Plan). In summary:</p> <ul style="list-style-type: none"> <li>• The upland swamps situated to the north or north-west of Longwall 304 were inspected to confirm the extent of the upland swamps and the vegetation communities present in July/August 2015 (Swamps 59, 69, 70, 71a and 71b) or July/August 2016 (Swamps 60, 61, 62, 63, 64, 65, 66, 67, 68a, 68b, 72, 73, 133 and 134). Upland swamps situated to the west of the Woronora Reservoir overlying or proximal to Longwall 307-310 were inspected in July 2017 (Swamps 81, 82, 83, 84, 86, 88 and 89). [Swamp locations shown on Figure 18 in the Extraction Plan Main Text.]</li> <li>• To date, baseline transect and quadrat vegetation surveys have been conducted since spring 2015 in Swamp 71a consistent with the methods used for Longwalls 20-22, 23-27, 301-303 and 304 upland swamp vegetation monitoring. Swamp 71a was however subject to WaterNSW hazard reduction burns in October 2016 and August 2017. Metropolitan Coal proposes to continue vegetation monitoring in this swamp, however notes no comparisons can be made with the established control swamps, nor can any statistical analyses be conducted. Paired piezometers were installed in Swamp 71a in June 2016. <ul style="list-style-type: none"> <li>- It is noted that Swamp 48 which will be monitored as a component of this BMP (Section 8.1 of Appendix C) overlies Longwall 305.</li> <li>- In addition to Swamp 71a, Swamps 63, 64, 65/66, 67, 68a, 68b, 69, 70 and 71b overlying or proximal to Longwalls 305-307 were also subject to hazard reduction burns in October 2016 and August 2017. It is recognised that while these swamps were all re-mapped as containing Banksia Thicket vegetation, the hazard reduction burns are likely to have affected the vegetation communities that are now present.</li> <li>- The <i>NSW Native Vegetation Interim Type Standard</i> (Sivertsen 2009) requires patches of vegetation to be mapped if the dimensions of the representative polygon on a map sheet are 2 mm x 2 mm or greater (i.e. at a map scale of 1:25,000, patches of vegetation equal to or greater than 0.25 ha). However, the revised swamp vegetation mapping boundaries (including those swamps less than 0.25 ha in area) are shown on Figure 18 in the Extraction Plan Main Text to document the changes to the previous Bangalay Botanical Surveys (2008) vegetation mapping. It is noted that many of the revised swamp boundaries comprising vegetation characteristic of the upland swamp vegetation communities are very small in size and doubtfully represent an upland swamp. For example, Swamp 65/66 (0.112 ha in area), Swamp 67 (0.030 ha in area), Swamp 68a (0.043 ha in area), Swamp 68b (0.034 ha in area). In addition to those listed above, Swamps 61, 63, 73, 83, 86 and 88 are all less than 0.25 ha in area.</li> </ul> </li> </ul>

**Table A3-1 (Continued)**  
**Program to Collect Baseline Data for the Next Extraction Plan (i.e. Longwalls 305 on)**

Aspect of Next Extraction Plan	Proposed Data Collection
Upland Swamps (Continued)	<ul style="list-style-type: none"> <li>- Swamp 84 and Swamp 86 are considered to be marginal upland swamps in that they contain non-swamp vegetation more consistent with sandstone woodland (Appendix 2 of the BMP).</li> <li>• Paired swamp piezometers were installed in Swamp 71a in June 2016 (location shown on Figure 18 in the Extraction Plan Main Text). Metropolitan Coal will install paired piezometers and soil moisture probes as described for 'Groundwater' above. To inform the water holding capacity of the swamps installed with soil moisture probes, a log of the soil profile will be taken at the location of the piezometers/soil moisture probes, and the depth of the swamp substrate across the swamp will be sampled and recorded.</li> <li>• Metropolitan Coal will investigate the potential to install a small flow measuring flume immediately downstream of Swamp 92, Swamp 77 and Swamp 76 prior to the commencement of Longwall 305 as described for 'Surface Water' above.</li> </ul>
Riparian Vegetation	<p>As described in Section 11.2 of the BMP (Appendix C of the Longwall 304 Extraction Plan), no significant streams (i.e. streams which are third order or higher) are located over or proximal to Longwalls 305-310 with the exception of the Eastern Tributary and Waratah Rivulet.</p> <p>Riparian vegetation monitoring data is available for the Eastern Tributary and Waratah Rivulet (as described in Section 7 of the BMP).</p>
Aquatic Biota and their Habitats	<p>As described in Section 11.4 of the BMP, streams relevant to the next Extraction Plan include the Waratah Rivulet, Eastern Tributary and the first and second order streams that flow into the Woronora Reservoir.</p> <p>The results of visual and photographic surveys of the Waratah Rivulet and Eastern Tributary prior to the commencement of Longwall 20, and during the mining of Longwalls 20-27 and Longwalls 301-303 provide information on aquatic habitats. Monitoring of macroinvertebrates and macrophytes has been conducted at sites on the Eastern Tributary and Waratah Rivulet (as described in Section 4.3.3 of the BMP).</p> <p>Hydro Engineering &amp; Consulting (2019) conducted a visual inspection and photographic survey of the first and second order streams in the vicinity of Longwalls 304-310 (not previously inspected for Longwalls 301-303) in April 2018. The visual inspection and photographic survey report provides information on the aquatic habitats available (Appendix 4 of the BMP).</p> <p>As described for 'Surface Water' above, prior to the commencement of Longwall 305, Metropolitan Coal will investigate the potential to install:</p> <ul style="list-style-type: none"> <li>• a pool water level meter in the large pool mapped on the lower reaches of the stream that overlies Longwalls 309 to 311, downstream of Swamp 92; and</li> <li>• a pool water level meter in two of the large pools mapped on the lower reaches of the stream that overlies Longwall 311, downstream of Swamp 77;</li> </ul> <p>to monitor predicted impacts on pools/aquatic habitat in advance of future mining.</p>

**Table A3-1 (Continued)**  
**Program to Collect Baseline Data for the Next Extraction Plan (i.e. Longwalls 305 on)**

Aspect of Next Extraction Plan	Proposed Data Collection
Terrestrial Fauna and their Habitats	<p>Metropolitan Coal will collect baseline data for terrestrial fauna and their habitats for the next Extraction Plan (i.e. Longwalls 305 on) in accordance with Section 11.5 of the BMP (Appendix C of the Longwall 304 Extraction Plan). In summary:</p> <ul style="list-style-type: none"> <li>• Baseline data has been, or will be, collected for terrestrial fauna habitats (i.e. upland swamps, riparian vegetation, slopes and ridgetops, and aquatic habitats), as described above.</li> <li>• Two amphibian monitoring sites (sites 29 and 30) have been established proximal to Longwalls 305 and 306 and monitoring will commence in spring 2018/summer 2019. No additional control sites are required to ensure a continually robust experimental design. A total of 30 amphibian survey sites have been established to date, including 19 test sites overlying or adjacent to longwalls to monitor amphibian species, with a focus on the habitats of the Giant Burrowing Frog and Red-crowned Toadlet.</li> <li>• Access to mining areas become logistically difficult to the west of the Woronora Reservoir. Prior to the commencement of Longwall 305, field inspections will be conducted to identify potential suitable monitoring sites overlying or proximal to Longwalls 308-310.</li> </ul>
Aboriginal Heritage	<p>Metropolitan Coal will collect baseline data for Aboriginal heritage sites for the next Extraction Plan (i.e. Longwalls 305 on) in accordance with Section 12 of the Heritage Management Plan (HMP) (Appendix D of the Longwall 304 Extraction Plan). In summary:</p> <ul style="list-style-type: none"> <li>• Detailed baseline recording has been completed for 22 sites located within 600 m of Longwalls 304-306 not previously subject to baseline recording, namely sites FRC 94, FRC 95, FRC 97, FRC 101, FRC 180, FRC 184, FRC 185, FRC 186, FRC 187, FRC 191, FRC 198, FRC 254, FRC 311, FRC 312, FRC 313, FRC 316, FRC 340, FRC 344, FRC 345, NEW 1, NEW 10 and NEW 22 (locations shown on Figure 10 in the Extraction Plan Main Text). The baseline record for these sites is provided in Appendix 1 of the HMP.</li> <li>• Prior to the commencement of secondary extraction associated with the next Extraction Plan baseline data will be obtained for Aboriginal heritage sites located within the relevant 35° angle of draw and/or predicted 20 mm subsidence contour of the Extraction Plan longwall layout. The collection of baseline data will include photographic records, detailed scaled plans including physical characteristics and features, and detailed information regarding the dimensions, composition and features.</li> <li>• In addition to the baseline data collection, consideration of the environmental performance and management measures in accordance with the review(s) conducted as part of the HMP will inform the appropriate type and frequency of monitoring of Aboriginal heritage sites relevant to the next Extraction Plan.</li> </ul>

**Table A3-1 (Continued)**  
**Program to Collect Baseline Data for the Next Extraction Plan (i.e. Longwalls 305 on)**

Aspect of Next Extraction Plan	Proposed Data Collection
Built Features	<ul style="list-style-type: none"> <li>• Prior to the commencement of secondary extraction associated with the next Extraction Plan, baseline data (e.g. pre-mining inspections) will be obtained for built features located within the relevant 35° angle of draw and/or predicted 20 mm subsidence contour of the Extraction Plan longwall layout.</li> <li>• Metropolitan Coal will also collect baseline data relevant to built features for the next Extraction Plan in accordance with each component plan of the Built Features Management Plan (BFMP) (Appendix E of the Longwall 304 Extraction Plan). In general, the baseline data that has been collected for Longwalls 301-304 will also be relevant to Longwalls 305 on as longwall mining progressively moves further away from many of the built features.</li> <li>• In addition to baseline data collection, consideration of the environmental performance and management measures in accordance with the review(s) conducted as part of the BFMP will inform the appropriate type and frequency of monitoring of the assets relevant to the next Extraction Plan.</li> </ul>