APPENDIX 5: LANDFORM ASSESSMENT METHODOLOGY

Regional 10 m contours for an area approximately 30 km surrounding the Mine Site Development Envelope were taken into consideration when defining the LAU. It was clear from a review of this regional elevation data that the key landforms in relation to the Mine Site Development Envelope were located in a north-west to south-east trending band parallel to the Mine Site Development Envelope. This area was therefore selected as the focus for defining the LAU.

The local assessment unit (LAU), and the landforms within this were derived through the use of contour line data (5 m intervals). Contours were obtained for the area surrounding the Mine Site Development Envelope and a digital elevation model (DEM) was derived from the contour data as a raster elevation surface using ArcMap 10.2. A slope surface was then derived from the DEM and all raster cells with a slope ≥5 degrees were extracted, converted to a vector polygon format, and used to define landforms in the LAU. Without specific guidance provided in the ESD, this approach was used as it is consistent with how the OEPA has defined landforms within a LAU for other projects where the Landform factor has been assessed.

The resulting regional landform shape file was simplified by zooming to the extent of the shape file, converting to a geo-referenced raster, and then converting back into a vector shape file. This approach was equivalent to buffering areas by 50 to 100m, smoothing the geometry and quickly merging smaller, more intricate groups of polygons into larger areas that better represented formations adequate for visualisation in the LAU.

This buffering was required because a slope raster was used as a base for the analytical process. When initially identifying areas where the slope was greater than five degrees, a discrete (or a directly definable) boundary was created. On the ground, the areas of greater than five degree slope actually form more of a continuous (or flowing/transitioning) boundary where values progressively change over distance as opposed to definitive cut-off line.

The process of simplifying/buffering was therefore carried out for three main purposes:

- As the real world boundary is continuous, the buffering process expands of the discrete boundary to encompass transitioning variations in slope across the terrain.
- As the analysis was based on defining discrete boundaries (greater than five degrees), polygons can be fragmented by holes or gaps. The smoothing and buffering removes these holes/gaps to create a more defined/single landform area.
- As the analysis used a raster as a base, the boundaries created follow a jagged pattern of the pixel geometry. The smoothing/buffering process removes jagged features and creates a more realistic and smoother boundary line.