MINERAL RESOURCES

J5 and Bungalbin East Iron Ore Proposal
Response to Submissions – Attachment 8
Response to WA Family Bushwalking Club

TABLE 1: COMMENTS FROM THE OFFICE OF THE EPA

Issue No.	Submitter	Submission and/or issue.
285	WAFBC	Please see Issue number 165. The submission at Attachment 3 relates to landform and amenity factors. Please provide a full and reasoned response to the presentation at Attachment 3.

TABLE 2: SUMMARY OF PUBLIC SUBMISSIONS

Issue No.	Submitter	Submission and/or issue.
165	WAFBC	The submitter has provided a detailed submission in the form of a slideshow. This full submission is included at Attachment 3. The submitter contends that the proponent's assessments are misleading and do not provide a fair assessment of the landform and visual impacts. In particular: • misleading landform comparisons with other ranges; • misleading and irrelevant statistical assessments of the impacted areas; • misleading photographic records of landform and visual impact; and • non-existent consideration of aesthetic values in considering landform and visual impact. Attachment 3 provides three key components: 1. A quantitative evaluation of the landform of HAR relative to other BIF ranges using a range of measures that can be sensibly correlated with aesthetic values: (a) Absolute elevation – i.e. height of the range above sea level. (b) Topographical Prominence – i.e. how "peaky" the range is in terms of altitude changes between adjacent peaks. (c) Tortuosity – i.e. how the range "twists and turns" when viewed from above. The submitter contends that its work confirms that HAR is unquestionably the "jewel in the crown" of all the BIF ranges from a landform perspective being proven significantly superior to any other range on all the measures outlined above. 2. Evaluation of the visual impact of the proposed mines, through GIS based viewshed analysis and scientifically precise photo montages from key view points throughout the range. In any range of hills, most of the significant viewpoints will be from the hills and ridges. Such locations are conspicuously absent from the proponent's submission and hence cannot be considered a representative or fair assessment. Our submission conclusively illustrates the devastating impact that the proposed mines will have on the significant views from the range and the total destruction of the

		wilderness experience. 3. A "walkthrough" over half the East Bungalbin open pit, which through a series of 90 georeferenced photos, we have documented the myriad of amazing rock features that will be destroyed forever (including caves, cliffs, buttresses, overhangs, towers and tunnels). This is in stark contrast to the proponent's assessment where there is a general downplaying of the steepness of the terrain and only occasional mention of any such features and minimal (and only poor quality) photographic evidence thereof. *Please note that any identifying photos (people included) have been removed from Attachment 3.* The submitter states that based on its submission it is considered that sufficient information is provided to aid the EPA in concluding that a strong rejection of the proponent's mining proposals at J5 and East Bungalbin is appropriate, based on landform values and visual impact. In addition, the WAFBC requests that the EPA should recommend that HAR be provided permanent protection through being declared as a Class A Reserve – National Park. The submitter contends that the information contained in its submission confirms that from a landform perspective such a status is completely appropriate. Please have regard to the detailed submission at Attachment 3 and provide a full and reasoned response to the issues presented. The submission relates to the landforms and amenity factors.

MRL disagrees with the submitters' contention that the MR assessments are misleading and do not provide a fair assessment of the landform and visual impacts.

Aesthetic value

In relation to measures of aesthetic value, the submitter is critical of the way in which slopes have been classified in the PER such that all slopes >40 degrees form a single category. The submitter further asserts that "*area*" is not an appropriate measure of steep slopes as, by definition, steep slopes take a small percentage of land area, and that these areas should be measured by run length instead of area.

MRL advises that slope can be classified at any interval, but it will not change the fact that there is only a small area of very steep slopes relative to the overall area of the range landform (i.e. slopes >40 degrees). Slope has been classified based on the histogram (or range of values) in the data. Slopes >40 degrees comprise a very small portion of the histogram (0.6%) and have been grouped to give them greater observable significance in Figure 6-9 of the PER.

It is common practice to measure landform classes in terms of area. These classes can be converted to surface area, or run length, but it would not significantly change the summary of the landform.

In any case, the spatial extent of steep slopes (or run length) is provided visually in the PER (refer figure 6-9, page 6-19).

The submitter also states that "*aspect…implies no aesthetic value and hence is not a useful parameter"*. MRL advises that this statement is effectively contradicted by the submitter in its promotion of tortuosity as an indicator of the potential for significant views ("*a new view around every corner*"). Tortuosity is clearly related to aspect but this is overlooked by the submitter.

In any case, it may be argued that aspect plays a key role in terms of landform weathering, micro-climate, evaporative demand and soil moisture content, all of which influence vegetation pattern and species distribution (e.g. Di Virgillo et al 2015).

MRL acknowledges that no TPI data is presented for other ranges, which is a result of time and cost constraints on the work required to collect and analyse data at the same (detailed) resolution over a very large geographic extent.

The submitter's analysis of land heights of BIF ranges > 600 m AHD concludes that the Helena-Aurora Range has a greater area of land above this elevation than the Mt Manning Range, Mt Jackson Range and Die Hardy Range.

It is not clear why 600 m was adopted by the submitter as the basis for the analysis, which remains incomplete as the total area of each range above this elevation is presented visually and not quantified. Nor is there any assessment of the impact of the Proposal on this particular measure.

MRL has assessed 28 landforms in the region and it is clearly reported that there is a range of elevations across these landforms. A cursory inspection suggests that the Proposal will impact a relatively small proportion of land above 600 m elevation (~13%).

MRL notes the submitter's view that the highest point of the HAR "must be considered a significant peak" on the basis that the closest higher point is Gnanagooragoo Peak some 430 km away. The HAR itself contains other "significant peaks" such as the one 2.9 km west of Bungalbin East (695 m) and the one immediately north of the pit at Bungalbin East (698 m) that will not be mined, but these are not labelled.

MRL advises that the accompanying figure showing the locations of peaks of higher elevation than the Helena-Aurora Range appears to combine data from two different sources, namely the SRTM data underlying the primary data source of the figure (opentopmap.org) and MRL's LiDAR elevation dataset. The SRTM data has been used to interpolate contour intervals of 10 m whereas the LiDAR has a nominal accuracy of 0.15 m.

The Helena-Aurora Range is labelled as being 702 m AHD, which is correct in terms of the LiDAR data but incorrect in terms of the SRTM data. The SRTM data does not show any spot heights associated with the Helena-Aurora Range and therefore the highest point that can be accurately inferred from that dataset is 690 m.

The combination of these two datasets has other implications for the submitter's analysis in terms of topographic prominence, which is explored further below.

Regardless of the accuracy of different datasets describing the highest point of the Helena-Aurora Range, MRL advises that the Proposal will not diminish the significance of the range in this regard as the Proposal will not disturb the highest point of the Helena-Aurora Range.

Topographic prominence

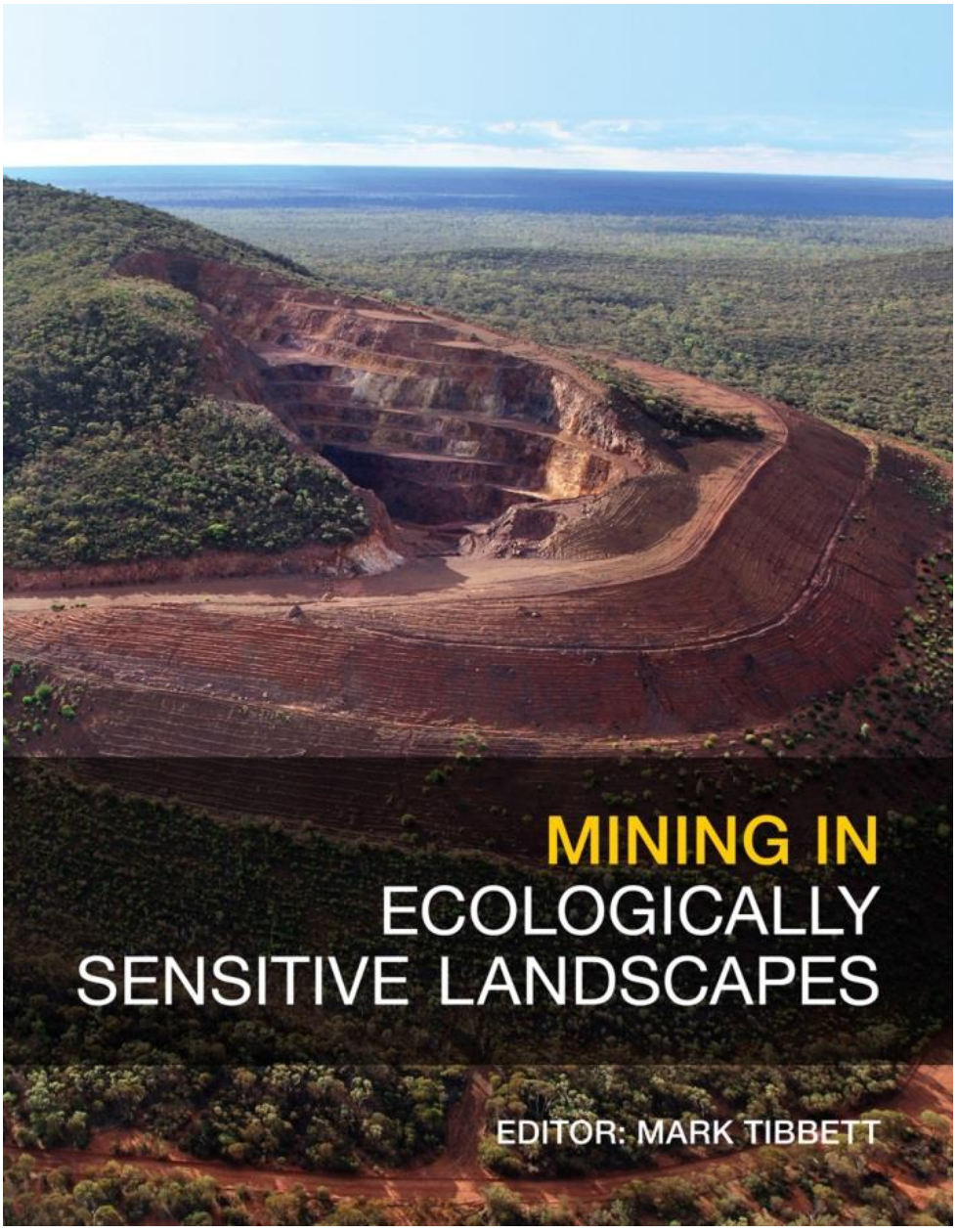
The submitter advocates the use of topographic prominence as a measure of the significance of a summit, where prominence of a peak is the height of the peak's summit above the lowest contour line encircling it but containing no higher summit within it.

Amidst the discussion on topographic prominence the submitter incudes two slides titled "*Example of mining destruction at Mt Jackson*". The slides show the J2 and J3 mines from adjacent hills using Google Earth. The date of the source imagery is stated by the submitter as being 2016; however this is incorrect by an entire decade. The Google Earth source imagery for both slides was taken on 28 August 2006.

MRL understands that intent of slides is to demonstrate the effect of mining at the J2 and J3 deposits in the Jackson Range. However, there are two issues that become apparent upon review of these slides:

The visual representation provided, based on Google Earth, is extremely crude. The underlying digital elevation model has not been updated to reflect the imagery as at 2006. This means that the imagery from 2006 has been draped over the pre-mine elevation of the range such that the mine pit appears to be physically situated (and elevated) on the surface of the range, rather than extending below it as it actually does.

The analysis does not attempt to demonstrate what the mines look like today, as compared to ten years ago when the Google Earth imagery was taken. The analysis ignores the extensive rehabilitation completed at these locations, and the fact that over time a post-mine landscape can look very different to an operational one. These shortcomings of the submitter's graphical representation of mining at J3, as shown from the summit of Muddarning Hill, are apparent with reference to the photographic evidence shown on the inside front cover of Tibbet (2015) – see below. This photograph of the same mine clearly shows the extent of rehabilitation that has occurred on the lower slopes of the waste dump.



The submitter calculates the number of peaks with prominence ≥ 200 m and concludes that of the four ranges analysed only the Helena-Aurora Range meets this threshold. The "*lowest contour*" used to calculate prominence was not specified for any of the ranges analysed, but

from the figures provided it appears to be the 500 m contour was used in respect of the Helena-Aurora Range.

From the SRTM data the highest point of the Helena-Aurora Range is 690 m (recalling that there are no spot heights provided in this dataset for this range). Therefore the Helena-Aurora Range has no peaks with a topographic prominence ≥ 200 m (690 – 500 = 190 m).

In stating that the highest point of the Helena-Aurora Range has a prominence ≥ 200 m MRL assumes the submitter has taken the highest point from the LiDAR dataset (702 m) and used this in conjunction with the 580 m contour derived from the lower resolution SRTM data provided by opentopomap.org (e.g. 702 – 580 – 202 m). This is not an appropriate use of the data.

In the regional analysis of landforms presented in the PER, MRL has used a single dataset to avoid issues such as that noted above.

Tortuosity

The submitter discusses the concept of tortuosity as an indicator of aesthetic value on the basis that "*a more tortuous route will offer a greater number of significant view opportunities* (*around every bend is new view*)".

MRL notes that landforms that are more tortuous than others may offer a great number of viewpoints having different aspect, but that the significance of the view opportunity is dependent on other factors that include the overall width of the range/ridgeline, the position of the viewer relative to the ridgeline and the presence/absence of screening vegetation.

The submitter acknowledges that the published techniques available for measuring tortuosity do not provide the outcome sought, so a more subjective, unrecognised measure has been developed and applied. The submitter states that the resulting value of tortuosity does not depend on path length, but this is contradicted by the fact that the resulting value is expressed in units of degrees *per kilometre*.

It is incorrect to state that the objective and scientific results presented in the PER are opinion when they are robust, reliable and capable of being replicated using the data generously supplied by MRL. The submitter has provided no proof as to the incompleteness of MRL's assessment.

MRL notes the submitter's slides showing "examples of significant views that emphasise the importance of prominence and tortuosity", with photos corresponding to the numbered viewpoints. This analysis is incomplete as the submitter does not compare the Helena-Aurora Range with the other ranges in the analysis (e.g. Mt Manning, Die Hardy, Mt Jackson) to demonstrate why views from the other ranges are less significant due to their reduced tortuosity.

MRL also notes that the Proposal would not be visible in any of these views as shown.

Wilderness experience

The submitter contends that the PER does not consider the "completeness of the wilderness experience".

The PER acknowledges the remote, natural setting within which the Proposal is situated and that the Proposal will change the visitor experience in this regard. The magnitude of this change will be more evident from some locations than others, or not evident at all in some instances.

MRL advises that the term "wilderness" should be used cautiously, as it carries particular meaning depending on the context in which it used. MRL understands that the term is not solely defined by the inability to detect human activity, as suggested by the submitter.

In Western Australia, a wilderness area means:

"an area that has a wilderness quality rating of 12 or greater and meets a minimum size threshold of 8,000 hectares in temperate areas or 20,000 hectares in arid and tropical areas. A wilderness area is gazetted under section 62(1)(a) of the Conservation and Land Management Act 1984 by the Minister on any land that is vested in the Conservation Commission of Western Australia." (CALM, n.d)

In accordance with Policy Statement No. 62 (CALM, n.d.), "wilderness areas will be identified through the preparation of area and regional management plans, which enables the opportunity for extensive community consultation in the form of advisory committees and public workshops with a broad range of stakeholders, and a two month statutory public comment period for draft management plans."

MRL is not aware of any such management plans for the Mt Manning area, nor the existence of any wilderness areas, either classified or proposed, pursuant to the *Conservation and Land Management Act 1984* (WA).

MRL is unable to comment on whether the Helena-Aurora Range/Mt Manning area meets the relevant criteria for classification as a wilderness area as set out in in Policy Statement No. 62 (CALM, n.d).

MRL notes, however, that the classification of the Helena-Aurora Range as a wilderness area would appear have a far greater impact on visitor access than the Proposal. In accordance with Policy Statement No. 62 (CALM, n.d) once a wilderness area has been established, the use of any form of mechanised transport is not permitted except for rescue, fire emergency or essential management operations, or reasons of cultural importance. Further, the policy requires closure of all vehicle tracks other than those required for emergency and essential management purposes.

Visual impact assessment

The stated objective of the submission is to correct the record through provision of more appropriate photographic evidence and landform review. The submission focusses on the "*aesthetic value of wilderness vistas and landforms*". In relation to the provision of more appropriate photographic evidence, MRL advises that the photographic evidence tendered to assess visual impact is both inaccurate and incomplete.

The use of MRL's fly-through animation of the Proposal to demonstrate "how destructive the proposed mine sites will be on the wilderness views" is not appropriate as the viewing locations used in the animation are 'helicopter' views that look down on the range, and are not representative of the way in which visitors access and view the landscape from the ground.

The fly-through animation visually demonstrates the extent and type of disturbance relative to the entire Helena-Aurora Range. It does not depict how this disturbance appears from the ground. In this regard, the graphic provided by the submitter showing "wilderness views destroyed" is misleading at best and factually incorrect at worst.

The submitter queries why no viewshed analysis was included in the PER. This issue was raised during the peer review of the Visual Impact Assessment (Bioscope, 2016) and satisfactorily addressed by MRL as per the Peer Review Close-Out Report (PER, Appendix 10-C).

MRL has concerns about the accuracy of the preliminary viewshed analysis provided by the submitter, and notes the submitter's acknowledgement that "due to extensive vegetation cover, particularly on the plain, areas impacted will be less than shown". MRL can confirm that once vegetation is included as part of a viewshed analysis, very little is visible in terms of ground-based locations.

Rather than undertake a modelled viewshed assessment that accounts for (modelled) tree cover, as suggested by the submitter, MRL opted to provide photographic evidence to demonstrate the extent of visibility of the Proposal from selected locations.

The submitter also queries why additional locations on the ridgeline were not selected for detailed analysis as part of the VIA of the Proposal. In response, MRL advises that the locations chosen for the photo montages were agreed with both OEPA and DPaW as being representative of the way in which the majority of visitors experience the Helena-Aurora Range.

For example, many more locations were selected on the major access routes and tracks in the area.

The submitter's visual impact assessment presents photos and/or Google Earth imagery from a selection of points on the ridge, overlaid with shaded polygons that correspond with the disturbance area for the Proposal.

The submitter notes that no attempt has been made to replicate the proposed pit geometry and that it has "highlighted" all the land that is directly impacted. The submitter neglects to mention that it has also made no attempt to provide a realistic interpretation of how the Proposal might actually look using appropriate colour and texture. In doing so, the submitter frames the visual impact of the Proposal with a complete absence of realism.

MRL notes that the J5 viewpoint (J5FE) is from on top of the monolith, which is not representative of how the majority of visitors would view the area from this location – there is no safe access to the top of the monolith.

MRL also notes that the Bungalbin Hill viewpoint (location 106) is referenced as being from the summit, but MRL queries whether the photo is, in fact, taken from the actual summit (as identified informally by a stone cairn). The summit of Bungalbin Hill is well rounded and surrounded by vegetation of medium height that partially obscures views in all directions.

The submitter queries the absence of the mine infrastructure area and haul road at J5, as modelled from site 16 in the LIA (Bioscope, 2016). MRL advises these features are oriented perpendicularly to the viewing location and would be obscured by the surrounding woodland.

In relation to the submitter's conclusions regarding the importance of the Helena-Aurora Range, MRL is unable to comment on whether the Helena-Aurora Range is the most significant and important BIF range outside the Pilbara, nor whether it should be recommended for permanent protection as a Class A reserve.

MRL re-iterates, however, that the reserve containing the Helena-Aurora Range is designated as "other than Class A", which means that mining can be carried out under the *Mining Act 1978* with the approval of the Minister for Mines in consultation with the Minister responsible for the reserve, in this case the Minister for Environment.