# GLEBE MINES LIMITED

**779** 

Cavendish Mill, Stoney Middleton, Hope Valley, Derbyshire S32 4TH Tel: 01433 630966 Fax: 01433 631826

Mr D Bent
Peak District National Park Authority
Aldem House
Baslow Road
Bakewell
Derbyshire
DE45 1AE

29th October 2010

Dear Mr Bent

Planning Permission Reference Review (ROMP) Application PEAK DISTRICT NATIONAL PARK AUTHORITY

ALLOCATED :GROUP

DATE REC'D

COPIED TO:

Z = OCT 2010

ACKNOWILL MESSIES IN REPLY!
FILE ALLOCATION:

1898/9/69; WED/1177/464 NP/WED/0497/157

Further to your letter of 12<sup>th</sup> August 2008 requiring further information to enable the Authority to provide an up-to-date statutory EIA screening opinion please find attached Glebe Mines Ltd submission.

Please contact me if there is anything else you require.

Regards

Clint White

Mines' and Technical Services Manager

#### 1 INTRODUCTION/ EXTENT/ TIMING

- 1.1 The following paper and attached plans describe the proposed scheme to extract the vein minerals and other associated minerals from the eastern end of Longstone Edge in the area known as Peak Pasture. The area of interest is shown shaded yellow on Drawing No. PP\_04\_SB, which also shows the extent of the mineral planning consent boundary marked red.
- 1.2 Glebe Mines temporarily suspended its right, through a legally binding s106 agreement dated 21 June 2010 with the Peak District National Park Authority, to extract those minerals in consideration of the grant of planning permission to extract vein minerals from land known as Tearsall.
- On the basis of the s106 Agreement of 21 June 2010 the earliest that extraction can commence on Peak Pasture is 2014. Given that the Peak Pasture Consent is valid until 2042 the proposed scheme will have a duration of some 28 years with an estimated total output of 2.9Mt vein minerals and 5.9Mt limestone aggregates.
- 1.4 The proposal in respect of Peak Pasture is for the surface extraction of the minerals through the development of 3 separate open pits. Some 2 tons of limestone will be sold as aggregate for every ton of vein mineral extracted. The excess limestone generated during safety bench development will be stored in a temporary working stockpile above ground level prior to processing as aggregates.
- 1.5 This scheme is limited to the areas where Glebe Mines Ltd owns the vein mineral rights, shown on Drawing No. PP\_04\_SB and does not include any proposals for the extraction of minerals from Backdale, Wagers Flatt or Becon Rod.

#### 2 CURRENT AND PROPOSED DEVELOPMENTS

#### **Current Situation**

2.1 The current status of the area (of which Glebe control) is that no vein mineral extraction has taken place during Glebe Mines tenure (post-1999). There are no active open pits or underground operations in the area and previous operations such as those on Deep Rake or Red Rake have been restored to ground level and returned to an agricultural after-use. The only area that has been subject to vein mineral extraction in modern times that remains open is an area to the east of Bramley Land and to the north west of Backdale Quarry but is of limited extent.

#### **Geology/ Structure**

2.2 The geology of the area is well known and the current assessment is based on surface trenching, grab sampling, deep boreholes, and aerial photographs, BGS Sheet No. SK27SW and production records from historical open pitting on the

- site and adjacent areas. In addition to this underground mapping of mine tunnels and boreholes, has provided information to the west of the area for Red Rake and Gospel Rake at depth.
- 2.3 An underlying volcanic unit; believed to correspond to the Litton Tuff found in Sallet Hole underground mine; lies at between 115mAOD and 133mAOD across the area where the ground surface rises from near Dog Rake at 244mAOD to 271mAOD near Gospel Rake. Therefore the theoretical backs available for vein mineral extraction are up to 138 metres vertically. However, it is unlikely that the base of any of the proposed open pits will approach this depth and therefore the unit will have no bearing on either the extraction of vein minerals or on the geotechnical stability of the workings. The 2 principle vein systems of economic interest are Deep Rake and Red Rake. Deep Rake is considered to be the main feeder structure for the mineralization in the area with Red Rake being an important and significant branch to the north. Between these 2 veins there are numerous important "cross-cutting" offshoots that also contain vein mineralization. The veins are mineralized, vertical to sub-vertical fissures hosted in Carboniferous Limestone and exhibit a typical assemblage of fluorite-baryteslead-calcite.

## **Status of Mineral Assessment**

- 2.4 It is not the intention that this assessment should conform to the standards of the International Code for the Reporting of Resources and Reserves. It is clear that there is insufficient exploration data to support anything more than, at best, an Inferred Mineral Resource. It would be disadvantageous to the company at this stage to apply very strict application of the Code, as in doing so this would devalue, and restrict unnecessarily its rights to work the vein minerals on Peak Pasture for which there is already planning permission.
- 2.5 There is no doubt however, that there is sufficient evidence to support the contention that there are important resources located in the area and this is sufficient to support the principles of the excavation design. A summary of the parameters used to estimate the vein mineral tonnages that could be extracted from the Peak Pasture area is given in Appendix 1. The methodology used was to design open pits on the known and inferred veins present in the area (Drawing No. PP\_002\_OPD sheets 1 to 4) and to generate long sectional profiles along those structures to calculate the area of mineral present within each pit. Width and assay data from trenches, boreholes and underground workings has then been used to generate volumes and tonnages for each of the open pits.

#### Mineralization

- 2.6 Three zones of mineralization have been identified for the purposes of open pit design in the area. These are (1) Gospel & Camm Rake (+offshoots), (2) Catlow Rake & parts of Dog & Red Rake (+offshoots) and, (3) Red Rake & Parallel Vein (+offshoots).
- 2.7 The mineralization is hosted in vertical and sub-vertical steeply dipping fissures within the limestone. The Red Rake and Deep Rake structures are the most significant ore-bearing veins in the area and are orientated approximately WSW-ENE and WNW-ESE respectively.

2.8 Gospel, Camm, Catlow, Dog Rake and numerous offshoots are believed to be sub-ordinate to Deep Rake and Red Rake and are orientated approximately SSW-NNE through to NNW-SSE.

## **Extractive Scheme**

- 2.9 The mineralization in the area will be extracted from 3 discreetly separate open pits. These have been designed to allow safe access to the mineralization at depth by creating safety benches in the limestone host rock.
- 2.10 The vein mineralization will be excavated, blended and hauled to Cavendish Mill by private haul road incorporating for much of its length the existing Strawberry Haul road. The limestone host rock will be taken to a mobile primary and secondary crushing station with ancillary screening units and processed for sale as aggregate.
- 2.11 As the rate of extraction of rock will necessarily exceed the rate of sale currently allowed by the 2:1 ratio of limestone to vein mineral ore, it will be necessary to store the additional rock in a temporary stockpile on the ground surface in the area around Red Rake. It is estimated that this stockpile will have a capacity of some 400,00m³ (c.1Mt) and have average dimensions of 180m x 150m x 15m. This will be a working stockpile constructed during the first 10 years of operations and will be present for an estimated 20 years.
- 2.12 Once the stockpile has been created to its maximum designed capacity all further rock, until the stockpile is ultimately removed, will be tipped into exhausted open pit workings. Subsequently, all new rock generated will be either processed for sale as aggregate or used to restore levels in exhausted workings.
- 2.13 Extraction will initially commence on the Gospel and Camm Rake vein systems, and then move to the Catlow, Dog Rake and Red Rake East system and then the Red Rake (west) system.

## Phase I - Gospel and Camm Rake Veins and Off-Shoots

- 2.14 The total volume at maximum extent of the open pit designed for the extraction of these veins is 1,836,143 m<sup>3</sup> although progressive restoration means that it will never in reality all be open at any one time. The open pit will reach an average depth below surface of circa 65m (205mAOD), producing an estimated 1,111,161t of vein minerals at a ROM grade of 10% CaF2.
- 2.15 In addition it will be necessary to drill, blast and liberate some 3,703,965t of host limestone to enable the creation of safety benches and access ramps. Of this some 2,222,323t will be sold from the site as limestone aggregate. As the rate of extraction will exceed the rate of aggregate sales it will be necessary to transport circa 400,000m<sup>3</sup> of limestone to a temporary working stockpile over the Red Rake area (Phase Ia Drawing No. PP\_003\_P1A).
- 2.16 Aggregates will be produced from this stockpile by mobile crushing and screening equipment located in the Deep Rake area over a period of around 20 years. The limestone extracted in subsequent years (Phase Ib Drawing No. PP\_003\_P1B) will be used to restore the first half of the open pit, which by that time should be

fully depleted. Phase I operations are expected to have a duration of some 10-11 years.

## Phase II - Catlow Rake, Dog Rake and Red Rake (east)

- 2.17 The total volume at maximum extent of the open pit is estimated will be 1,426,717 m<sup>3</sup> and is shown in Drawing No. PP\_003\_P2. It is estimated that some 648,443t of vein minerals at a ROM grade of 10%CaF2 will be produced along with some 1,296,887t limestone aggregate sales.
- 2.18 In addition it will be necessary to extract an additional 3,085,037t of host limestone that will be used to restore the Gospel open pit. The open pit will reach an average depth of 55m below surface (210mAOD). By the completion of Phase II of the operation the temporary working stockpile above Red Rake will be virtually fully depleted allowing the development of Phase III extraction. It is anticipated that Phase II will last some 6-7 years.

## Phase III - Red Rake and Off-Shoots

- 2.19 The Phase III open pit has been designed to extract the vein system associated with Red Rake (west) vein and is shown in Drawing No. PP\_003\_P3. This will reach a maximum average depth below surface of 82m (200mAOD) and at its maximum extent have a volume of some 3,201,219 m3. It is estimated that some 1,173,666t of vein minerals will be produced at a ROM grade of 10% CaF2 and that a total of 7,192,973t of limestone host will need to be extracted to allow access to the minerals at depth.
- 2.20 Of the limestone extracted some 2,347,331t will be crushed and sold as aggregates with the remaining limestone being tipped into the Phase II workings and any depleted workings associated with Phase III. Phase III is anticipated to have a duration of some 11-12 years.

#### Restoration/ Ecology

- 2.21 The exhausted open pits will be progressively restored using overburden rock from new developments in adjacent open pits. This will reduce the overall footprint of the developments certainly for the Gospel (Phase I) and Catlow (Phase II) open pits. It is anticipated that these open pits will be restored to near ground level or shallow valley features incorporating low cliffs on one or more sides.
- 2.22 When levels have been restored the topsoil stored around the perimeter of the pits will be spread and the land returned to agriculture. In the case of the Red Rake open pit (Phase III) it will not be possible to achieve similar levels due to a deficit of materials on the site. Therefore, in this instance it is proposed to leave a deep, steep sided valley with cliffs and scree to encourage bio-diversity. Soils would be spread around the base of the area to complete restoration. The final restored landform is shown in Drawing No. PP 003 P4.

## Method of Working

2.23 In each case soils will be stripped ahead of extraction and stored around the perimeter of the individual open pits to provide screening and provide noise

- attenuation. The soil will be seeded to prevent desiccation and wind blow, and will be safeguarded for use in restoration at the earliest opportunity.
- 2.24 Where possible the vein will be extracted ahead of drilling and blasting of the host limestone. This has been found to be the most efficient way to extract the vein minerals and maintain grade control. In most cases it is probable that the vein mineralization will not need to be drilled and blasted, being friable enough to be extracted directly using a 360' excavator. The host rock will be drilled and blasted, with blasting taking place approximately one or two times per week. Both vein mineral ore and broken rock will be dug at the face using large 360' hydraulic excavators and loaded into articulated dump trucks for haulage to either Cavendish Mill (ore) or the crushing station at Deep Rake.

## **Hours of Working**

2.25 It is anticipated that working will take place between 07:00-17:00 Monday to Friday and from 07:00 – 13:00 Saturday. No working will take place on Sundays or Bank Holidays. It is not anticipated that any external lighting will be required on the site other than lights fitted as standard to operating plant.

# **Phasing/ Output/ Timing**

2.26 There will be 3 main phases of operations associated with each of the individual open pits. Gospel open pit will necessarily have 2 sub-phases to allow for an initial period of working stockpile construction and then latterly for progressive restoration of the 1<sup>st</sup> half of the pit once it is exhausted. An overview of phasing output and duration is given in Table 1 below. An average rate of extraction is anticipated at this stage with a production rate of some 105ktpa vein minerals and 210ktpa limestone aggregates.

Table 1 - Output/Timing

| Phase | Open Pit    | Vein Ore (t) | Lst<br>(t) | Aggregate | Lst<br>(t) | Restoration | Duration<br>(a) |
|-------|-------------|--------------|------------|-----------|------------|-------------|-----------------|
| 1     | Gospel      | 1,111,161    |            | 2,222,323 |            | 1,481,642   | 10.6            |
| Ш     | Catlow      | 648,443      | <u> </u>   | 1,296,887 |            | 3,085,037   | 6.2             |
| III   | Red<br>Rake | 1,173,666    |            | 2,347,331 |            | 4,845,642   | 11.2            |
| Total |             | 2,933,270    |            | 5,866,541 |            | 9,412,321   | 28.0            |

#### Plant Requirements

2.27 It is anticipated that plant requirements for the scheme will be similar to those seen in recent years at the company's other operations on Longstone Edge in terms of the scale and number of equipment. The plant compliment is expected to comprise 4x40t ADT's, 2x40t 360' excavators, 2x966 FEL and 1xD8 dozer. In

addition to this there would be primary and secondary crushing units with ancillary screens.

## Haulage

2.28 It is proposed that all vein mineral ore leaving the site would travel to Cavendish Mill by the company's private Strawberry Vein haul road in 40t ADT's. This would avoid having to put additional HGV traffic onto the local road system. All limestone aggregates would leave the site in a westerly direction along the restricted by-way to join the Longstone Moor tarmac road near to the restored Arthurton West open pit. From here it would travel to, and enter the A623 at Housley and be delivered to markets to the west and east of the National Park.

#### 3 ENVIRONMENTAL IMPACTS

3.1 This section will attempt to identify the potential environmental impacts that may arise as a result of the proposed scheme.

#### **Noise**

- 3.2 Currently there is no mineral extraction taking place on Peak Pasture and any activities are related to agriculture or amenity use. There is no heavy equipment in the immediate area and noise levels are low.
- 3.3 The proposed equipment to be used for the development of the scheme will be to industry noise standards and only operate with all cowls and exhaust systems in place. Soil bunds around the perimeter of the open pits will provide baffling and as the site is fairly remote from centres of population it is anticipated that any noise generated will only have a low impact on residential and recreational amenity.
- 3.4 Additionally, much of the extraction activities, other than soil stripping and drilling and blasting on the upper benches, will take place below ground level resulting in low noise levels. It is anticipated that there will be an impact from the limestone crushing and screening operations and from the haulage vehicles used to remove aggregates from the site.

## **Vibration**

3.5 There are currently no blasting operations taking place on the site and consequently no impacts from blast related vibration. Under these proposals it will be necessary to drill and blast the host limestone to liberate it prior to extraction. This will inevitably result in and increase in the perceptible level of blast vibrations locally and is anticipated will be comparable to levels associated with similar operations at Backdale and Bow Rake/High Rake. These will be maintained within accepted levels through appropriate blast design controls.

## Dust

- 3.6 Currently there are no operations on the site that have the potential for significant/any dust generation. The site is farmed agricultural land and has a good soil and vegetative cover that precludes dust generation.
- 3.7 Under the proposals all crushing and screening will take place with the benefit of an Environmental Process Authorisation (EPA) issued by the Local Authority that will be subject to strict limits on fugitive dust emissions. Mobile crushers and screens will be fitted with spray bars fed from a water tank on-site whilst haul roads will be damped down in dry weather using a mobile dust suppression vehicle.
- 3.8 Monitoring of instantaneous dust levels will be undertaken on a regular basis using hand held equipment and on a monthly basis using static equipment ("frisbee") located around the perimeter of the site.
- 3.9 The impacts locally as a result of dust generated by the operations are considered to be minimal and it is anticipated that operations will not result in any significant increase to those seen during the operations at Bow Rake/High Rake or at Backdale. However, it is expected that dust levels will increase compared to the current situation.

# Visual Impacts

- 3.10 The site is in an elevated position but overlooked principally from areas to the east. Currently, there are no workings in the area that present any visual intrusion in the landscape although to the south of the proposed workings, and outside the Glebe area, the Backdale Quarry has a significant impact.
- 3.11 During extraction the majority of operations will take place below ground level and have limited visual impact. However, the first phases of development will include soil stripping, drilling and blasting and the construction of a temporary working stockpile above ground along with crushing and screening units and various mineral product stockpiles. The most significant visual impact from the operations in the area is anticipated will be over a 20 year period from the temporary working stockpile that will be some 400,000m<sup>3</sup> in volume and up to circa 15m high covering an area of some 30,000m<sup>2</sup>.
- Other impacts during operations are anticipated from the crushing and screening equipment and various items of plant (dumpers and dozers etc) that will be present above ground level on the site for the duration of the planning permission. Following extraction the restoration of the Phase I & II open pits will result in a return of those areas to landforms in keeping with the surrounding area although it is expected that some remnant cliff features will be retained.
- 3.13 There is likely to be a greater perceived visual impact following restoration of the Phase III open pit which will appear in the landscape as a fairly deep, steep sided valley feature with cliffs, roll-over and scree. During operations soils stripped from areas to be extracted will be stored around the perimeter of the individual open pits to provide screening from local public rights of way. However, these are likely to be of limited effectiveness to long distance views of the area.

## Ecology

The area is currently farmed with the principal activity being that of sheep grazing. The area is characterised by areas of enclosed pasture with reasonably level fields separated by dry-stone walls. The proposals would see the temporary loss of some of those areas during extraction but ultimately the creation of a more diverse habitat following restoration with the retention of cliffs and scree. These types of area are known to have attracted raptor species in other areas of Longstone Edge.

# **Archaeology**

3.15 Any archaeological interest within the areas of the proposed open pits will inevitably be destroyed during the extraction process. However, it is proposed that prior to extraction, soil stripping will be undertaken under a watching brief to record any archaeological finds that may be uncovered. During extraction any old workings encountered, that may constitute industrial archaeology, will be recorded.

## **Public Rights of Way**

3.16 There are numerous public rights of way comprising Bramley Lane (restricted byway) to the south and other footpaths that cross the site and these are shown on Drawing No. PP\_04\_SB. It is not the intention, under these proposals, to divert or interrupt Bramley Lane. However, it will be necessary to permanently divert the footpath in the area of the Phase III open pit at Red Rake.

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|  |   |   | t ROM t<br>836,419 T1-1.5m ns: T2-1m ns: 23/87-4.75m tw@73.54; 6/87-6.16m tw@72.55%; Surface | 87,199 T1-1.5m st; 72-1m st; 2387-4,75m tw@73.54; 887-6m tw@72.55%; Surface | 1.com=ug 3-vo =av w 3.com; .Ug samples used = 7.co%-car-2<br>81.281 T4-0.3m@63.2%+T-2.9m@46.5%= av tw 0.6m@60.68%CaF2<br>38.483 Use 0.6m w from average of T3/14 and same crade as from T3/14=50.68% | 10,515 Use 0.6m tw from average of T3/T4 and same grade as from T3/T4=50.68% | or, goo use uson wittoin average or 13/14 and same grade as from 13/14=50,06%. |                         |                      |  |                        | 35            |                           |                          | Comments                       | 210,111 T7-0,8m @65%CaF2<br>48 605 T5-0 5 ns use T6 secav≓40 6%. | 73,467 T6-1.4m @ 40.6% | 96,252 Width from bit near RR shaft and assay from surface sample | 38,707 Width from T7; assay av T7 (65%)+surface sample 42.5% = 53.75 | 27,703 nominal 0.5m width; av assay T7 (65%)& surface sample 42.5%=53.75%<br>24.574 nominal 0.5m width; av assay T7 (65%)® surface sample 42.5%=59.759 | z 1,57 Fiorinika 0.501 widith, av assay 17 (65%)& surface sample 42.5%=53.75%<br>123,390 widith 0.6m T7; av assay T7 (65%)& surface sample 42.5%=53.75% | 8,638 use width assay from Camm Rake above |             |
|--|---|---|--|---|--|--|--|-------------------------|----------------------|--|------------------------|---------------|---------------------------|--------------------------|--------------------------------|--|------------------------|---|--|--|---|--|-------------|
| Time (a)<br>10.6<br>6.2<br>11.2  | e   |   | st ROM t<br>836,419  | 87,199  | 38,483   | 10,515   | 1,111,161  |                         |                      |  |                        |               |                           |                          | st ROM t                       | 210,111  | 73,467                 | 96,252  | 38,707   | 27,703   | 123,390   | 8,638                                      | 648,443     |
| (t)<br>(t)<br>0.4<br>0.9<br>1.4  | 230,860 m <sup>34</sup>   |   | st CaF2 t E<br>83,642  | 8,720   | 8,128<br>3,848   | 1,051  |  |                         |                      |  |                        |               |                           |                          | st CaF2 t E                    | 21,011   | 7,347                  | 9,625   | 3,871  | 2,770  | 12,339  | 884  | 48,48       |
| (m) (t) 1,066,829 0.4 10.8 498,254 0.9 6.2 685,213 1.4 11.2 2,858,296 1.07 28  | racted  |   | Est Av. G Est CaF2 t Est ROM t<br>72.98% 83,642 836,419                                      | 72.98%  | 50.68%   | 50.68%   | 67.93%   |                         |                      |  |                        |               |                           |                          | Est Av. G Est CaF2 t Est ROM t | 65.00%<br>40.60%   | 40.60%                 | 42.50%  | 53.75%   | 53.75%   | 53.75%  | 50.68%                                     | 2<br>4<br>% |
| Tot Lst R<br>bulk (m3)<br>769,314<br>928,463<br>2,516,006<br>4,213,783   | Av Volume Extracted   |   | insltu (* E<br>114,609   | 11,948  | 16,038   | 2,075  | 163,563  |                         |                      |  |                        |               |                           |                          |                                | 32,325<br>11,972   | 18,095                 | 22,648  | 7,201  | 5,154  | 22,956  | 1.704                                      | 126,068     |
| • [  | ¥   |   | Est %OM<br>10%   | 10%   | 10%<br>10%   | 5<br>8<br>8  |  |                         |                      |  |                        |               |                           |                          |                                | 50<br>80<br>80<br>80   | 20%                    | 10%   | ₽<br>%<br>8<br>8   | 40<br>% %  | 5<br>8<br>8   | 10%  | R<br>2      |
| (t)<br>3,333,484 1,945,330 3,520,997 4   |   |   | Vol (m3) Ei<br>47,164  | 4,917   | 6,600  | 25.<br>25.<br>25.  | 67,310   |                         |                      |  |                        |               |                           |                          |                                | 13,302   | 7,447                  | 9,320   | 2,964  | 2,121  | 9,447   | 701  | noo"Le      |
| Tot Aggs Tot Sales Tot Restm (1) (1) Lst (1) 2,222,323 3,333,484 1,481,642 1,296,887 1,945,330 3,085,037 2,347,331 3,520,997 4,845,642 5,886,541 8,7396,811 1,8,412,321  | 2043  | 4,815,126 t<br>1,111,161 t<br>2,222,323 t<br>3,333,484 t<br>3,703,965 t<br>1,481,642 t<br>3,33 t:1  |  | 1.00  | 0.60<br>0.60   | 88   |  |                         | 3,733,481 t          | 648,443 t                                    | 1,230,007 1            | 3,085,037 t   | 1,788,151 t               | 0.9 11                   |                                | 8 6  | 4                      | 2:00  | 0<br>0<br>0<br>0   | 8 6  | 9.0   | 90   |             |
| CaF2 10% 1 10% 1 10% 2 1 | 123   | 4-400-  | XS Area (M2) Av Width<br>14,037 3.36   | 4,917   | 11,000   | 1,423  | 44,335   |                         | (*)                  | •  |                        | ,             | _                         |                          |                                | 7.038  | 5,319                  | 4,660   | 5,927  | 3.303  | 15,745  | 1,169                                      | i cafio     |
|  | 209,519 tpa<br>336,154 tpa<br>29 y  | 1,836,143 m³ 41,541 m³ 854,739 m³ 1,266,281 m³ 1,424,602 m³   |  | တ္က   | Ø  | un u   |  |                         | 1,426,717 m³         | 240,164 m²                                   | 738,967 m <sup>3</sup> | 1,186,553 m³  | 928,463 m³                |                          |                                | 8/0  |                        |   | S  | 2 C  | }   |  |             |
| 10t v  | 28<br>104,7<br>209,5<br>336,1   | 1,834<br>41-426<br>1,266<br>7,672<br>7,687  | Vein<br>Gospel   | Gospel O/S  | Camm<br>Camm O/S   | Camm O/S   | Š.   |                         | 1,42                 | 2. 2. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. | 2.5                    | 1,48          | 926                       |                          | Vein                           | Carrow<br>Dog Rake O/S   | Dog Rake               | Red Rake  | Cattow O/S   | Carlow CV O/S  | Cattow CV   | Сатт                                       | · ·         |
| Max Vol<br>1,836,143<br>1,426,717<br>3,201,219<br><b>6,464,079</b>   | 4-2042)   atles)  |   | Section No.<br>11  | 42  | € <del>4</del>   | र्फ क्   | 2  | S/C                     |                      |  |                        |               |                           |                          | Section No.                    | - 42   | 6                      | 8   | 7 2  | 3 8  | 24 5  | 52   |             |
| Summary Pt A - Gospal Pit B - Catlow + RR O/S Pit C - Red Rake Total   | Remaining Permission (2014-2042)<br>Rate of Production (Vn)<br>Rate of Production (Aggregates)<br>Rate of Restortn Lst Extraction<br>Life @ 100ktpa | Pit A - Gospel Total Maximum Volume Total Vein Mineral Output Total Let Sales Total CABLS Total CABLS Total CABLS Total CABLS OVB:Vn Ore OVB:Vn Ore | ss<br>₹d   | 4   | ∢ ∢  | ď∢   | Sub-Total  | Pit B - Catlow + RR O/S | Total Maximum Volume | Total Vein Mineral Output                    | Total Sales (Vn+Lst)   | Total O/B Lst | Total Lst to tip (bulked) | O/B:Total Sales (Vn+Lst) |                                | m m  | ш                      | œ ·   | <b>20</b> C  | o co   | ı œ   | B<br>Sub-Total                             | onn-cora    |

| ROM t Comments                         | 111,563 Use nominal tim tw: oracle from surface sample norm v1∈50 A | 256.244 U/G mapping & bh's: Surface seamole 50 6%-projections | 428,334 U/G macufing & bh's: Surface samula 72 2% and | 74,099 Use nominal 0.6m width seen in Catlow and other veins intersected in trenches. Use Av | surface samples 50.5%+72.2% CaF2 sampled in Red Rake and RR PV | 53.767 Use northinal 0.6m width seen in Cattow and other veins intersected in trenches. Use Av | surface samples 50.5%+72.2% CaF2 sampled in Red Rake and RR PV<br>84,394 Use nominal 0.6m width seen in Catlow and other veins intersected in trenches. Use Av | surface samples 50.5%+72.2% CaF2 sampled in Red Rake and RR PV<br>68,383 Use nominal 0.6m width seen in Cattow and other veins intersected in trenches. | surface samples 50.5%+72.2% CaF2 sampled in Red Rake and RR PV 33.328 Use nominal 0.6m width seen in Catlow and other veins intersected in trenchas. Use Av | surface samples 50.5%+72.2% CaF2 sampled in Red Rake and RR PV 34.241 Use nominal 0.6m width seen in Catlow and other veins intersected in trenches. Use Av | surface samples 50.5%+72.2% CaF2 sampled in Red Rake and RR PV 29.312 Use nominal 0.6m width seen in Catlow and other vehrs intersected in trenches. Use Av | Surface samples 50.5%+72.2% CaF2 sampled in Red Rake and RR PV 1173,666 | *ns=no sample                                       |
|--|---|---|---|--|--|--|--|---|---|---|---|---|---|
| t CaF2 t Est                           | 11,156  |   |   |  |  | 2,37   | 8,439  | 6,838   | 3,333   | 3,424   | 2,931   | 117,367 1,1   |   |
| insitut Est Av. G Est CaF2 t Est ROM t | 50.50%  | 50.50%  | 72.20%  | 61.35%   |  | 4.cs.la  | 61.35%   | 61.35%  | 61.35%  | 61.35%  | 61.35%  | 60.59%  |   |
| insitu t E                             | 22,092  | 50,741  | 59,326  | 12,078   | 700  | 9,70   | 13,756   | 11,146  | 5,433   | 5,581   | 4,778   | 193,695   |   |
|  | 10%   | 10%   | 10%   | 10%  | 706  | 8  | 10%  | 10%   | 40%   | 10%   | 10%   | 40%   |   |
| Vol (m3) Est %OM                       | 9,091   | 20,881  | 24,414  | 4,970  | 2007   | 2000   | 5,661  | 4,587   | 2,236   | 2,297   | 1,966   | 79,710  |   |
|  | 0.60  | 0.60  | 2.00  | 0.60   | 9  | 3  | 0.60   | 0.60  | 0.60  | 0.60  | 0.60  | 92'0  |   |
| XS Area (MZ) Av Width                  | 15,152  | 34,802  | 12,207  | 8,284  | 604  | 2  | 9,435  | 7,645   | 3,726   | 3,828   | 3,277   | 104,367   |   |
| Vein                                   | Ked Kake C/S  | Ked Rake PV   | Red Rake  | Red Rake O/S   | Red Rake O/S   |  | Red Rake 0/5   | Red Rake O/S  | Red Rake O/S  | Red Rake O/S  | Red Rake O/S  |   | 2.6 t/m3<br>2.7 t/m3<br>10% %CaF2<br>35%            |
| Section No.                            | - •   | 7   | es .  | 4  | ις   | 1  | Ø  | 7   | 80  | On.   | 5   | A.  | 9.6 TO 10.8   |
| id.                                    | ) (   | ) ن   | ပ   | 3  | ပ  | ı  | o  | υ   | υ   | U   | O   | Sub-Total   | Lst S.G.<br>Ore S.G.<br>Est ROM G<br>Bulking Factor |

(

8,366,638 t 1,173,666 t 2,347,331 t 3,520,397 t 7,192,973 t 4,845,642 t 6,1 t t 1,4 t t

3,201,219 m³
434,691 m³
902,820 m³
1,337,511 m³
2,766,528 m³
2,516,006 m³

Pit C - Red Rake
Total Maximum Volume
Total Vein Mineral Output
Total Let Sales
Total Sales (Vn+Lst)
Total O/B Let
Total Let to tip (bulked)
O/B:Vn Ore
O/B:Vn Ore

