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**EXPLORATION POTENTIAL OF THE  
GRASSY MINE AREA**

**KING ISLAND TASMANIA**

**2011**

**Prepared for: King Island Scheelite Pty Ltd**

**Tim Callaghan, December 2011**

## **EXECUTIVE SUMMARY**

Exploration targets and resource definition opportunities around the Grassy Mine development include:

- Dolphin South resource definition/exploration drilling
- Bold Head Indicated resource definition drilling
- Bold Head South exploration
- Grassy Regional exploration
- Grassy East and Teredo exploration targets

Additional resources from the Dolphin South area will have immediate strategic importance to the underground Dolphin Mine. Recent surface exploration has reduced the potential for additional C-Lens resources south of the existing mine reserve. However the potential for increased B-lens resource has been demonstrated. The Decline conceptual exploration Target remains untested due to technical difficulties drilling from surface. Due to the high cost of surface exploration drilling, future exploration should be conducted from an exploration drill drive. Approximately 200m of drill drive is required to delineate B-Lens Resources and drill test the Decline Target.

Subsequent development of Dolphin South will allow access to the Teredo and East Grassy conceptual targets, potentially unlocking whole new areas for resource expansion. Should these targets prove viable then the Resource Base and life of the King Island Project may be significantly increased. All of these areas are accessible to existing underground mine infrastructure.

The Bold Head Mine has limited potential for significant resource additions in and around the existing historic infrastructure. A small open pitable resource on high grade resources at the top of the Bold Head Mine requires resource definition drilling to convert the resource from Inferred to Indicated Resource. This resource has the potential to provide an alternative high grade ore supply if required.

The Bold Head South Exploration Target (2-10Mt) should be viewed as a separate project requiring separate mine infrastructure. It is a longer term target with potential to add significantly to the King Island Project and should be included in future exploration possibilities. It is recommended that existing geological and geophysical data be compiled and assessed. Future follow up drilling should include several deep (800m+) exploration drill holes testing for mineralised mine sequence and the granodiorite at depth.

The periphery of the Grassy Pluton has been systematically explored by previous operators. Mineralised mine sequence has been identified in a number of drill holes. Drilling density and the depth and tenor of mineralisation identified to date suggests the area has potential to host several 1-2Mt resources. It is recommended that existing geological and geophysical data be compiled and assessed.

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## **MAP CONVENTIONS**

Unless otherwise stated, coordinates in for this report are in ISG Zone 55/3 coordinates, a NSW state grid used by the previous mine operator Geopeko.



## **1 INTRODUCTION.**

A report on the exploration potential surrounding the King Island Scheelite project was requested by King Island Scheelite (KIS) in February 2010. A revised Exploration Report was requested in December 2011 after completion of a three hole diamond drilling program testing the Dolphin South area during July-November 2011.

The potential for near mine exploration resource drilling adjacent to the Dolphin Mine was of particular importance to support the reopening of the remnant resources within the Dolphin underground mine. Positive results from exploration will benefit the life of mine which at present are based purely on remnant resources in the Dolphin and Bold Head Mines and the historic tailings dam.

This report has been structured to accommodate firstly the potential for additional resources around the Dolphin Mine that may be accessible from current mine infrastructure, and secondly to highlight other exploration targets within southeast King Island.

The review was made using the Dolphin drilling database, blockmodel, solid models, aeromagnetic data and historic Geopeko Company Reports. Summaries of previous exploration reports by Lindsay Newnham (2008) and particularly Grieve Brown (1982) form the basis of much of this report.

The Dolphin and Bold Head Mines were operated by Geopeko Ltd until low metal prices forced the closure of the operation in 1990. The geological data, sections and plans produced by Geopeko are of a high industry standard. Much of the information available has been digitally derived from the hard copy plans, sections and drill logs.

### **1.1 Project Risks**

When compared with many industrial and commercial operations, mining is a relatively high risk business and prospects that are still in the exploration phase are even higher risk. Even after a discovery is made the nature of the mineralisation, the grade distribution within the body and the behaviour of the ore during mining and processing is never completely predictable.

The difficulty in discovering economically viable mineral deposits is progressively increasing as most deposits that outcrop at surface have already been discovered. Consequently discovery of additional deposits is increasingly reliant on the combination of an in-depth understanding of factors controlling the development of mineral deposits within any specific geological environment as well as the application of optimum exploration techniques applicable to the style of deposit being sought.

Many of the Exploration Targets and any estimates of potential target sizes are conceptual in nature. There has been insufficient exploration to define a mineral resource and it is uncertain if additional exploration will result in a mineral resource.

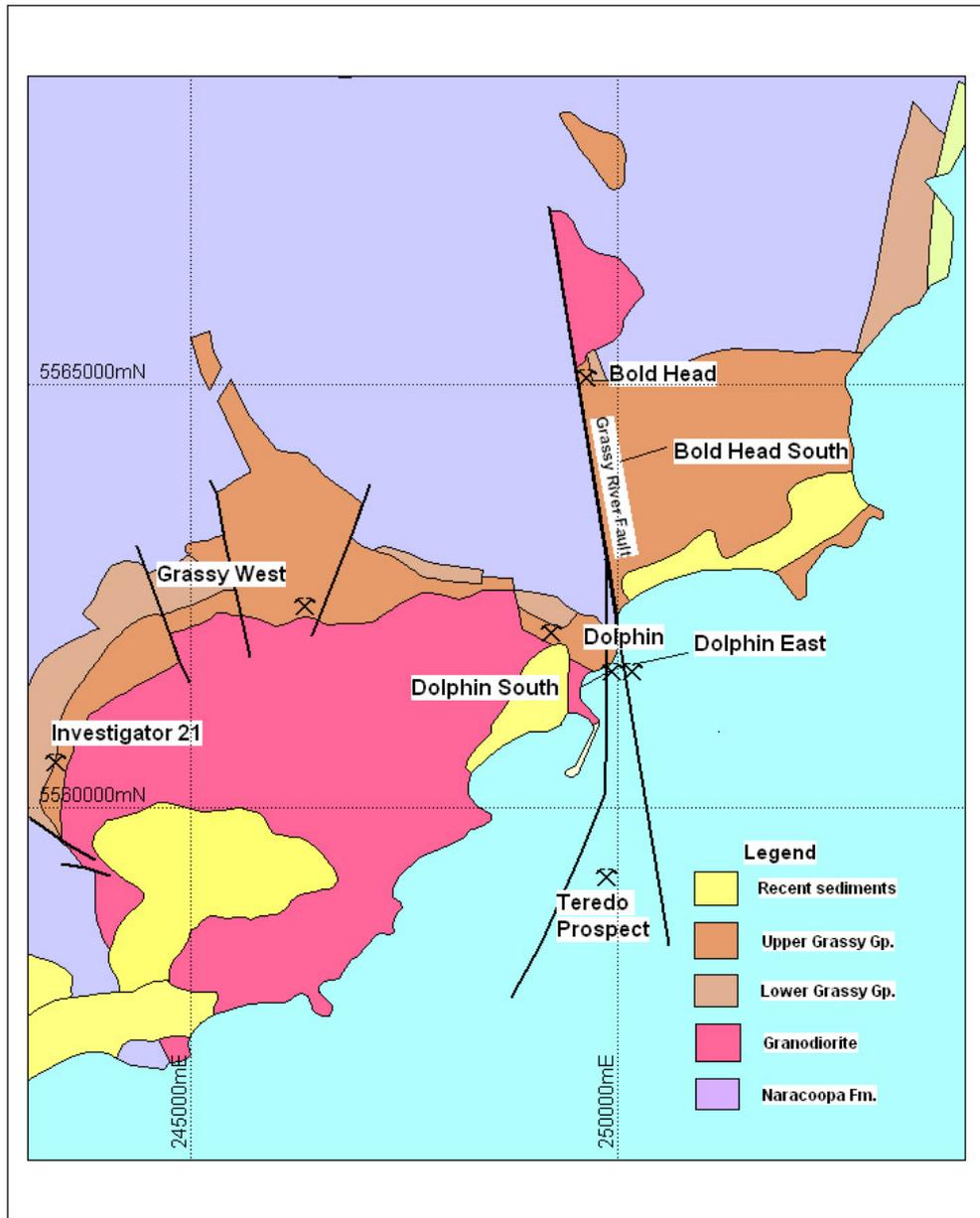


Figure 1. Dolphin and Bold Head Mines, prospect locations and simplified geology (Coordinates GDA94).



## 2 GEOLOGY

### 2.1 REGIONAL GEOLOGY

The regional geology of King Island is best described in Tasmanian Geological Record 2007/02, *Some Notes on the Geology of King Island* (Calver, 2007). Much of the geology described in this section is summarized from this publication (Figure 2).

The geology of King Island consists primarily of Proterozoic rocks with lesser Devonian Granites and extensive wind blown Pleistocene to Recent sand cover. The Proterozoic Geology of the eastern half of the island (hosting the Bold Head and Dolphin WO<sub>3</sub> deposits) is distinctly different from the geology of the western half. The relationship between the western and eastern halves remains problematic.

The western half is dominated by the Mesoproterozoic (1300Ma) Surprise Bay Formation. The Surprise Bay Formation is dominantly an N-S striking regionally metamorphosed amphibolite grade meta-sedimentary unit with minor mafic intrusives. The western margin of the Surprise Bay Group was intruded by a 790Ma granite body (Calver, 2007) post dating the 760Ma Wickham Orogeny (Cox, 1989, Turner *et al.* 1998).

The Eastern half of the Island is dominated by the (1000-750Ma) Naracoopa Formation which appears to be a correlate of the Cowrie Siltstone in NW Tasmania (Calver, 2007). The Naracoopa Formation consists of a thick succession of relatively unmetamorphosed shale, siltstone and fine grained muscovite-quartz sandstone. Along the Southeast Coast the siltstone is conformably overlain by the 580Ma Grassy Group which is considered a correlate of the Togari Group in NW Tasmania, (Calver, 2007).

The Grassy Group in the City of Melbourne Bay area is well described by Calver (2007) and Meffre *et al* (2004). A summary of the Grassy group stratigraphic sequence is described below:

**Cottons Breccia** - A basal unit of polymict cobble to boulder diamictite.

**Cumberland Creek Dolostone** - Calcareous sediments, shale with limestone/dolomite inter-beds. (Host Horizon for the King Island Scheelite Mineralisation).

**Yarra Creek Shale** - Planar laminated shale with rare volcanoclastic interbeds.

**Grimes Intrusive Suite** - Gabbroic intrusive sills of andesitic composition.

**City of Melbourne Volcanics** - Tholeiitic pillow lava, peperite and volcanoclastic sandstone.

**Shower Drop Volcanics** – Picritic, high MgO pillow lava and hyaloclastite.

**Bold Head Volcanics** – Tholeiitic basalt, volcanoclastic sandstone and conglomerate.

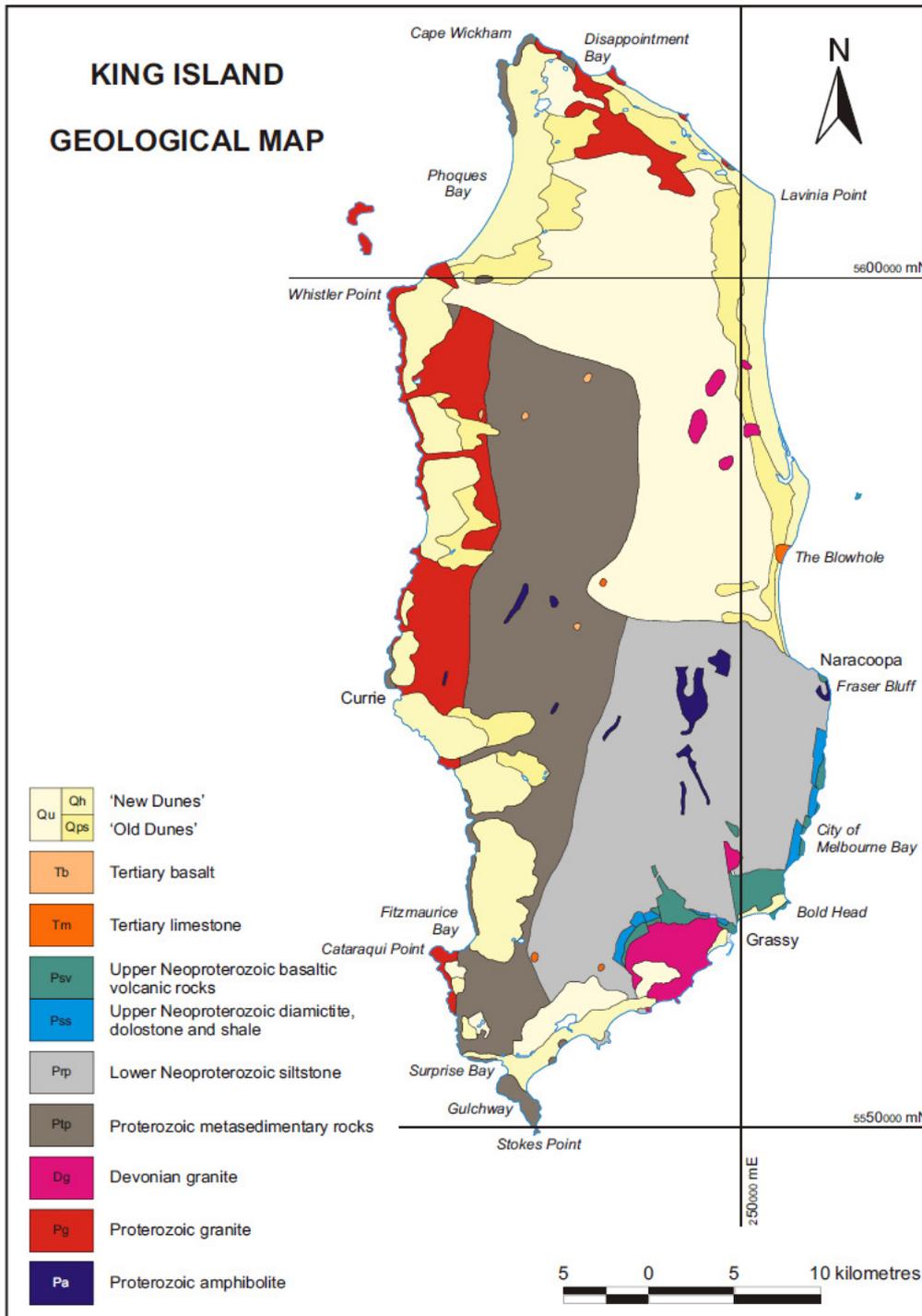


Figure 2. Regional Geology of King Island, (Calver 2007). Coordinates GDA94.



Three granite bodies, the Grassy, Bold Head and Sea Elephant plutons intrude the Proterozoic sediments on the southeast coastline of King Island. The intrusions are classified as I-type monzogranite-granodiorite (Calver, 2007). The Bold Head Granite may be a sliver of the larger Grassy granite, separated by the N-S trending Grassy River Fault (Figures 1 and 2).

The Bold Head Granodiorite is porphyritic with large pink k-feldspar phenocrysts. The mineralogy consists of quartz, k-feldspar, plagioclase, biotite and amphibole with minor apatite, allanite, sphene, magnetite and zircon.

## 2.2 MINE GEOLOGY.

Scheelite skarn mineralisation has formed within the metamorphic aureole of the Bold Head and Grassy Granodiorite plutons where they have come into contact with the calcareous sediments and carbonates of the Lower Grassy Group Cumberland Creek Dolostone. Both the Bold Head and Grassy mineralisation is hosted in a similar stratigraphic sequence, although the carbonate units appear to be thicker in the Grassy area (Danielson, 1975, Figure 2). Mineralisation has formed by selective metasomatism, mainly within and immediately adjacent to carbonate horizons. The deposits formed over a 100-200m sequence of complex skarn mineralogy located in the lower part of the Grassy Group, with two main host horizons known as B and C lens hosted in carbonates of 10-30m thickness separated by a similar thickness of skarn altered volcanic sediments. Mineralisation appears to have occurred where carbonates come into direct contact with the intrusion, or adjacent to brittle faults tapping into the nearby intrusion. Mineralisation grades increase towards major structures such as the Central, Decline and Grassy Faults at Grassy and the Number 2 and Boundary Faults at Bold Head.

Mine sequence rocks have been intensely contact metamorphosed and metasomatised and are described in Geopeko drill logs and maps by the resultant skarn mineralogy and not the stratigraphic protolith described in the regional geology. Geopeko logging codes include:

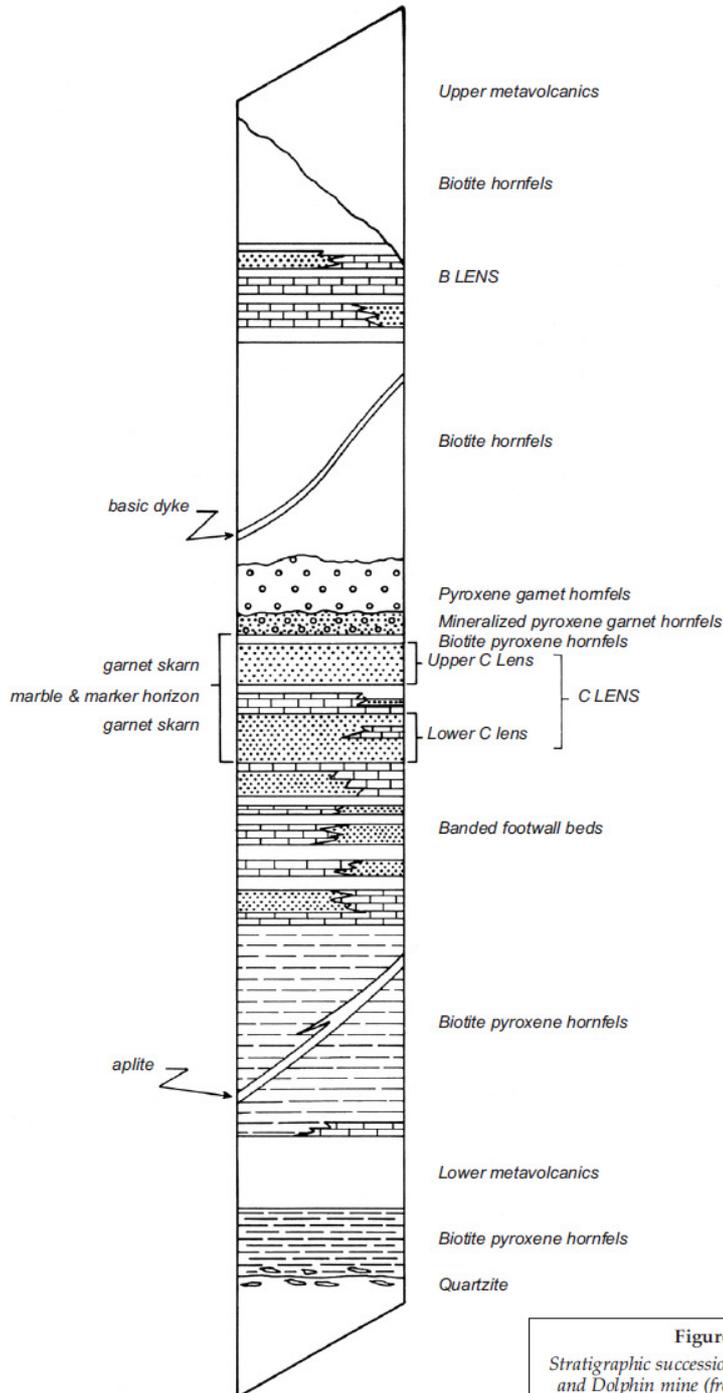
### DDH logging codes

Code	Geology
um	Upper metavolcanics
bh	Biotite-actinolite hornfels
pbh	Pyroxene-biotite hornfels
pgh	Pyroxene-garnet hornfels banded pyroxene andradite skarn (+/- Scheelite)
gh	Garnet hornfels, andradite skarn (+/- Scheelite)
ch	Marble
bfb	Banded footwall beds, interbedded marble and biotite-pyroxene grossularite skarn (+/- garnet, Scheelite)
lv	Lower metavolcanics



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Mineralisation occurs predominantly as coarse Scheelite with lesser Powellite in either garnet-hornfels, pyroxene garnet hornfels and sometimes the garnet-pyroxene altered banded footwall beds.



**Figure 4**  
*Stratigraphic succession, No. 1 Open Cut and Dolphin mine (from Brown, 1990).*

**Figure 3. Stratigraphic column of the Grassy Group host sequence in the Grassy open cut (from Brown, 1990). The sequence is very similar to the Bold Head sequence 3km north.**



### 3 DOLPHIN MINE RESOURCE POTENTIAL

Structurally the Dolphin Mine deposit is located at the base of the Grassy Group on the northern side of the shallow north dipping Grassy Pluton. The Grassy Group dips shallowly south towards the pluton and is truncated by a series of Northwest and North trending and brittle faults. The host sequence is bound to the east by the steeply west dipping Grassy River Fault and the south by the granite intrusion. The host sequence outcrops to the north and west away from the granite. Mineralisation is best developed adjacent to either the granite contact or major brittle fault structures such as the Decline, Central, Swan, Wedge and Grassy River Faults.

The proximity of the granite roof and major brittle faults on the host sequence is very important in the development of the large tonnage pyrometasomatic skarns of the Dolphin and Bold Head Ore bodies. Identifying similar geological settings is paramount to any exploration efforts.

Most of the diamond drilling around the Dolphin Ore body consists of short resource definition diamond drilling with little strategic resource exploration drilling completed in the last decade of operation. Consequently there is potential to add to the Dolphin Resource in and around the previously mined area.

#### 3.1 Resources within Dolphin Mine Infrastructure

A digital estimation of the remnant resource utilizing historic Geopeko plans, sections and hard copy drill logs is listed in Table 1 (Callaghan, 2010).

**Table 1. Dolphin Mineral Resource**

Classification	0.25% WO <sub>3</sub> Cut Off			0.70% WO <sub>3</sub> Cut Off		
	KTonnes	WO <sub>3</sub> %	Tonnes WO <sub>3</sub>	KTonnes	WO <sub>3</sub> %	Tonnes WO <sub>3</sub>
Indicated	8,419	0.95	79,980	4,752	1.29	61,300
Inferred	524	0.50	2,620	7	0.73	50
<b>Total</b>	<b>8,943</b>	<b>0.92</b>	<b>82,600</b>	<b>4,759</b>	<b>1.29</b>	<b>61,350</b>

The estimation includes all remnants including pillars and areas sterilized by historic mining. Redevelopment of the underground Dolphin Mine is based on the recovery of a Probable Reserve of 2.69Mt @ 1.04% WO<sub>3</sub> at a 0.5% stope cut off (Fudge, 2011).

Grieve Brown (1982) suggested there is the potential to add an additional 100,000t on existing mining blocks within the historic reserve. The updated digital mine model, resource and reserve estimation has allowed the potential for additional resources within the existing Mine infrastructure to be systematically reviewed. Most areas of potential have been included within the global resource estimation. The reserve has delineated areas that can be practically mined given the current financial and mining constraints. Potential changes in mining techniques or economic circumstances may result in increases or decreases in the mining reserve. It is unlikely that the resource base will change significantly within the limits of the mine infrastructure. Most additions will be derived from resource extension and/or green-fields exploration.



No follow up exploration is recommended in this report as yet but specific areas may be targeted as the resource and reserve models are developed.

### 3.2 Dolphin South

The Dolphin Resource remains open to the south east where there is potential to add additional resources below -250mRL, immediately west of the Grassy River Fault and east of the granite contact. This area has been referred to in a previous report by Lindsay Newnham (2008) as Dolphin South and by Brown (1982) as the Southern Orebody. This area remains the highest priority target as it has immediate benefit to the underground project.

At the end of mining operations, stoping was taking place in the south east of the mine in the C-Lens Swan and Wedge stopes with minor development in the B-Lens between the Decline Fault and Grassy River Fault. Ground conditions between the Decline Fault and Grassy River Faults are reported to be poor (Fudge, Sheehan, Curtain pers *comm.*)

Two areas for potential resource additions exist in the Dolphin South area (Figures 4 and 5):

- Deposits in the B and C horizons south of the Swan Stope and west of the Decline Fault (Swan Extended of Newnham, 2006)
- Deposits in the B and C horizons between the Decline and Grassy River Faults (Decline Orebody).

One surface diamond drillhole (D300/8) was drilled 200m south of the Dolphin Mine infrastructure and underground exploration envelope in the early 1980's (Brown, 1982). This hole intersected the granite at depth after passing through moderately mineralised B lens in the upper mine sequence (Figure 4). The hole limits the potential west of the Decline Fault to an area of approximately 500 x 150m (Swan Extended, Figure 4), which Brown, (1982) considered may potentially host an exploration target of 0.5 Mt.

Two additional diamond drill holes testing north of D300/8 and south of the mine infrastructure and underground drilling were completed by King Island Scheelite in 2011. The drilling program was designed as a first pass 100m spaced drilling program testing the potential of mineralised mine series (B-lens and C-lens) between the limit of underground drilling and the granite outcrop to the south. Two holes were designed to test west of the Decline Fault (Figure 4) in an area known as Swan Extended (Brown, 1982) and the third more speculative hole was designed to test for mine series rocks between the Decline Fault and the Grassy River Fault in an area named the Decline Orebody (Brown, 1982).

Diamond hole KI001 intersected B-Lens between 290.5 and 319.0m. The carbonate was moderately metasomatised, particularly near the contacts forming a pyroxene-garnet assemblage with sporadic low grade Scheelite mineralisation. Best intersections include 298.0 – 299.0 for 1.0m @ 0.6% WO<sub>3</sub> from a larger zone between 296.0 – 299.0 containing 3.0m @ 0.3% WO<sub>3</sub>.



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Diamond Drillhole KI002 intersected B-lens between 338.2 and 352m downhole. Metasomatised pyroxene – garnet hornfels was intersected on the margins of B-lens with strong Scheelite mineralisation occurring on the skarn/carbonate contact. A downhole intercept between 341.0 and 343.0m returned a very high grade 2.0m @ 6.4%  $WO_3$ . The lower contact returned a low grade intercept between 351.0 and 352.0m of 1.0m @ 0.2%  $WO_3$ .

Both holes failed to intersect the better mineralised C-Lens which appears to have been cut off by the granite intrusion (Figures 4-6). Historic underground drillhole D160/22 intersected mineralised C-Lens 75m NW of KI001 and historic drillhole D300/5 intersected mineralised C-Lens 80m east indicating the presence of discontinuous C-Lens in the Swan Extended area. Despite the discontinuity of the historically better mineralised C-lens, the high grade B Lens intercept in KI002 suggests additional B Lens resources will be added to the King Island Scheelite project from the Swan Extend Area. However the potential has been diminished and is likely to host a small exploration target of 1-200,000t.

There is potential to add additional underground resources from between the Decline Fault and the Grassy River Fault in the southern extensions of what is known as the Decline Target (Figure 4). The Decline and Grassy River Faults diverge to the south opening up the tonnage potential in this area. It is worth commenting that the grades in both B and C lens increase towards the Decline and Grassy Faults suggesting these were major fluid pathways. Brown, 1982 suggests any additional ore found in this area is likely to be of a higher grade, similar to that of the Lower Wedge Orebody (1.2%  $WO_3$ ). There is the potential to host 0.5 - 1Mt of mineralisation in this area with further potential existing to the south.

The geometry of the granite and host sequence is not known in this area. There is the possibility that the granite has intruded the mine sequence limiting the potential for resource additions.

A third hole KI003 was designed to test for mineralised mine sequence east of the Decline Fault and west of the Grassy River Fault in the Decline Target. The hole made very slow progress due to numerous sub parallel faults with squeezing clays which are considered to be part of the Decline Fault system. Unfortunately the hole was lost at 239m after the barrel disengaged from the rod string and the hole collapsed behind it. Attempts to retrieve the hole were not successful. Given the high cost of drilling all three diamond holes a decision was made to discontinue the surface exploration drilling. Exploration of the eastern side of the Decline Fault is planned to recommence from mine infrastructure where the drilling costs are considered to be substantially lower and technically less difficult.

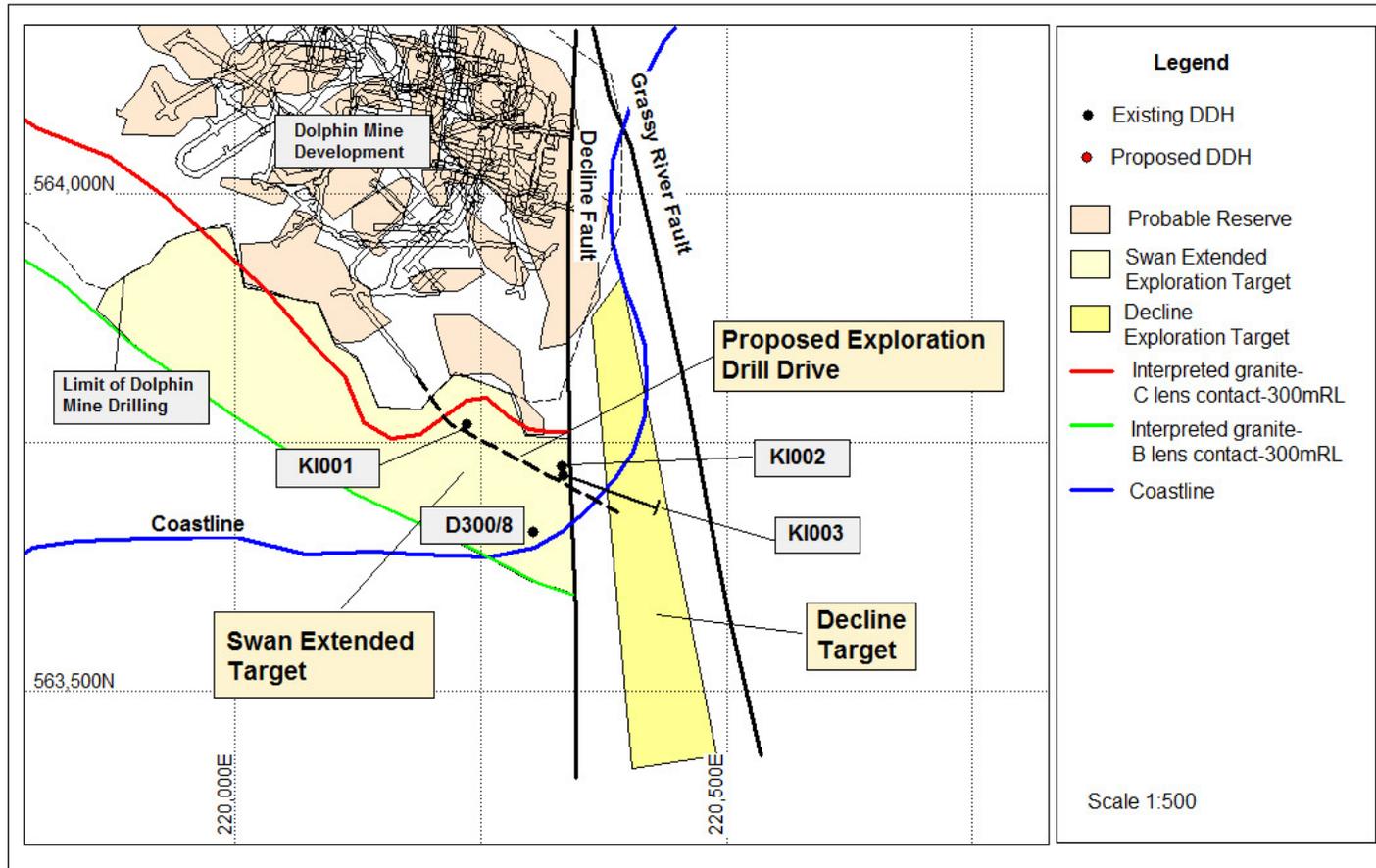


Figure 4. Dolphin South Exploration Targets.

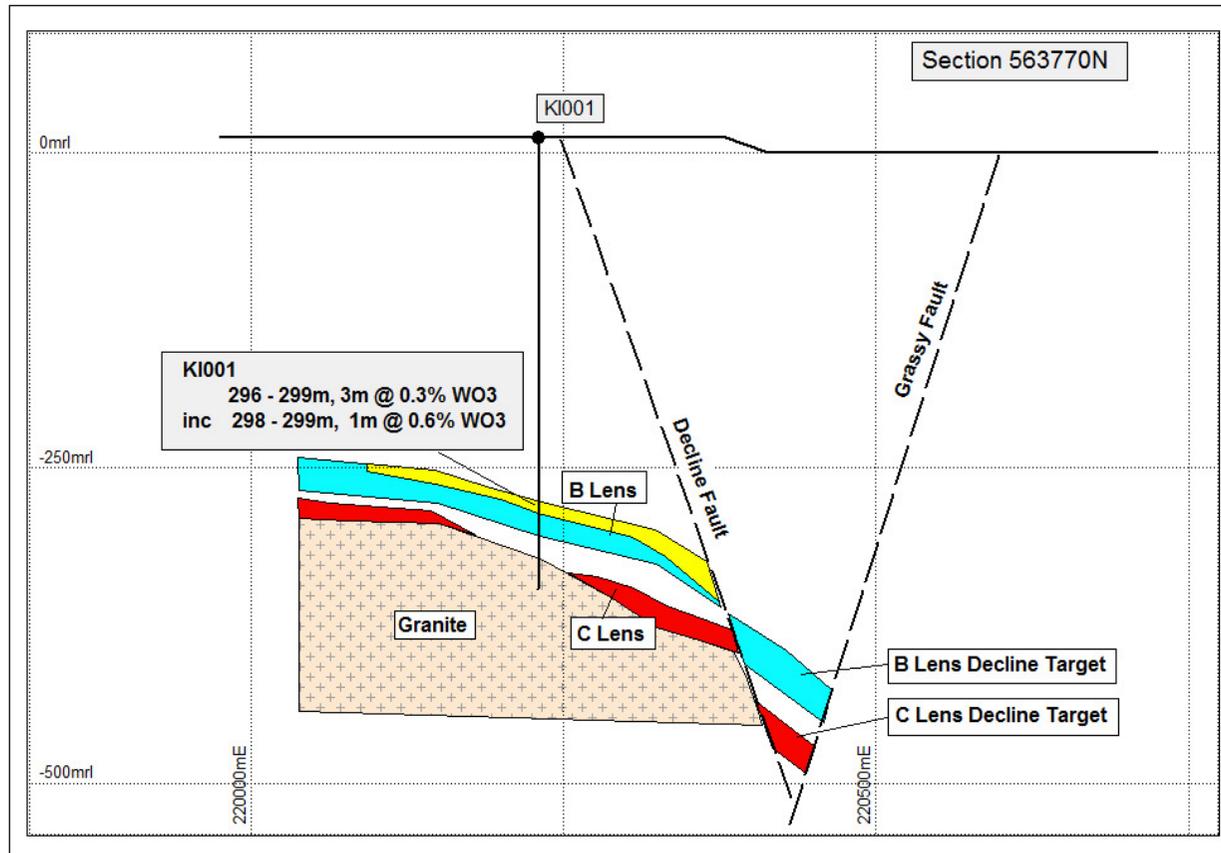


Figure 5. Section 563,770mN, Swan Extended and Decline Target.

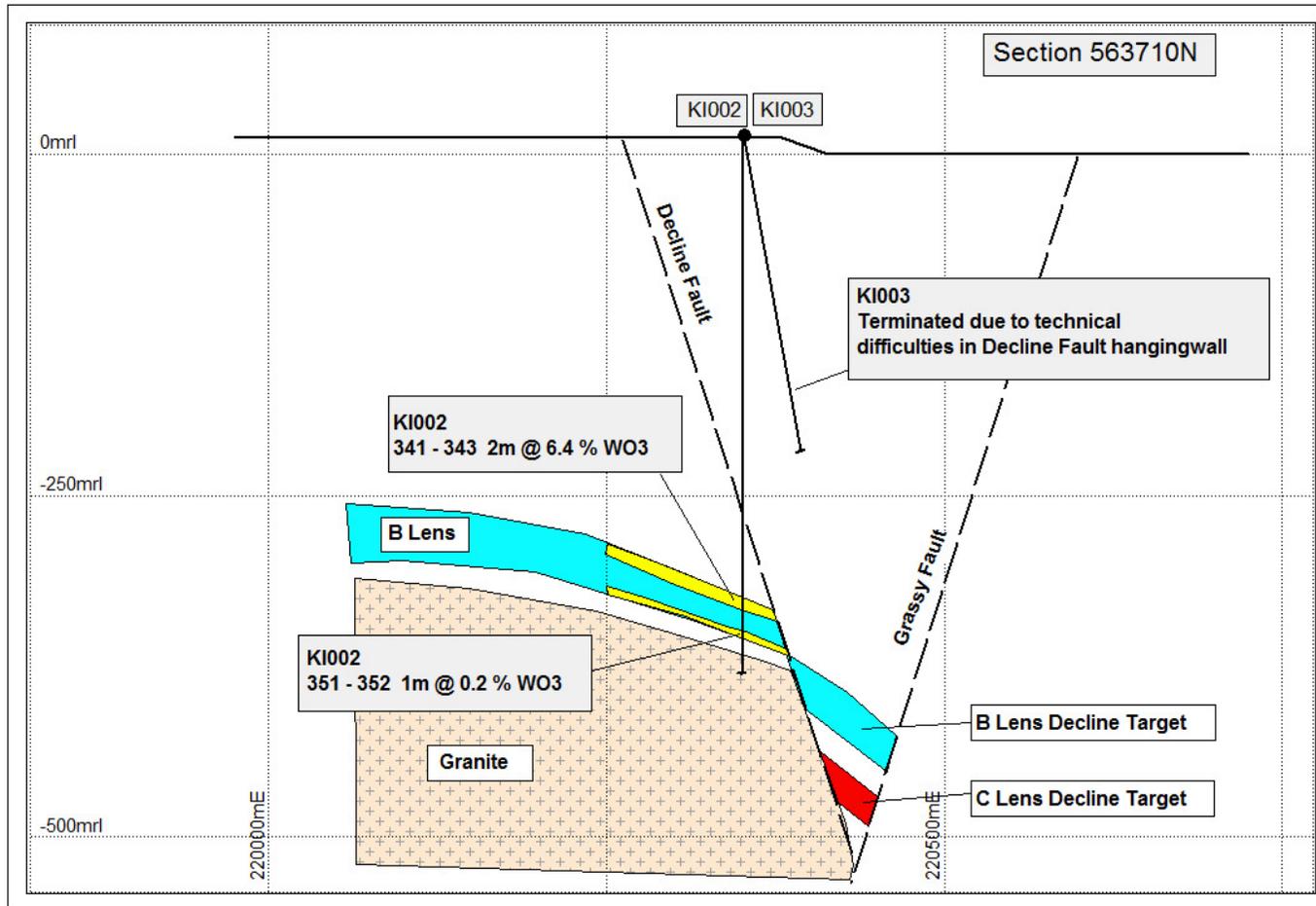


Figure 6. Section 563,710mN

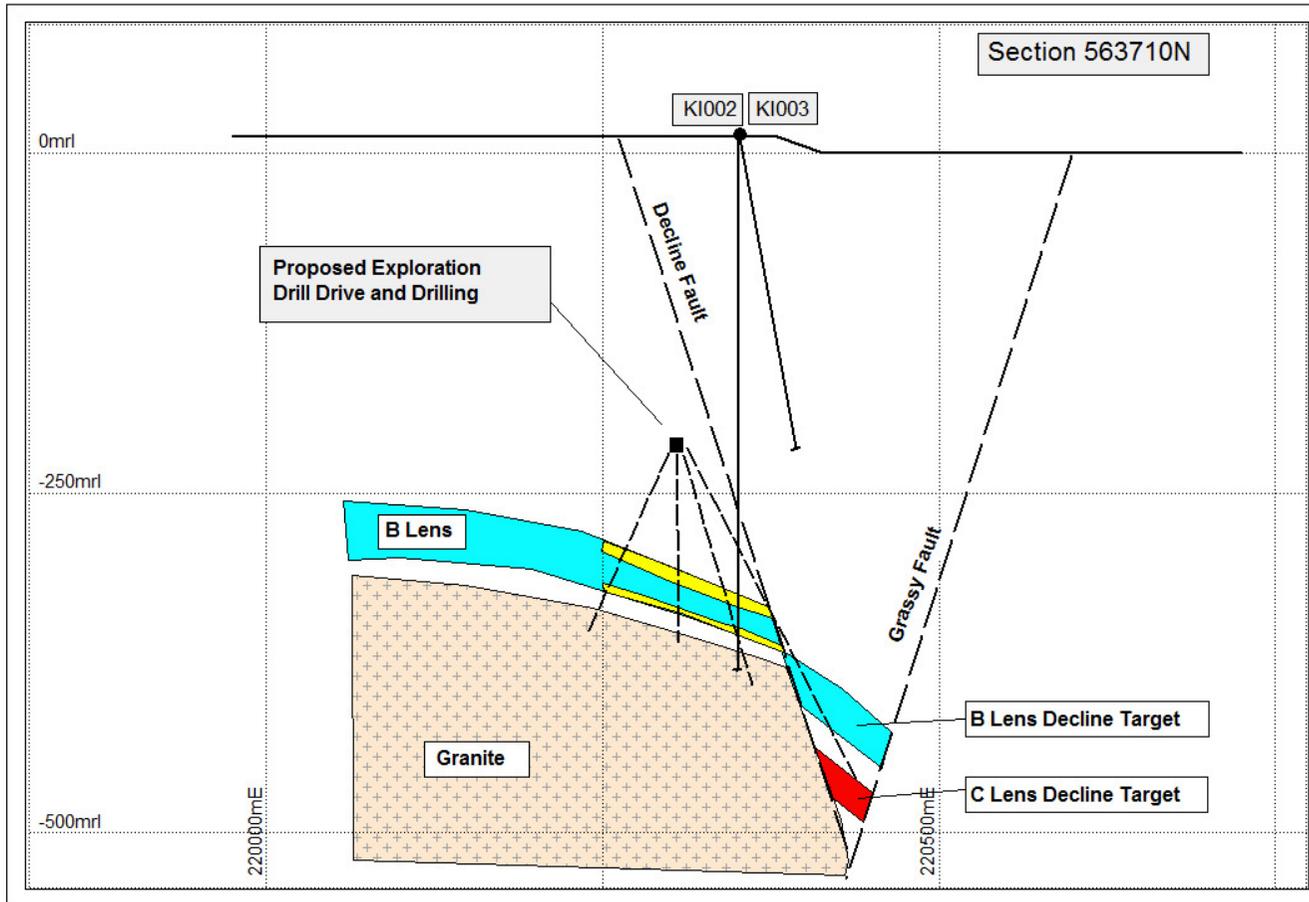


Figure 7. Section 563,710mN with proposed development and exploration drilling.



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Further exploration of both the Swan Extended and Decline Targets in the Dolphin South area is warranted. However surface drilling costs are very high (>\$400/m) mainly due to the very poor ground conditions associated with the Decline Fault. There is limited potential for C-Lens hosted mineralisation in the Swan Extended area as it is apparent that the granite has stopped out the carbonate horizon 50-100m south of the limit of underground drilling. There remains a considerable extent of B-Lens however this is historically less well mineralised than C-Lens. The best location to target high grade B-Lens mineralisation is likely to be adjacent to the Decline Fault. This area is extremely difficult and expensive to drill from surface and is best explored from underground via a hangingwall drill drive located in the geotechnically more competent ground below the decline fault (Figure 7).

Several surface exploration holes could be drilled along the B-Lens Granite contact at the western end of Dolphin south but these are considered a lower priority target as they are expected to be lower grade due to the absence of major fault structures..

*This is the highest priority target as it has the potential to add additional resources accessible from the dolphin mine. It is recommended that future exploration of the Dolphin South extensions be completed from an exploration drill drive. Some additional surface exploration may be required to test lower priority targets to the southwest of the mine...*

### **3.3 Teredo**

The Teredo Prospect is a conceptual exploration target postulated by Brown (1982) located 1-2km further south along the eastern side Grassy Fault (Figure 1). Aeromagnetic images suggested Grassy Group volcanics are present in the area. One interpretation of the data suggests the Decline Fault swings southwest controlling the eastern margin of the granite. This area is very difficult to test and will require exploration from underground mine infrastructure. However it remains a promising conceptual target and, if proven may significantly extend mine life as the area is large.

The Dolphin South extensions are vital to the exploration of this area. If additional resources are defined at Dolphin South, a drill drive/ventilation drive can be justified to the south, providing access for exploration of this area.

*If Dolphin South surface drilling is positive, it is recommended a ventilation drive be designed to provide a drilling platform for further incremental resource additions to the south. Due to the difficulty in drilling this area and its conceptual nature it is considered a Low Priority Target.*



### 3.4 Dolphin East

Dolphin East (Figure 4) is a similar conceptual target to the Bold Head South target, with a possible host horizon and granodiorite position located on the eastern downthrown side of the Grassy Fault. As the prospect is located out to sea it is a very difficult area to assess. Extending one of the Dolphin South exploration holes to approximately 1km depth would provide vital information testing this conceptual target. If the concept is confirmed, the area will be a significant area for resource delineation in the longer term.

The target is reminiscent of the Rendeep Project completed a Renison Bell in the 1990's which added significant high grade resources through a focused exploration program on the downthrown side of the Federal Bassett Fault. The potential resource of this area is unknown but could conceivably be extensive along the edge of the Grassy River Fault to the north and south.

There is a very real possibility that the Bold Head Mine represents the fault offset eastern side of the Grassy Pluton and therefore the Dolphin East orebody. If this is the case then there is little likelihood of additional resources directly east of the Dolphin Mine and Grassy River Fault. The South Bold Head target (See Section 4.2) is therefore a much better target for mineralisation east of the Grassy River Fault. It is also far more accessible for exploration.

The Dolphin East area is possibly accessible from the Dolphin Mine infrastructure lower levels but would require a designated drill platform extending east towards the Decline Fault.

*This is a Low Priority Target as it is high risk and conceptual in nature. Drilling this target will be technically difficult.*



#### 4 BOLD HEAD

Structurally the Bold Head deposit is located within a roof pendant of the Grassy Group over a 700m embayment in the Bold Head pluton (Figure 5). It is bound by the Boundary Fault to the east and the granodiorite to the west, north and south. The southern boundary appears to be influenced by a pre-intrusive ductile shear known as the Graham's Road Fault. The Graham's Road Fault is an east-west striking, approximately 45° south dipping shear zone resulting in attenuation and down-warping of the Grassy Group. The later granodiorite intrusion has truncated the host sequence at about 10,200mN (Mine Grid). The sequence has been closed off by several deep exploration drill holes to the south.

The Boundary Fault is a north-south striking (Mine Grid) steeply east dipping reverse fault juxtaposing the basement Naracoopa Formation quartzite against the Lower Grassy Group. A significant splay off the Boundary Fault known as the No 2 Fault has resulted in a 4-500m by 40m slice of up thrown mine sequence known as the Fault Block. Immediately east of the No 2 Fault there is an 80-100m wide slice of mine sequence hosting the Main B and C lens. A minor N-S striking fault termed the Western Fault has had a minor west side up displacement of the mine sequence within 20-30m of the granodiorite contact to the west. The West B and C lens are located between the Western Fault and the granodiorite.

Mineralisation in the Bold Head deposit is best developed within the C and B Lens within the fault block between the No 2 Fault and Boundary Fault. The Main B and C Lens are well mineralised adjacent to the No 2 Fault. Mineralisation and skarn development is generally strongest adjacent to the faults and on the upper and lower contacts of the B and C Lens. Mineralisation is also well developed in the banded footwall beds within the fault block and immediately above the granodiorite contact at the south end of the mine.

A digital database, mine model, solid model and blockmodel were developed from historic Geopeko data in early 2009 (Callaghan, 2009). The Bold Head Mine contains an estimated remnant Indicated and Inferred Resource of 1.65Mt @ 0.96% WO<sub>3</sub> at a 0.50% WO<sub>3</sub> cutoff. This has converted to a Probable Reserve 0.16Mt @ 0.76% WO<sub>3</sub> at a 0.50% WO<sub>3</sub> cutoff (Fudge 2010). The Inferred Resource of 140,000t @ 1.22% WO<sub>3</sub> is not included in the reserve.

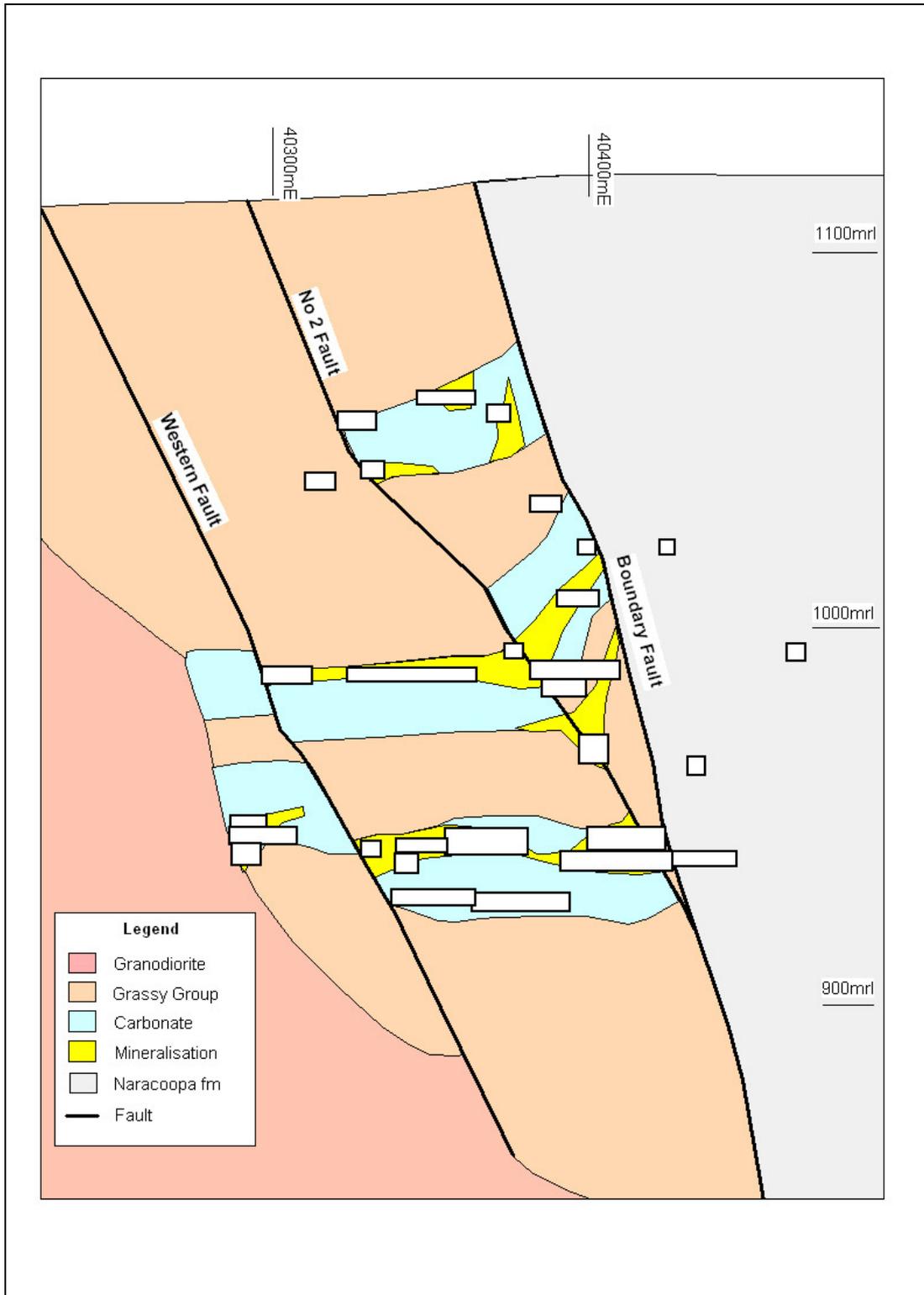


Figure 7. Bold Head cross section 10,500mN.



#### **4.1 Bold Head Mine Exploration Potential**

There is limited opportunity for significant resource extensions in and around the Bold Head Mine as the host horizon is bound structurally in all directions and is limited to a small basin of 650m x 200m. Minor resource extensions (in the order of 50-100,000t) are likely from the northwest and southern ends of the mine area. There is minor exploration potential west of the western fault, particularly to the north. The benefit of additional resources within the bold head mine is constrained by the viability of re-accessing the old mine. There is the potential for a small open pit resource in the upper levels of the mine.

The remnant resource in the upper mine provides an excellent opportunity for early mill feed. The mineralisation associated with the Boundary Fault Ore body is higher grade than much of the remaining resource and also happens to be the most accessible in the upper levels of the mine. There is some uncertainty in the grade interpolation and geological interpretation of the Boundary Fault and a short drilling program (approximately 1-2000m) is recommended to confirm the mineralisation and improve the resource classification to Indicated or Measured.

Unfortunately the Graham's Road Fault, Boundary Fault and granite contact mean that conceptual grass roots exploration is required south of the Bold Head Mine and north of Grassy.

*It is recommended that the high grade Inferred Resource in the upper Mine be converted to an Indicated Resource and its potential to add additional high grade feed assessed. Approximately 1000m of surface drilling is required.*

#### **4.2 South Bold Head**

South Bold Head is a purely conceptual exploration target located south of the Graham's Road Fault along the eastern side of the Grassy Fault (Figure 1). The Graham's Road Fault is a ductile shear with a south-side down throw of over 200m. The possible mine sequence is postulated to occur at depth beneath the outcropping upper volcanics of the Grassy Group.

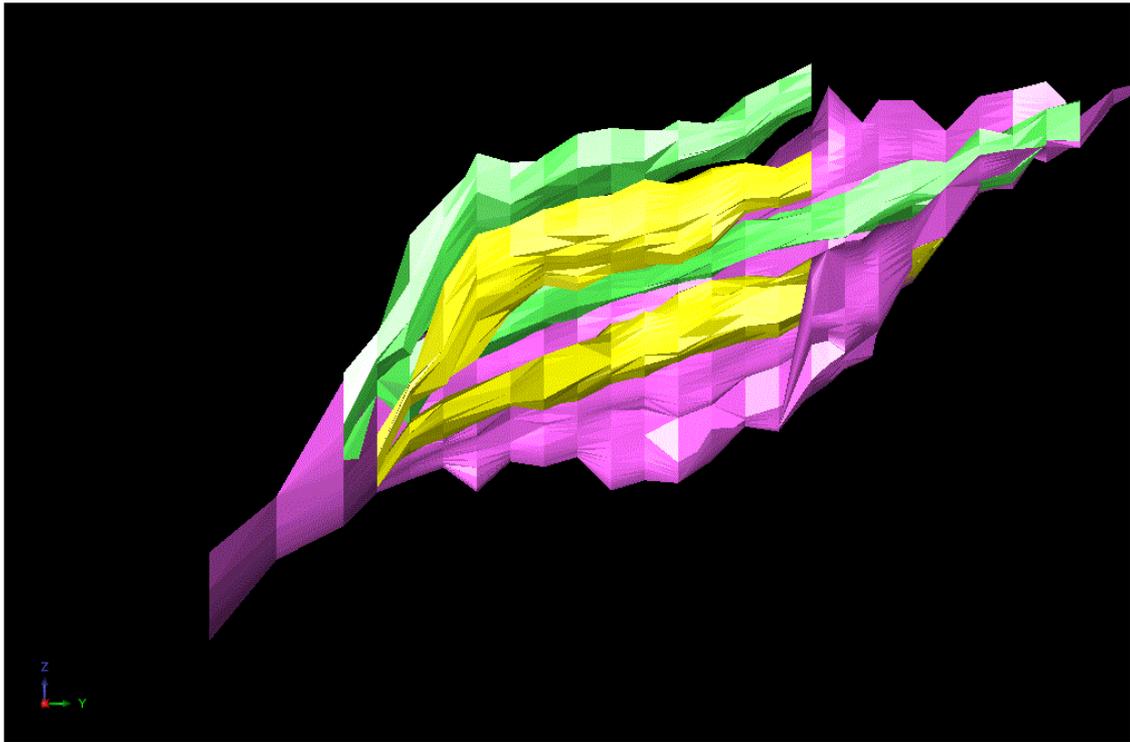
Detailed geophysical surveys were completed in 1982 and reported in Brown, (1983). Gravity surveys indicate a number of residual bouger anomaly highs and lows suggestive of a granite surface similar to the Bold Head setting. The presence of the upper volcanic sequence suggests there is the potential for a deep target (800m+) adjacent to the Grassy River Fault on its eastern margin.

Exploration of this area will not benefit the short term resources available to the King Island Scheelite project as it will require the development of a new mine. However it is very important for future project life and expansion opportunities and early exploration success would demonstrate longevity of the King Island Scheelite Project. Although considered highly prospective this target is ranked second to the Dolphin South area due to exploration risk, cost and lead time required for development.



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*It is recommended that the historic geological and geophysical data be acquired, reprocessed and assessed. Initial exploration would require 3-4 800m+ drillholes to test for the presence of mine sequence and the Bold Head granodiorite east of the Grassy River Fault. Drilling should concentrate initially on 566,000N (ISG) just east of the Grassy River Fault.*



**Figure 6. Long Projection of the Bold Head Mine Sequence looking west. Note the downward folding of the host sequence at the southern margin. The host sequence extends over a distance of about 700m.**



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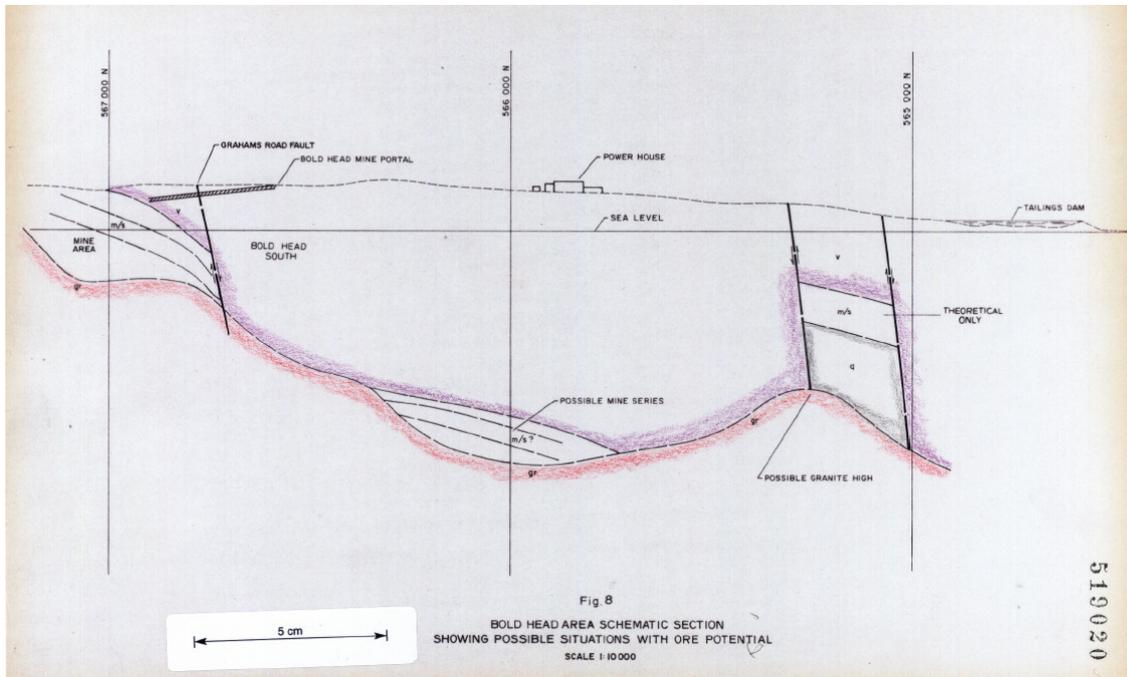


Figure 7. Long Section viewing east showing interpretation of Bold Head South Conceptual exploration target. Granite topography has been interpreted from Geopeko gravity survey (Brown 1983).



## 5 KING ISLAND REGIONAL

A seven kilometer length of Grassy Group volcanics is exposed along the northern and western margin of the Grassy Granodiorite (Figure 4). The geology is moderately well defined from previous first pass drilling, mapping and magnetic surveys and has been studied and explored by the previous mine operators. Mineralisation has been identified in a number of prospects (e.g. Investigator 21 and Grassy West). Most intercepts to date have been low grade and narrow (Table 2).

Hole Id	East_GDA94	North_GDA94	Depth	Azm	Dip	From m	To m	Length m	WO3 %
INV18/1A	246,126.5	5,562,344.1	250.0	0	-90	191.0	192.5	1.5	1.0
INV18/2	246,089.6	5,562,660.4	295.0	0	-90	262.5	264.0	1.5	0.7
INV21/1	243,406.6	5,560,838.7	189.3	0	-90	87.8	92.3	4.5	0.5
INV21/10	243,289.8	5,560,836.2	177.6	0	-90	102.5	103.0	0.5	1.0
INV21/13	243,416.4	5,560,738.3	176.0	0	-90	89.0	92.0	3.0	0.3
INV21/14	243,466.6	5,560,739.9	179.0	0	-90	120.5	121.5	1.0	0.5
INV21/14	243,466.6	5,560,739.9	179.0	0	-90	123.5	126.5	3.0	0.6
INV21/2	243,463.9	5,560,838.9	189.9	0	-90	110.3	113.3	3.0	0.5
INV21/4	243,466.1	5,560,790.5	105.5	0	-90	87.6	92.1	4.5	0.4
INV21/5	243,466.1	5,560,790.5	131.2	0	-90	117.4	119.4	2.0	0.8
INV23/4	245,765.4	5,562,649.4	253.3	0	-90	222.0	123.0	1.0	1.7
INV3-1	245,305.5	5,562,407.9	150.5	0	-90	27.5	31.5	4.0	0.2
INV6/4	246,178.0	5,562,340.1	336.2	0	-90	196.0	202.0	1.0	0.4
INV6/4	246,178.0	5,562,340.1	336.2	0	-90	227.5	228.5	1.0	1.3
INV6/4-2	247,624.6	5,562,730.6	53.0	0	-90	40.5	42.0	1.5	0.6

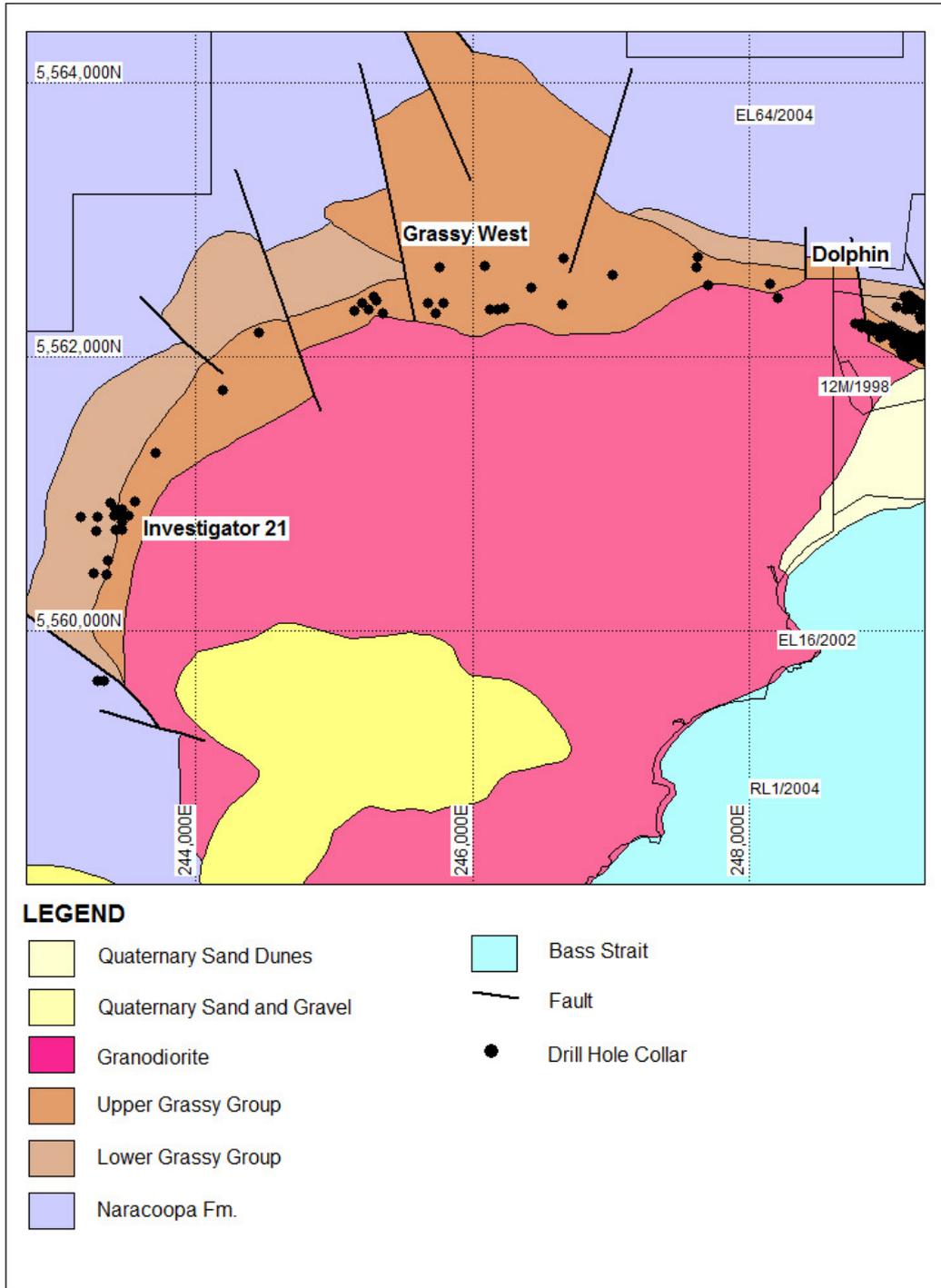
Previous exploration has confirmed the prospectivity of the periphery of the Grassy Granodiorite identifying mineralized calc-silicate skarn adjacent to the granodiorite. Several major fault structures have been mapped regionally. Additional detailed exploration is required including collation of drilling data and geological information and interpretation of gravity and aeromagnetic data followed by further targeted exploration drilling.

The area is of strategic importance to the King Island Scheelite project and maintaining expenditure commitments on the EL is warranted. However the chances of finding large tonnage additional resources similar in size to the Dolphin deposit is unlikely considering the level of exploration to date. There is the potential to discover several small 1-2Mt resources low to medium grade around the Grassy Pluton.

*It is recommended that the data be re-assessed using all available information and strategic targets tested over the lifetime of the project.*



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## 6 DISCUSSION

There are several significant exploration targets around the Grassy and Bold Head Granodiorite intrusions within the tenement holding of the King Island Scheelite Project.

The Dolphin South area is likely to benefit the medium to long term development of the Dolphin Mine and should be explored as a matter of high priority. There is very good potential to add small amounts of additional high grade resources amenable to underground exploitation from this area.

Recent surface exploration has closed off C-Lens on the southwestern side of the Decline Fault, diminishing the tonnes available from this area. Some minor additional resources (1-200,000t) may be defined within B-lens adjacent to the Decline Fault.

The conceptual Decline Fault Target has yet to be verified. This is a prospective exploration target but is hosted in geotechnically difficult ground conditions and is therefore difficult to access and drill. It has the potential to add an additional 1Mt of high grade resources but must be considered as high risk due to the difficulty of access, poor ground conditions, high cost of exploration and speculative nature of the target. These areas will require a designated exploration drill drive to delineate resource drilling from underground. The cost effectiveness of this type of development is difficult to justify without supporting surface exploration drill intercepts confirming the existence of mineralisation and is therefore high risk.

The Teredo and East Grassy exploration targets are purely conceptual and must also be regarded as high risk. Given the lack of information from either of these areas they could be considered to have the potential to host reasonable tonnage targets. Should these prove to be viable targets then the Resource Base and life of the King Island Project will be significantly enhanced. The Dolphin South, Teredo and Dolphin East targets may be accessible from existing underground mine infrastructure reducing the capital development required for resource delineation drilling.

Bold Head South should be viewed as a separate project requiring a new mine and therefore requiring the discovery of a significant high grade resource. Although conceptual the target has significant potential (2-10Mt). It is recommended that the historic geophysical information be reviewed and possibly reprocessed in conjunction with geological mapping to define preliminary target areas. These will require several deep exploration drill holes firstly aimed at confirming mine sequence and granodiorite at depth.

The Bold Head Mine has limited potential in and around the existing historic infrastructure. The only possible low cost benefit from the Bold Head area to the immediate future of the King Island Project is a small open pit on high grade resources at the top of the Bold Head Mine. Several drillholes are required to improve the resource categorization from Inferred to Indicated Resource.

Historic exploration activity around the Grassy Granodiorite west of the Dolphin Mine has demonstrated the presence of mineralised lower Grassy Group. There are several prospects worthy of systematic follow up exploration. However given the drilling density



already present the area is unlikely to host deposits of greater than 1-2Mt. Most intersections to date are too deep to be mined via an open pit. Consequently they are unlikely to be economic unless higher grade mineralisation is identified. These prospects must therefore be regarded as moderate risk.

## Summary

### **Dolphin South**

Risk	<i>Moderate to High (conceptual target, poor ground conditions)</i>
Potential Return	<i>High (1Mt of immediately accessible resources)</i>
Estimated cost	<i>\$1,000 000 (includes 200m of exploration drill drive and 1000m of underground drilling)</i>

### **Bold Head Resource Definition**

Risk	<i>Low (convert Inferred Resource to Indicated and develop early mine plan).</i>
Potential Return	<i>High (140,000t @ 1.22% WO<sub>3</sub> into early mill feed)</i>
Estimated cost	<i>5 DDH for 1000m \$300,000</i>

### **Bold Head South**

Risk	<i>High (conceptual target)</i>
Potential Return	<i>High (2-10Mt)</i>
Estimated cost	<i>Compile and assess geological and geophysical data, \$25,000 2 DDH for 2000m \$600,000</i>

### **Grassy Regional**

Risk	<i>Moderate (conceptual target, some existing drilling)</i>
Potential Return	<i>Moderate (1-2Mt)</i>
Estimated cost	<i>Compile and assess geological and geophysical data, \$25,000 5 DDH for 1000m \$300,000</i>

### **Teredo - Dolphin East**

Risk	<i>High (conceptual target)</i>
Potential Return	<i>High (1-5Mt)</i>
Estimated cost	<i>not estimated in this report</i>



## **RECOMMENDATIONS**

The following work program is recommended:

- Definition drilling of the upper Bold Head Inferred Resource and assess its potential for open cut mining (1000m @ approximately \$300,000).
- Maintain expenditure commitments on the EL19/2001 through systematic exploration of Bold Head South. Review and reprocess existing geophysical and geological data, define targets (\$25,000). Drill 2 exploration drill holes for (2000m @ approximately \$ 600,000)
- Maintain expenditure commitments on EL19/2001 through systematic exploration of the Grassy Regional area west of Dolphin. Compile historic drilling, geophysical and geological data and define target areas (\$25,000). Follow up diamond drilling of 5 DDH ( 1000m @ approximately \$300,000)
- Develop 200m of exploration drill drive over the South Dolphin area and exploration 1000m of drilling (approximately \$1.0M) after the mine is redeveloped and production has commenced.



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## **ADDITIONAL NOTES**

### ***LIMITATIONS AND CONSENT***

The report is provided to the King Island Scheelite Project in the context of an independent review of the exploration potential surrounding the Dolphin and Bold Head Orebodies and should not be used or relied upon for any other purpose.

This report has been prepared using information available to the Author at the time of writing. The opinions stated herein are given in good faith and with the belief that the basic assumptions are factual and correct and the interpretations reasonable.

This report is not intended for the use as a public document nor, in whole or in part, in a public document without written consent to the form and context in which it appears.

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### ***COMPETENT PERSON AND JORC CODE***

This report was prepared by Tim Callaghan, who is a Member of The Australian Institute of Mining and Metallurgy (“AusIMM”), has a minimum of five years experience in the estimation, assessment and evaluation of Exploration Results and Mineral Resources of this style and the activity he is undertaking to qualify as a competent Person as defined in the 2004 edition of the Australian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code).

### ***EXPLORATION TARGET STATEMENT***

In accordance with the JORC Code, readers are advised that Exploration Targets are conceptual in nature, there has been insufficient exploration to define mineral resources and it is uncertain that further exploration will result in the definition of a mineral resource.

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### ***STATEMENT OF INDEPENDENCE***

Tim Callaghan has no material interest or entitlement in the securities or assets of King Island Scheelite or any associated companies.

# ASX Announcement

King Island Scheelite Limited (KIS)



1<sup>st</sup> March 2012

## Dolphin Project – Definitive Feasibility Study

King Island Scheelite Limited is pleased to announce results from the recently completed Definitive Feasibility Study (DFS) for its 100% owned Dolphin Project.

Redevelopment of this world class, high grade, tungsten deposit on King Island (Tasmania) has the potential to generate strong cash flows over an initial 10 year mine life, during the course of which it would produce approximately one quarter of the current world non-Chinese supply of tungsten.

Key Outcomes from the DFS show that at current tungsten prices and a capital outlay of \$133M, this project would deliver;

- Surplus cash of >\$300M.
- An ungeared NPV of >\$100M.
- An IRR of >25%.

The DFS is based on the current reserves and does not include the potential to for additional high grade ore immediately down-plunge.

With amendments to permits and approvals now agreed, necessary freehold land acquired and the team in place, this project is ready to construct subject to funding. The company is well placed to progress off-take discussions and secure project funding.

An overview of the project and outcomes of the DFS are provided in the attached report. The company remains focused on delivering the Dolphin Project and will provide updates on off-take and funding arrangements as they develop.

Yours faithfully,

A handwritten signature in blue ink, appearing to read 'Simon Bird', written over a blue scribbled line.

**Simon Bird**  
**Chief Executive Officer**  
(02) 8622 1400

# Dolphin Project

## Definitive Feasibility Study

### February 2012



### Key Outcomes

The historic world class, high-grade Dolphin Project tungsten deposit is set for redevelopment.

The Definitive Feasibility Study (DFS) outcomes are as follows:

- A 10 year mine life from remnant underground mining and retreated tailings.
- Potential for additional high-grade ore immediately down-plunge from the current ore blocks.
- Production of 3,500 tonnes per annum of contained tungsten trioxide (WO<sub>3</sub>) in an industry standard 65% WO<sub>3</sub> concentrate.
- Project NPV range of A\$69 million to A\$116 million (un-g geared, post-tax).
- Project IRR range of 21% to 29% (un-g geared, post-tax).
- Cash cost in the first four years of US\$169 / metric tonne unit (mtu = 10 kg WO<sub>3</sub>).
- Initial capital expenditure would be A\$133 million.

King Island Scheelite Limited (KIS), the 100% owner of the project, has reached agreement for all project permits and approvals with the Tasmanian Environment Protection Authority, Minerals Resources Tasmania and King Island Council. The Dolphin Project is within a retention licence (RL) that has adjacent exploration licences (EL's). A mining licence (ML) would be activated upon payment of the agreed environmental bond.

The outright freehold purchase of key mine-related land from the King Island Council was announced on 13<sup>th</sup> February 2012.

Strong interest has been received from potential off-takers for all concentrate production and global tungsten consumption is expected to substantially increase between 2010 and 2020.

Discussions are underway with financiers and potential joint venture partners to secure funding for this mine redevelopment.

*Refer to cautionary statement on second last page.*

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# 1. Introduction

King Island Scheelite Limited (ASX code: KIS) is pleased to announce a positive result from the Definitive Feasibility Study (DFS) of its Dolphin Project, a tungsten ore body located on King Island, Tasmania.



The project involves re-establishing mining and processing operations at the historic Dolphin tungsten mine which operated between 1917 and 1990. Mine closure at the time was due to low world tungsten prices, not exhaustion of ore or any operational issues.

The DFS incorporates the mining of underground ore from the Dolphin ore body and nearby Bold Head ore body, with early concentrate production from re-treatment of historic mine tailings.

The DFS projects a 10 year mine life based on firstly, reserves from remnant underground operations at Dolphin and Bold Head and secondly, on certain tailings re-treatment. Mineralisation remains open immediately down-plunge thereby providing potential for substantially extending underground mine life. This exploration up-side is consistent with historic precedent at the Dolphin mine.

Production from the re-treatment of historic mine tailings has been incorporated into the DFS and permitting process. A mining scenario (“Dolphin Only”) that includes only Dolphin ore could be scheduled in the event off-taker and/or funding are not secured for Bold Head and/or the historic mine tailings.

Exploration targets, including those with significant tungsten drill intercepts, have been identified away from the immediate mine environment but within key exploration tenements owned 100% by KIS.

The plan is to mine 350,000 tonnes of ore per annum which will be processed to produce a tungsten ore concentrate with 65% contained  $WO_3$ .

A separate study undertaken by GR Engineering, reviewed the potential of further beneficiation to produce ammonium paratungstate (APT). The result is positive, however KIS determined that the capital cost and technical requirements, combined with potential to delay first production, were not in the interest of KIS or its shareholders. Whilst there could be an opportunity to review this study at a later stage, the focus is on accelerating implementation of the DFS.

The DFS and Dolphin Only financial results are:

Item	Unit	DFS	Dolphin Only
Production $WO_3$ LOM	tonnes	30,999	25,189
Initial Capital <sup>1</sup>	\$M	133	120
Operating costs, Years 1-4 <sup>2</sup>	\$/mtu	169	158
DFS mine life	years	10	7.5
Annual ore throughput	tonnes	350,000	350,000
<b>Financial results</b>			
Net cash flow LOM <sup>3</sup>			
High	\$M	349	318
Low	\$M	241	227
Project NPV			
High	\$M	116	112
Low	\$M	69	71
Project IRR			
High		28.5%	29.8%
Low		20.7%	22.8%

Notes:

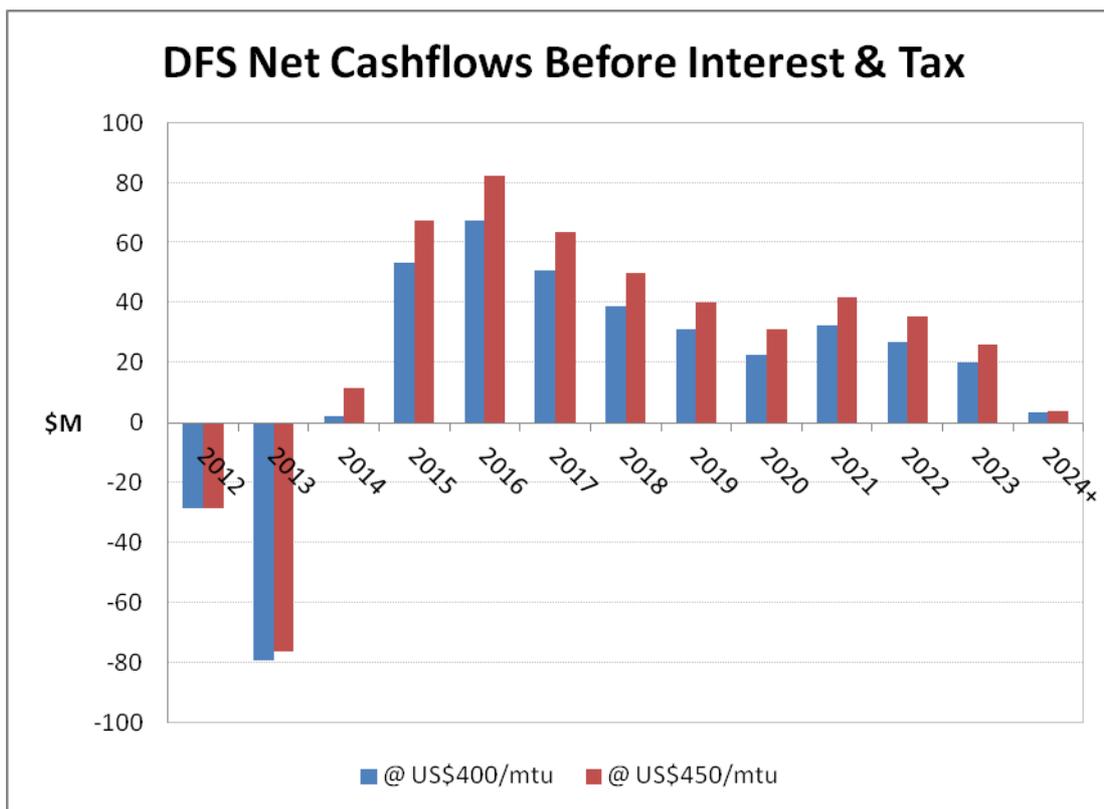
1. Capital required to commence operations for Dolphin Only, excludes incremental capital for Tailings and Bold Head.
2. Operating costs include mining, processing, site administration and royalties.
3. Cash flow is before interest and tax.



The economic assumptions used for the DFS are:

Economic Parameters			
APT prices			
High	\$/mtu		450
Low	\$/mtu		400
Concentrate Discount	%		20
Tailings Concentrate Discount	%		30
Discount rate (real, after tax)	%		8
Exchange rate	US\$:A\$		1.00
Company Tax			30%
Power	\$/kwh		0.335
Fuel (diesel)	\$/litre		1.20

The annual project cash flows before tax based on the assumptions in the table above are illustrated in the chart below:



Every additional year of production from Dolphin at 300ktpa (assuming an average tungsten grade of 1%) would generate >\$40M additional cash flow before interest and tax.

## Construction Costs

Life of mine, including ongoing capitalised development.

	Dolphin Only \$ 000	Bold Head '\$ 000	Tailings '\$ 000	DFS '\$ 000
Tailings re-treatment & storage facilities	5,540		4,175	9,715
Mining capital	27,748	9,501		37,249
Processing plant & associated infrastructure	68,625		8,591	77,216
Owner's capital (including general contingency)	16,570	475	638	17,683
	<b>118,483</b>	<b>9,976</b>	<b>13,404</b>	<b>141,863</b>

## Operating Costs

Average C1 cash costs for years 1 – 4 of production. C1 cash costs are operating costs including mining, processing, site administration and royalties.

	Dolphin Only \$/mtu	DFS \$/mtu
Mining	79.03	84.45
Processing	41.27	45.28
Royalties, Administration, etc	37.84	38.92
	<b>158.14</b>	<b>168.65</b>



## Sensitivities

Sensitivities on the DFS project net present value (NPV) and internal rate of return (IRR) have been run with results for various inputs shown in the following table. An APT price of US\$445/mtu was applied in the DFS, consistent with prices at the time.

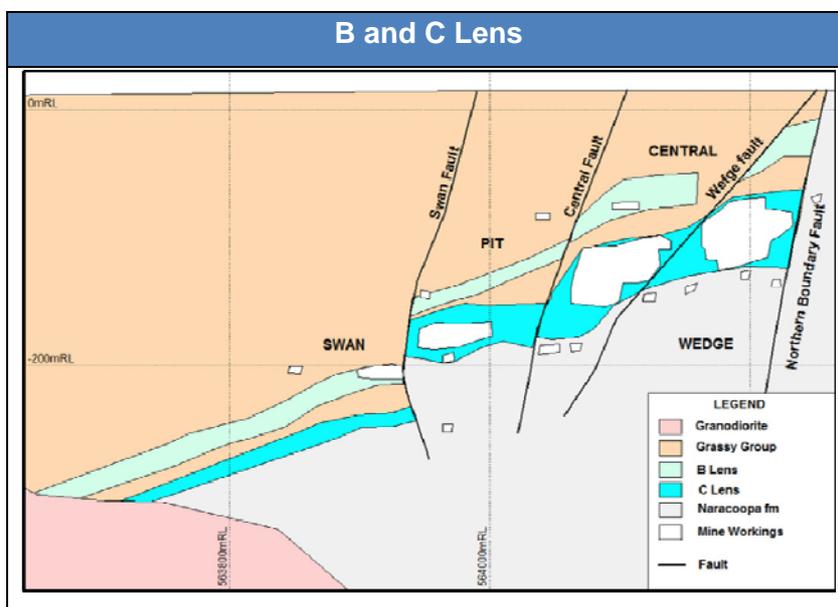
APT Price US\$/mtu	NPV \$mill	IRR %		FX US\$:A\$	NPV \$mill	IRR %
450	115.7	28.5		0.90	158.9	35.3
445	110.9	27.8		1.00	110.9	27.8
400	68.6	20.7		1.10	72.7	21.4
<b>Recovery</b>						
Recovery %	NPV \$mill	IRR %		WACC %	NPV \$mill	IRR %
95	128.3	30.3		7	122.4	27.8
91	110.9	27.8		8	110.9	27.8
87	93.8	25.1		9	100.2	27.8
<b>Capex</b>						
Capex %	NPV \$mill	IRR %		Opex %	NPV \$mill	IRR %
-15	125.9	33.6		-15	143.1	32.7
0	110.9	27.8		0	110.9	27.8
15	95.9	23.2		15	80.3	22.8

## 2. Mineral Resources

### Minerals and Geology

Scheelite ( $\text{Ca WO}_4$ ) is the main mineral of economic importance to the Dolphin Project.

- Mineralogical examination of underground composites from B Lens and C Lens, and tailings, show that scheelite represents approximately 95% of the  $\text{WO}_3$  in B and C Lens ore and 85% in the tailings.
- Minerals wolframite and tungstite make up the balance.



This ore body with an in-situ resource valued at over \$2.9 billion is classified by the United States Geological Survey, as a world class deposit.

### Dolphin Resource Estimates

The resource estimates for the DFS were compiled by independent consultant T Callaghan of Resource and Exploration Geology Pty Ltd.

The data used includes 681 drill holes for 62,326 metres undertaken by former owner GeoPeko (now a subsidiary of Rio Tinto). Wire-framed solid models of geological and mineralisation domains were created from 20m spaced north-south cross sections utilising drill hole data and historic GeoPeko geological sections.



Mineralised WO<sub>3</sub> domains were delineated using a minimum mining width of 3m and cut-off grade of 0.5% WO<sub>3</sub> with some allowances for geological continuity. A total of 17 mineralised domains were identified.

The Dolphin Resource WO<sub>3</sub> grades were interpolated into a block model using an ordinary kriging algorithm. The block model and digital mine model were validated by comparing the sliced models with the drafted GeoPeko cross sections.

The estimated mineral resource for the Dolphin Mine at a 0.25% and 0.70% WO<sub>3</sub> cut-off is summarised as follows:

### Dolphin Mineral Resource

Classification	0.25% WO <sub>3</sub> Cut off			0.70% WO <sub>3</sub> Cut off		
	tonnes (000)	WO <sub>3</sub> (%)	WO <sub>3</sub> tonnes	tonnes (000)	WO <sub>3</sub> (%)	WO <sub>3</sub> tonnes
Indicated	8,419	0.95	79,980	4,752	1.29	61,300
Inferred	524	0.50	2,620	7	0.73	50
Total	8,943	0.92	82,600	4,759	1.29	61,350

### Bold Head Resource Estimates

The Bold Head resource estimates were undertaken on a similar basis to Dolphin. The estimated mineral resource for the Bold Head mine at a 0.5% WO<sub>3</sub> cut-off is summarised as follows:

### Bold Head Mineral Resource

Classification	0.50% WO <sub>3</sub> Cut off		
	tonnes (000)	WO <sub>3</sub> (%)	WO <sub>3</sub> tonnes
Indicated	1,500	0.93	13,950
Inferred	150	1.22	1,830
Total	1,650	0.96	15,780

### Tailings Resource Estimates

A drilling programme designed to provide a reliable resource estimation of the historic tailings was completed in March 2011. A total of 112 holes were drilled for 1,212 metres.

The tailings resource WO<sub>3</sub> grades were interpolated into a block model using an ordinary kriging algorithm.

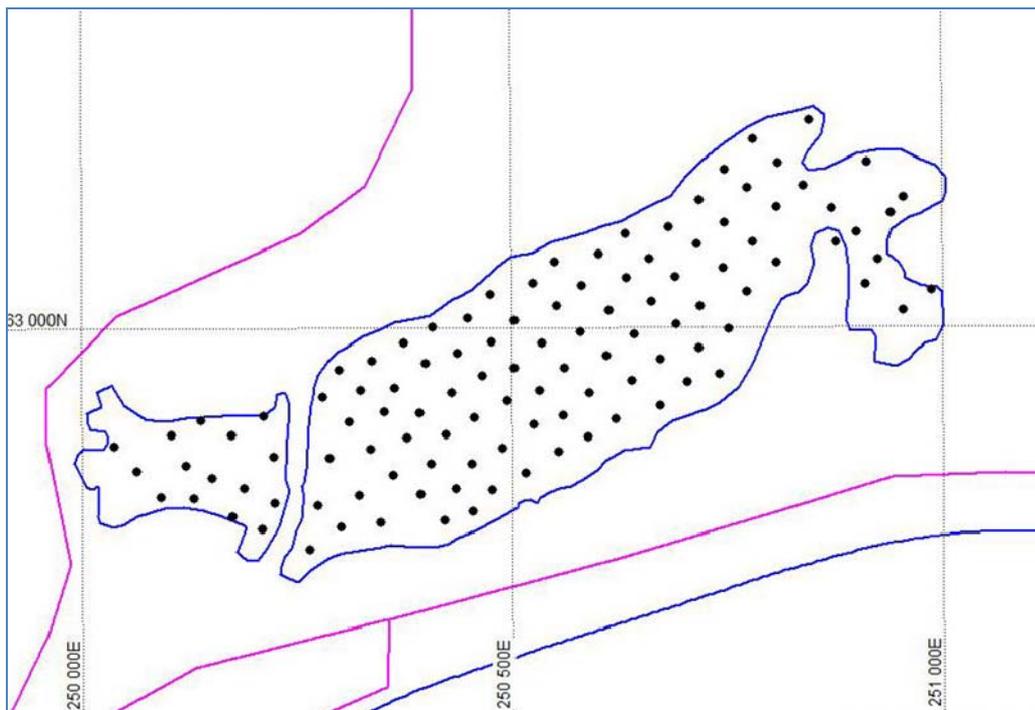
The estimated mineral resource for the tailings at a 0.08% WO<sub>3</sub> cut-off is summarised as follows:



### Tailings Mineral Resource

Classification	0.08% WO <sub>3</sub> Cut off		
	tonnes (000)	WO <sub>3</sub> (%)	WO <sub>3</sub> tonnes
Measured	2,700	0.17	4,590
Total	2,700	0.17	4,590

### Tailings Dam Location and Drill Holes



### 3. Mining and Reserves

#### Dolphin

There is significant history from past operations at the Dolphin mine which provides the basis for current mine design.

Mine planning criteria, based on historic geotechnical, hydrological and ventilation data from the past operation, were developed for mine planning and reserve estimation purposes.

- A mine production rate of up to 300,000 tpa has been proposed utilising a twenty- four hour, seven day per week operation. The previous operation’s production rate was 120,000 tpa in its final years of operation utilising a five day operation on a single eight hour shift with ten underground operators and a shift foreman. A recent review indicates a production rate of 350,000 tpa is achievable.
- Three principal mining methods have been selected to generate a mine plan: post pillar cut and fill, simple cut and fill and bench stoping utilising a primary/secondary stope system. Cemented paste fill will be provided by a paste plant utilising tailings from the processing plant.
- The historic mining policy of minimal subsidence will be maintained through the use of cut and fill techniques and relatively small bench stopes as part of the mine is located below the sea shore. The former practice of monitoring water entering the mine through diamond drill holes and structures for salinity is also proposed. Geotechnical issues around major fault structures are not expected to be significant.
- An ore reserve was prepared by the application of appropriate dilution and recovery estimates to obtain estimated production data for all planned mining shapes.

#### Dolphin Ore Reserve

Tonnes (000)	WO <sub>3</sub> (%)	mtu WO <sub>3</sub> (000)	Category
2,687	1.04	2,806	Probable

- The existing open pit (approximate 3 Mm3) and underground openings are currently filled with fresh water. It is planned to dewater the open pit into the adjacent ocean within six months of project approval and progressively dewater the underground as required for development and production.
- A contract miner will be used for all underground development and production activities.

A detailed life of mine schedule has been produced based on the ore reserve information, development requirements, stope schedules and a target production rate of 300,000 tpa. The



schedule details the dewatering, rehabilitation, development and production stages of the underground operation for the entire life of mine. Feed from the underground mine has been scheduled from both B and C mineralised lenses. The resultant production schedule is as follows:

Item	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Ore mined (000)	5.4	255.7	301.6	301.6	305.2	300.6	297.5	305.2	305.5	205.7	35.3	2,619.4
Grade WO <sub>3</sub> (%)	1.07	1.24	1.20	1.35	1.13	1.01	0.89	0.86	0.92	0.87	0.88	1.05

### Bold Head

There is also significant history from past operations at the Bold Head mine.

A mine production rate of up to 100,000 tpa is proposed utilising a twenty-four hour, seven day per week operation.

- Similar mining methods as proposed for Dolphin will be used for Bold Head.
- Ore will be trucked on an existing road to the Dolphin processing plant.

### Bold Head Ore Reserve

Item	Tonnes (000)	WO <sub>3</sub> (%)	mtu WO <sub>3</sub> (000)	Category
Mining Reserve	609	0.76	464	Probable

### Tailings

GHD Pty Ltd has undertaken a study of the mining of the existing tailings.

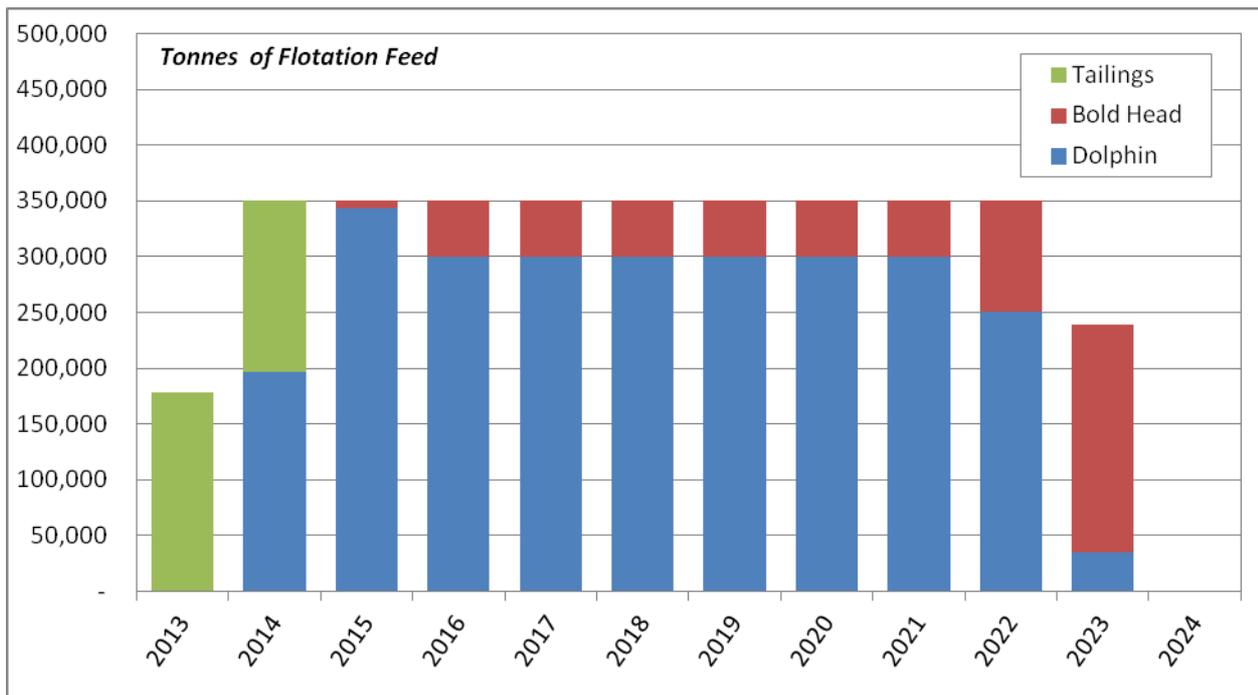
Mining of the tailings will be by a contract miner using excavators, bulldozers and trucks at a rate of 165 tonnes per hour. Tailings can be screened and then pumped to the processing plant at a rate of 1.3 Mtpa.



### Tailings Ore Reserve

Cell	Million cubic metres (Mm <sub>3</sub> )	Tonnes (000)	WO <sub>3</sub> (%)	mtu WO <sub>3</sub> (000)	Category
4	0.80	1,290	0.21	270.9	Proven
1, 2 & 3	0.39	620	0.15	90.1	Proven
<b>Total</b>	<b>1.19</b>	<b>1,910</b>	<b>0.19</b>	<b>361.0</b>	

### Total Ore Production Schedule



## 4. Metallurgy and Process Design

GR Engineering Services Limited (GRES) were engaged to review past test work conducted during 2009 and 2011 by Guangzhou Research Institute of Non-ferrous Metals (GZRINM).

GRES were also requested to provide a process design and project process and infrastructure capital and operating cost estimates.

The metallurgical process flow sheet proposed for the Project comprises three stage conventional crushing, grinding to 80% passing (P80) size of 90µm, magnetic separation (for tailings re-treatment only), low grade whole ore flotation, attritioning, high grade flotation, concentrate filtration and bagging, tailings neutralisation and tailings disposal.

The high level process flow sheet is set out in the Annexures. The process plant can be built in two stages:

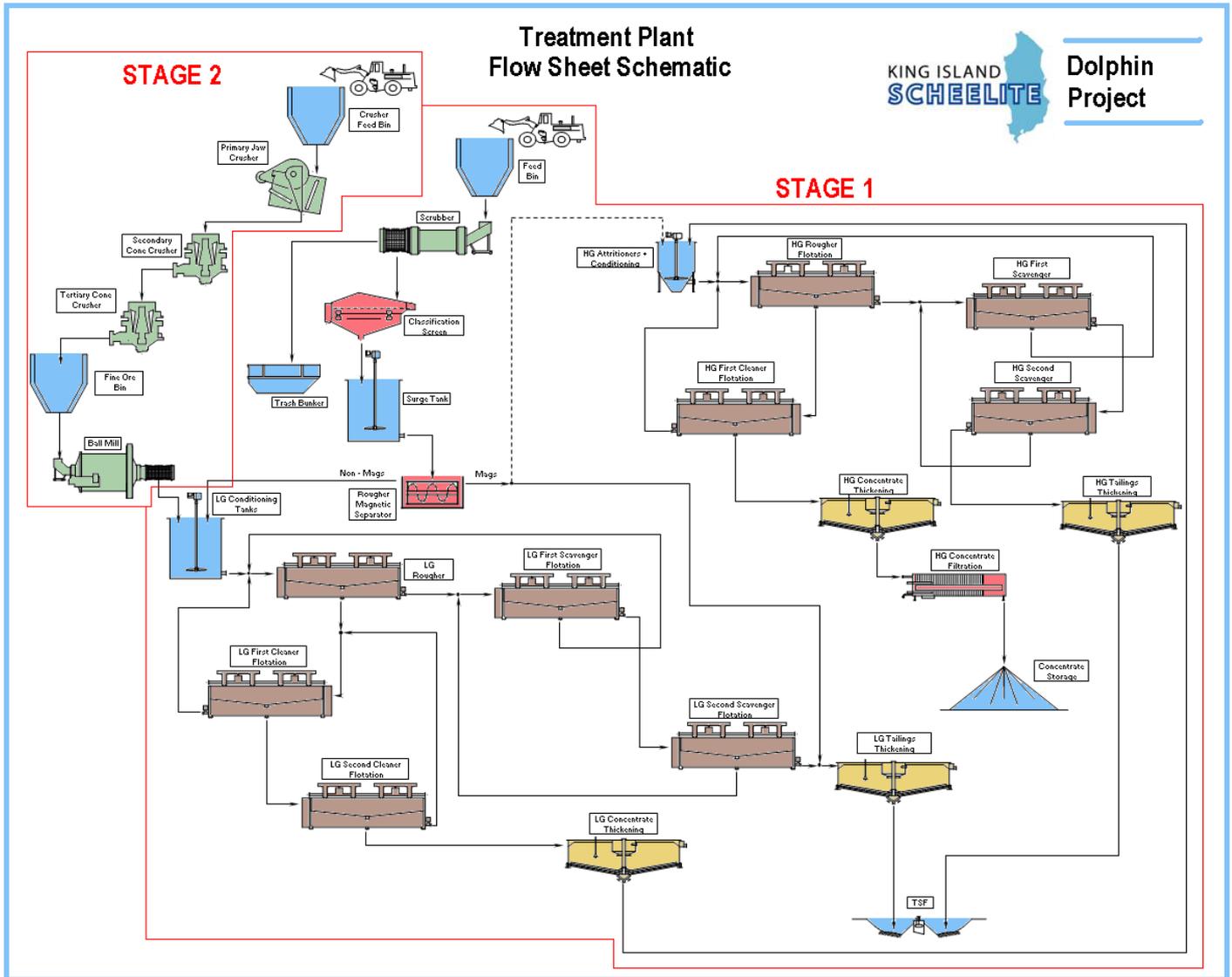
- Stage 1 is designed for treatment of only the existing tailings; and,
- Stage 2 comprises addition of crushing and grinding circuits required for treatment of underground ore from the Dolphin and Bold Head Mines.

Whole ore flotation (WOF) of ore from Dolphin will produce a concentrate containing greater than 65%  $WO_3$  while achieving greater than 90% recovery. Molybdenum levels in Dolphin concentrate are expected to vary between 1 and 2%.

High magnetic intensity separation and WOF treatment of tailings will produce a concentrate containing greater than 50%  $WO_3$ . This concentrate can be sold as is or upgraded via leaching to 65%  $WO_3$ . Molybdenum levels in upgrades tailings concentrate are expected to be up to 4%.



See recovery process flow sheet below



---

## 5. Infrastructure and Logistics

### 5.1 Water

Raw water for the Project will be drawn from the existing Lower Grassy Dam.

### 5.2 Power

The estimated mine demand of 8 megawatts will be provided by a power station, under a build-own-operate contract.

### 5.3 Fuel Supply

King Island Ports currently purchase liquid fuels in bulk and distributes to the power station and resellers. KIS will construct fuel storage and distribution systems at the mine site and is actively pursuing an alternative ocean transport mode involving bulk tanker delivery.

### 5.4 Communications

The Project site is well serviced with mobile phone network. Provision will be made to distribute fibre-optic communication cabling throughout the process plant and phone connection to the new site offices.

### 5.5 Logistics

The Grassy port is capable of handling a 5,000 tonne ship. King Island is currently serviced by a weekly shipping operation based on a triangular route between Melbourne, Devonport and King Island.

Regional Express Airline (REX) flies daily services between King Island and Melbourne. Semi regular flights are also flown from Launceston and Burnie to the island.

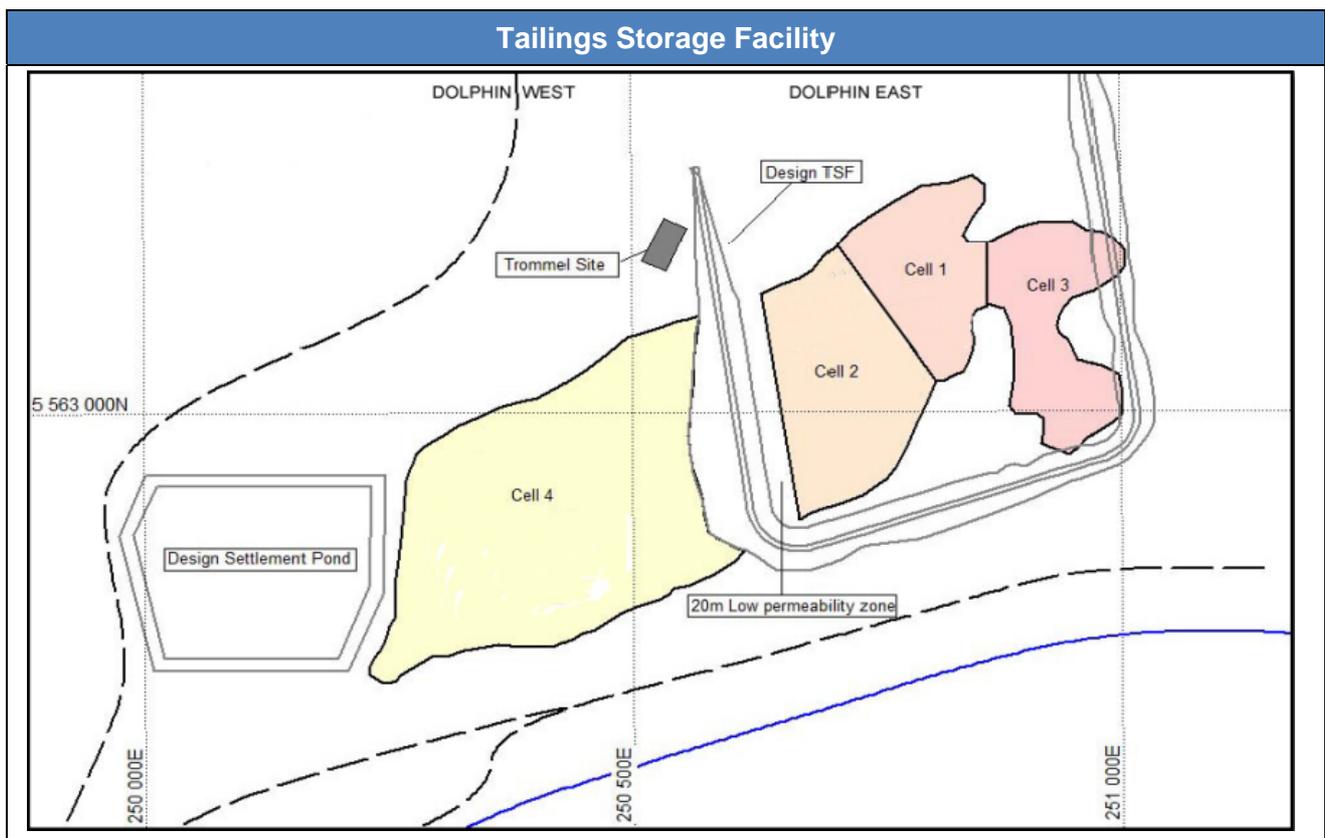


## 6. Tailings Disposal

The proposed tailings storage facility may be split into three containment areas (refer illustration). The first, the Dolphin East, will be a new embankment constructed to contain re-processed tailings and have a storage volume of approximately 1.6 million cubic metres.

- Dolphin East and Dolphin West are anticipated to contain sufficient storage for the tailings produced over the current design mine life, less the amount used as paste fill underground. The Dolphin West cell may be raised to provide further storage beyond the proposed life of mine.
- The spillways for all embankments have been conservatively designed to pass a 1:10,000 annual exceedance probability (AEP) storm event, which is considered appropriate for a “Significant” hazard category dam.

Re-treatment of tailings will provide a source material to make paste fill for use in the initial year of underground production at Dolphin. If tailings are not re-treated rock fill available from the surface may have to be utilised in the initial production year.



## 7. Exploration Potential

There are several significant tungsten exploration targets around the Grassy and Bold Head granodiorite intrusions within the tenement holding of the Project.

### Dolphin South

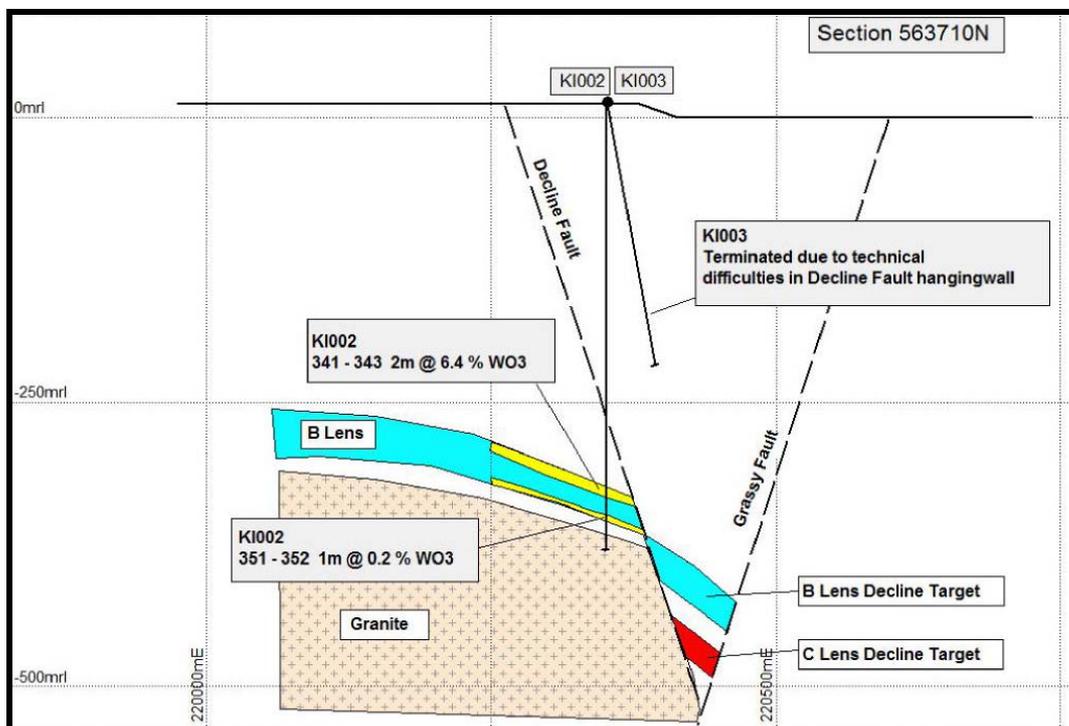
Additional resources from the Dolphin South area would have high strategic importance for the project adding to mine life. There is very good potential to add an additional 1-2 million tonnes of high grade resources amenable to underground exploitation.

Dolphin South has long been regarded as a high priority target being to the south and at depth from previous operations. The target area is difficult to target from surface as it is just off-shore and drill paths from shore need to travel through a known fault

A surface diamond drilling programme to test Dolphin South was undertaken in 2011.

- Holes 1 and 2 targeted mineralisation known to exist immediately south of past operations. Results showed that the anticipated C Lens had been stoped out by intruding granite. Intercepts of B Lens provided encouraging results.

### Section 563,710mN



- The surface drilling programme was terminated due to difficult drilling conditions encountered with Hole 3.

It is now anticipated that the target areas will be better accessed by drilling from underground positions at an RL of -250m early in the Dolphin redevelopment.

### **Bold Head**

There is near-surface potential at Bold Head. Several existing drill intersections carry significant grade providing potential for a small open pit.

It has also been postulated that there is significant potential for mineralisation at depth along the main fault zone separating Bold Head and Dolphin.

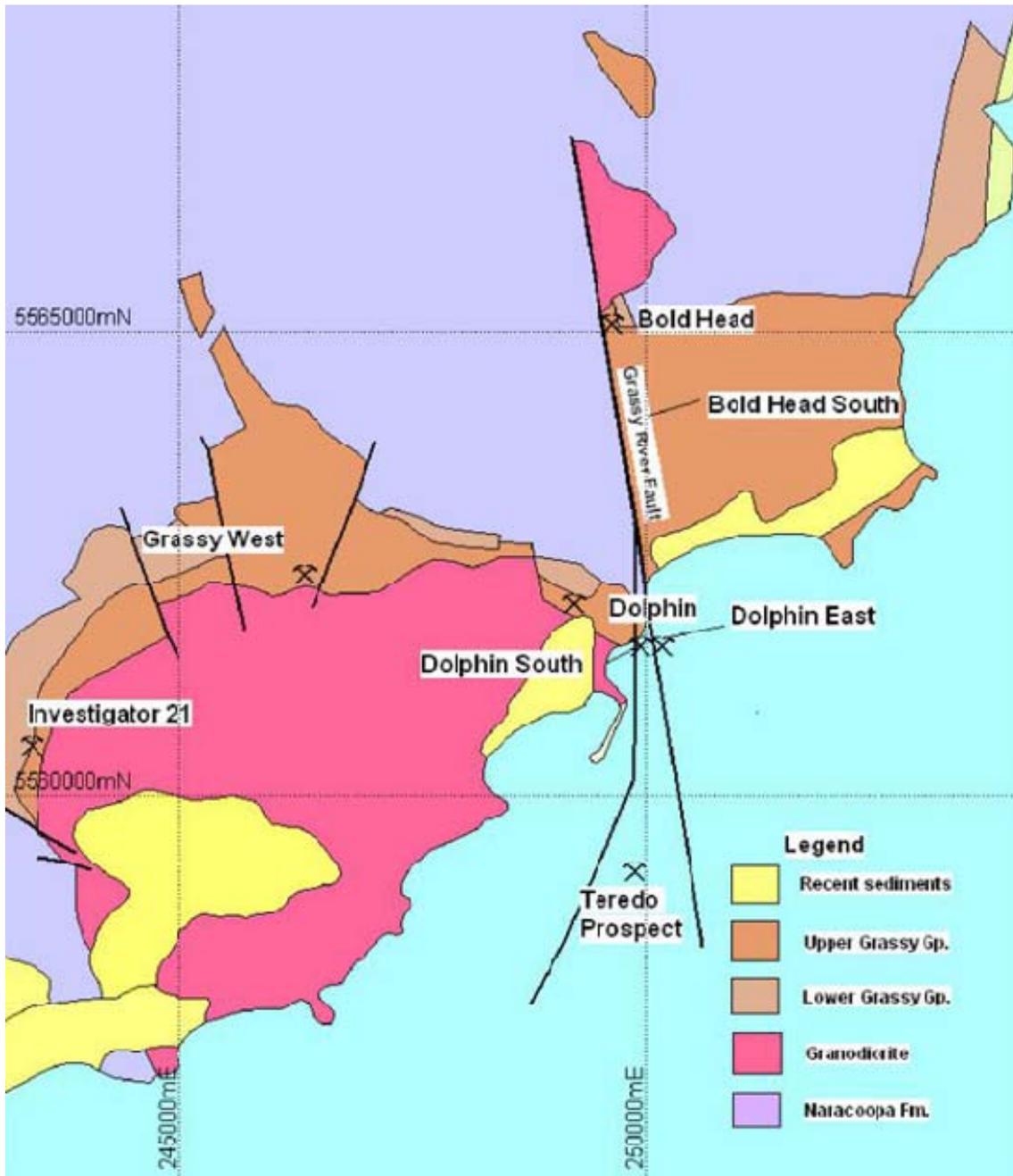
### **Regional Exploration Potential**

A seven kilometre length of Grassy Group volcanics is exposed along the northern and western margin of the Grassy granodiorite. The geology is moderately well defined from previous first pass drilling, mapping and magnetic surveys and has been studied and explored by the previous mine operators. Mineralisation has been identified in a number of prospects (e.g. Investigator 21 and Grassy West).

Previous exploration has confirmed the prospectivity of the periphery of the Grassy granodiorite identifying mineralised calc-silicate skarn adjacent to the granodiorite. Several major fault structures have been mapped regionally. Additional detailed exploration is required including collation of drilling data and geological information and interpretation of gravity and aeromagnetic data followed by further targeted exploration drilling.

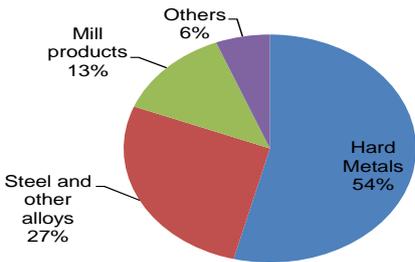
There is the potential to discover several small 1-2Mt resources of low to medium grade around the Grassy Pluton.





## 8. Tungsten Market

Tungsten has a number of unique properties as indicated below. These properties make it suitable for use in a wide variety of applications, particularly cemented carbides (hard metals).

Properties	Tungsten consumption by market segment 2009
<ul style="list-style-type: none"> <li>Highest melting point &amp; lowest vapour pressure of all metals.</li> <li>Highest tensile strength at high temperatures.</li> <li>Tungsten carbide products are the hardest of all metals.</li> <li>Among the heaviest of all metals.</li> <li>Brilliant sheen, is scratch and corrosion resistant and conducts electricity well.</li> </ul>	 <p>Source: C&amp;M, ITIA</p>
Applications	
<ul style="list-style-type: none"> <li>Cutting tools.</li> <li>Mining / oil / gas drilling equipment.</li> <li>Military applications</li> <li>Specialty chemicals.</li> </ul>	

### Supply

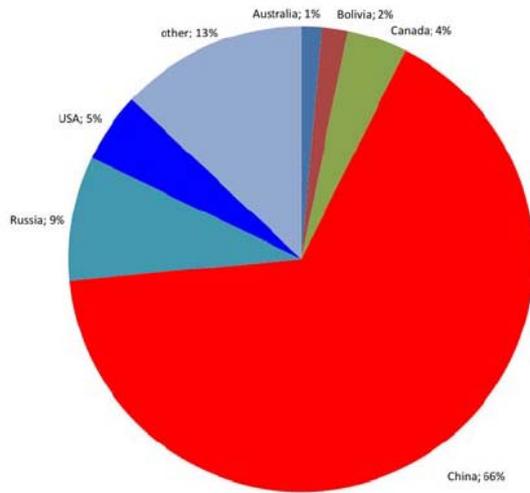
Tungsten concentrates containing 50% to 68%  $WO_3$  are produced by mining, milling and processing. The principal intermediate product is ammonium paratungstate (APT) which is produced from concentrate or scrap metal. In addition, tungsten oxides (yellow and blue) are also produced. Almost 66% of all tungsten used (primary and scrap) is ultimately converted to tungsten metal powder.

The tungsten minerals of economic importance are scheelite and wolframite.

China is the dominant global supplier of concentrate and APT with production of approximately 60,000 tonnes relative to global production of approximately 70,000 tonnes in 2010. In recent years China has preferred to export processed  $WO_3$ , and has restricted the supply of tungsten concentrates and intermediate products by imposing significant quotas and taxes. Western downstream processors are seeking non-Chinese sources of supply for tungsten concentrates.

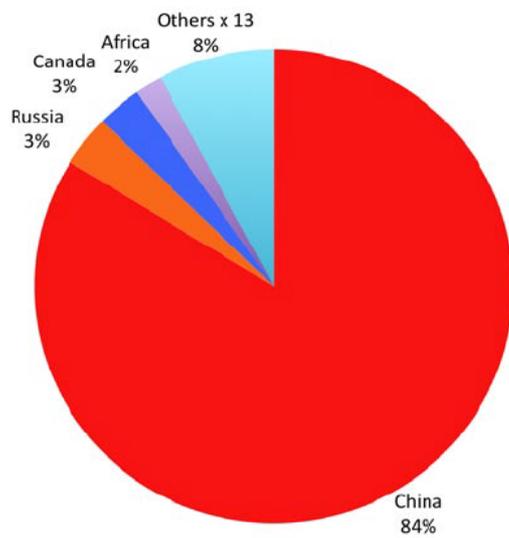


### World Tungsten Reserves, Share by Country 2011 (%)



Source: USGS, Geoscience Australia

### Primary Tungsten Supply by Country, 2009 (%)



Source: C&M, ITIA, USGS



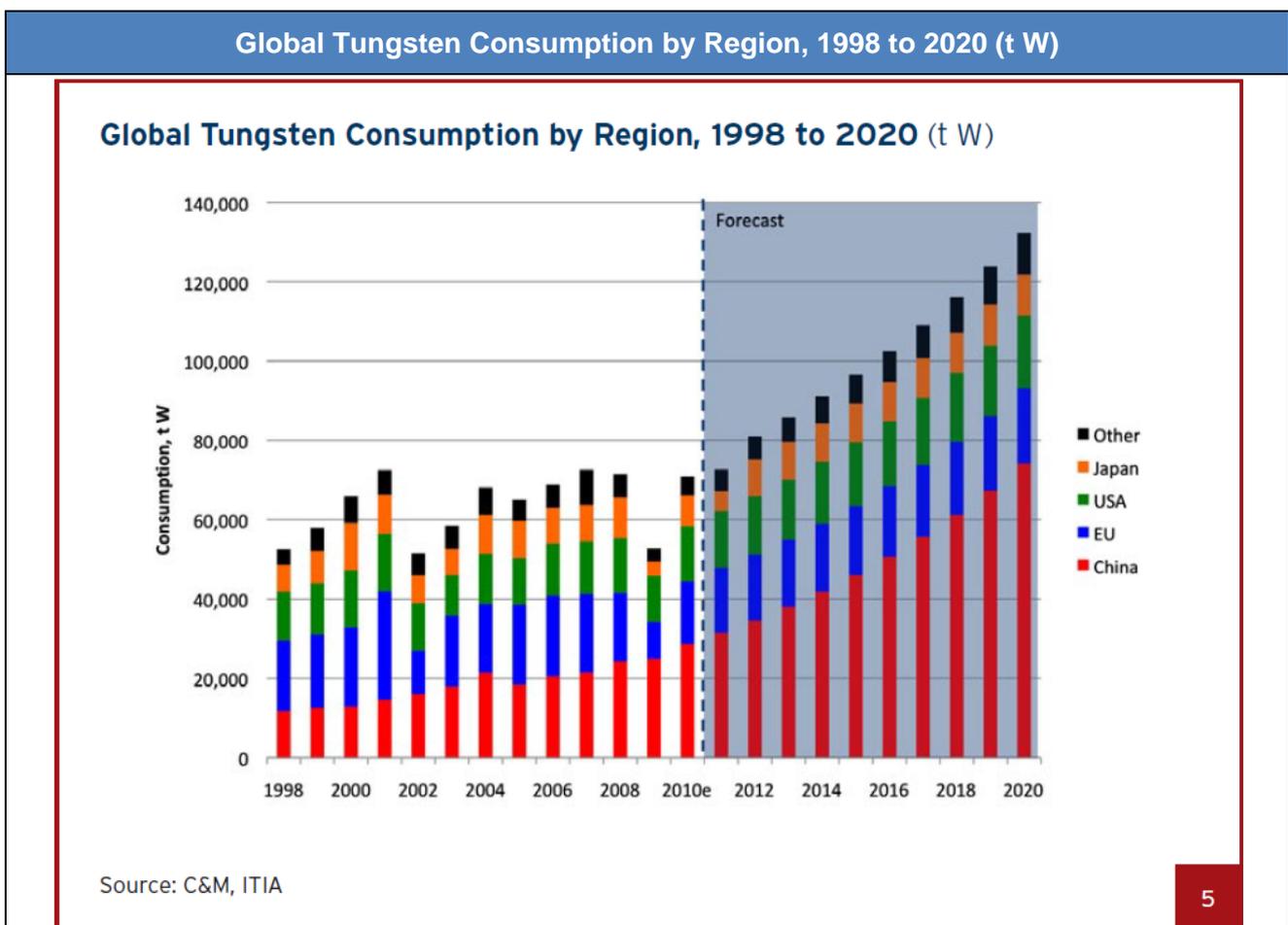
Western stockpiles are depleting and Western processors rely heavily on recycling. Tungsten was declared a US “conflict metal” in 2010 and identified by the EU as one of 14 ‘critical’ minerals.

### Demand

Historically, tungsten demand has been closely correlated to economic growth. The level of industrial output is the key driver for growth of tungsten markets, especially the rate of machine-tool capital spending related to automotive production, aerospace industries, drilling in the mining and energy sectors and military spending.

China currently accounts for 37% of total tungsten consumption and has had an average growth rate of 7% over the past 10 years. Cemented carbide consumption is strongly linked to GDP per capita - potentially causing tungsten consumption to grow faster than GDP in China.

A confidential report prepared for KIS has forecast global tungsten consumption to rise to 132,000 tonnes by 2020, providing a strong outlook for tungsten demand and pricing.



## 9. Board of Directors

King Island Scheelite Limited has an experienced board of directors with a track record in project development.

**Tony Haggarty**  
**Non-Executive Chairman**

Tony joined the Board in March 1998 and became Chairman in February 2007. He has more than 25 years of experience in mining in Australia and overseas. Tony was a co-founder and Managing Director of Excel Coal Limited until its acquisition by Peabody Energy Corporation in 2006. He is currently Managing Director of Whitehaven Coal and Non-Executive Director of IMX Resources.

**Robin Morritt**  
**Non-Executive Director**

Robin joined the Board in May 2005. He is an exploration geologist with over 30 years of experience. Robin co-founded ReLODE Ltd (now Integra Mining Ltd) as was the Chairman and Managing Director of that company in its formative years. He put together the package of gold tenements that now forms the core of Integra's activities in the Goldfields of Western Australia. Robin worked extensively with the former Western Mining Corporation Ltd in Australia, the USA, Brazil and Chile. He also represented Franco-Nevada Mining Ltd in Australia. Robin is a Director of Pleiades Resources Pty Ltd, a private company exploring in Australia.

**Andrew Plummer**  
**Non-Executive Director**

Andy joined the board in March 2006 and has over 30 years of industry experience ranging from mining finance/investments to mining engineering and operations. Until 2006 he was an executive director of Excel Coal Limited, where he was responsible for the group's business development activities. He is also a Director of Whitehaven Coal.

**Li Li (Fang Wu, alternate)**  
**Non-Executive Director**

Mr Li joined the Board in May 2011. He is a Director of Hunan Nonferrous Metals Corporation Limited

**Ian Morgan**  
**Company Secretary**

Ian is an experienced Chartered Company Secretary and Chartered Accountant, with over 25 years of experience in corporate administration.



## 10. Management Team

The management team has the technical and financial skill mix required for the development of a project of this nature.

### **Simon Bird** **Chief Executive Officer**

Simon has extensive management and finance experience through senior roles at Stockland Limited, GrainCorp Limited and Wizard Mortgage Corporation. He is a Fellow of the Australian Institute of Company Directors (FAICD) and Fellow of CPA Australia (FCPA). Simon is a Non-Executive Director of Metals Finance Limited and Mount Gibson Iron Limited and is a former Director of CPA Australia Limited.

### **Paul Carrick** **Manager Mining Operations**

Paul has over 20 years of experience in open pit and underground mines throughout Australia and overseas including feasibility studies, mine design and construction, contractor and operational management.

### **Alvin Johns** **Chief Metallurgist**

Alvin has over 25 years of mining industry experience and has been involved in commissioning a number of processing facilities around the world as well as in Tasmania.

### **Sue Jolliffe** **Finance Manager**

Sue has over 20 years of experience in various roles focused on management accounting and finance management. She spent significant time working in finance within the coal industry in the Hunter Valley.

King Island Scheelite Limited also has a team of consultants with long experience working on the Dolphin Project and other projects in Tasmania.



## 11. Implementation Strategy

The large scale of the Dolphin project means that KIS will seek a partner to assist in funding and developing the project.

Key implementation steps are as follows.

### Approvals

- All approvals are in an advanced stage and expected to be finalised in March 2012.

### Off-taker

- KIS is in advanced discussions with potential tungsten off-takers in Europe, North America, Japan and China.
- Acceptability of Dolphin concentrate has been confirmed.

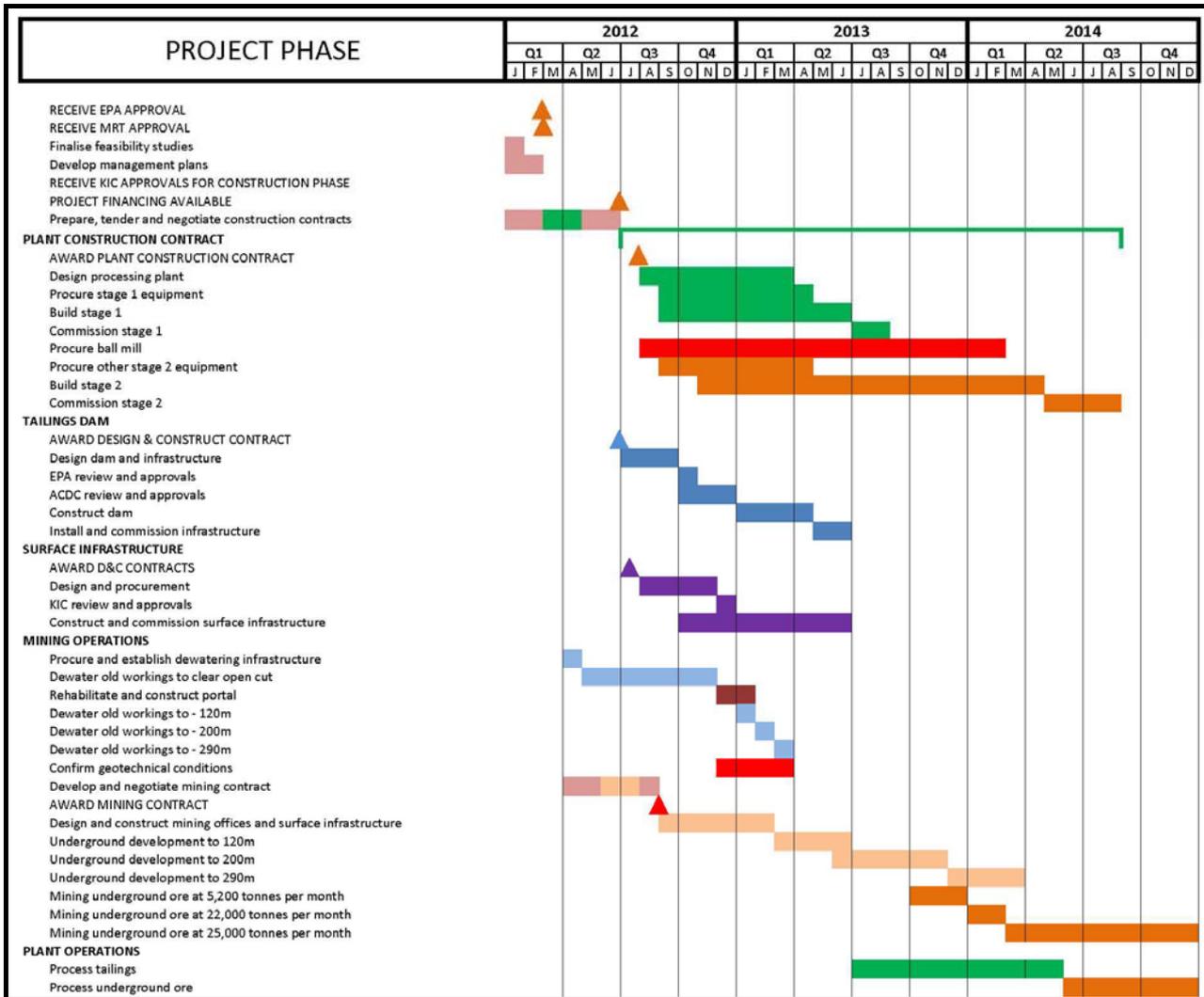
### Financing

- Financing plan includes debt supported by off-taker commitments.
- Discussions with potential equity joint venture partners have commenced.



## Project implementation

A project schedule is outlined below.



## 12. Mineral Resources & Reserves

Resource			
	Tonnes (000)	WO <sub>3</sub> %	WO <sub>3</sub> Tonnes
<b>Dolphin</b>	0.70% WO <sub>3</sub> cut off		
Indicated	4,752	1.29	61,300
Inferred	7	0.73	50
Total	4,759	1.29	61,350
<b>Bold Head</b>	0.50% WO <sub>3</sub> cut off		
Indicated	1,500	0.93	13,950
Inferred	150	1.22	1,830
Total	1,650	0.96	15,780
<b>Tailings</b>	0.08% WO <sub>3</sub> cut off		
Measured	2,700	0.17	4,590
<b>TOTAL</b>	<b>9,109</b>	<b>0.90</b>	<b>81,720</b>

Resource estimate is in accordance with JORC code 2004

### Explanatory Notes for Resource Statement: Competent Person and JORC Code

The resource report was prepared in accordance with the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code") by Consultant Geologist Mr Tim Callaghan of Resource and Exploration Geology, who is a Member of The Australasian Institute of Mining and Metallurgy ("AusIMM"); has a minimum of twenty years of experience as a geologist, five of which are in the estimation, assessment and evaluation of Mineral Resources of this style and is the Competent Person as defined in the JORC Code. This announcement accurately summarises and fairly reports his estimations and he has consented in writing to the resource report in the form and context in which it appears.



		Reserve		
		Tonnes (000)	WO <sub>3</sub> %	WO <sub>3</sub> Tonnes
Dolphin	Probable	2,687	1.04	28,060
Bold Head	Probable	609	0.76	4,640
Tailings	Proven	1,900	0.19	3,610
<b>TOTAL</b>		<b>5,196</b>	<b>0.70</b>	<b>36,310</b>

#### Explanatory Notes for Reserves Statement: Competent Person and JORC Code

The reserves report (for Dolphin and Bold Head) was prepared in accordance with the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code") by Consultant Mining Engineer Mr Alan Fudge of Polberro Consulting, who is a Member of The Australasian Institute of Mining and Metallurgy ("AusIMM") and has a minimum of five years of experience in the estimation, assessment and evaluation of Mineral Reserves of this style and is a Competent Person as defined in the JORC Code (2004). This announcement accurately summarises and fairly reports his estimations and he has consented in writing to the reserve report in the form and context in which it appears.

#### Explanatory Notes for Reserves Statement: Competent Person and JORC Code

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## 13. Data Sources

Consultant	Study area
Burnie Laboratories	Drilling assays and metallurgical test work
E3 Planning	EPA approvals & mining permits
Esker Milling & Processing	Flow sheet and metallurgical test work
GHD	Engineering for tailings extraction and dams
GR Engineering	Process plant design and costings
GZRINM <sup>1</sup>	Metallurgical test work
Mancala	Underground mining contractor costs
Metsolve	Gravity test work
Neville J Wiggs & Associates	Dewatering plan and general engineering (W R Hill)
Polberro Consulting	Underground mine plan, reserve and schedule
Resource and Exploration Geology	Resource estimation
R W Nice Consulting	Metallurgy and process review
Rob Hill & Associates	Island Establishment/Infrastructure engineering
Clark & Marron Pty Ltd	Tungsten Markets

Note 1: Guangzhou Research Institute of Non-ferrous Metals



## 14. Cautionary statement / disclaimer

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This report is not and should not be considered as an offer or invitation to subscribe for or purchase any securities in KIS, or as an inducement to make an offer or invitation with respect to those securities. No agreement to subscribe for securities in KIS will be entered into on the basis of this report.

This report contains certain forward-looking statements which have not been based solely on historical facts but, rather, on KIS current expectations about future events and on a number of assumptions which are subject to significant uncertainties and contingencies many of which are outside the control of KIS and its directors, officers and advisers.

This report contains Exploration Targets which are conceptual in nature where there has been insufficient exploration to define full mineral resources and it is uncertain that further exploration will result in the determination of a Mineral Resource.

Due care and attention has been taken in the preparation of this report. However, the information contained in this report (other than as specifically stated) has not been independently verified for KIS or its directors and officers, nor has it been audited. Accordingly, KIS does not warrant or represent that the information contained in this report is accurate or complete. To the fullest extent permitted by law, no liability, however arising, will be accepted by KIS or its directors, officers or advisers, for the fairness, accuracy or completeness of the information contained in this report.



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**Email: [simon.bird@kisltd.com.au](mailto:simon.bird@kisltd.com.au)**



# KING ISLAND SCHEELITE LIMITED

Dolphin (Tungsten) Project update

June 2012

Simon Bird - CEO



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# Our Project



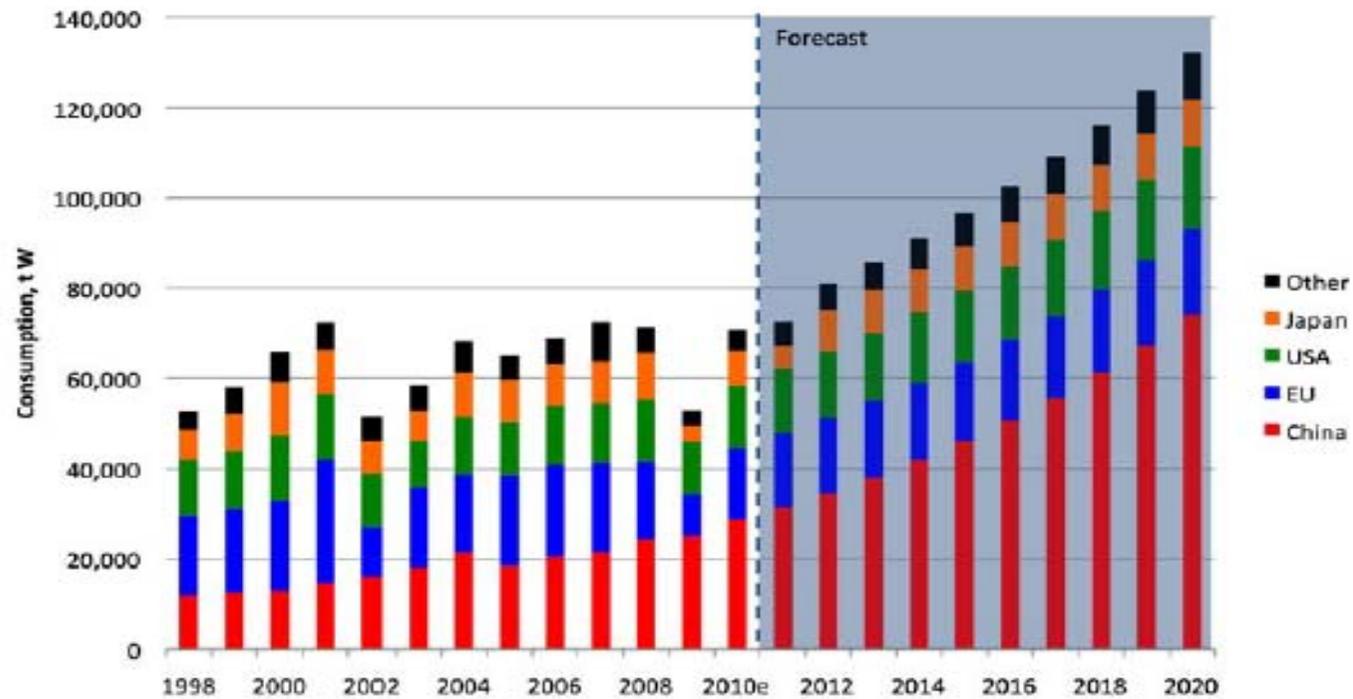
**King Island owns 100% interest in this well known tungsten project**

<b>Tungsten</b>	Demand for this strategic metal continues to grow particularly in China	Global demand to double by 2021 Chinese restrictions remain in place
<b>Resources</b>	World class deposit at Dolphin mine + Bold Head and Tailings	9.1m tonnes at 0.90% WO <sub>3</sub> in situ value of \$2.75b
<b>Mine plan</b>	Robust plan developed with former underground manager	Up to 350,000pa mill feed over initial 10 year mine life
<b>Plant design</b>	Based on tests using latest Chinese techniques	91% WO <sub>3</sub> recovered into standard 65% concentrate
<b>Approvals</b>	Land ownership and necessary environmental, development & mining approvals in place	100% freehold title for land required + support from Council, EPA and Mineral Resources Tasmania.
<b>Economics</b>	Definitive Feasibility Study completed	NPV >\$100m at acceptable returns
<b>Team to deliver</b>	Respected board & management in place	Strong mining and technical expertise



# Tungsten has strong global demand

## Global Tungsten Consumption by Region, 1998 to 2020 (t W)



Source: C&M, ITIA



# Project location

(Under Mineral Resources Tasmania jurisdiction)



# Former Dolphin operations

(one of the last western mines to close in early 1990's)



# Significant high grade deposit

(classified 'World Class' by US Geological Society)



Resource			
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Resource estimate is in accordance with JORC code 2004



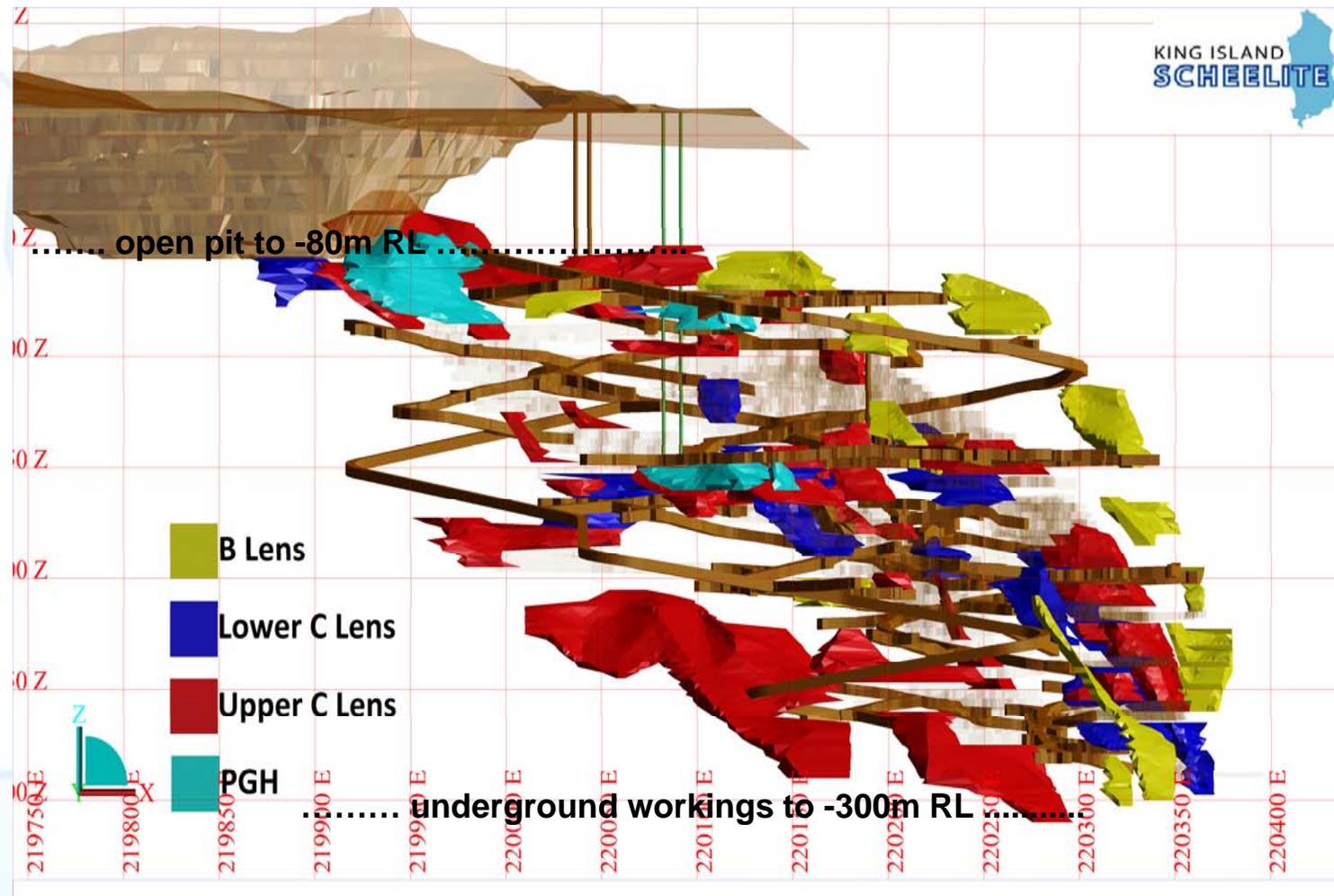
# Detailed mine plan

(developed in conjunction with former underground manager)

KING ISLAND  
SCHEELITE



KING ISLAND  
SCHEELITE



# Robust production profile



		Reserve		
		Tonnes	WO <sub>3</sub> %	Mtu's
Dolphin	Probable	2,687,000	1.04	2,806,000
Bold Head	Probable	609,000	0.76	464,000
Tailings	Proven	1,910,000	0.19	362,900
<b>TOTAL</b>		<b>5,206,000</b>	<b>0.70</b>	<b>3,632,900</b>

Plans to dewater, rehabilitate and mine Dolphin utilising paste fill method, with associated mine schedule completed. This will produce up to 350,000tpa mill feed from mid 2014.

Reopening the former underground mine at Bold Head will produce a further 100,000tpa mill feed.

Tailings reclamation utilising dry mining extraction methods at 1,300,000tpa can generate a plant feed at approximately 350,000tpa.

Reserve estimate is in accordance with JORC code 2004

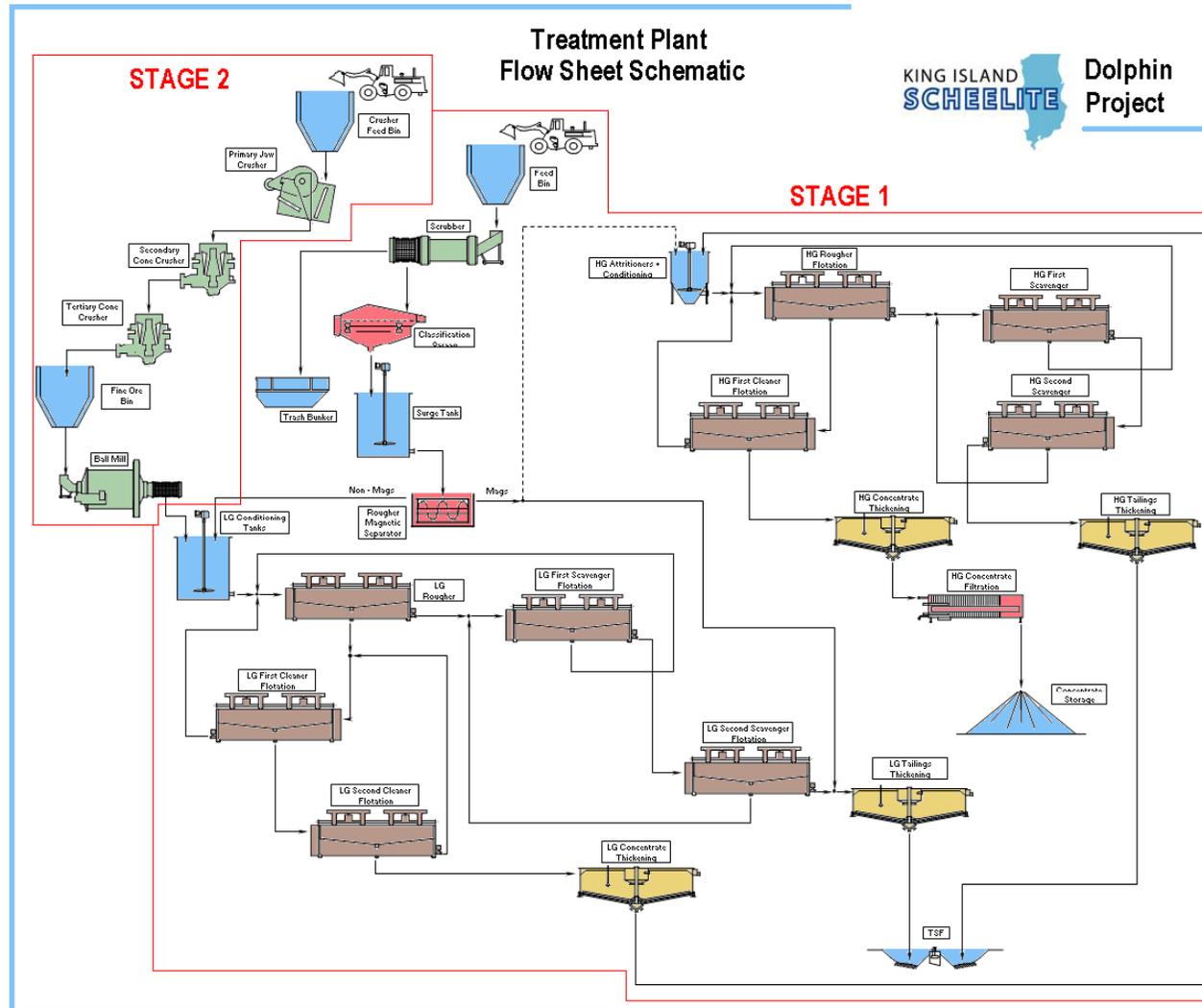


# Recovery process confirmed

(based on latest Chinese techniques)



KING ISLAND SCHEELITE  
Dolphin Project



# Confident of output assumptions



- ❖ **substantial test work undertaken with Chinese experts**
- ❖ **confirmatory work successfully completed in Burnie**
- ❖ **well understood processes and metallurgy**
- ❖ **our product is well known to off-takers from previous operations**
- ❖ **expecting 91%  $WO_3$  recovery into > 65% concentrate**



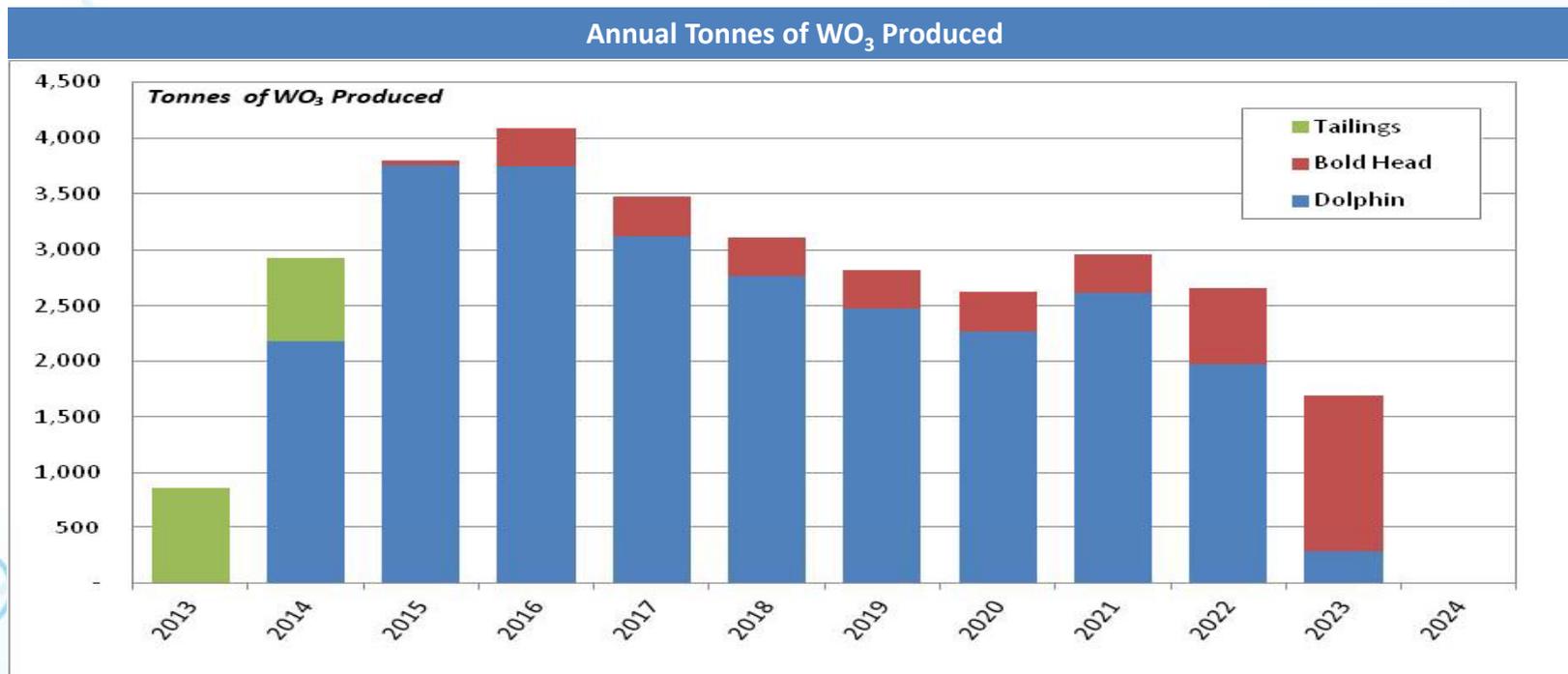
# Set to be a significant tungsten producer



**Produce up to 25% of non-Chinese world production**

**Supplying up to 5,700 tonnes of concentrate pa**

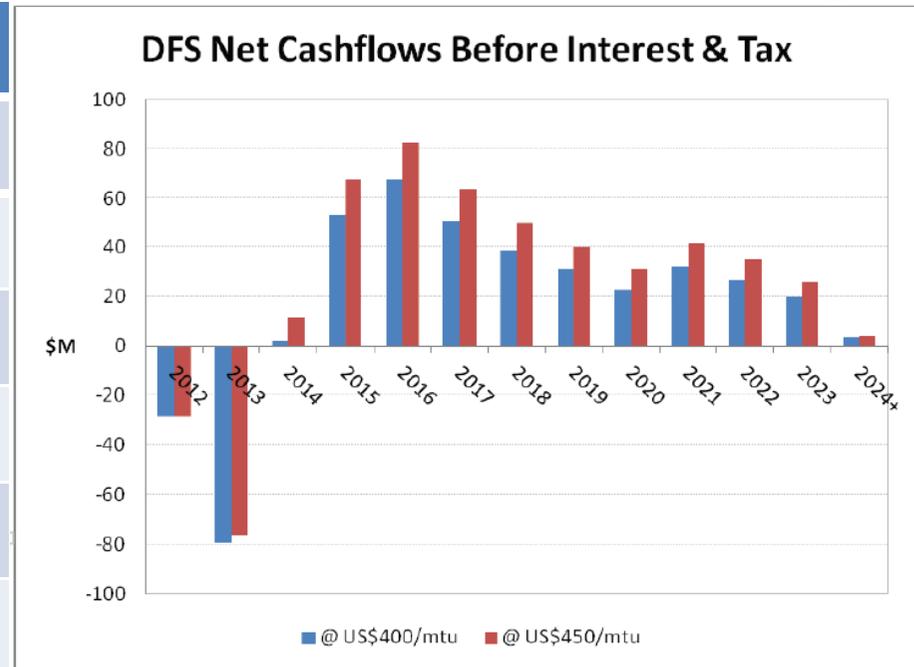
**10 year mine life before any further resources are confirmed**



# Definitive Feasibility Study



<b>Revenue generated</b>	<b>~ \$1,100 million</b>
<b>Project capital</b>	<b>~ \$133 million</b>
<b>Cash generated</b>	<b>&gt; \$300 million</b>
<b>NPV post tax</b>	<b>&gt; \$100 million</b>
<b>IRR post tax</b>	<b>&gt; 25%</b>
<b>Healthy Margins</b>	<b>52 – 56%</b>
<b>Mine Life</b>	<b>10 years</b>

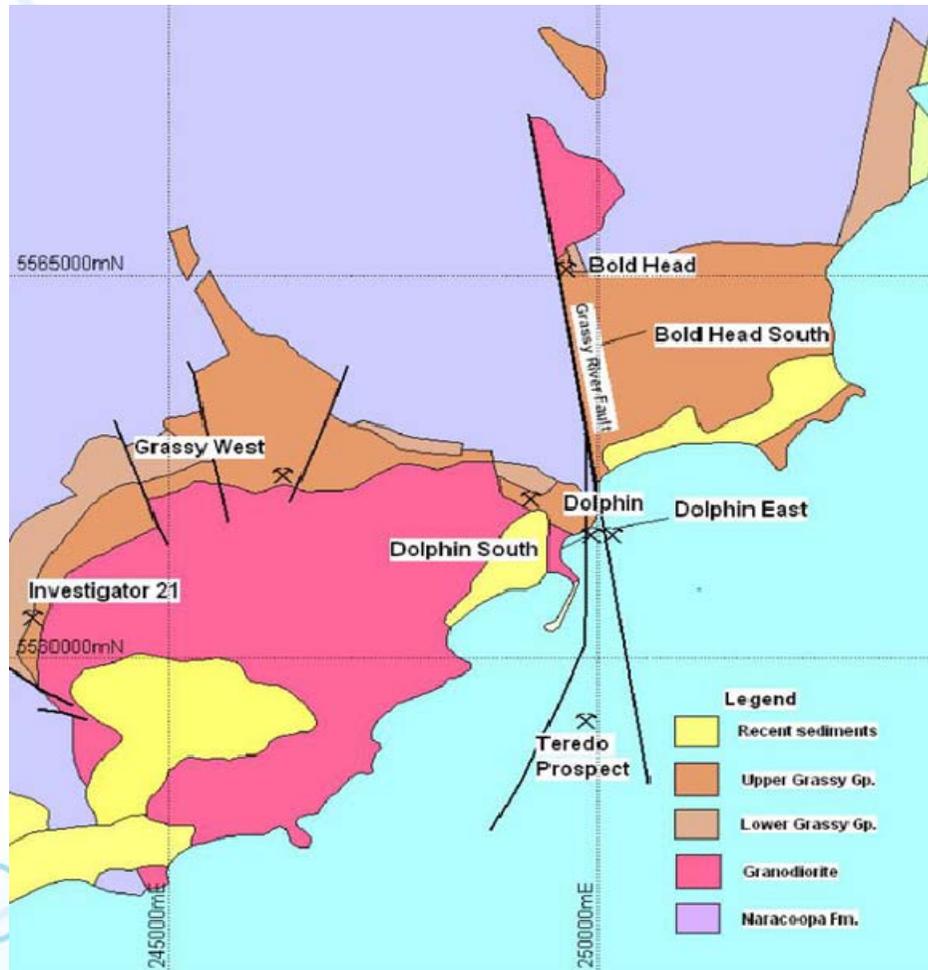


**Additional mineralisation beyond -300m RL could generate >\$40 million in cash flow for each additional year of mine life.**



# Exploration potential

(particularly as extension down-plunge of former underground workings)



A number of geological reports indicate the potential for additional mineralisation in the area.

The primary target, however is immediately below and south of the former underground workings. High grade ore 'down-plunge' at Dolphin South is considered most economic and likely potential to extend the mine life.

Recent surface drilling recorded a 2m intercept at -341m RL @ 6.4% WO<sub>3</sub> at Dolphin South.

Drilling has been suspended until underground access is established.



# Team to deliver



## ❖ Board

❖ Tony Haggarty, Andy Plummer, Dr Robin Morritt, Mr Li Li

## ❖ Management

❖ Simon Bird (Chief Executive)

❖ Ian Morgan (Co Secretary)

❖ Paul Carrick (Mining Engineer)

❖ Alvin Johns (Metallurgist)

❖ Sue Jolliffe (Finance Manager)

❖ Rob Hill (Site Infrastructure and Engineering)

❖ Tim Callaghan (Geologist)

Also: Alan Fudge, Evan Boardman, Neville Wiggs, Nick Moony  
GR Engineering, GZRINM, Burnie Laboratories, Mancala, GHD



# Development ready



- ❖ land and approvals in place
- ❖ robust mine plan developed
- ❖ process and recoveries proven
- ❖ strong technical team assembled
- ❖ definitive feasibility study completed
- ❖ off-takers and financiers engaged



# KING ISLAND SCHEELITE LIMITED



**Simon Bird**  
Chief Executive Officer

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**Explanatory Notes for Resource Statement: Competent Person and JORC Code**

The resource report was prepared in accordance with the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code") by Consultant Geologist Mr Tim Callaghan of Resource and Exploration Geology, who is a Member of The Australasian Institute of Mining and Metallurgy ("AusIMM"); has a minimum of twenty years of experience as a geologist, five of which are in the estimation, assessment and evaluation of Mineral Resources of this style and is the Competent Person as defined in the JORC Code. This announcement accurately summarises and fairly reports his estimations and he has consented in writing to the resource report in the form and context in which it appears.

**Explanatory Notes for Reserves Statement: Competent Person and JORC Code**

The reserves report (for Dolphin and Bold Head) was prepared in accordance with the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code") by Consultant Mining Engineer Mr Alan Fudge of Polberro Consulting, who is a Member of The Australasian Institute of Mining and Metallurgy ("AusIMM") and has a minimum of five years of experience in the estimation, assessment and evaluation of Mineral Reserves of this style and is a Competent Person as defined in the JORC Code (2004). This announcement accurately summarises and fairly reports his estimations and he has consented in writing to the reserve report in the form and context in which it appears.

**Explanatory Notes for Reserves Statement: Competent Person and JORC Code**

The reserves report (Tailings) was prepared in accordance with the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code") by Consultant Geologist Mr Tim Callaghan of Resource and Exploration Geology, who is a Member of The Australasian Institute of Mining and Metallurgy ("AusIMM"); has a minimum of twenty years of experience as a geologist, five of which are in the estimation, assessment and evaluation of Mineral Reserves of this style and is a Competent Person as defined in the JORC Code (2004). This announcement accurately summarises and fairly reports his estimations and he has consented in writing to the reserve report in the form and context in which it appears.

