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© 2012
1 Summary ................................................................................................................................. 9
  1.1 Geology and mineralization .............................................................................................. 10
  1.2 Metallurgical testwork ...................................................................................................... 11
  1.3 Drilling, sampling and assaying ....................................................................................... 11
  1.4 Mineral Resource estimate ............................................................................................... 12
  1.5 Recommendations ........................................................................................................... 16
    1.5.1 Metallurgical testwork ............................................................................................... 16
    1.5.2 Mineral Resource Estimates ...................................................................................... 16

2 Introduction ............................................................................................................................ 17
  2.1 Terms of reference ............................................................................................................ 17
  2.2 Sources of information and data used ............................................................................. 17
  2.3 Personal inspections ......................................................................................................... 17

3 Reliance on other experts ..................................................................................................... 18

4 Property description and location ......................................................................................... 19
  4.1 Tenure ............................................................................................................................... 19
  4.2 Status of mining titles ....................................................................................................... 19
    4.2.1 Confirmation of tenure ............................................................................................. 20
  4.3 Royalties, fees and taxes ................................................................................................ 20
  4.4 Location ........................................................................................................................... 21

5 Accessibility, climate, local resources, infrastructure and physiography ...................... 22
  5.1 Climate and physiography ............................................................................................... 22
    5.1.1 Vegetation .................................................................................................................. 22
  5.2 Accessibility ..................................................................................................................... 22
  5.3 Infrastructure .................................................................................................................... 23

6 History .................................................................................................................................. 25
  6.1 Work completed by Silver Standard ................................................................................. 29
  6.2 Previous feasibility studies at the Property ..................................................................... 29
  6.3 Prior mineral production ................................................................................................ 29
  6.4 Preliminary Economic Assessment 2010 .......................................................................... 30

7 Geological setting and mineralization ............................................................................... 31
  7.1 Regional geological setting .............................................................................................. 31
  7.2 Local geology - the Sulphurets Mining Camp ................................................................. 32
    7.2.1 Stratigraphic setting and major mineral deposits .................................................... 32
    7.2.2 Alteration and Mineralization .................................................................................. 36
    7.2.3 Structural setting and metamorphism ..................................................................... 36
  7.3 Property geology ............................................................................................................. 40
    7.3.1 Lithology and Stratigraphy ....................................................................................... 40
7.3.2 Alteration and Mineralization ................................................. 44
7.3.3 Structure and Metamorphism .................................................. 55

8 Deposit types ........................................................................... 58

9 Exploration ............................................................................. 60

10 Drilling .................................................................................... 63

10.1 Historical drilling ................................................................. 63
10.2 Silver Standard drilling ....................................................... 63
10.3 Pretivm drilling .................................................................. 63

11 Sample preparation, analyses and security .............................. 67

11.1 Sample preparation before dispatch of samples ..................... 67
11.2 Analytical laboratory ......................................................... 67
11.2.1 Method .......................................................................... 68
11.2.2 Density determinations .................................................... 68
11.3 Quality assurance and quality control ................................. 68
11.3.1 Data - 2011 ................................................................. 68
11.3.2 Data - 2012 ................................................................. 70
11.4 Author’s opinion on date sample preparation, security and analytical procedures .............................................................. 71

12 Data verification ....................................................................... 72

12.1 Site verification and independent sampling by P&E ............... 72
12.2 Data verification by Snowden ............................................... 73

13 Mineral processing and metallurgical testing ......................... 76

13.1 Introduction ......................................................................... 76
13.2 Summary ............................................................................ 76
13.3 Conclusions ....................................................................... 77
13.4 Recommendations ............................................................. 77

14 Mineral Resource estimates ................................................... 78

14.1 Disclosure .......................................................................... 78
14.2 Known issues that materially affect mineral resources ......... 78
14.3 Assumptions, methods and parameters ............................... 78
14.4 Data provided ...................................................................... 79
14.5 Geological interpretation and modelling ............................. 80
14.5.1 VOK and Galena Hill ..................................................... 80
14.5.2 Shore Zone, Gossan Hill and Bridge Zone ....................... 81
14.5.3 West Zone .................................................................... 81
14.5.4 Domains used for modelling ......................................... 81
14.6 Compositing of assay intervals ........................................... 83
14.6.1 Summary statistics ....................................................... 83
14.6.2 Extreme values – gold and silver ................................................................. 85
14.7 Consideration of grade outliers and estimation method ..................................... 85
14.8 Variogram analysis ............................................................................................ 88
14.9 Establishment of block models ......................................................................... 94
14.10 Grade interpolation parameters ........................................................................ 94
14.11 Density estimation and assignment ................................................................... 98
14.12 Prior mining ..................................................................................................... 98
14.13 Model validation ............................................................................................... 99
  14.13.1 Global comparisons ..................................................................................... 99
  14.13.2 Visual validation .......................................................................................... 100
  14.13.3 Grade trend plots ........................................................................................ 102
14.14 Resource classification ..................................................................................... 102
14.15 Resource reporting .......................................................................................... 105
14.16 Comparison with previous Mineral Resource estimate ...................................... 108
14.17 Open pit sensitivity - Tabulation of grade-tonnage .......................................... 109

15 Adjacent properties ............................................................................................. 111

16 Other relevant data and information ................................................................... 112
  16.1 Preliminary economic assessment 2011 .......................................................... 112
  16.2 Updated preliminary economic assessment 2012 ........................................... 112

17 Interpretation and conclusions ............................................................................. 113

18 Recommendations .............................................................................................. 114

19 References .......................................................................................................... 115

20 Certificate of author ............................................................................................ 118

Tables
  Table 1.1 Valley of the Kings Mineral Resource estimate based on a cut-off grade of 5 g/t AuEq – September 2012\(^{(1)(4)(5)}\) ................................................................. 14
  Table 1.2 West Zone Mineral Resource estimate based on a cut-off grade of 5 g/t AuEq – April 2012\(^{(1)(4)(5)}\) ................................................................. 14
  Table 1.3 Brucejack (total) Mineral Resource estimate (including VOK and West Zone) based on a cut-off grade of 5 g/t AuEq – September 2012\(^{(1)(4)(5)}\) ................................................................. 14
  Table 1.4 Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 0.3 g/t AuEq – September 2012\(^{(1)(4)(5)}\) ................................................................. 15
  Table 1.5 Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 0.5 g/t AuEq – September 2012\(^{(1)(4)(5)}\) ................................................................. 15
  Table 1.6 Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 1.0 g/t AuEq – September 2012\(^{(1)(4)(5)}\) ................................................................. 15
  Table 4.1 List of mineral claims ............................................................................. 19
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 12.1</td>
<td>Standard verification</td>
<td>75</td>
</tr>
<tr>
<td>Table 14.1</td>
<td>Summary statistics of composited data for mineralized domains – VOK and Galena Hill</td>
<td>83</td>
</tr>
<tr>
<td>Table 14.2</td>
<td>Summary statistics of composited data for mineralized domains – Shore Zone</td>
<td>84</td>
</tr>
<tr>
<td>Table 14.3</td>
<td>Summary statistics of composited data for mineralized domains – Gossan Hill</td>
<td>84</td>
</tr>
<tr>
<td>Table 14.4</td>
<td>Summary statistics of composited data for mineralized domains – Bridge Zone</td>
<td>84</td>
</tr>
<tr>
<td>Table 14.5</td>
<td>Parameters to describe gold grade continuity for the low grade population estimates within the high grade domains</td>
<td>89</td>
</tr>
<tr>
<td>Table 14.6</td>
<td>Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in VOK and Galena Hill</td>
<td>90</td>
</tr>
<tr>
<td>Table 14.7</td>
<td>Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in West Zone</td>
<td>91</td>
</tr>
<tr>
<td>Table 14.8</td>
<td>Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in Shore Zone</td>
<td>91</td>
</tr>
<tr>
<td>Table 14.9</td>
<td>Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in Gossan Hill</td>
<td>92</td>
</tr>
<tr>
<td>Table 14.10</td>
<td>Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in Bridge Zone</td>
<td>92</td>
</tr>
<tr>
<td>Table 14.11</td>
<td>Parameters to describe gold grade continuity at the low grade / high grade population threshold</td>
<td>93</td>
</tr>
<tr>
<td>Table 14.12</td>
<td>Parameters to describe density continuity</td>
<td>94</td>
</tr>
<tr>
<td>Table 14.13</td>
<td>Comparison of the mean composite grade with the mean block model grade for the mineralised domains in West Zone</td>
<td>99</td>
</tr>
<tr>
<td>Table 14.14</td>
<td>Comparison of the mean composite grade with the mean block model grade for the mineralised domains in VOK and Galena Hill</td>
<td>99</td>
</tr>
<tr>
<td>Table 14.15</td>
<td>Comparison of the mean composite grade with the mean block model grade for the mineralised domains in Shore Zone</td>
<td>99</td>
</tr>
<tr>
<td>Table 14.16</td>
<td>Comparison of the mean composite grade with the mean block model grade for the mineralised domains in Gossan Hill</td>
<td>100</td>
</tr>
<tr>
<td>Table 14.17</td>
<td>Comparison of the mean composite grade with the mean block model grade for the mineralised domains in Bridge Zone</td>
<td>100</td>
</tr>
<tr>
<td>Table 14.18</td>
<td>VOK Mineral Resource estimate based on a cut-off grade of 5 g/t AuEq – September 2012</td>
<td>106</td>
</tr>
<tr>
<td>Table</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>14.19</td>
<td>West Zone Mineral Resource estimate based on a cut-off grade of 5 g/t AuEq – April 2012&lt;sup&gt;(1)(4)(5)&lt;/sup&gt;</td>
<td>106</td>
</tr>
<tr>
<td>14.20</td>
<td>Mineral Resource estimate: Brucejack Project based on a cut-off grade of 5 g/t AuEq – September 2012&lt;sup&gt;(1)(4)(5)&lt;/sup&gt;</td>
<td>107</td>
</tr>
<tr>
<td>14.21</td>
<td>Contribution of grade populations to the estimate – VOK</td>
<td>108</td>
</tr>
<tr>
<td>14.22</td>
<td>Contribution of grade populations to the estimate – West Zone</td>
<td>108</td>
</tr>
<tr>
<td>14.23</td>
<td>Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 0.3 g/t AuEq – September 2012&lt;sup&gt;(1)(4)(5)&lt;/sup&gt;</td>
<td>109</td>
</tr>
<tr>
<td>14.24</td>
<td>Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 0.5 g/t AuEq – September 2012&lt;sup&gt;(1)(4)(5)&lt;/sup&gt;</td>
<td>110</td>
</tr>
<tr>
<td>14.25</td>
<td>Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 1.0 g/t AuEq – September 2012&lt;sup&gt;(1)(4)(5)&lt;/sup&gt;</td>
<td>110</td>
</tr>
<tr>
<td>15.1</td>
<td>Mineral reserve estimates for adjacent property</td>
<td>111</td>
</tr>
</tbody>
</table>

**Figures**

- Figure 4.1: Mineral claim map of the Property
- Figure 5.1: Planned access to the project
- Figure 5.2: Proposed high voltage Northwest Transmission Line
- Figure 6.1: West Zone underground vein location plan
- Figure 6.2: West Zone section 5080S
- Figure 7.1: Tectonic setting of Brucejack and Snowfield Properties in the north-west Cordillera
- Figure 7.2: Regional structural and stratigraphic setting of the Brucejack Property and Sulphurets Mining Camp in northwest BC
- Figure 7.3: Local structural and stratigraphic setting of the Brucejack Property and Sulphurets Mining Camp
- Figure 7.4: Sulphurets Mining Camp geology and mineralization
- Figure 7.5: Brucejack Property geology
- Figure 7.6: Brucejack Property geology
- Figure 7.7: Historical map with mineral deposits and occurrences
- Figure 7.8: Brucejack Property Mineralization Zones
- Figure 7.9: VOK geology map
- Figure 7.10: VOK cross section 426500 E
- Figure 7.11: VOK to West Zone geological section 426600 E - looking west
- Figure 7.12: West Zone drillholes and assay cross section
- Figure 7.13: Trace element analysis by lithology for VOK and West Zone
- Figure 8.1: Brucejack Deposit mineralization within context of porphyry systems
- Figure 9.1: 3-D geophysical model schematic according to Quantec Geoscience MT survey
- Figure 9.2: 3-D Geophysical model schematic according to Quantec MT survey
Figure 10.1  Core in wooden core boxes ready for transport ........................................ 64
Figure 10.2  Sample transportation by snowcoach ......................................................... 65
Figure 10.3  Brucejack Property diamond drillhole plan .................................................. 66
Figure 11.1  Cutting PQ core at the Brucejack Property .................................................... 67
Figure 12.1  P&E independent site visit sample results for gold ....................................... 72
Figure 12.2  P&E independent site visit sample results for silver ................................. 73
Figure 12.3  Sample verification results for Au grades ....................................................... 74
Figure 12.4  Sample verification results for Ag grades ....................................................... 75
Figure 14.1  Plan showing the distribution of exploration drillholes .............................. 80
Figure 14.2  Cross section showing lithological interpretation and mineralized domain interpretation at VOK ................................................................. 82
Figure 14.3  Orthogonal view of mineralized high grade domain interpretation ............ 82
Figure 14.4  Log probability plot showing threshold between lower and higher grade populations ............................................................... 86
Figure 14.5  Example cross section showing estimated gold grades compared to input composites within the mineralised domains for VOK .............. 101
Figure 14.6  Example oblique section showing estimated gold grades compared to input composites within the mineralised domains for West Zone ...... 102
Figure 14.7  Example cross section showing classification of resource estimate for VOK with drilling coloured by gold grade ............................... 104
Figure 14.8  Example oblique section showing classification of resource estimate for West Zone with drilling coloured by gold grade ................. 105
Figure 14.9  Schematic showing comparison of September 2012 estimation domains with prior April 2012 domains ........................................... 109
1 Summary

In May 2012, Snowden Mining Industry Consultants Inc. ("Snowden") was engaged by Pretium Resources Inc ("Pretivm"), to complete an update of the Mineral Resource estimate for the Valley of the Kings (VOK), Galena Hill, Shore Zone, Gossan Hill and Bridge Zone of the Brucejack Project in compliance with National Instrument ("NI") 43-101 and Form 43-101F1. The zones are five gold-silver zones of mineralization that are part of Pretivm's Brucejack Project that was the subject of a (now out-of-date) preliminary economic assessment in February 2012.

The purpose of this Technical Report is to support the news release of 7 September 2012 in which an updated Mineral Resource estimate was reported for VOK and West Zone as well as to support the reported estimates as noted above.

The Brucejack Property (the "Property") is situated approximately at 56°28′20″N Latitude by 130°11′31″W Longitude, a position approximately 950 km northwest of Vancouver, 65 km north-northwest of Stewart, and 21 km south-southeast of the Eskay Creek Mine in the Province of British Columbia. The Brucejack Property consists of six mineral claims totalling 3,199.28 ha in area and all claims are in good standing until 31 January, 2022.

The Property and the surrounding region have a history rich in exploration for precious and base metals dating back to the late 1800s. More recently in 2009 Silver Standard Resources Inc. began work on the Property. The 2009 program included drilling, rock-chip and channel sampling, and re-sampling of historical drill core. In 2010, pursuant to a purchase and sale agreement between Silver Standard (as the seller) and Pretivm (as the buyer), Silver Standard sold to Pretivm all of the issued shares of 0890693 BC Ltd., the owner of the Brucejack Project and the adjacent Snowfield Project.

In 2010, Silver Standard’s drill program was designed to further define bulk tonnage mineralization found the previous year, as well as to attempt to define a high grade resource at VOK. In this year, a total of 73 diamond drillholes was completed which totalled 33,400 m. Of this, 11 holes comprising 3,693 m were targeted at VOK, and 2 holes, totalling 1,119 m at the footwall of West Zone. In VOK, wide spaced drilling intersected enough high grade mineralization to confirm the exploration potential of the zone. The exploration potential included the preliminary definition of some of the ore controls which put the intersections into a geologic context. The West Zone drilling intersected a broad zone of bulk tonnage mineralization within which were several high grade intersections.

Pretivm's 2011 diamond drill program was the first in almost 20 years that was focused specifically on defining high grade resources. In this year a total of 178 holes was completed totaling 72,805 m in holes SU-110 to SU-288. Included in this were 97 holes (41,219 m) targeted at VOK, 16 holes (7,471 m) at West Zone, and 21 holes (7,220 m) targeting the surrounding areas. The remaining drilling was focused on expansion of Shore Zone, testing for structurally controlled high grade mineralization in Galena Hill and Bridge Zones, and testing new target areas.

The 2012 diamond drill program is focused on defining the high grade resource at the Valley of the Kings, specifically targeting geological and structural features believed to be associated with gold mineralization. Diamond drilling is also focused on expanding the VOK Zone, both west of the Brucejack Fault and along trend to the east of the main mineralized zone. A total of 175 holes (55,849 m) were competed in Holes SU-289 to SU-466.
1.1 Geology and mineralization

The Sulphurets Mining Camp, which includes the Snowfield and Brucejack Properties, is located on the eastern limb of the broad McTagg anticlinorium, a major north-trending mid-Cretaceous structural culmination in the western SFB (Figure 7.3). Sedimentary and volcanic rocks of the Upper Triassic Stuhini Group form the core of the anticlinorium, and are successively replaced outwards towards the west, north, and east of the core by progressively younger rocks of the Lower to Middle Jurassic dominantly volcanic and lesser sedimentary rocks of the Hazelton Group followed by dominantly sedimentary rocks of the Bowser Lake Group.

Geology on the Brucejack Property can generally be characterized as a northerly-trending, broadly arcuate, concave-westward structural-stratigraphic belt of variably altered rocks. This belt is bisected on the western side of the Property by a prominent topographic lineament, the Brucejack Fault. This belt is characterised by a broad band of variably but generally intensely quartz-sericite-pyrite altered rocks of up to several hundred meters or more across, and approximately five kilometres in strike extent. The quartz-sericite-pyrite alteration typically contains between two and 20% pyrite, and, depending on the alteration intensity, can preclude protolith recognition. Most of the defined mineral resources on the Property are located within the intensely altered zone.

High grade gold (± silver) mineralization is predominantly located within this alteration band and is generally associated with vein-stockwork systems of varying intensity. These stockwork systems display good continuity along-strike (several tens of metres to several hundreds of metres) and are characterized by the presence of mesothermal to epithermal veins of quartz, quartz-carbonate, quartz-adularia, and pyrite that are typically on the order of millimetres to tens of centimetres in thickness and which form intense crosscutting networks within the stockworks. In rare cases, the veins may range up to nearly ten metres in thickness. Most high grade zones are either on the margins of, or contained within, a zone of bulk mineralization. Bulk low grade mineralization zones (locally up to several grams per tonne gold) tend to be associated with disseminated anhedral pyrite. Zones and veins of euhedral pyrite are barren.

The hypothesis for the formation of the mineralization on the Brucejack Property at the time of this report is that it represents a deformed transitional meso- to epithermal porphyry-associated quartz stockwork in pervasively altered lower Hazelton Group rocks. It is thought that the bulk mineralization may have been formed shortly after consolidation of the volcanic pile due to reactions between these rocks and seawater. Progressive development and telescoping of the porphyry system in rocks of the volcanic pile would then have resulted in widespread and zoned porphyry-style alteration and mineralization, with the high grade gold and gold-silver mineralization generated in a transitional meso- to epithermal environment slightly more distal (i.e., down temperature) from the intrusive stock/dyke/sill body than the KSM and Snowfield deposits.

More than 40 gossanous zones containing gold, silver, copper, and molybdenum have been identified along the length of the arcuate band of altered rocks as a result of periodic exploration over the past several decades (Figure 7.6). A subset of these was selected for additional follow-up exploration in 2011 by Pretivm (Figure 7.7). A total of six zones were modelled for mineral resource estimation: Bridge Zone, Valley of Kings (VOK), Galena Hill, West Zone, Gossan Hill, and Shore Zone. These zones range from deformed high-grade gold-rich, silver-poor zones such as the VOK Zone, through deformed high grade gold-silver zones like the West Zone, to high-tonnage but relatively low-grade zones like the Bridge Zone.
1.2 Metallurgical testwork

The review of preliminary test work on the Brucejack mineralization led to the following conclusions:

- Brucejack mineralization is moderately hard.
- The test results suggest that the mineralization is amenable to a combined process. The process should include:
  - gravity concentration to recover coarse free gold and silver
  - flotation to produce rougher and scavenger concentrates
  - regrinding on the rougher and scavenger concentrates
  - gravity concentration to recover fine free gold and silver
  - cyanide leaching on gravity concentration tailings to produce gold/silver doré including intensive cyanide leaching.
- The test results indicate that there is significant variation in metallurgical performance between the mineralization samples.
- The process conditions from the test work have not yet been optimized. Excess cyanide was used to ensure cyanide dosage was not a limiting factor in evaluation of previous metal recovery.

1.3 Drilling, sampling and assaying

The database for the Brucejack Property used for the VOK, Galena Hill, Shore Zone, Gossan Hill and Bridge Zone estimate consisted in 1311 drillholes, including 442 underground drillholes, 400 surface historic drillholes and 469 actual surface drillholes completed since 2009. For this estimation only drillholes with collars between 425450 mEast and 427550 mEast and between 6256450 mNorth and 6260550 mNorth were used.

The database used for the VOK estimate contains 331 drillholes for 114,949 m including nine historical surface drillholes (579 m) and 175 surface drillholes completed in the 2012 Brucejack Exploration Program (55,849 m). The database used for the West Zone estimate contains 756 drillholes for 62,208 m including 439 underground drillholes (24,688 m), 269 historical surface drillholes (21,321 m) and 48 surface drillholes completed since 2009 (17,199 m).

Historical drill core sizes for surface drillholes were NQ (47.6 mm diameter) and BQ (36.5 mm diameter). Core size for drillholes collared from an underground exploration ramp at West Zone was AQ (27 mm diameter).

Core sizes for Pretivm’s surface collared drillholes are PQ (85 mm diameter), HQ (63.5 mm diameter) and NQ (47.6 mm diameter). Approximately 50% to 60% of the Pretivm core is HQ size. For drillholes less than 600 m length, core size is commenced at HQ and is reduced to NQ when conditions require. For drillholes greater than 600 m length the commencing core size is PQ which is run down to approximately between 200 m and 300 m in order to minimise drill path deviation.

The drill collars were surveyed by McElhanney Surveying from Terrace, BC. McElhanney Surveying use a total station instrument and permanent ground control stations for reference and have completed all the surveying on the project since 2009.
Drillhole paths are surveyed at a nominal 50 m interval using a Reflex EZ single shot instrument. There is no apparent drilling or recovery factor that would materially impact the accuracy and reliability of the drilling results.

Split PQ samples weigh approximately 10 kg. HQ samples are around 6 kg, and NQ 3 kg to 4 kg. These weights assume a nominal 1.5 m sample length. In general, the average sample size submitted to the analytical laboratory, ALS Chemex ("ALS") was 6.5 kg. Samples at ALS were crushed to 70% passing 2 mm, (-10 mesh). Samples were riffle split and 500 g were pulverized to 85% passing 75 µm (-200 mesh). The remaining coarse reject material was returned to Pretivm for storage in their Smithers warehouse for possible future use.

Gold was determined using fire assay on a 30 g aliquot with an atomic absorption (AA) finish. In addition, a 33 element package was completed using a four acid digest and ICP-AES analysis, which included the silver. Density determinations were done by ALS using the pycnometer method on pulps from the drilling program.

Procedures undertaken by Pretivm have been under the supervision and security of the issuer’s staff, as far as drill core sampling prior to dispatch. Laboratory sample reduction and analytical procedures have been conducted by independent accredited companies with acceptable practices.

Pretivm ensures quality control is monitored through the insertion of blanks, certified reference materials and duplicates. It is the author’s opinion that the sample preparation, security, and analytical procedures are satisfactory and that the data is suitable for use in Mineral Resource estimates.

1.4 Mineral Resource estimate

Snowden, in September 2012, completed Mineral Resource estimates for VOK, Shore Zone, Gossan Hill, Galena Hill and Bridge Zone within the Brucejack Project. The West Zone estimate remains unchanged from the April 2012 Mineral Resource estimate (Olssen and Jones, 2012a). The new estimates are reported at a high-grade cut-off for potential underground extraction whereas estimates prior to that reported in April 2012 were reported at a lower-grade cut-off in those regions where open-pit mining is potentially achievable.

A threshold grade of 0.3 g/t Au was found to generally identify the broad zones of mineralization in the drill cores. A high grade mineralization was identified and modelled by Snowden, with a threshold of 5 g/t Au in VOK and Galena Hill and 2.5 g/t Au in Shore Zone, Gossan Hill, and Bridge Zone. Snowden used Pretivm’s interpretation of the lithological domains, together with a nominal 0.3 g/t Au grade cut-off and a separate interpretation of the high grade domains to define a series of mineralized domains for estimation.

At VOK, the mineralization was found to form a series of pods within the core Jurassic rocks, with the pods being associated, at least in part, with intensely silicified zones resulting from local silica flooding and over pressure caprock formation mainly in polyolithic conglomerate, and to a lesser extent the fragmental pyroclastic rocks in the lower Hazelton Group. Within the bounding Triassic and porphyry rocks, the mineralization forms a series of sub-vertical domains.

In Shore zone, Gossan Hill, Galena hill and in part of Bridge Zone, no lithology model was available. The estimation in these zones was based on the high and low grade mineralization domains, with threshold grades of 0.3 g/t Au and 2.5 g/t Au respectively.
All data was composited to the dominant sample length of 1.5 m prior to analysis and estimation. Statistical analysis of the gold and silver data was carried out by lithological domain (at VOK) and mineralized domain. Review of the statistics indicated that the grade distributions for the mineralization within the Triassic and porphyry lithologies are very similar and as a result these were combined for analysis. The Jurassic mineralization shows a similar population distribution to the Triassic and porphyry but has more extreme grades making the populations differ at high grades. All domains exhibit a strong positive skewness with high coefficient of variation and extreme outliers.

Because of the extreme positive skew in the histograms of the gold and silver grades within the high grade domains, Snowden elected to use an indicator approach whereby the proportion of high grade in a block was modelled, as was the grade of the high grade portion, and the grade of the low grade portion.

The high grade population which contains a significant number of samples with extreme grades required indicator kriging methods for grade estimation. The low grade estimation was estimated with ordinary kriging combined with topcut data. Density was estimated using simple kriging of specific gravity measurements provided by ALS.

Grade estimates and models were validated by: undertaking global grade comparisons with the input drillhole composites; visual validation of block model cross sections; and by grade trend plots.

The resource classification definitions (Measured, Indicated, Inferred) used for this estimate are those published by the Canadian Institute of Mining, Metallurgy and Petroleum in their document “CIM Definition Standards”.

In order to identify those blocks in the block model that could reasonably be considered as a Mineral Resource, the block model was filtered by a cut-off grade of 5 g/t AuEq. The gold-equivalent calculation used is: AuEq = Au + (Ag/53). These blocks were then classified as Measured, Indicated or Inferred and reported (Table 1.1, Table 1.2 and Table 1.3).

Classification was applied based on geological confidence, data quality and grade variability. Areas classified as Measured Resources were those within the well informed portion of West Zone where the resource is informed by 5 m by 5 m or 5 m by 10 m spaced drilling. Areas classified as Indicated Resources are informed by 20 m by 20 m to 20 m by 40 m drilling within Shore Zone, West Zone or VOK. The remainder of the Mineral Resource is classified as Inferred Resource where there is some drilling information and the blocks lie within the mineralized interpretation. Areas where there is no informing data and/or the lower grade material is outside of the mineralized interpretation are not classified as a part of the Mineral Resource.

A sensitivity was also prepared to examine the open cut potential of the project. Tonnes and grade above a conceptual pit have also been reported at a 0.3 g/t AuEq, 0.5 g/t AuEq and a 1.0 g/t AuEq (Table 1.4 to Table 1.6).
Table 1.1  Valley of the Kings Mineral Resource estimate based on a cut-off grade of 5 g/t AuEq – September 2012\(^{(1)(4)(5)}\)

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Contained(^{(3)}) Gold (million oz)</th>
<th>Contained(^{(3)}) Silver (million oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicated</td>
<td>9.9</td>
<td>16.2</td>
<td>14.1</td>
<td>5.1</td>
<td>4.5</td>
</tr>
<tr>
<td>Inferred(^{(2)})</td>
<td>4.6</td>
<td>35.0</td>
<td>13.3</td>
<td>5.1</td>
<td>2.0</td>
</tr>
</tbody>
</table>

(1) Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, marketing, or other relevant issues. The Mineral Resources in this news release were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council.

(2) The quantity and grade of reported Inferred resources in this estimation are uncertain in nature and there has been insufficient exploration to define these Inferred Resources as an Indicated or Measured Mineral Resource and it is uncertain if further exploration will result in upgrading them to an Indicated or Measured Mineral Resource category.

(3) Contained metal and tonnes figures in totals may differ due to rounding.

(4) The Mineral Resource estimate stated in Table 1.1 is defined using 5 m by 5 by 5 m blocks in the well drilled portion of West Zone (5 m by 10 m drilling or better) and 10 m by 10 m by 10 m blocks in the remainder of West Zone and in VOK, Galena Hill, and parts of Shore Zone, and 20 m by 20 m by 20 m in the poorer informed Bridge Zone, Gossan Hill and parts of Shore Zone.

(5) The gold equivalent value is defined as AuEq = Au + Ag/53.

Table 1.2  West Zone Mineral Resource estimate based on a cut-off grade of 5 g/t AuEq – April 2012\(^{(1)(4)(5)}\)

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Contained(^{(3)}) Gold (Moz)</th>
<th>Contained(^{(3)}) Silver (Moz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
<td>2.4</td>
<td>5.85</td>
<td>347</td>
<td>0.5</td>
<td>26.8</td>
</tr>
<tr>
<td>Indicated</td>
<td>2.5</td>
<td>5.86</td>
<td>190</td>
<td>0.5</td>
<td>15.1</td>
</tr>
<tr>
<td>M+I</td>
<td>4.9</td>
<td>5.85</td>
<td>267</td>
<td>0.9</td>
<td>41.9</td>
</tr>
<tr>
<td>Inferred(^{(2)})</td>
<td>4.0</td>
<td>6.44</td>
<td>82</td>
<td>0.8</td>
<td>10.6</td>
</tr>
</tbody>
</table>

(1), (2), (3), (4) and (5) See footnotes to Table 1.1

Table 1.3  Brucejack (total) Mineral Resource estimate (including VOK and West Zone) based on a cut-off grade of 5 g/t AuEq – September 2012\(^{(1)(4)(5)}\)

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Contained(^{(3)}) Gold (Moz)</th>
<th>Contained(^{(3)}) Silver (Moz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
<td>2.4</td>
<td>5.85</td>
<td>347</td>
<td>0.5</td>
<td>26.8</td>
</tr>
<tr>
<td>Indicated</td>
<td>13.2</td>
<td>13.8</td>
<td>487</td>
<td>5.9</td>
<td>47.4</td>
</tr>
<tr>
<td>M+I</td>
<td>15.6</td>
<td>12.6</td>
<td>94.7</td>
<td>6.3</td>
<td>47.4</td>
</tr>
<tr>
<td>Inferred(^{(2)})</td>
<td>9.7</td>
<td>20.3</td>
<td>43.2</td>
<td>6.3</td>
<td>13.5</td>
</tr>
</tbody>
</table>

(1), (2), (3), (4) and (5) See footnotes to Table 1.1
<table>
<thead>
<tr>
<th>Table 1.4</th>
<th>Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 0.3 g/t AuEq – September 2012(^{(1)(4)(5)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>Tonnes (millions)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured</td>
<td>7.4</td>
</tr>
<tr>
<td>Indicated</td>
<td>139</td>
</tr>
<tr>
<td>M+I</td>
<td>146</td>
</tr>
<tr>
<td>Inferred(^{(2)})</td>
<td>857</td>
</tr>
</tbody>
</table>

\(^{(1)}, (2), (3), (4) and (5) See footnotes to Table 1.1\)

<table>
<thead>
<tr>
<th>Table 1.5</th>
<th>Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 0.5 g/t AuEq – September 2012(^{(1)(4)(5)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>Tonnes (millions)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured</td>
<td>7.4</td>
</tr>
<tr>
<td>Indicated</td>
<td>100</td>
</tr>
<tr>
<td>M+I</td>
<td>107</td>
</tr>
<tr>
<td>Inferred(^{(2)})</td>
<td>600</td>
</tr>
</tbody>
</table>

\(^{(1)}, (2), (3), (4) and (5) See footnotes to Table 1.1\)

<table>
<thead>
<tr>
<th>Table 1.6</th>
<th>Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 1.0 g/t AuEq – September 2012(^{(1)(4)(5)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>Tonnes (millions)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured</td>
<td>6.9</td>
</tr>
<tr>
<td>Indicated</td>
<td>55.9</td>
</tr>
<tr>
<td>M+I</td>
<td>62.7</td>
</tr>
<tr>
<td>Inferred(^{(2)})</td>
<td>157</td>
</tr>
</tbody>
</table>

\(^{(1)}, (2), (3), (4) and (5) See footnotes to Table 1.1\)
1.5 Recommendations

1.5.1 Metallurgical testwork

Further test work is recommended to:

- confirm the findings of the test work completed to date,
- optimize the process flowsheet, especially gravity separation process, primary grind size, regrind size and flotation optimization, and
- investigate metallurgical performances, and determine engineering related data.

1.5.2 Mineral Resource Estimates

The author makes the following recommendations:

- Complete density measurements using a second technique (such as the weight in air, weight in water method) to add confidence in the density measurements already available.
- Complete sufficient close-spaced drilling on the defined mineralization, particularly the high grade mineralization that is close to surface. The aim should be to optimise the confidence in the resource estimates and subsequently improve the classification.
- Open up underground workings at VOK and bulk sample the mineralization in one or two representative areas in order to reconcile tonnage and grade estimates.
- Test for additional VOK mineralization at depth and along the eastern down plunge projection of the syncline.
- Complete sufficient infill drilling to upgrade the classification of some of the Inferred Resources to Indicated Mineral Resources.
- Continue to attempt to define high grade resources and their geological controls in the zones outside of VOK and West Zones.
- Continue to refine the geological model with the aim of improving the single integrated geological model.
2 Introduction

2.1 Terms of reference

This NI 43-101 Technical Report has been prepared by Snowden Mining Industry Consultants (“Snowden”) for Pretium Resources Inc., (“Pretivm”). The report was prepared to provide a Mineral Resource Estimate update of the high grade portion of the gold and silver mineralization at West Zone, Valley of the Kings (VOK), Shore Zone, Gossan Hill, Galena Hill and Bridge Zone of the Brucejack Property, Skeena Mining Division, BC (the “Brucejack Project” or “the Property”). Pretivm has a 100% outright interest in the Property.

2.2 Sources of information and data used

Pretivm has provided to Snowden the data used as the basis of this report from geological mapping, sampling and various drilling campaigns.

This report is based, in part, on internal company technical reports, and maps, published government reports, company letters and memoranda, and public information as listed in the “References” section at the conclusion of this report. Several sections from reports authored by other consultants have been directly quoted in this report, and are so indicated in the appropriate sections. Snowden has not conducted detailed land status evaluations, and has relied upon previous qualified reports, public documents and statements by Pretivm regarding property status and legal title to the Property.

2.3 Personal inspections

Ivor Jones, FAusIMM (CP), Senior Principal Consultant, Snowden, Perth visited the project site in February 2012 and takes overall responsibility for this report.

In June 2012, Adrian Martínez Vargas (Consultant, Snowden) under the supervision of Mr Jones completed a separate site visit and sample validation.
3 Reliance on other experts

The author has relied upon documentation provided by Pretivm in respect of the status of the Mineral Claims that cover the Brucejack Project. This is described in Section 4.2.
4 Property description and location

Information in this section has been excerpted from Gaffari et al., (2012) and updated.

4.1 Tenure

In 2010, pursuant to a purchase and sale agreement between Silver Standard (as the seller) and Pretivm (as the buyer), Silver Standard sold to Pretivm all of the issued shares of 0890693 BC Ltd., the owner of the Brucejack Project and Snowfield Project.

4.2 Status of mining titles

The Brucejack Property consists of six mineral claims totalling 3,199.28 ha in area (Table 4.1 and Figure 4.1) and all claims are in good standing until 31 January, 2022.

Information relating to tenure was verified by means of the public information available through the Mineral Titles Branch of the BC Ministry of Energy, Mines, and Petroleum Resources MTO land tenure database by P&E Mining Consultants Inc., (“P&E”). The six above-mentioned mineral claims were converted from 28 older legacy claims to BC’s new MTO system in 2005. P&E and Snowden have relied upon this public information, as well as information from Pretivm, and have not undertaken an independent verification of title and ownership of the Property claims.

A legal land survey of the claims has not been undertaken.

Table 4.1 List of mineral claims

<table>
<thead>
<tr>
<th>Tenure No.</th>
<th>Tenure Type</th>
<th>Map No.</th>
<th>Owner</th>
<th>Pretivm Interest</th>
<th>Status</th>
<th>In Good Standing To</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>509223</td>
<td>Mineral</td>
<td>104B</td>
<td>0890693 BC Ltd.</td>
<td>100%</td>
<td>Good</td>
<td>Jan. 31, 2022</td>
<td>428.62</td>
</tr>
<tr>
<td>509397</td>
<td>Mineral</td>
<td>104B</td>
<td>0890693 BC Ltd.</td>
<td>100%</td>
<td>Good</td>
<td>Jan. 31, 2022</td>
<td>375.15</td>
</tr>
<tr>
<td>509400</td>
<td>Mineral</td>
<td>104B</td>
<td>0890693 BC Ltd.</td>
<td>100%</td>
<td>Good</td>
<td>Jan. 31, 2022</td>
<td>178.63</td>
</tr>
<tr>
<td>509463</td>
<td>Mineral</td>
<td>104B</td>
<td>0890693 BC Ltd.</td>
<td>100%</td>
<td>Good</td>
<td>Jan. 31, 2022</td>
<td>482.57</td>
</tr>
<tr>
<td>509464</td>
<td>Mineral</td>
<td>104B</td>
<td>0890693 BC Ltd.</td>
<td>100%</td>
<td>Good</td>
<td>Jan. 31, 2022</td>
<td>1,144.53</td>
</tr>
<tr>
<td>509506</td>
<td>Mineral</td>
<td>104B</td>
<td>0890693 BC Ltd.</td>
<td>100%</td>
<td>Good</td>
<td>Jan. 31, 2022</td>
<td>589.78</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>3,199.28</strong></td>
</tr>
</tbody>
</table>

There are no annual holding costs for any of the six mineral claims at this time, as the claims are paid up until 31 January, 2022.

The majority of the Property falls within the boundaries of the Cassiar-Iskut-Stikine Land and Resource Management Plan (LRMP) area, with only a minor south-eastern segment of Mineral Claim No. 509506 falling outside this area. All claims located within the boundaries of the LRMP are considered as areas of General Management Direction, with none of the claims falling inside any Protected or Special Management Areas.

At the time of this report, the land claims in the area are in review and subject to ongoing discussions between various First Nations and the Government of BC.
4.2.1 Confirmation of tenure

Snowden is not qualified to provide legal comment on the mineral title to the reported properties, and has relied on the provided information. No warranty or guarantee, be it expressed or implied, is made by Snowden with respect to the completeness or accuracy of the tenement description referred to in this document.

4.3 Royalties, fees and taxes

The royalties applicable to the Project are as follows:

- “Royalty” means the amount payable by the Owner, calculated as 1.2% of the NSR, with the following exemptions:
  - gold: the first 503,386 oz produced from the Project
  - silver: the first 17,907,080 oz produced from the Project.
4.4 Location

The Property is situated approximately at 56°28′20″N Latitude by 130°11′31″W Longitude, a position approximately 950 km northwest of Vancouver, 65 km north-northwest of Stewart, and 21 km south-southeast of the Eskay Creek Mine. The Property coordinates used in this report are located relative to the NAD83 UTM coordinate system.
5 Accessibility, climate, local resources, infrastructure and physiography

Information in this section has been excerpted from Gaffari et al., (2012) and updated.

5.1 Climate and physiography

The climate is typical of north-western BC with cool, wet summers, and relatively moderate but wet winters. Annual temperatures range from +20°C to -20°C. Precipitation is high with heavy snowfall accumulations ranging from 10 m to 15 m at higher elevations and 2 m to 3 m along the lower river valleys. Snow packs cover the higher elevations from October to May. The optimum field season is from late June to mid-October.

5.1.1 Vegetation

The tree line is at approximately 1200 m elevation. Sparse fir, spruce, and alder grow along the valley bottoms with only scrub alpine spruce, juniper, alpine grass, moss, and heather covering the steep valley walls. The Brucejack Property, at an elevation above 1300 m, has only sparse mosses along drainages. Rocky glacial moraine and polished glacial-striated outcrops dominate the terrain above tree line.

5.2 Accessibility

The Property is located in the Boundary Range of the Coast Mountain Physiographic Belt along the western margin of the Intermontane Tectonic Belt. The terrain is generally steep with local reliefs of 1,000 m from valleys occupied by receding glaciers, to ridges at elevations of 1,200 m above sea-level (“asl”). Elevations within the Property area range from 1,366 m asl along Brucejack Lake to 1,650 m asl at the Bridge Zone. However, within several areas of the Property, the relief is relatively low to moderate.

The Property area is easily accessible with the use of a chartered helicopter from the town of Stewart, or seasonally from the settlement of Bell II. The flight time from Stewart is approximately 30 minutes and slightly less from Bell II; however, Stewart has the advantage of having an established year-round helicopter base. Pretivm has started construction on reopening the Newhawk access road. Originally the Newhawk access was by barge over Bowser Lake, then by truck to camp. Pretivm is rehabilitating the old road along the Bowser River and up the Knipple Glacier, and is in the process of building a new stretch of road, working up Scott Creek from the Bowser River and up Wildfire Creek from Highway 37. The road is expected to be completed by late 2012. As at the end of August 2012, there were 26 km of new road completed, (Figure 5.1).

Until the road is completed, heavy exploration equipment, fuel, and camp provisions can be transported along a good gravel road from Stewart to the Granduc staging site and then flown by helicopter to the Property. This combined truck and helicopter transportation method cuts the more expensive helicopter flight time in half from Stewart.
5.3 Infrastructure

Pretivm has started construction on reopening the Newhawk access road. Pretivm is
rehabilitating the old road along the Bowser River and up the Knipple Glacier, and is in the
process of building a new stretch of road, working up Scott Creek from the Bowser River
and up Wildfire Creek from Highway 37. The road is expected to be completed by late
2012. As at the end of August 2012 there were 26 km of new road completed, (Figure
5.1).

There are no local resources other than abundant water for any drilling work. The nearest
infrastructure is the town of Stewart, approximately 65 km to the south, which has a
minimum of supplies and personnel. The towns of Terrace and Smithers are also located
in the same general region as the Property. Both are directly accessible by daily air
service from Vancouver.

The nearest railway is the Canadian National Railway Yellowhead route, which is located
approximately 220 km to the southeast. This line runs east-west and terminates at the
deep water port of Prince Rupert on the west coast of BC.

Stewart, BC, the most northerly ice-free shipping port in North America is accessible to
store and ship concentrates. Such material is at the time of this report, being shipped from
the Wolverine and Huckleberry mines via this terminal.
A high voltage 138-kV power line currently services Stewart, BC and has sufficient capacity to provide power to the Brucejack Project. Also, a high voltage power line running parallel with Highway 37 is planned for construction (www.highway37.com). The plan calls for the new 287-kV line to extend from the community of Terrace to the beginning of the Galore Creek access road at Bob Quinn Lake providing access for the Property to the BC Hydro electric grid (Figure 5.2). The final capacity of this transmission line has yet to be determined and may be increased due to demand.

Figure 5.2 Proposed high voltage Northwest Transmission Line

(Source: Cited Website)
6 History

Information in this section has been excerpted from Gaffari et al., (2012) and updated.

The Property and the surrounding region have a history rich in exploration for precious and base metals dating back to the late 1800s. This section describes the mineral exploration, including the historical drilling carried out prior to Pretivm’s acquisition of Brucejack. The historical data have been summarized mostly from various Assessment Reports available through the BC Ministry of Energy, Mines and Petroleum Resources.

In 1935, prospectors discovered copper-molybdenum mineralization on the Sulphurets Property in the vicinity of the Main Copper zone, approximately six km north-west of Brucejack Lake; however, these claims were not staked until 1960.

From 1935 to 1959, the area was relatively inactive with respect to prospecting; however, it was intermittently evaluated by a number of different parties and several small copper and gold-silver occurrences were made in the Sulphurets-Mitchell Creek area.

In 1960, Granduc and Alaskan prospectors staked the main claim group covering the known copper and gold-silver occurrences, which collectively became known as the Sulphurets Property, starting the era of modern exploration, outlined as follows:

- **1960-1979** – Granduc continued exploration, conducting further geological mapping, lithgeochemical sampling, trenching, and diamond drilling on known base and precious metal targets north and north-west of Brucejack Lake resulting in the discovery of gold-silver mineralization in the Hanging Glacier area and molybdenum on the south side of Mitchell.

- **1980** – Esso optioned the property from Granduc and subsequently completed an extensive program consisting of mapping, trenching, and geochemical sampling that resulted in the discovery of several showings including the Snowfield, Shore, West, and Galena zones. Gold was discovered on the peninsula at Brucejack Lake near the Shore Zone.

- **1982-1983** – Exploration was confined to gold and silver-bearing vein systems in the Brucejack Lake area at the southern end of the property from 1982 to 1983. Drilling was concentrated in 12 silver and gold-bearing structures including the Near Shore and West zones, located 800 m apart near Brucejack Lake. Drilling commenced on the Shore Zone.

- **1983** – Esso continued work on the property and (in 1984) outlined a deposit on the west Brucejack Zone.

- **1985** – Esso dropped the option on the Sulphurets property.

- **1985** – The property was optioned by Newhawk and Lacana Mining Corp. (Lacana) from Granduc under a three-way joint venture (the Newcana JV). The Newcana JV completed work on the Snowfield, Mitchell, Golden Marmot, Sulphurets Gold, and Main Copper zones, along with lesser known targets.

- **1986-1991** – Between 1986 and 1991, the Newcana JV spent approximately $21 M developing the West Zone and other smaller precious metal veins on what would later become the Bruceside Property.

• 1991 – Six holes were drilled at the Shore Zone, totalling 1,200 m, to test its continuity and to determine its relationship to the West and R-8 zones. Results varied from 37 g/t Au over 1.5 m to 13 g/t Au over 4.9 m (www.infomine.com).

• 1994 – Exploration in the Brucejack area consisted of detailed mapping and sampling in the vicinity of the Gossan Hill Zone, and 7,352 m of diamond drilling (over 20 holes), primarily on the West, R8, Shore, and Gossan Hill zones. Mapping, trenching, and drilling of the highest priority targets were conducted on 10 of the best deposits (including the West Zone).

• 1996 – Granduc merged with Black Hawk to form Black Hawk Mining Inc.

• 1997-1998 – No exploration or development work was carried out on the Brucejack Property (Budinski et al., 2001).

• 1999 – Silver Standard acquired Newhawk and with it, Newhawk’s 60% interest and control of the Brucejack Property (www.infomine.com).

• 2001 – Silver Standard entered into an agreement with Black Hawk whereby Silver Standard acquired Black Hawk’s 40% direct interest in the Brucejack Property, resulting in 100% interest in the property.

• 1999-2008 – No exploration or development work was carried out on the Brucejack Property during the period from 1999 to 2008.

The historical interpretation (Budinski et al., 2001) of mineralized zones on the West Zone, prior to Silver Standard undertaking their exploration work in 2009, is shown in Figure 6.1 (underground vein location plan map) and Figure 6.2 (cross section map).
Figure 6.1  West Zone underground vein location plan

(Source: Pretivm)
Figure 6.2  West Zone section 5080S

(Source: Pretivm)
6.1 Work completed by Silver Standard

In 2009 Silver Standard began work on the Property, the first since its acquisition. The 2009 program included drilling, rock-chip and channel sampling, and re-sampling of historical drill core.

During the 2009 Property field program, Silver Standard collected a total of 1,940 drill core samples from 25 historical drillholes stored onsite and sent them for analysis to ALS Minerals Laboratories Ltd. ("ALS Minerals", or "ALS"). The samples were sent to the ALS assay laboratory in Terrace for preparation and then forwarded to the ALS facility in Vancouver for analysis. Samples were analyzed for gold (30 gram fire assay with atomic absorption finish) as well as 33 other elements by using four acid digest with inductively coupled plasma ("ICP") analysis. The 2009 program also included re-analysis of 941 pulp samples derived from historical drill core samples. These samples were also analyzed for gold, plus 33 other elements at the ALS facility in Vancouver.

Field work undertaken throughout the 2009 program included the collection of 2,739 rock-chip and channel samples from surface outcrops. This sampling work was mostly done in target areas that were drilled by the company in 2009, with samples generally collected along north-south oriented lines that corresponded to the surface traces of some of the 2009 drillholes. Specifically, rock-chip and channel sampling were completed at the Galena Hill, Bridge, SG, and Mammoth zones (where drilling was carried out in 2009), as well as at the Hanging Glacier Zone, where historical surface sampling had identified rocks enriched in gold and silver. The surface samples were analyzed for gold plus 33 other elements.

A total of 17,846 m of diamond drilling were completed in 37 holes during the 2009 field season.

In 2010 a total of 33,400 m of diamond drilling was completed in 72 holes.

6.2 Previous feasibility studies at the Property

Corona completed a feasibility study on a proposed underground mine with decline access for the Sulphurets Project (West and R-8 Zones only) in 1990. Total operating costs of $145 per ton were estimated based on a 350 ton-per-day mill facility for processing, a capital cost of $42.7 million and a 6.7% pre-tax return at a price of US $400/oz gold and $5/oz silver. The study concluded that higher metal prices must be realized before a production decision could be taken.

The reader is cautioned that the above mentioned 1990 Corona Sulphurets Project Feasibility Study is no longer relevant, is not NI 43-101 compliant and should not be relied upon.

6.3 Prior mineral production

In excess of 5 km of underground ramps, level development and raises were completed on West Zone down to the 1100 level. In 1993, a Project Approval Certificate was issued in respect of the Project by the Minister of Sustainable Resource Management and Minister of Energy and Mines for the Province of British Columbia. The Mine was not developed and the certificate as amended expired in 2006. No ore has been mined or processed from the Property, including West Zone.
6.4 Preliminary Economic Assessment 2010

Silver Standard commissioned Wardrop to complete a Preliminary Economic Assessment ("PEA") on the combined resources of the Brucejack Project and Snowfield Project in 2010 (Wardrop Engineering Inc. 2010).

The following consultants were commissioned to complete the component studies for the NI 43-101 Technical Report:

- Wardrop: processing, infrastructure, capital and operating cost estimates, and financial analysis
- AMC Mining Consultants (Canada) Ltd. (AMC): mining
- P&E Mining Consultants Inc. (P&E): Mineral Resource estimate
- Rescan Environmental Services Ltd. (Rescan): environmental aspects, waste and water treatment
- BGC Engineering Inc. (BGC): tailings impoundment facility, waste rock and water management, and geotechnical design for the open pit slopes.

Based on the results of the PEA, it was recommended that Silver Standard continue with the next phase - a Pre-feasibility Study, in order to identify opportunities and further assess viability of the Property. This report was reissued for Pretium in October 2010, however the report is no longer current.
7 Geological setting and mineralization

Information in this section has been partly excerpted, condensed and updated from P&E sections within Gaffari et al., (2012), and from relevant sections in Olssen and Jones (2012) by Pretivm’s Chief Geologist Dr. Warwick Board, P.Geo..

7.1 Regional geological setting

The Brucejack and Snowfield Properties are located in the western Stikine terrane (or Stikinia), the largest of several allochthonous terranes in the Intermontane Belt of the Canadian Cordillera. Stikinia, which is considered to be a multistage mid-Palaeozoic to Middle Jurassic island arc terrane that developed in an intraoceanic setting isolated from the North American continental margin (e.g., Gagnon et al., 2012), underlies much of western British Columbia (Figure 7.1). Stikinia appears to have been accreted to the North American continental margin as early as the late Middle Jurassic.

The Stikine terrane in north-western British Columbia (e.g., MacDonald et al. 1996) consists of a series of unconformity-bound tectonostratigraphic elements, including: Palaeozoic island-arc rocks of the Stikine assemblage, Mesozoic island-arc rocks of the Upper Triassic Stuhini Group and Lower to Middle Jurassic lower Hazelton Group, and Middle to Upper Jurassic overlap assemblage sedimentary rocks of the Bowser Lake Group. Tertiary igneous and metamorphic rocks of the Coast Plutonic Complex occur to the west of the Stikine terrane in this area.

At least four magmatic episodes and three mineralizing events have been recognised in north-western Stikinia (Anderson et al., 2003): Late Triassic-Early Jurassic (205-196 Ma) alkaline porphyry-related magmatism and associated deformed mesothermal Ag-Au veins (e.g., Red Mountain); Early Jurassic (196-187 Ma) alkaline porphyry-related epithermal and mesothermal Au-Ag veins and base and precious metal deposits (e.g., Premier, Sulphurets, and Bronson Creek); Early to Middle Jurassic (184-183 Ma) small and poorly mineralized porphyry intrusions; and Middle Jurassic (175-172 Ma) calc-alkaline and tholeiitic back-arc magmatism and syn- to epigenetic back-arc basin-related stratabound base and precious metal deposits (e.g., Eskay Creek, RDN).

The north-west part of Stikinia, (in particular the volcanic and sedimentary rocks of the Hazelton Group), and related Early Jurassic plutons, represent perhaps the most well-endowed metallogenic assemblage in British Columbia. In addition to the Brucejack and Snowfield Properties, this area also includes nearby former producers such as Eskay Creek, Silbak-Premier, Big Missouri, Dolly Varden, Torbrit Silver, Granduc, and Anyox (Figure 7.2). Furthermore, adjacent properties host significant precious and base metal resources (e.g., Kerr-Sulphurets-Mitchell and Red Mountain deposits) as well as a number of high-potential mineral occurrences (e.g., Homestake Ridge, Silver Coin, Big Missouri, Clone, and Tennyson Properties). The Kerr-Sulphurets-Mitchell (KSM) deposits, along with the Snowfield and Brucejack Deposits together comprise what is commonly referred to as the Sulphurets Mining Camp.
Several major compressional tectonic events affected rocks of the Stikine terrane in northwestern British Columbia throughout the Mesozoic. The earliest event in the Late Triassic to Early Jurassic affected Palaeozoic and Triassic rocks of the Stikine assemblage and Stuhini Group. A second, younger event in the Late Jurassic through Late Cretaceous, which has been associated with accretion of the outboard Insular terranes west of the Coastal Plutonic Complex and the formation of the Skeena fold belt (SFB), resulted in widespread, predominantly east-verging fold and thrust deformation of rocks in western Stikinia (Figure 7.1). Deformation associated with the Middle Jurassic accretion of Stikinia to the North American continent appears to have mainly affected rocks of eastern Stikinia (e.g., Evenchick et al. 2007).

7.2 Local geology - the Sulphurets Mining Camp

The Sulphurets Mining Camp, which includes the Snowfield and Brucejack Properties, is located on the eastern limb of the broad McTagg anticlinorium, a major north-trending mid-Cretaceous structural culmination in the western SFB (Figure 7.3). Sedimentary and volcanic rocks of the Upper Triassic Stuhini Group form the core of the anticlinorium, and are successively replaced outwards towards the west, north, and east of the core by progressively younger rocks of the Lower to Middle Jurassic dominantly volcanic and lesser sedimentary rocks of the Hazelton Group followed by dominantly sedimentary rocks of the Bowser Lake Group.


7.2.1 Stratigraphic setting and major mineral deposits

The Stuhini Group, which generally underlies the western and northern parts of the Sulphurets Mining Camp (Figure 7.4), is characterized by fine-grained and well-stratified sedimentary rocks and subordinate mafic volcanic arc-related rocks. The sedimentary package includes dark grey turbiditic siltstone, minor interbedded micritic limestone, and thick sequences of immature conglomerate and sedimentary breccia. Mafic volcanic rocks in this unit include alkalic pyroxene- and hornblende-phyric massive and pillowed basaltic flows, flow breccia, and tuff.
Figure 7.1  Tectonic setting of Brucejack and Snowfield Properties in the north-west Cordillera

Note: Shows location of project area in north-central Stikine terrane as well as nearby Bowser Basin (left) and latest Jurassic to mid-Cretaceous Skeena fold belt (right). Rectangle on righthand image represents location of Figure 7.2.

(Source: Gaffari et al., 2012)
Figure 7.2 Regional structural and stratigraphic setting of the Brucejack Property and Sulphurets Mining Camp in northwest BC

Note: Shows significant past-producing mines as well as selected advanced exploration projects. Rectangle represents location of Figure 7.3.

(Source: Gaffari et al., 2012)
The central and eastern parts of the Sulphurets Mining Camp are largely underlain by subaqueous to locally subaerial arc-related volcanic and subordinate sedimentary rocks of the lower Hazelton Group, which unconformably overlie the Stuhini Group. The lowermost unit of the lower Hazelton Group, the Lower Jurassic Jack Formation, is characterised by polythlitic (granitoid and volcanic) pebble to boulder conglomerate and limy fossiliferous sandstone and siltstone. The Jack Formation appears to be conformably overlain by the volcanic rocks of the lower Hazelton Group, which generally consist of thick massive plagioclase (± hornblende, K-feldspar, and pyroxene)-phyric and dacitic flows, breccias, and related predominantly pyroclastic fragmental rocks, with subordinate mafic and felsic rocks and minor siltstone and mudstone layers of the Unuk River Formation. These rocks are overlain by well-beded green, maroon, and grey andesitic to dacitic pyroclastic and epiclastic rocks, mafic flows, and minor carbonaceous mudstone, chert and limestone of the Betty Creek Formation, which are in turn disconformably overlain by the Mount Dilworth Formation. The Mount Dilworth Formation is characterised by dacitic and rhyolitic tuff, welded ash-flow tuff, volcanic breccia, flow-layered lava domes, and subordinate interbedded limy fossiliferous sandstone.

The upper Hazelton Group, which is limited to the northern and extreme eastern parts of the Sulphurets Mining Camp, is characterised by distinctive black carbonaceous pyritic mudstone, light and dark banded tuffaceous siltstone, and local amygdaloidal basalt of the Salmon River Formation. These rocks display unconformable relationships to the rocks of the lower Hazelton Group. Recent re-examination of stratigraphic sections through the Hazelton Group (Gagnon et al., 2012) has suggested that the term ‘Salmon River Formation’ be replaced by ‘Iskut River Formation’. These rocks clearly delineate the outline of the anticlinorium in the broader Sulphurets area (Figure 7.3).

Rocks of the Middle to Upper Jurassic Bowser Lake Group, which are generally characterised by clastic basin-fill sediments including submarine fan, prodelta slope, shelf, and fan delta sedimentary assemblages, are limited to the extreme north and northeast of the Sulphurets Mining Camp (see Figure 7.4). These rocks display conformable to disconformable relationships to the underlying Hazelton Group rocks.

Plutonic rocks are located in the western and northern parts of the Sulphurets Mining Camp, and occur as dykes, sills, and plugs, which generally intrude Stuhini Group rocks. These rocks, the so-called ‘Mitchell intrusions’ of Kirkham and Margolis (1995), include diorite, monzodiorite, monzonite porphyry, syenite porphyry, quartz syenite porphyry, porphyritic aplitic low-silica granite, sodic albite-hornblende porphyry, and K-feldspar megacrystic porphyry. Monzonitic, syenitic, and granitic intrusions display a close spatial and temporal relationship to porphyry-style Cu ± Au ± Mo mineralization in the KSM deposits.

A number of internally consistent U-Pb zircon dates from pre-, syn- and post-mineral intrusive phases of the Mitchell intrusions at the KSM deposits suggest that porphyry-style mineralization was emplaced between 192 and 195 Ma. This Early Jurassic age is consistent with a number of galena Pb dates for mineralization from these deposits, as well as for mineralization from the Snowfield Deposit and from the West Zone on the Brucejack Property. All of these dates plot in the “Jurassic cluster” of galena Pb dates defined by Aldrick, Gabites, and Godwin (1987) and Aldrick et al. (1990) for the so-called “Stewart Mining Camp.” Other regionally close mineral deposits that have similar age dates include Silbak-Premier and Big Missouri.
7.2.2 Alteration and Mineralization

Large, coalescing hydrothermal alteration haloes are developed around the intrusive complexes. Potassic K-feldspar alteration associated with copper and gold mineralization is widespread in the Mitchell Intrusions and adjacent Stuhini Group rocks. Propylitic and chlorite-sericite alteration is also developed around the KSM intrusions and the Snowfield Deposit, often overprinting earlier potassic alteration at KSM. Quartz-sericite-pyrite alteration is widely developed in the Stuhini Group and lower Hazelton Group rocks further to the east of the intrusions in the Sulphurets Mining Camp (Figure 7.4), and also occurs as a pervasive overprint to earlier alteration in the intrusive rocks.

Altered Stuhini Group rocks and Mitchell intrusions are the main host rocks to porphyry-style mineralization at the Kerr (copper-gold), Sulphurets (gold-copper), and Mitchell (gold-copper-molybdenum) deposits. Mineralization at the KSM deposits occurs within a gold-enriched copper porphyry system controlled by a series of dikes, sills and plugs, and is associated with quartz veinlet stockworks and sheeted quartz veinlet arrays mainly in the altered host rocks adjacent to the intrusions. Pyrite and chalcopyrite are the dominant sulphide minerals, with minor molybdenite, and trace amounts of tennantite, bornite, sphalerite, and galena. All mineralization is hypogene, except for small remnants of preserved weak supergene at higher elevations.

7.2.3 Structural setting and metamorphism

Rocks in the Sulphurets Mining Camp have been affected by folding, faulting, penetrative cleavage formation, late stage quartz vein formation, and low-grade lower greenschist facies regional metamorphism. Rocks of the Stuhini Group were subjected to intense ductile deformation during the Late Triassic to Early Jurassic prior to the deposition of the Hazelton Group rocks. Ductile deformation during the Late Jurassic to Late Cretaceous development of the SFB resulted in the formation of the major structural culmination of the McTagg anticlinorium and associated fold and thrust structures that affected the Stuhini Group through Bowser Lake Group rocks in the Sulphurets Mining Camp.

Penetrative cleavage (foliation) development was associated with the Late Jurassic to Late Cretaceous event and affected most of the altered and unaltered rocks in the area, where host rock mineral assemblage (i.e., the presence and concentration of phyllosilicates in the rock) permitted its development. Age dating (Ar-Ar) of sericite within pressure shadows about pyrite provide a minimum age for this deformation at 110 ± 2 Ma. Foliation orientations, whilst variable within the Sulphurets Mining Camp, are dominantly east-west trending on the Snowfield and Brucejack Properties (Figure 7.4). This is in contrast to the more-regional scale north-northwest to north-east orientation of structural fabrics (particularly foliation) that is more in accordance with typical Cordilleran structural trends. The east-west trending foliation orientations coincide with a distinct westward-oriented ‘kink’ in the McTagg anticlinorium (Figure 7.3), which is possibly a reflection of the warping of this structure about a protrusion of more strain-resistant rocks inboard of the culmination that resulted in apparent N-S compression in this part of the area. The existence of such a strain resistor might also have resulted in the development of the southeast-vergent fold-induced thrusts during strain accommodation to the east of the anticlinorium axis. The Snowfield Deposit is considered to be part of the upper Mitchell Deposit that was thrust southeasterwards over lower Hazelton Group rocks during the Late Jurassic to Late Cretaceous deformation.
Figure 7.3  Local structural and stratigraphic setting of the Brucejack Property and Sulphurets Mining Camp

(Source: Pretivm, 2012)
Figure 7.4 Sulphurets Mining Camp geology and mineralization

(Source: Gaffari et al., 2012)
Mineralized quartz veins, vein networks, and vein stockworks in and around the various mineral deposits in the Sulphurets Mining Camp display clear and abundant evidence for significant post-mineralization deformation, including tight through isoclinally folded veins, rootless intrafolial folded veins, apparently ptygmatically folded veins in less competent and deformed host rocks, boudinaged veins, rootless boudinaged veins hosting gold mineralization tracing out tight folds and terminating at the vein contacts, transposition of veins into foliation planes with extension cracks perpendicular to the foliation, pinch-and-swell deformed veins with cuspathe and lobate margins wrapped by the foliation, mesoscale folded stockworks, brecciated veins, fracture offset veins, and other small-scale post-mineral deformation features. These features are visible on the microscope (including strained and partially recrystallised quartz in veins and vein stockworks), hand-specimen, drill core, and outcrop scales.

Development of the McTagg anticlinorium effectively exposed older pre-Salmon River Formation rocks in the Sulphurets Mining Camp. Rocks of the Hazelton Group and Bowser Lake Group, which are located on the eastern limb of the north-plunging anticlinorium, display moderate to steep dips towards the southeast, east, and northeast, indicative of an overall eastward tilting of the original strata and porphyry-associated mineralization in this area as a result of the Late Jurassic to Late Cretaceous deformation event.

En echelon arrays of late shallow southeast-dipping (25° to 40°) veins with vertical or steeply-oriented crystal fibres in thin crack-seal textures cut across foliated and unfoliated altered and mineralized rocks, mineralized veins, and unaltered rocks throughout the region. Arrays of similarly late sigmoidally-folded veins with a top-to-the-southeast sense of shear are also present. These late quartz veins have been interpreted as having formed during the southeast-vergent thrusting that produced the Sulphurets and Mitchell thrusts in the eastern part of the anticlinorium.

The Brucejack Fault is a late, steeply dipping, northerly striking brittle structure which forms a distinct topographical feature in the centre of the Sulphurets Mining Camp (Figure 7.4). Pre-existing folds, thrust faults, alteration, and mineralization zones are cut by the Brucejack Fault as well as by many other similar late northerly-striking faults. Movement on the fault is probably complex and has been difficult to determine. A much thicker section of Hazelton Group rocks on the east side of the fault suggests considerable east-side-down displacement, which may be interpreted as reflecting post-depositional displacement. Kirkham and Margolis (1995) indicate that the Brucejack Fault appears to have an east-side down dip-slip displacement of greater than 500 m with a dextral strike-slip component in the area north of the Snowfield Deposit, and approximately 100 m of dextral strike-slip with uncertain dip-slip on the Brucejack Property. Davies et al. (1994) noted that, northwest of Brucejack Lake, preserved slickenside and cast elongation lineations on a steeply west-dipping surface indicate dip-slip offset of potentially between 700 m and 800 m with a reverse fault sense of movement (i.e., west-side up). Stratigraphic contacts a short distance northwest of the Brucejack Lake have been interpreted as indicating a possible strike separation of between 200 m to 300 m, and dip-slip displacement is likely less than in the north. In contrast, Britton and Alldrick (1988) considered that displacement on the Brucejack Fault was on the order of tens of metres. Elsewhere in the Sulphurets Mining Camp the northerly, north-easterly and north-westerly striking brittle faults, and rare east-west striking faults, display typically steep dips, steeply-plunging fault fabrics, and locally normal-dextral oblique displacements of up to tens of metres.

The possibility that the Brucejack Fault structure was formed as a result of late brittle deformation reactivation of a pre-existing syn-depositional fault developed at or near a volcanic sub-basin margin during deposition of the lower Hazelton Group is being considered based on recent fieldwork. If this hypothesis is correct then, given the spatial proximity of the fault to the alteration and contained mineralization zones on the Brucejack and Snowfield Properties (Figure 7.4), it may have partly controlled the hydrothermal alteration and mineralization in this part of the Sulphurets Mining Camp.
Rocks of the Sulphurets Mining Camp were subjected to lower greenschist facies metamorphism, characterised by epidote, calcite, quartz, and chlorite, and the absence of biotite, hornblende, and actinolite in andesitic volcanic rocks and sedimentary rocks outside of the areas of hydrothermal alteration. The peak metamorphic temperature probably did not exceed 275°C (assuming a 3 km depth of burial).

7.3 Property geology

The information in this section on the Brucejack Property geology is summarised and updated from the work of Mr. Charles Greig, Senior Geologist for Pretivm, as presented in Olssen and Jones (2012).

Geology on the Brucejack Property can generally be characterized as a northerly-trending, broadly arcuate, concave-westward structural-stratigraphic belt of variably altered rocks. This belt is bisected on the western side of the Property by a prominent topographic lineament, the Brucejack Fault (Figure 7.5 and Figure 7.6). To the south of Brucejack Lake, the belt generally displays a north-easterly trend, rotating towards the northwest north of the lake. The arcuate trend is outlined by the stratified rocks and the intensely quartz-sericite-pyrite altered rocks. Most of the defined mineral resources on the Property are located within the intensely altered zone.

7.3.1 Lithology and Stratigraphy

Triassic Stuhini Group

Rocks of the Upper Triassic Stuhini Group, which are typically fine-grained and well bedded siltstone and mudstones with minor micritic limestone, conglomerate, and sedimentary breccia, are limited to the western parts of the Property, west of the Brucejack Fault. These rocks are intruded by a number of mafic to felsic predominantly alkalic intrusions, a number of which have been dated as Early Jurassic in age. The Upper Triassic clastic rocks have been folded across steep northerly-trending folds and related faults and were deformed and eroded prior to deposition of the lowermost rocks of the Hazelton Group.

Lower Jurassic lower Hazelton Group

The majority of the lithological units mapped on the Brucejack Property appear to correlate reasonably well with those of the Unuk River and Betty Creek Formations of the Early Jurassic lower Hazelton Group, as described by Britton and Alldrick (1988). Pretivm has, however, elected not to assign formation-level regional stratigraphic names to these rocks until the current detailed field mapping is complete, due to the existence of complicated lateral facies variations and the diachronous nature of many of the units.
Unconformably overlying the Triassic rocks are rocks of the Lower Jurassic Hazelton Group. They comprise five principal intercalated rock types. These include: 1) heterolithic volcanic conglomerate, most common at the base and typically coarse-grained (Jack formation), 2) massive and locally well-layered medium to dark green volcanic siltstone containing common carbonate concretions, and subordinate litharenite and locally-derived pebble conglomerate, 3) hornblende and/or feldsparphyric volcanic rocks, principally flows and related coarse fragmental rocks, 4) weakly stratified heterolithic green to dark green volcanic pebble to boulder conglomerate, sandstone and local mudstone, containing zones of intensely silicified conglomerate, 5) pyroclastic rocks, including medium- and coarse lapilli tuff and tuff-brecia, with minor intercalated intensely silicified zones. The flows include several subtypes which may be distinguished by the grain size and compositions of their phenocryst assemblages generally fine- to medium-grained hornblende and plagioclase feldspar, +/- medium- and locally coarse-grained potassium feldspar – they are typically rich in groundmass potassium feldspar, and are essentially latites to trachydacites or trachyandesites.

Previously, some of the rocks straddling the Brucejack Fault were mapped as intrusive (e.g., Davies et al. 1994). Based on drilling and detailed mapping across the Property over the last three years, Pretivm now interprets the majority of the rocks on the Property as being extrusive. Most of the bodies of massive fine-grained rocks contain local fragmental layers, which are interpreted to represent interflow block tuff or flow-brecia. In addition, there is little or no evidence in the vicinity of the larger masses for associated dykes, and little evidence for contact aureoles. In a number of outcrops, there is clear evidence for the incorporation of large, angular fragments of these bodies, which are texturally distinctive (they typically contain abundant fine- to medium-grained hornblende and/or feldspar phenocrysts within an aphanitic groundmass) within marginal and/or overlying fragmental units. Furthermore, the relatively massive rocks are commonly interlayered with clastic sedimentary rocks near their basal contacts, and locally they contain fragments of lithologies which are known to be Upper Triassic in age. The various Early Jurassic hornblende feldspar-phyric rocks display variable ages over a range of 15 Ma, as determined from preliminary U-Pb dating, which is more consistent with an extrusive interpretation.

The polyolithic conglomerate and overlying pyroclastic fragmental units appear to have been favourable sites for channelling hydrothermal fluids due to the presence of numerous stratiform intensely silicified zones within these relatively porous and permeable rocks. Intense silica flooding with an associated cross-cutting network of crack-seal and hydraulic fractures filled with cryptocrystalline quartz indicates that these zones may have acted as local pressure caps during fluid infiltration that induced local overpressure conditions and subsequent hydraulic fracturing. The presence of multiple zones of intense silicification that are effectively stratiform and which are present at different stratigraphic levels within the conglomerate and younger fragmental units suggests a continuum of fluid infiltration, silica ponding, overpressurization, and hydraulic fracturing. A Late Triassic U-Pb age obtained by Pretivm on one of these silicified zones hosted within these Early Jurassic volcano-sediments therefore reflects the detrital age of one of the pebble or cobble clasts (most likely rhyolite). The intensely silicified zones have been intersected in VOK (particularly on the southern limb of the VOK syncline), as well as in the West Zone, Gossan Hill, and Golden Marmot. These units were previously variably interpreted as submarine rhyolite flows (which is irreconcilable with the geochronology), dykes, sills, or chert horizons (e.g., McPhearson et al., 1994).
Figure 7.5  Brucejack Property geology

(Source: Gaffari et al., 2012)
Figure 7.6  Brucejack Property geology

(Source: Pretivm, 2012)
Well-bedded green, maroon, and grey andesitic to dacitic pyroclastic and epiclastic rocks comparable to rocks of the Betty Creek Formation, are present to the northeast and southeast of Brucejack Lake, off the eastern edges of the Brucejack geological map in Figure 7.5.

There are almost no intrusive rocks east of the Brucejack Fault, other than a limited number of narrow post-mineral and post-tectonic amygdaloidal mafic dykes. This is in contrast to the increased abundance in intrusives noted west of the Property (e.g., Kirkham and Margolis, 1995).

### 7.3.2 Alteration and Mineralization

The prominent gossanous alteration features on the Brucejack Property define a distinctive north-south trending and west-concave arcuate belt that is generally located on the east of the Brucejack Fault. This belt is characterised by a broad band of variably but generally intensely quartz-sericite-pyrite altered rocks of up to several hundred meters or more across, and approximately five kilometres in strike extent. The quartz-sericite-pyrite alteration typically contains between two and 20% pyrite, and, depending on the alteration intensity, can preclude protolith recognition.

High grade gold (± silver) mineralization is predominantly located within this alteration band and is generally associated with vein-stockwork systems of varying intensity. These stockwork systems display good continuity along-strike (several tens of metres to several hundreds of metres) and are characterized by the presence of mesothermal to epithermal veins of quartz, quartz-carbonate, quartz-adularia, and pyrite that are typically on the order of millimetres to tens of centimetres in thickness and which form intense crosscutting networks within the stockworks. In rare cases, the veins may range up to nearly ten metres in thickness. Most high grade zones are either on the margins of, or contained within, a zone of bulk mineralization. Bulk low grade mineralization zones (locally up to several grams per tonne gold) tend to be associated with disseminated anhedral pyrite. Zones and veins of euhedral pyrite are barren.

Vein mineralization includes trace to 10% combined disseminated pyrite, tetrahedrite, tennantite, arsenopyrite, chalcopyrite, galena, sphalerite, pyrargyrite, polybasite, acanthite, and rare native gold and electrum. The presence of base metals and/or arsenopyrite in veins and vein stockworks is only weakly correlated to gold mineralization, and therefore are not considered an indicator thereof. Where visible, gold in the form of electrum typically occurs as coarse aggregates or late stage fracture fillings, as rims on subhedral quartz crystals, or as lace-like networks formed around coarse grains of adularia. Seams of electrum up to a centimetre in thickness have also been observed in sericitized country rocks, with little obvious association to veins. Appreciable silver grades are generally present in mineralized zones where gold to silver ratios are less than 1:10; all of the known bonanza grade intersections on the Property have gold to silver ratios of roughly 2:1. Silver-dominant veins tend to be restricted in extent. High-grade silver mineralization occurs as silver sulphides and sulphosalts that are related to adularia-rich veins in which adularia pseudomorphs bladed calcite, indicative of epithermal conditions. Preliminary mineral zonation patterns (e.g., Au:Ag ratios, absence/presence of adularia and/or base metal veining, and meso- versus epithermal vein textures) on the Property suggest down temperature thermal gradients towards the east (i.e., up stratigraphy) and north.
Mineralized quartz veins, vein networks, and vein stockworks in and around the various mineral deposits on the Brucejack Property have been affected by significant post-mineralization deformation. The various deformation features noted from the broader Sulphurets Mining Camp (see Section 7.2.3.) are developed throughout the mineralized zones on the Brucejack Property. The nature, spatial, and geological associations of the mineralization within a zoned alteration environment proximal to known porphyry bodies with associated porphyry-style mineralization, coupled with the intense deformation of the bulk mineralized host-rocks, veins, and vein stockworks argue strongly against the syn-tectonic model previously proposed for the high grade mineralization on the Property. Syn-tectonic vein development appears to be limited to late unmineralized shallow southeast-dipping veins and sigmoidal shear veins (see Section 7.2.3).

The currently hypothesis for the mineralization on the Brucejack Property is that it represents a deformed transitional meso- to epithermal porphyry-associated quartz stockwork in pervasively altered (quartz-sericite-pyrite; i.e., within the Sericite alteration zone of Sillitoe, 2010) lower Hazelton Group rocks. The bulk mineralization may have been formed shortly after consolidation of the volcanic pile due to reactions between these rocks and seawater (e.g., Margolis, 1993), possibly as a result of hydrothermal fluid circulation driven by a distal and developing porphyry system. Progressive development and telescoping of the porphyry system in rocks of the volcanic pile would then have resulted in widespread and zoned porphyry-style alteration and mineralization, with the high grade gold and gold-silver mineralization generated in a transitional meso- to epithermal environment slightly more distal (i.e., down temperature) from the intrusive stock/dyke/sill body than the KSM and Snowfield deposits.

Thermal perturbations associated with pulsing in the porphyry system would likely have resulted in a succession of alteration and mineralization imprints and overprints within such a transitional environment and possibly induced upgrading and zonation of the precious metal mineralization.

More than 40 gossanous zones of gold, silver, copper, and molybdenum mineralized zones have been identified along the length of the arcuate band of altered rocks as a result of periodic exploration over the past several decades (Figure 7.6). A subset of these was selected for additional follow-up exploration in 2011 by Pretivm (Figure 7.8). A total of six zones were modelled for mineral resource estimation: the Bridge Zone, Valley of Kings (VOK), Galena Hill, West Zone, Gossan Hill, and Shore Zone. These zones range from deformed high-grade gold-rich, silver-poor zones such as VOK, through deformed high grade gold-silver zones like the West Zone, to high-tonnage but relatively low-grade zones like the Bridge Zone.

**Bridge Zone**

The Bridge Zone is located about 1,500 m south of the West Zone and is centred on a three hectare-ha nunatak surrounded by ice of the eastern arm of the Sulphurets glacier. Gold mineralization at the Bridge Zone is hosted by plagioclase-hornblende phryic volcanic rocks that are moderately to strongly sericite-chlorite altered, with disseminated and stringer pyrite making up a few percent of the rock by volume. Mineralization occurs both in low grade bulk tonnage associated with the altered host rocks, and in deformed quartz vein and vein stockwork associated moderate to high grade styles. The moderate to high grade mineralization is generally associated with east-west trending quartz vein and vein stockworks that dip steeply to the north.

Quartz ± chlorite ± sericite veins, ranging from 20 cm to 200 cm in thickness, are fairly common and contain minor to trace amounts of pyrite, sphalerite, galena, molybdenite, and an unknown dark grey, possibly silver-bearing sulphosalt (or salts). Some of the veins contain appreciable concentrations of molybdenum and rhenium, with the Mo/Re ratio similar to that at Pretivm’s Snowfield Deposit.
The pervasive nature of the mineralization in the Bridge Zone, the association of this mineralization with Mo and Re, and the spatial proximity of the intensely hydrothermally altered and mineralized southern limb of the VOK syncline (immediately to the north of the Bridge Zone; see below), suggests that the Bridge Zone rocks were relatively proximal to an intrusive body (stock/sill/dyke/other narrow apophysis) of the mineralizing porphyry system.

**VOK**

Exploration drilling by Silver Standard (2009, 2010) and Pretivm (2011 to present), as well as recent surface mapping, has been successful in outlining a series of corridors of high grade mineralization associated with deformed quartz stockworks and intense quartz-sericite-pyrite alteration in an east-west trending and east-southeast plunging tight syncline developed in almost the full sequence of lower Hazelton Group rocks described in Section 7.3.1 (Figure 7.8 and Figure 7.9).

The VOK mineralized zone trends approximately west-northwest to east-southeast (Figure 7.8). Its orientation mirrors that of Electrum Ridge, a pronounced topographic feature near the southern margin of the zone, and drilling to date has extended its strike to over 800 m. The zone is up to 150 m wide and was originally thought to be bound to the west by the Brucejack Fault. Recent drilling in the current 2012 drill program, together with the presence of significant intervals of gold mineralization, in the Waterloo Zone, indicates that the VOK continues west across the fault, thereby making the zone open to the west, as well as to the east and at depth.

High-grade gold and silver mineralization within the VOK occurs as electrum, which is generally hosted in deformed quartz-carbonate and quartz-adularia veins and vein stockworks. While quartz veining and stockworks are common throughout the zone, the majority of gold intersections are confined to corridors within a 75 m to 100 m wide zone on the southern limb of the syncline. The orientation of these corridors is sub-parallel to the fold axis. Au:Ag ratios within the VOK are typically 2:1 or higher. Variations in this ratio, which could be a function of thermal gradients developed at the time of mineralization, are suggested by a visible increase in the proportion of silvery electrum (at the expense of more gold-coloured electrum) with a concomitant increase in the proportion of vein-hosted adularia towards the eastern parts of the zone. Additional precious metals-bearing minerals found in the VOK, typically in trace quantities, include silver sulphides, acanthite, pyrargyrite and tetrahedrite, and associated with base metal-bearing sulphides include sphalerite and galena.

Low grade bulk tonnage mineralization, associated with disseminated anhedral pyrite, forms a halo within the altered rocks, surrounding the high grade mineralization corridors.
Figure 7.7 Historical map with mineral deposits and occurrences

(Note: modified after Budinski, 1995).
(Source: Gaffari et al., 2012)
Figure 7.8  Brucejack Property Mineralization Zones

(Source: Gaffari et al., 2012)
Figure 7.9 VOK geology map

(Source: Pretivm, 2012)
Figure 7.10  VOK cross section 426500 E

(Source: Pretivm, 2012)
Galena Hill

Galena Hill is a prominent hill southeast of the southern end of the West Zone and east of the VOK. The hill is marked by widespread iron oxide staining of altered volcanic fragmental and reworked volcanic fragmental rocks and the slopes are commonly faced by quartz stockwork.

The Galena Hill mineralization is characterized by east-west and northeast-southwest-trending deformed quartz veins and deformed quartz stockworks within a zone of hydrothermal alteration and mineralization that is at least 460 m long and 300 m wide. Mineralization in Galena Hill is similar to that in the northern parts of the VOK (i.e., northern limb of the syncline). It is likely that Galena Hill is located at or near the east-southeast plunging fold axis of the anticline that appears to link West Zone and VOK (see Figure 7.11 and Section 7.3.3).

The Galena Hill mineralization is hosted by a similar sequence of rocks to the VOK: fragmental volcanic and volcaniclastic rocks and underlying polylithic conglomerates. The intensely silicified zones common in the polylithic conglomerate unit on the southern limb of the VOK have also been intersected by drilling in the Galena Hill.

As in the West Zone and VOK, gold mineralization at Galena Hill is preferentially associated with quartz veins and quartz stockworks. The sericite-altered, intermediate composition host volcanic rocks are typically mineralized with disseminated pyrite and do host low- to medium-grade bulk tonnage style mineralization. Mineralized veins contain trace to visible native gold and electrum, with trace to locally massive sphalerite, chalcopyrite, and galena. The Galena Hill mineralization is open to the northwest, west, east, and at depth.

West Zone

The West Zone gold-silver deposit (Figure 7.11 and Figure 7.12) is hosted by a northwesterly trending band of intensely altered Lower Jurassic latitic to trachyandesitic volcanic and subordinate sedimentary rocks, as much as 400 m to 500 m thick, which passes between two more competent bodies of hornblende plagioclase hornblende phryic flows (Figure 7.10). The stratified rocks dip moderately to steeply to the northeast and are intensely altered, particularly in the immediate area of the precious metals mineralization. The West Zone appears to form the northern limb of an anticline that links up with the VOK to the south (Figure 7.10), and the southern limb of a syncline that extends further to the north.

The West Zone deposit itself comprises at least 10 quartz veins and mineralized quartz stockwork ore shoots, the longest of which has a strike length of approximately 250 m and a maximum thickness of about around 6 m. Most mineralized shoots have vertical extents that are greater than their strike lengths. Veins and stockworks in this zone display clear evidence of post-mineral ductile and brittle deformation. The West Zone is open along strike to the southeast, and at depth to the northeast.

In terms of hydrothermal alteration, the West Zone is marked by a central silicified zone that passes outwards to a zone of sericite ± quartz ± carbonate and then an outer zone of chlorite ± sericite ± carbonate. The combined thickness of the alteration zones across the central part of the deposit is between 100 m and 150 m.

Gold in the West Zone occurs principally as electrum in quartz veins and is associated with, in decreasing order of abundance, pyrite, sphalerite, chalcopyrite, and galena. Besides being found with gold in electrum, silver occurs in tetrabethrite, pyrargyrite, polybasite and, rarely, stephanite and acanthite. Gangue mineralogy of the veins is dominated by quartz, with accessory adularia, albite, sericite, and minor carbonate and barite. The increased abundance of silver in the West Zone may suggest that this zone was formed down temperature gradient from the VOK.
Gossan Hill

The mineralized zone known as Gossan Hill is a circular area, about 400 m in diameter, of intense quartz-sericite-pyrite alteration developed in Lower Jurassic volcanic rocks. The visually impressive alteration zone at Gossan Hill is host to at least eleven deformed quartz vein and quartz vein stockwork structures, most of which trend east-west and dip steeply to the north. Individual structures are up to 250 m long and 20 m thick.

Precious metal mineralization at the Gossan Hill occurs both as low grade bulk tonnage and high grade styles. The low grade bulk tonnage style is associated with fine quartz stockworks and anhedral pyrite. Higher-grade gold mineralization at Gossan Hill differs somewhat from other zones on the Property in that it is associated with the larger quartz lenses, particularly where they contain local aggregates of pyrite, tetrahedrite, sphalerite, and galena. Electrum is observed in the bonanza grade intersections, while silver also occurs in tetrahedrite, pyrrylgrite, and polybasite. The Gossan Hill remains open along strike, across strike, and at depth.

Shore Zone

The Shore Zone is a relatively small gold-silver deposit located along the north-eastern shore of the peninsula that extends into the west end of Brucejack Lake (Figure 7.7).

This zone is characterized by deformed quartz veins and quartz vein stockworks up to 100 m in length, which are hosted in deformed and quartz-sericite-pyrite altered trachyandesite, sandstone and pebble conglomerates of the lower Hazelton Group. The zone has a strike length of approximately 530 m and a maximum width of 50 m. The northwest-southeast trend of the zone is coincident with a pronounced lineament that extends south-eastward from the Brucejack Fault beneath Brucejack Lake, and which is likely a fault.
Figure 7.11 VOK to West Zone geological section 426600 E - looking west

(Source: Pretivm, 2012)
Figure 7.12  West Zone drillholes and assay cross section

(Source: Gaffari et al., 2012)
Given the intense folding displayed by the lower Hazelton Group rocks in this area, as well as the variable competency of the rocks in this part of the Property, it is likely that a combination of ductile deformation and rock competency differences controlled the orientation of this zone. Way-up structures in steeply northeast dipping sedimentary units in the Shore Zone indicate that it likely forms the northern limb of a parasitic southeast plunging anticline. The aforementioned lineament likely utilised the ductile deformation-prepared northwest-trending zone of structural weakness for propagation during late brittle deformation.

The veins and vein stockworks consist predominantly of quartz with minor carbonate and barite, with patchy sulphide mineralization consisting of variable quantities of pyrite, tetrahedrite, sphalerite, galena, and arsenopyrite. Electrum has been observed in trace amounts. Silver is present in some of the highest concentrations observed in the Brucejack Property. This observation, together with the stratigraphic (up stratigraphy) and spatial position (i.e., relatively far northeast of the Bridge Zone) of the Shore Zone, provides further evidence for thermal gradient-induced mineral zonation across the Property.

### 7.3.3 Structure and Metamorphism

The Brucejack Property is characterized by the presence of steep structural elements, including steeply dipping planar features such as bedding, foliation, and brittle faults, and steeply plunging linear features, such as fold hinges, pencil cleavage, or mineral lineation. These structural elements are associated with the Late Jurassic to Late Cretaceous Skeena Fold Belt deformation, and deform unaltered and altered rocks, as well as mineralized veins and stockworks.

#### Foliation

Foliation on the Property is pervasive, although it is best developed in the most intensely altered rocks. The foliation is defined by muscovite in altered rocks, and by sericite and chlorite in less altered rocks. The foliation displays a dominantly east-west trend across the Property, with a sub-vertical dip that is generally to the north, but which does vary about the vertical.

Foliation orientation appears to be locally controlled by the presence of proximal competent rock masses that acted as strain resistors during deformation (e.g., the relatively competent hornblende feldspar phryic volcanic flow that forms the southern and south-western margin of the West Zone probably controlled the northwest trend of the foliation in this area).

Within the broader zones of veining, individual veins, veinlets, and narrower stockwork zones have been partially to completely reoriented sub-parallel to the foliation in the host rocks. The most intensely foliated rocks tend to be altered rocks immediately adjacent to the veins and stockworks.

A second, locally developed foliation has been observed in the footwall to West Zone, Gossan Hill, and Golden Marmot. The development of this foliation, which is also typically steep, is generally associated with the most intensely foliated and altered lithologies. A steeply southeast plunging intersection cleavage lineation (or pencil structure) is often associated with the presence of the second foliation, and is sub-parallel to mesoscale fold axes. Pencil cleavage is also developed at the intersection of steep (and commonly curvilinear) joint sets with the steep foliation.
Folding

Rocks on the Brucejack Property have been folded into a series of tight, moderate to steeply east- to southeast-plunging south-vergent synclines and anticlines, with wavelengths on the order of approximately a hundred metres. Smaller-scale parasitic folds (few metres scale) with similar orientations to these folds are locally developed. These folds are generally quite difficult to recognise in the field, and have been delineated using both field observations and lithological domain trace element analyses (Figure 7.5 and Figure 7.13). They tend to be best delineated in the field by following the contacts between older, predominantly clastic rocks and the younger, predominantly volcanic flows and associated coarse volcanic fragmental rocks of the lower Hazelton Group. The east-west trending fabric, which generally tends to be axial planar to these folds is interpreted as having formed at the same time as this folding event. The variation in intensity of folding between less competent clastic rocks and more competent volcanic flows suggests preferential strain partitioning in the less competent rocks during deformation. The more competent rocks possibly acted as strain resistors which locally controlled folding of the less competent rocks (e.g., the westward tightening up of the syncline in the VOK between the two porphyritic flows in this part of the property).

Gentle warping of the earlier folded rocks about a roughly east-west trending and east-plunging axis could reflect the waning stages of the ductile deformation continuum, or could simply be a larger magnitude of strain accommodation penecontemporaneous with the development of the more intense folding.

Brittle faulting

Steep post-mineral late brittle faults, which cut deformed unaltered and altered rocks and deformed mineralized veins and vein stockworks, are present across the Property. Many form well-defined lineaments, with that of the Brucejack Fault being the most prominent. Few have any well-defined offsets, and most offsets appear relatively minor (less than several tens of metres). An exception is noted in the area near the western margin of the Sulphurets glacier, to the north-west of Brucejack Creek, where clean and well-exposed outcrops show apparent dextral offsets of up to 20 or more metres along north-trending faults occupying lineaments which are sub-parallel to the Brucejack Fault. Numerous smaller-scale north-trending brittle features on the Property show similar apparent displacements. Discussion of the offset along the Brucejack Fault is presented in Section 7.2.3.

Metamorphism

The rocks on the Brucejack Property experienced lower greenschist facies metamorphism around 110 Ma associated with the Skeena Fold Belt deformation. See Section 7.2.3 for further discussion on the metamorphism of the rocks of the Sulphurets Mining Camp.
Figure 7.13  Trace element analysis by lithology for VOK and West Zone
8 Deposit types

Based on the geological discussions presented in Section 7, the gold-silver quartz (± carbonate, barite, adularia) and minor base metal (galena, sphalerite and rare chalcopyrite) veins of the Brucejack Deposit are considered as having been formed in a transitional meso- to epithermal porphyry-associated quartz stockwork system in pervasively altered (quartz-sericite-pyrite; the Sericite alteration zone of Sillitoe (2010); Figure 8.1) lower Hazelton Group rocks. Geological, mineralization, and alteration features of the Snowfield Deposit (see Armstrong et al., 2011) suggest that this deposit is more proximal to the porphyry apophysis, most likely in the Chlorite-Sericite alteration zone of Sillitoe (2010) (see Figure 8.1).
Figure 8.1  Brucejack Deposit mineralization within context of porphyry systems

(Source: Modified after Sillitoe (2010))
9 Exploration

Information in this section has been excerpted from P&E sections within Gaffari et al., (2012) and updated.

In September 2011, Quantec Geoscience was contracted to undertake a Spartan magnetotelluric (“MT”) survey of the Snowfield and Brucejack Properties. The exploration objectives were to map and detect porphyry mineralization to depth within the Snowfield and Brucejack Projects, and to establish an understanding of the geological system and fluid pathways to great depth within the Snowfield and Brucejack survey area (Gharibi et al., 2011).

There were approximately 57 lines surveyed at a spacing of 500 m.

The following definition of MT is taken from Quantec Geoscience’s report:

“The (MT) method is a passive/inductive method which measures the time-variations in the Earth’s natural electric (E) and magnetic (H) fields to image the subsurface resistivity below the sounding site. No source or transmitter is used. The E and H fields are measured over a broad range of frequencies from 10 kHz to 1Hz (worldwide lightning activity), and from 1Hz to 0.001Hz (oscillations of the Earth’s ionosphere as it interacts with the solar wind). While the E and H fields are random, (solar wind and lightning activity) the ratio of the fields depends on the subsurface resistivity structure”.

The 16 scattered MT stations over the southern part of the Brucejack area provided a preliminary understanding of the resistivity contrasts. There are clear contrasts between rock types and a significant interpreted northerly structure that appears to correlate with indicated mineralized zones from the Bridge to West Zones. A second interpreted east-northeast structure is also apparent that may offset the northerly structure. The 16 stations are sparse coverage over more than two square kilometres, with significant topography, and show differences in resistivity responses between individual stations. While these data may suggest geologic features they should be used with caution.

Three dimensional figures from the Quantec Geoscience report (2011) are presented in Figure 9.1 and Figure 9.2.
Figure 9.1 3-D geophysical model schematic according to Quantec Geoscience MT survey

Iso-surfaces
400 ohm-m (Pink)
1000 ohm-m (green)
2000 ohm-m (blue)

(Source: Gaffari et al., 2012)
Figure 9.2  3-D Geophysical model schematic according to Quantec MT survey

(Source: Gaffari et al., 2012)
10 Drilling

Information in this section has been excerpted from P&E sections within Gaffari et al., (2012). Snowden updated and verified this information.

10.1 Historical drilling

Drilling on the Brucejack Property dates back to the 1960’s, although most of the historical drilling was completed in the late 1980’s and early 1990’s. Up to this time, 452 surface diamond drillholes were completed which totaled 60,854 m. These holes were relatively short, averaging 135 m per hole, and were mostly concentrated on West Zone, followed by Shore Zone, Galena Hill and Gossan Hill. As part of this exploration program, an exploration ramp was driven on the West Zone from which an additional 442 underground diamond drillholes were completed which totalled 33,750 m. This drilling was focused exclusively on West Zone and increased the drill density to approximately 5 m centres between 5 m and 10 m sections. Historical drill core sizes for surface drillholes were NQ (47.6 mm diameter) and BQ (36.5 mm diameter). Core size for drillholes collared from the underground exploration ramp was AQ (27 mm diameter).

10.2 Silver Standard drilling

Using the historical drill and trench data as a baseline, and following on the success of the Snowfield bulk tonnage drilling to the north, the 2009 Brucejack drill program was designed to test for additional bulk tonnage resources on the Property. This program successfully discovered several areas with bulk tonnage mineralization. Within the broader bulk tonnage mineralization were locally discreet high grade intersections. These included holes SU-5 and SU-12, which were drilled to test for the western extension of the previously defined Galena Hill. These two holes intersected 1.5 m of 215 g/t Au and 1.5 m of 16,949 g/t Au respectively in what would eventually be called VOK. Drilling in 2009 totaled 17,846 m in 37 holes, of which 2,913 m in 6 holes was targeted at VOK.

In 2010, the drill program was designed to further define the bulk tonnage mineralization found the previous year, as well as attempt to define a high grade resource at VOK. In this year, a total of 73 diamond drillholes was completed which totaled 33,400 m. Of this, 11 holes comprising 3,693 m were targeted at VOK, and 2 holes, totaling 1,119 m at the footwall of West Zone. In VOK, wide spaced drilling intersected enough high grade mineralization to confirm the exploration potential of the zone. The exploration potential included the preliminary definition of some of the ore controls which put the intersections into a geologic context. The West Zone drilling intersected a broad zone of bulk tonnage mineralization within which were several high grade intersections.

10.3 Pretivm drilling

The 2011 diamond drill program was the first in almost 20 years that was focused specifically on defining high grade resources. In 2011, a total of 178 holes were completed totalling 72,805 m in holes SU-110 to SU-288. Included in this were 97 holes (41,219 m) targeted at VOK, 16 holes (7,471 m) at West Zone, and 21 holes (7,220 m) targeting the surrounding areas. The remaining drilling was focused on expansion of Shore Zone, testing for structurally controlled high grade mineralization in Galena Hill and Bridge Zones, and testing new target areas. Drill collar coordinates, and results of the drilling in 2011 are described by P&E in Gaffari et al., (2012).
The 2012 diamond drill program was focused on defining the high grade resource at the Valley of the Kings, specifically targeting geological and structural features believed to be associated with gold mineralization. Diamond drilling was also focused on expanding the VOK Zone, both west of the Brucejack Fault and along trend to the east of the main mineralized zone. A total of 175 drillholes (55,849 m) were competed in Holes SU-289 to SU-466.

In 2011 and 2012, the drilling contractors were Radius Drilling from Prince George BC, and Matrix Drilling from Kamloops BC. They both used Hydracore drill rigs.

Core sizes for Pretivm’s surface collared drillholes are PQ (85 mm diameter), HQ (63.5 mm diameter) and NQ (47.6 mm diameter). Approximately 50 to 60% of core is HQ size. For drillholes less than 600 m length, core size is commenced at HQ and is reduced to NQ when conditions require. For drillholes greater than 600 m length the commencing core size is PQ which is run down to approximately between 200 and 300 m in order to minimise drill path deviation.

The drill collars were surveyed by McElhanney Surveying from Terrace, BC. McElhanney Surveying use a total station instrument and permanent ground control stations for reference and have completed all the surveying on the project since 2009. Drillhole paths are surveyed at a nominal 50 m interval using a Reflex EZ single shot instrument.

Drill core logging and handling procedures were the same for all three programs. At the end of each drill shift all core were placed in wooden boxes (Figure 10.1), labelled by drillhole and interval and transported to the core logging and core splitting facility on site by snowcoach (Figure 10.1) or helicopter. The sample boxes were covered to avoid sample loss or contamination during transportation (Figure 10.2).

**Figure 10.1** Core in wooden core boxes ready for transport.
Prior to any geotechnical and geological logging, the entire drill core was photographed in detail using a digital camera. These images were stored in individual files per drillhole.

A trained geo-technician recorded the core recovery and rock quality data for each measured drill run. All lithological, structural, alteration and mineralogical features of the drill core were observed and recorded during the geological logging.

The geologist responsible for logging a drillhole assigned sample intervals with the criteria that the intervals did not cross geologic contacts and the maximum sample length was 2 m. Within any geologic unit, sample intervals of 1.5 m long could be extended or reduced to coincide with any geologic contact. Sample lengths were rarely greater than 2 m or less than 0.5 m, and generally average 1.5 m. Every drillhole was sampled in its entirety from top to bottom.

The logging data was directly introduced in a database, using the software DHLogger, at the moment of the logging, by the trained geotechnicians and geologists.

It is the author’s opinion that the core logging procedures employed are thorough and provide sufficient geotechnical and geological information. There is no apparent drilling or recovery factor that would materially impact the accuracy and reliability of the drilling results. The author believes that drilling has been conducted using industry standard guidelines.
Figure 10.3  Brucejack Property diamond drillhole plan

(Source: Pretivm)
11 Sample preparation, analyses and security

Information in this section has been excerpted from P&E sections within Gaffari et al., (2012), edited in part and modified.

11.1 Sample preparation before dispatch of samples

Upon completion of the geological logging, the core was moved to the splitting area where the core was either split or sawn in half lengthwise using a wet diamond saw. All PQ core was sawn as the core was too big to fit into the splitters (Figure 11.1). Likewise, any sample intervals which contained visible gold or interesting mineralization were also sawn. All other core was cracked in half using a standard hammer/blade core splitter. One-half of the drill core was placed in a plastic sample bag with the appropriate sample tag and the other half was returned to its original position in the core box. The sample bags were placed in 4 or 5 rice sacks and flown to the staging area by helicopter. Individual work orders were generally between 80 and 120 samples, including standards, blanks and field duplicates. At the staging area, a local expediter brought the samples to Stewart where they were loaded onto a 5 tonne truck and locked for the night in the company's warehouse. The next morning they were driven to the ALS Minerals sample preparation facility in Terrace, BC.

Figure 11.1 Cutting PQ core at the Brucejack Property

The cut PQ samples weigh approximately 10 kg. HQ samples are around 6 kg, and NQ samples between 3 kg and 4 kg. These weights assume a nominal 1.5 m sample length. In general, the average sample size submitted to the analytical laboratory was 6.5 kg.

Pretivm's Qualified Person for field activities is Mr Ken McNaughton.

11.2 Analytical laboratory

The 2011 program on the Property used ALS Chemex (“ALS”) as the principal laboratory. The samples that were originally sent to ALS in Terrace, BC, for sample preparation were then forwarded to the ALS facility in Vancouver, BC, for analysis.
ALS is an internationally recognized minerals testing laboratory operating in 16 countries and has an ISO 9001:2000 certification. The laboratory in Vancouver has also been accredited to ISO 17025 standards for specific laboratory procedures by the Standards Council of Canada (SCC).

A second laboratory, SGS Canada, was used as a check and as a comparison with ALS.

11.2.1 Method

Samples at ALS were crushed to 70% passing 2 mm, (-10 mesh). Samples were riffle split and 500 g were pulverized to 85% passing 75 µm (-200 mesh). The remaining coarse reject material was returned to Pretivm for storage in their Smithers warehouse for possible future use.

Gold was determined using fire assay on a 30 g aliquot with an atomic absorption (AA) finish. In addition, a 33 element package was completed using a four acid digest and ICP-AES analysis, which included the silver.

11.2.2 Density determinations

Density determinations were done by ALS using the pycnometer method on pulps from the drilling program. Pretivm’s QP selected the samples as the programs were progressing to maintain good coverage over a wide range of locations and rock types. A total of 1,038 density determinations have been completed, including 759 determinations during the 2011 drilling program.

The core is very competent and there is not expected to be a material difference between these pulp specific gravity measurements and bulk density.

11.3 Quality assurance and quality control

11.3.1 Data - 2011

During 2011, data were entered into a data capture tool suited for import to a database. Data were then sent digitally to Caroline Vallat at GeoSpark Consulting Inc., (“GeoSpark”).

Updated sampling data were provided regularly, including down hole primary sample details as well as reference to duplicate samples and standards and blanks inserted throughout the sampling. The drillhole header, survey, and down hole attribute data were also provided on a regular basis.

To the best of GeoSpark’s knowledge the sample data were provided in their original digital state, and there is no reason to suspect any data tampering.

Data provided were loaded to a relational database suited for quality assurance and quality control on the analytical results reported by ALS Minerals, Vancouver. The database was reviewed regularly to ensure that the data remained functional for use by eliminating down hole interval overlaps, records beyond end of hole depths, addressing any data entry issues related to the down hole attribute codes, for example. Updates were also made to the sampling table wherever quality assurance and quality control (“QAQC”) measures revealed data entry issues related to the sample identities or details. For example, there were some issues where the wrong standard identity was entered and the returned analytical results clearly revealed the correct standard identity. All updates to sample identities were tracked within the database.
All analytical results were entered directly from ALS and SGS Canada, (“SGS”) assay certificates to a database managed by GeoSpark. The analytical results were then provided to Pretivm personnel for use internally.

The analytical records in the 2011 Brucejack database exist as they were provided from the laboratories. The data were provided as they were originally produced and there was no need to perform manual verification.

Ongoing review of the analytical results took place in order to remedy any suspect analytical results. Re-analyses were requested from the lab whenever there was a question of the accuracy of results reported. In addition internal lab repeat and field duplicates were reviewed in order to monitor the repeatability or precision of results reported.

Any re-analyses were further reviewed and the results were assigned to the primary samples which were denoted with a suffix of 'R' meaning re-run.

Duplicates, standards, and blanks were inserted approximately every twentieth sample and amount to 5.86%, 5.76%, and 5.98% relative to the total number of primary samples submitted to ALS. In addition a representative set of check samples was submitted to SGS Canada for analysis using similar analytical methods and techniques. The check samples serve to define any bias in the primary results.

This amount of QAQC data is sufficient to represent the quality of the sample analytical results reported by ALS.

Ongoing documentation of the analytical result QAQC was provided to Pretivm (Vallat 2011).

Vallat (2011) concluded:

“With consideration of inhomogeneity within the Brucejack project mineralization as a function of nugget mineralization and the nugget effect, and thorough review of the analytical results reported on field duplicates, a satisfactory level of precision has been inferred for the primary sample results. Additionally, initial review of the internal lab repeat results at the time of analysis reporting has increased the confidence in results reported by ALS Chemex.

Mineral concentrations reported on standard and blank materials have been consistently monitored in order to remove any concern of local contamination or instrumentation issues.

The detailed review of the standard and blank results has inferred that there is strong accuracy in the primary sample results reported by ALS Chemex.

Check sampling has shown that there is no need for concern of bias in the primary sample results reported.

The quality assurance and quality control measures taken and addressed herein have allowed for overall confidence in the analytical results reported for the 2011 Brucejack project.”
11.3.2 Data - 2012

Throughout the Brucejack 2012 exploration program, drillhole data was entered at camp using a local database platform. Weekly updates of the drillhole sample details were provided to GeoSpark for update of the local master QAQC database.

Periodically, additional drillhole details including drillhole collars, surveys, and down hole lithology records were exported from the camp based data system and provided to GeoSpark for update of the Brucejack 2012 master database.

The Brucejack 2012 data was maintained within a relational database housing drillhole collar, survey, sampling, assay, and down hole lithology details. Additionally, a separate database was used for the QAQC of all received assay certificates.

As assay certificates were received, the data was imported directly to the QAQC database and the analytical results for the duplicate pairs, standards, and blanks were reviewed prior to sending database exports to Pretivm personnel. QAQC was documented regularly in order to maintain communications in this regard.

A master database for the Brucejack project was compiled to include all data from the project in order to improve data transferability. This was compiled from multiple source databases including:

- The pre-2011 Brucejack Database compiled by Silver Standard Resources. This included data from 2009 and 2010. This database source was a relational database system suited for exploration and mining data management.

- The Historic Brucejack database including all data for drillholes drilled prior to 2009. This database was compiled and verified by Silver Standard Resources following the initial database compilation and analytical result QAQC and verification by GeoSpark.

- The 2011 and 2012 Pretium relational database, compiled by GeoSpark for Pretivm as described above.

The master Brucejack database was provided to Snowden and the database was then further reviewed for any potentially problematic data.

The Master Brucejack database was, at the time of this report, regularly updated and maintained by GeoSpark. All new data was imported from provided camp database exports and original assay certificates. Original assay certificates were reviewed for QAQC as they were received, and the original data provided by Pretivm was checked for potentially problematic data. The database was reviewed to ensure that the data remained functional for use by eliminating down hole interval overlaps, records beyond end of hole depths, addressing any data entry issues related to the down hole attribute codes, etc. Updates were also made to the sampling table wherever quality assurance and quality control (QAQC) measures revealed data entry issues related to the sample identities or details. For example, there were some issues where the wrong standard identity was entered and the returned analytical results clearly revealed the correct standard identity. Updates to sample identities were tracked within the database.

2012 QAQC

The QAQC analytical results for the 2012 Brucejack project are quantitatively sufficient to represent precision, accuracy, and bias.
Primary sample analytical results for the Brucejack project drill holes with identities SU-289 to SU-463 and SU-465 and SU-466 were reported by ALS Global of Vancouver, British Columbia.

Secondary Check samples analyses were analyzed at SGS Canada of Vancouver, British Columbia.

Primary sample gold concentrations were analyzed using fire assay with atomic absorption finish. Silver, copper, and an additional 31 elements were analyzed using four acid digestion with ICP analysis.

Secondary check samples were analyzed using similar analytical methods.

As analytical results were reported, the results of analysis on field duplicates, blanks and standards were reviewed in order to maintain high quality results throughout the exploration program.

Standard and blanks that were determined to have been reported in excess of the defined acceptable limits for the materials were re-analyzed along with the sample in their vicinity. This allowed for improvement of any samples with questionable accuracy.

In addition the field duplicates were monitored for sample pairs with poor correlation due to the nature of the mineralization having localized high grade narrow vein mineralization. Sample pairs where the duplicate was returned at a much greater grade than the primary sample and within the greater than 5 g/t Au category were flagged as being in the high grade region.

Ongoing documentation of the analytical result QAQC was provided to Pretium as were updated database exports with the sample details associated with the analytical results.

A summary QAQC report was generated reviewing the analytical results. This report was written by Caroline Vallat and is dated September 13, 2012. The report concludes that, "The quality assurance and quality control measures taken by Pretium Resources have been sufficient to maintain high quality results. The review of field duplicates, blanks and standards, and check samples has allowed for inference of a reasonable level of precision, good accuracy, and insignificant levels of bias within the primary sample results reported by ALS Global related to the Brucejack 2012 project including drill holes SU-289 to SU-463, SU-465, and SU-466. The analytical results can be inferred to be of sufficient quality to represent the project."

11.4 Author’s opinion on date sample preparation, security and analytical procedures

Procedures undertaken to date by Pretium have been under the supervision and security of the issuer’s staff, as far as drill core sampling prior to dispatch. Laboratory sample reduction and analytical procedures have been conducted by independent accredited companies with acceptable practices.

Pretium ensures quality control is monitored through the insertion of blanks, certified reference materials and duplicates.

It is the author’s opinion that the sample preparation, security, and analytical procedures are satisfactory.
12 Data verification

Information in this section has been excerpted from P&E sections within Gaffari et al., (2012) and updated. The current drilling and sampling database is identical to the 2011 database used by P&E as described in Gaffari et al., (2012). In that exercise, the following verification was described (excerpted from Gaffari et al., (2012)

12.1 Site verification and independent sampling by P&E

The Property was visited by Mr. Fred Brown, CPG, Pr.Sci.Nat. from September 13 to 15, 2011. Independent verification sampling was done on diamond drill core, with ten samples distributed in nine holes collected for assay. An attempt was made to sample intervals from a variety of low- and high-grade material. The chosen sample intervals were then sampled by taking the remaining half-split core. The samples were then documented, bagged, and sealed with packing tape and were brought by Mr. Brown to ALS in Terrace, BC for analysis.

At no time, prior to the time of sampling, were any employees or other associates of Pretivm advised as to the location or identification of any of the samples to be collected.

A comparison of the P&E independent sample verification results versus the original assay results can be seen in Figure 12.1 and Figure 12.2.

Figure 12.1 P&E independent site visit sample results for gold

(Source: Gafari et al (2012))
12.2 Data verification by Snowden

Snowden’s QP Mr Ivor Jones visited the Brucejack site on 15 and 16 February 2012 and takes the overall responsibility for data verification for this report. The following items were verified:

- Cross-check of Pretivm drill logs with drill core. Example core was reviewed with Mr. Ken McNaughton.
- Core handling, storage and security at Pretivm’s core storage facility in Stewart.
- Core logging process, alignment, recovery, mark-up and core sawing, sampling.
- Insertion of blanks, certified reference material.
- Core shack at the Brucejack Camp.
- Review of drill logs, assay records and interpretations at the Pretivm Vancouver office.
- Snowden carried out a basic statistical and visual validation of the data prior to estimation and found no significant issues.
In June 08 to 10, 2012 Adrian Martínez Vargas completed the sample validation under the supervision of Ms Lynn Olssen and Mr Ivor Jones (QP for this report). The following items were verified:

- Cross-check of collar coordinates.
- Core logging process, alignment, recovery, mark-up and core sawing, sampling.
- Insertion of blanks, certified reference material.
- Core shack at the Brucejack Camp.
- Sample transportation and delivery in ALC facilities in Terrace, BC.

In June 09, 2012 Mr Martínez Vargas collected twelve samples from six drillholes for assay. The samples were selected randomly as two contiguous intervals per drillhole. Each sample was taken as the halve interval of HQ cores, then documented, bagged and sealed. All the samples were selected from cores with good recovery with a weight averaging 6.74 kg. The samples were transported by Mr. Martínez by car to Terrace and by airplane to Vancouver, BC. The samples were under the direct supervision of Mr. Martínez for the duration of the transportation.

The samples were sent for assaying to the ALS laboratories in North Vancouver, BC. The sample preparation and assaying protocol requested to ALS was the same used by Pretivm in the ALS facilities in Terrace. Additionally two different standards, provided by Pretivm were assayed in order to test the accuracy of the laboratories. The results for the standards assays are shown in the Table 12.1.

The comparison between the grade in the samples collected by Snowden and Pretivm are shown in Figure 12.3 and Figure 12.4.

**Figure 12.3** Sample verification results for Au grades
Figure 12.4  Sample verification results for Ag grades

Table 12.1  Standard verification

<table>
<thead>
<tr>
<th>ID</th>
<th>Snowden Au</th>
<th>Snowden Ag</th>
<th>Pretivm Au</th>
<th>Pretivm Ag</th>
<th>Nominal Au</th>
<th>Nominal Ag</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10.65</td>
<td>283</td>
<td>9.97</td>
<td>275</td>
<td>9.97±0.58</td>
<td>276.0 ± 17.1</td>
</tr>
<tr>
<td>B</td>
<td>0.86</td>
<td>40.3</td>
<td>0.87</td>
<td>39.3</td>
<td>0.87±0.09</td>
<td>39.3 ± 4.6</td>
</tr>
</tbody>
</table>

The author has not undertaken a complete data verification study, however sufficient checks have been completed to satisfy the author that the Brucejack drilling and sampling data is suitable to use in estimating a Mineral Resource to support a preliminary economic assessment.
13 Mineral processing and metallurgical testing

Information in this section has been excerpted from Gaffari et al., (2012) and condensed and updated. The reader is referred to Gaffari et al., (2012) for detailed information.

13.1 Introduction

The Project consists of several mineralization zones mainly including West Zone, VOK, Shore Zone, Galena Hill, and Gossan Hill. The key valuable metals in the mineralization of the project are gold and silver. The test work conducted on the Brucejack mineralization includes gold/silver bulk flotation, gravity concentration and cyanidation. According to the information available for review, several testing programs have been carried out to investigate the metallurgical performance of the mineralization, including recent test work during 2009 and early 2011 and historical test work conducted between 1988 and 1990 for a feasibility study by Cominco Engineering Services Ltd (CESL) in March 1990. At the time of this report, Pretivm is conducting a comprehensive metallurgical test program to further assess the metallurgical performance of the mineralization to support the feasibility study. The ongoing test results are not included in this test work review. Tetra Tech in Gaffari et al., (2012) reviewed the test work and summarized the results below.

13.2 Summary

The 2009 and 2011 preliminary metallurgical test work investigated the metallurgical responses of the mineral samples from various mineralization zones to bulk flotation, Pretium Resources Inc. 1-9 1291990100-REP-R0001-01 Technical Report and Updated Preliminary Economic Assessment of the Brucejack Project gravity concentration and cyanidation. The testing programs include open circuit process condition optimization and variability tests The test results showed that the mineralization was amenable to a combined flowsheet consisting of gravity separation, flotation and cyanidation (including intensive leaching), for the recovery of gold and silver. The variability test results showed that the combined flowsheet could recover approximately 89 to 99% of the gold from the head samples containing approximately 1.79 g/t Au to 73.3 g/t Au.

The test work and mineralogical study also indicated that there is a significant amount of the gold in the mineralization present as free gold with a wide range of grain sizes. The gravity concentration would recover approximately 30% of the gold from the variability test samples.

The grindability test results showed that the mineralization is moderately hard with an average Bond ball mill work index (BWI) of 16.0 kWh/t.

Further test work to optimize the flotation, gravity concentration and cyanidation conditions is ongoing.
13.3 Conclusions

The review of preliminary test work on the Brucejack mineralization led to the following conclusions:

- Brucejack mineralization is moderately hard.
- The test results suggest that the mineralization is amenable to a combined process. The process should include:
  - gravity concentration to recover coarse free gold and silver
  - flotation to produce rougher and scavenger concentrates
  - regrinding on the rougher and scavenger concentrates
  - gravity concentration to recover fine free gold and silver
  - cyanide leaching on gravity concentration tailings to produce gold/silver doré including intensive cyanide leaching.
- The test results indicate that there is significant variation in metallurgical performance between the mineralization samples.
- The process conditions from the test work have not yet been optimized. Excess cyanide was used to ensure cyanide dosage was not a limiting factor in evaluation of previous metal recovery.

13.4 Recommendations

Further test work is recommended to:

- confirm the findings of the test work completed to date
- optimize the process flowsheet, especially gravity separation process, primary grind size, regrind size and flotation optimization
- further investigate metallurgical performances, and determine engineering related data.
14 Mineral Resource estimates

Snowden has carried out Mineral Resource estimates for VOK, Shore Zone, Gossan Hill, Galena Hill and Bridge Zone mineralized areas within the Brucejack Project. West Zone was not updated for this Mineral Resource as there has been very little additional drilling in this area. The West Zone estimate created as part of the previous, April 2012 Mineral Resource (Olssen and Jones, 2012a), has been combined with updated estimates of the other areas to produce a combined estimate. The West Zone resource estimate from April 2012 is documented in this report for completeness. The estimates are reported at a high-grade cut-off for potential underground extraction.

14.1 Disclosure

Mineral Resources were prepared by Snowden under the supervision of the author, Ivor Jones, Senior Principal Geologist an employee of Snowden Mining Industry Consultants Inc. (Olssen and Jones, 2012).

The author, by way of experience and qualifications, is a Qualified Person as defined by NI 43-101 and is independent of Pretivm.

14.2 Known issues that materially affect mineral resources

The author is not aware of any permitting, legal, title, taxation, socio-economic, and marketing or political issues that could materially affect the Mineral Resource estimates.

14.3 Assumptions, methods and parameters

The estimates were prepared in the following steps:

- Data validation.
- Data preparation – this and subsequent steps are summarised below.
- Exploratory data analysis of data.
- Geological interpretation and modelling.
- Establishment of block models.
- Compositing of assay intervals.
- Consideration of grade outliers.
- Variogram analysis.
- Derivation of kriging plan.
- Grade value estimation.
- Deduction for prior mined volume.
- Classification of estimates with respect to CIM Definition Standards.
- Resource tabulation and resource reporting.
14.4 Data provided

The drillhole database used by Snowden for the resource estimate was provided by Caroline Vallat, from GeoSpark Consulting Inc, ("GeoSpark"). This database is in Microsoft Access format and contains collar, survey, assay and specific gravity data.

Digital terrain models (DTMs) for the topographic elevation and the base of the ice cap were provided by Pretivm. Sections containing interpretation of the lithological domains in VOK were provided by Pretivm and were digitised, snapped to drillholes and wireframed by Snowden.

For the resource estimate, Snowden used all drillholes with collars lying inside of the area covered by the topography; which comprises a rectangular area with coordinates 425450 mE to 427550 mE and 6256450 mN to 6260550 mN (Figure 14.1). The data used in the estimates exclude intervals with no gold (Au) and silver (Ag) values.

The total input data comprises 1,311 drillholes including 439 underground drillholes at West Zone (24,704 m), 400 historical surface drillholes (35,745 m) and 458 surface drillholes completed since 2009 (175,242 m). Of the new drilling, 175 drillholes (55,849 m) have been completed since the previous April 2012 Mineral Resource estimate.

The input data for the Galena Hill / VOK estimate comprises 331 drillholes for 114,949 m including 9 historical surface drillholes (579 m) and 175 surface drillholes completed in the 2012 Brucejack Exploration Program (55,849 m). The input data for the West Zone estimate comprises 756 drillholes (62,208 m) including 439 underground drillholes (24,688 m), 269 historical surface drillholes (21,321 m) and 48 surface drillholes (17,199 m) completed since 2009.

The input data for the Shore Zone estimate comprises 71 drillholes for 10,553 m including 59 historical surface drillholes (7,019 m) and 12 surface drillholes completed since 2009 (3,534 m). The input data for the Gossan Hill estimate comprises 58 drillholes for 13,741 m including 17 historical surface drillholes (2,799 m), one underground drillhole (95 m) and 40 surface drillholes (10,847 m) completed since 2009. The input data for the Bridge Zone estimate comprises 148 drillholes (34,982 m) including one historical surface drillhole (56 m) and 147 surface drillholes completed since 2009 (34,926 m).

The sample database and the topographic surface were reviewed and validated by Snowden. Snowden found: 130 overlapped samples, one error in the collar coordinates and nine drillholes without collar coordinates from the historical database. The errors were corrected by GeoSpark in the final database provided. The nine drillholes without collar coordinates were excluded from the database used for the resource estimation.
14.5 Geological interpretation and modelling

For the September 2012 resource estimate, the mineralised interpretation was refined by Snowden to outline the higher grade corridors within the broader mineralised package.

14.5.1 VOK and Galena Hill

At VOK / Galena Hill, lithological interpretations were used together with a nominal 1 g/t Au to 3 g/t Au cut-off grade to define high grade corridors based on analysis of the statistical grade populations. In addition, a lower grade halo was defined based on a nominal 0.3 g/t Au cut-off grade.
At VOK the mineralization was found to form a series of higher grade pods within the core Jurassic rocks and separated from the main mineralized corridors by mainly barren silica rich rocks previously interpreted by Pretivm as rhyolite intrusives.

Within the bounding Triassic and porphyry rocks, the mineralization forms a series of sub-vertical domains. While there is some indication of a hard boundary between the Jurassic and porphyry in places, the mineralization crosses this contact in other places and the two rock types appear to have similar statistical characteristics. As a result, the two lithological units were combined for estimation but the mineralized interpretation used the lithological boundaries as a guide where the contact appears to be hard.

The boundary between the Jurassic and Triassic/porphyry mineralized domains is a hard contact in places due to the unconformity on the boundary with a barren siliceous unit along most of the contact. There are places where this siliceous unit does not exist and this boundary is gradational, with the subvertical mineralized corridors crossing the contact.

Galena Hill was interpreted as an extension of the mineralization in VOK and these two areas were modelled as a single zone where the mineralized corridors join (Figure 14.2).

14.5.2 Shore Zone, Gossan Hill and Bridge Zone

At Shore Zone, Gossan Hill and Bridge Zone there is no lithological interpretation and the high grade domains were defined based on a nominal 2.5 g/t Au cut-off grade. The low grade halo domains were defined based on a nominal 0.3 g/t Au cut-off grade (Figure 14.2).

14.5.3 West Zone

West Zone was interpreted for the April 2012 estimate using a nominal 0.3 g/t Au cut-off grade (Olssen and Jones, 2012a). There are no high grade corridors defined at West Zone.

14.5.4 Domains used for modelling

Review of the grade distributions for the mineralized corridors and different rock types at VOK and Galena Hill indicates that they are statistically similar. As a result, in order to control the estimation, each mineralized corridor was estimated using hard boundaries but where the corridors have been interpreted to cross the lithological boundaries, these contacts were treated as soft. The surrounding low grade domain was estimated as a single domain using soft boundaries but excluding the high grade population from within the high grade domains.

The mineralised corridors within VOK and Galena Hill change orientation locally. This was addressed by using a series of ‘search domains’ with locally adjusted orientations applied for estimation. The boundaries between these search domains were treated as soft for estimation.

The high grade domains at Bridge Zone, Gossan Hill and Shore Zone were estimated as single domains. As with VOK, the surrounding low grade domains were estimated as single domains using soft boundaries but excluding the high grade population from within the high grade domains.

West Zone was estimated using a single mineralized domain.
Figure 14.2  Cross section showing lithological interpretation and mineralized domain interpretation at VOK

Figure 14.3  Orthogonal view of mineralized high grade domain interpretation
14.6 Compositing of assay intervals

All data was composited to the dominant sample length of 1.5 m prior to analysis and estimation.

14.6.1 Summary statistics

Statistical analysis of the gold and silver data was carried out by lithological domain (at VOK) and mineralized domain (high grade and low grade) within each area. VOK and Galena Hill were combined for analysis as the mineralized corridors merge and appear to part of the same domain.

Review of the statistics at VOK and Galena Hill indicated that the grade distributions for the mineralization within the different lithologies are very similar and as a result these were combined for analysis. The siliceous and argillite domains are mainly barren with some contact mineralization which has been included in the mineralized domains.

Initial review of the individual high grade corridors within each area showed that they have similar statistical distributions and hence the individual corridors within each area were combined for statistical analysis and variography.

All high grade domains, including the West Zone domain, exhibit a strong positive skewness with high coefficient of variation and extreme grades. The low grade domains also show positively skewed distributions but have lower coefficients of variation and few extreme grades.

Table 14.1 summarizes the statistics for gold and silver for the mineralized domains. Due to clustering of the drilling in some areas, the data for West Zone, Shore Zone, Gossan Hill and Bridge Zone have been declustered for statistical analysis.

Table 14.1 Summary statistics of composited data for mineralized domains – VOK and Galena Hill

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Gold g/t</th>
<th>Silver g/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples</td>
<td>26,959</td>
<td>26,959</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.00</td>
<td>0.02</td>
</tr>
<tr>
<td>Maximum</td>
<td>14,043.71</td>
<td>3,851.32</td>
</tr>
<tr>
<td>Mean</td>
<td>4.15</td>
<td>10.10</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>123.40</td>
<td>53.70</td>
</tr>
<tr>
<td>CV</td>
<td>29.71</td>
<td>5.32</td>
</tr>
<tr>
<td>Variance</td>
<td>15,227.00</td>
<td>2,884.00</td>
</tr>
<tr>
<td>Skewness</td>
<td>77.54</td>
<td>40.99</td>
</tr>
</tbody>
</table>
### Table 14.2  Summary statistics of composited data for mineralized domains – Shore Zone

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low grade domain</td>
<td>High grade domain</td>
</tr>
<tr>
<td>Samples</td>
<td>2,308</td>
<td>2,094</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Maximum</td>
<td>17.27</td>
<td>705.80</td>
</tr>
<tr>
<td>Mean</td>
<td>0.40</td>
<td>1.87</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.56</td>
<td>12.50</td>
</tr>
<tr>
<td>CV</td>
<td>1.39</td>
<td>6.69</td>
</tr>
<tr>
<td>Variance</td>
<td>0.31</td>
<td>156.30</td>
</tr>
<tr>
<td>Skewness</td>
<td>13.71</td>
<td>35.34</td>
</tr>
</tbody>
</table>

### Table 14.3  Summary statistics of composited data for mineralized domains – Gossan Hill

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low grade domain</td>
<td>High grade domain</td>
</tr>
<tr>
<td>Samples</td>
<td>2,836</td>
<td>1,064</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td>Maximum</td>
<td>8.91</td>
<td>743.30</td>
</tr>
<tr>
<td>Mean</td>
<td>0.39</td>
<td>2.83</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.50</td>
<td>27.47</td>
</tr>
<tr>
<td>CV</td>
<td>1.28</td>
<td>6.99</td>
</tr>
<tr>
<td>Variance</td>
<td>0.25</td>
<td>754.40</td>
</tr>
<tr>
<td>Skewness</td>
<td>5.41</td>
<td>20.14</td>
</tr>
</tbody>
</table>

### Table 14.4  Summary statistics of composited data for mineralized domains – Bridge Zone

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low grade domain</td>
<td>High grade domain</td>
</tr>
<tr>
<td>Samples</td>
<td>10,414</td>
<td>10,467</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>5.64</td>
<td>2,409.00</td>
</tr>
<tr>
<td>Mean</td>
<td>0.44</td>
<td>1.15</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.44</td>
<td>14.89</td>
</tr>
<tr>
<td>CV</td>
<td>0.99</td>
<td>12.92</td>
</tr>
<tr>
<td>Variance</td>
<td>0.19</td>
<td>221.80</td>
</tr>
<tr>
<td>Skewness</td>
<td>3.33</td>
<td>96.29</td>
</tr>
</tbody>
</table>
14.6.2 Extreme values – gold and silver

Around 2% to 5% of the data within the mineralized high grade domains appears to lie in a separate higher grade population which contains significant extreme grades. The treatment of these extreme grades is discussed in the following section.

14.7 Consideration of grade outliers and estimation method

Assay populations from gold deposits are generally skewed and contain high grade outliers that can introduce bias to mineral resource estimates.

Both West Zone, VOK and the higher grade domains in the other areas, exhibit extremely skewed grade populations where the high grades and the majority of the metal are located in less than 5% of the data, with individual raw gold grades of up to around 41,500 g/t Au. As a result of this population distribution, standard estimation techniques have been found to significantly over smooth the grades.

Discussions with Pretivm and analysis of the data indicated the mineralization can be split into a pervasive background mineralization and a separate high grade but discreet mineralization style. In order to model this style of mineralization without smearing grade, Snowden separated the lower grade ‘background’ population from the higher grade population and estimated them independently. For gold in West Zone, VOK and Galena Hill, a threshold of 5 g/t Au was selected to separate the two populations based on review of the population statistics and graphs. In Gossan Hill, Shore Zone and Bridge Zone a threshold of 2.5 g/t Au was selected. The silver data was treated using the same method with a threshold of 50 g/t Ag for VOK, 300 g/t Ag for West Zone and 18 g/t Ag for Gossan Hill, Shore Zone and Bridge Zone (Figure 14.4).

The relatively low skewness and the presence of only few samples with extreme grades in the low grade domains allowed for the estimation of grades using ordinary kriging with a top cut. A top cut of 60 g/t Au and 300 g/t Ag was selected for VOK, Galena Hill, Gossan Hill and Shore Zone based on the point of disintegration seen on the histogram and log probability plot. In Bridge Zone a top cut of 5 g/t Au and 100 g/t Ag was selected.

In the high grade domains (including West Zone), with the separation of the lower and higher grade populations, the lower grade population is amenable to the ordinary kriging method of grade interpolation.

Multiple indicator kriging was selected for estimation of the higher grade population within the high grade domains, to control the skewness of the data. Multiple indicator kriging involves modelling variograms at a series of grade thresholds which allows the range of continuity to be reduced at the higher grades. A mathematical model was then used to define the top end of the grade distribution. The result of this estimation method is that, while no top cut is used to limit the higher grades, the higher grades are limited in their influence using a mathematical model based on the higher grade data to estimate grades in the top class based on probability rather than using the individual extreme grades in the dataset for grade estimation.
Figure 14.4  Log probability plot showing threshold between lower and higher grade populations

VOK and Galena Hill

Gold

Silver

West Zone

Gold

Silver
Shore Zone

Gold

Silver

Gossan Hill

Gold

Silver
**Bridge Zone**

**Gold**

**Silver**

**14.8 Variogram analysis**

**High grade domains - low grade population**

Due to the positively skewed nature of the grade distributions, normal scores experimental variograms were modelled for gold and silver for the estimates of the lower grade population within the high grade domains.

For the low grade population in VOK/Galena Hill and West Zone, variograms were calculated and modelled using only data below the thresholds of 5 g/t Au and 50 g/t Ag. Due to the locally changing orientations in the VOK/Galena Hill area, the orientations of the variogram models were locally adjusted to reflect the interpretation.

At Shore Zone, Gossan Hill and Bridge Zone, the low grade population variograms were calculated and modelled using only data below the thresholds of 2.5 g/t Au and 18 g/t Ag. Due to the small datasets in these areas, the data below the thresholds within the high grade domain and the surrounding low grade halo was combined to provide sufficient data for variography.

The normal scores models were back-transformed prior to estimation.
### Table 14.5 Parameters to describe gold grade continuity for the low grade population estimates within the high grade domains

<table>
<thead>
<tr>
<th>Area</th>
<th>Grade</th>
<th>Orientation</th>
<th>Nugget</th>
<th>Structure 1</th>
<th>Structure 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sill</td>
<td>Range</td>
</tr>
<tr>
<td>VOK/Galena Hill</td>
<td>Gold</td>
<td>00→100</td>
<td>0.18</td>
<td>0.45</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-90→000</td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>00→010</td>
<td></td>
<td></td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>Silver</td>
<td>00→100</td>
<td>0.19</td>
<td>0.45</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-90→000</td>
<td></td>
<td></td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>00→010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Zone</td>
<td>Gold</td>
<td>00→120</td>
<td>0.21</td>
<td>0.63</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-80→030</td>
<td></td>
<td></td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10→030</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Silver</td>
<td>00→120</td>
<td>0.15</td>
<td>0.46</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-80→030</td>
<td></td>
<td></td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10→030</td>
<td></td>
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<td></td>
<td></td>
<td>020→005</td>
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</tr>
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</table>

### High grade domains - high grade population

Indicator variograms for gold were calculated and modelled for the high grade populations within the high grade domains for VOK/Galena Hill, West Zone, Gossan Hill, Shore Zone and Bridge Zone.

At VOK/Galena Hill and West Zone, given the small proportion of data above the high grade population threshold grade, experimental variograms were poorly structured. As a result, experimental variograms were modelled for the 50th percentile of the distribution and then adapted for the 10, 20, 30, 40, 60, 70, 80, 90, and 95th percentiles of the distribution (Table 14.6). The resultant variograms show more anisotropy and longer ranges of continuity than those modelled for the previous April 2012 estimate. This change is a function of the improved interpretation and additional data.

As with the low grade population, due to the locally changing orientations in the VOK/Galena Hill area, the orientations of the variogram models were locally adjusted to reflect the interpretation.
It was not possible to model variograms for silver in West Zone. Given the high correlation between gold and silver (approximately 0.9 correlation coefficient), the gold variograms were also used for the estimation of the silver high grade population for West Zone.

At Gossan Hill, Shore Zone and Bridge Zone, given the small proportion of data above the high grade population threshold grade, experimental variograms were poorly structured. As a result, omnidirectional experimental variograms for gold and silver were calculated and modelled for the 30th to 70th percentile of the distribution and then adapted for the 10, 20, 80, 90, and 95th percentiles of the distribution (Table 14.8, Table 14.19 and Table 14.10).

The upper tail of the high grade population distributions, above the 95 percentile, was modelled using a hyperbolic or power mathematical model for each area for gold and silver.

### Table 14.6 Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in VOK and Galena Hill

<table>
<thead>
<tr>
<th>Grade</th>
<th>Cut-off (percentile)</th>
<th>Orientation</th>
<th>Nugget</th>
<th>Structure 1</th>
<th>Structure 2</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td>Sill</td>
<td>Range</td>
</tr>
<tr>
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<td></td>
<td>0.26</td>
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<td></td>
<td>00→010</td>
<td></td>
<td>0.26</td>
<td>5</td>
</tr>
<tr>
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<td>00→100</td>
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<td>4</td>
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<td>0.36</td>
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<td>00→100</td>
<td>0.49</td>
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<td>-90→000</td>
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<td>0.36</td>
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</table>
Table 14.7  Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in West Zone

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<th>Cut-off (percentile)</th>
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<th>Structure 2</th>
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<td>Sill Range</td>
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<td>00→330</td>
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</tr>
<tr>
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<td>-90→000</td>
<td>0.56</td>
<td>6</td>
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</tr>
<tr>
<td></td>
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<td>00→240</td>
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<td>3</td>
<td>0.38</td>
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Table 14.8  Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in Shore Zone

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<th>Grade</th>
<th>Cut-off (percentile)</th>
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<td>Sill Range</td>
<td>Sill Range</td>
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<td>10</td>
<td>14</td>
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<td></td>
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<td>000→315</td>
<td>0.25</td>
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Table 14.9 Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in Gossan Hill

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<th>Structure 1 Range</th>
<th>Structure 2 Sill</th>
<th>Structure 2 Range</th>
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<td>-059--&gt;091</td>
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<tr>
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<td>-059--&gt;091</td>
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<td>0.16</td>
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</table>

Table 14.10 Parameters to describe gold grade continuity for a range of indicators for the high grade population estimates within the high grade domains in Bridge Zone

<table>
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<th>Cut-off (percentile)</th>
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<th>Nugget</th>
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<th>Structure 1 Range</th>
<th>Structure 2 Sill</th>
<th>Structure 2 Range</th>
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<td></td>
</tr>
<tr>
<td>Gold</td>
<td>10,20,30,40, 50,60,70</td>
<td>072--&gt;208</td>
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<tr>
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<td></td>
<td>-010--&gt;265</td>
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<tr>
<td>Gold</td>
<td>80,90</td>
<td>072--&gt;208</td>
<td>0.25</td>
<td>0.57</td>
<td>2</td>
<td>0.18</td>
<td>19</td>
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<td>072--&gt;208</td>
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</table>
High grade domains - probability

In order to estimate the proportion of the high grade population within each block, an indicator variogram was calculated and modelled for the mineralized domains at the population threshold (5 g/t Au and 50 g/t Ag for VOK/Galena Hill, 5 g/t Au and 300 g/t Ag for West Zone and 2.5 g/t Au and 18 g/t Ag for Shore Zone, Gossan Hill and Bridge Zone).

For West Zone and Gossan Hill a lower cut-off was used to remove the background ‘waste’ and improve the quality of the indicator variograms. The lower cut applied was 1 g/t Au and 30 g/t Ag for West Zone and 0.36 g/t Au and 18 g/t Ag for Gossan Hill. All other areas gave reasonably structured variograms without having to apply a lower cut.

The resultant variograms for VOK/Galena Hill show longer ranges of continuity than those modelled for the previous April 2012 estimate. This change is a function of the improved interpretation and additional data.

As with the low grade and high grade populations, due to the locally changing orientations in the VOK/Galena Hill area, the orientations of the variogram models were locally adjusted to reflect the interpretation. Table 14.11 summarises the variogram models used for the probability estimate.

<table>
<thead>
<tr>
<th>Table 14.11</th>
<th>Parameters to describe gold grade continuity at the low grade / high grade population threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area</strong></td>
<td><strong>Cut-off threshold</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>VOK</td>
<td>Gold 5 g/t</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Silver 50 g/t</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>West Zone</td>
<td>Gold 5 g/t</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Silver 300 g/t</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Shore Zone</td>
<td>Gold 2.5 g/t</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silver 18 g/t</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Gossan Hill</td>
<td>Gold 2.5 g/t</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silver 18 g/t</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridge Zone</td>
<td>Gold 2.5 g/t</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silver 18 g/t</td>
</tr>
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<td></td>
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<tr>
<td></td>
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</tr>
</tbody>
</table>
Low grade domains

The low grade domains were estimated using the variograms defined for the low grade populations within the high grade domains.

Density

Given the amount of density data, a single omnidirectional variogram was calculated and modelled for the total Brucejack deposit. Table 14.12 summarizes the variogram model.

Table 14.12  Parameters to describe density continuity

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Nugget</th>
<th>Sill</th>
<th>Range</th>
<th>Sill</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omni-directional</td>
<td>0.10</td>
<td>0.63</td>
<td>32</td>
<td>0.27</td>
<td>210</td>
</tr>
</tbody>
</table>

14.9 Establishment of block models

A Datamine block model with cell dimensions of 10 mE by 10 mN by 10 mRL was coded to reflect the surface topography, base of overburden, lithological contacts, and the mineralization domains. This block model was used for estimation of the background grades, low grade domains and the low grade mineralized population within the high grade domains at VOK, Galena Hill, the well informed area in Shore Zone and the majority of West Zone.

Within the well informed portion of West Zone, with close spaced drilling of around 5 m by 5 m to 10 m by 10 m, the parent cell size was reduced to 5 mE by 5 mN by 5 mRL for estimation of the background grades and low grade mineralized population.

Within Bridge Zone, Gossan Hill and in part of the Shore Zone the nominal drill spacing is wider that the other the areas and as a result the parent cell size was increased to 20 mE by 20 mN by 20 mRL for estimation of the background grades, low grade domains and the low grade mineralized population within the high grade domains.

Two small scale discretized block models were created for the multiple indicator kriging estimates so that these point estimates could be subsequently reblocked to take into account the correct degree of smoothing at the final block size. The discretized block models have parent cells sizes of 2.5 mE by 2.5 mN by 2.5 mRL for VOK, Galena Hill, Shore Zone, Gossan Hill, Bridge Zone and the majority of West Zone and 1.25 mE and 1.25 mN by 1.25 mRL for the well informed portions of West Zone.

14.10 Grade interpolation parameters

High grade domains - low grade population

The lower grade population within the high grade domains was estimated using ordinary kriging into 10 m by 10 m by 10 m parent blocks at VOK, Galena Hill, the better informed portion of Shore Zone and most of West Zone. In the well informed portion of West Zone a 5 m by 5 m by 5 m parent block used. In the poorly informed portions of the Shore Zone, and in Bridge Zone and Gossan Hill a 20 m by 20 m by 20 m parent block was used for the estimation.
At VOK and Galena Hill the mineralized corridors were estimated with hard boundaries for estimation. A series of 'search domains' with locally adjusted orientations applied for estimation to account for the local variability in the orientation of the corridors. The boundaries between these search domains were treated as soft for estimation.

At West Zone, Shore Zone, Gossan Hill and Bridge Zone the high grade domains were treated as a single domain for estimation for each area.

Gold and silver grades were interpolated using 1.5 m composites with all data above the population threshold removed (5 g/t Au and 50 g/t Ag for VOK/Galena Hill, 5 g/t Au and 300 g/t Ag for West Zone and 2.5 g/t Au and 18 g/t Ag for Shore Zone, Gossan Hill and Bridge Zone). Estimation parameters were established from the variography analysis. Any target blocks that remained uninformed after the first pass search were subsequently estimated in a second search pass using a broader search ellipse and different restrictions.

In VOK, Galena Hill and West Zone the interpolation was controlled by:
- Minimum / maximum numbers of composites: 20 / 26 per block (8 / 26 for pass 2).
- Discretisation: 4 by 4 by 4.
- Maximum number of composites per hole: 8.
- Search ellipse:
  - West Zone: 200 m by 300 m by 30 m (400 m by 600 m by 60 m for pass 2).
  - VOK/Galena Hill: 60 m by 100 m by 20 m (120 m by 200 m by 40 m for pass 2).

In Shore Zone, Gossan Hill and Bridge Zone the interpolation was controlled by:
- Minimum / maximum numbers of composites: 20 / 26 per block (for 3 passes).
- Discretisation: 4 by 4 by 4.
- Maximum number of composites per hole: 4.
- Search ellipse: 50 m by 50 m by 50 m.
- Octants: at least 4 octants with data, minimum 1 sample per octant, maximum 10 samples per octant.

**High grade domains - high grade population**

The higher grade populations were estimated using multiple indicator kriging to control the skewness of the data. Indicator variograms were modelled up to the 95 percentile of the data with a mathematical model used to define the top end of the grade distribution. The threshold for the 95 percentile of the higher grade population is:

- VOK/Galena Hill: 378 g/t Au and 480 g/t Ag.
- West Zone: 93 g/t Au and 3,479 g/t Ag.
- Shore Zone: 30 g/t Au and 244 g/t Ag.
- Gossan Hill: 168 g/t Au and 192 g/t Ag.
- Bridge Zone: 45 g/t Au and 213 g/t Ag.

The higher grade populations were estimated into small scale discretized blocks of 2.5 mE by 2.5 mN by 2.5 mRL for VOK, Galena Hill, Shore Zone, Gossan Hill, Bridge Zone and
the majority of West Zone and 1.25 mE and 1.25 mN by 1.25 mRL for the well informed portions of West Zone. The estimates were subsequently reblocked into parent blocks the size of those used for the lower grade population estimates for Shore Zone, Gossan Hill and Bridge Zone. In VOK, Galena Hill and West Zone the estimates were reblocked into parent blocks twice the size of those used for the lower grade population estimates to further limit the influence of the highest grades in the highest grade areas.

At VOK and Galena Hill the mineralized corridors were estimated with hard boundaries for estimation. As with the low grade populations, a series of ‘search domains’ with locally adjusted orientations applied for estimation to account for the local variability in the orientation of the corridors. The boundaries between these search domains were treated as soft for estimation.

At West Zone, Shore Zone, Gossan Hill and Bridge Zone the high grade domains were treated as a single domain for estimation for each area.

Gold and silver grades were interpolated using 1.5 m composites with all data below the population threshold removed (5 g/t Au and 50 g/t Ag for VOK/Galena Hill, 5 g/t Au and 300 g/t Ag for West Zone and 2.5 g/t Au and 18 g/t Ag for Shore Zone, Gossan Hill and Bridge Zone).

Estimation parameters were established from the variography analysis. Any target blocks that remained uninformend after the first pass search were subsequently estimated in a second search pass using a broader search ellipse and different restrictions. The maximum number of samples was kept small in the second search pass to prevent single extreme grades influencing the block estimates at a great distance.

The interpolation was controlled by:

- Minimum / maximum numbers of composites:
  - West Zone: 8 / 20 per block (2 / 8 for pass 2).
  - VOK / Galena Hill: 6 / 16 per block (2 / 6 for pass 2).
  - Shore Zone, Gossan Hill and Bridge Zone: 8 / 10 per block

- Discretisation: 1 by 1 by 1 (indicator kriging).

- Maximum number of composites per hole:
  - West Zone: 10
  - VOK/Galena Hill: 10
  - Shore Zone, Gossan Hill and Bridge Zone: 4

- Search ellipse:
  - West Zone: 50 m by 50 m by 50 m (150 m by 150 m by 150 m for pass 2)
  - VOK/Galena Hill: 50 m by 50 m by 20 m (150 m by 150 m by 60 m for pass 2)
  - Shore Zone, Gossan Hill and Bridge Zone: 50 m by 50 m by 50 m (100 m by 100 m by 100 m for pass 2, and 200 m by 200 m by 200 m for pass 3) ; 4 filled octants as minimum, with 1/10 composites per octant as minimum/maximum.

**High grade domains - probability**

The proportion of the higher grade mineralization was estimated into each block and used to combine the two estimates in the determination of the overall block grade. For
example, if a block had a probability of 5% high grade then the final block grade would combine 95% of the low grade estimate with 5% of the high grade estimate. The influence of the high grade population above the 95 percentile is therefore greatly restricted.

An indicator estimate was run at the population threshold for gold and silver (5 g/t Au and 50 g/t Ag for VOK/Galena Hill, 5 g/t Au and 300 g/t Ag for West Zone and 2.5 g/t Au and 18 g/t Ag for Shore Zone, Gossan Hill and Bridge Zone), using all of the data within the mineralized high grade domains.

Estimation for VOK and Galena Hill was into the small scale discretized blocks used for the high grade population estimates. The resultant probabilities were reblocked into parent blocks the same size of those used for the lower grade population estimates. Estimation for Shore Zone, Gossan Hill and Bridge Zone was into parent blocks the same size of those used for the lower grade population estimates.

The same domains and boundary conditions applied to the high grade and low grade populations were used for the probability estimate. Probability for gold and silver were interpolated using 1.5 m composites. Estimation parameters were established from the variography analysis and used a single search pass only to prevent spreading the probability estimate too far in all areas except VOK/Galena Hill.

In VOK/Galena Hill there has been a significant increase in drilling and the use of a single search for the probability resulted in oversmoothing of the estimate. As a result a two pass search was used with the first search kept very tight to prevent oversmoothing in well informed areas. The second search was set similar to the single search used for the other areas. The maximum number of samples was also reduced in the first search pass and the maximum number of composites per drillhole was reduced.

In VOK, Galena Hill and West Zone the interpolation was controlled by:

- Minimum / maximum numbers of composites:
  - West Zone: 5 / 50 per block.
  - VOK/Galena Hill: 5 / 20 per block (5 / 50 for pass 2).

- Discretisation: 1 by 1 by 1 into small scale discretized blocks.

- Maximum number of composites per hole: 10 (West Zone), 6 (VOK/Galena Hill).

- Search ellipse:
  - West Zone: 75 m by 75 m by 30 m.
  - VOK/Galena Hill: 35 m by 35 m by 10 m (70 m by 70 m by 20 m for pass 2).

In Shore Zone, Gossan Hill and Bridge Zone the interpolation was controlled by:

- Minimum / maximum numbers of composites: 8 / 20 per block.

- Discretisation: 4 by 4 by 4.

- Maximum number of composites per hole: 6.

- Search ellipse: 75 m by 75 m by 75 m.
For VOK, around 3% of the data is above 5 g/t Au and the average proportion of high grades within the blocks was estimated at 3% within the Indicated portions of the estimate. For West Zone, around 5% of the data is above 5 g/t Au and the average proportion of high grades within the blocks was estimated at 5% within the Measured and Indicated portions of the estimate.

**Low grade domains**

The background low grade domain in VOK and Galena Hill was estimated with ordinary kriging using dynamic anisotropies to locally adjust the search and variogram orientations to reflect the main trends of the folding in this area. The search and variogram parameters used were the same as for the low grade population within the high grade domains.

The background low grade domains in the other areas were estimated with ordinary kriging into single domains using the same search and variogram parameters as for the low grade population within the high grade domains.

The background low grade domains were estimated using 1.5 m top cut composites with soft boundaries between the low grade and high grade domains, but excluding the high grade population from within the high grade domains.

**14.11 Density estimation and assignment**

Density was estimated using simple kriging, with a global mean of 2.78 t/m$^3$ into 20 mE by 20 mN by 20 mRL parent blocks. Density values were interpolated using 1.5 m composites with parameters established from the variography analysis.

To avoid local extreme minimum and maximum values the data was capped to a floor of 2.6 t/m$^3$ and to a ceiling of 3.00 t/m$^3$.

The interpolation was controlled by:

- Minimum / maximum numbers of composites: 8 / 30 per block (2 / 8 for pass 2).
- Discretisation: 4 by 4 by 4.
- Maximum number of composites per hole: 9.
- Search ellipse: 300 m by 300 m by 300 m (900 m by 900 m by 900 m for pass 2).

Outside of these areas, the average density of 2.78 t/m$^3$ was applied. There is little variation in density between the different rock types.

A density of 0.9167 t/m$^3$ was assigned to the ice existing in the glacial cap.

**14.12 Prior mining**

A 3D wireframe model of the underground development and stopes at West Zone was represented by wireframes and coded in the block model to ensure that the reported Mineral Resource estimates are depleted for prior mining.

No mining has occurred at VOK, Galena Hill, Shore Zone, Gossan Hill or Bridge Zone.
14.13 Model validation

Grade estimates and models were validated by: undertaking global grade comparisons with the input drillhole composites; visual validation of block model cross sections; and by grade trend plots.

14.13.1 Global comparisons

The final grade estimates were validated statistically against the input drillhole composites. Table 14.13 to 14.17 provide a comparison of the estimated grades compared to the input grades (declustered where required) for the global estimates within the mineralised domains. This statistical comparison shows that the domains validate reasonably well globally. Note that in VOK the comparison is only for the Indicated resources to remove areas of extrapolation at depth.

<table>
<thead>
<tr>
<th>Mineralized domain</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of samples</td>
<td>33,089</td>
<td>33,089</td>
</tr>
<tr>
<td>Composite mean</td>
<td>1.40</td>
<td>30.66</td>
</tr>
<tr>
<td>Estimated mean</td>
<td>1.32</td>
<td>28.54</td>
</tr>
</tbody>
</table>

Table 14.13 Comparison of the mean composite grade with the mean block model grade for the mineralised domains in West Zone.

<table>
<thead>
<tr>
<th>High grade domain</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Low grade domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of samples</td>
<td>22,852</td>
<td>22,852</td>
<td>24,514</td>
</tr>
<tr>
<td>Composite mean</td>
<td>4.47</td>
<td>9.87</td>
<td>0.40</td>
</tr>
<tr>
<td>Estimated mean</td>
<td>3.70</td>
<td>8.31</td>
<td>0.34</td>
</tr>
</tbody>
</table>

Table 14.14 Comparison of the mean composite grade with the mean block model grade for the mineralised domains in VOK and Galena Hill

<table>
<thead>
<tr>
<th>High grade domain</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Low grade domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of samples</td>
<td>2,094</td>
<td>2,094</td>
<td>2,308</td>
</tr>
<tr>
<td>Composite mean</td>
<td>1.63</td>
<td>31.19</td>
<td>0.37</td>
</tr>
<tr>
<td>Estimated mean</td>
<td>1.26</td>
<td>17.95</td>
<td>0.36</td>
</tr>
</tbody>
</table>
Table 14.16  Comparison of the mean composite grade with the mean block model grade for the mineralised domains in Gossan Hill

<table>
<thead>
<tr>
<th></th>
<th>High grade domain</th>
<th></th>
<th>Low grade domain</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gold (g/t)</td>
<td>Silver (g/t)</td>
<td>Gold (g/t)</td>
<td>Silver (g/t)</td>
</tr>
<tr>
<td>Number of samples</td>
<td>1,136</td>
<td>1,136</td>
<td>3,107</td>
<td>3,107</td>
</tr>
<tr>
<td>Composite mean</td>
<td>3.46</td>
<td>16.76</td>
<td>0.38</td>
<td>5.02</td>
</tr>
<tr>
<td>Estimated mean</td>
<td>0.96</td>
<td>8.97</td>
<td>0.36</td>
<td>5.23</td>
</tr>
</tbody>
</table>

Table 14.17  Comparison of the mean composite grade with the mean block model grade for the mineralised domains in Bridge Zone

<table>
<thead>
<tr>
<th></th>
<th>High grade domain</th>
<th></th>
<th>Low grade domain</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gold (g/t)</td>
<td>Silver (g/t)</td>
<td>Gold (g/t)</td>
<td>Silver (g/t)</td>
</tr>
<tr>
<td>Number of samples</td>
<td>11,020</td>
<td>11,020</td>
<td>10,108</td>
<td>10,108</td>
</tr>
<tr>
<td>Composite mean</td>
<td>1.38</td>
<td>8.29</td>
<td>0.44</td>
<td>5.50</td>
</tr>
<tr>
<td>Estimated mean</td>
<td>0.90</td>
<td>7.16</td>
<td>0.47</td>
<td>5.62</td>
</tr>
</tbody>
</table>

14.13.2  Visual validation

The gold and silver estimates show a good visual correspondence with the input composite grades. Example sections through the higher grade portions of the main mineralised areas are illustrated in Figure 14.5 and Figure 14.6 for VOK and West Zone respectively.
Figure 14.5  Example cross section showing estimated gold grades compared to input composites within the mineralised domains for VOK

Note: drillholes are shown with +/- 10 m clipping.
Figure 14.6 Example oblique section showing estimated gold grades compared to input composites within the mineralised domains for West Zone

Note: drillholes are shown with +/- 10 m clipping.

14.13.3 Grade trend plots

Sectional validation graphs were created to assess the reproduction of local means and to validate the grade trends in the model. These graphs compare the mean of the estimated grades to the mean of the input grades (declustered for West Zone) within model slices (bins). The graphs also show the number of input samples on the right axis, to give an indication of the support for each bin.

Validation graphs were created for the low grade domains and high grade domains including the low grade population estimates, the high grade population estimates, the probability estimates and the final combined estimates for each area (Olssen and Jones, 2012b).

These graphs indicate that there is good local reproduction of the input grades in both the horizontal and vertical directions. The high grade population estimate is quite smooth compared to the input data as expected. This smoothing was incorporated into the high grade population estimate to prevent the over influence of the individual high grade samples when the high grade and low grade estimates are recombined.

14.14 Resource classification

The resource classification definitions used for this estimate are those published by the Canadian Institute of Mining, Metallurgy and Petroleum in their document “CIM Definition Standards”.

**Measured Mineral Resource:** that part of a Mineral Resource for which quantity, grade or quality, densities, shape, physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough to confirm both geological and grade continuity.

**Indicated Mineral Resource:** that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

**Inferred Mineral Resource:** that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes.

In order to identify those blocks in the block model that could reasonably be considered as a Mineral Resource, the block model was filtered by a cut-off grade of 5 g/t AuEq.

The blocks occurring above 5 g/t AuEq were classified as Measured, Indicated or Inferred. Classification was applied based on geological confidence, data quality and grade variability. Areas classified as Measured Resources (“Rescat 1”) are within the well informed portion of West Zone where the resource is informed by 5 m by 5 m or 5 m by 10 m spaced drilling. Areas classified as Indicated Resources (“Rescat 2”) are informed by 20 m by 20 m to 20 m by 40 m drilling within West Zone, VOK, Galena Hill and Shore Zone. The remainder of the Mineral Resource is classified as Inferred Resources (“Rescat 3”) where there is some drilling information and the blocks lie within the mineralized interpretation. Areas where there is no informing data and/or the background material is outside of the mineralized interpretation are not classified as a part of the Mineral Resource (“Rescat 4”).

With respect to some of the areas in the high grade zones at the Valley of the Kings that have drill spacing nearing that of the Measured Resource of West Zone, Snowden has elected to retain the Indicated Resource classification until underground sampling has demonstrated a high level of confidence in these estimates. This is because of the high grade nature of the mineralization.

Figure 14.7 and Figure 14.8 illustrate example sections through the main areas of mineralization, coloured by resource classification (or “Rescat”) for VOK and West Zone respectively.
Figure 14.7  Example cross section showing classification of resource estimate for VOK with drilling coloured by gold grade

Note: drillholes are shown with +/- 20 m clipping. Codes are Green for Indicated and Blue for Inferred Resource categories.
Figure 14.8  Example oblique section showing classification of resource estimate for West Zone with drilling coloured by gold grade

Note: drillholes are shown with +/- 10 m clipping. Codes are Red for Measured, Green for Indicated and Blue for Inferred Resource categories.

14.15 Resource reporting

The Mineral Resources are reported above a cut-off grade of 5 g/t gold equivalent (AuEq) which reflects the potential economics of a high grade underground mining scenario. The AuEq value for each block is calculated according to the formula (AuEq = Au + Ag/53) based upon prices of $US1,590/oz and $US30/oz for gold and silver respectively. Recoveries for gold and silver are assumed to be similar.

High grade Mineral Resources for VOK and West Zone are summarized in Table 14.18 and Table 14.19 respectively. The combined Mineral Resource is summarized in Table 14.20.
Table 14.18  VOK Mineral Resource estimate based on a cut-off grade of 5 g/t AuEq – September 2012\(^{(1)(4)(5)}\)

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Contained(^{(3)})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Gold (Moz)</td>
<td>Silver (Moz)</td>
<td></td>
</tr>
<tr>
<td>Indicated</td>
<td>9.9</td>
<td>16.2</td>
<td>14.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Inferred(^{(2)})</td>
<td>4.6</td>
<td>35.0</td>
<td>13.3</td>
<td>5.1</td>
</tr>
</tbody>
</table>

(1) Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, marketing, or other relevant issues. The Mineral Resources in this news release were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council.

(2) The quantity and grade of reported Inferred resources in this estimation are uncertain in nature and there has been insufficient exploration to define these Inferred Resources as an Indicated or Measured Mineral Resource and it is uncertain if further exploration will result in upgrading them to an Indicated or Measured Mineral Resource category.

(3) Contained metal and tonnes figures in totals may differ due to rounding.

(4) The Mineral Resource estimate stated in Table 14.8 is defined using 5 m by 5 m blocks in the well drilled portion of West Zone (5 m by 10 m drilling or better) and 10 m by 10 m by 10 m blocks in the remainder of West Zone and in VOK, Galena Hill, and parts of Shore Zone, and 20 m by 20 m by 20 m in the poorer informed Bridge Zone, Gossan Hill and parts of Shore Zone.

(5) The gold equivalent value is defined as AuEq = Au + Ag/53.

Table 14.19  West Zone Mineral Resource estimate based on a cut-off grade of 5 g/t AuEq – April 2012\(^{(1)(4)(5)}\)

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Contained(^{(3)})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Gold (Moz)</td>
<td>Silver (Moz)</td>
<td></td>
</tr>
<tr>
<td>Measured</td>
<td>2.4</td>
<td>5.85</td>
<td>347</td>
<td>0.5</td>
</tr>
<tr>
<td>Indicated</td>
<td>2.5</td>
<td>5.86</td>
<td>190</td>
<td>0.5</td>
</tr>
<tr>
<td>M+I</td>
<td>4.9</td>
<td>5.85</td>
<td>267</td>
<td>0.9</td>
</tr>
<tr>
<td>Inferred(^{(2)})</td>
<td>4.0</td>
<td>6.44</td>
<td>82</td>
<td>0.8</td>
</tr>
</tbody>
</table>

(1), (2), (3), (4) and (5) - See footnotes to Table 14.18
Table 14.20  Mineral Resource estimate: Brucejack Project based on a cut-off grade of 5 g/t AuEq – September 2012*(1)(4)(5)

<table>
<thead>
<tr>
<th>Area</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Gold (Moz)</th>
<th>Silver (Moz)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measured Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Zone</td>
<td>2.4</td>
<td>5.85</td>
<td>347</td>
<td>0.5</td>
<td>26.8</td>
</tr>
<tr>
<td><strong>Indicated Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Zone</td>
<td>2.5</td>
<td>5.86</td>
<td>190</td>
<td>0.5</td>
<td>15.1</td>
</tr>
<tr>
<td>VOK</td>
<td>9.9</td>
<td>16.2</td>
<td>14.1</td>
<td>5.1</td>
<td>4.5</td>
</tr>
<tr>
<td>Galena Hill</td>
<td>0.5</td>
<td>11.3</td>
<td>31.3</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Shore Zone</td>
<td>0.3</td>
<td>7.47</td>
<td>53.4</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Indicated</td>
<td>13.2</td>
<td>13.8</td>
<td>48.7</td>
<td>5.9</td>
<td>20.6</td>
</tr>
<tr>
<td><strong>Measured + Indicated Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Zone</td>
<td>4.9</td>
<td>5.85</td>
<td>267</td>
<td>0.9</td>
<td>41.9</td>
</tr>
<tr>
<td>VOK</td>
<td>9.9</td>
<td>16.2</td>
<td>14.1</td>
<td>5.1</td>
<td>4.5</td>
</tr>
<tr>
<td>Galena Hill</td>
<td>0.5</td>
<td>11.3</td>
<td>31.3</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Shore Zone</td>
<td>0.3</td>
<td>7.47</td>
<td>53.4</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Measured + Indicated</td>
<td>15.6</td>
<td>12.6</td>
<td>94.7</td>
<td>6.3</td>
<td>47.4</td>
</tr>
<tr>
<td><strong>Inferred Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Zone</td>
<td>4.0</td>
<td>6.44</td>
<td>82.1</td>
<td>0.8</td>
<td>10.6</td>
</tr>
<tr>
<td>VOK</td>
<td>4.6</td>
<td>35.0</td>
<td>13.3</td>
<td>5.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Galena Hill</td>
<td>0.8</td>
<td>12.5</td>
<td>29.3</td>
<td>0.3</td>
<td>0.7</td>
</tr>
<tr>
<td>Bridge Zone</td>
<td>0.2</td>
<td>5.42</td>
<td>12.6</td>
<td>0.03</td>
<td>0.07</td>
</tr>
<tr>
<td>Gossan Hill</td>
<td>0.1</td>
<td>6.88</td>
<td>13.8</td>
<td>0.03</td>
<td>0.05</td>
</tr>
<tr>
<td>Shore Zone</td>
<td>0.1</td>
<td>5.86</td>
<td>48.9</td>
<td>0.01</td>
<td>0.10</td>
</tr>
<tr>
<td>Total Inferred</td>
<td>9.7</td>
<td>20.3</td>
<td>43.2</td>
<td>6.3</td>
<td>13.5</td>
</tr>
</tbody>
</table>

(1), (2), (3), (4) and (5) - See footnotes to Table 14.18

**Contribution of low grade, high grade and extreme grade populations**

Within the final combined estimates, the proportion of metal attributable to the low grade (<5 g/t Au), high grade (5 g/t Au to 95 percentile) and extreme grade (>95 percentile) populations was calculated. This information is reported in Table 14.21 and Table 14.22 for the combined Measured + Indicated and the Inferred portions of VOK and West Zone resources.
### Table 14.21  Contribution of grade populations to the estimate – VOK

<table>
<thead>
<tr>
<th>Classification</th>
<th>Population</th>
<th>Tonnes (Mt)</th>
<th>Gold metal (koz)</th>
<th>Gold grade (g/t)</th>
<th>Contribution Gold metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicated</td>
<td>Low grade</td>
<td>&lt;5 g/t Au</td>
<td>9.0</td>
<td>195</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td>High grade</td>
<td>5-380 g/t Au</td>
<td>0.76</td>
<td>3,073</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Extreme grade</td>
<td>&gt;380 g/t Au</td>
<td>0.11</td>
<td>1,824</td>
<td>518</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>9.9</td>
<td>5,124</td>
<td>16.2</td>
</tr>
<tr>
<td>Inferred</td>
<td>Low grade</td>
<td>&lt;5 g/t Au</td>
<td>4.0</td>
<td>85</td>
<td>0.66</td>
</tr>
<tr>
<td></td>
<td>High grade</td>
<td>5-380 g/t Au</td>
<td>0.31</td>
<td>1,779</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Extreme grade</td>
<td>&gt;380 g/t Au</td>
<td>0.23</td>
<td>3,232</td>
<td>429</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>4.6</td>
<td>5,119</td>
<td>35.0</td>
</tr>
</tbody>
</table>

### Table 14.22  Contribution of grade populations to the estimate – West Zone

<table>
<thead>
<tr>
<th>Classification</th>
<th>Population</th>
<th>Tonnes (Mt)</th>
<th>Gold metal (koz)</th>
<th>Gold grade (g/t)</th>
<th>Contribution Gold metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured + Indicated</td>
<td>Low grade</td>
<td>&lt;5 g/t Au</td>
<td>4.2</td>
<td>144</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>High grade</td>
<td>5-93 g/t Au</td>
<td>0.67</td>
<td>777</td>
<td>36.2</td>
</tr>
<tr>
<td></td>
<td>Extreme grade</td>
<td>&gt;93 g/t Au</td>
<td>0.001</td>
<td>2.4</td>
<td>97.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>4,918</td>
<td>924</td>
<td>5.84</td>
</tr>
<tr>
<td>Inferred</td>
<td>Low grade</td>
<td>&lt;5 g/t Au</td>
<td>3,570</td>
<td>93</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>High grade</td>
<td>5-93 g/t Au</td>
<td>378</td>
<td>526</td>
<td>43.3</td>
</tr>
<tr>
<td></td>
<td>Extreme grade</td>
<td>&gt;93 g/t Au</td>
<td>49</td>
<td>208</td>
<td>133</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>3,997</td>
<td>827</td>
<td>6.44</td>
</tr>
</tbody>
</table>

### 14.16 Comparison with previous Mineral Resource estimate

In the September 2012 study, Olssen & Jones (Olssen and Jones, 2012b) have reported Mineral Resource estimates for the high grade portion of the West Zone and VOK assuming underground extraction of the mineralization.

The September 2012 estimate has been based on a consolidated interpretation prepared by geologists from Pretivm and Snowden to cover the drilled part of the Brucejack Property. Of significance to the new interpretation is that the mineralized domains have been better defined and more tightly constrained than the previous estimate. On top of this, the new interpretations and model have been prepared including results of drilling information which comprises, since the April 2012 Mineral Resource estimate, an additional 175 drillholes (55,849 m), into VOK. This has resulted in increased confidence in the definition of the mineralized zones, and subsequent increased confidence in the estimated Mineral Resource. The West Zone was not updated in this study as there was no additional drilling in this area.

With the additional data in VOK, the quality of the high grade variography has improved and now indicates an anisotropy in the grade continuity with a shorter range of continuity in the cross strike direction. This anisotropy matches the expectation based on the geological model and has been applied to the search parameters for the high grade estimation resulting in a tighter constraint on the higher-grade material in the estimate.
Figure 14.9 illustrates the change in interpretation in VOK between the April 2012 and September 2012 estimates.

**Figure 14.9** Schematic showing comparison of September 2012 estimation domains with prior April 2012 domains

---

14.17 Open pit sensitivity - Tabulation of grade-tonnage

In the September 2012 study, a Mineral Resource estimate has been reported (Olssen and Jones, 2012b) for the high grade portion of the West Zone and VOK assuming underground extraction of the mineralization. As a separate exercise, the overall model which also encompasses Galena Hill, Shore Zone, Gossan Hill and Bridge Zone has been reported at a variety of cut-off grades (Table 14.23 to Table 14.25) above a conceptual pit shell. This pit shell was put together to demonstrate that there is a reasonable expectation of economic extraction, as required by the CIM, and the tonnes and grade reported.

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Contained(^{(3)}) Gold (Moz)</th>
<th>Contained(^{(3)}) Silver (Moz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
<td>7.4</td>
<td>2.77</td>
<td>152</td>
<td>0.66</td>
<td>36.3</td>
</tr>
<tr>
<td>Indicated</td>
<td>139</td>
<td>2.14</td>
<td>12.9</td>
<td>9.6</td>
<td>57.8</td>
</tr>
<tr>
<td><strong>M+I</strong></td>
<td><strong>146</strong></td>
<td><strong>2.17</strong></td>
<td><strong>19.9</strong></td>
<td><strong>10.3</strong></td>
<td><strong>94.1</strong></td>
</tr>
<tr>
<td>Inferred</td>
<td>857</td>
<td>0.86</td>
<td>8.49</td>
<td>23.7</td>
<td>234</td>
</tr>
</tbody>
</table>

\(^{(1)}\), \(^{(2)}\), \(^{(3)}\), \(^{(4)}\) and \(^{(5)}\) - See footnotes to Table 14.18
Table 14.24  Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 0.5 g/t AuEq – September 2012(1)(4)(5)

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Contained(3)</th>
<th>Silver (Moz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
<td>7.4</td>
<td>2.78</td>
<td>153</td>
<td>0.66</td>
<td>36.3</td>
</tr>
<tr>
<td>Indicated</td>
<td>100</td>
<td>2.87</td>
<td>16.4</td>
<td>9.2</td>
<td>52.5</td>
</tr>
<tr>
<td>M+I</td>
<td>107</td>
<td>2.86</td>
<td>25.8</td>
<td>9.9</td>
<td>88.8</td>
</tr>
<tr>
<td>Inferred(2)</td>
<td>600</td>
<td>1.09</td>
<td>10.2</td>
<td>21</td>
<td>197</td>
</tr>
</tbody>
</table>

(1), (2), (3), (4) and (5) - See footnotes to Table 14.18

Table 14.25  Brucejack Grade-tonnage estimate (Open Cut sensitivity) based on a cut-off grade of 1.0 g/t AuEq – September 2012(1)(4)(5)

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnes (millions)</th>
<th>Gold (g/t)</th>
<th>Silver (g/t)</th>
<th>Contained(3)</th>
<th>Silver (Moz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
<td>6.9</td>
<td>2.94</td>
<td>163</td>
<td>0.65</td>
<td>36.0</td>
</tr>
<tr>
<td>Indicated</td>
<td>55.9</td>
<td>4.67</td>
<td>24.2</td>
<td>8.4</td>
<td>43.4</td>
</tr>
<tr>
<td>M+I</td>
<td>62.7</td>
<td>4.48</td>
<td>39.4</td>
<td>9.0</td>
<td>79.5</td>
</tr>
<tr>
<td>Inferred(2)</td>
<td>157</td>
<td>2.58</td>
<td>19.3</td>
<td>13.1</td>
<td>97.5</td>
</tr>
</tbody>
</table>

(1), (2), (3), (4) and (5) - See footnotes to Table 14.18
15 Adjacent properties

Information in this section has been excerpted from P&E sections within Gaffari et al., (2012) and updated.

Within the adjacent KSM property there are four copper-gold mineral deposits, namely Kerr, Mitchell, Sulphurets and Iron Cap. All of these occurrences are situated within the claim holdings that at the time of writing this report were owned and operated by Seabridge.

Seabridge acquired the property from Placer Dome in June 2000.

In May 2011, an updated Preliminary Feasibility Study increased Mineral Reserves, extended mine life, estimated Base Case operating costs as US$105 per ounce during the first seven years and improved Base Case total net cash flow by US$4.5 billion. Engineering work is now focused on evaluating two different throughput expansion scenarios and potential underground mining in the later years. These results indicate an estimated Reserve statement as shown in Table 15.1. All information for this section has been taken from the Seabridge website at www.seabridgegold.net.

Table 15.1  Mineral reserve estimates for adjacent property

<table>
<thead>
<tr>
<th>Zone</th>
<th>Reserve Category</th>
<th>Tonnnes (millions)</th>
<th>Average Grades</th>
<th>Contained Metal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gold (ozt)</td>
<td>Copper (%)</td>
</tr>
<tr>
<td>Mitchell</td>
<td>Proven</td>
<td>617.9</td>
<td>0.64</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>848.6</td>
<td>0.59</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1,466.5</td>
<td>0.51</td>
<td>0.16</td>
</tr>
<tr>
<td>Iron Cap</td>
<td>Proven</td>
<td>334.1</td>
<td>0.42</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>179.1</td>
<td>0.62</td>
<td>0.26</td>
</tr>
<tr>
<td>Sulphurets</td>
<td>Proven</td>
<td>212.7</td>
<td>0.25</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>1,574.5</td>
<td>0.51</td>
<td>0.22</td>
</tr>
<tr>
<td>Totals</td>
<td>Proven</td>
<td>617.9</td>
<td>0.64</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Probable</td>
<td>1,574.5</td>
<td>0.51</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2,192.4</td>
<td>0.55</td>
<td>0.21</td>
</tr>
</tbody>
</table>

The author for this report has not verified the information concerning Seabridge, and the information is not necessarily indicative of the mineralization at the Brucejack Project.
16 Other relevant data and information

16.1 Preliminary economic assessment 2011

Pretivm commissioned Wardrop to complete a preliminary economic assessment (“PEA”) on the high-grade gold and silver resources at the Brucejack Project as a “stand-alone” project, and results were made public in June, 2011. The following consultants were commissioned to complete the component studies for the NI 43-101 Technical Report and Preliminary Economic Assessment:

- Wardrop: processing, infrastructure, capital cost estimate, processing, operating cost estimate, and financial analysis;
- AMC Mining Consultants (Canada) Ltd. (AMC): mining including mine capital and operating cost estimates;
- P&E Mining Consultants Inc. (P&E): Mineral Resource estimate;
- Rescan Environmental Services Ltd. (Rescan): environmental aspects, waste and water treatment;
- BGC Engineering Inc. (BGC): tailings impoundment facility, waste rock and water management, and geotechnical design.

16.2 Updated preliminary economic assessment 2012

Pretivm commissioned Wardrop to complete an updated PEA on the Brucejack Project as a underground mining project in late 2011, and results were reported in Gaffari et al., (2012). The following consultants were commissioned to complete the component studies for the NI 43-101 Technical Report and Preliminary Economic Assessment:

- Wardrop: processing, infrastructure, capital cost estimate, processing, operating cost estimate, and financial analysis;
- AMC Mining Consultants (Canada) Ltd. (AMC): mining including mine capital and operating cost estimates;
- P&E Mining Consultants Inc. (P&E): Mineral Resource estimate;
- Rescan Environmental Services Ltd. (Rescan): environmental aspects, waste and water treatment;
- BGC Engineering Inc. (BGC): tailings impoundment facility, waste rock and water management, site wide groundwater studies, and geotechnical design for onsite facilities;
- GeoSpark Consulting Inc. (GeoSpark): quality assurance and quality control (QA/QC) and database management.
17 Interpretation and conclusions

An updated Mineral Resource estimate has been prepared for West Zone, VOK, Galena Hill, Shore Zone, Gossan Hill and Bridge Zone at the Brucejack Property of Pretivm located near Smithers, BC. The Measured, Indicated and Inferred Mineral Resource estimates, effective September 2012 are intended for use in a preliminary economic assessment of a high grade underground mining scenario. The Measured and Indicated Mineral Resource estimates could be used in a feasibility study.

In February 2012 a preliminary economic assessment was reported (Gaffari et al., 2012) based upon Mineral Resource estimates for the VOK and West Zones that are now out-of-date. Gaffari et al (2012) reported Mineral Resource estimates prepared by P&E for the Brucejack project. The P&E study considered the potential for open pit mining of the near surface portions of the deposits. Mineral Resource estimates were reported by P&E for higher grade portions of the deposits that are considered to be potentially minable by underground methods.

In the current study, Olssen & Jones have reported Mineral Resource estimates for the high grade portions of West and VOK that are considered to be potentially minable by underground methods, regardless of the open pit potential. The grade-tonnage estimates have also been reported for the overall Brucejack project, but at much lower cut-off grades. These estimates are reported above a conceptual pit shell demonstrating the reasonableness of the decision of economic extractability. Snowden has also tested the impact on any potential future open cut of extraction of the high grade mineralization by underground methods, and found the open cut to remain having a reasonable expectation of economic extraction.
18 Recommendations

The author makes the following recommendations:

- Complete density measurements using a second technique (such as the weight in air, weight in water method) to add confidence in the density measurements already available.

- Complete sufficient close-spaced drilling on the defined mineralization, particularly the high grade mineralization that is close to surface. The aim should be to optimise the confidence in the resource estimates and subsequently improve the classification.

- Open up underground workings at VOK and bulk sample the mineralization in one or two representative areas in order to reconcile tonnage and grade estimates.

- Test for additional VOK mineralization at depth and along the eastern down plunge projection of the syncline.

- Complete sufficient infill drilling to upgrade the classification of some of the Inferred Resources to Indicated Mineral Resources.

- Continue to attempt to define high grade resources and their geological controls in the zones outside of VOK and West Zones.

- Continue to refine the geological model with the aim of preparing a single integrated geological model.

- Complete updated resource estimates for all zones including those zones outside of VOK and West Zones.

The budgeted cost for the drilling and associated studies (including the resource updates) is $20 million, whilst the cost of the underground bulk sample is budgeted at $30 million. These costs are in Canadian dollars.
19 References


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20 Certificate of author

(a) I, Ivor W.O. Jones, Senior Principal Consultant of Snowden Mining Industry Consultants Inc., 87 Colin Street, West Perth, Western Australia; do hereby certify that:


(c) I graduated with an Honours Degree in Bachelor of Science in Geology from Macquarie University in Sydney in 1986. In 2001 I graduated with a Master of Science degree in resource estimation from the University of Queensland. I am: a Fellow and Chartered Professional of the Australasian Institute of Mining and Metallurgy. I have worked as a geologist continuously for a total of 25 years since graduation. I have been involved in resource evaluation for 20 years and consulting for 15 years, including resource estimation of primary gold deposits for at least 5 years. I have been involved in gold exploration and mining operations for at least 5 years. I have read the definition of ‘qualified person’ set out in NI 43-101 (“the Instrument”) and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a ‘qualified person’ for the purposes of the Instrument.

(d) I visited the Brucejack Property from 15 February to 16 February, 2012.

(e) I am responsible for the overall preparation of the Report.

(f) I am independent of the issuer as defined in section 1.4 of the Instrument.

(g) I have had prior involvement with the property that is the subject of the Report. I completed a prior report dated 30 April 2012; and have reviewed a technical review prepared by Dr W. Board of Snowden in 2010.

(h) I have read the Instrument and Form 43-101F1, and the Report has been prepared in compliance with that instrument and form.

(i) As of the date of this certificate, to the best of my knowledge, information and belief, the Report contains all the scientific and technical information that is required to be disclosed to make the Report not misleading.

(j) I consent to the filing of the Report with any stock exchange or any regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Report.

Dated at West Perth this 18th Day of September, 2012.

[signed]

Ivor W.O. Jones