# ASX ANNOUNCEMENT



# HIGH GRADE GOLD MINERALISATION AT SATULINMÄKI TARGETED FOR FOLLOW-UP DRILLING

### Highlights

- Planning for gold exploration drilling is advancing, with data compilation over the Satulinmäki and Riukka gold prospects in Finland now completed.
- Satulinmäki identified as the highest priority and diamond drill follow-up is scheduled to commence after the completion of the drilling programme at our nearby Kietyönmäki lithium pegmatite (expected to be Q4, 2016).
- Diamond drilling was completed at Satulinmäki by the Geological Survey of Finland (GTK) during the period 2001 to 2005, and returned very encouraging results, including:
  - 25.0m @ 3.17 g/t Au from 50m downhole in drill hole R391, including;
    - 3.0m @ 9.3 g/t Au, and
    - 4.0m @ 10.3 g/t Au
  - o 3.0m @ 5.9 g/t Au from 33.9m downhole in drill hole R414
  - o 10.0m at 2.7 g/t Au from 15m downhole in drill hole R416
  - o 4.0m @ 5.2 g/t Au from 101.3m downhole in drill hole R419
- Rock saw channel sampling in outcrop above hole R391 over a 5.0m length returned results between 1.9 and 8.5 g/t Au.
- Historical geophysical data comprising detailed ground magnetics and Induced Polarisation is being sourced to define additional targets.

Avalon Minerals Ltd **(ASX: AVI)** ('Avalon') is pleased to provide an update on the Satulinmäki and Riukka gold prospects located within the Tammela Project claims in southern Finland, which also hosts the Kietyönmäki lithium pegmatite project being explored by Avalon (figure 1 below).

Both the Satulinmäki and Riukka prospects were drilled by the Finnish Geological Survey (GTK) during the period 2001 to 2005 with highly encouraging results.

At Satulinmäki 60 shallow holes were completed for a total of 4727m, which only tested the plane of mineralisation to a depth of 80m below surface.

At Riukka, 40 shallow holes were completed for a total of 3350m and also only tested to a vertical depth of 60m.

The Satulinmäki prospect has been selected by Avalon as the highest priority target to initially follow-up based on its intense and complex quartz veining and alteration.

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At Satulinmäki, clear drill targets exist at depth, below the better historical intersections (see figure 2 below). Targets also exist along strike where preliminary structural interpretations suggest historical drilling may not have tested all scenarios.

The first drill test by Avalon will be to follow the high grade zone at Satulinmäki to depth to extend the mineralisation zone beyond the current shallow 70m of vertical extent. Intersections in this zone range for 3m to 10m wide, and contain grades of between 1.4 g/t and 10.3 g/t.

The immediate target zone is interpreted to have a steep shoot geometry and has a strike extent of at least 100m. Additional target zones exist along strike.

Drill Holo	Prospect	Year	Down hole;	Intersection	Au a/t	EOH depth
		Diffieu			Au g/t	(11)
K328	Satulinmaki	2001	40.3	1.0	17.8	67.3
R330	Satulinmäki	2001	59.5	1.0	5.6	102.0
and			73.0	8.5	1.4	
and			85.5	5.0	2.1	
R334	Satulinmäki	2002	30.2	4.0	1.5	85.1
R344	Satulinmäki	2002	72.5	1.0	15.0	80.9
R389	Satulinmäki	2004	73.0	8.0	1.4	83.7
incl.			75.0	1.0	8.2	
R391	Satulinmäki	2004	50.0	25.0	3.2	81.7
incl.			54.0	3.0	9.3	
incl.			66.0	4.0	10.3	
R413	Satulinmäki	2005	51.3	25.0	1.7	85.2
incl.			51.3	1.0	9.8	
incl.			62.3	1.0	8.6	
incl.			74.3	1.0	6.2	
R414	Satulinmäki	2005	33.9	3.0	5.9	93.0
R416	Satulinmäki	2005	15.0	10.0	2.7	101.3
R418	Satulinmäki	2005	78.0	2.0	8.8	101.8
R419	Satulinmäki	2005	101.3	4.0	5.2	139.2
R422	Satulinmäki	2005	64.0	3.0	4.0	100.3
R428	Satulinmäki	2005	63.0	7.0	1.6	79.3

Tabulation of key results from previous drilling at Satulinmäki by GTK:

The gold prospects are located within a regional NW trending structural domain, but locally appear to be controlled by E-W and NE trending structures and veins. Avalon has applied for exploration reservations that cover approximately 30km of strike of the interpreted main structure controlling gold mineralisation.

Access to the proposed drill site requires minimal logistical planning as it is located in a timbered area adjacent to farmland and supported by a good road network and local towns.





Figure 1: Diagram showing the location of the Satulinmäki and Riukka gold prospects relative to the Kietyönmäki lithium pegmatite project. Background colours are topography with red being highest elevation, and approximately 40m greater than the lowest blue colours.







Figure 2: 3D modelling of gold mineralisation at Satulinmäki showing multiple zones of gold mineralisation that are open at depth. Drilling has only tested the mineralised horizon to approximately 80m below surface.







Figure 3: Photograph showing quartz veined and sulphidic outcrop at the Satulinmäki gold prospect and the 2003 GTK 5m channel sample which returned assay results of between 1.9 g/t and 8.5 g/t Au. Drill hole R391 was drilled below this outcrop and returned values of 25.0m @ 3.17g/t Au including 3.0m @ 9.3g/t Au, and 4.0m @ 10.3g/t Au.

Hole_ID	From (m)	To (m)	Interval (m)	Gold (g/t)	Comments	Hole_ID	From (m)	To (m)	Interval (m)	Gold (g/t)	Comments
R329	13.4	20.5	7.1	1.67	Nortec sampling	R329	14.4	15.4	1	0.9	GTK sampling and assays
							16.4	19.4	3	3.33	GTK sampling and assays
R330	51	88.7	37.7	1.03	Nortec sampling	R330	51	53	2	0.92	GTK sampling and assays
including	58.5	61.5	3	3.85	Nortec sampling		59.5	60.5	1	5.55	GTK sampling and assays
including	84.2	88.7	4.5	3.37	Nortec sampling		73	81.45	8.45	1.4	GTK sampling and assays
							85.45	90.45	5	2.09	GTK sampling and assays
R334	29.2	34.2	5	1.6	Nortec sampling	R334	30.2	34.2	4	1.53	GTK sampling and assays
R340	20.8	31.8	11	0.48	Nortec sampling	R340	27.8	28.8	1	0.6	GTK sampling and assays
							30.8	31.8	1	0.8	GTK sampling and assays
R385	13	15	2	1.57	Nortec sampling	R385	13	15	2	3.74	GTK sampling and assays
R386	40	43	3	0.56	Nortec sampling	R386	40	41	1	0.81	GTK sampling and assays

Table showing comparison of GTK and Nortec selected samples



#### About Avalon

Avalon has an advanced portfolio of exploration and development projects in Scandinavia. The portfolio comprises:

- The Kietyönmäki lithium pegmatite project in southern Finland which is scheduled for a 3,000m resource drilling program commencing in late August 2016. The project is part of an earn-in JV with Canadian company Nortec Minerals, where Avalon can earn up to an 80% interest (see ASX announcement dated 19<sup>th</sup> May 2016). Historical drilling by the Geological Survey of Finland (GTK) identified a high grade lithium pegmatite deposit including diamond drill intersections of up to 18m at 1.8% Li<sub>2</sub>O. Proposed work will deliver a mineral resource estimate and preliminary metallurgical studies by the end of 2016.
- 2. The Viscaria Copper project in northern Sweden which has a completed Scoping Study and is moving towards PFS and permitting to allow for mine development. The project has a mineral resource estimate of 52.4 Mt at 1.2% Cu, and a Mining Inventory considered for the 2016 Scoping Study Update (see ASX announcement dated 5<sup>th</sup> April 2016) of 18Mt at 1.2% Cu. Considerable exploration upside exists and low technical risk extensional drill targets have been defined to increase the resource estimate.
- The Satulinmäki and Riukka gold prospects in southern Finland. These prospects have received shallow diamond drilling by GTK and are now the subject of plans for follow-up drilling by Avalon. Intersections include 25m @ 3.17g/t Au from 50m downhole, including 3m @ 9.3g/t Au, and 4m @ 10.3g/t Au in drill hole R391 at Satulinmaki.
- 4. A portfolio of early stage lithium exploration projects in Sweden and Finland. These cover areas of documented lithium bearing pegmatite rocks and are being advanced to allow for drill testing in 2017.

#### For further information please visit www.avalonminerals.com.au or contact:

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#### APPENDIX 1 The following Table and Sections are provided to ensure compliance with the JORC Code (2012 Edition)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.	<ul> <li>The results announced here are from historical diamond drill core samples drilled during the period 2001 to 2005 by the Geological Survey of Finland (GTK) and 6 of the 60 holes were subsequently selectively re-logged and resampled by Nortec Minerals Corp (see Nortec announcement March 1<sup>st</sup>, 2011). At Satulinmäki 60 drill holes were completed by GTK and Nortec's check sampling was from 6 drill holes, R329, 330, 334, 340, 385 and 386.</li> </ul>
	• Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	• No reports of core recovery have been sighted.
	• Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.	• Diamond drilling was used to obtain ~1m samples from which 3-5 kg were sent to the laboratory to be pulverised to produce a 250g sample. Then a 50g portion of this sample was used for gold and multi-element analysis.
Drilling techniques	• Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).	Diamond drill core.
Drill sample	• Method of recording and assessing core and chip sample recoveries and results assessed.	• Diamond core recovery data for this historical drilling has not been sighted.
recovery	• Measures taken to maximise sample recovery and ensure representative nature of the samples.	Details of geological logs suggest good core recovery.

# **TABLE 1 – Section 1: Sampling Techniques and Data**

Criteria	JORC Code explanation	Commentary		
	• Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	• No relationship between sample recovery and grade has been established.		
Logging	• Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	• Drill samples were logged for lithology. No further studies were undertaken.		
	• Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	• Drill samples were logged for lithology and hence logging is qualitative. Core was photographed and selected intervals have been viewed.		
	• The total length and percentage of the relevant intersections logged.	• All drill holes were logged in full from start to finish of the hole, based on historical reports. Nortec then re-logged selected intervals.		
Sub-sampling techniques and sample preparation	• If core, whether cut or sawn and whether quarter, half or all core taken.	• Half core was sampled and the remaining core is stored in GTK's core storage facility. The core was logged at GTK's Loppi core archive. After logging the core was cut in half by saw for those holes drilled between 2002 and 2005, and by hand splitter for holes drilled in 2001.		
	• If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	• Core samples.		
	• For all sample types, the nature, quality and appropriateness of the sample preparation technique.	• The whole half-core sample was ground by a swing mill at GTK's Kuopio or Rovaniemi laboratories. The analyses were undertaken at GTK's Espoo and Rovaniemi laboratories. Assays by Notec were submitted to ALS Chemex in Outokumpu for Ore grade Gold by fire assay with an AAS finish (FA-AAS)		
	• Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	• There is no record of specific QAQC processes during the historical drilling or on the check assays, although assays from both GTK and Nortec were consistent with one another hence providing confidence in the results.		
	• Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.	No record of these procedures.		
	• Whether sample sizes are appropriate to the grain size of the material being sampled.	• Sample sizes are considered to be appropriate and correctly represent the style and type of mineralisation.		

Criteria	JORC Code explanation	Commentary
Quality of assay data and laboratory tests	• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.	<ul> <li>The major method used by GTK was fire assay (plus ICP-AES) from a 50 gram subsample (method code 705P). Gold from the first drill cores (DH 326-DH331) was analysed by GFAAS from aqua regia leach Hg-coprecipitation and using 20g subsamples (method 522U). In addition, ICP-AES analyses by partial leaching (aqua regia digestion, method code 511P) were used for samples from holes D326-D347 and ICP-MS analyses from holes D379-D389.</li> <li>Samples taken by Nortec were submitted to ALS Chemex in Outokumpu for Ore grade Gold by fire assay with an AAS finish (FA-AAS). Best intercepts were calculated using a cut-off grade of 0.4g/t Gold and a maximum internal waste of 2 metres.</li> </ul>
	• For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.	• No handheld XRF measurements were taken on this hole.
	• Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	• Re-sampling by Nortec confirmed earlier assay results received by the Geological Survey of Finland (GTK).
Verification of	• The verification of significant intersections by either independent or alternative company personnel.	• Verification of GTK results by subsequent sampling by Nortec.
sampling and	• The use of twinned holes.	• Twin holes have not been drilled in this area.
assaying	• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	• Nortec data and the Finnish Geological Survey (GTK) data have been sighted in reports.
	• Discuss any adjustment to assay data.	Assay data were not adjusted.
Location of data points	• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.	• Hole locations are shown on detailed maps from GTK 2006 report Kärkkäinen et. al.
	• Specification of the grid system used.	• The current projection used for map preparation in Finland is ETRS- TM35FIN, with Datum EUREF89
	• Quality and adequacy of topographic control.	• No reports of topographic control have been sighted.

Criteria	JORC Code explanation	Commentary
Data spacing	• Data spacing for reporting of Exploration Results.	• The historical drilling was comprised of 60 drill holes on multiple traverses at approximately 10 and 40m apart.
and distribution	• Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	• Sufficient continuity in both geology and mineralisation has been established based on geological mapping and cross-section representation.
	• Whether sample compositing has been applied.	No sample compositing was done.
Orientation of data in relation	• Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	• Drilling orientations were considered appropriate for the interpreted structures controlling mineralisation.
to geological structure	• If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	• The company does not believe that any sample bias had been introduced which could have a material effect.
Sample security	• The measures taken to ensure sample security.	• Nortec's sampling procedures indicate individual samples were given due attention.
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	• No audits were completed.

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.	The Satulinmäki gold occurrence is covered by approved exploration claims, under the Finnish Mining Act.
	• The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	• Exploration claims are valid and are held by Nortec Minerals Corp. Avalon has a joint venture with Nortec to explore the claims.
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	• The historic drilling at Satulinmäki was undertaken by the Finnish Geological Survey in 1985, and was re-logged and re-sampled by Nortec Minerals Corp. in 2010.
Geology	• Deposit type, geological setting and style of mineralisation.	• The Satulinmäki gold occurrence is interpreted to be an orogenic gold system hosted by a series of quartz veins.
Drill hole Information	<ul> <li>A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:         <ul> <li>a. easting and northing of the drill hole collar</li> <li>b. elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>c. dip and azimuth of the hole</li> <li>d. down hole length and interception depth</li> <li>e. hole length.</li> </ul> </li> </ul>	<ul> <li>Details of the drill holes discussed in this announcement are referenced to Nortec Minerals Corp reports at <a href="http://www.nortecminerals.com/index.php">http://www.nortecminerals.com/index.php</a>.</li> <li>60 drill holes were completed by GTK on multiple traverses. Holes were drilled at mainly -45 degree angles. The deepest hole was to 139.2m EOH at -60 degrees which tested to ~100m below surface.</li> </ul>
	• If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	Information included above.

# **TABLE 1 – Section 2: Exploration Results**

Criteria	JORC Code explanation	Commentary
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.	• The Weighted Averaging method is used to calculate drill hole intersections for the gold grade based on the assay results received, and the down hole width of the assayed interval.
	• Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	Weighted averaging method used.
	• The assumptions used for any reporting of metal equivalent values should be clearly stated.	Metal Equivalents have not been applied.
Relationship between	• If the geometry of the mineralisation with respect to the drill-hole angle is known, its nature should be reported.	• The orientations of the mineralised horizons is interpreted to be sub-vertical based on geological mapping and cross-sectional interpretation.
mineralisation widths and intercept lengths	• If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').	• See above – estimated true widths are approximately 60% of intersected widths based on cross section construction.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	• Reporting of historical holes only. No significant discovery reported here.
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	• Historical results only and this is stated in the text
Other substantive	• Other exploration data, if meaningful and material, should be reported) including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk	• No other significant geological data has been reviewed at this stage.

Criteria	JORC Code explanation	Commentary
exploration data	density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	
Further work	• The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).	• Comprehensive data compilation is ongoing. The GTK have extensive open file data available. Field work is ongoing during 2016, with follow-up drilling expected in Q4 2016.
	• Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	• Additional exploration reservation areas have been applied for which cover the interpreted extensions of the prospective domains.