



**Athena**  
Resources

ACN 113 758 900

19 July 2021

The Company Announcements Office  
ASX Limited  
4 Floor, 20 Bridge Street  
SYDNEY NSW 2000

## **BYRO INDUSTRIAL MINERALS PROJECT**

### **Completion of further metallurgical test work**

Athena Resources Limited (**Athena the Company**) (ASX:**AHN**) is pleased to announce the company is continuing with its Byro Industrial Minerals Project with the completion of further metallurgical test work on the Whistlejack and Byro South magnetite ore within its Byro tenements.

#### **Preliminary Flotation Test Work**

Preliminary test work was designed and completed to determine if a processing option for a concentrate product from the Whistlejack and Byro South ore could be optimised to produce a higher purity concentrate similar to the Company's high grade FE1 and Mt Narryer Ore bodies. The flagship FE1 ore body is situated approximately 10 kilometers west of the Whistlejack and Byro South ore bodies.

All test work was completed by ALS Laboratories in Perth. A 20kg representative composite from historic DTR composite reserves from the Byro South ore was ground and processed using Low Intensity Magnetic Separation (LIMS), to form a primary concentrate of 69.7%Fe at P80/45µm. The concentrate then subjected to three flotation tests each using a different reagent scheme. The most successful flotation scheme yielded a product assay at **70.61%Fe** with a calculated head grade of **69.36%Fe**, an improvement of 1.25%Fe.

The same process was applied to the Whistlejack ore using a 20kg representative composite from historic DTR reserves, ground and processed using Low Intensity Magnetic Separation (LIMS), to form a primary concentrate of P80/45µm at 69.0%Fe. The concentrate then subjected to three reverse flotation tests each using a different reagent scheme. The most successful flotation scheme yielded a product assay at **70.22%Fe** with a calculated head grade of **68.62%Fe**, an improvement of 1.6%Fe.

The test results demonstrate it is feasible to further reduce impurities while improving the grade from the Whistlejack and Byro South iron concentrate. Results show this is possible with the reduction of residual silica (SiO<sub>2</sub>), aluminium oxide (Al<sub>2</sub>O<sub>3</sub>), phosphorus (P), Potassium (K<sub>2</sub>O) and Sodium (Na<sub>2</sub>O) by scavenging using industry standard reverse flotation processes. However, these results are not conclusive and further detailed and definitive test work is required to reach a conclusive understanding for optimising a processing route for the Whistlejack and Byro South ore.

**Athena Resources Limited**

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## Preliminary Ore Roasting Test

Further test work was undertaken as a preliminary test to identify if residual sulphur could be removed from the Whistlejack and Byro South concentrates during calcination using a standard roasting process.

Sample split from the master composite concentrates used in the flotation tests above were roasted using a static roast in a Muffle furnace at 1250°C for 120 minutes and then assayed. Preliminary results are in Table 1 below.

**Table 1** Sulphur Removal Results

Sulphur	Whistlejack	Byro South
Sulphur Grade of Feed:	0.15%	0.30%
Sulphur Grade of Calcine:	0.002%	0.004%
Sulphur Removed from Feed:	98.58%	98.63%

These results are not conclusive but demonstrate that in this test greater than 98% of residual sulphur from the Whistlejack and Byro South master composite concentrates was removed during the roasting process. These results are not representative of the whole Byro South and Whistlejack ore bodies. Further detailed and definitive test work is required to reach a conclusive understanding for optimising a processing route for the ore types.

## Preliminary Flotation Test Work Details

A master composite was compiled for each of the Byro South and Whistlejack ore bodies. The master composites were combined from reserves held in storage from historic DTR analysis. The reserves making up the master composite for each ore body were selected from magnetite intersections as a general representation of the ores for the floatation test work.

The reserves from historic DTR composites used to make up the Byro South master composite were originally analysed in May 2016 and announced on the ASX platform on 29 July 2016, Table 2 below shows the historic DTR assay results announced at that time.



**Table 2.** DTR Composite Results used in the Byro South Master Composite.

Byro South Composite	Feed	Mags		Assays (%)							
	g	g	%	Fe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	P	S	Fe <sub>3</sub> O <sub>4</sub>	LOI <sub>1000</sub>
BS2	20.01	4.21	21.0	67.64	4.24	0.99	0.54	0.005	0.276	82.5	-3.58
BS6	20.00	4.30	21.5	68.80	2.85	0.78	0.40	0.006	0.401	85.5	-3.33
BS8	20.00	6.58	32.9	69.86	2.37	0.43	0.21	0.004	0.177	87.5	-3.47
BS10	20.00	4.74	23.7	70.32	1.69	0.40	0.27	0.003	0.190	88.2	-3.60
BS11	20.00	5.08	25.4	70.17	1.53	0.54	0.34	0.003	0.485	86.8	-3.30
BS15	20.00	1.87	9.4	70.68	1.18	0.53	0.14	0.002	0.129	90.2	-3.82
BS16	20.01	6.27	31.4	70.59	0.92	0.64	0.40	0.003	0.198	88.9	-3.39
BS17	20.00	6.01	30.1	70.39	1.30	0.67	0.20	0.005	0.013	81.0	-3.25
BS18	20.02	0.71	3.5	69.66	1.53	0.45	0.12	0.003	0.023	NR	IS
BS19	20.06	2.28	11.3	70.89	1.14	0.38	0.08	0.003	0.020	90.0	-3.78
BS21	20.00	5.87	29.4	70.86	0.90	0.51	0.21	0.003	0.028	86.6	-3.36
BS28	20.00	5.64	28.2	67.63	4.54	0.63	0.22	0.008	0.152	80.8	-3.20
BS31	20.02	9.60	48.0	70.29	1.44	0.67	0.22	0.003	0.186	88.7	-3.26
BS32	20.01	7.84	39.2	70.10	1.94	0.78	0.16	0.002	0.107	86.8	-3.48
BS33	20.02	7.56	37.8	66.32	5.78	1.01	0.26	0.008	0.311	78.3	-2.92
BS40	20.04	8.30	41.4	65.81	6.68	0.74	0.15	0.008	0.506	80.1	-3.14

The reserves from historic DTR composites used to make up the Whistlejack master composite were originally analysed in August 2016 and announced on the ASX platform on 19 October 2016, Table 3 below shows the historic DTR assay results announced at that time.

**Table 3.** DTR Composite Results used in the Whistlejack Master Composite.

Whistlejack Composites	Feed	Mags		Assays (%)							
	g	g	%	Fe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	P	S	Ni	LOI <sub>1000</sub>
WJ5	20.43	9.78	47.9	69.76	2.15	0.58	0.11	0.002	0.047	0.003	-3.18
WJ6	20.23	10.63	52.5	68.95	3.17	0.68	0.09	0.002	0.101	0.004	-3.23
WJ7	20.31	9.69	47.7	68.56	3.68	0.71	0.11	0.006	0.073	0.002	-3.23
WJ8	20.68	7.93	38.4	66.75	4.45	0.81	0.19	0.005	0.547	0.004	-2.86
WJ9	20.33	8.61	42.3	70.31	1.36	0.73	0.23	0.003	0.044	0.003	-3.22
WJ10	20.32	9.58	47.2	68.97	2.85	0.90	0.22	0.004	0.068	0.006	-3.21
WJ12	20.29	9.17	45.2	67.99	4.31	0.84	0.21	0.003	0.034	0.003	-3.23
WJ14	20.78	9.54	45.9	67.42	4.77	0.99	0.35	0.008	0.052	0.004	-3.14
WJ15	20.89	7.86	37.6	66.37	5.72	0.94	0.28	0.008	0.102	0.006	-3.06
WJ16	20.45	8.80	43.0	66.22	6.03	1.05	0.22	0.008	0.126	0.007	-3.14
WJ18	20.84	8.90	42.7	67.55	4.59	0.93	0.28	0.008	0.096	0.004	-3.23
WJ19	20.15	7.40	36.7	67.64	4.04	0.90	0.29	0.007	0.131	0.006	-3.21

The reserves, (Table 2 and Table 3), were combined to form a master composite for each ore body. The master composite material was ground to P80/45µm and assayed. Results of the master composite head assays are seen in Table 4 below.



**Table 4. Master Composite Head Assays for Byro South and Whistlejack**

A22325 HEAD ASSAYS FOR ATHENA RESOURCES MAGNETITE PROJECT												
Sample ID	Fe(%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	P(%)	S(%)	Mn(%)	CaO(%)	MgO(%)	TiO <sub>2</sub> (%)	K <sub>2</sub> O(%)	V(%)	LOI 1000(%)
BS	31.97	42.10	4.31	0.041	0.278	0.073	2.930	3.16	0.24	0.66	0.006	-0.74
WJ	36.88	40.30	1.82	0.036	0.171	0.062	2.470	2.41	0.13	0.42	0.002	-1.60
Sample ID	Na <sub>2</sub> O(%)	Cr <sub>2</sub> O <sub>3</sub> (%)	Co(%)	Ni(%)	Cu(%)	Zn(%)	As(%)	Ba(%)	Cl(%)	Pb(%)	Sn(%)	
BS	0.61	0.028	0.001	0.005	0.005	0.010	0.001	0.030	0.043	0.006	0.001	
WJ	0.17	0.016	0.001	0.002	0.001	0.008	0.001	0.038	0.020	0.004	0.001	

BS = Byro South, WJ = Whistlejack

Following grinding and head assays the composites were subjected to Wet Low Intensity Magnetic Separation (LIMS) @ 1200G. The LIMS magnetitic and non-magnetic product components were split and assayed. Results in Table 5 and 6 show master composite concentrate grade for Byro South of 69.7%Fe and 69%Fe for Whistlejack.

**Table 5. Wet Low Intensity Magnetic Separation Product Assay Results. (BS Concentrate)**

A22325 - BS - WET LOW INTENSITY MAGNETIC SEPARATION - WET LIMS @ 1200G ON HEAD SAMPLE (MILLED TO P80 45µm, 3 PASS)										
LIMS @ 1200G	FRACTION WEIGHT (kg)	Wt. DISTn. (%)	Fe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	P	S	TiO <sub>2</sub>	K <sub>2</sub> O	
			Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)
Mags	5.98	31.5	69.7	2.52	0.71	0.003	0.312	0.23	0.025	
N-Mags	13.02	68.5	15.3	61.00	5.77	0.060	0.225	0.23	0.924	
Calc'd HEAD	19.00	100.0	32.4	42.59	4.18	0.042	0.252	0.23	0.641	
HEAD ASSAY			32.0	42.10	4.31	0.041	0.278	0.24	0.656	

A22325 - BS - WET LOW INTENSITY MAGNETIC SEPARATION - WET LIMS @ 1200G ON HEAD SAMPLE (MILLED TO P80 45µm, 3 PASS)										
LIMS @ 1200G	FRACTION WEIGHT (kg)	Wt. DISTn. (%)	Na <sub>2</sub> O	Cr <sub>2</sub> O <sub>3</sub>	Co	Ni	Cu	Pb	LOI-0	
			Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)
Mags	5.98	31.5	0.026	0.517	0.008	0.196	0.018	0.010	-3.68	
N-Mags	13.02	68.5	0.844	0.024	0.001	0.009	0.003	0.006	0.17	
Calc'd HEAD	19.00	100.0	0.587	0.179	0.003	0.068	0.008	0.007	-1.04	
HEAD ASSAY			0.609	0.028	0.001	0.005	0.005	0.006	-0.74	



**Table 6. Wet Low Intensity Magnetic Separation Assay Results. (WJ Concentrate)**

A22325 - WJ - WET LOW INTENSITY MAGNETIC SEPARATION - WET LIMS @ 1200G ON HEAD SAMPLE (MILLED TO P80 45µm, 3 PASS)									
LIMS	FRACTION	Wt.	Fe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	P	S	TiO <sub>2</sub>	K <sub>2</sub> O
@ 1200G	WEIGHT (kg)	DISTn. (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)
Mags	8.24	43.4	<b>69.0</b>	3.43	0.83	0.003	0.146	0.20	0.019
N-Mags	10.76	56.6	12.8	68.80	2.83	0.064	0.146	0.11	0.751
Calc'd HEAD	19.00	100.0	37.2	40.45	1.96	0.038	0.146	0.15	0.434
HEAD ASSAY			36.9	40.30	1.82	0.036	0.171	0.13	0.420
A22325 - WJ - WET LOW INTENSITY MAGNETIC SEPARATION - WET LIMS @ 1200G ON HEAD SAMPLE (MILLED TO P80 45µm, 3 PASS)									
LIMS	FRACTION	Wt.	Na <sub>2</sub> O	Cr <sub>2</sub> O <sub>3</sub>	Co	Ni	Cu	Pb	LOI-1000
@ 1200G	WEIGHT (kg)	DISTn. (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)	Grade (%)
Mags	8.24	43.4	0.015	0.384	0.006	0.143	0.018	0.010	-3.58
N-Mags	10.76	56.6	0.322	0.012	0.001	0.006	0.001	0.005	-0.39
Calc'd HEAD	19.00	100.0	0.189	0.173	0.003	0.065	0.008	0.007	-1.77
HEAD ASSAY			0.165	0.016	0.001	0.002	0.001	0.004	-1.60

The LIMS magnetic product for the Whistlejack master composite was split and prepared for flotation test work. The concentrate then subjected to three flotation tests each using a different reagent scheme. The flotation products were assayed using a standard iron ore suite.

The most successful flotation scheme yielded a product assay at **70.61%Fe** with a calculated head grade of **69.36%Fe**, an improvement of 1.25%Fe.



**Table 7. Whistlejack Concentrate Flotation Assay Results**

PRODUCT	WEIGHT		Al <sub>2</sub> O <sub>3</sub>	Co	Cr <sub>2</sub> O <sub>3</sub>	Cu	Fe	K <sub>2</sub> O	Na <sub>2</sub> O
	Gram	%							
Con 1	7.36	1.48	1.35	0.005	0.437	0.034	32.78	0.22	0.071
Con 2	11.5	2.30	1.26	0.007	0.673	0.028	45.81	0.13	0.058
Con 3	11.3	2.27	1.2	0.008	0.849	0.027	57.19	0.081	0.037
Con 4	13.6	2.72	1.08	0.008	0.804	0.024	63.07	0.042	0.019
Ro Tail	455.01	91.2	0.81	0.005	0.343	0.01	70.22	0.005	0.0025
Calc'd Head	498.70	100.0	<b>0.84</b>	<b>0.005</b>	<b>0.376</b>	<b>0.012</b>	<b>68.62</b>	<b>0.014</b>	<b>0.006</b>
Rougher Con 1		1.48	1.35	0.01	0.44	0.03	32.8	0.22	0.07
Rougher Con 1-2		3.78	1.30	0.01	0.58	0.03	40.7	0.17	0.06
Rougher Con 1-3		6.04	1.26	0.01	0.68	0.03	46.9	0.13	0.05
Rougher Con 1-4		8.76	1.20	0.01	0.72	0.03	51.9	0.11	0.04
PRODUCT	WEIGHT		Ni	P	Pb	S	SiO <sub>2</sub>	TiO <sub>2</sub>	LOI 1000
	Gram	%							
Con 1	7.360	1.48	0.17	0.017	0.003	0.383	48.4	0.15	-1.07
Con 2	11.47	2.30	0.26	0.013	0.007	0.382	31.7	0.17	-2.36
Con 3	11.30	2.27	0.328	0.01	0.006	0.38	15.9	0.2	-3.29
Con 4	13.56	2.72	0.312	0.007	0.011	0.346	9.23	0.2	-3.61
Ro Tail	455.01	91.2	0.131	0.001	0.013	0.122	1.51	0.21	-3.58
Calc'd Head	498.70	100.0	<b>0.144</b>	<b>0.002</b>	<b>0.013</b>	<b>0.144</b>	<b>3.43</b>	<b>0.21</b>	<b>-3.51</b>
Rougher Con 1		1.48	0.17	0.02	0.00	0.38	48	0.15	-1.07
Rougher Con 1-2		3.78	0.22	0.01	0.01	0.38	38	0.16	-1.86
Rougher Con 1-3		6.04	0.26	0.01	0.01	0.38	30	0.18	-2.39
Rougher Con 1-4		8.76	0.28	0.01	0.01	0.37	23	0.18	-2.77

The LIMS magnetic product for the Byro South master composite was split and prepared for flotation test work. The concentrate then subjected to three flotation tests each using a different reagent scheme. The flotation products were assayed using a standard iron ore suite.

The most successful flotation scheme yielded a product assay at **70.61%Fe** with a calculated head grade of **69.36%Fe**, an improvement of 1.25%Fe.



**Table 8.** Byro South Concentrate Flotation Assay Results

PRODUCT	WEIGHT		Al <sub>2</sub> O <sub>3</sub>	Co	Cr <sub>2</sub> O <sub>3</sub>	Cu	Fe	K <sub>2</sub> O	Na <sub>2</sub> O
	Gram	%	%	%	%	%	%	%	%
Con 1	6.28	1.26	1.78	0.011	1.01	0.093	52.55	0.248	0.134
Con 2	10.4	2.08	1.51	0.01	1.025	0.037	52.07	0.173	0.114
Con 3	13.9	2.78	1.23	0.01	1.11	0.032	58.65	0.1	0.063
Con 4	23.5	4.69	1.05	0.01	1.12	0.029	64.17	0.057	0.055
Ro Tail	446.06	89.2	0.66	0.005	0.429	0.01	70.61	0.01	0.0025
Calc'd Head	500.14	100.0	0.73	0.006	0.500	0.013	69.36	0.021	0.011
Rougher Con 1		1.26	1.78	0.01	1.01	0.09	52.6	0.25	0.13
Rougher Con 1-2		3.34	1.61	0.01	1.02	0.06	52.3	0.20	0.12
Rougher Con 1-3		6.12	1.44	0.01	1.06	0.05	55.2	0.16	0.09
Rougher Con 1-4		10.8	1.27	0.01	1.09	0.04	59.1	0.11	0.08

PRODUCT	WEIGHT		Ni	P	Pb	S	SiO <sub>2</sub>	TiO <sub>2</sub>	LOI 1000
	Gram	%	%	%	%	%	%	%	%
Con 1	6.280	1.26	0.407	0.027	0.011	1.66	19.2	0.25	-0.75
Con 2	10.42	2.08	0.399	0.012	0.005	0.849	21.7	0.24	-2.52
Con 3	13.91	2.78	0.432	0.007	0.004	0.645	13.75	0.23	-3.47
Con 4	23.47	4.69	0.439	0.005	0.012	0.533	7.87	0.23	-4
Ro Tail	446.06	89.2	0.17	0.001	0.013	0.264	1.36	0.23	-3.67
Calc'd Head	500.14	100.0	0.198	0.002	0.013	0.317	2.66	0.23	-3.62
Rougher Con 1		1.26	0.41	0.03	0.01	1.66	19	0.25	-0.75
Rougher Con 1-2		3.34	0.40	0.02	0.01	1.15	21	0.24	-1.85
Rougher Con 1-3		6.12	0.42	0.01	0.01	0.92	18	0.24	-2.59
Rougher Con 1-4		10.8	0.43	0.01	0.01	0.75	13	0.23	-3.20

Drilling to date for the Byro South and Whistlejack ore bodies supports magnetite mineralisation. The magnetite intersection grades reported for each body is preliminary in nature. There has been insufficient exploration to define a mineral resource. Further exploration is warranted to improve understanding and reduce uncertainty about these magnetite bodies.

The test results demonstrate it is possible to further reduce impurities while improving the grade from the Whistlejack and Byro South DTR concentrate. Results in this announcement show this is possible with the reduction of residual silica (SiO<sub>2</sub>), aluminium oxide (Al<sub>2</sub>O<sub>3</sub>), phosphorus (P), Potassium (K<sub>2</sub>O) and Sodium (Na<sub>2</sub>O) by scavenging using industry standard reverse flotation processes.

However, these results are not conclusive and further detailed and definitive test work is required to reach a conclusive understanding for optimising a processing route for the Whistlejack and Byro South ore.



## Preliminary Ore Roasting Test Details

Further test work was undertaken as a preliminary test to identify if residual sulphur could be removed from the Whistlejack and Byro South concentrates during calcination using a standard roasting process.

Sample split from the master concentrates used in the flotation tests above were roasted using a static roast in a Muffle furnace at 1250°C for 120 minutes and then assayed. The target mineral was sulphur and as seen in the assays other elements were mobile to a lesser extent.

A feed mass of 50.29g was roasted producing a calcine mass of 52.12g for the Whistlejack concentrate and a feed mass of 49.83g was roasted producing a calcine mass of 51.68g for the Byro South concentrate. The feed and calcine components were assayed. Table 9 below shows the mobile residue results.

**Table 9** Residue Assay Results

Residue Assays									
Sample	Residue Sample	Mass g	Cl %	Co %	Cu %	Mg %	Pb %	S %	Sn %
WL	Feed	50.29	0.009	0.005	0.011	0.15	0.008	0.15	0.002
WL	Calcine	52.12	0.003	0.003	0.008	0.13	0.002	0.002	0.001
BS	Feed	49.83	0.008	0.006	0.012	0.11	0.007	0.30	0.002
BS	Calcine	51.68	0.003	0.004	0.009	0.09	0.002	0.004	0.001

The target mineral, “Sulphur” was reduced dramatically in both ores by over 98%.

**Table 10** Residue Sulphur Assay Results

Sulphur	Whistlejack	Byro South
Sulphur Grade of Feed:	0.15%	0.30%
Sulphur Grade of Calcine:	0.002%	0.004%
Sulphur Removed from Feed:	98.58%	98.63%

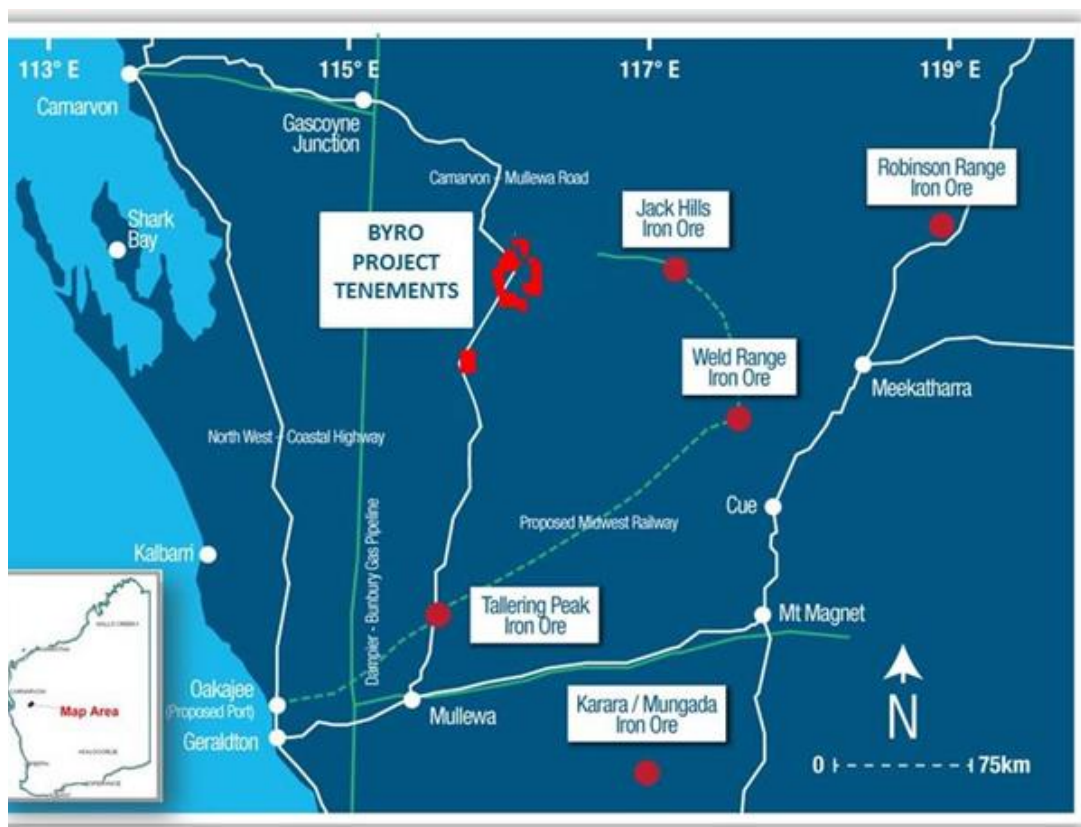
These results are not conclusive but demonstrate that in this test greater than 98% of residual sulphur from the Whistlejack and Byro South master composite concentrates was removed during the roasting process. These results are for the composites tested and not representative of the whole Byro South and Whistlejack ore bodies. Further detailed and definitive test work is required to reach a conclusive understanding for optimising a processing route for the ore bodies.



## ABOUT ATHENA RESOURCES LIMITED

Athena Resources Limited (ASX:AHN), which is based in Perth was listed on the ASX in 2006 and currently has 793 million shares on issue. Athena owns a 100% interest in the Byro Project through its subsidiaries Complex Exploration and Byro Exploration where it is exploring for copper, nickel, PGE's and iron ore.

### Regional Project Location



This announcement was authorised by the Board.

Yours faithfully

Ed Edwards  
Executive Director

**Athena Resources Limited**

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## JORC Code, 2012 Edition – Table 1 report template

### Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
<b>Sampling techniques</b>	<ul style="list-style-type: none"> <li><i>Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.</i></li> </ul>	<ul style="list-style-type: none"> <li>All samples used in this announcement were taken from reserves held in storage. The nature and quality of the Original drilling and sampling is referenced in previous announcements</li> </ul> <p><b>14 December 2011</b> - Drilling update Byro South Iron Ore  <b>18 October 2011</b> – Byro Iron Ore Project – Drilling Results.  <b>19 October 2016</b> - Byro Iron Ore Narryer High Grade Magnetite, (Whistlejack DTR Results).  <b>29 July 2016</b> - Quarterly Activities Report, (Byro South DTR Results)</p>
	<ul style="list-style-type: none"> <li><i>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</i></li> </ul>	<ul style="list-style-type: none"> <li>150g splits were weighed from from DTR composite reserves and combined to form 20kg master composites</li> </ul>
	<ul style="list-style-type: none"> <li><i>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 (eg '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 (eg submarine nodules) may warrant disclosure of detailed information.</i></li> </ul>	<ul style="list-style-type: none"> <li>20kg of Reserves were combined pulverised and ground in lab conditions to obtain P80/45 micron and assayed using X-Ray Fluorenece. (a glass disc using a Lithium Borate flux. For ore grade materials, flux composition and sample to flux ratios were varied to ensure the sample dissolves completely and that re-crystallisation does not occur as the melt is cooled. Oxidising agents may be added to ensure retention of Sulphur or conversion of certain elements to highest state).</li> </ul> <p>Industry standard LIMS and flotation techniques were used to Conduct LIMS testwork</p>

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Criteria	JORC Code explanation	Commentary
		<ul style="list-style-type: none"> <li>-Recover &amp; filter LIMS Mags</li> <li>-Split LIMS N-Mags for assay</li> <li>-Split LIMS Mags for assay &amp; floatation testwork (Damp sample, 0.5kg charges)</li> <li>-Sample prep on LIMS products for head</li> <li>-Conduct assay on LIMS products (Std Iron ore suite)</li> </ul>
<b>Drilling techniques</b>	<ul style="list-style-type: none"> <li>• <i>Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg 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).</i></li> </ul>	<ul style="list-style-type: none"> <li>• Reverse Circulation (RC)</li> </ul>
<b>Drill sample recovery</b>	<ul style="list-style-type: none"> <li>• <i>Method of recording and assessing core and chip sample recoveries and results assessed.</i></li> <li>• <i>Measures taken to maximise sample recovery and ensure representative nature of the samples.</i></li> <li>• <i>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.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Original samples recovered from cyclone splitter using 1m intervals and 2 to 4m composites</li> <li>• Collection of RC cuttings both chips and fines</li> <li>• No bias was observed between recovery and sample quality or loss or gain</li> </ul>
<b>Logging</b>	<ul style="list-style-type: none"> <li>• <i>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.</i></li> <li>• <i>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</i></li> <li>• <i>The total length and percentage of the relevant intersections logged.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Original drill chips were geologically logged as well as recording major geotechnical features observable in chip over the full depth of the holes.</li> </ul>
<b>Sub-sampling techniques and sample preparation</b>	<ul style="list-style-type: none"> <li>• <i>If core, whether cut or sawn and whether quarter, half or all core taken.</i></li> </ul>	<ul style="list-style-type: none"> <li>• RC Drilling</li> </ul>
	<ul style="list-style-type: none"> <li>• <i>If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Original samples were dry rotary split and prepared as composites then split as composite reserves and composite for assay</li> </ul>



Criteria	JORC Code explanation	Commentary
	<ul style="list-style-type: none"> <li>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</li> </ul>	<ul style="list-style-type: none"> <li>Best practice XRF analysis as per ALS Laboratories</li> </ul>
	<ul style="list-style-type: none"> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> </ul>	<ul style="list-style-type: none"> <li>Industry standard sampling preparation procedures were used. Lab results are reviewed and checked for deviation using lab certified references and in house analysis</li> </ul>
	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>150g splits taken from reserve DTR samples were combined and blended using industry standard procedures by ALS Laboratories.</li> </ul>
	<ul style="list-style-type: none"> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	<ul style="list-style-type: none"> <li>Original average drill sample size from splitter was 5kg, average grain size is 2-20mm. Sample sizes taken are large enough to be representative of the whole rock constituents.</li> </ul>
<b>Quality of assay data and laboratory tests</b>	<ul style="list-style-type: none"> <li>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> <li>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.</li> <li>Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.</li> </ul>	<ul style="list-style-type: none"> <li>XRF fusion techniques are suitable for the analysis of most mineralogical ores, metallurgical products and complex matrices.</li> <li>No ground geophysical measurements were taken</li> <li>Lab QAQC involved internal lab standards, certified reference</li> </ul>
<b>Verification of sampling and assaying</b>	<ul style="list-style-type: none"> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> </ul>	<ul style="list-style-type: none"> <li>Summary inspection by contract Geologist</li> <li>No adjustments have been made to readings</li> <li>Assays have been verified using standard QA QC methods</li> <li>All primary data from drilling and assay is recorded in a data base.</li> </ul>



Criteria	JORC Code explanation	Commentary
	<ul style="list-style-type: none"> <li>Discuss any adjustment to assay data.</li> </ul>	<ul style="list-style-type: none"> <li>All reserve samples in storage are catalogued in the database and stored in marked steel drums.</li> </ul>
<b>Location of data points</b>	<ul style="list-style-type: none"> <li>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.</li> <li>Specification of the grid system used.</li> <li>Quality and adequacy of topographic control.</li> </ul>	<ul style="list-style-type: none"> <li>GPS +/- 10m Sample locations were measured with Garmin hand held GPS. Accuracy is within +/-5m</li> <li>MGA_GDA94 Zone 50</li> <li>Topographic surface recorded with handheld Garmin</li> </ul>
<b>Data spacing and distribution</b>	<ul style="list-style-type: none"> <li>Data spacing for reporting of Exploration Results.</li> <li>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.</li> <li>Whether sample compositing has been applied.</li> </ul>	<ul style="list-style-type: none"> <li>Spacing is randomly biased by drill collar location.</li> <li>Mineralisation domains have not demonstrated continuity in either grade or geology. Therefore cannot support the definition of a Mineral Resource or Reserve, and the classifications under the 2012 JORC Code.</li> <li>Sample compositing has been applied throughout the test process to ensure a blend representative of the ore type.</li> </ul>
<b>Orientation of data in relation to geological structure</b>	<ul style="list-style-type: none"> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> </ul>	<ul style="list-style-type: none"> <li>This report refers to composite assay results that are not affected by orientation.</li> </ul>
	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>No orientation based sampling bias has been identified in this data at this point</li> </ul>
<b>Sample security</b>	<ul style="list-style-type: none"> <li>The measures taken to ensure sample security.</li> </ul>	<ul style="list-style-type: none"> <li>Chain of custody was maintained from sample site to lab</li> </ul>
<b>Audits or reviews</b>	<ul style="list-style-type: none"> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul>	<ul style="list-style-type: none"> <li>No reviews of data management systems has been carried out</li> </ul>



## Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
<b>Mineral tenement and land tenure status</b>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Tenements referred to in this report, E09/1507 and E09/1781 are 100% Athena owned and operated within native title claim WAD 6033/98, made on behalf of the Wajarri Yamatji People.</li> </ul>
	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>The tenements are in good standing and no known impediments exist.</li> <li>See tenement listing attached.</li> </ul>
<b>Exploration done by other parties</b>	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<ul style="list-style-type: none"> <li>Historic exploration within the project area largely confined to south of a line extending from Imagi Well to the Byro East intrusion (Melun Bore). The earliest work with any bearing on Athena's activities is that of Electrolic Zinc Co (1969) exploring for chromatite at Imagi Well, followed closely by Jododex Australia (1970-1974) at Byro East. Much of the exploration of a more regional nature is of limited use either because of the vagaries of the accuracy of positional information and the limited range of elements analysed. More recent surveys pertinent to Athena's current investigations include that of Redback Mining (1996-2002), Yilgarn Mining Limited (2003-2008) and Mithril (2007, JV with Yilgarn) at Byro East, and Western Mining Corporation (1976-1979) and Precious Metals Australia at Imagi Well. Newcrest Mining carried out a limited reconnaissance RAB drilling programme for platinum just to the east of Byro homestead (1998-1990).</li> </ul>



Criteria	JORC Code explanation	Commentary
<b>Geology</b>	<ul style="list-style-type: none"> <li>• <i>Deposit type, geological setting and style of mineralisation.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Upper amphibolite to granulite metamorphic facies with mafic to ultramafic intrusive. Granite and migmatite are common</li> </ul>
<b>Drill hole Information</b>	<ul style="list-style-type: none"> <li>• <i>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:</i> <ul style="list-style-type: none"> <li>○ <i>easting and northing of the drill hole collar</i></li> <li>○ <i>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</i></li> <li>○ <i>dip and azimuth of the hole</i></li> <li>○ <i>down hole length and interception depth</i></li> <li>○ <i>hole length.</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• The Byro South master composite reserves were from historical drill samples from drill holes AHRC0048a, AHRC0049, AHRC0050, AHRC0051, AHRC0052, AHRC0053D, AHRC0054D and AHRC0055</li> <li>• The Whistlejack master composite reserves were from historical drill samples from drill holes AHRC0084, AHRC0085, AHRC0086,</li> </ul> <p>Historical drilling details are referenced in previous announcements</p> <p><b>14 December 2011</b> - Drilling update Byro South Iron Ore  <b>18 October 2011</b> – Byro Iron Ore Project – Drilling Results.  <b>19 October 2016</b> - Byro Iron Ore Narryer High Grade Magnetite, (Whistlejack DTR Results).  <b>29 July 2016</b> - Quarterly Activities Report, (Byro South DTR Results)</p>
	<ul style="list-style-type: none"> <li>• <i>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.</i></li> </ul>	<ul style="list-style-type: none"> <li>• No information has been excluded</li> </ul>
<b>Data aggregation methods</b>	<ul style="list-style-type: none"> <li>• <i>In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.</i></li> </ul>	<ul style="list-style-type: none"> <li>• No weighting, min max, ave, truncation or cut off techniques were used in this report</li> </ul>



Criteria	JORC Code explanation	Commentary
	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>No metal equivalent are referred to in this report</li> </ul>
	<ul style="list-style-type: none"> <li>The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>	<ul style="list-style-type: none"> <li>No metal equivalent are referred to in this report</li> </ul>
<b>Relationship between mineralisation widths and intercept lengths</b>	<p><i>These relationships are particularly important in the reporting of Exploration Results.</i></p>	
	<ul style="list-style-type: none"> <li>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported</li> </ul>	<ul style="list-style-type: none"> <li>The test work announced in this report is metallurgical. There is no relationship to the geometry of mineralisation or drill hole angle.</li> </ul>
	<ul style="list-style-type: none"> <li>If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').</li> </ul>	<ul style="list-style-type: none"> <li>The test work announced in this report is metallurgical. There is no relationship to the width or or down hole length.</li> </ul>
<b>Diagrams</b>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>The test work announced in this report is metallurgical by nature. All relevant data is tabulated within the body of the announcement .</li> </ul>
<b>Balanced reporting</b>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>This report contains all meaningful assay results for the test procedure.</li> </ul>



Criteria	JORC Code explanation	Commentary
<p><b>Other substantive exploration data</b></p>	<ul style="list-style-type: none"> <li><i>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 density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.</i></li> </ul>	<ul style="list-style-type: none"> <li>This report contains all meaningful assay results for this procedure</li> </ul>
<p><b>Further work</b></p>	<ul style="list-style-type: none"> <li><i>The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).</i></li> <li><i>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</i></li> </ul>	<p>Further metallurgical work will be undertaken to obtain definitive and conclusive data to be incorporated into processing route design concepts.</p> <ul style="list-style-type: none"> <li>The planned drilling information is commercially sensitive and is not included in this report.</li> </ul>



## INTERESTS IN MINING TENEMENTS

Athena Resources Limited 100%

Tenement Type

**Byro Exploration**

E – Exploration License

E09/1507

E09/1552

E09/1637

E09/1781

E09/1938

**Byro Project Mining**

M - Mining Lease

M09/166

M09/168



## CAUTIONARY NOTES AND DISCLOSURES

### **Disclosures**

All data and Information of material nature referred to within this Report with reference to the Byro Industrial Minerals Project and Byro Iron Ore have previously been reported on the ASX platform in compliance with the relevant JORC compliance reporting format at the time of data acquisition.

### **Announcements**

14 December 2011 - Drilling update Byro South Iron Ore

18 October 2011 – Byro Iron Ore Project – Drilling Results.

19 October 2016 - Byro Iron Ore Narryer High Grade Magnetite, (Whistlejack DTR Results).

29 July 2016 - Quarterly Activities Report, (Byro South DTR Results)

### **Cautionary Notes and Forward Looking Statements**

This announcement contains certain statements that may constitute “forward looking statements”. Such statements are only predictions and are subject to inherent risks and uncertainties, which could cause actual values, results, performance achievements to differ materially from those expressed, implied or projected in any forward looking statements.

### **JORC Code Compliance Statement**

Some of the information contained in this announcement is historic data that have not been updated to comply with the 2012 JORC Code. The information referred to in the announcement was prepared and first disclosed under the JORC Code 2004 edition. It has not been updated since to comply with the JORC Code 2012 edition on the basis that the information has not materially changed since it was last reported.

### **Competent Persons Disclosure**

Mr Kelly is an employee of Athena Resources and currently holds securities in the company.

### **Competent Person Statement**

The information included in the report was compiled by Mr Liam Kelly, an employee of Athena Resources Limited. Mr Kelly has had over twenty years’ experience as a geologist in mining and exploration and is a Member of the Australasian Institute of Mining and Metallurgy, (306501). Mr Kelly has sufficient relevant experience in the styles of mineralisation and deposit styles under consideration to qualify as a Competent Person as defined in “The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012 Edition)”. The historical information included is compliant with the relevant JORC Code, 2004 Edition, and new information announced post that version of the JORC Code is compliant with the JORC Code 2012 Edition. Mr Kelly consents to the inclusion of the information in the report in the context and format in which it appears

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