

## ASX Announcement

16 April 2020

# ELAN PROJECT SCOPING STUDY

Atrum Coal Ltd (**Atrum** or the **Company**) (ASX: ATU) is pleased to advise of the completion of the Scoping Study on its 100%-owned Elan Hard Coking Coal Project (**Elan Project**) in southern Alberta, Canada.

The Scoping Study has demonstrated that development and open-pit mining of the low-strip Isolation South and Elan South deposits under two cases (10Mtpa and 7.5Mtpa ROM) yields a technically robust, highly economic, world-class operation delivering Tier 1 Hard Coking Coal (**HCC**) into seaborne markets.

	Unit	10Mtpa ROM	7.5Mtpa ROM
Total ROM coal mined	Mt ROM	126	126
<b>Initial life-of-mine</b>	<b>years</b>	<b>15</b>	<b>19</b>
Average strip ratio (ROM) (bcm = bank cubic metre)	bcm:t	4.3	4.3
Processing yield	%	60	60
<b>Nameplate HCC production</b>	<b>Mtpa saleable</b>	<b>6.0</b>	<b>4.5</b>
Total product coal (HCC)	Mt saleable	76	76
Resultant product coal strip ratio (HCC)	bcm:t	7.2	7.2
Pre-production capital expenditure	US\$M	683	587
Cash operating cost (FOB Vancouver)	US\$/t saleable	81	84
HCC price (Elan MV HCC FOB Vancouver)	US\$/t saleable	138	138
<b>NPV<sub>9%</sub> (post-tax, real basis, ungeared, Y-1)</b>	<b>US\$M</b>	<b>860</b>	<b>790</b>
<b>IRR (post-tax, real basis, ungeared, Y-1)</b>	<b>%</b>	<b>25</b>	<b>26</b>
Project net cashflow (post-tax)	US\$M	2,610	2,580

## SUBSTANTIAL UPSIDE POTENTIAL

- Isolation South pit expansion.** Pit optimisation and mine planning activities resulted in a practical pit shell at Isolation South containing 188Mt ROM coal. However approximately 108Mt ROM coal of in-pit Inferred resources at Isolation South were then **excluded** from the Scoping Study mine schedule and production target presented (leaving 80Mt ROM coal from Isolation South in the schedule), in accordance with the current regulatory framework. Incorporation of these in-pit Inferred resources, via targeted upgrade into Measured and/or Indicated classification, offers substantial potential upside to Elan Project economics via: operating life extension, lower average strip ratio and deferred commencement of Elan South (lower pre-production capital and lower strip ratio in early years).
- Exploration upside.** Substantial resource upside exists across the entire Elan Project tenement base, including at Isolation South and Elan South, and is targeted to be realised via further extensional drilling. Teck Resources' proximate Elk Valley complex produces over 25Mtpa of premium HCC from several mines.
- BOOT financing.** Development has been modelled on an owner-operated basis with equipment leasing of mining fleet. Clear potential exists to finance the coal handling and preparation plant facilities, and conveyor and rail loadout systems, via Build-Own-Operate-Transfer (BOOT) contract. This could reduce total pre-production capital to US\$140-150M and increase post-tax NPV<sub>9%</sub> and IRR to US\$910-1,020M and 52-54%.
- Higher processing yield.** Regional experience indicates potential upside to the 60% process yield used in the Scoping Study. More detailed Isolation South washability testwork results remain pending.
- HCC price.** Conservative long-term HCC benchmark price of US\$141/t FOB Queensland and 0.79 C\$/US\$.

## Cautionary Statement

The Scoping Study referred to in this ASX release has been undertaken for the purpose of initial evaluation of a potential development of the Elan Project hard coking coal deposits. It is a preliminary technical and economic study of the potential viability of the Elan Project. The Scoping Study outcomes, production target and forecast financial information referred to in this release are based on low accuracy level technical and economic assessments that are insufficient to support estimation of Ore Reserves. While each of the modifying factors was considered and applied, there is no certainty of eventual conversion to Ore Reserves or that the production target itself will be realised. Further exploration and evaluation work and appropriate studies are required before Atrum will be in a position to estimate any Ore Reserves or to provide any assurance of an economic development case. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study.

Of the Mineral Resources scheduled for extraction in the Scoping Study production plan approximately 70% are classified as Indicated and 30% as Inferred. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised. Inferred Resources comprise less than 20% of the production schedule in the first year of operation and an average of 24% over the first three years of operation. Atrum confirms that the financial viability of the Elan Project is not dependent on the inclusion of Inferred Resources in the production schedule.

The Mineral Resources underpinning the production target in the Scoping Study have been prepared by a competent person in accordance with the requirements of the JORC Code (2012). The Competent Person's Statement is found in Appendix A of this ASX release. For full details of the Mineral Resources estimate, please refer to Atrum ASX release dated 10 February 2020, *Total Elan Project Resources Exceed 450 Mt*. Atrum confirms that it is not aware of any new information or data that materially affects the information included in that release. All material assumptions and technical parameters underpinning the estimates in that ASX release continue to apply and have not materially changed.

This release contains a series of forward-looking statements. Generally, the words "expect," "potential", "intend," "estimate," "will" and similar expressions identify forward-looking statements. By their very nature forward-looking statements are subject to known and unknown risks and uncertainties that may cause our actual results, performance or achievements, to differ materially from those expressed or implied in any of our forward-looking statements, which are not guarantees of future performance. Statements in this release regarding Atrum's business or proposed business, which are not historical facts, are forward-looking statements that involve risks and uncertainties, such as Mineral Resource estimates, market prices of metallurgical coal, capital and operating costs, changes in project parameters as plans continue to be evaluated, continued availability of capital and financing and general economic, market or business conditions, and statements that describe Atrum's future plans, objectives or goals, including words to the effect that Atrum or management expects a stated condition or result to occur. Forward-looking statements are necessarily based on estimates and assumptions that, while considered reasonable by Atrum, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies. Since forward-looking statements address future events and conditions, by their very nature, they involve inherent risks and uncertainties. Actual results in each case could differ materially from those currently anticipated in such statements. Investors are cautioned not to place undue reliance on forward-looking statements, which speak only as of the date they are made.

Atrum has concluded that it has a reasonable basis for providing these forward-looking statements and the forecast financial information included in this release. This includes a reasonable basis to expect that it will be able to fund the development of the Elan Project upon successful delivery of key development milestones and when required. The detailed reasons for these conclusions are outlined throughout this ASX release (including Section 20) and in Appendix C. While Atrum considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Scoping Study will be achieved.

To achieve the range of outcomes indicated in the Scoping Study, pre-production funding in excess of US\$700M may be required. There is no certainty that Atrum will be able to source that amount of funding when required. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Atrum's shares. It is also possible that Atrum could pursue other value realisation strategies such as a sale, partial sale or joint venture of the Elan Project. This could materially reduce Atrum's proportionate ownership of the Elan Project.

No Ore Reserve has been declared. This ASX release has been prepared in compliance with the current JORC Code (2012) and the ASX Listing Rules. All material assumptions, including sufficient progression of all JORC modifying factors, on which the production target and forecast financial information are based have been included in this ASX release.

## A world-class hard coking mine

The Scoping Study provides an early stage assessment of the technical and commercial viability for development and operation of the Elan Project. Leading coal technical consultant, Palaris Australia Pty Ltd, was the study manager.

The two development scenarios evaluated in the Scoping Study are outlined in Table 1. Case 1 represents a nameplate mining and processing capacity of 10Mtpa ROM (for 6Mtpa product HCC); Case 2 represents equivalent capacity of 7.5Mtpa ROM (for 4.5Mtpa product HCC).

All coal extraction is via open pit method and based on mining of a single large pit at Isolation South and three discrete pits at Elan South (South East Corner, Oil Pad and Fish Hook). The Scoping Study mine schedule supports total ROM coal production of approx. 126Mt at a globally low life-of-mine (**LOM**) average stripping ratio of approx. 4.3 bcm/t.

Conventional coal processing is undertaken through a single coal handling and preparation plant (**CHPP**), to be located near Isolation South. Mined coal volumes from Elan South will be trucked to the plant via haul road. Processing yield to product coal is forecast at 60%, delivering total LOM product HCC of approx. 76Mt. This is delivered over an initial operating life of 15 years (6Mtpa HCC) or 19 years (4.5Mtpa HCC).

**Table 1: Key physical parameters**

Key Physical Parameters	Unit	10Mtpa ROM	7.5Mtpa ROM
<b>Operational capacity</b>			
Nameplate mining and processing rate	Mtpa ROM	10.0	7.5
Initial mine life	years	15	19
<b>Mining - Isolation South</b>			
Total ROM coal mined	Mt	79.5	79.5
Mining rate (steady state)	Mtpa ROM	6.0	4.5
Total waste mined	Mbcm	262	262
Strip ratio (ROM)	bcm/t	3.3	3.3
<b>Mining - Elan South</b>			
Total ROM coal mined	Mt	46.7	46.7
Mining rate (steady state)	Mtpa ROM	4.0	3.0
Total waste mined	Mbcm	279	279
Strip ratio (ROM)	bcm/t	6.0	6.0
<b>Mining - total</b>			
Total ROM coal mined	Mt	126.2	126.2
Total waste mined	Mbcm	541.4	541.4
Strip ratio (ROM)	bcm/t	4.3	4.3
<b>Product output</b>			
Processing yield	%	60	60
HCC production	Mtpa saleable	6.0	4.5
Total product coal	Mt	76	76

The implied *product coal* LOM strip ratio for the Elan Project is approximately 7.1 bcm/t HCC. This product strip ratio is considered very low, particularly when compared with the 2019 average at the nearby Teck Resources mines in the Elk Valley, which was 11.4 bcm/t HCC. The Isolation South pit is particularly low strip (3.3 bcm/t ROM), yielding a product strip ratio of just 5.5 bcm/t HCC product.

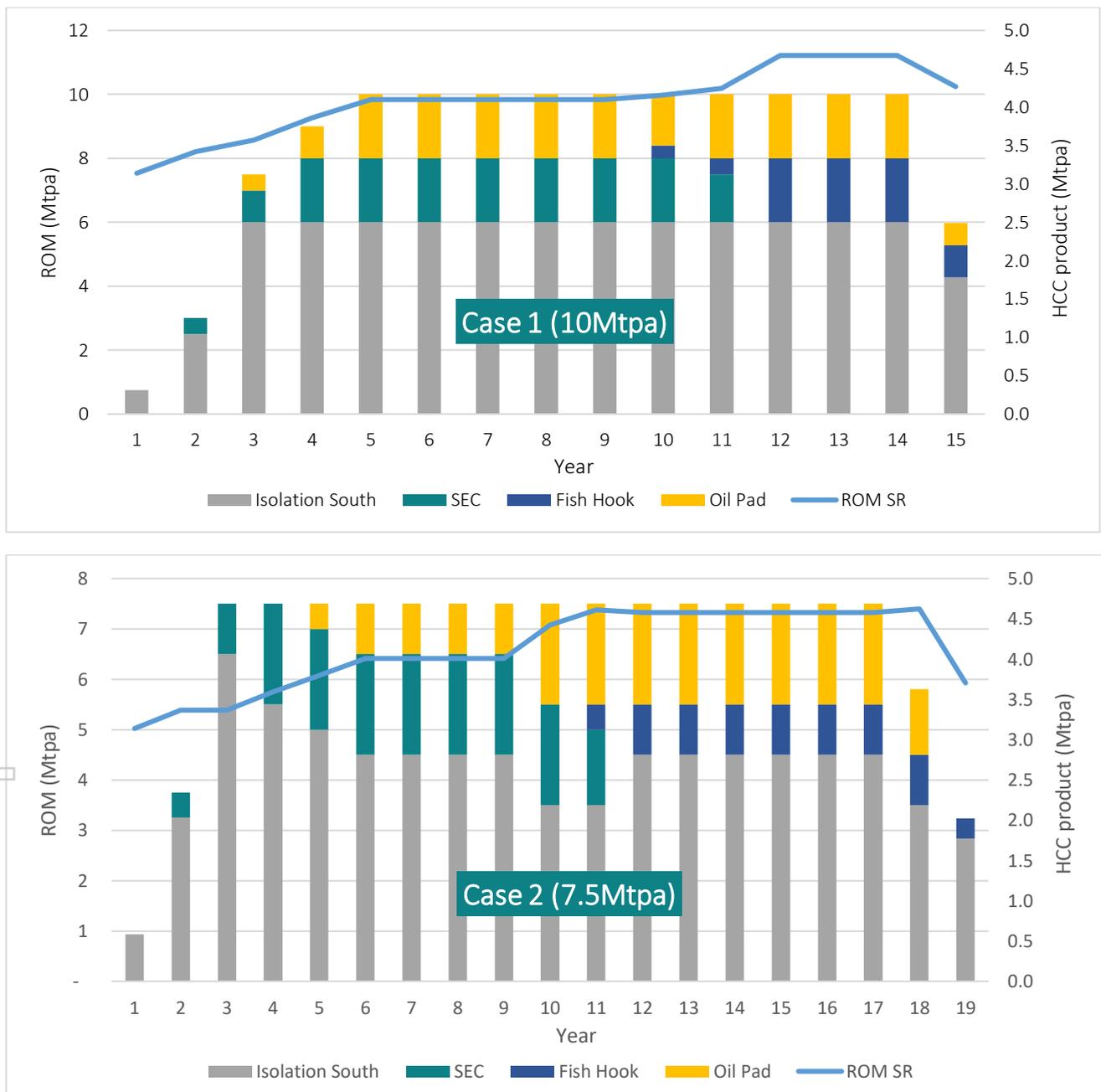
Product HCC is transported approximately 36km across a dedicated covered conveyor system from the CHPP to a new train loadout area located close to Canadian Pacific Rail's Crowsnest subdivision mainline.

The proposed alignment of the conveyor is designed to maximise utilisation of existing forestry and gasfield road and access corridors over Crown land.

From train load-out the product HCC is railed approximately 1,100km via existing tracks operated by Canadian Pacific Rail (CPR) and Canadian National Railways (CN) to the preferred export terminal of Westshore in Vancouver, British Columbia. From this facility, Elan HCC is to be exported into global seaborne HCC markets.

Mine plans under both development scenarios are outlined in Figure 1. A conservative production ramp-up has been allowed for with nameplate production forecast to be reached in Year 5 in Case 1 (10Mtpa) and Year 3 in Case 2 (7.5Mtpa).

**Figure 1: Mine schedules for Case 1 (10Mtpa ROM) and Case 2 (7.5Mtpa ROM)**



Scheduled production is sourced from both the Isolation South and Elan South areas throughout the project operating life. This is predominantly to ensure that Inferred resources (of which there is currently a higher

proportion within the Isolation South total resource estimate) do not feature as a significant component of the overall mine schedule, particularly in the earlier years.

As a result, Inferred resources comprise only 30% of the overall mine schedule and less than 25% over the first three years of operation. Atrum confirms that the financial viability of the Elan Project is not dependent on the inclusion of Inferred resources in the production schedule.

Isolation South possesses resource scale (a further 108Mt of in-pit Inferred resources sit outside the current mine schedule for the same reason as above), favourable and relatively uniform geology (shallow, thick, consistent coal seams), and a considerably lower stripping ratio than all planned pits at Elan South (including SE Corner).

For these reasons, and as outlined in the “*Substantial upside potential*” section below, further resource classification upgrade drilling at Isolation South has the potential to: (1) add substantial tonnage and life extension to the Scoping Study mine schedule; and (2) allow development of Elan South to be deferred until later in the overall mine schedule (thereby lowering both pre-production capital and strip ratio / operating cost in early years).

Projected economics for the Elan Project are outlined in Table 2. An average LOM benchmark HCC price of US\$141/t FOB Queensland has been utilised, which is conservative based on historical pricing over the past 10 years. With a forecast 2% discount for Elan medium-to-low volatile HCC products applied, this equates to a realised Elan HCC price of approximately US\$138/t FOB Vancouver.

All capital and operating cost forecasting is structured on an owner operator basis, with mining fleet equipment leased. A C\$/US\$ exchange rate of 0.79 has been utilised over the LOM. Forecast estimation accuracy of the Scoping Study is +/- 35-40%.

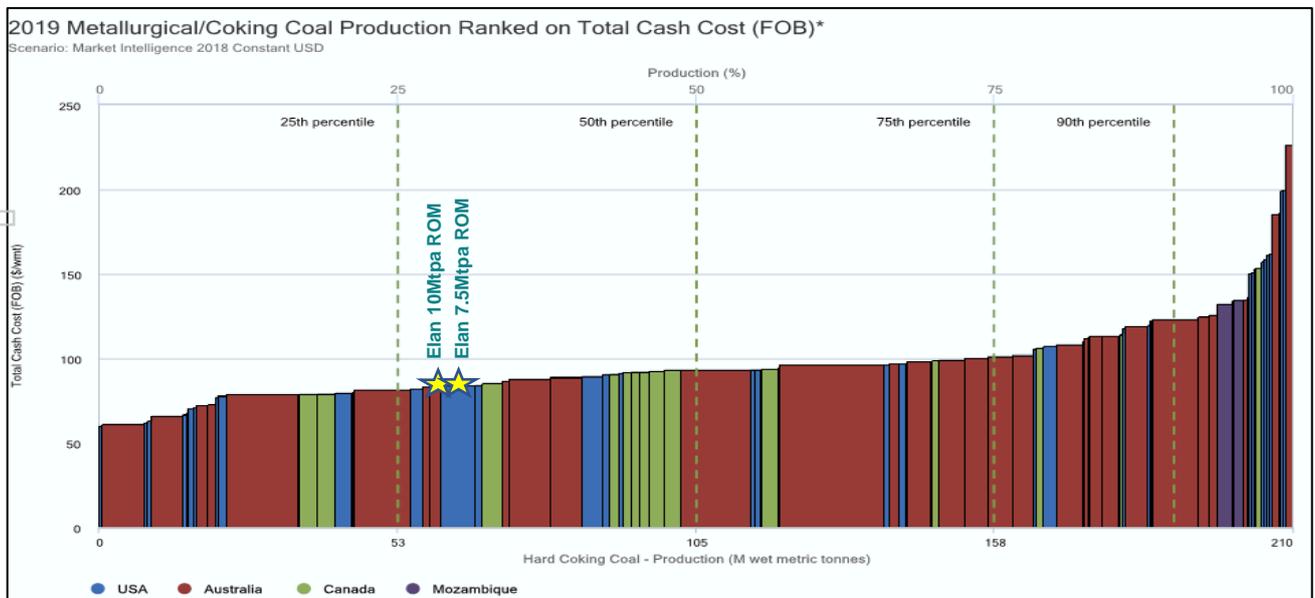
Key economic attributes include:

- Attractive cash operating cost for Elan product HCC averaging US\$81/t FOB (10Mtpa) or US\$84/t (7.5Mtpa), which are comparable with the nearby Teck Resources Elk Valley operations (average opex of C\$105/t FOB in 2019). This operating cost estimate places the Elan Project in the lower second quartile of the global seaborne hard coking coal operating cost curve (based on S&P Global Market Intelligence 2019 FOB cash cost curve; refer Figure 2).
- Forecast pre-production capital expenditure of US\$683M (10Mtpa) or US\$587M (7.5Mtpa). This represents a highly competitive upfront capital intensity of US\$114 - 131 per tonne of installed saleable HCC production.
- Ungearing, real, post-tax NPV9% of US\$790 - 860M and internal rate of return (IRR) of 25 - 26%.
- Upfront capital efficiency (pre-production capital expenditure divided by post-tax NPV) of approximately 1.3x.
- Forecast LOM net cashflow of US\$3.4B (pre-tax) and US\$2.6B (post-tax), with pre-production capital payback of approximately 4 years.

**Table 2: Key financial outcomes**

Key financial outcomes	Unit	10Mtpa ROM	7.5Mtpa ROM
<b>Price inputs (LOM average)</b>			
C\$/US\$ (long term forecast)	USc	0.79	0.79
HCC price (Platts Premium LV FOB Queensland)	US\$/t	141	141
HCC price (Elan MV HCC FOB Vancouver)	US\$/t	138	138
<b>NPV, returns and key metrics</b>			
NPV <sub>9%</sub> (post-tax, real basis, ungeared, Y-1 basis)	US\$M	860	790
NPV <sub>9%</sub> (pre-tax, real basis, ungeared, Y-1 basis)	US\$M	1,180	1,070
IRR (post-tax, real basis, ungeared, Y-1 basis)	%	25	26
IRR (pre-tax, real basis, ungeared, Y-1 basis)	%	29	30
Payback period (post-tax, from first production)	years	4.4	3.9
Payback period (pre-tax, from first production)	years	4.0	3.6
Capital efficiency (post-tax NPV / PP capex)	x	1.3	1.3
Pre-production capital expenditure	US\$M	683	587
LOM sustaining capital expenditure	US\$ / ROM t	1.7	1.7
Project net cashflow (post-tax)	US\$M	2,610	2,580
Project net cashflow (pre-tax)	US\$M	3,400	3,340
<b>Unit cash operating costs</b>			
Mining	US\$/t ROM	23	24
Processing	US\$/t ROM	4	4
Free on Rail (FOR) cash cost	US\$/t ROM	27	28
	US\$/t saleable	44	46
Rail transport and port	US\$/t saleable	29	29
Marketing, commissions and corporate	US\$/t saleable	2	2
Royalties	US\$/t saleable	6	6
Total cash operating cost - Free on Board (FOB)	US\$/t saleable	81	84

**Figure 2: Forecast Elan Project operating cost (US\$/t FOB) relative to global HCC mined products**



Source: S&P Global Market Intelligence

## Regulatory and social licence to operate

The learnings from the adjacent Grassy Mountain HCC Project (Riversdale Resources) permitting process, which has similar or identical environmental, social, and geological settings, are being actively applied and utilised for baseline studies, stakeholder engagement, impact assessment and permit applications with respect to the Elan Project.

Atrum has already undertaken early engagement with First Nations, government, communities and other relevant stakeholders in relation to development of the Elan Project. Ownership of all regulatory applications and early, proactive engagement of federal and provincial regulators remains an ongoing focus.

Atrum commenced a comprehensive environmental study program in 2019. This has been designed to characterise the environmental setting and identify potential sensitive aquatic and terrestrial receptors within the Elan Project area. The results of the baseline program will form the foundation for mine planning and impact assessment.

Under the Coal Development Policy for Alberta (1976), the Elan Project tenure sits within Category 2 land zoning, which is generally considered to not be appropriate for open cut mining. In 2016, a precedent was set when Ram River Coal successfully obtained Alberta Government approval to permit an open cut coal mining project on Category 2 land in central western Alberta. Atrum's confidence in obtaining Alberta Government approval for open cut mining on Category 2 land has also further increased due to recent government engagement and support for replacing the now outdated land categorisation policies. This matter is also being pursued strongly with government by the Coal Association of Canada.

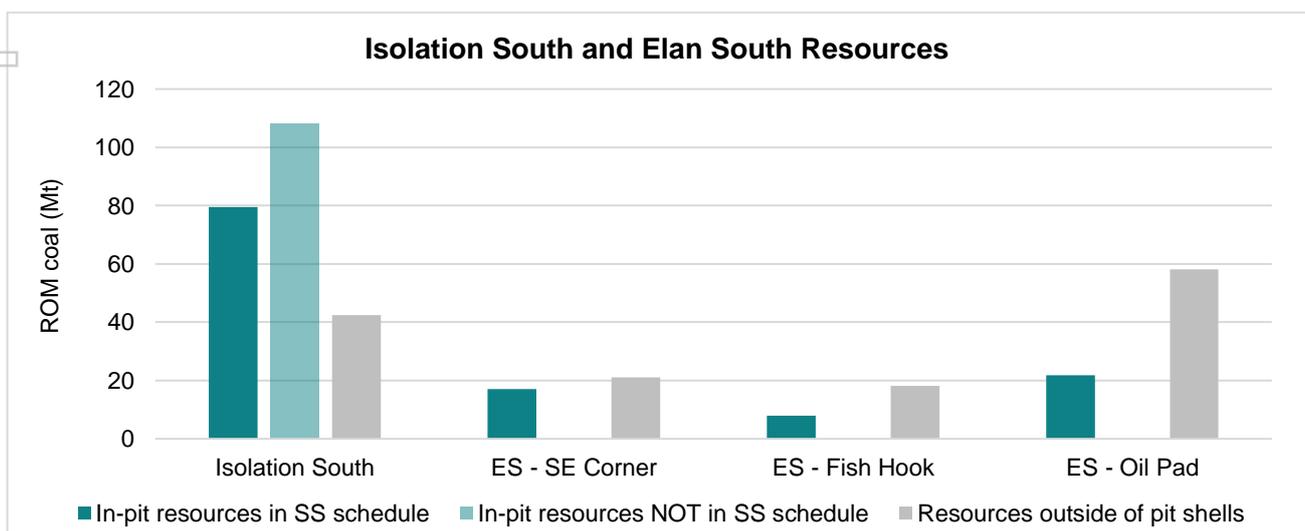
## Substantial upside potential

The Atrum Board considers the Scoping Study to be a conservative representation of the long-term development potential of the Elan Project.

### (1) Isolation South pit expansion

Pit optimisation and mine planning activities resulted in a practical pit shell at Isolation South containing 188Mt ROM coal. However approximately 108Mt ROM coal of in-pit Inferred resources at Isolation South were then excluded from the Scoping Study mine schedule and production target presented (leaving 80Mt ROM coal from Isolation South in the schedule), in accordance with the current ASIC/ASX regulatory framework (see Figure 3).

Figure 3: Preliminary pit shell composition compared with final Scoping Study mine schedule



Incorporation of these in-pit Inferred resources, via targeted upgrade into Measured and/or Indicated classification, offers substantial potential upside to Elan Project economics through mine life extension, lower average strip ratio and future output expansion.

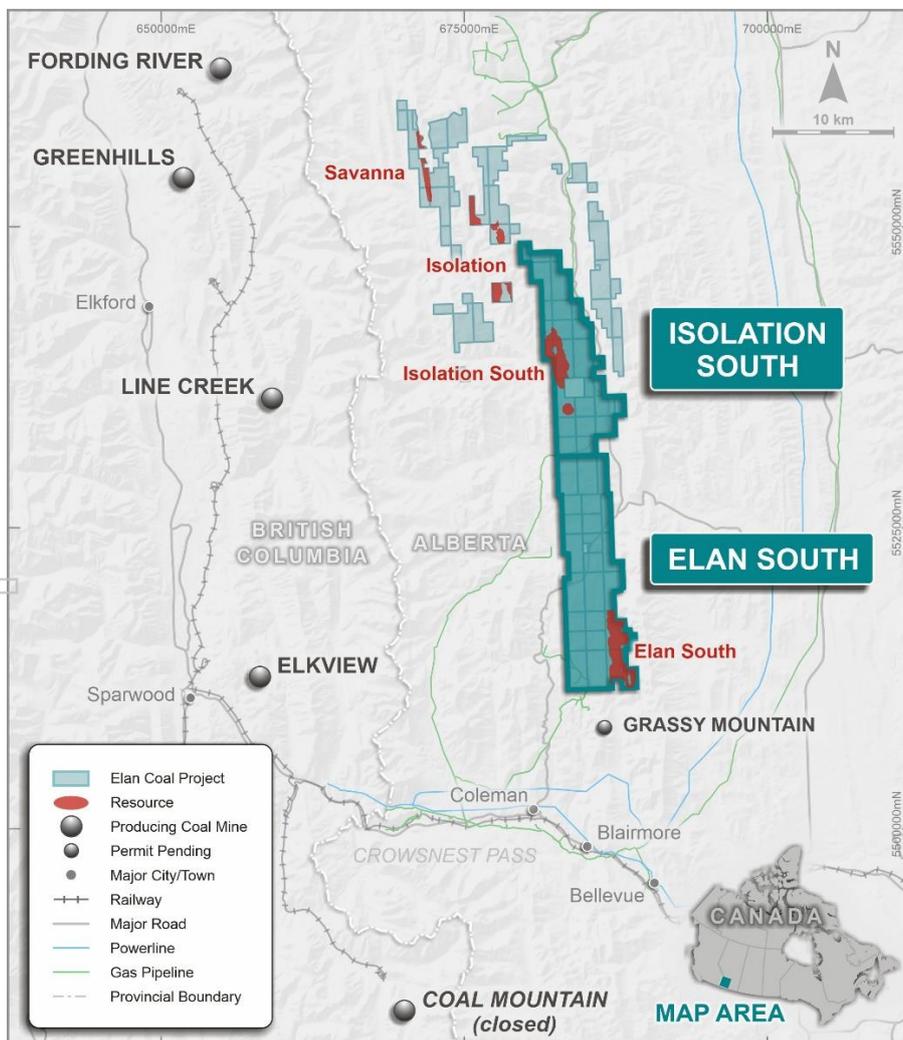
Naturally Atrum has also considered the broader project scope and phased development opportunities that targeted upgrade of in-pit Inferred Resources could present. One clear opportunity is deferred commencement of Elan South. The scale and extremely favourable geology of the Isolation South deposit, plus the planned location of the CHPP proximate to Isolation South, means that sole sourcing ROM coal from the Isolation South mine in the early years (at either of 10Mtpa or 7.5Mtpa) would likely allow for greater development and operating simplicity, lower pre-production capital and lower strip ratios (and hence operating costs) in those initial years.

## (2) Further exploration and resource growth

Substantial resource upside exists across the entire Elan Project tenement base, including at Isolation South and Elan South (see Figure 4). This potential is targeted to be realised via further extensional drilling in future field programs.

Further resource delineation has the clear potential to supplement the currently planned Elan Project development by extending operating life, delivering expansion potential and/or lowering average strip ratios.

**Figure 4: Elan Project tenement base and proximate Elk Valley HCC mines to the west**



Moreover, the total areal footprint of the Elan tenement base, combined with its thick, shallow and high-quality coal seam depositions, evidences clear potential for it to host multiple, large Tier 1 hard coking coal developments. Teck Resources' proximate Elk Valley complex produces over 25Mtpa of premium HCC from four operating mines.

### (3) BOOT financing

Development of the Elan Project has been modelled on an owner-operated basis with equipment leasing of mining fleet. Clear potential exists to finance the CHPP, and product conveyor transport and rail loadout/loop systems, via Build-Own-Operate-Transfer (BOOT) contract.

By utilising BOOT arrangements for these two major capital items (see Section 11 of the Executive Summary for more detail on specific assumptions), total pre-production capital requirements could be reduced by approximately US\$430 - 530M.

This would reduce total pre-production capital to US\$140 - 150M for both the 10Mtpa and 7.5Mtpa cases. It would also increase post-tax NPV<sub>9%</sub> and IRR metrics to US\$910 - 1,020M and 52 - 54%, respectively.

### (4) Higher processing yield

Regional experience shows Teck Resources' Elk Valley mines, with a similar raw coal ash content range, have processing yields that typically range from 60 to 70% (which compares with the 60% assumption utilised for the Scoping Study). More detailed Isolation South washability testwork results are expected in the next few months. Additional sampling, testing and simulated yield modelling are also required for the PFS phase in order to arrive at a reliable overall production yield.

### (5) HCC price and C\$/US\$ inputs

The Scoping Study HCC benchmark price forecast of US\$141/t (FOB Queensland) is based on the long-term real hard coking coal price forecast provided by Consensus Economics (February 2020). It compares with the prevailing low-vol HCC spot price FOB Queensland of approximately US\$150 - 165/t in mid/late March 2020, as well as the quarterly average price of nearly US\$180/t over the past decade. Utilising a 10% higher benchmark HCC price input (US\$155/t) increases the Elan Project NPV to approximately US\$1,150M (10Mtpa ROM) and US\$1,060M (7.5Mtpa ROM), an approximate 34% increase for both.

The long-term C\$/US\$ foreign exchange rate forecast of 0.79 has also been adopted from Consensus Economics. This exchange rate drives all US\$ cost assumptions in the Scoping Study that are denominated in C\$ (which is much of the forecast Elan operating cost base). The current spot C\$/US\$ exchange rate is 0.71. Utilising a 10% lower C\$/US\$ exchange rate (0.71) increases the Elan Project NPV to approximately US\$1,060M (10Mtpa ROM) and US\$980M (7.5Mtpa ROM), an approximate 24% increase for both.

### Next steps

The Elan Project is now set for transition into the Pre-Feasibility Study (**PFS**) phase. This is planned to be undertaken in parallel with a targeted exploration program to potentially expand and upgrade the classification of the existing resource base.

Current social and operating constraints associated with the COVID-19 pandemic have meant that full commencement of these activities is necessarily paused, with work limited to predominantly desktop study activities for the time being. The Atrium Board will be regularly reassessing this status as local and global conditions evolve over the coming months. Beyond this period, Atrium's focus remains the rapid progression of the Elan Project through key evaluation phases (PFS and DFS) and into development.

**Atrum Managing Director and CEO, Max Wang, commenting on the Scoping Study results said:**

*“We are delighted with the outcomes from the Elan Project Scoping Study. If the 2018 and 2019 field programs highlighted the sheer scale of resource endowment across Elan, then the Scoping Study has demonstrated the world-class nature of Atrum’s planned hard coking coal mine development there.*

*“Perhaps most exciting is the strong potential for substantial upside to the physical and financial metrics presented in the Scoping Study. The current mine schedule exploits less than 43% of the existing resource tonnes at the large, shallow Isolation South deposit. The potential to extend operating life, deliver future expansion, reduce pre-production capital and/or lower strip ratios in early years is strong.*

*“Similarly, further resource growth potential remains latent. There are significant swathes of the Elan tenure that are under-explored. Mapped coal extents stretch far beyond existing resource envelopes. As we have consistently noted, Elan has the clear potential to host multiple, large Tier 1 hard coking coal operations. Already well established as a world-class coking coal production region through Teck’s established operations in the nearby Elk Valley, a further mine development such as Elan in the Crowsnest Coalfield is an exciting opportunity, especially as we are targeting some of the highest quality metallurgical coals in the global market.*

*“Our approach to the Scoping Study has aligned with our commitment to a best-in-class development and operating philosophy. Key stakeholder engagement commenced early, including with First Nations, and interaction with government and regulatory bodies has been highly proactive. Comprehensive environmental data collection commenced last year and will continue through to submission of an EIA for the project.*

*“Just as there is no mainstream substitute for hard coking coal in the production of steel via the blast furnace process, there are very few large depositions of Tier 1 quality hard coking coal globally that are amenable to development. There are even fewer in mining jurisdictions as robust as Canada, and that are proximate to existing rail and port infrastructure with surplus capacity. The Elan Project is a compelling candidate to fill the growing need of seaborne markets for a major new supply basin of premium hard coking coal.*

*“Development of Elan will deliver much needed investment into the Crowsnest Pass area of south-western Alberta. This includes the creation of several hundred full-time jobs set to be sourced from local towns including Blairmore, Coleman, Sparwood and other nearby communities, as well as the obvious flow-on benefits to local businesses in the area. The Elan Project would also be a significant contributor to Alberta, with expected provincial royalties of approximately US\$450M to be paid over the life of the mine based on this Scoping Study. The indirect contributions to local, provincial and federal economies and taxes will also be many times larger than this provincial royalty total.*

*“Throughout the communication and engagement process, local municipalities and provincial government have been positive and supportive towards the rapid advancement of the Elan Project. We will continue to engage early and proactively with all key stakeholders, including the relevant government and regulatory bodies as well as the First Nations.*

*“While we would like to be forging ahead with the 2020 field program and full-scope Pre-Feasibility Study activities immediately, we must respect the global social and operating environment stemming from the COVID-19 pandemic. The safety of our people, and the communities in which they live, and we operate, is and will always be our number one priority. To that end, we plan to undertake only limited project activities, predominantly desktop in nature, until risk levels start to recede.”*

**This ASX release was authorised on behalf of the Atrum Board by:**  
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# SCOPING STUDY

ELAN HARD COKING COAL PROJECT  
MARCH 2020



## Contents

<b>1. Introduction and project overview</b>	<b>4</b>
<b>2. Study team</b>	<b>6</b>
<b>3. Project areas</b>	<b>6</b>
<b>4. Geology and resource estimate</b>	<b>8</b>
Geological setting	8
Resource base	8
<b>5. Mine design and scheduling</b>	<b>9</b>
Pit optimisation and mine planning	9
Geotechnical design parameters	10
Modifying factors	10
Mine schedule and production target	10
Sequencing	11
Ex-pit spoil pile design	13
Mining fleet	13
<b>6. Coal processing</b>	<b>14</b>
Processing requirements	14
Design objectives	14
Processing assumptions	15
Plant location	15
<b>7. Coal quality and marketing</b>	<b>16</b>
Coal quality characteristics	16
Product type	16
Marketing	17
<b>8. Infrastructure</b>	<b>18</b>
On site infrastructure	18
Water source	18
Product coal logistics	18
Tailings storage	19
<b>9. Rail logistics and access</b>	<b>19</b>
Rail loadout	19
Rail transport	21
Access	21
<b>10. Port facilities and access</b>	<b>21</b>
Westshore and Neptune (Vancouver)	21
Ridley (Prince Rupert)	22
Access	22
<b>11. Environmental and social</b>	<b>22</b>
Baseline monitoring	22
Impact assessment	22

First Nations and community engagement .....	23
<b>12. Permitting.....</b>	<b>23</b>
Land categorisation.....	23
Process .....	23
<b>13. Operating costs .....</b>	<b>24</b>
<b>14. Capital costs .....</b>	<b>26</b>
<b>15. Financial analysis .....</b>	<b>27</b>
Basis of estimates.....	27
Hard coking coal price assumptions and revenue factors .....	27
Key financial metrics .....	28
Cash flow and rolling NPV estimates.....	29
Financing alternatives .....	30
Sensitivity analysis.....	31
<b>16. Project development schedule.....</b>	<b>32</b>
<b>17. Key risks.....</b>	<b>33</b>
<b>18. Key opportunities .....</b>	<b>35</b>
Isolation South pit expansion .....	35
Further exploration and resource growth.....	35
BOOT financing .....	35
Process yield increase .....	35
HCC price and C\$/US\$ inputs.....	35
<b>19. Conclusions and next steps.....</b>	<b>36</b>
<b>20. Reasonable basis for funding assumption.....</b>	<b>36</b>
<b>APPENDIX A: PLANS AND SECTIONS .....</b>	<b>39</b>
<b>APPENDIX B: COMPETENT PERSONS'S STATEMENT.....</b>	<b>47</b>
<b>APPENDIX C: REASONABLE BASIS FOR FORWARD LOOKING STATEMENTS.....</b>	<b>48</b>

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## 1. Introduction and project overview

The Scoping Study provides an early stage assessment of the technical and commercial viability for development and operation of the Elan Hard Coking Coal Project (**Elan Project** or **Elan** or the **Project**).

The Elan Project is 100%-owned by Atrum Coal Limited (ASX:ATU) (**Atrum**). Elan is located in the Crowsnest Pass area of south-western Alberta, approximately 13 km north of the towns of Blairmore and Coleman (refer Figure 1). The Elan tenements are situated in the foothills and front ranges of the Rocky Mountains of Alberta, within the Crowsnest Coalfield.



Figure 1: Location plan

The Project is situated within the well-established metallurgical coal producing Crowsnest Coalfield region of southern Alberta and British Columbia. Nearby open cut operations that also target the coal seams of the Mist Mountain Formation (Kootenay Group) include the Teck Resources' HCC mines of south-eastern British Columbia (25+ Mtpa Elk Valley complex) (see Figure 2). The proposed Grassy Mountain HCC Project (Riversdale Resources) is located adjacent to the southern boundary of the Elan South area and is currently in the final permitting and approvals process.

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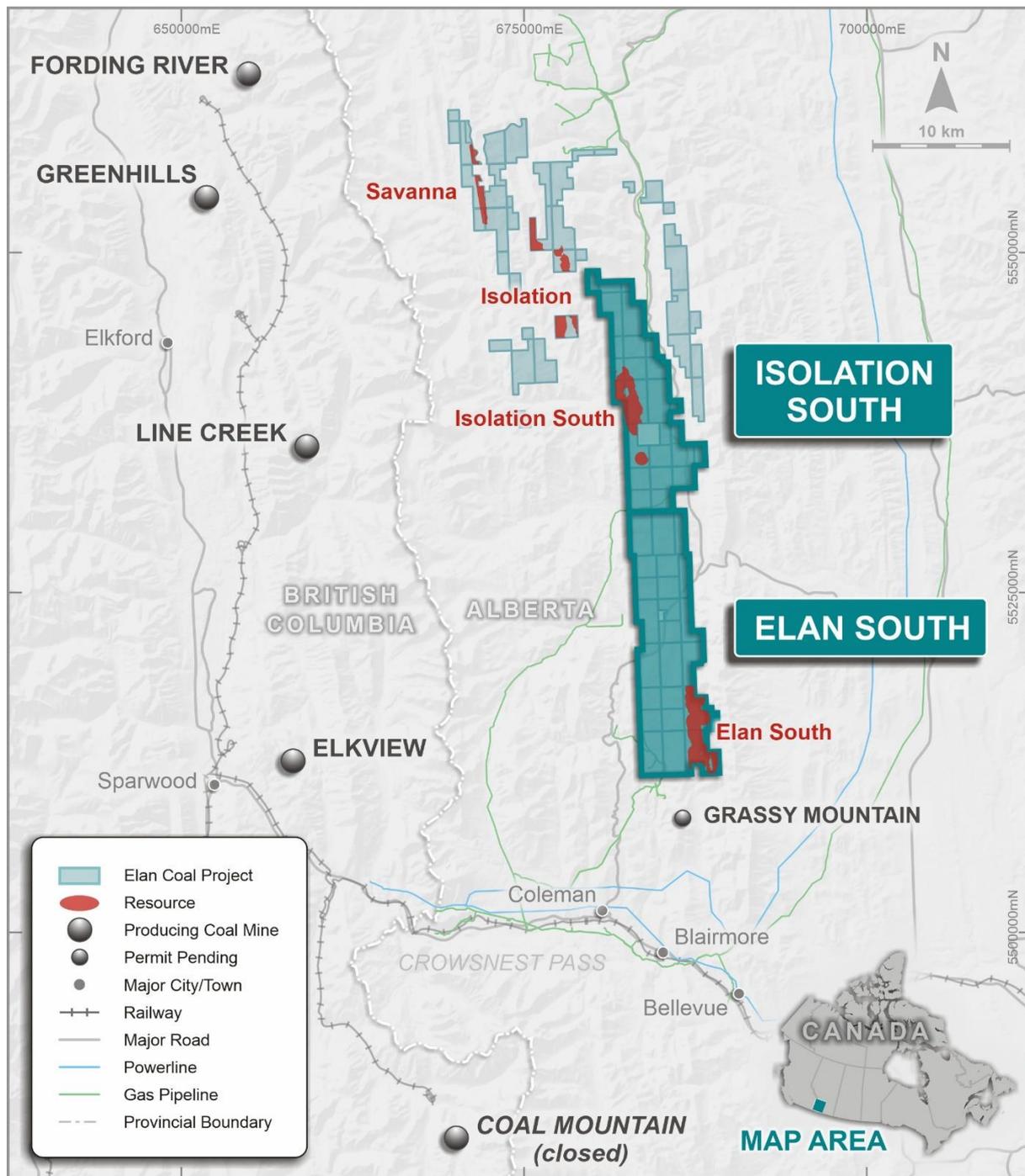


Figure 2: Regional location plan

## 2. Study team

The study team was led by Atrum Coal with Palaris Australia as study manager, coal handling and processing inputs from Sedgman Canada, and the logistics review conducted by Hatch (refer Figure 3).

### Scoping Study Team

#### Management: Atrum Coal

- Project management and strategic direction
- Exploration management and execution
- Environment and approvals
- Co-contributors to Scoping Study report

#### Scoping study: Palaris Australia

- Overarching Scoping Study management
- Geology and resource estimates
- Mine planning and scheduling
- Financial analysis

#### Coal handling and processing: Sedgman

- Coal handling and processing design
- CHPP related infrastructure
- Capital and operating cost estimates

#### Logistics: Hatch

- Evaluation of rail load-out options
- Covered conveyor design and routes
- Capital and operating cost estimates

Figure 3: Key study team responsibilities

## 3. Project areas

The Elan Project is comprised of numerous areas where geological (structural) features have presented potential opportunities for shallow, open cut mineable coal.

The Isolation South area saw considerable exploration effort in 2019 and is now considered the flagship target mining area of the Project due to the substantial increase in shallow and thick resources delivered from last year's drilling program. The area to the north of the Oldman River (on Cabin Ridge) has been the focus of most exploration and is the predominant location of delineated resource tonnage at Isolation South (see Figure 4).

Elan South comprises the tenement holdings immediately north of the most southern Elan tenement boundary (which abuts the Grassy Mountain HCC Project owned by Riversdale Resources Limited). The Elan South area contains prospective zones for open cut mining including the South East Corner, Fish Hook and Oil Pad areas (see Figure 4 also); these were deemed to have the most potential from a mining perspective based on the depth and continuity of coal seams and recent exploration efforts.

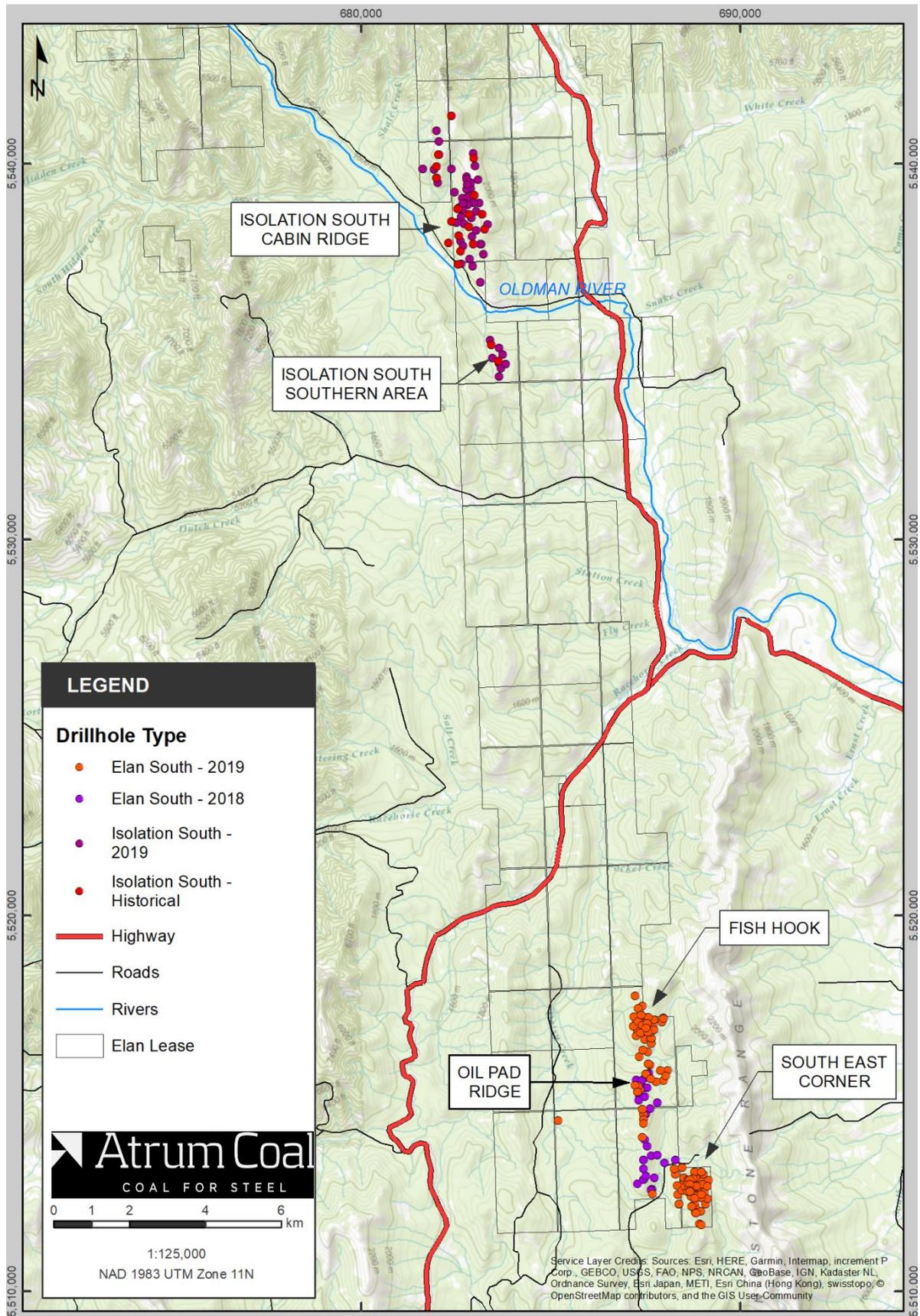


Figure 4: Elan Project areas and focus of exploration

## 4. Geology and resource estimate

### Geological setting

The target seams are Cretaceous coal seams of the Mist Mountain Formation (Kootenay Group), the same as mined at Teck Resources' nearby coal mines in the Elk Valley. Exploration by Atrum in 2018 and 2019 has targeted the historically explored Isolation South area, as well as several areas within the Elan South tenement holding. The Mist Mountain Formation contains from three to 30+ seams with cumulative apparent coal thickness that can range to in excess of 100 metres.

The Project is comprised of numerous areas where structural features have presented open cut mineable coal. The areas with open cut mining potential are representative of thrust faults and anticline / syncline structures and are associated with north-south trending ridgelines. More details on the geology of the project areas can be viewed in Atrum's ASX release dated 10 February 2020 (*Total Elan Project Resources Exceed 450 Mt*).

The Scoping Study incorporates an assessment of open cut mining at the Isolation South (Cabin Ridge) area, as well as the South East Corner, Fish Hook and Oil Pad North areas of Elan South. These areas were deemed the most prospective based on the thickness, depth and continuity of coal seams, and the amount of exploration work undertaken to date. Isolation South is considered the primary target area, with thick, shallow and consistent seams across the dip slope at Cabin Ridge, as illustrated in Figure 5.

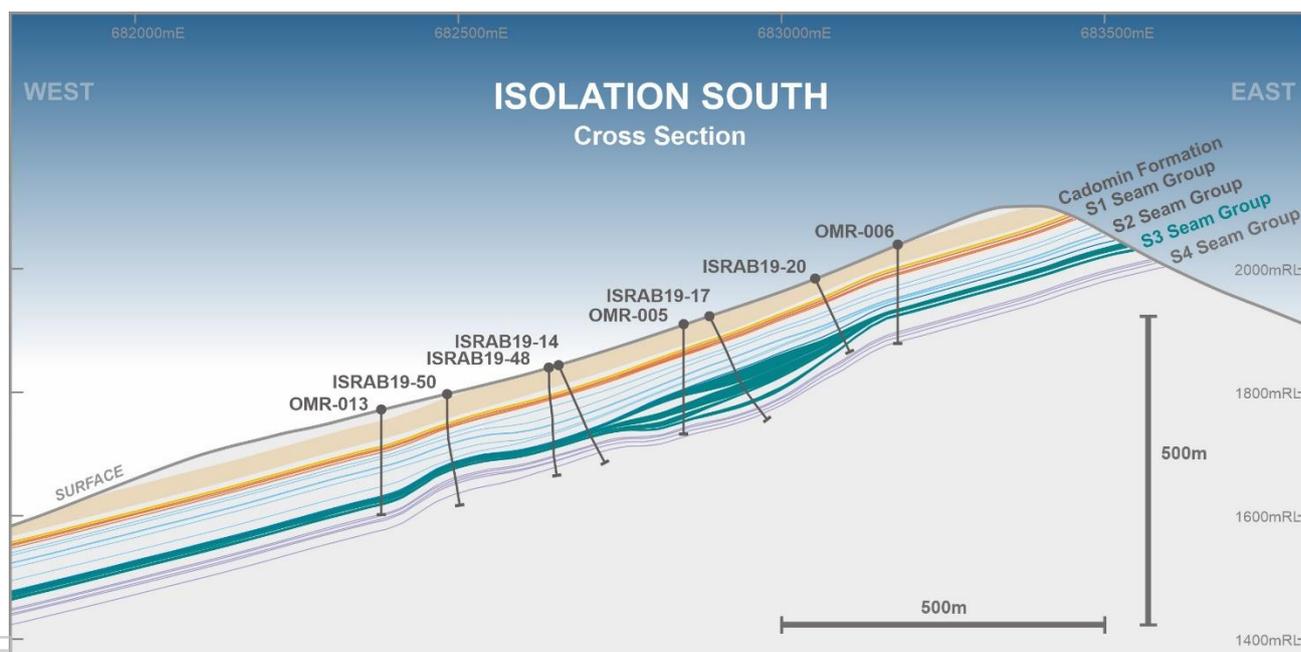


Figure 5: Cross section of the Isolation South area

### Resource base

As a result of the additional resource definition at Isolation South and Elan South from the 2019 drilling program, overall Elan Project resources now total 454 Mt (142 Mt Indicated and 312 Mt Inferred; refer Table 1). The resources that form the basis of the mine schedule and production target in the Scoping Study have been previously announced publicly (see Atrum ASX release dated 10 February 2020, *Total Elan Project Resources Exceed 450 Mt*).

**Table 1: Total Elan Project resource estimates**

Area	Project	Indicated (Mt)	Inferred (Mt)	Total (Mt)	Date of Announcement
Elan Northern Tenements	Isolation South	82	148	230	10-Feb-20
	Isolation	-	51	51	22-Jan-19
	Savanna	-	30	30	22-Jan-19
Elan South	South East Corner	16	22	38	10-Feb-20
	Fish Hook	15	11	26	10-Feb-20
	Oil Pad	29	50	80	10-Feb-20
<b>TOTAL</b>		<b>142</b>	<b>312</b>	<b>454</b>	

Atrum confirms that it is not aware of any new information or data that materially affects the information included in its ASX releases dated 10 February 2020 (*Total Elan Project Resources Exceed 450 Mt*) and 22 January 2019 (*Additional 201 Mt JORC Resources Defined for Elan Project*). All material assumptions and technical parameters underpinning the estimates in these releases continue to apply and have not materially changed.

The Isolation South and Elan South areas contain coal resources totaling 373 Mt (142 Mt Indicated and 231 Mt Inferred), as outlined in Table 2 below.

**Table 2: Resource estimates for Isolation South and Elan South areas**

Project Area	Seam Group	Indicated (Mt)	Inferred (Mt)	Total (Mt)
Isolation South	Seam 1	13.8	23	37
	Seam 2	10.6	25	36
	Seam 3	57.2	79	136
	Seam 4	-	21	21
<b>Isolation South Total</b>		<b>82</b>	<b>148</b>	<b>230</b>
South East Corner	Seam 1	3.2	3	7
	Seam 2	5.4	9	15
	Seam 4	7	9	16
Fish Hook	Seam 1	1.3	1	3
	Seam 2	9.6	4	13
	Seam 4	4.3	6	10
Oil Pad	Seam 1	18.4	23	41
	Seam 2	9.9	19	29
	Seam 4	1	9	10
<b>Elan South Total</b>		<b>60</b>	<b>83</b>	<b>143</b>
<b>GRAND TOTAL</b>		<b>142</b>	<b>231</b>	<b>373</b>

## 5. Mine design and scheduling

### *Pit optimisation and mine planning*

A pit optimisation study was completed on the Isolation South and Elan South (South East Corner, Fish Hook and Oil Pad North) areas to assess the open cut economic viability of the geological domains and coal seams. For the purposes of defining an optimum pit shell, cost and revenue assumptions were applied to the geological model to determine a “break-even” pit shell at various price or revenue levels. The results from optimisation generally show the pit size and stripping ratio increasing with increasing revenue.

Determination of a practical pit shell for Isolation South required minimal adjustment due to its consistent seam dip and seam position relative to the topography. The more complex geology and topography for the South East Corner, Oil Pad and Fish Hook pits required more meaningful adjustment.

### Geotechnical design parameters

Exploration to date has not included geotechnical logging, sampling and testwork. The geotechnical design parameters used are based on advice from geotechnical consultants and those utilised for advanced feasibility study on the neighbouring Grassy Mountain HCC Project.

An overall highwall batter angle of 45 degrees was used as the principal geotechnical design parameter, while highwalls were based on 70-degree individual faces and 10m wide benches, with maximum unbenched height of 25 metres.

### Modifying factors

The assumptions used for determination of mineable quantities in the mine schedule and production target are summarised in Table 3.

**Table 3: Assumptions used for mined quantities in the mine schedule and production target**

Parameter	Assumption
Minimum mineable thickness	Coal plies have been combined into practical working sections where coal plies are greater than 30 cm thick and parting up to 30 cm thick
Mining loss	Losses of 5 cm and dilution of 3 cm have been applied to working section roof and floor
Mining recovery	An overall mining recovery of 95% was applied for Isolation South due to seam thickening characteristics of Seam 3, elsewhere 100%
Upper limit	Incorporates the latest digital terrain model and a base of weathering grid (modelled coal above the base of weathering is classified as waste)
Coal density	ROM coal tonnage is calculated using a relative density (ad) of 1.50 with coal losses, and dilution at an RD of 2.20
Moisture	ROM moisture 5% and product moisture 10%

### Mine schedule and production target

All mining is assumed by open pit method and based on mining of the flagship Isolation South pit and three discrete pits at Elan South. The combined production target is 126.2 Mt ROM coal at a stripping ratio of 4.3:1 bcm/t, and 75.8 Mt product hard coking coal at a forecast processing yield of 60%.

The mine plan and schedule support an annual production rate of 10 Mtpa ROM / 6 Mtpa saleable HCC over a mine life of 15 years (Case 1); or 7.5 Mtpa ROM / 4.5 Mtpa saleable HCC over 19 years (Case 2). The life of mine overburden volumes and coal tonnes mined in the two cases is identical.

The Isolation South pit is the Project's flagship mining area with 79.5 Mt of ROM coal included in the production target. Isolation South is a large pit with favourable geology including thick and consistent coal seams. Located approximately 20 km to the south of Isolation South, three discrete pits at Elan South (South East Corner, Fish Hook and Oil Pad North) supplement production from Isolation South and contribute an additional 46.7 Mt ROM.

Pit optimisation and mine planning activities initially resulted in a practical pit shell at Isolation South containing 188 Mt ROM coal. However approximately 108 Mt ROM coal of in-pit Inferred resources at Isolation South were then excluded from the Scoping Study mine schedule and production target (leaving only 80 Mt ROM coal from Isolation South in the schedule), in accordance with the current ASIC/ASX regulatory framework.

A summary of the Scoping Study mine schedule and production target with respect to total overburden volumes, ROM and saleable tonnes, and underlying resource classification is provided in Table 4.

**Table 4: Mine schedule and production target by deposit**

Pit	Waste Mbcm	ROM Coal Mt	Strip Ratio bcm/t ROM	Product Coal Mt	Indicated Resources	Inferred Resources
Isolation South	262	79.5	3.3	47.7	74%	26%
South East Corner	82	17.0	4.8	10.2	64%	36%
Fish Hook	61	7.9	7.7	4.8	86%	14%
North Oil Pad	136	21.8	6.2	13.1	53%	47%
<b>Total</b>	<b>541</b>	<b>126.2</b>	<b>4.3</b>	<b>75.8</b>	<b>70%</b>	<b>30%</b>

The Scoping Study outcomes, production target and forecast financial information referred to in this report are based on low accuracy level technical and economic assessments that are insufficient to support estimation of Ore Reserves. While each of the modifying factors was considered and applied, there is no certainty of eventual conversion to Ore Reserves or that the production target itself will be realised. Further exploration and evaluation work and appropriate studies are required before Atrum will be able to estimate any Ore Reserves or to provide any assurance of an economic development case.

### Sequencing

Scheduled production is sourced from both the Isolation South and Elan South areas throughout the project operating life. This is predominantly to ensure that Inferred resources (of which there is currently a higher proportion at Isolation South) do not feature as a significant component of the overall mine schedule, particularly in the earlier years.

Isolation South possesses resource scale (a further 108Mt of in-pit Inferred resources sit outside the current mine schedule for the same reason as above), favourable and relatively uniform geology (shallow, thick, consistent coal seams), and a considerably lower stripping ratio than all planned pits at Elan South (including SE Corner). For these reasons, further resource classification upgrade drilling at Isolation South has the potential to: (1) add substantial tonnage and life extension to the Scoping Study mine schedule; and (2) allow development of Elan South to be deferred until later in the overall mine schedule (thereby lowering both pre-production capital and strip ratio / operating cost in early years).

The Scoping Study mine schedule sees production commencing at Isolation South and ramping up over three years to steady state production of 6 Mtpa ROM (Case 1) or 4.5 Mtpa ROM (Case 2). South East Corner commences production in Year 2, ramping up to 2 Mtpa ROM production over three years, while mining commences at Oil Pad North in Year 3 (Case 1) or Year 5 (Case 2), supplementing production from Isolation South and South East Corner. Once South East Corner is approaching exhaustion, mining at Fish Hook commences (Years 10/11) to supplement production from Isolation South and Oil Pad North. See Figures 6 and 7 for detailed mine schedules across both Cases 1 and 2.

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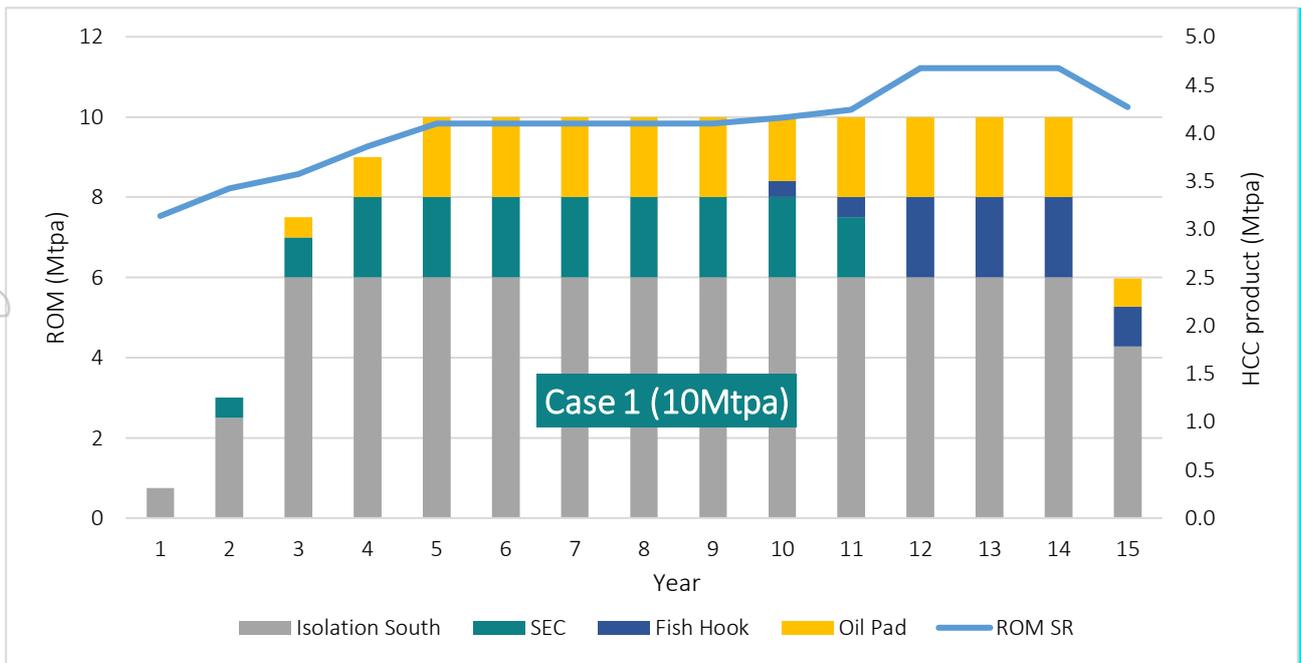


Figure 6: Production profile (ROM) for Case 1

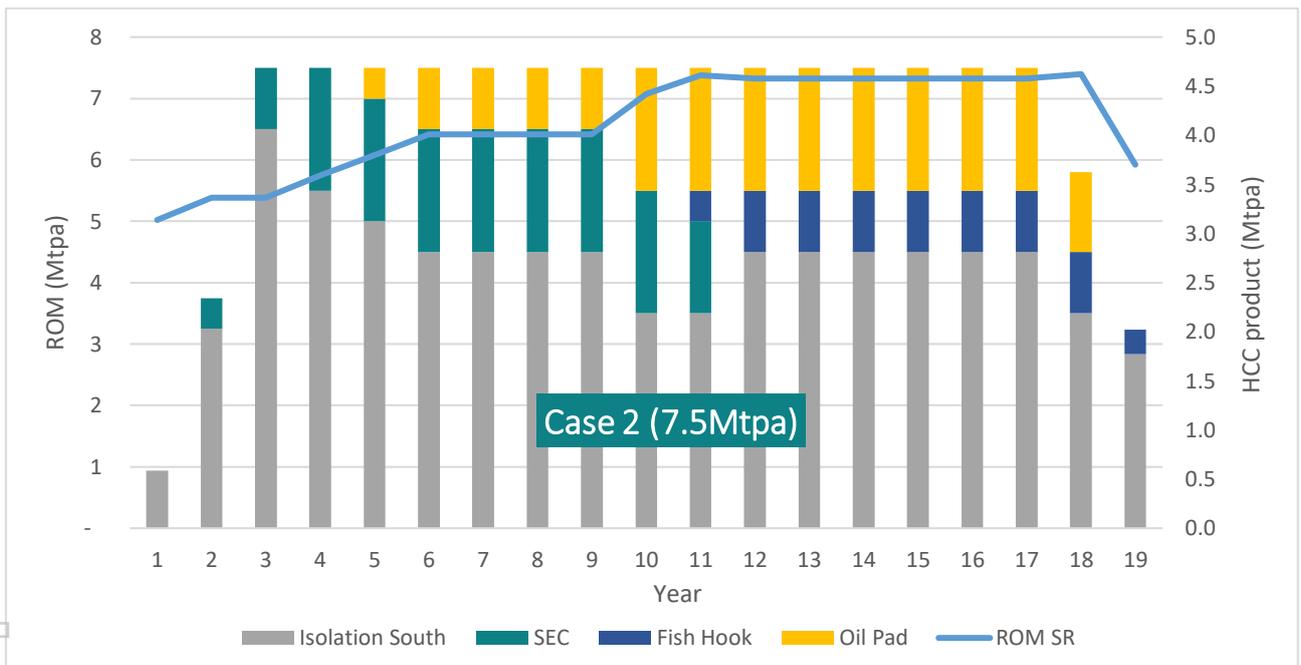
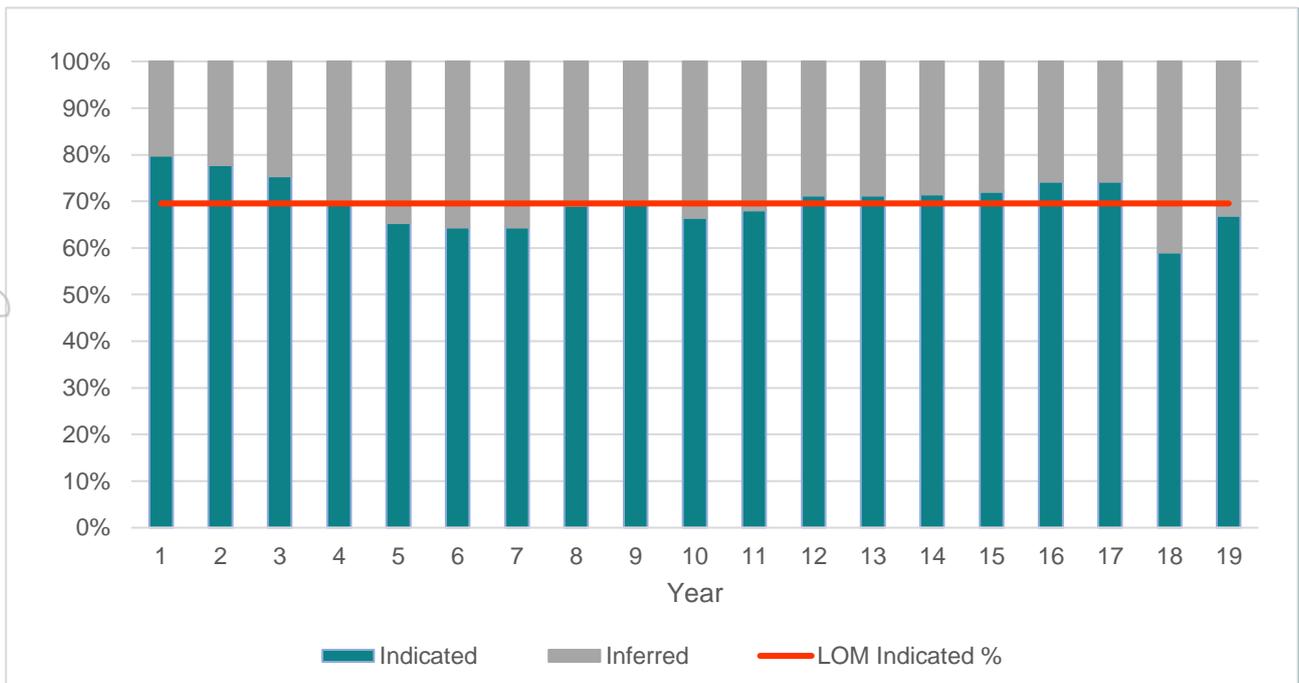


Figure 7: Production profile (ROM) for Case 2

Inferred resources comprise only 30% of the overall mine schedule (Indicated 70%) for both Cases, and contribute less than 25% over the first three years of operation (see Figure 8). As a result, Inferred resources do not feature as a significant proportion of the proposed mine plan and the financial viability of the Elan Project is not dependent on the inclusion of Inferred resources in the production schedule.



**Figure 8: Composition of mine schedule by resource classification (Case 2: 7.5 Mtpa ROM)**

There is a low level of geological confidence associated with Inferred mineral resources, and there is no certainty that further exploration work will result in the determination of Indicated mineral resources or that the production target itself will be realised.

### **Ex-pit spoil pile design**

Ex-pit spoil capacity adjacent to the planned pits was investigated during the study. The design assumed that no reshaping of the ex-pit spoil piles would be required after the dumps have been filled during mining. A potential excess capacity was identified at Isolation South, noting the design of the ex-pit spoil piles should be progressed in more detail during further studies with selenium mitigation being a high priority.

At a Scoping Study level, the available out-of-pit capacity at Fish Hook and Oil Pad North is sufficient for the proposed production levels. A lack of available capacity at South East Corner indicates further work is required to minimise hauling and ensure that mineable coal is not sterilised. The potential for sequencing and dumping between the Elan South pits can be investigated in further studies. Fish Hook and Oil Pad North are a short haul distance and have potential for backfilling of completed pits.

### **Mining fleet**

Hydraulic backhoe excavators and 220 tonne trucks were chosen as the preferred mining fleet. This decision was driven by a combination of the following factors:

- Suitable match with total production profile (i.e. up to 6 Mtpa product coal);
- Suitability to smaller pit size;
- Flexibility to allow movement between mining areas;
- Efficient alignment of truck and excavator capacity (i.e. optimised excavator loading time); and
- Moderate operating cost compared to other suitable equipment.

The open cut operations at the Elan Project are likely to be more dozer intensive than might be the case on average, with the added topographic challenges for access and drill and blast preparation. Due to potential geotechnical risks with regards to the dumps, a dozer is expected to be required at each active

dump. It is also anticipated that a dozer will be required for each active excavator – and this is accepted best practice. Another dozer was included for ancillary tasks including road works and drill and blast area preparation. The separation of the Isolation South and Elan South working areas requires equipment to be allocated to either working area rather than shared between the two. The mining fleet required to achieve the mine plan is shown in Table 5.

**Table 5: Mining fleet requirements**

Type	Example Make	Example Model	Maximum Units Required
<b>Production Equipment</b>			
Excavator	Hitachi	EX5600	3
Excavator	Hitachi	EX3600	4
Excavator	Hitachi	EX2600	1
Mining Trucks	Caterpillar	793	33
<b>Ancillary Equipment</b>			
Track dozer	Caterpillar	D11T	14
Rubber tyred dozer	Caterpillar	854K	1
Drill	Caterpillar	MD6250	5
Grader	Caterpillar	16M	4

The 220 tonne haul trucks that have been matched to the excavators are a standard size for medium-to-small sized excavators.

## 6. Coal processing

### Processing requirements

Sedgman Canada was engaged to provide a conceptual design and capital expenditure estimates for coal handling and processing requirements. The processing design for the Project is based on a single stage processing plant, consistent with other mines and projects targeting the Mist Mountain Formation coals in the region.

The CHPP design basis incorporates dense media cyclones (DMC), reflux classifiers and a flotation circuit, with product drying completed with a hyperbaric filter process. While several options were analysed, the selected processing plant is based on a throughput capacity of 1,650 tph for Case 1 (10 Mtpa ROM) or 1,100 tph for Case 2 (7.5 Mtpa ROM).

### Design objectives

To develop the capital and operating costs, a high-level flowsheet was initially established, including ROM handling, the coal preparation plant, rejects and product handling. Based on these flowsheets, high-level capital and operating cost estimates were developed. A baseline premium mid-vol hard coking coal quality was assumed for the Scoping Study.

The following principal design objectives were applied for the proposed CHPP:

- CHPP facilities are designed for a nominal 30-year mine life, operating 24 hours per day, 7 days per week, with assumed operating hours of 7,200 hours per year excluding wear and tear.
- CHPP facilities are based on safe, economical, durable and functional designs.
- A single coal processing plan is based on dense media cyclone (DMC), reflux classifier and flotation circuits with product sizing on the drain and rinse screen (see Figure 9).

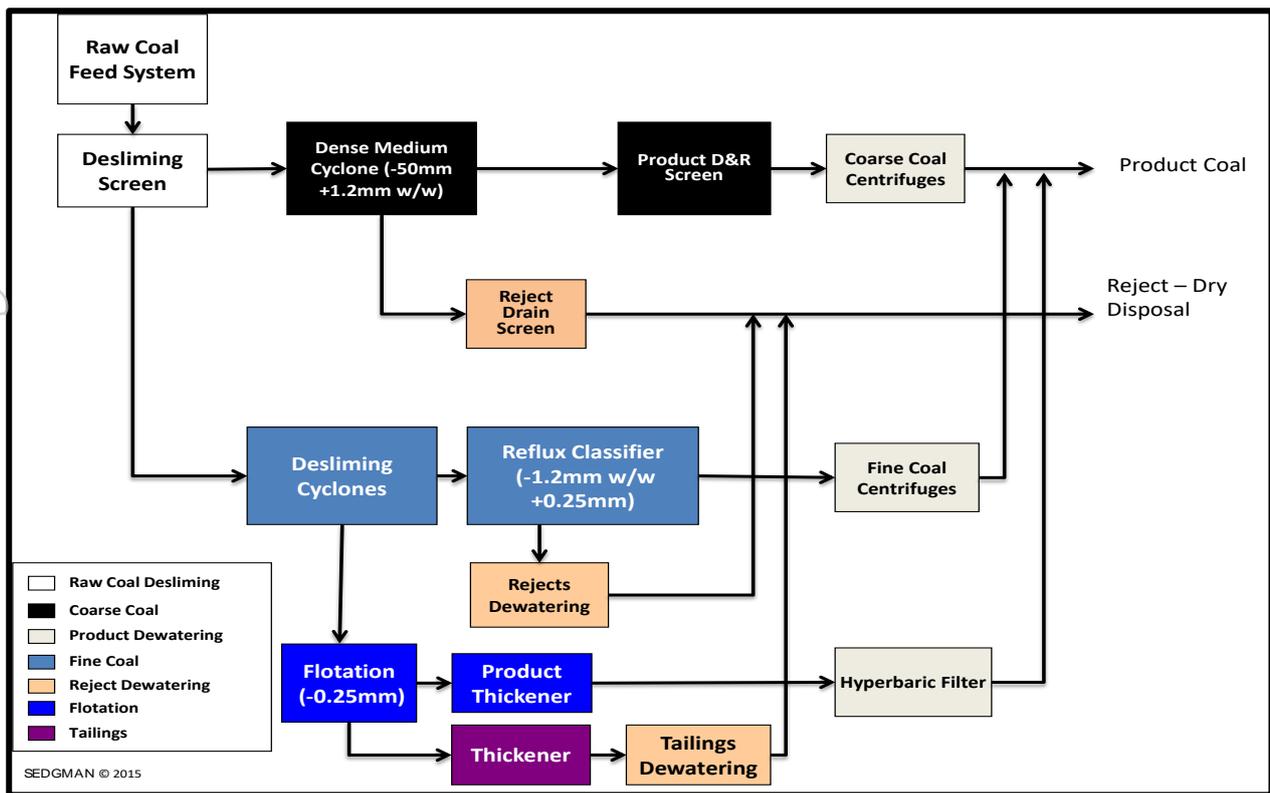


Figure 9: Block flow diagram of the CHPP

The CHPP design is easily capable of delivering 6 Mtpa saleable product (Case 1) or 4.5 Mtpa saleable (Case 2) at an assumed CHPP yield of 60% and 7,200 operating hours per annum.

### Processing assumptions

The Scoping Study utilises a forecast processing yield of 60% for all seams based on theoretical yield results, washability testwork completed on both Elan South and Isolation South samples to date, and regional experience. The following additional considerations are relevant:

- There is still insufficient data to be able to reliably predict CHPP yield on a seam by seam basis in each area, with the laboratory testing of samples from the 2019/20 program ongoing.
- Theoretical washability results from float sink testwork have not accounted for CHPP efficiency, mining losses and dilution.

Further exploration testwork and washability simulation will be required to enable a more detailed assessment of product yield and quality. Wash yield sensitivities have been included in the financial analysis in recognition of potential practical yield variability.

### Plant location

The Isolation South and Elan South mining areas are separated by approximately 20 km. The CHPP has been preliminarily located near the Isolation South pit (to the south-east), given that approximately 63% of the total ROM coal produced in the mined schedule is mined from Isolation South (with clear potential upside to this number upon further resource classification upgrade drilling).

ROM coal mined from the Elan South pits will be truck hauled to the CHPP via road trains on hauling roads. Establishing a separate, smaller CHPP module located near Elan South might be examined in further studies.

## 7. Coal quality and marketing

### Coal quality characteristics

The seams of the Mist Mountain Formation within the Elan Project area are characterised by variable raw ash content, with low total sulphur and phosphorus content.

Testing conducted in the 2018 exploration program at Oil Pad (South) importantly established key coal quality attributes and potential for high coke strength products.

Analytical testing of the core samples from Isolation South and Elan South from the field program conducted in 2019 and early 2020 was only partially complete at the time of undertaking the Scoping Study. Typical ranges for raw coal quality attributes are summarised in Table 6.

**Table 6: Typical raw quality ranges for each area (air dry basis)**

Area	IM %	ASH %	VM %	TS %	CSN
Isolation South	0.5 - 0.7	11 - 30	22 - 26	0.40 - 0.70	2 - 7
South East Corner	0.6 - 0.7	15 - 30	20 - 24	0.50 - 0.70	2 - 5
Fish Hook	0.4 - 0.6	12 - 25	19 - 24	0.40 - 0.80	2 - 5.5
Oil Pad	0.6 - 0.9	14 - 30	20 - 23	0.30 - 0.60	2 - 5

*Test results on 2018 core samples from the South Oil Pad show ash content varies between 6% and 25%.*

The Mist Mountain Formation contains from three to over 30 seams or seam plies with cumulative coal thickness that can range to in excess of 100 metres. Rank increases with depth with most of the coal occurring as medium-to-low volatile bituminous and of metallurgical grade.

Indicative clean coal quality results to date for each area are summarised in Table 7. The results demonstrate the favourable clean coal attributes associated with the Elan deposits including a favourable rank range, low product ash, low total sulphur and phosphorus, and typically high CSN.

**Table 7: Typical clean quality ranges for each area (air dry basis)**

Area	R <sub>o</sub> Max %	ASH %	VM %	TS %	PHOS %	CSN
Isolation South	1.10 - 1.24	7 - 9	23 - 25	0.40 - 0.50	< 0.020	3.5 - 9
South East Corner	1.12 - 1.20	6 - 9	22 - 27	0.50 - 0.80	< 0.040	3 - 8
Fish Hook	1.19 - 1.37	7 - 10	21 - 24	0.50 - 0.80	< 0.020	3 - 9

*Clean coal results for Oil Pad (North) are not yet available.*

The interim washability results indicate that target seams will wash to 8 - 9% product ash at favourable yields. As noted earlier, further washability testwork results remain pending.

### Product type

The expected saleable products will be premium mid-to-low-volatile hard coking coal blends with favourable ash content, and low total sulphur and phosphorus content (considered a Tier 1 HCC). The rank as measured by vitrinite reflectance is expected to be in the range of 1.16 - 1.20%. Based on the coke strength testwork completed on seam blend composites at Elan South, the expected coke strength after reaction with CO<sub>2</sub> (CSR) is expected to be in the range of 69 to 71%.

Refer to Table 8 for additional detail on expected product attributes.

**Table 8: Key attributes of Elan South HCC products (air dried basis)**

Coal Quality Parameter (adb unless otherwise stated)	Unit	Indicative Specification
Total Moisture	(% ar)	10
Ash	(%)	8 - 9
Volatile Matter	(%)	22 - 26
FSI (CSN)	-	7 - 8
Gieseler fluidity	ddpm	100 - 300
Total Sulphur	(%)	~0.60
Phosphorous	(%)	< 0.050
Reactive Maceral Content	(%)	65 - 75
R <sub>o</sub> Max	(%)	1.16 – 1.20
Basicity Index	-	< 0.10
Coke Strength after Reaction (CSR)	(%)	69 - 71

Attributes of Isolation South HCC products will be available after current testing of composites from large diameter bore holes is completed over coming months, but Table 7 data is a guide.

Blending is an integral part of Teck's coking coal operations in the Elk Valley and is required to balance the clean coal (mining) economics and coking coal properties across their four operating mines and multiple seams and seam splits. Similar to Teck, the Elan Project will produce premium HCC blends from coal constituents of different rank and type from each seam group, and also across the four planned Elan mining areas. This will allow optimisation of the coking product blends according to the various blending constituents available and the desires of the prevailing coal buyers to meet their coke oven blend requirements.

### Marketing

Elan's premium hard coking products are likely to be comparable to coking coal products currently exported from Teck's nearby Elk Valley mines. Coking coals from Western Canada are well renowned for their characteristics which include low ash content, low fluidity, low basicity index and high CSR. The low basicity index and corresponding high CSR in Mist Mountain Formation coals is largely due to the acidic (refractory) ash chemistry (high in kaolinite and quartz) which is an important marketing advantage.

Value-in-use assessments including coke analyses, yield, coke-ash / blast furnace fuel requirements, ash-flux smelting, blast furnace fuel combinations, and coke by-products credits, indicate that Atrium's HCC products, with their high coke qualities and excellent ash chemistry, should be able to achieve market price levels similar to the Platts Queensland premium low volatile HCC index, especially as the expected trend for increases in blast furnace size will require higher CSR coals.

Multiple coking products (at different volatile or rank ranges) will be evaluated in further studies. For the modelling of revenue, a pricing discount of 2% to Queensland premium low volatile HCC (Platts Premium Low Vol index) was adopted.

Coking coal products from the Elan Project will be capable of penetrating the export coal market through the projected global increases in demand, capturing market share from existing suppliers and replacing products from mines approaching the end of their lives. The target markets for Elan HCC are likely to be similar to Teck's, which includes sales to Japan, South Korea, China, India, Europe, Turkey and North / South America.

## 8. Infrastructure

### *On site infrastructure*

The Project will require onsite surface facilities to support mine operations that includes the following:

- Administration facilities including offices, training and meeting, first aid, emergency response facilities as well as workers' shift change and sanitary facilities.
- Warehouse facilities.
- Mining equipment workshop facilities and fuel facilities.
- Surface coal handling and processing plant (CHPP) including stockpiles (ROM and product) and coal loadout facilities.
- Tailings and waste rock storage facilities.
- Services and associated facilities for fresh water supply and treatment, waste-water treatment, water storage for fire and process water.
- Sewage treatment plant.
- Electrical reticulation and communications.
- First aid and Emergency Response facilities (first aid room, monitoring room, control room).

As with the CHPP, other shared mine infrastructure has been preliminarily located near the Isolation South pit.

### *Power supply*

A high voltage power transmission line runs east and south of the Elan Projects tenements (see Figure 2). Requisite power supply for the Elan Project can be readily sourced from this line via a short link. The optimal tap-in location is planned to be determined during the PFS phase.

### *Water source*

Water licences or allocations for coal processing are to be permitted under the Alberta Water Act, and may be granted or transferred from other licence holders. Atrum has engaged specialty water resource management consultant, WaterSmart, to assist in identifying the best option for water licences, and this evaluation work will feed into the PFS. Possible water intake locations have been identified for the Scoping Study with details to be further examined during the PFS. Atrum plans to employ industry best practices in water conservation and water management in designing and operating the CHPP, where site water retention, recycling and re-use will be maximised.

### *Product coal logistics*

Hatch was commissioned to undertake a review of logistical options to transport product from the CHPP to a proposed train loadout site. The use of a dedicated conveyor system was deemed the optimal solution. The conveyor will have a nominal capacity of 2,000 tph and be covered to minimise any environmental impact. A typical covered overland conveyor is shown in Figure 10.



**Figure 10: Example of covered overland conveyor system**

The current preferred conveyor route is approximately 36 kilometres in a generally south-south-west direction from the CHPP to the train loadout facility, set to be located close to Canadian Pacific's Crowsnest subdivision mainline (see Figure 11).

The proposed alignment of the conveyor is designed to maximise utilisation of existing forestry and gasfield road and access corridors over Crown land. Near the township of Coleman, the proposed rail spur line and loadout area may overlap one or two private land parcels. A range of viable conveyor alignment and rail loadout options were evaluated as part of the Scoping Study. While the selected alignment and location were assessed as optimal, another option could readily be progressed if required.

### ***Tailings storage***

The reject handling system will combine the coarse rejects with the dewatered fine rejects and tailings filter cake. The combined rejects will be transferred into a rejects bin and will be discharged into haul trucks for co-emplacement back in the pit. The rejects tailings would be co-mingled and returned to the mine for emplacement with the mine waste to avoid a tailings dam.

## **9. Rail logistics and access**

### ***Rail loadout***

The Project will require the construction of a new railway spur line from the Crowsnest subdivision mainline to the proposed Elan train loadout area. The preferred train loadout area identified by Hatch is located to the west of Coleman in the Crowsnest Pass (see Figure 11).

This location was deemed the superior of a number of options considered given that it allows for heavy grade tolerance to be available and is expected to minimally impact on the local community or surrounding environment. The spur track length required is 4.7 km plus an additional 5.5 km for the loading loop.

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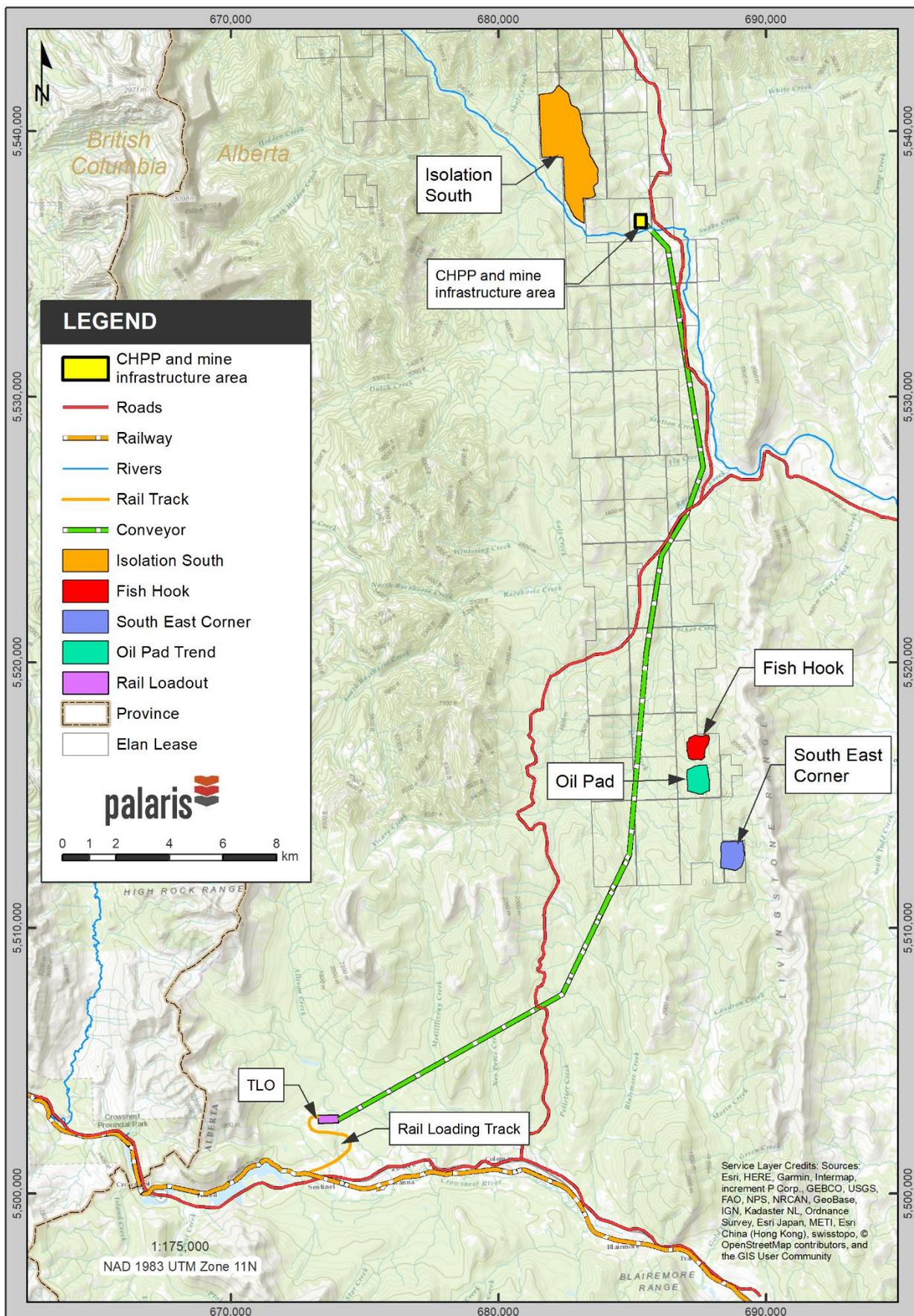


Figure 11: Site and regional logistics plan

## **Rail transport**

Product coal will be railed to coal export terminals in Vancouver on the West Coast of Canada, a distance of approximately 1,100 km from the Project. The rail networks linking the Crowsnest Pass to Vancouver are operated by Canadian Pacific Rail (CPR) and Canadian National Railways (CN).

From the Elan rail loadout site to the west of Coleman, the proposed spur line would connect to the CPR mainline on the northern side of Highway 3. The first section of track is operated by CPR and transports the coal in a north-westerly direction to Kamloops, British Columbia. From Kamloops, the rail network to the West Coast is jointly operated by CPR and CN, with westbound loaded trains using the CN operated tracks and returning trains utilising the CPR operated tracks.

Expected rail quantities are around 16,500 tonnes per train. This equates to approximately one train per day (at 6 Mtpa product HCC (Case 1)) once Elan ramps up to full production.

## **Access**

Preliminary assessment indicates the strong likelihood of there being ample capacity on the CPR / CN lines for the Project's forecast product coal transport requirement of either 6 Mtpa (Case 1) or 4.5 Mtpa (Case 2). Discussions with CPR have indicated track capacity for the full extent of Atrum's requirements, in addition to the expected Grassy Mountain Project output. CPR has an approximate two year required lead time to purchase new rolling stocks, recruit and train operators, and upgrade maintenance shops.

## **10. Port facilities and access**

### ***Westshore and Neptune (Vancouver)***

The Westshore coal terminal in the Vancouver region, British Columbia, is the most attractive option for the Elan Project in terms of both relative proximity (see Figure 1) and expected availability of capacity.

Westshore Terminals Investment Corporation operates the Westshore coal terminal, located on a man-made island at Roberts Bank, 30 km south of Vancouver. Westshore has a nominal capacity of 33 Mtpa, with 31 Mt of shipments exported from the terminal in 2019. It has nine existing contracts with coking and thermal coal producers located in Canada and the north-western US. The largest exporter through Westshore currently is Teck Resources, which accounted for 60% of Westshore's volumes in 2019 (the two largest US coal producers accounted for an additional 31.5%, with approximately 11 Mt of thermal coal shipped in 2019). Teck's current agreement with Westshore concludes in March 2021.

As a result of recent decisions that Teck has made with respect to apparent preferred export logistics – including the expansion of Neptune coal terminal and signed commitment of 6 Mtpa (with an option for up to 9 Mtpa) through the northern BC Ridley coal terminal – there is expected to be significant excess capacity available at the Westshore coal terminal from 2021 (see Table 9).

The Neptune port, located north of Vancouver, is jointly owned by Canpotex Bulk Terminals (54%) and Teck Resources (46%). Neptune primarily exports Canadian potash and metallurgical coal. The Neptune coal terminal is currently being expanded, via funding from Teck, with this work expected to be completed in Q1 2021. This expansion is expected to see metallurgical coal export capacity from Neptune increased to 18.5 Mtpa. However, as a result of the ownership and funding structure, Neptune is essentially dedicated to Teck's shipments in terms of current and planned future coal export capacity.

**Table 9: Existing and planned coal shipment through Vancouver ports (excluding Elan)**

Existing and Planned Shippers	Likely Contracted Volume (Mtpa)	Expected Westshore and Neptune Capacity (2021)
<b>Teck</b> (18.5Mtpa through Neptune from 2021 and some minor volumes through Westshore possible)	20	Westshore (33 Mtpa) Neptune (18.5 Mtpa)
<b>CST Canada Coal Ltd</b>	1.0 – 1.5	
<b>Riversdale Resources (Grassy Mountain)</b>	4.5	
<b>US Thermal Coal</b>	11	
<b>TOTAL</b>	<b>36.5 – 37.0</b>	<b>51.5</b>

Overall, current assessment indicates that there is set to be ample Vancouver port capacity available (at Westshore) to handle the full production output of the Elan Project (both 4.5 Mtpa or 6 Mtpa HCC) on top of the future volumes planned from the Grassy Mountain Project and US Powder River Basin thermal coal producers.

### **Ridley (Prince Rupert)**

An alternative port option on the West Coast is the Ridley coal terminal in Prince Rupert, British Columbia (serviced via CN rail). Ridley Terminals is owned by a partnership that includes AMCI Group, Riverstone Holdings, Lax Kw'alaams Band and Metlakatla First Nation. Ridley primarily exports coal and LPG, with a current coal export capacity of around 18 Mtpa. Teck recently struck an agreement with Ridley Terminals to increase its attributable capacity there from 3 to 6 Mtpa, with further optionality to increase to 9 Mtpa. While there is expected to be some excess capacity at Ridley following the planned expansion, the Ridley terminal is located a further approximate 500 km from the Elan Project, relative to the Vancouver ports.

### **Access**

Atrum plans to commence detailed port (and rail) access preparations during the PFS phase. Rail and port access pricing is not regulated by the Canadian government and commercial discussions are expected to take place as the Elan Project progresses towards PFS completion.

## **11. Environmental and social**

The Project is abutted to the south by Riversdale Resource's Grassy Mountain Project, which is in its final phase of its permitting process. The learnings from the Grassy Mountain process, which has similar or identical environmental, social, geological settings, will be applied and utilised for the environmental baselining, stakeholder engagement, impact assessment and permit application for the Elan Project.

### **Baseline monitoring**

Atrum Coal has commenced a robust and accelerated environmental baseline program to characterise the environmental setting and identify potential sensitive aquatic and terrestrial receptors within the Project area. The results of the baseline program will form the foundation for mine planning (e.g. water management, materials handling) and the effects assessment. Baseline data collection commenced in 2018 and will continue through 2021.

### **Impact assessment**

A comprehensive IA will be prepared to satisfy all components of the Federal Impact Assessment Act (IAA) and Provincial Environmental Protection and Enhancement Act (EPEA). The IA will leverage key learnings identified during the Grassy Mountain Project approval process and incorporate all requisite

elements of the 'new' IAA. This approach will ensure thorough and complete impact assessment work for the Elan Project and reduce the application review timeframe by both the agencies and the public and avoid multiple rounds of Information Requests.

A selenium mitigation and management strategy, which will be incorporated into the overall mine plan, includes surface water management, seepage collection, waste segregation, passive treatment and active treatment. Research and testing conducted by Teck Resources has confirmed the effectiveness of the passive saturated rock fill (SRF) treatment process, which was also employed by the Grassy Mountain Project.

### **First Nations and community engagement**

Stakeholders are categorised into key groupings including indigenous peoples, governments, regulatory agencies and local communities.

The entirety of the Elan Project tenements are located on Crown land and on the Traditional Territory of the Treaty 7 First Nations: Blood Tribe, Piikani Nation, Siksika Nation, Tsuut'ina Nation and Stoney (Chiniki, Wesley, Bearspaw). Atrum has been actively engaging the Treaty 7 First Nations for the Alberta Coal Exploration Permits (CEP) since early 2018. Treaty 7 Nations were also invited to conduct Traditional Land Use Studies (TUS) and Traditional Ecological Knowledge (TEK) Studies at the Elan Project site during the summer of 2019. The information for the TLU/TEK will be combined with other environmental and social baseline data to form the basis for impact assessment.

Active and regular engagement with local communities and various government bodies and agencies has also been underway since 2018. Atrum has established a local office in the Crowsnest Pass and participated in and supported community events and activities, with positive feedback from both the First Nations communities and local municipalities.

## **12. Permitting**

### **Land categorisation**

Under the Coal Development Policy for Alberta (1976), which aimed to designate land zones for coal exploration and development, the Project tenure sits within Category 2 land zoning, generally considered not to be appropriate for open cut mining. In 2016, a precedent was set when Ram River Coal successfully obtained Alberta Government approval to permit an open cut coal mining project on Category 2 land in central western Alberta.

Through various discussions with senior officers, including Ministers and Deputy Ministers, of Alberta Environment and Parks and Alberta Energy, Atrum's confidence in obtaining Alberta Government approval for open cut mining on Category 2 Land has significantly increased over the past year. It is believed that this approval could come in the form of either an approval letter, like in the case of Ram River's Aries Project, or a renouncement of the 1976 Alberta Coal Policy by the Alberta Government. The Coal Association of Canada is also actively engaging the Alberta Government on replacing the outdated 1976 Alberta Coal Policy in order to promote more export based coal (especially metallurgical coal) development in the province.

Atrum plans to maintain its regular, proactive engagement with the Alberta Government and believes it is possible that such an approval could be realised as early as within 2020.

### **Process**

In addition to obtaining approval to permit open cut mining on Category 2 Land, other streams of work needed in order to support the environmental impact assessment and over project permits include:

- Environmental baseline study to cover all impact areas, including Isolation South and the transportation corridor, followed by Impact Assessment.

- Ongoing mine planning and evaluation activities to form the project lifetime scope and impact zones for permitting.
- Further extension of stakeholder engagement to other First Nations and community stakeholders in Alberta and British Columbia, as identified in the Grassy Mountain Project engagement process.
- Preparation of various provincial permits from mining operation to water licensing and land use.

Atrum is planning to submit its Impact Assessment for the Elan Project approximately 12 to 15 months after commencement of a PFS. With an estimated approvals timeframe of approximately 24 months from submission, this has the grant of mining permit and all necessary approvals targeted for securement approximately 3 years after commencement of the PFS (see Figure 18).

### 13. Operating costs

Operating costs for the Project are characterised by relatively low site costs. Overburden removal costs are favourable due to the low stripping ratios over the LOM, driven largely by the Isolation South pit. The Project has higher ex-mine costs relative to some Australian coking coal producers largely reflecting the railing distance of approximately 1,100 km to the preferred Westshore port.

Rail and port loading operating costs are largely based on actual or expected costs reported by nearby operating and proposed coal mining operations. Mine closure costs have not been estimated due to limited information on the final landform required and because they are considered to be immaterial to overall project economics.

Total product unit operating costs (FOB Vancouver) are estimated at US\$81/t (Case 1) or US\$84/t (Case 2). Refer to Table 10 for a more detailed composition of those operating cost estimates.

**Table 10: Project operating cost summary**

Operating Costs	Units	10 Mtpa ROM	7.5 Mtpa ROM
Overburden removal (incl rehab)	US\$/bcm	3	3
	US\$/t ROM	12	12
Coal mining (incl labour)	US\$/t ROM	2	2
Road transport	US\$/t ROM	1	1
Services, ancillary & overheads	US\$/t ROM	6	7
Equipment Lease	US\$/t ROM	2	3
<b>Pit-Top ROM Cash Cost</b>	<b>US\$/t ROM</b>	<b>23</b>	<b>24</b>
Coal handling and preparation, rejects, loadout	US\$/t ROM	4	4
<b>Free on Rail (FOR) Cash Cost</b>	<b>US\$/t ROM</b>	<b>27</b>	<b>28</b>
	<b>US\$/t saleable</b>	<b>44</b>	<b>46</b>
Rail and port	US\$/t saleable	29	29
Marketing, commissions and other	US\$/t saleable	1	1
Corporate charges	US\$/t saleable	1	1
<b>Total Ex Mine Costs (excl. Royalty)</b>	<b>US\$/t saleable</b>	<b>75</b>	<b>77</b>
Royalties	US\$/t saleable	6	6
<b>Free on Board (FOB) Cash Costs</b>	<b>US\$/t saleable</b>	<b>81</b>	<b>84</b>

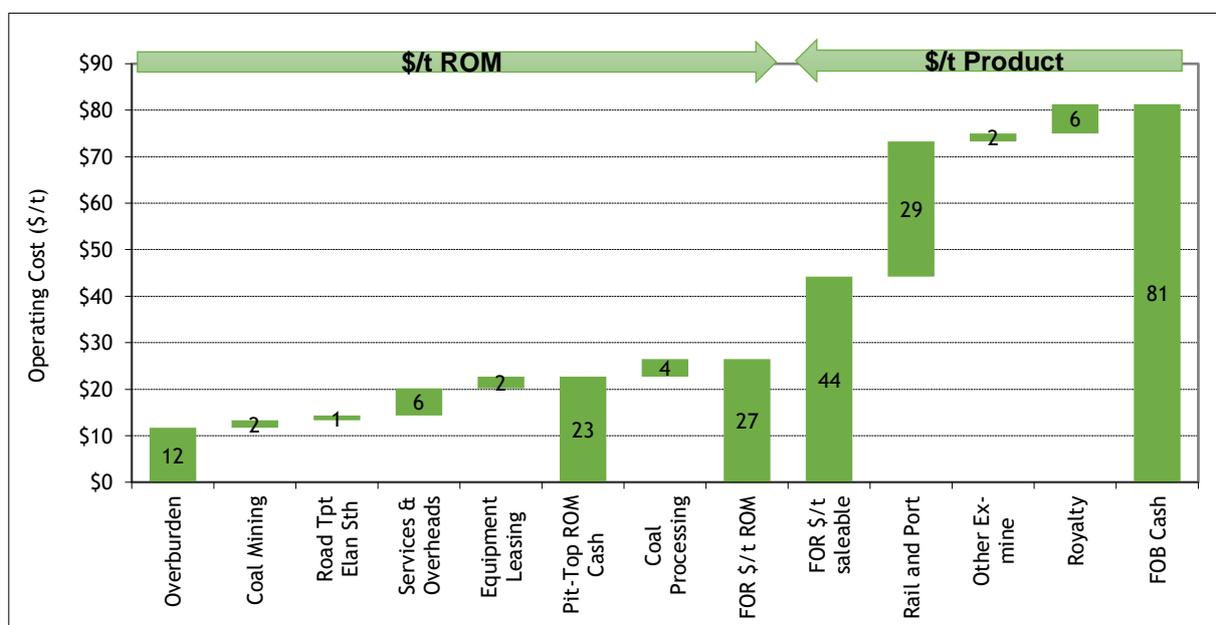
Operating cost estimates are comparable to both Teck's 2019 actuals<sup>1</sup> and the proposed Grassy Mountain operation<sup>2</sup> (as shown in Table 11).

**Table 11: Operating cost benchmarking**

Cost Parameters	Unit	Teck 2019 Actual	Grassy Mountain LOM Target	Elan 10 Mtpa ROM
Site costs	US\$/t saleable	49*	40	44
Rail and port costs	US\$/t saleable	29	29	29
Corp / G&A / inventory chg.	US\$/t saleable	1	1	1
<b>FOB ex royalty, marketing</b>	<b>US\$/t saleable</b>	<b>79</b>	<b>70</b>	<b>74</b>

\* Total cost of sales includes amortization of capitalized stripping and other depreciation costs

Figures 12 and 13 depict unit operating cost waterfall charts for the 10 Mtpa ROM and 7.5 Mtpa ROM cases respectively.



**Figure 12: Operating cost waterfall for 10 Mtpa ROM (Case 1) - US\$/t ROM and US\$/t saleable**

<sup>1</sup> Teck Resources Quarterly Report (Unaudited Annual and Fourth Quarter Results for 2019)

<sup>2</sup> Riversdale Resources Target Statement, Independent Technical Review by RPM Global

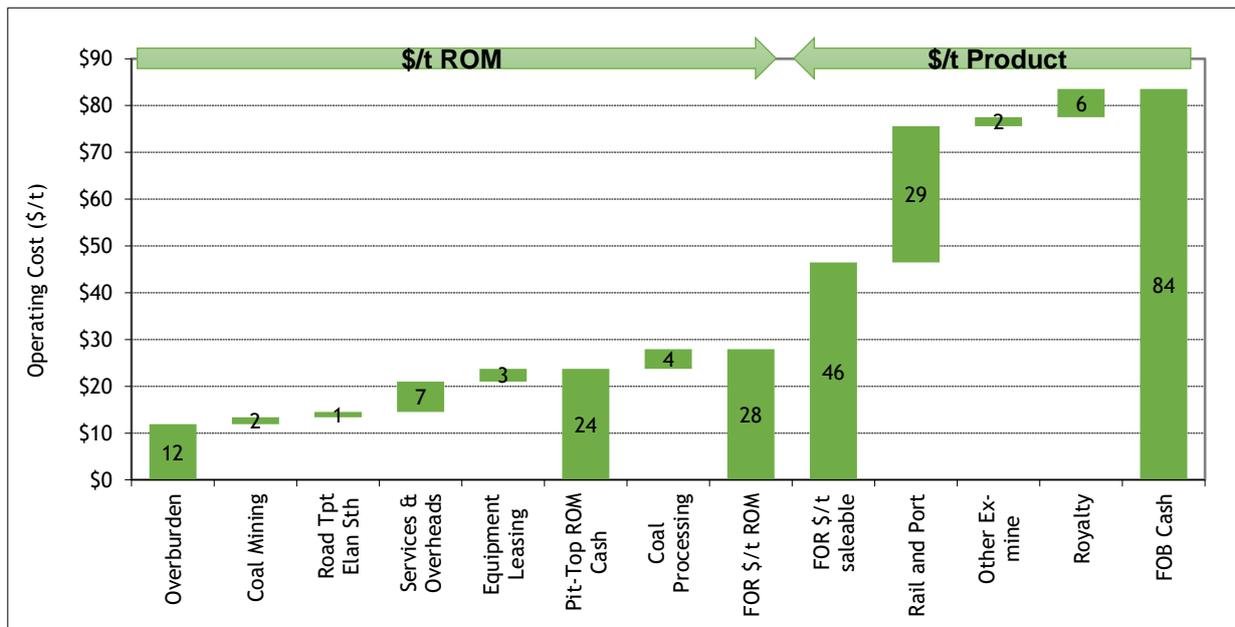


Figure 13: Operating cost waterfall for 7.5 Mtpa (Case 2) - US\$/t ROM and US\$/t saleable

#### 14. Capital costs

Forecast pre-production capital expenditure to develop the Elan Project is estimated at US\$683M (10 Mtpa ROM) and US\$587M (7.5 Mtpa ROM).

The main capex items include mine infrastructure, a 1,650 tph coal handling and preparation plant (CHPP), a 36 km covered conveyor product transport system to the train loadout area, and a rail spur and loop.

The pre-production capital cost estimates for each case are presented in Table 12 using the work breakdown structure (WBS) adopted for the Project. The target order of accuracy for these estimates is 35% - 40%.

Table 12: Pre-production capital expenditure estimate

Item Description	Contingency	10Mtpa ROM US\$M	7.5Mtpa ROM US\$M
Owners Costs - exploration, feasibility studies, approvals / EIA process, owners team / EPCM	10%	45	45
Surface Infrastructure - on and off-site civils, MIA / buildings, water and waste management, utilities to site, rail loadout	21%	151	148
Coal handling and preparation civils, ROM and raw coal handling at CHPP	15%	69	45
Coal processing plant	15%	122	88
Product coal handling and conveyor, product drying, and reject dewatering and emplacement	15%	102	69
Overland covered conveyors 36km - CHPP to TLO	20%	182	182
Contractor indirects	30%	12	10
<b>TOTAL</b>	<b>18%</b>	<b>683</b>	<b>587</b>

Sustaining capex of US\$1.7/t ROM has been estimated using unit rates derived from similar operations in consideration of the Elan Project's proposed fixed infrastructure and mining operations.

## 15. Financial analysis

Financial estimates for the Elan Project were developed by Palaris using a discounted cash flow (DCF) model. The base case operation (including both production cases) is assumed to be managed by Atrum as an owner operated mine, with mobile equipment leasing.

The intended estimation accuracy of the Scoping study is +/- 35 to 40%. Individual inputs for the financial model are at varying levels of accuracy with higher levels of accuracy for the majority of fixed infrastructure based on budget quotes, while factored estimates and costs sourced from Palaris' database make up the remainder.

### *Basis of estimates*

The estimate was prepared under the following assumptions:

- A **discount rate of 9%** was used for discounted cash flow modelling.
- The financial outcomes are intended to provide a high-level assessment and not a valuation in accordance with the VALMIN Code (2015).
- Costs are quoted in **real** US dollar 2020 terms, unless otherwise stated.
- Cash flow periods are expressed annually in calendar years.
- No stockpile adjustments have been applied; and it is assumed that all coal produced within a calendar year is sold within the same period.
- All financial assessments have been undertaken on a 100% project ownership (full equity) basis.
- Mobile equipment is assumed to be leased over a 5-year period using a 7% p.a. leasing charge, and lease principal repaid in equal annual instalments.
- Sunk costs and any expenditure to date has not been considered for valuation purposes.
- All costs are stated exclusive of GST.
- Canadian corporate tax (15%) and provincial tax (8% from 2022) have been applied to taxable income with no allowance for internal structuring, tax credits or arrangements to minimise tax. Royalties are based on the Alberta Coal Royalty Guidelines published in 1993 for bituminous coal.
- Depreciation of project capital has been applied using the double declining balance method with full asset write-off at conclusion of useful life. Nominal depreciation schedule has been adjusted down to real depreciation assuming a constant inflation rate of 2% (this is due to modelling in real cash flows and is intended to capture a fixed depreciation schedule against rising revenues and costs). Depreciation is used only for calculating a deduction against taxable income.
- No consideration is given to future productivity improvements, technological advances, force majeure conditions or industrial relations disruptions.
- Quantities stated are metric (SI units).

### *Hard coking coal price assumptions and revenue factors*

The LOM price forecast adopted for premium low-volatile HCC (FOB Queensland) is US\$141/t. This is based on the long-term real hard coking coal price forecast provided by Consensus Economics (February 2020). It also compares with the prevailing spot price FOB Queensland of approximately US\$150-165/t during mid/late March 2020, and the quarterly average price of nearly US\$180/t over the past decade.

Global demand for HCC is expected to maintain growth through to at least 2025 predominantly due to continued high levels of steel production in China, Japan and South Korea, plus significant growth in demand for seaborne HCC from India.<sup>3</sup> The global HCC market is well-supported in the long-term as the coke oven/blast furnace route accounts for approximately 75% of world steel production and there is no viable baseload substitute for hard coking coal in that process.

With a forecast 2% discount applied for Elan HCC products (reflective of approximate long-term market discounts for equivalent HCC products), this equates to a realised Elan HCC price of approximately US\$138/t FOB Vancouver.

The long-term C\$/US\$ foreign exchange rate forecast of 0.79 (current spot is 0.71) has also been adopted from Consensus Economics. This exchange rate drives all US\$ cost assumptions that are denominated in C\$ (which is much of the forecast Elan operating cost base).

The Project is subject to the Alberta Coal Royalty Guidelines (1993) under the Bituminous Coal category. The coal royalty is calculated in two phases: (1) prior to project payback; and (2) subsequent to project payback. Prior to project payback, the royalty is 1% of gross coal revenue less transport expenses. Subsequent to project payback, the royalty is 1% of gross coal revenue plus 13% of the net revenue (coal revenues less deductible costs).

### **Key financial metrics**

Forecast LOM financial metrics for development of the Elan Project in-line with the Scoping Study parameters are summarised in Table 13. These metrics are provided for Case 1 (10 Mtpa ROM) and Case 2 (7.5 Mtpa ROM).

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<sup>3</sup> Australian Government, Dept of Industry, Science, Energy and Resources, Resources and Energy Quarterly March 2020

Table 13: Key financial metrics

Key financial outcomes	Unit	10 Mtpa ROM	7.5 Mtpa ROM
<b>Price inputs (LOM average)</b>			
C\$/US\$ (long term forecast)	USc	0.79	0.79
HCC price (Platts Premium LV FOB Queensland)	US\$/t	141	141
HCC price (Elan MV HCC FOB Vancouver)	US\$/t	138	138
<b>NPV, returns and key metrics</b>			
NPV <sub>9%</sub> (post-tax, real basis, ungeared, Y-1 basis)	US\$M	860	790
NPV <sub>9%</sub> (pre-tax, real basis, ungeared, Y-1 basis)	US\$M	1,180	1,070
IRR (post-tax, real basis, ungeared, Y-1 basis)	%	25	26
IRR (pre-tax, real basis, ungeared, Y-1 basis)	%	29	30
Payback period (post-tax, from first production)	years	4.4	3.9
Payback period (pre-tax, from first production)	years	4.0	3.6
<b>Capital expenditure</b>			
Pre-production capital expenditure	US\$M	683	587
LOM sustaining capital expenditure	US\$ / ROM t	1.7	1.7
Capital efficiency (post-tax NPV / PP capex)	x	1.3	1.3
<b>Operating costs</b>			
Mining	US\$/t ROM	23	24
Processing	US\$/t ROM	4	4
Free on Rail (FOR) cash cost	US\$/t ROM	27	28
	US\$/t saleable	44	46
Rail transport and port	US\$/t saleable	29	29
Marketing, commissions and corporate	US\$/t saleable	2	2
Royalties	US\$/t saleable	6	6
Total cash operating cost - Free on Board (FOB)	US\$/t saleable	81	84
<b>Project cashflow (ungeared, approx.)</b>			
Gross revenue	US\$M	10,450	10,450
Operating costs	US\$M	(6,160)	(6,320)
Operating cashflow	US\$M	4,290	4,120
Pre-production capital expenditure	US\$M	(680)	(590)
Sustaining capital expenditure	US\$M	(220)	(220)
Project net cashflow (pre-tax)	US\$M	3,400	3,340
Project net cashflow (post-tax)	US\$M	2,610	2,580

### Cash flow and rolling NPV estimates

Projected LOM cashflow is shown in Figures 14 (10 Mtpa ROM) and 15 (7.5 Mtpa ROM).



Figure 14: Forecast LOM cashflow (10 Mtpa ROM)

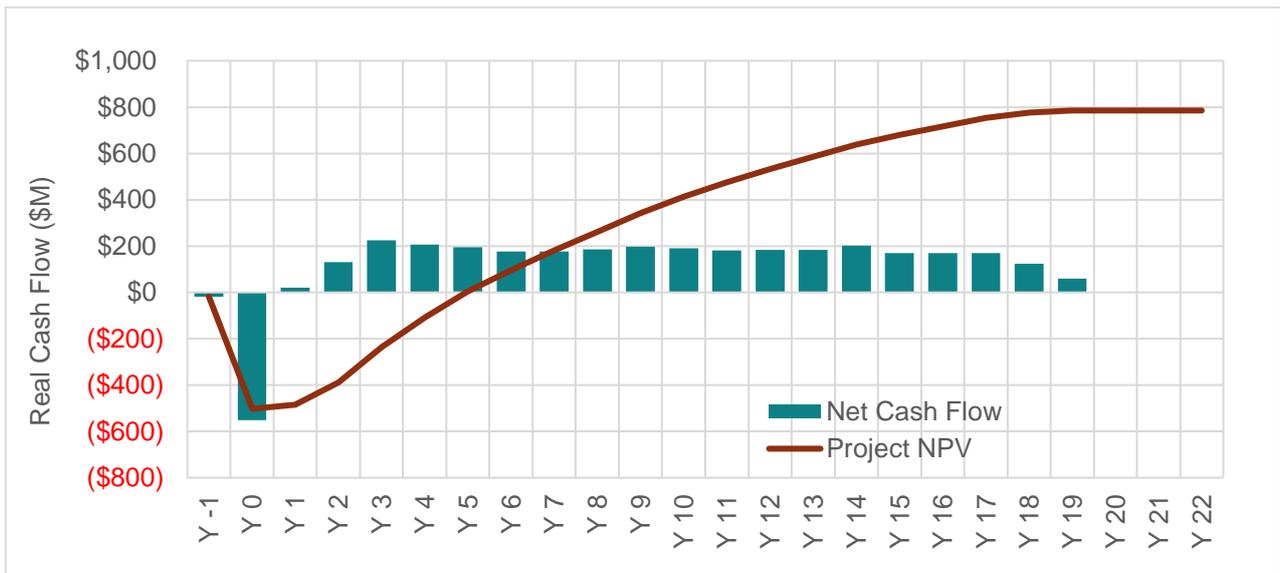


Figure 15: Forecast LOM cashflow (7.5 Mtpa ROM)

Following the significant pre-production capital expenditure invested in Year 0, full production is forecast to be reached by Year 5 for the 10 Mtpa ROM development (Case 1) and Year 3 for the 7.5 Mtpa development (Case 2). The Project is expected to achieve post-tax payback in approximately four years under both cases.

### Financing alternatives

Financial modelling for the Scoping Study has been undertaken based on an owner-operated model. This approach typically provides the lowest operating costs but also has the highest capital outlay. The base case does however assume that mobile mining equipment has been leased<sup>4</sup>.

<sup>4</sup> Mobile equipment is assumed to be leased over a 5-year period using a 7% p.a. leasing charge, and lease principal repaid in equal annual instalments

The Scoping Study included a review of other potential capital financing arrangements. An alternative approach would be to adopt a build, own, operate and transfer (BOOT<sup>5</sup>) model for coal handling, processing, conveying and rail loadout/loop systems. This would still be proposed to be coupled with mobile equipment leasing. Such an approach would naturally substantially lower upfront development capital cost but with the trade-off of increasing forecast operating costs.

An indicative BOOT and mobile equipment leasing development approach would be expected to reduce pre-production capital expenditure to US\$140M - 150M under both development cases (see Table 14). The project NPV and expected IRR also improve significantly relative to the base case estimates.

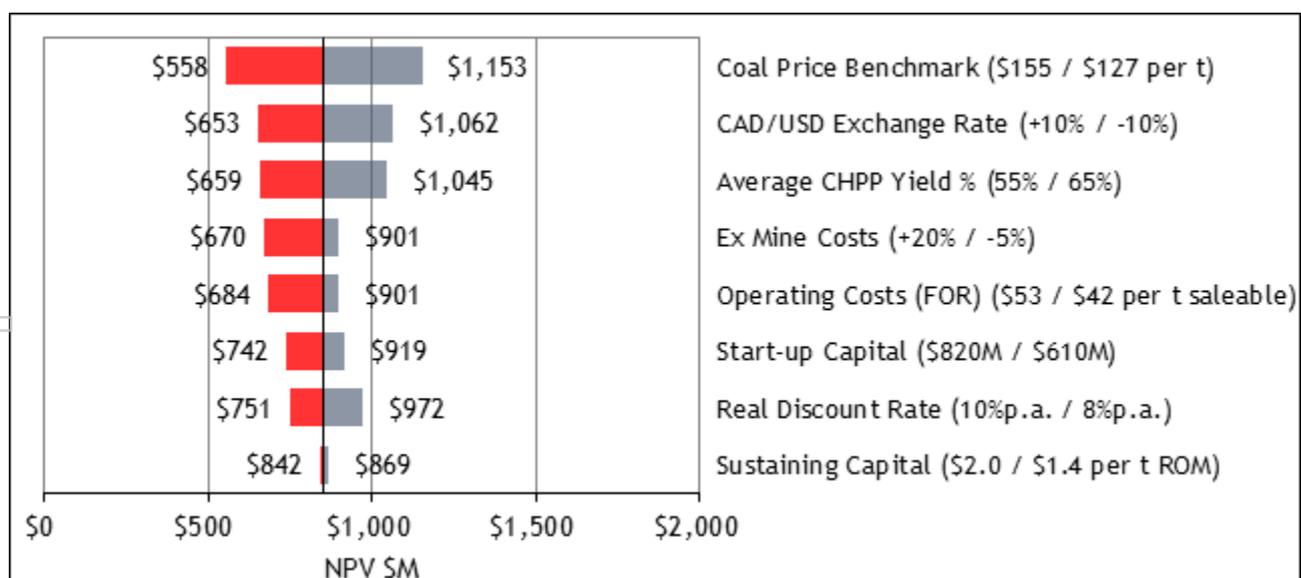
**Table 14: Financial metrics under BOOT arrangement plus mobile equipment leasing**

Parameter	Unit	10 Mtpa ROM	7.5 Mtpa ROM
NPV <sub>9%</sub> real post-tax	US\$M	1,020	910
IRR real post-tax	%	52	54
Pre-production CAPEX	US\$M	147	142
FOB cash cost	US\$/t saleable	89	90
BOOT – finance charge	%	7	7
BOOT – payment term	years	15	15

### Sensitivity analysis

The key revenue metrics of HCC price and C\$/US\$ exchange rate are the most important determinants of NPV outcomes. Yield, CAPEX and OPEX estimates are also key fundamental value drivers.

The sensitivity of the Elan Project NPV to key inputs is shown in Figures 16 (10 Mtpa ROM) and 17 (7.5 Mtpa ROM).



**Figure 16: NPV sensitivity tornado chart for 10 Mtpa ROM case (US\$860M NPV real post-tax)**

<sup>5</sup> 15-year BOOT period, with the CAPEX portion amortised over each annual payment

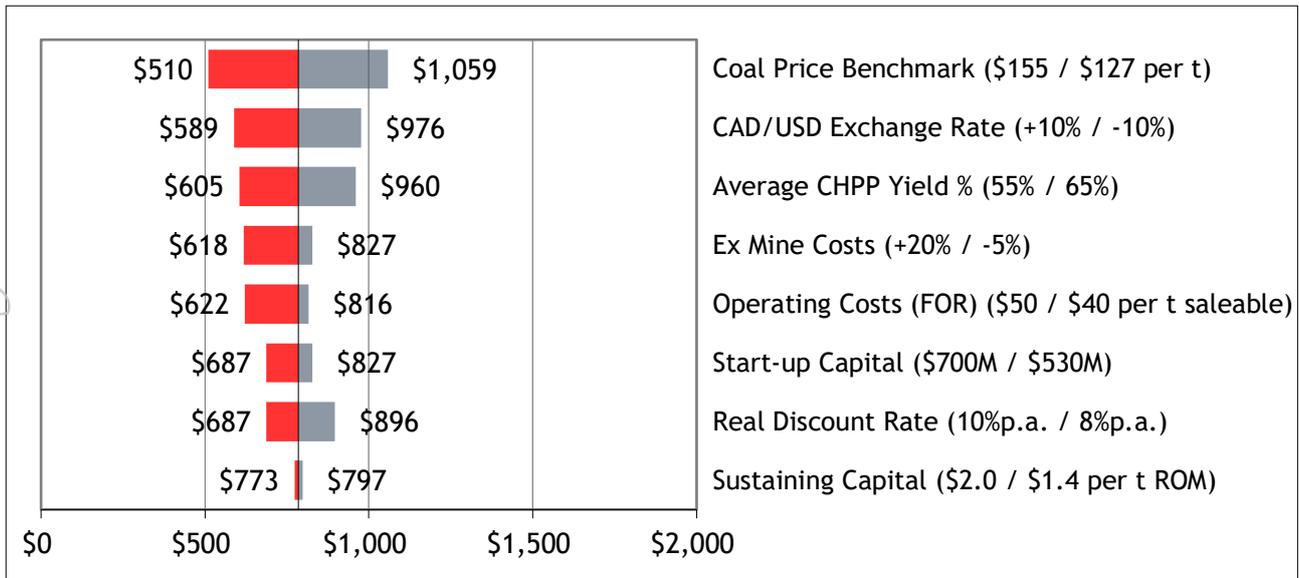


Figure 17: NPV sensitivity tornado chart for 7.5 Mtpa ROM case (US\$790M NPV real post-tax)

## 16. Project development schedule

When practicable, Atrum intends to commence an accelerated exploration program targeting Isolation South. The aim of the program is to rapidly upgrade resource classification and acquire the necessary residual data to underpin a PFS on the Elan Project. From commencement of that exploration program, Atrum is targeting completion of a PFS within approximately 12 months.

Approximately 3 to 4 months post completion of the PFS, Atrum is targeting submission of its Project Description and then Impact Assessment (IA) to the Alberta Energy Regulator and the Federal Impact Assessment Agency, thereby commencing the approvals process.

Alongside completion of a Definitive Feasibility Study (DFS) on the Project (over the approximate 9 to 12 months post IA submission), the estimated approvals timeframe of approximately 24 months from IA submission sees the grant of mining permit and all necessary approvals targeted for approximately 40 months after commencement of the accelerated PFS exploration program.

A basic project development timeline is provided in Figure 18.

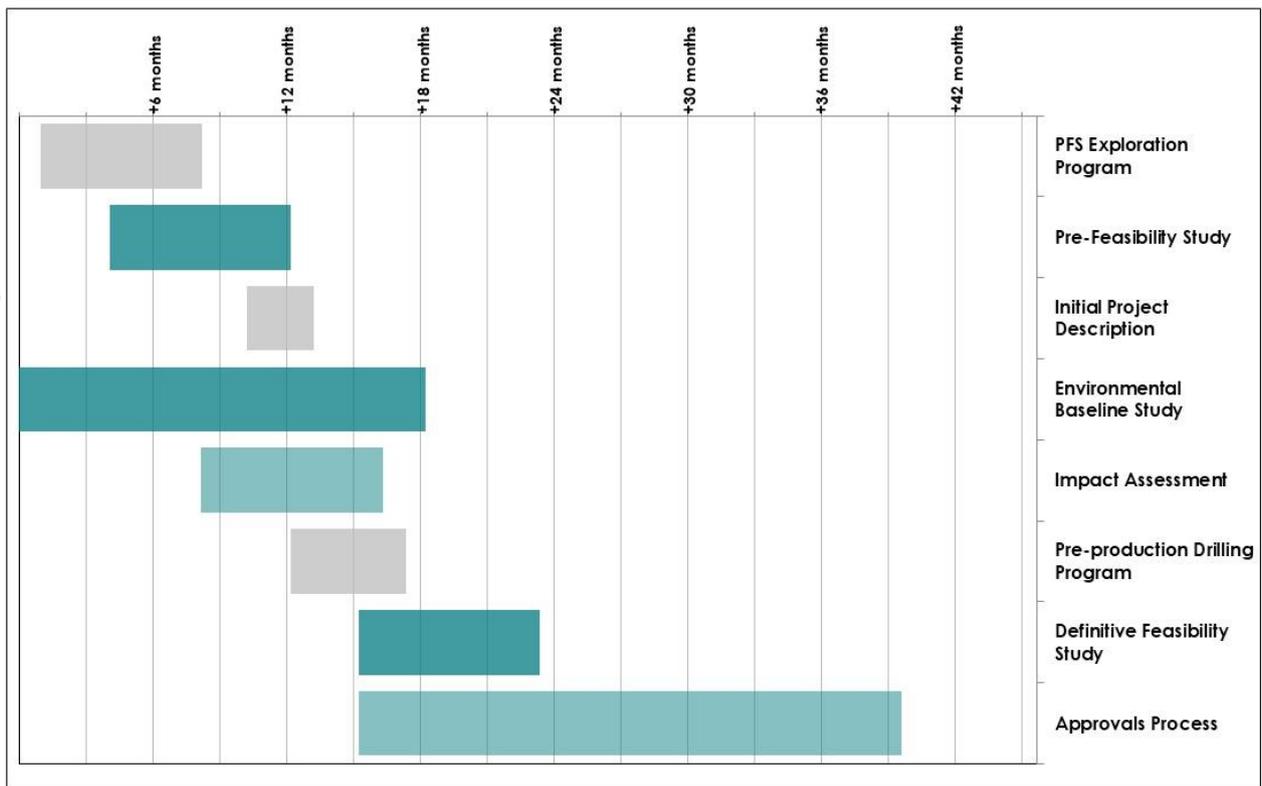


Figure 18: Project development timeline

## 17. Key risks

Key project risks and mitigation measures identified during the Scoping Study process are summarised in Table 15.

Table 15: Project risks

Risk	Issue Description/Finding	Risk	Potential Controls
<b>Land categorisation</b>	Land categorised as Category 2 under the Coal Development Policy for Alberta (1976)	High	Engagement of Alberta Government (Ram River Aries Project precedent), conversion to Category 4
<b>Stakeholder relations</b>	Need a strong relationship with the First Nations and other stakeholders and their support for the project development	High	Proactive engagement, meaningful consultation and future employment opportunity creation
<b>Selenium</b>	Potential for rock storage area(s), coarse coal reject and other mining related material to leach Selenium creating elevated levels in the receiving environment.	High	Mine Planning and design to ensure that potential selenium sources and all mitigation strategies (e.g. Saturated backfill) are incorporated.
			Holistic water management approach to minimize contact water and capture/treat all water emanating from disturbed areas.
			Potential water treatment solution for final discharge point to ensure compliance in the receiving environment (final option).
<b>Westslope Cutthroat Trout habitat</b>	Listed as threatened under provincial and federal regulations. The proposed 2019 Westslope Cutthroat trout recovery and action plan identifies Daisy Creek as critical habitat.	High	Providing a robust offsetting and enhancing plan for habitat that is directly impacted by mine development
<b>Approval timeframe longer than anticipated</b>	Uncertain approvals timeframe	High	Streamline the approvals process, learning from Grassy Mountain, engagement with AER and Federal IAA

<b>Conveyor and road hauling</b>	Environmental issues relating to covered conveyor belts and / or truck hauling	Medium	Further work to optimise logistics plan and minimise environmental impacts during PFS
<b>Land use and access</b>	Need to secure land use and access rights for conveyor and rail	Medium	Mostly on Crown land; start any required negotiation with private land parcel owner(s) during the PFS phase to secure access
<b>Water licence</b>	Need transfer of existing water licenses and/or allocations	Medium	Proactive and early engagement of Alberta Environment and Parks (AEP) as well as the AER to address the water source issue. Progress has been made with AEP.
<b>Aquatic health</b>	Potential for elevated levels of parameters of interest within the receiving environment resulting in bioaccumulation within sensitive aquatic receptors	Medium	Water management planning, mine design and rock management strategy, defining aquatic receptor thresholds for impact assessment.
<b>Metal Leaching/Aid Rock Drainage (ML/ARD)</b>	Similar to Selenium, leaching of metal and acid from mine rocks/waste (e.g. Cadmium, Sulphate, etc.) entering the receiving environment needs to be mitigated.	Medium	Rock management and disposal area strategies to ensure that material blending targets a net neutral (i.e. non-potential acid generating) ratio and minimizes probability of acidic conditions developing. Combine the mitigation strategy with selenium solutions to ensure effectiveness and efficiency.
<b>Vegetation</b>	Vegetation within the project footprint includes rare and endangered plants, Whitebark Pine, and Fescue ssp. (e.g. Rough Fescue)	Medium	Conservation and reclamation plan will be developed to incorporate consideration for managing identified species.
<b>Wildlife</b>	Potential for habitat fragmentation and direct impacts to certain species (e.g. amphibian, songbirds) natal territory as a result of mine development.	Medium	Mine closure planning, progressive reclamation, avoidance of sensitive ecosystems with high wildlife values (e.g. wetlands).
<b>Proposed production levels not achieved</b>	Out-of-pit spoil capacity may be insufficient in SE Corner area	Medium	Investigate opportunities to sequentially mine and backfill the three Elan South pits in PFS
<b>Accuracy of geological models</b>	Potential for differences in pit ROM tonnes and stripping ratio based on geological complexity and early stage of exploration	Medium	Further exploration work to increase geological confidence, upgrading of resource classification and detailed mine design during next phase of study
<b>Coal quality</b>	Potential for further testing to indicate a lower coal quality than the data has shown to date	Low	Historical data and testing to date have provided a reasonable confidence. Conduct more comprehensive testing in the next phase to further confirm the coal quality.
<b>Proposed production levels not achieved</b>	Geotechnical risks associated with steep dips, complex structure and bedding plane weaknesses in Elan South pits	Medium	Undertake comprehensive exploration and geotechnical sampling and testing in order to underpin geotechnical design parameters in further studies.
<b>Key personnel</b>	The loss of key personnel and failure to recruit and retain qualified staff for critical positions needed to progress the project into the next phases	Medium	Focused effort in staff recruitment and development, competitive compensation including share-based compensation as incentives and a retention tool.
<b>Project funding</b>	Failure to secure funding for project exploration and development as well as start-up CAPEX	Medium	Produce high quality PFS and DFS and work closely with advisors to progress and execute on project financing options.

## 18. Key opportunities

### *Isolation South pit expansion*

As outlined in Section 5, pit optimisation and mine planning activities resulted in a practical pit shell at Isolation South containing 188 Mt ROM coal. However approximately 108 Mt ROM coal of in-pit Inferred resources at Isolation South were then excluded from the Scoping Study mine schedule and production target presented (leaving 80 Mt ROM coal from Isolation South in the schedule), in accordance with the current ASIC/ASX regulatory framework.

Incorporation of these in-pit Inferred resources, via targeted upgrade into Measured and/or Indicated classification, offers substantial potential upside to Elan Project economics through mine life extension, lower average strip ratio and future output expansion.

Another clear opportunity would be deferred commencement of Elan South. The scale and extremely favourable geology of the Isolation South deposit, plus the planned location of the CHPP proximate to Isolation South, means that sole sourcing ROM coal from the Isolation South mine in the early years (at either of 10Mtpa or 7.5Mtpa) would likely allow for greater development and operating simplicity, lower pre-production capital and lower strip ratios (and operating costs) in those initial years.

### *Further exploration and resource growth*

As outlined in Section 4, substantial resource upside exists across the entire Elan Project tenement base, including at Isolation South and Elan South. This potential is targeted to be further realised by Atrum via further extensional drilling in future field programs.

Further resource delineation has the clear potential to supplement the currently planned Elan Project development by extending operating life, delivering expansion potential and/or lowering average strip ratios.

Moreover, the total areal footprint of the Elan tenement base, combined with its thick, shallow and high-quality coal seam depositions, evidences clear potential for it to host multiple, large Tier 1 hard coking coal developments. Teck Resources' proximate Elk Valley complex produces over 25Mtpa of premium HCC from several mines.

### *BOOT financing*

As outlined in Section 15, by utilising BOOT arrangements for several major capital items, total pre-production capital requirements could be reduced by approximately US\$430 - 530M.

This would reduce total pre-production capital to US\$140 - 150M for both the 10Mtpa and 7.5Mtpa cases. It would also increase post-tax NPV<sub>9%</sub> and IRR metrics to US\$910 - 1,020M and 52 - 54%, respectively.

### *Process yield increase*

As outlined in Section 6, regional experience shows Teck Resources' Elk Valley mines, with similar raw coal ash content range, have processing yields that typically range from 60 to 70% (which compares with the 60% assumption utilised for the Scoping Study). More detailed Isolation South washability testwork results are expected in the next few months. Additional sampling, testing and simulated yield modelling are also required for the PFS phase in order to arrive at a reliable overall production yield..

### *HCC price and C\$/US\$ inputs*

As outlined in Section 15, the Scoping Study HCC benchmark price forecast of US\$141/t (FOB Queensland) is based on the long-term real hard coking coal price forecast provided by Consensus Economics (February 2020). It compares with the prevailing low-vol HCC spot price FOB Queensland of approximately US\$155 - 160/t in mid/late March 2020, as well as the quarterly average price of nearly US\$180/t over the past decade.

The long-term C\$/US\$ foreign exchange rate forecast of 0.79 has also been adopted from Consensus Economics. This exchange rate drives all US\$ cost assumptions in the Scoping Study that are

denominated in C\$ (which is much of the forecast Elan operating cost base). The current spot C\$/US\$ exchange rate is 0.71.

## 19. Conclusions and next steps

The Elan Project is now set for transition into the Pre-Feasibility Study (**PFS**) phase, in parallel with accelerated resource drilling and further coal quality testing (both focused predominantly on Isolation South).

Current social and operating constraints associated with the COVID-19 pandemic have meant that full commencement of these activities is necessarily paused, with work limited to predominantly desktop study activities for the time being. The Atrum Board will be regularly reassessing this status as global and regional conditions evolve over coming months. Beyond this period, Atrum's focus remains the rapid progression of the Elan Project through key evaluation phases (PFS and DFS) and into development.

## 20. Reasonable basis for funding assumption

To achieve the range of outcomes indicated in the Scoping Study, pre-production funding in excess of US\$700M may be required.

There is no certainty that Atrum will be able to source that amount of funding when required. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Atrum's shares. It is also possible that Atrum could pursue other value realisation strategies such as a sale, partial sale or joint venture of the Elan Project. This could materially reduce Atrum's proportionate ownership of the Elan Project.

An assessment of various funding alternatives for the Elan Project has been made based on precedent funding transactions in the coking coal mining industry.

Atrum has formed the view that there is a reasonable basis to believe that requisite future funding for development of the Elan Project will be available when required. There are a number of grounds on which this reasonable basis is established:

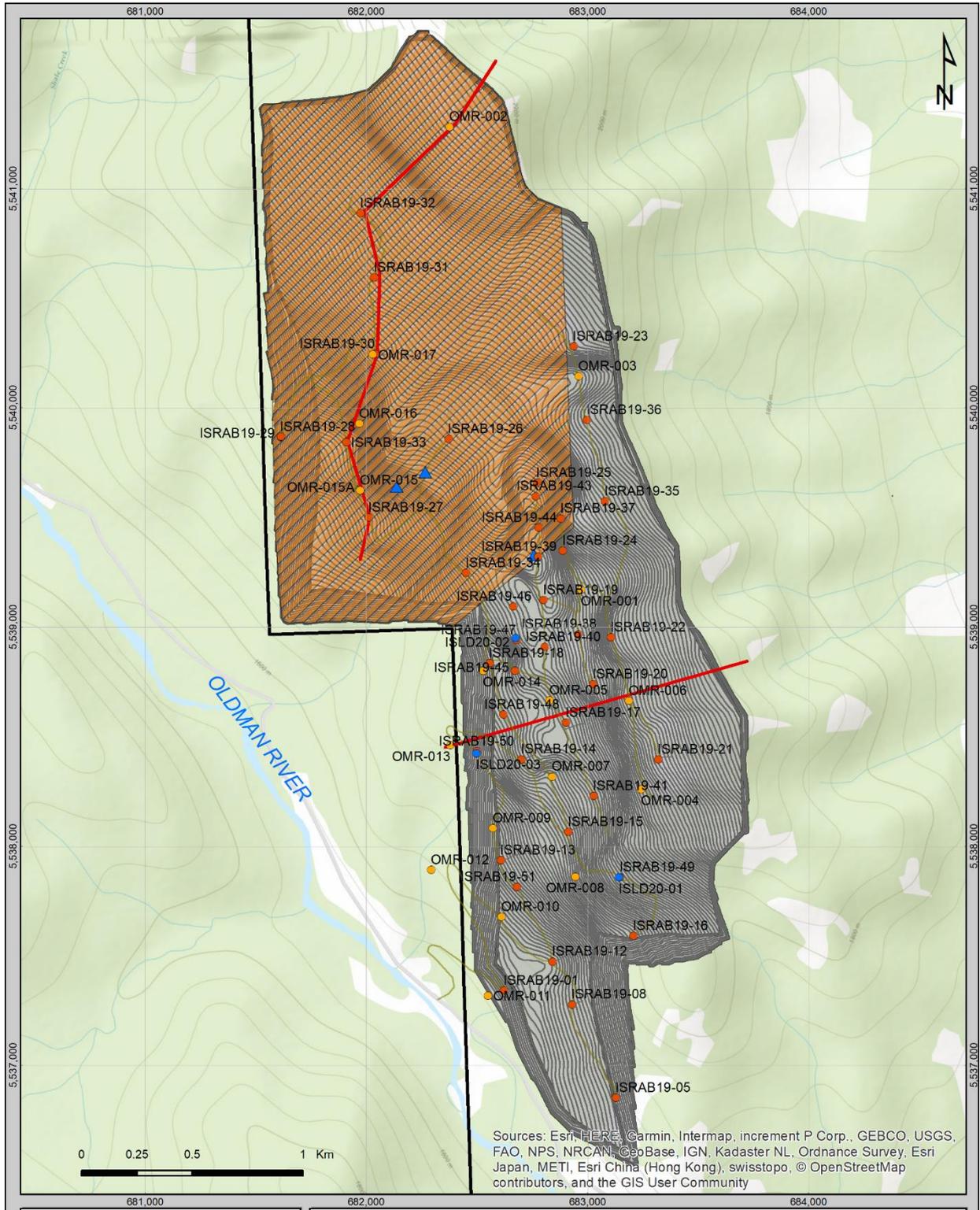
- Global debt and equity finance availability for high-quality coking coal projects remains robust. Recent examples of significant funding being made available for progression or construction of metallurgical coal projects, and/or strategic acquisitions of such projects, that are owned by Australian listed or unlisted companies include:
  - Golden Investments (Australia) Pte. Ltd launching an on-market takeover offer at A\$1.00 cash per share for the residual interest in Stanmore Coal Limited (ASX:SMR) in April 2020, valuing this residual stake at approximately A\$175M;
  - Warburton Group acquiring 16.7% of Atrum Coal Limited (ASX:ATU) for total cash consideration of A\$13M in March 2020;
  - TerraCom Limited (ASX:TER) seeking to acquire over 90% of the shareholding in Universal Coal Plc (ASX:UNV) and proceed to a mandatory sell-out process in March 2020;
  - Bowen Coking Coal (ASX:BCB) receiving a finance facility of up to A\$15M and a marketing agreement with M Resources in March 2020;
  - Tiger's Realm Coal Limited (ASX:TIG) raising new equity funding of A\$58M via an accelerated renounceable entitlement offer (February 2020) for its Amaam North and Amaam Projects Chukotka, Russia;
  - Aspire Mining Limited (ASX:AKM) securing A\$33M of new equity funding (placement to major strategic shareholder in September 2019) for its Ovoot Project in Mongolia;

- TerraCom Limited (ASX:TER) achieving a new US\$80M term loan facility in July 2019 for its BNU Mine in Mongolia, and Blair Athol Mine in Queensland, Australia;
  - Hancock Prospecting Limited acquiring the remainder of Riversdale Resources Limited (unlisted), owner of the Grassy Mountain Project in Alberta, Canada, in May 2019 for total cash consideration of approximately A\$650M (valuing 100% of Riversdale at approximately A\$800M);
  - TerraCom Limited (ASX:TER) securing A\$35M of new equity funding (entitlement offer) and US\$20M of convertible bond finance (from OCP Asia) in May 2019 for its BNU Mine in Mongolia, and Blair Athol Mine in Queensland, Australia;
  - Kingfisher Capital Pte Ltd acquiring 8.2% of Riversdale Resources Limited (unlisted), owner of the Grassy Mountain Project in Alberta, Canada, in December 2018 for an undisclosed total cash consideration.
  - Aspire Mining Limited (ASX:AKM) raising A\$15M of new equity funding (placement to major strategic shareholder and Noble Group in December 2018) for its Ovoot Project in Mongolia;
  - Allegiance Coal Limited (ASX:AHQ) obtaining C\$7M of new equity funding (announced November 2018) from staged placement to major coal player, Itochu Corporation of Japan, for its Tenas Project in British Columbia, Canada;
  - Hancock Prospecting Limited acquiring 19.99% of Riversdale Resources Limited (unlisted), owner of the Grassy Mountain Project in Alberta, Canada, in August 2018 via a A\$69M placement of new equity;
  - Jameson Resources Limited (ASX:JAL) achieving staged project equity funding from Bathurst Resources Limited (ASX:BRL) for up to a total of C\$121M in exchange for 50% equity ownership in its Crown Mountain Project in British Columbia, Canada (announced June 2018; first two tranches now paid); and
  - Bounty Mining Limited (ASX:B2Y) undertaking an Initial Public Offering (IPO) to successfully raise A\$18M of new equity funding in June 2018 for its Cook Colliery Project in Queensland, Australia.
- Atrum has held preliminary, confidential discussions with respect to project and corporate funding/ownership with a number of potential strategic partners and financiers. These include international mining companies, trading houses, senior lenders and other parties capable of providing up to 100% of the financing required to develop the Elan Project. These discussions have indicated that the Elan Project possesses physical and financial attributes that deliver Atrum a reasonable likelihood of securing the requisite funding for its development as it is required.
  - The Elan Project is world-class by scale and hard coking coal quality parameters. The technical and financial parameters detailed in the Elan Project Scoping Study are robust and economically attractive (US\$790 - 860M NPV<sub>9%</sub> (post-tax, ungeared, real basis) and 25 - 26% IRR). The Elan Project is ideally located in a first world country and within the well-established and low-risk mining region of Crowsnest Pass in Alberta. Release of these Scoping Study fundamentals also now provides a platform for Atrum to advance discussions with potential strategic partners, off-takers, debt providers and equity investors.
  - Atrum has a current market capitalisation of approximately A\$85M, and zero debt. The Company has an uncomplicated, clean corporate and capital structure. Atrum also owns 100% of the Elan Project. Finally, 100% of the forecast hard coking coal production from the Elan Project remains uncommitted. These are all factors expected to be highly attractive to potential strategic investors, offtake partners and conventional equity investors. These factors also deliver considerable flexibility in engagement with potential debt or quasi-debt providers.

- The Atrum Board and management team has extensive experience in the global coal industry. They have played leading roles previously in the exploration and development, including project financing, of several large coking coal projects globally. In this regard, key Atrum personnel have a demonstrated track record of success in identifying, acquiring, defining, funding, developing and operating quality coking coal assets of significant scale.
- The Company has a strong track record of raising equity funds as and when required to further the exploration and evaluation of the Elan Project. Atrum's prior equity raising was a A\$20M institutional placement that was successfully undertaken in March 2019.
- Funding for Elan Project pre-production and initial working capital is not expected to be required until close to or post completion of a Definitive Feasibility Study (DFS). Finalisation of a DFS on the Elan Project is not expected before 1H 2022. The majority of market analysts/commentators globally forecast demand, and market prices, for hard coking coal to be robust in the medium and longer term.
- Atrum is targeting total pre-production and working capital funding being comprised of one, some or all of: senior project debt, mezzanine debt, offtake prepayment, equipment leasing, Build-Own-Operate-Transfer (BOOT) contract, sale of a strategic asset interest, equity issuance and/or royalty funding. As noted earlier, total pre-production funding (or equivalent) in excess of US\$700M may be required. The final mix will depend on general market and mineral industry conditions, specific counterparty appetite and terms, and the Atrum Board's prevailing views on optimal funding mix and balance sheet configuration. However, a general view is that debt financing has the potential to form at least 50% of the total pre-production capital requirement.
- It should be noted that this funding strategy is subject to change at the Atrum Board's discretion at any point. It should also be noted that, while the Atrum Board holds a reasonable basis to believe that funding will be available as required, there is no assurance that the requisite funding for the Elan Project will be secured.

# APPENDIX A: PLANS AND SECTIONS

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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

**Atrum Coal**  
COAL FOR STEEL

**ISOLATION SOUTH**  
Open Cut Pit Shell with Area  
Excluded from Production Target

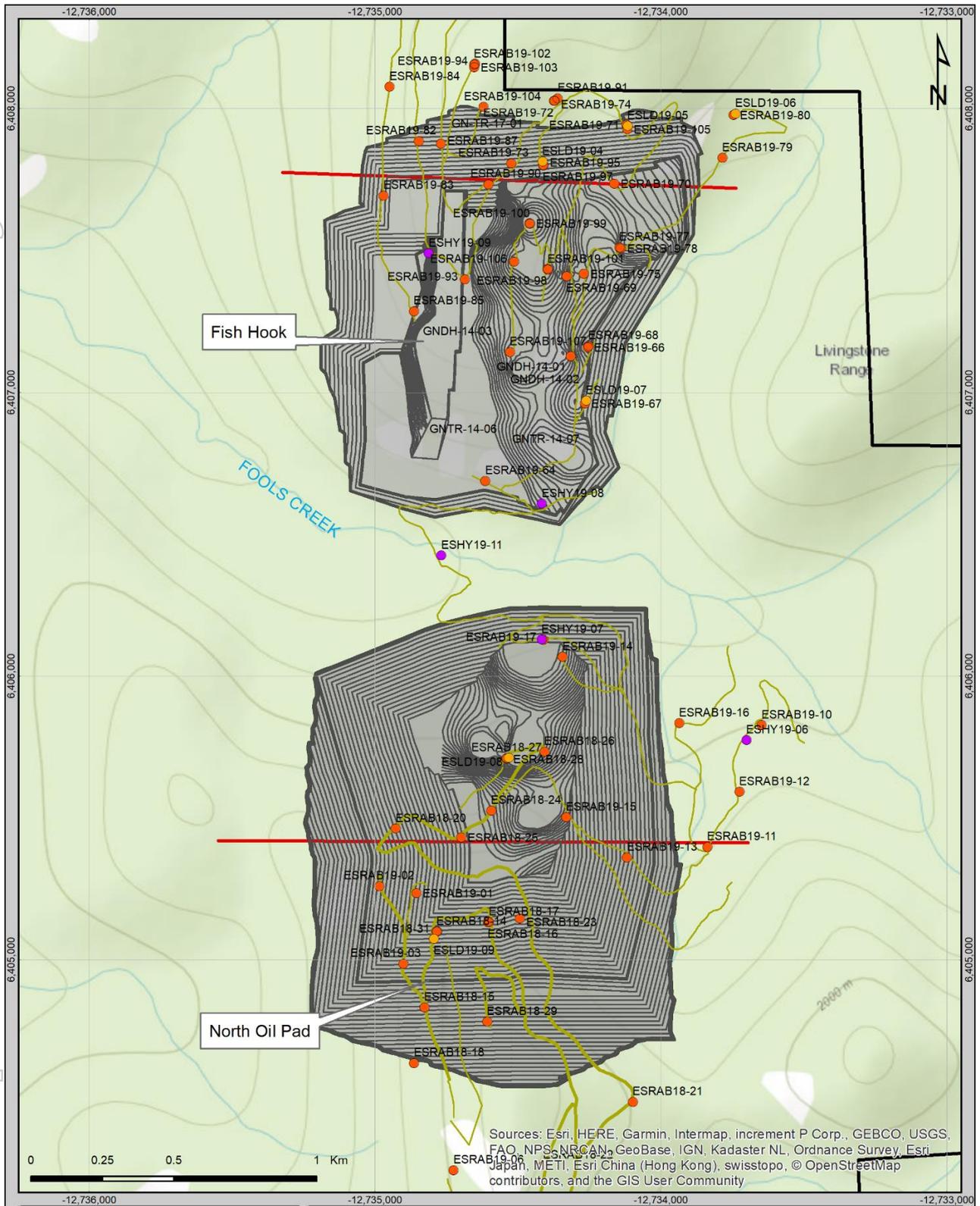
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Drawn: bwillis Coordinate System: NAD 1983 UTM Zone 18R  
Projection: Transverse Mercator

**LEGEND**

<span style="color: yellow;">●</span> Cored	<span style="color: blue;">▲</span> Adits	Isolation South Pit Shell
<span style="color: blue;">●</span> LDC	Roads	Excluded from Production Target
<span style="color: orange;">●</span> RAB	Tracks	Cross section line location
		Isolation South tenements

Isolation South pit shell

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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

**Atrum Coal**  
COAL FOR STEEL

**FISH HOOK / OIL PAD**  
Open Cut Pit Shells

**palaris** Date Printed: 21/02/2020 Scale: 1:16,817  
Drawn: dwills  
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere  
Projection: Mercator-Auxiliary Sphere

**Borehole Type**

- LD Core
- HQ Hydrogeology
- RAB

— Tracks

▭ Oil Pad Pit Shell

▭ Fish Hook Pit Shell

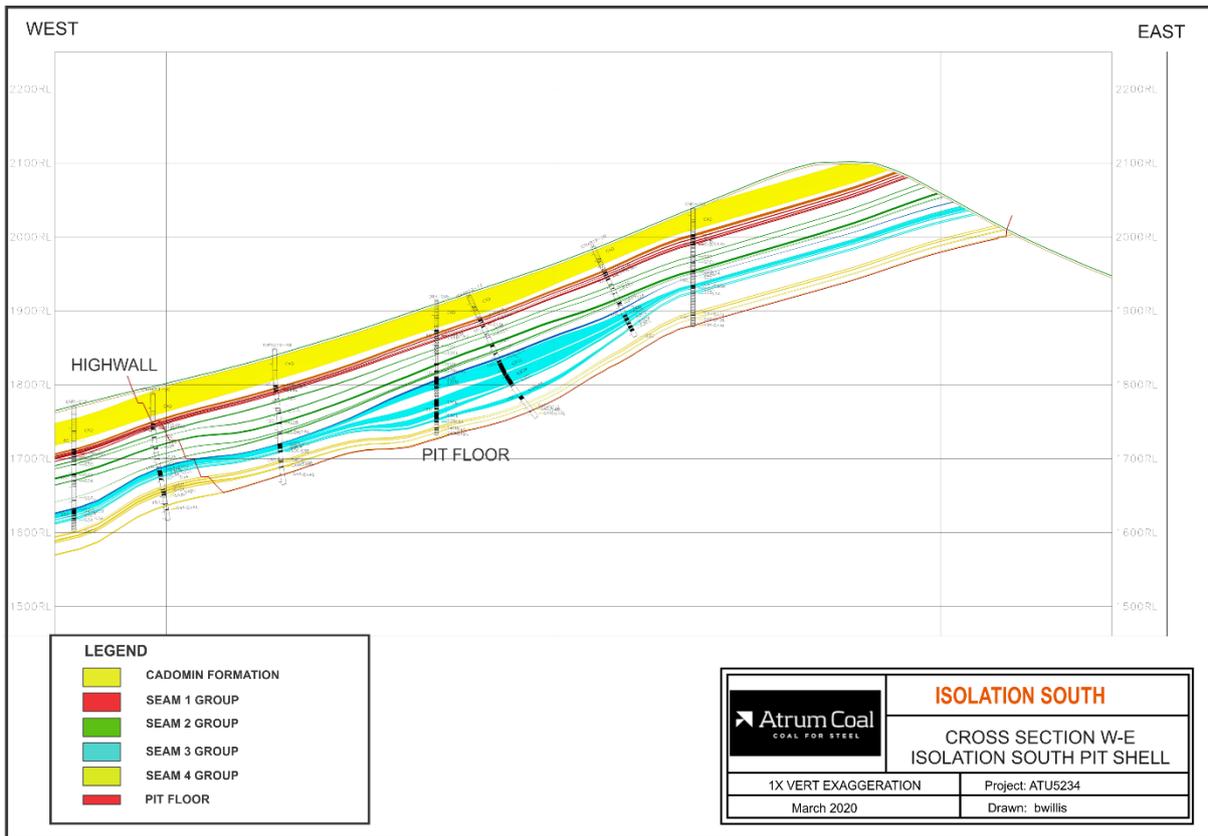
— Cross section line location

▭ Elan South

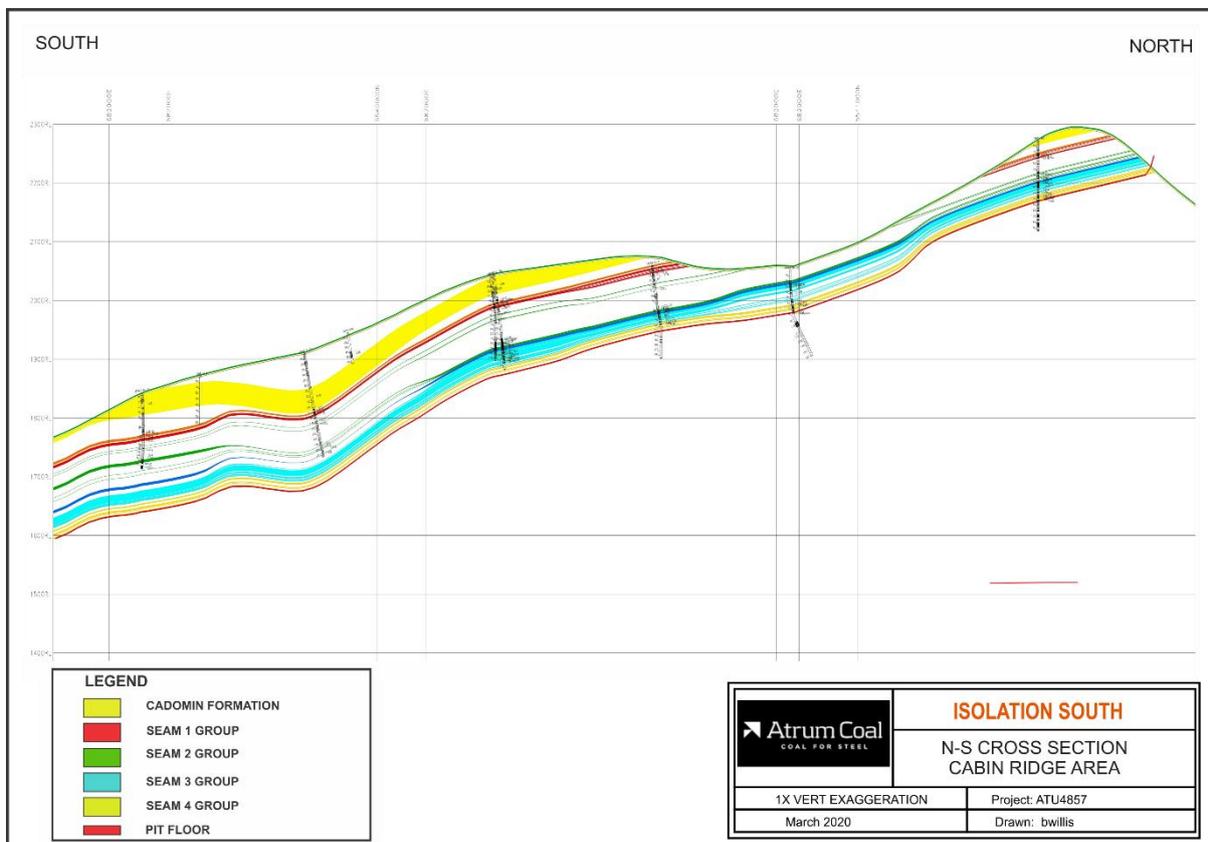
**Fish Hook / Oil Pad pit shells**



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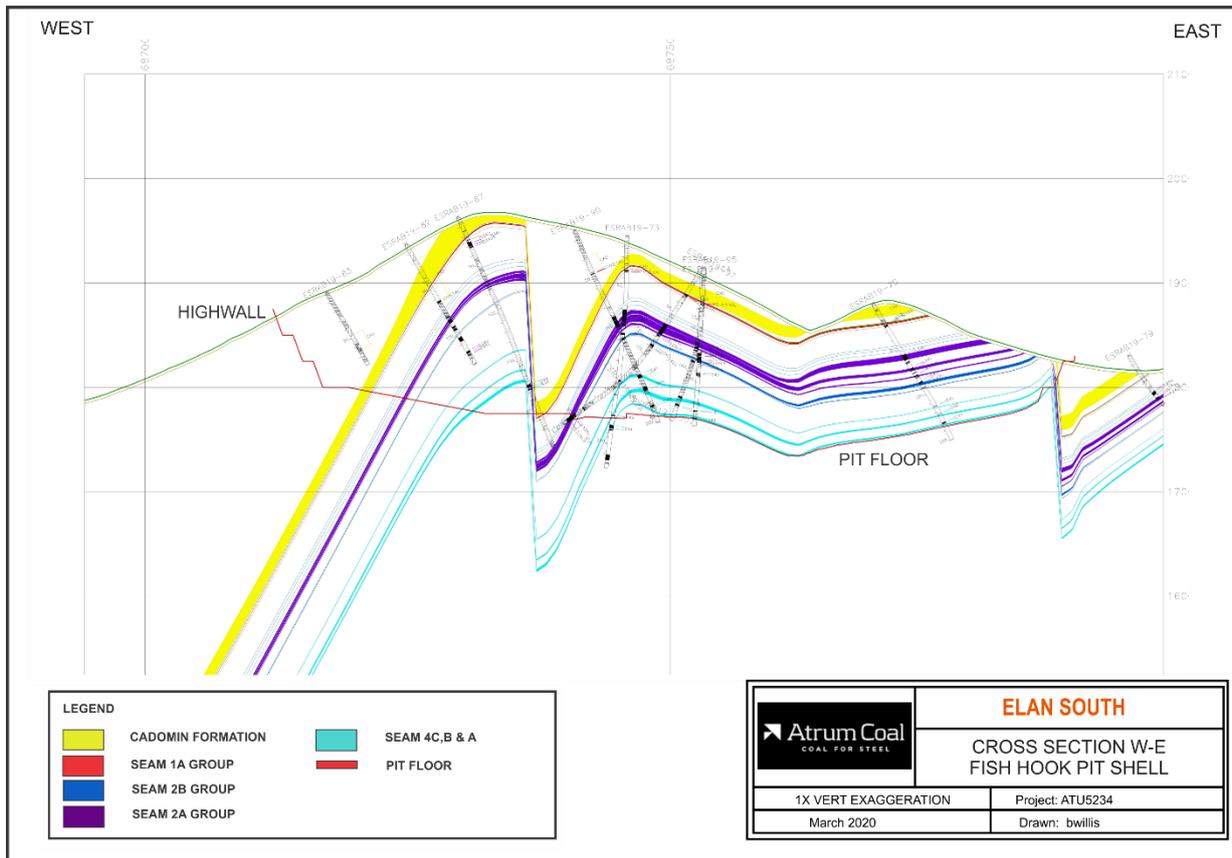


Cross section through the Isolation South pit shell

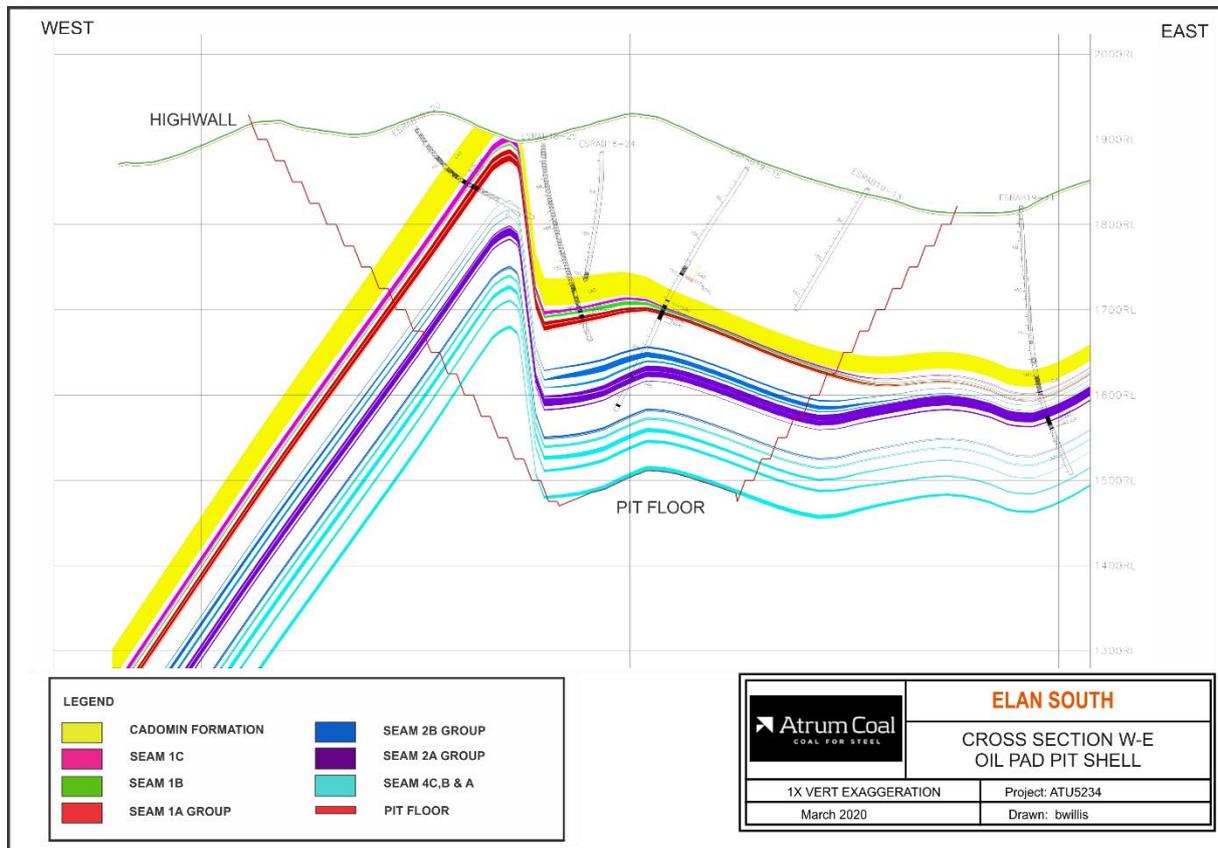


Cross section through the Isolation South northern Inferred in-pit resources excluded from schedule

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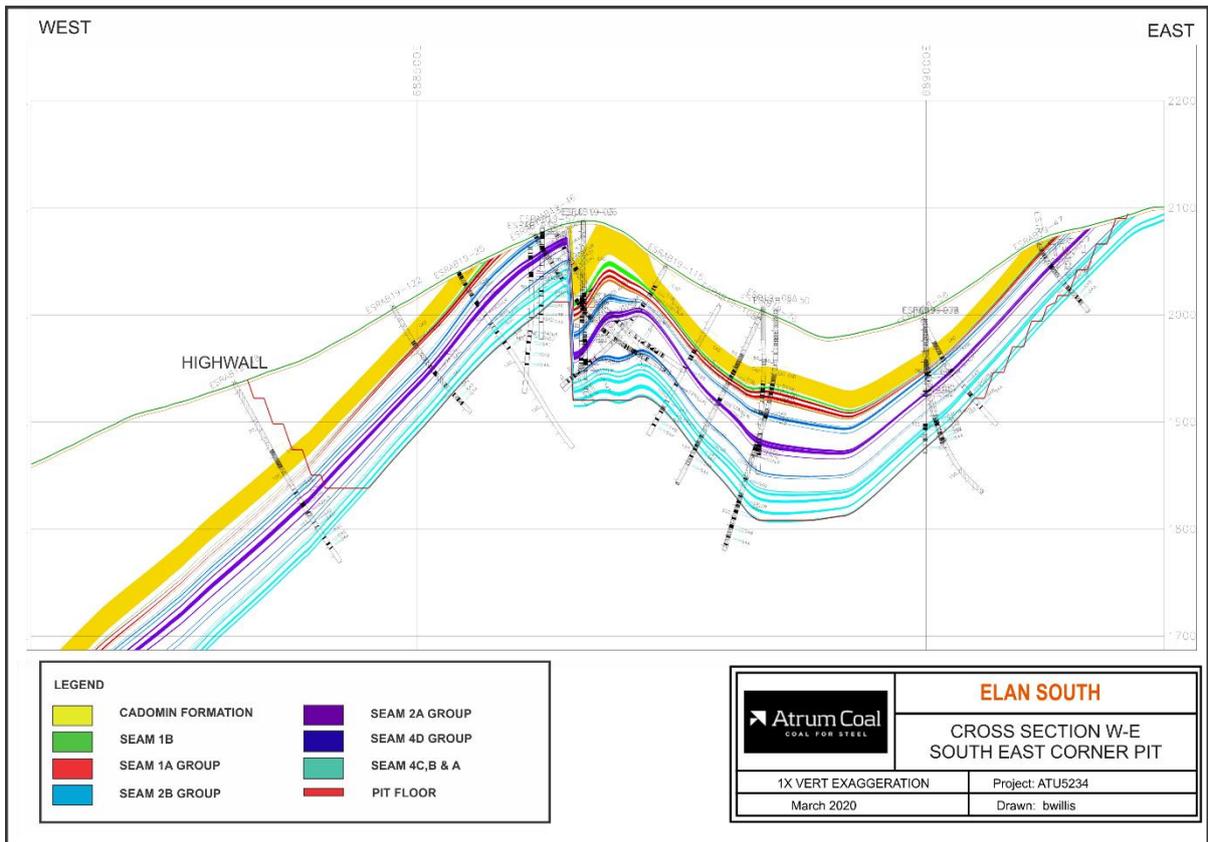


Cross section through the Fish Hook pit shell



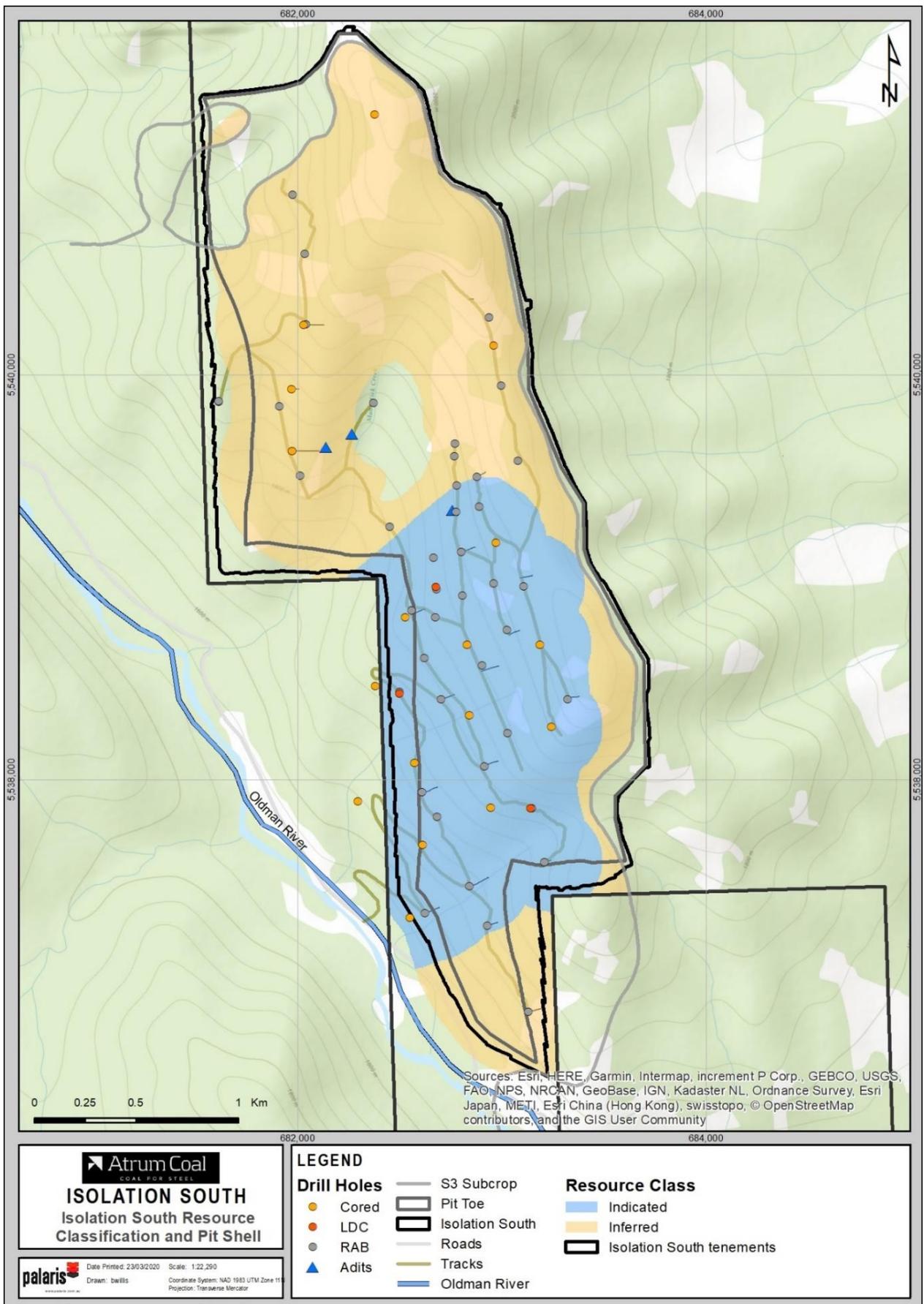
Cross section through the Oil Pad pit shell

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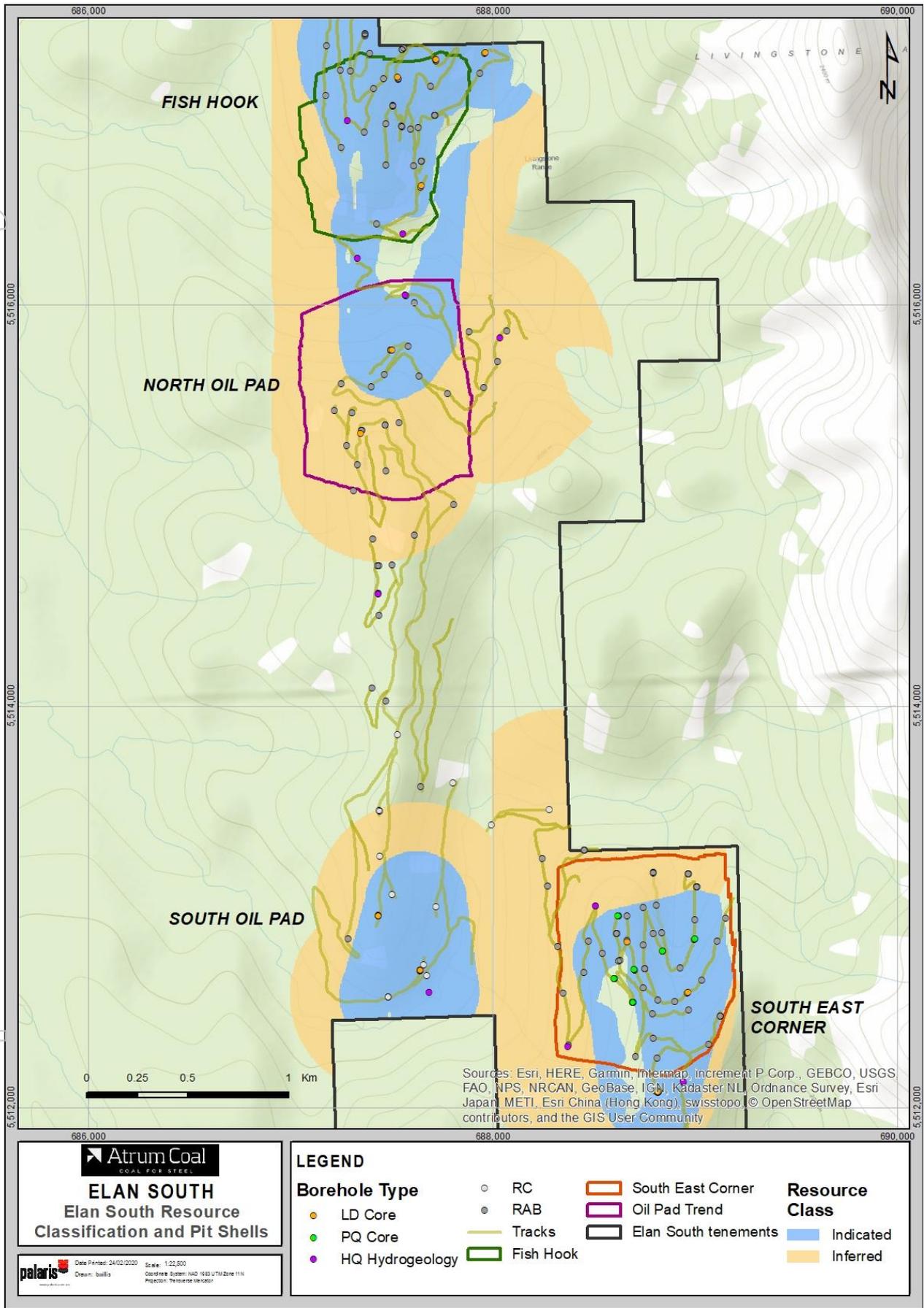
Cross section through the South East Corner pit shell

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Isolation South Indicated and Inferred resource class areas (Seam 3)

For personal use only



Elan South Indicated and Inferred resource class areas (Seam 1)

## APPENDIX B: COMPETENT PERSONS'S STATEMENT

The results of the Scoping Study and Coal Resources that underpin the production target are based on, and fairly represent, information and supporting documentation compiled by Mr Brad Willis, who is a Member of the Australasian Institute of Mining and Metallurgy (205328).

Brad Willis is Principal Geologist at Palaris. He has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity he is undertaking to qualify as a Competent Person, as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Willis has 20 years' experience in exploration and mining of coal deposits. Mr Willis consents to the inclusion of the Scoping Study results disclosed by the Company in the form in which it appears.

Neither Mr Willis nor Palaris have a direct or indirect financial interest in, or association with Atrum Coal, the properties and tenements reviewed in this statement, apart from standard contractual arrangements for the preparation of this report and other previous independent consulting work. In preparing this Annual Coal Resource and Reserve Statement, Palaris has been paid a fee for time expended on this report. The present and past arrangements for services rendered to Atrum Coal do not in any way compromise the independence of Palaris with respect to this estimate.

Competent Person	
Mr Brad Willis Member AusIMM (#205328) Principal Geologist Palaris Australia Pty Ltd	 <b>Signature</b>

## APPENDIX C: REASONABLE BASIS FOR FORWARD LOOKING STATEMENTS

No Ore Reserve has been declared. This ASX release has been prepared in compliance with the current JORC Code (2012) and the ASX Listing Rules. All material assumptions on which the Scoping Study production target and forecast financial information are based have been included in this release and disclosed in the table below.

### Consideration of Modifying Factors (in the form of Section 4 of the JORC Code (2012) Table 1)

Criteria	JORC Code explanation	Commentary
<b>Mineral Resource estimate for conversion to Ore Reserves</b>	<ul style="list-style-type: none"> <li>Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.</li> <li>Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.</li> </ul>	<ul style="list-style-type: none"> <li>As an early stage exploration project at Scoping Study level, the resource base is at Indicated to Inferred classification</li> <li>No Ore Reserve has been declared.</li> </ul>
<b>Site visits</b>	<ul style="list-style-type: none"> <li>Comment on any site visits undertaken by the Competent Person and the outcome of those visits.</li> <li>If no site visits have been undertaken indicate why this is the case.</li> </ul>	<ul style="list-style-type: none"> <li>The Competent Person has undertaken several site visits to the Elan project in 2018 and 2019</li> <li>The Competent Person has been involved in many aspects of the project since 2018</li> </ul>
<b>Study status</b>	<ul style="list-style-type: none"> <li>The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.</li> <li>The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.</li> </ul>	<ul style="list-style-type: none"> <li>The Elan project is an early stage exploration project at Scoping Study level</li> <li>The project is not at Pre-Feasibility level and an Ore Reserve has not been declared.</li> </ul>
<b>Cut-off parameters</b>	<ul style="list-style-type: none"> <li>The basis of the cut-off grade(s) or quality parameters applied.</li> </ul>	<ul style="list-style-type: none"> <li>Cut off grades or limits to particular coal quality attributes have not been applied in the estimation of the production target</li> <li>The basis for this is that all coal seams included in the production target can be processed and blended into the final product</li> <li>There are no particular seams identified that have negative coal quality attributes that would justify their exclusion from the production target</li> </ul>
<b>Mining factors or assumptions</b>	<ul style="list-style-type: none"> <li>The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).</li> <li>The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.</li> <li>The assumptions made regarding geotechnical parameters (eg pit slopes,</li> </ul>	<ul style="list-style-type: none"> <li>ROM and/or Marketable Ore Reserves have not been declared.</li> <li>The production target in this report was estimated by undertaking a pit optimisation process followed by practical pit adjustments</li> <li>Open cut mining has been selected as the mining method and will be a mix of strip and terrace mining. This is related to the often complex geological structure that implies underground mining would not be suitable</li> <li>The geotechnical design parameters are largely based on nearby mining projects and advice from geotechnical consultants</li> </ul>

Criteria	JORC Code explanation	Commentary
	<p><i>stope sizes, etc), grade control and pre-production drilling.</i></p> <ul style="list-style-type: none"> <li><i>The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).</i></li> <li><i>The mining dilution factors used.</i></li> <li><i>The mining recovery factors used.</i></li> <li><i>Any minimum mining widths used.</i></li> <li><i>The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.</i></li> <li><i>The infrastructure requirements of the selected mining methods.</i></li> </ul>	<ul style="list-style-type: none"> <li>The highwalls are designed on individual slope angles of 70° with 10m bench width every 25 metres</li> <li>Low-walls are designed face angles of 37° with 8m bench width every 36 metres</li> <li>Pit optimisation was undertaken using an assumed sale price of US\$140/t and between 80% and 100% revenue factor</li> <li>Open cut working sections were built using a minimum coal thickness of 0.3m and maximum parting thickness of 0.3m</li> <li>Mining losses of 5cm and out of seam dilution (at 2.20) were added to working section roof and floors</li> <li>ROM tonnes were estimated using a coal RD of 1.50</li> <li>A 95% mining recovery was applied at Isolation South, 100% elsewhere</li> <li>The production target includes 30% Inferred resources. The proportion of Inferred resources was deliberately limited to 30%.</li> <li>Inferred resources do not feature as a significant proportion of the proposed mine plan and this confirms that the financial viability of the Elan Project is not dependent on the inclusion of Inferred resources in the production schedule</li> </ul>
<p><b>Metallurgical factors or assumptions</b></p>	<ul style="list-style-type: none"> <li><i>The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.</i></li> <li><i>Whether the metallurgical process is well-tested technology or novel in nature.</i></li> <li><i>The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.</i></li> <li><i>Any assumptions or allowances made for deleterious elements.</i></li> <li><i>The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.</i></li> <li><i>For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?</i></li> </ul>	<ul style="list-style-type: none"> <li>The processing design work was undertaken by Sedgman Canada, who have significant regional experience</li> <li>The CHPP design basis incorporates dense media cyclones (DMC), reflux classifiers and a flotation circuit, with product drying completed with a hyperbaric filter process.</li> <li>This processing design and flowsheet is common in the coal industry, both in Canada and abroad</li> <li>Float sink testwork from 2019 is only partially complete and will be required in order to undertake washability simulation work and predict CHPP yields on a seam by seam basis for each mining area</li> <li>The preference for large diameter coring is favourable for sizing and washability analysis and subsequent processing design work</li> <li>The processing yield of 60% is consistent (if not conservative) with other operations mining the Mist Mountain Formation in the region</li> <li>Pilot scale carbonization testwork has been completed on large diameter seam blends in order to predict the CSR range for the indicative product specification</li> </ul>
<p><b>Environmental</b></p>	<ul style="list-style-type: none"> <li><i>The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.</i></li> </ul>	<ul style="list-style-type: none"> <li>Atrum Coal has commenced a robust and accelerated environmental baseline program to characterize the environmental setting and identify potential sensitive aquatic and terrestrial receptors within the Project area</li> <li>The study area for the baseline program include all land areas within the proposed mine footprint that are expected to be disturbed as a result of mine development and operations</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul style="list-style-type: none"> <li>A comprehensive Impact Assessment (IA) will be prepared to satisfy all components of the Federal Impact Assessment Act (IAA) and Provincial Environmental Protection and Enhancement Act (EPEA). The IA will leverage key learnings identified during the Grassy Mountain Project approval process and incorporate all requisite elements of the 'new' IAA.</li> </ul>
<b>Infrastructure</b>	<ul style="list-style-type: none"> <li>The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.</li> </ul>	<ul style="list-style-type: none"> <li>The Project is located approximately 13 km north of the rail mainline that provides access to coal terminals on West Coast of BC, a raiiling distance of 1,100 km</li> <li>The project requires development of coal haul roads, a coal handling and processing plant, 36km of covered conveyors and a rail loop to access this infrastructure</li> <li>Land in the project area is designated as Crown Land, managed by the Alberta Government</li> <li>Atrum has engaged consultants WaterSmart to review water licensing and allocation for mining purposes</li> <li>Labour and accommodation can be accessed from nearby towns including Blairmore, Coleman, Bellevue and Sparwood</li> </ul>
<b>Costs</b>	<ul style="list-style-type: none"> <li><i>The derivation of, or assumptions made, regarding projected capital costs in the study.</i></li> <li><i>The methodology used to estimate operating costs.</i></li> <li><i>Allowances made for the content of deleterious elements.</i></li> <li><i>The source of exchange rates used in the study.</i></li> <li><i>Derivation of transportation charges.</i></li> <li><i>The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.</i></li> <li><i>The allowances made for royalties payable, both Government and private.</i></li> </ul>	<ul style="list-style-type: none"> <li>A first principles buildup of capital costs was undertaken</li> <li>The cost estimates are at varying levels of accuracy with higher levels of accuracy for the majority of fixed infrastructure based on budget quotes while factored estimates and costs sourced from Palaris' database make up the remainder</li> <li>Operating costs were estimated using a combination of first principles build ups, factored estimates and internal databases.</li> <li>Rail and port loading operating costs are largely based on actual or expected costs reported by nearby operating and proposed coal mining operations</li> <li>The Elan Project is located in Alberta and is subject to the Alberta Coal Royalty Guidelines (1993) under the Bituminous Coal category. The coal royalty is calculated in two phases, (1) Prior to project payback, and (2) Subsequent to project payback. Project payback is determined using a formula where cumulative net revenue exceeds the sum of total CAPEX, cumulative OPEX and allowances for capital returns</li> </ul>
<b>Revenue factors</b>	<ul style="list-style-type: none"> <li><i>The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.</i></li> <li><i>The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.</i></li> </ul>	<ul style="list-style-type: none"> <li>A coal price forecast for premium low volatile hard coking coal is based on the long-term real forecast provided by Consensus Economics (February 2020) which has a long term price forecast of US\$141</li> <li>A 2% discount has been applied to the QLD premium LV index to account for the potentially lower pricing of the product relative to the low-volatile benchmark, although there are no attributes in the product that are likely</li> </ul>

Criteria	JORC Code explanation	Commentary
		<p>to attract penalties</p> <ul style="list-style-type: none"> <li>It is noted that the expected CSR of the Elan product is expected to be close to benchmark specification</li> <li>The long-term foreign exchange rate forecasts have been adopted from Consensus Economics and these rates drive all cost and revenue assumptions denominated in foreign currency</li> </ul>
<b>Market assessment</b>	<ul style="list-style-type: none"> <li><i>The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.</i></li> <li><i>A customer and competitor analysis along with the identification of likely market windows for the product.</i></li> <li><i>Price and volume forecasts and the basis for these forecasts.</i></li> <li><i>For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.</i></li> </ul>	<ul style="list-style-type: none"> <li>Mid volatile hard coking coals generally constitute a greater proportion of the coke blend than low and high volatile coking coals. There is continued demand for mid volatile coking coal and any shortfall in low volatile HCC would need to be made up with mid volatile coal</li> <li>Atrium's proposed coking coal production will be capable of penetrating the export coal market through the projected global increases in demand, capturing market share from existing suppliers and replacing mines approaching the end of their lives</li> <li>The main target markets are Japan and South Korea, India, China and Europe</li> <li>The price forecast for premium low volatile hard coking coal is based on the long-term real forecast provided by Consensus Economics (February 2020) which has a long term price forecast of US\$141/t</li> </ul>
<b>Economic</b>	<ul style="list-style-type: none"> <li><i>The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.</i></li> <li><i>NPV ranges and sensitivity to variations in the significant assumptions and inputs.</i></li> </ul>	<ul style="list-style-type: none"> <li>The discount rate used is 9% real which reflects the early stage of the project and risk</li> <li>DCF modelling was converted to US\$ using the Consensus Economics long term forecast rates of 0.79 C\$/US\$ and 0.74 A\$/US\$</li> <li>Cash flow periods expressed annually in calendar years</li> <li>Mobile equipment is assumed to be leased over a 5-year period using a 7% p.a. leasing charge, and lease principal repaid in equal annual instalments.</li> <li>Depreciation of project capital has been applied using the double declining balance method with full asset write-off at conclusion of useful life. Nominal depreciation schedule has been adjusted down to real depreciation assuming a constant inflation rate of 2%</li> <li>The intended estimation accuracy of the study is +/-35 to 40 %.</li> <li>Sensitivity analyses have been provided to demonstrate effect on NPV with regard to coal price, FX rate, processing yield, discount rate, operating costs, transport and port costs, development and sustaining capital</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li><i>The status of agreements with key stakeholders and matters leading to social licence to operate.</i></li> </ul>	<ul style="list-style-type: none"> <li>Atrium Coal has identified the key stakeholders and has commenced early engagement with First Nations, government, communities and other directly impacted stakeholders</li> <li>The company has commenced early engagement of government regulators to ensure alignment on objectives, scopes and</li> </ul>

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		<p>terms of references</p> <ul style="list-style-type: none"> <li>Proactively engaging federal and provincial regulators early, Atrum has found the Government of Alberta to be supportive of its exploration efforts</li> </ul>
<b>Other (incl Legal and Governmental)</b>	<ul style="list-style-type: none"> <li>To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:</li> <li>Any identified material naturally occurring risks.</li> <li>The status of material legal agreements and marketing arrangements.</li> <li>The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.</li> </ul>	<ul style="list-style-type: none"> <li>Under the Coal Development Policy for Alberta (1976), which aimed to designate land zones for coal exploration and development, Elan project tenure sits within Category 2 land zone. Category 2 land zones are designated as those areas that can be explored under strict controls, and are generally considered to be appropriate for in-situ or underground mining. In 2016, Ram River Coal was allowed to permit an open cut mining of a coking coal project in Category 2 land in Alberta</li> <li>While the land categorisation could be considered a risk for open cut mining, Atrum Coal does not view the Category 2 zoning as an impediment to exploration, nor does Atrum consider it likely to dictate the type of mining method that can be permitted.</li> <li>Any coal mine development would need to go through the process of preparing an Environmental Impact Assessment (EIA) and submission of an application to the Alberta Energy Regulator (AER) under the Environmental Protection and Enhancement Act (EPEA) and Canadian Environmental Assessment Act 2012 (CEAA).</li> </ul>
<b>Classification</b>	<ul style="list-style-type: none"> <li>The basis for the classification of the Ore Reserves into varying confidence categories.</li> <li>Whether the result appropriately reflects the Competent Person's view of the deposit.</li> <li>The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).</li> </ul>	<ul style="list-style-type: none"> <li>No Ore Reserve has been declared.</li> <li>The factors used in the rationalisation and determination of final resource classification polygons included: reliability of the data, consideration of 3D representivity and removal of isolated points of observation, quantity and location of coal quality data points, variability shown in continuity and grade, and likelihood of the coal seams being mined</li> </ul>
<b>Audits or reviews</b>	<ul style="list-style-type: none"> <li>The results of any audits or reviews of Ore Reserve estimates.</li> </ul>	<ul style="list-style-type: none"> <li>No Ore Reserve has been declared.</li> <li>An independent review of the geological models and resource estimates was undertaken by Xenith Consulting in early 2020</li> <li>An independent review of the draft Scoping Study was also undertaken</li> </ul>
<b>Discussion of relative accuracy/confidence</b>	<ul style="list-style-type: none"> <li>Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.</li> <li>The statement should specify whether it</li> </ul>	<ul style="list-style-type: none"> <li>No Ore Reserve has been declared.</li> <li>The production target has been based on geological models and resources that are classified as Indicated and Inferred</li> <li>In the view of the Competent Person, the Indicated to Inferred resource classification reflects the moderate level of confidence within the deposit, highlighting the project requires further exploration to improve the level of geological confidence and resource classification</li> <li>No geostatistical assessments have been carried out.</li> <li>As a Scoping Study, the intended estimation accuracy of the study is +/-35 to 40 %.</li> </ul>

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	<p><i>relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.</i></p> <ul style="list-style-type: none"> <li>• <i>Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.</i></li> <li>• <i>It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Key modifying factors that may impact on accuracy and confidence of the resource and study outcome include the relatively complex geology, lack of reliable geotechnical data, limited amount of coal quality and washability data points, and processing yield assumptions.</li> <li>• The company plans to recommence exploration as quickly as practicable in order to fill in some of the existing data gaps.</li> </ul>