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#### **Cadence Minerals Plc**

**("Cadence Minerals", "Cadence", or "the Company")**

#### **PFS Level Economic Study for the Amapá Iron Ore Project Increases Net Present Value to US 1.97 Billion**

Cadence Minerals (AIM: KDNC), the AIM-quoted investment company, is pleased to announce an updated Pre-Feasibility Study ("PFS") on the Amapá Iron Ore Project ("Amapá", "Project" or "Amapá Project"), in northern Brazil. Cadence owns an equity stake of 34.6% in the Project. The updated PFS is based on the Direct Reduction grade ("DR-grade") flow sheet announced on [AIM: 26 November 2024](#).

#### **Highlights:**

- **73%<sup>[1]</sup> increase** of post-tax Net Present Value ("NPV<sub>10%</sub>") to **US 1.97 billion** and **56% internal rate of return ("IRR")**.
- Average **annual free cash flow** from start-up to closure is estimated to be **US 342 million**.
- The Project is estimated to generate a total of US 9 billion in gross revenues, US 4.9 billion in net operating profit and **US 4.6 billion in free cash flow over its 15-year mine life**.
- Revised processing plant design to produce **67.5% Iron ("Fe") DR-grade** iron ore concentrate at an average<sup>[2]</sup> rate of **5.5 million metric tonnes per annum ("Mtpa")**.
- **Free on Board ("FOB") C1 Cash Costs US 33.7 per dry metric ton ("DMT")** at the port of Santana. **Cost and Freight ("CFR") C1 Cash Costs US 61.9/DMT** in China.
- Pre-production capital of **US 377 million**, and the **payback period is reduced to 3 years** due to higher free cash flows.

**Cadence CEO Kiran Morzaria commented:** *This significant update to the Amapá Prefeasibility Study, which includes the DR-grade concentrate flow sheet, reinforces our firm belief that the project can add substantial value to Cadence. The increased net present value of 1.97 billion and improved post-tax internal rate of return reflect significant advancements in the project's robust economics.*

*The Amapá Project represents a well-developed and largely de-risked opportunity, featuring established mineral reserves, advanced environmental permitting, and complete control of integrated rail and port infrastructure. This ownership and control of the infrastructure contribute to the project's low-cost base and will enable the pursuit of regional expansion opportunities, with substantial resources located within 30 kilometres of the existing rail line. In addition to the DR-grade flow sheet, the project will use 100% renewable energy sources. We anticipate this will help us achieve one of the lowest carbon footprints in the region while still delivering a robust and highly profitable project.*

*We are excited about the potential of the Amapá Iron Ore Project and look forward to providing further updates on our progress."*

**Chairman Andrew Suckling added:** *"The Amapa Project is now emerging as a material "green iron" project, backed by product quality and highly competitive economic metrics. We are at this juncture due to the tireless efforts of the Board and Project team, and I'd like to put on record my thanks and gratitude to them and our shareholders and stakeholders. I look forward to Amapa playing its part in "green steel" production and the decarbonisation of the iron and steel industry."*

*Table 1 Key Project Metrics (100% project basis)*

Metric	Unit	Revised PFS July 2024	Updated DR Grade PFS Nov 2024
Total ore feed to the plant	Mt (dry)	176.93	<b>176.93</b>
Life of Mine	Years	15	<b>15</b>
Fe grade of ore feed to the plant	%	39.34	<b>39.34</b>
Recovery	%	76.27	<b>75.27</b>
62.0% iron ore concentrate production	Mtpa	0.95	-
65.4% iron ore concentrate production	Mtpa	4.51	-
67.5% iron ore concentrate production	Mtpa	-	<b>5.52</b>
C1 Cash Costs FOB *	US /DMT	33.50	<b>33.75</b>
C1 Cash Costs CFR **	US /DMT	62.19	<b>61.93</b>
Pre-Production capital investment***	US M	343	<b>377</b>
Sustaining capital investment over life of mine****	US M	245	<b>220</b>
AISC Cash Costs FOB*****	US /DMT	45.22	<b>47.38</b>
Platts TSI IODEX 65% Fe CFR used	US /DMT	118.75	<b>120.00</b>
Post-tax NPV <sub>10%</sub>	US M	1,145	<b>1,977</b>
Post-tax IRR	%	42	<b>56</b>
Project payback	Years	4	<b>3</b>
Total profit after tax (net operating profit)	US B	3.14	<b>4.96</b>

- \* Means operating cash costs, including mining, processing, geology, occupational health and safety environment, rail, port and site G&A, divided by the tonnes of iron ore concentrate produced. It excludes royalties and is quoted on a FOB basis (excluding shipping to the customer).
- \*\* This means the same as C1 Cash Costs FOB; however, it includes shipping to the customer in China (CFR).
- \*\*\* Includes direct tax credit rebate over 48 months
- \*\*\*\* Includes both sustaining capital and deferred capital expenditure, specifically, improvements to the railway, the installation of a slurry pipeline and mine site to rail load out
- \*\*\*\*\* Includes all the C1 Cash Cost, plus royalties, pre-production capital investment and sustaining capital investment over the life of the mine and is quoted on a FOB basis

## Introduction

The Project comprises an open-pit iron ore mine, a processing and beneficiation plant, a railway line, and an export port terminal. The Amapá Project is 100% owned by DEV Mineração S.A. ("DEV") and its subsidiaries. DEV is owned by Pedra Branca Alliance Pte. Ltd. ("PBA"), a joint venture ("JV") between Cadence and Indo Sino Trade Pte Ltd ("Indo Sino").

The Project ceased operations in 2014 after the port facility suffered a geotechnical failure, which limited iron ore export. Before the cessation of operations, the Project generated an underlying profit of US 54 million in 2012 and US 120 million in 2011. Operations commenced in December 2007, and in 2008, the Project produced 712 thousand tonnes of iron ore concentrate. Production steadily increased, producing 4.8 Mt and 6.1 Mt of iron ore concentrate products in 2011 and 2012, respectively.

Cadence and Indo Sino, through their JV, acquired 100% of DEV's shareholding in 2022 through the submission of a judicial restructuring plan approved by the unsecured creditors. As part of this plan, DEV sought to redevelop the Amapá Project. This strategy includes a plan to resume operations after plant revitalisation and modifications, aimed at improving product quality and increasing recovery, along with recovery of the port, railway, and support areas.

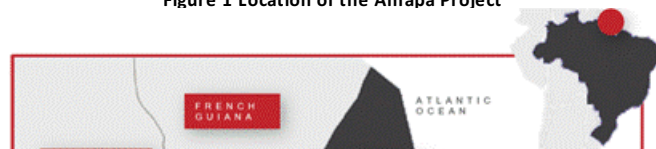
It should be noted that Indo Sino and Cadence have managed this PFS, and it represents an update to the PFS published on [AIM: 3 January 2023](#) and the revised PFS published on [AIM: 9 July 2024](#). In particular, this updated PFS has been prepared to reflect the 67.5% Fe concentrate flow sheet.

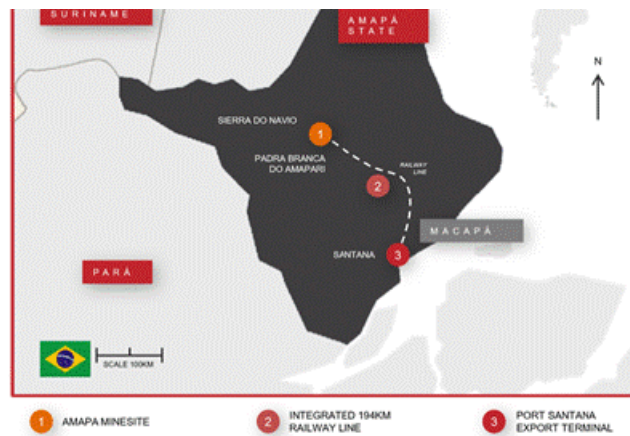
## Location

The Project is in Amapá state. Amapá is Brazil's second least populous state and the eighteenth largest by area. Most of the Amapá state territory is rainforested, while the remaining areas are covered with savannah and plains. The State capital and largest city is Macapá (pop. circa 500,000), with the municipality of Santana (pop. circa 120,000) located just 14km to the southwest.

The Amapá mine is some 125km northeast of the state capital, Macapá, and the port facility is located on the Amazon River in the municipality of Santana, close to Macapá, as shown in (Figure 1). The port site in Santana is located 170km from the mouth of the Amazon River. The nearest populace centre to the Amapá mine is Pedra Branca Do Amapari, some 11km west, with the larger town of Serra do Navio 18 km northwest.

**Figure 1 Location of the Amapá Project**





### Amapá Project Components

The Amapá Project PFS encompasses four distinct but completely integrated operational components that formed part of the original PFS. The four areas are:

**Amapá Mining Complex** An open-pit iron ore mine with various open pits, an iron ore concentration and beneficiation plant, associated waste rock dumps, and a tailings management facility.

**Railway Line:** Integrated 194 km railway line connecting Serra do Navio to the port terminal at Santana. The rail passes via Pedra Branca do Amapari (180 km from the port), located 13 km from the Amapá mine and the plant.

**Export Port Terminal:** An integrated industrial port site, privately owned and controlled by DEV, is located in Santana. The terminal had the capacity for loading the Supramax and Handymax vessels.

**Transshipment Solution:** A Capesize vessel is partially loaded at the berth in Santana port and topped off in the open ocean, 200 nautical miles from the berth.

### Updated Pre-Feasibility Study

As announced on [AIM: 26 November 2024](#) the Amapá Iron Ore Project completed its metallurgy test work and successfully produced a DR-grade iron ore concentrate. The updated PFS investigates all the design, engineering, and business parameters required to implement the DR-grade flow sheet at a rate of 5.5 Mtpa (dry basis)/6.03 Mtpa (wet basis). This comprises the mine schedule published in July 2024 and the processing plant and associated infrastructure required for DR-grade concentrate production.

### Mining Schedule

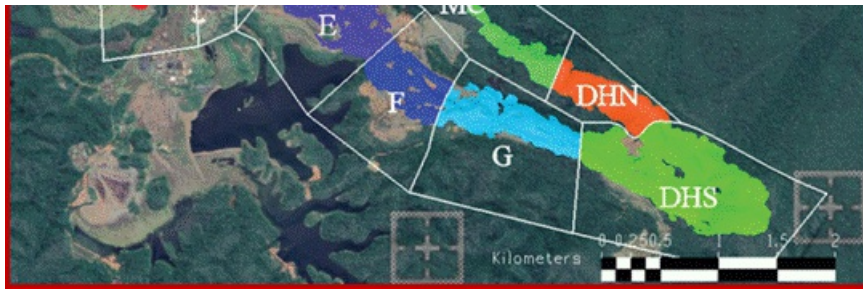
The improved flow sheet's annual feed rate ("ROM") is 13.99 Mtpa (wet base). The mining schedule prepared for the revised PFS published earlier in the year was utilised for this purpose. The mine engineering and design work for this PFS, including equipment requirements and mining strategy, have been undertaken by Wardell Armstrong International. These works have been conducted at the PFS level and incorporate an Ore Reserve Estimate for open pit mining, which was prepared under the guidelines of the JORC Code (2012). The Ore Reserve for the Amapá Project is at 195.8 million tonnes, with an average grade of 39.34% Fe and a cut-off grade of 25% Fe.

A Life of Mine ("LOM") production plan was scheduled using the Deswik.Blend® Scheduler Optimiser. The solids used in the mine schedule were based on the final pit design, with a Selective Mining Unit of 100m x 200m x 4m. The LOM schedule allows for 15 years of production with the current economic values and cut-off of 25% Fe.

The resultant LOM strip ratio is approximately 0.4:1 (tonnes waste: tonnes ore), and the average ore mine delivered to the plant is 13.99 Mtpa. A site plan of the pits and phases is outlined in (Figure 2).

Figure 2 Open Pit Design Phases





### Processing Plant

Pei Si Engineering Incorporated conducted the test work and designed the flow sheet. The metallurgical test work established that the optimal flow sheet utilised a regrind, which feeds into a low-intensity magnetic separator. This process produces two streams: the first stream goes to a reverse flotation circuit, while the second stream is sent to a high-intensity magnetic separator, followed by a second reverse flotation circuit. As a result of the above, the following main changes were made to the original PFS flow sheet published in January 2023.

- Removing the jigging circuit, with the iron being recovered via the grinding, magnetic, and flotation circuits. This improves the iron recovery rate.
- Replacing hydrocyclone desliming with thickeners, improving classification efficiency and lowering power consumption.
- The 67.5% flow sheet will remove the 62% product stream, eliminating the spiral circuit. This will shorten the process flow and reduce power consumption.
- Adding a flow sheet to improve iron concentrates from 65.4% to 67.5% via regrinding the material from the magnetic separator, meaning finer particles can be further liberated, improving iron concentrate grade to 67.5%.
- Replacement of all slurry, water, and reagent pumps involved in the beneficiation process.
- Due to a single concentrate product, the conveyor transport is replaced by a slurry pipeline and filtrate water return pipeline, reducing operating and capital costs.
- The particle size of the concentrate after the tower mills is too fine to be filtered by the existing vacuum disc filters. Therefore, horizontal press filters are required to ensure the moisture content of the filter cake is no greater than 8%.
- A train loading system will be built in the train loading area.

An outline of the plant layout is shown in (Figure 3)

**Figure 3 DR-Grade Plant Layout**



### Cost Estimates

To evaluate the project's economics, an updated PFS financial model, which included the updated mining schedule, capital costs ("CAPEX"), operational costs ("OPEX"), and revised product price, was developed. All other aspects of the financial analysis remained the same as per the revised PFS published in July 2024.

The CAPEX estimate is based on the layout for all areas of the Project and is supported by mechanical equipment lists and engineering drawings. The costs for these items have been derived from informal vendor quotes for the equipment and materials or consultant engineering databases. Parts of the CAPEX estimate are after tax (with the duties and taxes deemed

recoverable calculated separately), include contingency, and exclude escalation. The CAPEX estimate includes all the direct and indirect costs, local taxes and duties and appropriate contingencies for the facilities required to bring the Project into production, as defined by a PFS-level engineering study. As this is a PFS, the cost accuracy is estimated at  $\pm 25\%$  and has a base date of June 2022 and November 2024. Pre-production, deferred and sustaining summaries of the capital cost estimates are provided below. Pre-production CAPEX has increased due to the equipment required to achieve the DR-grade product. However, the variance in the total CAPEX has been reduced. This is a result of producing one product stream, which uses a slurry pipeline to transport the concentrate from the mine to the rail loadout station rather than a conveyor.

Table 2 Pre-Production Capital Cost Estimates

Description	Revised PFS July 2024 (US M)	Updated DR Grade PFS Nov 2024 (US M)
Direct Capex Mining	2.8	2.8
Direct Capex Beneficiation Plant	104.4	133.7
Direct Capex Rail	28.5	28.5
Direct Capex Port	113.9	113.9
<b>Sub-total Direct Capex</b>	<b>249.6</b>	<b>278.9</b>
<b>Sub-total Indirect Capex</b>	<b>55.7</b>	<b>56.4</b>
Environment and Community Cost	7.1	6.8
Deduct Tax Credit	-14.6	-14.0
Contingency	44.7	49.2
<b>Pre-Production Capex Costs</b>	<b>343.2</b>	<b>377.5</b>

Table 3 Deferred, sustaining, and closure capital costs over LOM.

Description	Revised PFS July 2024 (US M)	Updated DR Grade PFS Nov 2024 (US M)
Railway (2 <sup>nd</sup> Phase)	20.0	20.0
Tailings Storage Facility	9.8	9.8
Pipeline Construction / Conveyor	60.5	33.6
Pipeline Construction - EIA/RIMA	0.4	0.3
Contingency	-	9.6
Stay in Business	90.7	84.4
Closure Costs	62.8	62.8
<b>Total Deferred Capital Costs</b>	<b>244.5</b>	<b>220.5</b>

OPEX for the Project has been prepared based on the Project physicals, detailed estimates of the consumption of key consumables based on those physicals, and the unit cost of consumables.

The periods considered are annual, and production follows the production plan produced by DEV, based on a yearly output of 5.5 Mtpa of DR-grade (dry basis) / 6.03 Mtpa (wet basis). OPEX comprises physicals, labour, reagents and operating consumables, freight and power costs, mobile equipment, utilities, maintenance and mining contract costs, external contractor costs, environmental, and miscellaneous/other General and Administrative (G&A) expenses. OPEX estimates were prepared or advised by independent consulting engineers. The estimate is supported by engineering, benchmarking, and pricing of key consumables and costs derived from past production figures and informal quotes from suppliers. The table below illustrates the operating costs developed by discipline during the PFS. The project FOB and CFR average cash cost per tonne of dry product over the LOM is summarised below. Overall cash costs have been reduced primarily due to the use of the slurry pipeline, which has reduced the plant costs. Mining costs have increased due to the lower recovery rate.

Table 4 FOB and CFR average cash cost per tonne of dry product over the LOM

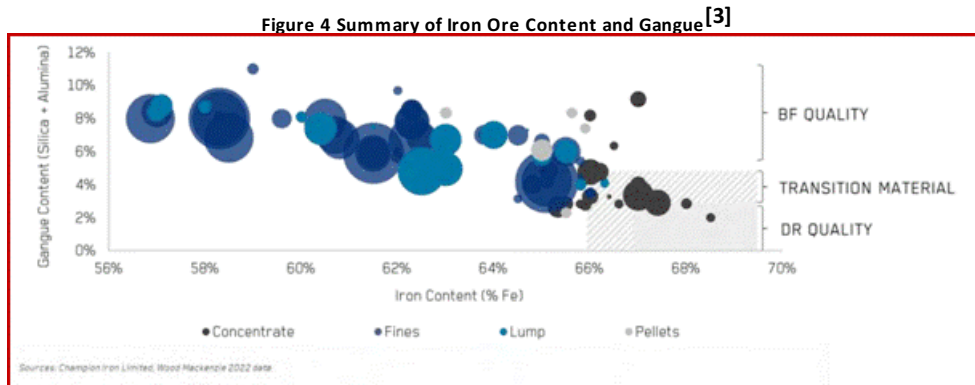
Cash Cost Per Discipline	Revised PFS July 2024	Updated DR Grade PFS Nov 2024
	<b>US /DMT</b>	<b>US /DMT</b>
Mine	16.73	17.65
TSF	0.08	0.09
Beneficiation Plant, Pipeline, Transfer & Rail Loading	10.94	10.50
Rail Freight	2.43	2.26
Port	1.55	1.52
G & A	1.77	1.74
<b>FOB Cash Costs</b>	<b>33.50</b>	<b>33.75</b>
Marine Logistics	28.70	28.18
<b>CFR Cash Costs</b>	<b>62.20</b>	<b>61.93</b>

#### DR-Grade Pricing Mechanism

Steel contributes about 8% of global carbon emissions, potentially reaching 12% by 2035. The industry is shifting from traditional Blast Furnace and Basic Oxygen Furnace ("BF/BOF") methods to Direct Reduced Iron and Electric Arc Furnace ("DRI/EAF") processes to promote greener production. While BF/BOF emits around 2.2 tons of CO<sub>2</sub> per ton of steel, DRI/EAF

can reduce this to 0.3-1 per ton with hydrogen. Wood Mackenzie projects EAF's share will grow from 28% to 38% by 2033, supported by significant government funding to reduce emissions and increase DRI/EAF capacity.

Due to its strong slag rejection capabilities, the BF/BOF process efficiently processes a wide range of iron ore grades. In contrast, the EAF is sensitive to impurities, making low-grade iron ore with high impurity levels problematic for yield and increasing electricity consumption and slag production. Thus, the EAF requires iron ore with over 67% purity and gangue elements like  $\text{SiO}_2$  and  $\text{Al}_2\text{O}_3$  below 2.5%, as shown in (Figure 4).



The drive to decarbonise industries and the rise in DRI and EAF steel production are increasing demand for DR-grade pellet feed, like that envisaged to be produced at Amapá. CRU, a globally recognised consulting firm, estimates that 2050 demand for DR-grade pellet feed is expected to reach 310 million tonnes. In Europe, regulatory pressures to cut emissions further drive demand. However, a significant supply shortfall of about 100 million tonnes is anticipated, necessitating new DR-Grade iron ore projects.

Iron ore is primarily traded on a CFR or FOB basis. CFR transactions transfer ownership upon unloading at the destination and include shipping costs. Due to the lack of transparent indices for products like Amapá's, the industry recommends using a comparable index with adjustments. The Platts TSI IODEX 65% Fe CFR China is the closest benchmark for assessing Amapá's DR-Grade product, with an additional premium for the DR-grade material.

The 65% Fe Index for the updated PFS was evaluated using various methods. Price forecasts available in the public domain from Wood Mackenzie (US 92.50/DMT), CRU (US 96.00/DMT), and Fastmarkets (US 120.00/DMT) were considered. Historically, the 3-year trailing price averages US 152.20/DMT, and the 5-year average is US 135.70/DMT. Based on these considerations, Amapá has used US 120.00/DMT, an increase of US 1/DMT compared to the Project's previously published PFS.

It is generally agreed that DR-grade iron ores should command a premium over the 65% Fe Index. It is anticipated that the Amapá DR-Grade, given its beneficial properties, will qualify for this premium. One recognised industry assessment technique for product premiums involves utilising a Value in Use ("VIU") methodology. This approach entails determining a premium or discount by considering Fe,  $\text{SiO}_2$ , and  $\text{Al}_2\text{O}_3$  variations compared to the 65% Fe. Amapá has used the premium attributed to the Kamistiasusset Iron Ore Property ("Kami") in Newfoundland as a guide to determine and assist the Value in Use (VIU) analysis. This analysis suggests a premium of about US 24.8/DMT, though this may not fully account for green premiums or carbon savings.

Table 5 Comparative product specification between Kami and Amapá iron ore projects.

Product	TFe%	$\text{SiO}_2\%$	$\text{Al}_2\text{O}_3\%$	p%	$\text{TiO}_2\%$	CaO%	MgO%	US Premium / DMT
Amapá Concentrate	67.5	0.6	0.84	0.08	0.02	0.03	0.03	27.6
Kami Concentrate	67.6	2.1	0.25	0.02	0.03	0.3	0.35	24.8

### Project Financial Analysis

A PFS financial model was developed to evaluate the project's economics. Summary results from the financial model outputs, including financial analysis, are presented in tables within this section. The financial model considers 100% equity funding for the Project, although, in reality, the financing of the Project will be a mix of debt and equity. However, the existing obligations in terms of principal repayment and current interest liabilities payable have been included in the financial model.

The product change and increased premium associated with DR-grade iron ore concentrate are primary economic drivers to changes in the financial model compared to the revised PFS published in July 2024.

Table 6 Summary of key financial information for the Project.

Item Over Life of Mine	Unit	RevisedPFS July 2024	Updated DR GradePFS Nov 2024
Gross revenue	US M	9,389	11,242
Freight (Maine Logistics)	US M	(2,351)	(2,188)
<b>Net Revenue</b>	<b>US M</b>	<b>7,038</b>	<b>9,054</b>
Operating costs	US M	(2,744)	(2,621)
Royalties and taxes (excluding income tax)	US M	(373)	(460)
<b>EBITDA</b>	<b>US M</b>	<b>3,922</b>	<b>5,973</b>
<b>EBIT</b>	<b>US M</b>	<b>3,547</b>	<b>5,586</b>
Net Taxes and Interest	US M	(390)	(621)
<b>Net Operating Profit</b>	<b>US M</b>	<b>2,144</b>	<b>4,964</b>
Initial, Sustaining capital costs & repayments	US M	(645)	(656)
<b>Free Cash Flow</b>	<b>US M</b>	<b>2,672</b>	<b>4,696</b>

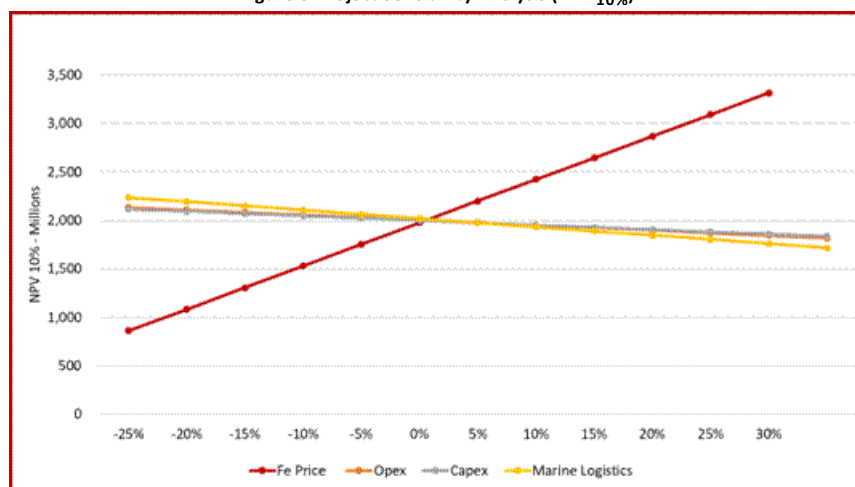
Item	Unit	RevisedPFS June 2024	Updated DR Grade PFS Nov 2024
Life of mine	Years	15	15
Discount rate	%	10	10
NPV <sub>10%</sub>	US M	1,145	1,977
IRR	%	42	56
Project Payback	Years	4	3

### Project Sensitivity Analysis

A sensitivity analysis was performed on key parameters within the financial model to assess the impact of changes on the project's post-tax NPV (debt-free). To examine the sensitivity of the Project base case NPV, each cost factor's economic and operational conditions were independently varied within a range of +/-25%, and discount rates were changed within the 8%-15% range.

Project sensitivity analysis demonstrates that the Amapá Project is most sensitive to a change in iron ore concentrate price, followed by logistics costs (marine shipment charges) and operating costs. It was least sensitive to deviation in CAPEX (Figure 5)

Figure 5 Project Sensitivity Analysis (NPV<sub>10%</sub>)



### Cadence Ownership

As of the end of November 2024, Cadence's total investment in the Amapá Project is approximately US 14.3 million, and its equity stake in the project stands at 34.6%.

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Kiran Morzaria B.Eng. (ACSM), MBA, has reviewed and approved the information contained in this announcement. Kiran holds a Bachelor of Engineering (Industrial Geology) from the Camborne School of Mines and an MBA (Finance) from CASS Business School.

#### Cautionary and Forward-Looking Statements

*Certain statements in this announcement are or may be considered forward-looking. Forward-looking statements are identified by their use of terms and phrases such as "believe", "could", "should", "envisage", "estimate", "intend", "may", "plan", "will", or the negative of those variations or comparable expressions including references to assumptions. These forward-looking statements are not based on historical facts but rather on the Directors' current expectations and assumptions regarding the company's future growth results of operations performance, future capital, and other expenditures (including the amount, nature, and sources of funding thereof) competitive advantages business prospects and opportunities. Such forward-looking statements reflect the Directors' current beliefs and assumptions and are based on information currently available to the Directors. Many factors could cause actual results to differ materially from the results discussed in the forward-looking statements, including risks associated with vulnerability to general economic and business conditions, competition, environmental and other regulatory changes actions by governmental authorities, the availability of capital markets reliance on crucial personnel uninsured and underinsured losses and other factors many of which are beyond the control of the company. Although any forward-looking statements contained in this announcement are based upon what the Directors believe to be reasonable assumptions. The company cannot assure investors that results will be consistent with such forward-looking statements.*

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[1] Compared with revised PFS published on [AIM: 9 July 2024](#)

[2] Average after one year ramp up until year 14 of mine life

[3] *Champion Iron Limited Pre-feasibility Study for the Kamistatusset (Kami) Iron Ore Property*. [online] Available at: <https://company-announcements.afr.com/asx/cia/1e8c4153-e249-11ee-b0cc-26a478d59520.pdf> [Accessed 1 Dec. 2024]

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