Engebø Rutile and Garnet

Updated Definitive Feasibility Study

Executive Summary

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1. Executive Summary

1.1 Introduction

The Updated Definitive Feasibility Study (UDFS) is an update of the DFS for the Engebø Rutile and Garnet project (the Project) which was completed in January 2020. As a consequence of the COVID-19 pandemic and uncertainties related to the markets for rutile and garnet, and the opportunities for securing project financing, Nordic Mining decided in spring 2020 to undertake a Value Engineering process to make the Project more resilient. The UDFS and this Executive Summary is effective as of 11 May 2021.

The Project comprises a mining and processing operation at the Engebø Deposit. The hard rock deposit is one of the world's highest-grade rutile deposits and is unique due to its substantial content of garnet.

The two minerals, rutile and garnet, which will be produced at Engebø, is briefly described in the following:

- Rutile is a high-grade titanium feedstock, primarily used in the production of titanium pigment, titanium metal and welding rods
- Garnet is used in the waterjet cutting and abrasives industries. The Engebø garnet is almandine, generally considered to be the highest quality in industrial applications.

Nordic Mining ASA is a public company listed on Euronext Expand Oslo (ticker code: NOM). The mineral rights to the Engebø Deposit is held by Nordic Mining's wholly owned subsidiary Nordic Rutile AS.

Lists of tables and figures used in the UDFS are included in Section 2.1 and Section 2.2. The main contributors to the UDFS together with a list of abbreviations are included in Section 2.3 and Section 2.4.

The UDFS confirms that production of rutile and garnet in an integrated process is cost effective and provides an attractive business case with robust project economics, low environmental impacts and significant upside potential.

The main improvements and risk-reducing measures in the UDFS are:

- Reduced environmental footprint; 99% reduction in consumption of approved chemicals in the production process (compared with the 2016 environmental permit), around 80% reduction of CO_2 emissions and approximately 40% reduction of the process plant facilities footprint compared with the DFS
- Contract and execution strategy based on EPC partnerships and early vendor engagement
- Stick-build construction methodology and improved ore flow logistics
- Reduced initial capital investment needed to realize the Project and commence operation by USD 93 million compared to USD 311 million in DFS
- Reduced process operating cost by more than 25% following from flowsheet optimizations, including reduction in energy costs from use of electrical dryers for drying of minerals

- Improved mining design for open pit and underground focusing on practical and cost-effective operations. Mining schedule in open pit has been optimized for the initial years and the underground mining schedule targets higher grades and simplified infrastructure design
- Reduced market risk based on post-pandemic market forecasts for rutile and garnet, retaining flexibility to increase garnet production in line with increasing demand
- Attractive project economics with considerable reductions in market, financing and execution risks.

1.2 Highlights

1.2.1 Main Project Parameters

Nordic Mining will produce high-quality rutile and garnet products from an annual Run of Mine (ROM) of 1.5 Mt ore. Open pit mining will be carried out in the first 14 years, followed by 1 year combined open pit and underground mining operations. From year 16 and for a period of 18 years, the mining operation will be underground. Production will be extended by approximately 6 years processing lower grade ore that will be stockpiled in the open pit period at the waste rock area. The overall schedule for the around 39 years Life of Mine (LOM) operation is illustrated in Figure 1-1.

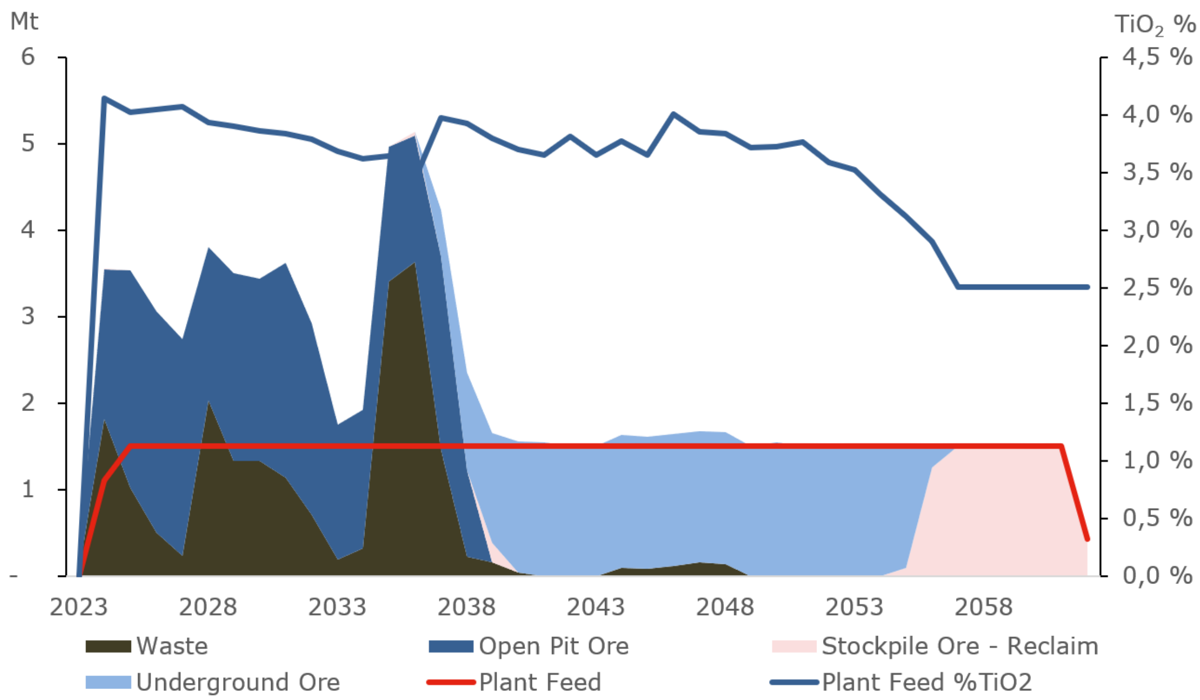

Figure 1-1: LOM Schedule

The production process for rutile and garnet is integrated from mine to finished products. The average production and sales volumes of rutile and garnet will be approximately 35.000 tpa and 180.000 tpa, respectively, for the first 10 years of operation. Production of garnet is based on initial marketing strategies and is forecasted to gradually increase to 200,000 tpa over the first 6 years of operations. Production capacity for garnet can be increased with additional future investments, in line with market and demand development.

A preliminary timeline for financing, construction, commissioning and ramp-up of production is illustrated in Figure 1-2.

Figure 1-2: Project Schedule

1.2.2 Key Project Characteristics

The Engebø Project has important characteristics which secure a low environmental footprint and long-term financial returns:

- *Low Environmental Footprint*

  Compact Project layout and infrastructure, minimal internal transportation, mineral comminution and processing based on renewable hydroelectric power and accessible sea freight, imply a low carbon footprint and minimal land use. Inert minerals enable operation without acidic run-off, heavy metal contamination and radioactive pollution.

- *Low-Cost Mining Operation*

  The Deposit is a large, outcropping high-grade resource. This allows for easy transition from low cost open pit mining with a low pit stripping ratio (waste tonne/ore tonne) of 0.6 with limited overburden, to efficient underground mining operation. Favorable geotechnical conditions support cost effective open pit and underground mining methods.

- *Long Project Lifetime*

  The 39 years Project lifetime will position the operation as a long-term supplier of high-quality rutile and garnet. From a regional perspective, the Project will contribute positively and long-term to activity levels, employment, tax income, etc. Substantial Inferred Resource is documented and may allow for increased future production and/or extension of the mine life.

- *High-Quality Products*

  Testwork programs have been successful in producing a commercial rutile product suitable for pigment and metal production. Through extensive testing of various garnet products, a baseline strategy to produce a high performance 80 mesh garnet product has been selected to respond to market demand in targeted geographies.

- *Favorable Infrastructure*

  The Project is located near existing infrastructure with reliable power supply and raw water generated on site by desalination. The existing deep-water quay caters for low cost shipping-based logistics during construction and operation

1.2.3 Project Economics

The basis for the Project is the geological properties of the Engebø Deposit including the Mineral Resource Statement, the Ore Reserve Statement and the mine plan and process flowsheet with estimates for capital expenditures and operating costs. These fundamentals are further described in this Executive Summary.

The mining plan and mineral processing for the Project is based on the Measured and Indicated categories from the Mineral Resource Estimates. Significant mineral resources (Inferred Resources) may be qualified through future drilling programs to extend the Project lifetime. The UDFS has been prepared according to JORC reporting standards.

The economics of the Project was evaluated using an Excel-based real-basis DCF-model (Discounted Cash Flow) to forecast the Unlevered Free Cash Flow (UFCF) over the life of the Project, and present a valuation of the Project as a stand-alone entity in terms of Internal Rate of Return (IRR) and Net Present Value (NPV). The rutile and garnet prices used in the valuation were based on the outlook from TZMI with a long-term FOB-price for rutile of USD 1,179 per tonne for a 95% TiO_2 product (real 2021 USD), and USD 230 per tonne for 92% garnet product (real 2021 USD). The financial calculations use a USD/NOK exchange rate of 8.53.

The initial capital investment needed to realize the project and commence commercial production is USD 217.8 million, including contingency, and comprise of USD 203.4 million capital expenditure for open pit mine and the processing plant, USD 12.6 million for purchase of land and contributions to infrastructure investments, and USD 1.8 million in pre-production operating expenditure related to mobilization of operational personnel. Payment to ConocoPhillips for mining rights of USD 4.7 million is expected to be financed from cash flow from operations.

The DCF-valuation shows high-margin annual EBITDA of around USD 54 million, summating to USD 2.1 billion over the life of the Project, corresponding to an average EBITDA-margin of 68%. The undiscounted operating cash flow of the Project is around USD 1.7 billion. The high-margin operating cash flow, combined with reduced pre-production capital expenditure, and low average annual sustaining capital cost of USD 0.6 million, result an unlevered post-tax IRR of 19.8% and post-tax and NPV of USD 260.4 million discounted using a real discount rate of 8%. The Project's undiscounted payback period is around 4 years from start of operations, and the discounted payback period around 6 year.

Table 1-1 summarizes key financial and production metrics for the Project.

Table 1-1: Key Production and Financial Summary

Description	Unit	Value
Project Financials		
Pre-tax NPV @ 8.0%	USD million	354.6
Pre-tax IRR	%	22.5
Post-tax NPV @ 8.0%	USD million	260.4
Post-tax IRR	%	19.8
EBITDA (Undiscounted)	USD billion	2.1
EBITDA-margin	%	67.6
Free Cash Flow (Undiscounted)	USD billion	1.4
Free Cash Flow the first 10 year of full production	USD Million/Annum	51.1
Payback Period (from Start of Production)	years	4.4
Discounted Payback Period (from Start of Production)	years	5.9
Profitability Index (PI)	ratio	2.4
Production Capacity		
Initial Production Capacity ROM	Mtpa	1.5
Pre-Production Capital Expenditure		
Initial Capital Expenditure for Open Pit and Processing Plant	USD million	203.4
Capital Intensity for Open Pit and Processing Plant	USD/Production Capacity	860
Inital Capital Expenditure for Outside Battery Limit ("OBSL")	USD million	12.6
Pre-Production Operating Expenditure	USD million	1.8
Financial Operating Metrics First 10 Years of Commercial Production		
Average Cash Cost[1][2][3]	USD/ROM Tonne	14.4
Average Cash Cost[1][2][3]	USD/Sales Tonne	95.9
Average Operating Revenue[1][2][3]	USD/Sales Tonne	375.4
Mining and Processing		
Open Pit Phase	Years	15
Total Open Pit Ore Production	Mt	29.7
Underground Phase	Years	19
Total Underground Ore Production	Mt	27.4
Stockpile Phase	years	6

1 Average first 10 years
2 Rutile and Garnet combined
3 Excludes Royalties

Description	Unit	Value
Total Project Life of Mine	years	39
Total Project Ore Production	Mt	57.1
Ore Grade – Rutile[1]	%	3.9
Rutile Recovery[1]	%	56.93
Ore Yield – Garnet[1]	%	12.49
Rutile Production[1]	ktpa	35
Garnet Production[1]	ktpa	180
Product Price Assumptions (2021 dollars)		
Average Rutile Price (FOB Engebø)	USD/Sales Tonne	1,179
Average Garnet Price (FOB Engebø)	USD/Sales Tonne	230

Figure 1-3 below presents a summary of the Project's Unlevered Free Cash Flow.

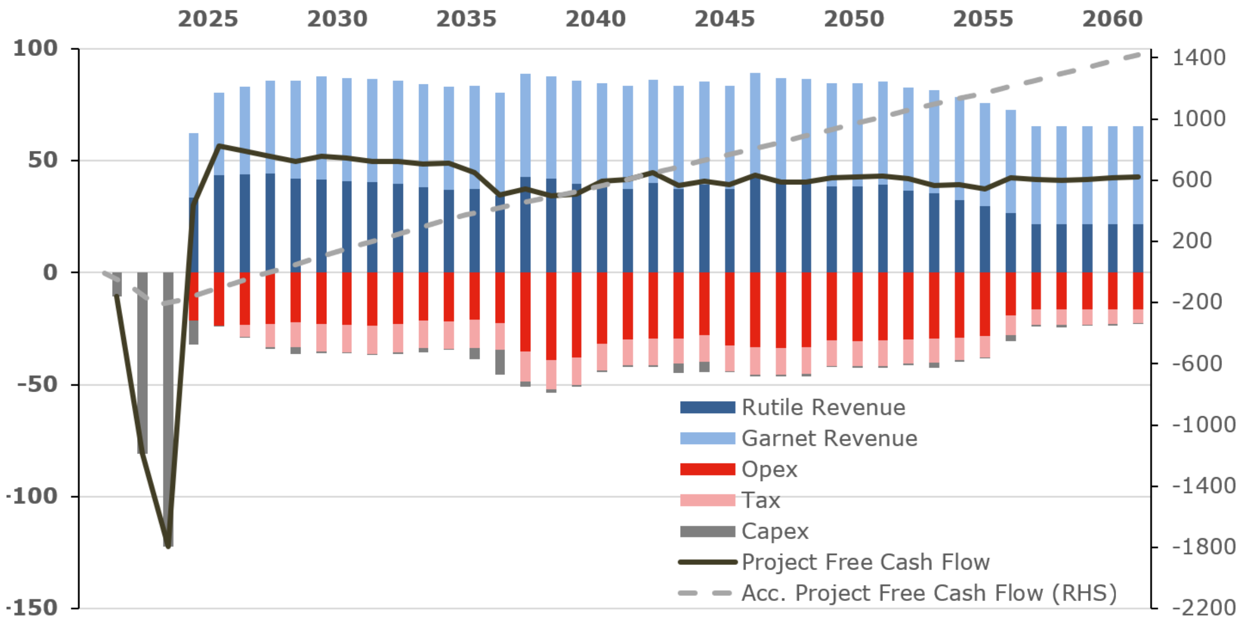

Figure 1-3: Unlevered Free Cash Flow

Engebø is positioned in the first quartile of the titanium feedstock industry R/C ratio curve with a weighted average R/C ratio at 3.6, well above the forecast weighted average; ref. Figure 1-4

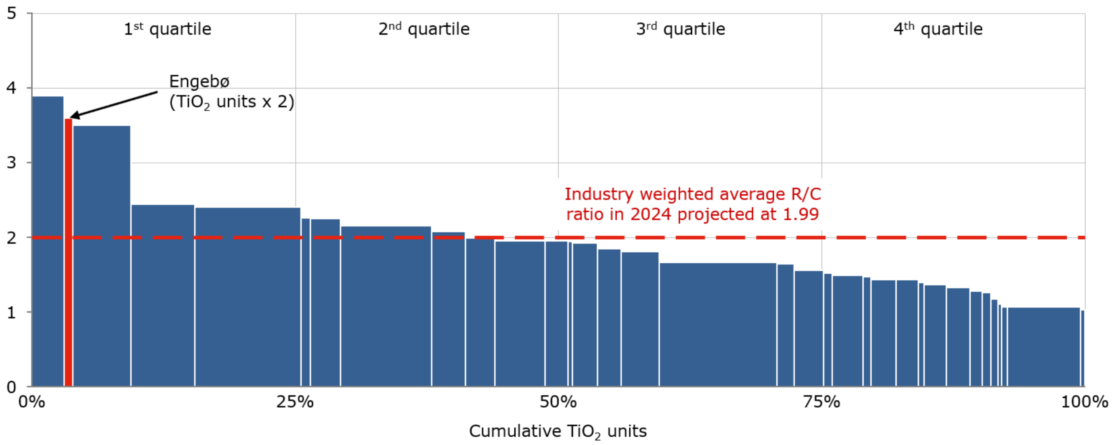

Figure 1-4: Industry weighted average R/C ratio

Figure 1-5 and Figure 1-6 summarize the Project's sensitivities to changes in rutile and garnet prices, and capital costs and operating costs on the unlevered post-tax IRR and NPV. Rutile and garnet prices have, based on post-pandemic market forecasts for rutile and garnet, similar impact on the Project's IRR and NPV, with the NPV being marginally more sensitive to changes in garnet prices compared to rutile prices. The reduction in initial capital expenditure for open pit and processing plant has reduced the Project's sensitivity to changes in capital cost on IRR and NPV compared to the DFS. The Project is more sensitive to changes in capital costs compared to operating costs in terms of IRR, however is marginally more sensitive to changes in operating costs compared to capital costs on NPV.

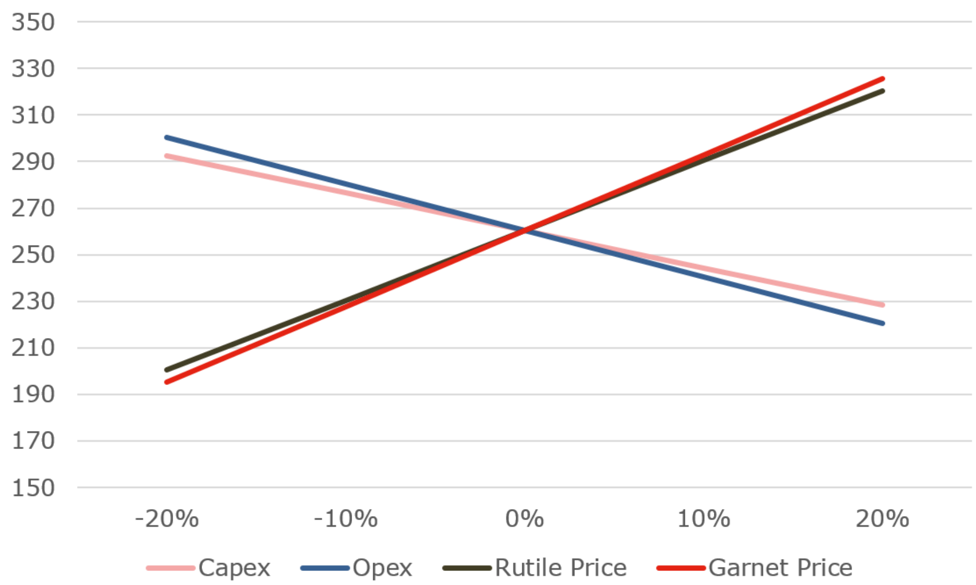

Figure 1-5: Project NPV Sensitivity (Post-Tax)

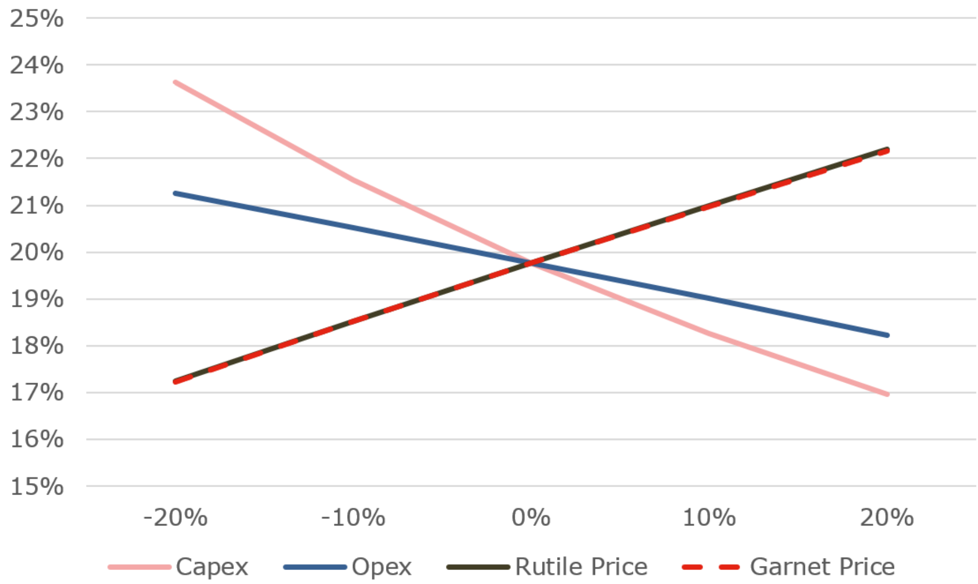

Figure 1-6: Project IRR Sensitivity (Post-Tax)

1.2.4 *ESG Focus Areas*

The Project will be developed in accordance with IFC Performance Standards and relevant Equator Principles as well as applicable regulations in Norway. The Project will positively impact locally and regionally on people's livelihood, education, work opportunities and cultural flourishment. Stakeholders' engagement will ensure good dialogue with neighbors, communities and interest groups based on transparency, respect and responsiveness. A local stakeholder resource group is established and a digital portal for communication and feedback is organized on the Company's webpage.

Comprehensive Environmental and Social Management Systems (ESMS) for the Project will be completed prior to construction and adapted for operation as part of the operational readiness work.

1.2.5 *Upside Opportunities*

There are unquantified future upside potentials related to:

- Extending the Project lifetime through increased ore reserves from Inferred Resources
- Increasing ROM within existing regulatory framework
- Production and sales of speciality rutile products
- Flexible initial production capacity, and potential for future expansion to accommodate additional sales of garnet
- Production and sales of aggregates and ballasting products to infrastructure projects.

1.3 Project Description, Permits and Licenses

1.3.1 Location and Area of Property

The Engebø Project is located in Naustdal in Sunnfjord municipality in Vestland county on the west coast of Norway. The Project site is on the northern side of the Førde Fjord with short and navigable access to the North Sea; ref. Figure 1-7.

Sunnfjord municipality was established 1 January 2020 from a merger between the previous Naustdal municipality and three neighbouring municipalities; Førde, Gaular and Jølster. Sunnfjord municipality has approximately 22,000 inhabitants.

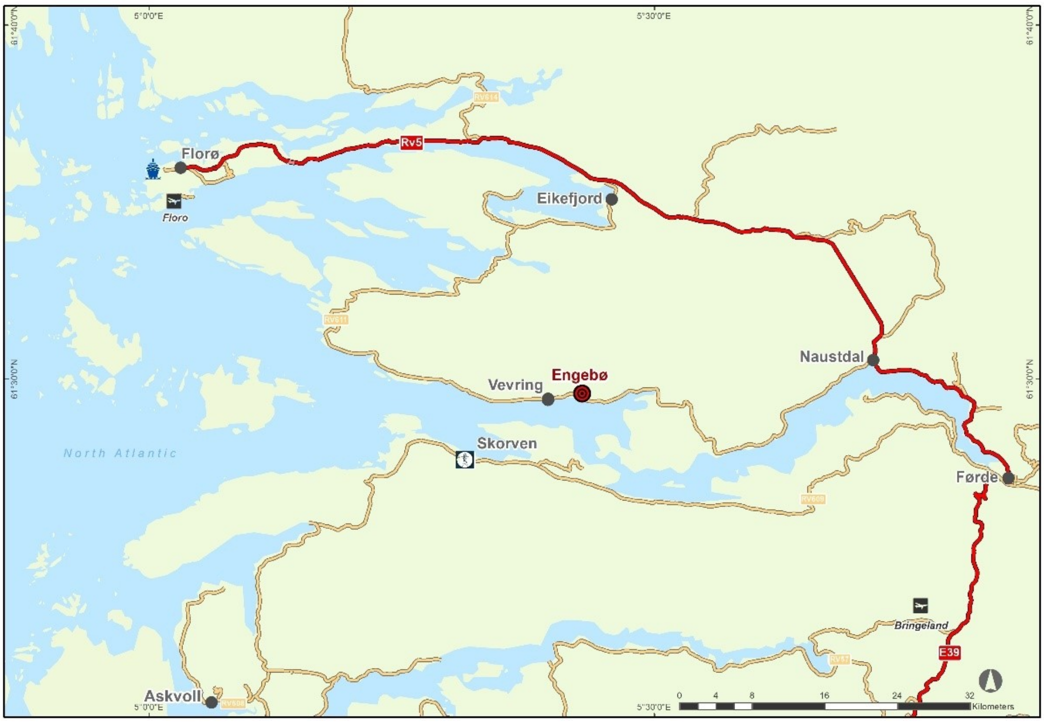

Figure 1-7: Project Site and Infrastructure in the Sunnfjord Region

Engebø is the local name of the hill which contains the Deposit. The hill varies in elevation from sea level to approximately 335 meter above sea level and runs parallel to the Førde Fjord.

The Project site at Engebø is located near the Fv 611 county road that runs alongside the Fjord. There is a haul road from the county road to the top of the Engebø hill.

A closed, small quarry and a quay which were constructed in the mid-1990s for shipping of armour stone is located in the eastern part of the Project site area. A detailed assessment by a Norwegian consultant in early 2018 indicated that the quay is in a good structural condition and is designed for vessels with a capacity of up to 80,000 tonnes, providing direct access to the North Sea and international ports.

Hydroelectric power for the operations will be sourced from a strengthened 22 kV grid that passes across the Project site.

The climate at Engebø is typical for the western Norway coastal climate and is characterized by long, warm days in summer and colder, darker and shorter days in winter. Snow is common in winter, but due to the proximity to the sea and the relatively low altitude there is no permanent freezing or snow accumulation, and operations can be run year around. Rainfall exceeds 2,000 mm a year, through all four seasons. The Førde Fjord at Engebø is permanently ice-free.

The nearest town, Førde, with a population of about 10,000 people, is located about 30 km east of Engebø, at the inner most part of the Førde Fjord. Førde is a regional centre and the largest city on the west coast of Norway between Bergen in south and Ålesund in north.

The property on which the Project is located consist of two areas:

- The processing plant area including the existing deep-water quay
- The mining, service and rock storage area.

Both areas are located within the regulated area of the approved zoning plan for mineral extraction and processing at Engebø. The zoning plan area including the areas for mining, mineral processing and deposition of tailings is shown in Figure 1-9.

Nordic Mining has signed agreements with three private landowners who own the area for the processing plant, giving Nordic Mining the right to acquire the subject properties. The option agreements are valid until 2025 with exclusive rights for Nordic Mining to extend the option period.

The open pit mining, service and rock storage areas are owned by the same three landowners who owns the processing plant area. Nordic Mining has entered into agreements with the three landowners which provides exclusive right to access and use the area for mining operations including required infrastructure and installations. The agreements regulate the compensation to the landowners for the extraction of rutile, garnet and possible other minerals.

1.3.2 Prior and Current Ownership

The Engebø Deposit was first recognized as a rutile deposit in the 1970s, after development of a local road tunnel on county road Fv611. The Deposit was not systematically explored until the 1990s when DuPont made claims for exploration of rutile. DuPont carried out comprehensive drilling and sampling programs in the period 1995 to 1998 with assistance from the Geological Survey of Norway (NGU). In 1997, DuPont, through its subsidiary Conoco (later ConocoPhillips), qualified the initial Exploration Rights to become Extraction Permits under the Norwegian mineral law.

The company Fjord Blokk AS initiated a small-scale quarrying operations in 1998, with production of armour stone (block stone) in the eastern part of the Deposit.

In September 2006, Nordic Mining acquired the Extraction Permits from ConocoPhillips. Since 2011, the permits have been held by Nordic Mining's wholly owned subsidiary Nordic Rutile AS.

1.3.3 Mineral Tenures, Permits and Licenses

Nordic Mining holds nine Extraction Permits covering the entire planned mining area; ref. Figure 1-8.

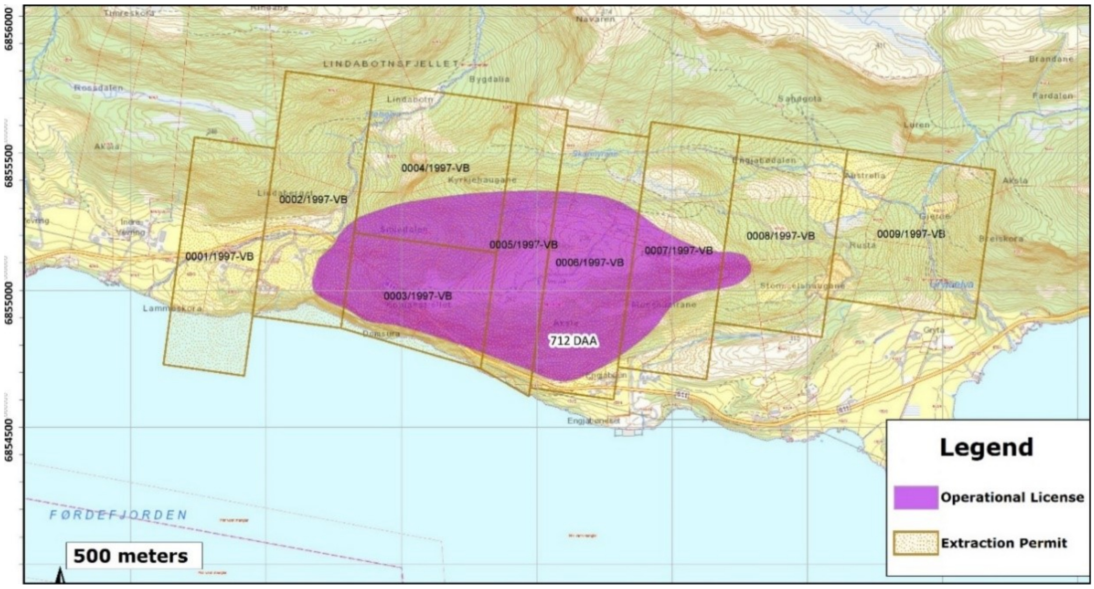

Figure 1-8: Extraction Permits and Area for the Operational License

1.3.3.1 Key Permits Overview

The key legislative requirements for mining operations at Engebø have been granted as detailed in Table 1-2.

Table 1-2: Key Permits and Approvals

Regulatory Requirements	Authority	Status	Comment
Project Zoning Plan	Ministry of Local Government and Modernisation	Approved, 2015	Final
Detailed Zoning Plan	Naustdal Municipality	Approved, 2019	Final
Environmental Permit	King in Council Environment Agency	Approved, 2016 Approved, 2021	Final
Operational License	Directorate of Mining	Approved, 2020	Pending confirmation from the Ministry of Trade, Industry and Fisheries

1.3.3.2 Zoning Plan

The zoning plan is regulated by The Planning and Building Act. Approximately 2 km^2 is regulated on land, and 4.4 km^2 of seabed area is regulated for submarine disposal of tailings; ref. Figure 1-9.

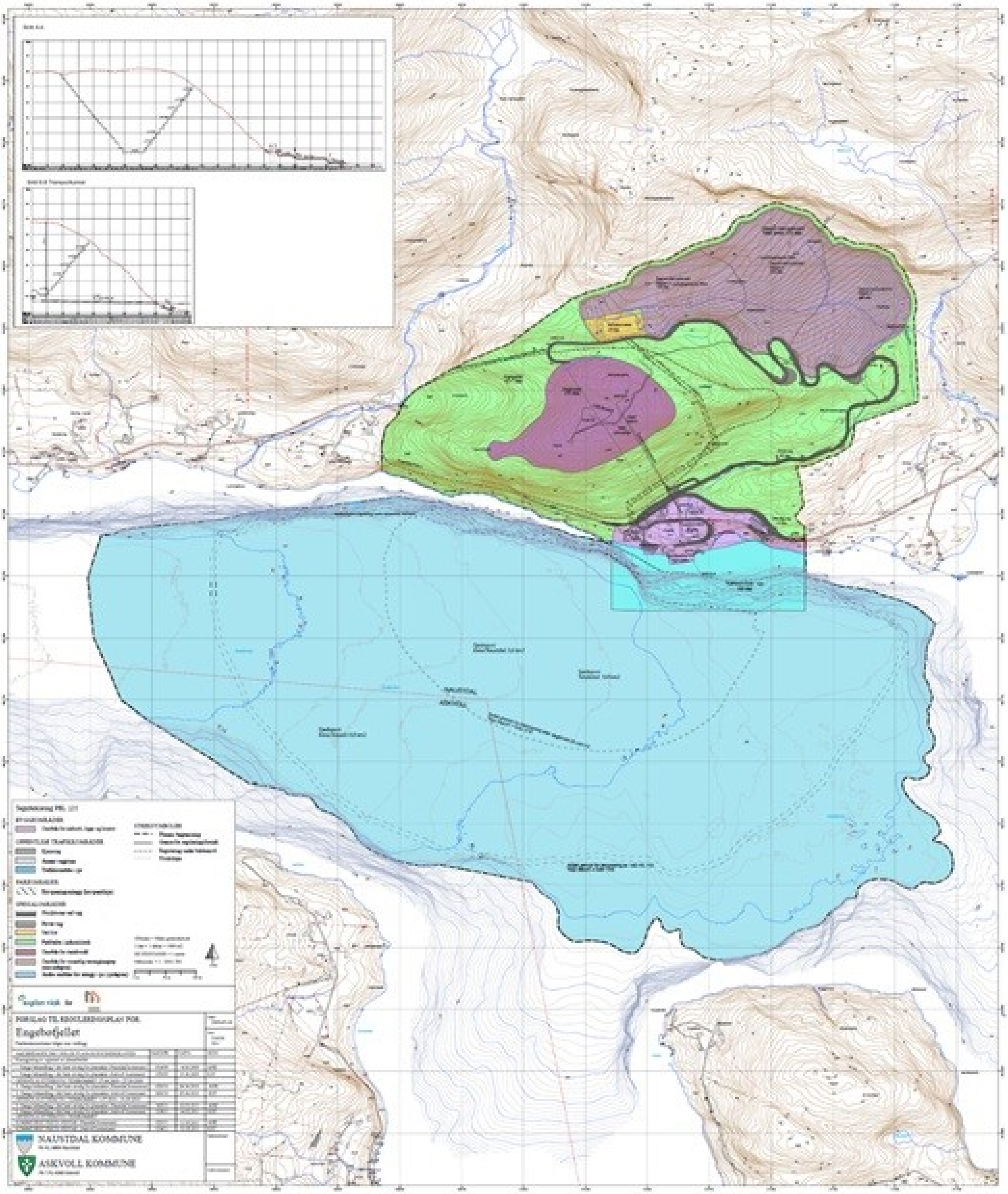

Figure 1-9: Zoning Plan Area

The zoning plan allows for and regulates the areal disposition of the following:

- Process plant
- Open pit and underground mining
- Mining service area
- Waste rock deposition
- Access road between mining area and process plant
- Underground infrastructure for ore transportation and primary crushing
- Seabed Tailings Deposit (STD).

A detailed zoning plan for the terrestrial part of the Project has been granted by Naustdal municipality.

1.3.3.3 Environmental Permit

The environmental permit is governed under The Pollution Act, and the responsible authority is the Environment Agency. The environmental permit covers license to discharge solids, gas and fluids to the air, water or ground and licences for vibration and noise pollution, and requirements for environmental monitoring and reporting.

An environmental monitoring program has been developed in collaboration with DNV. Monitoring of key parameters will start approximately one year prior to operation to track baseline data. Key requirements for the monitoring and measurement programs are:

- Monitoring of juvenile salmon (starts spring 2021)
- Monitoring of effects on Fjord biodiversity
- Monitoring of spawning ground for cod
- Measurements of particle concentrations and accumulation for STD
- Measurements of dust emissions from operations
- Measurements of noise and vibrations.

1.3.3.4 Operational License

The granting of an operational license is regulated under the Mining Act and is managed by the Directorate of Mining. The operational licence governs the practical aspects of the mining operation, such as open pit and waste rock storage area stability, safety and closure, as well as mining sequence and mineral resource management. Included in the Directorate's assessment is an evaluation of competencies required to operate the mine in a safe and sound manner.

The area for the operational license is shown in Figure 1-8.

The Directorate of Mining's decision to grant the operational license was appealed by various stakeholders. In November 2020, the Directorate confirmed that the appeals do not provide any basis to revoke or change the decision. The matter has been forwarded to the Ministry of Trade, Industry and Fisheries for final confirmation. Arctic Mineral Resources AS (AMR) is one of the appellants. In March 2021, AMR summoned Nordic Rutile claiming that AMR has exclusive rights to the garnet on the western side (Vevring side) of the Deposit and that Nordic Rutile has no rights to the said garnets. AMR's claim is contrary to the Directorate of Mining's decision and contrary to the Minerals Act. Nordic Mining rejects the claim in its entirety.

1.4 Geology and Mineral Resources

1.4.1 Geology

The Engebø Deposit is one of the world's highest-grade rutile (TiO_2) hard rock deposits as well as being unique for its substantial content of almandine-type ($Fe_3Al_2Si_3O_{12}$)

garnet; ref. Figure 1-10[4]. The Deposit has neglible level of radionuclide content; ref Figure 1-11

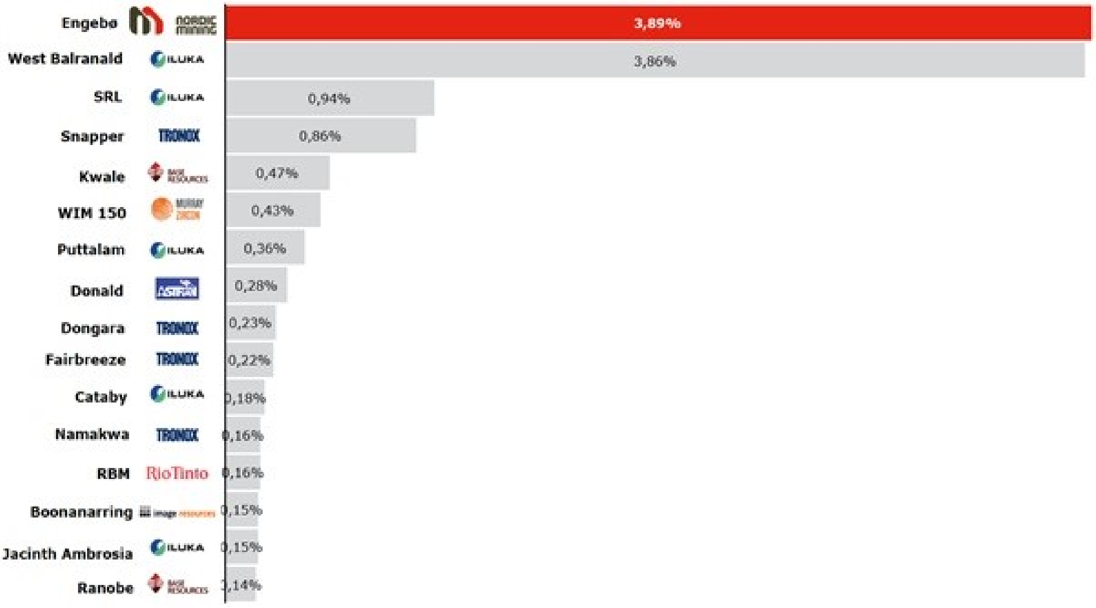

Figure 1-10: In-situ Rutile Grades for Current Producers and Planned Projects

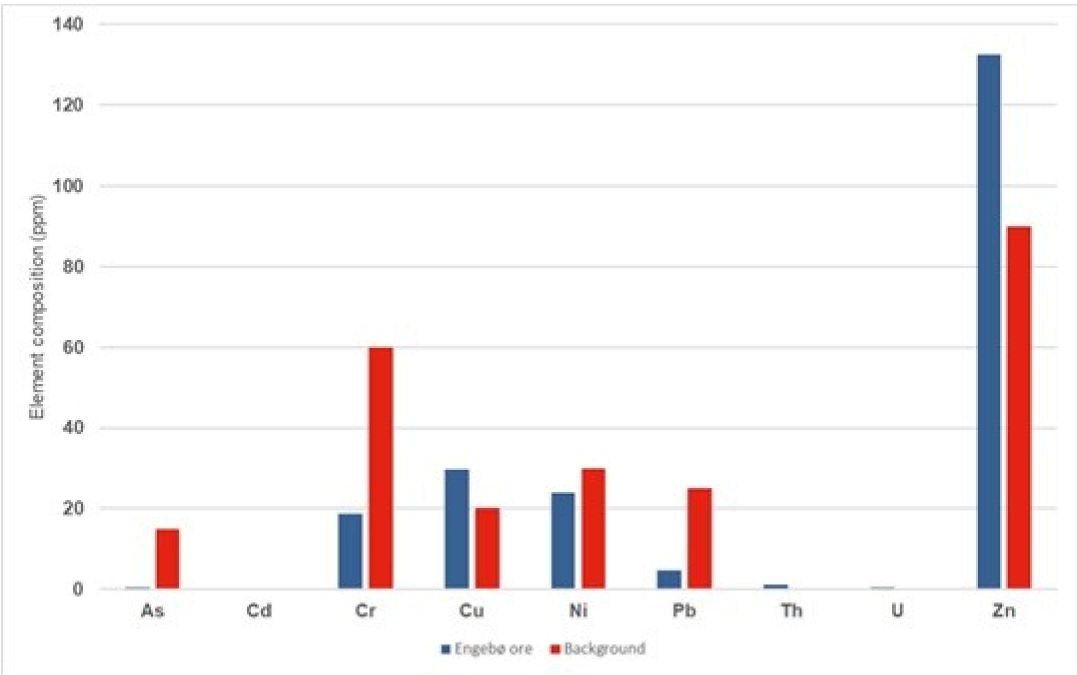

Figure 1-11: Heavy Metal and Radionuclide Content

The Deposit forms a roughly 2.5 km x 0.5 km E-W trending lens situated in a Proterozoic gneiss, with an overall dip to the north of approximately 85 degrees. Drilling has not yet reached the depth of the Deposit, but has demonstrated a span of at least 500 m vertical, from the surface in the east to the deepest drill holes in the west. The centre of the

[4] Source: TZMI, February 2021

eclogite lens is well preserved with limited alteration, foliation and shearing. Towards the contact to the surrounding gneisses, the amount of deformation and alteration increases, and the eclogite is progressively more deformed and altered to amphibolite facies lithologies.

The contact zone to the gneiss is typically defined by an intensively sheared and folded mixture of alternating mafic (eclogite and amphibolite) and felsic (gneiss) lithologies.

As a tool for characterization of the Engebø eclogite, the lithology has been subdivided based on the content of Ti and Fe:

- Ferro eclogite is defined by Fe_2O_3 > 16% and TiO_2 > 3%
- Transitional eclogite is defined by 14-16% Fe_2O_3 and 2-3% TiO_2
- Leuco eclogite is defined by Fe_2O_3 < 14% and TiO_2 < 2%.

Compared to the ferro eclogite, the leuco eclogite is brighter in color and less dense due to the increasing content of felsic minerals. Figure 1-12 shows the distribution of the high grade ore type eclogite (transitional and ferro eclogite) and the low grade, non-ore type eclogite (leuco eclogite).

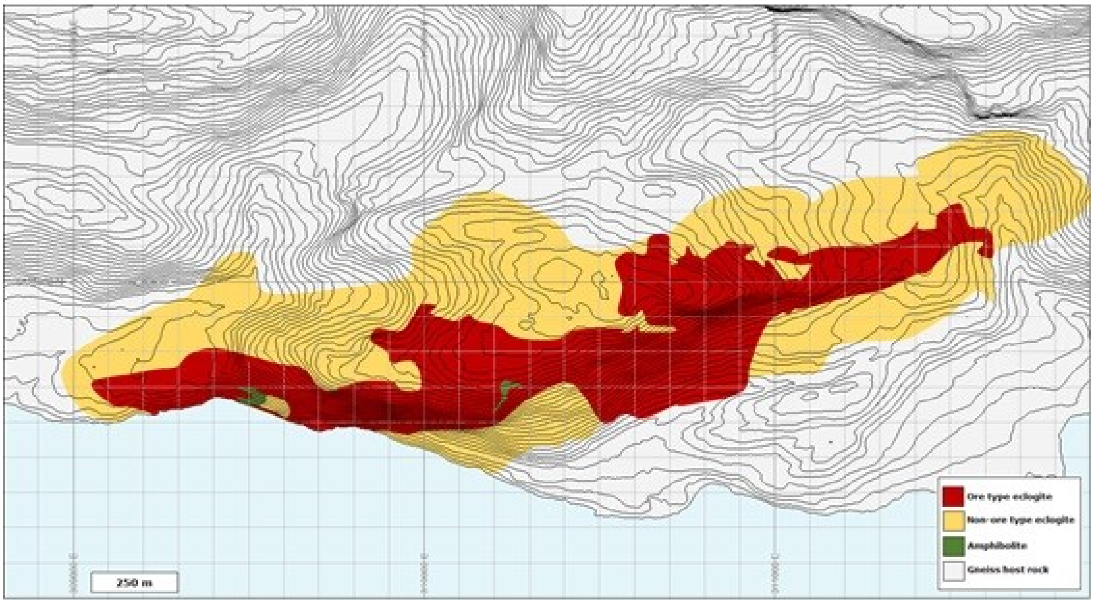

Figure 1-12: Geology of the Engebø Deposit

In ferro eclogite, rutile is typically the fourth most abundant mineral representing up to 6% of the mineral composition. Rutile is the most common Ti-bearing mineral in the Deposit and accounts for, in average, >95% of all the TiO_2 in the ferro and transitional eclogite lithologies. The exception is in local, highly altered zones where rutile more pervasivly breaks down to form ilmenite. Typically, the in-situ rutile grain size is between 100 and 300 µm.

The structural geology in the Deposit is dominated by eclogite facies folds, shear zones and foliation. The mechanism behind this deformation is interpreted to be a top-to-left E-W shearing combined with a N-S shortening.

1.4.2 *Ore Characterization and Resource Data Verification*

The ore characterization is based on three drilling campaigns; ref. Table 1-3 and Figure 1-13

Table 1-3: Overview of Drilling Campaigns

Drilling Campaign	Focus Area	Drillholes	Core Size	Length (m)	Average Length/ Hole (m)
1995 - 1997 DuPont/Conoco	Western Part	49	BQ	15,198	310
2016 Nordic Mining	Central Part (Open Pit)	38	NQ2	6,348	167
2018 Nordic Mining	Central Part (Open Pit)	10	NQ2	1,581	158

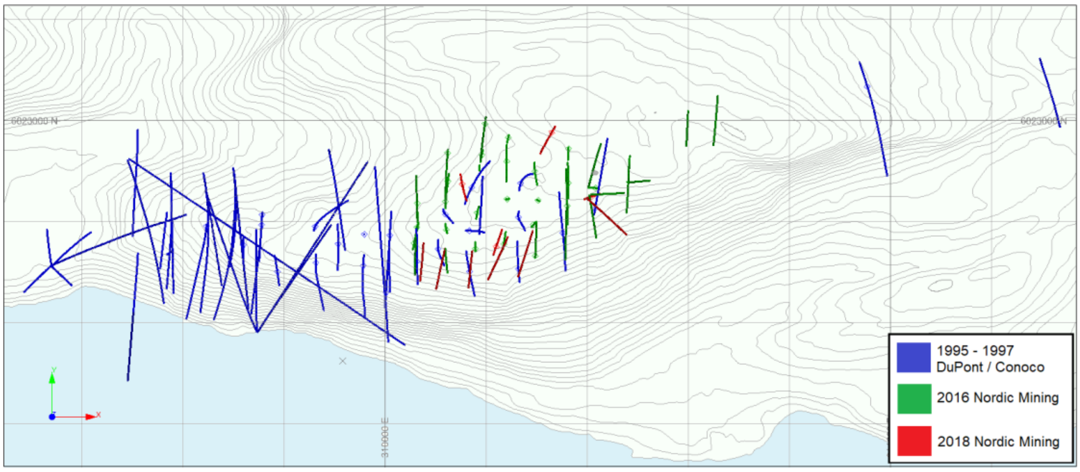

Figure 1-13: Drill Hole Positions in Drilling Campaigns

The DuPont/Conoco drilling was focused on the western part of the Deposit. A few holes were also drilled further east to define the resource. Sampling along the county road tunnel and shore line, trenching and surface sampling were also carried out to supplement the drill hole data. A portable XRF was used as the main acquisition method for chemical data. This was done on 25 cm intervals along most of the drill cores, and data were corrected against 116 whole rock XRF assays of drill core composites. No specific Quality Control and Quality Assurance (QA/QC) program was followed, and no specific geotechnical investigation was carried out.

The 2016 and 2018 drilling campaigns carried out by Nordic Mining were executed according to the JORC code. Competent Person Adam Wheeler was engaged to assist in the planning and execution of the drilling campaigns and to model the ore Deposit and qualify the resource according to the JORC. NQ2 cores were drilled in a 40 x 60 meter grid focusing on the open pit area representing the first years of mining. The aim of the drilling programs were to improve understanding and classification of the resource for a PFS/DFS level and to provide geotechnical input for mine modelling.

Whole rock XRF assays were done for 5 meter ore composites on all drill holes. An extensive QA/QC program was executed as part of the 2016 and 2018 drilling campaigns to assure high standards and JORC compliancy. The garnet content was quantified based on a combination of Qemscan and chemical calculations, and qualitative measurements were carried out to investigate grain size and variations.

The following ore characteristics were recorded for all drill holes for the 2016 and 2018 campaigns:

- Lithological logging
- Rock Quality Designation (RQD)
- Density measurements
- Chemical assaying.

Several oriented drill cores were logged by means of advanced geotechnical logging, and samples throughout the drill cores were assayed by Qemscan for garnet quantification.

In 2016, verification of the 1995/1997 drill core data based on reinvestigating the older core material was carried out. A total of 709 meters of ferro and transitional eclogite was relogged and re-assayed, representing 6% of the total 1995/1997 drill cores and 22% of the 1995/1997 drill cores within the open pit area. Favorable results were achieved from every aspect of the analysis, and it was concluded that the historical data could be used for resource estimation for all resource category levels.

Competent Person Adam Wheeler states that the geological data used to inform the Engebø resource estimation have been collected in line with good industry practice, allowing the results to be reported according to the guidelines of the JORC code 2012. It is considered that all available data is suitable for use in the estimation of all resource categories including:

- DuPont/Conoco diamond drillhole data
- DuPont/Conoco surface data
- 2016 - 2018 Nordic Mining diamond drillhole data
- 2016 Nordic Mining surface sample data.

As part of the UDFS an extensive logging campaign of the 1995/1997 drill cores were relogged and reassayed, confirming previous analysis.

1.4.3 Mineral Resource Estimate

The Mineral Resource estimation for the Project was done by Competent Person Adam Wheeler using Datamine Software. The data used for the resource estimation was based on drill hole data and surface sampling from the three campaigns referred in Section 1.4.2.

The main lithology and ore type boundaries were modelled creating wireframes in Datamine.

All samples from the data acquisition campaigns were converted into 5 meter composites.

A volumetric model was created based on the lithology wireframes. The default block was 15 x 15 x 15 meters and filler blocks down to 5 x 5 x X meters (where X will be determined by the best fit). The topographic model restricted the volumetric model against the surface, and blocks inside the 50-meter Fjord perimeter were flagged since they were classified as unavailable.

Grade estimation was done based on Kriging Neighbourhood Analysis using three searching parameters including the search distances applied as well as the minimum and maximum of composites and drill holes. TiO_2 and Fe_2O_3 grades were estimated using ordinary kriging, and all other grades are estimated using inverse-distance weighing. Dynamic anisotropy was applied in the estimation process to orient the search ellipsoids approximately parallel to the lithology zone geometries.

For the resource classification the following classification criteria was used for searches:

- *Measured*

  At least three drill holes, and samples present in at least 3 octants within a search of 40 x 40 x 24 meters

- *Indicated*

  At least 3 drill holes, and samples present in at least 3 octants, within a search of 75 x 75 x 45 meters

- *Inferred*

  Within interpreted structures and limited by a maximum extrapolation of 180 meters (down-dip) or 120 meters (along-strike) from available sample data.

The model was validated by the following steps:

- Examination of model/sample cross-section
- Block volume checks
- Comparison of global averages
- Comparison of local averages
- Historical comparisons.

A Mineral Resource estimate was made based on an ore model by Adam Wheeler. The resource classification is illustrated in Table 1-4 applying a 2% TiO_2 cut-off. This represents the ferro and transitional eclogite ore types which are regarded as economically feasible resources.

Table 1-4: 2019 Mineral Resource Estimate (2% TiO_2 Cut-off)

TiO_2 Cut-Off	Classification	Tonnes (Mt)	Total TiO_2 (%)	Garnet (%)
2%	Measured	29.2	3.60	44.5
	Indicated	104.0	3.48	43.9
	Total – Measured and Indicated	**133.2**	**3.51**	**44.0**
	Inferred	254.1	3.15	41.3

1.4.4 Ore Reserve Estimate

An Ore Reserve estimate was developed by Competent Person Matthew Randall (Open Pit) and Anton von Wielligh (Underground), Axe Valley Mining Consultants, based on the resource model and Axe Valley's open pit and underground mine plans.Table 1-5 shows the Ore Reserve estimate for the open pit and underground.

Table 1-5: Ore Reserve Estimate

Open Pit	Tonnes (Mt)	TiO_2 Grade (%)	Garnet Grade (%)
Proven	19.33	3.56	44.25
Probable	10.33	3.29	44.45
Total Open Pit	**29.65**	**3.47**	**44.32**
Underground			
Proven	2.55	3.78	44.92
Probable	24.75	3.66	44.42
Total Underground	**27.30**	**3.68**	**44.47**
Grand Total	**56.95**	**3.57**	**44.39**

The Ore Reserves were calculated from the mining schedule with the following assumptions:

- All eclogite types with TiO_2 grades above 2% are included
- The underground break-even cut-off was calculated at USD 25.9/t ore, rounded up to USD 26/t ore
- Measured and Indicated ore classes were included as Ore Reserves and were considered for revenue calculations.Inferred material was included in the underground (diluted ore tonnes) if it was part of the stope volume, however Inferred material in stopes were treated as waste dilution only (no grade and no revenue addition)
- All Inferred material and all other lithologies except eclogite above 2% TiO_2 are reported as waste
- The open pit was constrained to within the Owner's boundary based on the zoning plan
- 50 m safety zone between underground mining and the open pit, topography and the Fjord
- A 2% TiO_2 cut-off was applied in the recovery curves due to concentrate grade considerations

1.4.5 Geotechnical Studies

In 2019, SRK conducted geotechnical investigations, analysis, and development of slope design criteria that substantiated the previous geotechnical work completed on the Project. Analysis of drill cores and development of rock mass characteristics indicate a competent rock mass for all lithologies that will be present within the pit wall. Furthermore, finite element analysis of the whole slope stability returns high safety factor values in relation to failure through the rock mass and, as such, any significant instability within the pit walls is likely to be controlled by in-situ structure.

Nordic Mining's drilling campaigns focused on positioning geotechnical drill holes to intersect the proposed pit walls. Several holes were surveyed by optical and acoustic tele-viewing. In addition, spinner tests were done on a number of drill holes together with a suite of laboratory tests for defining intact rock strength and discontinuity shear strength to substantiate extensive point load testing. Structural mapping and modelling was also undertaken.

A brief summary of results, findings and comments from SRK follows:

- *Rock Mass Strength*

  The rock was characterized as very to extremely strong, returning RMR89 (Rock Mass Rating) values in excess of 70.

- *Structural Analysis*

  SRK undertook kinematic analysis of the pit slopes. A domain in the East was identified as a higher risk than the rest of the open pit, and here the berm width was set to 6 meters versus 5 meters as for the rest of the open pit.

- *Rockfall Analysis*

  Trajec3D was used for analyzing the rockfall for verifying the berms. The result was that majority of the cubic blocks would be retained on the first or second bench below the seed point. The risk with rockfall of blocks is considered low.

- *Finite Element Analysis*

  Finite element analysis (RS2) was undertaken to define safety factors for the entire slope along three geotechnical cross-sections developed to intersect the highest section of the north, south and east slopes. Several different models and parameters were assessed and all returned factor of safety in excess of 3. Due to the high factor of safety it was considered unnecessary to run probabilistic analysis.

- *Proposed Slope Geometry*

  Two domains were proposed: Domain 1 covers most of the open pit while Domain 2 covers a relatively small portion in the east. Domain 1 will have a maximum inter-ramp angle of 63° and Domain 2 will have a maximum inter-ramp angle of 60°. The only difference between the two domains is the difference in berm width as described above.

- *Underground Infrastructure*

  One of the drill holes in the 2018 drilling campaign intersected the area for underground infrastructure. No signs of poor ground were noted in the drill core. Finite element modelling of the interaction between the proposed infrastructure and the pit slope returned a Strength Reduction Factor of >3.5. No tangible displacement is evident.

The proposed inter-ramp angles are considered achievable given the existing dataset, high quality final slope blasting practices, state of the art slope monitoring and a rigorous Ground Control Management Plan will need to be implemented to provide the best opportunity to safely achieve such angles. In addition, a constant geotechnical mapping program, interpretation, updated analysis and, if required, modifications to interim and final slope design will be implemented when mining commences.

The UDFS geotechnical input used for the open pit design is based on the same background data as in the DFS, but are slightly more conservative to further reduce the probability of inpit rockfall. Compared to the DFS, the UDFS pit has wider berms and less steep bench face angles resulting in a reduction of the inter-ramp angles from 63° to 60° and 60° to 58° for Domain 1 and Domain 2 respectively; ref. Figure 1-14.

1.5 Mining

The Engebø Project provides easy access to high grade ore with limited waste stripping. The open pit is restricted from the boundaries in the zoning plan, depth of the pit and practical mining width. Mining will progress underground towards the West with access from the open pit. The underground design and schedule is currently at PFS level and will progress to DFS level during the open pit mining. Low/medium grade ore is stockpiled, improving the feed grade to the plant. The stockpiled ore will be utilized at the end of the underground operation; ref. Figure 1-1.

1.5.1 Open Pit Mining

A major factor for mine planning is that orebody is relatively massive and homogeneous, with economic TiO_2 grades ranging between 2% and 6% and garnet grades varying between 30% and 50%. Grade control is not seen to be a complex process, and it is expected that a mined ore recovery approaching 100% can be achieved. This accounts for the fact that most of the expected dilution at the ore contacts is likely to be low grade material.

1.5.1.1 Pit Optimization

The pit optimization was run with two different software packages:

- NPV Scheduler (NPVS)
- SimSched Direct Block Scheduler (DBS).

NPVS is based on the standard Lerch Grossman algorithm that is an accepted industry standard for pit optimization. DBS was selected for the detailed mine sequencing of the open pit as it can explicitly model the stockpiling of ore as part of the mine optimization process.

The chosen pit shell from the optimization delivers approximately 30 Mt in Ore Reserve and 19 Mt of waste.

The pit limit determined with NPVS in combination with the schedule optimization in DBS provides a sound framework for design of the open pit. This is based on:

- Multiple pit stages that focus mining on higher grade areas
- Optimizing waste rock stripping
- Early access to the ore-pass.

1.5.1.2 *Mine Design*

The main design parameters are:

- Geotechnical parameters; ref. Table 1-6 and Figure 1-14
- Zoning plan boundary
- Location of the ore-pass
- Location of the haul road tunnel
- Ramp width of 15 m and gradient of 10%
- Minimum cut width of 35 m
- Maximum vertical sinking rate of 90 m per year.

The pit design was guided by the selected NPVS Pit and the optimum mine sequence obtained with DBS. The zoning plan boundary was the main constraint for both the pit optimization and the pit design.

Table 1-6: Design Domain Specifications

	Domain 1 - Grey	Domain 2 - Brown
Slope Dip Direction	330° - 210°	210° - 330°
Double Bench Height	20 m	20 m
Bench Face Angle	75°	75°
Geotechnical Berm Width	17 m	17 m
Spill Berm Width	6.2 m	7.3 m
Maximum Stack Height	90 m	90 m
Inter-Ramp Angle	60°	58°

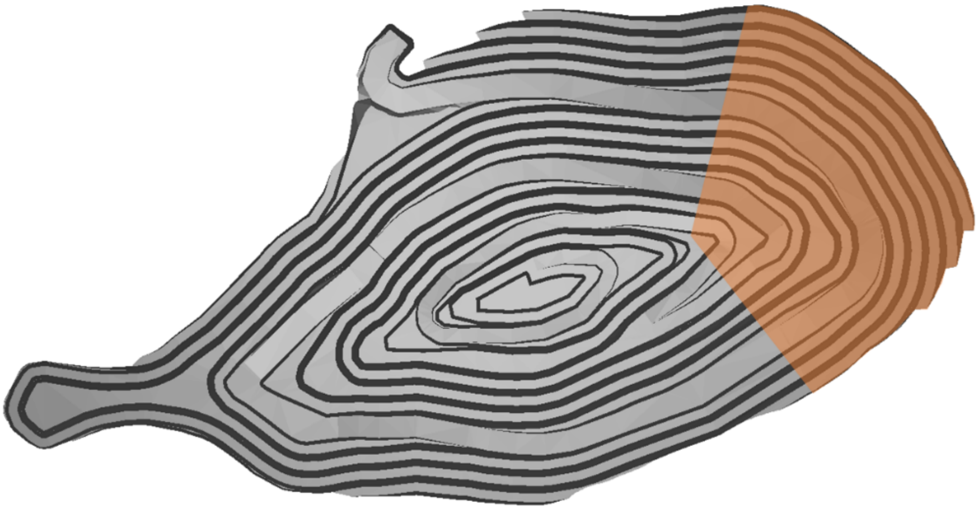

Figure 1-14: Slope Domains in Open Pit

The open pit has been split into two distinct pushbacks, PB1 and PB2, and PB1 has been split into 5 stages, ref.Table 1-7. The waste stripping ratio for PB1 is 0.4:1 and 2.2:1 for PB2. The subdivision of the pit into multiple stages minimizes the pre-production development and improves access to high grade ore. The staging delays the stripping of PB2.

Table 1-7: Open Pit Design Summary

Pushback	Stage	Rock (kt)	Waste (kt)	Ore (kt)	TiO_2 Grade (%)	Garnet Grade (%)	Strip Ratio
1	1	220	88	131	3.88	43.1	0.7
	2	104	30	74	3.65	42.3	0.4
	3	883	186	698	3.79	42.7	0.3
	4	18,106	3,741	14,365	3.53	44.0	0.3
	5	17,045	6,433	10,612	3.41	44.5	0.6
2	6	12,187	8,417	3,771	3.33	45.5	2.2
Total		**48,545**	**18,895**	**29,651**	**3.47**	**44.3**	**0.6**

The first stage of PB1 is mined as part of the pre-production work to establish the access to the ore-pass. Stages 2 and 3 are primarily pre-production work to establish the ramp access to the design benches and expose ore. The total rock movement is less than 1 Mt and will be moved in the first 3 to 4 months of production. Stages 4 and 5 complete PB1 with a total ore production of approximately 18 Mt of medium to high grade, and around 8 Mt of low grade ore, ref. Figure 1-15.

PB2 completes the development of the mine with 3.8 Mt of ore grade material > 2% TiO_2, ref. Figure 1-16 and Figure 1-17. The final collar position of the ore pass is established at RL 205 on the south side of the main ramp.

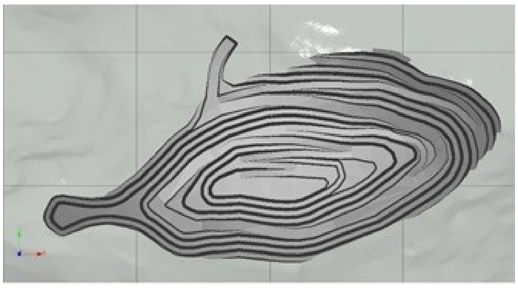

Figure 1-15: Design for Pushback 1

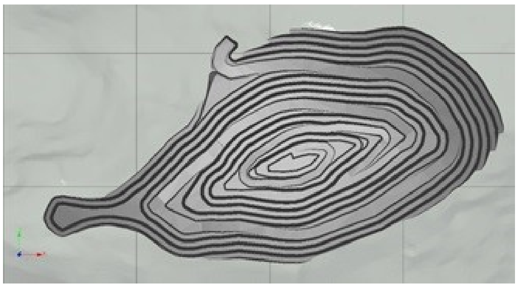

Figure 1-16: Design for Pushback 2

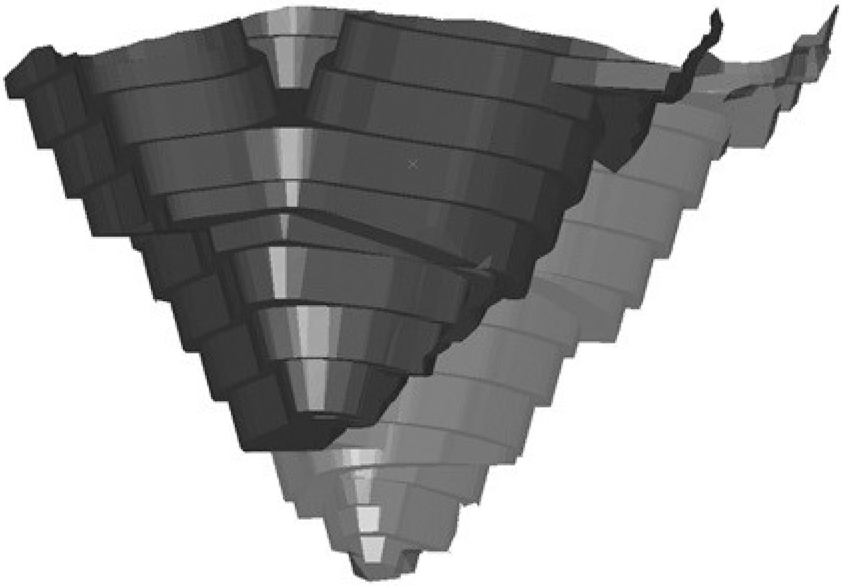

Figure 1-17: Side Cut of Open Pit with PB1 (dark grey) and PB2 (light grey)

1.5.1.3 *Mine Schedule*

The final schedule closely matches the chosen pit from pit optimization. This confirms access to high grade ore in the early periods and delivering >4.0% TiO_2 for 4 years. The high grading strategy ensures that lower grade material is stockpiled during the life of the open pit and the lowest grade material is only reclaimed once the open pit is mined out.

The schedule for the open pit extends over 15 years with a short pre-production period. During the pre-production period the access road is constructed from the access tunnel exit on the pit side to the ore-pass collar at RL 285. The ore-pass will be established as part of the construction works.

During the first year several benches are established from the road to the ore-pass to provide sufficient flexibility with multiple mining faces of ore and waste available. The ore exposure is focused on the higher grade zones to minimize the amount of lower grade material that is sent to the stockpiles.

Where possible, all low grade ore is stockpiled for reclamation in the last Project years. Additionally, medium grade ore is stockpiled during the first 4 years. This ore will be reclaimed early and will therefore be stockpiled in a separate area.

The ore pass collar will be lowered in increments of 1 bench (10 m) approximately every 12 to 18 months. The initial collar will be at RL 285 and the final location is at RL 205. Once the final position is reached then all the remaining ore on and below this elevation is hauled to this collar position. Prior to this, the collar position will change as the pit is deepened and the ore haulage distance minimized.

The highwall ramp in PB1 that gives access to PB2 has been designed as a single lane ramp to reduce waste stripping.

Table 1-8: Open Pit Production Schedule Summary

	Unit	Value
Total Rock Tonnage	Mt	48.5
Waste Tonnage	Mt	18.9
Run of Mine Tonnage (Ore to Plant incl. Stockpile)	Mt	29.7
Rutile Grade in ROM (incl. Ore to Stockpile)	%	3.47
Garnet Grade in ROM	%	44.32
Open Pit Mine Life	years	15
Ore Plant Feed (incl. Ore from Stockpile)	years	21

1.5.1.4 Mining Equipment

The open pit will be operated by a mining contractor for the first 5 years, thereafter by own staff continuing with leased equipment. The final selection of equipment size, and model, will be mutually agreed between Nordic Mining and the mining contractor. The mining fleet was simulated in the open pit mine design by Axe Valley using the fleet specification as shown in Table 1-9.

Table 1-9: Equipment List

Equipment	Specification
Drill	140 to 171 mm diameter DTH drill
Excavator	90 tonnes
Front End Loader	10 m^3 bucket size
Trucks	41 tonnes

In addition to the above production equipment, the following support vehicles will also be employed:

- Grader
- Service Trucks
- Explosive Truck
- Utility Excavator
- Utility Front End Loader.

1.5.2 *Underground Mining*

Two underground options were studied for the UDFS. The first option was Long Hole Open Stoping (LHOS) with cemented tailings backfill of the stope voids; the second option considers LHOS without backfill.

The two options showed a similar NPV, and the LHOS without backfill was used as basis for the underground schedule due to higher accuracy in the estimates. Backfilling may be a future opportunity.

1.5.2.1 *Mine Design*

Table 1-10 summarizes the stope geometric settings/parameters used to develop stope shapes and

Table 1-11 shows the underground production schedule summary. The underground design is illustrated in Figure 1-19 and Figure 1-20.

Table 1-10: Stope Optimization Geometric Parameters

Description	Unit	Long Hole Open Stoping
Minimum Stope Height	m	40
Stope Strike Length	m	20
Stope Height (Floor to Floor)	m	40
Minimum Stope Dip (angle)	Degrees	65
Maximum Stope Segment width (schedule/extraction width segments)	m	20
Pillar Width	m	10
Maximum Stope Width (before leaving an in-situ pillar)	m	20
Pillar Minimum Width	m	10
Sill Pillar Height	m	10
Sill Pillar Spacing (vertically)	m	40

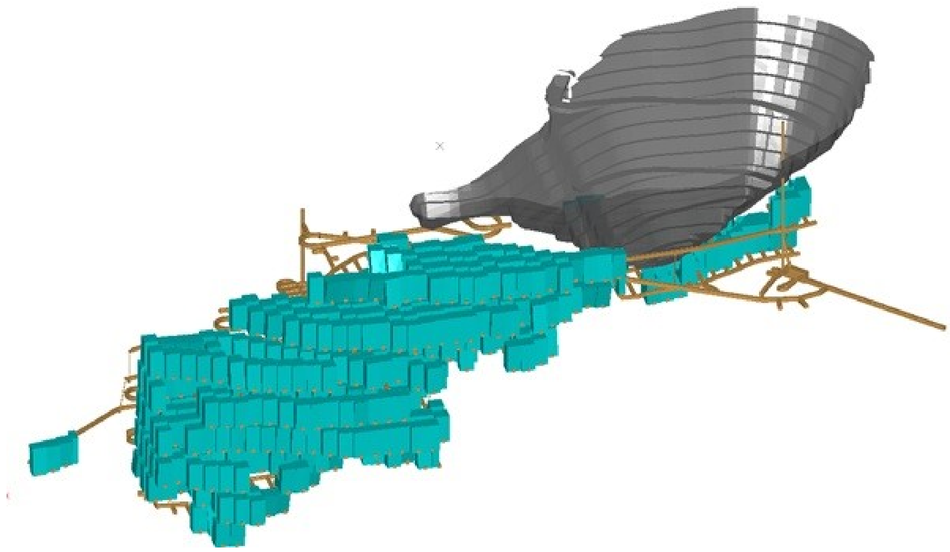

Figure 1-18: Open Pit and Underground Mining 3D Model – North-East

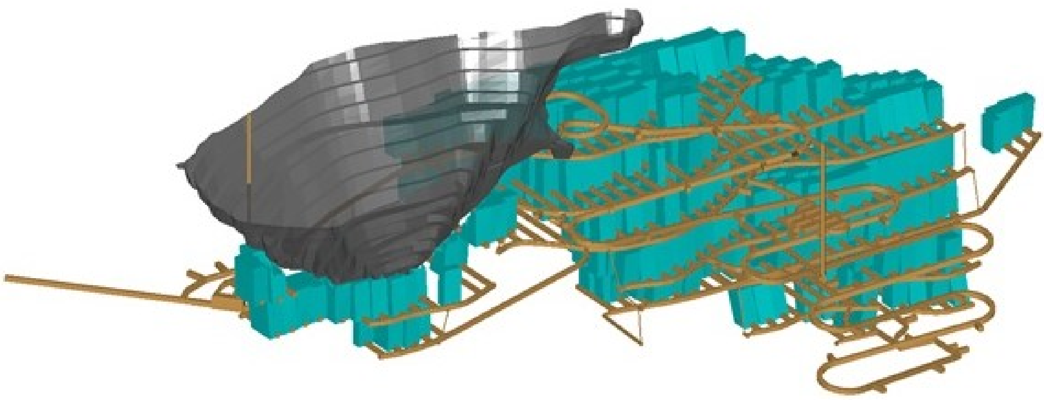

Figure 1-19: Open Pit and Underground Mining 3D Model – South-West

Table 1-11: Underground Production Schedule Summary

	Unit	Value
Total Tonnes	Mt	28.20
Waste Tonnes	Mt	0.78
Run of Mine Tonnes (Ore to Plant)	Mt	27.42
Rutile Grade in ROM	%	3.66
Garnet Grade in ROM	%	44.38
Life (Ore Production)	years	18

1.5.2.2 *Mining Equipment*

The underground design allows for a flexible mining fleet for various operational shift strategies. The main mechanized mining fleet used for the UDFS is listed in Table 1-12.

Table 1-12: Equipment List

Equipment	Specification
Drill Rig - Short hole	twin boom development drill rig
Drill Rig - Long hole	long hole production drill rig
LHD	17 tonnes
Truck	50 tonnes

The ancillary equipment fleet will consist of various utility vehicles for the transport of equipment and consumables. Storages are allowed both, inside and outside of the underground mine. In addition to the utility vehicle fleet, an underground motor grader, integrated tool handler and light vehicles are included in the costs.

1.6 Processing

1.6.1 Process Circuit Development

In 2016, IHC Robbins, Brisbane Australia, was engaged to complete the metallurgical process development testwork for the PFS for the Project. The testwork focused on a flowsheet suitable for producing rutile and garnet products. This resulted in a flowsheet that led to the successful completion of the PFS in October 2017.

Significant additional testwork has since been completed with focus on process optimization, reducing process related risk, and increasing overall process confidence. Metallurgical testwork has mainly been carried out by IHC Robbins with additional testwork by Light Deep Earth and Core Group.

The additional testwork programs spanned over a period of 24 months from November 2017 to November 2019 and formed the basis of the input to the DFS. A key aim for this work was to optimize and confirm the metallurgical performance of the PFS flowsheet using a representative blended ore sample (program 1364) with a grade of 3.95% TiO_2, matching the TiO_2 grade from the initial period of mining while also taking into consideration the relative abundance of ore types.

The DFS also included a variability program (program 1365) to understand the impact of ore variance in the metallurgical performance by processing different ore types through an abbreviated flowsheet. The term 'abbreviated' was adopted as it refers to the reduced number of gravity processing stages in a circuit by making use of more selective equipment, and in the process, allow smaller samples to be processed to overcome time constraints. Results from these programs indicate consistent performance, and all the samples produced market grade rutile and garnet products. After the completion of the DFS, a value engineering exercise was conducted. The DFS flowsheet was re-evaluated and optimized during the UDFS. The testwork results were re-evaluated corresponding to the UDFS optimized flowsheet.

The UDFS financial analysis is underpinned by program 1364, program 1365, program 1663, and the PFS bulk programs (program 1234 and 1308). Table 1-13 summarizes the major testwork programs conducted to inform the UDFS.

Table 1-13: Main Testwork Programs

Program	Study Phase	Sample Type	Aim
1364	DFS	DFS Blend	Bulk program for process optimization and design using a DFS Blend. Results from this program was used to inform the DFS program
1365	DFS	5 different ore types	Variability program - five 150 kg samples processed using an abbreviated flowsheet
1365A		DFS Blend	Determine whether a smaller sample could replicate results obtained in program 1364
1365B		Ferro_2	Determine the performance of the developed process to a change in ore types and thus varying feed grades
1365C		Ferro_1	
1365D		Ferro_4	
1365E		Trans_2	

1663	DFS	DFS Blend	Bulk program to evaluate the process performance by replacing the tertiary HSI crusher with a cone crusher
1234	PFS	Low Grade	PFS bulk programs used to construct the TiO_2 grade-recovery relationship
1308	PFS	High-Grade	

The results from 1365A were directly correlated to the 1364 bulk program since both programs used the DFS Blend. The results obtained from the variability program were then interpreted based on this correlation.

In addition to program 1364 and 1365, a series of 23 different optimization testwork programs were conducted during the PFS and DFS with varying objectives to comprehensively understand the metallurgical response of the ore and to optimize the design of the process.

Furthermore, comminution testwork and simulations were conducted to validate the selected comminution flowsheet capable of producing a suitable and consistent feed to the process. The objective was to maximize garnet and rutile liberation while minimizing the generation of fines and overgrinding.

A second bulk program (program 1663) was conducted during the DFS to determine the impact of replacing the tertiary Horizontal Shaft Impactor (HSI) with a cone crusher (in the comminution circuit) on the performance of the developed metallurgical circuit. The results supported the conclusion that the use of a cone crusher for secondary and tertiary crushing will not affect metallurgical performance of the ore in the process.

The finalized flowsheet for the UDFS retains all the process areas that were designed in the DFS phase. The design and operational philosophy of the comminution circuit was further optimized from an operational and cost efficiency point of view.

The comminution crushing circuit was designed to operate for 5 days a week and 2 shifts a day in conjuction with the mining operation and is separated from the milling and the processing circuit by the means of storage silos. Optimization work within the process areas in the DFS/UDFS resulted in a coarse garnet circuit designed to meet the garnet product volume requirements, and a significantly de-risked comminution circuit.

The UDFS includes various improvements of the mineral processing flowsheet to increase efficiency and reduce fines generation. The developed flowsheet will produce a premium grade rutile product as well as a coarse and a fine garnet concetrate that are stored separately in product silos. The coarse and fine garnet will be combined in a particular blend ratio to a generate a garnet product conforming to client particle size distribution specification prior to shipment.

1.6.2 Flowsheet Summary

The Deposit's primary constituents are garnet, pyroxene, amphibole,rutile and felsic minerals. The mineralogical assemblage differs from typical mineral sands, however its mineralogical constituents mostly share the same physical property differences (i.e. mineral specific gravity, magnetic susceptibility and conductivity) as seen in minerals sands. This makes processing of the ore, using the same methodologies and equipment technologies as in minerals sand operations a viable option. Unlike typical mineral sands, the Engebø ore is sourced from a hard-rock deposit and must be crushed/milled to achieve the mineral liberation.

Comminution test work has demonstrated that a large amount of garnet can be liberated at coarser size fractions compared to rutile. This led to the development of a flowsheet processing +212 µm and -212 µm fractions separately. In addition to producing a coarser garnet stream, this approach is believed to reduce comminution power requirements and minimize overgrinding. A secondary grinding stage is included for the rejects from the +212 µm coarse circuit to liberate the rutile and finer garnet in order to be recovered downstram.

The optimized flowsheet in the UDFS is presented schematically in Figure 1-20.

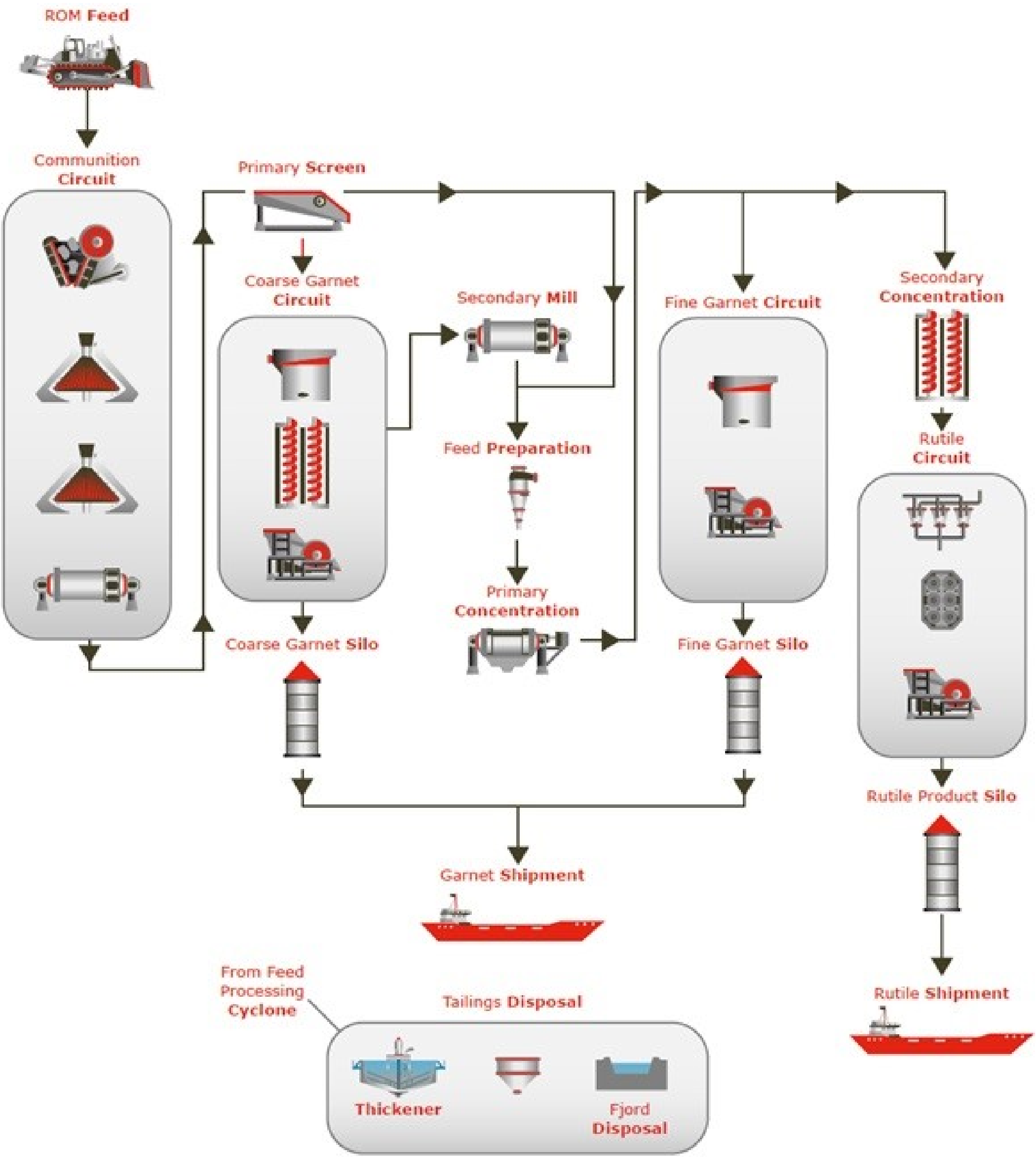

Figure 1-20: Simplified Diagram of the Optimized Flowsheet

The different areas within the processing plant and their corresponding functions are summarized in Table 1-14.

Table 1-14: Process Area Description

	Process Area	Area Description
Comminution Circuit	Run-of-mine (ROM) Feed	Ore from Deposit delivered at 1.5 million tonnes per annum
Comminution Circuit	Primary Crushing Secondary Crushing Tertiary Crushing	To crush the rocks to a suitable size to prepare for milling
Comminution Circuit	Stockpile	Buffer between crushing and milling
Comminution Circuit	Primary Mill	To grind the crushed rocks and liberate the minerals for separation
Process Circuit	Primary Feed Preparation	To classify the material for efficient separation
Process Circuit	Coarse Garnet Circuit	To generate a coarse garnet product stream
Process Circuit	Secondary Milling	To mill the coarse garnet rejects to liberate the rutile
Process Circuit	Feed Preparation Process	To remove ultrafine -45µm material
Process Circuit	Primary Concentration Process	To separate rutile from garnet for fine processing
Process Circuit	Fine Garnet Circuit	Generate a fine garnet product stream
Process Circuit	Secondary Concentration Process	To upgrade the rutile for dry processing
Process Circuit	Froth Flotation	To remove pyrite from rutile concentrate
Process Circuit	Rutile Upgrade Process	To generate a final rutile product
	Tailings Disposal	Final tailings handling and disposal
	Product Silos	To store the final products for shipment

1.6.3 *Metallurgical Performance*

The PFS and DFS phases have involved extensive metallurgical laboratory testwork using several ore types and varying sample sizes. Of these, all large-scale bulk programs and several small-scale programs were conducted using only full scale or scalable equipment. IHC Robbins and Hatch are of the opinion that sufficient testwork has been completed to a DFS level, and that the testwork forms a sound basis from which engineering can be completed.

In IHC Robbins' and Hatch's view, a pilot plant would be of limited value as issues with re-circulating loads, operational changes and inefficiencies for the full-scale process would remain. To account for the effect of re-circulating streams and potential mismatch in mineral accouting, Hatch recommended using a mathematical model in order to simulate full scale production. Hatch performed the modelling based on Limn® which is an Excel hosted application that allows the user to draw and model the process flowsheet. Limn® iteratively solves for a solution based on the re-circulating loads and the input parameters defined in the model.

The final mass pull and recovery results for the testwork programs were calculated using Limn®. Where available, release curves obtained from testwork were used to model the performance of the circuit. By doing so, the change in process performance to a change in feed grade (due to recirculation) can be predicted from a range as opposed to a single point obtained during testwork.

Table 1-15 presents the data used to construct the TiO_2 grade-recovery relationship. Table 1-16 shows the data used to construct the relationship between the garnet recoveries and the TiO_2 head grade.

Table 1-15: Limn® Model TiO2 Results Comparison for Bulk Programs

	1364	1663	1234	1308
Head Grade				
TiO_2 %	3.95	4.09	2.73	4.89
Recoveries				
TiO_2 Recovery %	56.2	58.1	48.6	65.3

Table 1-16: Limn® Model Garnet Results Comparison for Program 1365

	1365 A	1365 B	1365 C	1365 D	1365 E
Head Grade					
Garnet %	46.6	47.5	47.0	43.8	46.4
TiO_2 %	3.84	4.73	3.53	3.28	2.77
Mass Yield					
Coarse Garnet Yield %	4.6	7.1	5.9	2.9	3.5
Fine Garnet Yield %	12.3	14.1	12.7	10.7	12.5
Overall Garnet Yield %	18.7	22.5	19.5	14.3	16.9
Recoveries					
Coarse Garnet Recovery %	9.0	13.8	11.5	6.1	6.9
Fine Garnet Recovery %	24.3	27.2	24.8	22.5	24.9

The following conclusions were drawn during the testwork programs and subsequent Limn® modelling:

- Program 1364 was successful in producing rutile and garnet products at market grade specifications; ≥95% TiO_2 and ≥92% garnet. The PFS testwork programs were also modelled in Limn® to generate the TiO_2 grade-recovery relationship

- The variability testwork program (1365) indicated consistent performance of the developed process for the different ore types with respect to ore feed grade and how it impacts the garnet yield. Grade-recovery relationships were established between the TiO2 head grade and garnet recoveries. This relationship indicated that the TiO2 head grade was a better predictor variable for garnet recovery using a simple linear regression model than the garnet head feed grades. The final target garnet grade was achieved for 1365A to 1365E

- Program 1663 indicated consistent mass splits compared to program 1364 and achieved the market-grade rutile and garnet products. The program results supported the conclusion that using a cone crushing technology for tertiary crushing will result in similar metallurgical performance as the HSI.

1.6.4 Process Plant Development

The engineering development of the process plant and associated plant infrastructure for the UDFS was completed by external consultants appointed by Nordic Mining, including Hatch, Asplan Viak, COWI, and four appointed Engineering, Procurement and Construction (EPC) contractors.

The basis for the engineering update included:

- Value Engineering study, as compiled by Ausenco
- Updated process flowsheet
- Studies, specifications, design criterias and other engineering work completed in the DFS, updated where required for the UDFS.

Key inputs into the engineering design included:

- Project specific permits and plans, including zoning plans and the Environmental Permit
- Process Flow Diagrams (PFDs), Stream Tables and Process Design Criteria
- Specific technical studies, investigations and testwork by sub-consultants to support the engineering design
- Norwegian legislation.

Nordic Mining elected to structure the UDFS on an EPC execution model, with four EPC contractors. The split of engineering responsibilities for this approach include:

- Project Management Consultant (PMC) is responsible for the process design, as well as overall engineering coordination and integration
- EPC 1: Site wide earthworks, tunnelling and underground development
- EPC 2: Site Buildings and civils
- EPC 3: Structural Mechanical Piping and Platework (SMPP)
- EPC 4: Electrical, Control and Instrumentation (E&I)

- The UDFS has implemented a stick-build approach for the Project. The process plant footprint has been reduced, in accordance with the Value Engineering Study, so that the plant is located South of the Fv611.

The processing circuit layout will include the following major elements:

- Underground primary crushing circuit, and discharge conveyor arrangement to transfer crushed ROM to the process plant
- Process Plant. The layout of the process plant The process plant layout has been developed to incorporate the majority of the circuits into three main building structures, as shown in Figure 1-21
- Comminution and Milling Building
- Wet Plant Building
- Dry Plant Building
- Other key elements of the process plant include:
  - Ore silos, to provide a stockpile buffer between the rushing and primary milling circuits
  - Rutile, fine garnet and coarse garnet product bins, as well as a ship-loading system for material transfer from the product bins into bulk carriers.
  - Tailings system, for discharge of tails to the seabed.
  - Water storage systems for the plant water requirements
  - Administrative office incorporating the change house, laboratory and control room
  - Integrated workshop and stores.

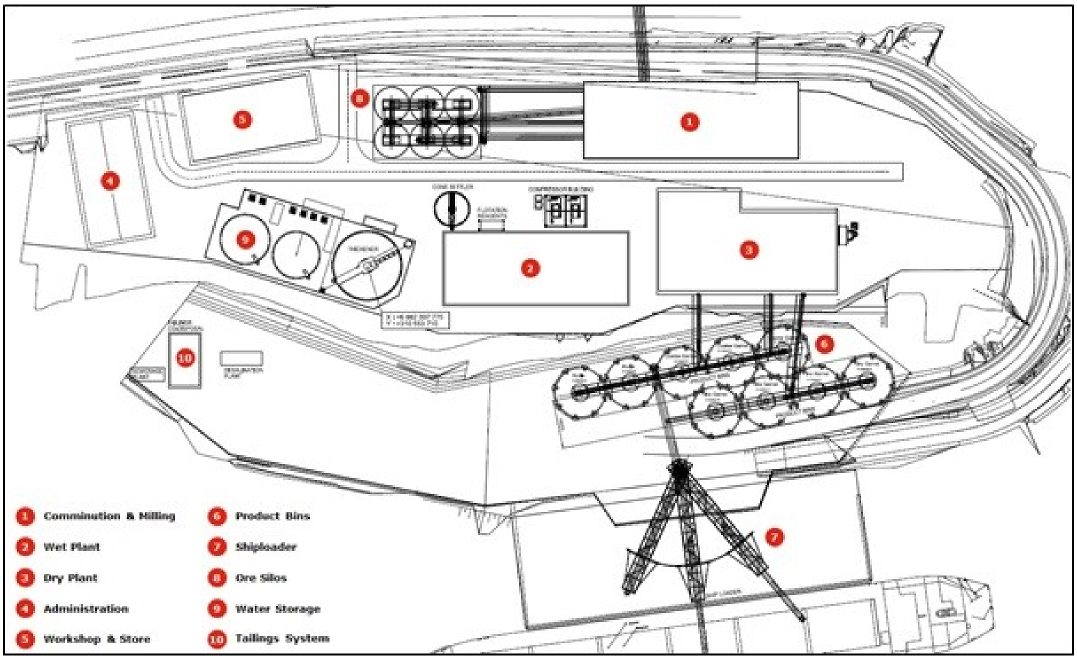

Figure 1-21: Process Plant Layout

No new untested equipment is used in the process flowsheet. All equipment is standard industry equipment.

Mechanical equipment sizing and quantities were developed from the updated UDFS process flowsheet, which formed the basis for the equipment technical specifications that were issued to the market for pricing of the mechanical equipment.

The updated mechanical equipment list formed the basis for the updated electrical design.

Piping and Instrumentation Diagrams (P&IDs) were developed from Process Flow Diagrams (PFD) and the Functional Description updated to reflect changes.

The updated plant layout model and technical documentation formed the basis for the updated design development with the EPC contractors.

1.7 Project Facilities

The layout for the mining and processing plant areas are shown in Figure 1-21 and

Figure 1-22.

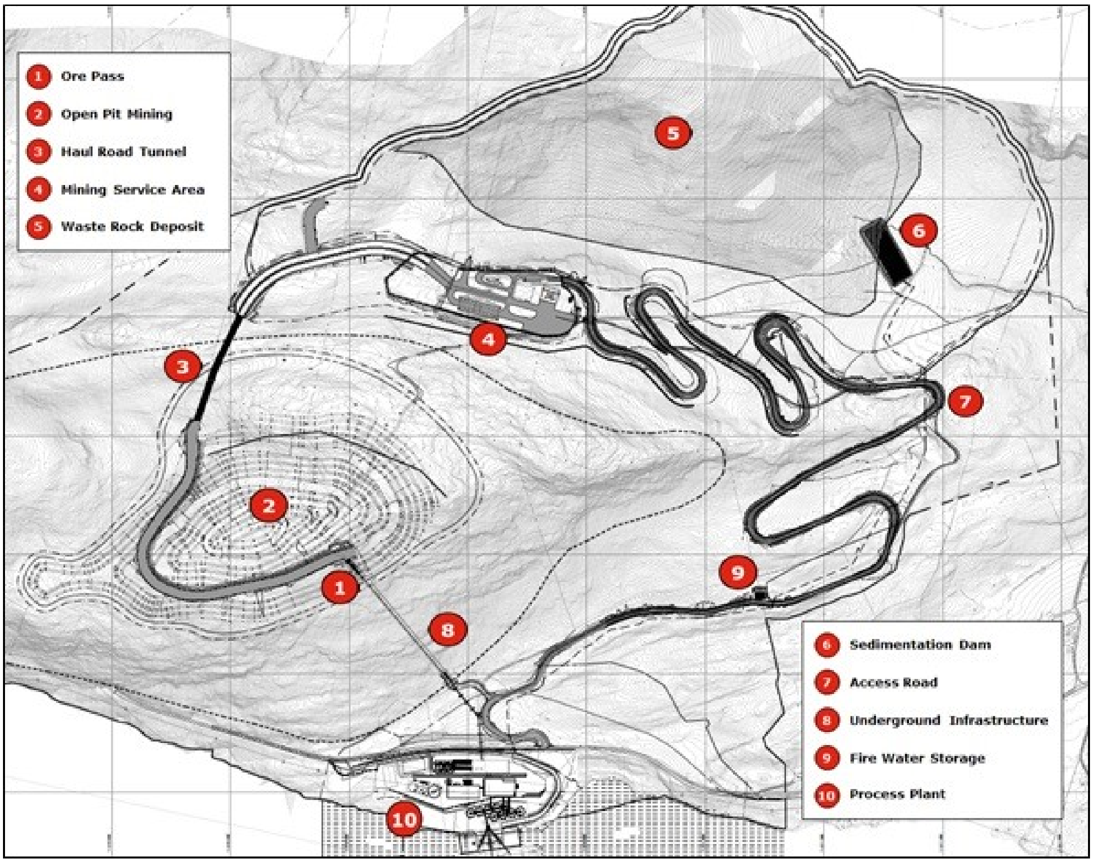

Figure 1-22: Project Layout

The general infrastructure and facilities for the Project includes the following major elements:

- *Power Supply*

  Bulk power will be supplied by SFE, the regional power utility, from a hydro-electric power station. The existing 22 kV grid from the Øyravatnet transformer station to Engebø will be upgraded. The SFE line will feed into a Main SFE Intake Substation located within the process plant. Nordic Mining has an agreement with SFE for engineering of the grid upgrade. Nordic Mining's discussions with SFE are based on a supply of up to 15 MW of power to the Project.

- *Raw Water Supply*

  Raw water will be sourced from the Førde Fjord. A package-type desalination plant delivering 100 m^3/h raw water will discharge into the insulated process plant Raw Water Tank. The 600 m^3 tank will provide raw water to the following services:

  - Top up water to the process water tank
  - Supply to the process plant facilities
  - Supply to the underground primary crusher plant.
  - Potable water supply to the offices and buildings
  - Supply to the 400 m^3 insulated process plant firewater reservoir located at an elevation of 84 MASL, adjacent to the mine access road. This reservoir will provide firewater supply to the process plant (gravity line). In addition, water will also be pumped from this reservoir to the mining services area for raw water/potable water and firewater requirements.

- *Fv611 County Road*

  - New turn-offs from the Fv611 road will be provided to access the process plant entrance road (South side of Fv611), as well as mine access road (North side)
  - An new avalanche berm will be provided on the Northern side of the Fv611, to provide protection to the process plant
  - A safety barrier will be provided on the south side of the Fv611 road, as a safety measure due to the cutting required for the process plant access road and plant terrace.

- *Site Communications*

  External communications from site will be via fiber, or a 5G network, when available.

- *Open Pit Infrastructure*

  - The open pit mine facility will be fenced with a 2.3 m high wildlife fence. Power supply will be routed into the mine area for dewatering pumping and other requirements. Dewatering from the open pit will be discharged into the waste rock settlement dam
  - In-pit lighting will be provided by the mining contractor

- *Access Road*

  An access road will be constructed from the Northern side of the Fv611, to provide access to the primary crusher tunnel entrance and the mine service area. This road will be used mainly for personnel movement, as well as the supply and movement of fuel, spares, explosives and other activities in support of the mining operation. It has been designed with a maximum gradient of 1:10.

- *Mine Service Area*

  The mine service area will support the mining operations. The principal infrastructure in this area includes:

  - EMV service workshop, for servicing of the mining fleet. The workshop includes provision for storage of critical spares and limited office space
  - Fuel and lubricants storage and dispensing facility. Haul trucks will be able to refuel at this facility. The EMV fleet permanently located in the open pit area will be serviced by a fuel truck. A 40 m^3 fuel storage tank will be provided, for diesel and Adblue storage and dispensing
  - The mine service area will include a parking area for the mine fleet, a brake test ramp, as well as other utilities required to support the EMV workshop operations.

- *Haul Road*

  - A haul road will be constructed to connect the open pit mining area to the mine service area. Access from the haul road to the waste rock and low grade material stockpile area will be provided
  - The final section of the haul road to the open pit will incorporate a tunnel of approximately 200 m length.

- *General Surface Run-off*

  The design of all new roads and structures will include drainage structures for the management of general surface run-off water.

- *Waste Rock Deposit*

  - This area will be used for the storage of waste rock, as well as stockpiling of lower grade material for future reclamation and processing. This area will be fenced off
  - A sedimentation pond will be provided in Eastern side of the storage area. Water run-off from the waste rock and low grade stockpile areas will be channelled to the pond by means of temporary berms and channels, which will be progressively modified by mining operations as the footprint of the stockpiles extends. The pond shall allow for the settlement of suspended material, and will also receive discharge water from the pit-dewatering system
  - Water will be discharged from the pond to the Fjord via a drainage channel.

- *Underground Facilities*
  - A 4.2 m diameter vertical ore pass will be constructed in the south-eastern side of the open pit mining area, and will be connected to an underground crusher chamber and access tunnel
  - ROM material from the open pit operations will be discharged into the vertical ore pass, via a static grizzly
  - ROM material will be extracted from the vertical ore pass by an apron feeder to a primary jaw crusher, from where the material will be discharged by conveyor through the access tunnel to a transfer station located outside of the tunnel. The material will then be conveyed over the Fv611 county road and discharged into the comminution building in the process plant, for further crushing
  - A safety chamber will be located adjacent to the crushing chamber to facilitate safe personal isolation in the event of a safety incident underground. An underground ventilation system, consisting of a fan and air ducting system, will be installed to service the underground tunnel and crusher chamber, to provide a constant flow of clean air through the working areas
  - Sump pumps in the underground working areas will pump water ingress into the underground working areas out to the process plant. The dominant water ingress is expected from the vertical ore pass. Floor sloping and drainage channels will drain water to the sumps.
- *Processing Plant*
  - The process plant area will be accessed from the Fv611 via a ramp road from the Fv611 turnoff. The site will be constructed with two terrace levels. The upper level will include the process plant and buildings. The lower level will include the final product silos and tailings disposal system
  - As detailed in Section 1.6.4 above, the process plant circuit (after primary crushing) has been configured into three main process buildings. In addition, the following facilities are integral to the process circuit:
    - Buffer Stockpiling Facilities
      - Six storage silos will be installed between the tertiary crushing and primary milling circuits. These silos are located to the west of the comminution building
      - The three stage crushing circuit is based on a 5 day/week, 16 hour per day operational cycle. The silos provide a storage buffer to allow for the continuous operation of the primary milling and downstream processing circuit.

- *Product Storage and Loading Facilities*
  - The final product storage consists of 9 product bins, including 7 bins for coarse and fine garnet product, and 2 bins for rutile. The bins will discharge onto discharge conveyors and final product shiploader. The bins have been sized in accordance with anticipated shipping volumes and frequencies
  - The existing quay will be used for berthing of vessels for ship-loading. A technical assessment of the quay conducted in 2018 indicated that the quay is in a good structural condition.
- *Tailings Disposal Facilities*

  A tailings disposal system will transfer tailings from the process plant via a subsea pipeline to a dedicated subsea deposition area area. The tailings system comprises a mixing chamber, pumping systems (for startup and seawater pumping to upsteram mixing circuits) and subsea discharge pipeline for hydraulic discharge of the tailings.

- Other Site Infrastructure
  - An insulated Process Water tank will be used for the storage of recovered process water, from where it will be pumped to various circuits in the plant
  - A dust handling system will be used for dust collection and management from the dry processing circuit
  - A site wide fire protection system will provide detection and protection to offices and process areas on the site
  - Boundary fencing around the site, and an existing quay which will be renovated.
- *Compressed Air Systems*

  Plant and instrument air will be supplied from a centralized compressor plant located between the wet and dry process building. The compressor system consists of two compressors (one running, one standby), and two 1.0 m^3 air receivers. Plant air is fed directly from the receiver, whilst instrument air is dried using desiccant dryers.

- *Process Plant Buildings, Workshops, Laboratory and Stores*
  - The administration building including personnel offices and meeting rooms, change house, control room, reception, canteen, training room, medical room and laboratory will be located in an integrated double story building
  - An integrated plant workshop and stores building equipped with overhead cranes will be used to provide operational and maintenance support.
- *Sewage Treatment Plant*

  The process plant sewage treatment plant is sized for the operational staffing requirements. A sludge separator unit will be used for sewage treatment. Sewage from the mine complex will also be routed to the sludge separator.

- *Process Plant Spillage Control*

  All process plant areas will be bunded to contain any local spillage of material or wash down water. Spillage and wash down water will be directed into sumps in the process areas, from where it will be pumped to a specific process circuit for processing.

1.8 Environmental and Social Responsibility

The environmental and social standards applicable to Norway forms the basis for the Engebø Project. Norway is a member of The European Economic Area (EEA) and policies and regulations are compliant with those of the European Union (EU). EU regulations such as the Water Framework Directive (WFD), REACH (regulations for use of chemicals) and the Mining Waste Directive are implemented in Norwegian environmental legislation.

The Project will be developed in accordance with relevant Equator Principles and IFC's Performance Standards and Guidelines.

Extensive ESIA studies, in total 67 reports, were carried out in stages to support the various permitting processes.

1.8.1 Social and Economic Effects

The ESIA concludes that the Project will have significant positive social and economic effects in the region due to direct and indirect employment and tax revenues. The Project will employ more than 100 people that will substantially contribute to local employment and activity. The Project will have a positive impact on local settlement and may lead to reversing of an historical commuting and migrating workforce trend.

The Project is expected to have substantial indirect effects for a variety of supporting business and services, both locally, regionally and nationally. A study (SINTEF 2013) estimated that the Project will have an employment ripple effect factor of 1.9, resulting in an additional number of approximately 200 jobs.

Sunnfjord municipality will receive increased tax revenue through income, wealth and property tax related to the Project. A 22% corporate tax for the enterprise will be received directly by the State. The increased revenues are assessed to have a large positive effect, in particular in the Sunnfjord region.

The Project will be a long term corner-stone operation in the region. The Project will as far as possible seek to employ locally and regionally, and will promote educational programs to secure adequate competencies. A locally based work force, settling and living in the region, is considered a strategic advantage contributing to a safe and healthy working environment.

1.8.2 Terrestrial Impact

The region surrounding the Project Area is to a large extent pristine with natural habitats and some agricultural activity. There is minimal industrial activity in the region. The Project area has, as part of the ESIA process, been mapped in terms of land use, landscape qualities, natural habitats, endangered species and wildlife. Some key features of the terrestrial landscape are:

- A habitat of conservation importance with rich deciduous woodland is found on the southern slope of the Engebø hill and one red listed orchid species has been documented in this area
- There is limited wildlife at Engebø, but several species of birds have habitats in the forests surrounding the hill
- Traces of deer activity such as grazing and tracks have been documented in the Project area. The area is however not regarded to be of substantial importance for the regional deer population
- There is limited agricultural activity at Engebø, but there is some pasture of sheep, cows and horses, rented out by landowners to local farmers. There is also some recreational use for hiking by the local population.

Based on the ESIA studies, measures incorporated into the Project design to limit the effects on the landscape, natural habitats and visual impact include:

- The open pit is restricted to an area on top of the Engebø hill to limit the visual impact and disturbance of natural habitats. The profile of the hill will largely be preserved when viewed from nearby areas
- A park belt around the industrial operation will be preserved as habitats for wild life, and will provide visual screening for the operation to the surroundings in the form of trees and vegetation
- Revegetation of the waste rock storage area and the visible open pit benches will be carried out
- The open pit, waste rock storage area, process plant and sections of the access road will be fenced in to keep people and wild life from entering the operational areas
- Parts of the access road to the open pit will be placed in a tunnel to reduce visual disturbance, noise and dust.

1.8.3 Impact on Fresh Water

Ground water quality in the area is generally good and is a typical source of drinking water from small wells to local farms. There is limited surface water at Engebø. As a result of the lack of major streams or rivers, flood line determination does not apply and no river diversions will be required.

The Engebø ore and waste rock has no acid producing capability and low heavy metal content. The risk of heavy metal or acid contamination of nearby streams, ground water is regarded as low. A sedimentation pond will be constructed at the foot of the waste rock pile to confine drainage water. Excess water from the pond is diverted to the process plant area and ultimately discharged to the sea.

1.8.4 *Marine Impact*

The Førde Fjord is a typical glacial fjord, 40 km long, with steep slopes and a flat deep fjord basin. The Fjord is up to 330 m deep and is characterized as a sedimentation environment. Over the years, millions of cubic meters of sediments have accumulated from glaciers, rivers and erosion of surrounding landmass on the seabed consisting of clay and silt.

The Sea Tailings Deposit (STD) area comprises around 5% of the total sea floor and is located at approximately 300 m depth. In combination, the zoning plan and environmental permit, forms a 3 dimensional volume that regulates particle dispersion and accumulation from the STD. Particle concentration and sedimentation outside the regulated area cannot exceed permitted levels (at non-effect concentrations). The environmental permit also states that particles cannot exceed the permitted thresholds 40 m above the discharge point which means that the water column above the discharge point to a large extent is unaffected.

Main conclusions from the ESIA regarding potential effect of STD:

- Engebø tailings is regarded as inert minerals with low risk for heavy metal pollution to the Fjord. The composition is similar to natural sediments on the bottom of the Fjord
- There is limited risk for particles spreading in significant concentration outside the STD area and to shallower water beyond 100 m depth
- The tailings will mainly affect bottom living organisms (benthic fauna) within the regulated area where the sedimentation rate is high. Mobile species such as fish will likely avoid areas with high turbidity (sediment concentration)
- There is low risk for effects on commercial and recreational fishing outside the designated deposit area
- There is low risk for effects on fish farms since these are operated outside the designated area and in shallow water
- There is low risk for effects on migrating salmon since salmon generally remain within the upper 30 meters of the water column that is unaffected by the STD
- The benthic community is expected to return to a good state within 10 years after deposition ends, potentially with a different species composition reflecting the new sea floor environment
- The effect of the STD is local and there is low probability of serious or irreversible effects on the Fjord's ecosystem.

The Project has included a comprehensive basis of design to limit and monitor effects of the STD.

1.8.5 *Cultural Heritage*

Archaeological mapping and assessments have been carried out in accordance with the Cultural Heritage Act. Five sites with traces of prehistoric settlement and activities were documented. The sites have been excavated and released for industrial development.

There are no further liabilities in terms of archaeological investigations or excavations in the area prior to construction.

1.8.6 *Environmental and Social Management*

An Environmental and Social Management System (ESMS) will be established to ensure that the Project is managed in accordance with the Company's standards, permits and Norwegian regulations. The system and supporting programs are progressing and will be completed prior to construction and adapted for operation as part of the operational readiness work. The objectives of the ESMS will be to:

- Undertake the ongoing identification and assessment of potential environmental and social impacts, both adverse and beneficial, building on the ESIA and its supporting studies
- Avoid, or where avoidance is not possible, minimize, mitigate or compensate for adverse impacts and enhance positive impacts on workers, affected communities, and the environment
- Seek to continually improve operational performance by means of adaptive management
- Ensure affected communities and staff are engaged on issues that could potentially affect them
- Confirm compliance with regulatory and corporate requirements
- Confirm compliance with IFC Standards and Equator Principles and lenders commitments.

Main management plans and programs are:

- Environmental Monitoring Plan
    - Measurement Program
    - Monitoring Program
- Stakeholder Engagement Plan
- Energy Management Plan
- Extractive Waste Management Plan
- Closure and Rehabilitation Plan.

1.8.7 *Stakeholder Engagement*

Stakeholder engagement is an integral part of the Norwegian permitting process for new industrial activity. All permit applications and ESIA studies are made publicly available for a consultation/hearing process where stakeholders can state views.

There has been substantial interest and engagement from stakeholders in all hearings related to the Project. Each process has generated in the order of 20 to 30 input letters from different stakeholder groups. In the hearing rounds, the main concerns of the stakeholders have been related to the STD.

In addition to the formally organized stakeholder engagement, Nordic Mining has actively engaged with stakeholders throughout the Project development. This includes numerous public meetings in Naustdal and Askvoll municipalities with stakeholder participation. Typically, meetings have been initiated when the Company has submitted new applications, published results from environmental studies or planned physical work on site, such as the drilling programs. Attendance at the meetings has been good with 50 to 100 attendees, including municipality representatives, NGOs and local media.

Nordic Mining has established a Resource Group to assist and strengthen stakeholder dialogues during the construction and operational phases. The purpose is for stakeholders to have a forum for sharing information and engaging with the Company.

1.8.8 Closure Planning and Costing

The closure of the operation will consist of the following main activities:

- Rehabilitation and revegetation of pit benches and waste rock deposit
- Cleaning and removal of equipment at Project site
- Capping and closure of underground infrastructure and ore passes
- Continued environmental monitoring of tailings deposit and waste rock facility for 15 years after closure
- Removal of buildings at work shop in the service area
- Fencing and maintenance of fence around the open pit.

1.9 Market Analysis

1.9.1 Rutile

Titanium feedstock is the most critical input to the titanium pigment and titanium metal manufacturing processes. The key minerals mined to supply titanium feedstock are ilmenite and rutile. While rutile may be used directly as a feedstock, ilmenite is normally undergoing a smelting process to produce titanium slag and pig iron.

The global TiO_2 pigment market accounts for approximately 90% of total feedstock demand and is therefore the dominant driver of offtake. Titanium metal is the second largest consumer of feedstock accounting for approximately 5%. Rutile and various forms of upgraded ilmenite are the main feedstock for further processing using the chloride technology. The Australian market analysis group TZMI is estimating an overall growth of global chloride feedstock demand of 5.6% CAGR towards year 2029, ref. Figure 1-23.

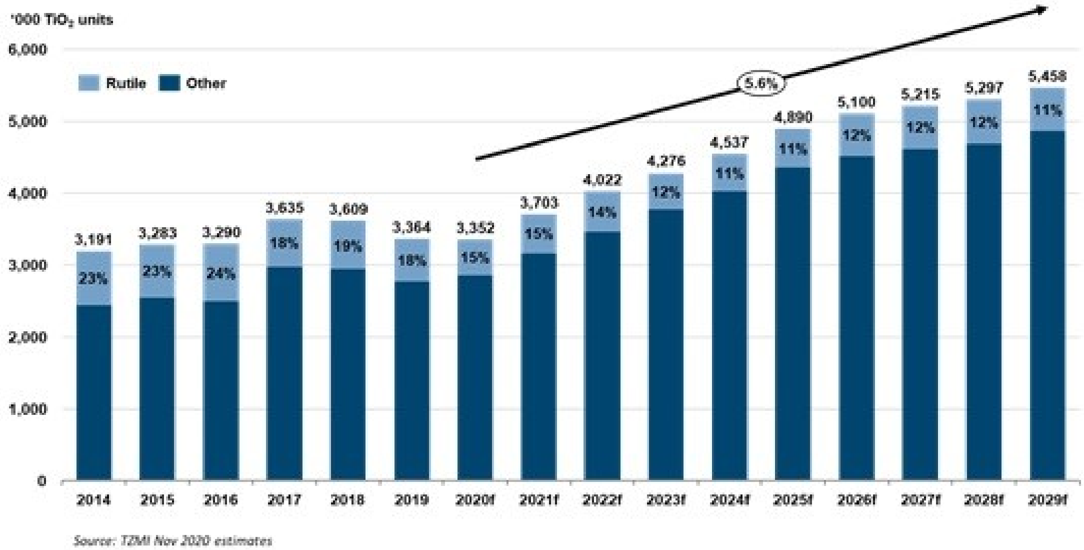

Figure 1-23: Global Chloride Feedstock Demand 2014 – 2029

TZMI has for several years forecasted a significant reduction in the supply of rutile in the period 2017 towards 2030. Global rutile supply for 2020 is estimated at 517,000 TiO_2 units, down 12% from 2019. A further significant decline in global rutile output from existing operations is expected from year 2022 as seen in Figure 1-24.

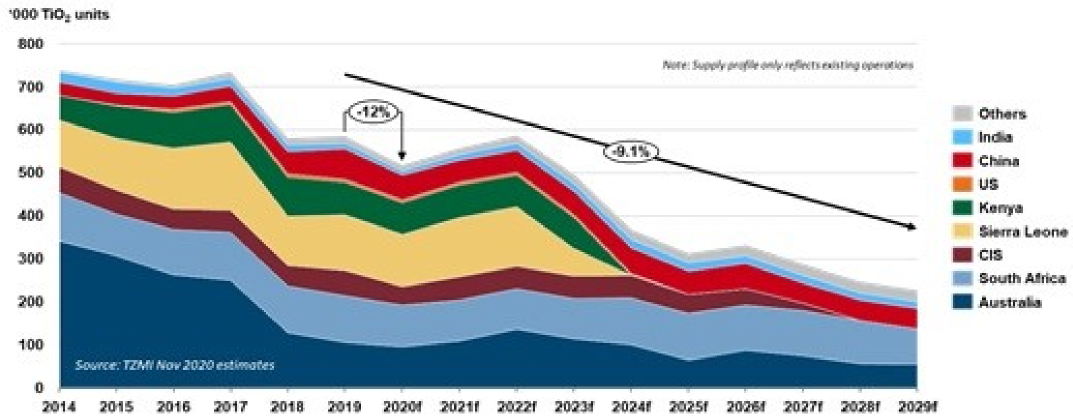

Figure 1-24: Global Rutile Supply 2014 - 2029

The reduction in rutile supply results from closure of major rutile mines in Australia and Africa. In addition, there has been reduced output from Ukraine. Although much of the decline will be offset by likely new supply to come in production, TZMI is forecasting a continous downward trend in rutile supply in the next 10 year period. TZMI expects the lack of new supply also to affect the total demand for rutile as pigment and metal producers could seek to partly replace rutile with other high grade feedstock.

The increase in global demand of rutile in chloride pigment applications is expected to be around 5% in the next decade, while demand for rutile in titanium sponge production (metal) is expected to be approximately 6%.

Although there is a certain interchangeability between different high grade feedstock, TZMI forecasts a significant supply deficit beyond year 2023.

Global demand for rutile is forecasted to remain at 600,000 tonnes TiO_2 units per year in 2029, representing a gap in supply/demand of up to 200,000 tonnes TiO_2 units per year. The prevailing outlook for the rutile market leaves good offtake opportunities for the planned output from Engebø at around 35,000 tpa.

TZMI forecasts the average rutile price to weaken slightly during 2021 due to the effect of the Coronavirus pandemic. After 2021, the price is expected to firm-up and stabilize towards the anticipated long term inducement price for rutile being forecasted to USD 1,138 per tonne of rutile (FOB, 2019 dollars) which translates to USD 1,179 in 2021 dollars, ref. Figure 1-25 This is the long-term price assumption used for the UDFS financial analysis and lower than observed market prices, ref. Figure 1-23.

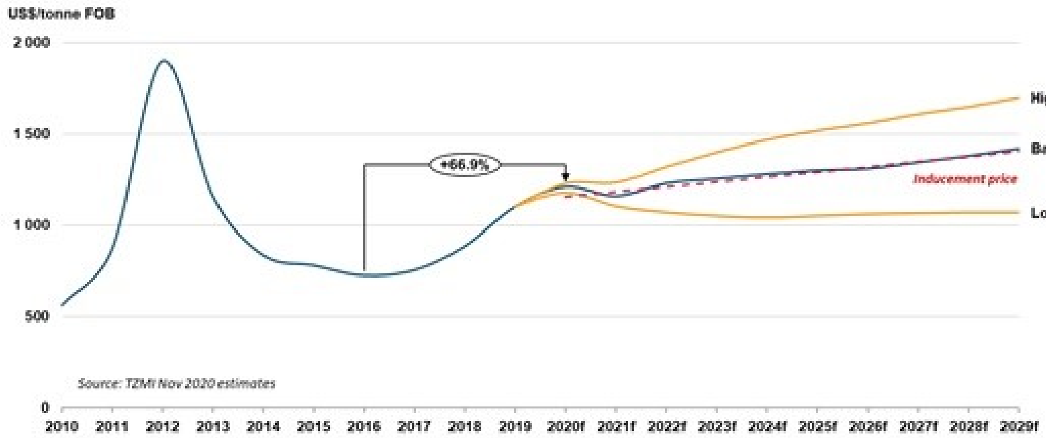

Figure 1-25: Nominal Rutile Price Forecast

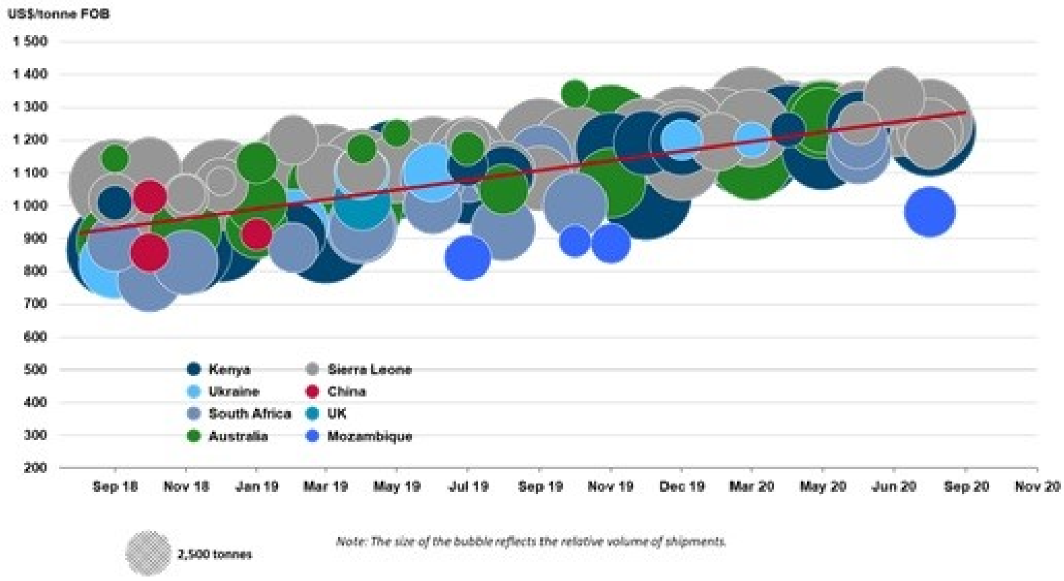

Figure 1-26: Cross border trade prices for rutile

Nordic Mining has entered into a Heads of Agreement (HOA) with a reputable Japanese trading house for supply and offtake of the majority of its production of rutile. The HOA also outlines a participation in the construction financing of the Project.

1.9.2 Garnet

Garnet has for many years been an attractive abrasives mineral due to its hardness. Historically, garnet has been applied in sand paper and for manual surface preparations, while the current primary markets for garnet are in abrasive blasting and waterjet cutting. The development of waterjet cutting machines paved the way for a rapid increase in the use of garnet since the 1990's. Production of waterjet cutting machines in China has seen strong growth recently with a CAGR of 25% from 2013 to 2018.

Garnet is also utilized in abrasive resistant materials such as flooring, however in smaller volumes. In addition, garnet is used for water filtration in combination with a range of other minerals. The total demand for garnet has remained stable during the last years at approximately 1.12 million tpa. Waterjet cutting and abrasive blasting represent the majority of this demand with approximately 80%. The demand has remained somewhat subdued during the last 5 years due to weak global growth and also political ban of garnet export from India since 2016. Estimated demand dropped to below 0.9 million tpa in 2020 due to the Coronavirus pandemic.

Global demand is expected to increase in the next decade with an average growth of approximately 7.2% CAGR towards year 2030, ref. Figure 1-27. The waterjet segment will represent the strongest growth with approximately 8.1% CAGR estimated towards 2030.

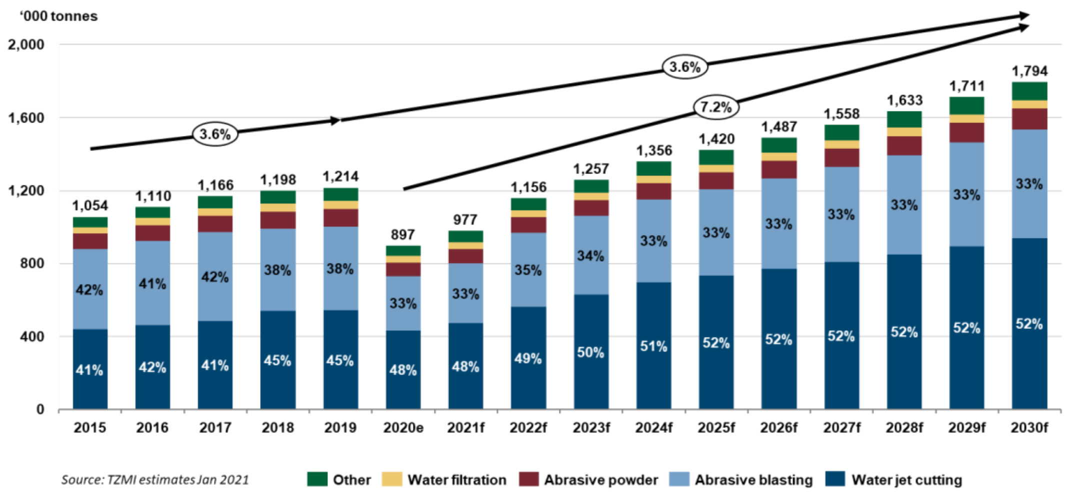

Figure 1-27: Garnet Demand Forecast by Application

Traditionally, the main supply of garnet has come from Australia and India. Currently an increasing supply is originating from South Africa, while smaller volumes are produced in the US. Engebø will be the first producer of garnet in Europe. China has increased its domestic production of garnet to over 400,000 tpa in 2020. Most of China's production are used domestically.

TZMI estimates the total production of garnet to increase to approximately 1.5 million tonnes in year 2028, including likely production from new projects.

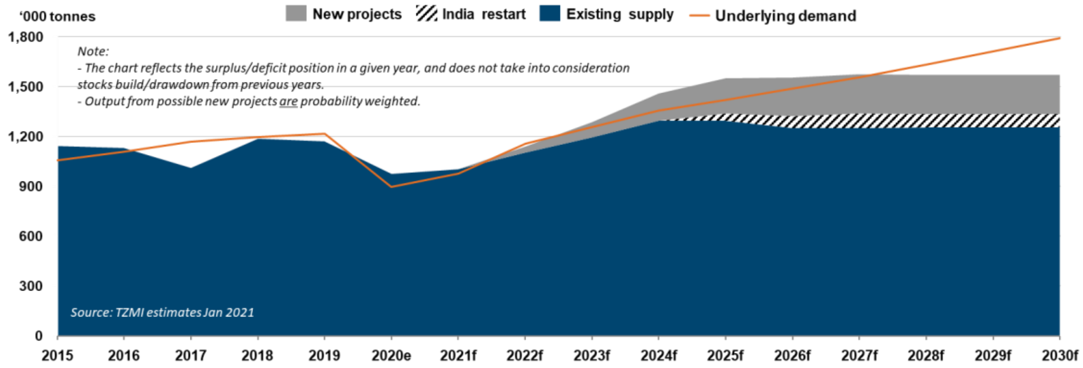

Figure 1-28: Garnet Supply/Demand Outlook

The supply/demand pattern of garnet, as well as pricing has been affected by the abruption of Indian garnet supply as well as increased exports from China. The forecasted growth in the waterjet market segment indicates a good position for Engebø garnet in the European market, as well as overseas markets, ref. Figure 1-28.

Figure 1-29: Historic Import Prices (CIF) for Garnet

Historic import prices (CIF) for garnet have gradually increased to a level of approximately USD 300 per tonne; ref. Figure 1-29. TZMI forecasts the average price of garnet to temporarily decrease from USD 260 per tonne FOB in 2020 towards 2023, before it increases towards year 2030. The long-term average price assumption for garnet in the UDFS financial analysis is USD 230 per tonne FOB.

Nordic Mining is proceeding with discussions for long-term offtake arrangements with selected marketing partners.

1.9.3 Waste Rock

Crushed rock is used as ballast and protection material in various offshore applications in Norway and internationally, i.a. in connection with platform constructions, windmills, pipelines, bridges etc, and to support landfill, dykes and similar constructions. High density rock types like the Engebø eclogite (specific gravity around 3.2 t/m^3) are often preferred due to favorable properties related to high weight to volume ratio.

The Project has available area and permit to install crushing facilities in the waste rock storage area. Costs to produce saleable products of eclogite ballast product based on waste rock will include crushing/sorting, transportation, storage, and loading. Certain investments will be required to facilitate commercial production of rock ballast material, including mobile crusher, conveyor transport equipment from the waste rock storage area to the port area, and suitable ship-loading equipment.

Business opportunities and technical solutions related to sale of eclogite to ballasting applications will be further investigated. No revenues from sale of eclogite ballast material have been included in the UDFS financial analysis.

1.10 Project Execution Plan

The key Project execution objectives are:

- Deliver the Project within schedule, budget and performance requirements
- Implement and maintain the highest health and safety standards
- Compliance with environmental regulations and requirements
- Develop and foster community and social engagement during execution
- Ensure successful commissioning, ramp up and operation of the plant
- Secure recruitment of relevant competencies regionally and nationally.

The Project has selected an execution strategy based on an integrated Owner's Team, consisting of the Owner and a Project Management Consultant (PMC), who will manage and oversee the Project execution. The team will be led by the Nordic Mining Project Director, reporting to a Project steering committee.

The operations team will be progressively strengthened with new appointments, in line with the operational readiness strategy and coordinated by the GM Operations.

The process design will be finalised by the PMC. This will serve as the technical basis for the final selection and procurement by the Owner of the mechanical equipment from international suppliers, who have tendered in the DFS and UDFS.

The PMC will work with the Owner as in integrated Owner's Team. The key support from the PMC will include:

- Project management, including project controls
- Multi-disciplinary engineering technical assurance, design coordination and interface management of the detail design of the EPC contractors
- Construction management
- Commissioning management, including key technical specialists to support this stage of the project

A critical success factor for the project will be the integration of the Owner, PMC and EPC contractors to ensure close alignment of the project planning, detail design, construction management and commissioning of the project

Detail design, fabrication and supply of bulks and specified equipment, logistics and construction of the plant will be done by four EPC's. These EPC's were nominated at the commencement of the UDFS and have been actively involved in the design and engineering in the UDFS.

1.10.1 Project Organization

- The organisational structure for the project implementation is shown in Figure 1-30
- The Owner and PMC will be structured as an integrated team, under the leadership of the Project Director. The Owner is planning to set up a project office in the Førde region to support the engineering development of the project
- The four EPC contractors will be Norwegian companies.

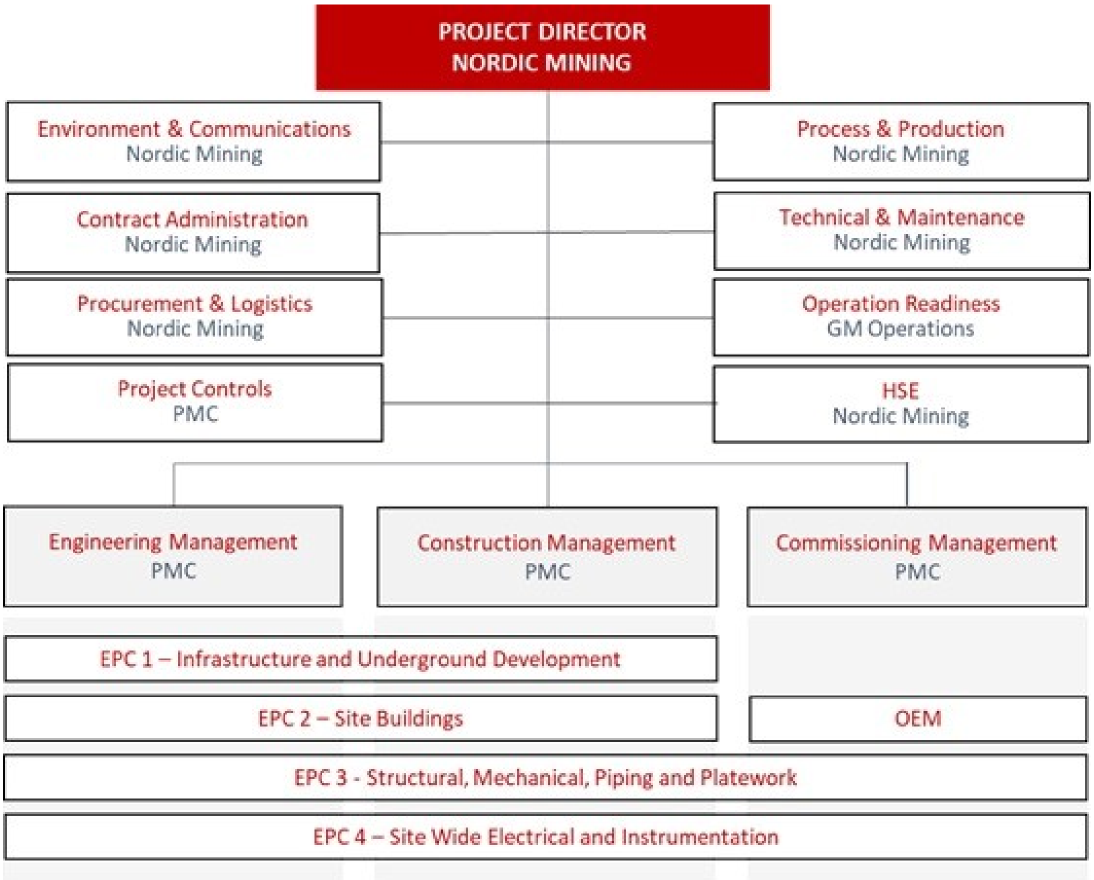

Figure 1-30: Project Organization

1.10.2 Health, Safety, Environmental and Social Management

The integrated Owner's team will finalise the project HSE requirements and the Construction Environmental Management Plan (CEMP), which will be implemented on site with by the responsible EPC according to the Plan and Building Act. The CEMP will consolidate the various applicable Norwegian environmental and social standards into one management plan.

1.10.3 Commissioning

Commissioning will be executed in accordance with the Project commissioning plan. The PMC commissioning manager shall set up and develop the required commissioning systems, plans and procedures, to ensure close alignment of the construction schedule with the commissioning plan.

The commissioning manager will be supported by various specialists and groups, including:

- PMC process and other specialists
- Owner's operations and maintenance staff
- Key resources from EPC3 and EPC4
- OEM equipment specialists
- Other specialists as identified.

On completion of cold commissioning, the Project will proceed with hot commissioning and operational ramp-up with continued support from the PMC and EPCs.

1.10.4 Operational Readiness

The operational design for the Project is based on a lean staff count, high degree of automation and optimal use of digital technology to support managerial, operational and maintenance work functions.

A strategy has been developed to provide the framework for operational readiness in the next phase.

All management, operational and maintenance functions will be performed by permanent staff. In the first 5 years of operation, a contract miner will be engaged for the mining, including maintenance of mining fleet supplied by the contractor. Current planning indicates a total operational head count in excess of 100 people, including the mining contractor.

The Project will use the services of either the PMC or similar third-party specialist, to assist with operational readiness implementation during the construction phase leading to steady state operation; ref.Table 1-17.

Table 1-17: Head Count

Summary	Head Count
Management and Administration	14
Technical Services	4
Mining	~30
Comminution and Process	38
Laboratory	7
Maintenance	11
Total	**~104**

1.10.5 Project Schedule

The Project schedule has been developed utilizing a bottom-up estimation approach and the Critical Path scheduling Method (CPM). The schedule has been developed with key inputs from equipment vendors (equipment delivery lead times) and the four EPC contractors.

The schedule has been developed to a Level 3 detail. Refer to Table 1-18 for preliminary key dates.

Table 1-18: Preliminary Project Schedule

Activity	Start	Finish
Detail engineering	August 2021	September 2022
Construction – EPC 1	September 2021	March 2023
Construction – EPC 2	May 2022	June 2023
Construction – EPC 3	October 2022	September 2023
Construction – EPC 4	October 2022	September 2023
Mechanical Completion	June 2023	September 2023
Cold Commissioning	August 2023	December 2023
Hot Commissioning	December 2023	February 2024

1.11 Capital and Operating Costs

1.11.1 Capital Cost Estimate

Key inputs into the Capital Cost Estimate included:

- The EPCs developed Bills of Quantities from the plant layout and building area designs, which formed the basis for pricing for the major site contracts. Firm EPC pricing will be obtained before contract award
- Equipment supply pricing were predominantly based on a competitive bidding and adjudication process. Equipment sizing was derived from the engineering design
- Estimates were also obtained from other Project consultants/contributors and incorporated into the overall Project estimate
- Estimates for Owner’s costs, and other indirect costs were developed based on estimations of activities, resources and deliverables
- Contingency was determined in a Quantitative Risk Assessment (QRA); ref Section 1.12

The capital cost estimate for the open pit mining operation and the process plant is USD 203.4 million, as summarized in Table 1-19.

Table 1-19: Capital Cost Estimate

Description	USD million
Open pit mining, underground infrastructure and primary crushing	16.691
Comminution, mineral processing and tailings handling	95.475
Site wide infrastructure, product storage and loadout	61.137
Indirects (excluding Contingency)	13.044
Contingency	17.090
Total	**203.437**

1.11.2 Operating Cost Estimate

The operating cost for all key operating cost drivers were developed from first principals. Unit costs for consumables and spares were obtained from potential suppliers. Each cost-generating activity was identified as well as the underlying cost drivers.

Major contributors to the operating cost include contract mining costs, labour, electric power, reagents, spare parts and consumables.

The total weighted average operating cost over the first 10 years is USD 14.4/ROM tonne and USD 95.9 per sales tonnes of rutile and garnet combined.The operating cost were forecasted based on the production schedule and is summarized in Table 1-20 below.

Table 1-20: Operating Cost Summary

Description	Unit	USD/tonne
Open Pit - Waste Mining (Including Fleet lease)	Waste tonne	2.53
Open Pit - Ore Mining (Including Fleet lease)	Ore tonne	2.48
Underground Mining (Including Fleet lease)	Mined tonne	11.43
Process	ROM tonne	6.99
Sales, General and Administrative (SGA)	ROM tonne	2.23
Average Cash Cost[5][6]	ROM tonne	14.4
Average Cash Cost[5][6][7]	Sales tonne	95.9
Average Cash Cost Project lifetime[6]	ROM tonne	17.1
Average Cash Cost Project lifetime[6][7]	Sales tonne	113.6
All-in Sustaining Costs	ROM tonne	14.9

1.12 Risks and Opportunities

A robust risk assessment process was followed through the UDFS whereby both qualitative and quantitative risk approaches were undertaken. Information was

[5] Average first 10 years
[6] Excludes Royalties
[7] Rutile and Garnet combined

accumulated into a quantitative risk analysis of the capital estimate and project execution schedule, to derive the total capital risk profile. Given that Project capital and operational costs can be impacted by estimate uncertainty, schedule uncertainty, revenue uncertainty and risk events, an integrated risk process was followed:

- A schedule risk profile model was developed to capture duration uncertainty and schedule risk events that result in variations to the deterministic schedule. The schedule was used to assess the cost impact of time variable capital costs that will vary in line with schedule variations from the plan
- A capital cost risk profile model was developed to understand the potential variability in the base cost estimate
- A project risk register risk event model was developed to understand the potential impact of project risk events on schedule and cost.

The risk analysis, using a Monte Carlo simulation method, resulted in a contingency risk allowance from the capital base estimate of USD 186.35 million to the statistical Mean value of USD 203.44 million, equating to USD 17.09 million or 9.17% of the base estimate. The Project implementation schedule is targeting 02 February 2024 for the completion of hot commissioning, carrying a nine week schedule risk allowance to the Mean of 09 April 2024. Through the rigour of the QRA workshop, attended by Nordic Mining and Hatch, risks were accounted for, recognizing that further risk treatment and mitigation strategies will be carried out during the next Project stage to gain further definition and confidence. When evaluating the stanalone project risks, a further time allowance of six weeks to the Mean needs to be catered for. The total schedule risk allowance is therfore, fifteen weeks. The capital estimate is within a AACE(I) Class II accuracy.

The QRA analysis excludes growth provision, forex and escalation.

During the UDFS, an update to the feasibility study Hazop was carried out, focusing only on those nodes where changes were introduced.

Several project risk workshops were undertaken during the UDFS, documented in the study report. The risk process included reviewing the risks identified through the DFS process. In addtion, further risk identifcation together with risk treatment plannning characterised the risk work undertaken.

The most significant risk areas observed:

- EPC coordination and integration (Delivery model)
- Technical design
- Project management
- Steel price inflation
- Operational readiness

2. Additional Information

2.1 List of Tables

2.2 List of Figures

2.3 Contributors

The UDFS has been prepared through collaboration between a number of recognized contributors representing a broad range of expertise. The key Project contributors are summarized in Table 2-1.

Table 2-1: Key Project Contributors

Company/Person	Primary Source of Services
Hatch Johannesburg, South Africa	• Main Technical Consultant • Mineral Comminution and Processing • Project Infrastructure and General Infrastructure • Engineering Design Update Coordination with EPC Contractors • Technical Support for Procurement • Capital and Process Operating Cost Estimates • Human Resources and Operational Readiness • UDFS Coordination, Report Write-Up and Quality Assurance
Adam Wheeler Independent Mining Consultant Cornwall, United Kingdom	• Competent Person for Mineral Resource Estimations in Accordance with the Guidelines of the JORC Code • Mineral Resource Statement
Axe Valley Mining Consultants Ltd Swanage, United Kingdom	• Mine Design and Scheduling • Mine – Techno-Economical Modelling including Operating Cost Estimate • Competent Person for Ore Reserve Estimations in accordance with the guidelines of the JORC Code • Ore Reserve Statement
IHC Robbins Brisbane, Australia	• Metallurgical Testwork Programs and Results • Flowsheet Development and Advisory
Light Deep Earth Pretoria, South Africa	• Metallurgical Testwork Programs and Results
SGS in Perth, Australia	• Comminution testwork and results
Core Group Brisbane, Australia	• Flotation Testwork
COWI Fredrikstad, Norway	• Tailings Disposal Design and Engineering
Asplan Viak Bærum & Leikanger, Norway	• Regulatory Works • Infrastructure Design • Infrastructural Geotechnical investigations • Waste Rock Deposit and Rehabilitation
DNV Bærum, Norway	• Environmental Assessments • Environmental Monitoring Program
SRK Cardiff, United Kingdom	• Mining Geotechnical (Open Pit Mine Design) • Hydrogeology • ESG Evaluations
SINTEF Trondheim, Norway	• Tailings Management Modelling
TZMI Perth, Australia	• Rutile Market Information • Garnet Market Information
TAK Industrial Mineral Consultancy Gerrards Cross, United Kingdom	• Garnet Market Information

Company/Person	Primary Source of Services
Mintek in Johannesburg, South Africa	• Comminution testwork and results
JKTech in Brisbane, Australia	• Metallurgical testwork programmes and results
SGS in Johannesburg, South Africa	• Comminution testwork and results
IMS in Johannesburg, South Africa	• Metallurgical testwork programmes and results
Nippon Elriech in Perth, Australia	• Verti-mill Piloting Testwork

2.4 Abbreviations

The abbreviations used in the UDFS are listed in Table 2-2.

Table 2-2: Abbreviations

Abbreviation	Unit or Term
3D	three-dimensional
AACE(I)	American Association of Cost Engineers (International)”
amsl	above mean sea level
°C	degrees Centigrade
Ca	calcium
CAGR	Compound Annual Growth rate
CAPEX	Capital Expenditure
cm	centimetre
CP	Competent Person
CPM	Critical Path (Scheduling) method
DFS	Definitive Feasibility Study
°	degree (degrees)
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
EEA	European Economic Area
EIA	Environmental Impact Assessment
ESG	Environmental and Social Governance
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
FEED	Front-End Engineering and Design
FCF	Free Cash Flow
FEL	Front End Loader
FOB	Free on Board
G	Gram
g/cm^3	grams per cubic centimetre
GSI	Geological Strength Index
g/t	gram per tonne
Ha	hectare
HCl	hydrochloric acid
HOA	Heads of Agreement
ICP-MS	Inductively coupled plasma mass spectrometry
IFC	International Finance Corporation
IFRS	International Financial Reporting Standards

Abbreviation	Unit or Term
IRR	Internal Rate of Return
JORC	(Australasian) Joint Ore Reserves Committee
kg	kilograms
kg/m^3	kilogram per cubic metre
km	kilometre
km^2	square kilometre
kV	kiloVolt
kW	kiloWatt
LOM	Life of Mine
LPG	Liquid Petroleum Gas
m	metre
m/s	metre per second
m^2	square metre
m^3	cubic metre
m^3/s	cubic metre per second
masl	metre above sea level
mm	millimetre
Mn	Manganese
Mt	Million tonnes
Mtpa	Million tonnes per annum
MW	Million Watts
NGU	Geological Survey of Norway
NOK	Norwegian Krone
NPV	Net Present Value
NSR	Net Smelter Return
NTNU	Norwegian University of Science and Technology
OPEX	Operating Expenditure
%	percent
P&ID	Piping and Instrumentation Diagram
PEP	project execution plan
PFD	Process Flow Diagram
PFS	Prefeasibility Study
PSD	particle size distribution
QA/QC	Quality Assurance/Quality Control
QEMSCAN	Quantitative Evaluation of Materials by Scanning

Abbreviation	Unit or Term
QRA	Quantitative Risk Assessment
QXRD	Quantitative X-ray Diffraction
RED	Rare Earth Drum
RER	Rare Earth Roll
REACH	Regulations for use of chemicals
ROM	Run of Mine
S	second
SEP	Stakeholder Engagement Plan
SG	Specific Gravity
SPMT	Self-Propelled Mobile Transporter
STD	Submarine Tailings Deposit
t	tonne (metric tonne) (2,204.6 pounds)
TiO_2	titanium dioxide
Tpa	tonnes per annum
tph	tonnes per hour
tpd	tonnes per day
t/m^3	tonnes per cubic metre
µm	micron or microns
UDFS	Updated Definitive Feasibility Study
USD	U.S. Dollar
V	Volts
W	Watt
WACC	Weighted Average Cost of Capital
WBS	Work Breakdown Structure
WFD	Water Framework Directive (WFD)
WHIMS	Wet High Intensity Magnetic Separator
XRF	X-ray Fluorescence
y	Year