

COLLULI POTASH PROJECT ERITREA

SOCIAL AND ENVIRONMENTAL IMPACT ASSESSMENT

NON TECHNICAL EXECUTIVE SUMMARY

PREPARED FOR:

COLLULI MINING SHARE COMPANY
(CMSC)



SUBMITTED TO: MINISTRY OF ENERGY AND MINES AND
MINISTRY OF LAND, WATER AND ENVIRONMENT

MARCH 2016

PREPARED BY:

Martinick Bosch Sell Pty Ltd
4 Cook Street
West Perth WA 6005
Ph: (08) 9226 3166
Fax: (08) 9226 3177
Email: info@mbsenvironmental.com.au
Web: www.mbsenvironmental.com.au

PREPARED FOR:

CMSC
Level 7, Room 701
S.A. Building
Warsi Avenue
Asmara
Ph: +291 11 11 163

MBS
ENVIRONMENTAL

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1. INTRODUCTION

The Colluli Mining Share Company (CMSC) proposes to develop the Colluli Potash Project (the project) in the Danakil Depression of southern Eritrea. This document represents the Non Technical Executive Summary of the Social and Environmental Impact Assessment (SEIA).

In accordance with the requirements of the Government of the State of Eritrea (GSE), this document:

- Provides a summary of the proposed project and the social and environmental setting in which it is located.
- Summarises the stakeholder engagement process.
- Provides a summary of the more significant social and environmental impacts.
- Summarises the management and monitoring plans to be implemented to mitigate and manage the more significant social impacts.
- Summarises the mitigation and management measures proposed to address the more significant environmental impacts.
- Describes the predicted residual social and environmental impact after implementation of mitigation and management measures to the more significant impacts.

2. PROJECT BACKGROUND

2.1 OWNERSHIP

The Colluli Potash Project is proposed to be developed by the Colluli Mining Share Corporation (CMSC), which is a joint venture company equally owned by the Eritrean National Mining Company (ENAMCO) and Danakali Limited (Danakali). Danakali is a mineral exploration company headquartered in Perth, Western Australia and listed on the Australian Stock exchange (ASX: DNK).

Exploration in the Colluli Potash Project area and co-ordination of baseline environmental and social studies has been undertaken on behalf of CMSC by Danakali via its wholly-owned Eritrean subsidiary South Boulder Mines Eritrea (STB Eritrea).

Baseline studies commenced in 2012 and have been undertaken by specialist in country and expatriate consultants consistent with the requirements of the project specific Terms of Reference. Results of baseline studies have been provided to the Department of Mines (DoM) and Department of Environment (DoE) prior to completion of the SEIA document.

2.2 PROJECT LOCATION

The project is located in Eritrea in the Horn of Africa, about 350 km by road from the capital city Asmara and 230 km by road from the port of Massawa, which is Eritrea's key import / export facility. The Colluli resource is located near the border with Ethiopia and is about 50 km from the nearest coast (i.e. Marsa Fatuma). Access to the project area is via the Massawa-Assab Road. An unsealed public road runs to the deposit area from Marsa Fatuma via Adaito.

The Colluli Potash Project area has components located in both the Northern and Southern Red Sea Zobas. The proposed potash mine and processing infrastructure is located in the Gelalo Sub-Zoba of the Northern Red Sea Zoba and the WITA is located in the Arita Sub-Zoba of the Southern Red Sea Zoba. Product will be transported to Massawa which is located in the Massawa Sub-Zoba.

The location of the project within Eritrea is shown in Figure 1.

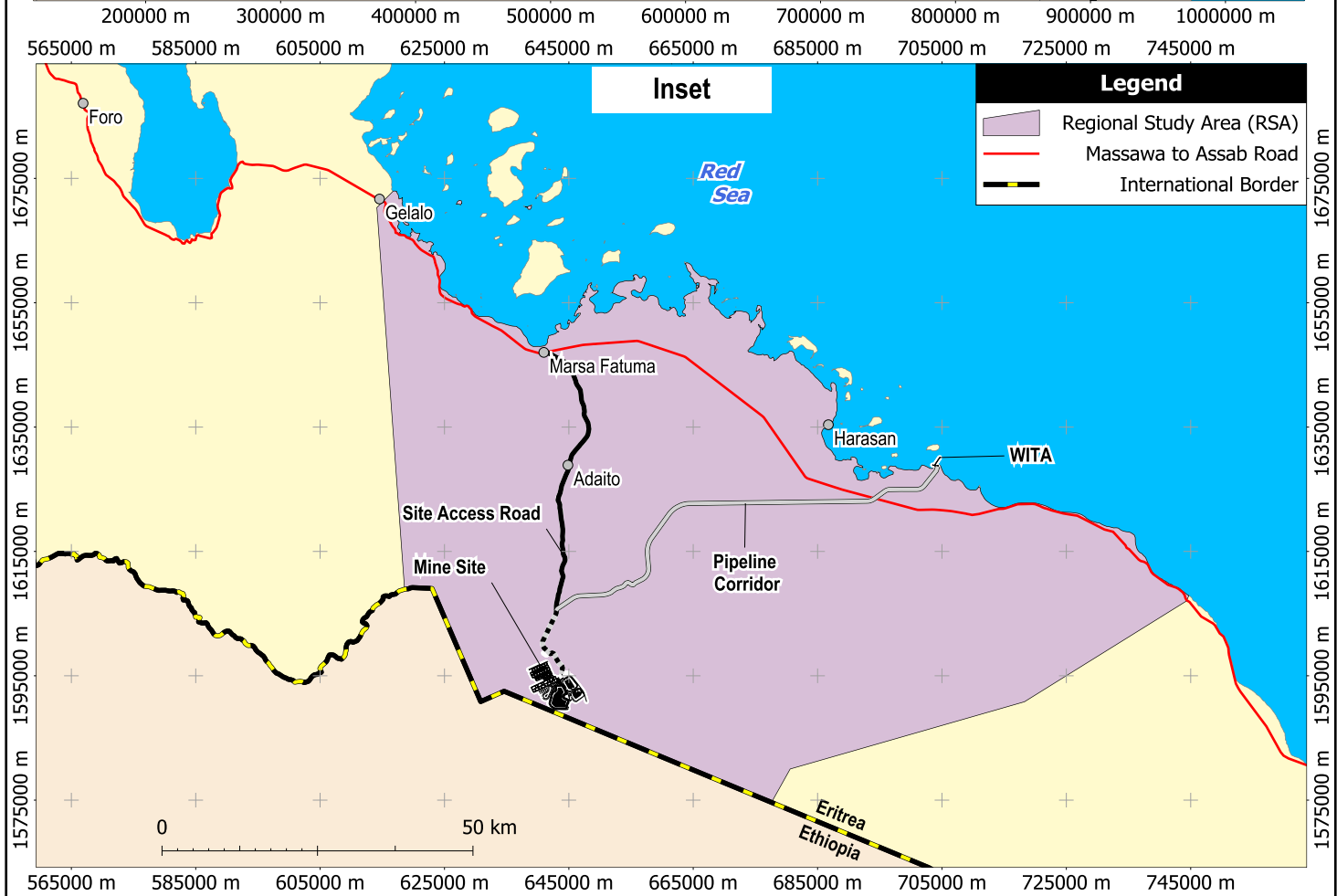
2.3 PROJECT DESCRIPTION

The Colluli resource comprises three potassium bearing salts in solid form which will be mined using an open pit. These salts will be combined in the process plant in a high yield, low energy process to produce potassium sulphate (SOP), which is a high quality potash fertiliser carrying a price premium over the more common muriate of potash (MOP). Potassium sulphate has limited production centres around the world and is suitable for application to fruits, vegetables, coffee plants and other chloride intolerant crops.

2.3.1 Project Components

The project has four different components:

- Mine Site at Colluli.
- Site Access Road which links the Mine site with Marsa Fatuma.
- A Water Intake and Treatment Area (WITA) on the Red Sea Coast at Ras Hafele.
- A Pipeline corridor which links the WITA with the Mine Site.



Scale: 1:5100000
Original Size: A4
Grid: UTM:37(N)

Danakali Limited
Colluli Potash Project

Figure 1

Project Location
and Layout

Martinick Bosch Sell Pty Ltd
4 Cook St
West Perth WA 6005
Ph: (08) 9226 3166
Fax: (08) 9226 3177
info@mbsenvironmental.com.au
www.mbsenvironmental.com.au

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2.3.1.1 Mine Site

The mine will consist of a single open pit developing progressively from the northeast to southwest over the course of the 60-year project life. The pit will have a progressive working face that provides access to each of the mineralised layers simultaneously. Mining will be conducted using mechanised equipment including surface miners, excavators, bull dozers and haul trucks. The Mine Site will run on a continuous 365 day per year, 24 hour per day basis.

Infrastructure in the Mine Site area will include an open pit potash mine, rock salt stockpiles, ore stockpiles, a ROM pad, processing plant, process and tailings ponds, permanent mine waste landforms, workshops and administration buildings, an accommodation village, haulage and access roads, power plant and power reticulation infrastructure and chemical and fuel storage facilities.

A schematic of what the Mine Site area will look like is shown in Figure 2.



Figure 2: Mine Site Schematic

2.3.1.2 Site Access Road

SOP will be transported from the Mine Site to Massawa Port in sealed containers via the Site Access Road and the existing public Massawa-Assab Road. Together these roads will form the transport corridor for the project. The current road to Colluli from Marsa Fatuma will be upgraded to form the Site Access Road. Equipment and supplies will be imported to the Mine Site using the same transport route.

Figure 3 shows the transport corridor from the Mine Site to Massawa Port including the Site Access Road.



Figure 3: Transport Corridor

2.3.1.3 Water Intake and Treatment Area

A Water Intake and Treatment Area (WITA) will be constructed on the Red Sea coast at Ras Hafele to supply water for the project. Infrastructure at the WITA site will include a seawater intake pipeline, water treatment (Reverse Osmosis) plant, brine discharge pipeline, power generation facilities and pumps. The purpose of the WITA is to provide both desalinated water and seawater for use at the Mine Site.

2.3.1.4 Pipeline Corridor

An 87 km Pipeline Corridor will be constructed to link the deposit and Water Intake and Treatment Area (WITA). This will be where desalinated and seawater pipelines will be buried.

2.3.2 Project Phases

The project will be developed and implemented in two phases. Phase I of the project is based around development of an open pit mine and infrastructure to support an initial process plant module (Module 1) with an annual capacity of 425,000 tonnes of SOP production. Phase I will be from Years 1 to 5 of the project life.

Phase II of the project will involve duplicating the process plant (Module 2) to double plant capacity to 850,000 t/a of SOP. This will be completed by Year 6 of the project. Mining rates will increase to supply sufficient ore for the increased processing capacity. Additional water volume will be supplied from the WITA to allow sufficient water for increased processing capacity.

2.3.3 Project Implementation Schedule

Implementation of the project is estimated to take about 27 months after award of the construction contract to first ore being fed through the processing plant.

Pioneer construction facilities will be established near the existing CMSC exploration camp in order to use these facilities for first construction teams arriving at the project. These teams will immediately begin construction of support facilities to allow the main construction workforce to be brought to site. The initial key activities following the granting of site access for construction include:

- Upgrade the site access to a state suitable for construction purposes.
- Construct accommodation for the construction workforce of up to 150 people.
- Establish water bores at the Mine Site to support construction activities and accommodation.
- Establish power generation and fuel storage facilities at the Mine Site to support construction.

2.3.4 Employment

The Colluli Potash Project will need to be fully and immediately self-sufficient given the location of the project in a remote region of Eritrea. Initial recruitment will be capability based, with longer term training and mentoring plans to upskill the local workforce.

Up to 1,000 people are expected to be required at the peak of construction activities including the operations team. Build-up of manpower will be governed by the sequence and timing of activities needed to support construction.

Approximately 450 workers will be needed during operation of Phase I of the project. During this time, about 70% of the workforce will be sourced from Eritrea. Phase II will require approximately 150 additional employees and is expected to result in the Eritrean workforce accounting for approximately 73% of the total. Up-skilling of the workforce and training and mentoring programs will be undertaken to transition to a predominantly Eritrean workforce by Year 15 when it is expected that over 90% of the workforce will be Eritrean.

Workers will generally be split into three panels. Two of these will be on site (day shift and nightshift) and the third will be on rest and relaxation at any given time. Rosters are anticipated to be two weeks on, one week off for Eritreans and six weeks on three weeks off for expatriates.

Employees will be bussed to and from Asmara or other place of residence at the beginning and end of their shifts.

2.4 EXISTING ENVIRONMENT

Danakali on behalf of CMSC has commissioned a number of baseline environmental and social assessments to identify, characterise and understand the biophysical and socio-economic environments that potentially interact with and may be influenced by the development of the project. Results of these assessments have been submitted to Government departments for technical review and adequacy assessment. Information obtained has been used to inform project design during the Definitive Feasibility Study (November 2015).

2.4.1 Environmental Setting

The project area is in the semi-desert agro ecological zone of Eritrea and is hot and dry with a minimum mean temperature of 28.8°C in winter and a maximum mean temperature of 38.8°C in summer. Average annual precipitation is 159.5 mm, minimum annual precipitation is 37 mm and maximum is 392 mm. Most rain falls between November and February and a significant portion of annual precipitation may be received in a single event. Evaporation exceeds precipitation by a factor of five in the wet season and a factor of 50 in the dry season. The region is sparsely populated and the majority of the project is located on barren land that is of little use to communities and wildlife; however the proposed Site Access Road and Pipeline Corridor cross an important rangeland that is grazed extensively by livestock and wildlife. There is almost no agriculture in the region due to the arid climate and poor soils.

There is large variation in landforms and topography in the vicinity of the project area with altitude varying from -180 m in the deposit area to over 500 m in the Bedita Hills. The southern part of the project area consists of a flat evaporite plain approximately -180 m and anhydrite slopes up to about 0 m. Moving northwards the topography consists of a range of hills and mountains with a central valley that terminates at the coastal plain. Rainfall received in the mountains gives rise to streams and rivers that drain into the Danakil Depression or the Red Sea. These dissect the terrain creating gullies and valleys and alluvial fans where they discharge onto the evaporite plains. The WITA is located on a barren part of the coastal plain. The proposed Pipeline Corridor passes through areas of low relief and foothills in addition to these landform types.

The potash deposit is located on an extensive flat plain consisting of a thin cover of wind-blown soil, underlain by an unconsolidated unit that varies in soil composition. The unconsolidated unit supports a groundwater aquifer and, depending upon the time of year and location, groundwater levels range from at surface to 6 m below ground surface. Other features found across the flat plain over the deposit include ephemeral hypersaline drainage lines and sinkholes. Bordering the northeast of the flat plain area are sulphate slopes consisting of sedimentary deposited layers of gypsum and anhydrite with thin layers of clays and sand. The anhydrite surface is cross cut by several southwest – northeast running river valleys, which are up to 100 m incised in this flat. The flat plain extends to the southwest and west of the deposit beyond the border with Ethiopia.

Groundwater is saline to hyper saline in the deposit area and fresh to brackish in the transport corridor and PET areas. Community wells tend to be placed in or near river beds where the surficial aquifers are recharged during flow events.

Surface drainage in the region generally originates from rain in the Danakil mountain range to the northeast and from the Ethiopian Highlands in the west. Seasonal surface flows discharge downslope into the Red Sea or into the Danakil Depression where they terminate as alluvial fans onto the evaporite flats. Streams in the project area are ephemeral and only flow after infrequent rainfall events and are brackish to saline. Apart from two small oases there is no permanent surface water in the project area. These are the Galli Colluli Oasis about 2.5 km from the open pit area and the Sukora Oasis about 10 km from the Mine Site and <1km from the Site Access Road. Both oases serve as important wildlife habitat and watering points and are also used by migrating livestock.

The project is located on a barren coastal plain that grades inland into bushlands and grasslands. Further inland, the deposit area is located below sea level on salt and anhydrite flats that supports little to no wildlife. Vegetation cover is extremely sparse to moderate except along rivers and in general wildlife is concentrated on the rangelands between the deposit area and the coast. Most of the LSA is comprised of barren land of limited value to wildlife which preferentially concentrates in vegetated areas where food, shelter and water resources are available. Of the wildlife observed during the baseline study, 90% were found in grassland, wooded grassland, riparian and oasis habitats. With the exception of the very small areas of oasis habitat, the wildlife habitats identified are considered to be regionally common. The Pipeline corridor will pass near to the Hakor, Awara and Madbaro plains. These provide foraging and breeding habitat and also serve as migration corridors for wildlife. Four conservation significant mammal species were positively identified during the wildlife survey (critically endangered African Wild Ass (*Equus africanus*), vulnerable Dorcas and Soemmerring's Gazelles (*Gazella dorcas* and *Nanger soemmerringii*) and near threatened Striped Hyena (*Hyaena hyaena*)).

Birds represent the most diverse faunal assemblage in the project area. Bird diversity is generally low in the deposit area and increases towards the coast as more suitable habitat types become available. 120 species of birds have been identified as potentially occurring in the project area and wider region. Of this, the majority are found near the WITA. One species (Egyptian Vulture) is listed as Endangered and is known to be in the project area and one (Hooded Vulture) is known to be present within the wider region. Two species listed as Vulnerable (Socotra Cormorant and Secretary Bird) are known to be present in the WITA area. Five species listed as Near Threatened (White-eyed Gull, Sooty Falcon, Black-tailed Godwit, Eurasian Curlew, Lesser Flamingo) are known to be present within the WITA area and two species listed as Near Threatened may occur within the wider regional area (Pallid Harrier and Arabian Bustard). Many of the bird species are seasonal migrants and will only be found in the project area at certain times of year.

Livestock species raised in the area include goats, camels, sheep, cattle and donkeys. The majority of the land in the vicinity of the project area consists of barren land with limited use for livestock, however vegetation cover increases towards the Red Sea and the northern part of the LSA constitutes an important rangeland. The coastal plain including the WITA area is largely barren and of limited use to livestock, however mangrove communities provide shade and fodder and animals move between these. The closest mangrove community is 8 km from the proposed WITA. The distribution of livestock is driven by the spatial and temporal distribution of rainfall and daily and seasonal migrations occur between suitable pasture and watering points.

Wind and dust storms occur in the region resulting in higher levels of fine particles in the air. Combustion products such as oxides of sulphur and nitrogen and associated secondary pollutants are not considered to be of concern in the area due to a lack of significant emission sources. Baseline conditions in the project area are generally dusty with World Health Organization (WHO) guideline values and interim targets for particulate matter as PM10 and PM2.5 regularly exceeded within the airshed.

Sources of noise and vibration in the local study area are limited to domestic noise and noise generated by occasional traffic which is most common along the coastal Massawa-Assab Road and to a lesser extent the road inland from Marsa-Fatuma to Adaito.

Heritage remains within the study area include artisanal potash mining and export facilities, an Italian trench in Adilu, trenches made by the Eritrean Defence forces during the 1998-2000 border war, the ruined railway that runs from Dallol in Ethiopia to Marsa Fatuma and three abandoned mining villages (Ageray, Mendah'ay and Gebelay east of Colluli deposit area. There are also a number of graves and cemeteries scattered across the deposit and Pipeline Corridor areas.

Photographs of the project area are shown in Figure 4.



View from Anhydrite Escarpment in Mine Site Area



Evaporite Plain in Mine Site Area



WITA Area Looking West



Site Access Road



Pipeline Corridor



Pipeline Corridor

Figure 4: Project Area Photographs

2.4.2 Social Setting

There are no permanent settlements within the exploration lease, and few settlements within the area surrounding the deposit area; the communities closest to the Mine Site are Laen Bada and Bolalli (20 km to the north-northwest) and Adaito (30 km to the north).

There are no communities immediately within the proposed Pipeline Corridor, though there are three communities (Gororoha, Sahil and Fredelu) within 5 km. The closest of these is Gororoha, 1.2 km away. The closest communities to the WITA are Sahil, Fredelu, Daraytu and Tio, all approximately 6 km from the proposed site.

Almost all residents in the LSA are from the Afar ethnic group (97%) which is ethnically homogenous. The Afar people are organised into families that derive common ancestry from clans. Individuals and clans are interlinked via kinship groups that serve as fundamental units for social relations and resource management systems. Islam is the dominant religion in the LSA and is practiced by 99% of residents. Mosques serve as places of social activity as well as worship.

Afar is the dominant language spoken by 98.2% of households; however Arabic (28.4%) and Tigrinya (23.3%) are also spoken. English is spoken by more educated Eritreans and there are also some Italian speakers.

The median age in the LSA is 19 years and half of the population over 15 years of age in the LSA is economically active (employed, self-employed or looking for work). Economically inactive groups include students, housewives, aged and disabled persons. The employment rate in the LSA is 40% however males are far more likely to be employed than females. The largest sources of employment are the service, fishing and agricultural sectors and 10% of those employed worked in professional and technical sectors.

Land use units in the LSA have been identified as no-use (66.6%); intensive grazing and browsing (16.9%); minimal browsing (9.4%), minimal grazing (6.3%), crop production (0.1%), mangrove forest (0.4%), settlement (0.3%) and oasis (0.1%). The WITA and Mine Site areas are located on barren land, while the Pipeline Corridor will pass through a rangeland used for grazing and browsing of livestock. None of the project infrastructure is proposed to be constructed over or near any agricultural, commercial or residential land.

Remittances from the diaspora, livestock rearing, participation in small-scale business activities as well as wage labour are the most important sources of household income in the LSA. Livestock rearing is an important source of livelihood with over half of households owning livestock. Fishing is an important activity in coastal communities and crop production is very limited.

Rangeland in the LSA is operated on a free-access system and livestock from within and outside of the LSA can be grazed on it freely.

Food security in the LSA is poor and two of every 10 households reported failing to eat to satisfaction in the year prior to the socio-economic survey. Nearly half of children are underweight. Over a quarter of households in the LSA reported having had a least one sick member in the 12 months prior to the socio-economic survey. Illnesses reported included malaria, the common cold, respiratory diseases, diarrhoea, tuberculosis and anaemia.

There are public health facilities at Tio, Bada and other larger towns in the LSA, but due to the remote locations of many settlements access to health services is poor. Water is sourced from protected and unprotected public wells, public taps and tanker trucks with little to no treatment. Access to sanitation is limited and many households lack toilet facilities.

3. STAKEHOLDER ENGAGEMENT

Stakeholder engagement is a key element of the SEIA process. The purpose of stakeholder engagement is to allow for stakeholders to interact with the decision-making process, express their views and influence mitigation and technical solutions selected to address concerns voiced during the impact assessment process. It allows stakeholders to understand the risks, impacts and opportunities of the project in order to achieve positive outcomes.

Danakali, on behalf of CMSC, during project development planning has consulted regularly and extensively with the Department of Mines and other Government departments and officials, and conducted less formal, but more frequent consultation with members of communities in the Local and Regional Study Areas. SEIA documentation has addressed issues of waste management, dust and odour emissions, water shortage and conservation and infrastructure improvement raised during stakeholder engagement.

CMSC aims to foster the positive relationships developed during the baseline data gathering period to extend for the life of the project.

Stakeholders that will be engaged throughout the project life include:

- Communities located in the Local Region.
- Local Community Groups.
- Local Government and Traditional Leaders.
- National / Regional Government Agencies.
- Community / National Groups.
- General Public.
- Businesses.
- National Institutions.
- Non Governmental Organisations.
- Investors, Financial Institutions.
- Media.

During the pre-construction period, in mid 2016, CMSC will engage in a targeted campaign of stakeholder engagement focussing on communicating the outcomes of the SEIA process. Specifically this will involve communicating:

- What is involved with implementation of the project and how the project will operate.
- The key social and environmental impacts and opportunities potentially generated by the project.
- The management measures which CMSC will implement to avoid or minimise the risks.

Stakeholders will have 60 days to provide feedback on the project. This engagement program will be run concurrent to the Government's assessment of the SEIA documentation. Feedback provided by stakeholders will be collated and considered, responses will be provided or clarification sought from contributors and CMSC will update SEIA documents including Management and Monitoring Plans to reflect these contributions to project planning.

CMSC has prepared a Stakeholder Engagement Plan for the project. Stakeholder engagement is planned to be a constant component of the project. The SEP is a dynamic document that will be regularly updated to reflect project stakeholder engagement need and expectations.

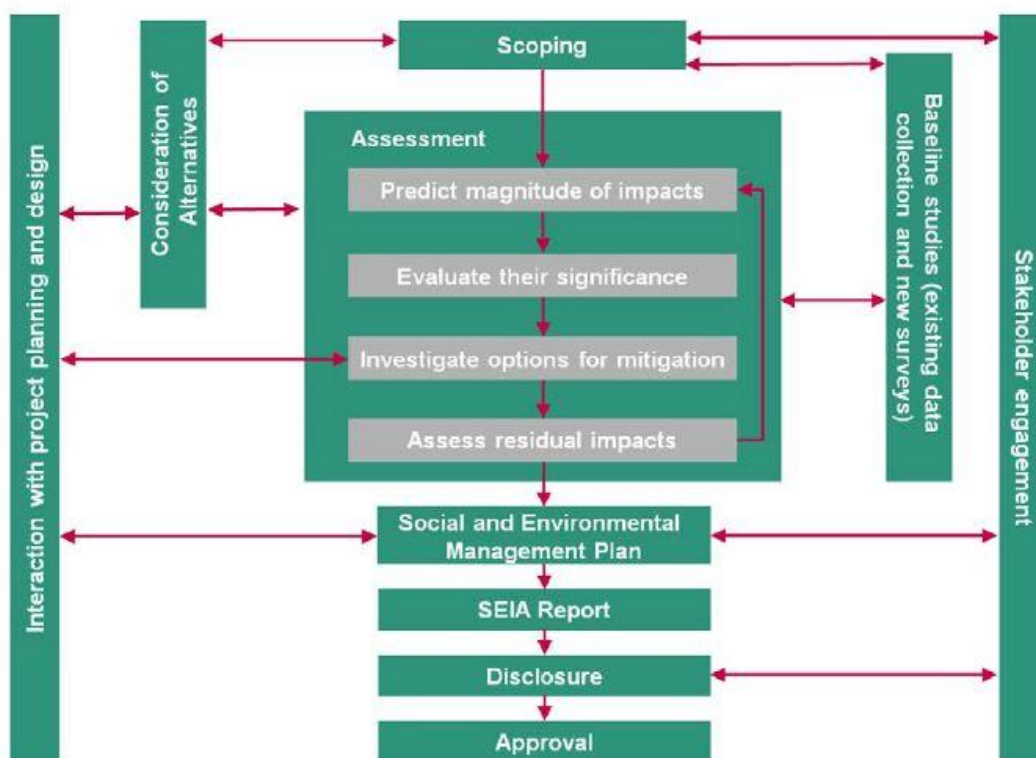
4. POTENTIAL SOCIAL AND ENVIRONMENTAL IMPACTS

The systematic approach followed for determining social and environmental impacts is shown in Figure 5 and the key steps are described in the following sections.

This process considered the following five aspects:

- **Baseline** – Establishing what is the current environmental and social situation?
- **Prediction of Impacts**– How will conditions in the environment and society change as a consequence of the project and how significant is that change?
- **Evaluation of Risk** – a function of the significance of an impact and the likelihood of occurrence.
- **Mitigation** – If a significant environmental or social risk is identified, what can be done to reduce that risk? Risk can be mitigated by reducing the significance of an impact or the likelihood of that impact occurring.
- **Residual Risk** – After mitigation is taken into account, establishing what the residual risk associated with that impact will be.

Figure 5: SEIA Approach



A summary is presented in the following sections of the findings of the social and environmental impact assessment conducted for the project. The summary presents only those potential impacts that were deemed to have a significant “Inherent Risk” (i.e. before mitigation or management measures were implemented). This covers impacts that were rated at an inherent risk level of Medium, High or Extreme. For these impacts, the main mitigation and management measures are listed and the Residual Risk after consideration of these is presented.

Potential social impacts are presented in Table 1 while Table 2 presents the potential environmental impacts associated with development of the project.

The basis for the significance ranking is described in Section 5 of the SEIA.

Table 1: Potential Social Impacts – Inherent and Residual Risks

Potential Impact	Inherent Significance	Key Management Measures	Residual Significance
Employment			
Creation of direct and indirect employment opportunities for the life of the project.	Benefit	N/A	Benefit
Induced job creation from service and supply jobs to meet demands from the resident workforce and the mine itself (arising from increased disposable income and demand for additional goods and services).	Benefit	N/A	Benefit
Labour disputes between and within CMSC and contracted parties affect company reputation.	Moderate	<ul style="list-style-type: none"> • Audit alignment for contractors and sub-contractors within the supply chain. • Human Rights Impact Assessment. • Work in good faith with the trade unions. • Grievance Mechanism. 	Low
Labour dispute between CMSC and port employees and /or product haulage contractor employees affect company reputation.	Moderate	<ul style="list-style-type: none"> • Audit alignment for contractors and sub-contractors within the supply chain. • Human Rights Impact Assessment. • Work in good faith with the trade unions. • Grievance Mechanism. 	Moderate
Risk of unmet community expectations for jobs due to lack of suitable candidates.	Moderate	<ul style="list-style-type: none"> • Ongoing stakeholder engagement. • Conduct community awareness of recruitment processes and project skill requirements. • A fair and non-discriminatory and transparent recruitment process. 	Moderate
Reduction in direct, indirect and induced employment during the closure phase.	Moderate	<ul style="list-style-type: none"> • Develop a workforce transition program. 	Low
Inability to source and retain a sufficiently skilled workforce.	Moderate	<ul style="list-style-type: none"> • Promote and support training partnerships and vocational training and skills development through established learning centres. • Employee development program. 	Low

Potential Impact	Inherent Significance	Key Management Measures	Residual Significance
Potential impacts on traditional social structures from employment practices	Moderate	<ul style="list-style-type: none"> Grievance Mechanism. Ongoing stakeholder engagement. Community and cultural awareness training for employees. 	Moderate
National and Local Economic Investment			
Increase in local procurement opportunities in particular during the operational phase of the project.	Benefit	N/A	Benefit
Potential that local communities are unable to take advantage of increased economic opportunities afforded by the project.	Moderate	<ul style="list-style-type: none"> Local procurement framework. Supplier development program. Local Development Fund. 	Low
Localised inflationary effects due to the impacts of the project on the local economy.	Moderate	<ul style="list-style-type: none"> Ongoing stakeholder engagement. 	Low
Sustainable local community development initiatives implemented in partnership between the project and key stakeholders.	Benefit	N/A	Benefit
Increased revenue to local and national Government budgets through taxes, royalties and other payments.	Benefit	N/A	Benefit
Decreased economic investment at the local level at the closure phase of the project, leading to higher vulnerability in project-affected communities.	Moderate	<ul style="list-style-type: none"> Develop a workforce transition program. Coordinate with the government and other departments on local initiatives. Employee development and training program. 	Low
Labour and Working Conditions			
Labour disputes between and within CMSC and contracted parties affect company reputation.	Moderate	<ul style="list-style-type: none"> Audit alignment for contractors and sub-contractors within the supply chain. Human Rights Impact Assessment. Work in good faith with the trade unions. Grievance Mechanism. 	Low

Potential Impact	Inherent Significance	Key Management Measures	Residual Significance
Labour dispute between CMSC and port employees and /or product haulage contractor employees affect company reputation.	Moderate	<ul style="list-style-type: none"> Audit alignment for contractors and sub-contractors within the supply chain. Human Rights Impact Assessment. Work in good faith with the trade unions. Grievance Mechanism. 	Moderate
Benefit of international standard working conditions introduced by the project on project workforce, contractors and partners.	Benefit	N/A	Benefit
Health, Safety and Security			
Emergency impacting workers, emergency responders, government agencies and communities.	High	<ul style="list-style-type: none"> Develop response and escalation processes. Competency, training and awareness including drills and simulations. 	Moderate
Spread of communicable diseases within the workforce and between the workforce and the community, including STIs.	Moderate	<ul style="list-style-type: none"> Periodic medical re-assessments for CMSC employees. Local public health campaigns. Medical facilities at the project site for CMSC employees. Employee Code of Conduct. 	Low
Increased risk to workers of accident, injury or fatality in working on a new mine site.	High	<ul style="list-style-type: none"> Competency, training and awareness. Change management process. Personal Protective Equipment provided to CMSC employees. Incident and emergency response. 	Moderate
Threats to human health and safety of communities from access to mining facilities and infrastructure at the Colluli Potash Project.	Moderate	<ul style="list-style-type: none"> Signage and fencing. Stakeholder engagement and Grievance Mechanism. Work area inspections. 	Low
Antisocial behaviour or social fracture induced by project activities in the Project Area, including between and within communities and the project workforce.	Moderate	<ul style="list-style-type: none"> Cultural awareness training. Employee Code of Conduct. Grievance Mechanism. 	Low

Potential Impact	Inherent Significance	Key Management Measures	Residual Significance
Road accidents, incidents or fatalities on both the Site Access Road (Masa Fatuma) and the public road (Marsa Fatuma to Port in Massawa), between project and public road users.	High	<ul style="list-style-type: none"> • Offsite traffic management controls including signage and speed restrictions. • Stakeholder engagement including Grievance Mechanism. • Hazardous Material controls and training. • Specific driver training and competency checks. • Community traffic safety awareness program. • Rigorous vehicle safety standards and inspections. 	Moderate
Potential lack of telecommunications along the transport corridor, preventing rapid response to emergency situations.	High	<ul style="list-style-type: none"> • Communication devices fitted to all mine vehicles. • Emergency response team based at the minesite. • Specific driver training and competency checks. 	Moderate
Landuse and Livelihoods			
Disruption to project activities through intentional or accidental breach of water infrastructure.	Moderate	<ul style="list-style-type: none"> • Leak detection. • Stakeholder engagement. 	Low

Table 2: Potential Environmental Impacts – Inherent and Residual Risks

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
HYDROMETEOROLOGY AND CLIMATE			
Mine Site			
Contamination of surface water by hydrocarbons from power generation equipment.	Medium	<ul style="list-style-type: none"> Power station located away from surface water flow paths. Storage in bunded areas. Spill kits. Employee training in spill response. 	Low
Contamination of surface water by hydrocarbons from storage failure.	Medium	<ul style="list-style-type: none"> Centralised storage area located away from surface water flow paths. Storage in bunded areas. Tank integrity testing procedure. Spill kits. Employee training in spill response. 	Low
Sediment from mine waste enters watercourses	Medium	<ul style="list-style-type: none"> Drain located upstream of RS2 and W2 to intercept upstream flows from interacting with mine waste. Surface flows from RS2 and W1 directed to open pit. 	Low
Change in surface water flow patterns as a result of mine infrastructure	Medium	<ul style="list-style-type: none"> Project design considers natural drainage. Culverts installed to prevent blockage of ephemeral drainages. Roads constructed with engineered surface water drainage structures. Siting road crossings to minimise disturbance to watercourses as far as practicable. Permanent drainage installations designed for a 100-year/24-hour recurrence period. 	Low
Alteration to Sariga River channel due to aggregate borrow pit.	Medium	<ul style="list-style-type: none"> Borrow pit located on alluvial fan upstream of project infrastructure. Maximum depth of extraction is 3 m. Location considers periodic filling as a result of high sediment loads in Sariga River flows. Small volumes of aggregate removed. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Pipeline Corridor			
Disturbance of watercourse banks leading to instability	Medium	<ul style="list-style-type: none"> Sediment control measures during construction. Project design considers natural drainage. All infrastructure constructed in order to reduce the risk of erosion and transport of sediment. 	Low
Site Access Road			
Contamination of water dams/tanks along Site Access Road	Medium	<ul style="list-style-type: none"> Cover tanks Spill kits. Spill response training. Alternate water source provided until remediated. 	Low
HYDROGEOLOGY			
Mine Site			
Passive water abstraction to allow mining causes aquifer groundwater levels to drop and impacts beneficial users (humans, wildlife, livestock, ecosystem functions).	Medium	<ul style="list-style-type: none"> Groundwater monitoring (quality, levels, abstraction volume). No active dewatering of clastics. 	Medium
Contamination of groundwater due to hydrocarbon storage failure	Medium	<ul style="list-style-type: none"> Spill kits. Storage in bunded areas. Hazardous materials on site minimised. Potentially contaminated water will be captured for re-use or treatment before discharge. Groundwater quality and abstraction monitoring, with corrective actions implemented as required. Waste oils will be reused where possible. 	Low
Contamination of groundwater from domestic waste (landfill)	Medium	<ul style="list-style-type: none"> Design is for a lined landfill facility to prevent seepage. 	Low
Pipeline Corridor			
Contamination of groundwater due to saline water spill/pipe leak	Medium	<ul style="list-style-type: none"> Pipelines have leak detection sensors and can be automatically shut down. Pipeline buried or shallow covered to minimise exposure. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Site Access Road			
Contamination of groundwater due to hydrocarbon spills during transport	Medium	<ul style="list-style-type: none"> Transport in compliance with Dangerous Goods requirements. Speed limits. Transport route upgrade and maintenance. Spill kits. Employee training in spill response. 	Low
Contamination of groundwater due to process reagent spills during transport	Medium	<ul style="list-style-type: none"> Transport in compliance with Dangerous Goods requirements. Speed limits. Transport route upgrade and maintenance. Spill kits. Employee training in spill response. 	Low
Contamination of uncovered wells due to dust emissions from vehicles	Medium	<ul style="list-style-type: none"> Speed limits for all project-associated roads. Wells will be covered. 	Low
AIR QUALITY			
Mine Site			
Gaseous emissions from product drier impacting receptors (humans, wildlife, livestock).	Medium	<ul style="list-style-type: none"> Drier design incorporates bag houses to capture particulates and scrubbers to remove harmful gaseous components. 	Low
Greenhouse gas emissions due to fuel burning (power generation, mobile equipment, vehicles).	Medium	<ul style="list-style-type: none"> Stack design meet international air quality criteria. Product drier has pollution control devices (bag house and scrubbers). Maximise fuel efficiency across project. 	Medium
Odour emissions from processing reagents affecting receptors (humans).	Medium	<ul style="list-style-type: none"> Reagents stored in compliance with Dangerous Goods requirements. Work area training program. Chemical storage areas designed to be well ventilated. Availability of PPE. 	Low
Pipeline Corridor			
Particulate emissions due to land disturbance affects receptors (wildlife, livestock, nomadic herders).	Medium	<ul style="list-style-type: none"> Short construction period. Speed limits applied. Dust control measures will be implemented. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Site Access Road			
Particulate emissions due to land disturbance affects receptors (wildlife, livestock, people).	Medium	<ul style="list-style-type: none"> Dust control measures will be implemented. Speed limits. Air quality monitoring program at sensitive receptor locations. Communication with communities about construction schedule. 	Medium
Particulate emissions due to traffic movement along unsealed road impacting receptors (livestock, wildlife, people).	High	<ul style="list-style-type: none"> Vehicles confined to defined routes and tracks. Dust control measures will be implemented. Air quality monitoring programme at sensitive receptor locations. Speed limits applied particularly through residential areas. 	Medium
Particulate emissions due to wind erosion of disturbed surfaces impacting receptors (livestock, wildlife, people).	Medium	<ul style="list-style-type: none"> Dust control measures will be implemented. Progressive rehabilitation of disturbed areas. Air quality monitoring program at sensitive receptor locations. 	Medium
NOISE AND VIBRATION			
Site Access Road			
Noise impacts to livestock and wildlife during construction	Medium	<ul style="list-style-type: none"> Vehicles and plant equipment regularly maintained for efficiency and to prevent undue noise. Community engagement regarding construction schedule. 	Low
Construction noise impacting communities (health, amenity)	Medium	<ul style="list-style-type: none"> Vehicles and plant equipment regularly maintained for efficiency and to prevent undue noise. Community engagement regarding construction schedule. Noise monitoring undertaken at sensitive receptor locations. 	Low
Noise from movement of vehicles impacting on wildlife.	Medium	<ul style="list-style-type: none"> Vehicles and plant equipment regularly maintained for efficiency and to prevent undue noise. 	Low
Noise from movement of vehicles impacting on livestock.	Medium	<ul style="list-style-type: none"> Vehicles and plant equipment regularly maintained for efficiency and to prevent undue noise. Community engagement regarding road maintenance schedule. Noise monitoring undertaken at sensitive receptor locations. 	Medium

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Noise and vibration from movement of vehicles impacting on communities (health and amenity).	Extreme	<ul style="list-style-type: none"> Vehicles confined to defined routes and tracks. Speed limits applied particularly through residential areas. Noise monitoring program at sensitive receptor locations. Vehicles maintained for efficiency and to prevent undue noise. Noise exposure monitoring program. 	High
GEOLOGY AND SOILS			
Mine Site			
Contamination of soils due to hydrocarbon leaks and spills from mobile equipment	Medium	<ul style="list-style-type: none"> Preventative maintenance scheduled for mobile equipment. Spill kits. Employee training in spill response. 	Low
Land contamination caused by reagent spills	Medium	<ul style="list-style-type: none"> Reagents stored in accordance with Dangerous Goods requirements in centralised location. Tanks bunded. Spill kits. Employee training in spill response. 	Low
Land contamination caused by SOP spills	Medium	<ul style="list-style-type: none"> SOP stored in enclosed, concrete floored building. SOP transported in sealed containers. Spill kits. Employee training in spill response. 	Low
Land contamination caused by hydrocarbon spills from power generation facilities.	Medium	<ul style="list-style-type: none"> Hydrocarbons stored in accordance with Dangerous Goods requirements in centralised locations. Tanks bunded. Tank integrity inspection procedure. Spill kits. Employee training in spill response. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Land contamination caused by hydrocarbon spills from storages	Medium	<ul style="list-style-type: none"> Hydrocarbons stored in accordance with Dangerous Goods requirements in centralised locations. Tanks banded. Tank integrity inspection procedure. Spill kits. Employee training in spill response. 	Low
Land contamination caused by product spills and product dusting	Medium	<ul style="list-style-type: none"> Process plant designed with enclosed product handling area. SOP transported in sealed containers. Spill kits. Work area inspections. Employee training in spill response. Work area inductions. 	Low
Land contamination caused by process spills	Medium	<ul style="list-style-type: none"> Process plant designed with bunding of tanks. Spill kits. Plant preventative maintenance schedule. Work area inspections. Employee training in spill response. Work area inductions. 	Low
Land contamination caused by hydrocarbon spills from workshops	Medium	<ul style="list-style-type: none"> Workshops designed with concrete floors. Washdown bays fitted with oil water separators. Hydrocarbons stored in accordance with Dangerous Goods requirements. Tanks banded. Tank integrity inspection procedure. Spill kits. Work area inductions. Employee training in spill response. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Site Access Road			
Erosion due to uncontrolled surface water run-off and channelling along roads	Medium	<ul style="list-style-type: none"> Engineered road design considers surface water runoff and includes provision for drains where necessary. 	Low
Increase in soil salinity due to use of saline water for dust suppression.	Medium	<ul style="list-style-type: none"> Water sprays kept to road surface area. Spray drift controlled. Application of water will be on an as needs basis. 	Medium
Land contamination caused by SOP spills during transport	Medium	<ul style="list-style-type: none"> Transported in sealed containers. Spill kits. Employee training in spill response. 	Low
LANDFORMS AND AESTHETICS			
Mine Site			
Alteration to landforms and terrain due to tailings ponds affects visual amenity.	Medium	<ul style="list-style-type: none"> Final landform assessed through Mine Closure Plan. Pond design considers post project amenity. 	Low
WITA			
Loss of aesthetics due to light spill from project areas	Medium	<ul style="list-style-type: none"> Lights positioned to minimise light spill. Downlights used where possible to minimise light spill. Use of external lights minimised. 	Low
Site Access Road			
Alteration to landforms and terrain due to excavation of borrow pits for road construction material	Medium	<ul style="list-style-type: none"> Borrow pit depths restricted to 2m Rehabilitation of disturbed areas. 	Low
Light spill during operations impacts communities (amenity).	High	<ul style="list-style-type: none"> Vehicle lights to be dimmed when travelling through communities at night. 	Low
TERRESTRIAL VEGETATION			
WITA			
Introduction of weed species	Medium	<ul style="list-style-type: none"> Construction vehicles inspected prior to entry to Pipeline Corridor to ensure free of seeds and vegetative material. Weed inspection process. Weed control programs if required. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Pipeline Corridor			
Vegetation loss due to land disturbance.	Medium	<ul style="list-style-type: none"> Land clearing strictly limited to that necessary for operations. Land Disturbance authorisation process. Where possible, trees pruned rather than removed. Vehicles keep to designated roads and tracks. Disturbed areas will be rehabilitated as available. 	Low
Loss of community significant species.	Medium	<ul style="list-style-type: none"> Pre clearance inspection process. Land Disturbance authorisation process. Vehicles keep to designated roads and tracks. 	Low
Introduction of weed species	Medium	<ul style="list-style-type: none"> Construction vehicles inspected prior to entry to Pipeline Corridor to ensure free of seeds and vegetative material. Weed inspection process. Weed control program if required. 	Low
Site Access Road			
Vegetation loss due to land disturbance.	Medium	<ul style="list-style-type: none"> Land clearing strictly limited to that necessary for operations. Land Disturbance authorisation process. Where possible, trees pruned rather than removed. Vehicles keep to designated roads and tracks. Disturbed areas will be rehabilitated as available. 	Low
Vegetation damage caused by vehicles outside of designated roads	Medium	<ul style="list-style-type: none"> Vehicles confined to defined routes and tracks. Work area induction. 	Low
Introduction of weed species	Medium	<ul style="list-style-type: none"> Construction vehicles inspected prior to entry to SAR to ensure free of seeds and vegetative material. Weed inspection process. Weed control program if required. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
BIRDS, LIVESTOCK, WILDLIFE AND HABITAT			
Mine Site			
Disruption to use of Galli Colluli Oasis by wildlife	Medium	<ul style="list-style-type: none"> Project layout considered oasis location. Oasis declared prohibited area for employees and contractors. Site induction. Wildlife monitoring program. 	Medium
Pipeline Corridor			
Injury or death of wildlife or livestock due to interaction with vehicles.	Medium	<ul style="list-style-type: none"> Short construction period. Awareness of issue addressed in work area induction. Speed limits. 	Low
Disruption of wildlife or livestock migration routes through rangeland	Medium	<ul style="list-style-type: none"> Project design considers livestock, wildlife habitat and known migration routes. Awareness of issue addressed in work area induction. Speed limits, particularly during migration periods. Road safety program including for livestock herders. 	Low
Site Access Road			
Fragmentation of habitat due to land disturbance.	Medium	<ul style="list-style-type: none"> Project design considers location of fauna species and habitat of significance. Land clearing strictly limited to that necessary for operations. Land disturbance authorisation process. Where possible, trees pruned rather than removed. Disturbed areas will be rehabilitated as available. Vehicles confined to defined roads and tracks. 	Low
Injury or death of wildlife or livestock due to interaction with construction equipment.	Medium	<ul style="list-style-type: none"> Awareness of issue addressed in work area induction. Speed limits. Vehicles confined to defined work areas. Construction and maintenance schedule shared with communities. Community education program for livestock herders. Compensation Agreement to be developed with communities. Grievance Mechanism. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Injury or death of wildlife due to interaction with transport vehicles.	Medium	<ul style="list-style-type: none"> Awareness of issue addressed in work area induction. Speed limits. Vehicles confined to defined roads and tracks. Wildlife observation records. Grievance Mechanism. 	Low
Injury or death of conservation significant wildlife due to interaction with transport vehicles.	Medium	<ul style="list-style-type: none"> Awareness of issue addressed in work area induction. Speed limits. Vehicles confined to defined roads and tracks. Wildlife observation records. Grievance Mechanism. 	Medium
Injury or death of livestock due to interaction with transport vehicles.	Medium	<ul style="list-style-type: none"> Awareness of issue addressed in work area induction. Speed limits. Vehicles confined to defined roads and tracks. Grievance Mechanism. Compensation Agreement. 	Medium
Disruption of livestock migration patterns through rangeland.	Medium	<ul style="list-style-type: none"> Project design considers location of livestock migration patterns. Speed limits. Vehicles confined to defined roads and tracks. Awareness of issue addressed in work area induction. Community education program for livestock herders. Grievance Mechanism. 	Medium
Disruption of wildlife migration patterns through rangeland.	Medium	<ul style="list-style-type: none"> Project design considers location of wildlife species and habitat of significance. Speed limits. Vehicles confined to defined roads and tracks. Awareness of issue addressed in work area induction. 	Medium
Increase in feral animals due to increased access to water and food.	Medium	<ul style="list-style-type: none"> Borrow pits rehabilitated to minimise ponding. Transport vehicles fitted with rubbish bags. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
CULTURAL HERITAGE			
Mine Site			
Direct removal of graves/heritage sites during project construction.	Medium	<ul style="list-style-type: none"> • Project design considers location of heritage sites. • Land disturbance strictly limited to that necessary for operations. • Land Disturbance authorisation process. • Grave removal procedure. • Community consultation. • Awareness of issue addressed in work area induction. • Grievance Mechanism. • Cultural heritage monitoring program. 	Low
Disturbance of grave/heritage sites due to uncontrolled vehicle movements.	High	<ul style="list-style-type: none"> • Vehicles confined to defined routes and tracks. • Awareness of issue addressed in work area induction. • Grievance Mechanism. • Cultural heritage monitoring program. 	Medium
WITA			
Direct removal of graves/heritage sites during project construction	Medium	<ul style="list-style-type: none"> • Project design considers location of heritage sites. • Land disturbance strictly limited to that necessary for operations. • Land disturbance authorisation process. • Grave removal procedure. • Community consultation. • Awareness of issue addressed in work area induction. • Grievance Mechanism. • Cultural heritage monitoring program. 	Low
Disturbance of grave/heritage sites due to uncontrolled vehicle movements	Medium	<ul style="list-style-type: none"> • Vehicles confined to defined routes and tracks. • Awareness of issue addressed in work area induction. • Grievance Mechanism. • Cultural heritage monitoring program. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Loss of access to cultural heritage sites or areas of importance.	Medium	<ul style="list-style-type: none"> Project design considered cultural heritage sites and practices. Stakeholder Engagement Plan Awareness of issue addressed in work area induction. Grievance Mechanism. 	Low
Pipeline Corridor			
Direct removal of graves/heritage sites during project construction	High	<ul style="list-style-type: none"> Project design considers location of heritage sites. Land disturbance strictly limited to that necessary for operations. Land disturbance authorisation process. Grave removal procedure. Community consultation. Awareness of issue addressed in work area induction. Grievance Mechanism. Cultural heritage monitoring program. 	Medium
Disturbance of grave/heritage sites due to uncontrolled vehicle movements	High	<ul style="list-style-type: none"> Vehicles confined to defined routes and tracks. Low vehicle frequency required during operations. Awareness of issue addressed in work area induction. Grievance Mechanism. Cultural heritage monitoring program. 	Medium
Site Access Road			
Direct removal of graves/heritage sites during project construction	Medium	<ul style="list-style-type: none"> Project design considers location of heritage sites. Land disturbance strictly limited to that necessary for operations. Land disturbance authorisation process. Grave removal procedure. Community consultation. Awareness of issue addressed in work area induction. Grievance Mechanism. Cultural heritage monitoring program. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Disturbance of grave/heritage sites due to uncontrolled vehicle movements	Medium	<ul style="list-style-type: none"> Vehicles confined to defined routes and tracks. Awareness of issue addressed in work area induction. Grievance Mechanism. Cultural heritage monitoring program. 	Medium
Degradation of graves/heritage sites due to dust or vibration from vehicle movements	Medium	<ul style="list-style-type: none"> Project design considers location of heritage sites. Vehicle movements keep to designated roads and tracks. Grave removal procedure. Community consultation. Awareness of issue addressed in work area induction. Grievance Mechanism. Cultural heritage monitoring program. 	Low
MARINE WILDLIFE AND HABITAT			
WITA			
Contamination of seawater due to uncontrolled rubbish management (solid wastes) impacting wildlife (turtles, mammals).	Medium	<ul style="list-style-type: none"> Waste removed to the Mine Site for disposal in landfill. Waste receptacles will be provided and will have secure lids. Awareness of issue addressed in work area induction. 	Low
Loss of marine habitat: <ul style="list-style-type: none"> In pipeline footprint. Foraging habitat for conservation significant species (turtles, mammals). 	Medium	<ul style="list-style-type: none"> Project design considered marine habitat and conservation significant marine wildlife. Pipes pre-constructed and floated into position before anchoring down to minimise turbidity and habitat loss. Discharge point of brine pipeline has been designed to angle upwards to minimise sea bed erosion and resultant turbidity. Monitoring program (coral, sea grass, seaweed, water quality). 	Low
Death or injury of marine wildlife due to entrainment at seawater intake point	Medium	<ul style="list-style-type: none"> Project design has considered impingement and entrainment. Low intake velocity for seawater. Inspections program for seawater intake pipeline. 	Low

Potential Impact	Inherent Risk	Key Management Measures	Residual Risk
Impacts to potential turtle nesting sites: <ul style="list-style-type: none"> • Loss of turtle nesting habitat. • Light spill disrupts nesting or hatching. • Poaching of turtle eggs on beaches by employees. • Physical presence of humans causes disturbance or nest abandonment. 	Medium	<ul style="list-style-type: none"> • Project design has considered turtle habitat. • Lighting design considers turtle requirements (down focuses lights, light colour, minimal external lighting). • Employees prohibited from hunting, fishing or egg collection while on duty. • Awareness of issue addressed in work area induction. • Turtle monitoring program. • Wildlife observation program. 	Low
Death of conservation significant marine wildlife from increase in water temperature due to brine discharge.	Medium	<ul style="list-style-type: none"> • Brine discharge designed to achieve less than 1°C temperature increase at discharge point. • Discharge point located to maximise mixing. • Water quality monitoring program. • Wildlife observation program. 	Low

5. MANAGEMENT AND MONITORING PLANS

CMSC has developed a number of aspect specific environmental and social Management and Monitoring Plans to assist with management of potential project impacts. These mitigation measures are planned to be implemented to ensure impacts are avoided or managed. Monitoring programs are proposed and will assist in ensuring risks are consistent with predictions documented in the SEIA.

Social management plans developed for the project are:

- Stakeholder Engagement Plan.
- Community Development Plan.
- Community Health, Safety and Security Management Plan.
- Human Resources Management Plan.
- Emergency Preparedness and Response Plan.
- Occupational Health and Safety Management and Monitoring Plan.

Environmental management and monitoring plans developed for the project are:

- Mine and Process Waste Management and Monitoring Plan.
- Wildlife, Habitat, Livestock and Land Use Management and Monitoring Plan.
- Marine Management and Monitoring Plan.
- Land, Vegetation and Weed Management and Monitoring Plan.
- Surface Water Management and Monitoring Plan.
- Groundwater Management and Monitoring Plan.
- Air Quality Management and Monitoring Plan.
- Noise Management and Monitoring Plan.
- Hazardous Materials Management and Monitoring Plan.
- Traffic and Transport Management and Monitoring Plan.
- Mine Closure Plan.

6. CONCLUSION

6.1 KEY PROJECT BENEFITS

Development of the Colluli Potash Project is expected to bring considerable socio-economic benefits to Eritrea over a long period (>50 years). This will include:

- **Increased Government Revenues:** CMSC will contribute to the Eritrean economy directly through payment of royalties, company taxes, payment of shareholder dividends to ENAMCO, payment of salaries to Eritrean nationals thereby increasing the tax base and procurement of goods and services such as fuel, food, accommodation and transport.
- **Creation of Employment Opportunities:** The project will result in creation of direct and indirect jobs. About 450 direct jobs will be created during Phase 1 increasing to about 600 jobs during Phase II. Employment will prioritise Eritreans, particularly people within local communities.
- **Skills Enhancement:** The projects creation of employment opportunities will require provision of formal and on the job training to ensure local and national employment targets can be met throughout the project life. This will result in improvement of skills and experience to Eritreans in a local, regional and national setting, thereby enhancing their potential to achieve employment outside of the Colluli Potash Project.
- **Procurement of Goods and Services:** CMSC has committed to developing a Procurement Framework prior to commencement of construction. This will include provisions for local procurement to promote local supplier development. Local procurement from a mix of project-affected communities will be prioritised. The local procurement provisions will be designed to encourage capacity building and competition among suppliers in the project supply chain. The main objective will be to maximise where practicable local purchasing, by directly working with local enterprises and by incentivising the project's contractors to contract locally. Local procurement will assist with indirect employment opportunities, creating income to supplement current pastoral and fishing activities and building a more diverse and stable economy.
- **Improvements in Infrastructure and Services:** CMSC will upgrade and maintain the Site Access Road which is a public track that runs from Marsa Fatuma to Adaito and on to the Mine Site area. Revenue from the project will enable the Government State of Eritrea to complete other planned infrastructure improvements such as upgrade of the Massawa-Assab Road which will provide a benefit to communities in the LSA and RSA and may support other economic activities in the Northern and Southern Red Sea Zobas.

Management and mitigation measures proposed to be implemented by CMSC will assist in ensuring the socioeconomic benefits are shared across local, regional and national levels.

Environmental benefits from the project relate primarily to increased scientific knowledge of the project area. CMSC has conducted extensive baseline studies in a previously poorly studied area and provided results of these to the Government State of Eritrea. Ongoing monitoring programs will continue to assist understanding of the project area environment and contribute to future conservation management plans for conservation significant terrestrial and marine wildlife species.

6.2 KEY PROJECT RISKS

The SEIA process has identified and assessed a range of potential environmental and social impacts associated with development of the project. The project location in the remote Danakil Depression means that adverse environmental and social impacts will be low in number and largely be of low risk in nature. This is a direct result of the majority of land disturbance required for development of the project occurring within areas identified by baseline studies as being largely barren land and the majority of project activities occurring more than 20 km from the nearest residential areas.

Key environmental issues identified during the impact assessment process were:

- Particulate and noise emissions from project vehicles along the transport route, particularly the unsealed sections close to villages, affecting human health and amenity.
- Particulate and noise emissions from Site Access Road upgrade (construction stage) and maintenance activities (operation stage) affecting human health and amenity.
- Death or injury of humans, livestock or wildlife due to interactions with project vehicles on the transport route during construction and operations project stages.
- Disruption of wildlife and livestock migration patterns due to project activities, particularly vehicle movements on the Site Access Road (construction and operations).
- Unauthorised removal or disturbance of graves/heritage sites along the Pipeline Corridor and Site Access Road as a result of uncontrolled project vehicle movements (construction and operations).

Key social issues identified during the impact assessment process were:

- Unmet community expectations regarding employment as a result of lack of suitably qualified candidates (construction and operations).
- Impacts on traditional social structures as a result of CMSC employment practices (construction and operations).
- Adverse impacts on company reputation as a result of labour disputes between CMSC and contractors, particularly port and transport contractors where CMSC anticipates it will have lower levels of control on contract conditions (operations).
- Employee injury or death as a result of employees working in a new and unfamiliar environment (construction, operations).

The SEIA identified that there are no significant cumulative or transboundary impacts associated with implementation of the project. While a number of other companies are conducting exploration activities in the Danakil Depression, only one other project, the Yara Dallol Potash Project located south west of the Colluli Potash Project in Ethiopia has commenced detailed plans for implementation of a commercial project. Passive groundwater abstraction in the Colluli Potash Project open pit will result in localised drawdown of hypersaline groundwater in the clastics. The highly saline nature of the groundwater means that it has no beneficial use (human, livestock or ecosystem function) and as such drawdown will not result in adverse impacts on receptors.

6.3 RISK MANAGEMENT

During project design, CMSC considered results of baseline studies and used these to identify potential environmental and social impacts associated with development of the project. Significant effort has been made to design the project to prevent or avoid social and environmental impacts and thus lower the risk of these occurring. This has included selection of project alternatives with lower environmental and social risks and location of project components to avoid or minimise interactions with environmental or socially significant items.

Where prevention or avoidance during project design wasn't a practicable mitigation option, a range of other measures have been committed to in order to reduce the associated risk to a tolerable level. The mitigation measures are documented in the SEMP, specifically the aspect specific Management and Monitoring Plans (see Section 5).

CMSC will ensure the availability of all necessary resources, including personnel and financial resources needed to conduct all environmental and social management, monitoring and mitigation activities at the project throughout the construction, operation and closure phases.

6.4 RECOMMENDATION

CMSC believe that based on the findings of the SEIA that the project should be approved subject to the management measures and monitoring programs described in the Management and Monitoring Plans being implemented and results of these being provided to government authorities to ensure impacts are consistent with those predicted by the SEIA.