11.1 **INTRODUCTION**

This *Chapter* assesses the predicted socio-economic, health, cultural heritage and visual and landscape (social) impacts associated with the proposed Project. Potential social impacts (both positive and negative) of the Project are discussed in the following sub-sections and include the following:

- **Socio-Economic and Livelihood Impacts:**
  - Increased government revenue;
  - Creation of employment opportunities and skills enhancement;
  - Procurement of goods and services;
  - Increased price inflation and economic vulnerability; and
  - Community anger and resentment over unmet expectations.

- **Impacts Related to Project Induced In-Migration.**

- **Change to Socio-Cultural Heritage:**
  - Disturbance to cultural values, traditional leadership and intangible heritage.

- **Community Health, Safety and Security:**
  - Increased incidence of communicable diseases;
  - Increased transmission of malaria; and
  - Increased incidence of non-communicable diseases.

- **Impacts Related to Labour and Working Conditions:**
  - Exposure of workforce to health and safety incidents; and
  - Exposure of workforce to insufficient labour and accommodation standards.

- **Impact on Natural Resources:**
  - Potential decreased availability of palms; and
  - Potential decreased availability of water.

- **Impacts to Cultural Heritage Resources:**
  - Impacts to sub-surface cultural resources related to groundworks;
  - Impacts related to vibration; and
- Impacts to cultural sites as a result of increased presence of non-locals in the Project Area.

- **Visual and Landscape Impacts.**
  - Impacts to landscape character; and
  - Visual Impacts.

### 11.1.1 Defining Geographic Extent

In determining the impact magnitude and significance, the geographic extent of the impact is considered. The various geographic extents considered are:

- **The Project Area** – defined as Yara Dallol BV’s concession areas (North Musley and Crescent concessions and the nearby Musley block), but also includes the footprint of the areas outside of Yara Dallol BV’s concession areas that will be used for linear infrastructure (including pipelines and access roads), as well as alluvial fans located outside of the Yara Dallol BV concession areas, that will be used as a source of water. These areas are directly to the west of Yara Dallol BV’s concession area.

- **Socio-economic Study Area** (SSA) – refers to the villages closest to the Project Site, such as Bada, Musley, new Alai lai and Mororo.

- **Broader Study Area** – refers to villages/settlements located within Project transportation corridor (Hamad Ela, Berahale, Ambule, Serdo and others), and villages that collect and use natural resources close to the Project Site (such as Asabuya, Assagoso, and Elefani Kalili).

- **Regional** – refers to the Afar region and Tigray region, specifically Mekele, which is the closest major town to the Project Site and has well developed businesses and public services and infrastructure.

- **National** – refers to all other areas within the borders of Ethiopia excluding Afar and Tigray regions.

*Figure 11.1* below show the geographic location of the settlements mentioned above.
11.2 **SOCIO-ECONOMIC AND LIVELIHOOD IMPACTS**

This section presents the proposed Project’s impacts on the national, regional, and local economy and livelihoods.

11.2.1 *Increased Government Revenue*

Increased Government revenue refers to the royalties and taxes that Yara Dallol BV will pay once the proposed Project is operational.

*Description of the Baseline Environment*

The payment of royalties and taxes is a legislative requirement under the following laws:

- Mining Proclamation 678/2010 and 816/2013;
- Mining Income Tax Proclamation 53/1993;
- Mining Operations Council of Ministers Regulations 182/1994; and

Each mining license issued stipulates that every mining company must pay between two and eight percent in royalties (depending on the type of mineral mined), for potash this is understood to be four percent. In addition other taxes include 25 percent income tax, as well as five percent free equity shares (1). Furthermore, the Ethiopian Government has a right to acquire five percent interest in any mining venture, and value added taxes have to be paid at 15 percent. *Figure 11.2* shows the Ethiopian taxes and royalties’ payment for the mining sector.

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In the fiscal year July 2009 to July 2010, the Government of Ethiopia (GoE) received an estimated USD 27 million (1) through the payment of royalties and taxes linked to mining developments, this accounted for 0.32 percent of the total government revenue for that period. However, approximately 19 percent (2) of the GoE’s revenue is from grants therefore any increases of government revenue from domestic sources will help to establish a more financially sustainable system.

Proposed Project Activities

The proposed Project is anticipated to begin commercial production of sulphate of potash (SOP) towards the end of 2017. The proposed Yara Dallol Potash Project’s direct contribution to Government revenue will be through the payment of income, export taxes, withholding taxes (3), royalties, economic contribution (value added), and on taxes for payment to suppliers and salaries to expatriate staff.

(2) Ethiopia -Resources for poverty eradication: A background paper, 2013
(3) Withholding is a scheme of tax payment administered by the ERCA withheld by the buyer on procurement of goods and services in Ethiopia.
Yara Dallol BV has already started to contribute to the national economy through the payment of and other taxes and fees during the exploration phase which began in 2010. The payment of royalties and taxes will be paid throughout the life of proposed Project.

**Sensitive Receptors**

It is assumed that Government revenues from royalties and taxes are reallocated into various types of national and regional expenditure including recurrent expenditure, grants, repayment of loans and development spending, all of which have the potential for multiple positive impacts for the country.

**Significance of Impact (Pre-mitigation)**

The proposed Project’s contribution to increased Government revenue will be of **Positive** significance during construction and operation phases. The nature of the impact is discussed in Table 11.1.

**Table 11.1 Rating of Impacts Related to Increased Government Revenue (Pre-Mitigation)**

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Positive Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Even though the impact is likely to extend countrywide, the number of people who will benefit from it is likely to be low relative to government revenues. The extent to which this increased Government revenue will feed into development expenditure in the local area is unknown, as the specific detail of the mechanisms to be used by the Government for reallocating revenues and grants is not clear at this time.</td>
<td></td>
</tr>
</tbody>
</table>

**Enhancement and Management Measures**

The proposed Project recognises that it has limited ability to directly optimise or manage potential impacts on the national economy. Ethiopia’s ability to benefit from the economic opportunities that the proposed Project offers at a national level will depend on good governance and fiscal transparency. The proposed Project will seek to contribute to impact mitigation and optimisation by working with government and other stakeholders throughout the life of the proposed Project and aligning with the objectives of on-going programmes. The measures below will assist to enhance any potential benefits.

Collaborate with the GoE to make payments of taxes and royalties in a transparent, accurate, and timely manner, utilising sound financial principles and accounting practices. This will be aligned with the Extractive Industries Transparency Initiative (EITI) driven by the World Bank Group’s requirements. Ethiopia has applied to be a member of the EITI, and has since been accepted as an EITI Candidate country in 2014 and is expecting
validation in 2017 (1). Yara Dallol BV is already a member of the committee formed by Ministry of Mines to manage the EITI candidacy status. The EITI criteria are set out in Box 11.1.

**Box 11.1 Extractive Industries Transparency Initiative (EITI) Criteria**

1. Regular publication of all material oil, gas and mining payments by companies to governments (“payments”) and all material revenues received by governments from oil, gas and mining companies (“revenues”) to a wide audience in a publicly accessible, comprehensive and comprehensible manner.
2. Where such audits do not already exist, payments and revenues are the subject of a credible, independent audit, applying international auditing standards.
3. Payments and revenues are reconciled by a credible, independent administrator, applying international auditing standards and with publication of the administrator’s opinion regarding that reconciliation including discrepancies, should any be identified.
4. This approach is extended to all companies including state-owned enterprises.
5. Civil society is actively engaged as a participant in the design, monitoring and evaluation of this process and contributes towards public debate.
6. A public, financially sustainable work plan for all the above is developed by the host government, with assistance from the international financial institutions where required, including measurable targets, a timetable for implementation, and an assessment of potential capacity constraints.

- Yara Dallol BV will disclose results publically as part of Annual Sustainability Reporting (utilise existing Yara Dallol BV’s Global Reporting Initiative (GRI) / United Nations Global Compact Framework as vehicle for reporting data) (2).

- Communicate proactively with Ministry of Mines regarding closure plans and schedule, including implications for royalties and taxes payments.

**11.2.2 Creation of Employment Opportunities and Skills Enhancement**

**Description of the Baseline Environment**

Formal employment opportunities in the socio-economic Study Area (SSA) at present are low, with the majority of the population engaged in artisanal salt mining and subsistence pastoralism or other natural resource based livelihoods. Prior to the commencement of mining related exploration activities in the area, Government services were the only source of formal employment (incl. health care, education and administrative services). Furthermore, local capacity and skills in relation to mechanised industry in the SSA are low.

The presence of mining exploration activities in the broader SSA has slightly expanded the range of potential employees and employers; nevertheless, the lack of formal education and technical skills has meant that the local

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(1) https://eiti.org/node/1277/implementation

(2) The Global Reporting Initiative (GRI) is a leading organization in the sustainability field. GRI promotes the use of sustainability reporting as a way for organizations to become more sustainable and contribute to sustainable development.
population have typically only secured temporary unskilled positions. The current Government road construction activities have also afforded the local population (both men and women) some limited temporary unskilled employment opportunities.

Proposed Project Activities

Employment

Employment opportunities associated with the Project started in 2010 when Yara Dallol BV began its exploration activities. To date, Yara Dallol BV has employed up to 50 local people for unskilled temporary jobs during the exploration phase (although this number has varied), including another 100 from the wider areas in Ethiopia and up to 30 expatriates for highly skilled positions. The majority of exploration recruitment activities have been undertaken by Ardan Risk & Support Services Limited (Ardan), a Yara Dallol BV Contractor; while some recruitment has been facilitated by the Dallol Woreda officials.

It is anticipated that up to 1,000 direct employment opportunities (i.e. 1,000 people may be hired) will be created by the proposed Project at the peak of construction in June 2016. The majority of the construction jobs will be temporary in nature, especially the unskilled non-support services positions. The construction workforce is intended to be a mix of locals, people from the Afar region, and people from elsewhere in Ethiopia, and expatriates with specialised skills and experience. The percentage breakdown of the distribution of employment opportunities in terms of place of origin will be planned with a balanced approach although specifics are not currently known.

Operational activities are expected to commence in early part of 2018, requiring a workforce of approximately 980 people. The workforce will potentially include 517 staff; 255 support staff and 208 product truck drivers. A breakdown of operational employment positions is provided in Table 11.2 below. These numbers do not account for all expected personnel in the Project Area such as general drivers and others.

Table 11.2 Breakdown of Operational Staff (Estimates) for the Proposed Project

<table>
<thead>
<tr>
<th>Total No. of Employees</th>
<th>Positions</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dallol</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Management</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Degreed Employees</td>
<td>40</td>
<td>62</td>
</tr>
<tr>
<td>Tradesmen</td>
<td>58</td>
<td>132</td>
</tr>
<tr>
<td>Skilled Labour</td>
<td>93</td>
<td>252</td>
</tr>
<tr>
<td>Unskilled/Helpers (includes Support Staff)</td>
<td>81</td>
<td>241</td>
</tr>
<tr>
<td>Product Truck Drivers</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td><strong>Total Dallol</strong></td>
<td>344</td>
<td>760</td>
</tr>
<tr>
<td><strong>Addis Corporate Office</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Management</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Position</td>
<td>Total No. of Employees</td>
<td>Positions</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Degreed Employees</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Tradesmen</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Skilled Labour</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unskilled/Helpers (includes Support Staff)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Product Truck Drivers</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total Serdo</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Senior Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degreed Employees</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tradesmen</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Skilled Labour</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Unskilled/Helpers</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Product Truck Drivers</td>
<td>104</td>
<td>104</td>
</tr>
<tr>
<td>Total Serdo</td>
<td>117</td>
<td>125</td>
</tr>
<tr>
<td>Storage at Port of Tadjoura</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Management</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Degreed Employees</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tradesmen</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Skilled Labour</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Unskilled/Helpers</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Product Truck Drivers</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total Port of Tadjoura</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Camp at Tadjoura</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Management</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Degreed Employees</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Tradesmen</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Skilled Labour</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Unskilled/Helpers</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Product Truck Drivers</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Total Camp at Tadjoura</td>
<td>67</td>
<td>76</td>
</tr>
<tr>
<td>Total Yara Dallol BV Project</td>
<td>539</td>
<td>980</td>
</tr>
</tbody>
</table>

The proposed Project is, further, anticipated to create indirect and induced employment opportunities. Indirect employment opportunities include jobs created in the Project supply chain and their suppliers or subcontractors/service providers; these are expected to occur at a regional level, elsewhere in Ethiopia and abroad. Induced employment refers to the jobs created through spending in the local economy by direct and indirect employees on the Project. Induced employment is expected to be limited in the local area due to the limited availability of goods and services.

**Skills Enhancement**

The proposed Project’s provision of employment opportunities will also result in improvement of skills and experience in the SSA; especially amongst those
who are able to secure employment with the proposed Project; thereby improving the potential for staff to achieve future employment.

This positive impact will be enhanced by training received through on-the-job and more formal training courses related to skill development for production and Health and Safety and Environment (HSE) standards required for the proposed Project. This positive impact will include suppliers and Contractor staff, who will have to meet particular production, operational, and quality standards as required by Yara Dallol BV.

For those national and local companies that have the opportunity to be part of the proposed Project’s supply chain, long lasting and sustained benefits to the businesses and their employees can be expected, in the form of enhanced work experience, delivery capacity and training, particularly in having to meet stringent international standards of quality, health, safety and environmental management.

Decommissioning and closure will involve large scale downscaling and retrenchment of the workforce over a number of years. By that time a large number of local professionals will have worked on the proposed Project, and will constitute a reserve of trained workforce. Closure will have a considerable impact on the youth, as they will be in the prime of their working lives at the time of decommissioning, with significant earning potential, and large demands on their income (i.e., young families). However, those that have worked on the proposed Project are likely to have a significant advantage when securing other jobs in the mining or other sectors due to the experience and training received.

**Sensitive Receptors**

An influx of migrant job-seekers into the SSA will significantly increase local competition for employment opportunities. It is possible that some of these migrants will have gained skills in mining and construction in previous large scale projects in Ethiopia and elsewhere, and will have an advantage in seeking work with the proposed Project. As such, there is a potential for the local population to miss out on some of the benefits offered by the proposed Project.

Given the generally high levels of unemployment and the low levels of education (in particular amongst women), the local population will require training, capacity building and support in order for them to qualify for any positions with the proposed Project and to advance into semi-skilled and skilled positions.

**Significance of Impact (Pre-mitigation)**

The creation of employment and provision of skills enhancement will be a **Positive Impact** during the construction and operational phases as illustrated in Table 11.3. The decommissioning and closure of the proposed Project will
result in a need for employees to find alternative livelihoods in the area or move to a different area in search of economic opportunities. However, training received as part of construction and operational activities will allow retrenched staff to take opportunities in other mining developments in the SSA or elsewhere in the country.

Table 11.3  **Impacts Related to Creation of Employment Opportunities and Skills Enhancement (Pre-mitigation)**

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Direct, In-direct, and Induced Positive Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>The creation of employment opportunities will improve the livelihoods of those who are able to secure employment from the proposed Project or its supply chain. The likelihood that the local population will be able to take up the employment opportunities provided is relatively high; however, due to an absence of skills and experience in the area it is unlikely that local workforce will be able to capitalise on many of the semi-skilled or skilled positions. The training received as part of the proposed Project will improve chances to seek employment opportunities in other developments.</td>
<td></td>
</tr>
</tbody>
</table>

**Enhancement and Management Measures**

The proposed Project will attempt to maximise economic and employment benefits to people from the SSA and Ethiopia. It is anticipated that this can be achieved prior to the commencement of both construction and operation through the provision of training and capacity building. During operations the proposed Project will implement strategies to develop its workforce such that local and Ethiopian employees are trained and skilled to take on increasingly skilled and managerial positions, and that the employment of foreign nationals is a temporary measure to be phased out over a period of time, to the extent possible.

**Employment**

Yara Dallol BV will develop and implement a Recruitment Policy for application during construction and operations phases. The core components of the policy should include:

- Setting targets for maximising immediate local (Dallol / Berahale Woreda), regional (Afar) and national (Ethiopian) employment. The local employment targets should be written into all Sub-Contractor agreements.

- Yara Dallol BV should publicly disclose employment requirements and associated skills requirements in the SSA. These should be presented in the local languages. All employment requirements will be advertised in a timely manner.

- Yara Dallol BV should develop and maintain a human resources database of local (Dallol / Berahale Woreda-based) staff with historical experience working with other local mining and exploration operations. A section of the database should comprise of a contact list of local labour from the SSA.
which Yara Dallol BV and its Contractors can refer to whenever labour is required.

- Yara Dallol BV should provide all its Contractors with the requirements related to hiring for inclusion in tendering documents related to human resources database, aspirational hiring targets, auditing arrangements, and (where relevant) training requirements.

- There should be no requirement for applicants to make payments for applying for, or securing, employment on the proposed Project.

Yara Dallol BV should ensure that the economically active population of the villages in the SSA receive equal access to opportunities in terms of local recruitment, training, small business development, procurement and community outreach programmes.

Yara Dallol BV should develop an engagement and hiring offices in Bada/Berahale / Adaqua and / or Semera to disseminate information about potential job opportunities and procurement contracts. These can be used to engage stakeholders, collect CVs and update the human resources and supplier database.

Skills Development and Training

- Yara Dallol BV should develop and implement a Training Policy and relevant programs. The policy should be developed in partnership with relevant Ethiopian (such as Mekele or Semera) Universities or international organisations. The policy should:

  - Undertake a comprehensive training needs assessment to understand skills levels in the SSA;

  - Identify the particular training needs of the youth and women;

  - Identify the skills gap and initiate mechanisms to train local people to meet the company’s needs;

  - The Yara Dallol BV Community Liaison Officer (CLO) will consult and collaborate with women’s groups and networks to ensure that the Training Plan takes into account the needs of women and that they are able to fully benefit from training opportunities.

  - Yara Dallol BV should encourage its Contractors to provide proactive training programs to local and regional candidates to provide a potential pool of semi-skilled workforce prior to start of construction period.
• Provide on-the-job and formal training (in partnership with relevant organisations) to local and regional contractors or Yara Dallol BV staff to allow transition of staff into operational phases.

• Develop internal Yara Dallol BV training ‘certification' or reference letter provisions to assist retrenched employees achieve employment elsewhere.

• For operational jobs, training plans will be developed according to each permanent employee’ work agreement and relevant to their job description.

Closure

• Yara Dallol BV should establish retrenchment plan and processes for implementation related to completion of construction and operations phases. Include substantial timely stakeholder engagement efforts to discuss with local stakeholders prior to retrenchment.

• Over the life of mine, Yara Dallol BV should encourage and invest in alternative livelihoods development (in collaboration with relevant partners). This action is expected to reduce the reliance of the local population on employment and economic opportunities linked to the proposed Project.

11.2.3 Procurement of Goods and Services

Description of the Baseline Environment

At the SSA level, at the time of writing (2014) there are no businesses that are able to provide the scale of goods and services required as well as meet the stringent health and safety standards needed by the proposed Project. The majority of the proposed Project procurement needs for exploration are currently being met (to some degree) from the Tigray region e.g. Mekele.

Proposed Project Activities

The planning, design, construction and operation of the proposed Project will require the purchase of equipment and other goods and services. The majority of these will be for highly specialised and technical goods and will be provided by specialist providers. Locally owned businesses in the Project Area have limited capacity to meet the standards required by the Project. Mining equipment will be imported to the country from abroad with some being assembled on site or in Mekele and then transported to site.

Gravel, sand, and rocks will be procured in the SSA; while consumables (e.g., consumables) will continue to be purchased in Mekele and elsewhere in the country. Cement, blocks, and structural steel can also be procured in Mekele.
The number of local businesses likely to secure contracts (albeit small and temporary) is going to be low.

It is anticipated that with time, the potential exists for local /and regional businesses to develop and grow to meet at least some of the procurement needs of the proposed Project, especially during operations. Procurement locally will assist in creating income and building a more stable and diverse economy. As the proposed Project develops, the increased demand for goods and services should create commercial opportunities for local businesses (those opportunities are likely to be focused on the production and transformation of food products). In addition, the influx of migrant job-seekers will bring people with different experiences, knowledge and demands that will supplement the existing economic and livelihood activities and offer additional activities that will serve to diversify the local economy.

Sensitive Receptors

Locally owned businesses in the Project Area do not have the capacity to provide goods and services to the Project; while at a regional (Mekele etc.) and national level there are some businesses that will be able to meet the Project needs, but at a limited scale. For those companies that do get the opportunity to be part of the supply chain, there will be long lasting and sustained benefits to the businesses and their employees through increased experience, capacity and training, in having to meet more stringent requirements.

During operation, the needs of the population will continue to grow. The economy may adapt to meet the demands for goods and services, therefore resulting in economic development and diversification.

The decommissioning and closure of the mine will clearly result in the termination of the procurement contracts associated with operations. This may have significant implications for businesses that have become dependent on the Project. Some companies will have an opportunity to become involved in the decommissioning and closure process and to benefit from this; however, this will be minimal in comparison to operational requirements.

The presence of other solution mining developments being proposed in the Project Area may help to enhance this impact for suppliers.

Significance of Impact (Pre-mitigation)

The procurement of goods and services will be a **Positive Impact** as illustrated in Table 11.4 pre-mitigation.
Table 11.4 Rating of Impacts Related to Procurement of Goods and Services (Pre-Mitigation)

<table>
<thead>
<tr>
<th>Type of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct, In-direct, and Induced Positive Impact</td>
</tr>
</tbody>
</table>

This impact will be positive; however, the current lack of capacity and the challenging business environment means that local businesses will have difficulty securing opportunities with the Project and their contractors.

Enhancement and Management Measures

In order to enhance this impact, the following mitigation measures should be implemented:

- Yara Dallol BV should develop and implement a Procurement Plan prior to the start of the construction phase. The Plan should be designed to stimulate and sustain local business during the various phases of the proposed Project and to stimulate capacity and competition amongst suppliers in the Project supply chain. The main objective of the plan will be to maximise local purchasing, by directly working with local enterprises and by incentivising the Project’s contractors to contract locally. To the extent possible, Yara Dallol BV should unbundle certain contracts to allow a number of small businesses to provide goods and services rather than the supply being monopolised by one large (foreign) contractor.

- Yara Dallol BV should maintain a contact database of all relevant local businesses that could be used as potential suppliers.

- Yara Dallol BV should identify local procurement opportunities:

  - Undertake an audit and due diligence of local / regional businesses and their potential capacity to provide goods and services locally. These opportunities will relate to materials necessary for proposed Project construction, the supply and construction of labour camps, as well as other materials necessary for the proposed Project (e.g., concrete and light steel products, quarry material and food items).

  - The audit and due diligence of local / regional businesses should also identify business development needs and where applicable, relevant training and capacity building initiatives should be established.

  - This audit should identify the specific development needs of the youth and women, and focus on delivering pertinent training and skills development to allow the youth and women to participate in the provision of goods and services to the proposed Project.

- Yara Dallol BV should improve communication of the procurement programme, in the following manner:
Procurement needs and associated programmes should be communicated to the population of the broader SSA and region in a transparent and culturally appropriate manner.

Disseminate information regarding procurement opportunities as early as possible.

When advertising procurement opportunities, the proposed Project should clearly define the requirements for the goods or service.

Local procurement should be promoted through events such as local/regional/national supplier trade shows. There should be coordination with the Ministry of Mines on local procurement priorities and opportunities. A small medium enterprise (SME) electronic portal should be created to facilitate the communication of contract opportunities and management training materials to SMEs from the mining sector.

Provide quality standards required by the Project for provision of goods and services to potential suppliers as requested.

All contractors throughout the life of the Project should be required to include broader Project Area businesses in their procurement plans and to stipulate Project requirements for local involvement in tender documents.

The proposed Project contract and legal documents should be adapted to suit the level of local businesses. This should be undertaken whilst still maintaining the integrity of Yara Dallol BV’s operating principles.

The procurement of goods and services should not discriminate on any grounds e.g., gender, age, ethnicity, religion, or any such demographic or cultural traits. Women, youth and other vulnerable groups should be eligible for the contracts.

Procurement targets should be defined in consultation with potential suppliers and key authorities and included in contractors’ contracts.

The Project should procure available goods and services from the local market wherever possible during the construction phase.

Yara Dallol BV should promote capacity building of local staff and suppliers, in the following manner:

Through a tendering process, Yara Dallol BV should invite recognised Ethiopian and international organisations, institutions or Non-governmental Organisations (NGOs) to prepare and implement a programme for training, promoting and supporting entrepreneurship.
and small business development. This should be developed during the pre-construction and construction phases.

- Yara Dallol BV should, in collaboration with the Ministry of Trade and other relevant organisations, promote training of local and regional suppliers to deliver goods and services. This should be developed during the pre-construction and construction phases.

- Yara Dallol BV should monitor the performance and effectiveness of the policy (and associated programmes) as well as ensure that it is aligned across the proposed Project team and contractors and performance reports will be produced quarterly.

- Yara Dallol BV should provide Contractor requirements related to procurement for inclusion in tendering documents related to supplier data base, aspirational local/regional procurement, and auditing arrangements.

- The numbers of local businesses used at all levels should be tracked on an on-going basis and annual forecasts should be developed outlining the targets for local procurement to ensure that over time a greater percentage of local businesses are used. Targets should be developed and communicated to the local communities.

11.2.4 *Increased Price Inflation and Economic Vulnerability*

*Description of the Baseline Environment*

Increased expenditure in the SSA (by migrants) and purchasing by Yara Dallol BV employees and contractors will have the potential to cause localised inflation. Such inflationary trends can exacerbate adverse economic impacts, by reducing the availability and affordability of basic goods and services, in particular for the poorest and most economically vulnerable. In addition, in-migration and increased local demand may cause a rise in land and house prices. This increased demand is also likely to affect the traditional exchange mechanisms, as discussed in Section 11.4.1.

*Proposed Project Activities*

The presence of the Project, along with the other proposed solution mining operations in the area, may attract business and job seekers. This in-migration and resultant increase in population could result in additional demand for goods and services causing an increase in the cost of basic goods. This will be most pronounced in larger settlements where the migrant population is likely to settle in order to be closer to the Project activities whilst retaining access to better public services and infrastructure than in the Project Area; for example settlements such as Bada, Musley, Asabuya, Hamad Ela, Ambule, Berahale, Serdo and others. In addition, the presence of mining company employees is also likely to increase the demand for goods and services and establish a cash
economy in the area which may also result in an increase in the cost of basic goods.

**Sensitive Receptors**

This impact may be particularly significant for all people who are economically vulnerable and have limited ability to take up opportunities to increase their income and therefore are unable to adapt to increasing prices. With the current subsistence and artisanal mining based livelihoods and a lack of education as well as employment opportunities in the broader SSA, the majority of the population will be vulnerable to this impact.

Following the initial construction boom, the demand for goods and services is likely to level out or even decrease due to a reduction of unskilled employment opportunities (the local population will form the majority of the unskilled or semi-skilled labour during construction) and some of the in-migrants returning to their places of origin; also refer to Section 11.2.2: Creation of Employment Opportunities and Skills Enhancement.

Over time, throughout the operation stage, any increased demand is likely to be met through local market adaptation leading to an increased supply of goods and services.

The decommissioning and closure of the mine will impact economic development in the area and may reduce prices in the area due to a decrease in the local demand for goods and services.

**Significance of Impact (Pre-mitigation)**

Based on the analysis provided above, this impact has been assessed as a **Major Negative Impact** pre-mitigation (refer to Table 11.5).

| Table 11.5 Rating of Impacts Related to Price Inflation and Economic Vulnerability (Pre-Mitigation) |
|---|---|---|
| **Type of Impact** | **Indirect and Induced Negative Impact** |
| **Rating of Impacts** | **Summary of Reasoning** |
| **Characteristic** | **Designation** | **Local** |
| Extent | This impact may be experienced by stakeholders living in communities that experience substantial amounts of in-migration. This may include Bada, Hamad Ela, and Berahale and to a lesser extent communities along the road network from Berahale such as Ambule. |
| Duration | Long-term | Without mitigation and management the impact may continue for the duration of the proposed Project. |
| Scale | Large | The impact may cause a fundamental change in the local economic system. |
| Frequency | Intermittent | This impact may occur where in-migration is significant and demand increases for goods and services. |
| **Magnitude** | **Medium Magnitude** |
Mitigation/Management Measures

Inflation at a local level is difficult to forecast or mitigate; however, the following measures (to a certain degree) will help to mitigate and manage this impact:

- Yara Dallol BV should collaborate with Government to develop a price index for critical goods purchased by the most vulnerable sections of the community.

- Yara Dallol BV should collaborate with the local government to monitor inflation statistics through market studies and identify changes that may be linked to Project activities. Demographic surveys and rapid appraisal methods of assessment should also be undertaken in order to reflect on the perceived challenges and changes to quality of life.

- Yara Dallol BV should collaborate with the local government and relevant stakeholders (government / NGOs) to develop local cooperatives to ensure fair pricing in the local area.

- Proactively engage relevant stakeholders (government / NGOs) in advance of humanitarian emergency situations regarding provision of Yara Dallol BV support should an emergency occur. In the event of emergency lobby stakeholders to provide timely support.

- Yara Dallol BV should implement and disseminate information regarding the grievance and feedback mechanism throughout the area of influence and at engagement and hiring offices.

- Yara Dallol BV should develop a stakeholder engagement strategy and implementation plan to define objectives for engagement during construction, operation and closure phases.

- Yara Dallol BV should strive to provide opportunities for employment, procurement and skills development for the economically vulnerable, wherever possible, as indicated in Section 11.2.2: Creation of employment Opportunities and Skills Enhancement.

- As part of the Procurement Plan (in Section 11.2.3: Procurement of Goods and Services); Yara Dallol BV should establish purchasing agreements for
goods and services (incl. consumables) required by the proposed Project, with relevant businesses to determine pricing.

- Through the Workforce Code of Conduct (in Section 11.4: Change to Socio-Cultural Heritage); Yara Dallol BV should restrict migrant workforce access to the local communities (through closed camp, control over shift rotations, etc.). This action is likely to limit their spending in the local economy and thus reduce the potential for price inflation.

- Yara Dallol BV should apply mitigation measures outline in Section 11.3: Project Induce In-migration.

**Residual Impact (Post-mitigation)**

Based on the implementation of the proposed mitigation measures, the significance of the impact to price inflation and economic vulnerability will be a **Moderate Negative Impact** post-mitigation (refer to Table 11.6).

**Table 11.6 Rating of Residual Impacts Related to Price Inflation and Economic Vulnerability (Post-Mitigation)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>This impact may be experienced by stakeholders living in communities that experience substantial amounts of in-migration. This may include Bada and Hamad Ela and to a lesser extent communities along the road network from Berahale such as Ambule.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long-term</td>
<td>The impact may continue for the duration of the Project.</td>
</tr>
<tr>
<td>Scale</td>
<td>Medium</td>
<td>Successful implementation of the measures above, especially those designed to discourage in-migration to the area, may result in reduced number of people affected by the impact.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
<td>This impact may occur where in-migration is significant and demand increases for goods and services.</td>
</tr>
<tr>
<td><strong>Magnitude</strong></td>
<td></td>
<td><strong>Medium Magnitude</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Significant Rating After Mitigation</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Moderate Negative Impact</strong></td>
</tr>
</tbody>
</table>

**11.2.5 Community Anger and Resentment over Unmet Expectations**

**Description of the Baseline Environment**

There are high expectations amongst the local community in terms of employment available with the proposed Project. However, (as stated in Chapter 7), it is unlikely that the skills and experience for many jobs during the construction and operation of the mine are available in the local Project Area. Many Project Area residents have low levels of education and there has been a general absence of formal or on-the-job training opportunities to acquire the requisite skills (beyond those offered by the Project in recent years). Illiteracy
levels exceed 90 percent in some local Project Area villages and as little as five percent (1) of the population is engaged in formal employment activities.

**Proposed Project Activities**

An influx of opportunistic in-migrant job seekers into the area, including foreigners and Ethiopian nationals from other parts of the country will significantly increase local competition for employment opportunities. It is possible that some of these migrants will have gained relevant skills in mining and construction in other Projects in Ethiopia and elsewhere, which will be an advantage in seeking work positions with the proposed Project.

**Sensitive Receptors**

The results of stakeholder engagement and community feedback indicated that the youth have particularly high expectations of waged employment. In addition to the enthusiasm and the sense of entitlement, young men applying for jobs will be aware that they are fit and strong and thus more suited to manual labour and construction jobs. This perception will be compounded by a sense of entitlement to jobs created in the region, which has the potential to result in tension (and potentially violence) against any in-migrants competing for the same employment opportunities.

There has historically been some resentment towards Yara Dallol BV and its contractor Ardan by some of the local people employed by the Project when contracts ended. This resentment has largely been related to perceptions that temporary work positions were permanent jobs. If unmet expectations are not actively managed, they could result in negative relations with stakeholders, pose business and reputational risks to Yara Dallol BV and the company can lose its ‘social licence’ to operate. As a worst case scenario, the local population in the surrounding areas may attempt to disrupt Yara Dallol BV activities and become aggressive.

**Significance of Impact (Pre-mitigation)**

Based on the analysis provided above, this impact has been assessed as a **Major Negative Impact** pre-mitigation (refer to Table 11.7).

**Table 11.7**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local to regional</td>
<td>This will affect those directly affected by the Project activities including settlements along the project transportation corridor.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long-term</td>
<td>Anger and resentment associated with unmet expectations will fluctuate over the course of life of mine; with varying intensity.</td>
</tr>
</tbody>
</table>

(1) Personal Comms, April/May 2014 with the Woreda Officials
Scale | Medium | The impact will affect only a local population including the population residing along the Project transportation corridor and will not greatly affect their everyday existence in a tangible matter.
---|---|---
Frequency | Intermittent | The impact may occur at the start of construction and occur intermittently during hiring and retrenchment cycles.

### Magnitude

| Sensitivity/Vulnerability/Importance of the Resource/Receptor | High Sensitivity |

The sensitivity of the population will be high as the population begin to realise that Project workforce will be limited to only 1,000. This will be further exacerbated by the locals competing with in-migrants for the same opportunities.

### Significant Rating Before Mitigation

| Major Negative Impact |

**Mitigation/Management Measures**

The following mitigation and management measures will help to avoid or reduce this impact:

- Establish and implement transparent and fair recruitment procedure and processes; as mentioned in *Section 11.2.2: Creation of Employment and Skills Enhancement*.

- Yara Dallol BV should regularly communicate information and updates about all Project activities as well as any Community Development initiatives and associated benefits. All communication should be undertaken in local language and undertaken as part of a defined Stakeholder Engagement Strategy that builds on the ESIA Stakeholder Engagement Programme. Engagement should be undertaken in a manner that seeks to manage potential expectations.

- Through the Community Liaison Officers (CLOs), Yara Dallol BV should increase awareness of the grievance procedures amongst the communities (and continuously monitor the use of the procedures). As part of the awareness-raising, the purpose of the grievance procedures will be clearly communicated.

**Residual Impact (Post-mitigation)**

Based on the implementation of the proposed mitigation measures, the significance of the impact to community anger and resentment over unmet expectations will be a **Minor Negative Impact** post mitigation (refer to *Table 11.8*).
Table 11.8  
*Rating of Residual Impacts Related to Community Anger and Resentment over Unmet Expectations (Post-Mitigation)*

<table>
<thead>
<tr>
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<td>Duration</td>
<td>Long-term</td>
<td>Anger and resentment associated with unmet expectations will fluctuate over the course of life of mine; with varying intensity.</td>
</tr>
<tr>
<td>Scale</td>
<td>Medium</td>
<td>The impact will affect only a local population including the population residing on the Project transportation corridor.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
<td>The impact may occur at the start of construction and occur intermittently during hiring and retrenchment cycles.</td>
</tr>
</tbody>
</table>

**Magnitude**

<table>
<thead>
<tr>
<th>Medium Magnitude</th>
</tr>
</thead>
</table>

**Significant Rating After Mitigation**

<table>
<thead>
<tr>
<th>Minor Negative Impact</th>
</tr>
</thead>
</table>

11.3  
**IMPACTS RELATED TO PROJECT INDUCED IN-MIGRATION**

Project Induced In-Migration (PIIM) has the potential to create a range of positive and negative risks and impacts. Likely in-migrant groups are listed in *Box 11.2* below.

**Box 11.2  In-Migrant Groups**

- Job seekers and their families;
- Entrepreneurs/traders;
- Opportunists looking to qualify for Project-related benefits, such as:
  - Training opportunities, and
  - Resettlement entitlements;
- Informal money lenders;
- Commercial sex workers; and
- Camp followers (1).

Project motivated in-migrants may not only be outsiders; they may also be re-settlers (people return to an area after having moved away) and their relatives moving within the Project in order to position themselves to secure potential Project benefits such as:

- Resettlement and livelihood compensation entitlements;
- Project investments, such as improved healthcare facilities or community infrastructure;
- Project-initiated training and employment opportunities; and
- Living with or nearby legitimate directly impacted community members to leverage Project benefits and entitlements.

**Description of the Baseline Environment**

In-migration of locals in the broader SSA is influenced by multiple, interdependent components and influences including drought, food shortages

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(1) term used to identify civilians who follow construction camps (for any large development), army camps, and mining operation camps.
and environmental degradation, transhumant-pastoralist lifestyle, and the artisanal salt mining industry. The non-Afars who have moved into the area often undertake a variety of activities, including small-scale trade, local government and construction jobs, which the local Afar people cannot capitalise on due to a lack of education and skills, and experience to non-subsistence livelihoods.

**Project Activities**

It is anticipated that approximately 20 percent of the Yara Dallol BV workforce will be residing outside the proposed Project camp. This will include local residents and some in-migrant workforce. An assumption has been made that the in-migrant workforce that will not be residing in the camp will settle in the larger more established settlement, such as Berahale. It is further assumed that some of these workers may relocate their families to these areas. The workforce residing outside of the proposed Project camp will be provided transportation to and from the Project Area by Yara Dallol BV. To ensure compliance with the labour laws of the country (a full work day is an eight hours shift) and for health and safety reasons, Yara Dallol BV is considering building a halfway house in Serdo where driver changeover can occur. However, the halfway house is likely to create influx into Serdo and the surrounds of in-migrants seeking various business opportunities including commercial sex workers.

The large settlements of Berahale, Ambule, Hamad Ela and Serdo are likely to host the majority of the migrant population (e.g., job-and-business seekers and camp followers) as they are well established, have better access to public services and infrastructure and easily accessible (by car and public transportation).

Experience from other large scale developments demonstrates that PIIM frequently causes a complicated mix of positive and negative environmental, social, and health impacts. The positive impacts of PIIM are often overshadowed by the negative impacts; but these may play a significant role in bringing about the changes in the affected communities.

**Sensitive Receptors**

If PIIM is unmanaged and approached without the direct involvement and active engagement of regional and local Government, the in-migrants may contribute to a decline in the well-being and welfare of the resident population and place additional pressure on public infrastructure, services and utilities of the host communities.

Some of the positive and negative impacts associated with PIIM are presented below.
Positive PIIM Impacts

Positive impacts of PIIM can be difficult to achieve and are highly dependent on the proactive commitment of the local Government. When planned in agreement with project partners including the proposed Project proponent, national, regional and local Government, PIIM host communities, and with the support of the NGO and donor community, the positive impacts of PIIM on a Project’s host communities may include:

- Improved access to and opportunities for local employment;
- Diversity of lifestyles and social experiences;
- Changing attitudes towards vulnerable groups; and
- Alternate livelihood opportunities.

Positive local and regional business development impacts for host communities associated with PIIM can include:

- Development of supply chain links to mainstream economies;
- Increased local skills base and local labour pool (when business development opportunities prioritise directly impacted communities);
- New markets for local products and services;
- Increased diversity and availability of goods and services;
- Improved local training and skills development opportunities;
- Monetisation of remote rural economies, improving purchasing power and increasing trade; and
- Potential improvement in opportunities for informal sector businesses.

Negative PIIM Impacts

In-migration may have a wide range of negative impacts on host communities; including:

- Impacts on the environment;
- Public infrastructure, services and utilities;
- The local and regional economy;
- Livelihood strategies;
- Public health, the social; and
- Cultural environment.

Some of the potential negative impacts associated with PIIM are described below.

- Increased demand for portable water due to increased population sizes.
- Potential breakdown of traditional institutions, traditional leadership structures and cultural norms leading to a loss of community identity and resilience.

- Decreased food security through diminished communal and natural livelihood assets.

- Increased competition for natural resources, land occupation and use, and actual and perceived Project benefits and entitlements.

- Increased vulnerabilities associated with poverty, loss of livelihood assets and associated community status, and domestic violence.

- Increased pressure on existing infrastructure, such as inadequate schools, health centres and waste disposal facilities, and limited water supply network.

- Increased opportunities for the transmission of communicable diseases from in-migrant populations to local communities, with potential for epidemics.

- Increased disposable income may result in increased incidences of prostitution and casual sexual relations. These sexual relations could lead to an increase in STIs and an increased incidence of HIV/AIDS.

- Increases in anti-social behaviours due to the presence of in-migrants and a lack of knowledge of the local culture, beliefs, habits and rules of behaviour by outsiders may cause conflict.

- The presence of migrants can lead to a large increase in the quantities of solid waste, with impacts on environmental health conditions.

The Project’s security objectives include protection of its workforce, safeguard the project’s physical assets, sustain business continuity, and preservation of the Project and company’s reputation. PIIM and its associated impacts can affect the ability of the Project/development to achieve these security objectives, and as a result should be considered as a direct and indirect threat to Project security.

**Direct threats** to Project security are often driven by efforts to secure Project assets and competition for Project benefits, and efforts to influence or control a Project’s decisions regarding the distribution and awarding of those benefits.

**Indirect threats** to Project security may include competition for control over economic activities outside the Project, including monopolization of legitimate business activities such as transportation and food distribution, as well as criminal and semi-criminal activities such as money lending, extortion, gambling, prostitution, drug and alcohol dealing, and gangs.
Mitigation/Management Measures

A number of points need to be borne in mind, regarding the assessment and management of PIIM:

- The location of the proposed Project is in an area that is the focus of numerous development activities being pursued simultaneously, and which are outside of the scope of the proposed Project. These activities could act as additional drivers of in-migration and may affect the potential scale of in-migration associated with the proposed Project in ways that cannot be controlled directly.

- Human migration is a complex phenomenon shaped by numerous variables that may change independently of Project activities. These may have a profound effect on the actual demographic patterns that emerge. For practical purposes, predictions and projections are made on the basis of existing available data and the assumption of stability of ‘external variables’. Predictions and recommendations may therefore have to be revisited and revised over time, as more updated information on changes to existing social, political, cultural and economic circumstances becomes available.

- In many instances, in-migration is both a positive and necessary condition for Projects to be able to make meaningful contributions to local development. Short sighted attempts to control or limit PIIM may therefore unintentionally mitigate against efforts to promote local development, by inhibiting the establishment of a critical mass of local producers and consumers that are so integral to development.

- Attempts to control or limit in-migration and other forms of human mobility engage fundamental questions related to international human rights as well as domestic rights related to freedom of movement and the pursuit of livelihoods. It is in the interest of the Project to ensure that any efforts to control migration or human mobility remain in accordance with established legal and social norms.

PIIM risks that any project can actively manage relate to the project’s execution strategy, behaviour of Contractors, management of environmental and social impacts, careful planning and delivery of local employment, training and procurement opportunities, and selective community investment initiatives. Management of PIIM requires close collaboration with a range of actors including local and regional government.

Given the potential for significant impacts related to PIIM, specific management and mitigation measures need to be built into the proposed Project management system. PIIM is a cross-cutting issue related to most social and environmental impacts associated with the proposed Project’s planning and construction phase strategies.
Yara Dallol BV should develop and implement a PIIM Management Plan. The Plan should cover the following key elements:

- Communication;
- Minimising potential for in-migration;
- Managing and directing influx;
- Enhancing physical infrastructure;
- Building human capacity to manage influx;
- Monitoring and evaluation of in-migration; and
- Consideration of Project closure.

To implement the Plan, Yara Dallol BV should partner with the national, regional and local Government, other mine operations in the broader SSA, and various national and international NGOs.

Under the Plan’s communication activities, Yara Dallol BV should:

- Engage with Government authorities on issues, risks, threats, and opportunities regarding in-migration;
- Engage with local communities to understand their concerns, raise awareness of risks and opportunities, and identify solutions to issues relating to in-migration;
- Develop and implement a targeted communications plan in areas known to be potential sources of in-migration and, using migrant networks, inform potential in-migrants of the scale and nature of opportunities, manage their expectations, and where appropriate discourage them from moving to the Project area; and
- Communicate the Project’s policy of recruiting through Local Employment Offices and the locations of those offices through activities targeted at potential in-migrants.

A range of other specific mitigation measures identified should be integrated into the PIIM Plan and developed into actionable programmes. These should include:

- Working with Project affected communities and local authorities to support them in securing safe and sustainable water supplies.
- Working with and assisting local authorities in planning for the provision of waste management facilities to meet the needs of the expanded population.
- Working in conjunction with relevant partners (e.g. health authorities, NGOs, development agencies), the Project should develop information,
education and communication campaigns around diseases and health practices related to sanitation and hygiene.

- Working with Project affected communities and local authorities support village zoning to assist in protecting land-based resources of importance to biodiversity and cultural heritage;

- Monitoring changes in land cover and land use to identify loss of areas of importance for biodiversity and cultural heritage.

- Working with the local authorities to discourage informal settlements along Project roads to minimise loss of habitat of value for biodiversity.

- Working in partnership with local government (Woreda and Kebeles) to design and implement an information and awareness programme regarding sustainable harvesting grazing of natural resources.

- Provide education for local agencies and communities related to threats to biodiversity from human activities and develop case studies of coexistence between human activities and natural habitat.

- Working with local leaders and community groups to support local cultural events and conserve and reinforce local traditions and culture.

- Supporting community-based and inter-village youth programmes for sport, arts, and culture.

The PIIM Plan should provide guidance in terms of how the proposed Project will support local government’s capacity to manage in-migration. This should include:

- Implement an integrated capacity building programme to help provide opportunities for local authorities and village communities to plan, prioritise, build and maintain necessary infrastructure.

- Provide technical support to relevant government authorities with the aim of assisting them in effectively administering land development and land use changes as appropriate.

- Provide support for the establishment and operation of In-Migration Committees in settlements identified to be at high risk from in-migration. These committees should take part in promoting spatial planning, monitoring in-migration, identifying arising issues, and promoting good relations between local people and in-migrants.

- Work with local authorities and village leaders to actively manage in-migration and its impacts, particularly through registering newcomers and directing them to appropriate accommodation options.
To further minimise the potential for in-migration around Project activities, Yara Dallol BV should:

- Deploy signage in relevant local languages related to Yara Dallol BV hiring in relevant locations (away from areas identified to be sensitive to in-migration).

- In collaboration with local government monitor in migration rates.

- Engage new migrants’ close to Yara Dallol BV worksites in a timely manner about Yara Dallol BV’s hiring policies.

- Implement employment policy forbidding informal labour hire.

- Implement policy forbidding distribution of water to the public at Yara Dallol BV gate / camp sites.

- As part of the in-migration management plan define buffer zones which trigger variety of different pre-agreed responses from the Yara Dallol BV team should settlement monitoring show increases. The first buffer should be negotiated with local and traditional leaders and be sign-posted and engaged upon as an 'area not approved for settlement'.

- Plan routes for transport of proposed Project materials, goods and personnel taking into account the potential for in-migrants to be attracted into informal roadside settlement. Along the transport route define buffer zones which trigger variety of different pre-agreed responses from the Yara Dallol BV team should settlement monitoring show increases.

- Require Project vehicles to use pre-identified Yara Dallol BV managed truck stops to discourage setting up of roadside stalls in unsuitable locations.

- Support development of village zoning plans for settlements at high risk from in-migration, to direct in-migrant related development to defined areas where impacts should be minimised.

- Explicitly include consideration of biodiversity and natural resource impacts of in-migration, and integration of appropriate responses into the overall programme.

- Assist with the identification and demarcation of transitional zones for settlement, business, and informal trading in anticipation of an influx of people and associated housing demands, with the aim of directing future settlement patterns.
• Give careful consideration to the legacy of in-migration when plans are made for mine closure.

• Establish a Dallol Mining Forum with other extractive organisations (and involving local government) to agree common and shared approach to in-migration.

• Engage local Government regarding managing potential in-migrants. Agree with local government designated areas in Berahale for new migrant settlement, new commercial ‘zoning’, etc.

• Lobby relevant NGOs / Government organisation for infrastructure improvements in Berahale to support management of in-migrants.

Residual Impacts (Post-mitigation)

The impacts associated with PIIM are likely to develop during the construction phase when investment in employment and training, and potential benefits from impact mitigations are being provided. However, during operations when fewer employment opportunities are available, some in-migrants may move on in anticipation of employment elsewhere, while others may remain as permanent residents.

11.4 CHANGE TO SOCIO-CULTURAL HERITAGE

This Section presents the potential impacts of the Project related to socio-cultural dynamics in the Project Area. The proposed Project may result in significant social change and the influence of the Project on the various intra- and inter-settlement social systems and structures is likely to be experienced in a number of ways, both positive and negative.

11.4.1 Disturbance to Cultural, Values, Traditional Leadership and Intangible Heritage

Description of the Baseline Environment

The Afar ethnic group are the dominant in the SSA and significant concentration of non-Afar people; i.e., Tigreans and Amhara are only present in the larger settlements such as Ambule, Berahale, Hamad Ela, and Bada. The non-Afar people found in the area are typically government officials, traders, salt diggers and transporters.

During community engagement activities it became clear that the Afar possess a strong socio-cultural perception of what is acceptable social behaviour and attribute much of the ‘socially unacceptable behaviours’ (such as substance abuse, engagement of commercial sex work, and others) to the presence of outsiders. Although there is clearly some tension between Afar groups and highlanders (e.g. Tigreans and Amhara), it does not appear that this has recently manifested in significant competition or conflict.
Proposed Project Activities

As discussed in Section 11.3 the proposed Project may attract non-Afar in-migrants with their own cultural and social values and these may result in:

- Changes to cultural and social values;
- Challenges to traditional leadership; and
- Changes to formal and informal support structures.

Changes to Cultural and Social Values

The cultural and social values of newcomers may differ from those held within the local communities. Although cultural norms and identities are dynamic and are constantly subject to change depending on context; there is the potential for unease among the host community when these norms and identities are altered in a short period of time. These changes have the ability to cause tension and conflict, particularly among those who perceive their sense of identity and belonging to be under threat. People likely to be most vulnerable to this impact include the elderly, women and traditional leaders as they are not likely to be able to link a changed sense of identity (i.e., urban versus rural) with real benefits (e.g., employment and business opportunities).

Traditional governance system remains a strong and respected parallel administrative structure in the SSA, and traditional leaders are reported to retain significant influence. Within all of the affected villages traditional leadership is still viewed as essential for resolving disputes, making key decisions and in general representing the community.

Challenges to Traditional Leadership

In-migration will change the demographic profile of the area and may challenge traditional leadership to redefine and/or assert itself on the population. Outsiders will not be accustomed to, or bound by, allegiance to the existing traditional leadership structures and individuals with specific agendas or particular levels of skill and education are likely to assert the desire for more representative structures through which to engage the proposed Project. If there is general community support for more broad representative approach, it is possible that traditional leadership roles will be compromised.

Differences in income between the proposed Project employees and local inhabitants who don’t secure employment with the proposed Project are already evident and with time, this may fuel disparity in the levels of development and empowerment. Those who receive employment opportunities and income may desire a more substantive role in governance and may, directly or indirectly, challenge the traditional systems. Furthermore, local people who are working are likely to be exposed to different (non-Afar) cultures and ways of life. These differences may challenge
the traditional subordination to the existing cultural management and leadership systems.

It is anticipated that the youth, who form a large portion of the population, are likely to feel more empowered due to Project induced changes in the Project Area including greater access to information, and more employment opportunities. This may affect levels of support for traditional decision making and leadership hierarchies. As employment increases an increase in young men with independent access to income could undermine established age-based relations and the ability of older generation to exercise controls on younger men. However it should be noted that for the youth this impact may be perceived as positive allowing them to develop their own identity that is not informed by traditional systems.

The challenge for the traditional leadership of managing perceived and actual socio-economic changes may place further pressures on the traditional authority. Opinions about the correct approach to manage changes may differ, potentially leading to internal conflict, undermining their role in providing a consolidated ‘leading voice’.

Changes to Formal and Informal Support Structures

A characteristic common to the Afar is the sharing of resources and informal welfare structures that exist not only within, but across villages. Traditional Afar society and social interaction are structured according to the sharing of resources and possessions. It is forbidden for someone to claim sole ownership over resources or possessions, with households commonly sharing items such as food, medication and water.

Kinship and the significance derived from clan membership determine the extent to which someone will receive assistance in times of difficulty, the ability to secure and access resources, and the way in which conflicts are resolved.

Afar society is based on a patriarchal system where men are recognised as the leaders in society and are the chief income generators and decision makers. A woman’s role is identified to be in the household and she is responsible for the maintenance of wellbeing of the household and its member. There are clear expectations of men and women in Afar culture and engagement in sex work and substance abuse is strictly prohibited of anyone in the local Afar community.

The development of the proposed Project in an environment that is a currently a combination of rural villages, micro-informal economies and mixed livestock and crop farms will significantly alter the sense of place of local people. This will have positive impacts for some; however, care must be taken to recognise the negative impacts, particularly on vulnerable groups and those dependent on the sense of place for their livelihoods and cultural heritage.
Throughout the life of the mine, culture and social values and traditional structure is anticipated to continue to change as the population grows and becomes more diverse. Depending on the level of vulnerability of the stakeholders involved, these changes in social and cultural values could have a negative impact as people struggle to assimilate the rapid pace of change. For others, such as the economically active, and those who are able to embrace this change and actively seek to escape their rural identity, the impact will be perceived as positive. The ability of local residents to adapt to these changes in culture and social values and traditional structure is likely to vary depending on their levels of vulnerability; for the elderly, traditional leaders (in some instances), and the unskilled/ unemployed vulnerability may be higher.

Significance of Impact (Pre-mitigation)

Based on the analysis the impact will be a **Moderate Negative Impact** pre-mitigation (as shown in Table 11.9).

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Rating of Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect, Induced, Negative Impact</td>
<td>Summary of Reasoning</td>
</tr>
<tr>
<td>Extent</td>
<td>Local</td>
</tr>
<tr>
<td>The impact will occur within the local area in villages in close proximity to the proposed Project that may experience in-migration or substantial cultural change.</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>Long term to permanent</td>
</tr>
<tr>
<td>The impact duration will continue throughout the Project life of mine, as changes will continue as the population grows through in-migration.</td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>Medium</td>
</tr>
<tr>
<td>Depending on the stakeholders involved, these changes in social and cultural norms could be perceived as a negative impact as people struggle to assimilate the rapid pace of change in the area. For others, who are able to embrace this change the impact will be perceived as positive.</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
</tr>
<tr>
<td>The impact will occur intermittently as traditional leadership is occasionally challenges.</td>
<td></td>
</tr>
</tbody>
</table>

**Magnitude**

**Medium Magnitude**

**Sensitivity/Vulnerability/Importance of the Resource/Receptor**

**High Sensitivity**

The most vulnerable receptors will include the elderly, women, and traditional leaders. While the youths, especially those who get opportunities with the Project will view the change as positive and seek to capitalise on the changes.

**Significant Rating Before Mitigation**

**Moderate Negative Impact**

Mitigation/Management Measures

Mitigation measures as outlined in Section 11.3 should be implemented to ensure that impacts linked to in-migration are managed efficiently. To further
address the negative impact of changes to cultural, values, traditional leadership, and to maximise the positive impacts, the following mitigation measures should be implemented.

- Yara Dallol BV should apply mitigation as specified in Section 11.8 to protect tangible cultural heritage resources and thereby socio-cultural sense of place.

- Yara Dallol BV should develop and implement induction programmes, including a Workforce Code of Conduct, for all newcomers directly related to the Project. This will increase worker-sensitivity to local norms and customs and will ensure that contractors and employees are aware of appropriate and acceptable behaviours.

- Yara Dallol BV should pursue a proactive Stakeholder Engagement Programme that is built on openness, mutual trust and inclusiveness in terms of its operational activities and community-based development initiatives. This involvement will empower communities to identify and address issues of concern to them and will facilitate solutions to some of the manageable changes resulting from the Project.

- Yara Dallol BV should implement the Grievance Procedures included in the Stakeholder Engagement Programme (refer to Annex C in Part II of this ESIA).

- Yara Dallol BV should ensure that the Project and government actions regarding spatial development framework planning continue to involve on-going consultations with local communities.

- Yara Dallol BV should establish a local information office, recruitment centre and appoint a permanent community liaison officer to cover each of the communities.

- Yara Dallol BV should support inter-village sport and recreational competitions to foster a sense of community within villages and healthy competition between villages.

*Residual Impact (Post-mitigation)*

Based on the implementation of the proposed mitigation measures, the significance of the impact will be a **Minor Negative Impact** post-mitigation (as shown in to Table 11.10).
Table 11.10  Rating of Residual Impacts Related to Disturbance of Cultural, Values, Traditional Leadership and Intangible Heritage (Post-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The impact will occur within the local area in villages in close proximity to the proposed Project that may experience in-migration or substantial cultural change.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long - Term to Permanent</td>
<td>Without mitigation and management the impact will either cause a long-term or permanent change to traditional governance mechanisms.</td>
</tr>
<tr>
<td>Scale</td>
<td>Small</td>
<td>The impact may be experienced by community members in the local settlements and to a lesser extent communities along the road network.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Rare to intermittent</td>
<td>This impact may present as a slow degeneration of the governance mechanism. The perceived benefit of this impact means the frequency may be reduced.</td>
</tr>
</tbody>
</table>

Magnitude

<table>
<thead>
<tr>
<th>Significant Rating After Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor Negative Impact</td>
</tr>
</tbody>
</table>

11.5 Community Health, Safety and Security

This Section looks at ways in which the health, safety and security of the local communities could be impacted during the life of the proposed Project as a result of both routine and non-routine activities. This includes consideration of disease transmission, access to health care and accidents and injuries. The assessment of potential impacts to community health, safety and security considers communicable and non-communicable diseases and risks.

11.5.1 Increased Incidence of Communicable Diseases

The rate of spread of communicable diseases may increase within communities due to:

- Potential for overcrowding as a result of increased pressure on existing housing infrastructure related to in-migration;

- Potential interactions between the construction workforce and local communities; and

- In-migrants to the area bringing new diseases or varying disease profiles compared to the existing community.

The assessment of potential impacts related to increases in the incidence of communicable diseases considers sexually transmitted diseases, and water and sanitation related diseases.
Increased incidences of sexually transmitted infections (STIs) including HIV/AIDS

Description of the Baseline Environment

According to the USAID (July 2008), the level of HIV/AIDS in the ANRS is approximately 2%. Other sexually transmitted diseases were not reported but likely to exist (1). The low number of recorded cases may be due to under-reporting and low HIV testing amongst the population. The extent to which anti-retro virals (ARTs) are provided to those infect was not reported by the authorities or communities engaged.

There are commercial sex workers in the Woreda; who are said to be attracted to the area by the presence of the armed forces as well as tourists. The commercial sex workers are mainly of non-Afar (highlanders) origins and their numbers are said to have increased over the past five years due to presence of mining exploration activities in the Danakil.

Proposed Project Activities

The proposed Project is likely to increase the transmission of HIV and other STIs in the broader SSA (incl. settlements along the Project’s transportation corridor) due to the following:

- Transport drivers, who may typically have higher rates of HIV or STIs than the general population, may engage in casual sexual activity along the transport route and at their end destination, acting as a vector for the disease.

- In-migration of people with higher HIV or STI prevalence rates than the host community may promote the transmission of the disease.

- A mainly male workforce with a comparatively larger disposable income may engage in sexual activities with commercial sex workers both in the local community and on transit routes to / from site, acting as a vector for the disease.

- In-direct economic activities may result in an increase in disposable income in the local area resulting in an increase in transactional sex. This is a particular risk for young women who may be unaware of the potential impacts of such activities or who, due to existing levels of poverty, may see this as a way to earn an income or access goods.

- Commercial sex workers may come from other areas of Ethiopia and may have higher rates of HIV.

(1) Pers. Comms with local authorities, 2014
• Existing stigma and taboos around STIs and HIV will make it challenging to negotiate safe sex practices such as the use of condoms (including the use of female condoms).

Any increase in the prevalence of HIV or STIs in the SSA is a business risk for the proposed Project and may affect the health of the workforce and therefore their ability to do their job. There is little access to treatment for STIs in the Woreda and as such these could also impact the long term health of those who suffer infections. The stigma and taboos around STIs may also affect people accessing treatment in a timely manner which may affect health outcomes.

**Sensitive Receptors**

Women, young children, the elderly, those infected with sexually transmitted infections and their carers will be most vulnerable to increased transmission of HIV or STIs. The vulnerability in women will be linked to the potential of being infected by their partners and potentially passing the diseases onto their young children (especially HIV) and/or having to care for the ill for long time. In turn, the elderly may end up having to care for the young children in case of the parents’ severe illnesses and deaths. Those infected by HIV or STIs are likely to endure long term stigmatisation by their peers.

**Increased Incidence of Water and Sanitation Related Diseases**

**Description of the Baseline Environment**

Access to improved sanitation in the SSA is low and the majority of the population do not have access to a dug pit latrine. As a result people defecate in the open and cover the faeces with rocks. During the highland rainy season, the water flows into the Project Area as flash floods and washes faeces and other domestic waste into the water sources of the population. During the wet season, incidences of cholera increase significantly until all seasonal water sources dry-out and the same cycle begins the following rainy season.

**Proposed Project Activities**

In-migration will likely result in an increased number of people using unimproved sanitation facilities which may further increase the already high burden of disease.

Even though the local Yara Dallol BV workforce will have access to safe drinking water and improved sanitation, when they do visit their homes during shift changes they will also be exposed to unsanitary conditions and to the water and sanitation diseases. This will compromise their health status and may result in lost man hours.

**Sensitive Receptors**

Vulnerable receptors include villages/settlements likely to house significant numbers of in-migrants such as Hamad Ela, Bada, as well as those settlements
situated in the transportation corridors of the proposed Project such as Ambule, Berahale and Serdo. The sensitivity of the receptors is further likely to be heightened due to the lack of alternative water sources and poor access to sanitation as well as the existing levels of baseline diseases. Amongst the sensitive receptors young children and the elderly will be most affected due to their less developed immune system.

Significance of Impact (Pre-mitigation)

Based on the analysis provided above, this impact has been assessed as a Major Negative Impact prior to mitigation (refer to Table 11.11).

Table 11.11 Rating of Impacts Related to Increased Incidence of Communicable Diseases (Pre-Mitigation)

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Direct and Indirect, Negative Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
<td>Designation</td>
</tr>
<tr>
<td>Extent</td>
<td>Regional</td>
</tr>
<tr>
<td>Duration</td>
<td>Long-term to Permanent</td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Large Magnitude</td>
</tr>
<tr>
<td>Sensitivity/Vulnerability/Importance of the Resource/Receptor</td>
<td>High Sensitivity</td>
</tr>
<tr>
<td>Significant Rating Before Mitigation</td>
<td>Major Negative Impact</td>
</tr>
</tbody>
</table>

Mitigation/Management Measures

The following measures should be undertaken by the Project in partnership or collaboration with other agencies (development agencies, NGOs or health authorities) not only to mitigate health impacts but also as community development activities. The Project should proactively seek and manage these partnerships to ensure that the mitigation is being delivered in a timely manner and will measure and monitor outcomes based on KPIs.
As a means to improve the health context in which the proposed Project operates the following measures should be implemented:

- Yara Dallol BV, in collaboration with the local and regional Government and local emergency providers and local health care facilities, should develop and implement Emergency Prevention, Preparedness and Response Plans (EPPRPs) to cover all incidents presenting risks to public safety and the affected communities in proximity to the various Project Sites and the environment. The EPPRPs should:
  - Be applicable to all contractors and subcontractors as well as local communities;
  - Consider access to health care, major incidences, exposure to hazardous materials, multiple casualty events, epidemics and pandemics; and
  - Make provisions for awareness-raising activities and emergency response training to the communities that are considered to be at higher risks.

- The Yara Dallol BV medical facility at the camp should be staffed with appropriately trained personnel and will stock all relevant medication to treat or refer to hospital for these diseases.

- Yara Dallol BV should collaborate with regional/local Government and relevant NGOs to support improvements to existing health services to handle the potential increase in population numbers and changes to the existing health profile of the area. This may include facilities, quality of medical personnel, diagnostic capacity and treatment, and capacity to address epidemics and pandemics.

- Yara Dallol BV in partnership with regional/local Government and/or relevant NGOs should provide community investment to improve local health services, sanitation, and vaccine provision.

- Yara Dallol BV should provide training for all new staff as part of induction programs including sanitation, sexual health, communicable diseases etc.

- Yara Dallol BV should ensure that key employees/supervisors receive first aid training before the start of construction.

- Yara Dallol BV should monitor the emergence of major pandemics through WHO alerts. If the WHO Pandemic Alert Scale reaches level 4 the Project should implement the relevant Emergency Response Plans.

As a means to mitigate impacts related to the increased incidences of HIV/AIDS and other STIs:
Yara Dallol BV should develop and implement an HIV/AIDS Prevention Programmes for its workforce. The key elements of a workforce HIV/AIDS prevention programme are presented in Box 11.3 below.

**Box 11.3 Key Elements of a Workforce HIV/AIDS Prevention Programme**

<table>
<thead>
<tr>
<th>Prevention:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Raise awareness (address the facts and fiction of HIV transmission);</td>
</tr>
<tr>
<td>- Get the message out (make use of local languages or non-written forms of communication);</td>
</tr>
<tr>
<td>- Go beyond the workplace;</td>
</tr>
<tr>
<td>- De-stigmatise the disease;</td>
</tr>
<tr>
<td>- Peer education (train and support peer educators);</td>
</tr>
<tr>
<td>- Review occupational health and safety procedures;</td>
</tr>
<tr>
<td>- Condom distribution;</td>
</tr>
<tr>
<td>- Circumcision promotion;</td>
</tr>
<tr>
<td>- Voluntary HIV testing and counselling;</td>
</tr>
<tr>
<td>- Post exposure prophylaxis programme for all employees with potential exposure to blood or body fluids;</td>
</tr>
<tr>
<td>- Prevention of Mother-to-Child Transmission; and</td>
</tr>
<tr>
<td>- Training of managers and supervisors - to improve programme success.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment and Care:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Anti-Retroviral Treatment (ARV);</td>
</tr>
<tr>
<td>- ARV programme for family members infected;</td>
</tr>
<tr>
<td>- Adherence promotion;</td>
</tr>
<tr>
<td>- Preparation for treatment;</td>
</tr>
<tr>
<td>- Controlled dispensing of medication;</td>
</tr>
<tr>
<td>- On-going adherence monitoring promotion;</td>
</tr>
<tr>
<td>- Provision of nutritional programme; and</td>
</tr>
<tr>
<td>- Terminal and home-based care.</td>
</tr>
</tbody>
</table>

Yara Dallol BV should develop and implement a Workforce Code of Conduct. The key health and safety elements of the code should include:

- Zero tolerance of illegal activities by all personnel;
- Forbidding the use of prostitution;
- Forbidding the illegal sale or purchase of alcohol (Yara Dallol BV already operate a no alcohol on-site policy);
- Forbidding the sale, purchase or consumption of drugs; and
- Forbidding gambling and fighting.

The Workforce Code of Conduct should be adhered to by all Contractors and Yara Dallol BV employees. Any employee or Contractor found in violation of the Code should face disciplinary hearing which should potentially result in dismissal.

Yara Dallol BV should ensure that company medical services have sufficient capacity and capability to implement the company’s policy on care and treatment of any HIV-positive employees.

Yara Dallol BV should ensure there is access to free condoms (including female condoms) at the worker camp to promote safe sexual practices.
In partnership with local health officials and relevant NGOs, Yara Dallol BV should undertake information, education and communication campaigns around safe sexual practices and transmission of STIs and HIV/AIDS as well as condom distribution (including female condoms) at stopping locations within the transport corridor targeting commercial sex workers.

In partnership with local authorities and relevant NGOs Yara Dallol BV should support women’s empowerment and education programmes to promote women’s rights and safe sexual practices (including the use of condoms and female condoms) and support.

As a means to mitigate impacts related to sanitation and water-borne diseases Yara Dallol BV should:

- Conduct information, education and communication campaigns amongst Project personnel on hygiene and sanitation.
- Partner with local authorities and relevant organisations as (e.g. donors, civil society and NGOs) to facilitate delivery of sufficient supply, and adequate quality, of water to affected settlements (including schools).

**Residual Impact (Post-mitigation)**

Based on the implementation of the proposed mitigation measures, the significance of the impact will be assessed as a **Minor to Moderate Negative Impact** (refer to Table 11.12).

**Table 11.12 Rating of Residual Impacts Related to Increased Incidence of Communicable Diseases (Post-Mitigation)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Regional</td>
<td>The transmission of communicable diseases has a potential to extend beyond the Project Area given the presence of migrant workers.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long-term to Permanent</td>
<td>Communicable diseases can take a long time to treat and sometimes require a complete change in lifestyle by those affected and respective carers. These also result in deaths if not treated or managed accordingly.</td>
</tr>
<tr>
<td>Scale</td>
<td>Medium</td>
<td>A significant degree of change in the affected person will be required; some may not be able to provide for their households while other people will require additional care</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
<td>The frequency of the impact will depend on multiple factors. For instance impacts related to vector borne diseases can recur if certain changes in lifestyle are not undertaken.</td>
</tr>
</tbody>
</table>

**Magnitude**

- **Medium Magnitude**
- Significant Rating After Mitigation
- **Minor to Moderate Negative Impact**
11.5.2 **Increased Transmission of Malaria**

**Description of the Baseline Environment**

In the SSA, the malaria burden is experienced mainly in the wet season, due to a widespread stagnant water pools suitable for mosquito breeding and disease transmission. Malaria transmission only occurs during a limited seasonal window as surface water flows are only ephemeral.

**Proposed Project Activities**

The proposed Project has the potential to impact, as well as be impacted by malaria (through worker ill health). Modifications to the physical environment (e.g., creation of borrow pits, trenches civil works) can create small water pools (e.g., in wheel ruts and footprints) offering new mosquito breeding grounds and leading to increased vector density and increased human vector (mosquito) interaction. The highly endemic nature of malaria means that the Project is unlikely to significantly add to the already high disease burden of the community during the wet season. However, modifications to the environment may change the breeding patterns of mosquitoes extending the high risk season for transmission.

The in-migration of people may play an indirect role in increasing the malaria burden through an increase in pressure on medical facilities, inadequate waste management and establishment of make-shift housing (reducing natural protection to mosquitoes).

**Sensitive Receptors**

The local population’s vulnerability will be increased due to poor access to treatment and in some cases lack of knowledge around basic malaria prevention and transmission. The Project workforce sensitivity is regarded as low as they will have access to the medical treatment provided by the on-site Yara Dallol BV clinic.

**Significance of Impact (Pre-mitigation)**

Based on the analysis provided above this impact has been assessed as a **Moderate Negative Impact** prior to mitigation (refer to Table 11.13).

### Table 11.13 Rating of Impacts Related to Increased Transmission of Malaria (Pre-Mitigation)

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Rating of Impacts</th>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct and Indirect, Negative Impact</strong></td>
<td></td>
<td>Extent</td>
<td>Local</td>
<td>The extent of the impact will be local, as it will be limited to the Project Area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Duration</td>
<td>Long-term to Permanent</td>
<td>The impact will have Medium to Long Term effects on those affected, as the diseases can leave lasting effects and in the worst-case scenario, death.</td>
</tr>
<tr>
<td>Scale</td>
<td>Medium to Large</td>
<td>The scale of the impact is based on the fact that contracting malaria can lead to death.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>Occasional</td>
<td>It likely to occur during the rainy season.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Medium Magnitude</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Medium Sensitivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance</td>
<td>Medium Sensitivity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The local population’s vulnerability will be increased due to poor access to treatment and in some cases lack of knowledge.

### Significant Rating Before Mitigation

<table>
<thead>
<tr>
<th>Rating</th>
<th>Moderate Negative Impact</th>
</tr>
</thead>
</table>

### Mitigation/Management Measures

To mitigate impacts related to the transmission of malaria Yara Dallol BV should develop and implement an Integrated Malaria Control, Prevention and Treatment Programme. The programme should include the following key aspects:

- **Vector Management**:
  - Avoid the creation of mosquito breeding conditions through creation of proactive surface water management during construction activities e.g., excavation for road building, leaking water pipes and engineering works that interfere with the natural lines of water drainage.
  - Reduce or elimination of mosquito breeding habitats e.g., level ground, appropriate drainage, and vegetation clearance.
  - Reduce the presence of standing water onsite through strict environmental controls and source reduction to avoid the creation of new breeding grounds. Such measures include repairing leaking pipes, dewatering of open excavations and effective drainage systems along access roads.

- **Control or Reduction of Individual Risk**:
  - Personal protection and behaviour modification measures e.g., awareness raising and education programmes, and mandating compliance with appropriate anti-malarial chemoprophylaxis when recommended.
  - Reduce the potential for mosquito-human interactions in workforce accommodation, office space and other buildings through the use of screens at windows and doors, application of air conditioners and fans, the use of bed nets and other measures.
  - Ensure that the workforce has access to prompt, accurate and effective diagnosis and treatment while working on site or in remote areas.
- Develop and implement a malaria information booklet and training material for the workforce. These materials should be used as part of a new employee induction, as well as part of annual refresher training sessions on malaria.

- **Limit Effect of Infection:**

  - The malaria immunity status of all employees and malaria transmission patterns of labour source areas should be considered and catered for when considering treatment options.
  
  - Partnership and collaboration in community programs with key external stakeholders to ensure community collaboration and enhance program sustainability.
  
  - Ensure availability of malaria treatment at all clinics used by the workforce and local communities. This should be achieved through a partnership with the ministry of health and / or relevant NGOs.

Box11.4 shows an example of an integrated malaria control programme.

**Box11.4 Example of an Integrated Malaria Control, Prevention and Treatment Programme**

<table>
<thead>
<tr>
<th>PRIMARY CONTROL</th>
<th>Vector Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVIRONMENTAL</td>
<td>CHEMICAL</td>
</tr>
<tr>
<td>Site Selection</td>
<td>Larval control</td>
</tr>
<tr>
<td>Buffer zone; distance from vector breeding areas/</td>
<td>Destruction through biological, mechanical or physical means.</td>
</tr>
<tr>
<td>population with active malaria transmission.</td>
<td></td>
</tr>
<tr>
<td>Source Reduction</td>
<td>Adult Mosquito</td>
</tr>
<tr>
<td>Environmental modification to reduce vector habitats; environmental manipulation to produce unfavourable conditions for vectors</td>
<td>In-door residual spraying, space spraying and long lasting insecticide-treated bed-nets and other materials.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECONDARY CONTROL (A,B,C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/ Reduction of Individual Risk</td>
</tr>
<tr>
<td>AWARENESS</td>
</tr>
<tr>
<td>Malaria and personal protection information distribution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHEMOPROPHYLAXIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular chemoprophylaxis for those considered at risk</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TERTIARY CONTROL (D)</th>
<th>Limiting Effect of Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIAGNOSIS</td>
<td>TREATMENT</td>
</tr>
<tr>
<td>Prompt diagnosis through blood sampling or rapid diagnostic tests.</td>
<td>Use of artemisinin-based combination therapy; emergency standby treatment.</td>
</tr>
</tbody>
</table>

Source: ICMM Guidelines on HIV/AIDS, Tuberculosis, and Malaria; 2007
Residual Impact (Post-mitigation)

Based on the implementation of the proposed mitigation measures, the significance of the impact to increased transmission of malaria will be a **Minor to Moderate Negative Impact** mitigation (refer to Table 11.14).

### Table 11.14 Rating of Residual Impacts Related to Increased Transmission of Malaria (Post-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The extent of the impact will be local, as it will be limited to the Project Area.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long-term</td>
<td>The impact will have Medium to Long Term effects on those affected, as the diseases can leave lasting effects and in the worse-case scenario, death.</td>
</tr>
<tr>
<td></td>
<td>Permanent</td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>Medium to Large</td>
<td>The scale of the impact is based on the fact that contracting malaria can lead to death.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Occasional</td>
<td>Exposure will be limited to wet season only.</td>
</tr>
</tbody>
</table>

### 11.5.3 Increased Incidence of Non-Communicable Diseases

The non-communicable diseases discussed in this Section include:

- Increased incidences of chronic/acute respiratory infections;
- Nutrition related illnesses;
- Increased anti-social behaviours;
- Increase in injuries/accidents; and
- Workforce health and safety.

**Increased Incidences of Chronic/Acute Respiratory Infections**

**Description of the Baseline Environment**

The proposed Project is located in a desert, characterised with extreme heat conditions, limited rainfall and sand storms. The broader Study Area is rural and underdeveloped with limited, underfunded and underdeveloped social infrastructure and services. There is limited available grid electricity and households rely on fuel wood and charcoal as the main sources of energy for cooking. All household cooking is undertaken indoors due the unpredictable weather in a structure which serves multiple purposes (i.e., kitchen, living room and bedroom). The combination of extreme natural conditions and
general poor living conditions has led to high incidences of chronic/acute respiratory infections, excluding Tuberculosis (TB).

There are limited daily vehicles movements in much of the SSA. People tend to walk or use donkeys/mules and camels to travel to their destination. As result, the ambient air is dusty but free of exhaust emissions such as carbon monoxide (CO), nitrogen oxides (NO₂), sulphur oxides (SO₂) and fugitive hydrocarbons; refer to Chapter 10 for further details.

The WHO has done extensive research on indoor pollutants and related illnesses. Some of its finds are summarised in Box 11.5.

**Box 11.5 Ambient (Outdoor) Air Quality and Health**

In developing countries, indoor exposure to pollutants from the household combustion of solid fuels on open fires or traditional stoves increases the risk of acute lower respiratory infections and associated mortality among young children. Indoor air pollution from solid fuel use is also a major risk factor for cardiovascular disease, chronic obstructive pulmonary disease and lung cancer among adults.

Outdoor air pollution is a major environmental health problem affecting everyone in developed and developing countries alike. It estimates that 14 percent of outdoor air pollution-related premature deaths were due to chronic obstructive pulmonary disease or acute lower respiratory infections. Furthermore, WHO stated that an ambient (outdoor air pollution) in both cities and rural areas was estimated to cause 3.7 million premature deaths worldwide per year in 2012. This mortality is due to exposure to small particulate matter of 10 microns or less in diameter (PM₁₀), which causes cardiovascular and respiratory disease, as well as cancers.


**Proposed Project Activities**

Impacts on the ambient air quality as a result of the proposed Project activities (construction and operation) are associated with:

- The generation of dust during site clearance and preparation;

- The generation of dust from road traffic (secondary unpaved roads); and

- Exhaust emissions (which may include sulphates, nitrogen oxides and particulate matter) from construction and operational vehicles (including approximately 96 vehicle movements per day related to potash shipment by road) as well as machinery (e.g., emergency generators).

**Sensitive Receptors**

The entire population of the SSA is highly vulnerable to respiratory infection due to underdevelopment and natural events, in absence of the proposed Project. The introduction of diesel exhaust emissions (i.e., carbon monoxide (CO), nitrogen oxides (NO₂), sulphur oxides (SO₂) and fugitive hydrocarbons) in combination with the extreme natural conditions could increase the burden
of chronic/acute respiratory diseases amongst the local population; especially the elderly and young children.

Population residing in settlements such as Hamad Ela, Ambule, Berahale, Serdo and others, which are located within the Project transportation corridor, will be the most vulnerable to the changes in air quality and the potential burden of respiratory diseases.

**Significance of Impact (Pre-mitigation)**

Based on the analysis provided above, this impact has been assessed as a **Major Negative Impact** prior to mitigation (see Table 11.15).

**Table 11.15 Rating of Impacts Related to Increased Incidences of Chronic/Acute Respiratory Infections (Pre-Mitigation)**

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Direct and Cumulative, Negative Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating of Impacts</td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Designation</td>
</tr>
<tr>
<td>Extent</td>
<td>Local to regional</td>
</tr>
<tr>
<td>Duration</td>
<td>Long-term</td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
</tr>
<tr>
<td>Frequency</td>
<td>Frequent</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Large Magnitude</td>
</tr>
<tr>
<td>Sensitivity/Vulnerability/Importance of the Resource/Receptor</td>
<td>High Sensitivity</td>
</tr>
<tr>
<td>Significant Rating Before Mitigation</td>
<td>Major Negative Impact</td>
</tr>
</tbody>
</table>

**Mitigation/Management Measures**

These measures and recommendations should be read in conjunction with measures included in the Air Quality Impact Assessment (*Chapter 10*).

The following measures will help to improve the health context in which the Project operates:

- In partnership with the government, and NGOs; Yara Dallol BV should:
- Develop and implement educational campaigns to inform families about the early warning signs of acute respiratory infections that indicate the need to seek care.

- Discuss the potential delivery of electricity at the local health centres in order to facilities the safe storage of various medicines. This could be achieved through the installation of solar power panels if feasible. Electricity can also be used to power medical equipment and improve the overall provision of medical care in the broader SSA.

- Adhere to WHO guidelines for infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in Yara Dallol BV managed health care facilities.

**Road Transportation:**

In addition to the above, Yara Dallol BV should:

- Commit to the lowest possible available sulphur fuel usage possible so as to minimise harmful emissions.

- Develop and implement an equipment and vehicle maintenance program to reduce emissions and dust generation.

- A speed limit of 32kph should be maintained on gravel roads where surface binding agents or salt encrusting have not been applied.

- Yara Dallol BV should implement dust suppression programme on their private roads including covered loads, vehicle washing and road wetting, particularly in areas where the road passes close to dwellings, schools and businesses. This may include chemical bonding on unpaved road surfaces or uses of saline water to develop a salt crust.

- Any directly affected individuals should be able to lodge grievances with the Yara Dallol BV using the grievance procedure regarding dust emissions that could be linked to the Project.

**Residual Impact (Post-mitigation)**

Based on the implementation of the proposed mitigation measures, the significance of the impact will be considered a **Minor to Moderate Negative Impact** (refer to Table 11.16).
**Table 11.16 Rating of Residual Impacts Related to Increased Incidences of Chronic/ Acute Respiratory Infections (Post-Mitigation)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local to Regional</td>
<td>The impact will be experienced along the transport corridor and in settlement close to roads used for heavy and light vehicle movements.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long-term as it relates to the Project</td>
<td>The impact will be experienced through the life of mine but will be largest during the operations phase when the largest amount of vehicle movements will occur.</td>
</tr>
<tr>
<td>Scale</td>
<td>Medium</td>
<td>The increased dust generation will have adverse effects on the health outcomes of the population and also increase pressure on health care facilities. Exposure to increased dust will be reduced due to road treatment.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Frequent</td>
<td>During operations there will be 64 truck movements per day driving to or from site during daylight hours, excluding light vehicles and vehicles linked to other proposed solution mines in the area.</td>
</tr>
</tbody>
</table>

**Magnitude**

<table>
<thead>
<tr>
<th>Medium Magnitude</th>
<th>Significant Rating After Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor to Moderate Negative Impact</td>
<td></td>
</tr>
</tbody>
</table>

**Nutrition Related Illnesses**

**Description of the Baseline Environment**

Poverty is high in the broader SSA due to the harsh natural conditions including water shortages, and poor agricultural yields due to a lack of modern agricultural inputs and equipment. There is a shortage of arable land and villages such as Bada are practising sharecropping so as to ensure that everyone in the villages has some food. Access to markets to sell produce is also limited. Over 95 percent of the population rely on food aid (PSNP) \(^{(1)}\); which they receive for only six months of the year.

**Proposed Project Activities**

The proposed Project will not directly affect food security concerns; however, the proposed Project may induce in-migration which may in turn lead to increased competition for arable land. Decreased food security may result in a number of health impacts associated with decreased access to nutrition through the following pathways:

- Changes to water supply / access could lead to reduced yields especially for villages that rely on seasonal surface water to produce crops along the perennial rivers.

\(^{(1)}\) Pers. Communication with Woreda administration, April 2014
• Land pressure and inflation in the cost of food may lead to the theft of crops, which in turn can lead to farmers harvesting their crops early when they provide less nutritional value.

• Employment patterns may result in the youth taking up employment opportunities at the mine rather than undertaking pastoralism / farming; leading to decreased yields of crops and decreased food security.

• Movement away from subsistence agriculture to a market economy will affect the poorest that are least able to adapt.

_Sensitive Receptors_

Women and female headed households are identified as one of the most susceptible groups to food insecurity. The local health clinic reported that children are currently most likely to suffer from malnutrition while women in the household typically have to give up the largest proportion of food to men, leaving them more vulnerable.

Those who are poorest are also likely to be highly vulnerable as they are will be unable to afford increased food costs. Due to an absence of income generating livelihoods female headed households are typically also some of the poorest.

_Significance of Impact (Pre-mitigation)_

Based on the analysis provided above, this impact has been assessed as a **Major Negative Impact** prior to mitigation (refer to Table 11.17).
Table 11.17  Rating of Impacts Linked to Nutrition Related Illnesses (Pre-Mitigation)

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Rating of Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Induced and Cumulative, Negative Impact</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The impact is expected to affect villages/settlements that likely to host the most in-migrants such as Ambule, Berahale, and others.</td>
</tr>
<tr>
<td>Duration</td>
<td>Short to medium term</td>
<td>The impact is expected to occur at the peak of construction when the in-migrant population is anticipated to be at its highest.</td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
<td>The quality of life for those affected will decrease; with a potential to their health status.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
<td>The impact will occur without a predictable periodicity during periods of environmental shock or food cost inflation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Magnitude</th>
<th>Large Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity/Vulnerability/Importance of the Resource/Receptor</td>
<td>High Sensitivity</td>
</tr>
</tbody>
</table>

Lack of skills to increase food production on existing plots and increased cost of food mean that nutritional diseases will particular affect children and women. Those who are poorest are likely to be disproportionately affected as they are will be unable to afford increased food costs.

| Significant Rating Before Mitigation | Major Negative Impact |

**Mitigation/Management Measures**

Mitigation/management measures in *Section 11.2.4: Increased Price Inflation and Economic Vulnerability* are applicable to this impact.

The following measures will help to avoid or reduce this impact:

- Yara Dallol BV should partner with appropriate organisations to provide community training related to pastoralist and agricultural livelihood improvement. This may include equipment provision, microfinance and help in the establish market linkages between producers and potential customers (e.g., support for cooperatives, local market infrastructure, procurement contracts).

- Yara Dallol BV should actively engage relevant stakeholders (government/NGOs) in advance of emerging humanitarian emergency situations regarding provision of Yara Dallol BV support should an emergency occur. In the event of emergency lobby stakeholders to provide timely support.

**Residual Impact (Post-mitigation)**

Based on the implementation of the proposed mitigation measures, the significance of the impact to nutrition related illnesses will be a **Minor to Moderate Negative Impact** post-mitigation (refer to *Table 11.18*).
### Table 11.18 Rating of Residual Impacts Related to Nutrition Related Illnesses (Post-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The impact is expected to affect villages/settlements that likely to host the most in-migrants such as Ambule, Berahale, and others.</td>
</tr>
<tr>
<td>Duration</td>
<td>Short to medium term</td>
<td>The impact is expected to occur at the peak of construction when the in-migrant population is anticipated to be at its highest.</td>
</tr>
<tr>
<td>Scale</td>
<td>Medium</td>
<td>The quality of life for those affected will decrease; with a potential to their health status. Mitigation measures should increase food harvests.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
<td>The impact will occur without a predictable periodicity during periods of environmental shock or food cost inflation.</td>
</tr>
</tbody>
</table>

#### Magnitude
- Medium to Low Magnitude
- Significant Rating After Mitigation
- Minor to Moderate Negative Impact

### Increased Anti-Social Behaviours

**Description of the Baseline Environment**

Anti-social behaviour in this context refers to behaviour that is perceived to lack consideration to others and cause damage to wider society, whether intentionally or through negligence. Anti-social behaviour therefore can be understood as actions that are contrary to the prevailing norms, and influences the way that a community functions. This may incorporate a large spectrum of actions however in this context refers to alcohol and substance abuse, the use of commercial sex-workers, crime and violence.

Overall, a limited number of anti-social behaviour was cited and observed during data collection. Alcohol consumption and abuse is believed to be present in the broader SSA, particularly amongst highlanders; but is not widespread. Islamic and traditional values amongst the Afar mean that alcohol consumption is rare and generally disapproved by local communities. *Khat* is not widely used by the local population although truck drivers and the *Arho* (salt transporters) are reported to use it.

Commercial sex workers were reported to be present within Hamad Ela and Berahale; however, were not observed elsewhere in the broader SSA. Commercial sex-workers tend to operate out of coffee houses and serve the military camp, tourists and migrant salt workers or transporters, and were reported to not be used by local Afar inhabitants.

**Proposed Project Activities**

The proposed Project may attract in-migration of businesses and job seekers into the Project Area in addition to migrants recruited to work for Yara Dallol BV. The in-migrants have the potential to change the way that the local
community function and increase the practice of activities that are currently forbidden in the Afar Region, but more widespread across the rest of Ethiopia.

The potential for employment opportunities for local Afar men may increase available cash which may be associated with higher rates of alcohol and substance abuse, and solicitation of commercial sex workers (among local people). It should be noted that during data collection some stakeholders reported that increased employment of Afar locals, particularly members of the youth, may directly reduce stress, anxiety, depression and related social dysfunctions. The receipt of employment was believed to have benefited the mental health of some employees resulting in their cessation of *khat* and tobacco consumption.

The presence of mine workers, including nationals from outside the local Afar area, may disrupt the community cohesion and traditional way of life (refer to Section 11.4: Change to Socio-Cultural Heritage), potentially creating stress and anxiety for some residents and increasing the tendency to seek out anti-social behaviours as coping mechanisms. Substantial weakening of the existing social bonds, could promote a greater likelihood for increases in anti-social behaviours.

*Sensitive Receptors*

Increased prevalence of anti-social behaviours may cause a worsening of the health profile related to substance abuse, STIs etc. The youth may be particularly susceptible to developing anti-social behaviours as they currently face a limited ability to participate in the governance network and may be keen to pursue new activities perceived to be exotic or glamorous. Women may be particularly susceptible to the negative consequences of an increase in anti-social behaviour including violence and STIs.

*Significance of Impact (Pre-mitigation)*

Based on the analysis provided above this impact has been assessed as a **Moderate Negative Impact** prior to mitigation (refer to Table 11.19).

**Table 11.19 Rating of Impact Related to Increased Anti-Social Behaviour (Pre-Mitigation)**

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Rating of Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Induced and Cumulative, Negative Impact</strong></td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Designation</td>
</tr>
<tr>
<td>Extent</td>
<td>Local</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>Long Term</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
</tr>
</tbody>
</table>
Frequency | Intermittent | This impact may occur where residents substantially change the way they act.
---|---|---
Magnitude
Large Magnitude

Sensitivity/Vulnerability/Importance of the Resource/Receptor
Medium Sensitivity

Vulnerability of receptors is dictated by the absence of existing cosmopolitan areas with substantial variation in social requirements.

Significant Rating Before Mitigation
Moderate Negative Impact

*Mitigation/Management Measures*

All mitigation measures related to helping reduce avoid or manage potential in-migration, and helping to preserve Afar will be relevant to this impact (see mitigation/management measures in *Section 11.3: Project Induced In-Migration* and *Section 11.4: Change to Socio-Cultural Heritage*).

In addition the Project should partner with the local Government, community leaders and NGOs to promote an education and awareness programme targeted at managing anti-social behaviour. This programme should provide training and awareness raising events around the dangers and consequences of substance abuse, violence and others.

*Residual Impact (Post-mitigation)*

Based on the implementation of the proposed mitigation measures, the significance of the impact will be a **Minor Negative Impact** (refer to *Table 11.20*).

*Table 11.20  Rating of Residual Impacts Related to Increased Anti-Social Behaviour (Post-Mitigation)*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>This impact may be experienced by stakeholders living in communities that experience substantial amounts of in-migration. This may include Hamad Ela and communities along the road network from Berahale to the proposed Project, such as Ambule and Serdo.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long term</td>
<td>This impact may continue for the duration of the Project.</td>
</tr>
<tr>
<td>Scale</td>
<td>Small</td>
<td>The impact may be experienced by community members in the settlements of Berahale, Hamad Ela and potentially communities along the road network from Berahale to the proposed Project, such as Ambule and Serdo.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Rare</td>
<td>This impact may occur where residents substantially change the way they act.</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Small Magnitude</td>
<td></td>
</tr>
<tr>
<td>Significant Rating After Mitigation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor Negative Impact</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Increased Risk of Road Traffic Accidents

Description of the Baseline Environment

The SSA is relatively rural, and has only one major road which is still under construction. The majority of the population walks to their destination and only a limited number relies on motor vehicle transportation. Historically, the only sources of road traffic in the broader Project Area were:

- Weekly commercial buses between Berahale and Mekele;
- Infrequent 20 to 30 tonne trucks used to transport goods to the various local shops; and
- Light vehicles belonging to tourism operators bringing tourists to visit Mt. Dallol.

Road traffic accidents between vehicles and humans or livestock have been historically uncommon; however, these have increased due to the newly constructed paved road; connecting Dallol and Mekele via Ambule and Berahale. Road improvements have been reported to have resulted in increased vehicle movements and higher speeds. Locals reported that there has been a rise in the number of traffic accidents occurring in the area, although there is no data available in this regard. Settlements along the road stated they believe that drivers were driving very fast which made the population feel unsafe.

Given the previously rural nature of the road, communities are unaccustomed to high levels of road traffic, and have not been exposed to common road safety measures, thus increasing their vulnerability to road traffic accidents. Amongst vehicle users and pedestrians there is poor road safety awareness and limited enforcement of basic traffic safety protocols.

Proposed Project Activities

Construction and operations activities will increase the road traffic levels in the area; through the following:

- Transport of construction equipment and materials;
- Transport of goods and personnel including heavy and light vehicles, buses and cars; and
- Transport of the potash product to the Port of Tadjoura in Djibouti by road.

Table 11.21 summarises the road traffic impacts associated with the proposed Project.
Table 11.21  Road Traffic associated with the Proposed Project

<table>
<thead>
<tr>
<th>Project Activity</th>
<th>Type of Vehicle</th>
<th>Settlements in close proximity</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation of equipment and materials (construction)</td>
<td>Heavy and light vehicles</td>
<td>Hamad Ela, Ambule, Berahale, Mekele, Serdo and others</td>
<td>Port of Tadjoura to and from site Other parts of Ethiopia to and from site</td>
</tr>
<tr>
<td></td>
<td>Abnormal loaded vehicles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation of fuel (construction and operations)</td>
<td>Heavy vehicles</td>
<td>Hamad Ela, Ambule, Berahale, Mekele, Serdo and others</td>
<td>Port of Tadjoura to and from site</td>
</tr>
<tr>
<td>Transportation of workforce (construction and operations)</td>
<td>Heavy and light vehicles</td>
<td>Hamad Ela, Ambule, Berahale and others</td>
<td>Ambule/ Berahale to and from site Mekele and other part of the Region</td>
</tr>
<tr>
<td>Transportation of daily goods and services</td>
<td>Heavy vehicles</td>
<td>Hamad Ela, Serdo and others</td>
<td>Port of Tadjoura to and from site</td>
</tr>
<tr>
<td>Transportation of product</td>
<td>Heavy vehicles (approximately 96 truck/day)</td>
<td>Hamad Ela, Serdo and others</td>
<td>Port of Tadjoura to and from site</td>
</tr>
</tbody>
</table>

The proposed Project is also anticipated to indirectly increase road traffic in the SSA as a result of increased employment (direct and indirect) and vehicle movements associated with other small businesses and movements of immigrants.

The Ethiopian Road Authority (ERA) is planning to construct a haul road that could also be used to receive equipment and deliveries as well as export potash. This route is planned to travel south from site through the Depression to Serdo (a new road), onto Afdera and into Djibouti and onto the Port of Tadjoura (on existing roads). It is unknown when this road will be commissioned. In total 48 trucks daily will be driving along this potash transport route in each direction (thus 96 total truck movements) from site to the Port during operations. All trucks will try to travel during daylight hours only. The transportation route is indicated in Figure 11.3 below.

Sensitive Receptors

Increases in road traffic and poor safety awareness will increase the risk of road traffic accidents occurring which could result in injuries or fatalities to road users and pedestrians. Children are generally considered to be at a higher risk due to a lack of awareness.

Significance of Impact (Pre-mitigation)

Based on the analysis provided above, this impact has been assessed as a Major Negative Impact prior to mitigation (refer to Table 11.19).
Table 11.22  
Rating of Impact Related to Increased Risk of Road Traffic Accidents (Pre-Mitigation)

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Rating of Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct, Indirect and Cumulative, Negative Impact</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local and regional</td>
<td>The transportation of goods, services, people and product to and from site will occur at a local and regional level.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long Term</td>
<td>The impact will occur throughout the life of mine.</td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
<td>The impact will be experienced through a wide area. The exposure to this risk is considered to be large and the potential to change standards of living is considerable.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
<td>The treat of impact will be constant while the actual accidents are likely to be sporadic.</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Large Magnitude</td>
<td></td>
</tr>
</tbody>
</table>

**Sensitivity/Vulnerability/Importance of the Resource/Receptor**

<table>
<thead>
<tr>
<th>High Sensitivity</th>
</tr>
</thead>
</table>

Receptor sensitivity is considered to be high due to the lack of health care facilities to deal with trauma cases and poor road safety awareness in the communities.

**Significant Rating Before Mitigation**

<table>
<thead>
<tr>
<th>Major Negative Impact</th>
</tr>
</thead>
</table>
Figure 11.3 Product Transportation Route
Mitigation/Management Measures

Yara Dallol BV should develop and implement a Traffic Management Plan for its own drivers that provide specific traffic calming measures related to identified sensitivities along the transport route. The Plan will make provisions for the following:

- Develop and implement a Driving Policy. This should include:
  - Restrictions on vehicle speeds;
  - Forbidding unauthorized passenger transport;
  - Forbidding alcohol and drug use (including *khat*);
  - Forbidding reckless driving;
  - Forbidding cellular telephone use;
  - Forbidding stopping at any location except Yara Dallol BV controlled compounds; and
  - General safe and defensive driving practices.

- Yara Dallol BV should implement a road safety awareness campaign throughout the route of the proposed road connection to improve community knowledge of the dangers of industrial road traffic and safe behaviour in and around roads. This programme should be implemented with a suitable and experienced local partner or NGO and in partnership with the local government. Such a program may be targeted at schools within the SSA to help disseminate road safety information to children who may be particularly vulnerable to vehicle traffic.

- Mandatory defensive driving training for all staff that drive vehicles.

- All Yara vehicles should be clearly marked to ensure communities understand where possible disruption is caused by other companies / organisations.

- Installation of GPS vehicle trackers to collect live updates on project’s vehicle locations and reports on average speeds, speeding infractions, variations from agreed routes, stopping times etc. This would help to ensure adherence to driving policies and provide required data for driver audits.

- Mechanically limit heavy goods vehicles speeds.

- Install alarms in heavy goods vehicles that sound when driver and passenger do not have seatbelts engaged.

- Install cameras in heavy goods vehicles to observe that unauthorised passengers are not allowed into the cabin and that driving protocols are followed.
• Yara Dallol BV should establish a livestock compensation framework that defines the process and rates for compensation for livestock that are injured or killed in RTAs involving Yara Dallol BV vehicles.

• Yara Dallol BV should implement a stakeholder engagement, consultation and information disclosure process prior to commencement of construction / use of the proposed road connection. This should allow stakeholders to understand the upcoming increases in vehicle traffic, the plans for vehicle movements and driving policies, and to provide feedback on construction / transportation plans.

• Yara Dallol BV should establish an Emergency Response Plan (ERP) for the proposed road connection that details the agreed protocols, process, engagement and investigation processes for various relevant potential emergencies (Road Traffic Accidents - RTAs, spillage etc.) along the road connection. The ERP should include management and monitoring requirements as well Key Performance Indicators (KPIs) related to emergencies and emergency response.

• Yara Dallol BV should, where engineering or financially feasible, engage the governments of Ethiopia and Djibouti to take responsibility to construct settlement ‘bypasses’ for certain towns and villages along the portions of the road connection where existing roads are present. This should include settlements that are bisected by the road connection and / or have structures in close proximity to the edge of the road. This series of bypasses will help to avoid potential RTAs and the need for physical resettlement.

**Residual Impact (Post-mitigation)**

Based on the implementation of the proposed mitigation measures, the significance of the impact will reduced to **Moderate Negative Impact** (refer to Table 11.23).

**Table 11.23  Rating of Residual Impacts Related to Increased Risk of Road Traffic Accidents (Post-Mitigation)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local and regional</td>
<td>The transportation of goods, services, people and product to and from site to the port to Mekele and other places will occur at a local and regional level.</td>
</tr>
<tr>
<td>Duration</td>
<td>Medium to Long term</td>
<td>The risks associated with the impact will remain at a reduced magnitude throughout the life of mine. Exposure to the risk should be reduced through mitigation.</td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
<td>The scale of the impact is large due to the potential of increased road traffic accidents leading to death.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Rare</td>
<td>The occurrence of accidents is likely to be rare.</td>
</tr>
</tbody>
</table>

**Magnitude**

<table>
<thead>
<tr>
<th>Rating of Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium Magnitude</td>
</tr>
<tr>
<td>Significant Rating After Mitigation</td>
</tr>
<tr>
<td>Moderate Negative Impact</td>
</tr>
</tbody>
</table>
11.6 **IMPACTS RELATED TO LABOUR AND WORKING CONDITIONS**

The impacts to the labour and working conditions of Yara Dallol BV employees are discussed in this *Section* and include:

- Exposure of workforce to health and safety standards incidents; and
- Exposure of workforce to insufficient labour and working standards.

11.6.1 *Exposure of Workforce to Health and Safety Incidents*

*Description of the Baseline Environment*

Conditions of employment in Ethiopia are outlined in the Labour Proclamation 2003. This legislation sets out the basic conditions of employment including working hours, occupational health and safety, collective bargaining, termination of employment etc. Further to this, Ethiopia ratified the International Labour Organisation’s (ILO) Occupational Safety and Health Convention (No. 155) in 1991, and several other ILO conventions relating to labour conditions including the Abolition of Forced Labour Convention (No. 105) and Worst Forms of Child Labour Convention (No. 182) in 1999 and 2003 respectively. Relevant Ethiopian legislation includes Part 7 of the Ethiopian Labour Amendment Proclamation (No. 494 of 2006) that outlines occupational health, safety and working environment requirements.

Despite these legal measures during the stakeholder engagement activities the local population lacked knowledge of labour laws including health and safety standards.

*Proposed Project Activities*

Yara Dallol BV is committed to complying with both Ethiopian legislation and international requirements including the relevant IFC Guidelines and Performance Standard. When Ethiopian regulations differ from the levels and measures presented in the employment and EHS Guidelines, the proposed Project will be expected to achieve whichever is more stringent.

Yara Dallol BV has developed a Health and Safety Policy Statement which outlines the provisions of the Project’s Safety, Health and Environmental (SHE) Management System that includes:

- Safe and healthy working conditions;
- Arrangements for the operation, design and maintenance of safe systems for work;
- Proper maintenance of machinery;
- Information, instruction, training and supervision appropriate to the company’s activities; and
Arrangement for consultation with employees and their representation of health and safety matters.

Yara Dallol BV has committed to continue to develop their SHE Management System in alignment with international good practice. Yara Dallol BV has also developed an Emergency Response Plan (ERP) that identifies the appropriate response to incidents using a comprehensive response matrix. Yara Dallol BV has trained personnel and emergency equipment in place in the event of any emergency and all site personnel, including contractors, are to be trained in the appropriate responses for fire and accident emergencies. Yara Dallol BV has developed an Emergency Evacuation Plan (EEP) that applies to all contractors and authorised visitors on site. The EEP provides a detailed procedure should an emergency evacuation of the camp be ordered.

Mining and associated processing in the Danakil, albeit solution mining, involves inherent hazards. Without careful management the workforce employed to support the proposed Project may be exposed to these risks as a result of unplanned events or failures in existing systems, potentially resulting in injury or death. These may include, but not limited to:

- Exposure to dehydration and hyperthermia (heat stress) related to the extreme temperature;
- Injury associated with the use of machinery during construction and operation;
- Injury from vehicle (including aviation) accidents while travelling to and from and within the site;
- Vehicle and machine interfaces;
- Falls from height;
- Dropped objects;
- Exposure to noise;
- Exposure to dusts;
- Excavation (fall of ground from excavations);
- Exposure to poisonous insects, snakes etc.;
- Manual handling;
- Exposure to hazardous materials (including chemicals);
- Exposure to water hazards and drowning;
- Exposure to radiation sources; and
- Exposure to electricity both associated with portable and fixed equipment including medium and high voltage systems, sub-stations, transmission systems and others.

It should be noted that due to the extreme environmental conditions in the area surrounding the proposed Project baseline ambient air quality and temperature are very high.

*Sensitive Receptors*

As the number of employees increase it will become more difficult to manage the workforce and enforce the necessary health and safety standards, particularly amongst contractor staff and their sub-contractors. In addition the unskilled labour force is less likely to be accustomed to working to
national and international health and safety standards which may leave them more at risk of unsafe behaviours.

Furthermore, working in a remote area, in a country with less stringent and frequently poorly enforced labour laws and using primary and secondary subcontractors may result in Yara Dallol BV, contractors and suppliers being underprepared to meet national and international requirements, placing employees at risk. Typically the lower down in the ‘subcontractor hierarchy’ a supplier is, the greater the risk for failures implementing health and safety standards and therefore higher risk of exposure of workers to health and safety hazards.

The sensitivity of receptors is evaluated to be medium. Employees from other regions in Ethiopia and international employees are likely to have a better understanding of health and safety standards, and therefore understand the relevance of any training and mitigation measures and appropriate working conditions. However, employees sourced from the SSA may have a higher vulnerability due to a poorer understanding of Occupational Health and Safety (OHS) standards and working conditions, and lower literacy levels.

**Significance of Impact (Pre-mitigation)**

Based on the analysis provided above, this impact has been assessed as a **Moderate Negative Impact** prior to mitigation (refer to Table 11.24).

**Table 11.24** Rating of Impacts Related to Exposure of Workforce to Insufficient Health and Safety Standards (Pre-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local to Regional</td>
<td>The impact is only relevant for Yara Dallol BV’s workforce (including contractors) they may come from elsewhere in Ethiopia.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long-term</td>
<td>Without mitigation and management measures the impact may continue for the duration of the Project. Severe consequences of the impact will potentially result in permanent impacts.</td>
</tr>
<tr>
<td>Scale</td>
<td>Small to Medium</td>
<td>Depending on the type of health and safety incident experienced changes to quality of life may substantial.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Intermittent</td>
<td>Impact is likely to recur / occur intermittently and potentially for prolonged periods of time if management measures are not implemented and monitored.</td>
</tr>
</tbody>
</table>

**Magnitude**

| Sensitivity/Vulnerability/Importance of the Resource/Receptor | Medium Sensitivity |

Receptors to this impact may include those contracted or subcontracted to work on the Project. Receptors with heightened sensitivity may include employees who have a poor understanding of the requirements of OHS standards.

**Significant Rating Before Mitigation**

| Moderate Negative Impact |

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**Table 11.24** Rating of Impacts Related to Exposure of Workforce to Insufficient Health and Safety Standards (Pre-Mitigation)
Mitigation/Management Measures

In order to avoid and reduce the significance of this impact Yara Dallol BV should develop and implement an Occupational Health and Safety (OHS) Plan with the goals of:

- Achieving Zero Harm to employees;
- Demanding visible leadership, with clear accountabilities, that encourages effective employee, contractor and supplier participation in achieving its goals;
- Strengthening the capability of employees and contractors to recognise and control the potential impact of their activities;
- Identifying, controlling and monitoring health and safety risks in construction and operational areas;
- Ensuring the risk-based objectives, targets and actions are set, reviewed and integrated into business planning and decision-making processes;
- Providing and developing adequate resources and expertise to manage health and safety performance;
- Striving to implement the best available practices and technology to deliver health and safety excellence;
- Building from a foundation of compliance with applicable legal and other requirements; and
- Working on the on-going improvement of management systems and work practices.

The OHS management plan should include but not be limited to:

- Hazard identification and risk assessment procedure;
- A ‘fitness for work’ programme to ensure that all employees are physically able to undertake their work without impact to their health;
- An occupational health and safety monitoring and surveillance programme;
- Mandatory OHS training programmes (including awareness-raising of disease vectors) provided to all employees, including contractors to ensure staff are aware of the health and safety guidelines;
• Specific OHS training programmes provided for workers assigned to tasks associated with particular H&S risks;

• Development of camp and workforce management protocols that reflect Yara Dallol BV’s OHS standards and contractually require all contractors to comply as minimum standard;

• The provision and enforcement of use of appropriate Personal Protective Equipment (PPE) based on task based hazard analysis;

• Visual warning signs in place, including those for the electrical and mechanical equipment safety warnings, and chemical hazard warnings; and

• Toolbox talks or health and safety meeting on a daily basis to ensure that procedures are being adhered to, and to discuss any incidents that have occurred.

In addition to an OHS Plan and associated monitoring programs put in place to verify the effectiveness of prevention and control strategies the following measures should be adopted so as to help to mitigate this impact.

**Engagement with Workforce**

• All workers (including those of primary and secondary third party contractors) should have contracts that clearly state the OHS terms and conditions of their employment and their legal rights, with copies provided in relevant local languages. Contracts should be verbally explained to all workers where this is necessary to ensure that workers understand their rights. This engagement should include OHS induction and training. Yara Dallol BV should implement a worker feedback mechanism and OHS event reporting system that allows workers (including contractors) to report health and safety events or issues.

**Contractor Auditing and Supply Chain Management**

• All contractors should be audited on at least a quarterly basis for adherence to the relevant Ethiopian laws and Yara Dallol BV’s (international) OHS standards.

• All contracts for primary and secondary contractors should specify OHS performance and monitoring in their contracts and should be required to action gaps in an agreed period.

• All primary suppliers should be audited on a bi-annual basis for adherence to both national requirements and Yara Dallol BV’s OHS standards. Regular auditing should serve to monitor Yara Dallol BV’s primary supply chain and identify any significant changes or new risks arising.
Where significant health and safety risks are identified related to supply chain workers Yara Dallol BV should introduce specific procedures and mitigation measures to address these risks over a specified time period. If risks are not addressed Yara Dallol BV should look to change the primary supply chain by selecting suppliers that comply with Yara Dallol BV’s OHS standards and national requirements.

A central part of supply chain management should consider identifying potential risks related to significant safety incidents, damage to the environment or use of child or forced labour.

**Residual Impact (Post-mitigation)**

Based on the implementation of the proposed mitigation measures, the significance of the impact will be assessed as a Negligible Negative Impact (refer to Table 11.25).

**Table 11.25** Rating of Residual Impacts Related to Exposure of Workforce to Insufficient Health and Safety Standards (Post-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local to Regional</td>
<td>The impact is only relevant for Yara Dallol BV’s workforce (including contractors) they may come from elsewhere in Ethiopia.</td>
</tr>
<tr>
<td>Duration</td>
<td>Short-term</td>
<td>The impact is less likely to have a long-term / permanent impact if mitigation measures are implemented, however exposure will be due to a short term failure in management measures.</td>
</tr>
<tr>
<td>Scale</td>
<td>Small</td>
<td>A potential reduction in the number of employees that are exposed / experience the impact throughout all phases. (Supply chain numbers not included).</td>
</tr>
<tr>
<td>Frequency</td>
<td>Rare</td>
<td>Decline in the frequency of the impact occurring from recurrent to rare.</td>
</tr>
</tbody>
</table>

**Magnitude**

- Small Magnitude
- Significant Rating After Mitigation
- Negligible Negative Impact

**11.6.2 Exposure of Workforce to Insufficient Labour and Accommodation Standards**

This Section considers the potential for the workforce to fail to enjoy proper access to their rights related to labour and working conditions due to the deployment of labour on the proposed Project. This is focussed on the potential for adverse conditions to arise for workers and the steps needed to prevent this, as opposed to the impact of the Project on the community.
Description of the Baseline Environment

The assessment is carried out against provisions in relevant national laws and international standards and in Performance Standard 2: Labour and Working Conditions of the International Financial Corporation (IFC PS2) which seeks to protect the fundamental rights of workers including their right to freedom of association, non-discrimination, a safe working environment and protection of vulnerable groups such as children and migrant labour.

This Section deals with all individuals working on construction, operation and eventual closure of the Project, including staff employed directly by the Project (referred in the remainder of this chapter as Project employees) and employees of contractors and subcontractors (referred to as contractor employees). All mitigation measures will apply equally to both Project and contractor employees. This Section also considers the potential for risks to those employed indirectly in the Project supply chain; that is in enterprises providing goods and services to the Project such as local suppliers of food and maintenance services. In accordance with IFC PS2, these supply chain risks are focussed on child and forced labour and life-threatening safety issues only (see Section 11.6.1).

Legislation and Standards

The key Ethiopian legal framework for labour relations are embedded in the -

- Constitution of the Federal Democratic Republic of Ethiopia (1995);
- Labour Amendment Proclamation (No. 494 of 2006)
- Occupational Safety and Heat Directive 2008, Ministry of Labour and Social Affairs; and
- International Labour Organisation’s (ILO).

The provisions of each are summarised in Box 11.6, Box 11.7, Box 11.8 and Box 11.9 below.
Box 11.6  Constitution

Under the Constitution of the Federal Democratic Republic of Ethiopia (Proclamation No. 1/1995, Chapter 3 contains the fundamental rights and freedoms of the population. The fundamental rights have been grouped under the headings, "Human Rights" and "Democratic Rights". Among these fundamental rights, a whole range of general principles of labour rights are included in the constitution. The constitution provides for principles such as the right of the security of the person (Article 16 of the Constitution), the prohibition against inhuman treatment and the abolishment of slavery and servitude (Article 18 (2)) and forced and compulsory labour (Article 18 (3) and (4) of the Constitution).

General Freedom of Association is laid down in the Constitution (Article 31, "for any cause or purpose"), and specified in Article 42, “Rights of Labour”, which reads: “Factory and service sector employees, peasants, agricultural workers, other rural workers, government employees below a certain level of responsibility and the nature of whose employment so requires, shall have the right to form associations for the purpose of improving their economic and employment conditions. This right shall include the right to form trade union and other associations and to negotiate with their employers and other organizations affecting their interests”. The Right to Strike is explicitly mentioned in Article 42 (1) b) of the Constitution. This article, in its paragraph 2, also lays down the right to reasonable limitation of working hours, to rest, to paid leave and to healthy and safe working environment.

Article 35 of the Constitution deals with the rights of women, such as equality with men (Article 35(1)), in particular in employment, promotion, pay and the transfer of pension entitlements (Article 35(7), and 42 (1) d)). The Constitution grants the right to maternity leave with full pay, as well as prenatal leave with full pay, in accordance with the provisions of the law (Article 35(4) a) and b)).

Article 36 on the rights of children states, “every child has the right not to be subject to exploitative practices, neither to be required not permitted to perform work which may be hazardous or harmful to his or her education, health or well-being”.

Box 11.7  Labour Laws

Relevant Ethiopian legislation the Ethiopian Labour Amendment Proclamation (No. 494 of 2006) outlines the basic conditions of employment, occupational health, safety and working environment requirements.

Labour Proclamation No. 377/2003 is the principal source of labour law in Ethiopia. Ethiopian Labour Amendment Proclamation (No. 494 of 2006) amends the previous Labour Proclamation No. 42/1993 and 2003; some of the significant changes to the legislation include:

- It introduces an obligation of employers to maintain records;
- It introduces a clear ban for compulsory HIV/AIDS testing (Article 14 (2) d);
- It strengthens the workers' position in case of termination (Article 27 (2) and (3);
- It clarifies regulations on severance pay and compensation, disablement payment and dependants benefits (Arts. 39, 40, 109, 110);
- It creates the full guarantee of freedom of association by abolishing trade union monopoly (Article 114), provided that the number of members of the union is not less than ten;
- It introduces a simpler system of collective bargaining and labour dispute settlement, with specified time limits to speed up the resolution of conflict (Articles 130 (2), 142 (3), 143 and 151);
- It intends to improve the efficiency of the Labour Relation Boards (Articles 145, 147(4), 149 (6), 150, 153 and 154); and
- It restricts the definition of “essential services” (Article 136 (2)), excluding railway and inter-urban bus services, filling stations and banks, thereby entitling workers or employers of these undertakings to the right to strike or lockout.

Other labour regulation(s), include the Civil Code (Civil Code Proclamation, No. 165/1960), title XVI, “Contracts for the Performance of Services”, specifically Articles 2515 to 2639, which contain regulations on general employment contracts, specific forms of employment, such as for domestic servants living in, and wage regulations.
Box 11.8  Occupational Health and Safety

Constitution (1995), Article 42/2: Rights of Labour provides the context to a worker’s right for healthy and safe work environment.

Section 92 outlines the obligations of an employer in terms of health and safety of the workers. These are:

- Comply with the occupational health and safety requirements provided for in the law;
- Take appropriate steps to ensure that workers are properly instructed and notified concerning the hazards of their respective occupations and the precautions necessary to avoid accident and injury to health; ensure that directives are given and also assign safety officer;
- Provide workers with personal protective equipment, clothing and materials and instruct them of their use;
- Register employment accident and occupational diseases and notify the labour inspection of same;
- Arrange, according to the nature of the work, at his own expenses for the medical examination of newly recruited workers and for those workers engaged in hazardous work, as may be necessary;
- Ensure that the workplace and premises do not cause danger to the health and safety of the workers;
- Take appropriate pre-executions to ensure that all the processes of work shall not be a source or cause of physical, chemical, biological, ergonomical and psychological hazards to the health and safety of the workers; and
- Obey the directives issued by the appropriate authority in accordance with this Proclamation.

Section 93 lists the obligations of the workers in terms of health and safety; which include:

- Cooperate with the employer in the formulation and implementation of work rules to safeguard the workers’ health and safety;
- Inform forthwith to the employer any defect related to the appliances used and injury to health and safety of the workers that he discovers in the undertaking;
- Report to the employer any situation which he may have reason to believe could present a hazard and which he cannot remedy on his own any accident or injury to health which arises in the course of or in connection with work.
- Make proper use of all safeguards, safety devices and other appliances furnished for the protection of his health or safety and for the protection of the health and safety of others; and
- Obey all health and safety instructions issued by the employer or issued by the competent authority.

HS promotion included in priorities

Box 11.9  International Standards

Ethiopia is signatory to all International Labour Organisation’s (ILO) fundamental conventions; namely:

- Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87);
- Right to Organise and Collective Bargaining Convention, 1949 (No. 98);
- Forced Labour Convention, 1930 (No. 29);
- Abolition of Forced Labour Convention, 1957 (No. 105);
- Minimum Age Convention, 1973 (No. 138);
- Worst Forms of Child Labour Convention, 1999 (No. 182);
- Equal Remuneration Convention, 1951 (No. 100), and
- Discrimination (Employment and Occupation) Convention, 1958 (No. 111).

IFC Performance Standard 2: Labour and Working Conditions
Approved in 2011 and effective from January 1, 2012, the new IFC Performance Standards are designed to help companies avoid and mitigate adverse impacts and manage risk as a way of doing business sustainably. IFC PS 2 deals directly with labour and working conditions. It aims to:

- Promote fair treatment, non-discrimination and equal opportunity of workers;
- Establish, maintain, and improve the worker-management relationship;
- Promote compliance with national employment and labour laws;
- Protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the company’s supply chain;
- Promote safe and healthy working conditions, and the health of workers; and
- Avoid the use of forced labour.
Proposed Project Activities

Yara Dallol BV will employ an estimated 1,000 people during the construction and 800 during the operational phase of the proposed Project. As such there is a high risk of exposing the workforce to insufficient labour and working conditions. Such risks will not only harm the workforce, but they will also have reputational and business risks for Yara Dallol BV.

Some of the concerns/ issues that have occurred during the exploration phase have been related to a lack of education and knowledge of labour and contract laws. There have been issues related to a lack of contracts translated in the local language (Afar). This has led to some locals believing that they were fired when their contracts ended, with the confusion stemming from a lack of understanding the law of contracts.

Sensitivity Receptors

The sensitivity of the workforce including those employed directly by Yara Dallol BV’s Contractors is summarised below against core Ethiopian labour laws.

Human Resources Policies and Procedures

Yara Dallol BV does not have a local human resources (HR) department as yet although Yara International ASA operate a global human resources function; and they are highly dependent on Arden for its recruitment activities. Arden has its own human resources policies and procedures that are not linked to Yara Dallol BV. As Yara Dallol BV moves towards construction and thereof operations, they are planning to develop their fully fledged own HR Department. At the time of writing some of the human resources and procurement policies and procedures for Yara Dallol BV were under development.

The HR policies and procedures will apply specifically to Yara Dallol BV, with some policies and procedures from Yara International ASA also adopted by the workforce in Ethiopia.

Box 11.10 Sensitivity of the Receptor

| Vulnerability: Project employees will have several means to claim their rights and benefits, in particular through complaints addressed to their representatives, the Project grievance procedure and legal redress. As a consequence, vulnerability is low for Project employees. |
| Where workers are employed by contractors, there is a greater risk that local and overseas companies used during construction will have inadequate human resource policies and procedures and a lack of capacity to deal with human resource issues, and, as a consequence, vulnerability will be medium for contractor employees. |
**Working Hours**

Normal working hours in Ethiopia are eight hours a day or 48 hours a week (Article 61). These should be distributed evenly, but may be calculated over a longer period of time (Articles 63 and 64). Workers are entitled to a weekly rest period of 24 non-interrupted hours in a period of seven days. Unless otherwise stated in a collective agreement, the weekly rest should be on Sunday, but another day may be chosen for certain services (Article 70).

Any work exceeding the normal working time of 48 hours a week is overtime. Overtime is only permissible for up to two hours a day, or 20 hours a month, or 100 hours a year, in the following cases (Article 67). The overtime payment ranges from a rate of one and one quarter (1 ¼) of the ordinary hourly rate (from 6 a.m. to 10 p.m.) to two and one half (2 ½) on public holidays.

**Box 11.11 Sensitivity of the Receptor**

While long working hours and overtime paid at a premium will potentially have a positive impact on livelihoods of workers, such practices could have a negative impact on their enjoyment of working conditions in accordance with national law and international standards, create a risk to their health and safety and have negative impacts on their social and family lives. The construction schedule is likely to lead to the requirement for working long hours. The vulnerability is low for Project employees and medium for contractor employees.

**Wages and Leave**

Articles 53 and 54 of the Proclamation define “Wages” as the regular payment to which the worker is entitled in return for the performance of the work that he performs under a contract of employment. Overtime pay, allowances, bonuses, etc. are not considered as “wages”. Under Article 162 (2), claims for payment of wages, overtime and other payments shall be barred after six months from the date they became due. In case of bankruptcy of the employer, wages enjoy priority.

Annual, uninterrupted leave with pay shall be a minimum of 14 working days, plus one working day for every additional year of service (Article 77). Additional leave is granted for employees engaged in particularly hazardous or unhealthy work. It is forbidden to pay wages in lieu of the annual leave (Article 76). Under Articles 73 to 75, public holidays are paid. A worker who is paid on a monthly basis will not be subjected to a reduction in wages for not working on a public holiday. An employee who works on a public holiday is entitled to the double of his or her ordinary hourly wages. Employees are entitled to maternity leave, which is to start from 30 days prior to due date of birth, and end not less than 60 days after birth of the child. Maternity leave is classified as paid leave (Article 88 (3) to (4).
Worker Organisations (trade unions)

The Constitution recognizes the right to freedom of association, the right to form and join a trade union and the right to participate in trade union activities. Part 8, Chapter 1 of the Ethiopian Labour Proclamation stipulates the right of both workers and employers to form organizations of their own and to participate in them.

There are trade unions (formed by workers), employer's associations, federations (organization established by more than one trade unions or employers' association) and confederations (established by more than one trade union federations or employer federation). The Proclamation allows the formation of federations and confederations and the right to join international organizations (Articles 114 (5) and (6)). Article 114 (3), (4), (5) and (6) of the Proclamation permits the establishment of federations and confederations by registered trade unions and employers' associations. Subsection 8 allows individual employers to join established employers' federations.

Equality

The Constitution guarantees the right to equality in employment, promotion, pay and the transfer of pension entitlement (Article 35 (8) of the Constitution). The Labour Proclamation in its Article 14 (Unlawful Activities) penalizes any discrimination against female workers in matters of remuneration, on the ground of sex (Article 14 (1) b)) and contains a general provision of anti-
discrimination on the basis of sex, religion, political outlook “or any other condition” (Article 14 (1) f)).

**Box 11.14 Sensitivity of the Receptor**

The absence of specific communication and training on discrimination issues at company level, there is risk that Project and contractor employees during all phases of the Project, and in particular women and workers from ethnic minorities, will not benefit from adequate protection against discrimination. Women and workers from ethnic minorities are vulnerable even though complaints and grievance procedures can be used.

**Retrenchments**

Generally any contract of employment might be terminated by both parties, and in accordance with the provisions of the law or a collective agreement. The contract of employment can be terminated on the following grounds:

- On expiration of the agreed period of employment (Article 24 (1));
- By death of the worker (Article 24 (2));
- On retirement of the worker (Article 24 (3));
- By the insolvency of the employer; completion of the specified task (Article 24 (4));
- By the impossibility of performance, where the worker becomes partially or permanently unable to perform his or her obligations in terms of the contract (Article 24 (5)); and
- By mutual agreement (Article 25).

Generally a worker can terminate the contract of employment giving prior notice of fifteen days (Art. 31). Under Article 32(1) good cause for termination without notice from the side of the worker are:

- Criminal assault from the side of the employer against him or her; and
- If the employer has repeatedly failed to fulfil his basic obligations.

The contract of employment may not be terminated in the absence of a justified reason.

Article 26 of the Labour Proclamation expressly recognizes the following grounds for termination of the employment contract:

- Misconduct on the part of the employee;
- The employee's poor work performance and/or incapacity; and
- The operational or organizational requirements of the undertaking.

The following grounds do not constitute legitimate grounds for termination and make any dismissal unfair (Article 26 (2)):

- Membership in a trade union or participation in its lawful activities;
- Seeking or holding office as a workers representative;
• Submission of grievance or the participation in proceedings against the employer; and
• His or her nationality, sex religion, political outlook, marital status, race, colour, family responsibilities, pregnancy, lineage or social status.

Box 11.15  Sensitivity of the Receptor

Restructuring during the Project and at closure could lead to a need for retrenchment of staff. The complexities inherent in implementing retrenchment procedures on a large scale create a risk related to the absence of adequate protection and severance payments. At the time of mine closure, the Project’s employees will have little choice and face retrenchment. However, employees have means to claim their rights and benefits, notably through their union representatives who will be informed and consulted on any retrenchment plan.

Settlement of Individual Labour Disputes

Labour disputes are generally regulated as part of the Ethiopian Labour Proclamation. Individual disputes fall under the jurisdiction of labour divisions at the ordinary courts, established “as may be necessary” at each regional first instance court (Article 137(1)). Article 138(1) lists the following individual labour disputes as examples:

• Disciplinary measures including dismissal;
• Claims related to the termination or cancellation of employment contracts;
• Questions related to hours of work, remuneration, leave and rest day;
• Questions related to the issuance of certificate of employment;
• Claims related to employment injury; and
• Unless otherwise provided for in this proclamation, any criminal and petty offences under this proclamation.

The decision is to be taken within 60 days. Appeal lies with the labour division of the regional court. The jurisdiction of the labour division of the regional court is defined in Article 139. The decision of the Court in matters of appeal is final (Article 140 (2)). The general court procedure follows the Civil Procedure, laid down in the Civil Procedure Code Decree, No.3/1965.

Box 11.16  Sensitivity of the Receptor

Even with the best policies and practices, there is always a risk that the Project may cause or contribute to negative impacts on workers’ rights that are not foreseen or cannot be prevented. Workers whose rights are negatively impacted by Project activities need to have access to remedies. In this context, if a grievance procedure was not formalised and communicated this would have a negative impact on workers who would not to be able rise grievances and have them properly addressed.

When trade unions are present in the company, workers have other means to raise their concerns or complain.
Collective Bargaining

The Ethiopian Labour Proclamation states that one of its central objectives is to promote collective bargaining as a means of maintaining industrial peace and of working in the spirit of harmony and cooperation towards the all-round development of the country (Preamble).

Details are regulated in Chapter 2 of the Labour Proclamation. Article 124 defines “collective agreement” and “collective bargaining”. The first is “… an agreement concluded in writing between one or more representatives of trade unions and one or more employers or agents or representatives of employers organizations”, whereas the latter is defined as “negotiation made between employers and workers organizations or their representatives concerning conditions of work or collective agreements or the renewal and modifications of the collective agreement”. Article 125 (1) grants the right to collective bargaining to trade unions on the one hand and to employers or employers' organizations on the other hand.

Collective agreements apply to all parties covered (Article 134(1)) and where their provisions are more favourable to the workers than those provided by law (Article 134 (2)). The collective agreement remains in force even after a trade union, which is party to the agreement, is dissolved. Under Article 133 (3), the duration of an agreement is fixed at three years unless expressly stipulated otherwise.

Box 11.17 Sensitivity of the Receptor

There is a collective bargaining understanding in place in relation to mine employment and developing grievance mechanisms. As a consequence, vulnerability is low for direct employees and during operations. Conversely, weak enforcement mechanism in the field of labour rights may means that contractors workers and during construction may have little to no means to secure their rights. As a result their vulnerability is high. During closure, consultation with worker representatives is particularly important and any failure to consult could have significant impacts on workers.

Workforce Accommodation

There are no specific requirements applying to workforce accommodation in the labour legislation.

Box 11.18 Sensitivity of the Receptor

The Project’s construction and operational workforce will be mostly accommodated in a self-sufficient camp. There will be risks associated with the living conditions within the camp especially with the presence of workers from different cultures and ethnic backgrounds, has the potential to lead to tensions between workers. In very restricted circumstances, some limitations on workers’ freedom of movement may be put in place where this is shown to be necessary to manage community impacts and security risks.
**Occupational Health and Safety**

Fundamental occupational health and safety obligations of the employer are spelt out in Article 92 of the Labour Proclamation. Under the legislation the employer is obliged to comply with the occupational health and safety requirements provided for in the law; take appropriate steps to ensure that workers are properly instructed and notified concerning the hazards of their respective occupations and the precautions necessary to avoid accident and injury to health; ensure that directives are given and also assign safety officer; provide workers with personal protective equipment, clothing and materials and instruct them of their use; register employment accident and occupational diseases and notify the labour inspection of same; and others obligations.

In turn, Article 93 lists the obligations of the employee in terms of their own health and safety; with Articles 95 to 112 describing occupational injuries and compensation thereof.

**Box 11.19 Sensitivity of the Receptor**

Given the nature of the Project and the use of large numbers of contractors, protecting the health and safety of Project and contractor employees and proper implementation of procedures with respect to training, monitoring and enforcement, will be challenging during construction, operation and closure. Any difficulties in meeting the Project’s strict standards would have a negative direct impact on workers in terms of their safety and health.

In relation to contractors, there is a risk that where health and safety systems do not function adequately, workers would have no choice but to keep working despite the lack of adequate training in occupational health and safety or use of personal protective equipment.

Overall, should the workforce experience insufficient labour and accommodation standards they will be negatively impacted including affecting their legal rights, their psychological well-being, as well as increasing the chances for health and safety impacts such as increased disease and to conflict.

Receptors to this impact may include those contracted or subcontracted to work on the Project. Sensitive receptors may include employees who have a poor understanding of the level of national and international requirements for labour and accommodation standards or a lower literacy levels.

**Mitigation/Management Measures**

Assessing potential Project labour and working conditions risks requires analysing the possibility that workers involved on the proposed Project, either directly or through contractors and suppliers, will not enjoy the benefit of the rights and entitlements provided for in law, collective bargaining agreements, contracts of employment and other applicable standards (notably IFC PS2) related to employment, health and safety and workplace conditions.
To ensure that the mitigation measures for protection of workers are applied to all Project personnel through all project phases, Yara Dallol BV should:

- Consider human resources, labour rights and labour relations issues in pre-qualification of contractors and suppliers, taking into account the size and nature of the companies likely to apply for prequalification.

- Include a specific assessment of recruitment practices for companies using high levels of unskilled labour and companies coming from countries where a specific risk has been identified.

- Work with the contractors to ensure adequate resources and technical knowledge to cover issues relating to labour rights and working conditions.

- Work with the contractors to ensure development of appropriate policies and procedures and in particular covering working conditions, non-discrimination and grievances.

- Ensure that the grievance mechanism is adequately communicated to workers at the time of recruitment.

- Develop a detailed monitoring framework to capture information on labour and working conditions of workers engaged in the Project.

**Human Resources Policies**

In the absence of adequate state monitoring, and enforcement mechanisms or capacity, the likelihood of breaches of worker rights depends primarily on the implementation by companies of adequate policies and procedures. Any adverse labour and working conditions will be significantly mitigated by adherence to national law, international standards, collective bargaining agreements and contracts of employment, and establishment and operation of management systems to guarantee that workers and contracted workers benefit from these rights. The following sections describe how the Project should respond to these requirements.

The development and application of rigorous human resource policies within the proposed Project and its contractors will have positive impacts for not only for the enjoyment of the rights and quality of work anticipated by national law and international standards, but also for the commercial sustainability of the proposed Project. To ensure proposed Project workers are aware of relevant human resources policies and procedures, Yara Dallol BV should:

- Review and adapt human resources policies and procedures with sufficient resources to ensure their smooth implementation throughout the proposed Project’s life and apply the same principles through its organisation and those of its subcontractors.
• Continue to develop the resources and capacity of the Human Resources Department.

• Communicate the internal regulations, the collective bargaining agreement and relevant policies to all workers at the time of their recruitment prior to the start of work and annex these regulations and documents to workers’ contracts of employment.

• Strengthen the promotion and communication of human resources policies, in particular regarding discrimination on grounds of gender or ethnicity, sexual harassment and freedom of association.

• Deliver advance training about workers’ rights and benefits in the induction sessions given to all new starters included workers with low literacy rates.

• Develop awareness modules on workers’ rights and obligations in collaboration with relevant trades unions.

• Work with its contractors to develop support for consistent HR capacity and policies, including requirements on contents of contractor’s HR policy and the roles and responsibilities of their Human Resources Departments.

• Undertake monitoring of implementation and regular audits of the proposed Project’s own procedures and those of contractors for corrective actions.

**Working Hours and Leave**

To manage working hours, Yara Dallol BV should:

• Employ an appropriate number of workers to avoid undue pressure on hours worked by employees.

• Assert rules around working hours and exercise control of overtime, and any payment of overtime premiums, to ensure that the limits set in the law and company policy are understood and respected.

For contractor employees Yara Dallol BV should:

• Ensure contractors have adequate policies and procedures on working hours and the use of overtime in compliance with the law.

• Develop mechanisms to monitor the correct implementation by contractors of procedures on hours and overtime.

• Develop key reporting indicators on hours for contractors (number of hours work, volume of overtime by category of personnel).
• Periodically audit contractors for compliance with legislation, policies and procedures.

• Include questions on working hours in any audits conducted at contractors.

• Ensure that all workers understand that they may lodge grievances or contact trade union representatives in relation to excessive working hours.

Wages and Benefits

The negotiation of wages and benefits with trade union representatives and their correct implementation provides an opportunity for positive impact on workers beyond the requirements of the law and applicable collective bargaining agreements applicable in the mining sector. In relation to wages and benefits, Yara Dallol BV should:

• Ensure timely payment of wages and benefits and provide payslips to all workers.

• Avoid the use of daily workers as far as possible.

• Review daily worker rates to ensure that it allows workers to both meet basic needs (housing, energy, nutrition, clothing, health care, education, potable water, childcare and transportation) and provide some discretionary income.

• Benchmark daily worker rates against the wages of permanent unskilled workers in the project and other companies.

• Allow daily workers to select their own representatives to negotiate on their behalf and ensure their workplace concerns can be raised.

• Participate in surveys of wages in the similar industry and areas of operation using interviews with local communities and workers.

• Gather, in coordination with relevant partners, data on basic food and energy and housing prices to understand how income is used and use an internationally accepted methodology to determine the poverty line and the level of living wages.

• Develop a mechanism for regular review of wages in consultation with workers’ representatives and based on a series of objective criteria.

• Review working hours sign-off procedures to avoid difficulties for workers in obtaining supervisor sign-off on timesheets.

For contractor employees the Yara Dallol BV should:
- Ensure that contractors have developed adequate policies and procedures on wages including detailed wage structure and that these policies and structures are communicated to the proposed Project.

- Develop mechanisms to monitor the correct implementation by contractors of procedures on wages and benefits.

- Development of key reporting indicators on wages for contractors (details of wages paid by category of personnel, regularity of payment etc.).

- Inclusion of questions on wages in any audits conducted at contractors.

- Review of documentation related to payment of wages.

Workers’ Organisation - Trade Unions, Freedom of Association and Collective Bargaining

The risk of infringement of workers’ rights to representation should be mitigated by creating an environment favourable to the development of healthy worker / management relationships based on workers representation, consultation and participation, and strengthening the capacities of union representatives to act on behalf of those who they represent, Yara Dallol BV should:

- Promote an open dialogue with trade union representatives.

- Take measures to support trade union representatives’ understanding of their role and to develop their capacities in the field of labour rights and negotiation.

- Formalise the procedures around communication and exchange of information with union representatives to ensure that information needed for meaningful discussion or negotiation is received in a timely fashion.

- Develop a framework to determine areas for consultation with trade union representatives.

For contractor employees Yara Dallol BV should:

- Ensure that contractors have designed adequate policies on trade unions and should not restrict or discourage workers from forming or joining union.

- Work with the trade unions, contractors and relevant public officials to discuss employment issues related to the contracted construction workforce.
Equality

To minimise the risk of discrimination Yara Dallol BV should:

- Communicate its discrimination policies, in particular with regard to gender and ethnic discrimination and migrant workers.

- Ensure its grievance mechanism has personnel trained to receive complaints regarding sexual harassment.

- Keep under review the need to monitor wages received by female and male workers.

- Ensure policies and procedures on non-discrimination and equal opportunity cover aspects of recruitment, termination, working conditions and terms of employment.

Retrenchments

Where reductions in workforce are anticipated, Yara Dallol BV should:

- Develop and apply a retrenchment plan based on IFC PS 2, including: seeking alternatives to retrenchment, consultation with workers, non-discrimination, compliance with national law and collective bargaining agreements, and ensuring that all relevant payments are made to workers.

- Undertake an orderly reduction in mine workforce as operations wind down, in accordance with a planned approach to mine closure and addressing the changing mix of skills likely to be required as the operation moves from full production through rehabilitation and decommissioning to closure and long term monitoring.

- Address the need to retain a skilled workforce through to the end of the operation and at the same time provide skills and opportunities for employees to transition to other employers or careers.

- Reduce the workforce following good international practice on labour retrenchment.

- Ensure that human resources staff have received adequate information and training to manage the retrenchment correctly.

- If the retrenchment is envisaged to be significant, undertake a social impact assessment to analyse the potential adverse impacts on the community to assist with the retrenchment planning.

- Develop and implement communication timetables to prepare employees and the broader community of Project phase transitions and implications for direct, indirect, and induced employment. (Communication activities
with the broader community will be included in the Project Stakeholder Engagement Plan.

- Undertake assessments of the proposed Project supply chain (including both indirect and induced businesses) prior to the next phase to determine regional and local economic linkages with the Project. Following those assessments, the proposed Project should develop appropriate responses to support businesses’ capacity to meet new demands or expand into alternative markets (e.g. industry referrals, access to finance, vocational training for Small and Medium Enterprises).

**Settlement of Individual Labour Disputes**

To ensure an adequate approach to managing grievances is available to its workers the Project should establish and operate a Grievance Procedure designed to receive and respond to all concerns of internal and external stakeholders. This should resolve concerns promptly, using an understandable and transparent process that is culturally appropriate and readily accessible. Grievances should be addressed with no cost to the party that raised the concern and without retribution. The mechanism should also not impede access to other judicial or administrative remedies available to affected parties.

**Workers’ Accommodation**

To manage risks associated with housing for construction workers and camp accommodation for operations staff, the proposed Project should:

- Design and operate accommodation camps in accordance with international good practice on workers’ accommodation and IFC / EBRD standards.

- Adopt detailed clear, non-discriminatory, internal accommodation rules including disciplinary procedures.

- Ensure that grievance and conflict resolution mechanism are available to all workers living in camp accommodation.

- Ensure that all workers are made aware of their rights and obligations in camps.

- Where appropriate, consult workers and their representatives on internal rules and policies and provision of facilities.

For its operational workforce the proposed Project should develop and implement a housing and infrastructure strategy based on best practices and in consultation with the workforce and local communities.
11.7  IMPACT ON NATURAL RESOURCES

The use of land and natural resources is a key part of local livelihoods. Natural resources are used to secure livelihoods, establish homes, undertake agricultural activities, and supplement incomes. Threats to the availability and quality of these resources could have significant implications for food security and survival. Furthermore, reduced access to such resources could create competition and potential conflict amongst local residents and with newcomers to the area.

This Section discusses the impact to the following natural resources:

- Decreased availability of Doum Palms; and
- Decreased availability of fresh water.

11.7.1 Decreased Availability of Palms

Description of the Baseline Environment

The SSA is located in an arid environment where water resources are scarce; however, a groundwater resource exist which surfaces along the edge of the salt pan. This upwelling of fresh groundwater and surface or near-surface flows support a narrow fringe of vegetation which includes a population of Doum Palms. The Doum Palms are a highly important source of livelihood for the local women who harvest the palm leaves to make mats, baskets, strings for beds and other household goods. The women typically sell these at local markets, to neighbours and tourists to generate an income. Livelihood activities related to Doum Palm harvesting, processing and sale are the sole income-generating activities available for many women and female-headed households and are anticipated to makeup a significant proportion of income generation for households in the area.

The Doum Palm leaves also play a significant role in the construction of traditional Afar housing structures. A typical Afar house is a dome like structure that has a wooden structure that is covered with palm leaves-made mats; as shown in Figure 11.4 below.
Proposed Project Activities

As is mentioned in the geohydrology impacts assessment related to groundwater drawdown in the alluvial fan aquifers (refer to Chapter 10), the proposed Project will require large quantities of water with different quality requirements depending on the use. An estimated 650 m³/h of fresh water will be needed for conversion and 870 m³/h of brackish water (up to a TDS of 30,000 mg/L) for mining. Further, an amount of 30 m³/h of potable water will be required for drinking and sanitary needs. This will equate to an average Project water consumption of 1,550 m³/h for the duration of mining (18 years). Survival of Doum Palms will depend on maintaining a stable groundwater depth, with the abstraction of freshwater being less than the groundwater recharge capacity and no increase in the salinity of the available groundwater.

The current conceptual groundwater model developed by MWH geohydrologists suggests that there is a scarcity of freshwater, and that proposed offtake levels may cause a reduction in groundwater levels which may cause the emergence of groundwater to cease, and subsequent drying out of Doum Palm habitat. Neighbouring mining companies are also considering use of the same aquifers to meet their water requirements, and current proposed water abstraction levels present a risk to the ecological receptors that are dependent on the groundwater.

Carbon dating of the groundwater resource indicates that a large proportion of the water infiltrated thousands of years ago, and could be referred to as Fossil water. The age of the aquifer, sources of recharge and recharge rates are not fully understood, but the conceptual model suggests that a significant
storage aquifer is present but that recharge of the fossil water component could be extremely slow.

**Sensitive Receptors**

Doum Palms are sensitive to groundwater loss and are restricted to the relatively small fringe habitat

The Doum Palm (*Hyphaene thebaica*) is important for the harvesting of palm leaves upon which local and distant Afar communities depend. This species is expected to be sensitive to alterations in the height of the water table. The collection and processing of palms into products is the only significant livelihoods available to women. Although some women work in shops and gain small amounts of income from petty trading, palm collecting and processing represents the only significant income generating activity that is available to women, leaving them vulnerable to any changes in its productivity or availability.

**Significance of Impact (Pre-mitigation)**

Based on the analysis provided above, this impact has been rated as a **Major Negative Impact** pre-mitigation (refer Table 11.26).

**Table 11.26**  
**Rating of Impacts Related to Decreased Availability of Palms (Pre-Mitigation)**

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Indirect, Induced, Cumulative Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
<td>Designation</td>
</tr>
<tr>
<td>Extent</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Long term to Permanent</td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
</tr>
<tr>
<td>Frequency</td>
<td>Continuous</td>
</tr>
<tr>
<td>Magnitude</td>
<td>High Magnitude</td>
</tr>
<tr>
<td>Sensitivity/Vulnerability/Importance of the Resource/Receptor</td>
<td>High Sensitivity</td>
</tr>
</tbody>
</table>

Vulnerability of receptors is dictated by the high levels of dependence on palm products for income, particularly for women.

**Significant Rating Before Mitigation**

**Major Negative Impact**
**Mitigation/Management Measures**

To avoid and reduce the significance of this impact; the mitigation and management measures developed in response to impacts to water resources and biological receptors (refer to *Chapter 10*) will also be relevant to this impact.

Due to the relatively low level of certainty around the biological and social impacts associated with the potential loss of areas of Fringe Habitat as a result of groundwater abstraction the ESIA has identified that further monitoring is required to inform the mitigation and management approach. Over abstraction of groundwater for solution mining Projects will have potentially detrimental impacts to the Doum Palms; however, there is still a low confidence level with respect to recharge into the aquifers targeted for groundwater abstraction. In this respect the ESIA has taken a precautionary approach to these impacts and residual impacts remain high.

Although MWH (2014) indicate that there is a high probability that there are sufficient water reserves for solution mining by Yara Dallol BV and other mining companies in the Danakil, and that recharge into the aquifers targeted for groundwater abstraction is thought to be sufficient, long term monitoring of groundwater levels and water quality in production boreholes and observation wells is required, both to confirm recharge parameters and to better refine a groundwater model. The groundwater model will be continually refined and updated as further data becomes available.

Moreover, it is crucial that the survival rates of Doum Palms in response to groundwater abstraction are monitored. Monitoring systems will be established prior to the commencement of the operational phase and maintained through the life of mine into the decommissioning and closure phase and will only cease once positive and predictable environmental trends are established. In the event that monitoring does identify significant impacts to Doum Palms (i.e. mass mortality rates) a then Yara Dallol BV have committed to compensatory measures. The following measures will be required to improve the understanding of potential palm mortality and inform any required compensatory measures (discussed later in this section):

- Yara Dallol BV should continue to support/conduct groundwater, ecological and livelihood analysis so as to understand the spatial extent and magnitude of the impact to palms.

- Develop a comprehensive Doum Palm livelihoods protection management and monitoring plan that includes the proactive measures to monitor and respond to potential increases in palm mortality. This plan should be based on on-going monitoring of the palm population baseline to benchmark the health of the population (should be carried out by a trained and qualified botanist or ecologist). A comprehensive monitoring program
that records mortality trends in a meaningful and appropriate timeframe should be included.

- Transplant all mature palms that may be directly impacted by road construction of surface water alterations as supervised and managed by a trained and specialist horticulturalist. Transplanted palms should be relocated to a defined palm ‘plantation’ or offset area managed or supported by Yara Dallol BV, and other relevant stakeholders.

- Implement a thorough review of all internal road design and comprehensive culvert design process to avoid or reduce potential impacts to surface flows. Monitor surface flow variations subsequent to road development to understand potential unexpected impacts to Doum Palms and, where necessary, implement bespoke mitigation and management measures from Doum Palm livelihoods protection management plan.

- In coordination with relevant government and potential partner organisations implement livelihood diversification programs that may allow increased productivity of alternative livelihoods not dependant on palm resources. This program should be particularly be targeted at women and female headed households.

As indicated by the scale or impact indicated by monitoring implement Yara Dallol BV may be required to implement a series of compensation measures. These should be bound within a Livelihood Restoration Framework (LRF) and / or Plan (LRP) to define the scale of required mitigation and / or compensation for affected households, as well as a programme to monitor impacts to palms over time and its associated impact on palm-related livelihood activities. The implementation of the LRF / LRP should be dependent on updated modelling and monitoring data related to palms and groundwater. A critical element of the LRF / LRP will include:

- Developing a palm plantation or offset area plan to be managed or supported by a trained and specialist horticulturalist to provide a continuous source of palm resources to local communities. This area should be irrigated with water provided by Yara Dallol BV and training should be given to local users concerning the sustainable management of the resource. Yara Dallol BV should also engage with relevant communities prior to establishment of the nursery, and discuss how the nursery should be managed.

**Residual Impact (Post-mitigation)**

Based on the implementation of the proposed mitigation measures, the significance of the impact to will be a **Moderate Negative Impact** post mitigation (refer to Table 11.27.).
Table 11.27  Rating of Residual Impacts Related to Decreased Availability of Palms (Post-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The extent of impact will remain constant regardless of mitigation, and will be restricted to the local alluvial fan aquifers.</td>
</tr>
<tr>
<td>Duration</td>
<td>Long term</td>
<td>Impacts will last at least for the life of mine.</td>
</tr>
<tr>
<td>Scale</td>
<td>Medium</td>
<td>Diversification of livelihood opportunities may reduce the scale of the impact.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Inevitable</td>
<td>Good management of the aquifer, reduced demand through desalination and no abstraction of groundwater by adjacent mining operators is still expected to lead to reduced groundwater availability for Doum Palms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Magnitude</td>
</tr>
<tr>
<td>Significant Rating After Mitigation</td>
</tr>
<tr>
<td>Moderate Negative Impact</td>
</tr>
</tbody>
</table>

11.7.2 Decreased Availability of Water

Description of the Baseline Environment

Access to both surface and groundwater resources are limited in the Project Area. Most of the communities potentially impacted reported frequent water shortages as a serious concern, and that existing water sources are located too far (20 to 50 km) from some settlements. The majority of communities rely on unimproved water sources that are saline; even schools and health facilities lack access to water.

Proposed Project Activities

The proposed Project will require a substantial amount of groundwater for solution mining activities which will be abstracted from a series of boreholes. This abstraction of water may impact the availability of water for the local communities. The impact may be exacerbated by the cumulative effect of other potential solution mining projects in the area which are anticipated to have similar water demands and land acquisition requirements. This impact may also be exacerbated by in-migration into the area where demand and abstraction of surface / groundwater resources and the increased chance for contamination of water sources may result from a greater number of users accessing an essentially unmanaged resource.

The MWH Report (in Chapter 8: Geohydrology) discusses the potential for mixing of different quality waters within the aquifer as a consequence of abstraction; this would affect the quality of groundwater, potentially causing a decrease as the concentrations of major ions increase. The nature of the impact is not only directly related to the overall changes in the groundwater flow, but also how changes in flow may impact the availability of the groundwater resources to local communities.
Based on hydrogeological study the likelihood that Yara Dallol BV could impact community water resources is considered to be low; however, a precautionary principle has been applied and this impact has been assessed for communities who utilise ground water resources within the Gehertu and Musley fans.

**Sensitive Receptors**

Lowering of the local water table, mixing of water qualities and the prevention of through flow may result in boreholes and wells drying up or decreasing in quality, directly impacting human health and potentially increasing malnutrition associated with failing pastoral/agricultural (palm) productivity.

Women, the elderly and young children will have increased vulnerability due to their susceptibility to disease and the lack of a fully developed immune system to water shortages and diseases linked to water shortages.

**Significance of Impact (Pre-mitigation)**

Based on the reasonable worst case scenario, although the latest hydrogeological study considers this impact unlikely this impact has been assessed as a potential **Major Negative Impact** prior to mitigation based on a combined evaluation of magnitude and vulnerability as illustrated in **Table 11.28**.

**Table 11.28 Rating of Impacts Related to Decreased Availability of Water (Pre-Mitigation)**

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Indirect, Induced, Cumulative Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating of Impacts</td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Designation</td>
</tr>
<tr>
<td>Extent</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Long term to Permanent</td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
</tr>
<tr>
<td>Frequency</td>
<td>Continuous</td>
</tr>
</tbody>
</table>

**Magnitude**

| High Magnitude |

**Sensitivity/Vulnerability/Importance of the Resource/Receptor**

| High Sensitivity |

Vulnerability of receptors is considered to be high due to limited availability of sources of water lack of alternate water sources and a lack of capacity to adapt without significant levels of intervention.

**Significant Rating Before Mitigation**

| Major Negative Impact |
Mitigation/Management Measures

Although this impact is considered unlikely and Yara Dallol BV’s water abstraction may not impact community water resources, the precautionary principle has been applied and management and mitigation measures below should be implemented where monitoring results show significant variation in ground water levels or quality.

To avoid and reduce the significance of this impact all mitigation measures related to water resources (refer to Chapter 10: Geohydrology) will assist in managing this impact. These measures focus on avoiding, minimising and restoring the impact to groundwater; these will be based on further research to determine the likely scenario of groundwater abstraction and the appropriate response. These measures include:

- Survey all settlements in the affected area in zone of influence to record the location, extent, and quality of water sources, the size of the population reliant on these water sources and their usage patterns, particularly with regard to seasonality, and differences in water use or access by vulnerable populations, including women.

- Collaborate with other solution mining companies in the area to development of a comprehensive local and regional monitoring system to ensure that an early warning system provides a timely indication of the impact of abstraction.

- Develop and model different abstraction strategies to minimise the impacts of water abstraction.

- The drilling of monitoring boreholes to monitor the effects of groundwater abstraction on community water supplies.

- The assessment of the cumulative impact of groundwater abstraction by various mining companies.

- Ensure water supply to potentially impacted communities based on water monitoring. Replacement infrastructure will ensure supply of potable water to all potentially impacted communities should monitoring indicate that access / quality of water may be impacted. These water sources will provide water of a higher standard than previously occurring.

Residual Impact (Post-mitigation)

Based on the implementation of the proposed mitigation measures, the significance of the impact to decreased availability of water will be a Minor Negative Impact post mitigation (refer to Table 11.29).
Table 11.29  Rating of Residual Impacts Related to Decreased Availability of Water (Post-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The impact will be experienced by communities drawing their water from the Musley, Gehertu fans. Villages likely to be affected are Musley, Hamad Ela, Alai lai, and Mororo.</td>
</tr>
<tr>
<td>Duration</td>
<td>Short-term</td>
<td>Where guaranteed available water resources are available any impact will be over a short term</td>
</tr>
<tr>
<td>Scale</td>
<td>Large</td>
<td>The actual scale of the impact will be informed by the on-going monitoring and modelling of underground water resources.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Continuous</td>
<td>There will be a continuous abstraction of groundwater, and possibly exaggerated through unmanaged abstraction by adjacent concessions.</td>
</tr>
</tbody>
</table>

**Magnitude**
- Small Magnitude
- Significant Rating After Mitigation
- Minor Negative Impact

11.8  IMPACTS ON CULTURAL HERITAGE

11.8.1  Description of the Baseline Environment

This Section will discuss impacts related to tangible cultural heritage and archaeological sites.

As part of the Social Impact Assessment (SIA) of the proposed Project, a desktop and field-based baseline survey was conducted to gather data for the assessment of potential Project impacts on cultural heritage sites within the Project Area. The baseline data gathering efforts revealed that the Project Area contains a number of aboveground tangible archaeological sites (refer to Chapter 9: Cultural Heritage).

Because no previous archaeological studies had been conducted in the Project Area, ERM developed a system of resource classification for cultural heritage resource sites, namely:

- Isolated Cairns
- Cairn Clusters
- Historic Architecture
- Military Structures
- Rock Shelters
- Abandoned Settlements
- Specialized Activity Areas
11.8.2 Cultural Heritage Resource Sensitivities

The cultural heritage baseline surveys identified a total of 78 cultural heritage sites within the Cultural Heritage Study Area (refer to Chapter 9: Cultural Heritage).

Table 11.30 summarizes the types and sensitivities of the identified sites. In total, the survey identified 24 cultural heritage sites of high sensitivity, 33 sites of medium sensitivity and 34 sites of low sensitivity in the Project Area. Detailed locations of the 78 sites and their cultural heritage sensitivities are shown in Figure 11.5 through Figure 11.10.

Table 11.30 Summary of the 78 Cultural Heritage Sites Identified in the Project Area

<table>
<thead>
<tr>
<th>Archaeological Category</th>
<th>High Sensitivity Site</th>
<th>Medium Sensitivity Site</th>
<th>Low Sensitivity Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated Cairn (10)</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Cairn Cluster (25)</td>
<td>9</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Historic Architecture (3)</td>
<td>-</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Military Shooting Blind (1)</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Rock Shelter (1)</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Abandoned Settlement (32)</td>
<td>9</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Specialized Activity Area (6)</td>
<td>1</td>
<td>-</td>
<td>5</td>
</tr>
</tbody>
</table>
Figure 11.5  Detailed View of Site Locations and Their Sensitivities (Map A)
Figure 11.6 Detailed View of Site Locations and Their Sensitivities (Map B)
Figure 11.7  Detailed View of Site Locations and Their Sensitivities (Map C)
Figure 11.8  Detailed View of Site Locations and Their Sensitivities (Map D)
Figure 11.9  Detailed View of Site Locations and Their Sensitivities (Map E)
Figure 11.10  Detailed View of Site Locations and Their Sensitivities (Map F)
11.8.3 Proposed Project Activities

There are no cultural heritage sites located within the footprints of any Project components. However, it is likely that, given the long period of human settlement in the general Project Area, there are (currently unknown or unidentified) sub-surface archaeological resources that could fall within the footprints of proposed ground disturbing activities. Moreover, both known aboveground and unknown sub-surface cultural resources currently located outside the proposed Project component footprints might be impacted by future Project activities that have not yet been planned or designed. The latter may include access roads, borrow pits, utilities and other ancillary Project infrastructure. Such impacts would be direct and could cause irreparable damage to cultural sites.

Vibration impacts from construction activity and increased road traffic is also of concern, as is the potential for an increase in non-local project staff who might alter or remove artefacts from archaeological sites in the area. The latter two impacts could occur during both the construction and operational phases.

Accordingly, based on a review of the Project description, three principal impact sources have been identified:

- Ground works associated with Project construction;
- Vibrations from construction and increased vehicle traffic; and
- Influx of non-local Project staff.

11.8.4 Sensitive Receptors

No known aboveground cultural heritage sites fall within the footprint of a planned Project component or concession area and so there are no anticipated direct impacts from planned groundworks. However, the existence of subsurface cultural resources is unknown since no archaeological excavations have taken place in the general area. If subsurface remains exist, they could be found during site construction. Managing the discovery of previously unknown subsurface cultural resources is detailed within the Chance Finds Protocol outlined in the Cultural Heritage Management Plan (Annex I in Part III of the ESIA).

There are also sixteen (16) known sites that fall within 200 meters of roads that will be used for transportation and thus will be subjected to an increase in ground vibrations from passing vehicles which could damage above ground (refer to Figure 11.11 and Figure 11.12). Of these sixteen sites, two (2) have a Major Impact Significance Rating: Site #42 and Site #77 (refer to Annex E in Part II of this ESIA for more info on these two sites).

In terms of impact from increased presence of non-locals, there are thirteen (13) sites that have a Major Impact Significance Rating: Site #37, #40, #42, #46, #47, #55, #56, #58, #61, #62, #63, #77, and #78 (refer to Figure 11.13) (refer
to Annex E in Part II of this ESIA for more info on these two sites for more info on these thirteen sites).
Figure 11.11  Impact Significance to Cultural Heritage Sites from Vibration (Map A)
Figure 11.12 Impact Significance to Cultural Heritage Sites from Vibration (Map B)
Figure 11.13 Map of Potential Impact Magnitude to Cultural Heritage Sites Caused by Increased Presence of Non- Locals (Pre-Mitigation)
11.8.5  Significance of Impact (Pre-mitigation)

Impacts Related to Groundworks

Because no known sites fall within any proposed groundwork areas, the impact significance to known, aboveground cultural heritage is Negligible. However, there is potential for the existence of sub-surface cultural resources, which are impossible to detect without test excavations. Accordingly, if sub-surface sites exist, and if they are impacted by groundworks, then the impacted significance could range from a Moderate to Major Negative Impact (refer to Table 11.31).

**Table 11.31** Rating of Impacts to Sub-Surface Cultural Heritage Sites Related to Groundworks (Pre-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Type of Impact</th>
<th>Rating of Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extent</strong></td>
<td>Local</td>
<td>Direct Negative Impact</td>
<td>Anyplace where there will be ground disturbance.</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Permanent</td>
<td></td>
<td>Currently unknown sub-surface sites will be destroyed by groundworks.</td>
</tr>
<tr>
<td><strong>Scale</strong></td>
<td>Any place where ground disturbing activities will take place (excluding the salt pan)</td>
<td></td>
<td>Since sub-surface sites can exist anywhere in this region (aside from the salt flats in the east of the Project Area), the scale is as large as the area where groundworks will take place</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>Alongside ground disturbing activities</td>
<td></td>
<td>This type of impact would only occur as a result of groundworks during the construction phase of the proposed Project.</td>
</tr>
<tr>
<td><strong>Likelihood</strong></td>
<td>Possible</td>
<td></td>
<td>There is a high degree of uncertainty concerning the location of subsurface cultural resources, as there is no current data to suggest where these subsurface resources might exist. However, given the long history of settlement in the region, the likelihood is possible that at some point during groundworks a sub-surface site will be encountered.</td>
</tr>
</tbody>
</table>

**Magnitude**

- Moderate to Large Magnitude

**Sensitivity/Vulnerability/Importance of the Resource/Receptor**

- Could range from Low to High Sensitivity

**Significant Rating Before Mitigation**

- Moderate to Major Negative Impact

Impacts Related to Vibration

While no known cultural sites fall within the footprints of proposed Project infrastructure, there is an additional risk of disturbance to cultural sites from vibration caused by passing vehicles during the construction and operational phases of the proposed Project. The effects of vibration on historic structures and ruins have been subject to extensive study. Ground borne vibration is
typically described in terms of the motion of particle (i.e. a point in or on the ground surface or within a structure). As a result, vibrations are measured in terms of peak particle velocity (PPV) which describes the velocity of an individual particle due to vibrations. The PPV caused by vibrations can be dampened by soil beneath a resource. In general, the denser or more compact the soil the greater the dampening effect on vibrations. Conversely, vibrations travel easily and with little dampening through loose, unconsolidated soils such as sand.

The Swiss Association of Standardization Vibration Damage Criteria states that structures highly sensitive to vibration, such as historic buildings, will sustain damage if continuous activities generate vibrations in the underlying soil of 3.048 millimetres (mm)/second (sec) or higher. A lower PPV threshold of 2.032 mm/sec has been recommended for ruins and ancient monuments (1).

The effects of previous vibration impacts to cultural heritage sites in the Cultural Heritage Study Area have been documented by ERM Cultural Heritage specialists. Several cairn clusters were severely damaged by vibrations from nearby road construction as part of Ethiopian government road project (refer to Figure 11.14). The loose, stacked stone walls of these cairns appear to have collapsed due to vibrations caused by construction activities and/or vehicle traffic. A preliminary assessment of the damage attributed to this road construction suggests cairns as far as 200 m from the road right-of-way were damaged.

**Figure 11.14** Recorded Vibration Damage to Cairns from nearby Government Road Building Activity

The retaining walls of these cairns have collapsed in sections, due to vibrations from road building equipment. Government road building activity can be seen in the background of the right-hand image.

Sixteen (16) known cultural sites exist within 200 meters of existing or planned roads. Due to the low dampening effects of the sandy soils within the Project Area, these resources could be subject to PPV at or greater than 2.032 mm/sec.

1 Whiffen and Leonard 1971
These sixteen sites are therefore at risk of damage from vibration due to increased vehicle traffic. Impacts from vibration to cultural sites range between Negligible to Major Negative Impact (pre-mitigation) (refer to Figure 11.11 and Figure 11.12, see also Table 11.32).

**Table 11.32 Rating of Impacts Related to Vibration (Pre-Mitigation)**

<table>
<thead>
<tr>
<th>Type of Impact</th>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Negative Impact</td>
<td>Extent</td>
<td>Local</td>
<td>Within 200 meters of heavy traffic or construction activity</td>
</tr>
<tr>
<td></td>
<td>Duration</td>
<td>Permanent</td>
<td>Sites within 200 meters of heavy vibration sources will be permanently damaged by vibrations from nearby construction activities and increased vehicle traffic (including traffic during the operational phase of the proposed Project).</td>
</tr>
<tr>
<td></td>
<td>Scale</td>
<td>Any vulnerable site within 200 meters of construction activity and roads with high vehicle traffic</td>
<td>Unless avoided by at least 200 meters, the sites will be damaged by vibrations from nearby construction activities and increased vehicle traffic.</td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>Ongoing</td>
<td>This type of impact would both happen during construction and operation phases.</td>
</tr>
<tr>
<td></td>
<td>Likelihood</td>
<td>Likely</td>
<td>It is quite likely that some cultural resources within 200 meters of roads that will have heavy vehicle traffic will be damaged by ground vibrations.</td>
</tr>
</tbody>
</table>

**Magnitude**

Small to Medium Magnitude

**Sensitivity/Vulnerability/Importance of the Resource/Receptor**

Low to High Sensitivity

**Significant Rating Before Mitigation**

Negligible to Major Negative Impact

**Impacts to Cultural Sites as a Result of Increased Presence of Non-locals in the Project Area**

The development and operation of the proposed Project will also increase the presence of domestic and foreign workers in the remote region, exposing archaeological sites to greater accessibility and thus risk of damage. These impacts may occur both during the Project construction and operation phases. The presence of Project workers will increase the likelihood for disturbance to cultural sites from increases in commercial activity and development, unauthorized removal of artefacts from sites by non-locals, and also the looting of artefacts by locals seeking items to sell to the non-local workers. The impact magnitude from increased access from non-locals on cultural sites will range between Negligible to Large, where larger magnitude impacts will occur closer to non-local living and work areas, such as the processing plant and staff living quarters. The magnitude of impact reduces the further away
sites are from living and working areas. Accordingly, cultural sites that exist within 1 km of living and working areas will be subjected to a potentially high impact magnitude. Sites between 1 and 2 km will be subjected to medium impact magnitude. Sites that fall between 2 and 3 km will be subjected to small impact magnitude. And, sites that fall 4 km beyond any living or working area will have a negligible impact from increased presence of non-locals. Therefore, 19 sites fall within Large Magnitude, 14 sites fall within Medium Magnitude, 12 sites fall within Small Impact Magnitude, and the remaining 45 sites fall within Negligible Impact Magnitude (see Figure 11.13 and Table 11.33). Impacts to cultural sites as a result of increased presence of non-locals into the Project Area ranges between Negligible to Major Negative Impact (pre-mitigation) (refer to Table 11.33).

Details about the specific impacts from increased presence of non-locals to each site can be viewed in Annex E in Part II of this ESIA.

**Table 11.33**  
Rating of Impacts Related to Increased Access of Non-Locals (Pre-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>As currently understood, the cultural heritage sites are of local importance.</td>
</tr>
<tr>
<td>Duration</td>
<td>Permanent</td>
<td>Removal of artefacts by non-locals from their original archaeological will permanently diminish the scientific and local cultural value of sites.</td>
</tr>
<tr>
<td>Scale</td>
<td>Any cultural site with movable artefacts, such as stone beads, tools and ceramics.</td>
<td>Approximately 20% of all recorded sites in the Project Area had artefacts. Therefore there is a one in five chance that any archaeological site encountered by a site worker will have artefacts. Accordingly, there is a high risk that an untrained site worker will pick up found artefacts from sites that, when unauthorized by the Ethiopian government, is an illegal activity.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Ongoing</td>
<td>This type of impact would occur during both the construction and operation phases.</td>
</tr>
<tr>
<td>Likelihood</td>
<td>Likely</td>
<td>It is quite likely that site workers will come across artefacts and pick them up if not trained to leave artefacts where found.</td>
</tr>
</tbody>
</table>

**Magnitude**  
Small to Large Magnitude

**Sensitivity/Vulnerability/Importance of the Resource/Receptor**  
Low to High Sensitivity

The cultural sites will be of Low to Medium to High sensitivity dependent on their importance to local stakeholders and the scientific community.

**Significant Rating Before Mitigation**  
Negligible to Major Negative Impact
To avoid and reduce the significance of the above mentioned impacts, the following mitigation and management measures should be implemented by Yara Dallol BV:

*Post-Assessment Archaeological Test Excavations*

Yara Dallol BV should support a systematic programme of government or other agencies of archaeological test excavations to investigate the potential for sub-surface resources. Test excavations are a targeted and rapid approach that will generate data as to where sub-surface resources might be located. Once areas with sub-surface resources are identified then it is then possible to avoid these areas by Project redesign, or by implementing other types of mitigation (such as rescue excavation) if redesign is not possible. Test excavations would only need to be undertaken in areas where ground disturbance activities are planned to take place. However, no test excavations would be necessary in the salt flats to the east of the Project Area, even in places where ground disturbance will take place, since there is extremely low potential for sub-surface resources within the salt flats themselves because of their unstable nature. The scope of this programme of excavations should be developed in consultation with national and local stakeholders, and staffed by a team of Ethiopian archaeologists with guidance provided by international cultural heritage specialists as required.

*Execution of a Chance Finds Programme*

In order to minimize the potential for impact to sub-surface cultural resources, Yara Dallol BV should establish a Chance Find Programme staffed with on-site Ethiopian archaeologists and overseen by experienced cultural heritage management specialists to address the discovery of Chance Finds during the Project construction phase. This is explained in the Cultural Heritage Management Plan (refer to Annex I in Part III of this ESIA).

*Provision of Cultural Heritage Training*

Yara Dallol BV should establish an adequate Cultural Heritage Training Programme for Project management and workers. This training should address Chance Finds procedures set out in the aforementioned Chance Finds Programme, consultation with local and national stakeholders, local sensitivity to loss of access to cultural heritage sites, and the sensitivity of cultural heritage sites to looting.

*Marking of Vulnerable Cultural Heritage Sites*

Yara Dallol BV should mark vulnerable cultural heritage of significance for avoidance using warning signage and high visibility temporary flagging. This will reduce the incidence of unintended impact to cultural heritage sites by ancillary construction activities or vibration caused by construction or vehicle traffic. Staff and contractor briefings on cultural heritage should include
information on the presence and significance of the protective signage at cultural heritage sites.

**Reduced Speed Limit near Sites Vulnerable to Vibration Impact**

In the case of vibration due to vehicle traffic, it is suggested that trucks travel at slower speeds when traveling in areas within 200 meters of vulnerable sites within the Project Area and immediate surrounds in order to reduce the magnitude of their vibrations. The recommended speed limit is 20km/h, which given the loose and unconsolidated nature of the soil, is considered slow enough to reduce the vibration impact zone considerably.

**Vibration Impact Monitoring at Cultural Heritage Sites**

Even with a reduced speed limit, vibrations from vehicle traffic still could negatively impact cultural resources. Accordingly, once a quarter a monitoring assessment should be undertaken to assess any signs of damage to vulnerable cultural resources within the 200m vibration impact zone.

### 11.8.7 Residual Impact (Post-mitigation)

**Residual Impacts Related to Groundworks**

Based on the implementation of the proposed mitigation measures, the significance of the post-mitigation impact to cultural sites from groundworks is assessed as a **Minor to Moderate Negative Impact** (refer to Table 11.34).

**Table 11.34 Rating of Residual Impacts to Sub-Surface Cultural Resources Related to Groundworks (Post-Mitigation)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The impacts remain local.</td>
</tr>
<tr>
<td>Duration</td>
<td>Permanent</td>
<td>The impacts to those sites that cannot be avoided remain permanent.</td>
</tr>
<tr>
<td>Scale</td>
<td>Any place where ground disturbing activities will take place</td>
<td>The establishment of a Chance Finds Procedures and archaeological test excavations will serve to lessen the total impact to undiscovered subsurface sites.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Periodic</td>
<td>The implementation of the recommended schemes will reduce the frequency for impacts to sub-surface sites.</td>
</tr>
<tr>
<td>Likelihood</td>
<td>Possible</td>
<td>The implementation of a Chance Finds Protocol and archaeological test excavations lessens the likelihood that subsurface cultural resources will be impacted before archaeological data recovery can occur.</td>
</tr>
</tbody>
</table>

| Magnitude       | |
|-----------------| Small to Medium Magnitude |
|                 | Significant Rating After Mitigation |
|                 | Minor to Moderate Negative Impact |

**Residual Impacts Related to Vibration**
Based on the implementation of the proposed mitigation measures, the significance of the post-mitigation impact to cultural sites from vibrations is assessed as a **Negligible to Moderate Negative Impact** (refer to *Table 11.34*).

### Table 11.35 Rating of Residual Impacts Related to Vibration (Post-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The impacts remain local.</td>
</tr>
<tr>
<td>Duration</td>
<td>Permanent</td>
<td>The impacts to those sites that cannot be avoided remain permanent.</td>
</tr>
<tr>
<td>Scale</td>
<td>Any vulnerable cultural site within 200 meters of construction activity and roads with high vehicle traffic.</td>
<td>The scale remains the same.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Periodic</td>
<td>The implementation of the recommended schemes will reduce the frequency of high vibration sources near vulnerable cultural sites.</td>
</tr>
<tr>
<td>Likelihood</td>
<td>Possible</td>
<td>If vibration sources are lessened in their intensity or moved farther away from vulnerable cultural sites, the likelihood of impact will be greatly diminished, but not completely removed.</td>
</tr>
</tbody>
</table>

**Magnitude**  
Small to Medium Magnitude  
**Significant Rating After Mitigation**  
Negligible to Moderate Negative Impact

**Residual Impacts Related to Increased Access to Non- Locals**

Based on the implementation of the proposed mitigation measures, the significance of the post-mitigation impact to cultural sites from increased access to non-locals will be a **Negligible to Moderate Negative Impact** (refer to *Table 11.34*).

### Table 11.36 Rating of Residual Impacts Related to Increased Access to Non- Locals (Post-Mitigation)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Designation</th>
<th>Summary of Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent</td>
<td>Local</td>
<td>The impacts remain local.</td>
</tr>
<tr>
<td>Duration</td>
<td>Temporary to Short-Term</td>
<td>The training of management and staff should reduce the intensity of artefact removal and looting.</td>
</tr>
<tr>
<td>Scale</td>
<td>Any cultural site with movable artefacts, such as stone beads, tools and ceramics.</td>
<td>Scale remains the same</td>
</tr>
<tr>
<td>Frequency</td>
<td>Periodic</td>
<td>The frequency of impacts will be reduced if there is less of a market for looters and Project workers understand the risks of looting.</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>--------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Likelihood</td>
<td>Possible</td>
<td>Even with training of Project management and staff, there is still the potential for opportunistic removal of surface artefacts. With the application of the above mitigation measures, the likelihood of this happening will be greatly diminished.</td>
</tr>
<tr>
<td><strong>Magnitude</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Small to Medium Magnitude</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Significant Rating After Mitigation</td>
<td>Negligible to Moderate Negative Impact</td>
</tr>
</tbody>
</table>

11.9 **VISUAL AND LANDSCAPE IMPACTS**

The predicted impacts to the landscape and visual receptors as a result of the proposed Yara Dallol Potash Project are described in this *Section*.

11.9.1 **Impacts during Construction**

A description of the construction schedule for the proposed Project has been provided in *Chapter 2 of Part I* of this ESIA report. It is assumed that the duration of construction activities will be approximately 31 months. The construction phase will likely include the following activities:

- Construction of Access Roads;
- Construction of Brine and Water Pipelines
- Construction of Staff Living Quarters;
- Construction of Processing Plant and associated office/support facilities;
- Construction of Evaporation Ponds; and
- Solution mining preparation.

It is acknowledged that short-term landscape and visual impacts will occur throughout the construction phase of the proposed Project; however, these impacts would be phased, temporary and restricted to the construction period, and therefore the resulting landscape and visual impacts will also be temporary. Even though appropriate construction management will be in place with best practicable means (BPM), it is important to establish the key landscape and visual impacts which might arise during the construction period. The mitigation measures described below have been recommended to ensure that the potential construction impacts are reduced.

**Potential Impacts**

The key landscape and visual impacts during the construction phase include those resulting from:

- The installation, movement and use of heavy and light construction machinery;
- Earth movement;
- Presence of temporary storage areas and material stockpiles;
The installation of temporary construction compounds;
- The installation of temporary offices, facilities and sign boards;
- The development of temporary facilities for traffic and pedestrian access and regulation;
- The introduction of construction traffic; and
- Construction lighting including high mast lighting for activities.

As described earlier, the receiving environment is essentially a very open and expansive area with few scattered villages. It is recognised that the construction activities, including temporary lighting, will provide some degree of increased disruption to the landscape and intrusion into views, especially to visual receptors in the immediate area. The impacts on landscape character and visual impacts are discussed below in Table 11.37 and Table 11.38.

**Impacts on Landscape Character**

**Table 11.37 Assessment of Impacts on Landscape Character Areas**

<table>
<thead>
<tr>
<th>Landscape Character Area</th>
<th>Sensitivity</th>
<th>Magnitude of change</th>
<th>Significance of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open arid salt plains</td>
<td>Low</td>
<td>The introduction of construction machinery and equipment over a relatively large area will impact the open desolate setting of the area. The overall magnitude of change is considered to be medium.</td>
<td>Minor</td>
</tr>
<tr>
<td>Mount Dallol</td>
<td>High</td>
<td>Direct impacts to the landscape will not occur. The introduction of construction activities associated with the evaporation ponds to the north will be intervisible from Mount Dallol although intervening topography will limit visibility. At a distance of over 4.5km (from summit), dust and haze will also limit visibility and therefore reduce impacts on setting and characteristic views over the salt plains. Construction activities associated with the processing plant will occur approximately 15km to the west and will be largely imperceptible. Overall the magnitude of change is considered to be small.</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
The Project Area is located almost entirely within the open arid salt plains with a small area to the west falling within the gently rising alluvial fans and foothills, and so direct impacts will be limited to these character areas. By taking into account the above listed landscape receptors, the surrounding environment, which overall is of low to high sensitivity, the absence of any landscape designations, and the small to medium magnitude of change, it is considered that prior to mitigation the construction impacts are most likely to be of **minor to moderate significance** with regard to landscape impacts.

**Visual Impacts**

**Table 11.38  Assessment of Visual Impacts**

<table>
<thead>
<tr>
<th>VP No.</th>
<th>VP sensitivity</th>
<th>Magnitude of Change</th>
<th>Significance of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: View from Ashe Ale (approximately 12km distance to the south of the Project Area)</td>
<td>Medium</td>
<td>Considering the distance from the proposed Project, construction activities will be barely visible. Therefore the magnitude of change is considered to be negligible.</td>
<td>Negligible</td>
</tr>
<tr>
<td>2: View from tarmac road near the military camp and Dallol Potash Project Camp (approximately 250m to the west of the Project Area) (similar views available from military camp)</td>
<td>Low</td>
<td>Clear views of construction activities associated with the processing plant, approximately 250m to the east, exist; however, considering the existing context of the view, which contains two existing camp sites, the magnitude of change is considered to be medium.</td>
<td>Minor</td>
</tr>
<tr>
<td>VP No.</td>
<td>VP sensitivity</td>
<td>Magnitude of Change</td>
<td>Significance of Impact</td>
</tr>
<tr>
<td>--------</td>
<td>----------------</td>
<td>---------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>3: View from the base of Mount Dallol (approximately 2.5km to the southeast of the Project Area)</td>
<td>Medium</td>
<td>Views of construction activities associated with the evaporation ponds will be available. Taller construction plant will be discernible whilst lower machinery will be heavily obscured by haze and dust. The magnitude of change is considered to be medium.</td>
<td>Moderate</td>
</tr>
<tr>
<td>4: View from Musley village (approximately 3.3km to the west of the Project Area)</td>
<td>Medium</td>
<td>Construction activities associated with the processing plant will be visible. However at this distance haze and dust will obscure views. Therefore the magnitude of change is considered to be small.</td>
<td>Minor</td>
</tr>
<tr>
<td>5: View from Asabuya village (approximately 9km to the northwest of the Project Area)</td>
<td>Medium</td>
<td>Due to the distance of the proposed Project and the screening offered by haze and dust, construction activities will be barely visible. The magnitude of change is considered to be negligible.</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

In the vicinity of the construction activities, the main receptor groups are the residents at Musley and tourists at Mount Dallol. Although the Project Area is located within a very open and expansive area, it is important to note that with the increase in distance there is a large reduction in magnitude, due to dust and haze, and therefore in visual impacts. This is particularly relevant to some of the settlements which are considerable distances from the Project Area (viz. Asabuya Village).

By taking into account the above listed visual receptors, which overall are of low to medium sensitivity, the absence of any visual designations, and the negligible to medium magnitude of change it is considered that the construction impacts are most likely to be of negligible to moderate significance with regard to visual impacts prior to mitigation.

**Mitigation**

The mitigation measures described below are an inherent part of the construction management practice; however, these are further reiterated and
recommended throughout the construction phase, to minimise landscape and visual impacts. These measures include:

- Machinery and construction materials should be stored tidily and in designated areas during the works.

- Roads should be made with most suited available local material and covered with an anti-dusting agent. Roads in the vicinity of the Process Plant should be paved.

- Outdoor construction lighting, where required shall be as unobtrusive as possible and shall not allow light to shine upwards or towards residential receptors,

- Security and work lighting (both during construction and operation) shall be shielded and directed downwards to prevent side spill and the use of tall mast lights shall be carefully assessed to avoid causing light impacts both during construction and operation.

- Temporary buildings and structures in use during the construction phase should (as far as possible) be painted with colours that blend in with the natural colours of the surrounding landscape.

- To reduce the potential of glare, external surfaces of buildings and structures should use anti-glare/non-reflective materials.

- Fires should not be permitted in the Project Area.

- Construction vehicles should keep to speed limits so to avoid excessive dust generation.

- Ad hoc monitoring should be implemented so as to ensure that dust control measures during the construction phase of the proposed Project are implemented effectively.

Residual Impact (Post-mitigation)

Should the above mentioned recommendations be implemented and managed according to industry best good practice, the landscape and visual impacts of the proposed Project during construction phase will be reduced although the overall significance of impact would remain as minor to moderate for landscape character and negligible to moderate for visual.

11.9.2 Impacts during Operation

Permanent landscape and visual impacts will arise during operation due to the fact that the proposed Project is close to a number of villages and tourist receptors and the development will increase the amount of infrastructure in the locality. Solution mining will occur within Zone 1 in the North Musley
concession, where 388 caverns are proposed, each with a radius of 40m. The number of caverns in operation is estimated to be about 28 with approximately 20 being replaced each year resulting in an estimated mine life of around 21 years.

During operation the extracted brine will be pumped from the caverns to the solar evaporation ponds within the Crescent concession. From here the resulting salts will be directed to the Processing Plant where it will be separated into desirable (SOP – Sulphate of Potash) and undesirable (effluent and NaCl) material. The effluent will be sent back to the evaporation ponds and the NaCl will be discarded on the TMA.

Potential Permanent Impacts

The ZTVs modelled for the proposed Project (refer to Chapter 8 in Part I of this ESIA) (approximate worse case height considered is 30m for the Processing Plant and 30m for the TMA) highlight the fact that the proposed Project is likely to be visible within the areas of Musley, Ashe Ale, Asabuya and Mount Dallol. The proposed Project is also likely to be visible from transportation routes used by the tourists.

However it is important to reiterate that the ZTVs do not take into account environmental conditions like reflection, dust and haze which, in particular the latter, effectively screen or reduce visibility to and from the site. Therefore, whilst considering the ZTVs and arriving at the significance of landscape and visual impacts, other factors discussed below are taken into consideration.

Impacts on Landscape Character

There are currently no designated landscapes located within the Project Area and surrounds, and there are no known or identified built and cultural heritage features located within the Project Area which would make the landscape more sensitive. The loss of the land as a resource due to the proposed Project is considered to be a minor change as the land is currently open, without any features and of a type common in the wider region.

The impacts on the landscape character areas have been discussed in Table 11.39 below.
Table 11.39  Impacts on Landscape Character

<table>
<thead>
<tr>
<th>Landscape Character Area</th>
<th>Sensitivity</th>
<th>Magnitude of Change</th>
<th>Significance of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open arid Salt Plains</td>
<td>Low</td>
<td>Permanent loss of land resource will occur, although the land is of a type common in the wider area. The presence of the proposed Project, including the Pond Area and 30m high TMA, will impact the desolate setting. However, visibility across the wider area will be limited by dust and haze as well as the low height of the majority of the infrastructure associated with the proposed Project. The overall magnitude of change is considered to be medium.</td>
<td>Minor</td>
</tr>
<tr>
<td>Mount Dallool</td>
<td>High</td>
<td>The presence of the evaporation ponds and TMA to the north will be visible with the area, although intervening salt stack deposits will limit visibility (The view from Mount Dallool is illustrated in Figure 11.16 below). At a distance of over 4km dust and haze will also limit visibility and therefore reduce the impact on setting and characteristic views. The overall magnitude of change is considered to be small.</td>
<td>Moderate</td>
</tr>
<tr>
<td>Landscape Character Area</td>
<td>Sensitivity</td>
<td>Magnitude of Change</td>
<td>Significance of Impact</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Gently rising alluvial fans and foothills</td>
<td>Medium</td>
<td>Permanent loss of land resource will occur, although the land is of a type common in the wider area. The proposed Project, in particular the 30m high Processing Plant, will be intervisible from settlements in the area (The view from Musley is illustrated in Figure 11.17 below). However at a distance of over 3km dust and haze will limit visibility and therefore reduce impacts on setting. The overall magnitude of change is considered to be small.</td>
<td>Minor</td>
</tr>
</tbody>
</table>

Taking into account the above listed landscape receptors, the surrounding environment, which overall is of low to high sensitivity, the lack of any landscape designations and the proposed Projects’ magnitude of change ranging from medium to small; overall the resultant impacts on the landscape during operation is considered to be of **minor to moderate significance**.

**Visual Impacts**

The main receptors in the vicinity of the site are the immediate populations of Musley village, and tourists visiting Mount Dallol, with residential receptors located in Asabuya which is approximately 9 km to the northwest of the Project Area (refer to Figure 11.1 on Page 11-3).

There are currently no designated areas of visual importance i.e. strategic views or any in the process of being identified. **Table 11.40** below discusses and assesses visual impacts of the proposed Project at key representative locations within the Project Area and surrounds.
### Table 11.40 Visual Impacts

<table>
<thead>
<tr>
<th>VP No.</th>
<th>VP sensitivity</th>
<th>Magnitude of Change</th>
<th>Significance of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: View from Ashe Ale (approximately 12km to the south of the Project Area)</td>
<td>Medium</td>
<td>Considering the distance of the VP from infrastructure associated with the proposed Project, the proposed Project will be barely visible. Therefore the magnitude of change is considered to be negligible.</td>
<td>Negligible</td>
</tr>
<tr>
<td>2: View from tarmac road near the military camp and the Yara Dallol BV Project Camp (approximately 250m to the west of the Project Area) (similar views available from military camp)</td>
<td>Low</td>
<td>Clear views of the 30m high Processing Plant will be available; however, considering the existing context of the view which contains two existing camp sites, the magnitude of change is considered to be medium. The view from this location is illustrated in Figure 11.15</td>
<td>Minor</td>
</tr>
<tr>
<td>3: View from the base of Mount Dallol (approximately 2.5km to the southeast of the Project Area)</td>
<td>Medium</td>
<td>The evaporation ponds and TMA will be visible to the north; however, intervening topography will provide some intermittent screening. Views will also be obscured by haze and dust. Views of the processing plant to the west) will be largely obscured by dust and haze. The overall magnitude of change is considered to be small. The view from this location is illustrated in Figure 11.16</td>
<td>Minor</td>
</tr>
<tr>
<td>VP No.</td>
<td>VP sensitivity</td>
<td>Magnitude of Change</td>
<td>Significance of Impact</td>
</tr>
<tr>
<td>--------</td>
<td>----------------</td>
<td>---------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>4: View from Musley village (approximately 3.3km distance to the west of the Project Area)</td>
<td>Medium</td>
<td>The 30m high processing plant to the east will be visible; however, views will be partially screened by intervening topography and at this distance slightly obscured by haze and dust. Therefore the magnitude of change is considered to be small. The view from this location is illustrated in Figure 11.17</td>
<td>Minor</td>
</tr>
<tr>
<td>5: View from Asabuya village (approximately 9km to the northwest of the Project Area)</td>
<td>Medium</td>
<td>Due to the distance of the VP from infrastructure associated with the proposed Project and the screening offered by haze and dust, the proposed Project will be barely visible. The magnitude of change is considered to be negligible.</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
Figure 11.15  Photomontage from Viewpoint 2 (Tarmac Road near the Military Camp and the Yara Dallol Potash BV Project Camp)
Figure 11.16  Photomontage from Viewpoint 3 (from the base of Mount Dallol)
Figure 11.17  Photomontage from Viewpoint 4 (from Musley Village)
By taking into account the above listed visual receptors, which overall are of low to medium sensitivity, the absence of any visual designations, and the negligible to medium magnitude of change, it is considered that the operation impacts are most likely to be of negligible to moderate significance with regard to visual impacts.

**Night Time Impacts of Lighting**

Operation of the proposed Project will require night time lighting in the following areas:

- The salt screening plant (situated at the evaporation ponds) will be lit 24/7;
- The evaporation ponds (will have vehicle lighting only and minimal intersection lighting);
- The Processing Plant (will be lit 24/7); and
- The well field (will have motion activated lighting).

The lighting will be apparent in hours of darkness, particularly visible to and affecting the residents of nearby Musley Village. Given the topography, night lighting is also likely to visible within the surrounds of the Project Area affecting some populations to the north, including Asabuya, from where lighting associated with the Processing Plant will be visible. Overall the magnitude of change at night is considered to be medium.

As the overall sensitivity of the receiving environment is considered to be low to medium with a medium magnitude of change, the resulting impacts at night would be of minor to moderate significance.

**Mitigation Measures**

The following mitigation measures are recommended throughout the operational phase of the proposed Project to further minimise landscape and visual impacts:

- Non-reflective surfaces and surface colour treatment should be appropriately used.
- External signage clutter should be minimised.
- Roads providing access to site facilities and works areas should be maintained free of dust where feasible.
- Operational vehicles should keep to speed limits so to avoid excessive dust generation.
- Outdoor lighting should be as unobtrusive as possible and shall be shielded and directed downwards to prevent side spill.
• Monitoring to ensure that visual screening and dust control measures in the Management and Action Plans for the Project should be effectively implemented.

**Residual Impact (Post-mitigation)**

It is important to note that the height and bulk of the proposed Project is generally dictated by the detailed engineering feasibility study process, and the use of recommended mitigation measures is limited in the current landscape. It is assumed that the recommended mitigation measures described for the construction and operational phases are implemented and managed according to industry good practice. In doing so, the landscape and visual impacts of the development will be slightly reduced although the overall significance of impact would remain as **minor to moderate for landscape character and negligible to moderate for visual**.

11.10 **SUMMARY OF IMPACTS AND RESIDUAL IMPACTS**

A summary of pre and post (residual) mitigation social impacts is provided in Table 11.41.

Management Plans detailing mitigation measures commitments aimed at reducing impacts, and the management and monitoring of residual impacts is also detailed in each of the respective Management Plans in Part III Annex I to M. Social Management Plans include:

- Annex I – Cultural Heritage Management Plan
- Annex J – Community Health, Safety and Security Management Plan
- Annex K – In-migration Management Plan
- Annex L – Sourcing, Procurement and Recruitment Management Plan
- Annex M – Worker Management Plan
### Table 11.41 Summary of Social Impacts

<table>
<thead>
<tr>
<th>Impact</th>
<th>Significance (pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOCIO-ECONOMIC AND LIVELIHOOD IMPACTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased government revenue</td>
<td>Positive Impact</td>
<td>Positive Impact</td>
</tr>
<tr>
<td>Creation of employment opportunities and skill enhancement</td>
<td>Positive Impact</td>
<td>Positive Impact</td>
</tr>
<tr>
<td>Procurement of goods and services</td>
<td>Positive Impact</td>
<td>Positive Impact</td>
</tr>
<tr>
<td>Increased price inflation and economic vulnerability</td>
<td>Major Negative Impact</td>
<td>Moderate Negative Impact</td>
</tr>
<tr>
<td>Community anger and resentment over unmet expectations</td>
<td>Major Negative Impact</td>
<td>Minor Negative Impact</td>
</tr>
<tr>
<td><strong>IMPACTS RELATED TO PROJECT INDUCED IN-MIGRATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project induced in-migration (PIIM) impacts on Project host communities</td>
<td>Positive Impact</td>
<td>Positive Impact</td>
</tr>
<tr>
<td>Negative impacts associated with PIIM on Project host communities</td>
<td>Negative Impact (no significance rating allocated)</td>
<td>Negative Impact (no significance rating allocated)</td>
</tr>
<tr>
<td><strong>CHANGE TO SOCIO-CULTURAL HERITAGE IMPACTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbance to cultural, values, traditional leadership and intangible heritage</td>
<td>Moderate Negative Impact</td>
<td>Minor Negative Impact</td>
</tr>
<tr>
<td><strong>IMPACTS RELATED TO COMMUNITY HEALTH, SAFETY AND SECURITY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased incidence of communicable diseases</td>
<td>Major Negative Impact</td>
<td>Minor to Moderate Negative Impact</td>
</tr>
<tr>
<td>Increased transmission of malaria</td>
<td>Moderate Negative Impact</td>
<td>Minor to Moderate Negative Impact</td>
</tr>
<tr>
<td>Increased incidences of chronic / acute respiratory infections</td>
<td>Major Negative Impact</td>
<td>Minor to Moderate Negative Impact</td>
</tr>
<tr>
<td>Nutrition related illnesses</td>
<td>Major Negative Impact</td>
<td>Minor to Moderate Negative Impact</td>
</tr>
<tr>
<td>Increased anti-social behaviours</td>
<td>Moderate Negative Impact</td>
<td>Minor Negative Impact</td>
</tr>
<tr>
<td>Increased risk of road traffic accidents</td>
<td>Major Negative Impact</td>
<td>Moderate Negative Impact</td>
</tr>
<tr>
<td><strong>IMPACTS RELATED TO LABOUR AND WORKING CONDITIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure of workforce to health and safety incidents</td>
<td>Moderate Negative Impact</td>
<td>Negligible Negative Impact</td>
</tr>
<tr>
<td>Exposure of workforce to insufficient labour and accommodation standards</td>
<td>Negative Impact (no significance rating allocated)</td>
<td>Negative Impact (no significance rating allocated)</td>
</tr>
<tr>
<td><strong>IMPACTS ON NATURAL RESOURCES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Significance (pre-mitigation)</td>
<td>Residual Impact Significance</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Decreased availability of palms</td>
<td>Major Negative Impact</td>
<td>Moderate Negative Impact</td>
</tr>
<tr>
<td>Decreased availability of water</td>
<td>Major Negative Impact</td>
<td>Minor Negative Impact</td>
</tr>
</tbody>
</table>

**IMPACTS ON CULTURAL HERITAGE**

<table>
<thead>
<tr>
<th>Impact</th>
<th>Significance (pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts to sub-surface cultural resources related to groundworks</td>
<td>Moderate to Major Negative Impact</td>
<td>Minor to Moderate Negative Impact</td>
</tr>
<tr>
<td>Impacts related to vibration</td>
<td>Negligible to Major Negative Impact</td>
<td>Negligible to Moderate Negative Impact</td>
</tr>
<tr>
<td>Impacts to cultural sites as a result of increased presence of non-locals in the Project Area</td>
<td>Negligible to Major Negative Impact</td>
<td>Negligible to Moderate Negative Impact</td>
</tr>
</tbody>
</table>

**VISUAL AND LANDSCAPE IMPACTS**

<table>
<thead>
<tr>
<th>Impact</th>
<th>Significance (pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts on the landscape character during construction</td>
<td>Minor to Moderate Negative Impact</td>
<td>Minor to Moderate Negative Impact</td>
</tr>
<tr>
<td>Visual impacts during construction</td>
<td>Negligible to Moderate Negative Impact</td>
<td>Negligible to Moderate Negative Impact</td>
</tr>
<tr>
<td>Impacts on the landscape character during the operational phase</td>
<td>Minor to Moderate Negative Impact</td>
<td>Minor to Moderate Negative Impact</td>
</tr>
<tr>
<td>Visual impacts during the operational phase</td>
<td>Negligible to Moderate Negative Impact</td>
<td>Negligible to Moderate Negative Impact</td>
</tr>
<tr>
<td>Night time lighting during the operational phase</td>
<td>Minor to Moderate Negative Impact</td>
<td>Minor to Moderate Negative Impact</td>
</tr>
</tbody>
</table>