ANNEX I

B

Scoping Report and Terms of Reference

REPORT

ESIA Terms of Reference

ESIA for the Lokichar to Lamu Crude Oil Pipeline Project

Submitted to:

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

Popo Road,
South C,
off Mombasa Road

P.O.BOX 67839-00200,
Nairobi
Kenya

Submitted by:

Golder Associates (UK) Ltd and ESF Consultants

Woodlands Office Park,
1C Suite 1st Floor, Woodlands road, Off Lenana Road.
P.O. Box, 7745-00100, Nairobi, Kenya

Cavendish House, Bourne End Business Park, Cores End Road,
Bourne End, Buckinghamshire, SL8 5AS, UK

Kenya: +254 736100205

UK: +44 0 1628 851851

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Glossary of Terms

AGI	Above Ground Infrastructure
AOI	Area of Interest
BAT	Best Available Technology
Bopd	Barrels of oil per day
CBO	Community Based Organisation
CPF	Central Processing Facility
CSO	Civil Society Organisation
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FEED	Front End Engineering Design
GIS	Geographic Information System
HDD	Horizontal Directional Drilling
HG	Hunter - gatherer
ICP	Informed Consultation and Participation
JDA	Joint Development Agreement
LAPSSET	Lamu Port, South Sudan, Ethiopia Transport Corridor
LCDA	LAPSSET Corridor Development Authority
LLCOP	Lokichar to Lamu Crude Oil Pipeline
LLTS	Long Line Trace System
LOF	Load- Out Facility
NEMA	National Environment Management Authority
NGO	Non - Government Organisation
NLC	National Land Commission
PPMT	Pipeline Project Management Team
RAP	Resettlement Action Plan
ROA	Right of Access
SEA	Strategic Environmental Assessment
SEP	Stakeholder Engagement Plan
SSEC	Senior Stakeholder Engagement Coordinator
ToR	Terms of Reference
VLCC	Very Large Crude Carrier
ZTF	Zone of Theoretical Visibility

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1.0 INTRODUCTION

This Terms of Reference (ToR) has been prepared based on the outcomes of the Lokichar to Lamu Crude Oil Pipeline (LLCOP) Project Environmental and Social Impact Assessment (ESIA) Scoping Report[1]. The ToR presents the proposed baseline studies, impact assessment and mitigation planning activities that are considered necessary for the successful delivery of the LLCOP ESIA.

This ToR has been prepared to comply with the requirements of the *Environmental (Impact Assessment & Audit) Regulations 2003* (as amended).

This ToR does not include any additional non-statutory activities that will be undertaken on a voluntary basis by the LLCOP to meet the internal requirements of the Joint Development Agreement (JDA) Partners or for project financing purposes. All such activities will be undertaken in coordination with the development of the ESIA for Kenyan regulatory compliance purposes and will be reported separately in a *Supplemental Assessment*. The ToR and subsequent reports for such additional actions will be disclosed by the LLCOP in accordance with the LLCOP ESIA Stakeholder Engagement Plan.

A list of potential effects and planned assessment approach for each of the technical topics has been identified and prepared during the Scoping Stage and is presented in Section 3 of this document. This information incorporates the latest LLCOP Project-related activities and infrastructure design information.

An indicative table of contents for the ESIA is presented in Section 4. The contents address all relevant technical disciplines as stipulated in the Kenyan ESIA regulatory framework.

A list of key experts who will undertake the LLCOP ESIA is presented in Section 5.

The Project SEP (Stakeholder Engagement Plan) is included in Annex 1.

Relevant extracts from the Joint Development Agreement (JDA) which provides the governance framework for the LLCOP is presented in Annex 2.

This document is intended to be a stand-alone document in addition to the submitted Scoping Report and includes all information requested by NEMA.

2.0 PROJECT PROPONENT

The purpose of the Project is to design and construct an 820km long pipeline for transporting crude oil from the proposed oil fields near Lokichar in Turkana to a Project Storage and Load-out Facility at the new Port currently under construction in Lamu.

The LLCOP Project is a stand-alone element of the LAPSSET strategic corridor programme (Lamu Port, South Sudan, Ethiopia Transport Corridor), a key component of the Kenya 2030 strategic vision

In October 2017, the following four parties executed a Joint Development Agreement (JDA) for the purpose of design (see Annex 2: JDA for the LLCOP), assessment and permitting of the Lokichar Lamu Crude Oil Pipeline (LLCOP):

[1] Note that the terms environmental and social impact assessment (ESIA) and environmental impact assessment (EIA) are used interchangeably in this ToR to mean the scope of assessment required to prepare an approvals document for review and approval by NEMA to meet Kenyan regulatory requirements.

- The Government of Kenya, represented by The Ministry of Energy (now Ministry of Petroleum and Mining);
- Maersk Oil (now TOTAL OIL);
- Africa Oil; and
- Tullow Oil.

The scope of work contained within the JDA includes the preparation of the ESIA for the LLCOP. The implementing body established to deliver the JDA scope of work is the Pipeline Project Management Team (PPMT), which is the proponent for this ESIA as the representative of the parties to the JDA listed above.

As the PPMT is a project delivery mechanism, the Project Proponent is the JDA Partners. This means that the four members of the JDA are jointly responsible for the effective implementation of the approved Environmental and Social Management Plan (ESMP) and environmental license conditions.

3.0 PROJECT DESCRIPTION

The LLCOP Project is designed to provide transportation, storage and export facilities for the heavy and waxy crude oil from the Lokichar oil fields. The Project consists of a pipeline approximately 820km long and an export Load-Out Facility at the Port of Lamu. The pipeline will be buried throughout its length but will have a number of above ground structures (AGI) at suitable locations. The construction time will be approximately two to three years.

The Lokichar to Lamu Crude Oil Pipeline (LLCOP) will be routed for all of its length within the proposed Lamu Port, South Sudan, Ethiopia, Transport Corridor (LAPSSET), LAPSSET is a linear land corridor selected by the Government of Kenya for strategic infrastructure development and is a major initiative for Kenya and the East African region. The export facilities at Lamu will include an oil storage area within the Lamu Port facility and a single berth at the Port itself dedicated to transferring the oil onto appropriate vessels.

Land required for the proposed pipeline will be acquired by the Government and leased to the Project. The proposed pipeline will need a 30m Right of Access (ROA) width for construction and 6m width for operations.

Figure 1 shows the proposed pipeline route.

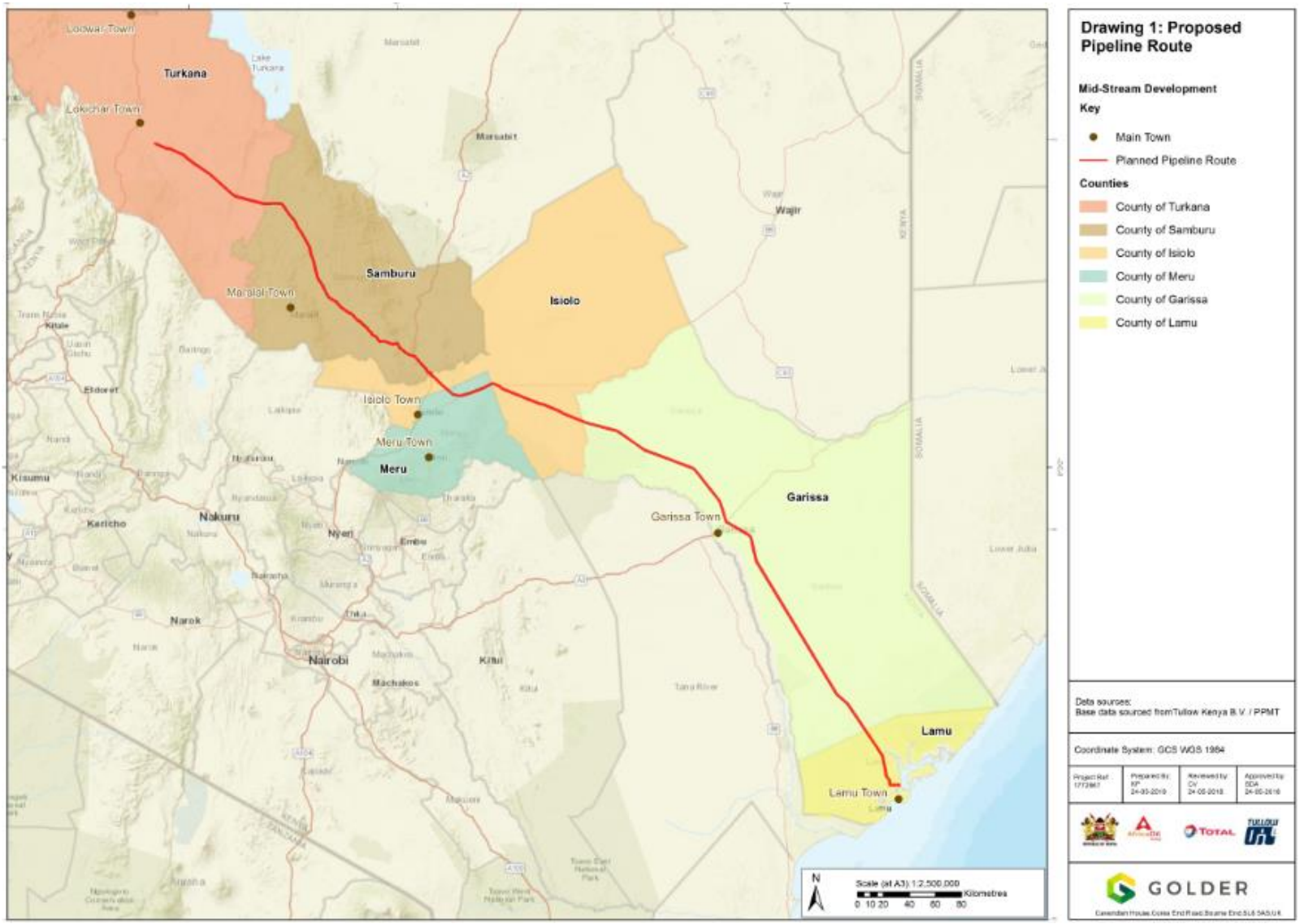

Figure 1: Map of Proposed LLCOP Route

The LLCOP will pass through six Counties (Turkana, Samburu, Isiolo, Meru, Garissa and Lamu). As far as possible, the selected route option avoids settlements and sensitive areas of biodiversity and community importance.

3.1 Key Design Parameters

The key design Parameters for this Project include the following:

- Project infrastructure has a design life in excess of 30 years for continuous oil transportation over this period;
- The pipeline will be buried for the approximately 820 km route reducing the footprint of the Project;
- The expected construction technique will be conventional trench and back fill;
- Main rivers will be crossed using trenchless construction techniques such as Horizontal Directional Drilling (HDD), micro-tunneling or similar methods;
- 17 AGIs are planned along the route (co-located or stand-alone) including block valves, pig launcher/receiver stations, pressure reduction stations, pumping stations and electrical generation stations;
- A planned 18” diameter pipeline based on a flowrate of 60 – 80 thousand bopd (barrels of oil per day);
- Due to the waxy nature of the crude oil from the South Lokichar fields the pipeline system will require thermal insulation and electrical trace heating to maintain the crude oil at an optimum temperature for pumping. The Trace Heating System used will be a Long Line Trace System (LLTS);
- Maximum peak operational power demand is 23MW;
- The Lokichar Central Processing facility (CPF) will provide the stabilised crude for the pipeline;
- The main Pump Station (PS1) will be located within the confines of the Lokichar CPF;
- Two additional Pump Stations (PS2 and PS3) will be along the pipeline;
- There will be one pressure reduction station along the pipeline;
- Up to six different Construction teams are envisaged for the pipeline construction implementation operating out of county-based centres;
- Pipeline construction will likely radiate from construction centres in a simultaneous programme;
- The crude oil will be stored before shipment at Lamu Port in one of two options:
  - Option 1 – Onshore floating roof storage tanks (3 x 500,000 bbls);or
  - Option 2 – Floating vessel storage (VLCC);
  - Crude will be transferred directly to a Suezmax-size tanker for export in both options;
- Two loading lines from the onshore storage to the Load-Out Facility (LOF);
- The connection from the potential on-shore storage terminal will either be across the causeway or sub-sea;
- The LOF for crude oil export will be designed for Suezmax-size type tankers for transportation in batches of 1MM bbl;

- Where applicable, Project facilities will be designed using closed drain systems that will collect discharge from pipework and equipment within AGIs during routine operations and maintenance and direct any discharges to a dedicated storage vessel to prevent discharge to the environment;
- Best Available Technology (BAT) will be used - the Project will be designed so that all emissions and discharges meet applicable environmental standards; and
- The Project, and construction activities will be designed in line with the environmental mitigation measures defined in the ESIA.

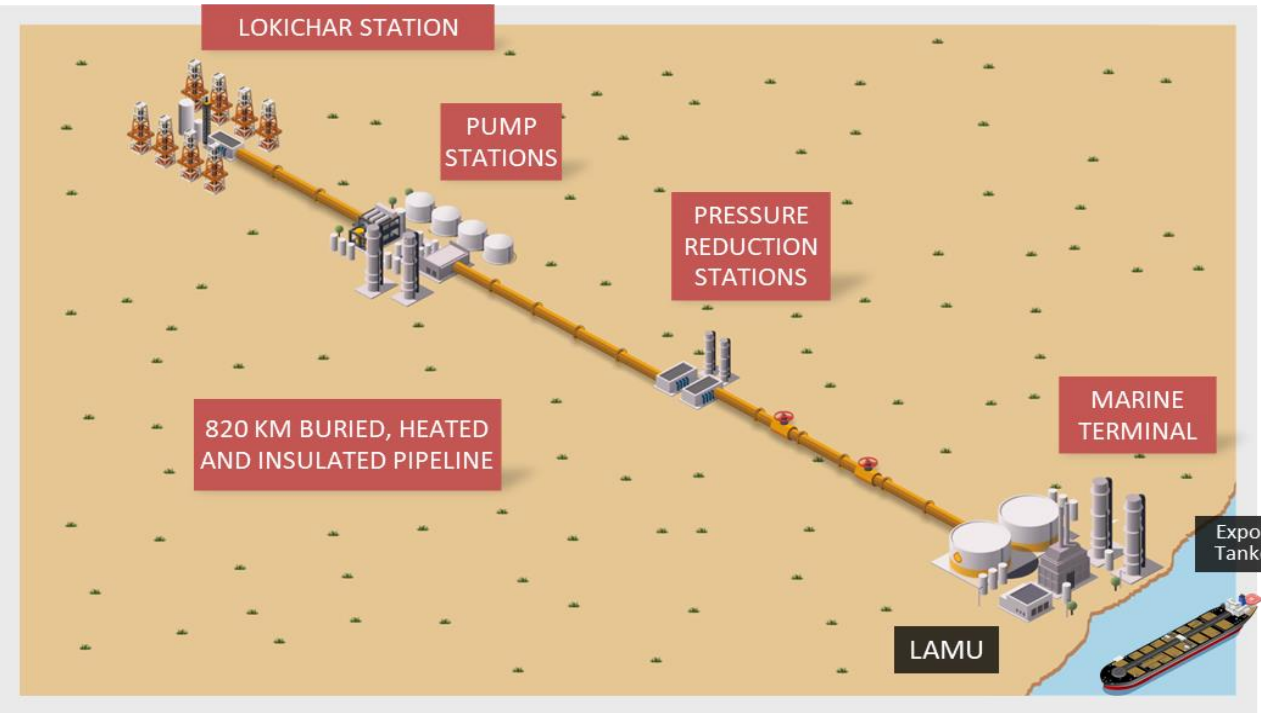

Figure 2: Schematic Representation of Key Design Elements of LLCOP

The AGIs will be constructed in securely fenced compounds and most will operate automatically being controlled remotely from the main pipeline operational management control centre. The majority will be block structures (buildings), with the equipment enclosed within the unit. Operational design and performance standards for the AGIs will be finalised by the FEED designer and their potential impact on the surrounding environment will be assessed in the Impact Assessment.

At Lamu Port, the Pipeline will arrive at a crude oil storage facility. Two options are currently being evaluated; a land side Marine Storage Terminal consisting of three above ground floating roof storage tanks (3 x 500,000 bbl) or a floating Storage Option consisting of a leased permanently moored VLCC located at the berth, with product transferred directly from the VLCC via the Load-out Facility to a Suezmax-size tanker for transportation in batches of 1MM bbl;

There will be two loading lines to the Load-Out Facility (LOF). This will either be a jetty and trestle or a sub-sea option.

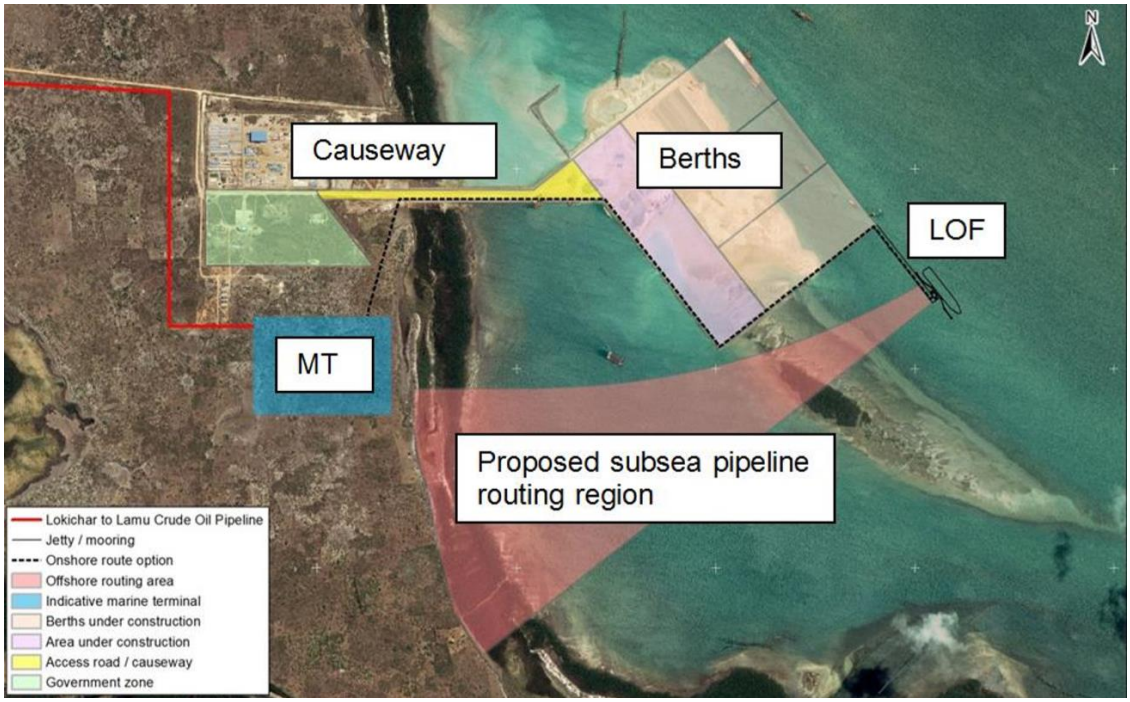

Figure 3: Proposed Layout Options for the LLCOP at Lamu Port.

3.2 Pipeline Construction

Pipeline construction is a sequential process and comprises a number of distinct operations which are described below. Final construction techniques are to be determined during the detailed design. Typically, construction activities at any one pipeline construction site can move forward at the rate of approximately 600 m per day, although this will be dependent on the nature of the ground and the weather.

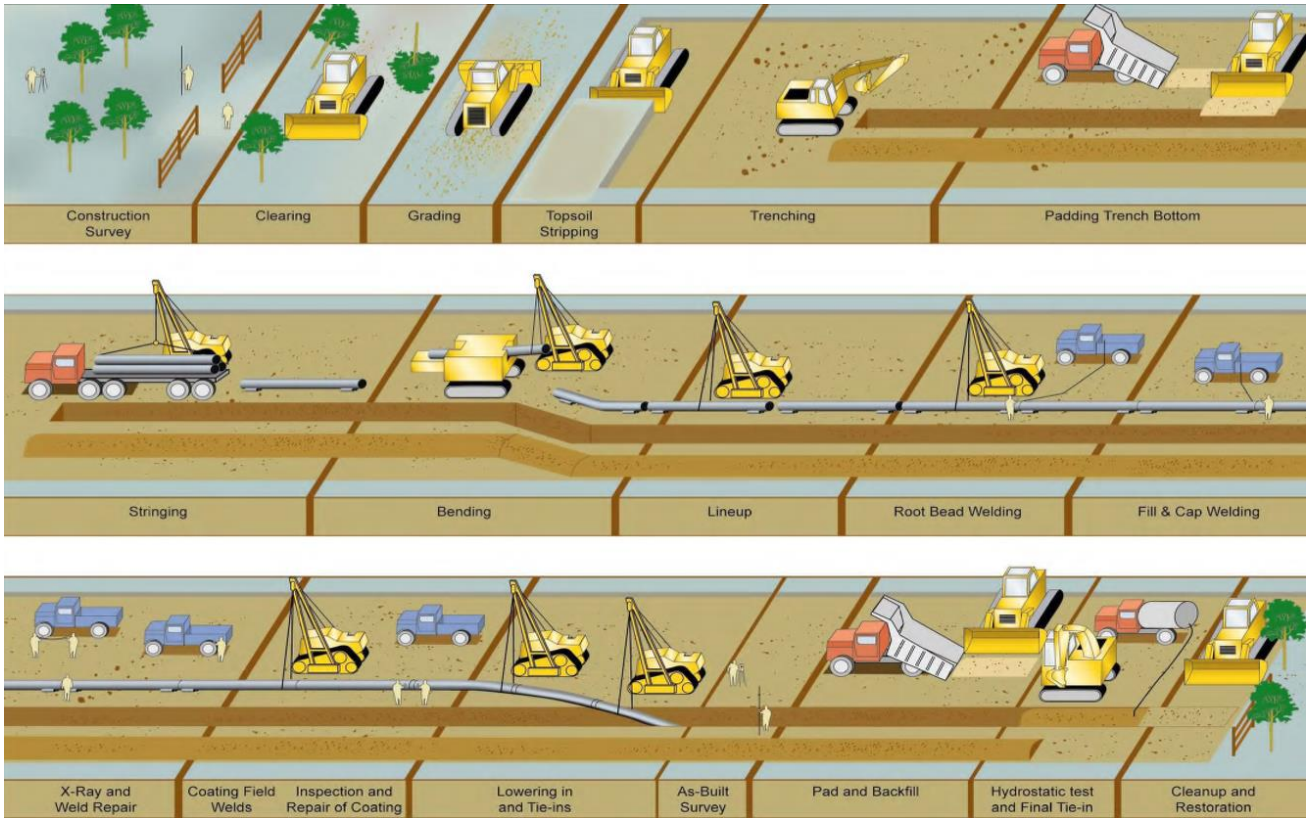

Figure 4: Typical Pipeline Construction Sequence

The majority of the route is expected to be constructed using conventional excavation and back-fill, which involves the digging of the trench directly into the surface ground layer. Laying of the pipes, burying the pipe and back–filling the trench back to the previous ground level. The objective will be to return the ground to its previous condition and characteristics as quickly as possible. Original soil and earth structures will be used as far as possible to minimise introduction of new or invasive species. The proposed conventional trench and backfill construction technique will be used for the majority of the route and will be undertaken within the approximately 30 m wide construction wayleave. This working width is adequate to allow the safe working of the expected construction plant and provision of a parallel vehicle access route. Proposals for the reclamation of the 30 m construction easement down to the required 6 m operational strip following the construction phase, will be assessed in the ESIA.

For major river crossings the Horizontal Directional Drilling (HDD) methodology is preferred. The use of HDD at the crossing points will be determined through advanced geotechnical survey boreholes at each location. Should HDD not be applicable, micro-tunelling will be used as an alternative construction method.

The construction compounds will be temporary work compounds, only existing for the duration of time the construction teams are in the field. A typical size compound is expected to house around 350 workers at any time plus equipment, with maintenance capability, stores, pipe warehousing and worker support facilities such as canteens, washing facilities and accommodation. The construction camps will be provided with the full range of facilities and amenities for worker's welfare, including sleeping, catering, medical and hygiene facilities. They will have independent power sources and controlled water supplies including waste, waste water and surface water runoff handling capacity to minimise detrimental environmental effects.

The pipeline laydown areas are likely to be extensive in area although not complex in potential impact. Construction camps will be temporary and only existing to support the construction activities for their targeted construction segment. Surface grading, soil removal and installation of drainage infrastructure for these areas is expected.

Proposed plans for the reclamation of the construction camps and laydown areas following the construction phase will be assessed in the ESIA.

4.0 APPROACH TO THE ESIA

The following sections provide an overview of the planned approaches, key issues and locations proposed for investigation for the baseline studies of the LLCOP ESIA. It also highlights selected specific elements for impact assessment which will be considered in the ESIA, based on the studies to date, informing this Scoping Report.

4.1 The LLCOP ESIA

This ESIA is focused on the LLCOP Project, and the full LAPSSET Corridor programme is not within its remit. The LAPSSET Corridor has been subject to a separate Strategic Environmental Assessment (SEA) which has been reviewed and approved by the Kenyan National Environment Management Agency (NEMA). Further developments within the framework of LAPSSET will be subject to component-specific ESIAs by the respective Proponent.

This ESIA ToR summarises the approaches detailed in the accompanying Scoping Report. Following approval of this ToR by NEMA a detailed work plan for the ESIA activities will be finalised for internal planning purposes.

5.0 FIELD ACTIVITIES UNDERTAKEN DURING SCOPING STAGE

This section sets out baseline data collection and stakeholder consultation activities undertaken during the scoping stage for the ESIA.

5.1 Advanced Baseline

Advanced baseline studies have been undertaken prior to submission of the ESIA TOR and in parallel with the ESIA Scoping Stage. This was considered necessary, in order, for the ESIA team to undertake biodiversity surveys in the period of the long rains of 2018. These studies were undertaken in May and June 2018. Areas for investigation were selected after consideration of Critical Habitat Screening, key areas where physical habitat responses to the rains are likely to be pronounced and also related to physical access and security considerations for field teams.

The biodiversity studies were performed by the ESIA Biodiversity Team, who have prepared a range of field reports. This informs the accompanying Scoping Report and this ToR, as well as providing wet season data sets for the main baseline.

Water quality sampling of the water in the marine area around Lamu Port was also undertaken during this period.

5.2 Stakeholder Consultation

A stakeholder consultation exercise was carried out along the LLCOP route to support the scoping for this ESIA. The important point to note for the LLCOP ESIA ToR is that key concerns raised by national and county-level stakeholders during these sessions have been noted and documented. and it is the intention of this ESIA to examine these concerns to provide further information for Project design and planning purposes.

The LLCOP ESIA Team is aware of the recent Court Judgement concerning the Lamu Port EIA[2]. Together with the PPMT, the ESIA Team will co-ordinate stakeholder engagement and communications throughout the ESIA process with the intention of ensuring transparency in approach through an ongoing process of consultation and engagement within each County along the LLCOP route.

6.0 LAND ACQUISITION PROCESS

The LLCOP will be constructed wholly within the LAPSSET Corridor. The land acquisition for the LAPSSET corridor is managed under a separate Government-led process independent of the LLCOP. As such, all land within the LAPSSET Corridor alignments will be acquired by the Ministry of Land & Physical Planning working with the National Land Commission (NLC) and will then be transferred to the LAPSSET Corridor Development Authority (LCDA) under the process set out in the Land Act (No 6 of 2012). As the registered land owner, LAPSSET will then grant a lease to LLCOP.

On 29 June 2016 the LAPSSET Corridor Development Authority submitted to the National Land Commission a request for issuance of land title deeds to LCDA (as the Trustee of all LAPSSET Corridor Project implementers) for all LAPSSET Corridor Project Component areas and investment areas along the LAPSSET Corridor.

The process of acquiring land for the LAPSSET Corridor is underway and is being led by the Ministry of Lands and Physical Planning. This process is running concurrently with the ESIA.

[2] Petition No 22 of 2012

As LLCOP will not be acquiring the land, there is therefore no requirement for the LLCOP to prepare a Resettlement Action Plan (RAP) which is the mandate of the NLC. However, this ESIA will examine the impact of LLCOP on livelihoods and present recommended mitigation methods.

If during the ESIA process there is any requirement to make minor alterations to the LLCOP route outside the existing LAPSSET corridor to avoid sensitive receptors, the LAPSSET corridor will be redefined in accordance with Kenyan regulatory requirements to include these areas. This will be reported in the ESIA report.

7.0 ESIA STAKEHOLDER ENGAGEMENT

The approach to stakeholder consultation will be to use an Informed Consultation & Participation (ICP) process for affected communities. This will be supported by a series of community engagement meetings along the entire length of the LLCOP route, which will be undertaken by the ESIA Stakeholder Engagement Team in conjunction with the PPMT and LAPSSET.

The Scoping Study has instigated and reported a two-tier approach to stakeholder engagement, with meetings held for national-level stakeholders in Nairobi for parliamentarians and NGO representatives, and county-level stakeholder meetings (for both state and non-state actors) were held in each respective county headquarters. Results and findings have been reported in a stand-alone Scoping Consultation Report.

The next stages of ESIA stakeholder consultations will build on this approach, together with a third tier which will be focused on community-level engagement. While there will be continued engagement at the national and county levels, more intensive and extensive engagements are proposed with affected communities. This will focus on identifying and engaging stakeholders at the community level to inform them of the proposed Project and to receive comments and feedback from local stakeholders for consideration within the ESIA process.

7.1 Approach

The stakeholder approach at the national level will include multi-stakeholder workshops and, where necessary, one-on-one meetings, while that for the county and community levels will focus on a wide range of different types of engagement methods to ensure coverage of relevant stakeholders across all counties.

During the Scoping exercise, stakeholders and stakeholder groups were identified. A mapping exercise was then undertaken to understand the nature and degree of interest or influence these stakeholders have on the Project. The approach to stakeholder engagement for this ESIA segments the stakeholders into:

- National Government and Government agencies, National Level Non-State Actors (NGOs, CSOs, Religious Organizations, Private Sector entities);
- County-level Governance and county level Non-state actors; and
- Communities (community members along AOI, specific interest community groupings such as user type associations e.g. beekeeping, Self-help groups, pastoralists, women, youth and community associations)

The ESIA Stakeholder Engagement Team will be coordinated by the National Stakeholder Lead who will deliver the national level workshops and oversee all other consultations. The county-level and community-level consultations will be undertaken under the leadership of ESIA Regional Stakeholder Coordinators accompanied by county-based support teams. Each county will have an ESIA County Coordinator and approximately 3 support persons. The teams, led by Kenyan experts, will have a full team briefing in methodologies, reporting and project information prior to the field programme.

The ESIA Regional Stakeholder Coordinators are all from the respective regions and are well versed with the language, dynamics and circumstances within each county, ensuring a robust and effective approach to consultation.

A GIS-based mapping exercise will be used, in conjunction with consultation, to delineate within the Project AoI which settlements will be identified as potentially project-affected. Based on this, and in consultation with appropriate stakeholders, suitable locations for community *barazas* will be identified. The programme will be implemented in October /November 2018 across the entire LLCOP route. Centres proposed for Baraza's are given in Figure 5 below. The consultation programme will finish with workshops for the Parliamentarians and NGO Groups in Nairobi where the opportunity will be taken to inform and update the audiences of key findings to date. Given limiting factors, principally security and access, this exercise will aim to ensure that as far as practicable all community-level stakeholders can access community *barazas*. Towns in the potential Project AoI are shown in Figure 5.

Follow up meetings have been allowed for after this exercise to cater for the eventuality that some mobile groups have not been engaged in the above programme due to seasonal migration. These groups will be identified during the community engagements and with the local leadership.

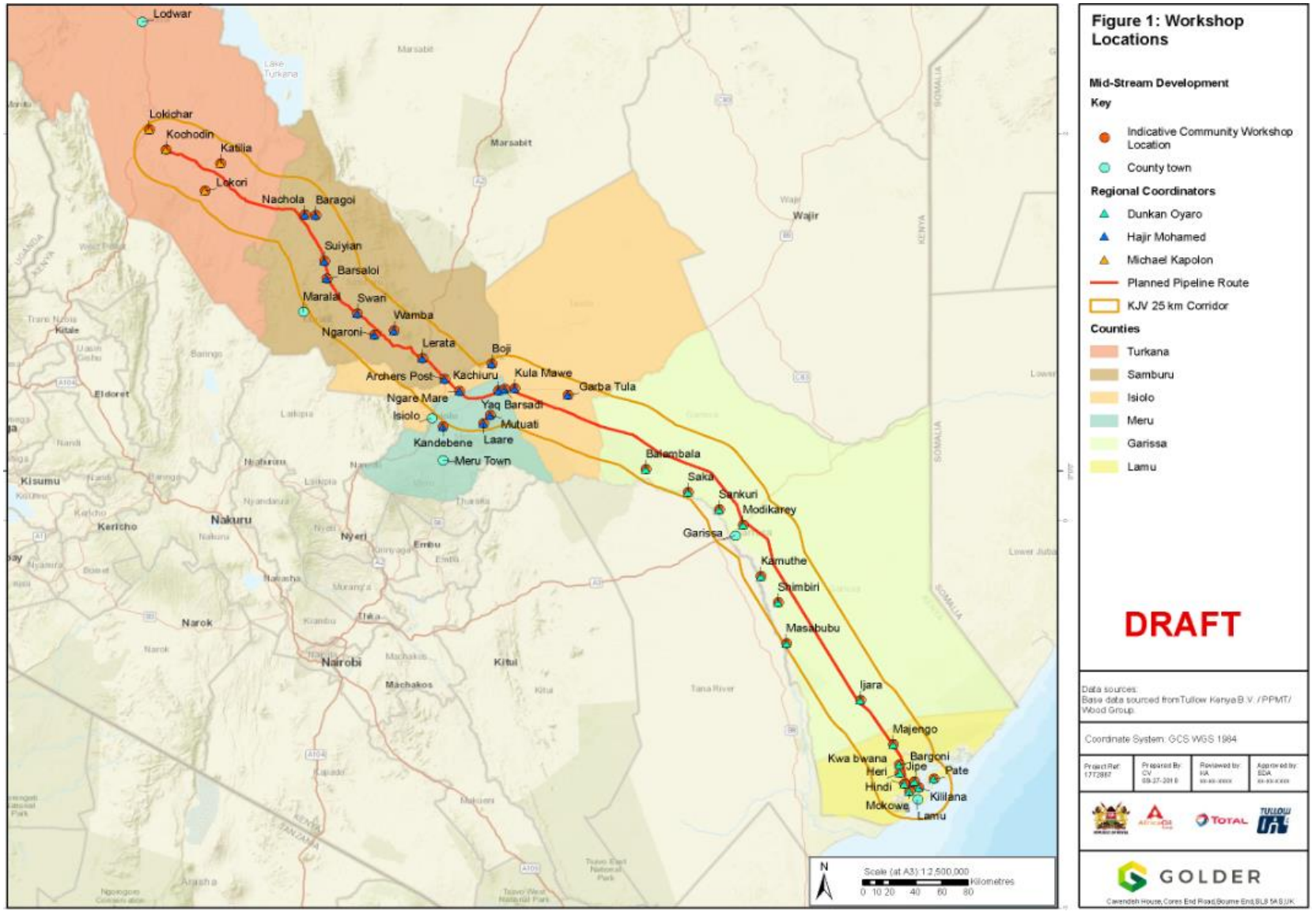

Figure 5: Proposed Stakeholder and Community Engagement Locations

The Stakeholder Engagement team will be organised into three parallel teams that will deliver the engagement programme in the counties as follows:

- Team 1 – Lamu and Garissa;
- Team 2 – Isiolo, Meru and Samburu; and
- Team 3 – Turkana.

The reason for this structure is to use experts who are well versed in the particularities of each regions social and cultural context. The Stakeholder Engagement Plan (updated) is presented in Annex 1 of this Report.

7.2 Notification Methods

The ESIA Stakeholder Engagement Team will carry out a notification exercise with the relevant stakeholders prior to all planned stakeholder meetings. The location and category of stakeholders will define the approach adopted for this notification. The Notifications will be delivered in English, Swahili and local languages as appropriate. It will be designed to ensure that adequate notice and information is provided, so that affected and interested parties are aware of and able to attend these meetings if they so wish. Notice will be given to stakeholders in compliance with the statutory requirement of 7 days as a minimum. Notifications will be implemented using a combination of letters, email, posters in strategic locations and radio advertisements as appropriate.

The key notification methods that will be used for different types of stakeholder meetings are summarised below:

- National level workshops: formal letters, emails and telephone follow-up;
- County level workshops: formal letters, emails and telephone follow-up; and
- Community *Barazas*: posters in strategic places such as marketplaces, chief's offices or churches/mosques; radio advertisements on local radio stations and verbal announcements from chiefs in other local forums.

The process of notification for community-level engagements is illustrated in Figure 6:

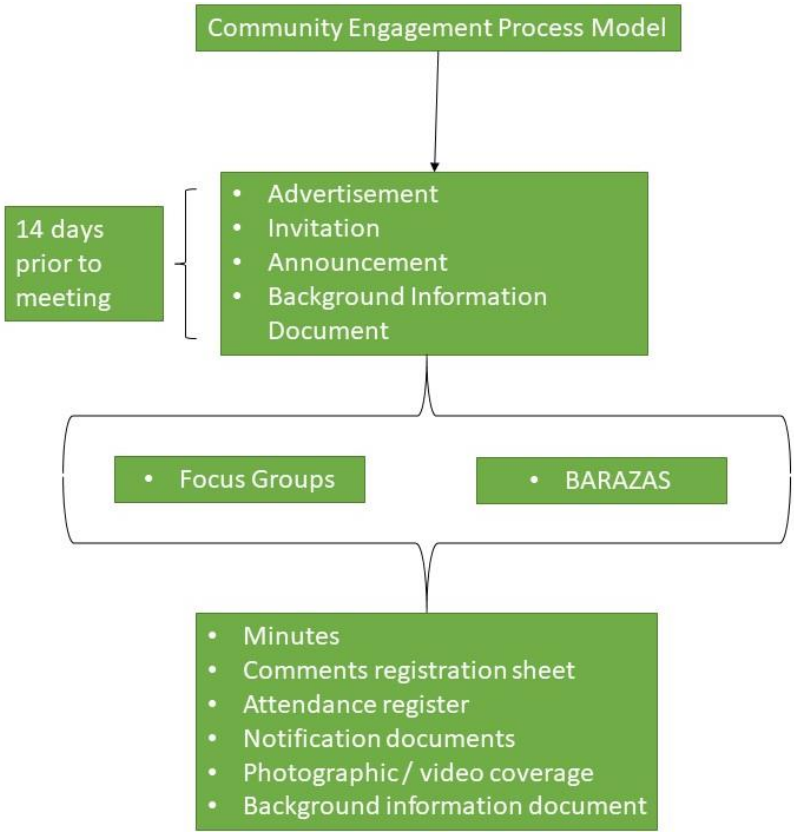

Figure 6: Process of Notification for Community-Level Stakeholder Engagement

7.3 Engagement Methods

A range of stakeholder engagement methods will be used. These will include, but not necessarily be limited to, the following:

- **Workshops**: These will be used for structured meetings at the national and county levels of engagement. They will offer an opportunity to inform stakeholders on project details, respond to queries and receive comments;
- **Individual consultations**: These will focus on key resource institutions and individuals with the intention of receiving informed opinions as well as strategic knowledge such as empirical monitoring and other data, community-based knowledge, policy and programme positions;
- **Public *barazas***: These will be held in community zones within optimal areas for invited participants comfort and easy access. The *barazas* will either be held in the open air or within appropriate community buildings such as halls or schools and will provide a forum for the ESIA team to inform community members of the Project and its attributes as well as to receive community feedback and comments on the Project; and
- **Focus group meetings**: These meetings will target special interest groups and vulnerable groups identified by the ESIA team for focused issue-specific consultation (e.g. women, bee keeping groups, fishermen).

7.4 Documentation of Stakeholder Engagement

Records will be made of all notification exercises as well as all stakeholder engagements (workshops, meetings etc). These meeting minutes will form an appendix to the Stakeholder Engagement Report that will form part of the ESIA report. Records of the meetings will include (as appropriate):

- Notification documentation;
- Background Information Document;
- Register of attendance;
- Comments sheets;
- Photographic/video coverage; and
- Minutes of meeting.

7.5 Grievance Mechanism

A grievance mechanism is being set up by the LLCOP in parallel to the ESIA. This will be developed further following the ESIA completion to address the needs of the construction and operations phases.

While the LLCOP ESIA will undertake stakeholder engagement related to the ESIA, the PPMT will be the ultimate "owner" of the relationship with local communities. These relationships will then be maintained throughout the Project life.

The LLCOP Community Relations Plan will set out how LLCOP will engage with local communities and will include a grievance management system. This will be supported by:

- County Commissioners and networks of local chiefs acting as a two-way channel for information;
- Monthly visits by LAPSSET Regional Coordinators;
- Bi-monthly visits by PPMT;
- Regular visits by SSEC (in support of LAPSSET and PPMT); and
- ESIA team activities.

7.6 Approach to Vulnerable and Marginal Groups

Vulnerable and Marginalised Groups will be considered using the approach and methodology set out in the World Bank publication *Country Social Analysis of Vulnerable and Marginalised Groups in Kenya*[3]. In practice, this will:

- Use the Vulnerable and Marginalised Group mapping in the publication to identify potential areas where vulnerable and marginalised groups may be affected by the project; and
- Undertake field-based verification and key informant interviews to confirm the presence and location of affected Vulnerable and Marginalised Groups.

Based on the above approach the ESIA will apply a consistent engagement framework across all identified vulnerable and marginal communities. Table 1 below is taken from the above referenced Report and presents the vulnerable and marginalised groups recognised by the Kenyan Constitution.

[3] World Bank Group. 2016. Country Social Analysis of Vulnerable and Marginalised Groups in Kenya: Guidance for Applying the World Bank Operational Policy 4.10 on Indigenous Peoples. World Bank, Washington, DC.

Table 1: List of Vulnerable and Marginalised Groups as per the New Kenyan Constitution

Name	Other Names Usually derogatory	Estimated Population[4]	Livelihood[5]	Administrative Location Counties[6]
Sengwer		50,000	HG/Farmers	Trans-Nzoia; Uasin-Gishu; West Pokot; Keiyo-Marakwet
Ogiek	Dorobo	40,000	HG/Farmers	Nakuru; Baringo; Uasin Gishu; Bomet; Kericho; Narok; Nandi
Waatha	Wasanye	13,000	HG/Farmers	Kwale; Tana River; Marsabit, Kilifi
Aweer	Boni	7,000	HG	Lamu, Tana River
Yiaaku	Dorobo	4,000	HG/Farmers	Laikipia
El Molo		2,900	Fishing	Marsabit, Samburu
Ilchamus		33,000	Fishing/Farmers/ Livestock Keeper	Baringo
Endorois	Dorobo	60,000	Fishing/Farmers/ Livestock Keeper	Baringo, Laikipia
Borana		136,936	Pastoralists	Marsabit, Wajir
Gabra		31,000	Pastoralists	Marsabit, Samburu
Rendille		62,000	Pastoralists	Marsabit, Samburu
Turkana		1,008,463	Pastoralists	Turkana, Baringo, Laikipia
Pokot		662,000	Pastoralists	West Pokot /Baringo
Maasai		666,000	Pastoralists	Narok, Kajiado

Source: ERMIS Africa Ethnographic Survey of Marginalized Groups, 2005-2012

This approach will document the engagement process with affected communities during the LLCOP ESIA stakeholder engagement programme and provide records of community meetings and barazas at which the affected communities were given the opportunity to provide their views.

[4] Internet based – several sites
[5] Source: ERMIS Africa Ethnographic Survey of Marginalized Groups, 2005-2012
[6] Ibid.

8.0 FIELD BASELINE STUDIES

For the field baseline studies, the ESIA ToR divides the route into sectors, within which baseline field studies will be managed and undertaken. These sectors are of differing lengths and area, and are defined by local characteristics, access or homogeneity and may cross county boundaries.

8.1 Area of Influence and Field Study Areas

The sector maps in this ToR are for location information only and are of a certain size for graphic representation on a map of this scale and do not necessarily coincide with the Project AoI. The field surveys will concentrate on the route centre line and will cover appropriate distances either side of that centre line. Where appropriate (as discussed in the Scoping Report) AoIs for wider areas (often defined by the presence of identified receptors) may be applied where considered appropriate.

8.2 Use of Satellite Data

Given the nature of the physical and security environment in certain sectors, there are challenges in ensuring appropriate coverage by the field teams for the complete route. The ToR proposes to minimise this issue by using detailed satellite imagery (ortho-mosaic) collected by PPMT for the entire route and which provides a 50 cm ground resolution and covers approximately 2.5 km either side of LLCOP route centreline. This will supplement the field studies to provide continuity of the ESIA baseline along the full LLCOP route.

It is planned that field teams will undertake surveys of all key characteristic/representative areas along the LLCOP route as well as any areas which scoping may indicate the potential for sensitive environments to be present. The ESIA detailed work plan which will be prepared based on the ToR will include the visit schedule and logistics arrangements for all areas to be visited. As noted in Section 7.2 of the Scoping Report, security conditions prevailing at the time of the baseline visits will be a key factor in determining schedule, access, logistics and field team composition.

The following sections present the ESIA baseline sector maps and give an introduction to the ESIA baseline approach for each sector. For each sector, a brief summary is provided as follows:

- **Characteristics**: This is a brief overview of the physical typology of the entire sector;
- **Field visit rating**: An estimate of likelihood of field team gaining suitable (and safe) access to the area;
- **Key Teams**: Priority field teams for surveying within each sector. Social Engagement team activities and access along the route is considered in Section 2.3 of this ToR Report. The teams have been identified in response to the findings of the Scoping Studies with the objective of filling data/knowledge gaps and/or seasonal difference; and
- **Notes**: Any particular points relevant to the ToR planning for the sector.

8.3 Sector A: Turkana

Characteristics: semiarid / arid environment, sparsely populated.

Field Visit Rating: 95%.

Key Teams:

- Biodiversity: mammals / birds / aquatic ecosystems/herpetology/invertebrates/flora;
- Cultural Heritage: survey of route for Pastoral Neolithic and hunter gatherer artefacts/areas of interest; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes:

Field visits for biodiversity in this sector for the advanced baseline surveys had to be postponed in June 2018, as a result of community activism at the time of the planned visit. It is anticipated that this work will be able to be undertaken as part of the main ESIA baseline studies.

8.4 Sector B: Kerio River

Characteristics: key major river (permanent) in semi-arid area, sparsely populated.

Field Visit Rating: 95%.

Key Teams:

- Biodiversity: mammals/birds /aquatic ecosystems/herpetology/invertebrates/flora;
- Cultural Heritage: rock paintings from Neolithic periods and potential early pastoralist/hunter-gatherer finds;
- Water Quality: sampling and measurement of river and key water regime characteristics; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: Access routes into the area from Lokori.

8.5 Sector C: Suguta River

Characteristics: Major permanent river with important indicators, unique habitats and migratory routes; exposed lava rock habitats and sand dunes within valley area;

Field Visit Rating: 95%.

Key Teams:

- Biodiversity: mammals/birds/aquatic ecosystems/herpetology/invertebrates/flora;
- Water Quality: sampling and measurement of river and key water regime characteristics. and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: Access routes for eastern side bank of the river valley from the Baragoi area. Closest overland access to the western bank without specialist access equipment is circa 27 km. The ESIA team is considering options or access from the western bank.

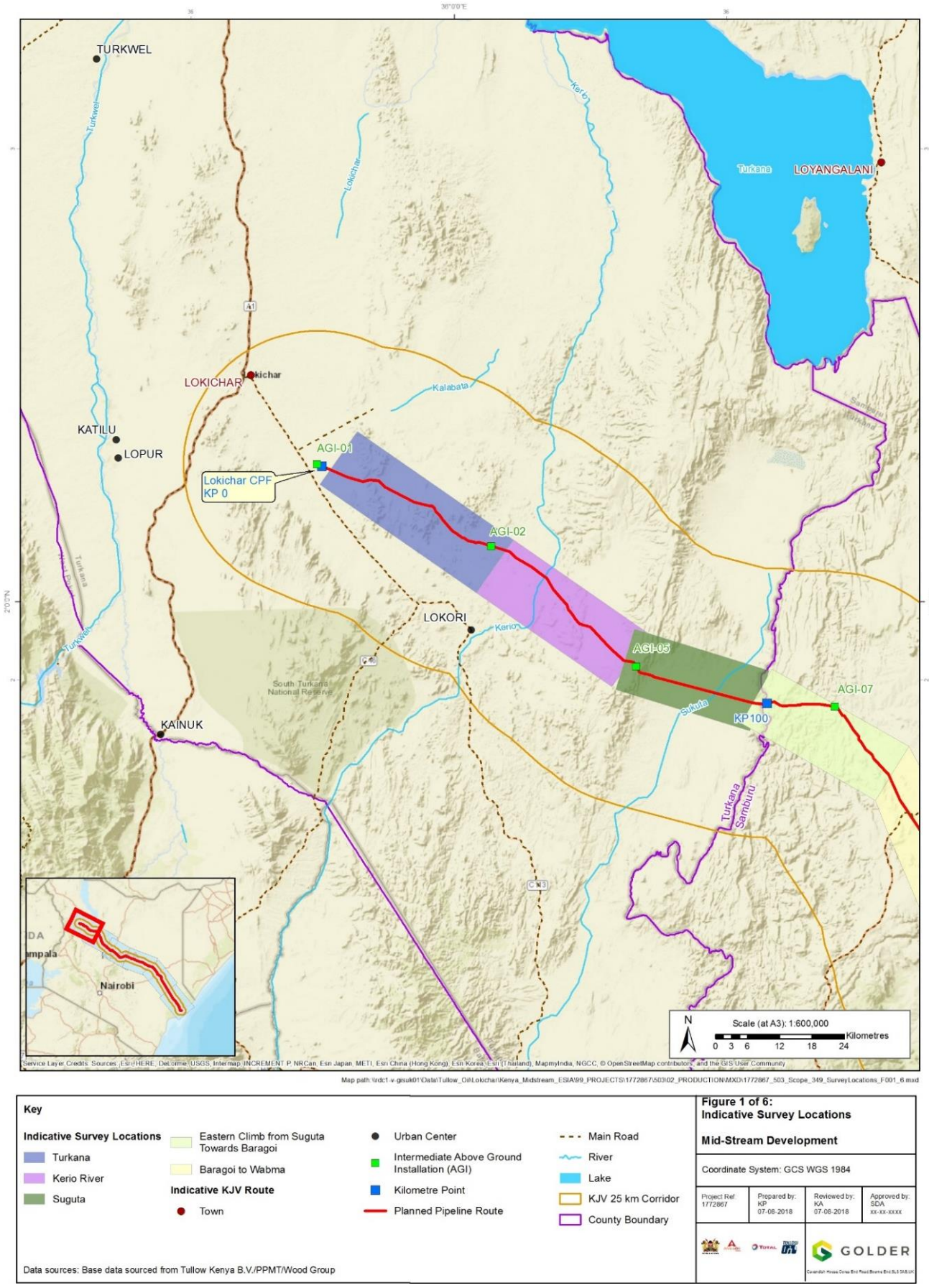

Figure 7: Route Baseline Sectors - Turkana to Baragoi

8.6 Sector D: Suguta to Baragoi Area

Characteristics: The main climb along the LLCOP route, through lava rocks and approximately a 950m increase in elevation up to the plateau.

Field Visit Rating: 95%.

Key Teams:

- Biodiversity: mammals/birds/aquatic ecosystems/herpetology/invertebrates/flora;
- Cultural Heritage: potential Nakali collection influence area; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: Access from Baragoi area.

8.7 Sector E: Baragoi to Wamba

Characteristics: semi-arid zone, the LLCOP route is dissected by many seasonal luggas and sparsely populated; area of potential erosional impacts; are of potential wildlife migration routes.

Field Visit Rating: 95%.

Key Teams:

- Biodiversity – mammals/birds/herpetology/invertebrates/flora;
- Air Quality and Noise: ambient monitoring for air and noise;
- Water Quality: Seasonal luggas investigated during wet season conditions (first phase undertaken during Advanced Baseline Studies);
- Soils: potential environmental impacts from increase in rates of erosion; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: Field teams to build on understanding from advanced baseline field work for dry season.

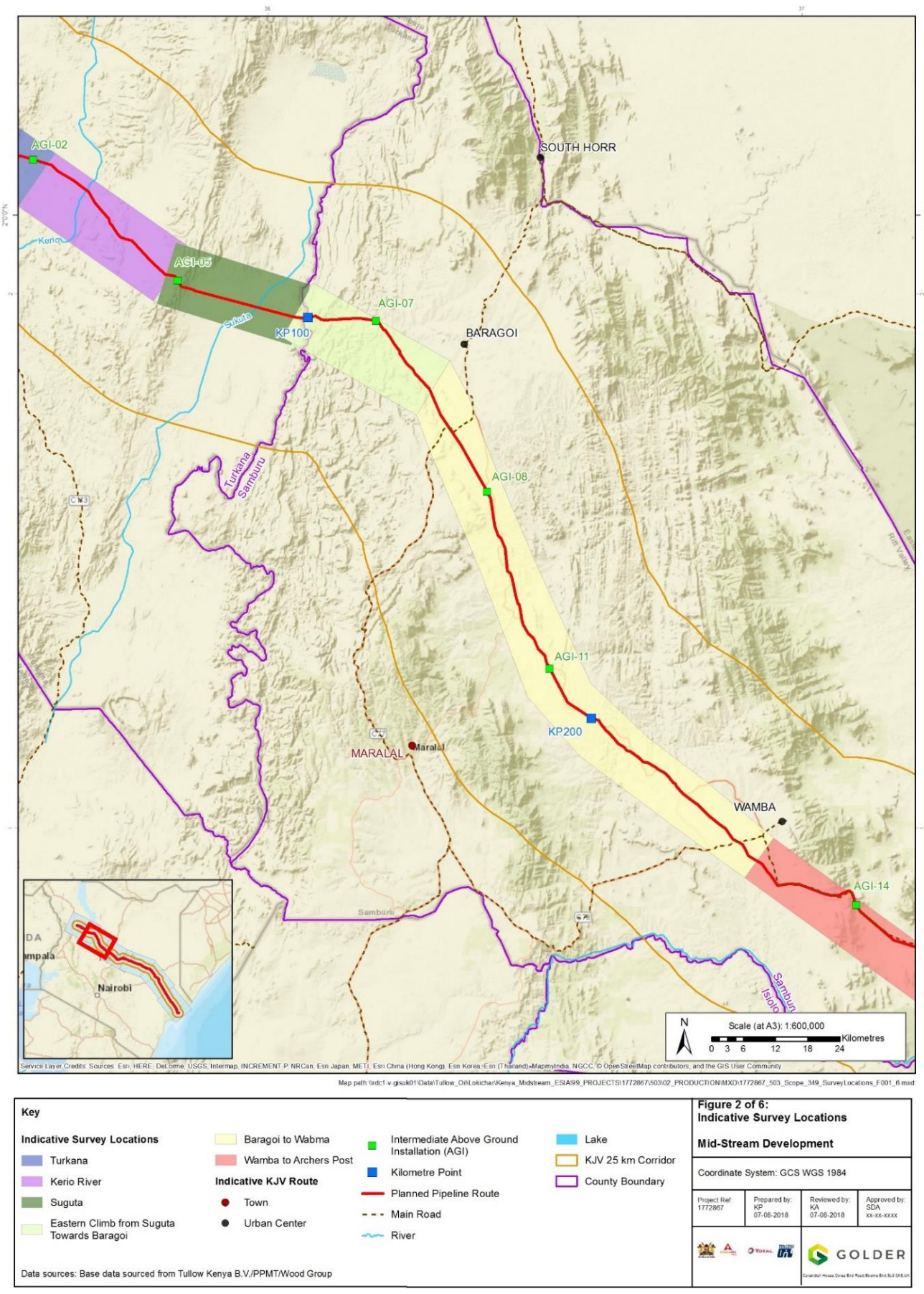

Figure 8: Route Baseline Sectors - Suguta to South of Wamba

8.8 Sector F: Wamba to Archers Post

Characteristics: A key LLCOP route sector including a constrained pass section below the Matthews Range; proximity to Conservancies and National Parks; modified landscapes on LLCOP route; population centres of Wamba and Archers Post within Project AoI.

Field Visit Rating: 100%.

Key Teams:

- Biodiversity – mammals/birds/herpetology/invertebrates/flora;
- Air Quality and Noise: ambient monitoring for air and noise;
- Cultural Heritage: Late Stone Age site potential on Ewaso Ngiro plains; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: LLCOP route area in proximity to human populations and areas of biodiversity importance; LLCOP construction activities and impacts will be noticeable and noted by local communities and land users; important protected biodiversity areas nearby and key tourist and transport hub of Archers Post.

8.9 Sector G: Ewaso Ngiro River

Characteristics: Major permanent river draining west to east; important for biodiversity and population in close proximity vicinity of the pipeline route.

Field Visit Rating: 100%.

Key Teams:

- Biodiversity: mammals/birds/aquatic ecosystems/herpetology/invertebrates/flora;
- Air Quality and Noise: ambient monitoring near Archers Post;
- Water Quality: sampling and measurement of river and key water regime characteristics; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: Important river crossing albeit in disturbed and/or modified area; likely high-profile construction activity and interaction of construction teams with local community; likely to be one of the most publicly visible areas for LLCOP construction activities, impacts and mitigation.

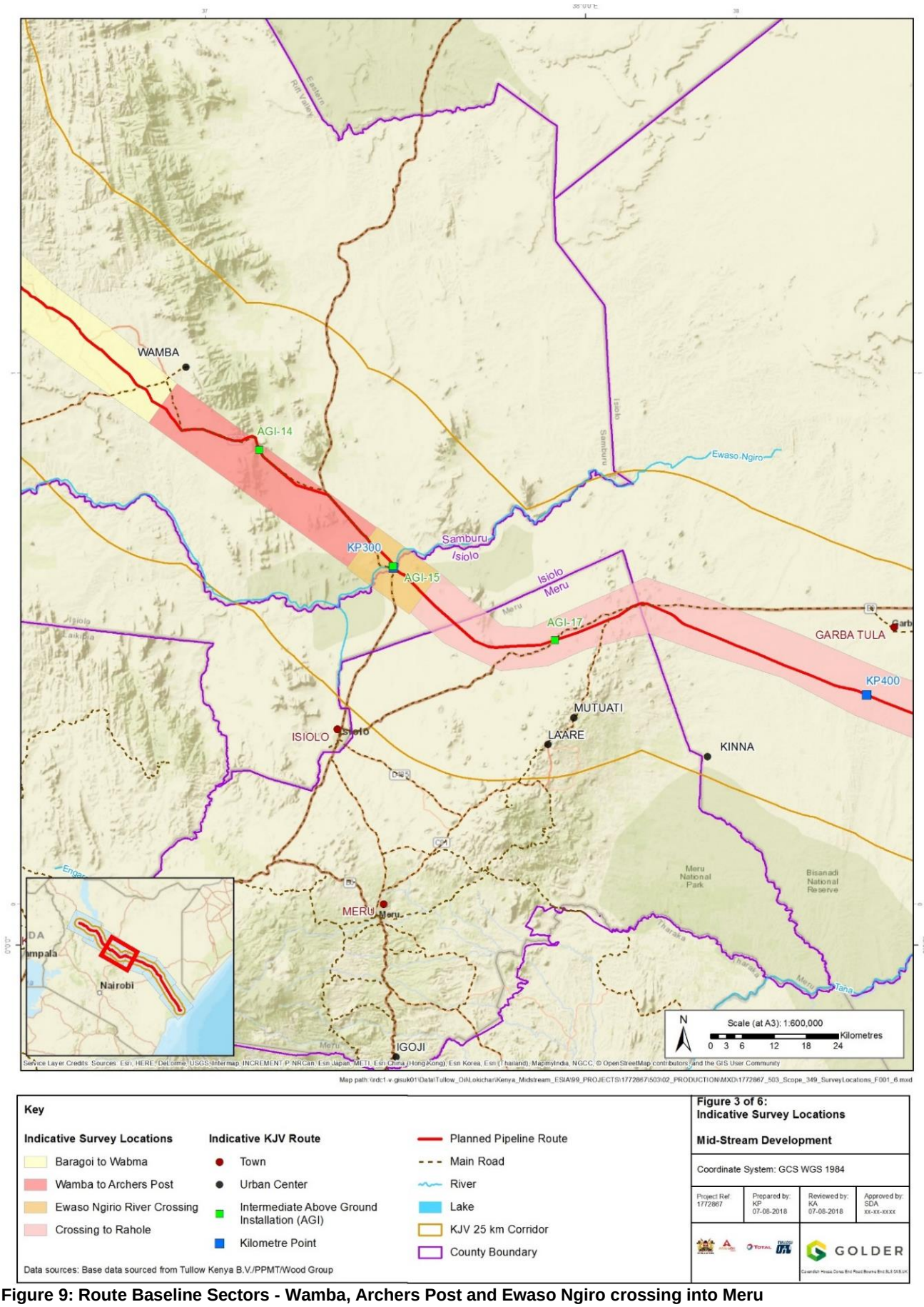

Figure 9: Route Baseline Sectors - Wamba, Archers Post and Ewaso Ngiro crossing into Meru

8.10 Sector H: Kula Mawe to Garba Tula

Characteristics: semi-arid acacia landscape; sparse population along route but proximity to populated areas in Isiolo and Meru.

Field Visit Rating: 95%.

Key Teams:

- Biodiversity: mammals/birds/aquatic ecosystems/herpetology/invertebrates/flora;
- Air Quality and Noise: Ambient monitoring for air and noise; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: Field teams will avoid military areas along the southern proximity of the LLCOP route in this area.

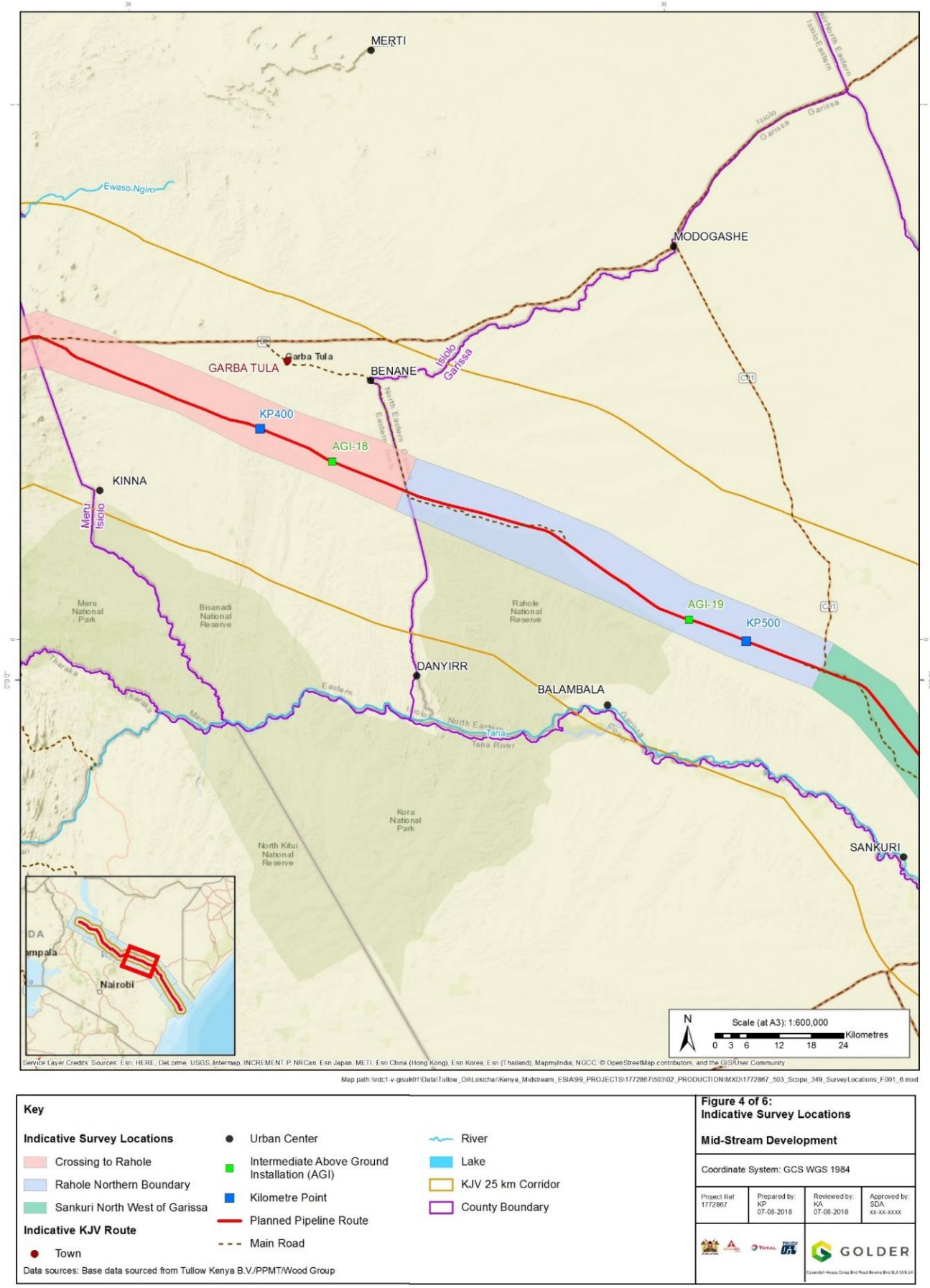

Figure 10: Route Baseline Sectors - Kula Mawe to Garba Tula

8.11 Sector I: Rahole Park Northern Boundary

Characteristics: semi-arid acacia landscapes with sparse population.

Field Visit Rating: 60%.

Key Teams:

- Biodiversity: mammals/birds/aquatic ecosystems/herpetology/invertebrates/flora;
- Air Quality and Noise: ambient monitoring for air and noise; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: This sector is identified for potential security access limitations for field teams.

8.12 Sector J: Sankuri Area – North West of Garissa

Characteristics: semi-arid acacia landscapes with sparse population.

Field Visit Rating: 65%.

Key Teams:

- Biodiversity: mammals/birds/aquatic ecosystems/herpetology/invertebrates/flora;
- Cultural heritage – Scoping Report indicates cultural sites such as cairns could be present in the Sankuri area; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: The Sankuri area is often subject to additional security measures and field visits are dependent on the situation at the time.

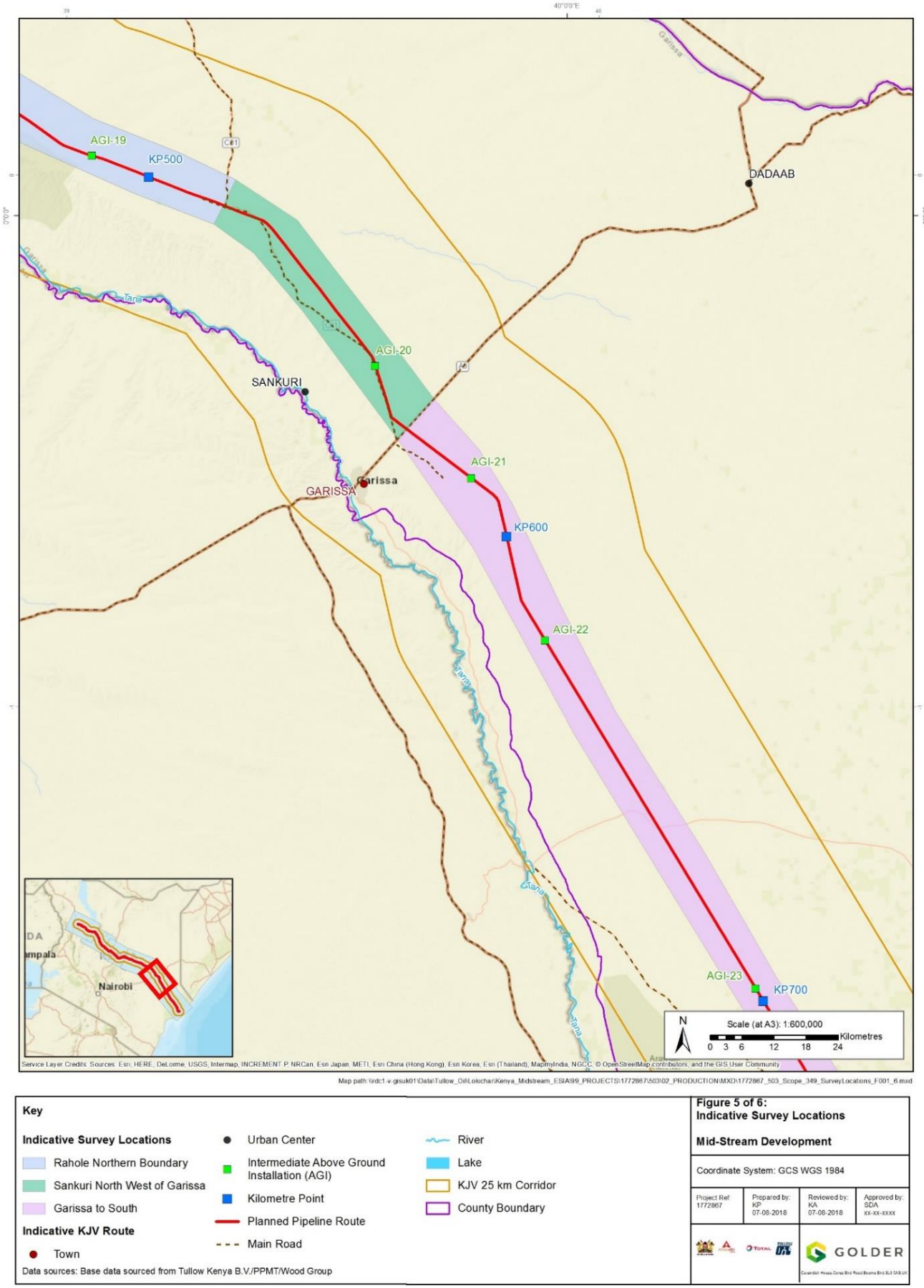

Figure 11: Route Baseline Sectors - Sankuri to South of Garissa

8.13 Sector K: Garissa towards Ijara

Characteristics: semi-arid area with sparse population.

Field Visit Rating: 50%.

Key Teams:

- Biodiversity: mammals/birds/aquatic ecosystems/herpetology/invertebrates/flora;
- Air Quality and Noise: ambient monitoring for air and noise; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: Indications are that satellite data should provide a good understanding of most of route in this sector. However, some field studies for mammals in particular will be a key objective; conservation measures for Hirola during construction will be required; data sets for Hirola will be obtained from KWS to supplement field studies.

8.14 Sector L: Inland Lamu and Coastal Forest

Characteristics: Increasing density of coastal forest and areas of standing water present sensitive ecosystems; increased population with some permanent settlements and agriculture.

Field Visit Rating: 50%.

Key Teams:

- Biodiversity: mammals/birds /aquatic ecosystems/herpetology/invertebrates/flora;
- Air Quality and Noise: ambient monitoring for air and noise; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: The area inland of Lamu is subject to incursions and social tensions, making it an area of risk for outside visitors and survey teams; the ESIA team has been discussing the options to undertake limited survey on the LLCOP route (selected points) in this area, supported by high security measures and this is being investigated further; it is likely that important assemblages of flora and fauna will be found in this area.

8.15 Sector M: Lamu Port and Lamu Marine Area

Characteristics: coastal littoral habitats, important mangrove habitats and turtle breeding grounds, important artisanal fisheries with settlements and the main town of Lamu are in close proximity.

Field Visit Rating: 95%.

Key Teams:

- Biodiversity: mangroves/turtles/marine surveys/dugongs/cetaceans/birds;
- Cultural Heritage: Swahili origin culture and Lamu old Town UNESCO World Heritage site;
- Air Quality and Noise: ambient monitoring for Marine Terminal Storage Area and LOF;
- Water Quality: sampling and measurement of key water characteristics in Lamu Port Marine Area; and
- Social: socio-economic information, livelihoods, community health safety & security, stakeholder engagement.

Notes: Key baseline area for marine impact assessment, particularly with reference to LOF and maritime transport; potential for significant oil spills.

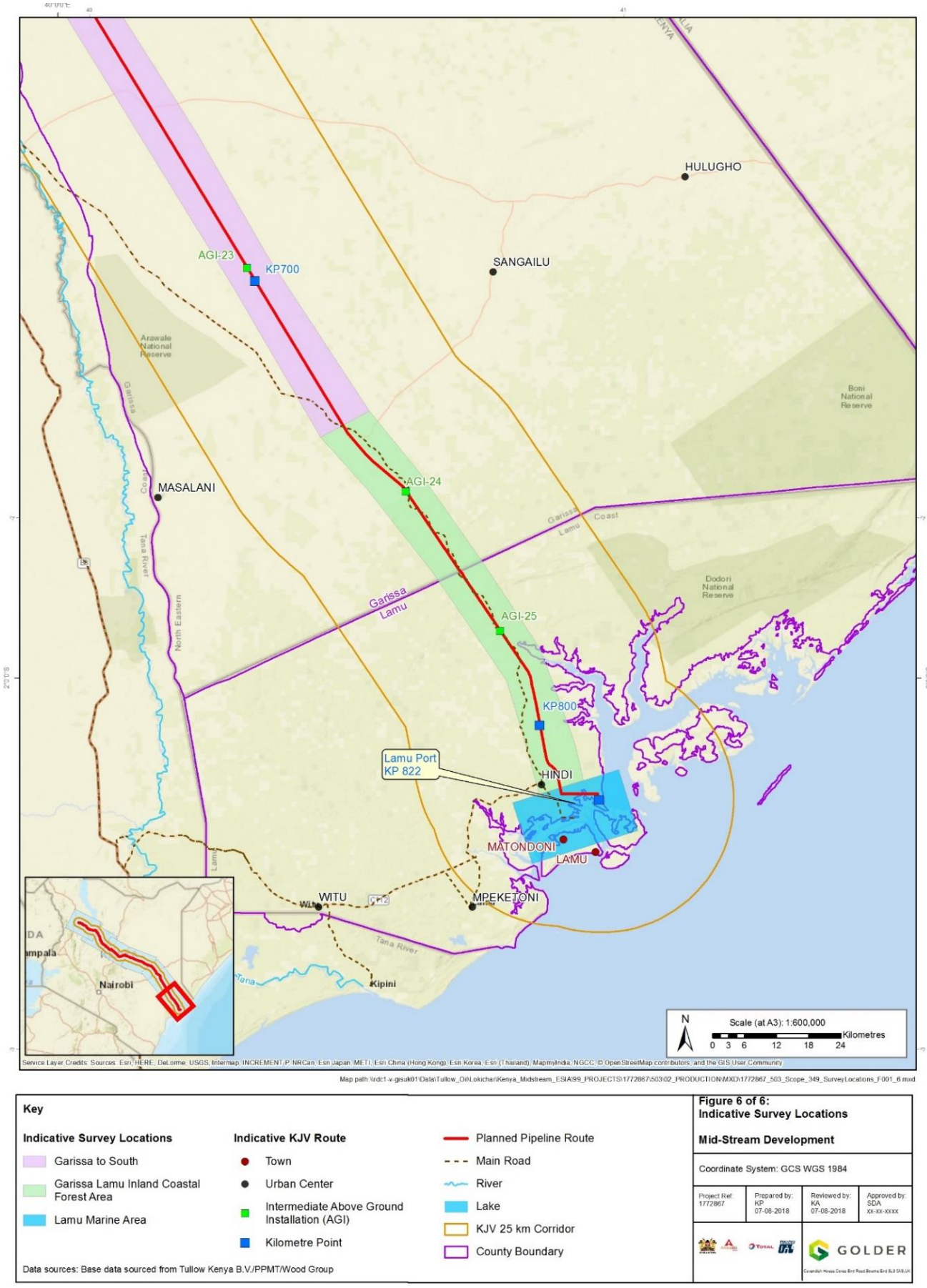

Figure 12: Route Baseline Sectors - South of Garissa to the Lamu Marine Area

9.0 IMPACT ASSESSMENT ISSUES

The above discussion covers the LLCOP route to be assessed. However, in addition to assessment of potential construction and operational impacts along LLCOP route there are further issues of additional significance for the ESIA which will be considered in the impact assessment and for which further specialist modelling or other studies may be required.

9.1 Terrestrial Oil Spill/Release

Leakage and /or spills of crude oil from the pipeline along the LLCOP route will be considered in the ESIA. This will include consideration of the characteristics of the crude oil and its behaviour in the receiving marine environment, specifically:

- Soils and groundwater surrounding and/or adjacent to the pipeline;
- Permanent rivers crossed by the pipeline; and
- Seasonal luggas crossed by the pipeline.

9.2 Marine Oil Spill/Release

Leakage and /or spills of crude oil from the LLCOP pipeline, storage facilities and marine offloading facility will be considered in the ESIA. This will include consideration of the characteristics of the crude oil and its behaviour in the receiving marine environment. This will include spill dispersion modelling of potential release scenarios and development of appropriate mitigation measures, oil spill sensitivity mapping and emergency response plans.

9.3 Pipeline Construction Camps

The construction camps, although temporary, have the potential to create local impacts through disruption to local economies, communities and pressure on local resources etc. The proposed locations for the construction camps will be considered by the ESIA team and will be supported by an assessment of proposed locations, analysis of specific potential issues at particular camp locations and the environmental and social mitigation measures proposed to control any such impacts.

9.3.1 Pipeline Laydown Areas

The pipeline laydown areas are likely to be extensive in area although not associated with complex potential impacts. Like the construction camps they will be temporary and only existing to support the construction activities for their targeted construction segment. Surface grading, soil removal and drainage infrastructure for these areas is expected.

9.3.2 Pipeline Treatment and Coating Facilities

Imported pipe lengths will require treatment and coating prior to transport to the pipeline laydown areas. These will be considered by the ESIA.

9.3.3 Material Transportation Routes

The LLCOP Project will also require a large quantity of materials, pipes, machinery, consumables etc. This will need to be transported to the laydown areas and then to pipeline construction areas prior to use. This may involve significant volumes of road transport from a receiving area to move the materials to the laydown areas and the sector of the pipeline route where they will be used. Some of these routes may be through sensitive and/or populated areas, both of which could be subjected to adverse impact from these activities. New access routes may be required to be constructed and/or existing routes improved.

9.3.4 Hydrotest Water

Once the pipeline has been installed, it will need to be tested for leaks or other issues by being pressure tested with water. The sources of this water and potential impacts will be considered. Treatment and disposal of hydrotest water will be considered and opportunities for the minimisation of water consumption will be considered.

9.3.5 Waste Management

Construction of the pipeline will generate a variety of waste streams. A waste inventory will be developed, waste management strategies for each waste stream identified based on the waste management hierarchy, and a waste management plan will be developed.

Waste streams will likely arise from the construction camps, including effluents, catering, and domestic wastes arising from the concentration of a large volume of workers based in a single location over the construction period. Waste management measures and management requirements for such temporary construction camps are a well understood issue.

Hydrocarbon wastes from the LLCOP itself are not expected as a significant waste stream although waste oils, lubricants, storage and disposal of such materials used in supporting heavy equipment and machinery will be an important component of the waste management plan.

The main waste streams from the LLCOP are expected to arise from construction packaging, consumables and domestic wastes. The capacity to store and dispose of all wastes will be assessed against the capacity of the local waste management facilities or disposed safely in alternative options.

The ESIA will examine potential for waste generation for all LLCOP activities and will provide appropriate mitigation and management measures.

9.3.6 Emergency Response

Emergency scenarios will be identified in conjunction with the FEED team and emergency response plans will be developed. The crude oil from the Lokichar upstream fields is a viscous oil which is why the LLCOP will require heating along its length. Analysis of the behaviours of this oil type for potential accidental release in luggas, river crossings and groundwater seepage will be considered in the ESIA. The potential impact of the crude oil from an uncontrolled leakage or spill into the Lamu Marine Area will also be modelled. This will take into account the behaviours of the oil in sea water and its dispersal and distribution parameters.

Management of unplanned events which require an element of environmental or social risk management will be incorporated into the ESIA and its associated Management Plans. The Management Plans will include an Emergency Response and Preparedness Plan, and will:

- Identify and quantify both the likelihood of the occurrence of unplanned events and their environmental and social consequences (i.e. level of hazard should the event occur); and
- Specify both measures for avoiding/minimising risks of occurrence through design, training and allocation of resources and operational procedures, as well as responses to be implemented in the event of an occurrence.

The above approach will meet the requirements of national legislation and international good practice as well commitments within the policies of the JDA partners and provide clear guidelines on the avoidance, response to and management of high consequence, low probability unplanned events.

9.3.7 Security Management

The ESIA will describe in outline the security management solution adopted by LLCOP and LAPSSET and identify any potential environmental and social impacts for assessment and mitigation planning by the ESIA.

10.0 SUMMARY OF IMPACTS & APPROACH TO ASSESSMENT

The following table is based on the information and analysis set out in the Scoping Report and presents a summary of the planned approach to the ESIA baseline and impact assessment for each technical area to be considered within the scope of the ESIA. If any changes to these approaches are required, based on additional information developed as part of the baseline and impact assessment process, this will be documented in the ESIA report.

Table 2: Summary of Potential Effects and Planned Assessment Approach

Topic	Potential Significant Effects	Planned Assessment Approach
Social	■ Changes in crime and social ills. ■ Changes in ethnic conflict. ■ Changes in expectations. ■ Changes in health and safety aspects. ■ Changes in infrastructure. ■ Changes in livelihoods. ■ Changes in local economic and commerce opportunities (positive and negative). ■ Changes in local employment opportunities. ■ Changes in population through the introduction of outsiders (contractors). ■ Changes in social capital, influenced by education, capacity building, skills development, awareness and so forth. ■ Changes in livelihoods, socioeconomic and cultural practices of vulnerable groups and pastoralists. ■ Occupational health of LLCOP workforce.	**Integrated stakeholder and social assessment process.** The stakeholder engagement and social process will be integrated in that the social information will largely be sourced through the stakeholder engagement process. The focus is in filling the information gaps identified and verification of available information. Primary research will take place through issue-based site-specific surveys, semi structured interviews, community mapping and collating the results from the stakeholder engagement process. Secondary research will be based on issue-based literature research and the feedback from the integrated stakeholder engagement process. The integrated stakeholder engagement process will: ■ Engage with local communities and stakeholders, including vulnerable and marginalised groups, on the basis of informed consultation and participation; ■ Engage with other stakeholders on the basis of timely and transparent engagement and disclosure of relevant project information; ■ Developing an understanding of directly impacted stakeholders and their issues at grassroots level; ■ Engaging community using Barazas, focus groups, key informant interviews in the community and County levels; and ■ Engage issue-based stakeholders such as government institutions, NGOs at national and County level and CBOs. Occupational health effects will be considered in terms of defining relevant occupational health standards to be adopted.

Topic	Potential Significant Effects	Planned Assessment Approach
		Engagement with Vulnerable and Marginalised Groups Identify groups based on the methodology set out in the World Bank publication *Country Social Analysis of Vulnerable and Marginalised Groups in Kenya*[7]. ■ Use the Vulnerable and Marginalised Group Listings in the publication to identify potential areas where Vulnerable and Marginalised Groups may be affected by the project; and ■ Undertake field-based verification and key informant interviews to confirm the presence and location of affected vulnerable and marginalised Groups. **Impact Assessment** A social impact assessment and a community health and safety assessment will be undertaken. The aim will be to: ■ Identify anticipated socioeconomic and health impacts and analyse these in consultation with the affected stakeholders and the respective specialist teams.

[7] World Bank Group. 2016. Country Social Analysis of Vulnerable and Marginalised Groups in Kenya: Guidance for Applying the World Bank Operational Policy 4.10 on Indigenous Peoples. World Bank, Washington, DC.

Topic	Potential Significant Effects	Planned Assessment Approach
Biodiversity and Ecology	■ Direct loss/conversion of natural habitats. ■ Indirect loss, conversion or disturbance of natural habitats. ■ Introduction of invasive species, pests or diseases. ■ Barriers to movement. ■ Contamination. ■ Population influx (Harvesting of plants, fibre and wood; bushmeat hunting).	**Baseline:** ■ Vegetation mapping including mapping of modified and natural habitat. Seasonal bird surveys; ■ Seasonal herpetofauna surveys; ■ Seasonal terrestrial invertebrate surveys; ■ Seasonal large mammal transect surveys; ■ Remote camera trapping survey across the AoI as required; ■ Seasonal small mammal trapping surveys; ■ Seasonal bat acoustic monitoring surveys; and ■ Long wet season fish, macro invertebrate and wetland surveys. **Impact Assessment:** ■ Habitat-area based impact analysis using selected ecosystem or community-level indicators or biodiversity features using GIS; ■ Quantification of effects relative to baseline conditions by association of particular species or species groups with mapped vegetation communities or habitat types identified as indicators; ■ Specific analysis will be conducted for species of concern identified in the baseline; and ■ Analysis of predicted changes to any areas identified as Critical Habitat.

Topic	Potential Significant Effects	Planned Assessment Approach
Soil and Terrain	■ Change in topographic assemblages. ■ Erosion of soils. ■ Compaction of soils. ■ Change in soil quality.	**Baseline:** ■ Soil sampling and analysis of characteristics; and ■ Terrain descriptions (topography, slope gradient, surface expression). **Impact Assessment:** ■ GIS soil mapping and land suitability mapping; and ■ Analysis of changes to soil quality.
Water Resources	■ Change in flow and quality of surface water. ■ Change in flow and quality of groundwater. ■ Degradation from oil spill into marine waters.	**Baseline:** ■ Water sampling and analysis; ■ Surface water flow and rainfall-runoff characterisation; ■ Groundwater levels; and ■ Marine water sampling (water quality, bathymetry, tidal flow characteristics). **Impact Assessment:** ■ Assessment of impact on quality and quantity in watercourses; ■ Potential risk from accidental spill; and ■ Spatial analysis of local water users and potential assessment of impacts to water environment.

Topic	Potential Significant Effects	Planned Assessment Approach
Geology and Geohazards	■ Built structures. ■ Infrastructure.	**Baseline:** ■ Desk based review of regional earthquake hazard. **Impact Assessment:** ■ Description of potential impacts and risks to be managed in an emergency preparedness plan.
Air and Climate	■ Change in air quality. ■ Fugitive dust deposition from construction. ■ Air emissions from the AGIs. ■ Odour nuisance. ■ Contribution to global emissions of greenhouse gases.	**Baseline:** ■ Air quality monitoring of ambient conditions. **Impact Assessment:** ■ Evaluate impact to air quality of proposed construction activities through a qualitative assessment; ■ Evaluate impact of risk dust deposition; ■ Evaluate impact of odour emissions and sources; and ■ Quantification of greenhouse gas emissions.
Noise and Vibration	■ Change in noise for human and ecological receptors including. livestock (loss of amenity/sleep disturbance). ■ Vibration causing structural damage.	**Baseline:** ■ Ambient noise levels at representative locations including diurnal variation. **Impact Assessment:** ■ Evaluate effects on noise environment of proposed construction and operation activities; and ■ Identification of potential vibration sources and prediction of vibration levels.

Topic	Potential Significant Effects	Planned Assessment Approach
Landscape and Visual	■ Changes to existing views and visual amenity of receptors. ■ Physical changes to the character and aesthetics of the existing landscape.	**Baseline:** ■ Preparation of ZTV (Zone of Theoretical Visibility) to define the study area (based on preliminary scheme design) where appropriate for human community receptors; ■ Mapping the location and type of visual receptors, using aerial imagery and field observations; and ■ If required, photographic recording of receptors and key views during a site visit. **Impact Assessment:** ■ Updated ZTV's where appropriate based on final scheme design. Visual and landscape impact analysis.
Cultural Heritage	■ Loss or damage to surface or buried remains and/or above-ground features. ■ Loss of previously unknown features and sites revealed during project related activities. ■ Loss or damage to sacred or historic places and/or impacts on their setting.	**Baseline**: ■ Field survey of development footprint in key areas of find potential; and ■ Consultations with local communities and leaders to identify culturally or historically significant sites and traditional practices and beliefs. **Impact Assessment:** ■ Evaluate effects based on baseline findings and develop cultural heritage management plan; and ■ Intangible impact analysis will inform the socio-economic impact analysis.

Topic	Potential Significant Effects	Planned Assessment Approach
Waste Management	■ Uncontrolled discharge of waste streams from construction camps into receptor environments eg effluents, catering, domestic wastes. ■ Hazardous wastes from construction and operational activities e.g. lubricants, waste oils, chemicals and contaminated materials etc. creating pollution and legacy hazards. ■ Disposal of packaging, containers, consumables from construction process etc. into receptor environments. ■ Strain on capacity of local waste management to handle project waste streams.	■ Develop waste inventory for LLCOP construction and operation phases. ■ Recommend effective Waste management plans and control mechanisms.
Emergency Response	■ Accidental release of crude oil into receptor environments ■ Deliberate third party actions to release crude oil into receptor environments ■ Impacts of combustion of release of crude oil on receptor environments ■ Construction EHS hazards for workforce	■ Model behaviours of the crude oil in the event of accidental release into the marine environment at Lamu ■ Model behaviour of accidental release into riverine environment ■ Assess potential impact of crude oil release into the marine environment at Lamu (biodiversity and social impacts) ■ Develop emergency response and preparedness plan ■ International operator response to Tier 1 /2/3 incident levels ■ Develop appropriate standards for final designs and management controls ■ Safety distances from the pipeline will be part of the mitigation in the ESIA

11.0 DRAFT TABLE OF CONTENTS FOR ESIA

The following is an indicative table of contents for the ESIA report for the LLCOP project:

- Non-Technical Executive Summary;
- Introduction;
- Project Description;
- Project Need and Alternatives;
- Approach to the ESIA;
- Scoping;
- Policy, Legal and Institutional Framework;
- Stakeholder Engagement;
- Environmental, including:
  - Geology and Geohazards;
  - Soils and Geomorphology;
  - Air Quality and Climate;
  - Noise and Vibration;
  - Water Resources and Water Quality;
  - Marine Environment;
  - Landscape and Visual; and
  - Biodiversity and Ecology;
- Social, including:
  - Administrative Divisions and Governance Structure;
  - Demographics;
  - Infrastructure and Services;
  - Economics, Employment and Livelihoods;
  - Land Use and Ownership;
  - Community Health and Safety;
  - Education;
  - Social Maladies;
  - Social Capital and Conflict; and
  - Cultural Heritage;
- Ecosystem Services;
- Waste Management;
- Occupational Health;

- Emergency, Accidental and Non-Routine Events Accidents;
- Summary of Impacts and Proposed Mitigation;
- Cumulative Impact Assessment;
- Conclusions; and
- Environmental and Social Management Plans.

12.0 ESIA TEAM

This section presents the ESIA technical experts who will be delivering the LLCOP ESIA. The experts will guide, observe and develop all the plans for baseline investigations and impact assessment and proposed mitigation measures. The majority will be closely involved in field studies and participating in activities along the pipeline route to ensure that route characteristics and potential impacts for receptors are fully understood.

The team is strong on Kenyan expertise and knowledge including local languages and the understanding of cultural dynamics that will influence the successful gathering of data and communications with communities along the LLCOP route. The international team will be working throughout with the national experts to assist with project facilitation and final delivery.

Mr James Kambo as the Kenyan Project lead and his team from ESF Consultants will play the lead role in the local and national interfaces with the communities and officials that the Project will interact with. This will ensure in-depth knowledge of the Kenyan societies along the LLCOP route and the appropriate behaviours required during the social engagement activities.

Table 3: LLCOP ESIA Technical Experts

Project Team	Experience
James Kambo, Benv ESIA Practitioner Environmentalistes Sans Frontiers (ESF) **Project Role:** In country Leader / Consultation Coordinator	James Kambo is a Director of ESF and an EIA specialist with more than 15 years' experience of working in Kenya and East Africa. He has provided environment and social governance services to private investors, governments, financial institutions and non-governmental clients in Energy, Oil and Gas, mining, infrastructure, agriculture and manufacturing industry. James has been providing technical and leadership support in environmental and social performance within Africa and the Islands Region for well over a decade. James is a Lead EIA and Audit Expert for National Environmental Management Authority (NEMA): No. 0713, and a Lead Expert for the Petroleum Institute of East Africa. He has been involved in numerous IFC and Equator Banks projects in Kenya and East Africa. He has worked with Tullow (plus ENI, Anadarko, Apache and Fugro) on EIA for Seismic surveys.
Bernard Odera Agwanda, MSc **Project Role:** In - Country Biodiversity Lead	Mr. Agwanda has worked on ecological impact assessment on development activities particularly wind power development and oil operations. An animal ecologist by training, he has also worked on biodiversity research projects focusing on mammals. He has worked with Tullow Oil, Turkana wind power and the IUCN.
Dickens Odeny, PhD. **Project Role:** Aquatic Specialist	Mr. Odeny is a research scientist with the National museums of Kenya. He has worked with institutions such as KEFRI, KETRACO, Nature Kenya and Kurrent Technologies. He has skills in software application for geospatial analysis, modelling, statistics and design. He has also been involved in spatial modelling publications.
Philista Malaki, PhD **Project Role:** Ornithologist	Ms. Philista Malaki is a researcher and ornithologist with years of experience. She works with the National Museums of Kenya and has been involved in different projects such as the Kipeto wind farm project in bird and bat survey and monitoring. She has also worked with Lewa downs and IUCN. She is also involved in a number of publications relating to biodiversity studies.
Morris Mutua, PhD **Project Role:** Invertebrates Specialist	Dr. Morris Mutua is a researcher in zoological fields with more than a decade of experience. He has worked in the National Museums of Kenya as a senior research technologist and Thuiya development and environmental consultants prior to that. He has been involved in publication of journals and newsletters relating to invertebrates.

Project Team	Experience
John Kimeu, PhD **Project Role:** Botany Specialist	Mr. John Kimeu is a researcher in the field of botany. He has worked with Tullow BV Kenya and Nanyuki base camp as an environmental and social impact assessment expert. He has also been involved in several publications.
Victor Wasonga, MSc **Project Role:** Biodiversity Specialist	Mr. Wasonga is a research scientist with over decades experience specializing in the field of herpetology. He has worked with Italian corporation and Nile basin initiative. He works with National Museums of Kenya, GEF and Laikipia Nature conservancy. He has done impact assessment and monitoring on multiple projects and has also been involved in a number of publications.
Quentin Luke **Project Role:** Biodiversity Specialist	Quentin Luke is a renowned botanist who was born in Limuru, Kiambu County within Kenya. Mr Luke is currently a Senior Research Associate, at the National Museums of Kenya, he is also appointed “Chair” IUCN SSC East African Plant Red Listing Authority (EAPRLA). Between 2004 and 2016 Mr Luke was elected Alternate Africa Representative to CITES Plants Committee and he is also an appointed Research Associate, Missouri Botanical Garden, USA. In 2014 Mr Luke was awarded the David Fairchild Medal for Plant Exploration awarded by the National Tropical Botanic Garden, USA, in 2014 he was Elected Fellow of the Linnean Society and in 2015 he was awarded the Harry Messel Award for Conservation Leadership by the IUCN. Quentin Luke has authored or co-authored over 40 scientific papers concerning botany with considerable onus on African and specifically Kenyan floral and habitat composition.
Harrison Onganda, MSc **Project Role:** Marine Ecologist Specialist	Harrison Ongánda holds a master’s degree in applied marine ecology with more than 20 years’ experience in marine resources and mapping along Kenyan coast and offshore. He has undertaken numerous studies on marine environment including mapping of sensitive ecosystems along the Kenyan coast, mapping of coastal forests, mapping of priority conservation areas, and assessing potential impacts of hydrocarbon exploration offshore Kenya among many more. Harrison is also an expert in GIS.
Judith Okello, PhD **Project Role:** Marine Ecologist Specialist	Dr. Okello is a researcher and marine ecologist with more than 10 years of experience. She has worked with JICA and ministry of transport and infrastructure as a researcher and impact assessment expert.

Project Team	Experience
Bernard Kibet Kirui Yebei, PhD	Dr. Kirui is lecturer in Egerton University as well as chairman of the Natural resource department. He has years of experience in the field of environment working with KEMFRI among other institutions. He has been involved in USAID, UNEP and Lafarge projects.
Project Role: Mangrove Ecologist specialist	
Handa Collins, PhD	Dr. Collins is a lecturer at the technical university of Kenya and has worked as a research scientist with the National Museums of Kenya. He is affiliated with several associations and has vast experience working as a consultant in wetland and biodiversity assessments.
Project Role: Wetland specialist	
Michael Kapolon, BSc	Mr. Kapolon has worked on ESIA projects with Tullow Oil. Additionally, he has work on food security and drought resilience programmes and has served in the Turkana county government as a consultant. He has worked with Oxfam as a consultant and Feinstein International Centre as a research assistant.
Consultant	
Golder Associates	
Project Role: Turkana Regional Co-ordinator	
Duncan Oyaro, BEnv and MSc	Mr. Oyaro has worked as an ESIA consultant on multiple projects centering on mining, oil and gas as well as transport projects. He has working experience with ARM limestone mining, USTDA, Zarara Oil and Gas, KWS, Tullow Oil among other prominent institutions.
Lead EIA expert	
ESF consultants	
Project Role: In - Country ESIA Expert and Lamu Regional Co-ordinator	
Shidhe Mohamed Shukri, BSc	Mr. Shidhe has worked mainly in Garsen constituency office in the capacities of Field officer and constituency office manager. Additionally, he has worked at KNBS as a researcher and Kenya red cross as a logistics assistant.
Project Role: Garissa Regional Co-ordinator	
Hajir Mohammed	Hajir holds a Diploma in Conflict studies with experience in community engagements, conflict resolution and social assessment. He has 10 years of experience working in marginalised and conflict zones within East Africa.
Project Role: Isiolo - Meru and Samburu Regional Co-ordinator	
Christine Ogola, PhD	Dr. Christine Ogola is an archaeologist and research scientist that has years of experience in the field of archaeology and cultural heritage. She has worked with Tullow Oil, National Museums of Kenya and Koitalel Samoei Nandi Mausoleum. She has also published quite a number of academic reports relating to archaeology.
Project Role: Cultural Heritage Specialist	

Project Team	Experience
Joyce Olenja, PhD	Prof. Olenja is a professor in the school of public health in the university of Nairobi. She has vast experience in the field of anthropology spanning over two decades. She has experience in several projects such as working with KAVI, UNFPA UNAIDS and the EU. She has published in a number of journals, books and editorials.
Project Role: Sociologist/ Social expert	
Darlington Akkabwai	Mr. Akkabwai has worked as a researcher for several years mainly dealing with issues relating to security. He has worked on different publications to the same effect and has worked with the Government of Kenya in the role of a researcher as well as Golder and Tufts Team associates.
Project Role: Security Specialist	
Milka Owuor, MSc	Ms. Milka Owuor has experience in the medical field serving as a public health consultant for more than half a decade. She has also worked as a researcher and medical officer. She works with SHAPE consulting and has previously worked for IFAKARA and Vihiga district and Kakamega provincial hospitals.
Project Role: Health Specialist	
Samson Obiyo, MSc	Mr. Obiyo is an environmental consultant with over ten years of experience in environmental management. He has worked with Bamburi Cement, Tullow and Golder associates.
Project Role: Air quality and Noise specialist	
Dan Odero, MSc	Mr. Odero is a hydrogeologist who has worked with the ministry of water, APEC consortium Ltd as well as SWAS consultants. He has worked in projects with the Northern water services board, the government of Southern Sudan and Zambia water Authority.
Project Role: Water Specialist	
Monica Wanjiku Mucheru-Muna, PhD	Dr. Monica is a senior lecturer at Kenyatta University with over 10 years of experience in the field of environment and soils science. She is a member of several societies and has experience in different projects working as an environmental compliance auditor. She has been involved in book publications, journal articles and technical publications.
Project Role: Land Use specialist	
Casty Mbae, MSc	Ms. Mbae is a consultant in the ministry of urban and regional planning and has previously worked as a physical planner and valuer in the ministry of lands. She has worked as a consultant in Bahari wind farm project and feasibility study for pipeline way leave from Kenya to Uganda among other projects.
Project Role: Land Value Specialist	
Fridah Mugo, PhD	Dr. Mugo is a senior lecturer at the university of Nairobi working as a consultant in different capacities for T-DEC

Project Team	Experience
Project Role: Land Use Specialist	consultants and ICRAF. She has also worked for the ministry of energy and is a member of several associations. She has also been involved in a number of publications.
Joshua Maviti, MSc	Mr Maviti holds a Master of Science Degree in Geographic Information Systems from the Manchester Metropolitan University which he has combined with over ten years' work experience. He has worked in data and database Management, Desktop GIS and Mapping, Training and Capacity building, Communication, Participatory Project Management, Urban Assessments, Environmental Impact Assessments (EIA) and Project Coordination. Some of the projects in which he has worked a GIS consultant include: Sustainable Maseru Project under UN-HABITAT; Mombasa Slum Upgrading Programme (MSUP); Lake Victoria Urban Planning and Infrastructure Investment Project; Lake Victoria City Development Strategies (CDS) Project, and the Nairobi River Basin Project (NRBP).
Project Role: GIS Specialist	

Table 4: LLCOP ESIA Project Management Team and International Experts

Project Team	Experience
Simon Aldrich, MA	Simon Aldrich is a senior ESIA and ESDD practitioner with over 20 years' experience in international environmental development (Africa, Asia, EU, Russia, South and North America, Middle East) and the delivery of Environmental projects for the oil and gas, transportation and infrastructure sectors. His project experience includes the reporting and scoping of environmental risks for project investors to meet various international standards criteria including IFC, EU, Espoo and other requirements and the management of environmental risk to protect investment structures. He has been responsible for the successful delivery of high profile signature projects, EIA, ESIA and SEA as well as corporate strategic programmes for environmental investment for financial organisations. He has been a lead advisor on environmental and sustainability policy, structures and implementation for international organisations, national Governments and His Royal Highness the Prince of Wales.
ESIA Practitioner	
Golder Associates	
Project Role: Project Manager	

Project Team	Experience
Andrew Morsley, MSc ESIA Practitioner /Associate Golder Associates **Project Role:** Project Director	Andrew Morsley is a Chartered Scientist, ESIA project manager/director and water resources specialist. Andrew is an Associate, who leads the ESIA team in the UK, is the South Lokichar Upstream ESIA Project Manager and Tullow client sponsor at Golder. Andrew has over 15 years of experience in engineering and environmental assessment. He has provided surface water and physical sciences technical input and project management to ESIAs (baseline, impact assessment and management plans) to IFC performance standards, closure plans, Asset Retirement Obligation studies, third party review of ESIA to IFC PSs, hydrological studies. Andrew has extensive experience in diverse environments including Kenya, South America, Africa, Easter Europe, Canada and UK.
Tim Flower BSc, MSc, MCIWEM. CWEM Technical Director Golder Associates **Project Role:** Technical Reviewer	Tim Flower is an environmental professional with over 30 years' experience in a broad range of environmental management issues. He has significant project management and technical experience in environmental and social impact assessment & mitigation, environmental and social due diligence, governance & compliance and pollution risk assessment & management. Tim's forte is the direction and delivery of large, complex and challenging ESIA projects in a wide variety of sectors. Tim is proficient in managing and integrating inputs from varied technical disciplines into impact assessments for a wide range of clients. Tim's track record has been built upon work for both the public and private sectors, in the UK and internationally. His experience demonstrates his capacity for mediating the engineering-environmental management and regulator-industry interfaces. Tim is proficient in managing health and safety risks on projects and providing advice on risks associated with international travel and field survey work, particularly in harsh, remote and hostile environments. Tim has extensive overseas experience gained in the following countries: Algeria, Morocco, Tunisia, Egypt; Qatar; Saudi Arabia, United Arab Emirates; Oman, Yemen, Jordan; Turkey; Iran, Georgia; Russian Federation; Poland; Romania; Kazakhstan; Kyrgyzstan; Pakistan; India; Ghana; Mauritius South Africa, Thailand; Japan; USA; France; Belgium; Germany; Italy; and Ireland.

Project Team	Experience
Kevin Arbizu, MSc **ESIA practitioner / Social Scientist** **Project Role:** Project Coordinator	Kevin Arbizu is an ESIA Practitioner with an MSc in Development Economics whose role is to assist in the delivery of EIA and ESIA projects including coordinating projects, undertaking stakeholder engagement tasks and completing technical work for EIA and ESIA projects. His experience includes working with multidisciplinary teams as a project coordinator, with additional roles in database analysis, development of community relationship plans, economic valuation of environmental impacts, field sampling, identification of ecosystem services and their economic valuation. Participation and leading of workshops in rural communities close to extractive projects and development of ESIA for up to 6 projects in the extractive industry.
Dr David De Waal, DLitt et Phil Africa Lead, Social Management and Specialist Services Golder Associates **Project Role:** Social and Stakeholder Engagement Lead and Senior Review.	David has more than 30 years of experience in his field of practice. He advises and practices in the areas of social due diligences, social assessment and management processes, social baseline studies, human rights assessments, integrated environmental governance and institutional conflict management. David has extensive African experience including projects requiring compliance with IFC and World Bank standards. He has led social management and related processes in Kenya, Botswana, Ghana, Mozambique, Rwanda, Seychelles, South Africa, Swaziland, Uganda and Zambia. He has worked on linear projects (pipelines, road networks, electricity lines) large-scale infrastructure (including mining, oil and gas, industry and housing) waste management, relocation, RAP assessment and social recipient studies.

Table 5: LLCOP ESIA International Review Experts

Project Team Lead	Experience
Mervyn Mason, MSc, CEnvP Associate, Biodiversity Specialist Golder Associates **Project Role:** Biodiversity and Ecosystem Services Specialist	Mervyn is an impact assessment and biodiversity specialist. He has over 20 years' experience across the resource development and infrastructure sectors in Africa, the Middle East, the Asia-Pacific region and North America. Mervyn has scoped, designed, conducted and reviewed biodiversity and ecosystem services baseline studies and impact assessments to lender standards for oil and gas, mining, and infrastructure projects in Uganda, Kenya, Ethiopia, Malawi, Mozambique, Democratic Republic of the Congo, Uzbekistan, Iran, the Philippines, Fiji, the Solomon Islands, Papua New Guinea, Laos, India, Canada, and Australia. Many of these projects have involved pipelines. He has led teams of local specialists to deliver projects to meet IFC's Performance Standards (PSs), including the determination of critical habitat (CH) and assessing impacts to CH.
Giovanni Torchia, BSc Senior Project Manager and Project Director Golder Associates **Project Role:** Marine Biodiversity Specialist	Giovanni Torchia is a marine biologist with 25 years of working experience in environmental services. From 1990 to 2000, Giovanni worked at the Marine Biology and Animal Ecology Laboratory at the University of Genoa. From 2000 to 2003, he worked for the UNEP-RAC/SPA of Tunis (Tunisia) as Expert Marine Biologist. From 2003 to summer 2009, he held the position of Manager and Scientific Director of the Cooperative Nautilus (a private company specialized in environmental sciences and geophysical / marine biological services). In 2009, he joined Golder where he currently directs Environmental and Social Impact Assessments (ESIA), ecological studies, coastal/marine surveys (including geophysical campaigns) and environmental monitoring activities. Giovanni is senior Project Manager and Project Director. His areas of primary expertise include: biodiversity, marine and coastal.
Freddy Brookes, MSc **Project Role:** Biodiversity Specialist	Freddy joined Golder in June 2010 and since then he has delivered technical inputs and project management both domestically and internationally to a diverse suite of ESIA/EIA projects under IFI and National legislative standards. Freddy has over twelve years of experience of working within the consultancy sector on large mining, gas, power and land development projects. He has practical experience of devising and delivering biodiversity offsetting projects where on site mitigation has proved to be inadequate in isolation and net gains for critical habitat (IFC, 2012) features are required. Freddy has undertaken a

Project Team Lead	Experience
	number of critical habitat assessments and is expert in undertaking biodiversity impact assessment of EIA/ESIA projects in the UK, Kenya and Overseas in order to facilitate lender financial support to project proposals. Recently, Freddy has been engaged by the EBRD to deliver ESIA biodiversity capacity building training to government, consultants and NGO's in central Asia and the Caucuses as part of a capacity building programme. In addition to specialising in delivery of high quality terrestrial and aquatic biodiversity training and impact assessments he also undertakes ecosystem services baseline and impact assessments to relevant IFI standards. Freddy is also a Full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM); Full member if the Institute of Fisheries Management MIFM and Licenced bat worker (Mitigation and Survey) (UK).
Neil Cousins, MBA **Project Role:** Marine specialist	Neil is the founder of Bluedot Associates Ltd, a specialist coastal and marine biodiversity company providing advisory services globally to address risks, build capacity, develop simple solutions for complex issues and support research and conservation. Neil has over 19 years' experience of coastal and marine biodiversity screening, assessments (e.g. critical habitat assessments); baseline studies, implementing measures across the mitigation hierarchy; and supporting coastal and marine integrated planning. He has also led many wider ESIA studies internationally. Neil has been resident as a senior environmental scientist in the UK, Hong Kong and Oman; and worked on projects in a wide range of other countries, including Europe (Georgia, Pan European studies), Middle East (UAE, Saudi Arabia, Qatar, Bahrain), Africa (Cape Verde, Guinea, Sudan, Gabon, Sierra Leone, Liberia, Nigeria, Ghana, Angola, Kenya, Mozambique, Tanzania, Tunisia), SE Asia (Vietnam, Laos), East Asia (Japan) and the Pacific Rim (Australia and New Zealand). Neil has worked in academic, government and consultancy organisations. He has operated in a leading role within both small and very large multi-national corporations. Neil is a visiting lecturer at the University of Swansea UK, University of Exeter UK (Falmouth campus) and University of West England in the UK. He also provides training internationally, which has included mainstreaming biodiversity training arranged by IAIA in the USA.

Project Team Lead	Experience
Linda Havers, MSc Senior Social Specialist Golder Associates **Project Role:** Social Specialist	Linda Havers possesses over 20 years of experience that combines community development and social program planning, social impact analysis, gender-based social analysis and public and stakeholder consultation. She has taken the lead role in developing social baselines and conducting social impact assessments of projects in the nuclear energy sector and in mining, oil sands development and linear developments in contexts as diverse as Vietnam, Tanzania, Guinea, eastern Europe, rural Washington, Canada's Arctic and Greenland. Ms. Havers has worked within many regulatory frameworks including those of Canada's as well as NEPA in the U.S.A. and the IFC World Bank. Ms. Havers also recently held the role of senior technical advisor on a proposed mining project in Guinea, West Africa. This project involved Human Rights Risk Assessment and planning for in-migration and other potential social effects of the project including resettlement. Ms. Havers' role at Golder has expanded to provide senior technical advice on projects requiring adherence to Equator Principles, IFC policy and Performance Standards and providing due diligence audits of social components of mines. Due diligence work has been carried out in Guyana, Greenland and Nunavut, Canada.
Antoinette Pietersen, BA Senior Stakeholder Engagement Specialist / Trainer Golder Associates **Project Role:** Stakeholder Engagement Specialist	Antoinette Pietersen has worked for Golder Associates for six years; prior to Golder, Antoinette worked as an independent consultant to the mining, government/policy development, infrastructure and energy industries. She has been a stakeholder engagement lead on projects in Tanzania, Democratic Republic of Congo, Republic of Congo, Malawi and South Africa. Recently, Antoinette has led the stakeholder engagement processes for Shell's proposed shale gas exploration project in the Karoo, South Africa and oil and gas exploration for SacOil in Malawi. Antoinette is an internationally certified trainer in public participation and has presented the course in several countries in Africa with participants from across the globe (Africa, USA, Australasia and Europe). She is one of a limited number of highly skilled members of global trainers certified to deliver the Emotion, Outrage and Public Participation course.

Project Team Lead	Experience
Richard Boak, BSc Independent Senior Water Resources Manager **Project Role:** Senior Water Resources Specialist	Richard is an independent senior water resources specialist with 36 years' experience in the extractive industry. Richard has spent the last 4 years working for Tullow in Nairobi, however became independent in December 2017. At Tullow he was responsible for developing & implementing a water resources management plan for field operations, community water supply, and future oil production in Turkana, including management of the in-country Water Resources team. Previously he has held the roles of regional manager Europe & Africa, Schlumberger Water Services and UK Operations Manager for Water Management Consultants Ltd and has a wealth of technical expertise on Water resources projects all over the world including Angola, Azerbaijan, Bahamas, Botswana, Georgia, India, Kenya, Libya, Malawi, Mauritius, Netherlands, Niger, Oman, South Africa, Tanzania, Uganda, United Kingdom, Zambia. His native tongue is English, but speaks very good Swahili.
Samantha Arnold, PhD Senior Atmospheric Scientist Golder Associates **Project Role:** Climate, Air Quality Specialist	Dr Samantha Arnold leads the air team in the UK and is the representative for European air services for Golder globally. Samantha has completed many air quality impact assessments for EIAs, planning and PPC applications. These assessments have included detailed Air Dispersion Models (utilising AERMOD, ADMS, ADMS-ROADS, and GasSim), meteorological forecasting, climate change, ambient air monitoring and qualitative amenity loss assessments. The technical assessments are supported by expert advice, stakeholder engagement and public meetings. Samantha has undertaken multi-disciplinary projects for power, waste, manufacturing, transportation and oil and gas clients in the UK and internationally. She has co-ordinated and worked on overseas projects including sites in France, the European Alps, the Falkland Islands, Guinea, Kazakhstan, Liberia, Slovakia, South Africa and Uzbekistan. Samantha maintains an active research position through ongoing CPD. Dr Arnold acts as an advisor for air queries and writes and reviews reports pertaining to air dispersion and air quality for peer reviewed journals, governmental bodies (DEFRA, Environment Agency, Ministry of Defence, Home Office), university consortium and industry.

Project Team Lead	Experience
Danny de Silva, BSc Noise Specialist Golder Associates **Project Role:** Noise and Vibration Specialist	Danny da Silva is a Principal based in Golder's Toronto, Ontario office. He is the leader of Golder's Toronto-area Environmental Planning and Permitting Division. Danny is a recognized expert in acoustics, noise and vibration by the Ontario Municipal Board, Alberta Utilities Commission and the Joint Review Panel for the Deep Geologic Repository. Danny has led numerous successful EA and permitting projects in Ontario's power sector. In addition, Danny has been involved in international EIA's governed by the IFC.
Dennis O'Leary, BA, P.Ag. Associate, Senior Terrain Scientist Golder Associates **Project Role:** Geology, Soils and Contamination Specialist	Dennis O'Leary is an Associate at Golder and brings over 37 years of earth sciences experience to the Project team. He is a professional terrain scientist and a member of the Association of Professional Geohazards. He has worked around the world including most recently in Guinea on a large mine and 650 km long rail project. Dennis has completed baseline soils, terrain and geohazards mapping as well as Environmental Impact Assessments for most of Canada's major pipeline projects, including the 1,500 km long Energy East pipeline project and the nearly 1,200 km long Northern Gateway pipeline project. He has assembled a team of local and international specialists to deal with geology, including seismology, soils and contamination, all with experience in the Project area, including seismological investigations in the East African Rift Valley in both Uganda and Tanzania.
Izak Olivier, Dr Independent Health Consultant and Medical Practitioner SHAPE Consulting Limited **Project Role:** Health Specialist	Dr Izak Oliver is a qualified medical practitioner with post graduate qualifications in occupational health, travel health and incapacity management. He has international experience in both community and occupational health with a specific focus on the extractive industry. In the course, of his work in the international arena, he has become skilled in stakeholder engagement, program development and management and is adept at managing and working as part of diverse, multi-disciplinary and multi-cultural teams. Izak has participated in the conduct of several large-scale health impact assessments in a variety of African countries and has assisted clients with the development, implementation and monitoring of health management plans for both community and workforce health. This includes the development of IEC and BCC programs in both community and workforce settings as part of both HSE and corporate social responsibility requirements. As a result, he is very

Project Team Lead	Experience
	cognizant to the inherent interdependency between these two distinct disciplines.
Paul Wheelhouse, BA Senior Cultural Heritage Specialist Golder Associates **Project Role:** Cultural heritage Specialist	Paul Wheelhouse is a Senior Archaeologist with over nineteen years' experience in archaeological and cultural heritage fieldwork, consultancy and research. Paul has over twelve years' experience in archaeological excavation, post-excavation analysis, project management and publication. Paul is a Member of the Institute of Field Archaeologists and is responsible for the coordination and project management of archaeological work for Golder's clients, in Africa, United Kingdom and Europe. Paul designs and formulates archaeological solutions, creates management strategies, and oversees the implementation of archaeological research and mitigating field investigations including geophysical surveys, trial and detailed excavations, in a coordinating and monitoring role. Paul coordinates cultural heritage ESIA chapters, managing reconnaissance surveys and the evaluation of archaeological sites for international projects, including mine sites in Africa: Central African Republic, Guinea, Liberia, Malawi, Sierra Leone, and Togo; preparing work instructions and recording systems for local sub-contracted archaeologists to use, and working closely with the mine operators to ensure protection of sites identified in the field.
Kyriki Petroulaki, MSc **Project Role:** GIS Specialist	Kyriaki Petroulaki is a GIS Analyst and Remote sensing. She holds a Postgraduate Degree in Geography and Applied Geo - informatics in Environmental and Risk Management and an undergraduate degree in Natural Resources and Environmental Engineering. She worked as a Research assistant at Manchester Metropolitan University regarding the applications of Remote Sensing for studying land degradation in South African Savannahs. Subsequently, she worked as a GIS Technician for British Telecoms to produce technical reports containing cartographic representations and notes for the field engineers. Currently, she is working for Golder Associates (UK) and Supporting the Senior GIS analyst in data management, data analysis, data integration, map production, spatial analysis and contour generation for projects in the UK and overseas.

13.0 CLOSURE AND APPROVAL

The ESIA team (Golder and ESF) trust that the contents of the ToR and the Scoping Report meet with the approval of NEMA. This ToR is submitted on behalf of the ESIA team by Mr James Kambo EIA Lead expert - License No. 0713 of ESF Consultants EIA Firm of Experts - License No. 0204.

ESF Consultants:

Woodlands Office Park,

1C Suite 1st Floor,

Woodlands road, Off Lenana Road.

P.O. Box, 7745-00100,

Nairobi, Kenya

Signature Page

James Kambo
Registered NEMA EIA Lead Expert
ESF Consultants

Simon Aldrich
Project Manager
Golder Associates (UK) Ltd

JK/SDA/kc

3 October 2018