MEMORANDUM

To: **Guyana Environmental Protection Agency**
From: Conservation International[1]
Date: April 17th, 2017
Re: Technical review of the Environmental Baseline Study (EBS), the Oil Spill Response Plan, the Environmental Impact Assessment (EIA), and Environmental Management Plan (EMP) for the Liza Phase 1 Development Project to be undertaken by Esso Exploration and Production Guyana, Limited (EEPGL).

1. Summary

With the purpose of better informing the development of the Liza Phase 1 Development Project, CI would like to provide the recommendations below for the assessment and management of risks and impacts.

With respect to the Environmental Baseline Study (EBS), CI recommends:

- Field sampling for the purposes of establishing a holistic baseline including additional sampling of marine taxa fish, marine mammals and other species of note (i.e. turtles). There was an absence of information on any of these groups therefore CI suggests that in field studies be conducted.

- Additional sampling periods to better capture temporal variations in baseline condition. Samples were collected only during the April-May 2014 period. While marine benthic environments are sometimes less prone to seasonal alterations when compared to other systems they can be susceptible to variations due to natural or anthropogenic sources. Given the potential for variability (e.g. seasonality, storms, the potential for or absence of human activity) and the paucity of data for the region CI suggests additional sampling be conducted.

- Sampling area definition and possible widening to more appropriately assess baseline condition of future areas potentially impacted by indirect or cumulative impacts. While the sampling sites were deemed to be representative of the immediate Liza and Sorubim project areas they do not describe the basis for that statement nor does the report discuss the area that could potentially be impacted from an indirect or cumulative perspective. These indirect and cumulative areas of influence could be many times greater than project boundaries.

- Additional sampling efforts for under-surveyed groups (i.e. benthic fauna)

- Immediate procurement of the services of an independent third party to monitor and verify and report on of all aspects of the development of the operation given the nascent state of regulation and limited capacity of the country. This will establish a performance reporting scorecard that can

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assist the EPA and the GGMC in its staged approach to support the growth of the oil and gas industry being currently led by EEPGL.

- Unless already completed, commence the preparation of national standards for emissions, safe limits of discharge, and waste management for the oil and gas industry.

- Development of suitable onshore waste management facilities that meet international guidelines, noting that this will be required by the company.

- Commission a Strategic Environmental Assessment to assess the state of legislation, policies, plans and programme that will be impacted or have an impact on the oil and gas sector, especially given the substantial impact of the sector on the country's economy and potential impact on marine-related systems.

With respect to the Oil Spill Response Plan (OSRP), CI recommends:

- Clarity on stakeholder consultation process. "Consultation with the appropriate stakeholders and authorities" is mentioned in several instances but should be elaborated.

- Specific guidance on what "will" be carried out as opposed to what "can/ could be" carried out. In several instances the OSRP suggests course of actions as opposed to delineating them. Exchanging words like "could" with "would" or "will"

- Improve the indirect impact map on Figure 3 to better represent indirect impact potential.

- Provide a mechanism for the immediate release of technical and financial resources from the time of occurrence of a spill event to mitigate impacts beyond the jurisdiction of EEPGL. This could be through an established Fund, through the environmental permit, or through the production agreement.

With respect to the EIA and the EMP, CI recommends:

- Application of a precautionary approach, particularly for poorly-known taxa considering the current high uncertainties about marine ecosystems and biodiversity, and the potential further oil and gas development representing greater pressures on biodiversity and ecosystems services.
- Conducting a systematic review of ecosystems services using existing guidance and tools, which could allow for an enhanced understanding of potential stakeholder related risks, and operational risks and dependencies on those ecosystems services.
- Avoidance measures are the most cost effective way to manage project impacts and risks. CI recommends evaluating the mitigation measures included in the Environmental Management Plan (EMP) through the lens of the mitigation hierarchy to ensure the steps of avoidance,

mitigation and restoration are being taken in the correct order, before determining residual impacts. Residual impacts should then be assessed for purposes of determining an offset strategy.

- Evaluating the extent to which the Project will intervene natural vs modified areas. Also, considering the presence of some endangered and critically endangered species in the area of influence of the project, CI recommends conducting a Critical Habitat Assessment (CHA) to determine if critical habitats will be impacted and to what degree.
- Consideration of biodiversity net gain as the biodiversity goal for the Project. Although the study concludes there are not significant residual impacts from the Project, it is important to consider current uncertainties on marine biodiversity and ecosystems, and the potential future additional oil and gas development which might increase the effects of indirect and cumulative impacts. Therefore, even if the residual impact is not considered significant, net gains could still be obtained by identifying additional opportunities to enhance habitat and protect and conserve biodiversity.
- Consideration of an assessment and potential conservation plan at the Landscape/seascape level. Landscape/seascape analysis is a fundamental step in determining ecologically-appropriate mitigation options that align with broader conservation efforts in the region.
- Monitoring to be carried out on three levels: a) in field monitoring of relevant biodiversity values; b) monitoring of implementation and effectiveness of mitigation measures and management controls; and c) monitoring of status of non-project related ongoing threats to biodiversity values in the project's vicinity and the extent to which the project might exacerbate them. Finally, the Project should ensure adaptive management practices to adjust methodologies and practices to the ways ecosystems and biodiversity are being managed and monitored.

2. Technical Review and Recommendations

This section provides recommendations with respect to the technical reviews conducted for the Environmental Baseline Study (EBS) for the Stabroek Block; the Oil Spill Response Plan (OSRP); and the Environmental Impact Assessment (EIA) for the Liza Phase 1 Development Project to be undertaken by Esso Exploration and Production Guyana, Limited (EEPGL).

2.1 Findings from Evaluation of the Environmental Baseline Study

With regards to the review findings for the Environmental Baseline Study (EBS), overall the report is well written and demonstrates many of the current best practices in the areas it assessed. The EBS has as its two main objectives to 1) define the range of sediment habitat conditions and 2) evaluate water column physical, therefore comments are focused around these two objectives. While the breadth of the study is robust for the procedures it carried out, some issues and suggestions are discussed below.

2.1.1 Performance Standards and Guidance

The review has been conducted using as reference international best practices and standards such as the International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social Sustainability (in particular PS 6 and its corresponding Guidance Note (GN), the Energy and Biodiversity Initiative (EBI) Good Practice in the Prevention and Mitigation of Primary and Secondary Biodiversity Impacts from offshore development and the Cross Sector Biodiversity 's Good Practices for the Collection of Biodiversity Baseline Data.

2.1.2 Missing Taxon

In addition to the benthic fauna many other species of note occur in the marine environment off the coast of Guyana (turtles, fish, whales, etc.) however they were not mentioned in the EBS. Neither were they mentioned in the context of discounting that they were not sampled because it was believed that they would not be impacted therefore, CI suggests that these additional groups and other traditional marine groups be assessed.

2.1.3 Sampling period

With regards to the sampling period, it was only carried out once within a calendar year (i.e. April-May 2014) raising the question of whether additional samples taken along the calendar year would not be more indicative of baseline conditions. A suggestion would be to discuss at greater length the rationale for the sampling methods and periodicity selected citing any potential for variability (e.g. seasonality, storms, the potential or absence of human activity) and also consider additional sampling periods at other times of the year be conducted.

Document	Page	Chapter	Paragraph	Remark	Suggestion
Environmental Baseline Study (EBS)	23	3.3.1 – Total Suspended Solids (TSS) and Total Organic Carbon (TOC)	1	"Although collected over a limited time period, these results are assumed to represent seasonal background conditions for the study area."	Conduct additional sampling along the calendar year to assure seasonal variability is accounted
	38	5.1 - Background	4 & 5	"Suggest no, or minimal, seasonal variation would be predicted for the benthos in the Liza and Sorubim sampling areas."	Conduct additional sampling along the calendar year to assure seasonal variability is accounted. The authors state that "studies of macrofaunal community diversity and abundance have not been conducted on the continental slope offshore Guyana." Thus, to assume that a poorly studied environment could be defined on a

					paucity of data does not seem to be prudent

2.1.4 Sampling area

Little mention is made of the rationale for the establishment of the areas sampled. The study mentions that the design was configured to account for "potential impacts" however no further discussion is included on the criteria used. Suggest greater treatment of the area of influence concept so it reflects the potential expected impacts. The area of influence should also consider expected direct, indirect and cumulative potential impacts.

Document	Page	Chapter	Paragraph	Remark	Suggestion
Environmental Baseline Study (EBS)	4	1.1 – Environmental Baseline Study Objectives	2	"The EBS was designed to cover the estimated range of potential impacts to the environment from exploration drilling and potential well development."	Suggest including more information on how the area of influence was established. Primarily for clarify but also for the inclusion of potential indirect and cumulative impacts in addition to direct impacts

2.1.5 Sampling effort

The authors note that in some instances additional sampling would be needed to adequately represent the diversity of the families of benthic fauna sampled. Therefore, CI suggests conducting additional samples to account for this potential underrepresentation of families.

Document	Page	Chapter	Paragraph	Remark	Suggestion
Environmental Baseline Study (EBS)	41	5.2.2 – Diversity and Dominance	3	"proportion of families represented by few individuals indicates that much more sampling is required to adequately represent the family diversity either locally or regionally"	Conduct additional sampling to establish a robust baseline.

2.2 Findings from Evaluation of the Oil Spill Response Plan

With regards to the review findings for the Oil Spill Response Plan (OSRP), overall the report is quite detailed and thorough and outlines plans (i.e. strategies) and procedures should an oil spill or other similar unplanned event occur. One example of good practice included in the OSRP is a having a tiered response to incidents of differing magnitudes. The OSRP describes a tiered response framework. In addition, the

report will use the Net Environmental Benefits Analysis (NEBA) in consultation with stakeholders and authorities to prioritize responses. Despite the technical quality of the report CI does have some suggestions with respect to the inclusion of specificity related to concepts and actions within the OSRP.

The significance of impact of an oil spill event is dependent on the volume and nature of discharge. It may be helpful to provide some scenarios of impact around these two variables. This is not only relevant to oil spills, but also for unplanned/untreated discharges from the FPSO during its operation.[2]

In addition, although this might have been considered, the EIS should specifically describe the potential impact of an oil spill on shipping lanes. In this light, it may be appropriate to include "shipping lanes and traffic" as one of the receptors to be considered in Section EIS 3.0 (Table EIS-2).

While we are pleased that EEPGL will undertake regular oil spill response training exercises, Guyana should seek to establish an Oil Spill Response Committee in a similar manner as Barbados (MOSAP). Training for all stake holders in the control system will only improve the implemented system, and lead to the design and establishment of such a system.

We note the transboundary impacts that will occur in the event of an oil spill on Trinidad and Tobago, Venezuela and other islands of the Caribbean. These impacts may be extremely significant for the economies of countries that are highly dependent on the tourism and fisheries industries. The very limited mechanisms in place to deal with an oil spill, along with weak legal frameworks that exist within the region, suggest that impacted countries would be in a highly disadvantageous position to respond to a transboundary oil spill event. Consideration should therefore be given to the establishment of an environmental bond or the triggering of an immediate imposition of an early payment (within the fine structure of the agreement) that can be immediately used by Caricom members and other affected parties in the event of an oil spill. This can be eventually offset through the penalties and fees by EEPGL as it goes through the process of assigning or accepting financial liability and establishing a claims process during its response to such a transboundary event.

2.2.1 Performance Standards and Guidance

The review of this section has been conducted using as reference materials international best practices and standards including: IPIECA's many guidance documents including 1) Oil spill preparedness and response: an introduction, 2) Contingency planning, for oil spills on water - Good practice guidelines for the development of an effective spill response capability, 3) At-sea containment and recovery, 4) Controlled in-situ burning of spilled oil, 5) Satellite remote sensing of oil spills at sea 6) Capabilities and uses of sensor and video - equipped waterborne surveillance-ROVs for subsea detection and tracking of oil spills and 6) Tiered preparedness and response.

[2] While Table EIS-3 indicated that discharges will be treated if necessary to meet internationally recognised standards, it would be helpful to note the risk of and associated impact of discharges that for one reason or another do not meet these specifications.

2.2.2 Specificity

This sections discusses instances in the OSRP in which details or specifics are lacking to execute on the plan discussed.

- How will consultations/ notifications with stakeholders take place? Who are the community stakeholders besides the government?
- The indirect area of influence (AoI) in Figure 3 appears to adhere to unrealistic angular boundaries. Given ocean dynamics (currents, thermoclines, etc.), wind, and other factors this angular shape and thus the AoI is unlikely to represent an actual marine indirect AoI. CI suggests that since an AoI is the basis for defining an adequate response that the methodology used to develop the current AoI be explained at greater length and/or the map be redrawn to incorporate modeling that is more realistic.
- Tone – some of the document reads as what the project developer "can/could" do in response to an event as opposed to what they "should/will" do. CI understands that to be overly prescriptive is difficult when the possibilities are numerous as to what can occur however CI suggests using language and structure that more clearly states what actions the plans expects will be done.

Document	Page	Chapter	Paragraph	Remark	Suggestion
Oil Spill Response Plan (OSRP)	29	5.3 – Appropriate Response Strategies	3	"Shoreline protection and cleanup **may be needed** for some scenarios, in which case, sensitive shorelines will **receive prioritization for protective booming**.	Describe procedures for actions. A plan should outline how things will proceed not merely a list of the potential actions that could be taken. e.g. (bolded text in remarks) Under what context is shoreline cleanup conducted? is there a **prioritization** process for what areas receive booming?
	31	6.1 Surveillance and Monitoring	1	"Surveillance and monitoring teams **can** fulfill the following response objectives"	Suggest stronger language "should" or "will"
	42	7 Response Resources	Table 6	Wildlife response	List how many personnel are available to assist from the organizations listed

2.3 Findings from Evaluation of the Environmental Impact Assessment and Environmental Management Plan

2.3.1 Performance Standards and Guidance

The review has been conducted using as reference international best practices and standards such as the International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social Sustainability (in particular PS 6 and its corresponding Guidance Note (GN), and the Energy and Biodiversity Initiative (EBI) Good Practice in the Prevention and Mitigation of Primary and Secondary Biodiversity Impacts from offshore development.

2.3.2 Impact Evaluation

As per IFC PS6 GN15, the EIA should spell out project-related direct, indirect and residual impacts on populations, species and ecosystems and on ecosystem services identified in the baseline studies. In addition, as per IFC PS1 paragraph 8, the area of influence should also encompass cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The EEPGL's EIA assessed direct, indirect, cumulative and residual impacts and classified them between none and minor impacts on physical, coastal and marine biological resources. CI suggests the application of a precautionary approach, in particular for poorly-known taxa considering the current high uncertainties about marine ecosystems and biodiversity, and the potential disturbance vessel activity, lighting, sound and flowlines installed could have on marine and coastal biological resources possibly causing displacement from habitats (as per EBI Good Practice in the Prevention and Mitigation of Primary and Secondary Biodiversity impacts from offshore development). Also, CI encourages a precautionary approach considering the potentially further future oil and gas development in the area, consequently representing greater pressures on biodiversity and ecosystems services, and therefore, increasing the effects of indirect and cumulative impacts.

2.3.3 Ecosystem Services Review

As per IFC PS on Environmental and Social Sustainability, impacts and mitigation measures should be evaluated and considered for both ecosystems and ecosystems services. Although the Liza Phase 1 Project's EIA includes a brief discussion about benefits the ecosystems from the area of influence are currently providing, considering the high dependence of onshore communities on fisheries and others, CI recommends conducting a systematic review of ecosystems services using existing guidance and tools. IFC PS GN130 provides a list of resources relevant to Ecosystem Services Review (ESR) processes. A proactive assessment of ecosystems services could allow for an enhanced understanding of potential stakeholder related risks, as well as the identification of operational risks and dependencies on those ecosystems services that may otherwise be overlooked.

2.3.4 Mitigation Hierarchy

As per IFC PS6 GN16, the Project would be expected to fully exercise the mitigation hierarchy. Therefore, as per IFC PS6 paragraph 7, the Project should strive for avoiding impacts on biodiversity and ecosystem

services as much as possible. CI recommends EEPGL to document the avoidance measures taken, considering that they are the most cost effective way to manage project impacts and risks.

When avoidance of impacts is not possible, measures to minimize impacts and restore biodiversity and ecosystem services should be implemented. As per IFC PS6 paragraph 10, the mitigation hierarchy includes biodiversity offsets, which may be considered only after appropriate avoidance, minimization, and restoration measures have been applied. CI recommends evaluating the mitigation measures included in the Environmental Management Plan (EMP) through the lens of the mitigation hierarchy. This would ensure the appropriate mitigation steps of avoidance, mitigation and restoration are being taken in the correct order, before determining residual impacts and the potential need for biodiversity offsets.

2.3.5 Critical and Natural Habitats

Natural habitat is defined by the IFC PS6 as viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.

As per IFC PS6 paragraph 14, the project should not significantly convert or degrade natural habitats, unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on modified habitat;
- Consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation; and
- Any conversion or degradation is mitigated according to the mitigation hierarchy.

Critical habitat is defined by the IFC PS6 as areas with high biodiversity value, including: (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes. Critical habitats are a subset of modified or natural habitats.

As per IFC PS6 paragraph 17, in areas of critical habitat, project activities should not be implemented unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and

- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

CI recommends to evaluate the extent to which the Project will intervene natural vs modified areas. Also, considering the presence of some endangered and critically endangered species in the area of influence of the project, CI recommends conducting a Critical Habitat Assessment (CHA) to determine if critical habitats will be impacted and to what degree. IFC PS6 GN 55 through 97 presents a framework and methodology for conducting the CHA. In addition, as per IFC PS6 GN22, if the Project were to affect critical habitat, external experts with regional experience should be involved in the review of the biodiversity assessment, project's risks and impacts identification process, proposed mitigation strategy, and the CHA.

2.3.6 Biodiversity Goal

As per IFC PS6 paragraph 15, in areas of natural habitat, mitigation measures will be designed to achieve no net loss of biodiversity where feasible. However, as per PS6 paragraph 10, a net gain is required in critical habitats. CI strongly encourages the consideration of biodiversity net gain as the biodiversity goal for the Project.

Although the study concludes there are not significant residual impacts from the Project, it is important to consider current uncertainties on marine biodiversity and ecosystems, and the potential future additional oil and gas development which might cause greater pressures on biodiversity and ecosystems services, increasing the effects of indirect and cumulative impacts. Therefore, even if the residual impact is not considered significant as it is defined in the IFC Standards, based on the IFC PS6 GN34 and GN107, where there are no significant residual impacts, net gains could still be obtained by identifying additional opportunities to enhance habitat and protect and conserve biodiversity. Such gains should be demonstrated on an appropriate geographic scale (e.g., local, Landscape/seascape -level, national, regional) as determined by external experts. In other words, the "on-the-ground" and "like for like or better" requirements for biodiversity offsets would also apply to other proposed measures for achieving net gains of relevant biodiversity values.

The project could also endeavor to implement additional measures in modified and natural habitats, for example, in modified habitat, the restoration of relevant biodiversity values or other habitat enhancement measures, such as the removal of invasive species. For natural habitats, an example might be the development of strategic frameworks with other companies and/or with the government through the design of joint mitigation measures. The project could also opt to catalyze funding from third-party financiers for appropriate and integrated land use planning exercises by relevant government structures or partner in research programs with local universities. As per IPIECA's 2005 Guidance on Biodiversity Action Plans (BAPs), companies may provide support to biodiversity–related initiatives and organizations as a way to promote biodiversity conservation in the areas in which they work. As per IFC PS6 GN23, CI encourages the Project to develop partnerships with recognized and credible conservation organizations and/or academic institutes.

2.3.7 Landscape/seascape Approach

CI would like to highlight the need for the Project to consider an assessment and potential conservation plan at the Landscape/seascape level. Based on IFC PS6 GN17 and GN102, the Project should consider project-related impacts across the potentially affected landscape or seascape. Landscape/seascape analysis is a fundamental step in determining ecologically-appropriate mitigation options that align with broader conservation efforts in the region, especially important in preventing the degradation and fragmentation of natural habitat, in particular from cumulative impacts.

2.3.8 Monitoring

Based on IFC PS6 GN105, CI encourages monitoring to be carried out on three levels:

- In field monitoring of relevant biodiversity values;
- Monitoring of implementation and effectiveness of mitigation measures and management controls (part of the Environmental Management System); and
- Monitoring of the status of non-project related ongoing threats to biodiversity values in the project's vicinity (e.g., overfishing, bushmeat hunting, agricultural encroachment, unsustainable cattle grazing, invasive species, overharvesting, etc.) and the extent to which the project might exacerbate them.

Lastly, as per IFC PS6 GN20 and GN106, CI encourages the Project to ensure adaptive management practices to adjust methodologies and practices to the ways ecosystems and biodiversity are being managed and monitored.

3. References

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