Netherlands Commission for
Environmental Assessment

Quick Scan (Scoping) of the Terms of Reference for ESIA of the Kigali Waste Water Project

Memorandum by the NCEA

RWANDA

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Advice of the Secretariat

To	RDB
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From	The Netherlands Commission for Environmental Assessment (The NCEA)
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Subject	**Quick Scan (Scoping) of the Terms of Reference for ESIA of the Kigali Waste Water Project in Rwanda, November 2015** By: the Secretariat of the Netherlands Commission for Environmental Assessment – Ms Gwen van Boven (Technical Secretary) and Ms Bobbi Schijf (quality control), with expert input from Mr Willem van Starkenburg Advice 2016-03

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1. Introduction

The Rwanda Development Board (RDB) received and approved the Terms of Reference for the ESIA (Environmental and Social Impact Assessment) and the RPF (Resettlement Policy Framework) for the Kigali Wastewater Project. According to the ToR, the promoter is represented by the Ministry of Finance and Economic Planning (MINECOFIN), although the communication about the ToR is with the Water and Sanitation Corporation (WASAC).

Wastewater disposal in Kigali is currently by means of septic tanks and soakaways, or in some cases direct discharge to open watercourses. The project aims at developing a networked sewer system and wastewater treatment plant in Gitikinyoni, Kigali, to be extended in phases:

- in the first phase, chemically enhanced primary treatment and sludge processing to cope with 12.000 m3/year and 120.000 p.e. (population equivalent) from areas covering Kiyovu-Rugenge, Nyarugenge, Gitega and Muhima;
- a pilot secondary treatment step for 30.000 p.e.;
- the ultimate lay-out of the plant will be to cope with secondary treatment and sludge processing for 550.000 p.e., allowing for future connection of areas beyond those considered at present.

The Government of Rwanda is seeking finance for the project through the European Investment Bank (EIB). The project background provided in the ToR (p.4) states that "*the EIB requires that the ESIA be prepared in compliance with the Bank's environmental standards and specifically the requirements for ESIAs to meet the EU EIA Directive and related guidance*". For this purpose, the European Commission EIA review checklist has been included in Annex 1 as guidance.
Additionaly, the ToR indicates that the project will require the preparation of a Stakeholder Engagement Plan at this stage, which will guide the public consultation processes for the ESIA and the RPF.

1.1 Approach to this Quick Scan

The RDB, who implements the EIA procedure in Rwanda, has requested that the Netherlands Commission for Environmental Assessment (NCEA) assesses the quality of the ToR for the ESIA. As explained by the RDB, although the RDB already approved the ToR, additional requirements to study in the ESIA can be added in a later stage. Any recommendations made by the NCEA will therefore be forwarded to the investor.

Usually, to provide an advice on ToR for an ESIA, the NCEA deploys a full working group of experts and visits the project site. This time, due to time limitations but also the fact that the ToR had already been approved, making full uptake of the advice less predictable, the NCEA has limited itself to a Quick Scan of the interim ESIA. This advice is a so-called NCEA 'Advice of the secretariat' and has been prepared based on a desk review only, and therefore does not constitute an in-depth technical analysis of the project and ToR, nor have the documents been verified 'on the ground' in Rwanda. For the purpose of this Quick Scan, the NCEA engaged an expert on civil engineering with a focus on waste water system/sewerage to perform the analysis and otherwise used the knowlegde available at the NCEA's secretariat.

The NCEA normally analyses the ToR for an ESIA study as a stand-alone document, meaning that all information necessary for the execution of the study should be contained in the ToR, without requiring the reader to consult other documentation to complement gaps in information in the ToR itself. However, in this particular case, the Design Critera Report of December 2013 was also considered, as this provided some complementary information on the project design that was lacking in the ToR.

The NCEA does not express an opinion on the project itself, but focuses on the quality and completeness of the ToR.

In the following chapters, the NCEA first presents key observations in relation to the EIB's EIA requirements and the technical contents of the ToR (chapter 2). In chapter 3, the NCEA elaborates in more detail how conclusions have been reached, by providing observations on specific aspects.

Note:
Chapter 4 was added after the NCEA's visit to Kigali in February 2016 and contains additional observations on potential impacts to be studied during the ESIA.

2. Key observations

2.1 Conformity with national and international ESIA procedures

As the RDB already approved the ToR, the NCEA did not further check conformity with national procedures. The NCEA did however use the European Commission's EIA review checklist (provided in Annex 1 of the ToR and also attached in the annex to this Quick Scan) to check whether the ToR will ensure that the ESIA will comply with the EIB 's requirement for ESIAs to meet the EU EIA Directive and related guidance. In addition, the NCEA checked whether the ToR require the preparation of a Stakeholder Engagement Plan at this stage, which will guide the public consultation processes for the ESIA and the RPF.

- The NCEA concludes that the ToR provides a list of requirements for the ESIA and the Environmental and Social Management Plan (ESMP), but that this list is not complete and does not reflect all requirements of the EIB.
- The NCEA concludes that the ToR for the Stakeholder Engagement Plan is present (Task 4, p. 11) and although generic, should be sufficient for the preparation of an effective SEP.

2.2 ToR for tender not for ESIA

The NCEA observes that the document covers an assignment including: a Resettlement Policy Framework (RPF, task 1), the ESIA (task 2), an Environmental and Social Management Plan (ESMP, task 3) and a Stakeholder Engagement Plan (SEP, task 4). As the request for this quick scan related to the ESIA, the NCEA limited itself to tasks 2, 3 and 4.

The document contains more information on the tender procedure and requirements than on the scope of work for the ESIA itself, which is merely a list of bullets than a proper ToR for an

ESIA. As such it resembles more a terms of reference for a tender procedure for technical assistance rather than a ToR for an Environmental and Social Impact Assessment.

In Ch. 6 Requirements, the ToR outlines which key experts will need to be engaged to carry out the work. Four key experts have been identified: 1) Project manager and international ESIA expert; 2) Social/community expert; 3) Resettlement Specialist; 4) ESIA expert. The NCEA observes that while these are all relevant expertises for the scope of this project, the fact that no subject specialist (civil engineering, waste water management, sewerage systems, alternative technologies) is included in the team, is an omission. This person would be able to judge whether the design and underlying calculations are correct and complete, and to assess the potential impacts of this design and potential alternatives. Also, (socio-)economic factors may play an important role in this project, its feasibility and its impacts, but do not seem to be covered by the requirements.

■ The NCEA recommends the inclusion of a subject specialist (civil engineering, waste water management, sewerage systems, alternative technologies) as well as (socio)-economic expertise in the requirements for the ESIA team composition.

2.3 Quality of Technical content

As indicated above, the NCEA concludes that these ToR is not yet complete and does not reflect all requirements of the EIB. Main elements which are still missing are:

- The ***project rationale*** is not complete in the ToR and the ToR does not ask for it's inclusion in the ESIA. Without a clear description of the problem to be solved, it is impossible to know whether the proposed activity will provide the solution.
- The ***project description*** is not complete and again, the ToR does not ask for it's inclusion in the ESIA. The exact site location and size remains unclear. In the ToR the technology used is not described and no justification of choice of waste water treatment mode. If these aspects are not properly described in the ESIA, it will be hard to identify and assess potential impacts of this projects. Therefore, it will be hard to know whether proposed measures will be sufficient
- ***Baseline information*** is also missing, such as on plans/activities in the surroundings and information on composition and quantity of waste water, the quality of treated water and the composition of produced sewage sludge. Again, the ToR does not ask for this information to be included in the ESIA. Without it, the impact assessment is impossible to do.
- The ToR does not require the consideration of ***alternatives***. Description of alternatives will be useful to help design the best project in the best location. It is also required by the EIB.

■ The NCEA recommends to complement the ToR for the ESIA for the Kigali Waste Water project on the points desribed above and using the detailed recommandations that will follow in chapter 3.

3. Detailed observations

It is specified in the ToR that "*the complete ESIA report will include the non-technical summary, the Environmental and Social Management Plan and the Environmental and Social Action Plan compliant with EIB requirements*" (par. 7.2 Deliverables).
The ESIA will need to comply with the EC's EIA review checklist. The structure of this chapter in the NCEA advice will therefore follow the structure of that checklist.

The NCEA observes that the ToR at this point does not follow the structure of this checklist. Also, at the start of the specific ToR for the ESIA (Task 2, p.10) no clear reference is made to the checklist. As these will be used as verification framework for the review of the ESIA, it would be useful, as a precaution, to already shape the requirements for the ESIA accordingly. Therefore:

- The NCEA recommends to re-write the ToR to make them follow the structure (in seven sections) of the European Commission EIA review checklist has been included in Annex 1 as guidance.
- The NCEA also recommends to specifically refer to the checklist as the framework for review, alerting the consultants once more to the need to comply to its requirements.

3.1 Section 1: Description of the project

Reading the ToR, the NCEA finds it very hard to form a clear image of the exact issue that is at stake. Even when considering the Design Criteria Report, this is not easy. Neither of the documents starts with a clear analysis of the problem, explaining why it is necessary to invest in waste water management, why the current solutions do not suffice, what composition and quantity of waste water is predicted and what would be the best way to treat it and why. That would provide a logic or rationale for the project. Since the problem analysis is not available, there is no way of knowing whether the proposed project will perhaps be too small and insufficient, will potentially be too large and cause unneccesary social or environmental impacts and/or investment loss, or would not function optimally due to water flow differences or other reasons.

Then, the project description itself also remains unclear. In the ToR, only a very general description is provided in pages 3-4, but with so little technical detail that it is impossible to understand what is being proposed, where and how. No maps, coordinates or other type of illustrations are available. No concise overview of what will be constructed, its locations or itinerary is given. Is the construction earthquake-proof, are spills likely to occur during torrential rains in the wet season? It remains unclear in what phase the project finds itself. Has funding been secured yet? Are the site selection and design choices final or still being studied? In the Design Criteria Document, more information is given but presented in a very scattered manner, making the information difficult to comprehend and seemingly incomplete. Some very rough maps of the area are given on p.40 and onwards but without a legend or coordinates, these cannot be used as reference material. A lay-out sketch is given in the annex but with the same omissions. This makes it very hard to understand potential impacts of the activity, and therefore to know whether the ToR is adequate or not.

This is not only an omission in the document itself, but the ToR also does not require a proper project description in the ESIA. The ToR only asks to consider:

- *sewage plant location and consultation;*
- *network selection and consultation on the alignment.*

Given the above and with this level of detail, the NCEA expects this to be insufficient and not in line with the EIA checklist as to the type of information that is expected at this stage (e.g. objectives and physical characteristics of the project, size of the project, production processes and resources used, residues and emissions, risks of accidents and hazards).

Special attention should be given to the composition of the waste water and subsequently, after treatment, the expected composition of the sewage sludge. If the source material and the sludge will contain contaminants such as worm-eggs or heavy metals, potential impacts on health and environment will be much higher than expected and use of sludge (such as for agriculture) may be less optimal or impossible.

■ The NCEA recommends to include a short but sound problem analysis and description of the proposed project in the ToR document itself. This should at least include a map of the area and a lay out sketch of the proposed constructions, with clear legend and coordinates.
■ The NCEA further recommends to include in the ToR the requirement for a concise, illustrated project description in the ESIA, allowing a profound understanding of the potential impacts of the activity and in its exact location.
■ The NCEA recommends to prescribe sampling and analysis of the quantity and composition of the waste water allowing the subsequent assessment of the quality of the sludge and its suitability for agricultural purposes.

The ToR in general terms also state (p.10):
"The consultant shall review the site selection process, existing environmental and social documentation, expropriation plans, technical design documentation and other relevant Project documentation prepared under various stages of the Project planning, development and permitting as well as any Project preparation activities undertaken to date."

It then starts by mentioning Strategic Environmental Assessment on existing master plan of Kigali sewage system and urban master plan; and Scoping assessments. Both (type of) documents are unknown to the NCEA and if available, will probably not cover all of the information mentioned in the quote from the ToR, above. To ensure that the consultants will take into account which documentation is meant and available, it would be better to specifically list which documentation to include.

■ The NCEA recommends to include a complete list of documentation that the consultants are required to take into consideration in the ESIA study

3.2 Section 2: Consideration of alternatives

The ToR does not require the study of alternatives. Yet this is an important requirement of the EIB. It is required in the ESIA to describe the baseline in the No Project situation ('zero' or 'do-nothing' alternative), then to describe realistic alternatives to the project. If an alternative is chosen, the EIB asks whether a good explanation has been given in the ESIA, including any environmental reasons for the choice?

The NCEA concurs with the EIB as to the importance of the description of alternatives in this case. The project is sensitive and located in a densely populated city. It is recommendable to include at least location alternatives and technological alternatives in the ESIA, allowing the justification of the final choices made. For example:

Location alternatives, with respect to criteria such as:

- distance from the treatment plant in relation to required distance of waste water collection infrastructure;
- distance from environmentally sensitive areas;
- the size of the site for the currently proposed project;
- space required for future expansion plans;
- number of people and businesses to resettle.

Size alternatives

- The quantity of the waste water that has to be treated is not known. No measured data are provided. The projected plant may therefore be to small or too big. Instead of measuring data, it is now proposed to first build a relatively small pilot plant of 30,000 p.e. Once that plant functions well, it will become part of a future bigger plant and the technology of the future plant will be determined. The small plant will normally not be used in the exension of the total plant. It would therefore be worthwhile to calculate future needs based on measured data and then work out plants of alternative sizes that will fit the needs.

Technological alternatives, for example:

- The quality of the waste water that has to be treated is not known. It is therefore unknown whether chemical (pre-) treatment will be needed. Chemical treatment is complex (dosing and maintenance require highly skilled personnel) and it is much more expensive than a conventional aerobic treatment plant. In case of spills or other accidents, environmental and health impacts may be much higher. It will be worthwhile to consider the alternative of a more conventional aerobic treatment plant rather than chemical treatment.
- According to table 1.1. of the Design Criteria report, the influent BOD (Biochecmical Oxygen Demand) will be 534 mg/l. This can be treated with oxygen, but also with in combination an-aerobic pre-treatment (treatment without the use of oxygen). This would make the running costs and footprint lower than with purely aerobic treatment as is currently being proposed. There is no information found why this technology is not considered as an alternative.
- The effluent will be treated in a maturation pond. The pond has the function of pathogen reduction, effluent polishing and receiving body of untreated or maltreated waste water in case of problems (quality/quantity) at the WWTP.

    - Removal of pathogens in open water depends on temperature and retention time of the water. Retention time is said to be 2-4 days whereas 10 days is the general condition for the dying of pathogens. Study whether this may become a problem and consider an alternative technology if necessary.
    - The effluent will contain phosphate, which in combination with sunlight will lead to algae growth. If fish will occur in the pond (which is hard to prevent), it may die due to fluctuations in oxygen. Smell problems will occur. Calculate the potential algae growth and consider alternatives in pond surface, use of wetlands, or water plants that are able to collect particles from the water.
    - If in case of problems, untreated of maltreated water indeed reaches the pond, oxygen may in the long run dissappear from the water and smell can occur. Sludge will sink to the bottom and will cause water quality problems for a longer time. Consider a design of the pond that would allow easy removal of the sludge when necessary (e.g. baffles).
- The plant produces sewage sludge. This sludge will be digested in unheated digesters, and the resulting biogas will be flaired. Flairing biogas is destroying energy. Study and compare the efficiency and costs of unheated versus heated digesters (making the process faster) and whether the biogas could be used (for heating the digesters for example) instead of flaired and wasted.
- After digestion the sewage sludge will be mechanically dewatered, before it will be dried on drying beds. Mechanical dewatering is not an easy process. It asks for a skilled staff and it costs special machines and chemicals. Test and study what works better in the Rwandan context: drying over a longer time and using larger drying beds vs mechanical drying.

■ The NCEA recommends to include in the ToR the requirement to consider alternatives, in particular the ones mentioned above.

3.3 Section 3: Description of the environment likely to be affected by the project

The ToR asks for Environmental and social (economic) baseline studies. No further information is provided as to which aspects of the environment are to be described. The EIB requirements go much further and include for example a description of existing land uses and activities in and surrounding the project area, and many more.

■ The NCEA recommends to either specify which information is required, or to refer to the EIA checklist and require that the consultant complies with the description of aspects of the environment asked for there.

3.4 Section 4: Description of the likely significant effects of the project

The ToR requires the description of the following impacts, presented as a list of bullets:

- Impacts to cultural heritage.
- Cumulative impacts assessment; associated facilities.
- Impacts on any sensitive areas or listed species.
- Visual intrusion and discomfort (mainly at the level of the treatment plant).

- Air, noise, odours and vibration impacts prediction and significance.
- Community impacts and risks.
- Construction impacts, including construction material sourcing.
- Operation impacts, including decommissioning, transport, storage and use of sludge.

And further down:

- The hiring of migrant workers may potentially be an issue on the project. Worker accommodation provisions and standards will also need to be considered during due diligence.
- Emergency and evacuation preparedness procedures in the event of a disaster (earthquake, fire, flooding...). Cumulative impacts of the waste water treatment plant with other structures located in the area of influence (e.g. the cement plant) will need to be taken into consideration.

The NCEA does not understand the logic in the order or identification of impacts. This is probably also related to the limited description of the activity at this stage (see 3.1). The ToR does not invite the consultant to identify further impacts. That means that this list can be considered exhaustive by the consultant. Yet there is no distinction between direct and indirect or other impacts. The prediction of effects on human health and sustainable development issues is lacking entirely. The ToR does not contain presciptions on the evaluation of the significance of the impacts or on impact assessment methods.

■ The NCEA recommends a more structured and complete requirement for the description of the potential impacts of this project. This should be required for the different alternatives that will be considered, allowing equal comparison. The NCEA also recommends to state explicitly that the list in the ToR is not exhaustive and that the consultant is expected to add impacts that become known in the course of their study.

3.5 Section 5: Description of mitigation

In the description for task 2, the ESIA, the ToR requires the description of a short list of measures (3 bullets only). This list again seems relatively incomplete and arbitrary, ranging from a very detailed one (road safety) with no apparent relation to earlier listed impacts, to very general ones ("*Review the environmental, health and safety and social obligations to be imposed on the Project to manage environmental and social risks")* which could potentially cover all sorts of measures. This is confusing.

However under task 3 : Environmental and Social Management Plan, however, a more comprehensible set of requirements is noted which have as a starting point the findings of the ESIA study. This is a good starting point as the study will tell what the exact impacts are that can be expected, and only then can appropriate measures be identified and relevant monitoring and institutional arrangement plans be prepared.

■ The NCEA recommends to exclude the incomplete list of measures the consultant is required to describe, and rather adhere to what is being asked for under task 3. If well executed this should lead to a good quality ESMP with binding commitments and complying with the EIB requirements.

Furthermore, to bring more structure and logic in the description of mitigation, the NCEA recommends to create a clear link in the ToR between the alternatives and the mitigating measures. The choice for one alternative (against the other) will have certain consequences in terms of impacts, and the described measures should respond to those impacts. By exploring these measures in direct relation to the alternatives, their effectiveness and financial and technological feasibility will become clear. For example (not exhaustive):

Issue	Alternative	Potential Impact	Mitigating measure to be explored in the ESIA
Population density	The project is located in a densely populated area	Resettlement of the population	Explore sites with less population pressure
Sensitive wetlands	The project site selection means that the effluent of the treatment plant may reach environmentally sensitive wetlands	If untreated sewage reaches the wetland, it may impact on the water quality, biodiversity, or agricultural practices ongoing in the wetland	Study measure to avoid leakage of effluent Explore how barriers could be constructed between the effluent and the wetland
Treatment of the influent	Alternative 1: In the first phase of the project, the influent will be treated with chemicals	If not properly managed/ maintained, checmical treatment will not work optimally	Consider the options for hiring qualified staff or training of staff to bring their knowledge to the appropriate level
	Alternative 2: the influent will be treated in a more conventional aerobic treatment plant	Larger surface area may be required for the treatment plant	Study alternative locations or explore other lay-out designs to fit this into the original project site
Treatment of the effluent	The effluent will be treated in a maturation pond	If the retention time is too low, pathogens will not be removed	Explore technological and management options to enlarge the retention time in the pond
Use of the sewage sludge	Sewage sludge will be used in agriculture	potential contamination of agricultural products with worm-eggs and/or heavy metals, making them unsuitable for human consumption	Study technologies to ensure contaminant-free sewage sludge Explore other use of the sludge, in non-food agriculture or consider not using it at all

■ The NCEA recommends to include in the ToR the requirement to clearly describe the potential measures for each alternative and its related impacts, using the table above as inspiration.

3.6 Section 6: Non-technical summary

The ToR does require the inclusion of a non-technical summary in the ESIA report, and requires it to form part of the disclosure package. The ToR however does not specify in any way what the non-technical summary should contain.

■ The NCEA recommends to specify the required contents of the non-technical summary.

3.7 Section 7: Quality of presentation

In the relevant chapters on the tasks for the ESIA and the ESMP, no instructions have been provided as to the quality of the presentation. In par 7.2. Deliverables (p.18), it is indicated that "*the consultant shall include relevant maps, plans, tables, graphs, diagrams and any other illustrative material what would make easy appreciation for the content of the RPF*". No such requirement is included for the ESIA, while the appreciation of its content would also greatly benefit from such illustrative material.

■ The NCEA recommends that the ToR requires the inclusion of relevant maps, plans, tables, graphs, diagrams and any other illustrative material in the ESIA.

3.8 Additional observations

Some missing elements

Aside from what is required by the EIB, the NCEA did not find any requirements in the ToR in relation to:

- Institutional and legal framework, specific to the project (such as, for example, norms and standards for the effluent)
- Consistency analysis with existing policies, plans, programmes

In the general section of the ToR (par. 4.1), it is mentioned that the performance of the project will be judged against certain standards and guidelines, and several of those are listed. It is not required by the ToR however to study those (and others) in the ESIA and how they may influence the project or vice versa.

■ The NCEA recommends to also require the inclusion of these elements in the ESIA.

The Stakeholder Engagement Plan (SEP)

In Tasks 4 and 5 in the ToR, the requirements for the preparation of the SEP and its implementation are described. While generic, the tasks seems clear and relatively complete. The only element that the NCEA finds lacking is the obligation to use the results of the stakeholder engagement in the ESIA, and justify why the results were used in a certain way. This is to ensure that the stakeholder consultations do not become a seperate exercise but actually function to feed into the ESIA process.

■ The NCEA recommends to require the justification of the use of the results of the stakeholder engagement in the ESIA.

4. Observations after the site visit

After the publication of the quick scan on the 26th of January, the NCEA had the opportunity to visit the proposed project site and to discuss the project with relevant government stakeholders such as RDB, WASAC, the City of Kigali, REMA and MININFRA during the week of 8-12 February 2016. This chapter contains additional observations made during this visit in relation to potential risks and impacts to be considered during the ESIA.

Kigali Masterplan

- A Masterplan for the city of Kigali has been developed, in which portions of the city have been allocated for different uses. Execution of the plan involves activities such as the removal of buildings and houses where they do not fit the allocated use, the creation of buffer zones to prevent certain activities in certain areas, and the widening of roads. Such activities are also foreseen in the project area, but the phasing in relation with the time scheme of the construction of the sewer and waste water treatment plant is not known. This may have major consequences for the works and design of the project.

■ The NCEA recommends that the ESIA contain a clear description of consequences of the Kigali City Master Plan on the proposed project area (sewer system area, waste water treatment plant and discharge areas) and the timing of events and proposed measures in case of conflicts in timing.

Construction of the sewer

- The main track of the proposed sewer system is planned along or in the middle of an important road in central Kigali. The construction of the secondary tracks will open up roads in residential and commercial areas for a considerable period of time. Traffic and logistical problems are to be expected during construction of the sewer.
- The construction of the sewer is planned in an area with many houses, buildings and small industries. The risk is that during construction other public services utilities like drinking water lines, cables etc. will be affected by the construction activities.

■ The NCEA recommends to require the description of (temporary) impacts due to sewer construction works during the different phases of the project and to propose measures to mitigate these impacts to an acceptable level.

Connection to the sewer

The centralised waste water treatment plant has been designed for the treatment of a certain amount of waste water (capacity). A wastewater treatment plant functions best with a relatively steady quality and quantity of wastewater that matches the capacity for which the plant is designed. Too little waste water would have a negative impact on the performance of the sewer (clogging, smell, etc) and would lead to problems in the maintenance of the treatment plant (erosion). Too much waste water on the other hand, could lead to overflow and would lead to a poor performance of the treatment plant, resulting in effluent that will not meet the standards.

Therefore, a realistic calculation of the capacity required of the waste water treatment plant is important. There is currently a risk that the actual amount of waste water to be treated may be different than that predicted in the project documents, for several reasons:

- The amount of waste water is calculated on the basis of the possible consumption of drinking water. However, not all inhabitants are connected to the drinking water network, and leakages may occur in this network, two factors that may lead to a lower consumption of water. The waste water production may then be lower than predicted as well.
- In the city of Kigali many houses and buildings (hotels, offices) currently have individual treatment systems such as septic tanks. The septic tanks are emptied on occasion and the sludge and effluent taken away. For the centralised water treatment plant to function as currently planned, all these buildings will need to be connected to the new sewer while the existing individual treatment systems are abandoned. If this does not happen (i.e. if people do not comply with the requirement to connect to the sewer), the amount of waste water will again be lower than predicted
- Commonly the largest part of municipal waste water originates from the flushing of toilets [for example, 50-75% in the Netherlands]. The sewer capacity has been calculated on the basis of a discharge of 80 liter per person per day. However, it is imaginable that houses, buildings or offices have taken measures to reduce the amount of flushing water. If this is not taken into account in the calculations for the capacity of the new sewer system, the amount of waste water may be much lower than predicted.
- Storm water is discharged into open mains in the city. There is a risk is that people may connect the storm water to the waste water sewer. This would dilute the waste water, and lead to a different quality of waste water than was assumed in the treatment plant design. Dilution can lead to the discharge of sludge particles together with the effluent. When that happens, the quality of the effluent will deteriorate and sludge will be settling in the maturation pond.

The assumptions about the quality and quantity of the wastewater that will be coming into the treatment plant need to be carefully examined to ensure that these are realistic.
Otherwise the capacity for which the treatment plant is designed may not match the incoming waste water. Such a mismatch can lead to avoidable social or environmental impacts and/or investment loss.

■ The NCEA recommends to include in the ToR the requirement to provide reliable data and realistics prognoses on the expected amount and quality of waste water to be treated.

The location of the treatment plant

- The treatment plant is planned alongside an important and busy road in Kigali, which connects on-going traffic to the south and north bound national roads. The project will likely lead to traffic impacts, not only during construction (traffic of construction material and workers) but also during the operational phase of the plant, particularly because of the transportation of sewage sludge.
- The envisaged project site is currently partly in use by garages and car-repair enterprises, which may have led to soil contamination. Soil will probably be excavated during the construction work of the plant, which in case of contamination may have a negative impact on the health of the workers and/or on the environment at the disposal site.
- The waste water treatment plant will produce biogas. At the current site, along the busy road next to the site, two petrol stations are located. The combination of the

biogas production and the petrol stations is a risk, as gas can escape and cause accidents.

■ The NCEA recommends to pay particular attention to the above identified potential impacts and to require their analysis and mitigation in the ESIA.

Electricity supply

- The preformance of aerobic waste water treatment plants depend on a continuous supply of electricity. The bacteria require oxygen and even a few hours of power shortage would make them less active or may kill them off. High tension lines are available near the proposed project site, but electricity supply is not always reliable in Rwanda. A back-up system will therefore be required. This back-up system could make use of conventional diesel generators, but the production of electricity from biogas from the sludge is an alternative that would be feasible and would reduce maintenance costs of the plant (lower electicity bill).

■ The NCEA recommends to study options for biogas production from the sludge as an alternative source of electricity for the running of the plant.

Monitoring and maintenance

- After passage through a maturation pond, the effluent will be discharged in the river Nyabarongo. The current quality of the river is not given in the project documents, and as a consequence the influence of the discharged effluent on the river cannot be assessed and the quality of the river water after the discharge point cannot be predicted. This is important, because there are downsteam features that may be negatively impacted by any decline in water quality. For example, directly down stream of the maturation ponds, sugar cane is produced. Also, the river ends up in Lake Victoria and flows along preserved nature areas, such as Akagera.
- The current project plan proposes analysis of the effluent every three months. This frequency is too low to keep sufficient track of the effluent quality. At this frequency, any malfunctioning of the plant may be observed too late to avoid negative impact on the surroundings of the plant or the river into which the effluent is discharged.
- There is no information provided about the monitoring of the different components of the treatment plant. Careful monitoring of the different components of the plan is necessary to ensure that appropriate measures are taken to maintain proper performance of the treatment plant, and to enable learning by the staff on the effectiveness of management measures.
- This will be the first centralised water treatment plant in Rwanda of this size and using this technology. Given the nature of the plant and the requirements for monitoring and maintenance, extensive training of staff and management will be required, particularly in the first year of operations, and subsequently on a regular basis.

■ The NCEA recommends to require a detailed and precise monitoring scheme and training programme to be developed in the ESIA as part of the Environmental and Social Management Plan (ESMP).

Annex: The European Commission's EIA checklist

Source: http://ec.europa.eu/environment/archives/eia/eia-guidelines/g-review-full-text.pdf

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
The Objectives and Physical Characteristics of the Project				
1.1	Are the need for and objectives of the project explained?			
1.2	Is the programme for implementation of the Project described, detailing the estimated length of time and start and Finnish dates for construction, operation and decommissioning? (this should include any phases of different activity within the main phases of the Project, for example extraction phases for mining operations)			
1.3	Are all the main components of the project described (for assistance see the Checklist of Project Activities in Part C of the Scoping Guide in this series)			
1.4	Is the location of each Project component identified, using maps, plans and diagrams as necessary?			
1.5	Is the layout of the site (or sites) occupied by the project described? (including ground levels, buildings, other physical structures, underground works, coastal works, storage facilities, water features, planting, access corridors, boundaries)			
1.6	For linear projects, are the route corridor, the vertical and horizontal alignment and any tunnelling and earthworks described?			
1.7	Are the activities involved in construction of the project all described?			
1.8	Are the activities involved in operation of the project all described?			
1.9	Are the activities involved in decommissioning the project all described? (e.g. closure, dismantling, demolition, clearance, site restoration, site re-use etc)			
1.10	Are any additional services required for the project all described? (e.g. transport access, water, sewerage, waste disposal, electricity, telecoms) or developments (e.g. roads, harbours, powerlines, pipelines)			
1.11	Are any developments likely to occur as a consequence of the Project identified? (e.g. new housing, roads, water or sewerage infrastructure, aggregate extraction)			
1.12	Are any existing activities which will alter or cease as a consequence of the Project identified?			
1.13	Are any other existing or planned developments with which the Project could have cumulative effects identified?			
The Size of the Project				
1.14	Is the area of land occupied by each of the permanent project components quantified and shown on a scaled map? (including any associated access arrangements, landscaping and ancillary facilities)			
1.15	Is the area of land required temporarily for construction quantified and mapped?			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.16	Is the reinstatement and after use of land occupied temporarily for operation of the Project described? (e.g. land used for mining or quarrying)			
1.17	Is the size of any structures or other works developed as part of the Project identified? (e.g. the floor area and height of buildings, the size of excavations, the area or height of planting, the height of structures such as embankments, bridges of chimneys, the flow or depth of water)			
1.18	Is the form and appearance of any structures or other works developed as part of the Project described? (e.g. the type, finish and colour of materials, the architectural design of buildings and structures, plant species, ground surfaces, etc)			
1.19	For urban or similar development projects, are the numbers and other characteristics of new populations or business communities described?			
1.20	For projects involving the displacement of people or businesses, are the numbers and other characteristics of those displaced described?			
1.21	For new transport infrastructure or projects generating substantial traffic flows, is the type, volume, temporal pattern and geographical distribution of new traffic generated or diverted as a consequence of the Project described?			
Production Processes and Resources Used				
1.22	Are all the processes involved in operating the Project described? (e.g. manufacturing or engineering processes, primary raw material production, agricultural or forestry production methods, extraction processes)			
1,23	Are the types and quantities of outputs produced by the Project described? (these could be primary or manufactured products, goods such as power or water or services such as homes, transport, retailing, recreation, education, municipal services (water, waste, etc))			
1.24	Are the types and quantities of raw materials and energy needed for construction and operation discussed?			
1.25	Are the environmental implications of the sourcing of raw materials discussed?			
1.26	Is efficiency in use of energy and raw materials discussed?			
1.27	Are any hazardous materials used, stored, handled or produced by the Project identified and quantified? • during construction • during operation • during decommissioning			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.28	Are the transport of raw materials to the Project and the number of traffic movements involved discussed? (including road, rail and sea transport) • during construction • during operation • during decommissioning			
1.29	Is employment created or lost as a result of the Project discussed? • during construction • during operation • during decommissioning			
1.30	Are the access arrangements and the number of traffic movements involved in bringing workers and visitors to the Project estimated? • during construction • during operation • during decommissioning			
1.32	Is the housing and provision of services for any temporary or permanent employees for the Project discussed? (relevant for Projects requiring migration of a substantial new workforce into the area for either construction or the long term)			
Residues and Emissions				
1.33	Are the types and quantities of solid waste generated by the Project identified? (including construction or demolition wastes, surplus spoil, process wastes, by-products, surplus or reject products, hazardous wastes, household or commercial wastes, agricultural or forestry wastes, site clean-up wastes, mining wastes, decommissioning wastes) • during construction • during operation • during decommissioning			
1.34	Are the composition and toxicity or other hazards of all solid wastes produced by the Project discussed?			
1.35	Are the methods for collecting, storing, treating, transporting and finally disposing of these solid wastes described?			
1.36	Are the locations for final disposal of all solid wastes discussed?			
1.37	Are the types and quantities of liquid effluents generated by the Project identified? (including site drainage and run-off, process wastes, cooling water, treated effluents, sewage) • during construction • during operation • during decommissioning			
1.38	Are the composition and toxicity or other hazards of all liquid effluents produced by the Project discussed?			
1.39	Are the methods for collecting, storing, treating, transporting and finally disposing of these liquid effluents described?			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.40	Are the locations for final disposal of all liquid effluents discussed?			
1.41	Are the types and quantities of gaseous and particulate emissions generated by the Project identified? (including process emissions, fugitive emissions, emissions from combustion of fossil fuels in stationary and mobile plant, emissions from traffic, dust from materials handling, odours) • during construction • during operation • during decommissioning			
1.42	Are the composition and toxicity or other hazards of all emissions to air produce by the Project discussed?			
1.43	Are the methods for collecting, treating and finally discharging these emissions to air described?			
1.44	Are the locations for discharge of all emissions to air identified and the characteristics of the discharges identified? (e.g. height of stack, velocity and temperature of release)			
1.45	Is the potential for resource recovery from wastes and residues discussed? (including re-use, recycling or energy recovery from solid waste and liquid effluents)			
1.46	Are any sources of noise, heat, light or electromagnetic radiation from the Project identified and quantified? (including equipment, processes, construction works, traffic, lighting, etc)			
1.47	Are the methods for estimating the quantities and composition of all residues and emissions identified and any difficulties discussed?			
1.48	Is the uncertainty attached to estimates of residues and emissions discussed?			
Risks of Accidents and Hazards				
1.49	Are any risks associated with the Project discussed? • risks from handling of hazardous materials • risks from spills fire, explosion • risks of traffic accidents • risks from breakdown or failure of processes or facilities • risks from exposure of the Project to natural disasters (earthquake, flood, landslip, etc)			
1.50	Are measures to prevent and respond to accidents and abnormal events described? (preventive measures, training, contingency plans, emergency plans, etc)			
Other Questions on Description of the Project				

SECTION 2 CONSIDERATION OF ALTERNATIVES				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
2.1	Is the process by which the Project was developed described and are alternatives considered during this process described? (for assistance, see the guidance on types of alternatives which may be relevant in Part B3 of the Scoping Guide in this series)			
2.2	Is the baseline situation in the No Project situation described?			
2.3	Are the alternatives realistic and genuine alternatives to the Project?			
2.4	Are the main reasons for choice of the proposed Project explained, including any environmental reasons for the choice?			
2.5	Are the main environmental effects of the alternatives compared with those of the proposed Project?			
Other Questions on Consideration of Alternatives				

SECTION 3 DESCRIPTION OF ENVIRONMENT LIKELY TO BE AFFECTED BY THE PROJECT				
No.	**Review Question**	**Relevant?**	**Adequately Addressed?**	**What further information is needed?**
Aspects of the Environment				
3.1	Are the existing land uses of the land to be occupied by the Project and the surrounding area described and are any people living on or using the land identified? (Including residential, commercial, industrial, agricultural, recreational and amenity land uses and any buildings, structures or other property)			
3.2	Are the topography, geology and soils of the land to be occupied by the Project and the surrounding area described?			
3.3	Are any significant features of the topography or geology of the area described and are the conditions and use of soils described? (Including soil quality stability and erosion, agricultural use and agricultural land quality)			
3.4	Are the fauna and flora and habitats of the land to be occupied by the Project and the surrounding area described and illustrated on appropriate maps?			
3.5	Are species populations and characteristics of habitats that may be affected by the Project described and are any designated or protected species or areas defined?			
3.6	Is the water environment of the area described? (Including running and static surface waters, groundwaters, estuaries, coastal wasters and the sea and including run off and drainage. NB not relevant if water environment will not be affected by the Project)			
3.7	Are the hydrology, water quality and use of any water resources that may be affected by the Project described? (Including use for water supply, fisheries, angling, bathing, amenity, navigation, effluent disposal)			
3.8	Are local climatic and meteorological conditions and existing air quality in the area described? (NB not relevant if the atmospheric environment will not be affected by the project)			
3.9	Is the existing noise climate described? (NB not relevant if acoustic environment will not be affected by the Project)			
3.10	Is the existing situation regarding light, heat and electromagnetic radiation described? (NB not relevant if these characteristics of the environment will not be affected by the Project)			
3.11	Are any material assets in the area that may be affected by the Project described? (Including buildings, other structures, mineral resources, water resources)			
3.12	Are any locations or features of archaeological, historic, architectural or other community or cultural importance in the area that may be bisected the Project described, including any designated or protected sites?			
3.13	Is the landscape or townscape of the area that may be affected by the Project described, including any designated or protected landscapes and any important views or viewpoints?			

SECTION 3 DESCRIPTION OF ENVIRONMENT LIKELY TO BE AFFECTED BY THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
3.14	Are demographic, social and socio-economic conditions (e.g. employment) in the area described?			
3.15	Are any future changes in any of the above aspects of the environment, that may occur in the absence of the project, described? (the so-called Moving Baseline or No Project situation)			
Data Collection and Survey Methods				
3.16	Has the study area been defined widely enough to include all the area likely to be significantly affected by the Project?			
3.17	Have all relevant national and local agencies been contacted to collect information on the baseline environment?			
3.18	Have sources of data and information on the existing environment been adequately referenced?			
3.19	Where surveys have been undertaken as part of the Environmental Studies to characterise the baseline environment are the methods used, any difficulties encountered and any uncertainties in the data described?			
3.20	Were the methods used appropriate for the purpose?			
3.21	Are any important gaps in the data on the existing environment identified and the means used to deal with these gaps during the assessment explained?			
3.22	If surveys would be required to adequately characterise the baseline environment but they have not been practicable for any reason, are the reasons explained and proposals set out for the surveys to be undertaken at a later stage?			
Other Questions on the Description of the Environment				

SECTION 4 DESCRIPTION OF THE LIKELY SIGNFICANT EFFECTS OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Scoping of Effects				
4.1	Is the process by which the scope of the Environmental Studies was defined described? (for assistance, see the Scoping Guide in this series)			
4.2	Is it evident that a systematic approach to scoping was adopted?			
4.3	Is it evident that full consultation was carried out during scoping?			
4.4	Are the comments and views of consultees presented?			
Prediction of Direct Effects				
4.5	Are direct, primary effects on land uses, people and property described and where appropriate quantified?			
4.6	Are direct, primary effects on geological features and characteristics of soils described and where appropriate quantified?			
4.7	Are direct, primary effects on fauna and flora and habitats described and where appropriate quantified?			
4.8	Are direct, primary effects on the hydrology and water quality of water features described and where appropriate quantified?			
4.9	Are direct, primary effects on uses of the water environment described and where appropriate quantified?			
4.10	Are direct, primary effects on air quality and climatic conditions described and where appropriate quantified?			
4.11	Are direct, primary effects on the acoustic environment (noise or vibration) described and where appropriate quantified?			
4.12	Are direct, primary effects on heat, light or electromagnetic radiation described and where appropriate quantified?			
4.13	Are direct, primary effects on material assets and depletion of non-renewable natural resources (e.g. fossil fuels, minerals) described?			
4.14	Are direct, primary effects on locations or features of cultural importance described?			
4.15	Are direct, primary effects on the quality of the landscape and on views and viewpoints described and where appropriate illustrated?			
4.16	Are direct, primary effects on demography, social and socio-economic condition in the area described and where appropriate quantified?			
Prediction of Secondary, Temporary, Short Term, Permanent, Long Term, Accidental, Indirect, Cumulative Effects				

SECTION 4 DESCRIPTION OF THE LIKELY SIGNFICANT EFFECTS OF THE PROJECT				
No.	**Review Question**	**Relevant?**	**Adequately Addressed?**	**What further information is needed?**
4.17	Are secondary effects on any of the above aspects of the environment caused by primary effects on other aspects described and where appropriate quantified? (e.g. effects on fauna, flora or habitats caused by soil, air or water pollution or noise; effects on uses of water caused by changes in hydrology or water quality; effects on archaeological remains caused by desiccation of soils)			
4.18	Are temporary, short term effects caused during construction or during time limited phases of project operation or decommissioning described?			
4.19	Are permanent effects on the environment caused by construction, operation or decommissioning of the Project described?			
4.20	Are long term effects on the environment caused over the lifetime of Project operations or caused by build up of pollutants in the environment described?			
4.21	Are effects which could result from accidents, abnormal events or exposure of the Project to natural or man-made disasters described and where appropriate quantified?			
4.22	Are effects on the environment caused by activities ancillary to the main project described? (ancillary activities are part of the project but usually take place distant from the main Project location e.g. construction of access routes and infrastructure, traffic movements, sourcing of aggregates or other raw materials, generation and supply of power, disposal of effluents or wastes			
4.23	Are indirect effects on the environment caused by consequential development described? (consequential development is other projects, not part of the main Project, stimulated to take place by implementation of the Project e.g. to provide new goods or services needed for the Project, to house new populations or businesses stimulated by the Project)			
4.24	Are cumulative effects on the environment off the Project together with other existing or planned developments in the locality described? (different future scenarios including a worst case scenario should be described). For further guidance on assessment of cumulative impacts see *http://ec.europa.eu/environment/eia/eia-support*			
4.25	Are the geographic extent, duration, frequency, reversibility and probability of occurrence of each effect identified as appropriate?			
Prediction of Effects on Human Health and Sustainable Development Issues				
4.26	Are primary and secondary effects on human health and welfare described and where appropriate quantified? (e.g. health effects caused by release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the project, changes in living conditions, effects on vulnerable groups)			
4.27	Are impacts on issues such as biodiversity, global climate change and sustainable development discussed where appropriate?			
Evaluation of the Significance of Effects				

SECTION 4 DESCRIPTION OF THE LIKELY SIGNFICANT EFFECTS OF THE PROJECT				
No.	**Review Question**	**Relevant?**	**Adequately Addressed?**	**What further information is needed?**
4.28	Is the significance or importance of each predicted effect discussed in terms of its compliance with legal requirement and the number, importance and sensitivity of people, resources or other receptors affected?			
4.29	Where effects are evaluated against legal standards or requirements are appropriate local, national or international standards used and relevant guidance followed?			
4.30	Are positive effects on the environment described as well as negative effects?			
4.31	Is the significance of each effect clearly explained?			
Impact Assessment Methods				
4.32	Are methods used to predict effects described and are the reasons for their choice, any difficulties encountered and uncertainties in the results discussed?			
4.33	Where there is uncertainty about the precise details of the Project and its impact on the environment are worst case predictions described?			
4.34	Where there have been difficulties in compiling the data needed to predict or evaluate effects are these difficulties acknowledged and their implications for the results discussed?			
4.35	Is the basis for evaluating the significance or importance of impacts clearly described?			
4.36	Are impacts described on the basis that all proposed mitigation has been implemented i.e. are residual impacts described?			
4.37	Is the level of treatment of each effect appropriate to its importance for the development consent decision? Does the discussion focus on the key issues and avoid irrelevant or unnecessary information?			
4.38	Is appropriate emphasis given to the most severe, adverse effects of the Project with lesser emphasis given to less significant effects			
Other Questions relevant to Description of Effects				

SECTION 5 DESCRIPTION OF MITIGATION				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
5.1	Where there are significant adverse effects on any aspect of the environment is the potential for mitigation of these effects discussed?			
5.2	Are any measures which the developer proposes to implement to mitigate effects clearly described and their effect on the magnitude and significance of impacts clearly explained?			
5.3	If the effect of mitigation measures on the magnitude and significance of impacts is uncertain is this explained?			
5.4	Is it clear whether the Developer has made a binding commitment to implement the proposed mitigation or that the mitigation measures are just suggestions or recommendations?			
5.5	Are the Developer's reasons for choosing the proposed mitigation explained?			
5.6	Are responsibilities for implementation of mitigation including funding clearly defined?			
5.7	Where mitigation of significant adverse effects is not practicable or the developer has chosen not to propose any mitigation are the reasons for this clearly explained?			
5.8	Is it evident that the EIA Team and the Developer have considered the full range of possible approaches to mitigation including measures to reduce or avoid impacts by alternative strategies or locations, changes to the project design and layout, changes to methods and processes, "end of pipe" treatment, changes to implementation plans and management practices, measures to repair or remedy impacts and measures to compensate impacts?			
5.9	Are arrangements proposed to monitor and manage residual impacts?			
5.10	Are any negative effects of the proposed mitigation described?			
Other Questions on Mitigation				

SECTION 6 NON TECHNICAL SUMMARY				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
6.1	Does the Environmental information include a Non-Technical Summary?			
6.2	Does the Summary provide a concise but comprehensive description of the Project, its environment, the effects of the Project on the environment and the proposed mitigation?			
6.3	Does the Summary highlight any significant uncertainties about the Project and its environmental effects?			
6.4	Does the Summary explain the development consent process for the Project and the role of EIA in this process?			
6.5	Does the Summary provide an overview of the approach to the assessment?			
6.6	Is the Summary written in non-technical language, avoiding technical terms, detailed data and scientific discussion?			
6.7	Would it be comprehensible to a lay member of the public?			
Other Questions on Non Technical Summary				

SECTION 7 QUALITY OF PRESENTATION				
No.	**Review Question**	**Relevant?**	**Adequately Addressed?**	**What further information is needed?**
8.1	Is the Environmental Information available in one or more clearly defined documents?			
8.2	Is the document(s) logically organised and clearly structured so that the reader can locate information easily?			
8.3	Is there a table of contents at the beginning of the document(s)			
8.4	Is there a clear description of the process which has been followed?			
8.5	Is the presentation comprehensive but concise, avoiding irrelevant data and information?			
8.6	Does the presentation make effective use of tables, figures, maps, photographs and other graphics?			
8.7	Does the presentation make effective use of annexes or appendices to present detailed data not essential to understanding the main text?			
8.8	Are all analyses and conclusions adequately supported with data and evidence?			
8.9	Are all sources of data properly referenced?			
8.10	Is consistent terminology used throughout the document(s)?			
8.11	Does it read as a single document with cross referencing between sections used to help the reader navigate through the document(s)?			
8.12	Is the presentation demonstrably fair and as far as possible impartial and objective?			
Other Questions on Quality of Presentation				

OVERALL APPRAISAL OF THE EIS			
If the reviewer wishes to use the Review Checklist to make an overall appraisal of the quality of Environmental Information, this can be done using the table below.			
No.	**Review Topic**	**Grade**	**Comment**
1	CHARACTERISTICS OF THE PROJECT		
2	ALTERNATIVES CONSIDERED		
3	LOCATION OF THE PROJECT		
4	MITIGATION		
5	CHARACTERISTICS OF THE POTENTIAL IMPACTS		
6	PRESENTATIONAL ISSUES		
Overall Assessment:			
Comment:			