

5.6. Analysis of Alternatives

A number of options are proposed for the wastewater treatment, considering the large capacity of the treatment plant, the limited available area and the environmental requirements. The Consultant will analyze all these alternatives and develop an evaluation framework to assess each one. This is part of the FS. The evaluation framework will include a comprehensive set of indicators covering environmental, financial, and socioeconomic factors (area requirements-foot print, effluent quality and sludge production, capital cost, robustness, reliability and complexity of operation and the operation and maintenance cost). The framework will cover the construction and implementation phases with specific indicators of each phase. In addition, the time span of each scheme, from initiation to completion, will also be part of the assessment framework. Moreover, alternatives regarding the WWTP location will be assessed. The alternative processes and technologies are as follows:

1. Primary treatment Process:

- Conventional Primary Clarification
- Lamella Clarifiers
- Compact Chemically Enhanced Primary Treatment (CEPT), i.e. Dense Sludge Clarifiers

2. Secondary Treatment Process:

- Conventional Activated Sludge (CAS)
- Biological Aerated Filters (BAF)
- Moving Bed Biofilm Reactor
- Membrane Biological Reactors (MBR)
- High Rate Activated Sludge system (HRAS, A-B Process)

The four alternatives including the primary and secondary treatment processes are as follows:

- Alternative 1: Dense Sludge Primary Clarification and BAF for the secondary treatment
- Alternative 2: Conventional Primary Clarification, MBBR reactors and Dense Sludge Secondary Clarifiers for the secondary treatment
- Alternative 3: Dense Sludge Primary Clarification and MBR for the secondary treatment
- Alternative 4: Conventional Primary Clarification, and a two-stage secondary activated sludge system including aeration tanks and conventional clarifiers (stage A), MBBR tanks combined with Dense Sludge final clarifiers for the second stage (stage B).

3. Sludge Treatment Process:

- Sludge Thickening
- Sludge Anaerobic Digestion
- Thermal Hydrolysis
- Sludge dewatering
- Sludge Thermal Drying

The alternative sludge treatment schemes that could be implemented are as follows:

- Anaerobic Digestion and Dewatering
- Thermal Hydrolysis, Anaerobic Digestion and Dewatering
- Thermal Hydrolysis, Anaerobic Digestion, Dewatering and Thermal Drying

As for the sludge reuse alternatives the following will be assessed during the ESIA:

- Sludge use on Land (land application as soil conditioner)
- Landfill disposal
- Industrial usage

Alternatives regarding the use of treated wastewater effluent include:

- Reuse for irrigation
- Reuse for industrial usages
- Discharge into the sea

5.7. Environmental and Social Management Plan

An ESMP will be developed aiming to summarize all the significant impacts identified as well as the mitigation measures proposed during the different project phases. A monitoring plan will be part of the ESMP to ensure the mitigation measures has indeed succeeded in minimizing adverse impacts and to alert the wastewater operator of any unanticipated impacts that may arise. The plan will include a list of indicators to monitor and a schedule for monitoring them.

The Consultant will coordinate with the CDR and BMLWE to ensure that the personnel and costs for implementing the ESMP are feasible. The consultant will provide CDR with information of the exact requirement to successfully implement this plan.

6. STRUCTURE AND WORK PLAN FOR THE ESIA REPORT

Based on the above, the next steps for preparation of the ESIA are as follows:

- Conduct field sampling activities including water quality and ambient air quality analysis;
- Describe the marine biodiversity using different national studies conducted near the study area;
- Conduct a socioeconomic survey through key informant interviews;
- Conduct public consultation using the methods proposed in Section 5.2 (pending screening of the project from MOE and approval of the methods by MOE and EBRD);
- Update of project description based on the findings of the Technical Assessment;
- Analysis of social and environmental impacts of the project and proposal of mitigation measures;
- Analysis of project alternatives;
- Preparation of environmental and social environmental management plan;
- Update of Stakeholder Engagement Plan.

The submitted ESIA Study will have the following structure:

- Table of Contents
- Introduction
- Policies, Legal and Administrative Framework
- Analysis of Applicable Requirements
- Public Consultation
- Project Description
- Analysis of Reasonable Alternatives
- Baseline Conditions
- Assessment of Impacts
- Environmental and Social Management Plan
- Conclusion
- Annex (includes public meeting notes, additional data, reference documents)

Separate documents and plans:

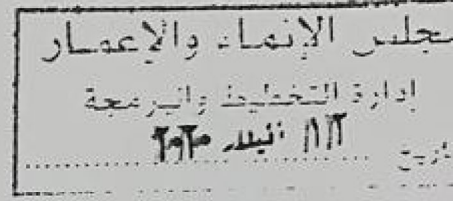
- Non-technical Summary
- Environmental and Social Management Plan(s)
- Stakeholder Engagement Plan (SEP)

ANNEX I: SCREENING APPLICATION SUBMITTED TO CDR

مجلس الإنماء والإعمار

١/١٣٠

بيروت - لبنان بيروت في ٢٠٢٠/٥/٦



جانب وزارة البيئة

٥٨

الموضوع: طلب إفادة عن تصنيف مشروع "إنشاء محطة التكرير الثانوية للمياه المبتذلة في الدورة - برج حمود في إطار مشروع الصرف الصحي للمنطقة الشمالية من بيروت الكبرى"

المرجع: - المرسوم رقم ٨٦٣٣ الصادر في ٧ آب ٢٠١٢
- كتاب الاستشاري الأجنبي Enviroplan s.a. المسجل لدى المجلس تحت الرقم ٢٨٨٧/م.ر. بتاريخ ١٠/٣/٢٠٢٠

بالإشارة إلى الموضوع والمرجع المبينين أعلاه،

في إطار التحضير لإمكانية تمويل المرحلة الثانية الثانوية من مشروع إنشاء محطة معالجة المياه المبتذلة في الدورة - برج حمود (المرحلة الأولى يجري تنفيذها حالياً وهي تعود للمعالجة التمهيدية) في إطار مشروع الصرف الصحي للمنطقة الشمالية من بيروت الكبرى، وذلك عبر البنك الأوروبي للتمير والبنك الأوروبي للإنشاء والتعمير،

وحيث ان البنك الأوروبي للإنشاء والتعمير قد قدم مساهمة عبر دراسة الجدوى الفنية والمالية للمرحلة الثانية للمشروع بالإضافة لدراسة تقييم الأثر البيئي والاجتماعي العائدة له وذلك من خلال الاستشاري الأجنبي Enviroplan s.a. وهذه الدراسة يمكن الاستعانة بها لاتخاذ القرار المناسب في حال تم الطلب من هذين المصرفين تمويل المشروع،

استناداً إلى المرسوم رقم ٨٦٣٣ الصادر في ٧ آب ٢٠١٢ المتعلق بـ "أصول تقييم الأثر البيئي"، لاسيما مادته الرابعة (٢) التي نصت على أن: "تتقدم الإدارة الرسمية من وزارة البيئة طلب إفادتها عن تصنيف مشروعها"، وذلك للتأكد من ضرورة لزوم إجراء دراسة تقييم أثر بيئي،

وعدم ربطها طلب إفادة عن تصنيف المشروع المذكور وفقاً للنموذج المبين في الملحق رقم ٤ من مرسوم المشار إليه أعلاه، وكما تقدم به الى المجلس الاستشاري Enviroplan s.a.

جى التفضل بالاطلاع وأخذ العلم وتزويدنا بإفادتك عن تصنيف المشروع.

رئيس مجلس الإنماء والإعمار



ANNEX II: STAKEHOLDER ENGAGEMENT PLAN