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1. INTRODUCTION

1.1 The Initiative: Jakarta Urgent Flood Mitigation Project

The Jakarta Urgent Flood Mitigation project (JUFMP) aims to reduce the risk of flooding to the city of Jakarta by rehabilitating a selection of the existing waterways and retention basins, restoring their capacity to carry the original design flows. The project will concentrate on a number of selected rivers and some of the larger drainage channels of Jakarta. The main activities within the project will be dredging of waterways and retention basins, rehabilitation of their banks, and transportation, processing (for example separation) and disposal of the dredging sludge.

The project should also include the development of feasible monitoring, management and maintenance plans to ensure that the discharge capacity, once increased, is maintained.

It is important to note that the project is not only technical in nature. For one, there are relevant social impacts to consider in project development and implementation. It is expected that the project will include resettlement of people that are currently living and working on waterway embankments, in the perimeters of the retention basins, and at proposed disposal sites. Secondly, the project is intended to include a capacity building component. Project activities will extend to support for the main government organisations involved to develop the co-operative arrangements, and the expertise and capacity needed to implement the project.

The project is put forward by three initiators, each responsible for different aspects within the projects scope of work:

- Directorate General of Human Settlements, Ministry of Public Works (DGCK – Cipta Karya);
- Directorate General of Water Resources, Ministry of Public Works (DGWR); and
- DKI Jakarta (the city's provincial government).

These proponents are co-operating with the World Bank in developing this project, as it will be considered for a loan to finance the majority of the implementation costs. The World Bank Jakarta office has prepared a "concept note" describing the project and its background. To date, this is the most comprehensive project description document available. In this concept note the project is renamed the Jakarta Emergency Dredging Initiative (JEDI)

1.2 Request for involvement of the Commission

The Ministry of Public Works and DKI Jakarta requested the Netherlands Commission for Environmental Assessment ("the Commission")[1] to provide advice on the Terms of Reference (ToR) for the Environmental Impact Assessment (EIA) report for this project, by letters dated March 3rd, 2008 (see Appendix 1). The request for advice was supported by the Worldbank office of Jakarta, with a letter of the same date.

The purpose of this advice prepared by the Commission is to advise the projects initiators, and the relevant EIA Commission (in this case the Amdal Commission of Jakarta Province) on the guidelines for the EIA study for the JEDI. The Amdal Commission of Jakarta sets the Terms of Reference for the EIA and is also responsible for the review of the EIA report

1.3 Justification of the approach

The EIA study and report will need to meet both the standards of the Indonesian Amdal (EIA) procedure and the World bank environmental and social safeguards[2]. Where relevant, this advice refers to the structure for an EIA ToR that the Amdal regulation prescribes, and which the Amdal Commission needs to adhere to.

Below, the process followed to develop this advice is described. It relates to II. SCOPE OF THE STUDY, 2.3. Scoping, a) Scoping Process, of the Amdal ToR format.

In order to prepare the requested advisory report, the Commission formed a working group of experts, representing the Commission, which comprises of the following disciplines: dredging, geo-chemistry, hydrology, and social impact assessment. The working group members of the Commission are listed in Appendix 2.

Early March 2008, the Commission met with a delegation from the Indonesian government to discuss the project in general terms and the nature of the advice on the ToR that the Commission could provide. Later that same month, another delegation visited the Netherlands. This time, a series of more detailed presentations on the project and the current conditions in Jakarta were given and a questions and answers session was held.

Subsequently, the working group visited Jakarta from 19-25 April 2008 (see Appendix 3, programme). The purpose of this visit was to collect project- and site specific information and discuss matters with several (government) authorities and representatives of civil society. More specifically, the visit was organised to:

- Assess project and site specific environmental and socio-economic issues to be taken into account;

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[1] The Netherlands Commission for Environmental Assessment is an independent advisory body, which has a statutory basis in Dutch legislation and was established in 1985. For more information see the Commission's website: www.eia.nl

[2] For the environmental and social safeguards of the WB see: www.worldbank.org/safeguards. For the standards for the AMDAL EIA procedure see: Regulation No. 8/2006 by the Indonesian Ministry for Environment.

- Consult with relevant authorities and other stakeholders involved in order to clarify the proposed project, and identify relevant alternatives and potential impacts;
- Review the available documentation, including several background reports that had already been prepared for related activities.

In this advisory report the Commission presents its findings. In each paragraph the Commission, if possible, refers to the information on the topic already available and gives its points of view on the adequacy of this information (see Appendix 5 for a list of all the documents that have been used by the Commission). The Commission also specifically formulates recommendations for additional information to be gathered in order to guarantee that all essential environmental and socio-economic information has been provided for sound and well balanced decision making. The Commission emphasizes that it does not provide its opinion on the feasibility or acceptability of the project itself; focus of the advice is on the quality of the information necessary to judge feasibility, acceptability and environmental permitting. This advisory report will be made publicly available on the website of the Commission (www.eia.nl) after final consultation with the key stakeholders.

Structure of this advisory report:
The main project activities that need to be addressed in the EIA study are:

- Resettlement of people, currently living on waterway embankments, in/on the perimeters of the retention basins or at proposed disposal sites;
- Dredging of channel and drain banks and retention basins (waduks);
- Rehabilitation of embankments and waduk edges;
- Processing of sludge, for example separation;
- Transport of sludge;
- Disposal of the sludge.

For each of these six activities this advice provides guidelines on the problems to be tackled, the objectives to be achieved, the development of feasible alternatives and identification and comparison of impacts for these alternatives.

2. PROBLEM ANALYSIS AND PROJECT OBJECTIVES

2.1 Problem analysis

In this subsection, and the next, the project's objectives are discussed. This corresponds to I. INTRODUCTION, 1.1. Background, 1.2. Objectives and Benefits, of the Amdal ToR format.

Jakarta's problem with flooding is long-standing, but seems to be increasing in severity. In recent years, regular floods have occurred, at serious social and economic costs. The causes of the flooding problem have been analysed in detail, and are described in the project concept note[3]. Causes include the

[3] World Bank, Jakarta Emergency Dredging Initiative (JEDI) Project concept Note, Annex 2: Overview of the Flood Control System of Jakarta.

rapid expansion of the city while water management measures lag behind, subsidence, climate change, increased sedimentation load due to land changes upstream, insufficient waste collection services in Jakarta city as well as lack of capacity at the key agencies and co-ordination between them. The multiple studies that have identified these causes have also made recommendations for addressing the problem. However, a comprehensive approach to deal with these causes at a more strategic level has not yet been agreed between the authorities in charge.

The JEDI project would not need to be delayed until a more strategic approach has been developed because it represent a more immediate effort to rehabilitate already existing waterways. The project is intended to deal with a subset of causes for the Jakarta flooding problem, namely the backlog in maintenance activities that has led to a lowering of the capacity of Jakarta's existing flood control system. The concept note states that additional projects will follow to further improve the floodways.

Recommendations:

The EIA should clearly delineate the contribution that the project will make to the overall flooding problem. The EIA should provide:

- A summary of the flooding problem and the underlying causes;
- An analysis of the concrete contribution that the JEDI project will make to alleviate flooding[4], including a justification for the priority dredging and rehabilitation locations that have been selected for this project[5].

2.2 Project objectives and scope of activities

The project objectives and the scope of activities for the project can be derived from the concept note, and from a series of presentations provided to the Commission by DKI and PU. The JEDI project's main objective is to address the more immediate dredging works that will restore the capacity of a number of priority flood ways, drains and retention. A second project objective is to build capacity within the Ministry of Public Works and DKI so that the restored water flow and storage capacities can be maintained. However, the descriptions in the concept note are rather general, and do not sufficiently explain the project ambitions or scope of activities.

Recommendations:

It is recommended that a more detailed description of project objectives and the scope of project activities is included in the final ToR for the EIA. The Commission notes that this demarcation of objectives and scope is primarily

[4] Flooding is defined as the overflowing or failing of the normal confines of a river, stream, lake, canal, sea or accumulation of water as a result of heavy precipitation by lacking or exceedance of the discharge capacity of drains, both affecting areas which are normally not submerged. A flood is a temporary condition of surface water (river, lake, sea), in which the water level and/or discharge exceed a certain value, thereby escaping from their normal confines. However, this does not necessarily result in flooding.

[5] The concept note lists source document for the selection of sites, specifically: Report WJEMP DKI 3-9, Drainage Management for Jakarta: Strategic Action Program Development, NEDECO, 2005.

the responsibility of the involved authorities and not necessarily a task for the EIA team.

The EIA report should be specific about the environmental and social ambitions for the project. This is necessary for the identification and formulation of alternatives and to furnish criteria for monitoring and evaluation. For example, if the disposal site(s) are intended to be allocated a beneficial use after disposal ends, there are different end uses that could be explored (residential, recreational, etc), each leading to specific requirements for capping and monitoring of the site. The ambitions should be translated into specific, and if possible quantified, objectives. The EIA will need to distinguish between short-term objectives for the immediate dredging and rehabilitation activities, as well as longer term objectives for maintenance of the waterways, and maintenance and use of the disposal sites.

Specifically the EIA should describe:

- The level of flood protection that the project aims to achieve. Will the waterways and retention basin be restored to original design capacity or will these capacities be increased? This has implications for the volume of material to be dredged.
- Timeframe of the activities. What is the timeframe for the immediate dredging activities, as well as for the longer term maintenance dredging programme that is to be considered in the EIA? This also determines the span of time that the disposal site(s) will need to continue to receive dredging sludge, which in turn determines the required storage capacity of the site(s).
- Environmental objectives, including objectives for separation and re-use of the different fractions in the dredging material, and for re-use of the disposal sites.
- Social objectives, including objectives to improve currently poor living and working conditions where project activities will take place.
- The objectives and scope of activities (and their locations) related to the rehabilitation of river embankments.
- The project concept note mentions two pilot projects: one for resettlement and one for dredging of micro drains. Are these considered an integral to the JEDI project? What are the intentions for incorporating lessons from these experiences into the JEDI approach? This will have implications for the phasing of project activities.

3. PROJECT SETTING

This chapter discusses the legal and institution context and the opportunities and constraints it presents to the project. It corresponds to I. INTRODUCTION, 1.1. Background, 1.3. Law and Regulations, of the Amdal ToR format.

3.1 Legislative and regulatory considerations and policies

The EIA report should list national laws, rules, regulations and policies governing the proposed activity and if relevant, international conventions and regulations that are relevant for this project. The aforementioned WorldBank environmental and social safeguards and standards should be part of this listing. For each of these policies the EIA report should describe the preconditions these may put on the project.

A clear overview is needed of the relevant environmental and social policies and standards the project needs to meet, and the thresholds the potential effects cannot exceed. Including:

- Dredging and processing: The environmental and social requirements and conditions with respect to dredging, including standards that apply for activities that cause disturbance in an urban environment and requirements for occupational health of workers involved.
- Transport: Requirements and conditions that control the transport of sludge and waste (such as restrictions for night and daytime transport by road, safety requirement, etc);
- Disposal: Limitations for locating sludge disposal sites when considering protected archeological sites, cultural heritage values, groundwater-recharge zones etc. Also, requirements and conditions with respect to storage the sludge and (separated) waste, including regulation on disposal of hazardous waste and standard that might apply to surplus water to be released or pumped from processing or disposal locations.
- Resettlement: Relevant requirements and conditions for resettlement.

A specific point of attention will be the compliance between Indonesian and World Bank standards. Both sets of standards should be described and compared for each of the six identified main activities. In the case of differences between the two sets it should be justified which one prevails.

The EIA report should discuss how the proposed project activities can meet with the relevant legislative and regulatory considerations and policies. Also, it should be discussed which opportunities the project opens to contribute to current policies to be implemented in other areas. For example: if the quality is sufficient, dredged material might be used to raise the level of locations vulnerable to flooding, or it can be used to provide filling material for planned reclamations. Also, the project may contribute to water quality improvement goals, as well as improving living and working conditions by relocating people to better environments. It is recommended that the EIA identify such opportunities to help implement such policies and explain their relevance to the project.

3.2 Institutional and procedural EIA framework

The EIA report should give a clear description of the institutional framework in Jakarta, including competent (licensing) authorities directly involved in the approval and execution of the project and in the control of the executed works.

In particular the EIA should explain the Indonesian Amdal procedure that will need to be completed before the necessary project approvals can be granted. When the Commission visited Jakarta, the Amdal procedure had not officially started yet. However, it had been agreed that an EIA would be required. In the first stage of the Amdal process, the project will need to be announced, an Amdal commission appointed to oversee the process, and public participation undertaken. This phase will result in the establishment, by the Amdal commission, of the Terms of Reference for the EIA report, and the associated Environmental Monitoring and Management Plans.

Concerning the consultation process for the Amdal, the Commission recommends:

- The EIA team as well as the DKI and PU officers identify the (informal) leaders of the affected people and involve these in organising the consultation. Informal site visits will help to develop a good rapport with the leader of the community prior to the public consultation process, and is strongly suggested;
- Arrange for the public consultation meetings to be held at locations which are easily accessible to the participants;
- Conduct public consultation in the evenings, as most of the participant will be working during the day;
- Engage experienced facilitators to manage public consultation, who are already familiar with the community.

3.3 Public and agency involvement

The EIA report should contain an inventory and description of all stakeholders involved in or affected by the project. It should also describe how their opinions and interests influenced the contents of the EIA report. The views of at least the following stakeholders should be taken into account:

- Local inhabitants, especially the flood affected and those who may be affected by or benefit form the project, and their organisations;
- National, provincial and regional authorities, including those that are partly privatised, such as the Jaya Ancol;
- Regional and national organisations involved in projects or other activities in the project area, such as NGO's.

The EIA should indicate:

- in which way the stakeholders will become involved in the project;
- how the mandates for the different aspects of the project are divided over the different authorities (larger rivers, smaller canals, disposal sites, resettlement), and particularly how the different authorities will co-operate.

4. DESCRIPTION OF THE PROJECT AND ALTERNATIVES

This chapter discusses the project activities and the alternatives to be explored in the EIA. It corresponds to II. SCOPE OF THE STUDY, 2.1. Description of the Proposed Project (including alternatives), of the Amdal ToR format.

4.1 General

The EIA report should contain, or be able to refer to, a clear and extensive description of the project activities that have been agreed between the three proponents. Below, the detailed information that is required for each of the project's activities is listed.

4.2 Project activities, alternatives and mitigating measures

For each of the six main activities alternative approaches can be considered. Several alternative approaches that prevent or mitigate social or environmental impacts are identified in this section. Additional alternatives to explore should be added on the basis of consultation.

However, the exploration of alternatives for dredging, processing and disposal is currently constrained by the available information about sedimentation quality and composition. For a more targeted identification and analysis of options it is essential that the following information be collected first:

- Volume estimations are given in the project concept note, but the basis for these estimations is not sufficiently clear. Given that information on the original design profile of the canals and the drains is currently hard to obtain, to what degree are the estimations based on the original profiles? To arrive at a more precise estimation of the volume of the material to be dredged, information on the actual current water – sediment interface needs to be collected, and set against an (estimated) description of the originally designed profiles. A bathymetric survey of the areas to be dredged should therefore be undertaken to establish the canal's bed level in metres above or below Chart Datum (reference level). The calculation of the volume to be dredged should preferably be undertaken with the use of a GIS (Geographical Information System), if possible based on an existing hydrological or hydraulic model.
- Moreover, for some waterways new profiles have been proposed by DKI during the site visits (straight profile with vertical sheet piling instead of V-shaped with slopes of 1:1 or 1:2). Such profile designs are also described in one of the previous flood management proposal documents[6]. Additional dredging will be needed to realise these profiles. Where these new profiles are considered, the volume of material to be dredged needs to be adjusted upwards.
- Sediment quality is an important factor in determining the possibilities for re-use and disposal. If the dredging material is contaminated, then sediment disposal can only take place in isolated and controlled disposal sites. These sites will require extensive measures, such as capping of the site, and construction of dikes, to prevent pollution of the surrounding environment. If the dredging material is clean, there are more options for disposal and re-use. At the moment, sediment quality data is too limited[7]: it does not cover the range of expected contaminants nor is it representative for all waterways to be dredged. The EIA will need to contain a description and analysis of the (chemical) sediment quality and the local variations in this quality, for the sections of the drainage system to be dredged. Because a wide variety of potentially contaminating activities is present in the project area, including point sources (e.g. industries) as well as non-point-sources (e.g. traffic), it can be expected that the sediment quality will be very heterogeneous. A sound investigation of sedi-

[6] Special assistance for Project Implementation (SAPI) for Ciliwung-Cisadane river flood control Project (I), IP-496, July 2004.

[7] Some measurements on sediment quality are present: Witteveen+Bos. Project plan dredging of river outlets in Jabodetabek area, June 2003; Ministry of Settlement and Regional Infrastructure, Directorate General of Urban and Rural development, Western Java Environmental Management Project, PUSAT 3-10, April 2005 .

ment quality should include heavy metals, PAH (Polycyclic Aromatic Hydrocarbons) and mineral oil, complemented with organochlorine compounds. The latter can be expected in the sediment because of the agricultural activities in upstream areas. Initially, approximately 10-25% of all samples may be investigated for these compounds. Dependent on the results, more samples can be analysed for organochlorine pesticides in a following phase. In Appendix 7 a possible approach to the sediment quality analysis is suggested.

- The amount of waste (plastics, wood, iron, glass and so on) present in the sediment is another important factor which determines the dredging approach, transport and disposal options. For example, the amount and nature of the waste determines the equipment that can be used for dredging. It also affects disposal options. The amount of waste will influence the sedimentation settlement processes in a disposal site, as well as leaching of contaminants. For this reason, it is important to investigate the occurrence of waste in the sediments, specifically the nature, amount and spatial distribution of this waste. It will be necessary to dig test trenches and/or undertake pilot dredging to get this information.

The information on quality and composition of the material to be dredged is essential for several reasons. Firstly, the content of waste in the sediment will determine which dredging techniques are best suited. For example, hydraulically operated dredgers that raise the dredged material from its in-situ state, and transport it in suspension through a pipe system that is connected to a centrifugal pump, can be clogged by waste. Mechanical equipment may be more effective in areas where the amount of solid waste is high, but will have higher access and space requirements. Secondly, the composition and quality of the material governs the possibilities for beneficial re-use. Depending on the nature and amount, it could be feasible to take recyclable waste fractions out for re-use, conserving natural resources and reducing the disposal capacity needed. This would also make the sediment fraction more suitable for use as fill in land reclamations. Finally, a higher level of contamination of the sediment will dictate more stringent requirements for containment of the sediment in the disposal sites, as well as for monitoring of the site(s).

4.2.1 Resettlement of affected people

The concept note makes clear that resettlement of affected people is expected in order to realise the project. The EIA will need to describe different resettlement strategies that could be applied within the project, as well as describing the possibilities for undertaking the project without resettlement.

In the last four decades, the Provincial Government of DKI has carried out two different types of related projects: the Kampong Improvement Project (1969 – 1999) and the Apartment Building Project (2000 – present). The first shows better results than the latter as it increases the level of community participation, requires no land acquisitions, targets the poor more directly, requires lower government expenditure, and results in better living conditions.[8] In fact, a study conducted by the Housing Agency of the Provincial

[8] Darunndono (2007) Peran Modal Sosial dalam Perbaikan Kampung, Studi Kasus: Proyek MH Thamrin di Jakarta. The Role of Social Capital in Kampong Improvement, a Case Study of MH Thamrin Kampung Improvement Project in Jakarta. Dissertation. University of Indonesia, Jakarta.

Government of DKI (2001) concluded that the Apartment Building Project is not suitable for the poor. In 2002, another study showed that significant changes in ownership occur within a few years after the initiation of the apartment project: by then 80% of the apartment rooms were in the hands of the middle class[9].

Explore in the EIA the extent to which it is possible to relocate squatters following the Kampong improvement approach mentioned above. Also, the EIA should look at the suitability of resettlement approaches that seek to relocate smaller numbers of people to locations within the neighbourhood that they already inhabit. In general, the resettlement strategies should take into account the socio-economic characteristic of the affected people as well as the current social capital (social networks, etc) of the community.

The resettlement strategies can include different options for phasing the resettlement. Dredging activities can start in those areas where less social impacts are expected, such as Cideng Thamrin Drains, Cengkareng Floodways, West Banjir Canal and all the DKI Drains. For the sites where resettlement and/or livelihood disruption are relevant, a longer preparation time is needed. On the basis of existing experience in Indonesia, the Commission estimates that the resettlement process for each location will take at least a year from initiation of public consultation.

4.2.2 Dredging; selection of dredging method, preparation, mobilisation and implementation

The Commission concludes that the range of dredging methods that would be effective in the Jakarta context is limited due to the restricted access to the waterways and the presence of obstacles such as low bridges. These circumstances favour the use of smaller equipment as well as equipment that can operate from the water rather than from the waters edge. Beyond this observation, the Commission at this point does not make any further technical recommendations concerning alternative dredging methods or equipment to be considered, since the feasible approaches will depend on the composition of the material to be dredged. As yet, this composition is unknown.

Aside from the choice of equipment, the dredging approach can vary on other aspects. The EIA report should describe:

- Options for establishing temporary or permanent access points for the dredging and transportation equipment. Permanent access points have the advantage of facilitating future maintenance dredging.
- Different operational schedules that can be considered to minimise the impacts on the urban environment (full continuous, nighttime or daylight schedules). Nightime transport of dredged material, for example, could lead to less traffic disruption.
- The range of depths and volumes that can be considered for dredging the waduks. There is more capacity to be gained from widening rather than from deepening the basins. Widening may have additional benefits as well: the expanded margins of the waduks can be used as

[9] Ibid (2007: 7).

buffer zones that deliver ecosystem services such as recreation or cityscape improvement. The EIA should explore this option.

- In some of the dredging sites dwellings on poles have been constructed (for example the Waduk Pluit). Dredging close to such clusters of dwellings may affect their stability, and thus cause collapse. For each of the areas where this is relevant, the EIA should consider the possibility of dredging around these dwellings without affecting their stability as well as the alternative of removing the housing areas altogether and resettling the inhabitants.

4.2.3 Processing; separation of waste, sediment and water

The EIA report should describe:

- Options for separating and processing (such as cleaning and compacting) the different fractions in the dredged material (sedimentation, waste and water), specifically the options for taking out fractions of waste or sediment that can be re-used.
- Possibilities for on-site separation of sediment and waste, as well as the options for separation after transport. Options should include the establishment of permanent stations for separation and/or processing and/or transfer close to the dredging sites, which would also serve maintenance activities in the long run, as well as more temporary set-ups.
- Wherever dredged material is to be processed, the EIA should explore the possibility to include a settlement pond for the water fraction in the dredged material. Through this, the quality of this water can be greatly improved, because it allows the water to 'rest' in settling basins prior to discharge. Most of the contaminants in the water are attached to suspended solid particles, which can be separated from the remainder of the water after settlement. The same applies to the surplus water that is released from longer term disposal sites.

4.2.4 Transport

The EIA report should describe:

- The different options for transportation of the dredged material. The EIA should describe both transportation means (vehicle/vessel) and transport modes (road, water or train). Transport by train (there is an existing connection with the Ancol area) might not be feasible, but should be investigated in the EIA because of the potential to avoid substantial impacts on the urban environment.
- The availability of loading/unloading areas needs to be investigated.
- The EIA should also explain how distance of transport could be optimised for different dredging locations, dredging factions and disposal sites.
- The EIA should indicate how the different options for treatment of the dredged material affect transport requirements.

4.2.5 Disposal

On the basis of meetings with proponents, the Commission observes that there is no full consensus on the list of alternative disposal sites under consideration. Furthermore, a new potential disposal site (Ancol) was proposed during one of the site visits. This site is not mentioned in the concept note. Consequently, it is not clear which disposal sites the project initiators want to

see considered in the EIA. Going by a recent presentation by DKI, five disposal sites have been proposed (see the map in the Annex), two of which are situated on land, three in the marine environment (including the Ancol site). The Commission notes that all the sites proposed concern contained disposal, open water disposal of dredged material is currently not considered.

The EIA report should describe:

- A final list of alternative sites that meet basic requirements and conditions for disposal, the surface area available at each site, the volume and quality of sediment to be disposed of at each site and the accessibility of the site. The EIA should explore the advantage of dedicating separate disposal sites to different sediment pollution levels, thereby reserving the more costly containment measures for the most heavily contaminated sediment.
- Methods of disposal of the dredged material into the disposal site (quay, diffuser).
- Options for the design of the disposal sites, including the construction of dikes (height and construction material), piles (length, strength) and isolation layer. Capping techniques – as used in landfills – may be necessary where re-use of the site is intended.
- From an environmental point of view a thicker disposal layer is favourable because the permeability is much less. However, such a layer will require measures (such as constructing bunds) to keep it in place. This possibility should be explored in the EIA.
- Options for dealing with surplus water (treatment (including settlement) discharge, treatment) on the disposal site.
- Possibilities for capture and beneficial use of any methane gas released from the disposal site(s).

4.2.6 Rehabilitation of embankments

Under this header, the concept note refers to "some embankment stretches that need rehabilitation to restore their crest levels to the original design levels". This description provides too limited a base to suggest alternatives or impact mitigation measures. Alternatives should be explored in the EIA based on the more detailed project description that has been suggested under 2.1 of this advice.

5. DESCRIPTION OF THE CURRENT NATURAL AND SOCIO-ECONOMIC ENVIRONMENT AND HOW IT WOULD DEVELOP WITHOUT THE PROJECT

This chapter discusses the baseline information that will serve as a reference for the assessment of the impacts. It corresponds to II. SCOPE OF THE STUDY, 2.2. Description of the Environmental Baseline, of the Amdal ToR format.

5.1 General

The EIA report should contain a description of the current situation of the natural and socio-economic environment and its development, were this project not undertaken (the autonomous development or reference situation). This serves as a basis for comparison of the impacts of various alternatives. The description of the current situation also serves as a baseline against

which to compare the results of project implementation, which will in turn inform dredging maintenance decisions.

Demarcation of the project and study area
The project area for the EIA is the area which the project activities take place. The study area is the area where significant impacts could manifest, this area will extend beyond the direct areas of activity, and differ depending on the impact that is studied. For example, disruption of traffic at a dredging site can ripple outward from the project activity along the road network to congest traffic elsewhere. The EIA should indicate both project and study area for each category of impact.

5.2 Natural environment

5.2.1 Biophysical environment

Geomorphology:
Disposal sites:

- The EIA should describe the current geomorphologic conditions at the proposed disposal sites, including a soil analysis. Particularly, the degree of clay in the soil needs to be studied. The presence of clay can favour land disposal, because clay generally seals the sludge off from the groundwater beneath. The clay content also influences the rate of consolidation of the soil layers below a disposal site.
- Similarly the EIA should give an analysis of the seabed at the off or near shore locations where disposal is proposed. The Amdal report prepared for the Ancol reclamation might provide useful information on this aspect.

Hydrology:
Dredging, rehabilitation and disposal sites:

- Previous studies have contributed to a comprehensive understanding of the capacity of the waterways and waduks, and of the water levels reached under different circumstances[10]. The available information should be sufficient to describe in the EIA the existing water quantity situation and its autonomous development. Include here the variability in water quantity expected due to climate change.
- With regard to the water quality: there is little information available at present, and additional measurements are likely to be needed. For each of the dredging and disposal sites parameters of dissolved oxygen (DO), biological oxygen demand (BOD), heavy metals and organic pollutants need to be measured for the surface water and set out in the EIA.

Disposal sites:

- The above parameters need to be measured for the shallow, and where applicable, deep groundwater at the proposed disposal sites.

[10] Report DKI 3-10c, basic design, SAPI team for JBIP, 2004, and the flood mapping and analysis reports of the Netherlands Water Partnership and DKI and PU Flood Initiative project, 2007.

5.2.2 Ecosystem services

The majority of of the proposed dredging sites are urban areas. However, at the waduks the project might have an impact on the quality of existing ecosystem services. These include: fisheries, water supply (for irrigation or other uses), recreation, and city/landscape enhancement. Therefore, the ecosystem services at or near the retention basins and the disposal sites should be identified and described in the EIA.

In addition, the EIA should identify and describe relevant ecosystems and their services near to the disposal sites or waterway outlets, as these could be impacted by release of contaminated water from processing or disposal. This will include the mangrove area close to the Kali Adem disposal site, already mentioned in the concept note, as well as the mangrove area at the outlet of the Angke river.

5.3 Human environment

5.3.1 Urban environment

The urban environment that will be affected by this project is currently characterised by a high level of disturbance and traffic congestion. Consequently, some of the project's potential negative impacts may be negligible when compared against the existing situation. To determine if this is the case, the existing situation needs to be described in the EIA.

Traffic
Most of the waterways are located near, or adjacent to, Jakarta roads with heavy traffic. The EIA should describe the current traffic situation in general terms along those routes that could possibly be used for sludge transportation. The traffic situation, including safety, at locations that will be used to access the waterways or waduks for dredging activities, needs to be described in more detail.

Disturbance
The EIA should describe the current conditions concerning disturbance in the at the dredging, rehabilitation and disposal sites: these include noise, odour, vibration and dust.

5.3.2 Socio-economic conditions

All riverbanks, canals and reservoirs are state property. However, many of these areas are used by local people for the purpose of housing and/or small-scale agriculture. These inhabitants have been utilising these areas for years. They are characterized by employment in the informal sector and a low income level[11]. Their communities tend to be close knit. A range of reciprocal and intimate relations are commonly found amongst the inhabitants of slum areas, particularly when compared to inhabitants of middle class housing and

[11] Dinas Pekerjaan Umum (2002) *Environmental Impact Statement for Proposed Dumping Site and Site Management for Dredging Materials of River, Canal and Reservoir of Jakarta Province.*

upper class real estate[12]. Such communities generally have a low level of trust for government initiatives and are quickly mobilised into protests and other types of resistance. The EIA needs to carefully analyse the existing socio-economic setting in order to develop an effective approach for consultation and resettlement, and to manage the impacts in the areas where there will not be resettlement.

The socio-economic situation needs to be described for those project locations where resettlement is likely to be needed, where livelihoods will be affected, or where access to resources is impacted. As identified by the concept note these include the Kamal, and the Cakung drain and the lower Angke, the latter will require (temporary) removal of informal ferry wharfs. The Commission expects that resettlement and livelihood disruption is also relevant for the Sunter Floodway, as well as the waduks Pluit and East Sunter. Concerning the proposed disposal sites the Commission notes that at least for the Taman BMW, Muarai Kali Adem and West Banjir Canal Estuarine the socio-economic conditions need to be described in the EIA. The final list of disposal sites will need to be screened to see if additional sites need to be added to this list. On the basis of consultation the list could also be further refined.

The EIA should describe the socio-economic conditions at two levels: at the level of the Kelurahan (the smallest administrative until), and at the level of the directly-impacted areas. The directly-impacted area refers to those strips of land located directly alongside (and sometimes in) the waterways and waduks, where people currently live and work, as well as the relevant disposal sites in their entirety. The information needed for the description at the Kelurahan level can be derived from secondary data available (Local Statistic Bureau), whereas the description of the directly-impacted area should be derived from primary data. The EIA report should specifically address the following:

<u>Demography:</u>

- At the level of *Kelurahan* of the project area:
    - Total population and households;
    - Population structure, gender ratio, density, growth;
    - Educational level, literacy;
    - Labour force;
    - Migration patterns.
- For the directly -impacted area:
    - Number of population and households;
    - Educational level, literacy;
    - Migration patterns (including duration of establishment of communities).

<u>Economic conditions:</u>

- At the level of *Kelurahan* of the project area:
    - Employment by education level and occupation classification.
- Directly impacted-area:

[12] Darunndono (2007) Peran Modal Sosial dalam Perbaikan Kampung, Studi Kasus: Proyek MH Thamrin di Jakarta. *The Role of Social Capital in Kampong Improvement, a Case Study of MH Thamrin Kampung Improvement Project in Jakarta.* Dissertation. University of Indonesia, Jakarta.

- Occupation or economic activities of all member of the household;
- Livelihood strategy (which may include multiple occupations)[13];
- Access, use and control of the resources along waterways and disposal area;
- (Informal) land tenure system[14].

Social conditions (including health)

- At the level of *Kelurahan* of the project area:
  - Housing conditions (type of building, type of dwelling unit, ownership status of dwelling unit);
  - Quality and accessibility of services (particularly access to fresh water supply and social services such as health service);
  - Identification of sensitive structures of locations of cultural, religious or architectural significance, as well as schools, hospitals, etc;.
- Directly-impacted area:
  - Housing conditions (type of building, type of dwelling unit, ownership status of dwelling unit);
  - Services quality and accessibility (particularly access to fresh water supply and social services like health);
  - Social institution of the inhabitants, including women's institutions[15];
  - Type of diseases prevalent, particularly the occurrence of waterborne diseases (diarrhoea, dengue, malaria, etc)[16];
  - Social relations and networks among impacted people, including leadership, and frequency, intensity and type of contacts amongst people;
  - Degree of resistance to, or support for, the project.

6. IMPACTS

This chapter identifies the impacts to be analysed in the EIA, where relevant it indicates the method by which the impact assessment should be undertaken. It corresponds to II. SCOPE OF THE STUDY, 2.3. Scoping, b) Results of Scoping Process, Potential Impact and Scope of the Study Area, as well as III. METHOD OF EIA STUDY, of the Amdal ToR format.

6.1 General

It is stressed that the potential impacts should be described per alternative considered and should cover the complete significantly affected area (study area) for each impact. Negative as well as positive impacts (e.g. better living

[13] Often people will have more than one jobs or occupation to earn adequate income. For example, an elementary school teacher might work as a rental-bike operator after school hours.

[14] Although the land is in state hands, land access and use will be managed informally by a complex tenure system.

[15] - Within poor communities various social institutions are created that protect people from falling into worsened conditions. Examples include "arisan" and "jimpitan" institutions. "Arisan" is a regular social gathering mostly among woman whose members contribute to, and take turns at, winning an aggregate sum of money. "Jimpitan" is community emergency fund: every single household donates half a glass of rice weekly; the collected rice is used for an emergency situation.

[16] - Particularly for the proposed Muara Kali Adem disposal site the project may potentially increase resident exposure to waterborne diseases.

conditions after resettlement or increased level of protection against flooding) have to be described. Also impacts of the project activities associated with immediate dredging and rehabilitation, as well as those resulting from longer term maintenance dredging and disposal of material.

6.2 Natural environment

6.2.1 Geomorphology

Disposal: The EIA should describe the impacts on the geomorphology, including the soil, as a result of disposal site construction as well as the of the disposal itself. Where excavation of the sea bed could take place, aspects of side slope stability and impact on sediment movement due to currents have to be described.

6.2.2 Hydrology

The EIA should describe:

- Disposal: The potential impacts on both ground and surface water quality as a result of exchange between polluted sludge (water) and the surrounding waterbodies. For off- or near-shore locations the impact on tidal current should be analysed.
- Processing and disposal locations: The long term and cumulative impact from continued discharge of the excess water from (temporary) storage locations, as well as from permanent disposal sites.

6.2.3 Ecosystem services

The EIA should describe:

- Processing and disposal: The potential effects of discharge and leachate of pollutants from processing and disposal on the ecosystem services identified.
- Dredging and rehabilitation: The potential impact on ecosystem services as a result of dredging and restructuring of the waduk edges.

The change of ecosystem services due to the project implementation can be described qualitatively.

6.3 Impacts on the human environment

6.3.1 Impacts on the urban environment

<u>Traffic</u>
The EIA should describe the effect on traffic from the project activities, including traffic disruption and impact on traffic safety.

<u>Disturbance</u>
The EIA should describe any significant disturbance in the area around the dredging and rehabilitation works, as well around the disposal sites, during preparation and execution of the project. The relevant effects may include: noise, smell, vibration, and dust generation. The EIA should indicate where these impacts are expected to exceed the existing conditions to such a degree that mitigation measures are needed.

6.3.2 Impacts on the socio-economic environment

The EIA-report should describe for all the relevant dredging, processing, disposal and resettlement activities:

- Changes in vulnerability to flooding;
- Impact on housing conditions;
- Changes in access to services;
- Disruption of livelihoods;
- Changes in access to, use and control of resource, including land resources;
- Disruption to the social institutions, relations and networks;
- Potential change in health conditions as a result of increased (temporary) exposure to waterborne pollutants and diseases.

The EIA should describe the magnitude and duration of each impact, as well as who will be affected (age group, gender, class or livelihood). The EIA should include the impact on current inhabitants in areas or communities to which people will be resettled.

In identifying and evaluating the social impacts, ordinal scale analysis is not suitable (i.e. considering the magnitude of each impact to arrive at a numeric score and subsequently adding all of the positive and negative impacts to arrive at one single number[17]). This approach obscures appropriate valuation of impacts by the EIA experts, and does not make the magnitude of impact adequately visible for consultation. A qualitative approach is much more suitable for this, and thus preferable.

6.4 Project related risks

The concept note does not mention risks associated with project implementation. Specific risks to be taken into account in the EIA are:

- Pollution of the physical environment as a result of accidental sludge release (eg. spills from transport);
- Risks to health and safety of workers and local population as a result of accidents (including spills) or poor working conditions;
- Possibility of encountering old explosive material that has been buried in the seabed at the off-shore disposal sites;
- Possible risks from methane eruptions from the disposal sites;
- Risks of collapse of housing, embankment and bridges as a result of the project activities.

The EIA should describe measures to minimise risks, as well the requirements for any contingency plan in the event of accidents and calamities.

[17] See for example: The Environmental Impact Statement for Proposed Dumping Site and Site Management for Dredging Materials of River, Canal and Reservoir of Jakarta Province (Dinas Pekerjaan Umum 2002).

7. COMPARISON OF IMPLEMENTATION ALTERNATIVES

Environmental and socio-economic impacts of alternatives should be compared, leading to at least the preferred alternative of the proponent and an alternative that will contribute most to sustainability (i.e. a balanced improvement of both economic, social and environmental conditions, also in the long term). Alternatives should be compared on their accordance with the standards and conditions identified set by the project's context (see section 3.1), as well as their contribution to the project's objectives. The comparison should yield the preferred alternative for implementation. For comparison, selection and valuation of alternatives discriminating economic, technical, ecological and social criteria have to be identified.

Comparison of alternatives for dredging and processing of the material

There are different combinations possible of dredging methods, operational planning, on- or off-site separation and processing, transport and disposal in suitable disposal location. The EIA should present a range of combinations that optimise one or more of the aspects below for different sites:

- Transportation distance and mode;
- Maximal separation and re-use of the waste and sediment fractions in the dredging material;
- Space requirement on- and off-site;
- Disturbance caused in the urban environment;
- Energy requirements;
- Benefits for longer-term maintenance dredging activities. Specifically, permanent access points for equipment and processing stations will ease maintenance dredging in the future.

The purpose of doing this would be to identify combined approaches that are maximally optimised for the specific conditions at different dredging and/or disposal locations. For example, maximising on-site separation where space is available and disturbance is not an issue or minimizing transport away from sites where traffic disruption is a likely problem.

Comparison of the potential disposal sites

For the impact analysis and comparison of the potential disposal sites, a two staged process is proposed: working first with a long-list of potential sites, and then undertaking further analysis on a reduced short-list of locations. In the first stage of the description of the possible impacts should facilitate a comparison of the different locations.

The following potential impacts should be compared, for each disposal site on the long list:

- Number of people affected;
- Impacts on ground and surface water quality;
- Impacts on ecosystem services;
- Impacts on soil;
- Impacts on the tidal currents in Jakarta bay (only applicable for the offshore locations);
- Subsidence and gas formation to be expected after construction and during exploitation. In case of storage of polluted sludge, risk of failure of protection provisions.

- Impacts on urban environment (traffic disruption and safety, noise, odour, vibration and dust).

In addition to the impacts, the following factors should also be taken into account when selecting potential disposal sites for further analysis: the area available (volume that can be accommodated at the site) and the average distance from the dredging locations for which the disposal site will be used. Based on the first comparison, the number of disposal sites under consideration can then be narrowed down.

In the second stage some additional analysis for the selected site(s) needs to be undertaken, specifically:

- What amount of contaminants (the flux, expressed as mg.m-2.year-1) could potentially disperse from the disposal site to the surrounding soil and groundwater?
- What concentrations in levels of contaminants (heavy metals, organic pollutants as well as nutrients) are expected to be contained in the surplus water which will be discharged to the surrounding surface water (which may either be fresh or seawater)? What impact would these discharges have on the receiving water body (increase of concentrations in terms of percentage)?

Both impacts need to be calculated in order to compare them to (inter)national standards. If the contaminant flux and contaminant concentrations exceed the applicable standards, the design of the site will need to incorporate measures to avoid or reduce this pollution. Site design should meet good practice (inter)national standards.

8. GAPS IN INFORMATION AND KNOWLEDGE

Not all the information needed for the EIA may be attainable, for example, the original design profiles of the waterways may have been lost over time. Where this is the case, the EIA should clearly state that there is information or knowledge lacking, explain what assumptions have been made in order to progress with analysis, and what uncertainty remains. Apply a sensitivity analysis to the uncertain impact predictions to check their robustness. This analysis may be qualitative or quantitative; for each impact prediction the sensitivity analysis should match the method used to predict the impact under consideration.

9. ENVIRONMENTAL MANAGEMENT PLANS

The Indonesian Amdal regulation requires both an Environmental Management Plan and Environmental Monitoring Plan. The two are closely related: the Environmental Management Plan outlines how the environmental and social impacts will be controlled through management measures, and the Monitoring Plan provides the information base on which management decisions can be made.

The Environmental Management plan should outline the measures needed during project implementation to avoid or minimise the environmental and social impacts identified in the EIA. It needs to cover the full range of project activities (resettlement, embankment rehabilitation, dredging, processing,

transport and disposal), both in the short term as well as long term maintenance dredging and disposal site management. The Environmental Management Plan should list ongoing operational measures, additional measures that will be taken if agreed trigger values are exceeded, and contingency measures (for the latter see section 6.4 Project related risks).

On the basis of the impacts and mitigation measures identified in the EIA, the list of relevant measures for the management plan should be determined.

The Management Plan should indicate the institutions responsible for the implementation of the plan and the way implementation is funded. It should indicate if adequate capacity is available at the institutions indicated. If capacity is insufficient, the plan should indicate where and how capacity will need to be strengthened.

Given the time limitations, the Commission has not assessed the capacity needs for effective environmental management and monitoring, and does not make specific recommendations for capacity building. At the EIA review stage, the feasibility of the proposed monitoring and maintenance activities in the Environmental and Monitoring Plans should be evaluated.

10. MONITORING AND EVALUATION

In the EIA report an environmental monitoring plan should be presented, for both the immediate dredging phase of the project and for longer term monitoring of maintenance dredging and the disposal. The effects of the project will need to be monitored for two reasons. Firstly, the monitoring outcomes can continually be compared against the predicted impact levels, in order to assess whether the potential negative effects of the project have been adequately avoided or reduced. Where necessary remedial environmental management measures can then be taken. Secondly, monitoring data can be used to expand the existing environmental quality monitoring programmes undertaken by DKI and PU, providing a more solid basis for future decisions on maintenance dredging.

The monitoring plan should include monitoring of at least:

- Monitoring of the quality of the excess water discharged from processing and disposal sites. The most important aspect to monitor is the amount of suspended solid particles in the water (TSS: total suspended solids).
- Water quality downstream of the discharge locations of the surplus water from the disposal, monitoring for indicators BO, BOD, heavy metals and organic pollutants.
- Groundwater quality in the surroundings of the disposal site(s) (by means of monitoring wells at relevant depths).
- Sedimentation flow and settlement patterns. The bathymetric survey required for the EIA will provide relevant starting information. It should be followed by an annual bathymetric survey, carried out lengthwise along the Talweg[18] for a selection of Jakarta's main drain-

[18] The line of maximum depth in a waterway

age canals. Monitoring and studying the drainage system's behaviour will provide a better information basis for maintenance dredging decisions, which should be more frequent there where sedimentation build up occurs faster.

- The urban environment aspects of the surrounding of the disposal site(s) (traffic, noise, odour, dust and vibration).
- Monitoring of socio-economic conditions, including the presence and fluctuation of project related health problems.

The Monitoring Plan should include agreed trigger values. If the monitoring results show that these trigger values (for example a concentration level of a pollutant in the surface water or groundwater) are exceeded this should lead to additional measures to be carried out, as agreed between the proponents.

The Monitoring Plan should include a description of where, how and when (duration and frequency) the monitoring should be conducted. It should also give instructions on how information is recorded and shared between relevant organisations. As with the Environmental Management Plan, the monitoring plan should also indicate the institutions responsible for the implementation of the plan and the way implementation is funded. The plan should indicate if adequate capacity is available at the institutions named. If it is not, the plan should indicate where and how capacity will need to be strengthened.

A project evaluation plan has to be included in the EIA report, indicating which institution will be responsible for evaluation. The main objective of evaluation will be to determine to which extent project objectives have been fulfilled.

11. FORMAT AND PRESENTATION OF THE EIA REPORT

The use of maps and tables may considerably increase comprehensiveness and is therefore recommended. A non-technical summary should be included. This should address the main subjects of the EIA report and be written in such diction that it provides non-technicians with a clear insight in the issues treated.

Furthermore it is recommended that the EIA develop a spatial information system to manage and present the environmental data, using a GIS application. The environmental information generated in the EIA, and the environmental monitoring information that will follow from project implementation, can then become attributes of relevant locations in regions. The resulting spatial projection of this information will improve understanding of local differences in environmental conditions, which in turn will enable more effective consultation as well as more targeted decision-making. This GIS database can be used as an input for the environmental management plan and the maintenance plan of the urban drainage system.