

Initial Environmental Examination

November 2020

CAM: Second Greater Mekong Sub-Region
Corridor Towns Development Project

CW02: Kampot Landfill Subproject

Prepared by Ministry of Public Works and Transport for the Asian Development Bank. This is an updated version of the draft originally posted in August 2015 available on <https://www.adb.org/projects/documents/cam-second-gms-corridor-towns-devt-project-kampot-sihanoukville-aug-2015-iee-jun-2015-emp>.

ABBREVIATIONS

ADB	-	Asian Development Bank
AP	-	Affected people
BOD	-	Biological Oxygen Demand
C-EHS	-	Contractor Environmental, Health and Safety Officer
COD	-	Chemical Oxygen Demand
CSC	-	Construction Supervision Consultant
DED	-	Detailed Engineering Design
EHS	-	Environmental, Health and Safety
EMP	-	Environment Management Plan
ESC	-	Environment Safeguards Counterpart
ESO	-	Environment Safeguards Officer
GMS	-	Greater Mekong Subregion
GPS	-	Global Positioning System
GRC	-	Grievance Redress Committee
GRM	-	Grievance Redress Mechanism
I/NES	-	International and National Environmental Specialists
ICEM	-	International Centre for Environmental Management
IEE	-	Initial Environment Examination
IEIA	-	Initial Environmental Impact Assessment
IFC	-	International Finance Corporation
IUCN	-	International Union for Conservation of Nature
MOE	-	Ministry of Environment
MOWRAM	-	Ministry of Water Resources and Meteorology
MPS	-	Main Pump Station
MPWT	-	Ministry of Public Works and Transport
O&M	-	Operation and Maintenance
PAM	-	Project Administration Manual
PDOE	-	Provincial Department of Environment
PDPWT	-	Provincial Department of Public Work and Transportation
PISCB	-	Project Implementation Support & Capacity Building Consultant
PIU	-	Project Implementation Unit
PMU	-	Project Management Unit
PSC	-	Project Steering Committee
RRP	-	Report and Recommendation of the President
SPS	-	ADB's safeguard policy statement (2009)
TSS	-	Total Suspended Solids
UNDP	-	United Nations Development Program
UXO	-	Unexploded Ordinance
WHO	-	World Health Organization
WWTP	-	Wastewater Treatment Plant

CURRENCY EQUIVALENTS

(as of 2 September 2020)

Currency unit	–	Riel
KR 1.00	=	\$ 0.000244
\$1.00	=	KR 4,098

WEIGHTS AND MEASURES

dB	-	decibel
ha	-	hectare
km	-	kilometer
L	-	liter
LAeq	-	Equivalent Continuous Level 'A weighting' - 'A'-weighting = correction by factors that weight sound to correlate with the human ear
mm	-	millimeter
mg	-	milligram
m ³	-	cubic meter
m/s	-	meters per second

GLOSSARY

Khan or Srok	-	District level administration subdivision below province. Khan is used for cities and srok elsewhere
Sangkat	-	Commune level administration subdivision below district. A ministerial decision, signed by a Minister under
Prakas (Proclamation)	-	Cambodian law, which must conform to the Constitution and to the law or sub-decree to which it refers.

NOTE

- (i) In this report, "\$" refers to US dollars.

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EXECUTIVE SUMMARY

A. Introduction and Purpose

1. The project represents the second phase of the ongoing Greater Mekong Subregion Corridor Towns Development Project (the Project). It supports the Government of Cambodia in enhancing the competitiveness of Kampot town, located along the Southern Economic Corridor, one of the three main economic corridors in the Greater Mekong Subregion.
2. The Project will result in improved urban services in Kampot through wastewater management and urban drainage upgrading and solid waste disposal. The project will enhance climate resilience and will be in line with the “3Es” of economy, environment, and equity as outlined in the Urban Operational Plan of the Asian Development Bank (ADB).
3. Each subproject has a dedicated Initial Environmental Examination (IEE) and separate Environmental Management Plan (EMP) as follows:
 - IEE and EMP for Kampot urban drainage, wastewater collection network and wastewater treatment plant; and
 - IEE and EMP for Kampot controlled landfill.
4. This IEE covers the controlled landfill subproject. This IEE updates the original IEE (2015) based on the detailed engineering design.
5. The project was classified as environment category B during project preparation under ADB’s Safeguard Policy Statement (SPS 2009) and this classification remains valid as confirmed during the detailed engineering design phase. The changes reflected in this updated IEE include:
 - Splitting the individual subprojects into separate IEEs as explained under item 3 above;
 - Removal of Sihanoukville subprojects from the Project; and
 - New landfill site location.

B. Key Findings

6. For the solid waste subproject, the key construction impacts are associated with site clearance and preparation. The most significant environment risks associated with the subprojects are during the operation phase. The landfill site can cause environmental pollution if it is not managed and maintained effectively. Pollution can include long term risks to groundwater and soils from poor leachate management. Therefore long term effective operational practices are required and the construction of subsequent landfill cells, when the project cell is full, needs to be in accordance with the detailed engineering design requirements.
7. If effectively managed, the subproject will bring about environmental improvements to the local project area. The current environment is being contaminated by ineffective waste disposal practices. The growing pressures on the urban areas means that waste generation is likely to continue to increase. However the benefits of the new landfill site will only be realized if waste collection service provision in the town and surrounding areas significantly increased, improving environmental sustainability and realizing the benefits from the financial investment.

C. Environmental Management Plan

8. The EMP aims to avoid impacts where possible and mitigate those impacts which cannot be eliminated to an acceptable and minimum level. The EMP includes detailed requirements for:
-

- Mitigation and monitoring measures including specific protection measures for houses within 300m of the landfill;
- Institutional arrangements and project responsibilities;
- EMP budget for implementation;
- Capacity building and training requirements;
- Public consultation and information disclosure;
- GRM including clearly defined timescale and responsibilities.

9. The project includes a capacity building program to address technical and institutional issues and promote the sustainable provision of quality services. This is particularly relevant to maintaining operational standards for the landfill. The Project Implementation Support and Capacity Building Consultant will be responsible for arranging relevant training. As set out in the EMP, environmental specific training will include the following, in addition to technical training relating to operation and maintenance to ensure subproject sustainability:

- EMP development and implementation;
- Undertaking consultation with Affected People;
- Implementing and using the Grievance Redress Mechanism;
- Environmental protection for construction projects;
- Environmental monitoring and reporting.

10. The key mitigation measures during construction will include requirements for:

- Good construction practices to be adopted to ensure minimal disturbance to affected persons from construction related nuisance, such as noise, dust and pollutant emissions.
- Access to properties and agricultural land to be maintained and encroachment avoided to allow people to continue their activities unimpeded.
- The contractor to submit site specific Construction Environmental Management Plans (CEMPs) for key activities which will also require the contractor to develop appropriate maps to ensure all stakeholders are clear on where activities will take place.
- A community and occupational health and safety plan, emphasizing the need to address risks in particular to site operatives and people in the local area.

11. Mitigation and monitoring measures are also required for the operation phase. The importance of training in landfill operations should be emphasized if the investments are to be sustainable, and operations are to be effectively maintained as per the subproject designs. Recognizing that operator performance is critical to environmental performance, a detailed long-term operator training plan and associated budget is provided in the capacity development component of this project.

12. A Grievance Redress Mechanism will be established to receive comments and facilitate resolution of affected peoples' concerns and grievances about project social and environmental safeguards performance. It should address affected people's concerns promptly, using a transparent process that is readily accessible to all affected people. It will contain multiple entry points to allow affected people to approach the person or institution most suitable for them. It will be based on a project hotline approach to improve the resonance with the local people.

D. Conclusion

13. The main project risks related to environment include: (i) low institutional capacity for environmental management and the possibility that the PMU and Implementing Agency will fail to monitor the environmental impact and implement the EMP during the construction and operation of the project; (ii) the PMU and Implementing Agency fail to implement corrective actions as issues

arise during project implementation (iii) inadequate budget is allocated for maintenance of the landfill and in particular the development of the next phase of cells in an appropriate manner.

14. This IEE was undertaken to determine the environmental issues and concerns associated with the landfill subproject. As a result of understanding the environmental baseline, receptors and project activities, the EMP was developed. The EMP, if implemented as directed, will mitigate impacts on the natural environment and affected people to an acceptable level. The key parties for mitigation measures and monitoring are the construction contractors and the operators. The implementation of the EMP will be closely monitored and reported on by the relevant stakeholders in the project.

15. Overall, the project is anticipated to bring environmental benefits. It will serve to improve waste disposal practices, reduce pollution impacts and will provide long term environmental improvements and health benefits for residents and visitors. However, a significant step up of the waste collection service delivery in Kampot town and surroundings is required to see benefits of the landfill site.

I. INTRODUCTION

A. Background and introduction

16. The project represents the second phase of the ongoing Greater Mekong Subregion (GMS) Corridor Towns Development Project (the Project). It will support the Government of Cambodia in enhancing the competitiveness of Kampot town, located along the Southern Economic Corridor, one of the three main economic corridors in the GMS. The project will result in improved urban services through wastewater management, solid waste disposal practices, and urban drainage upgrading. The project will enhance climate resilience and will be in line with the “3Es” of economy, environment, and equity as outlined in the Urban Operational Plan of the Asian Development Bank (ADB)¹.

17. Each subproject under the Project has a dedicated Initial Environmental Examination (IEE) and separate Environmental Management Plan (EMP) as follows:

- IEE and EMP for Kampot Urban drainage, wastewater collection network and wastewater treatment plant (WWTP); and
- IEE and EMP for Kampot controlled landfill.

18. This IEE covers the controlled landfill subproject. This IEE updates the original IEE (2015) based on the detailed engineering design. The original IEE (2015) can be found on the ADB website:

<https://www.adb.org/projects/documents/cam-second-gms-corridor-towns-devt-project-kampot-sihanoukville-aug-2015-iee-jun-2015-emp>

19. The changes reflected in this updated IEE include:

- Splitting the individual subprojects into separate IEEs
- Removal of Sihanoukville subprojects from the Project; and
- New landfill site location.

B. ADB and Domestic Environmental Due Diligence

20. The project was classified as environment category B during project preparation under ADB’s Safeguard Policy Statement (SPS 2009) and this classification remains valid as confirmed during DED phase.

21. Domestic environmental due diligence requires an Initial Environmental Impact Assessments (IEIA) to be completed for each subproject. Details on the requirements for Ministry of Environment (MoE) approvals under Cambodian law are in Section II. At the time of writing IEIA approval is awaited; construction will not begin until the IEIA is approved by MoE.

C. Structure of This Report

22. This IEE follows the format of an environmental assessment in Appendix 1 of SPS 2009.

¹ ADB (2015) 46443-002 Report and Recommendation of the President Proposed Loan Kingdom of Cambodia: Second Greater Mekong Subregion Corridor Towns Development Project

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Environmental Assessment Requirements of ADB

23. Safeguard requirements for all projects funded by ADB are defined in SPS 2009 which establishes an environmental review process to ensure that projects undertaken as part of programs funded through ADB loans are environmentally sound; are designed to operate in compliance with applicable regulatory requirements; and are not likely to cause significant environmental, health, or safety hazards. SPS 2009 is underpinned by the ADB Operations Manual, Bank Policy (Operations Manual Section F1/BP, October 2013). The policy also promotes adoption of international good practice as reflected the World Bank Group's Environmental, Health and Safety (EHS) Guidelines. This IEE is intended to meet SPS 2009 requirements.

24. SPS 2009 environmental assessment requirements specify that:

- At an early stage of project preparation, the borrower/client will identify potential direct, indirect, cumulative, and induced environmental impacts on and risks to physical, biological, socioeconomic, and cultural resources and determine their significance and scope, in consultation with stakeholders, including affected people and concerned nongovernment organizations.
- The assessment process will be based on current information, including a project description, and appropriate environmental and social baseline data;
- Impacts and risks will be analyzed in the context of the project's area of influence;
- Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including preconstruction, construction, operations, decommissioning, and post-closure activities such as restoration; and
- The assessment will identify potential transboundary and global impacts.

B. Environmental Assessment Requirements of Cambodia

25. Environmental assessment in Cambodia is governed by the following laws and guidelines:

- **Sub-decree on EIA Process No. 72 (1999).** This law provides the detailed guidelines for implementation of the EIA Process. .
- **Declaration on Guideline for Conducting IEIA and EIA Reports No. 376 (2009).** This declaration specifies the basic contents of IEIA/EIA Reports, which should include: (i) introduction; (ii) legal framework; (iii) project description; (iv) description of the existing environment; (v) public participation; (vi) assessment of, and mitigation measures for, significant environmental impacts; (vii) environmental management plan; (viii) cost-benefit analysis; and (ix) conclusion and recommendations.
- **Prakas No.21 on EIA Classification for Development Projects (2020).** The Prakas provides clarity on development projects which require a Contracts on Environmental Protection and/or Initial or Full Environmental and Social Impact Assessment (IEIA or EIA) reports. Section 6 'Infrastructure Sector', project type no. 188 of the Prakas' Appendix states waste sites require an IEIA.

26. The Ministry of Environment (MoE) through its EIA Department regulates and monitors the EIA Process. The MoE is responsible for: (i) review and approval of IEIA/EIA reports in collaboration with other relevant ministries and (ii) monitoring the EMP implementation of Project Proponents/Owners throughout the different project phases. MoE operates at the municipal and provincial levels through its Provincial Department of Environment (PDoE).

27. The project owner (public or private) is required to submit the necessary project document (IEIA/EIA report) to MoE for review and approval. After submission of IEIA/EIA report, it should take a maximum of 30 working days for a decision. A registered company is required to complete IEIAs.

C. Legal and Policy Framework for Environmental Protection

28. The hierarchy of legislation in Cambodia is Royal Decree, Sub-decree, Ministerial Decision and Regulation. A Royal Decree ratifies laws passed by parliament and these can be supplemented by “Prakas” or ministerial decisions. These laws allow sub-decrees and regulations to be passed which can stipulate procedures and standards to be met to ensure compliance with the law. In addition, there are several guidance documents which are designed to support best practices as required in Cambodia.

29. Cambodia’s main legal framework for addressing environmental protection, management of natural resources and public consultation is the Law on Environmental Protection and Natural Resource Management (‘the Environment Law’), which was adopted in 1996.

30. A summary of other legislative and policy instruments relevant to the project is presented in Table II-1. A summary of national and international guidance for landfill site criteria are presented Table II-2. The key environmental quality standards applied to the EMP for this IEE are listed in Table II-3 and presented in detail in Annex 1. The most stringent limit (national or international) shall apply. Protocols of the Environment, Health and Safety Guidelines of the World Bank (2007) also apply and are reflected in the EMP mitigation measures where appropriate.

31. Cambodia is signatory to many international environmental treaties and conventions which provide a comprehensive legal framework related to coastal management. These include: the Coordinating Body of the Seas of East Asia (1995), Association of South East Asian Nations (1999), The International Convention for the Prevention of Pollution from Ships (known as MARPOL) (1994), Biodiversity convention (1994), Convention on International Trade in Endangered Species of Wild Fauna and Flora (known as CITES) (1997), Ramsar convention on Wetlands of International Importance (1999) and Climate Change convention (1995) (MOE 2006). The closest Ramsar site to the subproject areas is more than 170 km West in Peam Krasaob Wildlife Sanctuary, Koh Kong province.

Table II-1 Laws, Sub-decrees and Guidance for Environment and Health Protection

Law/Regulation/Guideline	Year	Summary
Law on the Protection of Cultural Heritage (NS/RKM/0196/26)	1996	Regulates the protection of national cultural heritage and cultural property in general against illegal destruction, modification, alteration, excavation, alienation, exportation or importation. Its Article 37 stipulates that in case of chance find of a cultural property during construction, work should be stopped and the person who found the property should immediately make a declaration to the local police, who shall, in turn, transmit the property to the Provincial Governor without delay.
Law on Forest enacted by National Assembly, 2002 promulgated by Preah Reach Kram/NS/RKM/0802/016	2002	Defines the framework for management, harvesting, use, development and conservation of the forests. Objective: To ensure the sustainable management of forests for their social, economic and environmental benefits, including conservation of biological diversity and cultural heritage. Under this law the state ensures customary user rights of forest products and by-products for local communities. The Forestry Law states the roles and responsibilities for the management of all forests. It states that the management of forests is under the jurisdiction of the Ministry of Agriculture Forestry and Fisheries (MAFF) (except for management of flooded forests which is covered by a different law). Furthermore, it delegates the authority to manage Protected

Law/Regulation/Guideline	Year	Summary
		<p>Areas to the Ministry of Environment.</p> <p>Article 4 under the Forestry Law states that prior to major forest ecosystem related activity that may significantly impact on the environment and social conditions, and environmental and social impact assessment should be conducted.</p>
Law on Land (NS/RKM/0801/14)	2001	<p>Provides that: (i) unless it is in the public interest, no person may be deprived of ownership of his immovable property; and (ii) ownership deprivation shall be carried out according to legal forms and procedures and after an advanced payment of fair and just compensation. (Article 5)</p>
Labor Law (1997) Decree No. CS/RKM/0397/01	1997	<p>This law governs relations between employers and workers resulting from employment contracts to be performed within Cambodia. The key sections relevant to this project include: Chapter VIII Health and Safety of Worker. The key provisions relate to the quality of the premises; cleaning and hygiene; lodging of personnel, if applicable (such as workers camp); ventilation and sanitation; individual protective instruments and work clothes; lighting and noise levels in the workplace.</p> <p>Article 230: Work places must guarantee the safety of workers. However, the only specific occupational health and safety Prakas relates to the garment industry and brick manufacture.</p> <p>Chapter IX Work-Related Accidents Article 248: All occupational illness, as defined by law, shall be considered a work-related accident. The law sets out how accidents should be managed in terms of compensation.</p>
Law on Water Resources Management (NS/RKM/0607/016)	2007	<p>Requires license/permit/written authorization for the: (i) abstraction & use of water resources other than for domestic purposes, watering for animal husbandry, fishing & irrigation of domestic gardens and orchards; (ii) extraction of sand, soil & gravel from the beds & banks of water courses, lakes, canals & reservoirs; (iii) filling of river, tributary, stream, natural lakes, canal & reservoir; and (iv) discharge, disposal or deposit of polluting substances that are likely to deteriorate water quality and to endanger human, animal and plant health. (Articles 12 & 22) Its Article 24 stipulates that Ministry of Water Resources and Meteorology (MOWRAM), in collaboration with other concerned agencies, may designate a floodplain area as flood retention area.</p>
Expropriation Law	2010	<p>Defines the principles, mechanisms, and procedures of expropriation, and defining fair and just compensation for any construction, rehabilitation, and public physical infrastructure expansion project for the public and national interests and development of Cambodia.</p>
Sub-decree on Solid Waste Management (Sub-decree No. 36 ANK/BK),	1999	<p>Article 1: Regulates solid waste management to ensure the protection of human health and the conservation of biodiversity through using appropriate technical approaches.</p> <p>Article 2: This sub-decree applies to all activities related to disposal, storage, collection, transport, recycling, dumping of garbage and hazardous waste.</p> <p>Article 4: The Ministry of Environment shall establish guidelines on disposal, collection, transport, storage, recycling, minimizing, and dumping of household waste in provinces and cities in order to ensure the safe management of household waste.</p> <p>The authorities of the provinces and cities shall establish the waste management plan in their province and city for short, medium and long-term.</p> <p>Article 15 The storage, transportation and disposal of hazardous waste shall be performed separately from the household waste which will be stipulated by the Prakas of the Ministry of Environment.</p>

Law/Regulation/Guideline	Year	Summary															
		The disposal of hazardous waste into public site, public drainage systems, public water area, rural area and forest area shall be strictly prohibited.															
Sub-decree on Water Pollution Control (Sub-decree No. 27 ANRK/BK) (relevant to leachate)	1999	Regulates activities that cause pollution in public water areas in order to sustain good water quality so that the protection of human health and the conservation of biodiversity are ensured. Its Annexes 2, 4 and 5 provide the industrial effluent standards, including effluent from wastewater stabilization ponds, water quality standards for public waters for the purpose of biodiversity conservation, and water quality standards for public waters and health, respectively.															
Sub-decree on Control of Air Pollution and Noise Disturbance (Sub-decree No. 42 ANK/BK	2000	Regulates air and noise pollution from mobile and fixed sources through monitoring, curb and mitigation activities to protect the environmental quality and public health. It contains the following relevant standards: (i) ambient air quality standard (Annex 1); and (ii) maximum allowable noise level in public and residential areas (Annex 6). Article 3 A. “Source of pollution” is defined and separates mobile sources (including transport) and fixed sources such as factories and construction sites. Article 3 B. “Pollutant” is defined as smoke, dust, ash particle substance, gas, vapor, fog, odor, radio-active substance															
Sub-decree on Management of Urban Garbage and Solid Waste (sub-decree 113)	2015	Clarifies the roles on solid waste management in urban areas by transferring the function of solid waste management under the mandate of MoE to the municipal and district administrations Article 36 For city and district administration, the determination and selection of the places of field for urban garbage and solid waste shall be approved by provincial administration. Every proposal for establishing a landfill must obtain approval from the Ministry of Environment regarding the preparation of the landfill to protect environment during the operations and decommissioning.															
Environmental Guidelines on Solid Waste Management ²	2006	Contains a Landfill Ordinance that regulates landfill requirements to: (i) reduce as far as possible the adverse effects of waste disposal on the environment; (ii) preserve groundwater, surface water & air quality & to reduce emissions of greenhouse gases (iii) ensure waste is not harmful to human, natural & animal health during operation & decommissioning; and (iv) provide information and technical recommendation on the construction, operation and closing/follow-up management of landfills to ensure public health and safety and environmental protection.															
Guidance on Selection of Landfill Sites (2016)	2016	<div>The Guidance sets out the requirements for site selection in terms of:</div> <table><tr><td></td><td>MoE (2016) Requirements</td></tr><tr><td rowspan="6">Distance to Receptor</td><td>1 km from any residential property</td></tr><tr><td>3 km from any school/health centre/natural resources/ water source</td></tr><tr><td>5 km from any place of worship and resort</td></tr><tr><td>8 km from an airport</td></tr><tr><td>10 km from town center</td></tr><tr><td>15 km from any heritage site</td></tr><tr><td rowspan="2">Hydrology</td><td>Not in a flooded area</td></tr><tr><td>Depth to Groundwater – More than 3m</td></tr><tr><td rowspan="2">Cell Design</td><td>Gas collection (flaring)</td></tr><tr><td>Leachate collection system</td></tr></table>		MoE (2016) Requirements	Distance to Receptor	1 km from any residential property	3 km from any school/health centre/natural resources/ water source	5 km from any place of worship and resort	8 km from an airport	10 km from town center	15 km from any heritage site	Hydrology	Not in a flooded area	Depth to Groundwater – More than 3m	Cell Design	Gas collection (flaring)	Leachate collection system
	MoE (2016) Requirements																
Distance to Receptor	1 km from any residential property																
	3 km from any school/health centre/natural resources/ water source																
	5 km from any place of worship and resort																
	8 km from an airport																
	10 km from town center																
	15 km from any heritage site																
Hydrology	Not in a flooded area																
	Depth to Groundwater – More than 3m																
Cell Design	Gas collection (flaring)																
	Leachate collection system																

² http://comped-cam.org/Documents/developmentguideline/06_03_25_Environmental%20gl%20on%20swm END.pdf.

Law/Regulation/Guideline	Year	Summary		
			Leachate treatment (lagoon)	
			Clay liner ≥ 1 m (first liner)	
			HDPE liner (second liner)	
			Permeable liner (third liner)	
		Drainage system	Depth 1m, width 0,6 m	

32. **Landfill Site Guidance.** A meeting was held at MoE Phnom Penh on 31-10-17³ in order to discuss the application of the guidance for ADB projects. MoE advised the project team to follow the guidance where possible, but recognized it was not always possible given the very stringent requirements. MoE emphasized that groundwater protection was the main concern however the requirements could be applied pragmatically with MoE review of the landfill design before it is finalized.

33. A comparison of national and international landfill siting guidance is in Table II-2. The table shows that the minimum distance to houses in any of the international guidance is 250m (ADB and World Bank/IFC) however ADB guidance also refers to daily cover indicating that 250m is appropriate for a site which has daily cover. The highest depth to groundwater in any of the international guidance is 1.5 m (World Bank/IFC). The Cambodian guidance is most stringent for distance to housing and depth to groundwater.

Table II-2 Comparison of Landfill Selection Criteria

Source of Guidance	Residential Receptors	Water Receptors
International Solid Waste Association- Guidelines for Design and Operation of Municipal Solid Waste Landfills in Tropical Climates (2013).	Not located in the immediate proximity of occupied dwellings Minimum 500m	No distance given
ADB – Integrated Solid Waste Management for Local Governments., A Practical Guide (2017)	No residential development within 250 m	The site must be located in an area where the landfill's operation will not detrimentally affect environmentally sensitive resources such as aquifer/ groundwater
World Bank / IFC Environment Health and Safety (EHS) Guidelines: Sanitary Landfill (2007)	Typically further than 250 meters (for gas only, no mention of dust /odor)	Perennial stream should not be located within 300 down gradient Groundwater's seasonally high table level (i.e., 10 year high) should be at least 1.5 meters below
Cambodian Landfill Site Selection Guidance	1km from residences	Out of flooded area Depth to ground water over 3m

Table II-3 Key National Environmental Standards

Environmental Media	National Standard	International Standard
Ambient air	Standard Annex 1, Ambient Air	World Health Organization (WHO) Air

3 Participants: HE Heng Nareth, Director General, General Directorate of Environmental Protection, MOE; HE Vong Pisith, Deputy Director General, MPWT; Mr Dy Kiden, Director, Department of Solid Waste Management, MOE; Ms Genevieve O'Farrell, Environmental Specialist, ADB; Ms Rachel Wildblood, Environmental Specialist, ADB projects; Mr Teemu Jantunen, Resettlement and Social Development Specialist, ADB projects; Mr Chea Mong, National Environmental Specialist, ADB projects; Mr Mongtoeun Yim, National Solid Waste Management Specialist, ADB projects

Environmental Media	National Standard	International Standard
quality	Quality Standard, of Sub-decree on Control of Air Pollution and Noise Disturbance, 2000	Quality Guidelines, global update 2005
Noise	Standard Annex 6, Max. Standard of Noise Level Allowable in the Public and Residential Areas, of Sub-decree on Control of Air Pollution and Noise Disturbance, 2000	WHO Guidelines for Community Noise, 1999
Groundwater quality (for drinking)	Drinking water Quality Standards, 2004	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011
Groundwater (ambient)	Ministry of Handicrafts and Industry Groundwater Quality Standards	EU Groundwater Directive 2006/118/EC
Surface water quality	Standard Annex 4, Water Quality Standards for Public Waters for the Purpose of Biodiversity Conservation, and Annex 5, Water Quality Standards for Public Waters and Health, of Sub-decree on Water Pollution Control, 1999	US EPA National Recommended Water Quality Criteria Mekong River Commission: Technical Guidelines for the Protection of Aquatic Life Mekong River Commission Technical Guidelines for the Protection of Human Health
Effluent quality (including leachate)	Standard Annex 2, Effluent standard (Discharged wastewater to public water areas or sewers), of Sub-decree on Water Pollution Control, 1999	IFC/World Bank EHS General Guidelines and Guidelines for Water and Sanitation

D. Agencies responsible for Environmental Management

34. The national agencies that oversee environment and natural resources management are listed below. Most of Ministries have provincial line departments.

- Ministry of Environment;
- Ministry of Agriculture, Forestry and Fisheries;
- Ministry of Water Resources and Meteorology;
- Ministry of Mine and Energy;
- Ministry of Industry and Handicraft
- Ministry of Land Management; and Urban Planning;
- Ministry of Tourism;
- Ministry of Public Works and Transport and
- National Climate Change Committee - a cross-ministerial policy body

35. Solid waste management is not the responsibility of a provincial line department but is the responsibility of sub-national authorities following sub-decree 113 on Solid Waste Management in Urban Areas (2015) which decentralizes solid waste management responsibilities to municipalities and districts.

III. DESCRIPTION OF THE PROJECT

A. Project Rationale

36. Detailed description of the project rationale can be found in the project's ADB Report and Recommendation of the President⁴ (RRP). This is available on ADB's website and a summary is presented below:

<https://www.adb.org/sites/default/files/project-document/176005/46443-002-rrp.pdf>

37. The Project, covering Cambodia, the Lao People's Democratic Republic and Viet Nam, represents the second phase of the ongoing GMS Corridor Towns Development Project in these countries, which supports urban development along the East–West Economic Corridor and the Southern Economic Corridor. The location of the second GMS Corridor Towns Development Project is shown in Figure III-1.

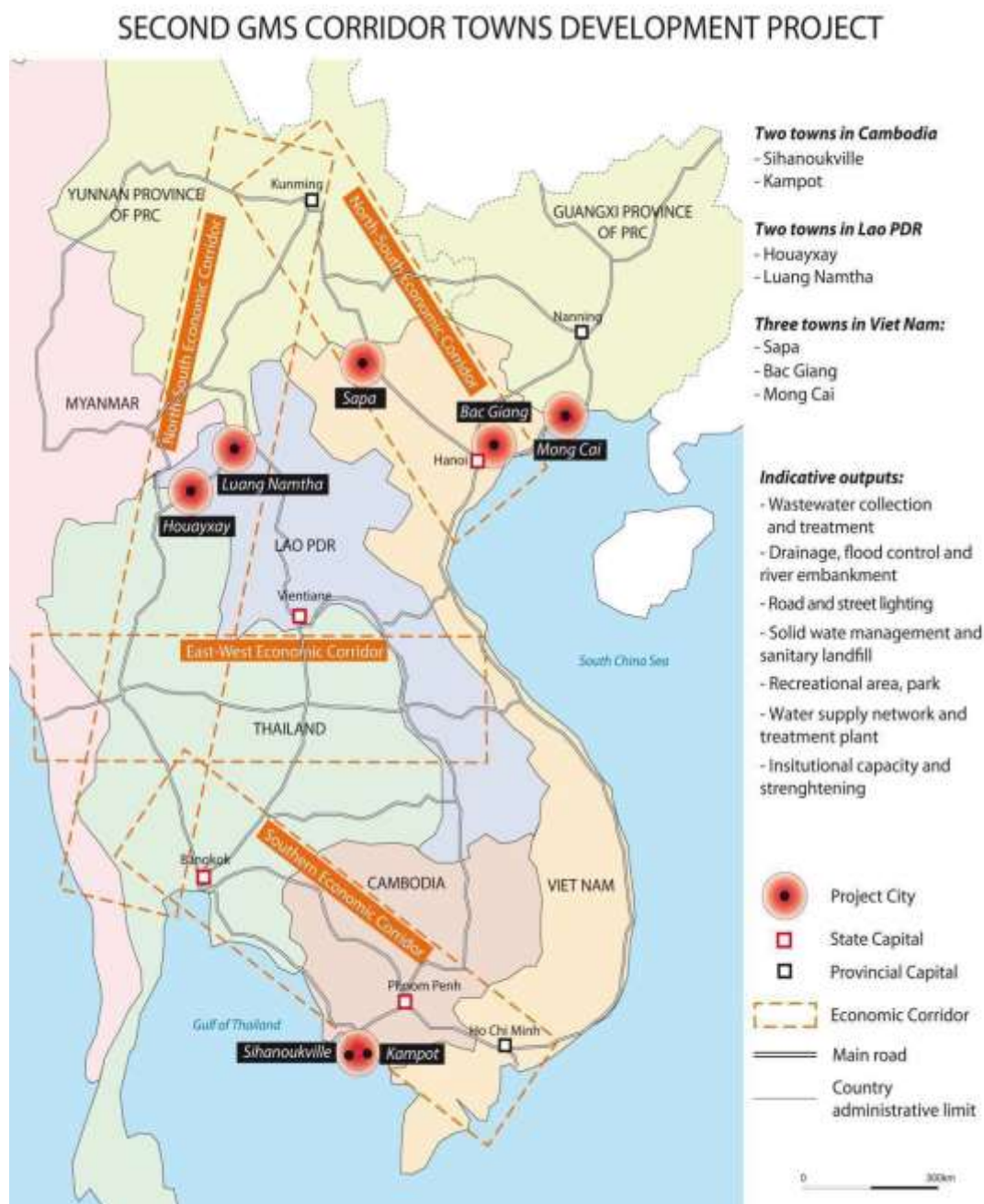
38. The focus on developing towns along economic corridors aims to maximize the benefits of increased trade and traffic flows so as to strengthen their competitiveness and catalyze wider economic growth in the region. The development of environmental infrastructure will promote green growth and improve the climate resilience of these towns in the future. The project supports the first four strategic thrusts of the GMS strategic framework, 2012–2022: (i) strengthening infrastructure linkages; (ii) facilitating cross border trade, investment, and tourism; (iii) enhancing private sector participation and competitiveness; and (iv) developing human resources.

39. Kampot has significant opportunities for increased economic activities and investments. While tourism development is at an early stage, visitor numbers are rising significantly, with tourism potential linked to Kampot's heritage architecture, proximity to the Bokor National Park, and a new river port that will offer seaborne access to the outlying holiday islands. Currently, there is no reticulated wastewater collection and treatment in Kampot, and urban flooding during the wet season is not uncommon as most drainage infrastructure was built during the French colonial times. Solid-waste collection is contracted out to the private sector, with collected waste being disposed of in a poorly managed dump site.

40. Sihanoukville was part of the second GMS Corridor Towns Development Project, as shown in Figure III-1, but no longer has subprojects under this project therefore is not discussed further.

⁴ ADB (2015) 46443-002 Report and Recommendation of the President Proposed Loan Kingdom of Cambodia: Second Greater Mekong Subregion Corridor Towns Development Project

Figure III-1 Second GMS Corridor Town Development Project



Source: ADB 2nd GMS Corridor Towns Development Project, TA-8425REG Final Report

B. Project Impacts and Outcome

41. As defined in the RRP, the Project impacts and outcome will be:

- **Impact:** promoting growth that is sustainable, inclusive, equitable, and resilient; creating employment, including through improving competitiveness; promoting equity through reducing poverty; improving environmental sustainability; and promoting efficiency through further strengthening institutional capacity and governance.
- **Outcome:** improved urban services in the two participating towns.

42. The environmental sustainability benefits of a sound waste disposal facility will be realized only when the waste collection service improves; waste must be collected for disposal in the controlled landfill sites. In addition, the sustainability of the drainage systems are also

dependent on ensuring waste is kept out of any open channels.

C. Project Outputs

43. The Project outputs as defined in the Project Administration Manual (PAM) are:

- **Output 1:** Strategic Local Economic Development Plans developed;
- **Output 2:** Priority urban infrastructure investments and upgrading implemented;
- **Output 3:** Institutional capacities for managing public investments strengthened; and
- **Output 4:** community awareness on project activities and environmental sustainability improved

44. The PAM is available on ADB's website at:

<https://www.adb.org/sites/default/files/project-document/176008/46443-002-pam.pdf>

45. The priority urban infrastructure investments (Output 2):

- Kampot town:
 - Urban Drainage
 - Wastewater collection
 - Wastewater Treatment Plant
 - Controlled Landfill

46. Project Implementation Support, Detailed Design, and Construction Supervision is undertaken for the project under consulting Package 1. Capacity building and Strategic Local Economic Development Plan implementation is undertaken under consulting Package 2. The focus of this updated IEE is on Output 2, Controlled landfill subproject. It refers to the other outputs as required and they will be addressed in detail in a separate IEE and corresponding EMP.

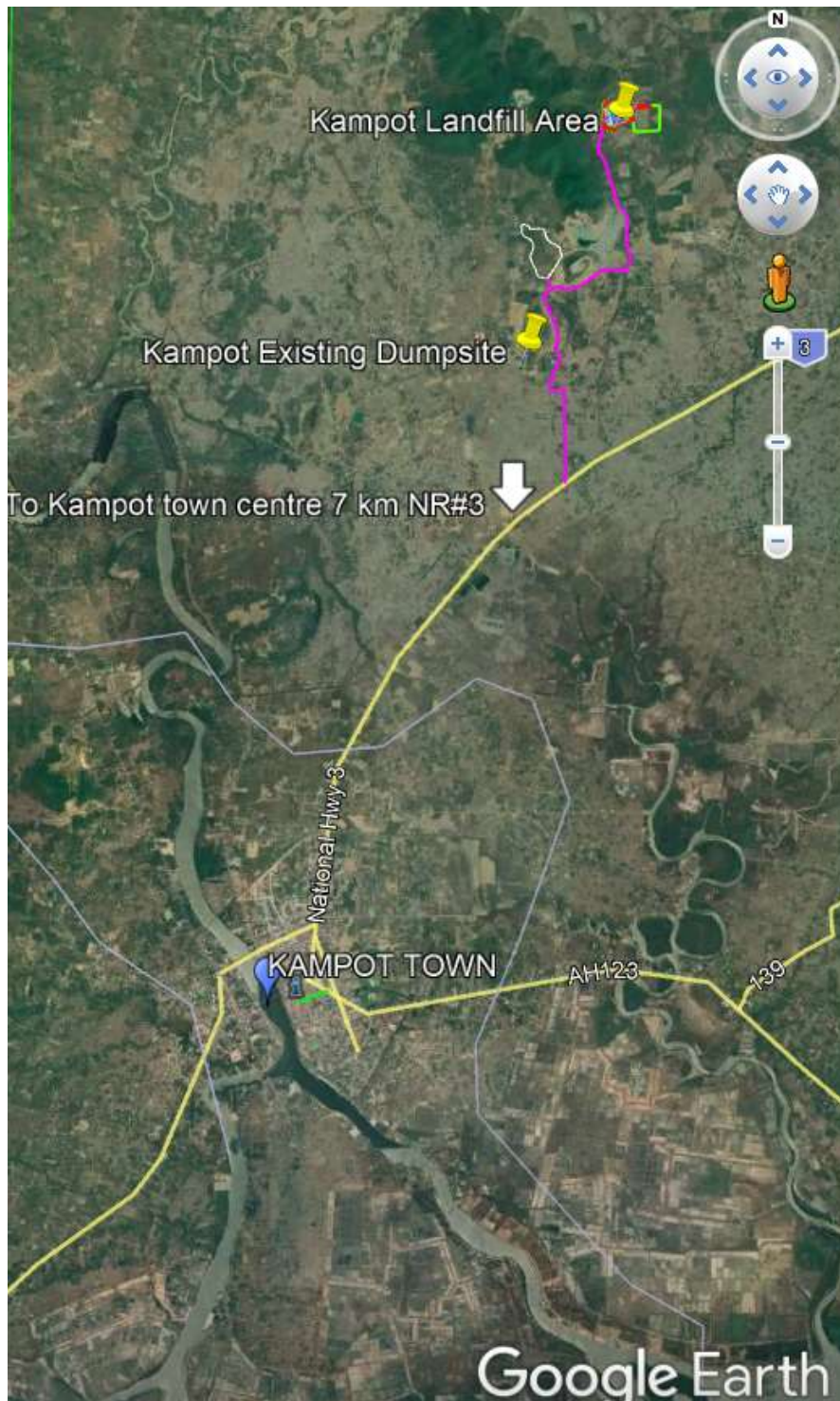
D. Landfill Subproject Description

47. This section provides information on the subproject but does not replicate the information provided in the DED report; this section summarizes the key designs features relevant to the IEE to enable the project impacts to be assessed.

1. Subproject Location

48. Location map for the landfill subproject is shown in Figure III-2.

Figure III-2 Kampot Subproject location



Source: PISCB Team

49. **Kampot Landfill Site Location.** The site is located approximately 10 km north east of the town and is accessed from national road No. 3, 7km from the town, shown in Figure III-3. The subproject does not include any work on the access road, it is shown in the map for information. The proposed engineered municipal solid waste landfill will be developed at a site in Kor Chen Leng Village, Thmei Commune, Tuek Chhou District.

Figure III-3 : Kampot Dumpsite, Landfill and Access Road Location



Source: PISCB Team / Google Earth

50. The technical guidelines on Solid Waste Management for urban area published by Ministry of Environment (MOE) in 2016 provides guidelines in the selection of sites for landfill. These are in Table III-1.

Table III-1: MoE criteria for selection new landfill in Kampot

Criteria		Status of Compliance	Comment
1.	At least 10km from town center and forest of 50km from town	✓	Kampot town 13 km
2.	At least 1km from NR, residence, public drainage	x	Closest house 10m from site boundary
3.	At least 3km from school, health center, natural surface water (lake, river, beach, stream)	✓	3.5 km to Stung Sanke to North West
4.	At least 5km from eco-tourism, religion celebration place, pagoda, (religion temple) and natural conservation	✓	Pagoda on NR#3 is 5km
5.	At least 15km from natural and historical heritage	✓	None known in area
6.	At least 8km from airport	✓	10 km to (unused)

			Kampot airport
7.	Non-flooded area and access road year-round	✓	Access to quarries surround site is all year
8.	It should be located in low economic land and unfertilized soil area.	✓	Scrub and borrow sites
9.	Depth of groundwater – more than 3m	✓	12m estimate by site investigation (borehole) team

51. The majority of MoE's landfill site selection criteria are met apart from the distance to the nearest property. There are several properties within 1 km however a meeting was held at MoE⁵ Phnom Penh on 31 October 2017 in order to discuss the application of the guidance for ADB projects. MoE advised the project team to follow the guidance where possible, but recognized it was not always possible given the very stringent requirements. MoE emphasized that groundwater protection was the main concern.

52. Five houses are within 500m of the centre of the site, with the closest being 10m from the southern edge of the site which is less than 80m from the edge of the cell. These houses are specifically discussed in the Mitigation Measures section of the EMP.

2. Site location conditions

53. The landfill site is in an area used for active aggregates extraction and therefore has an existing access road which is suitable for heavy vehicles and is maintained by the quarry company so access during wet season is not impeded.

54. Figure III-4 shows the condition of the site and access road. The western half of site has been used extensively to excavate construction materials and has been an active borrow area. The eastern half is scrub land with some areas previously used for agriculture.

Figure III-4 : Kampot New Landfill Site Current Condition



⁵ Participants: HE Heng Nareth, Director General, General Directorate of Environmental Protection, MOE; HE Vong Pisith, Deputy Director General, MPWT; Mr Dy Kiden, Director, Department of Solid Waste Management, MOE; Ms Genevieve O'Farrell, Environmental Specialist, ADB; Ms Rachel Wildblood, Environmental Specialist, TS-1; Mr Teemu Jantunen, Resettlement and Social Development Specialist, TS-1; Mr Chea Mong, National Environmental Specialist, TS-1; Mr Mongtoeun Yim, National Solid Waste Management Specialist, TS-1.



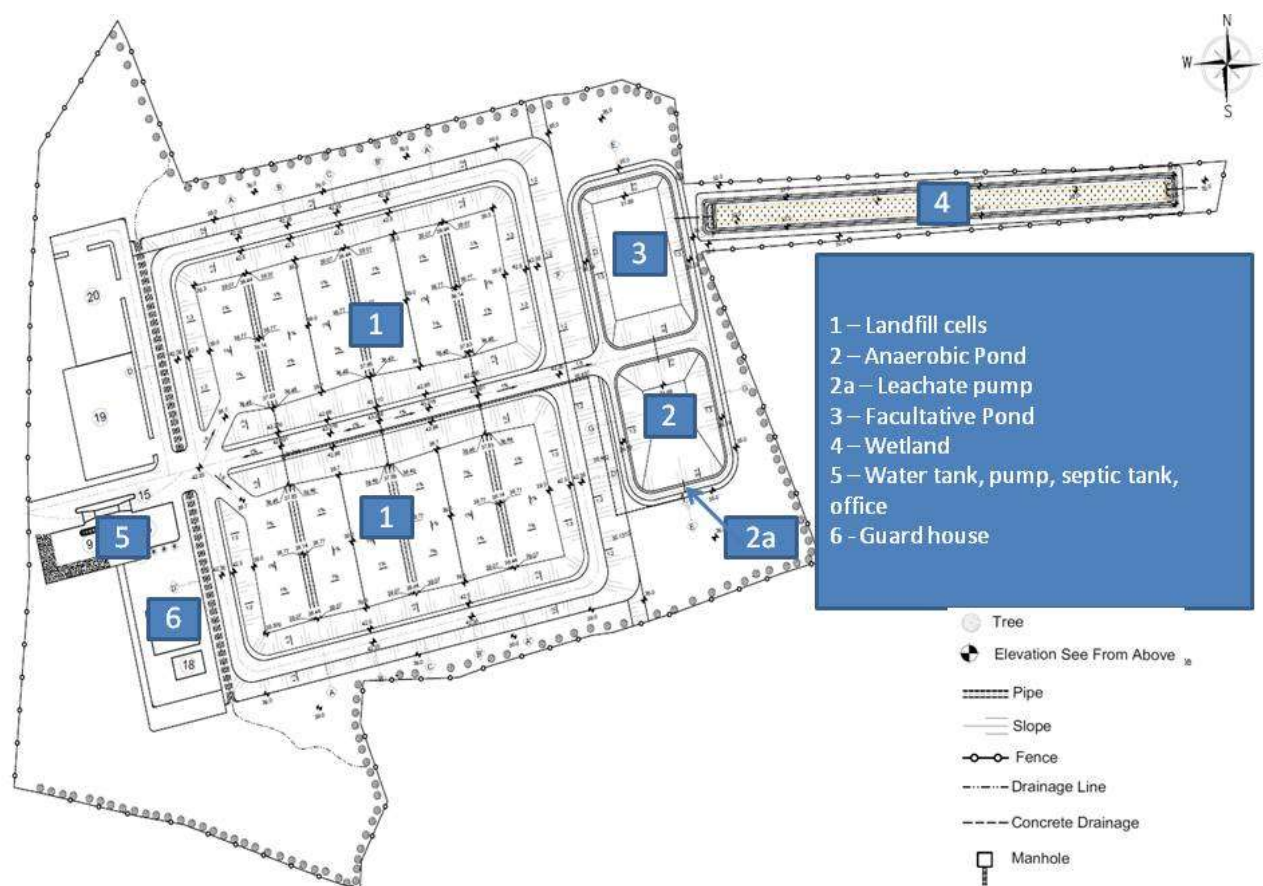
a. Borrow site area western part; b. Access road at quarry site; c. fenced eastern part

Source: PISCB Team

3. Scope of the proposed works

55. The layout of the landfill site is shown in Figure III-5.

Figure III-5: Layout of controlled landfill in Kampot Subproject



56. The landfill life expectancy is approximately 17 years. The proposed works include the following technical and functional items:

- Preparation works, excavation and backfilling of site development area about 8.77ha
- Both cells area about 2.80 ha

- Fencing of site 1922 m with the required gates to prohibit unauthorized dumping and access to the site; fencing acts as a litter trap for wind blown litter
- Administration building (area 117.94 m²)
- Guard house (area 47.34 m²)
- Worker toilet and shelter (20 m²)
- Shelter for equipment
- Weighbridge (pit above ground type, capacity: 60.00 tons, steel deck 3m x 12m)
- Leachate collection and treatment systems
 - Anaerobic leachate pond (capacity of 4,600 m³)
 - Facultative leachate pond (capacity of 3,400 m³)
 - Constructed wetland (area of 2,500 m²)
- Water Facilities (water tank, pump house and tube well) with needed pipeline
- Septic Tanks (2 locations)
- Monitoring well (2 locations) one upstream and one downstream of the landfill site. The drilling engineer will locate the suitable sites during construction.
- Parking area
- Landscaping (about 182.26 m²) and tree planting - a tree boundary which will act as a visual screen and reduce wind across the site therefore reducing the risk of wind blown litter.
- Internal access roads, total 353.5 m, width 2-8m depending on location
- External access road, total 230m width 12m
- 3.1km 5 m wide laterite pavement on existing commune road from the junction with the access road to the quarry site to the entrance of the landfill; within right of way, existing road is over 5m wide.
- Lightning of the reception areas and roads at the sites by illumination poles with armatures
- Other site works

57. **Landfill liner.** The cell lining will comprise a compacted clay/silt (geological barrier) with a minimum required thickness and a maximum allowable hydraulic conductivity, overlaid by an asphalt liner, a proven waterproofing material in hydraulic engineering:

- Geological barrier minimum 600 mm base and sides
- Bottom sealing, minimum 50 mm asphalt liner (air content <5%)

58. **Leachate Treatment.** The leachate treatment method selected is the stabilization pond treatment. Conventionally this would require a series of anaerobic, facultative and maturation ponds. However, the irregular size of the site for the landfill does not allow the construction of 3 ponds without having to reduce the storage area for solid waste. Therefore, to make full advantage of the available space, the option selected is a combination of an anaerobic pond, a facultative pond and a constructed wetland area in a narrow section at the eastern lower elevation of the landfill site.

59. The leachate treatment pond system and constructed wetland is oversized to accommodate an extreme rainfall event of 151 mm per day with a return period of 10 years. The run off from the cell in operation will be about 1.200 m³/day, assuming a runoff factor of 75% during the initial phase of filling the cell. Even under these extreme events the anaerobic pond would provide for a Hydraulic Residence Time of 3.6 days and the facultative pond 2.5 days. The

constructed wetland would have the capacity to treat a flow of 20 l/s (1.700 m³/day) assuming a treatment efficiency for BOD removal in the anaerobic and facultative ponds of 80%. It should be considered that during extreme rainfall events the pollution load of the leachate will be greatly diluted, especially during the first 2 years of cell filling.

60. Under average conditions with a daily rainfall of 26 mm. the Hydraulic Residence Time in the anaerobic and facultative ponds will be respectively 21 and 14 days. Under these conditions about 63% of the BOD₅ will be removed in the anaerobic ponds and of the remaining BOD₅ load 63% will be removed in the facultative pond. To treat the remaining BOD load a constructed wetland area of 716 m² is required. However, a total wetland area of 2.500 m² is provided to deal with extreme events and under average conditions assures that no untreated effluent is discharged from the site.

61. Construction of anaerobic and facultative ponds is the same as the landfill bottom construction. Bottom sealing of ponds shall be done using asphalt concrete.

4. Existing dump site

62. The dump site will not be closed as part of the project. It is on private land and is the responsibility of the private operator to close as required. The dumpsite is in a flat and hilly area 9 km by road north of the town in Prey Khmom commune, Teuk Chhou district, and is accessed with a 3 km unsealed track off the main highway. A solid waste collection service currently is contracted by the Government with approximately 85% of houses on the collection route having garbage collected. The province reported that originally the 17.2 ha site was divided into three parts: a) dump site (15.2 ha); b) hazardous waste site (1 ha); and c) a composting area (1 ha).

63. The dump site was originally divided into 80m x 30m x 4m deep cells. However, the site is now an uncontrolled dump with no leachate collection or cell management. The cells are not distinguishable. Waste is dumped over a wide area close to the access road without organized compaction or regular earth cover and is periodically burned. Collection and dump management are currently contracted out to the private contractor Gaia. Photos of the current site are shown in Figure III-6.

Figure III-6 : Kampot Dumpsite Existing Condition



Source: PISCB Team

IV. DESCRIPTION OF THE ENVIRONMENT

A. Introduction

64. The description of the affected environment in Kampot focuses on the immediate subproject areas that could possibly be affected by the investments, or the environmental features that could influence the successful implementation and operation of the completed subprojects. Regional environmental information is included where relevant.

65. Environmental baseline information was obtained from the 2015 IEE which primarily used recent provincial State of the Environment Reports prepared by the Provincial Departments of Environment (PDOEs) and supplemented with information from other reports where available. For this update, additional more recent reports were used where available, and baseline data was provided by the IEIA and field visits.

66. Detailed descriptions of the socioeconomic and demographic profiles of Kampot is provided in the relevant social assessment reports.

B. Project Area of Influence

67. The subproject site was visited for the preparation of this IEE, with particular attention paid to identifying:

- Sensitive natural environmental receptors such as water bodies, biodiversity and wildlife habitats;
- Sensitive human receptors;
- Cultural and heritage sites; and
- Potential health and safety issues

68. According to SPS 2009, the area of influence encompasses:

- (i) The primary project site(s) and related facilities that the borrower/client develops or controls. The primary project sites for this project include direct construction sites, access roads, disposal areas, and construction camps.
- (i) Associated facilities that are not funded as part of the project whose viability and existence depends exclusively on the project. No associated facilities are anticipated for this project.
- (ii) Effects from cumulative impacts from further planned development of the project, other sources of similar impacts. No cumulative impacts in this regard are anticipated as a result of this or similar projects.
- (iii) Effects from unplanned but predictable developments caused by the project that may occur later or at a different location. As a result of this project, it is anticipated that the development of the urban centres will continue, leading to further developments around the subproject areas.

69. For construction, borrow sites are not required.

70. The area of influence i.e. the area which is affected by the project, also depends on the environmental impact being considered. Local impacts with a narrow area of influence are those impacts arising from noise, dust and amenity issues. A larger area of influence results from impacts which contribute to global issues such as the embodied carbon associated with the manufacture, supply and use of concrete products, and the carbon emissions associated with material transport. SPS 2009 requires the assessment to identify potential transboundary effects, such as air pollution, and global impacts, such as emission of greenhouse gases.

71. For the purposes of this IEE, the area of influence for amenity issues (noise and dust) is taken to be 250 m, based on noise levels, as follows:

- WHO Community Noise Limits: One Hour LAeq 55 dBA (Decibel average, Outside; residential receptor, day time limit)
- Construction Noise: Backhoe excavator 80dBA at 15m and concrete mixer 79dBA at 15m. Source: Construction Noise Handbook (www.fhwa.dot.gov), US Department of Transport.
- Noise attenuation factor: a conservative 6 dBA each time the distance from the point source is doubled. Source: US Occupational Safety and Health Administration (www.osha.gov/dts/osta/otm/new_noise/). Note that in soft vegetated environments such as in agricultural fields at the landfill site, the noise attenuation will be significantly increased meaning the area of influence could be narrowed.
- Calculation: At 250m the noise at a receptor is approximately 55 dBA (WHO limit).

72. A summary of receptors for the subproject is shown in Table IV-1. These are within the area of influence for the subprojects.

Table IV-1 Summary of Receptors for all Kampot Subprojects

Receptors	Description	GPS Co-Ordinate
Socio-Economic	5 houses within 500m of landfill centre Property 1) 10m from boundary Property 2) 56m from boundary Property 3) 54m from boundary Property 4) 78m from boundary Property 5) 140m from boundary	 10° 42.388'N, 104° 13.008'E 10° 42.567'N, 104° 13.119'E 10° 42.355'N, 104° 12.929'E 10° 42.499'N, 104° 12.863'E 10° 42.291'N, 104° 13.006'E
	Housing area up to 840m along access road from National Road 3	-
Surface water	Numerous ponds for agricultural use Pond 1 Pond 2 Pond 3	 10° 42.345'N, 104° 12.917'E 10° 42.578'N, 104° 12.987'E 10° 42.512'N, 104° 12.838'E
Ecological	Scrub and secondary growth such as acacia trees mimosa and grasses	
Cultural	Wat Pou 124m from access road	10° 40.140'N, 104° 12.750'E

Source: PISCB Team

73. Photographs showing the site environment and relevant receptors are shown in Figure IV-1 and Figure IV-2. These receptors are discussed in the following sections.

Figure IV-1: Kampot Landfill Receptors Map



Figure IV-2: Kampot Landfill Example Receptors



Grass in centre of site



Former borrow sites



General site view from access road



Quarry vehicle on access road



Property close to site
Source: PISCB Team, Site Visits



Sayamia germaini observed on site visit

C. Environmental Compliance Audit

74. **Kampot Dumpsite.** An Environmental Compliance Audit has been undertaken for Kampot dumpsite. It is an SPS requirement for 'existing facilities' and identifies environmental risks and recommendations. Although not strictly a requirement for this subproject, as the site is not being closed and is privately operated on private land, for full information on the current context of the subproject, the audit findings are given in Annex 2.

D. Geography and Topography

5. Geographic Location and Topography

75. The province of Kampot is located in southwestern Cambodia with a total coastline of 73 kilometers. The province occupies 4,873 km² and consists of 8 districts (khan), 92 communes (sangkat), and 104,993 households. The total population of the province is 528,405.

76. The topography and land use in the subproject area is characterized flat low level areas 10-20m above sea level, with a distinct hill area, approximately 190 m above sea level at its peak, 3.6 km long running north south, 2 km wide. This hill area is being used extensively as a quarry.

6. Geology and Soils

77. A geotechnical survey was undertaken in the subproject areas.

78. Geotechnical survey was undertaken to inform the landfill DED on 11th to 12th August 2019. The location of the boreholes for the Kampot landfill site are shown in Figure IV-3.

Figure IV-3: Geotechnical investigation boreholes, Kampot landfill



79. All four borehole logs show dense clayey coarse sand with gravel or lean clays then weak rock starting between to 5m to 12m. The geotechnical report hydraulic conductivity tests confirmed the landfill site to be of low permeability.

E. Climate

7. Rainfall

80. This section uses climate information from the urban drainage subproject DED urban for Kampot.

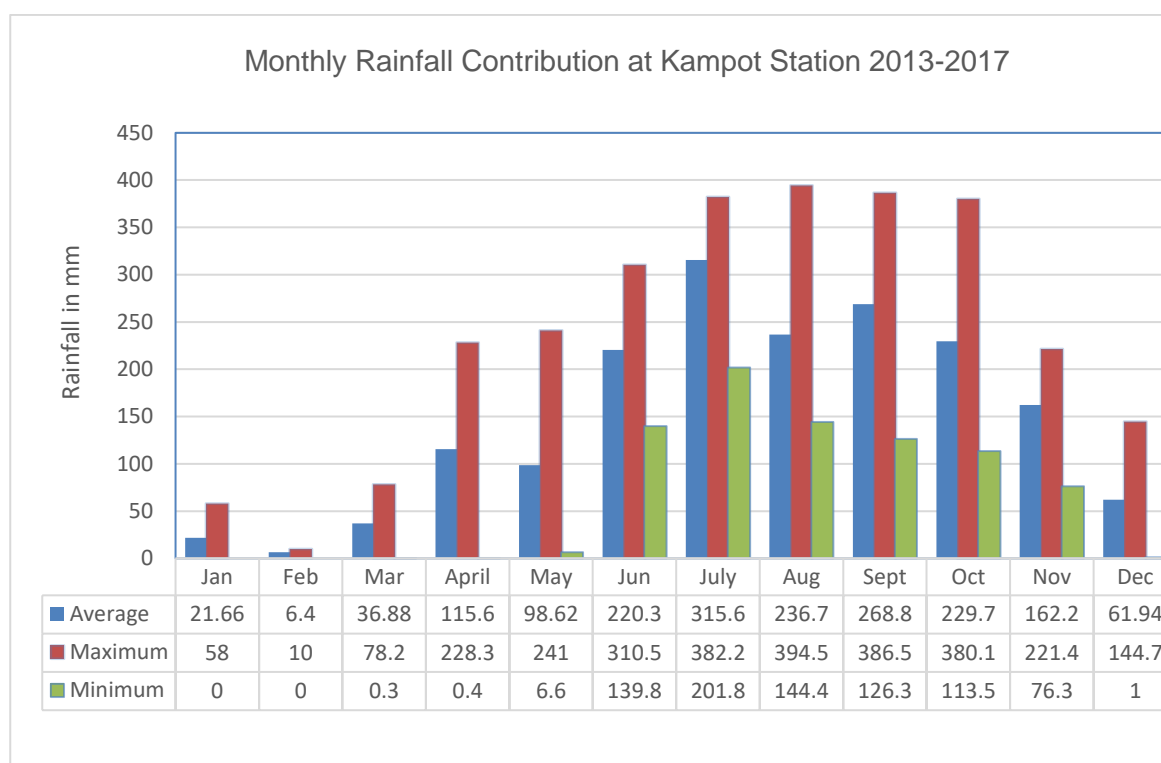
81. Cambodia is located in Southeast Asia in the tropical zone, just 10°-13° north of the equator. Like most of Southeast Asia, Cambodia is warm to hot year round. Cambodia's climate is dominated by tropical monsoonal conditions, divided into two distinct seasons, rainy and dry. The rainy season starts around late May and ends around late October and the dry season covers from the months of November to April.

82. Based on rainfall data (2013-2017) obtained from Department of Meteorology in Phnom Penh and Office of Meteorology in Kampot Province, Table IV-2 shows rainfall statistics. Figure IV-4 gives monthly detail for rainfall data.

Table IV-2 Kampot Rainfall Data (2013-2017)

Town	Annual Average (mm)	Annual Maximum (mm)	Annual Minimum (mm)
Kampot	1774.4	1998.5	1568.5

Source: Department of Meteorology in Phnom Penh and Office of Meteorology in Kampot

Figure IV-4 Kampot Monthly Rainfall Data 2013-2017

Source: DED Report, Kampot Urban Drainage (2018)

8. Temperature and Humidity

83. Inter-annual variations in climate are caused by the El Niño Southern Oscillation. El Niño episodes influence the behavior of the monsoons in this region, and generally bring warmer and drier than average winter conditions across south-east Asia, whilst La Niña episodes bring cooler than average summers⁶. Cambodia experiences hot tropical temperatures.

84. Temperature (Table IV-3) and humidity (Table IV-4) data were obtained from the Department of Meteorology of MoWRAM (2013-2017).

85. For Kampot city, the average annual minimum temperature is 22.7°C, while the average annual maximum temperature is 34.2°C. The highest temperature was 39°C and was recorded in April 2003 and 2011, and the lowest minimum temperature was 19.1 °C and was recorded in February 2011. Humidity averages from 66% to 80% throughout the year, over the last five years.

Table IV-3: Average temperature at Kampot station 2013-2017

Year/Month		Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec
2013	Max	34	36.6	36	37.7	37.7	37	35.2	34.3	33.8	33	32.7	33.1
	Min	20.5	23.2	23.5	23.6	24.4	24.2	23.3	23.2	23.7	23.3	23.3	20
2014	Max	31.3	30.7	33	33.1	34.7	33	33	34	33	34	33.5	33
	Min	16	20	21.8	22	24.8	23.7	23	23	22.5	23.5	21.5	19.8
2015	Max	32.5	33.7	35.2	35.2	25.8	36.5	33.8	34.1	34.2	33.5	33.7	33.3
	Min	19.4	19.9	23	23	24.6	23.4	24.1	24.3	23.9	23.5	23	22.4
2016	Max	33.3	35.5	33.3	34.9	35.3	36.7	34.2	33.9	35	33.8	32.9	32.2

	Min	21	19.4	23.8	23.6	25	23.4	24.2	24.2	23.12	24.1	23.2	22.2
2017	Max	34.7	35.4	36.6	36	34.2	34.9	32.9	33.9	33.7	33.7	32.6	32.9
	Min	21	20.7	22.5	24.2	24	23.3	23.2	23.4	24.3	23.2	23.3	16.2
Average		26.4	27.5	28.9	29.3	29	29.6	28.7	28.8	28.7	28.6	28	26.5

Source: Department of Meteorology of MoWRAM, Kampot

Table IV-4: Humidity (%) in Kampot station 2013-2017

Year/month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
2013	71.3	71.6	68.2	70.4	72.3	71	59.4	76.2	86.3	75.3	73.1	63.2
2014	62.1	69.6	67.7	68.5	68.2	74	74.4	77.5	81.9	80.9	76.4	78.4
2015	66.1	69.3	70.3	72.4	67.8	74.3	76	77	79.3	76.8	76.4	70.1
2016	71.3	63.3	70	66.7	73.3	78	76.8	77.5	74.7	80.9	75.3	72.1
2017	61	65.7	70.2	73.5	78.1	73.5	78	78.6	78.3	78.3	76.8	67.4
Average	66.3	67.9	69.3	70.3	72	74.1	72.9	77.4	80.1	78.4	75.6	70.2

Source: Department of Meteorology of MoWRAM, Kampot

9. Wind

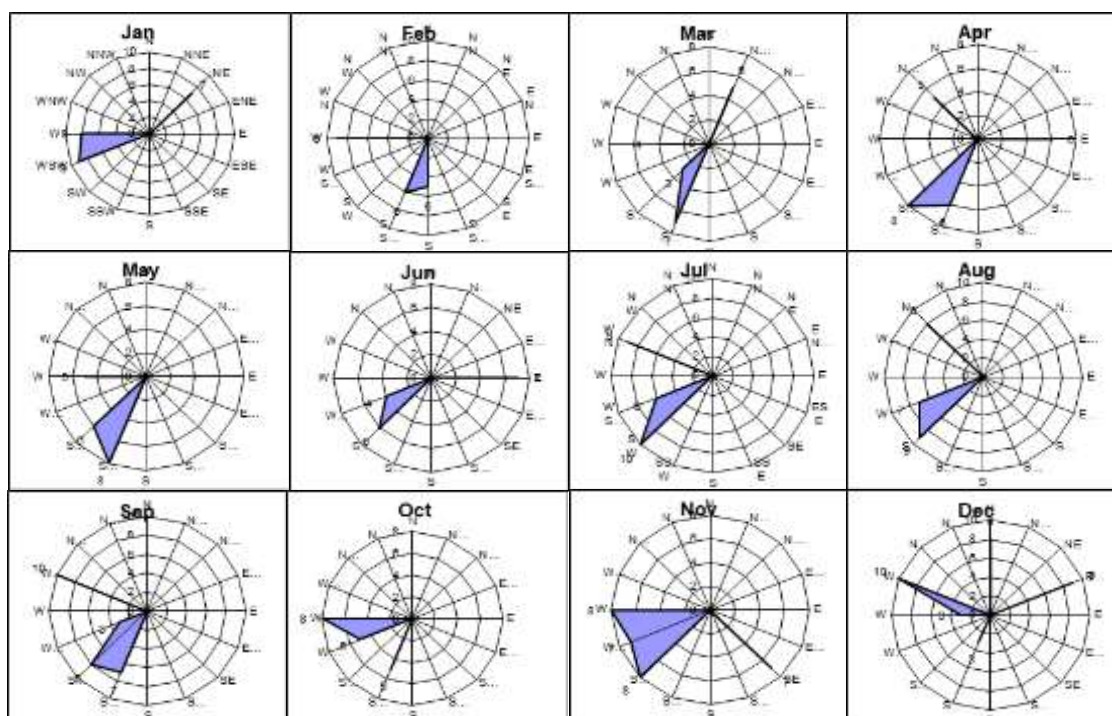
86. Wind speed data and wind roses are provide below showing a clear west to south-south-west wind is dominant in Kampot.

Table IV-5: Wind direction and speed (m/s) at Kampot station 2014-2016

Year/Month		Jan	Feb	Mar	Apr.	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Av/
2014	Direction	WN W	SW	W	NW	W	W	WN W	NW	WN W	WS W	W	SSW	6.6
	Speed	8	6	4	5	5	4	9	8	10	5	8	3	
2015	Direction	NE	S	NNE	E	SSW	E	SW	NW	SW	SSW	SW	N	7
	Speed	7	5	5	6	8	7	10	8	8	5	8	8	
2016	Direction	WS W	W	SSW	SSW	SW	W	WS W	SW	SSW	SSW	SE	ENE	7.2
	Speed	9	9	7	8	6	6	6	9	7	5	7	9	
Average		8	7	5	6	7	6	8	8	8	5	7	7	

Source: Source: Department of Meteorology of MoWRAM, Kampot

Figure IV-5: Wind Direction in Kampot town 2014-2016



Source: Department of Meteorology of MoWRAM, Kampot

10. Natural Hazards and Climate Change

87. Information in this section is from the final report from TA 8425-REG: Second Greater Mekong Subregion Corridor Towns Development Project: Integrated Disaster Risk Management. This report was completed in June 2017 by The International Centre for Environmental Management (ICEM)⁷. The key findings of the report include:

- **Critical and social infrastructure is threatened by climate and geophysical hazards.** The most prevalent climate hazards include river floods, urban floods, drought, erosion and sedimentation, tropical storms and typhoons. Geophysical hazards include landslides.
- **Besides the new and changing vulnerabilities relating to growing urbanization, there are added impacts from climate change that threaten the project towns.** Climate trends and anecdotal evidence suggest each town is already experiencing the impacts of climate change.
- **Drought spells in the wet season will increase, but also the frequency and duration of flooding [will increase].** The intense rainfalls will trigger erosion and landslides and flash floods in urban areas. The *El Niño–Southern Oscillation* will cause extended droughts, increase the number of tropical storms and so the frequency of high-intensity rainstorms.

88. **Natural Hazards.** Through consultation with local stakeholders, the report identifies and maps natural hazards and past extreme climate events. The natural hazards identified in Kampot are shown in Figure IV-6.

89. **Climate change impacts.** Climate change is projected to bring more extreme

⁷ ICEM (2017) TA8425-REG Second Greater Mekong Subregion Corridor Towns Development Project: Integrated Disaster Risk Management (46443-001) KEY FINDINGS AND LESSONS LEARNED and FINAL REPORT Prepared for Asian Development Bank

conditions to the GMS countries. This includes increasing the frequency and severity of climate and hydrological events. Sea level rise, storm surge, increased flood levels and flood duration, and more extensive and unpredictable droughts threaten populations and critical infrastructure across the region. The ICEM developed a downscaled climate change model for Kampot province. The model looked at reliable projections with time horizons of 2030, 2050, and 2100. The results are presented for annual and seasonal (dry and wet) rainfall as well as for temperature increase Figure IV-7

90. ICEM's predictions show that the monsoon will start later than today, the duration of the time when rainfall occurs will become shorter, the time between consecutive rainfalls will become longer, and the rainfall intensity will increase. All these will have a mostly negative effect specifically on the agricultural and social-economic development of the countries.

Figure IV-6: Identified natural hazards in project area

Country	Cam
Natural hazard/city	Kampot
Floods (rivers)	x
Flash flood (urban)	x
Flash flood	
Drought	x
Landslides	
Erosion and sedimentation	x
Earthquakes	
Tropical storms and typhoons	x
Storm surge	x
Tsunami	
Sea level rise	x
Heatwaves	x

Source: ICEM Final Report: Integrated Disaster Risk Management (2017)

Figure IV-7: Expected climate change effects by 2050 expressed in change in annual, dry and wet season rainfall, and temperature

Country	Cam
Climate parameter/town	Kampot
Increase in annual rainfall (%)	+ 6.8
Increase in dry season rainfall (%)	- 4.0
Increase in wet season rainfall (%)	+ 9.5
Increase in annual temperature (°C)	+ 2.6
Increase in dry season temperature (°C)	+ 2.3
Increase in wet season temperature (°C)	+ 2.9

Source: ICEM Key Findings and Lessons Learned: Integrated Disaster Risk Management (2017)

F. Water

11. Surface Water

91. Kampot landfill site does not have any surface water streams in its immediate vicinity but it has a number of surface water ponds used for agriculture scattered in the farmland surrounding the site. Stoung Sanke is the nearest flowing surface water body, to the north and east of the site, approximately 4 km away, with the mountain in between the site and the river. It is a tributary to

Teuk Cheuu river approximately 8km from the landfill site. No water analysis is available for Stoung Sanke however Teuk Cheuu river and Kbal Romeas river (9km south of the landfill site) were analysed for the urban drainage and sewage collection subproject. Table IV-6 shows water analysis results, taken on 5th March 2018. The parameters are all within the prescribed standard.

Table IV-6: Water Quality Analysis for Teuk Cheuu and Kbal Romeas River (Kampot)

No	Parameters	Unit	Results / Sample Number			Standard
			R-01 ^(a)	R-03 ^(b)	S-01 ^(c)	
1	pH	-	7.5	7.4	8	6.5 - 8.5
2	Temperature	oC	21	22	25	-
3	DO	mg/L	6.4	6.4	5.8	2 - 7.5
4	Turbidity	NTU	2	0	16	-
5	TSS	mg/L	47	6	59	25 -100
6	(BOD) ₅	mg/L	7.9	0.85	9.4	1-10
7	(COD)Cr	mg/L	20	4	28	-
8	Oil and Grease	mg/L	3.8	0.24	4.86	-
9	Arsenic (As)	mg/L	0.003	ND	0.005	-
10	Cadmium (Cd)	mg/L	0.0006	ND	0.0004	-
11	Copper (Cu)	mg/L	0.0005	ND	0.0008	-
12	Lead (Pb)	mg/L	0.0003	ND	0.0002	-
13	Mercury (Total)	Mg/L	0.0002	ND	0.0003	-
14	Total Coli form	MPN/100	2.4×10 ³	1.4×10 ²	14.6×10 ³	<5000
(a) Teuk Cheuu River X=410301 Y=1172212						
(b) Teuk Cheuu River X=409296 Y= 1173844						
Standard: Water Quality Standard in public water areas for bio-diversity conservation Sub-decree No. 42 ANRK.BK on Water Pollution Control, MOE, 1999 (Annex 4)						

Source: Ministry of Environment Testing Laboratory

12. Ground Water

92. A geotechnical survey was conducted 11/08/19. Four boreholes were drilled on the landfill site. Water encountered during drilling at 0.4-0.5m. The drilling team noted that there had been exceptional heavy rain during drilling and after 24 hours the borehole water level was at ground level. The drilling team assumed a depth to actual groundwater 12m.

G. Air Quality and Noise

93. Typically, in Cambodia, outside Phnom Penh or town centers there are few industrial pollution sources and the volume of vehicular traffic is low mean air quality is fair. Kampot landfill access road passes a quarry which will generate noise and dust. Key noise sensitive receptors are residents living around the site including access roads, during construction and operation. No specific analysis for noise or air quality is available at the landfill subproject site.

H. Protected Areas, Flora and Fauna

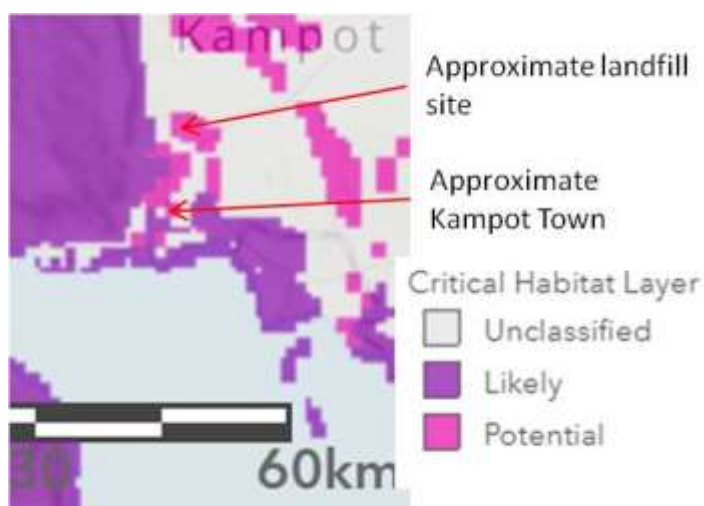
13. 1. Protected Areas and Critical Habitat

94. The IBAT⁸ screening tool was used to identify biodiversity features and species located in the following buffers: 1km, 5km and 10km. Bokor National Park was the only biodiversity feature identified. The closest protected areas to the project site is Bokor National Park, approximately 10km to the west of Kampot town. Given the distance of Bokor national park to the subproject sites and its drainage (draining towards the project site), it is not considered at risk of impact from the project.

⁸ Integrated Biodiversity Assessment Tool (IBAT) available at www.ibat-alliance.org Proximity Report run date: 27-11-20

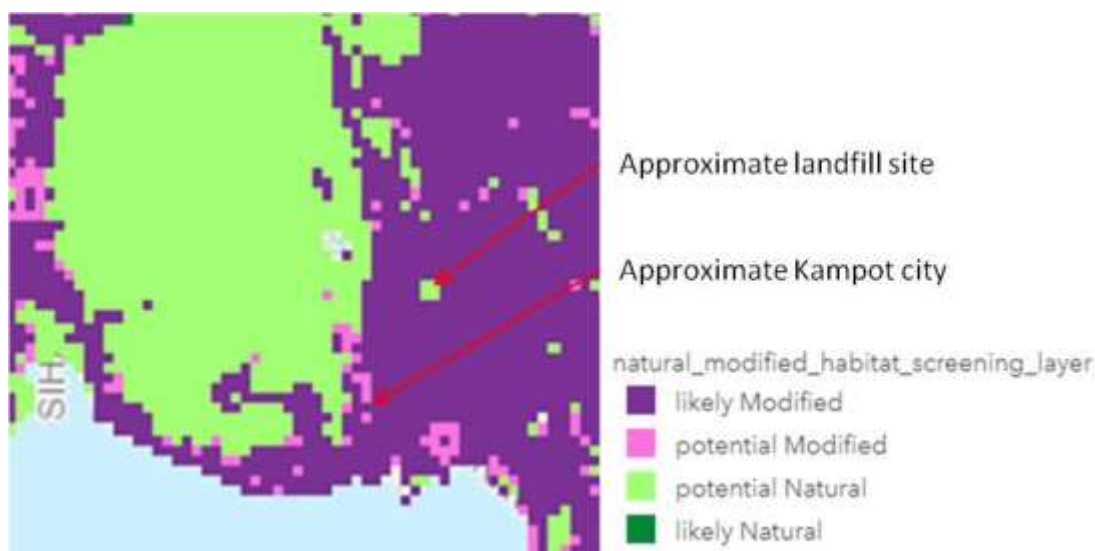
95. Using UNEP's Critical Habitat's database⁹ a broad assessment is made of potential critical habitat and UNEP's Natural and Modified Habitat screening layer¹⁰ are used to broadly outline any potential habitat issues. These tools are more applicable to larger sites as the resolution is limited to 1km squares however the results are shown below. Both show the mountain area to the west of the landfill site to be a potential habitat of interest, however the site is being rapidly used for aggregates as quarries are being worked indicating habitat of note is unlikely.

Figure IV-8 Critical Habitat, Kampot



Source: UNEP data, accessed September 2020

Figure IV-9 Natural and Modified Habitat, Kampot



Source: UNEP data, accessed September 2020

14. Flora

96. The landfill site is located in a highly disturbed area used as borrow sites and in between quarried areas. It is covered by a mix of low grass, shrubs and secondary vegetation such as

⁹ <https://data.unep-wcmc.org/datasets/44>

¹⁰ <https://data-gis.unep-wcmc.org/portal/home/item.html?id=6c90138935c54556aa26e1091e5eb5de>

acacia trees. There are also considerable areas of bare earth where the site has been excavated for construction materials, exposing sandy gravelly soils. As a result no significant flora is observed on the site and no further studies were commissioned.

15. Fauna

97. Given the disturbed nature of the landfill site and access road, and proximity to a quarry and the heavy traffic it generates, no fauna of note is known of in this area. Figure III-4 shows the condition of the site and confirms that it is not a viable habitat for significant species however species such as freshwater crabs *Sayamia germaini* and common myna *Acridotheres tristis* were observed during the site visit¹¹. Both these species are classified as Least Concern on IUCN's Red List Database¹².

I. Socio-Economic Environment

98. The information in this section is taken from a household socio-economic survey conducted with 50 households in Kampot (May 2018), during the preparation of the IEIA.

99. **Occupations.** According to interviews with local people in three villages (Krang, Mouy Uksophea and Kampong Bay village) show that there were six main occupations found in the project area. The highest percentage is small scale business, 66.7% follow by farmer, Non-Governmental Organisations (NGO) and private company staff.

100. **Income and expenditure.** According to the socio-economic survey conducted in three villages (Krang, Mouy Uksophea and Kampong Bay village), the highest average income is pharmacist (966 \$/month) and follow by private company staff (800 \$/month) and small scale business (685 \$/month). The lowest average income is farmer (500\$/month). The expenditure and income is given in Table IV-7.

Table IV-7: Monthly income and expenditure in Kampot subproject

No.	Occupation	Monthly income (\$)	Monthly expend (\$)
1	Pharmacist	966	416
2	Staff of private company	800	425
3	Small scale business	685	351
4	NGO	625	250
5	House Rental	600	300
6	Farmer	500	200
7	Other	650	350

Source: IEIA conducted by KCC, 2018

101. **Water and energy use.** The water use in Kampot town increases every year due to increasing population size; Table IV-8 shows that water use increased by 51% between 2012 and 2016.

Table IV-8: Water use in Kampot town from 2012 to 2016

Data	Unit	2012	2013	2014	2015	2016
Annual Water Supply	m ³	1,449,418	1,635,809	1,828,787	2,130,954	2,193,243
Daily Water Supply	m ³	3,971	4,482	5,010	5,838	6,009
Annual Water Use	m ³	1,178,629	1,344,923	1,570,918	1,899,425	1,989,063
Daily Average Water Use:	m ³	3,229	3,685	4,304	5,204	5,449

¹¹ 03-07-2018

¹² <https://www.iucnredlist.org/>

1. Residential Water Use	m ³	2,791	3,205	3,107	3,725	4,037
2. Trading Water Use	m ³	98	129	880	1,101	977
3. Institutional Water Use	m ³	340	359	318	378	436

Source: Water supply Authority in Kampot town

102. The capacity of power supply in Kampot province is 3.08 MW. This is imported from Vietnam through Kampong Trach district to supply in Kampot town. In 2015, power directly supplied by EDC via 22KV voltage distribution and the 3338km of low voltage network (0.4Kv) was used by over 11,00 consumers.

103. **Kampot Solid Waste Management.** Waste management is intermittent in the town with collections taking place for disposal at the dumpsite in some areas of the town but not all. Outside the urban core, collection usually does not take place and residents are required to manage their waste according to their own preferences. Typically in Cambodia this includes burning, burial or dumping elsewhere informally.

104. **Waste Pickers.** For other ADB projects involving replacement of dumpsites (e.g Tonle Sap Urban Environmental Improvements Projects, landfills in Pursat and Kampong Chhnang) the General Department of Resettlement did not allow the pickers to be 'moved' to the new landfill site. Encouraging waste pickers is not part of a modern landfill and poses significant health and safety risks. As a result the resettlement team propose supporting the waste pickers engagement as employees at the landfill, formalising their role in waste management or providing alternative training opportunities. This is supported through PISCB Package 2 Sustainable Livelihoods Development and Community Awareness which includes a program for skills development and vocational training. Waste picker livelihoods training is specified in the EMP 'Capacity Building and Training' section.

J. Physical Cultural Environment

105. Within the area of influence for the landfill construction, Wat Pou is 120m from the access road to Kampot landfill but is accessed from the main road National Road No.3. No historic cultural buildings including colonial architecture will be affected by the project.

V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

A. Positive Impact and Environmental Benefits

106. The subproject will bring about improved urban environment and climate change-resilience, significantly contributing to an improvement in the lives of residents. The hazards and risks associated with uncollected solid waste will be reduced and waste will be managed in an organized engineered waste disposal facility. The benefits of a modern landfill will only be realized, for the environment and residents, if the site is correctly operated and waste collection in the town is improved. It is essential that the correct waste planning and public awareness campaigns take place to ensure that waste collection coverage is expanded, service delivery is improved, enabling the landfill to capture as much waste as possible.

B. Environmental Impact Screening

107. Screening environmental impacts allows minor impacts to be screened out, allowing the EMP to focus on those impacts which are most in need of mitigation measures. The following section screens the potential impacts according to the following factors and recommends mitigating activities on this basis:

- **“Receptor”**: the resource (human/natural environment/economic/social) which is potentially going to receive and have to cope with an impact.
- **“Sensitivity”**: ability to cope with an impact and/or its importance to the country of Cambodia. It is generally accepted that human health is always a high sensitivity receptor, however in terms of environmental/natural resources, the sensitivity varies according to the receptor e.g. scrubland with no significant biodiversity is considered less sensitive than a mature forest which supports ecosystems and livelihoods.
- **“Magnitude”**: the size of the potential impact. Impacts may be short term and considered low magnitude (e.g. noise or temporary reduction of income during a short construction project) or high magnitude (e.g. the poor disposal of large quantities of hazardous waste into a water course).

108. Where an impact may occur, if there is no receptor to receive the impact, mitigating actions will not be required. This follows the source-pathway-receptor model, whereby in order for there to be an impact, the pollutant or issue (source) needs to be present, the pathway to a receptor is needed (such as fissures in rocks, or water for human consumption) and a receptor must be present to receive the impact, such as humans, flora or fauna.

109. **Potential impact significance.** The following matrix was used during the screening process to anticipate the potential significance of impact, in order to identify the most significant likely impacts to be addressed in the Environmental Management Plan:

Figure V-1 Impact Screening Matrix

		Magnitude of Impact		
		LOW	MEDIUM	HIGH
Receptor Sensitivity & Importance	LOW	Low	Low	Medium
	MEDIUM	Low	Medium	High
	HIGH	Medium	High	High

110. **Residual impact significance.** The residual significance of the impact is the potential impact that remains following mitigation. This more accurately describes the impacts of the project as it is anticipated that the requirements of the EMP will be followed and impacts satisfactorily mitigated.

C. Actions and Impacts Associated with Project Location, Planning and Design

111. Actions associated with the planning phase, prior to construction, that are considered to support sound environmental safeguards are:

- (i) Institutional strengthening. Establishment of PMU and PIU offices and nomination of appropriate staff for each. Includes issuing a Prakas to formally define the offices in relation to the project. Prior to the start of construction, an environmental capacity building and training program will be instigated by the PISCB team. The training will focus on ADB's and Cambodia's relevant environmental, health and safety laws, regulations and policies; implementation of the EMP, environmental monitoring, requirements for information disclosure, public consultation and the project GRM.
- (ii) Grievance Redress Mechanism will be established and functioning prior to construction as detailed in Section VIII of this IEE.
- (iii) This IEE will be updated throughout the project as required, including when the phased completion of project designs takes place. This will result in the EMP also being updated if required.
- (iv) The EMP will be included in the bidding documents. Contractors will then be aware of the required mitigation measures, will uptake into their construction environmental management plan (CEMP) and can budget accordingly for them.
- (v) Disclosure and Consultation. This will take place before construction and will be repeated during the implementation phase, as detailed in Section VII of this IEE.
- (vi) Environmental quality baseline. The environmental baseline is analysed for the subproject including air quality, nearest water body quality, noise and vibration as required by the IEIA and reported in this IEE where data are available.
- (vii) Unexploded ordnance (UXO). UXO clearance will be required prior to any construction activities taking place.

112. No specific indirect, cumulative or induced impacts are anticipated in the design phase.

D. Environmental Impact and Mitigation Measures in Construction

113. The impacts on environmental receptors identified for construction are set out according to the activities anticipated during construction. This makes the EMP as practical as possible for the contractors and operators who are required to follow the mitigation measures within the EMP, as they implement their activities.

114. These impacts and mitigation measures apply as indicated for each construction activity. The specific EMPs will include site specific references to receptors as required, to ensure the contractor and operators are clear on the locations of the key receptors and mitigation measures.

115. Where indirect, cumulative or induced impacts are anticipated, this is specifically mentioned.

16. Household Environmental Protection Measures

116. **Potential Impacts.** The operation of the landfill will cause noise, dust, odor and pest issues to nearby residents, regardless of how effectively the site is managed. Local houses have little protection without windows or well-fitting doors. Although not a construction impact, the mitigation measures will be required as part of the construction contract.

- **Potential Impact Significance:** High – the impacts will be long term throughout the life of the landfill.
- **Residual Impact Significance:** Medium – mitigation measures will be applied to ensure the impacts are as low as possible but the houses remain close to the site.

117. **Mitigation Measures.** The mitigation measures will include the provision of glass windows, fly screens on windows in all houses within 300m of the site and the provision of saplings for a tree screen for properties. The aftercare of the trees will be the responsibility of the house owner. The house owners will be specifically approached about this during the project implementation phase.

17. Land clearance and grubbing

118. **Potential Impacts.** The clearing and grubbing shall consist of clearing the sites of vegetation, grubbing stumps and roots from the landfill site. Potential impacts will be associated with the noise from clearance process, and the disposal of waste arisings. There will be some loss of vegetation and associated ecosystem services from the secondary vegetation growing in the sites.

- **Potential Impact Significance:** Low – the impacts are short term and are not in the immediate vicinity of significant numbers of housing.
- **Residual Impact Significance:** Low – mitigation measures will be applied to ensure the impacts are as low as possible.

119. **Mitigation Measures.** The mitigation measures are covered by those defined below for solid waste management, use of machinery and equipment and flora. Therefore, no further mitigation is needed for land clearance and grubbing.

18. Construction staging area.

120. **Potential Impacts.** A staging area will be required for storing machinery, stockpiles and equipment required for construction. The main potential impact from a staging area is on soil quality from machinery and fuel storage, and the noise and traffic associated with vehicle movements. The site(s) will not be located close to surface water body.

121. **Potential Impact Significance: Medium** – the staging areas will not be located close to residential receptors or water bodies, but impacts on land quality maybe medium term if management of the site is poor.

122. **Residual Impact Significance: Low** – impacts can be lowered through good practice and appropriate siting of the staging area.

123. **Mitigation Measures.** The contractor will provide a map to identify the staging area and this will not be within 20m of a water course and the other mitigation measures in the EMP such as fuel storage and vehicle maintenance requirements will be followed. A plan for restoration following construction will be required.

19. Earthworks and General Civil Works

124. **Potential Impacts.** The impacts from earthworks on the landfill include noise, air quality impacts and traffic generated by construction vehicles; these are similar impacts from the quarrying sites located close to the landfill site therefore there is potential to give rise to cumulative impacts. The impact screening is:

- **Potential Impact Significance: Medium** – noise and dust sensitive receptors are primarily the five household identified within 300m of the site.
- **Residual Impact Significance: Medium** – impacts can be lowered through good practice but noise disturbance cannot be avoided.

125. Recommended mitigation measures to reduce impacts include:

- (i) Water will be sprayed at least twice per day on construction sites, material handling areas when fugitive dust is noticeably generated.
- (ii) Any topsoil and overburden removed should be stockpiled for later restoration.
- (iii) A Traffic Management is included in Community Health and Safety.
- (iv) Trained traffic marshals will be used to direct large construction vehicle movements when entering public roads.
- (v) Contaminated spoil must be tested for contaminants then follow Government regulations including handling, transport, treatment (if necessary), and disposal and will be isolated from human contact and environmental receptors by plastic sheeting or similar.
- (vi) Strict construction hours will be observed from 8am to 5pm.

20. Solid and Liquid Waste

126. **Potential Impacts.** Wastes will be generated throughout construction and will impact on resource use associated with waste production. This includes generation of inert wastes e.g. spoil, biodegradable wastes e.g. cleared vegetation, hazardous wastes e.g. oily wastes and liquid wastes such as sewage from any construction worker sanitation facilities. The impact screening is:

- **Potential Impact Significance: High** – sensitive receptors and hazardous wastes
- **Residual Impact Significance: Low** – simply mitigated but resource use cannot be avoided

127. With adequate waste disposal approaches, including prevention of waste from being generated through recycling, waste generation should not have significant impacts on environmental receptors. The following mitigation measures are recommended:

-
- (i) Manage general solid and liquid waste from construction in line with Government regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force.
 - (ii) Make clear arrangements for storage and transportation of all hazardous and non-hazardous waste to an authorized and approved disposal point (approved by Provincial Department of Environment).
 - (iii) Segregate recyclables at source and given/sold to recycler (plastic, metal, card, paper as a minimum).
 - (iv) Store all solid waste in containers with lids, more than 25 m from all surface water, water supplies, and cultural and ecological sensitive receptors.
 - (v) Prohibit burning of waste at all times.
 - (vi) Provide all vehicles/drivers with plastic bags for waste collection and prevent any unauthorized waste disposal with particular attention paid to prevention of waste entering water ways including drainage ditches.
 - (vii) Provide a schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible.
 - (viii) All spills must be cleaned up completely with all contaminated soil removed and handled in accordance with spoil management mitigation measures.

21. Occupational Health and Safety and Emergency Response

128. **Potential Impacts.** Occupational health risks are particularly a concern in construction sites where excavations, heavy machinery and equipment is used. The receptors (construction workers) are considered sensitive and the magnitude of an impact will be high, should life changing injury of a fatality occur. The impact screening is:

- **Potential Impact Significance: High** – sensitive receptors
- **Residual Impact Significance: Low** – accidents can be largely avoided through good practice

129. For the avoidance of occupational accidents and injury to workers, the following mitigation measures are recommended:

- (i) Assurance that all workers are equipped with, and use Personal Protective Equipment (PPE).
 - (ii) Specifications for the PPE to be used on site and the contractors' approach to enforcement of its use by workers.
 - (iii) Sufficient signage giving occupational health and safety warnings and information disclosure within all construction sites – sub-plan to include example warnings.
 - (iv) Details of worker education and awareness seminars for construction hazards will be given. A construction site safety program will be developed and distributed to workers.
 - (v) Details of daily toolbox meetings (safety briefings)
 - (vi) Details of the site accident record book which will be maintained where all major or minor accidents and incidents are recorded with actions taken.
 - (vii) An Environment Health and Safety qualified engineer or staff member will be engaged for the contract and adequate first aid equipment provided on site.
 - (viii) Drinking water must be provided at all construction sites
-

130. In addition, an emergency response plan will be required, detailing preventative measures for all types of incidents covered in the plan. This will include: Worker injury, Spillage, Fire, and other incidents anticipated by the contractor.

131. As of March 2020, COVID-19 protection measures are required for all Contractors. Any EMPs written after this date will include specific COVID-19 measures to be followed by the Contractor. Contract documents before this date will require contractors to demonstrate their consideration of COVID-19 and how they are managing the issues on active construction sites.

132. COVID-19 specific requirements are summarized in the EMP for Kampot landfill which was written after the COVID-19 pandemic begun as related to construction work and in particular work camps. The EMP also incorporates additional COVID-19 management guidance specific to construction sites.

22. Construction Workers and Camp Management

133. **Potential Impacts.** The influx of workers from outside the area may cause social problems, particularly if the workers are from overseas and are not familiar with local customs and laws. Also the establishment of worker camps, if used in the construction phase, can cause water and soil contamination and will produce household type wastes. The impact screening is:

- **Potential Impact Significance: Medium** – potential sensitive receptors, low magnitude/duration of impact
- **Residual Impact Significance: Low** – impacts can be avoided through good practice

134. For the avoidance of social and environmental concerns and for the welfare of any workers housed in a construction workers' camp, the following mitigation measures are recommended:

- (i) A map showing camp lay out, welfare facilities, and first aid kit locations.
- (ii) Accommodation facilities including separate toilets for male and female workers, adequate drainage to prevent flooding, security including a no weapons policy and waste disposal areas.
- (iii) Pit latrines to be located at least 200m from surface waters, and in areas of suitable soil profiles and above the groundwater levels.
- (iv) A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times.
- (v) Worker camps will have adequate drainage.
- (vi) Providing fire fighting equipment will be provided in all camps and will have adequate signage and prescribed testing intervals.

135. In addition, if a camp is not required, mitigation measures will include:

- (i) Adequate waste disposal facilities including garbage cans for workers.
- (ii) Welfare facilities including water for washing, drinking and include facilities for male and female workers.
- (iii) toilets for male and female construction workers with a cleaning schedule.
- (iv) The contractor will give priority to local labor force and retain evidence of how local labor recruitment efforts were undertaken.
- (v) Relevant training for all construction workers (HIV/Aids, Cambodian laws, GRM, Occupational Health and Safety).

136. The mitigation measures in the EMP include a preference for use of local workers, then workers renting houses within the area, instead of a camp. If this is not possible suitable accommodation will be provided in order to meet ILO Minimum Work Camp Standards, as a supplementary table in EMP. In addition to ILO Requirements¹³, International Finance Corporation requirements are included in the EMP to the extent practicable. Good camp housekeeping will be maintained includes sound waste management; relevant training on local laws and health protection measures provided including on COVID-19; first aid kits are required; communal areas will be provided; strict food hygiene standards will be maintained.

23. Community Health, Safety and Access

137. **Potential Impacts.** During excavations, movement of construction vehicles, and general construction, the local community can be affected by health and the construction has potential to contribute to the cumulative impacts of heavy goods vehicles on local roads given the quarry vehicle traffic. The impact screening is:

- **Potential Impact Significance: Medium** – potential sensitive receptors, low likelihood of serious incident and for the landfill site the residents are used to heavy quarry vehicles.
- **Residual Impact Significance: Low** – impacts can be avoided through good practice.

138. Recommended mitigation measures to prevent community accidents and injury and ensure safe access to property includes a Community Health, Safety and Access Plan which will set out:

- (i) Mud on public roads will be removed at the end of each day and signs warning of mud/skid risk will be placed on the road. Other spillages on public roads will be removed immediately. For the landfill, this includes mud tracked onto the National Road No. 3.
- (ii) Details of sufficient signage giving community dangers / warnings and information disclosure outside all construction sites.
- (iii) Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all roads used by construction vehicles.
- (iv) The contractor will ensure access to private land surrounding the construction sites.

24. Transport, Storage and Use of Construction Materials

139. **Potential Impacts.** The use of heavy construction vehicles to move construction materials including loose aggregates and any pre-fabricated structures, can impact on the local community by increasing the risk of traffic incidents and the air pollution (dust and fumes) associated with vehicle use and the movement of loose materials. Existing quarries will be used for extraction of the aggregates therefore there is less impact than if a new site was to be established however asphalt and concrete batching plants may be required for landfill building construction and finishing road surfaces. The impact screening is:

- **Potential Impact Significance: High** – potential sensitive residential receptors.
- **Residual Impact Significance: Medium** – impacts can be lowered through good practice but disturbance (dust and traffic) cannot be avoided.

¹³ ILO (2009) Workers' housing. ILO Helpdesk Factsheet No. 6

140. Recommended mitigation measures to reduce impacts from construction material transport, storage and use include:

- (i) Define and schedule how materials are transported, and handled and stored at sites.
- (ii) Define and schedule how fabricated materials such as steel, wood structures will be transported and handled.
- (iii) Trucks carrying dry construction materials such as earth; aggregate will be covered with tarpaulins or other suitable cover.
- (iv) Driving on unmade roads, trucks will be limited to 15 kph. Warning sign to inform road users of turning heavy vehicles will be used where trucks cross or turn off the National Road #3.
- (v) Asphalt and concrete batching facilities will be located at least 500m downwind from the nearest dwellings in order to reduce the impact of fumes on humans and to be fitted with necessary equipment such as bag house filters to reduce fugitive dust emissions.
- (vi) Water will be sprayed on material storage areas where fugitive dust is generated and where vehicles are transporting materials on unmade roads, generating dust, where human receptors are within 300m.

25. Use of Machinery and Equipment

141. **Potential impacts.** Static or mobile machinery and equipment will produce noise which can impact on local residents. The use of equipment may impact on water or soil quality if the machinery is not kept in good order, or is repaired in the wrong location e.g. near a sensitive receptor. Also there are inherent occupational health and safety risks to when using construction equipment. The impact screening is:

- **Potential Impact Significance: High** – potential sensitive receptors living close to the landfill site construction area.
- **Residual Impact Significance: Medium** – noise impacts can be lowered through good practice but cannot be avoided, pollution and health and safety impacts can be avoided.

142. Recommended mitigation measures to reduce impacts from use of machinery and equipment are:

- (i) Maintain all exhaust systems in good working order; undertake regular equipment maintenance.
- (ii) Restrict construction activities using heavy machinery between 8 am - 5 pm..
- (iii) Provide advance warning to the community on timing of noisy activities including all residential receptors listed in this EMP. Seek suggestions from community members to reduce noise annoyance, particularly related to noise sensitive activities at receptors
- (iv) Public notification of construction operations will incorporate noise considerations; information procedure of handling complaints through the Grievance Redress Mechanism will be disseminated.
- (v) Ensure noise monitoring is undertaken near sensitive receptors, particularly dwellings when construction machinery is operational.
- (vi) Construction vehicles and machinery will be maintained to a high standard to minimize emissions.

- (vii) All construction workers will use appropriate Personal Protective Equipment (PPE) including ear defenders when operating machinery.
- (viii) No washing or repair of machinery within 50m of surface waters including rivers.
- (ix) Vehicles and machinery to be turned off when not in use.
- (x) Construct temporary noise barriers around excessively noisy activity areas where noise standards (WHO and national) will be breached.

26. Storage and Use of chemicals and fuels

143. **Potential impacts.** Chemicals such as degreasers, oils and fuels are required for the operation of equipment such as generators, and vehicles. The area of influence includes a number of water bodies which are used for agriculture around the landfill site and agricultural fields used for crops. Therefore standard good practice is required. The impact screening is:

- **Potential Impact Significance: Medium** – potential sensitive water receptors, but magnitude of any spillage should be limited
- **Residual Impact Significance: Low** – impacts can be avoided through good practice.

144. Recommended mitigation measures to reduce impacts from storage and use of chemicals and fuels are:

- (i) Refuelling only in designated areas which are to be 50 m from a water course and drip trays to be used when refuelling or topping up / changing machinery fluids.
- (ii) Construction fluids such as oils, and fuels should be stored and handled on a bunded impermeable surface; a bund will be provided around any above ground fuel storage tanks with a capacity of 110% of the largest single tank.
- (iii) All chemicals and fuels will be in labelled containers.

27. Fauna.

145. The baseline assessment shows there are no significant impacts on fauna as it is generally not present in the project area of influence.

28. Flora

146. **Potential Impacts.** Flora on the site is not considered ecologically significant but performs an ecosystem service which will be impacted by vegetation removal at the landfill site.

- **Potential Impact Significance: Low** low value/sensitivity flora receptor intermittent scrub and secondary tree growth.
- **Residual Impact Significance: Low.** Impacts cannot be avoided as tree removal is required.

147. Recommended mitigation measures to reduce impacts on flora are:

- (i) Provision of a tree screen planted around the site to recover some ecosystem services. (Included in construction contract and Bill of Quantities).

29. Restoration and Repair.

148. **Mitigation measures.** At the end of construction, construction workers camp, staging areas, and access roads may contain waste, spoil and other debris. Also the use of public highways and proximity to private properties during excavation may cause unforeseen damage from heavy vehicles and equipment, e.g. damage to road surfaces. The project Bill of Quantities includes repairs caused by such damage and is also included in the EMP for consistency.

- **Potential Impact Significance: Medium** – these sites will not be near sensitive receptors.
- **Residual Impact Significance: Low** – impacts can be lowered through site clear up and rehabilitation.
 - (i) Plan of how camp / staging areas will be restored to original condition after construction completed.
 - (ii) Retention of topsoil on landfill construction areas to support vegetation screening; clear up of debris.
 - (iii) waste, spoil and removal of any contaminated land e.g. oils spills; repair road damage and other accidental damage to the quality specified in the bill of quantities.

E. Environmental Impact and Mitigation Measures in Operation

30. General Community Nuisance

149. **Potential impacts.** The community will be impacted by vehicle movements, odor and dust from the landfill.

- **Potential Impact Significance:** Medium – the community is sensitive to the impacts from the site but will not be living close to the site e.g. may pass by on a journey. However impacts will be long term throughout the operation of the landfill.
- **Residual Impact Significance:** Medium – mitigation measures will be applied to ensure the impacts are as low as possible but the landfill site operation cannot be fully mitigated.

150. **Mitigation Measures.** The landfill operator should be contactable and provide a signboard outside the site; public complaints will be recorded. Waste loads will be covered; litter collections; tree screen; soil cover and wheel washing should be in place. Tree screening is required (to be planted during construction) in order to reduce nuisance impacts from the landfill site. See Visual Impact below.

31. Community H&S

151. **Potential impacts.** Unauthorized access to the site can put people at risk of accident, particularly for landfill sites. Waste pickers are not allowed to access the site as per GDR requirements.

- **Potential Impact Significance:** Medium – some likelihood of access given a culture of waste picking.
- **Residual Impact Significance:** Low – risk of access can be lowered.

152. **Mitigation Measures.** The operator should identify practical measures to prevent unauthorized access including training staff to identify and remove people if required and maintaining fences as far as they are installed during construction.

32. Controlled Landfill Operation

153. **Potential impacts.** Of high magnitude include: (i) air emissions / pollution from dust, gas and odor; (ii) ground water contamination from leachate; (iii) soil contamination from leachate; (iv) visual impact on the landscape; (v) pests/rodents/vermin, bird & stray animal attraction; (vi) wind-blown litter; (vii) fire; (viii) health and safety hazards of, & nuisance for, community along the access roads; and (ix) workers health and safety hazards.

- **Potential Impact Significance:** High –sensitive receptors and long-term impacts.
- **Residual Impact Significance:** Medium – mitigation measures will be applied to ensure the impacts are as low as possible, but a landfill site cannot be fully mitigated and legacy impacts will remain when the site is closed.

154. **Mitigation Measures.** Measures focus on sound operation through the development of a working plan which covers the main aspects of landfill operation such as waste placement, soil cover, and compaction. Environmental protection and monitoring includes groundwater wells and testing surface water ponds and boundary odor monitoring.

33. Occupational Health and Safety

1. **Potential Impacts.** The operations of the subprojects will mean potential health and safety risks to staff; landfill risks include handling waste, bioaerosols, and use of landfill machinery.

- **Potential Impact Significance: High**– highly sensitive human receptors with long term occupational exposure to potential risks.
- **Residual Impact Significance: Low** – can be minimized through good practices in the work place.

155. **Mitigation measures.** Include the development of rigorous site specific health and safety procedures which sets out how the operators will complete a comprehensive H&S training programme; Undertake risk assessments; Use of appropriate PPE; Undertake health assessments; develop emergency procedures and provide access to first aid.

34. Visual impact

156. The landfill will also be clearly visible but is in a quarry area which is already visually impacted.

157. **Mitigation measures.** A tree screen will be planted at the landfill site.

VI. ANALYSIS OF ALTERNATIVES

158. **No Project Alternative.** This is not a viable alternative to landfill, as set out by the Rationale for the project summarised in this IEE and detailed in the project's RRP. The subproject will provide valuable environmental improvements to areas which currently have poor waste management comprising an uncontrolled dumpsite without any environmental controls.

159. **Location.** A number of sites were considered. The final site selected is considered appropriate for a landfill site because it is already in a disturbed site (used as borrow sites), will not take valuable agricultural land and is an area being quarried. In addition and importantly for a landfill, it is a site that is geologically appropriate for waste disposal.

VII. INFORMATION DISCLOSURE AND PUBLIC CONSULTATIONS

160. The stakeholder consultation strategy during project preparation embodied the principles of meaningful engagement, transparency, participation, and inclusiveness to ensure that affected and marginalized groups such as women and the poor were given equal opportunities to participate in the design of the project, in accordance with the requirements ADB's Safeguard Policy Statement (2009), and the ADB Public Communication Policy (2012).

161. The consultation approach on environmental issues during project preparation and DED phase has meant collaboration between the environmental and social teams and has included data collection from:

- (i) Household and village leader interviews conducted by the social development team;
- (ii) Where possible separate consultations with provincial agencies and other stakeholders with by social development team; and
- (iii) Individual and focus group interviews by the environmental team.

162. Public Consultation is continuing during the detailed design and construction phases as per the Public Communication Policy (2012) and general requirements of Cambodia.

A. Identification of Stakeholders

163. Stakeholders were identified and engaged in a participatory manner. Stakeholder communication to date has focused on institutional stakeholders, affected communities, and persons directly affected by proposed subproject interventions. The stakeholders involved in the design of the project include:

- Institutional stakeholders invited including the (i) project Executing Agency and PIUs (ii) provincial agencies (e.g., Environment, Women's Affairs, Commerce, Tourism, Water Resources, Public Works & Transport); private sector groups, and chambers of commerce;
- Communities living near the subproject areas who will benefit from the project, and who have an interest in identifying measures to enhance or maximize the benefits;
- Communities within the subproject area who may be directly and/or adversely affected, and who have an interest in the identification and implementation of measures to avoid or minimize negative impacts;
- Vulnerable and/or marginalized groups who have an interest in the identification and implementation of measures that support and promote their involvement and participation in the project; and
- Other institutions or individuals with a vested interest in the outcomes and/or impacts of the project.

B. Discussion Guide

164. Five open-ended questions, and information requests were posed to guide discussions of the stakeholders.

Table VII-1: Guiding Questions and Information Requests for Stakeholder Consultations

- | |
|--|
| <ol style="list-style-type: none"> 1. What will be the benefits of the subproject? Please list benefits of project. 2. Do you have any environmental concerns with the subproject?
Please list environmental concerns of subproject. 3. Do you any have environmental concerns with the construction activities of the subproject? |
|--|

Please list environmental concerns of construction phase activities.

4. Do you have environmental concerns with the **completed operation phase** of the completed subproject?

Please list environmental concerns of the operation of completed subproject.

5. Do you think the subproject design or operation should be changed to prevent negative environmental, or community impacts?

Please list changes to subproject that you think will prevent or reduce negative environmental, or community impacts?

C. Public Consultations during Project Preparation and DED phase

165. The environmental consultative meetings were conducted in Kampot City Hall on Feb 20, 2015. The meeting was separated between the provincial department levels, and community levels. The consultation in 2015 included discussion on all subprojects in Kampot, not only the subproject within the scope of this IEE.

166. The provincial department level the meeting was conducted in the provincial hall office and chaired by the Vice Governor. Five provincial departments invited to participate defined by Environment, Tourism, Land Management, Public Works, and the Municipality of Kampot. The community level meeting was conducted in a different room. The participants of the community-level meeting represented all areas of the different subproject components. The forty (40) participants including individual villagers, representative of villages, and community level representatives for the entire subproject service area.

167. The individual consultation with local people conducted during the DED phase was conducted on 26 April 2018. The consultation included discussion on all subprojects in Kampot, not only the subproject within the scope of this IEE.

168. **Consultation Outputs.** The stakeholder consultations showed overall positive support for the subprojects in Kampot. Table VII-2 summarizes the comments and concerns of the stakeholders from consultation undertaken for the original IEE (2015). **Note that not all of the responses are now relevant as the scope of the project and available finalized budget has changed.**

169. Table VII-3 gives a summary of stakeholder consultation views during project preparation and Table VII-3 summarizes DED phase consultation.

Table VII-2: Summary of Stakeholder Views in Kampot (2015)

Benefits of subprojects expressed by stakeholders	<ul style="list-style-type: none"> Improved living standard of people due to upgraded and construct new waste water treatment system; Improve drainage system in the town with upgraded capacity; Reduced flooding in rainy season due to improved drainage systems; Rivers will be less polluted due to new waste water treatment plants; Improved environments from new sanitation landfill in Kampot Kampot will be cleaner due to the new infrastructure of subprojects; The provincial development plans of Kampot will be supported by subprojects; Increased GDP in Kampot due to subprojects; Reduce the disease from infection from drainage and sewage when systems are separated; City is clean with good infrastructure;
Stakeholder View	Subprojects Safeguard Response

Construction phase issues	<ul style="list-style-type: none"> • Noise from construction activities; • Air pollution from dust during constructing; • Waste from the construction material; Remain some soils after construction in front of house; • Dust and noise from the construction activities; • Disturbance to the people living next to project site during the construction; • Traffic congestion may disturb to tourist and people living in Kampot; • Traffic Accident during construction; • Block entrance road to home of people living along the project construction; • Wastewater from camp of workers; • Construction Workers may infect HIV/AIDS to local people; • Drug Traffic with workers; • Affect to income of people have shop in front of house when project construct the drainage and sewage system; • Affect to people income due to loss structure without compensate; • Affect to structures and tree along the road and proposed area of project. 	<ul style="list-style-type: none"> • For the construction phase of both subprojects in Kampot the EMPs specify mitigation sub-plans for constructions disturbances such as noise, dust, solid and liquid waste management, traffic congestion, public & worker safety, blocked access, and management of waste from worker camps. • The EMPs also prescribe measures to prevent or reduce social issues arising between the community and worker force such as HIV/Aids • The separate social impact and land acquisition assessments prescribe compensation measure for lost income or property due to subprojects • Tree loss mitigation, and site restoration plans are included in the two EMPs for the subprojects in Kampot. • All potential loss or damage to structures and cultural property will be avoided as per specifications of EMP.
Operation phase issue	<ul style="list-style-type: none"> • It may pollute the water in Kbal Romeas River due to wastewater treatment plant does not have the good capacity to treat. • It may affect to people living along the road to landfill due to waste collection truck. • It may obstruct/destroy the sewage system/pipe and drainage system during operating due to there is not good management and cooperation. • It may affect to waste collectors in landfill due to trucks drive so fast. • if landfill managed by company, they will not apply the technical management. 	<ul style="list-style-type: none"> • Incorporated into the operational phase of the new WWTP in Kampot is regular monitoring of treated effluent quality to ensure effluent meets original design criteria for environmental protection • Included with the new and improved landfills in both towns is a re-designed operations and schedule of garbage trucks traveling to/from the landfills to increase safety and reduce costs. This will include speed limits along access roads in and town. • The new drainage system that is installed will include new stormwater drain as and new wastewater drains so there is no risk of damaging existing drains during operation • The private companies that may operate the new/improved landfills will have to abide by the new rules of operations in order to obtain and then retain their government issued licenses to operate the landfill

Suggested impact mitigation measures	<ul style="list-style-type: none"> • Construction on roads for drainage and sewage system will be finished by block before starting to another place. • Traffic on the road should have facilitator to resolve during construction. • Sub-constructor has to spray water on road that they used during construction. • Good machineries should be used during construction to avoid air pollution. • Waste water and solid waste management system should be done in order to minimize the environmental impacts; • Keep the existing vegetation along the canal/river bank as possible or plant more if not exist; • Standard construction management on both safety and environment should be applied; • Human resources development on the operation and management of waste water treatment plant and landfill should be applied. • Compensate affected people if there are lost assets. • For sewage and drainage system, it should have the responsible team to resolve all matters during operation; if the project doesn't establish this team, we will have the problem again. This team has to control and prepare the penalty for villager or who destroy the system. • All affection has to give the compensation; • Subcontractor has to spray water on used road regularly to avoid dust; • Solid waste generated from project has to collect to dispose every day; • In the operation phase, landfill has to management properly as technical, thus monitoring from provincial level has to be done to avoid company does freely. During transport, waste must not be allowed to fall on to roads. • All waste collection trucks must be cleaned regularly. 	<ul style="list-style-type: none"> • The drainage upgrades will be done in discrete sections with the new drains of a section being completed and operational before the next section is started. • Throughout the construction phase and into the operational phase construction traffic will be managed to minimize congestions, and prevent accidents with the public. • As part of the mitigation sub-plans for dust, water or other wetting agents will be used on all construction roads to prevent dust • Similarly, contractors will have to keep all construction vehicles in good working order. • All construction wastewater will isolated and disposed according to Cambodian regulations. • The site restoration sub-plan of <ul style="list-style-type: none"> • EMP includes riverbank vegetation. • Existing Ministry of Labor and ILO regulations for worker and public safety will be applied to the subprojects during construction and operational phases. • The subprojects incorporate a capacity development and training program for all agencies responsible for the operation and maintenance of the new infrastructure in Kampot and Sihanoukville. • Asset loss compensation is part of the pre-construction phase of the subprojects as indicated above. • As part of capacity development and training, the roles and responsibilities of the operators of the new Kampot WWTP and drainage systems, and appropriate penalties for public violators will be clarified in order to ensure the sustainability of the new systems. • Solid waste will be collected daily according to the needs of each sector in the towns. • Strict operating guidelines and rules for the new and upgraded landfill site will be identified and enforced to ensure the sustainability of effective solid waste management including operation of covered garbage trucks.
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Source: Original Project IEE, Project Preparation Phase (2015)

Table VII-3: Summary of Stakeholder Views in Kampot for all Kampot Subprojects (2018)

Meeting at Kampot Department of Public Work and Transportation office 13-11-2018

14-11-2018	Comments / Requests / Questions / Issues	Safeguard Response
DPWT, DWRAM, DOLMUP&C, DOA, DRD, DOWA, DoT, Krong Kampot, Thmei Commune, Kampong Bay Commune, Krang Ampil Commune, Kampong Kandal Commune, Chum Kreal Commune, Trapeang Chum Commune	<ul style="list-style-type: none"> • All agree with, and support the two sub-projects (Urban Drainage, Wastewater collection network and WWTP and control landfill. • Request that the project owner/contractor should inform before construction • Request to compensate if the project destroy the pipe line • Must provide construction schedule to Water Supply Authority prior to construction of the drainage • Worry about the flood and smell impact to local people who live near the WWTP site. • Flood management in WWTP • Request to provide adequate traffic control during construction • The distance of manhole should be between 50 to 100m • Worry about the remaining soil in front of people's house after construction • Block entrance road to home of people living along the project construction • Boundary the landfill site • Request to consider on women and children in landfill especially on hygiene and health • The location of landfill should locate in the downstream • Request to protect local people who work close to landfill site • Request on capacity building on landfill and WWTP management • Collaborate with local authority • Schedule collection time during operation • Everyday waste collection • Control on workers' health before and after finishing construction • Must provide personal protected equipment (PPE) to workers and staffs • Request to cash salary every month • Salary of worker should be follow government policy • Provide detail design to provincial governor • Conduct a meeting with local authority before construction 	The comments from this consultation are remarkably similar to those above on the previous day, therefore the same responses apply as above.
Note: DPWT=Department of Public Work and Transportation, DOE=Department of Environment, DWRAM=Department of Water Resource and Meteorology, DOLMUP&C=Department of Land Management, Urban Planning and Construction, DOA=Department of Agriculture, DRD=Department of Rural Development, DOWA=Department of Women Affair.		

Table VII-4: Public consultation with waste picker in Kampot

Date 13-14/10/2018	Comments / Requests / Questions / Issues	Safeguard Response
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Kampot Dump site	<ul style="list-style-type: none"> • They support the project • They do not worry about the fly and smell from the dump site • If the project closure they will find other job as worker or stay home to look after children etc... • Request to provide short course training as Sewer, Moto/car repairing, Hair cutting... for young people 	The project social/resettlement team will consider the employment status of the waste pickers in discussion with MPWT.
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Source: PISCB Team consultation August 2018

D. Public Consultations during Project Implementation

170. Consultation will take place during implementation. The PIU Environmental Safeguard Counterpart will undertake consultation, supported by PISCB, following the finalization of the detailed design, and will conduct consultation interviews within 4-6 weeks of construction starting and then again every 3 months until the end of construction. This is set out in the Environmental Monitoring Plan provided in the Environmental Management Plan for each subproject.

171. It is suggested that the consultations take the form of meetings and site-based discussions and include the following types of topics:

- Environmental impacts of civil works (e.g., solid & liquid waste, erosion, local flooding, pollution);
- Any unforeseen impacts caused accidentally e.g. through spillages;
- Civil nuisance (e.g., noise, dust, disrupted business & farming activity, social issues, community health and safety);
- Impaired use of access road to landfill site (e.g. traffic issues and access); and
- GRM and its procedures including details of persons to contact and contact details

172. In summary, informal monitoring interviews with affected people will focus on complaints about community disturbance from construction activities, as well as public concerns about ecological protection, soil / land concerns and access issues. This will contribute to project monitoring. Consultation monitoring templates are developed for use by the PIU for this project. Each is tailored to the types of subproject and an example is in Annex 3 and Annex 4 gives an example of corrective action form that will be used if problems arise during consultation.

E. Information Disclosure

173. Environmental information on the project, including the IEE and other safeguards information will be disclosed in accordance with ADB's Public Communications Policy (2011) and SPS (2009). This includes:

- The EMP will be translated into Khmer and be available for review PDPWT offices;
- The IEE will be disclosed on ADB's project website (www.adb.org) on approval;
- Copies of the IEE are available upon request; and
- Semi-annual environmental reports on project's compliance with the Environmental Management Plan (EMP) and other necessary information will be available at www.adb.org.

Figure VII-1: Photo of the public consultation in Kampot (2018)



Individual interview with local people in Kampot subproject

Figure VII-2: Photo of the public consultation with related provincial governor and related department in Kampot (2018)

1. Public consultation with Kampot governor and related department (date 14/11/2018)



Table VII-5: Public consultation with waste picker in Kampot

1. Public consultation with waste picker in Kampot (date 14/11/2018)



Source: IEIA study team

VIII. Grievance Redress Mechanism

A. GRM Objective

174. A grievance redress mechanism (GRM), consistent with the requirements of the ADB Safeguard Policy Statement (2009) will be established to prevent and address community concerns, reduce risks, and assist the project to maximize environmental and social benefits. In addition to serving as a platform to resolve grievances, the GRM has been designed to help achieve the following objectives: (i) open channels for effective communication, including the identification of new environmental issues of concern arising from the project; (ii) demonstrate concerns about community members and their environmental well-being; and (iii) prevent and mitigate any adverse environmental impacts on communities caused by project implementation and operations. The GRM is accessible to all members of the community and is free of charge.

175. The GRM is set out here in accordance with the approved approach established during Project Preparation, which remains valid. This is a separate grievance system to that managed by General Department of Resettlement which deals with resettlement issues only.

B. Proposed Approach

176. The roles and responsibilities for the GRM are set out in Table VIII-1.

Table VIII-1: GRM Roles and Responsibilities

Role	Responsibilities in GRM
MPWT / Executing Agency	Establish the GRM Set up a Grievance Redress Committee (GRC)
Grievance Redress Committee	Members: Sangkat representative Village leaders or representative PIU-ESC PMU-ESO Municipality representatives Provincial representatives Function: GRM Access Point and Decision Making Monitor and record complaints
PMU-ESO	Oversight of GRM implementation and use Co-ordination with PIU-ESC GRM Record keeping and document storage of all GRM complaints (Formal or Informal) Contact with ADB if Affected People appeal the process GRM reporting
PIU-ESC	GRM implementation at the town level Responsible for keeping the PMU informed
Contractor	Entry point for affected people during construction

177. Table VIII-2 shows sangkats/communes and villages within the project area. Representatives of each, such as Village Chief, will be included in the GRM committee and will be key access points for GRM implementation:

Table VIII-2: Sangkats and Villages for GRM Access and Implementation

Subproject Component	District/ town	Commune / Sangkat	Village
Kampot Landfill	Tuek Chhou	Thmei	Thmei

C. Access to the Mechanism

178. The PMU-ESO and counterparts in the PIUs, will ensure that:

- the public, especially the residents and business owners, in the main areas of influence of the subprojects, are aware of their rights to access, and will have access to, the GRM free of administrative and legal charges;
- the GRM is fully disclosed prior to construction: (a) in public consultations or social/community events, (b) through posters displayed in the offices of the PMU, PIU, Sihanoukville and Kampot Municipalities and concerned Villages/Sangkats and at strategic places within the main areas of influence of subprojects (posters to include names and contact details of the PMU-ESO and PIU-ESC); and (c) sign boards at construction sites.
- Access points will participate in GRM issues and will include:
 - (i) Village representative, e.g. Village Chief (ii) Sangkat representative e.g. from Sangkat Committee (iii) Municipal government representative (iv) PIU-ESC and PMU-ESO.

D. GRM Steps and Timeframe

1.1. Communication on the GRM: Project Hotline

179. The GRM will be communicated to the public and affected people as a Project Hotline; this is considered to be more resonant with people than a 'grievance redress mechanism'. This will include a project **hotline notice board** to be located in each construction site.

180. The project hotline notice board will include the following information and will require the telephone numbers to be updated should the member of staff leave the organisation mentioned on notice board.

Project Hotline

Project: Construction of a controlled landfill for Kampot town

For suggestions, questions or problems related to the project, please contact any of these phone numbers: Call, SMS or Telegram

Name	Role or Company	Phone Number
	Project Management Office, Ministry of Public Works and Transport, Phnom Penh,	
	Project Implementation Office, Phnom Penh, Department of Public Works and Transport, [Town]	
	Sangkat [town]	
	Village Chief, [village]	
	Construction Contractor, [company name]	
	Construction Site Supervisor, Project Management and Implementation Consultants	

You can also contact ADB directly:

ADB, Phnom Penh Office:

[Name] and [Phone Number] and [email address]

ADB Southeast Asia Department of ADB, Manila, Philippines:

[Name] and [Phone Number] and [email address]

Complaints Receiving Officer, Accountability Mechanism

Asian Development Bank

ADB Headquarters, 6 ADB Avenue, Mandaluyong City 1550, Metro Manila, Philippines

(+632) 632-4444 loc. 70309

(+632) 636 2086

amcro@adb.org

Instructions available here: <http://www.adb.org/site/accountability-mechanism/how-file-complaint>

1.2. Recording Project Hotline or GRM issues: Steps and Timeline

181. Complaints should be managed centrally by the PMU-ESO. Records should be kept of complaints made to the other access points, and the date they were passed to PMU for investigation but the main burden of recording detailed information should be on the PMU-ESO.

All complaints should be compiled centrally by PMU-ESO to ensure none are missed and trends are identified. This should include all formal and informal complaints. The format of the recording both within the PMU and within other identified access points.

182. For comments, suggestions or minor issues that can be managed within the construction area, the Hotline Access Point will record the following information, and will inform the PMU:

Table VIII-3: Project Hotline Informal Contact with Affected People

TIMING	For Hotline Access Point Person	
Day 1	1. Date of Contact to Hotline [or verbal contact with GRM access point]	<i>Example: 25-08-19</i>
	2. Name of Person & Contact Details [If Given]	<i>K. Srey, 012 90129901</i>
	3. Construction Site / Project Activity [relevant to person]	<i>Wastewater treatment site</i>
	4. Suggestion / Comment / Complaint: [give detail]	<i>Suggestion: Contractor moves broken concrete pile away from path to improve access</i>
	5. Date PMU (Phnom Penh) Informed:	<i>26-08-19</i>
	6. Name of Person in PMU Informed:	<i>T. Pheap, PMU-ESO</i>
Day 2	7. Action Taken: [for suggestions / comments, for questions, for complaints]	<i>Site Supervisor informed. Concrete moved the next day.</i>
	For PMU: Follow Up	
Day 4	8. Follow Up with Affected Person [date of call, site visit, evidence e.g. photograph from AP or Hotline Access Point]	<i>Called K. Srey. Confirmed concrete moved and access is clear</i>
	9. Further action or resolved? [describe if the problem is solved or action needed]	<i>Resolved</i>

183. For issues that cannot be resolved on site, by discussion with the contractor, the PMU will use the following table to record and resolve the issue.

Table VIII-4: Project Hotline Formal Contact with Affected People

TIMING	For Hotline Access Point Person	
Day 1	1. Date of Contact to Hotline [or verbal contact with GRM access point]	<i>Example 22-02-19</i>
	2. Name of Person & Contact Details [If Given]	<i>D. Than, 092 90129901</i>
	3. Construction Site / Project Activity [relevant to person]	<i>Drain excavation</i>
	4. Suggestion / Comment / Complaint: [give detail]	<i>Complaint: Contractor has cut off water supply to house</i>
	5. Date PMU (Phnom Penh) Informed:	<i>22-02-19</i>
	6. Name of Person in PMU Informed:	<i>T. Pheap, PMU-ESO</i>
Day 2	7. Action Taken: [for suggestions / comments, for questions, for complaints]	<i>Site Supervisor informed. Contractor disagrees.</i>
	For PMU: Follow Up	
Day 4	8. Follow Up with Affected Person [date of call, site visit, evidence e.g. photograph from AP or Hotline Access Point]	<i>Called D. Than. Confirmed water supply not restored</i>
	9. Further action or resolved? [describe if the problem is solved or action needed]	<i>Not resolved Contractor disagrees. Water</i>

		<i>supply was never connected.</i>
	For PMU if Complaint Not Resolved:	
Day 5	10. Complaint Screening: [explain why it is valid/not valid]	<i>Valid complaint. All houses in the road have a water supply.</i>
	11. Date Person informed of Screening [tell affected person if PMU considers the complaint valid]	<i>26-02-19</i>
Day 6-7	12. Investigation & Agreement [discuss on site with PMU, PIU, Contractor and others as required. Identify a solution]	<i>Meeting on site. Contractor will replace the PVC water pipe. Agreed on 28-02-19</i>
	13. Date for implementing resolution [to be completed within 15 days of initial complaint]	<i>30-02-19</i>
Day 16	14. Implementation Follow Up [Contact PIU/Contractor/Site Supervisor and get evidence from site e.g. photographs of completed works]	<i>PIU photos via Telegram of completed pipe work. Discussed with contractor by phone</i>
Day 20	15. Solution Satisfaction Follow Up [Contact Affected Person, obtain signed letter of satisfaction that complaint resolved]	<i>Call to D. Than. Water supply restored. Letter is signed. PIU sent copy via Telegram</i>

184. **Informal Approach (minor issues).** Informally, an affected person (AP) can give a suggestion, comment, question or complaint through:

- Directly to the Contractor during construction;
- Directly to any other Access Point such as village chief; or
- Use the project hotline contact numbers.

185. During operation the affected people will be required to contact the operator as the project hotline approach and PMU, as an office, will no longer be operating.

186. The contractor will initially ensure its worker /staff member hands a GRM Contact Card (required by this EMP) to the complainant. The contractor will also immediately inform the PMU of the comment/question/complaint.

187. For minor issues, if possible the contractor will rectify the problem within one day of any complaint or implementable suggestion. For more significant issues, that may require changes to construction practices, project design or additional budget, the PMU will use the formal approach to managing the affected persons comments/complaints.

188. **Formal Approach (significant issues).** If the issue cannot be resolved informally or the affected person is not satisfied with the resolution so far, the PMU will be required to screen the complaint and engage with other stakeholders as needed to find a solution. As set out in Table VIII-4 the steps to be followed by the PMU are:

- **Complaint Screening.** Screening to check the complaint is valid i.e. is as a result of the project activities. Affected Person is immediately informed of the screening results. If the complaint/issue is screened as non-Project-related and/or invalid, the affected person will be advised that he/she can raise his/her complaint to the second stage of the complaint process; and the PMU-ESO will formally forward the complaint to the District Office
- **Investigation & Agreement.** PIU, Contractor and affected person will discuss the complaint at the site within 2 days of screening. Agreement on actions and measures and a date for implementation of resolution will be agreed. Agreement will be documented using Table VIII-4 and filed by PMU-ESO; PIU, AP, Contractor/Operator will have copies.
- **Implementation Follow Up.** PMU-ESO will follow up to check the implementation of the resolution. The PMU-ESO will obtain evidence on implementation through, site visit and /or photographs and will contact the contractor, PIU and Site Supervisor.

- **Solution Satisfaction Follow Up.** Four days after implementation of the solution the PMU-ESO will contact the affected person to confirm that the solution is working. PIU will secure a written confirmation of satisfaction from the affected person and will forward this to the PMU-ESO.

1.3. Managing Unresolved Complaints

189. **District Level.** For actions not taken within the agreed timeframe and when affected person is dissatisfied with the action taken at the First Stage, the person can raise a complaint to the District Office GRC Representative. The District Office has 15 days within which to resolve the complaint to the satisfaction of all concerned. If the complaint cannot be solved at this stage, the District Office will bring the case to the Provincial Grievance Redress Committee representative.

190. **Provincial Level Appeal.** If the affected person remains dissatisfied (or, in the event the issue/impact persists despite actions undertaken), AP can appeal for assistance from the district in the elevation of his/her complaint to the provincial authority. The provincial authority shall call all parties concerned to review the history of the grievance and resolution process taken and assess the validity of the appeal.

- Within 30 days of the submission of the grievance, the Provincial GRC representative must make a written decision and submit copies to the MPWT, GRC members and the affected person.
- If appeal is found not valid, the provincial authority shall write the affected person and declare the grievance closed. In the event of an appeal, the MPWT shall immediately report to the PMU. The PMU shall inform ADB immediately.

191. **ADB Intervention.** If a resolution is not found, affected people should be encouraged to contact the i) ADB Cambodia Resident Mission or ii) the Southeast Asia Department of ADB in Manila. Finally the Accountability Mechanism of the ADB can be used. The Affected Person should contact the Complaints Receiving Officer of the ADB via the following addresses which will be included in the subproject Hotline signboard:

Complaints Receiving Officer, Accountability Mechanism
Asian Development Bank
ADB Headquarters, 6 ADB Avenue, Mandaluyong City 1550, Metro Manila, Philippines
(+632) 632-4444 loc. 70309
(+632) 636 2086
amcro@adb.org

Instructions available here: <http://www.adb.org/site/accountability-mechanism/how-file-complaint>.

192. **ADB Special Mission or Judicial System.** If the complainant is still unsatisfied, the PMU/EA will inform ADB to convene a special mission to attempt a resolution prior to use of the Cambodian judicial system

193. The Project's GRM should not impede access to the country's jurisdiction or administrative remedies. Accessing the country's legal system and GRM can be done at the same time. If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, the AP has the right to directly discuss his/her concern/complaint with ADB.

194. The PMU-ESO will record all complaints, suggestions, comments including those dealt with within the project site and those elevated to the GRC. This will include all resolutions and satisfaction of affected people.

195. The number of grievances recorded and resolved and the outcomes will be displayed at the offices of PIU, PMU and Municipality and reported in the monthly progress reports, semi-annual monitoring reports during construction and annual monitoring reports during operation, submitted to ADB.

196. All costs involved in resolving complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the PMU. In cases where affected people do not have the writing skills or are unable to express their grievances verbally, they may seek third-party assistance.

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Summary

197. A full EMP for the subproject is provided in a separate document. For clarity, this section of the IEE provides a summary of the EMP.

198. The EMP aims to avoid impacts where possible and mitigate those impacts which cannot be eliminated to an acceptable and minimum level. The EMP includes detailed requirements for:

- Mitigation and monitoring measures;
- Institutional arrangements and project responsibilities;
- EMP budget for implementation
- Capacity building and training requirements
- Public consultation and information disclosure
- GRM including clearly defined timescale and responsibilities

199. The overall responsibility for EMP implementation and compliance with loan assurances lies with the Executing Agency, the Ministry of Public Works and Transport (MPWT). The EA has established a Project Management Unit (PMU) based in Phnom Penh, responsible for general project implementation. The Implementing Agency is the Provincial Department of Public Works and Transport (PDPWT). The PDPWT has established a Project Implementation Unit (PIU), comprising relevant provincial government representatives including the Provincial Department of the Environment.

200. A summary of the key functions for project implementation and environmental safeguards is presented in Table IX-1. To date the Project Management Unit (PMU) has assigned a named Ministry of Public Works and Transport (MPWT) engineer with environmental and social safeguard experience to the role of PMU-ESO and a staff member has been nominated and named for the PIU-ESC role¹⁴.

Table IX-1: Key Functions for Project Implementation

Role	Abbreviation	Location	Summary of Overall Function
Project Steering Committee	PSC	Phnom Penh	Policy and technical guidance for subproject implementation
Project Management Unit	PMU	Phnom Penh within MPWT	Responsible for general project implementation and reporting
PMU Environment Safeguards Officer	PMU-ESO	Phnom Penh within PMU	Existing MPWT staff seconded/assigned to the PMU for the environmental management of the Project EMP compliance and GRM implementation across the subprojects for environmental safeguards – Full Time
Project Implementation Unit	PIU	Provinces within PDPWT	Responsible for subproject implementation
PIU Environmental Safeguard Counterpart	PIU-ESC	Provinces within PIU	Nominated person responsible for subproject environmental monitoring and support to PMU-ESO

14 All PMU and PIU staff are named in Prakas No. 149 (21 March 2016) on the Establishment of Project Management Unity for 2nd Corridor Town Development Project under ADB's Loan by MPWT

Contractor Environmental, Health and Safety Officer	C-EHS	Construction Site	Mitigation measure implementation and reporting
Project Implementation Support & Capacity Building Consultants	PISCB	Phnom Penh	Project final design and implementation, support and capacity development Engineering supervision for all construction and reporting through engagement of a PISCB Construction Supervision Consultant (PISCB-CSC)
PISCB International and National Environment Specialists	PISCB -I/NES	Phnom Penh within PISCB team	Environmental safeguards and reporting support during design and implementation - Intermittent
Asian Development Bank	ADB	-	Review project progress, compliance with covenants and advise on corrective actions

X. CONCLUSIONS and RECOMMENDATIONS

A. Project Risks and Assurances

201. The main project risks related to environment include: (i) low institutional capacity for environmental management and the possibility that the PMU and Implementing Agency will fail to monitor the environmental impact and implement the EMP during the construction and operation of the project; (ii) the PMU and Implementing Agency fail to implement corrective actions as issues arise during project implementation (iii) inadequate budget is allocated for maintenance of the landfill and in particular the development of the next phase of cells in an appropriate manner.

202. The Government and MPWT have assured ADB that implementation of the project shall conform to all applicable ADB policies including those concerning anticorruption measures, safeguards, procurement, consulting services, and disbursement. These are set out in relevant project documents including the PAM.

B. Conclusions

203. This IEE was undertaken to determine the environmental issues and concerns associated with all subprojects. As a result of understanding the environmental baseline, receptors and project activities, an EMP is developed. The EMP, if implemented as directed, will mitigate impacts on the natural environment and affected people to an acceptable level. The key parties for mitigation measures and monitoring are the construction contractors and the operators. The implementation of the EMP will be closely monitored and reported on by the relevant stakeholders in the project.

204. The most significant impacts from the project will arise from facility operation, for the landfill. As a result, there is a comprehensive training and capacity building component to the project which is essential for ensuring the investment is both financially and environmentally sustainable and beneficial.

205. A robust Grievance Redress Mechanism will be established, as outlined in this IEE and the EMP. It will ensure that all unplanned impacts which cause grievances for affected people are managed and a satisfactory outcome brought about swiftly.

206. Overall, the project is anticipated to bring environmental benefits to the project cities. It will serve to improve waste disposal practices, reduce pollution impacts and will provide long term environmental improvements and health benefits for residents and visitors. However the promotion of improved waste collection and overall improved management is required to realize the environmental benefits of the landfill.

C. Recommendations

207. The project will require agreements from the Government that the key risks from the subproject will be mitigated as set out in the EMP. In particular the implementation of construction mitigation measures, and the provision of adequate O&M budgets for operation in accordance with the design recommendations.

208. A key recommendation made with regards to the future sustainability of the subproject:

- The long term benefits of a controlled landfill will be seen only when the waste collection service coverage improves; this means increasing the service area to more of the population which will ensure waste is not disposed of in water bodies, which may impact on the design flow rates for the drainage network subproject.

ANNEXES

1. ANNEX: ENVIRONMENTAL STANDARDS FOR CAMBODIA

(1) Ambient Air Quality Standards

Source: Sub-decree **No. 42 ANRK.BK** on Air Pollution Control and Noise Disturbance, MoE 2000.

Parameter	Averaging Period	Standard	
		Unit	Value
Nitrogen Dioxide (NO ₂)	24 hours	mg /m ³	0.1
Sulfur Dioxide (SO ₂)	24 hours	mg /m ³	0.3
Carbon Monoxide (CO)	8 hours	mg /m ³	20
Ozone (O ₃)	1 hours	mg /m ³	0.2
Lead (Pb)	24 hours	mg /m ³	0.005
TSP	24 hours	mg /m ³	0.33
PM 2.5 (use WHO value in Cambodia)	24 hours	mg /m ³	0.025
PM 10 (use WHO value in Cambodia)	24 hours	mg /m ³	0.05

(2) Ambient Noise Standards

Source: Sub-decree **No. 42 ANRK.BK** on Air Pollution Control and Noise Disturbance, MoE, 2000 and WHO. Bold highlights most stringent standard to be followed.

Areas	Time Period (24 hours)	Standard	
		National Standard (dB(A))	WHO Community Noise (dB(A))
RES: Residential Area MIX: Mixed Residential and Small Industries Area I&C: Industrial and Commercial	Day time (from 6:00am to 6:00pm)	RES: 60 MIX: 75	RES: 55 (serious annoyance) RES: 50 (moderate annoyance) I&C: 70 (hearing impairment)
	Evening Time (from 6:00pm to 10:00pm)	RES: 50 MIX: 70	RES: 55 (moderate annoyance) I&C: 60 (hearing impairment)
	Night time (from 10:00pm to 6:00am)	RES: 45 MIX: 50	RES: 45 (moderate annoyance) I&C: 60 (hearing impairment)

(3) Surface Water Quality Standard

Referring to Sub-decree **No. 27 ANRK.BK** on Water Pollution Control, MoE, 1999, the standards of water quality are divided as follows:

Annex 2 of Sub-decree on Water Pollution Control

Effluent standard for pollution sources discharging wastewater to public water areas or sewer

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer
1	Temperature	0C	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD ₅ (5 days at 200 C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 50	< 80
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5.0	< 15

8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (NO ₃)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO ₄)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO ₄)	mg/l	< 3.0	< 6.0
16	Cyanide (CN)	mg/l	< 0.2	< 1.5
17	Barium (Ba)	mg/l	< 4.0	< 7.0
18	Arsenic (As)	mg/l	< 0.10	< 1.0
19	Tin (Sn)	mg/l	< 2.0	< 8.0
20	Iron (Fe)	mg/l	< 1.0	< 20
21	Boron (B)	mg/l	< 1.0	< 5.0
22	Manganese (Mn)	mg/l	< 1.0	< 5.0
23	Cadmium (Cd)	mg/l	< 0.1	< 0.5
24	Chromium (Cr)+3	mg/l	< 0.2	< 1.0
25	Chromium (Cr)+6	mg/l	< 0.05	< 0.5
26	Copper (Cu)	mg/l	< 0.2	< 1.0
27	Lead (Pb)	mg/l	< 0.1	< 1.0
28	Mercury (Hg)	mg/l	< 0.002	< 0.05
29	Nickel (Ni)	mg/l	< 0.2	< 1.0
30	Selenium (Se)	mg/l	< 0.05	< 0.5
31	Silver (Ag)	mg/l	< 0.1	< 0.5
32	Zinc (Zn)	mg/l	< 1.0	< 3.0
33	Molybdenum (Mo)	mg/l	< 0.1	< 1.0
34	Ammonia (NH ₃)	mg/l	< 5.0	< 7.0
35	DO	mg/l	>2.0	>1.0
36	Polychlorinated Byphemyl	mg/l	<0.003	<0.003
37	Calcium	mg/l	<150	<200
38	Magnesium	mg/l	<150	<200
39	Carbon tetrachloride	mg/l	<3	<3
40	Hexachloro benzene	mg/l	<2	<2
41	DTT	mg/l	<1.3	<1.3
42	Endrin	mg/l	<0.01	<0.01
43	Dieldrin	mg/l	<0.01	<0.01
44	Aldrin	mg/l	<0.01	<0.01
45	Isodrin	mg/l	<0.01	<0.01
46	Perchloro ethylene	mg/l	<2.5	<2.5
47	Hexachloro butadiene	mg/l	<3	<3
48	Chloroform	mg/l	<1	<1
49	1,2 Dichloro ethylene	mg/l	<2.5	<2.5
50	Trichloro ethylene	mg/l	<1	<1
51	Trichloro benzene	mg/l	<2	<2
52	Hexachloro cyclohexene	mg/l	<2	<2

Remark: The Ministry of Environment and the Ministry of Agriculture, Forestry and Fishery shall collaborate to set up the standard of pesticides which discharged from pollution sources.

(4) Water Quality Standard in public water areas for bio-diversity conservation

Source: Sub-decree No. 42 ANRK.BK on Water Pollution Control, MOE, 1999.

Annex 4 of Sub-decree on Water Pollution Control

a) River

Parameter	Standard	
	Unit	Value
pH	mg/l	6.5 – 8.5
BOD ₅	mg/l	1 – 10
Suspended Solid	mg/l	25 – 100

Dissolved Oxygen	mg/l	2.0 - 7.5
Coliform	MPN/100ml	< 5000

b) Lakes and Reservoirs

Parameter	Standard	
	Unit	Value
pH	mg/l	6.5 – 8.5
COD	mg/l	1 – 8
Suspended Solid	mg/l	1 – 15
Dissolved Oxygen	mg/l	2.0 - 7.5
Coliform	MPN/100ml	< 1000
Total Nitrogen	mg/l	1.0 – 0.6
Total Phosphorus	mg/l	0.005 – 0.05

Annex 5 of Sub-decree on Water Pollution Control:

Water Quality Standard (ground and surface water) in public water areas for public health protection (not non-potable water)

No	Parameter	Unit	Standard Value
1	Carbon tetrachloride	µg/l	< 12
2	Hexachloro-benzene	µg/l	< 0.03
3	DDT	µg/l	< 10
4	Endrin	µg/l	< 0.01
5	Dieldrin	µg/l	< 0.01
6	Aldrin	µg/l	< 0.005
7	Isodrin	µg/l	< 0.005
8	Perchloroethylene	µg/l	< 10
9	Hexachlorobutadiene	µg/l	< 0.1
10	Chloroform	µg/l	< 12
11	1,2 Trichloroethylene	µg/l	< 10
12	Trichloroethylene	µg/l	< 10
13	Trichlorobenzene	µg/l	< 0.4
14	Hexachloroethylene	µg/l	< 0.05
15	Benzene	µg/l	< 10
16	Tetrachloroethylene	µg/l	< 10
17	Cadmium	µg/l	< 1
18	Total mercury	µg/l	< 0.5
19	Organic mercury	µg/l	0
20	Lead	µg/l	< 10
21	Chromium, valent 6	µg/l	< 50
22	Arsenic	µg/l	< 10
23	Selenium	µg/l	< 10
24	Polychlorobiohenyl	µg/l	0
25	Cyanide	µg/l	< 0.005

Groundwater Quality Standard (for drinking) from Ministry of Handicrafts and Industry

Based on WHO (2003) Standards

No	Parameter	Standard	
		Unit	Value
2	pH	-	6.5-8.5
3	Turbidity	NTU	5.0
4	Chloride (Cl-)	mg/l	250

5	Sulphate (SO ₄)	mg/l	250
6	Aluminum (Al)	mg/l	0.2
7	Copper (Cu)	mg/l	1.0
8	Iron (Fe)	mg/l	0.3
9	Manganese (Mn)	mg/l	0.1
10	Zinc (Zn)	mg/l	3.0
11	Total Coli form	MPN/100ml	0
12	Mercury (Hg)	mg/l	0.001
13	Lead (Pb)	mg/l	0.01
14	Arsenic (As)	mg/l	0.05
15	Nitrate (NO ₃)	mg/l	50
16	Nitrite (NO ₂)	mg/l	3

Effluent Quality Standard

(Effluent from WWP and from Leachate Treatment Facility at the controlled disposal facility)

Source: Sub-decree **No. 42 ANRK.BK** on Water Pollution Control, MOE, 1999.

No	Parameter	Standard (Allowable limits for pollutant substance discharging) to		
		Unit	Value (Protected public water area)	Value (Public water area and sewer)
1	Temperature	0C	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD ₅ (5 days at 200 C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 50	< 80
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5.0	< 15
8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (NO ₃)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO ₄)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO ₄)	mg/l	< 3.0	< 6.0
16	Cyanide (CN)	mg/l	< 0.2	< 1.5
17	Barium (Ba)	mg/l	< 4.0	< 7.0
18	Arsenic (As)	mg/l	< 0.10	< 1.0
19	Tin (Sn)	mg/l	< 2.0	< 8.0
20	Iron (Fe)	mg/l	< 1.0	< 20
21	Boron (B)	mg/l	< 1.0	< 5.0
22	Manganese (Mn)	mg/l	< 1.0	< 5.0
23	Cadmium (Cd)	mg/l	< 0.1	< 0.5
24	Chromium (Cr)+3	mg/l	< 0.2	< 1.0
25	Chromium (Cr)+6	mg/l	< 0.05	< 0.5
26	Copper (Cu)	mg/l	< 0.2	< 1.0
27	Lead (Pb)	mg/l	< 0.1	< 1.0
28	Mercury (Hg)	mg/l	< 0.002	< 0.05
29	Nickel (Ni)	mg/l	< 0.2	< 1.0
30	Selenium (Se)	mg/l	< 0.05	< 0.5
31	Silver (Ag)	mg/l	< 0.1	< 0.5
32	Zinc (Zn)	mg/l	< 1.0	< 3.0
33	Molybdenum (Mo)	mg/l	< 0.1	< 1.0
34	Ammonia (NH ₃)	mg/l	< 5.0	< 7.0
35	DO	mg/l	>2.0	>1.0
36	Polychlorinated Biphenyl	mg/l	<0.003	<0.003

37	Calcium	mg/l	<150	<200
38	Magnesium	mg/l	<150	<200
39	Carbon tetrachloride	mg/l	<3	<3
40	Hexachloro benzene	mg/l	<2	<2
41	DTT	mg/l	<1.3	<1.3
42	Endrin	mg/l	<0.01	<0.01
43	Dieldrin	mg/l	<0.01	<0.01
44	Aldrin	mg/l	<0.01	<0.01
45	Isodrin	mg/l	<0.01	<0.01
46	Perchloro ethylene	mg/l	<2.5	<2.5
47	Hexachloro butadiene	mg/l	<3	<3
48	Chloroform	mg/l	<1	<1
49	1,2 Dichloro ethylene	mg/l	<2.5	<2.5
50	Trichloro ethylene	mg/l	<1	<1
51	Trichloro benzene	mg/l	<2	<2
52	Hexachloro cyclohexene	mg/l	<2	<2

2. ANNEX: ENVIRONMENTAL COMPLIANCE AUDIT - KAMPOT DUMPSITE

Kampot

October 2018

Introduction

The project will not close the current dumpsite in the town as part of its overall solid waste management improvements. However this Environmental Compliance Audit (ECA) was undertaken¹⁵ in advance of the development of the detailed engineering design (DED) for the project. It provides additional information from an environmental perspective on the dumpsite to support any future management of the site by local authorities. Therefore in this case, the analysis has been done but the results have not been included into the project EMP which would be the required approach if an ECA is part of a project, and in that case costs, responsibilities and the timeline for corrective actions would also have to be determined.

Given the project will not close the dumpsite, it is not considered as an *Existing Facility*¹⁶ of the project. For existing facilities, an ECA must be conducted of that facility, as required by the SPS (2009) which states:

.....for projects involving facilities and/or business activities that already exist or are under construction, the borrower/client will undertake an environment and/or social compliance audit, including on-site assessment, to identify past or present concerns related to impacts on the environment, involuntary resettlement, and Indigenous Peoples.

Essentially, an ECA of the existing dumpsite identifies present or past concerns or issues related to impacts of the dumpsite on the environment. Although not strictly a requirement for this subproject, the ECA was conducted and identifies:




- a) whether the dumpsite is in compliance with current government laws and regulations; and

¹⁵ Site visit 03-07-18 undertaken by National and International Environmental Consultants under PISCB

¹⁶ Existing Facilities 12. For projects involving facilities and/or business activities that already exist or are under construction, the borrower/client will undertake an environment and/or social compliance audit, including on-site assessment, to identify past or present concerns related to impacts on the environment, involuntary resettlement, and Indigenous Peoples. The objective of the compliance audit is to determine whether actions were in accordance with ADB's safeguard Appendix 4 principles and requirements for borrowers/clients and to identify and plan appropriate measures to address outstanding compliance issues. Where noncompliance is identified, a corrective action plan agreed on by ADB and the borrower/client will be prepared. The plan will define necessary remedial actions, the budget for such actions, and the time frame for resolution of noncompliance. The audit report (including corrective action plan, if any) will be made available to the public in accordance with the information disclosure requirements of the Safeguard Requirements 1–3. For environment category A projects involving facilities and/or business activities that already exist or are under construction, the borrower/client will submit the audit report to ADB to disclose on ADB's website at least 120 days prior to ADB Board approval. If a project involves an upgrade or expansion of existing facilities that has potential impacts on the environment, involuntary resettlement, and/or Indigenous Peoples, the requirements for environmental and social impact assessments and planning specified in Safeguard Requirements 1-3 will apply in addition to compliance audit.

b) critical information on the affected environment that will assist with the successful future design of dumpsite closure approach and any associated impacts on the new controlled landfill.

Audit Results – Kampot Dumpsite

GPS Co-Ordinates	<ul style="list-style-type: none"> 10°40'48.83"N, 104°12'21.36"E 	
Setting	<ul style="list-style-type: none"> A relatively flat site, at the foot of a hill area. 10 km north of the town in Prey Khmom commune, Teuk Chhou district Access via 3 km unsealed track off the main highway. 	 <p>Access Road</p>
History	<ul style="list-style-type: none"> The dump site was originally divided into 80m x 30m x 4m deep cells. The cells are not distinguishable The 17.2 ha site was divided into three parts: a) dump site (15.2 ha); b) hazardous waste site (1 ha); and c) a composting area (1 ha). 	
Current Operation	<ul style="list-style-type: none"> An uncontrolled dump with no leachate collection or cell management Periodic burning There is a separate composting facility operated by an NGO [not visible on site visit] 03-07-18 Waste dumped on the site in no order hence spreading beyond the original site boundary Collection and dump management are currently contracted out to Gaia, a private company, on behalf of the municipality 	

Social Aspects	<ul style="list-style-type: none"> • Approximately 30 persons involved in waste picking, living within 1 km or within neighbouring communes. • No households living within the dumpsite but there are some temporary makeshift plastic covered structures. • A wholesaler 300 meters from the dumpsite buys recyclables for sale to a bigger wholesaler in Kampot • A waste picker earns an average of 6,000-7,000 Riels a day; some are farmers who scavenge to supplement their income when farming duties are complete
Health and Safety Risks	<p>Hazards to human health for people currently active on the site or involved in its closure:</p> <ul style="list-style-type: none"> • Bioaerosols associated with organic waste material can impact on respiratory system • Chance of needle stick if walking on waste without steel mid-sole boots or handling waste with appropriate gloves • Cuts and contamination could lead to diseases such as tetanus • Flies as vectors of diseases such as typhoid and dysentery - the site had a large bird population feeding on the flies
Environmental Aspects	<ul style="list-style-type: none"> • Leachate is expressing from the waste onto the surrounding areas include rice fields to the lower part of the site at the entrance; surface water is being contaminated • Groundwater boreholes are not drilled in the dumpsite area so there is no quantification of groundwater contamination but it is assumed that the longer the waste is exposed to rainwater the increased risk of groundwater contamination • Run off from rainwater is not controlled • Evidence of uncontrolled waste burning is seen
Legal Compliance	<p>Sub-decree 113 on Management of Garbage and Urban Solid Waste. SWM is not in compliance with this sub-decree which requires:</p> <ul style="list-style-type: none"> • Article 5: Ministry of Environment is required to promote "environmentally safe the management of garbage and solid waste of downtowns, program to reduce, reuse and recycle (3R)" • Article 20: The municipality should take "measures to prevent any disposal or burning of garbage" - this is not being achieved • Article 37: Owners or operators of "...landfill shall operate their landfill in compliance with technical conditions and environmental protection measures" and if there is an "environmental pollution incident caused by landfill operation the owner or operator of such a landfill shall take immediate action to prevent it" <p>Law on Water Resources Management (2007). Aims to prevent water pollution and is not complied with:</p> <ul style="list-style-type: none"> • Does not allow for indiscriminate discharge, disposal or deposit of polluting substances that are likely to deteriorate water quality and to endanger human, animal and plant health. (Articles 12 & 22) <p>In addition the dumpsites are not known to have been subject to any form of environmental assessment and are polluting land without any mitigation measures. The EIA Law requires an IEIA assessment for all dumpsites serving a population of 200,000 people. This threshold is not met in Kampot; the waste collection service area is approximately 35,000 people.</p> <p>There is little control over the waste entering the site therefore it is anticipated that the Sub Decree on E-waste management on electrical and electronic equipment (2015) is not complied with as it prevents disposal in landfill.</p>

Action Plan – Social Issues	<ul style="list-style-type: none"> Waste pickers will gradually suffer economic displacement because the sources of their income/livelihood coming from the daily garbage brought to the dumpsite will stop because of the operations of the new landfill located elsewhere. The General Department of Resettlement is responsible for income restoration for the waste pickers as they will be prevented from accessing the new landfill. Therefore is not further discussed.
Action Plan – Environmental Issues and Health and Safety during Closure	<p>Health and Safety – measures should include:</p> <ul style="list-style-type: none"> Machine operators/ construction company staff should have no contact with the waste by hand and walking on the waste piles should be prevented Personal Protective Equipment should be provided and its use enforced including gloves, masks, and boots. Hand washing with soap should be provided for all workers involved in site closure Prevention of access by waste pickers or any other unauthorized people during site closure. <p>Site Closure Measures.</p> <p>There are many existing examples of successful site closure approaches. They involve either keeping waste in the existing area or moving it to a new area.</p> <p>Transport of waste to the new site would increase risks of exposure to the waste whilst it was being moved, loaded transported and unloaded. However, it would limit the likelihood of legacy groundwater contamination and would allow the site to recover, although the site cannot be considered free of contamination unless the soil beneath the waste is dug out to an appropriate depth and replaced with clean fill. Therefore keeping the waste in site and capping to prevent further water ingress and leachate generation is an appropriate response.</p> <p>The engineers may specify the closure in detail but the following principles are recommended if the waste stays on site:</p> <ul style="list-style-type: none"> Identifying an area within the site in which to move the waste, such as an existing or newly excavated depression. Considering drainage through using cut off drains or similar to direct surface water flow away from the new area to be capped Recontouring existing waste to a slope to encourage run off of surface water and prevent existing contaminated water being mobilized further Sensitively contouring the waste within the existing landscape Capping the waste with a clay barrier layer then adding a sand and growing medium and re-seeding with native vegetation Implement a quarterly surface water sampling regime downslope of the closed site

3. ANNEX: AFFECTED PERSON MONITORING CONSULTATION - WASTE

For Solid Waste Management Subproject Kampot

When to use this form: DURING CONSTRUCTION

1. Key Informant Interviews - individual answers recorded when consulting individual Affected People.

2. Focus Group Discussion – groups of 8 to 12 people (maximum 12)

Date of Interview		Interviewer Name	
Interview Site: <i>Where is the interview held? In school, on the road, in shop, meeting place</i>		Stakeholder Name & Status: <i>Full name, status is business owner, school teacher, religious leader, resident</i>	
Construction Site & Date Construction Started (subproject) <i>Which location, GPS location if available</i>		Has this stakeholder been interviewed before? <i>Yes (when were they interviewed) No</i>	

Impacts from **NEW LANDFILL CONSTRUCTION**

1. NOISE

1a. Before the project started, was the person disturbed by noise? If yes, explain how and when.

*Where did the noise come from? E.g. traffic, machinery, people, music
When did it disturb the person? E.g. all day, at night, intermittently*

1b. During the construction, is the person disturbed by noise from the project? If yes, explain how and when.

What type of noise and where did the noise come from? All day, at night, intermittently?

1c. If noise from construction is a problem, what changes does the person suggest are made?

2. AIR QUALITY

2a Before the project started, was the person affected by air pollution or dust? If yes, explain how and when.

Where did the pollution or dust come from? E.g. traffic, machinery, construction,

Record of Discussion

burning garbage, cooking stoves When was the dust or pollution a problem? E.g. all day, at night, intermittently	
2b During the project, is the person disturbed by dust or pollution? If yes, explain how and when. What type of noise and where did the noise come from? E.g. increased traffic congestion, construction machinery, construction workers, burning construction garbage etc When did it disturb the person? E.g. all day, at night, intermittently	
2c If dust or air pollution from the construction is a problem, what changes does the person suggest are made?	
3. VEGETATION AND LAND USE	Record of Discussion
3a Before the project started, what was the vegetation like in the project area? E.g. pasture land, trees, shrubs, rice fields.	
3b During the project, has the person found the vegetation situation has changed? If yes, explain how and when.	
3c If impact on vegetation is unacceptable, what changes does the person suggest are made?	
4 COMMUNITY SAFETY	Record of Discussion
4a Before the project started, can you describe the community safety situation in the project area? E.g. no problems, some accidents, difficulty crossing the roads	
4b During the project, has the person found the community safety situation has changed? If yes, explain how and when. Slower traffic so easier to cross the roads, construction vehicles are making a crossing harder / easier, more accidents / less accidents, construction site dangers, river bank unstable	
4c If change in road safety is unacceptable, what changes does the person suggest are made?	
5. WATER QUALITY	Record of Discussion
5a Before the project started, was the person affected by poor water quality? If yes, explain how and when. Ground water? Surface Water? which Water source? How was it polluted?	
5b During the project, is the person affected by water pollution? If yes, explain how and when. Ground water? Surface Water? which Water source? How is quality being affected?	
5c If water quality from the construction	

is a problem, what changes does the person suggest are made?	
6. ACCESS	Record of Discussion
6a. Before the project started, was the person affected by difficulties accessing their property or business?	
6b. During the project, is the person affected by reduced access to their business, home or land? <i>Access to what is limited, and how?</i>	
6c If access limitations are not acceptable, please suggest changes which can be made?	
7. WASTE COLLECTION	Record of Discussion
7a Before the project started, did the person have a waste collection service in their area? <ul style="list-style-type: none"> <i>If yes, explain how long this service has been available?</i> <i>IF they have a service in their area, but do not use it, can they explain why not? Egg. Cost, bad service etc?</i> 	
8. OTHER ISSUES	Record of Discussion
Any other issues about the project that the person wants to discuss? <i>Examples:</i> <i>wastewater concerns</i> <i>waste disposal</i> <i>impact on livelihood/business</i> <i>labour force & social issues</i> <i>Flooding</i>	

4. ANNEX: AFFECTED PERSON MONITORING– CORRECTIVE ACTION FORM

When to use this form:

1. After Consultation with Affected People including Key Informant Interviews and Focus Group Discussions when consultation shows a problem or correction needs to be implemented.

PMU Staff Responsible: <i>(name and role)</i>	Name:	Role:
Date this form is completed		
Form Issued to and Agreed by: <i>(person responsible for corrective action)</i>	Signature:	Date:

Date Consultation Held		
Details of Consultation <i>-Key informant Interview or Focus group Discussion or Other -Location</i>		
Affected Person/Organisation Contact details (if available): <i>-Name & Contact Details</i>		
Details of Issue: <i>-Issues as described during consultation -Actions taken so far</i>		
Corrective Action Needed - Next steps for PMU to resolve the issue		
Who Needs To Take Action	What Actions are Needed	
Example: Contractor	Example: Reduce noise on site after 6pm	
Example: CSC/Contractor	Example: Reduce dust levels by moving aggregate storage	
Deadlines for Corrective Action		
Date Person/Organisation informed about the Corrective Action they need to Take	Date Corrective Action Must be Completed	
Example: Contractor – 1 st April 2018	Example: Immediately	
Example: CSC/Contractor – 1 st April 2018	Example: By 8th April	