

Environmental Assessment Report

Summary Initial Environmental Examination
Project Number: 30240

Cambodia: Cambodia Road Improvement Project

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SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

A. Introduction

1. The Project is classified as environmental category B and an initial environmental examination (IEE) was conducted as part of Project preparation in accordance with *Environmental Assessment Requirements of the Asian Development Bank*. The IEE has been accepted by the Ministry of Public Works and Transport (MPWT).

B. Description of the Project

2. The Project will (i) rehabilitate 150 km of national highway (NR) 6 and NR5 from Siem Reap to Poiphet on the border with Thailand; and (ii) rehabilitate about 60 bridges along NR56 from Sisophon to Samrong and NR68 from Kralanh to Samrong. Both NR56 and NR68 link to NR6.

C. Description of the Environment

1. Physical Resources

3. NR6 and NR5 which links Siem Reap and Poiphet is situated at about 10 m above sea level (asl) on a large area of the Central Plain that surrounds the Tonle Sap and continues to the Mekong river system. Protruding from the plain are a few scattered outcrops of small sandstone hills that may rise to about 100 m asl above the plain. Otherwise, the plain is flat and featureless. From the Tonle Sap the plain rises imperceptibly at a gradient of about 0.03 percent until it encounters the lower slopes of the Dangrek escarpment that forms the divide between Cambodia and Thailand. The range rises to a height of about 800 m.

4. The climate of the area is characterized by a distinct wet and dry season. The southwest monsoon starts in May and ends in October while from November to April the dry northeast monsoon occurs. Temperatures are high throughout the year with a daytime maximum of nearly 35 degrees occurring in April just prior to the rainy season. Average rainfall in Siem Reap is 1408 mm, with 80 percent of the rainfall occurring during the wet season.

5. The hydrology of the area is dominated by three systems that drain to the Tonle Sap, namely; (i) four moderately sized and entrenched watercourses that traverse the flood plain and derive their runoff from the upper catchment areas of the Dangrek escarpment; (ii) locally derived surface flows that originate from the floodplain; and (iii) the operation of the Tonle Sap itself. In normal years, the Tonle Sap operates within the levels of 1.1 m asl and 10.0 m asl. As the road is set about 10.0 m asl, parts of the road that cross the plain at or below this level are influenced.

2. Ecological Resources

6. The Tonle Sap is the largest freshwater lake in Southeast Asia. It covers an area of approximately 250,000 ha in the dry season, and extends to 1,000,000 ha during the wet season creating a vast floodplain. Both the flood plain and the Tonle Sap are essential and linked components of the fisheries of the area. Over 200 species of fish are found in the Tonle Sap with 100 species regularly occurring in the fish catches. The huge wetland system with its habitat diversity supports one of the most productive fisheries in Asia. Other ecological

resources include 200 plant species, 46 mammals and 255 birds along with crocodiles, turtles, water snakes, mollusks and amphibians are recorded in Tonle Sap Biosphere Reserve (TSBR).

7. The dominant land cover along NR6/NR5 between Siem Reap and Poiphet is a mix of paddy fields and extensive grazing. Surrounding and within some of the paddy areas sugar palms occur. From Sisophon to Poiphet, paddy areas are interspersed with shrub and low woody vegetation.

8. Between Siem Reap and Sisophon, NR 6 crosses the Tonle Sap flood plain. Here the alignment of NR6 forms the outer boundary of the Transition Zone of TSBR. The Transition Zone is the lowest classified conservation management area within the TSBR and permits a variety of human activities to be undertaken in it. In discussions with the Ministry of Environment (MOE), reconstruction of NR6 alongside the Transition Zone has been agreed as an acceptable activity.

9. NR 56 runs from Sisophon to Samrong and passes through paddy fields and grazing land with inclusions of woodland close to Samrong. For about 18 km, the road borders the 81,200 hectare (ha) Banteay Chhmar Protected Landscape (BCPL). In common with the rest of the road, the open woodland in the vicinity of the BCPL has been degraded by human settlement. NR 68 from Kralanh to Samrong mainly traverses paddy fields with some grazing land and woodland occurring close to Samrong.

10. According to the sub-decree on management of protected areas prepared by the MOE, development projects can be implemented within protected areas, but not the core areas. The BCPL has not been surveyed nor demarcated so no core area has been identified. According to a study undertaken by the provincial Department of Environment, no rare or endangered species have been reported within the vicinity of the road where it passes alongside the BCPL.

3. Human and Economic Development

11. The population that is resident within the vicinity of NR6/NR5 is 433,400 persons, while 63,200 persons are resident along NR56 and 22,700 persons along NR68. Household size is 5.5 persons and the people are typically Khmer. Poverty is endemic in the area and is greater in the area served by NR56 and NR68 in Oddar Meanchey Province. Rice and fish are important part of the diet for people living in the Project area. Rice cultivation is the dominant agricultural activity, but yields are frequently erratic due to flooding. In some of the slightly higher areas along NR 56, fruit trees and maize are planted. Safe drinking water is a major limitation in the area as both the groundwater and surface water supplies are affected by quality concerns during the dry season. Malaria is endemic in the area. Tourism is a major source of employment close to Siem Reap.

D. Screening of Potential Environmental Impacts and Mitigation Measures

1. Drainage

12. Each year NR6 between Siem Reap and Sisophon is inundated for up to 30 days during the wet season. The raising of the embankment between Siem Reap and Sisophon to a flood free height will cause additional runoff to be held behind the embankment. This will require an engineering solution in terms of additional cross drainage to increase discharge through the embankment. This may be achieved by widening the existing bridges and culverts or construction of additional cross drainage through the road embankment.

13. The required design to address provision of additional cross drainage will; (i) relieve water that may build up against the embankment and; (ii) maintain the flood level at the same height on both sides of the embankment. In areas where rice is cultivated, improved drainage will give landholders better access to their paddy fields and increase rice production. Safe discharge velocities will be required at the drainage outlets to avoid unnecessary sedimentation and water pollution.

2. Fisheries and Other Ecological Resources

14. The flood plain of the Tonle Sap is of major significance to the maintenance of fish stocks and provides a rich feeding area for fish that move in and out of the floodplain. Those fish species that exhibit migratory patterns move into the flood plain during August and September and move back to the Tonle Sap in October. As the road will be provided with additional cross drainage, this will restore and improve access for fish to the flood plain above the road, consequently, no significant impacts are anticipated on other ecological resources.

3. Noise and Dust

15. Noise and dust from unpaved roads is a major nuisance for roadside residents, especially those in built-up areas. As traffic flows increase, this problem will get worse until road surfaces are paved. The Project will have positive impacts on the quality of life of roadside residents as it will result in a significant reduction in dust and to a smaller extent noise.

16. During construction, mitigation measures for noise and dust will be necessary. In order to reduce impacts by noise; (i) construction activities will be avoided at night close to residential areas; and (ii) vehicles will be equipped with effective mufflers. In order to minimize dust; (i) construction sites and access roads through villages will be watered several times a day depending on the condition; and (ii) road paving will be commenced first in built-up areas so as to minimize the numbers of the inhabitants that would be affected by dust.

4. Construction Materials

17. Borrow pits will need to be located along the roads as a source of sub-base material. Borrow pits will be finished and revegetated. Those located on adjoining private land may be used for fish or duck ponds or for storing irrigation water for use in the dry season.

18. Gravel and crushed stone will be hauled by trucks to the project sites. There is a tendency to overload trucks, and already several bridges along NR 5 south of Sisophon are damaged. To avoid further bridge and pavement deterioration during reconstruction, it will be necessary to ensure that the contractors' haulage trucks do not exceed weight limits.

19. The bridge design recommends the use of pre-cast concrete beams that would be cast in a concrete manufacturers site centrally located within the Project. The beams are then transported to site and erected. Thus apart from the bridge abutments and possibly for large box culverts, quantities of cement and aggregate that would normally have been brought on site will be significantly reduced.

20. Fuel and oil, and bitumen storage areas will be located well away from any watercourses. Storage areas will be bunded and provided with interceptor traps so that accidental spills do not contaminate the environment. All waste oil will be stored and disposed of

to acceptable oil industry standards. Washing down water will be directed to this system and held in separation areas for treatment. Wherever possible, refueling will be carried out at a fuel storage area and not permitted within or adjacent to watercourses.

5. Cleanup of the Construction Site

21. When construction is completed, the contractors will clean up the construction sites by removing all equipment and buildings and carrying out site remediation work.

6. Health and Safety

22. The main risks during the construction stage may arise from; (i) inadequate sanitation facilities in work camps; (ii) lack of preparation for accidents and injuries; (iii) introduction of sexually transmitted or other diseases by immigrant workers, and; (iv) outbreaks of malaria in the labor force. In order to avoid these risks; (i) camps will be located well away from communities; (ii) the contractor will be required to prepare a worker health and safety plan which will include provision of sanitation facilities, equipment and medical care; (iii) workers will receive health and safety training; and (iv) workers will under go pre-employment health screening.

7. Historic and Cultural Monuments

23. Two ancient bridges are located along NR 68, which are currently used to carry the road. While initial assessments have indicated that the structural strength of the bridges needs only minor reinstatement, further analysis will be carried out during detailed design.

8. Resettlement

24. The Project will require 122 ha of land from within the RoW of NR5/NR6, affecting approximately 2000 farmers, 240 houses and combined house-shops and 300 small roadside stalls. A Resettlement Plan has been prepared to address these issues. No resettlement is needed for NR56 and NR68.

E. Institutional Requirements and Environmental Monitoring Program

25. The Project complies with procedures set out by MOE on environmental review processes. The IEE, consisting of environmental management plan (EMP) and other components as required by the ADB requirements, will be implemented by the Social and Environment Unit (SEU) that will be established within the Planning Department of the MPWT. Based on the IEE, the SEU will during detailed design, develop a detailed EMP. The detailed EMP will be implemented by MPWT, construction supervision consultants and contractors.

26. During the detailed design stage, close consultations will be undertaken with relevant line ministries such as MOE, Ministry of Water Resources and Meteorology, Ministry of Agriculture Forestry and Fisheries, and the Ministry of Culture and Fine Arts.

27. A Project Implementation Unit (PIU) will be established for the Project and will carry out the environmental monitoring together with the construction supervision consultants. The results will be reported to the Social and Environment Unit, and will be incorporated in the quarterly project progress reports submitted to ADB.

F. Findings and Recommendations

28. The environmental screening process for the project indicates that overall environmental impacts are deemed to be minor because:

- (i) The Project will rehabilitate existing roads, bridges and culverts with limited realignment.
- (ii) Resettlement impacts are limited to RoW occupants.
- (iii) Careful consideration has been given to avoid environmental impacts along the project road.
- (iv) Measures contained in the IEE/SIEE will be taken to mitigate potential impacts

G. Conclusion

29. Potential impacts have been identified and their mitigation measures were prepared together with monitoring program in the IEE. Implementation of the proposed mitigation measures and the monitoring program will reduce most impacts to insignificant levels. Consequently, the IEE is regarded as the final environmental assessment report for the Project.