Public Works Department
Government of Meghalaya

Design of Roads in the State of Meghalaya (EAST)

under Meghalaya Integrated Transport Project

Environmental Assessment Report

EXECUTIVE SUMMARY

Date of Release	: 16. 01. 2020
Prepared	: USS
Checked	: RP / RP
Approved	: RBS

Consultant:

Projects Consulting India (P) Ltd
Engineers & Planners
An ISO 9001:2015 Certified Company
New Delhi 110 070
Email: info@pcindia.co
www.pcindia.co

EXECUTIVE SUMMERY OF EIA REPORT FOR 5 ROAD SECTION IN MEGHALAYA EAST UNDER MITP

A. INTRODUCTION

1. Meghalaya Integrated Transport Project (MITP) is an ambitious project of the Government of Meghalaya (hereinafter refer to as GoM) under which it intends to strategically transform the Core Road Network of 2000 km road length. In the project, State Road Network roads of 650 km road length will be widened, and 1350 km road length will be provided periodic maintenance besides other institutional, development activities. The Project shall follow a Multiphase Programmatic Approach (MPA). Up-gradation of 266.82 km road length will be carried out in Phase-I. The Department of Economic Affairs (DEA) and The World Bank (WB) has accorded in-principle approval of Tranche-I of MITP for US$ 110 million (loan assistance of US$ 82 million and State Share of US$ 28 million), under which State Road Network roads measuring 128 km length will be upgraded along with certain other institutional development activities. There are total 10 road sections selected under Phase-I, 5 road sections in East Meghalaya and 5 road sections in West Meghalaya.

2. The proposed consultancy assignment is to carry out the DPR for Construction of 122.68km of major district roads in East Meghalaya State under Phase-I of MITP. The Consultancy service for preparation of Detailed Project Report have been entrusted to M/s. Projects Consulting India Pvt. Ltd., for total design length of 122.68km of major road sections as listed in below Table-1.

List of roads in Meghalaya East under the project

S.No.	Division	Name of Road	Category	Total Length (km)	Proposed Length (km)
1	N.H. Bye Pass	Shillong - Diengpasoh Road	MDR	21.73	11.763
2	North Jowai	Pasysih - Garampani Road	SH	48	26.98
3	Shillong South	Mawmaram - Nongthliew Mawmih- Mawlyndep Road	MDR	44	41.488
4	N.H. Bye Pass	Laitkor-Pomlakrai - Laitlyngkot Road (5th -16th km)	MDR	15.52	11.358
5	Nongpoh	Umling- Patharkhmah Road	MDR	40	31.100
Total				**169.25**	**122.68**

B. DESCRIPTION OF PROJECT ROAD SECTIONS

3. The subproject roads are located in Eastern part of Meghalaya State covering three districts namely East Khasi Hills, Jaintia Hills and Ri-Bhoi. The total design length of the subproject road sections is 122.68 km. The salient features of individual road sections are brief below:

4. **Shillong – Diengpasoh Road:**This Major District Road starts from Itshyrwat Junction in Shillong and end at Shillong Bypass at km 19.00. The total length of road section is 21.73 km. However, in this scope of study 11.763 km of MDR is covered starting from km 2.200 of Shillong - Diengpasoh Road near Itshyrwat Village to km 13.983 of Shillong - Diengpasoh Road. The section from chainage km

13.983 to end point of MDR where it joins Shillong bypass is being rehabilitated under PMGSY program. The carriageway width varies from 5.0 m to 5.5m and right of way as was observed varies from 12m to 15m.

5. At present most of the length of project road is single lane carriageway with paved shoulders throughout the length. The project road is having poor to fair pavement condition in general, with few stretches having very poor pavement condition.

6. As part of the road improvement for the road section the existing single-lane road would be converted into 2-lane corridor (7.000m carriageway) with 0.9 m wide paved shoulder on either side, V-type Drain / Crash Barrier Hill / Valley side with 0.6m on each side. The total width required will be 10.0m in rural areas and 11.2m in builtup areas, where both side drain is proposed. The alignment passes through bult up areas including Mawdiangdianag, Mawkasiang, Siejong, Tynring and MawpdamgNongthmmai.

7. **Laitkor – Laitlyngkot Road:**This MDR joins NH-6 a primary National Highway connecting Meghalaya, Mizoram and Assam and NH-40 which joins Guwahati and Shillong. The length of this MDR is 15.52 km and in this scope of study 11.358 km of road is covered starting from km 4.0 of Laitkor-Pomlakarai Road to end point of MDR at Laitylyngkot km 15+358 on NH-40. The carriageway width varies from 3.75m to 4m and Right of Way varies from 8.5 to 9.0m.

8. At present most of the length of project road is single lane carriageway throughout the length. The project road is having poor to fair pavement condition in general, with few stretches having very poor pavement condition. The proposed formation width is 7.700 m for rural areasand and 8.900m for both side built-up areas. The villages existing along the road alignment include Laitkor, Mawbynna, Mawtharia, Liewlong, Rangbihbih, Umsaw, Mawpynthih, Maweitnai, Latah&Laitlyngkot.

9. **Mawmaram – Mawlyndep Road:** The road section takes off from NH 106 (Mawmaram / Mawsawa Village) and ends before barrage of Badapani which provided connectivity to NH 06 joining Shillong and Gawahati. The length of MDR section is 41.488 km. The road is in hilly terrain and in the last stretch it runs along Bada Pani lake. The MDR after rehabilitation shall act as western bypass to Shillong City and provides connectivity to tourist places like Diengiei Peak, Mawphanlur, Nongkhnum, Mawsynram caves, Mawlyngbna, Sohra, Mawlynnong.

10. At present most of the length of project road is single lane carriageway throughout the length. The project road is having poor to fair pavement condition in general, with few stretches having very poor pavement condition. The proposed formation width is 6.000m for rural areas and 7.050m for built-up areas.

11. **Pasysih – Garampani Road:** The MDR starts from NH 06 at Pasyih known for Coal mining and ends near the boundary of Meghalaya – Assam Border. The length of MDR is 47.00 km and in the scope of study 26.98 km of road starting from km 20.00 of MDR to km 46+960 of Pasysih - Garampani Road at Saphai Village near Kopili Damis included. The condition of road from km 0.00 to km 20.00 is good that's why this stretch has been excluded from the scope of study. The road provided connectivity of Meghalaya with Assam. The carriage way width varies from 5.0 to 6.0m and right of way as observed is 12.00 to 16.00 m.

12. At present most of the length of project road is single to intermediate lane carriageway throughout the length. The project road is having poor to fair pavement condition in general, with few stretches having very poor pavement condition. The proposed formation width is 8.500 m for rural areas and 9.700m for both side builtup area. The alignment passes through built up areas of Pyntei, Biar, Chatwakhu, Nongkroh, Lakadong, Theym&Saphai.

13. **Umling Patharkama Road:** This MDR takes off from NH 06 and ends at junction of MMR Road (MawmgapMairangRanigodown). The total length of MDR is 40 km. The Scope of Study includes 31.1 km of Length starting from Km 8.00 of MDR to the end point of MDR. The stretch of MDR from km 0.00 to km 8.00 has been developed. The road is running on the bank of small stream from approx. 15 .00 km to 17.00 km and from 17.00 to 21.00 Km on the right and left bank of River UMTRU road crosses the river Umtru at km 18.00. In the last stretch of road, it is also running very near to the road. The carriageway width varies from 3.0 to 3.5m and Right of Way varies from 6.0 to 8.2m.

14. At present most of the length of project road is single lane carriageway throughout the length. The project road is having poor to fair pavement condition in general, with few stretches having very poor pavement condition. The proposed formation width is 6.000 m in rural areas and 7.20m for both side built-up areas. The alignment connects village including Umling, Umdu, Umladoh, Lailad, Umsohma, Old Tasku, NewTasku, Mawpnar, Jali, Them, Nongladew, Umsong, Nongbirthem, Umtasen&Umrit.

Table: Silent features of project road sections

S.N.	Name of Road	Road section			Existing Carriageway width (M)	Existing RoW (M)	Pavement Conditions
		Start Chainage	End Chainage	Length (Km)			
1	Shillong – Diengpasoh Road	2+220	13+983	11.763	6.00 to 8.00	12- 15	Fair -Poor
2	Laitkor – Laitlyngkot Road	4+000	15+358	11.358	3.75 to 4.0	8.5- 9.0	Fair - very Poor
3	Mawmaram – Mawlyndep Road	0+000	41+489	41.488	3.50 to 3.75	7.20 to 12.0	Fair - Poor
4	Pasysih – Garampani Road	19+980	46+960	26.98	5.00 to 6.00	12.0 to 16.0	Fair - very Poor
5	Umling Patharkama Road	0+000	31+100	31.100	3.00 to 3.50	6.0 to 8.2	Poor - very Poor

Table: Environmental features along the project road sections

S.N.	Name of Road	Villages along alignment	Community Sensitive receptors	Terrain& Elevation	Estimated nos. of trees affected	Water bodies	Forest area	Protected area	Remarks
1	Shillong – Diengpasoh Road	Ishriyat, MawdiaigMawkasiang, Siejong, Tynring, MawpdamgNongthmmai	School- 3 nos. at km 5+860, 8+680 & 11+600 Chruch-2 nos. at km 7+800 & 9+000	Hill-rolling terrain At 1170-1462m	85nos.	Stream crossing at km 13+500	Itshriyat reserve forest on RHS of road section about 3 km	Nil	The widening proposal is on LHS of the road to avoid forest land on RHS.
2	Laitkor – Laitlyngkot Road	Laitkor, Mawbynna, Mawtharia, Liewlong, Rangbihbih, Umsaw,	School- 3 nos. at km 4+910, 7+700 & 8+400 Chruch-2 nos. at km 4+900 & 8+380, Health Center at km 9+010	Hill -rolling terrain At 1690-1835m	239nos.	Stream crossing at km 13+000	Nil	Nil	Landslide zone at km 11+550, 12+420, 14+600 and 11+800

S.N.	Name of Road	Villages along alignment	Community Sensitive receptors	Terrain& Elevation	Estimated nos. of trees affected	Water bodies	Forest area	Protected area	Remarks
		Mawpynthih, Maweitnai, Latah, Laitlyngkot							
3	Mawmaram – Mawlyndep Road	Mawmaram, Kynsew, Dewsaw, Nongthliew, Laitarted, Dewlieh, Krang, Dewsaw, Nongsawin, Mawlaide, Umbir and Umsaw	School- 6 nos. at km 4+900, 6+275, 10+400, 10+480, 11+570 & 13+100 Chruch-4 nos. at km 23+790 , 37+050, 44+650, 45+850, Health Center-3 at km 4+700, 32+400& 32+700,	Hill -rolling terrain At 940-1765m	53 nos.	Bada pani water reservoir along the road alignment	Nil	Nil	Landslide zone at km 2+000, 2+600, 2+800, 14+325, 14+519, 14+715, 29+760 and 29+740
4	Pasysih – Garampani Road	Pyntei, Biar, Chatwakhu, Nongkroh, Lakadong, Theym, Saphai	School- 8 nos. at km 30+700, 31+315, 35+495, 36+00, 38+110, 43+500, 44+092 & 44+500 Chruch-4 nos. at km 23+790, 37+050, 44+650 & 45+850, Health Center – 2 nos. at km 30+340 & 38+900 community hall – 3 nos. at km 24+040, 31+315 & 44+500	Hill -rolling terrain At 655-1155m	8 nos.	Number of fishing ponds along the road alignment spotted	Nil	Nil	Landslide zone at km 40+560

S.N.	Name of Road	Villages along alignment	Community Sensitive receptors	Terrain& Elevation	Estimated nos. of trees affected	Water bodies	Forest area	Protected area	Remarks
5	Umling Patharkama Road	Umling, Umdu, Umladoh, Lailad, Umsohma, Old Tasku, NewTasku, Mawpnar, Jali Them, Nongladew, Umsong, Nongbirthem, Umtasen, Umrit	School- 2 nos. at km 20+851, 34+500 Chruch-1 nos. at km 20+870, Health Center at km 32+700 community hall at km 33+200	Hill -rolling terrain At 147-349m	73nos.	River cross at km 18+400, Number of seasonal streams cross the road alignment	Nil	Nongkhyliem Wild Life Sanctuary from km 18 to 21 is passing through the ESZ of the wildlife sanctuary	Landslide zone at km 9+250, 10+101, 11+890, 12+950, 19+445, 23+536, 25+113, 25+158, 25+302, 26+190, 26+880, 28+355, 28+890, 29+153, 29+258 & 29+766

15. The Environmental Impact Assessment study for each road section has been conducted in order to identify all relevant direct, indirect and cumulative environmental and social risks and impacts for construction and operational phase. For environmental studies and subsequently the assessment the Corridor of Impact is considered of 500m on either side of the proposed road and project influence zone is taken 10km on either side (Arial distance) from boundary of road.

16. The environmental assessment study was prepared between the months of October-December 2019 as part of detailed project report. This is draft Environmental Impact Assessment (EIA) report prepared to fulfil requirements of the Operational Policy 4.01 for World Bank funded Project.

C. DESCRIPTION OF ENVIRONMENT

17. **Physical Environment**: The project area experience typical tropical climate. The topography of the project road sections is hilly terrain. Land use is mixed type having community open vegetation, agriculture and habitation along the road sections.

18. The road sections are situated in Meghalaya Plateaumainly Central Plateau of Khasi Hills the elevations range between 900-2000m and Sub-montane region of Jaintia Hills with elevation below 900m.

19. According to GSHAP data, the state of Meghalaya falls in a region of high to very high seismic hazard. As per the 2002 Bureau of Indian Standards (BIS) map, this state also falls in Zone V. Historically; parts of this state have experienced seismic activity greater than **M**6.0 including an **M**8.1 in 1897.

20. The soil quality in the project region is characterized as having dark brown to dark reddish-brown colour, varying in depth from 50-200 cm. The texture of soils varies from loamy to fine loamy. Soils are by and large highly leached, rich in organic carbon with high nitrogen supplying potential, but deficient in phosphorus and potassium. Soil reaction varies from acidic (pH 5.0 to 6.0) to strongly acidic (pH 4.5 to 5.0).

21. One of the world's wettest regions is found in Meghalaya. Mawsynram and Cherrapunji (Sohra) in the East Khasi Hills district are geographically considered as the rainiest places in the World, with Cherrapunjee, receiving close to 12000 mm of annual rainfall and and Mawsynram, a village directly west of Cherrapunji, where rainfall of around 17,800 mm (700 inches) per year.

22. The level of ground water development in the state is 0.15%. The annual gross dynamic ground water recharge of Meghalaya has been estimated as 1.234BCM. Annual allocation for domestic & industrial water requirement upto year 2025 is estimated as 0.096 BCM as per census 2001. 1.014 BCM of ground water potential may be utilized for irrigation.

23. The water resource in the state are currently threatened with contamination, siltation and pollution primarily contributed from coal mining and domestic effluents. The water in coal mining areas is highly acidic with silt and suspended solids deposited at the bottom of these water bodies.

24. The ground water quality analysis conducted by CGWB on sample collected from various dug wells, springs, bore and tube wells in East Khasi Hills, West Jaintia Hills and Ri-Bhoi district. The chemical constituents present in the ground water of the project area is within the desirable limit set for drinking and irrigation water standards. As per CGWB report the spring water is by and large slightly alkaline rather than acidic.Overall the chemical constituent present in the ground water is within permissible

limit set by BIS and WHO except the concentration of Iron in few pockets in deeper aquifer, which is higher than permissible limit.

25. Ambient air quality monitoring has been conducted for assessment of the existing status of air environment within the project influence area. The monitoring of the Ambient Air Quality (AAQ) selected locationsalong the project corridor was carried as per guidelines of Central Pollution Control Board (CPCB) and the requirements of MoEF&CC. Ambient air quality parameters are well within the NAAQ standards of prescribed by MoEFCC for residential areas. Maximum concentration of PM_{10} is 68 &67 µg/m^3 found atMawmaram village &Lakadong Village on Shillong – Diengpasoh Road&Mawmaram – Mawlyndep Road, respectively whereas maximum concentration of PM2.5 is 38 &39.0 µg/m^3 found also at these locations of these road sections. These levels are well within the standards limit of 100 µg/m3 and 60 µg/m^3 prescribed by MoEFCC for PM_{10} and $PM_{2.5}$ respectively. However; PM_{10} level is found to be on higher side compared to World Bank prescribed Standards of 50 µg/m^3 for interim stage 2. Overall the air quality along the subproject roads is not an issue.

26. Similarly, ambient noise levels monitoring was also undertaken along the project road alignments. The noise monitoring levels results are well within the permissible limits for residential areas prescribed by CPCB and also by World Bank EHS standards of 55 dB(A) and 45 dB(A) for day time and night time respectively. The maximum recorded day time noise level is 53.1 dB(A) at Mawmaram and night time noise level is 40.8 dB(A) recorded at same location.

27. **Biological Environment**: The project districts in general have moderate to lowpercentage of forest cover. As per 2011-12 SFR, East Khasi Hills and Jaintia Hills districts in the region have the lowest 63.83% and 65.88% respectively, the state forest cover is 77.2%. The selected project road sections are passing through hilly and rolling terrain with land use being open vegetation, agriculture and patches of forest.

28. The selected road sections under the project are not passing through forest area, except Shillong – Diengpasoh road section.The road section of Shillong – Diengpasoh of 3km length on right hand side is running along Itshyrwat Reserve Forest. The right of way is available for the proposed improvement work on this road section. Hence; no forest clearance from State forest department will be required to undertake improvement work on these road sections.

29. There are Khasi Hills Autonomous District Council, Garo Hills Autonomous District Council and the Jaintia Hills Autonomous District Council. These ADCs have the power to make laws with respect to, among others, the management of any forest not being a reserved forest. In the project road sections, there are no community forest along the existing alignments has been identified.

30. About 428 trees are likely to be cut for the implementation of the improvements proposed under the project for 5road sections under the project. All cut trees will be compensated at the rate of 1:10 with preference to fast growing local species that are more efficient in absorbing emissions. No endangered floral species does exist within the project corridor.

31. **Ecological Environment**: The protected area network in Meghalaya occupies 512.61 Sq.km area The Protected Area Network includes two National Parks, four Wildlife Sanctuaries and one Biosphere Reserve playing an important role in in-situ conservation of biodiversity. The protected area of the State within the project influenced area of Umling-Patharkama Road section is Nongkhyllem Wildlife Sanctuary located in Ri-Bhoi district. There are no other environmentally sensitive areas exist in project road sections.

The proposed Umling-Patharkama Road section passes through through ESZ of Nongkhyliem Wild Life Sanctuary (NWLS) in the State of Meghalaya. About 3 km length (from km 18 to km 21) of Umling-Patharkama Road project section is bordering on ESZ of Nongkhyliem Wild Life Sanctuary (NWLS).

32. **Socio-economic Environment:**Meghalaya is predominantly a tribal state with 86 per cent of the total population being Scheduled Tribes. The tribes of Meghalaya can be classified into three major groups - Garos, Khasis and Jaintias (or Pnars). In the project districts state protected monuments and archaeological sites exists recognized by Archaeological Survey of India. However; there is no protected monuments and archaeological sites on the project road alignment or in the corridor of impact of the project road sections.

D. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

D.1 Design & Construction Phase

33. **Impact on Physiography and Topography:** Since proposed project road sections only involves widening of existing road within available ROW without any land acquisition, impacts on the physiography of the area would be insignificant during both construction and operation phases. The project design considered the improvement of roadside drainage conditions through the improvement of cross-drainage structures. Design of the cross-drainage structures followed IRC Guidelines (IRC, 1995).

34. **Potential Environmental Impacts on Soil:** Since all activities will occur within the available RoW, no adverse environmental impacts are anticipated on the productive soil. Land taken on lease for construction camps and muck disposal will be restored to its original land use.

35. Land clearing and grubbing will remove vegetation and soil cover which may cause some soil erosion during monsoon. Excavations in borrow pits may lead to loss of top soil and soil erosion. There is risk of stream and river bank erosion near bridges and cross drainage works. To avoid or minimize erosion, land clearing and grubbing will be conducted during dry season, productive top soils from borrow pits will be stored and reused in road embankment slope protection. Erosion control measures like silt screens will be installed along rivers and *nallahs*.

36. There is the risk of contamination of soil from construction material and oil spills. Contractors are required to ensure proper handling materials and able to implement spills containment. All fuel and lubricant storage and handling areas will be located at least 500 meters from the nearest water body and provided with perimeter interceptor drains. All muck generated from site including construction and demolition waste will be disposed by the Contractor on pre-designated areas as identified by the PMC.

37. **Impact on Water Resources and Drainage:** Deterioration of water quality may occur near the construction camp and active construction camps. This will be minimized by timing land clearing and earthmoving during the dry season; proper handling of materials including oil, and lubricants; prohibiting the disposal of untreated sewage; and proper erosion control near rivers and *nallahs*. Special attention on water tapping points along the road alignments created by community to divert stream water for their domestic purposes.

38. **Impact on Ambient Air Quality:** Significant amount of dust will be generated during project construction. The following mitigation measures will also be undertaken:

i) Asphalt and hot-mix plants will be located at least 1.5 km away from any inhabited urban and rural stretches along the road with the NOC from the Meghalaya State

Pollution Control Board.

ii) Sprinkling of water on the active construction fronts and construction yard.

iii) Regular maintenance of machinery and equipment.

39. **Impact on Flora, Fauna and Ecosystem:** Clearing and grubbing activities will result to the removal of shrubs, grasses, and an estimated 428 trees. All cut trees will be compensated at the rate of 1:10 with preference to fast growing local species that are more efficient in absorbing carbon emissions.

40. **Construction Workers' Camp:** As the Contractors are required to source labor from the local communities along the project roadsections, the size of the construction camps will be relatively small. It is the contractual responsibility of the Contractors to maintain a hygienic camp with adequate water and electric supply; toilet facilities located away from the water bodies and wells; proper disposal of domestic refuse; temporary medical facilities; pest control; clean and adequate food; and security.

41. **Impacts on Social Environment:** Construction and operation phases of project roads will have some beneficial impact on social environment. Some increase in income of local people is expected as local unskilled, semi-skilled and skilled persons may gain direct or indirect employment during construction phase. Since; the immigration of work force during construction phase is likely to be very small, the social impacts on literacy, health care, transport facilities and cultural aspects are expected to be insignificant.

D.2 Operation Phase

42. Increase in vehicular emissions, noise level, road crashes due to higher speed vehicular speed, and oil contaminated road surface runoff will occur during project operation phase. The impact on air quality is not expected to be significant given the low projected traffic. Community safety is enhanced through the crash barriers, speed brakes, footpaths, and pavement markers. Oil contamination will occur but expected to be in trace amounts based on the low-level vehicular traffic. To control the anticipated increase in noise level measures such as good road surface will reduce the road-tire noise, prohibition of horns along sensitive areas, road widening will increase capacity and decrease congestion of vehicles, and compensatory tree plantation will be located near sensitive areas will be implemented.

E. CLIMATE RESILIENT MEASURES

43. The engineering measures has been considered for designing of project road sections to address risks of climate change identified in the State. The measures undertaken includes following: such as

- design of cross-drainage structures based on rainfall data of the project area,
- accommodation of improvement proposal within existing right of way following existing alignment, to avoid impacts on trees, land and existing structures,
- tree plantation on valley side and application of Bio-engineering and
- engineering and bio technology treatment for identified landslide zones on each road section
- dumping areas for muck disposal has been identified at the designing stage for proper management of muck generated from project roads
- protection and breast walls have been proposed at required locations; and
- construction of side drains to minimize soil erosion and water pollution.

F. PUBLIC CONSULTATION AND INFORMATION DISCLOSURES

44. Public consultations have been carried out for project road sectionsduring project planning. In total 4community consultation session and one stakeholder's consultation were organized involving over 101 participants. The participants include village head, housewife, business owners, labours, farmers and students from the villages in the project affected area.Additional to public consultation one to one discussion were also undertaken to record individual's opinion on proposed improvements.

45. Most of the people interviewed strongly support theproject. The people living in the entire project areas expect the different project elements to facilitate transport, employment, tourism, boost economic development and thereby provide direct, or indirect, benefits to them.

46. The EIA report will be disclosed in the English language in the office of MPWD and also to the public through the World Bank's website.

G. INSTITUTIONAL ARRANGEMENT

47. The project activities will be implemented by agencies: Public Works Department (PWD), Urban Affairs (UA) Department, Department of Tourism, Transport Department and Community and Rural Development Department. Each of the mentioned departments, will depute a Project Director (PD) preferably at the level of a Chief Engineer/Superintending Engineer along with the required supporting staff with the overall responsibility for project implementation with the involvement of the various field divisions and other units at the head-quarters (HQ – Shillong).

48. PDs will work under the overall guidance and oversight of a Project Advisory Committee headed by the Secretary of the respective departments. In addition, nodal officers will be deputed from the beneficiary departments like Tourism, Agriculture, Police, Health, Education and C&RD. All civil works component will be implemented mainly by PWD, and involvement UA and Transport departments will be mainly for the technical assistance and pilot projects on improving mobility. When functional, the Transport Sector Board will also be constituted to provide high level policy guidance and oversight for project implementation.

49. Meghalaya Infrastructure Finance Development Corporation (MIFDC) set up under the Planning Department will be responsible for overall planning, coordination, implementation and monitoring of the project along with various departments. It will also be responsible for mobilizing private sector finance for the development works. The State Planning Department will be the nodal department for the Project. MIDFC will be responsible for overall planning and implementation of the entire project. It will ensure that ESIA is conducted and ESMPs are prepared and that the ESMF is followed during project implementation. Additionally, a project management unit (PMU) will be mobilized under MIDFC to support the implementing agencies during project preparation and subsequent implementation.

50. The institutional arrangement for the implementation of the EMP in the project road section has been mentioned to identify the role and responsibility of each parties involved in the project implementation. PMU for overall project is headed by the Chief Engineer, PWD who will be responsible for the successful implementation of the Project. The Chief Engineer would be assisted by an Environmental Officer. The team at the PMU would be assisted by the Environmental Officer of Project Management Consultant (PMC). The actual responsibility of implementation of the EMP would be with the Contractor.

51. The Contractor's Environmental Engineer and Health Safety Officer would be responsible for the implementation of the environmental safeguards. The roles and responsibilities of each of these officials have also been detailed out in the EMP. Training and capacity building would be required especially for

the PMU staff associated with the project as the Environmental Safeguards would be a relatively new areas which staff are required to handle. The training and capacity building would not only be project specific but would target and developing long term capacities in PWD.

52. The Environment Management Plan for each project road section has been prepared to detail out the mitigation measures which has been identified during the impact assessment in the EIA Study. It furthers detail out the mitigation measures discussed earlier during the Pre-Construction, Construction and Operation Phases of the project. This will ensure that environmental issues are properly addressed during road upgradation. This Environment Management Plan would be included as part of the Bidding Document and shall at a later date used by the Contractor for developing the Contractor's EMP.

53. The budget for implementing the Environmental management Plan for each road section has estimated presented in Table below. This budget would not be part of the Contract and would be used by the PMU to implement the Environmental Safeguards. The budget should not form a part of the Bid Document.

EMP Implementation Estimated Budget

S.N.	Name of Road	Estimated EMP implementation cost (Rs.)
1	Shillong – Diengpasoh Road	**29615827**
2	Laitkor – Laitlyngkot Road	**29806164**
3	Mawmaram – Mawlyndep Road	**58795062**
4	Pasysih – Garampani Road	**37960456**
5	Umling Patharkama Road	**44554300**

54. An Environmental Monitoring Program has been drawn up to essentially monitor the day to day activities in order to ensure that the environmental quality is not adversely affected during the implementation. The monitoring programme consists of Performance Indicators and Process Indicators. The performance indicators would identify the components which have to be monitored and reported on a continuous basis during the stage of the implementation. These would help identify the level of environmental performance of the project. In addition, there would be Process Indicators which would help in assessing the effectiveness of the system which has been instituted for the program.

55. For the purpose of reporting of environmental performance, a reporting framework has been defined. This include:

- Daily Monitoring Report: by the contractor to the PMC on the environmental actions which has been implemented.
- Fortnightly and Monthly Monitoring Report: by the PMC to PMU
- Quarterly Auditing by the PMU to the Management
- Annual Audit by an External Agency of the entire process of EMP Implementation and reporting to the PMU for onward reporting to the World Bank

H. CONCLUSION AND RECOMMENDATIONS

56. The project road sections would be developed with financial assistance of the World Bank. The road section alignment passing through East Khasi Hills, Jaintias Hills & Ri-Bhoi district of Meghalaya State. Development of the road sections would not only provide connectivity between important habitation of the district but also help economic development of the rural economic and market accessibility to the farmers. The commuting to either State Capital and district headquarters for work or other purposes would be easier and faster.

57. The Key recommendations are:

- The road section of Shillong – Diengpasoh is running along the boundary of Itshriyat reserve forest on RHS, approx. 3km length. Right of way is available for improvement on LHS.

- The Pasysih - Garampani project road section is of category state highway located at an altitude of 1000MSL. Hence, fall under the purview of Environmental Impact Assessment Notification 2006 (amended in 2009, 2011 and 2013), as Category "B" project. Therefore; Environmental Clearance from SEIAA/MoEFCC will be required for section.

- The proposed Umling-Patharkama Road section length of 3km passes through ESZ of Nongkhyliem Wild Life Sanctuary (NWLS) in the State of Meghalaya. However, RoW is available for proposed improvement work in this section. There no wildlife movement or corridor has been reported by Wildlife Officer and local community during consultation. No Objection Certificate (NOC) from State Wildlife Board will be required to undertake work on road section in ESZ of NWLS.