

Semi-Annual Report

January 2019

PNG: HIGHLANDS REGION ROAD IMPROVEMENT INVESTMENT PROGRAM (TRANCHE 3)

Gewa-Gembogl Road Sub-Project

Prepared by Highlands Road Management Group (HRMG) of the Department of Works for the Asian Development Bank

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Abbreviations

ADB	-	Asian Development Bank
AIDS	-	Acquired Immune Deficiency Syndrome
AP	-	Affected People
CEMP	-	Construction Environment Management Plan
CRO	-	Community Relations Officer
CSC	-	Construction Supervision Consultant
EA	-	Executing Agency
PSC	-	Project Supervision Consultant
DBST	-	Double Bitumen-layer Surface Treatment
DC	-	Design Consultant
DOW	-	Department of Work
EA	-	Executive Agency
EMP	-	Environmental Management Plan
EO	-	Environmental Officer
ESSU	-	Environment and Social Safeguards Unit
GOPNG	-	Government of Papua New Guinea
GRC	-	Grievance Redress Committee
HCRN	-	Highlands Region Core Road Network
HIV	-	Human Immunodeficiency Virus
HRMG	-	Highlands Road Management Group
HRRIP	-	Highlands Region Road Improvement Investment Program
IA	-	Implementation Agency
IEE	-	Initial Environment Examination
ISS	-	International Safeguards Specialist
LLG	-	Local Level Government
MFF	-	Multi-tranche Financial Facility
MOA	-	Memorandum of Agreement
NRA	-	National Road Authority
PNG	-	Papua New Guinea
PRO	-	Public Relations Officer
PSC	-	Project Steering Committee
PWM	-	Provincial Works Manager
ROW	-	Right of Way
RP	-	Resettlement Plan
SHP	-	Southern Highland Province
SIS	-	Socio-economic Impact Study
SPS	-	Safeguard Policy Statement
STDs	-	Sexual Transmitted Diseases
TOR	-	Terms of Reference

FACT SHEET:

Loan	ADB Loan: 3404/3408 and Grant 0485 PNG
Project Number	CSTB 3530
Subproject	Gewa-Gembogl Road Subproject
Executing Agency	The Department of Works (DOW) is the executing agency for the Highlands Region Road Improvement Investment Program (HRRIP). It has overall responsibility to manage the planning, implementation and monitoring for all road improvement works including environmental management and environmental compliance monitoring. It also includes the acquisition of use rights for additional land to implement HRRIP subprojects, as well as compensation for damages on project-affected land DOW is also responsible for reporting to ADB and the recruitment of the organization to conduct independent monitoring
Implementing Agency/Unit	<p>The DOW will also be the Implementing Agency for the road improvement works. The DOW has delegated to the Highlands Road Management Group (HRMG), the responsibility to carry out the planning, implementation and monitoring for environmental management and environmental compliance monitoring, land acquisition and/or resettlement activities, as required. The more relevant delegated responsibilities include the following;</p> <p>Prior to the commencement of civil works:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Submit and indorse environmental assessments required for regulatory approval of the CEPA and require the Contractor to obtain approval, e.g., environmental clearance, environmental permit or permits from other statutory authorities as required by the Government. <input type="checkbox"/> Ensure that all regulatory clearances for the subproject are obtained from the relevant government authorities and are submitted promptly to ADB. <input type="checkbox"/> Ensure that the EMP is updated based on detailed design and included in the bidding document of the subproject and that all bidding Contractors have access to the environmental assessments and EMP. <input type="checkbox"/> Ensure that the EMP and all required mitigation measures during construction, including conditions stipulated in the CEPA's clearance or environmental permit, are included in BCD with requirements to update the EMP in response to any unexpected impacts and <input type="checkbox"/> That all selected Contractors have agreed to implement in full the requirements of environmental mitigation measures prescribed in the EMP <input type="checkbox"/> Provide training as required to HRMG in Mt Hagen and Contractor; <input type="checkbox"/> Receive environmental safeguard clearance on subproject(s). <input type="checkbox"/> Provide training to Contractor prior to preparation of CEMP, safeguards requirements of ADB and regulatory

	<p>requirements of CEPA.</p> <p><input type="checkbox"/> Approve CEMP for the subproject, after being cleared by PSC.</p> <p>During the implementation of civil works:</p> <p><input type="checkbox"/> Ensure that the CEMP including all proposed mitigation measures and monitoring and relevant provisions of the environmental assessments is updated as required,</p> <p><input type="checkbox"/> Conduct environmental management and compliance monitoring on a monthly basis in cooperation with the PSC.</p> <p><input type="checkbox"/> Review and assess the Contractor's monthly environmental monitoring report and compliances as contained in the CEMP.</p> <p><input type="checkbox"/> Assist the Engineer in the compliance of the submitted CEMP.</p> <p><input type="checkbox"/> Prepare the quarterly and semi-annual reports in cooperation with the PSC for submission to DOW and ADB.</p>
Coverage of the Environmental Monitoring Report for 2018	July to December 2018

1.0 EXECUTIVE SUMMARY

- i. This Semi-annual Environmental Monitoring Report covered the period from July to December 2018. This report was carried out by the DOW through the Highlands Road Management Group (HRMG) and the monitoring results will be communicated to ADB through this report.
- ii. The Gewa-Gembogl road project is one of the more challenging projects of the 4 sub-projects of Tranche 3 of the Highlands Region Roads Improvement Investment Program due to its very steep terrains and limited road widening opportunities.
- iii. This report is a consolidation of the various monthly reports from the contractor, PSC and HRMG.
- iv. Most of the environmental issues are minor including the solid waste, liquid waste and hazardous waste management implementation which fail to follow the submitted plans. The issues include the contamination of the soil from used oil and lubricants, proper construction of septic tanks and leaching fields.
- v. Other issues of concern are the siting for spoils disposal since no agreement forms have been provided by the contractor. This is of concern considering the previously mentioned steep slopes which are being used for subsistence farming.
- vi. The relocation of households which were affected by the Sumburu Quarry and crushing site has finally addressed and resolved.
- vii. The contractor has not yet submitted all the Quarry Management Plans for its identified new quarry site. They are preparing the QMP for the new site.
- viii. Considering the accident which has happened during the previous monitoring period, the contractor needs to provide first aid facilities and personnel. A recent training on first aid availed by some employees should be echoed to other personnel in the camp.
- ix. Several seminars and trainings are proposed to provide capacity and capability building activities to the Contractor's environmental officers and project management, PSC and HRMG staff. This is to ensure that the environmental management and compliance monitoring requirements are done in an efficient and timely manner.

2.0 INTRODUCTION

2.1 Background

1. The Highlands Region of Papua New Guinea (PNG), comprising the Provinces of Western Highlands, Southern Highlands, Hela, Eastern Highlands, Enga and Chimbu, is a major contributor to the PNG economy through its agricultural production and mineral resources. A well-maintained road network is essential to facilitate the movement of goods and people. The Government of PNG (GoPNG) has made significant investments in improving the road network but a lack of maintenance has resulted in the deterioration of the roads such that the Highlands Core Road Network (HCRN) is now in poor condition.

2. In order to address the deterioration of the HCRN, there is a clear need to: (i) implement a program of regular maintenance on all HCRN roads that are in good condition; and (ii) improve those roads that are in poor condition and (iii) ensure that maintenance begins on those roads as soon the improvement works are completed.

3. The GoPNG has negotiated a Multi-Tranche Financing Facility (MFF) loan with the Asian Development Bank (ADB) to implement the Highlands Region Road Improvement Investment Program (HRRIP) in tranches. The HRRIP includes projects to improve the HCRN, the preparation of long-term maintenance contracts for the HCRN, and the capacity development of road agencies. In total, 13 road sections are expected to be funded under the program.

4. Project 1 has included the improvement of two road sections and Project 2 is currently being implemented to upgrade three road sections while Project 3 is progressing now to rehabilitate four road sections comprising 113.3 km of the HCRN.

5. The Execution Agency (EA) for the program is the Department of Works (DOW) whilst the Highland Region Management Group (HRMG) is the Implementation Agency (IA). The Renadet is the supervision consultant supervising the contractors.

6. Tranche 3 (ADB 3043/3408 and EU Grant 0485) include the upgrading, rehabilitation and maintenance of four road sections namely, Henganofi-Nupuru, Gewa-Gembogl, Nipa-Munihi, and Gewa-Gembogl in the Eastern Highlands Province (EHP), Chimbu Province and Southern Highlands Province (SHP).

7. The rehabilitation of the Gewa to Gembogl road in the Simbu province has a length of 21.025 km. The works proposed for the upgrading and rehabilitation of the Gewa to Gembogl Road such as earthworks, establishment and operation of quarry sites and extraction of materials, minor civil works and discharge of wastewater are Level 2 activities under the EPAR and requires an EP depending on the duration and scale of those activities.

8. . The project commencement date was October 16, 2017. However, the civil works only started in February 26, 2018. The construction period of the project is 24 months. The Long Term Performance Based Maintenance Services is 60 months from the issuance of the Performance Certificate for the Improvement Work.

9. The Gewa-Gembogl Road Section is covered by CSTB contract # 3530 entered into by the Independent State of Papua New Guinea represented by the Department of Works and China Harbour Engineering Co. Ltd (CHEC LTD).

2.2 Sub-Project Description

10. The existing Gewa to Gembogl Road is the first part of the old Bundi Highway which runs in a north east direction from Kundiawa Town and eventually connects through to Bundi in Madang Province. The location of the Gewa-Gembogl Road is shown in Road. See **Error! Reference source not found.**

11. The IEE assessment has discovered that the first 10.6 kilometers from Kundiawa to Gewa has recently been improved. The report therefore covered the next 21 km section from Kokonigle Bridge, Gewa to Gembogl Station. The road serves as the primary access for the remote rural populations living in the northern part of Simbu Province to the township of Kundiawa. The road is the only link to the major tourist destination of Mt. Wilhelm, a major trout farm industry, and is used by the people to transport cash crops, coffee in particular. This is also the main supply route to two mines, located near Gembogl. The upgrading of this road is expected to improve vital commercial trade and promote agricultural activity, improve living standards and facilitate access for government services to reach the people. The route passes through eight villages of which Maupini (km18) and Williame (km 31) are the largest. There are also several smaller settlements that typically consist of clusters of up to six or so houses.

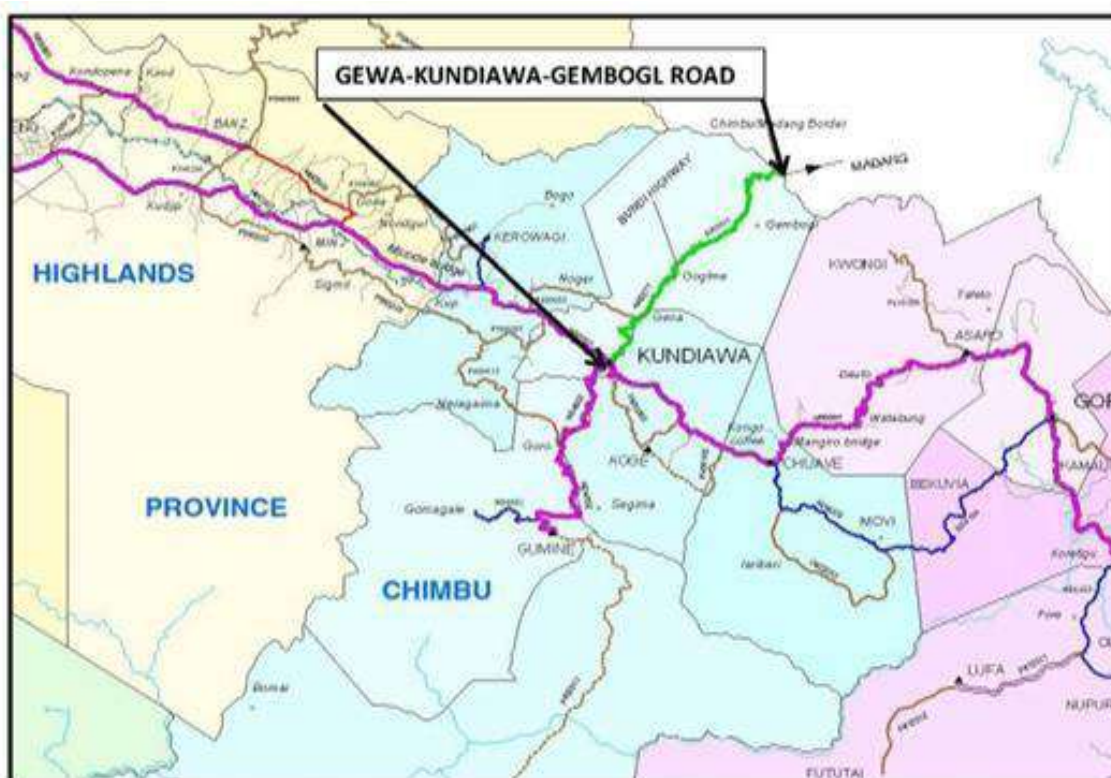


Figure 1. Location Map of Gewa Gembogl Road

12. The alignment of the Gewa – Gembogl road runs along the valley of the Simbu River. The terrain is rugged and mountainous with very steep slopes and frequent rock outcrops. The road is benched into these slopes and there are steep drops to the river below and almost vertical cut faces above. The topography is such that sites for the development of settlements are limited. The alignment passes through 10 major and 12 minor villages/settlement areas, the largest of which is Womatne. These settlements are generally clusters of tribal houses, typically numbering around 15 to 20 with additional linear development in major villages. Elsewhere along the route there are occasional structures but the rugged terrain limits the

areas where construction is feasible. Similarly, the opportunities for cultivation immediately adjacent to the road corridor are restricted.

13. The environmental impacts assessed at the time of preliminary design categorized the subproject as Category B for environment. The Initial Environment Examination (IEE) dated April 2016 has already been disclosed in the ADB web site. The IEE confirmed that environmental impacts of the rehabilitation of the Gewa-Gembogl subproject road are limited to the road corridor, are of minor impacts and can be mitigated through the thorough implementation of the measures contained in the environment management plan. The impacts such as dust, noise, materials sourcing, storage, haulage, soil erosion, sedimentation and run-off are likely to occur mainly during the construction phase.

14. Based on the EMP presented in the IEE, a Contractor's Environment Management Plan (CEMP) has been prepared and submitted by the Contractor and ADB has provided a No Objection letter in January 23, 2018.

15. Induction Meetings were conducted for all the Contractors in July 12, 2017 and October 31 and November 1, 2018 by the Engineer and HRMG with the PSC to provide a background of the environmental management plans and compliance monitoring requirements.

16. A reference compact disc (CD) was also provided to the Contractors during this meeting containing best practices for environmental management and mitigation, including sewage treatment, solid and hazardous waste management; and soil erosion control and management. Based on the experiences with Tranche 1 and Tranche 2, environmental laws including a summary presentation on the legal framework of PNG, CEPA Act 2014, Environment Act of 2000, list of suggested environmental monitoring equipment, and PNG Water Quality Standards, was also provided in the CD. Further, also provided were sample forms and requirements on sample monthly monitoring report, Notice of Violation Form, and Logbook Sample Content.

17. Internal monitoring will be conducted by the environmental specialist of the Construction Supervision Consultant (CSC) whereas independent monitoring will be conducted by the Environmental Officer (EO) of HRMG. The CSC, HRMG and Contractor are all required to provide monthly environment reports.

2.3 Proposed Scope of Works

18. The project proposes to rehabilitate the existing road and provide a 6.0 meter wide carriageway with DBST and 1.0 meter wide gravel shoulders which will be sealed as necessary to prevent possible scour/erosion. The horizontal and vertical alignments will follow the existing alignments as much as possible with improvements limited to those consistent with meeting the required pavement width and stopping sight distance requirements.

19. The route traverses through mountainous terrain and significant excavation will be required in existing cut slopes to widen the existing road bench to the required width. An average width of 2.5 m each side of the existing cleared area will be required to accommodate the earthworks. In practical terms this additional work will only be taken on one side of the road where cuttings will be made. It will also be necessary to provide slope protection and retaining structures to ensure the long term stability of the road.

20. A total of 92 additional culverts to discharge roadside drains are proposed in addition to the replacement of 29 existing culverts which are of inadequate capacity (typically 450mm diameter) while seven existing culverts are to be retained and rehabilitated with the capacity of 750 to 900 mm diameter to cope with the flows from roadside drains. Approximately 28,000

meters of lined roadside drain will be provided to cater for surface works run off from the road and adjacent slopes.

21. A total volume of 480,000 cu.m. of excavation will be necessary to accommodate the carriageway, shoulder and drainage. Of this volume, 50,000 cu.m. will be reused in embankment, 130,000 is expected to be unsuitable which will need to be disposed of together with approximately 300,000 cu.m. of surplus material. The selection and management of disposal sites will be of the utmost importance in the execution of the earthworks.

22. There are nine existing bridges within the road section, details of which are given in the Table 1. All of the bridges are in maintainable condition and will only require minor repairs, clean and painting and the provision of steel decking (apart from Kaer 2 Bridge)

Table 1. Bridges along the Gewa – Gembogl Road.

BRIDGE NAME	CHAINAGE	SPAN	TYPE
Gewa	11+860	22.24	Standard Bailey
Yombai	13+704	21.61	Standard Bailey
Seme	17+440	27.73	Compact 200
Nununige	20+048	12.41	Standard Bailey
Kaer 2	23+520	34.04	Compact 200 with Steel Deck
Davai	24+786	18.58	Standard Bailey
Kombukme	26+628	15.42	Standard Bailey
Bendam	28+346	15.42	Standard Bailey
Akonige	30+825	23.00	Steel Truss

23. All rivers and streams carry clear water in the dry season. Communities along the road depend heavily on water courses for their domestic activities. The civil works will therefore have a high impact on the community and would necessitate the need to coordinate construction adjacent to water courses with community needs.

24. The rehabilitation and upgrading would approximately take 24 months and would involve the following:

- (i) Transport, handling and storage of construction materials, fuel and lubricants and, machinery to site;
- (ii) Preparation of Contractor's camp and work sites;
- (iii) Establishment of ancillary facilities, i.e. identification and establishment of suitable material sources/quarries, batching, crushing and asphalt plants;
- (iv) Clearing and grubbing (shoulders and drainage);
- (v) Excavate defective sections and improve side drains as required;
- (vi) Excavation and/or filling to widen the existing road bench;
- (vii) Culvert removal, installation, extension and/ or replacement;
- (viii) Construct masonry retaining walls;
- (ix) Construction of gabion protection works;
- (x) Rehabilitate bridges which may include installation of new steel decks if necessary, removing rust and repainting and, construct a new bridge;
- (xi) Backfill and compact as required;
- (xii) Layout sub-base and base materials and compaction;
- (xiii) Install road furniture required (guardrails, pavement markings, etc.); and
- (xiv) Pave roadway with DBST.

25. It is estimated that the upgrading and rehabilitation works for the Gewa to Gembogl Road would require 216 people of which 105 unskilled workers will be sourced from the local

communities in the area. Various machinery and heavy equipment will be required in the rehabilitation and upgrading works.

26. This works require materials including fuel, lubricants, paint, bitumen, cement, aggregates, sand, timber, geotextile, steel plates, drainage pipes, gabion baskets, culvert pipes, trees and plants. All the materials will be sourced from approved suppliers whilst some locally procurable materials will be supplied by the community. Workers, including local women, will make gabions using local materials for embankment and bridge pier protection

2.4 Purpose

27. This environmental safeguards monitoring report for Gewa-Gembogi sub-road project is written to present the status of the environment including compliance with the approved CEMP, ADB SPS 2009 and GoPNG environment regulations. Semi-annual environment safeguards monitoring reports is a requirement under the SPS. In addition, the report provides updates with regards the implementation of CEMP activities as well as the environmental mitigation outcomes and corrective actions as required for mitigation works.

28. Considering that the project civil works has just commenced in February 2018, the compliance monitoring requirements enumerated in the monitoring findings are prospective and will be guided by the approved CEMP. The submitted CEMP was provided with a letter of no objection by ADB. However, an evaluation by the DOW-ESSB in March 22, 2018 indicate that the CEMP was not yet approved.

2.5 Methodology

29. This six-month consolidated report is written using data gathered from several sources. These include (i) Contractor's interviews and monthly reports (ii) CSC monthly reports and; (iii) HRMG-PIU verification of environmental parameters on site and general observations.

30. This report is reviewed by the Renadet supervision consultant and HRMG-PIU environmental specialists prior to submission to ADB. It also follows the format prescribed by ADB and a checklist for monitoring environmental compliance.

31. The list of reports reviewed is in Appendix 1 whilst names of people interviewed are in Appendix 2.

2.6 Institutional Arrangements

32. The Department of Works is the EA and has the overall responsibility to manage the planning, implementation and monitoring related to acquiring use rights for additional land to implement the sub-projects as well as provides compensation for damages.

33. DOW established a Project Management Office (PMO) headed by a Project Director which manages the day to day activities of the program. Within the PMO, there are two units, the Project Management Unit (PMU) which is based in Port Moresby. The other is the Highlands Road Management Group (HRMG), the DOW's Project Implementation Unit (PIU) for HRRIP subprojects to carry out the planning, implementation and monitoring for land activities, as required and is based in Mt. Hagen City.

34. In the revitalized organizational chart (as of February 2017), the HRMG is headed by the Field Project Manager (FPM). Under the FPM are two sub-units, the construction unit

headed by the “Engineer” and the social and environmental safeguards unit headed by the Senior Field Project Coordinator (SFPC).

2.7 Report Organization

35. The report consists of the foregoing introduction and 2 other sections as follows:

- i) Section 1 – Executive Summary
- ii) Section 2 - Introduction,
- iii) Section 3 – Monitoring results and finding
- iv) Section 4 – Conclusions and recommendations and appendices

3.0 MONITORING RESULTS AND FINDINGS

36. The main findings shall include the assessment of environmental impacts during and mitigations in the review period and suggestions for corrective actions are prescribed in this section.

37. The basis for monitoring are the parameters considered in the CEMP of which are as follows:

- Contractor’s camp and yard
- Erosion and sedimentation
- Water quality
- Air quality
- Noise
- Waste management
- Hazardous material management
- Aggregates extraction
- Tree removal and vegetation management
- Socio-economic issues (workers)
- Socio-economic issues (community)
- Public safety
- Health and safety issues
- Traffic management
- Prevention of HIV/AIDS and STDs
- Existing Infrastructure Issues
- Environment Related Grievances
- Training and Mentoring

38. The summary of status of non-compliance observed from the monthly reports prepared jointly by HRMG and CSC is provided in Table 2. Environment Officers from HRMG with PSC should prepare the Notices of Violation if warranted based on the standards set during a meeting for this purpose.

Table 2. Summary of Non-Compliance for July to December 2018 for Gewa – Gembogl Rd.

NON-COMPLIANCE	MONTHS					
	J	A	S	O	N	D
Complete monthly environmental monitoring with comparisons on environmental baselines.	X	✓	X	X	X	X
Soil erosion due to absence of management practices	✓	✓	X	X	X	X

Lack of implementation of solid, liquid and hazardous waste management	X	X	X	X	X	X
Leaking sewage system of the contractor could contaminate community's water system.	X	X	X	X	✓	✓
Replacement of damaged and cut trees during the construction activities.	X	X	X	X	X	X
Submit or revise all required plans which have not been approved.	X	X	X	X	X	X
Submit the required Quarry Management Plans	X	X	X	X	X	X

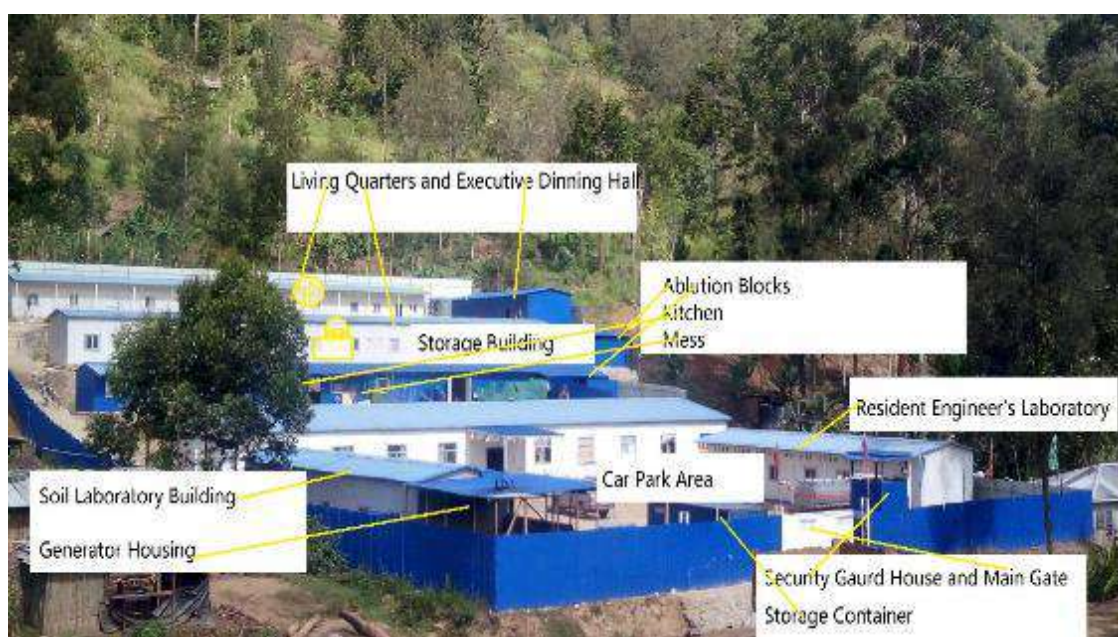
3.1 Contractor's Camp and Yard

39. The Contractor's camp at Goglime has been completed in the third quarter 2018. (Photograph 1). However, a Camp Site Development Plan has not been provided to review its sewage facilities among others.

40. The Contractor's Solid, Liquid and Hazardous Waste Management Plans were reviewed by DOW-ESSB in March and should go through the approval process. The contractor has to take note of the necessary procedures for approval. Compliance monitoring will base on the provisions of these plans and best management practices.

41. The foul odor (stinky smell) coming from the septic tank at the camp site is being mitigated by the contractor (Photograph 2). The measures under taken includes covering the canal with ploy plastic and application of chlorine (Photograph 3). However, the design of the septic tank should be reassessed to determine if it is of the appropriate design.

42. The sewage disposal has contaminated the community's water system but these has been mitigated by the application of chlorine though this is not a best practice. The contractor was advised to monitor and ensure the disposal of wastes is contained as seen in photograph 2 and 3. The issue on disposal of sewage waste has been controlled therefore no more issue.



Photograph 1. Contractor's camp at Goglime with building designations.



Photograph 2. Leak sewerage into the eroded open drainage at the contractor's camp



Photograph 3. Covering the septage canal with plastic.

3.2 Erosion and Sedimentation Control

43. Soil erosion and the deposition of sediments in water bodies such as streams and rivers and food gardens are imminent. The contractor is doing its best to control and manage soil erosion and landslides by building gabion baskets for walling and also strengthening the base of the hills hence retaining structures (Photograph 4). There are still challenges faced on erosion due to continuous raining in the area during the reporting period.

44. A spoils disposal agreement has been signed with the landowner, however, the contractor has been advised to select better and less environmentally harmful sites. There were allocated sites for disposal of waste soil materials as per the agreement with the landowners.



Photograph 4. Gabion construction in eroding road section.

45. Some practices as adopted by the contractor is the covering the processed quarry materials with tarpaulin to prevent it from erosion downstream is evident (Photograph 5). The crushed quarry materials are covered using tarpaulin canvas to protect the material from rain and sun's heat.

46. Simple bioengineering practices such as fascines which are used to protect banks and soil from washout and seepage. Live fascines could be providing more protection in the long run through its root system (Photograph 5).



Photograph 5. Aggregate materials covered in tarpaulin.



Photograph 6. Fascines locally used to protect slopes from erosion.

47. The contractor has identified a structure which it called a silt pond (Photograph 7). However, the size, location and design of the structure could be further improved. The CSC is discussing the design of the silt pod with the contractor.



Photograph 7. Contractor's silt pond design.

3.3 Water Quality

48. The monthly monitoring of water qualities is ongoing and the contract has established sampling stations (Photograph 8). It is recommended that the identified monitoring stations should be followed during the next reporting period.

49. There was a leaking sewer at Sumburu quarry (Photograph 9). The contractor was tasked to fix the sewer immediately after the incident was reported.



Photograph 8. Contractor's Environmental Officer collecting water samples.



Photograph 9. Leaking sewer at Sumburu quarry.

3.4 Air Quality

50. The baselines for air quality was also gathered for the identified sampling sites. The contractor continues to monitor the air quality on selected locations.

51. Road wetting from water trucks reduce dusts generated by vehicular traffic (Photograph 10).



Photograph 10. Road wetting using water truck sprinklers.

3.5 Noise

52. The baselines for noise levels has been obtained by the contractor with the assistance of HRMG. There were no reports on excessive noise from the community and schools near the project area. The contractor environment officer is monitoring the noise level at selected locations thus the workers are advised if and when there is noise pollution.

3.6 Wastes Management

53. The previous report has observed the improper disposal of wastes from clearing and grubbing. In the second quarter of the year however, the contractor has improved to haul spoils to selected disposal sites (Photograph 11).

54. The responsible disposal of spoils, however, is contradicted by the observation in November wherein the contractor has deliberately dumped spoils in the cliff (Photograph 12).

55. The unwarranted disposal of spoils in very steep slopes impact not only the trees and vegetation that hold the soil but also pollute the water bodies downstream (Photograph 13).

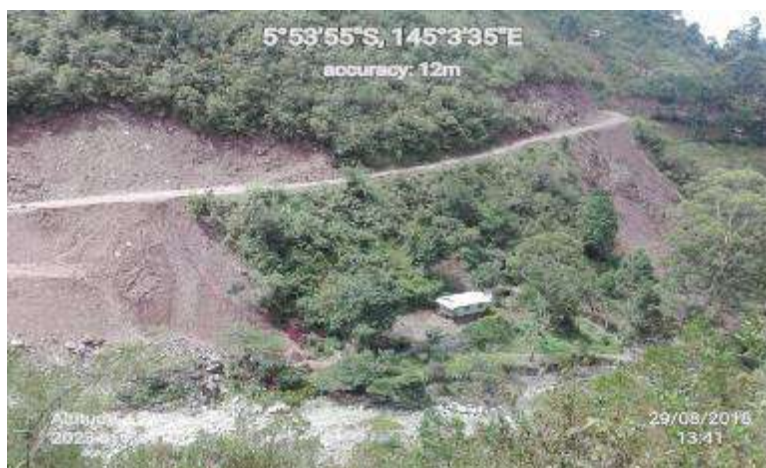
56. Unsorted solid waste are also thrown in a dump in Sumburu quarry in violation of the contractor's CEMP and associated waste management plans (Photograph 14).



Photograph 11. Contractor hauls spoils to disposal site.



Photograph 12. Deposition of spoils along Ch. 20+300 and Ch.22+230.



Photograph 13. Tree and shrubs destroyed and water body is affected by sedimentation.



Photograph 14. Dump at Sumburu Quarry where waste is being disposed near the river.

3.7 Hazardous Materials Management

57. The contractor needs to provide an inventory of hazardous and e-wastes generated and its proper disposal. These include fluorescent bulbs, computers and peripherals, printers and other equipment. Other monitored wastes needing attention are used batteries, battery fluids, oils, lubricant, and asphalt products.

58. The monitoring period show that used tires are not disposed properly and are burned at the site (Photograph 15).

59. The previous monitoring period reported on the contractor's bringing in of blasting materials without informing the client and supervision consultant. The PNG Defense Force advised that the facility be located in an isolated area away from construction activities with adequate security. An area has been leased and the storage facility has been constructed for this purpose.



Photograph 15. Burning of used tire at the camp area.

3.8 Aggregates Extraction

60. The contractor has to secure CEPA permits for its riverine quarries if the extraction rates will exceed 10,000 tons per annum and rock quarries if extraction rates exceed 100,000 tons per annum.

61. The Sumburu River Quarry obtained its CEPA permit on September 2018 with a number of conditionalities and restrictions including the annual extraction rate of only 100,000 tons per year.

62. A total of three river quarries and four rock or limestone quarries need Quarry Management Plans before they could commence extraction. Prevention of pollution of the river is a continuing concern (Photograph 16).



Photograph 16. River quarry require soil conservation to prevent deposition to the river.

63. Other issues in the Sumburu Quarry site is pollution from the sewerage system which contaminates the river and nearby households (Photograph 17). Efforts were made to rectify and mitigate the problem (Photograph 18).



Photograph 17. Defective or inappropriate plastic septic tanks.



Photograph 18. Removal and replacement of the inappropriate septic tanks.

3.9 Trees Removal and Vegetation Management

64. The project has marked the trees for cutting (Table 3), a requirement of the project contract. It is recommended that the trees destroyed should be replaced and replanted on a ratio of 1:10 or for every tree cut, it should be replaced through the replanting of 10 seedlings to ensure the survival of the replacement.

65. The trees destroyed or cut were given to the land owners (Photograph 19) for firewood or converted into timber for local use (Photograph 20). The commercial production of timber in the future could have negative impacts on the surrounding forest area.

66. It is recommended that tree planting should commence at this stage of the project to ensure that the seedlings will have a higher chance of survival. Which means, more time in the nursery and the inclusion of seedling hardening to cope with the harsher conditions in the project site.

67. When planted, the seedlings should be maintained and protected by the contractor.

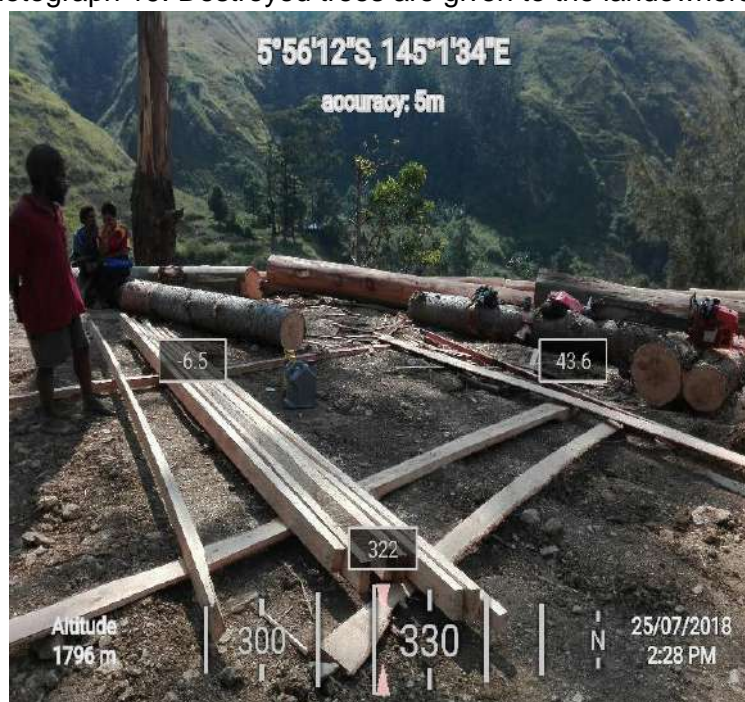
Table 3. Summary of Trees Removed Inventory between Ch:13+770- Ch:23+00

Trees Species	Small Diameter	Average Diameter	Matured	Total
Gum	92	76	71	239
Pine	56	75	90	221
Casuarina	68	81	144	293
Other Native sp	8	23	52	83
Coffee			48	48
Pandanus (Marita)			35	35
Bananas			36	36
Total				955

Source: CHEC Ltd Tree Clearance Inventory July 2018



Photograph 19. Destroyed trees are given to the landowners.



Photograph 20. A portable sawmill cutting the trees into timber at Ch:17+800.

3.10 Socio-economic Issues of Workers

68. The socio-economic data were also collected to reflect the direct benefits of the road construction project. The total number of workers hired for the period was 3,818 consisting of 3,320 males and 436 females or 88% and 12% respectively Table 4. The hired women is below the ADB recommended 30% hiring requirement for women.

69. In the case of employment for non-payroll activities on a per piece basis, the total women hired totalled 434 women for the reporting period Table 5.

Table 4. Summary of disaggregated employment from July-December 2018

Month	Male	Female	Total	DPs Employed	Estimated Female Wages
July	547	67	644	442	37,520
August	547	72	622	438	40,320
September	481	67	577	439	37,520
October	548	76	624	451	42,560
November	770	73	843	447	40,880
December	427	81	508	450	45,360
Total	3,320	436	3,818	2,667	244,160
Average	553	73	636	445	40,693
Percentage	88	12	100	70	

Table 5. Women Employment in Non-Payroll Activities from July-December 2018

Month	Gabions	Line Drains	Rip Raps	Head Walls	Others	Total
July	15	24	5	9	14	67
August	20	25	4	11	12	72
September	20	21	6	10	10	67
October	19	24	5	12	14	76
November	20	24	7	10	12	73
December	27	26	6	11	11	81
Total	121	144	33	63	73	434
Average	20	24	6	11	12	73

3.11 Socio-Economic Issues of Community

70. The Contractor has spent a total of PGK 77,350 for local purchases of food Photograph , construction materials, other items and other local expenditures the period (Table 6).

71. It is important that documentation is provided for socio-economic benefits and issues. The contractor has to provide detailed records of purchases as in the case of single vendors (Photograph 21) and small markets (Photograph 22).

Table 6. Monthly Expenditures for local purchases from July – December 2018.

Month	Purchases of Food (K)	Construction Materials (K)	Purchases of other items K	Other Local Expenditure K	Total
July	1600	6500	1200	1000	10,300
August	1600	7500	1600	1400	12,100
September	1650	7600	2000	1500	12,750
October	1700	8000	2000	2000	13,700
November	2000	8000	2000	2000	14,000
December	2000	8500	2000	2000	14,500
Total	10,550	46,100	10,800	9,900	77, 350
Monthly Average	1,758	7,683	1,800	1,650	12,892
Percentage	14	59	14	13	100



Photograph 21. Woman farmer selling produce.



Photograph 22. Small vendors along the roadside.

72. The only reported payments for quarry extraction is for Sumburu Quarry amounting to PGK 12,000 per month or an assumed PGK 72,000 for the reporting period.

3.12 Public Safety

73. The contractor has provided warning tapes for sharp road bends (Photograph 23). Other traffic warning barriers would have been more appropriate.

74. Public school education campaigns on road safety is also an important activity (Photograph 24).



Photograph 23. Warning tapes in sharp bends for public safety.



Photograph 24. Safety Education at Barengil Primary School

3.13 Workers Health and Safety

75. An accident during the previous reporting period has highlighted the need for worker's safety and appropriate emergency responses. The contractor has initiated First Aid seminar for its personnel (Photograph 25).



Photograph 25. First Aid and Emergency Response training.



Photograph 26. Daily health and safety procedures induction.

3.14 Traffic Management

76. The Contractor has provided traffic signages for public traffic (Photograph 27). However, this sign could have been more visible if mounted on a traffic post.

77. Women traffic aides are utilized for traffic management (Photograph 28).



Photograph 27. Traffic signage along the road surface.



Photograph 28. Women as traffic aides for traffic management.

3.15 Prevention of HIV/AIDS and STDs

78. Several activities were conducted by the service provider for the reporting period and are summarized in Table 7. These include awareness raising, social issues and behaviour, distribution and demonstration of use of male and female condom, pamphlets distribution and HIV-AIDS tests,

79. The stigma attached to HIV-AIDS may have caused the low number of people availing of the tests and the number of participants in these activities.

80. The number of HIV-AIDS positive persons need to be identified in a baseline to determine the affectivity of the campaign.

81. More effort is needed to increase awareness activities, HIV-AIDS tests, pamphlets, condom distribution and the number of participants from the average of 62.

Table 7. Monthly HIV-AIDS activities from July-December 2018

Month	HIV/AIDS Activity	Number of Participants	Issues and Concerns
July	Awareness on social issues and behaviour. Demonstrations on proper use of males and females' condoms; and distribution of educational pamphlets.	72	No HIV-AIDS tests were administered.
August	Counselling in private, demonstrations on use of condoms; condom distribution and distribution of educational brochures.	85	No HIV-AIDS tests were administered.
September	Counselling in private, demonstrations on use of condoms; condom distribution and	80	Reluctance of people to get tested. Only 3

	distribution of educational brochures. HIV-AIDS tests were administered.		were tested.
October	Counselling in private, demonstrations on use of condoms; condom distribution and distribution of educational brochures. HIV-AIDS tests were administered.	35	Small number of attendees.
November	Counselling in private, demonstrations on use of condoms; condom distribution and distribution of educational brochures. HIV-AIDS tests were administered.	53	Number of attendees is low.
December	Counselling in private, demonstrations on use of condoms; condom distribution and distribution of educational brochures. HIV-AIDS tests were administered.	48	Number of attendees is low.
Total		373	



Photograph 29. HIV-AIDS Awareness meetings and distribution of materials.



Photograph 30. Administration of HIV-AIDS tests to a participant.

3.16 Existing Infrastructure Issues

82. For the monitoring period from July to December 2018, the only issue was the provision by the contractor of a water pipe for water distribution in the community (Photograph 31).

83. The results of the District Administrator's Reassessment Exercise to determine whether other Displaced Persons or infrastructure facilities have been impacted by the project has yet to be released.



Photograph 31. Water pipe provided for the use of the community.

3.17 Environment Related Grievances

84. A summary of environment related grievances are provided in Table 8. The major issue on relocation has been addressed and the contractor has provided a new septic tank.

Table 8. Recorded Environmental Grievances from July-December 2018

Month	Environmental Grievance	Concerned Person / Organization	Resolution or Mitigation
July	Sewerage leakages at the contractor's camp	Local community near the camp	Chlorination to reduce foul smell.
	Noise and water pollution near Sumburu Quarry.	Local community near the quarry.	Not resolved.
August	Resettlement of people affected by the Sumburu crusher site. Provision of drinking water from the contaminated river. Requests for proper sewerage facilities to eliminate pollution.	Local community near the quarry.	Not resolved yet
September	Resettlement of affected persons at Sumburu crusher site.	Local community near the quarry.	Residents were relocated.
October	Nil		
November	Nil		
December	Nil		

18 Training and Mentoring

85. A seminar workshop on Technical Report Writing was provided to Environmental and Social Safeguards Officers of the Contractors, HRMG, and PSC last November 30, 2018 held at Kuri Lodge. The aim of the seminar was to provide grammar pointers and technical editing using Word.



Photograph 32. Participants to the Technical Report Writing Seminar.

86. Regular employee briefings are also provided to the employees for environmental concerns, work, health and safety issues (Photograph 33).

87. The contractor has also allowed its personnel and HRMG staff to attend a training in Work Health and Safety.



Photograph 33. Regular briefings by the contractor on environment and related issues.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusion

88. This semi-annual environmental monitoring report indicates that the contractor should conduct regular monitoring using its in-situ equipment for the identified sampling stations.

89. The observed solid waste, septage and workshop wastes need to be contained following the submitted plans.

90. The problems in Sumburu quarry has been addressed except for its septic tank which will again fail due to faulty design.

91. The submission of the riverine and rock quarry environmental management plans need to be provided soonest to prevent delays in the project's aggregates requirements.

92. The improper disposal of wastes in road sides are exacerbated by the steep slopes and the damages to food gardens and sedimentation of water bodies downstream.

93. There is need to optimize the siting for spoils disposal to ensure that water bodies down stream are not affected.

94. Several seminars and trainings are proposed to provide capacity and capability building activities to the Contractor's environmental officers, project management and HRMG staff to ensure that the environmental management and compliance monitoring requirements are done in an efficient and timely manner.

4.2 Recommendations for Implementation and Corrective Actions

95. The experiences from Tranche 1 and Tranche 2 indicate that the personnel recruited by the Contractor need capacity building. It is therefore important that these trainings, seminars and workshops need to be done as soon as possible to ensure that the Contractor's staff with the assistance of DOW-HRMG together with the PSC would benefit from these capacity and capability building activities (Table 7).

96. The importance of identifying environmental harm and mitigating or remediating these harmful activities need corrective action. In this case, corrective action could be categorized into two; corrections mean that there is immediate relief or action to an environmental problem. Corrective action refers to actions that would ensure that these environmental problems are not repeated either through policy or application of environmental management best practices (Table 8).

Table 9. Recommended Seminars and Trainings for Capacity Building

Activity Number	Item and Recommended Action	Responsibility	Completion Date
1	Training on the use of environmental In-situ equipment for monitoring.	HRMG-PSC-CONTRACTOR	February 2019
2	Echo Seminar-Workshop on Traffic Safety.	DOW-HRMG-PSC-CONTRACTOR	February 2019
3	Echo Seminar-Workshop on First Aid Procedures	HRMG-PSC-CONTRACTOR	March 2019
4	Echo Seminar-Workshop on Environment Health and Safety Best Practices.	HRMG-PSC-CONTRACTOR	March 2019
5	Seminar Workshop on Status, Issues and Concerns in the Implementation of the CEMP and other plans.	HRMG-PSC-CONTRACTOR	March 2019
6	Training on Mapping Using Geotagging and Google Maps for Monitoring and Quarry Management.	HRMG-PSC-CONTRACTOR	March 2019

Table 10. Corrective Action Plan.

Non Compliance	Recommendations for Implementation	Corrective Actions	In-Charge	Date of Implementation
Absence of complete monthly monitoring for identified environmental parameters.	Advise the contractor to conduct environmental monitoring using in-situ equipment.	Assist the contractor's Environmental Officer in the use of their equipment.	CHEC PSC HRMG	January – February 2019
Soil erosion due to absence of management practices.	Implement sediment traps construction and tree and grass seeding or planting.	Contractor to provide action plan with detailed activities.	CHEC	January – February 2019
Lack of implementation of the solid, liquid and hazardous waste management plans.	Contractor to review the respective plans with PSC and HRMG.	Identify activities that are implementable in both the short and long term.	CHEC PSC HRMG	January – February 2019
Replacement of damaged and cut trees during the construction activity.	Identify the resources required and the sites for tree planting.	PSC and HRMG to assist in the planning activity.	CHEC PSC HRMG	February – March 2019
Absence of appropriate health personnel to provide first aid assistance.	Designate personnel who attended the First Aid training to assume such role.	Implement the submitted Health and Safety Plan	CHEC	January – February 2019
Submit or revise all required plans which have not been approved.	Review with the contractor the pending plans.	Assist the contractor in the plans' accomplishment.	CHEC	January – February 2019
Submit the required Quarry Management Plans	Follow the prescribed format in QMP.	Assist the contractor in the plans' accomplishment.	CHEC PSC HRMG	January – February 2019

5.0 Appendices

Appendix 1: List of References

1. Initial Environmental Examination for Gewa - Gembogl Road section (2016).
2. Department of Works Specification for Road and Bridge Works 1995
3. Department of Works Specification for Road and Bridge Works 2015 Edition
4. Back to Office Report of HRMG Environmental Officer
5. Conformed Documents for the Improvement Works and Long Term Performance Based Maintenance Service (LTPBM) for Gewa - Gembogl Road. Contract Number CSTB 3533.
6. Scherer, Thomas F. 2016. North Dakota State University Extension Service. Reviewed and Reprinted October 2016.
7. DOWL. 2015. Erosion and Sediment Control Best Management Practices Manual. Montana Department of Transportation.
8. General Construction Waste Management and Hazardous Materials Handling and Waste Disposal DEC 1997.
9. Sample Environmental Baseline Procedure for Tranche 3 Projects. The Case of Pangia Wiri Loop Road.

Appendix 2: List of People Interviewed

1. Mr. Jun Requito – Resident Engineer PSC
2. Alphonse Niggins, Senior Field Coordinator, HRMG
3. Steven Sukot, Environmental consultant, PSC
4. Paul Nombri, Manager, Technical Services, HRMG
5. P a r a k a N e w m a n , Environmental Officer, HRMG
6. Ms. Maricel Babayen-on, PSC Cost Engineer
7. Ms. Joyce Kupul – HRMG Environmental Officer