

Semi-Annual
Report

July 2019

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

Pangia to Wiru Loop Sub-Road Project

(January to June 2019)

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

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Abbreviations

ADB	- Asian Development Bank
APs	- Affected Persons
BTOR	- Back to Officer Report
CEMP	- Contraction Environmental Management Plan
CEPA	- Conservation and Environment Protection Authority
CRO	- Community Relations Officer
DOW	- Department of Works
EA	- Executing Agency
EMP	- Environmental Management Plan
EMR	- Environmental Monitoring Report
EO	- Environmental Officer
ESSU	- Environment and Social Safeguards Unit
GOPNG	- Government of Papua New Guinea
HCRN	- Highlands Region Core Road Network
HIV	- Human Immunodeficiency Virus
HRMG	- Highlands Roads Management Group
HRRIP	- Highland Region Road Improvement Investment Program
IA	- Implementing Agency
IEE	- Initial Environment Examination
NRA	- National Road Authority
PNG	- Papua New Guinea
PSC	- Project Supervision Consultant
PPE	- Personal Protective Equipment
SEMR	- Semi-annual Environmental Monitoring Report
SHP	- Southern Highlands Province
SPS 200	- Safeguards Policy Statement 2009
TMP	- Traffic Management Plan

Fact Sheet

Loan	3076/3077 PNG
Project Number	
Subproject	Pangia Wiru Loop Road Sub-project
Road Length	31.40 km
Contract Amount	K88, 908, 670.34
Improvement Works	K79, 385, 106.01
Long Term Maintenance	K9, 523, 564.33
Commencement Date	16 th October 2017
Completion Date	24 months (estimated – 16 th November 2019)
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 acquiring 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 land acquisition and/or resettlement activities, as required. The more relevant delegated responsibilities include the following;</p> <ol style="list-style-type: none"> 1. Review and endorse the draft RP as prepared by its consultant prior to submitting it to DOW and, subsequently, to ADB for approval; 2. Monitor the process of allocation and disbursement of funds for compensation and ensure that funds are available and compensation is paid in a timely manner; 3. Coordinate and carry out consultations with affected communities to ensure that all stakeholders are informed in a timely manner about its policies and procedures; ensure that all public disclosure of the provisions for land acquisition and compensation are carried out; and, oversee and monitor the grievance redress process; 4. Carry out all other activities related to internal monitoring of land acquisition activities and collaborate with and support the work of the independent monitoring organization; 5. Coordinate with civil works contractors to ensure that required land is cleared in a timely manner, that unforeseen damages and losses are recorded and compensation paid and that all other steps and measures are taken to complete the civil works in an efficient manner. <p>The NRA will be the Implementing Agency for road maintenance. This will include all road maintenance works contracted directly by the NRA or transferred from the DOW. A project implementation unit will be established in the NRA.</p>
Coverage of Semi - Annual Environmental Monitoring Report # 3	Semi - Annual Environmental Monitoring Report – January to June 2019

Executive Summary

1. This semi-annual environmental report (SEMR) is prepared for the civil works carried out by the contractor and its associated environmental impacts for the 31.400 kilometres; Pangia-Wiru Loop road project from January to June 2019.
2. The associated environmental impacts were minor and mitigated well by the contractor for the identified monitoring activities from January to June 2019. The monitored activities were; clearing and grubbing, side excavation, embankment and capping layer, construction of line drainages, construction of protection headwalls and slope protection, construction of gabion baskets, application of sub-base and base materials and fine sand, compaction, trimming and priming, sealing, quarry operations, bridge construction, camp management and batching plant and asphalt preparation sites.
3. The contractor was complaint by buying own in-situ equipment to monitor for air quality, noise level and water quality. The monitored results from the use of the in-situ equipment showed that the parameters were at acceptable levels respectively.
4. The excavated solid wastes from construction activities and quarry operations were not properly disposed of at designated sites. Kumarini Quarry at chainage 27+000 had excavated wastes not properly dumped and compacted. The wastes overburden and slipped into the nearby environment. Traffic Management and Health and Safety Plans were not fully implemented by the contractor. The contractor failed to fully implement these sub plans.
5. The resettlement issue for the Paiyama ceremonial ground has been addressed and the landowners have agreed through Grievances Redress Committees (GRCs) for payment for improvements and structures at chainage 28+600 when funds are available.
6. The project has impacted the livelihoods of the people and they have benefited a lot from construction activities as hired labours; rentals for land lease; quarry operations and local hires and purchases. The table below shows the summary of (i) Local Hires & Purchases, (ii) Land Lease and (iii) Quarry payments from January to June 2019 in PNG Kina.

Table 1: Summary payments to local communities

Items – January to June 2019	Amount (PNG Kina)
Land Lease	15, 000.00
Local Hire and Purchases	3, 466, 019.20
Quarry Payments	104, 802.10
Total	3, 585, 821.30

7. The contractor has employed a total of 1, 543 workers inclusive of skilful and casuals from January to June. Women participation was 255 and accounted for 16.53% which was below Asian Development Bank's (ADB) requirement of 30%. Displaced Persons (DPs) were 975 and accounted for 63.19% of the total workforce.

1.0 Introduction

1. Department of Works (DoW), through the Project Implementing Unit (PIU), Highlands Roads Management Group (HRMG) has prepared the Semi-annual Environment Monitoring Report (SEMR) from January to June 2019 for the Pangia Wiru Loop (31.40KM) sub project in the Southern Highlands Province. The Pangia Wiru Loop Road sub project is under the Tranche 3 projects and which has been identified in the Highlands Region Improvement and Investment Program (HRRIP) for rehabilitation and upgrading.
2. The SEMR from January to June 2019, highlights the construction activities and works in progress undertaken by the contractor and the implementation of the Construction Environmental Management Plan (CEMP) and sub plans.
3. The report covers the construction activities and the associated environmental impacts on the identified monitoring parameters. The 21 unified monitoring environmental parameters have been monitored. Some non-compliance parameters have been observed during the monitoring months but were minor and manageable.
4. The in-situ equipment for water quality, air quality and noise level was used for monitoring. The results obtained all parameters were at acceptable levels. The contractor was mostly complying with the CEMP and sub plans during the implementation of the road project. The results have been discussed as per the monitoring parameter in the main body of the report.

1.1 Background Information

5. The Highlands Region of Papua New Guinea (PNG), comprising the Provinces of Western Highlands, Southern Highlands, Eastern Highlands, Enga, Jiwaka and Chimbu, is a major contributor to the PNG economy through its agricultural production, mineral resources and the much anticipated Oil and Gas industry in the country from the Southern Highlands and HELA provinces.
6. A well-maintained road network is essential to facilitate the movement of goods and services. The Government of PNG (GoPNG) has made significant investment in improving the road network but a lack of maintenance has resulted in deterioration of the roads such that the Highlands Core Road Network (HCRN) is now in poor condition. Therefore, GoPNG has sought financial assistance from ADB Loans 3404/3408 PNG SF to upgrade and rehabilitate the identified roads in the HRRIP.
7. The GoPNG through the DoW has identified 13 road projects in the Highlands Region and are classified as Tranche Projects which are being funded by ADB. Tranche Project 1 projects are Laiagam to Pogera and Mendi to Kandep sub projects which have been successfully completed and now embarking on Tranche 2 sub projects which are Mendi to Tambul (55.53 KM), Kotna to Lapramb (31.65 KM) and Ialibu to Kagua (31.778 KM) in Southern Highlands/Western Highlands, Western Highlands and Southern Highlands respectively.

8. The rehabilitation and upgrade of Tranche 3 projects are; Nipa Munihi (27.70 KM and Pangia Wiru Loop (30.40KM) road sub-projects in the Southern Highlands Province (SHP), Gewa Gembolg (21.025 KM) in Chimbu Province and Henganofi Nupuru (34.200 KM) in the Eastern Highlands Province.
9. The executing agency (EA) for the project is the Department of Works (DOW) and the Project Implementing Unit (PIU) is Highlands Road Management Group (HRMG). The Tranche 3 sub project covers 31.40 kilometres starting from Pangia Station and ends at Williame Village. The project is supervised by Project Supervision Consultant (PSC), Renardet S.A Consultancy Engineers for the implementing period.
10. The contract was awarded to COVEC (China) Limited on the 18th of January 2017 and commenced operations on the 16th of October 2017 for a period of twenty-four (24) months for the rehabilitation and upgrade of the 31.460 KM road length from Pangia Station to Williame Village.
11. It is expected that the project will be completed by 16 of November 2019. Thus, the defects liability period of one year begins and after the end of the liability period, the maintenance program of ten (10) years will take effect. Once the road is built, it will provide an effective link from Pangia to South Wiru District in the Southern Highlands Province (SHP).

1.2 Project Description

12. The Pangia Wiru Loop road sub-project road length of 31.460 KM stretches from Pangia Station at O+000KM (Kauwo Ward) to Williame village (31.460KM) in Ialibu Pangia District in the Southern Highlands Province (SHP).
13. The road passes through twenty-four (24) council wards. The first thirteen (13) wards have road access by vehicles. The remaining road length has been neglected overtime and impassable by vehicles starting from Tunde Primary School (chainage 24+500) to Williame village (ch.30+460)
14. The project has an average elevation of 2000 metres above sea level and runs through three big (3) creeks (Iperei, Polea and Wanduve) and other two (2) small perennial creeks. There will be three (3) new steel deck bridges with a lot of culverts to be constructed. The contractor has so far completed many culverts, line drainages and gabion baskets. The contractor has recently completed constructing the Iperei Bridge at chainage 27+880.
15. The project runs through a ceremonial ground at chainage 28+600, Paiyama Village. Negotiations and meetings have been held through the Grievances Redress Committees (GRC) and locals at Paiyama village to settle the outstanding issues regarding the ceremonial ground. Genuine persons have been identified and endorsed by the GRC for payment through the HRMG Office. Once funds are ready, payments will proceed immediately for the smooth progress of the road without any delay and disturbances from the locals.

16. The Pangia Wiru Loop road sub-project starts at Pangia Station and ends at Williame Station for a total length of 31.40KM. The map below shows the location of the road (black line).

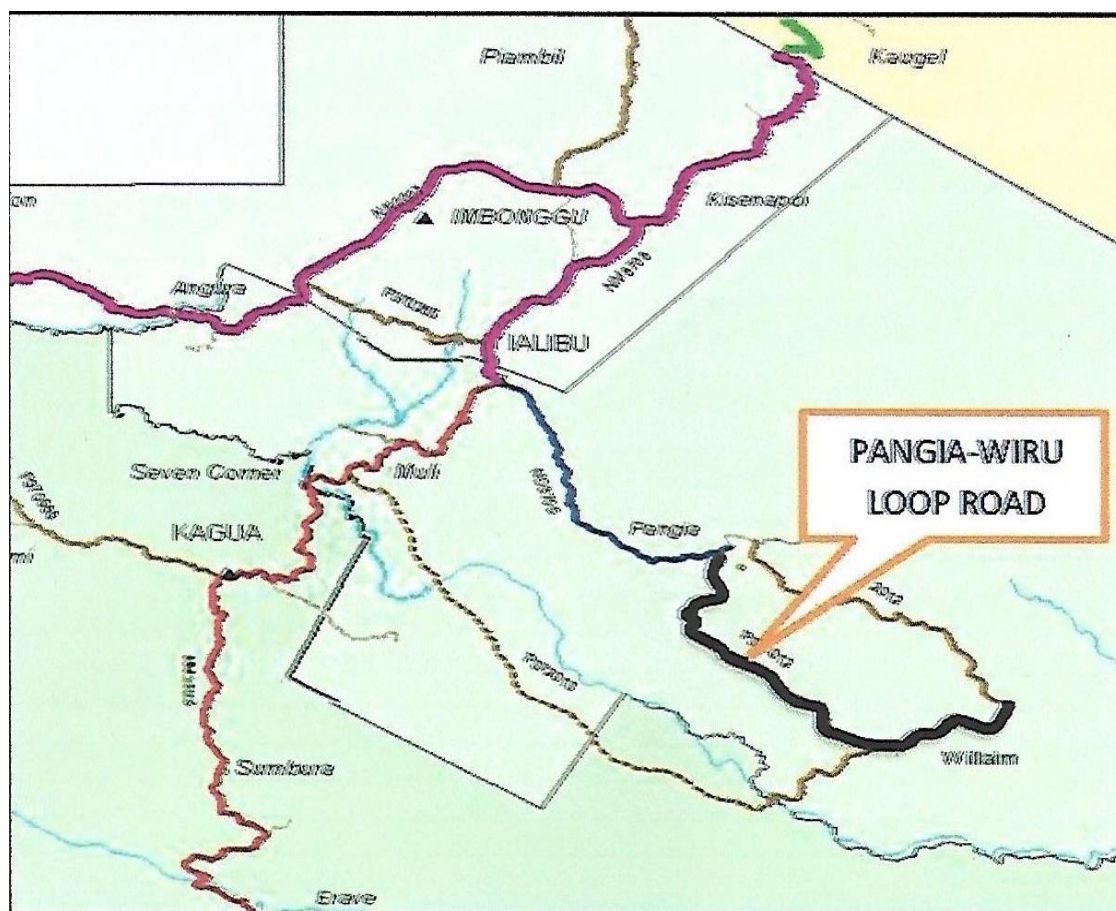


Figure 1 : Map showing the site location of the Pangia Wiru Loop sub-project

1.3 Purpose of the Semi-Annual Environmental Monitoring Report

17. The purpose of the semi - annual Environmental Monitoring Report is prepared to update and provide the Project Implementation Unit (PIU), Highlands Road Management Group and the Executing Agency (EA), Department of Works for the quarterly construction activities carried out by the contractor and its compliance with the CEMP and sub plans from January to June 2019.
18. The effectiveness of the implementation of the CEMP and the sub plans by the contractor has been on average. The semi - annual report is prepared to update the employer (DOW) the effectiveness and weaknesses in the implementation of the CEMP and the sub plans by the contractor for the civil works during the implementation period.
19. The semi - annual EMR is prepared to capture the construction activities using the twenty-one (21) unified monitoring parameters. The report intends to highlight and emphasis on the implementation process of the CEMP and the sub plans. The implementation of the CEMP and the sub plans is the prerequisite of the contractor.

The CEMP is a bid document; therefore, the employer (DOW) needs to know the implementation processes involved together with other minor management plans.

1.4 Methodology used in the report

20. The semi - annual EMR for the project is prepared using; (i) brief back to office reports (BTOR), (ii) monthly monitoring reports (combined report – HRMG and PSC), (iii) community consultations and (iv) checklists of 21 unified parameters and the use of the in-situ equipment.
21. Most of the empirical data with descriptive information obtained in this report has been derived from the monthly reports jointly conducted by PSC and the contractor. The in-situ equipment was used in the monitoring months for the identified monitoring parameters. The contractor was complying by buying their own in-situ equipment for monitoring for air quality, noise level and water quality (parameters).

2.0 Monitoring Activities and Findings

22. The semi - annual EMR consists of the following monitoring activities using the twenty-one (21) parameters. (i) Road Construction Activities, (ii) Quarry Operations, (iii) Camp Facility Management, (iv) Batching Plant and Asphalt Preparation site, (v) (vi) Impacts of the project and (vii) Benefits of the sub project. The unified 21 monitoring parameters are tabulated below.

Table 2: Monitoring Parameters.

#	Monitoring Stations (STN)	Unified Monitoring Parameters
1	STN 2.0	Summary of compliance and non-compliance
2	STN 3.0	Training, Mentoring and Meetings
3	STN 4.0	Health and Safety Issues
4	STN 5.0	Contractor's Camp and Yard
5	STN 6.0	Earthworks
6	STN 7.0	Erosion and Sedimentation
7	STN 8.0	Water Quality
8	STN 9.0	Air Quality
9	STN 10.0	Noise Level
10	STN 11.0	Waste Management
11	STN 12.0	Hazardous Waste Management
12	STN 13.0	Aggregates Extraction
13	STN 14.0	Ancillary Facilities Management
14	STN 15.0	Tree Removal and Vegetation Management
15	STN 16.0	Socio-Economic Issues of Workers
16	STN 17.0	Socio-Impacts to the community
17	STN 18.0	Public Safety
18	STN 19.0	Traffic Management
19	STN 20.0	Prevention of /HIV/AIDS and STIs
20	STN 21.0	Existing Infrastructure Issues
21	STN 22.0	Environmental Related Issues

Table 1. The unified monitoring parameters inclusive of the summary

23. The contractor has commenced on the 16th of October 2017 and has employed an Environmental Officer, Mr. Rodney Karu for the proper implementation of the CEMP for the construction works during the implementation period of the project.
24. The semi - annual EMR is the summary of compliance and non-compliance parameters from January to June 2019. The summary of compliance and non-compliance has been derived from the jointly monthly reports by PSC, HRMG and the contractor. Table 3 shows the summary of compliance and non-compliance from January to June.

Table 3: Summary of environmental compliance and non-compliance

Monitoring Parameters x=non-compliance, ✓=compliance, N/A = Not Applicable		Months (average performance)					
		Jan	Feb	Mar	Apr	May	June
STN02	Summary = non-compliance	4	5	2			
STN03	Training, Mentoring and Meetings	✓	✓	✓	✓	✓	✓
STN04	Health and Safety Issues	X	✓	x	X	X	X
STN05	Contractor's camp and Yard	✓	X	✓	✓	✓	✓
STN06	Earth Works	✓	✓	✓	✓	✓	✓
STN07	Erosion and Sedimentation	x	✓	✓	✓	✓	✓
STN08	Water Quality	✓	✓	✓	✓	✓	✓
STN09	Air Quality	✓	✓	✓	✓	✓	✓
STN10	Noise Management	✓	✓	✓	✓	✓	✓
STN11	Waste Management	x	x	✓	✓	X	✓
STN12	Hazardous Waste Management	✓	✓	✓	✓	✓	✓
STN13	Aggregates Extraction	✓	x	✓		✓	✓
STN14	Ancillary Facilities Management	✓	✓	✓	✓	✓	✓
STN15	Tree Removal & Vegetation Mgmt.	✓	✓	✓	N/A	N/A	N/A
STN16	Socio-economic Issues of Workers	✓	✓	✓	✓	✓	✓
STN17	Socio-Economic impacts – Comm.	✓	✓	✓	✓	✓	✓
STN18	Public Safety	✓	✓	✓	✓	N/A	✓
STN19	Traffic Management	x	x	x	x	x	x
STN20	Prevention of HIV/AIDS and STIs	✓	✓	✓	✓	✓	✓
STN21	Existing Infrastructure issues	✓	✓	N/A	N/A	N/A	N/A
STN22	Environmental Related Grievances	✓	x	N/A	N/A	N/A	N/A

Table 2. Summary of compliance and non-compliance

25. The contractor has mostly complied with the CEMP and minor management plans but had minor associated environmental issues. The contractor has not fully implemented the Traffic Management plans. Also, Health and Safety issues were not properly addressed at construction, camp, quarry and asphalt preparation sites.
26. The non-conformance parameters monitored during the monitoring months have been highlighted and reported in the monthly reports for corrective action. The copies of the reports were given to the Resident Engineer (RE), and the non-conformance issues were addressed through the RE to the contractor and immediate mitigation measures have been taken to combat associated impacts from the construction activities.

2.1 Training, Mentoring and Meetings

27. The contractor was mostly complaint with internal meetings and trainings for their workers. When issues encountered at the site; COVEC, HRMG and PSC amicably solved issues like the Paiyama Ceremonial Ground issue at kilometre 28+600 where landowners stopped the contractor from carrying out the construction activities.

The geotagged photographs (1) show Grievances Redress Committee members (GRC) having a meeting at Pangia District Administration Building for the Paiyama Ceremonial Ground issue and (2) the resettlement officer talking to locals at Paiyama village in April.



Photograph 1. GRC Meeting at District Office with members in January



Photograph 2. Re-settlement Officer talking to landowners at Paiayama village in April.

2.2 Health and Safety Issues

28. The contractor has submitted the Occupational Health and Safety Plan and approved by the Department of Works through the Executing Agency, Environment and Social Safeguards Unit (ESSU) in April 2018.
29. The contractor did not fully implement the Health and Safety Management Plans for most of the monitoring months. Most skilful labours at static work sites were not in basic Personnel Protective Equipment (PPE) during the monitoring months. The geotagged photographs three (3) and four (4) show workers without basic PPE.



Photograph 3. Welder without basic PPE the workshop area.



Photograph 4. Workers without PPE at the asphalt preparation site

2.3 Contractor's Camp and Yard

30. The contractor's camp and yard were partially clean. The Waste Management Plan was not properly executed during the monitoring months as evident of solid wastes being burned and not segregated well for proper disposal.
31. The solid and liquid wastes have been burned inside the campsite which was not healthy and unhygienic as fume from the wastes could cause internal problems in the near future for those who worked close to the site. The photographs five (5) and six (6) show the burned wastes at the campsite.



Photograph 5. Wastes burned at the camp in January 2019.



Photograph 6. Wastes burned at the camp in February 2019.

32. The solid wastes have to be segregated and dumped at the nominated or designated sites permanently. The Chinese living quarters were in good condition. Fire extinguishers were installed at sensitive to fire like fuel pump area, workshop and living quarters. The geotagged (7) and (8) photographs below show the fire extinguisher installed at the camp site.



Photographs 7 and 8. Fire extinguisher installed at the fuel pump area.

2.4 Earthworks

33. The contractor has constructed most of the earth works from chainage 0+000 to 31+460. There were no major associated environmental issues observed during the monitoring months. Only the Paiyama Ceremonial Ground had issues but resolved amicably by HRMG and PSC and work has progressed well without any delay. Works in progress from January to June 2019 were;
 - Clearing and grubbing 31+460 (end of the project)
 - Line drainages
 - Gabion baskets
 - Protection Headwalls and slopes
 - Installation of Culverts
 - Iperei Bridge Construction
 - Embankment and capping layer
 - Culvert construction
 - Application of sub-base and base and fine sand
 - Compaction
 - Trimming, Priming and Sealing up to chainage
34. The associated environmental impacts were minor and no major incidents were reported for the monitoring months from January to June 2019. The contractor was compliant with the construction activities as per the design specifications. The geotagged photographs (9) and (10) respectively show earth works by the contractor.



Photograph 9. Building foundation for Iperei Bridge at ch.27+880



Photograph 10. Completed Iperei Bridge at ch.27+880 in June.

2.5 Erosion and Sedimentation

35. Erosion and sedimentation from construction works have been fully controlled during the monitoring months from January to June 2019. Most excavated wastes have been removed and dumped at designated sites as agreed by the landowners. Clearing and grubbing has completed and less erosion and sedimentation. There were only slight sedimentation at construction sites like line drainages, culvert and gabions baskets, slope and protection head wall and Iperei Bridge but were only temporarily.
36. The only uncontrollable slipping of wastes into the nearby environment was from the quarry operations. There were four (4) quarries in operation; Elu, Kabulbul, Tomaire and Kumarini Quarries. The geotagged photographs (11) and (12) below show some of the solid wastes slipped into the nearby environment.



Photograph 11. Erosion at Tomiare Tomiare quarry ch.22+300



Photograph 12. Wastes heaped adjacent to Kumarini quarry – ch.27+.0

2.6 Water Quality

37. There are small perennial creeks from the start of the project and three major creeks towards the end of the project where the rivers were and in-situ equipment was used for the water parameters during the monitoring months. The contractor was complaint by buying

own in-situ equipment for monitoring. The first three months (January, February and March assisted the contractor on how to use the new equipment).

38. The results obtained from the in-situ equipment are tabulated in table (4) below for the identified rivers/creeks from January to March 2019 only as April, May and June, the contractor sampled own results using their new equipment and not included.

Table 4: Result from the in-situ equipment for water quality compared with baseline

STN		Water Parameters		Baseline Datum	January Results	Feb Results	March Results
01	27+880 (Ipereick)	i	Dissolved Oxygen (DO)	6.57mg/L	2.4mg/L	5.7mg/L	6.39mg/L
		ii	Presence of Hydrogen (pH)	6.96 @ 27.8 °C	6.10@20.7 °C	6.3@21.7°C	6.1@20.7 °C
		iii	Turbidity NTU (Neuphelometric	11.2 NTU	13.8 NTU	7.51 NTU	13.35 NTU
02	29+431 (Poleack)	i	Dissolved Oxygen (DO)	4.68mg/L	<div>↓</div>	5.63mg/L	5.0mg/L
		ii	Presence of Hydrogen (pH)	6.43 @ 27.4°C		6.5@25.8 °C	6.3@24.8 °C
		iii	Turbidity NTU (Neuphelometric	9.99 NTU		16.77 NTU	11.37 NTU
03	30+086 (Wanduwe ck)	i	Dissolved Oxygen (DO)	6.16mg/L	<div>↓</div>		5.88mg/L
		ii	Presence of Hydrogen (pH)	7.36 @ 27.3°C			6.6@22.0 °C
		iii	Turbidity NTU	3.99 NTU			12.50 NTU

39. The comparative analysis against the baseline datum sampled by the National Agriculture Research Institute (NARI) in Port Moresby shows less alteration to the properties from January to March 2019. The geotagged photographs (13) and (14) show the Environmental Officer for HRMG using the in-situ equipment to sample water parameters at respective monitoring stations.



Photograph 13. HRMG EO sampling water parameters at ch.29+431



Photograph 14. HRMG EO sampling water parameters at ch.30+086

2.7 Air Quality

40. Dust was evident where works were in progress but was minor. The contractor used water trucks to suppress dust. The monitoring months had experienced most rainfall and not much impact had on the environmental receptors. The contractor needs to provide dust control barriers like humps and public entities like schools and markets.
41. The suspended air particulate matter for fine to coarse materials (PM_{2.5} and PM₁₀) has been at acceptable levels from less than 10 $\mu\text{m}/\text{m}^3$ and 20 $\mu\text{m}/\text{m}^3$ respectively. The in-situ equipment for air quality was used at the identified monitoring stations during the monitoring months only for January, February and March. The contractor was complaint by sampling for air quality using their own in-situ equipment for April, May and June as well. The results from the in-situ equipment are tabulated in table (5) below only for January, February and March.

Table 5: Results obtained from the in-situ equipment for air quality

STN		Air Quality ($\mu\text{m}/\text{m}^3$)					
		January		February		March	
		PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀
01	0+000 - Start	2.0	8.0	1.0	2.4	1.2	2.4
02	27+880 - Iperei Ck	1.8	4.1	1.3	1.8	2.0	3.8
03	29+431 - Polea Ck			0.9	1.3	1.6	2.3
04	30+086 - Wanduwe Ck					1.4	2.1
05	31+400 - Williame	No work					

42. The results show that the general air quality was at acceptable level. The reporting months have experienced a lot of rainfall and also the contractor used water trucks to water the road surfaces to suppress dust during working sites. The geotagged photographs (15) and (16) show the HRMG EO using the in-situ equipment to check air quality at given monitoring stations during the monitoring months.



Photograph 15. HRMG EO checking air quality at ch.27+880



Photograph 16. HRMG EO checking air quality at ch.29+431

43. The other contributing factor to air pollution was the burning of plastics, fuel filters, used tyres and other lubricants at camp site and also exhausts from machines and big dumps at construction sites. The contractor has to comply with these issues as reported earlier that wastes have burned at the camp site and also issue basic PPEs to workers construction sites.

2.8 Noise Management

44. The construction works have started and big dumps and machines were busy at work. The results obtained from the in-situ equipment show the noise levels were at acceptable level for the identified monitoring stations from January to June 2019.
45. The noise produced by machines at quarry operations and construction works may pose hearing problems so the contractor must issue ear plugs to machine operators and crews. The geotagged photographs (17) and (18) show the HRMG Environmental Officer (EO) using in-situ equipment for noise level.



Photograph 17 and 18. EO checking noise level at ch.27+880 & 29+431.

46. The noise levels obtained from the in-situ equipment are tabulated in table (6) below. The noise levels were at acceptable level during working hours where construction works were in progress. The decibels (dBAs) for noise levels without machines/trucks were around 54 dBAs and with machines/trucks were at an average of 85 dBAs.

Table 6: The results obtained from in-situ equipment from January to March only

Monitoring STNs		Noise Level in Decibel (dBAs)					
		January		February		March	
		No Trucks	With Trucks	No trucks	With trucks	No trucks	With trucks
01	0+000	52.2	71.8		68.7		68.7
02	27+880 – Iperei Ck	65.5			80.3		64.3
03	29+431 – Polea Ck			67.6		58.4	
04	30+086 – Wanduw					52.4	
05	31+460 – Williame	No	Work				

Table 5. The results obtained from the in-situ equipment from January to March only.

2.9 Waste Management – Solid and Liquid

47. The contractor has submitted the Waste Management Plan and approved by the employer. The contractor has mostly complied with the Waste Management Plan for Solid and Liquid wastes from construction works, workshop activities, quarry operations and asphalt preparation and batching plant site.
48. Excavated wastes have been dumped at agreed sites with the landowners for further developments. The segregated domestic wastes at the camp have been put in the drums for proper disposal at designated sites.
49. Some solid wastes have been burned by the contractor at the campsite in January and lubricants leaked but were mitigated immediately. Excavated wastes have not been removed have been overburden and slipped into the nearby environment for both the Tomiare and Kumarini Quarries. The geotagged photographs (19) and (20) show some of the minor issues observed during the monitoring months and were mitigated later in the same months.



Photograph 19. Solid wastes burned at the campsite in January.



Photograph 20. Excavated wastes not removed at ch.27+000 in February

2.10 Hazardous Materials Management

50. The contractor has been mostly complying with the storing and handling of hazardous materials during the monitoring months. There were no explosives used for the project especially at quarry operations. The contractor used only rock hammers to crush the rocks for road works.
51. Used oils and lubricants were properly disposed of at designated sites. Bitumen and asphalt preparation area had minor spillages/leakages and were mitigated by the contractor. There were no major issues of hazardous spillages or in incidences during the monitoring months.
52. The contractor was instructed through verbal and written reports not to burn wastes at the campsite as it might cause long term effects to the workers who maybe working nearby. The contractor complied and disposed wastes properly and never burned after the reports.

53. The geotagged photographs (21) and (22) below show some minor environmental issues observed during the monitoring months and best ways to mitigate for handling and storing.



Photograph 21. Minor Bitumen leakage at the preparation site.



Photograph 22. Used oil drums used as drip trays at workshop site.

54. The contractor was advised to properly label the types of lubricants and store them at safe place at the store room. Leakages were to be covered with dust/saw dust and remove and dump at proper dump site area. Drip trays have been provided at gen set house and workshop area in case of leakages. The issue of safety for the workers was not properly addressed.

2.11 Aggregates Extraction

55. The contractor has submitted the Quarry Management Plan (QMP) and was evaluated and approved later by the Department of Works through the Executing Agency, Environmental and Social Safeguards Unit (ESSU) in April 2018 for Elu Quarry and Kabulbul Quarry respectively. The Tomiare Quarry at chainage 22+300 got the approved QMP on the 30th of July 2018 and the new quarry, Kumarini got the QMP approved in February.
56. Elu and Kabulbul are existing quarries while Tomiare and Kumarini are new quarries. The Tomiare and Kumarini quarries have observed some environmental damages done by the contractor. The landowners have agreed to have their land cleared for the extraction of the aggregates and were paid some lump sums for the removal of improvements and structures. Tomiare and Kumarini quarries have been continuously experiencing slips due to over burden as not being disposed of the excavated wastes at proper place.
57. The landowners have agreed with the contractor by signing a Memorandum of Agreement to sell their aggregates at a rate of K1.30/m³. Therefore, the contractor has paid a lump sum of **PNG Kina of 105, 1920.10** to the landowners of the quarries from January to June 2019 as tabulated in table 7 below.

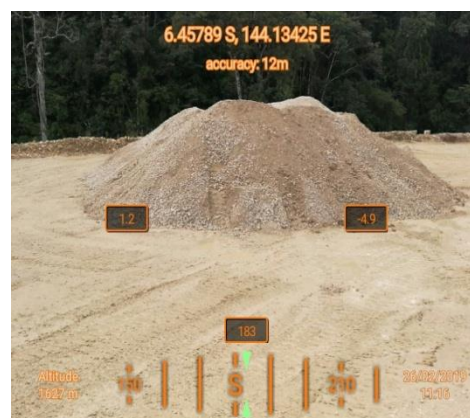
Table 7: Aggregates volume (M³) per quarry at K1.30/cubic each

Month	Elu Quarry	Kabulbul Quarry	Tomiares Quarry	Kumarini Quarry	Total in M ³	Total (Kina)
January	11, 040	2, 820	4, 280		18, 140	23, 582.00
February	7, 310	5, 890	1, 040		14, 240	18, 512.00
March	3, 190	4, 570	3, 460	3, 630	14, 850	19, 305.00
April		3, 660	3, 160	3, 300	10, 060	13, 078.00
May	1, 196	5, 512	2, 626	1, 963	11, 297	14, 686.10
June	900	5, 280	3, 750	2, 400	12, 330	16, 029.00
Total	23, 636	27, 732	18, 316	11, 293	80, 917	105, 192.10

58. The quarry owners have been benefiting from the company since the inception of the project and continuously benefitting from the spinoffs. The quarry owners worked as spotters, security guards, crews and machine operators apart from the direct benefit from quarry royalties. Geotagged photographs 23 and 24 show Tomiare Quarry at kilometre 22+300 and



Photograph 23. Tomiare Quarry



Photograph 24. Kabulbul Quarry

2.12 Ancillary Facilities Management

59. The temporary construction works by the contractor has engaged day casuals at the respective work sites. The contractor paid casuals on time using PNG Labour Laws but some casuals complained of not being paid well. The contractor had temporary work sites like open line drainages, culvert constructions, gabion baskets, protection headwalls and slopes, Iperei Bridge construction, clearing and grubbing, and sealing. Most of these casuals have been recruited from the construction sites for the required construction works.
60. The contractor partially complied with the Health and Safety issues of the workers. Most of the workers working at static sites like workshop and batching and asphalt preparation areas have not been issued with basic PPE during the monitoring months. The geotagged photographs (25) and (26) show some of the workers at static locations without basic PPE.



Photograph 25. Workers at batching plant without basic PPE.



Photograph 26. Workers at a line drainage site without basic PPE.

2.13 Tree Removal and Vegetation Management

61. The contractor has commenced construction works at chainage 29+100 to 31+200 and trees and vegetation within the construction limits have been removed. Those removed have been identified and recorded by the social safeguards and resettlement officer for deliberation through the Grievances Redress Committees (GRC) for final payment for Pupi Paiyama village towards the end of the project.
62. The contractor has been very careful and worked within the construction limits. Those trees felled and vegetation removed outside of the construction limits were the sole responsibility of the contractor and paid for the losses to the landowners accordingly.
63. There is a plan for tree planting or revegetation by the contractor. This plan will look at planting of new seedlings for the cut trees later. The environmental officer for the contractor will come up with a tree planting plan for this program later. The geotagged photographs (27) and (28) show some trees felled during construction works by the contractor.



Photograph 27. Trees felled at Paiyama village at ch.29+100



Photograph 28. Trees felled at Kumarini Quarry at ch.27+000

2.14 Socio-Economic Issues of Workers

63. There were no issues raised by employees. Most casuals were happy with the contractor for day work. The contractor paid the casuals on time. The permanent workers have been provided with permanent accommodation with meals and clean water provided. The photographs (29) and (30) show day casuals at different work sites during the monitoring months.



Photographs 29. Day casuals at work.



Photograph 30. Day casuals at work

2.15 Socio-Economic Impacts to the Community

64. The locals from the vicinity of the road project have benefited a lot from construction activities since the inception of the road project. The contractor was fair by engaging individuals as casuals and skilful labours from the road impacted wards from the start of the project (0+000 KM) to the end of the project at Williame Village (31+460 KM) at South Wiru sub-district.
65. Gender equality has been emphasised by ADB to engage about 30% of women to participate the total workforce but the average is 13.80% which is below the set benchmark. The distribution of employment by gender from January to June is tabulated below in table 8.

Table 8: Distribution of employment by gender from January to June

Month	Male (Nationals)	Female (Nationals)	Chinese (Int'l)	Total	DPs Employed
January	220	60	38	318	212
February	160	60	40	260	180
March	195	35	35	265	160
April	170	40	34	244	146
May	160	30	34	224	145
June	170	30	32	232	132
Total	1, 075	255	213	1, 543	975
Monthly Ave.	179.17	42.5	35.5	257.17	162.5
Percentage	69.67%	16.53%	13.80%	100%	63.19%

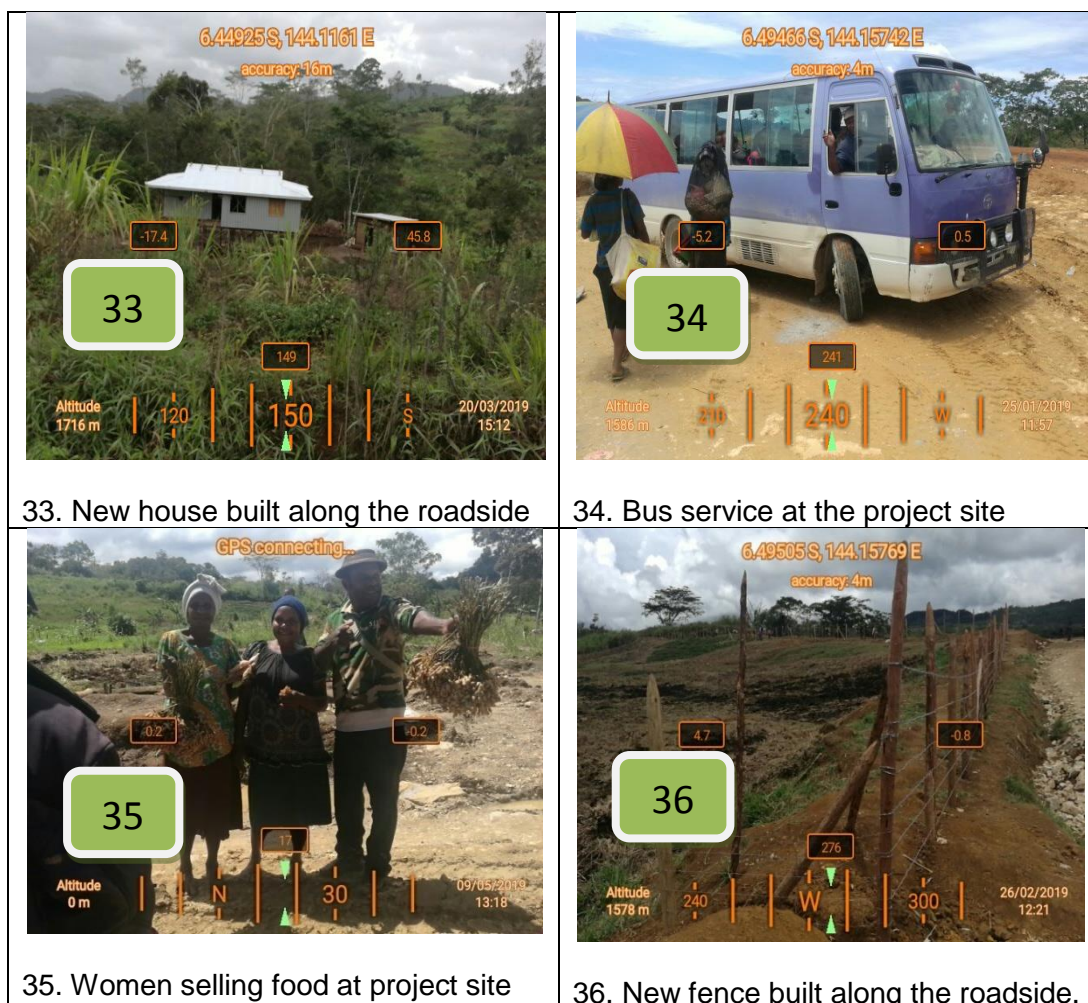
66. The contractor has employed a total of 1, 543 employees from January to June 2019. Of the total, 255 were females which constituted about 13.80% of the total workforce, which was below the required mark of 30% by ADB. About 975 casuals for the construction works were mostly DPs, which of 63.19% of the total workforce from January to June.
67. Currently the contractor is stationed at chainage 13+600, Lagani village and pays a lump sum of K2, 500.00 per month. Therefore, the contractor has paid a total of Fifteen Thousand Kina (PNG Kina of 15, 000.00) from January to June 2019 to the landowners.
68. The landowners of the four (4) quarries, Elu Quarry at chainage 8+000, Kabulbul Quarry at chainage 13+600, Tomiare Quarry at chainage 22+200 and Kumarini at chainage 27+000 have been paid a lump sum of One Hundred Four Thousand, Eight Hundred and Two Kina and Ten Toea (Kina of 104, 802.10) from January to June for the extraction of aggregates by the contractor for civil works.
69. The rehabilitation of the Pangia Wiru Loop road sub-project has seen a lot of improvements from various activities. These were some of the observations during the monitoring months;
- more mothers selling food items along the road corridors,
 - new improvements (buildings and clearing of gardens, new fences),
 - more bus services – movement of buses travelling to and fro within the project site – more income for the bus owners,
 - more casuals employed at construction sites, quarry operations and camp
 - selling and buying of dried coffee beans,
 - more people moving to and fro doing daily activities unlike prior to the construction of the road project.
70. The geotagged photographs below show some of the activities during the monitoring months from January to June 2019.



31. Women Participation at project site



32. Locally produced timbers for work



71. The project has added more value to the locals in terms of purchases of local foods and timbers by the company. The company has hired dump trucks and heavy machines for the civil works from January to June 2019.
72. The local purchases and hires by the contractor are tabulated in table (9) below from January to June 2019 for a total of Kina 1, 994, 919.00.

Table 9: Local purchases and hires by contractor

#	Month	Dump Trucks (Kina)	Machine (Kina)	Fine Sand (Kina)	Sealing Chips (K)	Kina (K0.00)
1	Jan	117, 000	372, 000	40, 000	140, 000	669, 000
2	Feb	117, 000	372, 000	190, 000	60, 000	739, 000
3	Mar	116, 543	304, 710	40, 180	125, 486	586, 919
4	April	116, 543	304, 710	45, 000	155, 000	621, 243
5	May	89, 610	280, 500	65, 000	80, 210	515, 320
6	June	69, 763	86, 932.20	96, 842	81, 000	
	Total	350, 543	1, 048, 710	270, 180	325, 486	1, 994, 919

2.16 Public Safety

73. There were no major reports received from the locals and company employees. The only complaints were for the Eperei Bridge and Paiyama Ceremonial Ground in January 2019. The issues addressed by the locals were resolved amicably by HRMG and the supervision consultant.
74. The safety of the public and traffic was not properly addressed by the contractor at kilometre 27+000 where the Kumarini Quarry was. The contractor did not fully implement the Traffic Management plans to safeguard the safety of the people and traffic. There were big boulders and heavy machines at work without traffic signs placed to warn of big boulders and machines at work near the road.
75. The locals complained for the proper construction of the Iperei Bridge using the design specifications by the contractor for convenience. The Paiyama Ceremonial Ground issue was addressed by HRMG to sort out the affected community when funds are available. The general public were warned during construction phase to take extra precaution when machines and dumps moving to and fro. The geotagged photographs (37) and (38) show the old Iperei Bridge and public consultation at Paiyama Ceremonial Ground respectively.



Photograph 37. Existing Iperei Bridge



Photograph 38. No Traffic control for the safety of moving traffic and public.

2.17 Traffic Management

76. The contractor has submitted the Traffic Management Plan (TMP) and was elevated and approved by the Department of Works and Implementation through the Executing Agency, Environmental and Social Safeguards Unit (ESSU).
77. The contractor was not fully implementing the Traffic Management Plan properly from January to June 2019. Despite attempts by the contractor to implement at certain construction sites; partially non-compliant during the monitoring months. The geotagged photographs (39) and (40) show contractor failed to comply.



Photograph 39. No Traffic Control at KM 25+300



Photograph 40. No Traffic Control at Kumarini Quarry at KM 27+000

2.18 Prevention of HIV/AIDS and STIs

78. The contractor has submitted the HIV/Aids Management Plan and approved by the Department of Works through the Executing Agency, Environment and Social Safeguards Unit (ESSU) in April 2018 for the Pangia Wiru Loop road sub-project.
79. The contractor was compliant by engaging a service provider, Pangia Health Centre, Department of Health for its HIV/AIDS programs. The volunteer counselling and public awareness was progressing well at identified villages per the monitoring month. The geotagged photographs (41) and (42) show the health officials and volunteers at certain locations along the road corridor.



Photograph 41. Contractor Environmental Officer talking to general public .



Photograph 42. Health worker counselling a female volunteer.

2.19 Existing Infrastructure Issues

80. The landowners around Iperei Bridge at chainage 27+880 have complained that the contractor did not get their consent to construct a by-pass for the Iperei Creek. There was a stop work by the locals but later resolved and paid the rightful landowners Kina of 1, 000.00 each to both sides of the river. The landowners have agreed that a by-pass would be built to make way for traffic and general public during the construction of the Iperei Bridge.
81. The Paiyama ceremonial ground has been an issue for the contractor as locals stopped work. After several public consultations with the locals, the contractor was

allowed to proceed with civil works. The issue has been resolved amicably with the locals by HRMG and the supervision consultant for the project.

The geotagged photographs (43) and (44) show the public consultation with the locals at Iperei Bridge and Paiyama ceremonial ground respectively.



Photograph 43. Public consultation at Iperei Bridge at ch.27+880



Photograph 44. Public consultation with locals at Paiyama - ch.28+650

2.20 Environmental Related Grievances

81. The construction works have been carried out by the contractor and only two (2) issues have been raised in February only. The construction works were carried out within the scope and construction limit. There may be some environmental issues aroused later when construction works stretches outward.
82. The two issues raised during the monitoring month of February were for the realignment at chainage 26+500 and a new culvert at chainage 25+300. The realignment was done without the consent of the landowners and the culvert construction had affected the locals living near the road.
83. The locals at kilometres 28+650 where the ceremonial ground is complained of assets and stopped civil works but then agreed for the contractor to pursue with construction activities after amicably resolved with HRMG and the supervision consultant in May 2019.
84. The geotagged photographs (45) and (46) show the HRMG and PSC officers talking to the disgruntled landowners for the realignment and the new culvert respectively.



Photograph 45. HRMG and PSC Officers talking to landowners



Photograph 46. Landowners agreed with written letter for contractor to work.

3.0 Conclusion and Recommendations

3.1 Conclusion

85. The main conclusions arising from the environmental monitoring activities during the review period are:
 - i. Improve on the number of female employments, currently it is below the 30% required mark by ADB.
 - ii. Health and Safety Plan to be properly executed.
 - iii. Traffic Management Plan to be properly executed.
 - iv. Improve on violations identified and forward to contractor through the Residential Engineer to mitigation.
86. Based on the above conclusions of internal monitoring, it is recommended that further actions are pursued as outlined in the next section.

3.2 Recommended Actions

87. The recommendations, implementation timelines and other relevant information for action by the contractor, PSC and HRMG are provided in Table 10 below.

Table 10: Recommendation for Corrective actions

N	Item and Corrective Action	Responsibility	Completion Date (Planned)
1	Contractor to employ more women participation to meet ADB requirement.	Contractor	Prior Completion of the project.
2	Contractor to fully implement the Health and Safety Plan properly.	Contractor	Continuous
3	Contractor to fully implement the Traffic Management Plan properly.	Contractor	Continuous
4	Issuance of notices of violations and penalize the contractor for continuous violations.	HRMG/Contractor PSC	Continuous

4.0 Appendices

Appendix 1 List of References (source)

1. Brief Back to Office Reports – January to June 2019
2. Contractor's Monthly Reports – January to June 2019
3. Initial Environment Examination for Pangia Wiru Loop – 2015 publication
4. Internal Monitoring Reports by HRMG – January to June 2019

Appendix 2 List people interviewed

- | | | |
|----|--------------------|--|
| 1. | Mr. Joven Du | - Administration Manager – COVEC |
| 2. | Mr. Rodney Karu | - Contractor Environmental Officer – COVEC |
| 3. | Mr. Steven Sukot | - CSC Environmental Specialist |
| 4. | Mr. Paul Nombri | - Manager Technical Services |
| 5. | Mr. Mathias Konga | - Re-settlement and Social Safeguards Specialist |
| 6. | Mr. Carlton Kunupo | - Community Relations Officer – PWL |
| 7. | Mr. Samson Wereh | - GRC Chairman – District Administrator |