

# Environmental Monitoring Report

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Semi-Annual Report no. 4  
For the period covered January to June 2019  
Project Number: 47381-002  
December 2019

## SRI: Mahaweli Water Security Investment Program – Tranche 1

North Western Canal Project (NWPCP)

Prepared by Ministry of Mahaweli Development and Environment with the assistance of Program Management, Design and Supervision Consultant (Joint Venture Lahmeyer International GmbH – GeoConsult ZT GmbH) for Democratic Socialist Republic of Sri Lanka and the Asian Development Bank.

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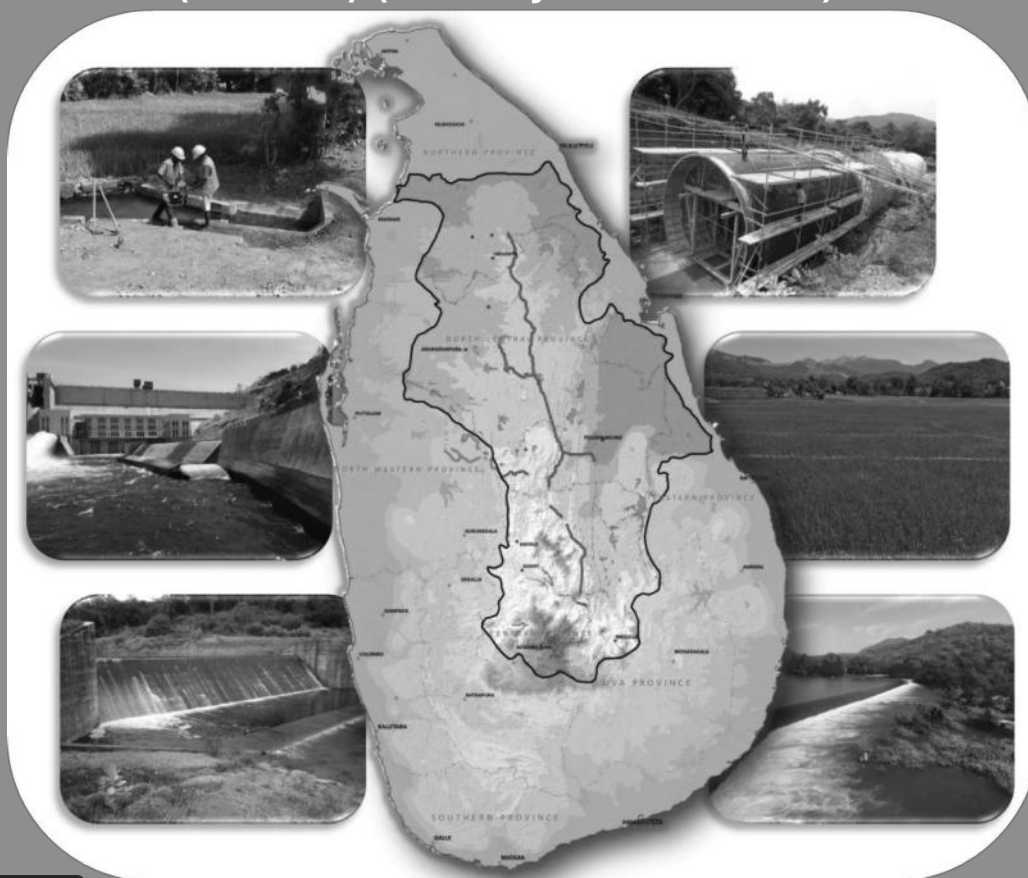
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# Mahaweli Water Security Investment Program

## Semi Annual Environmental Monitoring Report (SAEMR) No. 05 for North Western Province Canal Project (NWPCP) (January to June 2019)



**Ministry of Mahaweli  
Development and Environment  
Sri Lanka**



**December 2019  
Final Report**

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**SAEMR No. 05 for NWPCP**

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# 1 INTRODUCTION

## 1.1 Scope of the Report

1. This Semi Annual Environmental Monitoring Report (SAEMR) No. 5 is prepared to update the progress of North Western Province Canal Project (NWPCP) with respect to environmental safeguard aspects for the period of January to June 2019, which fulfils Asian Development Bank (ADB) requirement to submit a SAEMR to ADB and Central Environmental Authority (CEA) for the “Category A” projects as documented in FAM<sup>1</sup> and EARF<sup>2</sup>.

2. The purpose of this report is to ensure that the Project is implemented with due concern for environmental and social safeguards according to the ADB’s Safeguard Policy Statement (SPS) 2009, and specifically to ensure that these issues are adequately addressed in compliance with the requirements of ADB. Further, this report is to assess the progress with implementation of the program in complying with the approved Environmental Impact Assessment (EIA) including Addendum to the EIA: NWPCP Tranche 1 packages (May 2017) and Environmental Management Plan (EMP)<sup>3</sup> as per the stipulation No. 14.3 of the EIA approval No. 08/EIA/WATER/07/2012 issued by CEA on 23 February 2016, renewed approval by CEA on 11.03.19 by Letter Ref. Ref.08/EIA/Water/07/2012/Vol 3, and approval for the addendum (Ref.08/EIA/Water/07/2012/Vol 2 dated 11 April 2018).

3. This SAEMR is prepared addressing following aspects, based on the available information as of the monitoring period from January to June 2019:

- (i) Background/context of the monitoring report (adequate information on the project, including physical progress of project activities, scope of monitoring report, reporting period, and the monitoring requirements including frequency of submission as agreed upon with ADB);
- (ii) Changes in project scope and adjusted safeguard measures;
- (iii) Qualitative monitoring data;
- (iv) Monitoring results compared against previously established benchmarks and compliance status (e.g., obtaining necessary approvals for establishment of certain facilities, national environmental emission and ambient standards and/or standards set out in the WB’s EHS guidelines; timeliness and adequacy of environmental mitigation measures; and training, capacity building, etc.);
- (v) Corrective action plan in any case of non-compliance or any major gaps identified;
- (vi) Records on disclosure of monitoring information to affected communities;
- (vii) Identification of key issues, or grievances from affected people, or recommendations for improvement;
- (viii) Proposed items of focus for the next reporting period and due date.

4. This SAEMR for NWPCP is prepared by the Environmental Specialist of PMDSC based on the monthly monitoring and progress reports received from the Environmental Monitoring Specialist (EMS), and the updates which were received from the Environmental Specialist of PMU and Senior Environmental Officer for PIU of NWPCP.

## 1.2 Current status of NWPCP

5. Two contracts, NWPCP-NCB-1 and NWPCP-ICB-2, started construction work under MWSIP Tranche 1 and the bid evaluation is in progress for the NWPCP-ICB-1 construction package. The key details related to above 3 construction packages are summarized in **Table 1-1**.

<sup>1</sup> Paragraph 60 of Facility Administration Manual (FAM), June 2015 prepared by MMDE.

<sup>2</sup> Paragraph 111 of Environmental Assessment Review Framework (EARF) November 2014 (updated in June 2017) by MMDE.

<sup>3</sup> Environmental Impact Assessment Report (EIAR) dated June 2015 and approved by CEA on 31.03.2016.



**Table 1-1: Details of the NWPCP contract packages as of June 2019**

Package	NWPCP-NCB-1	NWPCP-ICB-2	NWPCP-ICB-1
<b>Work Description</b>	Improvements to Wemedilla Left Bank Main Canal up to Nabadagahawatta (0 km to 5+250 km) and Construction of New Sluice and Tail Canal (0 km to 0+600 km)	Construction of Main Canal from Nabadagahawatta to Mahakithula Reservoir Inlet Tunnel (from 5+250 km to 22+500 km)	Construction of Mahakithula Inlet Tunnel, Mahakithula and Mahakirula Reservoirs, Feeder Canal from Mahakithula to Mahakirula Reservoir
<b>Environmental Significance of the Project Area</b>	<ul style="list-style-type: none"> <li>The proposed works under NCB-1 package are mainly associated with an existing canal, and hence not any protected or ecological sensitive areas to be affected (refer <b>Figure 1-1</b>).</li> <li>However, the social environmental significance is fairly high since the canal is going through rural residential areas with some land acquisition impacts.</li> <li>The new sluice and tail canal at the Wemedilla reservoir have some environmental significance due to the naturalized ecosystems in the surrounding areas.</li> </ul>	<ul style="list-style-type: none"> <li>The two sections, 18+400 km to 19+500 km and 20+700 km to 22+300 km, fall within the Kahalle-Pallekele wildlife sanctuary under the jurisdiction of Fauna and Flora Protection Ordinance (FFPO). The land ownership is with the FD as the canal trace traverses through Kahalla-Pallekele Forest reserve (refer <b>Figure 1-2</b>).</li> </ul>	<ul style="list-style-type: none"> <li>The entire project area falls within the Kahalle-Pallekele wildlife sanctuary under the jurisdiction of Fauna and Flora Protection Ordinance (FFPO).</li> </ul>
<b>Package No.</b>	MMDE/MWSIP/ADB/NWPCP/N CB-1/3267-3268-SRI/NCB/2016/001	MMDE/MWSIP/ADB/NWPCP/ ICB-2/3267-3268-SRI/ICB/2017/003	MMDE/MWSIP/ADB/NWPCP/ ICB-1/3267-3268-SRI/ICB/2017/005
<b>Commence-ment Date</b>	29 Sept 2016	01 November 2018	
<b>Completion Date</b>	Original completion date was 29 Dec 2018, and the updated completion date was 30 May 2019. Both dates were not met by the progress.	05 May 2021	Invitation for bids advertised on 24.04.2019 and site visit was made for the bidders on 24.05.2019. The bid submission was closed on 08.07.2019.
<b>Name of the Contractor</b>	M/S NEM Construction (Pvt) Ltd.	M/S China State Construction Engineering Corporation Limited	
<b>Address</b>	No. 629, Baseline Road, Colombo 9	No. 15, Sanlihe Road, Haidian District, Beijing, China	
<b>Contract Amount LKR (incl. VAT)</b>	926,113,863.39	7,226,621,051.00	

6. The following sections will provide a brief description of the physical progress of each contract package mobilized under NWPCP as per end of June 2019.



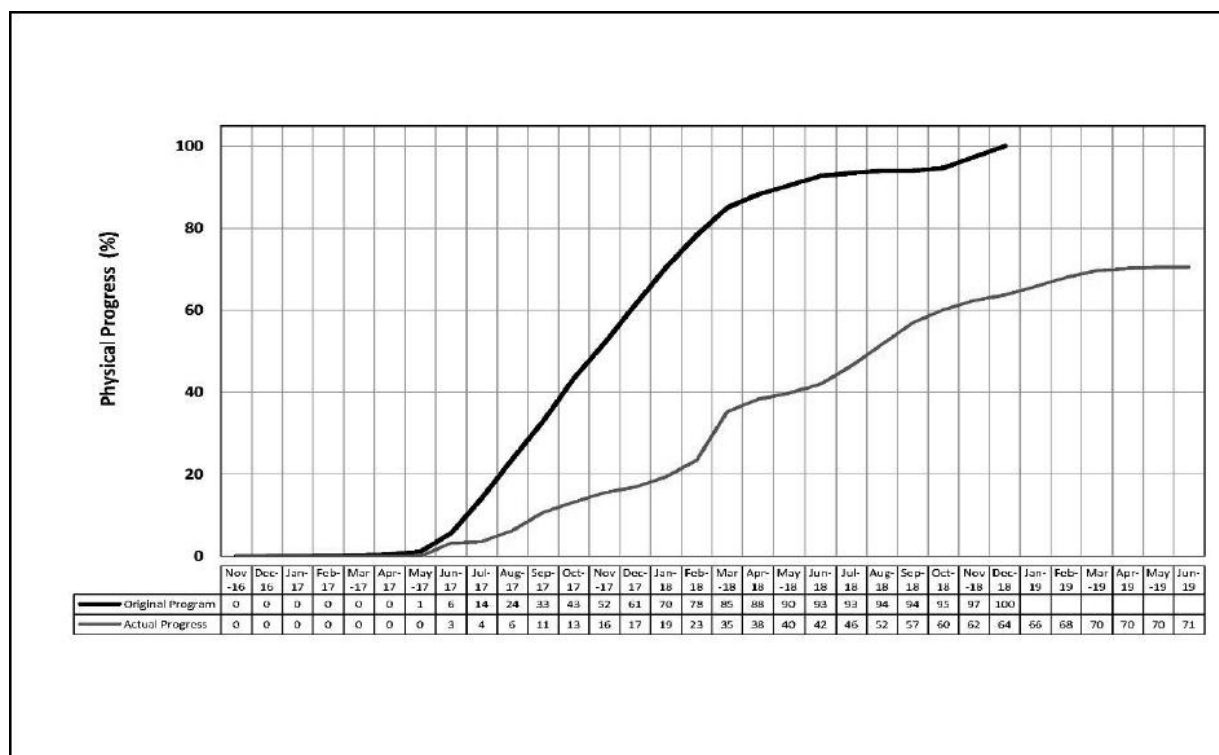
**Figure 1-1: View of the NWPCP NCB 1 project area of existing Wemedilla LB canal**



**Figure 1-2: View of the NWPCP ICB 2 project area inside Kahalla palkeleke sanctuary**

### **1.2.1 NWPC-NCB-1**

7. The Contractor has failed to complete the construction work as per the original intended completion date 29 December 2018, and also the provisionally extended completion date of 30 May 2019 (to be finally determined pending the assessment of submitted claims by the Contractor for an Extension of Time). Cumulative physical progress by June 2019 is about 71 % of the total work to be done, as shown in **Figure 1-3**.

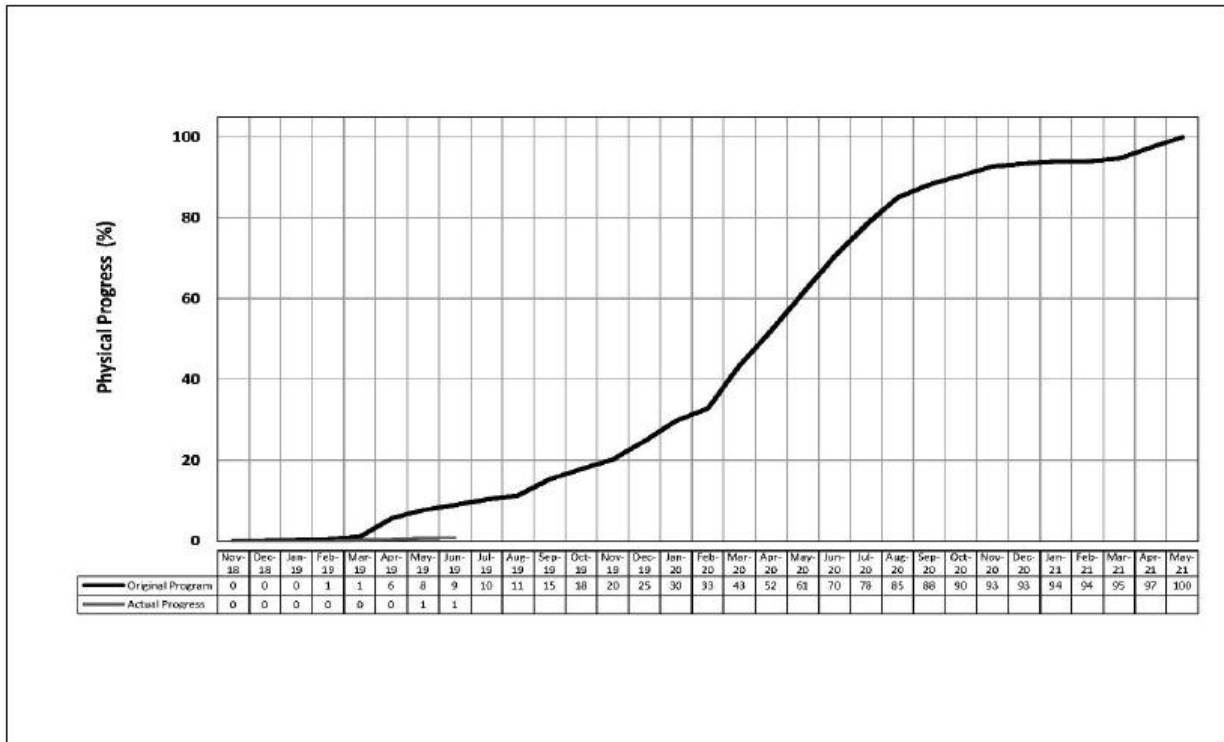


**Figure 1-3: Physical progress of NWPCP-NCB-1 as of June 2019**

8. Most of the construction works of Left Bank Main Canal (LBMC) of Wemedilla have been suspended since 14 December 2018 due to not completed and/or unresolved land acquisition and resettlement matters by the Employer. The Contractor has temporarily demobilized the site works, except for fixing sluice gates and trash racks at the Wemedilla tail canal. The Employer has issued the land handing-over schedule which is supposed to be completed by end of September 2019. The Contractor had proposed mutual termination of the Contract. Resumption of the works by the Contractor is subject to discussion between the parties and an assessment of the pending claims for suspension of access to site by the Engineer.

### 1.2.2 NWPCP-ICB-2

9. The establishment of Contractor's facilities and site clearing, excavation work from 17+000 km to 18+500 km started in NWPCP-ICB-2 package during the reporting period from January to June 2019. Concrete work also started in some sections between 17+650 km to 17+750 km. Physical progress by June 2019 is slowly picking up (**Figure 1-4**).



**Figure 1-4: Physical progress of NWPCP-ICB-2 as of June 2019**

10. The delay in the land acquisition process and handing over of the sites has significantly affected the progress of the construction work. The area handed over to the Contractor by end of June 2019 included the sections from 18+500 km to 19+660 km and 20+760 km to 22+300 km which are located inside the Kahalla-Pallekele wildlife sanctuary area and Korakahagalla Forest reserve inside the wildlife protected area. However, the construction within the wildlife areas was not allowed until the conditions and requirements are met by the Contractor as defined by the Engineer and the DWC.

11. The key requirements to be fulfilled by the Contractor prior to starting the work inside the protected areas include the establishment of 3 security huts at the 3 locations Egodayaya, Getahinna, and Korahagolla. At these places the electric fence will be disturbed by construction work. Further key requirements include appointment of security personnel recommended by the DWC to the gates, submission of and obtaining Engineer's approvals for the construction and environmental method statements, conducting required training for the site workers, especially inside the wildlife protected areas, establishing notice boards, issuing identity cards and name board for the workers, machineries, and vehicles operating inside the protected areas etc.

12. Felling of 1,408 trees in the wildlife area up to 21+900 km was completed by the State Timber Corporation (STC) and approved by the Forest Department (FD) and Department of Wildlife Conservation (DWC). The areas were subject to baseline ecological survey, critical species translocation and transplanting program by a group of experts appointed and supervised by the PMDSC prior to commencing the tree felling and site clearing work. The findings of the survey are described in Section 4.3 below.

## 2 CHANGES IN PROJECT SCOPE AND ADJUSTED SAFEGUARD MEASURES

### 2.1 NWPC-NCB-1

13. The original intended project completion date and also the provisionally determined extension of time until 31 May 2019 elapsed without completion of the construction works. The Contractor has temporarily demobilized his workers and construction equipment from the site by end of June 2019 due to unresolved land issues in the construction areas. Detailed chainages with unresolved land issues are listed below:

RB	1+460 km to 1+800 km, 1+860 km to 1+920 km, 2+355 km to 2+475 km, 2+875 km to 2+900 km, 3+130 km to 3+665 km, 3+845 km to 3+940 km, 4+550 km to 4+645 km, 4+725 km to 4+875 km and 4+995 km to 5+120 km
LB	0+070 km to 0+135 km, 0+385 km to 0+640 km, 1+070 km to 1+090 km, 1+215 km to 1+450 km, 1+620 km to 1+800 km, 1+860 km to 1+920 km, 2+335 km to 2+475 km, 2+600 km to 3+025 km, 3+130 km to 3+665 km, 3+845 km to 3+940 km, 4+550 km to 4+645 km, 4+725 km to 4+875 km, 4+900 km to 4+995 km, and 5+140 km to 5+210 km

14. Due to the site isolation, the site maintenance work has been unattended, and the environmental issues notified were not attended due to the absence of environmental officer and other Contractor's key staff from the site.

### 2.2 NWPCP-ICB-2

15. A need for a canal realignment arose between 21+943 km to 22+340 km. This was identified during the ecological baseline survey and critical species translocation/transplanting program carried out by the PMDSC environmental team, prior to the tree felling along the canal trace within the sensitive habitats, in April 2019.

16. A perennial stream - enriched with ecologically sensitive habitat for the various types of aquatic, semi-aquatic critical fauna and flora species - and the canal cross or pass this critical habitat four times within this almost 400 m long reach. This would significantly disturb the existing ecology of the stream habitat and will hinder the stream flow during the construction period. Due to the heavy flows in the deep stream section, especially during the rainy seasons, the associated canal-stretch could not be diverted without disturbing the existing environmental conditions.

17. Further, as per sub-clause 3.10 of the Environmental Conditional Approval<sup>4</sup> issued by the Central Environmental Authority (CEA), the proposed canal should be covered to avoid any disturbance of wildlife movements within the sanctuary and wildlife influenced area.

18. With the original canal alignment, the canal conduit would have remained exposed in places, which would constitute a visual disturbance and - at the same time - create a barrier for wildlife as the existing ground level is lower than the top level of the concrete lining or the conduit soffit level due to the undulating terrain of the area.

19. Considering the above reasons, it was proposed to shift the canal alignment between 21+943 km to 22+340 km by up to a maximum of 40 m towards south. The map of the canal alignment is shown in **Figure 2-1**.

<sup>4</sup> Environmental Conditional Approval issued by CEA approving the Environmental Impact Assessment (EIA) Report prepared for proposed North Western Province Canal Project (NWPCP) in June 2015

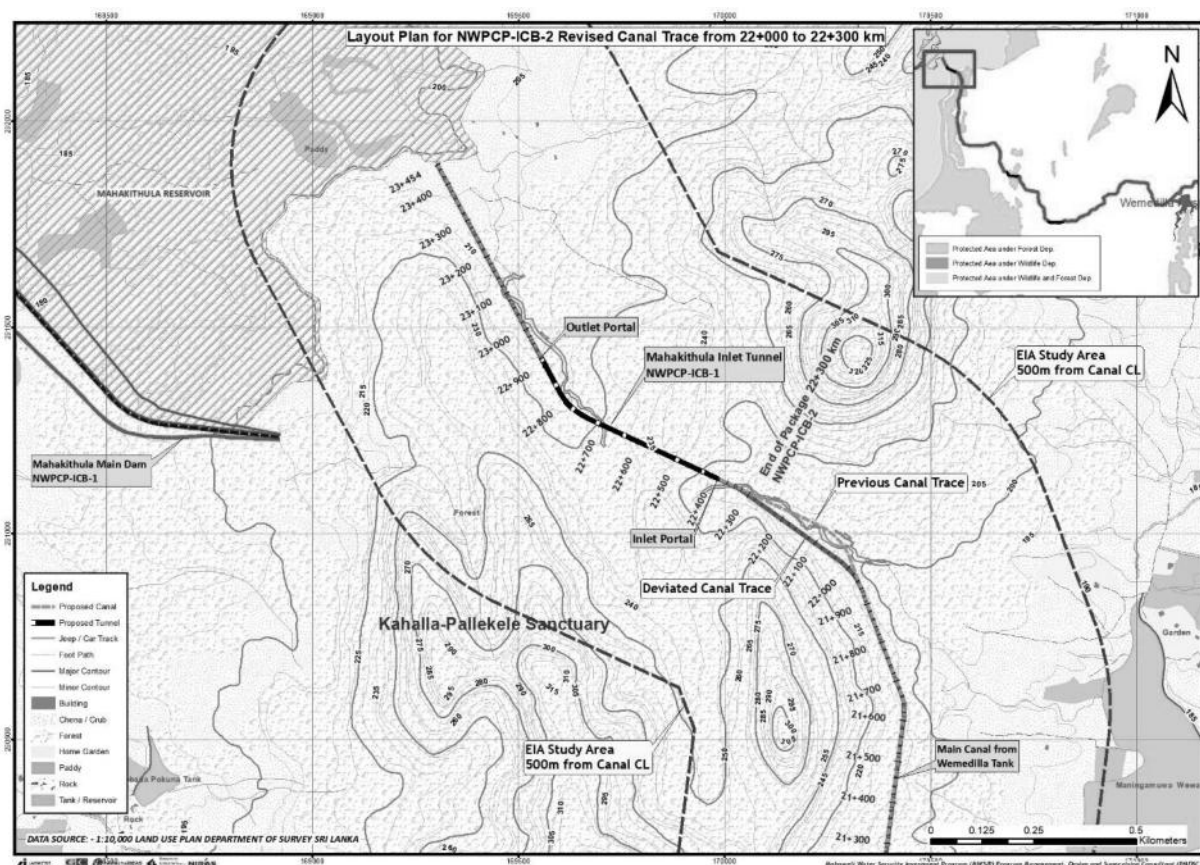


Figure 2-1: Map showing the alignment change between 21+943 km to 22+340 km

20. The alignment change with respect to the original chainage of the canal trace is summarized in **Table 2-1**.

**Table 2-1: Design changes of the realigned section compared to the original alignment**

	Start (km)	End (km)	Length (km)
At original alignment	21+943	22+357	0+414
At realignment	21+943	22+340	0+397

21. With the realignment, the length of the canal has been reduced by 17 m; canal type and dimensions were not changed. The canal is designed as a cut & cover twin rectangular conduit. The major anticipated environmentally positive impacts associated with the proposed realignment are shown in **Table 2-2**.

**Table 2-2: Major anticipated environmentally positive impacts of canal realignment**

Current proposal	Summary of environmentally positive impacts
1. Avoid interference of canal alignment and stream as much as possible by shifting the canal by maximum 40 m to the high ground area	<ul style="list-style-type: none"> <li>i. Minimize/prevent disturbance of the ecological values of the critical aquatic habitat described under section 3.2</li> <li>ii. Prevent disturbance of the natural stream flow by avoiding stream diversion, thereby ensuring that the environmental flow to the downstream habitats is nourished by the stream</li> <li>iii. Availability of the stream habitat for use by wild animals by shifting the construction area to avoid the stream</li> </ul>
2. Avoiding exposed sections after construction	<ul style="list-style-type: none"> <li>i. After construction the canal sections will be completely underground which will ensure safe passage and movements of wild animals</li> <li>ii. This will avoid localized impounding floods, by avoiding hindrance to surface runoff in the sanctuary area</li> </ul>
3. Shorten the canal alignment by 17 m	<ul style="list-style-type: none"> <li>i. Saving of 340 m<sup>2</sup> (0.034 ha) wildlife and forest habitat (20 m x 17 m)</li> <li>ii. Reduction of excavation by some 300 m<sup>3</sup> (approx. 7 m x 2.5 m x 17 m); thereby reducing the areas required for disposal / stockpiling</li> </ul>

22. The details of the realignment including the ecological survey details were submitted to CEA and DWC compiled into an addendum to EIA No. 2 in May 2019. The approval was granted for the alignment change on 18 June 2019 through letter ref. 08/EIA/Water/07/2012 Monitoring Volume III (**Annex 1**).

### 3 ENVIRONMENTAL MONITORING FINDINGS

23. This section summarizes the key environmental issues recorded during the monitoring period from January to June 2019, and the corrective actions taken by the Contractor. Further, the records of the environmental qualitative data based on the assessment carried out in the NWPCP-ICB-2 area through an accredited laboratory are summarized in the sections below.

#### 3.1 NWPC-NCB-1

24. As described in the earlier sections, no construction work was carried out in the NWPCP-NCB-1 canal area since December 2018. Hence no significant environmental issues – due to construction – were noted. However, due to the site isolation and unattended routine site cleaning environmental issues were noted (**Table 3-1**); the Contractor was instructed to attend the required corrective actions.

**Table 3-1: Environmental issues noted in NWPCP-NCB-1 site during the monitoring period**

Issue Recorded		Corrective Actions Proposed	Progress attending corrective actions as of end June 2019
i.	Jan 2019: Heavy soil erosion, scouring all over the places along the canal where excavated and unattended canal structures, lining and at the sluice areas. Site untidy with garbage and discarded oil cans.	<ul style="list-style-type: none"> <li>Immediately attend with some sandbags and cover the slopes with a proper geotextile material which will be last for some time until the contractor restarts the work.</li> </ul>	<ul style="list-style-type: none"> <li>Corrective actions proposed in July, Sept but due to the site isolation by the contractor corrective actions not attended</li> </ul>
ii.	March 2019: Edges of the soil stockpile areas are not protected with the protective bunds and not covered which result soil erosion and forming gullies.	<ul style="list-style-type: none"> <li>Put erosion protection bunds around the stockpile areas and cover with a suitable geotextile material to avoid siltation in the nearby streams due to erosion.</li> </ul>	<ul style="list-style-type: none"> <li>Stockpiles were arranged to minimize erosion supporting with sandbags at the bottom by May 2019</li> </ul>
iii.	April 2019: Water stagnation in the sluice area and other open canal areas unattended which result in mosquito breeding.	<ul style="list-style-type: none"> <li>Dewater the stagnant water and attend a long-term solution to prevent water stagnation in the possible areas including the sluice area.</li> </ul>	<ul style="list-style-type: none"> <li>Corrective actions proposed since April but due to the site isolation by the contractor corrective actions not attended</li> </ul>
iv.	June 2019: Coffor dam at the new sluice getting scoured and eroded; there is also a safety risk. No safety arrangements.	<ul style="list-style-type: none"> <li>Attend coffer dam protection measure, or immediately complete the sluice and remove coffer dam, dump the soil into the temporary stockpile areas before the heavy rains.</li> </ul>	<ul style="list-style-type: none"> <li>Corrective actions not implemented due to the site isolation by the contractor</li> </ul>
v.	June 2019: O&M roadside slopes unprotected, prone to erosion, and number of unprotected temporary stockpiles along the O&M road obstructing the access with a safety risk. With the rains these eroded material will be moved and ending up in the nearby paddy fields (cultivated), in the canal and adjacent streams. Blocking of existing culverts by this eroded soil will result locally in inundations with the rains.	<ul style="list-style-type: none"> <li>Put erosion protection bunds around the possible eroding areas and cover these with a suitable geotextile material to avoid siltation of the material in the nearby streams.</li> <li>Attend safety arrangements as there is a high risk of road users falling into the canal.</li> <li>Clean the site.</li> </ul>	



Issue Recorded		Corrective Actions Proposed	Progress attending corrective actions as of end June 2019
vi.	May 2019 It was observed that the Contractor is piling up all material in the batching plant area and cleaning the lab. It was noted that the sludge in the settling pond of the batching plant had been emptied into the adjacent open ground area without disposing it into the designated locations which cause water pollution.	<ul style="list-style-type: none"> <li>Immediately clean the area where the sludge is dumped. Properly clean the sedimentation tanks and dewater the stagnant water. Cover the tanks in a proper way to avoid collecting water collection inside during any idling period.</li> <li>Clean the cement and other materials in the silos, feed bins and conveyor, and cover them to avoid any stagnant water or inundation.</li> </ul>	Corrective actions not implemented due to the site isolation by the contractor from Dec 2018
vii.	May 2019: Alien Invasive Species (AIS), Giant Mimosa ( <i>Mimosa pigra</i> ) started spreading in the sluice area and on the slopes of the O&M road due to site isolation.	<ul style="list-style-type: none"> <li>Undertake a joint survey to identify the areas where AIS started spreading and apply standard control measures immediately under the guidance of EMS.</li> </ul>	
viii.	Dust issues as no route watering takes place.	<ul style="list-style-type: none"> <li>Arrange sprinkler system / dust covers.</li> </ul>	
ix.	June 2019: Contractor's Environmental Officer on site has been transferred to another site at Ampara by NEM, hence no Contractor's staff to take care of corrective actions on site.	<ul style="list-style-type: none"> <li>Relocate EO to site.</li> </ul>	

## 3.2 NWPC-ICB-2

### 3.2.1 Compliance with environmental approvals

25. The NWPCP-ICB-2 Contractor was educated about approval requirements time and time again through letters, and during the monthly environmental meetings. Separate Method Statements were obtained from the Contractor addressing the environmental safeguard requirements, mitigation measures and the restoration plans for the disposal and stockpile areas. Comments were submitted by PMDSC to improve the documents prior to the approval.

26. Stockpile areas and approval requirements are summarized in **Table 3-2**.

**Table 3-2: Summary of stockpile areas and approval requirements**

SP #	Location	Landowner	Current approval status	Engineer's recommendation
SP 01	17+000 km	Anuruddha Rajapakse	Approval from GS & DS	Obtain PS approval
SP 02		Nanda Kumarihami	Approval from GS & DS	
SP 03	18+400 km	P. M. Saman Lal	Approval from GS, DS & Galewela PS	As the lands are located closer to the wildlife protected area, and due to the larger extent including land filling, inform CEA for approval requirements
SP 04	20+300 km	P. M. Chanaka Nishantha	Approval from GS & DS	

SP #	Location	Landowner	Current approval status	Engineer's recommendation
SP 05	11+200 km	R. R. Munasinghe	Approval from GS, DS & Galewela PS	Approvals are adequate and suspension is fully lifted for operations
SP 06	18+100 km	B. G. Lenard	Approval from GS, DS & CEA (up to 12 months from 08.07.19)	
SP 07	20+270 km	K. Renuka Bandara	Approval from GS & DS	Obtain PS approval
SP 08	16+400 km	M. Sumith Gunathilake	Approval from GS, DS & Galewela PS	Inform CEA for approval requirements, since the terrain of the land is hilly/slope, of larger extent, and includes land filling

27. The approvals for the main Contractor's facilities such as concrete batching plant, disposal areas etc. operating at the end of June 2019 have been obtained from the relevant approving agencies. Further requirements are communicated to the Contractor for his necessary action. **Table 3-3** summarizes the details of Contractor's facilities, disposal areas, etc. as of June 2019.

**Table 3-3: Summary of the contractor facilities and approval status under NWPCP-ICB-2**

Type/ Name of Facility	Site Location		Ownership	Approval status			
				Approving Agency	Approval Ref No.	Validity Period	
	Address	Chainage / GPS				from	to
Batching plant	Katupotha, Babaragahayaya	13+500 km N 7.771956 / E 80.536586	Mr. H. A. Wimalasiri	CEA PS	CEA/CPO/MT/07/538/2018 Mapa/Gaprasa/12/Wayabaela	01.11.2018 19.11.2018	31.10.2019
Contractor's office	240/A, Kaleel Puwakpitiya, Galewela	N 7.771271/ E 80.579624	Mr. Kaleel	PS	Private lands on lease		
Permanent disposal areas	1. No. 29/C, Aluthwewa, Babaragasyaya	17+000 km N 7.788436 / E 80.514965	Mr. I.W.P. Kumarasiri	CEA PS DS/GS	CEA/CPO/MT/Other/85/2019 Mpa/gprasa/13/prisara/2019	26.03.2019 13.06.2019 06.03.2019	25.03.2020
	2. No. 15/C, Aluthwewa, Babaragasyaya	17+000 km N 7.784527 / E 80.513700	Mrs. Sumanawathi	CEA DS/GS	CEA/CPO/MT/Other/86/2019	27.03.2019 06.03.2019	26.03.2019
	No. 26 D, Aluthwewa, Babaragawewe	17+000km N 7.784743 / E 80.513819	Mr. P.G. Thusara Sampath Dissanayake	CEA DS/GS	CEA/CPO/MT/Other/86/2019	13-06-2019 14.05.2019	12.06.2019
Temporary disposal areas	No.27/1, Aluthwewa, Bambaragasyaya	16+900 km N 7.785256 / E 80.515934	Mr. R.R.G. Piyathissa	DS/GS PS	Mpa/gprasa/13/prisara/2019	28.03.2019	
	Church road, Aluthwewa, Babaragaswawe, Galewela	18+100 km N 7.759825 / E 80.546290	Mr. B.G. Lenard	DS/GS PS, CEA	CEA/CPO/MT/Other/99/2019	09-05-2019	
	No.380 A, Korakahagolla, Bambaragaswewe	16+400km N 7.786489 / E 80.520101	A.M. Sumith Gunatilaka,	DS/GS CEA		29-05-2019	
Material storage areas	Batching Plant Katupotha, Babaragahayaya	13+500 km N 7.771956 / E 80.536586	Mr.H.A. Wimalasiri	CEA PS	CEA/CPO/MT/07/538/2018 Mapa/Gaprasa/12/Wayabaela	01.11.2018 19.11.2018	31.10.2019
Vehicle parking areas	240/A, Kaleel Puwakpitiya, Galewela			Private lands on lease			
Fuel storage	240/A, Kaleel Puwakpitiya, Galewela	N 7.771271/ E 80.579624	Mr. Kaleel	Private lands on lease			

### 3.2.2 Reporting and documentation – NWPCP-ICB-2

28. The revised version of the Contractor's Environmental Management Plan (CEMP) was submitted on 29 January 2019 addressing the comments and awareness training provided by PMDSC's environment safeguard team on the draft CEMP submitted in December 2018. The review comments, with the status of approval "Approved Except as Noted" (AN) was given by the Engineer on 31 January 2019, to carry out the construction activities. The CEMP was considered as 40% completed. The Contractor was made aware of the fact that the CEMP is considered as a live document which needs subsequent updates as the construction program progresses. Further payment against the CEMP item in the bill of quantities shall be made at every successful update of the CEMP.

29. Monthly Environmental Progress Reports are submitted by the Contractor at the end of each month since April 2019, describing the progress of CEMP implementation, issues and major concerns noted during the previous month as per the format shared by the Engineer.

### 3.2.3 Environmental Monitoring Findings – NWPCP-ICB-2







30. Environmental Non-Compliance Records (E-NCR) are issued when an issue is noted by the Environmental Monitoring Specialist (EMS) of the PMDSC as part of his monitoring process. During the monitoring period, 3 E-NCRs were issued in NWPCP-ICB-2 area. Details are provided in **Table 3-4**.





**Table 3-4: Records of E- NCR during the monitoring period in NWPCP-ICB-2**




Date of Record	Issue	Corrective Actions Taken
05.03.19	Debris generated due to site clearing (vegetative parts of the felled trees, branches, bushes etc.) is dumped beyond the permitted working area disturbing the surrounding community and the habitat. Burning of the debris on site (from 17+000 km to 17+500 km at Galapitawewa tank).	The Contractor removed all the debris, and piled it temporarily up in selected areas inside the cleared canal trace until he obtained the approved disposal areas. Once the disposal areas were approved, he transported all the debris to the permanent disposal areas. He placed the required sign boards and the boundary was properly barricaded.
08.04.19	Extensive Fire at the Dumping Site No. 3 at 16+790 km.	This disposal site was banned for further use, as it may trigger social unrest in the area as the landowner had permitted this site only for the vegetative parts to be dumped, enabling the improvement of soil fertility, for future use of the land for cultivation purpose by the landowner. With this fire the objective was lost. The site was restored to the landowner's consent and handed over. A separate disposal site was found and required approvals were obtained.
08.04.19	Serious dust issue in the active construction area.	Dust barriers were erected for the residential areas. 2 new bowsers were mobilized for water spraying.




31. Details and photographic records noted during the monitoring period to highlight the corrective measures taken by the Contractor for NWPCP-ICB-2 are shown in **Table 3-5**. With the guidance from PMDSC and PIU the Contractor has attended to corrective actions and other environment management aspects at a satisfactory level.

**Table 3-5: Summary of the monitoring findings in NWPCP-ICB-2 area**

Location	Environmental issues	Date observed, Action by PMDSC	Corrective measures by Contractor
17+000 km to 17+500 km at Galapitawewa tank	<ul style="list-style-type: none"> <li>Debris that has been generated due to land clearing dumped outside RoW.</li> </ul>	03.05.19 E-NCR issued and monitoring to confirm that the Contractor attended the recommended corrective actions.	<ul style="list-style-type: none"> <li>Removed all debris and temporally dump within the RoW on the same day, and material was just dumped within the RoW</li> <li>The material transferred to the approved disposal site in June 2019</li> </ul>
	 <p>Before</p>		 <p>After</p>
16+790 km	<ul style="list-style-type: none"> <li>Fire at dump site.</li> </ul>	08.04.19 E-NCR issued and monitoring to confirm that the Contractor attended the recommended corrective actions (refer Table 3-4).	<ul style="list-style-type: none"> <li>The site was restored to the landowner's consent and handed over by end April 2019</li> </ul>
			
17+000 km to 18+200 km	<ul style="list-style-type: none"> <li>Damaged dust covers.</li> </ul>	12.04.19 E-NCR issued and monitoring to confirm that the Contractor attended the recommended corrective actions.	<ul style="list-style-type: none"> <li>Dust covers were reinstated by end May 2019</li> </ul>
			

Location	Environmental issues	Date observed, Action by PMDSC	Corrective measures by Contractor
17+450 km to 17+550 km	<ul style="list-style-type: none"> <li>Large stockpile of earth is placed at the edge of a natural drainage path with no erosion protection measures.</li> <li>The stockpile is not managed in a proper way with respect to slope protection and covering to mitigate dust and erosion.</li> </ul>  <p>Before</p>	<p>End April 2019</p> <p>Informed the Contractor verbally during the monitoring visits and meetings.</p> <p>Monitoring to confirm that the Contractor attended the recommended corrective actions.</p>	 <ul style="list-style-type: none"> <li>The contractor attended required mitigation measures partly by end May 2019</li> </ul>
			Sandbag preparation
			 <ul style="list-style-type: none"> <li>Restoration of drainage path at this location was attended by 1<sup>st</sup> week of May 2019</li> </ul>
16+675 km to 18+500 km, and 19+650 km to 20+760 km	<ul style="list-style-type: none"> <li>Dust emission during construction activities.</li> </ul>	<p>During May 2019</p> <p>Informed the Contractor verbally during the monitoring visits and meetings.</p> <p>Monitoring to confirm that the Contractor attended the recommended corrective actions.</p>	<ul style="list-style-type: none"> <li>Awareness discussion held with labours and supervision staff.</li> <li>Arranged watering twice a day, increased number of bowser and replaced broken down bowser.</li> </ul>  <ul style="list-style-type: none"> <li>Watering and required measures were implemented by end May 2019</li> </ul>

Location	Environmental issues	Date observed, Action by PMDSC	Corrective measures by Contractor
16+675 km to 18+500 km	<ul style="list-style-type: none"> <li>Haphazard waste disposal along the site.</li> </ul>		<ul style="list-style-type: none"> <li>The labours and officers were educated regarding the waste management.</li> <li>Daily collection systems were arranged by end May 2019</li> </ul> 
Batching Plant	<ul style="list-style-type: none"> <li>Concrete batching plant wastewater treatment issues identified.</li> </ul>		<ul style="list-style-type: none"> <li>Settling tanks and treatment system for concrete waste were established by end May</li> </ul> 
Disposal site - 01	<ul style="list-style-type: none"> <li>Disposal of soil waste arising due to clearing and grubbing and excavation of canal from 17+000 km to 17+400 km.</li> </ul>		<ul style="list-style-type: none"> <li>The land was prepared to prevent soil erosion establishing drains around the stockpile by end June 2019</li> <li>But progress not satisfactory as no covering of stockpiles, sandbags for erosion not attended by end of reporting period</li> </ul>  <p>Disposal site 1</p>
Batching plant and 16+675	<ul style="list-style-type: none"> <li>Haphazard waste disposal at batching plant area recorded</li> </ul>		<ul style="list-style-type: none"> <li>Labours and officers were educated regarding the waste management.</li> </ul>

Location	Environmental issues	Date observed, Action by PMDSC	Corrective measures by Contractor
km to 18+500 km	April 2019, and instruction issued early May 2019		<ul style="list-style-type: none"> <li>▪ Daily collecting systems were arranged for solid waste contacting Local authority by end June, but not periodical collection take place</li> <li>▪ No arrangement for sludge disposal in place</li> </ul> 
17+160 km	<ul style="list-style-type: none"> <li>▪ Aggregation of water in excavated area observed in June 2019 with the activation of rains</li> </ul>		<ul style="list-style-type: none"> <li>▪ No proper dewatering mechanism in place, and Dewatering MS not approved by end of reporting period</li> <li>▪ Temporary solutions were made diverting pumped water to the existing natural stream path</li> </ul>
17+000 km to 18+500 km	<ul style="list-style-type: none"> <li>▪ Social unrest due to improper drainage arrangement, disturbance to the access etc.</li> </ul>		<ul style="list-style-type: none"> <li>▪ People educating sign board was placed near the road.</li> </ul> 
17+450 km to 17+550 km	<ul style="list-style-type: none"> <li>▪ Large earthen stockpile is placed at the edge of a natural drainage path with no erosion protection measures.</li> <li>▪ The stockpile is not managed in a proper way with respect to slope protection and covering to mitigate dust and erosion.</li> <li>▪ This was recorded and corrective actions were proposed by mid May 2019</li> </ul>		 <ul style="list-style-type: none"> <li>▪ The land was prepared to prevent soil erosion establishing drains around the stockpile by end June 2019</li> <li>▪ But progress not satisfactory as no covering of stockpiles, sandbags for</li> </ul>



Location	Environmental issues	Date observed, Action by PMDSC	Corrective measures by Contractor
			erosion not attended by end of reporting period

### 3.2.4 Baseline Environmental Quality Monitoring

32. The Baseline Environmental Quality survey was conducted through SGS Lanka (Pvt) Ltd. identified through the ADB shopping procurement procedure. The contract was awarded in March 2019. The selected laboratory carried out sampling for surface and ground water quality, air quality, noise and vibration in the identified sample locations during the month of May 2019.

33. The sample locations were selected through a joint inspection with the participation of EMS – PMDSC and SEO of PIU considering the existing environmental conditions and the significance of the impacts during the construction period.

#### (a) Surface Water Quality

34. There are 4 locations identified for surface water quality measurements, and the details of the sample locations identified are given in the **Table 3-6**.

**Table 3-6: Sample locations for Surface water quality**

Location ID	Sample ID	Location Description
Location 1	S1	Korakahagolla wewa, Pibidunagama
Location 2	S2	Maningamuwa wewa
Location 3	S3	Galapitawewa, Aluthwewa, Galewela
Location 4	S4	Bambaragahawewa, Galewela

35. As per the original Terms of Reference (ToR) for the environmental quality baseline surveys 6 sample locations for surface water quality was proposed, but considering the sensitivity of the existing ground water resources, and available surface water bodies in the project affected area, the number of sample locations for surface water quality was reduced from 6 to 4 and increased ground water sample locations from 6 to 8.

36. The four surface water bodies were selected on the basis that the storm water collected from the construction affected area of NWPCP ICB 2 is finally drained into these tanks through the natural stream network associated with the project area.

37. As per the baseline measurements of the studied surface water bodies, the pH levels are towards the alkaline range above pH 8 except S2 location at Maningamuwa tank which has a pH of 7.4. The pH of Galapitawewa tank which is much affected during the previous rainy season showed high pH value of 9.4.

38. The Total Suspended Solids (TSS) values of the all 4 tanks are well below the tolerance limits of 50 mg/l as per CEA standards.

39. The dissolved Oxygen (DO) levels also considerably favorable for the aquatic species as the baseline levels are in the range of 4mg/l to 6.9 mg/l, and the baseline values of the Chemical Oxygen Demand (COD) in the tanks varies from 13mg/l to 26 mg/l which is very much lower than the tolerance limits of inland waters with waste water discharges (250 mg/l).

40. The oil and grease and heavy metals were not detectable in the surface water bodies sampled during the baseline data collection.

**(b) Ground water Level and Quality**

41. The sampled ground water sources are used for both drinking and domestic purposes, the details of the sample locations identified for the ground water quality baseline measurements are given in the **Table 3-7**.

**Table 3-7: Sample locations for ground water quality**

Location ID	Sample ID	Location Description
Location 1	S1	Residential well of Mr Sudath Rohana, 499 A, Mathale Road, Bogasyaya, Pahala Bambawa, Galewela
Location 2	S2	Residential well of Mr Nihal Sarath, 660A, Kapaliya, Galewela
Location 3	S3	Natural spring at Nilagama Tunnel portal
Location 4	S4	Residential well of Mr P. G. Thilakaratne, 270, Katupotha, Bambaragaswewa
Location 5	S5	Residential well of Mr S. R. Gunawarnana, Palliya Road, Aluthwewa, Bambaragawewa
Location 6	S6	Residential well of Mr R. G. Wijerathne, 311 A. Kospotha
Location 7	S7	Well located inside the batching plant
Location 8	S8	Well at Pibidunagama, Galewela

42. As per the baseline values recorded by SGS in their draft report, the quality of the water in the sampled wells meet the WHO standard requirements for drinking water except Total Dissolved Solid (TDS) for S 8 well which records high TDS of 1,001 mg/l while most of other wells has TDS less than 300 mg/l. Some wells such as S1, S3, S4, S7 records alkalinity over 200 mg/l while S8 well has higher alkalinity over 750 mg/l which is not acceptable for drinking.

**(c) Boundary Noise and Vibration measurements**

43. Details of the sample locations identified for Noise and Vibration measurements are given in the **Table 3-8**. As per the baseline records, the background noise levels in the project area is found to be in the low noise range below 55 dB during daytime.

**Table 3-8: Sample locations for noise and vibration measurements**

Location ID	Sample ID	Location Description
Location 1	L1	499 A, Mathale Road, Bogasyaya, Pahala Babawa (N 07.75145/E 80.56863)
Location 2	L2	660A, Kappetiya, Galewela (N 07.75039/E 80.56904)
Location 3	L3	270, Katupotha, Bambaragawewa (N 07.75041/E80.56885)
Location 4	L4	Galewela, Bambaragasvila, Korakahagolla (N 07.81183/E 80. 50439)

44. No detectable source of vibration was recorded during the baseline surveys in the project area.

**(d) Air Quality measurements**

45. Details of the sample locations identified for ambient air quality measurements are given in the **Table 3-9**, and the ambient air quality measurements were far below the CEA acceptable standard values. The draft report with results of the baseline measurements is given in **Annex 2**.

**Table 3-9: Sample locations for ambient air quality measurements**

Location ID	Sample ID	Location Description
Location 1	L1	499 A, Mathale Road, Bogasyaya, Pahala Babawa (N 07.75145/E 80.56863)
Location 2	L2	660A, Kappetiya, Galewela (N 07.75039/E 80.56904)
Location 3	L3	270, Katupotha, Bambaragawewa (N 07.75041/E80.56885)
Location 4	L4	Galewela, Bambaragasvila, Korakahagolla (N 07.81183/E 80. 50439)
Location 5	L5	Aluthwewa, Bambaragaswewa (N 07.78708 / E 80.50687)
Location 6	L6	311 A, Kospotha, Begama

## 4 ENVIRONMENTAL SAFEGUARD COMPLIANCE STATUS - NWPCP

46. The overall environmental safeguard compliance implementing the recommendations and conditions given in the EIA for NWPCP, conditional approvals issued by CEA and other stakeholder agencies such as DWC, FD and the ADB requirements are addressed by the Employer and the PMDSC, simultaneously with the environmental monitoring and supervision carried out on the Contractors'CEMP implementation.

47. The activities and measures carried out during the monitoring period from January to June 2019 are briefly described under this chapter.

### 4.1 Compliance Status Related to the CEA Approval Conditions

48. **Table 4-1** summarizes the activities carried out jointly by the Employer and PMDSC to meet the conditions given in the CEA approval.

**Table 4-1: Key Actions in Compliance with the CEA approval conditions**

No.	Approval condition	Compliance status	Remarks
1	Preparation of Wildlife Management Plan (WMP)	Plan prepared & approved by CEA	
2	Implementation of recommendations of WMP	Implementation works of the WMP is in progress Work plan & activity plan prepared for implementation	<ul style="list-style-type: none"> <li>165 ha reforestation – Beligamuwakanda</li> <li>7 tanks for ecological restoration – Kumbukulawa cascade /Polpitigama</li> <li>Rehabilitation of 4 water holes in within Kahalla-Pallakele sanctuary (KPS)</li> <li>Establishment of elephant corridor (Galgamuwa Teak plantation to Ambakolawewa via Mi Oya)</li> <li>Removal of Mimosa Pigra in Wemedilla tank</li> <li>Removal of teak plantation and restoration as grass land and natural forest inside KPS</li> </ul>
3	Information of changes to the Project between proposal in the approved EIA and implementation	EIA addendum on deviation of ICB-2 canal alignment 400 m long section and information to CEA; addendum approval granted	
4.a	Implementation of non-construction-based recommendations of EIAR, e.g. reforestation	Nursery establishments and site survey in progress for reforestation program of the Beligamuwa Kanda forest area	<ul style="list-style-type: none"> <li>Advanced release to FD according to MOU conditions</li> </ul>
4.b	Construction based events, e.g. key events of site monitoring with responsive actions in case of non-compliances	<ul style="list-style-type: none"> <li>Works inside the KPS</li> <li>Works around village area</li> <li>Disposal of unwanted material, waste, soil, etc.</li> <li>Removing of trees in private lands</li> </ul>	

49. In addition to above, following **Table 4-2** summarizes the construction-based activities in which the Employer and PMDSC were involved with the Contractor and other key stakeholder agencies during the monitoring period.

**Table 4-2: Construction based events carried out during the monitoring period**

Date	Activity	Location
07.01.19	Site inspection for NCB-1 and ICB-2	NCB-1 / ICB-2
09.01.19	Joint inspection with MMDE/PMDSC/PMU/NEM for NCB-1 / ICB-2	NCB-1 / ICB-2
17.01.19	Joint inspection with PMDSC & ICB-2 Eos in ICB-2 & DWC office	ICB-2
21.01.19	Site inspection NCB-1 / ICB-2	NCB-1 / ICB-2
22.01.19	Joint inspection with FD/BFO for ground truth the reforestation land - Galewela	NCB-1
28.01.19	Ground truth survey for Beligamuwa Kanda forest for reforestation with FD officers	Beligamuwakanda
29.01.19	Site inspection for identification survey of boundary marks at Pibidunugama with PMU officers & PD/IE PIU	ICB-2
12.02.19	Site inspection with ICB-2 Contractor & PMDSC at 17+500 km for access road	ICB-2
14.02.19	Discussion with RE ICB-2 and site inspection in ICB-2 with PMDSC	ICB-2
15.02.19	ICB-3 site visit with ADB resettlement group & PMDSC	ICB-3
18.02.19	Road condition survey in Aluthwewa GN area with PMDSC & CSCEC	ICB-2
21.02.19	ICB-2 site inspection with IEMS & PMDSC & CSCEC officers	ICB-2
07.03.19	Ecological survey & priority species removal in KPS	ICB-2
09.04.19	Tunnel Training & Discussion	
10.04.19	Site inspection NCB-1, investigation of few Grievances	
19.04.19	Tunnel area inspection	Ranwediya & Nilagama
20.04.19	Site inspection for ICB-2 land inspection	ICB-2 area
25.04.19	Field inspection with audit team	NCB-1 / ICB-2
27.04.19	Site inspection NCB-1 & Nilagama area	NCB-1 / ICB-2
03.04.19	Site inspection ICB-2 at KPS & tree removing works	KPS / ICB-2
04.04.19	ICB-2 at 22+300 km: inspection with PMU & PMDSC staff for alignment changes	
10.04.19	Meeting with Hombawa Katupotha people, CSEC & DS at DS office about dust & other issues at batching plant	DS office
23.04.19	Site inspection ICB-2 & NCB-1	ICB-2 / NCB-1
25.04.19	Ground truth for Mimosa Pigra at Wemedilla with PMU	Wemedilla
16.05.19	Join inspection at Kospotha Area with PMU, PMDSC, CSCEC	ICB-2
24.05.19	Pre-bid site visit ICB-1 & discussion	ICB-1
26.06.19	ICB-1 field inspection inside the KPS	ICB-1
27/28.06.19	Mi Oya elephant corridor ground truth survey	Mi Oya - Galgamuwa

50. Several meetings and training programs were carried out during the monitoring period with the participation of relevant officers representing PMU, PIU, PMDSC (Engineer) and the Contractor. A summary of the details is shown in **Table 4-3**.

**Table 4-3: Summary of the meetings and trainings conducted during the monitoring period**

Date	Activity	Location
03.01.2019	Monthly progress meeting for NCB-1	RE's office
16.01.2019	Meeting with CRE & Contractor ICB-2 at PIU	PIU / NWPCP
22.01.2019	Monthly site meeting NCB-1	Engineer's / Employer's office, Galewela
29.01.2019	Small tank project discussion with PMU officers	PIU / NWPCP
05.02.2019	Monthly Environmental progress meeting NCB-1 / ICB-2	RE's office
07.02.2019	Monthly progress meeting NCB-1 / ICB-2	Engineer's / Employer's office, Galewela
08.02.2019	Tunnel training workshop at Mahaweli center - Colombo 7	Colombo 7
13.02.2019	Environmental training with IEMS & all environmental staff of MWSIP	UECP-Elahera
25.02.2019	GRC-Aluthwewa	Aluthwewa,
	Monthly site meeting NCB-1	RE's office
27.02.2019	Safety program for school children	Polpitigama School
28.02.2019	Environmental awareness for Contractors - MWSIP	Pallegama DS office
05.03.2019	Environmental progress meeting and site visit ICB-2 / discussion with Contractor ICB-2	RE's office
26.03.2019	Work shop for MWSIP progress achieving (MMDE, PMU, PMDSC, PIUs, ISWP, etc.)	Hector K.A.C
29.03.2019	Awareness program for CSCEC staff about Social Safeguard at CSCES office	CSCEC office
01.04.2019	Environmental & Safety progress meeting for NCB-1 & ICB-2, site inspections in NCB-1 & ICB-2	NCB-1 / ICB-2
02.04.2019	Social Safeguard monthly progress meeting	PIU
04.04.2019	ICB-2 Monthly progress meeting	CSCEC office
05.04.2019	WMP / HEC meeting - District Secretariat	Kurunegala
18.04.2019	First Aid Training Program - conducted by PMDSC	PIU office
02.05.2019	Monthly Progress meeting NCB-1 / ICB-2	RE's office
06.05.2019	Monthly Environmental progress meeting – ICB-2	CSCEC office
07.05.2019	Social Safeguard meeting - MWSIP	UEC office
09.05.2019	GRC - Kospotha	Kospotha
31.05.2019	GRC meeting for LA matters at Welamitiyawa	NCB-1
03.06.2019	Environmental progress meeting NCB-1, ICB-2	CSCEC office
06.06.2019	Monthly progress meeting ICB-2, NCB-1	RE's office
11.06.2019	WMP meeting at DS-Galgamuwa	Galgamuwa
13/14.06.2019	ADB training at Dambulla	Dambulla
25.06.2019	ICB-1: Boundary demarcation meeting at PIU office & field inspection at Mahakithula	ICB-1

## 4.2 Disclosure and GRM

51. PIU and PMU have conducted several community awareness and consultation programs related to NWPC project activities. These are summarized in **Table 4-4**.

**Table 4-4: Summary of the Awareness Sessions and Community Consultations**

No.	Type of event	Purpose	No. of participants	Location (GN-DS)	Date	Resource persons
1	Awareness meetings	Awareness building for school children about project environment & safety	45	Aluthwewa School	10.06.2019	SCO & SEO (PIU), SO PMDSC & CSCEC
		Awareness building for all Contractors about ENMT management	60	Laggala DS office	28.02.2019	FD, DWC, CEA, GSMB, LD
		World Environment Day program	120	Nikawewa School - Polpitigama	07.06.2019	SEO/SCO/IE (PIU)
2	Consultations	School children about project safety	45	Polpitigama Central College	27.02.2019	IE, SEO, SCO (PIU)

52. **Table 4-5** summarizes the number of Grievance Redress Committee (GRC) meetings conducted during the monitoring period by PMU/PIU in the NWPCP project area.

**Table 4-5: Summary of the GRCs Established in NWPCP Area**

Type of committee	GRC-Name	Members	No of meetings	No issues raised
GRC	Welamitiyawa Kospotha Hombawa Aluthwewa	<ul style="list-style-type: none"> <li>Divisional Secretary (DS)</li> <li>Grama Niladhari (GN)</li> </ul>	4 meetings	Environment related issues of handing over sections
	DS level	<ul style="list-style-type: none"> <li>Development Officer (DO) of the DS</li> </ul>	1 meeting	Issues of batching plant establishment
	GA level	<ul style="list-style-type: none"> <li>Aagrarian Services Dept.</li> </ul>	No meetings held, but the Grievances received by community to GN and PD-PIU	Land acquisition issues of Bambawa & Danduyaya
	MMDE Level	<ul style="list-style-type: none"> <li>CBO leaders</li> <li>Police</li> </ul>		Land acquisition issues of Bambawa & Danduyaya

53. A brief summary of the environment related grievances during the monitoring period is given in **Table 4-6**.

**Table 4-6: Summary of Environmental Grievances Attended**

GRC - Name	No. received	No. attended	No. resolved	Remarks
Hombawa	1	1	1	DS level meeting
ICB2	4	4	4	GN level

### 4.3 Additional Surveys under NWPCP within the Reporting Period

54. The critical species translocation and baseline ecological survey was carried out by the Rajarata University team selected as per ADB shopping procurement procedure by PMDSC. The task was attended prior to tree felling along the proposed canal alignment in the Kahalla-Pallekele Sanctuary area (March 2019). However, the last 200 m of the alignment were not completed due to a late design change. It will be carried out after realigning of the canal has been carried out.

55. 447 individuals of 8 selected target fauna species and 56 individuals of 7 non-target fauna species so far have been translocated. One flora species, *Tropidia thwaitesii*, nationally endangered (EN) ground orchid species was selected for translocation but was not yet completed due to dry weather. **Table 4-7** and **Figure 4-2** show details.


**Table 4-7: Selected Target Fauna Species and Non-Target Fauna Species**

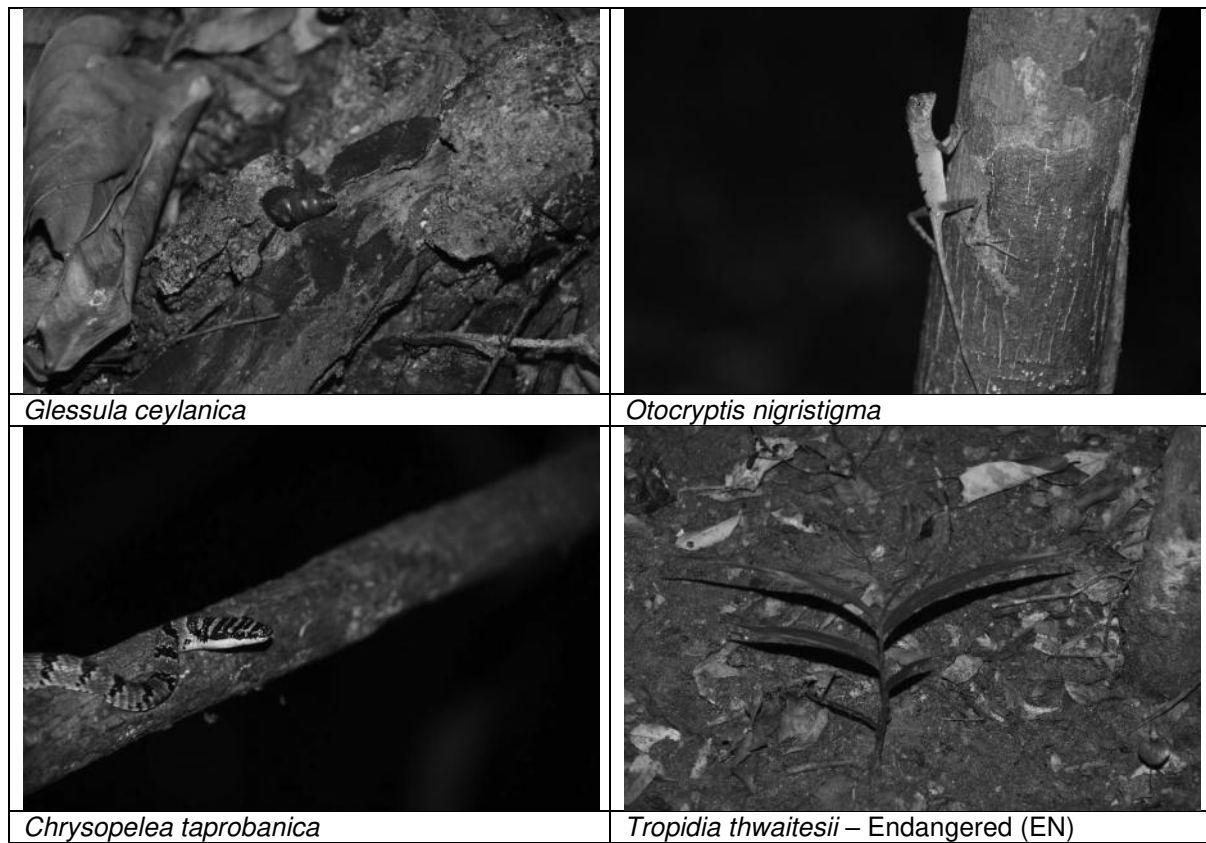
Status	Group	Scientific Name	English Name	TS	NCS
STS	Land Snail	<i>Euplecta layardi</i>		Endemic	EN
STS	Land Snail	<i>Beddomea tifasciatus</i>		Endemic	VU
STS	Land Snail	<i>Aulopoma itieri</i>		Endemic	EN
STS	Land Snail	<i>Micraulax coeloconus</i>		Indigenous	CR
STS	Land Snail	<i>Theobaldius cratera</i>		Endemic	DD
STS	Land Snail	<i>Theobaldius parma</i>		Endemic	EN
STS	Land Snail	<i>Glessula ceylanica</i>		Endemic	EN
STS	Lizard	<i>Otocryptis nigrigemma</i>	Black spotted kangaroo lizard	Endemic	
NTS	Snake	<i>Chrysopelea taprobanica</i>	Striped flying snake	Indigenous	
NTS	Frog	<i>Polypedates maculatus</i>	Spotted tree frog	Indigenous	
NTS	Gecko	<i>Hemidactylus frenatus</i>	Common house-gecko	Indigenous	
NTS	Land Snail	<i>Cryptozona bistrialis</i>		Indigenous	
NTS	Land Snail	<i>Pterocyclus cumingi</i>		Indigenous	NT
NTS	Skink	<i>Eutropis carinata</i>	Common skink	Indigenous	
NTS	Snake	<i>Hypnale hypnale</i>	The Merrem's hump nose viper	Indigenous	

**Abbreviations:**

**STS** – Selected Target Species, **NTS** – Non-Target Species, **TS** – Taxonomic Status, **NCS** – National Conservation Status, **CR** – Critically Endangered, **EN** – Endangered, **VU** – Vulnerable, **NT** – Near Threatened, **DD** – Data Deficient



	
Canal Path	Canal Path
	
Collecting Fauna	Collecting Fauna
	
Translocated Area	Translocated Area
	
<i>Aulopoma itieri</i> & <i>Micraulax coeloconus</i>	<i>Beddomea tifasciatus</i>



**Figure 4-1: Photographic records of the baseline ecological survey and critical species translocation in NWPCP ICB 2 area**

## 5 PROPOSED ITEMS OF FOCUS FOR THE NEXT REPORTING PERIOD

56. The key activities for the next reporting period from July to December 2019, other than the construction supervision and monitoring activities under Task 3 are summarized in the Table 5-1 below which will be carried out mainly through the PIU NWPCP.

**Table 5-1: Summary of the activities planned for the next reporting period**

No	Task Name	Start Date	finished date
	<b>Wildlife Management plan implementation</b>	01.07.2019	Continue in 2020
1	Beligamuwa Kanda Reforestation work	01.07.2019	Continue in 2020
2	Habitat enrichment program for KPS (Grassland & Natural forest)	01.07.2019	Continue in 2020
3	Kumbukulawa Cascade 7 tank ecological restoration	01.07.2019	Continue in 2020
4	Eradication program of Mimosa Pigra in Wemedilla tank	01.07.2019	Continue in 2020
5	Establishment of Mi Oya Elephant corridor	01.07.2019	Continue in 2020
6	<b>GRC Meetings</b>	01.07.2019	Continue in 2019
7	<b>Environment &amp; Safety inspection for ICB2, ICB1&amp; NCB1</b>	01.07.2019	Continue in 2019
	<b>ICB2</b>		
8	Tree Removing -21+900-22+300	01.07.2019	31.11.2019
9	Progress & site meeting	01.07.2019	Continue in 2019
	<b>NCB1</b>		
10	Reforestation program for NCB1	01.07.2019	Continue in 2019
11	Progress & site meetings	01.07.2019	Continue in 2019
	<b>ICB1</b>		
12	Tree Removing	01.07.2019	Continue in 2019
13	Progress & site meeting	01.07.2019	Continue in 2019

## **Annex 1:**

# **CEA LETTER OF APPROVAL & THE ADDENDUM TO EIA NO. 02**

## PROGRAM MANAGEMENT, DESIGN AND SUPERVISION CONSULTANT

Joint Venture Tractebel Engineering GmbH – Geoconsult ZT GmbH  
c/o Tractebel Engineering GmbH, No. 493, T.B. Jayah Mawatha Colombo 10, Sri Lanka

## MAHAWELI WATER SECURITY INVESTMENT PROGRAM

Eng. K.R. Neil Bandara  
Program Director  
Program Management Unit (MWSIP)  
No. 493/1/1, T.B. Jayah Mawatha  
Colombo 10, Sri Lanka

Our ref.: 25.4/7.23\_L03006

Date: 03 June 2019

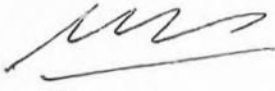
**Subject: Submission of Addendum No. 2 to EIA – NWPCP-ICB-2**

Dear Sir,

We enclosed the Addendum No.2 to EIA for NWPCP-ICB-2 package for your review. Please proceed with relevant stakeholder approvals.

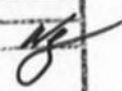
With thanks in advance.

Yours sincerely  
Program Management, Design and Supervision Consultant

  
Michael Chegwin  
Team Leader

  
P.W.C. Dayaratne  
Deputy Team Leader

Encl:

MWSIP - PMDSC	
493, T.B. Jayah Mawatha, Colombo 10	
Registered Outgoing By:	LM
Team Leader:	
Sent Date:	03 JUN 2019
Copies to:	APK, RV, ROE

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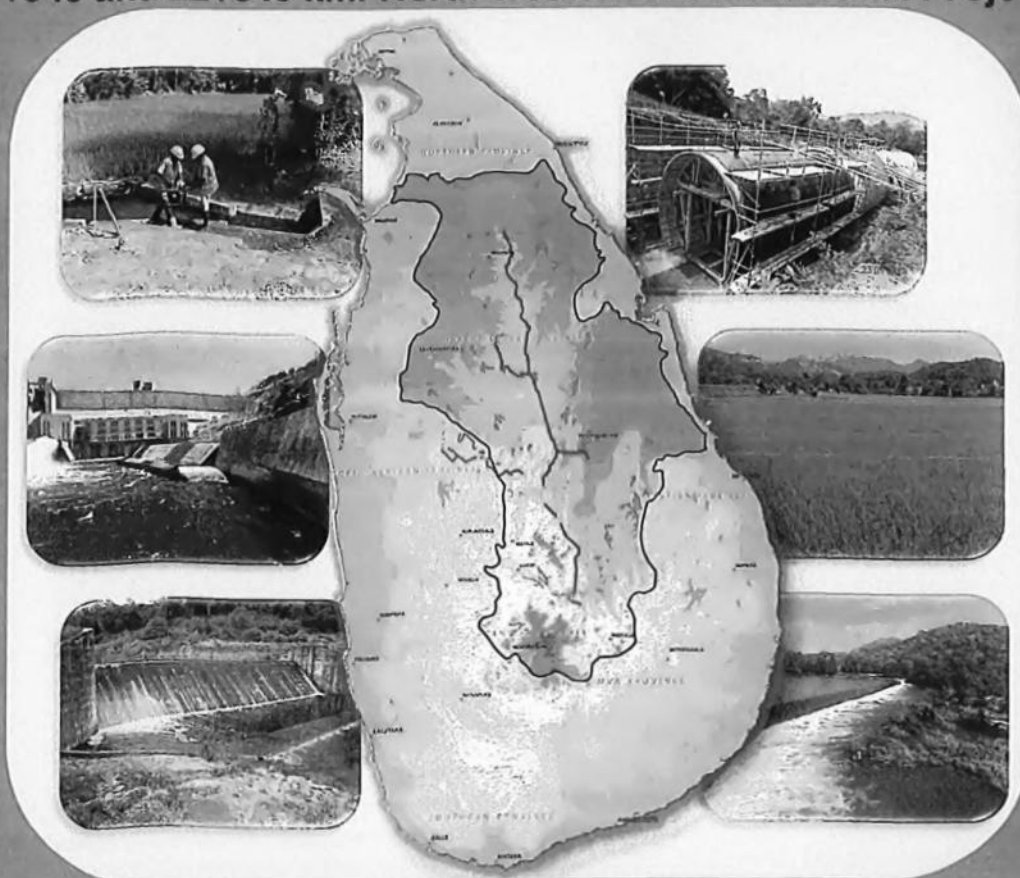
**ENGINEERING  
CONSULTANTS (PVT.)  
LIMITED**

**NIRVAS**

PROGRAM MANAGEMENT, DESIGN AND SUPERVISION CONSULTANT

# Mahaweli Water Security Investment Program

**Addendum No. 2 to the Environmental Impact Assessment on  
NWPCP-ICB-2 Canal Realignment between  
21+943 and 22+340 km: North Western Province Canal Project**



**Ministry of Mahaweli  
Development and Environment  
Sri Lanka**



**ADB**

**May 2019  
Draft Report**

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**Addendum No. 2 to EIA**

Project Number     H.503409  
Subject               Addendum No.2  
Project Director     Dr. Beau Freeman  
Country               Sri Lanka

Project Title:     **Mahaweli Water Security Investment Program**

Client               Ministry of Mahaweli Authority for Development and Environment

Prepared for     Project Management Unit  
Mahaweli Water Security Investment Program  
No. 493 1/1 Jayah Mawatha  
Colombo 10  
Sri Lanka

Prepared by     Program Management, Design and Supervision Consultant  
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Date                May 2019

Revision	Date	Status	Author	Checked	Approved
0	29 May 2019	In process	Dr. A. P. Kasige Ecological survey inputs by T.N. Peries		

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# 1 INTRODUCTION

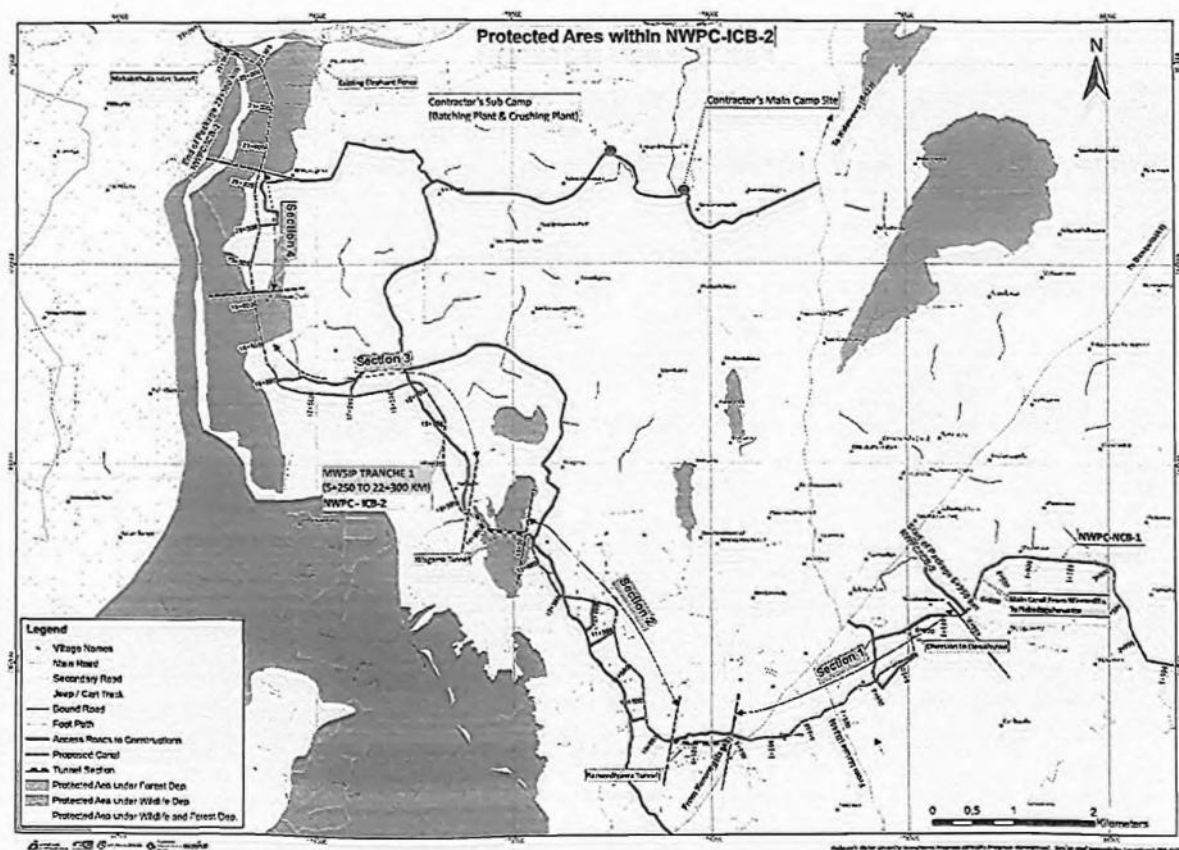
## 1.1 Background

1. This document has been prepared by the Program Management, Design and Supervision Consultant (PMDSC) of the Mahaweli Water Security Investment Program (MWSIP), and forwarded to the Program Management Unit (PMU) established under the Ministry of Mahaweli Development and Environment for their concurrence and proceeding for the required approval, as addendum No. 2 to the Environmental Impact Assessment (EIA) for the proposed North Western Province Canal (NWPC) project, dated June 2015<sup>1</sup> and approved by the Central Environmental Authority (CEA) on 23 February 2016.
2. This addendum is titled as "Addendum No. 2 to the Environmental Impact Assessment on NWPCP ICB 2 Canal Realignment between 21+943 and 22+340 km: North Western Province Canal Project (NWPCP)" as the Addendum No. 1 for NWPCP was submitted in Jan 2018, describing the key design changes of NWPC-ICB-1 and NWPC-ICB-2 contract packages, which come under Tranche 1 of MWSIP.
3. The CEA conditional approval for the Addendum No. 1 was granted on 11 April 2018, through the Ref. Letter No. 08/EIA/Water/07/2012/Vol 2.
4. This document is to describe the essential re-alignment of canal trace falls under NWPC ICB 2 construction package which come under Tranche 1 of MWSIP, that has already been handed over to the Contractor (M/S China State Construction Engineering Corporation Limited) between chainages 21+943 and 22+300 km.
5. The reach in question is located entirely in Kahalla Palkelele Sanctuary and Forest Reserve, and the requirement of alignment change was identified mainly as an additional environmental mitigatory requirement once the contractor is mobilized, and during the baseline ecological surveys were carried out by the PMDSC prior to habitat clearance.

## 1.2 Purpose of the EIA Addendum

6. This Addendum updates the 2015 EIA for the NWPC canal, which comes under NWPC- ICB-2 (Main Canal from Nabadagahawatta to Mahakithula Reservoir (5+250 to 22+500km)) package of MWSIP Tranche 1, thereby providing more information to the Asian Development Bank (ADB) and the CEA on potential environmental issues and how they will be managed due to the alignment change.
7. Figure 1-1 shows the project area of NWPCP ICB 2 package and the distribution of the protected areas falls within the project affected area.

<sup>1</sup> Mahaweli Authority of Sri Lanka (2015), Environmental Impact Assessment Report. Proposed North Western Province (NWP) Canal Project. Prepared by Mahaweli Consultancy Bureau Pvt Ltd. June 2015.



**Figure 1-1: Layout Plan for NWPC-ICB-2 Project Impact Area**

## 2 DESCRIPTION OF PROPOSED ALIGNMENT CHANGE

### 2.1 Proposed alignment change

8. The canal alignment between 21+943 to 22+340 km is proposed to be shifted 40 m from the original canal trace towards south from the original alignment where the proposed change is within the EIA study area of 500 m. The map of the canal alignment is shown in Figure 2-1.

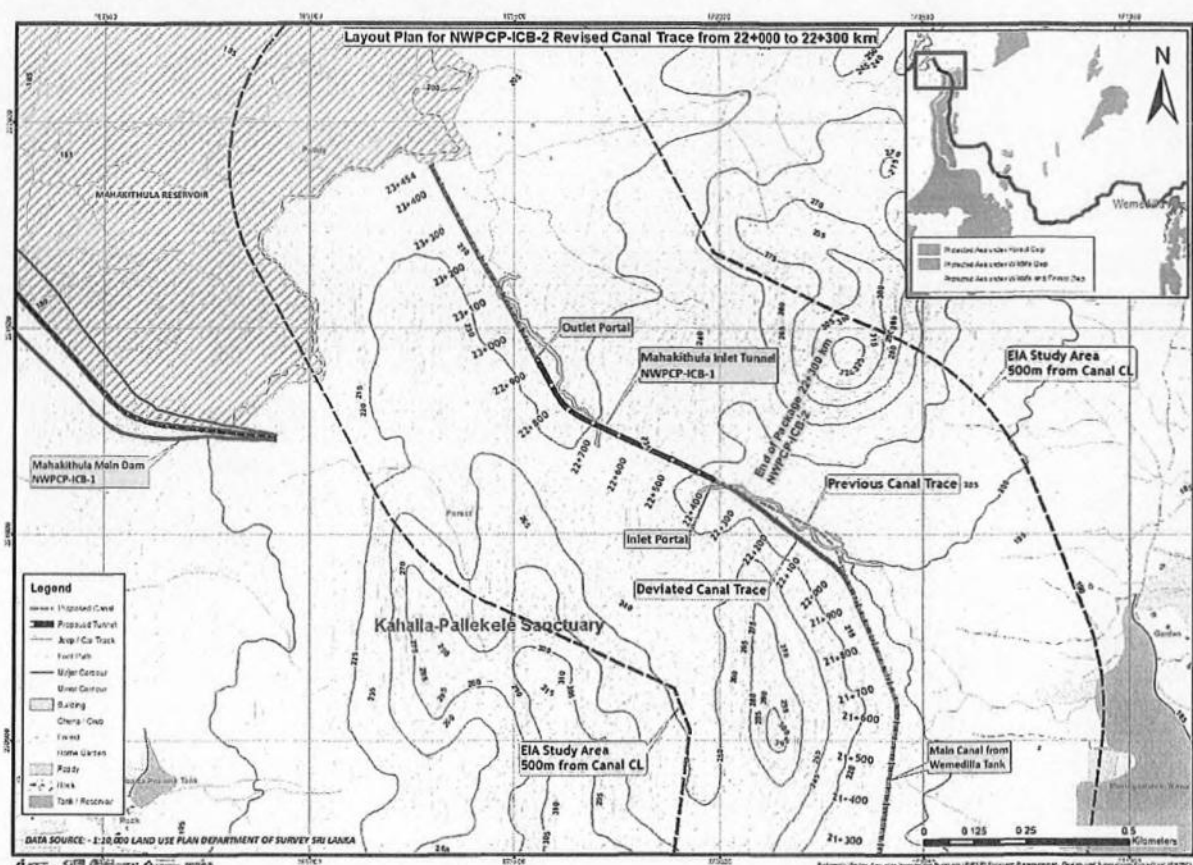


Figure 2-1: Map showing the alignment change between 21+943 to 22+340 km

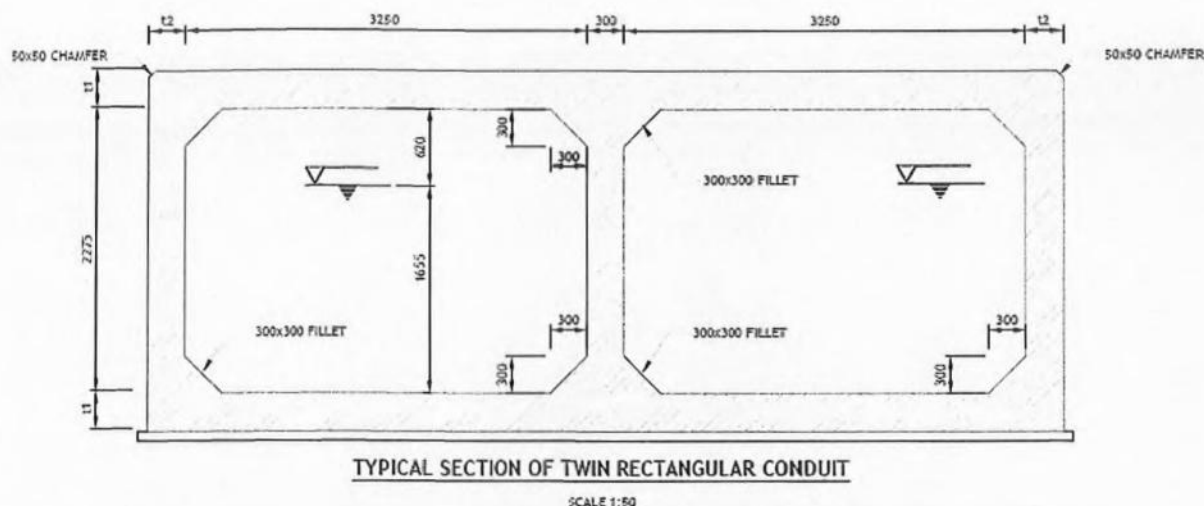
9. The alignment change with respect to the original chainage of the canal trace is summarized in Table 2-1.

Table 2-1: Design changes of the realigned section compared to the original alignment

	Start (km)	End (km)	Length (km)
At Original alignment	21+943	22+357	0+414
At Realignment	21+943	22+340	0+397

10. With the realignment, the length of the canal has been reduced by 17 m, and the canal type and dimension have no change. The canal is designed as a cut and cover twin rectangular conduit and the typical section of the canal is shown in Figure 2-1.





**Figure 2-2: Typical section of twin rectangular conduit for the realigned canal section**

## 2.2 Justification of the alignment change

11. The need for the proposed canal realignment in between 21+943 to 22+340 km was identified during the ecological baseline survey and critical species translocation/transplanting program carried out by the PMDSC environmental team, prior to the tree felling along the canal trace within the sensitive habitats, in April 2019.

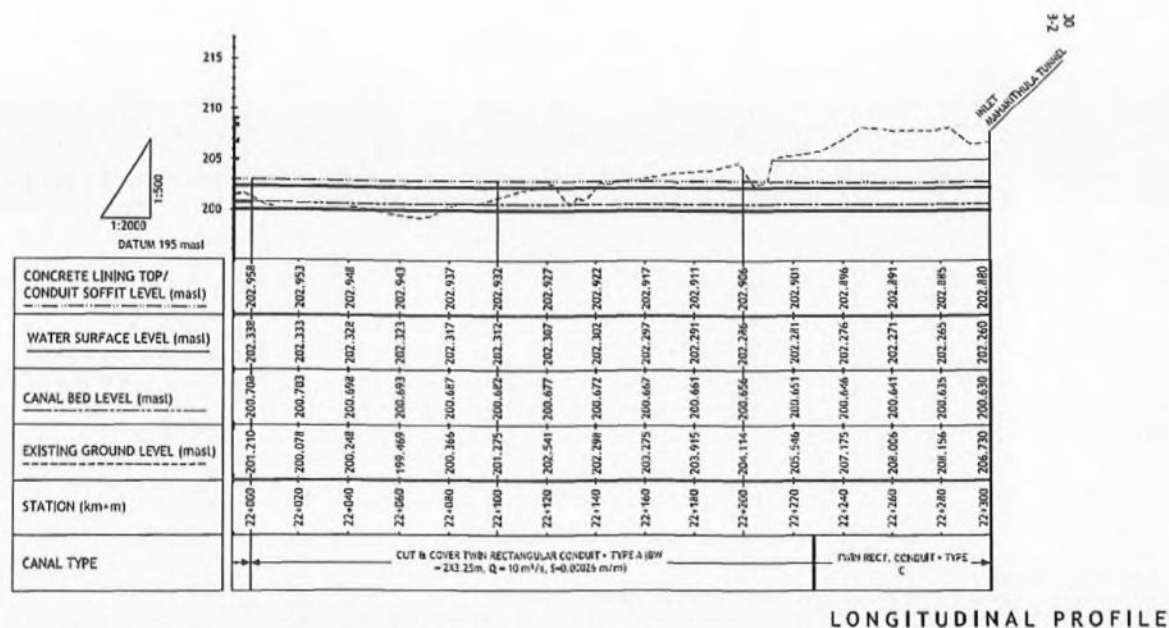
12. Consultants observed that there is a perennial stream enrich with ecologically sensitive habitat for the various types of aquatic, semi aquatic critical fauna and flora species, and the canal crosses or passes this critical habitat<sup>2</sup> four times within the said reach. This would significantly disturb the existing ecology of the stream habitat and will hinder the stream flow during the construction period. Due to the heavy flows in the deep stream section specially during the rainy seasons, associated canal stretch would not be able to divert without any disturbance to the existing environmental conditions.

13. Further, as per the sub clause 3.10 of the Environmental conditional approval<sup>3</sup> issued by Central Environmental Authority (CEA), proposed canal should be covered to avoid any disturbances for wildlife movements within the sanctuary and wildlife influenced area.

14. With the previous canal alignment, the canal conduit would also remain exposed in places, which would constitute a visual disturbance and at the same time create a barrier for wildlife as the existing ground level is lower than the top level of the concrete lining or the conduit soffit level due the undulating terrain of the area (Figure 2-3).

<sup>2</sup> Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; Critical habitats include those areas either legally protected or officially proposed for protection (ADB SPS – 2009).

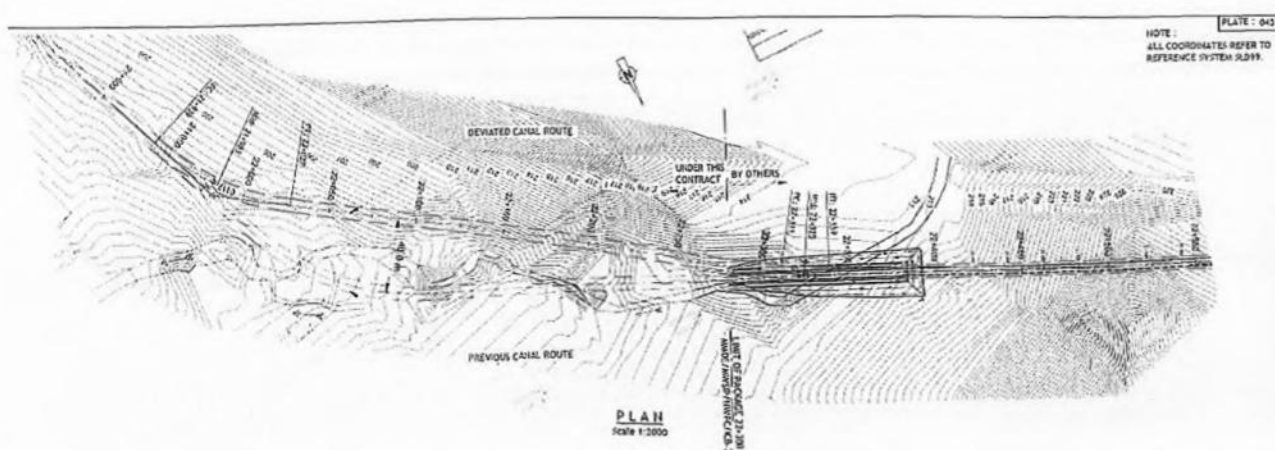
<sup>3</sup> Environmental Conditional Approval issued by CEA approving the Environmental Impact Assessment (EIA) Report prepared for proposed North Western Province Canal Project (NWPCP) in June 2015



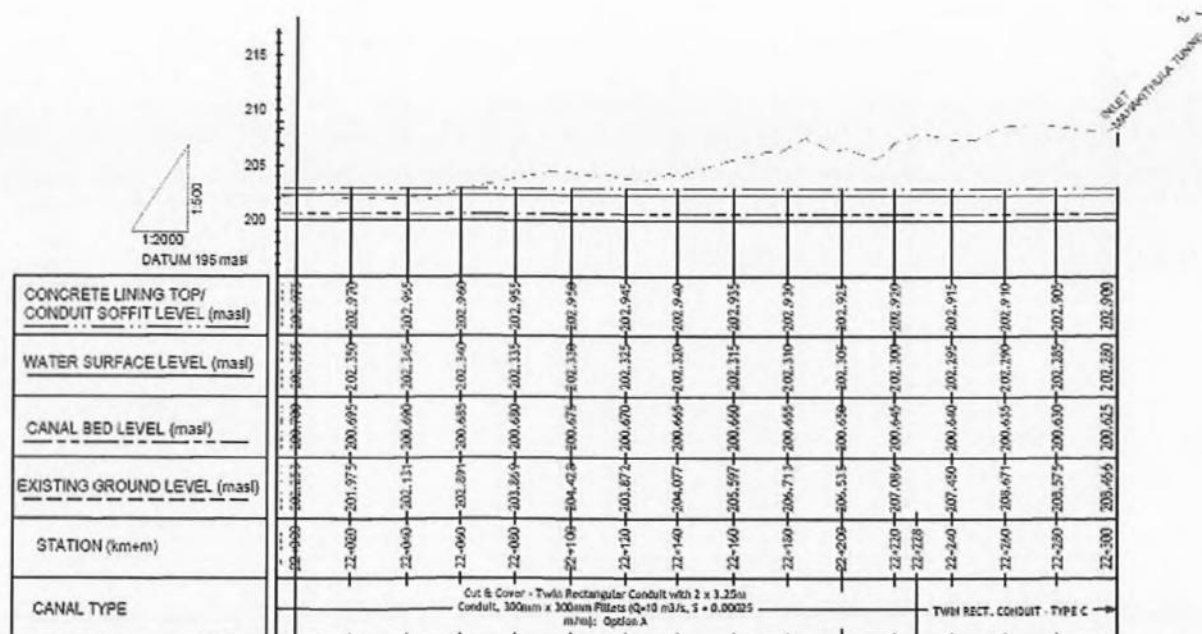
**Figure 2-3: Longitudinal profile of the previous canal section with exposed conduit sections above ground**

15. If the canal was shifted to the higher ground on the LB, by about 40 m at the maximum, and starting at approximate chainage 21+943 km, as indicated in red colour on the Figure 2-4, it would be possible to

- avoid the stream as much as possible, which would be beneficial for the animals using the stream as habitat and could also be beneficial for construction, since it would potentially reduce stream diversion efforts,
- have the conduit covered throughout, i.e., avoiding exposed sections (Figure 2-5), and
- shorten the canal alignment marginally, so that potentially higher costs for earthworks could be somewhat balanced.



**Figure 2-4: Realigned section shifted to the higher ground on the LB, by about 40 m at the maximum**



**Figure 2-5: Longitudinal profile of the realigned canal section avoiding exposed conduit sections above ground**



### 3 ANTICIPATED ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES

#### 3.1 Environmental significance of the critical stream habitat avoided by realignment

16. The rapid ecological survey carried out by the consultants Environmental Monitoring Specialist recorded the stream habitat falls under the previous canal trace (between 21+943 km to 22+357 km) as a critical habitat due to the presence of following endemic, endangered fauna and flora species.

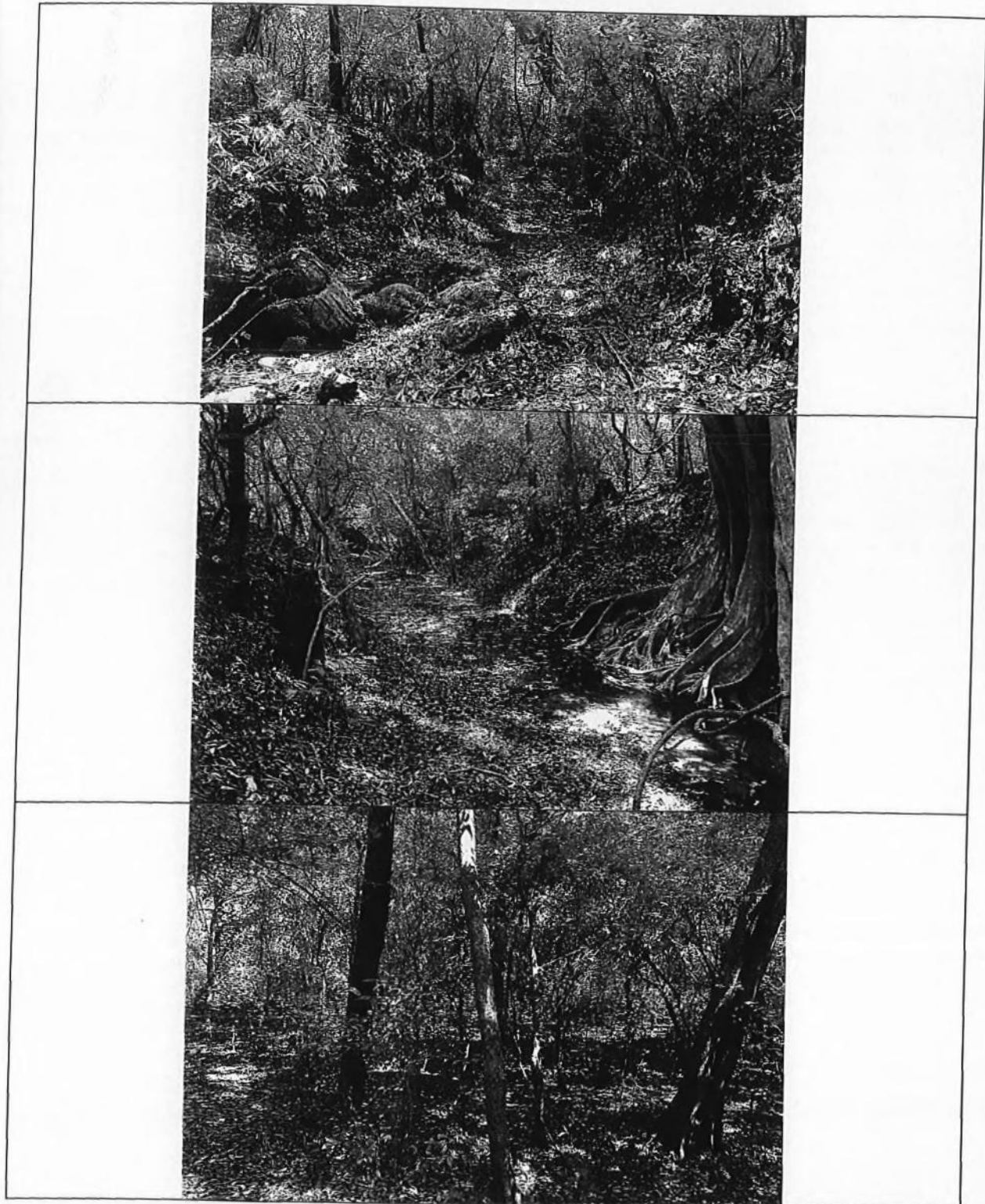
17. Some plant species that observed associated with the stream habitat were *Anodendron paniculatum* (As Wel), *Garcinia spicata* (Ela Gokatu), *Mallotus resinosa* (Ma Endaru), *Hydnocarpus venenata* (Makulu), *Streblus taxoides* (Gon Gotu), *Ixora coccinea* (Ratambala).

18. Of them *Anodendron paniculatum* (As Wel) is nationally vulnerable (VU) species, *Garcinia spicata* (Ela Gokatu) is nationally near threatened (NT) species and *Mallotus resinosa* (Ma Endaru) and *Hydnocarpus venenata* (Makulu) are endemic species to the country.

19. With respect to fauna species, fish species, *Devario malabaricus* (Giant Danio / Dankola Sayala), *Rasbora microcephalus* (Thin line Rasbora / Caveri Randiya), *Lepidocephalichthys thermalis* (Common spiny loach / Thith Ahirawa), *Channa kelaartii* (Brown snakehead / Paradel Kanaya) and mammalian species, *Lutra lutra* (Otter) were observed. Of them, *Channa kelaartii* (Brown snakehead / Paradel Kanaya) is endemic to the country and *Lutra lutra* (Otter) is nationally vulnerable (VU) species.

20. The ecological significance of the area is shown with photographic evidence in the Figure 3-1.





**Figure 3-1: Photographic evidences to show the ecological significance of the critical stream and associated habitats avoided by realignment**

### 3.2 Environmental significance related to the terrestrial habitats affected due to realigned trace

21. Biogeographically, the canal trace subjected to the realignment is located within the Kahalla Palkeleke sanctuary and Forest reserve, lies within the low country Dry Zone. Floristically it is under the Dry and Arid Lowlands Floristic Zone.

22. Tropical Dry Mixed Evergreen Forests, Tropical Thorn Forests, Damana and Villu Grasslands, Flood-plain Wetlands, Rivers and Streams, Riverine and Gallery Forests are typical natural vegetation formations and habitats in the Dry and Arid Lowlands floristic zone. However, except Tropical Dry Mixed Evergreen Forests, other typical natural vegetation formations and habitats in the Dry and Arid Lowlands floristic zone cannot be observed in the proposed new alignment trace.

23. Forests in the proposed realigned canal trace (between 21+943 to 22+340 km) are similar to the forest habitat recorded in the previous trace in terms of structure and also dominated by similar plant species that can be observed in the forests of the previous trace such as, *Drypetes sepiaria* (Weera), *Pterospermum suberifolium* (Welan), *Dimocarpus longan* (Mora), *Diospyros ovalifolia* (Kunumella), *Lepisanthes tetraphylla* (Dambu), *Schleichera oleosa* (Koon), *Tarennia asiatica* (Tarana), *Memecylon capitellatum* (Dedi Kaha), *Discospermum sphaerocarpum* (Gal Seeru), *Polyalthia korinti* (Ulkenda), *Xylopia nigricans* (Heen Kenda), *Uvaria spheonocarpa*, *Maba buxifolia*, *Diospyros ebenum* (Kaluwara), *Mallotus rham-nifolius* (Molabe), *Ziziphus oenoplia* (Heen Eraminiya), *Ventilago madraspatana* (Yakada Wel), *Derris par-viflora* (Kala Wel), *Ixora pavetta* (Maharatambala), *Glycosmis mauritiana*, *Manilkara hexandra* (Palu), *Vitex altissima* (Milla), *Dimorphocalyx glabellus* (Weli Wenna), *Trichopus zeylanicus* (Bim Pol), *Salacia reticulata* (Kotala Himbutu), *Connarus monocarpus* (Radaliya).

24. Of those forest species recorded in both previous canal trace and realigned section, *Diospyros ebe-num* (Kaluwara) and *Salacia reticulata* (Kotala Himbutu) are nationally endangered (EN) species, *Manil-kara hexandra* (Palu) and *Trichopus zeylanicus* (Bim Pol) are nationally vulnerable (VU) species, *Xylopia nigricans* (Heen Kenda) and *Vitex altissima* (Milla) are nationally near threatened (NT) species and *Me-mecylon capitellatum* (Dedi Kaha), *Derris parviflora* (Kala Wel), *Xylopia nigricans* (Heen Kenda), *Uvaria spheonocarpa* are endemic species to the country.

25. With respect to fauna, other than species that observed in the stream and associated habitat in the previous canal trace, all other fauna species that observed in the old trace can be observed in the proposed realigned section as well.

26. The detail list of the critical fauna and flora species recorded along the ecological sensitive habitats of the entire NWPCP ICB 2 canal trace shall be described in the report prepared at the completion of the ongoing baseline ecological survey and critical species translocation and transplanting study.

### 3.3 Anticipated environmental impacts

27. In keeping with the approach taken so far in this EIA Addendum, the environmental implications of the proposed design change appear to be “environmentally positive” as described under Section 2.2 of this addendum, but the common negative impacts associated with the construction activities in a wildlife protected area of Kahalla Palkeleke sanctuary and Forest Reserve could be anticipated.

28. The Table 3-1 summarizes the key anticipated positive impacts associated with the proposed canal alignment.

**Table 3-1: Key anticipated positive environmental impacts associated with the proposed canal realignment**

Current proposal	Summary of environmental positive impacts
1. Avoid the stream as much as possible by shifting the canal to the high ground area by about 40 m maximum	i. Minimize/prevent disturbances to the ecological values of the critical aquatic habitat described under section 3.2 ii. Prevent disturbances to the natural stream flow by avoiding stream diversion and there by ensure the e-flow to the downstream habitats nourished by the stream iii. Ensure the stream habitat for the use of wild animals by shifting the construction area avoiding the stream
2. Avoiding exposed sections after construction	i. The canal sections will be totally underground after construction which will ensure safe passage and movements for the wild animals ii. This will avoid localized floods, by avoiding hindrance to surface runoff in the sanctuary area
3. Shorten the canal alignment by 17 m	i. This will save wildlife and forest habitat of (20m x 17m) 340m <sup>2</sup> (0.034 ha) ii. Reduce the excavated material amount (approx. 7,000 m x 2,500 x 17m) , and thereby reduce the areas required for the disposal / stockpile

29. Further to the key positive impacts anticipated, following common negative impacts are envisaged during the construction period by the NWPCP ICB 2 contractor to the specific area.

- Impacts on wildlife movements by establishing temporary electric fence surrounding the construction area to avoid animals falling into deep excavated sections
- Impacts on land stability, erosion, pollution of associated stream network in the area
- adverse impacts on existing drainage systems/natural storm paths of the project area

30. Updated Environmental Management Plan (EMP) prepared for the NWPCP ICB 2 package shall be revised including the additional environmental mitigations identified in the in this Addendum under section 3.3.

### 3.4 Additional mitigatory measures to manage possible impacts

31. As an immediate mitigatory measure, the tree felling was stopped informing relevant stakeholder agencies including Department of Forest Conservation (FD) and State Timber Corporation (STC) in the reach of canal trace subjected to the canal realignment until the designs are finalized, and the approvals granted for this addendum to avoid unnecessary habitat clearance.



32. The required construction area to clear was identified as 20 m corridor, and the contractor to plan construction work without further disturbances to surrounding habitats. The relevant geological surveys need to be conducted beforehand to understand the excavation profiles.

33. With the approval of the relevant stakeholder agencies including CEA for this addendum, the tree enumeration shall be redo, and the baseline ecological survey followed by the critical species translocation/transplanting will be continued just before the site clearing activities.

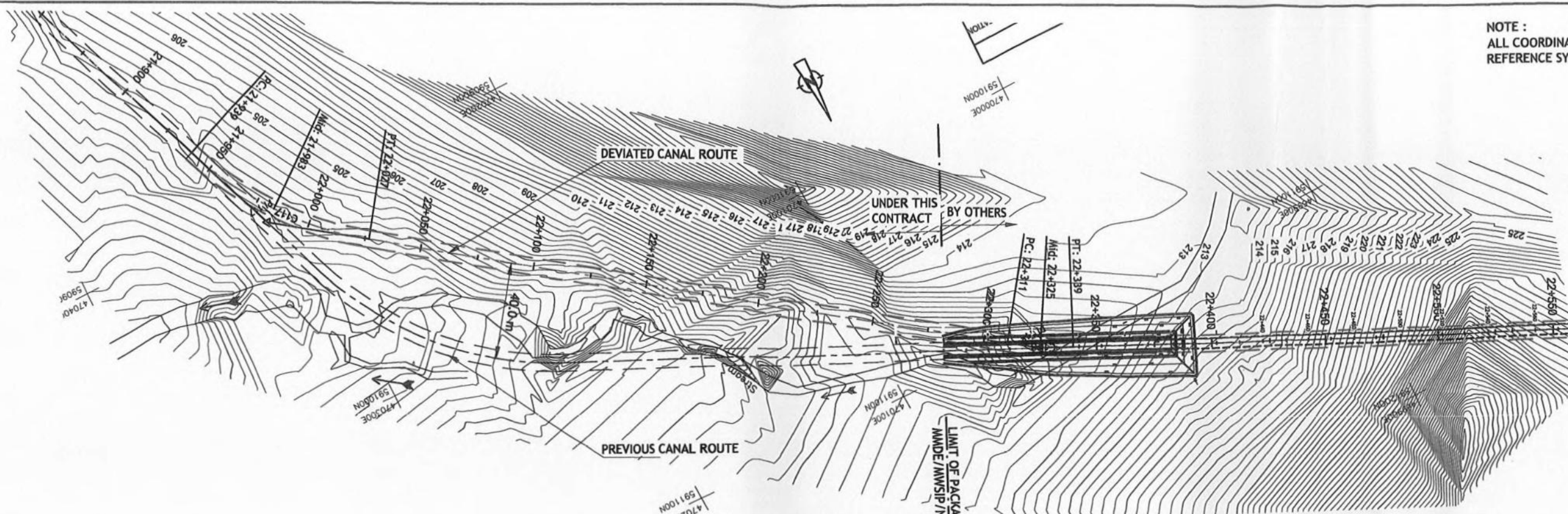
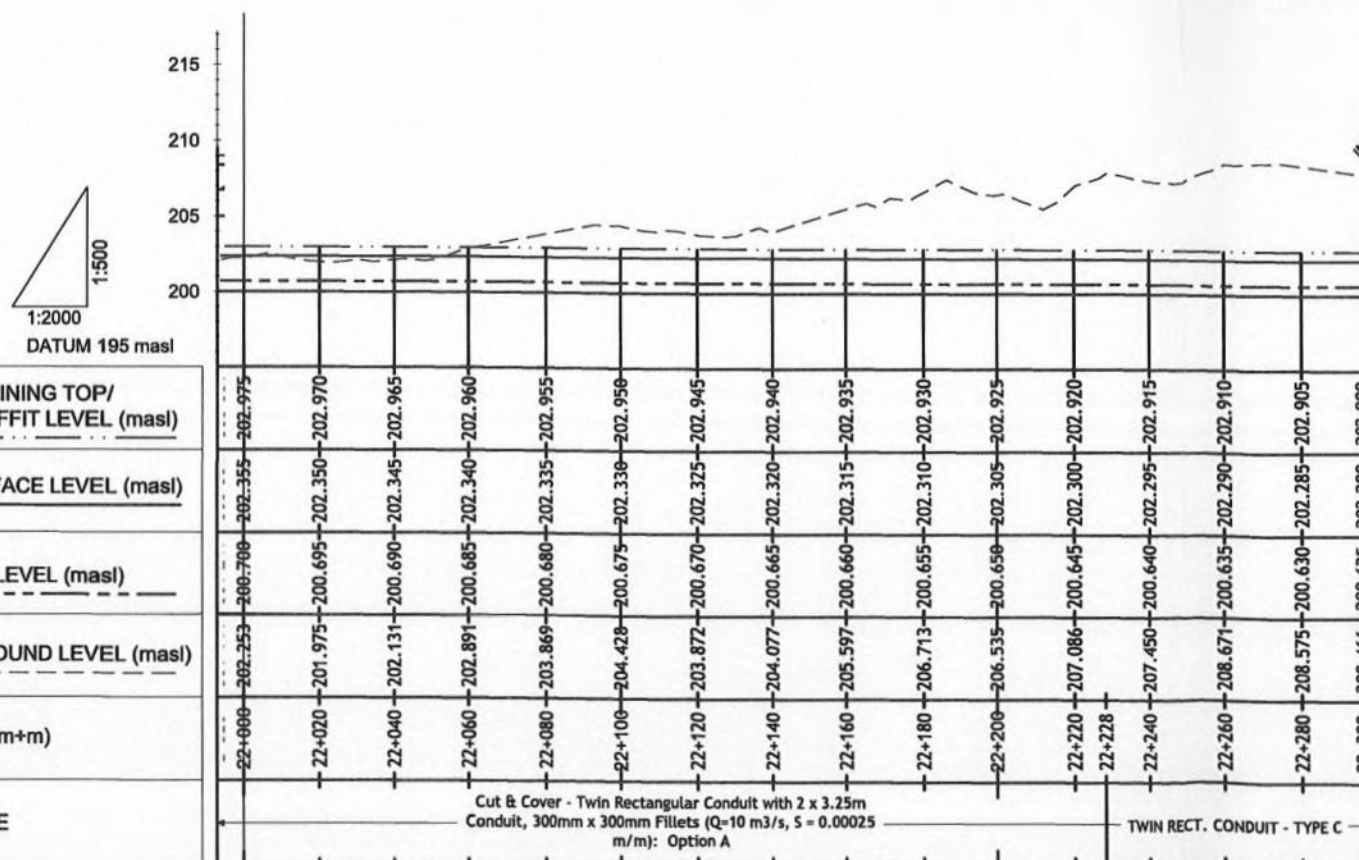
34. In addition, following key mitigatory measures shall be adopted to avoid common environmental negative impacts as already emphasized in the updated EMP.

- Development of a comprehensive erosion and sediment control plan prior to earth-moving activities; (i) Construct settling ponds where silt-laden water can settle before being discharged into natural watercourses; (ii) Application of erosion and sediment control practices to prevent excessive onsite damage; (iii) Apply perimeter control practices to protect the disturbed areas from onsite runoff and to prevent sediment damage to areas below the construction site; (iv) Keeping run-off velocities low and trying to retain much of the run-off on the site and Stabilization of the disturbed areas as soon as the final grade has been attained
- Provision of silt traps where required and carrying out rock excavation, canal lining, and other related earth & concrete work in the canal with the minimum disturbances to the existing natural aquatic and terrestrial ecosystems along the trace
- Soil removed during the construction should not be dumped at any edge of waters or disposed into surrounding environment without proper protection measures and approval
- Uprooting the trees should be done with appropriate equipment to minimize the damage to soil
- Natural water paths and valleys should be kept free from any obstruction through any kind of construction or disposal of soil/rocks etc
- Avoid adverse impacts on existing drainage systems/natural storm paths of the project area
- Wildlife/elephant movements should not be disturbed
- Avoiding any tree felling other than the identified trees and if any additional trees are to be felled, they should be enumerated and removed with the consultation of respective Divisional Secretary and Forest Department through the State Timber Cooperation

## Annex A      Revised Plan and Longitudinal Section of the Proposed Canal Realignment between 21+943 to 22+340 km











2016.10 Addendum EIA NWPC ICB 2 alignment change 21+943 to 22+340km  
V1

Annex A

NOTE :  
ALL COORDINATES REFER TO  
REFERENCE SYSTEM SLD99.PLAN  
Scale 1:2000

LONGITUDINAL PROFILE

NOT FOR CONSTRUCTION

REVISION			APPROVED	K.R.N.B.		05 Dec. 18	<div>EMPLOYER</div> <div><div>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT</div><div>MAHAWELI WATER SECURITY INVESTMENT PROGRAM</div></div>	<div>NORTH WESTERN PROVINCE CANAL PROJECT</div> <div>NWPCP-ICB-2</div> <div>CONSTRUCTION OF MAIN CANAL FROM NEBADAGAHAWATTA TO MAHAKITHULA RESERVOIR INLET TUNNEL (FROM 5+250 TO 22+300 km+m)</div> <div>PLAN AND LONGITUDINAL SECTION</div> <div>STATION 22+000 TO 22+300 km+m</div>	DATE: 05 Dec. 2018		
NO.	DATE	DESCRIPTION	RECOMMENDED	M.R.C.		05 Dec. 18			DRAWING NO. NW-102-E-PLS-001		
			SUBMITTED	S.S.		05 Dec. 18			SHEETS 29 OF 29		
			CHECKED	J.J.		05 Dec. 18					
			DRAWN	H.E.W.		05 Dec. 18			SCALE AS SHOWN		
			DESIGNED	A.L.B.D.		05 Dec. 18					
<div>CONSULTANT:</div> <div>LAHMEYER INTERNATIONAL</div> <div>GEOCONSUL</div> <div>IN ASSOCIATION WITH:</div> <div>Infotechs IDEAS</div> <div>ENGINEERING CONSULTANTS (PVT) LIMITED</div> <div>NIRAS</div>							Rev A				



# මධ්‍යම පරිසර අධිකාරිය மத்திய சுற்றாடல் அதிகாரசபை Central Environmental Authority



පරිසර පියස, 104, ඩෙන්සිල් කොට්ඨාසයේ මාවත, බත්තරමුල්ල, ශ්‍රී ලංකාව.

"பரிசர பியச", 104, டென்சில் கொப்பேகடுவ மாவத்தை, பத்தரமுல்லை, இலங்கை.

"Parisara Piyasa", 104, Denzil Kobbekaduwa Mawatha, Battaramulla, Sri Lanka. Web: www.cea.lk

අපේ යොමුව  
எமது தொடர்பு  
Our Ref.

ඔබේ යොමුව  
உமது தொடர்பு  
Your Ref.

දිනය  
திகதி  
Date

08/EIA/Water/07/2012 Monitoring Vol. III

18 June 2019

Director General  
Irrigation Department

## NORTH WESTERN PROVINCE CANAL PROJECT

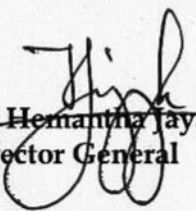
### – ENVIRONMENTAL APPROVAL FOR PROPOSED ALTERATIONS TO THE CANAL TRACE FROM CH 21+943 TO 22+340 KM

This has reference to the letter dated 03.06.2019 sent by the Program Director of Mahaweli Water Security Investment Program requesting environmental approval for the altered canal trace from CH 21+943 to 22+340 km.

Upon perusing the details and information submitted together with the aforesaid letter, we note the following;

- Re-alignment of canal trace between CH 21+943 and 22+340km has been done to avoid disturbances to a perennial stream within the Forest Reserve in Kahalla-Pallekele Sanctuary.
- The canal trace has been shifted by 40m towards the highland from the Perennial stream.
- The proposed canal trace falls within the study area of the original EIA study.
- Additional study has been done to identify potential additional impacts and mitigation measures for additional environmental impacts ( Addendum No. 2 to the Environmental impact Assessment on NWPCP-ICB-2 Canal Realignment between CH 21+943 and 22+340 km : North Western province Canal Project dated May 2019).

Therefore, the CEA has no objection for implementation of the proposed alterations under strict supervision and guidance of the Department of Wildlife Conservation. No separate environmental approval is required for the above alteration as the altered canal trace falls within the original EIA study.

  
P B Hemantha Jayasinghe  
Director General

CC: Program Director, Mahaweli Water Security Investment Program - f.n.a  
Project Director, North Western Province Canal Project - f.n.a

Chairman	Tel : 2872361, 2872348 Fax : 2872347	Director General	Tel : 2872359 Fax : 2872608	General Office	Tel : 2872278, 2873447, 2873448 7877277-280	Complaint : 2888999
Deputy Director Generals	HRD. Admin. & Finance Tel : 2865296 Fax : 2877515	Envt. Pollution Control Tel : 2873453 Fax : 2872605	Envt. Mgt. & Assess. Tel : 2872388 Fax : 2872296	Envt. Edu. & Awareness Tel : 2872297 Fax : 2872609	Waste Mgt. Te: 2872409 Fax: 2882152	



## **Annex 2:**

# **DRAFT BASELINE DATA REPORT NWPCP ICB 2 AREA**

19<sup>th</sup> August 2019

**IMPLEMENTATION OF ENVIRONMENTAL QUALITY  
BASELINE DATA COLLECTION AND REPORTING FOR  
MAIN CANAL FROM NEBADAGAHAWATTA TO  
MAHAKITHULA RESERVOIR**

**(5+250 TO 22+500km) UNDER NWPCP-ICB-2 CONTRACT PACKAGE AREA**

**MAHAWELI WATER SECURITY INVESTMENT PROGRAM (NWISP)**

**(MINISTRY OF MAHAWELI DEVELOPMENT & ENVIRONMENT)**

**Source of Funding** : Asian Development Bank (ADB) & Government of Sri Lanka

**Contract No** : PMDSC/CS01/WORKS 028

**Contract Ref** : MMDE/MWSIP/ADB/3268-SRI/Consult/CS- 01/PMDSC/ICB/2015/002

**Address** : Mahaweli Water Security Investment Program,  
No.493, T.B. Jayah Mawatha, Colombo 10

**Attention** : Michael Chegwin – Team Leader  
Program Design and Supervision Consultant (PMDSC)

**ADDITIONAL FEASIBILITY STUDIES REPORT**

**MAIN CANAL FROM NEBADAGAHAWATTA TO MAHAKITHULA RESERVOIR**

SGS Lanka (Pvt) Limited is pleased to submit this report describing the findings of the Environmental Site Assessment report of Main Canal from Nebadagahawatta to Mahakithula Reservoir (5+250 to 22+500km) under nwpcp-icb-2 contract package area. This assessment was prepared in accordance with the standards published by Central Environment Authority (CEA) of Sri Lanka.

The purpose of this Environmental Site Assessment was to gather sufficient information to render an independent professional opinion about the present environmental condition of the project site.

If you have any questions or require further clarification of the report findings, please contact the undersigned at your convenience. Thank you for the opportunity to be of service to your esteem organization.

Yours very truly,

SGS Lanka (Pvt) Limited  
141/7 C, Vauxhall Street,  
Colombo - 02

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## **1. Background**

### **Introduction:**

Mahaweli Water Security Investment Program (MWSIP), implemented by the Ministry of Mahaweli Development and Environment Ministry of the Government of Sri Lanka (GoSL), is funded by the Asian Development Bank (ADB) (No. 47381-002-SRI (SF), envisages to maximize the productivity of the Mahaweli River Basin (MRB) water resources, by transferring available water to the North Central and North Western dry zone areas for irrigation, drinking and commercial purposes. The updated Mahaweli Development Program (MDP) comprises three main individual investment projects namely.

- (i) Upper Elahera Canal Project (UECP)
- (ii) North Western Province Canal Project (NWPCP)
- (iii) Minipe Left Bank Canal Rehabilitation Project (MLBCRP)

Hence, the objective of this study is to transfer Mahaweli water to water short Upper Mi Oya irrigation systems and Hakwatuna Oya irrigation scheme in the Upper Deduru Oya basin. The project is to be implemented in two stages with transfer of 30 MCM annually from Nalanda reservoir in Stage 1 and further 100 MCM of Mahaweli water to be diverted from Dambulu Oya below Bowatenna Tunnel under Stage 2, on completion of Upper Elahera Canal from Moragahakanda reservoir. The proposed project includes construction of diversion canals of length 91 km and two medium reservoirs namely Mahakithula and Mahakirula located in the Kahalla-Pallekele forest reserve.

### **Project area:**

Main Canal from Nebadagahawatta to Mahakithula reservoir Project (5+250 to 22+500km) under nwpcp-icb-2 contract package area.

Since the Environmental Monitoring Plan (EMoP) for the Project, incorporated in the Environmental Impact Assessment (EIA) study completed in June 2015, requires conducting an Environmental Baseline Survey (EBS) to determine the pre-project status in the project affected area covering ambient air, surface water and ground water qualities.

### **1.1 Study objectives**

Aim of the Service is to carry out Environmental Quality Baseline Data Collection at NWPCP-ICB-2 project area, comprising the construction of main canal approximately 17km from Nebadagahawatta to Mahakithula reservoir inlet tunnel.

The purpose of the environmental assessment was to conducting an Environmental Baseline Survey (EBS) to determine the pre-project status in the project affected area covering ambient air, noise, vibration, wind rose, and surface water and ground water qualities.

## **1.2 Scope of the study**

Depends on the objectives of the project, Selection of sampling location and appropriate sampling and analysis techniques play key role in providing actual information of the baseline to determine the project status.

Environmental Baseline Survey (EBS) provide information to decision makers and the public about the environmental implications of proposed actions for a project.

(i) Sample locations were identified on (21.05.2019) within the NWPCP-ICB-2 Contract Package area through a joint site inspection carried out with the Environmental Monitoring Specialist (EMS) of the Program Management Design Supervision Consultant (PMDSC) and the Senior Environmental Officer (SEO) of Project Implementation Unit (PIU) of NWPCP.

(ii) Most appropriate sampling and analysis techniques were finalized based on the most updated standardized testing method complying with the CEA requirements.

## **2. Technical approach and Methodology**

### **2.1 Reconnaissance visit and basis for sample location selection**

Six (6) different sampling assessment locations were selected within the NWPCP-ICB-2 Contract Package area through a joint site inspection carried by Environmental Monitoring Specialist (EMS) of the Program Management Design Supervision Consultant (PMDSC) and the Senior Environmental Officer (SEO) of Project Implementation Unit (PIU) of NWPCP.

The study of Air quality, Noise, Vibration, Wind rose, Surface water quality and Ground water quality will provide baseline information about the status of the project area. This baseline information will be used by local, state and project agencies and local decision-makers. Over time, the baseline data will be used to predict problems and quantify the seasonal variations and identify water quality changes.

## 2.2 Baseline data collection

The objective of water quality monitoring is to obtain quantitative information on the physical, chemical, and biological characteristics of water via statistical sampling. Analysis parameters were determined by the Environmental Monitoring Specialist (EMS) of the Program Management Design Supervision Consultant (PMDSC) and the Senior Environmental Officer (SEO) of Project Implementation Unit (PIU) of NWPCP.

### 1. Surface water quality Test-

#### Sampling locations

LOCATION	SAMPLE ID	NAME OF THE LOCATION	GPS CO-ORDINATE
Location 1	S1	Korakahapellessa Wewa, Pibidunugama (31.05.2019)	
Location 2	S2	Maningamuwa Wewa (31.05.2019)	
Location 3	S3	Galapita Wewa, Aluthwewa, Galewela (31.05.2019)	
Location 4	S4	Bambaragawewa, Galewela (31.05.2019)	

# **Analysis of parameters, method of sample collection and analysis method**

Analysis Parameters		Method of Sample collection	Analysis method
Temperature		APHA 1060 B, 23 <sup>rd</sup> Edition	APHA 2550 B:2012
pH			APHA 4500-H B:2012
Electrical Conductivity (EC)			APHA 2510 B:2012
Dissolved Oxygen (DO)			ASTM D 888-12 Method C
Biological Oxygen Demand (BOD)			APHA 5210 B: 2012
Chemical Oxygen Demand (COD)			APHA 5220 D:2012
Total Dissolved Solids (TDS)			APHA 2540 C: 2012
Total Suspended Solids (TSS)			APHA 2540 D: 2012
Turbidity (NTU)			APHA 2130 B: 2012
Oil & Grease			APHA 5520 B: 2012
Dissolved Phosphate			APHA 4500-P D: 2012
Total Kjeldahl Nitrogen			APHA 4500-Norg C: 2012
Heavy metals	Iron		APHA 3120 B: 2012
	Chromium		APHA 3120 B: 2012
	Arsenic		APHA 3120 B: 2012
	Cadmium		APHA 3120 B: 2012
	Lead		APHA 3120 B: 2012
Pesticides		APHA 6630 PART C : 2012	
E.Coli		SLS 1461-1: S3: 2013	

## 2. Ground water level and quality test –

### Sampling locations

LOCATION	SAMPLE ID	NAME OF THE LOCATION	GPS CO-ORDINATE
Location 1	S1	Residential well- Mr. Sudath Rohana (29.05.2019)  499 A, Mathale Road, Bogasyaya, Pahala, Bambawa, Galewela	
Location 2	S2	Residential well- Mr. Nihal Sarath (29.05.2019)  660 A, Kapaliya, Galewela	
Location 3	S3	Bubula  (29.05.2019)	
Location 4	S4	Residential well - Mr. P.G. Thilakaratna (29.05.2019)  270, Katupotha, Babaragaswewa	
Location 5	S5	Residential well - Mr.S.R. Sisil Gunawarnana (29.05.2019)  Palliya Road, Aluthwewa, Babaragaswewa	
Location 6	S6	Residential well - Mr. R.G. Wijerathna (29.05.2019)  311 A, Kospotha	
Location 7	S7	Well of inside the bleaching plant (29.05.2019)	
Location 8	S8	Well water (29.05.2019)  Pibidunugama Galewela	



### Analysis of parameters, method of sample collection and analysis method

Analysis Parameters		Method of Sample collection	Analysis method
Temperature		APHA 1060 B, 23 <sup>rd</sup> Edition	APHA 2550 B:2012
pH			APHA 4500-H B:2012
Electrical Conductivity (EC)			APHA 2510 B:2012
Dissolved Oxygen (DO)			ASTM D 888-12 Method C
Total Suspended Solids (TSS)			APHA 2540 D: 2012
Turbidity (NTU)			APHA 2130 B: 2012
Free Ammonia (as NH3)			APHA 4500-NH3 D: 2012
Calcium (as Ca)			APHA 3500-Ca B: 2012
Chloride (as Cl-)			APHA 4500-Cl B: 2012
Chemical Oxygen Demand (COD)			APHA 5220 D: 2012
Fluoride (as F-)			APHA 4500-F- C: 2012
Nitrate (as NO3-)			APHA 4500-NO3- B: 2012
Sulphate (as SO4-2)			APHA 4500-SO4-2 E: 2012
Total Alkalinity (as CaCO3)			APHA 2320 B: 2012
Total Dissolve Solids (TDS)			APHA 2540 C: 2012
Oil and Grease			APHA 5520 B: 2012
Dissolved Phosphate			APHA 4500 P D: 2012
Heavy Metals	Cadmium		APHA 3120 B: 2012
	Arsenic		APHA 3120 B: 2012
	Lead	APHA 3120 B: 2012	

### 3. Boundary Noise Measurement –

Noise monitoring is the measurement of noise in an outdoor environment caused by activities. Encompassing sound in a given situation given time usually composed of sound from maximum sources near and far.

#### Sampling Locations

LOCATION	LOCATION ID	NAME OF THE LOCATION	GPS CO-ORDINATE
Location 1	L1	499 A, Mathale Road, Bogasyaya, Pahala, Bambawa	N 07.75145 E 80.56863
Location 2	L2	660 A, Kapatiya, Galewela	N 07.75039 E 80.56904
Location 3	L3	270, Katupotha, Babaragaswawa	N 07.75041 E 80.56885
Location 4	L4	Galewela, Babaragasvila, Korakahagolla	N 07.81183 E 80.50439

Test Protocol : BS 4142:1997 Standard

Instrumentation : Integrated Averaging Sound Level Meter

Instrument Type : CR: 1710  
 Manufacturer : Cirrus Research plc, UK  
 Serial No : G061818  
 Range : 20dB to 140dB

#### Acoustic Calibrator

Instrument Type : CR: 515  
 Manufacturer : Cirrus Research plc, UK  
 Serial No : 60513  
 Calibration Noise Level : 93.7dB @ 1 kHz

Sound level meter was calibrated using the acoustic sound calibrator, before and after the series of measurements.

#### Method of Measurements:

Continuous noise measurements were recorded for about 24 hours at each selected locations in accordance with the methods of BS 4142:1997 Standard, as stipulated in the gazetted National Environmental (Noise Control) Regulations No.1 1996, stipulated by Central Environmental Authority.

#### 4. Vibration Measurement -

##### Sampling Locations

LOCATION	LOCATION ID	NAME OF THE LOCATION	GPS CO-ORDINATE
Location 1	L1	499 A, Mathale Road, Bogasyaya, Pahala, Bambawa	N 07.75145 E 80.56863
Location 2	L2	660 A, Kapatiya, Galewela	N 07.75039 E 80.56904
Location 3	L3	270, Katupotha, Babaragaswawa	N 07.75041 E 80.56885
Location 4	L4	Galewela, Babaragasvila, Korakahagolla	N 07.81183 E 80.50439

##### Instrumentation:

Vibration meter : Smart Sensor- Vibration meter

Model : AS63B

Measurement range : 0.1 -199.9 mm/s

Frequency range : 10-1000 Hz

##### Method of measurements:

Continuous vibration levels were recorded for an hour at selected locations in accordance with the methods laid down in International Organisation for Standardization – ISO- 4966:1990E, as stipulated in the interim vibration standard stipulated by the Central Environmental Authority of Sri Lanka.

##### Condition of Measurements:

Vibration levels were recorded at each selected locations without the activities of the project site.

Type 3 structures is referred since the locations include Single and two storey houses and buildings made of lighter construction, using lightweight materials such as bricks, cement blocks etc, not designed to resist earthquakes.

Predominant frequency in each time interval measurements was about 50 Hz.

## 5. Ambient Air Quality Measurement –

Ambient air quality refers to the condition or quality of air surrounding in the outdoors.

### Sampling Locations

LOCATION	LOCATION ID	NAME OF THE LOCATION	GPS CO-ORDINATE
Location 1	L1	499 A, Mathale Road, Bogasyaya, Pahala, Bambawa	N 07.75145 E 80.56863
Location 2	L2	660 A, Kapatiya, Galewela	N 07.75039 E 80.56904
Location 3	L3	270, Katupotha, Babaragaswawa	N 07.75041 E 80.56885
Location 4	L4	Galewela, Babaragasvila, Korakahagolla	N 07.81183 E 80.50439
Location 5	L5	Aluth wawa, Babaragaswawa	N 07.78708 E 80.50687
Location 6	L6	311 A, Kospotha, Begama	

### Sampling and Analytical Conditions & Sampling and Analytical Methodology

Air samples were collected from four different locations for the analysis of SO<sub>2</sub>, NO<sub>2</sub>, CO, O<sub>3</sub>, Particulate Matter (PM<sub>10</sub>) and Particulate Matter (PM<sub>2.5</sub>). The sampling rates were maintained at 0.5 l/min for SO<sub>2</sub>, NO<sub>2</sub>, and O<sub>3</sub>, 16.6 l/min for Particulate Matter (PM<sub>2.5</sub>) and 1.13 m<sup>3</sup>/min for Particulate Matter (PM<sub>10</sub>). CO was analysed continuously by EL-USB-CO300 Analyzer.

Parameter	Test Protocol	Instrumentation
Nitrogen Dioxide	ASTM D 1607-91, Griess Saltzman Reaction	Bubblers
Sulphur Dioxide	ASTM D 2914-01, West-Gaeke Method	Bubblers
Total Oxidants as Ozone	IS 5182 (Part 9), UV Method	Bubblers
Carbon Monoxide	Automatic Analyzer	EL-USB-CO300
Particulate Matter (PM <sub>10</sub> )	High Volume Sampling	Model: PEM –RDS 8NL
Particulate Matter (PM <sub>2.5</sub> )	Medium Volume Sampling	Model : PEM – ADS 2.5

## 6. Wind rose Measurement –

Wind rose is a measurement of wind speed and directions that summarizes information about the wind at a particular location over a specified time period.

### Sampling Locations

LOCATION	LOCATION ID	NAME OF THE LOCATION	GPS CO-ORDINATE
Location 1	L1	499 A, Mathale Road, Bogasyaya, Pahala, Bambawa	N 07.75145 E 80.56863
Location 2	L2	660 A, Kapatiya, Galewela	N 07.75039 E 80.56904
Location 3	L3	270, Katupotha, Babaragaswawa	N 07.75041 E 80.56885
Location 4	L4	Galewela, Babaragasvila, Korakahagolla	N 07.81183 E 80.50439

### Instrumentation:

Wind rose meter : Professional Weather Center

Model No : WH5302

### Method of measurement:

Continuous wind rose readings were recorded for 24 hours at selected locations. Wind speed were plotted in graph considering all wind directions.

### 3. Baseline Data / Analysis Results

Parameters		Results			
		S1	S2	S3	S4
<b>1. Surface water quality</b>					
Temperature (°C)		32.4	31.2	34.0	31.6
pH		8.47	7.47	9.4	8.26
Electrical Conductivity (EC) (µS/cm at 25°C)		464	198	133.2	581
Dissolved Oxygen (DO) (mg/L)		4.0	6.4	6.8	6.9
Chemical Oxygen Demand (COD) (mg/L)		13	15	21	26
Total Dissolved Solids (TDS) (mg/L)		242	139	107	286
Total Suspended Solids (TSS) (mg/L)		28	43	18	19
Turbidity (NTU)		37	32	70	7.6
Oil & Grease		ND	ND	ND	ND
Dissolved Phosphate (mg/L)		0.29	ND	ND	ND
Total Kjeldahl Nitrogen		ND	ND	ND	ND
Heavy metals (mg/L)	Iron	0.73	1.5	4.8	0.60
	Chromium	ND	ND	ND	ND
	Arsenic	ND	ND	ND	ND
	Cadmium	ND	ND	ND	ND
	Lead	ND	ND	ND	ND
	Mercury	ND	ND	ND	ND
	Selenium	ND	ND	ND	ND
	Nickel	ND	ND	ND	ND
	Zinc	0.02	0.02	0.04	ND
Pesticides		ND	ND	ND	ND
E.Coli (MPN/100ml)		23	33	46	33

ND- Not Detected

# **APPLICABLE REGULATIONS:**

## **Sri -Lanka Standards - SLS (614: 2013)**

Parameters		SLS Limits
Temperature (°C)		-
pH		6.5 to 8.5
Electrical Conductivity (EC) (μS/cm at 25°C)		-
Dissolved Oxygen (DO) (mg/L)		-
Total Suspended Solids (TSS) (mg/L)		-
Turbidity (NTU)		2 NTU
Free Ammonia (as NH <sub>3</sub> ) (mg/L)		0.06 mg/L
Calcium (as Ca)		100 mg/L
Chloride (as Cl <sup>-</sup> ) (mg/L)		250 mg/L
Chemical Oxygen Demand (COD) (mg/L)		10 mg/L
Fluoride (as F <sup>-</sup> ) (mg/L)		1.0 mg/L
Nitrate (as NO <sub>3</sub> <sup>-</sup> )		50 mg/L
Sulphate (as SO <sub>4</sub> <sup>-2</sup> )		200 mg/L
Total Alkalinity (as CaCO <sub>3</sub> ) (mg/L)		200 mg/L
Total Dissolve Solids (TDS) (mg/L)		500 mg/L
Oil and Grease (mg/L)		0.2 mg/L
Dissolved Phosphate (as PO <sub>4</sub> <sup>3-</sup> )		2.0 mg/L
Calcium (as Ca) (mg/L)		100 mg/L
Iron (mg/L)		0.3
Heavy Metals (mg/L)	Cadmium	0.003 mg/L
	Arsenic	0.01 mg/L
	Lead	0.01 mg/L
	Chromium	0.05 mg/L
	zinc	3.0
	Mercury	0.001

1. Ground Water Quality	Results							
	S1	S2	S3	S4	S5	S6	S7	S8
Temperature (°C)	29.3	29.6	30.9	28.7	28.5	30.8	31.0	28.1
pH	6.55	6.5	6.75	6.98	7.24	6.17	6.46	8.03
Electrical Conductivity (EC) ( $\mu$ S/cm at 25°C)	948	309	870	510	372	334	683	1692
Dissolved Oxygen (DO) (mg/L)	7.9	7.1	8.0	6.7	8.3	8.0	7.9	7.0
Total Suspended Solids (TSS) (mg/L)	ND	3	ND	ND	3	ND	ND	ND
Turbidity (NTU)	0.80	3.9	19	3.6	5.7	1.1	2.1	0.65
Free Ammonia (as NH <sub>3</sub> ) (mg/L)	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (as Ca)	70	23	74	43	34	26	47	18
Chloride (as Cl <sup>-</sup> ) (mg/L)	55	7	16	7	7	8	21	22
Chemical Oxygen Demand (COD) (mg/L)	7	7	8	7	6	8	7	ND
Fluoride (as F <sup>-</sup> ) (mg/L)	0.22	0.24	0.36	0.22	0.32	0.15	0.51	5.8
Nitrate (as NO <sub>3</sub> <sup>-</sup> )	5.29	0.54	0.63	ND	2.87	ND	1.16	3.63



1. Ground Water Quality		Results							
		S1	S2	S3	S4	S5	S6	S7	S8
Sulphate (as SO <sub>4</sub> -2)		39.1	4.7	75.6	10.4	7.0	4.6	10.3	38.9
Total Alkalinity (as CaCO <sub>3</sub> ) (mg/L)		282	112	334	265	138	126	299	768
Total Dissolve Solids (TDS) (mg/L)		547	199	574	216	219	218	394	1001
Oil and Grease (mg/L)		ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Phosphate		ND	ND	ND	ND	ND	ND	ND	ND
Heavy Metals (mg/L)	Cadmium	ND	ND	ND	ND	ND	ND	ND	ND
	Arsenic	ND	ND	ND	ND	ND	ND	ND	ND
	Lead	ND	ND	ND	ND	ND	ND	ND	ND
	Chromium	ND	ND	ND	0.03	ND	ND	0.03	0.02

ND- Not Detected

#### APPLICABLE REGULATIONS:

SLS Standards - SLS (614: 2013)

## 2. Noise

Measurement Location		Assessment time period - Day			Assessment time period - Evening			Assessment time period - Night		
L #	GPS	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB
<b>L1</b>	N 07.75145 E 80.56863	57	39	57	54	35	54	53	34	53
<b>L2</b>	N 07.75039 E 80.56904	47	32	47	53	35	53	49	33	49
<b>L3</b>	N 07.75041 E 80.56885	50	34	50	53	34	53	50	32	50
<b>L4</b>	N 07.81183 E 80.50439	52	50	**	54	50	52	50	50	**

MNL – Measured Noise level (LAeq T); Residual Noise Level (LAeqT); CNL – Corrected Noise Level (LAeq T)

Note- Minimum value of noise level during the measurements is taken as Residual noise in each location.

\*\* No additional contribution



**APPLICABLE CEA REGULATIONS:**

Maximum Permissible Noise Levels (MPNL) as per National Environmental (Noise Control) Regulations No.1 1996.

Area	LAeq (T)dB	
	Day Time	Night Time
<b>Low Noise</b>	<b>55</b>	<b>45</b>
Medium Noise	63	50
High Noise	70	60
Silent Zone	50	45



### 3. Vibration

Time	L1 Max. peak value in Velocity mode (mm/s)			
9.20 a.m. on 29 <sup>th</sup>	0.02	-	-	-
9.25 a.m.	0.0	-	-	-
9.30 a.m.	0.01	-	-	-
9.35 a.m.	0.05	-	-	-
9.40 a.m.	0.0	-	-	-
9.45 a.m.	0.0	-	-	-
9.50 a.m.	0.0	-	-	-
9.55 a.m.	0.0	-	-	-
10.00 a.m.	0.0	-	-	-
10.05 a.m.	0.0	-	-	-
10.10 a.m.	0.0	-	-	-
10.15 a.m.	0.0	-	-	-
10.20 a.m.	0.0	-	-	-

Time		L2 Max. peak value in Velocity mode (mm/s)		
10.30 a.m. on 29 <sup>th</sup>	-	0.0	-	-
10.35 a.m.	-	0.0	-	-
10.40 a.m.	-	0.01	-	-
10.45 a.m.	-	0.0	-	-
10.50 a.m.	-	0.0	-	-
10.55 a.m.	-	0.0	-	-
11.00 a.m.	-	0.0	-	-
11.05 a.m.	-	0.03	-	-
11.10 a.m.	-	0.0	-	-
11.15 a.m.	-	0.0	-	-
11.20 a.m.	-	0.0	-	-
11.25 a.m.	-	0.0	-	-
11.30 a.m.	-	0.0	-	-

			<b>L3</b> <b>Max. peak value</b> <b>in Velocity mode</b> <b>(mm/s)</b>	
12.00 p.m.	-	-	0.0	-
12.05 p.m.	-	-	0.0	-
12.10 p.m.	-	-	0.0	-
12.15 p.m.	-	-	0.0	-
12.20 p.m.	-	-	0.0	-
12.25 p.m.	-	-	0.01	-
12.30 p.m.	-	-	0.0	-
12.35 p.m.	-	-	0.0	-
12.40 p.m.	-	-	0.0	-
12.45 p.m.	-	-	0.0	-
12.50 p.m.	-	-	0.0	-
12.55 p.m.	-	-	0.0	-

				<b>L4</b> <b>Max. peak value in</b> <b>Velocity mode (mm/s)</b>
2.30 p.m. 31 <sup>st</sup> May	-	-	-	0.0
2.35 p.m.	-	-	-	0.0
2.40 p.m.	-	-	-	0.0
2.45 p.m.	-	-	-	0.0
2.50 p.m.	-	-	-	0.0
2.55 p.m.	-	-	-	0.0
3.00 p.m.	-	-	-	0.0
3.05 p.m.	-	-	-	0.0
3.10 p.m.	-	-	-	0.0
3.15 p.m.	-	-	-	0.0
3.20 p.m.	-	-	-	0.0
3.25 p.m.	-	-	-	0.0
3.30 p.m.	-	-	-	0.0

### MAXIMUM PERMISSIBLE VALUES-

The interim standard for vibration levels of the operation of machinery, construction activities stipulated by the Central Environmental Authority of Sri Lanka for different type of structures summaries below:

Structure type	Type of vibration	Frequency of Vibration (Hz)	Vibration in ppv (mm/sec)
Type 1 structures- Multi storey buildings of reinforced concrete or structural steel, with filling panels of block work, brick work or precast units not designed to resist earth quakes	Continuous	0-10	5.0
		10-50	7.5
		Over 50	15.0
	Intermittent	0-10	10.0
		10-50	15.0
		Over 50	30.0
Type 2 structures- Two storey domestic houses and buildings constructed of made of reinforced block work, precast units, and reinforced floor & roof construction, or wholly of reinforced concepts or similar, not designed to resist earthquakes	Continuous	0-10	2.0
		10-50	4.0
		Over 50	8.0
	Intermittent	0-10	4.0
		10-50	8.0
		Over 50	16.0



Structure type	Type of vibration	Frequency of Vibration (Hz)	Vibration in ppv (mm/sec)
<b>Type 3 structures- Single and two storey houses and buildings made of lighter construction, using lightweight materials such as bricks, cement blocks etc, not designed to resist earthquakes</b>	Continuous	0-10	1.0
		10-50	2.0
		<b>Over 50</b>	<b>4.0</b>
	Intermittent	0-10	2.0
		10-50	4.0
		Over 50	8.0
Type 4 structures- Structures that, because of their sensitivity to vibration, do not correspond to those listed above 1,2 & 3, & declared as archeologically preserved structures by the Department of Archaeology	Continuous	0-10	0.25
		10-50	0.5
		Over 50	1.0
	Intermittent	0-10	0.5
		10-50	1.0
		Over 50	2.0

#### 4. Ambient Air Quality

Parameters	L1 4.33 p.m. on 27 <sup>th</sup> – 1.30 p.m. on 28 <sup>th</sup>	L2 5.12 p.m. on 27 <sup>th</sup> – 5.15 p.m. on 28 <sup>th</sup>	L3 6.05 p.m. on 28 <sup>th</sup> – 1.30 p.m. on 29 <sup>th</sup>	L4 2.26 p.m. on 28 <sup>th</sup> – 2.30 p.m. on 29 <sup>th</sup>	L5 3.10 p.m. on 29 <sup>th</sup> – 7.00 a.m. on 30 <sup>th</sup>	L6 4.40 p.m. on 29 <sup>th</sup> – 12 p.m. on 30 <sup>th</sup>
PM <sub>10</sub>	0.030	0.018	0.027	0.039	0.038	0.039
PM <sub>2.5</sub>	0.016	0.015	0.022	0.017	0.033	0.017
SO <sub>2</sub>	*	*	*	*	*	*
NO <sub>x</sub>	*	*	*	*	*	*
O <sub>3</sub>	*	*	*	*	*	*
CO	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

\*No elements were detected within a reporting limit (Reporting limit for NO<sub>2</sub>, SO<sub>2</sub> and O<sub>3</sub> are 0.004 mg/m<sup>3</sup>, 0.025 mg/m<sup>3</sup> and 0.020 mg/m<sup>3</sup> respectively)



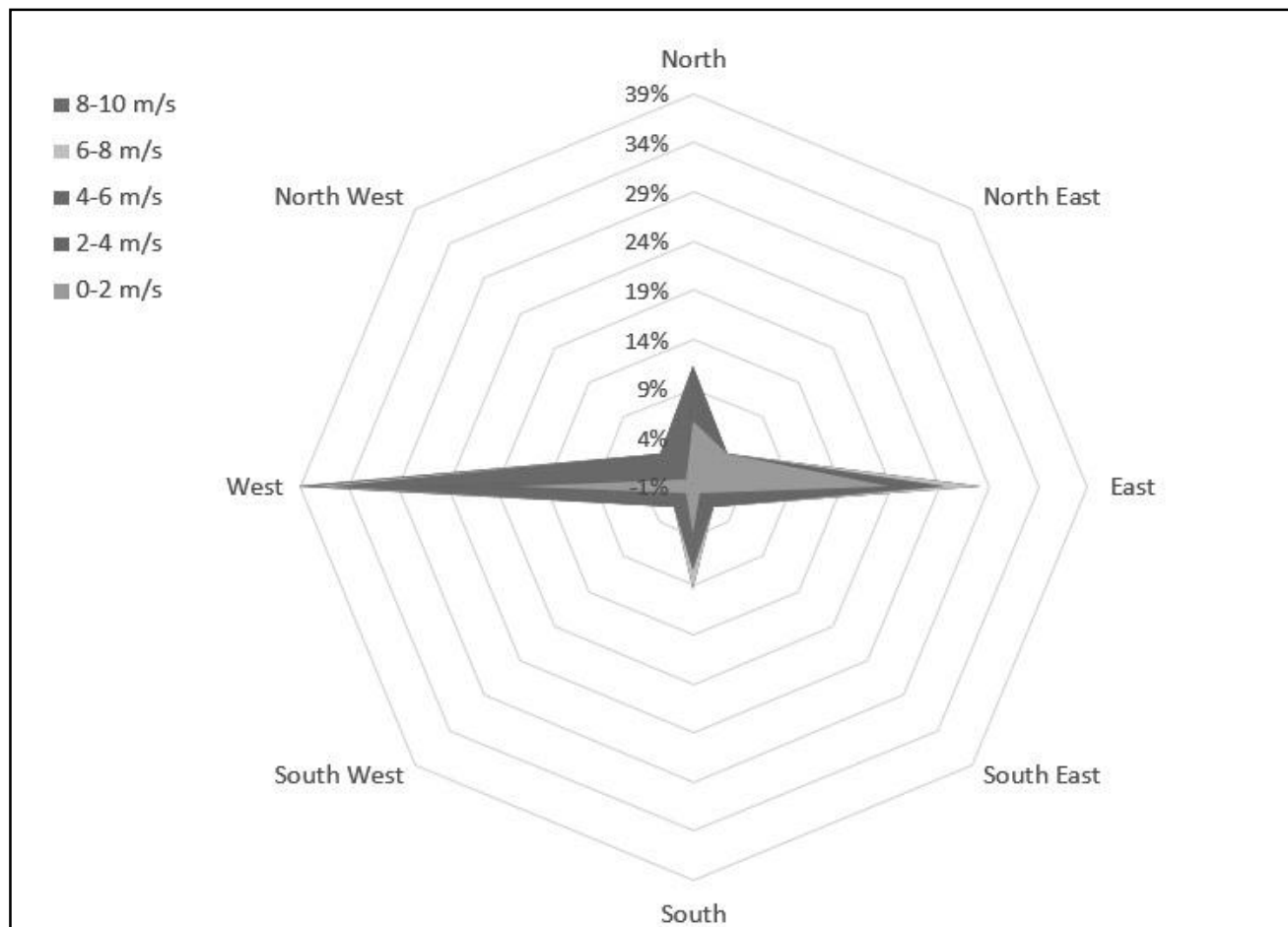
**APPLICABLE CEA REGULATIONS:**

<b>Parameter</b>	<b>Averaging Time</b>	<b>Maximum Permissible Level<sup>1</sup> (mg/m<sup>3</sup>)</b>
Nitrogen Dioxide (NO <sub>2</sub> )	24 hrs	0.10
Sulphur Dioxide (SO <sub>2</sub> )	24 hrs	0.08
Ozone (O <sub>3</sub> )	1 hr	0.20
Carbon Monoxide (CO)	8 hrs	10
Particulate Matter (PM <sub>10</sub> )	24 hrs	0.100
Particulate Matter (PM <sub>2.5</sub> )	24 hrs	0.050

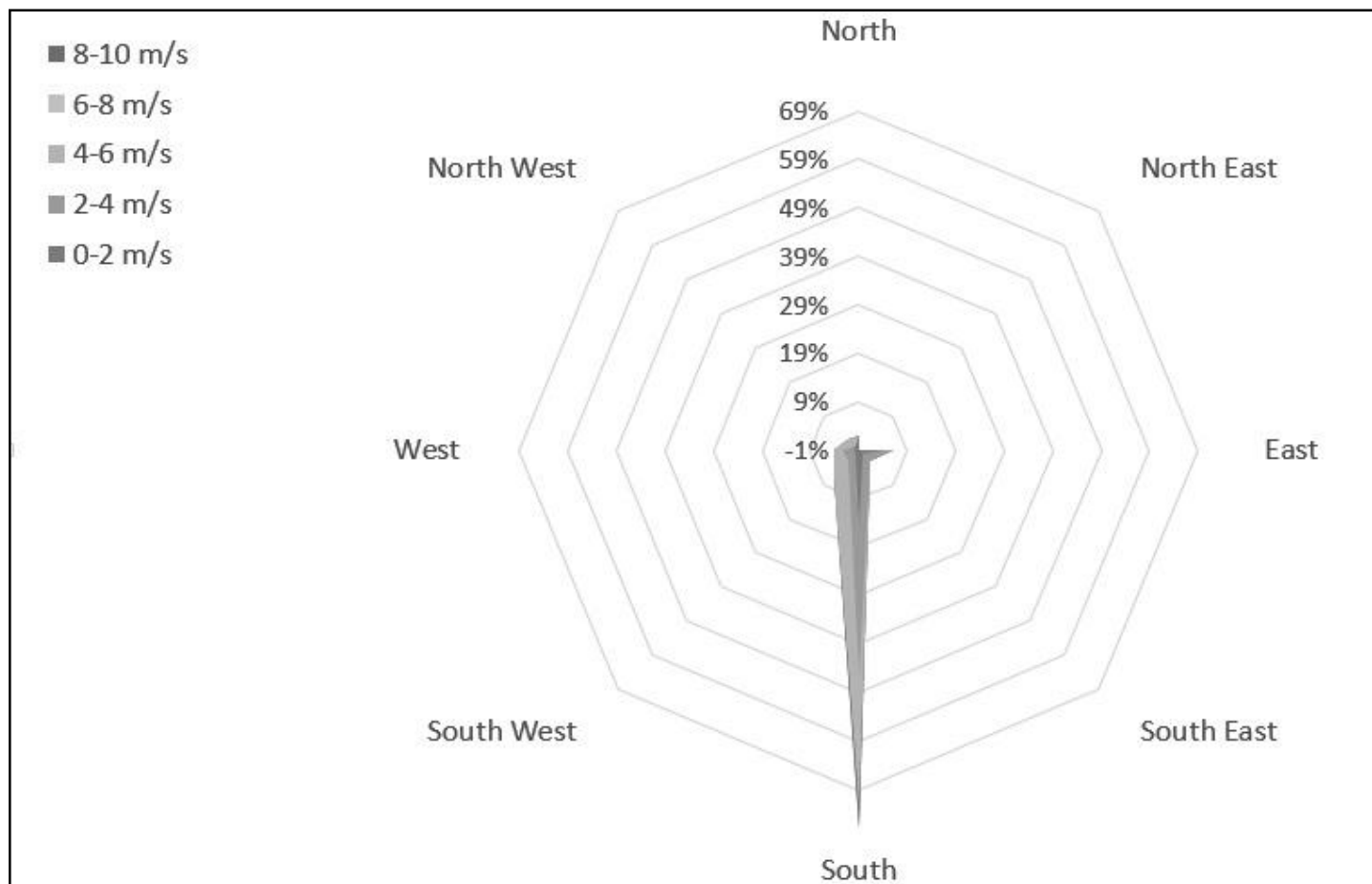
<sup>1</sup>As given in Ambient Air Quality Standards stipulated under Extraordinary Gazette No.1562/22, 15<sup>th</sup> August 2008.

## 5. Wind rose

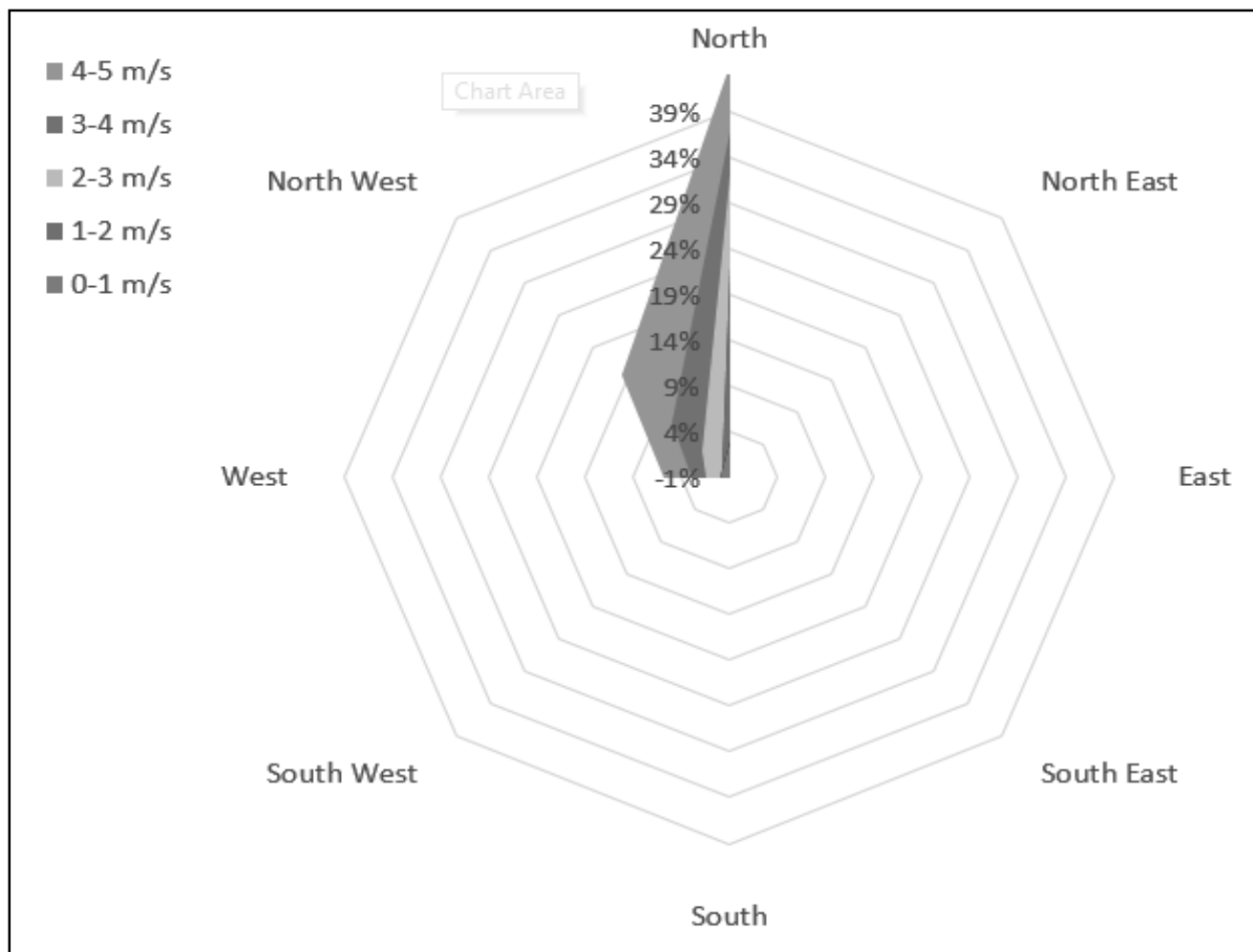
### Point 1:



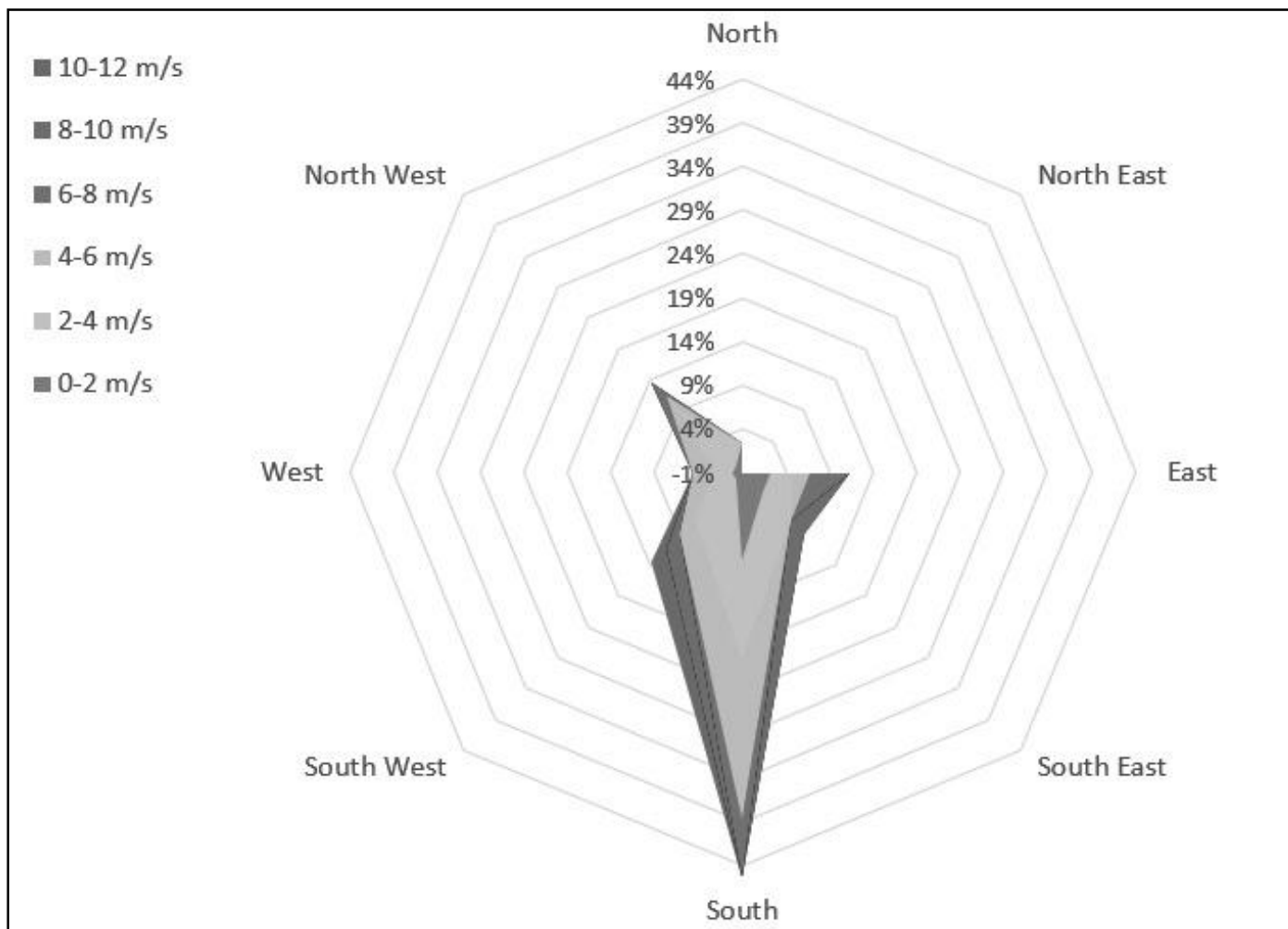
## Point 2:



## Point 3:



## Point 4:





#### 4. Results and Discussion:

##### (1) Noise – Location 1

Measurement Location		Assessment time period - Day			Assessment time period - Evening			Assessment time period - Night		
L #	GPS	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB
L1	N 07.75145 E 80.56863	57	39	57	54	35	54	53	34	53

Since the location is situated within Pradeshiya Sabha, the Low noise limits are applicable.

##### **Remarks –**

Day and Night time noise was above the permissible limit. It was noticed that residential noises contributed to noise level in the day time.

Environmental noise such as insects' noise contributed to noise level in the night time.





**Ambient Air Quality – Location 1**

<b>Parameters</b>	<b>Results L1</b>	<b>Remarks</b>
	<b>4.33 p.m. on 27<sup>th</sup> – 1.30 p.m. on 28<sup>th</sup></b>	
<b>PM<sub>10</sub></b>	0.030	Below Maximum permissible limit stipulated by CEA
<b>PM<sub>2.5</sub></b>	0.016	Below Maximum permissible limit stipulated by CEA
<b>SO<sub>2</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>NO<sub>x</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>O<sub>3</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>CO</b>	<0.5	Below Maximum permissible limit stipulated by CEA



**(2) Noise – Location 2**

Measurement Location		Assessment time period - Day			Assessment time period - Evening			Assessment time period - Night		
L #	GPS	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB
<b>L2</b>	N 07.75039 E 80.56904	47	32	47	53	35	53	49	33	49

Since the location is situated within Pradeshiya Sabha, the Low noise limits are applicable.

**Remarks** – Night time noise was above the permissible limit. It was noticed that environmental noise such as insects' noise contributed to noise level



**Ambient Air Quality – Location 2**

<b>Parameters</b>	<b>Results L2</b>	<b>Remarks</b>
	<b>5.12 p.m. on 27<sup>th</sup> – 5.15 p.m. on 28<sup>th</sup></b>	
<b>PM<sub>10</sub></b>	0.018	Below Maximum permissible limit stipulated by CEA
<b>PM<sub>2.5</sub></b>	0.015	Below Maximum permissible limit stipulated by CEA
<b>SO<sub>2</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>NO<sub>x</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>O<sub>3</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>CO</b>	<0.5	Below Maximum permissible limit stipulated by CEA



### (3) Noise – Location 3

Measurement Location		Assessment time period - Day			Assessment time period - Evening			Assessment time period - Night		
L #	GPS	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB
<b>L3</b>	N 07.75041 E 80.56885	50	34	50	53	34	53	50	32	50

Since the location is situated within Pradeshiya Sabha, the Low noise limits are applicable.

**Remarks** – Night time noise was above the permissible limit. It was noticed that environmental noise such as insects’ noise contributed to noise level



**Ambient Air Quality - Location 3**

<b>Parameters</b>	<b>Results L3</b>	<b>Remarks</b>
	<b>6.05 p.m. on 28<sup>th</sup> – 1.30 p.m. on 29<sup>th</sup></b>	
<b>PM<sub>10</sub></b>	0.027	Below Maximum permissible limit stipulated by CEA
<b>PM<sub>2.5</sub></b>	0.022	Below Maximum permissible limit stipulated by CEA
<b>SO<sub>2</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>NO<sub>x</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>O<sub>3</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>CO</b>	<0.5	Below Maximum permissible limit stipulated by CEA



**(4) Noise – Location 4**

Measurement Location		Assessment time period - Day			Assessment time period - Evening			Assessment time period - Night		
L #	GPS	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB	MNL dB	RNL dB	CNL dB
<b>L4</b>	N 07.81183 E 80.50439	52	50	**	54	50	52	50	50	**

Since the location is situated within Pradeshiya Sabha, the Low noise limits are applicable.

**Remarks** – Night time noise was above the permissible limit. It was noticed that environmental noise such as insects' noise contributed to noise level.



**Ambient Air Quality – Location 4**

<b>Parameters</b>	<b>Results L4</b> <b>2.26 p.m. on 28<sup>th</sup> – 2.30 p.m. on 29<sup>th</sup></b>	<b>Remarks</b>
<b>PM<sub>10</sub></b>	0.039	Below Maximum permissible limit stipulated by CEA
<b>PM<sub>2.5</sub></b>	0.017	Below Maximum permissible limit stipulated by CEA
<b>SO<sub>2</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>NO<sub>x</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>O<sub>3</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>CO</b>	<0.5	Below Maximum permissible limit stipulated by CEA



**(5) Ambient Air Quality – Location 5**

<b>Parameters</b>	<b>Results L5</b>	<b>Remarks</b>
	<b>3.10 p.m. on 29<sup>th</sup> – 7.00 a.m. on 30<sup>th</sup></b>	
<b>PM<sub>10</sub></b>	0.038	Below Maximum permissible limit stipulated by CEA
<b>PM<sub>2.5</sub></b>	0.033	Below Maximum permissible limit stipulated by CEA
<b>SO<sub>2</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>NO<sub>x</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>O<sub>3</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>CO</b>	<0.5	Below Maximum permissible limit stipulated by CEA





**(6) Ambient Air Quality – Location 6**

<b>Parameters</b>	<b>Results L6</b> <b>4.40 p.m. on 29<sup>th</sup> – 12 p.m. on 30<sup>th</sup></b>	<b>Remarks</b>
<b>PM<sub>10</sub></b>	0.039	Below Maximum permissible limit stipulated by CEA
<b>PM<sub>2.5</sub></b>	0.017	Below Maximum permissible limit stipulated by CEA
<b>SO<sub>2</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>NO<sub>x</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>O<sub>3</sub></b>	*	Below Maximum permissible limit stipulated by CEA
<b>CO</b>	<0.5	Below Maximum permissible limit stipulated by CEA