Quarterly Environmental Quality Monitoring Report for the Landslide Disaster Protection Project National Road Network Package -1

(JICA Format)

Report No-09 (December 2019)

(NOISE LEVEL MONITORING)

Mitigation Measures

Noise

1. Construction Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	66.1	72	50/75	55	Diyagala	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		47.7	48	40/50	45	Diyagala			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	67.6	70	50/75	55	Nawalapitiya	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		47.1	52	40/50	45	Nawalapitiya			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	69.0	71	50/75	55	Kothmalegama-1	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		46.2	48	40/50	45	Kothmalegama-1			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	62.1	66	50/75	55	Kothmalegama-2	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		43.6	48	40/50	45	Kothmalegama-2			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	68.3	71	50/75	55	Ramboda	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		44.6	51	40/50	45	Ramboda			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	64.1	67	50/75	55	Toppass	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		47.3	52	40/50	45	Toppass			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	68.1	71	50/75	55	Keppetipola	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		45.6	47	40/50	45	Keppetipola			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National standards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	68.2	70	50/75	55	Ginigathhena	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		63.7	65	40/50	45	Ginigathhena			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National stadards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	59.2	64	50/75	55	Pitawala	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		45.2	47	40/50	45	Pitawala			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Mitigation Measures

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value (Mean)	Measured Value (Max)	National stadards (Max) *1	World Bank Guidelines * 2	Remarks			
							Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dB(A)	61.5	63	50/75	55	Theligama	Construction Stage : 4 times / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	Night time (22:00 - 7:00)		46.2	48	40/50	45	Theligama			

*1 : National Environmental (Protection & Quality) Regulations, CEA (2008)

*2 : Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3dBA at the nearest off - site receptor

Quarterly Environmental Quality Monitoring Report for the Landslide Disaster Protection Project National Road Network Package -1 (JICA Format) Report No-09 (December 2019)

(AIR QUALITY MONITORING)

Mitigation Measures

Air Quality (Ambient Air Quality)

Construction Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		22	25	200	-	Diyagala			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hour		16.9	19	250	200	Diyagala			
	1year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hour		3113	3219	30000	30000	Diyagala			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hour		5.3	6	200	-	Diyagala			
Lead compounds	24 hours	$\mu g/m^3$	0.2	0.2	2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$				20				
	3 hours		23.5	29.0						
SPM	1 hour	$\mu g/m^3$			500	-				
	3 hours		141.1	150.4	450	-	Diyagala			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Operation Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		13.8	14.5	200	-	Nawalapitiya			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hour		14.2	16.1	250	200	Nawalapitiya			
	1year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hour		1391	1456	30000	30000	Nawalapitiya			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hour		5	6	200	-	Nawalapitiya			
Lead compounds	24 hours	$\mu g/m^3$		<0.1	2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$				20				
	3 hours		38.9	38			Nawalapitiya			
SPM	1 hour	$\mu g/m^3$			500	-				
	3 hours		130.7	138.5	450	-	Nawalapitiya			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Operation Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		18.2	20.1	200	-	Kothmalegama-1			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hour		17.1	21	250	200	Kothmalegama-1			
	1year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hour		1224	1243	30000	30000	Kothmalegama-1			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hour		5.3	5.6	200	-	Kothmalegama-1			
Lead compounds	24 hours	$\mu g/m^3$	0.1	0.1	2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$				20				
	3 hours		34.1	36.4			Kothmalegama-1			
SPM	1 hour	$\mu g/m^3$			500	-				
	3 hours		127.3	146.4	450	-	Kothmalegama-1			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Operation Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	µg/m³			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		12.7	13.9	200	-	Kothmalegama-2			
NO_2	24 hours	µg/m³			100	-				
	8 hours				150	-				
	1 hour		16.7	17.8	250	200	Kothmalegama-2			
	1year				-	40				
CO	8 hours	µg/m³			10000	10000				
	1 hour		1529	1582	30000	30000	Kothmalegama-2			
O_3	8 hours	µg/m³			-	100				
	1 hour		4	5	200	-	Kothmalegama-2			
Lead compounds	24 hours	µg/m³	0.1	0.1	2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	µg/m³				20				
	3 hours		29.9	35.4						
SPM	1 hour	µg/m³			500	-				
	3 hours		111.4	122.3	450	-	Kothmalegama-2			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Operation Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		15.3	17.1	200	-	Ramboda			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hour		13	16	250	200	Ramboda			
	1year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hour		1144	1185	30000	30000	Ramboda			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hour		4.2	5.5	200	-	Ramboda			
Lead compounds	24 hours	$\mu g/m^3$	0.1	0.1	2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$				20				
	3 hours		26.9	28.1			Ramboda			
SPM	1 hour	$\mu g/m^3$			500	-				
	3 hours		107.1	117.2	450	-	Ramboda			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Operation Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		15	17	200	-	Toppass			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hour		17.8	21.1	250	200	Toppass			
	1year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hour		1122	1186	30000	30000	Toppass			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hour		6.2	7.1	200	-	Toppass			
Lead compounds	24 hours	$\mu g/m^3$		<0.1	2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$				20				
	3 hours		22.4	27.1						
SPM	1 hour	$\mu g/m^3$			500	-				
	3 hours		117.1	125.1	450	-	Toppass			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Operation Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		16.3	18.2	200	-	Keppetipola			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hour		15.8	17	250	200	Keppetipola			
	1year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hour		2564	2611	30000	30000	Keppetipola			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hour		5	5	200	-	Keppetipola			
Lead compounds	24 hours	$\mu g/m^3$		<0.1	2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$				20				
	3 hours		24.2	27.1			Keppetipola			
SPM	1 hour	$\mu g/m^3$			500	-				
	3 hours		152	159	450	-	Keppetipola			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air Quality (Ambient Air Quality)

Operation Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		24.3	26	200	-	Ginigathhena			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hour		18.1	21	250	200	Ginigathhena			
	1year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hour		1637	1653	30000	30000	Ginigathhena			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hour		5.1	6	200	-	Ginigathhena			
Lead compounds	24 hours	$\mu g/m^3$	0.2	0.2	2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$				20				
	3 hours		33.1	42			Ginigathhena			
SPM	1 hour	$\mu g/m^3$			500	-				
	3 hours		162	179	450	-	Ginigathhena			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

Air quality (Ambient Air Quality)

1. Operation Stage

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		17.5	20	200	-	Pitawala			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hour		21.4	22	250	200	Pitawala			
	1year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hour		2221	2243	30000	30000	Pitawala			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hour		5	5	200	-	Pitawala			
Lead compounds	24 hours	$\mu g/m^3$	0.1	0.1	2	-				
	1 year				0.5	0.5				
POM_{10}	24 hours	$\mu g/m^3$				20				
	1 year					50				
SPM	1 hour	$\mu g/m^3$			500	-				
	3 hours		146.4	153.1	450	-	Pitawala			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures

1. Operation Stage

*1: National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

Item	Averaging Time	Unit	Measured value (mean)	Measured value (max)*1	National standards	WHO Guidelines*2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	µg/m³			80	20		Design Stage 1 time as a baseline data Construction Stage: 4 time / year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		34.2	36	200	-	Theligama			
NO_2	24 hours	µg/m³			100	-				
	8 hours				150	-				
	1 hour		27.5	29	250	200	Theligama			
	1year				-	40				
CO	8 hours	µg/m³			10000	10000				
	1 hour		2132	2161	30000	30000	Theligama			
O_3	8 hours	µg/m³			-	100				
	1 hour		6.3	7.1	200	-	Theligama			
Lead compounds	24 hours	µg/m³		<0.1	2	-				
	1 year				0.5	0.5				
POM_{10}	24 hours	µg/m³				20				
	3 hour		29.7	32.1		50				
SPM	1 hour	µg/m³			500	-				
	3 hours		154.1	167.5	450	-	Theligama			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*2: WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Quarterly Environmental Quality Monitoring Report for the Landslide Disaster Protection Project National Road Network Package -1 (JICA Format) Report No-09 (December 2019)

(VIBRATION LEVEL MONITORING)

Mitigation Measures

Vibration

1. Construction Stage

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.56	0.60	4.0		Diyagala			

Mitigation Measures

Vibration

1. Operation Stage

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.54	0.57	4.0		Nawalapitiya			

Vibration

1. Operation Stage

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.60	0.64	4.0		Kothmalegama-1			

Mitigation Measures

Vibration

1. Operation Stage

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.56	0.58	4.0		Kothmalegama-2			

Vibration

1. Operation Stage

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.57	0.63	4.0		Ramboda			

Mitigation Measures

Vibration

1. Operation Stage

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.62	0.64	4.0		Toppass			

Vibration

1. Operation Stage

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.57	0.59	4.0		Keppetipola			

Mitigation Measures

Vibration

1. Operation Stage

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0			Every 6 months during the construction stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.53	0.59	4.0		Ginigathhena			

Mitigation Measures

Vibration

1. Opeartion Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Pitawala	Every 6 months during the stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.51	0.54	4.0					

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".

* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Mitigation Measures

Vibration

1. Operation Stage

Item	Unit	Frequency Band	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max.)	International Guidelines	Remarks			
							Location*2	Frequency	implementation	Supervision
Vibration	mm/sec	0-10 Hz			1.0		Theligama	Every 6 months during the stage, and on complain at the construction site	Constructor through approved monitoring agency	RDA/ESD
		10-50 Hz			2.0					
		Over 50 Hz	0.44	0.53	4.0					

* 1 : National Environmental (Protection & Quality) Regulations, CEA (2008), Category of the structure - "Type C" , Type of Vibration - "Intermittent".
* 2 : The distance from the source (radious / width of corridor) shall be decided by the constructor and RDA.

Quarterly Environmental Quality Monitoring Report for the Landslide Disaster Protection Project National Road Network Package -1 (JICA Format) Report No-09 (December 2019)

(WATER QUALITY MONITORING)

Mitigation Measures

Water Quality (Effluent/Wastewater)

Operation Stage

Site Location: Nawalapitiya (A113-015)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.037	0.048	-	-	Nawalapitiya (A113-015)	Design Stage: 1 time as a baseline data Construction stage : 4 times/year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH	-	7.2	7.4	6.0-8.5	6-9 *2				
DO	(mg/L)	12.15	13.2	-	-				
Turbidity	(mg/L)	0.11	0.14		<0.2 *3				
TSS	(mg/L)	7.4	9	50	50 *2				
BOD_5	(mg/L)	0.52	0.61	30	30 *2				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	0.24	0.39	10	10 *2				
Coliform	MPN/100mL	32	36	40	400 *2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – "All nondrinking water uses"

Mitigation Measures

Water Quality (Effluent/Wastewater)

Operation Stage

Site Location: Ginigathhena (A007-054)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.117	0.127	-	-	Ginigathhena (A007-054)	Design Stage: 1 time as a baseline data. Construction stage : 4 times/year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH	-	7.0	7.2	6.0-8.5	6-9 *2				
DO	(mg/L)	3.1	3.4	-	-				
Turbidity	(mg/L)	0.12	0.13		<0.2*3				
TSS	(mg/L)	0.47	0.57	50	50*2				
BOD_5	(mg/L)	1.51	1.72	30	30*2				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	0.3	0.6	10	10*2				
Coliform	MPN/100mL	31	35	40	400*2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – "All nondrinking water uses"

Mitigation Measures

Water Quality (Effluent/Wastewater)

1). Operation Stage

Site location: Theligama (A007-031)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.041	0.051	-	-	Theligama (A007-031)	Design Stage: 1 time as a baseline data Construction stage : 4 times/year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH	-	6.7	7.0	6.0-8.5	6-9 *2				
DO	(mg/L)	2.6	3.3	-	-				
Turbidity	(mg/L)	0.14	0.17		<0.2 *3				
TSS	(mg/L)	3.6	4.9	50	50 *2				
BOD_5	(mg/L)	0.41	0.52	30	30 *2				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01				
Oil & grease	(mg/L)	0.4	0.7	10	10 *2				
Coliform	MPN/100mL	31	34	40	400 *2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

Mitigation Measures

Water Quality (Effluent/Wastewater)

1). Operation Stage

Site location: Pitawala (A007-045)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	National Standards (Max) *1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	(S/m)	0.13	0.15	-	-	Pitawala (A007-045)	Design Stage: 1 time as a baseline data. Construction stage : 4 times/year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH	-	6.5	7.1	6.0-8.5	6-9 *2				
DO	(mg/L)	2.6	4.0	-	-				
Turbidity	(mg/L)	0.15	0.17		<0.2*3				
TSS	(mg/L)	1.32	1.54	50	50*2				
BOD_5	(mg/L)	2.2	2.7	30	30*2				
Lead	(mg/L)	Not Detected	Not Detecetd	0.1	0.01				
Oil & grease	(mg/L)	0.6	0.9	10	10*2				
Coliform	MPN/100mL	33	35	40	400*2				

*1: National Environmental (Protection & Quality) Regulations, CEA (2008)

*2: IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

*3: ADB Guidelines & Standards in Relation to Wastewater Reuse (2011), Main usage – "All nondrinking water uses"

Quarterly Environmental Quality Monitoring Report for the Landslide Disaster Protection Project of the National Road Network

Package 2- (R-1) JICA Format

Report No-10 (December 2019)

Mitigation Measures
Air Quality (Ambient Air Quality)
1). Design and Construction Stage

Item	Averaging Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (max)*1	WHO Guidelines *2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	µg/m³			80	20		Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		15	16	200	-	Walhaputenna-03			
NO_2	24 hours	µg/m³			100	-				
	8 hours				150	-				
	1 hour		10.3	12	250	200	Walhaputenna-03			
	1 year				-	40				
CO	8 hours	µg/m³			10000	10000				
	1 hour		3283.3	3450	30000	30000	Walhaputenna-03			
O_3	8 hours	µg/m³			-	100				
	1 hours		4	5	200	-	Walhaputenna-03			
Lead Compounds	24 hours	µg/m³			2	-	Walhaputenna-03			
	1 year				0.5	0.5				
PM_{10}	24 hours	µg/m³	33.8	35.2	100	20	Walhaputenna-03			
	1 year				50	50				
SPM	1 hour	µg/m³			500	-				
	3 hours		144.53	148.2	450	-	Walhaputenna-03			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)
*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures
Air Quality (Ambient Air Quality)
1). Design and Construction Stage

Item	Averaging Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (max)*1	WHO Guidelines *2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	µg/m³			80	20		Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		16	17	200	-	Ambepussa			
NO_2	24 hours	µg/m³			100	-				
	8 hours				150	-				
	1 hour		17	18	250	200	Ambepussa			
	1 year				-	40				
CO	8 hours	µg/m³			10000	10000				
	1 hour		3388	3483	30000	30000	Ambepussa			
O_3	8 hours	µg/m³			-	100				
	1 hours		3	5	200	-	Ambepussa			
Lead Compounds	24 hours	µg/m³			2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	µg/m³	39.2	43.2	100	20	Ambepussa			
	1 year				50	50				
SPM	1 hour	µg/m³			500	-				
	3 hours		318.5	345.2	450	-	Ambepussa			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)
*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures
Air Quality (Ambient Air Quality)
1). Design and Construction Stage

Item	Averaging Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (max)*1	WHO Guidelines *2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	µg/m³			80	20		Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		10	11	200	-	Haputhale			
NO_2	24 hours	µg/m³			100	-				
	8 hours				150	-				
	1 hour		14	17	250	200	Haputhale			
	1 year				-	40				
CO	8 hours	µg/m³			10000	10000				
	1 hour		3216.6	3450	30000	30000	Haputhale			
O_3	8 hours	µg/m³			-	100				
	1 hours		3	3	200	-	Haputhale			
Lead Compounds	24 hours	µg/m³			2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	µg/m³	34.8	36.2	100	20	Haputhale			
	1 year				50	50				
SPM	1 hour	µg/m³			500	-				
	3 hours		173.86	1762	450	-	Haputhale			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)
*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures
Air Quality (Ambient Air Quality)
1). Design and Construction Stage

Item	Averaging Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (max)*1	WHO Guidelines *2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	µg/m³			80	20		Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		11	12	200	-	Bandarawela			
NO_2	24 hours	µg/m³			100	-				
	8 hours				150	-				
	1 hour		15	17	250	200	Bandarawela			
	1 year				-	40				
CO	8 hours	µg/m³			10000	10000				
	1 hour		2553	2606	30000	30000	Bandarawela			
O_3	8 hours	µg/m³			-	100				
	1 hours		3	4	200	-	Bandarawela			
Lead Compounds	24 hours	µg/m³			2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	µg/m³	35.2	36.2	100	20	Bandarawela			
	1 year				50	50				
SPM	1 hour	µg/m³			500	-				
	3 hours		149.7	160.2	450	-	Bandarawela			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)
*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures
Air Quality (Ambient Air Quality)
1). Design and Construction Stage

Item	Averaging Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (max)*1	WHO Guidelines *2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	µg/m³			80	20		Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		10	11	200	-	Ella			
NO_2	24 hours	µg/m³			100	-				
	8 hours				150	-				
	1 hour		15	16	250	200	Ella			
	1 year				-	40				
CO	8 hours	µg/m³			10000	10000				
	1 hour		2540	2623	30000	30000	Ella			
O_3	8 hours	µg/m³			-	100				
	1 hours		3	4	200	-	Ella			
Lead Compounds	24 hours	µg/m³			2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	µg/m³	36.5	38.2	100	20	Ella			
	1 year				50	50				
SPM	1 hour	µg/m³			500	-				
	3 hours		150.2	155.2	450	-	Ella			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)
*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures
Air Quality (Ambient Air Quality)
1). Design and Construction Stage

Item	Averaging Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (max)*1	WHO Guidelines *2	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	µg/m³			80	20		Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hour		14.3	16	200	-	Uduwara			
NO_2	24 hours	µg/m³			100	-				
	8 hours				150	-				
	1 hour		11	12	250	200	Uduwara			
	1 year				-	40				
CO	8 hours	µg/m³			10000	10000				
	1 hour		2483.3	2613	30000	30000	Uduwara			
O_3	8 hours	µg/m³			-	100				
	1 hours		3	4	200	-	Uduwara			
Lead Compounds	24 hours	µg/m³			2	-				
	1 year				0.5	0.5				
PM_{10}	24 hours	µg/m³	34.3	35.6	100	20	Uduwara			
	1 year				50	50				
SPM	1 hour	µg/m³			500	-				
	3 hours		161.86	170.2	450	-	Uduwara			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)
*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures
Air Quality (Ambient Air Quality)
2). Operation Stage

Item	Average Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (Max.) *1	WHO Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		2 time/year for 2 years	RDA through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hours		11	12	200	-	Walhaputhenna 1&2			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hours		8.6	10	250	200	Walhaputhenna 1&2			
	1 year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hours		2410	2531.6	30000	30000	Walhaputhenna 1&2			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hours		3	4	200		Walhaputhenna 1&2			
Lead Compounds	24 hours	$\mu g/m^3$			2					
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$	30.4	32.2	100	20	Walhaputhenna 1&2			
	1 year				50	50				
SPM	1 hours	$\mu g/m^3$			500	-				
	3 hours		139.86	144.2	450	-	Walhaputhenna 1&2			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)
*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

2). Operation Stage

Item	Average Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (Max.)*1	WHO Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		2 time/year for 2 years	RDA through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hours		15.6	23	200	-	Kahagalla			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hours		13	15	250	200	Kahagalla			
	1 year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hours		1813.3	1846.5	30000	30000	Kahagalla			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hours		3	4	200		Kahagalla			
Lead Compounds	24 hours	$\mu g/m^3$			2					
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$	32.93	36.2	100	20	Kahagalla			
	1 year				50	50				
SPM	1 hours	$\mu g/m^3$			500	-				
	3 hours		133.8	136.2	450	-	Kahagalla			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

2). Operation Stage

Item	Average Time	Unit	Measured Value (mean)	measured value (max)*1	National standards (Max.) *1	WHO Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
SO_2	24 hours	$\mu g/m^3$			80	20		2 time/year for 2 years	RDA through approved monitoring agency	RDA/ESD
	8 hours				120	-				
	1 hours		12	12	200	-	2nd mile post			
NO_2	24 hours	$\mu g/m^3$			100	-				
	8 hours				150	-				
	1 hours		14.6	16	250	200	2nd mile post			
	1 year				-	40				
CO	8 hours	$\mu g/m^3$			10000	10000				
	1 hours		1606.66	1660	30000	30000	2nd mile post			
O_3	8 hours	$\mu g/m^3$			-	100				
	1 hours		3	5	200		2nd mile post			
Lead Compounds	24 hours	$\mu g/m^3$			2					
	1 year				0.5	0.5				
PM_{10}	24 hours	$\mu g/m^3$	36.46	37.2	100	20	2nd mile post			
	1 year				50	50				
SPM	1 hours	$\mu g/m^3$			500	-				
	3 hours		222.53	225.2	450	-	2nd mile post			
	8 hours				350	-				
	24 hours				300	-				
	1 year				100	-				

*1: national Ambient Air Quality (NAAQS) of Sri Lanka (2009)

*2: Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures
Water Quality (Effluent/Wastewater)
1). Design and Construction Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.0943	0.101	-	-	Walhaputenna-03	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH		6.73	6.8	6-8.5	6-9*[2]	Walhaputenna-03			
DO	mg/L	9.1	9.4	-	-	Walhaputenna-03			
Turbidity	mg/L	Not Detected	Not Detected	-	0.2*[3]	Walhaputenna-03			
TSS	mg/	Not Detected	Not Detected	50	50*[3]	Walhaputenna-03			
BOD_5	mg/L	1.06	1.23	30	30*[3]	Walhaputenna-03			
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*[2]	Walhaputenna-03			
Oil and grease	mg/L	Not Detected	Not Detected	10	10*[2]	Walhaputenna-03			
Coliform	MPN/100	Not Detected	Not Detected	40	400*[2]	Walhaputenna-03			
E-coli	MPN/100	Not Detected	Not Detected			Walhaputenna-03			

1). Design and Construction Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	international Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.113	00.119	-	-	Ambepussa	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH		7.03	7.1	6-8.5	6-9*[2]	Ambepussa			
DO	mg/L	9.9	10.4	-	-	Ambepussa			
Turbidity	mg/L	0.08	0.12	-	0.2*[3]	Ambepussa			
TSS	mg/L	10	13	50	50*[3]	Ambepussa			
BOD_5	mg/L	2.43	3	30	30*[3]	Ambepussa			
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*[2]	Ambepussa			
Oil and grease	mg/L	Not Detected	Not Detected	10	10*[2]	Ambepussa			
Coliform	MPN/100	47	120	40	400*[2]	Ambepussa			
E-coli	MPN/100	Not Detected	Not Detected			Ambepussa			

Mitigation Measures
Water Quality (Effluent/Wastewater)
1). Design and Construction Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.124	0.144	-	-	Haputhale	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH		6.6	6.7	6-8.5	6-9*[2]	Haputhale			
DO	mg/L	8.9	9.1	-	-	Haputhale			
Turbidity	mg/L	0.08	0.19	-	0.2*[3]	Haputhale			
TSS	mg/	9	17	50	50*[3]	Haputhale			
BOD_5	mg/L	0.1	0.13	30	30*[3]	Haputhale			
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*[2]	Haputhale			
Oil and grease	mg/L	Not Detected	Not Detected	10	10*[2]	Haputhale			
Coliform	MPN/100	7	08	40	400*[2]	Haputhale			
E-coli	MPN/100	Not Detected	Not Detected			Haputhale			

1). Design and Construction Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	international Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.122	0.134	-	-	Bandarawela	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH		6.76	6.8	6-8.5	6-9*[2]	Bandarawela			
DO	mg/L	10.06	10.6	-	-	Bandarawela			
Turbidity	mg/L	0.08	0.16	-	0.2*[3]	Bandarawela			
TSS	mg/L	11	33	50	50*[3]	Bandarawela			
BOD_5	mg/L	0.72	1.9	30	30*[3]	Bandarawela			
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*[2]	Bandarawela			
Oil and grease	mg/L	0.2	0.6	10	10*[2]	Bandarawela			
Coliform	MPN/100	4.33	13	40	400*[2]	Bandarawela			
E-coli	MPN/100	Not Detected	Not Detected			Bandarawela			

Mitigation Measures
Water Quality (Effluent/Wastewater)
1). Design and Construction Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.138	0.162	-	-	Ella	Design Stage 1 time as a baseline data Constuiction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH		6.7	6.9	6-8.5	6-9*[2]	Ella			
DO	mg/L	9.3	9.5	-	-	Ella			
Turbidity	mg/L	0.11	0.17	-	0.2*[3]	Ella			
TSS	mg/	17	51	50	50*[3]	Ella			
BOD_5	mg/L	0.803	1.21	30	30*[3]	Ella			
Lead	mg/L	0.0026	0.008	0.1	0.01*[2]	Ella			
Oil and grease	mg/L	Not Detected	Not Detected	10	10*[2]	Ella			
Coliform	MPN/100	3.3	08	40	400*[2]	Ella			
E-coli	MPN/100	Not Detected	Not Detected			Ella			

1). Design and Construction Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	international Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.047	0.052	-	-	Uduwara	Design Stage 1 time as a baseline data Construction stage: 4 time /year for 2 years	Constructer through approved monitoring agency	RDA/ESD
pH		7.06	7.1	6-8.5	6-9*[2]	Uduwara			
DO	mg/L	10.63	11.9	-	-	Uduwara			
Turbidity	mg/L	0.1	0.16	-	0.2*[3]	Uduwara			
TSS	mg/L	6	18	50	50*[3]	Uduwara			
BOD_5	mg/L	1.46	1.6	30	30*[3]	Uduwara			
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*[2]	Uduwara			
Oil and grease	mg/L	Not Detected	Not Detected	10	10*[2]	Uduwara			
Coliform	MPN/100	Not Detected	Not Detected	40	400*[2]	Uduwara			
E-coli	MPN/100	Not Detected	Not Detected			Uduwara			

Mitigation Measures
Water Quality (Effluent/Wastewater)

02). Operation Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	International Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.071	0.078	-	-	Walhaputhenna 1&2	2 times/year for 2 year	RDA though approved monitoring agency	RDA/ESD
pH		6.76	6.8	6-8.5	6-9*2	Walhaputhenna 1&2			
DO	mg/L	9.7	10.1	-	-	Walhaputhenna 1&2			
Turbidity	mg/L	Not Detected	Not Detected	-	0.2*3	Walhaputhenna 1&2			
TSS	mg/L	Not Detected	Not Detected	50	50*3	Walhaputhenna 1&2			
BOD_5	mg/L	0.58	1.3	30	30*3	Walhaputhenna 1&2			
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	Walhaputhenna 1&2			
Oil and grease	mg/L	Not Detected	Not Detected	10	10*2	Walhaputhenna 1&2			
Coliform	MPN/100	Not Detected	Not Detected	40	400*2	Walhaputhenna 1&2			
E-coli	MPN/100	Not Detected	Not Detected			Walhaputhenna 1&2			

02). Operation Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	international Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.118	0.131	-	-	Kahagalla	2 times/year for 2 year	RDA though approved monitoring agency	RDA/ESD
pH		6.73	6.8	6-8.5	6-9*2	Kahagalla			
DO	mg/L	9	9.4	-	-	Kahagalla			
Turbidity	mg/L	0.03	0.06	-	0.2*3	Kahagalla			
TSS	mg/L	0.33	1	50	50*3	Kahagalla			
BOD_5	mg/L	0.70	0.91	30	30*3	Kahagalla			
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	Kahagalla			
Oil and grease	mg/L	Not Detected	Not Detected	10	10*2	Kahagalla			
Coliform	MPN/100	2	2	40	400*2	Kahagalla			
E-coli	MPN/100	Not Detected	Not Detected			Kahagalla			

*1: National Environmental (protection and Quality) Regulation, CEA (2008)

*2:IFC EHS general guideline, for Sanitary Sewage Discharge (2007)
*3: ADB guideline and standards in relation to waste water Reuse (2011), Main usage- "All nondrinking water uses

02). Operation Stage

Item	Unit	measured value (mean)	measured value (max)*1	National Standards (max)*1	international Guidelines	Remarks			
						Location	Frequency	Implementation	Supervision
EC	S/m	0.30	0.564	-	-	2nd mile post	2 times/year for 2 year	RDA though approved monitoring agency	RDA/ESD
pH		6.76	6.8	6-8.5	6-9*2	2nd mile post			
DO	mg/L	9.8	10.2	-	-	2nd mile post			
Turbidity	mg/L	Not Detected	Not Detected	-	0.2*3	2nd mile post			
TSS	mg/L	0.33	01	50	50*3	2nd mile post			
BOD_5	mg/L	0.29	0.33	30	30*3	2nd mile post			
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	2nd mile post			
Oil and grease	mg/L	Not Detected	Not Detected	10	10*2	2nd mile post			
Coliform	MPN/100	2.6	6	40	400*2	2nd mile post			
E-coli	MPN/100	Not Detected	Not Detected			2nd mile post			

*1: National Environmental (protection and Quality) Regulation, CEA (2008)
*2:IFC EHS general guideline, for Sanitary Sewage Discharge (2007)
*3: ADB guideline and standards in relation to waste water Reuse (2011), Main usage- "All nondrinking water us

Mitigation Measures

Noise

1). Design and construction Stage

Item	One-hour Laeq	Unit	Measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00) Design/Construction	db(A)	70.6	83	50/75	55	Walhaputenna-03	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constriction through approved monitoring stage	RDA/ESD
	Night time (22.00-7.00) Design/Construction		No work	No work	40/50	45	Walhaputenna-03			

1). Design and construction Stage

Item	One-hour Laeq	Unit	measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00) Design/Construction	db(A)	70.6	85	50/75	55	Ambepussa	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constriction through approved monitoring stage	RDA/ESD
	Night time (22.00-7.00) Design/ Construction		No work	No work	40/50	45	Ambepussa			

*1: National Environmental (protection and Quality) Regulation, CEA (2008)

*2: Residential area IFC EHS general guideline, for general health and Safety (EHS) guideline (2007')

Mitigation Measures

Noise

1). Design and construction Stage

Item	One-hour Laeq	Unit	Measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00) Design/Construction	db(A)	70	88	50/75	55	Haputhale	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constriction through approved monitoring stage	RDA/ESD
	Night time (22.00-7.00) Design/Construction		No work	No work	40/50	45	Haputhale			

1). Design and construction Stage

Item	One-hour Laeq	Unit	measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00) Design/Construction	db(A)	70.66	85	50/75	55	Bandarawela	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constriction through approved monitoring stage	RDA/ESD
	Night time (22.00-7.00) Design/ Construction		No work	No work	40/50	45	Bandarawela			

*1: National Environmental (protection and Quality) Regulation, CEA (2008)

*2: Residential area IFC EHS general guideline, for general health and Safety (EHS) guideline (2007')

Mitigation Measures

Noise

1). Design and construction Stage

Item	One-hour Laeq	Unit	Measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00) Design/Construction	db(A)	70	82	50/75	55	Ella	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constriction through approved monitoring stage	RDA/ESD
	Night time (22.00-7.00) Design/Construction		No work	No work	40/50	45	Ella			

1). Design and construction Stage

Item	One-hour Laeq	Unit	measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00) Design/Construction	db(A)	67..3	85	50/75	55	Uduwara	Design Stage 1 time as a baseline data Constriction stage: 4 time /year for 2 years	Constriction through approved monitoring stage	RDA/ESD
	Night time (22.00-7.00) Design/ Construction		No work	No work	40/50	45	Uduwara			

*1: National Environmental (protection and Quality) Regulation, CEA (2008)

*2: Residential area IFC EHS general guideline, for general health and Safety (EHS) guideline (2007')

2). Operation Stage

Item	One-hour Laeq	Unit	Measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00)	db(A)	70.6	83	50/75	55	Walhaputhenna 1&2	2 times/year for 2 year	RDA though approved monitoring agency	RDA/ESD
	Night time (22.00-7.00)		No work	No work	40/50	45	Walhaputhenna 1&2			

2). Operation Stage

Item	One-hour Laeq	Unit	Measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00)	db(A)	70	88	50/75	55	Kahagalla	2 times/year for 2 year	RDA though approved monitoring agency	RDA/ESD
	Night time (22.00-7.00)		No work	No work	40/50	45	Kahagalla			

*1: National Environmental (protection and Quality) Regulation, CEA (2008)
*2: Residential area IFC EHS general guideline, for general health and Safety (EHS) guideline (2007)

2). Operation Stage

Item	One-hour Laeq	Unit	Measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks			
							Location	Frequency	Implementation	Supervision
Noise*1	Day time (7.00-22.00)	db(A)	70.6	83	50/75	55	2nd mile post	2 times/year for 2 year	RDA though approved monitoring agency	RDA/ESD
	Night time (22.00-7.00)		No work	No work	40/50	45	2nd mile post			

*1: National Environmental (protection and Quality) Regulation, CEA (2008)
*2: Residential area IFC EHS general guideline, for general health and Safety (EHS) guideline (2007)

Mitigation Measures

Vibration

1). Design Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10Hz			1			1 time with identification of noise barriers requirement location	Constructer through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.59	0.65	4		Bandarawela			

1). Design Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
Vibration	mm/sec	0-10Hz			1			1 time with identification of noise barriers requirement location	Constructer through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.55	0.72	4		Uduwara			

***1: National Environment (Protection and quality) Regulations, CES (2008), Category of the Structure: - "Type C" Type of Vibration- "intermittent"**

***2: The distance from the source (radius/width of corridor) shall be decided by the constructor and RDA**

Mitigation Measures

Vibration

2). Construction Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
vibration	mm/sec	0-10Hz			1			Every 6 months during stage, and on complain at the construction site	Constructer through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.75	0.86	4		Walhaputenna-03			

2). Construction Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
vibration	mm/sec	0-10Hz			1			Every 6 months during stage, and on complain at the construction site	Constructer through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.69	0.75	4		Ambepussa			

***1: National Environment (Protection and quality) Regulations, CES (2008), Category of the Structure: - "Type C" Type of Vibration- "intermittent"**

***2: The distance from the source (radius/width of corridor) shall be decided by the constructor and RDA**

Mitigation Measures

Vibration

2). Construction Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
vibration	mm/sec	0-10Hz			1			Every 6 months during stage, and on complain at the construction site	Constructer through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.62	0.71	4		Haputhale			

2). Construction Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
vibration	mm/sec	0-10Hz			1			Every 6 months during stage, and on complain at the construction site	Constructer through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.65	0.7	4		Ella			

***1: National Environment (Protection and quality) Regulations, CES (2008), Category of the Structure: - "Type C" Type of Vibration- "intermittent"**

***2: The distance from the source (radius/width of corridor) shall be decided by the constructor and RDA**

Mitigation Measures

Vibration

3). Operation Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
vibration	mm/sec	0-10Hz			1			Every 6 months during stage, and on complain at the construction site	RDA through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.70	0.79	4		Walhaputhenna 1&2			

3). Operation Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
vibration	mm/sec	0-10Hz			1			Every 6 months during stage, and on complain at the construction site	RDA through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.46	0.53	4		Kahagalla			

Mitigation Measures

Vibration

3). Operation Stage

Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Remarks			
							Location	Frequency	Implementation	Supervision
vibration	mm/sec	0-10Hz			1			Every 6 months during stage, and on complain at the construction site	RDA through approved monitoring agency	RDA/ESD
		10-50Hz			2					
		Over 50Hz	0.53	0.66	4		2nd mile post			

***1: National Environment (Protection and quality) Regulations, CES (2008), Category of the Structure: - "Type C" Type of Vibration- "intermittent"**

***2: The distance from the source (radius/width of corridor) shall be decided by the constructor and RDA**

Mitigation Measures

4.Groundwater Level

Item	Unit	Stage	Measured Value	Measured value (Max)	Remarks			
					Location	Frequency	Implementation	Supervision
Ground Water Level	m	Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage			Walhaputhenna 3	On Complain	DRA through approved monitoring agency	
		Operation Stage				2 times with an interval of 6 months for 3-year time		

Item	Unit	Stage	Measured Value	Measured value (Max)	Remarks			
					Location	Frequency	Implementation	Supervision
Ground Water Level	m	Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage			Ambepussa	On Complain		

							DRA through approved monitoring agency	
		Operation Stage				2 times with an interval of 6 months for 3 year time		
Item	**Unit**	**Stage**	**Measured Value**	**Measured value (Max)**	**Remarks**			
					Location	**Frequency**	**Implementation**	**Supervision**
Ground Water Level	m	Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage			Haputhale	On Complain		
		Operation Stage				2 times with an interval of 6 months for 3-year time	DRA through approved monitoring agency	

Item	**Unit**	**Stage**	**Measured Value**	**Measured value (Max)**	**Remarks**			
					Location	**Frequency**	**Implementation**	**Supervision**
Ground Water Level	m	Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage			Ella	On Complain		

		Operation Stage				2 times with an interval of 6 months for 3 year time	DRA through approved monitoring agency	

Item	Unit	Stage	Measured Value	Measured value (Max)	Remarks			
					Location	Frequency	Implementation	Supervision
Ground Water Level	m	Design Stage			Bandarawela	2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage				On Complain		
		Operation Stage				2 times with an interval of 6 months for 3-year time	DRA through approved monitoring agency	

Item	Unit	Stage	Measured Value	Measured value (Max)	Remarks			
					Location	Frequency	Implementation	Supervision
Ground Water Level	m	Design Stage			Uduwara	2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage				On Complain		

							DRA through approved monitoring agency	
		Operation Stage				2 times with an interval of 6 months for 3 year time		

Item	Unit	Stage	Measured Value	Measured value (Max)	Remarks			
					Location	Frequency	Implementation	Supervision
Ground Water Level	m	Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage				On Complain		
		Operation Stage			Walhaputhenna 1&2	2 times with an interval of 6 months for 3-year time	DRA through approved monitoring agency	

Item	Unit	Stage	Measured Value	Measured value (Max)	Remarks			
					Location	Frequency	Implementation	Supervision
Ground Water Level	m	Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage				On Complain		
		Operation Stage			Kahagalla	2 times with an interval of 6 months for 3-year time	DRA through approved monitoring agency	

Item	Unit	Stage	Measured Value	Measured value (Max)	Remarks			
					Location	Frequency	Implementation	Supervision
Ground Water Level	m	Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	RDA/ESD
		Construction Stage				On Complain	DRA through approved monitoring agency	
		Operation Stage			2^{nd} mile post	2 times with an interval of 6 months for 3-year time		

Monitoring Item	Monitoring Result during Report Period
Adequateness of slope drainage design	As per the approved Design
Protection of drainage outline against score and erosion	Drainage paths were covered by tarpaulin or disturbed by aggregates where possible.
Complaints on land acquisition and resettlement issue	No Complaints and issues
Disruption of drinking or irrigation water	Earth works were mostly carried out in dry period. Erosion, canal bank

Waste/Spoil Disposals

	erosioand sedimentation of surface water bodies were minimized through water pooling, silt traps and temporary drains. Tarpaulin sheets were used for cover the soil when heavy rains occurred. Spills of oil and chemicals from machines and vehicles were avoided through proper and timely maintenance.
Adequateness of spoil tipping away	Earth removed is used for backfilling and soil that cannot be reused were disposed in an approved disposal yard. Adequate facilities available for quick removal of soil.