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

report 110-09 (December 2019)

(NOISE LEVEL MONITORING)

Noise

### 1. Construction Stage

ltem	One hour Laeq	Unit	Measured Value	Measured Value	National standards	World Bank		Re	emarks	
			(Mean)	(Max)	(Max) *1	Guidelines * 2	Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	10/4)	66.1	72	50/75	55	Diyagala	Construction Stage:	Constructer through	
Noise *1	Night time (22:00 - 7:00)	dB(A)	47.7	48	40/50	45	Diyagala	4 times / year for 2 years	approved monitoring agency	RDA/ESD

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2 :</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

1. Operation Stage

ltem	One hour Laeq	Unit	Measured Value	Measured Value	National standards	World Bank		Ren	narks	
			(Mean)	(Max)	(Max) *1	Guidelines * 2	Location	Frequency	Implementation	Supervisor
Naina *4	Day time (7:00 - 22:00)	10/43	67.6	70	50/75	55	Nawalapitiya	Construction Stage:	Constructer through	1.77.4
Noise *1	Night time (22:00 - 7:00)	dB(A)	47.1	52	40/50	45	Nawalapitiya	4 times / year for 2 years	approved monitoring agency	RDA/ESD

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

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<sup>\*2 :</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

### 1. Operation Stage

ltem	One hour Laeq	Unit	Measured Value	Measured Value	National standards	World Bank		Rema	rks	
			(Mean)	(Max)	(Max) *1	Guidelines * 2	Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	-10/4)	69.0	71	50/75	55	Kothmalegama- 1	Construction Stage:	Constructer through	
Noise 1	Night time (22:00 - 7:00)	dB(A)	46.2	48	40/50	45	Kothmalegama- 1	4 times / year for 2 years	approved monitoring agency	RDA/ESD

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2 :</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

### 1. Operation Stage

ltem	One hour Laeq	Unit	Measured Value	Measured Value	National standards	World Bank Guidelines		Rema	arks	
			(Mean)	(Max)	(Max) *1	* 2	Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	JD/A)	62.1	66	50/75	55	Kothmalegama- 2	Construction	Constructer through	
140136 1	Night time (22:00 - 7:00)	dB(A)	43.6	48	40/50	45	Kothmalegama- 2	Stage : 4 times / year for 2 years	approved monitoring agency	RDA/ESD

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2 :</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

1. Operation Stage

Item	One hour Laeq	Unit	Measured Value	Measured Value	standards	World Bank Guidelines		Re	emarks	
<del></del>	D1		(Mean)	(Max)	(Max) *1	* 2	Location	Frequency	Implementation	Supervisor
Noise *1	Day time (7:00 - 22:00)	dD(A)	68.3	71	50/75	55	Ramboda	Construction	Constructer through	
	Night time (22:00 - 7:00)	dB(A)	44.6	51	40/50	45	Ramboda	Stage : 4 times / year for 2 years	approved monitoring agency	RDA/ESD

<sup>\*1 :</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2 :</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

### 1. Operation Stage

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

<sup>\*1 :</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2 :</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

1. Operation Stage

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

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2 :</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

### 1. Operation Stage

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

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2:</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

## 1. Operation Stage

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

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2:</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

Noise

### 1. Operation Stage

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

<sup>\*1 :</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2 :</sup> Residential area IFC EHS general guideline, for General Health and safety (EHS) Guidelines (2007)

## 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

ltem	Averaging	Unit	Measured value	Measured value	National	WHO .		Rei	marks	
	Time		(mean)	(max)*1	standards	Guidelines*2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				· · · · · · · · · · · · · · · · · · ·
SO <sub>2</sub>	8 hours	μg/m³		:	120	-				
302	1 hour	_	22	25	200	-	Diyagala			
	24 hours				100	-				
NO <sub>2</sub>	8 hours	3			150	-				
	1 hour	μg/m³	16.9	19	250	200	Diyagala			
	1year				-	40				
со	8 hours	3		<del>-</del> ,	10000	10000				
CO	1 hour	μg/m³	3113	3219	30000	30000	Diyagala	<u>Design Stage</u> 1 time as a		
	8 hours	3			-	100		baseline data	Constructer	
O₃	1 hour	μg/m³	5.3	6	200	-	Diyagala	Construction	through approved	RDA/ESD
Lead	24 hours		0.2	0.2	2	-	··· · · · · · · · · · · · · · · · · ·	Stage: 4 time / year for	monitoring agency	
compounds	1 year	μg/m³			0.5	0.5		2 years		
DA 4	24 hours					20		1		
PM <sub>10</sub>	3 hours	μg/m³	23.5	29.0				1		•
<del></del>	1 hour	-			500	<u></u>		1		
	3 hours		141.1	150.4	450	-	Diyagala	1		
SPM	8 hours	μg/m³	<del></del>		350			1		
	24 hours				300	-		1		
	1 year				100	_		-		

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Air Quality (Ambient Air Quality)

ltem	Averaging	Unit	Measured value	Measured value	National	WHO		Rei	marks	
	Time		(mean)	(max)*1	standards	Guidelines*2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
SO <sub>2</sub>	8 hours	μg/m³			120	-				
302	1 hour		13.8	14.5	200		Nawalapitiya			
	24 hours				100	-				
NO <sub>2</sub>	8 hours	3			150	-	,,			
	1 hour	μg/m³	14.2	16.1	250	200	Nawalapitiya			
	1year				-	40				
	8 hours	. 9			10000	10000	1			
со	1 hour	μg/m³	1391	1456	30000	30000	Nawalapitiya	<u>Design Stage</u> 1 time as a		
	8 hours	, 3			-	100		baseline data	Constructer	
O <sub>3</sub>	1 hour	μg/m³	5	6	200	-	Nawalapitiya	<u>Construction</u>	through approved monitoring agency	RDA/ESD
Lead	24 hours	3		<0.1	2	-		Stage: 4 time / year for	monitoring agency	
compounds	1 year	μg/m³		-	0.5	0.5	,	2 years		
	24 hours	. 3				20				
PM <sub>10</sub>	3 hours	μg/m³	38.9	38			Nawalapitiya	,		
	1 hour				500	-				
	3 hours		130.7	138.5	450	-	Nawalapitiya			
SPM	8 hours	μg/m³		<del>, ,</del>	350	-				
	24 hours	-			300	-				
	1 year				100	-	<u></u>			

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Air Quality (Ambient Air Quality)

Averaging Time	Unit	Measured value	Measured value	National	wно		Ren	narks	<del></del>
		(mean)	(max)*1	standards	Guidelines*2	Location	Frequency	Implementation	Supervision
<del></del>				80	20		<del>                                     </del>	mplementation	Supervision
	μg/m³			120	-				
		18.2	20.1	200	-	Kothmalagama 1	+		
<u> </u>				100	-	Kotimalegama-1	-		
8 hours	3			150	<u>-</u>				
1 hour	μg/m²	17.1	21	250	200		-		
1year					<del></del>	Kothmalegama-1	-		
8 hours			<del></del>	10000			-		
1 hour	μg/m³	1224	12/12						
8 hours			- 1245			Kothmalegama-1	baseline	•	
1 hour	μg/m³				100		data	Constructer	
		5.3	5.6	200		Kothmalegama-1	Construction		RDA/ESD
	ua/m³	0.1	0.1	2			Stage:	monitoring agency	İ
<u> </u>				0.5	0.5				
	110/m <sup>3</sup>				20		Tor 2 years		
3 hours	дулп г	34.1	36.4			Kathraalaaaaa	-		
1 hour				500	-	Kothmalegama-1	-		
3 hours	ļ	127.3	146.4			Kothmalogoms 1			
8 hours	μg/m³	-			<del></del>	vonimalegama-1			
24 hours	, J.							Ì	
1 year	}			100	-				
	Time  24 hours  8 hours  1 hour  24 hours  8 hours  1 hour  1year  8 hours  1 hour  24 hours  1 hour  24 hours  1 hour  24 hours  1 year  24 hours  3 hours  1 hour  3 hours	Time  24 hours 8 hours 1 hour  24 hours 8 hours 1 hour  1year  8 hours 1 hour  1year  4 hours 1 hour  24 hours 1 hour  4 hours 1 hour  4 hours 1 year  4 hours 1 year  4 hours 1 year  4 hours 1 hour  4 hours 1 year  4 hours 1 hour  4 hours 1 hour  4 hours 1 year  4 hours 1 hour  4 hours 1 hour  4 hours 1 hour  4 hours 1 hour	Time Unit value (mean)  24 hours  8 hours  1 hour  1 hour  1 year  8 hours  1 hour  1 year  1 hour  24 hours  1 hour  24 hours  1 hour  1 year  24 hours  1 hour  1 hour  1 hour  24 hours  1 hour  24 hours  1 hour  24 hours  1 year  24 hours  3 hours  1 hour  3 hours  4 hours	Time Unit value (mean) Value (max)*1  24 hours 8 hours 1 hour 1 hour 1 18.2 2 10.1  24 hours 8 hours 1 hour 1 17.1 21  1 year 8 hours 1 hour 1 1224 1 1243 8 hours 1 hour 1 1 year 2 1 hour 1 hour 1 1 hour 2 1 1 hour 3 hours 1 hour 1 1 year 2 1 hour 1 1 year 2 1 hour 1 1 year 2 1 hour 2 1 hour 3 hours 1 hour 3 hours 1 hour 1 1 hour 1 1 year 2 1 hour 1 1 year 2 2 hours 3 hours 1 hour	Time Unit value (mean) Value (max)*1 Standards  24 hours 8 hours μg/m³ 120  1 hour 18.2 20.1 200  24 hours 150  1 hour 17.1 21 250  1 year - 10000  8 hours 10000  1 hour 17.1 21 250  1 hour 19g/m³ 1224 1243 30000  8 hours 1 hour 5.3 5.6 200  24 hours 1 year 0.1 0.1 2  1 year 24 hours 1 year 3 34.1 36.4  1 hour 3 hours 127.3 146.4 450  8 hours 1 year 24 hours 129m³ 350  24 hours 127.3 146.4 450  8 hours 1 year 3000  1 year 3000  1 year 3000	Time   Unit   value (mean)   value (max)*1   National standards   Guidelines*2	Time   Unit   Value (mean)   Value (max)*1   Standards   Standa	Time   Unit   Value (mean)   Value (max)*1   Standards   Guidelines*2   Location   Frequency	Time   Unit   value (mean)   value (mean)   value (mean)   value (mean)   value (max)   value (ma

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Air Quality (Ambient Air Quality)

ltem	Averaging Time	Unit	Measured value	Measured value	National standards	WHO		Rema	rks	<del></del>
	24 hours	<u> </u>	(mean)	(max)*1		Guidelines*2	Location	Frequency	Implementation	Supervision
	8 hours	_			80	20		-		
SO <sub>2</sub>		μg/m³			120	-				
	1 hour		12.7	13.9	200	_	Kothmalegama-2			
	24 hours				100	-	Notifilalegalila-2	1		
NO <sub>2</sub>	8 hours	_		· -	150			-		
-	1 hour	μg/m³	16.7	17.8						
	1year			17.0	250	200	Kothmalegama-2			
<del>-</del>	8 hours		<u> </u>			40				
СО		μg/m³			10000	10000				
	1 hour	μу/т	1529	1582	30000	30000	Kothmalegama-2	<u>Design Stage</u> 1 time as a		
_	8 hours	2				100	Rottimalegama-2	baseline data	_	
O <sub>3</sub>	1 hour	μg/m³	4	5	200			_	Constructer through approved	RDA/ESD
	24 hours	<u> </u>					Kothmalegama-2	Construction Stage:	monitoring agency	KDA/E3D
Lead compounds	1 year	μg/m³	0.1	0.1	2	-		4 time / year for		
					0.5	0.5		2 years		
PM <sub>10</sub>	24 hours	μg/m³				20				
10	3 hours	μу/п	29.9	35.4						
	1 hour				500				•	
	3 hours	ŀ	111.4	122.3	<del></del>					
SPM	8 hours	3		144.5	450	-	Kothmalegama-2	,		
31 141	24 hours	μg/m³			350	-			ļ	
		1			300					
	1 year				100	_				

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Air Quality (Ambient Air Quality)

ltem	Averaging Time	Unit	Measured value	Measured value	National	WHO		Re	emarks	
		<del>                                      </del>	(mean)	(max)*1	standards	Guidelines*2	Location	Frequency	Implementation	Supervision
	24 hours 8 hours	-	ļ		80	20		<del>                                     </del>	prementation	Super vision
SO₂		μg/m³			120	-				
<del>-</del>	1 hour		15.3	17.1	200	-	Ramboda			1
	24 hours		_		100	-	Variiboda	-		
NO <sub>2</sub>	8 hours	. ,		<del></del>	150	<u> </u>	<del>-</del>	<del>-</del>		
	1 hour	μg/m³	13	16	250	200		-		
	1year	ļ				40	Ramboda	-		
	8 hours	<u>-</u>						_		
CO	1 hour	µg/m³			10000	10000		Design Stage		
	8 hours	-	1144	1185	30000	30000	Ramboda	1 time as a		
O <sub>3</sub>	L	μg/m³			-	100		baseline data	Constructer	
	1 hour		4.2	5.5	200	-	Ramboda	<u>Construction</u>	through approved	RDA/ESD
Lead	24 hours	3	0.1	0.1	2	-		Stage:	monitoring agency	
compounds	1 year	μg/m³			0.5	0.5		4 time / year for 2 years		
	24 hours		<del></del>					2 years		
PM <sub>10</sub>	3 hours	μg/m³				20				
	1 hour		26.9	28.1			Ramboda			
					500	-				
	3 hours	į	107.1	117.2	450	-	Ramboda			
SPM	8 hours	μg/m³			350	-		į		
	24 hours				300	-				
	1 year				100					

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Air Quality (Ambient Air Quality)

ltem	Averaging Time	Unit	Measured value	Measured value	National standards	WHO		Rem	arks	<del>-</del>
	24 hours		(mean)	(max)*1		Guidelines*2	Location	Frequency	Implementation	Supervision
	8 hours				80	20				
SO₂		μg/m³			120	-				
<del></del>	1 hour		15	17	200	-	Toppass	7		
	24 hours				100	_	Toppass	-		1
NO <sub>2</sub>	8 hours	_			150		<del></del>	_		
2	1 hour	μg/m³	17.8			-		_		
	1year		17.0	21.1	250	200	Toppass			
<del></del>						40				
со	8 hours	μg/m³		_	10000	10000		7		
	1 hour	μg/π	1122	1186	30000	30000	Toppass	<u>Design Stage</u> 1 time as a		
_	8 hours					100		baseline data		
O <sub>3</sub>	1 hour	μg/m³	6.2	7.1	300				Constructer	DD 4 /50D
	24 hours			<b>7.1</b>	200		Toppass	Construction	through approved monitoring agency	RDA/ESD
Lead compounds		μg/m³		<0.1	2	<del>-</del>		Stage: 4 time / year for	and against	
	1 year				0.5	0.5		2 years		
PM <sub>10</sub>	24 hours	, 3		_		20		-		
F1V110	3 hours	μg/m³	22.4	27.1				-	,	
	1 hour				F00	-		-		
	3 hours				500			_		
		_  -	117.1	125.1	450	<u> </u>	Toppass			
SPM	8 hours	μg/m³			350	-		]		
	24 hours				300	-		-		
	1 year	ļ-			100	_		-		

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Air Quality (Ambient Air Quality)

Item	Averaging Time	Unit	Measured value	Measured value	National	WHO		Rema	arks	<del></del>
			(mean)	(max)*1	standards	Guidelines*2	Location	Frequency	Implementation	Supervision
	24 hours				80	20			p.c.iiciitutioii	Super vision
SO <sub>2</sub>	8 hours	μg/m³			120	-	-			
	1 hour	<u> </u>	16.3	18.2	200	-	Keppetipola	-		
	24 hours	-		<del>-</del>	100	-	- керреприя		,	
NO <sub>2</sub>	8 hours	μg/m³		-	150	-	-	,		
	1 hour	μу/пі	15.8	17	250	200	Keppetipola	-		
·-·	1year				-	40	Керрепрога			
со	8 hours	3			10000	10000	·	1		
	1 hour	μg/m³	2564	2611	30000	30000	Keppetipola	<u>Design Stage</u> 1 time as a		
O <sub>3</sub>	8 hours	3			-	100		baseline data	Constructer	
	1 hour	μg/m³	5	5	200	-	Keppetipola	Construction	through approved	RDA/ESD
Lead	24 hours	a/ma <sup>3</sup>		<0.1	2	-		Stage:	monitoring agency	
compounds	1 year	μg/m³			0.5	0.5		4 time / year for 2 years		
PM <sub>10</sub>	24 hours	3				20		1		
	3 hours	μg/m³ 	24.2	27.1			Keppetipola			
	1 hour				500	-	vehherihota			
	3 hours	ľ	152	159	450		Keppetipola			
SPM	8 hours	μg/m³			350					
į	24 hours	Ì			300					
	1 year	ļ			100					

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

Mitigation Measures
Air Quality (Ambient Air Quality)

Item	Averaging Time	Unit	Measured value	Measured value	National standards	WHO Guidelines*2			narks	
	24 hours		(mean)	(max)*1			Location	Frequency	Implementation	Supervision
	8 hours	,	<u> </u>		80	20		_]		
SO <sub>2</sub>	1 hour	μg/m³			120	-				
	<u> </u>		24.3	26	200	_	Ginigathhena			
	24 hours	ļ			100	-		7		
NO <sub>2</sub>	8 hours	3			150	-		-		
	1 hour	μg/m³	18.1	21	250	200	Ginigathhena			
	1year				-	40	Gingathnena	-		
60	8 hours	. 3			10000	10000		-		
СО	1 hour	μg/m³	1637	1653	30000	30000	Ginigathhena	<u>Design Stage</u>	į	
	8 hours			-		100	Ginigatrinena	1 time as a		
O <sub>3</sub>	1 hour	μg/m³	5.1				<del>-</del>	baseline data	Constructer through	
	24 hours			6	200	<u> </u>	Ginigathhena	Construction	approved	RDA/ESD
Lead compounds	1 year	μg/m³	0.2	0.2	2	*		Stage: 4	monitoring agency	
	<u> </u>				0.5	0.5		time / year for 2 years		
PM <sub>10</sub>	24 hours	μg/m³				20		, yeurs		
	3 hours	дулл	33.1	42			Ginigathhena	1		
	1 hour				500	_	omgatimena	-		
	3 hours	ľ	162	179	450		Ginigathhena			
	8 hours	,		<del></del>	350		Cangadalella	-		
SPM	24 hours	μg/m³			300			-		
		-				<u> </u>				
	1 year				100	-				

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

## Air quality (Ambient Air Quality)

Item	Averaging Time	Unit	Measured value	Measured	National	WHO		Re	marks	
<del>-</del>			(mean)	value (max)*1	standards	Guidelines*2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
SO <sub>2</sub>	8 hours	μg/m³			120	<u> </u>				
3O <sub>2</sub>	1 hour		17.5	20	200		D!4	_		
	24 hours				100	_	Pitawala	-		
NO <sub>2</sub>	8 hours	, 3			150		<u> </u>	-		
	1 hour	μg/m³	21.4	22	250	200		-		
	1year	·			-	40	Pitawala	-		
СО	8 hours	. 3	-		10000	10000		-		
	1 hour	µg/m³	2221	2243	30000	30000	Pitawala	<u>Design Stage</u> 1 time as a baseline		
0	8 hours			-		100	Fitawaia	data	Constructer through	
O <sub>3</sub>	1 hour	μg/m³	5	5	200	-	Dial	Construction Stage:	approved monitoring	RDA/ESD
Lead	24 hours	, 3	0.1	0.1	2		Pitawala	4 time / year for 2	agency	
compounds	1 year	μg/m³			0.5	0.5		years		
POM <sub>10</sub>	24 hours	, 3				20	·	-		
	1 year	μg/m³		ļ		50		-		
	1 hour				500		<u> </u>	-		
	3 hours	Ī	146.4	153.1	450		D'11-	4	į	
SPM	8 hours	μg/m³			350	-	Pitawala	-		
	24 hours	ľ			300			-		
	1 year	ŀ			100	_		-		

<sup>\*1:</sup> National Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> WHO Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide (2006) Mitigation Measures

---- James A verso source sets Anatich)

## 1. Operation Stage

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

Item	Averaging Time	Unit		Measured	National	WHO		Re	marks	
	ime		Measured value (mean)	value (max)*1	standards	Guidelines*2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
50	8 hours	μg/m³			120					
SO₂	1 hour		34.2	36	200	-	Thelian	-		
	24 hours				100	-	Theligama	-{		
NO <sub>2</sub>	8 hours	3			150	-		_		
	1 hour	μg/m³	27.5	29	250	200	Theligama	1		
	1year				-	40	mengama	-		
со	8 hours	, ,			10000	10000		-		
CO	1 hour	μg/m³	2132	2161	30000	30000	Theligama	<u>Design Stage</u> 1 time as a baseline		
	8 hours	. 3			-	100		data	Constructer through	
O <sub>3</sub>	1 hour	µg/m³	6.3	7.1	200	-	Theligama	Construction Stage:	approved monitoring agency	RDA/ESD
Lead	24 hours	3		<0.1	2		THEIRAITIA	4 time / year for 2 years		
compounds	1 year	μg/m³			0.5	0.5		-		
POM <sub>10</sub>	24 hours	. 4		-		20		_	i	
POIVI10	3 hour	μg/m³	29.7	32.1		50		j		
	1 hour				500	-		-		
	3 hours		154.1	167.5	450	-	Theligama	1 !	i	
SPM	8 hours	μg/m³			350	-		-		
	24 hours				300	-		1		
	1 year				100		-	1		-

<sup>\*2:</sup> 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)

minigation Micasures

### 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.

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

- 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.

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

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.

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

- 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.

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

- \* 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.

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

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

- \* 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.

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

- 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.

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

Vibration

1. Opeartion Stage

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

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

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

Vibration

Item	Unit	t Frequency Band	Measured Value	Measured Value	d National Standards (Max.)	International Guidelines	Remarks				
			(Mean)	(Max.)			Location*2	Frequency	implementation	Supervision	
		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	
Vibration	mm/sec	c 10-50 Hz			2.0						
		Over 50 Hz	0.44	0.53	4.0						

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

<sup>\* 2 :</sup> 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)

### wirtigation ivieasures

Water Quality (Effluent/Wastewater)

**Operation Stage** 

Site Location: Nawalapitiya (A113-015)

Item	Unit	Measured Value (Mean)	Measured	National Standards (Max) *1	International	Remarks					
····			Value (Max.)		Guidelines	Location	Frequency	Implementation	Supervision		
EC	(S/m)	0.037	0.048	-	-				<u> </u>		
рН	-	7.2	7.4	6.0-8.5	6-9 *2			:			
DO	(mg/L)	12.15	13.2	-	-	Nawalapitiya (A113-015)	<u>Design Stage</u> :	Constructer			
Turbidity	(mg/L)	0.11	0.14		<0.2*3	(A113					
TSS	(mg/L)	7.4	9	50	50 <sup>*2</sup>	oitiya	1 time as a baseline data	through			
BOD <sub>5</sub>	(mg/L)	0.52	0.61	30	30*2	walaj		approved	RDA/ESD		
Lead	/ma/1)	Not	Not			Na	<u>Construction stage</u> :	monitoring			
Leau	(mg/L)	Detected	Detected	0.1	0.01		4 times/year for 2 years	agency			
Oil & grease	(mg/L)	0.24	0.39	10	10*2						
Coliform	MPN/100mL	32	36	40	400*2						

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2:</sup> IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

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

Water Quality (Effluent/Wastewater)

**Operation Stage** 

Site Location: Ginigathhena (A007-054)

		Measured	Measured	National	International	Remarks						
Item	Unit	Value (Mean)	Value (Max.)	Standards (Max) *1	Guidelines	Location	Frequency	Implementation	Supervision			
EC	(S/m)	0.117	0.127	-	-							
pH	-	7.0	7.2	6.0-8.5	6-9 *2	54)			1			
DO	(mg/L)	3.1	3.4	-	-	(A007-054)	<u>Design Stage</u> :	Constructer				
Turbidity	(mg/L)	0.12	0.13		<0.2*3			through				
TSS	(mg/L)	0.47	0.57	50	50 <sup>*2</sup>	Ginigathhena	1 time as a baseline data	approved	RDA/ESD			
BOD₅	(mg/L)	1.51	1.72	30	30*2	migat	Construction stage :	monitoring				
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01	<u> </u>	4 times/year for 2 years	agency				
Oil & grease	(mg/L)	0.3	0.6	10	10*2	1						
Coliform	MPN/100mL	31	35	40	400*2							

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2:</sup> IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

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

Water Quality (Effluent/Wastewater)

1). Operation Stage

Site location: Theligama (A007-031)

Item	Unit	Measured	Measured	National	International		Remark	s	<u> </u>
iteiti	Offic	Value (Mean)	Value (Max.)	Standards (Max) *1	Guidelines	Location	Frequency	Implementation	Supervision
EC	(S/m)	0.041	0.051	-	-				74.
рН	-	6.7	7.0	6.0-8.5	6-9 *2				
DO	(mg/L)	2.6	3.3	-	-	_	<u>Design Stage</u> :		
Turbidity	(mg/L)	0.14	0.17	-	<0.2 <sup>*3</sup>	7-031)		Constructer	
TSS	(mg/L)	3.6	4.9	50	50 <sup>*2</sup>	(A00)	1 time as a baseline data	through approved	RDA/ESD
BOD <sub>5</sub>	(mg/L)	0.41	0.52	30	30*2	ama		monitoring	NDA/ L3D
Lead	(mg/L)	Not Detected	Not Detected	0.1	0.01	Theligama (A007-031)	Construction stage: 4 times/year for 2 years	agency	
Oil & grease	(mg/L)	0.4	0.7	10	10*2				
Coliform	MPN/100mL	31	34	40	400 <sup>*2</sup>				

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2:</sup> IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

The state of the standards in relation to wastewater neuse (ZOLL), Iviain usage — "All nongrinking water uses"

#### **Mitigation Measures**

Water Quality (Effluent/Wastewater)

1). Operation Stage

Site location: Pitawala (A007-045)

		Measured	Measured	National	International		Remark	s	
Item	Unit	Value (Mean)	Value (Max.)	Standards (Max) *1	Guidelines	Location	Frequency	Implementation	Supervision
EC	(S/m)	0.13	0.15	-	-				
рН	-	6.5	7.1	6.0-8.5	6-9 *²				
DO	(mg/L)	2.6	4.0	-	-	045)	<u>Design Stage</u> :		
Turbidity	(mg/L)	0.15	0.17		<0.2*3	Pitawala (A007-045)		Constructer	
TSS	(mg/L)	1.32	1.54	50	50 <sup>*2</sup>	ala (	1 time as a baseline data	through approved	RDA/ESD
BOD₅	(mg/L)	2.2	2.7	30	30*2	Pitaw		monitoring	((DA) £3D
Lead	(mg/L)	Not Detected	Not Detecetd	0.1	0.01		Construction stage: 4 times/year for 2 years	agency	
Oil & grease	(mg/L)	0.6	0.9	10	10*2				
Coliform	MPN/100mL	33	35	40	400*2				

<sup>\*1:</sup> National Environmental (Protection & Quality) Regulations, CEA (2008)

<sup>\*2:</sup> IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

<sup>\*3:</sup> 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

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Package 2- (R-1) JICA Format Report No-10 (December 2019)

	Averaging		Measured	measured	National	WHO		Remarks		
item	Time	Unit	Value (mean)	value (max)*1	standards (max)*1	Guidelines *2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
SO <sub>2</sub>	8 hours	μg/m³			120	<u> </u>				
	1 hour		15	16	200		Walhaputenna-03			
	24 hours				100	-				
NO <sub>2</sub>	8 hours	μg/m³			150	-		_		
NO <sub>2</sub>	1 hour	μg/111	10.3	12	250	200	Walhaputenna-03			
	1 year				<u>-</u>	40				
со	8 hours	μg/m³			10000	10000				
	1 hour	μg/пι	3283.3	3450	30000	30000	Walhaputenna-03	<u>Design Stage</u>		
0	8 hours	μg/m³			=	100		1 time as a baseline data	Constructer through approved monitoring	RDA/ESD
O <sub>3</sub>	1 hours	i hβ/111	4	5	200	-	Walhaputenna-03	Constriction stage:	agency	(IOA) LSD
Lead	24 hours	μg/m³			2	<u> </u>	Walhaputenna-03	4 time /year for 2 years	,	
Compounds	1 year	рв/т			0.5	0.5				
DNA	24 hours	μg/m³	33.8	35.2	100	20	Walhaputenna-03			
PM <sub>10</sub>	1 year	μg/m .			50	50				
	1 hour				500	-		]		
	3 hours		144.53	148.2	450	-	Walhaputenna-03	]		
SPM	8 hours	μg/m³			350	-		]		
	24 hours				300	-		]		
	1 year				100	<u>.</u>				

<sup>\*1:</sup> national Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

	Averaging		Measured	measured	National	WHO		Remarks		
Item	Time	Unit	Value (mean)	value (max)*1	standards (max)*1	Guidelines *2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
SO <sub>2</sub>	8 hours	μg/m³			120	_				
	1 hour	·	16	17	200	-	Ambepussa			
	24 hours				100	-				
NO <sub>2</sub>	8 hours	μg/m³			150	-				
1402	1 hour	рв/пі	17	18	250	200	Ambepussa			
	1 year				<u>.</u>	40				
со	8 hours	μg/m³			10000	10000		]		
	1 hour	H8/111	3388	3483	30000	30000	Ambepussa	<u>Design Stage</u>		
O <sub>3</sub>	8 hours	μg/m³			-	100		1 time as a baseline data	Constructer through	DDA/CCD
	1 hours	μ6/111	3	5	200	- 1	Ambepussa	Constriction stage:	approved monitoring agency	RDA/ESD
Lead	24 hours	μg/m³			2	-		4 time /year for 2 years	,	
Compounds	1 year	дь/п			0.5	0.5				
PM <sub>10</sub>	24 hours	μg/m³	39.2	43.2	100	20	Ambepussa	_		
F 14110	1 year	με/···			50	50				
	1 hour				500	-				
	3 hours		318.5	345.2	450	-	Ambepussa			
SPM	8 hours	μg/m³			350	-				
	24 hours				300	-				
,	1 year				100	-				

<sup>\*1:</sup> national Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

	Averaging		Measured	measured	National	WHO		Remarks		
ltem	Time	Unit	Value (mean)	value (max)* <sup>1</sup>	standards (max)*1	Guidelines *2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
SO₂	8 hours	μg/m³			120	-				
	1 hour		10	11	200		Haputhale			
	24 hours				100					
NO	8 hours	μg/m³			150	-				
NO <sub>2</sub>	1 hour	μg/m	14	17	250	200	Haputhale			
•	1 year				-	40				
60	8 hours	μg/m³			10000	10000				
со	1 hour	μg/m	3216.6	3450	30000	30000	Haputhale	<u>Design Stage</u>		
0	8 hours	μg/m³				100		1 time as a baseline data	Constructer through approved monitoring	RDA/ESD
O <sub>3</sub>	1 hours	μg/m	3	3	200		Haputhale	Constriction stage:	agency	1107,9202
Lead	24 hours	μg/m³			2	-	. <u> </u>	4 time /year for 2 years		
Compounds	1 year	дв/пі			0.5	0.5				
204	24 hours	μg/m³	34.8	36.2	100	20	Haputhale			
PM <sub>10</sub>	1 year	дв/пі			50	50				
	1 hour				500	_				
	3 hours	]	173.86	1762	450	_	Haputhale			
SPM	8 hours	μg/m³			350	_				
	24 hours				300	-				
<u> </u>	1 year	]			100	_				

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

	Averaging		Measured	measured	National	WHO		Remarks		
Item	Time	Unit	Value (mean)	value (max)*1	standards (max)*1	Guidelines *2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
SO <sub>2</sub>	8 hours	μg/m³			120	_				
	1 hour		11	12	200	-	Bandarawela			
	24 hours				100	-				
NO <sub>2</sub>	8 hours	μg/m³			150	-				
NO <sub>2</sub>	1 hour	μg/III	15	17	250	200	Bandarawela			
	1 year				•	40				
со	8 hours	μg/m³			10000	10000				
	1 hour	μ <sub>6</sub> /	2553	2606	30000	30000	Bandarawela	<u>Design Stage</u>	·	
O <sub>3</sub>	8 hours	μg/m³			<u>-</u>	100		1 time as a baseline data	Constructer through	RDA/ESD
	1 hours	µб/ III	3	4	200	-	Bandarawela	Constriction stage:	approved monitoring agency	KDA/E3D
Lead	24 hours	μg/m³			2	-		4 time /year for 2 years	,	
Compounds	1 year	μβ/п			0.5	0.5				
PM <sub>10</sub>	24 hours	μg/m³	35.2	36.2	100	20	Bandarawela	7		
PIVI10	1 year	μg/m			50	50				
	1 hour				500	-				
	3 hours		149.7	160.2	450	-	Bandarawela	7		
SPM	8 hours	μg/m³			350	-				
1	24 hours				300	-				
	1 year				100	-				

<sup>\*1:</sup> national Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

	Averaging		Measured	measured	National	WHO		Remarks	· <u></u> ·	,
ltem	Time	Unit	Value (mean)	value (max)*1	standards (max)*1	Guidelines *2	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
SO <sub>2</sub>	8 hours	μg/m³			120	-				
	1 hour		10	11	200	-	Ella			
	24 hours				100	-		•		
NO <sub>2</sub>	8 hours	μg/m³			150	-				
1402	1 hour	рв/п	15	16	250	200	Ella			
	1 year				-	40				
со	8 hours	μg/m³			10000	10000				
	1 hour	рв/п	2540	2623	30000	30000	Ella	<u>Design Stage</u>		
O <sub>3</sub>	8 hours	μg/m³			-	100		1 time as a baseline data	Constructer through	22.4522
. <u> </u>	1 hours	μβ/ш	3	4	200		Ella	<u>Constriction stage:</u>	approved monitoring agency	RDA/ESD
Lead	24 hours	μg/m³			2	-		4 time /year for 2 years	uge,	
Compounds	1 year	μg/111			0.5	0.5				
PM <sub>10</sub>	24 hours	μg/m³	36.5	38.2	100	20	Ella			
F1V110	1 year	μβ/ш			50	50				
	1 hour				500	-				
	3 hours		150.2	155.2	450	-	Ella			
SPM	8 hours	μg/m³			350	-				
	24 hours				300	_				
	1 year				100	-				

<sup>\*1:</sup> national Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

	Averaging		Measured	measured	National	WHO		Remarks		
ltem	Time	Unit	Value (mean)	value (max)*1	standards (max)*1	Guidelines *2	Location	Frequency	Implementation	Supervision
•	24 hours				80	20				
SO₂	8 hours	μg/m³			120	_				
	1 hour		14.3	16	200	-	Uduwara	<u> </u>		
	24 hours				100	<u> </u>				
NO₂	8 hours	μg/m³			150	-				
NO <sub>2</sub>	1 hour	μg/п	11	12	250	200	Uduwara			
	1 year				_	40		_		
со	8 hours	μg/m³			10000	10000				
	1 hour	дв/т	2483.3	2613	30000	30000	Uduwara	<u>Design Stage</u>		
0	8 hours	μg/m³			-	100		1 time as a baseline data	Constructer through approved monitoring	RDA/ESD
O <sub>3</sub>	1 hours	рв/ш	3	4	200	-	Uduwara	Constriction stage:	approved monitoring	INDAY ESD
Lead	24 hours	μg/m³			2	-		4 time /year for 2 years		
Compounds	1 year	μg/m			0.5	0.5				1
DA	24 hours	3	34.3	35.6	100	20	Uduwara			
PM <sub>10</sub>	1 year	μg/m³			50	50				ļ
	1 hour				500	-				
	3 hours		161.86	170.2	450	-	Uduwara			
SPM	8 hours	μg/m³			350	-				
	24 hours				300	-				
	1 year	1			100	-				

<sup>\*1:</sup> national Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

					National			Remai	rks	
item	Average Time	Unit	Measured Value (mean)	measured value (max)*1	standards (Max.) *1	WHO Guidelines	Location	Frequency	Implementation	Supervision
	24 hours			1	80	20				
SO <sub>2</sub>	8 hours	μg/m³			120					
	1 hours		11	12	200	-	Walhaputhenna 1&2			
	24 hours				100	<u> </u>				
$NO_2$	8 hours	μg/m³			150					
NO <sub>2</sub>	1 hours	μg/III	8.6	10	250	200	Walhaputhenna 1&2			
	1 year				-	40				1
CO	8 hours	μg/m³			10000	10000				
	1 hours	рв/ш	2410	2531.6	30000	30000	Walhaputhenna 1&2		RDA through	
O₃	8 hours	μg/m³	·		-	100		2 time/year	approved	RDA/ESD
O <sub>3</sub>	1 hours	μβ/ш	3	4	200		Walhaputhenna 1&2	for 2 years	monitoring agency	11079235
Lead	24 hours	μg/m³			2				g egene,	
Compounds	1 year				0.5	0.5				ŀ
PM <sub>10</sub>	24 hours	_ μg/m³	30.4	32.2	100	20	Walhaputhenna 1&2			
FIVI <sub>10</sub>	1 year				50	50		Į		
	1 hours	_			500	<u> </u>				
	3 hours	/203	139.86	144.2	450		Walhaputhenna 1&2			
SPM	8 hours	μg/m³			350	-				
	24 hours				300	-		_		
	1 year				100	-				<u> </u>

<sup>\*1:</sup> national Ambient Air Quality (NAAQS) of Sri Lanka (2009)

<sup>\*2:</sup> Who Air Quality guideline for particular matter, ozone, nitrogen dioxide and sulfur dioxide (2006)

		1			National			Rem	arks	
ltem	Average Time	Unit	Measured Value (mean)	measured value (max)*1	standards (Max.)*1	WHO Guidelines	Location	Frequency	Implementation	Supervision
	24 hours				80	20		_		
SO <sub>2</sub>	8 hours	μg/m³			120			_		
_	1 hours		15.6	23	200		Kahagalla			
	24 hours				100	<u>-</u> _		_		]
	8 hours	1 , 3			150					
NO <sub>2</sub>	1 hours	μg/m³	13	15	250	200	Kahagaila	_		
	1 year	1				40		_	•	
	8 hours	μg/m³			10000	10000		_		
CO	1 hours	– μg/m	1813.3	1846.5	30000	30000	Kahagalla		RDA through	
_	8 hours	μg/m³				100		2 time/year for	approved monitoring	RDA/ESD
O <sub>3</sub>	1 hours	μg/m	3	4	200		Kahagalla	2 years	agency	
Lead	24 hours	μg/m <sup>3</sup>			2			_		
Compounds	1 year	– μg/m			0.5	0.5				
	24 hours	μg/m <sup>3</sup>	32.93	36.2	100	20	Kahagalla	_		
PM <sub>10</sub>	1 year				50	50				
	1 hours				500	-		_		
	3 hours	7 , ,	133.8	136.2	450		Kahagalla	_		
SPM	8 hours	μg/m <sup>3</sup>			350			_		
	24 hours				300	<u>-</u>		_		
	1 year	7			100	_			<u> </u>	

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

				1	National			Ren	narks	
Item	Average Time	Unit	Measured Value (mean)	measured value (max)*1	standards (Max.) *1	WHO Guidelines	Location	Frequency	Implementation	Supervision
	24 hours				80	20				
SO <sub>2</sub>	8 hours	μg/m³			120	-				
•	1 hours	]	12	12	200		2 <sup>nd</sup> mile post			
	24 hours				100	-				
	8 hours	μg/m³			150					
NO <sub>2</sub>	1 hours	μg/m	14.6	16	250	200	2 <sup>nd</sup> mile post	<u> </u>		
	1 year	1				40				
со	8 hours	μg/m³			10000	10000				
CO	1 hours	μg/m	1606.66	1660	30000	30000	2 <sup>nd</sup> mile post		RDA through	
O <sub>3</sub>	8 hours	μg/m³			-	100		2 time/year for	approved monitoring	RDA/ESD
U <sub>3</sub>	1 hours	με/111	3	5	200		2 <sup>nd</sup> mile post	2 years	agency	1,07,400
Lead	24 hours	μg/m³			2				,	
Compounds	1 year	<u> </u>			0.5	0.5				
PM <sub>10</sub>	24 hours	_ μg/m³	36.46	37.2	100	20	2 <sup>nd</sup> mile post			1
LIVI70	1 year				50	50				
	1 hours				500	-				
	3 hours	/3	222.53	225.2	450		2 <sup>nd</sup> mile post			1
SPM	8 hours	μg/m³			350					
	24 hours				300					
	1 year				100	<u> </u>				

<sup>\*1:</sup> 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

	Unit	measured	measured	National	International		Remark	.s	
ltem	Jiii	value (mean)	value (max)*1	Standards (max)*1	Guidelines	Location	Frequency	Implementation	Supervision
EC	S/m	0.0943	0.101	-	-	Walhaputenna-03			·
pH		6.73	6.8	6-8.5	6-9* <sup>2</sup>	Walhaputenna-03	B		1
DO	mg/L	9.1	9.4	-	-	Walhaputenna-03	Design Stage  1 time as a baseline		1
Turbidity	mg/L	Not Detected	Not Detected	-	0.2*3	Walhaputenna-03	data	Constructer through	
TSS	mg/	Not Detected	Not Detected	50	50* <sup>3</sup>	Walhaputenna-03		approved monitoring	RDA/ESD
BOD <sub>5</sub>	mg/L	1.06	1.23	30	30* <sup>3</sup>	Walhaputenna-03	Constriction stage:	agency	ļ
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	Walhaputenna-03	4 time /year for 2		
Oil and grease	mg/L	Not Detected	Not Detected	10	10*2	Walhaputenna-03	years		1
Coliform	MPN/100	Not Detected	Not Detected	40	400* <sup>2</sup>	Walhaputenna-03			
E-coli	MPN/100	Not Detected	Not Detected			Walhaputenna-03		<u> </u>	<u> </u>

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

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

ltem	Unit	measured	measured	National	International		Remari	(S	
		value (mean)	value (max)*1	Standards (max)*1	Guidelines	Location	Frequency	Implementation	Supervision
EC	S/m	0.124	0.144	-	-	Haputhale	_		
pН		6.6	6.7	6-8.5	6-9* <sup>2</sup>	Haputhale			
DO	mg/L	8.9	9.1	-	-	Haputhale	Design Stage		1
Turbidity	mg/L	0.08	0.19	-	0.2*3	Haputhale	1 time as a baseline		
TSS	mg/	9	17	50	50* <sup>3</sup>	Haputhale	data	Constructer through	RDA/ESD
BOD <sub>5</sub>	mg/L	0.1	0.13	30	30* <sup>3</sup>	Haputhale	Constriction stage:	approved monitoring	USA/ACA
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	Haputhale	4 time /year for 2	agency	
Oil and grease	mg/L	Not Detected	Not Detected	10	10* <sup>2</sup>	Haputhale	vears		
Coliform	MPN/100	7	08	40	400* <sup>2</sup>	Haputhale	700,3		
E-coli	MPN/100	Not Detected	Not Detected			Haputhale		1	

ltem	Unit	measured	measured	National	international	1	Remari	ks	
		value (mean)	value (max)*1	Standards (max)*1	Guidelines	Location	Frequency	Implementation	Supervision
EC	S/m	0.122	0.134	=	-	Bandarawela			
рH		6.76	6.8	6-8.5	6-9* <sup>2</sup>	Bandarawela	Design Stage		
DO	mg/L	10.06	10.6	<u>-</u>	-	Bandarawela	1 time as a	Constructer through approved monitoring agency	RDA/ESD
Turbidity	mg/L	0.08	0.16	-	0.2*3	Bandarawela	baseline data		
TSS	mg/L	11	33	50	50* <sup>3</sup>	Bandarawela			
BOD <sub>5</sub>	mg/L	0.72	1.9	30	30* <sup>3</sup>	Bandarawela	Constriction stage:		
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	Bandarawela	4 time /year for 2		
Oil and grease	mg/L	0.2	0.6	10	10*2	Bandarawela	years		
Coliform	MPN/100	4.33	13	40	400* <sup>2</sup>	Bandarawela			
E-coli	MPN/100	Not Detected	Not Detected			Bandarawela			

## Mitigation Measures Water Quality (Effluent/Wastewater)

#### 1). Design and Construction Stage

ltem	Unit	measured	measured	National	International		Remark	S	
		value (mean)	value (max)*1	Standards (max)*1	Guidelines	Location	Frequency	Implementation	Supervision
EC	S/m	0.138	0.162	-	-	Ella			
pН		6.7	6.9	6-8.5	6-9*2	Ella			
DO	mg/L	9.3	9.5	-	-	Ella	<u>Design Stage</u>	Constructer through approved monitoring	•
Turbidity	mg/L	0.11	0.17	-	0.2*3	Ella	1 time as a baseline		1
TSS	mg/	17	51	50	50* <sup>3</sup>	Ella	data		RDA/ESD
BOD <sub>5</sub>	mg/L	0.803	1.21	30	30* <sup>3</sup>	Ella	Constuiction stage:		KDAUESD
Lead	mg/L	0.0026	0.008	0.1	0.01*2	Ella	4 time /year for 2	ugene,	
Oil and grease	mg/L	Not Detected	Not Detected	10	10* <sup>2</sup>	Ella	years		
Coliform	MPN/100	3.3	08	40	400* <sup>2</sup>	Ella	years		
E-coli	MPN/100	Not Detected	Not Detected			Ella			

Item	Unit	measured	measured	National	international		Remark	s	
		value (mean)	value (max)*1	Standards (max)*1	Guidelines	Location	Frequency	Implementation	Supervision
EC	S/m	0.047	0.052	-	-	Uduwara			
pН		7.06	7.1	6-8.5	6-9* <sup>2</sup>	Uduwara	<u>Design Stage</u>		
DO	mg/L	10.63	11.9	-	-	Uduwara	1 time as a		
Turbidity	mg/L	0.1	0.16	_	0.2*3	Uduwara	baseline data	Constructer through	
TSS	mg/L	6	18	50	50* <sup>3</sup>	Uduwara		approved monitoring	RDA/ESD
BOD <sub>5</sub>	mg/L	1.46	1.6	30	30* <sup>3</sup>	Uduwara	Construction stage:	agency	
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	Uduwara	4 time /year for 2		
Oil and grease	mg/L	Not Detected	Not Detected	10	10* <sup>2</sup>	Uduwara	years	!	
Coliform	MPN/100	Not Detected	Not Detected	40	400* <sup>2</sup>	Uduwara			
E-coli	MPN/100	Not Detected	Not Detected			Uduwara			

## Mitigation Measures Water Quality (Effluent/Wastewater)

#### 02). Operation Stage

Item	Unit	measured	measured	National	International		Remar	ks	
		value (mean)	value (max)*1	Standards (max)*1	Guidelines	Location	Frequency	Implementation	Supervision
EC	S/m	0.071	0.078	-	-	Walhaputhenna 1&2			
pН		6.76	6.8	6-8.5	6-9* <sup>2</sup>	Walhaputhenna 1&2	]		
DO	mg/L	9.7	10.1	-	-	Walhaputhenna 1&2	]		
Turbidity	mg/L	Not Detected	Not Detected	-	0.2* <sup>3</sup>	Walhaputhenna 1&2	]		
TSS	mg/L	Not Detected	Not Detected	50	50* <sup>3</sup>	Walhaputhenna 1&2	2 times/year for 2	RDA though	RDA/ESD
BOD₅	mg/L	0.58	1.3	30	30* <sup>3</sup>	Walhaputhenna 1&2	year	approved monitoring agency	KDA/ESD
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	Walhaputhenna 1&2	]	agency	
Oil and grease	mg/L	Not Detected	Not Detected	10	10* <sup>2</sup>	Walhaputhenna 1&2	1		
Coliform	MPN/100	Not Detected	Not Detected	40	400* <sup>2</sup>	Walhaputhenna 1&2	7		
E-coli	MPN/100	Not Detected	Not Detected			Walhaputhenna 1&2	7		

item	Unit	measured	measured	National	international		Remark	(S	
		value (mean)	value (max)*1	Standards (max)*1	Guidelines	Location	Frequency	Implementation	Supervision
EC	S/m	0.118	0.131	<del>-</del> .		Kahagalla			
рH		6.73	6.8	6-8.5	6-9* <sup>2</sup>	Kahagalla			
DO	mg/L	9	9.4	-	-	Kahagalla			
Turbidity	mg/L	0.03	0.06	-	0.2*3	Kahagalla		RDA though	
TSS	mg/L	0.33	1	50	50* <sup>3</sup>	Kahagalla	2 times/year for 2	approved monitoring	RDA/ESD
BOD <sub>5</sub>	mg/L	0.70	0.91	30	30* <sup>3</sup>	Kahagalla	year	agency	
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	Kahagalla			
Oil and grease	mg/L	Not Detected	Not Detected	10	10* <sup>2</sup>	Kahagalla			
Coliform	MPN/100	2	2	40	400* <sup>2</sup>	Kahagalla	]		
E-coli	MPN/100	Not Detected	Not Detected			Kahagalla			

<sup>\*1:</sup> National Environmental (protection and Quality) Regulation, CEA (2008)

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

Item	Unit	measured	measured	National	international		Remarl	KS .	
		value (mean)	value (max)*1	Standards (max)*1	Guidelines	Location	Frequency	Implementation	Supervision
EC	S/m	0.30	0.564	-	_	2 <sup>nd</sup> mile post			
pН		6.76	6.8	6-8.5	6-9* <sup>2</sup>	2 <sup>nd</sup> mile post	<del>-</del>		
DO	mg/L	9.8	10.2	-	-	2 <sup>nd</sup> mile post			
Turbidity	mg/L	Not Detected	Not Detected	-	0.2*3	2 <sup>nd</sup> mile post	7	RDA though	
TSS	mg/L	0.33	01	50	50* <sup>3</sup>	2 <sup>nd</sup> mile post	2 times/year for 2	approved monitoring	RDA/ESD
BOD <sub>5</sub>	mg/L	0.29	0.33	30	30* <sup>3</sup>	2 <sup>nd</sup> mile post	year	agency	
Lead	mg/L	Not Detected	Not Detected	0.1	0.01*2	2 <sup>nd</sup> mile post			
Oil and grease	mg/L	Not Detected	Not Detected	10	10* <sup>2</sup>	2 <sup>nd</sup> mile post			
Coliform	MPN/100	2.6	6	40	400* <sup>2</sup>	2 <sup>nd</sup> mile post			
E-colî	MPN/100	Not Detected	Not Detected			2 <sup>nd</sup> mile post			

<sup>\*1:</sup> National Environmental (protection and Quality) Regulation, CEA (2008)

<sup>\*3:</sup> ADB guideline and standards in relation to waste water Reuse (2011), Main usage- "All nondrinking water uses

<sup>\*2:</sup>IFC EHS general guideline, for Sanitary Sewage Discharge (2007)

<sup>\*3:</sup> ADB guideline and standards in relation to waste water Reuse (2011), Main usage- "All nondrinking water us

#### Noise

1). Design and construction Stage

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

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

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

#### Noise

1). Design and construction Stage

lb.a	0		Measured value (mean)	measured value (max)*1	National Standards(max)*1	World Bank Guideline*2	Remarks				
Item	One-hour Laeq	Unit					Location	Frequency	Implementation	Supervision	
Noise*1	Day time (7.00-22.00) Design/Construction		70	88	50/75	55	Haputhale	Design Stage 1 time as a baseline data	Constriction		
	Night time (22.00-7.00) Design/Construction	db(A)	No work	No work	40/50	45	Haputhale	Constriction stage: 4 time /year for 2 years		RDA/ESD	

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

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

#### Noise

1). Design and construction Stage

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

ltem	One-hour Laeg	Unit	measured value (mean)	measured	National	World Bank		Rer	narks	
item	One-nour Laeq	Onit	(,	value (max)*1	Standards(max)*1	Guideline*2	Location	Frequency	Implementation	Supervision
-	Day time (7.00-22.00) Design/Construction		673	85	50/75	55	Uduwara	Design Stage 1 time as a baseline data		
Noise*1	Night time (22.00-7.00) Design/ Construction	db(A)	No work	No work	40/50	45	Uduwara	Constriction stage: 4 time /year for 2 years	Constriction through approved monitoring stage	RDA/ESD

<sup>\*1:</sup> 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

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

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

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

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

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

#### Vibration

#### 1). Design Stage

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

#### 1). Design Stage

			Bioneurod	mongurad				Remarl	<b>(</b> 5	
Item	Unit	Frequency Band	Measured Value (mean)	measured value (max)	National Standards(max)*1	international Guidelines	Location	Frequency	Implementation	Supervision
		0-10Hz			1	<del></del>		1 time with identification of	Constructer through	
Vibration	mm/sec	10-50Hz			2			noise barriers	approved	RDA/ESD
		Over 50Hz	0.55	0.72	4		Uduwara	requirement location	monitoring agency	

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

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

#### Vibration

#### 2). Construction Stage

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

#### 2). Construction Stage

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

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

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

#### Vibration

#### 2). Construction Stage

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

#### 2). Construction Stage

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

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

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

#### Vibration

### 3). Operation Stage

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

		Frequency	Measured	measured	National	nal international		Remarks				
Item	Unit	Band	Value (mean)	value (max)	Standards(max)*1	Guidelines	Location	Frequency	Implementation	Supervision		
		0-10Hz			1			Every 6 months during stage, and				
vibration	mm/sec	10-50Hz			2			on complain at the construction	RDA through approved	RDA/ESD		
, vibration	111111111111111111111111111111111111111							site	monitoring agency			
		Over 50Hz	0.46	0.53	4		Kahagalla					

#### Vibration

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

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

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

#### 4.Groundwater Level

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

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

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		Operation Stage				2 times with an interval of 6 months for 3 year time	DRA through approved monitoring agency	
ltem	Unit	Stage	Measured	Measured		Re	emarks	
1.0111	July Stage		Value	value (Max)	Location	Frequency	Implementation	Supervision
		Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	
Ground Water Level	m	Construction Stage			Haputhale	On Complain		RDA/ESD
		Operation Stage				2 times with an interval of 6 months for 3-year time	DRA through approved monitoring agency	

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Item	Unit	Stage	Measured Value	Measured value (Max)	Remarks				
Item	O				Location	Frequency	Implementation	Supervision	
Ground Water Level	m	Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	•	
		Construction Stage			Ella	On Complain	36450		

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

		C+	Measured	Measured Measured		Remarks				
ltem	Unit	Stage	Value	value (Max)	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				

		Operation Stage				2 times with an interval of 6 months for 3 year time	DRA through approved monitoring agency	
ltem	Unit	Stage	Measured	Measured		Re	emarks	
166111	Ome	Jtage	Value	value (Max)	Location	Frequency	Implementation	Supervision
		Design Stage				2 times during dry and wet season	Constriction through approved monitoring stage	
Ground Water Level	m	Construction Stage				On Complain		RDA/ESD
	-	Operation Stage			Walhaputhenna 1&2	2 times with an interval of 6 months for 3-year time	DRA through approved monitoring agency	

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

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

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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

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	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.

