

# Addendum to the Environmental Impact Assessment

September 2017  
Project Number: 47381-001

## SRI: Mahaweli Water Security Investment Program

Tranche 1 and 2  
Upper Elahera Canal Project

Annexes 1 to 4

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

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## **ANNEX 1: ENVIRONMENTAL CODES OF PRACTICE**

## ENVIRONMENTAL CODE OF PRACTICE (ECOP) CHECKLIST

### Environmental screening on design changes of UEC-ICB-2A

**Site location:** UEC- ICB 2A- Proposed Southern portal of Tunnel 3 (SPT3)

**District Name:** Polonnaruwa

**DSD & GNDs:** Elahera DSD; Attanakadawala West GND

#### Climatic Conditions

Temperature	High: 25 °C Low: 35 °C
Humidity	High: 90% Low: 55%
Rainfall	1,000 mm - 900 mm
Rainy Season	November to February (North East monsoon)

#### Location and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain ( <del>Plain/ Undulating/ Hilly/ Mountainous etc.</del> ) (Explain the topography of the area)			Altitude: 541 feet MSL This area is with an undulating terrain associated with seasonal streams
2.	Forest Area / Mangrove / Other natural habitats (Explain whether there are forest areas or located along the forest areas and approximate distance to the forest area)?	✓		Type of Vegetation: The identified area for SPT <sub>3</sub> is a forest area, and falls within Elahera Girithale sanctuary.  Legal Status of the Forest Area: Elahera Girithale Sanctuary
3.	Inhabited Area		✓	
4.	Agricultural Land		✓	
5.	Barren Land		✓	
6.	Any other environmental significance observed	✓		Located across the elephant migratory path

#### Specific description of the Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems? (If yes, indicate the location whether Right or Left side and the chainage)	✓		Erosion possible if any deep cuts are made  ( ) No Secondary Information is available and Local Community is not aware of this matter

No.	Parameter/ Component	Yes	No	Explanation
2.	Are there any Tanks/streams /rivers etc. or any lakes/swamps beside in the area? (If yes, list them indicating the location)	✓		Stream crossing at N 07° 54.261; E 080° 49.355
3.	Is the project are prone to flooding or any problems of water stagnation and other drainage issues?	✓		There are some stream crossings in the area, hence there is possibility of water stagnation during the rainy season ( X ) No Secondary Information is available and Local Community is not aware of this matter
4.	Are there any trees with a dbh of 30 cm or more affected?	✓		
5.	Are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas?	✓		Refer Ecological survey findings in the section 3.3.1 of the report ( ) No Secondary Information is available and Local Community is not aware of this matter
6.	Is there any evidence of Flora and Fauna species that are classified as endemic, endangered /Threatened species?	✓		Three (03) endangered, Two (02) near Threatened and One (01) critically endangered Fauna species recorded. Five (05) endemic plant species, two (02) nationally endangered plant species, four (04) nationally vulnerable plant species, seven (07) nationally near threatened plant species recorded ( ✓ ) No Secondary Information Available and Local Community is not aware of this matter
7.	Is there any Alien Invasive fauna/flora species recorded?	✓		<i>Panicum maximum</i> (Rata Tana), <i>Lantana camara</i> (Gandapana), <i>Mimosa invisa</i>
8.	Are there any religious, cultural or community structures/buildings <sup>1</sup> within 50 m affected by the project? (If yes attach list with chainage)		✓	

<sup>1</sup> Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

### Suggested Alternatives

The latter part of the proposed road traverses through a good forest patch that will require felling a considerable number of trees. If the road can be turned from the point marked in the figure below (GPS N 07° 54.244; E 080° 49.492) and thus traversing a degraded area, mostly scrubland, it is possible to save some trees and wildlife habitat.



**Last 200 m of the Proposed Access to the Southern Portal of Tunnel 3 (SPT3)**

Photographs of the Project Area

Photo 1	Photo 2	Photo 3
		
Forest habitats found in the SPT3 area	Existing access trail through forest	Area associated with seasonal streams

## ENVIRONMENTAL CODE OF PRACTICE (ECOP) CHECKLIST

### Environmental screening on design changes of UEC-ICB-2A

**Site location:** UEC- ICB 2A- Proposed Permanent disposal site (DPS 1) and crushing plant

**District Name:** Polonnaruwa

**DSD & GNDs:** Elahera DSD; Attanakadawala West GND

### Climatic Conditions

Temperature	High: 25 °C Low: 35 °C
Humidity	High: 90% Low: 55%
Rainfall	1,000 mm - 900 mm
Rainy Season	November to February (North East monsoon)

### Location and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain ( <del>Plain/ Undulating/ Hilly/ Mountainous etc.</del> ) (Explain the topography of the area)			Altitude: 440 feet MSL This area is with an undulating terrain located at the right bank of the MEYE
2.	Forest Area / Mangrove / Other natural habitats (Explain whether there are forest areas or located along the forest areas and approximate distance to the forest area)?	✓		Type of Vegetation: The identified area for DPS1 is secondary vegetation on an old borrow site. Secondary forests Scrub jungle located within Elahera Girithale sanctuary.  Legal Status of the Forest Area: Elahera Girithale Sanctuary
3.	Inhabited Area	✓		Site entrance is located at the Elahera - Bakamoona main road (B112), and the inhabited area is along the road side
4.	Agricultural Land	✓		Home gardens and chena available
5.	Barren Land	✓		At present part of the proposed area is abandoned land - old borrow site
6.	Any other environmental significance observed	✓		Within 100 m distance, MEYE flows (Refer Figure D1)

### Specific description of the Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems? (If yes, indicate the location whether Right or Left side and the chainage)	✓		Erosion possible due to the undulating terrain sloping towards MEYE  ( ) No Secondary Information is available and Local Community is not aware of this matter



No.	Parameter/ Component	Yes	No	Explanation
2.	Are there any Tanks/streams /rivers etc. or any lakes/swamps beside in the area? (If yes, list them indicating the location)	✓		Minneriya Elahera Yoda Ela (MEYE)
3.	Is the project are prone to flooding or any problems of water stagnation and other drainage issues?		✓	High ground area ( X ) No Secondary Information is available and Local Community is not aware of this matter
4.	Are there any trees with a dbh of 30 cm or more affected?	✓		
5.	Are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas?	✓		Refer Ecological survey findings in the section 3.3.1 of the report
				( ) No Secondary Information is available and Local Community is not aware of this matter
6.	Is there any evidence of Flora and Fauna species that are classified as endemic, endangered /Threatened species?	✓		Refer Ecological survey findings in the section 3.3.1 of the report
				( ✓ ) No Secondary Information Available and Local Community is not aware of this matter
7.	Is there any Alien Invasive fauna/flora species recorded?	✓		<i>Panicum maximum</i> (Rata Tana), <i>Lantana camara</i> (Gandapana), <i>Mimosa invisa</i>
8.	Are there any religious, cultural or community structures/buildings <sup>2</sup> within 50 m affected by the project?	✓		Elahera road (B 112) and associated structures MEYE Canal Elephant Fence (access to the site is through elephant fence)

### Suggested Alternatives / mitigations

As shown in the figure below, the location is associated with sensitive areas such as a main road, a residential area and MEYE canal, and hence appropriate mitigation measures are required. Updated EMP and conditional approval of EIA by CEA/DWC described general migratory measures. However, the adequacy of the borrow site needs to be verified.




<sup>2</sup> Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures





**Proposed Permanent Disposal site and Location for Crushing Plant (DPS1)**

Photographs of the Project Area

Photo 1	Photo 2	Photo 3
		
Present land use	Elephant fence and road at the eastern boundary of the site	Old borrow pit

## ENVIRONMENTAL CODE OF PRACTICE (ECOP) CHECKLIST

### Environmental screening on design changes of UEC-ICB-2A

**Site location:** UEC- ICB-2A - Proposed Temporary disposal site (DPS 2) and access

**District Name:** Polonnaruwa

**DSD & GNDs:** Elahera DSD; Konduruwawa GND

### Climatic Conditions

Temperature	High: 25 °C Low: 35 °C
Humidity	High: 90% Low: 55%
Rainfall Rainy Season	1,000 mm - 900 mm November to February (North East monsoon)

### Location and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain ( <del>Plain/ Undulating/ Hilly/ Mountainous etc.</del> ) (Explain the topography of the area)			Altitude: 430 feet MSL This area is undulating terrain
2.	Forest Area / Mangrove / Other natural habitats (Explain whether there are forest areas or located along the forest areas and approximate distance to the forest area)?	✓		Type of Vegetation: The identified area for DPS2 is a disturbed forest habitat/scrub jungle located within Elahera Girithale sanctuary.  Legal Status of the Forest Area: Elahera Girithale Sanctuary
3.	Inhabited Area		✓	Inhabited area is located about 100 m away from the location/ beyond the electric fence
4.	Agricultural Land		✓	About 100 m away from the location/ beyond the electric fence
5.	Barren Land		✓	
6.	Any other environmental significance observed	✓		Located across the elephant migratory path

### Specific description of the Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems? (If yes, indicate the location whether Right or Left side and the chainage)		✓	( ) No Secondary Information is available and Local Community is not aware of this matter

No.	Parameter/ Component	Yes	No	Explanation
2.	Are there any Tanks/streams /rivers etc. or any lakes/swamps beside in the area? (If yes, list them indicating the location)	✓		The access road to DPS2 crosses Minneriya Elahera Yoda Ela (MEYE) at N 07° 54.643; E 80° 51.325
3.	Is the project are prone to flooding or any problems of water stagnation and other drainage issues?		✓	( X ) No Secondary Information is available and Local Community is not aware of this matter
4.	Are there any trees with a dbh of 30 cm or more affected?	✓		
5.	Are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas?	✓		Refer Ecological survey findings in the section 3.3.1 of the report
				( ) No Secondary Information is available and Local Community is not aware of this matter
6.	Is there any evidence of Flora and Fauna species that are classified as endemic, endangered /Threatened species?	✓		Refer Ecological survey findings in the section 3.3.1 of the report
				( ✓ ) No Secondary Information Available and Local Community is not aware of this matter
7.	Is there any Alien Invasive fauna/flora species recorded?	✓		<i>Panicum maximum</i> (Rata Tana), <i>Lantana camara</i> (Gandapana), <i>Mimosa invisa</i>
8.	Are there any religious, cultural or community structures/buildings <sup>3</sup> within 50 m affected by the project? (If yes attach list with chainage)		✓	

### Suggested Alternatives / mitigations

The identified area is in disturbed habitat with scrubland, and it is close to human settlements and cultivated areas. Still the location falls within the Elahera - Girithale sanctuary area within the elephant fence. Hence, mitigatory measures to be followed as per updated EMP and conditional approvals of CEA/DWC, to avoid disturbances to the existing wildlife and surrounding habitats.

<sup>3</sup> Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures



**Proposed Access to the Temporary Disposal Site (DPS2)**

## Groundwater Monitoring

<i>Bore Hole No</i>	<i>UEBH 01</i>	<i>UEBH 02</i>	<i>UEBH 03</i>	<i>UEBH 04</i>
<i>Longitude</i>	197150E	197194E 324862	196760E	196591E
<i>Latitude</i>	324726N 54+165	N 54+285 km	325229N 54+850	325400N 55+085
<i>Chain age</i>	km 150.65m	153.37m	km 148.65m	km 149.10m
<i>Ground Level (MSL)</i>				
<b>Date</b>	<b>Ground Water Level (MSL)</b>			
22-Feb-17	147.750	148.820	148.600	145.500
9-Mar-17	147.450	148.420	148.575	145.330
23-Mar-17	147.700	149.350	148.600	145.700
6-Apr-17	147.500	148.620	148.300	145.200
20-Apr-17	147.100	148.420	147.990	145.150
4-May-17	146.730	148.030	147.650	144.850
18-May-17	146.500	147.670	147.600	144.570
31-May-17	146.400	147.520	147.505	144.400

1.

<i>Dug Well No</i>	<i>DW 01 196777E</i>	<i>DW 02 196659E</i>	<i>DW 03 196709E</i>	<i>DW 04 196709E</i>
<i>Longitude</i>	325205N	325240 N	325337N	325337N
<i>Latitude</i>	54+819 km # m	54+873 km # m	54+927 km # m	54+953 km # m
<i>Chain age</i>				
<i>Ground Level (MSL)</i>				
<b>Date</b>	<b>Ground Water Level (MSL)</b>			
22-Feb-17	0.200	0.580	0.750	2.050
9-Mar-17	0.250	0.650	0.850	2.820
23-Mar-17	0.150	0.490	0.820	2.250
6-Apr-17	0.140	0.800	1.180	2.730
20-Apr-17	0.250	1.750	1.450	2.550
4-May-17	0.550	1.750	1.800	3.550
18-May-17	0.680	1.800	1.940	3.250
31-May-17	0.700	1.650	1.920	2.800

2.



**Photographs of the Project Area**

Photo 1	Photo 2	Photo 3
		



## ENVIRONMENTAL CODE OF PRACTICE (ECOP) CHECKLIST

### Environmental screening on design changes of UEC-ICB-2A

**Site location:** UEC- ICB-2A - Proposed Temporary disposal site and batching plant (DPS 3) and access

**District Name:** Polonnaruwa

**DSD & GNDs:** Elahera DSD; Attanakadawala West GND

#### Climatic Conditions

Temperature	High: 25 °C Low: 35 °C
Humidity	High: 90% Low: 55%
Rainfall	1,000 mm - 900 mm
Rainy Season	November to February (North East monsoon)

#### Location and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain ( <del>Plain/ Undulating/ Hilly/ Mountainous etc.</del> ) (Explain the topography of the area)			Altitude: 443 feet MSL This area is undulating terrain associated with seasonal streams
2.	Forest Area / Mangrove / Other natural habitats (Explain whether there are forest areas or located along the forest areas and approximate distance to the forest area)?	✓		Type of Vegetation: The identified area for DPS3 is a disturbed forest habitat and falls within Elahera Girithale sanctuary.  Legal Status of the Forest Area: Elahera Girithale Sanctuary
3.	Inhabited Area		✓	
4.	Agricultural Land	✓		Degraded forest habitat is due to the abandoned chena/ agriculture in the DPS 3 area
5.	Barren Land		✓	
6.	Any other environmental significance observed	✓		Located across the elephant migratory path and associated with stream network

#### Specific description of the Environment

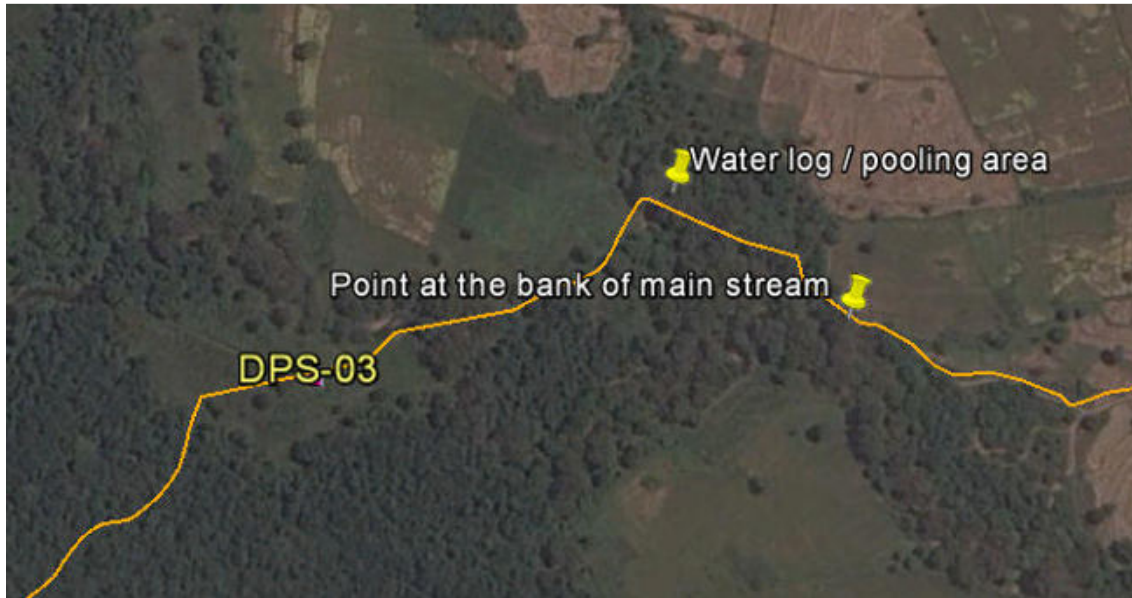
No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems? (If yes, indicate the location whether Right or Left side and the chainage)	✓		Erosion possible if any deep cuts made as there is loose soil  ( ) No Secondary Information is available and Local Community is not aware of this matter

No.	Parameter/ Component	Yes	No	Explanation
2.	Are there any Tanks/streams /rivers etc. or any lakes/swamps beside in the area? (If yes, list them indicating the location)	✓		Stream crossing at via access <ul style="list-style-type: none"> <li>N 07o 54.821; E 080o 50.208</li> <li>N 07o 54.830; E 080o 50.257</li> <li>N 07o 54.857; E 080o 50.356</li> <li>N 07o 54.825; E 080o 50.370 (this point is very close to the main stream)</li> </ul>
3.	Is the project are prone to flooding or any problems of water stagnation and other drainage issues?	✓		There are some stream crossings in the area, hence there is possibility of water stagnation during the rainy season Water logged area and pooling section is at N 07° 54.871; E 080° 50.307 ( X ) No Secondary Information is available and Local Community is not aware of this matter
4.	Are there any trees with a dbh of 30 cm or more affected?	✓		
5.	Are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas?	✓		Refer Ecological survey findings in the section 3.3.1 of the report ( ) No Secondary Information is available and Local Community is not aware of this matter
6.	Is there any evidence of Flora and Fauna species that are classified as endemic, endangered /Threatened species?	✓		Refer Ecological survey findings in the section 3.3.1 of the report ( ✓ ) No Secondary Information Available and Local Community is not aware of this matter
7.	Is there any Alien Invasive fauna/flora species recorded?	✓		<i>Panicum maximum</i> (Rata Tana), <i>Lantana camara</i> (Gandapana), <i>Mimosa invisa</i> , <i>Leucaena leucocephala</i> (Ipil Ipil)
8.	Are there any religious, cultural or community structures/buildings <sup>4</sup> within 50 m affected by the project? (If yes attach list with chainage)		✓	

<sup>4</sup> Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures




### **Suggested Alternatives / mitigations**

The area is associated with a good stream network and the bank of the main stream and water logged area is close to the access to DPS3. Since the batching plant is to be installed here, precautions need to be taken to avoid waste water discharges to the natural stream network. Further, dust and sedimentation impacts could be significant during the construction stage, hence appropriate mitigation actions will need to be taken.



**Proposed Access to the Temporary Disposal and Batching Plant (DPS3)**

**Photographs of the Project Area**

Photo 1	Photo 2	Photo 3
		
Main Stream crossing along access to DPS 3 and closer to batching plant	Small stream crossing found along access	Water pooling area during rainy season

## ENVIRONMENTAL CODE OF PRACTICE (ECOP) CHECKLIST

### Environmental screening on design changes of UEC-ICB-2A

**Site location:** UEC- ICB 2A- Proposed disposal site for Tunnel 3 & 4 Northern Portal (DPN3)

**District Name:** Anuradhapura

**DSD & GND:** Palugaswewa DSD ; Eppawela GND

### Climatic Conditions

Temperature	High: 25 °C Low: 35 °C
Humidity	High: 90% Low: 55%
Rainfall	1,000 mm - 900 mm
Rainy Season	November to February (North East monsoon)

### Location and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain ( <del>Plain/ Undulating/ Hilly/ Mountainous etc.</del> ) (Explain the topography of the area)			Altitude: 485 feet MSL Undulating
2.	Forest Area / Mangrove / Other natural habitats (Explain whether there are forest areas or located along the forest areas and approximate distance to the forest area)?		✓	Type of Vegetation: Abandoned land connected with home garden and Teak plantation  Legal Status of the Forest Area: Village/ state forests under Forest department
3.	Inhabited Area	✓		Location close to a road (Palugawewa-Yakalla). One residential house belongs to Mr Nimal Rajakaruna, 5th mile post, Namal pura, Galenbindunuwewa Tel: 0775431079 There are about 8 houses within 100 m of the proposed area
4.	Agricultural Land	✓		Seasonal agriculture lands fed by nearby small tanks and rain
5.	Barren Land	✓		Abandoned seasonal cultivated lands
6.	Any other environmental significance observed		✓	

## Specific description of the Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems? (If yes, indicate the location whether Right or Left side and the chainage)		✓	( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any Tanks/streams /rivers etc. or any lakes/swamps beside in the area? (If yes, list them indicating the location)		✓	
3.	Is the project are prone to flooding or any problems of water stagnation and other drainage issues?		✓	( x ) No Secondary Information is available and Local Community is not aware of this matter
4.	Are there any trees with a dbh of 30 cm or more affected?	✓		
5.	Are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas?	✓		Refer Ecological survey findings in the section 3.3.1 of the report
				( ) No Secondary Information is available and Local Community is not aware of this matter
6.	Is there any evidence of Flora and Fauna species that are classified as endemic, endangered /Threatened species?	✓		Refer Ecological survey findings in the section 3.3.1 of the report
				( ✓ ) No Secondary Information Available and Local Community is not aware of this matter
7.	Is there any Alien Invasive fauna/flora species recorded?	✓		<i>Panicum maximum</i> (Rata Tana), <i>Lantana camara</i> (Gandapana), <i>Leucaena leucocephala</i> (Ipil Ipil)
8.	Are there any religious, cultural or community structures/buildings <sup>5</sup> affected by the project?	✓		The residents and electricity line are located along the access road

<sup>5</sup> Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures



## Suggested Alternatives / Mitigations

As shown in the following diagram, the proposed area is associated with human settlements and a main access road and hence appropriate mitigation measures will need to be followed. The Volume 2 Updated EMP describes general migratory measures. The proposed disposal area is very close to the house of Mr. Nimal Rajakaruna, which might cause disturbances to his daily life.



Land Uses in the Proposed Area

ID	Area Description	Area (ha)
A	Contractor's Office	8.19
	Worker's Quarters	
	Segment Factory	
	Segment Stock Yard	
	Batching Plant	
B	Main Site	5.01
C	Stilling Pond	0.95
D	Employer's/ Engineer's Office/Accommodation	1.80
DPN-01		3.54
DPN-02	Proposed Disposal Sites	3.98



## Photographs of the Project Area



House adjacent to DPN 3

## ENVIRONMENTAL CODE OF PRACTICE (ECOP) CHECKLIST

### Environmental screening on design changes of UEC-ICB-2A

**Site location:** UEC- ICB-2A - Proposed access shaft (Temporary Ventilation shaft) (AS)

**District Name:** Polonnaruwa

**DSD & GNDs:** Hingurakgoda DSD; Mahasengama GND

#### Climatic Conditions

Temperature	High: 25 °C Low: 35 °C
Humidity	High: 90% Low: 55%
Rainfall Rainy Season	1,000 mm - 900 mm November to February (North East monsoon)

#### Location and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain ( <del>Plain/ Undulating/ Hilly/ Mountainous etc.</del> ) (Explain the topography of the area)			Altitude: 610 feet MSL This is an area of almost flat terrain located adjacent to the Moragaswewa - Ilukwewa road (B294)
2.	Forest Area / Mangrove / Other natural habitats (Explain whether there are forest areas or located along the forest areas and approximate distance to the forest area)?	✓		Type of Vegetation: The identified area for AS is within a disturbed forest, located road side.  Legal Status of the Forest Area: The site is within at the edge of Minneriya National park and Seegiriya sanctuary
3.	Inhabited Area	✓		Not residential, but B 294 road is connected with access road to Seegiriya and some hotels. Hence, lot of local and foreign tourists access this road
4.	Agricultural Land		✓	
5.	Barren Land		✓	
6.	Any other environmental significance observed	✓		The site is within at the edge of Minneriya National park and Seegiriya sanctuary

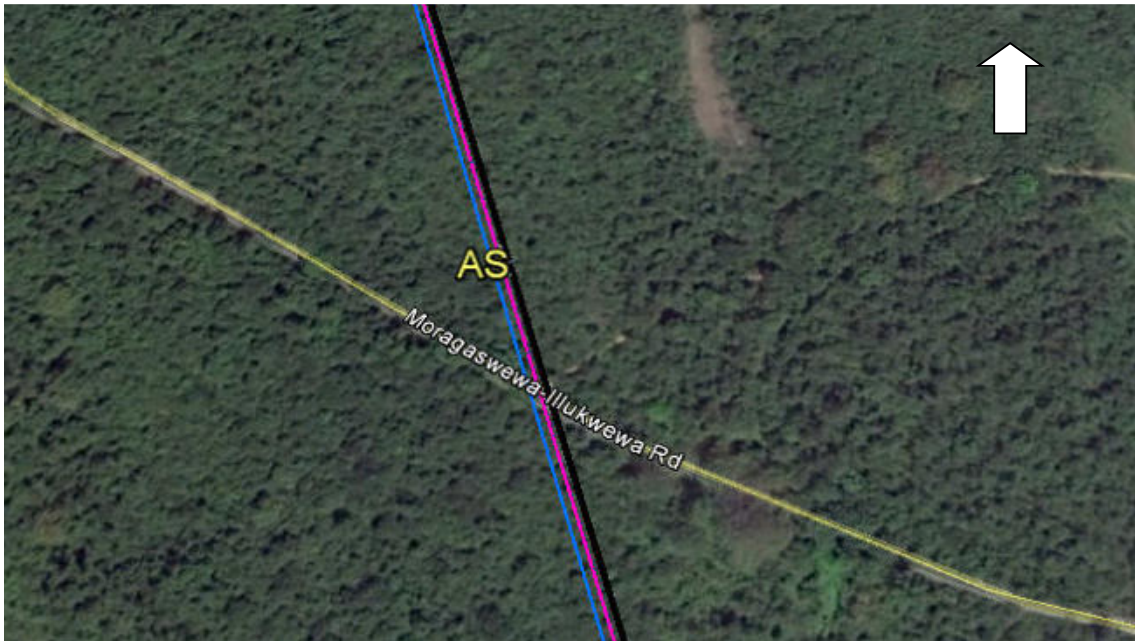
## Specific description of the Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems? (If yes, indicate the location whether Right or Left side and the chainage)		✓	( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any Tanks/streams /rivers etc. or any lakes/swamps beside in the area? (If yes, list them indicating the location)		✓	
3.	Is the project are prone to flooding or any problems of water stagnation and other drainage issues?		✓	High ground area ( X ) No Secondary Information is available and Local Community is not aware of this matter
4.	Are there any trees with a dbh of 30 cm or more affected?	✓		
5.	Are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas?	✓		Refer Ecological survey findings in the section 3.3.1 of the report ( ) No Secondary Information is available and Local Community is not aware of this matter
6.	Is there any evidence of Flora and Fauna species that are classified as endemic, endangered /Threatened species?		✓	Refer Ecological survey findings in the section 3.3.1 of the report ( ✓ ) No Secondary Information Available and Local Community is not aware of this matter
7.	Is there any Alien Invasive fauna/flora species recorded?	✓		Lantana camara (Gandapana)
8.	Are there any religious, cultural or community structures/buildings <sup>6</sup> affected by the project?	✓		About 1 km away from the site, there a religious place (Gallinda historic shrine/ devalaya). The access road (jeep track) going towards the North is to a hotel (Ji-wes Hide Out Forest Region)

<sup>6</sup> Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

**Suggested Alternatives / mitigations**

As shown below, the location is associated with sensitive habitats such as a main road leading to tourist hotels and forest within a protected area. Hence appropriate mitigation measures need to be followed. The Volume 2 Updated EMP and conditional approval to EIA by CEA/ DWC describes general migratory measures.



**Proposed Access Shaft (Temporary Ventilation shaft) (AS)**

**Photographs of the Project Area**

Photo 1	Photo 2	Photo 3
Present land use (Moragaswewa-Illukwewa road)		

## ENVIRONMENTAL CODE OF PRACTICE (ECOP) CHECKLIST

### Environmental screening on design changes of UEC-ICB-2A

**Site location:** UEC- ICB-2A - Proposed areas for construction facilities of Northern start shaft of Tunnel 3 & 4 (site establishment area A-D and disposal sites DPN 1 and DPN 2) and main camp

**District Name:** Anuradhapura

**DSD & GND:** Palugawewa DSD and Madawala GND

### Climatic Conditions

Temperature	High: 25 °C Low: 35 °C
Humidity	High: 90% Low: 55%
Rainfall Rainy Season	1,000 mm - 900 mm November to February (North East monsoon)

### Location and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain ( <del>Plain/ Undulating/ Hilly/ Mountainous etc.</del> ) (Explain the topography of the area)			Altitude: 525 feet MSL Flat terrain
2.	Forest Area / Mangrove / Other natural habitats (Explain whether there are forest areas or located along the forest areas and approximate distance to the forest area)?		✓	Type of Vegetation: The area identified as Block A-D and DPN 1 and DPN 2 are located adjacent to each other in State land of about 30 ha. There is no natural habitat in the area and main vegetation type is degraded forest and scrubland used for seasonal cultivation.  Legal Status of the Forest Area: NA
3.	Inhabited Area	✓		The area is close to a small township, and the access to the area has some residential houses. The existing jeep track to the area is used by the villagers as their cultivated lands are located adjacent to the proposed sites
4.	Agricultural Land	✓		Seasonal agriculture lands fed by nearby small tanks (Maha meegas wewa tank and Madugaha wewa tank)
5.	Barren Land	✓		Abandoned seasonal cultivated lands
6.	Any other environmental significance observed		✓	

## Specific Description of the Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems? (If yes, indicate the location whether Right or Left side and the chainage)		✓	( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any Tanks/streams /rivers etc. or any lakes/swamps beside in the area? (If yes, list them indicating the location)	✓		Small tanks (Maha meegas wewa tank and Madugaha wewa tank). Access road from palugaswewa cross Yan Oya at N 08° 07.598; E 80° 44.184
3.	Is the project are prone to flooding or any problems of water stagnation and other drainage issues?		✓	( x ) No Secondary Information is available and Local Community is not aware of this matter
4.	Are there any trees with a dbh of 30 cm or more affected?	✓		
5.	Are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas?	✓		Refer Ecological survey findings in the section 3.3.1 of the report
				( ) No Secondary Information is available and Local Community is not aware of this matter
6.	Is there any evidence of Flora and Fauna species that are classified as endemic, endangered /Threatened species?	✓		Refer Ecological survey findings in the section 3.3.1 of the report
				( ✓ ) No Secondary Information Available and Local Community is not aware of this matter
7.	Is there any Alien Invasive fauna/flora species recorded?	✓		<i>Panicum maximum</i> (Rata Tana), <i>Lantana camara</i> (Gandapana), <i>Leucaena leucocephala</i> (Ipil Ipil)
8.	Are there any religious, cultural or community structures/buildings <sup>7</sup> affected by the project?		✓	The community structures used by Madawala village such as Madawala school, water tank, health centre, electricity line are located along the access road

## Suggested Alternatives / mitigations

As shown below, the proposed area, including the access road is close to human settlements, temple etc., and so appropriate mitigation need to be followed. The Volume 2 updated EMP and conditional approval or EIA by CEA/ DWC describe general migratory measures. The proposed location for the facilities is an already disturbed habitat due to clearing lands for seasonal cultivations.

<sup>7</sup> Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures









Land Use in the Proposed Area

ID	Area Description	Area (ha)
A	Contractor's Office	8.19
	Worker's Quarters	
	Segment Factory	
	Segment Stock Yard	
	Batching Plant	
B	Main Site	5.01
C	Stilling Pond	0.95
D	Employer's/ Engineer's Office/Accommodation	1.80
DPN-01		3.54
DPN-02	Proposed Disposal Sites	3.98



Photographs of the Project Area

Photo 1	Photo 2	Photo 3
		
Identified area for block B & C	Identified area for DPN 2	Identified area for A&D blocks
Photo 4		
		
Temple located adjacent to block D		

## ENVIRONMENTAL CODE OF PRACTICE (ECOP) CHECKLIST

### Environmental screening on design changes of UEC-ICB-2B (KMTC)

**Site location:** UEC- ICB 2B- Proposed access road improvements and disposal site (DP 3) for KMTC

**District Name:** Matale

**DSD & GNDs:** Laggala - Pallegama DSD; road section “e” comes under Pottewela GND and new road section “f” and DP3 in Kambarawa GND

### Climatic Conditions

Temperature	High: 26°C Low: 29°C
Humidity	Average: 82 %
Rainfall Rainy Season	1,750-1,500 mm annual average rainfall, mainly during May to September from North East Monsoon

### Location and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain ( <del>Plain/ Undulating/ Hilly/ Mountainous etc.</del> ) (Explain the topography of the area)			Altitude: above 1,000 feet MSL This area is hilly terrain located adjacent to the Knuckles conservation forest area
2.	Forest Area / Mangrove / Other natural habitats (Explain whether there are forest areas or located along the forest areas and approximate distance to the forest area)?	✓		Type of Vegetation: Road sections “c” and “d” to be improved are within the Knuckles conservation forest boundary and other areas are within the buffer zone of Knuckles comes under the jurisdiction of Forest Ordinance (Forest Department) DP 3 is located on abandoned agriculture land of the relocated community under Kaluganga / Moragahakanda project  Legal Status of the Forest Area: Forest Ordinance (Forest Department)
3.	Inhabited Area	✓		The last settlement is at Laggala and after that (end of road section “d”) no inhabitant areas
4.	Agricultural Land		✓	
5.	Barren Land		✓	
6.	Any other environmental significance observed	✓		The area is rich with stream network and wildlife associated with Knuckles buffer zone. Further there is a significant pressure on wildlife movements due to Moragahakanda and Kaluganga inundation.

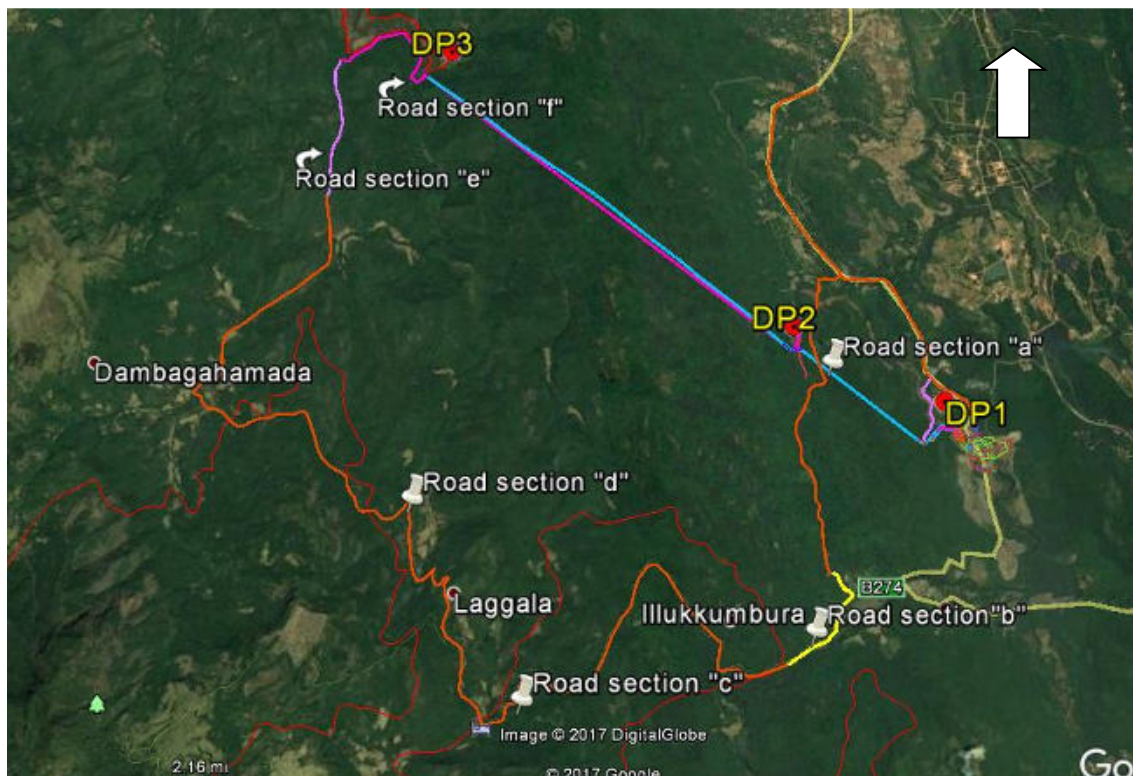
## Specific description of the Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems? (If yes, indicate the location whether Right or Left side and the chainage)	✓		Due to hilly terrain and as per NBRO zoning map this area is prone to erosion and land slides ( ) No Secondary Information is available and Local Community is not aware of this matter
2.	Are there any Tanks/streams /rivers etc. or any lakes/swamps beside in the area? (If yes, list them indicating the location)	✓		<ul style="list-style-type: none"> <li>• Moragahakanda reservoir</li> <li>• Kaluganga reservoir (under construction)</li> <li>• Stream cross 1 at No7° 36.839; E 80° 45.883</li> <li>• Stream cross 2 at No7° 36.625; E 80° 45.914</li> <li>• Stream cross 3 at No7° 36.381; E 80° 45.833</li> <li>• Stream cross 4 at No7° 36.224; E 80° 45.767</li> </ul>
3.	Is the project are prone to flooding or any problems of water stagnation and other drainage issues?		✓	High ground area ( X ) No Secondary Information is available and Local Community is not aware of this matter
4.	Are there any trees with a dbh of 30 cm or more affected?	✓		
5.	Are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas?	✓		Refer Ecological survey findings in the section 3.3.1 of the report ( ) No Secondary Information is available and Local Community is not aware of this matter
6.	Is there any evidence of Flora and Fauna species that are classified as endemic, endangered /Threatened species?		✓	Refer Ecological survey findings in the section 3.3.1 of the report ( ✓ ) No Secondary Information Available and Local Community is not aware of this matter
7.	Is there any Alien Invasive fauna/flora species recorded?	✓		<i>Panicum maximum</i> (Rata Tana), <i>Lantana camara</i> (Gandapana)
8.	Are there any religious, cultural or community structures/buildings <sup>8</sup> affected by the project?		✓	

<sup>8</sup> Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

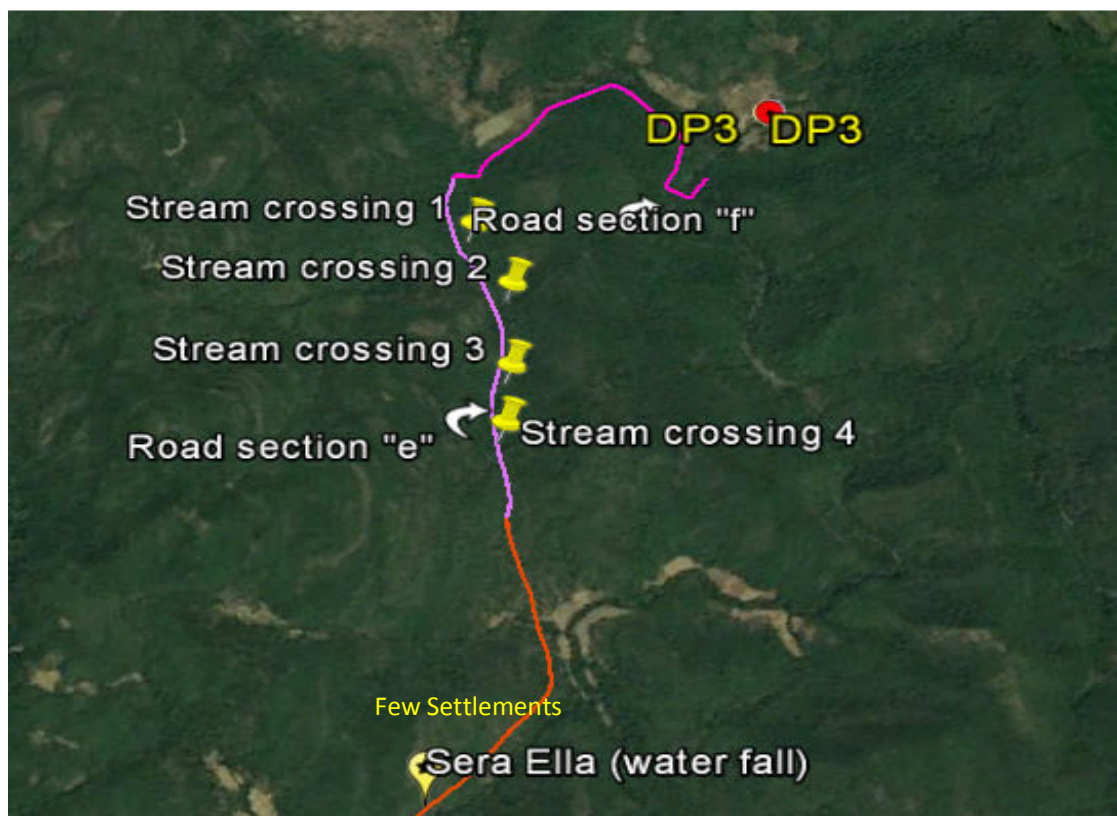
### Suggested Alternatives / mitigations

1. The road sections of “c” and “d” pass through the Knuckles conservation forest area and hence the rehabilitation work needs to be done with minimum disturbance to the associated environmental sensitive habitats, fauna and flora. Precautions need to be taken to avoid spreading of invasive species during construction.
2. Road section “e” is an existing jeep track, which need more rehabilitation to allow for the passage of construction vehicles. This area is within the Knuckles buffer zone. There are 4 stream crossings noted along the road section, and the Kambarawa Oya flows by the side of the road. Hence, road rehabilitation work needs adequate mitigation to maintain the stream flows, especially considering peak flow during rainy season.
3. The last human settlement is located about 500 m from the end of road section “d”, and the tourist attraction point of “Sera Ella” water fall access is located about 1.5 km from the end of road section “d”. Hence rehabilitation work may require meeting the requirements of both areas.
4. The new road section of about 2 km is traversed through a primary forest patch starting from the end of road section “e” within the Moragahakanda reservoir reservation. The land comes under the jurisdiction of Forest Department and lies within the buffer zone of Knuckles conservation forest. The proposed trace will traverse hilly terrain which might cause erosion towards Kambarawa stream.









**Proposed Access Road Sections and Disposal sites for KMTTC**





Environmentally sensitive areas associated with the proposed access roads and DP3

### Photographs of the Project Area

Photo 1	Photo 2	Photo 3
		
Kambarawa stream located closer to at DP3	Area identified for DP3	
Photo 4	Photo 5	Photo 6
		
Existing road section "e"	Forest to be cleared for new road section "f"	Existing road section possible to be linked via Kambarawa Oya instead of cutting new road section "f"



## **ANNEX 2: INVASIVE ALIEN PLANT SPECIES**

## ANNEX 2: INVASIVE ALIEN PLANT SPECIES

### ABBREVIATIONS

**HA** – Habit, **T** – Tree, **S** – Shrub, **H** – Herbaceous, **C** – Climber or Creeper, **SV** - Secondary Vegetation beside the Existing Canal, **CA** - Existing Canal, **ST** - Stream and Streamside Vegetation, **FO** – Forests, **RS** – Road Section within the Sanctuary to SP, DPS3 and DPS2, **AB** – Abandoned Lands, **WA** – Waterlogged Areas, **PD** – Paddy Lands, **SC** – Scrublands, **SP** – Southern Portal Tunnel 3, **DPS** – Disposal Sites 1, 2, 3, **RD** – Access Road to DPN1, DPN2, NSS, MC, **DPN** – Disposal Site 1, 2,3, **MC** – Main Camp, **NS** – Northern Shaft, **NP** – Northern Portal Tunnel 4, **RN** – Access Road to NP, **SA** – Seasonal Agricultural Lands, **TE** – Teak Plantation, **VS** – Ventilation Shaft, **RF** – New Access Road (section ‘f’), **RE** – Existing Access Road (section ‘e’), **DP3** – Disposal Site 3

Scientific Name	Common Name	HA	Madettawa			Koonketiya			RS						SP	DPS		
			SV	CA	ST	FO	SV	ST	FO	AB	ST	WA	PD	SC		1	2	3
<i>Leucaena leucocephala</i>	Ipil Ipil	T												+				
<i>Mimosa invisa</i>		C								+								+
<i>Mimosa pigra</i>	Yoda Nidikumba	S	+															
<i>Muntingia calabura</i>	Jam	T	+		+		+											
<i>Panicum maximum</i>	Rata Tana	H	+					+		+	+	+		+		+	+	+
<i>Typha angustifolia</i>	Hambu Pan	H		+														
<i>Lantana camara</i>	Gandapana	S	+				+		+	+				+		+	+	+

Scientific Name	Common Name	HA	RD	DPN			MC	NS	NP	RN				RF	RE	DP3
				1	2	3				SA	SC	TE	VS			
<i>Leucaena leucocephala</i>	Ipil Ipil	T	+						+	+						
<i>Mimosa invisa</i>		C							+	+						
<i>Mimosa pigra</i>	Yoda Nidikumba	S														
<i>Muntingia calabura</i>	Jam	T														
<i>Panicum maximum</i>	Rata Tana	H	+	+	+	+	+	+	+	+	+	+				+
<i>Typha angustifolia</i>	Hambu Pan	H														
<i>Lantana camara</i>	Gandapana	S	+	+	+	+	+	+	+	+	+	+	+			+

## **ANNEX 3 : RECORDED FAUNA SPECIES**

ANNEX 3: RECORDED FAUNA SPECIES

ABBREVIATIONS

**TS** – Taxonomic Status, **E** – Endemic, **B** – Breeding Resident, **N** – Indigenous, **W** – Winter Visitor, **NCS** – National Conservation Status, **GCS** – Global Conservation Status, **CR** – Critically Endangered, **EN** – Endangered, **VU** – Vulnerable, **NT** – Near Threatened, **MD** – Madettawa Tank Spill Tail Canal, **KE** – Koonketiya Tank Spill Tail Canal, **RS** – Road Section within the Sanctuary to SP, DPS3 and DPS2, **SP** – Sothern Portal Tunnel 3, **DPS** – Disposal Sites 1, 2, 3, **RD** – Access Road to DPN1, DPN2, NS, MC, **DPN** – Disposal Site 1, 2,3, **MC** – Main Camp, **NS** – Northern Shaft, **NP** – Northern Portal Tunnel 4, **RN** – Access Road to NP, **VS** – Ventilation Shaft, **RF** – New Access Road, **RE** – Existing Access Road, **D3** – Disposal Site 3

Family	Scientific Name	English Name	T S	N C S	G C S	DPS				DPN				M C	N S	N P	R N	V S	R F	R E	D 3
						M D	K E	R S	S P	1	2	3	R D	1	2	3					
	<b>Birds</b>																				
Accipitridae	<i>Accipiter badius</i>	Shikra	B			+											+	+			
Accipitridae	<i>Haliastur indus</i>	Brahminy Kite	B																		
Accipitridae	<i>Ictinaetus malayensis</i>	Black Eagle	B	N T															+		
Accipitridae	<i>Spilornis cheela</i>	Crested Serpent Eagle	B			+										+	+				
Aegithinidae	<i>Aegithina tiphia</i>	Common Iora	B			+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
Alcedinidae	<i>Halcyon smyrnensis</i>	White-throated Kingfisher	B			+				+							+	+			
Alcedinidae	<i>Pelargopsis capensis</i>	Stork-billed Kingfisher	B							+											
Ardeidae	<i>Bubulcus ibis</i>	Cattle Egret	B			+															
Ardeidae	<i>Egretta garzetta</i>	Little Egret	B			+															
Bucerotidae	<i>Anthracoceros coronatus</i>	Malabar Pied Hornbill	B								+										
Bucerotidae	<i>Ocyrceros gingalensis</i>	Sri Lanka Grey Hornbill	E			+	+	+	+		+	+							+	+	+
Campephagidae	<i>Tephrodornis pondicerianus</i>	Common Woodshrike	B				+	+			+					+					+
Charadriidae	<i>Vanellus indicus</i>	Red-wattled Lapwing	B							+											
Cisticolidae	<i>Prinia hodgsonii</i>	Grey-breasted Prinia	B			+											+	+			
Cisticolidae	<i>Prinia inornata</i>	Plain Prinia	B										+	+	+	+	+	+	+		
Cisticolidae	<i>Prinia socialis</i>	Ashy Prinia	B				+					+	+	+		+	+	+	+		
Cisticolidae	<i>Prinia sylvatica</i>	Jungle Prinia	B			+				+			+	+		+	+	+	+		
Columbidae	<i>Chalcophaps indica</i>	Emerald Dove	B															+	+	+	
Columbidae	<i>Ducula aenea</i>	Green Imperial Pigeon	B							+											
Columbidae	<i>Streptopelia chinensis</i>	Spotted Dove	B			+				+	+		+	+	+	+	+	+			
Columbidae	<i>Treron pompadora</i>	Pompadour Green-pigeon	B																+		
Corvidae	<i>Corvus levaillantii</i>	Large-billed Crow	B													+	+				
Cuculidae	<i>Centropus sinensis</i>	Greater Coucal	B			+	+	+			+	+	+	+	+		+	+	+	+	+
Cuculidae	<i>Cuculus micropterus</i>	Indian Cuckoo	B							+	+		+	+	+		+				
Cuculidae	<i>Eudynamys scolopacea</i>	Asian Koel	B			+											+	+			
Dicaeidae	<i>Dicaeum erythrorhynchos</i>	Pale-billed Flowerpecker	B			+	+	+		+	+	+	+	+	+	+			+	+	+
Dicruidae	<i>Dicrurus caerulescens</i>	White-bellied Drongo	B																		
Dicruidae	<i>Dicrurus paradiseus</i>	Great Racket-tailed Drongo	B	N T															+	+	+
Hemiprocnidae	<i>Hemiprocne coronata</i>	Crested Treeswift	B			+					+										
Laridae	<i>Chlidonias hybrida</i>	Whiskered Tern	W			+															
Meropidae	<i>Merops orientalis</i>	Green Bee-eater	B							+						+	+				
Monarchidae	<i>Hypothymis azurea</i>	Black-naped Monarch	B				+	+	+									+	+	+	
Monarchidae	<i>Terpsiphone paradisi</i>	Asian Paradise-flycatcher	B / W				+	+	+				+	+	+		+		+	+	
Motacillidae	<i>Anthus rufulus</i>	Paddyfield Pipit	B														+	+			
Muscicapidae	<i>Copsychus malabaricus</i>	White-rumped Shama	B			+	+	+	+					+	+		+	+	+	+	
Muscicapidae	<i>Copsychus saularis</i>	Oriental Magpie Robin	B																		
Muscicapidae	<i>Cyornis tickelliae</i>	Tickell’s Blue Flycatcher	B																+	+	+
Muscicapidae	<i>Saxicoloides fulicata</i>	Indian Robin	B			+				+							+	+			
Nectariniidae	<i>Nectarina lotenia</i>	Loten’s Sunbird	B							+											
Nectariniidae	<i>Nectarina zeylonica</i>	Purple-rumped Sunbird	B			+	+	+			+	+						+		+	+
Oriolidae	<i>Oriolus xanthornus</i>	Black-hooded Oriole	B			+	+	+		+	+		+	+	+		+	+	+		+
Phalacrocoracidae	<i>Phalacrocorax niger</i>	Little Cormorant	B			+															
Phasianidae	<i>Gallus lafayetii</i>	Sri Lanka Junglefowl	E			+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
Phasianidae	<i>Pavo cristatus</i>	Indian Peafowl	B								+						+	+			
Picidae	<i>Chrysocolaptes lucidus</i>	Greater Flameback	B																+		
Picidae	<i>Dinopium benghalense</i>	Black-rumped Flameback	B					+	+					+	+		+				
Ploceidae	<i>Ploceus philippinus</i>	Baya Weaver	B														+	+			

Family	Scientific Name	English Name	T S	N C S	G C S	DPS				DPN				M C	N S	N P	R N	V S	R F	R E	D 3
						M D	K E	R S	S P	1	2	3	R D	1	2	3					
Psittacidae	<i>Loriculus beryllinus</i>	Sri Lanka Hanging Para- keet	E																+	+	+
Psittacidae	<i>Psittacula eupatria</i>	Alexandrine Parakeet	B			+															
Psittacidae	<i>Psittacula krameri</i>	Rose-ringed Parakeet	B			+		+			+	+							+		
Pycnonotidae	<i>Hypsipetes leucoceph- alus</i>	Black Bulbul	B																	+	+
Pycnonotidae	<i>Pycnonotus cafer</i>	Red-vented Bulbul	B			+		+				+	+	+	+		+	+	+	+	+
Pycnonotidae	<i>Pycnonotus luteolus</i>	White-browed Bulbul	B			+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
Pycnonotidae	<i>Pycnonotus me- lanicterus</i>	Black-crested Bulbul	B																	+	+
Rallidae	<i>Amaurornis phoe- nicurus</i>	White-breasted Water- hen	B			+															
Ramphastidae	<i>Megalaima haema- cephala</i>	Coppersmith Barbet	B			+				+	+		+	+	+	+	+	+	+	+	+
Ramphastidae	<i>Megalaima rubri- capilla</i>	Crimson-fronted Barbet	E			+	+	+	+	+	+		+	+	+		+	+	+	+	+
Ramphastidae	<i>Megalaima zeylanica</i>	Brown-headed Barbet	B			+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
Rhipiduridae	<i>Rhipidura aureola</i>	White-browed Fantail	B													+					
Sturnidae	<i>Acridotheres tristis</i>	Common Myna	B			+										+					
Sylviidae	<i>Orthotomus sutorius</i>	Common Tailorbird	B			+	+	+	+		+	+	+	+	+		+	+	+	+	
Timalidae	<i>Dumetia hyperythra</i>	Tawny-bellied Babbler	B										+	+	+		+	+			
Timalidae	<i>Pellorneum fuscocapil- lum</i>	Sri Lanka Brown-capped Babbler	E			+	+	+	+		+	+	+	+	+		+	+	+	+	+
Timalidae	<i>Turdoides affinis</i>	Yellow-billed Babbler	B			+					+										+
	<b>Butterflies</b>																				
Lycaenidae	<i>Actyolepis puspa</i>	Common Hedge Blue	N																	+	
Lycaenidae	<i>Castalius rosimon</i>	Common Pierrot	N																+		
Lycaenidae	<i>Chilades pandava</i>	Plains Cupid	N																	+	
Lycaenidae	<i>Curetis thetis</i>	Indian sunbeam	N																	+	
Lycaenidae	<i>Euchrysops cnejus</i>	Gram Blue	N							+								+	+		
Lycaenidae	<i>Everes lacturnus</i>	Indian Cupid	N										+	+	+		+	+			
Lycaenidae	<i>Jamides bochus</i>	Dark Cerulean	N								+										
Lycaenidae	<i>Jamides celeno</i>	Common Cerulean	N							+	+							+	+		
Lycaenidae	<i>Lampides boeticus</i>	Pea Blue	N				+														
Lycaenidae	<i>Prosotas dubiosa</i>	Tailless Lineblue	N																	+	
Lycaenidae	<i>Rathinda amor</i>	Monkey-puzzle	N																+		
Lycaenidae	<i>Zizeeria karsandra</i>	Dark Grass Blue	N										+	+	+		+	+			
Lycaenidae	<i>Zizula hylax</i>	Tiny Grass Blue	N			+				+	+								+		
Nymphalidae	<i>Acraea violae</i>	Tawny costor	N			+												+	+		
Nymphalidae	<i>Ariadne ariadne</i>	Angled castor	N					+	+										+		
Nymphalidae	<i>Cethosia nietneri</i>	Ceylon lace wing	N																+		
Nymphalidae	<i>Cirrochroa thais</i>	Tamil yeoman	N																+		
Nymphalidae	<i>Cupha erymanthis</i>	Rustic	N																		
Nymphalidae	<i>Danaus chrysippus</i>	Plain tiger	N			+	+					+						+	+		+
Nymphalidae	<i>Euploea core</i>	Common crow	N			+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
Nymphalidae	<i>Euthalia aconthea</i>	Baron	N																	+	
Nymphalidae	<i>Junonia almana</i>	Peacock pansy	N										+	+	+		+	+	+		
Nymphalidae	<i>Junonia atlites</i>	Grey pansy	N																		
Nymphalidae	<i>Junonia iphita</i>	Chocolate soldier	N								+		+	+	+		+	+	+	+	
Nymphalidae	<i>Neptis hylas</i>	Common sailor	N			+				+	+		+	+	+		+	+			
Nymphalidae	<i>Neptis jumbah</i>	Chestnut-streaked sailor	N																+		
Nymphalidae	<i>Orsotriaena medus</i>	Medus Brown /Nigger	N				+	+			+	+						+	+		
Nymphalidae	<i>Parantica aglea</i>	Glassy tiger	N			+															
Nymphalidae	<i>Polyura athamas</i>	Nawab	N																	+	
Nymphalidae	<i>Tirumala limniace</i>	Blue tiger	N			+														+	
Nymphalidae	<i>Ypthima ceylonica</i>	White four-ring	N				+	+			+	+	+	+	+	+	+		+		+
Papilionidae	<i>Graphium agamem- non</i>	Tailed jay	N				+	+	+			+	+	+	+		+	+		+	+
Papilionidae	<i>Graphium doson</i>	Common jay	N																+	+	
Papilionidae	<i>Pachliopta aris- tolochiaie</i>	Common rose	N			+					+		+	+	+		+	+			
Papilionidae	<i>Pachliopta hector</i>	Crimson rose	N			+					+							+	+		
Papilionidae	<i>Papilio crino</i>	Banded peacock	N	V U			+	+	+		+	+	+	+	+		+	+	+	+	+
Papilionidae	<i>Papilio demoleus</i>	Lime butterfly	N			+							+	+	+		+	+	+	+	+
Papilionidae	<i>Papilio polymnestor</i>	Blue mormon	N																+	+	
Papilionidae	<i>Papilio polytes</i>	Common mormon	N			+							+	+	+	+	+	+	+		
Papilionidae	<i>Troides darsius</i>	Ceylon birdwing	E																+	+	
Pieridae	<i>Appias albina</i>	Common albatross	N			+								+	+	+	+	+	+	+	+

Family	Scientific Name	English Name	T S	N C S	G C S	DPS				DPN				M C	N S	N P	R N	V S	R F	R E	D 3
						M D	K E	R S	S P	1	2	3	R D	1	2	3					
Pieridae	<i>Appias galene</i>	Lesser albatross	E			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pieridae	<i>Catopsilia pyranthe</i>	Mottled emigrant	N										+	+	+	+	+		+		
Pieridae	<i>Catopsilia scylla</i>	Orange Migrant	N										+	+		+	+	+			
Pieridae	<i>Cepora nerissa</i>	Common gull	N							+					+			+			
Pieridae	<i>Delias eucharis</i>	Jezebel	N			+							+	+	+	+	+		+		
Pieridae	<i>Eurema hecabe</i>	Common grass yellow	N			+				+			+	+	+	+	+	+	+		+
Pieridae	<i>Hebomoia glaucippe</i>	Great orange tip	N																+	+	
Pieridae	<i>Leptosia nina</i>	Psyche	N										+	+	+		+		+	+	
Pieridae	<i>Pareronia ceylanica</i>	Dark wanderer	N					+	+				+	+	+		+	+			
	Dragonflies																				
Calopterygidae	<i>Vestails apicalis</i>	Black-tipped flashwing	N																+		
Cholorocyphidae	<i>Libellago adami</i>	Adam's Gem	E	V U															+		
Coenagri-onidae	<i>Ceriagrion coromandelianum</i>	Yellow Waxtail	N																		
Coenagri-onidae	<i>Pseudagrion rubriceps</i>	Red-headed Sprite	N			+															
Euphaeidae	<i>Euphaea splendens</i>	Shining Gossamerwing	E	N T															+	+	
Gomphidae	<i>Ictinogomphus rapax</i>	Rapacious Flangetail	E			+													+		
Libellulidae	<i>Acisoma panorpoides</i>	Asian Pintail	N			+											+	+			
Libellulidae	<i>Brachythymis contaminata</i>	Asian Groundling	N							+	+		+		+	+		+	+	+	+
Libellulidae	<i>Diplacodes trivialis</i>	Blue Percher	N										+	+	+		+	+	+		
Libellulidae	<i>Neurothemis tullia</i>	Pied Parasol	N			+															
Libellulidae	<i>Onychothemis tonkinensis</i>	Aggressive riverhawk	N	E N															+		
Libellulidae	<i>Orthetrum sabina</i>	Green Skimmer	N										+	+	+		+		+		+
Libellulidae	<i>Pantala flavescens</i>	Wandering Glider	N				+					+					+	+			
Libellulidae	<i>Tramea limbata</i>	Sociable Glider	N			+	+				+								+		+
Libellulidae	<i>Trithemis aurora</i>	Crimson Dropwing	N																+		+
Libellulidae	<i>Trithemis festiva</i>	Indigo Dropwing	N	V U															+	+	
Platycnemididae	<i>Copera marginipes</i>	Yellow Featherleg	N			+	+	+	+			+	+	+	+		+	+	+	+	
	Fishes																				
Channidae	<i>Channa striata</i>	Murrel	N			+															
Cichlidae	<i>Etroplus maculatus</i>	Orange chromide	N			+															
Cyprinidae	<i>Dawkinsia srilankensis</i>	Blotched filamented barb	E	C R															+		
Cyprinidae	<i>Devario malabaricus</i>	Giant Danio	N																+		+
Cyprinidae	<i>Garra ceylonensis</i>	Stone sucker	E	V U			+												+		
Cyprinidae	<i>Puntius bimaculatus</i>	Redside barb	N			+	+												+		+
Cyprinidae	<i>Rasbora microcephalus</i>	Carverii Rasbora	N			+	+												+		+
Cyprinidae	<i>Systemus martenstyni</i>	Martenstyni's barb	E	C R	E N														+		
Heteropneustidae	<i>Heteropneustes fossilis</i>	Stinging catfish	N			+															
	Mammals																				
Cercopithecidae	<i>Macaca sinica</i>	Sri Lanka toque monkey	E		E N					+									+	+	
Cercopithecidae	<i>Semnopithecus vetulus</i>	Purple-faced leaf monkey	E	E N				+	+										+	+	
Cercopithecidae	<i>Semnopithecus priam</i>	Grey langur	N		N T	+						+									
Cervidae	<i>Axis axis</i>	Spotted deer	N				+	+	+			+					+	+			
Cervidae	<i>Muntiacus muntjak</i>	Barking deer	N	N T			+	+	+									+	+	+	
Elephantidae	<i>Elephas maximus</i>	Elephant	N	E N	E N	+	+	+	+		+	+						+	+	+	+
Herpestidae	<i>Herpestes edwardsii</i>	Grey mongoose	N			+		+	+		+	+		+	+		+	+	+		
Herpestidae	<i>Herpestes smithii</i>	Ruddy mongoose	N					+	+			+						+	+		
Hystriidae	<i>Hystrix indica</i>	Porcupine	N				+	+	+			+						+	+	+	
Manidae	<i>Manis crassicaudata</i>	Pangolin	N	N T	E N		+	+	+												
Sciuridae	<i>Funambulus palmarum</i>	Palm squirrel	N			+		+	+	+	+	+	+	+	+		+	+	+	+	

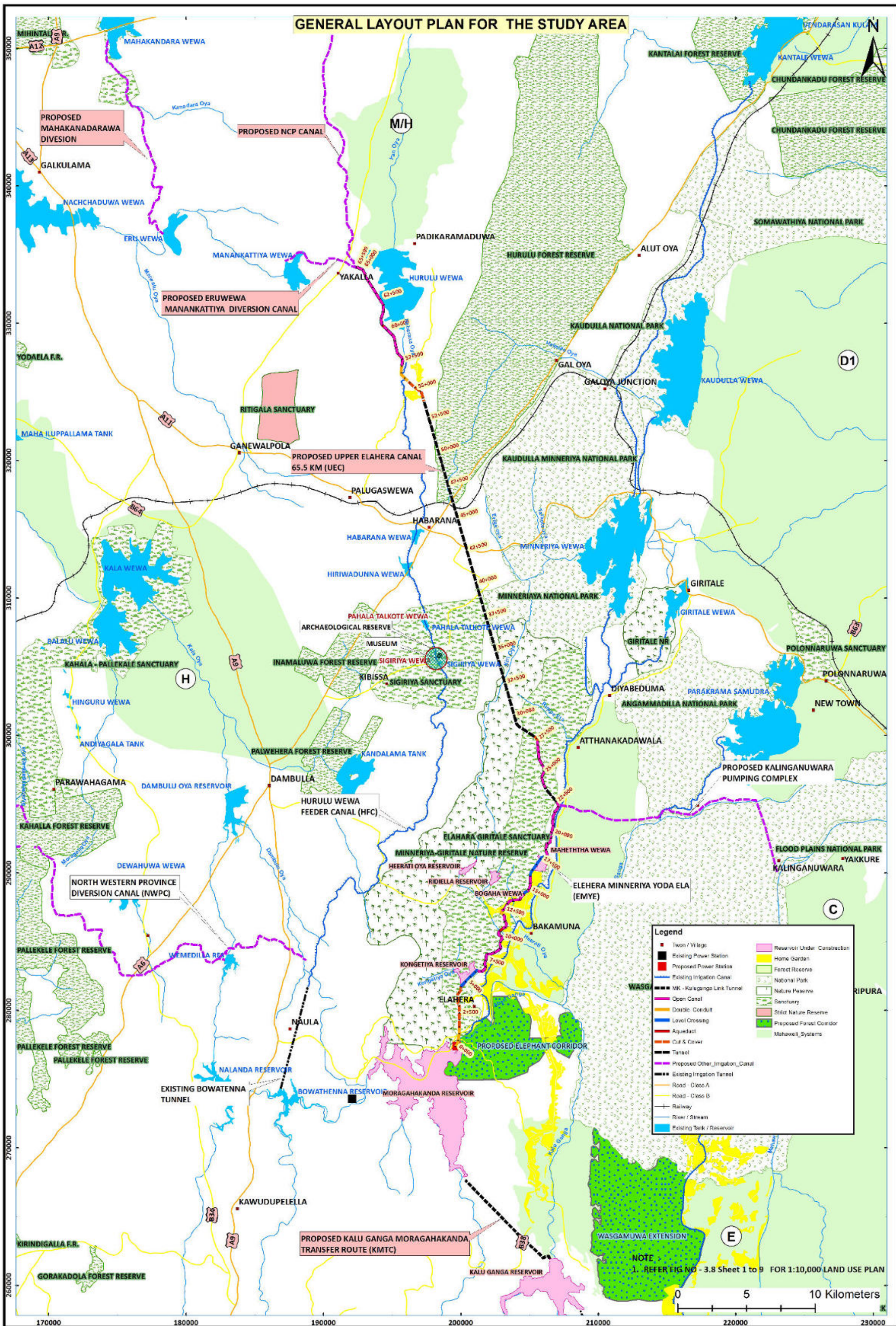


Family	Scientific Name	English Name	T S	N C S	G C S				S P	DPS			R D	DPN			M C	N S	N P	R N	V S	R F	R E	D 3
						M D	K E	R S		1	2	3		1	2	3								
Suidae	<i>Sus scrofa</i>	Wild boar	N				+	+	+			+												
Tragulidae	<i>Moschiola meminna</i>	Sri Lanka mouse-deer	E				+	+	+		+							+	+	+				
	Reptiles																							
Agamidae	<i>Calotes liolepis</i>	Whistling lizard	E	N T																		+	+	
Agamidae	<i>Calotes versicolor</i>	Common garden lizard	N			+		+			+	+	+	+	+		+	+		+				
Agamidae	<i>Otocryptis nigristigma</i>	Black spotted kangaroo lizard	E				+	+	+													+	+	
Bataguridae	<i>Melanochelys trijuga</i>	Parker's black turtle	N		N T	+																		
Scincidae	<i>Eutropis carinata</i>	Common skink	N			+		+	+					+	+		+	+		+		+	+	
Trionychidae	<i>Lissemys ceylonensis</i>	Flapshell turtle	E			+																		
Varanidae	<i>Varanus bengalensis</i>	Land monitor	N					+	+			+	+	+	+		+	+		+				
	Land Snail																							
Ariophantidae	<i>Cryptozona bistrialis</i>		N				+	+	+					+	+			+						
Ariophantidae	<i>Euplecta layardi</i>		E	E N					+															
Cyclophoridae	<i>Aulopoma grande</i>		E	V U			+																	
Cyclophoridae	<i>Micraulax coeloconus</i>		N	C R					+															
Glessulidae	<i>Glessula lankana</i>		E	E N			+																	
	Amphibians																							
Dicroglossidae	<i>Euphlyctis cyanophlyctis</i>	Skipper frog	N			+	+	+														+		+
Dicroglossidae	<i>Fejervarya shyadrensis</i>	Common paddy field frog	N			+	+	+														+		+

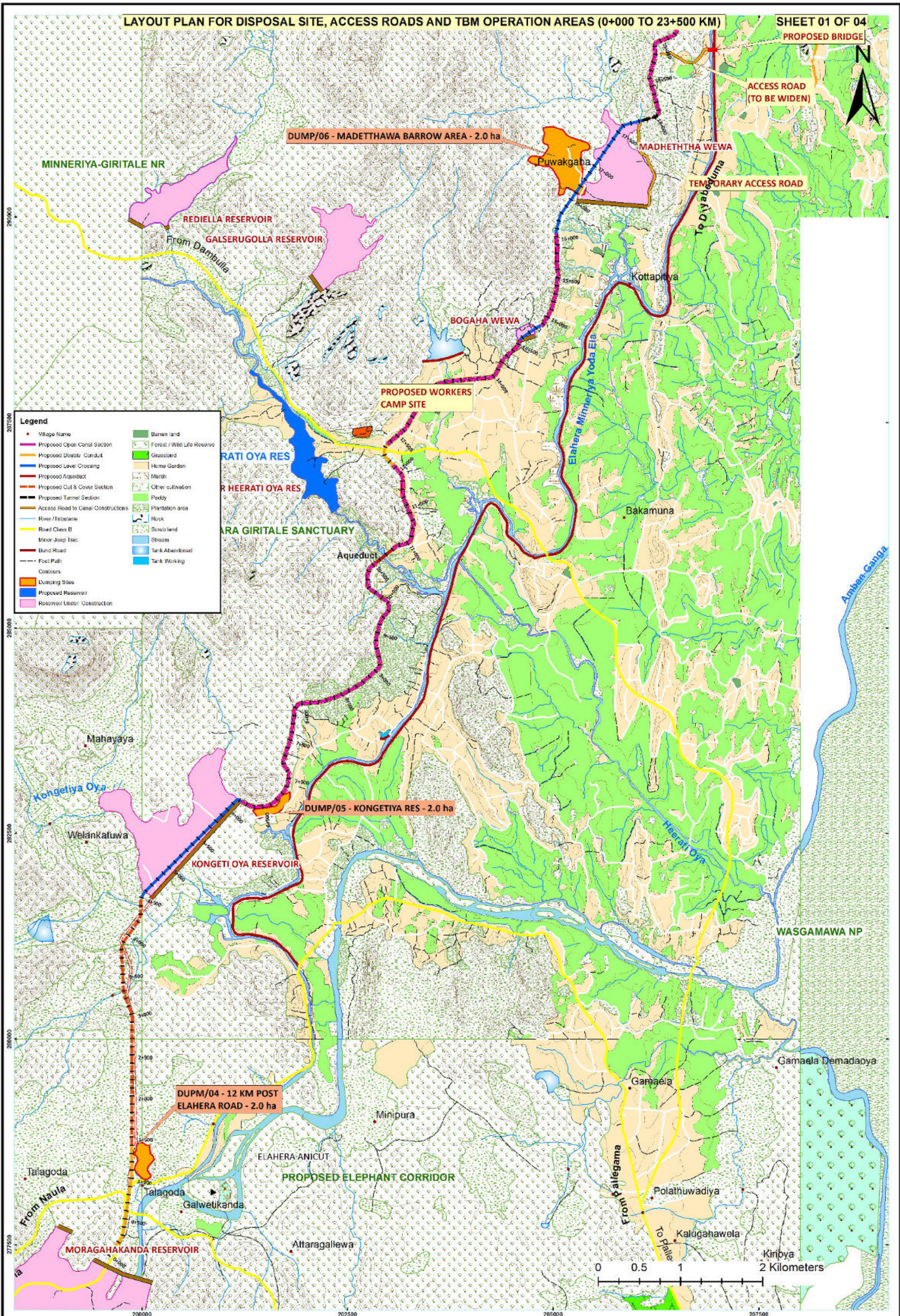
## **ANNEX 4: MAPS INCLUDED IN THE EIA REPORT**



# GENERAL LAYOUT PLAN FOR THE STUDY AREA



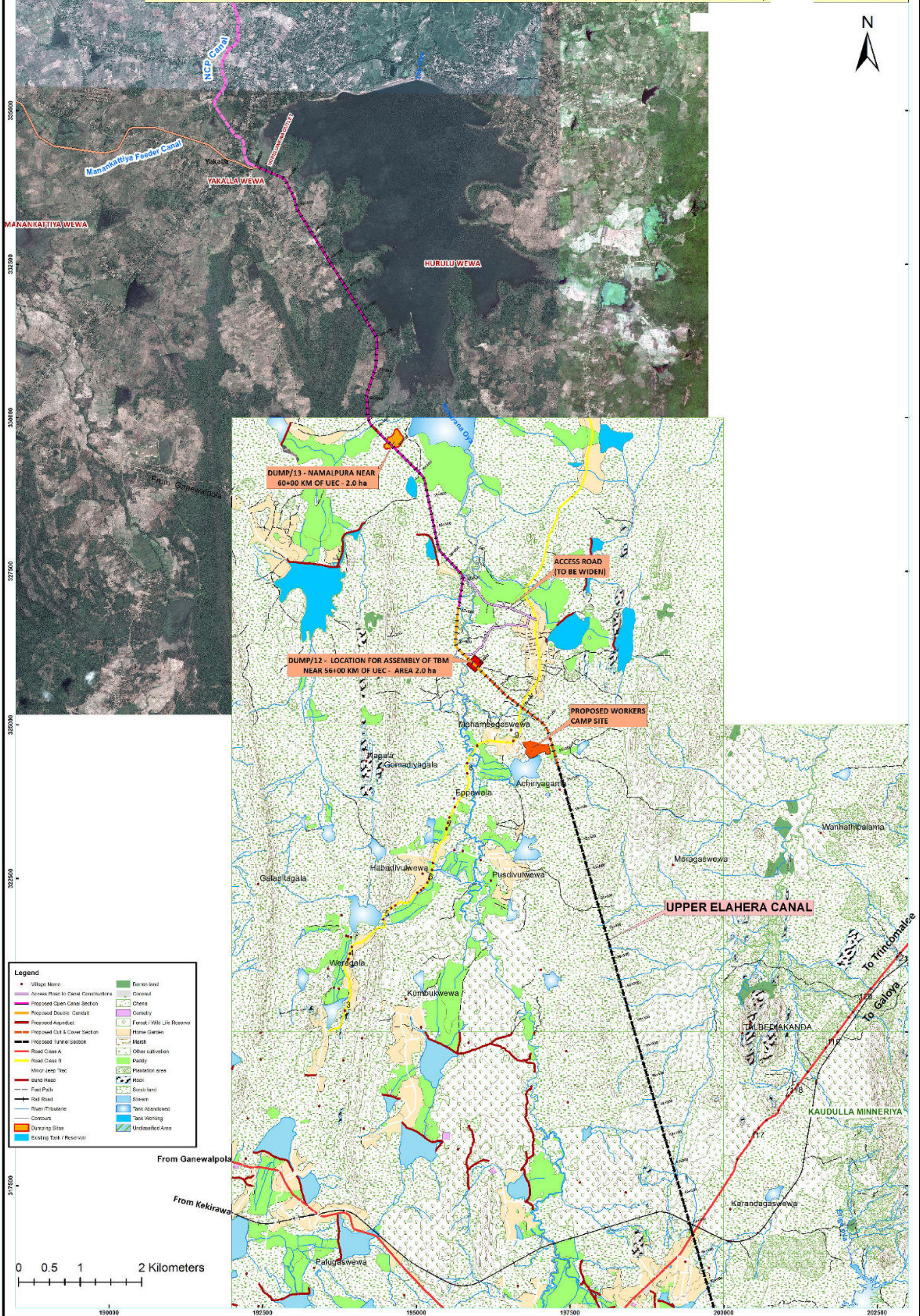














# KALU GANGA - MORAGAHAKANDA TRANSFER CANAL DISPOSAL SITE, ACCESS ROADS AND TBM OPERATION AREAS

SHEET 04 OF 04

