

## **4 DESCRIPTION OF ANTICIPATED ENVIRONMENTAL IMPACTS**

### **4.1 Anticipated impacts due to land preparation activities**

This project involves construction of Thapitigala dam, head race channel, related intake and outlet structures, a power house and access roads. As a result, considerable amount of land preparation is anticipated (approximately 15 ha of land will be affected due to the construction of various structures associated with the proposed project). The land preparation will result in removal of vegetation resulting in loss of habitats as well as generation of plant debris. Further, this will involve use of heavy machinery that will generate dust, noise and vibrations. Most of the project activities take place in highly human modified habitats where few endemic or threatened species of plants or animals were present. The species encountered in these habitats are common species that can withstand the type of disturbance that will arise due to the land preparation. Therefore, the impact of land preparation on fauna and flora in the area will not be significant as the total area impacted is relatively small (15 ha) and the type of species impacted are fairly robust species that will only be temporarily displaced from the area during heavy construction. Further, the land preparation will have a minimum impact on local communities as most of the land identified for project activities lies away from human settlements.

### **Potential Environmental Issues during Construction**

Number of negative impacts that may arise during the construction phase was identified during the stakeholder consultation and field investigations. These impacts are listed below.

- Difficulties faced in using the existing main road and by roads that will lead to construction sites due to movement of construction related vehicles.
- Inability to use river water below the proposed dam site for washing, bathing and fishing due to water becoming muddy during the construction phase.
- Dust problems during dry seasons when construction work is carried out.
- Health and sanitation issues that the general public and workers will have to face due to contamination of drinking water, improper disposal of waste, air pollution, excessive noise generation and vibration etc.,
- Accidents that may occur in and around the construction site
- Increase in the vector borne diseases such as Dengue and Malaria due to poor management of borrow pits and construction sites
- There will be temporary disturbances due to the proposed construction activities for the people living in the area

- Hindrance to the existing bathing places and sand mining places along Uma oya. It was recorded that there are about 2 bathing places and 4 sand mining places will be affected
- The development will improve the access roads and other basic facilities which are lacking in the proposed area and this will be a positive impact to the area

#### **4.2 Impact of the changing surface water on the ecology of the river**

Once the project is implemented the stretch of the river between the dam site and the tail race will be subjected to low flows due to diversion of water for power generation. The length of the river that will be subjected to low flows is approximately 3 km in length. This stretch of the river receives water from at least seven perennial sources and number of seasonal sources. In addition, an environmental flow will be released from the proposed dam at all times to meet the ecological demand of the river. Therefore, the impact due to changes in surface water will not be significant.

#### **4.3 Impacts of the changing surface water on river users**

There are no major uses in the river stretch that will be subjected to low flows due to the establishment of the proposed project, Further, an environmental flow of 3.23 m<sup>3</sup>/sec shall be released from the proposed reservoir at all times. Therefore, impacts of the change in surface waters on the river users will be insignificant.

#### **4.4 Development of new land for agriculture**

No new agriculture lands are to be developed under the proposed Thalpitigala reservoir. The project has been designed to construct the dam about 3 km upstream of the Bathmedilla anicut to ensure a reliable supply of irrigation water to the existing Bathmedilla irrigation scheme. The project will ensure a continuous supply of water to the scheme compared to the present situation where there are water shortages to Bathmedilla scheme during the period of May-September. The proposed scheme will provide water for the existing irrigation area of 810 ha under the Bathmedilla Ela scheme, which is currently served by flows from Vela Oya and supplemented by the diversion from Uma Oya. Therefore, this will result in an increased cropping intensity in the Bathmedilla Scheme.

According to the feasibility report (Ministry of Irrigation & water Resources Management, 2012), Uma Oya will be diverted at the headwork into the conveyance channel known as Bathmedilla Yoda Ela to supply water to the left and right bank canals. At present, this Yoda-Ela carries an average flow of 2.5 m<sup>3</sup>/ sec to feed the

irrigation areas served from the existing Bathmedilla anicut situated 3 km downstream of the dam site.

#### **4.5 Relocation of communities or loss of agriculture lands**

The reservoir surface area at the full supply level of 454 m asl is about 96 ha that falls under three administrative areas of Kandeketiya, Hali-ela and Uva paranagama DSDs and the details of the land use and their ownerships are given in previous sections based on the data collected during socio-economic survey in June 2013. It was revealed that there are 104 families will be affected due to loss of their cultivation lands. This includes loss of households of 7 families. The extent of the private ownerships to be affected is calculated approximately as 150 acres (60.7 ha) while Government lease, permits and encroachments are calculated as 70 acres (28.3 ha), 20 acres (8.0 ha) and 1 acre (0.4 ha) respectively. Table 4.1 provides the details of the ownerships and type of land use loss due to proposed project.

A land that belongs to the Land Reforms Commission (LRC) with an extent of 300 acres and located approximately 5 km downstream of the dam site on the right bank of Uma Oya has been selected as the resettlement site of the proposed project. This land at present exist as an abandoned land that has been cleared for cultivation from time to time (see figure 4.1). The extent of the proposed resettlement site is sufficient to house the seven families that will loose their houses as well as the 97 families that will loose their cultivated lands. Further, as the proposed resettlement site is located in close proximity to the proposed reservoir the distance of relocation will be less than 10 km and the necessary infrastructure facilities (electricity, water, access roads) will be provided by the project proponent. However, those who do not wish to be resettled in this manner will be provided with a suitable monetary package instead of land. The land extent provided for each of the affected persons within the proposed resettlement site or a suitable compensation package will be decided after a detailed land survey followed by negotiations held between Department irrigation and the affected parties facilitated by the District Secretary and Divisional Secretaries. Once the resettlement or compensation package has been agreed, cabinet approval will be obtained and the deeds for the resettlement land or the compensation will be paid to the affected parties. The process has already been initiated, where the resettlement options have been explained to the affected parties by the respective divisional secretaries and this process is intended to be completed prior to the commencement of the work (Please see annex V for the minutes of the meetings).

#### **4.6 Impacts due to changes of land use**

- a. Once the dam is constructed the river banks upstream of the proposed dam site up to about 3 km will become inundated by the proposed reservoir. This will result in a change of land use from a terrestrial to an aquatic system. As a result the terrestrial species will lose habitat while aquatic species and aquatic associates will find a new habitat. This impact is dealt with in detail under sections 4.8 and 4.9.
- b. At present the proposed reservoir bed is used for subsistence agriculture by surrounding communities who will lose their livelihoods which has been dealt in detail in the previous section

#### **4.7 Loss of stability of slopes and potential for landslides**

According to available local information, landslides or earth slips have not been reported within the proposed project area. However, a preliminary landslide assessment has been done by the National Building Research Organization (NBRO). Their investigations have revealed that the reservoir area, dam, forebay tank and power house is located within low landslides category zone and therefore, predisposition towards landslides is low. However, both abutments are strike ridges and there is a potential for slope instability when the water levels fluctuate during the rainy season. Further, some sections of the headrace tunnel and penstock path also pass through medium/ high landslide category zones and therefore, land instabilities can arise in such places during the construction phase. Therefore, the final conclusion of the landslide study is that the project is feasible even though slope instabilities can arise during the construction phase which can be easily mitigated by paying careful attention not to provoke slope instabilities. Their recommendations are included in the impact mitigation section.

#### **4.8 Loss of wildlife habitats**

The project will result in the inundation of 96 ha of land. Major part of the proposed reservoir will inundate human modified habitats such as cultivated lands, abandoned lands, home gardens and scrub forests. The species assemblage observed in these habitats is dominated by common species which are generally found in such human modified habitats. These species show a high degree of adaptability to changes and therefore, will not be affected a great deal by the proposed project other than the fact that they will lose their habitat. Only few large charismatic species were observed. This includes *Elephas maximus* (Asian Elephant) that are present in the area identified for inundation. Therefore, the project will result in loss of their habitats. However, the extent that will be lost will not lead to a significant increase in the human-elephant conflict in the area as compared to an average home range (5000 to 25000 ha) of an Elephant the area lost (96 ha) will be extremely small. Further, the tank will be at Full

supply level only for few months during the rainy season. During the rest of the time the reservoir will slowly recede and the resulting draw down area will be available for elephants and other wildlife.

#### **4.9 Impacts on biodiversity due to loss of forest land**

The proposed Thalpitigala reservoir will inundate 96 ha of land that includes several natural habitats such as the riverine forest, degraded savannah grasslands and scrubland. These habitats function as rich faunal and floral repositories. A total number of 104 faunal species was recorded in the project area. This included 9 endemic species, 3 Nationally Threatened species and three species of migrant birds. The floral assemblage recorded in the area included 138 plant species of which eight are endemic to Sri Lanka. This also included 109 indigenous and 21 introduced species. Two plant species recorded during the field survey are listed as Nationally Threatened species. None of the recorded plant or animal species is unique or restricted to the project area. Therefore, even though establishment of the reservoir will result in loss of habitat for a number of terrestrial plant and animal species its overall impact on biodiversity is insignificant due to following reasons. First, the extent of the area impacted is relatively small and contained mostly within the banks of the river and the inundated area will become exposed during the dry season which can be utilized by terrestrial species, especially animals. Second, majority of the species observed are common species that can be encountered in human modified landscapes as can be seen by the low level of endemism and threatened species encountered among both fauna and flora. Third, the inundated area does not function as a critical habitat necessary for survival of a species or their life processes such as migration, breeding etc., therefore, implementation of the project will have only a low impact on the biodiversity in the area.

#### **4.10 Anticipated problems of solid and liquid waste disposal**

Public health is a primary concern in any project during construction or in operation. It is often associated with sanitation and /or hygienic practices. During construction, the health and sanitation of the general public and workers shall be safeguarded from contaminated drinking water, improper disposal of wastes, air pollution, excessive noise generation and vibration etc. Anticipated problems are

- a. Improper disposal of solid waste can result in health hazards due to creation of breeding places for vectors of disease carriers. Further, it can emit odors and fly infestations in the area. Therefore, disposal of solid waste shall be done only at designated locations following procedures that will not result in such adverse impacts
- b. Establishment of temporary labor camps without proper sanitation and solid waste disposal facilities could lead to health issues.

- c. During construction, the health and sanitation of the general public and workers are effected from contaminated drinking water, improper disposal of wastes, air pollution, excessive noise generation and vibration etc.,
- d. If the contractor does not carry out required ground stabilization as well as take adequate steps to prevent sedimentation such as sediment traps, temporary sediment basins, drainage waives for storm drain inlets, check dams and subsurface drains etc., natural streams will become sedimented.
- e. Storm water has to be carefully managed in the site otherwise construction materials stored in the site like sand, bricks, metals, earth etc., will pollute the streams around the construction site.
- f. Deleterious substances including gasoline, diesel, motor oil, gear oil, hydraulic fluids and other lubricants from vehicles service centers and wash down areas if discharged on to ground or into the natural waterways can result in pollution of surface water sources.
- g. Potentially hazardous construction materials such as paint, acid for cleaning masonry surfaces, chemical additives used for soil stabilization, cleaning solvents and concrete curing compounds etc., if not properly handled, will contaminate the natural water sources and air.

#### **4.11 Positive and / or negative impacts on Aesthetic and Visual Environment**

Construction of Thalpitigala Reservoir will create a positive impact on the aesthetic and visual environment due to the newly formed large water body within the dense forest. Reservoir dam axis and Tunnel outlet are located in such a way for Uma Oya water to flow in to the reservoir through steep slopes creating a very attractive aesthetic and visual environment. However, there is a cascade that is approximately 10m in height sited slightly upstream of the tunnel outlet. After construction of the Thalpitigala Reservoir and diverting water for power generation through the tunnel, this cascade will be negatively impacted due to low flows received at the water fall during the dry periods. However, during the wet season cumulative effect of overflow from the dam and the environmental flow will ensure that there is sufficient flow over the cascade. Therefore, the overall impact on the cascade will not be significant. The construction of the dam will also provide an opportunity to establish a road in the future connecting Badulla and Nuwara eliya districts. The proposal to establish a road from Randenigala to Badulla through Maspenna will become a reality in the future as the Thalpitigala dam crest can be used to make the distance much less.