

Engineering Geological Site Investigation Report of the Alamdevi Electric Pump Water Supply Project

Reference:

- A. Sub-Contract Agreement between Ramboll Finland Oy and Narayan Gurung, dated 20 January 2011

1. INTRODUCTION

The proposed Alamdevi Electric Pump Water Supply Scheme site was visited by me as the Consultant Geo-technical Engineer to assess the geological feasibility of the site on the 25th January 2011 as per the sub-contract vide at Ref A.

The proposed Alamdevi Electric Pump Water Supply Scheme is located in Alamdevi VDC of Syangja district. The site has been proposed for the Electric Pump Water Supply Scheme (Lift System) by the District Development Syangja under the Rural Water Supply and Sanitation Project –Western Nepal.

2. GEOLOGICAL OBSERVATION

After assessing the site, following Geological observations were made.

Geological Stability: The proposed locations for the Reservoir Tank, Delivery Pipe Line and the Pump House / Collection Tank (CT) of the second stage Electric Pump Lift were found to be geo-technically feasible. For Reservoir Tank, two locations have been proposed. (*Photo 1- 2, Page 1, Annex A*). Both sites (higher and lower) are **geo-technically feasible**. Similarly the proposed alignment for delivery pipe and the location of 2nd stage pump house / CT were found to be geologically sound. However, for ease of construction, the location of the pump house / CT of the 2nd stage lift has been changed and selected for new. (*See Photo 3- 4, Page 2 -3, Annex A*)

Geological Instability:

Following geological instability was observed.

- A. Geological Instability of the proposed Pump House / CT location for the first stage Lift.

Details of the Geological Instability is as follows.

2.A Geological Instability at the proposed Intake and Pump House Site

The proposed location for the Pump House / CT of Alamdevi Scheme was found to be geologically infeasible as the site is prone to landslide. Besides, the area beneath the proposed location is paddy field and swampy, which further aggravates the chances of ground subsidence and landslides. As a result, the location for the Pump House / CT for the 1st stage lift was changed to a new location, some 5 m down from the previous location. (*See Photo 7,8, Page 5 - 6, Annex A*)

However the area must be made free from cultivation, especially from the paddy field and must be left fallow and instead, grass trees should be grown.

In consequence;

- The total lift head is slightly increased than the previous. Total head now is **514 m if the RT is selected at a lower location** and the total head would be **553 m if the RT is selected at a higher location**. According to locals, some 12 Households (HH) of Kotakot Village will be excluded from this scheme if the RT is selected at a lower location.
- A properly designed Retaining Wall is required at the back of 2nd stage Pump House/ CT location. Similarly a Retaining wall is must at the back slope of the proposed new Pump House / CT location. (See Photo 5 - 6, Page 4, Annex A)

3. DESIGN OF THE SYSTEM

As the total lift head of Alamdevi Scheme is more than 350 m, two stage lifting is proposed. The relevant Reduced Level (RL) of the proposed prominent locations are as follows.

- RL of the proposed site for Pump House and Collection Tank for the 1st Stage Lift = 858 m
- RL of the proposed site for Pump House and Collection Tank for the 2nd Stage Lift (Raidanda) = 1098 m
- RL of the proposed site for the Reservoir Tank (lower elevation) = 1372 m
- RL of the proposed site for the Reservoir Tank (higher elevation)= 1411 m

Hence the **first stage lift** head would be **240 m** and the **2nd stage lift** head would be **274 m and 313 m** for the lower and higher RT locations respectively. The **total head** to be lifted thus would be either **514 m or 553 m** depending on the selection of RT for the proposed Alamdevi Electric Pump Water Supply Scheme.

4. CONCLUSIONS AND RECOMMENDATIONS

The proposed Alamdevi Electric Pump Water Supply Scheme is **geo-technically feasible** at the proposed new locations less the Gravity system. The consultant has not assessed the gravity system nor has assessed the overall feasibility of the Scheme in socio-economic aspect as these do not fall under the scope of contract work of the consultant and the relevant organisations are sole responsible for this.

5. ACKNOWLEDGEMENTS

The consultant is grateful to the Project Support Unit, Rural Water Supply and Sanitation Project - Western Nepal for giving the opportunity to work for them and would like to thank everyone who accompanied and assisted during the field work and visit.

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