

4.1 INTRODUCTION

The baseline environmental status is important to understand region's existing physical, biological, cultural and social environmental characteristics. Information and data presented in this section is based on primary surveys and environmental quality monitoring, secondary data collected from various departments and prior studies undertaken by RSWML on the subject. The information on the baseline environmental conditions forms the basis to analyse the probable impacts of the proposed hydropower activities *vis-a-vis* the present background environmental quality of the core study area.

4.2 THE STUDY AREA

The project study area considered for this EIA study includes the whole catchment area of the Allain and Duhangan rivers, which is approximately 128.9 and 66.2 km², totalling to 195 sq km. The project components extend within villages of Pirni, Hamta and Jagatsukh in tehsil Manali in the district of Kullu, Himachal Pradesh. The project lies to the east of the Beas River. The location map of project area and its layout plan are shown in *Figures 1.1 and 1.2* in Section 1.

The core study area considered for the project is the 6-km radius from Surge shaft location covering area between the proposed Trench Weir on Duhangan, proposed Allain Barrage and proposed tail water discharge point. For socio-economic assessment, the villages of Jagatsukh, Hamta and Pirni have been considered.

4.3 GENERAL FEATURES OF THE MANALI & SURROUNDINGS

Until recently, settlements in the Manali area have been relatively small agricultural communities such as Manaligarh (Old Manali), Goshal, Chichoga, Pirini, Shanag, Vashisht, etc. The present site of Manali itself is not a traditional site of settlement. It has developed on relatively steep colluvial, and debris flow fan deposits and, more recently, on steep, valley-side slopes.

The elevation at Manali in general is 2,000 m. The immediate valley-side slopes rise at gradients of 20°-40° to about 4,500 m and above this, isolated peaks and ridges rise to 6,500 m. The best known peaks in the area include Hanuman Tibba, Deo Tibba, and Indrasan, all marked by extensive glacier and snow covers. At the head of the Kullu Valley is Rohtang Pass (4,310 m) which has served as an important access route to and from the greater Himalayan Ranges, Lahul - Spiti, Ladakh, and Tibet.

The climate of the area is characterized by cool, snowy winters and relatively warm, wet monsoonal summers. Above 3,000 m, snow falls in all months of the year and above 2,300 m, copious winter snowfall produces a well-developed snowcover on an annual basis and a significant snow avalanche hazard. Snowcover melting during April, May and June is an important source of water for the Beas and its tributaries.

Summer monsoon-rain, and snow at higher elevations, is another important water source.

The east of the Beas watershed comprises of extensive snow and ice-covered area which give rise to important tributaries of the Chandra and Spiti Rivers and large, flood-producing glaciers such as the Bara Shigri Glacier.

The biotic and soil conditions of the upper Beas River watershed are typically variable with elevation and slope aspect. Climatic treeline is at about 3,500 m. However actual treeline has been influenced over long periods of time by anthropogenic factors, including grazing practices and collecting of fuelwood and plants. Above treeline are found extensive areas of high elevation alpine vegetation while below the treeline is a mixed deciduous-coniferous forest interspersed with meadows or clearings known locally as thatches. This grade into the typical Himalayan temperate coniferous forest dominated by deodar (cedar), spruce and fir. Under natural conditions, such forest would encompass the entire lower slopes and valley floors of the area under consideration.

It is important to note that the dominant surficial material over most of the area is bedrock. The lower slopes are generally cloaked by colluvium, which may include modified glacial deposits such as sub-glacial till and ice-marginal glacio-fluvial deposits. Coarse-grained alluvium and debris-torrent deposits characterizing surficial deposits on the valley bottom in the Manali vicinity.

4.4 DESCRIPTION OF PHYSICAL ENVIRONMENT

4.4.1 Physiography

The proposed project lies in Manali in the Kullu district in the state of Himachal Pradesh. Lahul and Spiti in North, Kangra in West, Manali in Southwest, Shimla in South and Kinnaur in the East direction bound the district of Kullu. Topographically Kullu district is isolated, relatively wide at the valley floor running approximately 80km of length. This distinguishes it from the narrow, deeply incised valleys to the south and offers possibilities for agricultural landuses and settlements. At Manali, the valley becomes more confined by steep mountain slopes to a maximum valley-bottom width of about 1 km. As a result, flat, arable, and easily utilized land is restricted to a few valley-side terraces and fan areas at confluences of tributaries with the Beas River.

The physiography of the region is marked by hilly terrain rising from the altitudes of the 1700 m above mean sea level (amsl) near Beas river (western limits of the catchment area) to 4800 m amsl in the glaciers of Himalyan ranges (eastern limits of the catchment area).

The catchment area (drainage area) of the project is dependant on Allain and Duhanan streams which lie between the latitudes 32° 07' N & 32° 21' N and longitudes 77° 11' E & 77° 22' E. Both these streams flow east to west before joining Beas River.

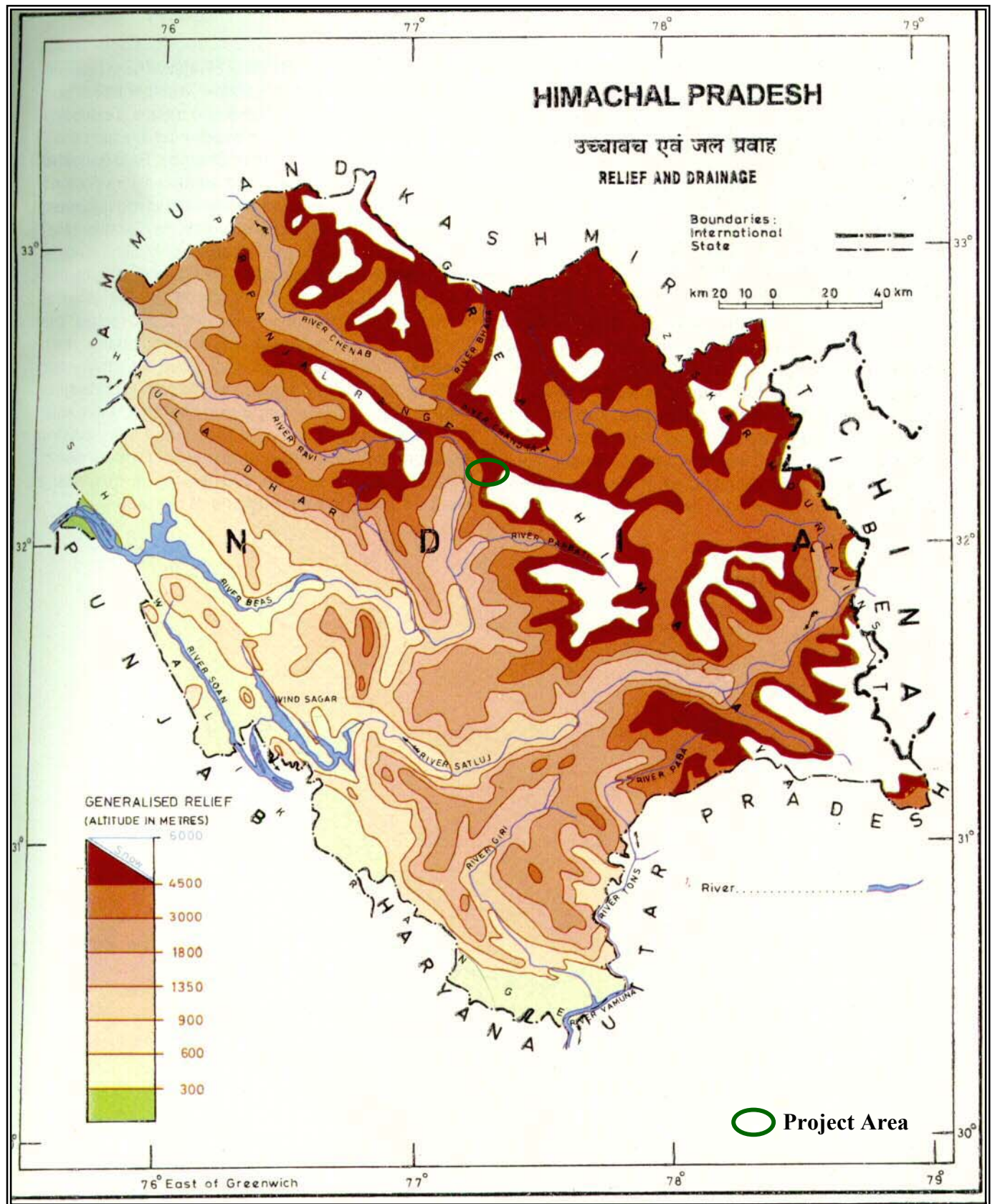


Figure 4.1: Relief and Drainage map of Himachal Pradesh highlighting the Project Area

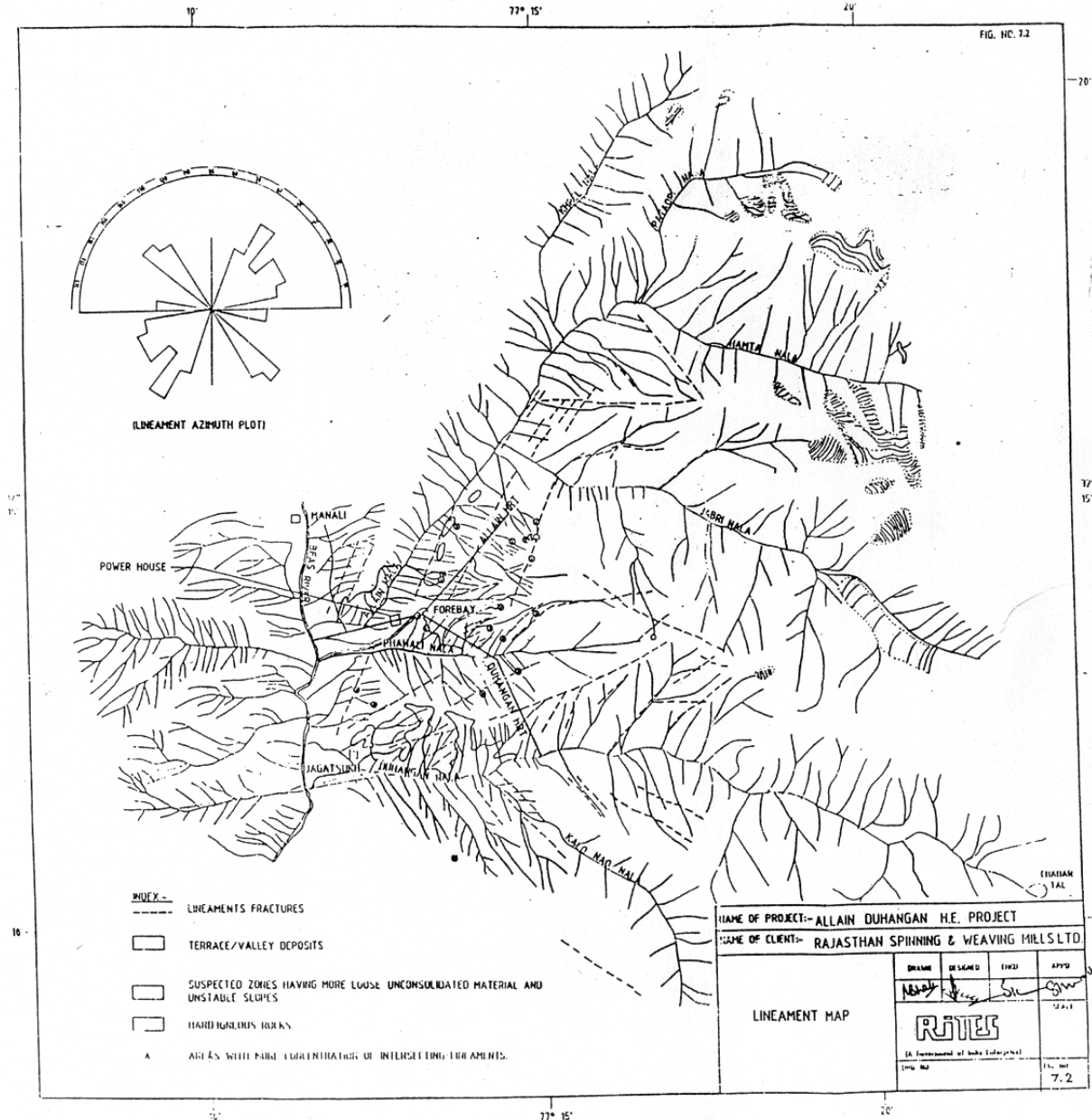


Figure 4.2: Relief Map of the Project Area