

CHAPTER 2 TOPOGRAPHY • GEOLOGY AND HYDROGEOLOGY

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2.1 Topography

2.1.1 Topographical Characteristics

The Sohar area is located on east side in northern part of the Hajar Mountains (Figure 2.1). The topography of the Study area mainly consists of the moderate and low relief mountains, hilly land, fans and terraces, alluvial plain and coastal plane. The moderate and low relief mountains are found in the northwestern and western parts of the area. The highest peak in this area is 540 m in elevation and mountains range in elevation from 350 to 500 m, showing typical topography of mature stages with out-croppings of mainly gabbroic rocks. The relief of mountains in the northwestern part of the area are especially steep, with slope planes steeper than 30° (Figure 2.2).

The hilly land extends into the western to central parts of the area and exhibits relatively gentle slopes ranging in elevation from 105 to 508 m. This area mainly consists of basaltic rocks and Sheeted-dyke Complex that are weathered and eroded. The density of rivers and valley in the district are relatively high. Numerous isolated hills consisting of coral limestone are found in the hilly land which gives this area a unique landscape. Slopes steeper than 30° locally are distributed throughout the district, except in the northwestern part of the area (Figure 2.3).

The fans and terraces are distributed along Wadi Suq, Wadi al Jizi and Wadi Bani Umar al Gharbi in southern to central parts of the area. The fans and terraces, ranging in elevation from 30 to 110 m, consist of four levels of terrace deposits, namely high, middle, low and flat alluvial plains. Terrace deposits mostly consist of sand and gravel. The High Terrace plain ranges in elevation from 100 to 320 m and is locally found along Wadi al Jizi and Wadi Suq. The Middle Terrace ranges in elevation from 80 to 500 m and is mainly and widely found along the wadis, extending to Magan in the eastern part of the area. The Low Terrace is found along with the middle terrace and is relatively long and narrow in shape. The narrow alluvial terrace plain is also locally and continuously found along the wadis.

The flat alluvial plains, ranging in length from 3 to 10 km, are distributed widely in the downstream reaches of each river. The flat alluvial flat plains at the lowest downstream point of each river are mutually combined and form wide continuous plains. These plains consist of sand and gravel in the upper part of the plain and fine or coarse sand in the lower part of the plain.

The coastal plains generally consist of coastal sand dunes distributed along the seashore, ranging in width from 0.5 to 2 km and ranging in elevation from 0 to 30 m. The heights of the dunes are relatively low, ranging in elevation from 1 to 5 m. Also the dunes are generally short in length. At the mouth of Wadi al Jizi, a small sand bar extends about 400 m into the Gulf of Oman in a northeasterly direction.

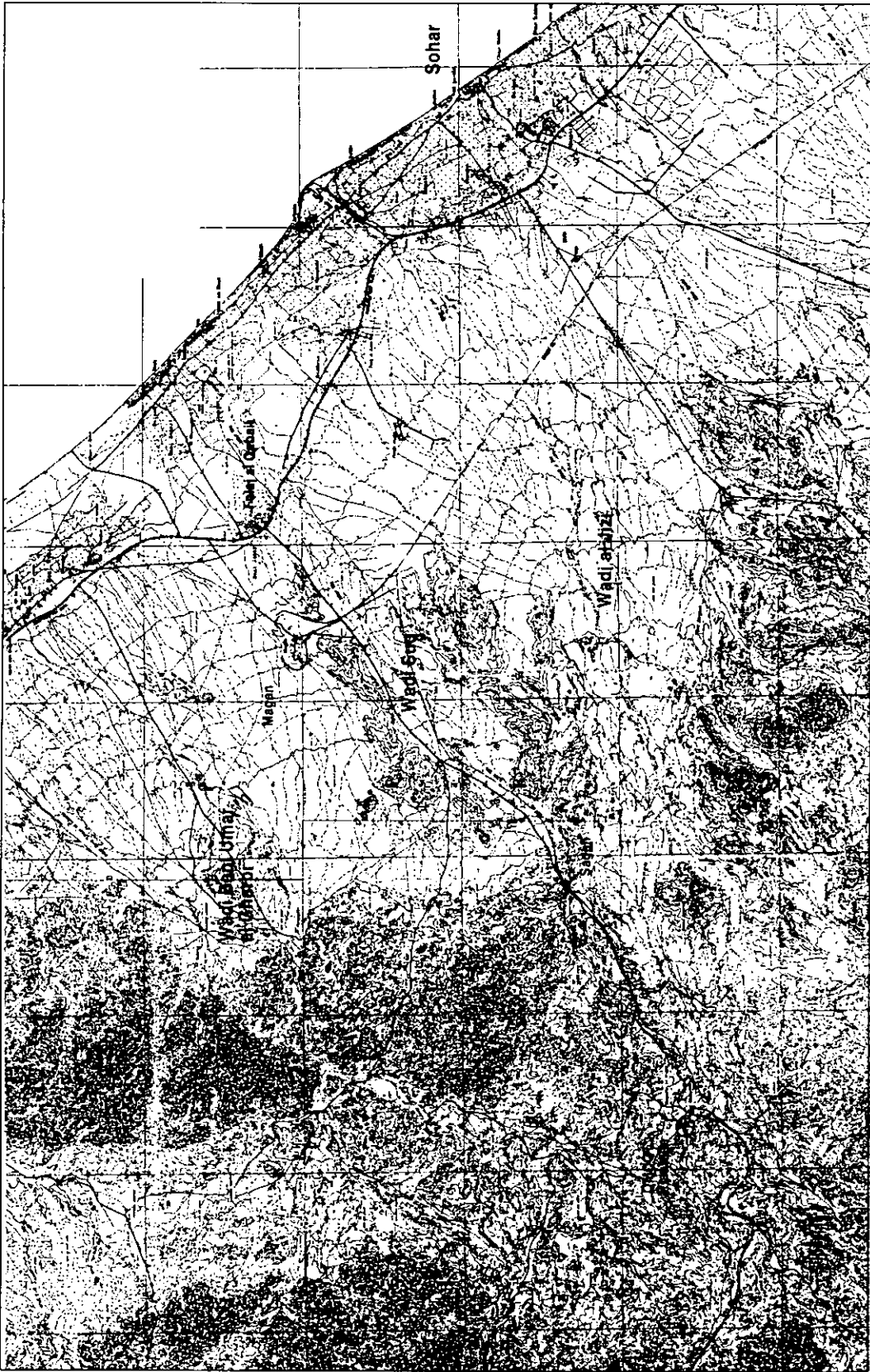


Figure 2.1 Topographic Map of the Study Area

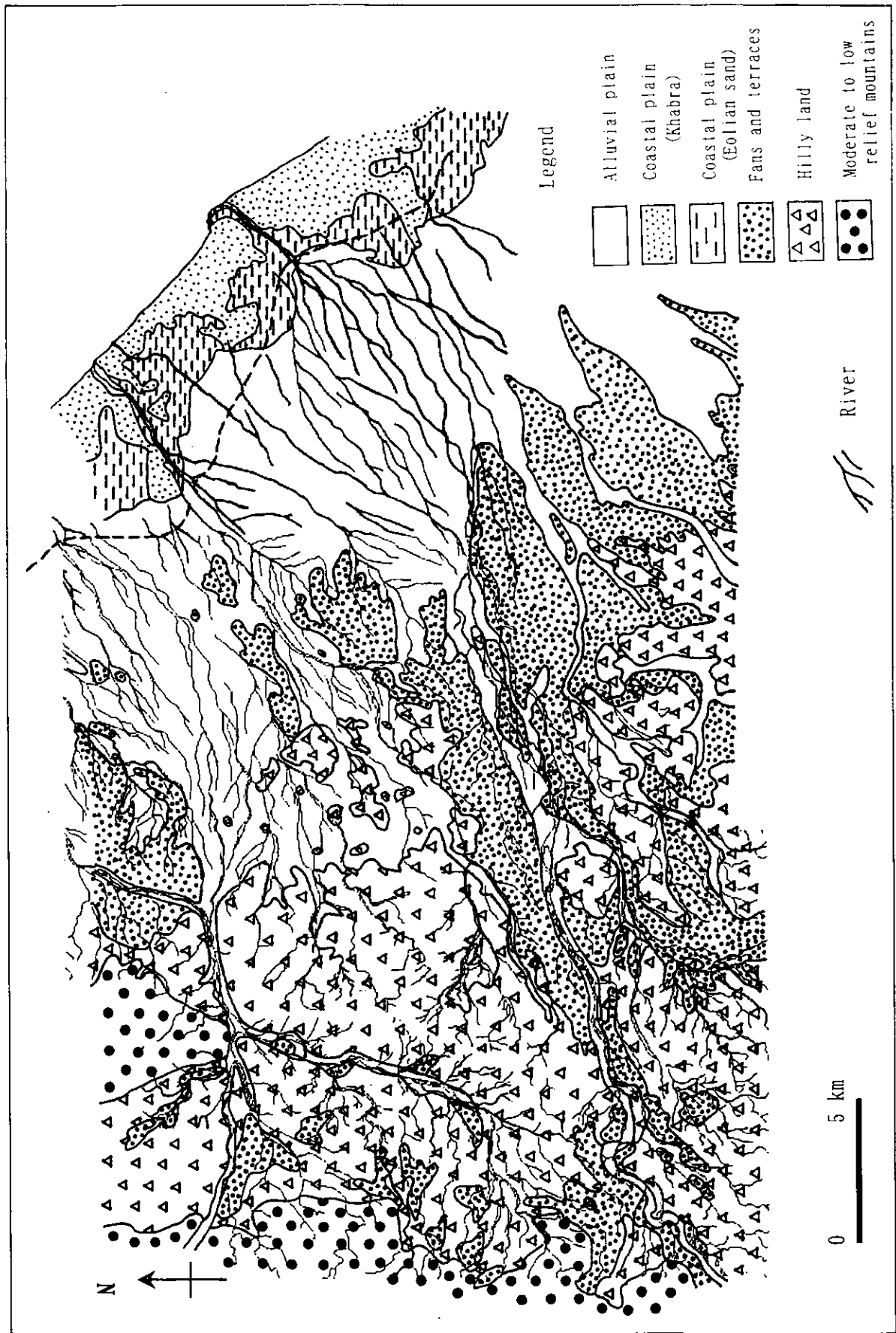


Figure 2.2 Classification of Landform in the Study Area

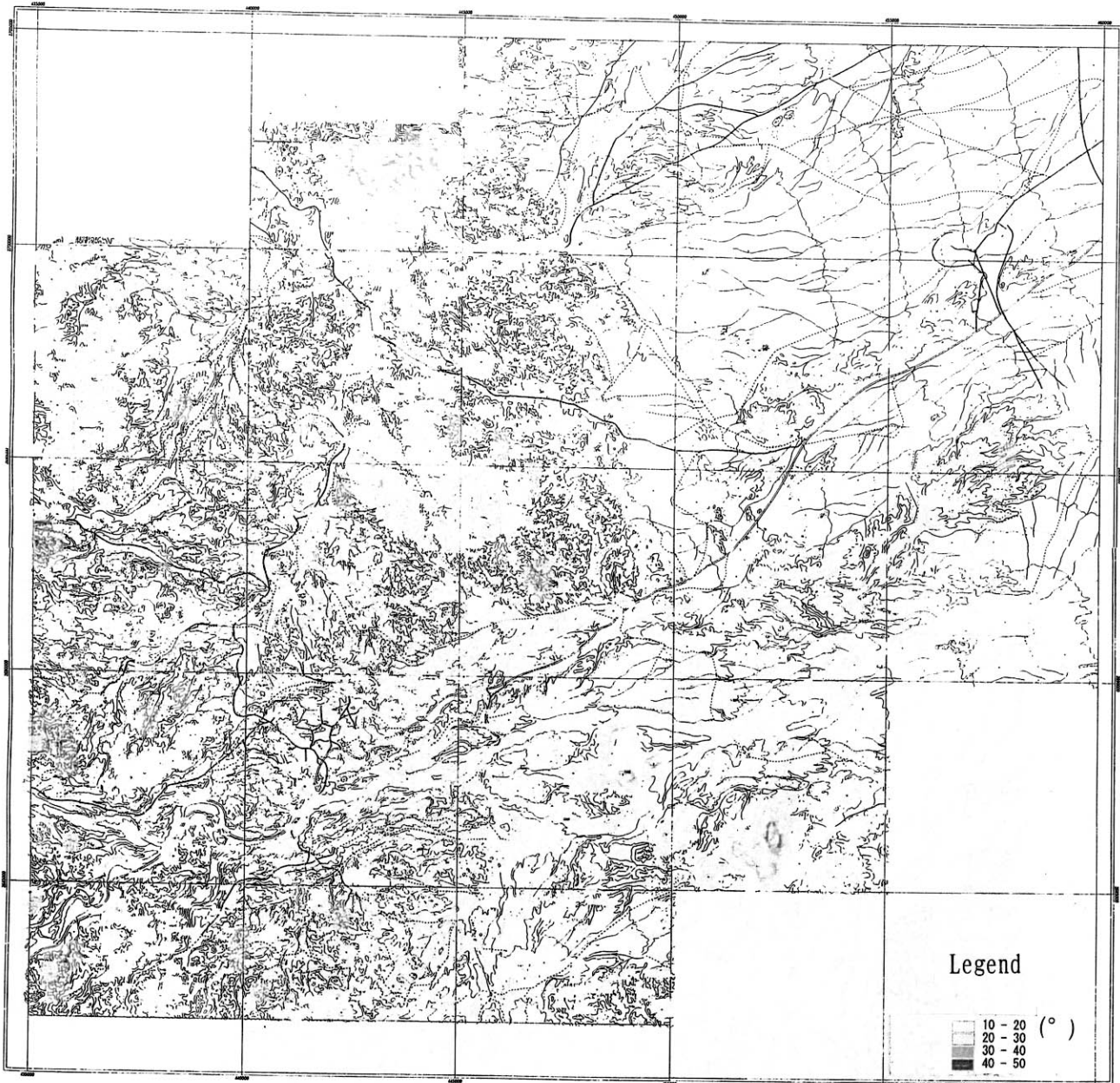


Figure 2.3 Topographic Gradient Map

2.1.2 Micro-topography along Wadi Suq

Wadi Suq is a dry valley, a so-called wadi; and, for the most part, no surface water is found. The catchment area of Wadi Suq is shown in Figure 2.4.

Wadi Suq has a river length of 34 km with an average slope of 0.008 (1:125). The maximum elevation of the wadi is 275 m. The wadi is 30 m above sea level at Falaj al Qabail in its down-stream area. The whole catchment area of Wadi Suq is 71 km², and the mountainous area of the basin occupies approximately 29 km². The upstream portion of the wadi is characterized by narrow river canyon, while the downstream portion has a gentle slope and forms wide floodplain.

The upper reaches of Wadi Suq consist of hilly land and locally low to moderate relief mountains. The tailing dam is located in this upper area. The width of the wadi at the based of the tailing dam is about 100 m and the depth of the valley is approximately 60 m. The high and middle terraces are found around the tailing dam. The western end of the tailing dam corresponds to the middle terrace plain of which is only about 10 m higher in altitude than the top of the tailings deposit.

From the tailing dam to a point approximately 2 km downstream, the Wadi Suq basin is characterized by low relief mountains. At this point the wadi turns to the east-northeast. The width of the wadi is wider in this area, ranging from 150 m to 250 m. Middle, low level, and alluvial terraces are distributed almost continuously along the wadi and the present course of the stream is almost straight within an eroded alluvial terrace plain approximately 1.0 to 2.0 meters deep. Trench 2, which was built by OMCO to intercept mine pollution from the tailing dam, is built at the end of this part of the wadi.

The middle section of Wadi Suq from the 2 km point to Sagha village at KM 14 is approximately 12 km in length. In this reach the wadi ranges in width 150 to 700 m wide and meanders with a wavelength of roughly 0.5 km. Middle and low terraces are distributed intermittently, while the alluvial terrace plain is distributed almost continuously. The present stream course meanders in eroded alluvial terrace plains approximately 0.5 m to 3.0 m deep.

The downstream reach of the wadi consists of total length of 15 km from the 14 km point to Falaj al Qabail village at the KM 29 point. This part of the catchment belongs to the fan and terrace zone. In this zone, the stream width ranges from 500 m to 4.5 km, forming shapes like fans with a great many stream channels. The width of the mainstream is 200 to 800 m. The middle and low terraces are distributed intermittently around the wadi, while alluvial terrace is distributed almost continuously or intermittently in floodplains of the wadi. The present main stream course and other smaller streams are contained in eroding alluvial terrace plains approximately 0.5 m to 2.0 m deep. The stream channels meander loosely within these plains.

The lowest portion of Wadi Suq consists of about 2 km from the Falaj al Qabail village through the coastal plain to the mouth of the wadi at the Gulf of Oman. The main stream continuously flows toward