



Figure 2. Land systems, Otanewainuku Ecological District.

### ***Whakamarama Plateau***

The Whakamarama rhyolite plateau is one of the oldest in the central North Island volcanic region. The plateau surface is undulating to hilly, with a main gradual fall east and north. It is bounded on the west by a high escarpment exposing andesite on the lower face and overlooking the Matamata Plain. The crest of this major fault scarp (Okauia Fault) is the Kaimai Range. In the east and south, a number of ancient rhyolite domes surmount the typical plateau surface.

A minor portion of the plateau is drained by streams crossing the scarp (Wairere and Te Ariki Falls) but otherwise streams flow northeast to eastward to the Tauranga Basin, becoming deeply entrenched along their lower reaches.

### ***Northern Mamaku Plateau***

The very gradual northern fall of the Mamaku plateau, the largest land system of the district, formed c.140,000 years ago. The surface is undulating to hummocky, and divided into long segments by the gorges containing virtually all the streams. These flow shallow and rapid over rock pavements; waterfalls are fairly common. The eastern side is characterised by rolling to hilly terrain between gorges; the ignimbrite being more deeply covered by moderately eroded pumiceous ash erupted from sources a few miles southward from the late Pleistocene to recent times.

### ***Papamoa Hills***

The Papamoa hills comprise ridges of rhyolites, andesites and volcanic breccias generally aligned northward from the headwaters of the Whataroa Stream. A main divide known as the Papamoa Range runs along the eastern side reaching 564 m a.s.l. (Otawa). Volcanic domes on the western side include Mt Misery, Pukunui and Kupukairua.

### ***Rotoiti Breccia Fan***

The immense Rotoiti breccia (unwelded ignimbrite) fan was erupted from sources just east of Rotorua c.50,000 years ago. An overall gradual fall from an altitude of 420 m or so along the south eastern boundaries ends at 60-100 m along an embayed margin overlooking the Maketu basin and Otamarakau coast. The breccia has been eroded to the extent that most of the plateau surface is rolling to hilly. Numerous consequent gullies and long narrow valleys have flat floors and few streams because of the very porous nature of the breccia and later ash deposits. Underlying Matahina Ignimbrite is exposed in a few very deep valleys.

### ***Matata Hills***

The Matata hills on the eastern side of the district are mainly very steep and rugged, rising to 370 m. The country rock is Matahina ignimbrite (which westward is overlain by the breccia fan). This land system is bounded on the north by Upper Pleistocene marine sandstone coastal cliffs up to 200 m high, and on the east by a high broken scarp (150-370 m) overlooking the Rangitaiki Plains.

### ***Sand dunes***

An originally narrow band of sand dunes lining the coast beneath the steep sandstone and ignimbrite cliffs has been further reduced by construction of a railway line and state highway running below the cliffs. The dune field is broken by several small streams and dune hollow wetlands occur in several places (generally associated with the streams).

### ***Otuhepo Hills***

Two small land systems are the outcropping Otuhepo andesitic hills in the south-eastern corner of the district and greywacke hills near Otamarakau.

### **Special geological features**

Kenny and Hayward (1996) identified four special geological features in the ecological district (see Table 2). The Matata Pleistocene marine sequence and fauna is of national importance and is the best exposed sequence of marine Pleistocene in northern North Island, one of several highly diverse Molluscan faunas of Pleistocene age in the Bay of Plenty. The Braemar Road Tephra Section, on the north-eastern margin of the district, is of national importance as the type locality for Hauparu, Te Mahoe and Maketu Tephrae.

Two sites are of regional importance. Taheke geothermal field has surface hydrothermal activity, which is of typical acid-sulphide, steam-heated type. Hydrothermal features consist of fumaroles, soft sinter pans, deposits of sulphur, and many small springs, seepages, and pools emitting gas. Discharges occur on the floors and lower slopes of valleys. Okere Falls hydro-electricity station and gorge is an excellent example of a deeply incised river gorge and falls. It is the site of an early hydro-electric power station, and Okere Falls was the fourth community in New Zealand to receive electric power.

## **SOILS**

Soils of the district are mainly moderately to strongly leached, developed from airfall volcanic ash, and can be classified in three main groups (DSIR 1964) as follows:

*Recent soils from volcanic ash:* these are the soils in the Manawahe locality, in the south-eastern corner of the ecological district. Grouped under "Tarawera soils", they are gravelly sands and gravels up to 25 cm thick derived from basaltic ash and lapilli erupted from Mt Tarawera in June 1886. Drainage and decomposition of organic matter are rapid.