

United States Department of the Interior
Geological Survey

EDM STATION DESCRIPTIONS
FOR MAUNA KEA, MAUNA LOA, AND HUALALAI
ISLAND OF HAWAII

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This report is preliminary
and has not been edited or
reviewed for conformity with
Geological Survey editorial
standards or nomenclature.

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INTRODUCTION

The purpose of this report is to describe and document the EDM stations presently being used on Mauna Loa, Mauna Kea, and Hualalai. Stations that were destroyed and older stations that have been reset are not described in this text. The detailed map and site descriptions in this report should help to reduce time spent searching for the EDM stations.

In 1965, R.W. Decker established what would eventually be the first of many stations that would eventually allow an EDM network to cover the summit, rifts, and flanks of Mauna Loa. In 1970, Don Swanson with the help of U.S. Geological Survey Hawaiian Volcano Observatory (HVO) personnel, expanded the network on the summit to six stations. Between 1975 and 1977, J.P. Lockwood, R.I. Tilling, P.W. Lipman M.K. Sako, K.Y. Yamashita and others at HVO established what is now the present EDM network on Mauna Loa. This network presently (1987) consists of 98 EDM stations and approximately 268 EDM survey lines.

The original purpose of the EDM net was to measure horizontal line-length changes across Mokuaweoweo Caldera so as to monitor inflation of the summit, which was expected to occur prior to an eruption. With the support of helicopters and more sophisticated and powerful instruments, we were able to expand the network to cover the rifts and flanks of Mauna Loa and also tie into stations on Kilauea, Mauna Kea and Hualalai.

Stations located on Mauna Kea give us a stable baseline and helps to determine how much horizontal strain occurs on Mauna Loa due to the inflation or deflation of the volcano and that accompanying large earthquakes. It also gives us the means to evaluate far field effects, if any, of a possible deep seated magma reservoir under Mauna Loa.

The Hualalai EDM network was established in 1971 by Don Swanson and HVO personnel. It is tied to Mauna Loa and Mauna Kea by shots to IKAAGA and HVO165HUALALAI (CABIN) EDM stations. The original net consisted of three stations (HVO165HUALALAI, HVO164AIRPORT, and KEALOHA) monitoring the southeast rift of Hualalai. This EDM network was expanded in 1985 (M.Sako, R.Hanatani, R.Moore, F.Trusdell and K.Ah Chong), to include the upper northwest rift of Hualalai. Additional EDM stations are being considered for the future to evaluate the serious volcanic hazards posed by a Hualalai eruption on the increasing population on the lower slopes of the volcano.

The entire Hawaii Island network is broken down into smaller monitors (Middle SW rift, Lower SW rift, NE rift etc.) for spot checking different areas of the volcano. For the purpose of this report, the EDM stations are categorized as follows:

1. Hualalai
2. Mauna Kea
3. Mauna Loa Lower Northeast Rift Zone
4. Mauna Loa Middle Northeast Rift Zone
5. Mauna Loa North and Northwest Flank
6. Mauna Loa South Flank
7. Mauna Loa Summit
8. Mauna Loa Middle Southwest Rift Zone
9. Mauna Loa Lower Southwest Rift Zone.

Some of these stations may become unstable after a large earthquakes, especially those stations located on cinder cones, for example, RIANA, 1949 CONE RESET. Others may be destroyed because of urban development, for example, TAGML75-3, KONA KAI, HAAO, VANCE.

These are a list of acronyms used in this report:

1. HVO Hawaiian Volcano Observatory
2. NPS National Park Service
3. HTS Hawaii Triangulation Station
4. HGS Hawaiian Government Survey
5. EDM Electronic Distance Measurements
6. PTA Pohakuloa Training Area

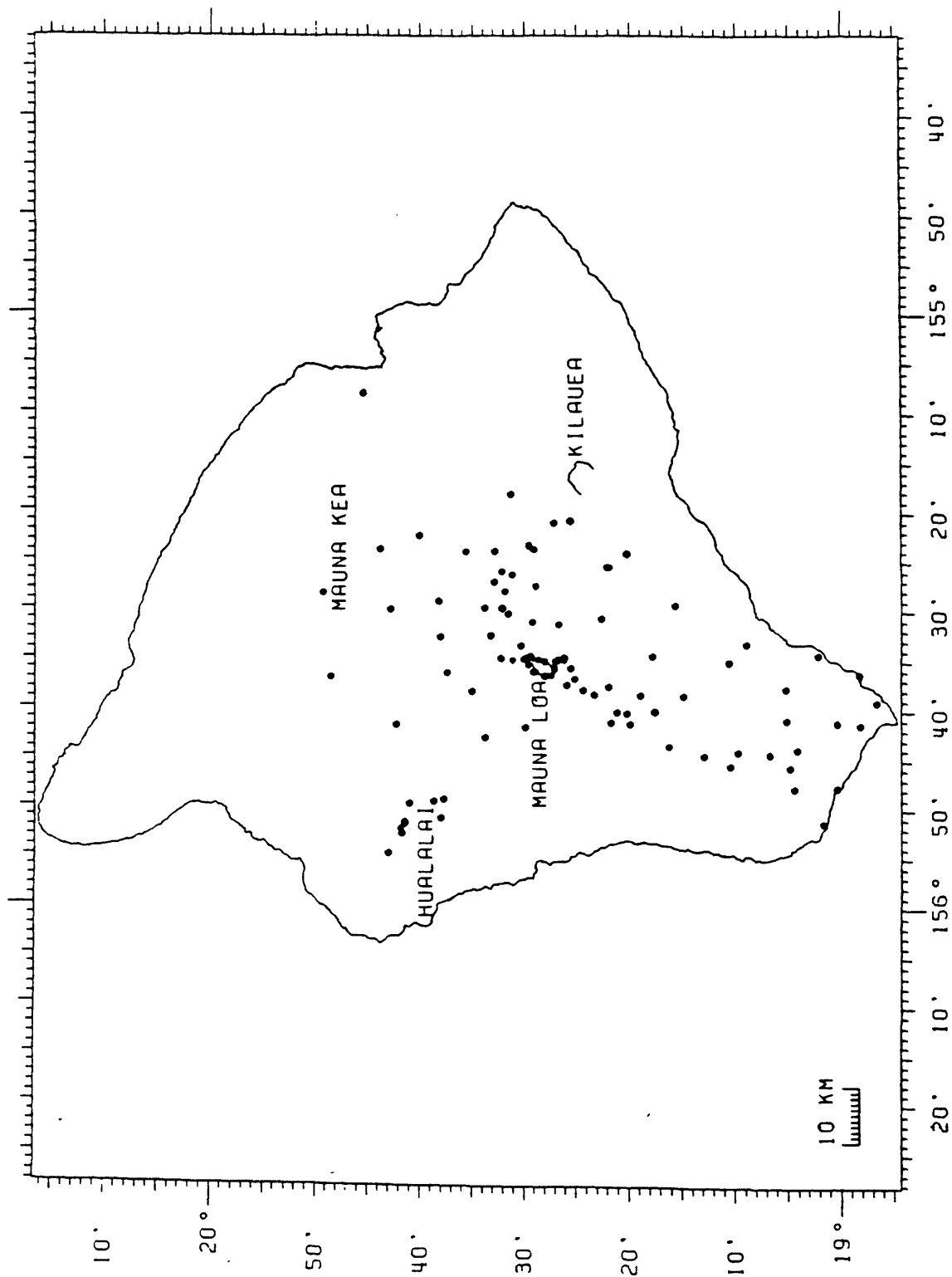
The following Hawaiian words are used to describe directions, certain geologic features and pertinent station markers in this report:

1. Ahu - rock cairn
2. Kipuka - inlie of older lava
3. Makai - downhill, towards the sea
4. Mauka - uphill, towards the summit
5. Puu - hill

ACKNOWLEDGEMENT

I would like to thank the staff members of the Hawaiian Volcano Observatory, past and present, who gave their time and effort in setting up the EDM networks. I especially would like to thank John Lockwood, Peter Lipman, Robert I. Tilling and Ken Y. Yamashita for their establishment notes which helped me to describe the stations. A very special thanks go out to Thomas L. Wright and John P. Lockwood, my two reviewers, for their helpful criticisms and comments.

MAUNA KEA, MAUNA LOA, AND HUALALAI
EDM STATIONS, JULY 1987

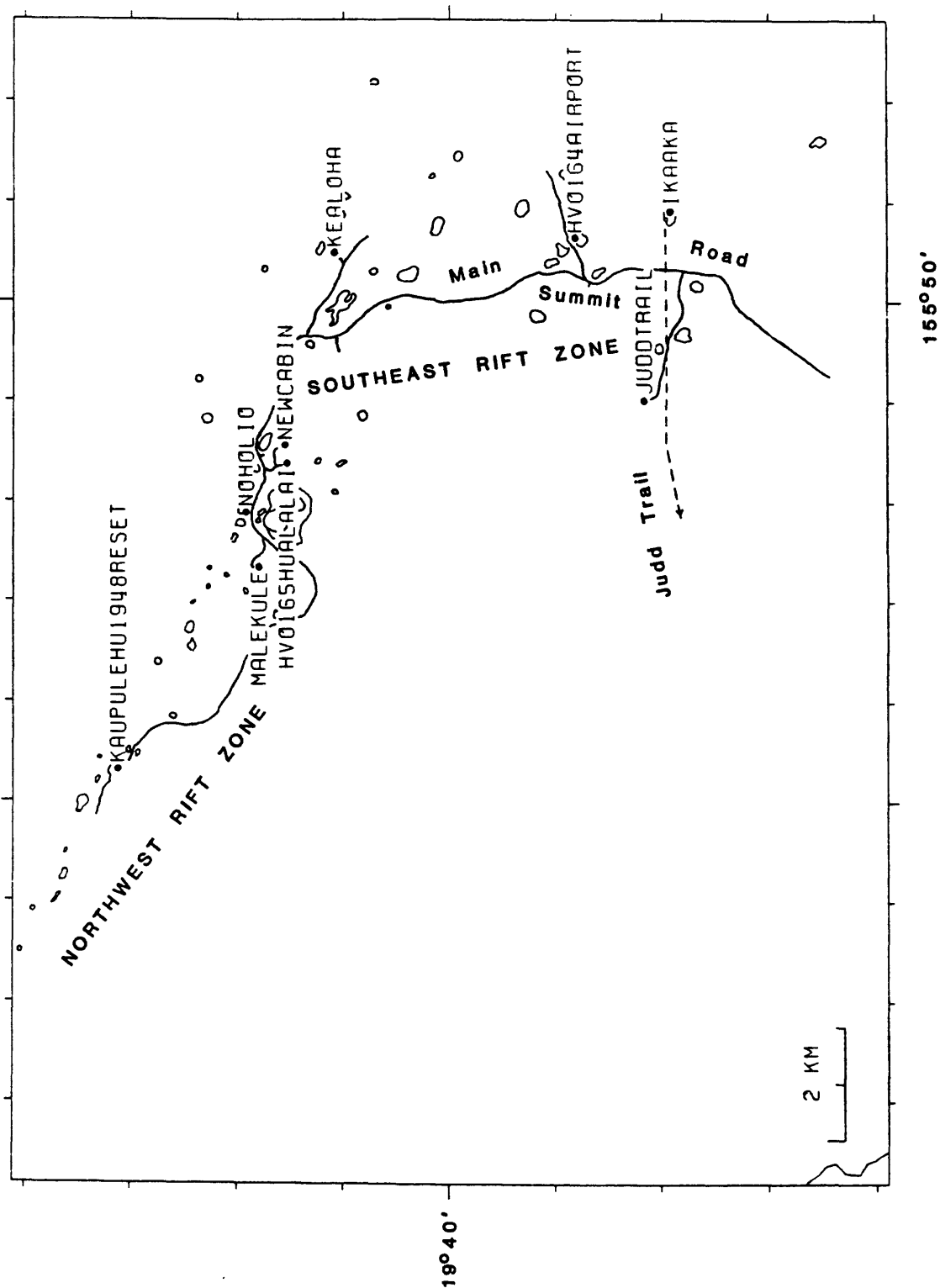


EDM STATION DESCRIPTIONS
HUALALAI

(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A" DETAILED
ACCESS INSTRUCTIONS

HUALALAI EDM STATIONS, JULY 1987



STATION NAME: JUDDTRAIL (*4) ELEVATION: 5170'
LATITUDE: 19.6361° LONGITUDE: 155.8496°

DESCRIPTION: JUDDTRAIL is an unmarked standard USGS disk set in bedrock, located 5 m to the makai of the road near an ahu at a point on the road where the land starts to flatten out.

From the Keauhou Shopping Center, take Kamehameha III road to the intersection of Highway 11. Turn right and drive for ~1.8 mi. to the Holualoa road sign. Turn left at the intersection and drive 0.1 mi to Mamalahoa Highway (Hwy 180). Turn left on Hwy 180 and drive ~0.5 mi to a building with a Donkey Mill sign makai of the road. Turn mauka at the road opposite the building (road to the summit). Drive 0.7 mi to the end of the paved portion of the road (avocado orchard on the left at the end of the paved road. Turn right at the next intersection and drive ~0.77 mi to a lock gate (Do not make any right turns along the way to the gate). From the gate, you drive through a thick forest with one locked gate, then through some thinning ohia forest on an aa flow with one unlocked but closed gate (the main road is very obvious). As you get off the the aa flow you past a experimental tree plot enclosure. Drive past this enclosure until you get to the next tree plot. Turn left just as the road approaches the plot. Follow the road until it intersects the Judd Trail at Pihapono cone. Drive on the trail about 100 m, then drive on a road that heads to the right. This road leads to a water trough. Go by the water trough ~0.22 mi driving on a road with a pipeline along the mauka side to reach JUDDTRAIL station.

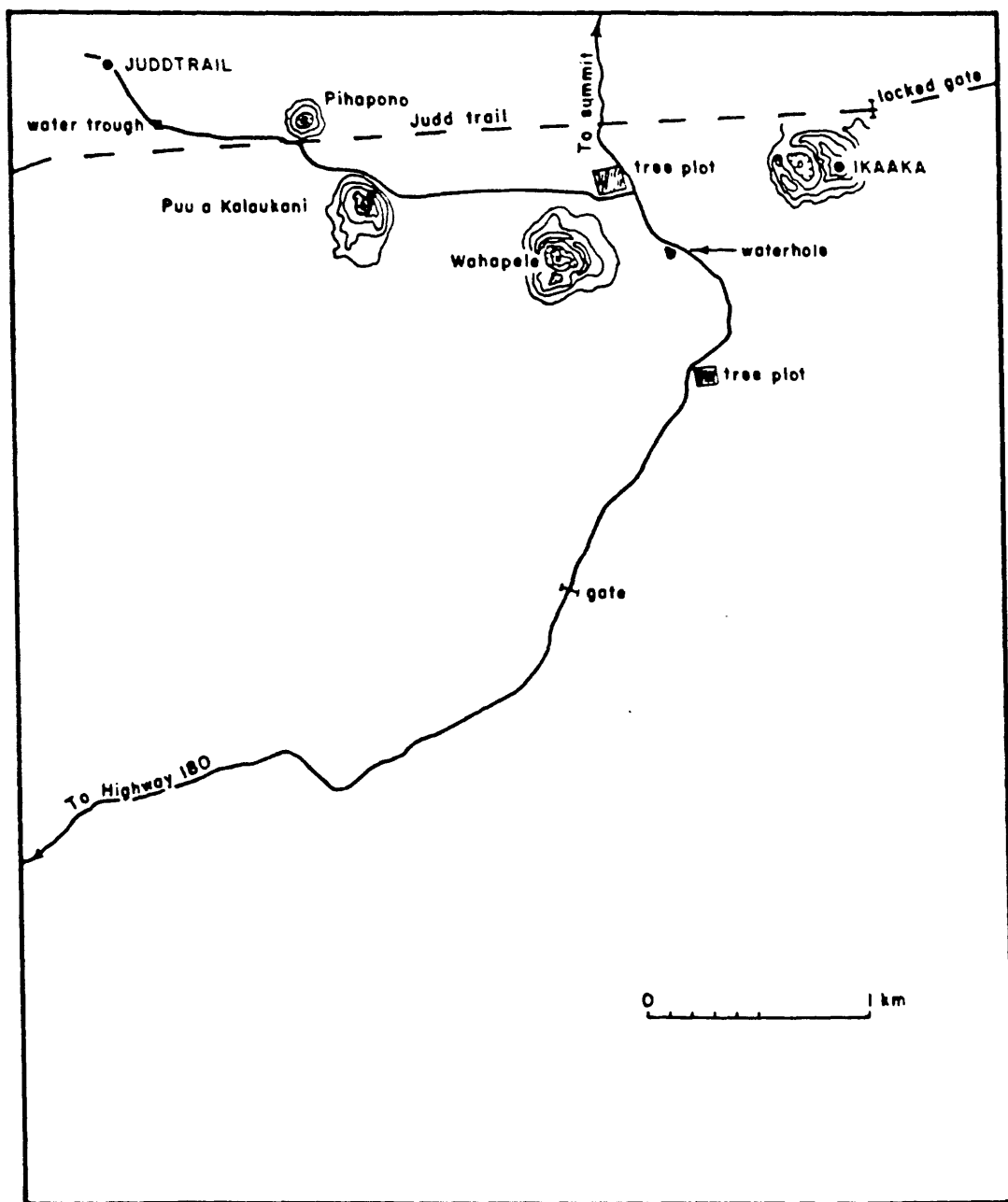
SEE KEALAKEKUA, PUU LEHUA, AND HUALALAI QUAD SHEETS

STATION NAME: IKAACA (*1 AND *4) ELEVATION: 5586'
LATITUDE: 19.6320° LONGITUDE: 155.8180°

DESCRIPTION: IKAACA is a standard USGS brass disk marked "IKAACA" cemented in a rock outcrop.

From the experimental tree plot intersection north of Wahapele, head mauka on the main road to the summit until it intersects with the Judd Trail. Turn right and drive ~0.7 mi. Puu Ikaaka is located makai of the trail. Walk to the top then head for the side facing Mauna Loa and Mauna Kea. There are Koa trees growing in the crater directly behind the station. You need a 4-wheel drive vehicle or helicopter (landing area on the top of the cone next to a large Koa tree located near the station).

SEE HUALALAI QUAD SHEETS



STATION NAME: HVO164AIRPORT (*4) ELEVATION: 6000'
LATITUDE: 19.6470° LONGITUDE: 155.8225°

DESCRIPTION: HVO164AIRPORT is a standard USGS aluminum disk stamped "HVO164" cemented on a galvanized pipe driven into the ground, and reinforced by a concrete pad.

Continue to head mauka from the intersection of the Judd Trail and the main road to the summit until you reach the second of two intersections on the mauka side of Puu o Mawae. Take the road that heads to the right which leads you through a saddle between two cones. Park the car at the crest of a hill about 100 m before you reach a flat and wide open area used as an unimproved airstrip for small aircrafts. Climb straight up the cone on the right of the road and go about 10 m west of the point where the trail intersects the top of the cone. The station may be buried by dead leaves and dirt. A machete is recommended to cut lines of sight to HVO165 and KEALOHA. As of June 1985, this station was replaced by IKAAGA as part of the Hualalai EDM monitor, but may still be used if the network is ever expanded.

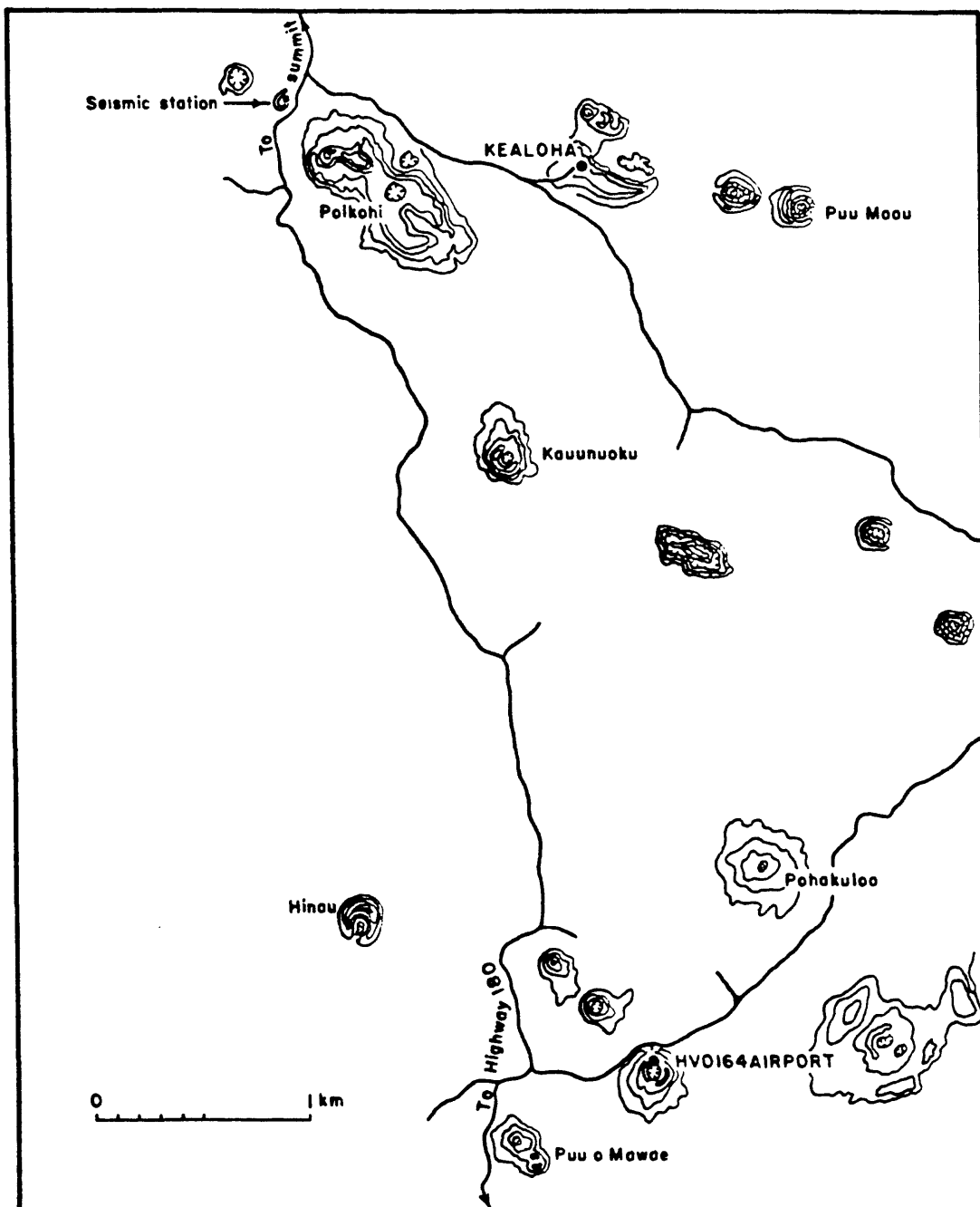
SEE HUALALAI QUAD SHEET

STATION NAME: KEALOHA (*4) ELEVATION: 6951'
LATITUDE: 19.6849° LONGITUDE: 155.8252°

DESCRIPTION: KEALOHA is a standard USGS brass disk cemented in a brass pipe reinforced by concrete and stamped "KEALOHA".

From the road intersection above Puu o Mawae that goes to HVO164AIRPORT, continue on the road to the summit until you go about 150 m past a small horseshoe shaped cinder cone, (site of the Hualalai seismic station). The seismic station cone is located north of Poikahi Cone and the road goes between the two. Look for an obscure road intersection marked by an ahu, ~100 m past the cone to the right. This road takes you to the back side of Poikahi, down a steep grade, and onto a flatter area. Look for the road that heads to the left and up a red cinder cone. Follow the road to the top of the cone to the station. There is an alternate route to KEALOHA via the road that goes toward HVO164AIRPORT, but it is not recommended because of the soft ash.

SEE HUALALAI QUAD SHEET



STATION NAME: HVO165HUALALAI (CABIN) (*4) ELEVATION: 7720'
LATITUDE: 19.6924° LONGITUDE: 155.8603°

DESCRIPTION: HVO165HUALALAI is a standard USGS aluminum disk cemented in solid rock stamped "HVO165".

From the intersection near the Hualalai seismic station, continue north on the main road to the summit. Drive pass Kipahee Crater to a road on the left (summit cabin road). Keep on the main road for another 150 m (a bend to the left, then a right). Before you get to the next sharp right, look for a turnoff on the left side of the road. Take this road and follow it to the right side of a small ridge on the edge of a crater at the eastern base of Hainoa Crater and Puu Lalakaukole. HVO165HUALALAI is located on the top of the ridge towards the southern end. This station is used for the Super Triangle monitor. An ahu marks the station.

SEE HUALALAI QUAD SHEET

STATION NAME: NEW CABIN (*4) ELEVATION: 7700'
LATITUDE: 19.6926° LONGITUDE: 155.8574°

DESCRIPTION: NEW CABIN is an unmarked standard USGS aluminum disk cemented in solid rock.

From HVO165HUALALAI, drive around along the north edge of the crater to a ridge on the eastern rim. Walk up the ridge and head toward the south edge to the station. An ahu marks the station.

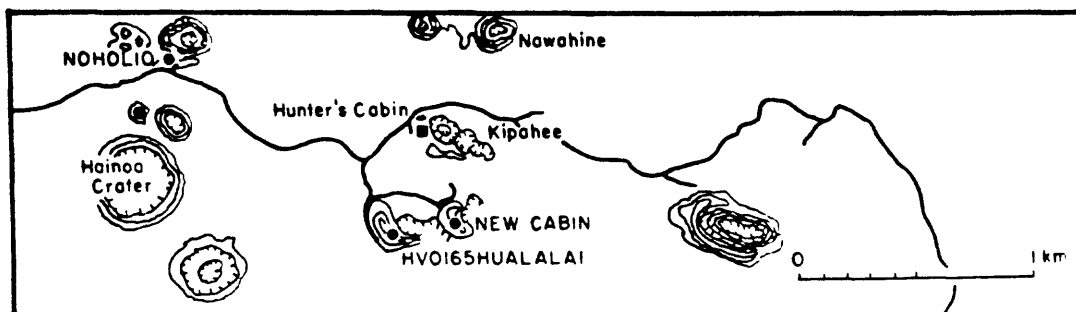
SEE HUALALAI QUAD SHEET

STATION NAME: NOHOLIO (*4) ELEVATION: 7840'
LATITUDE: 19.6987' LONGITUDE: 155.8685'

DESCRIPTION: NOHOLIO is an unmarked standard USGS aluminum disk
cemented in a lava outcrop.

From the intersection at the main road and the road to
HVO165HUALALAI, keep heading west along the main road until the
road gets to a saddle where you can see down the northwest rift
zone. Make a sharp right turn and drive up the cone about 15 m to
the edge of the crater. The station is located 5 m from a Ohia
tree on the edge of the crater. An ahu marks the station site.

SEE HUALALAI QUAD SHEET



STATION NAME: MALEKULE (*4) ELEVATION: 7822'
LATITUDE: 19.6966° LONGITUDE: 155.8777°

DESCRIPTION: MALEKULE is an unmarked standard USGS aluminum disk cemented in a rock outcrop.

From the Noholio turnoff, continue to drive over the crest on the main road until you get to a road intersection at the base of the cone. Take the right fork in the road which parallels a cinder cone to the left of the road. Go about 0.3 miles, then turn left and go up and into the cone's crater. From that point, drive straight up the side of the cone to the northeast ridge. Drive east along the ridge to the station which is located on the highest point in pahoehoe. An ahu marks the station site.

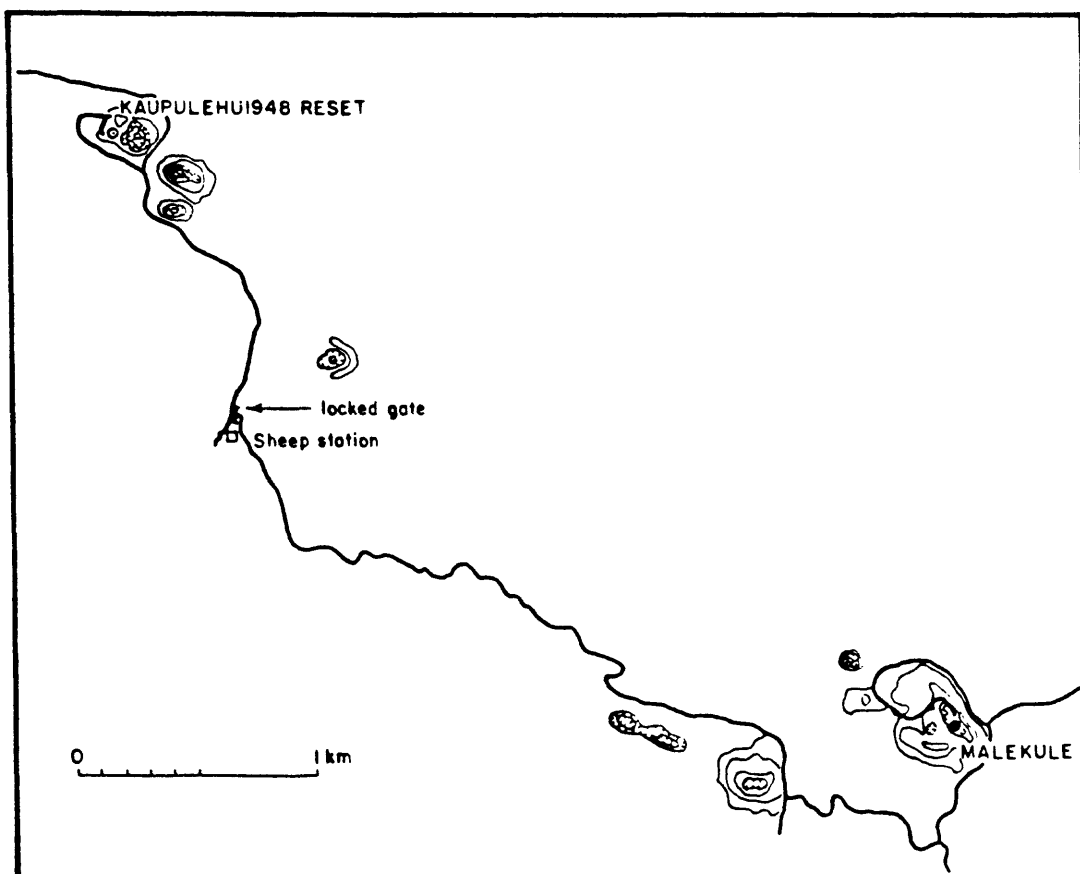
SEE HUALALAI AND KAILUA QUAD SHEETS

STATION NAME: KAUPULEHU1948RESET (*4) ELEVATION: 6141'
LATITUDE: 19.7186° LONGITUDE: 155.9113°

DESCRIPTION: KAUPULEHU1948RESET is a standard USGS brass disk cemented on a 6 cm pipe sticking out of the ground about 45 cm and stamped "KAUPULEHU 1948 RESET".

From the road intersection to the Malekule EDM station go left on a road that heads down the northwest rift of Hualalai. Stay on the main road by not making any left turns at two intersections on the way to a sheep station cabin. Turn right just past the cabin ~ 50 m then left to a locked gate. Open the gate and go through it. Turn right and drive ~0.75 mile to a black cinder cone with a road intersection and a microwave dish and radio antennas on it. Drive on the road that leads to the left side of the cone until you see a huge square antenna to your left. Look for a side road to the right that ends at a building. Walk around the right side of the building ~20 m to the station.

SEE HUALALAI AND KAILUA QUAD SHEETS

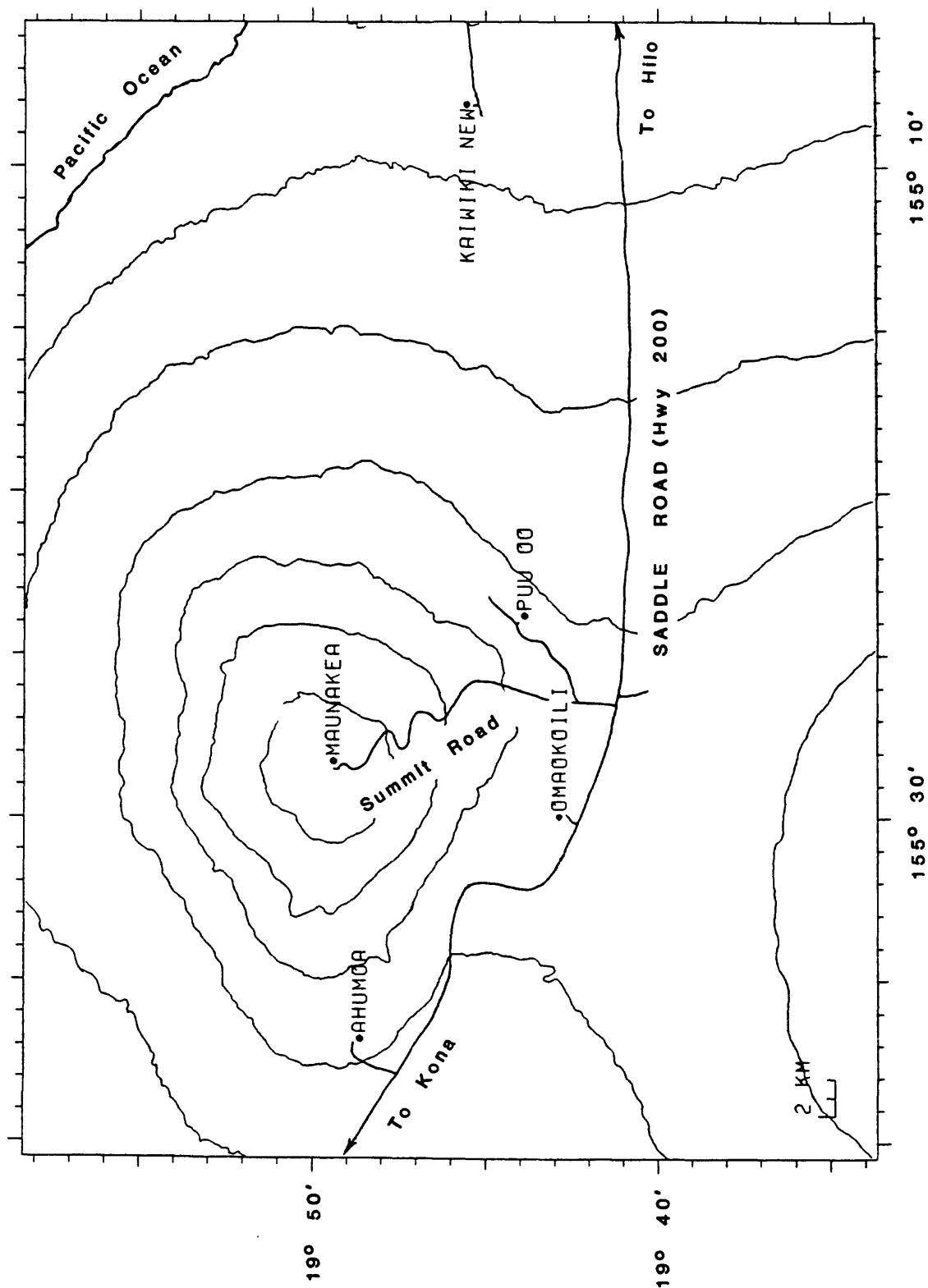


EDM STATION DESCRIPTIONS
MAUNA KEA

(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A" DETAILED
ACCESS INSTRUCTIONS

MAUNA KEA EDM STATIONS, JULY 1987



STATION NAME: AHUMOA (BM HVO75-52) (*1) ELEVATION: 7050'
LATITUDE: 19.8105° LONGITUDE: 155.6132°

DESCRIPTION: AHUMOA is on a large cinder cone located on the WSW slope of Mauna Kea. It is the largest round top cone on the lower skyline as you view it from Mauna Loa or from some parts of the Saddle Road. The station is a standard USGS aluminum disk stamped "HVO75-52" cemented in a large block of rock with yellow paint on it.

From Hilo drive up Highway 200 (Saddle Road) 0.5 mi past the 43 mi. marker to a gate across a hunters check-in station (~0.5 mi south of Kilohana Girls Scout camp). Turn right, go through the gate and drive on the dirt road until you reach the base of cone on the east side of Ahumoa (large cone closest to the Saddle Road). The road to the top of the cone starts here. As you near the top of the cone, take the road that heads around to the south rim of the crater. Stop about 100 m SE of quonset hut (old radio station site). The station is located ~5 m south of the road and about 3 m downslope. A four-wheel drive vehicle is needed. A helicopter can also land on the road above the station.

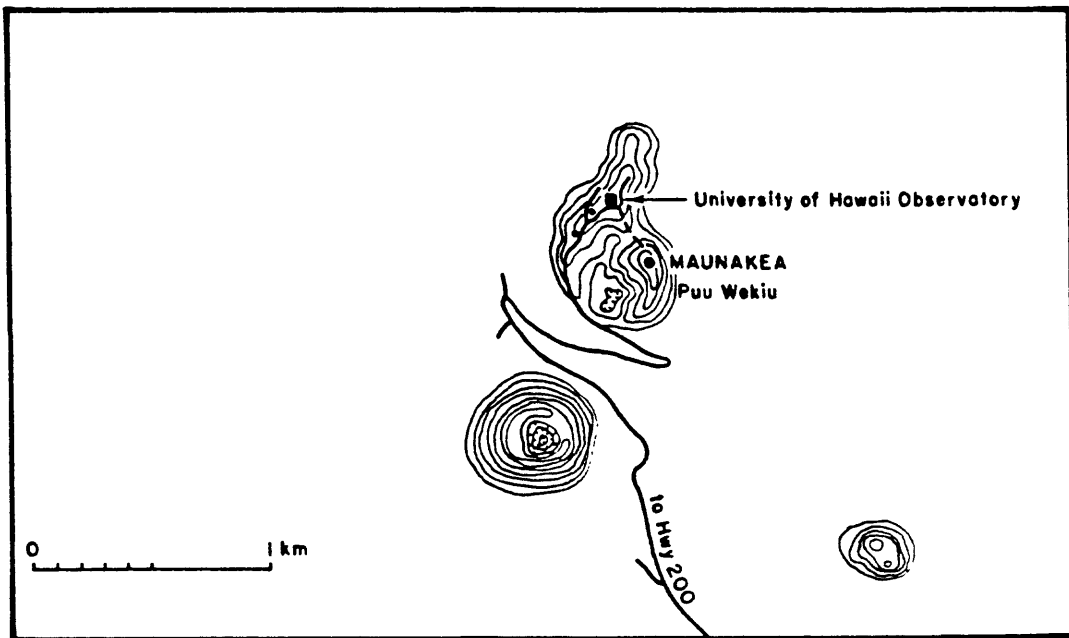
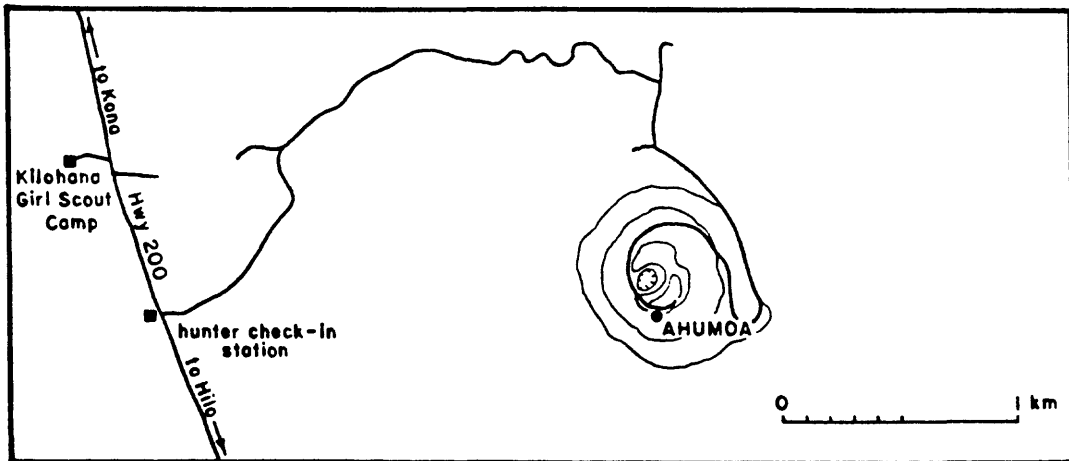
SEE KEAMUKU AND AHUMOA QUAD SHEETS

STATION NAME: MAUNAKEA (SUMMIT) (*1) ELEVATION: 13,769'
LATITUDE: 19.8236° LONGITUDE: 155.4709°

DESCRIPTION: MAUNAKEA is located on the summit cone (Puu Wekiu) of Mauna Kea. The station is a standard USGS brass disk stamped "SUMMIT 13,796".

From Hilo drive up HWY 200 (Kaumana Drive-Saddle Road) until you get to Puu Huluhulu which is about a mile past the 27 mi. marker (28 mile marker is gone). Turn right at the intersection across from the hunters check-in station. Go past the Mauna Kea State Park (Hale Pohaku area) and continue on an unpaved road that heads to the summit of Mauna Kea. As you approach the summit stay to the right of the buildings and park just opposite the third observatory (University of Hawaii's) along the right edge of the road. Look to the southeast for an ahu which is located on the east rim of the cone. Walk down a trail into the saddle of the cone, staying along the highest part of the rim until you reach the station. A 4-wheel drive vehicle is necessary for travel above Hale Pohaku.

SEE HILO, PIIHONUA, PUU OO, AND MAUNA KEA QUADS.



STATION NAME: OMAOKOILI (*1) ELEVATION: 7091'
LATITUDE: 19.7150° LONGITUDE: 155.4988°

DESCRIPTION: Omaokoili is a Hawaii Triangulation Station (HTS) Trig station located in PTA on a Mauna Kea cinder cone. Center on the carved-out hole in the rock in the cement pad inside of the carved triangle.

From PTA, drive back towards Hilo on the Saddle Road until you come to a gravel road with a iron gate, on the left side, .about 0.7 mi. past the 31 mi. marker and 50 m from the PTA boundary sign or ~200.m west of Puu Nene quarry road (a prominent cinder cone on the left of the highway). If you are coming from Hilo, the turnoff is about 0.35 mi. past the 30 mile marker. As you turn off of the Saddle Road, look for a red top hill with a trig flag on it that is slightly to the left front of you as you drive down the gravel road (the puu is the bigger and farther away one). Take the right fork in the road at the first intersection, which takes you between two cinder cones. Take the steep road that heads up the cone on the left which will take you to the station. A 4-wheel drive vehicle is needed to drive to the station or you can land a helicopter nearby.

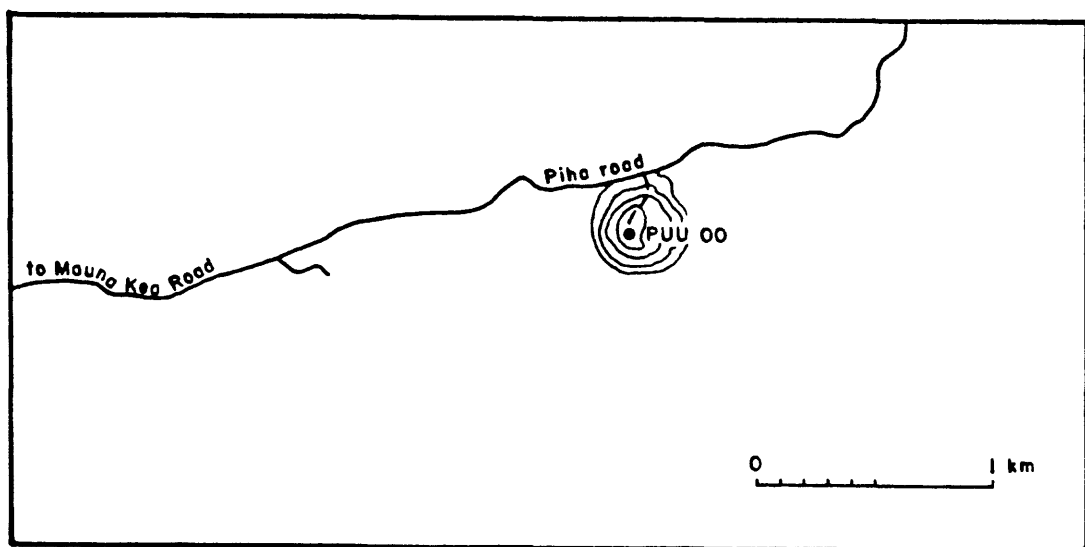
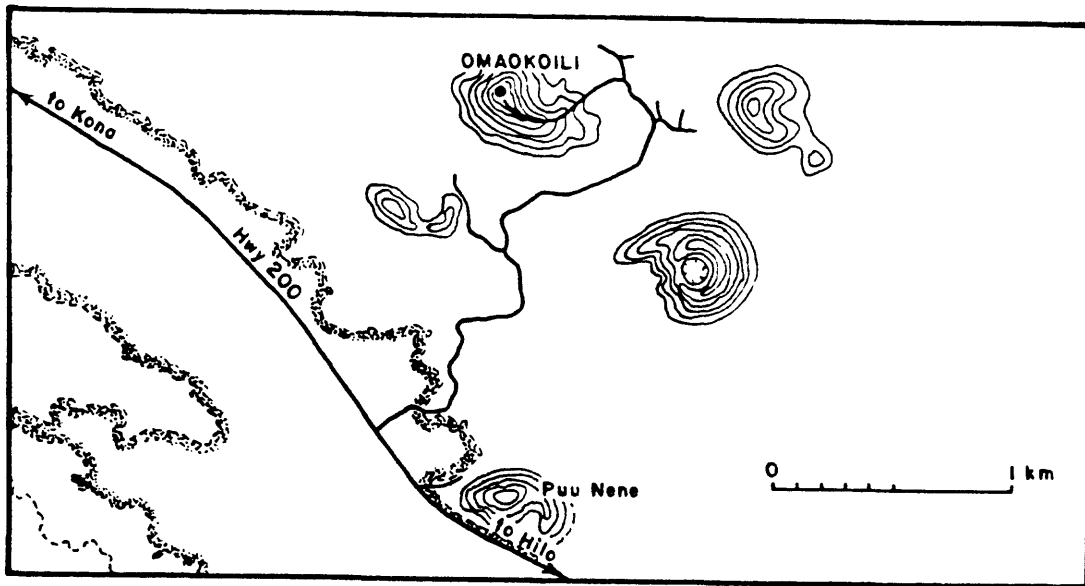
SEE PUU KOLI AND PUU OO QUAD SHEETS

STATION NAME: PUU OO ELEVATION: 6918'
LATITUDE: 19.7318° LONGITUDE: 155.3963°

DESCRIPTION: Puu OO is a HTS trig station located on an old cone on the south east slope of Mauna Kea. The station is located on the south side of the cone on the crest, on a large triangular cement pad stamped "PUU OO", with a trig flag on it.

From the Saddle Road, drive 2.1 mi. up the Mauna Kea Summit Road passing the Humuula Sheep Station (0.8 mi. from Saddle Road) to a dirt road (Piha Road) leading off to the right (Huikau cinder cone is almost due east of the road intersection). Follow this road 4.5 mi. to the saddle at the uphill base of Puu Oo; then walk up to the station. You need a 4-wheel drive vehicle or helicopter to get to the station.

SEE PUU OO QUAD SHEET

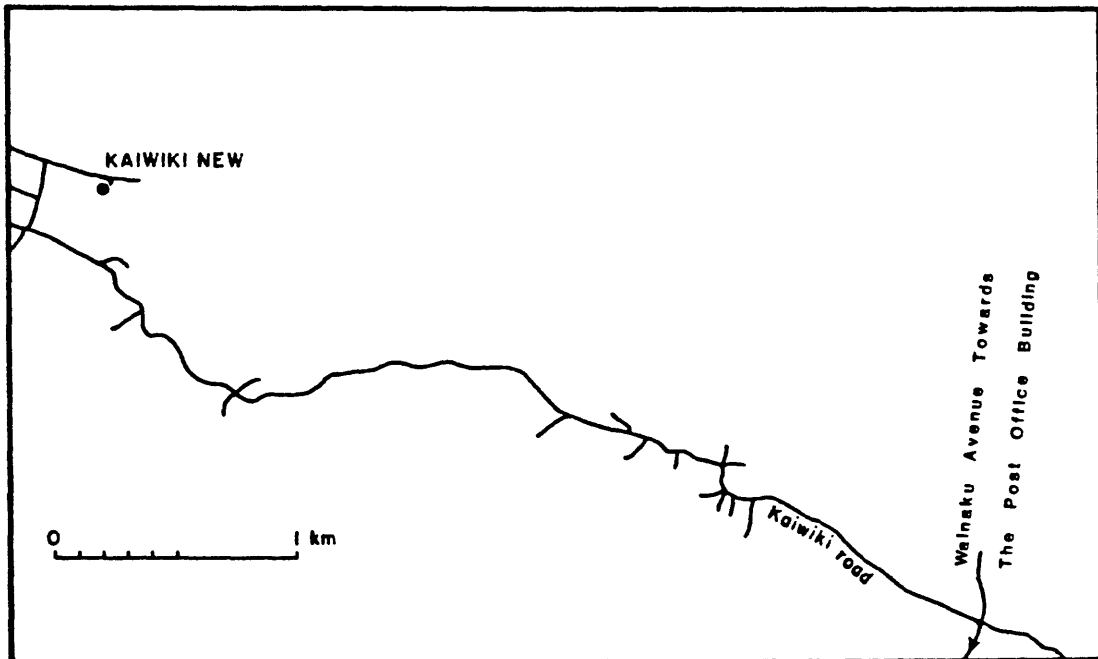


STATION NAME: KAIWIKI NEW (*10) ELEVATION: 1210'
LATITUDE: 19.7591' LONGITUDE: 155.1345'

DESCRIPTION: KAIWIKI NEW is located in an abandoned canefield on a small flat-topped knoll about 12 m in diameter which projects about 3 m above the surrounding area 3.5 mi NNW of Hilo. The station is a USGS disk stamped "1210" set in the top of a 10 cm diameter, cement-filled, concrete sewer pipe that projects 1 inch from the center of a 1.2 m square concrete platform.

From the intersection of Waianuenue and Kinooles Avenue, go north on Kinooles Avenue (just above downtown post office) to the intersection of Wailuku Drive. Turn left on to Wailuku Drive then right on Wainaku Avenue, crossing the third bridge up from the coast (past a hydro-electric plant just across the river). Go about 1.0 mi to an angling crossroad. Turn right on Kaiwika Road and drive 1.2 mi to Wainaku Camp and a fork in the road that heads to Wainaku gym. Take the fork to the right and drive 0.1 mi to a second fork and turn left. From the intersection, drive 2.25 mi in a westerly direction along the left edge of a gulch, then through the gulch to the opposite side until you get to a crossroad. Turn right and go north on a paved road for 0.2 mi to a T-road; turn right and go east on a track road for 0.1 mi to a dim track road on the right in cane field. Turn right and go southeast on the track road across the canefield for 0.05 mi to the station.

SEE HILO, PAPAIIKOU, AND AKAKA FALLS QUAD SHEETS.

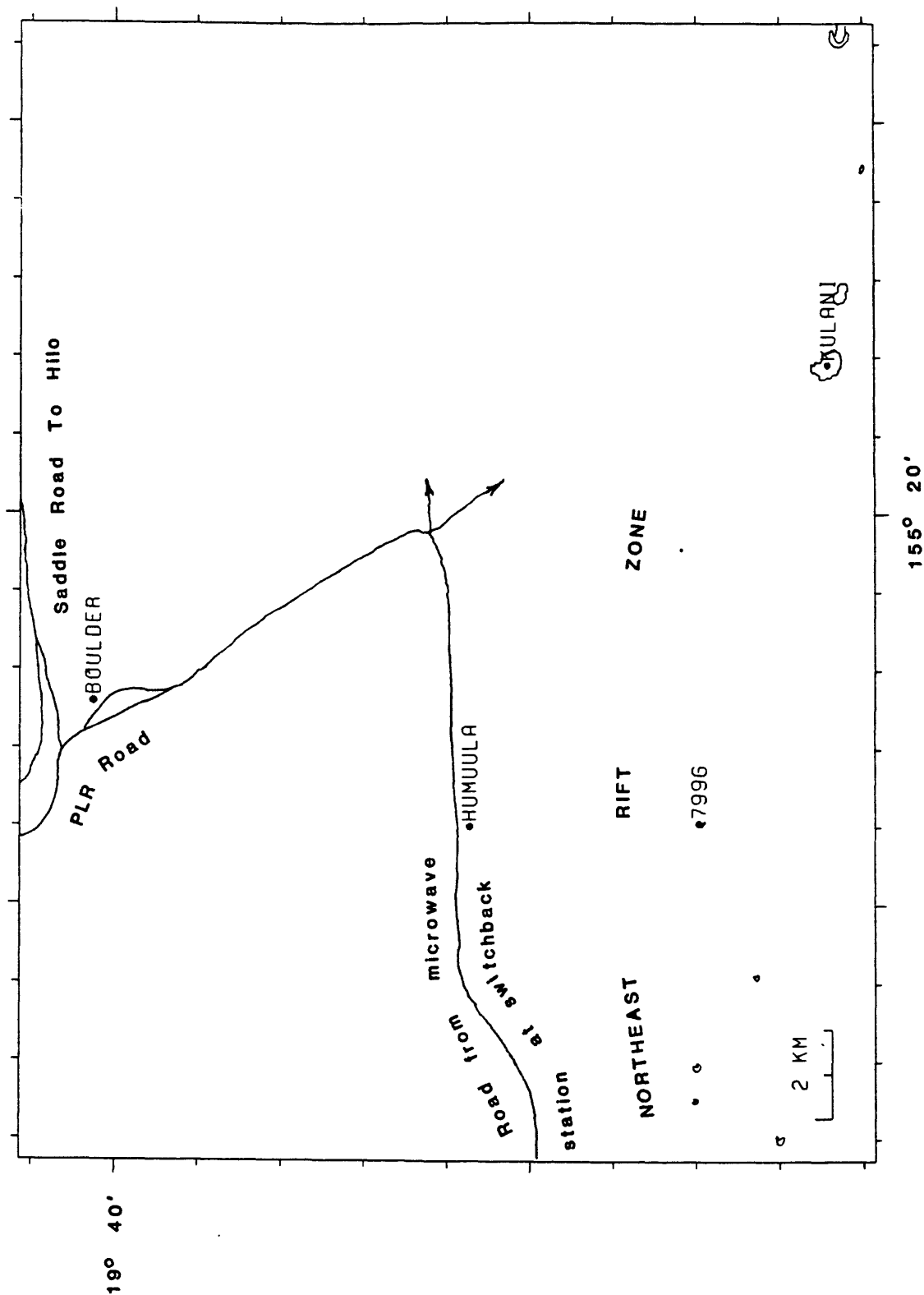


EDM STATION DESCRIPTIONS
MAUNA LOA LOWER NORTHEAST RIFT ZONE

(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A" DETAILED
ACCESS INSTRUCTIONS

MAUNA LOA LOWER NORTHEAST RIFT EDM STATIONS JULY 1987



STATION NAME: BOULDER ELEVATION: 5671'
LATITUDE: 19.6710° LONGITUDE: 155.3733°

DESCRIPTION: BOULDER is a USGS benchmark located on a high point in 1899 aa flow south of the Saddle Road (Highway 200) stamped "BOULDER 1955". It is east of the Powerline Road (PLR) and ~300 m south of the intersection with the gravel road that parallels the Saddle Road.

From Hilo, drive up the Saddle Road past the 21 mile marker 0.6 mi. through a curve to the right then back to the left. As you come out of the left turn, you will see a gravel road called PLR heading left. Turn on that road, taking the road to the right at the first intersection (~0.25 mi). Take the left fork at the next intersection (~125 m past intersection) and park just before you get to the top of a very steep downgrade (~30 m from intersection). The station is located to your left about 5 m away from the road and approximately 3 m higher than the road. There is a kipuka located 75 m to the east of the station. Access requires a 4-wheel drive vehicle. A helicopter can land near the station.

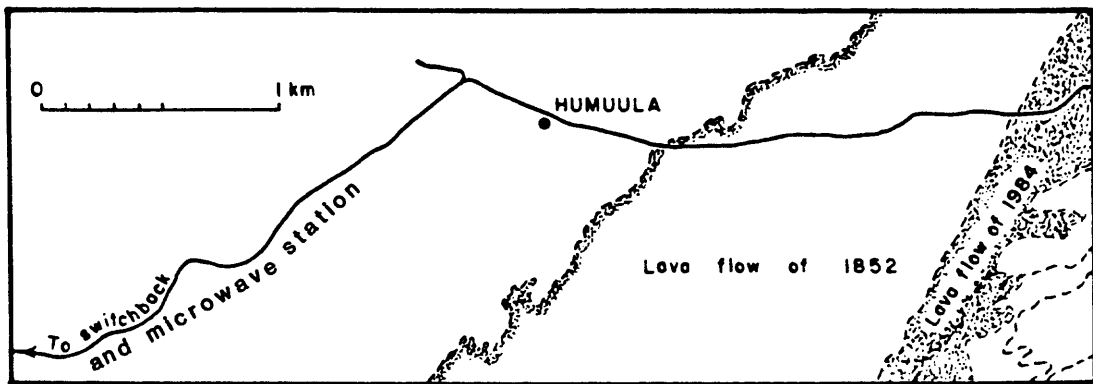
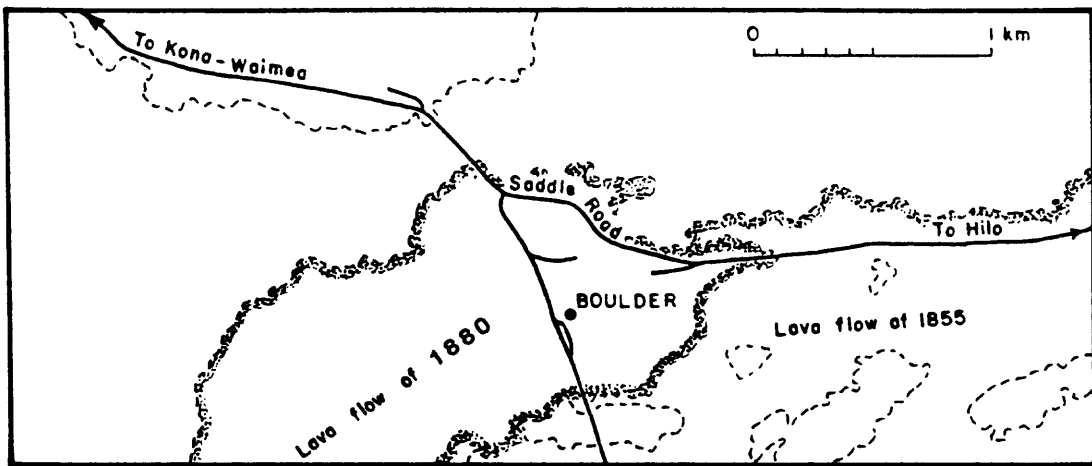
SEE UPPER PIHONUA QUAD SHEET

STATION NAME: HUMUULA ELEVATION: 6920'
LATITUDE: 19.5955° LONGITUDE: 155.4000°

DESCRIPTION: HUMUULA is a standard USGS aluminum disk cemented in solid pahoehoe stamped "HUMUULA".

From the Saddle Road-Mauna Loa Observatory road intersection, which is located approximately 100 m from Puu Huluhulu, drive 4.3 mi. to the Hilo-Kona Road-MLO road intersection. Turn left, staying on the paved section and drive another 4.5 mi. to a switchback with a gravel road and some buildings and microwave dishes located to the left. Turn left and drive on the gravel road for approximately 4.3 mi. and stop at pole #55. The benchmark is on a brushy pahoehoe knob about 30 m above the road. Use a 4-wheel drive vehicle to get to the station. A helicopter can land in an area about 100 m east of the station.

SEE PUU OO AND PUU ULAULA QUAD SHEETS.



STATION NAME: KULANI (*9) ELEVATION:5512'
LATITUDE: 19.5237° LONGITUDE: 155.3017°

DESCRIPTION: KULANI is a spike located on a 18 cm x 18 cm x 15 cm cement block between two larger cement piers on a large cement pad at the summit of Kulani cone.

From HVO, Drive down to Mt.View and turn left off of Highway 11 on to North Kulani Road. Drive until you get to a stop sign which is at the intersection of the Stainback Highway. Turn left and drive until you get to a closed gate with a prison guard. If you are coming from Hilo, drive on Highway 11 towards Volcano. Look for the Panaewa Zoo sign, then turn right on Makalika street. You will intersect Stainback Highway about 0.25 mi. Drive ~19 mi. to the prison gate. State your business and he will give you instructions on how to get a key to get to the cone. After obtaining the key, drive towards a gas pump located in the direction of some quonset huts. Turn left just before the gas pumps and head past the automotive shops which will bring you to a gravel road heading southwest. Follow the road until you come to a intersection with a cleared area directly ahead. Turn right at that intersection; this steep road will take you to the top of Kulani Cone. At the top of the cone, drive up a dirt road leading off to the right (south side of cone) near two radio towers and a shack. BRING ALONG MACHETES TO CUT LINES OF SIGHT. You need a 4-wheel drive vehicle or helicopter to get to the station. IF USING HELICOPTER, CAUTION PILOT TO BEWARE OF NUMEROUS TOWER GUY WIRES.

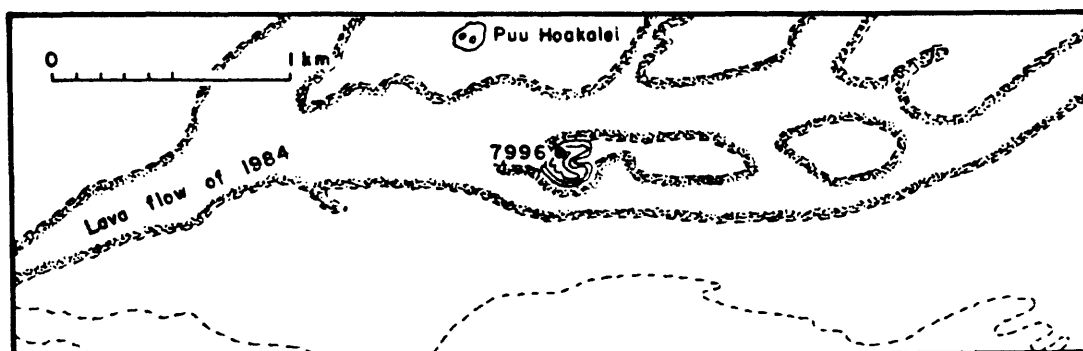
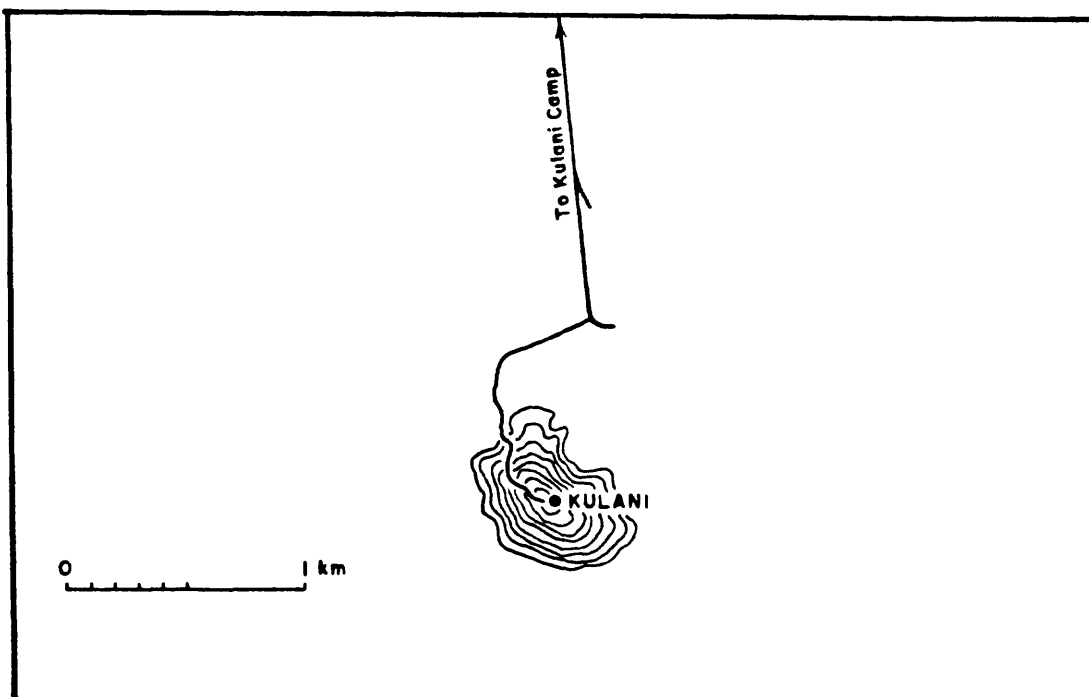
SEE MT.VIEW, PUU MAKALA, AND KULANI CONE QUAD SHEETS

STATION NAME: 7996 ELEVATION: 7996'
LATITUDE: 19.5495° LONGITUDE: 155.3993°

DESCRIPTION: 7996 is an unmarked standard USGS aluminum disk cemented on a high point on the northwest side of the cone.

7996 is an old cone on the northeast rift of Mauna Loa about 2 mi ENE of Puu Kulua (just off the map). It is at the upper edge of the vegetation line and a 1984 lava lobe that was headed in the Kulani direction surrounds the cone. This is a helicopter station. There is no flat area to shut down the helicopter.

SEE PUU ULAULA QUAD SHEET

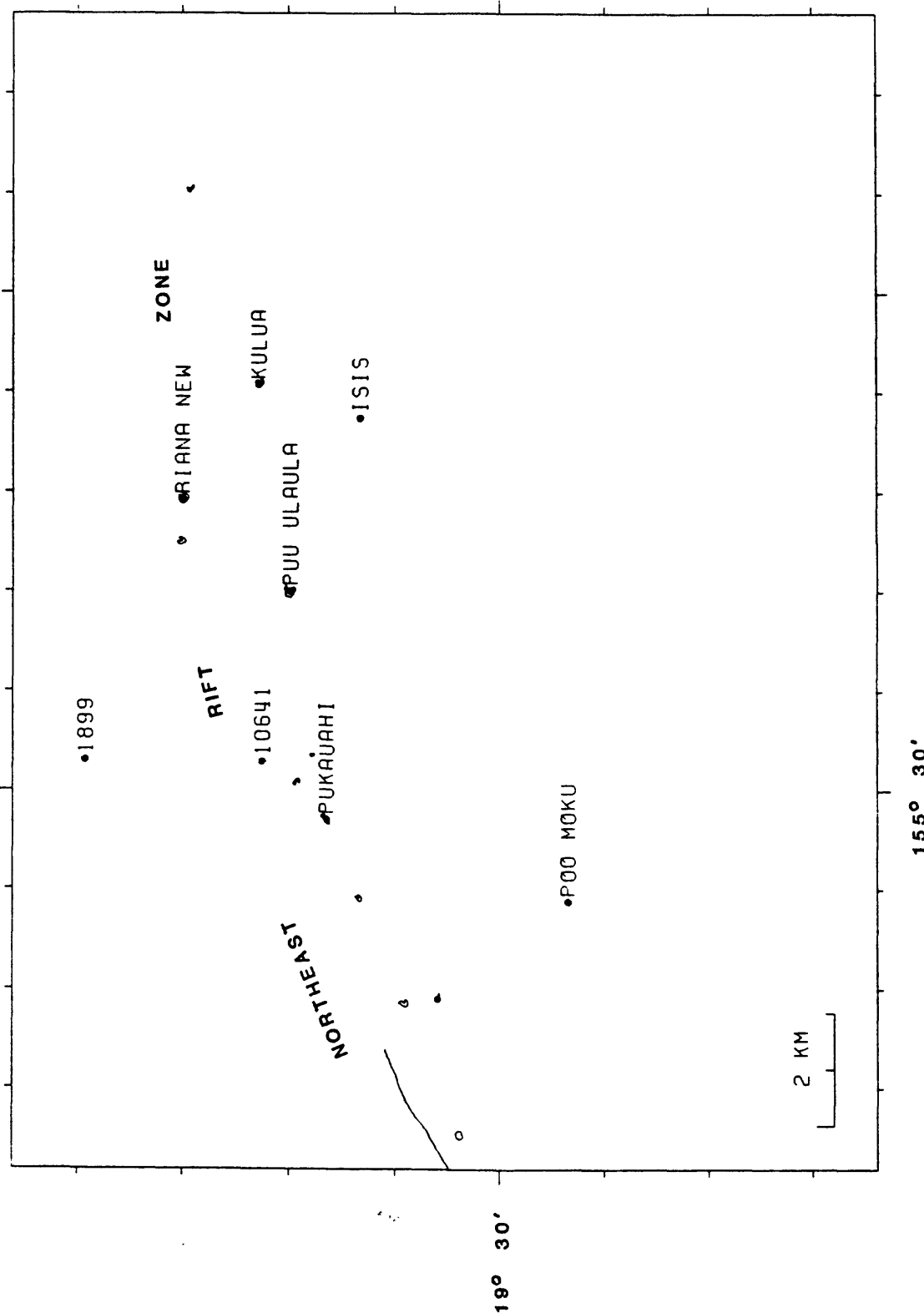


EDM STATION DESCRIPTIONS
MAUNA LOA MIDDLE NORTHEAST RIFT ZONE

(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A" DETAILED
ACCESS INSTRUCTIONS

MAUNA LOA MIDDLE NORTHEAST RIFT EDM STATIONS, JULY 1987



STATION NAME: ISIS (ML75-8) ELEVATION: 9007'
LATITUDE: 19.5222° LONGITUDE: 155.4377°

DESCRIPTION: ISIS is a USGS standard aluminum disk cemented in solid pahoehoe.

The station is located on the south side of Mauna Loa northeast rift zone, 10 m north of the Puu Ulaula trail on a line of collapsed lava tubes, 1.5 m southwest of a large ahu and 2 m above the trail. A white plastic cross marks a helicopter landing area 25 m southeast of the station. This is a helicopter only station.

SEE PUU ULAULA QUAD SHEET

STATION NAME: RIANA NEW ELEVATION: 9475'
LATITUDE: 19.5500° LONGITUDE: 155.4513°

DESCRIPTION: RIANA NEW is an untagged rebar spike set in cement 1 m east of large ahu at a high point on the north side of the cone.

Riana New is located on an old red-orange colored cone on the north side of the Mauna Loa northeast rift zone. It is 0.5 mi due east of Puu Kapanaha. A helicopter can land a few meters south of station.

SEE PUU ULAULA QUAD SHEET

STATION NAME: KULUA (TAG75-6) ELEVATION: 9014'
LATITUDE: 19.5381° LONGITUDE: 155.4321°

DESCRIPTION: KULUA is a rebar spike with a tag stamped "75-6" pounded in cinder and reinforced by cement on a cone on the south side of the Mauna Loa northeast rift.

The rebar is located on the west rim of a prehistoric black-colored cinder cone. A helicopter can land about 5 m north of station. There is another landing area 50 m north of the station. CAUTION THE GROUND NEAR THE STATION IS VERY LOOSE.

SEE PUU ULAULA QUAD SHEET

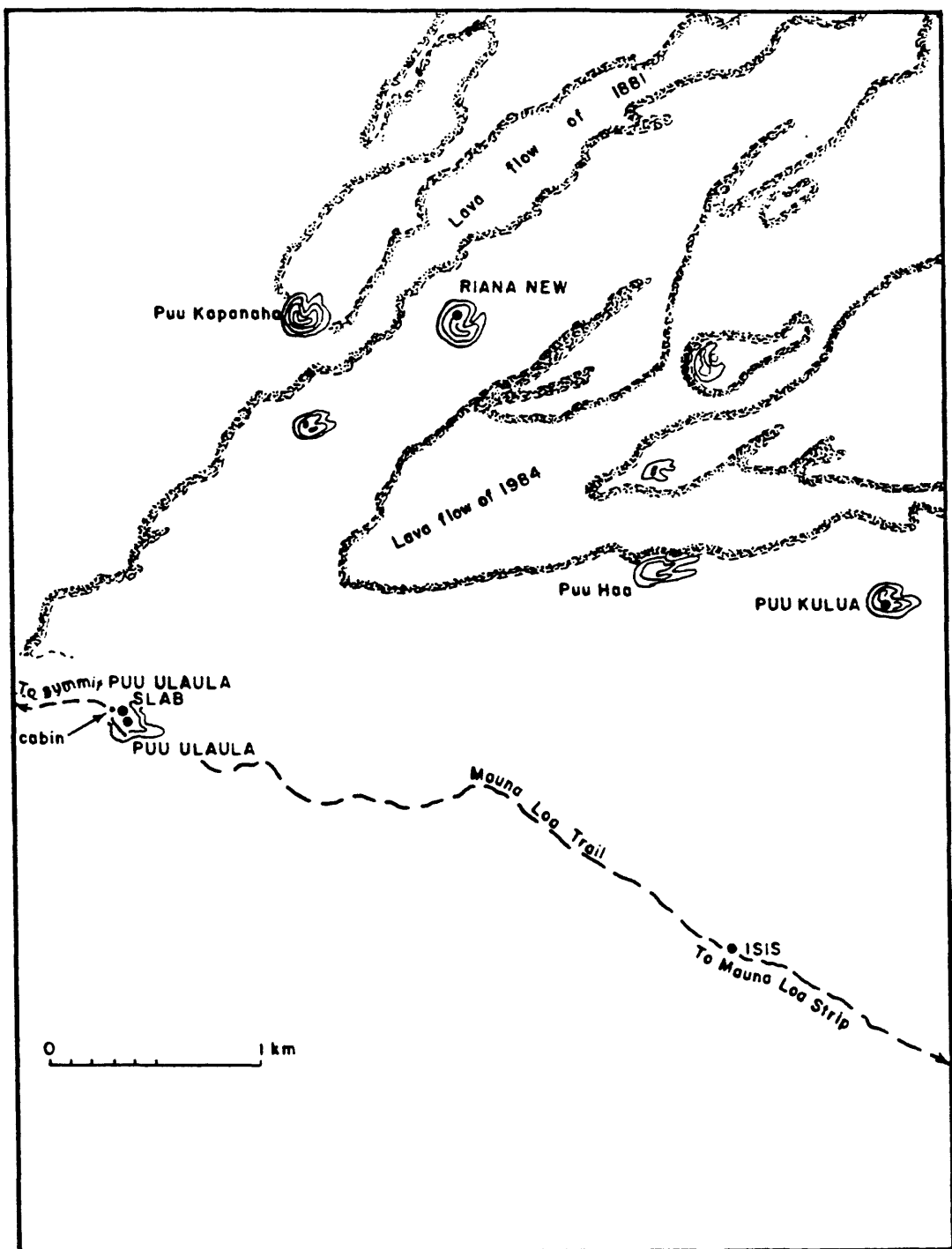
STATION NAME: PUU ULAULA (BM75-7) ELEVATION: 10050'
LATITUDE: 19.5328° LONGITUDE: 155.4664

STATION NAME: PUU ULAULA SLAB (BM77-506) ELEVATION: 10066'
LATITUDE: 19.5331° LONGITUDE: 155.4667°

DESCRIPTION: PUU ULAULA and PUU ULAULA SLAB are marked standard USGS aluminum disks set in cement on solid pahoehoe (stamped "BM75-7") and a cement slab (stamped "BM77-507") respectively.

PUU ULAULA is located on a red cinder cone with a NPS hikers cabin on it on the Mauna Loa northeast rift zone. The station is located about 100 m southeast of the cabin and 40 m south of the high point of the cone. SLAB is located near a large ahu on the highest point of the cone due east of the cabin. SLAB is used only for the shot to EDM station 10641. A helicopter can land close to either station.

SEE PUU ULAULA QUAD SHEET



STATION NAME: POO MOKU (BM77-503) ELEVATION: 11040'
LATITUDE: 19.4892° LONGITUDE: 155.5187°

DESCRIPTION: POO MOKU is a marked standard USGS aluminum disk cemented in solid pahoehoe lava stamped "BM77-503".

The station is located on a conspicuous pahoehoe tumulus, on the south side of northeast rift of Mauna Loa, just north of a terminus of an aa flow lobe. It is about 0.35 mi south of the southern edge of the Ke A Poomoku lava flow. The helicopter can land ~25 m north of the tumulus. The station is marked by a white plastic cross.

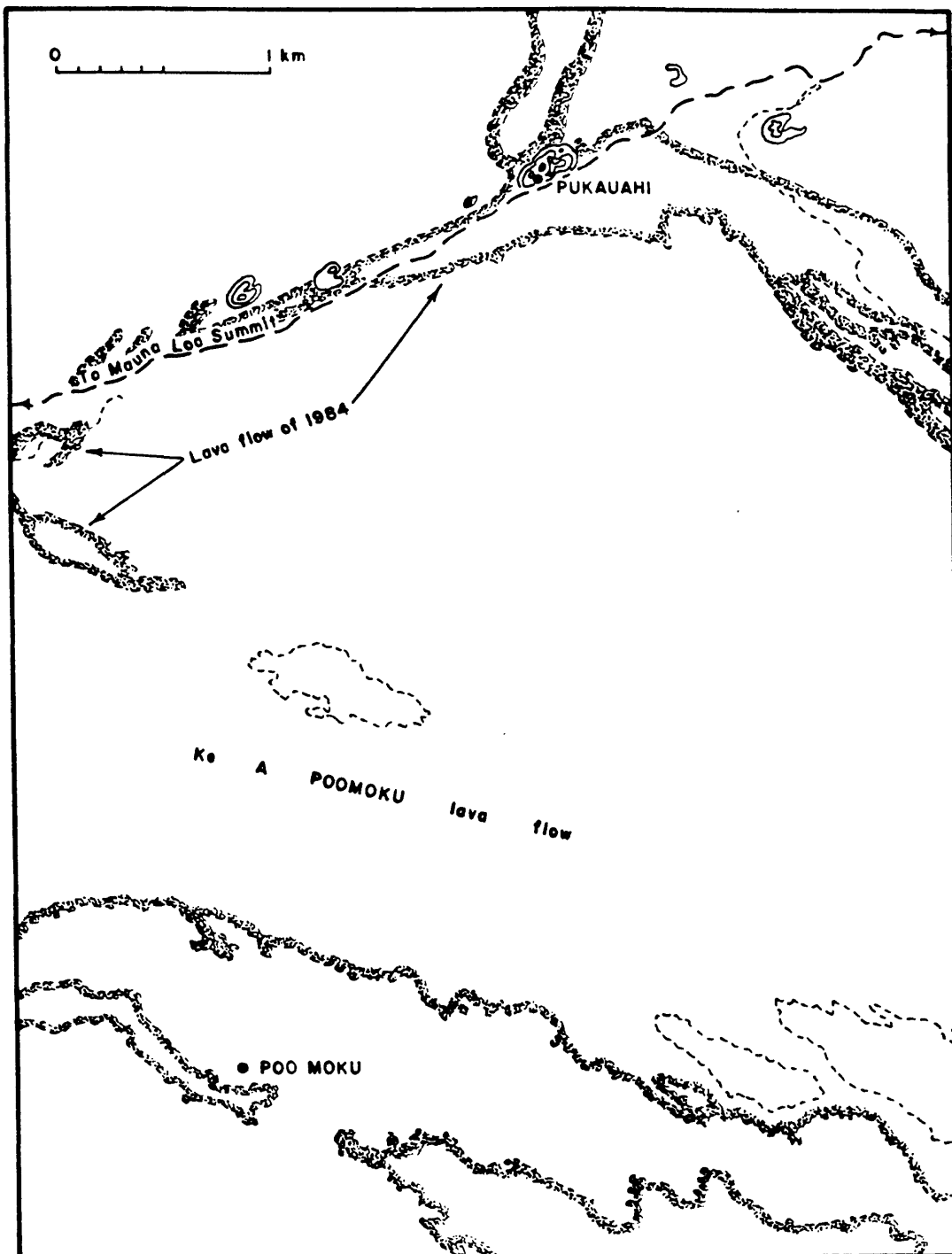
SEE MAUNA LOA QUAD SHEET

STATION NAME: PUKAUAAHI ELEVATION: 11071'
LATITUDE: 19.5275° LONGITUDE: 155.5048°

DESCRIPTION: PUKAUAAHI is an untagged rebar spike set in cement at a high point on the south side between the two craters.

The station is located on an old elongated cone on the northeast rift of Mauna Loa at the east end of a line of 1984 fissures surrounded by 1984 lava flow. It is about 0.65 mi ENE of a profusely steaming area. The helicopter lands on the rim just east of the station.

SEE KOKOOLAU QUAD SHEET



STATION NAME: 1899 ELEVATION: 9440'
LATITUDE: 19.5655' LONGITUDE: 155.4950'

DESCRIPTION: 1899 is a standard USGS aluminum disk stamped "1899" cemented in a solid cinder block. The station is located on a small prehistoric cone on the north side of the Mauna Loa northeast rift zone.

From the Saddle Road-Mauna Loa Weather Observatory road, drive 8.8 mi on the paved road to the observatory to the switchback with the microwave dish. Stay on the paved road for another 2.5 mi. to a red cinder road on the left marked by a sign "cinder cone". Drive to the end of the road, staying on the road to the left as you approach the cinder quarry. Drive onto a gravel road that heads towards the left of the cone. You can try driving up the cone or walk it. The station is on the left side of the road, ~15 m after the road starts to level off on top of the south rim of the cone. A cairn is located near the station. A helicopter can land on the top of the cone near the station. A 4-wheel drive vehicle is recommended if you drive to the station.

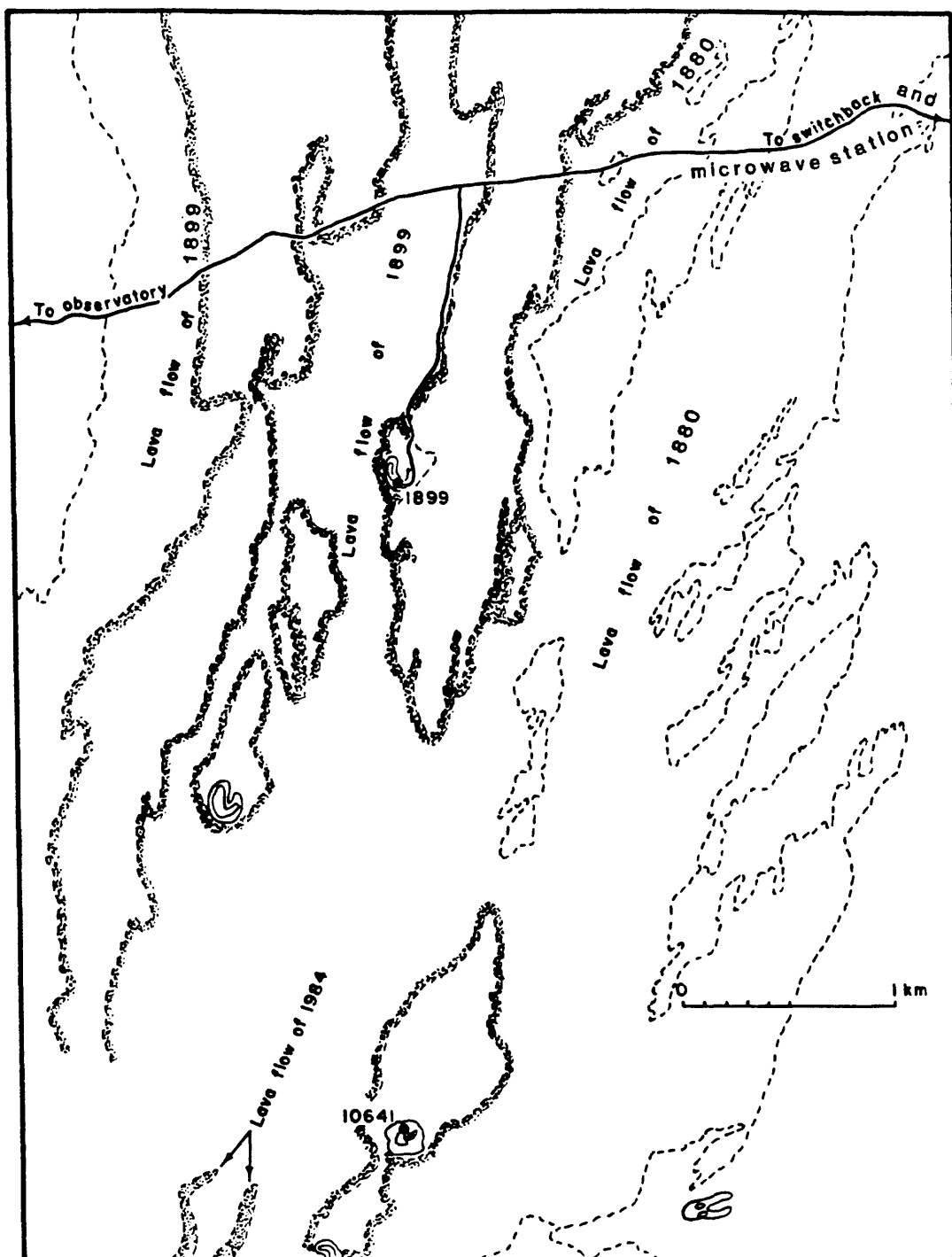
SEE PUU OO AND PUU ULAULA QUAD SHEETS

STATION NAME: 10641 ELEVATION: 10641'
LATITUDE: 19.5377' LONGITUDE: 155.4952'

DESCRIPTION: 10641 is an untagged rebar spike set in cement at the high point on the north side of the cone.

10641 is on an old cone on the north side of the northeast rift of Mauna Loa. It is about 2.0 mi WNW of Puu Ulaula and almost due south of 1899 EDM station. Helicopter lands on the flatter southwest rim.

SEE PUU ULAULA QUAD SHEET

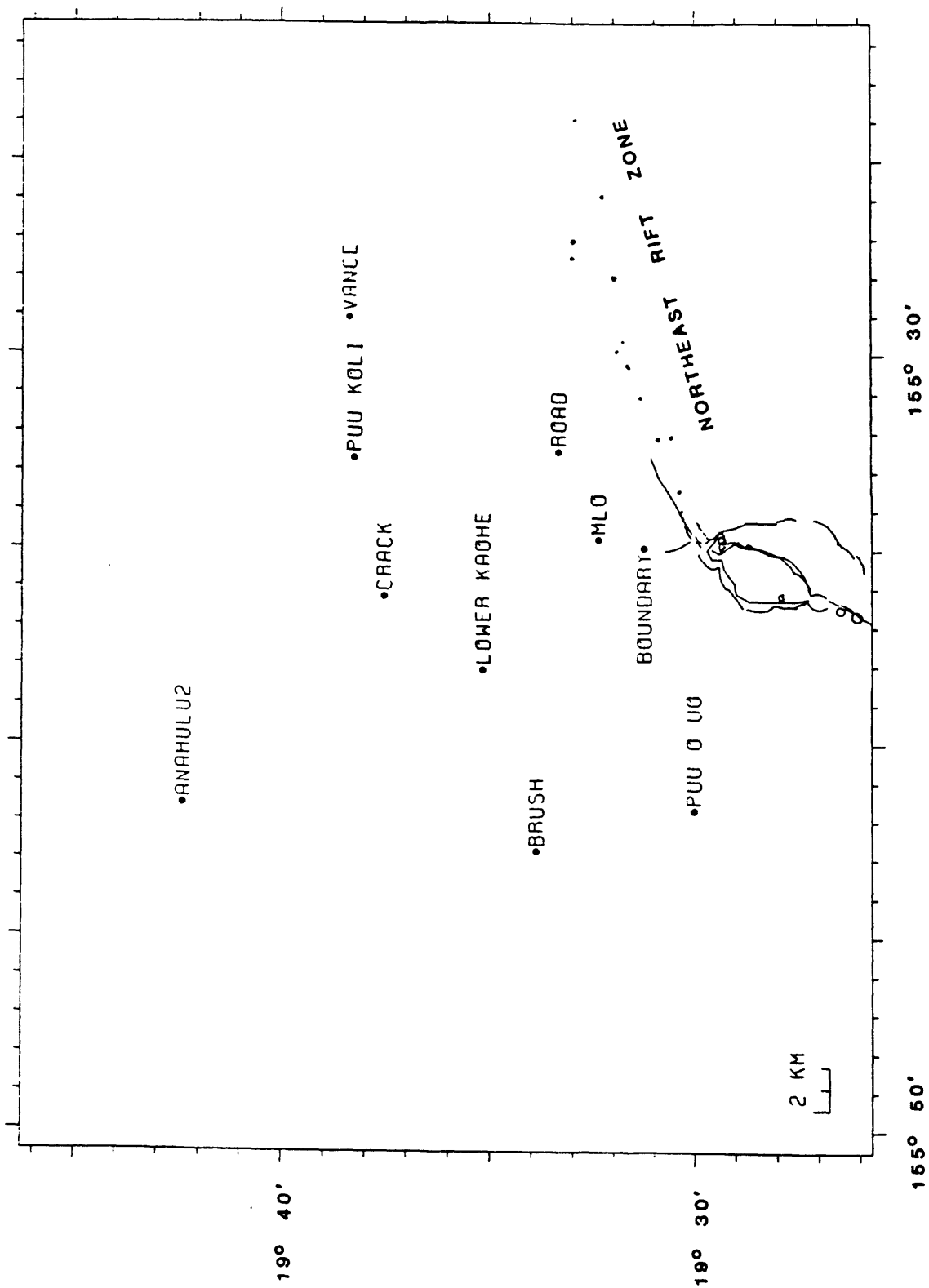


EDM STATION DESCRIPTIONS
MAUNA LOA NORTH AND NORTHWEST FLANK

(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A"
DETAILED ACCESS INSTRUCTIONS

MAUNA LOA NORTH FLANK EDM STATIONS, JULY 1987



STATION NAME: ANAHULU 2 (*1) ELEVATION: 5220
LATITUDE: 19.7065° LONGITUDE: 155.6927°

DESCRIPTION: ANAHULU 2 is a marked standard USGS brass disk cemented in solid pahoehoe stamped "ANAHULU 2".

The station is located in Pohakuloa Training Area. There is a good helicopter landing area on red-brown pahoehoe 50 m N of the station. The station is located about 600 m due north of the Bobcat Trail on a fault scarp from a point where the road heading in a NNW direction takes a 90° turn in a southwesterly direction. The station is marked by bright yellow paint. Helicopter or an easy walk from the Bobcat Trail Road (now improved).

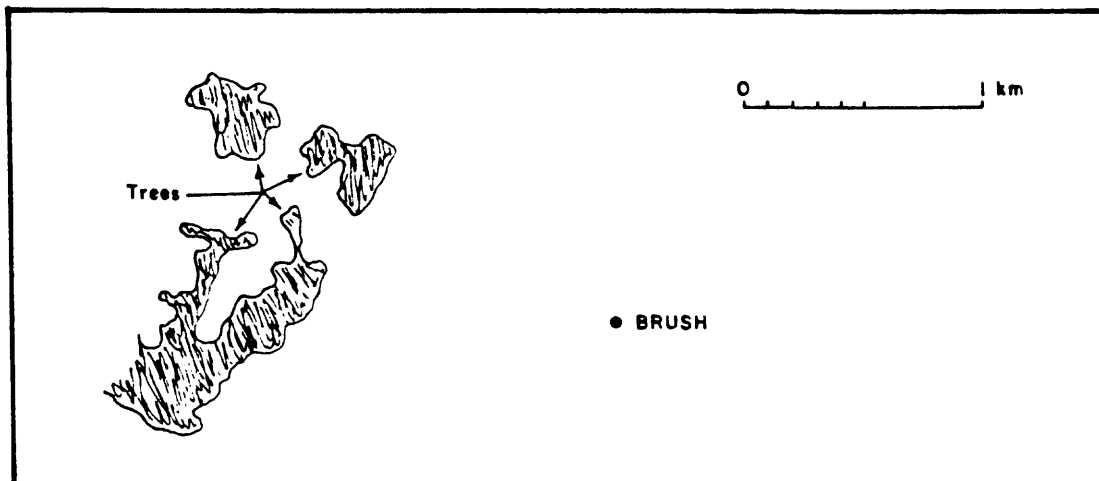
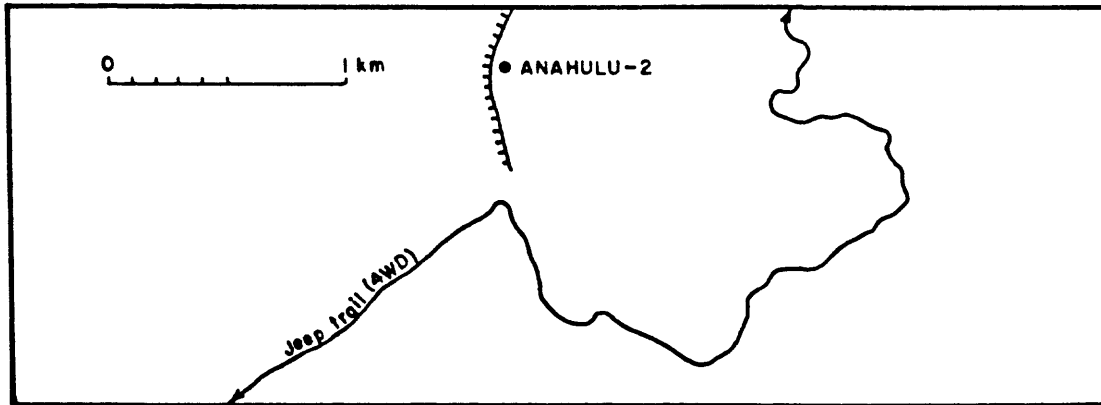
SEE NAOHUELEELUA QUAD SHEET

STATION NAME: BRUSH (Tag 76-18) (*1) ELEVATION: 7120'
LATITUDE: 19.5648° LONGITUDE: 155.7128°

DESCRIPTION: BRUSH is a PK nail and tag stamped "78-16" in solid pahoehoe.

BRUSH is located on the west slope of Mauna Loa on a small tumulus 30 m NE of much larger tumulus, in old pahoehoe. The best helicopter landing spot is marked by a large cross of white plastic. The station is in a relatively featureless terrain and is difficult to spot from the air. Large clumps of lush Mamane and Naio trees about 0.6 mi and 1.0 mi down-slope to the west and WNW is the nearest distinctive feature. A bright yellow spot was painted on the large tumulus and is quite visible if you approach the station from the east. A yellow mark was also painted around the station to make it easier to help find the station. The station is located about 20 m NW of the helicopter landing site. Helicopter only.

SEE PUU O UO QUAD SHEET



STATION NAME: BOUNDARY ELEVATION: 12,180'
LATITUDE: 19.5209° LONGITUDE: 155.5823°

DESCRIPTION: BOUNDARY is an untagged rebar spike in cement located on a red cinder cone ~100 m north of the road that leads up to the summit of Mauna Loa.

From the Saddle Road-Mauna Loa Observatory road intersection just before Puu Huluhulu, follow the paved road until you get to 10,200 ft elevation (~15 miles). Turn left on a gravel road and drive ~4.0 miles, taking the left fork at the first intersection then a right at the second intersection. Park where the road passes nearest to the cone. Walk across some shelly pahoehoe to the cone then head towards the northeast side of the cone to an ahu. You can get to the station by 4-wheel drive vehicle or land a helicopter next to the station.

SEE PUU OO, PUU ULAULA, AND KOKOOLAU QUAD SHEETS

STATION NAME: MLO (*8) ELEVATION: 11120'
LATITUDE: 19.5396° LONGITUDE: 155.5787°

DESCRIPTION: MLO is a metal spike in a circular cement pad marked with the inscription "Stair 1955".

From the intersection at Hwy 200 (Saddle Road), drive up the road to the Mauna Loa Weather Observatory until you get to the last switchback in the road about 75 m from the Observatory. The station is located 20 m west of the switchback and about 10 m to the north and 3 m lower than the road. Any type of vehicle can be used to drive to the station. If a helicopter is being used, permission to land near the Observatory should be obtained from the Observatory personnel.

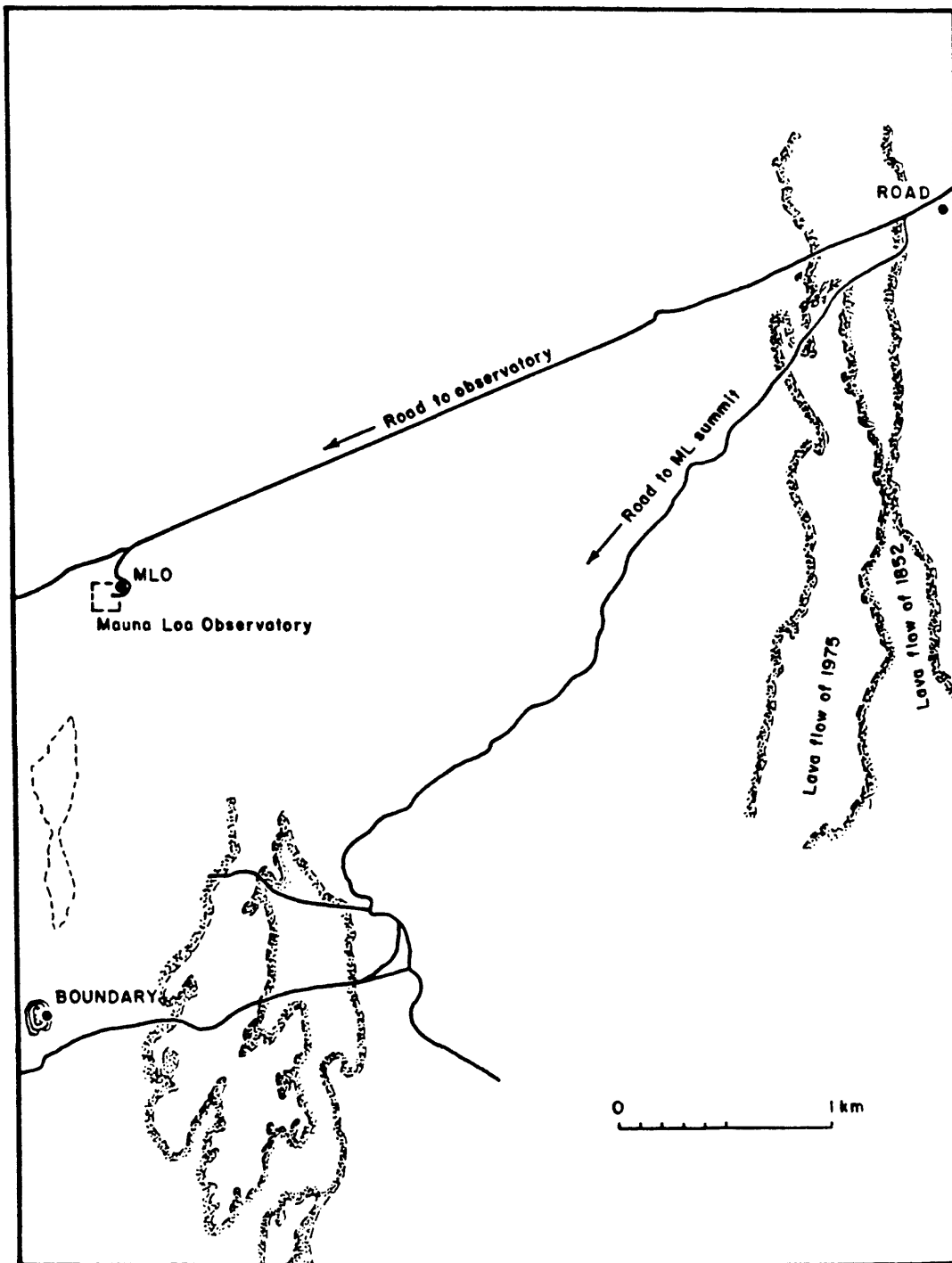
SEE KOKOOLAU QUAD SHEET

STATION NAME: ROAD ELEVATION: 10180'
LATITUDE: 19.5557° LONGITUDE: 155.5413°

DESCRIPTION: ROAD is a standard USGS aluminum disk stamped "ROAD" cemented in solid pahoehoe.

The station is located on the northeast flank of Mauna Loa along the road to Mauna Loa Weather Observatory on a small pahoehoe patch in aa. It is about 50 m southeast of the road and 200 m below the turn-off to ML summit (~15.0 mi from Hwy 200). Look for telephone pole #261. The station is marked by an ahu and is painted yellow. Any type of vehicle may be used to drive to the station. A helicopter can land near the station.

SEE KOKOOLAU QUAD SHEET



STATION NAME: LOWER KAOHE (*1) ELEVATION: 8471'
LATITUDE: 19.5862° LONGITUDE: 155.6350°

DESCRIPTION: LOWER KAOHE is a temporary PK nail and should be replaced by a standard disk (nail may have already been replaced by disk).

The station is on an old red-orange cone on the northwest slope of Mauna Loa, east of all the dark 1859 flows. It is located on a steep high point between 2 craters. This is a helicopter only station. You can land about 100 m NW of the station on the lower part of the cone.

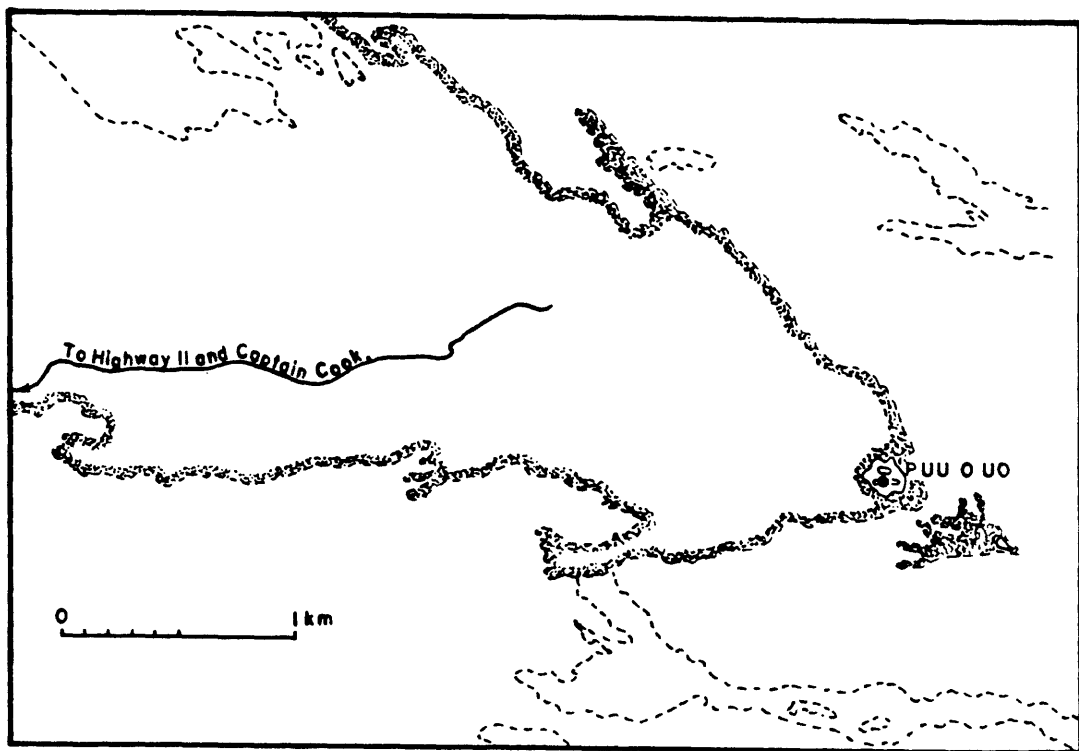
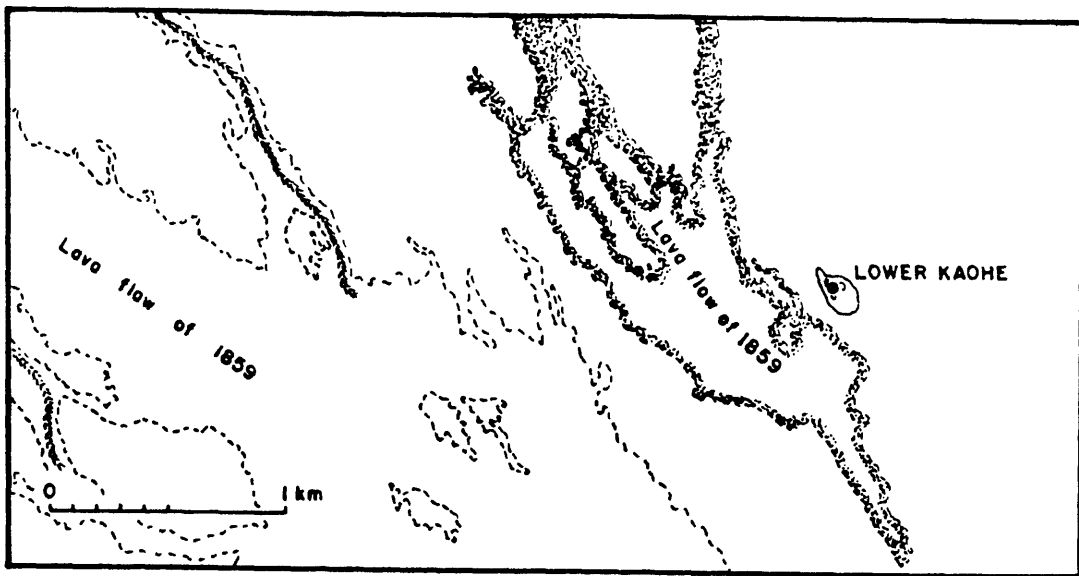
SEE PUU O UO QUAD SHEET

STATION NAME: PUU O UO ELEVATION: 8835'
LATITUDE: 19.5005° LONGITUDE: 155.6950°

DESCRIPTION: PUU O UO is a marked USGS standard disk located on a dark colored cinder cone on the west flank of Mauna Loa stamped "PUU O UO".

The cone is the source of a young-looking lava flow which reached the sea north of Kealahou bay about 500 yrs ago. This prominent dark brown cone is the only large hill on Mauna Loa's west flank. There is a line of spatter ramparts that extend from the upslope base of the cone for approximately 500 m in a ESE direction. A helicopter can land near the station.

SEE PUU O UO AND SULPUR CONE QUAD SHEETS



STATION NAME: VANCE (*1) ELEVATION: 7051'
LATITUDE: 19.6395° LONGITUDE: 155.4840°

DESCRIPTION: VANCE is a standard USGS aluminum disk stamped "VANCE 1976", cemented in pahoehoe.

From the Saddle Road (Hwy 200), take the road to the Mauna Loa Weather Observatory until you get to the intersection of the Hilo-Kona Road (4.3 mi). At this intersection you will see a large accretary boulder to the immediate east of the road. The station is located on the top of the boulder. This station replaces the original one that is located in the aa flow west of the road. Accessible by car or helicopter.

SEE PUU OO QUAD SHEET

STATION NAME: PUU KOLI (TAG76-25) (*1) ELEVATION: 7346'
LATITUDE: 19.6375° LONGITUDE: 155.5440°

DESCRIPTION: PUU KOLI is a rebar spike reinforced by concrete, on a high point at the west end of the cone marked by an ahu. A PK nail with a tag "76-25" is pounded into the top of the rebar.

From the Saddle Road, turn left at the red top road just before Puu Huluhulu that leads to Mauna Loa Observatory and drive until you get to an intersection with a 90° turn to the left and a red cinder road heading straight ahead (Hilo-Kona Road). Take the cinder road and drive for 3.8 mi to a road that leads off to the right towards a red cone, which is Puu Koli. The road takes you to the base of the cone. Drive up the cone in a ENE direction to the ridgeline (may have to walk because of loose cinder), then turn left and head towards the ahu. A helicopter can land near the station or you need a 4-wheel drive vehicle if you drive to the station.

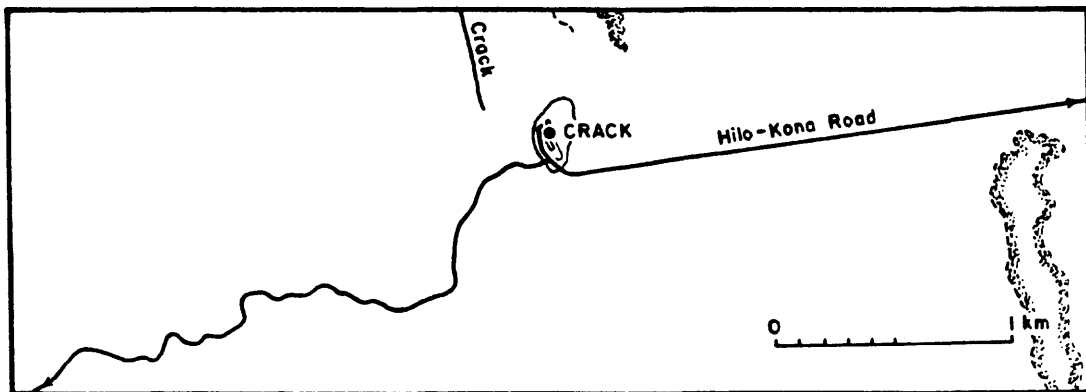
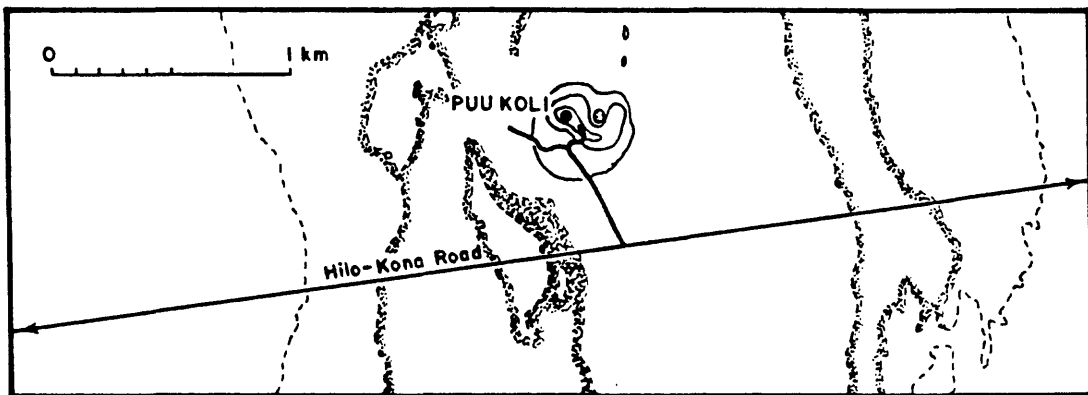
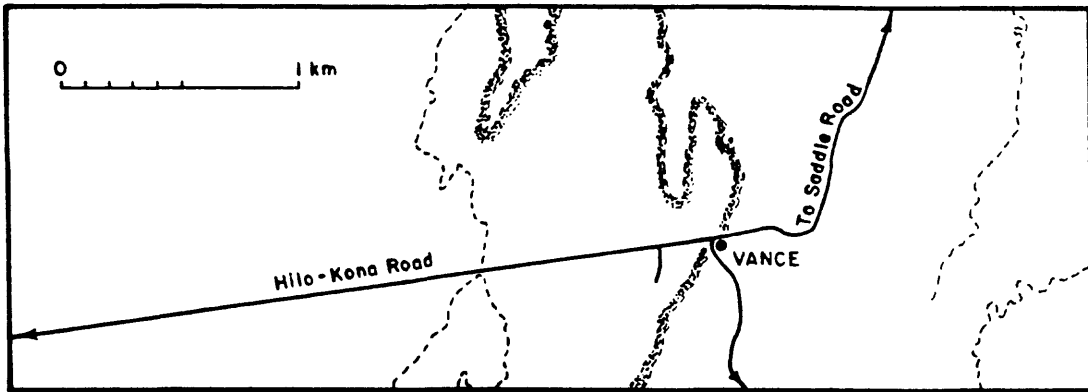
SEE PUU OO AND PUU KOLI QUAD SHEETS

STATION NAME: CRACK (TAG76-15) (*1) ELEVATION: 7490'
LATITUDE: 19.6257° LONGITUDE: 155.6035°

DESCRIPTION: CRACK is a rebar spike in cement located on top of a red spatter cone at the end of the good and straight part of the Hilo-Kona road. A tag stamped "76-15" is attached to the rebar.

From the Puu Koli turnoff, continue southwest for ~4.0 mi. to the red spatter cone with a quarry. Go up the road that heads along the west side of the cone. The station is located on the northeast rim of the cone 3 m from the road cut and 1.5 m above it. You can drive a 4-wheel drive vehicle or land a helicopter in the road cut on the top of the cone. THIS STATION IS NOW VERY CLOSE TO A PTA TARGET. BE CAREFUL OF LIVE ORDINANCE.

SEE PUU OO, PUU KOLI, AND KOKOOLAU QUAD SHEETS

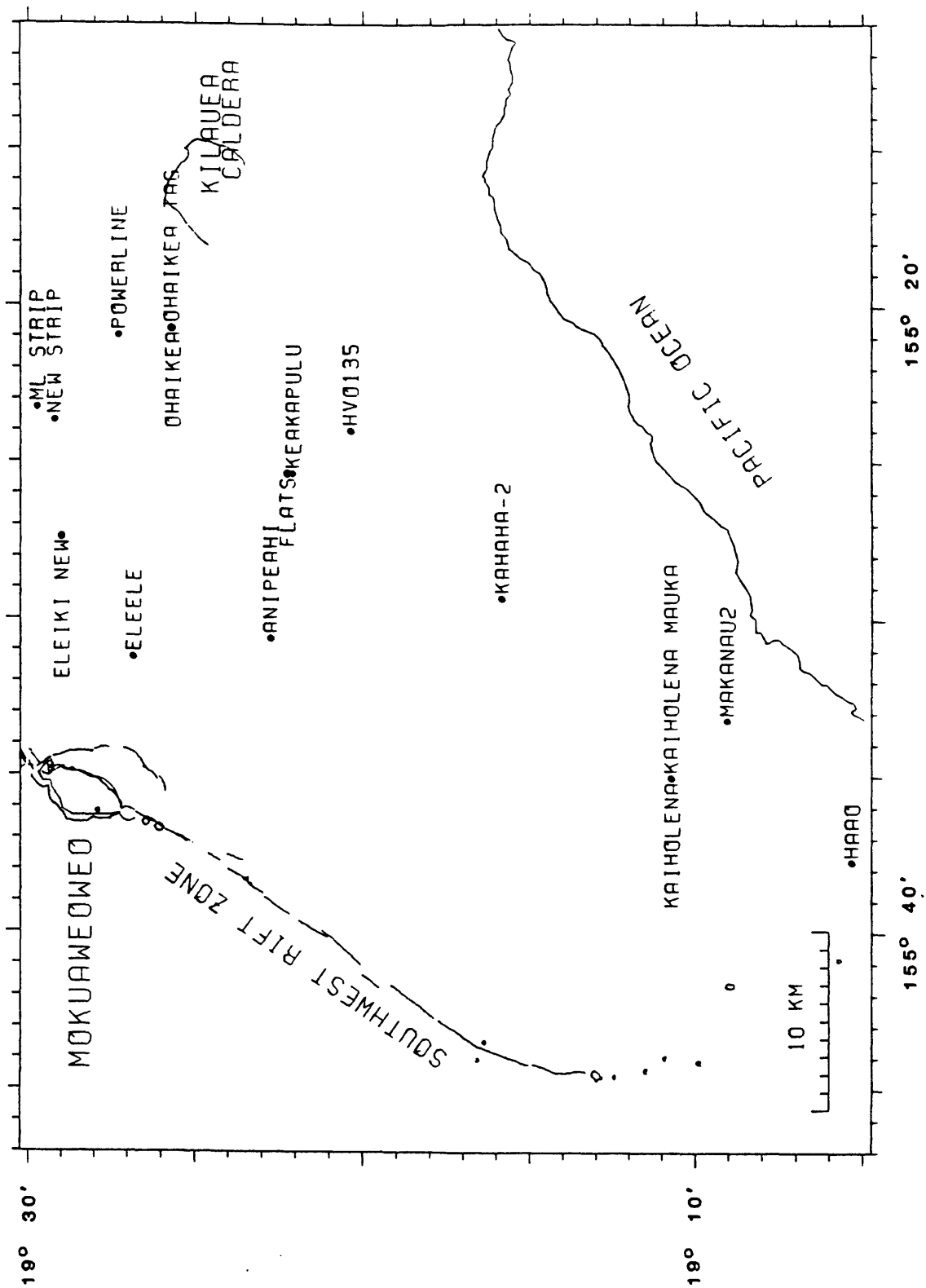


EDM STATION DESCRIPTIONS
MAUNA LOA SOUTH FLANK

(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A" DETAILED
ACCESS INSTRUCTIONS

MAUNA LOA SOUTH FLANK EDM STATIONS, JULY 1987



STATION NAME: HAAO (*7) ELEVATION: 2350'
LATITUDE: 19.0888° LONGITUDE: 155.6286°

DESCRIPTION: HAAO is a metal pipe in a rock pile on high point of cane-covered hill above Waiohinu.

The station is unusable when the sugar cane is high. It is in danger of being destroyed the next time the cane is harvested. Take the road opposite from the Naalehu Shopping Center that heads uphill for 2.0 mi. to a road intersection to the left. Drive up that road for ~2.25 miles to another intersection to the left. Drive on that road for 1.0 mi which comes up on the east side of Puu Haao. As the road gets to the nose of the puu, look for a road that heads off to the left. Go up the road about 150 m. The station is to the left of the road about 20 m into the cane field. You can get to the station by 4-wheel drive vehicle. You can land a helicopter on the road if the sugar cane is very short.

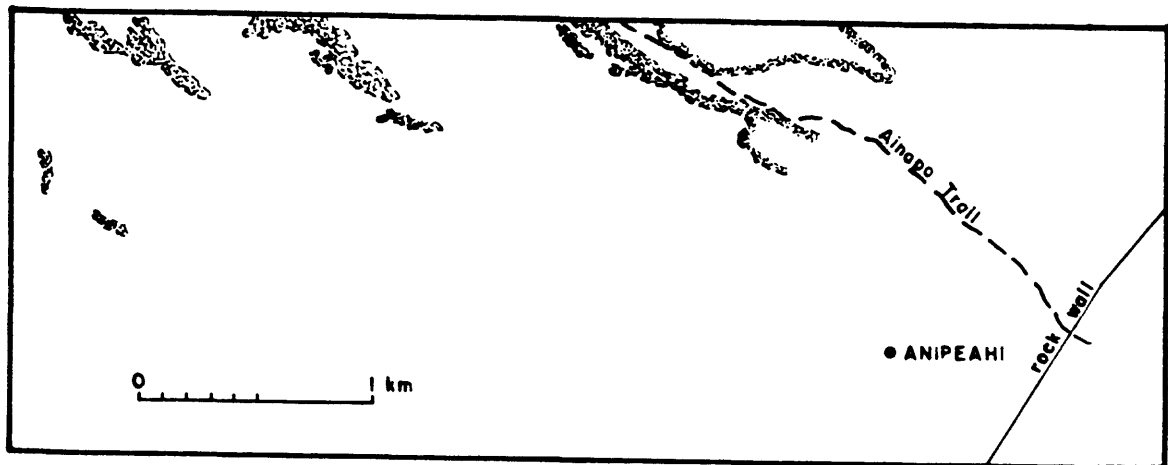
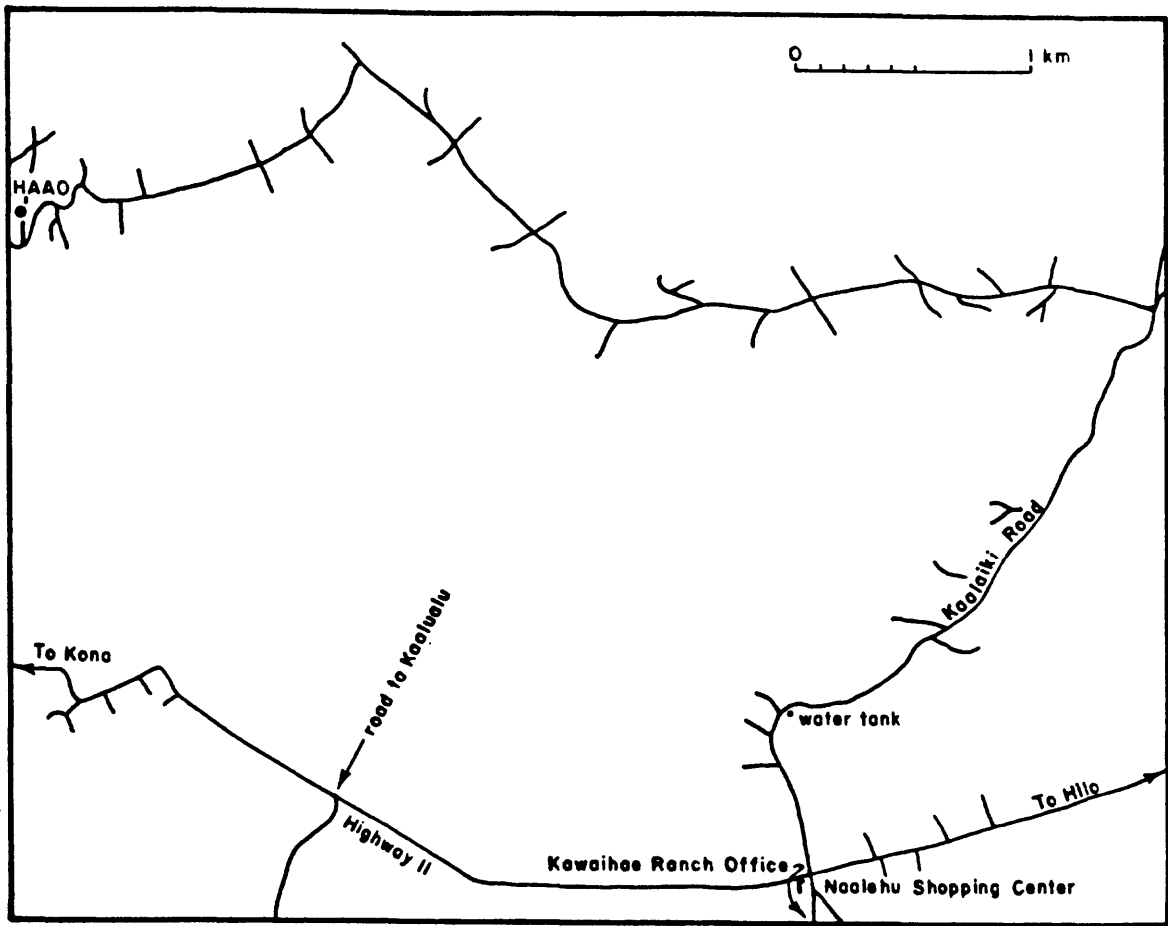
SEE NAALEHU QUAD SHEET

STATION NAME: ANIPEAHI (TAG 68-31) ELEVATION: 7170'
LATITUDE: 19.3792° LONGITUDE: 155.5110°

DESCRIPTION: ANIPEAHI is a PK nail with a tag "68-31" stamped on it pounded in solid pahoehe.

The station is located on the SE slope of Mauna Loa. The tag is on a high point of a large tumulus marked by white plastic strips, 500 m east of the trig station and about 600 m west of the intersection of the Ainapo Trail and an old stonewall. The trig station (elev 7513'), marked by unpainted boards, was located after the shots were made. It may eventually be desirable to abandon the tag when shots can be repeated at the trig station. Helicopter only.

SEE MAUNA LOA QUAD SHEET



STATION NAME: HVO135 (COW PASTURE) (*6) ELEVATION:2710'
LATITUDE: 19.3397° LONGITUDE: 155.4006°

DESCRIPTION: HVO135 is a standard USGS aluminum disk stamped "HVO135" cemented in pahoehoe.

Drive down Hwy 11 towards Pahala 1.2 mi past the National Park boundary sign to a metal gate located on the right side of the road. Go through the gate and drive 100 m and turn left at a hardtop road. Drive ~0.3 mi. into a grove of silver oak trees. Look for an arrow and a benchmark number HVO135 painted on the road. Park the vehicle in the little turnoff area and walk ~300 m upslope through guava and silver oak trees. Stay to the left of a large tumulus as you walk upslope. The station is ~150 m past the tumulus and on a flat low lying tumulus marked by an ahu. Line of sight to this station probably will need to be cleared of trees.

SEE WOOD VALLEY QUAD SHEET

STATION NAME: KEAKAPULU (*6) ELEVATION: 4091'
LATITUDE: 19.3683° LONGITUDE: 155.4236°

DESCRIPTION: KEAKAPULU is a standard USGS brass disk cemented in solid pahoehoe and stamped "KEAKAPULU". A white post marks the location.

From the paint mark to HVO135, continue on down the road until you get to the edge of a canefield with a gate across the paved road. Turn right and go through a closed gate. Follow the dirt road which goes along the edge of the field until you reach a road intersection. Turn right and follow the road heading mauka, driving through one unlocked gate (do not take any forks to the left). The road angles towards a corner of two fencelines. After you go through the fence-line, the road heads northeast, through pastureland, into some brushy area; then west of a grove eucalyptus trees with a rockwall around it and an old house in the midst of it (Ainapo camp). The road then bends to the north of the trees for 0.5 mi to an obscured fork in the road. Turn right and go 200 m to the station located on the right side of the road. A helicopter can land at station with minimal clearing and a 4-wheel drive vehicle is needed if driving. Machetes are needed to clean out lines of sight. CAUTION: DO NOT USE NEWER LOOKING BM COVERED BY ROCKS ~40 CM SW OF THE STATION.

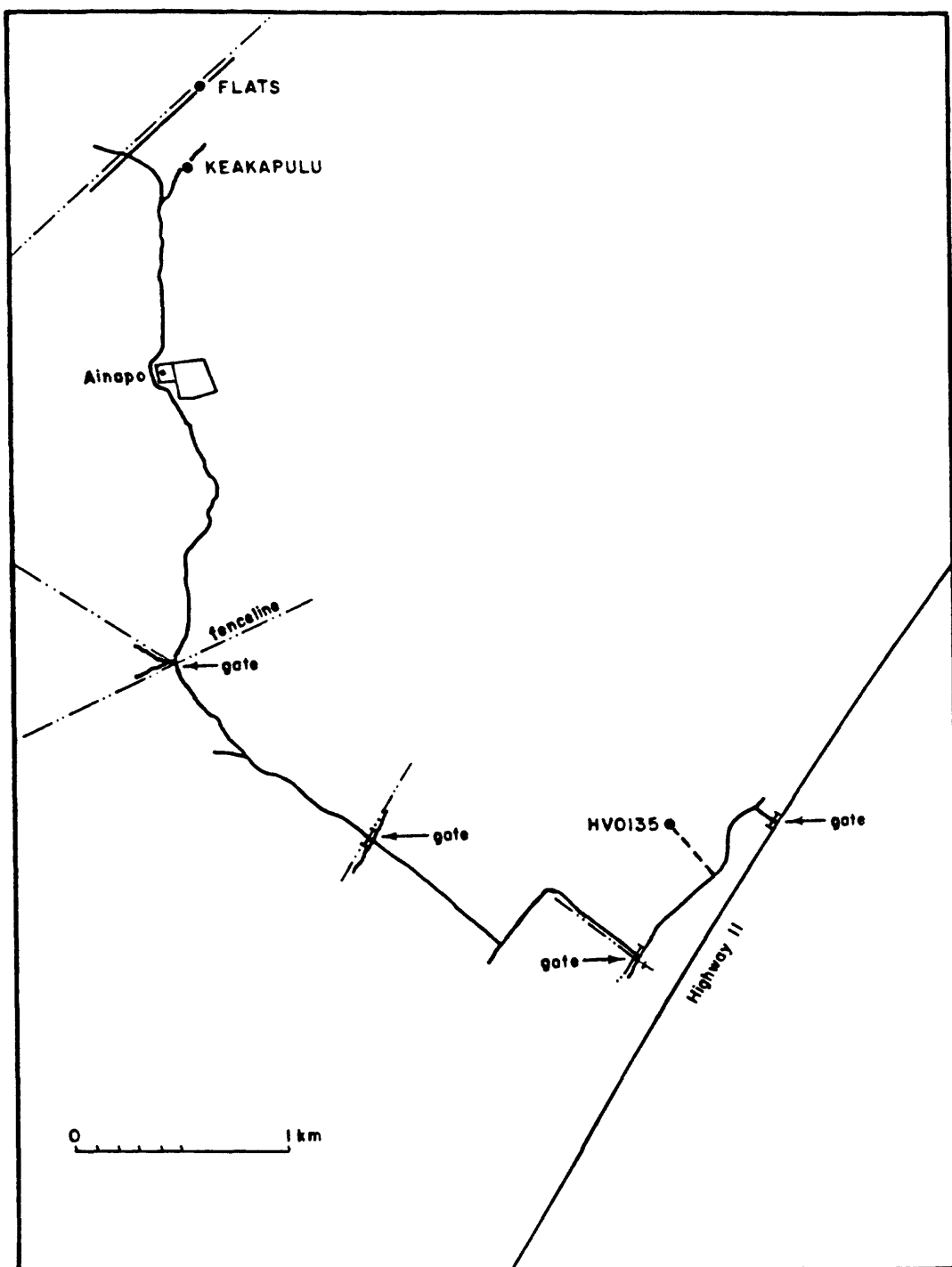
SEE WOOD VALLEY QUAD SHEET

STATION NAME: FLATS (*6) ELEVATION: 4120'
LATITUDE: 19.3710° LONGITUDE: 155.4235°

DESCRIPTION: FLATS is a standard USGS aluminum disk cemented in solid pahoehoe.

From the KEAKAPULU EDM station turnoff (0.5 mi above Ainapo camp), take the road heading straight up until you reach a fence line. Turn right and follow the road for 0.3 mi. The station is located on a smooth pahoehoe slab next to the fence marked by an ahu. A 4-wheel drive vehicle is needed to drive to the station. A helicopter can land mauka of the fence line with some clearing of brush.

SEE WOOD VALLEY QUAD SHEET



STATION NAME: ELEELE ELEVATION: 10540'
LATITUDE: 19.4473° LONGITUDE: 155.5208°

DESCRIPTION: ELEELE is a standard USGS aluminum disk cemented in pahohoe.

The station is on a large (40 m high) conspicuous tumulus on the south flank of Mauna Loa, on the skyline if you approach the station by helicopter from a ENE direction. The disk is located ~20 m from a cairn on a high point on the tumulus in a S 50° E direction. The station is marked by white plastic strips. A Small helicopter can land just west of the station on top of the tumulus. If there are problem at the base of the tumulus.

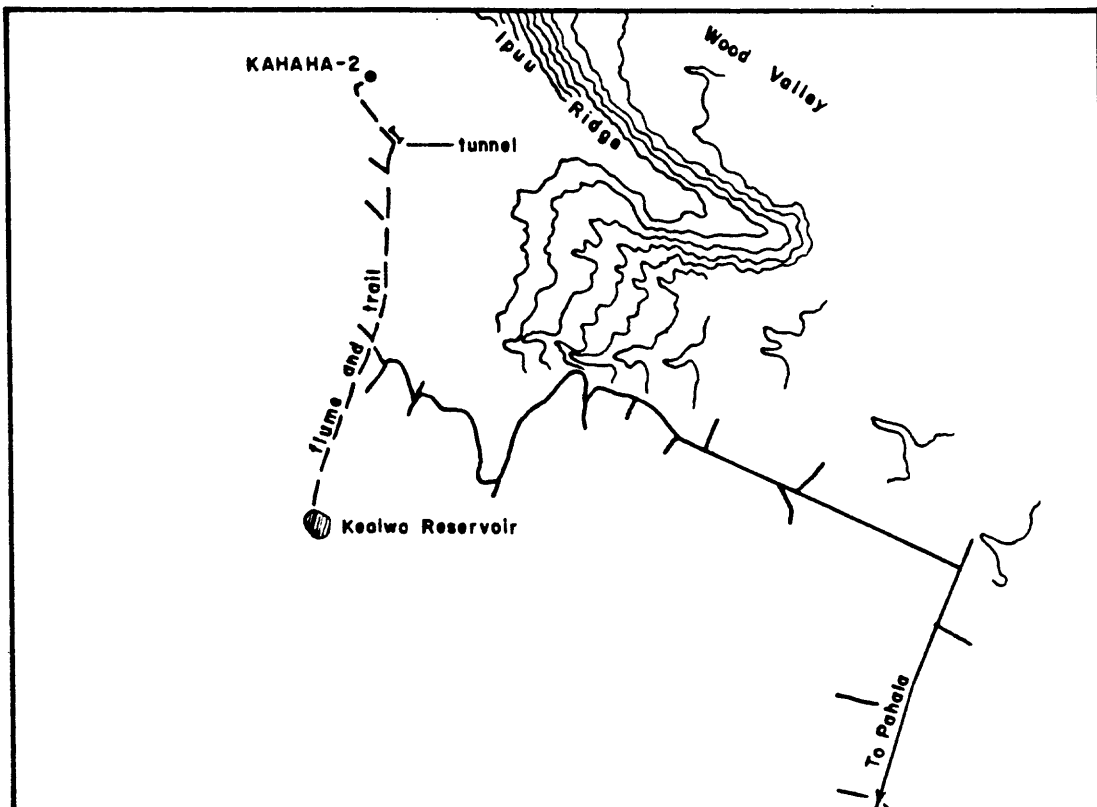
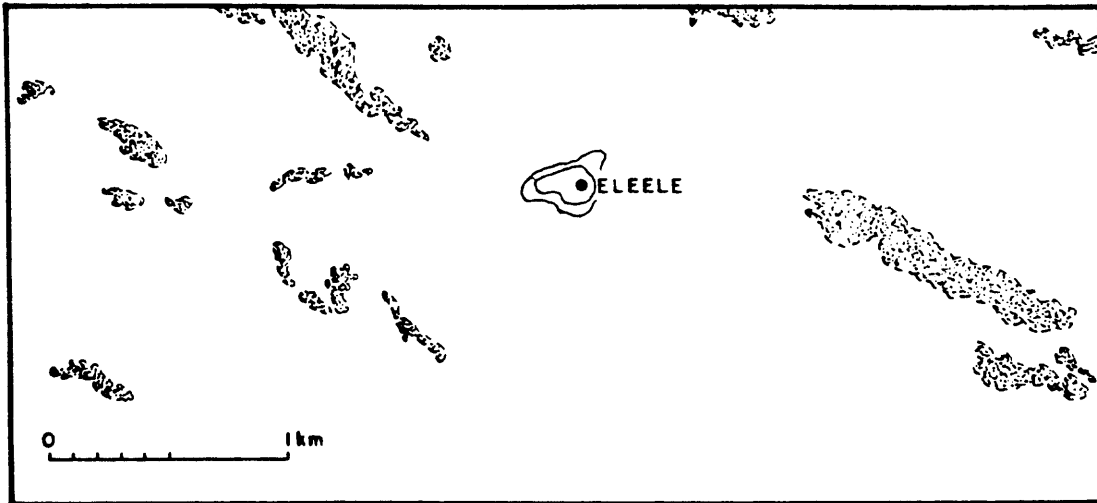
SEE MAUNA LOA QUAD SHEET

STATION NAME: KAHAHA-2 (*7) ELEVATION: 3669'
LATITUDE: 19.2640° LONGITUDE: 155.4890°

DESCRIPTION: KAHAHA-2 is a standard USGS brass disk cemented in a pipe buried in the ground stamped "KAHAHA-2".

From Highway 11, take the first road into Pahala as you travel south from HVO. Drive up the road to a stop sign then turn right on Highway 151. Drive for ~3 mi then turn left up through the cane field. Stay on the road that goes pretty much straight up the slope, staying as close to Piikea Gulch as possible. Park at the point where the road starts heading in a southwesterly direction (near top of canefield), and look for a hunters trail that will lead to a flume. Turn right and follow the flume to the mouth of a tunnel (Do not follow any of the three flumes that fork to the left between the hunters trail and the tunnel). Head uphill into an open area with Uluhe (False Staghorn) and small ohia trees until you get to about 15 m from the heavily wooded area. Turn right and go 15 m into some dense staghorn to the station located on a high point. Bring along a machete for clearing. A 4-wheel drive vehicle is recommended if driving. A helicopter can land at the station with minimal clearing.

SEE PAHALA, WOOD VALLEY, AND KEAIWA RESERVOIR QUAD SHEETS.



STATION NAME: ELEIKI NEW ELEVATION: 8530'
LATITUDE: 19.4833° LONGITUDE: 155.4568°

DESCRIPTION: ELEIKI NEW is a standard USGS aluminum disk cemented in pahoehoe.

The station is located about 150 m east of the Poomoku aa flow on pahoehoe lava. The station is 50 m southwest of a small black tumulus marked by a white plastic cross (Old Eleiki). A helicopter can land near the station.

SEE KIPUKA PAKEKAKE QUAD SHEET

STATION NAME: ML STRIP ELEVATION: 6662'
LATITUDE: 19.4955° LONGITUDE: 155.3879°

DESCRIPTION: ML STRIP is a standard USGS brass disk cemented in solid pahoehoe stamped "STRIP".

From Highway 11, take the road that heads toward Kipuka Puauulu (Birdpark). Go past Birdpark and drive to the end of the scenic road (ML Strip Road). Park your vehicle and walk ~5 m in from the road and ~10 m downslope from a lookout pavilion. The station is in a small low area on a pahoehoe nose on the left of a large Aali'i bush (the benchmark may be covered with dirt). There is yellow paint around the benchmark to help locate it. Any type of vehicle can be used. A helicopter can land near the station in the parking lot if no cars are present.

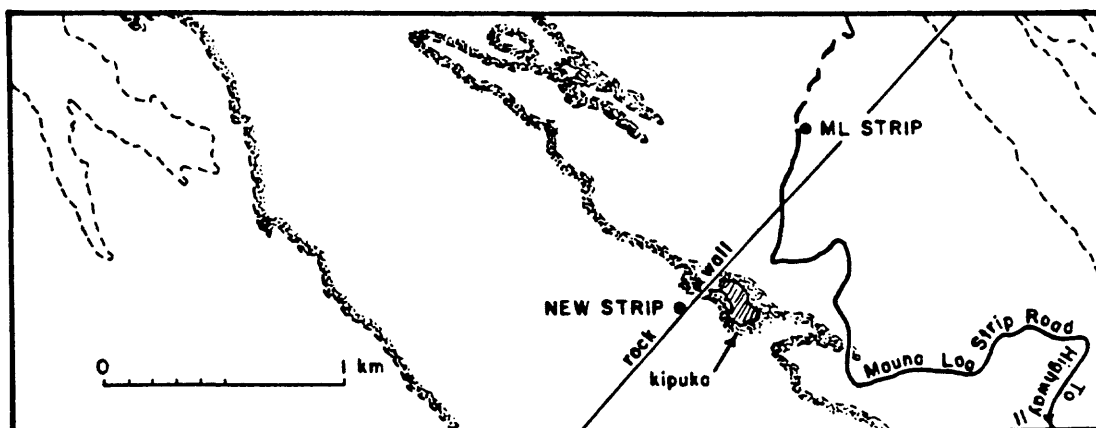
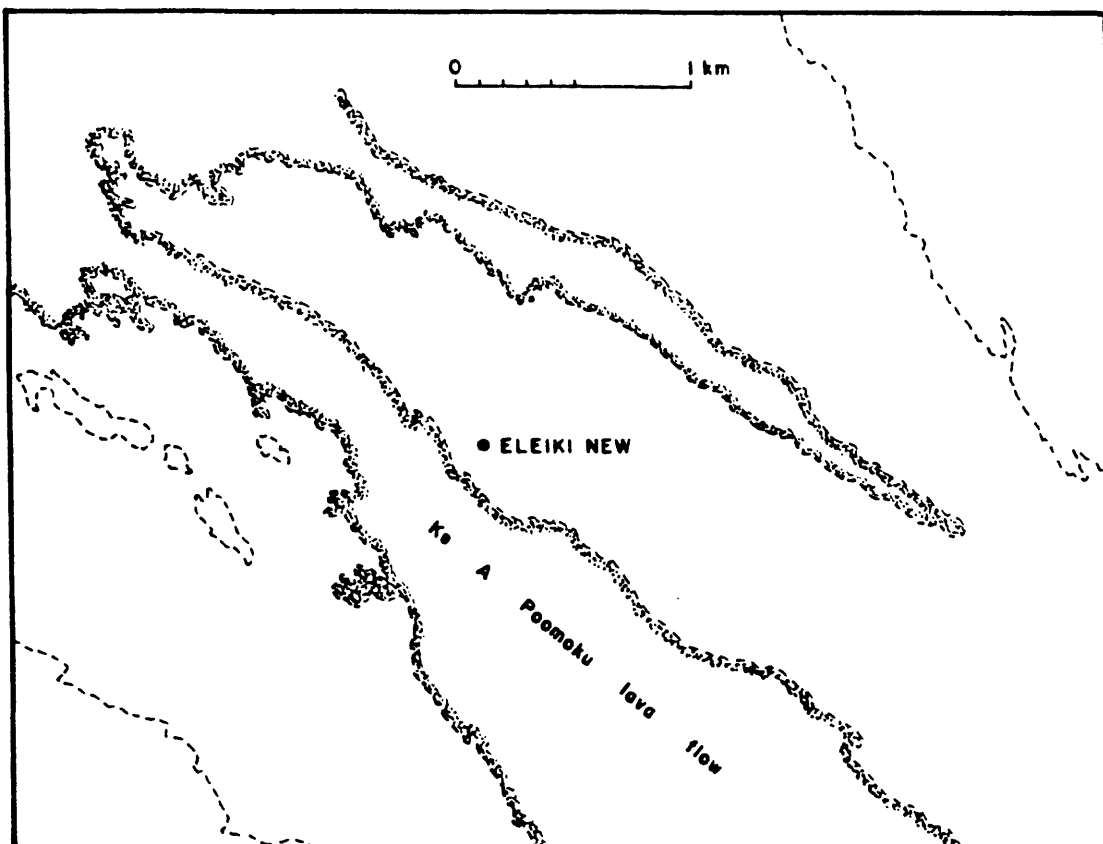
SEE KILAUEA CRATER AND KIPUKA PAKEKAKE QUAD SHEETS

STATION NAME: NEW STRIP ELEVATION: 6600'
LATITUDE: 19.4868° LONGITUDE: 155.3948°

DESCRIPTION: NEW STRIP is a standard USGS aluminum disk cemented in a pahoehoe in the middle of an aa lava flow.

To get to the station, drive up the ML Strip Road to ~0.3 mi from the end of the road following the instructions of ML STRIP. Park the car at a rockwall that intersects the Strip road and start walking to the left (west) following the wall. About 300 m in from the road you will cross a small stretch of aa, then go through a kipuka. Walk About 125 m past the small kipuka to a high point along the wall. The station is 5 m upslope from the rockwall on a high rise in unvegetated aa. A helicopter can land near the station. Any type of vehicle may be used to drive to the hiking point.

SEE KILAUEA CRATER AND KIPUKA PAKEKAKE QUAD SHEETS



STATION NAME: KAIHOLENA (*7) ELEVATION: 3723'
LATITUDE: 19.1790° LONGITUDE: 155.5842°

DESCRIPTION: KAIHOLENA is a standard disk stamped "KAIHOLENA 2 1949" set in a boulder flush with the ground.

In 1976 a helicopter landing area was cleared about 100 m NW of station. You can drive and hike to station (about 2 1/2 hours from HVO). At Pahala, take the road that passes the hospital to the intersection. Turn right and go one block. Turn left 0.33 mi. Turn left, follow paved cane-hauling road for about 2.5 mi to a small rock quarry on right. Follow cane roads to the head of the canefield. Turn right, up a steep jeep trail. Follow road for 1.1 mile. At bend in road, an unused trail leads off to the left. Park the car at the entrance of the trail and walk 1/4 mile to an area of multi-colored ribbons (may be faded) on the left side of the trail. Follow the marked path up towards Kaiholena Mauka. The trail was cleared in 1976 and may be overgrown. Hike up the very steep north ridge of the hill for about 30 minutes. Follow the pig trails across the top of the hill to a narrow ridge on the south side. The station is marked by flagging and 2 reference points. Considerable clearing probably needs to be done. Machetes and chainsaws are recommended. A 4-wheel drive vehicle is needed if you drive to the base of Puu Kaiholena. Flying by helicopter is the easiest way to get there. You probably need to do some clearing for a helicopter pad.

SEE PAHALA AND PUNALUU QUAD SHEETS

STATION NAME: KAIHOLENA MAUKA (*7) ELEVATION: 3740'
LATITUDE: 19.1789° LONGITUDE: 155.5842°

DESCRIPTION: KAIHOLENA MAUKA is a stainless steel pipe 3/4" in diameter.

The station is located ~400 m NNW of KAIHOLENA at the head of the steep ridge on the north side of the hill. A large branch was cut from an Ohi'a tree 3 m north of the station to mark the pipe, which will be completely covered by forest litter. See the description for KAIHOLENA for directions to KAIHOLENA MAUKA.

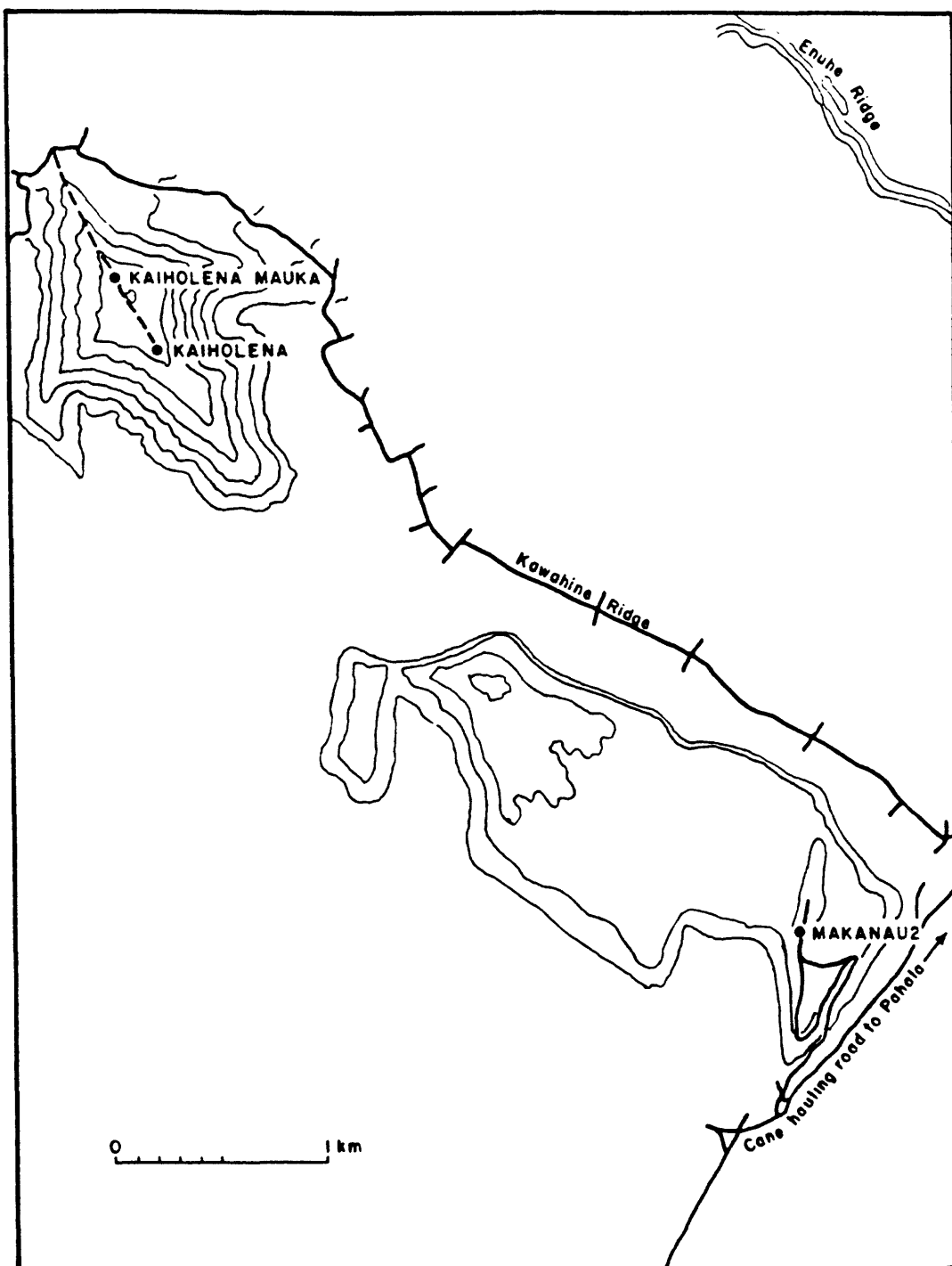
SEE PAHALA AND PUNALUU QUAD SHEETS

STATION NAME: MAKANAU2 (*7) ELEVATION: 1843'
LATITUDE: 19.1510° LONGITUDE: 155.5538°

DESCRIPTION: MAKANAU2 is a standard USGS brass disk stamped "MAKANAU2" cemented in a rockpile.

The station is located in the Ninole Hills. Follow the directions to KAIHOLENA to the rock quarry, but continue on the paved cane-haulage road in a SW direction to the south end of Mekanau. Turn sharply left and follow rough 4-wheel drive road to the top of the hill. The station is located on a rockpile at the southwest edge of the canefield north of a large conspicuous clump of eucalyptus trees. A 4-wheel drive vehicle is needed to drive to this station. A helicopter can land near the station if the sugarcane is harvested.

SEE PAHALA AND PUNALUU QUAD SHEETS



STATION NAME: OHAIKEA (*6) ELEVATION: 4288'
LATITUDE: 19.4280° LONGITUDE: 155.3460°

DESCRIPTION: OHAIKEA is a HTS Trig station on a cement pad with a large metal trig flag.

Follow Hwy 11, go 2.7 mi. towards Ka'u from the Namakani Paio turnoff to a gravel road on the right of the highway. There is a locked gate ~30 m in from the highway (a R3 key is needed to open the gate). Follow the road 1.0 mi. to the park boundary fence (unlocked). Follow the road ~100 m to a low area with corrals to the left, then turn right on an obscure jeep trail that head uphill and through another gate (~150 m from low area). Stay on a well used road for ~.75 mi. that follows a fault or gully on the right side. The road then head directly upslope toward a gate at the corner of two fencelines. Go through the gate and follow the road which gradually head towards the right away from the fenceline to an old abandoned airstrip. Drive along the airstrip, past the first intersection, which goes to Lacy's Ranch, to another gate just past a deeply eroded gully. Go through the gate and follow the road that start off toward the right then back towards the left across a meadow to a more conspicuous bulldozer-cut trail that heads to the right, up a second pali. This trail continues approximately 0.4 mi. to a corral. Go through the corral making sure you are in the same pasture as a water tank located ~ 0.1 mi. to the northeast. The station is located just southeast of the large water tank. Use a regular tribrach for this setup. You may also need a extra long tripod setup for this station. You can get to the station by 4-wheel drive vehicle or helicopter.

SEE KILAUEA CRATER QUAD SHEET

STATION NAME: OHAIKEA TAG68-30 (*6) ELEVATION: 4285'
LATITUDE: 19.4288° LONGITUDE: 155.3459°

DESCRIPTION: OHAIKEA TAG68-30 is a PK nail with a tag stamped "68-30".

Follow the directions to Ohaikea. From Ohaikea, the station is approximately 100 m N 28° E of the Trig station, on a rock outcrop in the corner of the next fenced pasture to the north. It is marked by an ahu. Bring along an axe or machete. You can get to the station by 4-wheel drive vehicle or helicopter.

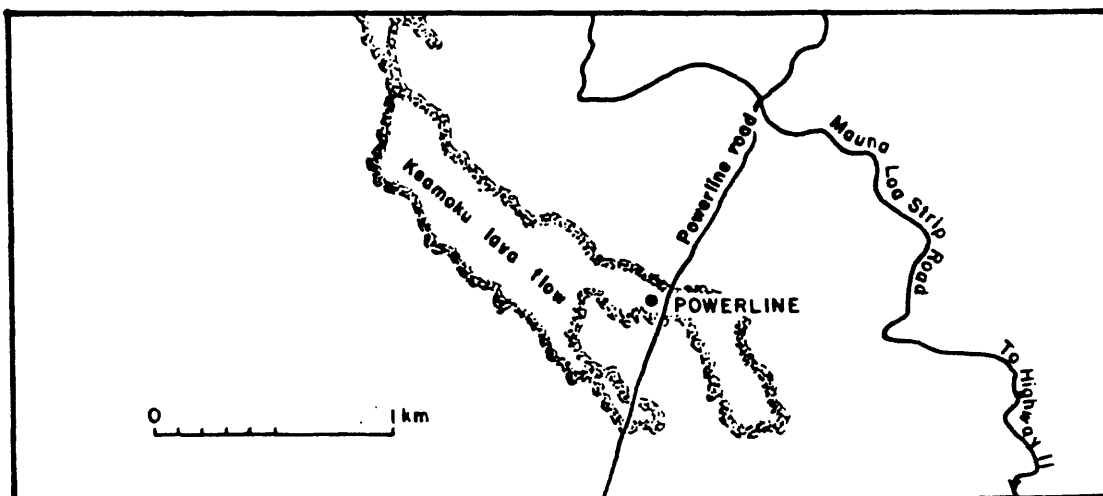
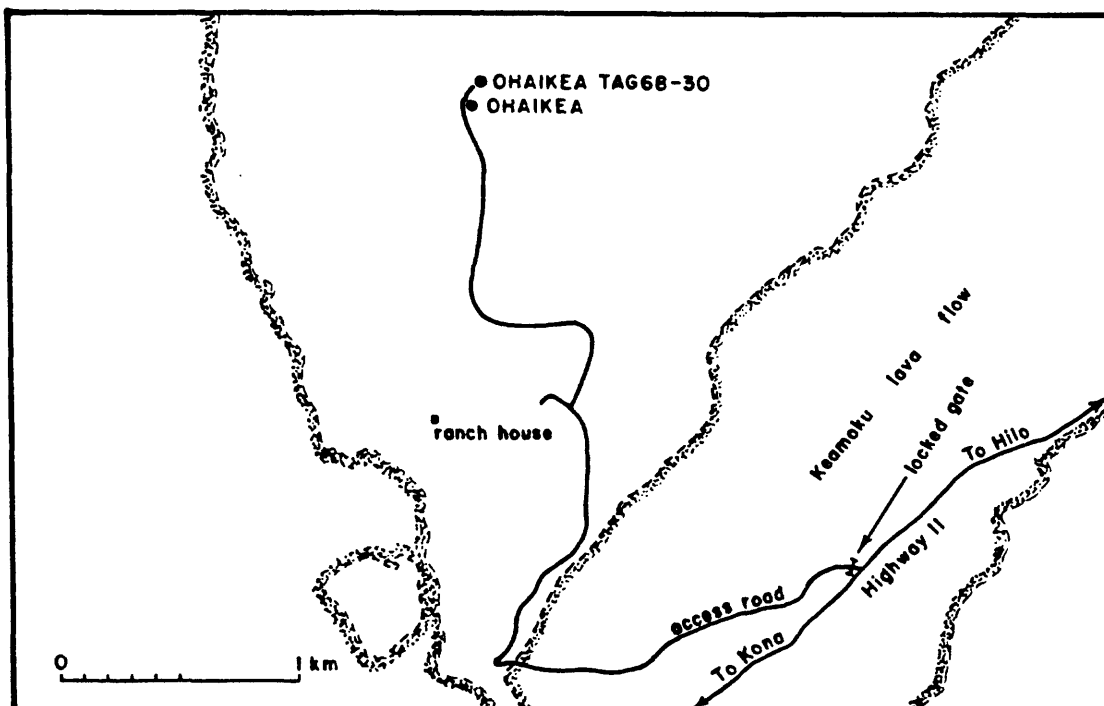
KILAUEA CRATER QUAD SHEET

STATION NAME: POWERLINE (BM77-508) ELEVATION: 4865'
LATITUDE: 19.4548° LONGITUDE: 155.3497°

DESCRIPTION: POWERLINE is a standard USGS disk stamped "BM77-508".

From Kipuka Puaulu drive ~4.5 mi. up the ML Strip road to the intersection of the Powerline Road. Turn left and open a locked gate (need R3 key). The station is located 0.65 mi SW of the Mauna Loa Strip Road along the powerline road on a high aa rib, about 50 m mauka of the road crossing the first lobe of the Keamoku flow. The station is visible from pole #172 and is marked by an ahu. A 4-wheel drive vehicle is recommended for driving to the station. A helicopter can also land close to the station.

SEE KILAUEA CRATER QUAD SHEET



EDM STATION DESCRIPTIONS
MAUNA LOA SUMMIT

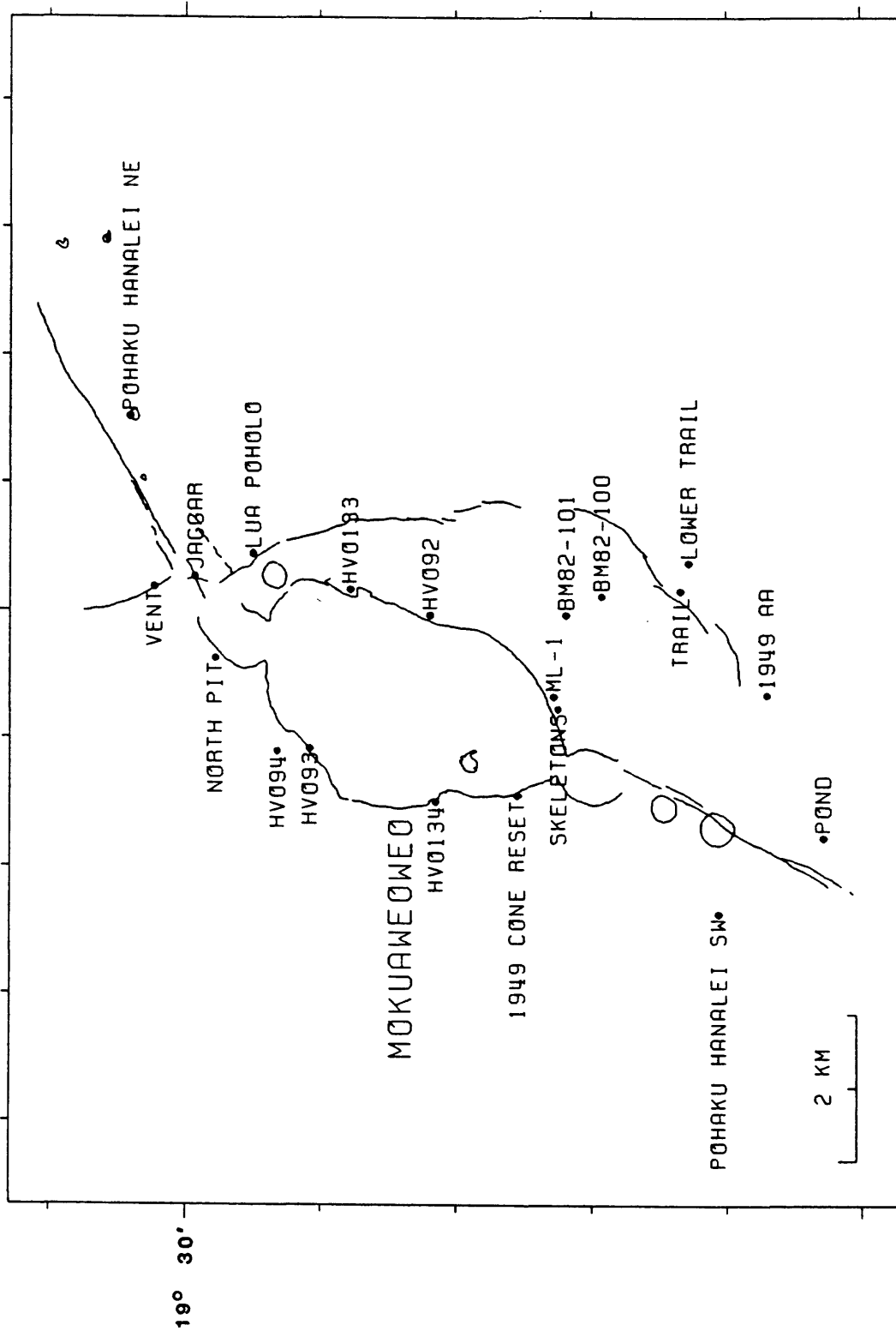
(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

YOU NEED A R3 KEY TO OPEN A NATIONAL PARK SERVICE GATE IF YOU
ARE
PLANNING TO DRIVE TO THE SUMMIT

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A" DETAILED
ACCESS INSTRUCTIONS

MAUNA LOA SUMMIT

EDM STATIONS JULY 1987



155° 35'

STATION NAME: BM82-100 ELEVATION: 13040'
LATITUDE: 19.4489° LONGITUDE: 155.5814°

DESCRIPTION: BM82-100 is a standard USGS aluminum disk stamped
"BM82-100" cemented in pahoehoe.

The station is located SE of the summit of Mauna Loa on a line of pahoehoe tumulus west of a large flat area of pahoehoe. The station is 0.6 mi north of the point where the Ainapo Trail crosses the outer caldera faults near a waterhole and is 50 m west of the trail on the flat pahoehoe. It is approximately 200 m ENE of the tip of a lobe of aa flow. A helicopter can land near the station, which is marked by an ahu.

SEE MAUNA LOA QUAD SHEET

STATION NAME: BM82-101 ELEVATION: 13120'
LATITUDE: 19.4531° LONGITUDE: 155.5839°

DESCRIPTION: BM82-101 is a standard USGS aluminum disk stamped
"BM82-101" cemented in pahoehoe.

The station is located southeast of the summit of Mauna Loa ~540 m NNW of BM82-100 on a small pad of flat pahoehoe lava along a row of tumulus. The benchmark is about 120 m SSW of the point where the Ainapo Trail comes off an aa flow onto flat pahoehoe. It is 150 m east and 200 m south of the edge of an aa flow. A helicopter can land on the pad of pahoehoe next to the station marked by an ahu.

SEE MAUNA LOA QUAD SHEET

STATION NAME: ML-1 ELEVATION: 13290'
LATITUDE: 19.4546° LONGITUDE: 155.5945°

DESCRIPTION: ML-1 is a standard USGS aluminum disk stamped "ML-1" cemented in pahoehoe. It is also used as a leveling benchmark.

ML-1 is located towards the SW rim of Mokuaweoweo Crater. The station is on a low, oval-shaped tumulus, about 15 m from caldera rim. A large, 1 m high ahu is located about 30 m to the northeast on the nearby rim. This ahu which is slim, can be seen silhouetted against the skyline from ~0.65 mi from the north. Two other smaller ahus are nearby. A permanent glass EDM reflector station (rebar with two reflector glass attached to it), is also located nearby. A helicopter can land 15 m south of the station.

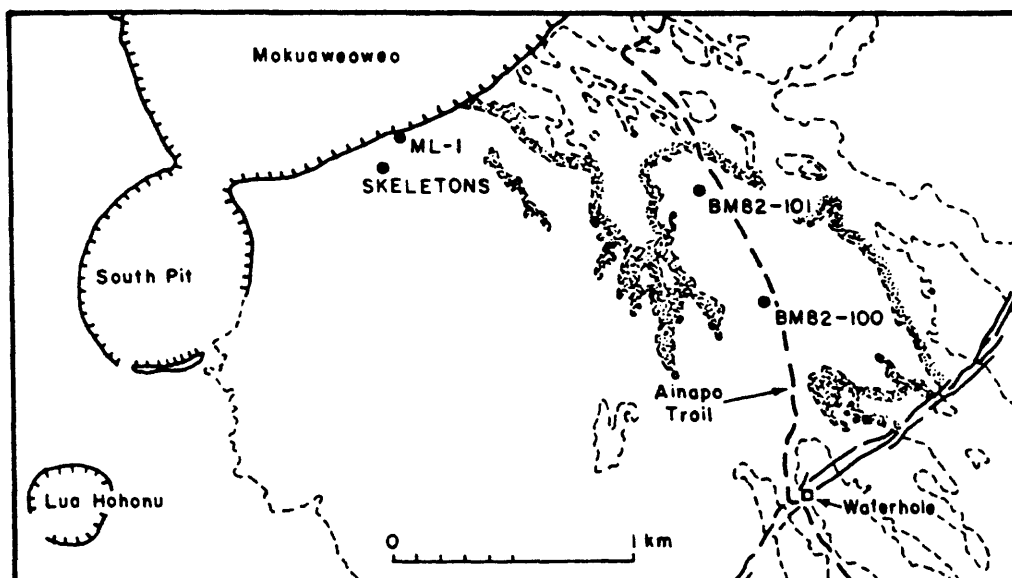
SEE MAUNA LOA QUAD SHEET

STATION NAME: SKELETONS (TAG76-26) ELEVATION: 13300'
LATITUDE: 19.4542° LONGITUDE: 155.5961°

DESCRIPTION: SKELETONS is a PK nail with a tag stamped "76-26".

SKELETONS is located on the south side of the southwest end of Mokuaweoweo Crater. It is a large tumulus 150 m SSW of ML-1. A ahu is on the tumulus next to the station. A Helicopter can land at the south base of the tumulus or at ML-1 (usually walk from ML-1 to SKELETONS).

SEE MAUNA LOA QUAD SHEET



STATION NAME: HVO92 (SUMMIT CABIN) ELEVATION: 13250'
LATITUDE: 19.4698' LONGITUDE: 155.5839'

DESCRIPTION: HVO92 is a standard USGS aluminum disk stamped "HVO92" cemented in pahoehoe. It is also used as a leveling benchmark.

HVO92 is located along the east rim of Mokuaweoweo Crater, 50 m from the NE corner of summit rest house in a N 15° E direction. The benchmark is 3 m south of the summit trail on an old pahoehoe outcrop flush with the general ground surface. A small ahu is next to the station. A helicopter can land near the station.

SEE MAUNA LOA QUAD SHEET

STATION NAME: HVO133 ELEVATION: 13245'
LATITUDE: 19.4797' LONGITUDE: 155.5805'

DESCRIPTION: HVO133 is a standard USGS aluminum disk stamped "HVO133" cemented in pahoehoe. It is also used as a leveling benchmark.

Follow the trail to the summit cabin through North Pit than past Lua Poholo. Go up a shallow gully about 400 m, past the last low spatter ramparts. Continue on the trail to the top of the gully (marked in 1974 by a yellow stick in an ahu). Look toward the caldera rim and you will see two ahus close together. Go to the ahu closest to the trail (about 100 yds.) and station. A rebar with permanent glass attached to it is located nearby. If you go too far on trail, you will (not seen 8/74) cross water or ice containing cracks several hundred feet beyond (south of turnoff to station). This is a helicopter or hike to station. DIFFICULT PLACE TO LAND BECAUSE OF LOTS OF GROUND CRACKS AND SHELLY PAHOEHOE.

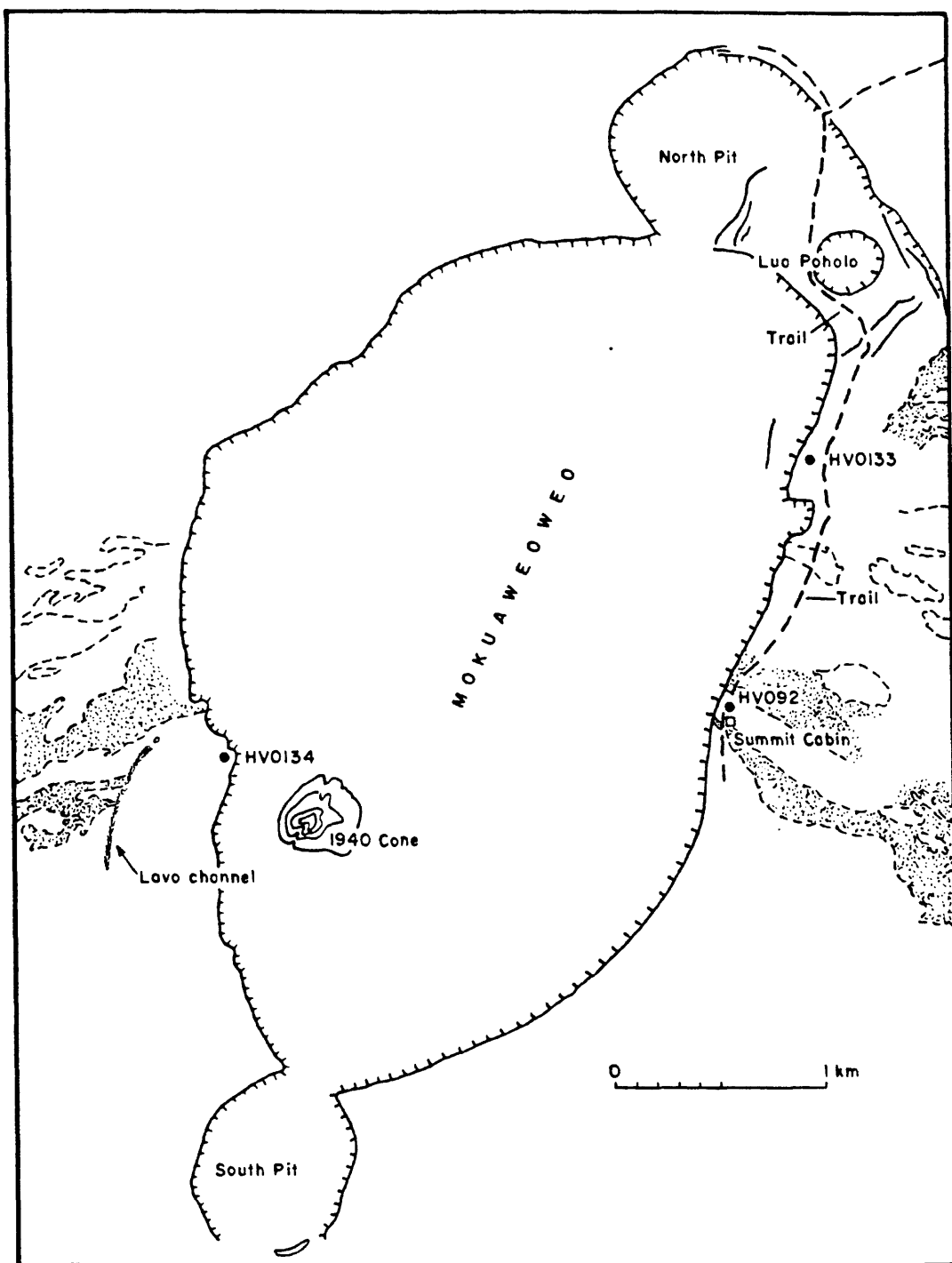
SEE MAUNA LOA QUAD SHEET

STATION NAME: HVO134 (WEST RIM) ELEVATION: 13490'
LATITUDE: 19.4691' LONGITUDE: 155.6082'

DESCRIPTION: HVO134 is a standard USGS aluminum disk stamped "HVO134" cemented in pahoehoe.

HVO134 is located on the west rim of Mokuaweoweo crater. It is ~250 m south of the last aa flow that lies south of the summit and ~30 m from the rim of the crater. Look for a cairn on a pahoehoe high point near some small collapsed tubes. CAUTION IS REQUIRED WHEN LANDING A HELICOPTER BECAUSE OF TRICKY WINDS.

SEE MAUNA LOA QUAD SHEET



STATION NAME: HVO93 ELEVATION: 13570'
LATITUDE: 19.4847° LONGITUDE: 155.6013°

DESCRIPTION: HVO93 is a standard USGS aluminum disk stamped "HVO93".

From Saddle Road, drive up the Mauna Loa Observatory road ~15 mi. to the turnoff to the summit road. Drive until you get to ~40 m from the end of the road. Turn left at that point and follow the faded yellow paint mark that ends at a nice flat pahoehoe area. Walk upslope and towards the caldera (southwest) for ~75 m looking for an ahu which marks the station. HVO93 is located NW of the summit of Mauna Loa on the west rim ~425 m by pacing S 3° E from the end of the summit road. It is 22 m from the rim of Mokuaweoweo in a westerly direction, 27 m from a weathered aa flow beheaded at the caldera rim, 50 m north of another beheaded aa flow, in weathered pahoehoe. A 4-wheel drive vehicle is needed to drive up to the summit. A helicopter can land near the station or at the area where you park the car.

SEE KOKOOLAU AND MAUNA LOA QUAD SHEETS

STATION NAME: HVO94MLOA (HVO94) (*1) ELEVATION: 13450'
LATITUDE: 19.4886° LONGITUDE: 155.6017°

DESCRIPTION: HVO94 is a standard USGS aluminum disk stamped "HVO94".

HVO94 is located at the end of the Mauna Loa summit road. Drive up the Mauna Loa Weather Observatory road from Saddle Road intersection for approximately 15 mi to a 4-wheel drive gravel road (200 m from pole #261, ROAD EDM station) that leads up to the summit of Mauna Loa. The station is located on the northeast corner of a flat bulldozed area at the end of the road. It is about 5 m away from the middle of the road on solid pahoehoe. You need a 4-wheel drive vehicle to drive to the station. A helicopter can land near the station.

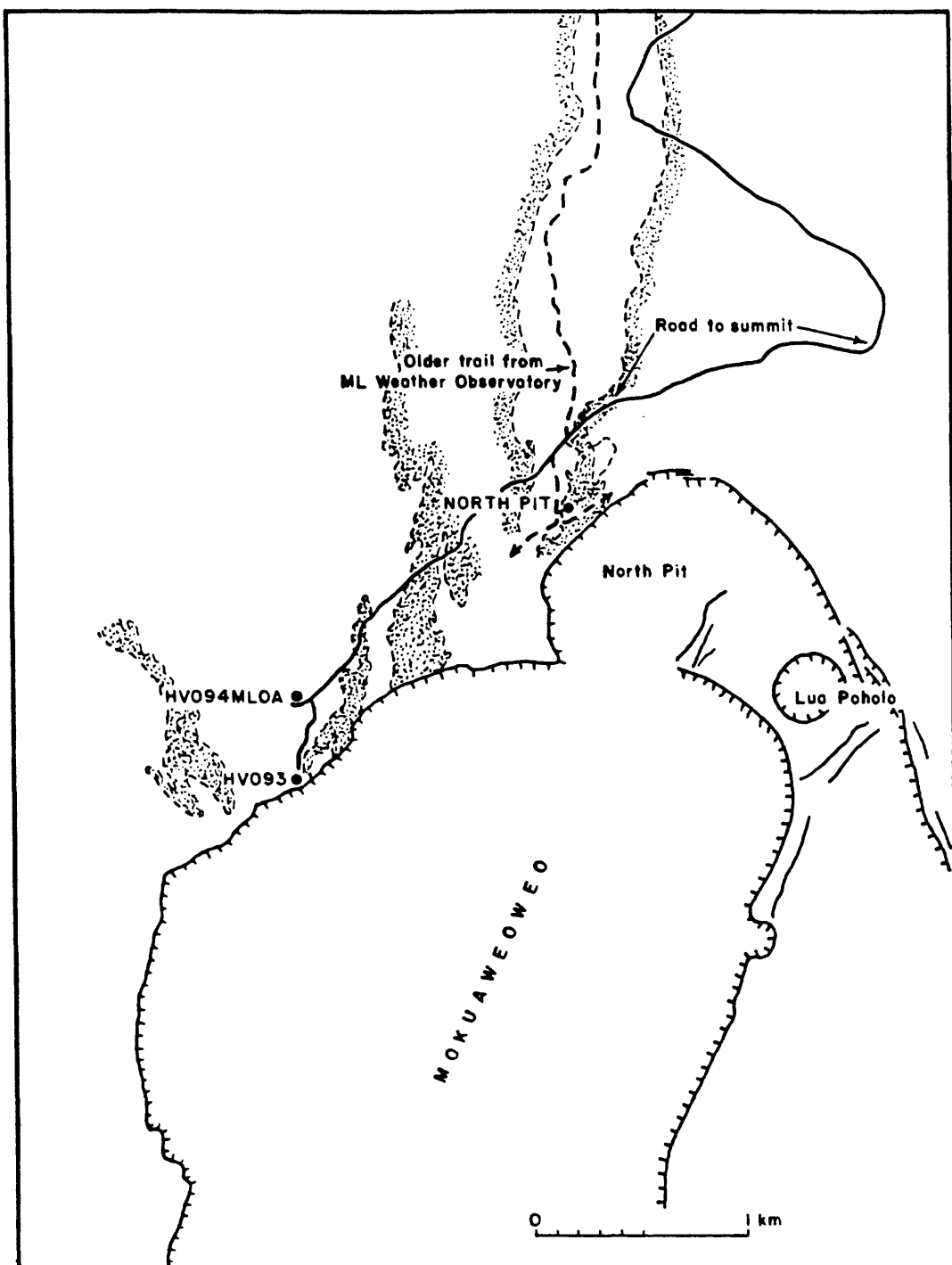
SEE PUU OO, PUU ULAULA, KOKOOLAU AND MAUNA LOA QUAD SHEETS.

STATION NAME: NORTH PIT ELEVATION: 13130'
LATITUDE: 19.4964° LONGITUDE: 155.5895°

DESCRIPTION: NORTH PIT is an unmarked (?) standard USGS aluminum disk located on a high point on an old aa flow overlooking Mokuaweoweo Crater.

Drive up 15 mi from the intersection of Saddle Road-Mauna Loa Observatory Road towards the observatory to the gravel road that leads to the summit of Mauna Loa. Drive ~7.5 mi, past a NPS gate (may be locked, need R3 key), until you reach the older Mauna Loa summit trail. Park the vehicle and follow the mauka edge of the aa flow towards the caldera for 200 m. Climb up the aa flow and look for an ahu. The station is ~10 m NW of a trail that follows the rim of the caldera. A 4-wheel drive vehicle is needed to drive to the station. A helicopter can land close to the station also.

SEE MAUNA LOA QUAD SHEET



STATION NAME: JAGGAR (TAG76-28) ELEVATION: 13,030'
LATITUDE: 19.4988' LONGITUDE: 155.5788'

DESCRIPTION: JAGGAR is a rebar spike with a tag stamped "76-28".

The station is located on a prominent small spatter rampart, at the north end of Mokuoweoweo, just northwest of the Mauna Loa trail, about 50 meters NE of BM13019. There is a good spot to land a helicopter just north of the station.

SEE MAUNA LOA QUAD SHEET

STATION NAME: LUA POHOLO (TAG76-40) ELEVATION: 13090'
LATITUDE: 19.4917' LONGITUDE: 155.5759'

DESCRIPTION: LUA POHOLO is a PK nail with a tag stamped "76-40".

The station is located on old agglutinated spatter along the rim of Mokuoweoweo due north of Lua Poholo pit crater. It is ~400 m east of the point where the hiking trail to the summit cabin heads into North Pit. The station is marked by an ahu and is easiest to access by helicopter which can land near the station.

SEE MAUNA LOA QUAD SHEET

STATION NAME: POHAKU HANAIE NE (TAG76-23) ELEVATION: 12423'
LATITUDE: 19.5068' LONGITUDE: 155.5580'

DESCRIPTION: POHAKU HANAIE NE is a tagged rebar spike "76-23".

The station is set in cement at the high point on north side of the steep cone crater. The cone is located on the upper Mauna Loa NE rift zone and is surrounded by 1975 and 1984 lava flows. Helicopter lands close to the station but cannot shut down.

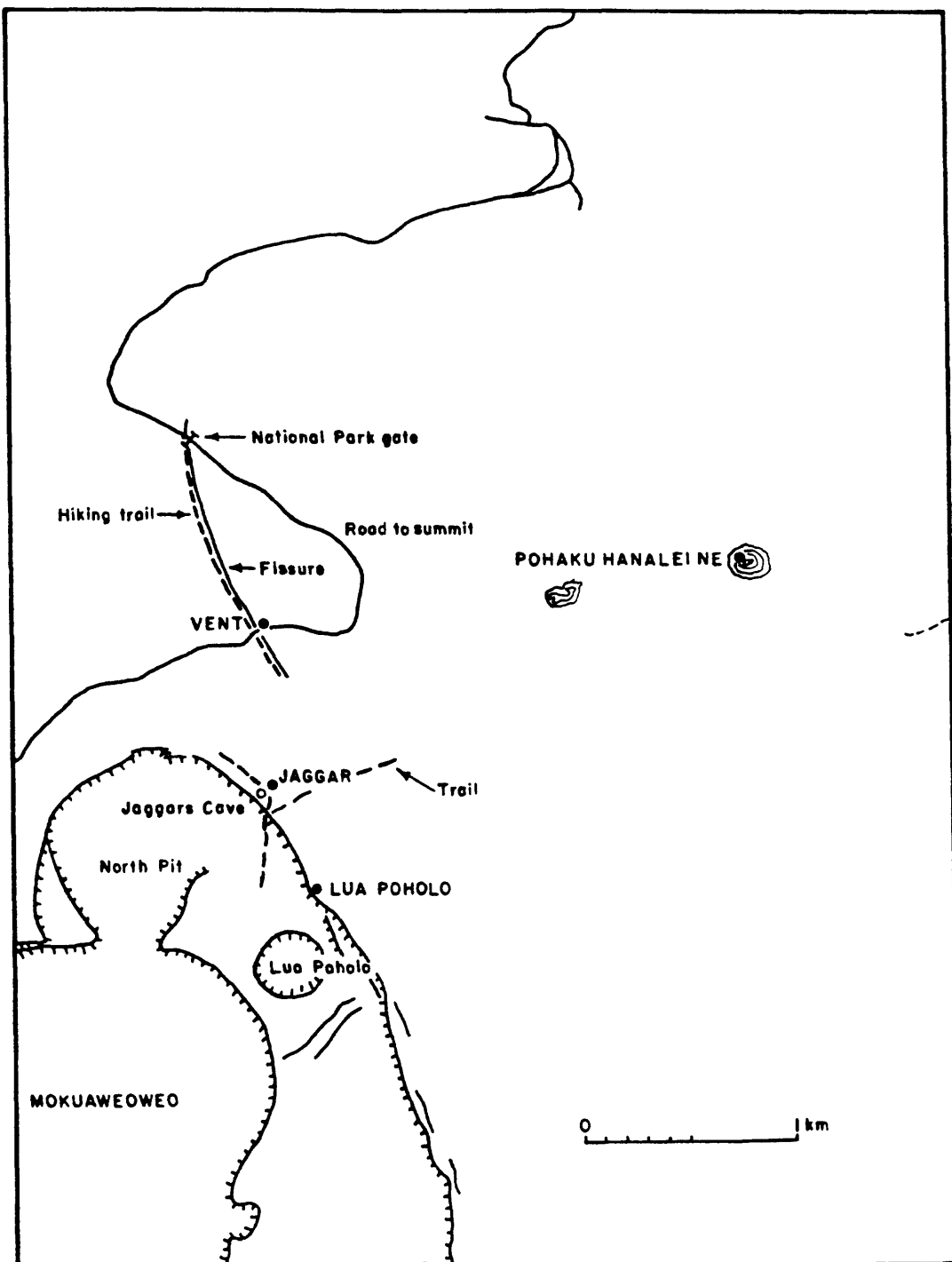
SEE KOKOOLAU QUAD SHEET

STATION NAME: VENT ELEVATION: 12860'
LATITUDE: 19.5038' LONGITUDE: 155.5802'

DESCRIPTION: VENT is an unmarked standard USGS aluminum disk cemented in pahoehoe (CAUTION PAHOEHOE HOLLOW UNDER STATION). It is also used as a leveling benchmark

Drive up the Mauna Loa Weather Observatory road (about 15 mi from the intersection at Hwy 200) ~200 m past ROAD (pole #261) then turn left on a 4-wheel drive road. Drive past the National Park gate; go around a switchback on the road and drive for ~400 m to a crest in the road where crossing a young eruptive vent. The station is located on the right of the road about 5 m in and 1 m higher in elevation on slightly shelly pahoehoe. If you go past a hiking trail then you have gone too far. A 4-wheel drive vehicle is needed. A helicopter can land near the station.

SEE KOKOOLAU QUAD SHEET



STATION NAME: POHAKU HANAIE SW (TAG76-33) ELEVATION: 12730'
LATITUDE: 19.4344' LONGITUDE: 155.6228'

DESCRIPTION: POHAKU HANAIE SW is a tagged rebar spike "76-33"

The station is on a high point on the northeast rim of the cone. It is located on the upper Mauna Loa southwest rift zone about 1.0 km due west of Lua Hou. It is the first big cone to the right as you head down the southwest rift from the summit. There is a fair helicopter landing area on the rim just south of the station.

SEE MAUNA LOA QUAD SHEET

STATION NAME: POND (BM77-500) ELEVATION: 12650'
LATITUDE: 19.4213' LONGITUDE: 155.6128'

DESCRIPTION: POND is a standard USGS aluminum disk stamped "77-500" cemented in solid pahoehoe.

The station is located on the Mauna Loa upper southwest rift zone on the south edge of a large, flat lava pond in 1950 lava flow. The station is about 1.5 km south of Lua Hou and is marked by a white plastic T and a white paint spot. There is an easy helicopter landing area just north of the station.

SEE MAUNA LOA QUAD SHEET

STATION NAME: 1949 AA (TAG76-30) ELEVATION: 12700'
LATITUDE: 19.4283' LONGITUDE: 155.5942'

DESCRIPTION: 1949 AA is a PK nail with a tag stamped "76-30".

The station is located at the north end of a pahoehoe kipuka, ~5 m onto the 1949 aa flow. The aa flow heads in a SSE direction out of South Pit at the southern end of Mokuaweoweo Crater. The kipuka is the northernmost one in the flow and is towards the eastern edge of the 3 m thick aa flow. White plastic strips mark the helicopter landing area. SHOULD USE CAUTION WHEN LANDING THERE BECAUSE OF SHELLY PAHOEHOE AND UNEVEN TERRAIN.

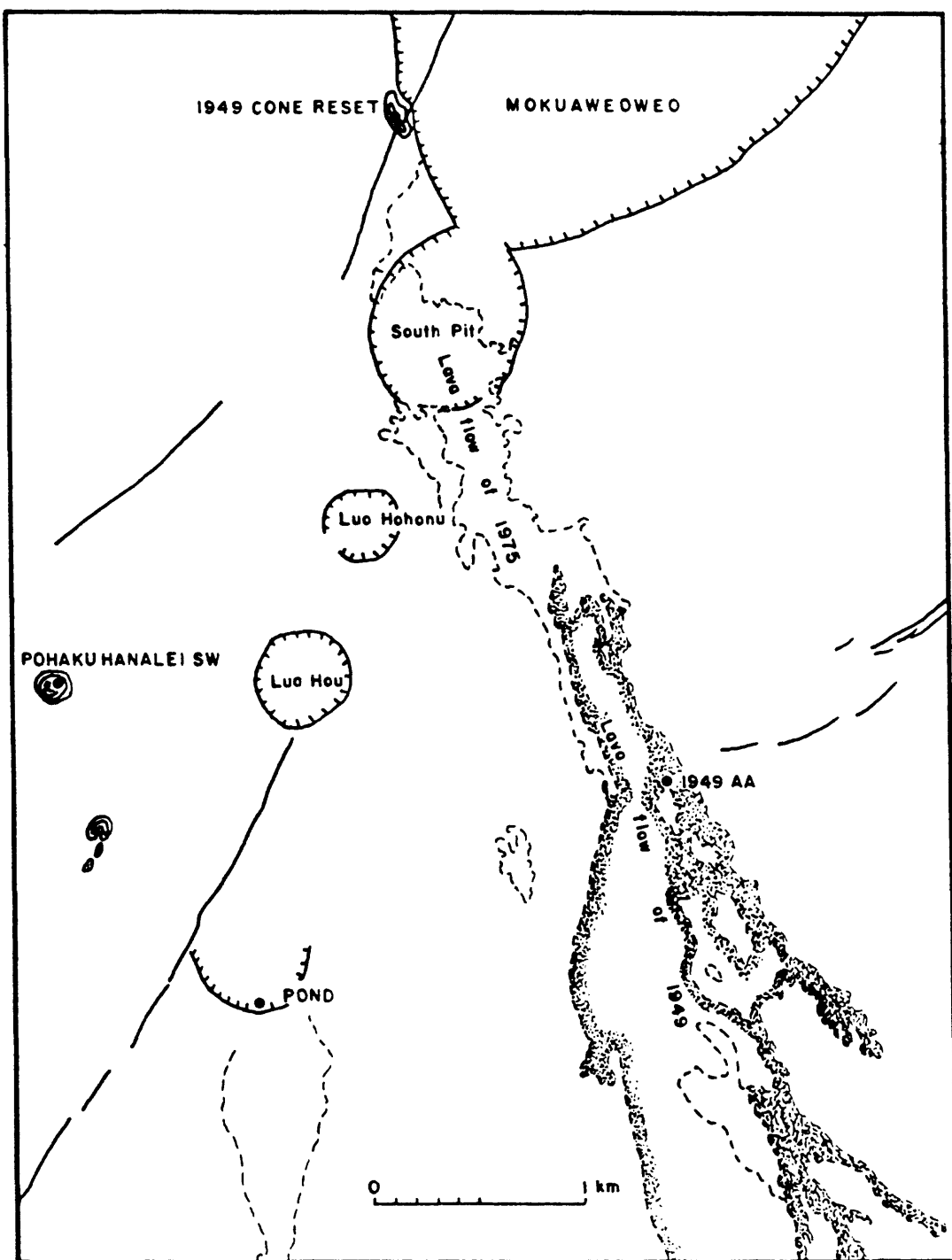
SEE MAUNA LOA QUAD SHEET

STATION NAME: 1949 CONE RESET ELEVATION: 13410'
LATITUDE: 19.4591' LONGITUDE: 155.6073'

DESCRIPTION: 1949 CONE RESET is a rebar driven into pumice and spatter and reinforced by concrete.

The station is located on the high point of the 1949 pumice cone on the west rim of the SW end of Mokuaweoweo Crater. It is ~20 m north of the 1984 fissure which cut through the cone. A helicopter can land on loose cinders at the top of the cone or on the pahoehoe lava flow at the bottom of the cone.

SEE MAUNA LOA QUAD SHEET.



STATION NAME: TRAIL (TAG76-32) ELEVATION: 12860'
LATITUDE: 19.4390' LONGITUDE: 155.5806'

DESCRIPTION: TRAIL is a PK nail with a tag stamped "76-32".

The station is located 150 m W of the Ainapo trail on the western edge of westernmost aa flow crossing the outer caldera fault zone. It is 100 m SE of the fault pali and 20 m from the edge of the pahoehoe. As you fly towards the station from the summit, there is a white rain gage station to the left of the aa flow that TRAIL is on. The EDM station is marked by an ahu and white "T" pattern. The helicopter lands on flat pahoehoe just southwest of the aa flow.

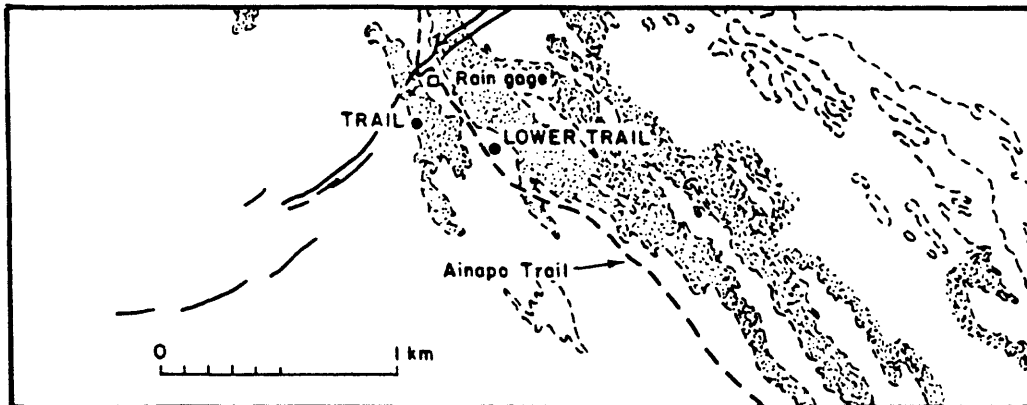
SEE MAUNA LOA QUAD SHEET

STATION NAME: LOWER TRAIL (BM77-504) ELEVATION: 12790'
LATITUDE: 19.4380' LONGITUDE: 155.5770'

DESCRIPTION: LOWER TRAIL is a standard USGS aluminum disk stamped "77-504" cemented in pahoehoe.

The station is located 40 m east of the Ainapo Trail on the south flank of Mauna Loa. It is ~0.5 km past the outer caldera faults of Mauna Loa summit. The station is on a tumulus of light grey, tube-fed pahoehoe above a small kipuka of old, orange-red deeply weathered pahoehoe. It is ~350 m ESE of TRAIL station. A white circle is painted around the benchmark. A helicopter may be able to land 5 m east of the station.

SEE MAUNA LOA QUAD SHEET

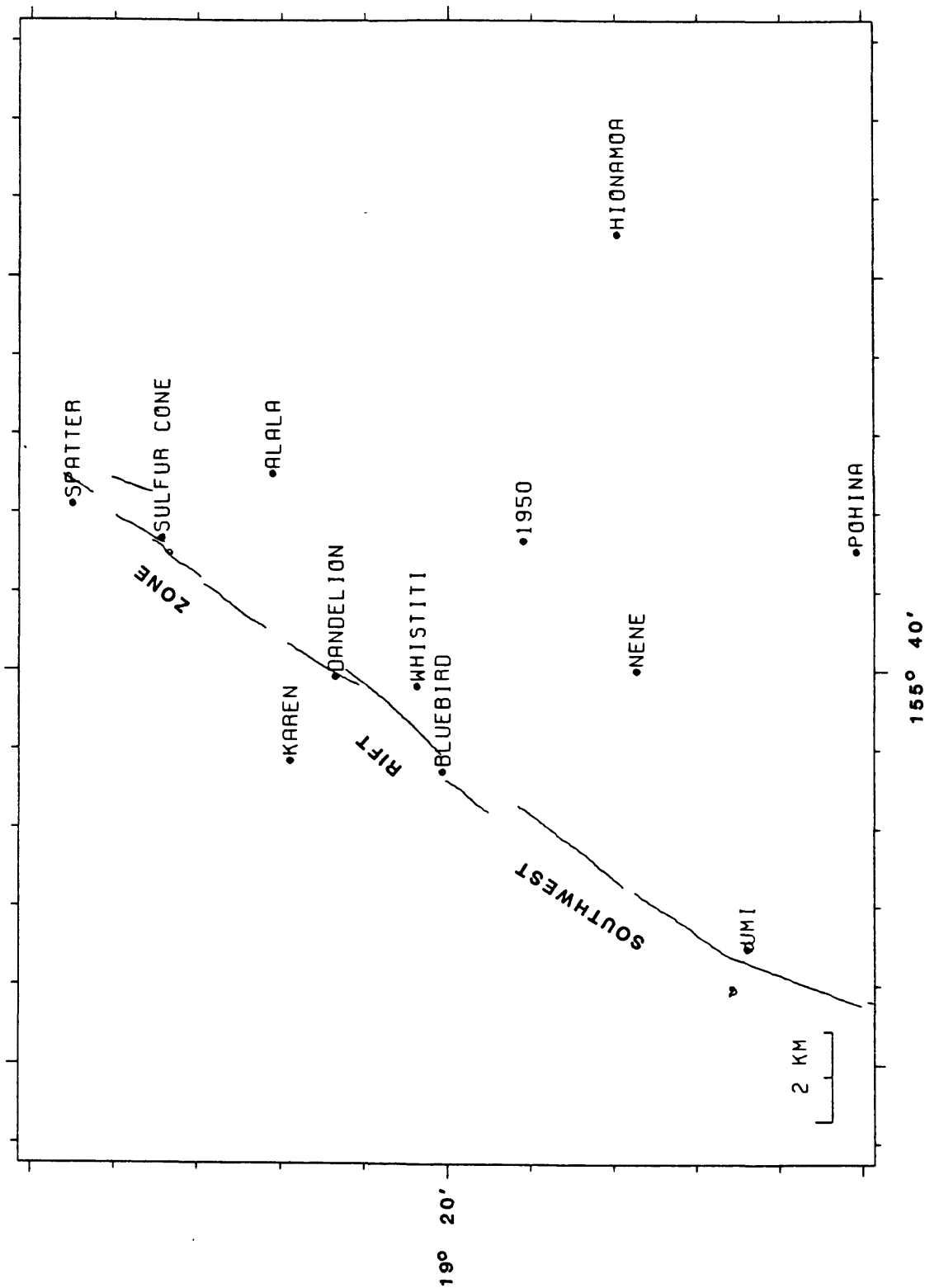


EDM STATION DESCRIPTIONS
MAUNA LOA MIDDLE SOUTHWEST RIFT ZONE

(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A" DETAILED
ACCESS INSTRUCTIONS

MAUNA LOA MIDDLE SOUTHWEST RIFT EDM STATIONS, JULY 1987



STATION NAME: ALALA (BM HVO77-501) ELEVATION: 10,330'
LATITUDE: 19.3683° LONGITUDE: 155.6253°

DESCRIPTION: ALALA is a standard USGS aluminum disk cemented in solid pahoehoe stamped "HVO77-501".

The station is located on the south flank of the upper Mauna Loa southwest rift zone on a high-standing ridge of light tan-gray tube-fed pahoehoe, bordered on both sides by 1950 aa. It is ~2.4 km SW of Sulphur Cone. The benchmark is directly between two large conspicuous skylights, on the rim of NW one. A white circle is painted on a flat surface 5 m north of BM. It is located at the boundary between Alika Cone and Keaiwa Reservoir quads. You can get to this station by helicopter only.

SEE ALIKA CONE AND KEAIWA RESERVOIR QUAD SHEETS

STATION NAME: SPATTER (TAG77-113) ELEVATION: 12080'
LATITUDE: 19.4080° LONGITUDE: 155.6317°

DESCRIPTION: SPATTER is a rebar spike with a tag stamped "77-113" set in cement.

The station is located on an old spatter rampart on the Mauna Loa southwest rift zone, west of a large crack, ~1.5 mi southwest of POND, surrounded by 1950 lava flow. A white paint spot 50 m to the north and an ahu next to the station helps to locate the site. A helicopter can land on the rampart crest next to the station.

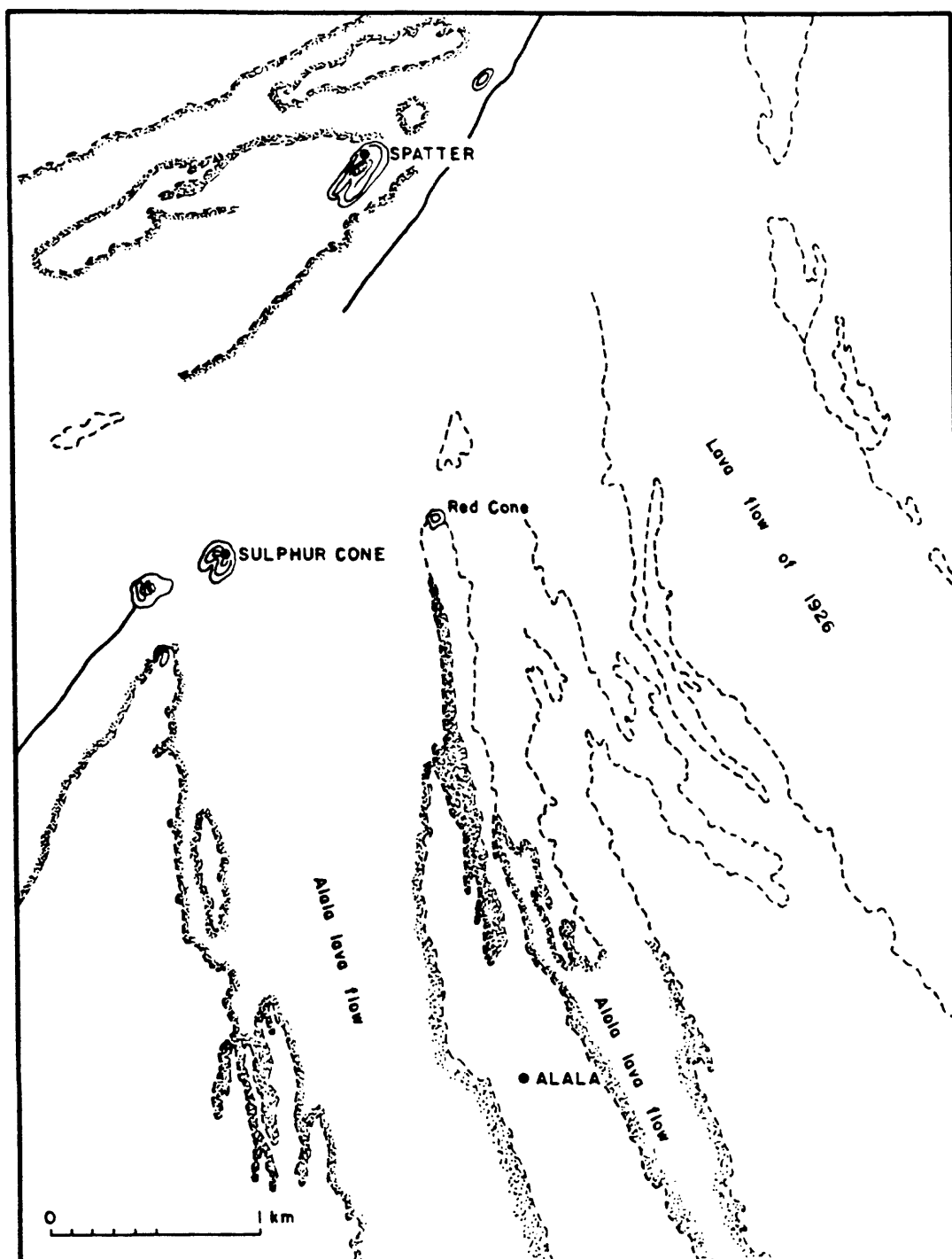
SEE SULPHUR CONE QUAD SHEET

STATION NAME: SULPHUR CONE (TAG79-109) ELEVATION: 11300'
LATITUDE: 19.3907° LONGITUDE: 155.6388°

DESCRIPTION: SULPHUR CONE is a rebar spike set in cement with a tag stamped "79-109".

The station is located on the Mauna Loa southwest rift zone ~1.25 km SSW of SPATTER. It is on a cinder cone just northeast of an area of sulphur deposits. The helicopter lands at the southeast end of the cone near a benchmark called Sulphur Cone (DO NOT USE THIS BENCHMARK). Instead, walk upslope along the eastern edge of the cone until you get to the high point on the cone where the station is located.

SEE SULPHUR CONE QUAD SHEET



STATION NAME: BLUEBIRD (Tag 75-58) ELEVATION: 9205'
LATITUDE: 19.3345° LONGITUDE: 155.6880°

DESCRIPTION: BLUEBIRD is a rebar with a tag stamped "75-58" set in cement.

The station is located on the northeastern rim of an old red-orange cinder cone on the crest of the southwest rift of Mauna Loa and is marked by an ahu. The helicopter lands on a small flat area on the crater rim 10 m south of the station.

SEE ALIKA CONE QUAD SHEET

STATION NAME: DANDELION (Tag75-61) ELEVATION: 9894'
LATITUDE: 19.3558° LONGITUDE: 155.6680°

DESCRIPTION: DANDELION is rebar with a tag stamped "75-61" set in cement.

The station is located on a large old reddish spatter cone along the crest of the southwest rift of Mauna Loa. The station is located on the southwestern tip of the cone and is marked by a large ahu. The helicopter lands about 25 m northeast of the station but cannot shut down.

SEE ALIKA CONE QUAD SHEET

STATION NAME: KAREN (TAG75-60) ELEVATION: 9530'
LATITUDE: 19.3345° LONGITUDE: 155.6880°

DESCRIPTION: KAREN is a PK nail with a tag stamped "75-60" pounded in pahoehoe.

The station is located on the west side of the middle southwest rift of Mauna Loa. Go About 1.5 mi WNW of DANDELION station. The station is 300 m north of the beginning of a lava channel and about 500 m west of a cinder cone. A large ahu is near the station. A helicopter can land close to the station.

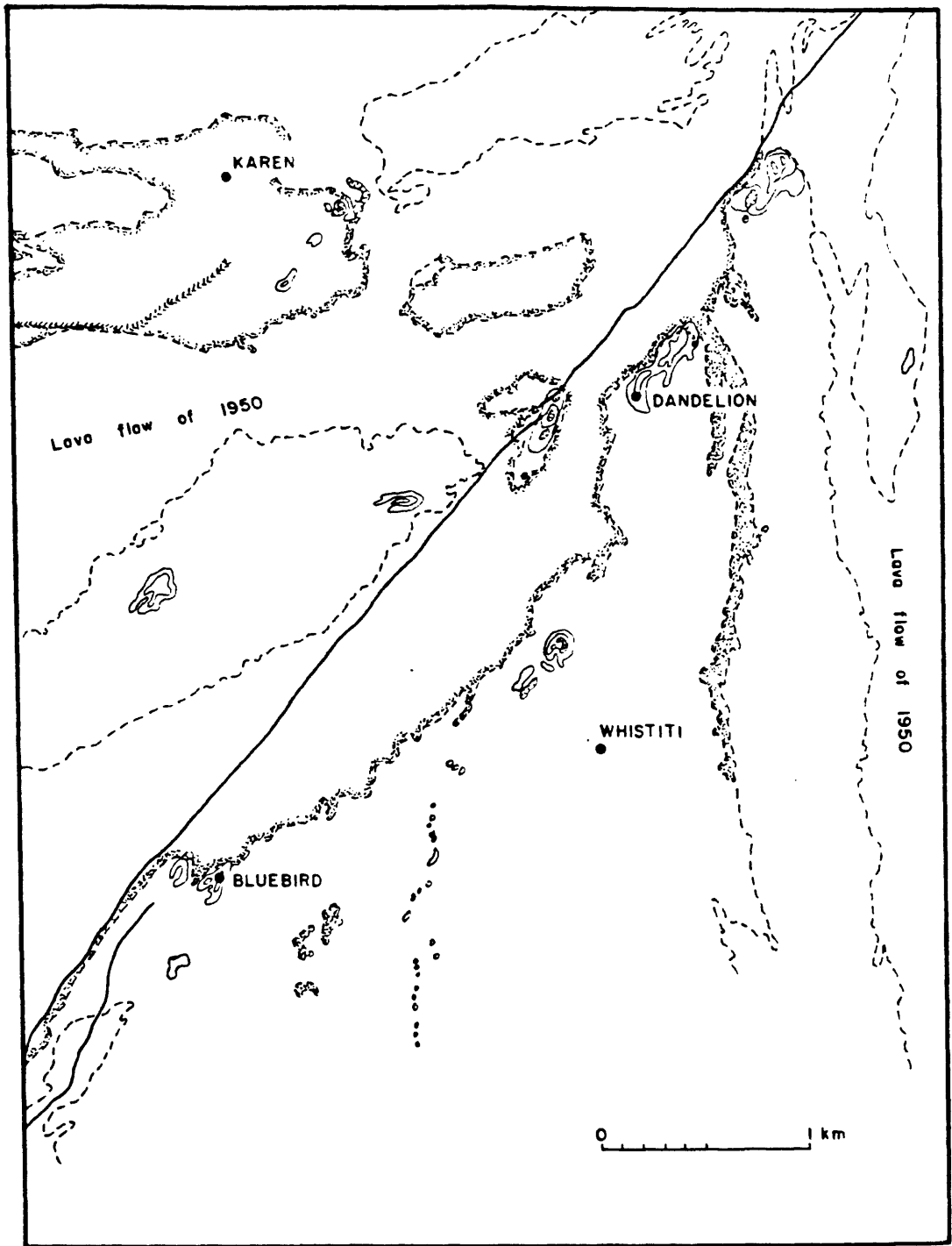
SEE ALIKA CONE QUAD SHEET

STATION NAME: WHISTITI (BM75-59) ELEVATION: 9335'
LATITUDE: 19.3395° LONGITUDE: 155.6700°

DESCRIPTION: WHISTITI is a standard USGS aluminum disk cemented in solid pahoehoe stamped "75-59".

The station is located on the east side of Mauna Loa southwest rift zone, ~600 m WNW of a very skinny flow of 1950 lava (~40 m wide at the terminus). It is on the edge of a late prehistoric pahoehoe pond marked by a large white painted spot. The helicopter lands on a flat area marked by a stone "H" about 100 m north of the station.

SEE ALIKA CONE QUAD SHEET



STATION NAME: HIONAMOA (*3) ELEVATION: 7071'
LATITUDE: 19.1995° LONGITUDE: 155.5743°

DESCRIPTION: HIONAMOA is a standard USGS brass disk set in cement stamped "HIONAMOA".

The station is located on an aa flow ~500 m east of a gravel road that goes through Kahuku Ranch on State Forestry land. From the first Kahuku Ranch sign on Highway 11, turn right onto the ranch road. Turn left just before you get to the ranch houses. Stay on that road until you get to a gate with a state forestry sign. Drive through the gate until you get to a Fish and Game cabin. Drive 4.0 miles beyond Fish & Game cabin; walk down hill along the NE side of an aa flow. The station is marked by yellow paint and also a white plastic cross and wooden trig flag, on a high ridge of aa. A 4-wheel drive vehicle is recommended to get to the station. You can also land a helicopter on an aa knob about 25 m SW of the station.

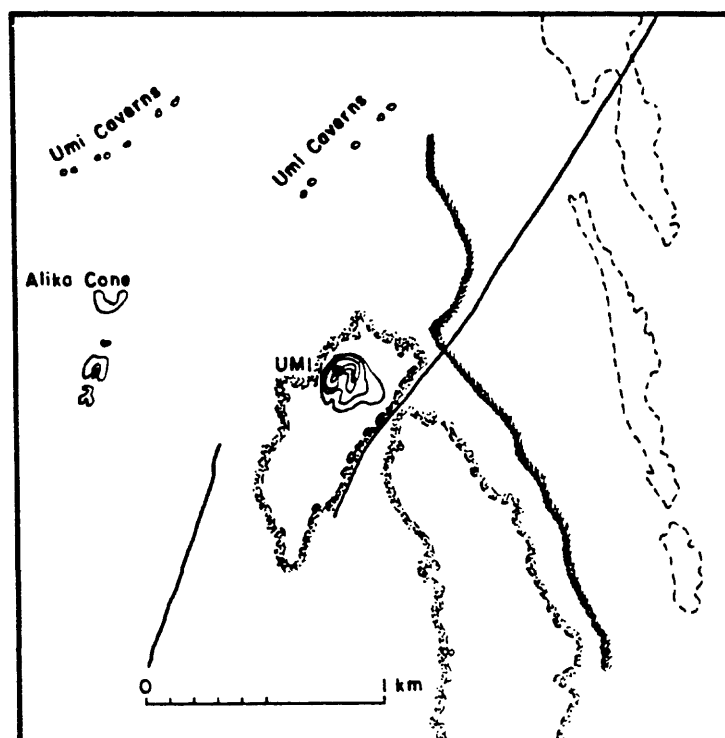
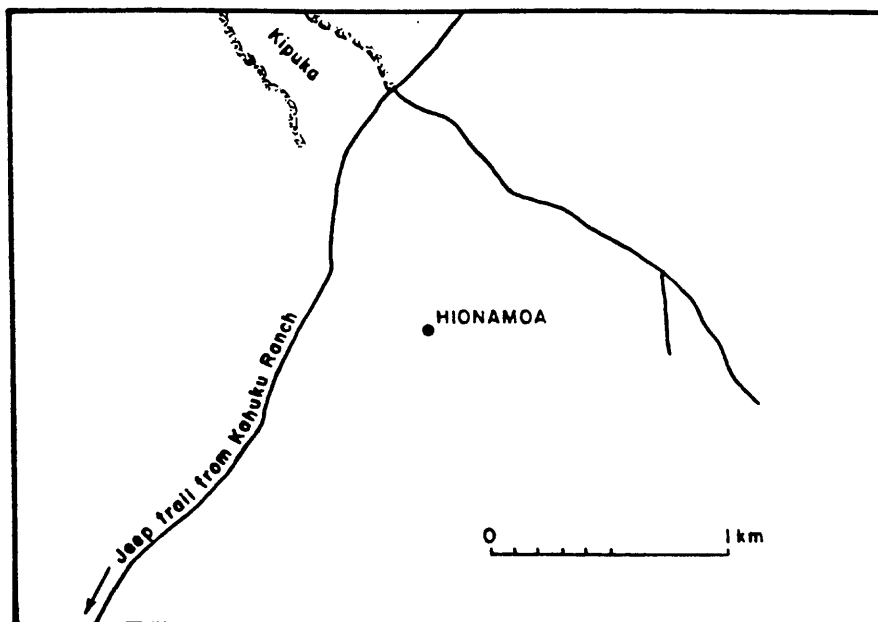
SEE KAHUKU, PUU O KEOKEO AND KEAIWA RESERVOIR QUAD SHEETS.

STATION NAME: UMI (TAG77-103) ELEVATION: 7940'
LATITUDE: 19.2733° LONGITUDE: 155.7257°

DESCRIPTION: UMI is a rebar spike set in cement with a tag stamped "77-103".

The station is located on a high point on the cone on the southwest rift zone of Mauna Loa, on the NW side of a large old spatter cone .65 mi ESE of Alika Cone; 500 m west of a large lava channel with a 90° turn in it that runs in a southeasterly direction. This channel is intersected by a large crack running in a southwesterly direction. The helicopter lands on the cone north of the station.

SEE ALIKA CONE QUAD SHEET



STATION NAME: NENE (BM77-507) ELEVATION: 8105'
LATITUDE: 19.2955' LONGITUDE: 155.6667'

DESCRIPTION: NENE is a standard USGS aluminum disk cemented in pahoehoe stamped "77-507".

The station is located on the east side of the SW rift of Mauna Loa 1 mi. west of a 1950 aa flow, ~0.3 mi east of the eastern edge of Kipuka Nene, and ~0.4 mi south of the tip of a finger of lava. It is on a large boulder along a channel in old pahoehoe. It is difficult to find without a map or a marked photo. It is marked by a white painted "t".

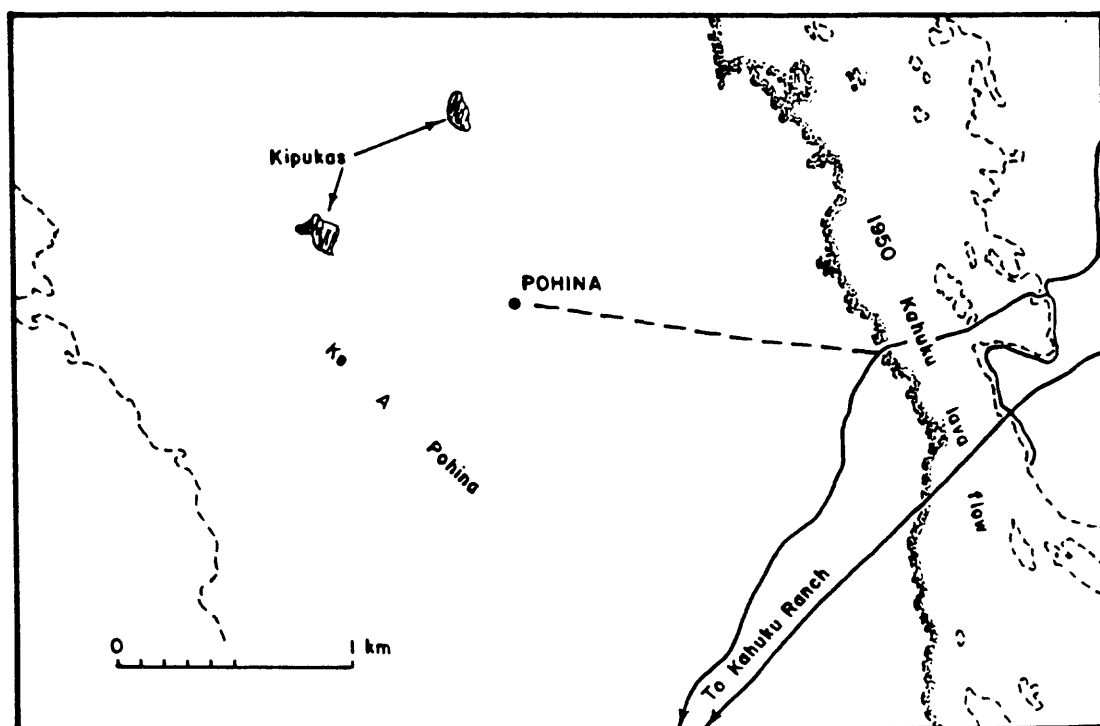
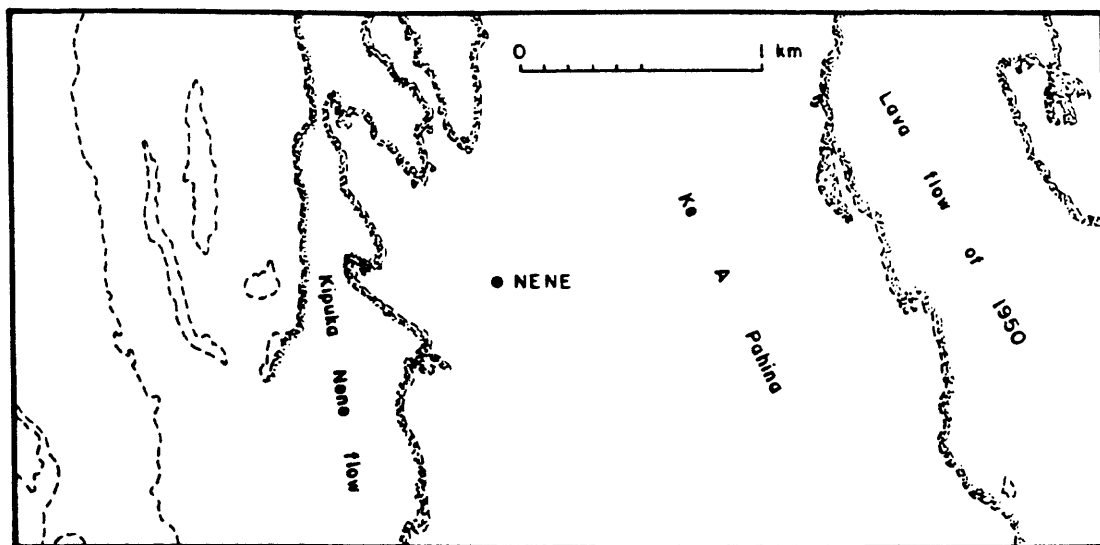
SEE ALIKA CONE QUAD SHEET

STATION NAME: POHINA (TAG76-29) (*3) ELEVATION: 6700'
LATITUDE: 19.2512' LONGITUDE: 155.6412'

DESCRIPTION: POHINA is a PK nail with a tag stamped "76-29". SEE APPENDIX B FOR SHOT DIRECTIONS.

The station is located on a high point of an old aa flow ~0.9 mi west of the 1950 Kahuku flow. There are two kipukas about 0.45 mi. to the NW and WNW of the station. The station is marked by white paint and an ahu. The ahu is visible on the skyline from the upper jeep trail that goes through Kahuku Ranch at the west end of the 1950 flow (N 80° W). This is a 45 minute walk. A good landing site, was also constructed near the station. There is another good landing area marked by white cross on a small kipuka of pahoehoe about 100 m from station in a direction of S 5.2° W.

SEE PUU O KEOKEO AND ALIKA CONE QUAD SHEETS.

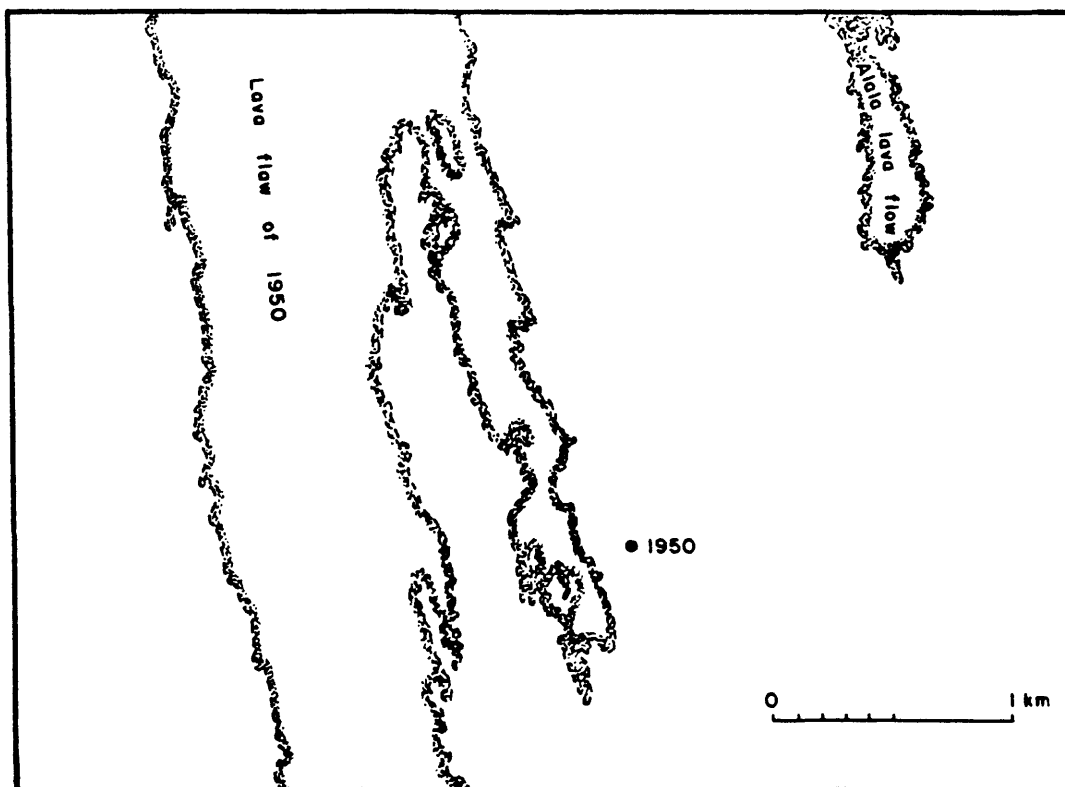


STATION NAME: 1950 (BM77-502) ELEVATION: 8620'
LATITUDE: 19.3183' LONGITUDE: 155.6392'

DESCRIPTION: 1950 is a standard USGS aluminum disk cemented in pahoehoe stamped "77-502".

The station is located on a tumulus of old pahoehoe 200-300 m east of and ~.45 mi NNE of the terminus of a large finger of 1950 aa flow that headed in the direction of Punaluu. The station is marked by a white painted cross. This is a helicopter only station.

SEE ALIKA CONE QUAD SHEET

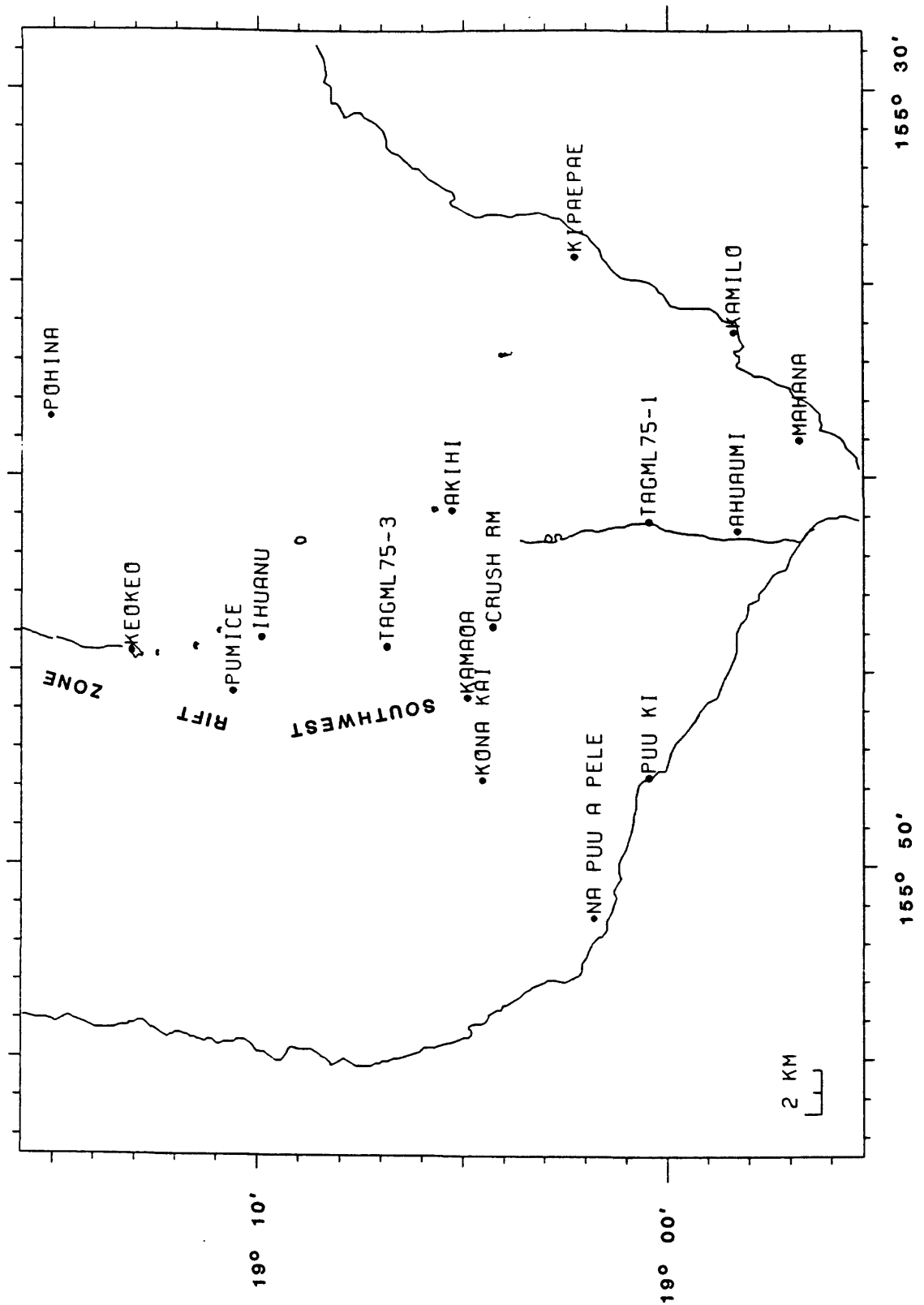


EDM STATION DESCRIPTIONS
MAUNA LOA LOWER SOUTHWEST RIFT ZONE

(ALL DESCRIPTION MAPS ARE ORIENTED IN A NORTH-SOUTH AND
EAST-WEST DIRECTION) .

(*NO.) AFTER THE STATION NAME REFERS TO APPENDIX "A" DETAILED
ACCESS INSTRUCTIONS

MAUNA LOA LOWER SOUTHWEST RIFT EDM STATIONS, JULY 1987



STATION NAME: AHUAUMI (*2) ELEVATION: 778'
LATITUDE: 19.9718' LONGITUDE: 155.6897'

DESCRIPTION: AHUAUMI is a HTS trig station. Center on a rusted-out pipe.

The station is located on Pali O Kulani on the lower SW Rift of Mauna Loa, on the top of a 6' high by 8' diameter cemented ahu. It is on the skyline and is visible from the South Point Road. From the intersection to Deleico Ranch foreman's house, drive down the South Point road to ~500 ft elevation (~ 4.5 mi). Look for a gate near some corrals. Go through the gate than head in the direction of the station by visual contact staying as much as possible on existing roads. The area may be overgrown by lantana bushes. A four-wheel drive vehicle is needed if you are driving. A helicopter can land near the station.

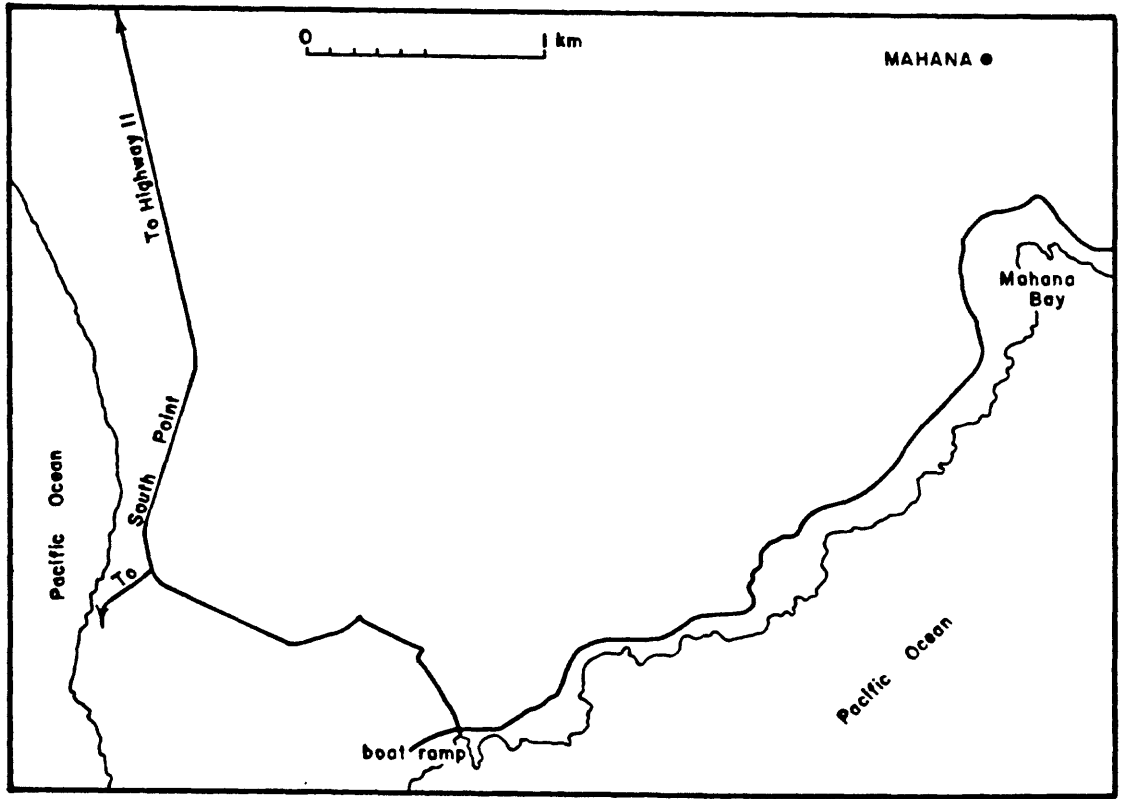
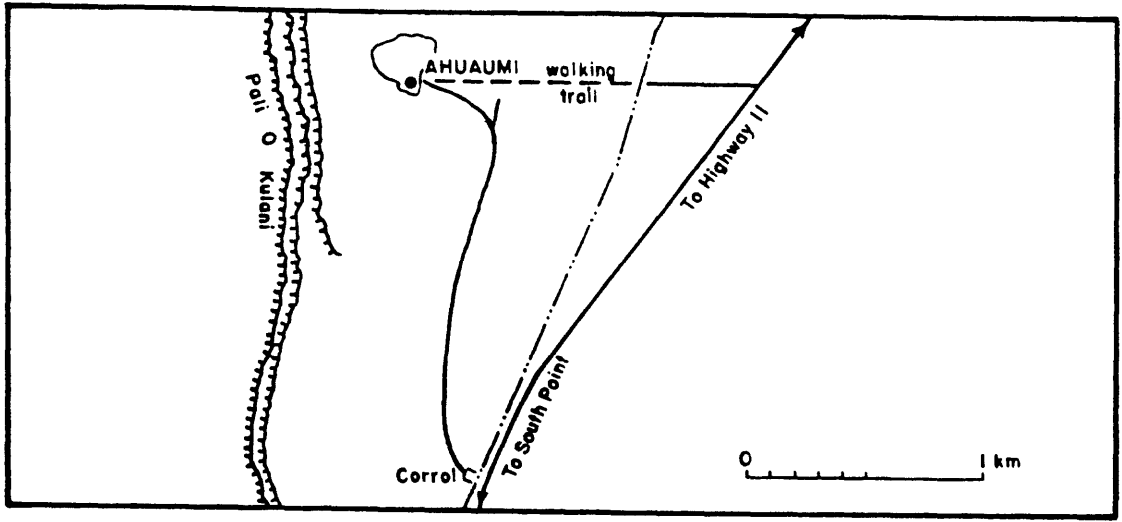
SEE KAHUKU RANCH AND KA LAE QUAD SHEETS

STATION NAME: MAHANA ELEVATION: 258'
LATITUDE: 18.9462' LONGITUDE: 155.6505'

DESCRIPTION: MAHANA is a HTS trig station. Center over the pipe.

Take the South Point Road to a fork about 0.5 mi. before the end. Turn left, following the road down to the boat ramp and a jeep road toward Mahana Bay. From Mahana Bay, drive cross-country by visual contact because there is no road to the station. The station is 0.5 mi. upslope of Greensand beach (Mahana Bay) and on the skyline. You need a 4-wheel drive vehicle or you can land near the station with a helicopter.

SEE KAHUKU RANCH AND KA LAE QUAD SHEETS



STATION NAME: AKIHI AND TAGML75-2 (*3) ELEVATION: 2892'
LATITUDE: 19.0943° LONGITUDE: 155.6811°

DESCRIPTION: AKIHI is a HTS trig station located north of Highway 11 in Kahuku Ranch. Center on the middle of the trig flag pipe cemented in a triangular shaped concrete pad just about flush to the surrounding ground.

From Highway 11, turn right at the first Kahuku Ranch sign as you head in a Kona direction from Waiohino. Drive up the road until you get to the residence area then take the road that heads to the left through a big iron gate for about mile. Look for a gate on the right side of the road with a dirt road that heads up the pali. Drive 0.5 mi. to a point where the road is blocked by a gate; turn left, following the road north along a fence ~0.4 mi. until you are able to see Puu Akihi to the left. A grassy road then leads you NW to the station on the highest point.

TAGML75-2, is located on pahoeohoe 3 m north of the cement pad, and is used for some shots.

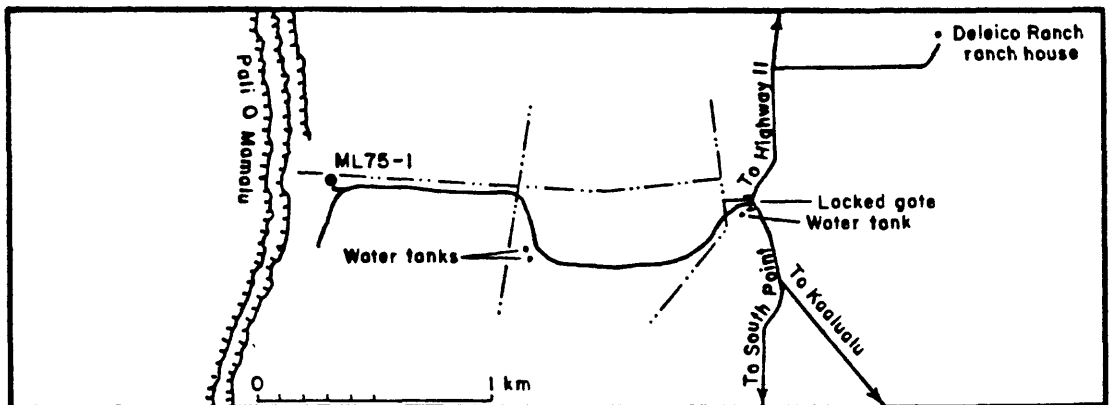
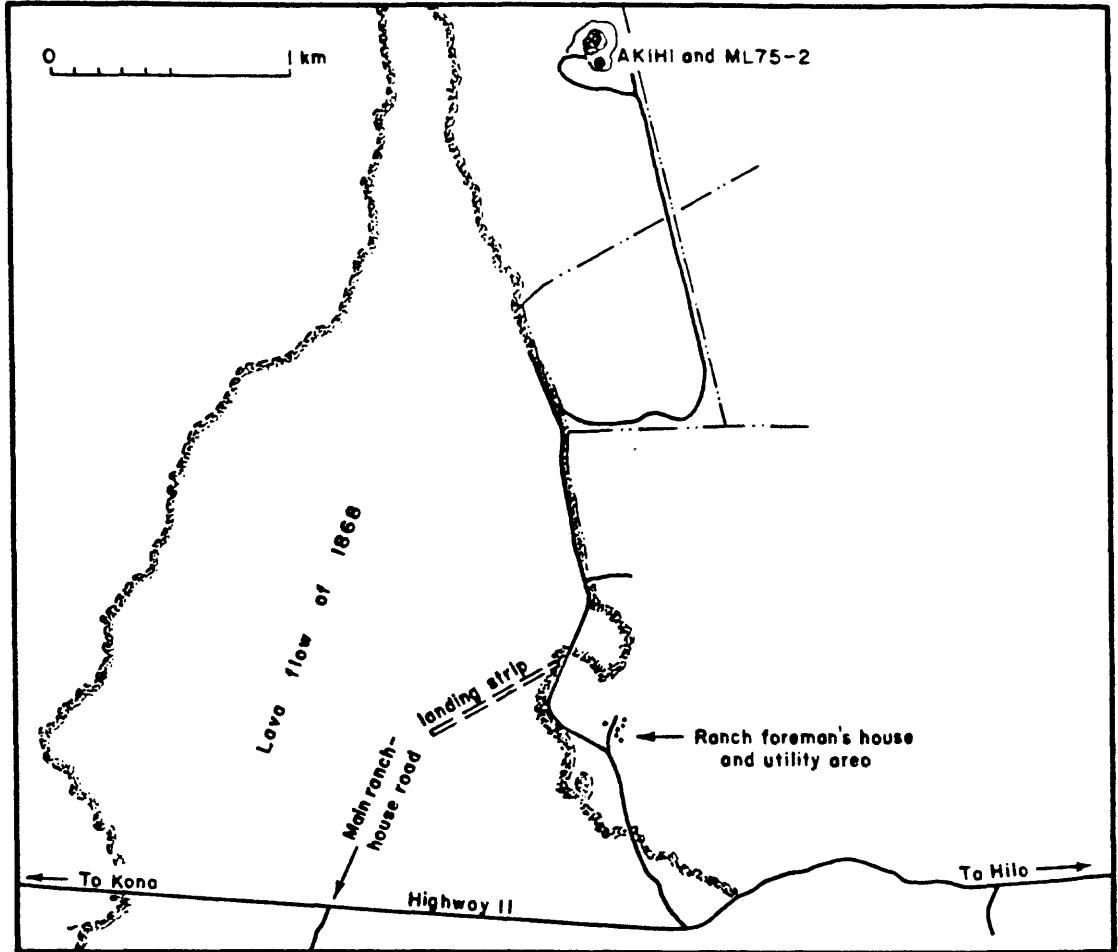
SEE KAHUKU RANCH QUAD SHEET

STATION NAME: TAGML75-1 (KAHUKU PALI) (*2) ELEVATION: 1205'
LATITUDE: 19.0080° LONGITUDE: 155.6858°

DESCRIPTION: TAGML75-1 is a PK nail and tag stamped "ML75-1".

From the road intersection to the foreman's house on the South Point Road, drive to a point where the road turns abruptly 60° to the left (0.4 mi). There is a locked aluminum gate; go through the gate for 100 m to a latched wooden gate. After passing this gate, follow tracks to the right, past the corral, to the fence, then left (west) along fenceline until two water tanks (one metal, one wood) are visible on a low rise to the WSW. Follow the tracks to these tanks then turn abruptly NNW to a fence intersection 0.3 mi. away, where you go through the gate which crosses the N-S fence (not the gate through the E-W fence). Proceed along the fence for 0.4 mi., past the shallow gulch. An ahu is about 100 m beyond gulch, on pahoeohoe bedrock on a rise 150 m from the Pali edge and 30 m south of E-W fence. You need a 4-wheel drive vehicle or a helicopter can land near the station.

SEE KAHUKU AND KA LAE QUAD SHEETS



STATION NAME: CRUSH RM ELEVATION: 1989'
LATITUDE: 19.0713° LONGITUDE: 155.7310°

DESCRIPTION: CRUSH RM is a reference mark labelled "Kahuku SE base 3 1948".

The station is located on 1887 aa lava flow, mauka of Hwy 11, 2.9 mi. west of the Kahuku Ranch road. Climb the bank at the end of the guardrail on southeast end of first deep roadcut beyond milepost 74 (about 100 m). The original benchmark was destroyed and replaced by a state bronze benchmark (labeled "survey mark") and is at the base of the power pole 2 m from the bank. The reference mark (referred to old state benchmark), is located 25 m N 50° W of the new state benchmark and set in a concrete post on the top of a high point left by the dozers. It is used because the new benchmark does not have line of sight to KAMAOA EDM station (blocked by power pole). Set up on the tick mark crossing the reference arrow.

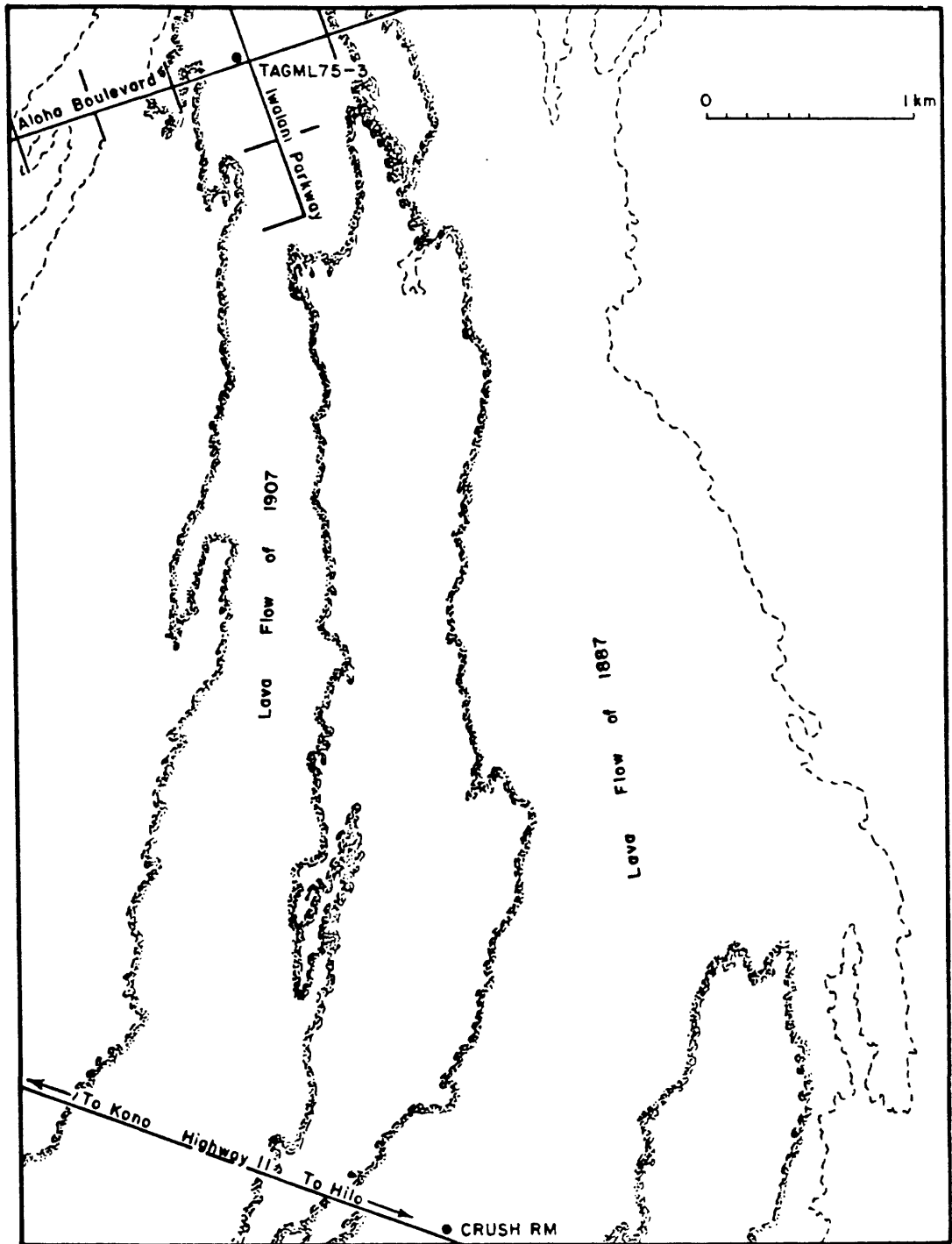
SEE KAHUKU RANCH QUAD SHEET

STATION NAME: TAGML75-3 (1907) ELEVATION: 3725'
LATITUDE: 19.1145° LONGITUDE: 155.7396°

DESCRIPTION: TAGML75-3 is a PK nail with a tag stamped "ML75-3".

Traveling west on Highway 11, take King Kamehameha Blvd into Ocean View Estates. Go 2.0 miles to Aloha Drive; then 2.2 miles; past Pineapple Drive to a high ridge about 75 m to the next intersection, which is Iwalani Drive. The nail is on the mauka side of the road where a yellow painted arrow points towards the station. The station is on a AA hummock along a lava channel, 15 m laterally and 5 m vertically above the road.

SEE POHUE BAY AND KAHUKU RANCH QUAD SHEETS



STATION NAME: IHUANU (TAG76-36) (*3) ELEVATION: 5303'
LATITUDE: 19.1653' LONGITUDE: 155.7357'

DESCRIPTION: IHUANU is a rebar with a tag stamped "76-36".

From Highway 11, turn right on King Kamehameha Boulevard until you arrive at Lei Parkway. Turn right on Lei and drive to the end of the road. Hike up the west side of a kipuka to an old cinder cone (about 30 minutes). The station is on the high point at the north end of the cinder cone. An ahu and an ohia pole near the station helps in locating it. You can also easily land a helicopter near the station.

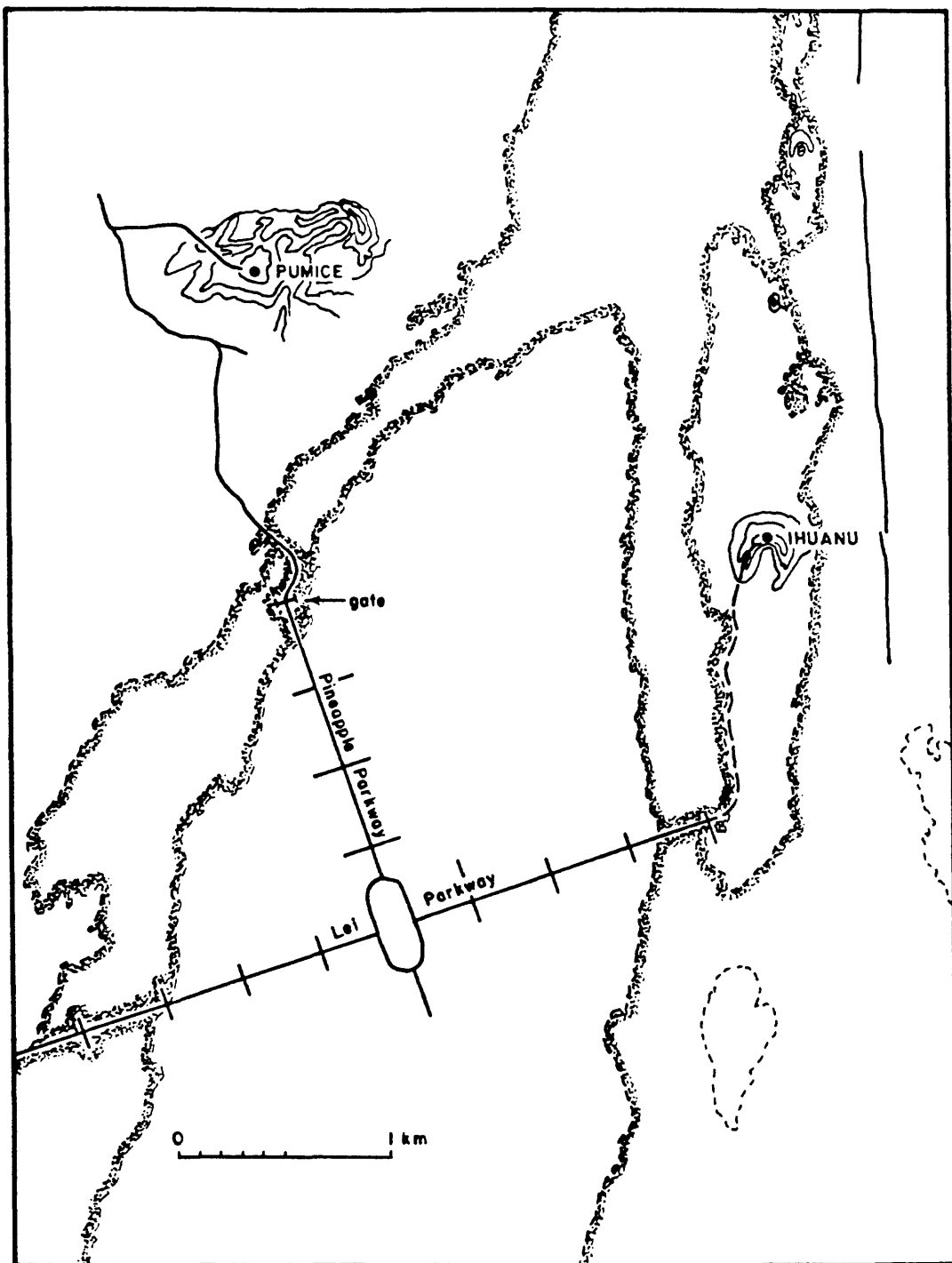
SEE POHUE BAY, PAPA, PUU O KEOKEO QUAD SHEETS

STATION NAME: PUMICE (TAG76-38) (*3) ELEVATION: 5420'
LATITUDE: 19.1767' LONGITUDE: 155.7588'

DESCRIPTION: PUMICE is a rebar with a tag stamped "76-38".

The station is located on an old cinder cone on Mauna Loa southwest rift zone called "Hapaimanu" on old maps. Drive to the end of Pineapple Drive in Oceanview Estates then through a locked gate for about 1 mi. to a road intersection with a cinder pit on the left. Turn left about 0.5 mi. to where tracks head toward back side of the cone. Head for the saddle, then for the point with an ahu. The station is about 20 m makai of the ahu. You need a 4-wheel drive vehicle or can land a helicopter next to the station.

SEE PAPA QUAD SHEET



STATION NAME: KAMILO ELEVATION: 15'
LATITUDE: 18.9732° LONGITUDE: 155.6043°

DESCRIPTION: KAMILO is a HTS trig station with a standard brass disk. The station is a 5'x 5'x 4' concrete pier with the words Lae O Kamilo chiseled in it.

The station is located along the coast ~6.5 mi (straight-line distance) NE of Ka Lae (South Point). From Highway 11, drive down the South Point road until you get to the coast. Head toward the left (easterly) on a dirt road that runs parallel to the coast until you come to a grove of Kiawe trees. Drive through the kiawe trees that lines the shore of Kaalualu Bay until you get to the road on an aa flow. Follow the road about a mile. The station is 50 m left of the road. A 4-wheel drive vehicle is recommended. A helicopter can also land close to the station.

SEE KAHUKU, NAALEHU, AND KA LAE QUAD SHEETS

STATION NAME: KAMAOA ELEVATION: 2005'
LATITUDE: 19.0819° LONGITUDE: 155.7616°

DESCRIPTION: KAMAOA is a HTS trig station. Pull out the trig flag and center on the pipe. "Puu o Kamaoa" is chiseled in the cement.

As you drive west along Hwy 11 turn left on Kohala Blvd located 0.2 miles from South Point restaurant. Immediately turn right on "Easement Road" running parallel to Hwy 11. Drive west 80 m to a trig flag on a concrete pad between easement road and the highway. The shot to PUU KI may be blocked by some brush so machetes are needed. Any type of vehicle can be used. A helicopter can land next to the station.

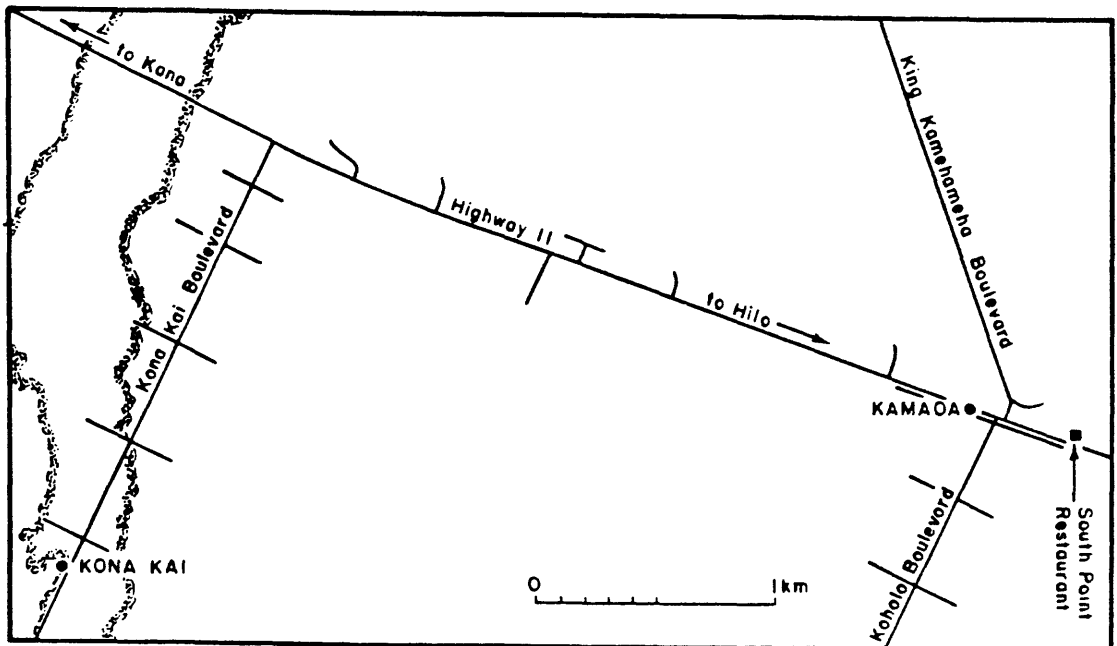
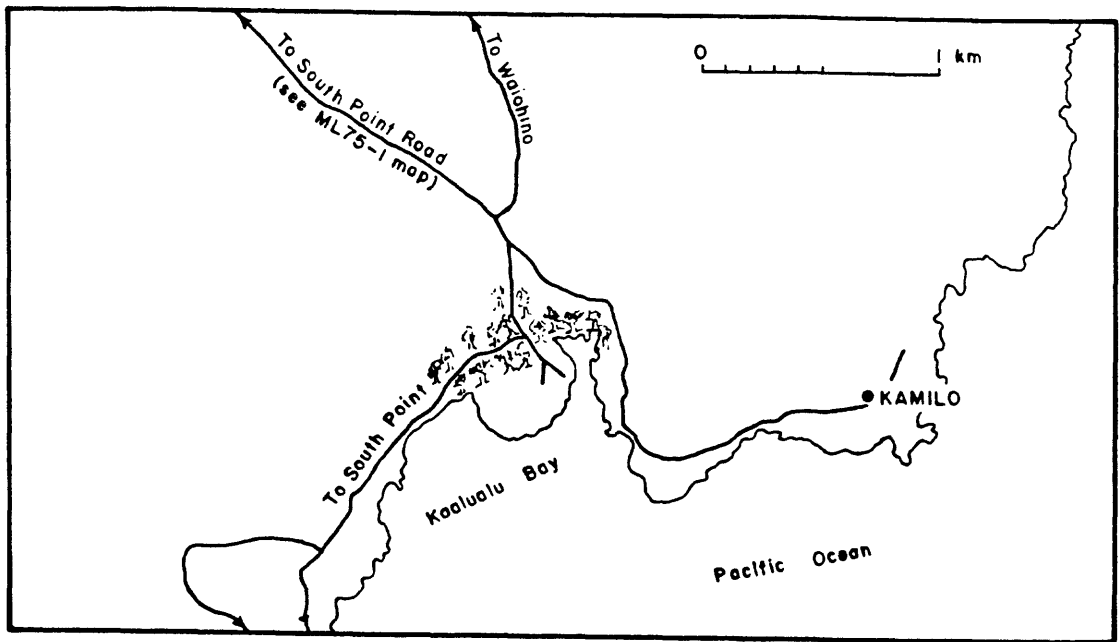
SEE POHUE BAY QUAD SHEET.

STATION NAME: KONA KAI (TAG75-ZZ) ELEVATION: 1540'
LATITUDE: 19.0757° LONGITUDE: 155.7972°

DESCRIPTION: KONA KAI is a PK nail with a tag stamped "75-ZZ".

The station is located on the lower SW rift zone of Mauna Loa. To get to the station, drive ~2.02 mi past the intersection of King Kamehameha Boulevard on Hwy 11 to Kona Kai Boulevard located on the makai side of the highway at a water tank. Go 1.2 mi. down on Kona Kai road, about 125 m past the Hibiscus Drive intersection. The Station is in aa, 20 m west of the road and south of a pull-out marked by an ahu. Any type of vehicle may be used. A helicopter can land near the station. NAIL MAY BE LOOSE AND NEEDS TO BE REPLACED BY A DISC. ALSO THE GATE ACROSS KONA KAI BLVD. IS SOMETIMES LOCKED BY RESIDENTS.

SEE POHUE BAY QUAD SHEET



STATION NAME: KEOKEO (TAG77-104) ELEVATION: 6890'
LATITUDE: 19.2180° LONGITUDE: 155.7418°

DESCRIPTION: KEOKEO is a spike driven in cinder and reinforced with cement, with a tag stamped "77-104".

The station is located on a prominent cone on the southwest rift of Mauna Loa about 7.0 km north of top of Oceanview Subdivision. It is located on the high point of the eastern cone of Puu O Keokeo. You can get to the station by helicopter only. You can land near the station marked by a white painted ahu.

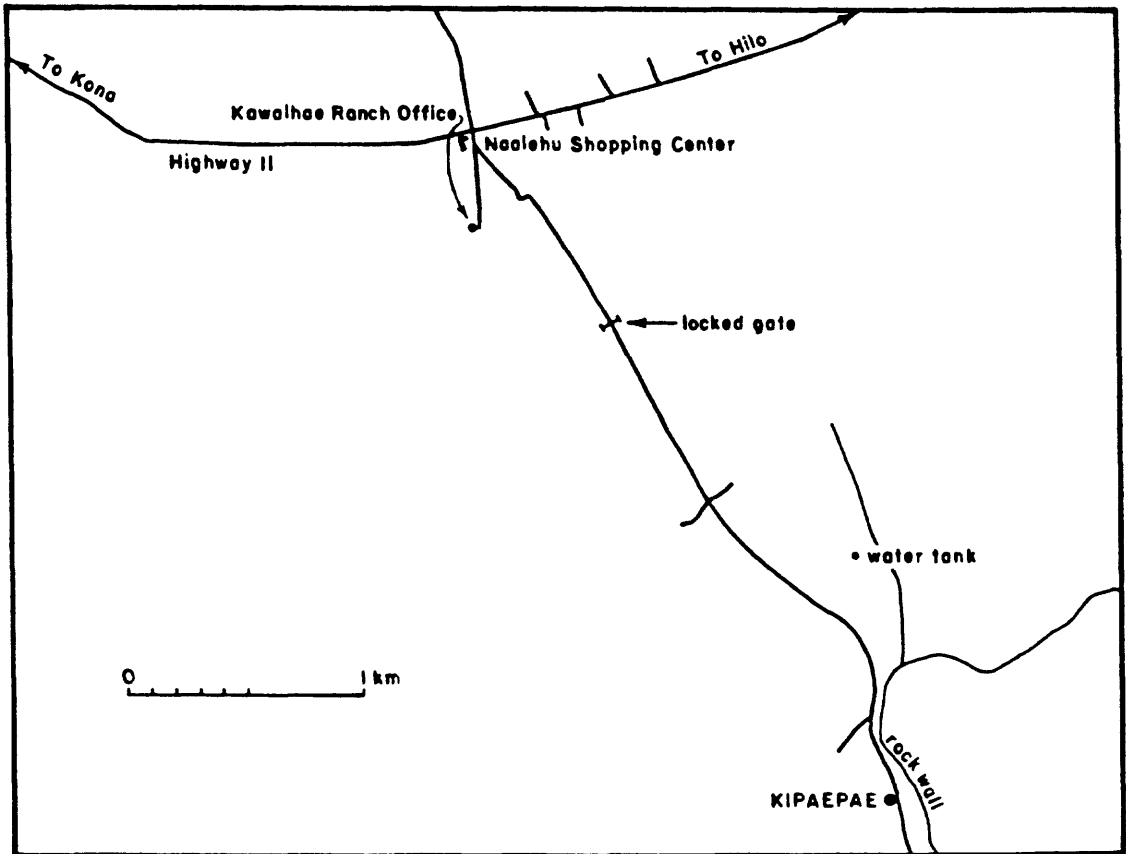
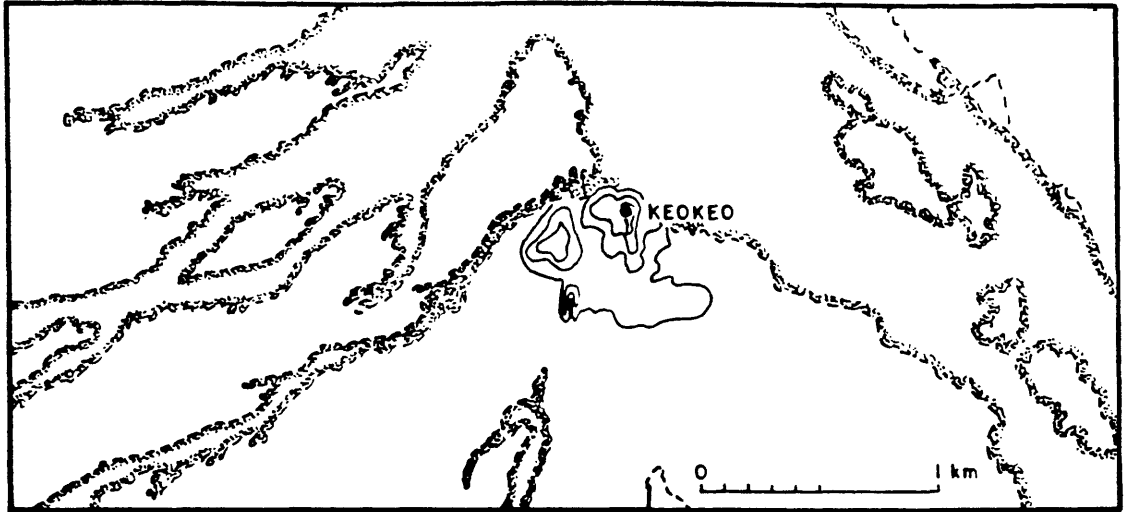
SEE PUU O KEOKEO QUAD SHEET

STATION NAME: KIPAEPAE (*5) ELEVATION: 465'
LATITUDE: 19.0380° LONGITUDE: 155.5723°

DESCRIPTION: KIPAEPAE is a HTS trig station. The trig flag could not be removed during the last occupation and therefore the station could not be measured. It is recommended that the pipe be cut and a new sleeve be put on. A new benchmark was installed nearby as a temporary replacement.

From the intersection of Hwy 11 and the road just before the shopping center turn makai and drive about 100 m to a fork in the road. Take the fork to the left onto an unpaved road for 0.6 mi. to a locked gate. Continue for 0.3 mi to a corral and go through a unlocked gate following a faint jeep trail that passes by a watertank at ~0.4 mi. Continue past the tanks bearing to the right for ~0.5 mi. Take a road that bears to the left towards a rockwall enclosure until you see a trig flag on a 2 m high stone platform. Pull out the trig flag and center on the middle of the pipe. A 4-wheel drive vehicle is needed. A helicopter can land on the road next to the station.

SEE NAALEHU QUAD SHEET



STATION NAME: NA PUU A PELE ELEVATION: 245'
LATITUDE: 19.0302° LONGITUDE: 155.8560°

DESCRIPTION: NA PUU A PELE is a standard Hawaiian Government Survey (HSG) brass disk stamped "NA PUU A PELE 1948".

The station is located on a old red-orange littoral cone on the southwest coast of the island. Going west on HWY 11, take a gravel road to left 0.3 mi. beyond Iolani Lane intersection. Go about 5.5 mi., turn right at the fork in road, before reaching the bay and go about 0.3 mi. Leave the car and hike 1 mi. to the west along the coastal trail. The benchmark is on most westerly point of cone.

An alternate route is to drive 0.6 mi past Iolani Lane to a 4-wheel drive road on the left of Hwy 11. Drive ~ 6.0 mi down the road and turn left at the intersection. Drive another 0.9 mi to a second intersection staying left until you get to the end of the road. Walk ~0.4 mi in a NE direction to the cone. This is less walking but a longer drive. Either way, a 4-wheel drive vehicle is recommended. There is a good helicopter landing area on top of the cone.

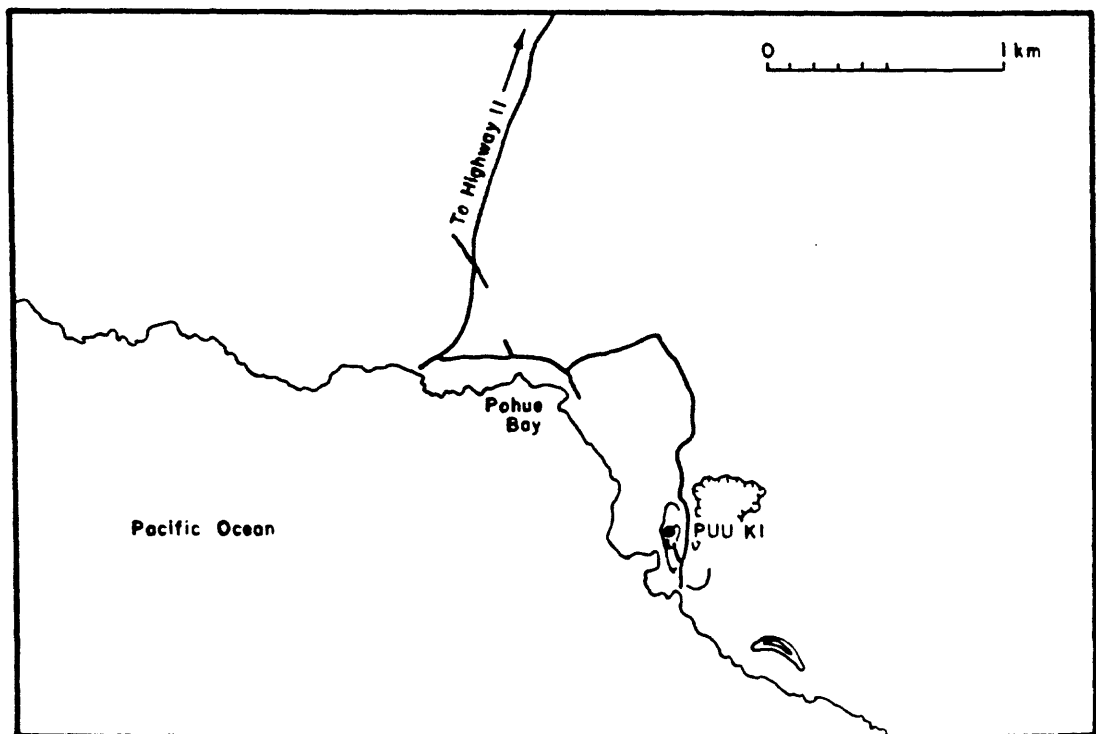
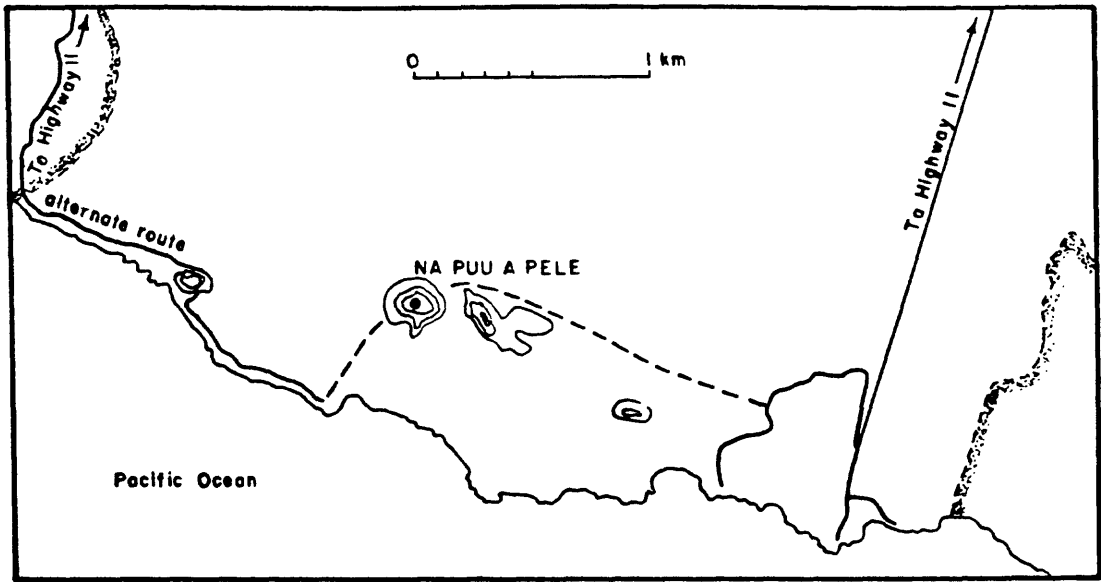
SEE POHUE BAY QUAD SHEETS

STATION NAME: PUU KI (*3) ELEVATION: 145'
LATITUDE: 19.0078° LONGITUDE: 155.7956°

DESCRIPTION: PUU KI is a standard brass Hawaiian Government Survey (HGS) disk stamped "PUU KI HGS 1914 1967" set in cement.

Driving west on Hwy 11, go 0.2 miles pass the South Point Restaurant than turn left onto Kohala Blvd. Go about 3.1 mi. and turn right at the intersection of Kohala Blvd. and Lanikai Drive. Drive 0.7 miles or to the third intersection; turn left on Maikai Blvd. and drive onto a gravel road. You need a key to open the chain or gate. This road takes you to Pohue Bay. From the end of the road to Pohue Bay, follow the jeep track about 1/2 mi. east (left) into a saddle between two cinder cones, then up the steep slope of the cone to the left, which takes you to the station. The benchmark is near a pile of lumber from a collapsed trig marker and may be covered by rocks. The station is a HGS BM set in the original hole drilled in 1914. You need a 4-wheel drive vehicle or you can land a helicopter near the station.

SEE POHUE BAY QUAD SHEET



APPENDIX A

DIRECTIONS FOR OBTAINING PERMISSION, ACCESS, AND KEYS TO STATIONS

- *1. PERMISSION FOR ACCESS INVOLVING FLYING THROUGH , LANDING IN, OR DRIVING TO A STATION LOCATED IN POHAKULOA TRAINING AREA (PTA) REQUIRES COORDINATION FROM THE CAMP COMMANDER AND RANGE CONTROL. PTA CAMP IS LOCATED ABOUT 36 MI. FROM HILO ON HIGHWAY 200 (SADDLE ROAD) ON THE MAUKA SIDE OF THE HIGHWAY. BASE CAMP HEADQUARTERS PH. 969-2400
RANGE CONTROL PH. 969-2410

STATIONS INVOLVED: AHUMOA, OMAOKOILI, PUU KOLI, CRACK, ANAHULU, .IKAKA, BRUSH, LOWER, .KAOHE, . HVO165HUALALAI, MAUNAKEA, HVO94MLOA, . PUU O UO, MLO, ROAD, AND VANCE.

- *2 TO GET PERMISSION FOR ACCESS AND THE KEYS TO THE VARIOUS GATES, CONTACT DICK SCHULTZ, THE FOREMAN OF DELEICO RANCH. PH 929-7378 OR 929-9777.

FROM HWY 11, DRIVE DOWN THE SOUTH POINT ROAD 3.5 MI., PAST THE 1868 FLOW, TO A SMALL PAVED ROAD WHICH LEADS TO THE LEFT; PAST A TREE-SURROUNDED HOUSE. THE DELEICO RANCH FOREMAN'S HOUSE IS LOCATED AT THE END OF THIS ROAD.

STATIONS INVOLVED: AHUAUMI, ML75-1 (KAHUKU)

- *3 CONTACT CARL BREDHOFF JR. TO GET PERMISSION FOR ACCESS AND THE KEYS TO THE VARIOUS GATES. PHONE 929-7413.

DRIVE WEST ON HWY 11 UNTIL YOU GET TO THE SECOND KAHUKU RANCH SIGN LOCATED MAKAI OF THE HIGHWAY. THE HOUSE IS THE LARGEST ONE LOCATED ON THE RIGHT OPPOSITE A CORRAL AT THE END OF THE ROAD.

STATIONS INVOLVED: AKIHI, PUU KI, PUMICE, IHUANU, POHINA, HIONAMOA.

- *4 TO GET PERMISSION AND KEYS FOR ACCESS TO ALL STATIONS ON HUALALAI, CALL THE LAND DIVISION OF THE BISHOP ESTATE OFFICE IN THE KEAUAU SHOPPING CENTER. PH. 322-6088
ADDRESS: 78-6831 ALII DRIVE, SUITE 232

FROM HVO, DRIVE OUT TO HIGHWAY 11 AND TURN LEFT AND DRIVE ~90 MI. TO KAINALIU TO THE INTERSECTION OF HIGHWAY 11 AND 180. TAKE THE ROAD TO THE LEFT (HIGHWAY 11) AND DRIVE ANOTHER 2.0 MI. TO THE INTERSECTION OF KAMEHAMEHA 111 ROAD (HIGHWAY 185) LOCATED MAKAI OF THE HIGHWAY. DRIVE ABOUT 2.0 MILES TO THE BACK ENTRANCE OF THE SHOPPING CENTER LOCATED ON THE RIGHT; TURN LEFT AS YOU APPROACH THE BUILDINGS; THE OFFICE IS LOCATED ON THE SECOND FLOOR OF A SECTION THAT PROTRUDES OUT IN THE REAR OF THE SHOPPING

CENTER. THE ENTRANCE IS LOCATED ON THE LEFT SIDE OF THE BUILDING AS YOU FACE MAKAI.

STATIONS INVOLVED: IKAACA, HVO164 (AIRPORT), JUDD TRAIL, KEALOHA, HVO165HUALALAI (CABIN), NEW CABIN, NOHOLIO, MALEKULE,
KAUPULEHU1948RESET

*5 YOU NEED PERMISSION AND A KEY FROM KAWAIHAE RANCH.

FROM HVO, DRIVE TO HIGHWAY 11 AND TURN LEFT. DRIVE ~36 MILES TO NAALEHU. TURN LEFT ON THE ROAD JUST BEFORE THE SHOPPING CENTER. DRIVE ABOUT 100 M AND TAKE THE FORK TO THE RIGHT TO THE OFFICE. Ph. 929-7411

STATION INVOLVED: KIPAEPAE

*6 CALL KAPAPALA RANCH FOR ACCESS PERMISSION.

YOU NEED A R3 KEY FOR THE GATES. MAKE SURE ALL THE GATES THAT YOU FIND CLOSED ARE CLOSED PROPERLY WHEN YOU PASS THROUGH. IF THEY'RE OPEN, LEAVE THEM THAT WAY. PH. 961-8403 RANCH
PH. 961-4781 OFFICE

STATIONS INVOLVED: KEAKAPULU, FLATS, OHAIKEA, OHAIKEA TAG, COW PASTURE

*7 CALL KA'U AGRIBUSINSS CO. INC. FOR ACCESS PERMISSION.
PH. 928-8311

FROM HVO, DRIVE TO HIGHWAY 11, AND TURN LEFT. DRIVE ~24 MI. TO THE FIRST ENTRANCE INTO PAHALA. TURN RIGHT AND DRIVE UP THE ROAD TO A STOP SIGN. TURN LEFT AT THE STOP SIGN, GOING PAST A SMALL SHOPPING COMPLEX UNTIL YOU GET TO A TRIANGLE IN THE ROAD. THE OFFICE BUILDING IS LOCATED ON THE RIGHT SIDE OF THE TRIANGULAR INTERSECTION THERE ARE SOME LARGE ROUND GEARS IN THE FRONT YARD MARKING THE BUILDING.

STATIONS INVOLVED: KAIHOLENA, KAIHOLENA MAUKA, MAKANAU2, HAAO, KAHAA2

*8 IF YOU ARE PLANNING TO STAY AT THE MAUNA LOA WEATHER OBSERVATORY OR IF THERE ARE PLANS FOR USING A SITE NEAR THE OBSERVATORY AS A STAGING AREA FOR A HELICOPTER, YOU NEED TO CALL 961-3788.

THEIR OFFICE IS LOCATED IN THE FEDERAL BLDG. (DOWNTOWN POST OFFICE), RM. 202, IN THE LEFT WING ON THE SECOND FLOOR, AS YOU FACE THE FRONT. YOU NEED TO GET A KEY TO THE SLEEPING QUARTERS BUILDING FROM THEM.

- *9 TO GET TO KULANI CONE, YOU NEED TO CALL THE KULANI CORRECTIONAL FACILITY TO GET PERMISSION AND A KEY TO DRIVE OR LAND ON THE CONE.

FROM HVO, DRIVE TO HIGHWAY 11 AND TURN RIGHT. GO ~16 0 MI. TO MT VIEW, ABOUT 0.25 MI. PAST THE SCHOOL TO THE INTERSECTION OF NORTH KULANI ROAD. TURN LEFT AND DRIVE ~4.0 MI. TO THE INTERSECTION OF STAINBACK HIGHWAY. TURN LEFT AND DRIVE ~12.0 MI. TO THE CAMP. PH. 935-3758

STATION INVOLVED: KULANI CONE

- *10 TO GET PERMISSION FOR ACCESS CALL MAUNA KEA AGRIBUSINESS CO INC. PH. 964-1025

STATION INVOLVED: KAIWIKI NEW

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