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Geophysical measurements in the Beaver Basin, west-central Utah;

Part 1--Slingram, magnetic, and self-potential profiles

by

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Summary

This report consists of figures showing profile locations (fig. 1, table 1) in the Beaver Basin, west-central Utah, and ground geophysical data collected in September 1980 along these traverses (figs. 2-11). These data consist of slingram electromagnetic (real and imaginary components at 222, 444, 888, 1777, and 3555 Hz), ground magnetic, and self-potential measurements collected at 200-foot (61-m) intervals along about 8.8 miles (14.2 km) of survey line. Table 2 lists equipment used. The report contains data only, and no interpretations of the data are included.

Table 1.—Profile locations. All station locations are in feet from station 0 with stations to the west (or northwest for Pass Road) taken negative, and stations to the east (or southeast) taken positive. Stations were located at 200-foot (61-m) intervals along the profile lines.

| Profile | Location | Purpose |
|-----------------------|--|--|
| Airport Road | On east-west county road 1.1 mi (1.77 km) south of Greenville. Eastward extension of this road passes just north of Beaver Airport. Station 0 is in a stream bed 1.05 mi (1.69 km) west of intersection with a county road going north into Greenville and 3.0 miles (4.83 km) east of intersection with Highway 21. Power lines cross the profile at station +200. | Crosses the extension of an anticlinal structure mapped by Machette and Steven, 1980. |
| Airport Road 200S | Parallel to the Airport Road profile but 200 ft (61 m) south of it. All stations on this profile are 200 ft (61 m) due south of the correspondingly numbered station on the Airport Road profile. An IP survey was made on this line. | To investigate north-south continuity of electromagnetic features seen on Airport Road profile; to have EM data along the line of the IP survey. |
| Airport Road 400S | Parallel to the Airport Road profile but 400 ft (122 m) south of it. All stations on this profile are 400 ft (122 m) due south of the correspondingly numbered station on the Airport Road profile. | To investigate north-south continuity of electromagnetic features seen on the Airport Road profile. |
| Airport Road South | Parallel to an east-west trending, 1.6 mi (2.6 km) long segment of Airport Road which is offset 0.25 mi (0.4 km) south of those portions of Airport Road lying both to the east and west. Because this segment of county road has minor bends where it crosses a stream, the profile was located 400 ft (122 m) south of the road, rather than precisely along it. Station 0 is along the east edge of the county road going north into Greenville. Station -5000 on this profile is located approximately 1600 ft (488 m) due south of Station 0 on the Airport Road profile. | To investigate for possible extensions of a uranium trend proposed by Miller and others (1980). |

Table 1.—Profile locations (continued).

| Profile | Location | Purpose |
|-----------|--|---|
| Pass Road | <p>Along the county road locally called "The Pass Road" which extends to the northwest into the Mineral Mountains from Highway 21. Station 0 is at the "Yield" sign in the SE quadrant of the crossroads with the county road which goes SE into Adamsville. Stations are on the SW border of the road. Profile trends N53W, and continues this trend for several stations at its southeast end where the Pass Road proper bends due east.</p> | <p>To cross Indian Creek, a drainage which Steven and others (1980), and Tucker and others (1980) report may be carrying uranium leached from the Mt. Belknap caldera and other volcanic sources in the Tushar Range.</p> |

Table 2.—Equipment used. Manufacturers and model numbers of equipment are given for descriptive purposes; this citation does not imply endorsement by the U.S. Geological Survey.

| Technique | Equipment | Comments |
|-------------|--|---|
| Slingram EM | Maxmin II gear, manufactured by Apex Perametrics, Ltd., Toronto, Canada | Data were corrected for tilt angle; other profiles were over such flat topography that no correction was judged necessary. |
| Magnetics | Rover magnetometer was a Geometrics Model G826A. Base magnetometer was a Geometrics Model 806 used with home-built timing and strip-chart recording components. Both magnetometers were switched to 1 nT sensitivity scale (1 nT = 1 gamma). | Base magnetometer was located at station +4300 on Airport Road south. Reported field is rover value minus base value plus a d.c. shift of 53277 nT. (This d.c. value represents the average field at the base station.) |
| SP | Electrodes used were home-built, with a silver-silver chloride inner cell and a cupric sulfate outer cell for greater surface contact. Potentials were measured using a Fluke Model 8020A digital volt meter. | Potentials were measured at 200 ft intervals with respect to a remote fixed electrode. |
| Graphics | Figures 2-11 were produced in the field using a Hewlett-Packard Model 2647A graphics terminal and a Hewlett-Packard Model 9872B x-y plotter. | The programs used were written in BASIC by Hamdy Sadek and Vince Flanigan. |

References Cited

- Machette, M. N., and Steven, T. A., 1980, Preliminary geologic map of the northwest-quarter of the Beaver quadrangle, Beaver County, Utah: U.S. Geological Survey Open-File Report 80-1270.
- Miller, W. R., McHugh, J. B., and Ficklin, W. H., 1980, Possible uranium mineralization, Beaver Basin, Utah: U.S. Geological Survey Open-File Report 80-508, 35 p.
- Steven, T. A., Cunningham, C. G., and Machette, M. N., 1980, Integrated uranium systems in the Marysvale volcanic field, west-central Utah: U.S. Geological Survey Open-File Report 80-524, 39 p.
- Tucker, R. E., Miller, W. R., and McHugh, J. B., 1980, Geochemical results from a natural waters study in the Mount Belknap caldera and vicinity, Utah: U.S. Geological Survey Open-File Report 80-1051, 53 p.

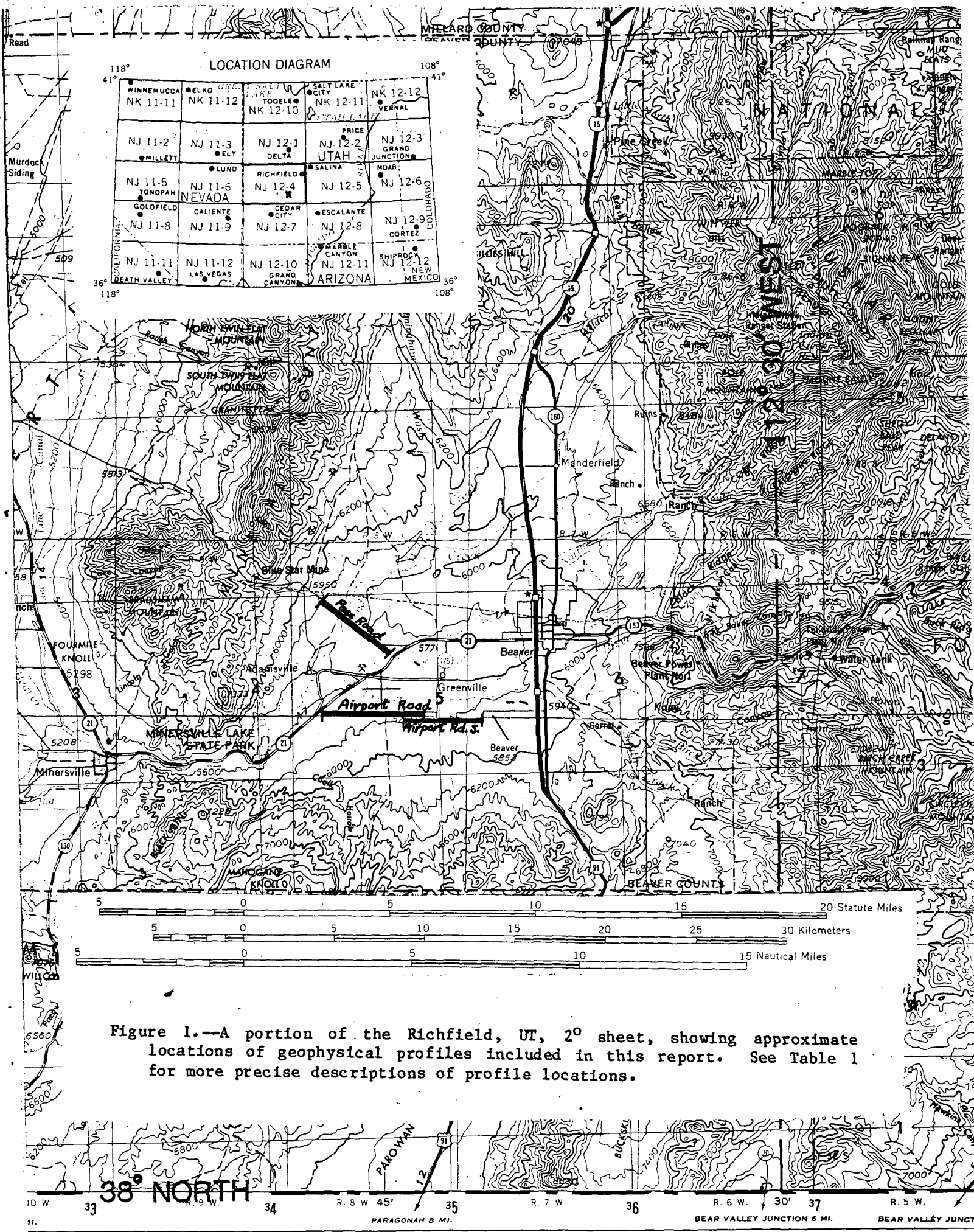


Figure 1.—A portion of the Richfield, UT, 2° sheet, showing approximate locations of geophysical profiles included in this report. See Table 1 for more precise descriptions of profile locations.

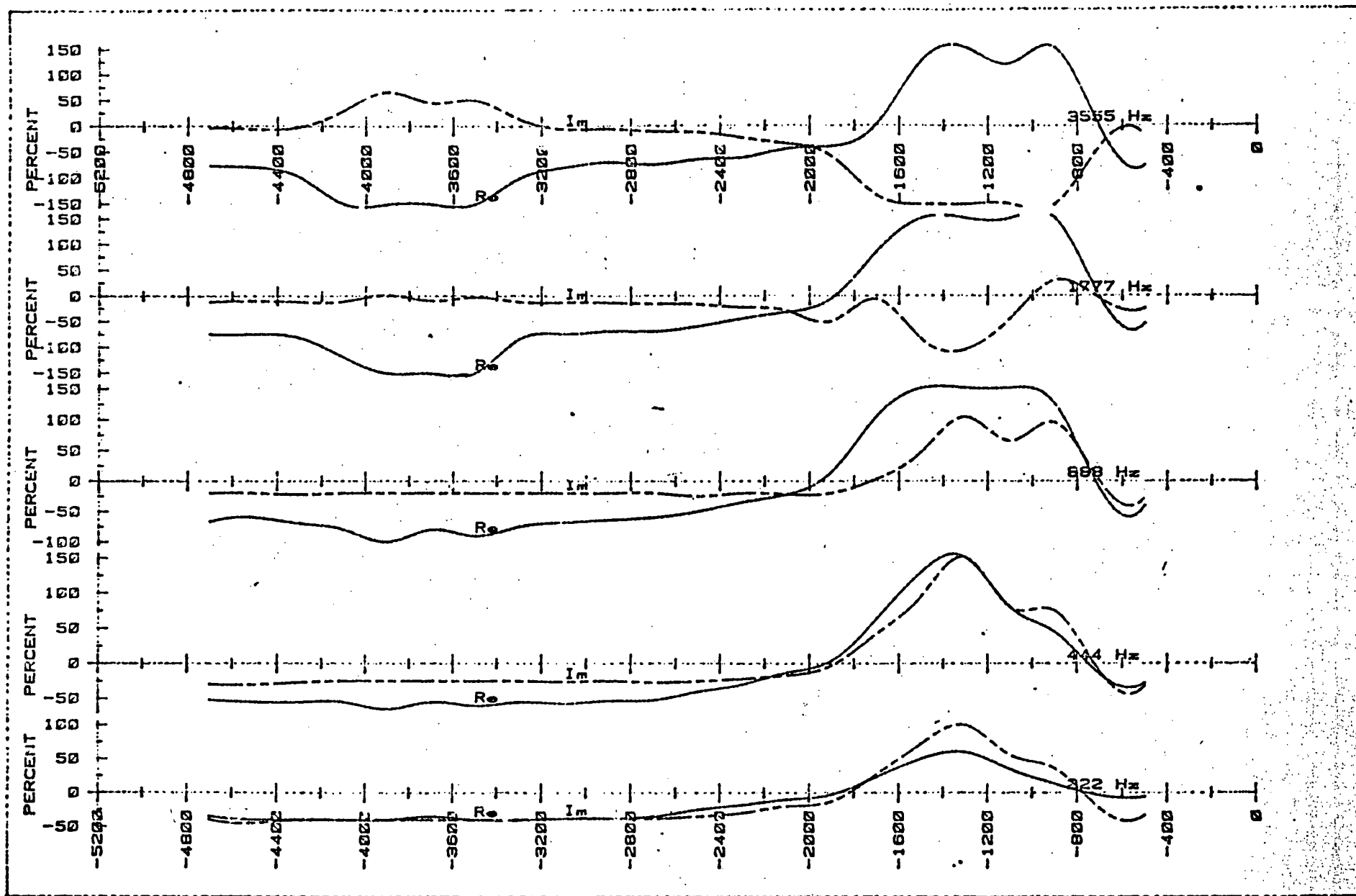


Figure 2.—Splined slingram data for Airport Road. Coil spacing $L = 1000$ ft (305 m), the x-spacing shown on the profiles is in feet. The real component (Re), and imaginary component (Im) are in percent of the primary field.

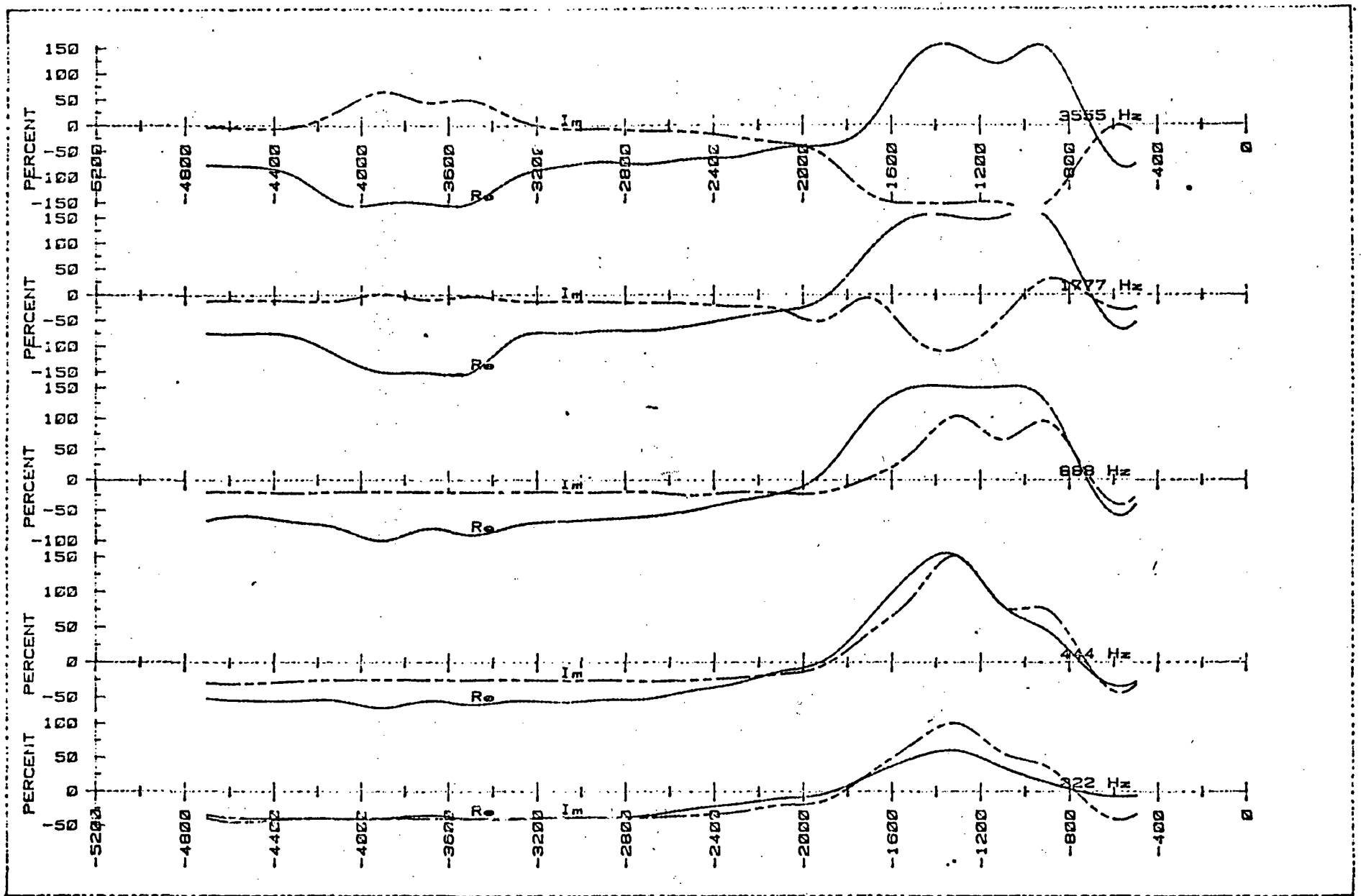


Figure 2.—Splined slingram data for Airport Road. Coil spacing $L = 1000$ ft (305 m), the x-spacing shown on the profiles is in feet. The real component (Re), and imaginary component (Im) are in percent of the primary field.

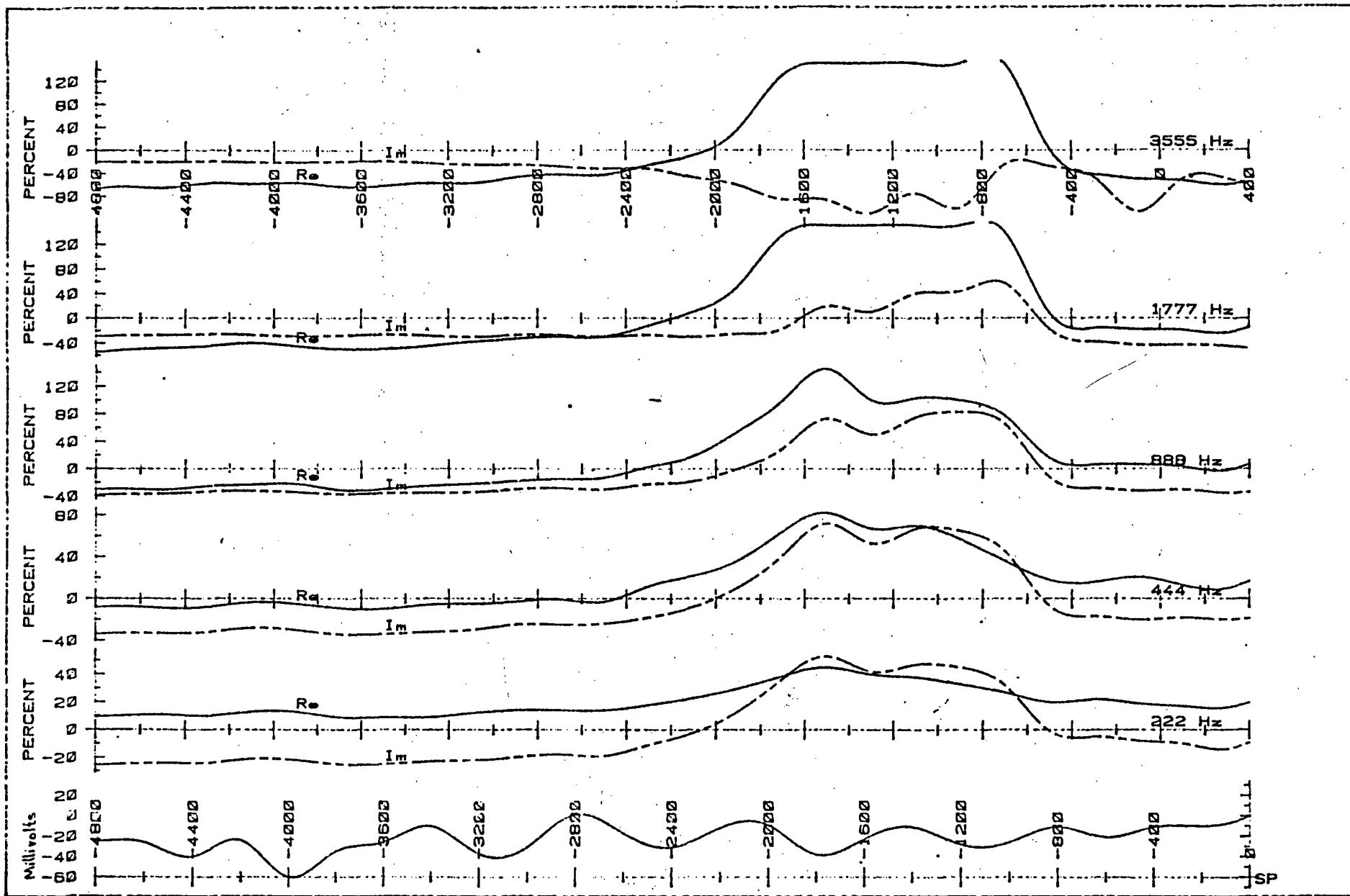


Figure 3.—Splined slingram and SP data for Airport Road. Coil spacing $L = 600$ ft (183 m), the x-spacing shown on the profile is in feet. The real component (Re), and the imaginary component (Im) are in percent of the primary field. Values along the x-axis are in feet.

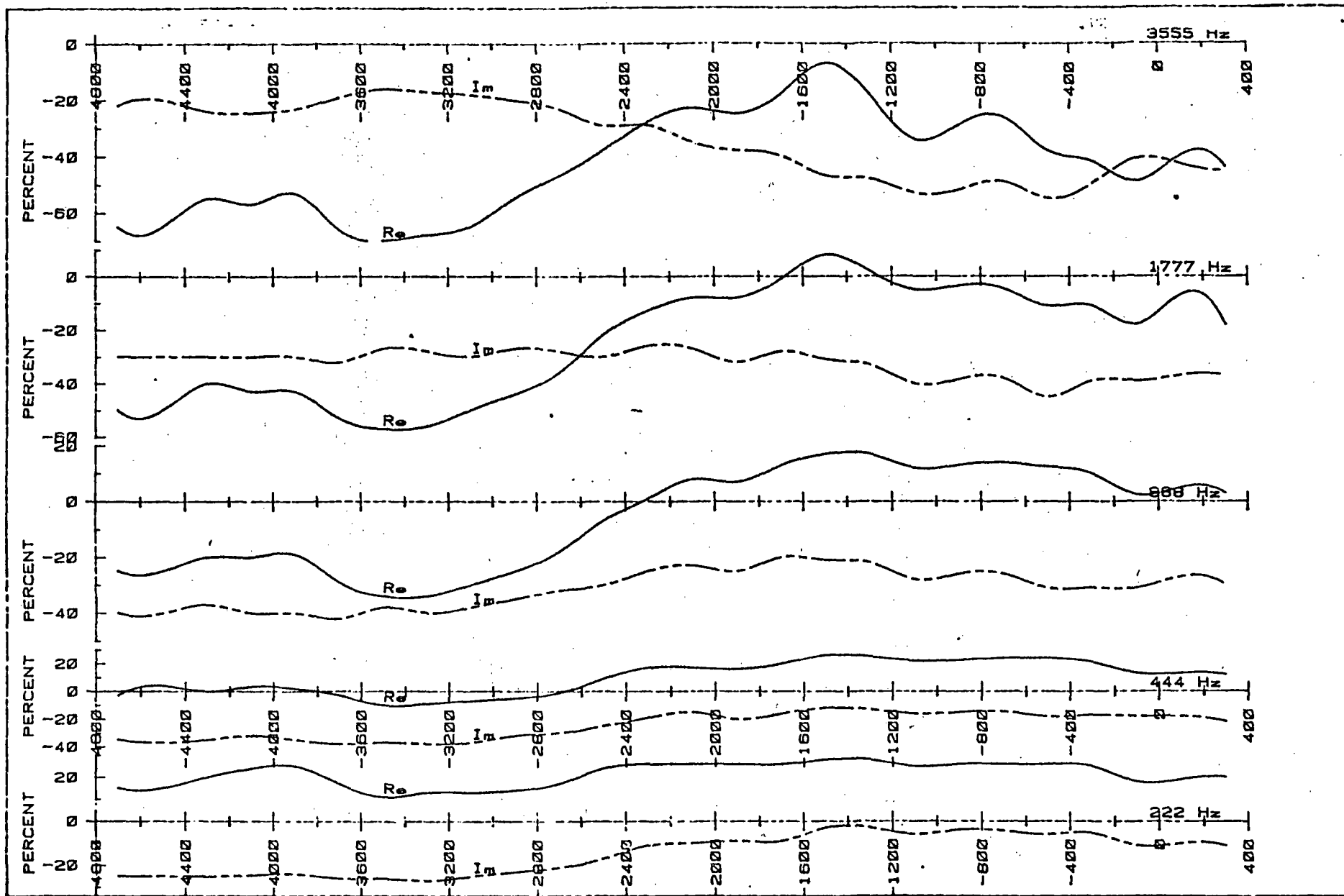


Figure 4.--Splined slingram data for Airport Road-200S. Coil spacing $L = 600$ ft (183 m). Values along the x-axis are in feet.

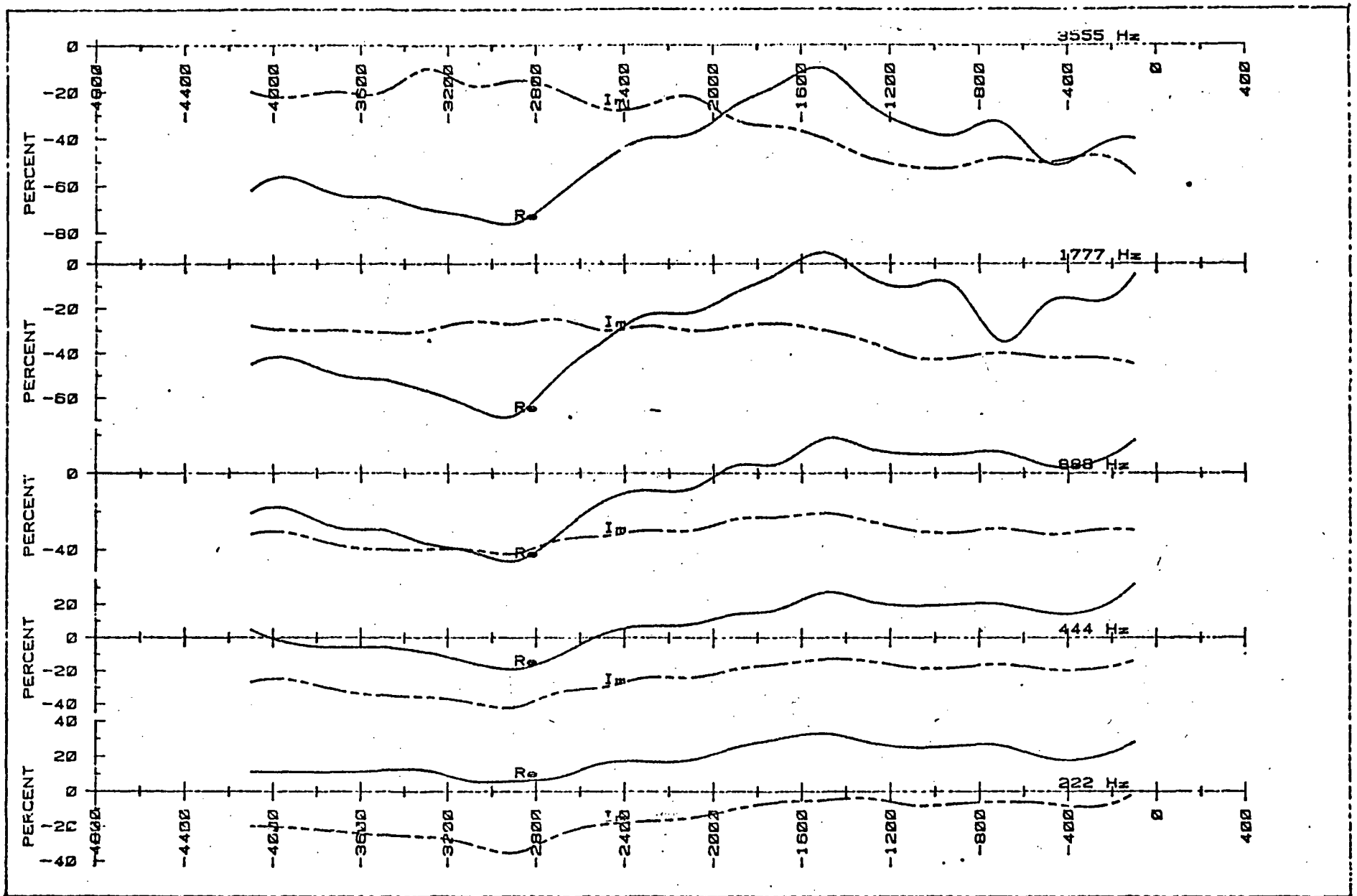


Figure 5.—Splined slingram data for Airport Road-400S. Coil spacing $L = 600$ ft (183 m). Values along the x-axis are in feet.

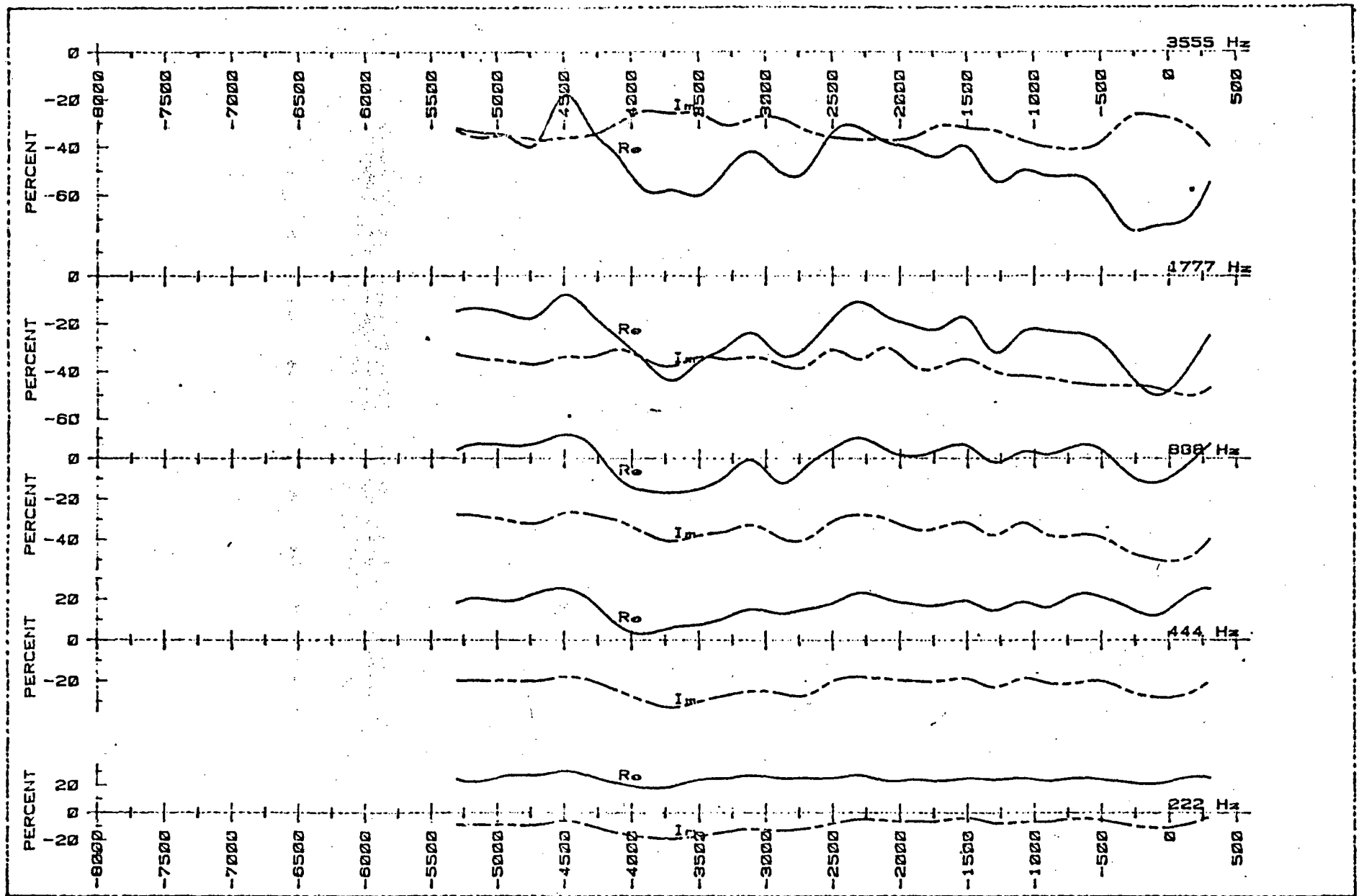


Figure 6.—Splined slingram data for western portion of Airport Road South. Coil spacing $L = 600$ ft (183 m). Values along the x-axis are in feet.

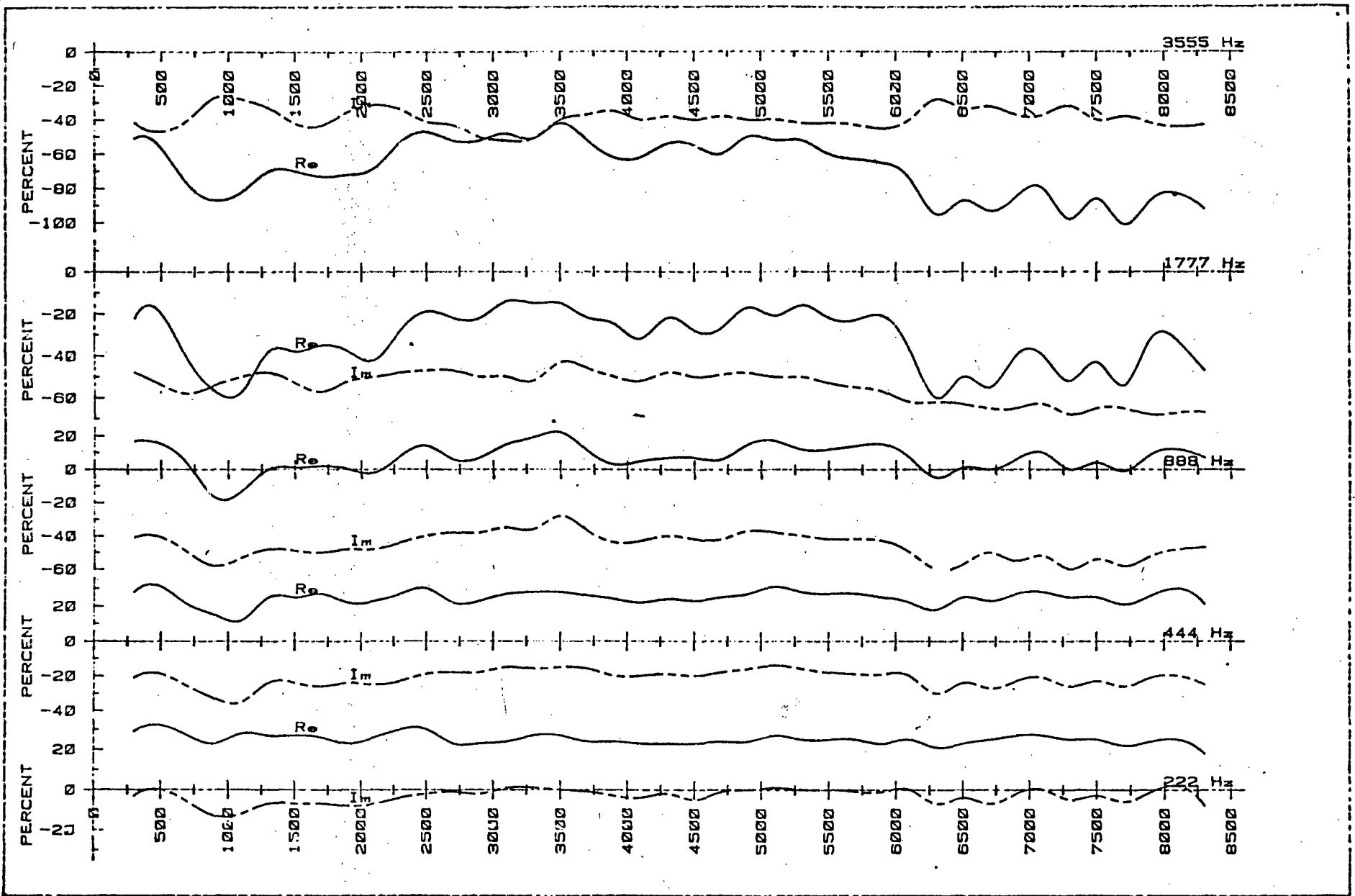


Figure 7.—Splined slingram data for eastern portion of Airport Road South. Coil spacing $L = 600$ ft (183 m). Values along the x-axis are in feet.

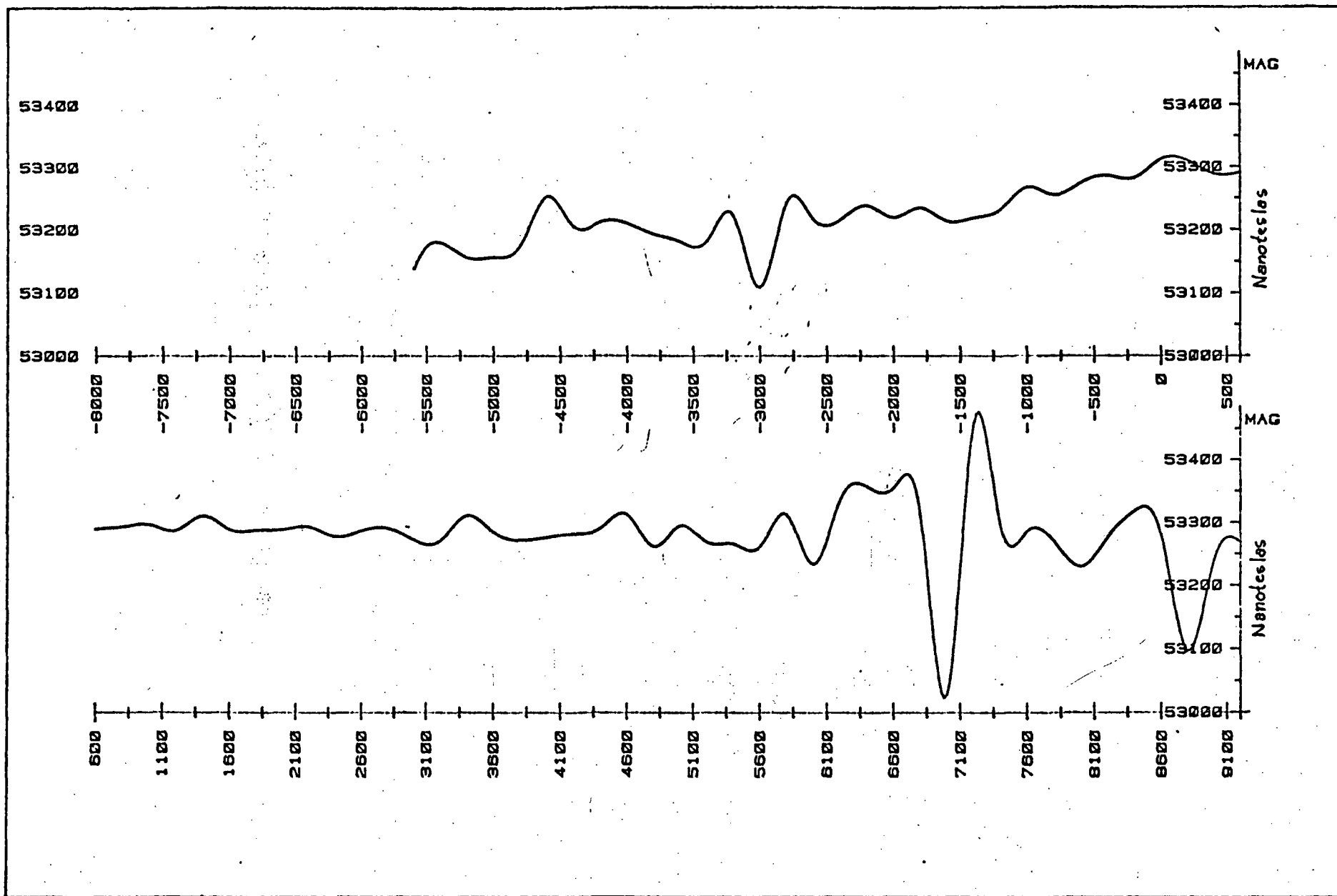


Figure 8.—Magnetic data for western (top) and eastern (bottom) portions of Airport Road South. Horizontal scale is adjusted for comparison with figures 5 and 6. Values along the x-axis are in feet.

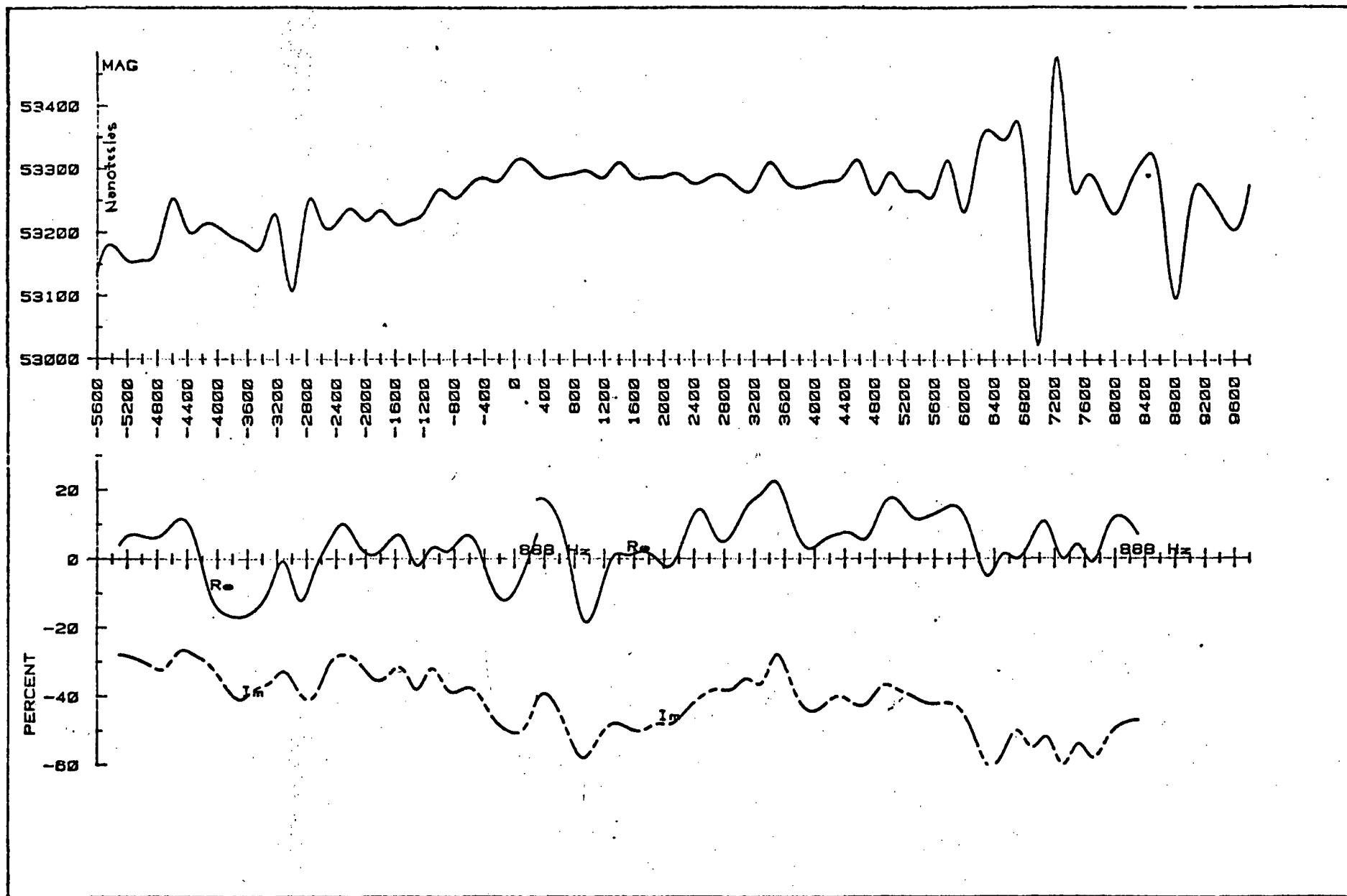


Figure 9.—Replotting of magnetics and one channel (888 Hz) of slingram data, from Airport Road South. The break at location 300 is due to the splining subroutines used. Values along the x-axis are in feet.

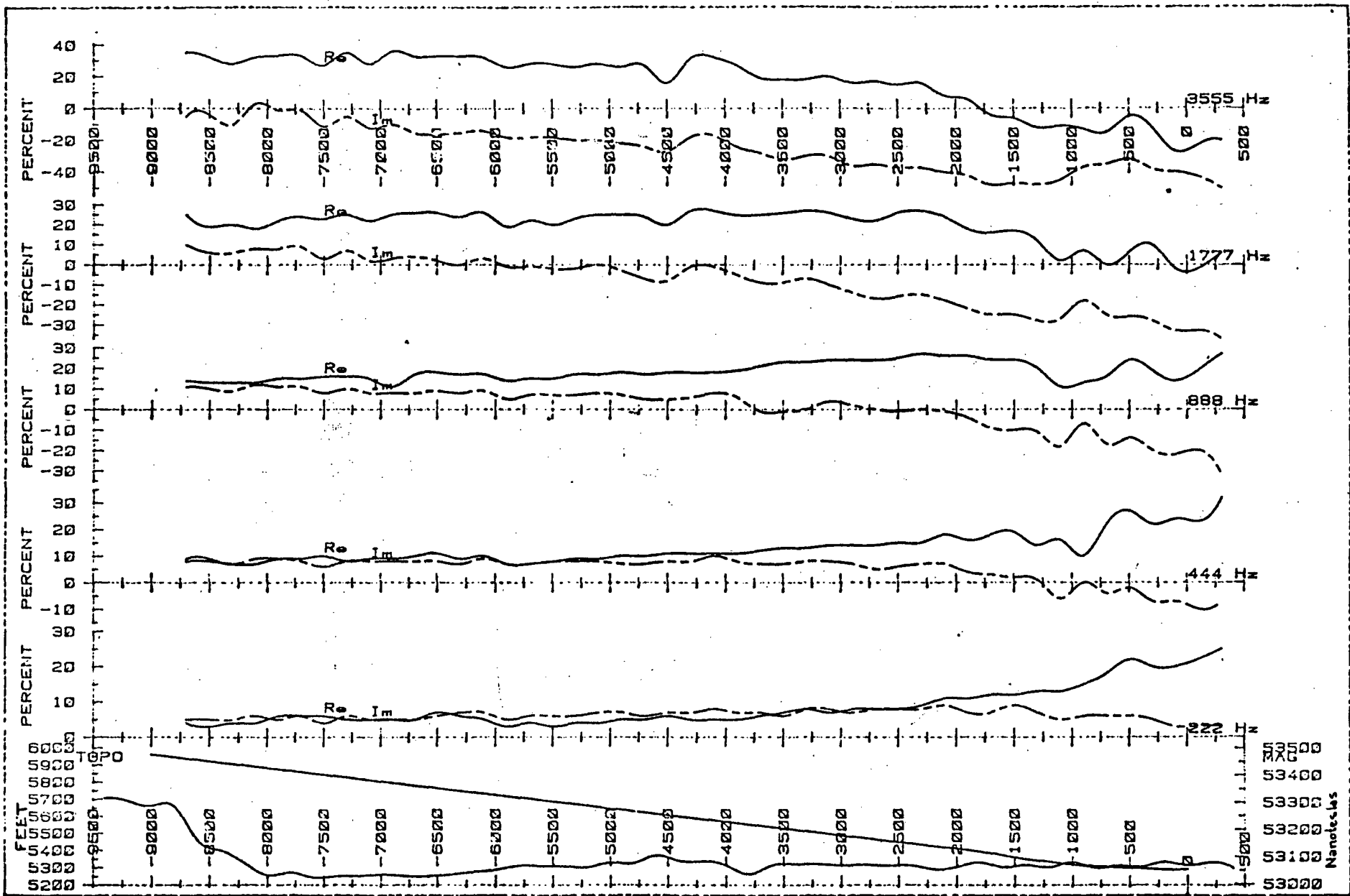


Figure 10.—Splined slingram, magnetic, and topographic data for northwestern portion of Pass Road profile. Slingram coil spacing $L = 600$ ft (183 m). Values along the x-axis are in feet.

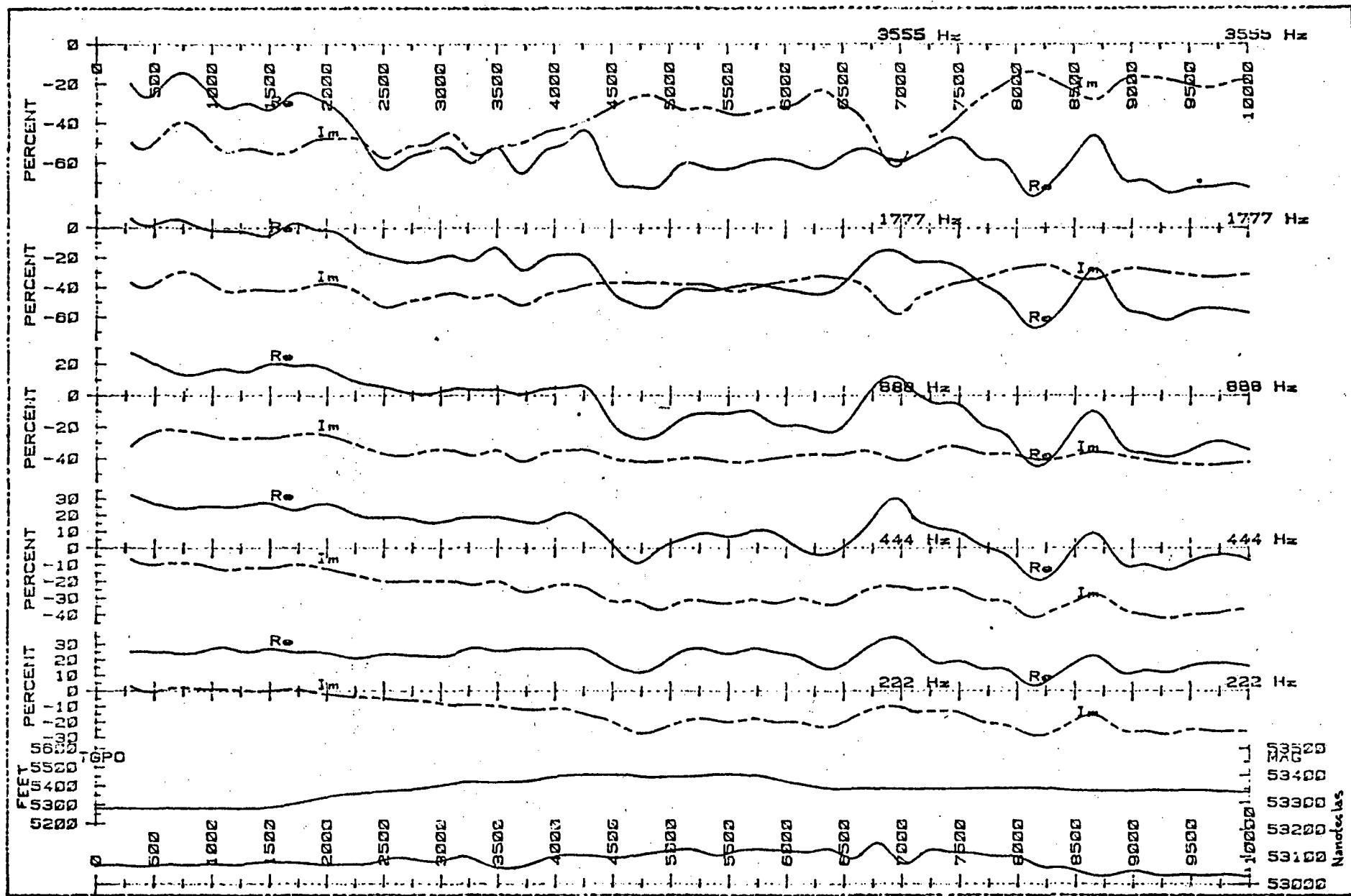


Figure 11.—Splined slingram, magnetic, and topographic data for southeastern portion of Pass Road profile. Slingram coil spacing $L = 600$ ft (183 m). Values along the x-axis are in feet.