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Department of Public Works
W. F. Callahan, Commissioner

U. S. Department of the Interior
Geological Survey
W. E. Wrather, Director

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Cooperative Geologic Project

Geologic Interpretation of Seismic Data

Braintree-Weymouth By-Pass

Cut, Stations 11-14

in Braintree, Mass.

by

James E. Maynard, geologist, U. S. Geological Survey,

and

Rev. Daniel Linahan, S. J., seismologist, Weston College

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1 plate ✓

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Seismic Series # _____

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General Statement

Field examination of the Braintree-Weymouth By-Pass, Cut, Stations 11-14, in Braintree, Mass. shows that a large volume of bedrock will have to be removed from the proposed cut at this site if the present base-line is to be used for the center line of the new highway. The surface geology of the site suggests that considerably less bedrock will be found in the required cut provided the center line of the new road is located approximately 50 feet to the east of the present base-line. Two seismic traverses were run in order to obtain additional information on the feasibility of this change in location. The work was done in May 1949 as a part of a cooperative program of the Massachusetts Department of Public Works and the United States Geological Survey.

Surface Geology

At this location the proposed base-line crosses a bedrock hillock that rises approximately 30 feet above the surrounding terrane. The hillock is partly veneered with a thin layer of moderately loose till. The bedrock is medium to coarsely crystalline granite; the outcrops, in the immediate

vicinity of the base-line, are shown on the accompanying plan.

Seismic Traverses

Two seismic traverses A-B 165 feet long and C-D 220 feet long were run at this location. The shot points were located as follows: A 162 feet to the right (east) of station 12+73; B at station 13; C 62 feet to the right (east) of station 11+68; D 82 feet to the right (east) of station 13+86.

Depths to Bedrock

The depths to bedrock at the shot points as calculated from the seismic data are:

A,	7	feet
B,	8	"
C,	7	"
D,	9	"

These values are based on an estimated till velocity of 2000 feet per second, a value in accord with the geological conditions at the site. The need for estimating the till velocity was caused, in part, by the detector closest to the shot point failing to register when each of the lines was run.

Geologic Interpretation of Seismic Data

The interpreted positions of the bedrock surfaces along the seismic traverses are shown on the geologic sections, sheet 1. Because of the limited accuracy of the depths at the shot points, the bedrock surfaces are shown by dotted lines. The general configuration of the bedrock surfaces, as shown on the sections, is based on good seismic velocity data and should be reasonably accurate.