

54-197

Commonwealth of Massachusetts
Department of Public Works
John A. Volpe, Commissioner

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

no. 703

✓
Cooperative Geologic Project

File Report



Geologic and Seismic Investigations for

Relocation of Route 20 (Springfield Bypass)

Alden Street to Chicopee River

Proposed Cuts, Stations 783-788, and 790-796

in Ludlow, Mass.

This report has been prepared for open file only, and has not been edited for conformity with U.S. Geological Survey standards and nomenclature.

by

James E. Maynard, Geologist, U. S. Geological Survey
and
Rev. Daniel Linehan, S. J., Seismologist, Weston College

This report has been prepared for open file only, and has not been edited for conformity with U. S. Geological Survey standards and nomenclature.

U. S. GEOLOGICAL SURVEY MASS DEPT. OF PUBLIC WORKS
COOPERATIVE GEOLOGIC PROGRAM
OPEN FILE REPORT

3 pages of text
2 plates ✓

Copies of this report have been placed in open files for public inspection at
U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. LIBRARY, and
Office of the ENGINEERING GEOLOGY BRANCH
U. S. GEOLOGICAL SURVEY, 270 Dartmouth Street,
Room 1, Boston 16, Massachusetts

Boston, Massachusetts
S. DEPT. of PUBLIC WORKS, 109 NASHUA ST., BOSTON, MASS.
November 1953

Seismic Series # _____

Geologic and Seismic Investigations for
Relocation of Route 20 (Springfield Bypass)
Alden Street to Chicopee River
Proposed Cuts, Stations 783-788, and 790-796
in Ludlow, Mass.

by
James E. Maynard, Geologist, U. S. Geological Survey
and
Rev. Daniel Linehan, S. J., Seismologist, Weston College

General Statement

This work was done to obtain geologic and seismic data that would aid in establishing a grade for the proposed highway and, also, be of value in preparing estimates on the quantities of materials to be excavated from the cuts. Seismic work was done at two sites, namely, stations 783-788; and 790-796. The work was performed in February 1952 as part of a cooperative program of the Massachusetts Department of Public Works and the United States Geological Survey.

Surface Geology

The area studied geologically occurs to the north and west of the right angled bend in Chicopee River, in Ludlow, Mass. The base line of the proposed roadway crosses the area in an east-west direction and approximately parallels the north side of Chicopee River valley close to the upper margin of the valley wall.

Throughout the area the surface is covered with a thick layer of fine, wind-blown sand and silt. This condition makes it impossible to determine, without subsurface exploration, the kind or kinds of materials immediately underlying the surface layer. The geology of the surrounding region, however, suggests that the surface layer may be directly underlain by sand of various grade sizes, or, possibly, by sandy till.

No bedrock was noted at or in close proximity to the area studied. The geology of the surrounding region, however, indicates that it is underlain by schist and or granite.

Seismic Traverses

Two consecutive traverses were made along the base line between stations 783+00 and 787+40, and two consecutive traverses were also made along the base line between stations 790+70 and 795+10. In addition, a 330-foot traverse was made with one shot point 50 feet to the right (south) of station 792+25 and the other 50 feet to the right (south) of station 795+50. These are shown on sheet one.

Subsurface Interpretation

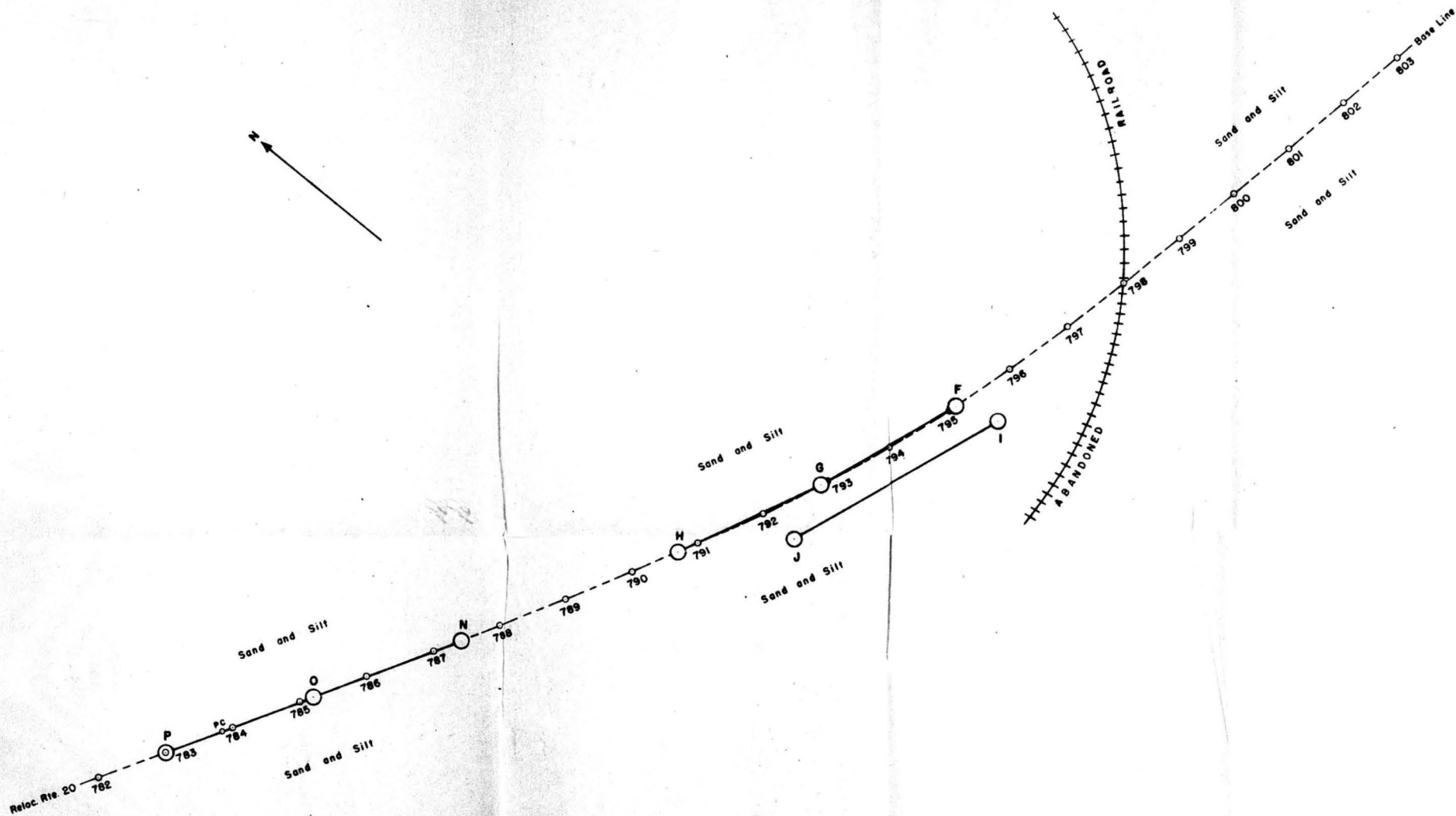
The geologic sections as interpreted from the surface geology and the seismic data are shown on sheet two. The surface profiles for these sections were prepared by the State Engineers.

Section P-O-N indicates that sand or sandy till overlies bedrock at depths that range from 20 to 30 feet below the surface of the ground.

Sections H-G-F and J-I indicate that a sand layer overlies a layer of more compact material, which is probably till, may be compact silt, and that this, in turn, rests on bedrock. The contact between the sand and the more compact layer on these sections is indefinite and, therefore, is shown on the sections by dotted lines.

Because the seismic work for this project was performed in the winter, the results given in this report have a somewhat lower order of reliability than if the work had been performed during a more favorable season of the year. The reason for this is that a zone of frozen soil not only makes it difficult

to obtain good seismograms, but also causes erratic velocity data that are very difficult to interpret.



COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

U. S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COOPERATIVE GEOLOGIC PROJECT

PLAN OF TRAVERSES

SCALE: 1 INCH = 100 FEET

Letters refer to shot points
at ends of traverses.

Numbers refer to D. P. W.
stations on baseline.

Y Shot point.

V - Apparent seismic velocity in feet per second.

Dotted bedrock lines indicate inconclusive seismic data.

Vertical measurements refer to elevations above mean
sea level (datum 1929).

Numerals at shot points indicate depths to bedrock,

as 10 16

INTERPRETATIVE GEOLOGIC SECTIONS ALONG SEISMIC TRAVERSES

GEOLOGY BY: JAMES E. MAYNARD

SEISMIC DATA BY: DANIEL LINEHAN S. J.

ENGINEERING BY: WARREN CARNEY

LUDLOW

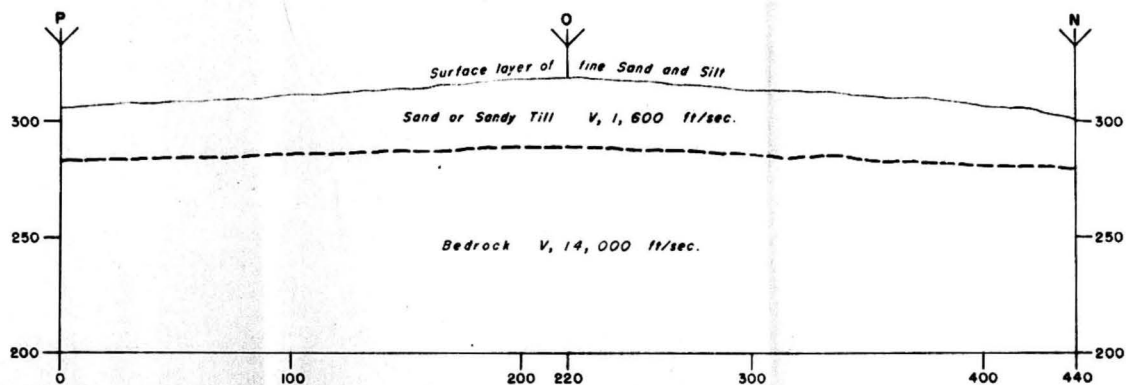
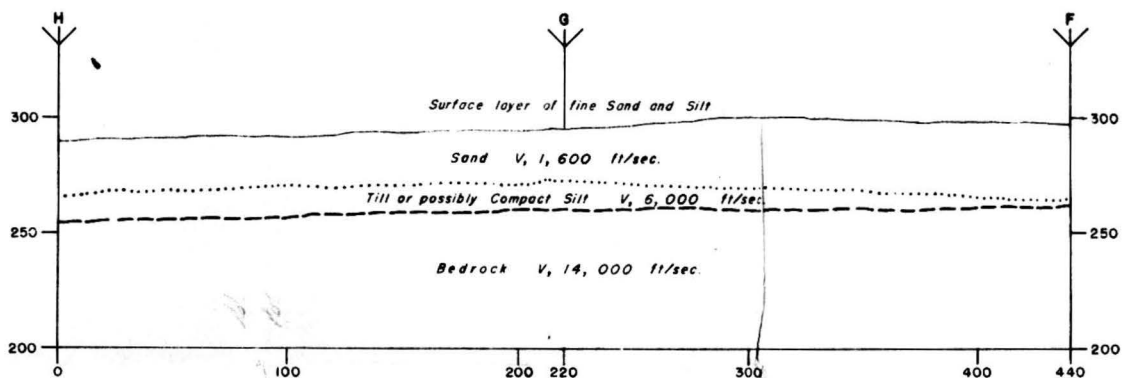
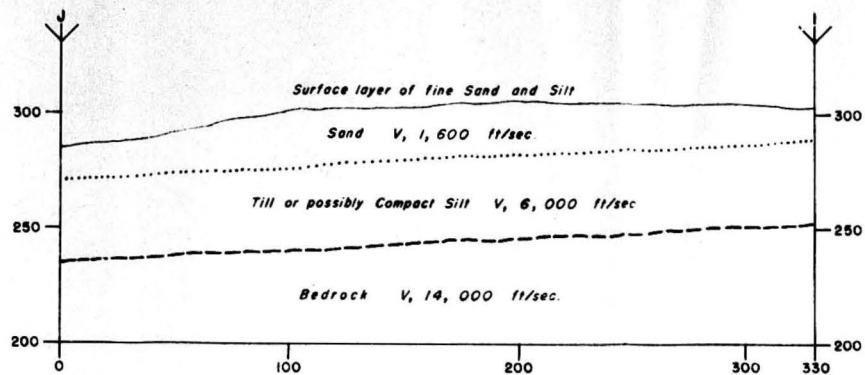
STATIONS 783-796

SCALE: 1 INCH = 40 FEET

ROUTE NO. 20

DATE: FEB. 1952

SHEET 1 OF 2



PLAN OF TRAVERSES

SCALE: 1 INCH = 100 FEET

Letters refer to shot points at ends of traverses.

Numbers refer to D.P.W. stations on baseline.

Y Shot point.

V - Apparent seismic velocity (ft) in feet per second.

Dotted bedrock lines indicate inconclusive seismic data.

Vertical measurements refer to elevations above mean sea level (datum 1929).

Numbers of shot points indicate depths to bedrock,

as follows:

INTERPRETATIVE GEOLOGIC SECTIONS ALONG SEISMIC TRAVERSES

GEOLOGY BY: JAMES E. MAYNARD

SEISMIC DATA BY: DANIEL LINEHAN S. J.

ENGINEERING BY: WARREN CARNEY

LUDLOW

ROUTE NO. 20

STATIONS 783-796

SCALE: 1 INCH = 40 FEET

DATE: FEB. 1952

SHEET 2 OF 2