

Commonwealth of Massachusetts  
Department of Public Works  
J. F. Callahan, Commissioner

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

Callahan  
[K.44]

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Cooperative Geologic Project

Geologic Interpretation of Seismic Data

Relocation of Route 116

Stations 7 to 135

in Cheshire, Mass.

by

Max B. Willard, geologist, U. S. Geological Survey,

and

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

4 pages of text  
4 plates ✓

Boston, Mass  
December 1949.

U. S. GEOLOGICAL SURVEY      MASS. DEPT. OF PUBLIC WORKS  
COOPERATIVE GEOLOGIC PROJECT

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Seismic Series # \_\_\_\_\_

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General Statement

Three segments of the proposed relocation of Route 110, Stations 7 to 135, in Cheshire, Mass. require shallow cuts. For the purpose of obtaining information on the depths to bedrock, and on the nature of the overlying materials, seismic and geologic studies were made of the segments in October 1949. The work was done as part of the cooperative program of the Massachusetts Department of Public Works and the United States Department of the Interior, Geological Survey. One seismic traverse was made between stations 7 and 13, 1 between stations 80 and 85, 3 between stations 85 and 90, and 4 between stations 125 and 135.

Geology

The geologic sections as interpreted from the surface geology and the seismic data are shown on the accompanying 4 sheets.

Excavations throughout the area of the proposed relocation have shown that the mica schist below either gravel or till commonly is weathered to a depth of several feet. Test pits made by the Mass. Dept. of Public Works

between stations 126 and 134 exposed as much as 7 feet of weathered schist above solid rock. In general the physical characteristics of the weathered schist are similar to those of a compact till. On the accompanying cross sections, the weathered schist is included in the surface layer and the bedrock profiles are the profiles on solid rock.

Stations 7 to 13.--At this location bedrock is not exposed. Large boulders (chiefly of massive quartzite) up to 5 feet across are concentrated near the crest of the hill 160 feet east of station 9. The stone fence along the present highway is made of very large boulders of quartzite. There is a surface layer of pebble gravel at this location. The upper 7 to 10 feet of this gravel layer is exposed along the present highway. Loose to moderately compact till is exposed below the gravel in the river gorge west of the present highway.

Stations 80 to 82.--This segment of the proposed highway is on a small gravel terrace. A pit east of station 82 has exposed 12 to 15 feet of poorly-sorted gravel. No bedrock is exposed. The large boulders (of a quartz breccia) that occur in the area of station 79 and 80 suggest that the cliff 75 feet east of the base-line is held up by bedrock.

Stations 85 to 90.--A thin surface layer of gravel overlies an irregular bedrock surface along this segment. Much of the surface to the right (west) of the base-line is strewn with large quartzite and schist boulders. Two exposures of bedrock (schist) occur to the right (west) of station 80+00. The low hill whose lower slope begins approximately 50 feet left (east) of the base-line is of coarse poorly sorted gravel.

Stations 126 to 135.--A thin layer of loose sandy till overlies an irregular bedrock surface. Outcrops of schist and amphibolite (a dark,

fine-grained, and tough rock) are abundant.

### Seismic Traverses and Depths to Bedrock

The locations of the seismic traverses are indicated on the accompanying 4 sheets.

Stations 7 to 13.--One 330-foot traverse was run east of the base-line and approximately parallel to it. Shot point A was located 33 feet left (east) of station 8+85, B 50 feet left (east) of station 12+20.

The depth to bedrock, as determined by the seismic data, is 17 feet at A and 8 feet at B.

Stations 80 to 82.--One 110-foot traverse was run east of the base-line and parallel to it. Shot point A was located 25 feet left (east) of station 80+40, B 25 feet left (east) of station 81+50.

As determined by the seismic data, the depth to bedrock at A is 20 feet and at B is 18 feet.

Stations 85 to 90.--Two consecutive 220-foot traverses, A-B and B-C were run. Shot point A was 20 feet left (east) of station 90+00, shot point B was at station 87+80, and shot point C was at 85+60. A third traverse, E-D, 110 feet long, crossed the base-line at station 88+00. Shot point E was 65 feet right (west) of station 87+85, shot point D was 45 feet left (east) of station 88+12.

*(As determined by the seismic data)*  
The depth to bedrock at A is 12 feet, at B 18 feet, at C 10 feet, at D 13 feet, and at E 16 feet.

Stations 126 to 135.--Three consecutive traverses, A-B, B-C, and C-D were run approximately along the base-line. Traverse A-B was 165 feet long, B-C and C-D were 320 feet long. A north-south trending traverse, E-F, 110 feet long, that crossed the base-line and traverse B-C, was run 65 feet

west of and approximately parallel to an exposed ridge of bedrock.

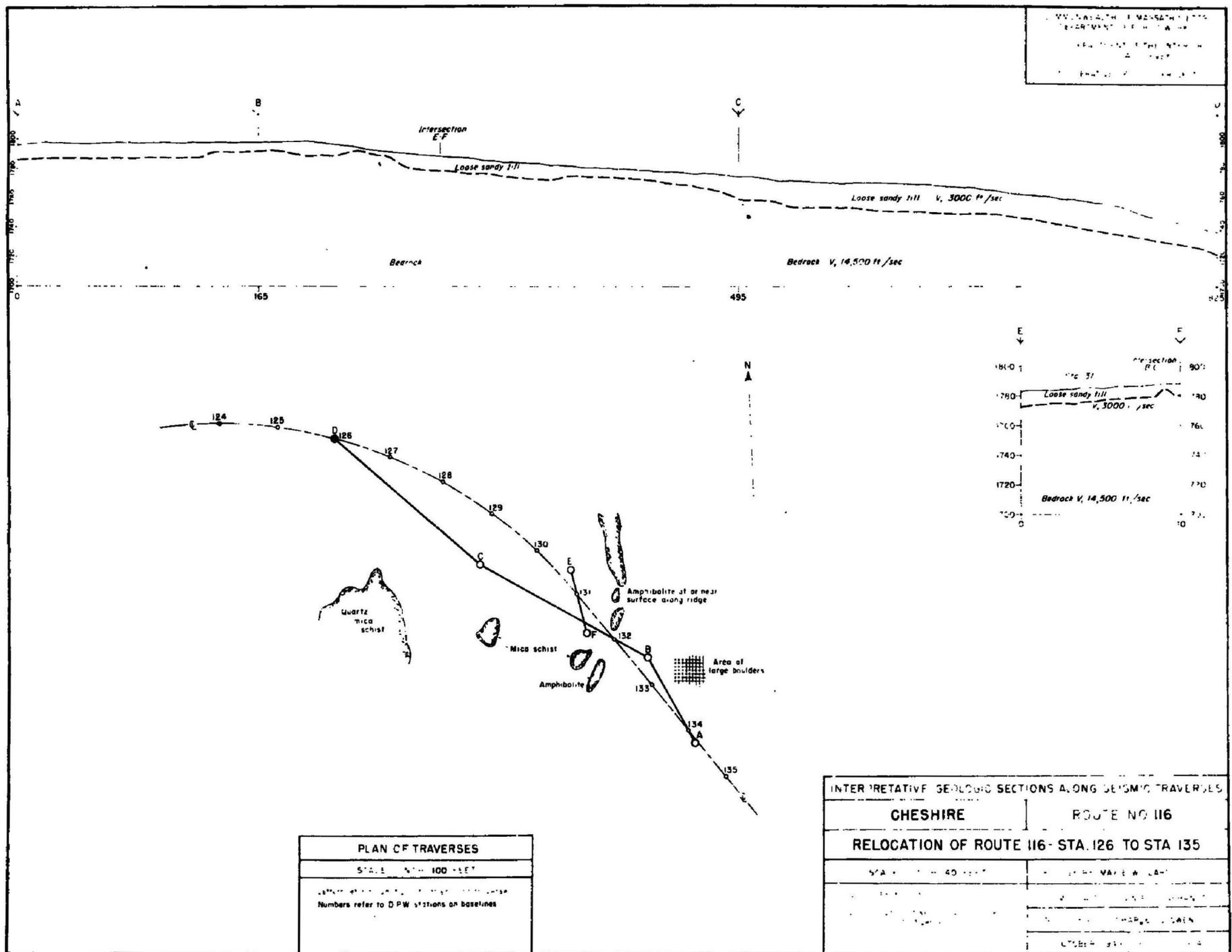
The locations of the shot points are as follows:

A	-	5 feet right (west)	of station	134+23
B	-	23 " left (east)	" "	132+60
C	-	81 " right (west)	" "	129+40
D	-	at station	126+00	
E	-	20 feet left (east)	" "	130+60
F	-	30 " right (west)	" "	131+63

Depths to bedrock at shot points as determined from the seismic data are as follows:

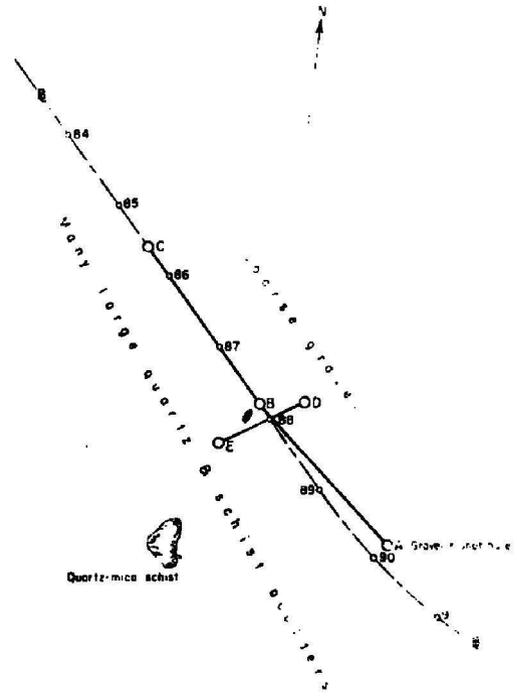
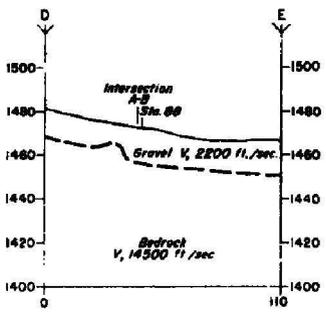
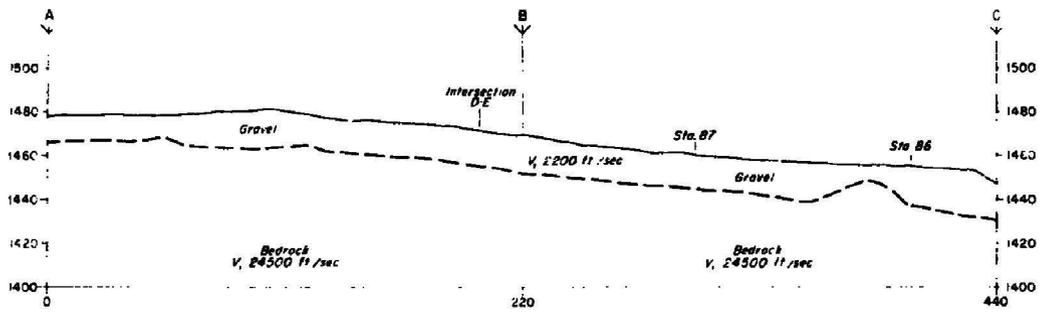
A	-	10 feet
B	-	6 "
C	-	15 "
D	-	15 "
E	-	10 "
F	-	8 "

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 BOSTON OFFICE  
 MASSACHUSETTS



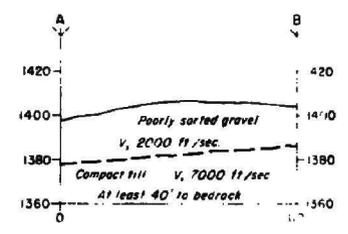
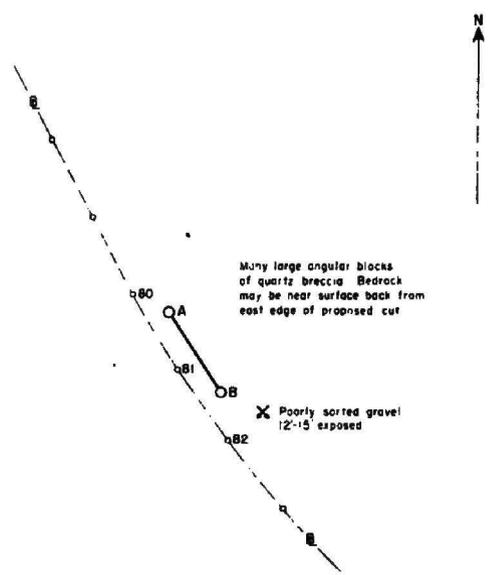
**PLAN OF TRAVERSES**  
 SCALE 1" = 100 FEET  
 Numbers refer to DPW stations on baselines

INTERPRETATIVE GEOLOGIC SECTIONS ALONG SEISMIC TRAVERSES	
<b>GRESHIRE</b>	<b>ROUTE NO. 116</b>
<b>RELOCATION OF ROUTE 116 - STA. 126 TO STA. 135</b>	
SCALE 1" = 40 FEET	DATE MADE 6-1961
DRAWN BY [illegible]	
CHECKED BY [illegible]	
APPROVED BY [illegible]	



PLAN OF TRAVERSES
SCALE 1 INCH = 100 FEET
Letters refer to specific observations on traverses. Numbers refer to D.P.W. stations on baselines.

INTERPRETATIVE GEOLOGIC SECTIONS ALONG SEISMIC TRAVERSES	
<b>CHESHIRE</b>	<b>ROUTE NO. 116</b>
<b>RELOCATION OF ROUTE 116 STA. 85 TO STA. 90</b>	
SCALE 1 INCH = 40 FEET	BY MAX E. WARD
APPROVED BY THE DIVISION OF HIGHWAYS	BY J. A. GARDNER, CHIEF ENGINEER
	BY J. A. GARDNER, CHIEF ENGINEER
	OCT. 25, 1949



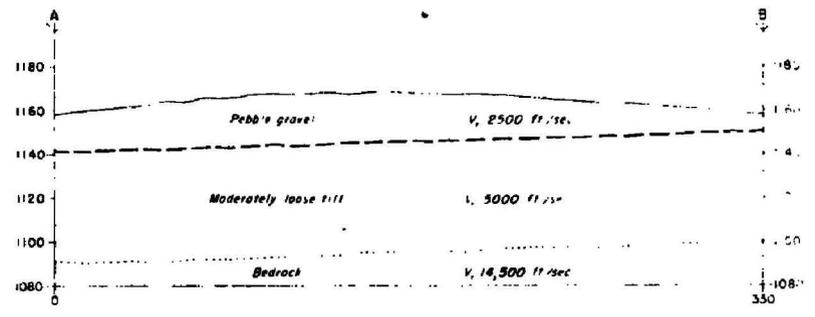
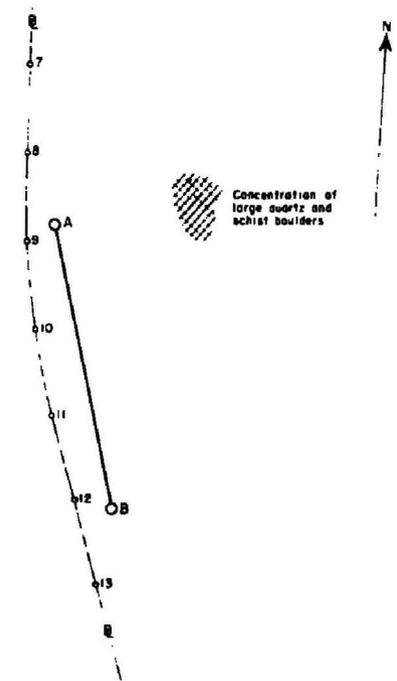
**PLAN OF TRAVERSES**

SCALE 1" = 100 FEET

LETTERS REFER TO POINTS OF INTEREST  
 Numbers refer to D.P.W. stations on baselines.

INTERPRETATIVE GEOLOGIC SECTIONS ALONG SEISMIC TRAVERSES	
CHESHIRE	ROUTE NO 116
RELOCATION OF ROUTE 116 STA 80 TO STA. 82	
SCALE 1" = 40 FEET	BY STATE MAPS WILLARD
DATE 1949	BY STATE MAPS DANIEL NEHAN
ADDITIONAL INFORMATION	BY STATE MAPS CHARLES J. OWEN
OCTOBER 1949	

COMMUNAL TRAIL, MA. SHEET 117  
 1:25,000 SCALE  
 RELOCATION OF ROUTE 116  
 STA. 7 TO STA. 13  
 EAST FIELD, MASS.



**PLAN OF TRAVERSES**  
 SCALE: 1" = 100 FEET  
 Numbers refer to D.P.W. stations on baselines.

**INTERPRETATIVE GEOLOGIC SECTIONS ALONG D.P.W. TRAVERSES**  
**CHESHIRE** ROUTE NO. 116  
**RELOCATION OF ROUTE 116 STA. 7 TO STA. 13**