SURVEY OF HIGHWAY CONSTRUCTION MATERIALS
IN THE TOWN OF PROCTOR, RUTLAND COUNTY, VERMONT

prepared by

Engineering Geology Section, Materials Division

Vermont Department of Highways

in cooperation with

United States Department of Commerce

Bureau of Public Roads

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Acknowledgments

The work of this Project was greatly implemented by the cooperation and assistance of many groups and individuals. The following were particularly helpful in carrying out the Project's objectives:

1. Various departments and individuals of the Vermont State Department of Highways, notably the Planning and Mapping Division and the Highway Testing Laboratory,

2. Professor D.P. Stewart of Miami University, Oxford, Ohio,

3. Professor C.G. Doll, Vermont State Geologist, University of Vermont, Burlington, Vermont,

4. United States Department of Commerce, Bureau of Public Roads.

History

The Materials Survey Project was formed in 1957 by the Vermont State Department of Highways with the assistance of the United States Bureau of Public Roads. Its prime objective was to compile an inventory of highway construction materials in the State of Vermont. Prior to the efforts of the personnel of the Survey as described in this and other reports, searches for highway construction materials were conducted only as the immediate situation required. Thus only limited areas were surveyed, and no overall picture of material resources was available. Highway contractors or resident engineers are usually required to locate the materials for their respective projects and have samples tested by the Highway Testing Laboratory. The additional cost of exploration for construction materials is passed onto the State in the form of higher construction costs. The Materials Survey Project was established to minimize or eliminate this factor by enabling the State and its contractors to proceed with information

on material sources available beforehand. Prior knowledge of locations of suitable material is an important factor in planning future highways.

The sources of construction materials are located by this Project through ground reconnaissance, study of maps and aerial photographs, and geological and physiographic interpretation. Maps, data sheets, and work sheets for reporting the findings of the Project were designed with their intended use in mind. These maps and data sheets were devised to furnish information of particular use to the contractor or construction man. For maximum benefit, the maps, data sheets, and this report should be studied simultaneously.

Inclosures

Included in this folder are two surface-geology maps, one defining the location of tests conducted on bedrock sources, the other defining the location of tests conducted on granular materials. These maps are derived from 15-minute or 7½-minute quadrangles of the United States Geological Survey enlarged or reduced to 1:31250 or 1" = 2604'. Delineated on the Bedrock Map are the various rock types of the area. This information was obtained from numerous sources: Vermont Geological Survey Bulletins, Vermont State Geologist Reports, United States Geological Survey Bedrock Maps, and the Centennial Geological Map of Vermont, as well as other references.

The granular materials map depicts areas covered by various types of glacial deposits (outwash, moraines, kames, kame terraces, eskers, etc.) by which potential sources of gravel and sand may be recognized. This information was obtained primarily from a survey being conducted by Professor D.P. Stewart of Miami University, Oxford, Ohio, who has been mapping the glacial features of the State of Vermont during the summer months since

1956. Further information was obtained from the Soil Survey (Reconnaissance) of Vermont conducted by the Bureau of Chemistry and Soils of the United States Department of Agriculture, and from Vermont Geological Survey Bulletins, United States Geological Survey Quadrangles, aerial photographs, and other sources. On both maps the areas tested are represented by Identification Numbers. Several tests are usually conducted in each area represented by an Identification Number, the number of such tests being more or less arbitrarily determined either by the character of the material or by the topography.

Also included in this folder are data sheets for both the Bedrock and Granular Materials Survey, which contain detailed information for each test conducted by the Project as well as information obtained from other sources, and including an active card file compiled by the Highway Testing Laboratory. The latter information was gathered over a period of years by many persons and consequently lacks the organized approach and detail required for effective use. The information on the cards varied widely in completeness. Transfer of information from the cards to the data sheets was made without elaboration or verification. When possible, the locations of the deposits listed in the card files have also been plotted on the maps; however, some cards in the file were not used because the information on the location of the deposit was incomplete or unidentifiable. Caution should be exercised wherever this information appears incomplete. This Project does not assume responsibility for the information taken from the card files.

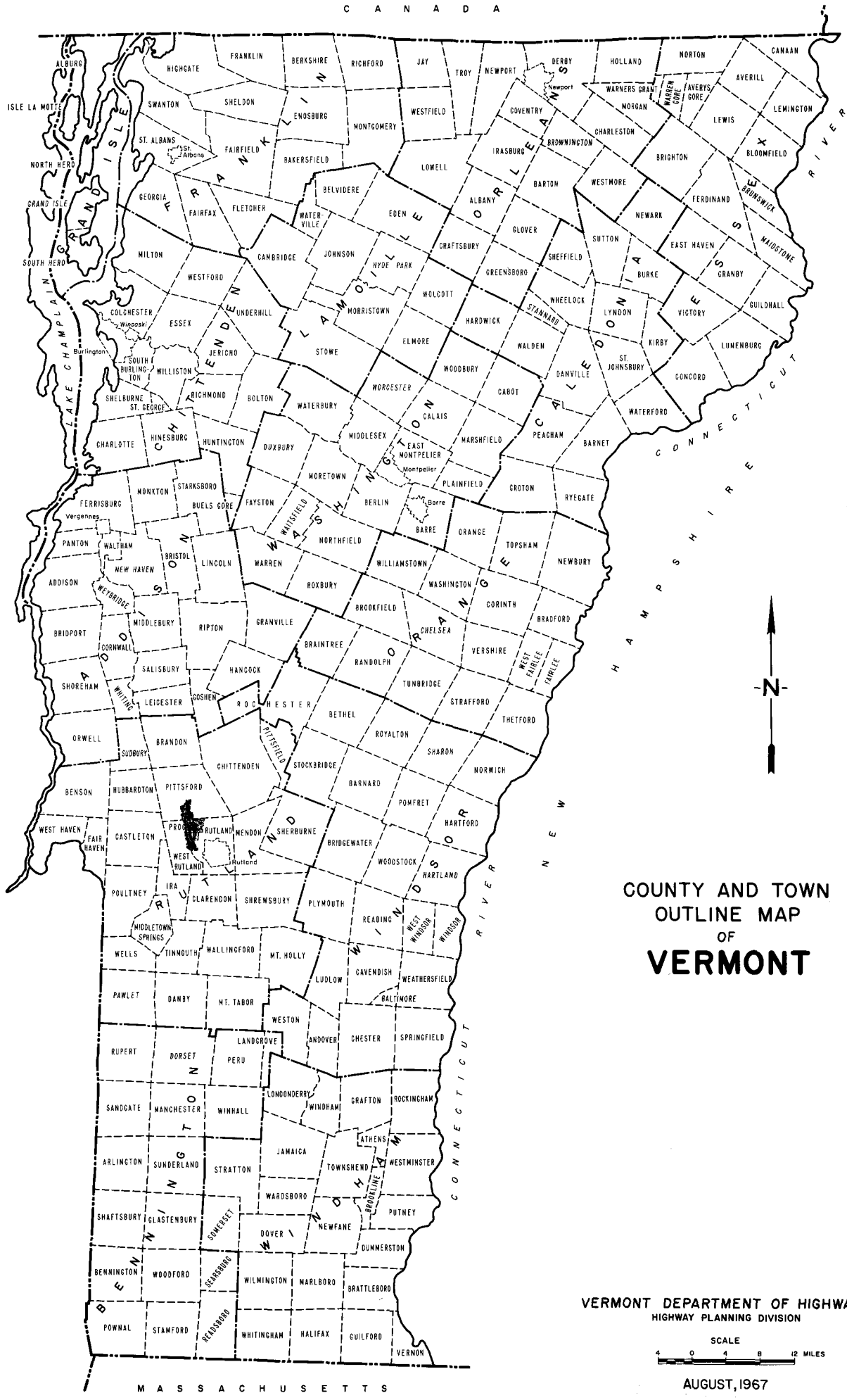
Work sheets contain more detailed information on each test and a detailed sketch of each Identification Number Area. The work sheets and laboratory reports are on file in the office headquarters of this Project.

LOCATION

The town of Proctor is located in north-central Rutland County in the southwest part of the state. Its northern one-third is surrounded by Pittsford. It is bounded on the west and southwest by West Rutland, and the town of Rutland lies to the southeast and east.

It is located in the Limestone Valley Physiographic Region of Vermont and is characterized by rolling to abrupt hills and a broad north-south trending floodplain through which Otter Creek flows north toward Lake Champlain.

Elevations range from a high of 1,445 feet on Pine Hill on the east side of town to a low of about 400 feet on the Otter Creek floodplain on the Proctor-Pittsford Town Line.



COUNTY AND TOWN OUTLINE MAP OF VERMONT

VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION

SCALE
4 0 4 8 12 MILES

AUGUST, 1967

SURVEY OF ROCK SOURCES

Procedure for Rock Survey

The routine employed by the project in the survey of possible sources of rock for highway construction is divided into two main stages: office investigation and field investigation. The first is conducted primarily during the winter months and comprises the mapping of rock types as indicated in various reference sources. Many different sources of information were utilized, as indicated in the bibliography. These references differ considerably in dependability due to new developments and studies contributing to the obsolescense of a number of reports. In addition, the results of samples taken by other individuals are analyzed, and the location in which these samples were taken is mapped when possible. In other words, as complete a correlation as possible is made of all the information available concerning the geology of the area under consideration.

The second stage of the investigation is begun in the field by making a cursory preliminary survey over the entire area. The information obtained in this survey, together with the information assimilated in the first stage of the investigation, is employed to determine the areas in which the testing and sampling will be concentrated. When a promising source is encountered as determined not only by rock type but also by volume, accessibility, and the existence of a good working face, chip samples are taken with a hammer and submitted to the Highway Testing Laboratory for testing by the Deval Method (AASHO T-3). It is kept in mind that the samples taken by the chip method are often in the weathered zone of the outcrop and consequently may show a less satisfactory test result than the fresh material deeper in the body of the rock structure. When deemed necessary, further samples are taken by drilling to a depth of approximately 3 feet and blasting across the strike or trend of the outcrop. When the material is uniform and satisfactory tests result from the chip samples, no further drilling, blasting, or sampling is done, and the material source is included as being satisfactory.

Discussion of Rock and Rock Sources

Rocks in the town of Proctor consist almost entirely of the Valley sequence of quartzites, dolomites, limestones, marbles, slates, and phyllites. The oldest formation of the sequence; the Dalton quartzite and dolomite, overlies the Mount Holly gneiss on the eastern edge of town, and both formations have been thrust over younger formations lying to the west by the Pine Hill thrust fault. This part of town is forested and accessible only by woods roads or field roads leading west from State Aid Highway No. 4 in Rutland.

Carbonate rocks comprising the Shelburne Formation have been extensively quarried in Proctor. Interestingly, the Sutherland Falls Marble Member is named from its supposed type exposure in the falls by that name in Otter Creek at Proctor Village. However, that rock has more recently been correctly mapped as the Winooski Formation. The Sutherland Falls Marble is exposed in a large operating quarry about 2,000' west of the river in Proctor Village.

The Vermont Marble Company owns inactive quarries in the town of Proctor that were investigated as possible sources of Item 204, Sub-base of Crushed Rock. A small quarry with a large waste pile is located on the northwest side of State Aid Highway No. 2 north of Proctor Village on property owned by Mrs. Emil Hancsarik. A small face and opening (now water-filled) was worked and a large waste pile accumulated. Small scattered exposures occur in the pasture west of the quarry. The materials survey party deemed this location too small and too distant from proposed construction projects to warrant consideration as a source of Item 204.

The Flint and Johnson Quarry, located on the east side of Vermont Route 3, 0.60 mile north of the Rutland Town Line, was investigated and sampled as Map Identification No. 1 (See Table II and Plate II). Rock in this locality has been mapped as the Columbian Marble Member and Intermediate Dolomite Member of the Shelburne Formation. It is apparently the Columbian marble which has been quarried, and the west edge of the quarry openings appears to follow a contact between a dolomite to the west and the Columbian Marble to the east. This dolomite may be only a thin bed within the Columbian Marble or may be the result of tight folds in the Columbian Marble and Intermediate Dolomite.

Two tests taken from dolomite beds and one from marble exposures met abrasion requirements for Item 204. Construction of the project on Vermont Route 3 will involve rock cutting and removal of waste piles between the highway and the quarry openings, and will necessitate moving a crusher and quarry operation eastward into the wooded hill where the Intermediate Dolomite may be uncovered.

The wooded area south of the quarries was sampled as Map Identification No. 2 (See Plate II and Table II). Beds of the Intermediate Dolomite were well exposed. However, no room is available beside the highway to set up a crusher. In order to locate an operation here it would be necessary to construct an access up to the more or less flat wooded area east of the highway and to clear a site for quarry and crusher.

SURVEY OF SAND AND GRAVEL SOURCES

Procedure for Sand and Gravel Survey

The method employed by the project in the survey of possible sources of sand and gravel for highway construction is divided into two main stages: office investigation and field investigation. The office investigation is conducted primarily during the winter months and comprises the mapping of possible potentially productive areas as indicated from various references. Of these references, the survey of glacial deposits mapped by Professor Stewart proves to be valuable, particularly when used in conjunction with other references such as soil-type maps, aerial photographs, and United States Geological Survey quadrangles. The last two are used in recognizing and locating physiographic features indicating glacial deposits and in studying drainage patterns. In addition, the location of existing pits are mapped when known. The locations in which samples were taken by other individuals are noted and mapped when possible.

The second stage of the investigation is begun in the field by making a cursory preliminary survey over the entire area noting area which show physiographic features giving evidence of glacial or fluvial deposits. These locations are later examined by digging test pits with a backhoe to a depth of approximately 11 feet and then sampling the material. The samples are submitted to the Highway Testing Laboratory where they are tested for gradation and stone wear, the latter by the Deval Method (AASHO T-4-35).

Discussion of Sand and Gravel Sources

The granular materials in the town of Proctor consist almost entirely of ice-contact sands and gravels exposed in Vermont Marble Company's large gravel pit at the east edge of Proctor Village. These gravels probably extend northeast along the wooded hillside east of and above Vermont Route 3, and south and southwest in a residential area.

Small patches of glaciolacustrine sands have been mapped by Dr. D. P. Stewart along the east side of Otter Creek and along State Aid Highway No. 2 on the west side of the flood plain, both in residential areas, and in a number of scattered small areas north of Proctor Village west of and above Otter Creek. Map Identification No. 1 is a small pit showing sitly sands unacceptable for Item 105, and there is little extension possible. Four other sand areas either could not be located in the field by the materials survey party or could not be tested because of cultural features. Numerous tests of sand and gravel acceptable for Item 201, Sub-base of Gravel have been taken in Map Identification No. 2, Vermont Marble Company's pit. However, a spokesman expressed the unwilligness of the company to sell any large quantity of material. The pit is in a feature mapped as a kame terrace and the material ranges from fine sands, exposed in a lower level on the northwest side of the property, to bouldery gravels and hardpan exposed on the east face.

Two features designated by Dr. D. P. Stewart as beach gravel deposits are located on the west side of State Aid Highway No. 2 and material representative of the deposits was sampled in Map Identification No. 3. In this location poorly-sorted, bouldery, and somewhat silty gravels are exposed in a small pit with limited extension.

SUMMARY OF ROCK FORMATIONS IN THE TOWN OF PROCTOR

Vermont Valley Sequence

Hortonville Formation - Black, carbonaceous, and pyritic slate and phyllite, locally sandy; brown-weathered limy beds are common near base.

Bascom Formation - Interbedded dolomite limestone or marble, calcareous sandstone, quartzite, and limestone breccia; irregular dolomitic layers, thin sandy laminae, and slaty or phyllitic partings characterize limestone and marble of lower, middle, and upper parts of the Bascom, respectively; south of West Rutland it includes some of Chipman formation.

Shelburne Formation - Chiefly a white marble characterized by raised lines of gray dolomite on the weathered surface. Includes Sutherland Falls Marble, Intermediate Dolomite (a massive gray-weathering rock) and the massive, white Columbian Marble.

Clarendon Springs Formation - Fairly uniform, massive, smooth-weathered gray dolomite characterized by numerous geodes and knots of white quartz; quartz sandstone and irregular masses of chert are near the top.

Danby Formation - Comprised of white vitreous or glassy quartzite beds, often cross-laminated, interbedded with gray dolomite. White quartzite beds, more than a foot thick, separated by 10 to 12 feet of dolomite in eastern areas, increase westward to continuous sections of white to pink weathered, massively bedded Potsdam quartzite, west of Orwell thrust.

Winooski Formation - Buff-weathered, pink, buff, and gray dolomite; beds 4 inches to 1 foot thick separated by thin, protruding, red, pink, green, and black siliceous partings.

Cheshire Formation - Very massive, white to faintly pink or buff vitreous quartzite near the top in west-central and southwestern Vermont; predominantly a less massive-appearing mottled gray, somewhat phyllitic quartzite, dolomitic sandstone and conglomerate near the base of the formation in west-central Vermont apparently grades southward into the Dalton Formation.

Dalton Formation - Schistose quartzite containing pebbles of feldspar and blue quartz; impure dolomite containing pebbles of quartz and feldspar occurs locally; conglomerate common near base.

Green Mountains

Mount Holly Complex - Mainly fine- to medium-grained biotitic gneiss, locally muscovitic, and in western areas chloritic; massive and granitoid in some localities, fine-grained or schistose and compositionally layered in others; also abundant amphibolite and hornblende gneiss, and minor beds of mica schists, quartzite, quartzite, and calc-silicate granulite; includes numerous small bodies of pegmatite and gneissoid granitic rock.

GLOSSARY OF SELECTED GEOLOGIC TERMS

Alluvial - Pertaining to material carried or deposited by running water.

Breccia - A rock consisting of consolidated angular rock fragments larger than sand grains. There may be fault, talus, and volcanic breccia.

Calcareous - Pertaining to or containing calcium carbonate.

Carbonate Rocks - Rocks composed of the molecule CO_3 combined with calcium, magnesium, etc. Includes limestones and dolomites.

Delta - A predominantly alluvial deposit built by a stream entering the sea or other body of water. Usually it has the form of the Greek letter delta.

Dolomite - A rock consisting predominantly of the mineral calcium magnesium carbonate (dolomite), containing carbon dioxide 47.7%, lime 30.4%, magnesia 21.9%.

Esker - A long, narrow winding ridge of mixed sand and gravel deposited by a stream of meltwater flowing in a tunnel or crevasse in stagnant glacial ice.

Glaciolacustrine - A term used to denote formation by, or deposition in, quiescent waters of glacial lakes.

Gneiss - Originally meaning a more or less banded metamorphic rock with the mineral composition of granite. The term now designates a foliated metamorphic rock with no specific composition implied, but having layers that are mineralogically unlike and consisting of particles visible to the eye. Usually gneiss displays an alternation of granular mineral and schistose minerals with the rock tending to split along the schistose bands.

Hardpan - A term loosely applied to any subsurface soil layer that offers great resistance to digging and drilling. Correctly, and as used in this report, it is gravel cemented by carbonates so as to form an impenetrable layer. It is commonly found in gravels having a preponderance of particles derived from carbonate rocks.

Ice Contact - Refers to sediments which have accumulated in contact with stagnant or wasting glacial ice. They assume the varied topographic forms expressed by eskers, kames, and kame terraces.

Kame - A conical hill of generally poorly stratified drift deposited in contact with glacial ice by streams flowing in or on the ice.

Kame Terrace - Stratified sands and gravels deposited by streams between a glacier and an adjacent valley wall.

Limestone - A bedded sedimentary rock consisting chiefly of calcium carbonate. The most important and widely distributed of the carbonate rocks.

Marble - A soft, white rock being the metamorphic form of limestone in which the calcium carbonate (calcite) is recrystallized and the calcite crystals are overgrown and interlocked with additional calcite. Commercially it is a trade name applied to any carbonate rock of good color and texture and hard enough to take a polish.

Metamorphic Rocks - Rocks that owe their distinctive characteristics to the transformation of preexisting rocks through intense heat or pressure or both.

Phyllite - A fine-grained, foliated metamorphic rock intermediate between the mica schists and slates into which it may grade. The foliation is made possible by the development of a large amount of potash mica, sericite, which also gives the rock a distinctive silvery appearance.

Physiographic - Pertaining to the physical divisions of the earth.

Quartzite - A compact metamorphic rock composed of quartz grains so firmly cemented that fracture takes place across the grains and the cementing material with equal ease.

Slate - A very fine-grained homogeneous metamorphic rock which splits smoothly along parallel cleavage planes and yields roughly similar slabs.

Thrust Fault - A low-angle or horizontal plane of displacement along which one block of rocks has been pushed or thrust upon and over another block. A lateral displacement of tens of miles along a fault plane of scores of miles is not uncommon.

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Appendix I

PARTIAL SPECIFICATIONS FOR HIGHWAY CONSTRUCTION MATERIALS

Listed below are partial specifications for Highway Construction Materials as they apply to this report at date of publication. For a complete list of specifications see Standard Specifications for Highway and Bridge Construction, approved and adopted by the Vermont Department of Highways in April, 1964.

Item 105, Granular Borrow

"Article 105.02 - Materials. The granular borrow shall be obtained from approved sources and shall consist of satisfactorily graded, free-draining, hard durable stone and coarse sand practically free from loam, silt, clay, and organic matter.

"The sand portion (material passing the No 4 screen) shall have not more than ten percent (10%) passing the No 270 mesh sieve and shall show a color of not more than three and one-half ($3\frac{1}{2}$) as determined by the colorimetric test described in AASHO Method of Test, Designation T-21.

"When used in connection with fine grading or in fills where piling is to be driven, the granular material shall all pass the nine-inch (9") square-opening screen."

Item 201, Sub-base of Gravel

"Article 201.02 - Materials. The gravel shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and meet the following requirements:

"Not less than forty percent (40%) stone shall be retained on No. 4 sieve.

"The percent of wear shall be not more than twenty-five (25) when tested by laboratory methods using Method T-4 or more than forty (40) when tested by AASHO Method T-96.

"The stone portion of the gravel shall be uniformly graded from coarse to fine, and the maximum-size particles shall not exceed two-thirds (2/3) of the layer being spread.

"The sand portion, when tested by laboratory methods using Method AASHO T-27, shall meet the grading requirements set up in the following table:

Minimum Percent of Stone	Percent Passing Square Openings No. 100	Percent Passing Square Openings No. 270
40	0-15	0-3
50	0-15	0-4
60	0-15	0-5
70	0-15	0-6

"The sand shall show a color of not more than three and one-half ($3\frac{1}{2}$) as determined by the colorimetric test described in the AASHO Method of Test, Designation T-21."

Item 202, Sub-base of Sand

"Article 202.02 - Materials. The sand shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and meet the following requirements:

"The sand, when tested by laboratory methods using Method AASHO T-27, shall meet the grading requirements set up in the following table:

Square Openings	Percent Passing
$1\frac{1}{2}$"	95-100
5/8"	80-100
No. 4	70-100
No. 100	0-18
No. 270	0-5

"The sand shall show a color of not more than three and one-half ($3\frac{1}{2}$) as determined by the colorimetric test described in the AASHO Method of Test, Designation T-21."

Item 204, Sub-base of Crushed Rock

"Article 204.02 - Materials. The materials for sub-base, filler, and

sand cushion shall be obtained from approved sources and meet the following requirements:

A - Crushed Rock. "The crushed rock shall be uniformly graded, crusher-run material and shall be free from dirt. The ledge from which this material is obtained shall be stripped and cleaned before blasting. Conical stockpiling, or any other method of stockpiling which causes segregation of aggregates, will not be permitted.

"The crushed rock, when tested by laboratory methods using Method AASHO T-27, shall meet the grading requirements set up in the following table:

Square Openings	Percent Passing
4"	95-100
1½"	25-50
No. 4	0-15

"The percent of wear shall not be more than eight (8) when tested by laboratory methods using Method AASHO T-3 or more than forty (40) when tested by AASHO Method T-96."

Item 205, Sub-base of Crushed Gravel

"Article 205.02 - Materials.

A - Crushed Gravel. "The crushed gravel shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and produced by a crusher adjusted to deliver a product uniformly graded from coarse to fine.

"When tested by laboratory methods using Method AASHO T-27, it shall meet the grading requirements as set forth below:

		Square Openings	Percent Passing
Sub-base of Crushed Gravel	Coarse-Graded Item 205-A	4"	100
		No. 4	25-50
	Fine-Graded Item 205-B	1½"	95-100
		No. 4	30-60

"At least thirty percent (30%) by weight of the stone content of the crushed gravel, that is, the material retained on the No. 4 screen, shall have a minimum of one (1) fractured face as determined by

actual count from the sample submitted to the laboratory.

"The percent of wear shall not be more than twenty (20) when tested by laboratory methods using Method AASHO T-4 or more than thirty-five when tested by AASHO Method T-96.

B - Sand. "The sand content of the crushed gravel, that is, the material passing the No. 4 screen, when tested by laboratory methods using Method AASHO T-27, shall meet the grading requirements set up in the following table:

Square Openings	Percent Passing
No. 100	0-18
No. 270	0-8

"The sand shall show a color of not more than three and one-half ($3\frac{1}{2}$) as determined by the colorimetric test described in the AASHO Method of Test, Designation T-21."

TABLE I

PROCTOR GRANULAR DATA SHEET NO. 1

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
1	1	1967	1-15	0-1	Yes	100	100	100	42.0	13.0*	1	---	---	Owner: Emil Hancsarik. This is a 150-foot long pit in side of a low mound. It is located 0.2 mile east of State Aid Highway No. 2 on Town Highway No. 5. Area was mapped as site of lake sand deposition by D. P. Stewart. Could not dig in rolling field to northwest, but it looks like thin fine material covering bedrock. Extension to northeast limited by bedrock. Pit face has much sloughing. Material is a fine sand with a 2-foot thick silt layer at 6'-8'. Very few pebbles noted.
2	1	1967	2-19	0-2	Yes	57.0	43.6	27.0	17	9.0	1	13.0%	Gran. Borrow (Grav.)	Owner: Angelo Margo. A small pit on the west side of State Aid Highway No. 2 1.65 miles north of U. S. Route 4. Property owned by Angelo Margo has about 225' frontage and is about 200' deep. The pit shows much sloughing and has many large boulders on faces and scattered around the floor. Test taken on north face. Mainly a "dirty", coarse, poorly sorted gravel with many +6" stones which were not included in the sample. A 6-foot thick boulder bed occurs from 4'-10'. Bottom 7' of 26-foot face was not sampled due to heavy

*Percentage of Total Sample

TABLE I

PROCTOR GRANULAR DATA SHEET NO. 2

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
														sloughing. This pit is located in feature mapped as a beach by D. P. Stewart.
3	1	1967	0-28	Stripped	Yes	61.1	43.3	26.1	18	4.5	1	7.0%	Gran. Borrow (Grav.)	Owner: Vermont Marble Company. Area is large pit located east of and above Williams Street in Proctor Village. There is also an access from the south from Warners Avenue, but haul road down south end of pit is too steep. The Vermont Marble Company is not interested in selling large quantities of gravel. Pit is in three levels. The northwest (lowest) level would extend eastward below floor of second level. This area was not sampled. A high face shows some gravel beds over fine sands with a few gravel lenses. Test #1 was a hand sample from south face of second level. Inclined beds of sand, gravel, and cobbles sampled; representing perhaps 10,000 to 12,000 cu. yds. of gravel. Sample had excess passing the #100 mesh sieve for Item 201.
	2	1967	0-4	Stripped	N O T S A M P L E D									Test #2 dug on east face in northeast lobe of pit. Some fine gravel, but clay and boulders hit at 4'. Pit seems to have reached its limit here. Much gullying and many boulders

*Percentage of Total Sample

TABLE I

PROCTOR GRANULAR DATA SHEET NO. 3

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
														and hardpan seen on east face in this part of pit.
	3	1967	13.5-29	0-1	Yes	94.0	76.1	49.0	6	1.8	1	8.2%	Gravel	Test #3 sampled on south face of upper level. Top of face had too much sloughing to get a hand sample representative of the material. Beds of gravel and gravelly sand were sampled from the lower face.
	4A	1967	1-6.5	0-1	Yes	37.2	33.0	30.5	5	1.0	1	---	Gran. Borrow (Grav.)	Test #4 dug in floor of second level near south end. From 1'-6.5' was sampled as Test #4A. The material was a coarse cobbly gravel with many +6" cobbles. Too few proper-size stones were included for the wear test.
	4B	1967	6.5-12.5	0-1	Yes	96.5	96.5	95.2	4.8	1.0 0.6*	1	---	Sand	Beds of coarse sand with a few stones were sampled as Test #4B. Hole bottomed in sand.
	5	1963	20-100		Yes	82.5	63.9	49.6	5	2.25	1	7.4%	Gravel	This pit was also sampled in 1963 by Callahan. Three gravel samples met requirements for Item 201.
	6	1963	2-60	0-2	Yes	68.2	49.4	40.0	15	6.5	1	12.0%	Gran. Borrow (Grav.)	Test #6 taken on center of the east face, had excess silt for Item 201.
	7	1963	2-20	0-2	Yes	83.8	75.7	44.5	2	0.75	1	---	Gran. Borrow (Grav.)	Test #7 also taken on east face met grading requirements for Item 201, but too few proper-size stones were taken for the wear test.
	8	1963			Yes	72.2	41.5	27.0	2	1.0	1	9.4%	Gravel	Pit probably has extension to south, southeast, and east.
	9	1963	2-30	0-2	Yes	74.1	51.4	45.2	6	3.0	1½	9.0%	Gravel	

*Percentage of Total Sample

TABLE I
Supplement

PROCTOR PROPERTY OWNERS - GRANULAR	Map Ident. No.
Hancsarik, Emil	1
Margo, Angelo	2
Vermont Marble Company	3

TABLE II

PROCTOR ROCK DATA SHEET NO. 1

Map Ident. No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Remarks
1	1	1967	Dolomite	Yes	Chip	3.2%	Vermont Marble Company, Flint and Johnson Quarry. Located 0.60 mile north of Rutland-Proctor Town Line. Three deep, water-filled openings and an open cut working, as well as numerous waste piles are located above the level of Vermont Route 3. Marble outcrops are visible between the openings and east of them. Dolomite beds occur west of a line joining the west faces of the openings. The rock is mapped as the Shelburne formation. E-An-Zen, in Vermont Geological Survey Bulletin No. 25, maps the rock as the Columbian Marble Member and the Intermediate Dolostone from west to east. Tests #1 and #2 were a continuous sample across the strike between the east side of Vermont Route 3 and the west edge of the north opening. A distance of 160' were covered having a relief of 35'-40'. The rock is a gray-weathering white to light gray dolomite with quartz stringers, clusters, and grains shown on surface. It is finely to coarsely crystalline, sugary and quite soft in places, but is generally quite hard. Possibly dolomite is the Bascom, not mapped in this area, with the Columbian lying to the east.
	2	1967	Dolomite	Yes	Chip	4.0%	
	3	1967	Marble	Yes	Chip	6.6%	Test #3 begun 130' north-northeast of east end of Test #1 and continued for 172' to the east. Rock is a white to dark gray-weathered marble. Fresh color is white with flesh-colored dolomite mottling. The texture was sugary coarse-grained to fine-grained. The rock broke fairly blocky to angular, and crumbled rather than broke in some places. Marble shows lacy streaks. The open cut working showed highly broken marble. The dolomite appeared better as Item 204 rock than did the marble. The south end of the quarry area has a deep water-filled opening backed by a high east face. The Rutland-Proctor S0163(1) project will be built in the vicinity of the existing highway, but the grade will be lowered in the quarry vicinity and much of the waste pile and the exposed rock west of the openings will be removed and a rock slope constructed. The proposed center line

TABLE II PROCTOR ROCK DATA SHEET NO. 2

Map Ident. No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Remarks
							will pass close to the east edge of the existing highway south of the Test #1 - Test #2 traverse.
2	1	1967	Dolomite & Marble	No	Chip	4.0%	Owner: Vermont Marble Company. This area is steep, wooded hillside and wooded flat area south of the Flint and Johnson Quarry on the east side of Vermont Route 3. The test traverse was begun at a point 425' north of the rest area and continued for 277' north 65° east across the strike. Test #1 was sampled from random outcrops on the steep, wooded slope above the highway. A horizontal distance of 127' was covered with relief of about 55'. The rock type from the highway to about halfway up the slope is a gray-weathering, somewhat soft marble and it is gradational and interbedded with dolomites higher up the slope.
	2	1967	Dolomite	No	Chip	4.2%	Test #2 was sampled from the top of slope eastward to a low vertical scarp, a distance of 150'. Traverse is fairly level and wooded. The rock is a nearly vitreous to finely crystalline dolomite weathering gray. It is hard, and breaks angular to fairly blocky with the tendency toward a conchoidal fracture. Exposures are plentiful in this wooded area between the quarry and the Rutland Town Line. However, there is little room to set up a crusher beside the highway. Also there is currently reconstruction and relocation of Vermont Route 3 in this vicinity. A possible access would be through the Flint and Johnson Quarry property and into the wooded area behind the quarries.

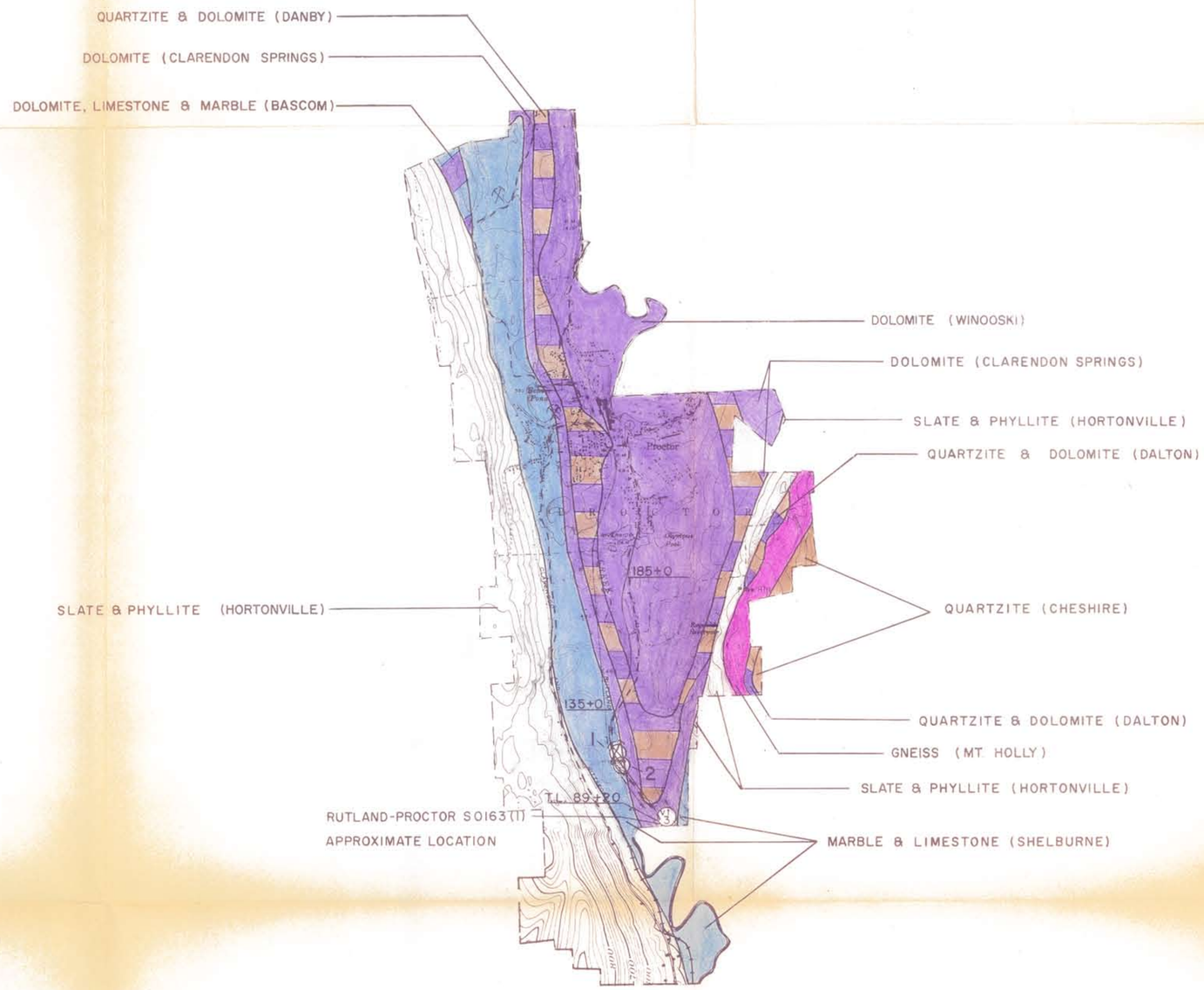
Table II
Supplement

PROCTOR PROPERTY OWNERS - ROCK

Map Ident. No.

Vermont Marble Comapny

1, 2



N

LEGEND

- ROCK, ACCEPTABLE FOR ITEM 204 (sub-base of crushed rock)
- ROCK, NOT ACCEPTABLE FOR ITEM 204
- EXISTING QUARRY
- GRANITE TO DIORITE (light to intermediate igneous rocks)
- AMPHIBOLITE, GABBRO, DIABASE, METADIABASE, GREENSTONE, TRAP DIKES (basic or dark igneous rocks)
- PERIDOTITE, PYROXENITE, SERPENTINITE (ultra-basic igneous rocks)
- GNEISS
- QUARTZITE
- DOLOMITE
- MARBLE, LIMESTONE
- SCHISTS, SLATES, PHYLLITES, SHALES, CONGLOMERATES
- 3 IDENTIFICATION NUMBER (refer to data sheets)

PROCTOR

SCALE 1:31,250

1 0.5 0 1 MILE

CONTOUR INTERVAL 20 FEET

1968

ROCK MATERIALS MAP

BY

VERMONT DEPARTMENT OF HIGHWAYS

IN COOPERATION WITH

U.S. BUREAU OF PUBLIC ROADS

NOTE: BASED ON U.S.G.S. TOPOGRAPHIC MAPS

PLATE II

ROCK

RUTLAND COUNTY VT. HWY. DISTRICT NO. 3

REVISIONS

DATE						
BY						

N

LEGEND

- ○ GRAVEL, ACCEPTABLE FOR ITEM 201 (sub-base of gravel)
- ● GRAVEL, DEPLETED OR NOT ACCEPTABLE FOR ITEM 201
- △ SAND, ACCEPTABLE FOR ITEM 202 (sub-base of sand)
- ▲ SAND, DEPLETED OR NOT ACCEPTABLE FOR ITEM 202
- □ GRANULAR BORROW, ITEM 105
- ■ BORROW, ITEM 104
- ✕ EXISTING PIT
- SG SAND & GRAVEL DEPOSIT
- S SAND DEPOSIT
- 3 IDENTIFICATION NUMBER (refer to data sheets)

PROCTOR

SCALE 1:31,250

0.5 0 1 MILE

CONTOUR INTERVAL 20 FEET

1968

GRANULAR MATERIALS MAP

BY

VERMONT DEPARTMENT OF HIGHWAYS

IN COOPERATION WITH

U.S. BUREAU OF PUBLIC ROADS

NOTE: BASED ON U.S.G.S. TOPOGRAPHIC MAPS

PLATE 1

GRANULAR

RUTLAND COUNTY VT. HWY. DISTRICT NO. 3

REVISIONS

DATE						
BY						