

SURVEY OF HIGHWAY CONSTRUCTION MATERIALS
IN THE TOWN OF PANTON, ADDISON COUNTY, VERMONT

Prepared by

Engineering Geology Section, Materials Division
Vermont Department of Highways

in cooperation with

United States Department of Transportation
Federal Highway Administration

Montpelier, Vermont

March, 1976

TABLE OF CONTENTS

	<u>Page</u>
Introduction	
Acknowledgements	1
History	1
Inclosures	2
Location	4
County and Town Outline Map of Vermont	
Survey of Rock Sources	
Procedure for Rock Survey	5
Discussion of Rock and Rock Sources	6
Survey of Sand and Gravel Deposits	
Procedure for Sand and Gravel Survey	7
Discussion of Sand and Gravel Deposits	8
Summary of Rock Formations in the Town of Pantan	9
Glossary of Selected Geologic Terms	10
Bibliography	12
Partial Specifications for Highway Construction Materials . . .	Appendix I
Pantan Granular Data Sheets	Table I
Pantan Property Owners - Granular	Supplement
Pantan Rock Data Sheets	Table II
Pantan Property Owners - Rock	Supplement
Granular Materials Map	Plate I
Rock Materials Map	Plate II

Acknowledgments

The work of this Project was implemented with 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 Division and Mapping Section and the Materials Division.
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, Federal Highways Administration.

History

The Materials Survey Project was formed in 1957 by the Vermont Department of Highways with the assistance of the Federal Highway Administration. Its prime objective was to compile an inventory of highway construction materials in the State of Vermont. Originally, investigations for highway construction materials were conducted only as the immediate situation required and only limited areas were surveyed; thus, no over-all picture of material resources was available. Highway contractors or resident engineers were required to locate the materials for their respective projects and samples were tested by the Materials Division. The additional cost of exploration for construction materials was passed on to the State bringing about higher construction costs. The Materials Survey Project was established to eliminate or minimize this factor by enabling the State and the contractors to proceed with information on available material resources and to project cost estimates. 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 are used 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 together.

Enclosures

Included in this report are two surface-geology maps, one defining the location of tests on bedrock, the other defining the location of tests on granular materials. These maps are based on 15-minute or 7-1/2-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 formations and types in the township. This information was obtained from: Vermont Geological Survey Bulletins, Vermont State Geologist Reports, United States Geological Survey Bedrock Maps, Centennial Geological Map of Vermont, the Surficial Geologic Map of Vermont and other references.

The granular materials map shows 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 conducted by Professor D. P. Stewart of Miami University, Oxford, Ohio, who mapped the glacial features of the State of Vermont during the summer months from 1956 to 1966. Further information is obtained from the Soil Survey (Reconnaissance) of Vermont (conducted by the Bureau of Chemistry and Soils of the United States Department of Agriculture), 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. The number and location of tests taken in each area represented by an Identification

Number is determined by the nature of the material or its topographic feature.

Also included in this report 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 an active card file compiled and updated by the Engineering Geology Section of the Materials Division over a period of years. Transfer of information from the cards to the data sheets was made and the location of the deposits was plotted on the maps. However, some cards in the file were not used because of incomplete or unidentifiable information on the location of the deposit. Caution should be exercised wherever this information appears incomplete.

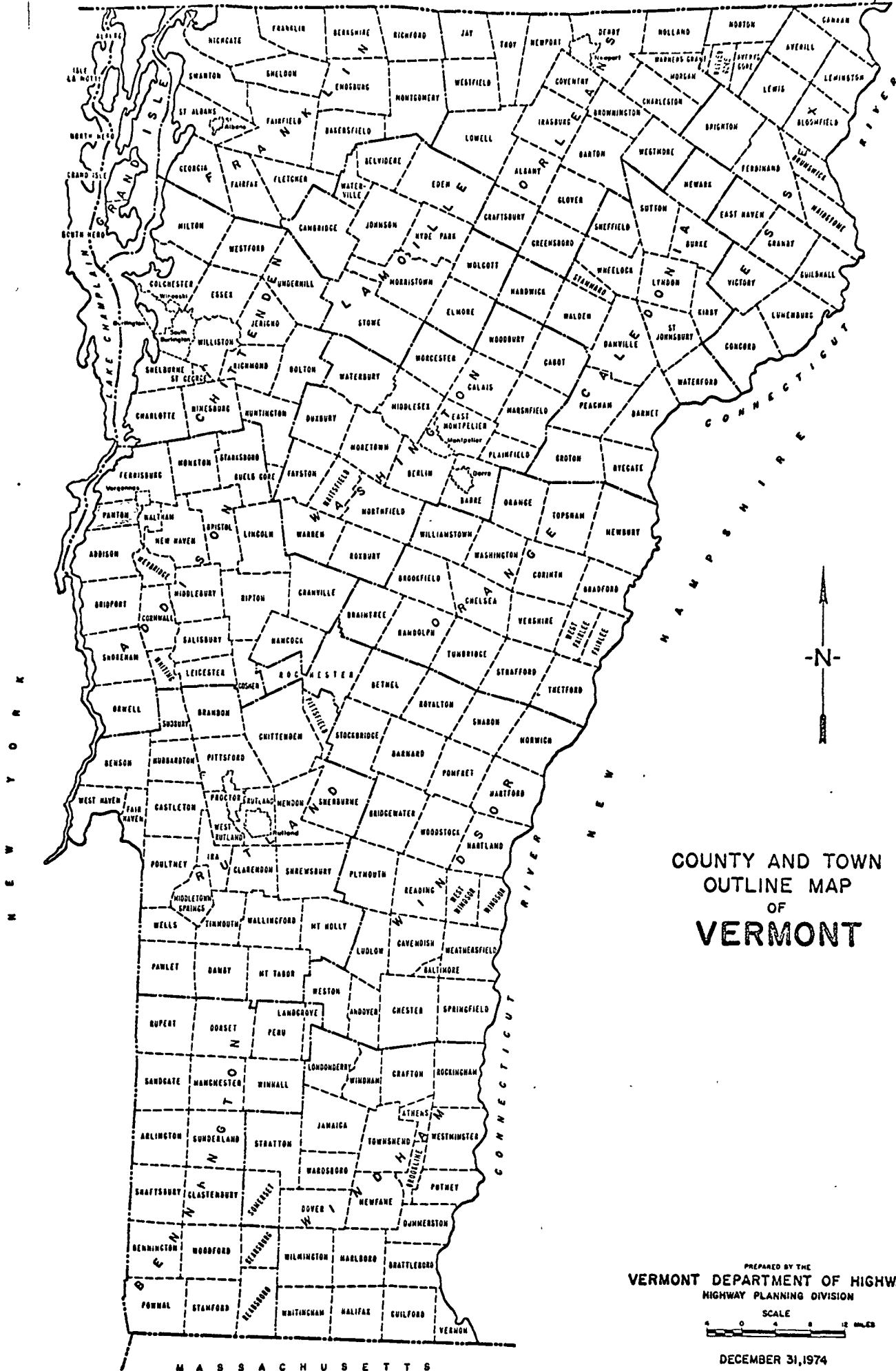
Work sheets, containing more detailed information and a field sketch of the area represented by the Identification Number, and laboratory reports are on file in the Materials Division of the Vermont Department of Highways.

LOCATION

The town of Panton is on the northwest side of Addison County in west-central Vermont. It is bounded on the north by Ferrisburg, on the northeast by the city of Vergennes, on the east by Waltham, on the south by Addison, and on the west by Lake Champlain. (See County and Town Outline Map of Vermont on the following page.)

The town has nearly flat topography and a low relief which varies from a high of 320 feet on a hill in the southeast corner of town, to 95 feet at the surface of Lake Champlain. Broad, low rises which trend north-northeast parallel the flat fields on both sides of the marshlands of Dead Creek in the center of town.

Drainage is to the north via Dead Creek and Holcomb Slang. The north-flowing Otter Creek forms the eastern boundary of the town. Several small, unnamed brooks drain westward into Lake Champlain.



SURVEY OF ROCK SOURCES

Procedure for Rock Survey

The method employed by the project in a survey of possible sources of rock for highway construction is divided into two main stages: office and field investigations.

The office investigation is conducted primarily during the winter months and comprises the mapping and description of rock types as indicated in the many reference sources, as indicated in the bibliography. These references differ considerably in dependability due to new developments and studies that have contributed to the obsolescence of a number of reports. In addition, the results of samples taken by other individuals are analyzed, and the location at which these samples were taken, is mapped when possible. As complete a correlation as possible is made of all the available information concerning the geology of the area under consideration.

The field investigation is begun by making a cursory survey of the entire town. The information obtained from this preliminary survey, as well as that assimilated in the office investigation, is used to determine the areas where sampling will be concentrated. When a promising source has been determined by rock type, volume of material, accessibility, and adequate exposure and relief, chip samples are taken with a hammer across the strike or trend of the rock, and are submitted to the Materials Division for abrasion testing by the Deval Method (AASHTO T-3) and the Los Angeles Method (AASHTO T-96). Samples taken by the chip method are often within the weathered zone of the outcrop and consequently may give a less satisfactory test result than fresh material deeper in the rock structure. When the rock is uniform, and the chip samples yield acceptable abrasion test results, the material source is included in this report as being satisfactory.

DISCUSSION OF ROCK AND ROCK SOURCES

The information on the Rock Materials Map is simplified. (For a more detailed description of the respective rock formations, see the summary included in this report.) In the summary, it is apparent the rocks that underlie the town are sedimentary and metamorphic in origin.

The western quarter of town is mapped (see Plate II) as being underlain by limestones of the Orwell, Valcour, and Crown Point formations; the Bridport Dolomite, the Stony Point Shale and Limestone, the Day Point Limestone and Sandstone, and the Hortonville-Glens Falls Slate, Phyllite and Limestone. The only formation exposed was the Orwell Limestone; it was sampled at Map Identification Numbers 1 and 2 and yielded material acceptable for Crushed Stone for Subbase.

The central half of town is mapped as being underlain by the slate, phyllite and limestone of the Hortonville-Glens Falls Formation, and the shale and limestone of the Stony Point Formation, but neither was found.

The eastern quarter of town is underlain by the Clarendon Springs Dolomite, which yielded material acceptable for Crushed Stone for Subbase at Map Identification Number 3. The Whitehall Limestone and Dolomite yielded material acceptable for Crushed Stone for Subbase at Map Identification Number 4. The Cutting Dolomite and the Bascom Dolomite, Limestone and Marble, mapped as underlying the extreme east part of town, were not located.

The rock sources are listed in most promising order first: Map Identification Numbers 2, 4 and 1.

SURVEY OF SAND AND GRAVEL SOURCES

Procedure for Sand and Gravel Survey

The method employed by the project in a survey of possible sources of sand and gravel for highway construction is divided into two main stages: office and field investigations.

The office investigation is conducted primarily during the winter months and comprises the mapping of potentially productive areas from various references. Of these references, the survey of glacial deposits mapped by Professor Stewart proves to be particularly helpful 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 the recognition and location of physiographic features indicating glacial deposits, and in the study of drainage patterns. The locations of existing pits are mapped, as are the locations in which samples were taken by other individuals.

The field investigation is begun by making a cursory survey of the entire town. All pits, and any areas that show evidence of glacial or fluvial deposition are noted, and later investigated by obtaining samples of materials from pit faces and other exposed surfaces. Test holes in pit floors and extensions are dug with a backhoe to a depth of approximately 11 feet to obtain samples which are submitted to the Materials Division where they are tested for stone abrasion by the AASHTO T-4 Method, and sieved for gradation.

DISCUSSION OF SAND AND GRAVEL DEPOSITS

Results of this survey showed that granular materials in Panton are nearly non-existent. The two areas mapped (see Plate I) as being features containing granular material, were occupied by farms or houses, and neither showed evidence of having granular material.

Map Identification Number 1 was a foundation hole east of Lake Champlain, which was sampled only to obtain a record of the material between the lake and East Panton, and was an A-7-6 clay. Map Identification Number 2 yielded an A-7-6 clay. Acceptable Sand Borrow and Cushion was found at Map Identification Number 3 and Number 4 (a small pit) but neither site had much reserves. Map Identification Number 5 was sampled only because it was a pit; however, it was depleted, and yielded material with more than 90% finer than the No. 200 sieve.

Overall, the material in town is mostly the fine sediments typical of those near Lake Champlain (see Map Identification Numbers 1, 3 and 5).

SUMMARY OF ROCK FORMATIONS IN THE TOWN OF PANTON

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.

Chazy Limestone (Crown Point Member): Lead-gray compact massive limestone that weathers to gray surface; becomes more argillaceous and thin-bedded toward top.

Chazy Limestone (Day Point Member): Calcareous quartz sandstone, and calcarenite; orange-weathered, dolomitic siltstones are common in eastern areas.

Chazy Limestone (Valcour Member): Dark gray calcarenite, succeeded by medium-to-light gray, buff-weathered, silty, partly coquinal limestone.

Chipman Formation (Bridport Dolomite Member): Buff-to brown-weathered, sharply defined and laterally persistent beds of medium-bedded to massive, scored dolomite.

Clarendon Springs Dolomite: 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.

Cutting Dolomite: Typically, a massive, gray-weathered, non-descript dolomite with a finely laminated, calcareous sandstone at the base.

Hortonville-Glens Falls Formation (Undifferentiated): Combined where the formation contact is widely covered by surficial deposits. Thin beds of dark blue-gray, coarsely granular, and highly fossiliferous limestone (Glens Falls) are succeeded by beds of black, carbonaceous, and pyritic slate and phyllite, locally sandy. Brown-weathered limy beds are common in the slates.

Orwell Limestone: Smooth-ledged, sublithographic and lithographic, dove-gray weathered limestone commonly cut by veins of white calcite; beds filled with fossil shell fragments are characteristic.

Stony Point Formation: Predominantly calcareous black shale that grades upward into argillaceous limestone and rare dolomite beds.

Whitehall Formation: Predominantly a massive dolomite interbedded with white marble or gray limestone. The marble or limestone is characterized by raised reticulate lines of gray dolomite on the weathered surface.

GLOSSARY OF SELECTED GEOLOGIC TERMS

Argillaceous: Containing or consisting of clay. The term is commonly used with rock names to indicate the presence of clay; as, argillaceous limestone, argillaceous sandstone.

Bedding: The arrangement of rock or granular material in layers.

Bedrock: The more or less solid, undisturbed rock at the surface, or beneath deposits of soil.

Bedrock Control: Land features which show bedrock on, or close to, the surface; also used to describe part of the topography.

Breccia: A rock made up of consolidated angular rock fragments larger than sand grains. It is like conglomerate, except that most of the fragments are angular with sharp edges and unworn corners. The unconsolidated equivalent is Rubble.

Calcareous: Consisting of, or containing calcium carbonate (CaCO_3), with the limits of 10 to 50 percent.

Coquinal: Rock consisting predominantly of whole or broken calcareous shells.

Drainage: The manner by which water moves on or beneath the earth's surface, in streams, rivers, brooks, and channels.

Geodes: A hollow nodule or concretion of stone lined with inwardly pointing crystals.

Interbedded: Occurring between beds, or lying adjacent and parallel to other beds of a different nature.

Lamina: A thin layer of stratified rock, 1 cm. or less in thickness.

Outcrop: The part of a body of rock that appears bare and exposed at the surface of the ground.

Phyllite: A fine-grained, foliated metamorphic rock intermediate between the mica schists and slates into which it may grade. The foliation is caused by large amounts of potash mica (sericite) which gives the rock a distinctive silvery appearance.

Relief: The term used to designate the difference in elevation between the summits and lowlands of a particular region.

Shale: A term for lithified muds, clays and silts that tend to split into thin sheets along the bedding planes or along cleavage planes. Shale differs from mudstone, claystone and siltstone by having the pronounced tendency to split (fissility).

Slate: A homogeneous, metamorphic rock, so fine-grained that no mineral grains can be seen. Slate splits with a foliation so perfect that it yields slabs having plane surfaces almost as smooth as the cleavage planes of minerals; hence this variety of foliation is termed slaty cleavage.

Water Table: The upper surface of a zone of saturation, except where the surface is formed by an impermeable body.

Weathered: Showing the effects of exposure to the atmosphere.

BIBLIOGRAPHY

- The Glacial Geology of Vermont; David P. Stewart; Vermont Geological Survey Bulletin No. 19; 1961.
- Soil Survey (Reconnaissance) of Vermont, W. J. Latimer; 1930; Bureau of Chemistry and Soils, United States Department of Agriculture.
- Soil Exploration and Mapping; 1950; Highway Research Board, Bulletin 28.
- Survey of Highway Aggregate Materials in West Virginia; December, 1959; Engineering Station, West Virginia University, Morgantown, West Virginia.
- Materials Inventory, Bangor Quadrangle, South Half; September, 1959; University of Maine.
- Glacial Geology and the Pleistocene Epoch, R. F. Flint; 1947; John Wiley and Sons, Inc.
- A Handbook of Rock, J. F. Kemp; June, 1946; D. Van Nostrand Company, Inc.
- Rock and Rock Minerals, L. F. Pirsson; June, 1949; John Wiley and Sons, Inc.
- Glossary of Selected Geologic Terms, W. L. Stokes and D. J. Varnes; 1955; Colorado Scientific Proceedings, Vol. 16.
- Centennial Geologic Map of Vermont, C. G. Doll; 1961.
- Lexicon of Geologic Names of the United States for 1936-1960; Grace C. Kerohar; Geological Survey Bulletin 1200, United States Department of the Interior.
- Port Henry, New York - Vermont Quadrangle; Geological Survey, United States Department of the Interior, 1947.
- The Surficial Geology and Pleistocene History of Vermont; David P. Stewart and Paul Mac Clintock; Vermont Geological Survey Bulletin No. 31; 1969.
- Surficial Geological Map of Vermont, C. G. Doll; 1970.

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, January, 1972.

DIVISION 700 - MATERIALS

703.03 SAND BORROW AND CUSHION. Sand borrow shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and shall meet the requirements of the following table:

TABLE 703.03A - SAND BORROW AND CUSHION

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	TOTAL SAMPLE	SAND PORTION
2"	100	
1½"	90-100	
½"	70-100	
No. 4	60-100	100
No. 100		0- 30
No. 200		0- 12

703.05 GRANULAR BORROW. Granular borrow shall be obtained from approved sources, consisting of satisfactorily graded, free draining, hard, durable stone and coarse sand reasonably free from loam, silt, clay, or organic material.

The Granular Borrow shall meet the requirements of the following table:

TABLE 703.05A - GRANULAR BORROW

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	TOTAL SAMPLE	SAND PORTION
No. 4	20-100	100
No. 200		0- 15

The maximum size stone particles of the Granular Borrow shall not exceed 2/3 of the thickness of the layer being spread.

704.05 GRAVEL FOR SUB-BASE. Gravel for Sub-base shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and shall meet the following requirements:

- (a) Grading. The gravel shall meet the requirements of the following table:

TABLE 704.05A - GRAVEL FOR SUB-BASE

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	TOTAL SAMPLE	SAND PORTION
No. 4	20-60	100
No. 100		0- 18
No. 200		0- 8

The stone portion of the gravel shall be uniformly graded from coarse to fine, and the maximum size stone particles shall not exceed $\frac{2}{3}$ the thickness of the layer being placed.

- (b) Percent of Wear. The percent of wear of the gravel shall be not more than 25 when tested in accordance with AASHTO T-4, or more than 40 when tested in accordance with AASHTO T-96.

704.06 CRUSHED STONE FOR SUB-BASE. Crushed stone for sub-base shall consist of clean, hard, crushed stone, uniformly graded, reasonably free from dirt, deleterious material, pieces which are structurally weak and shall meet the following requirements:

- (a) Source. This material shall be obtained from approved sources and the area from which this material is obtained shall be stripped and cleaned before blasting.
- (b) Grading. This material shall meet the requirements of the following table:

TABLE 704.06A - CRUSHED STONE FOR SUB-BASE

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	TOTAL SAMPLE	
$4\frac{1}{2}$ "		100
4"		90-100
$1\frac{1}{2}$ "		25- 50
No. 4		0- 15

- (c) Percent of Wear. The percent of wear of the parent rock shall be not more than 8 when tested in accordance with AASHTO T-3, or the crushed stone a percent of wear of not more than 40 when tested in accordance with AASHTO T-96.

- (d) Thin and Elongated Pieces. Not more than 30 percent, by weight, of thin and elongated pieces will be permitted.

Thin and elongated pieces will be determined on the material coarser than the No. 4 sieve.

- (e) Filler. The filler shall be obtained from approved sources and shall meet the requirements as set up for Sand Cushion, Subsection 703.03.
- (f) Leveling Material. The leveling material shall be obtained from approved sources and may be either crushed gravel or stone screening produced by the crushing process. The material shall consist of hard durable particles, reasonably free from silt, loam, clay or organic matter.

This material shall meet the requirements of the following table:

TABLE 704.06B - LEVELING MATERIAL

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves TOTAL SAMPLE
3/4"	100
1/2"	70-100
No. 4	50- 90
No. 100	0- 20
No. 200	0- 10

704.07 CRUSHED GRAVEL FOR SUB-BASE. Crushed gravel for sub-base shall consist of material reasonably free from silt, loam, clay or organic matter. It shall be obtained from approved sources and shall meet the following requirements:

- (a) Grading. The crushed gravel shall be uniformly graded from coarse to fine and shall meet the requirements of the following table:

TABLE 704.07A - CRUSHED GRAVEL FOR SUB-BASE

GRADING	Sieve Designation	Percentage by Weight Passing Square Mesh Sieves TOTAL SAMPLE	SAND PORTION
COARSE	4"	100	
	No. 4	25- 50	100
	No. 100		0- 20
	No. 200		0- 12
FINE	2"	100	
	1 1/2"	90-100	
	No. 4	30- 60	100
	No. 100		0- 20
	No. 200		0- 12

- (b) Percent of Wear. The percent of wear of the parent gravel shall be not more than 20 when tested in accordance with AASHTO T-4, or the crushed gravel a percent of wear of not more than 35 when tested in accordance with AASHTO T-96.
- (c) Fractured Faces. At least 30 percent, by weight, of the stone content shall have at least one fractured face.

Fractured faces will be determined on the material coarser than the No. 4 sieve.

704.09 DENSE GRADED CRUSHED STONE FOR SUB-BASE. Dense graded crushed stone for sub-base shall consist of clean, hard, crushed stone, uniformly graded, reasonably free from dirt, deleterious material and pieces which are structurally weak, and shall meet the following requirements:

- (a) Source. This material shall be obtained from approved sources and the area from which this material is obtained shall be stripped and cleaned before blasting.
- (b) Grading. This material shall meet the requirements of the following table:

TABLE 704.09A - DENSE GRADED CRUSHED STONE FOR SUB-BASE

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves TOTAL SAMPLE
3½"	100
3"	90-100
2"	75-100
1"	50- 80
½"	30- 60
No. 4	15- 40
No. 200	0- 10

- (c) Percent of Wear. The percent of wear of the parent rock shall be not more than 8 when tested in accordance with AASHTO T-3, or the crushed stone a percent of wear of not more than 40 when tested in accordance with AASHTO T-96.
- (d) Thin and Elongated Pieces. Not more than 30 percent, by weight, of thin or elongated pieces will be permitted.

Thin and elongated pieces will be determined on the material coarser than the No. 4 sieve.

704.10 GRAVEL BACKFILL FOR SLOPE STABILIZATION. Gravel backfill for slope stabilization shall be obtained from approved sources, consisting of satisfactorily graded, free draining, hard, durable stone and coarse sand reasonably free from loam,

silt, clay, and organic material.

The gravel backfill shall meet the requirements of the following table:

TABLE 704.10A - GRAVEL BACKFILL FOR SLOPE STABILIZATION

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	TOTAL SAMPLE	SAND PORTION
No. 4	20-50	100
No. 100		0- 20
No. 200		0- 10

The stone portion of the gravel backfill shall be uniformly graded from coarse to fine, and the maximum size stone particles shall not exceed $\frac{2}{3}$ the thickness of the layer being placed.

704.11 GRANULAR BACKFILL FOR STRUCTURES. Granular backfill for structures shall be obtained from approved sources, consisting of satisfactorily graded, free draining granular material reasonably free from loam, silt, clay, and organic material.

The granular backfill shall meet the requirements of the following table:

TABLE 704.11A - GRANULAR BACKFILL FOR STRUCTURES

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	TOTAL SAMPLE	SAND PORTION
3"	100	
2½"	90-100	
No. 4	50-100	100
No. 100		0- 18
No. 200		0- 8

PANTON GRANULAR DATA SHEET NO. 1

TABLE I

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
1-	1	1975	1-8	0-1	No	100	100	100	100	97.3	96.3	---	---	Owner: John Viscup. Area is among pines beyond west end of Town Highway No. 11. The sample was taken from a foundation excavation for a new house and represents material bordering the lake. Test No. 1 was on east wall of excavation. Material was: 1' - 8', clay with varves. Soil classification: a-7-6 clay.
2	1	1975	0-2	---	No	100	100	100	100	49	18	---	---	Owner: William DeGraaf. Area is south of trees on northern edge of cornfield, 0.1 mile south of State Aid Highway No. 1, and 0.77 mile west of its junction with State Aid Highway No. 3. Owner allowed only one test hole in area. Test No. 1 was near field road near trees. Material was: 0' - 2', compact silty sand.
	2	1975	0-8	---	No	100	100	100	100	98.7	97.4	---	---	Test No. 2 was 10 feet north of Test No. 1. Material was: 0' - 2', silty fine sand; 2' - 8', blue-gray silt-clay. Soil classification: A-7-6, clay.
3	1	1975	1.5-6	0-1.5	No	100	100	100	100	20	5	---	Sand	Owner: William DeGraaf. Area is a pasture with tiny, shallow pit near northwest

PANTON GRANULAR DATA SHEET NO. 2

TABLE I

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						2"	1-1/2"	1/2"	#4	#100	#200			
														corner, 0.1 mile north of State Aid Highway No. 1 and 0.22 mile west of its junction with State Aid Highway No. 3. Owner allowed only one test hole in tiny pit. Test No. 1 was in pit floor. Material was: 1.5' - 6', sand and fine sand seams; much water at 6' caused caving. Material was used for the Girl Scout Camp in town.
4	1	1975	0-9	---	Yes	100	100	100	100	66	50	---	---	Owner: Joseph Miner. Area is large cornfield with tiny pit at edge of woods, 0.42 mile southwest of State Aid Highway No. 1, 0.02 mile west of its junction with State Aid Highway No. 3. Test No. 1 was in floor of tiny pit. Material was: 0' - 3', sand; 3' - 7', blue-gray silty fine sand; 7' - 9', blue-gray silt-clay. There was a layer of small clam shells at 7'. Hole bottomed at 9' in water.
	2	1975	1-4	0-1	Yes	100	100	100	99	6	4	---	Sand	Test No. 2 was in north face of pit, 20 feet northeast of Test No. 1. Material was: 1' - 4', reddish-brown sand.

PANTON GRANULAR DATA SHEET NO. 3

TABLE I

[illegible]

TABLE I

SUPPLEMENT

PANTON PROPERTY OWNERS - GRANULAR

	Map Identification No.
DeGraaf, William	2, 3
Fisher, Osman	5
Miner, Joseph	4
Viscup, John	1

PANTON ROCK DATA SHEET NO. 1

Table II

Map Ident. No.	Field Test No.	Year Field Tested	Rock Type	Exist-ing Quarry	Method of Sampling	Abrasion AASHTO		Remarks
						T-3	T-96	
1	1-A	1975	Limestone	No	Chip	3.9%	26.6%	Owner: Floyd Whittemore. Area is rocky pasture north of the junction of State Aid Highway No. 2 and Town Highway No. 9. The outcrop is 50 to 70 feet wide and rises gently to the west 20 to 30 feet. The rock was sampled along the strike, north-northwest; development may be from east-to-west, and south-to-north. The rock is limestone of the Orwell Formation. Test No. 1-A was a 175-foot sample taken southward along the strike, starting 500 feet north-northwest of the gate at southern corner of pasture.
	1-B	1975	Limestone	No	Chip	4.5%	27.8%	Test No. 1-B was a 175-foot sample taken along the strike for 175 feet southward from Test No. 1-A. The rock breaks mostly sub-angular to angular and blocky.
2	1-A	1975	Limestone	No	Chip	4.2%	25.9%	Owner: Nicolaas Bliek. Area is a pasture with a low, long outcrop west of Town Highway No. 4; access is 0.8 mile south of its junction with State Aid Highway No. 1. Terrain has low relief, but bedrock rises to the west in level steps. The beds vary from thick-to-thin and are nearly horizontal; fragments broke blocky to sub-angular, and were quite hard. The contact between the Orwell Formation and the Valcour Member of the Chazy Limestone may be at, or just west of this location. Test No. 1-A was a 150-foot sample taken southward along the strike, starting 300 feet north along the major outcrop west of the gate.
	1-B	1975	Limestone	No	Chip	3.8%	26.2%	Test No. 1-B was a 150-foot sample taken along the strike southward from Test No. 1-A. Owner said material would be available.

PANTON ROCK DATA SHEET NO. 2

Table II

Map Ident. No.	Field Test No.	Year Field Tested	Rock Type	Exist- ing Quarry	Method of Sampling	Abrasion AASHTO		Remarks
						T-3	T-96	
3	1-A	1975	Dolomite	No	Chip	3.6%	19.6%	Owner: State of Vermont. Area is a rock cut on east side of Vermont Route 22-A, which was sampled to show type of material in the bedrock-control pasture east of the highway R.O.W.. The outcrop is exposed 0.27 mile north of the Addison Town Line and extends 0.11 mile to the north. The rock is the Clarendon Springs Dolomite; it strikes N.20°E. and dips 10°-15° to the southeast. It breaks mostly blocky with some minor angular and thin and elongated pieces. The beds generally are thicker than 2 inches. The sample was taken along the strike and represents 10 feet of relief. Test No. 1-A was a 200-foot sample taken southward from the north end of the outcrop.
	1-B	1975	Dolomite	No	Chip	3.2%	24.5%	Test No. 1-B was a 200-foot sample taken southward from Test No. 1-A.
4	1-A	1975	Dolomite	No	Chip	2.0%	25.2%	Owner: George Jackson. Area is a sloping pasture, west of Town Highway No. 5, which was sampled from scattered outcrops along the flank of the hill. Bedrock control extends northward from the pasture hillside. The total height of the ridge is 50 to 60 feet. The entire ridge would yield a considerable amount of material. The rock is in the Whitehall Formation which is predominantly a massive dolomite interbedded with white marble or gray limestone (only the massive dolomite was noted in this area). The siliceous dolomite was very hard, and broke like a quartzite (angular to sub-angular). Test No. 1-A was a 75-foot sample of scattered outcrops in the northern part of the exposures.

PANTON ROCK DATA SHEET NO. 3

Table II

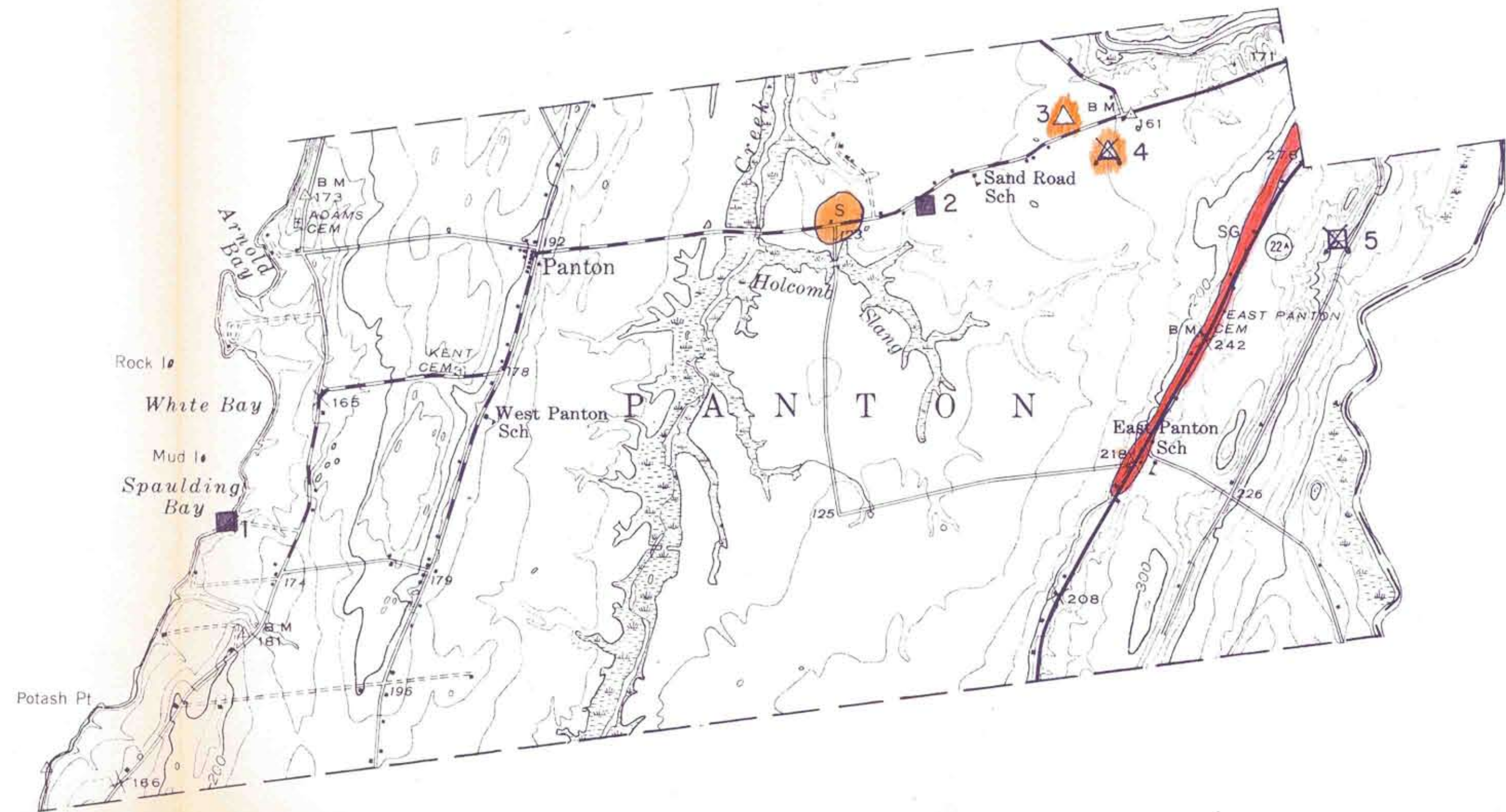
[illegible]

TABLE II
SUPPLEMENT

PANTON PROPERTY OWNERS - ROCK

Map Identification
No.

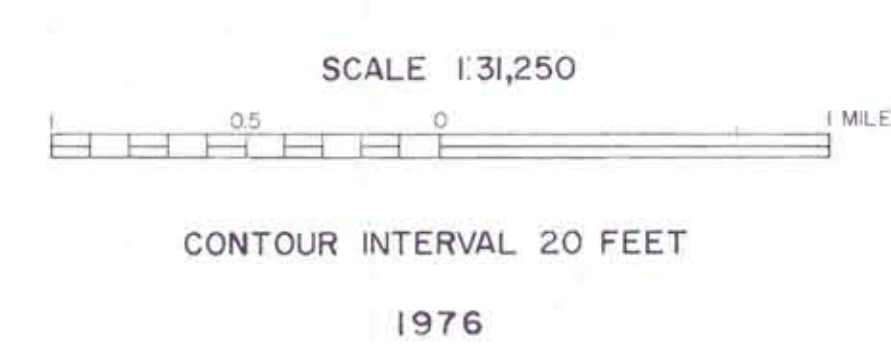
Bliek, Nicholaas	2
Jackson, George	4
Vermont, State of	3
Whittemore, Floyd	1



LEGEND

- GRAVEL, ACCEPTABLE FOR ITEM 704.05 (gravel for sub-base)
- GRAVEL, DEPLETED OR NOT ACCEPTABLE FOR ITEM 704.05
- △ SAND, ACCEPTABLE FOR ITEM 703.03 (sand borrow and cushion)
- ▲ SAND, DEPLETED OR NOT ACCEPTABLE FOR ITEM 703.03
- GRANULAR BORROW, ITEM 703.05
- MATERIAL NOT ACCEPTABLE FOR ITEM 703.05
- ✕ EXISTING PIT
- SG SAND & GRAVEL DEPOSIT
- S SAND DEPOSIT
- 3 IDENTIFICATION NUMBER (refer to data sheets)

PANTON



1976

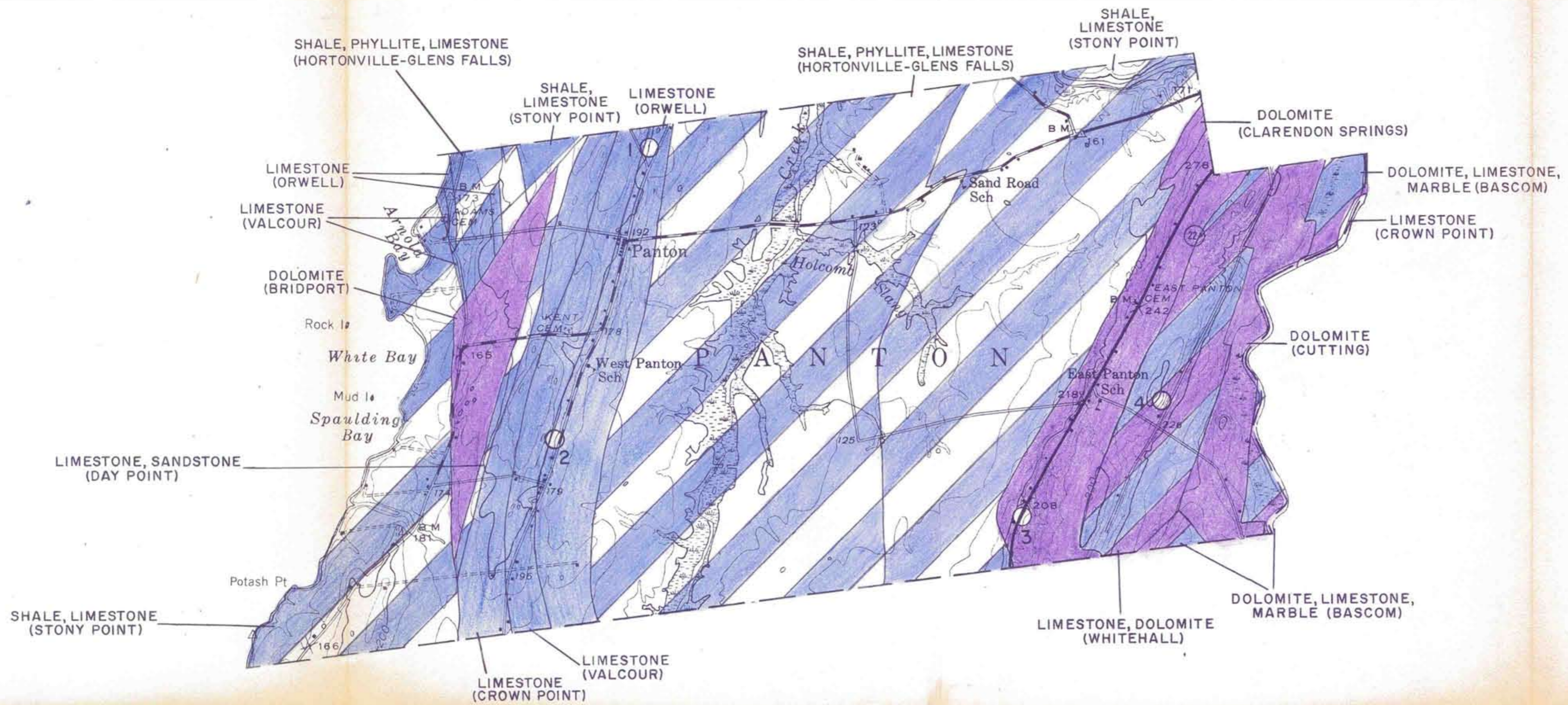
GRANULAR MATERIALS MAP

BY
VERMONT DEPARTMENT OF HIGHWAYS
IN COOPERATION WITH
U.S. BUREAU OF PUBLIC ROADS










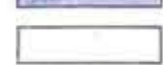


NOTE: BASED ON U.S.G.S TOPOGRAPHIC MAPS

REVISIONS

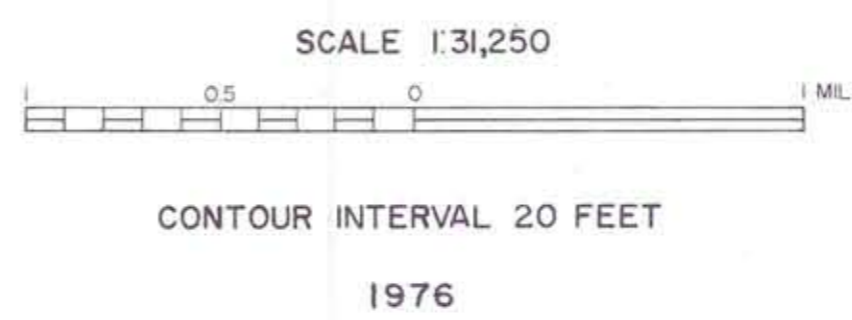
DATE					
BY					



LEGEND

-  ROCK, ACCEPTABLE FOR ITEM 704.06 (crushed stone for sub-base)
-  ROCK, NOT ACCEPTABLE FOR ITEM 704.06
-  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
-  SCHIST, SLATE, PHYLLITE, SHALE, SANDSTONE, CONGLOMERATE
-  IDENTIFICATION NUMBER (refer to data sheets)

PANTON



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

DATE						
BY						