SURVEY OF HIGHWAY CONSTRUCTION MATERIALS

IN THE TOWN OF WATERVILLE, LAMOILLE 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

April, 1975

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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.

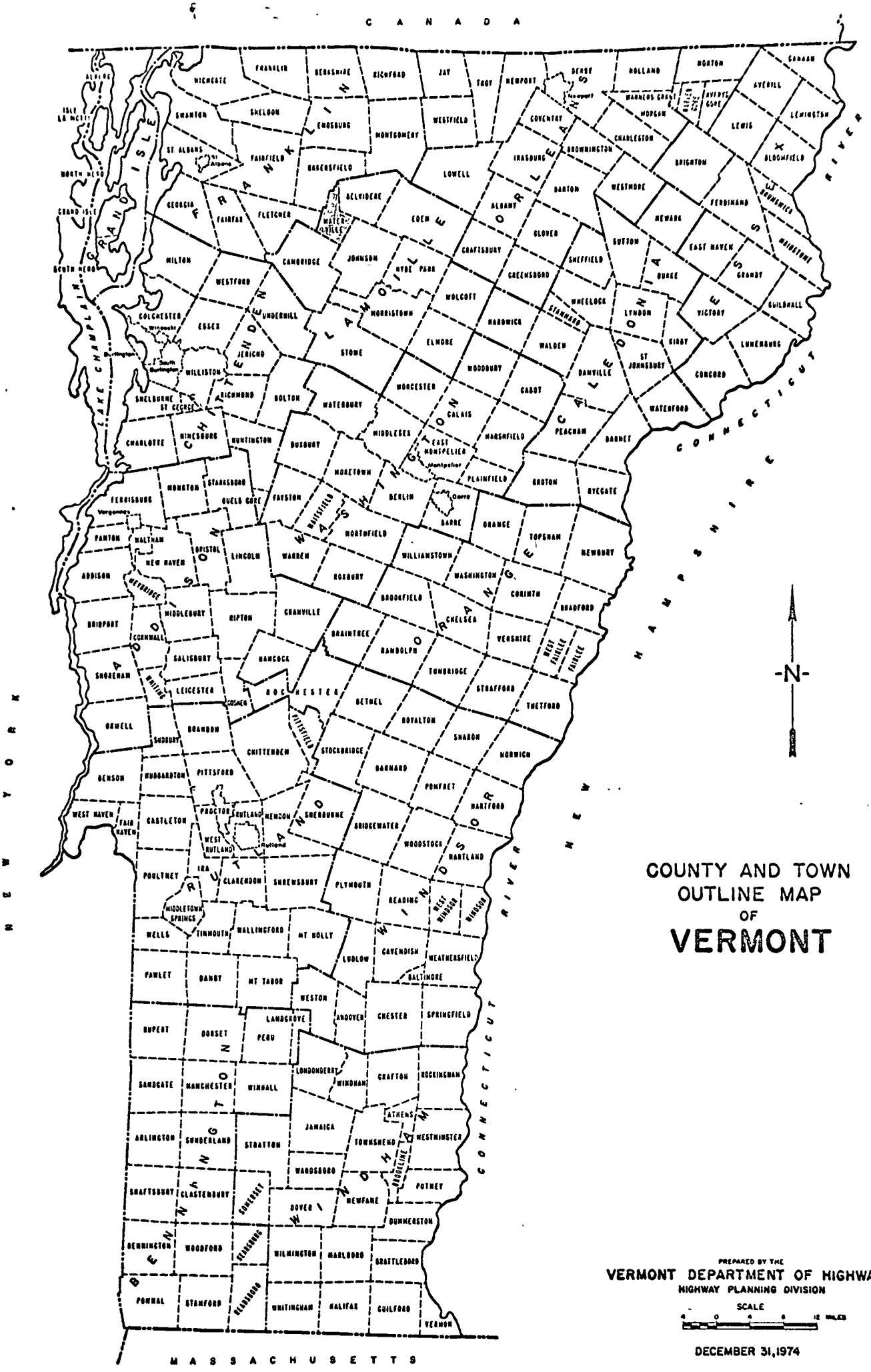
Work sheets, containing more detailed information and a field sketch of the area represented by the Identification Number, and laboratory reports are on file in the Materials Division of the Vermont Department of Highways.

LOCATION

The town of Waterville is located in northwest Lamoille County in the north-central part of the State. It is bounded on the northeast by Belvidere, on the southeast by Johnson, on the southwest by Cambridge, on the west by Fletcher, and on the northwest by Bakersfield (See County and Town Outline Map of Vermont on the following page).

Waterville lies within the Green Mountain Physiographic subdivision of the New England Upland. Its topography is characterized by rugged, steep sided, mountainous terrain with elevations ranging from about 2,400 feet at the Belvidere town line (southwest of the summit of Laraway Mountain); to less than 480 feet, where the North Branch of the Lamoille River crosses the Cambridge town line.

Principal drainage is southwestward via the North Branch, and its tributaries: Codding, Judevine, Streeter, and Taylor Brooks.



COUNTY AND TOWN OUTLINE MAP OF VERMONT

PREPARED BY THE
VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION

SCALE

DECEMBER 31, 1974

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 somewhat simplified. (For a more detailed description of the rock formations, see the Summary of Rock Formations included in this report.)

The town of Waterville is underlain predominantly by the quartz-sericite schist of the Hazens Notch Formation which was not sampled because it is mantled by glacial drift and forests. The silvery, gray-green quartz-sericite schist of the Underhill Formation is mapped as a narrow band along the Fletcher town line in the southwest corner of town, but the owner did not allow access over his property; it is mapped along the Cambridge town line in the south end of town but no outcrops were noted. A narrow strip of the silver-green quartz-sericite schist of the Jay Peak Member of the Underhill Formation is mapped along the Bakersfield town line but was inaccessible due to heavily wooded rough terrain. A small patch of ultramafic serpentinite is mapped in the north part of town, but was not noted by the field survey. The Hazens Notch Greenstone was sampled from a thin band in the wooded northwest corner of town. The rock is a heavily weathered, highly distorted, thin-bedded sericite-albite-quartz-greenstone which yielded failing results for both the AASHTO-T-3 and T-96 abrasion tests. Occasionally, a random piece of the greenstone contained more quartz and was much harder than the surrounding rock. It should be noted that the outcrop was very heavily weathered; sub-surface exploration might yield a better indication of the quality of this rock.

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

Most granular materials in the town of Waterville occur at elevations between 700 feet (the left bank of the North Branch of the Lamoille River) and 780 feet (in the vicinity of Streeter Brook about half a mile north of its confluence with the North Branch). According to Stewart and MacClintock, these valleys were inundated by Lake Vermont during the last retreat of glacial ice during Wisconsin time. Gravel was deposited as beach ridges at the edge of the lake, and deltas where meltwater streams entered the lake from the northwest. Probably the most extensive gravel deposit being worked at the time of this survey is north and west of the pit at Map Identification No. 9. A source of good gravel was found at Map Identification No. 10, however the area has limited extensions and limited depth of material. Small amounts of gravel for subbase were found at Map Identification Nos. 2 and 12 and would need further testing to determine exact volume and also Map Identification No. 5, which proved to have little or no extension. Map Identification No. 19 had acceptable gravel for subbase in the pit, however owner would not allow any backhoe sampling.

Map Identification No. 9 would also be a good source of sand borrow and cushion, as would Map Identification Nos. 13 and 11. No backhoe test-holes were allowed at Map Identification No. 13, which was nearly depleted pit; and only one at Map Identification No. 11, a site which looks promising for future use. Material at Map Identification No. 1 met requirements for granular borrow but may need modification (sieves-crusher) before it could be used for other items. Map Identification No. 14 yielded passing sand and gravel tests, but area would not be very promising due to amount of work needed to clear strippings, overburden and other undesirable material.

Material at Map Identification Nos. 3, 4, 6, 7, 8, 15, 16, 17, 18, 20, 21, and 22 either failed to meet specifications or was deemed unavailable by the owner.

For future reference there are promising areas which could not presently be tested that should be noted; they are: (1) Mr. Dallas Montgomery's large granular-looking field on the east side of Vermont Route 109 and north of the junction of Vermont Route 109 and Town Highway No. 14. (2) Mr. Victor Quinty's large fields and woodland bordering Royale Bradley's property, located northwest of Town Highway No. 15. (3) Dennis Thomas' large field, which borders Greg Griffins property and is located northwest of Town Highway No. 20 and north of the junction of Town Highway Nos. 20 and 17. (4) Mr. Allison Zansler's old pit, which has a house being built in it, west of Town Highway No. 4 and nearly on Waterville-Bakersfield town line.

SUMMARY OF ROCK FORMATIONS IN THE TOWN OF WATERVILLE

Hazens Notch formation: Interbedded carbonaceous and noncarbonaceous quartz-sericite-albite-chlorite schist; grades to quartzite and gneiss.

Hazens Notch Greenstone: Chiefly albite-actinolite-chlorite-epidote greenstone; locally hornblende-epodote-chlorite-albite amphibolite.

Underhill formation: Silvery, gray-green, quartz-sericite-albite-chlorite-biotite schist containing abundant lenticular segregations of granular white quartz; locally quartz-sericite-albite-chlorite phyllite; porphyroblasts of albite, garnet, and magnetite are common and locally very abundant in gneissic facies in axial anticlines of the Green Mountain anticlinorium.

Jay Peak member of the Underhill formation: Pale, silver-green, quartz-sericite-chlorite-albite schist, locally quartzitic.

Ultra Mafic Rocks: Serpentinite, carbonate rock, talc-carbonate rock and steatite.

GLOSSARY OF SELECTED GEOLOGIC TERMS

Albite: The light-colored sodium end member of the plagioclase feldspar group found in alkali rocks.

Amphibolite: A green to black metamorphic rock possessing more or less pronounced schistose structure and consisting partly or mainly of amphibole (i.e. tremolite, actinolite, hornblende, or arfvedsonite).

Anticlinorium: A large composite fold consisting of a series of smaller anticlines and synclines which have the general form of an arch or anticline. The term applies to relatively large features several miles wide.

Axial Anticline: The smaller anticlines located along the crest of an anticlinorium.

Beach: Usually well-sorted sand and pebbles deposited along a shore line.

Biotite: Black or brown mica.

Chlorite: A group of green hydrous silicates of magnesium and iron which may contain aluminum.

Delta: A deposit formed when a stream's velocity is decreased by entering a sea or lake; it usually is formed like the Greek letter Delta.

Epidote: A calcium aluminum iron silicate usually occurring as formless grains and masses in rocks. Epidote is usually green, pistachio-green or yellowish-green.

Facies: The aspect or appearance of a mass of earth material different in one or more ways from surrounding material.

Gneiss: Originally applied to a more or less banded, metamorphic rock with the mineral composition of granite. It now covers foliated metamorphic rocks with layers of visible, alternating light and dark minerals, (i.e. bands of granular minerals and tabular or schistose minerals).

Greenstone: A field term for metamorphic rocks which have chlorite, epidote, or actinolite.

Hornblende: A black, brown or green amphibole which occurs in prismatic masses in igneous and metamorphic rocks. It has a specific gravity of about 3.0 and a hardness of 5 to 6.

Lenticular: Lens-shaped.

Magnetite: A common, widely distributed accessory mineral of all rock classes. It is strongly magnetic, black, has a black streak and metallic luster. It's hardness is 5.5 to 6.5 and specific gravity is 5.16 to 5.18.

Outcrop: That part of rock which lies at or above the surface of the ground. Also used where the rock lies close to the surface but not exposed.

Phyllite: A fine-grained, foliated metamorphic rock between the mica schists and slates to which it may grade. Its foliation and pearly luster are due to a large amount of the potash mica: sericite.

Porphyroblasts: Large crystals in the fine-grained groundmass of a metamorphic rock formed in place by heat, pressure and solutions after the rock in which they form.

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

Schist: A crystalline metamorphic rock with a secondary foliation or lamination based on parallel alignment of platy or long grains. The rock tends to split along the foliation.

Sericite: A mineral similar to muscovite mica occurring as small flakes or scales in metamorphic rocks such as sericite phyllite, sericite schists, or sericite gneisses.

Serpentinite: A metamorphic rock containing mostly serpentine formed from the alteration of igneous rocks rich in olivine or other magnesium minerals. The process is known as: serpentinization.

Steatite: A soft impure, massive to schistose talc that may grade into talc schists. It feels greasy or soapy and can be cut with a knife. Also known as soapstone.

Ultramafic: Igneous rocks that have less than 45% silica, virtually no quartz or feldspar, and a correspondingly high amount of iron, magnesium, and calcium. The rocks occur as individual bodies or as segregations in larger igneous masses.

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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 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
4½"	100
4"	90-100
1½"	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	
	1½"	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 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

Table I

Waterville 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						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
1	1	1974	2-10	0-2	No	93	88	59	37	10	5	26.0%	Gran. Borrow (Grav.)	Owner: Wallace Coburn Area is a field northeast of Town Highway No. 6 about 0.25 mile from Town Highway No. 7. Test No. 1 was at north edge of field about 40 feet from the Town Highway. Material is: 2'-10', coarse gravel with 6" sand seams; bottom, coarse gravel.
2	1	1974	1-10	0-1	No	82	67	55	40	17	14	24.6%	Gran. Borrow (Grav.)	Owner: Wallace Coburn Area is a field northeast of Town Highway No. 6, east of, and separated by, woods from Map Identification No. 1. Test No. 1 was at southwest edge of field. Material is: 1'-10', bouldery gravel; bottom, same.
	2	1974	1.5-10	0-1.5	No	87	85	69	53	21	8	24.4%	Gran. Borrow (Grav.)	Test No. 2 was 270 feet east of Test No. 1 and located on a wooded ridge. Material is: 1.5'-8', sandy gravel; 3'-10', gravel with sand; bottom, gravel with sand.

Table I

Waterville 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						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
	3	1974	1-12	0-1	No	94	91	69	52	3	1	24.4%	Gravel	Sandy Gravel; 8'-10', gravel with sand; bottom, gravel with sand Test No. 3 was at edge of field about 240 feet north of Test No. 1. Material is: 1'-12', gravel; bottom same. Good looking material makes this the best location for a pit.
3	1	1974	1-8	0-1	No	61	61	46	34	11	6	28.0%	Gran. Borrow (Grav.)	Owner: Wallace Coburn Area is a field southwest of Town Highway No. 6 about 0.15 mile from Town Highway No. 7. Test No. 1 was in middle of 350'x160' field. Material is: 1'-8', coarse gravel; bottom, coars gravel and water table.
4	1	1973	2.5-10	0-2.5	No	94	90	68	51	27	19	----	----	Owner: Wallace Coburn Area is a sag amidst wooded knoll west of Belvidere Town Line about 0.13 mile north of junction of Town Highway No. 6 with Town Highway No. 7. Test No. 1 was in center of sag. Material is: 2.5'-5', silty sand an silt; 5'-9', fine gravel; 9'-10'; sand; bottom; sand.

Table I

Waterville GRANULAR DATA SHEET NO. 3

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
5	1	1974	1-7	0-1	yes	89	86	68	47	7	5	20.2%	Gravel	Owner: Wallace Coburn Area is a small (40'x60') pit northeast of Town Highway No. 8 about 0.17 mile from Town Highway No. 7. Test No. 1 was in 10' northeast face. Material is: 1'-7', gravel; bottom, sloughed material.
	2	1974	1.5-3	0-1.5	no	--	93.8	---	65.6	29.4	19.4	-----	-----	Test No. 2 was among trees about 140 feet northwest of Test No. 1. Material is: 1.5'-3', silt, sand and stones; bottom ledge. Soil Classification: A-1-b (silty gravel).
6	1	1974	2-12	0-2	no	94	90	81	68	23	9	26.2%	Gran. Borrow	Owner: Wallace Coburn Area is a field crossed by a powe line northwest of Town Highway No. 7 with access about 0.09 mile north of Town Highway No. 8 junctio Test No. 1 was near trees and just north of power line, about 420 feet from Town Highway No. 7. Material is: 2'-4', silty sand; 4'-10' gravel; 10'-12' silty sand; bottom, same.

Table I

Waterville GRANULAR DATA SHEET NO. 4

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
7	1	1974	1.5-11	0-1.5	no	100	100	74	54	39	28	20.8%	-----	Owner: Leonard McCuin Area is a field east of Town Highway No. 7 just west of the Belvidere Town Line. Test No. 1 was 210 feet southeast of Town Highway. Material is: 1.5'-10', gravelly sand; 10'-11', sandy gravel; bottom, same
	2	1974	1.5-8	0-1.5	no	100	100	88	75	34	21	-----	-----	Test No. 2 was 120 feet northeast of Test No. 1. Material is: 1.5'-8', silty sand with stones; bottom, ledge.
8	1	1974	1-8	0-1	yes	86	86	64	48	18	8	Not Tested	Gran. Borrow (Grav.)	Owner: Leonard McCuin Area is a small (30'x90') pit behind garage southwest of junction of Town Highway No. 8 with Town Highway No. 7. Test No. 1 was in 12-foot southwest face. Material is: 1'-3', gravel; 3'-8', sand and pebbly sand bottom, sloughed material. Material would probably not be available.

Waterville GRANULAR DATA SHEET NO. 5

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
9	1	1974	0.5-6	0-0.5	yes	85	78	64	47	5	3	24.4%	Gravel	Owner: Ellen Schofield Area is a large active pit west of Town Highway No. 7 0.79 mile north of its junction with Vermont Route 109. Test No. 1 was in northwest face of 1,000-foot long pit. Material is: 0.5'-5', gravel; 5'-6', gravelly and pebbly sands; bottom, pebbly sand.
	2	1974	0.5-7	0-0.5	yes	86	77	64	45	3	2	24.1%	Gravel	Test No. 2 was in 9-foot face about 150 feet east of Test No. 1. Material is: 0.5'-6'; gravel; 6'-7', pebbly sand; bottom, sand and fine sand.
	3	1974	0.5-20	0-0.5	yes	100	92	77	55	11	8	28.8%	Gran. Borrow (Grav.)	Test No. 3 was in 22-foot north face. Material is: 0.5'-7'; gravel; 7'-10', sand and gravelly sand; 10'-18', gravelly sand; 18'-20', silty fine sand; bottom, silt.
	4	1974	1-8	0-1	yes	100	100	97	85	12	4	-----	Sand	Test No. 4 was in 12-foot southwest face. Material is: 1'-2', gravel; 2'-5', fine sand; 5'-8', sand and pebbly sand; bottom; sand.

Waterville Granular Data Sheet No. 6

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 AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
	5A	1974	1.5-12	0-1.5	yes	100	100	88	68	7	5	-----	Sand	Test No. 5A was in upper part of 20-foot south face. Material is: 1.5'-3', fine gravel; 3'-9', gravel; 9'-12', pebbly sand; bottom, sloughings.
	5B	1974	12-20	0-1.5	yes	100	95	90	74	23	19	-----	-----	Test No. 5B was below Test No. 5A. Material is: 12'-17', fine gravel with sand layers; 17'-19', fine sand and sand with 4" silt layer at 17', 19'-20', sand; bottom, and fine sand.
	6A	1974	2-12	0-2	yes	93	87	71	55	5	3	23.6%	Gravel	Test No. 6A was in upper part of 20-foot northeast face. Material is: 2'-12', fine gravel, pebbly sand gravelly sand; bottom, sloughed material.
	6B	1974	12-19	0-2	yes	100	100	94	76	11	5	-----	Sand	Test No. 6B was below Test No. 6A. Material is: 12'-18', interbedded sands and pebbly sands; 18'-19', fine sand; bottom, sand.
	7	1974	1.5-12	0 -1.5	yes	100	100	96	92	15	7	-----	Sand	Test No. 7 was in 12-foot east face. Material is: 1.5'-4', gravel; 4'-12', sand and fine sand; bottom sloughed material.
	8	1974	0.5-8	0-0.5	yes	100	100	100	100	42	26	------	-----	Test No. 8 was in lower west face of eastern lobe of pit. Material is : 0.5'-2', gravel; 2'-6', fine sand; 6'-8', silty sand; bottom, fine sand.

Table I

Waterville GRANULAR DATA SHEET NO. 7

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
	9	1974	0.5-10	0-0.5	yes	100	100	100	100	61	42	-----	-----	Test No. 9 was in floor, 150 feet northwest of test No. 8. Material is: 0.5'-3', sand; 3'-10', fine sand; bottom, silty sand.
	10	1974	1.5-10	0-1.5	no	100	88	81	69	5	3	-----	Gran. Borrow	Test No. 10 was in northern extension 260 feet north of Test No. 2 Materia is: 1.5'-7', sand; 7'-10', sandy gravel; bottom, same.
	11	1974	1-11	0-1	no	64	64	58	51	12	4	24.0%	Gravel	Test No. 11 was in western extension, 250 feet west of Test No. 1, Material is: 1'-4', gravel; 4'-10', sand; 10'-11', fine sand; bottom, same.
	12	1974	1.5-11	0-1.5	no	100	100	93	76	3	2	19.6%	Sand	Test No. 12 was in southwestern extension, 225 feet south of Test No. 11. Material is: 1.5'-11', sandy fine gravel; bottom, same.
10	1	1974	0-5	---	yes	94	88	59	39	12	8	18.8%	Gravel	Owner: Maurice McCuin (formerly: William Burt, Sr.) Area is a large (580'x100') inactive pit east of Vermont Route 109 with Main Access 0.16 mile south of Town Highway No. 7 junction. Pit is nearly depleted. Backhoe tests in the floor and extension yielded good gravel. Test No. 1 was in low north floor, Material is: 0-1.5', layer of uniform 1½"-3" stones; 1.5'-5', gravel; bottom, fine sand.

Table I

Waterville GRANULAR DATA SHEET NO. 8

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
	2	1974	0-8	---	yes	92	78	51	28	10	7	23.0%	Gravel	Test No. 2 was in upper, south floor. Material is: 0-8', gravel; bottom, clayey silt.
	3	1974	1-5	0-1	no	76	63	49	40	12	7	22.4%	Gravel	Test No. 3 was in a terrace below, and 150 feet east of, Test No. 2. Material is: 1-5', sandy gravel; bottom, fine sand. The Town has used this pit for stock piling sand and mine rock. It is now over grown with trees and bushes.
11	1	1974	1-12	0-1	no	100	100	84	65	4	3	23.2%	Sand	Owner: Lucille Depot (formerly William Burt, Sr.) Area is a field crossed by a power line east of Vermont Route 109 at junction with Town Highway No. 9. Owner allowed only one test hole in field. Test No. 1 was 260 feet east of Highway, and 200 feet north of south end of field. Material is: 1'-7', fine gravel; 7'-12', pebbly sand; bottom, same. Area appears to be southward extension of Map Ident. No. 10.

Table I

Waterville GRANULAR DATA SHEET NO. 9

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
12	1	1974	3.5-12	0-3.5	yes	100	100	80	56	10	6	Not tested	Gran. Borrow (Grav.)	Owner: Lucille Depot (formerly William Burt, Sr.) Area is a small (45'x45') pit in pasture east of Vermont Route 109 with access 0.25 mile south of junction with Town Highway No. 9. Pit was opened only to provide fill For new house, and then would be smoothed over; according to Lauren Tilton, Lessee. Test No. 1 was in northwest face. Material is: 3.5'-7', fine sand; 7'-9', sand and sand layers; 9'-10', gravel; 10'-12', sandy gravel; bottom, sloughed material.
	2	1974	0-4	---	yes	100	100	91	81	17	4	-----	Sand	Test No. 2 was in floor. Material is: 0-2', fine gravel or pebbly sand; 2'-4', sand; bottom, blue silt-clay. Water seep at 3.5'.
	3	1974	1-8	0-1	no	96	84	65	41	5	3	21.6%	Gravel	Test No. 3 was in pasture, 220 feet northeast of Test No. 2. Material is: 1'-7'; sandy gravel; 7'-8', sand bottom, sand and water table.
	4	1974	0.5-11	0-0.5	no	86	84	57	37	8	5	18.8%	Gravel	Test No. 4 was in pasture near power line 200 feet south of Test No. 3. Material is: 0.5'-11', gravel with sand seams; bottom, gravel and water

Table I

Waterville GRANULAR DATA SHEET NO. 10

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
	5	1974	1.5-4.5	0-1.5	no	100	92	73	57	6	3	Not Tested	Gran. Borrow (Grav.)	Test No. 5 was near southeast corner of field, 240 feet west of the Lamoille River. Material is: 1.5'-3', sand; 3'-4.5', gravel; bottom, gravel and water.
13	1	1974	0-7	---	yes	100	100	85	65	4	2	-----	Sand	Owner: Albert Lanpher. Area is an inactive pit southeast of Vermont Route 109 with access 0.6 mile north of Town Highway No. 3 junction. Test No. 1 was in southeast face. Material is: 0-3', pebbly sand; 3'-7', gravelly sand; bottom, same.
	2	1974	1-5	0-1	yes	100	100	95	85	3	2	-----	Sand	Test No. 2 was in lower northwest face. Material is: 1'-5', pebbly sand; bottom, same.
	3	1974	0.5-10	0-0.5	yes	100	100	99	95	10	3	-----	Sand	Test No. 3 was in 12-foot northeast face. Material is: 0.5'-4', pebbly sand; 4'-8' sand; 8'-10', sand and fine sands; bottom, fine sand.
	4	1974	1-9	0-1	yes	100	100	96	83	3	1	-----	Sand	Test No. 4 was in upper 14-foot nort west face. Material is: 1'-4', fine gravel; 4'-9', fine gravel, pebbly sand and layer of uniform ¼-inch stones; bottom, pebbly sand.

Table I

Waterville GRANULAR DATA SHEET NO. 11

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
	5	1974	1-6	0-1	yes	100	100	90	84	6	4	-----	Sand	Test No. 5 was in southeast face, 240 feet from Vermont Route 109. Material is: 1'-3', pebbly sand; 3'-6', sand and pebbly sand; bottom, sloughed material.
14	1	1974	3-25	0-3	yes	100	100	100	100	36	6	-----	Gran. Borrow (Sand)	Owner: Mervin Cutting Area is a large (120'x70') pit northwest of Vermont Route 109 with access 0.24 mile north of Town Highway No. 3 junction. Test No. 1 was in 35-foot northwest face. Material is: 3'-20', fine sand; 20'-25', sand; bottom, sloughed material.
	2	1974	0.5-12	0-0.5	no	100	100	97	90	6	3	-----	Sand	Test No. 2 was 135 feet northwest of Test No. 1 in a field crossed by power line. Material is: 0.5'-6', pebbly sand; 6'-12', sand; bottom, same.
	3	1974	1-5	0-1	no	100	100	100	100	82	67	-----	-----	Test No. 3 was in woods 200 feet southwest of Test No. 2. Material is: 1'-5', silty fine sand with clay traces; bottom, boulder or bedrock.

Table I

Waterville GRANULAR DATA SHEET NO. 12

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
	4	1974	4-22	0-4	yes	89	85	68	48	14	9	39.8%	Gran. Borrow (Grav.)	Test No. 4 was in southwest face. Material is: 4'-22', gravel with silt traces; bottom, gravel. (Note: 10'-12' of overburden occurs about 20 feet north of Test No. 4)
15	1	1974	1-7	0-1	yes	100	100	88	65	3	2	-----	Sand	Owner: Duane Cutting (former owner: Mervin Cutting) Material is not available. Area is an inactive, depleted pit 0.08 mile northwest of Vermont Route 109 with access road 0.21 mile north of Town Highway No. 3 junction. Power line is parallel and close to southeast face. Test No. 1 was in northwest face. Material is: 1'-6', fine gravel; 6'-7', sand; bottom, fine sand.
16	1	1974	0-10	--	yes	100	100	100	100	95	60	-----	-----	Owner: Gerald Tatro Area is a diggings with large stockpile west of Vermont Route 109. Owner was using material for fill. Test No. 1 was in stockpile of silty fine sand.

Table I

Waterville GRANULAR DATA SHEET NO. 13

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
17	1	1974	1-8	0-1	yes	100	100	100	91	62	31	-----	-----	Owner: Robert Hemenway Area is a small (40'x25') pit southeast of Vermont Route 109 with access 0.25 mile north of Town Highway No. 13 junction. Material is not available. Test No. 1 was in 10-foot southeast face. Material is: 1'-4', fine sand; 4'-7', silt and fine sand; 7'-8', clayey silt; bottom, same.
18	1	1974	2-14	0-2	yes	100	100	89	76	7	4	-----	Sand	Owner: Royale Bradley Area consists of two small pits in woods west of Town Highway No. 15 The 0.61 mile-long access road joins Town Highway No. 15 0.1 mile from Town Highway No. 4. Test No. 1 was in north face of west pit. Material is: 2'-4', fine gravel; 4'-14', mixture of sand and pebbly sand; bottom, slough ed material.
19	1	1974	1.5-14	0-1.5	yes	100	91	69	48	10	7	20.5%	Gravel	Owner: Collise Brown Area is a pit 0.16 mile southwest of Town Highway No. 17 with access road 0.51 mile west of Town Highway No. 2 Pit is part of an extensive ridge which according to owner has much gravel. Material may not be availabl Test No. 1 was in northwest face.

Table I

Waterville GRANULAR DATA SHEET NO. 14

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
														Material is: 1.5'-4', coarse gravel 4'-7', gravel; 7'-8.5', layer of uniform 1"-4" stones; 8.5'-14', fine gravel; bottom, same.
	2	1974	1.5-12	0-1.5	yes	94	84	62	44	7	5	26.2%	Gran. Borrow (Grav.)	Test No. 2 was in southwest face., Material is: 1.5'-2.5', gravel; 2.5'-4', coarse gravel; 4'-8', gravel; 8'-12', fine gravel; bottom, fine gravel.
20	1A	1974	1-10	0-1	yes	96	87	57	28	18	12	22.3%	Gran. Borrow (Grav.)	Owner: Greg Griffin (formerly: Charles Allen) Area is an inactive pit south of Town Highway No. 17 with access road 0.12 mile west of Town Highway No. 2 Pit is in sugar bush where owner will not exploit gravel for any reason. Test No. 1A was in upper part of southwest face. Material is: 1'-4', gravel; 4'-7', uniform, 1/4"-3/4" stone; 7'-10', gravel.
	1B	1974	10-22	0-1	yes	100	100	81	60	7	4	-----	Sand Gravel (Grading only)	Test No. 1B was below Test No. 1A. Material is: 10'-15', sand with a small pebbly sand layer; 15'-22', fine gravelly sand; bottom, sloughe material.

Table I

Waterville

GRANULAR DATA SHEET NO. 15

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
21	1	1974	1-6	0-1	no	100	100	100	100	97	95	-----	-----	Owner: R. Mann Area is a field southwest of Town Highway No. 18 with access 0.07 mile from Vermont Route 109. Test No. 1 was atop knoll 280 feet south of Town Highway. Material is: 1'-3', silt; 3'-6', silt-clay; bottom, same.
22	1	1974	1-7	0-1	no	100	100	96	85	60	46	-----	-----	Owner: R. Mann Area is a small field southeast of Vermont Route 109 and northeast of State Aid Highway No. 1. Test No. 1 was at edge of trees nort east of knoll at east end of field. Material is: 1'-7', stones in silty sand; bottom, large boulder.

TABLE I
SUPPLEMENT

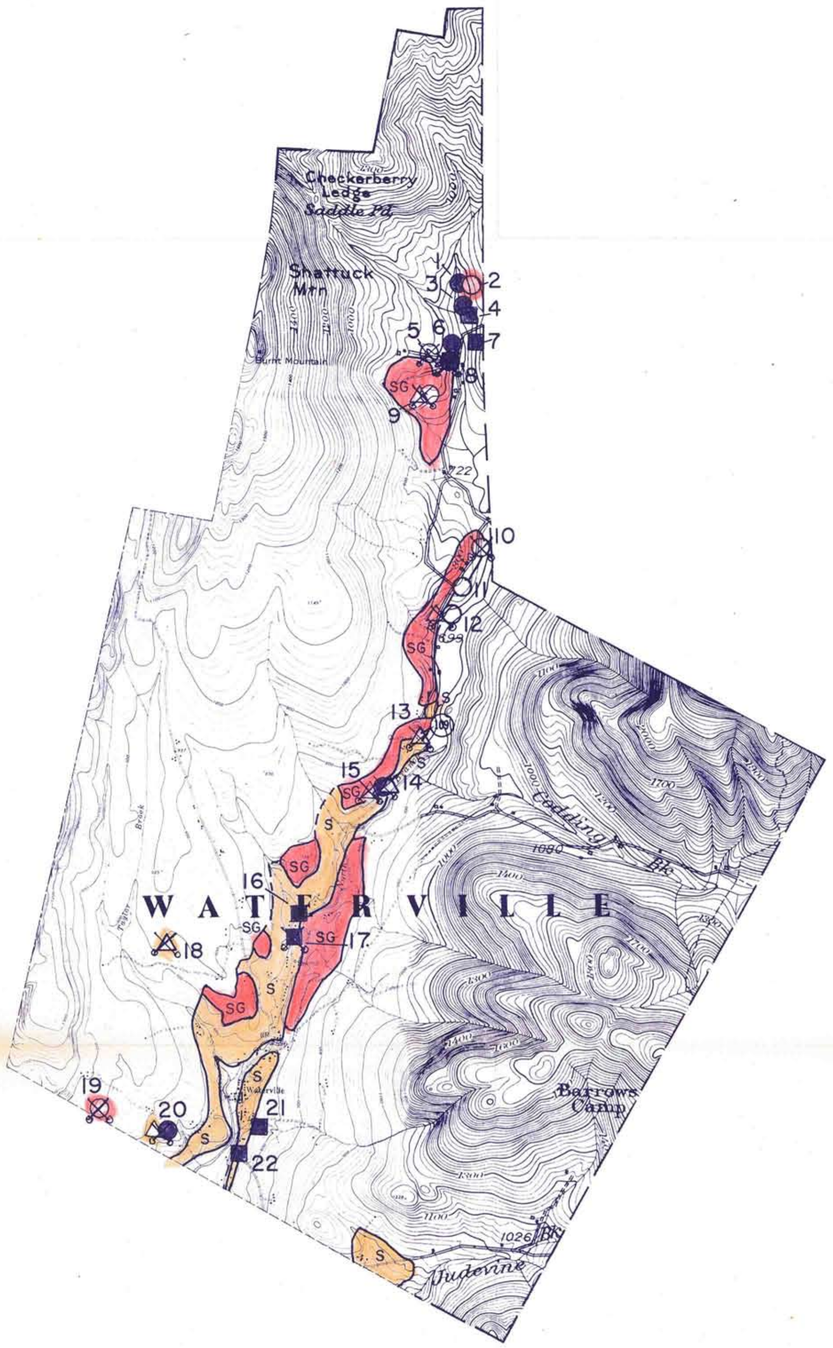
WATERVILLE PROPERTY OWNERS - GRANULAR	MAP IDENTIFICATION NO.
Bradley, Royale	18
Brown, Collise	19
Coburn, Wallace	1, 2, 3, 4, 5, 6
Cutting, Duane	15
Cutting, Mervin	14
Depot, Lucille	11, 12
Griffin, Greg	20
Hemenway, Robert	17
Lanpher, Albert	13
Mann, R.	21, 22
McCuin, Leonard	7, 8
McCuin, Maurice	10
Schofield, Ellen	9
Tatro, Gerald	16

Waterville ROCK DATA SHEET NO. 1

Ident. No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Abrasion AASHO T-96	Remarks
1	1-A	1974	Greenstone	No	Chip	10.6%	50.2%	Owner: Mrs. Harley N. Sherman. Area is low, string-like outcrop in a heavily wooded section northeast of Town Highway No. 4, 0.8 mile south of the Bakersfield Town Line. This narrow outcrop is surrounded by the main mass of the Hazens North schist. The distorted bedding has contributed to rapid weathering, however, better rock might be found beneath this surface zone. Overall, the rock was slippery and is classed somewhere between a phyllite and a schist; it was difficult to obtain pieces large enough for the AASHTO-T-3 Abrasion Test. A few random pieces of light green, more quartzose greenstone were noted which were very hard and seemed like a green quartzite.
	1-B	1974	Greenstone	No	Chip	14.8%	56.8%	

TABLE II
SUPPLEMENT

WATERVILLE PROPERTY OWNER - ROCK	MAP IDENTIFICATION NO.
Sherman, Mrs. Harley N.	1



N

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 and GRAVEL DEPOSIT
- S SAND DEPOSIT
- 3 IDENTIFICATION NUMBER (refer to data sheets)

WATERVILLE

SCALE 1:31,250

0.5 0 1 MILE

CONTOUR INTERVAL 20 FEET

1975

GRANULAR MATERIALS MAP

BY

VERMONT DEPARTMENT OF HIGHWAYS

IN COOPERATION WITH

U.S. BUREAU OF PUBLIC ROADS

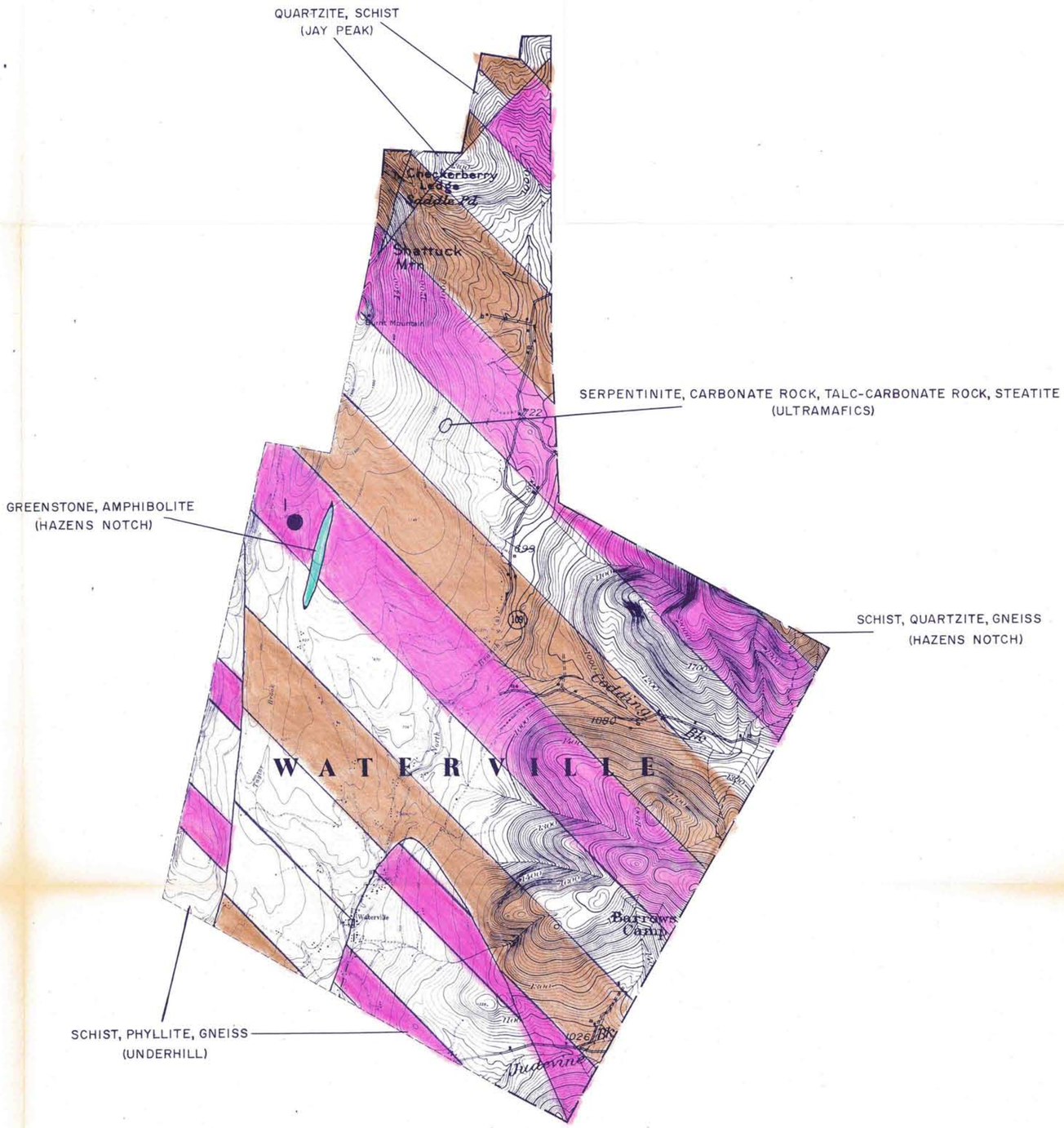
NOTE: BASED ON U.S.G.S. TOPOGRAPHIC MAPS

PLATE 1 GRANULAR

LAMOILLE COUNTY VT. HWY. DISTRICT NO. 8

REVISIONS

DATE						
BY						



N

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
- SCHISTS, SLATES, PHYLLITES, SHALES, CONGLOMERATES
- 3 IDENTIFICATION NUMBER (refer to data sheets)

WATERVILLE

SCALE 1:31,250

1 .5 0 1 MILE

CONTOUR INTERVAL 20 FEET

1975

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

LAMOILLE COUNTY VT. HWY. DISTRICT NO. 8

REVISIONS

DATE						
BY						