DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-911 A
PEPER—UNCONSOLIDATED MATERIALS,
PALMER QUAD., MASS.

Base from U.S. Geological Survey, 1969

10,000-foot grid based on Massachusetts coordinate-system, mainland zone
1000-meter Universal Transverse Mercator grid ticks, zone 18

UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

Textures mapped by J. D. Peper, 1972, 1974-75.

EXPLANATION

This map describes the type, thickness, and distribution of unconsolidated materials. It is intended to serve as an aid in reconnaissance evaluation of unconsolidated materials and can be used to identify areas of potential interest.

The units on this map indicate the first material of substantial thickness (generally greater than 3 feet (1 m) encountered beneath the soil layer. The soil layer (commonly a foot or two (about 0.5 m) thick) is not mapped. Other materials, different in composition, may underlie each map unit or may occur as minor lenses within each map unit.

THIS MAP SHOULD NOT BE USED AS A SUBSTITUTE FOR ONSITE INVESTIGATION.

Most unconsolidated materials are mixtures of the three particle-size classes defined in the diagram below. This diagram also relates these three size classifications to the Wentworth classification (Wentworth, 1922) which can be compared with other classifications used in engineering and soil science.

PARTICLE-SIZE CLASSIFICATION USED IN THIS REPORT
Modified from Wentworth (1922)

Diameter of particles	10 / 256	2.5 / 64	.16 / 4	.08 / 2	.04 / 1	.02 / .5	.01 / .25	.005 / .125	.0025 / .068	.00015 / .004	inches / millimeters

Boulders	Cobbles	Pebbles	Granules	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
Gravel-sized particles				Sand-sized particles						
COARSE				MEDIUM				FINE		

Coarse particles (stones) include granules, pebbles, cobbles, and boulders. Medium particles include very coarse, coarse, medium, and fine sand-sized particles. Fine particles include very fine sand, silt-, and clay-sized particles. Very fine sand is included in this class because it commonly occurs with finer materials, and because very fine sand, silt, and clay behave similarly when water-soaked and under stress.

Materials mapping involves a visual estimate of particle-size distribution by the field geologist. Percentages of particle sizes, therefore, may vary somewhat in places beyond the limits defined in the map units below.

g

GRAVEL

Particle sizes range from 100 percent coarse to 50 percent coarse and 50 percent medium. Materials may occur as layers of well- to poorly sorted gravel, or as layers of gravel interbedded with layers of sand. May also contain minor amounts of fine particles

sg

SAND AND GRAVEL

Particle sizes range from 50 percent coarse and 50 percent medium to 25 percent coarse and 75 percent medium. Material may occur as thin layers of well-sorted sand interbedded with thin layers of well-sorted gravel; as poorly sorted layers of mixed sand and gravel; or as distinct pockets of well- to poorly sorted sand and gravel. May contain minor amounts of fine particles

s

SAND

Particle sizes range from 25 percent coarse and 75 percent medium through 100 percent medium to 50 percent medium and 50 percent fine. Material commonly occurs as well- to poorly sorted sand in layers of variable thickness

f

VERY FINE SAND, SILT, AND CLAY

Particle sizes range from 50 percent fine and 50 percent medium to 100 percent fine. Material commonly occurs as layers of poorly sorted very fine sand, silt, and clay. May contain scattered coarser particles

g/s

GRAVEL OVER SAND

Areas where surface gravel deposits 3-15 feet (1-5 m) in thickness overlie sand deposits

t

TILL

Poorly sorted nonlayered mixture of coarse, medium, and fine particles in varying proportions. Some till, averaging less than 10 feet (3 m) in thickness, is sandy, loose, and very stony; other till, commonly more than 10 feet (3 m) in thickness, is less sandy, less stony, and very compact. Where these tills occur together, the loose, sandy till is always on top. The compact till forms the bulk of many smooth elongate hills (drumlins) even where the sandy till is exposed at the surface

sw

SWAMP DEPOSITS

Dark, decomposed organic material intermixed with varying amounts of sand, silt, and clay. Locally contains scattered stones

af

ARTIFICIAL FILL

Shown only for roads, highways, dams, solid-waste disposal, and other major construction. Additionally, in urban centers and other areas of dense development, fill of variable thickness and extent may overlie the natural materials shown on the map

BEDROCK (LEDGE) OUTCROP

Bedrock exposed at ground surface; may be partly covered by thin soil. Ruled pattern shows areas of small closely-spaced outcrops

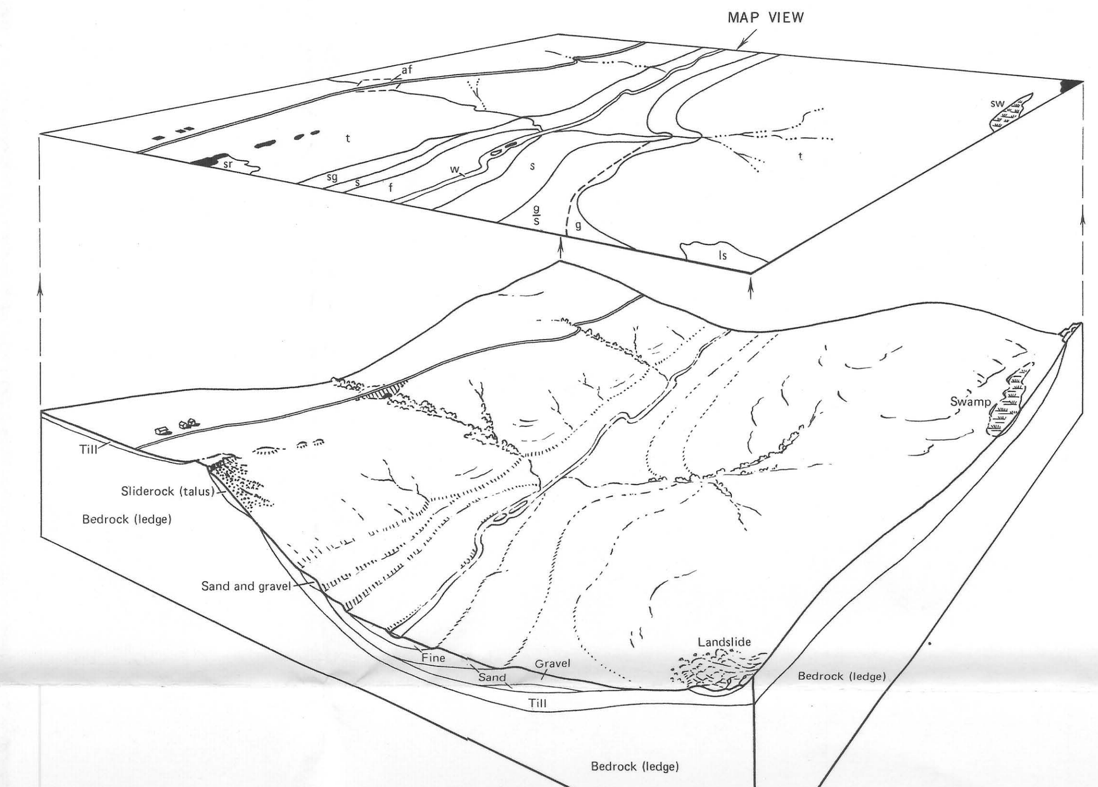
w

WATER BODIES

In general, lakes and ponds greater than 5 acres (2 hectares) in area, or streams wider than 200 feet (60 m)

REFERENCES

Peper, J. D., in press, Surficial geologic map of the Palmer quadrangle, south-central Massachusetts: U.S. Geol. Survey Geol. Quad. Map GQ-1465.
Wentworth, C. K., 1922, A scale of grade and class terms for clastic sediments: Jour. Geology, v. 30, p. 377-392.



Block diagram of hypothetical area in New England showing some common examples of unconsolidated materials overlying bedrock. Map view shows unconsolidated materials projected from land surface

MAP SHOWING UNCONSOLIDATED MATERIALS, PALMER QUADRANGLE, MASSACHUSETTS

By

John D. Peper

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For sale by Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202