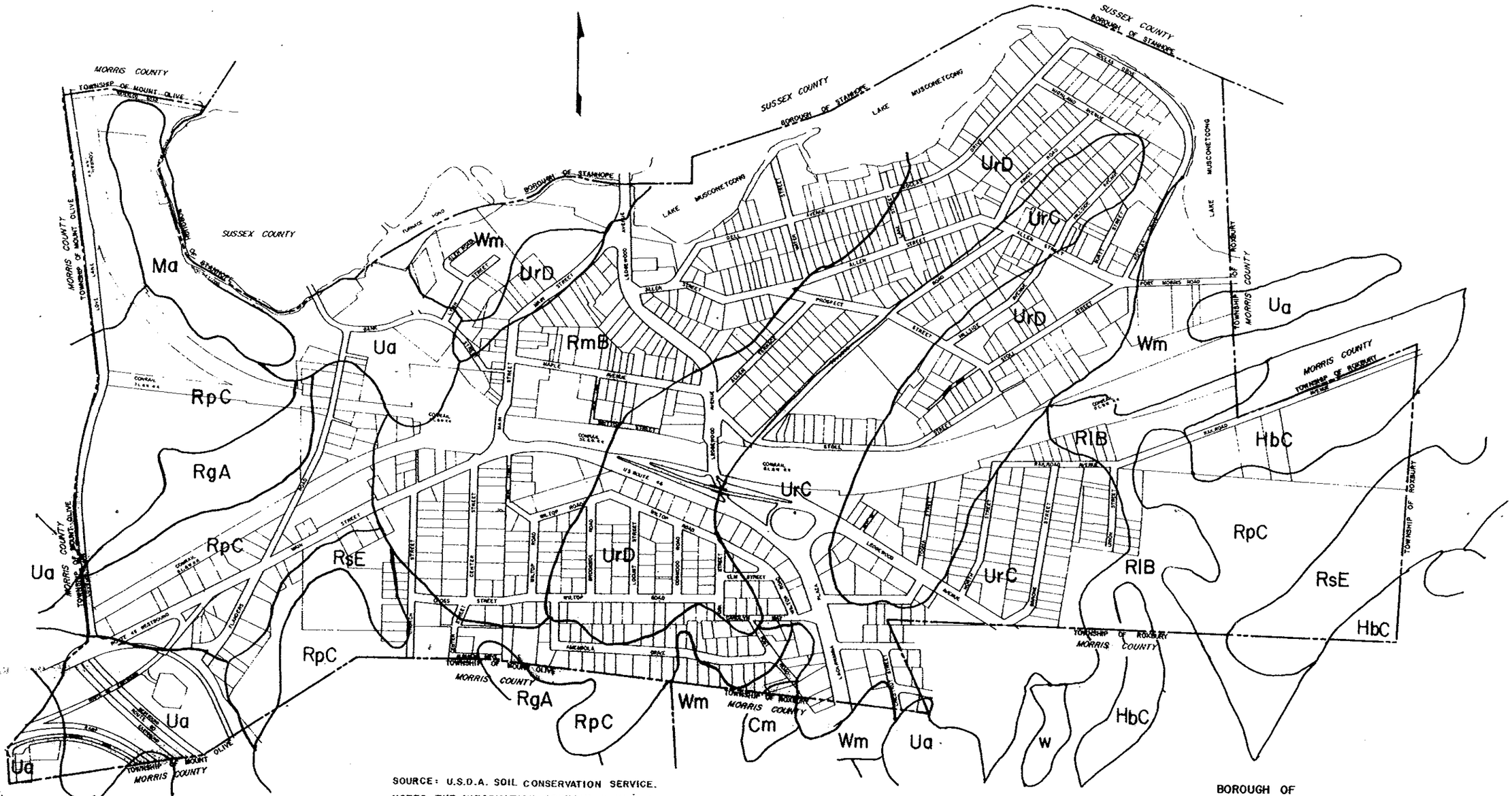
SOIL CONDITIONS

The accompanying map entitled "Soil Conditions" categorizes the different types of soils within the Borough. This map was based on the Soil Survey of Morris County prepared by the United States Department of Agriculture, Soil Conservation Service (U.S.D.A.S.C.S.). All areas marked with the same symbol are the same kind of soil wherever it appears on the map. It should be pointed out that as much as 15 to 20 percent of other soils may be included within a single soil boundary. For this reason this study should be used for overall planning and should not replace on-site investigations for detailed information pertaining to small areas or isolated parcels of land.

SOIL CONDITIONS

PLATE VI



SOURCE: U.S.D.A. SOIL CONSERVATION SERVICE.

NOTES: THE INFORMATION CONTAINED HEREIN IS FOR GENERAL INFORMATION AND PLANNING PURPOSES AND SHOULD NOT BE CONSTRUED AS EXACT GEOLOGICAL FACT AND SHOULD NOT BE USED AS THE SOLE BASIS OF JUDGEMENT AND SHOULD NOT BE USED TO REPLACE DETAILED ON SITE INVESTIGATIONS AND TESTING.

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BOROUGH OF
NETCONG
MORRIS COUNTY, NEW JERSEY

The name of each soil type and some characteristics are given in Table V entitled, "Soil Groups, Borough of Netcong". Each soil type is indicated by a group of letters. The first capital letter is the intial one of the soil name. A second capital letter, shows the slope as follows:

A = 0 to 3%
B = 3 to 8%
C = 8 to 15%
D = 15 to 25%
E = 25 to 45%

Most symbols without a slope letter are those of nearly level soils, but some are for land types or soil complexes that have a considerable range of slope.

The depth of the seasonal high water table which is given in Table V occurs usually in late winter or early spring. Often, the level of free water in the ground is quite varying in depth according to topography, season and rainfall. A high water table may be due to the general level of underground water which has risen to the surface, or because water is perched on an impervious layer within the ground. A soil may also be wet because underground water wells crop up out of the rock at that point.

TABLE V
SOIL GROUPS
BOROUGH OF NETCONG

SYMBOL	SOIL NAME	SLOPE %	EROSION POTENTIAL	DEPTH TO BEDROCK-FT.	SEASONAL WATER TABLE-FT.	SEPTIC AREA LIMITATIONS	DEPTH INCHES	TYPICAL SOIL PROFILE
Cm	Carlisle muck					Severe	0-60	Muck
HbC	Hibernia stony loam	3-15	slight-moderate			Severe	0-7	Gravelly loam
							7-46	Gravelly sandy loam
							46-60	Stony sandy loam
Ma	Made land, sanitary land fill					Severe		
PtB	Pompton sandy loam	3-8	high	>10	1/2-1 1/2	Severe	0-7	Sandy loam
							7-36	Sandy loam, Gravelly sandy loam
							36-60	Gravelly loamy sand
RgA	Ridgebury very stony loam	0-3		>10	0-1	Severe	0-9	Gravelly Loam, sandy loam
							9-60	Gravelly sandy loam
RlB	Ridgebury extremely stony loam	3-10	slight	>10	0-1	Severe	0-9	Gravelly loam, sandy loam
							9-60	Gravelly sandy loam
RpC	Rockaway very stony sandy loam	3-15		>10	1 1/2->10	Moderate	0-8	Cobbly sandy loam
							8-60	Gravelly sandy loam
RsE	Rockaway-Rock outcrop complex	25-45		>10	1 1/2->10	Severe	Too Variable to Estimate	
Ua	Urban land							Variable
UrC	Urban land-Rockaway complex	8-15	moderate			Moderate		Variable
UrD	Urban land-Rockaway complex	15-25				Severe		Variable
Wm	Whitman very stony loam			>10	0	Severe	0-8	Cobbly loam
							8-40	Gravelly loam
							40-60	Gravelly loamy sand, sandy loam

Source: U.S.D.A. Soil Conservation Service

The predominant geologic soil conditions present in the northeastern United States reflect the most recent Ice Age and the presence of the Wisconsin Glacier. The area affected by the glacier extends from Canada to Central New Jersey. Land relief patterns were formed by the glacial movement with its insipient scouring of pre-existing soil and rock formations and deposits of transported glacial debris.

The soils shown on Plate VI and listed in Table V are further described below:

Carlisle muck (Cm)

Carlisle muck consists of deep, nearly level, very poorly drained organic soils. These soils are in depressions that were formerly or are now partly occupied by lakes or ponds. Over a period of thousands of years, these lakes or ponds have gradually been filling by the accumulation of organic material or a mixture of mineral sediment and organic material.

In a representative profile the surface layer is black, highly decomposed muck about 18 inches thick. Below this, and extending to a depth of 60 inches, is very dark grayish-brown, decomposed muck that contains many fibers and pieces of wood.

Permeability is rapid, and available water capacity is high. The water table is at or above the surface most of the time. These soils are compressible and unstable under load and subside if they are drained.

The native vegetation is either marsh sedges and reeds or wetland trees. Red maple, ash, elm, and tamarack are common trees.

Included are areas of organic soils that are dominantly spongy, brownish sedimentary peat below a depth of 12 inches. Most areas of this Carlisle muck, particularly those around the edges of areas that grade toward mineral soils, have included areas of organic soils that are less than 51 inches deep over a mineral substratum.

Because the water table is high and the soil is unstable, Carlisle muck is poorly suited to community development.

Hibernia stony loam, 3 to 15 percent slopes (HbC)

These soils have stones on the surface and a fragipan. They formed in glacial till and colluvium derived from such deposits. The material has a mixed composition dominated by granitic gneiss but contains a small amount of many other kinds of rock.

In a representative profile the surface layer is very dark gravelly loam about 2 inches thick. The subsurface layer is yellowish-brown gravelly loam about 5 inches thick. The upper part of the subsoil is yellowish-brown and dark yellowish-brown gravelly sandy loam about 13 inches thick, and the lower part is a fragipan of strong-brown and dark-brown, very firm gravelly sandy loam about 10 inches thick. The upper 16 inches of the substratum is part of the fragipan and is light-gray, very firm gravelly sandy loam. Below this the substratum, to a depth of 60 inches, is brown and pale-brown stony sandy loam.

Permeability is moderate above the fragipan and slow in the fragipan. These soils have good workability, stability, and compaction characteristics; low subsidence; and low compressibility. Depth to the seasonal high water table is 1/2 foot to 1-1/2 feet late in winter and early in spring. In addition, water is locally perched on top of the fragipan. This water is held in the soil and moves laterally over the fragipan. Roots are commonly distributed throughout the soil above the fragipan. The available water capacity is low, and water stored below the fragipan is generally not available for use by plants. The hazard of erosion is moderate to severe, depending on slope. The slow permeability in the fragipan is a limitation to onsite disposal of septic tank effluent. Water seeping laterally on top of the fragipan is likely to move into foundations

and to the surface at steep cuts for roads and houses, causing drainage problems and unstable banks.

Use of this soil is limited by cobbles, stones, and boulders throughout the profile; slow permeability in the fragipan; moderate to rapid runoff; and a slight to moderate hazard of erosion. If it is used for farming and most community developments, improved drainage, control of runoff and erosion, and removal of stones are needed. If this soil is used for community developments, planting temporary cover to protect rolling slopes cleared during construction, early seeding of new lawns or other plant cover, use of diversions to divide long slopes or above steep cuts or banks, and temporary desilting basins are beneficial in reducing erosion and sedimentation.

Made Land, Sanitary Land Fill (Ma)

Made land, sanitary land fill (Ma) consists of fill material that varies widely in composition and physical characteristics. The characteristics depend on the kind and proportion of refuse disposed of, the kind and amount of soil material used to cover the refuse, and the particular kind of landfill operation that was practiced.

Generally the fill material includes trash, garbage, building material, and, in places, industrial waste. Normal operation requires compaction while filling and a cover of 2 feet of soil over the final fill. Formation of gases and leachate is likely, and differential settling limits the use of this land for many purposes.

The properties of sanitary land fill are so varied that intense onsite investigation is needed to determine its properties and potential uses.

Pompton sandy loam, 3 to 8 percent slopes (P+B)

The Pompton soils consist of deep, nearly level to gently sloping, somewhat poorly drained soils. These soils are on terraces and outwash plains in the major valleys of the northern half of Morris County and in gently sloping waterways or swales that cross the terraces and extend into the uplands. They formed in sandy and gravelly glacial outwash derived mainly from granitic material and in places from red and brown shale and traprock and a small amount of other kinds of material, such as quartzite, sandstone, and conglomerate. The soils are underlain by stratified, water-sorted sand and gravel.

In a representative profile the surface layer is very dark grayish-brown sandy loam about 7 inches thick. The upper part of the subsoil, to a depth of about 28 inches, is yellowish-brown sandy loam mottled with

with yellow, light brownish gray, and strong brown. Below this, and extending to a depth of about 36 inches, the subsoil is yellowish-brown gravelly sandy loam mottled with light brownish gray. The substratum is yellowish-brown and light olive-brown, loose gravelly loamy sand to a depth of 60 inches.

Permeability is moderately rapid, and available water capacity is moderate. These soils have seasonal water table at a depth of 1/2 foot to 1-1/2 feet in winter and in spring. Generally, they are not subject to flooding, but the soils in nearly level areas or in depressions are ponded for several days after heavy rains or fast thaws, especially late in winter. They are easily drained by open ditches or underdrains. In places some areas near the base of the steeper slopes need surface drainage. The organic-matter content is moderate in the surface layer.

This soil is found in swales and waterways in relatively low positions and receives runoff from the surrounding uplands. This soil frequently receives runoff more rapidly than it can be drained, and the water table fluctuates. The fluctuating water table and the hazard of erosion are the main limitations for community development.

Ridgebury very stone loam, 0 to 3 percent slopes (RgA)

The Ridgebury soils consist of deep, nearly level to gently sloping, poorly drained very stony or extremely stony soils. These soils are in shallow drainageways and depressions on the glaciated granitic uplands in the northwestern part of the county. They are mostly in elongated areas along streams and watercourses. The soils have a well-developed fragipan. They formed in glacial till derived largely from granitic gneiss and a small amount of micaceous gneiss and many kinds of quartzite, sandstone, and shale.

In a representative profile the surface layer is about 9 inches thick. The upper 4 inches of the surface layer is black gravelly loam, and the lower 5 inches is mottled, light yellowish-brown sandy loam. The upper part of the subsoil, to a depth of about 14 inches, is mottled, light brownish-gray gravelly light sandy loam to a depth of about 26 inches and dark yellowish-brown gravelly sandy loam between depths of 26 and 31 inches. The upper 5 inches of the substratum is part of the fragipan and is dark yellowish-brown gravelly sandy loam. Below this the substratum to a depth of 60 inches is varicolored, friable gravelly sandy loam.

Permeability is moderate above the fragipan and slow in the fragipan. The soils have good workability, stability, and compaction characteristics. They are only slightly compressible and have low subsidence. The water table is at or near the surface during most of the winter and in spring, and the soils are usually too wet to work, which limits their suitability as a source of borrow material. In low nearly level areas they are subject to seasonal ponding and frequently remain ponded for long periods. Roots are common and are distributed throughout the soil above the fragipan but are rare within or below the fragipan. The available water capacity is moderate, but water stored below the fragipan is generally not available for use by plants.

In many places this nearly level soil is in depressions that receive runoff from surrounding areas, and outlets are not available for surface water. In many places a thin mantle of recent alluvium has washed from surrounding higher areas. The alluvium is free of coarse fragments. The subsoil and generally the surface layer are as much as 50 percent stones, cobbles, and gravel. Stones on the surface are spaced 5 to 30 feet apart. Boulders are commonly on top of and throughout the soil.

This soil is not suitable to cultivation or to community development unless the stones are removed and drainage is imposed. Because of its low position and a high water table, in many places the soil is used for ponds and reservoirs.

Ridgebury extremely stony loam, 3 to 10 percent slopes (RIB)

This soil is similar to the abovedescribed Ridgebury soil (RgA) except is located on slightly greater slopes with a greater content of stone.

This gently sloping soil is at the base of slopes, where it receives runoff and seepage from higher areas. Unless the areas are protected, the hazard of erosion is moderate but inasmuch as most areas are wooded, erosion is only a slight hazard.

Rockaway very stony sandy loam, 3 to 15 percent slopes (RpC)

About 3 percent of the surface is covered by stones and a few boulders. The subsoil and substratum are nearly 30 percent coarse fragments. Stones on the surface are 5 to 30 feet apart.

In a representative profile the surface layer is very dark grayish-brown cobbly sandy loam about 8 inches thick. The upper part of the subsoil is strong-brown gravelly sandy loam about 12 inches thick, and the lower part is a fragipan of mottled, strong-brown, firm and brittle gravelly sandy loam about 16 inches thick. The upper 4 inches of the substratum is part of the fragipan and is pale-brown, very firm gravelly sandy loam. Below this the substratum to a depth of 60 inches is pale-brown, loose gravelly sandy loam that contains stones and cobblestones.

Permeability is moderate above the fragipan and slow in the fragipan. These soils have good workability, stability, and compaction characteristics; low compressibility; and low subsidence. In places the removal of stones and boulders is needed if these soils are used for embankments and subgrade and as homesites. In many places water perches on top of the fragipan, moves laterally as seepage, particularly in winter, early in spring, and after heavy rains. Above the fragipan, roots can penetrate easily and are distributed throughout the profile, but the fragipan restricts penetration of roots. Available water capacity is moderate to low, and water stored below the fragipan is generally not available for use by plants.

Runoff is moderate, and the erosion hazard is moderate. The available water capacity is low.

If this soil is used for community developments, boulders and stones encountered during excavation and grading make excavation difficult and commonly their disposal is a problem. In addition, seepage along the top of the fragipan is likely to enter foundations or deep cuts. To control runoff and erosion, most builders adapt their developments to the terrain and use the slopes, stones, and boulders in their landscaping plans. Growing a temporary grass cover to protect cleared areas prior to rough

grading and landscaping, establishing lawns and other plant cover early during development, and breaking slopes with diversions or cross streets are recommended practices to help control runoff and erosion. Interceptor and foundation drains to carry away seepage are also effective.

Rockaway-Rock outcrop complex, 25 to 45 percent slopes (RsF)

This complex is 60 to 80 percent Rockaway soils and 20 to 40 percent Rock outcrop. The subsoil and the substratum of the Rockaway soils are nearly 30 percent coarse fragments. Slopes are mainly 25 to 30 percent in most areas, but in some areas slopes are as much as 45 percent.

Included with this complex in mapping are areas of more gently sloping Rockaway extremely stony sandy loam and less stony Rockaway soils.

Runoff is rapid, and the hazard of erosion is severe. The available water capacity is low.

Urban Land (Ua)

Urban land consists mostly of areas that are either paved or built upon. The soils in the remaining open spaces have been reworked to the extent that the original profile cannot be recognized. The characteristics of the material are variable.

This mapping unit is in areas that are mostly well-drained, deep sandy, gravelly, or stony material or assorted glacial deposits. The areas are on uplands that mostly range from gently sloping to strongly sloping. The surface has been smoothed and in most places leveled. Included in mapping are are areas of moderately steep soils and small areas of undisturbed Rockaway, Hibernia, Riverhead, and Boonton soils and the Ellington loamy subsoil variant.

Urban Land-Rockaway complex, gently sloping and sloping (UrC)

This complex consists of well-drained, gently sloping or sloping gravelly sandy loam soils. It is mainly in upland areas of intensive residential or industrial development. Slopes range from 0 to 15 percent. The soil material is cobbly and stony glacial till that is mainly granitic material that contains a small amount of various other kinds of rock.

This complex is about 50 percent soils that have been disturbed by man to the extent that the original profile no longer remains and 40 percent Rockaway soils. The soils are in a complex pattern and it is not practical to map them separately. Making up the remaining percentage are small areas of Netcong and Hibernia soils.

This complex is generally deep over a water table, has rapid runoff and a moderate hazard of erosion, and is likely to have lateral seepage of

water on top of the fragipan. In places where excavation has exposed the fragipan, seepage of water to the surface on top of the fragipan is common and causes unstable slopes and a hazard of erosion. Moderate measures are needed to control erosion and runoff. Suitable practices include using diversions, interceptor drains, and a grass cover.

Urban Land-Rockaway complex, moderately steep (UrD)

This complex is in areas of steep, well-drained gravelly or stony sandy loam soils. It is in upland areas of residential developments. Slopes range from 15 to 25 percent. The soil material is cobbly and stony glacial till that is mainly granitic gneiss.

This complex is about 50 percent soils that have been disturbed by man to the extent that the original profile no longer remains and 40 percent Rockaway soils. These soils are in a complex pattern, and it is impractical to map them separately. Making up the remaining percentage are small areas of bouldery Rockaway soils, Netcong and Hibernia soils, or areas of bedrock outcrop. Most areas have been cut and filled for use as construction sites.

Whitman very stony loam (Wm)

This soil is nearly level. Some areas have nearly equal proportions of stony loam and loam, and there are a few areas where one or the other is dominant. Included in mapping are small areas of more steeply sloping Whitman soils, Ridgebury soils, and shallow muck soils.

This soil has a very high content of organic matter in the surface layer, contains stones and boulders throughout, has a seasonally high water table at or above the surface, has slow permeability, and is frequently ponded.

If this soil is used for intensive farming or community development, it requires improved drainage and removal of stones. Because of its low position on the landscape, outlets for subsurface drainage systems or ditches are difficult to obtain in many places. Where adequate outlets are available, this soil can be drained by tilling or by open ditches. Where seepage from adjoining higher areas is a hazard, interceptor drains are beneficial.

Summary and Conclusions

1) Most of the Borough is already developed. Since sewer and water service is provided throughout, the soil maps have little value as a general planning tool, however, should be used by the planning board with the development and redevelopment of specific sites with regard to soil erosion possibilities and controlling them.

2) Major drainage courses in the Borough are inadequate to carry runoff waters during heavier rainstorms. The central business district, i.e., Main Street and Maple Avenue, lack sufficient storm drainage. Application for funds to correct these problems should be considered if a future federal or state grant program becomes available.

3) Development within the recharge areas of the Borough's water well fields should be carefully monitored to protect the Borough's water supply.