This map also shows low, swampy lands with slopes of less than 7 per cent. Most of the low swamplands are located between existing and proposed portions of the Eisenhower Parkway and the Passaic River and are comprised of County parklands.

The remainder of the Borough's territory, including the majority of the developable land as well as most of the developed land, is characterized by moderate slopes of 7 to 15 per cent. In addition to furnishing pertinent data for the purpose of establishing land use policies, this map should be used as a reference by the Planning Board and by calling attention to critical areas it should assist the Board in the process of reviewing applications for development. The undeveloped steep slope and swampland areas should be preserved in their natural state to the extent practicable in order to minimize the effects of potential erosion and excessive runoff.

SURFACE DRAINAGE

The accompanying "Surface Drainage" Map indicates in a general way how surface water will drain in the Borough. Like the Excessive Slopes Map, this study was made by analyzing the Topography Map. The territory of the Borough is divided into several drainage basins bounded by ridge lines which are shown as drainage divides on the map. Much of the storm water runoff in the central and western areas of the Borough drains directly toward the Passaic River. The storm water in the eastern part of the Borough drains into Livingston before heading towards the Passaic River. Also storm water from a small area east of Passaic Avenue along Harrison Avenue drains north into West Caldwell prior to being intercepted by the Passaic River. This map is particularly useful when assessing the impact of applications for development and their effect pertaining to storm drainage runoff.

SOILS

The predominant geologic soil conditions evident in the northeast 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. This scouring resulted in the deposition of unsorted glacial debris in the form of "till" and the transportation and deposition of glacial debris by meltwater away from the glacier as "outwash" and "lake deposits."

Following the glacial period, the formation of new drainage patterns evolved whereby materials were eroded, transported and redeposited as "alluvium" along watercourses. In conjunction with these new drainage patterns, "organic muck deposits" were formed in low-lying areas of poor drainage.

The information shown on the accompanying "Soils Map" was obtained from the Engineering Soil Survey of New Jersey. It is not as detailed and accurate as some of the more recent soil surveys prepared by the Soils Conservation Service of the United States Department of Agriculture for other Counties in the New York-New Jersey metropolitan area. Essex County has not been mapped by the Soils Conservation Service so that the Engineering Soil Survey is presently the only readily available information on the subject.

The map indicates that all soils within the Borough are identified by a three-part code symbol. The first parts of the identification symbol defines the geologic association of the soil area. There are 10 different soil types found within the Borough, as shown on the "Soils Map." These can be grouped into 5 major geologic soil classifications which are identified by various patterns appearing in the Legend of the Surficial Geology Map. These soils include alluvium, organic muck, glacial outwash, residual soil and glacial till. Each of these classifications are described on the following pages. The second part of the coded soil designation identifies soil texture and consistency and the third part designates an estimate of ground water conditions which are described as excellent, good, imperfect, poor and very poor with the first letter of each of these words serving as a code (i.e. GE, good to excellent; PI, poor to imperfect; VP, very poor to poor, etc.).

There may be instances where there are a greater number of variables than can be provided for the three-part code. In that instance, substitute symbols are employed which include Z as swampland and R as variable land.

The use of the two mapping symbols in the form of a fraction indicates that the material described in the upper part of the fraction appears at the ground surface and is underlain by the material indicated in the lower part of the fraction. The fractional symbol is used to label areas where the underlying formation is close enough to the surface to be encountered occasionally, or even frequently, in ordinary construction. An example of this is the eastern third of the Borough where the surface is primarily glacial till and below the "till" is "residual soil."

A brief description of the five geological soil classifications found in the Borough are as follows:

Alluvium (AR)

Alluvium deposits are poorly drained, permeable, fine, sandy silts that lie adjacent to streams in flood plains. These soils are flooded periodically, following rainfall, and tend to pond for several days. In addition, superficial muck may be encountered in conjunction with poor drainage conditions. The depth to bedrock varies with no uniform characteristic.

Alluvial soils have severe limitations for all aspects of development due to poor drainage, poor bearing strength and high ground water conditions. Alluvial soils should be protected from subsurface sewage infiltration or any other kind of pollutant that could adversely affect the acquifer recharge areas.

The only area of alluvial soils mapped in Roseland are now occupied by the cloverleaf interchange between Eisenhower Parkway and Interstate Route 280.

Organic Muck (Z)

Organic muck deposits were formed in low-lying, poorly-drained areas during the post-glacial period. The thickness of these swamp deposits range from twelve (12) inches to over several feet and average about two (2) feet. The underlying soils vary greatly including glacal till, stratified outwash and lake clay beds. Muck formations have a high water table, slow permeability, low erosion potential and poor bearing capacity.

Muck formations are also indicative of poor drainage with severe construction limitations. Adjacent soil groups may serve as a rough indicator of subsoil condition, however, the circumstances of poor drainage vary to the extent that no generalized interpretations can be made for development purposes.

Organic muck is generally located west of Eisenhower Parkway adjacent to the Passaic River. There are other, smaller deposits of organic muck east of Livingston Avenue and north of Steel Court. These areas are not intensely developed. They are either in County parkland or part of the large-lot-office-building or industrial zones.

Glacial Outwash (GS)

Glacial outwash consists of assorted, relatively homogeneous material, predominantly of sand sized granules, with varying amounts of silt and gravel. These highly permeable deposits are associated with glacial meltwater streams and are typically many feet thick. Drainage conditions vary with topographic relief, drainage patterns and seasonal high ground water. Since this type of soil is the product of depositions rather than erosion, the depth is relatively great and bedrock will seldom be encountered.

With the exception of slope limitations and severe restrictions in the poorly-drained, low-lying areas, the overall development limitations are slight to moderate. These soils are generally acknowledged as ground water recharge areas due to their high permeability. Ground water quality may be detrimentally affected by any subsurface pollutant due to this soil's extreme perviousness and poor filtration, particularly in the coarser outwash.

There are four areas of the Borough, including both developed and undeveloped land, made up of glacial outwash soil. The major area is located in the developed area extending south from the Essex Fells boundary between the Morristown and Erie Railroad and the intersection of Harrison Avenue and Eagle Rock Avenue. This band of soil continues south along Livingston Avenue to the Livingston boundary on largely office-building and undeveloped property abutting the Route 280-Livingston Avenue interchange. Another area of glacial outwash soil is located largely in the County park property south of Route 280 west of Livingston Avenue. The third area is in the residential development along Passaic Avenue adjacent to West Caldwell. A fourth area is part of the industrial development along Steel Court.

Residual Soil (Ib)

The scouring movement of the Wisconsin Glacier exposed bedrock areas of high relief. Subsequently, thin "residual" soils evolved by weathering on the exposed outcrop of basalt. Residual soils vary in gradation being fine at the surface and coarsest just above bedrock. Typically, the deep zone of soil with decayed bedrock is the most pervious and best drained.

The primary limitations of residual soils are the slope conditions and shallowness of depth to bedrock which is generally less than 3 feet. Although they are well-drained and quite permeable, the high erosion potential may pose severe secondary limitations.

There is one area of residual soil in the Borough, east of Eisenhower Avenue, abutting Livingston. This area lies mostly in the County park property.

Glacial Till (GM, GD)

Glacial till composed of predominantly granitic gneiss exhibits a wide range of conditions. Most notably, this soil type is a permeable mixture of very coarse gravel, sand and silt which tends to have a semi-permeable layer or pan at a depth of 2 to 3 feet restricting the overall permeability. Depth to bedrock exceeds ten (10) feet except in areas of high relief and along areas of increased slope. Surface drainage is fair except in areas of low relief where occasional flooding and ponding may occur along natural drainage patterns due to high ground water. In addition, ground water may be ponded or perched in these low areas with seepage occurring in adjacent upslope vicinity.

Internal drainage is poor due to slow permeability across the pan with seepage or ponding depending on the slope. Where encountered, the semi-impervious "pan" stratum may cause temporary shallow perched ground water or slight artesian ground water conditions. The erosion potential increases with slope and soil erosion class is low.

The greatest bulk of the Borough land area, both developed and undeveloped, is made of up of glacial till soil as shown on the soils map.

SUMMARY AND CONCLUSIONS - PART 1

1. The territory of the Borough of Roseland varies in elevation from a high of 531 feet above sea level in the eastern part of the Borough to a low of 165 feet above sea level at the Passaic River in the western part of the Borough.

2. Much of the land in the central part of the Borough has slopes from 7 to 15 per cent. Most of the undeveloped land in the Borough is located in this area which has only slight to moderate restrictions for development. The western part of the Borough is nearly level and swampy. Most of this land is part of the County park system. The eastern and southwestern parts of the Borough contain slopes greater than 15 per cent. Most of these areas are developed.

3. Most of the storm water drains directly into the Passaic River. In some parts of the Borough, the storm water drains into adjoining municipalities, before being intercepted by the Passaic River.

4. The Engineering Soil Survey of New Jersey indicates that there are 10 soil types in Roseland. These can be grouped into 5 major geologic soil classifications.

Utilities

PART II - UTILITIES

WATER SYSTEM

The Borough of Roseland presently does not have a water supply facility of its own. Water is purchased from the Essex Fells Water Company which also serves Caldwell, North Caldwell and Essex Fells. Roseland does, however, have its own Water Department and transmission capabilities.

The Essex Fells supply consists of 18 wells, three rock wells and 15 drilled wells in glacial till. Water is pumped from these wells to a reservoir from which Roseland drains it supply. The system has a production capacity in excess of 5 million gallons per day (MGD). Average daily consumption is 2.1 MGD and peak daily consumption is 4.6 MGD*. Roseland purchased approximately 216.7 million gallons in 1981. Records of the past few years show no significant increase in demand; in fact water purchase figures have slightly decreased over the years.

The Essex Fells supply system is expected to provide sufficient capacity to handle current and near future demands, however new sources of supply are continually being explored.

The map entitled "Water Service" indicates the present system of the potable water supply infrastructure within Roseland as well as the location and size of all water lines and hydrants. This system is maintained by the Borough of Roseland. Presently, the connections to the Essex Fells system are found at the Essex Fells border on Devon Road, Forest Road, Roseland Avenue and Roosevelt Street.

A consultant's report, dated November 1980, evaluated the existing system and proposed several improvements. First, considerable variation was found in water pressures throughout the Borough. This is due partially to the small size of existing transmission lines. Secondly, the Borough must rely on the Essex Fells system to meet peak demands, as it has no storage facilities of its own. Sufficient water pressure and storage facilities are critical to fire flow and peak demand requirements.

To alleviate potential problems in these areas a new 1.0 million gallon storage tank and several new water mains are proposed. Proposed water main improvements are scheduled along Eagle Rock Avenue between Eisenhower Parkway and Becker Farm Road; along Eagle Rock Avenue between Monroe Avenue and the West Orange border and along Godfrey Avenue and Ridge Road. The new storage tank will be located south of Crestview Court. In addition, a new water main will be extended from Livingston Avenue to the storage tank. Several new check valves are also included in these improvements. Pipe sizes of the new water mains range from 8 inches to 16 inches.

* 1981 Figures, Essex Fells Water Department

The design of the new water distribution facilities is already underway. Funding for these improvements is provided through Community Development Block Grant money and appropriation of bonds and/or notes of the Borough.

Summary & Conclusions

No difficulty in meeting Roseland's water supply needs is anticipated in the near future. Improvements to the existing transmission system and the addition of a water storage tank within the Borough will further supplement water supply facilities.

SANITARY SEWER SYSTEM

The Borough of Roseland is presently served by a main sewage treatment plant in West Caldwell. The plant is located near the Roseland border and also serves the municipalities of Caldwell, West Caldwell, North Caldwell, Essex Fells, a portion of Fairfield and a portion of West Orange.

The following map entitled "Sanitary Sewer Service" shows the existing sanitary sewer infrastructure within the Borough. This map shows the location and size of the sewer lines and all other waste treatment facilities located within and serving the Borough. Also shown is the direction of flow for all lines.

Beginning in January 1979 a sewer extension ban was imposed on the Caldwell plant by the State Department of Environmental Protection, Division of Water Resources. The ban, which has also affected other communities and sewage treatment plants throughout the State, applies to those facilities which receive sewage in excess of their design flow and are unable to provide adequate treatment. Under the restrictions of the ban, new extensions of sewer lines which convey sewage from more than one building or which convey more than 2,000 gallons of sewage per day will not be permitted.

Though several large facilities have been constructed and tied into the existing system since the ban, they were facilities which had received permission from the State under a special exemption. No further major exemptions of this type are anticipated.

Solutions to the sewer moratorium have not been proposed at this time. However, a feasibility study is soon to be undertaken by the Borough to investigate possible alternatives.

Summary & Conclusions

Future growth in Roseland, as well as in surrounding communities, will be greatly influenced by the existing sewer moratorium. Until the present ban is resolved or other alternatives are found new construction within the Borough will be restricted to those facilities which meet the conditions of the ban.