

development for a particular area is the capability of the ground to support buildings and other structures. This capability is termed bearing capacity. Areas that have good bearing capacity are suitable for most types of urban development, while areas with limited or poor bearing capacity should be reserved for recreation, open space, and agricultural uses. The Itasca planning area, like all of Du Page County, is fortunate in that the major geologic elements which limit structural bearing capacity such as sub-surface fault lines, volcanic rock, water-saturated fine textured sands, and land subject to mud slides are seldom found in this area. However, the planning area does contain peat and muck deposits which have limited bearing capacity. These constraints are indicated on Plate 4.

Peat and muck deposits form in wet areas, such as marshes and bogs where oxidation is retarded, leaving accumulated organic matter preserved in thick deposits. The decomposition which does occur releases highly combustible gases and forms an organic residue called humus. The deposits thus formed, peat and muck, are composed of eighty to ninety percent organic matter. The principle distinction between the two deposits is that peat contains a high level of fibrous organic matter, usually above fifty percent, whereas muck is composed of much more highly decomposed organic matter (usually less than fifty percent fibrous). In either case, these deposits are extremely compressible under surface loading and are prone to shrinkage and swelling as the water table fluctuates. In addition, the organic content and associated gases are highly combustible when dry. Structures associated with urban development such as roadways, utility lines, and building foundations which are built on peat and muck deposits are subject to severe settling, shifting, and fire and health hazards. For these reasons, such deposits are considered as severe constraints to urban development.

The remainder of the planning area, excluding peat and muck deposits, has few, if any, areas of limited bearing capacity. It is possible, however, that some limitations may occur in localized areas. It should therefore be required that any site's bearing capacity be tested thoroughly before development is permitted. In addition, before any attempts are made to mitigate bearing capacity limitations by grading, excavation or filling, the environmental impacts of such actions must be evaluated.

Geologic Environments With Potential For Groundwater Recharge. Groundwater is the water that is stored within and flows through the rock formations underneath the surface of the earth. The Itasca planning area, like all of Du Page County, currently obtains all of its domestic, municipal, and industrial water supplies from this groundwater reservoir. However, it is estimated that by 1990, some areas of the County will experience shortages of water as these groundwater reservoirs decline. As a result, it is necessary to protect this source of water by identifying and protecting from intensive ground cover those geologic regions which contribute to the recharge and replenishment of groundwater supplies.

In the groundwater hydrologic cycle, water is constantly entering and leaving groundwater aquifers. Wherever precipitation touches the earth, some of it soaks in. It seeps downward toward the earth's center until blocked at some depth by nonporous rock; simultaneously it spreads out horizontally such that vast volumes of the earth become saturated with water. These water saturated formations are known as aquifers. The process by which the surface water enters into the groundwater supply is known as recharge. Recharge occurs naturally in virtually all of the County, however, due to geologic features such as coarsely grained geologic material, depth to bedrock surface, location of sub-surface aquifers, aquifer thickness and saturation, and the type and thickness

of overburden, the rate at which recharge occurs differs substantially. The geologic environments associated with aquifer recharge in order of decreasing recharge potential are as follows:

1. Sand and Gravel (Outwash) C-1 - Heights recharge potential and most severe limitations to urban development;
2. Sand and Gravel (Ice Contact) C-2 - Moderate to good recharge potential indicating severe limitations to urban development; and
3. Silt and Clay Till Overlying Sand and Gravel or Bedrock F-1 - Moderate to limited recharge potential depending upon the depth of till overlying the sand or gravel. Each area should be locally examined for recharge potential, but generally these geologic environments place moderate limitations on urban development.

These three geologic environments are indicated on Plate 4.

There may be specific locations within these areas which do not presently contribute to the recharge of aquifers. However, because of the great importance of the groundwater supply, these areas should be protected to the greatest extent possible. Development should not significantly alter the recharge capability of the site by covering it with impervious surfaces. Instead, the proportion of land devoted to open space uses in a recharge area should be maximized.

Geologic Environments Least Likely To Protect Groundwater Resources. In addition to protecting the quantity of groundwater resources, it is also necessary to protect their quality by preventing contamination from surface pollutants. During the passage of surface water through the ground, it is purified naturally by the soil acting as a filter. The degree of purification, however, depends upon the rate of infiltration, the thickness of the filtering material, and local geologic characteristics. Therefore, different geologic environments permit different concentrations of pollutants to enter the aquifers. As a result, it is necessary to keep any development that has the potential to generate pollutants away from areas that would permit the infiltration of these contaminants into the groundwater supply. Specific geologic environments where this is necessary are as follows:

1. Surficial Aquifers Continuous to Bedrock and Bedrock Outcrops - Any pollutants on the surface of these environments will be washed directly into the groundwater reservoir, thereby presenting a very severe limitation to all types of urban development;
2. Sand and Gravel (Outwash and Ice Contact) C-1 and C-2 - Due to their rapid permeability rating and direct contact with aquifers, all environments with good potential for groundwater recharge also have the potential to transmit surface pollutants to the groundwater supply. The greater the recharge potential, the greater the pollution potential. As a result, these environments present severe limitations to most types of urbanization;
3. Silt and Clay Tills - With only moderate to slight recharge potential, these environments have only moderate limitations for some types of urban development.

These constraints on urbanization found in the Itasca planning area are indicated on Plate 4.