

PLAN OF DEVELOPMENT

BACKGROUND PAPER: Physical Characteristics

April 1982

Extensive information on Ledyard's natural resources has been compiled and discussed in both the 1972 Plan of Development and the 1974 Plan of Conservation. This background paper provides both a summary of that information and an update based on a more recent soils survey.

Ledyard's topography and soils, shaped as they were by glacial activity, are extremely complex. Glacial action scoured the soil, leaving surface bedrock in some areas, while in others, large accumulations of sand and gravel were deposited. The terrain is highly irregular, consisting of steep rocky hills and a tangle of streams and wetlands in the valleys.

The physical characteristics of the town have been the central factor in shaping the town's growth pattern. The irregular topography discouraged the development of direct cross town transportation routes and encouraged scattered farmsteads in the more level areas.

Ledyard's physical characteristics provide both an obstacle to many forms of growth and an opportunity to develop in an interesting and attractive setting. In Ledyard, perhaps more so than many communities, development must be carefully located in order to avoid creating problems. The cost of inappropriate development is high, both for the property owner and for the town as a whole.

GENERAL DESCRIPTION

Ledyard's municipal boundaries encompass approximately 40.5 sq, miles. Ledyard is located approximately six miles north of Long Island Sound on the east bank of the Thames River Estuary. Ledyard's boundary extends up river for six more miles, and inland to the east for approximately seven miles. The eastern boundary is a chain of ponds connected by streams and Whitford Brook flowing south to the Mystic River. Elevation ranges from sea level along the Thames

River to the 475' high Ayer Hill near Route 2 in the far northeast corner of town. The elevation of the many hills is usually 100 to 250 feet above adjacent valleys, providing expansive views from the hilltops.

SOILS

Both the 1972 Plan of Development and the 1974 Plan of Conservation relied heavily on the 1969 Soils Survey published by the federal Soil Conservation Service. In 1979, the SCS completed field work on a more detailed survey which will be formally published in 1983. The survey data is now being refined, but field sheets are available for comparison with the 1969 results.

The SCS classifies soils into types based on stoniness, slope, permeability, and general suitability for various forms of development. Use of either the 1969 or 1979 soils data must be done with caution. The data must be verified in the field for actual site planning. The SCS data is excellent, however, for broader planning purposes.

In a town without community sewer systems, the suitability of soils for onsite subsurface sewage disposal systems becomes a crucial factor for development. Ledyard's decision to avoid community sewer systems wherever possible means that great care must be taken in the placement of septic systems. Soils with ledge located near the surface, steep slope, or high groundwater have severe limitations for septic systems.

The 1982 Plan of Development will include a map showing soil limitations for onsite sewage disposal systems, based on the 1979 soils survey. Categories which have been mapped are as follows:

- * slight limitations: soils are generally favorable for the specified use and limitations are minor and easily overcome. Approximately 2235 acres of land have been placed in this category, or about 9% of the town's total land area. Much of the area with slight limitations has been developed already. Major undeveloped areas

are located along the lower half of Shewville Road, the northern end of Colonel Ledyard Highway, and along Lambtown Road. From a soils standpoint, these soils can generally support relatively high densities of up to ½ acre with on-site water.

* moderate limitations: soil properties or site features (such as slope) are unfavorable for onsite subsurface sewage disposal system installation, but can be overcome by special planning and design. Limitations may be due to stoniness, a slow percolation rate, or some slope. Approximately 8000 acres of land have been placed in this category, or about 31% of the town's total land area. Land with moderate soil limitations is scattered throughout the town, with the heaviest concentration of these soils in the reservoir watershed and the Christy Hill area. Lower density or clustered development is most appropriate in these areas.

* severe limitations: soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Some of the town's most dense subdivisions are located in areas with severe soil limitations. Although problems have occurred, most of the homes in these areas have septic systems which function adequately. In some areas, ledge, high water or slope conditions virtually rule out any development at all. In others, although systems may be very costly to install and will require careful engineering, limited development is possible. It is not merely a matter of increasing the minimum lot size for development in order to allow larger systems. Rather, filling or interceptor drains may be required. Approximately 60% of the town's land area is classified as having severe limitations.

A fourth category, "made land", is land which has been disturbed so that the original properties of the soil are not relevant. It may be paved or extensively filled,

The combination of a stated town policy of sewer avoidance with the predominance of soils with severe limitations for individual septic systems means that development must be carried out with extreme care.

Some soil characteristics have significant limitations for uses other than septic systems. For example, steep slopes are an obstacle to road installation and water service. Erosion may also be a serious problem on steep slopes. Slopes in excess of 20% should be developed only with extreme care and avoided wherever possible.

WATER FEATURES

Watersheds

The town of Ledyard is divided into three major watershed areas:

1. The Thames River watershed includes approximately 50% of the town. Its major streams, which flow generally east to west, are Flat Brook, Pine Swamp Brook, Tom Allyn Brook (which flows through Dow industrial property), Billings-Avery Brook (joining the Thames River at Stoddards Wharf State Park), and Joe Clark Brook (which brings drainage off Geer Hill into Poquetanuck Cove). Shewville Brook, which flows near the Ledyard-Preston line into Poquetanuck Cove, drains the large Cedar Swamp area.
2. The Poquonnock River watershed, which encompasses approximately 15% of the town, is owned in large part by the City of Groton. Their reservoirs are designed to collect surface runoff and the City Utilities welcomes additional runoff which may be caused by new development. Their major concern is that water quality be maintained and that new development not become a cause for contamination. Much of the Ledyard Center area drains into this system. This is the town's smallest watershed and the least developed.
3. The town's third major watershed area is the Mystic River drainage area. This watershed includes a complex tangle of streams which head generally east and south, and includes about 35% of the town. Lee Brook (passing north from the Blonder Park through Sawmill Park and eastward), Williams Brook (which passes through Highlands Lake and receives discharge from the Highlands Treatment Plant), and Whitford Brook from Long Pond and Whitford Pond all join to form the Mystic River at Old Mystic just south of the Ledyard town line. Haley Brook and its extensive wetlands, Red Brook and its West Branch all flow southerly to the Groton line then easterly to the Mystic River. Long Pond is part of this watershed and acts as a storage basin, its level being controlled by a dam at the south end.

Major Wetlands

More than a dozen large wetlands are located within the town's boundaries. The largest is the approximately 800 acre Great Cedar Swamp near Route 2, a unique natural area. The approximately 100 acre Pine Swamp near Christy Hill, the Shewville Brook wetlands, and the wetlands along Haley Brook are some of the largest areas.

Wetlands are unsuitable for development. Wetlands play an important role in the natural drainage system by absorbing storm water and delaying the speed with which it runs off, thereby reducing the threat of downstream flooding. Wetlands also perform the function of pollution filtration and are an essential natural habitat for many species.

The State Statutes define inland wetlands by soil type and include soils with a water table at or near the surface much of the year.

Water Supply

Despite the presence of the large City of Groton Reservoir holdings, more of Ledyard's water supply comes from surface water impoundment. The town's water supply is entirely from ground water sources. Most homes are on individual wells, although there are several community water systems which are served by community wells. Unfortunately, the Highland development and its sewage treatment plant are located on the Williams-Whitford Brook reservoir. Care should be taken to avoid locating potential sources of pollution over aquifers, including treatment plants, storage areas, or high density development of all kinds.

OTHER NATURAL FEATURES

Sand and Gravel Deposits

Glacial action resulted in generous deposits of sand and gravel within Ledyard's boundaries. Large deposits are located along Stoddards Wharf, Long Cove, Thomas, Whalehead and Indiantown Roads. (See 1974 Plan of Conservation Figure 2) Sand and gravel are essential minerals for construction and necessary for such uses as landfill cover or road sanding. Once these deposits are covered by houses or other development, they are lost as a mineral resource and their other function of water filtration and purification are lost. Large deposits should be protected from premature surface development wherever possible.

In the past, sand and gravel removal has often left unattractive, barren "scars". Town regulations now provide for rehabilitation of a mining site once work is complete.

Prime Agricultural Lands.

Prime farmlands soils have been identified and mapped by the Soil Conservation Service. Prime agricultural soils have few limitations which would restrict the type of plants grown or which would require significant conservation measures. These soils are scattered throughout the town, with the greatest concentration of such soils in the southeast corner. Surprisingly, there is little correlation between the town's 17 existing farms and prime agricultural land. Many of the characteristics which make soils desirable for agricultural purposes also make these soils good for residential development and septic systems, although the best agricultural soils have a high water retention capability which is not desirable for septic systems.

Preserving local farmland has taken on a new importance in the face of rising energy costs and uncertain supply. Although an extremely desirable goal, it is difficult to encourage retention of agricultural uses through land use regulations. Zones solely for agricultural uses are usually considered too restrictive. The economics of farming in Ledyard, as in all of Connecticut, are difficult. Partial property tax abatement is provided through the state's Public Act 490, which allows a lower tax assessment for qualifying farm lands. While this provides home economic assistance, it is not sufficient to prevent the loss of farms to subdivision activity.

Woodlands

Ledyard's abundant woodlands should not be overlooked as an important physical resource. Much of the town's undeveloped land is covered by hardwoods including oak, beech and red maple. Softwoods such as white pine, cedar and hemlock usually comprise less than 10% of the tree cover. Ledyard was once the location of significant stands of cedar and pine, thus the names Pine Swamp and Great Cedar Swamp, but no significant large stands remain. Many areas which are now forested were once cleared farmland. The 1974 Plan of Conservation estimates that nearly 70% of all woodlands are immature trees.

Woodlands have many functions including a major role in controlling air temperature, air quality, water quality, erosion and sedimentation, flooding, and moderating droughts. Woodlands are also a valuable fuel resource which have experienced renewed popularity with the return to wood stoves as a means of home heating. Indiscriminate clear-cutting activities in order to take advantage of the rapidly expanding demand for firewood can waste this important resource and cause problems of erosion and sedimentation.

The Coastal Area

Ledyard has approximately eight miles of coastline in the Thames River and Poquetanuck Cove. The land within the coastal boundary (which includes properties within 1000 ft. of the shoreline) includes nearly 2000 acres, or about 8% of the town's total area. In March 1982, the Planning Commission adopted the Coastal Area Management Plan as an amendment to the town's Plan of Development. Resources which are identified as meriting special concern are the flood hazard area along the immediate shore, both tidal and freshwater wetlands, and the four major coves - Long Cove, Mill Cove, Clark Cove, the cove at Stoddards Hill State Park, and Poquetanuck Cove. Protection of coastal resources is a major goal of the Plan, while encouraging use of the resources for recreational and economic development, consistent with the capacity of the resources to support such activities.

Unique Features

The Ledyard Glacial Moraine is recognized widely as an outstanding example of glacial activity. The boulder train, formed by outwash from the frontal edge of the glacier, and the dry kettleholes, formed as blocks of ice broken off the glacier and covered with soil melted leaving large depressions, run in a band across the western side of the town from the Sherwood Forest Subdivision to Stoddards Wharf Road. The town has begun initial steps to preserve these notable features in a glacial park which highlights specific features, connected by a system of trails. The State Department of Environmental Protection has indicated their intent to develop a teaching guide for use of the park as part of their educational outreach efforts.