

SOILS and URBAN DEVELOPMENT in Hartford County

David E. Hill

Arthur E. Shearin

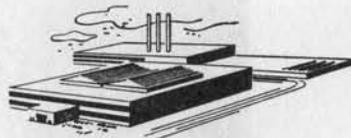


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THE AUTHORS David E. Hill is assistant soil scientist on the Station staff. Arthur E. Shearin is State Soil Scientist, Connecticut and Rhode Island, Soil Conservation Service, U.S. Department of Agriculture.

THE MAPS The Hartford County soil survey maps, as yet available only in draft form, may be inspected at The Connecticut Agricultural Experiment Station, 123 Huntington Street, New Haven, at the Windsor Laboratory of this Station, Cook Hill Road, Windsor, at the Hartford County Soil Conservation Service, 69 Lafayette Street, Hartford, and at the Storrs Agricultural Experiment Station, Storrs. The location and extent of soil series listed in Table 1 may be determined by reference to these soil survey maps.

COVER PHOTO A housing development on Whatley and Swanton soils in Hartford County.



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When colonies or suburbs begin to appear around cities, with homes and other buildings where none stood before, communities frequently undertake planning and zoning of land use. One primary determinant of land use is the nature of the soil.

Because agriculture needed the knowledge, this Station, almost from its first day in 1875, has investigated the basic physics and chemistry of soils. Thus, the Station accumulated in the "bank" of scientific information a vast store of fundamental facts on texture, structure, and leaching; on packing, porosity, and percolation. One combination of these is the excessively drained, very sandy soil called Windsor, another is the well drained, silty soil called Enfield, and still a third is the slowly drained, clayey soil called Buxton. To the farmer familiar with soil names, Windsor means droughts, Enfield means productive tobacco and potato fields, and Buxton means pastures. To the builder familiar with soil names,

Windsor means sand, Enfield means green lawns and dry basements, and Buxton means ineffective septic tanks and wet basements. Thus, the basic store of information on soils can be drawn upon by anyone who uses the soils.

Hartford County, Connecticut, is an excellent example of the nationwide trend toward urban and industrial expansion around established cities. Expansion from Hartford and other cities in the county, into the surrounding rural communities, has increased competition for land and soil in an area that has highly specialized types of agriculture.

Changes in Hartford County Land Use

Economic reasons for this increasing pressure on land resources are numerous; however, a look at recent population increases, which reflect business and industrial expansion, indicate the magnitude of the changes.

Hartford County, with an area of about 740 square miles, had 421,000 people in 1930 (a population density of about 570 to the square mile). In 1959, it had an estimated 662,000 people (a population density of nearly 900 to the square mile), an increase of about 241,000 in 29 years. About one-fourth of this increase in population was absorbed by the predominately commercial and industrial cities of Hartford, Bristol, and New Britain. The surrounding towns, most of them mainly rural or residential, absorbed about three-fourths of the population increase. Large increases in population have occurred in East Hartford, Enfield, Manchester, Newington, Southington, West Hartford, Wethersfield, and Windsor.

The new growth of business and industry in Hartford County has not been confined to the established centers of commerce and industry but has spread into surrounding areas. Factories and other commercial buildings have been built in the suburbs and on farm land, where there was room for spacious landscaped grounds and ample parking facilities.

Industrial and commercial expansion have created new jobs, which in turn have increased the need for living facilities: to meet this demand, housing has expanded rapidly. Many of the new houses are in large developments where uniformity of materials and near-uniformity of design permit lower construction costs.

The increasing suburban population must have services and public facilities. The present trend is toward large shopping centers in relatively uncongested areas. Schools, parks, golf courses, and drive-in theatres, to mention only a few typical uses of land, occupy many acres.

The site is an integral part of building construction. Nearly level to gently sloping, deep, well-drained soils which are relatively free from stones and boulders are the first to be considered. Urban expansion is greatest on this type of land. The best agricultural soils are also in this category, although some nearly level, excessively drained soils in Hartford County are not highly desirable for agriculture because of droughtiness. Thus, urbanization is rapid

in Hartford County and information on soils a useful tool in the planning.

Soil Surveys and Studies

The characteristics of soils in parts of the Connecticut Valley were mapped in 1899 by Dorsey and Bonsteel of the United States Department of Agriculture, Division of Soils.¹ Then, formalizing its long interest, the Station created a Department of Soils in 1923. The chief soil scientist, M. F. Morgan, and his associate, H. A. Lunt, spent a score of years compiling data on Connecticut soils, analyzing the results and publishing two outstanding reports. Bulletin 423 describes the soil types of Connecticut as Morgan understood them in 1939 and gives a reconnaissance survey of their location throughout Connecticut. This is still the only survey in many towns. Bulletin 523 is an encyclopedia on the forest soils of the state, giving abundant data on their texture and porosity. Both of these stores of basic knowledge about soils are drawn upon regularly.

Then, in 1948, a modern survey of Hartford County was begun by the Station and the Soil Conservation Service, building upon the earlier work. This new survey incorporated recent advances in the understanding of soils and their use and was made upon aerial photographs with a scale of 4 inches to the mile. The survey of Hartford County is complete and provides a new store of information on soils. The survey shows soil texture, slope, and stoniness. The name of the soil is usually taken from a town or stream near the spot where the soil was first described. Then this name indicates the genesis of the soil and whether the substratum is compact and restricts leaching or whether the substratum is porous and permits rapid leaching.

The influence of the soil types upon land use, urban and agricultural, was demonstrated through a study² of this survey of Hartford County: the adjacent towns of Southington and Plainville in the southwest were compared with the adjacent towns of Suffield and Windsor Locks in the north-central part of the county. Although these areas differ somewhat in physical features and in types of agriculture, they are of the same size and have been exposed to the same pressures of expanding industry and population. In 1957, 10 per cent of the Suffield-Windsor Locks area and 14 per cent of the Southington-Plainville area were in urban developments. In both areas 65 per cent of the urban development (urban includes farmsteads, residential areas, commercial and industrial building sites, golf courses, airfields, dumps, gravel pits, and quarries) had taken place on the predominantly well drained terrace soils. Only 20 per cent in the Suffield-Windsor Locks section and 12 per cent in the Southington-Plainville Section had occurred

¹ "One feature which has been very clearly recognized in the course of the survey is the continual and rapid encroachment of city and suburban development for summer residences and for industrial purposes. Many extensive areas which were formerly considered agricultural lands are now built up or held for speculative purposes for residence or industrial pursuits." Dorsey, C. W., and Bonsteel, J. A. Soil Survey in the Connecticut Valley, U. S. Department of Agriculture Report No. 64, 1900.

² Ritchie, A., Jr. and Swanson, C. L. W. Soils and Land Use, Hartford County, Connecticut. The Conn. Agr. Exp. Sta. Bul. 606, 1957. Available from the Station, address Box 1106, New Haven 4.

on the more rolling, stony, and rocky upland soils. The remainder had developed in miscellaneous land types.

This trend in man's actions may be explained by the information presented in Table 1. All soil series in the county are listed and rated according to such limitations as drainage, suitability for septic tank functions, flooding hazard, depth to bedrock, stoniness, and excessive slope.

Soil Characteristics Vary Widely

The well to excessively drained, stone-free terrace soils have the fewest limitations and so are favored by urban developers. Excessively drained terrace soils are very droughty and difficult to manage for crops but have advantages for urban development. These include the Windsor, Penwood, Manchester, and Hinckley soils. Such well-drained glaciofluvial terrace soils as Agawam, Branford, Enfield, Hartford, and Merrimac are highly productive agricultural soils. These soils also have advantages as potential construction sites. The moderately well drained terrace soils such as Ellington, Ninigret, Sudbury, and Tisbury usually owe their internal drainage limitations to high water tables in early spring. Internal drainage can often be improved by tile drainage systems; hence, the agricultural value of the land is not seriously curtailed.

The poorly drained and very poorly drained terrace soils such as Walpole and Scarboro present problems both to agriculture and to building. Nevertheless, many areas can be readily drained for either use.

The soils of the glaciolacustrine silt and clay terraces are generally not suitable sites for urban expansion. Surface and internal drainage are the main problems in such soils as Buxton, Berlin, Belgrade, and Scantic. They are difficult to drain due to the impervious nature of these medium- to fine-textured soils. It is difficult to maintain septic tanks and dry wells in proper working order. On the other hand, these soils are suitable for silage crops, hay, and pasture in support of dairying.

The competition for land has not been so severe in the upland areas, although it is increasing. The major upland areas, consisting of the Eastern and Western Highland portions of the county and the basalt ridges dissecting the Central Lowland, support a less intensive agriculture than do the terraces of the Central Lowland. Dairying predominates in these areas, with some poultry, but most of the land is still in forests or woodlots. Steep slopes, stoniness, shallow-to-bedrock conditions, and drainage are the limiting factors in these areas, and such conditions interfere with use of the land for both agriculture and urban development. For these soils, site ratings in Table 1 are generally given as a range because any or all of several limiting conditions may occur in a given location.

The upland soils best suited for urban development are the well-drained soils that have been cleared of stones, on level or gently sloping positions. These soils include the Brookfield, Charl-

Table 1. Site ratings and limitations of soil series as possible sites for urban development (continued)

Soil series	Site rating	Drainage Limitations			Other Limitations				
		Slight	Moderate	Severe	Slow infiltration rate ¹	Frequent flooding	Bedrock near surface ²	Stony or very stony phases ³	Slope phases more than 15% ⁴
Terrace soils (continued)									
Ninigret	Fair	X			X ⁵				
Sudbury	Fair	X			X ⁵				
Tisbury	Fair	X			X ⁶				
Walpole	Poor		X		X				
Scarboro	Very poor			X	X				
Glaciolacustrine terrace soils									
Sands over silt and clay									
Melrose	Fair				X				
Elmwood	Poor	X			X				
Swanton	Very poor		X		X				
Whately	Very poor			X	X				
Deep silts and clays									
Belgrade	Fair	X			X				
Buxton	Poor	X			X				
Berlin	Poor	X			X				
Biddeford	Very poor			X	X				
Wallington	Very poor		X		X				
Scantic-reddish variant	Very poor		X		X				
Biddeford-reddish variant	Very poor			X	X				
Scantic	Very poor		X		X				
Alluvial soils									
Deep sands and silts									
Alluvial lands	Very poor	X			X ⁵	X			
Bermudian	Very poor					X			
Hadley	Very poor					X			
Ondawa	Very poor					X			
Podunk	Very poor	X			X ⁵	X			
Rowland	Very poor	X			X	X			
Suncook	Very poor					X			
Winooski	Very poor	X			X	X			
Bowmansville	Very poor		X			X			
Limerick	Very poor		X			X			
Rumney	Very poor		X	X		X			
Saco	Very poor			X		X			
Miscellaneous land types									
Rockland-Hollis soils	Very poor				X	X	X	X	
Rockland-Holyoke soils	Very poor				X	X	X	X	
Terrace escarpments	Poor								X
Riverwash	Very poor			X	X	X			
Peats and mucks	Very poor			X	X				