OPEN FILE REPORT NCGS/OF-79-2

GEOLOGY OF WILSON COUNTY

BY

WILLIAM F. WILSON

1979

CONTENTS

TABLES AND FIGURES

GEOLOGY OF WILSON COUNTY, NORTH CAROLINA

Introduction

Wilson County is located in an area known as the eastern slate belt. Rocks in this particular geologic belt vary not only in their origin and types, but also in age from upper-precambrian to quaternary, a time span that could represent as much as 700 to 800 million years.

The rock types in Wilson County consist of metavolcanilastic epiclastics which are predominately laminated argillites with some scattered interbeds of sericite phyllite, too disseminated to show on the geologic map. Felsic crystal tuffs crop out in the central part of the county and are surrounded by Coastal Plain sediments. Some isolated limonitic sediments occur within the Coastal Plain sedimentary sequence.

Intrusive into the Wilson County area is a series of plutons of various sizes and shapes. They are coarse- to fine-grained, massive, and, in places, porphyritic felsic igneous intrusive rocks, predominately biotite granites and biotite-hornblende granites.

Lithology

Igneous Intrusive Rocks

Felsic Igneous intrusive rocks: Intrusive into the Wilson County area is a series of plutons of various sizes and shapes. They are fine- to coarse-grained, massive and, in places, porphyritic felsic igneous intrusive rocks and are predominately biotite granites.

Because of their fine-dense crystalline structure, the intrusives are resistant to rapid weathering and in outcrop, form isolated domed shaped bodies that project above the rock types they intrude.

Primary minerals in the felsic igneous intrusive rocks are quartz, biotite, and some muscovite mica, potassium, and plagioclase feldspars.

Sedimentary Rocks

Floodplain alluvium: The floodplains include those areas that are subject to frequent flooding. Floodplains in the crystalline rocks are predominately narrow. Floodplains broaden in areas underlain by Coastal Plain sedimentary rocks and become more extensive to the southeast and east as the drainage dissects these Coastal Plain sediments. This broadening of the floodplains in the Coastal Plain sediments reflects changes in gradient and topography of the area. They also indicate the susceptability to frequent flooding from rapid run-off of waters from the upland Piedmont and the inability of the unconsolidated surficial sands and clays to contain the erosional effects of excessive volumes of water.

Floodplain alluvium consists of unconsolidated sediment of varying thickness. The material is primarily dark-brown to gray silt, sand and clay with some gravels and boulders intermixed.

Gravels are scattered throughout the Coastal Plain sediments but are also found in a few locations along the major streams. The gravels are predominately well-rounded white, gray, red, brown or purple quartz and quartzite pebbles and cobbles commonly embedded in brown, orange or reddish limonitic clay.

Limonitic sediments: Locally, beds or layers of sand within the Coastal Plain sediments are firmly cemented by limonite. These range from a few inches to several feet in thickness. They consist primarily of limonite cemented disseminated angular to subangular quartz grains.

Metasedimentary and Metavolcanic Rocks

Argillites: The light- to medium-gray to brown, fine-grained argillites are epiclastic rocks with well-developed bedding, some of which is closely spaced, imparting a laminated appearance. The argillites probably originated by subaqueous deposition of clay and silt-sized particles deposited in a deep quiet-water basin. The sequence indicates deposition below wave base, and the presence of laminations suggest deposition in water void of any bottom turbulence. The laminations must have been produced by intermittent changes in the environment of deposition. Probable explanations are: 1) regularly spaced eruptions of volcanic ash, 2) seasonal variations, and 3) periodic currents.

Cleavage is both bedding plane and slaty and slabs 1/4 inch thick can easily be cleaved from this rock type.

In outcrop, the cleavage and foliation planes accelerate the weathering processes which causes the argillites to form broad areas of slightly undulating topography.

Felsic crystal tuffs: The felsic crystal tuffs are dense, medium- to light-gray pyroclastic rocks exhibiting subconchoidal to conchoidal fracture. The aphanitic matrix contains beta quartz and subhedral to euhedral feldspar crystals, most of which exhibit partial replacement by epidote. Other minerals present include sericite and iron minerals (limonite-magnetite).

Metamorphic Rocks

Hornfels: A fine-grained to dense rock formed by contact metamorphism around the periphery of an igneous intrusive rock.

GEOLOGY AS A BASIC TOOL FOR LAND USE

A geologic map is the basic foundation upon which many land use and land management decisions should be made. Geologic knowledge as a basic tool for land use planning has always been a necessity; many times, an overlooked necessity. The rapid increase in population and the transition of our structure from one of a predominantly agrarian society to one of complex interrelationships of manufacturing and technical services has overtaxed our resource evaluation and planning capacity to keep abreast with our growth. We find, therefore, that we have become the victims of virtually unplanned developments. Many times, the wants of a few have taken precedence over the needs of many.

It is now becoming apparent, that in order to just supply the ever increasing demand on our non-renewable mineral resources, all future planning must include basic geologic data and must ensure the protection of our active and potential mineral resource sites for our present and future generations.

Because of the accelerated growth, much planning is done after development rather than during the conceptual planning and development period. Consequently, the hasty development of many urban communities has left us in the unfavorable situation of trying to provide the needed resources these expanding areas demand while unplanned growth patterns have seriously abused our land and have not made the fullest and most productive use of our natural and mineral resources.

In addition to providing the planners with the distribution of the geologic rock types and the locations of inactive, active, and potential mineral resource sites, many solutions to land use planning and engineering problems which arise with urbanization can be solved through careful study of the information present on the geologic map. The following lists the types of information that may be assimilated from a geologic map:

A. Bedrock geology describing rock types and their distribution

B. Active, inactive and potential mineral resource sites

C. Topography of the area showing unique topographic features

D. Drainage systems and basins

E. Floodplains

F. Flood prone areas

G. Terraces - alluvial and marine

H. Areas susceptible to extreme erosion

I. Landslide prone areas

J. Slope design for highway and industrial sites

K. Cut and fill sites

L. Surface and subsurface data on the design and construction of public and private industrial projects

M. Dam site locations

N. Fault and shear zones which may be of significance in the location of dams, industrial sites, etc.

O. Location of solid and liquid waste disposal sites

P. Water well location sites to supply ground water to areas without municipal facilities

Q. Green belt locations

R. Recreational sites (parks, etc.)

S. Future location sites for bicycle and other trails

This information will save valuable time and money as new areas are planned for and incorporated into the evergrowing urban framework.

The urban area that does not project its long-ranged planned program for its existing and its potential mineral resource sites will have to bear the consequences of either added financial burden of higher transportation costs from distant source areas or of higher cost substitutes which may be in limited supply. So, it is imperative that city and county land use planners should, for present and future use, acquire from the geologists all available geological and mineral resource information on their area. This information is essential in order to make the most advantageous use possible of the strategically located supplies and deposits of raw rock and mineral resources within an area.

CONCLUSION

For intelligent resource management and land use planning, as much useful information as possible on the area should be obtained before any decisions are made and any plans or programs initiated. The assimilation of data in this text is provided for these very reasons. Without the basic geologic and mineral resource knowledge and understanding of an area, sound resource management and land use planning cannot and will not be implemented.

In order to plan properly, the basic information provided in this text should be used as a supplement to other information acquired for these purposes. Without wise and careful use of all the knowledge available, we become the victims of unplanned growth and of shortages of critical mineral resources, rather than the residents of well-planned communities.

Planned growth patterns primarily depend on the availability of suitable useable land and the mineral and natural resources for its development and continued support. Present and future land use planning and mineral resource evaluation and development depends upon our ability to work in close cooperation with one another and to use our combined knowledge to its wisest advantage. These facts are becoming more critical to us daily as we realize that we have the knowledge to plan land use but are beginning to lack many of the critical nonrenewable mineral resources needed to sustain our progress. This very fact places the burden of responsibility upon us to help ensure the survival of our future.

FIGURE 8: DERIVATIVE GEOLOGIC MAP POSSIBILITIES

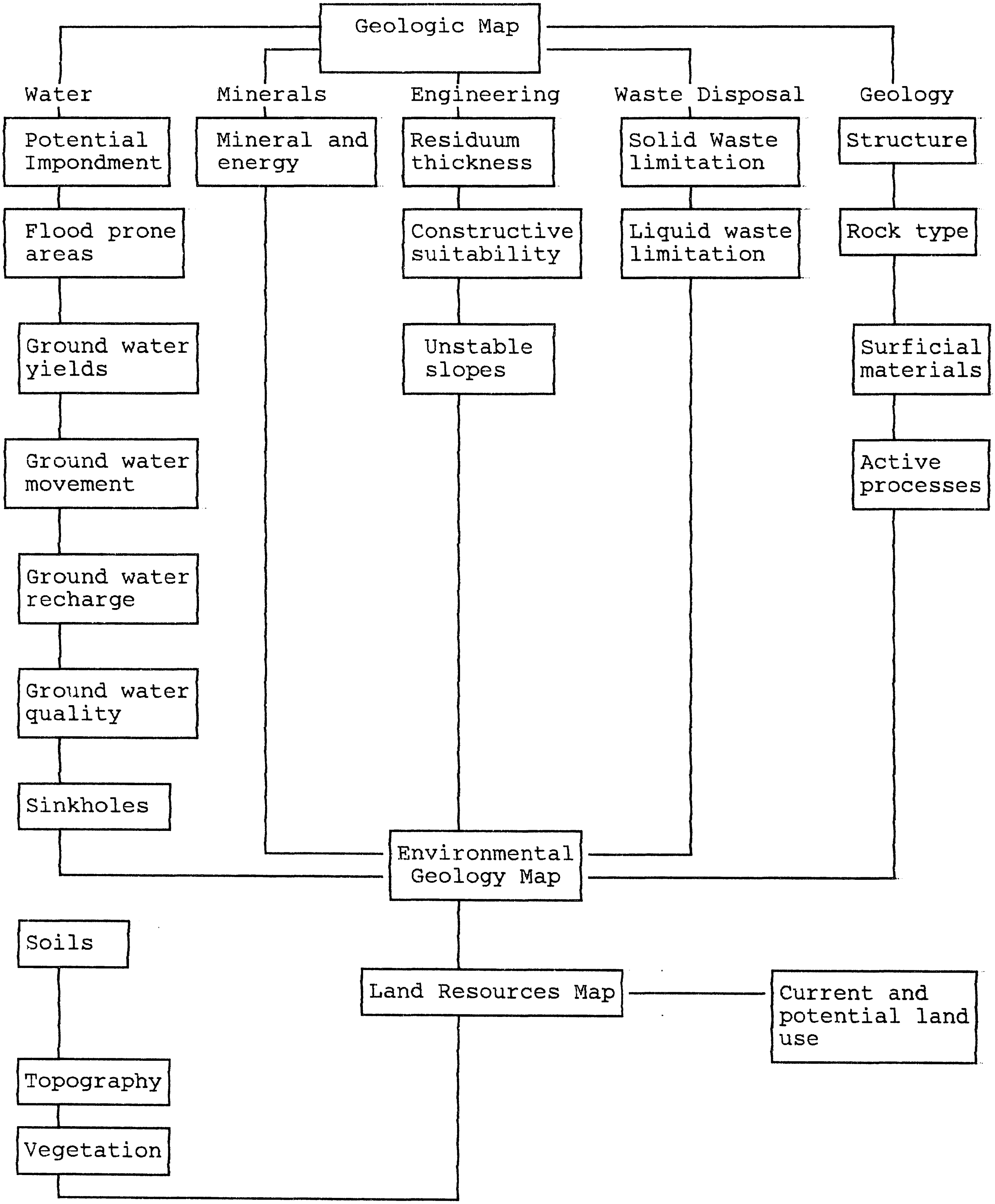

TABLE 1: GEOLOGIC MAP UNITS, CORRELATED WITH THEIR GENERAL ROCK TYPES, TOPOGRAPHY AND USES

GEOLOGIC UNIT	ROCK UNIT	TOPOGRAPHY	USES
Floodplain Alluvium	Unconsolidated sands and clays	Narrow to broad lowlands	Construction sand; brick clay (selected locations) ceramic clay (selected locations) clay
River terrace and Coastal Plain deposits	Unconsolidated clays, silt, sands and some gravels, often interlayered	Flat to moderately sloping divides; gentle to moderate slopes	Construction sand; decorative gravel (landscaping, etc.)
Coastal Plain sediments	Loose sand; some gravel terraces	Flat top divides and gentle to moderate slopes	Construction sand, decora tive gravel (landscaping, etc.); ceramic clays (selected locations)
Felsic igneous complexes	Light colored massive and granitic texture	Rolling dissected hills; slight to moderate slopes	Construction - crushed ston (highway base aggregate); concrete products
Argillites and tuffs	Soft metamormorphic rocks exhibits laminations and banding	Rolling hills and lowlands	Construction - lightweight aggregate