GEOLOGICAL AND SOILS DESCRIPTION OF DRAINAGE BASIN

Geological Description.

Lake Campbell and surrounding watershed is located on the Coteau des Prairie. This prairie coteau area is an erosion remnant, irregularly covered with glacial drift. This drift is the parent material of the soils and shallow aquifers in the Lake Campbell watershed.

The drift material consists of till and outwash laid down during the Wisconsin age. The till is composed of a heterogeneous mixture of material deposited directly by the glacier. It has a loamy texture consisting of about 40% sand, 34% silt and 26% clay (Soil Survey Moody County 1989).

Lake Campbell is a glacial outwash lake on a broad drift sheet that trends north and south, parallel with the Big Sioux River. There are no closed basins in this sheet, water flows in an integral pattern to the Big Sioux River.

Eastern South Dakota was glaciated at least four times during the Pleistocene Epoch. Deposits left by these four ice sheets are from youngest to oldest: the Wisconsin, Illinoian, Kansen and Nebrasken. The Wisconsin age has been sub-divided into four sub-stages listed in ascending order: the Iowan, Tazewell, Cary, and Mankato (Figure B-1).

No deposits older than the Wisconsin glacier are preserved in the Lake Campbell area. Little is know about pre-Wisconsin ice sheets; accepted theory is that the glaciers entered from the northeast (Baldwin 1951).

Much more is know about the Wisconsin age ice sheets because the till remained on the surface. Of the four Wisconsin glacial sub-stages in eastern South Dakota, the predominant remnants on the surface in the Lake Campbell area are from the Iowan and Cary age.

Iowan deposits are generally referred to as any till or boulder clay that is older then Tazewell deposits. Iowan deposits are characterized by level to slightly sloping topography, upon which an intricate pattern of dendritic drainage is developed. The smooth till surface is partly due to mantling of the former rough topography of the earliest Wisconsin age.

Cary deposits are comprised of till, outwash and glacial lake sediments. The Cary till is similar to Iowan but differentiated by topography, absence of loess and absence of well defined drainage. Cary till is characterized by knob and kettle topography which contains many filled depressions. The local relief varies greatly from ground to end moraine. In end moraine areas the terrain is rugged with maximum slopes ranging from six to greater than ten percent. The ground moraine is also rugged but slopes are usually less than six percent. Cary till varies from ten to seventy feet thick. Soil is normally poorly developed and often only six inches thick although in some instances reaches a few feet in thickness.

Cary outwash sediments are expressed as three topographical types: valley train deposits, terrace remnants and collapsed material (Steece,, 1958). The more common valley trains are characterized by level to nearly level, gently undulating