

-L-	183+20	to	186+50
-Y2-	15+00	to	17+00
-DET2-	11+25	to	13+40

5) Water Wells: Water wells were located within the proposed construction limits at the following locations.

<u>Line</u>	<u>Station</u>	<u>Offset</u>
-L-	18+51	205 ft LT
-L-	19+13	68 ft RT
-L-	19+98	38 ft LT
-L-	20+08	50 ft RT
-L-	21+07	44 ft RT
-L-	21+99	66 ft LT
-L-	22+07	68 ft LT
-L-	23+74	194 ft LT
-L-	24+71	161 ft LT
-L-	25+75	187 ft LT
-L-	63+53	93 ft RT
-L-	64+52	151 ft RT
-L-	204+74	193 ft LT
-L-	204+74	198 ft LT
-Y1-	9+71	116 ft LT
-Y2-	12+73	264 ft RT
-Y15-	17+24	196 ft RT

**Physiography and Geology**

The project is located within the Coastal Plain Physiographic and Geologic Province of North Carolina. Subdued topographic features characterize this Province, evidenced by a fairly level to rolling plain sloping to the southeast throughout the majority of Cumberland County. A veneer of recent alluvium, deposited by drainage features, was encountered throughout the site. Underlying the recent alluvial soils are Coastal Plain deposits of the Cape Fear Formation of Undifferentiated Age. The Cape Fear Formation typically consists of alternating beds of sandstone and mudstone. Sandstone beds are generally typically 3 to 17 feet thick and mudstone beds are generally thinner with a thickness of 3 to 6.5 feet. In most exposures, the unit is light gray to yellowish and gray with red, reddish-orange, and yellowish-orange mottling along fractures and over zones of groundwater movement such as bedding planes. Beds characteristically display good lateral continuity although sand/mud ratios will grade laterally within the beds. Depositional units are usually graded. They consist of pebbly sandstone and conglomerate with clay rip-up clasts at the base and grade through finer-grained sandstone to silty clay.

**Soils Properties**

Soils present on this project are separated into five major categories based on origin. These categories include Undifferentiated Coastal Plain Deposits, coastal plain deposits of the Cape Fear Formation, alluvial, roadway embankment fill soils and artificial fill soils.

Undifferentiated Coastal Plain deposits are the most prevalent soil type and are common to this physiographic region. The surficial soils are predominately tan, brown and gray, very loose to dense slightly silty slightly clayey fine to coarse sands (A-3, A-1-b, A-2-4, A-2-6) with lesser amounts of black to gray, very soft to very stiff sandy silts and clays (A-4, A-6, A-7-6). The surficial clays have low to high plasticity indices (2 to 41), but were generally below 20 for the entire project. The high plasticity soils were encountered in isolated areas throughout the project at the following locations:

<u>Line</u>	<u>Station</u>
-L-	19+00 to 21+50
-L-	51+80 to 57+80
-L-	64+00 to 65+80
-L-	76+60 to 78+00
-L-	105+50 to 109+00
-L-	118+00 to 118+80
-L-	136+00 to 141+20
-L-	148+00 to 154+00
-L-	162+00 to 166+00
-L-	183+20 to 184+80
-Y2-	12+60 to 16+00

Soils common to the Cape Fear Formation were encountered below the surficial Undifferentiated Coastal Plain deposits throughout the project. The Cape Fear soils are predominately loose to dense, red-orange to tan-orange, silty to clayey fine to coarse sands (A-2-4, A-2-6, A-2-7) with lesser amounts of fine to coarse sands (A-3, A-1-b) and medium stiff to very stiff, tan-orange to brown and gray, sandy silts and clays (A-4, A-6, A-7-5, A-7-6).

Alluvial soils were found in association with the numerous drainage features which cross the project. These soils vary from gray, brown and black, very loose to dense fine to coarse sands (A-3, A-1-b) and clayey sands (A-2-4) to black, orange with purple and red, very soft to medium stiff fine sandy silts and clays (A-4, A-7-6). Most alluvial soils contained no more than a trace of organic matter. However, soils containing high to moderate amounts of organic matter were present within the construction limits at the following locations:

<u>Line</u>	<u>Station</u>
-L-	38+50 to 39+20
-L-	118+80 to 121+80
-L-	122+80 to 124+50
-L-	183+20 to 186+50
-Y2-	15+00 to 17+50

The alluvial sands and silts are slightly compressible while the alluvial clays are moderately compressible. Soils with high to moderate organic content are highly compressible.

Roadway embankment soils were found in association with the major road crossings and areas to be widened in the project construction limits. These soils vary from tan, black, red-brown loose to medium dense slightly silty fine sands (A-3) to gray and red-orange, medium stiff to stiff coarse to fine sandy clayey silts (A-4).