APPENDIX M – SOIL DESCRIPTIONS

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For purposes other than farming, soils have three ratings based on the inherent limitations of the soil. These ratings are slight, moderate, and severe. *Slight* means the soil properties are generally favorable, and limitations are easily overcome. *Moderate* means limitations can be overcome with planning, design, or special maintenance. *Severe* means the soil properties are unfavorable, and limitations can only be overcome with costly corrections, special designs, intensive maintenance, or a combination of these measures.

Decatur Silt Loam (DaB)

The most common soil on the Muscle Shoals Reservation is **Decatur silt loam, 2 to 6 percent slope** (map symbol is DaB). This soil is located in the nearly level (gently sloping) areas surrounding the urban (developed) area in the central part of the environmental impact statement (EIS) study area. This soil was formed from weathered cherty limestone and limestone rock. It is primarily residuum, residual soil material from weathered stone that has not been transported. In some areas, Decatur silt loam contains alluvium (soil deposited on land by streams). It is a deep, well-drained soil that lies on broad convex ridges. Important soil properties and ratings are shown in Table K-1 below.

Table M-1. Decatur Silt Loam – Rating of Important Soil Properties

Soil Properties	Ratings
Permeability	0.6–2.0 inches water/hour
Available water capacity	9–12 inches
Soil reaction	pH of 4.5–6.0
Organic matter content	Moderately low
Natural fertility	Medium
Depth to bedrock	More than 60 inches
Root zone	More than 60 inches
Depth to water table	More than 6 feet
Flooding	None

Decatur silt loam is well suited for pasture and for growing cotton, corn, soybeans, and small grains. Most areas of Decatur soil are used to grow cultivated crops or pasture. Its susceptibility to erosion is its primary limitation.

Decatur silt loam areas are well suited for recreational development. For playground use, some areas may require leveling. Decatur silt loam soils are moderately suitable for building site development due to several factors. These soils may be too clayey for shallow excavations, and they may shrink and swell excessively with changes in moisture, which limits their suitability for supporting buildings. For supporting roads and streets, these soils lack strength.

The land classification occupying the second-largest part of the study area is urban. About 290 acres or around 21 percent of the site is urban. This area is predominantly covered by roads, parking areas, and buildings.

Chenneby Silt Loam (CbA)

The second most common soil type on the study area is **Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded** (map symbol CbA). This soil is located predominantly in the southern part of the study area. The Chenneby silt loam surrounds the Decatur silt loam and borders it on the west, south, and east. It is a very deep, poorly drained soil formed in alluvium and lies in floodplains. Important soil properties and ratings are shown in Table K-2 below.

Table M-2. Chenneby Silt Loam – Rating of Important Soil Properties

Soil Properties	Ratings
Permeability	0.6–2.0 inches water/hour
Available water capacity	9–12 inches
Soil reaction	pH of 4.5–6.0
Organic matter content	Moderately low
Natural fertility	Medium
Depth to bedrock	More than 60 inches
Root zone	More than 60 inches
High water table	At a depth of 1 to 2.5 feet from January through March
Flooding	Occasionally

Source: Bowen, C. D. 1994. *Soil Survey of Colbert County, Alabama.* USDA Soil Conservation Service, in cooperation with Alabama Agricultural Experiment Station and Alabama Soil and Water Conservation Committee. Available from Natural Resources conservation Service's Web Soil Survey <http://soils.usda.gov/survey/online_surveys/alabama>.

Aside from high moisture and flooding potential, this soil is similar to the Decatur soil. Chenneby silt loam can be used for cultivated crops, but its wet, cold nature often delays planting. Consequently, it is mostly used for woodland or pasture (current land use).

This soil is severely limited for supporting buildings or roads due to its flooding potential, wetness, and poor strength. The wetness and flooding potential make the Chenneby silt loam moderately limited for recreational use.

Guthrie Silt Loam (GuA)

The third most common soil in the study area is **Guthrie silt loam, 0 to 2 percent slopes**, frequently flooded (map symbol GuA). This soil covers about 99.4 acres or 7.1 percent of the study area. It lies along the southern boundary and along Pond Creek southeast of the urban area of the Environmental Research Center complex. Like the Chenneby silt loam, it is a very deep and poorly drained soil formed in alluvium on upland flats and depressions. It has more clay in the subsoil than the Chenneby silt loam and is more prone to flooding and more severely limited for most uses. It also contains a fragipan, a subsurface layer that has low porosity, is brittle, and restricts root growth. Important soil properties and ratings are shown in Table K-3.

Table M-3. Guthrie Silt Loam – Rating of Important Soil Properties

Soil Properties	Ratings
Permeability	0.6–2.0 inches water/hour above the fragipan and 0.06–0.2 inches water/hour in the fragipan
Available water capacity	9–12 inches
Soil reaction	pH of <4.5–5.0
Organic matter content	Moderately low
Natural fertility	Low
Depth to bedrock	More than 60 inches
Root zone (depth to fragipan)	20 to 40 inches
High water table	Perched at a depth of 0.5 to 1 foot from January through April
Flooding	Frequent

Source: Bowen, C. D. 1994. *Soil Survey of Colbert County, Alabama.* USDA Soil Conservation Service, in cooperation with Alabama Agricultural Experiment Station and Alabama Soil and Water Conservation Committee. Available from Natural Resources conservation Service's Web Soil Survey <http://soils.usda.gov/survey/online_surveys/alabama>.

Fullerton-Bodine Complex (FbF)

The fourth most common soil in the study area is the **Fullerton-Bodine complex, 15 to 45 percent slopes** (map symbol FbF). This complex consists of two soils that are so intricately mixed that they cannot be mapped separately. Most of this Fullerton-Bodine soil lies north of Reservation Road where the rough terrain ultimately drops to the level of the Pickwick Reservoir. There are four areas located south of Reservation Road, the largest of which lies on steep slopes along Pond Creek. These soils were made from weathered cherty limestone and limestone like the Decatur soil, but they have no alluvium. They also have a large amount of small cherty stones. This soil is not suited for cultivated crops and mostly supports mixed hardwoods and pine. Like other soils in the study area, the Fullerton and Bodine soils are low in fertility and are acidic and deep. However, unlike the more level soils previously discussed, these soils have low water-holding capacity and no flood risk.

Due to their steep slope, these soils are severely limited for building purposes. They are too steep for subsurface sewage disposal and are poorly suited for vegetation where deep cuts have been made for home sites or roads. These soils are often used for fill material and as a base for roads. Steep slope and the high number of small stones severely limit the suitability of these soils for recreational use.

Pruitton/Sullivan Silt Loam (PUA)

The fifth most common soil in the study area is also a complex of two soils. It is mapped as **Pruitton and Sullivan silt loams, 0 to 2 percent slopes, occasionally flooded** (map symbol PUA). These soils were formed from alluvium. Like the Fullerton-Bodine complex, these areas consist of two different soils. They are not intricately mixed like the Fullerton and Bodine soils and could have been mapped separately, but were combined because their characteristics and uses are so similar. The four areas that contain the Pruitton and Sullivan silt loams are in the southern part of the study area and lie between the Chenneby silt loam and Guthrie silt loam. As floodplain soils that are prone to flooding, the Pruitton and Sullivan silt loams are similar to the Guthrie and Chenneby silt loams, but actually have a greater depth to the water table. Outside of the study area, these soils are primarily used for cultivated crops.

These soils have poor potential for building site development due to flooding. They are slightly limited for picnic areas and severely limited for camping areas due to flooding.

Decatur-Urban Land Complex (DeB)

This complex is actually a mixture of soil and urban areas. It is mapped as **Decatur-Urban land complex, 2 to 8 percent slopes** (map symbol DeB). These areas consist of gently sloping, deep, well-drained Decatur and similar soils and urban areas. In the study area, this complex is located along Hatch Boulevard, the western border, and along 2nd Street, the southern border. These areas have about equal parts of urban land and upland soil. This particular soil and urban complex covers about 51.9 acres or 3.7 percent of the study area. These areas are primarily used for residential, commercial, and industrial development. The properties of the soil are identical to those listed for the Decatur silt loam, 2 to 6 percent slope. Like the Decatur silt loam, this soil-urban complex is slightly limited for building purposes due to its shrink-swell potential and low strength. It is less than ideal for septic systems due to its moderate permeability.

Dumps (Dp)

The phosphorus slag pile or **Dumps** as it is defined by the Natural Resources Conservation Service soil survey covers about 46 acres in the northernmost section of the study area. It is considered suitable for industrial purposes, but has practically no value as farmland. Soil

capability classes range from Class I for highest capability to Class VIII for lowest capability. The dumps' capability subclass is Class VIIIs, which means it has limitations that nearly preclude its use for crop production. The suffix "s" denotes that the soil is limited because it is shallow, droughty, or stony.

Fullerton Cherty Silt Loam (FaB)

Fullerton cherty silt loam, 2 to 6 percent slopes (FaB map symbol) soil is located along Reservation Road in the western part of the study area. Most of this gently sloping Fullerton soil type is on the level portions of the Multipurpose Building Complex (MPB). This soil was probably surveyed before the MPB complex was built in the early 1980s. The photograph in Figure 3-7 of Volume I of this EIS reveals that about half of the area labeled FaB is covered by buildings and pavement. Like the Decatur soil, this soil is gently sloping, very deep, and well drained. Fullerton cherty silt loam was formed from weathered cherty limestone, limestone and alluvium. This soil has the same limitations as the Decatur soil. It is slightly limited for building sites due to its shrink-swell properties and low strength. It is severely limited for recreational purposes due to the large amount of small stones.

Decatur Silt Loam (DaC2)

The **Decatur silt loam, 6 to 10 percent slopes, eroded** (DaC2) soil is adjacent to and southeast of the Environmental Research Center complex. This soil has properties that are similar to the more level Decatur silt loams; however, its use for building purposes is more limited due to its slope. Due to a clayey surface layer, it is severely limited for most kinds of recreational development.

Other Soil Types

There are five other soil types in the study area that cover a total of about 50 acres. The **Fullerton cherty silt loam, 6 to 15 percent slopes** (FaD) is located near the phosphate slag pile and along Reservation Road near the northeastern corner of the study area. Like the other Fullerton soils, it contains many small stones that limit its use for recreational development. Its relatively steep slope, low strength, and shrink-swell potential limit its use for building sites. Proper design and installation can be used to overcome these limitations.

Etowah silt loam, 2 to 6 percent slopes (EtB) soil occurs in the southern part of the study area between the Pruitton and Sullivan silt loams (PUA) and the Chenneby silt loam (CbA). The Etowah silt loam soil is similar to the Decatur silt loam, but its surface is browner, less red in color, and has brown mottles in the subsoil, indicative of poor drainage. Outside of the study area, this soil is used mainly for cultivated crops and pasture. Low strength and moderate permeability limit its use for building sites. Low strength also limits its use for roads. This soil has good potential for recreational development. Slope and the presence of small stones may limit its use for playgrounds.

Emory silt loam, 0 to 2 percent slopes, ponded (EmA) soil occurs in the southern section of the study area near Wilson Dam Road that forms the eastern boundary. The areas are actually depressions in an area of Decatur silt loam, 2 to 6 percent slope and Chenneby silt loam, 0 to 2 percent slope. Emory silt loam is a floodplain soil that contains alluvium like the Guthrie and Chenneby silt loams; however, unlike these soils, it has a buried surface layer of dark reddish brown silt. Consequently, it has a higher water table than these other two soils. From December through April, the water table can be perched at the surface to 1 foot above the surface. It has a high capability for growing crops if it is drained. Its use for building sites is

severely limited due to the poor drainage and low strength. For recreational purposes, it is also severely limited unless surface or subsurface drainage is used.

The **Dickson silt loam, 0 to 3 percent slopes** (map symbol DkA) soil occurs on a slightly convex area between three floodplain soils (the Guthrie, Pruitton, and Sullivan silt loams) in the southeast corner of the study area along 2nd Street. The Dickson silt loam is similar to the Guthrie silt loam. It also has a buried surface layer called a fragipan that has low permeability. Since this soil is either gently sloped or convex, it has much better drainage than the Guthrie, and its water table is below 2 feet in the wettest time of the year (January through April). Like the other floodplain soils, the Dickson silt loam is moderately limited for building sites due to moisture. It is severely limited for dwellings with basements. It is moderately limited for camping areas and slightly limited for use as trails or paths.

The soil type occupying the smallest part of the study area is **Emory-Urban land complex 0 to 1 percent slopes**. This small section of land, covering less than an acre, is located in the center of the southern boundary along 2nd street and is adjacent to an area defined as Decatur-Urban land complex. Like the Decatur-Urban complex, it is a mixture of soil and urban land. Unlike the Decatur-Urban complex, the Emory-Urban complex occurs in concave areas and, therefore, has a higher water table in the winter months and is more limited for use as building sites and roads.

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