

## Permit Information for Proposed Directional Bore

AT&T Project Number	0SD20627N/A01V4LC
Project Name:	ASENW:1803 BUSH RIVER RD,PL 0.6KF 24F,LGX,ECD=8/3
Project / Bore Location:	1803 BUSH RIVER RD
Proposed Installation Date:	06-15-2020
Proposed Boring Company:	ANSCO

### SITE LAYOUT PLAN

Entry & Exit Points, Access Pit Locations, Equipment & Pipe Layout Areas, Existing Utilities to be crossed, Depth of cover, R/W Lines, Controlled Access Lines, Property Lines and/or Utility Easements

See  
Attached  
Drawings

### BORING / DRILLING CRITERIA

Bore Length	280	feet with	3	bore pits
Proposed Casing				
Specifications on Casing	n/a			
Pilot Hole Size	2"			
Pre-Ream Size	n/a			
Back-Ream Size	n/a			
Soil Type as Per USGS Map	OrC			
Theoretical Amount of Fluid to be Utilized	515	gallons (approx)		
Proposed Source of Fluid & pH Value	CITY OF COLUMBIA		7.10 pH	
Proposed Drilling Product To Be Utilized	Soda Ash, Bore-Gel, EZ-Mud and Con Det			

### DRILLING EQUIPMENT

Proposed Drilling Machine	Vermeer D16X20 SERIES II / see attached spec. sheet
Proposed Tracking System	Vermeer Spot Detect 4 Computer
Proposed Mud Mixing System	Vermeer MX125
Electrical Strike Safety Package	Mounted on Boring Unit
Monitoring For Surface Movement	Visual Inspection, Prior to, During and After Process

### CONTINGENCY PLAN IN CASE OF FAC-OUT OR DRILL HOLE FAILURE

Vacuum Unit will be utilized to cleanup Drilling Fluids as needed with Temporary repairs being made the day of occurrence. Permanent repairs will be made as per SCDOT Specifications.

### TRAFFIC CONTROL

SCDOT work zone safety plans will be utilized for traffic control.	Yes, see attached sheet
Proposed Detour Routes	n/a for this bore
Assistance from Local Law Enforcement	emergency only
Assistance from SC Highway Patrol	emergency only

### DISPOSAL OF DRILLING FLUIDS

Excess Fluids will be disposed on Private Property

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except under written agreement

**Boring Fluid Products Needed for Project: OSD20627N/A01V4LC**

**Soda Ash**

0.25 to 0.5 lbs per 100 gallons of fresh water  
Totals lbs needed: 1.29 2.576  
Total 50lb bags needed:

**Bore-Gel**

10 to 20 lbs per 100 gallons of freshwater  
Total lbs needed: 51.52 to 103.04  
Total 50 lbs bags needed: 1.03 to 2.06

**EZ-Mud**

0.5 lbs per 100 gallons of of drilling fluid  
Total lbs needed: 2.58  
Total 14 lb pails needed: 0.2

***Suggested Additives for Difficult Formations (clay)***

**Con Det**

2 to 4 qts per 100 gallons of drilling fluid  
Total qts needed: 10.30 to 50.42  
Total 5 gallon Pails Needed: 0.5 to 2.5

***Mixing Order for drilling fluid products***

1. Soda Ash (add when filling water)
2. Bore-Gel
3. EZ-Mud (after drilling fluid has completely yielded)
4. Con Det (after polymer has been fully blended into the system)

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**Boring Fluids Program**

Project Number: **0SD20627N/A01V4LC**

Project Name: **ASENW:1803 BUSH RIVER RD,PL 0.6KF 24F,LGX,ECD=8/3**

Soil Conditions: **OrC**

Recycling Fluids: **NO**

**Pilot Hole Fluid Requirements:**

Gallons per Linear Foot Required: **1.84**  
Total Volume Required: **515** gallons

**Pre-Ream #1 Diameter: Not Required**

Gallons per Linear Foot Required: **NA**  
Total Volume Required for Pre-Ream #1: **NA**

Note: Multiply gallons per lineear foot by length of drill stem to get pumping requirements per drill stem.  
Divide pumping volume requirements per drill stem by the mud pumping rate to get pull-back time in minutes per drill stem.

Total Volume of Drilling fluids required: **515** gallons

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## Pre-Bore Log for Directional Bore

AT&T Project number: **0SD20627N/A01V4LC**  
Project Name: **ASENW:1803 BUSH RIVER RD,PL 0.6KF 24F,LGX,ECD=8/3**  
Project / Bore Location: **1803 BUSH RIVER RD**  
Installation Date: **06-15-2020**  
Boring Company: **ANSCO**

### BORE / DRILLING INFORMATION

Final Bore Length 280 feet with 3 bore pits  
Pilot Hole Size 2"  
Pre-Ream Size 1st n/a 2nd n/a 3rd n/a  
Final Back-Ream Size n/a  
Soil Type Encountered

### BORE / DRILLING FLUID INFORMATION

Amount of Fluids Utilized 515 Gallons (approx)  
Source of Fluid CITY OF COLUMBIA  
Fluid pH Value 7.1  
Drilling Fluid Products Utilized Soda Ash, Bore-Gel, Ez-Mud And Con-Det: see attached sheets  
Drilling Fluid Composition see attached sheets  
Drilling Fluid Viscosity n/a  
Drilling Fluid Density n/a  
Observed Fluid Pumping Rates

### PRODUCT / CASING INSTALLED

Casing Installed 0  
Product Installed Direct Boring of Cable 3/4" OD

### DRILL ROD DEPTH LOG

rod	inches
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

rod	inches
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	

rod	inches
41	
42	
43	
44	
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Notes:

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August 18, 2008

## **CRITERIA TO ALLOW HORIZONTAL DIRECTIONAL DRILLING USING A CUTTING HEAD**

This guideline is for perpendicular crossing of roadways and does not apply to utility installations that run parallel to the roadway within the Right-of-Way

All lines under pressure or transporting a hazardous material will require a steel casing or approved equal with vents installed at the Right-of-Way limits

A Performance Bond is required for a period of 5 years from the completion date of the installation to cover any roadway failures. The value of the bond shall be related to the pipe diameter installed and is shown in Table 1. Should the repairs exceed this amount then the utility company is still responsible for the cost of the repairs and no new permits shall be issued to the utility until the repair costs have been satisfied. The utility has the option to supply individual bonds, a yearly bond or have SCDOT named as an additional insurer on their general liability insurance.

Notify the Resident Maintenance Engineer for the county in which the work is to be done by fax or email 48 hours before performing the boring operation

Only perpendicular crossings will be allowed. Any other type crossing will be evaluated on a case by case basis for non controlled access roads only.

The permit application submittal must include at a minimum the following information:

### **Checklist (4 Pages)**

- 1.     \_\_Site layout plan, \_\_project schedule and \_\_company experience record  
**SEE ATTACHED SKETCH FOR SITE LAYOUT.  
ANSCO AND ASSOCIATES IS THE CONTRACTOR WITH SEVERAL YEARS EXPERIENCE IN TELEPHONY CONSTRUCTION AND YEARS EXPERIENCE WITH DIRECTIONAL BORING. ANSCO IS TO ADHERE TO THE SPECS OF SCDOT AND WILL ABIDE BY THE UTILITY MANUAL RECENTLY RECEIVED BY DOT.  
CONSTRUCTION TO COMMENCE ONCE PERMIT APPROVAL IS RECEIVED WITH A 2-3 DAY START TO FINISH SCHEDULE FOR EACH LOCATION.**
- 2.     \_\_Location of entry and exit points, \_\_access pit locations, and \_\_equipment and pipe layout areas

**SEE ATTACHED SKETCH**

- 3.     \_Proposed drill path alignment (both horizontal and vertical)  
to include the lowest point of the roadway cross section  
**SEE ATTACHED SKETCH**
- 4.     \_Location and \_clearances of all existing utility crossings  
and structures  
**DATA WILL BE PROVIDED WITH AS-BUILTS. ALL  
EXISTING UTILITIES WILL BE LOCATED BY PUPS 72  
HOURS PRIOR TO CONSTRUCTION START**
- 5.     \_Depth of cover over the casing  
**SEE ATTACHED SKETCH**
- 6.     \_Soil analysis to a depth of five feet below the proposed drill  
elevation  
**SEE ATTACHED SOIL PROFILE PLAN FROM USDA  
WEBSITE**
- 7.     \_Supply the theoretical amount of drilling fluid to be used  
during the drilling operation (calculation based on drilling diameter  
and number of pre-reams)  
**APPROXIMATELY \_\_\_\_\_ 515 \_\_\_\_\_ GALLONS**
- 8.     \_Supply data sheet showing the actual amount of drilling  
fluid used during the drilling operation  
**TO BE PROVIDED ON AS-BUILTS**
- 9.     \_Provide the source of the make up water for the drilling  
fluids  
**CITY OF COLUMBIA WATER**
- 10.    Supply \_field pH and \_hardness reading for the make up  
water, drilling fluids on the data sheet each time new fluids are  
mixed  
**PROVIDED ON AS-BUILTS**
- 11.    On systems that recycle drilling fluids, \_complete testing logs  
shall be filled out to verify that the drilling fluids are being main-  
tained in accordance with the original mix or to demonstrate the  
reason for changing the drilling fluid mix during the completion of  
the pull  
**PROVIDED ON AS-BUILTS**
- 12.    \_Length, \_product pipe diameter, \_pipe material, \_pipe wall  
thickness, and \_pipe ream diameter for proposed directional drill  
**SEE ATTACHED DATA SHEET FOR POLYPIPE**
- 13.    \_Detailed pipe calculations confirming ability of product pipe  
or casing pipe to withstand installation loads  
**SEE ATTACHED SHEET FOR POLYPIPE**

- 14.    \_Proposed and \_actual viscosity, \_density, and \_composition of drilling fluids whether they are bentonite or polymer based (based on soil analysis)  
**SEE ATTACHED SHEET FOR BAROID**
- 15.    \_Name of drilling fluids being used for boring (Company Name), \_Name of the field Representative (drilling fluids manufacturer) that will provide the technical support, fluids testing and recommendations as needed during the drilling and pulling phase  
**BORE-GEL FROM BAROID IS THE FLUID TO BE USED.  
 SEE ATTACHED DATA SHEET FOR BAROID  
 FIELD REP IS JIM MABREY @ 281-871-4871**
- 16.    \_Construction method including \_diameter of pilot hole, \_number. (Pre-reams only required when Railroad permit is req'd)  
**THERE WILL BE (1) 2" PILOT HOLE**
- 17.    Drilling fluid pumping capacity in \_gallons per minute (gpm), and \_gallons per rod (gpr), \_pressures, and \_flow rates proposed and \_actual pumping rates (rates may change as soil conditions and soil types change)  
**DRILLING FLUID PUMPING CAPACITY IS 25 GAL PER MIN AND 150 GAL PER ROD. MAXIMUM PRESSURE CAPACITY IS 1500 PSI.**
- 18.    Show all \_right-way-lines, \_controlled access lines, \_property lines and \_other utility right-of-way or easements  
**SEE ATTACHED SKETCH**
- 19.    \_Show all elevations  
**SEE ATTACHED SKETCH**
- 20.    \_Type and capacity of drilling machine to include the \_manufacturer, \_model number, \_thrust/pullback (in lbs.), \_maximum torque, \_drilling speed, \_drill pipe length, \_drilling distance and \_power source  
**DRILLING EQUIPMENT IS A D16x20 SERIES II (POWERED BY A 65 HP/48KW KUBOTA DIESEL ENGINE) GIVING YOU 2,000FT-LB/2,700 NM OF ROTATIONAL TORQUE AND 16,000 LBS/ 71 KN OF THRUST/ PULL BACK.**
- 21.    \_Type of tracking method/system, \_operation range and \_accuracy  
**SUB-SITE DIGITRAK MARK V SYSTEM WITH AN OPERATION RANGE OF 30' AND AN ACCURACY RATE OF +/- 1%.**
- 22.    \_Type and \_capacity of mud mixing system  
**13MM AT 500 GALLONS**
- 23.    \_A detailed plan for monitoring ground surface movement (settlement or heave) due to the drilling operation at the time of drilling and subsequent to the drilling operation being completed

**MONITOR BORE PATH FROM BEGINNING TO END  
DURING AND AFTER BORE TO ENSURE NO  
DISTURBANCE**

- 24. \_Contingency plan for frac-out or drilling hole failure  
**MILL 20' ON EITHER SIDE OF DISTURBANCES AND  
REPAVE ACCORDING TO SCDOT GUIDELINES**
- 25. \_Traffic control plan when applicable  
**SEE ATTACHED PLAN**
- 26. \_Disposal plan for spent drilling fluids, ie: (land farming,  
landfill, etc.)  
**LANDFILL**
- 27. \_Upon completion of the drilling operation supply accurate  
as built drawing within 30 days to the Resident Maintenance  
Engineer. The As-Built drawings must include the following  
information: \_Actual path alignment, \_depth of cover for the casing,  
\_actual length, \_product diameter, \_casing diameter, \_actual  
viscosity, density and composition of drilling fluid, \_actual fluid  
pumping capacity, \_pressure and flow rates, and \_all final  
elevations  
**BORING CONTRACTOR WILL PROVIDE UPON  
COMPLETEION OF JOB**
- 28. \_Confirm the drilling unit is equipped with an electrical strike  
safety package and \_a safety plan in the event of an electrical  
strike  
**ALL DRILLS ARE EQUIPPED WITH A STRIKE ALERT  
SYSTEM AND WORKERS EQUIPPED WITH SHOES AND  
GLOVES IN THE EVENT OF A STRIKE**

The following Table details the recommended minimum depths below the lowest point on the road cross-section:

**PERFORMANCE BOND AMOUNTS FOR DIFFERENT PIPE DIAMETERS**

For pipes 2 inches to 6 inches in diameter the minimum cover shall be 6 feet. Performance Bond value \$10,000.
For pipes greater than 6 inches to 14 inches in diameter the minimum cover shall be 10 feet. Performance Bond value \$20,000.
For pipes greater than 14 inches to 24 inches in diameter the minimum cover shall be 15 feet. Performance Bond value \$40,000.
For pipes greater than 24 inches to 48 inches in diameter the minimum cover shall be 25 feet. Performance Bond value \$75,000.





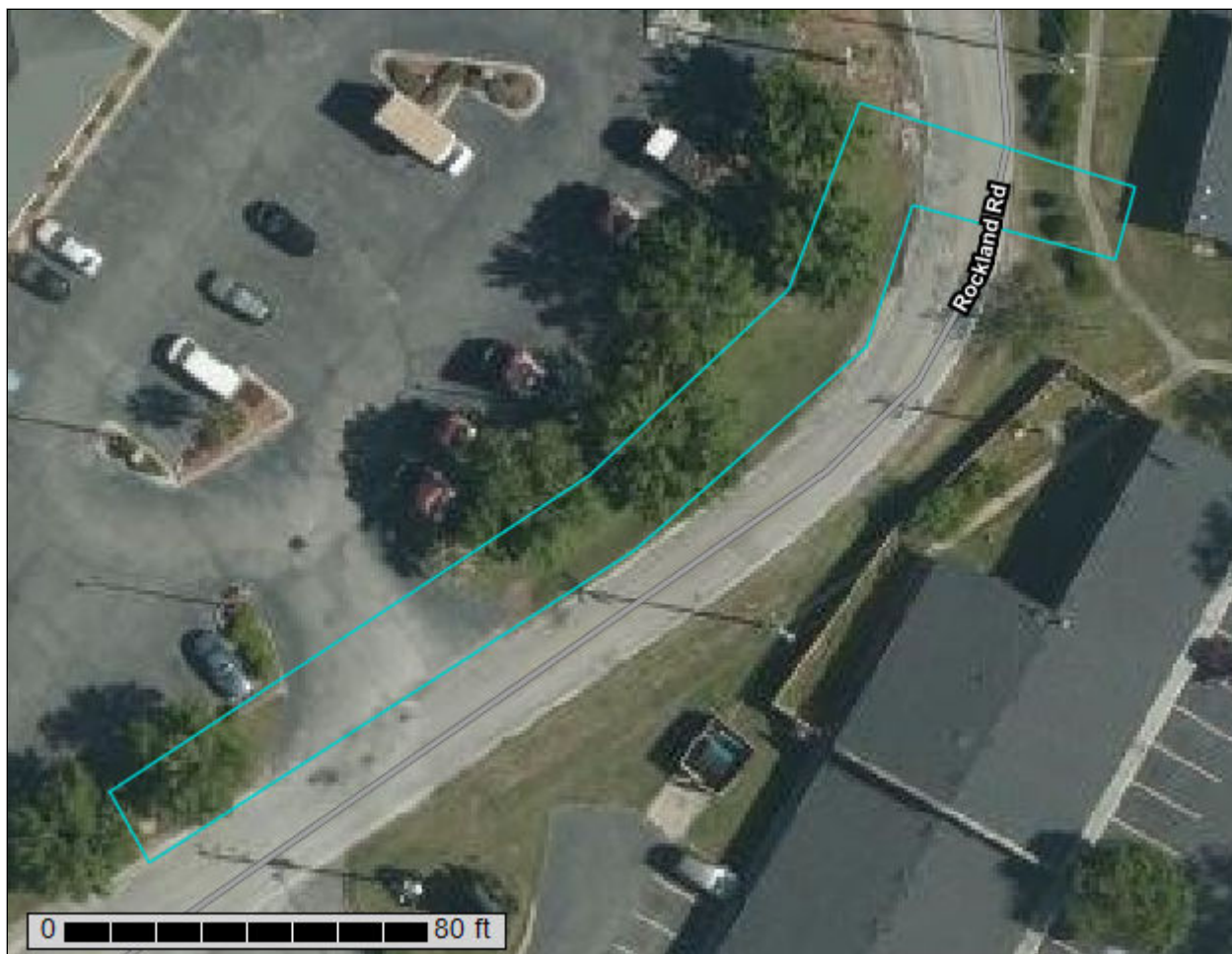
United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for **Lexington County, South Carolina**



May 16, 2020

# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

## Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.




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## MAP LEGEND


### Area of Interest (AOI)

 Area of Interest (AOI)


### Soils


 Soil Map Unit Polygons


 Soil Map Unit Lines


 Soil Map Unit Points

### Special Point Features

 Blowout

 Borrow Pit


 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot


 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop


 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip

 Sodic Spot


 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

### Water Features

 Streams and Canals


### Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lexington County, South Carolina  
Survey Area Data: Version 18, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 23, 2019—Apr 27, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
OrC	Orangeburg loamy sand, 6 to 10 percent slopes	0.1	100.0%
<b>Totals for Area of Interest</b>		<b>0.1</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Lexington County, South Carolina

### OrC—Orangeburg loamy sand, 6 to 10 percent slopes

#### Map Unit Setting

*National map unit symbol:* 4ctr

*Elevation:* 250 to 650 feet

*Mean annual precipitation:* 26 to 74 inches

*Mean annual air temperature:* 50 to 73 degrees F

*Frost-free period:* 210 to 230 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Cowarts and similar soils:* 100 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Cowarts

##### Setting

*Landform:* Marine terraces

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Parent material:* Loamy marine deposits

##### Typical profile

*Ap - 0 to 10 inches:* loamy sand

*E - 10 to 12 inches:* loamy sand

*Bt - 12 to 34 inches:* sandy clay loam

##### Properties and qualities

*Slope:* 6 to 10 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Low (about 4.6 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* A

*Ecological site:* Loamy Backslope Woodland - PROVISIONAL (F137XY006GA)

*Hydric soil rating:* No

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- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

## Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2\\_054242](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242)

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## PolyPipe® EHMW PE3608 Pipe



Extra High Molecular Weight (EHMW) High Density Polyethylene for use in industrial applications such as underground fire mains, mining, landfill, water reclamation or sewer.

➤ Other dimensional standards or custom requirements available.

TYPICAL PHYSICAL PROPERTIES			
PROPERTY	ASTM TEST METHOD	*NOMINAL VALUES	
		SI UNITS	ENGLISH UNITS
Density, Natural	D1505	0.946 gm/cc	--
Density, Black	D1505	0.955 gm/cc	--
Melt Index (190°C/2.16 kg)	D1238	0.07 gm/10 min.	--
Flow Rate (190°C/21.6 kg)	D1238	8.5 gm/10 min.	--
Tensile Strength @Ultimate	D638	34.5 MPa	5,000 psi
Tensile Strength @ Yield	D638	24.1 MPa	3,500 psi
Ultimate Elongation	D638	>800%	>800%
Flexural Modulus	D790	938 MPa	136,000 psi
2% Secant			
Environmental Stress Crack Resistance (ESCR)			
F <sub>0</sub> , Condition C	D1693	>10,000 hrs.	>10,000 hrs.
PENT	F1473	>100 hrs.	>100 hrs.
Brittleness Temperature	D746	<-117°C	<-180°F
Hardness, Shore D	D2240	64	64
Vicat Softening Temperature	D1525	124°C	255°F
Izod Impact Strength (Notched)	D256	0.37 KJ/m	7 ft – lb <sub>f</sub> /in
Volume Resistivity	D991	>10 <sup>15</sup> ohm-cm	--
Thermal Expansion Coefficient		2x10 <sup>-4</sup> cm/cm/°C	1.0x10 <sup>-4</sup> in/in/°F
CELL CLASSIFICATION:	D3350	345464C	Grade PE36
MATERIAL CLASSIFICATION:	D1248	Type III	Class C
		Category 5	
PPI HYDROSTATIC DESIGN BASIS (HDB)	D2837	11.0 MPa @ 23°C	1,600 psi @ 73.4°F
(As listed in PPI TR-4)		5.5 MPa @ 60°C	800 psi @ 140°F
PPI HYDROSTATIC DESIGN STRESS (HDS)		5.5 MPa @ 23°C	800 psi @ 73.4°F
(As established by the Hydrostatic Stress Board (HSB) of the Plastics Pipe Institute (PPI))			

\*Nominal values are intended to be guides only, and not as specification limit.

### PolyPipe, Inc.

2406 N. I-35 | P.O. Box 390 | Gainesville, TX 76241  
 Phone 940.665.1721 | 800.433.5632 | Facsimile 940.668.8612  
 Sales Facsimile 940.668.2704 | [www.polypipeinc.com](http://www.polypipeinc.com)



# PolyPipe® EHMW PE3608 Pipe

## Pipe Data and Pressure Ratings – IPS

**PolyPipe®**

Pressure Rating		Class 265 DR7		Class 200 DR9		Class 160 DR11		Class 130 DR13.5		Class 100 DR17		Class 80 DR21		Class 65 DR26		Class 50 DR32.5	
Nominal Pipe Size	OD Size, inches	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft
½"	0.840	0.120	0.12	0.093	0.10	0.076	0.08	---	---	---	---	---	---	---	---	---	---
¾"	1.050	0.150	0.18	0.117	0.15	0.095	0.13	---	---	---	---	---	---	---	---	---	---
1"	1.315	0.188	0.29	0.146	0.23	0.120	0.20	---	---	---	---	---	---	---	---	---	---
1 ¼"	1.660	0.237	0.46	0.184	0.37	0.151	0.31	0.123	0.26	---	---	---	---	---	---	---	---
1 ½"	1.900	0.271	0.60	0.211	0.49	0.173	0.41	0.141	0.34	---	---	---	---	---	---	---	---
2"	2.375	0.339	0.94	0.264	0.76	0.216	0.64	0.176	0.53	0.140	0.43	---	---	---	---	---	---
3"	3.500	0.500	2.05	0.389	1.66	0.318	1.39	0.259	1.15	0.206	0.93	0.167	0.76	0.135	0.62	---	---
4"	4.500	0.643	3.38	0.500	2.74	0.409	2.29	0.333	1.91	0.265	1.54	0.214	1.26	0.173	1.03	0.138	0.83
5"	5.375	0.768	4.83	0.597	3.91	0.489	3.27	0.398	2.72	0.316	2.20	0.256	1.80	0.207	1.47	0.165	1.19
5"	5.563	0.795	5.17	0.618	4.18	0.506	3.51	0.412	2.91	0.327	2.35	0.265	1.93	0.214	1.57	0.171	1.27
6"	6.625	0.946	7.34	0.736	5.93	0.602	4.97	0.491	4.13	0.390	3.34	0.315	2.74	0.255	2.23	0.204	1.80
7"	7.125	1.018	8.49	0.792	6.86	0.648	5.75	0.528	4.78	0.419	3.86	0.339	3.17	0.274	2.58	0.219	2.08
8"	8.625	1.232	12.43	0.958	10.05	0.784	8.43	0.639	7.00	0.507	5.66	0.411	4.64	0.332	3.78	0.265	3.05
10"	10.750	1.536	19.31	1.194	15.62	0.977	13.09	0.796	10.88	0.632	8.79	0.512	7.20	0.413	5.88	0.331	4.74
12"	12.750	1.821	27.17	1.417	21.97	1.159	18.41	0.944	15.30	0.750	12.36	0.607	10.13	0.490	8.27	0.392	6.67
14"	14.00	2.000	32.76	1.556	26.49	1.273	22.20	1.037	18.45	0.824	14.91	0.667	12.22	0.538	9.97	0.431	8.04
16"	16.00	2.286	42.79	1.778	34.60	1.455	28.99	1.185	24.09	0.941	19.47	0.762	15.96	0.615	13.02	0.492	10.51
18"	18.00	2.571	54.15	2.000	43.79	1.636	36.70	1.333	30.49	1.059	24.64	0.857	20.20	0.692	16.48	0.554	13.30
20"	20.00	2.857	66.85	2.222	54.06	1.818	45.30	1.481	37.64	1.176	30.42	0.952	24.94	0.769	20.35	0.615	16.42
22"	22.00	---	---	2.444	65.41	2.000	54.82	1.630	45.55	1.294	36.81	1.048	30.17	0.846	24.62	0.677	19.86
24"	24.00	---	---	2.667	77.85	2.182	65.24	1.778	54.21	1.412	43.80	1.143	35.99	0.923	29.30	0.738	23.64
28"	28.00	---	---	---	---	2.545	88.80	2.074	73.78	0.647	59.62	1.333	48.87	1.077	39.88	0.862	32.17
30"	30.00	---	---	3.333	121.63	2.727	101.93	2.222	84.70	1.765	68.44	1.429	56.11	1.154	45.78	0.923	36.93
32"	32.00	---	---	---	---	---	---	2.370	96.37	1.882	77.87	1.524	63.84	1.231	52.09	0.985	42.02
36"	36.00	---	---	---	---	3.273	146.78	2.667	121.96	2.118	98.55	1.714	80.79	1.385	65.92	1.108	53.19
42"	42.00	---	---	---	---	---	---	---	---	2.471	134.14	2.000	109.97	1.615	89.73	1.292	72.39
48"	48.00	---	---	---	---	---	---	---	---	---	---	2.286	143.63	1.846	117.19	1.477	94.55
54"	54.00	---	---	---	---	---	---	---	---	---	---	2.571	181.78	2.077	148.32	1.662	119.67
63"	63.00	---	---	---	---	---	---	---	---	---	---	3.000	247.42	2.423	201.89	1.938	162.88
65"	65.00	---	---	---	---	---	---	---	---	---	---	3.095	263.38	2.500	214.91	2.000	173.39

\*See notes on Page 3 for product information and pressure rating information.

# PolyPipe® EHMW PE3608 Pipe

## Pipe Data and Pressure Ratings – DIPS

Pressure Rating		Class 265 DR7		Class 200 DR9		Class 160 DR11		Class 130 DR13.5		Class 100 DR17		Class 80 DR21		Class 65 DR26		Class 50 DR32.5	
Nominal Pipe Size	OD Size, inches	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft	Min. Wall, inches	Weight, lbs/ft
3"	3.96	0.566	2.62	0.440	2.12	0.360	1.78	0.293	1.48	0.233	1.19	0.189	0.98	0.152	0.80	0.122	0.64
4"	4.80	0.686	3.85	0.533	3.11	0.436	2.61	0.356	2.17	0.282	1.75	0.229	1.44	0.185	1.17	0.148	0.95
6"	6.90	0.986	7.96	0.767	6.43	0.627	5.39	0.511	4.48	0.406	3.62	0.329	2.97	0.265	2.42	0.212	1.95
8"	9.05	1.293	13.69	1.006	11.07	0.823	9.28	0.670	7.71	0.532	6.23	0.431	5.11	0.348	4.17	0.278	3.36
10"	11.10	1.586	20.59	1.233	16.65	1.009	13.95	0.822	11.60	0.653	9.37	0.529	7.81	0.427	6.27	0.342	5.06
12"	13.20	1.886	29.12	1.467	23.55	1.200	19.73	0.978	16.40	0.776	13.25	0.629	10.86	0.508	8.86	0.406	7.15
14"	15.30	2.186	39.12	1.700	31.64	1.391	26.51	1.133	22.03	0.900	17.80	0.729	14.59	0.588	11.91	0.471	9.61
16"	17.40	2.486	50.60	1.933	40.92	1.582	34.29	1.289	28.49	1.024	23.02	0.829	18.87	0.669	15.40	0.535	12.43
18"	19.50	2.786	63.55	2.167	51.39	1.773	43.07	1.444	35.79	1.147	28.92	0.929	23.70	0.750	19.34	0.600	15.61
20"	21.60	3.086	77.98	2.400	63.06	1.964	52.84	1.600	43.91	1.271	35.48	1.029	29.09	0.831	23.73	0.665	19.15
24"	25.80	---	---	2.867	89.96	2.345	75.39	1.911	62.64	1.518	50.62	1.229	41.50	0.992	33.86	0.794	27.32
30"	32.00	---	---	---	---	---	---	2.370	96.37	1.882	77.87	1.524	63.84	1.231	52.09	0.985	42.02
36"	38.30	---	---	---	---	---	---	---	---	2.253	111.55	1.824	91.45	1.473	74.61	1.178	60.20
42"	44.50	---	---	---	---	---	---	---	---	2.618	150.59	2.119	123.45	1.712	100.73	1.369	81.27
48"	50.80	---	---	---	---	---	---	---	---	---	---	2.419	160.88	1.954	131.27	1.563	105.91
54"	57.56	---	---	---	---	---	---	---	---	---	---	2.741	206.54	2.214	168.53	1.771	135.97
60"	61.61	---	---	---	---	---	---	---	---	---	---	---	---	2.370	193.07	1.896	155.77
64"	65.67	---	---	---	---	---	---	---	---	---	---	---	---	2.526	219.36	2.021	176.98

- NOTES : ➤ PolyPipe® EHMW Pipe is manufactured in accordance with the following standards:
- ◆ ½" IPS through 3" IPS products are manufactured in accordance with ASTM D3035.
  - ◆ 4" IPS through 64" DIPS products are manufactured in accordance with ASTM F714.
  - ◆ Metric sizes also available.
  - ◆ Coiled pipe available through 6" OD and straight lengths available in 40' and 50' lengths. For custom lengths, contact a Customer Service Representative.
  - ◆ Products tested and certified to NSF Standard 61 are available upon request.
  - ◆ Factory Mutual (FM) pipe available upon request (*Refer to A-1005 for approved sizes*).
- Pressures are based on using water at 23°C (73.4°F) and are determined per ASTM D3035 or F714.
- Service factors should be utilized to compensate for the effect of substances other than water and for higher temperatures.
- The above weights for IPS and DIPS sizes are calculated in accordance with Plastics Pipe Institute (PPI) TR-7, using a value of 0.955 for density.
- Available with color-coded striping.
- Some sizes listed are special order. Call for availability on sizes.



### ***Erwin, TN***

P.O. Box 199  
1050 Industrial Drive South  
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Fax: (423) 743-8419

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P.O. Box 1147  
6790 Santa Fe Circle  
Evansville, WY 82636  
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Fax: (307) 234-9116

### ***Fernley, NV***

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PLASTICS·PIPE·INSTITUTE



PolyPipe® is an active member of the Plastics Pipe Institute, AWWA, AGA and ASTM.

### **PolyPipe, Inc.**

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ISO 9001:2000



B-1004  
09/08

## BORE-GEL™

### Description

BORE-GEL™ is a single sack, boring fluid system specially formulated for use in horizontal directional drilling (HDD) applications. BORE-GEL is a proprietary blended product using high-yielding Wyoming sodium bentonite. When BORE-GEL is mixed with fresh water, it develops an easy-to-pump slurry with desirable fluid properties for HDD.

### Applications/Functions

- Improve borehole stability in poorly consolidated/cemented sands and gravel formations
- Reduce filtration rate thus improving stability of water sensitive clays and shales
- Provide optimum viscosity with maximum clay platelets for hole cleaning
- Provide optimum gel strength for cuttings suspension and transport



[Click to enlarge](#)

[Click to enlarge](#)

### Advantages

- Minimizes the number of boring fluid products required
- Easy to mix and fast to yield
- Pumpable slurry with maximum amount of reactive solids for borehole stability
- Tolerant to moderate amount of hardness and low pH
- ANSI/NSF Standard 60 certified
- Provides lubricity for pulling product line

### Typical Properties

- Appearance - Tan to gray powder
- Grind size - 200 mesh
- Specific gravity - 2.6
- pH (4% slurry or 15 lb/bbl) - 10.2
- Bulk density, lb/ft<sup>3</sup> - 68 to 72 (as packaged)

### Recommended Treatment

Add slowly and uniformly through a high-shear jet type mixer over one or more cycles of the volume of slurry. Continue to circulate and agitate the slurry until all lumps are dispersed.

Recommended application amounts		
Boring Application	lb/100 gal	kg/m <sup>3</sup>
Normal boring conditions	15 - 35	18 - 42
Poorly consolidated sand/gravel	35 - 60	42 - 72

### Packaging

BORE-GEL is packaged in a 50-lb (22.7-kg) multiwall paper bag. The bag is sturdy, moisture resistant and easy to handle, store and transport.

Baroid Industrial Drilling Products  
Product Service Line, Halliburton  
3000 N Sam Houston Pkwy E  
Houston, TX 77032      Technical Service (877)379-7412

# D16x20 Series II



**Big Power in a Small Footprint.** The D16x20 Series II is powered by a 65 hp/48 kW Kubota diesel engine, giving you 2,000 ft-lb/2,700 Nm of rotational torque and 16,000 lbs/71 kN of thrust/pullback. The onboard pump provides high flow in large-diameter bores for more efficient backreaming. The D16x20 Series II brings performance to a wide range of bores. The unit's compact footprint allows for entry into confined jobsites and side-by-side trailering with many modular mix systems.

## Dimensional

Transport Length	200.5"	509.27 cm
Width: Transport Mode	41"	104.14 cm
Height	75"	190.5 cm

## Engine

Make & Model	Kubota 3600
--------------	-------------

## Operational

Pullback	16000 lbs	7257.48 kg
Maximum Spindle Torque	2000 ft-lb	2711.64 Nm

## Drilling Fluid System

Maximum Flow	25 gpm	94.64 L/min
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**Specifications Last Revised 04/19/2011**

# D24x40 Specifications

The D24x40 Series II is engineered to power through with a 125 hp/93kW John Deere 4045 diesel engine. That's 4200 ft.-lb./5,423 Nm of rotational torque and 24,000 lbs./107 kN of thrust/pullback.

## General Dimensions and Weights

Length	228"	579.12 cm
Width	74"	187.96 cm
Height	75"	190.5 cm
Weight	18440 lbs	8364.24 kg
Breakout System	Yes- side load vise	
Drilling Lights	Standard: 1 on gearbox, 2 on stakedown	
Stakedown System	Standard: stationary	

## Engine

Make and Model	John Deere PowerTech 4045HF275	
Fuel Type	Diesel	
Gross Horsepower	125 hp	93.21 kw

## Operational

Thrust	24000 lbs	10886.22 kg
Pullback	24000 lbs	10886.23 kg
Maximum Spindle Torque (Low at Maximum Engine RPM)	4200 ft-lb	5694.44 Nm
Maximum Spindle Torque (Medium at Maximum Engine RPM)	3200 ft-lb	4338.62 Nm
Maximum Spindle Torque (High at Maximum Engine RPM)	2100 ft-lb	2847.22 Nm
Maximum Spindle Speed at Max Engine RPM	270 rpm	
Minimum Bore Diameter	3.5"	8.89 cm
Transport speed	1.5 mph	2.42 km/h
Automated Rod Loader	Yes	

## Fluid Capacities

Fuel Tank	45 gal 170.34 L			
Hydraulic Tank	45 gal 170.34 L	Hydraulic System	55 gal	208.2L

## Hydraulic System

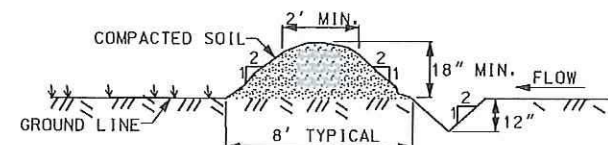
Auxiliary Pump Flow at Maximum Engine RPM	47 gpm	
Auxiliary Pump Relief Pressure	3000 psi	206.84 bar
Thrust/Pullback Pump Flow at Max Engine RPM	33 gpm	124.92 L/min
Thrust/Pullback Pump Relief Pressure	6000 psi	413.69 bar
Rotation Pump Flow at Maximum Engine RPM	33 gpm	124.92 L/min
Rotation Pump Relief Pressure	6000 psi	413.69 bar

## Drilling Fluid System Option One

Maximum Flow	50 gpm	189.27 L/min	Maximum Flow	1300 psi	89.63 bar
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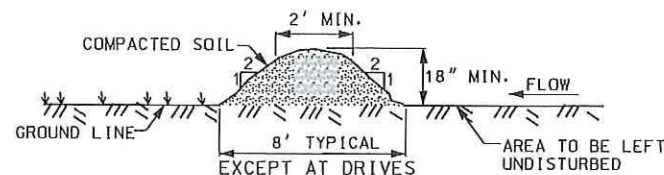






TEMPORARY DIVERSION DIKE WITH DITCH

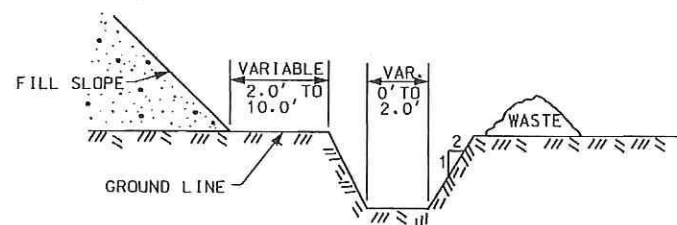
THE PAY ITEM SHALL BE TEMPORARY DIVERSION DIKE WITH DITCH.....L.F.



TEMPORARY DIVERSION DIKE

#### NOTES

1. THIS ITEM IS FOR DIVERTING CLEAN WATER AROUND A CONSTRUCTION AREA.
2. CLEAR AND GRUB ALL TREES, BRUSH, STUMPS AND OTHER OBJECTIONABLE MATERIAL.
3. ENSURE THAT THE MINIMUM CONSTRUCTED CROSS SECTION MEETS ALL DIMENSIONS SHOWN.
4. IMMEDIATELY AFTER CONSTRUCTION ESTABLISH VEGETATION, PLACING TEMPORARY EROSION CONTROL BLANKET ON THE DIKE. (AS APPLICABLE).
5. PAYMENT FOR TEMPORARY DIVERSION DIKE INCLUDES ALL MATERIALS IN PLACE, REMOVAL AND DISPOSAL OF MATERIALS AND RESHAPING DIKE TO DRAIN. SEEDING TO BE PAID FOR SEPARATELY.
6. THE PAY ITEM SHALL BE: TEMPORARY DIVERSION DIKE.....L.F.

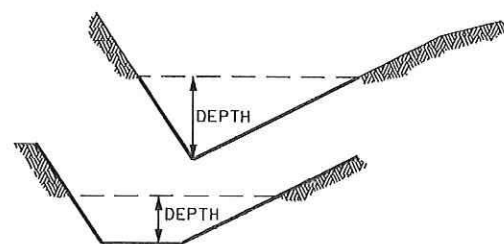


TEMPORARY SILT DITCH

#### NOTES

1. THIS ITEM IS TO MOVE SEDIMENT LADEN WATER FROM A CONSTRUCTION SITE TO A SEDIMENT CONTROL STRUCTURE.
2. SEED DITCH AND WASTE AREA WITH TEMPORARY SEEDING IMMEDIATELY AFTER CONSTRUCTION.
3. IMMEDIATELY AFTER CONSTRUCTION ESTABLISH VEGETATION, PLACING TEMPORARY EROSION CONTROL BLANKET ON THE DITCH (AS APPLICABLE).
4. THE PAY ITEM SHALL BE: SILT DITCHES.....C.Y.

ROLLED EROSION CONTROL PRODUCT



#### NOTES

1. THE DEPTH OF THE EROSION CONTROL PRODUCTS ARE TO BE DETERMINED BY DESIGN AND PLACED ON PLAN SHEETS.
2. INSTALL IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
3. COST OF INSTALLATION AND MATERIALS SHALL BE INCLUDED IN THE PAY ITEM FOR ROLLED EROSION CONTROL PRODUCT.
4. PAY ITEMS:  
TEMPORARY EROSION CONTROL BLANKET.....SY  
PERMANENT TURF REINFORCEMENT MAT.....SY

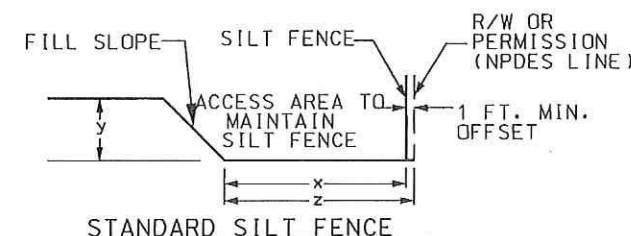
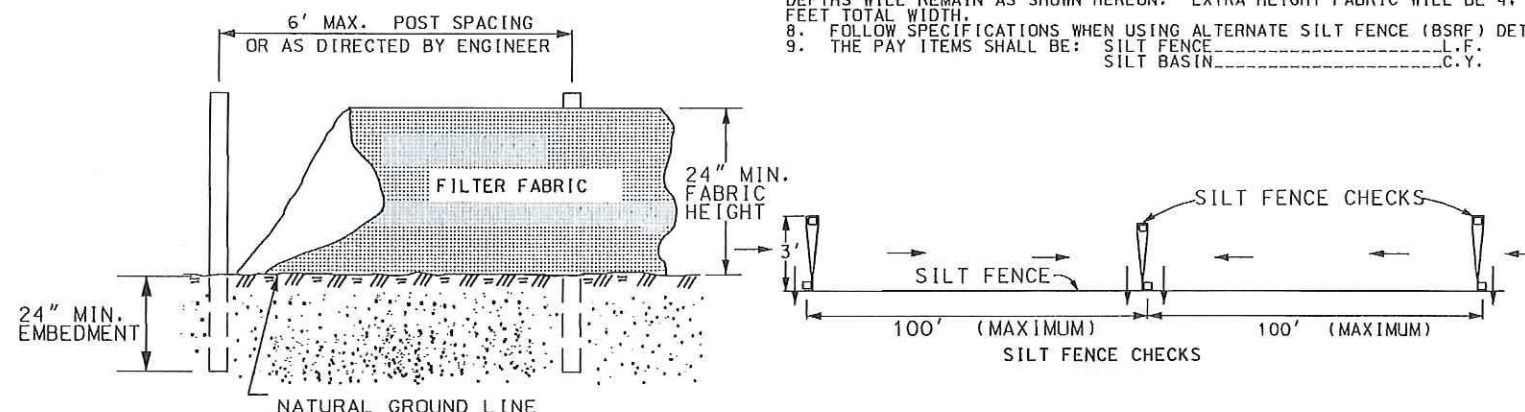
THIS DRAWING IS NOT TO SCALE

## SILT FENCE

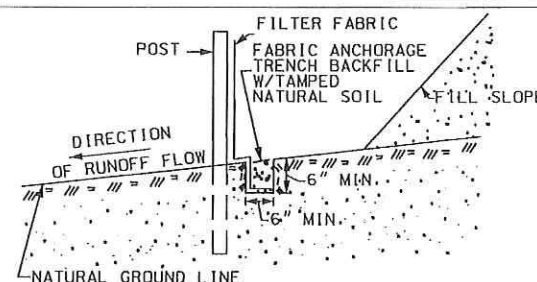
HEIGHT OF FILL (y) IN FEET	FILL SLOPE	MINIMUM SILT FENCE OFFSET FROM TOE OF SLOPE (x) IN FEET	MINIMUM RIGHT OF WAY OFFSET FROM TOE OF SLOPE (NPDES LINE) IN FEET	CHECK LENGTH IN FEET**
<6	2:1 4:1 6:1	2	3	2
6-10	2:1 4:1 6:1	12*	13*	5
>10	2:1 4:1 6:1	12*	13*	5

\*THESE MINIMUM OFFSETS MAY BE REDUCED WHEN CURB AND GUTTER OR SOME OTHER FEATURE REDUCES THE FLOW OF WATER DOWN THE SLOPE. THE SMALL OFFSETS OF EACH GROUP OF HEIGHT OF FILL CANNOT BE REDUCED.

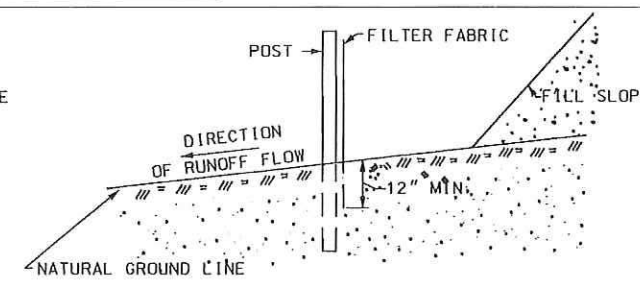
\*\*SILT FENCE CHECKS WILL HAVE A MAXIMUM LENGTH OF FIVE (5) FEET OR UNTIL THEY TIE BACK INTO THE SLOPE.



STANDARD SILT FENCE

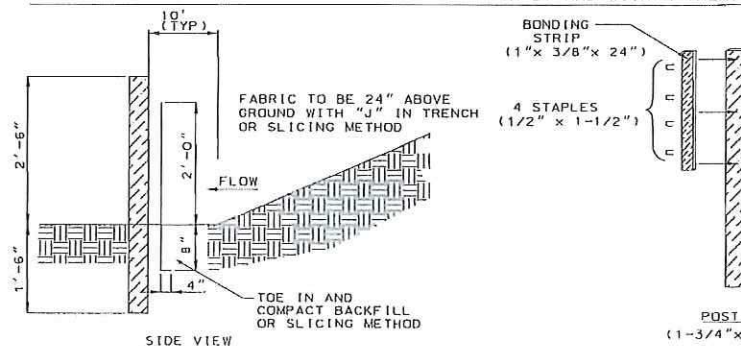


TRENCH METHOD



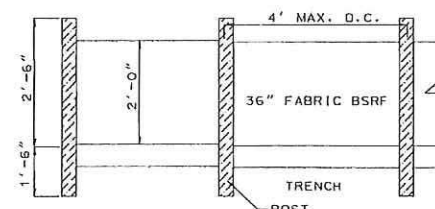
PNEUMATIC METHOD

12 INCHES OF THE FABRIC SHALL BE BURIED REGARDLESS, IF PLACED PNEUMATICALLY OR BY AND WITH A TRENCHER. BOTH METHODS SHOWN HERE.



SIDE VIEW

POST (OAK)  
(1-3/4" x 1-1/4" x 48")



FRONT ELEVATION

MINIMUM OVERLAP OF 18" IS TO BE PROVIDED AT ALL SPLICE JOINTS

ALTERNATE SILT FENCE - BELTED SILT RETENTION FENCE (BSRF)

## REFERENCES

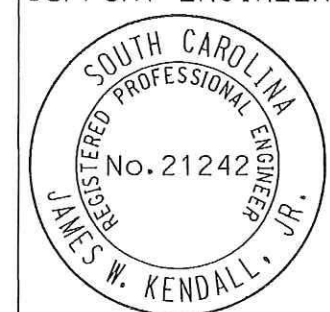
### NATIONAL DOCUMENTS

### SCDOT DOCUMENTS

SC-M-815-2, SC-M-815-9

### RELATED DRAWINGS & KEYWORDS

## PRECONSTRUCTION SUPPORT ENGINEER



James W. Kendall  
SIGNATURE

AUGUST 23, 2012  
DATE

4			
3			
2			
1	8/2012	KNB	ADDED SCDOT DOCUMENTS, REMOVED STEEL, CHANGED NOTES
0	3/2008	DSO	GENERAL REVISIONS
#	DATE	CHK	DESCRIPTION



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DESIGN STANDARDS OFFICE  
955 PARK STREET  
ROOM 405  
COLUMBIA, SC 29201

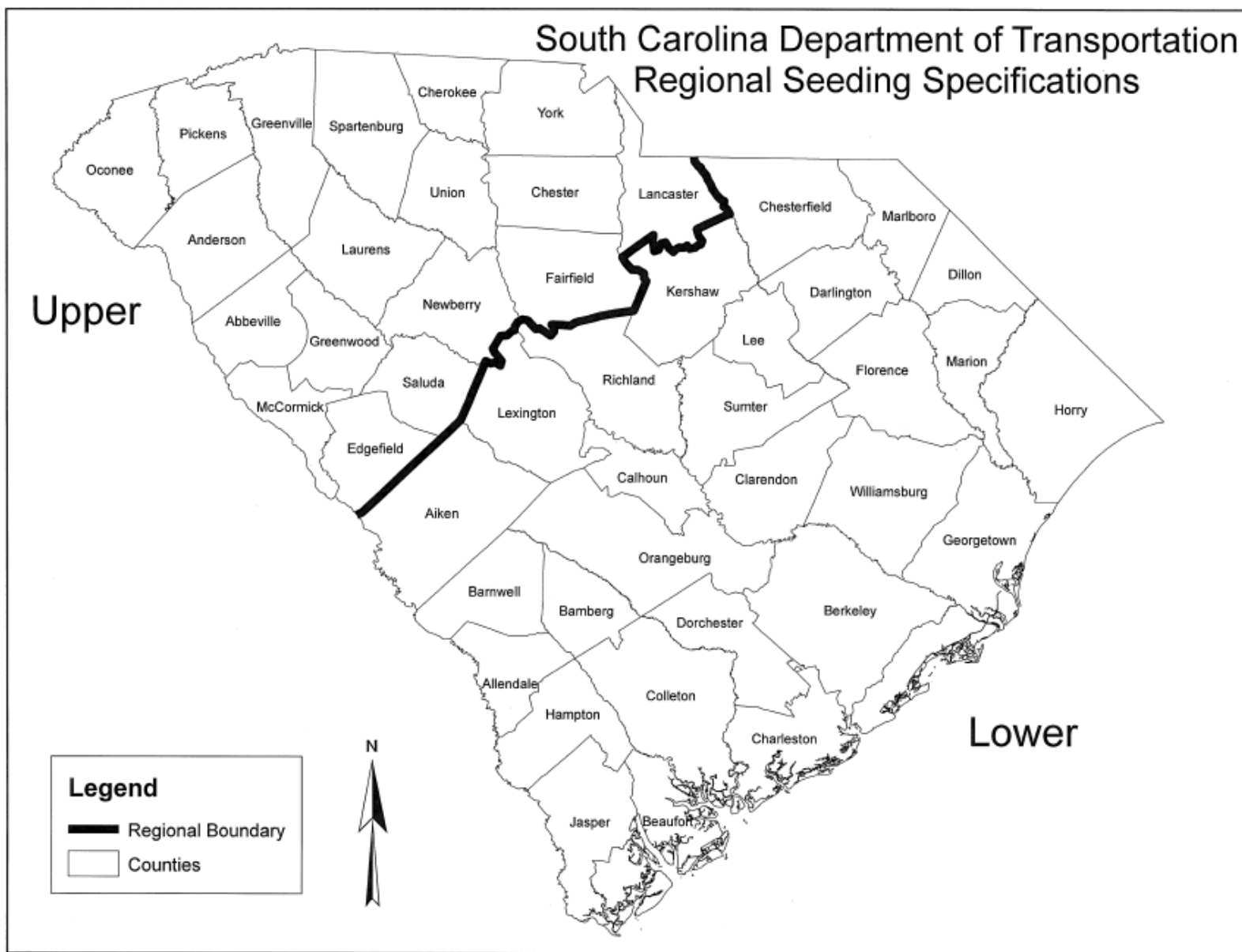
## STANDARD DRAWING

TEMPORARY  
EROSION &  
SEDIMENTATION  
CONTROL

815-605-00

EFFECTIVE LETTING DATE JAN., 2013

FIGURE 1: UPPER AND LOWER STATE MAP





**TABLE 1: PERRENIALS** \* Months shaded in gray represent applicable planting dates.

COMMON NAME <sup>6</sup>	BOTANICAL NAME	APPROVED SITE(S)	PLANTING RATE (lbs/acre)	PLANTING LOCATION	Planting Dates*											
					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TURF-TYPE GRASSES (SELECT ONE)																
Bahia <sup>1</sup>	Paspalum notatum	Shoulders, Slopes, or Medians	30	Upper State												
				Lower State												
Common Bermudagrass <sup>2</sup> (hulled = hull absent)	Cynodon dactylon	Shoulders, Slopes, or Medians	50	Upper State												
				Lower State												
Common Bermudagrass <sup>2</sup> (unhulled = hull present)	Cynodon dactylon	Shoulders, Slopes, or Medians	60	Upper State												
				Lower State												
Carpet Grass / Centipedegrass Combo	Axonopus affinis Eremochloa ophiuroides	Shoulders, Slopes or Medians	15	Upper State												
			10	Lower State												
Tall Fescue (KY-31) <sup>3</sup>	Festuca arundinacea	Shoulders, Slopes, or Medians	75	Upper State												
				Lower State												
GRASSES																
Weeping Lovegrass	Erograstis curvula	Slopes	10	Upper State												
				Lower State												
Indiangrass	Sorghastrum nutans	Slopes	10	Upper State												
				Lower State												
Little Bluestem	Andropogon scoparius	Slopes	10	Upper State												
				Lower State												
Coastal Panicgrass	Panicum amarum	Slopes	20	Upper State												
				Lower State												
Switchgrass	Panicum virgatum	Slopes	10	Upper State												
				Lower State												
Perennial Rye Grass <sup>4</sup>	Lolium perrene	Shoulders, Slopes, or Medians	15	Upper State												
				Lower State												
Virginia Wild Rye	Elymus virginicus	Shoulders, Slopes, or Medians	6	Upper State												
				Lower State												
LEGUMES <sup>4</sup>																
White Clover	Trifolium repens	Shoulders, Slopes, or Medians	5	Upper State												
				Lower State												
Crownvetch	Coronilla varia	Slopes	25	Upper State												
				Lower State												
Sericea Lespedeza (Scarified seed)	Lespedeza cuneata	Slopes	50	Upper State												
				Lower State												
Sericea Lespedeza (Unscarified seed)	Lespedeza cuneata	Slopes	80	Upper State												
				Lower State												

<sup>1</sup>Bahia<sup>1</sup>: Use at discretion of RCE based on project location.

<sup>2</sup>Common Bermudagrass: *Do not use Giant Bermudagrass (NK-37).*

<sup>3</sup>Tall Fescue (KY-31): *Do not use Tall Fescue (Lolium arundinacea).*

<sup>4</sup>Perennial Rye Grass: *Do not use Annual Italian Rye grass (Lolium multiflorum).*

\* Months shaded in gray represent applicable planting dates.

<sup>5</sup>Only use pre-inoculated legumes or use an appropriate inoculant with the seed at plant

<sup>6</sup>If Common Name of seed is not available, use seed with the listed Botanical Name.

**TABLE 2: ANNUALS**

\* Months shaded in gray represent applicable planting dates.

COMMON NAME <sup>5</sup>	BOTANICAL NAME	APPROVED SITE(S)	NURSE CROP RATE (lbs/acre)	TEMP COVER RATE (lbs/acre)	PLANTING LOCATION	Planting Dates*											
						JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>Crimson Clover</b> <sup>1</sup>	Trifolium incarnatum	Shoulders, Slopes, or Medians	20	20	Upper State												
					Lower State												
<b>Lespedeza</b> <sup>1</sup> <b>Kobe / Korean</b>	Lespedeza striata / stipulacea	Shoulders, Slopes	15	60	Upper State												
					Lower State												
<b>Browntop Millet</b> <sup>2</sup>	Panicum ramosum	Shoulders, Slopes, or Medians	10	40	Upper State												
					Lower State												
<b>German Millet</b> <sup>2</sup> <b>(Foxtail Millet)</b>	Setaria italica	Shoulders, Slopes, or Medians	10	40	Upper State												
					Lower State												
<b>Japanese Millet</b> <sup>2</sup>	Echinochloa crusgalli	Slopes	10	50	Upper State												
					Lower State												
<b>Oats</b>	Avena sativa	Slopes	40	110	Upper State												
					Lower State												
<b>Hairy Vetch</b> <sup>1</sup>	Vicia villosa	Slopes	15	50	Upper State												
					Lower State												
<b>Pearl Millet</b>	Pennisetum glaucum	Slopes	15	50	Upper State												
					Lower State												
<b>Sudangrass</b>	Sorghum bicolor	Slopes, Buffers	20	60	Upper State												
					Lower State												
<b>Barley</b>	Hordeum vulgare	Slopes	55	110	Upper State												
					Lower State												
<b>Wheat</b> <sup>4</sup>	Triticum spp.	Slopes, Buffers	35	110	Upper State												
					Lower State												
<b>Rye Grain</b> <sup>3,4</sup>	Secale cereale	Shoulders, Slopes, or Medians	40	110	Upper State												
					Lower State												

<sup>1</sup> Only use pre-inoculated legumes or an appropriate inoculant with the seed at planting.

\* Months shaded in gray represent applicable planting dates.

<sup>2</sup> Mow Millet (no lower than 3 inches) once it reaches a height of 18 - 24 inches or at the discretion of the RCE to reduce competitiveness with permanent vegetation.

<sup>3</sup> Rye Grain: Do not use Annual Italian Rye Grass (Lolium multiflorum).

<sup>4</sup> Mow Wheat and Rye Grain (no lower than 3 inches) once they reach a height of 18 - 24 inches or at the discretion of the RCE to reduce competitiveness with permanent vegetation.

<sup>5</sup> If the Common Name of the seed listed is not available, use seed with the listed Botanical Name. Do not use Wild Bird, Wild Animal, or Domestic Feed Seed.