

**REVISED DRAFT**

May 23, 2019

Town of Chapel Hill  
405 Martin Luther King Jr Blvd.  
Chapel Hill NC 27514

Attention: Mr. John Richardson

Subject: Interim Remedial Measures Cost Evaluation  
828 Martin Luther King Jr Blvd. Property  
Chapel Hill, North Carolina  
H&H Job No. TCH-002

Dear John:

**1.0 Introduction**

In accordance with your request, Hart & Hickman, PC (H&H) has prepared a cost evaluation for possible interim remedial measures related to the presence of exposed coal combustion products (CCPs) present at the property located at 828 Martin Luther King, Jr. Blvd. in Chapel Hill. Based upon our discussions, meetings with Town Council, and recent risk assessment activities, the possible interim remedial action consists of the following two components:

- Component 1 - Removal of erosional CCP along Bolin Creek Greenway Trail to mitigate potential direct contact with CCP along the trail. The approximate erosional CCP areas are represented as Areas G, H, and I on the attached Figure 1.
- Component 2 - Cover and migration control of exposed CCP on the embankment between the upper and lower portions of the property to minimize the potential for CCP re-deposition along the trail after the CCP removal in Component 1. This component would include removal and disposal of accumulated CCP behind the existing silt fence (to be disposed along with the material excavated as part of Component 1), repair and maintenance of the two layers of existing silt fencing and installation of super silt fencing

at the flank and downgradient boundaries of the exposed CCPs. In addition, the exposed CCP areas would be hydroseeded to promote vegetative growth. The embankment areas where exposed CCP is present are represented as Area D (small area) and Area F (primary area) in the attached Figure 1.

A brief description of the two components of the interim remedial measures is provided below.

## **2.0 Interim Remedial Measures Descriptions**

### **2.1 Component 1 – Removal of Erosional CCP Along Bolin Creek Trail**

Component 1 consists of removal of the visually observed erosional CCP areas along and near the Bolin Creek Trail. The major components and assumptions for this Component are provided below:

- Sampling of material to be excavated prior to excavation for waste profiling purposes and disposal facility acceptance.
- Excavation, transportation, and disposal of approximately 900 tons of non-hazardous erosional CCP along Bolin Creek Greenway Trail. In the cost evaluation in Table 1, we have assumed that the removed CCP will be disposed at a Subtitle D landfill. However, it is possible that CCP could be used in North Carolina Department of Transportation (NC DOT) road projects at a lower cost. The CCP would have to be tested and approved for use in NC DOT projects in accordance with NC DOT's March 26, 2015 *New Coal Combustion Material Placement Detail* (see Attachment A), and there would have to be an eligible roadway project to accept the CCP at the time of its removal. The potential for CCP use in NC DOT road projects would need to be vetted once there is a firm timeframe for removal of the material.
- Implementation of erosion and sediment control measures prior to start of excavation.
- Site restoration in the form of backfilling the shallow excavations along the trail and seeding with grass seed and straw cover.

- Collection of post-excavation soil samples from the base of the excavation areas to determine post-excavation concentrations of metals for use in future risk evaluations.

## **2.2 Component 2 - Cover and Migration Control of Exposed CCP Along Embankment**

The second component of the interim remedial measure consists of migration control of exposed CCP along the embankment to minimize the potential for future re-deposition of CCP along the trail after removal. The interim remedial measure may also minimize the potential for direct contact of CCP along the embankment if someone were to traverse the slope. For Component 2, two procedural steps were evaluated as discussed below.

### Step 1 – Silt Fencing

Step 1 would consist of: a) repairing existing silt fencing located primarily below the embankment where exposed CCP is present, and b) placing additional super silt fence along the flanks and the downgradient (southern) areas where these is exposed CCP to further minimize the potential for CCP to migrate to the area of Bolin Creek Trail. Key assumptions are noted below.

- Removal of CCP that has accumulated behind existing silt fencing in the vicinity of embankment Area F. The CCP will be disposed during erosional CCP removal activities conducted during Component 1.
- Installation of super silt fencing along the flanks and downgradient of Areas D and F where exposed CCP is present. For cost estimation purposes, we estimated that approximately 375 linear feet (lf) of super silt fencing (GEOTEX® 200ST or similar product) would be installed along the flanks of the embankment areas and along the respective downgradient boundaries. Super silt fencing has a chain link banking and is installed with metal poles for stronger support and longer term use as compared to standard silt fencing. The proposed super silt fencing location is shown on the attached Figure 1. Product specification sheets and photographs are included in Appendix B. Product photographs are included in Appendix C.
- Repair of existing standard silt fencing in the vicinity of embankment Area F. For cost estimation purposes and based upon our recent observations, we estimate that

approximately 100 lf of standard silt fencing (WINFAB® 77SF or similar product) will be needed for the repair activities.

- Prior to silt fence placement, some brush removal and limited removal of fallen trees that cross the path of the silt fence will likely need to occur.

Please note that silt fencing (standard and super) will need to be inspected and maintained. According to the *Erosion and Sediment Control Planning and Design Manual* by the North Carolina Sedimentation Control Commission, North Carolina Department of Environmental Quality and the North Carolina Agricultural Extension Service (May 2013), the recommended inspection frequency for silt fencing is once per week and after each significant rainfall event. Possible maintenance activities include: reinstallation of geotextile fabric, chain-link backing (super silt fence only), and/or support posts. Other maintenance activities could include removal and disposal of accumulated CCP behind the silt fence. Please note that this evaluation does not include silt fencing inspection or maintenance costs beyond the aforementioned repair of approximately 100 lf.

### Step 2 – Hydroseeding

In Step 2, a hydroseed mixture will be applied to the areas of exposed CCP which total approximately 10,000 sq ft. This would minimize the potential for stormwater contact and migration of CCPs to the Bolin Creek Trail. In addition, this would have the added benefit of minimizing the potential for exposure to the CCP (once vegetation is fully established) by covering the CCP should someone traverse the embankment slope.

The hydroseed mixture will include both warm-season grass seed (Bermuda or similar grass), cool-season grass seed (fescue or similar grass), and an organic matter amendment (ProGanics™ Biotic Soil Media™ or similar product) to promote sustainable vegetation. In addition, the mixture would also include a biodegradable growth medium (Flexterra® HP-FGM™ or similar product) to provide erosion resistance to the embankment slope. This mixture has been used to stabilize coal ash stockpiles at electric utilities. Note that following initial application of the hydroseed mixture, maintenance consisting of annual fertilization to promote continued vegetation growth will likely

be warranted an on-going basis (estimated \$1,500 to \$2,000 per year). The costs for annual fertilization are not included in our estimate.

### 3.0 Estimated Costs

Estimated costs for the interim remedial measures are included in Table 1 and are summarized below. Note that costs were obtained from two contractors to provide a range of likely costs.

#### **Erosional CCP Removal and Disposal, Silt Fencing Installation and Repair, and Hydroseeding (numbers rounded)**

	<b>Contractor 1</b>	<b>Contractor 2</b>
Embankment Silt Fencing Installation & Repair	\$39,000	\$50,000
Erosional CCP Removal and Disposal	\$98,000	\$146,000
Hydroseeding	\$9,000	\$8,000
Engineering/Oversight/Sampling/Reporting	<u>\$42,000</u>	<u>\$42,000</u>
<b>Estimated Total</b>	<b>\$188,000</b>	<b>\$246,000</b>

If you have any questions or comments concerning our evaluation, please let me know.

Sincerely,

*Hart & Hickman, PC*



Steve Hart, PG  
Principal

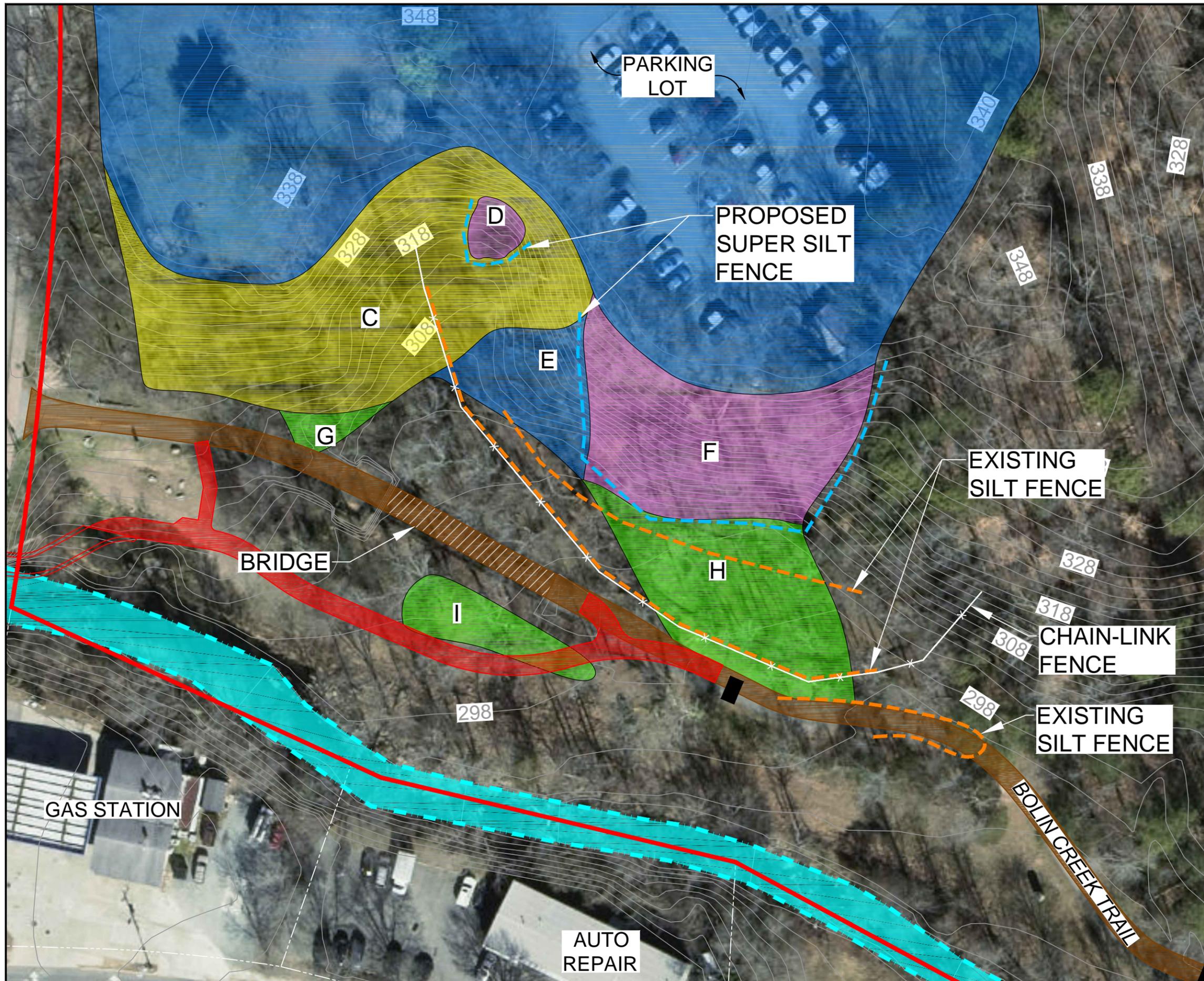
Attachments

**Table 1**  
**Interim Remedial Measures Installation Cost Estimate**  
**828 Martin Luther King, Jr. Blvd**  
**Chapel Hill, North Carolina**  
**H&H Job No. TCH-002**

Task Description	Remedial Contractor #1		Remedial Contractor #2	
	Unit Cost	Total	Unit Cost	Total
<b>Remedial Subcontractor Costs</b>				
<b>Component 1</b>				
<b>CCP Removal and Disposal</b>				
Non-Haz CCP Excavation, Transportation, & Disposal at Landfill (700 cy / 900 tons)	\$61.50/ton	\$55,350	\$85/ton	\$76,500
CCP Disposal Sampling by H&H (700 cy)	\$140/250 cy	\$420	\$140/250 cy	\$420
Import & Place Backfill in Erosional CCP Areas (700 cy / 900 tons)	\$33/ton	\$29,700	\$56/ton	\$50,400
CCP Removal and Disposal Subtotal		\$85,470		\$127,320
15% Contingency		\$12,821		\$19,098
CCP Removal and Disposal with Contingency (Rounded)		<b>\$98,000</b>		<b>\$146,000</b>
<b>Component 2</b>				
<b>Silt Fencing Installation and Repairs (Step 1) and Hydroseeding (Step 2)</b>				
Planning, Mobilization, & Demobilization	LS	\$6,500	LS	\$4,500
Access Road	LS	\$10,000	LS	\$25,000
Limited Tree Removal and Clearing Along Path of Silt Fence	LS	\$5,000	LS	\$5,000
Repair of Existing Standard Silt Fencing* (100 lf)	\$12.00/lf	\$1,200	\$6.25/lf	\$625
Installation of Super Silt Fencing* (375 lf)	\$19.80/lf	\$7,425	\$12.00/lf	\$4,500
Installation of Check Dams (2)	LS	\$1,500	LS	\$1,000
Site Restoration	LS	\$2,500	LS	\$2,500
Hydroseeding*	LS	\$8,000	LS	\$7,500
Silt Fencing Installation Subtotal		\$42,125		\$50,625
15% Contingency		\$6,319		\$7,594
Silt Fencing Installation and Repairs and Hydroseeding with Contingency (Rounded)		<b>\$48,000</b>		<b>\$58,000</b>
<b>Engineering/Oversight/Maintenance Costs</b>				
<b>CCP Removal Along Trail with Silt Fencing and Hydroseeding</b>				
Planning	--	\$10,000		
Oversight & Project Management (3 weeks / 15 days)	\$1,500/day	\$22,500		
Laboratory Analytical for Post-Excavation Samples	\$200/sample	\$4,000		
Final Reporting	--	\$5,000		
Engineering/Oversight Subtotal (Rounded)		<b>\$42,000</b>		

**Notes:**

ft = feet; sq ft = square foot; lf = linear feet; LS = lump sum; -- = not applicable and/or line item included elsewhere; \* = see Appendix B



**LEGEND**

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- FENCE LINE (APPROXIMATE LOCATION)
- - - EXISTING SILT FENCE (APPROXIMATE LOCATION)
- - - PROPOSED SUPER SILT FENCE (APPROXIMATE LOCATION)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE
- CCP DEPOSITIONAL LAYER
- STORMWATER CULVERT
- PROPOSED TRAIL

  
 APPROXIMATE  
 0 50 100  
 SCALE IN FEET

<b>TITLE</b>	
SITE MAP - PROPOSED INTERIM REMEDIAL MEASURES	
<b>PROJECT</b>	
TOWN OF CHAPEL HILL 828 MARTIN LUTHER KING JR. BOULEVARD CHAPEL HILL, NORTH CAROLINA	
	
<small>2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f) License # C-1269 / #C-245 Geology</small>	
DATE: 5-22-19	REVISION NO. 0
JOB NO. TCH-002	FIGURE NO. 1

\\HHF501\MasterFiles\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-002 - Police Station\PH II RI Work\Figures\Figures\_5.15.19.dwg, FIG 2 ALT, 5/22/2019 11:15:12 AM, S:\vcent

**Appendix A**  
**NCDOT CCP Re-Use Letter**



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

MEMO TO: Roadway Design Project Engineers  
Roadway Design Project Design Engineers

FROM: Glenn W. Mumford, PE  
State Roadway Design Engineer

DocuSigned by:  
*Glenn W. Mumford*  
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DATE: March 26, 2015

SUBJECT: New Coal Combustion Material Placement Detail

In order to be in compliance with Senate Bill 729 and NCGS 130A-309.215, beginning with the May 19, 2015 letting the Department is allowing the use of coal combustion products in embankments as a substitution for conventional borrow material.

Through close coordination with the Construction Unit and the contracting industry it has been decided to allow this substitution on any TIP project which has a bid item for "Borrow Excavation" included in the contract. This would not include contract resurfacing projects with a borrow pay item.

For all Raleigh central let projects, the Contract Standards and Development Unit will be responsible for inclusion of the Project Special Provision to cover this allowed substitution, when appropriate. For all Division let projects, Division personnel are responsible for inclusion of the project special provision, when appropriate. The Roadway Design Project Design Engineer is responsible for requesting the required detail from the Special Details squad in the Contract Standards and Development Unit and including it in the "2 Series" sheets in the Roadway Plans.

If you have any questions regarding this new requirement, please contact Joel Howerton, PE, at 919-707-6950.

GWM/rag  
Attachments

cc: Rodger Rochelle, PE      Debbie Barbour, PE      Randy Garris, PE  
Ricky Greene, PE      John Pilipchuk, LG, PE      Ron Hancock, PE  
Division Engineers -

Contractor that all the necessary requirements have been met before the placement of structural fill using coal combustion products is allowed.

### **Construction Methods**

In accordance with the detail in the plans, place CCPs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade and at least 5 feet above the seasonal high ground-water table. CCPs used in embankments shall not be placed as follows:

- (A) Within 50 feet of any property boundary.
- (B) Within 300 horizontal feet of a private dwelling or well.
- (C) Within 50 horizontal feet of the top of the bank of a perennial stream or other surface water body.
- (D) Within a 100-year floodplain except as authorized under NCGS § 143-215.54A(b). A site located in a floodplain shall not restrict the flow of the 100-year floodplain or result in washout of solid waste so as to pose a hazard to human life, wildlife or land and water resources.
- (E) Within 50 horizontal feet of a wetland, unless, after consideration of the chemical and physical impact on the wetland, the United States Army Corps of Engineers issues a permit or waiver for the fill.

Construct embankments by placing CCPs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

Divert surface waters resulting from precipitation from the CCPs placement area during filling and construction activities. Construct embankments such that rainfall will not run directly off of the CCPs. Provide dust control to minimize airborne emissions. Construct fill in a manner that prevents water from accumulating and ponding and do not pump nor discharge waters from CCP's filling and construction areas.

### **Measurement and Payment**

*Borrow Excavation* will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *2012 Standard Specifications*.

## Process for utilizing Coal Combustion Products

1. Contractor requests from the Engineer at least 90 days in advance for written approval to utilize Coal Combustion Products (CCPs) as a substitute for earth borrow material.
2. The request is to include the following details using the NCDOT Form CCP-2015-V1:
  - a. Description, purpose, and location of project.
  - b. Estimated start and completion dates of project.
  - c. Estimated volume of CCPs to be used on project with specific locations and construction details of the placement.
  - d. Toxicity Characteristic Leaching Procedure (TCLP) analysis from a representative sample of each different CCP source to be used in the project for, at minimum, all of the following constituents: arsenic, barium, cadmium, lead, chromium, mercury, selenium and silver.
  - e. The names, address and contact information for the generator of the CCPs.
  - f. Physical location of the project at which the CCPs were generated.
3. Submit the completed form to the Engineer and the State Value Management Engineer at [valuemanagementunit@ncdot.gov](mailto:valuemanagementunit@ncdot.gov) for review.
4. The Engineer will notify the Materials and Tests Unit and the Central Construction Unit of the request. Materials and Tests will conduct site specific sampling and testing for approval of the material proposed to be used.
5. Upon approval of the material, Materials and Tests will notify the Engineer and copy Construction Unit and Value Management.
6. The Engineer and the State Value Management Engineer will coordinate a response to the Contractor notifying of approval to use CCPs as a substitute for earth borrow material.
7. Upon completion of embankment containing CCPs the Engineer files Documentation with County Registrar of Deeds to be Recorded in accordance with "Coal Combustion Products in Embankments" process found in the NCDOT Construction Manual.
8. Value Management will update website that details CCP projects.



## **COAL COMBUSTION PRODUCTS IN EMBANKMENTS:**

(4-16-02) (Rev. 5-19-15)

235

SP02 R70

### **Description**

This specification allows the Contractor an option, with the approval of the Engineer, to use coal combustion products (CCPs) in embankments as a substitute for conventional borrow material. The amount of CCPs allowed to be used for this project will be less than 80,000 tons total and less than 8,000 tons per acre.

### **Materials**

Supply coal combustion products from the Department list of potential suppliers maintained by the Value Management Unit. Site specific approval of CCP material will be required prior to beginning construction.

The following CCPs are unacceptable:

- (A) Frozen material,
- (B) Ash from boilers fired with both coal and petroleum coke, and
- (C) Material with a maximum dry unit weight of less than 65 pounds per cubic foot when tested in accordance with AASHTO T-99 Method A or C.

Collect and transport CCPs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the CCPs as needed and transport in covered trucks to prevent dusting.

### **Preconstruction Requirements**

When CCPs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use CCPs and include the following details using the NCDOT Form #CCP-2015-V1 in accordance with NCGS § 130A-309.215(b)(1):

- (A) Description, purpose and location of project.
- (B) Estimated start and completion dates of project.
- (C) Estimated volume of CCPs to be used on project with specific locations and construction details of the placement.
- (D) Toxicity Characteristic Leaching Procedure analysis from a representative sample of each different CCP source to be used in the project for, at minimum, all of the following constituents: arsenic, barium, cadmium, lead, chromium, mercury, selenium, and silver.
- (E) The names, address, and contact information for the generator of the CCPs.
- (F) Physical location of the project at which the CCPs were generated.

Submit the form to the Engineer and the State Value Management Engineer at [valuemanagement@ncdot.gov](mailto:valuemanagement@ncdot.gov) for review. The Engineer and the State Value Management Engineer will coordinate the requirements of NCGS § 130A-309.215(a)(1) and notify the

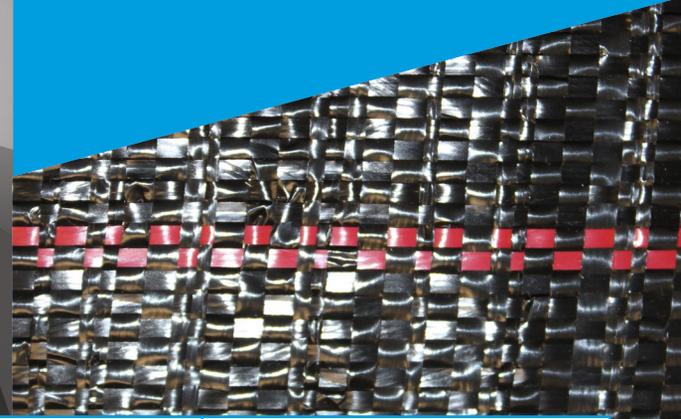
**Appendix B**  
**Product Specifications**



# REINFORCING SUCCESS

**WINFAB 77SF** is manufactured using high tenacity polypropylene yarns that are woven to form a dimensionally stable network, which allows the yarns to maintain their relative position.

**WINFAB 77SF** resists ultraviolet deterioration, rotting, and biological degradation and is inert to commonly encountered soil chemicals. It meets or exceeds the requirements of AASHTO M288 for supported silt fence and ASTM D6461 table 1.



PROPERTY	TEST METHOD	MARV ENGLISH	MARV METRIC
Tensile Strength (Grab)	ASTM D4632	100 x 100 lbs	445 x 445 N
Elongation (Grab)	ASTM D4632	15% x 15%	15% x 15%
Trapezoidal Tear Strength	ASTM D4533	50 x 50 lbs	322.4 x 322.4 N
CBR Puncture	ASTM D6241	250 lbs	1,112.5 N
UV Resistance (500 hrs)	ASTM D4355	80%	80%
Apparent Opening Size*	ASTM D4751	30 US Std. Sieve	0.60 mm
Permittivity	ASTM D4491	.1 sec <sup>-1</sup>	.1 sec <sup>-1</sup>
Water Flow Rate	ASTM D4491	8 gpm/ft <sup>2</sup>	326 lpm/m <sup>2</sup>

\*Maximum Average Roll Valve

PROPERTY	TEST METHOD	TYPICAL ENGLISH	TYPICAL METRIC
Roll Dimensions	Measured	36 in x 3300 yds	.91 m x 3018 m
		36 in x Custom	.91 m x Custom
		42 in x 3300 yds	1.07 m x 3018 m
		42 in x Custom	1.07 m x Custom
		48 in x 3300 yds	1.22 m x 3018 m
		48 in x Custom	1.22 m x Custom

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GEOTEX® 200ST is a woven polypropylene geotextile containing heavy woven flat tape yarns and will meet the following Minimum Average Roll Values (MARV) when tested in accordance with the methods listed below. These characteristics make GEOTEX® 200ST ideal for the construction of embankments over soft soils, steepened slopes, and modular block and/or wrapped-face retaining walls. The geotextile is resistant to ultraviolet degradation and to biological and chemical environments normally found in soils.

GEOTEX® 200ST conforms to the property values listed below<sup>1</sup>. Propex performs internal Manufacturing Quality Control (MQC) tests that have been accredited by the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP). This product is NTPEP tested for AASHTO standards.

PROPERTY	TEST METHOD	MARV <sup>2</sup>	
		ENGLISH	METRIC
<b>MECHANICAL</b>			
Grab Tensile Strength	ASTM D-4632	200 lbs	890 N
Grab Elongation	ASTM D-4632	15%	15%
CBR Puncture	ASTM D-6241	700 lbs	3114 N
Trapezoidal Tear	ASTM D-4533	75 lbs	334 N
<b>ENDURANCE</b>			
UV Resistance at 500 hrs	ASTM D-4355	70%	70%
<b>HYDRAULIC</b>			
Apparent Opening Size (AOS) <sup>3</sup>	ASTM D-4751	40 US Std. Sieve	0.425 mm
Permittivity	ASTM D-4491	0.05 sec <sup>-1</sup>	0.05 sec <sup>-1</sup>
Water Flow Rate	ASTM D-4491	4 gpm/ft <sup>2</sup>	163 l/min/m <sup>2</sup>
ROLL SIZES <sup>4</sup>		12.5 ft x 432 ft	3.81 m x 131.7 m
		15.0 ft x 360 ft	4.57 m x 109.7 m
		17.5 ft x 309 ft	5.33 m x 94.2 m

**NOTES:**

1. The property values listed above are effective 12/17/2018 and are subject to change without notice.
2. Values shown are in weaker principal direction. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported. Values represent testing at time of manufacture.
3. Maximum average roll value.
4. Contact your local Territory Business Manager (TBM) for custom widths and colors. Lead times may vary depending on customer requirements and volume requested.



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# ProGanics™ Biotic Soil Media



**GREEN DESIGN  
ENGINEERING™**  
EARTH-FRIENDLY SOLUTIONS  
FOR SUSTAINABLE RESULTS™

Solutions for your Environment™

## Description

ProGanics™ Biotic Soil Media™ (BSM™) is designed as an alternative to topsoil to accelerate development of depleted soils/substrates with low organic matter, low nutrient levels and limited biological activity. This Engineered Soil Media™ (ESM™) helps unleash soils to their fullest potential for vegetative establishment and more effective erosion control. ProGanics is non-toxic with bark and wood fibers that have been phytosanitized to eliminate potential weed seeds and pathogens - prior to the introduction of soil building components.

## Recommended Applications

- Development of Soils with Low Organic Matter (< 5%)
- Rapid Establishment and Sustained Growth of Vegetation
- Replacement of Costly or Difficult to Obtain Topsoil
- Replacement of Compost, Peat, Manure and Other Sources of Organic Material
- Typically Installed Beneath Hydraulically-applied and Rolled Erosion Control Products (HECPs and RECPs) as Growing Media.

## Soil Building and Revegetation

Mix seed and specified Prescriptive Agronomic Formulations at recommended rates in approved hydraulic seeding/mulching equipment when water has reached approximately 1/3 of the working capacity. Add ProGanics™ Biotic Soil Media at a rate of 100 pounds per 100 gallons of water (45 kg / 379 L) on hydraulic equipment with gear or positive displacement pumps and 75 pounds per 100 gallons of water (34 kg / 379 L) on centrifugal pumps while agitating; add fertilizer when the tank is approximately 3/4 full. Apply over properly prepared surfaces that are deemed geotechnically stable. Confirm specific material loading rates with equipment manufacturer.

## Erosion Control Solution

Apply ProGanics as directed above being sure to include all Prescriptive Agronomic Formulations, fertilizer and seed at their recommended rates. Apply Flexterra® HP-FGM™, ProMatrix™ EFM™, or RECP over ProGanics as directed by manufacturer's recommendation. Follow all manufacturer's product selection guidelines or go to [www.ProfilePS3.com](http://www.ProfilePS3.com) for assistance.

## Technical Data

Physical Properties*	Test Method	Units	Tested Value
Organic Material	ASTM D586	%	≥ 94
Mass/Unit Area	ASTM D6566 <sup>1</sup>	g/m <sup>2</sup> (oz/yd <sup>2</sup> )	≥ 392 (11.6)
Ground Cover	ASTM D6567 <sup>1</sup>	%	≥ 99
Water Holding Capacity	ASTM D7367	%	≥ 900
pH	ASTM D1293	n/a	6.0 ± 1.0
C:N Ratio	ASTM E1508 & EPA Method 1687	n/a	50:1 ± 10
Material Color	Observed	n/a	Brown
Performance Properties*	Test Method	Units	Tested Value
Cover Factor <sup>2</sup>	Large Scale <sup>4,5</sup>	n/a	≤ 0.01
Percent Effectiveness <sup>3</sup>	Large Scale <sup>4,5</sup>	%	≥ 99
Vegetation Establishment	ASTM D7322 <sup>1</sup>	%	≥ 850
Environmental Properties*	Test Method	Units	Tested Value
Ecotoxicity	EPA 2021.0	%	48-hr LC <sub>50</sub> > 100%
Biodegradability	ASTM D5338	n/a	Yes
EPA 503 Metal Pass/Fail <sup>6</sup>	EPA 503 Metal Limits	Pass/Fail	Pass
Pathogen Reduction	40 CFR 503 Class A Compost	Pass/Fail	Pass
Product Composition	Typical Value		
Thermally Processed Bark and Wood Fibers <sup>7</sup> (within a pressurized vessel)	89%		
Proprietary blend of Polysaccharide Polymers, Biochar, Seaweed Extract, Humic Acid, Endomycorrhizae, and Beneficial Bacteria	11%		
Moisture Content	12%		
Properties	Test Method	Units	Nominal Value
Bag Weight	Scale	kg (lb)	22.7 (50)
Bags per Pallet	Observed	#	40

\*When uniformly applied at a rate of 3,500 pounds per acre (3,900 kilograms/hectare) under laboratory conditions. 1. ASTM test methods developed for Rolled Erosion Control Products that have been modified to accommodate Hydraulic Erosion Control Products. 2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface. 3. % Effectiveness = One minus Cover Factor multiplied by 100%. 4. Large scale testing conducted at Utah Water Research Laboratory. For specific testing information please contact a Profile technical service representative at 800-508-8681 or +1-847-215-1144. 5. Performance Property values derived from testing of ProMatrix Engineered Fiber Matrix (EFM) applied at 3,500 pounds per acre (3,900 kilograms/hectare) over ProGanics at an application of 3,500 pounds per acre (3,900 kilograms/hectare). 6. A list of Metals included in the EPA 503 Metal Limits Testing is available upon request. 7. Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa) in order to be Thermally Refined™/Processed and to achieve phyto-sanitization.

## Packaging Data

UV and weather-resistant plastic bags. Pallets are weather-proof stretch wrapped with UV resistant pallet cover.

## Profile Products

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Buffalo Grove, IL 60089  
800-508-8681 or +1-847-215-1144  
[www.profileproducts.com](http://www.profileproducts.com)

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# Flexterra® HP-FGM™

## High Performance Flexible Growth Medium



**GREEN DESIGN  
ENGINEERING™**  
EARTH-FRIENDLY SOLUTIONS  
FOR SUSTAINABLE RESULTS™

Solutions for your Environment™

### Description

Flexterra® HP-FGM™ is a fully biodegradable, High Performance-Flexible Growth Medium (HP-FGM) composed of 100% recycled and Thermally Refined™ wood fibers, crimped interlocking biodegradable fibers, micro-pore granules, naturally derived cross-linked biopolymers and water absorbents. The HP-FGM is phytosanitized, free from weed seeds, free from plastic netting, requires no curing period and upon application forms an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant blanket that allows for rapid germination and accelerated plant growth.

### Recommended Applications

- Erosion control for slopes ranging from mild to severe ( $\leq 0.25H:1V$ )
- Rough graded slopes
- Superior performance over rolled erosion control blankets
- Enhancement of vegetation establishment
- Ideal infill material to create the GreenArmor™ System

### Technical Data

Physical Properties*	Test Method	Units	Tested Value
Mass/Unit Area	ASTM D6566 <sup>1</sup>	g/m <sup>2</sup> (oz/yd <sup>2</sup> )	≥ 390 (11.6)
Thickness	ASTM D6525 <sup>1</sup>	mm (in)	≥ 5.6 (0.22)
Ground Cover	ASTM D6567 <sup>1</sup>	%	≥ 99
Water Holding Capacity	ASTM D7367	%	≥ 1,700
Material Color	Observed	n/a	Green
Performance Properties*	Test Method	Units	Tested Value
Cover Factor <sup>2</sup>	Large Scale <sup>4</sup>	n/a	≤ 0.01
Percent Effectiveness <sup>3</sup>	Large Scale <sup>4</sup>	%	≥ 99
Cure Time	Observed	hours	0 - 2
Vegetation Establishment	ASTM D7322 <sup>1</sup>	%	≥ 800
Functional Longevity <sup>5</sup>	ASTM D5338	months	≤ 18
Environmental Properties*	Test Method	Units	Tested Value
Ecotoxicity	EPA 2021.0	%	48-hr LC <sub>50</sub> > 100%
Effluent Turbidity	Large Scale <sup>4</sup>	NTU	< 250
Biodegradability	ASTM D5338	n/a	Yes
Product Composition			Typical Value
Thermally Processed Wood Fiber <sup>6</sup> (within a pressurized vessel)			80 %
Wetting Agents-including high-viscosity colloidal polysaccharides, cross-linked biopolymers, and water absorbents			10 %
Crimped, Biodegradable Interlocking Fibers			5 %
Micro-Pore Granules			5 %

\* When uniformly applied at a rate of 3500 pounds per acre (3900 kilograms/hectare) under laboratory conditions. 1. ASTM test methods developed for Rolled Erosion Control Products that have been modified to accommodate Hydraulic Erosion Control Products. 2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface. 3. % Effectiveness = One minus Cover Factor multiplied by 100%. 4. Large scale testing conducted at Utah Water Research Laboratory. For specific testing information please contact a Profile technical service representative at 866-325-6262 or +1-847-215-1144. 5. Functional Longevity is the estimated time period, based upon field observations, that a material can be anticipated to provide erosion control and agronomic benefits as influenced by composition, as well as site-specific conditions, including, but not limited to – temperature, moisture, light conditions, soils, biological activity, vegetative establishment and other environmental factors. 6. Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa) in order to be Thermally Refined™/Processed and to achieve phyto-sanitization.

### Packaging Data

Properties	Test Method	Units	Nominal Value
Bag Weight	Scale	kg (lb)	22.7 (50)
Bags per Pallet	Observed	#	40

UV and weather-resistant plastic bags. Pallets are weather-proof stretch wrapped with UV resistant pallet cover.

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**Appendix C**  
**Product Photographs**



Photograph 1: Standard silt fencing



Photograph 2: Super silt fencing

Photographs courtesy of Google Images