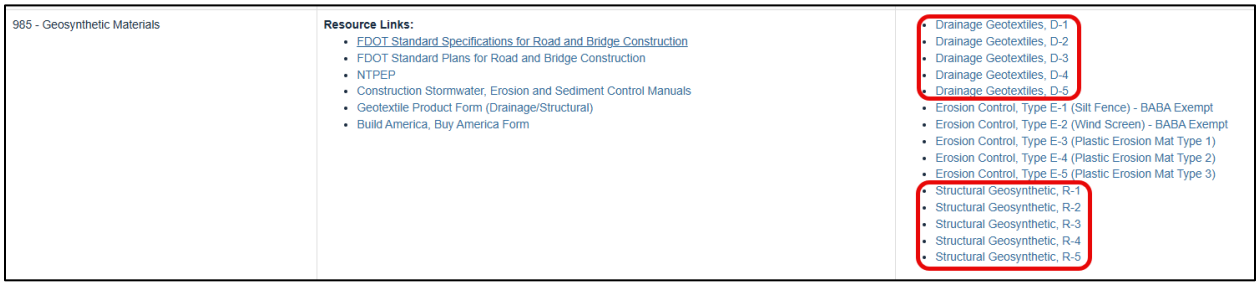
Quick Guide to Selecting Geosynthetic Materials for FDOT Projects

This document is intended to aid in the selection of geosynthetic materials used for drainage and reinforcement on Department projects. For more information on the proper selection of geosynthetic materials, please refer to Sections 145, 514, and 985 of the Standard Specifications for Road and Bridge Construction.

Note: The information provided in this document is for general guidance only and is not intended to replace or modify any existing policies or procedures. Should any discrepancies arise between this document and the Contract Documents, the Contract Documents supersede.

General Information

Approved Products List. All geosynthetic products used on Department projects must be listed on the Department's Approved Product List (APL). The list of all approved products can be found online in the Product Application and Tracking History (PATH) system. Geosynthetic products on the APL are under specification 985 – Geosynthetic Materials. This guide focuses on *Drainage Geotextiles* and *Structural Geosynthetics* under Section 985.



BABA Compliance. FDOT is required to implement the Build America, Buy America Act, Public Law 117-58. This requires federally funded projects to incorporate only domestically produced iron, steel, manufactured products, and construction materials into projects. Geosynthetics falls under the "Construction Materials" category since they are plastic and polymer based. For projects let on or after January 1, 2024, the 2 CFR 184 Guidance and M-24-02 are in effect. Many products changed from "Manufactured Products" to "Construction Materials" classification, per the updated Federal guidance. Therefore, geosynthetics used on federally funded projects let after January 1, 2024 must be BABA Eligible. BABA eligibility is listed on the APL for each product.

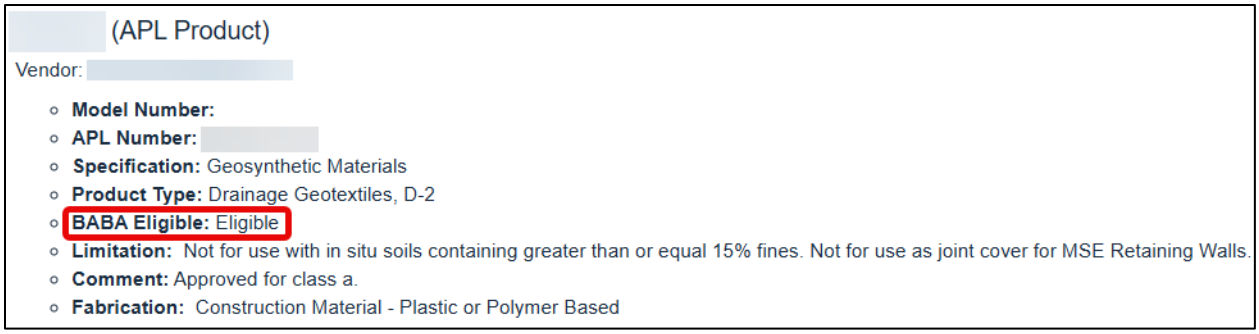


Figure 1. PATH Listing Example

Obtaining Proper Certification Documentation. Once a specific geosynthetic material has been selected that meets the criteria for the application, it is essential to obtain a certification document that meets the Department's requirements. Proper certification shall confirm the product being used is the product chosen and include the roll numbers being used on the jobsite. Acceptable certification documents include any one of the following:

(1) manufacturer's unaltered original certification letter that includes contractor's information, job information, roll numbers, and material properties;
(2) date stamped photos of the labels on the rolls at the jobsite that clearly show the product name, LOT number, and roll number;
(3) or delivery ticket/invoice that clearly shows the product, roll numbers, and the contractor's company/address.

It is important to remember that the certification document serves to ensure that the material selected is the material that is being used on the project.

Note: If the geosynthetic material was purchased from a third party vendor/distributor, this is the company the certification should be obtained from.

Drainage Applications

Drainage geotextiles are divided into five (5) categories based on the intended application: D-1, D-2, D-3, D-4, and D-5 (**Table 1**).

Furthermore, for geotextile types D-1, D-2, and D-3, the products selected must be approved for the class type – **a, b, c, or d** – associated with the onsite soils the geotextile is being used with (**Table 2**). In the case of geotextiles used for MSE wall joint cover, the geotextile must be approved for either class **e** or **f** depending on the type of backfill used for the wall (**Table 2**). This is to ensure the appropriate flow of water through the geotextile to avoid ponding of water and/or increases in pore water pressure and the appropriate filtration/separation of particles to avoid loss of material and/or migration of fines.

Select geotextile(s) based on the following applications:

Table 1. Geotextile Type for Drainage Applications

Geotextile Type	Application
D-1	Revetment (Special)
	Rock, Rubble without bedding stone
	Ditch Pavement (Rubble Riprap) without bedding stone
D-2	Revetment (Standard)
	Articulating Block
	Gabions
	Rock, Rubble, and Broken Concrete with bedding stone
	Ditch Pavement (Rubble Riprap) with bedding stone
	Joint Cover for Mechanically Stabilized Retaining Wall with Coarse Aggregate Backfill
	Joint Cover for Mechanically Stabilized Earth Retaining Wall Supporting Spread Footing Foundations
D-3	Underdrain: Types II, III, and V
	French Drain
	Sheet Piling Filter
	Filter Fabric Jacket (Culvert)
	Box Culvert Joints
	Concrete Pavement Subdrainage
	Joint Cover for Mechanically Stabilized Earth Retaining Wall with Sand or Limerock Backfill
D-4	Slope Pavement
	Ditch Pavement (Sand-Cement Riprap or Concrete)
	Coarse Aggregate Wrap
D-5	Separation Geotextile
	Cast-In-Place Retaining Wall

Table 2. Classes for Geotextile Types D-1, D-2, and D-3

In-situ Soil Type or Drainage Application	Class for D-1, D-2, D-3 Applications
< 15% passing a No. 200 Sieve	a
15% to 50% passing a No. 200 Sieve	b
> 50% passing a No. 200 Sieve	c
> 50% passing a No. 200 Sieve* with Plasticity Index >7	d
MSE Wall Joint Cover for Walls Using Sand or Limerock Backfill	e
MSE Wall Joint Cover for Walls Using Coarse Aggregate Backfill	f

PATH will show the category the geotextile is approved for under *Product Type*. If the material is approved for D-1, D-2, or D-3 applications, the class type (a, b, c, d, e, or f) it is approved for will be listed under *Comment* as shown below (**Figure 2**).

Additionally, any limitations on what materials or applications the product cannot be used with/for will be listed under *Limitation.*

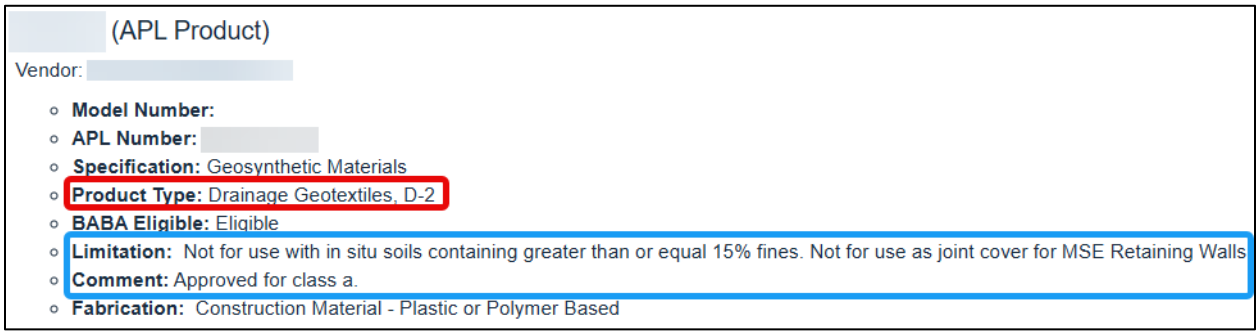


Figure 2. PATH Product Listing Example

Reinforcement and Stabilization Applications

When selecting geosynthetics used for reinforcement, the most important consideration is that the product meets the design requirements. Typically, the project Plans will specify the type of reinforcement geosynthetic and specific properties it must meet. Similar to drainage geotextiles, there are five (5) types of reinforcement geosynthetics; R-1, R-2, R-3, R-4, and R-5; each with specific requirements based on the applications shown in **Table 3** below.

Table 3. Reinforcement and Stabilization Applications

Type	Description
R-1	Geosynthetic Reinforced Soil (GRS-IBS)
R-2	Reinforcement of Foundations over Soft Soils
R-3	Reinforced Soil Slopes
R-4	Reinforced Embankment
R-5	Construction Expedient

Select the geosynthetic type specified in the Contract Documents. Ensure that the material meets the requirements specified (e.g. Tensile Strength @ 2% strain, Flexural Rigidity, etc.).

PROPERTY		REQUIRED TEST METHOD	STRUCTURAL INTEGRITY, DURABILITY
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	BASED ON FDOT APL
Tensile Strength (Lb./Ft.)			
MACHINE DIRECTION	Ultimate (T ult)	ASTM D 6637	1,310
	2% Strain		410
	5% Strain		810
CROSS DIRECTION	Ultimate (T ult)		1,970
	2% Strain		620
	5% Strain		1,340
USE R-2 IF BLACK BASE IS USED, SELECT HEAT TOLERANT GEOSYNTHETIC			

Figure 3. Example of Requirements for Reinforcement Geosynthetic