

## **SECTION 02000**

### **EROSION CONTROL SYSTEMS**

#### **PART I: GENERAL**

##### **1.1 GENERAL REQUIREMENTS**

- A. Requirements for construction and maintenance of erosion and sedimentation systems control and their components.
- B. Requirements for location and extent of the components of erosion and sedimentation systems.

##### **1.2 MEASUREMENT AND PAYMENT**

- A. Unit Prices:
  - 1. No payment will be made for erosion control systems under this Section. Include cost in applicable erosion control measures.
  - 2. Refer to Section 01270 – Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum):
  - 1. If Contract is Stipulated Price Contract, payment for work in this Section shall be included in Total Stipulated Price.

##### **1.3 REFERENCES**

- A. CFTS – City of Friendswood Technical Specifications.
  - 1. Section 01270 – Measurement and Payment.
- B. CFCO – City of Friendswood Code of Ordinances.
- C. EPA – Environmental Protection Agency.
- D. TCEQ – Texas Commission on Environmental Quality.

#### **PART II: PRODUCTS – NOT USED**

**PART III: EXECUTION**

**3.1 GENERAL**

- A. No clearing and grubbing or rough cutting, other than as specifically directed by the Project Manager to allow soil testing and surveying, shall be permitted until erosion and sedimentation control systems are in place.
- B. All equipment and vehicles used on the construction site shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way, easements or areas of construction.
- C. Damages caused by construction traffic to erosion and sedimentation control systems shall be repaired immediately.
- D. Conduct all construction operation under this Contract in conformance with the erosion control practices described in this Technical Specification.

**3.2 EROSION AND SEDIMENTATION CONTROL SYSTEMS REQUIRED FOR CONSTRUCTION OF WATER, SEWER AND DRAINAGE IMPROVEMENTS**

**A. Storm Sewers**

- 1. Inlet protection barriers shall be constructed prior to commencing work, using either a non-woven geotextile filter fabric silt fence or a straw bale silt fence.
- 2. Inlet protection barriers shall be constructed prior to commencing work immediately around each completed or partially completed storm manhole or inlet.
- 3. Contractor shall not leave any storm manhole or inlet unprotected overnight.

**B. Sanitary Sewers**

- 1. Under no circumstances shall unfiltered runoff enter the existing sanitary sewer system during construction.
- 2. Water and sediment removed from any parts of a partially constructed or unaccepted sanitary sewer system shall not be discharged directly into the storm sewer system, unprotected swales or unprotected ditches.

3. Water and sediment shall be discharged into the storm sewer system upstream of inlet protection barriers.

C. Water Distribution System

1. Water used to blow off the system shall be directed to nearby inlets upstream of inlet protection barriers.
2. Water used to blow off the system shall not be directed to existing unprotected swales or unprotected ditches.

- D. Place silt fences on downstream side of construction site when shown on the Drawings or when directed by the Project Manager.

- E. Compact top layer of any stockpiled excavated material that is to be left on site overnight.

- F. Trash pumps shall not discharge directly to any unprotected swale, unprotected ditch or unprotected low lying area.

- G. Trash pumps shall discharge upstream of inlet protection barriers or silt fences.

- H. The Contractor and the Project Manager shall inspect the erosion and sedimentation control system after each rain, daily during periods of prolonged rainfall and at a minimum of once a week regardless of weather.

- I. When damage to sediment control system is discovered, the Contractor shall immediately repair and/or replace damaged components of the system.

- J. The Contractor shall remove sediment deposits when the sediment has accumulated to one-half (1/2) the height of any area along any silt fence.

- K. Cast and spread sediment deposits within the limits of the construction site as directed by the Project Manager.

**3.3 EROSION AND SEDIMENTATION CONTROL SYSTEMS REQUIRED FOR CONSTRUCTION OF PAVING IMPROVEMENTS**

- A. Inlet protection barriers shall either be constructed by the paving contractor, or if inlet protection barriers are already in place, the paving contractor shall accept them for maintenance prior to commencing any

other construction activities.

- B. Place silt fences on downstream side of construction site when shown on the Drawings or when directed by the Project Manager.
- C. Compact top layer of any stockpiled excavated material that is to be left on site overnight.
- D. Trash pumps shall not discharge directly to any unprotected swale, unprotected ditch or unprotected low-lying area.
- E. Trash pumps shall discharge upstream of inlet protection barriers or silt fences.
- F. Before concrete pavement is placed and curb is completed, all previously constructed inlet protection barriers may be adjusted by the paving contractor.
- G. Storm manholes and inlets shall not be left overnight without inlet protection barriers before placement of concrete pavement and curb is completed.
- H. After placement and curing of the concrete curb, silt fences shall be placed behind the curb.
- I. Remove inlet protection barriers only after construction of the silt fences behind the curb or other protective measures are in place.
- J. The Contractor shall not leave any portion of any street unprotected overnight.
- K. The Contractor and the Project Manager shall inspect the erosion and sedimentation control system after each rain, daily during prolonged periods of rainfall and at a minimum of once a week regardless of the weather.
- L. When damage to sediment control system is discovered, the Contractor shall immediately repair and/or replace damaged components of the system.
- M. The Contractor shall remove sediment deposits when the sediment has accumulated to one-half (1/2) the height of any area along any silt fence.
- N. Cast and spread sediment deposits within the limits of the construction site as directed by the Project Manager.

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### 3.4 MAINTENANCE

A. The following applies only when a Storm Water Pollution Prevention Program (SWPPP) has been implemented by the Contractor:

1. Unless otherwise directed by the Project Manager, the Contractor shall be responsible for maintenance of the erosion and sedimentation control system until final acceptance of the or until the paving contractor receives notice to proceed.

2. The Project Manager shall walk through the project with the paving contractor and the Design Professional, and together the three (3) parties will observe each component of the erosion and sedimentation control system and agree that either:

a. Each component in the system is acceptable and the paving contractor shall assume maintenance responsibilities or,

b. List repairs the Contractor must make to each component that is not acceptable before the paving contractor shall assume maintenance responsibilities.

3. When the paving contractor receives notice to proceed, the Contractor is then responsible for maintaining the existing erosion and sedimentation control system provided that either:

a. There are no repairs required by the Contractor or,

b. Repairs to the system have been completed by the Contractor.

4. The paving contractor shall dispose of any component of the system constructed by the Contractor that is not reused in a manner consistent with the purpose of the system.

5. The paving contractor shall continue maintenance of the erosion and sedimentation control system after final acceptance by the City if so directed by the Project Manager and if included in the bid proposal and unit price description.

6. The paving contractor shall dispose of the system the Contractor has constructed, when so directed, by the Project Manager.

- B. When a PPP has not been implemented by the WSD (Water, Sewer and/or Drainage) Contractor, the paving Contractor shall be responsible for constructing and maintaining all components required by the PPP.

### 3.5 DUST CONTROL

- A. Control dust dispersed and movement on construction sites and roads to prevent exposure of soil surfaces, to reduce on and offsite damage, to prevent health hazards, and to improve traffic safety.
- B. Control dust dispersal and movement by utilizing one or more of the following methods:
  1. Mulches bound with chemical binders such as Curasol, Terratack, or equal.
  2. Temporary vegetative cover.
  3. Spray-on adhesives on mineral soils not under traffic loads.
  4. Tillage to roughen surface and bring clods to the surface.
  5. Sprinkling with water to keep top layer moist.
- C. Dust control methods shall be implemented immediately whenever dust can be observed blowing on or off the project site.

**END OF SECTION**

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## **SECTION 02005**

### **FILTER FABRIC SILT FENCE**

#### **PART I: GENERAL**

##### **1.1 GENERAL REQUIREMENTS**

- A. Requirements for the installation, maintenance and removal of erosion and sedimentation control filter fabric silt fence utilized during construction and prior to the final development of the site.

##### **1.2 MEASUREMENT AND PAYMENT**

###### **A. Unit Prices:**

- 1. Payment for filter fabric silt fence shall be on a unit price basis. Unit price includes cost of filter fabric fence, staking poles, ditching, and reinforcing. Maintenance during construction and removal of fence are incidental to installation and there shall be no separate pay for these items.
- 2. Refer to Section 01270 – Measurement and Payment for unit price procedures.

###### **B. Stipulated Price (Lump Sum):**

- 1. If Contract is Stipulated Price Contract, payment for work in this Section shall be included in Total Stipulated Price.

##### **1.3 REFERENCES**

###### **A. ASTM – American Society for Testing and Materials.**

- 1. ASTM D4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

###### **B. CFTS – City of Friendswood Technical Specifications.**

- 1. Section 01270 – Measurement and Payment.
- 2. Section 01330 – Submittal Procedures.
- 3. Section 02000 – Erosion Control Systems.

1.4 SUBMITTALS

- A. Conform to requirements of Section 01330 – Submittal Procedures.

**PART II: PRODUCTS**

2.1 MATERIALS

- A. Material shall be Non-woven Geotextile Filter Fabric:

1. Composed of either:
  - a. Polypropylene material;
  - b. Polyethylene material;
  - c. Ethylene material;
  - d. or Polyamide material.
2. Grab strength shall be at least one hundred pounds (100 Lbs) in any principal direction.
3. Mullen burst strength shall exceed two hundred pounds per square inch (200 psi).
4. Equivalent opening size shall be between fifty gallons per minute per square foot (50 gpm/Sf) and one hundred forty gallons per minute per square foot (140 gpm/Sf).
5. Water flow rate shall be ten gallons per minute per square foot (10 gpm/Sf) at fifty millimeters (50 mm) constant head as determined by multiplying permittivity (in  $\text{sec}^{-1}$ ) as determined by ASTM D4491 by a conversion factor of seventy-four (74).
6. Ultraviolet ray inhibitors and stabilizers shall provide a maximum of six months (6 Mos) of expected usable life at a temperature range of zero degrees Fahrenheit ( $0^{\circ}$  F) to one hundred twenty degrees Fahrenheit ( $120^{\circ}$  F).
7. Ultraviolet radiation stability shall be ninety percent (90%).
8. Fabric reinforced with support netting shall be reinforced with an industrial polypropylene netting with three-quarter inch (3/4 In) spacing and shall also include a heavy duty nylon top support cord.



B. Fence Supports

1. Two inch by two inch (2 In x 2 In) wooden posts three feet (3 Ft) long or equivalent, and field constructed or;
2. Factory pre-assembled with support netting and heavy duty nylon top support cord.

**PART III: EXECUTION**

3.1 GENERAL

- A. Except as otherwise directed or otherwise shown on the Drawings, provide non-woven geotextile filter fabric silt fences to prevent erosion and control sedimentation.
- B. Maintain silt fences until the project is accepted by the City.
- C. At the City's option, silt fences may remain in place after acceptance.
- D. Maintenance and removal of silt fences shall comply with all requirements as specified in Section 02000 – Erosion Control Systems.

3.2 CONSTRUCTION METHODS

- A. Silt fences shall not exceed twenty-four inches (24 In) in height.
- B. Wood posts shall be driven at least twelve inches (12 In) into the ground.
- C. Maximum spacing of wood posts shall be three feet (3 Ft) for field constructed fences and eight feet (8 Ft) for factory pre-assembled silt fences.
- D. Filter fabric shall be stapled using at least one-half inch (1/2 In) staples to the upslope side of the posts.
- E. Anchor the filter fabric by spreading at least eight inches (8 In) of the fabric in a four inch by four inch (4 In x 4 In) trench or a four inch (4 In) deep V-trench on the upslope side of the fence.

**END OF SECTION**

## **SECTION 02010**

### **STRAW BALE FENCE**

#### **PART I: GENERAL**

##### **1.1 GENERAL REQUIREMENTS**

- A. Requirements for the installation of erosion and sedimentation control straw bale fences utilized during construction and prior to the final development of the site.

##### **1.2 MEASUREMENT AND PAYMENT**

###### **A. Unit Prices:**

- 1. Payment for straw bale fence shall be on a unit price basis. Unit price includes cost of straw bale fence, staking poles, ditching, and reinforcing. Maintenance during construction and removal of fence are incidental to installation and there shall be no separate pay for these items.
- 2. Refer to Section 01270 – Measurement and Payment for unit price procedures.

###### **B. Stipulated Price (Lump Sum):**

- 1. If Contract is Stipulated Price Contract, payment for work in this Section shall be included in Total Stipulated Price.

##### **1.3 REFERENCES**

###### **A. CFTS – City of Friendswood Technical Specifications.**

- 1. Section 01270 – Measurement and Payment.
- 2. Section 01330 – Submittal Procedures.
- 3. Section 02000 – Erosion Control Systems.

##### **1.4 SUBMITTALS**

- A. Conform to requirements of Section 01330 – Submittal Procedures.

**PART II: PRODUCTS**

**2.1 STRAW BALES**

- A. Use straw bales bound by either wire, nylon or poly-propylene rope tied across the straw bales.
- B. Do not use straw bales bound with jute, cotton rope or twine.

**2.2 ANCHOR STAKES**

- A. Bales shall be anchored using three-eighths inch (3/8 In) diameter reinforcing steel bars.
- B. Length of bar shall be thickness of straw bale plus two feet (2 Ft).

**PART III: EXECUTION**

**3.1 GENERAL**

- A. Except if otherwise directed or otherwise shown on the Drawings provide straw bale fences to prevent erosion and control sedimentation.
- B. Maintain straw bale fences until the project is accepted by the City.
- C. At City's option, straw bale fences may remain in place after acceptance.
- D. Maintenance and removal of straw bale fences shall comply with all requirements as specified in Section 02000 – Erosion Control Systems.

**3.2 CONSTRUCTION METHODS**

- A. Excavate four inches (4 In) of material to embed each straw bale in the soil.
- B. Anchor bales securely by driving anchor stakes through the bales and at least two feet (2 Ft) into the ground below the bale.
- C. The first (1st) stake in each bale shall be angled toward the previously laid bale to force bales together.
- D. Fill any gaps between bales with straw to prevent unfiltered runoff from escaping between the bales.
- E. Wedge straw in gaps carefully so as not to separate bales.

**END OF SECTION**



## **SECTION 02015**

### **GEOTEXTILE**

#### **PART I: GENERAL**

##### **1.1 GENERAL REQUIREMENTS**

- A. Geotextile, also called filter fabric, in applications including pipe embedment wrap, around exterior of tunnel liner, around foundations of pipeline structures and slope stabilization.

##### **1.2 MEASUREMENT AND PAYMENT**

A. Unit Prices:

1. No separate payment shall be made for work performed under this Section. Include cost of work in unit prices for work requiring geotextile.
2. Refer to Section 01270 – Measurement and Payment for unit price procedures.

B. Stipulated Price (Lump Sum):

1. If Contract is Stipulated Price Contract, payment for work in this Section shall be included in Total Stipulated Price.

##### **1.3 REFERENCES**

A. AASHTO – American Association of State Highway and Transportation Officials.

1. AASHTO M288 – Standard Specification for Geotextile Specification for Highway Applications.

B. ASTM – American Society for Testing and Materials.

1. ASTM D4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
2. ASTM D4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
3. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles (Grab Method).

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4. ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of Geotextiles.
  5. ASTM D4833 – Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.
- C. CFTS – City of Friendswood Technical Specifications.
1. Section 01270 – Measurement and Payment.
  2. Section 01330 – Submittal Procedures.
  3. Section 02000 – Erosion Control Systems.
  4. Section 02125 – Excavation and Backfill for Utilities.

#### 1.4 SUBMITTALS

- A. Conform to requirements of Section 01330 – Submittal Procedures.
- B. Submit standard manufacturer's catalog sheets and other pertinent information, for approval, prior to installation.
- C. Submit installation methods, as part of work plan for tunneling or for excavation and backfill for utilities. Obtain approval from the Project Manager for filter fabric material and proposed installation method prior to use of filter fabric.

### PART II: PRODUCTS

#### 2.1 GEOTEXTILE

- A. Provide geotextile (filter fabric) designed for use in geotechnical applications. Filter fabric shall provide permeable layer or media while retaining soil matrix.
- B. Use fabric which meets physical requirements for Class A subsurface drainage installation conditions as defined in AASHTO M288 and as specified in Paragraph 2.2, Properties.

#### 2.2 PROPERTIES

- A. Material: Nonwoven, nonbiodegradable, fabric consisting of continuous chain polymer filaments or yarns, at least eighty-five percent (85%) by weight polyolefins, polyesters or polyamide, formed into dimensionally

stable network.

- B. Chemical Resistance: Inert to commonly encountered chemicals and hydrocarbons over pH range of three (3) to twelve (12).
- C. Physical Resistance: Resistant to mildew and rot, ultraviolet light exposure, insects and rodents.
- D. Minimum Test Values shall be as specified in TABLE 4.1 – MINIMUM TEST VALUES FOR GEOTEXTILE MATERIAL in this section.

**PART III: EXECUTION**

**3.1 GENERAL**

- A. Maintain geotextiles until the project is accepted by the City.
- B. At City's option, geotextiles may remain in place after acceptance.
- C. Maintenance and removal of geotextiles shall comply with all requirements as specified in Section 02000 – Erosion Control Systems.

**3.2 LINE WORK**

- A. Conform use of geotextile to backfill for utilities to Section 02125 – Excavation and Backfill for Utilities.

**PART IV: TABLES**

**4.1 MINIMUM TEST VALUES FOR GEOTEXTILE MATERIAL**

<b>PROPERTY</b>	<b>VALUE (MIN.)</b>	<b>TEST METHOD</b>
Grab Strength	180 lbs.	ASTM D4632
Trapezoidal Tear Strength	50 lbs.	ASTM D4533
Puncture Strength	80 lbs.	ASTM D4833
Mullen Burst Strength	290 psi.	ASTM D3786
Apparent Opening Size <sup>(1)</sup>	0.25 mm	ASTM D4751
Permittivity (sec <sup>-1</sup> )	0.2	ASTM D4491

<sup>(1)</sup> Maximum average roll value.

**END OF SECTION**

## **SECTION 02020**

### **STABILIZED CONSTRUCTION ACCESS, ROADS, PARKING AND WASH AREAS**

#### **PART I: GENERAL**

##### **1.1 GENERAL REQUIREMENTS**

- A. Section includes requirements for construction, maintenance and removal of stabilized construction access.
- B. Section includes requirements for construction, maintenance and removal of temporary stabilized roads, parking lots and wash areas.

##### **1.2 MEASUREMENT AND PAYMENT**

###### **A. Unit Prices:**

- 1. Payment for stabilized construction access shall be on a unit price basis for each installation.
- 2. Payment for temporary roads and driveways shall be on a unit basis per installation.
- 3. No separate measurement and payment shall be made for temporary parking lots or wash areas.
- 4. No separate measurement and payment shall be made for maintenance or removal or operations listed in this Section.
- 5. Refer to Section 01270 – Measurement and Payment for unit price procedures.

###### **B. Stipulated Price (Lump Sum):**

- 1. If Contract is Stipulated Price Contract, payment for Work in this Section shall be included in Total Stipulated Price.

##### **1.3 REFERENCES**

- A. CFTS – City of Friendswood Technical Specifications.
  - 1. Section 01270 – Measurement and Payment.



2. Section 01330 - Submittal Procedures.
3. Section 01580 – Waste Material Disposal.
4. Section 02000 – Erosion Control Systems.
5. Section 02015 – Geotextile.

- B. EPA – Environmental Protection Agency.
- C. TCEQ – Texas Commission on Environmental Quality.

#### 1.4 SUBMITTALS

- A. Conform to requirements of Section 01330 - Submittal Procedures.

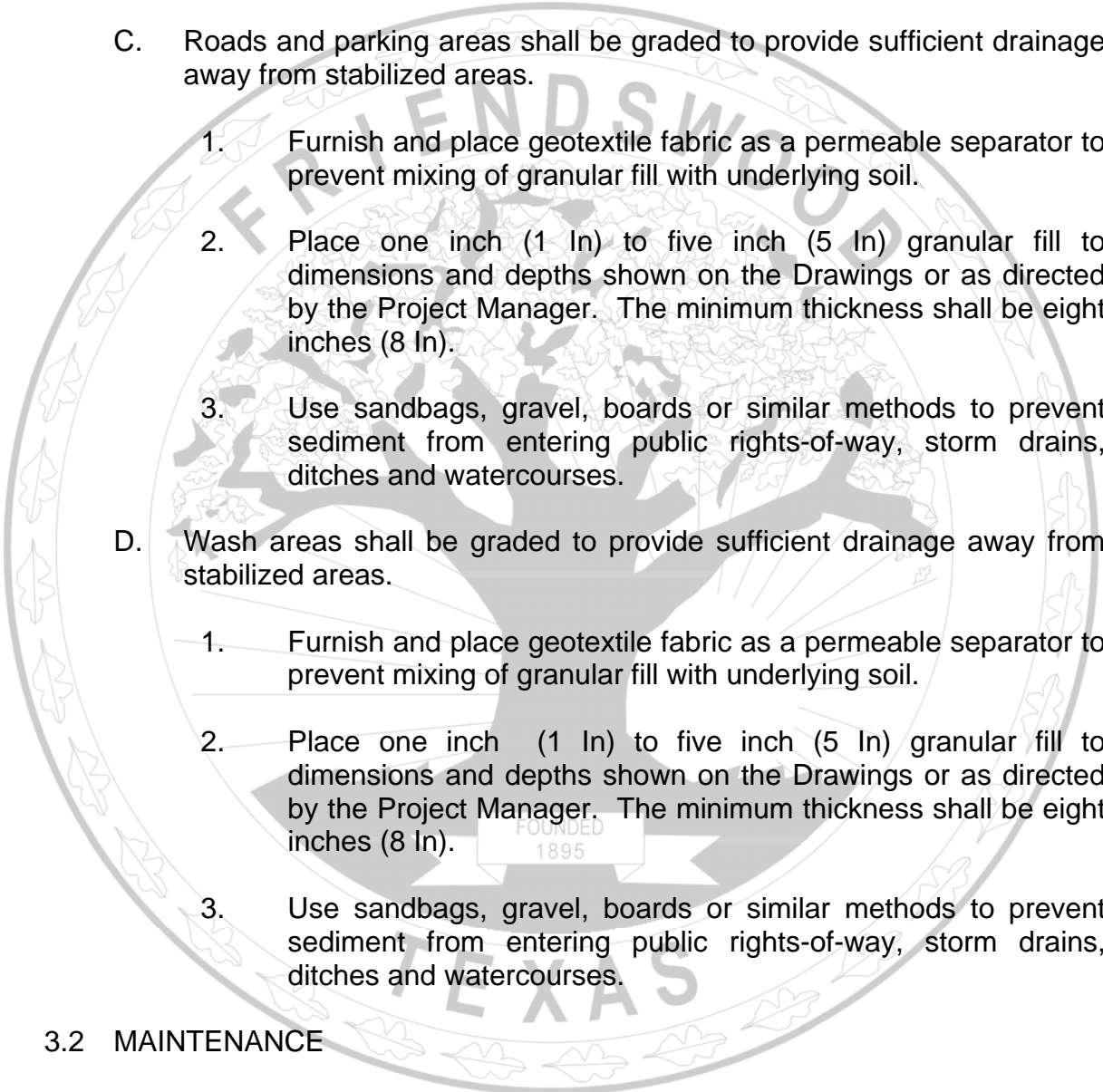
### PART II: PRODUCTS

- A. Permeable separator shall be a geotextile conforming to Section 02015 – Geotextile.
- B. Construction access foundation shall be flexible base, bituminous concrete, cement stabilized base course, portland cement concrete or other material as approved by the Project Manager.
- C. When wood construction entrance/exit is specified in the Drawings they shall conform to the following:
  1. Cross timbers surface shall be treated six inch by six inch (6 In x 6 In) railroad ties a minimum of twenty foot (20 Ft) in length.
  2. Bracing timber planks shall be two inch by ten inch (2 In x 10 In) treated, #2 grade minimum.

### PART III: EXECUTION

#### 3.1 GENERAL

- A. Provide stabilized access, washing areas and/or parking areas at locations shown on the Drawings or as approved by the Project Manager.
- B. Stabilized construction access:
  1. Shall be placed to allow positive drainage from the access to an approved sediment control system.

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2. Shall be a minimum of fifty feet (50 Ft) in length.
  3. Shall have six to one (6:1) approaches on front and back slopes of access containing permeable separator and three inch (3 In) to five inch (5 In) rock with a minimum thickness of eight inches (8 In).
- C. Roads and parking areas shall be graded to provide sufficient drainage away from stabilized areas.
1. Furnish and place geotextile fabric as a permeable separator to prevent mixing of granular fill with underlying soil.
  2. Place one inch (1 In) to five inch (5 In) granular fill to dimensions and depths shown on the Drawings or as directed by the Project Manager. The minimum thickness shall be eight inches (8 In).
  3. Use sandbags, gravel, boards or similar methods to prevent sediment from entering public rights-of-way, storm drains, ditches and watercourses.
- D. Wash areas shall be graded to provide sufficient drainage away from stabilized areas.
1. Furnish and place geotextile fabric as a permeable separator to prevent mixing of granular fill with underlying soil.
  2. Place one inch (1 In) to five inch (5 In) granular fill to dimensions and depths shown on the Drawings or as directed by the Project Manager. The minimum thickness shall be eight inches (8 In).
  3. Use sandbags, gravel, boards or similar methods to prevent sediment from entering public rights-of-way, storm drains, ditches and watercourses.

### 3.2 MAINTENANCE

- A. Inspect and maintain stabilized areas daily. Provide periodic top dressing with additional granular fill as necessary.
- B. Repair or replace components of stabilized access areas that become defective from intended use.
- C. Maintain stabilized access areas as specified in Section 02000 –

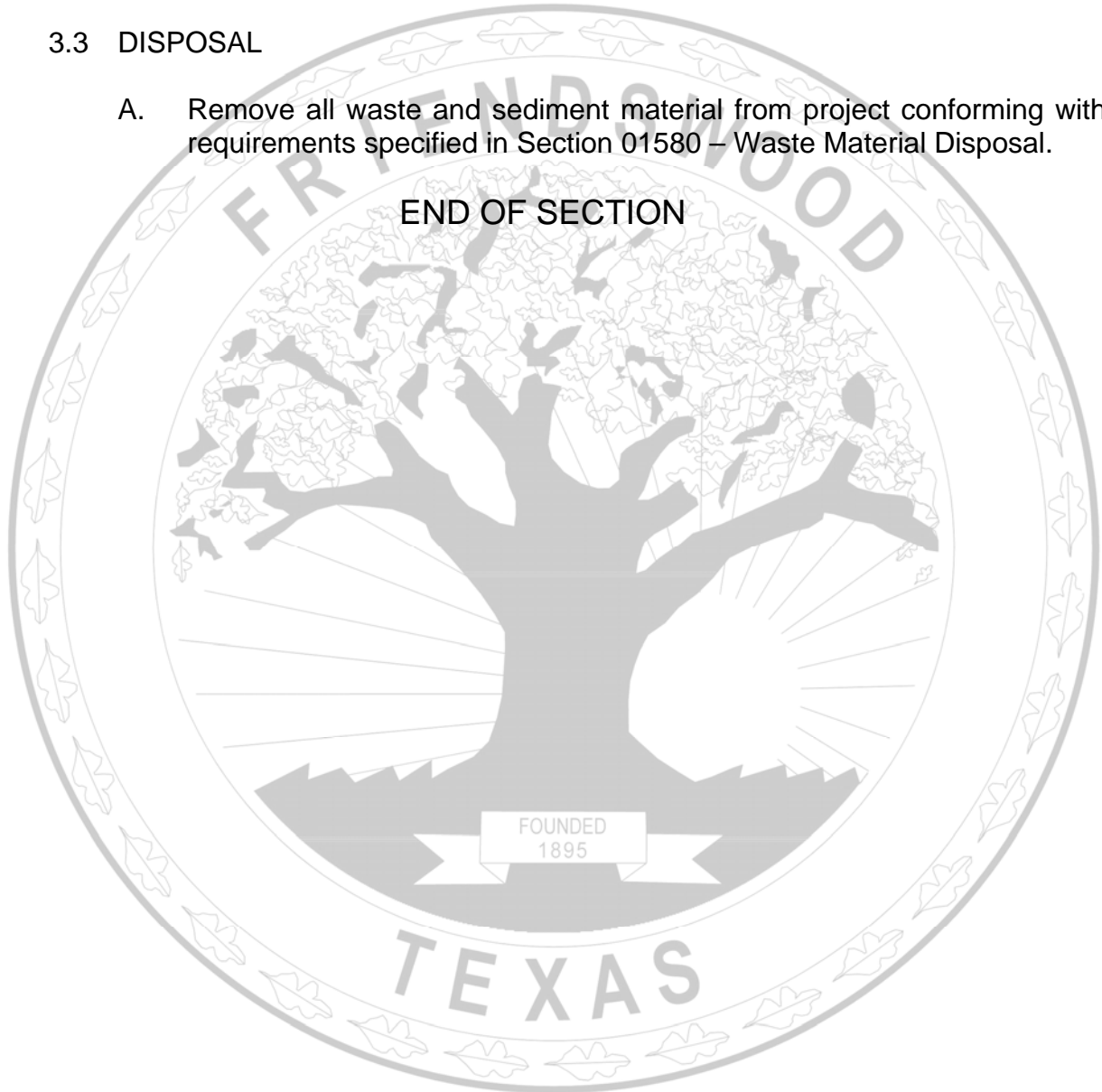
Erosion Control Systems until acceptance of the Project or as directed by the Project Manager.

- D. Remove stabilized access as specified in Section 02000 – Erosion Control Systems promptly when directed by the Project Manager. Restore areas where stabilized construction access was removed to final project grade in preparation of turf establishment by others.

### 3.3 DISPOSAL

- A. Remove all waste and sediment material from project conforming with requirements specified in Section 01580 – Waste Material Disposal.

END OF SECTION



## **SECTION 02025**

### **SANDBAG BARRIERS**

#### **PART I: GENERAL**

##### **1.1 GENERAL REQUIREMENTS**

- A. Requirements for the installation of erosion and sedimentation control installation of erosion and sedimentation control of sandbag barriers, which shall be utilized prior to the final development of the site and during construction.

##### **1.2 MEASUREMENT AND PAYMENT**

A. Unit Prices:

1. Payment for sandbag barrier shall include and be full compensation for all labor, equipment, materials, supervision, and all incidental expenses for construction of these items, complete in place, including, but not limited to, protection of trees, maintenance requirements, repair and replacement of damaged sections, removal of sediment deposits, and removal of erosion and sedimentation control systems at the end of construction.
2. Refer to Section 01270 – Measurement and Payment for unit price procedures.

B. Stipulated Price (Lump Sum):

1. If Contract is Stipulated Price Contract, payment for work in this Section shall be included in Total Stipulated Price.

##### **1.3 REFERENCES**

A. CFTS – City of Friendswood Technical Specifications.

1. Section 01270 – Measurement and Payment.
2. Section 01330 – Submittal Procedures.
3. Section 01560 – Tree and Plant Protection.
4. Section 02000 – Erosion Controls Systems.

1.4 SUBMITTALS

- A. Conform to requirements of Section 01330 – Submittal Procedures.

**PART II: PRODUCTS**

2.1 SANDBAG MATERIAL

- A. Provide woven sandbag material made of polypropylene, polyethylene, or polyamide material. Sandbag material shall have a minimum unit weight of four ounces per square yard (4 Oz/Sy), minimum grab strength of one hundred pounds per square inch (100 psi) in any principal direction (ASTM D4632), Mullen burst strength exceeding three hundred pounds per square inch (300 psi) (ASTM D3786), and ultraviolet stability exceeding seventy percent (70%).

2.2 SANDBAG

- A. Provide sandbag with length approximately eighteen inches (18 In) to twenty-four inches (24 In), width twelve inches (12 In) to eighteen (18 In) inches, and thickness six inches (6 In) to eight inches (8 In). Weight fifty pounds (50 Lbs) to one hundred twenty-five pounds (125 Lbs).

**PART III: EXECUTION**

3.1 GENERAL

- A. Except as otherwise directed or otherwise shown on the Drawings, provide non-woven geotextile filter fabric sandbags to prevent erosion and control sedimentation.
- B. Maintain sandbags until the project is accepted by the City.
- C. At The City's option, sandbags may remain in place after acceptance.
- D. Maintenance and removal of sandbags shall comply with all requirements as specified in Section 02000 – Erosion Control Systems.

3.2 CONSTRUCTION METHODS

- A. Provide sandbag barriers at locations specified on the Drawings. Sandbag barrier systems shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.

- B. Inspect sandbag barrier systems after each rainfall, daily during periods of prolonged rainfall and at a minimum once a week regardless of weather. Repair or replace damaged section immediately to restore the requirements of this Item. Remove sediment deposits when silt reaches one-third of the height of the sandbag in depth.

**END OF SECTION**



## **SECTION 02030**

### **ROCK FILTER DAMS**

#### **PART I: GENERAL**

##### **1.1 GENERAL REQUIREMENTS**

- A. Section includes requirements for furnishing, installing, maintaining and removing rock filter dams.

##### **1.2 MEASUREMENT AND PAYMENT**

A. Unit Prices:

1. Measurement and payment is as noted on the Unit Price Schedule.
2. Refer to Section 01270 – Measurement and Payment for unit price procedures.
3. Geotextile, excavation and disposal, granular fill and reinforcing wire shall not be measured separately.
4. No separate payment shall be made for removal of accumulated sediment. Maintenance and removal and subsequent reinstallation, if required, of the rock filter dam shall be incidental to the cost of the rock filter dam.

B. Stipulated Price (Lump Sum):

1. If Contract is Stipulated Price Contract, payment for work in this Section shall be included in Total Stipulated Price.

##### **1.3 REFERENCES**

A. ASTM – American Society for Testing and Materials.

1. ASTM A975 – Double-Twisted Hexagonal Mesh Gabions and Revet Mattresses (Metallic-Coated Steel Wire or Metallic-Coated Steel Wire with Polyvinyl Chloride (PVC) Coating).

B. CFTS – City of Friendswood Technical Specifications.

1. Section 01270 – Measurement and Payment.

2. Section 01330 – Submittal Procedures.
3. Section 01580 – Waste Material Disposal.
4. Section 02000 – Erosion Control Systems.
5. Section 02015 – Geotextile.
6. Section 02900 – Turf Establishment.

#### 1.4 SUBMITTALS

- A. Refer to Section 01330 – Submittal Procedures.
- B. Submit catalog data and mill certificate for geotextile and catalog data for wire to be used.

### PART II: PRODUCTS

#### 2.1 GRANULAR FILL

- A. Provide granular fill consisting of concrete or stone. Provide granular fill that is dense, durable and hard material.
- B. Provide granular fill, as shown on the Drawings or as directed by the Project Manager, to the following dimensions:
  1. Provide three inch (3 In) to five inch (5 In) granular fill with no material diameter less than three inches (3 In) and no material diameter greater than five inches (5 In).

#### 2.2 WIRE COATING

- A. Style 1 – zinc coated prior to being double twisted into mesh in accordance with ASTM A975.

#### 2.3 WIRE MESH FOR REINFORCEMENT

- A. Provide twenty (20) gauge galvanized double-twisted hexagonal wire mesh and tie wires or as shown on the Construction Plans.

#### 2.4 CONNECTION WIRES AND STIFFENERS

- A. Provide spiral binders, lacing wire and stiffeners made of wire having the same coating material and same wire size as the wire mesh for reinforcement.



**2.5 GEOTEXTILE SEPARATION FABRIC**

- A. Provide a geotextile of woven or spunbond nonwoven fibers consisting of long-chain synthetic polymers composed of at least ninety-five percent (95%) by weight of polyolefins. Provide geotextile fabric equal as specified in TABLE 4.1 – MINIMUM AVERAGE ROLL VALUE and TABLE 4.2 – MAXIMUM AVERAGE ROLL VALUE in this section.
- B. Refer to Section 02015 – Geotextile for storage and handling precautions and requirements.

**PART III: EXECUTION**

**3.1 GENERAL**

- A. Except as otherwise directed or otherwise shown on the Drawings, provide non-woven geotextile filter fabric rock filter dams to prevent erosion and control sedimentation.
- B. Maintain rock filter dams until the project is accepted by the City.
- C. At the City's option, rock filter dams may remain in place after acceptance.
- D. Maintenance and removal of rock filter dams shall comply with all requirements as specified in Section 02000 – Erosion Control Systems.

**3.2 SEDIMENT DISPOSAL**

- A. Refer to Section 01580 – Waste Material Disposal.

**PART IV: TABLES**

**4.1 MINIMUM AVERAGE ROLL VALUE**

<b>MINIMUM AVERAGE ROLL VALUE</b>	
Elongation	< 50 percent
Grab Strength	≥ 200 pounds
Puncture Strength	≥ 75 pounds
UV Stability (retained strength)	≥ 50 percent <sup>1</sup>

<sup>1</sup>After five hundred hours (500 Hrs) of exposure.

**4.2 MAXIMUM AVERAGE ROLL VALUE**

<b>MAXIMUM AVERAGE ROLL VALUE</b>	
Apparent Opening Size	0.212 to 0.6 mm <sup>1</sup>

<sup>1</sup>#70 to #30 US sieve.

**END OF SECTION**

