MODEL SPECIFICATION FOR SUBSURFACE DRAIN SYSTEM

1.0 DESCRIPTION

1.1 This work shall consist of providing and placing a drainage system comprised of a geo-composite, prefabricated, water collection system (collection system) and the associated water transport system (transport pipe) as described in the plans. The drainage system shall be installed in accordance with these specifications and in close conformity with the locations and dimensions as shown on the plans or specified by the engineer. The quantities of drainage system materials as shown on the plans may be increased or decreased at the discretion of the engineer based on actual site conditions that occur during construction of the project. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

2.0 MATERIALS

2.1 The collection system shall be of a flexible, prefabricated, rounded rectangular shaped, composite product, consisting of an inner core described in 2.1.1 and an outer geotextile wrap described in 2.1.2. The outer wrap shall function only as a filter and shall not be a structural component of the core.

2.1.1 The collection system core shall be made of a high-density polyethylene. The core shall be constructed using interconnected corrugated pipes that define and provide the flow channels and structural integrity of the collection system. Perforations shall be evenly distributed on both faces of the core. The core of the collection system shall conform to the following physical property requirements.

Thickness, inches	ASTM D-1777	1.0
Flow Rate, gpm/ft*	ASTM D-4716	29
Compressive Strength, psf	ASTM D-1621 (modified sand method)	6000
Perforations / sq. ft.	---	$\geq$ 300

* At gradient = 0.1, pressure = 10 psi for 100 hours.

2.1.2 The collection system shall be wrapped with a non-woven geotextile. The non-woven wrap shall be of a needle-punched construction consisting of long-chain polymeric fibers composed of polypropylene, polyethylene or polyamide. The fibers shall be oriented into a multi-directional stable network whereby they retain their positions relative with each other and allow the passage of water as specified. The fabric shall be free of any chemical treatment or coating, which reduces permeability and it shall be inert to chemicals commonly found in soil. The geotextile shall conform to the following minimum average roll values.

Weight	ASTM D-3776	4.0
Tensile Strength	ASTM D-4632	100
Elongation %	ASTM D-4632	50
Puncture, lb	ASTM D-751	50
Mullen Burst, psi	ASTM D-3786	200
Trapezoidal Tear, lb	ASTM D-4533	42
Coefficient of Permeability	ASTM D-4491	.1 cm/sec
Flow Rate, gpm/ft2	ASTM D-4491	100
Permittivity, 1/sec	ASTM D-4491	1.8
Apparent Opening Size	ASTM D-4751	70 Max US Std Sieve Opening
Seam Strength, lb/ft	ASTM D-4595	100
Fungus	ASTM G-21	No Growth

2.1.3 Multi-Flow meets or exceeds these specifications.

2.2 The connectors used with the collection system shall be of a snap together design. In no case shall any product be joined without the use of the manufacturer's connector designed specifically for the purpose.

2.3 Transport pipe shall be either PVC pipe meeting the requirements of ASTM D-2729 or ASTM F-949, or high-density polyethylene pipe meeting the requirements of AASHTO M252.2.4

3.0 CONSTRUCTION REQUIREMENTS

3.1 The amount of trench excavated at any time shall not exceed the amount of drain that can be set and backfilled completely in one working day. The trench shall be 4 inches wide and at the depth specified in the plans. The collection system shall be centered in the trench, and backfilled with clean coarse sand or an alternate selected by the engineer. Coarse sand is typically comprised of particles ranging from a # 8 to a # 30 U. S. Standard Sieve.

3.2 The trench excavations for the collection system and transport pipe shall be to the lines and grades shown on the plans. Over excavation in the bottom of the excavation shall be backfilled to the proper grade with excavated material or sand prior to the placement of the collection system.

3.3 The collection system shall be securely connected to the transport pipe using connectors approved by the manufacturer.

3.4 Backfill shall be consolidated in accordance with the plans or as directed by the engineer.

3.5 Any damaged collection system or transport pipe shall be replaced or repaired by splicing in an undamaged section of like material.