

Filtrex[®] Inlet Protection

Sediment & Pollution Control Technology

PURPOSE & DESCRIPTION

Filtrex[®] Inlet protection is a three-dimensional tubular sediment control and storm water runoff filtration device typically used for storm drain **Inlet protection** of sediment and soluble pollutants (such as phosphorus and petroleum hydrocarbons) on and around construction activities. Filtrex[®] Inlet protection traps sediment and soluble pollutants by *filtering* runoff water as it passes through the matrix of the Inlet protection *and* by allowing water to temporarily pond behind the Inlet protection, allowing *deposition* of suspended solids.

APPLICATION

Filtrex[®] Inlet protection has three distinct applications:

- around *drain inlets*,
- in front of *curb inlets*,
- as *curb sediment containment systems*

These applications are described in detail below and shown graphically in Figure 2.1 and 2.2.

Drain inlets are located in areas that receive runoff from surrounding lands, often exposed and disturbed soils, and are located at a low point, or in a sump. Inlet protection used around drain inlets (or *Drain Inlet protection*) should completely enclose the circumference of the drain and where possible should not be placed on a grade or slope. Inlet protection used around drain inlets should never be the only form of site sediment control and should be accompanied by erosion control/slope stabilization practices, such as compost erosion control blankets or rolled erosion control blankets. Inlet protection should never be placed where they divert runoff flow from the drain inlet, or on top of the inlet, which can cause flooding. Under high runoff and sediment loading conditions placement of 1-2 in (25-50 mm) diameter rock (AASHTO #2) may be placed around the outer circumference of the Inlet protection up to

½ the height of the Inlet protection. This will help slow runoff velocity as it contacts the Inlet protection and will reduce sediment build-up and clogging of the Inlet protection.

Curb inlets are generally located on paved surfaces and are designed to rapidly drain storm runoff from roadways to prevent flooding that poses a hazard to vehicular traffic. Inlet protection devices should be placed in a manner which intercepts runoff prior to entering the inlet, but does not block or divert runoff from the inlet. To prevent diversion of runoff, Inlet protection used around curbs (or *Curb Inlet protection*) should be used in low points, or sumps, and minor slopes or grades. Inlet protection should never be placed in or on the curb inlet drain, or placed in a manner that obstructs vehicular traffic. Inlet protection height should be at least 1 in (25 mm) lower than top of curb inlet to allow for overflow into the drain and not over the curb. Maximum sediment removal efficiency occurs when minor ponding exists behind Inlet protection but should never lead to flooding.

Curb sediment containment systems are used to reduce the sediment and pollutant load flowing to



Curb Inlet Protection – Fine Silts Filtration

a curb inlet. They are generally placed on paved surfaces perpendicular to runoff flow and should be lower than the height of the curb. Curb sediment containment systems should never cause flooding or placed where they are a hazard to vehicular traffic. Inlet protection used for curb sediment containment (or *Curb Sediment Containment* Inlet protection) can be placed on a grade but should never be placed directly upslope from curb inlet where it may inadvertently divert runoff from entering curb inlet.

ADVANTAGES AND DISADVANTAGES

Advantages

- Tubular filtration matrix allows for better trapping and removal of sediment and soluble pollutants in storm water runoff compared to planar constructed sediment control devices, such as silt fences.
- Inlet protection can be installed on soil or paved surface conditions.
- Greater surface area contact with soil or pavement than typical sediment control devices, reducing potential for runoff to undercut the device leading to unfiltered sediment.
- No trenching is required; therefore soil is not disturbed upon installation.
- Drain Inlet protection can be installed year-round in difficult soil conditions such as frozen or wet ground, and dense and compacted soils, as long as stakes can be driven.
- Inlet protection is easily implemented as a treatment in a greater treatment train approach to erosion and sediment control.
- Organic matter and humus colloids in FilterMedia™ have the ability to bind and adsorb phosphorus, metals, and hydrocarbons that may

be in storm water runoff.

- Microorganisms in compost FilterMedia™ have the ability to degrade organic pollutants and cycle captured nutrients in storm water runoff.
- Soxx™ (mesh netting containment system) allows Inlet protection to be placed in areas of high sheet flow and low concentrated flow.
- Drain Inlet protection can be direct seeded at time of application to provide greater stability and filtration capability once vegetation is established, if used on soil surface.
- FilterMedia™ is organic and can be left on site soil after permanent stabilization is complete, to be used in landscape design and/or seeded and planted with permanent vegetation.
- FilterMedia™ improves existing soil structure if spread out and used as a soil amendment after construction activity is complete.
- Biodegradable Drain Inlet protection can be left on site after construction activity eliminating the need for removal and labor and disposal costs.
- Inlet protection is available in 8 in (200mm), 12 in (300mm), 18 in (450mm), 24 in (600mm), and 32 in (800mm) diameters.
- Inlet protection may assist in qualification for LEED® Green Building Rating and Certification credits under LEED® New Construction 2.2. Awarded credits may be possible from SS Prerequisite 1, SS Credit 5.1, SS Credit 6.2, WE Credit 2, MR Credit 4.1, MR Credit 4.2, MR Credit 5.1, MR Credit 5.2, and MR Credit 6.

Note: LEED® is an independent program offered through the US Green Building Council. LEED® credits are determined on a per project basis by an independent auditing committee. Filtrex® neither guarantees nor assures LEED® credits from the use of its products.

ADVANTAGES			
	LOW	MED	HIGH
Installation Difficulty	✓		
Sediment Control			✓
Soluble Pollutant Control		✓	
Runoff Flow Control		✓	
Life Cycle Cost	✓		

Disadvantages

- If filler material of Inlet protection is not Certified FilterMedia™, hydraulic flow rate and and/or sediment and pollutant removal performance may be diminished.
- If not installed correctly, maintained or used for a purpose or intention that does not meet specifications, performance may be diminished.
- If land surface is extremely bumpy or rocky ground surface contact to Drain Inlet protection may be diminished thereby adversely effecting performance.
- If Inlet protection is installed on a grade or



slope, runoff may be diverted from drain or inlet, causing flooding downstream.

- If runoff breaches Inlet protection sediment retention will be minimal.
- Incorrect installation or application may cause flooding or pose a hazard to vehicular traffic.
- Inlet protection should never be the only form of site sediment control.
- Inlet protection should only be used in small drainage areas.

MATERIAL SPECIFICATIONS

Inlet protection use only high wear heavy duty netting materials (Safety Soxx[™]) available from Filtrex[®] International, LLC and are the only mesh materials accepted in creating Inlet protection for any application. For Soxx[™] Material Specifications see Table 2.1.



FILTERMEDIA[™] CHARACTERISTICS

Inlet protection use only Certified Filtrex[®] FilterMedia[™] which is a coarse composted material that is specifically designed for removal of solids and soluble pollutants from storm water runoff. *FilterMedia[™] can be altered or customized to target specific pollutants in runoff as approved by the Engineer or Filtrex[®] International.* All Certified Filtrex[®] FilterMedia[™] has been third party tested and certified to meet minimum performance criteria defined by Filtrex[®] International. Performance parameters include hydraulic flow through rate, total solids removal efficiency, total suspended solids removal efficiency, turbidity reduction, nutrient removal efficiency, metals removal efficiency, and motor oil removal efficiency. For information on the physical and chemical properties of Certified FilterMedia[™] refer to Certified FilterMedia[™] Specifications in Appendix 5.25. Look for the Filtrex[®] Certified FilterMedia[™] Seal from our international network of Filtrex[®] Certified[™] Installers.

PERFORMANCE

Performance testing and research on Sediment control has been extensive. For a summary of performance testing, research results, and design specifications see Table 2.2. For copies of publications, full reports, or Tech Link summaries contact Filtrex[®] International, LLC.

Successful bidders will furnish adequate research support showing their manufactured product meets or exceeds performance and design criteria outlined in this standard specification. Research or

performance testing will be accepted if it meets the following criteria: conducted by a neutral third party, utilizes standard test methods reported by ASTM or referenced in a peer reviewed scientific journal, product and control treatments are tested in triplicate, performance results are reported for product and control (control should be a bare soil under the same set of environmental and experimental conditions), results are peer reviewed, results indicate a minimum 60% TSS removal efficiency and a minimum hydraulic flow through rate of 5 gpm/ft². Bidders shall attach a copy of the research report indicating test methodologies utilized and results.

Note: the Contractor is responsible for establishing a working erosion and sediment control system and may, with approval of the Engineer, work outside the minimum construction requirements as needed. Where the Inlet protection deteriorates or fails, it shall be repaired or replaced with an effective alternative.

DESIGN CRITERIA

Inlet protection is used for curb inlet protection and curb sediment containment on paved surfaces by providing a physical barrier that reduces the rate at which sediment-laden runoff water can enter a storm drain. Inlet protection is also used around storm runoff drain inlets on soil surfaces where construction activities are ongoing and soil stabilization and erosion control measures are also employed. Inlet protection allows construction to continue while protecting storm systems from sediment overload. Inlets are normally protected until final vegetation and stabilization is complete, thereby reducing the amount of sediment reaching the storm inlets.

For most standard curb inlet protection applications, an 8 in (200mm) diameter Inlet protection is recommended; for drainage inlets



Drain Inlet Protection



receiving runoff where soils are not stabilized a 12 (300mm) in or 18 in (450mm) Drain Inlet protection may be specified.

For engineering design details of Inlet protection see Figure 2.1 and 2.2. For a summary of specifications for product/practice use, performance and design see Table 2.1 and Table 2.2.

Planning:

Inlet protection using Filtrexx® Inlet protection should not be considered the only form of site sediment control and should be used within an overall integrated Erosion and Sediment Control or Storm Water Pollution Prevention Plan. The blocking of storm drains by the use of Inlet protection should be considered in the overall site planning, especially where ponding water will create disturbances.

Preconstruction meetings should be conducted to educate construction site personnel about the E&SC devices used and acceptable traffic patterns that avoid running over Inlet protection with heavy equipment.

It is possible to drive over Inlet protection during construction (not recommended); however, these areas should be immediately repaired by manually moving Inlet protection back into place, if disturbed. Continued heavy construction traffic may destroy the material fabric, reduce the dimensions, and reduce the effectiveness of the Inlet protection.

Device Function:

The sediment and pollutant removal process characteristic to Inlet protection combines both filtering and deposition of solids. This is different than methods that rely solely on ponding for deposition of solids for sediment control. Ponding occurs when water flowing to the Inlet protection accumulates faster than the hydraulic flow through rate of the Inlet protection. Typically, hydraulic flow-through rates for Inlet protection are **50% greater** than geotextile filter fabric (silt fence). *Greater hydraulic flow-through rates reduce ponding, therefore reducing the need for taller sediment control structural design height.* However, installation and maintenance is especially important for proper function and performance.

Pollutant Removal:

Unlike most inlet protection devices, Inlet protection has been shown to remove pollutants other than total and suspended solids from storm water. Inlet protection has the ability to remove soluble pollutants, such as phosphorus and petroleum hydrocarbons (e.g. motor oil) from entering storm



Before and After Filtration

drains. Additional Filtrexx® products can be added to the Inlet protection to increase removal efficiency of target pollutants such as turbidity, TSS, and soluble phosphorus.

It should be noted that sediment removal efficiency can be near 100% unless runoff breaches the Inlet protection, at which point the effectiveness may be greatly diminished.

Runoff Flow:

Sheet and/or concentrated runoff flow should not exceed the hydraulic flow-through capacity, and ponding depth should not exceed the height, of the Inlet protection. If overflow of the device is a possibility, larger diameter Inlet protection should be specified, other sediment control devices may be used, or management practices to reduce runoff should be implemented. For curb inlets, Inlet protection should not exceed the height of the intake opening. For curb sediment containment, Inlet protection should not exceed the height of the curb.

Level Contour:

Place Inlet protection on level contours to prevent diversion of runoff from storm inlets. Sheet flow of water should be perpendicular to the Inlet protection at impact. If Inlet protection is to be placed on a grade, care should be taken not to divert runoff from storm inlet.

Runoff and Sediment Accumulation:

Where possible, Inlet protection used for drain inlets



should be placed at a 5 ft (1.5m) or greater distance away from the toe of the slope to allow for proper runoff accumulation for sediment deposition and to allow for maximum sediment storage capacity behind the device. If a 5 ft (1.5m) distance is not available, due to construction restrictions, a second Inlet protection may be installed to increase ponding and sediment accumulation capacity.

Vegetated Filter:

For permanent drain inlet applications Inlet protection can be direct-seeded to allow vegetation establishment directly in the device. Vegetation on and around the Inlet protection will assist in slowing runoff velocity which can increase deposition and filtration of pollutants. The option of adding vegetation will be at the discretion of the Engineer. No additional soil amendments or fertilizer are required for vegetation establishment in the drain Inlet protection. The appropriate seed mix shall be determined by the Engineer. This option is not normally available when using the tool on paved areas.

Drainage Area and Spacing:

Maximum drainage area contributing runoff to drain Inlet protection should be no more than 3 acres (1.2 ha). Drainage areas greater than 3 acres (1.2 ha) should implement sediment traps, sediment basins, or runoff reduction practices (KY TC, 2006).

Spacing between Inlet protection used for sediment containment along curbs is dependent on the grade of the roadway and can have an effect on the total sediment load reaching the curb inlet.



INSTALLATION

1. Inlet protection used for inlet protection to reduce sediment and soluble pollutants entering storm drains shall meet Filtrexx® FilterSoxx™ Material Specifications and use Certified Filtrexx® FilterMedia™.
2. Contractor is required to be a Filtrexx® Certified™ Installer as determined by Filtrexx® International, LLC (440-926-2607 or visit website at Filtrexx®.com). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application (current list of installers can be found at www.Filtrexx®.com). Look for the Filtrexx® Certified™ Installer Seal.

3. Filtrexx® Inlet protection shall be placed at locations indicated on plans as directed by the Engineer. Inlet protection should be installed in a pattern that allows complete protection of the inlet area.
4. Installation of curb Inlet protection will ensure a minimal overlap of at least 1 ft (300mm) on either side of the opening being protected. The Inlet protection will be anchored to the soil behind the curb using staples, stakes or other devices capable of holding the Inlet protection in place.
5. Standard Inlet protection for curb inlet protection and curb sediment containment will use 8 in (200mm) diameter Inlet protection, and drain inlets on soil will use 12 in (300mm) or 18 in (450mm) diameter Inlet protection. In severe flow situations, larger Inlet protection may be specified by the Engineer. During curb installation, Inlet protection shall be compacted to be slightly shorter than curb height.
6. If Inlet protection becomes clogged with debris and sediment, they shall be maintained so as to assure proper drainage and water flow into the storm drain. In severe storm events, overflow of the Inlet protection may be acceptable in order to keep the area from flooding.
7. Curb and drain Inlet protection shall be positioned so as to provide a permeable physical barrier to the drain itself, allowing sediment to collect on the outside of the Inlet protection.
8. For drains and inlets that have only curb cuts, without street grates, a spacer is required in order to keep the Inlet protection away from the drain opening. This spacer should be a hog wire screen bent to overlap the grate opening and keep the sock from falling into the opening. Use

Table 2.3 Spacing for Curb Sediment Containment Systems.

Grade (%)	Spacing (ft)	Spacing (mm)
0.5	100	30
1.0	50	15
2.0	25	8
3.0	16	5
4.0	13	4
5.0	10	3

Source: Fifield, 2001.



- at least one spacer for every 4 ft (1.2m) of curb drain opening. The wire grid also prevents other floatable waste from passing over the Inlet protection.
9. Stakes shall be installed through the middle of the Drain Inlet protection on 5 ft (1.5m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) wooden stakes.
 10. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.

INSPECTION

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Inlet protection should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional Inlet protection may be required or sediment removal may be necessary. Inlet protection shall be inspected until contributing drainage area has been permanently stabilized and construction activity has ceased.

MAINTENANCE

1. The Contractor shall maintain the Inlet protection in a functional condition at all times and it shall be routinely inspected.
2. If the Inlet protection has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the Inlet protection when accumulation has reached 1/2 of the effective height of the Inlet protection, or as directed by the Engineer. Alternatively, for drain Inlet protection, a new Soxx™ may be placed on top of the original increasing the sediment storage capacity without soil disturbance.
4. Inlet protection shall be maintained until disturbed area above or around the device has been permanently stabilized and construction activity has ceased.
5. Regular maintenance includes lifting the Inlet protection and cleaning around and under them as sediment collects.
6. The FilterMedia™ will be removed from paved areas or dispersed on site soil or behind curb once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.
7. Permanent vegetated filter strips will be left intact.

DISPOSAL/RECYCLING

Filtrex® FilterMedia™ is an organic, composted product manufactured from locally generated organic, natural, and biologically based materials. Once all soil has been stabilized and construction activity has been completed, the FilterMedia™ may be dispersed with a loader, rake, bulldozer or similar device and may be incorporated into the soil as an amendment or left on the soil surface to aid in permanent seeding or landscaping. Leaving the FilterMedia™ on site reduces removal and disposal costs compared to other sediment control devices. The mesh netting material will be extracted from the FilterMedia™ and disposed of properly by the Contractor. Consequently, the mesh netting material is photodegradable and will decompose in 2 to 5 years if left on site. Biodegradable mesh netting material is available and does not need to be extracted and disposed of, as it will completely decompose in approximately 6 months. Using biodegradable Inlet protection completely eliminates the need and cost of removal and disposal.

METHOD OF MEASUREMENT

Bid items shall show measurement as 'X in (X mm) Filtrex® Inlet protection' per linear ft (linear meter) installed, per inlet, or as specified by the Engineer. Engineer shall notify Filtrex® of location, description, and details of project prior to the bidding process so that Filtrex® can provide design aid and technical support.

REFERENCES CITED & ADDITIONAL RESOURCES

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Faucette, L.B., N. Strazar, A. Marks. 2006. Filtrexx® Polymer and Flocculent Guide. Filtrexx® Library #601.

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ADDITIONAL INFORMATION

For other references on this topic, including trade magazine and press coverage, visit the Filtrexx® Website at: <http://www.filtrexx.com/resourcespress.htm>

For research reports not included in the Appendix, visit: <http://www.filtrexx.com/resourcesreports.htm>

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TABLES & FIGURES:

Table 2.1. Filtrex® Soxx™ Material Specifications.

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Multi-Filament Polypropylene "SafetySoxx™"
Material Characteristic	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Design Diameters	5 in (125mm), 8 in (200mm), 12 in (300mm), 18 in (400mm)	5 in (125mm), 8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm)	8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm)	8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm)	8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm)
Mesh Opening	3/8 in (10mm)	3/8 in (10mm)	3/8 in (10mm)	3/8 in (10mm)	1/8 in (3mm)
Tensile Strength	ND	26 psi (1.83 kg/cm2)	26 psi (1.83 kg/cm2)	44 psi (3.09 kg/cm2)	202 psi (14.2 kg/cm2)*
% Original Strength from Ultraviolet Exposure (ASTM G-155)	23% at 1000 hr	23% at 1000 hr	ND	100% at 1000 hr	100% at 1000 hr
Functional Longevity/ Project Duration	6 mo-2 yr	9 mo-3 yr	6-12 months	1-4 yr	2-5 yr

*Tested at Texas Transportation Institute/Texas A&M University (ASTM 5035-95).

Table 2.2. Filtrex® Inlet Protection Performance and Design Specifications Summary.

Design Diameter	8 in (200mm)	12 in (300mm)	18 in (450mm)	24 in (600mm)	32 in (800mm)	Testing Lab/ Reference	Publication(s)
Design & Performance							
Effective Height	6.5 in (160mm)	9.5 in (240mm)	14.5 in (360mm)	19 in (480mm)	26 in (650mm)	The Ohio State University, Ohio Agricultural Research and Development Center	Transactions of the American Society of Agricultural & Biological Engineers, 2006
Effective Circumference	25 in (630mm)	38 in (960mm)	57 in (1450mm)	75 in (1900mm)	100 in (2500mm)		
Density (when filled)	13 lbs/ft (20 kg/m)	32 lbs/ft (50 kg/m)	67 lbs/ft (100 kg/m)	133 lbs/ft (200 kg/m)	200 lbs/ft (300 kg/m)	Soil Control Lab, Inc	
Air Space	20%	20%	20%	20%	20%	Soil Control Lab, Inc	
Maximum continuous length	unlimited	unlimited	unlimited	unlimited	unlimited		
Staking Requirement	10 ft (3m)	10 ft (3m)	10 ft (3m)	10 ft (3m)	10 ft (3m)		
Maintenance Requirement (sediment accumulation removal at X height)	3.25 in (80mm)	4.75 in (120mm)	7.25 in (180mm)	9.5 in (240mm)	13 in (325mm)		

(continued on next page)



Table 2.2. Filtrex® Inlet Protection Performance and Design Specifications Summary. *(continued)*

Initial Maintenance Requirement based on Rainfall-Runoff*	22 in (55 cm); 1109 L/linear m	32 in (80 cm); 1388 L/linear m	42 in (105 cm); 1825 L/linear m	64 in (160 cm); 2776 L/linear m	86 in (215 cm); 3885 L/linear m	The University of Georgia & Auburn University	
Functional Longevity**	2 – 5 yr	2 – 5 yr	2 – 5 yr	2 – 5 yr	2 – 5 yr		
Maximum Slope Length (<2%)	600 ft (183m)	750 ft (229m)	1000 ft (305m)	1300 ft (396m)	1650 ft (500m)	The Ohio State University, Ohio Agricultural Research and Development Center	Filtrex® Design Tool™, Filtrex® Library #301, Filtrex® Tech Link #3304 & #3311
Hydraulic Flow Through Rate	7.5 gpm/ft (94 L/min/m)	11.3 gpm/ft (141 L/min/m)	15.0 gpm/ft (188 L/min/m)	22.5 gpm/ft (281 L/min/m)	30.0 gpm/ft (374 L/min/m)	The Ohio State University, Ohio Agricultural Research and Development Center; University of Guelph, School of Engineering/ Watershed Research Group	Filtrex® Tech Link #3311 & #3313, #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006, Second Interagency Conference on Research in Watersheds, 2006
P Factor (RUSLE)	0.1-0.32	0.1-0.32	0.1-0.32	0.1-0.32	0.1-0.32	USDA ARS Environmental Quality Lab/ University of Georgia	American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006
Sediment Storage Capacity***	174 cu. in (2850cc)	396 cu. in (6490cc)	857 cu. in (14040cc)	1631 cu. in (26840cc)	2647 cu. in (43377 cc)		Filtrex® Tech Link #3314
Total Solids Removal	98%	98%	98%	98%	98%	Soil Control Lab, Inc	International Erosion Control Association, 2006
Total Suspended Solids Removal	78%	78%	78%	78%	78%	USDA ARS Environmental Quality Lab	Filtrex® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006
Turbidity Reduction	63%	63%	63%	63%	63%	USDA ARS Environmental Quality Lab	Filtrex® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006



Table 2.2. Filtrexx® Inlet Protection Performance and Design Specifications Summary. *(continued)*

Clay (<0.002mm) Removal	65%	65%	65%	65%	65%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Silt (0.002-0.05mm) Removal	64%	64%	64%	64%	64%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
TSS Removal w/PAM	97%	97%	97%	97%	97%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006
TSS Removal w/ Flocculent	97%	97%	97%	97%	97%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006
Turbidity Reduction w/PAM	98%	98%	98%	98%	98%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006
Turbidity Reduction w/ Flocculent	94%	94%	94%	94%	94%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006
Total Phosphorus Removal	34%	34%	34%	34%	34%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006

(continued on next page)

Table 2.2. Filtrexx® Inlet Protection Performance and Design Specifications Summary. *(continued)*

Reactive Phosphorus Removal	38%	38%	38%	38%	38%	USDA ARS Environmental Quality Lab	American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006
Total Phosphorus Removal w/ Nutrient Agent	60%	60%	60%	60%	60%	USDA ARS Environmental Quality Lab	American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006
Reactive Phosphorus Removal w/ Nutrient Agent	99%	99%	99%	99%	99%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006
Nitrate-N Removal	25%	25%	25%	25%	25%	USDA ARS Environmental Quality Lab	American Society of Agricultural & Biological Engineers Meeting Proceedings , 2006
Ammonium-N Removal	15%	15%	15%	15%	15%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Ammonium-N Removal w/ Nutrient Agent	33%	33%	33%	33%	33%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Motor Oil Removal w/ Hydrocarbon Agent	99%	99%	99%	99%	99%	USDA ARS Environmental Quality Lab	International Erosion Control Association, 2006
Diesel Fuel Removal w/ Hydrocarbon Agent	99%	99%	99%	99%	99%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Gasoline Removal w/ Hydrocarbon Agent	54%	54%	54%	54%	54%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Cadmium (Cd) Removal w/ Heavy Metal Agent	73%	73%	73%	73%	73%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Chromium (Cr) Removal w/ Heavy Metal Agent	47%	47%	47%	47%	47%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Copper (Cu) Removal w/ Heavy Metal Agent	70%	70%	70%	70%	70%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link



Table 2.2. Filtrexx® Inlet Protection Performance and Design Specifications Summary. *(continued)*

Nickel (Ni) Removal w/ Heavy Metal Agent	69%	69%	69%	69%	69%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Lead (Pb) Removal w/ Heavy Metal Agent	73%	73%	73%	73%	73%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Zinc (Zn) Removal w/ Heavy Metal Agent	53%	53%	53%	53%	53%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Iron (Fe) Removal	22%	22%	22%	22%	22%	Soil Control Lab, Inc	
Manganese (Mn) Removal	8%	8%	8%	8%	8%	Soil Control Lab, Inc	
Total coliform Removal	67%	67%	67%	67%	67%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
E. coli Removal	67%	67%	67%	67%	67%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Enterococcus Removal	47%	47%	47%	47%	47%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
E. coli Removal w/ Bacteria Agent	98%	98%	98%	98%	98%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Fecal coliform Removal w/ Bacteria Agent	98%	98%	98%	98%	98%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Enterococcus Removal w/ Bacteria Agent	91%	91%	91%	91%	91%	USDA ARS Environmental Quality Lab	Filtrexx® Tech Link
Other Recommended Uses	Inlet Protection, Ditch Protection, Slope Interruption	Inlet protection, Ditch Protection, Concrete Washout, Filtration System, Slope Interruption	Ditch Protection, Concrete Washout, Filtration System	Ditch Protection, Concrete Washout, Filtration System	Ditch Protection, Concrete Washout, Filtration System		

* Based on rainfall intensity of 12.5 cm (5 in)/hr applied to a bare clay loam soil at a 10% slope; runoff flow rate of 108 ml/sec/linear m (0.52 gpm/linear ft); and mean runoff volume of 230 L/m² (6.3 g/ft²).

** Functional Longevity is dependent on UV exposure, freeze/thaw frequency, region of US/Canada, runoff-sediment frequency/duration/loading, and adherence to specified maintenance requirement.

*** Sediment Storage Capacity = sediment accumulation behind (directly upslope) + within the device.



Figure 2.1. Engineering Design Drawing for Curb and Drain Inlet Protection

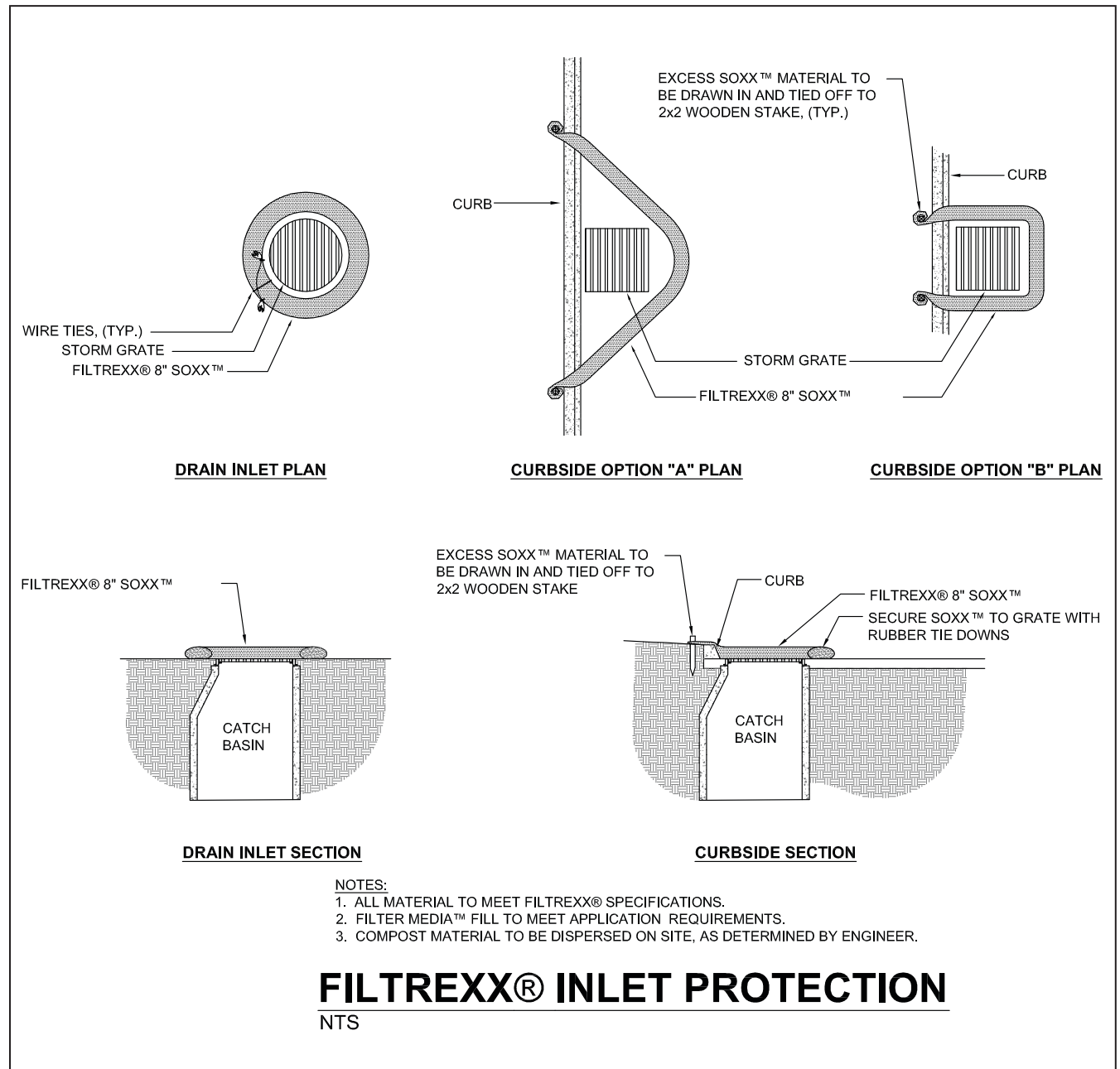


Figure 2.2. Engineering Design Drawing for Curb Sediment Containment Inlet Protection

