

*RESULTS*

**STORMWATER MANAGEMENT  
DESIGN REPORT**

**FOR**

**WEST CHESTER  
CHURCH OF THE NAZARENE  
AND  
VARIOUS  
SURROUNDING PROPERTIES  
(W00521)**

**WEST CHESTER TOWNSHIP  
BUTLER COUNTY, OHIO**

January 24, 2016

*Evans*

CivilPro

Engineers, LLC  
Consulting Engineers & Surveyors

4700 Duke Drive, Suite 100  
MASON, OHIO 45040  
(513) 398-1728

**RECEIVED**  
JAN 25 2016  
BY: \_\_\_\_\_



**Modified Ex Pond with addition of Areas D, C4 & C4.1**

Adjusted Areas	Say ICPR Acres	Average (sq ft)	Depth (ft)	Volume (cu ft)	Cumulative Volume (cu ft)	Say ICPR Acres	Reduction due to pond slope	Say ICPR Acres with fluff	Actual Mod Area
78,844	1.8100				872	1.8100	5115	1.6926	-0.05874
81,893	1.8800	80,368	0.8	64,295	872.8	1.8800	0	1.7660	-0.05859
82,328	1.8900	82,111	0.2	16,422	873	1.8900	4950	1.7764	-0.05155
125,017	2.8700	103,673	1.0	103,673	874	2.8700	5400	2.7460	-0.02803
155,074	3.5600	140,045	1.0	140,045	875	3.5600	5160	3.4415	-0.00734
168,142	3.8600	161,608	1.0	161,608	876	3.8600	4620	3.7539	0.020808
172,933	3.9700	170,537	0.7	122,787	876.72	3.9700	0	3.8720	0.030422
174,676	4.0100	173,804	0.3	48,665	877	4.0100	4050	3.9170	0.038829
181,645	4.1700	178,160	1.0	178,160	878	4.1700	3450	4.0908	0.051419
187,744	4.3100	184,694	1.0	184,694	879	4.3100	2820	4.2453	0.072851
190,357	4.3700	189,050	0.4	68,058	879.36	4.3700	0	4.3100	0.073623
194,278	4.4600	192,317	0.6	123,083	880	4.4600	2205	4.4094	0.092617
Total Volume (sf) =					<b>1,211,491</b>				
Ac-ft =					<b>27.81</b>				

W00521 \_ Ex Mod & D+C4-C4.1 \_ OUTPUT SUMMARY - 241.8 ac Inflow at CN 78.3 -68.5 ac Future  
 and Kroger slope and 1.4 ac 2016-01-22 modified weir per Ex shots

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Max Stage ft	Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
A-011	BASE	001	0.00	872.00	872.00	0.0000	13	13.57	30	0.00	0
A-011	BASE	002	0.00	872.00	872.00	0.0000	13	13.38	54	0.00	0
A-011	BASE	005	0.00	872.00	872.00	0.0000	13	13.28	85	0.00	0
A-011	BASE	010	0.00	872.00	872.00	0.0000	13	13.22	115	0.00	0
A-011	BASE	025	0.00	872.00	872.00	0.0000	13	13.12	175	0.00	0
A-011	BASE	050	0.00	872.00	872.00	0.0000	13	13.00	238	0.00	0
A-011	BASE	100	0.00	872.00	872.00	0.0000	13	12.95	313	0.00	0
A-012	BASE	001	13.57	874.41	880.00	0.0050	132240	12.58	81	13.57	30
A-012	BASE	002	13.38	875.12	880.00	0.0050	151652	12.58	128	13.38	54
A-012	BASE	005	13.28	875.98	880.00	0.0050	163280	12.50	189	13.28	85
A-012	BASE	010	13.22	876.65	880.00	-0.0050	168324	12.50	242	13.22	115
A-012	BASE	025	13.09	877.49	880.00	0.0050	174544	12.50	319	13.12	175
A-012	BASE	050	13.00	878.10	880.00	0.0050	178894	12.50	389	13.00	238
A-012	BASE	100	12.95	878.71	880.00	0.0050	183212	12.50	472	12.95	313

W00521 Basin WSE 872.00 9" Orifice  
 2016-01-22

W00521 \_ Ex Mod & D+C4-C4.1 \_ OUTPUT SUMMARY - 241.8 ac Inflow at CN 78.3 -68.5 ac Future and Kroger slope and 1.4 ac 2016-01-22 modified weir per Ex shots

---

Execute: Yes            Restart: No            Patch: No  
Alternative: No

Max Delta Z(ft): 1.00            Delta Z Factor: 0.00500  
Time Step Optimizer: 10.000      End Time(hrs): 24.00  
Start Time(hrs): 0.000            Max Calc Time(sec): 60.0000  
Min Calc Time(sec): 0.5000        Boundary Flows:  
Boundary Stages:

Time(hrs)            Print Inc(min)  
-----  
24.000                15.000

Group                Run  
-----  
BASE                  Yes

---

Name: 100                    Hydrology Sim: 100  
Filename: P:\Car-2e\Calculations\SWM\ICPR\100.I32

Execute: Yes            Restart: No            Patch: No  
Alternative: No

Max Delta Z(ft): 1.00            Delta Z Factor: 0.00500  
Time Step Optimizer: 10.000      End Time(hrs): 24.00  
Start Time(hrs): 0.000            Max Calc Time(sec): 60.0000  
Min Calc Time(sec): 0.5000        Boundary Flows:  
Boundary Stages:

Time(hrs)            Print Inc(min)  
-----  
24.000                15.000

Group                Run  
-----  
BASE                  Yes

---

W00521 Basin WSE 872.00 9" Orifice  
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---

Group	Run
-----	-----
BASE	Yes

---

Name: 010	Hydrology Sim: 010	
Filename: P:\Car-2e\Calculations\SWM\ICPR\010.I32		
Execute: Yes	Restart: No	Patch: No
Alternative: No		
Max Delta Z(ft): 1.00	Delta Z Factor: 0.00500	
Time Step Optimizer: 10.000		
Start Time(hrs): 0.000	End Time(hrs): 24.00	
Min Calc Time(sec): 0.5000	Max Calc Time(sec): 60.0000	
Boundary Stages:	Boundary Flows:	

Time(hrs)	Print Inc(min)
-----	-----
24.000	15.000

Group	Run
-----	-----
BASE	Yes

---

Name: 025	Hydrology Sim: 025	
Filename: P:\Car-2e\Calculations\SWM\ICPR\025.I32		
Execute: Yes	Restart: No	Patch: No
Alternative: No		
Max Delta Z(ft): 1.00	Delta Z Factor: 0.00500	
Time Step Optimizer: 10.000		
Start Time(hrs): 0.000	End Time(hrs): 24.00	
Min Calc Time(sec): 0.5000	Max Calc Time(sec): 60.0000	
Boundary Stages:	Boundary Flows:	

Time(hrs)	Print Inc(min)
-----	-----
24.000	15.000

Group	Run
-----	-----
BASE	Yes

---

Name: 050	Hydrology Sim: 050
Filename: P:\Car-2e\Calculations\SWM\ICPR\050.I32	

W00521 Basin WSE 872.00 9" Orifice  
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---

Start Time(hrs): 0.000	End Time(hrs): 24.00
Min Calc Time(sec): 0.5000	Max Calc Time(sec): 60.0000
Boundary Stages:	Boundary Flows:

Time(hrs)	Print Inc(min)
24.000	15.000
Group	Run
BASE	Yes

---

Name: 002	Hydrology Sim: 002	
Filename: P:\Car-2e\Calculations\SWM\ICPR\002.I32		
Execute: Yes	Restart: No	Patch: No
Alternative: No		
Max Delta Z(ft): 1.00	Delta Z Factor: 0.00500	
Time Step Optimizer: 10.000		
Start Time(hrs): 0.000	End Time(hrs): 24.00	
Min Calc Time(sec): 0.5000	Max Calc Time(sec): 60.0000	
Boundary Stages:	Boundary Flows:	

Time(hrs)	Print Inc(min)
24.000	15.000
Group	Run
BASE	Yes

---

Name: 005	Hydrology Sim: 005	
Filename: P:\Car-2e\Calculations\SWM\ICPR\005.I32		
Execute: Yes	Restart: No	Patch: No
Alternative: No		
Max Delta Z(ft): 1.00	Delta Z Factor: 0.00500	
Time Step Optimizer: 10.000		
Start Time(hrs): 0.000	End Time(hrs): 24.00	
Min Calc Time(sec): 0.5000	Max Calc Time(sec): 60.0000	
Boundary Stages:	Boundary Flows:	

Time(hrs)	Print Inc(min)
24.000	15.000

---

W00521 Basin WSE 872.00 9" Orifice  
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W00521 \_ Ex Mod & D+C4-C4.1 \_ OUTPUT SUMMARY - 241.8 ac Inflow at CN 78.3 -68.5 ac Future  
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Rainfall Amount(in): 3.99

Time(hrs)	Print Inc(min)
24.000	5.00

-----  
Name: 025  
Filename: P:\Car-2e\Calculations\SWM\ICPR\025.R32

Override Defaults: Yes  
Storm Duration(hrs): 24.00  
Rainfall File: Scsii-24  
Rainfall Amount(in): 4.70

Time(hrs)	Print Inc(min)
24.000	5.00

-----  
Name: 050  
Filename: P:\Car-2e\Calculations\SWM\ICPR\050.R32

Override Defaults: Yes  
Storm Duration(hrs): 24.00  
Rainfall File: Scsii-24  
Rainfall Amount(in): 5.32

Time(hrs)	Print Inc(min)
24.000	5.00

-----  
Name: 100  
Filename: P:\Car-2e\Calculations\SWM\ICPR\100.R32

Override Defaults: Yes  
Storm Duration(hrs): 24.00  
Rainfall File: Scsii-24  
Rainfall Amount(in): 6.04

Time(hrs)	Print Inc(min)
24.000	5.00

=====  
==== Routing Simulations =====  
=====

Name: 001                      Hydrology Sim: 001  
Filename: P:\Car-2e\Calculations\SWM\ICPR\001.I32  
  
Execute: Yes                  Restart: No                  Patch: No  
Alternative: No  
  
Max Delta Z(ft): 1.00                  Delta Z Factor: 0.00500  
Time Step Optimizer: 10.000

---

W00521 Basin WSE 872.00 9" Orifice  
2016-01-22



TABLE

Bottom Clip(in): 0.000  
Top Clip(in): 0.000  
Weir Discharge Coef: 3.200  
Orifice Discharge Coef: 0.600

=====  
=== Hydrology Simulations ===  
=====

Name: 001  
Filename: P:\Car-2e\Calculations\SWM\ICPR\001.R32

Override Defaults: Yes  
Storm Duration(hrs): 24.00  
Rainfall File: Scsii-24  
Rainfall Amount(in): 2.33

Time(hrs)	Print Inc(min)
24.000	5.00

Name: 002  
Filename: P:\Car-2e\Calculations\SWM\ICPR\002.R32

Override Defaults: Yes  
Storm Duration(hrs): 24.00  
Rainfall File: Scsii-24  
Rainfall Amount(in): 2.86

Time(hrs)	Print Inc(min)
24.000	5.00

Name: 005  
Filename: P:\Car-2e\Calculations\SWM\ICPR\005.R32

Override Defaults: Yes  
Storm Duration(hrs): 24.00  
Rainfall File: Scsii-24  
Rainfall Amount(in): 3.49

Time(hrs)	Print Inc(min)
24.000	5.00

Name: 010  
Filename: P:\Car-2e\Calculations\SWM\ICPR\010.R32

Override Defaults: Yes  
Storm Duration(hrs): 24.00  
Rainfall File: Scsii-24

W00521 Basin WSE 872.00 9" Orifice  
2016-01-22

```
=====
Name: Culvert          From Node: A-012      Length(ft): 75.00
Group: BASE           To Node: A-011      Count: 1
                        UPSTREAM    DOWNSTREAM
                        Geometry: Horz Ellipse Horz Ellipse
Span(in): 81.00       81.00
Rise(in): 60.00       60.00
Invert(ft): 872.800   872.420
Manning's N: 0.013000 0.013000
Top Clip(in): 0.000   0.000
Bot Clip(in): 0.000   0.000
Friction Equation: Automatic
Solution Algorithm: Most Restrictive
Flow: Both
Entrance Loss Coef: 0.00
Exit Loss Coef: 1.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None
=====
```

Upstream FHWA Inlet Edge Description:  
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:  
Horizontal Ellipse Concrete: Square edge with headwall

```
=====
=== Weirs ===
=====
```

```
Name: A-011W1          From Node: A-012
Group: BASE           To Node: A-011
Flow: Both            Count: 1
Type: Vertical: Mavis Geometry: Trapezoidal

Bottom Width(ft): 9.70
Left Side Slope(h/v): 0.21
Right Side Slope(h/v): 0.21
Invert(ft): 876.730
Control Elevation(ft): 876.730
Struct Opening Dim(ft): 9999.00

Bottom Clip(ft): 0.000
Top Clip(ft): 0.000
Weir Discharge Coef: 3.200
Orifice Discharge Coef: 0.600
```

TABLE

```
-----
Name: A-011W3          From Node: A-012
Group: BASE           To Node: A-011
Flow: Both            Count: 1
Type: Vertical: Mavis Geometry: Circular

Span(in): 9.00
Rise(in): 9.00
Invert(ft): 872.000
Control Elevation(ft): 872.000
-----
```

=====  
 Basins  
 =====

Name: A-012	Node: A-012	Status: Onsite
Group: BASE	Type: SCS Unit Hydrograph CN	
Unit Hydrograph: Uh484	Peaking Factor: 484.0	
Rainfall File:	Storm Duration(hrs): 0.00	
Rainfall Amount(in): 0.000	Time of Conc(min): 60.00	
Area(ac): 243.200	Time Shift(hrs): 0.00	
Curve Number: 78.30	Max Allowable Q(cfs): 999999.000	
DCIA(%): 0.00		

=====  
 Nodes  
 =====

Name: A-011	Base Flow(cfs): 0.000	Init Stage(ft): 872.000
Group: BASE		Warn Stage(ft): 872.000
Type: Time/Stage		

Time(hrs)	Stage(ft)
0.00	872.000
999.00	872.000

Name: A-012	Base Flow(cfs): 0.000	Init Stage(ft): 872.000
Group: BASE		Warn Stage(ft): 880.000
Type: Stage/Area		

Stage(ft)	Area(ac)
872.000	1.6900
872.800	1.7700
873.000	1.7800
874.000	2.7500
875.000	3.4400
876.000	3.7500
876.720	3.8700
877.000	3.9200
878.000	4.0900
879.000	4.2500
879.360	4.3100
880.000	4.4100

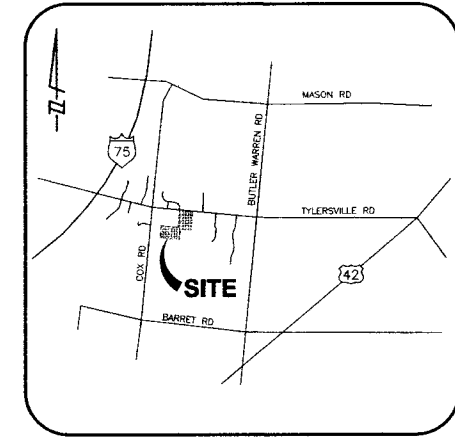
=====  
 Pipes  
 =====

W00521 Basin WSE 872.00 9" Orifice  
 2016-01-22

**GENERAL NOTES**

- 1) ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT SPECIFICATIONS AND REGULATIONS OF THE OHIO DEPARTMENT OF TRANSPORTATION (O.D.O.T.), AND BUTLER COUNTY, OHIO.
- 2) ALL STRUCTURES TO BE BUTLER COUNTY DESIGN STANDARDS UNLESS OTHERWISE NOTED.
- 3) EXISTING UTILITY LOCATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATIONS BY FIELD INVESTIGATION PRIOR TO CONNECTION TO UTILITIES. IF DISCREPANCY EXISTS, CONTACT ENGINEER.
- 4) ALL STORM DRAINAGE PIPE SHALL HAVE A MAXIMUM MANNING "N" VALUE OF 0.011 AS PER MANUFACTURER SPECIFICATIONS. ALL STORM DRAINAGE PIPES SHOWN ON PLANS SHALL MEET ODOT 706.02 OR 707.33 SPECIFICATIONS.
- 5) NO DIMENSION MAY BE SCALED. REFER ANY UNCLEAR ITEMS TO THE ENGINEER FOR INTERPRETATION.
- 6) EXISTING FEATURES AND UTILITIES ARE SHOWN BASED ON VARIOUS METHODS AS AVAILABLE; VISIBLE ABOVE GROUND FIELD SURVEY OBSERVATIONS, AND VARIOUS CONSTRUCTION PLANS AND OTHER INFORMATION AS MAY HAVE BEEN PROVIDED. CONTRACTOR TO VERIFY FEATURES IN THE FIELD AT THE TIME OF CONSTRUCTION.
- 7) THE CONTRACTOR WILL BE RESPONSIBLE FOR THE EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION.
- 8) PONDING OR LOW UNDRAINABLE AREAS CREATED BY CONSTRUCTION ARE TO BE ELIMINATED BY FILLING AND REGRADING.

# IMPROVEMENT PLANS FOR RETENTION POND MODIFICATIONS AT WEST CHESTER CHURCH OF THE NAZARENE



**VICINITY MAP**  
NOT TO SCALE

SITUATED IN  
SECTION 11, TOWN 3, RANGE 2  
WEST CHESTER TOWNSHIP  
BUTLER COUNTY, OHIO

JANUARY, 2016

PREPARED BY

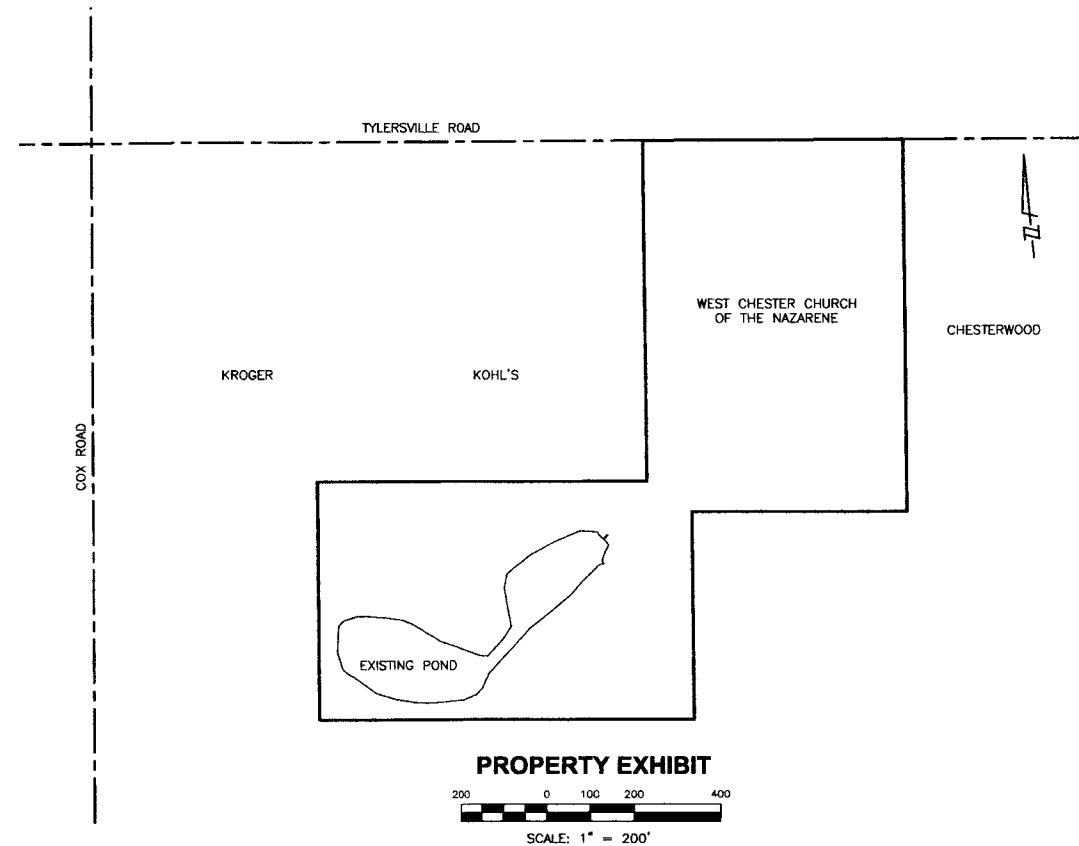
*Evans*  
**CivilPro**  
**Engineers, LLC**  
Consulting Engineers & Surveyors  
4700 Duke Drive, Suite 100  
Mason, Ohio 45040  
(513) 398-1728

**BENCH MARKS**

NO.	DESCRIPTION
BM 101	IRON PIN ON THE NORTHWEST PROPERTY CORNER BEHIND KROGERS 23' SOUTH OF THE BACK OF CURB ELEV 884.24
BM 100	IRON PIN ON WEST PROPERTY LINE 300' SOUTH OF THE NORTHWEST PROPERTY CORNER ELEV 882.49

**SHEET INDEX**

TITLE SHEET	1
RETENTION POND PLAN	2
EROSION & SEDIMENTATION CONTROL NOTES AND DETAILS	3
EROSION & SEDIMENTATION CONTROL DETAILS	4



NO.	DATE	DESCRIPTION

SCALE:	AS SHOWN
DRAWN BY:	TDA
JOB No:	W00521
DATE:	1/25/16

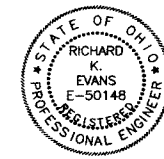
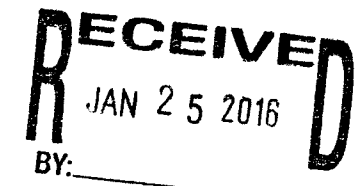
**TITLE SHEET**

**WEST CHESTER CHURCH  
OF THE NAZARENE**

7951 TYLERSVILLE ROAD  
WEST CHESTER TOWNSHIP  
BUTLER COUNTY, OHIO 45069

*Evans*  
**CivilPro**  
**Engineers, LLC**  
Consulting Engineers & Surveyors  
4700 Duke Drive, Suite 100  
Mason, Ohio 45040  
(513) 398-1728

**SHEET**  
**1**  
**OF 4**



RICHARD K. EVANS, P.E.  
*Evans* CivilPro Engineers, LLC

DATE

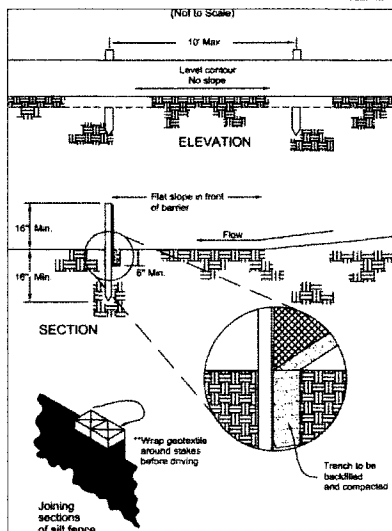
DATE RECEIVED APPROVAL

BUTLER COUNTY ENGINEER'S OFFICE





**Specifications for Silt Fence**



- Silt fence shall be constructed before upslope land disturbance begins.
- All silt fence shall be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions that may carry small concentrated flows to the silt fence are dissipated along its length.
- Ends of the silt fences shall be brought upslope slightly so that water ponded by the silt fence will be prevented from flowing around the ends.
- Silt fence shall be placed on the flattest area available.
- Where possible, vegetation shall be preserved for 5 feet (or as much as possible) upslope from the silt fence. If vegetation is removed, it shall be reestablished within 7 days from the installation of the silt fence.
- The height of the silt fence shall be a minimum of 18 inches above the original ground surface.
- The silt fence shall be placed in an excavated or sliced trench cut a minimum of 6 inches deep. The trench shall be made with a trencher, cable laying machine, slicing machine, or other suitable device that will ensure an occupancy uniform trench depth.
- The silt fence shall be placed with the stakes on the downslope side of the geotextile. A minimum of 8 inches of geotextile must be below the ground surface. Excess material shall lay on the bottom of the 6-inch deep trench. The trench shall be backfilled and compacted on both sides of the fabric.
- Seams between sections of silt fence shall be spaced together with a support post with a minimum 6-in. clear trip prior to driving into the ground. (See details).
- Maintenance—Silt fence shall allow runoff to pass only as diffuse flow through the geotextile. If runoff overtops the silt fence, flow under the fabric around the fence ends, or in any other way allows a concentrated flow discharge, one of the following shall be performed, as appropriate: 1) the layout of the silt fence shall be changed; 2) accumulated sediment shall be removed; or 3) other practices shall be installed.

FABRIC PROPERTIES	VALUES	TEST METHOD
Minimum Tensile Strength	120 lbs. (533 N)	ASTM D 4635
Maximum Elongation @ 60 lbs	50%	ASTM D 4635
Minimum Puncture Strength	50 lbs (220 N)	ASTM D 4833
Minimum Tear Strength	40 lbs (180 N)	ASTM D 4533
Apparent Opening Size	≤ 0.84 mm	ASTM D 4751
Minimum Permeability	1x10 <sup>-2</sup> sec. -1	ASTM D 4491
UV Exposure Strength Retention	70%	ASTM G 4355

**Specifications for Mulching**

- Mulch and other appropriate vegetative practices shall be applied to disturbed areas within 7 days of grading if the area is to remain dormant (undisturbed) for more than 21 days or on areas and portions of the site which can be brought to final grade.
  - Straw - Straw shall be unrotted small grain straw applied at the rate of 2 tons/acre or 90 lb./1,000 sq. ft. (two to three bales). The straw mulch shall be spread uniformly by hand or mechanically on the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 sq-ft sections and place two 45-lb. bales of straw in each section.
  - Hydroseeders - Wood cellulose fiber should be used at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
  - Other - Acceptable mulches include mulch matting and rolled erosion control products applied according to manufacturer's recommendations or wood mulch/chips applied at 10-20 tons/acre.
- Mulch Anchoring - Mulch shall be anchored immediately to minimize loss by wind or runoff. The following are acceptable methods for anchoring mulch:
  - Mechanical - Use a disk, crimper, or similar type tool set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but be left generally longer than 6 inches.
  - Mulch Nettings - Use according to the manufacturer's recommendations, following all placement and anchoring requirements. Use in areas of water concentration and steep slopes to hold mulch in place.
  - Synthetic Binders - For straw mulch, synthetic binders such as Acrylic DLR (Agi-Tac), DCA-70, Petrosel, Terra Track or equal may be used at rates recommended by the manufacturer. All applications of Synthetic Binders must be conducted in such a manner where there is no contact with waters of the state.
  - Wood Cellulose Fiber - Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 lb./acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb./100 gal. of wood cellulose fiber.

**Specifications for Temporary Seeding**

Seeding Dates	Species	Lb./1000 R2	Lb./Acre
March 1 to August 15	Oats	3	128 (4 bushels)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Perennial Ryegrass	1	40
	Tall Fescue	1	40
	Annual Ryegrass	1	40
August 16 to November	Rye	1.25	55
	Tall Fescue	3.25	142
	Annual Ryegrass	0.4	17
	Oats	0.4	17
	Perennial Ryegrass	1.25	40
	Tall Fescue	3.25	40
November 1 to February 29	Use mulch only or dormant seeding		

- Structural erosion and sediment control practices such as diversions and sediment traps shall be installed and stabilized with temporary seeding prior to grading the rest of the construction site.
- Temporary seed shall be applied between construction operations on soil that will not be graded or reworked for 21 days or greater. These site areas shall be seeded within 7 days after grading.
- The seedbed should be pulverized and loose to ensure the success of establishing vegetation. Temporary seeding should not be postponed if final seeded preparation is not possible.
- Soil Amendments—Temporary vegetation seeding rates shall establish adequate stands of vegetation, which may require the use of soil amendments. Base rates for lime and fertilizer shall be used.
- Seeding Method—Seed shall be applied uniformly with a cyclone spreader, drill, cut/packer seeder, or hydroseeder. When feasible, seed that has been broadcast shall be covered by raking or dragging and then lightly tamped into place using a roller or cut/packer. If hydroseeding is used, the seed and fertilizer will be mixed on-site and the seeding shall be done immediately and without interruption.

**Mulching Temporary Seeding**

- Applications of temporary seeding shall include mulch, which shall be applied during or immediately after seeding. Seeding made during optimum seeding dates on favorable, very flat soil conditions may not need mulch to achieve adequate stabilization.
  - Straw—If straw is used, it shall be unrotted small-grain straw applied at a rate of 2 tons per acre or 90 lbs./1,000 sq. ft. (2-3 bales).
  - Hydroseeders—If wood cellulose fiber is used, it shall be used at 2,000 lb./ac. or 46 lb./1,000-sq.-ft.
  - Other—Other acceptable mulches include mulch matting applied according to manufacturer's recommendations or wood chips applied at 5 ton/ ac.
- Straw Mulch shall be anchored immediately to minimize loss by wind or water. Anchoring methods:
  - Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but left to a length of approximately 6 inches.
  - Mulch Netting—Netting shall be used according to the manufacturer's recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
  - Synthetic Binders—Synthetic binders such as Acrylic DLR (Agi-Tac), DCA-70, Petrosel, Terra Track or equal may be used at rates recommended by the manufacturer.
  - Wood-Cellulose Fiber—Wood-cellulose fiber binder shall be applied at a net dry wt. of 750 lb./ac. The wood-cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb. / 100 gal.

**Specifications for Sodding**

- Materials**
  - Sod shall be harvested, delivered and installed within a period of 48 hours. Sod not transported within this period shall be inspected and approved prior to installation.
  - The sod shall be kept moist and covered during hauling and preparation for placement.
  - Sod shall be machine cut at a uniform soil thickness of 0.75 inches, plus or minus 0.25 inches, at the time of cutting. Measurements for thickness shall exclude top growth and thatch.
- Site Preparation**
  - A subsoiler, plow or other implement shall be used to reduce soil compaction and allow maximum infiltration. Maximizing infiltration will help control both runoff rate and water quality. Subsoiling shall not be conducted on slip-prone areas where soil preparation should be limited only to what is necessary for establishing vegetation.
  - The area shall be graded and topsoil spread where needed. (see Topsoiling)
  - Soil Amendments:
    - Lime—Agricultural ground limestone shall be applied to acidic soils as recommended by a soil test. In lieu of a soil test, lime shall be applied at the rate of 100 lb./1,000 sq. ft. or 2 tons/acre.
    - Fertilizer—Fertilizer shall be applied as recommended by a soil test. In lieu of a soil test fertilizer shall be applied at a rate of 12 lb./1,000 sq. ft. or 500 lb./ac. of 10-10-10 or 12-12-12 analysis.

- Before laying sod, the surface shall be uniformly graded and cleared of all debris, stones and clods larger than 3-in. diameter.
- During periods of excessively high temperatures, the sod shall be lightly irrigated immediately before laying the sod.
- Sod shall not be placed on frozen soil.
- The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and lightly wedged against each other. Lateral joints shall be staggered in a brick-like pattern. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids that would dry the roots.
- On sloping areas where erosion may be a problem, sod shall be laid with the long edge parallel to the contour and with staggered joints. The sod shall be secured with pegs or staples.
- As sodding is completed in any one section, the entire area shall be rolled or tamped to ensure solid contact of roots with the soil surface. Sod shall be watered immediately after rolling or tamping until the sod and soil surface below the sod are thoroughly wet. The operations of laying, tamping and irrigating for the first 8 hours.

- In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week with sufficient quantities to maintain moist soil to a depth of 4-5 inches.
- After the first week, sod shall be watered as necessary to maintain adequate moisture and ensure establishment.
- The first mowing shall not be attempted until sod is firmly rooted.

**Specifications for Permanent Seeding**

- Site Preparation**
  - Subsoiler, plow, or other implement shall be used to reduce soil compaction and allow maximum infiltration. Maximizing infiltration will help control both runoff rate and water quality. Subsoiling should be done when the soil moisture is low enough to allow the soil to crack or fracture. Subsoiling shall not be done on slip-prone areas where soil preparation should be limited to what is necessary for establishing vegetation.
  - The site shall be graded as needed to permit the use of conventional equipment for seeded preparation and seeding.
  - Topsoil shall be applied where needed to establish vegetation.
- Seedbed Preparation**
  - Lime—Agricultural ground limestone shall be applied to acidic soils as recommended by a soil test. In lieu of a soil test, lime shall be applied at the rate of 100 pounds per 1,000-sq. ft. or 2 tons per acre.
  - Fertilizer—Fertilizer shall be applied as recommended by a soil test. In place of a soil test, fertilizer shall be applied at a rate of 25 pounds per 1,000-sq. ft. or 1,000 pounds per acre of a 10-10-10 or 12-12-12 analysis.
  - The lime and fertilizer shall be worked into the soil with a disk harrow, spring-tooth harrow, or other suitable field implement to a depth of 3 inches. On sloping land, the soil shall be worked on the contour.

- Seeding Dates and Soil Conditions**

Seeding should be done March 1 to May 31 or August 1 to September 30. If seeding occurs outside of the above-specified dates, additional mulch and irrigation may be required to ensure a minimum of 80% germination. Tillage for seeded preparation should be done when the soil is dry enough to crumble and not form ribbons when compressed by hand. For winter seeding, use the following section on dormant seeding.
- Dormant Seeding**
  - Seedings should not be made from October 1 through November 20. During this period, the seeds are likely to germinate but probably will not be able to survive the winter.
  - The following methods may be used for Dormant Seeding:
    - From October 1 through November 20, prepare the seedbed, add the required amounts of lime and fertilizer, then mulch and anchor. After November 20, and before March 15, broadcast the selected seed mixture. Increase the seeding rates by 50% for this type seeding.
    - From November 20 through March 15, when soil conditions permit, prepare the seedbed, lime and fertilizer, apply the selected seed mixture, mulch and anchor. Increase the seeding rates by 50% for this type of seeding.
    - Apply seed uniformly with a cyclone seeder, drill, cut/packer seeder, or hydro-seeder (slurry may include seed and fertilizer) on a firm, moist seedbed.
    - Where feasible, except when a cut/packer type seeder is used, the seedbed should be formed following seeding operations with a cut/packer, roller, or light drag. On sloping land, seeding operations should be on the contour where feasible.

- Mulching**
  - Straw—If straw is used it shall be unrotted small-grain straw applied at the rate of 2 tons per acre or 90 pounds (two to three bales) per 1,000-sq. ft. The mulch shall be spread uniformly by hand or mechanically piled so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000-sq.-ft. sections and spread two 45-lb. bales of straw in each section.
  - Hydroseeders—If wood cellulose fiber is used, it shall be applied at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
  - Other—Other acceptable mulches include mulch matting applied according to manufacturer's recommendations or wood chips applied at 5 tons per acre.
- Mechanical**—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but, generally, be left longer than 6 inches.
- Mulch Netting**—Netting shall be used according to the manufacturer's recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- Asphalt Emulsion/Asphalt** shall be applied on recommended by the manufacturer or at the rate of 160 gallons per acre.
- Synthetic Binders**—Synthetic binders such as Acrylic DLR (Agi-Tac), DCA-70, Petrosel, Terra Track or equivalent may be used at rates specified by the manufacturer.
- Wood Cellulose Fiber**—Wood cellulose fiber shall be applied at a net dry weight of 750 pounds per acre. The wood cellulose fiber shall be mixed with water with the mixture containing a maximum of 50 pounds cellulose per 100 gallons of water.

- Permanent seeding shall include irrigation to establish vegetation during dry weather or on adverse site conditions, which require adequate moisture for seed germination and plant growth. Irrigation rates shall be monitored to prevent erosion and damage to seeded areas from excessive runoff.

Seed Mix	Seeding Rate		Notes:
	lb./ac.	lb./1,000SF	
<b>General Use</b>			
Creeping Red Fescue	10 - 20	1 - 2	For close mowing & for waterways with <2.0 R/s velocity.
Domestic Ryegrass	10 - 20	1 - 1	
Kentucky Bluegrass	20 - 40	1 - 1	
Tall Fescue	40 - 50	1 - 1 1/2	
Turf-type (dwarf) Fescue	90	2 1/2	
<b>Steep Banks or Cut Slopes</b>			
Tall Fescue	40 - 50	1 - 1 1/2	
Crown Vetch	10 - 20	1 - 2	Do not seed later than August.
Tall Fescue	20 - 30	1 - 2	
Flat Pea	20 - 25	1 - 2	Do not seed later than August.
Tall Fescue	20 - 30	1 - 2	
<b>Road Ditches and Swales</b>			
Tall Fescue	40 - 50	1 - 1 1/2	
Turf-type (dwarf) Fescue	90	2 1/2	
Kentucky Bluegrass	100 - 120	2	
Perennial Ryegrass	100 - 120	2	
Kentucky Bluegrass	100 - 120	2	For Shaded areas
Creeping Red Fescue	100 - 120	1 - 1 1/2	

Note: Other approved seed species may be substituted.

**Specifications for Grass Filter Strip**

- Filter strips shall be graded to prevent runoff from concentrating. Depressions, ridges and swales shall be graded out to achieve a uniform slope having a level grade across the slope.
- To assure that runoff remains as sheet flow through the filter strip, a level spreader shall be used at the top of the slope. The rock or grass level spreader must be placed on a contour, and shall have a minimum width and depth of 1 foot.
- Soil compaction shall be minimized in the filter strip area. Work shall be performed only when the soil moisture is low.
- A subsoiler, plow or other implement shall be used to reduce soil compaction and allow maximum infiltration. Subsoiling shall be done when the soil moisture is low enough to allow the soil to crack or fracture.
- Because a dense vegetation is critical for effective filter strips, only a dense stand of vegetation without till or grass level spreader is acceptable. If ribs or gullies form or if vegetation cover is not dense, a new seeded shall be prepared and replanted.
- The filter strip shall be seeded no later than September 30th to ensure that vegetation establishes prior to the onset of winter weather.

**Specifications for Maintenance of Permanent Seeding**

- Maintenance**
  - Expect emergence within 4 to 28 days after seeding with legumes typically following grasses. Check permanent seedings within 4 to 6 weeks after planting. Look for:
    - Vigorous seedlings;
    - Uniform ground surface coverage with at least 30% ground density;
    - Uniformity with legumes and grasses well intermixed;
    - Green, not yellow, leaves. Perennials should remain green throughout the summer, at least at the plant bases.
  - Permanent seeding shall not be considered established for at least 1 full year from the time of planting. Inspect the seeding for soil erosion or plant loss during this first year. Repair bare and sparse areas. Fall quills, re-fertilize, re-seed, and re-mulch if required. Consider no-till planting. A minimum of 70% growth density, based on a visual inspection, must exist for an adequate permanent vegetative planting.
    - If stand is inadequate or plant cover is patchy, identify the cause of failure and take corrective action: choice of plant materials, lime and fertilizer quantities, poor seedbed preparation, or weather. If vegetation fails to grow, have the soil tested to determine whether pH is in the correct range or nutrient deficiency is a problem.
    - Depending on stand conditions, repair with complete seedbed preparation, then over-seed or re-seed.
    - If it is the wrong time of year to plant desired species, over-seed with small grain cover crop to thicken the stand until timing is right to plant perennials or use temporary seeding. See Temporary Seeding standard.
- Satisfactory establishment may require re-fertilizing the stand in the second growing season.
  - Do not fertilize cool season grasses in late May through July (i.e. Kentucky Bluegrass, Orchardgrass, Perennial Ryegrass, Smooth Brome, Fescues, Timothy, Reed Canarygrass and Garrison Grass).
  - Grass that looks yellow may be nitrogen deficient. In lieu of a soil test, an application of 50 lbs. of N-7-K per acre in early spring will help cool season grasses compete against weeds or grow more successfully.
  - Do not use nitrogen fertilizer if the stand contains more than 20 percent legumes.
- Long-term maintenance fertilization rates shall be established by following soil test recommendations or by using the rates shown in Table 2.
- Consider mowing after plants reach a height of 6 to 8 inches. Mow grasses to a height of 3 inches in height and minimize compaction during the mowing process. Vegetation on structural practices such as embankments and grass-lined channels need to be mowed only to prevent woody plants from invading the stand.
  - Common Problems / Concerns
  - Insufficient topsoil or inadequately tilled, tined, and/or fertilized seedbed - results in poor establishment of vegetation.
  - Unsuitable species or seeding mixture: - results in competition with the perennials.
  - Horse crop rate too high in the mixture: - results in competition with the perennials.
  - Seeding done at the wrong time of year: - results in poor establishment of vegetation, also plant hardiness is significantly decreased.
  - Mulch rate inadequate: - results in poor germination and failure.

**MAINTENANCE FOR PERMANENT SEEDINGS: FERTILIZATION AND MOWING**

Mixture	Formula	lb./ac.	lb./1,000 SF	Time	Mowing
Creeping Red Fescue Kentucky Bluegrass	10-10-10	500	12		Not closer than 3'
Tall Fescue	10-10-10	500	12	Fall, yearly or as needed.	Not closer than 4"
Turf-type (Dwarf) Fescue	10-10-10	500	12		Not closer than 2"
Crown Vetch Fescue	0-20-20	400	10	Spring, yearly following establishment and every 4-7 yr. thereafter.	Do not mow
Flat Pea Fescue	0-20-20	400	10		Do not mow

Note: Following soil test recommendations is preferred to fertilizer rates shown above.

STORMWATER WATTLE / COMPOST SOCK - USED FOR EROSION CONTROL. TUBES OF STRAW USED FOR EROSION CONTROL. EACH STRAW WATTLE IS 8-9 INCHES IN DIAMETER. STAKE THE STRAW WATTLES AT EACH END AND 4 FEET ON CENTER.

**EROSION & SEDIMENTATION CONTROL NOTES AND DETAILS**

**WEST CHESTER CHURCH OF THE NAZARENE**

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DATE: 1/25/16  
JOB NO: W0521  
DRAWN BY: TDA  
SCALE: AS SHOWN

SHEET 3 OF 4

### Specifications for Turf Reinforcement Matting

(Not To Scale)

Erosion Stop Across Entire Width of Channel

Positive Slope to Prevent Flow Along Edge of Matting

Staple Every 2 Feet

1. Channel/Slope Soil Preparation Grade and compact area of installation, preparing seedbed by loosening 2"-3" of topsoil above final grade incorporate amendments such as lime and fertilizer into soil.

2. Channel/Slope Seeding Apply seed to soil surface prior to installation. All check slots, anchor trenches, and other disturbed areas must be reseeded. Refer to the Permanent Seeding specification for seeding recommendations.

Slope Installation

3. Excavate top and bottom trenches (12x6"). Intermittent erosion check slots (6x6") may be required based on slope length. Excavate top anchor trench 2' x 3' over crest of the slope.

4. If intermittent erosion check slots are required install TRM in 6"x6" slot at a minimum of 30 centers or the mid point of the slope. TRM should be stapled into trench on 12" centers.

5. Install TRM in top anchor trench, anchor on 12" spacings, backfill and compact soil.

6. Unroll TRM down slope with adjacent rolls overlapped a minimum of 3". Anchor the seam every 15'. Lay the TRM loose to maintain direct soil contact, do not pull taut.

7. Overlap roll ends a minimum of 12" with upslope TRM on top for a shingle effect. Begin all new rolls in an erosion check slot if required, double anchor across roll every 12".

8. Install TRM in bottom anchor trench (12x6"), anchor every 12". Place all other staples throughout slope at 1 to 2.5 per square yard dependant on slope. Refer to manufacturer's anchor guide.

**Channel Installation**

9. Excavate initial anchor trench (12x6") across the lower end of the project area.

10. Excavate intermittent check slots (6x6") across the channel at 30' intervals along the channel.

11. Excavate longitudinal channel anchor slots (4x4") along both sides of the channel to bury the edges. Whenever possible extend the TRM 2'-3' above the crest of channel side slopes.

12. Install TRM in initial anchor trench (downstream) anchor every 12", backfill and compact soil.

13. Roll out TRM beginning in the center of the channel toward the intermittent check slot. Do not pull taut. Trench adjacent rolls upstream with a 3" minimum overlap (anchor every 15') and up each channel side slope.

14. At top of channel side slopes install TRM in the longitudinal anchor slots, anchor every 15".

15. Install TRM in intermittent check slots. Lay into trench and secure with anchors every 12". backfill with soil and compact.

16. Overlap roll ends a minimum of 12" with upstream TRM on top for a shingle effect. Begin all new rolls in an intermittent check slot, double anchored every 12".

17. Install upstream end in a terminal anchor trench (12x6") anchor every 12". backfill and compact.

18. Complete anchoring throughout channel at 2.5 per square yard using suitable ground anchoring devices (U shaped wire staples, metal geotextile pins, plastic stakes, and triangular wooden stakes). Anchors should be of sufficient length to resist pullout. Larger anchors may be required in loose sandy or gravelly soils.

### Specifications for Construction Entrance

70 ft. (or 30R for Access to Individual House Lot)

14 ft. Minimum and Not Less Than Width of Ingress or Egress

15' or Sufficient to Divert Runoff

1. Stone Size—DOT # 2 (1.5-2.5 inch) stone shall be used, or recycled concrete equivalent.

2. Length—The construction entrance shall be as long as required to stabilize high traffic areas but not less than 70 ft. (exception: apply 30 ft. minimum to slope residence lots).

3. Thickness—The stone layer shall be at least 6 inches thick for light duty entrances or at least 10 inches for heavy duty use.

4. Width—The entrance shall be at least 14 feet wide, but not less than the full width at points where ingress or egress occurs.

5. Geotextile—A geotextile shall be laid over the entire area prior to placing stone. It shall be composed of strong rot-proof polymeric fibers and meet the following specifications:

GEOTEXTILE SPECIFICATION FOR CONSTRUCTION ENTRANCE	
Minimum Tensile Strength	200 lbs.
Minimum Puncture Strength	80 psi.
Minimum Tear Strength	50 lbs.
Minimum Burst Strength	320 psi.
Minimum Elongation	20%
Equivalent Opening Size	EOS < 0.6 mm
Permittivity	1x10 <sup>-3</sup> cm/sec.

6. Timing—The construction entrance shall be installed as soon as is practicable before major grading activities.

7. Culvert—A pipe or culvert shall be constructed under the entrance if needed to prevent surface water from flowing across the entrance or to prevent runoff from being directed out onto paved surfaces.

8. Water Bar—A water bar shall be constructed as part of the construction entrance if needed to prevent surface runoff from flowing the length of the construction entrance and ut onto paved surfaces.

9. Maintenance—Top dressing of additional stone shall be applied as conditions demand. Mud applied, dropped, oiled or tracked onto public roads, or any surface where runoff is not checked by sediment controls, shall be removed immediately. Removal of stone shall be accomplished by scraping or sweeping.

10. Construction entrances shall not be relied upon to remove mud from vehicles and prevent off-site tracking. Vehicles that enter the site shall be restricted from muddy areas.

11. Removal—the entrance shall remain in place until the disturbed area is stabilized or replaced with a permanent roadway or entrance.

### Specifications for Filter Berm

(Not to Scale)

Base Width Minimum 2' or 2 x Height

Height Minimum 1'

Compact Berm

FLOW

1. Materials—Compost used for filter berms shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of a particles ranging from 1/4" to 3".

2. Installation—Filter berms will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional berms shall be provided at the top and as needed mid-slope.

3. Maintenance—Inspect filter berms after each significant rain, maintaining the berms in a functional condition at all times. Remove sediments collected at the base of the filter berms when they reach 1/3 of the exposed height of the practice. Where the filter berm deteriorates or fails it will be repaired or replaced with a more effective alternative.

4. Removal—Filter berms no longer needed will be dispersed on site in a manner that will facilitate seeding.

Filter berms are not to be used in concentrated flow situations or in runoff channels.

### Specifications for Rock Check Dam

Low Center Section Must Center Flow Over Not Around Check Dam

Positive Slope

4' - 8' Rock

1. The check dam shall be constructed of 4-8 inch diameter stone, placed so that it completely covers the width of the channel. DOT Type D stone is acceptable, but should be underlain with a gravel filter consisting of DOT No. 3 or 4 or suitable filter fabric.

2. Maximum height of check dam shall not exceed 3.0 feet.

3. The midpoint of the rock check dam shall be a minimum of 6 inches lower than the sides in order to direct across the center and away from the channel sides.

4. The base of the check dam shall be entrenched approximately 6 inches.

5. Spacing of check dams shall be in a manner such that the loss of the upstream dam is at the same elevation as the top of the downstream dam.

6. A Splash Apron shall be constructed where check dams are expected to be in use for an extended period of time, a stone apron shall be constructed immediately downstream of the check dam to prevent flow from undercutting the structure. The apron should be 6 in. thick and its length two times the height of the dam.

7. Stone placement shall be performed either by hand or mechanically as long as the center of check dam is lower than the sides and extends across entire channel.

8. Side slopes shall be a minimum of 2:1.

### Specifications for Temporary Diversion

(Not to Scale)

2:1 Side Slopes

10' Max

1. Diversion area should not exceed 10 acres. Larger areas require a more extensive design.

2. The channel cross section may be parabolic or trapezoidal. The base of the dike before placing fill. Build the dike 10% higher than designed for settlement. The dike shall be compacted by traversing with tracked earth-moving equipment.

3. The minimum cross section of the levee or dike will be as follows: (Minimum design freeboard shall be 0.3 foot.)

Dike Top Width (ft.)	Height (ft.)	Side Slopes	Shape
0	1.5	4:1	Trapezoidal
4	1.5	2:1	Parabolic

4. The grade may be variable depending upon the topography, but must have a positive drainage to the outlet and be stabilized to be non-erosive.

Temporary Diversion Stabilization Treatment	
Diversion Slope	< 2:1
0 - 3%	Seed & Straw
3 - 5%	Seed & Straw
5 - 8%	Seed & Straw
8 - 20%	Seed & Straw
> 20%	Engineered

5. Outlet runoff onto a stabilized area, into a properly designed waterway, grade stabilization structure, or sediment trapping facility.

6. Diversion shall be seeded and mulched in accordance with the requirements in practice standards TEMPORARY SEEDING (or PERMANENT SEEDING) and MULCHING as soon as they are constructed or other suitable stabilization in order to preserve dike height and reduce maintenance.

### Specifications for Filter Sock

(Not to Scale)

2' x 2' Wooden Stake

3'-4'

Min 12'

1. Materials—Compost used for filter socks shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of a particles ranging from 3/8" to 2".

2. Filter Socks shall be 3 or 5 mil continuous, tubular, HDPE 3/8" knitted mesh netting material, filled with compost passing the above specifications for compost products.

3. Filter socks will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional socks shall be provided at the top and as needed mid-slope.

4. Filter socks intended to be left as a permanent filter or part of the natural landscape, shall be seeded at the time of installation for establishment of permanent vegetation.

5. Filter Socks are not to be used in concentrated flow situations or in runoff channels.

Maintenance:

6. Routinely inspect filter socks after each significant rain, maintaining filter socks in a functional condition at all times.

7. Remove sediments collected at the base of the filter socks when they reach 1/3 of the exposed height of the practice.

8. Where the filter sock deteriorates or fails, it will be repaired or replaced with a more effective alternative.

9. Removal—Filter socks will be dispersed on site when no longer required in such as way as to facilitate and not obstruct seedings.

### Specifications for Rock Lined Channel

Trapezoidal

Riprap Bedding

a = Top Width  
b = Depth  
c = Bottom Width  
z = Side Slope

1. Subgrade for the filter and riprap shall be prepared to the required lines and grades as shown on the plan. The subgrade shall be cleared of all trees, stumps, roots, soil, loose rock, or other material.

2. Riprap shall conform to the grading limits as shown on the plan.

3. No abrupt deviations from the design grade or horizontal alignment shall be permitted.

4. Geotextile shall be securely anchored according to manufacturer's recommendations.

5. Geotextile shall be laid with the long dimension parallel to the direction of flow and shall be laid loosely but without wrinkles and creases. Where joints are necessary, strips shall be placed to provide a 12-inch minimum overlap, with the upstream strip overlapping the downstream strip.

6. Gravel bedding shall be DOT No. 67# or 57# unless shown differently on the drawings.

7. Riprap may be placed by equipment but shall be placed in a manner to prevent slippage or damage to the geotextile.

8. Riprap shall be placed by a method that does not cause segregation of sizes. Extreme nesting with a coarser coarse segregation and shall be avoided by delivering riprap near its final location within the channel.

9. Construction shall be sequenced so that riprap channel protection is placed and functional without delays when the channel becomes operational.

10. All disturbed areas will be vegetated as soon as practical.

### Specifications for Sediment Trap

(Not to Scale)

Excavated Area

2:1 Side Slopes

Outlet Cross-Section (Not to Scale)

1. Work shall consist of the installation and removal of all sediment traps at the locations designated on the drawings.

2. Sediment traps shall be constructed to the dimensions specified on the drawings and operational prior to upslope land disturbance.

3. Fill used for the embankment shall be cleared, grubbed and stripped of vegetation to a minimum depth of six (6) inches. The soil shall be cleared as needed to facilitate sediment cleanout.

4. Fill used for the embankment shall be evaluated to assure its suitability and it must be free of roots or other woody vegetation, large rocks, organics or other objectionable materials. Fill material shall be placed in six (6) inch lifts and soil compacted to by traversing with a sheepsfoot or other approved compaction equipment. Fill height shall be increased five (5) percent to allow for structure/foundation settlement. Construction shall not be permitted if the earthfill or compaction surface is frozen.

5. The maximum height of embankment shall be five (5) feet. All cut and fill slopes shall be 2:1 (H:V) or flatter.

6. A minimum storage volume below the crest of the outlet of 67 ft<sup>3</sup> per acre of contributing drainage area shall be achieved at each location noted on the drawings with additional sediment storage volume provided below this elevation.

7. Temporary seeding shall be established and maintained over the useful life of the practice.

8. The outlet for the sediment trap structure shall be constructed to the dimension shown on the drawings.

9. The outlet shall be constructed using the materials specified on the drawings. Where geotextile is used, all overlaps shall be a minimum of two (2) feet or as specified by the manufacturer, whichever is greater. All overlaps shall be made with the upper most layer placed last. Geotextile shall be keyed in at least 6" on the upstream side of the outlet.

10. Warning signs and safety fence shall be placed around the traps and maintained over the life of the practice.

11. After all sediment-producing areas have been permanently stabilized, the structure and all associated sediment shall be removed. Stable earth materials shall be placed in the sediment trap area and compacted. The area shall be graded to blend in with the adjoining land surfaces and have positive drainage. The area shall be immediately seeded.

**EROSION & SEDIMENTATION CONTROL DETAILS**

WEST CHESTER CHURCH OF THE NAZARENE

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REVISIONS		
NO.	DATE	DESCRIPTION

DATE:	1/25/16	JOB No.:	W00521	DRAWN BY:	TDA	SCALE:	AS SHOWN
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SHEET  
**4**  
OF 4