

Additional Construction Site Pollution Controls

1. Construction personnel, including subcontractors who may use or handle hazardous or toxic materials, shall be made aware of the following general guidelines regarding disposal and handling of hazardous and construction wastes:

- Prevent spills
- Use products up
- Follow label directions for disposal
- Remove lids from empty bottles and cans when disposing in trash
- Recycle wastes whenever possible
- Don't pour into waterways, storm drains or onto the ground
- Don't pour down the sink, floor drain or septic tanks
- Don't bury chemicals or containers
- Don't burn chemicals or containers
- Don't mix chemicals together

2. Containers shall be provided for the proper collection of all waste material including construction debris, trash, petroleum products and any hazardous materials used on-site. Containers shall be covered and not leaking. All waste material shall be disposed of at facilities approved for that material. Construction Demolition and Debris (CD&D) waste must be disposed of at an Ohio EPA approved CD&D landfill.

3. No construction related waste materials are to be buried on-site. By exception, clean fill (bricks, hardened concrete, soil) may be utilized in a way which does not encroach upon natural wetlands, streams or floodplains or result in the contamination of waters of the state.

4. Handling Construction Chemicals. Mixing, pumping, transferring or other handling of construction chemicals such as fertilizer, lime, asphalt, concrete curing compounds, and all other potentially hazardous materials shall be performed in an area away from any watercourse, ditch or storm drain.

5. Equipment Fueling and Maintenance, oil changing, etc., shall be performed away from watercourses, ditches or storm drains, in an area designated for that purpose. The designated area shall be equipped for recycling oil and catching spills. Secondary containment shall be provided for all fuel oil storage tanks. These areas must be inspected every seven days and within 24 hrs. of a 0.5 inch or greater rain event to ensure there are no exposed materials which would contaminate storm water. Site operators must be aware that Spill Prevention Control and Countermeasures (SPCC) requirements may apply. An SPCC plan is required for sites with one single above ground tank of 660 gallons or more, accumulative above ground storage of 1330 gallons or more, or 42,000 gallons of underground storage. Contaminated soils must be disposed of in accordance with Item 8.

6. Concrete Wash Water shall not be allowed to flow to streams, ditches, storm drains, or any other water conveyance. A sump at risk with no potential for discharge shall be constructed if needed to contain concrete wash water. Field tile or other subsurface drainage structures within 10 ft. of the sump shall be cut and plugged. For small projects, truck chutes may be rinsed away from any water conveyances.

7. Spill Reporting Requirements: Spills on pavement shall be absorbed with sawdust or kitty litter and disposed of with the trash at a licensed sanitary landfill. Hazardous or industrial wastes such as most solvents, gasoline, oil-based paints, and cement curing compounds require special handling. Spills shall be reported to Ohio EPA (1-800-282-9378). Spills of 25 gallons or more of petroleum products shall be reported to Ohio EPA, the local fire department, and the Local Emergency Planning Committee within 30 min. of the discovery of the release. All spills which contact waters of the state must be reported to Ohio EPA.

8. Contaminated Soils. If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto the soil, the soil should be dug up and disposed of at licensed sanitary landfill or other approved petroleum contaminated soil remediation facility. (not a construction/demolition debris landfill). Note that storm water run off associated with contaminated soils are not to be authorized under Ohio EPA's General Storm Water Permit associated with Construction Activities.

9. Open Burning. No materials containing rubber, grease, asphalt, or petroleum products, such as tires, auto parts, plastics or plastic coated wire may be burned (OAC 3745-19). Open burning is not allowed in restricted areas, which are defined as: 1) within corporation limits; 2) within 1000 feet outside a municipal corporation having a population of 1000 to 10,000; and 3) a one mile zone outside of a corporation of 10,000 or more. Outside of restricted areas, no open burning is allowed within a 1000 feet of an inhabited building on another property. Open burning is permissible in a restricted area for: heating tar, welding, smudge pots and similar occupational needs, and heating for warmth or outdoor barbecues. Outside of restricted areas, open burning is permissible for landscape or land-clearing wastes (plant material), with prior written permission from Ohio EPA, and agricultural wastes, excluding buildings.

10. Dust Control or Dust Suppressants shall be used to prevent nuisance conditions, in accordance with the manufacturer's specifications and in a manner, which prevent a discharge to waters of the state. Sufficient distance must be provided between applications and nearby bridges, catch basins, and other waterways. Application (excluding water) may not occur when rain is imminent as noted in the short term forecast. Used oil may not be applied for dust control.

11. Other Air Permitting Requirements: Certain activities associated with construction will require air permits including but not limited to: mobile concrete batch plants, mobile asphalt plants, concrete crushers, large generators, etc. These activities will require specific Ohio EPA Air Permits for installation and operation. Operators must seek authorization from the corresponding district of Ohio EPA. For demolition of all commercial sites, a Notification for Restoration and Demolition must be submitted to Ohio EPA to determine if asbestos corrective actions are required.

12. Process Waste Water/Leachate Management. Ohio EPA's Construction General Permit still allows the discharge of storm water and does not include other waste streams/discharges such as vehicle and/or equipment washing, on-site septic leachate concrete wash outs, which are considered process wastewaters. All process wastewaters must be collected and properly disposed at an approved disposal facility. In the event, leachate or septic is discharged; it must be isolated for collection and proper disposal and corrective actions taken to eliminate the source of waste water.

13. A Permit To Install (PTI) is required prior to the construction of all centralized sanitary systems, including sewer extensions, and sewerage systems (except those serving one, two, and three family dwellings) and potable water lines. Plans must be submitted and approved by Ohio EPA. Issuance of an Ohio EPA Construction General Storm Water Permit does not authorize the installation of any sewerage system where Ohio EPA has not approved a PTI.

**OHIO RAINWATER AND LAND DEVELOPMENT MANUAL (2006)
CHAPTER 8, PAGES 6-8**

Maintenance of Water Quality Ponds

Long-term maintenance of the storm water quality ponds (wet/dry, extended detention ponds) shall be the responsibility of the property owner. An inspection report certified by a registered professional engineer, landscape architect, or certified professional in erosion and sediment control, shall be furnished to the County Engineer by May 1st of each year. Reports shall detail all inspection and maintenance performed during the prior year. The property owner shall ensure that pollutants collected within the storm water quality ponds be disposed of in accordance with local, state, and federal regulations.

Schedule	Activity
Monthly	Mow embankment and clean trash and debris from outlet structures. Address any accumulation of hydrocarbons.
Annually	Inspect embankment and outlet structure for damage and proper flow. Remove woody vegetation and fix any eroding areas. Monitor sediment accumulations in forebay and main pool.
Semi-Annually	Inspect wetland areas for invasive plants.
3-7 years	Remove Sediment from forebays.
15-20 years	Monitor sediment accumulations in the main pool and clean as pond becomes eutrophic or pool volume is reduced significantly.

POST-CONSTRUCTION STORMWATER MANAGEMENT CALCULATIONS (REV. 5/29/2020 - LOWERED POND N.W.E.)

Project: Mottl Reserve Subdivision
Sagamore Hills Township, Ohio

Discussion:

For the proposed project, a wet extended detention pond was chosen as the post-construction stormwater treatment BMP. This practice was selected because of the ability to perform extended detention within the retention pond, and because of the effectiveness in treating the required Water Quality Volume. The practice also has the added benefit of being able to provide post-construction stormwater treatment for the proposed development in a single facility.

Conclusion:

The following calculations indicate that, for the proposed retention pond, the Post-Construction Storm water treatment is sized to meet the design requirements of the Ohio EPA's NPDES Permit and the guidelines listed in the Ohio Rainwater and Land Development Manual (2006).

Stormwater Quality / Detention Pond (Wet Extended Detention):

Total Drainage Area [A] = 29.73 acres
Subdivision Area (1/4 Ac. Lots) = 14.27 acres @ 38% impervious = 5.4226 acres impervious
Wet Pond Area = 0.5069 acres (count as impervious)
Undisturbed Area to Pond = 15.46 acres @ 0% impervious = 0 acres impervious
Total Impervious Area to Pond = 5.9295 acres, 5.9295 / 29.73 = 0.1994
Fraction of Post Construction Impervious Surface [I] = 0.1994
Water Quality Storm Intensity [P] = 0.90 inch in 24 hours (per NPDES Permit)

Determination of Water Quality Volume

$R_v = 0.05 + 0.9i = (0.05 + 0.9 \times 0.1994) = 0.2295$
 $WQ_v = R_v \times P \times A / 12 = (0.2295 \times 0.90 \times 29.73 / 12) = 0.5117 \text{ ac-ft}$
 $= 22,290 \text{ cubic feet}$

Per NPDES Permit requirements for a wet extended detention pond:
Minimum Permanent Pool Volume = $WQ_v + WQ_v \times 0.20 = 26,748 \text{ cubic feet}$
Required Extended Detention Volume = $WQ_v = 22,290 \text{ cubic feet}$

Permanent Pool Volume Provided

Elevation	Area (S.F.)	Δ Volume (C.F.)	Σ Volume (C.F.)
866	5,209		6,066
867	6,923	6,066	13,907
868	8,758	7,841	23,682
869	10,791	9,776	33,533
870	12,911	11,851	45,384
870.67	17,774	10,279	45,812

Total Permanent Pool Volume Provided = **45,812 cubic feet** > 26,748 cubic feet ✓

Extended Detention Volume Provided

Elevation	Area (S.F.)	Δ Volume (C.F.)	Σ Volume (C.F.)
870.67	17,774		17,774
871	18,577	5,998	23,772
872	20,967	19,772	43,544
873	23,476	22,222	65,766
874	26,058	24,767	90,533
875	28,733	27,396	117,929
876	31,669	30,201	148,130
877	44,408	38,039	186,169

Extended Detention Elevation (Elevation at Σ Volume = 22,290 C.F.) = **871.82**

Calculation of Drawdown Time

Minimum drawdown time [T] = 24 hours for a wet extended detention basin
(To drawdown from the ED elevation of 871.82 to the normal water elevation of 870.67)
Maximum $Q_{avg} = 22,290 \text{ c.f.} / 86,400 \text{ sec} = 0.2580 \text{ cfs}$
Assume $Q_{avg} = \frac{1}{2} Q_{max}$

For 3.00' Diameter outlet orifice (A = 0.0491 sq. ft., center of orifice elevation = 870.80):
At Elev. = 871.82, H = 1.02'
 $Q_{max} = 0.61 \times 0.0491 \text{ sq. ft.} \times \sqrt{(64.4 \times 1.02 \text{ ft.})}$
 $= 0.2427 \text{ cfs}$
 $Q_{avg} = 0.1214 \text{ cfs} (< \text{Max. } Q_{avg} = 0.2580 \text{ cfs})$

Drawdown time: $T = 22,290 \text{ c.f.} / 0.1214 \text{ cfs} = 183,608 \text{ sec} = \mathbf{51.00 \text{ hours}} > 24 \text{ hours} \checkmark$

Verify that the upper 50% of the Extended Detention Volume will drain in no less than 1/3 of the required drain time:

50% of $WQ_v = 0.5 \times 22,290 \text{ c.f.} = 11,145 \text{ c.f.}$
 $1/3 \text{ of } T = T_{50} = 1/3 \times 24 \text{ hours} = 8 \text{ hours}$
Maximum $Q_{avg} = 11,145 \text{ c.f.} / 28,800 \text{ sec.} = 0.3870 \text{ cfs}$

50% of WQ_v (Elevation at Σ Volume = 11,145 c.f.) = 871.26

At Elev. = 871.26, H = 0.46'
 $Q_{50\%} = 0.61 \times 0.0491 \text{ sq. ft.} \times \sqrt{(64.4 \times 0.46 \text{ ft.})}$
 $= 0.1630 \text{ cfs}$
 $Q_{avg} = (Q_{max} + Q_{50\%}) / 2 = (0.2427 + 0.1630) / 2 = 0.2029 \text{ cfs}$

Drawdown time: $T_{50} = 11,145 \text{ c.f.} / 0.2029 \text{ cfs} = 54,929 \text{ sec} = \mathbf{15.26 \text{ hours}} > 8 \text{ hours} \checkmark$

SEDIMENT BASIN DATA											
BASIN DESIG.	STORAGE VOLUME NEEDED		DEWATERING STORAGE VOLUME PROVIDED		WIDTH OF EMERGENCY SPILLWAY (FEET)	EMERGENCY SPILLWAY ELEV. (FEET)					
	WATERSHED AREA (ACRES)	X 1000 C.F./AC. = (C.F.)	N.W.E. AREA (S.F.)	N.W.E. CREST AREA (S.F.)				TOTAL STORAGE (C.F.)			
SB	29.73	53,514	870.5	15,650	874.3	26,860	83,256	5	876.0		
SEDIMENT VOLUME NEEDED		SEDIMENT STORAGE VOLUME PROVIDED		OUTLET INFO			DRAIN TIME (HRS)				
AREA OF DISTURBANCE (ACRES)		X 1000 C.F./AC. = (C.F.)	BOTTOM ELEV. (FEET)	BOTTOM AREA (S.F.)	N.W.E. AREA (S.F.)	N.W.E. CREST AREA (S.F.)	TOTAL STORAGE (C.F.)	BARREL PIPE (IN.)	RISER PIPE (IN.)	ORIFICE (IN.)	
12.96		12,960	866.0	5,209	870.5	15,650	42,673	24	---	3	79

ORIFICE INVERT = 870.50

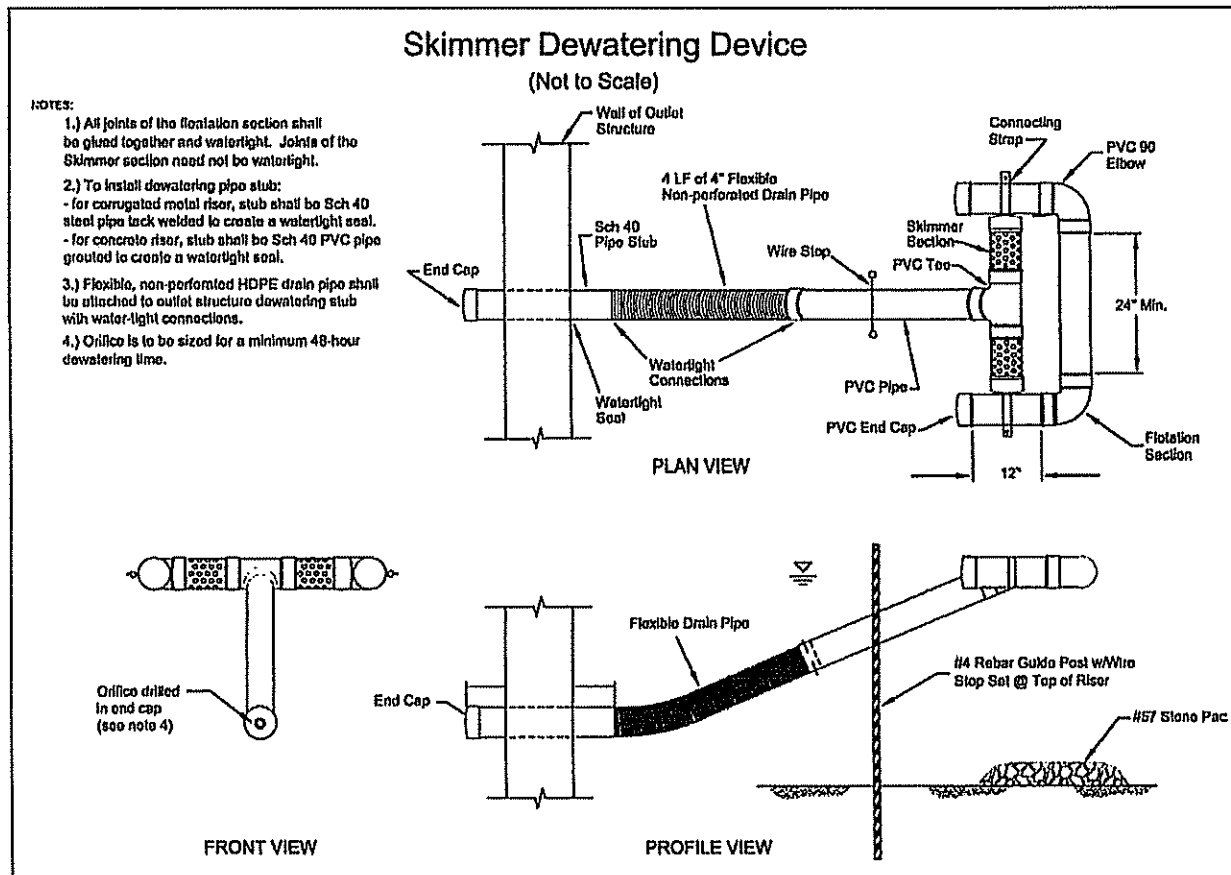
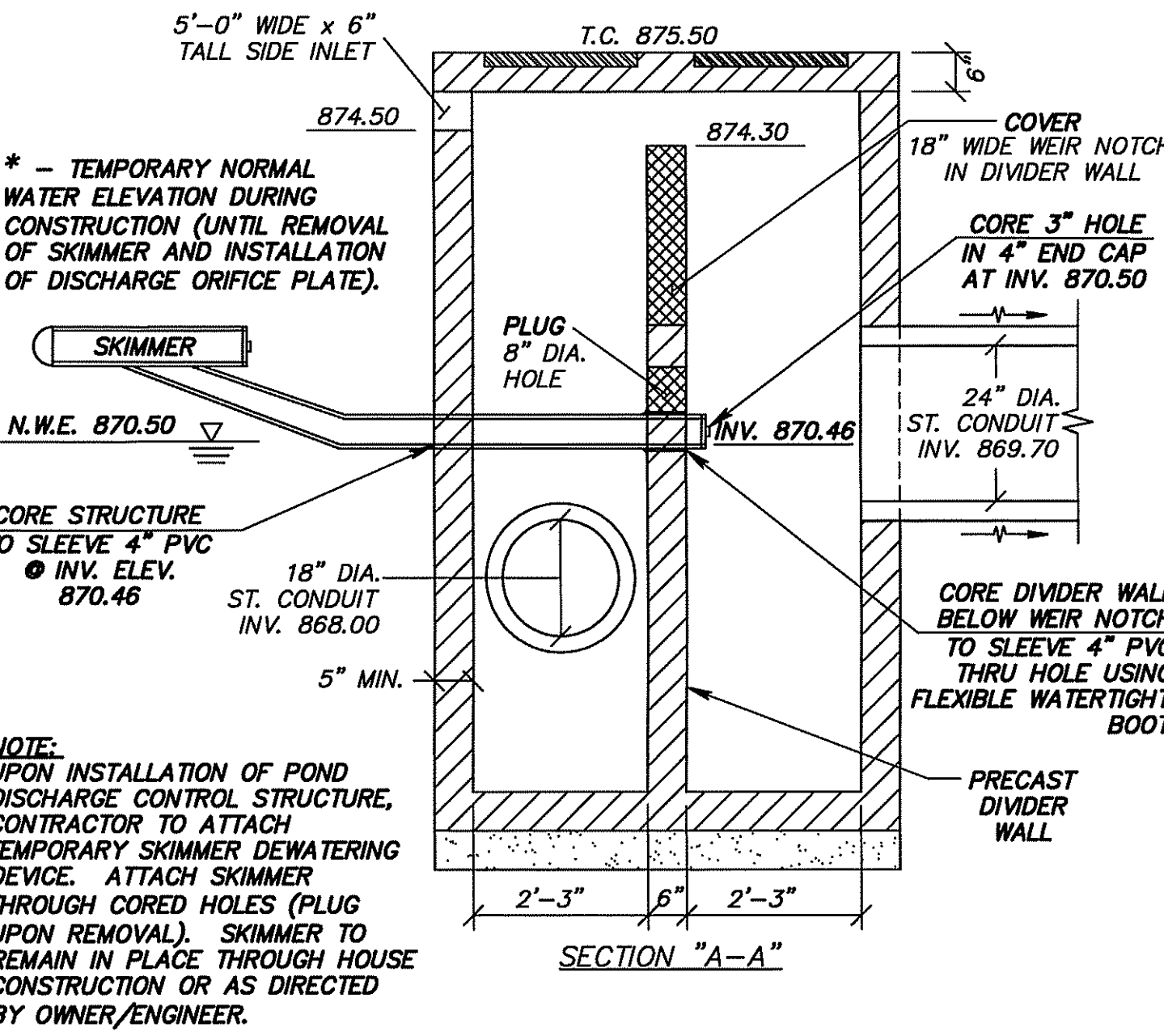


Figure 6.1.7 Delaware Dept. of Transportation Skimmer



**SEDIMENT BASIN DETAIL:
SKIMMER CONFIGURATION AT POND DISCHARGE CONTROL STRUCTURE NO. 46**

SCALE: 1/2" = 1'-0"

LEGEND

- PROPERTY LINE/ DRAINAGE SWALE
- EXISTING DRAINAGE
- - - FINISHED DRAINAGE
- ⊕ TREE/VEGETATIVE AREA CONSERVATION
- ⊕ SILT FENCE
- ⊕ TEMPORARY SEEDING UNDER CONSTRUCTION
- ⊕ GRAVEL ENTRANCE/ EXIT PAD
- ⊕ CURB INLET PROTECTION
- ⊕ SURFACE WATER INLET PROTECTION
- ⊕ SOIL STOCKPILE
- ⊕ PERMANENT SEEDING

- NOTES:**
1. EROSION/SEDIMENT CONTROL PRACTICES MUST BE FUNCTIONAL AND MAINTAINED THROUGHOUT CONSTRUCTION.
 2. PERMANENT SEEDING AND MULCH MUST BE ESTABLISHED IMMEDIATELY AFTER FINAL GRADING.
 3. SOIL EROSION AND SEDIMENT CONTROL PRACTICES FOR ANY WORK BEING DONE ON INDIVIDUAL LOTS SHALL BE THE RESPONSIBILITY OF THE HOME BUILDER, WHO MUST FILE AN INDIVIDUAL LOT NOTICE OF INTENT (NOI) WITH THE OHIO EPA.

SAMPLE EROSION/SEDIMENT CONTROL PRACTICE PLAN FOR TYPICAL INDIVIDUAL LOT (ONE-OR-TWO FAMILY DWELLING) UNDER CONSTRUCTION

NO SCALE

GABION/RENO MATRESS

THE GABIONS OR RENO MATRESS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS, THE MANUFACTURER'S RECOMMENDATIONS, AND AS DIRECTED BY THE ENGINEER. THE WORK CONSISTS OF PROVIDING ALL EXCAVATION, LABOR, MATERIALS, AND EQUIPMENT REQUIRED FOR THE COMPLETE INSTALLATION OF GABIONS. THEY SHALL BE TERRA AQUA GABIONS, INC. HEAVY DUTY RECTANGULAR BASKETS OR RENO MATRESSES, OR AN APPROVED EQUAL MANUFACTURED FROM ZINC COATED (GALVANIZED) STEEL WIRE OF DOUBLE TWIST HEXAGONAL WEAVE. EACH GABION MAY BE DIVIDED BY DIAPHRAGMS INTO CELLS WHOSE LENGTH SHALL BE GREATER THAN ONE HALF THE WIDTH OF THE GABION. MESH SHALL HAVE A NOMINAL OPENING OF 3 1/4" x 1/2" AND WIRE SHALL BE 0.1811 INCH DIAMETER (TERRA AQUA GABIONS), OR MESH SHALL HAVE A NOMINAL OPENING OF 2 1/2" x 3 1/4" AND WIRE SHALL BE 0.0668 INCH DIAMETER (TERRA AQUA RENO MATRESSES), AND ALL WIRE USED IN THE FABRICATION OF THE GABIONS AND IN WRING OPERATIONS DURING CONSTRUCTION SHALL BE COVERED WITH A ZINC COATING. THE INDIVIDUAL GABION UNITS SHALL BE LACED TOGETHER AND FILLED WITH CRUSHED STONE (NO SLAG) 4 TO 8 INCHES IN DIAMETER (GABIONS) OR 3 TO 4 INCHES IN DIAMETER (RENO MATRESSES). ALL STONE MUST BE OF SIZE SUFFICIENT TO BE RETAINED WITHIN THE MESH. BEFORE PLACING THE GABIONS, THE GROUND SURFACE SHALL BE RELATIVELY SMOOTH AND EVEN. ADJACENT GABIONS SHALL BE LACED ALONG THE PERIMETER OF ALL CONTACT SURFACES. THE MESH FORMING THE LID SHALL BE STRETCHED TIGHT WHEN THE GABION IS WIRED CLOSED IN ORDER THAT THERE CAN BE NO MOVEMENT OF THE FILL.

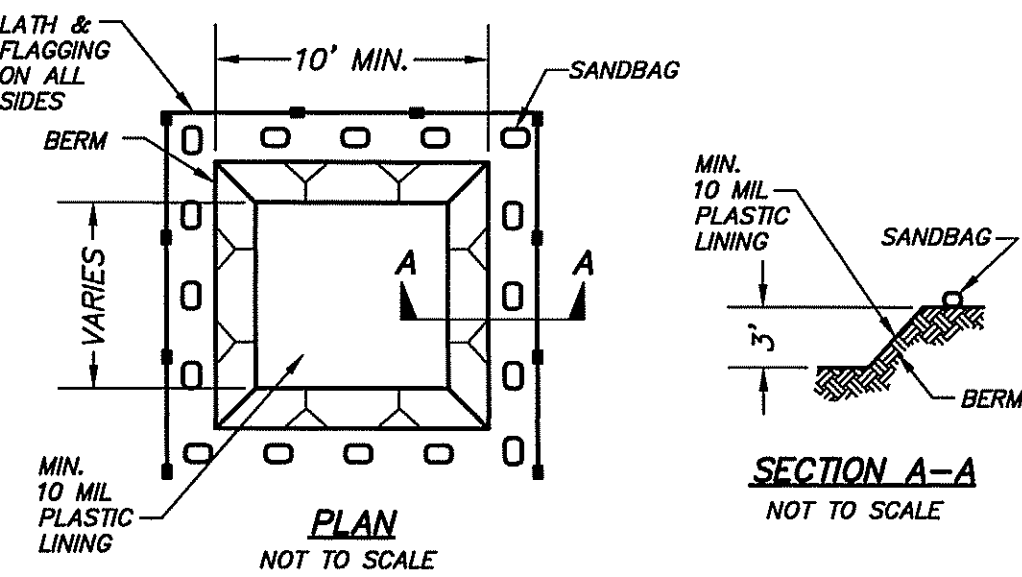
FILTER FABRIC

THIS WORK CONSISTS OF PROVIDING ALL LABOR, MATERIALS, AND EQUIPMENT REQUIRED FOR THE COMPLETE INSTALLATION OF THE FILTER FABRIC UNDER AND AROUND THE GABION STRUCTURE. THE FILTER FABRIC SHALL MEET THE REQUIREMENTS OF ODOT 712.09, TYPE B AND SHALL BE INSTALLED PER THE REQUIREMENTS OF ODOT ITEM 601.08 AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

GABION/RENO MATRESS					
QUANTITY	LENGTH (FEET)	WIDTH (FEET)	HEIGHT (FEET)	NUMBER OF CELLS	CAPACITY (C.Y.)
5	9'-0"	6'-0"	1'-0"	3	2.0

GABION/RENO MATRESS DETAIL

NO SCALE



-TEMPORARY CONCRETE WASHOUT FACILITIES (TYPE BELOW GRADE) SHOULD BE CONSTRUCTED AS SHOWN ON THE DETAIL, WITH A RECOMMENDED MINIMUM LENGTH AND MINIMUM WIDTH OF 10 FT. THE QUANTITY AND VOLUME SHOULD BE SUFFICIENT TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.

-LATH AND FLAGGING SHOULD BE COMMERCIAL TYPE.

-PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10 MIL POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.

-ALL WORK NECESSARY TO INSTALL AND MAINTAIN THE WASHOUT FACILITY SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "MAINTENANCE OF EROSION CONTROL ITEMS".

TEMPORARY CONCRETE WASHOUT FACILITY (TYPE BELOW GRADE)

SOIL PROTECTION CHART

STABILIZATION TYPE	J	F	M	A	M	J	J	A	S	O	N	D
PERMANENT SEEDING	●	●	●	●	●	●	●	●	●	●	●	●
DORMANT SEEDING	●	●	●	●	●	●	●	●	●	●	●	●
TEMPORARY SEEDING	●	●	●	●	●	●	●	●	●	●	●	●
SODDING	●	●	●	●	●	●	●	●	●	●	●	●
MULCHING	●	●	●	●	●	●	●	●	●	●	●	●

* - IRRIGATION NEEDED DURING JUNE THRU AUGUST
** - IRRIGATION NEEDED FOR 2-3 WEEKS AFTER APPLYING SOD
NOTE: DISTURBED AREAS THAT WILL BE IDLE OVER WINTER SHALL HAVE EROSION CONTROLS APPLIED PRIOR TO THE ONSET OF WINTER WEATHER.

PROJECT IMPLEMENTATION SCHEDULE

SYM.	ODOT ITEM	QUANTITIES	UNITS	DESCRIPTION
1. INITIAL SEDIMENT CONTROL MEASURES				
CRS	703.01	150	TONS	CONST. ROAD STABILIZATION NO. 2 AGGREGATE
SF	207	480	L.F.	SILT FENCING (FILTER FABRIC FENCE)
SF	207	1,880	L.F.	EXISTING SILT FENCING (FILTER FABRIC FENCE) - MAINTAIN
SB	207	1	EA.	SEDIMENTATION BASINS
ST	207	---	EA.	SEDIMENTATION TRAPS
IP	207	1	EA.	INLET PROTECTION (EXTG. INLETS)
D	207	---	L.F.	DRAINAGE WAY ROUTING (DIVERSIONS)
SPS	603	30	L.F.	TEMP. STORM CONDUIT CONSTRUCTION ROUTING
DPS	207	---	EA.	DROP PIPE STRUCTURE
SCD	207	---	EA.	SILTATION CHECK DAM
TCF	207	985	L.F.	TEMP. CONSTRUCTION FENCING
TCF	207	4,480	L.F.	TEMP. CONSTRUCTION FENCING (EXISTING) - MAINTAIN

2. SITE GRADING

TPS	651	---	C.Y.	TOPSOIL STOCKPILE
TS M	207	12.2	AC.	TEMPORARY SEEDING & MULCHING SEED MIX NO. 2
TBU	605	30	L.F.	TEMPORARY BASIN UNDERDRAINS
DP	207	---	S.Y.	DITCH PROTECTION
ES	670	22	S.Y.	EROSION CONTROL MAT (FOR EMERGENCY SPILLWAY)
EM	670	---	S.Y.	EROSION CONTROL MATTING

3. SITE IMPROVEMENT INSTALLATION -

SANITARY & STORM SEWERS, & WATERMAIN				
IP	207	40	EA.	INLET PROTECTION
IP	207	21	EA.	INLET PROTECTION (AFTER PAVEMENT CONSTRUCTION)
RP	601	---	C.Y.	ROCK OUTLET PROTECTION
GP	601	10	C.Y.	GABION OUTLET PROTECTION
LS SPEC	---	---	EA.	RIGID LIP LEVEL SPREADER

4. FINAL SITE STABILIZATION

SK	207	75	L.F.	FILTER SOCK, 12" DIA.
PS M	659	2.0	AC.	PERMANENT SEEDING & MULCHING SEED MIX NO. 1

POST-CONSTRUCTION STORM WATER MANAGEMENT
STORM WATER QUALITY POND (WET EXTENDED DETENTION)
FOR DEVELOPED AREAS.

RESIDENTIAL (SINGLE FAMILY HOMES)

SITE DESCRIPTION (TYPE OF CONSTRUCTION)		
TOTAL AREA OF SITE	38.0 AC.	
AREA TO BE EXCAVATED	14.9 AC.	
PRE-DEV. RUNOFF COEFF.	0.47	
POST-DEV. RUNOFF COEFF.	0.64	
IMPERVIOUS AREA	4.6 AC.	
% IMPERVIOUS CREATED	38%	
KNOWN PRIOR LAND USES: AGRICULTURAL & WOODS		

SOIL TYPES:	% OF SITE	% EXCAVATED
Wb: WADSWORTH SILT LOAM, 2 TO 6 PERCENT SLOPES	58	77
FcB: FITCHVILLE SILT LOAM, 2 TO 6 PERCENT SLOPES	26	66
Sb: SEBRING SILT LOAM 0 TO 2 PERCENT SLOPES	16	50

SITE LOCATION