

Project Closure & Permit Termination

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What is Project Closure?

- Making sure:
 - BMPs are built right
 - Final stabilization done/no more erosion
 - Institutional mechanism in place to require BMP maintenance and charge back if necessary
- Collecting and archiving BMP design and "as-built" data for future reference

Why is Closure Important?

- Storm water BMPs are part of a communities permanent infrastructure
 - Little things make them work right or fail
- All BMP will need future maintenance
 - It is important to have access to original design and as-built data to do it

BMP Maintenance...

...not if, but when?



Why is it Important? (cont.)

- If the BMPs do not work right, erode or fail:
 - No deep pockets to fix them – becomes a hidden tax/liability to new homeowners
 - Affects downstream water quality and property values
 - SW ordinance loses credibility and public confidence & support
 - Communities are penalized (no credit by DNR for MS4 Permits)

Outlet Pipes 1 Foot Too Low





Plugged Soils & Trees on Berm



Missing riprap/erosion/sediment



Seeding Not Successful

Outlet Not
Built to
Specs







Improperly Constructed Emergency Spillway

Improving Accountability (Continued)

- Construction verification
- Planting Verification
- Final regulatory inspection
- Permit termination
- Recording design/as-built data
- Releasing financial assurance

Project Closure Steps

Jim Rose
Waukesha County



Closure – Step 1

1. Construction & Planting Verification
 - As-built survey
 - Data summaries

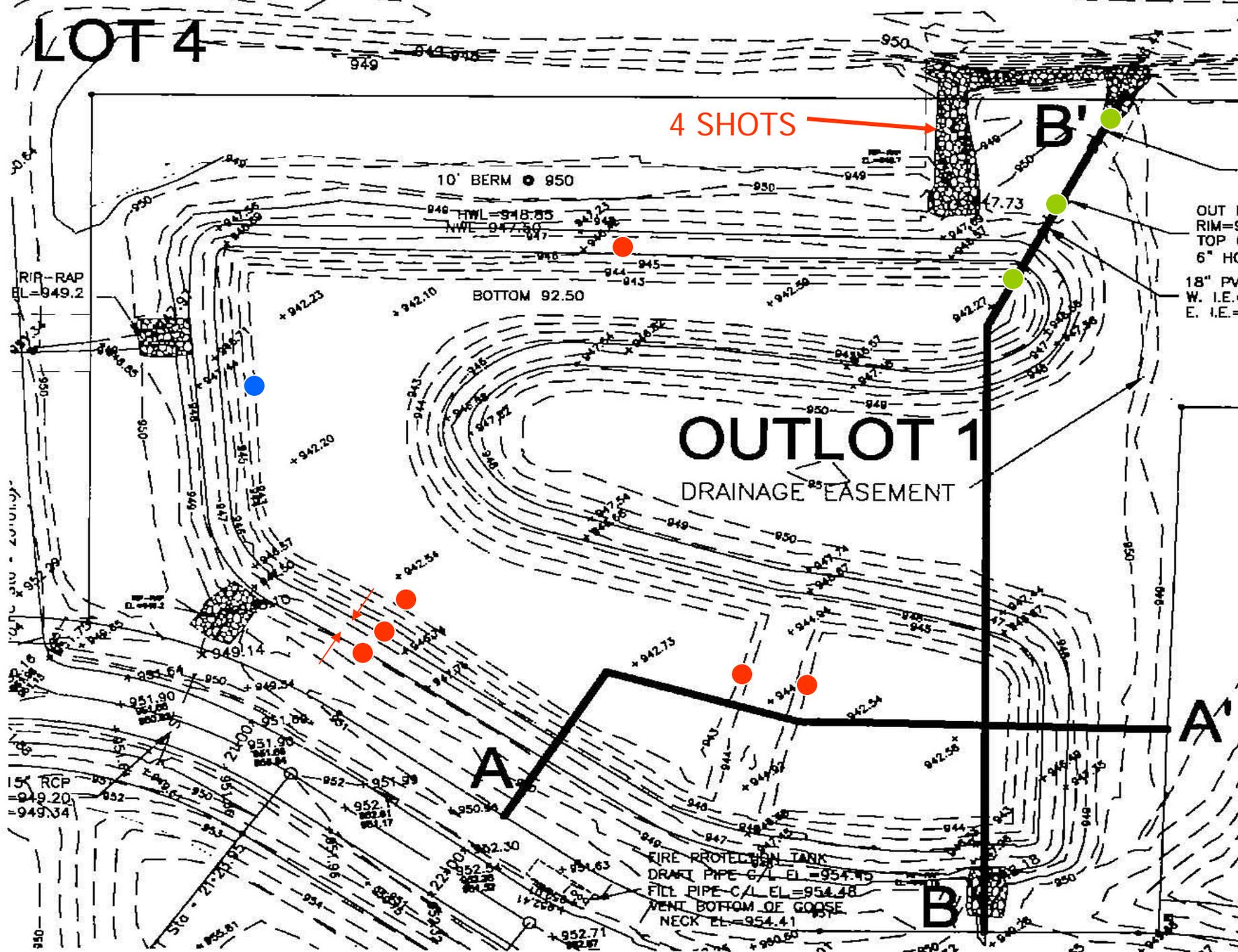


As-built Survey Standards

- Plan view location/spot elevations
 - Top of berm, spillway, pool, pipes, etc.
 - Feature outlines, final contours



LOT 4



4 SHOTS

OUTLOT 1

DRAINAGE EASEMENT

OUT P
RIM=9
TOP C
6" HO
18" PV
W. I.E.
E. I.E.=

FIRE PROTECTION TANK
DRAIN PIPE C/L EL = 954.10
VENT PIPE C/L EL = 954.48
VENT BOTTOM OF GOOSE
NECK EL = 954.41

R/R - RAP
EL = 949.2

15" RCP
EL = 949.20
EL = 949.34

10' BERM • 950

TWL = 948.85
NWE = 947.80

BOTTOM 92.50

A

B

B-B'

A'

As-built Survey Standards

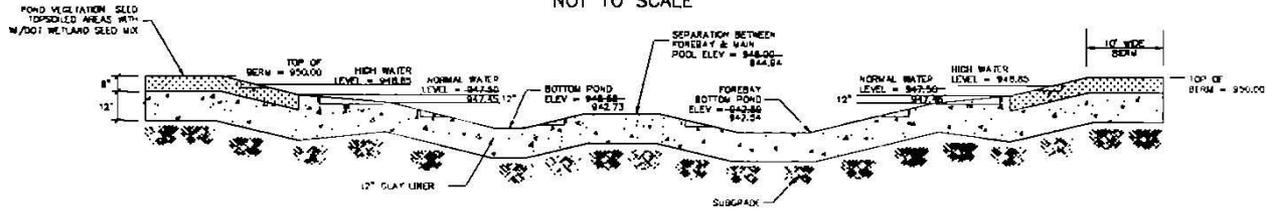
- Plan view location/spot elevations
 - Top of berm, spillway, pool, pipes, etc.
 - Feature outlines, final contours
- Cross-sections
 - Top/bottom of berm, water line, safety shelf, spillway, etc.
 - Side slopes, liners, trenches, structures, etc.



Exhibit E (continued)

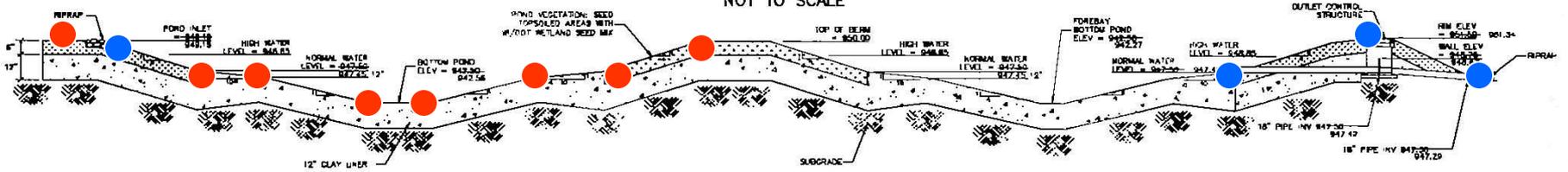
CROSS SECTION A-A'

NOT TO SCALE



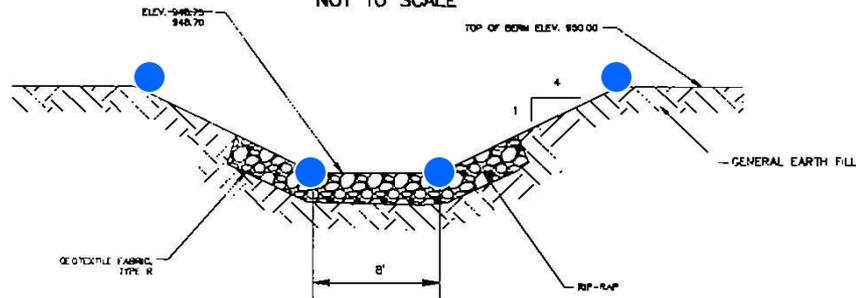
CROSS SECTION B-B'

NOT TO SCALE



EMERGENCY SPILLWAY DETAIL

NOT TO SCALE



As-built Survey Standards

- Plan view location/spot elevations
 - Top of berm, spillway, pool, pipes, etc.
 - Feature outlines, final contours
- Cross-sections
 - Top/bottom of berm, water line, safety shelf, spillway, etc.
 - Side slopes, liners, trenches, structures, etc.
- Conveyance system



As-Built Documentation

The as-built documentation shall be stamped and signed by a registered land surveyor or an engineer licensed in the State of Wisconsin and must contain the following statement:

"I hereby certify that, to the best of my knowledge and in accordance with applicable standards, the survey data presented in this document reflects as-built locations and elevations for the storm water management facilities shown."

Planting Verification

- Wetland and warm season plants (native species – plugs or seeds)
- Critical to BMP function
- Special site preparation/maintenance
- Slow establishment
- Difficult to identify early
- Specialist sign-off (70% coverage)



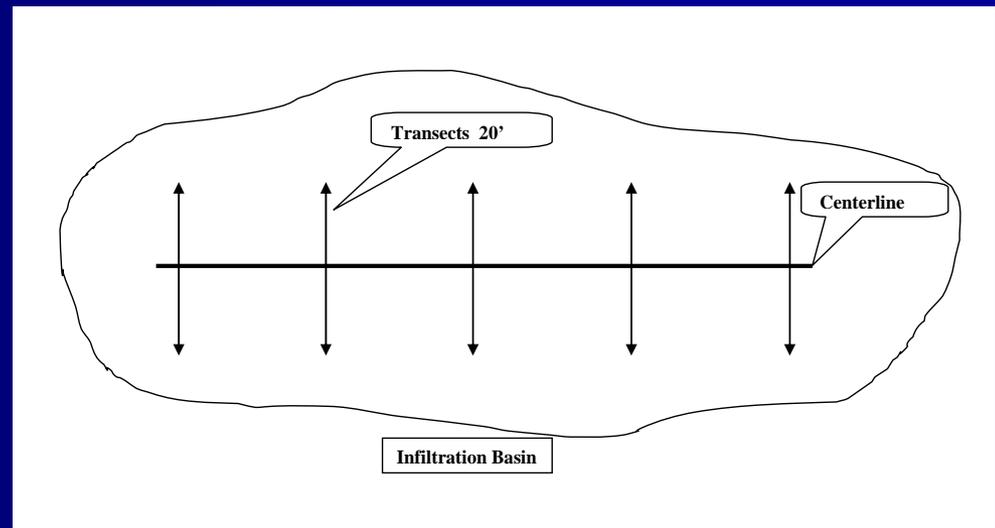
Planting Verification Transect

One Transect Per 5,000
Sq. Ft. of Basin (8/Ac)

10 Sample Pts at 1-Foot
Intervals on Each Side of
Centerline

Use Cord with knots @ 1
foot Intervals or Tape
Measure

Marker Must Touch a
Plant From the List to
Count





How to measure Cr...

Unroll for instructions

Closure – Step 2

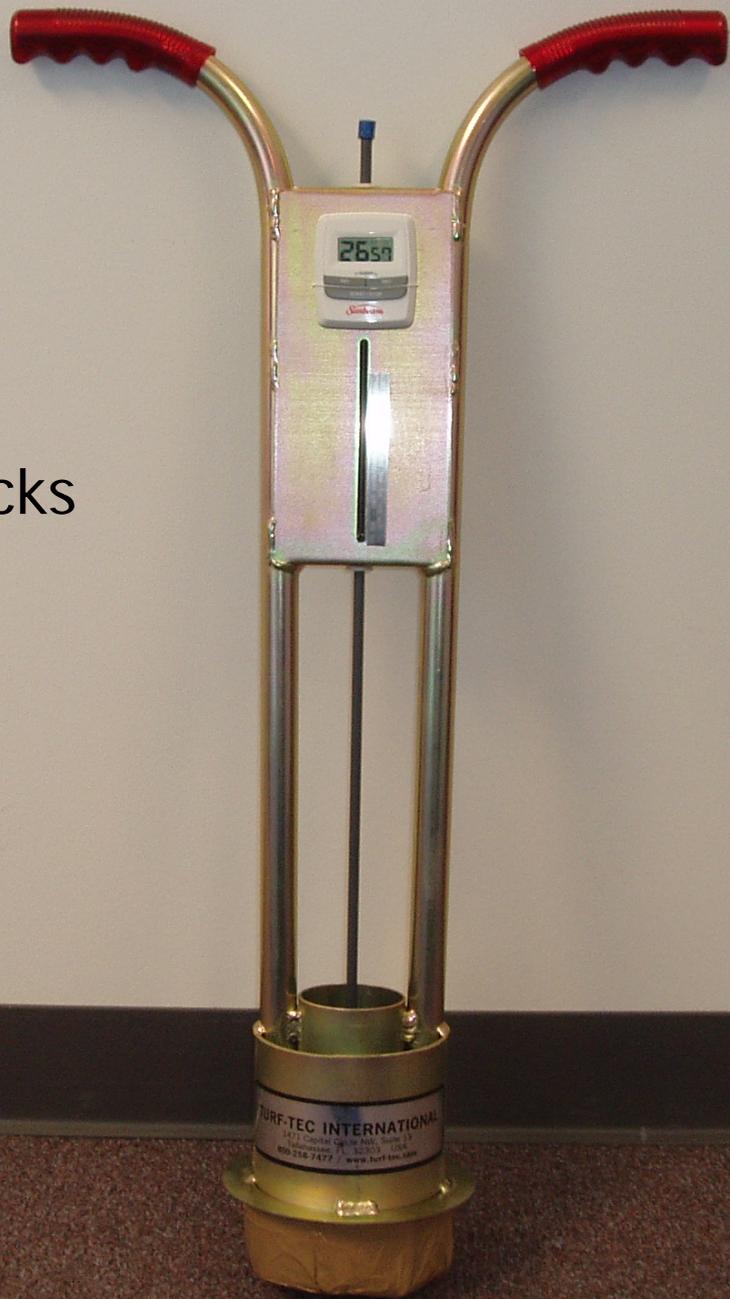
1. Construction & Planting Verification
 - As-built survey
 - Data summaries
2. **Final Inspection by Regulator**



Final Inspection Checklist

- Check for removal:
 - Silt Fence, Ditch Checks, Inlet Protection, Temp Sediment Basins, Temp Risers
- Site stabilization (70% cover)
 - Ditches, site, basins, etc.
- Installation:
 - No Trees Planted on Berm, Emergency Spillway, Rip Rap & Fabric at Outlet, Safety Shelf Planted, Liner thickness, Maintenance Access
 - Functioning? (pond level, wetness, etc.)

Infiltration spot checks



Closure – Step 3

1. Construction & Planting Verification
 - As-built survey
 - Data summaries
2. Final Inspection by Regulator
3. **Permit Termination Memo**



Expiration vs. Termination

- **Expiration** – Land disturbing activities are no longer permitted. Still need to satisfy Ordinance conditions.
- **Termination** – All conditions of the Ordinance have been satisfied.

Termination Memo

- Serves as a Notice of Termination under NR 216
- County Ordinance has been satisfied

Closure – Step 4

1. Construction & Planting Verification
 - As-built survey
 - Data summaries
2. Final Inspection by Regulator (“Stabilized”)
3. Permit Termination Memo
4. **Recording Addendum to Maintenance Agreement**



Maintenance Agreement Exhibits:

A – Legal Description

B – BMP Locations

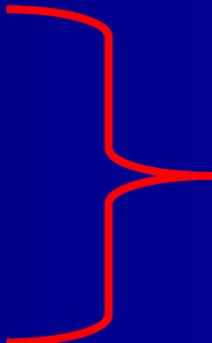
C – Maintenance Plan

D – Design Documentation

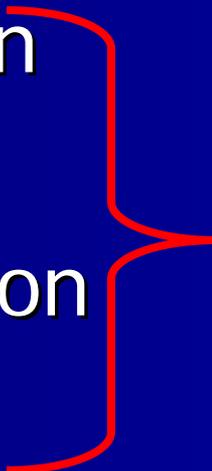
E – As-built Survey

F – Construction Verification

G – Permit Termination



Up-front
(plat/CSM)



Addendum

Watershed Data Summary

(D)

Example Data Summary Sheet for Stormwater Management Plan

Project Name: Rolling Acres Project Size: 110 Acres Project type: Residential Subdivision No. of Lots: 180
 Number of Runoff Discharge Points: 3 Watershed (ultimate discharge): Pewaukee Lake (via unnamed tributary)
 Watershed Area (including off-site runoff traveling through project area): 140 acres (30 acres off-site)
 Public Land Survey Location: SE1/4, Section 32, T8N R19E (Pewaukee Township)

Summary Data Elements	Subwatershed A		Subwatershed B		Subwatershed C	
	Pre-develop	Post-develop	Pre-develop	Post-develop	Pre-develop	Post-develop
Watershed Areas (in acres) (see attached map)	100 acres	120 acres	20	10	20	10
Average Watershed Slopes (%)	2-8%	2-8%	3-6%	3-6%	6-8%	6-8%
Land Uses (% of each) (see attached map)	75 ac. cropland 15 ac. brush 10 ac. woodland	110 ac. ½ ac. lots 5ac. brush 5 ac. woodlands	100% cropland	100% ½ ac. lots	100% Woodland	100% ½ acre lots
Runoff Curve Numbers	68 x 75ac.= 5100 30 x 25ac.= 750 Net 5850/100 ac. RCN = 59	70 x 110 ac.= 7700 10 x 10 ac.= 100 Net 7800/120ac RCN = 65	RCN = 68 (state standard)	RCN = 70	RCN = 30	RCN = 70
Conveyance Systems Types	Grass waterway	50% grass swale 50% storm sewer	100% bare channel	100% grass swale	100% natural channel	100% storm sewer
Summary of Average Conveyance System Data	8' bottom/4:1 ss 2' depth/3% grade	2' depth swale/3% 30" r/c sewer/2% (see calcs.)	15' (w) top 1' (d) parabolic 2% grade	2' deep standard road ditch 2% grade	15' top (w) 1' (d) parabolic 4% grade	2' deep standard road ditch 4% grade

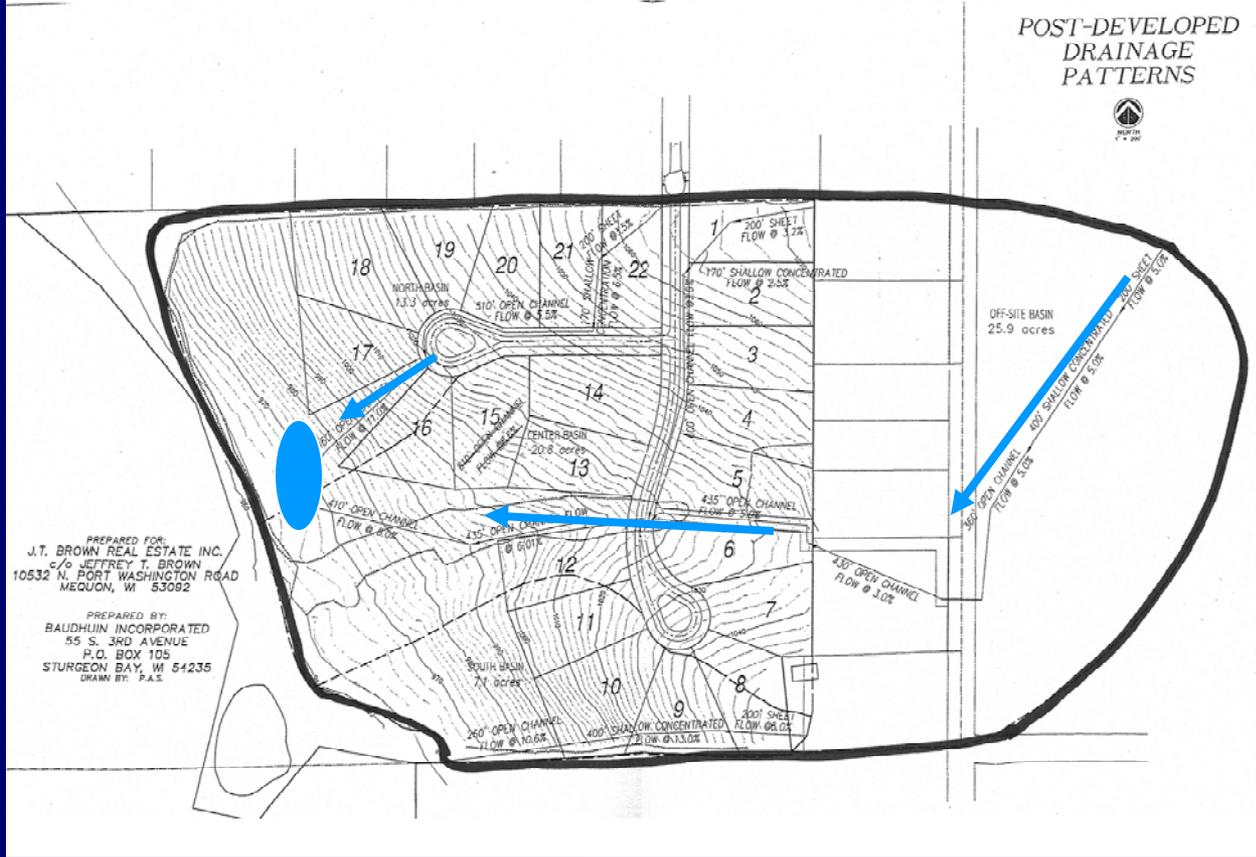
Watershed Map (D)

Should be no bigger than 11" x 17"

Exhibit D (continued)

Watershed Map. The watershed map shown below was used to determine the post-development data contained in this exhibit. The post-developed watershed areas are the same as the pre-development watershed areas for this project.

[Map scale must be sufficiently large enough to show necessary details, but page size should not exceed 11" x 17".]



BMP Design Summary (D)

- Future reference for repairs or proposed modifications

Example Data Summary Sheet for Wet Detention Basin Design

(Note: Example only – see minimum design criteria in DNR technical standard 1001)

Design Element	Design Data
Site assessment data: (see attached maps)	
Contributing drainage area to basin (subwatershed A)	120 acres
Distance to nearest private well (including off-site wells)	> 100 feet
Distance to municipal well (including off-site wells)	> 1200 feet
Wellhead protection area involved?	No
Ground slope at site of proposed basin	average 3%
Any buried or overhead utilities in the area?	No
Proposed outfall conveyance system/discharge (w/ distances)	35 ft. to CTH "U" Road ditch 1000 ft. to wetland
Any downstream roads or other structures? (describe)	Yes – 36" cmp road culvert
Floodplain, shoreland or wetlands?	No
Soil investigation data (see attached map & soil logs):	
Number of soil investigations completed	3 (in basin area)
Do elevations of test holes extend 3 ft. below proposed bottom?	Yes (see map)
Average soil texture at pond bottom elevation (USDA)	Clay loam
Distance from pond bottom to bedrock	> 5 feet
Distance from pond bottom to seasonal water table	Pond bottom 2 below mottling No water observed in test holes
General basin design data (see attached detailed drawings):	
Permanent pool surface area	1.5 acres
Design permanent pool water surface elevation	elev. 900.0
Top of berm elevation (after settling) and width	elev. 905.0 / 10 feet wide
Length/width (dimensions/ratio)	445 ft. (L) x 145 ft. (W) = 3:1
Safety shelf design (length, grade, max. depth)	10 ft. @ 10% slope/1.5' deepest
Ave. water depth (minus safety shelf/sediment)	5 ft. (in center)
Sediment forebay size & depth	.16 acres (13% pool size)/5 feet
Sediment storage depth & design maintenance	2 ft. depth for forebay & pool 15 year maintenance schedule

Design Basin Inflow, Outflow & Storage Data (see attached hydrographs and detail drawings)				
Inflow Peak/Volume	Maximum Outflow Rate	Max. Water Elevation	Storage Volume at Max. Elev. (above perm. pool)	Outflow Control Structures*
1-yr./24 hr. (volume)	.7 cfs (34 hr. drawdown)	901.3 ft.	2 acre feet	#1
24.3 cfs (Post 2-yr./24 hr. peak)	11 cfs	902.0 ft.	3.1 acre feet	#1 and #2
72 cfs (Post 10-yr./24 hr. peak)	35 cfs	903.0 ft.	4.5 acre feet	#3
171 cfs (Post 100-yr./24 hr. peak)	143 cfs	904.0 ft.	6.0 acre feet	#3 and #4

* The controlling elements are summarized below (See attached detail drawing of outlet structure):

#1 = 6 inch orifice in water level control weir plate – flow line elev. @ 900.0 (1.3 ft. max. head)

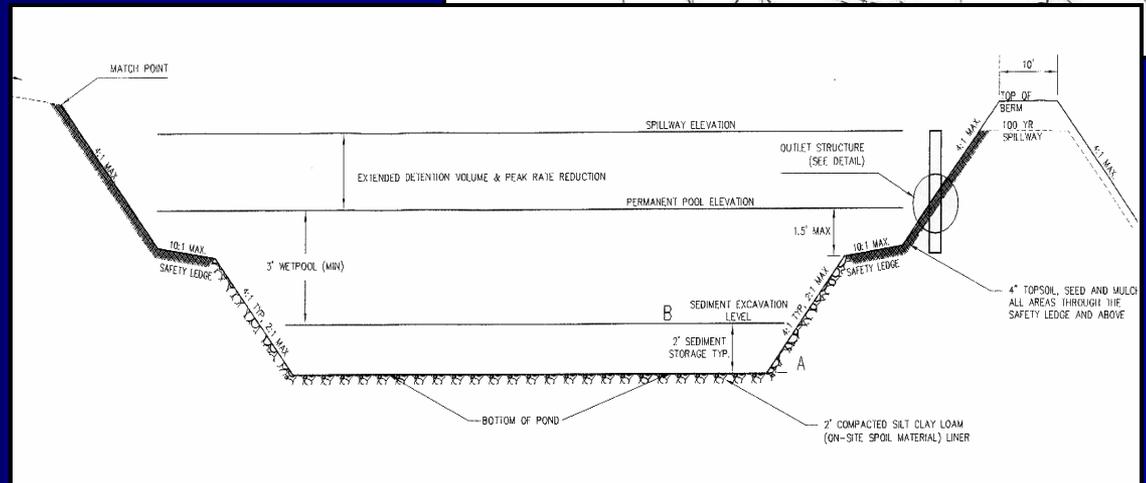
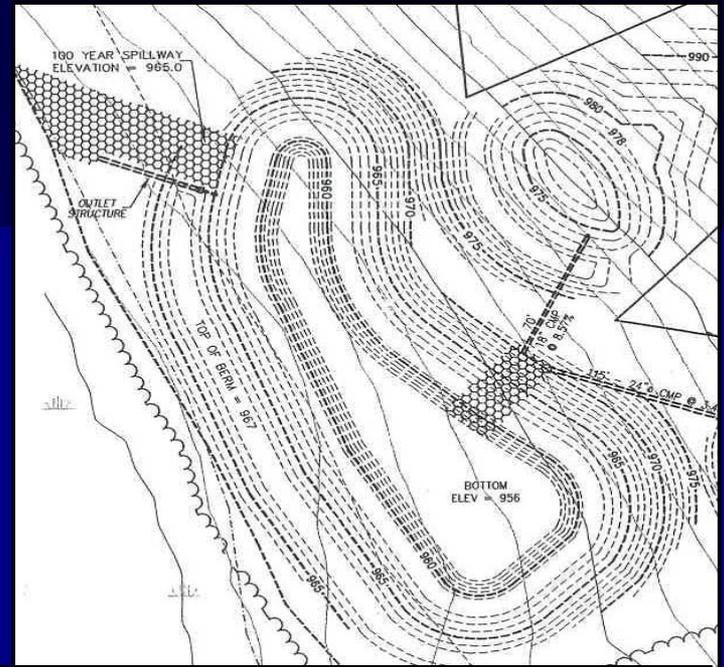
#2 = 2 foot wide rectangular weir – flow line elev. @ 901.3 (.7 ft. hydraulic head)

#3 = 30 inch diameter smooth wall pvc pipe – flow line elev. @ 900.0 (3.0 ft. max. hydraulic head)

#4 = 30 foot wide earthen/grass emergency spillway – flow line elev. @ 903.0 (1.0 ft. max. depth)

As-built Survey (E)

- Shows final construction details, elevations, etc.
- Referenced in construction verification



Construction Verification (F)

- Shows compliance with approved plans
- Documents any changes made
- References Exhibits D (design) and E (constr.)

Exhibit F Engineering/Construction Verification

DATE: 3-9-06

TO: Land Resources Division
Waukesha County Department of Parks and Land Use

FROM: Joe Engineer, P.E. – Engineering Specialists, Inc.

RE: Engineering/Construction Verification for the following project:
Project Name: Tree Line Estates Subdivision
Section 23, Town of Waukesha
Storm Water Permit #: 23158
Storm Water Management Practices: Wet Detention Basins A & B

This correspondence shall serve as verification that the storm water management practice design data presented in Exhibit D, and the “as-built” construction drawings presented in Exhibit E for the above-referenced project have been completed in accordance with all applicable state and local technical standards and in accordance with the Waukesha County Storm Water Management and Erosion Control Ordinance.

[Must include one of the following two statements:]

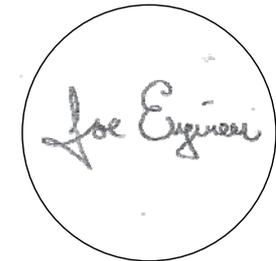
Any variations from the originally approved construction plans are noted in the Exhibit E. These variations are considered to be within the tolerances of standard construction techniques and do not affect the original design as presented in Exhibit D in any way.

[Note: The County may request additional documentation to support this statement depending on the extent of deviations from the approved plans.]

Or

Any design or construction changes from the originally approved construction plans are documented in Exhibits D and E and have been approved by Waukesha County.

[Note: If warm season and wetland planting verification is required, it may be included in this exhibit.]



(Signed P.E. stamp must be included)

Engineering & Construction Verification

Must include one of the following two statements:

- *Any variations from the originally approved construction plans are noted in Exhibit E. These variations are considered to be within the tolerance of standard construction techniques and do not affect the original design. Note: The County may request additional documentation to support this statement depending on the extent of deviations from the approved plans.*
- *Any design or construction changes from the originally approved construction plans are documented in Exhibits D and E and have been approved by Waukesha County.*

Permit Termination (G)

- Demonstrates compliance/closure to storm water permit
- Transfers BMP maintenance responsibility to the party identified in the agreement
- Final step to record maintenance agreement addendum & return financial assurance

Recording

- Get LRD approval of M.A. documents
 - LRD initials on front page
- Record the maintenance agreement
- Provide a copy of recorded documents or ROD file number to the LRD
- LRD verifies recorded documents & links to on-line database

Closure – Step 5

1. Construction & Planting Verification
 - As-built survey
 - Data summaries
2. Final Inspection by Regulator (“Stabilized”)
3. Permit Termination Memo
4. Recording Addendum to Maintenance Agreement
5. **Release Financial Assurance**



Partial Financial Assurance Release

Based on the completion or partial completion of various construction components or satisfaction of other individual requirements.



Questions?

