O&M Manual – Detention Systems

WOODLAND OAKS

SW Corner Colbern & Blackwell

PREPARED BY:

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Date: April 28, 2021

OPERATION:

Overview: Woodland Oaks 1st Plat utilizes two independent detention systems each comprised of single stage earthen detention basins designated E (North Basin) and D1 (Southwest Basin) to attenuate proposed peak storm water discharge rates. Attenuation refers to the reduction of peak storm water discharge rates. See tables for proposed peak inflows and outflows from each basin for a given storm event. The 2, 10 and 100-year storm events have been calculated. In addition the 1.37" storm event shall be detained and released over a minimum 40 to maximum 72 hour timeframe. The 1.37" storm is considered the water quality event and corresponds to the local 90% mean annual event (1.37"/24-hour rainfall). Following are a list of design parameters for each detention system.

Designation: **Detention Basin E (North)**
Type: Earthen Basin
Side Slopes: 3:1 Max.
Bottom Slope: 2% Min., Turf Lined
Basin Bottom Elevation: 934.6 @ Influent Pipe
Basin Top Berm Elevation: 944.00
Basin Volume: 200,503 cf @ 944.00
Control Structure: 5'x5' Precast Concrete Box with Interior 6" Baffle/Weir Wall
Baffle Wall Orifices: (8) 1" Diameter on 4" Centers, FL=934.00 (Bottom Orifice)
(1) 15" Diameter, FL=937.50
Baffle Wall Crest Elevation: 942
Control Structure Top Elevation: 944.00
Control Structure Overflow Weir Openings: N/A – NO Field Inlet Openings
Control Structure Influent Pipe: 30" HDPE, FL (In) = 934.60, FL (Out) = 934.20, L=51', S= 0.78%
Control Structure Effluent Pipe: 36" RCP, FL (In) = 932.78, FL (Out) = 924.42, L=47', S=17.64%
Emergency Spillway: Earthen Broad Crested Weir, Crest Elevation=942.00, Crest Length=160' Consecutive 100-YR Q=83.98 cfs, Emergency Spillway HGL=942.34', Freeboard=1.66'

The Detention Basin Plan for the Development may be found in Exhibit A. Emergency spillway calculations may be found in Exhibit B.

Detention Basin E (North) Data

	Peak Q In (cfs)	Tp In (min.)	Peak Q Out (cfs)	Tp Out (min)	Peak W.S.E.	Max. Storage Vol. (cf)
Basin E						
2-Year	27.74	721	3.03	754	938.30	35,284
10-Year	50.20	721	7.99	738	939.66	63,060
100-Year	83.98	721	11.86	741	941.49	111,524

Designation: **Detention Basin D1 (Southwest)**
Type: Earthen Basin
Side Slopes: 3:1 Max.
Bottom Slope: 2% Min., Turf Lined
Basin Bottom Elevation: 908.40 @ Influent Pipe
Basin Top Berm Elevation: 918.00
Basin Volume: 114,055 cf @ 918.00
Control Structure: 5'x4' Precast Concrete Box with Interior 6" Baffle/Weir Wall
Baffle Wall Orifices: (6) 1" Diameter on 4" Centers, FL=908.20 (Bottom Orifice)
(1) 12" Diameter, FL=913.50
Baffle Wall Crest Elevation: N/A
Control Structure Top Elevation: 916.50
Control Structure Overflow Weir Openings: None
Control Structure Influent Pipe: 24" HDPE, FL (In) = 908.40, FL (Out) = 908.30, L=42.66, S= 0.23%
Control Structure Effluent Pipe: 24" HDPE, FL (In) = 908.10, FL (Out) = 908.00, L=25.47', S= 0.39%
Emergency Spillway: Earthen Broad Crested Weir, Crest Elevation=916.00, Crest Length=78'
Consecutive 100-YR Q=51.64 cfs, Emergency Spillway HGL=916.40, Freeboard=1.60'

Detention Basin D1 (Southwest) Data

	Peak Q In (cfs)	Tp In (min.)	Peak Q Out (cfs)	Tp Out (min)	Peak W.S.E.	Max. Storage Vol. (cf)
Basin D1						
2-Year	17.16	719	0.47	926	912.31	24,502
10-Year	30.94	719	1.35	811	913.89	43,577
100-Year	51.64	719	5.29	747	915.40	66,564

MAINTENANCE:

Overview: Maintenance for all elements of the detention facilities shall be the responsibility of the HOA. Annual or more frequent inspections shall be made by the responsible party to assure that all inlet and outlet structures are fully functional and the detention basin has full storage capacity.

Maintenance Activities and Frequencies:

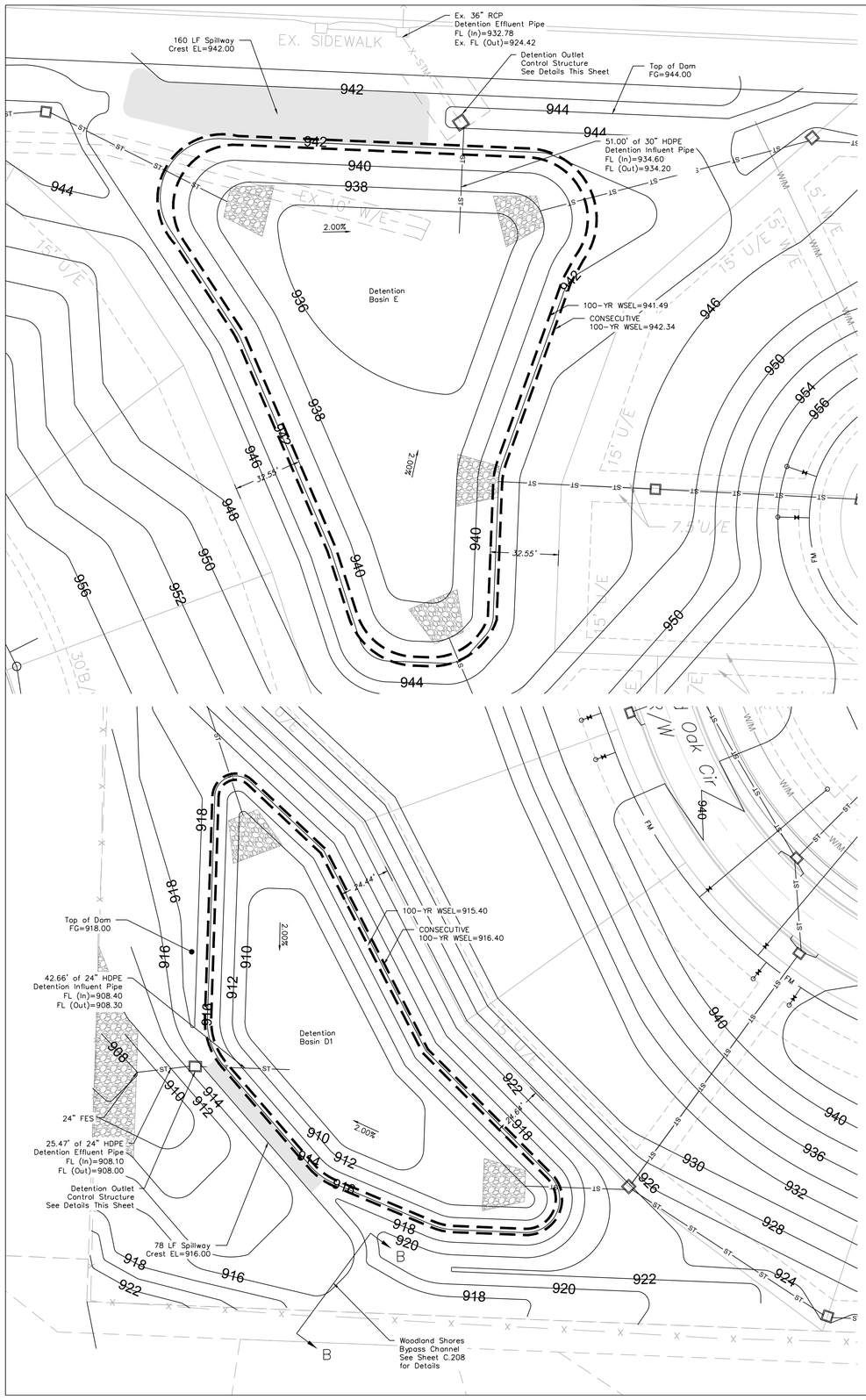
- Schedule semiannual inspection for the beginning and end of the wet season and after each extreme storm event for standing water, slope stability, sediment accumulation, trash and debris, and presence of burrows. The banks and bottom of the basin shall be checked and areas of erosion repaired. Remove nuisance wetland species and take appropriate measures to control mosquitoes. Remove sediments if they are within 18 inches of an orifice plate.

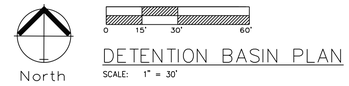
- Remove accumulated trash and debris in the basin and around the outlet structure during the semiannual inspections or as noticed. The frequency of this activity may be altered to meet specific site conditions.
- Check outlet after each storm event greater than 0.5 inches for clogging and remove any debris. If ponding greater than 72 hours occurs access control structure and rake/remove debris causing blockages. The water quality storm should be completely released within 40-72 hours for each basin.
- Grassy areas shall be mowed routinely for aesthetic and vector reasons. Repairs shall be made to signage, walkways, picnic tables, or any other public recreation equipment as needed. If both the operational and aesthetic characteristics of a dry pond are not maintained, then it will be viewed as an eyesore and negative environmental impact even if it is functioning properly.
- Remove sediment when accumulation reaches 6 inches, or if resuspension is observed or probable. Sediment may be permitted to accumulate deeper than 6 inches if there is a permanent marker indicating the depth where sediment needs to be removed and that mark has not been met.

<u>Sediment Removal:</u>

Some sediment may contain contaminants of which the Missouri Department of Natural Resources (MDNR) requires special disposal procedures. If there is any uncertainty about what the sediment contains or it is known to contain contaminants, then MDNR should be consulted and their disposal recommendations followed.

Some sediment collected may be innocuous (free of pollutants other than “clean” soil) and can be used as fill material, cover, or land spreading. It is important that this material not be placed in a way that will promote or allow resuspension in stormwater runoff. The sediment shall not be placed within the high water level area of the EDDB, other BMP, creek, waterway, buffer, runoff conveyance device, or other infrastructure.



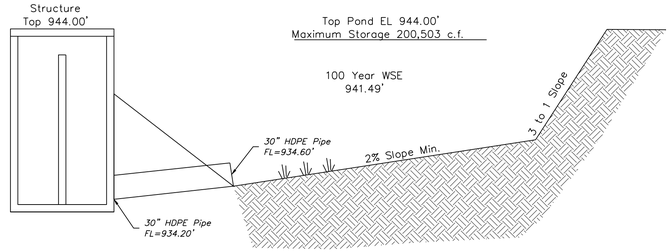


DETENTION BASIN PLAN

SCALE: 1" = 30'

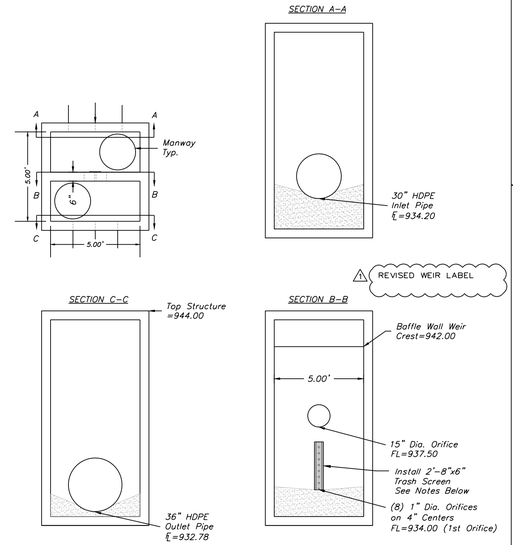
ADDED 100-YR WSE CLOGGED BOTH BASINS

NOTES:
1. BOTH BASINS SHALL BE CONSTRUCTED WITH THE EROSION AND SEDIMENT CONTROL MEASURES.
2. AN AS-BUILT DETENTION BASIN PLAN SHALL BE SUBMITTED AND ACCEPTED PRIOR TO ISSUANCE OF A CERTIFICATE OF SUBSTANTIAL COMPLETION, WITH AS-BUILT VERSUS PROPOSED STORAGE.



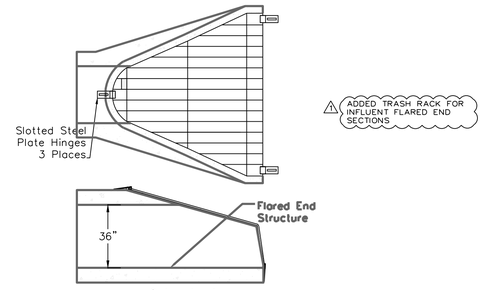
SECTION VIEW - BASIN E

N.T.S.



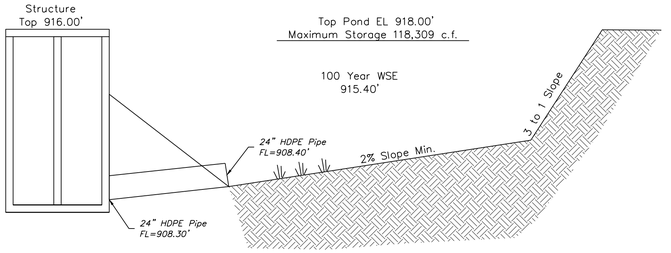
CONTROL STRUCTURE - BASIN E

1/4" = 1'-0"



ADDED TRASH RACK FOR INFLUENT FLARED END SECTIONS

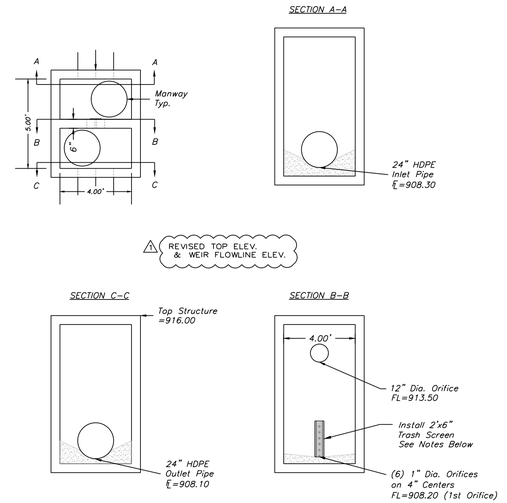
Galvanized
Trash Guard
For Influent Flared Ends
(Both Basins)



SECTION VIEW - BASIN D1

N.T.S.

REVISED EMERGENCY SPILLWAY LOCATION/LENGTH



CONTROL STRUCTURE - BASIN D1

1/4" = 1'-0"

ADDED ANTI-CLOGGING MEASURES BOTH STRUCTURES

Notes:
1. *Trash Screen Shall be Galvanized Wire Mesh Panel w/ 1/2" Mesh x 10 Gauge Wire*
2. *Fasten Screen to Baffle Wall w/ 1"x1/4" Galvanized Metal Straps bolt on 1' centers w/ 3/8" Anchor Bolts*

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Professional Registration
Missouri
Engineering 2005002186-D
Surveying 2005000319-D
Kansas
Engineering E-1695
Surveying LS-218
Oklahoma
Engineering 6254
Nebraska
Engineering CA2821

Part of the Southeast 1/4
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

Project: WOODLAND OAKS LSMO
Issue Date: February 25, 2021

Detention Basin Plan

Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri

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OK PE 25226
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REVISIONS

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