

Stormwater BMP Operation & Maintenance (O&M) Manual

Orchard Woods

1204 Ne Woods Chapel Road
Lee's Summit, Jackson County, Missouri

Prepared by:



Consultant: **PHELPS ENGINEERING, INC.**
1270 N. Winchester
Olathe, KS 66061
(913) 393-1155

Owner: **ENTRES DEVELOPMENT, LLC**
424 Ne Brockton Drive
Lee's Summit, MO 64064
310-760-6205

PEI #211142
October 5, 2023
Revised: January 23, 2024

Stormwater Management Facilities Description

Per the approved Stormwater Treatment Plan and constructions plans, the Orchard Woods Development includes the following stormwater treatment BMPs.

- Extended Dry Detention Basin

The extended dry detention basin is proposed within the northwest corner of the site, see attached site plan for the location of each BMP.

Extended dry detention basins (EDDB) provide stormwater volume control and may integrate water quality treatment by the infiltration and filtration of water through the turf grass and soil provided within the basin. Turf grasses shall be established and maintained within the entire basin. These grasses provide erosion control and stabilization for EDDBs.

A typical extended dry detention basin consists of a dry bottom basin. The bottom of basin shall slope towards the outlet structure at a minimum slope of 2%. The basin is typically drained by an outlet structure with multiple orifices. The only unique feature of this basin is the proposed retaining wall within the basin.

Site Contacts and Requirements for Change of Ownership or Manual Revision

Site Contacts:

Owner: Entres Development, LLC

Atten: Daniel Villanueva

Address: 424 Ne Brockton Drive Lee's Summit, Missouri, 64064

Phone: (310) 760-6205

The extended dry detention basin located within the site boundary will be owned and maintained by the ownership group listed above. In the event this manual requires an update this will be completed by Phelps Engineering Inc. (PEI). The updated manual will be submitted to the City of Lee's Summit for approval and subsequently distributed to the appropriate parties. In the event of a change in ownership of the site, the City of Lee's Summit will be notified of this change and the new ownership will inherit all maintenance requirements identified within this report.

Maintenance Procedure

Primary maintenance in EDDBs is related to maintaining dry conditions, repairing erosion, and managing vegetation. EDDB structures handle sporadic, intense runoff events, and are vulnerable to erosion on the side slopes and the flow line of the basin. Preserving design elevations through routine maintenance to forebays, swales, other pretreatment structures, and the contributing drainage area is critical to avoiding costly dredging. The side slopes shall conform as closely as possible to regraded or natural land contours, and shall not exceed 4:1 (H:V). Slopes showing excessive erosion may require erosion control and safety measures (Kansas City Metropolitan Chapter of the American Public Works Administration, 2006).

Routine inspection to ensure outlets are functioning properly prevents standing water issues. If a v-notch weir or orifice plate is used to control flow, weekly inspections may be required to ensure the opening is clear of vegetation, trash,

or other debris. Blocked outlet structures create standing water that can kill desired vegetation, encourage undesirable weed growth, and damage trash racks or other outlet structures. Inspect for evidence of muskrats, beavers, and other animals that can severely degrade the function of the basin. Additionally, routine inspection of the outfall of the basin into a stream or subsequent stormwater facility to identify erosion and prevent any head-cutting will avoid degradation and costly repair to the basin. These inspections shall be done as necessary but at minimum once a year.

Well-established turf grass in an EDDB can preclude weed infestation by occupying the root space and canopy sunlight. This will also help to reduce erosion within the basin. Maintenance of these grasses will include the removal of any woody or noxious vegetation as well as routine mowing. The removal of all debris shall be performed in strict accordance with all local codes and ordinances. String trimming to prevent disturbance from mowing equipment on saturated soils is strongly recommended. This should be done every two weeks during growing season.

During inspections, if it is determined that any components of the basin have been damaged and require replacement, they shall be replaced with materials matching the specifications listed below.

Pipe – ADS N12 Dual Wall HDPE

Outlet Structure – Lee's Summit current detail

Trash Rack – Shawnee Steel and Welding Inc. DWG No. "INLT 6X10X6" and "INLT 7X10X6"

Rip-Rap – 150 lbs. (min.) Rip-Rap

Maintenance and inspection activities shall only be conducted when the basin is empty and care should be taken when performing these activities to ensure the safety of those conducting the activities. Potential hazards should be anticipated, and steps should be taken to avoid them. Confined spaces shall not be entered without proper training, monitoring, and equipment.

Inspection Procedures

Inspection shall be performed by a qualified individual who is familiar with the operation of the BMP facilities. Inspections during the first year of operation will be required every 3 months using the inspection checklist provided in the Appendix of this report. After the first year of operation, inspections shall be required annually using the inspection checklist in the Appendix of this report. Inspection forms shall be retained for 10 years from the inspection date.

BMP Waste Disposal

All of the following shall be considered BMP waste and shall be disposed of in strict accordance with all local codes and ordinances.

- Woody or invasive vegetation
- Sediment
- Trash/Debris
- Oil/Gasoline/Salt build up

The removal of all waste shall be scheduled during a time when local weather forecasts do not anticipate any rainfall. If rainfall occurs during removal, all dispose activities shall be stopped until dry conditions exist and sediment protection shall be provided as necessary.

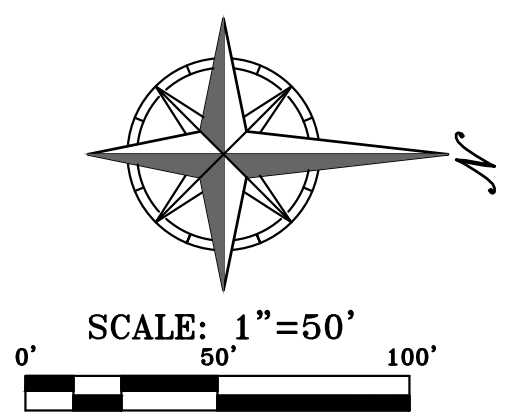
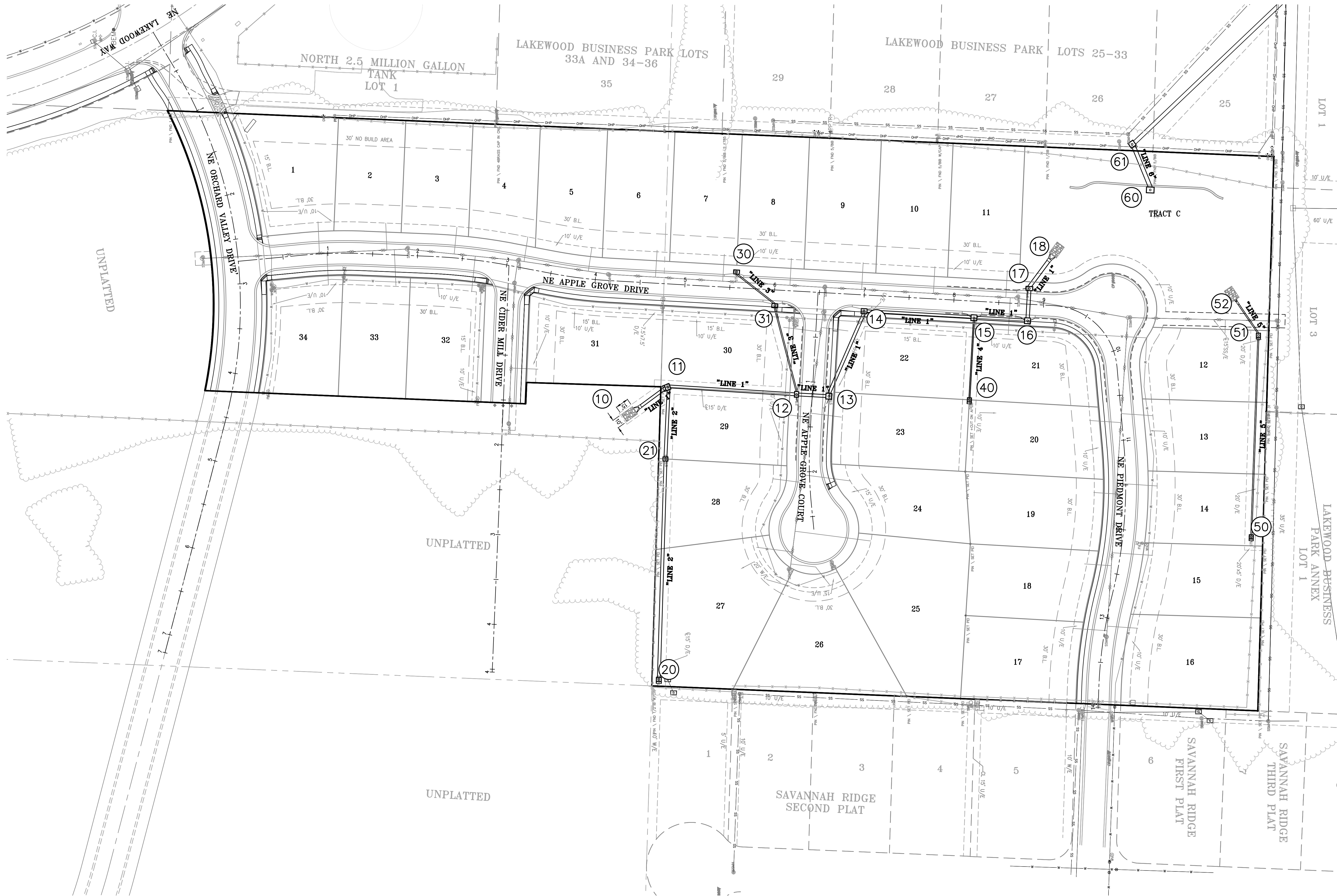
BMP SIGNAGE

BMP signage shall be:

- 12" x 18"
- 0.080 Steel or Aluminum
- Rounded Corners
- 0.375" holes 1.5" from top and bottom edge on center

Appendix

\\PHILIPS-SERVER\Projects\Projects\211142\Drawings\STORM SEWER general layout.dwg Layout:1 Jun 15, 2024 - 1:36pm JEANETTE CPAT



"AS-BUILT"
DATED: 11-13-23 BY: JTK

PROJECT NO.	211142	No.	Date	Revisions:	By	App.
DATE: 10-21-2022	DRAWN: BUG	1.	2-27-23	REVISED PER CITY COMMENTS	JMO	DEU
CHECKED: DEU	APPROVED: DEU	2.	4-24-23	REVISED PER CITY COMMENTS	JMO	DEU
CERTIFICATE OF AUTHORIZATION		3.	6-15-23	REVISED PER CITY COMMENTS	BUG	DEU
LAND SURVEYING - LS-82		4.	7-20-23	REVISED PER CITY COMMENTS	MRH	DEU
ENGINEERING - E-36		5.	10-11-23	REVISED TOP OF CURB ELEVATIONS	KAD	DEU
CERTIFICATE OF AUTHORIZATION						
LAND SURVEYING - LS-82						
ENGINEERING - E-36						

SHEET
12

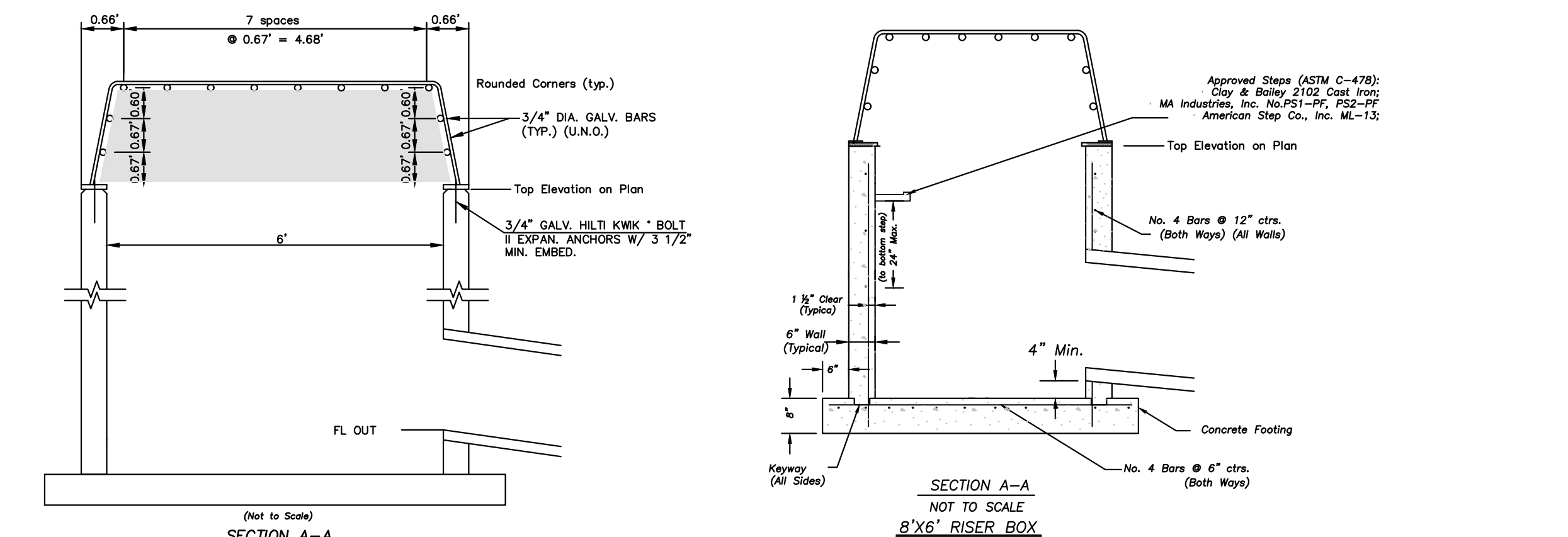
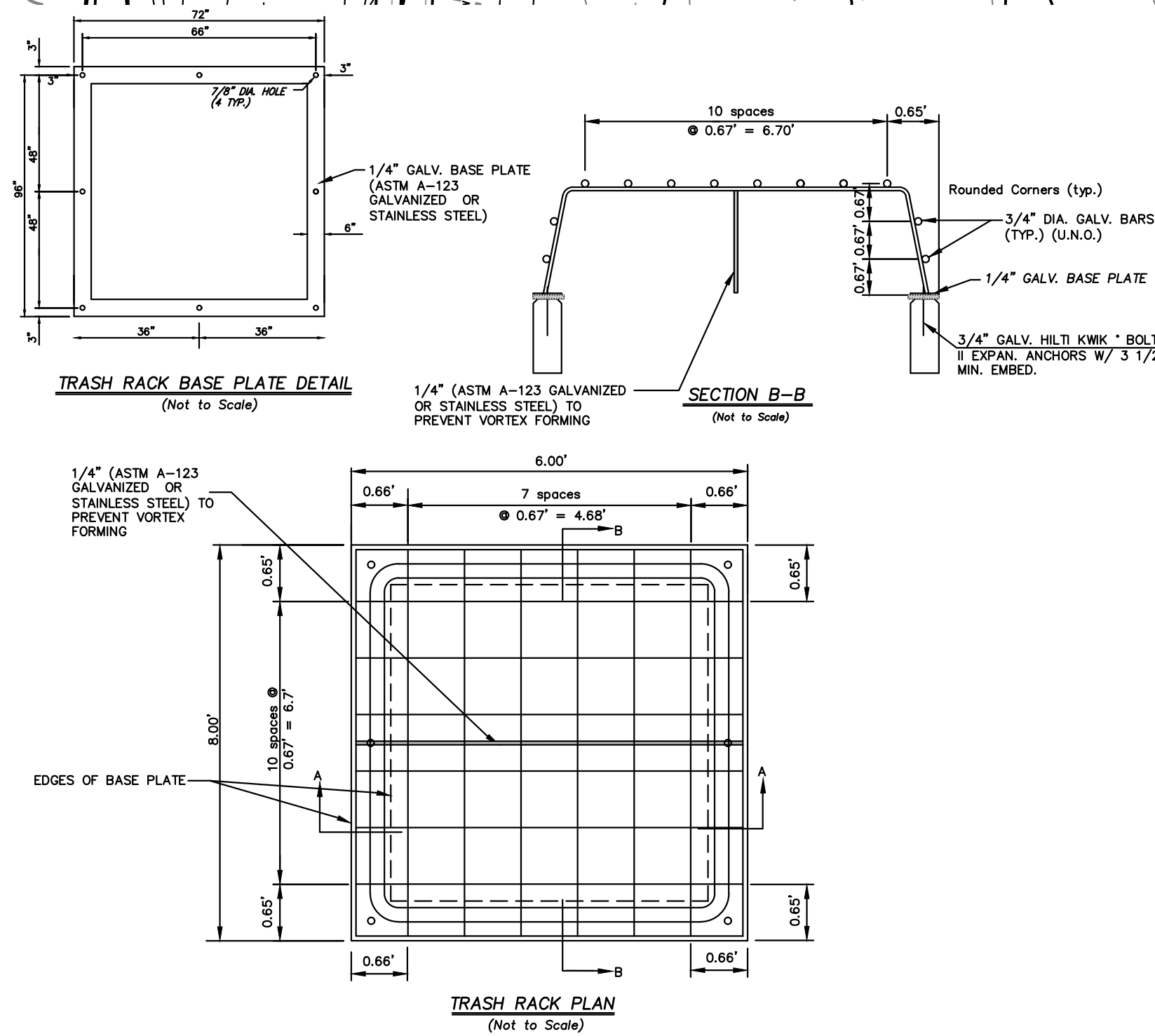
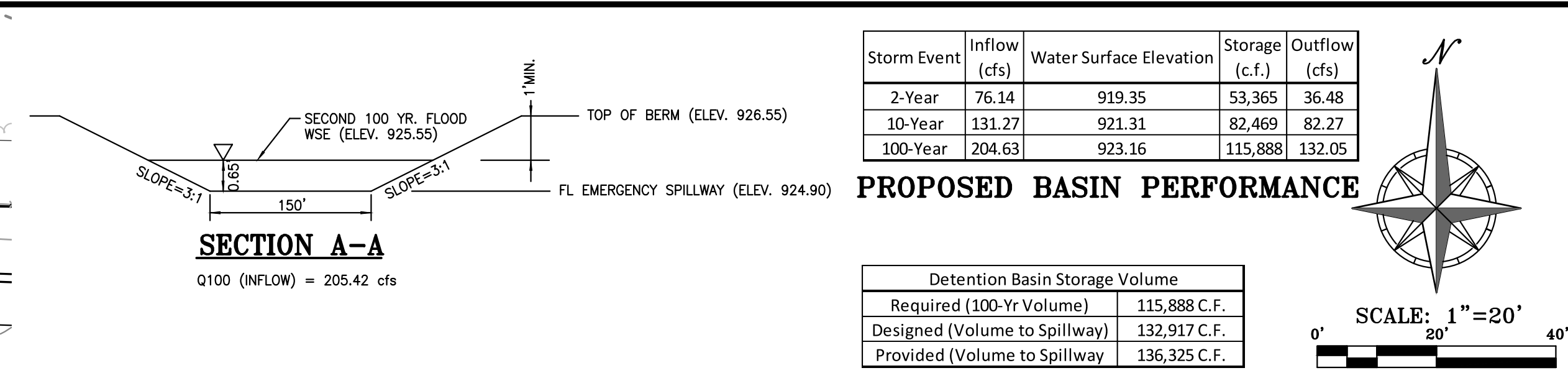
STORM SEWER GENERAL LAYOUT
ORCHARD WOODS
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI



PLANNING
ENGINEERING
IMPLEMENTATION

PHILIPS ENGINEERING, INC.
1270 N. Winchester
Olathe, Kansas 66061
(913) 393-1155
Fax: (913) 393-1166
www.phelpsenr.com





NOTE

1. All steel components shall be hot dip galvanized

NOTE
1. Concrete & Reinforcing to be constructed per City of Lee's Summit standard Junction Box.

“AS-BUILT”

DATED: 11-13-23 BY: JTK

Storm Event	Inflow (cfs)	Water Surface Elevation	Storage (c.f.)	Outflow (cfs)
2-Year	76.14	919.35	53,365	36.48
10-Year	131.27	921.31	82,469	82.27
100-Year	204.63	923.16	115,888	132.05

Detention Basin Storage Volume	
Required (100-Yr Volume)	115,888 C.F.
Designed (Volume to Spillway)	132,917 C.F.
Provided (Volume to Spillway)	136,325 C.F.

STATE OF MISSOURI
DOUGLAS
EUGENE
UBBEN, JR.
NUMBER
PE-2011010998
PROFESSIONAL ENGINEER

PHILPHELPS ENGINEERING, INC.
1370 N. Winchester
Olathe, Kansas 66061
(913) 393-1155
Fax (913) 393-1166
www.philpzhengineering.com

PLANNING ENGINEERING IMPLEMENTATION



DETENTION PLAN
ORCHARD WOODS
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

PROJECT NO.	211142	No.	Date	By
DRAWING		1	2-27-23	JMO DEL
DESIGNED: 10-26-2021		2	4-24-23	JMO DEL
CHECKED: DEU APPROVED: DEU		3	8-15-23	BAG DEL
CERTIFICATE OF AUTHORIZATION - LS-40		4	7-20-23	MRIH DEL
LAND SURVEYING - E-362		5	10-11-23	KAD DEL
ENGINEERING - E-361				
CERTIFICATE OF AUTHORIZATION				
LAND SURVEYING - 2007001728				
ENGINEERING - 2007005058				

SHEET

17

Extended Dry Detention STF Checklist

Site Address: _____

Date Inspection Completed: _____

Property Owner: _____

Owner's Address: _____

Inspector: _____

Inspection Criteria	Pass	Fail	N/A	Comments
Does the structure show signs of bank erosion/failure				
How is the vegetation establishment/Density				
Is the vegetation composition per plan?				
Are invasive vegetation and weeds controlled?				
Is there standing water? (beyond 40 hours)				
Does the primary cell have sediment accumulation?				
Is there trash accumulation in the structure?				
Is the outlet structure in good condition?				
Is the dam in good condition?				
Is the emergency spillway in good condition				
Are there signs of erosion below the outlet structure?				
Other				

Recommended Action	
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Required Maintenance	
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(Seal Below)

(Signature)

(Date)