WOODSIDE RIDGE DEVELOPEMNT STORMWATER MANAGEMENT FACILITY-BEST MANAGEMENT PRACTICES OPERATION AND MAINTENANCE PLAN

Prepared for:

Clayton Properties Group, Inc. dba Summit Homes

Lee's Summit, Missouri

September 2023

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PURPOSE

Stormwater Best Management Practices (BMPs) are implemented in this development to meet stormwater discharge water-quality standards of the City of Lee's Summit, Missouri. Permanent BMPs are provided via this development. In order for physical stormwater BMPs to be effective, proper maintenance is essential. Maintenance includes both routinely scheduled activities, as well as non-routine repairs that may be required after large storms, or because of other unforeseen conditions. ***Maintenance of site specific BMPs is the responsibility of the property owner and a requirement of approval for this development.*** The property owner, heirs and assigns shall maintain appropriate funds to provide all maintenance required up to and including replacement of said facilities at end of their useful life. The property owners shall require implementation of this manual for all BMPs transferred with land ownership transfer to subsequent property owners, heirs and assigns.

1. GENERAL SITE OVERVIEW

Woodside Ridge is a single-family residential development with 198 units. The development is located at the southwest intersection of Northwest Pryor Road and NW O'Brien Road, Section 2, Township 47 N, and Range 32 W, in Lee's Summit, Jackson County, Missouri.

Figure 1. Location Map.

1.1 Locations of Stormwater Best Management Practices

The Woodside Ridge Development has five stormwater detention basins located within the development.

The first basin is in Tract E, west of NW Joshua Drive, east of NW Ambersham Drive, north of Sterling Hills 3rd Plat, and south of NW Killarney Lane.

The second basin is in Tract G, west of NW Ambersham Drive, east of Sterling Hills 5th Plat, south of NW Killarney Lane and north of Sterling Hills 3rd Plat.

The third basin is in Tract J, west of cul-de-sac at NW O'Brien Road, east of Sterling Hills 5th Plat, and north of NW Killarney Lane.

The fourth basin is in Tract J, north of NW Patch Court and NW O'Brien Road, and south of The Forest of Brookridge Estates 3rd Plat.

The fifth basin is in Tract C, south of NW Ashurst Drive, west of NW Pryor Road, and east of NW Kaylea Court.

1.2 Types of Stormwater Best Management Practices

There are many different measures which can provide stormwater BMPs. The below list are the ones utilized within this development.

- Stormwater dry detention basins
    - Are designed to provide stormwater management benefits during rainfall events and control release rates to minimize downstream impacts. These basins are dry in normal conditions and will fill up during rain events to allow pollutants to settle out. The bottom of the basin is relatively flat and portions may experience shallow pools of water. These pools help enhance basins pollutant removal and should fully dry up within a relatively short period after rainfalls (ideally a week after normal draw down conditions occurred). Pools should not have amphibians animal life present.
- Stormwater wet detention basins
    - Has a permeant water elevation which in storm events will rise to allow for capture of stormwater runoff. This allows to control stormwater release rates in rainfall events along with the permanent pool allows for dissolvent of nutrients and urban pollutants before reaching waterways.
- Native vegetation
    - Plants which are historically located in this geographic region that are well adapted to the climate and natural disturbance. These are plants that are deep rooted which help enhance stormwater infiltration into the soil and reduce stormwater

2. MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

Stormwater management facilities need to be maintained to function properly. This section will discuss how to properly maintain the facilities within this development.

2.1 Native Vegetation

Native vegetation provides many benefits for stormwater management. Per the APWA/MARC BMP manual, dated October 2012, the below are some of these benefits:

- Containing species of plants indigenous to the area, vegetation will be able to thrive in the local climate with less maintenance.
- Deep roots enhance stormwater infiltration into the soil.
- With deep-rooted nature, native vegetation is able to withstand flooding events as well as extended dry periods.
- Reduces flow velocity of stormwater runoff.
- Attracts wildlife and improved biological diversity.
- Requires little to no fertilizer or chemical maintenance, as well as reduced amounts of water to survive.

With these benefits, the bottom of a stormwater basin is an ideal place for native vegetation to be planted. The basin located within Tract C, is intended to be vegetated by natives. Some of the typical plants one may see are below:

- Prairie Cordgrass
- Dark Green Bulrush
- Dudley's Rush
- Milkweed
- Fox Sedge
- Water Plantain
- Aster
- Iris
- Sedge
- Coneflower
- Goldenrod
- Blazingstar
- Fescue
- Cattail*
- Switchgrass
- Indian Grass
- Little Bluestem
- Big Bluestem

*Cattail growth shall be monitored to limit spread and not crowd out other species.

The maintenance requirements for native vegetation will vary depending on the climate, thus the maintenance of such should be flexible and allowed to change over time to allow responses to nature. The plan laid out in the below table are recommendations, the formal maintenance shall be adoptive based on the recommendations in Table 1.

Table 1. Maintenance of Native Vegetation.

Required Action	Maintenance Objective	Frequency of Action
Debris and Litter Removal	Removal of debris and litter from the basin area to minimize outlet clogging and improve aesthetics	Periodically and after large rain events
1st year of establishment-mowing*	To maintain a healthy level of vegetation	Mow no more than monthly to a minimum height of 5"

2nd year of establishment-mowing*	To maintain a healthy level of vegetation	Mow once in June to a minimum height of 8", spot treat weeds as necessary
3rd year and beyond of establishment-mowing*	To maintain a healthy level of vegetation	Mow once in the off-season (Late October to Early March) to a minimum height of 8"
Removal of invasive species	To encourage a healthy native plant environment, growth of species invasive to the area shall not occur	Periodically
Seeding (recommend to use a mix with the above plantings)	To establish plantings in bare areas	Shall occur if areas are bare soil for extend period of time

*Native vegetation shall never be mowed in wet or muddy conditions.

2.2 Extended Dry Detention Basin

Extended dry detention basins provide detention for the water quality volume with a 40-hour release rate, along with detention for up to the 100-year storm event. These basins are typically simple in design, which helps make them relatively easy and inexpensive to maintain.

The basins within this development are planted with native vegetation, which maintenance requirements were discussed in Section 2.1, thus Table 2, is looking at the maintenance for the overall detention basin and not focused on the vegetation.

Basin 2 was constructed in a natural channel allowing to take advantage of existing vegetation and drainage features. This part of the basin is relatively flat (design with 2% slope) in nature to slow down water and allow for an extended period of treatment before reaching the outfall structure.

Table 2. Maintenance of Extended Dry Detention Basin.

Required Action	Maintenance Objective	Frequency of Action
Debris and Litter Removal	Removal of debris and litter from the basin area to minimize outlet clogging and improve aesthetics	Periodically and after large rain events
Repairing Erosion	If erosional channels occur due to lack of vegetation and large rainfall events, the area shall be re-graded to fill in the channels and new vegetation shall be established per Section 2.1.	Periodically, as occurs after large rain events
Inspection of Outlet	To ensure the outlet box for the basin is function properly	Yearly in the springtime and periodically until winter
Inspection of the Spillway	To ensure spillway is stable and functioning correctly	Yearly in the springtime and periodically until winter

Removal of Sediment	To ensure the basin has enough volume to handle rainfall events and function as designed	Rare once the area draining to the basin is fully developed and vegetation established. Should occur if owner notices large amounts of silt in the bottom that is preventing the basin from draining/functioning.

Maintenance for the basin shall be minimal to the owner, however if unforeseen events happen, the owner shall restore the basin, per the Detention Basin As-built sheets, Appendix B.

2.3 Extended Wet Detention Basin

Extended wet detention basins are similar to dry detention basin with the difference that wet detention basins have a permanent body of water. Storm runoff is captured in the wet basin, raising the water level above the level of permanent pool. Then, the excess water accumulation dissipates at a 40-hour release rate. The basin within this development is existing. Detention capacity is enough to handle up to the 100-year storm events. During the residential development the spillway was reconstructed. Normal water depth at the deepest point of the pond, is unknown. Due to the constant presence of water, it is essential to keep the wet basin maintained at all times. Table 3 below is looking at the maintenance guidelines for the wet detention basin.

Table 3. Maintenance of Extended Wet Detention Basin.

Required Action	Maintenance Objective	Frequency of Action
Debris and Litter Removal	Removal of debris and litter from the basin area to minimize outlet clogging and improve aesthetics	Periodically and after large rain events
Repairing Erosion	During the establishment phase, if erosional channels occur due to large rainfall events, the area shall be re-graded to fill in the channels and new vegetation, if needed, shall be established per Section 2.1.	Periodically during the establishment phase, as occurs after large rain events
Evaluation of Plant Composition	To avoid woody invasion and plant/flower overtake	Yearly in the springtime/summer
Inspection of Outlet (DB 16-2)	Primary basin outfall structure. Inspection of the openings to ensure are free of debris and functioning properly. Box has 1 opening on the front face along with a reverse flow pipe.	Yearly in the springtime and periodically until winter
Reverse flow pipe	A 4” pipe located on the front of the primary basin outfall structure (DB 16-2). Water will enter through the	Yearly in the springtime and periodically until winter

Required Action	Maintenance Objective	Frequency of Action
	bottom of the pipe to release in smaller rain events from the basin. Pipe should be reviewed to make sure no clogs are present, which the top of the allows for cleaning access.	
Inspection of the Spillway	To ensure spillway is stable and functioning correctly	Yearly in the springtime and periodically until winter
Inspection/Removal of Sediment	To ensure the basin has enough volume to handle rainfall events and function as designed	Yearly in the springtime and periodically until winter. Also when sediment reaches 18” from the outlet and/or when any pretreatment structures are 50% full.
Inspection of Aeration System Components	To ensure all aeration system components (fountains, bubblers, feeder hoses, electrical conduits) are functioning properly	Yearly in the springtime and periodically until springtime
Inspection of Pool Depth with Probing Rod	To ensure the basin has enough volume to handle rainfall events and function as designed	Every 3 years

2.4 Inspection of Facilities

The above sections mentioned maintenance and frequency for each action. When an inspection of the facilities is performed, the form found in Appendix C, shall be filled out and included in this report for record keeping. It is recommended that owner walks around the facility areas yearly to check conditions and make sure no major concerns are occurring. If they see something of concern, they should reach out to a licensed professional for a deeper inspection of the issues and guidance on repairs required.

2.5 Repairs to Facilities

Many maintenance items can be done by the owner, however if larger repairs are needed the owner shall seek out a qualified contractor. Items that may require a contractor to perform are:

- Removal of sediment build up.
    - If there is undeveloped land, in proximity of the basin, sediment may be placed there with proper erosion control measure and seeding shall occur.
    - If the surrounding area is fully developed, then sediment shall be hauled off site to a proper disposal location.
- Repairs to the concrete outlet structure, spillway, or outlet pipe.
- Major erosional channels occurring on the sides slopes of the basin.

3. CHANGES TO THE CURRENT PLAN

This section will discuss the process if changes are desired to the current Stormwater Management Facility-Best Management Practices Operation and Maintenance Plan.

3.1 Ownership Change

In the event of ownership change of the land which BMPs are located on, the following steps should be performed.

1. Current owner shall have all BMPs inspected and reviewed to be fully functioning, per this plan. If deficiencies are found both parties shall discuss and agree upon a plan to address deficiencies.
2. City shall be notified via writing of the ownership change within 30 days.
3. Appendix D shall be updated with the new owner information.

3.2 Additional Land Added to the Development

If additional land is added into the development, this document shall be updated to include any stormwater management facilities located within the additional area. A revision date shall be provided for the document along with a copy provided to the City of Lee's Summit, Missouri for review.

3.3 Changes to How Maintenance is Performed

If the owner has desire to change the recommended maintenance mentioned in this document, they shall prepare an update to this document and present it to Development Services Department with the City of Lee's Summit, Missouri to review. The City may require a licensed professional to update the recommendations.

APPENDIX A

Location of Stormwater Management Facilities

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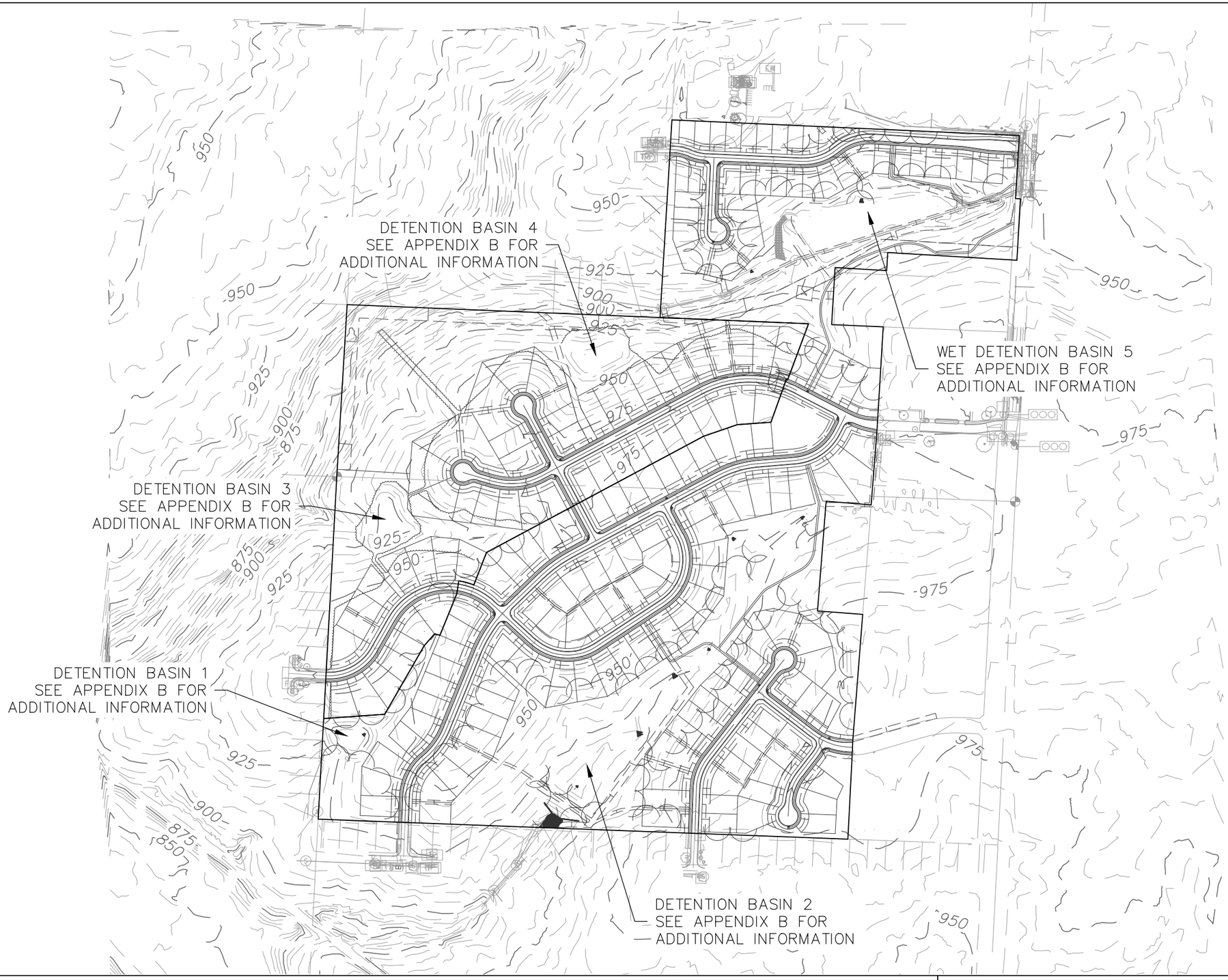


N

0' 200' 400'
SCALE IN FEET

PROJECT NO:	C019-1140
DRAWN BY:	AA
DATE:	2021.11.08

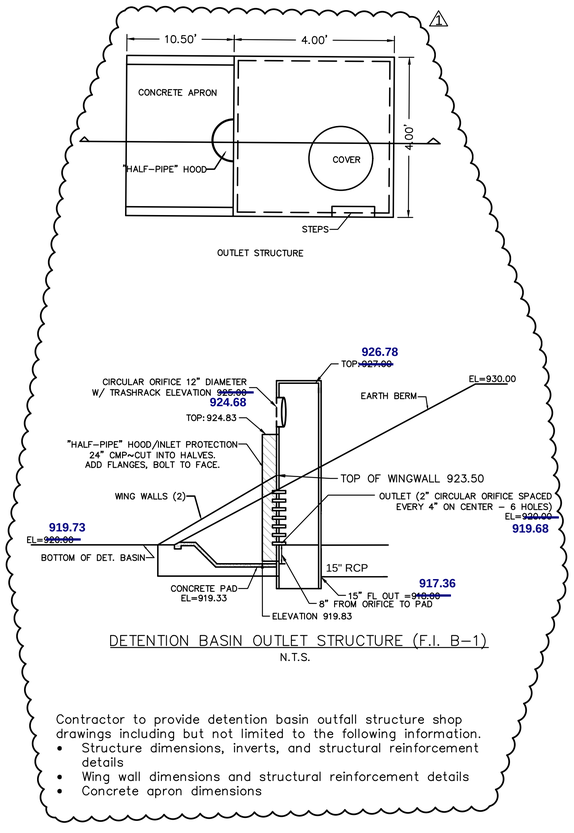
APPENDIX A-STORM WATER MANAGEMENT FACILITY LOCATION

olsson
1301 Burlington Street
North Kansas City, MO 64116
TEL 816.361.1177

EXHIBIT
1

APPENDIX B

Detention Basin As-Built Plan



DETENTION BASIN OUTLET STRUCTURE (F.I. B-1)

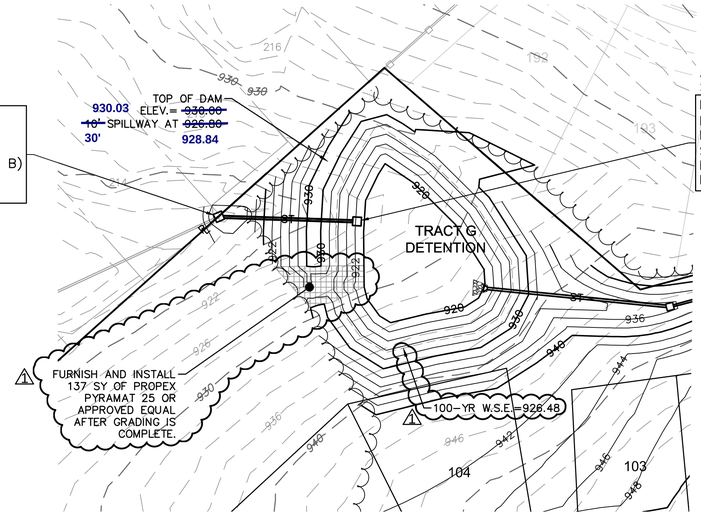
N.T.S.

Contractor to provide detention basin outfall structure shop drawings including but not limited to the following information.

- Structure dimensions, inverts, and structural reinforcement details
- Wing wall dimensions and structural reinforcement details
- Concrete apron dimensions

As-built is 2.01' S and 0.81' W of plan

F.I. B-0, CONST. STD.
FIELD INLET (5'X5' INSIDE)
OPEN ON 2 SIDES (N,E)
STA.: 10+00.00 (STORM LINE B)
N: ~~1,001,237.0710~~ **1001239.08**
E: ~~2,810,759.7550~~ **2810760.56**



As-built is 1.53' N and 1.16' W of plan

F.I. B-1, CONST. STD.
FIELD INLET (5'X5' INSIDE)
PER DETAIL THIS SHEET
STA.: ~~10+06.55~~ (STORM LINE B) **10+94.78**
N: ~~1,001,303.0104~~ **1001304.54**
E: ~~2,810,830.2869~~ **2810829.12**

EARTHWORK QUANTITIES	
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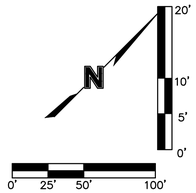
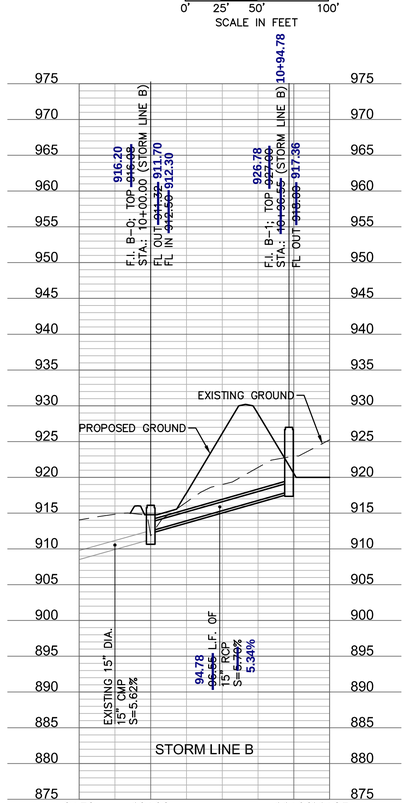
5702	1004

10yr. W.S.E.	100yr. W.S.E.
924.68	926.48





AS BUILT

Date Surveyed: 12/1/2020

Record Drawing

olsson
MO Certificate of Authority #001592
KS Certificate of Authority #E-2001
NORTH KANSAS CITY, MO 64116
TEL 816.361.1177
www.olsson.com

STATE OF MISSOURI
JULIE ELAINE SELLERS
NUMBER PE-2017000367
12/11/2020
PROFESSIONAL ENGINEER

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	4/2/2019	REVISED PER CITY COMMENTS	

REVISIONS

DETENTION BASIN PLAN
STREET & STORM SEWER PLANS

WOODSIDE RIDGE
FIRST PLAT

LEE'S SUMMIT, MO

2019

drawn by: D.A.H.O
checked by: J.E.S
designed by: S.M.S
QA/QC by: M.G.D
project no.: A18-1140
date: 2019.03.12

SHEET
C143

DWG: F:\2018\1001-1500\018-1140-A\40-Design\AutoCAD\Final Plans\Sheets\GNCV\01_Street & Storm_36x24\C_DBP02_1140A.dwg
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USER: ssoylor

FURNISH AND INSTALL 1210 SY OF FLEXAMAT AFTER GRADING IS COMPLETE. (2)

As-built is 1.84' S and 1.76' W of plan

E.S. A–0, CONSTRUCT END SECTION (42" RCP) W/ CONCRETE TOE WALL
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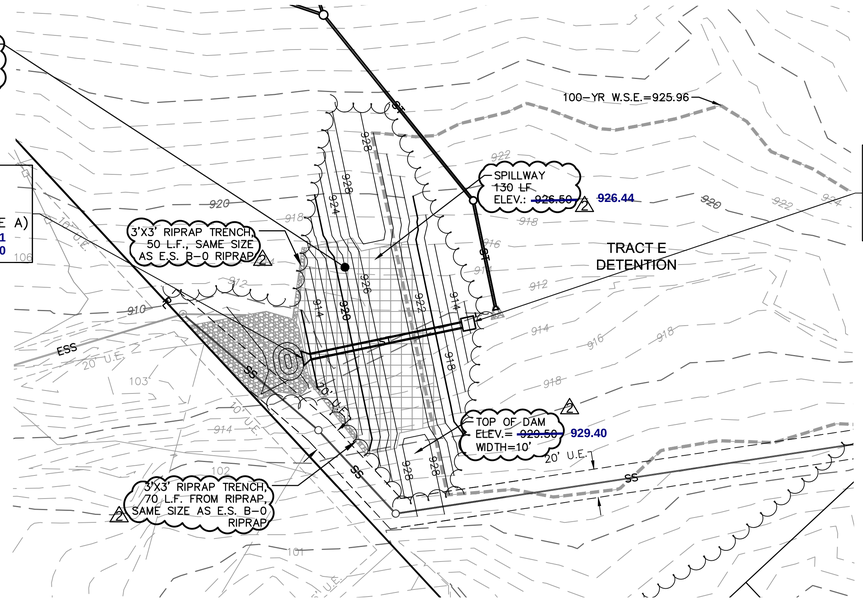
E: ~~2,811,673.3725~~ 2811672.30



As-built is 0.39' N and 0.31' W of plan

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FIELD INLET (8'X8' INSIDE)
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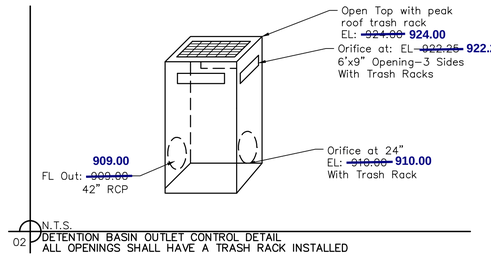
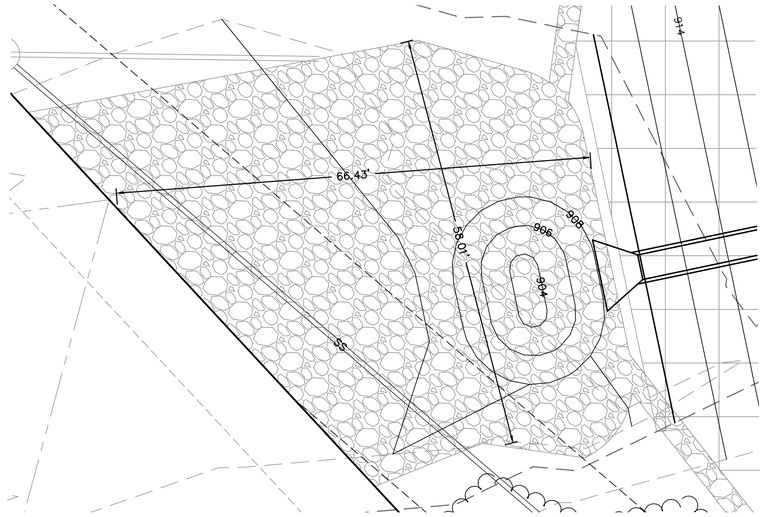
N: ~~1,001,110.7203~~ 1,001,111.11
E: ~~2,811,736.0925~~ 2,811,738.41

NOTES:
1. CONTRACTOR SHALL MAINTAIN DRAINAGE DURING CONSTRUCTION AND IS RESPONSIBLE FOR ANY DEWATERING NECESSARY FOR CONSTRUCTION. DEWATERING SHALL BE SUBSIDIARY TO OTHER BID ITEMS.
2. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS DETAILING THE STRUCTURE DIMENSIONS, INVERTS, AND STRUCTURAL REINFORCEMENT DETAILS ON THE PRINCIPAL SPILLWAY.
3. REINFORCED CONCRETE PIPE SHALL BE A MINIMUM OF CLASS 3, FOR THE CONDUIT THROUGH THE DAM.
4. THE CONDUIT NEEDS TO BE PLACED ON CONCRETE CRADLES, WITH TAPERED SIDED.



02 N.T.S.
DETENTION BASIN OUTLET CONTROL DETAIL
ALL OPENINGS SHALL HAVE A TRASH RACK INSTALLED



E.S. A–0
SCALE 1–10'

EARTHWORK QUANTITIES	
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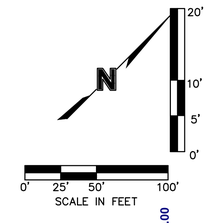
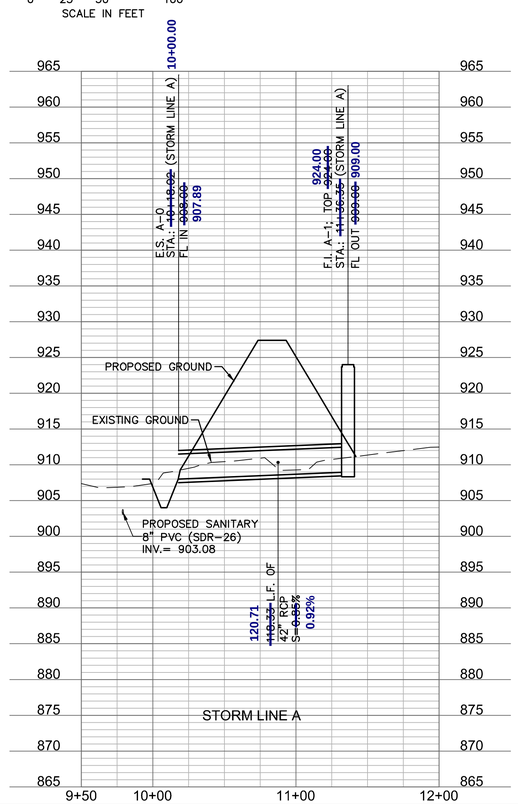
25	5410

10yr. W.S.E.	100yr. W.S.E.
923.65	925.96





Riprap Calculations							
End Section	Q_{100} (cfs)	Pipe Diameter (ft)	Class*	D50* (in)	Apron Length (ft)	Apron Depth (ft)	Area (SY)
E.S. B-0	207	3.5	6	22	25	4.00	149.0

*Per Table 10.1 HEC 14-FHWA-Energy Dissipators Pg. 10-18

NOTE: GEOFABRIC IS REQUIRED UNDER RIP RAP PER DETAIL ON SHEET C155

ENERGY DISSIPATOR BASIN DIMENSIONS:
D50 = 1.75'; DISSIPATOR POOL LENGTH (LS) = 20'; APRON LENGTH (LA) = 5'; APRON WIDTH (WB) = 17'; OVERALL BASIN LENGTH (LB) = 25'. PROVIDE RIPRAP UP TO ELEVATION 909 SURROUNDING DISSIPATOR BASIN. SEE BELOW FOR DETAILS.

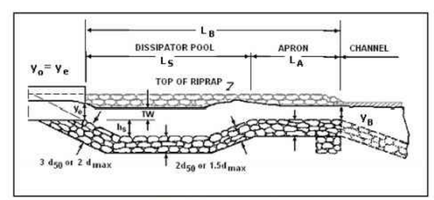


Figure 10.1. Profile of Riprap Basin

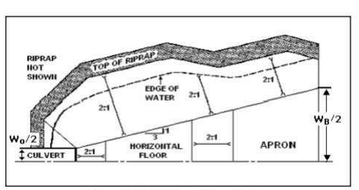


Figure 10.2. Half Plan of Riprap Basin

AS BUILT

Date Surveyed: 12/1/2020

Record Drawing

olsson
MO Certificate of Authority #:0000000000
101 E. Walnut Street, Suite 450
GREEN CASTLE, MO 64116
NORTH KANSAS CITY, MO 64116
TEL 816.361.1177
www.olsson.com

STATE OF MISSOURI
JULIE ELAINE SELLERS
NUMBER PE-2017000367
12/11/2020
PROFESSIONAL ENGINEER

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	4/2/2019	REVISED PER CITY COMMENTS	
2	5/16/2019	REVISED PER CITY COMMENTS	

REVISIONS

DETENTION BASIN PLAN
STREET & STORM SEWER PLANS

WOODSIDE RIDGE
FIRST PLAT

LEE'S SUMMIT, MO

2019

drawn by: D.A.H.O
checked by: J.E.S
designed by: S.M.S
QA/QC by: M.G.D
project no.: A18-1140
date: 2019.03.12

SHEET
C142

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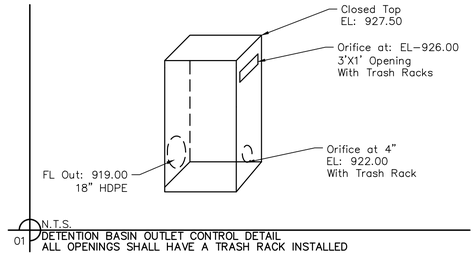
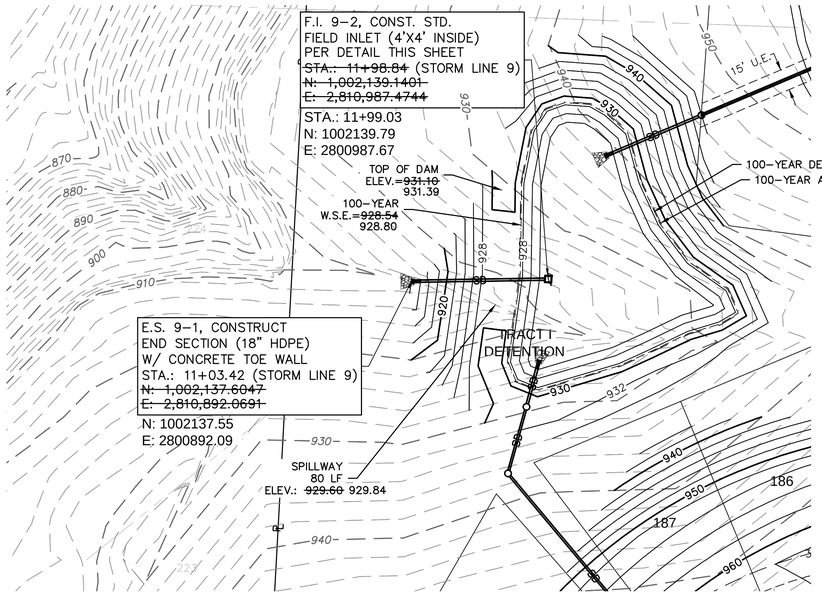
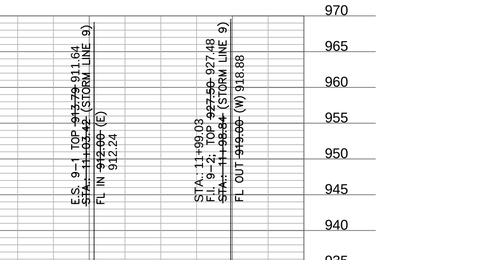


01 DETENTION BASIN OUTLET CONTROL DETAIL
ALL OPENINGS SHALL HAVE A TRASH RACK INSTALLED





NOTES:
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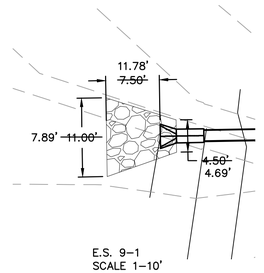
2. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS DETAILING THE STRUCTURE DIMENSIONS, INVERTS, AND STRUCTURAL REINFORCEMENT DETAILS ON THE PRINCIPAL SPILLWAY.

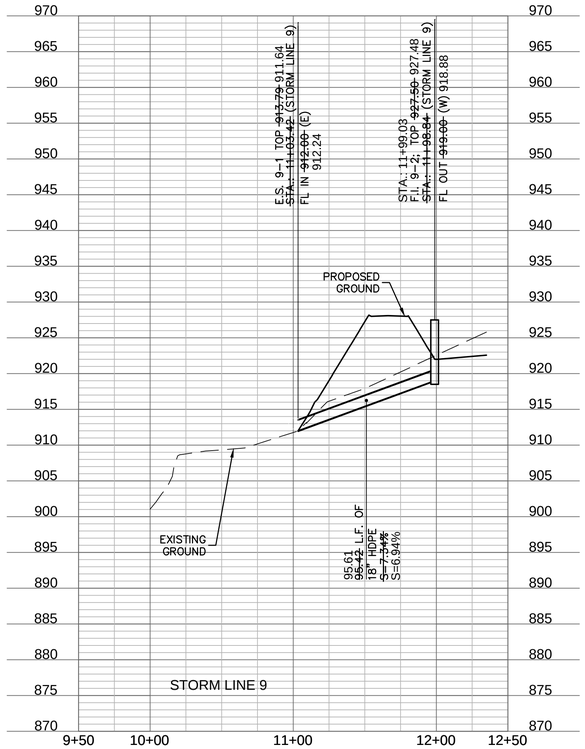


E.S. 9-1
SCALE 1-10'

Riprap Calculations							
End Section	Q_{100} (cfs)	Pipe Diameter (ft)	Class*	D50* (in)	Apron Length (ft)	Apron Depth (ft)	Area (SY)
E.S. 9-1	23.91	1.5	3	10	7.5	2.00	~~27.4~~ 23.88
*Per Table 10.1 HEC 14-FHWA-Energy Dissipators Pg. 10-18							

EARTHWORK QUANTITIES	
CUT (C.Y.)	FILL (C.Y.)
6,485	2,184

10yr. W.S.E.	100yr. W.S.E.
926.73	928.54



ASBUILT
03-24-2022

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

olsson
MO Certificate of Authority # 001592
1301 Burlington, Suite 100
NORTH KANSAS CITY, MO 64116
TEL 816.361.1177
www.olsson.com

STATE OF MISSOURI
JULIE ELAINE SELLERS
NUMBER PE-2017000367
4/12/2023
PROFESSIONAL ENGINEER

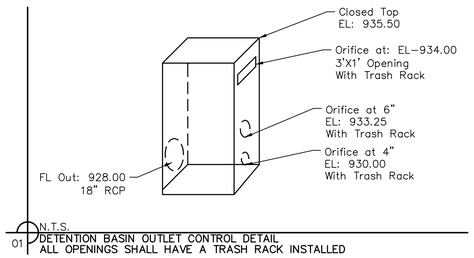
REVISIONS
NO. REV. | DATE | REVISIONS DESCRIPTION | BY

DETENTION BASIN PLAN
STREET & STORM SEWER PLANS
WOODSIDE RIDGE
SECOND PLAT
LEE'S SUMMIT, MO
2020

drawn by: C.S.M
checked by: S.M.S
designed by: C.S.M
QA/QC by: J.E.S
project no.: C18.1140
date: 2020.07.10

SHEET
C121

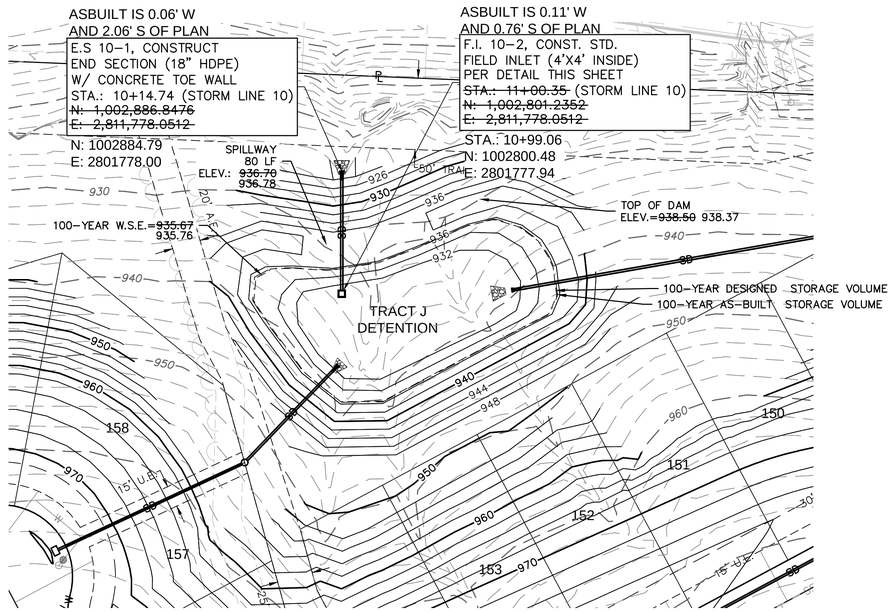
DWG: F:\2018\1001-1500\018-1140-C\40-Design\AutoCAD\Final Plans - Asbuilts\Sheets\GNCV\Street & Storm\C_DBP02_C18140.dwg USER: ssoylor
DATE: Apr 12, 2023 7:25am

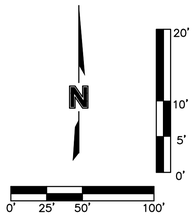


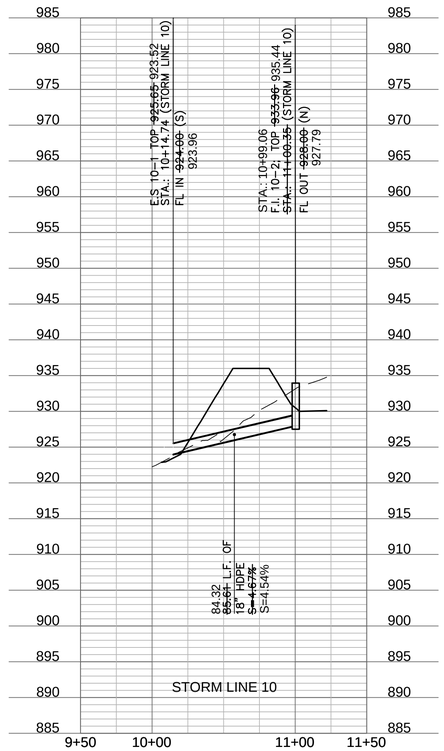
01 DETENTION BASIN OUTLET CONTROL DETAIL
ALL OPENINGS SHALL HAVE A TRASH RACK INSTALLED

EARTHWORK QUANTITIES	
CUT (C.Y.)	FILL (C.Y.)
4,012	2,535

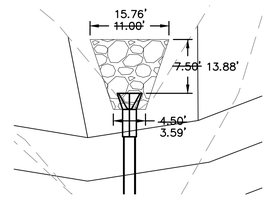
10yr. W.S.E.	100yr. W.S.E.
934.36	935.67







NOTES:
1. CONTRACTOR SHALL MAINTAIN DRAINAGE DURING CONSTRUCTION AND IS RESPONSIBLE FOR ANY DEWATERING NECESSARY FOR CONSTRUCTION. DEWATERING SHALL BE SUBSIDIARY TO OTHER BID ITEMS.
2. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS DETAILING THE STRUCTURE DIMENSIONS, INVERTS, AND STRUCTURAL REINFORCEMENT DETAILS ON THE PRINCIPAL SPILLWAY.



E.S. 10–1
SCALE 1–10'

Riprap Calculations								
End Section	Q_{100}	Pipe Diameter	Class*	D50*	Apron Length	Apron Depth	Area	
	(cfs)	(ft)		(in)	(ft)	(ft)	(SY)	
E.S. 10-1	18.41	1.5	3	10	7.5	2.00	~~27.4~~ 23.84	
*Per Table 10.1 HEC 14-FHWA-Energy Dissipators Pg. 10-18								

ASBUILT
03-24-2022

Accepted
Record Drawings

These plans have been reviewed for accuracy and are accepted for basic conformance to the approved construction drawings.

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www.olsson.com

STATE OF MISSOURI
JULIE ELAINE SELLERS
NUMBER PE-2017000367
4/12/2023
PROFESSIONAL ENGINEER

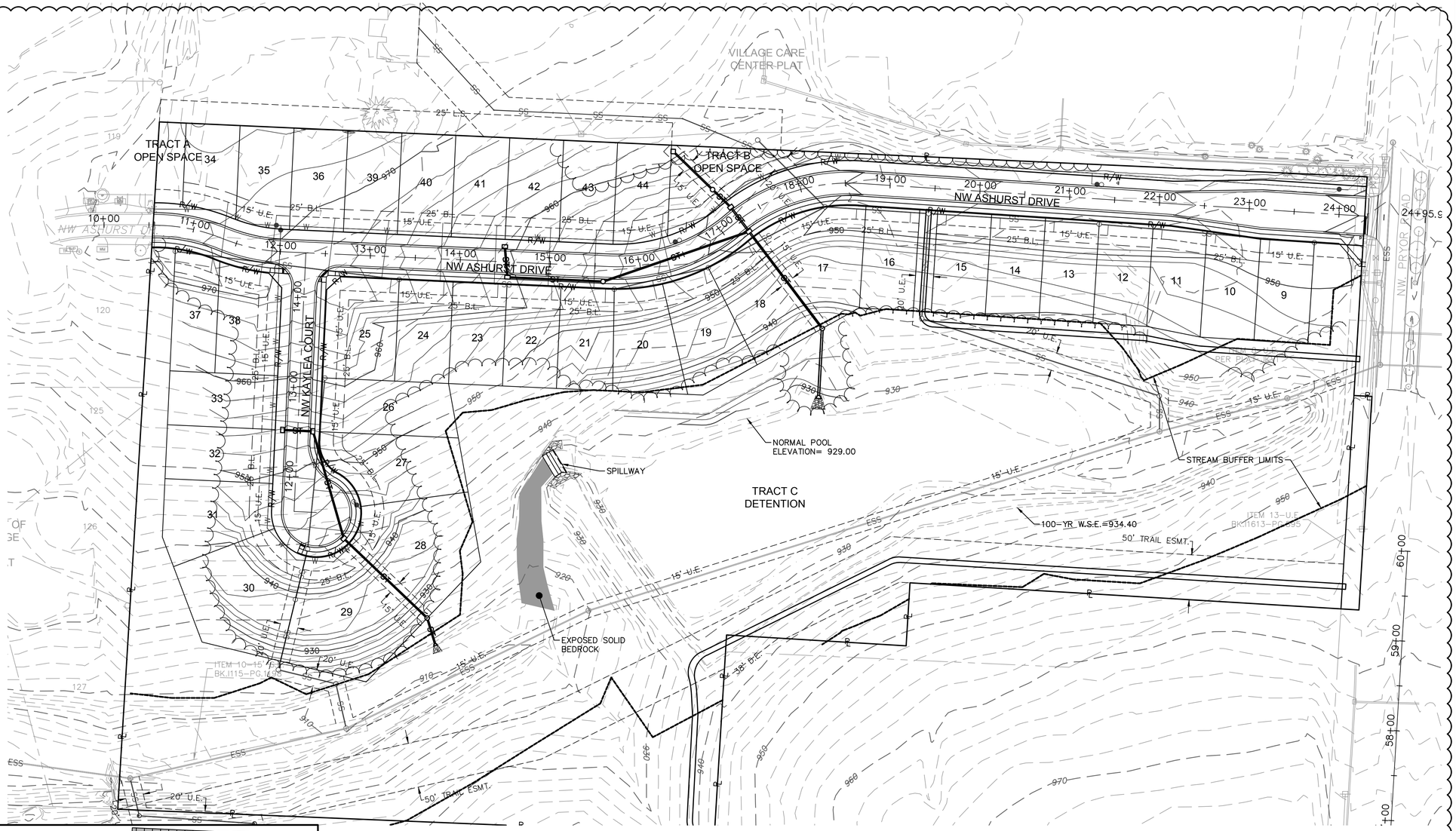
REVISIONS
NO. | DATE | REVISIONS DESCRIPTION | BY

DETENTION BASIN PLAN
STREET & STORM SEWER PLANS
WOODSIDE RIDGE
SECOND PLAT
LEE'S SUMMIT, MO
2020

drawn by: C.S.M
checked by: S.M.S
designed by: C.S.M
QA/QC by: J.E.S
project no.: C18.1140
date: 2020.07.10

SHEET
C122

DWG: F:\2018\1001-1500\018-1140-C\40-Design\AutoCAD\Final Plans - Asbuilts\Sheets\GNCV\Street & Storm\C_DBP02_C18140.dwg USER: ssoylor
DATE: Apr 12, 2023 7:25am



Key Map

0' 30' 60' 120'
SCALE IN FEET

Record Drawing

SHEET NOT AS-BUILTED

I hereby certify that the conditions shown are correct and the sewers are acceptably located within existing easements or right of ways.

Julie E. Sellers, PE

STATE OF MISSOURI
JULIE ELAINE SELLERS
NUMBER PE-2017000367
12/17/20
PROFESSIONAL ENGINEER

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STATE OF MISSOURI
GRANT LUCKENBILL
NUMBER PE-2012018100
PROFESSIONAL ENGINEER
02-04-20

REVISIONS

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	2020.01.17	REVISED PER CITY COMMENTS	

GENERAL LAYOUT
SPILLWAY RECONSTRUCTION

WOODSIDE RIDGE
FIRST PLAT

LEE'S SUMMIT, MO

2020

drawn by: S.M.S.
checked by: G.C.L.
designed by: K.A.S.
QA/QC by: G.C.L.
project no.: A18.1140
date: 2020.02.04

SHEET
S502

DWG: F:\2018\1001-1500\018-1140-A\40-Design\AutoCAD\Final Plans\Sheets\RDBR\C_GEN02_1140A.dwg USER: ssaylor
DATE: Jan 16, 2020 10:39am

GENERAL NOTES:

DESIGN SPECIFICATIONS:
INTERNATIONAL BUILDING CODE, 2018 EDITION

DESIGN UNIT STRESSES:
KCMMB 4K CONCRETE f'c = 4,000 PSI
REINFORCING STEEL (GRADE 60) fy = 60,000 PSI

DESIGN LOADING:
EARTH: 120 #/CU. FT.
EQUIVALENT FLUID PRESSURE: 90 #/CU. FT. (MAX.) ⚠1

RIPRAP:
LIGHT RIPRAP SHALL CONFORM TO THE MATERIAL AND CONSTRUCTION REQUIREMENTS IN SECTION 2605 OPEN CHANNELS OF THE APWA KC METRO CHAPTER CONSTRUCTION AND MATERIAL SPECIFICATIONS DATED FEBRUARY 2017.

STONE FOR RIPRAP SHALL CONSIST OF QUARRIED ROCK AND BE SOUND, DURABLE, AND ANGULAR IN SHAPE. NO MORE THAN 10% SHALL HAVE AN ELONGATION GREATER THAN 3:1, AND NO STONE SHALL HAVE AN ELONGATION GREATER THAN 4:1. MATERIAL SHALL BE FREE FROM CRACKS, SEAMS, OR OTHER DEFECTS. SHALE AND STONE WITH SHALE SEAMS ARE NOT ACCEPTABLE.

THE MINIMUM UNIT WEIGHT OF THE STONE SHALL BE 155 PCF.

NOT MORE THAN 10% OF THE STONE SHALL EXHIBIT SPLITTING, CRUMBLING, OR SPALLING WHEN SUBJECT TO 5 CYCLES OF SODIUM SULFATE SOUNDNESS TEST IN ACCORDANCE WITH ASTM C 88.

RIPRAP SHALL HAVE A MINIMUM THICKNESS OF 15 INCHES, OR 1.5 TIMES AS THICK AS THE LARGER STONES, WHICHEVER IS GREATER. AT LEAST 60% OF THE MASS SHALL BE OF PIECES HAVING A VOLUME OF ONE CUBIC FOOT OR MORE AND THE PIECES SHALL BE WELL GRADED. NO MORE THAN 6% OF THE STONES SHALL WEIGH LESS THAN 10 POUNDS.

MISCELLANEOUS:
THE SPILLWAY STRUCTURE SHALL BE CONSTRUCTED IN CONFORMANCE WITH APWA KC METRO CHAPTER CONSTRUCTION AND MATERIAL SPECIFICATIONS DATED FEBRUARY 2017. SECTION 2400 STRUCTURES SHALL GOVERN THE MATERIALS AND CONSTRUCTION REQUIREMENTS FOR STRUCTURAL CONCRETE.

ALL ELEVATIONS ARE SHOWN IN FEET UNLESS OTHERWISE NOTED.

MINIMUM CLERANCE TO REINFORCING STEEL SHALL BE 1½", UNLESS OTHERWISE SHOWN.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

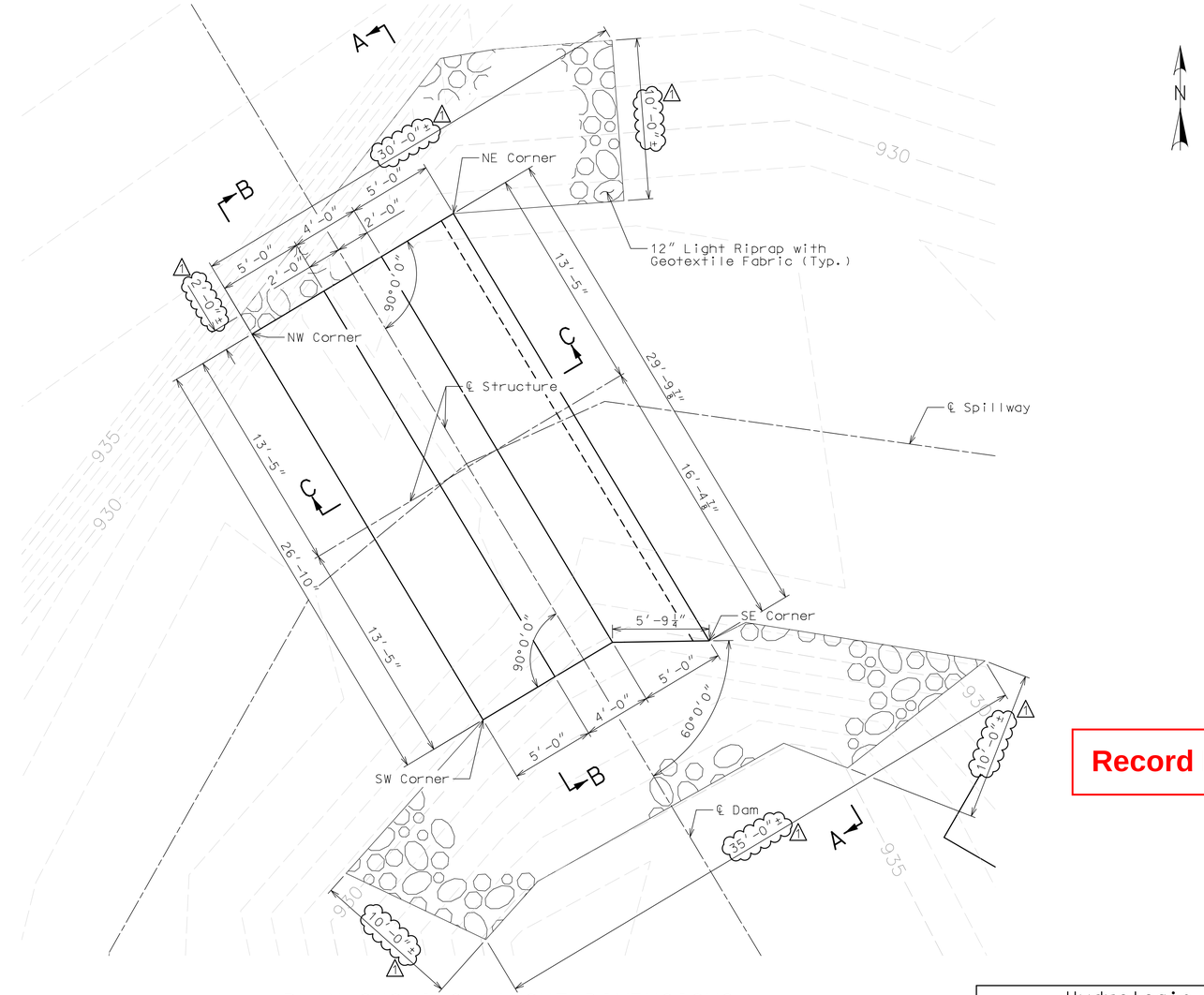
CONTRACTOR TO PROVIDE SHOP DRAWINGS THAT INCLUDE A BILL OF REINFORCING FOR APPROVAL BY THE ENGINEER PRIOR TO ORDERING MATERIALS.

CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING THE EXCAVATION. EXCAVATION SHALL BE FREE OF FLOWING WATER PRIOR TO CONSTRUCTION OF SLAB. A MINIMUM OF 4" THICK CONCRETE SEAL COURSE SHALL BE PROVIDED IF THE UNDERLYING ROCK IS FRAGMENTED AND/OR THE FLOW OF WATER CAN NOT BE ARRESTED.

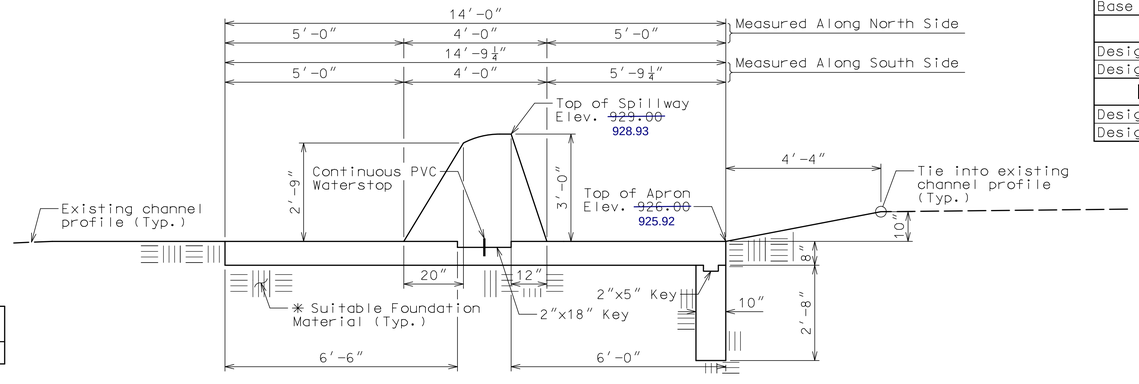
✳ STRUCTURE IS TO BE FOUNDED ON SOUND ROCK. THE SURFACE SHALL BE CLEANED AND FREE OF LAITENT MATERIAL PRIOR TO CASTING THE SLAB. IF UNSUITABLE FOUNDATION MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND BACKFILLING WITH AN APPROVED FLOWABLE FILL SHALL BE COMPLETED. CONTRACTOR TO COORDINATE FINDINGS WITH THE ENGINEER.

⚠1 CONTRACTOR SHALL RESTORE ORIGINAL EMBANKMENT SLOPE.

CORNER	NORTHING	EASTING
NE	1,003,341.9236	2,812,551.6906
NW	1,003,334.7319	2,812,539.6789
SE	1,003,316.4239	2,812,566.9579
SW	1,003,311.7090	2,812,553.4634



PLAN SHOWING LAYOUT DIMENSIONS



ELEVATION

ESTIMATED QUANTITIES FOR SPILLWAY		TOTAL
KCMMB 4K CONCRETE	CU. YARDS	19.5

ALL WORK SHOWN IN THE PLANS NECESSARY TO COMPLETE THE SPILLWAY COMPLETE IN PLACE SHALL BE COVERED BY THE BID ITEM "KCMMB 5K CONCRETE" PER CU. YD.

EXCAVATION, REMOVAL AND DISPOSAL OF EXISTING SPILLWAY, REINFORCING, CONCRETE, AND BACKFILL ARE CONSIDERED SUBSIDIARY TO THE BID ITEM "KCMMB 5K CONCRETE" PER CU. YD.

Hydrologic Data
Design Storm (2-year)
Base Flood Elevation = 931.83
Base Flood Discharge = 453 cfs
Design Storm (10-year)
Design Flood Elevation = 932.94
Design Flood Discharge = 739 cfs
Design Storm (100-year)
Design Flood Elevation = 934.36
Design Flood Discharge = 1,176 cfs

Record Drawing

AS-BUILT
Date Surveyed: 12/14/2020
I hereby certify that the conditions shown are correct and the sewers are acceptably located within existing easements or right of ways.

Julie E. Sellers, PE

STATE OF MISSOURI
JULIE ELAINE SELLERS
NUMBER PE-2017000367
12/17/20
PROFESSIONAL ENGINEER

ONLY FOR ELEVATION OF SPILLWAY

Note:
For View A-A, Section B-B, & Section C-C, see Sheet S504 ⚠1

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STATE OF MISSOURI
GRANT LUCKENBILL
NUMBER PE-2012018100
PROFESSIONAL ENGINEER
02-04-20

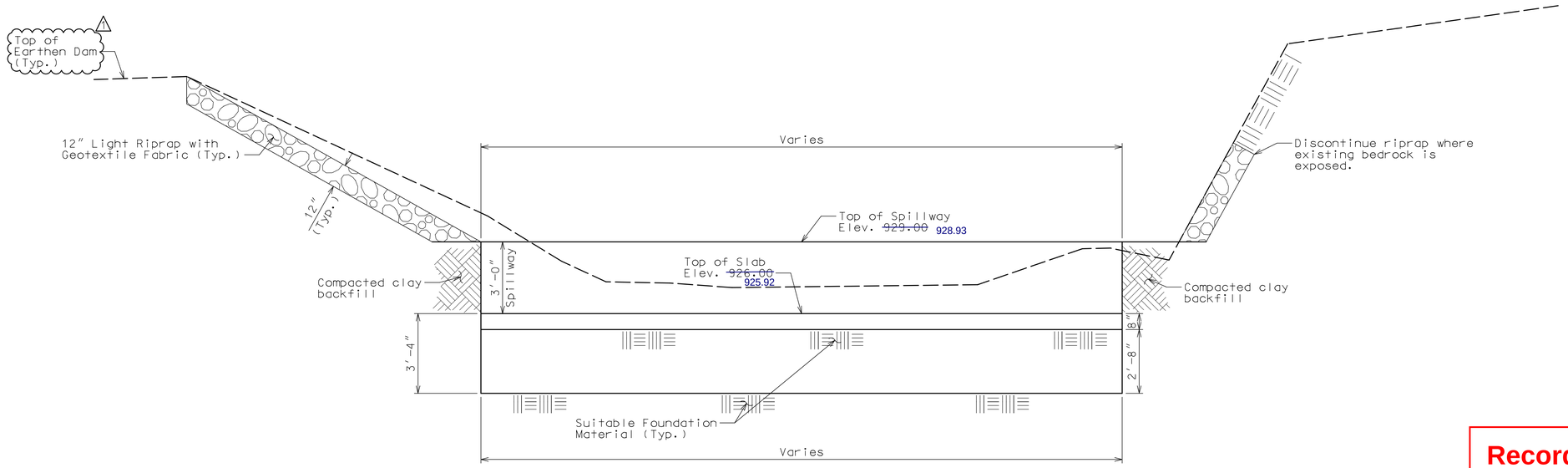
REVISIONS

NO./REV.	DATE	REVISIONS DESCRIPTION	BY
1	2020.01.17	REVISED PER CITY COMMENTS	

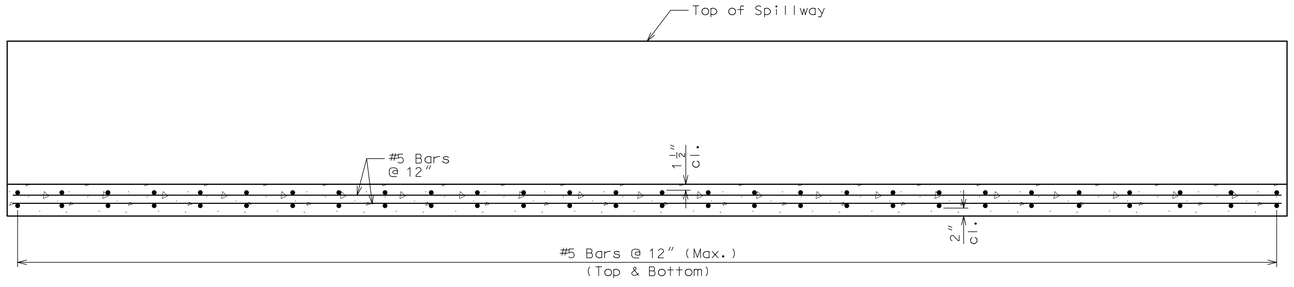
SPILLWAY GENERAL PLAN AND ELEVATION
SPILLWAY RECONSTRUCTION
WOODSIDE RIDGE
FIRST PLAT
LEE'S SUMMIT, MO
2020

drawn by: K.A.S
checked by: G.C.L
designed by: K.A.S
QA/QC by: M.G.D
project no.: A18-1140
date: 2020.02.04

SHEET S503 ⚠1

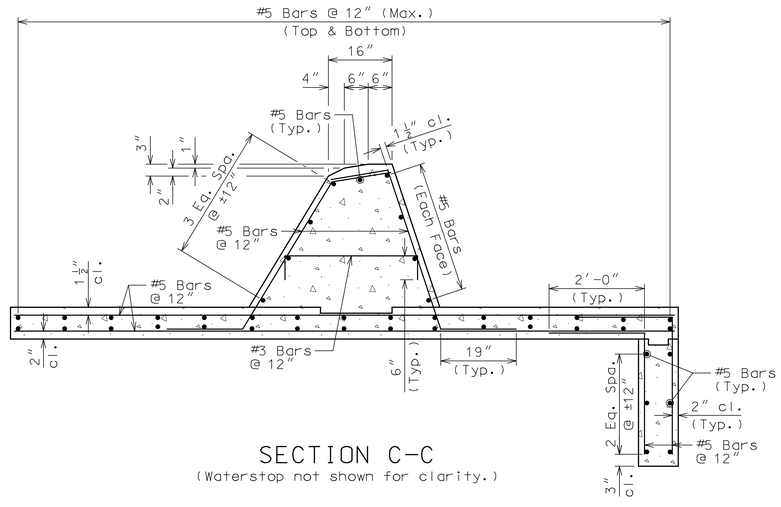


VIEW A-A



SECTION B-B

(Spillway drop reinforcing not shown for clarity.)



SECTION C-C

(Waterstop not shown for clarity.)

Record Drawing

AS-BUILT

Date Surveyed: 12/14/2020

I hereby certify that the conditions shown are correct and the sewers are acceptably located within existing easements or right of ways.

Julie E. Sellers, PE

STATE OF MISSOURI
JULIE ELAINE SELLERS
NUMBER PE-2017000367
12/17/20
PROFESSIONAL ENGINEER

ONLY FOR ELEVATION OF SPILLWAY

Note:
For locations of View A-A, Section B-B, & Section C-C, see Sheet S503

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NUMBER PE-2012018100
PROFESSIONAL ENGINEER
02-04-20

NO. REV.	DATE	REVISIONS DESCRIPTION	BY
1	2020.01.17	REVISED PER CITY COMMENTS	

REVISIONS

SPILLWAY DETAILS
SPILLWAY RECONSTRUCTION

WOODSIDE RIDGE
FIRST PLAT

LEE'S SUMMIT, MO

2020

drawn by: K.A.S
checked by: G.C.L
designed by: K.A.S
QA/QC by: M.G.D
project no.: A18-1140
date: 2020.02.04

SHEET S504

APPENDIX C

Inspection Report Form

STORMWATER BMP INSPECTION REPORT FORM

Location of BMP:_____ BMP Type:_____

Date of Inspection:_____ Inspected by:_____

Features				
Maintenance Item	**Yes**	**No**	**N/A**	**Comments**
Functioning to avoid complaints				
Aesthetically maintained				
Free of trash and debris				
Good vegetation cover				
Free of invasive species				
Evidence of erosion				
Bottom of basin clear of excess sediment				
Outlet structure in working condition				
Spillway in working condition				

Action to be taken: _____

_____

_____

_____

_____

APPENDIX D
Ownership Information

OWNERSHIP INFORMATION

Ownership information shall be updated in the event the property owner where the stormwater BMP's are located changes. Below is contact information for the property owner, shall they need to be contacted regarding the stormwater BMPs.

Stormwater BMP Property Ownership	
Property Owner	Woodside Ridge Master Homes Association, Inc.
Contact Person	Tawny Huddleston – Property Manager
Management	Young Management Group, Inc.
Address	10660 Barkley Street, STE 200, Overland Park, KS 66212
Phone Number	913-890-2300 ask for Tawny
Email Address	tawny@ymginc.com

Stormwater BMP Property Change of Ownership	
Property Owner	
Contact Person	
Address	
Phone Number	
Email Address	

Stormwater BMP Property Change of Ownership	
Property Owner	
Contact Person	
Address	
Phone Number	
Email Address	

Stormwater BMP Property Change of Ownership	
Property Owner	
Contact Person	
Address	
Phone Number	
Email Address	