

STORM WATER REPORT

Cobey Creek
Mixed Use Development
Lee's Summit, MO

PREPARED FOR
JCM DEVELOPMENT,LLC

PREPARED BY
Hg Consult, Inc

Condensed Version
October, 2020



Content

1. Original Storm Report-May 22, 2018
2. Addendum 1- July 1, 2019- Effective Height and Energy Dissipation additions to North Pond
3. Addendum 2- August 3, 2020- Updated South Pond Outlet Structure-Pond Pack Print out.
4. Addendum 3- October 8, 2020- Approved Outlet Structure Geometric Changes from Circular to Square and Rectangular

STORM WATER DRAINAGE REPORT

Cobey Creek

Mixed Use Development

Lee's Summit, MO

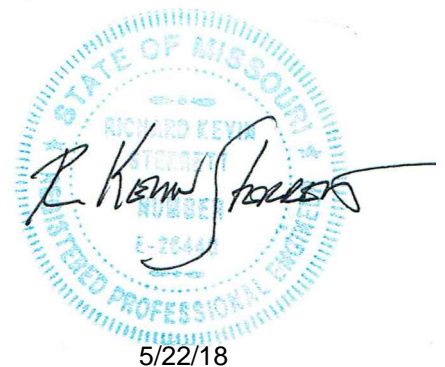
PREPARED FOR

JCM DEVELOPMENT, LLC

PREPARED BY HG

CONSULT, INC.

May 22, 2018



5/22/18

1. Project Overview

The proposed project is a mixed use development. The project will contain 12.7 acres of commercial development and 84.6 acres of mixed residential development and open space. The site is current undeveloped with a lone residential dwelling.

The topography of the site is a gentle slope south to the north, specifically to the north east corner to a creek. Some area along the highway frontage slopes to the south and drains through a culvert pipe under M-150 Highway.

2. Drainage Assessment of the Project Site

Storm drainage for the site will include a full underground system, designed for the 10-year storm event and overland routing of the higher storm events. The majority of the post development site drainage will be regulated at the north east corner of the site with a detention facility, sized for the 2-year, 10-year, and 100-year storm events with the 40-hour extended detention included.

3. Temporary Erosion and Sediment Control

During construction and prior to paving, it will be necessary to control erosion and sediment from the site during storms with in the construction timeframe. To insure that sediment does not enter the existing storm system or runs off to the existing street or creek, perimeter containment, silt fence, inlet protection, rock ditch checks will be used. The detention pond will utilized as a temporary sediment basin during construction of the early phases of the development. This will be fully addressed in the E, S&C plans with the Phase 1 construction plans. To keep construction traffic from tracking mud onto the adjacent citystreet, a stabilized rock construction entrance will need to be installed.

These erosion control devices, and their maintenance throughout the construction timeframe, are required by ordinance and the details for them are referenced by APWA 5600.

Post-development water quality will be addressed through the use a release structure sized for the 2-year, 10-year, and 100-year storm events with the 40-hour extended detention included. The owner will need to have a routine maintenance policy for the cleaning, repair and replacement of the detention release structure.

4. Soil Classifications

NRCS Web Soil Survey categorizes the soils on the Cobey Creek site below.

Table 4.1 – Soil Classification

Symbol	Name	Slopes	HSG
10000	Arisburg silt loam	1-5%	C
10082	Sampsel silty clay loam	2-5%	C/D
10117	Sampsel silty clay loam	5-9%	C/D

For this analysis, Soil group C was considered for the Cobey Creek site. Curve Numbers were used in accordance with the APWA 5600.

5. Methodology

The method for evaluating Cobey Creek was the use of a PondPack Model. Both Pre-Development and Post-Development conditions were considered:

PondPack V8i

- TR-55 Unit Hydrograph Method
 - 2-year, 10-year and 100-year Return Frequency storms
 - AMC II Soil Moisture conditions
 - 24-Hour SCS Type II Rainfall Distribution
 - SCS Runoff Curve Numbers per APWA 5600 (Table 5602-3)
 - Time of Concentration developed per TR-55

6. Pre-Development Conditions

This section of the drainage study has been prepared to evaluate the Pre-Development Conditions related to stormwater runoff. The following tables summarize the Pre-Development Conditions Analysis. Refer to the Design Calculations for details regarding the analysis.

Table 6.1 – Pre-Development Watershed Data

Name	Area (acres)	Composite CN	Tc (hrs)
EX1	17.64	75	0.217
EX2	2.43	74	0.145
EX3	89.68	75	0.419
EX4	14.70	74	0.182

Table 6.1 – Pre-Development Discharges

Name	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
EX1	29.07	61.09	107.36
EX2	4.29	9.17	16.32
EX3	105.54	226.85	403.16
EX4	23.98	51.33	91.04

Per APWA Section 5608.4 and City of Lee's Summit criteria, the post-development discharge rates from the site shall not exceed those indicated below:

- 50% storm peak rate less than or equal to 0.5 cfs per site acre
- 10% storm peak rate less than or equal to 2.0 cfs per site acre
- 1% storm peak rate less than or equal to 3.0 cfs per site acre

APWA allowable releases were calculated for the various points of discharge. Off-site flows were allowed to bypass detention. Off-site flows were calculated using a separate PondPack model. The off-site time of concentrations used the same existing time of concentrations located in Table 6.1 and the areas can be found in Table 6.3. Where detention was not possible, areas of the site were drained to the detention in P3 to reduce the outflow from EX1, EX2, and EX4. Release rates per APWA were added to the off-site discharges to produce the allowable rates.

Table 6.3 – Pre-Development Off-site Watershed Data

Name	Total Area (acres)	On-site Area (acres)	Off-site Area (acres)
EX1	17.82	13.42	4.38
EX2	2.43	2.24	0.19
EX3	89.68	68.35	21.33
EX4	14.70	14.7	0

Table 6.4 – Off-site flow rates

Name	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
EX1	8.30	16.50	28.11
EX2	0.33	0.70	1.24
EX3	32.55	63.46	106.65
EX4	0	0	0

Table 6.5 – Allowable Peak Flow Rates

Name	Allowable Q2 (cfs)	Allowable Q10 (cfs)	Allowable Q100 (cfs)
EX1	15.01	43.34	68.37
EX2	1.49	5.32	8.17
EX3	66.73	200.16	311.70
EX4	7.35	29.40	44.10

7. Post-Development Conditions

This section of the drainage study has been prepared to evaluate the Post-Development Conditions related to stormwater runoff. The following tables summarize the Post-Development Conditions Analysis. Refer to the Design Calculations for details regarding the analysis.

Table 7.1 – Post-Development Watershed Data

Name	Area (acres)	Composite CN	Tc (hrs)
P1	10.88	84	0.153
P2	0.68	81	0.112
P3	90.04	83	0.364
P4	4.40	82	0.165

Table 7.2 – Post-Development Discharges

Name	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
P1	29.29	58.87	84.76
P2	1.73	3.27	5.40
P3	56.27	194.07	282.73
P4	10.77	20.01	32.66

All storm events for Areas P2, P3, and P4 will see a decrease in the maximum release rates from Pre-Development Conditions to Post-Development Conditions. Area P1 does not meet the release requirements. This area will be a separate development that will require detention. The developer will be required to size this separate detention to meeting the allowable release rates located in Table 6.4.

P2 and P4 are fringe areas that do not contain any detention. The 2-year flows for P2 and P4 do not meet the allowable release rates located in Table 6.4. A waiver to the Design and Construction manual will be submitted to the City of Lee's Summit.

P5 on the proposed drainage map is a small fringe area on the backside of the detention pond. This area will be routed to a diversion ditch along the east side of the property and converge with the outlet of the detention pond at the Northeast corner of the property.

APWA 5608.4 also requires a 40-hour extended release of the water quality storm event (1.37"/24-hour rainfall) per Section 8.10 of the BMP Manual. The detention facility will release the water quality event over a 40-hour period. The Time vs. Volume graph is located in the Design Calculations Section.

8. Post-Development 100-year Spillway

APWA 5600 also requires a spillway in the detention pond sized for the 100-year event, assuming 100% clogging of the primary outlet works and zero available storage in the detention pond. The 100-year water surface elevation is 976.0. The spillway was set at an elevation of 976.5 and was sized to provide 1-foot of freeboard. The spillway will be 475-feet in length and riprap will be sized and placed throughout the spillway.

9. Future Conditions

The Cobey Creek site does not have any future developments planned.

10. Conclusions

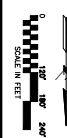
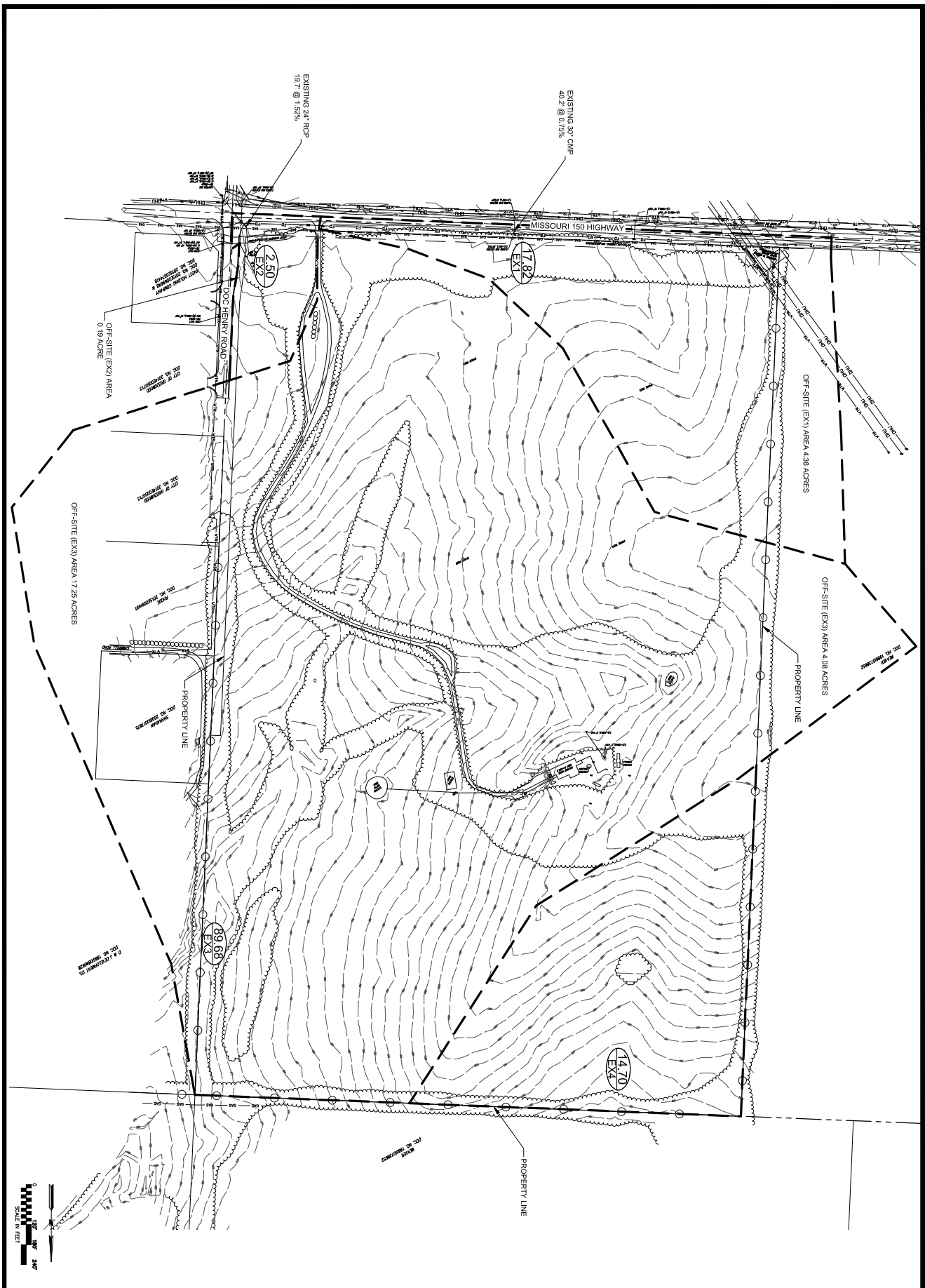
The Cobey Creek project is a mixed use development 186 single family lots, 44 multi-family lots, and 4 commercial lots. The project will contain 12.7 acres of commercial development and 84.6 acres of mixed residential development and open space. The report has been prepared to evaluate the stormwater discharge at the site to ensure the requirements of APWA 5600 are met. The detention pond and release structure was designed to not increase peak discharges from existing conditions as well as meeting the maximum releases from APWA 5600. It is not anticipated that the Cobey Creek Development will have any downstream impacts.

The 2-year flows for P2 and P4 do not meet the allowable release rates located in Table 6.4. A waiver to the Design and Construction manual will be submitted to the City of Lee's Summit.

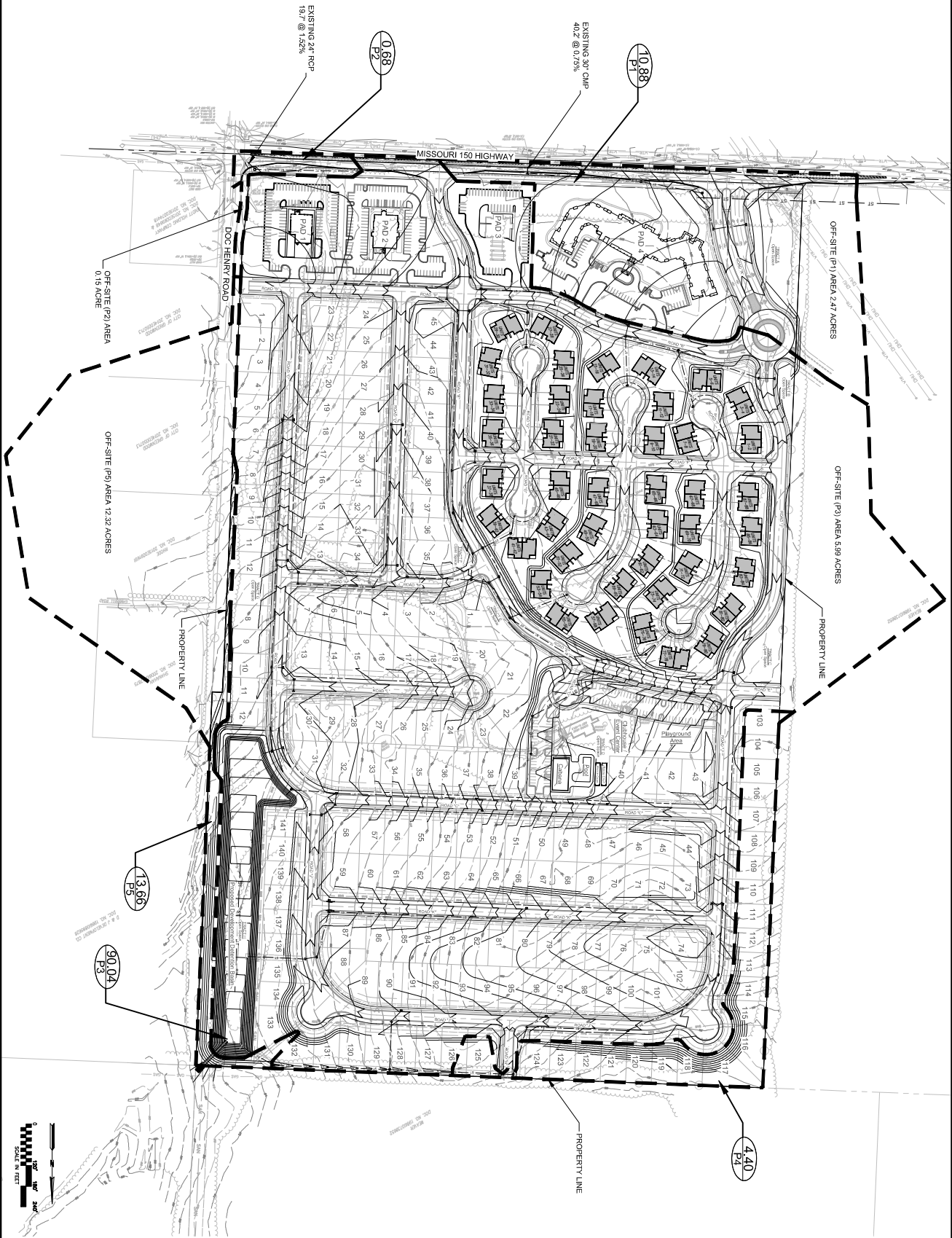
11. Design Calculations

See the attached for drainage area maps and stormwater calculations.

DRAINAGE AREA MAPS



STORM DRAINAGE REPORT EXISTING CONDITIONS		Consult Inc engineers planners		R. KEVIN STORRETT, KS E-21889 MO E-26440 3rd 11, 2017	
COBEY CREEK CITY OF LEE'S SUMMIT, JACKSON COUNTY, MISSOURI		11010 Haskell Street, Suite 210, Kansas City, Kansas 66109 CORPORATE LICENSE No. E201000573 (MO.) / E-1736 (KS.)		DATE REVISION NO. BY CV/APP	
14-0000 NAME 14-0000 STORM DRAINAGE May 8, 2018 14-0000		1 2		IF THIS IS NOT A BLUE INK SEAL AND THE SIGNATURE OR BLUE INK, THE PLAN IS A COPY AND MAY CONTAIN UNAUTHORIZED ALTERATIONS. THE CERTIFICATION CONTAINED ON THIS DOCUMENT SHALL NOT APPLY TO ANY COPIES	




SOIL CLASSIFICATIONS

Hydrologic Soil Group—Jackson County, Missouri



MAP LEGEND

Area of Interest (AOI)








 Area of Interest (AOI)

Soils





Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jackson County, Missouri
 Survey Area Data: Version 18, Sep 16, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 14, 2014—Oct 10, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10000	Arisburg silt loam, 1 to 5 percent slopes	C	60.8	66.3%
10116	Sampsel silty clay loam, 2 to 5 percent slopes	C/D	9.0	9.8%
10117	Sampsel silty clay loam, 5 to 9 percent slopes	C/D	21.9	23.8%
Totals for Area of Interest			91.7	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

TIME OF CONCENTRATION CALCULATIONS

	EX1		
	Area	CN	Composite CN
Row Crop	4.4	78	19
Undeveloped	13.4	74	56
Total	17.8		75

	EX2		
	Area	CN	Composite CN
Undeveloped	0.2	74	6
Undeveloped	2.3	74	68
Total	2.5		74

	EX3		
	Area	CN	Composite CN
Row Crop	4.1	78	4
Residential/Undeveloped	17.3	80	15
Undeveloped	68.4	74	56
Total	89.7		75

	EX4		
	Area	CN	Composite CN
Undeveloped	14.7	74	74
Total	14.7		

	P1		
	Area	CN	Composite CN
Row Crop	2.5	78	18
Undeveloped	1.0	74	7
Mixed Use	7.4	88	60
Total	10.9		84

	P2		
	Area	CN	Composite CN
Undeveloped	0.2	74	16
Undeveloped	0.2	74	23
Mixed Use	0.3	88	41
Total	0.7		81

	P3		
	Area	CN	Composite CN
Row Crop	6.0	78	5
Undeveloped	3.3	74	3
Multi Family	25.8	88	25
Residential	55.0	82	50
Total	90.0		83

	P4		
	Area	CN	Composite CN
Residential	4.4	82	82
Total	4.4		

Hg

Cobey Creek
Existing
Jackson County, Missouri

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)

EX3							
SHEET	100	0.0100	0.170				0.228
SHALLOW	1400	0.0330	0.050				0.133
CHANNEL	1520	0.0160	0.030	22.00	17.60	7.280	0.058
						Time of Concentration	.419
							=====
EX1							
SHEET	50	0.0140	0.170				0.114
SHALLOW	500	0.0200	0.050				0.061
CHANNEL	910	0.0200	0.030	8.00	10.00	6.019	0.042
						Time of Concentration	.217
							=====
EX2							
SHEET	50	0.0150	0.150				0.101
SHALLOW	100	0.0220	0.050				0.012
CHANNEL	350	0.0220	0.050	4.50	8.00	3.038	0.032
						Time of Concentration	.145
							=====
EX4							
SHEET	50	0.0120	0.150				0.110
SHALLOW	340	0.0300	0.050				0.034
CHANNEL	730	0.0300	0.050	16.00	15.00	5.336	0.038
						Time of Concentration	.182
							=====

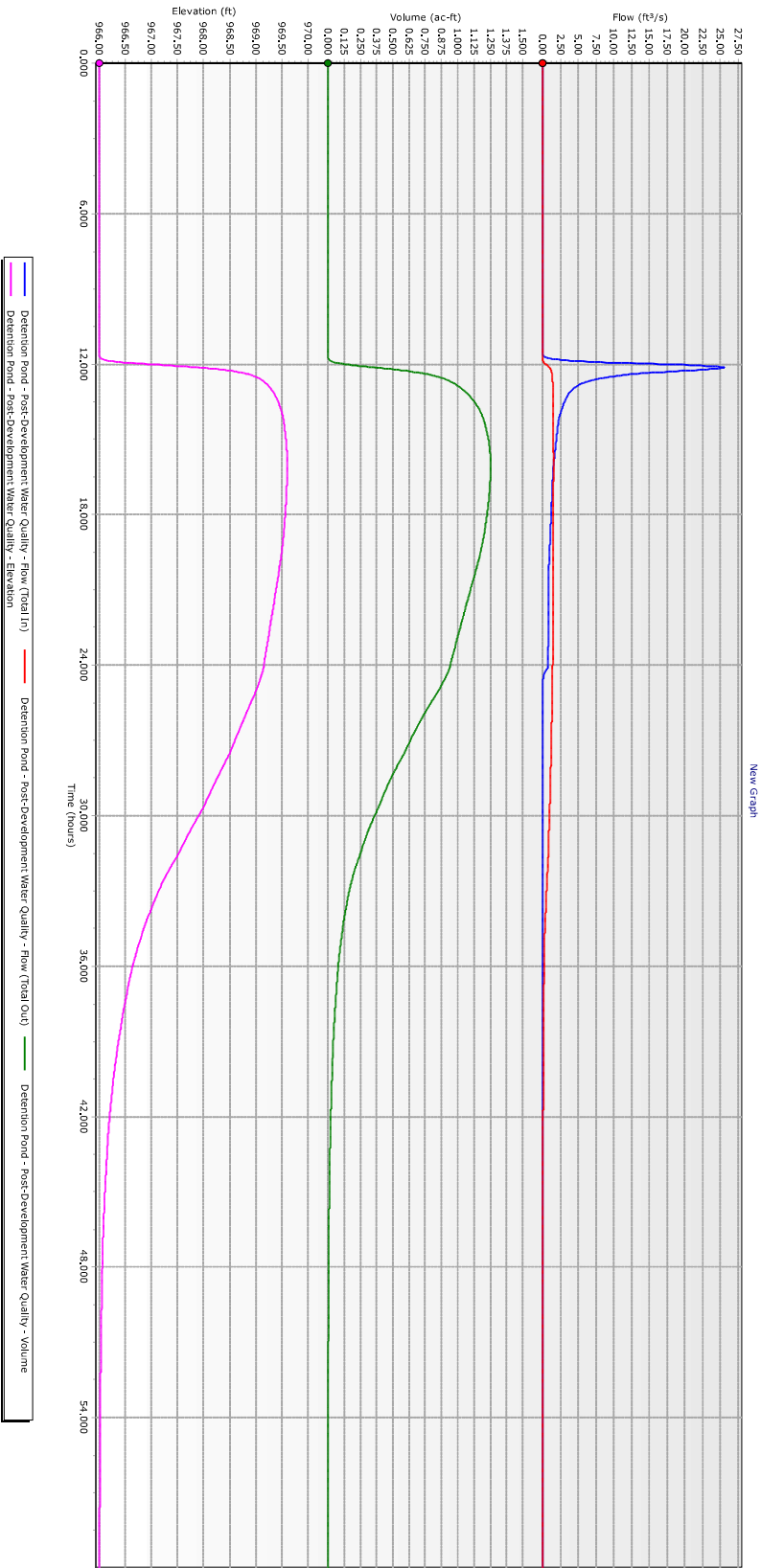
Cobey Creek
Proposed
Jackson County, Missouri

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)

P3							
SHEET	100	0.0100	0.170				0.228
SHALLOW	600	0.0160	0.050				0.082
CHANNEL	2950	0.0175	0.013	12.60	12.60	15.175	0.054
					Time of Concentration		.364
							=====
P1							
SHEET	50	0.0140	0.170				0.114
SHALLOW	200	0.0200	0.025				0.019
CHANNEL	1000	0.0200	0.013	8.00	10.00	13.889	0.020
					Time of Concentration		.153
							=====
P2							
SHEET	50	0.0150	0.150				0.101
SHALLOW	50	0.0220	0.025				0.005
CHANNEL	250	0.0220	0.013	4.50	8.00	11.574	0.006
					Time of Concentration		.112
							=====
P4							
SHEET	50	0.0120	0.150				0.110
SHALLOW	100	0.0300	0.050				0.010
CHANNEL	1460	0.0300	0.030	16.00	15.00	9.012	0.045
					Time of Concentration		.165
							=====

WATER QUALITY EVENT EXTENDED RELEASE



PONDPACK OUTPUT

COBEY CREEK

Project Summary

Title	COBEY CREEK
Engineer	Kellen Huffman
Company	Hg Consult, Inc
Date	5/22/2018

Notes

COBEY CREEK

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
P3	Pre-Development Water Quality	1	0.988	12.240	5.37
P3	Post-Development Water Quality	1	2.422	12.130	25.54
P3	Pre-Development 2 year	2	9.729	12.130	105.54
P3	Post-Development 2 year	2	13.945	12.090	169.63
P3	Pre-Development 10 year	10	20.139	12.130	226.85
P3	Post-Development 10 year	10	25.862	12.090	314.25
P3	Pre-Development 100 year	100	35.662	12.120	403.16
P3	Post-Development 100 year	100	42.704	12.090	511.44
P1	Pre-Development Water Quality	1	0.196	12.090	1.62
P1	Post-Development Water Quality	1	0.322	12.010	5.06
P1	Pre-Development 2 year	2	1.933	12.040	29.07
P1	Post-Development 2 year	2	1.756	11.980	29.29
P1	Pre-Development 10 year	10	4.002	12.030	61.09
P1	Post-Development 10 year	10	3.215	11.970	52.87
P1	Pre-Development 100 year	100	7.086	12.010	107.36
P1	Post-Development 100 year	100	5.265	11.970	84.76
P2	Pre-Development Water Quality	1	0.024	12.050	0.21
P2	Post-Development Water Quality	1	0.015	12.010	0.23
P2	Pre-Development 2 year	2	0.258	11.990	4.29
P2	Post-Development 2 year	2	0.097	11.950	1.73
P2	Pre-Development 10 year	10	0.543	11.970	9.17
P2	Post-Development 10 year	10	0.184	11.940	3.27
P2	Pre-Development 100 year	100	0.970	11.970	16.32

COBEY CREEK

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
P2	Post-Development 100 year	100	0.309	11.940	5.40
P4	Pre-Development Water Quality	1	0.141	12.080	1.11
P4	Post-Development Water Quality	1	0.107	12.030	1.58
P4	Pre-Development 2 year	2	1.519	12.010	23.98
P4	Post-Development 2 year	2	0.654	11.990	10.77
P4	Pre-Development 10 year	10	3.192	12.010	51.33
P4	Post-Development 10 year	10	1.228	11.990	20.01
P4	Pre-Development 100 year	100	5.706	11.990	91.04
P4	Post-Development 100 year	100	2.044	11.970	32.66

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-3	Pre-Development Water Quality	1	0.988	12.240	5.37
O-3	Post-Development Water Quality	1	2.421	16.040	1.53
O-3	Pre-Development 2 year	2	9.729	12.130	105.54
O-3	Post-Development 2 year	2	13.944	12.470	56.27
O-3	Pre-Development 10 year	10	20.139	12.130	226.85
O-3	Post-Development 10 year	10	25.861	12.290	194.07
O-3	Pre-Development 100 year	100	35.662	12.120	403.16
O-3	Post-Development 100 year	100	42.703	12.310	282.73
O-1	Pre-Development Water Quality	1	0.196	12.090	1.62
O-1	Post-Development Water Quality	1	0.322	12.010	5.06
O-1	Pre-Development 2 year	2	1.933	12.040	29.07

COBEY CREEK

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Post-Development 2 year	2	1.756	11.980	29.29
O-1	Pre-Development 10 year	10	4.002	12.030	61.09
O-1	Post-Development 10 year	10	3.215	11.970	52.87
O-1	Pre-Development 100 year	100	7.086	12.010	107.36
O-1	Post-Development 100 year	100	5.265	11.970	84.76
O-2	Pre-Development Water Quality	1	0.024	12.050	0.21
O-2	Post-Development Water Quality	1	0.015	12.010	0.23
O-2	Pre-Development 2 year	2	0.258	11.990	4.29
O-2	Post-Development 2 year	2	0.097	11.950	1.73
O-2	Pre-Development 10 year	10	0.543	11.970	9.17
O-2	Post-Development 10 year	10	0.184	11.940	3.27
O-2	Pre-Development 100 year	100	0.970	11.970	16.32
O-2	Post-Development 100 year	100	0.309	11.940	5.40
O-4	Pre-Development Water Quality	1	0.141	12.080	1.11
O-4	Post-Development Water Quality	1	0.107	12.030	1.58
O-4	Pre-Development 2 year	2	1.519	12.010	23.98
O-4	Post-Development 2 year	2	0.654	11.990	10.77
O-4	Pre-Development 10 year	10	3.192	12.010	51.33
O-4	Post-Development 10 year	10	1.228	11.990	20.01
O-4	Pre-Development 100 year	100	5.706	11.990	91.04
O-4	Post-Development 100 year	100	2.044	11.970	32.66

Pond Summary

COBEY CREEK

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Detention Pond (IN)	Post-Development Water Quality	1	2.422	12.130	25.54	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development Water Quality	1	2.421	16.040	1.53	969.60	1.254
Detention Pond (IN)	Post-Development 2 year	2	13.945	12.090	169.63	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 2 year	2	13.944	12.470	56.27	972.74	5.248
Detention Pond (IN)	Post-Development 10 year	10	25.862	12.090	314.25	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 10 year	10	25.861	12.290	194.07	974.17	7.988
Detention Pond (IN)	Post-Development 100 year	100	42.704	12.090	511.44	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 100 year	100	42.703	12.310	282.73	976.00	12.018

PONDPACK SPILLWAY OUTPUT

COBEY CREEK-SPILLWAY

Project Summary

Title	COBEY CREEK- SPILLWAY
Engineer	Kellen Huffman
Company	Hg Consult, Inc
Date	5/22/2018

Notes

COBEY CREEK-SPILLWAY

Subsection: Master Network Summary

Catchments Summary

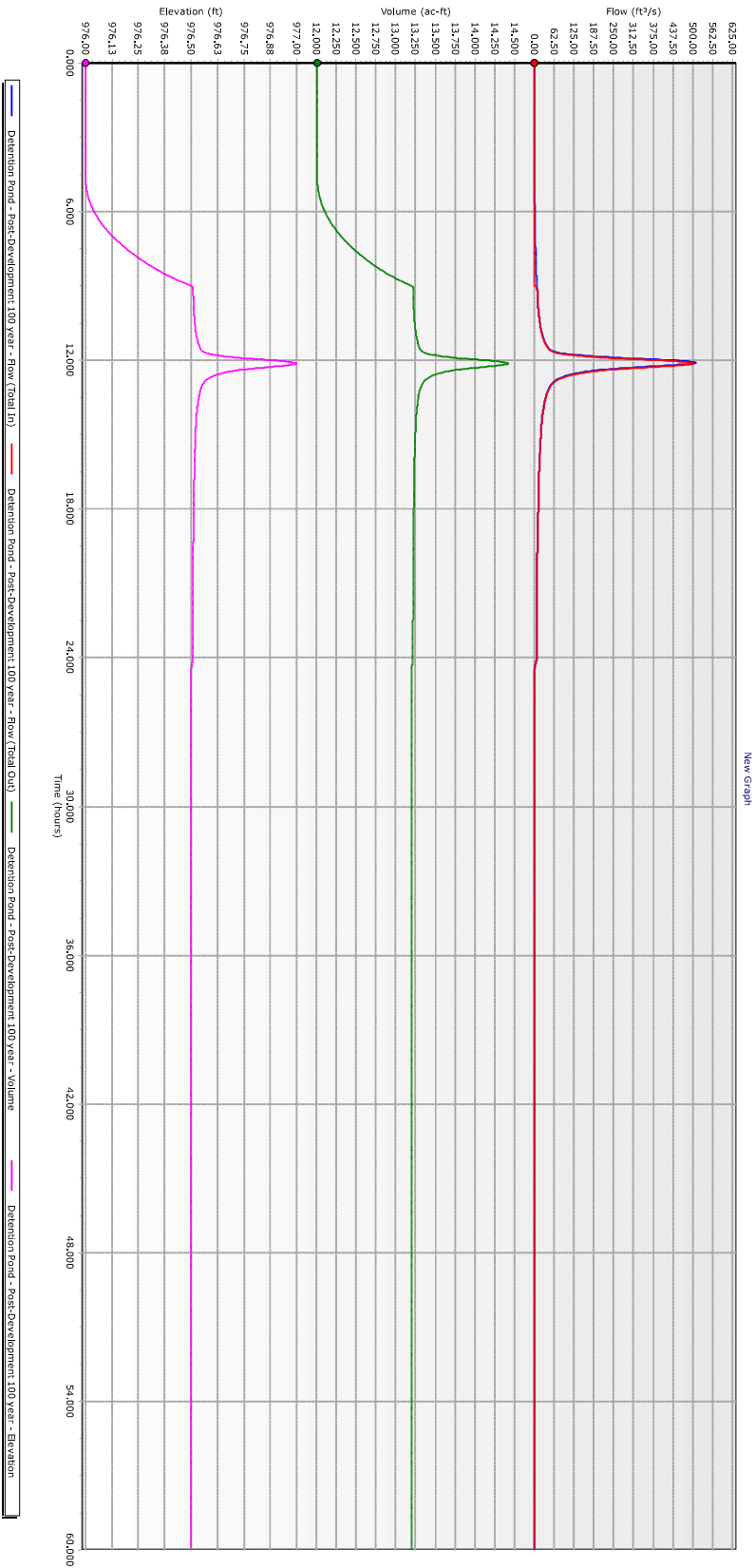
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
P3	Post-Development 100 year	100	42.704	12.090	511.44

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-3	Post-Development 100 year	100	41.518	12.130	502.73

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Detention Pond (IN)	Post-Development 100 year	100	42.704	12.090	511.44	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 100 year	100	41.518	12.130	502.73	977.00	14.420



FINAL STORM REPORT

ADDENDUM 1

Cobey Creek, Phase 1

Mixed Use Development

Lee's Summit, MO

PREPARED FOR

JCM DEVELOPMENT, LLC

PREPARED BY

HG CONSULT, INC.

July 1, 2019



7/1/19

Contents

1.	40 Hour Extended Detention.....	3
2.	Effective Height.....	3
3.	Energy Dissipation	3

This addendum to the final storm report for Cobey Creek, Phase 1, is prepared to address comments from the City of Lee's Summit staff from a letter dated May 25th, 2019 in regard to specific stormwater issues. The three sections are intended to provide additional information to the first three comments of said letter.

1. 40 Hour Extended Detention

The 8" skimmer used for erosion control will be permanent and the coupling will be capped. After final construction, if it is determined the North Detention Pond does not drain in 48 hours; the cap will be removed to drain the detention pond.

2. Effective Height

TR-60 states the following for the effective height of the dam.

"Effective height of dam. The difference in elevation in feet between the lowest open channel auxiliary spillway crest and the lowest point in the original cross section on the centerline of the dam. If there is no open channel auxiliary spillway, the top of the dam becomes the upper limit."

The top of the auxiliary spillway is at El. 977.0. The lowest point in the original cross section on the centerline of the dam is El. 968.0. Therefore, TR-60 does not apply to this detention pond.

3. Energy Dissipation

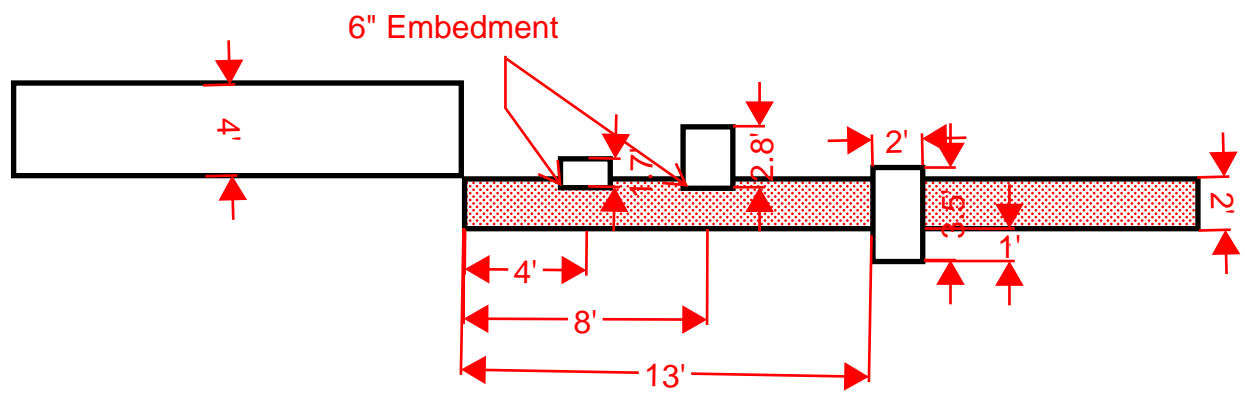
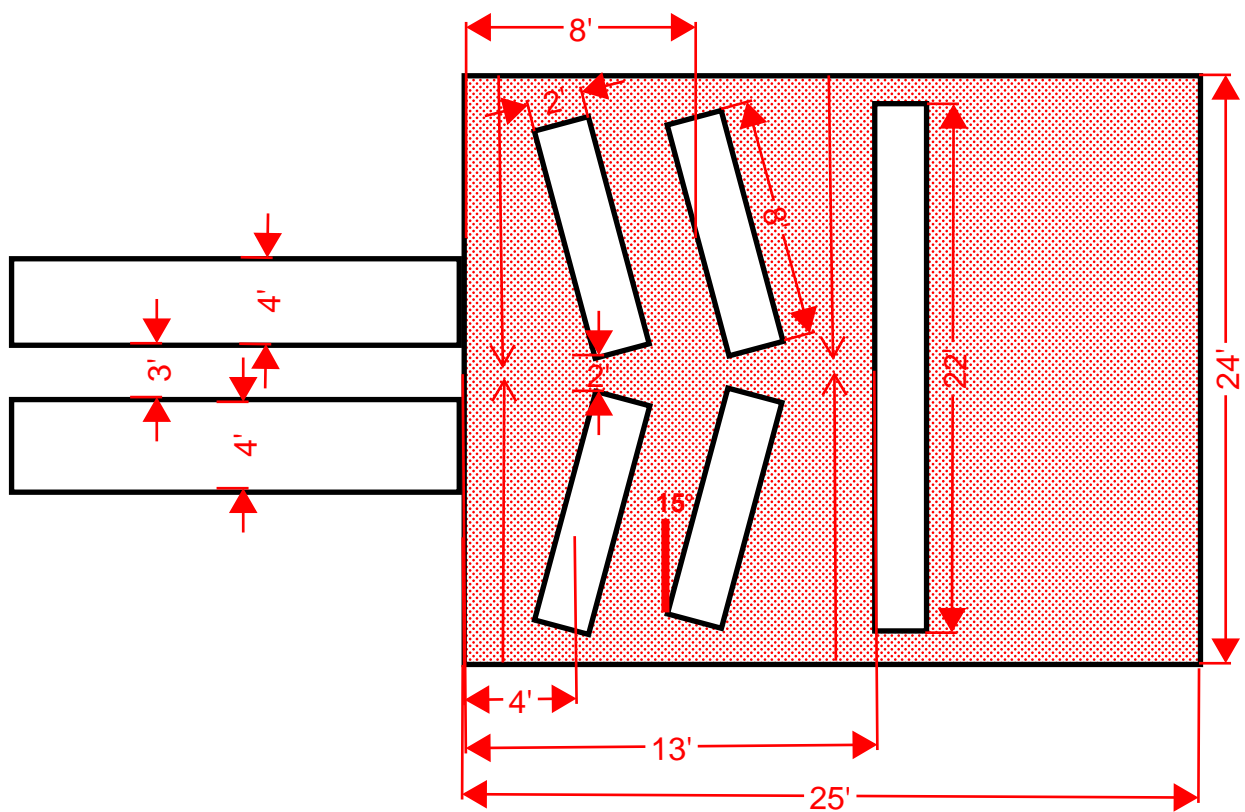
Additional energy dissipation has been added to the outlet structure at the request of the City of Lee's Summit. The outlet rip rap pad is fitted with a Contra Costa Design from HEC 14. The design details are included in the plans. The original 100-year outlet velocity is ~12.0 ft/s and the proposed 100-year outlet velocity is expected to be ~8.7 ft/s. Calculations are included in this Addendum.

HY-8 Energy Dissipation Report

External Energy Dissipator

Parameter	Value	Units
Select Culvert and Flow		
Crossing	Crossing 1	
Culvert	Culvert 1	
Flow	280.00	cfs
Culvert Data		
Culvert Width (including multiple barrels)	8.0	ft
Culvert Height	4.0	ft
Outlet Depth	3.51	ft
Outlet Velocity	11.98	ft/s
Froude Number	1.13	
Tailwater Depth	0.00	ft
Tailwater Velocity	0.00	ft/s
Tailwater Slope (SO)	0.0049	
External Dissipator Data		
External Dissipator Category	Streambed Level Structures	
External Dissipator Type	Contra Costa	
Restrictions		
Froude Number	<3	
TailWater	<.5D	
Input Data		
Baffle Block Height Ratio		
Note:	2.5 < Baffle Block Height Ratio < 7	
Note:	Optimum Baffle Block Height Ratio = 3.5	
Ratio of Baffle Block Height to Block Distance from the Culvert	3.500	
End Sill Height to Maximum Depth Ratio		
Note:	Maximum Depth in the Dissipator is 4.794 feet	
Note:	0.06 < End Sill Height to Max Depth Ratio < 0.1	
Note:	0.1 is Recommended for End Sill Height to Max Depth Ratio	
Ratio to Determine End Sill Height from Maximum Depth	0.100	
Basin Width		
Note:	Channel Width is 8.000 feet	ft
Note:	4.000 < Basin Width < 12.000	ft
Note:	Channel Width is Recommended for Basin Width	
Basin Width	8.000	ft
Results		
Basin Depth (Y2)	4.794	ft
Basin Length (LB)	21.373	ft
Basin Width (WB)	8.000	ft
Exit Width (W3)	8.000	ft
Exit Depth (YC)	2.954	ft

Exit Velocity (VB=VC)	8.653	ft/s
First Baffle		
Height (H1)	1.174	ft
Width (WB)	8.000	ft
Space (L1)	4.111	ft
Second Baffle		
Height (H2)	2.349	ft
Width (WB)	8.000	ft
Space (L2)	8.221	ft
End Sill		
Height (H3)	0.479	ft
Top Width (W3)	8.000	ft
Location (L3)	13.152	ft



STORM WATER REPORT

Addendum 2
Cobey Creek
Mixed Use Development
Lee's Summit, MO

PREPARED FOR
JCM DEVELOPMENT, LLC

PREPARED BY
Hg Consult, Inc

August 3, 2020

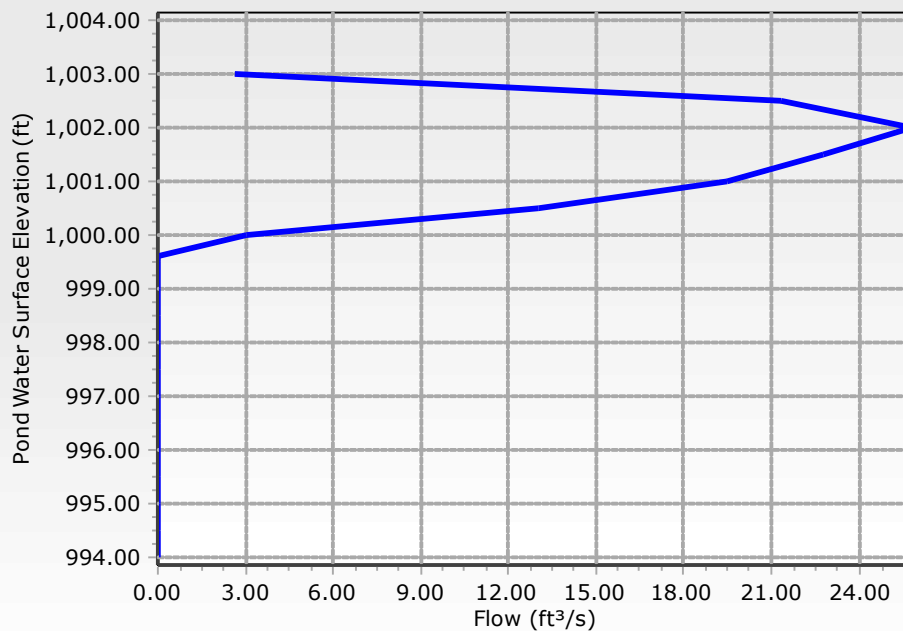


This addendum to the final storm report for Cobey Creek, Phase 1, is prepared to address the updating of the Pond Pack information for the south pond outlet structure. The attached Pondpack print out addresses the flow characteristics associated with six- 12inch diameter holes shown on the new square outlet structure detail, also attached.

The structure was changed to square from a circular manhole due to the unavailability of the manhole in a 6 foot diameter, as designed and approved in the original plans. The Pond pack information is provided as confirmation that original release orifices (12" holes) on the circular manhole when placed on the square version, shows no changes to the hydraulic function of the outlet structure within the pond.

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 3

Outlet Structure (Orifice)			
Orifice	Circular Orifice	Orifice Coefficient	0.600
Number of Openings	6	Orifice Diameter	12.0 in
Outlet Structure (Common)			
Elevation	999.60 ft		



RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)

Downstream ID = Culvert - 3 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
994.00	0.00	0.00	0.00	0.00
994.50	0.00	0.00	0.00	0.00
995.00	0.00	0.00	0.00	0.00
995.50	0.00	0.00	0.00	0.00
996.00	0.00	0.00	0.00	0.00
996.50	0.00	0.00	0.00	0.00
997.00	0.00	0.00	0.00	0.00

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 3

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)

Downstream ID = Culvert - 3 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
997.50	0.00	0.00	0.00	0.00
998.00	0.00	0.00	0.00	0.00
998.50	0.00	0.00	0.00	0.00
999.00	0.00	0.00	0.00	0.00
999.50	0.00	0.00	0.00	0.00
999.60	0.00	0.00	0.00	0.00
1,000.00	3.01	1,000.00	Free Outfall	998.82
1,000.50	13.03	1,000.50	999.79	999.79
1,001.00	19.45	1,001.00	1,000.26	1,000.26
1,001.50	22.75	1,001.50	1,000.49	1,000.49
1,002.00	25.81	1,002.00	1,000.71	1,000.71
1,002.50	21.30	1,002.50	1,001.62	1,001.62
1,003.00	2.64	1,003.00	1,002.99	1,002.99
Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
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0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	
0.00	0.00	(N/A)	0.00	

Message

WS below an invert; no flow.

WS below an invert; no flow.

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 3

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)

Downstream ID = Culvert - 3 (Culvert-Circular)

Message

WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
CRIT.DEPTH CONTROL Vh= .105ft
Dcr= .294ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .270ft
Dcr= .630ft CRIT.DEPTH Hev= .00ft
H =.74
H =1.01
H =1.29
H =.88
H =.01

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 3

Composite Rating Table

Tailwater Elevation = Free Outfall (Composite Outlet Structure - 3)

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
994.00	0.00	(N/A)	0.00
994.50	0.00	(N/A)	0.00
995.00	0.00	(N/A)	0.00
995.50	0.00	(N/A)	0.00
996.00	0.00	(N/A)	0.00
996.50	0.00	(N/A)	0.00
997.00	0.00	(N/A)	0.00
997.50	0.00	(N/A)	0.00
998.00	0.00	(N/A)	0.00
998.50	0.00	(N/A)	0.00
999.00	0.00	(N/A)	0.00
999.50	0.00	(N/A)	0.00
999.60	0.00	(N/A)	0.00
1,000.00	3.01	(N/A)	0.00
1,000.50	13.03	(N/A)	0.00
1,001.00	19.44	(N/A)	0.00
1,001.50	22.75	(N/A)	0.00
1,002.00	25.82	(N/A)	0.00
1,002.50	37.94	(N/A)	0.00
1,003.00	49.81	(N/A)	0.00

Contributing Structures

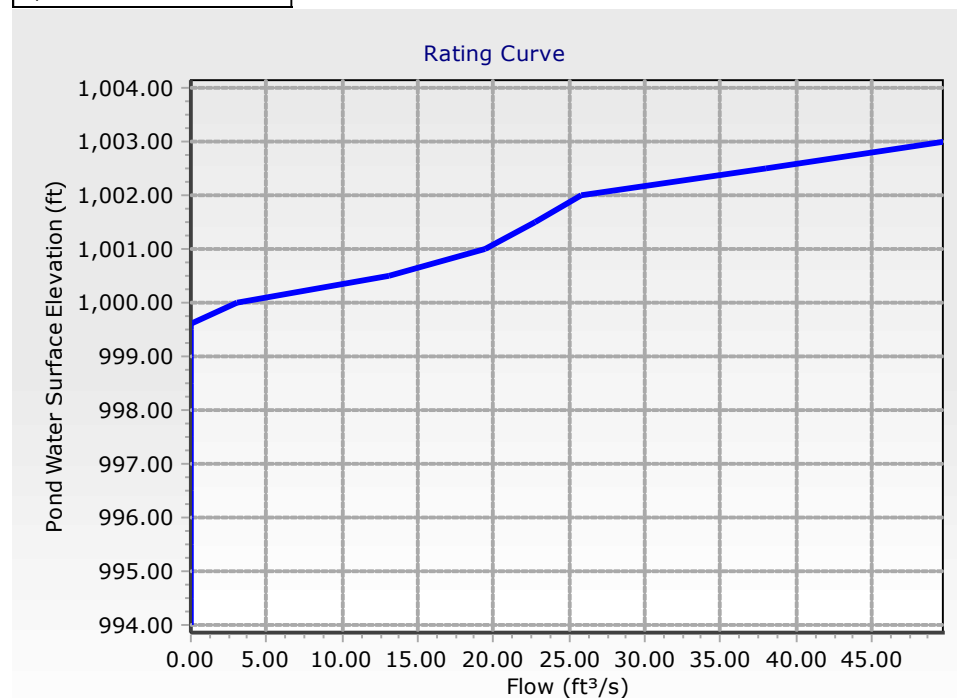
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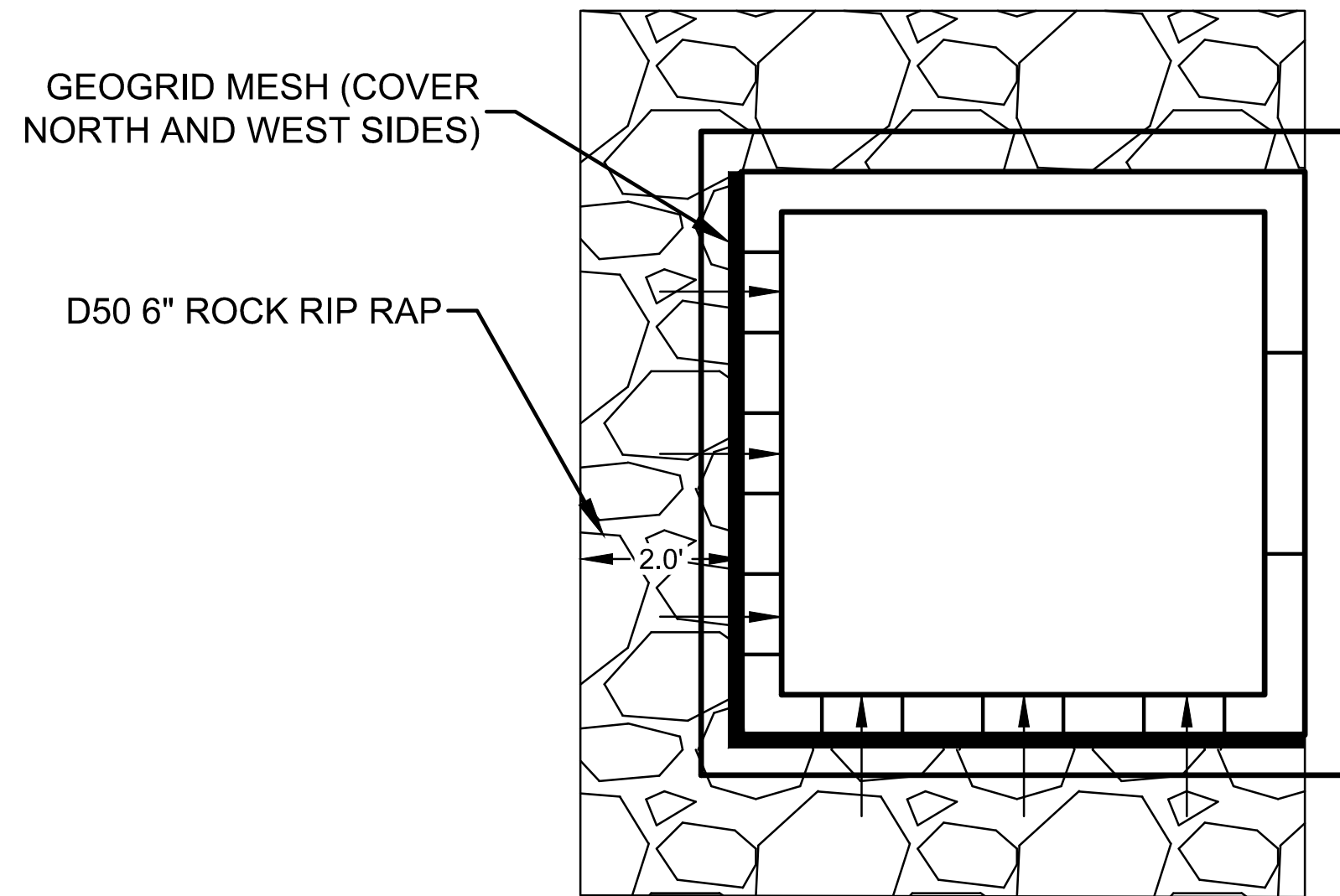
Composite Outlet Structure Detailed Report: Composite Outlet Structure - 3

Composite Rating Table

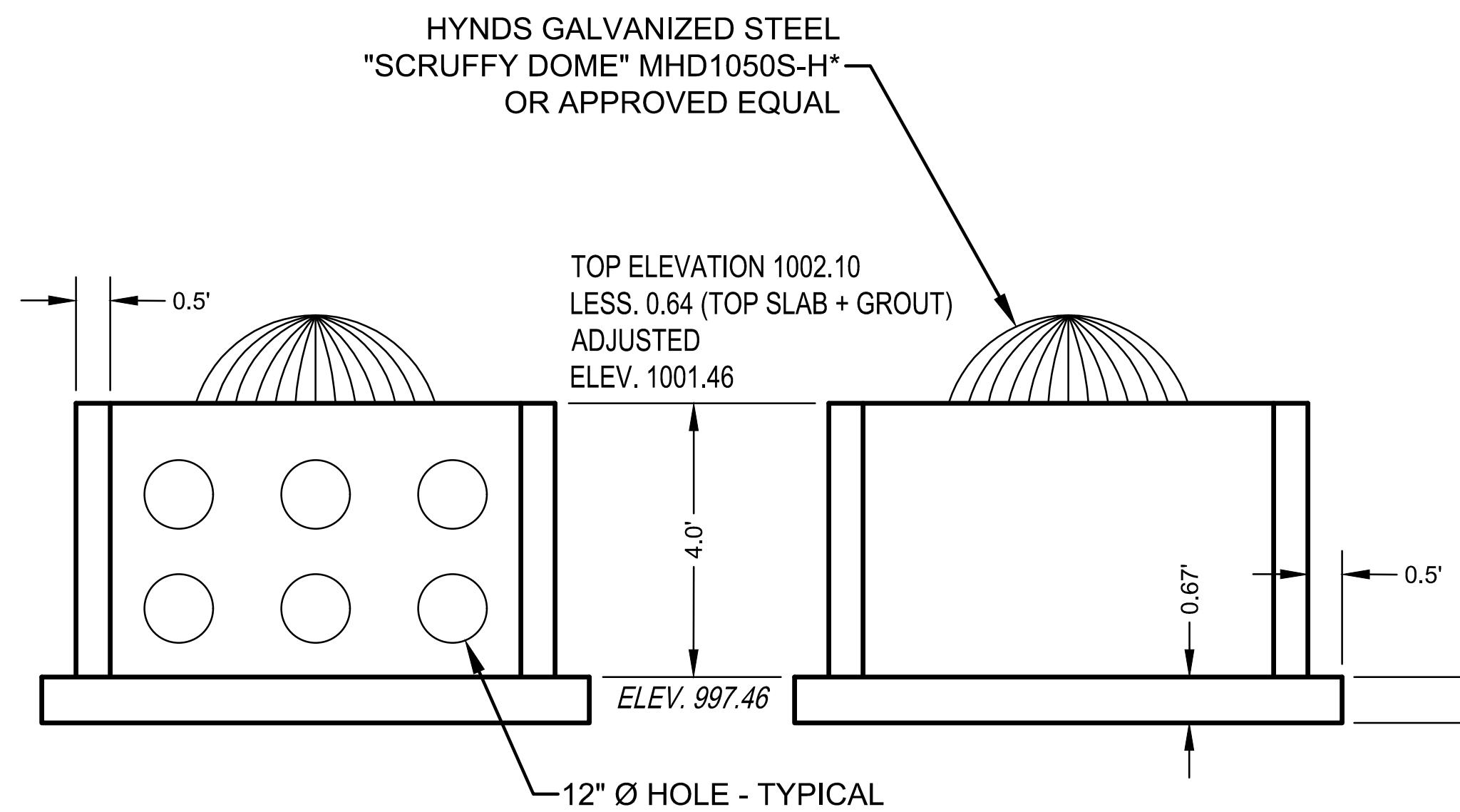
Tailwater Elevation = Free Outfall (Composite Outlet Structure - 3)

Contributing Structures
(no Q: Riser - 3, Orifice - 1, Culvert - 3)
Orifice - 1, Culvert - 3
(no Q: Riser - 3)
Orifice - 1, Culvert - 3
(no Q: Riser - 3)
Orifice - 1, Culvert - 3
(no Q: Riser - 3)
Orifice - 1, Culvert - 3
(no Q: Riser - 3)
Orifice - 1, Culvert - 3
(no Q: Riser - 3)
Riser - 3, Orifice - 1, Culvert - 3
Riser - 3, Orifice - 1, Culvert - 3



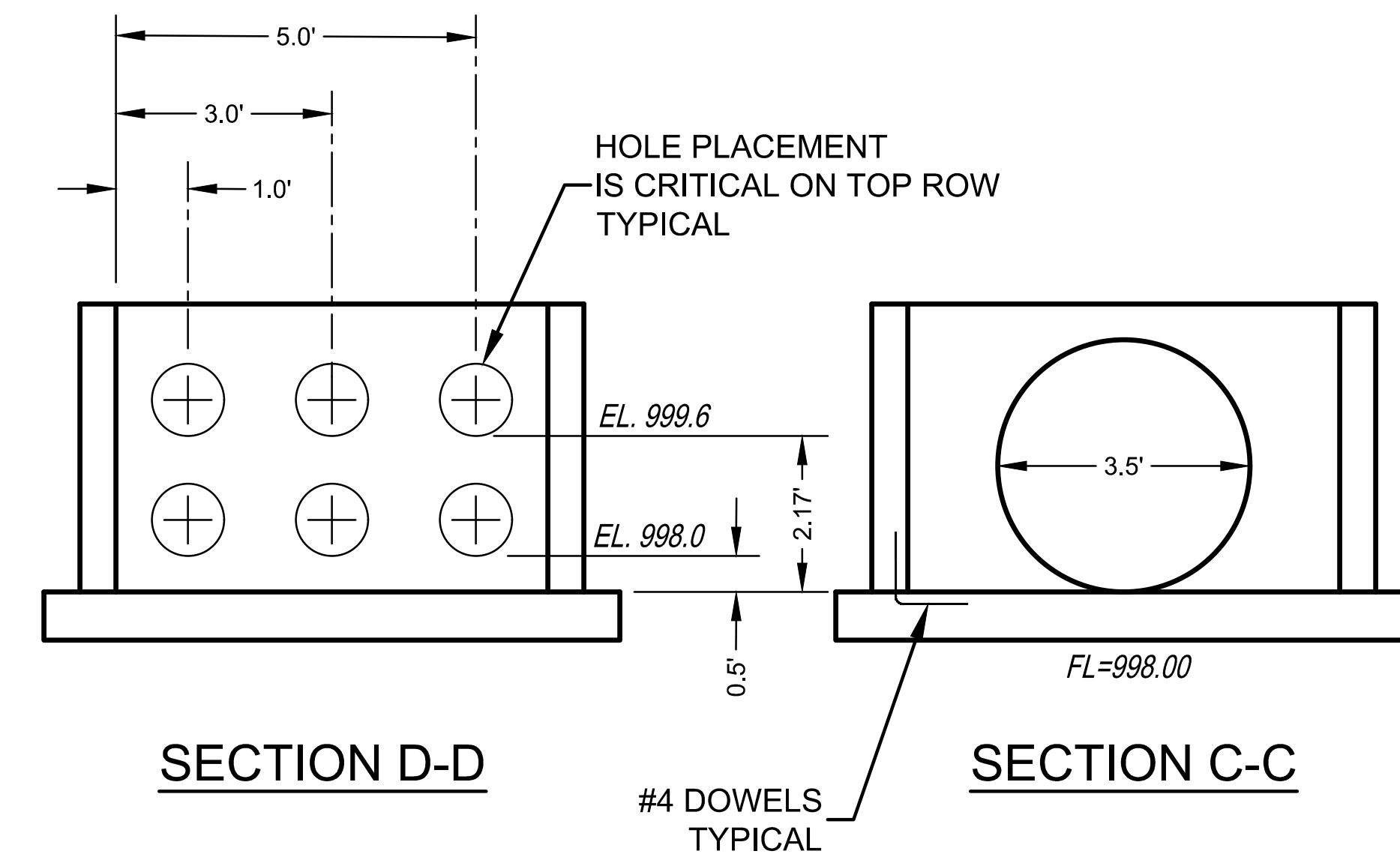


PLAN



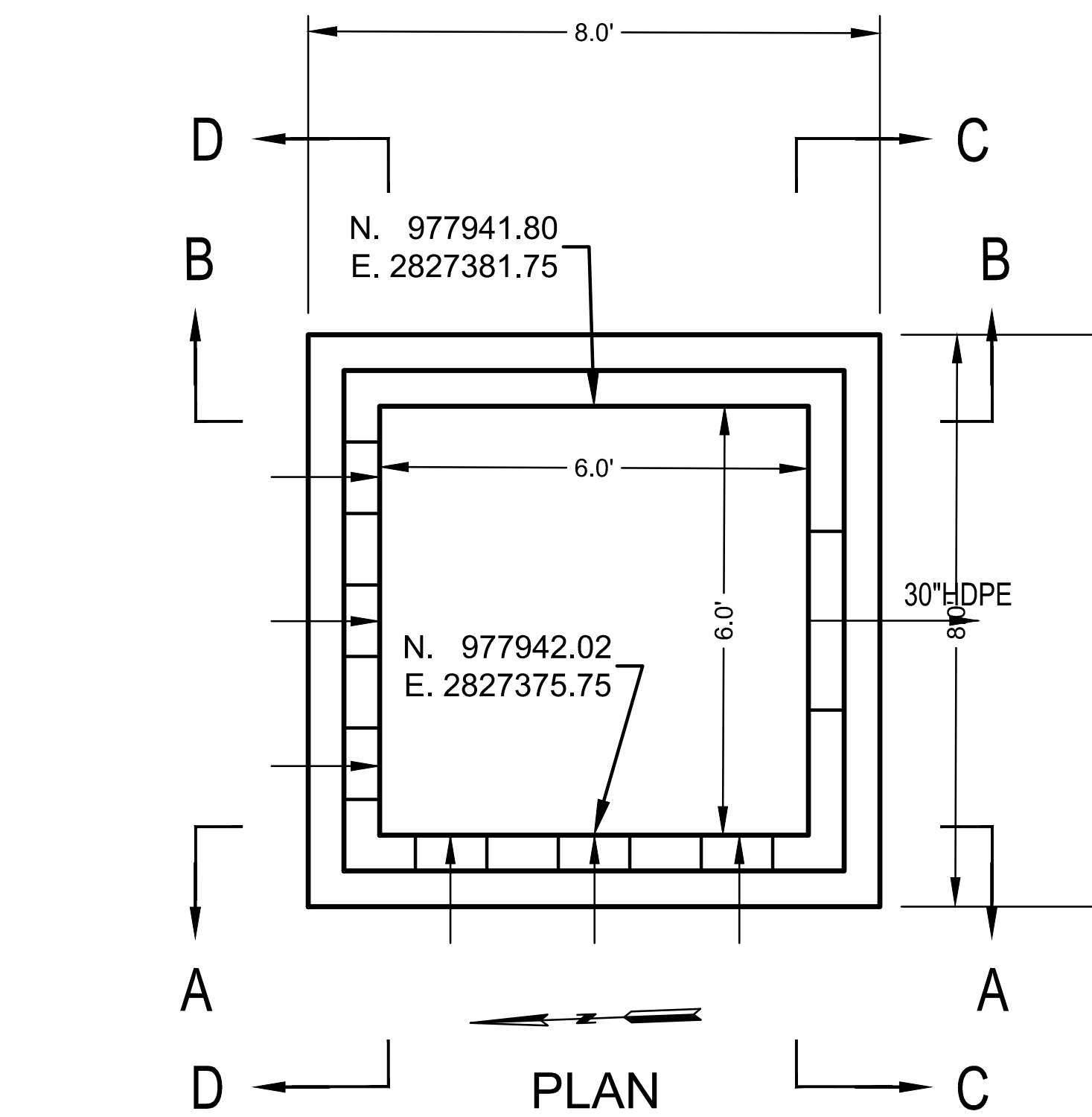
SECTION A-A

SECTION B-B

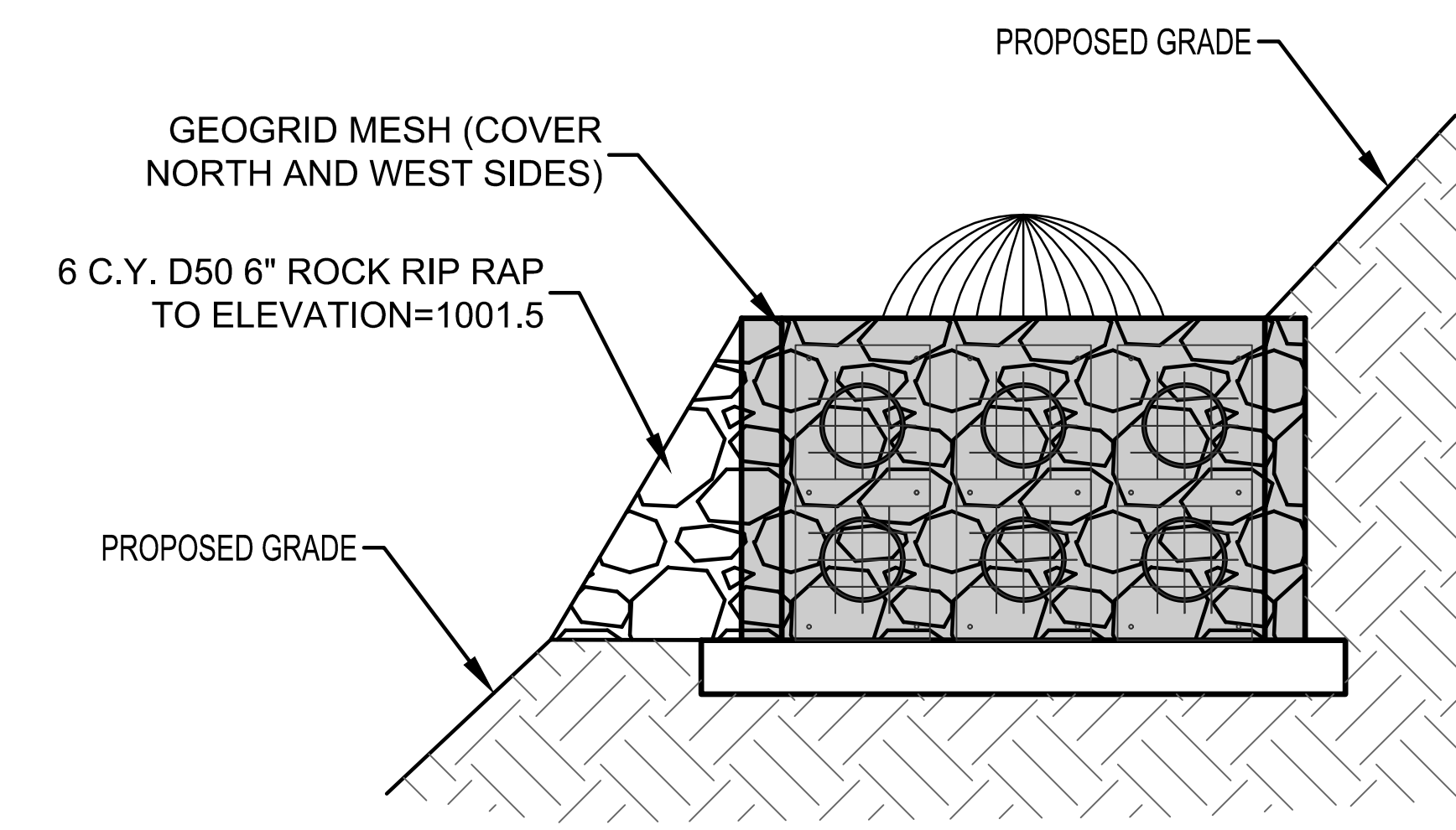


SECTION D-D

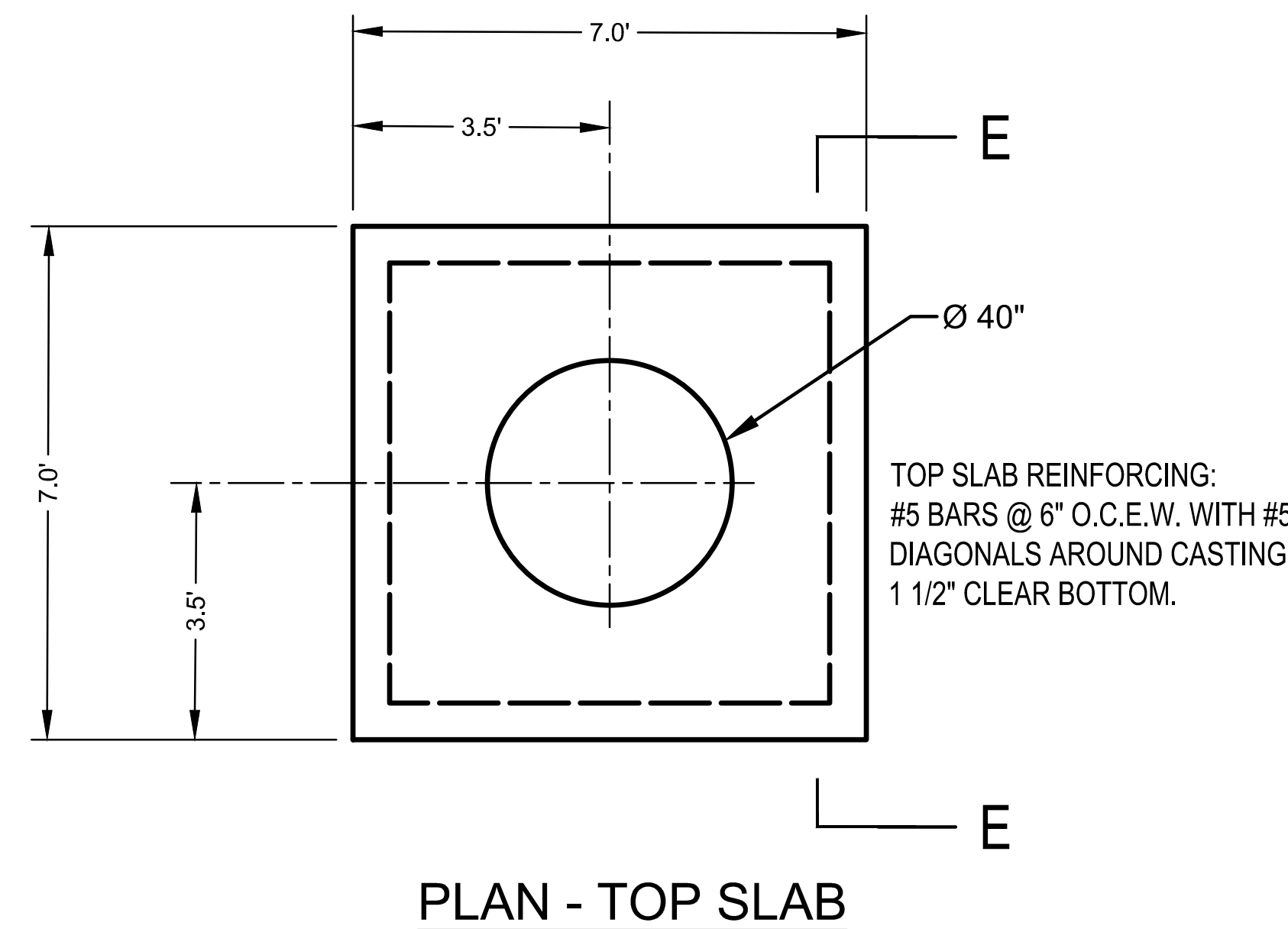
SECTION C-C



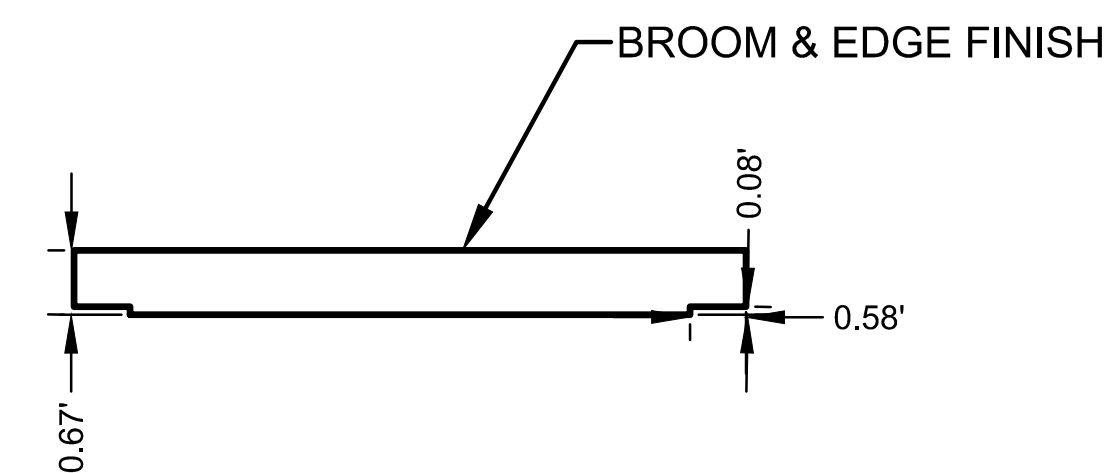
PLAN



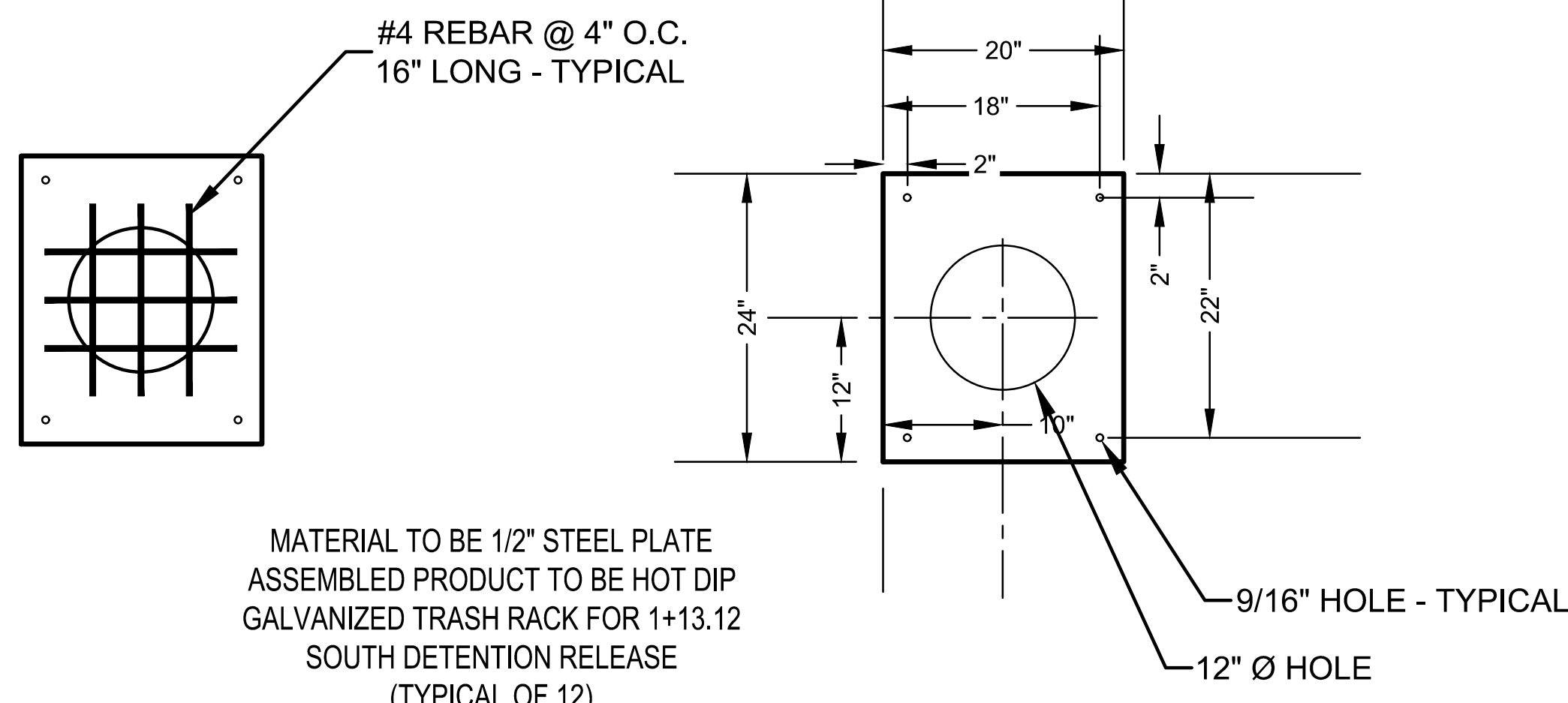
SIDE VIEW
FACING WEST SIDE



PLAN - TOP SLAB



SECTION E-E



TRASH RACK

DETENTION OUTLET STRUCTURE

NOT TO SCALE

The scruffy dome is made of galvanised steel and is used in stormwater applications to provide a debris and security screen for manholes.

- Design Specifications**
- The type 1 debris screen is a full height design, suitable for manholes with a 600mm diameter or larger. (Refer to figure 1.)
 - The type 2 debris screen has a lower height profile making it less noticeable in areas such as parks and gardens. Suitable for manholes with a diameter of 600 mm or larger. (Refer to figure 2.)
- Installation**
- Dome brackets are bolted to the manhole riser with stainless steel bolts.
 - The bolts are purchased separately.

Note: The North Island and South Island have different versions of Scruffy Dome with slight changes in the anchor design (See photos below). Please contact your local Hynds branch for more information.

North Island Scruffy Dome



South Island Scruffy Dome



Product Code	Manhole (mm)	Type	Riser ID (mm)	A x OD of Girth (mm)	B x Diameter of Inner Ring (mm)	C x Height of Dome (mm)	D x Leg Length (mm)
Type 1 High Profile							
MH-D0900S	600	1	610	640	145	200	190
MH-D0975S	675	1	686	716	145	200	190
MH-D0930S	900	1	914	950	230	300	190
MH-D1050S	1050	1	1066	1126	230	360	190
MH-D1050S-H*	1050	2	1066	1126	230	360	190
MH-D1050S	1200	1	1207	1270	230	430	190
MH-D1050S-H*	1200	2	1207	1270	230	430	190
MH-D1050S	1400	1	1372	1430	230	715	190
MH-D1050S	1500	1	1524	1580	230	780	190
MH-D1850S	1850	1	1876	1940	230	870	190
MH-D1850S	1900	1	1928	1990	230	950	190
Type 2 Low Profile							
MH-D0900L	600	2	610	640	145	190	190
MH-D0975L	675	2	686	716	145	190	190
MH-D0930L	900	2	914	950	230	170	190
MH-D1050L	1050	2	1066	1126	230	200	190
MH-D1050S2HL*	1050	2	1066	1126	230	200	190
MH-D1050L	1200	2	1207	1270	230	240	190
MH-D1050S2HL*	1200	2	1207	1270	230	240	190
MH-D1050L	1400	2	1372	1430	230	280	190
MH-D1050L	1500	2	1524	1580	230	320	190
MH-D1850L	1850	2	1876	1940	230	480	190
MH-D1850L	1900	2	1928	1990	230	520	190

Note: Larger sizes 2000, 2300, 2500, 3000mm are available on request.

*H - hinged top - hinged and lockable.

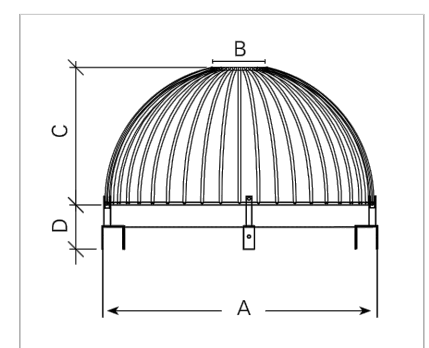


FIG. 1 Dimensions of Type 1 Hynds Scruffy Dome (see table).

Note: Brackets shown here are not supplied. Please see the North Island and South Island Scruffy Dome photos.

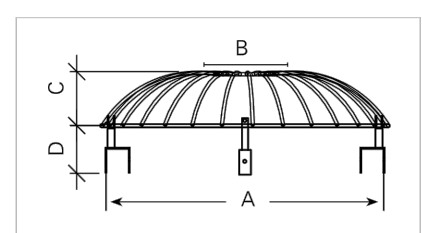
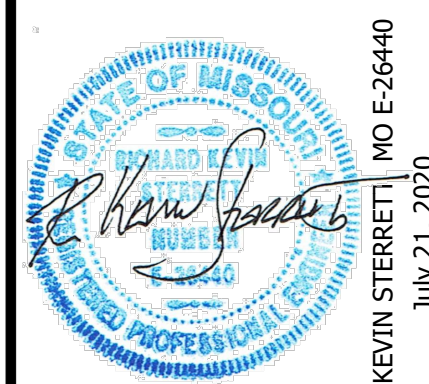


FIG. 2 Dimensions of Type 2 Hynds Scruffy Dome (see table).

Note: Brackets shown here are not supplied. Please see the North Island and South Island Scruffy Dome photos.

NO.	BY	DATE	REVISION	DATE	REVISION
1	SW	07/21/20	PER CITY COMMENTS	07/21/20	PER CITY COMMENTS
2	SW	11/21/18	SUBMITAL TO CITY OF LEES SUMMIT	11/21/18	SUBMITAL TO CITY OF LEES SUMMIT



Consult Inc engineers planners
11010 Haskell Street, Suite 210, Kansas City, Kansas 66109
CORPORATE LICENSE NO. E201000573 (MO.) / E-1736 (KS.)

STREET AND STORM SEWER PLANS
SOUTH DETENTION BASIN
OUTLET STRUCTURE
COBEY CREEK FIRST PLAT
PHASE I
CITY OF LEES SUMMIT, JACKSON COUNTY, MISSOURI

X-REF NO.	16-059 Base Phase I
DRAWING NO.	16-059 Phase I Street Plans
DATE	July 21, 2020
30% NO.	16-059

43B SHEET OF 53

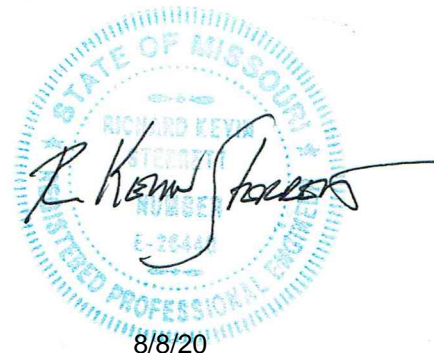
STORM WATER REPORT

Addendum 3
Cobey Creek
Mixed Use Development
Lee's Summit, MO

PREPARED FOR
JCM DEVELOPMENT,LLC

PREPARED BY
Hg Consult, Inc

October 8, 2020



This addendum to the Final Storm Report for Cobey Creek, Phase 1 is prepared for addressing the change to the geometric shape of the outlet structure in the north pond from circular to rectangular, due to the unavailability of a six foot diameter manhole.

This change is the same as the change at the south pond, except that the north pond design called for 2 circular manholes side by side. The shape of the outlet structure has been redesigned to incorporate the 2 manholes into one larger and rectangular structure. All orifices that were shown for the manholes have been incorporated into the rectangular structure at the same elevations to provide the same hydraulic flows at the various storm events as originally designed. Details of the new and approved structure are attached.

8/24/20

Cobey Creek-Phase 1

North Detention Pond- Outlet Structure

Executive Summary for Structure Changes

The approved outlet structure in the north detention pond is 2- 6' diameter manholes with the accompanying orifice openings and pipe sizes and locations shown. Due to the inability of the local precasters to provide a manhole of the diameter required, an alternate shape of structure is needed.

It is proposed that in lieu of the 2- 6 diameter manholes, a single 5' x 14' rectangular concrete box be used, to provide the same function.

As detailed, the rectangular concrete box will provide the same orifice opening sizes, elevations and domed grates as the approved manholes, with no changes in the hydraulic function of the structure or pond from the approved version of the plans and storm report.

Upon approval, the contractor intends to cast the box in place per the detail and in the location shown on the detention plan.



8/24/20

Design Specifications

- The type 1 debris screen is a full height design, suitable for manholes with a 600mm diameter or larger. *(Refer to figure 1.)*
- The type 2 debris screen has a lower height profile making it less noticeable in areas such as parks and gardens. Suitable for manholes with a diameter of 600 mm or larger. *(Refer to figure 2.)*

Installation

- Dome brackets are bolted to the manhole riser with stainless steel bolts.
- The bolts are purchased separately.

Note: The North Island and South Island have different versions of 5. Dome with small changes in the bracket design (See photos below). Please contact your local Hydriks branch for more information.

North Island Scruffy Dome



South Island Scruffy Dome



Product Code	Manhole (mm)	Type	Riser ID	A = OD of Riser (mm)	B = Diameter of Inner Ring	C = Height of Dome	D = Leg Length (mm)
Type 1 High Profile							
MHD060S2	600	1	610	640	145	300	190
MHD067S3	675	1	686	715	145	300	190
MHD090S3	900	1	914	950	230	500	190
MHD105S5	1050	1	1066	1125	230	565	190
MHD115S5C10	1050	0	1066	1125	230	565	190
MHD120S5	1200	1	1207	1270	230	635	190
MHD120S5+1	1200	1	1207	1270	230	635	190
MHD140S5	1400	1	1420	1430	230	715	190
MHD150S5	1500	1	1524	1580	230	790	190
MHD185S5	1850	1	1876	1740	230	870	190
MHD190S5	1900	1	1829	1800	230	950	190
Type 2 Low Profile							
MHD060S2S2	600	2	610	640	145	150	190
MHD067S3S2	675	2	686	715	145	150	190
MHD090S2S2	900	2	914	950	230	175	190
MHD105S2S2	1050	2	1066	1125	230	200	190
MHD105S2S2H1	1050	2	1066	1125	230	200	190
MHD105S2S2	1200	2	1207	1270	230	360	190
MHD120S2S2H1	1200	2	1207	1270	230	360	190
MHD140S2S2	1400	2	1420	1430	230	390	190
MHD160S2S2	1500	2	1524	1580	230	435	190
MHD185S2S2	1850	2	1876	1740	230	480	190
MHD190S2S2	1900	2	1829	1800	230	520	190

Note: Larger sizes 2000, 2300, 2550, 3000mm are available on request
*H - hinged HL - hinged and lockable

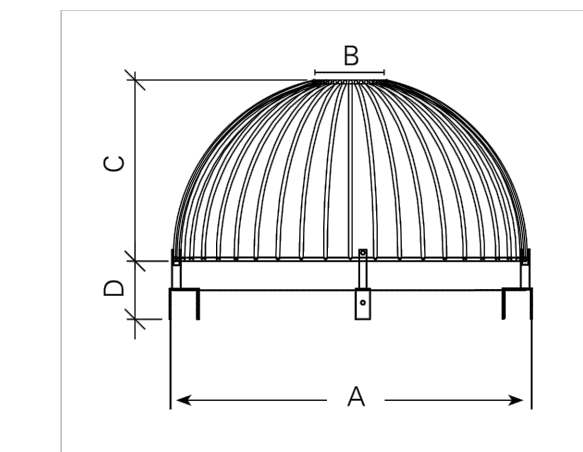


FIG. 1 Dimensions of Type 1 Hynds Scruffy Dome (see table)

Note: Brackets shown here are not supplied. Please see the North Island and South Island Scruffy Domes photos.

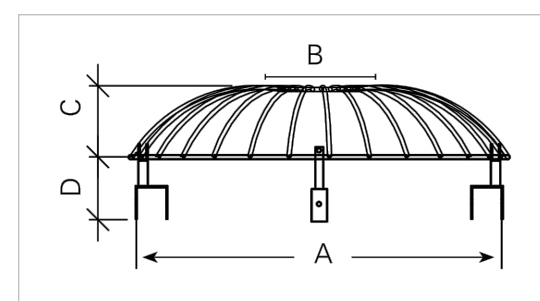
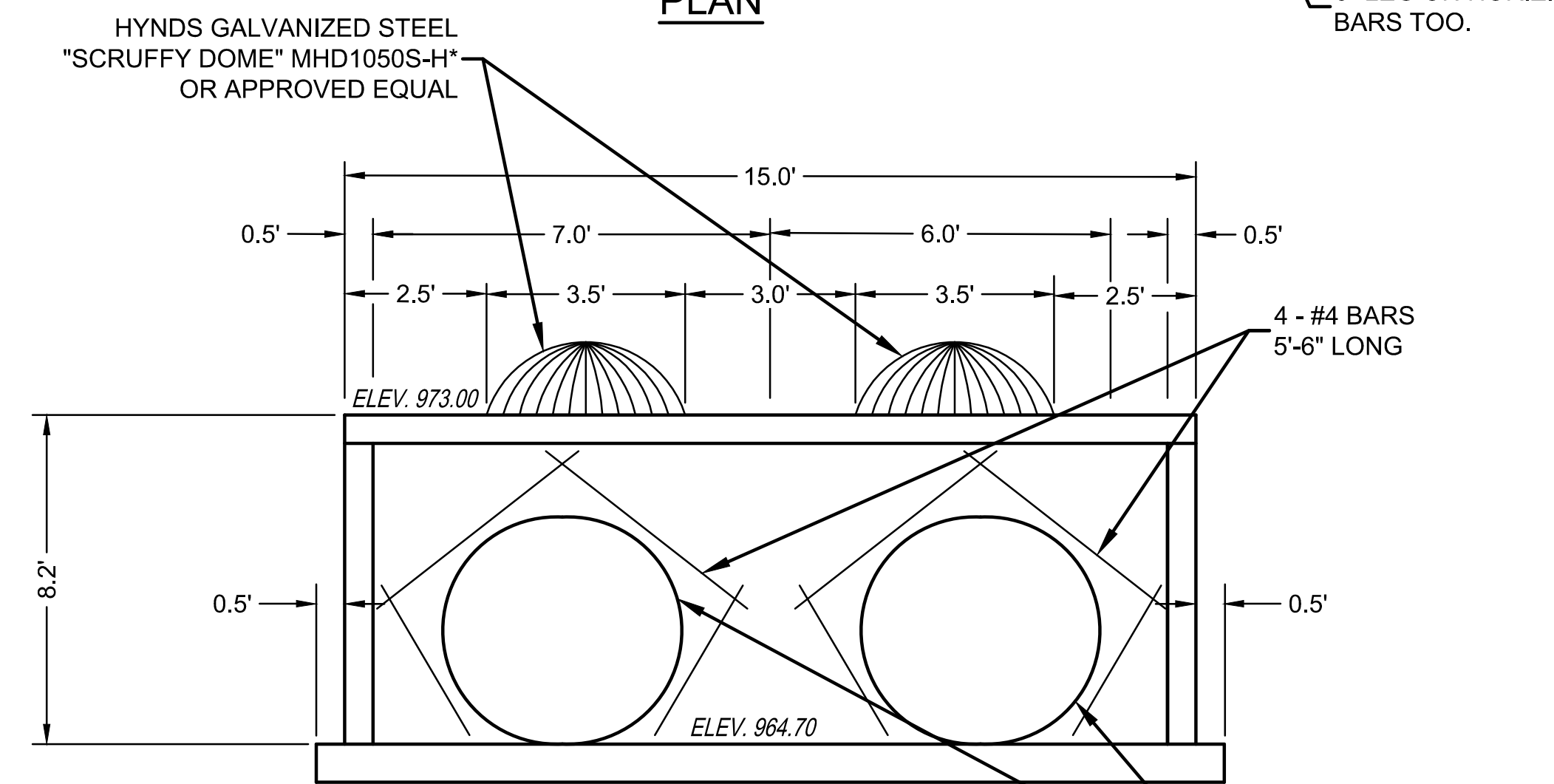
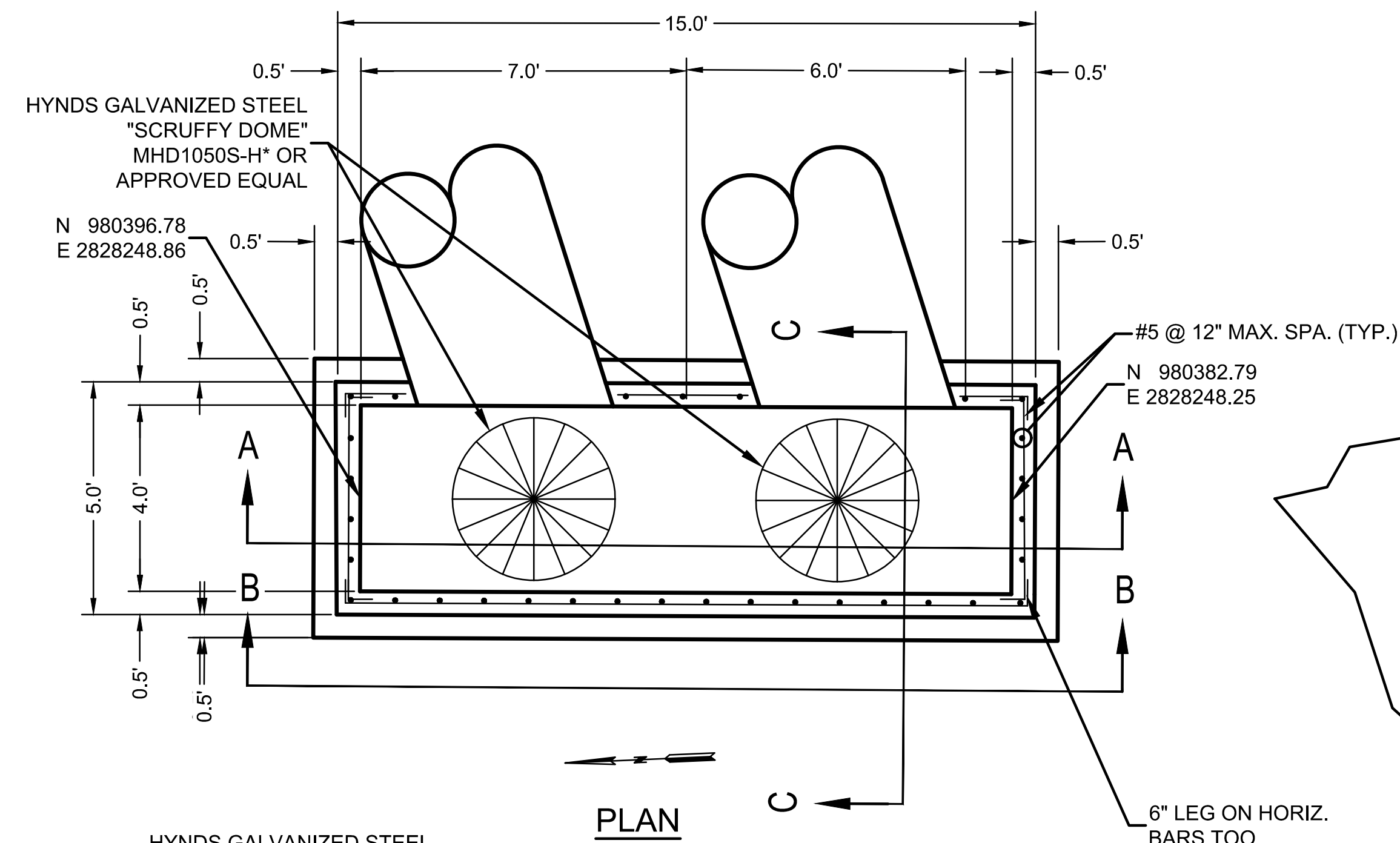
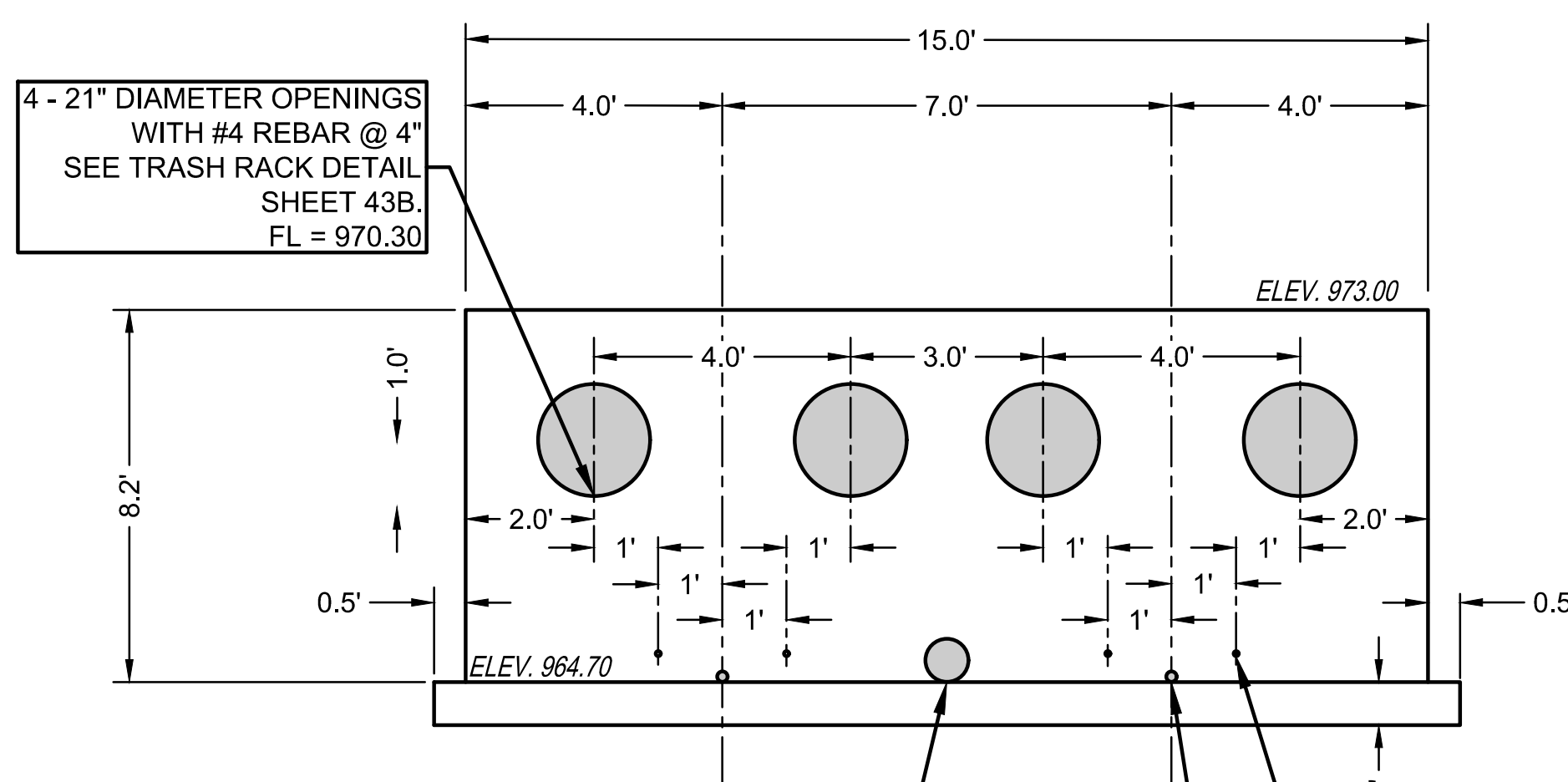


FIG. 2 Dimensions of Type 2 Hynds Scruffy Dome (see table).

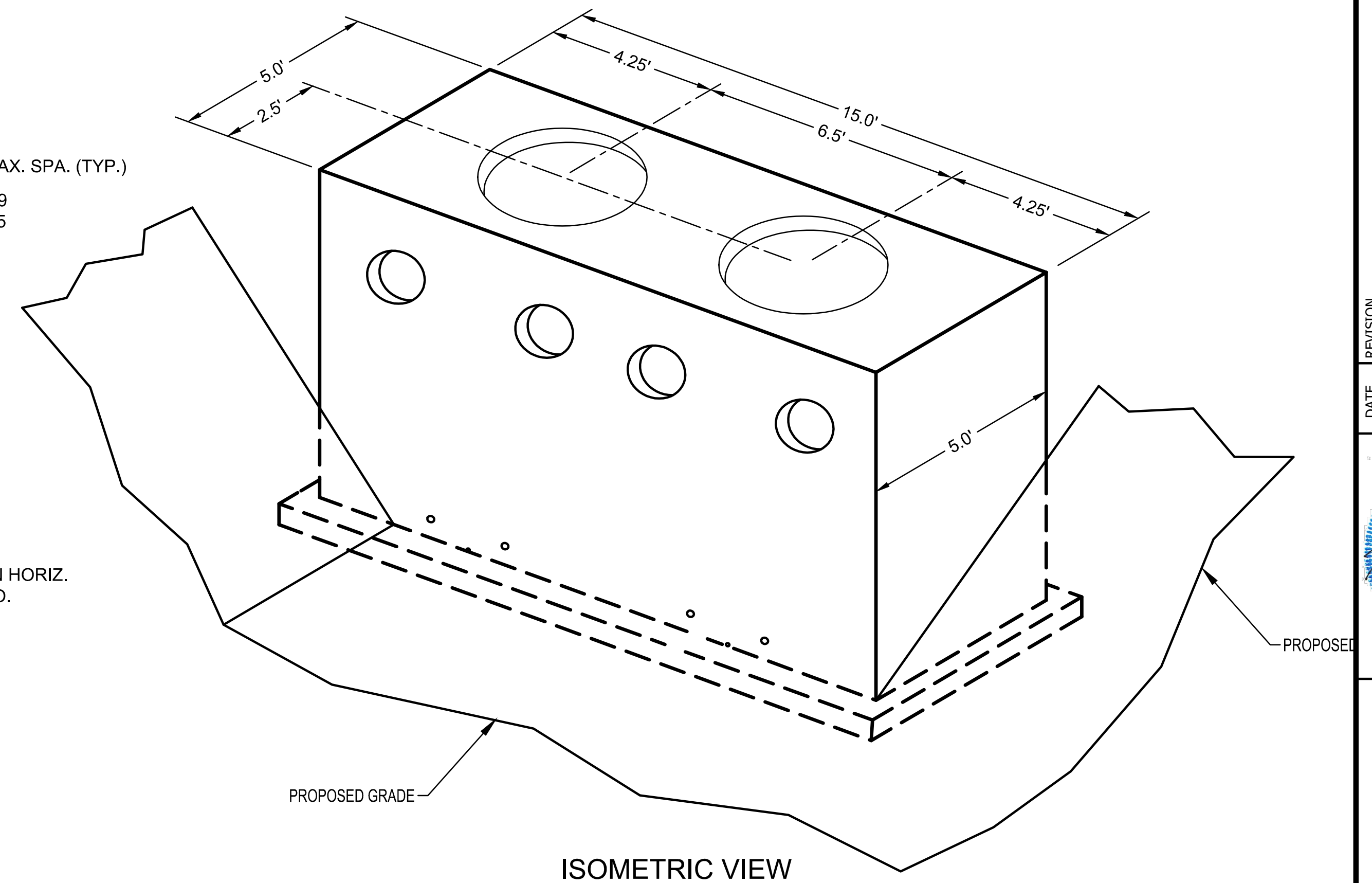
Note: Brackets shown here are not supplied. Please see the North Island and South Island Scruffy Domes photos.



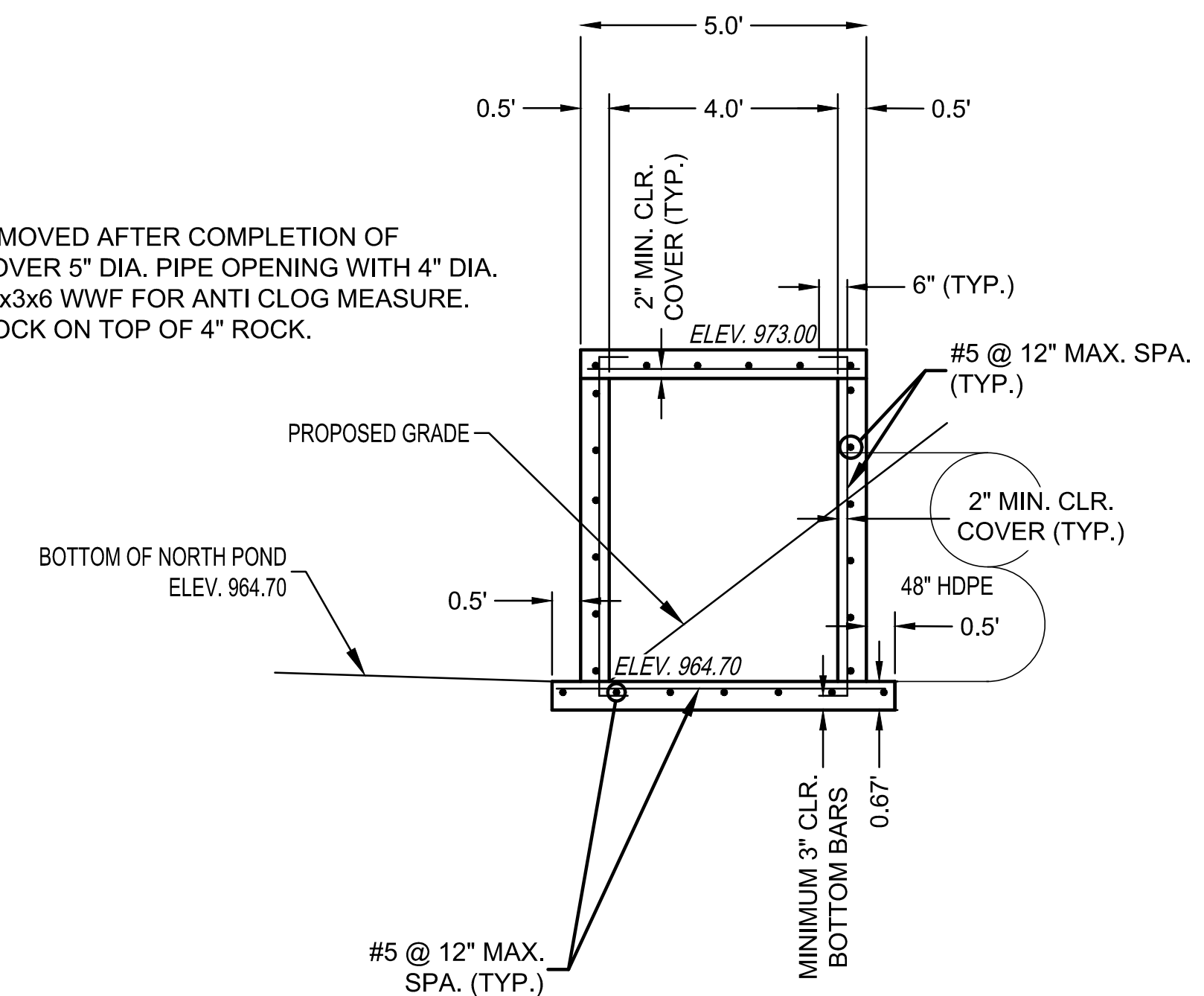
SECTION A-A



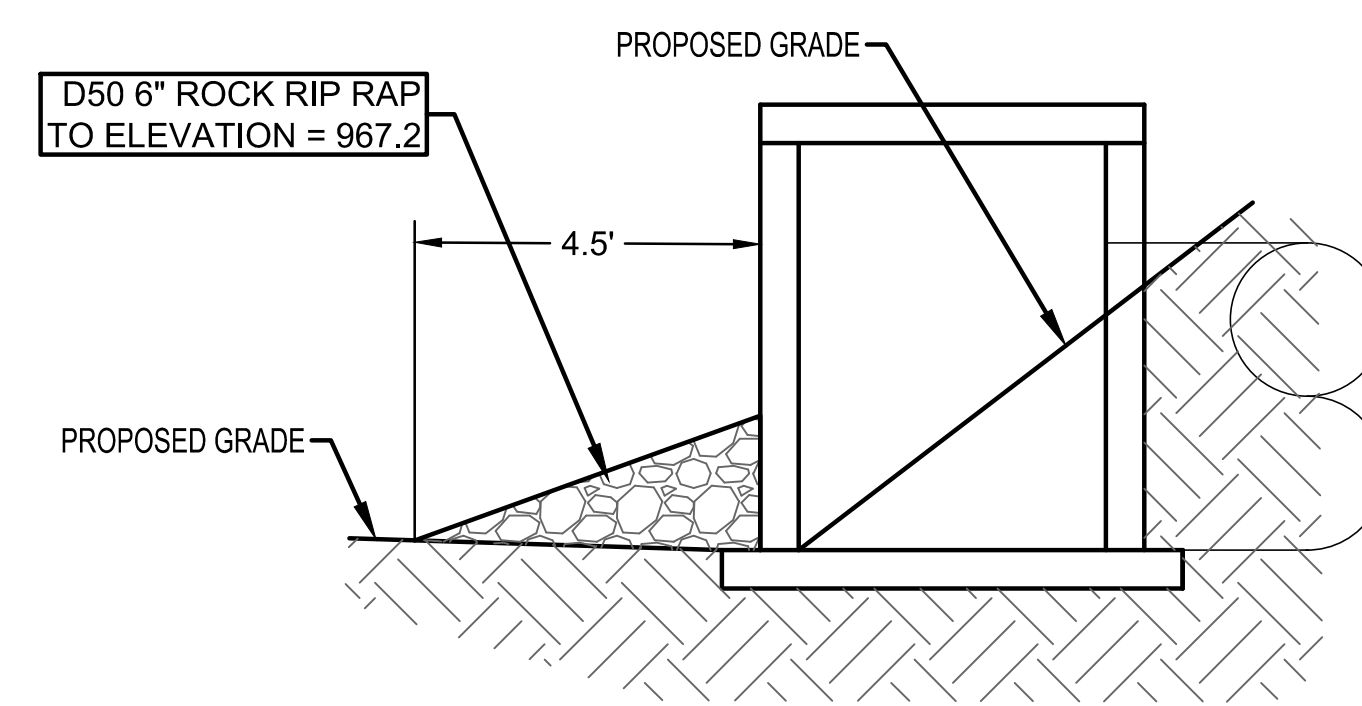
SECTION B-B



ISOMETRIC VIEW



SECTION C-C



SECTION C-C
POST CONSTRUCTION

NOTE:

1. REINFORCING STEEL FOR ALL WALLS, TOP AND BOTTOM SLABS WILL BE NO. 5 BARS WITH MAXIMUM SPACING OF 12" IN BOTH VERTICAL AND HORIZONTAL DIRECTIONS. BOTTOM SLAB IS 8" THICK. ALL OTHER WALLS AND TOP SLAB ARE 6" THICK. CONCRETE STRENGTH = 4 KSI. REINFORCING STEEL SHALL BE GRADE 60. TYPICAL MINIMUM CONCRETE COVER IS 2", EXCEPT 3" CLEAR COVER IS REQUIRED FOR BARS FROM THE BOTTOM OF THE BOTTOM SLAB. TOP COVER IN THE BOTTOM SLAB IS 1 3/4".
2. REINFORCING STEEL EXPOSED AT THE INLET OPENING LOCATIONS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

NOTE:
SKIMMER TO BE REMOVED AFTER COMPLETION OF
CONSTRUCTION. COVER 5" DIA. PIPE OPENING WITH 4" DIA.
CLEAN ROCK AND 3x3x6 WWF FOR ANTI CLOG MEASURE.
INSTALL LARGER ROCK ON TOP OF 4" ROCK.

2 - 48" HDPE PIPES
SEE PROFILE FOR
INFORMATION

4 - 21" DIAMETER OPENINGS
WITH #4 REBAR @ 4"
SEE TRASH RACK DETAIL
SHEET 43B
FL = 970.30

8" DIAMETER OPENING FOR SKIMMER CONNECTION DURING CONSTRUCTION. SOLID STEEL PLATE TO BE MOUNTED OVER 8" OPENING WITH SEALANT AFTER SITE IS STABILIZED. SEE LAND DISTURBANCE PLANS.
FL = 964.70

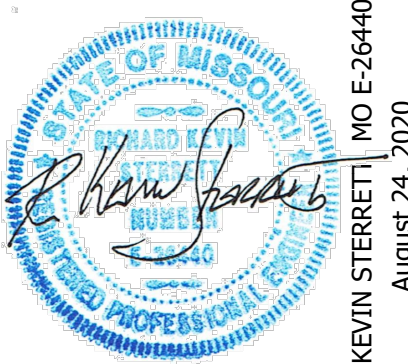
4 - 1" DIAMETER OPENINGS WITH 4" DIAMETER
CLEAN ROCK AND 3x3x6 WWF OVER OPENINGS
FOR ANTO CLOG MEASURE WITH LARGER ROCK
SHOWN ON TOP OF 4" ROCK
FL = 965.10

2 - 2" DIAMETER OPENINGS WITH 4" DIAMETER
CLEAN ROCK AND 3x3x6 WWF OVER OPENINGS
FOR ANTO CLOG MEASURE WITH LARGER ROCK
SHOWN ON TOP OF 4" ROCK
FL = 964.70

DETENTION OUTLET STRUCTURE
NOT TO SCALE

DATE	REVISION	NO.	BY	CX/APP
08/24/20	REMOVED NORTH OULET STRUCTURE PER ORIGINAL STORM REPORT	6	SPW	RKS
07/27/20	PER CITY'S COMMENTS	7	SPW	RKS
11/27/18	SUBMITTAL TO CITY OF LEES SUMMIT		SPW	RKS

IF THIS IS NOT A BLUE INK SEAL AND THE SIGNATURE IN BLUE INK, THE PLAN IS A COPY AND MAY CONTAIN UNAUTHORIZED ALTERATIONS. THE CERTIFICATION CONTAINED ON THIS DOCUMENT SHALL NOT APPLY TO ANY COPIES



R. KEVIN STERRETT MO E-26440
August 24, 2020

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Inc **engineers**
planners

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CORPORATE LICENSE NO. E201000573 (MO.) / E-1736 (KS.)

STREET AND STORM SEWER PLANS
NORTH DETENTION BASIN
OUTLET STRUCTURE

COBEY CREEK FIRST PLAT
PHASE I

CITY OF LEES SUMMIT, JACKSON COUNTY, MISSOURI

<i>X-REF NO.</i>	16-059 Base Phase I
<i>DRAWING NO.</i>	16-059 Phase I Street Plans
<i>DATE</i>	August 24, 2020
<i>JOB NO.</i>	16-059

43A SHEET OF 53

SEE STORM SEWER PLAN SHEETS 10 & 15 FOR RIPRAP INFORMATION.

FLARED END SECTION DET3B
N. 979586.44 E. 2828222.25
W/ STANDARD CONCRETE TOEWALL

FLARED END SECTION DET2E
N. 97952.93 E. 2828231.99
W/ STANDARD CONCRETE TOEWALL

NOTE:
THE 100 YEAR WATER SURFACE ELEVATION WITH
CLOGGED OUTLET STRUCTURE = 977.49.

48" DIA. ADS HP MANHOLE WITH
30" GRATE DET2B
N. 980352.98 E. 2828263.34

4'x 14' CONCRETE OUTLET STRUCTURE DET1B
N. 980389.78 E. 2828248.55

2 - 48" END SECTIONS DET1A
N. 980416.30 E. 2828345.36

INSTALL 44.4 C.Y. (24' WIDE X
25' LONG X 2' DEEP) STONE
RIPRAP WITH MINIMUM 15"
STONE AND ADDITIONAL
ENERGY DISSIPATORS. PLACE
FILTER FABRIC PRIOR TO
INSTALLATION OF RIPRAP.

100 YEAR WATER SURFACE
ELEVATION = 976.5

FLARED END SECTION DET2A
N. 980353.77 E. 2828245.35
W/ STANDARD CONCRETE TOEWALL

100 YEAR WATER SURFACE
ELEVATION = 976.5

48" DIA. ADS HP MANHOLE WITH
30" GRATE DET2D
N. 979851.29 E. 2828247.37

48" DIA. ADS HP MANHOLE WITH
30" GRATE DET2C
N. 980102.14 E. 2828255.35

GRADE SWALE AS SHOWN, FROM END OF RIP RAP TO THE
EXISTING SWALE. SWALE TO BE APPROXIMATELY 20' WIDE,
2' MAXIMUM DEPTH AND 3 TO 1 SIDE SLOPES. GRADING IS
LIMITED TO THE SOUTH SIDE OF THE PROPERTY LINE.

EMERGENCY SPILLWAY = 165' LONG
ELEV. = 977.00

48" DIA. ADS HP MANHOLE WITH
30" GRATE DET3A
N. 979585.77 E. 2828238.74

NOTE:

- AREAS TO RECEIVE FILL SHOULD BE STRIPPED OF VEGETATION, TOPSOIL, SOFT SOIL AND DELETERIOUS MATERIALS.
- THE EXPOSED SUBGRADE SHOULD BE PROOFROLLED WITH A FULLY LOADED TANDEM AXLE DUMP TRUCK. SOFT AREAS THAT DEVELOP SHOULD BE OVEREXCAVATED AND BACKFILLED WITH COMPACTED CLAY SOIL OR THE AREA MOISTURE CONDITIONED, REWORKED AND COMPACTED.
- NON-ORGANIC, FINE-GRAINED CLAY SOIL SHOULD BE USED FOR FILL.
- SOIL FILL SHOULD BE PLACED IN UNIFORM 8-INCH THICK LIFTS.
- THE FILL SHOULD BE COMPACTED TO AT LEAST 95 PERCENT STANDARD PROCTOR (ASTM D698) MAXIMUM DRY DENSITY AT A MOISTURE CONTENT BETWEEN MINUS 1 TO PLUS 3 PERCENT OF THE OPTIMUM MOISTURE CONTENT.
- DELETERIOUS MATERIAL AND PIECES OF ROCK LARGER THAN 2 INCHES SHOULD NOT BE INCLUDED IN THE FILL.
- THE FILL SHOULD NOT BE PLACED ON SOFT MATERIALS OR FROZEN GROUND. FROZEN SOILS SHOULD NOT BE USED FOR FILL.

1"=10'



R. KEVIN STERRETT, P.E.
JULY 21, 2020



STREET AND STORM SEWER PLANS
NORTH DETENTION BASIN, IN-BASIN STORM
LINE AND OUTLET STRUCTURE
COBEY CREEK FIRST PLAT
PHASE I
CITY OF LEES SUMMIT, JACKSON COUNTY, MISSOURI

X-REF NO.
16-059 Base Phase I
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