

NOTICE OF PLANNING & ZONING COMMISSION MEETING

City of Cumming

Tuesday March 4, 2025 – 6:00 p.m.

Cumming City Hall

649 N 44th Street

Cumming, Iowa 50061

- I. APPROVAL OF AGENDA** as presented and/or amended.
- II. CONSENT ITEMS**
 - a. Approve Minutes from January 28, 2025 Meeting
- III. PUBLIC COMMENT**
- IV. BUSINESS ITEMS**
 - A. Review and Recommendation to Council on Preliminary Plat/Site Plan for Great Western Cottages
- V. INFORMATIONAL ITEMS**
- VI. ADJOURN**

The City of Cumming welcomes public participation in its board and commission meetings. If you are unable to attend in person, you may access the meeting using the link and information below.

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Meeting ID: 262 226 777 201

Passcode: VX68bW2Y

City of Cumming
Planning and Zoning Commission Meeting
January 28, 2025, 6Pm Central Time.
Cumming City Hall

1. Roll Call.

Present at City Hall / or Via Zoom: Ethan Roose, Karen Mckinney, Matt Daniels, John Botts, Karen Borinsky, Absent- Shamus Shelly

2. Approval of the Agenda

Motion to Approve by Botts, Second by Borinsky All voted Yes.

4. Public Comment: None

5. Acton /Discussion Items

A. Review and Recommend to council on Roosters Coffee shop site plan.

Mark Gremler spoke on behalf of his daughter the owner, Brad Cooper of Cooper- Crawford discussed the plans and the exit out onto 43rd street. We discussed easement for utility boxes and putting up a Fence around the perimeter of the store. They want apartments on the second floor and a coffee shop and salon on main level. Parking spaces were discussed. Architectural standards were also talked about.

A motion was made by Mckinney to approve with the following conditions: The 3way stop must be put back in place due to the traffic back up this will cause, Can only have a right Turn out on to G14 and block traffic from going left out to G14, Easement for utility boxes, Height of Bldg. must not exceed our maximum footage, meeting the architectural standards the bike trail our front. Motion was seconded by Karen Borinsky, Roll call: Roose yes, Botts No, Daniels yes, Borinsky yes, Mckinney yes. Motion carried.

Motion to Adjourn was made by Daniels second by Borinsky all eyes meeting adjourned at 7:38 pm

P & Z Communication: Planning & Zoning Commission Meeting Items for March 4, 2025

SUBMITTED BY:

Rita Conner, City Administrator

SYNOPSIS:

The information below summarizes agenda items before the Commission for March 4, 2025.

BUSINESS ITEMS:

Preliminary Plat/Site Plan Great Western Cottages

Summary: Middlebrook HB, LLC and Middlebrook Land Concepts (Tim Portzen, Vice President, Diligent Development 12119 Stratford Drive Suite B Clive, Iowa 50325) has submitted a Preliminary Plat/Site Plan for 30 residential cottages as part of the Middlebrook Agrihood Planned Unit Development (PUD). The project location is generally south of Cumming Avenue, west of S. 44th Place and the Great Western Trail.

Background and general information:

- The Middlebrook Agrihood PUD was approved by City Council by Ordinance 2023-02 on September 25, 2023.
- The proposed project is part of Zone 2 in the approved PUD: *Commercial, High Intensity Residential and Medium Intensity Residential*
- Construction drawing for public utility improvements are under review, with spring 2025 construction initiation planned
- Street A is proposed as public; B, C, and D are proposed as private.
- There are both public and private shared use paths proposed for connectivity

Supplemental Materials

- City of Cumming Comprehensive Land Use Plan
<https://app.box.com/file/1135213796082?s=gg5cm7hbrzoieaj1hhrivmckmp0zxywn&sb=/activity>
- Middlebrook Agrihood PUD
<https://app.box.com/s/yfudn9fwc5lm53j4vye71ksathnxfyyd>

Staff comments:

1. Please see accompanying materials from McClure Engineering Company, the City's consulting engineer, including sanitary, stormwater management, and grading. Note consideration of future sanitary sewer needs.
2. Building elevations provided by the project architect appear to align with the PUD Zone 2 design typologies included in the PUD. 3D imagery would assist with context.
3. Note comment to connect drive access from existing home into the project area, potentially eliminating an access to Cumming Ave.
4. Future street grid and traffic controls will be reviewed at meeting for access to Cumming Ave.



PRELIMINARY PLAT/SITE PLAN REVIEW

Date: February 28, 2025
Project: Great Western Cottages
Project No.: 2024001997-100
Prepared By: Alex Schlader, PE
Joey Riley, PE

GENERAL INFORMATION:

Applicant:	Civil Design Advantage
Property Owner:	Middlebrook HB LLC / Land Concepts LLC
Requested Action:	Approval of Preliminary Plat / Site Plan
Location:	SW of the Intersection of Highway G14 and S 44 th Place
Size:	6.30 Acres
Zoning:	Middlebrook PUD - Zone 2 (Middlebrook Commercial, High Intensity Residential, or Medium Intensity Residential)

PROJECT DESCRIPTION:

On behalf of the developer, Civil Design Advantage has submitted the Preliminary Plat / Site Plan for the Great Western Cottages located southwest of the intersection of Cumming Ave. and S 44th Place in Cumming, Iowa Corporate Limits. This subdivision includes a 6.30-acre parcel (2020-01460) intended for Middlebrook Commercial, High Intensity Residential, or Medium Intensity Residential. The proposed site plan will need full review prior to construction.

REVIEW COMMENTS:

McClure has reviewed the Preliminary Plat / Site Plan and Stormwater Management Plan for conformance with Cumming's Subdivision Regulations, Middlebrook PUD, SUDAS, and other applicable city codes. Based on our review, we offer the following comments:

Preliminary Plat & Site Plan:

1. Sanitary Depth: Per SUDAS Design Section 3C-1.H, "*the sewer should be well below the frost line at all points and lower than any water lines placed in the same street.*" Looking at proposed sanitary sewer depths, these conditions are not met.
2. Future Sanitary Needs: Could you provide information on how future sanitary from future development is proposed to tie into the proposed/existing system? Assuming manhole S-1 is placed to allow tie in from future construction. Making this assumption, is 8" an adequate diameter? We suggest keeping P-1 to a minimum slope to gain as much elevation as possible. If you plan to tie in sanitary from the south, you will not have adequate horizontal separation between proposed sanitary sewer and proposed water main.
3. ST-1, Storm Water Outlet: The proposed FL of ST-1, proposed contours, and existing contours seem to conflict.

4. ST-16 Storm Water Inlet: The proposed FL of ST-16 and proposed contours seem to conflict.
5. ST-8, Grading Around Structure: Recommend locally lowering ST-8 (as you did for other area intakes) to reduce the amount of sheet flow overtop the trail.
6. Roadway Typicals: Provide a roadway typical for the public street improvements.
7. Public Right-of-Way and Roadway: Per Middlebrook PUD, the proposed right-of-way and roadway width of "Street A" do not meet requirements for Zone 2.
8. Shared Use Paths: Is it the intent for all paved shared use paths to be private or public? If path is to be public please provide public trail easement for access/maintenance.
9. ADA Compliance: All ADA ramps must have an ADA compliant receiving ramp.
10. Location of Curb Stops: According to SUDAS 4C-1.F, "*avoid locations where driveway approaches are likely to be constructed.*"

Storm Water Management Plan

1. Storm Water Runoff Summary (Drainage Basin 1): Per SUDAS the Q-100 on-site flow must be constrained to the Q-5 Existing Release Rate.
2. Storm Water Runoff Summary (Pond 1 Summary): Per SUDAS 2G-1 Section F the freeboard to the top of the dam should be a minimum of 1-foot above the emergency spillway discharge.
3. Storm Sewer Pipe Design (5-year): Design flows for L-3 does not meet the minimum cleaning velocity of 3fps. Design flows for L-10 does not meet the maximum flow velocity of 15fps. Please advise.
4. Storm Sewer Pipe Design (100-year): There appears to be an error in the design flow velocity for L-15 and L-16. Please update.

RECOMMENDATION:

Based on the satisfactory resolution of each of the foregoing review comments, McClure recommends P&Z approval of the Great Western Cottages Preliminary Plat / Site Plan subject to the following:

1. All Planning and Zoning Commission recommendations and McClure review comments being addressed in full prior to this being placed on the City Council agenda.
2. Additional review of parcel legal descriptions to be completed for accuracy and closure. Any necessary changes to legal descriptions be revised in full prior to this being placed on the City Council agenda.

GREAT WESTERN COTTAGES

STORM WATER MANAGEMENT PLAN CUMMING, IOWA

CDA PROJECT NO. 2405.385



	<p>I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.</p>
	<p>EMILY N. HARDING, P.E. _____ DATE _____ LICENSE NUMBER 19972 MY LICENSE RENEWAL DATE IS DECEMBER 31, 2025 PAGES OR SHEETS COVERED BY THIS SEAL: <u>ALL SHEETS</u></p>

CIVIL DESIGN ADVANTAGE
4121 NW URBANDALE DRIVE,
URBANDALE, IA 50322
(515) 369-4400

PREPARED BY: CIVIL DESIGN ADVANTAGE, LLC
PREPARED ON: JANUARY 29, 2025

GREAT WESTERN COTTAGES

Summary **1**

Assumptions **2**

Existing Runoff Analysis **3**

Post-Development Runoff Analysis **4**

Storm Sewer Design **5**



Section 1

Summary



PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages

SUBJECT: Storm Water Calculations DATE: 01/29/25 COMP. BY: JDS OK'D:

Project Description:

Existing Conditions

The existing site is located southwest of the intersection of Highway G14 and S 44th Place in Cumming, Iowa. The site consists of pasture and row crop agricultural land. No storm water detention or storm sewer is currently provided for the site. DB 1 - EX contains 7.64 acres and generally drains from the northwest to the southeast, discharging overland into a drainage ditch that runs along the eastern boundary of the site. Additionally, offsite flow from DB 1 - OFF travels through DB 1 - EX to the same drainage ditch. DB 1 - EX contains 6.65 acres of farmstead, paved bike trail, and the western half right-of-way of S 44th Place, which all generally drain to the south. Refer to the Existing Runoff Analysis section of the report for the Existing Drainage Map.

Proposed Conditions

Proposed site improvements for the property will include the development of 30 single family lots with associated roads and utilities. Proposed grades generally follow existing drainage patterns throughout the site. Refer to the Post-Development Runoff Analysis section of the report for the Post-Developed Drainage Map.

Storm Water Analysis:

Detention Analysis

For detention purposes the site was analyzed with one discharge point. The proposed detention for DB 1, Pond 1, was designed with Hydraflow Hydrographs Version 2024 utilizing the SCS Unit Hydrograph Method for basin routing. Procedures for the SCS Method for basin routing are outlined in Chapter 3 of the Iowa Stormwater Management Manual.

Storm Sewer Analysis

Storm sewer pipes have been designed to convey the 5-year post-developed storm event with overflow paths defined to provide routing for larger storm events. The Rational Method will be used to determine the flow rate for each drainage area. Manning's equation will be used to size pipes.



PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages
 SUBJECT: Storm Water Calculations DATE: 01/29/25 COMP. BY: JDS OK'D:

Storm Water Runoff Summary:

Detention Analysis

The site was analyzed in order to ensure that the 5-year and the 100-year post-developed release rate of the contributing drainage areas are at or below their respective existing release rates.

Drainage Basin 1 (DB 1) Summary:

Storm Event Return Period	Existing Runoff (DB 1 - EX), cfs	Offsite Runoff (DB 1 - OFF), cfs	Allowable Release, cfs	Post-Developed (DB 1), cfs
5	15.92	20.52	36.43	29.30
100	42.92	45.01	87.93	87.11

The Q100 on-site flow must be constrained to the Q5 Existing Release Rate. The existing runoff rate of 15.92 + 45.01 = 60.93 is your allowable release rate for the Q100 storm per SUDAS

Pond Summary Table (POND 1)

Rainfall Return Frequency (Yrs)	Detention Basin Peak Release, cfs	Detention Volume Provided, ft ³	Detention Elevation	Detention Freeboard
5	29.30	17,245	951.51	2.49
100	87.11	30,874	953.14	0.86

POND 1 will utilize a multi-stage SW-513 outlet structure with 3-9" tall x 72" wide weirs at elevation = 951.60. The pond overflow is at elevation = 954

Overflow Elevation = **954**

Freeboard to the top of dam should be at least 1 foot above the emergency spillway discharge to the top of dam per SUDAS 2G.1 Section F

Section 2

Assumptions



PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages

SUBJECT: Storm Water Calculations DATE: 01/29/25 COMP. BY: JDS OK'D:

Assumptions:

- * See attached Hydrologic Soil Map in this section. For this analysis, Hydrologic Soil Group C will be assumed for the post-developed condition.
- * For DB-1, assumed a 15 minute time of concentration for post-developed detention analysis.
- * Assumed a 10 minute time of concentration for storm sewer design.
- * Detention analysis utilized 2025 SUDAS Rainfall Data.
- * The runoff curve numbers used to determine flow rates for the site were taken from SUDAS Section 2B-4 and are listed in the following table.

Land Use or Surface Characteristics	C Soils	
	5-yr	100-yr
Open Space - Good Condition	0.35	0.55
Residential - 1/8 Acre or Less	0.55	0.70

Land Use or Surface Characteristics	Curve Number
	C Soils
Pasture, Grassland, or Range - Good Condition	74
Row Crops - SR + CR, Good Condition	82
Farmsteads	82
Residential - 1/8 Acre or Less	90
Paved; Open Ditches (Including R.O.W.)	92

- * The 24-hour rainfall depths used for determining flow rates are listed in the following table.

Section 5 - Central Iowa Rainfall Depths (inches)		
Duration	5-Year (20%)	100-Year (1%)
24-hour	3.81	7.12

Table 2B-4.01: Runoff Coefficients for the Rational Method

Cover Type and Hydrologic Condition	Runoff Coefficients for Hydrologic Soil Group											
	A			B			C			D		
	5	10	100	5	10	100	5	10	100	5	10	100
Open Space (lawns, parks, golf courses, cemeteries, etc.)												
Poor condition (grass cover < 50%)	.25	.30	.50	.45	.55	.65	.65	.70	.80	.70	.75	.85
Fair condition (grass cover 50% to 75%)	.10	.10	.15	.25	.30	.50	.45	.55	.65	.60	.65	.75
Good condition (grass cover >75%)	.05	.05	.10	.15	.20	.35	.35	.40	.55	.50	.55	.65
Impervious Areas												
Parking lots, roofs, driveways, etc. (excluding ROW)	.95	.95	.98	.95	.95	.98	.95	.95	.98	.95	.95	.98
Streets and roads:												
Paved; curbs & storm sewers (excluding ROW)	.95	.95	.98	.95	.95	.98	.95	.95	.98	.95	.95	.98
Paved; open ditches (including ROW)	---	---	---	.70	.75	.85	.80	.85	.90	.80	.85	.90
Gravel (including ROW)	---	---	---	.60	.65	.75	.70	.75	.85	.75	.80	.85
Dirt (including ROW)	---	---	---	.55	.60	.70	.65	.70	.80	.70	.75	.85
Urban Districts (excluding ROW)												
Commercial and business (85% impervious)	---	---	---	---	---	---	.85	.85	.90	.90	.90	.95
Industrial (72% impervious)	---	---	---	---	---	---	.80	.80	.85	.80	.85	.90
Residential Districts by Average Lot Size (excluding ROW)¹												
1/8 acre (36% impervious)	---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/4 acre (36% impervious)	---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/3 acre (33% impervious)	---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/2 acre (20% impervious)	---	---	---	---	---	---	.45	.50	.65	.60	.65	.70
1 acre (11% impervious)	---	---	---	---	---	---	.40	.45	.60	.55	.60	.65
2 acres (11% impervious)	---	---	---	---	---	---	.40	.45	.60	.55	.60	.65
Newly Graded Areas (pervious areas only, no vegetation)												
Agricultural and Undeveloped												
Meadow - protected from grazing (pre-settlement).....	.10	.10	.25	.10	.15	.30	.30	.35	.55	.45	.50	.65
Straight Row Crops												
Straight Row (SR)	Poor Condition	.33	.39	.55	.52	.58	.71	.70	.74	.84	.78	.89
	Good Condition	.24	.30	.46	.45	.51	.66	.62	.67	.78	.73	.86
SR + Crop Residue (CR).....	Poor Condition	.31	.37	.54	.50	.56	.70	.67	.72	.82	.75	.87
	Good Condition	.19	.25	.41	.38	.45	.61	.55	.60	.73	.62	.78
Contoured (C)	Poor Condition	.29	.35	.52	.47	.53	.70	.60	.65	.77	.70	.84
	Good Condition	.21	.26	.43	.38	.45	.61	.55	.60	.73	.65	.80
C+CR	Poor Condition	.27	.33	.50	.45	.51	.66	.57	.63	.75	.67	.82
	Good Condition	.19	.25	.41	.36	.43	.59	.52	.58	.71	.62	.78
Contoured & Terraced (C&T).....	Poor Condition	.22	.28	.45	.36	.43	.59	.50	.56	.70	.55	.73
	Good Condition	.16	.22	.38	.31	.37	.54	.45	.51	.66	.52	.71
C&T + CR.....	Poor Condition	.13	.19	.35	.31	.37	.54	.45	.51	.66	.52	.71
	Good Condition	.10	.16	.32	.27	.33	.50	.43	.49	.65	.50	.70

¹ The average percent impervious area shown was used to develop composite coefficients.

Note: Rational coefficients were derived from SCS CN method

- b. Composite Runoff Analysis:** Care should be taken not to average runoff coefficients for large segments that have multiple land uses of a wide variety (i.e., business to agriculture). However, within similar land uses, it is often desirable to develop a composite runoff coefficient based on the percentage of different types of surface in the drainage area. The composite procedure can be applied to an entire drainage area, or to typical sample blocks as a guide to selection of reasonable values of the coefficient for an entire area.

Table 2B-4.03: Runoff Curve Numbers for Urban Areas¹

Cover Type and Hydrologic Condition	Average Percent Impervious Area ²	CN's for Hydrologic Soil Group			
		A	B	C	D
Fully Developed Urban Areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.): ³					
Poor condition (grass cover < 50%)	-----	68	79	86	89
Fair condition (grass cover 50% to 75%)	-----	49	69	79	84
Good condition (grass cover >75%)	-----	39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	-----	98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)	-----	98	98	98	98
Paved; open ditches (including right-of-way)	-----	83	89	92	93
Gravel (including right-of-way)	-----	76	85	89	91
Dirt (including right-of-way)	-----	72	82	87	89
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town homes)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing Urban Areas					
Newly graded areas (pervious areas only, no vegetation) ⁴	-----	77	86	91	94
Idle lands (CN's are determined using cover types similar to those in Table 2B-4.01)					

¹ Average runoff condition and $I_a=0.2S$

² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figures 2B-4.01 or 2B-4.02.

³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁴ Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figures 2B-4.01 or 2B-4.02 based upon the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Source: NRCS National Engineering Handbook, Part 630, Chapter 9

Table 2B-4.04: Runoff Curve Numbers for Cultivated Agricultural Lands¹

Cover Description			CN's for Hydrologic Soil Group			
Cover Type	Treatment ²	Hydrologic Condition ³	A	B	C	D
Fallow	Bare Soil	---	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
Good		74	83	88	90	
Row Crops	Straight Row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T + CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small Grain	Straight Row (SR)	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	Contoured (C)	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	Contoured & terraced (C&T)	Poor	61	72	79	82
		Good	59	70	78	81
C&T + CR	Poor	60	71	78	81	
	Good	58	69	77	80	
Close Seeded or Broadcast Legumes or Rotation Meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

¹ Average runoff condition and $I_a=0.2S$

² Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

³ Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Source: NRCS National Engineering Handbook, Part 630, Chapter 9

Table 2B-4.05: Runoff Curve Numbers for Other Agricultural Lands¹

Cover Description		CN's for Hydrologic Soil Group			
Cover Type	Hydrologic Condition ³	A	B	C	D
Pasture, grassland, or range - continuous forage for grazing ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow - continuous grass, protected from grazing and generally mowed for hay	---	30	58	71	78
Brush - brush-weed-grass mixture with brush the major element ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 ⁴	48	65	73
Woods - grass combination (orchard or tree farm) ⁵	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods ⁶	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads - buildings, lanes, driveways, and surrounding lots	---	59	74	82	86

¹ Average runoff condition and $I_a=0.2S$.

² *Poor*: <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: >75% ground cover and lightly or only occasionally grazed.

³ *Poor*: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

⁴ Actual curve number is less than 30; use CN = 30 for runoff computations

⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

⁶ *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed, but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing and litter and brush adequately cover the soil

2. SCS Depth of Runoff: Depth of runoff may be calculated through the SCS Curve Number Method. This method separates total rainfall into direct runoff, retention, and initial abstraction to yield the following equation for rainfall runoff.

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \quad \text{Equation 2B-4.04}$$

where:

Q = Depth of direct runoff, in

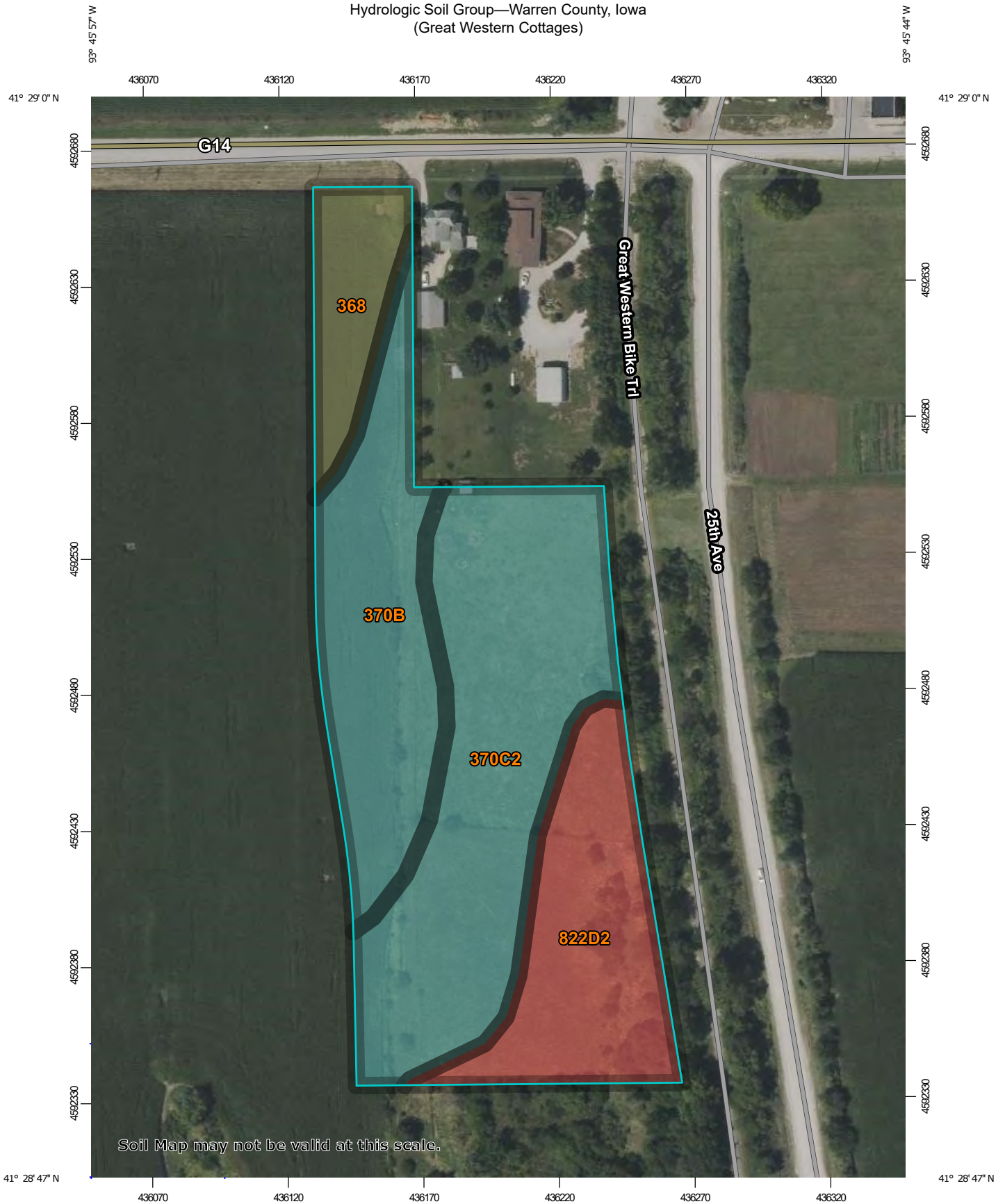
P = Depth of 24 hour precipitation, in. for design year storm (e.g. 10 year, 24 hour)

S = Potential maximum retention after runoff begins,
in

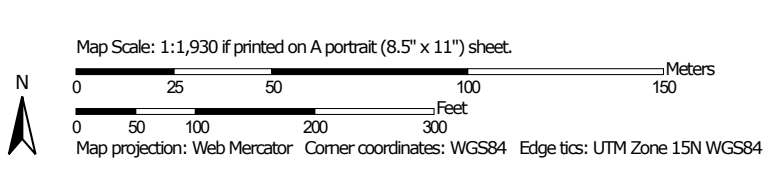
I_a = Initial abstraction, in

The initial abstraction (I_a) is all losses before runoff begins. It includes water retained in surface depressions, water intercepted by vegetation, evaporation, and infiltration during the early part of the storm. Interception and surface depression storage may be estimated from cover and surface conditions, but infiltration during the early part of the storm is highly variable and dependent on such factors as rainfall intensity, soil crusting, and soil moisture. Establishing a relationship for I_a

Hydrologic Soil Group—Warren County, Iowa
(Great Western Cottages)




Soil Map may not be valid at this scale.



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 1:15,800.

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: Warren County, Iowa
Survey Area Data: Version 30, Aug 29, 2024

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

Date(s) aerial images were photographed: Aug 17, 2023—Aug 31, 2023

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
368	Macksburg silty clay loam, 0 to 2 percent slopes	C/D	0.7	9.5%
370B	Sharpsburg silty clay loam, 2 to 5 percent slopes	C	1.8	25.3%
370C2	Sharpsburg silty clay loam, 5 to 9 percent slopes, eroded	C	3.0	42.4%
822D2	Lamoni silty clay loam, 9 to 14 percent slopes, eroded	D	1.6	22.8%
Totals for Area of Interest			7.1	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

Section 3

Existing Runoff Analysis



CIVIL DESIGN ADVANTAGE

4121 NW Urbandale Drive Urbandale, IA 50322

PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages

SUBJECT: Storm Water Calculations DATE: 01/29/25 COMP. BY: JDS OK'D:

Composite Runoff Coefficient Calculations:

Detention

Existing Curve Number Calculations - C Soils

Drainage Area ID	Land Use 1 CN*	Land Use 1 Area, SF	Land Use 2 CN**	Land Use 2 Area, SF	Total Area SF	Total Area Acres	Composite CN
DB 1 - EX	74	209,886	82	122,848	332,734	7.64	77
DB 1 - OFF	82	136,423	92	153,247	289,670	6.65	87

* Land Use 1 for DB 1 - EX; Pasture, Grassland, or Range - Good Condition
Land Use 1 for DB 1 - OFF; Farmsteads

** Land Use 2 for DB 1 - EX; Row Crops - SR + CR, Good Condition
Land Use 2 for DB 1 - OFF; Paved; Open Ditches (Including R.O.W.)



PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages
 SUBJECT: Storm Water Calculations DATE: 01/29/25 COMP. BY: JDS OK'D BY:

Existing Time of Concentration:

Drainage Area: DB 1 - EX

Sheet Flow:

Flow length, L_1 = 100 feet
 Land slope, s_1 = 1.8 %
 Manning's n = 0.15
 2-Year 24-hr p_2 = 3.08
 Travel time, t_1 = 10.4 minutes

Design Equation:

$$t_1 = \frac{0.007[(n)(L_1)]^{0.8}}{\sqrt{p_2(s)}^{0.4}}$$

Shallow Concentrated Flow:

Flow length, L_2 = 446 feet
 Land slope, s_2 = 5.5 %
 Ground Cover No. = 3 Table 1
 Flow velocity, v_2 = 1.63 ft/sec
 Travel time, t_2 = 4.6 minutes

Table 1:

Ground Cover:	No.	Equation	
Forest w/ heavy ground litter & meadow	1	$v_2 = s_2^{1/2} \times$	2.516
Minimum tillage cultivation and woodland:	2	$v_2 = s_2^{1/2} \times$	5.032
Short grass pasture & lawns	3	$v_2 = s_2^{1/2} \times$	6.962
Cultivated straight row crops	4	$v_2 = s_2^{1/2} \times$	8.726
Nearly bare ground	5	$v_2 = s_2^{1/2} \times$	9.965
Grassed waterway	6	$v_2 = s_2^{1/2} \times$	16.135
Paved area & shallow gutter flow	7	$v_2 = s_2^{1/2} \times$	20.238

Channel Flow:

Flow length, L_3 = 393 feet
 Land slope, s_3 = 3.6 %
 Manning's n = 0.045
 Left Slope = 2 :1
 Bottom Width = 4 feet
 Right Slope = 2 :1
 Flow depth = 1 feet
 Flow area, a = 6 ft²
 Wetted perim., P_w = 8.47 ft
 Flow velocity, v_3 = 4.98 ft/sec
 Travel time, t_3 = 1.3 minutes

Design Equation:

$$v_3 = \frac{1.486(a/P_w)^{2/3} s_3^{1/2}}{n}$$

$q = 29.8686$

Time of Concentration, t_c = 16.3 minutes $t_c = t_1 + t_2 + t_3$



PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages

SUBJECT: Storm Water Calculations DATE: 01/29/25 COMP. BY: JDS OK'D BY:

Existing Time of Concentration:

Drainage Area: DB 1 - OFF

Sheet Flow:

Flow length, L₁ = 100 feet
Land slope, s₁ = 2.9 %
Manning's n = 0.15
2-Year 24-hr p₂ = 3.08
Travel time, t₁ = 8.6 minutes

Design Equation:
$$t_1 = \frac{0.007[(n)(L_1)]^{0.8}}{\sqrt{p_2(s)}^{0.4}}$$

Shallow Concentrated Flow:

Flow length, L₂ = 280 feet
Land slope, s₂ = 6.3 %
Ground Cover No. = 3 Table 1

Flow velocity, v₂ = 1.75 ft/sec
Travel time, t₂ = 2.7 minutes

Table 1:

Ground Cover:	No.	Equation
Forest w/ heavy ground litter & meadow	1	v ₂ = s ₂ ^{1/2} x 2.516
Minimum tillage cultivation and woodland:	2	v ₂ = s ₂ ^{1/2} x 5.032
Short grass pasture & lawns	3	v ₂ = s ₂ ^{1/2} x 6.962
Cultivated straight row crops	4	v ₂ = s ₂ ^{1/2} x 8.726
Nearly bare ground	5	v ₂ = s ₂ ^{1/2} x 9.965
Grassed waterway	6	v ₂ = s ₂ ^{1/2} x 16.135
Paved area & shallow gutter flow	7	v ₂ = s ₂ ^{1/2} x 20.238

Channel Flow:

Flow length, L₃ = 333 feet
Land slope, s₃ = 2.1 %
Manning's n = 0.045
Left Slope = 2 :1
Bottom Width = 4 feet
Right Slope = 2 :1
Flow depth = 1 feet
Flow area, a = 6 ft²
Wetted perim., P_w = 8.47 ft
Flow velocity, v₃ = 3.80 ft/sec
Travel time, t₃ = 1.5 minutes

Design Equation:
$$v_3 = \frac{1.486(a/P_w)^{2/3} s_3^{1/2}}{n}$$

q = 22.8125

Time of Concentration, t_c = 14.1 minutes

t_c = t₁ + t₂ + t₃ + DB 1 - EX Channel Flow t_c

t_c = t₁ + t₂ + t₃ + 1.3 minutes

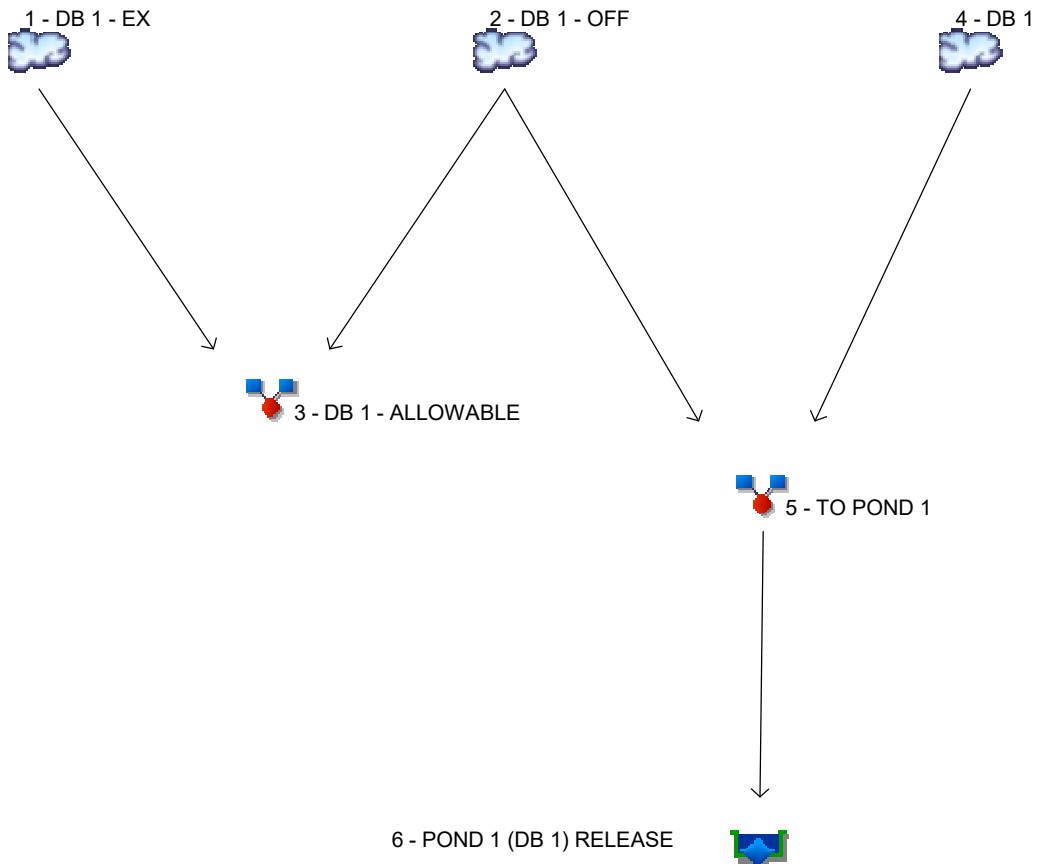
Section 4

Post-Developed Runoff Analysis

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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024



Legend

Hyd. Origin	Description
1	SCS Runoff DB 1 - EX
2	SCS Runoff DB 1 - OFF
3	Combine DB 1 - ALLOWABLE
4	SCS Runoff DB 1
5	Combine TO POND 1
6	Reservoir POND 1 (DB 1) RELEASE

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	-----	-----	15.92	-----	-----	-----	42.92	DB 1 - EX
2	SCS Runoff	-----	-----	-----	-----	20.52	-----	-----	-----	45.01	DB 1 - OFF
3	Combine	1, 2	-----	-----	-----	36.43	-----	-----	-----	87.93	DB 1 - ALLOWABLE
4	SCS Runoff	-----	-----	-----	-----	25.84	-----	-----	-----	53.82	DB 1
5	Combine	2, 4	-----	-----	-----	46.36	-----	-----	-----	98.83	TO POND 1
6	Reservoir	5	-----	-----	-----	29.30	-----	-----	-----	87.11	POND 1 (DB 1) RELEASE

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

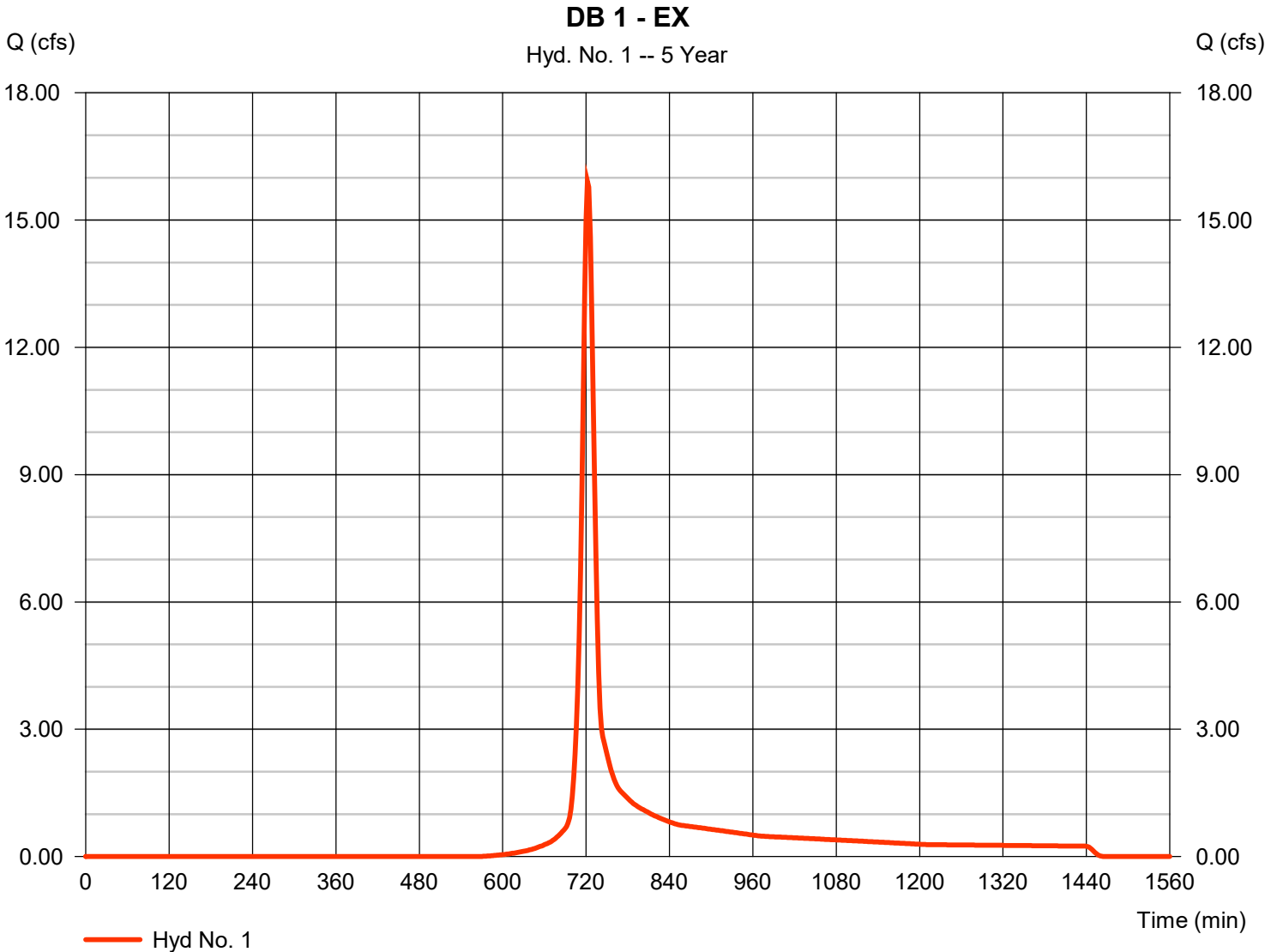
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	15.92	2	722	45,015	-----	-----	-----	DB 1 - EX	
2	SCS Runoff	20.52	2	722	57,969	-----	-----	-----	DB 1 - OFF	
3	Combine	36.43	2	722	102,983	1, 2	-----	-----	DB 1 - ALLOWABLE	
4	SCS Runoff	25.84	2	722	74,073	-----	-----	-----	DB 1	
5	Combine	46.36	2	722	132,042	2, 4	-----	-----	TO POND 1	
6	Reservoir	29.30	2	730	132,041	5	951.51	17,245	POND 1 (DB 1) RELEASE	
Existing & Post-Developed.gpw					Return Period: 5 Year			Wednesday, 01 / 29 / 2025		

Hydrograph Report

Hyd. No. 1

DB 1 - EX

Hydrograph type	= SCS Runoff	Peak discharge	= 15.92 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 45,015 cuft
Drainage area	= 7.640 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.30 min
Total precip.	= 3.81 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

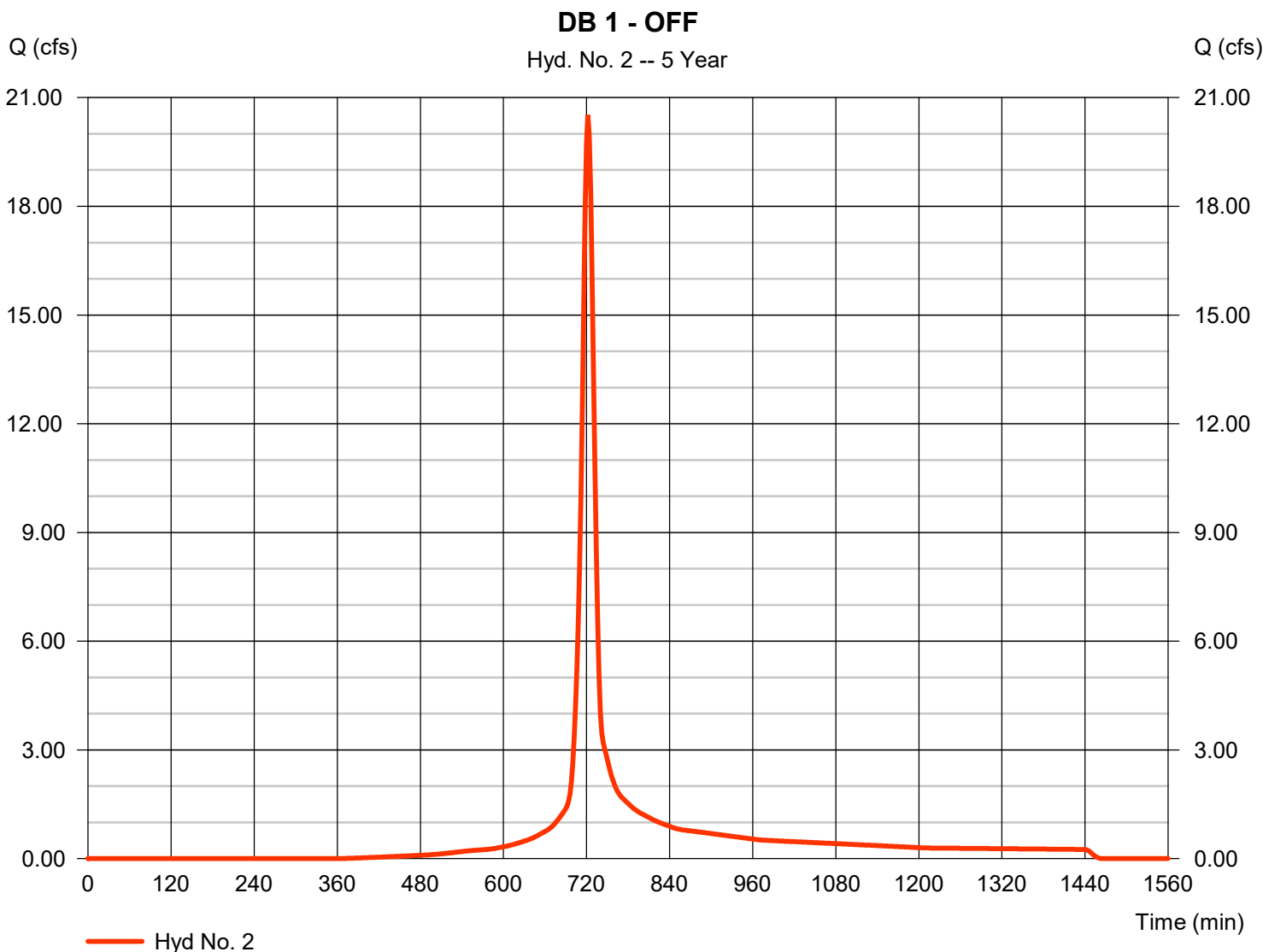
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Wednesday, 01 / 29 / 2025

Hyd. No. 2

DB 1 - OFF

Hydrograph type	= SCS Runoff	Peak discharge	= 20.52 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 57,969 cuft
Drainage area	= 6.650 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.10 min
Total precip.	= 3.81 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

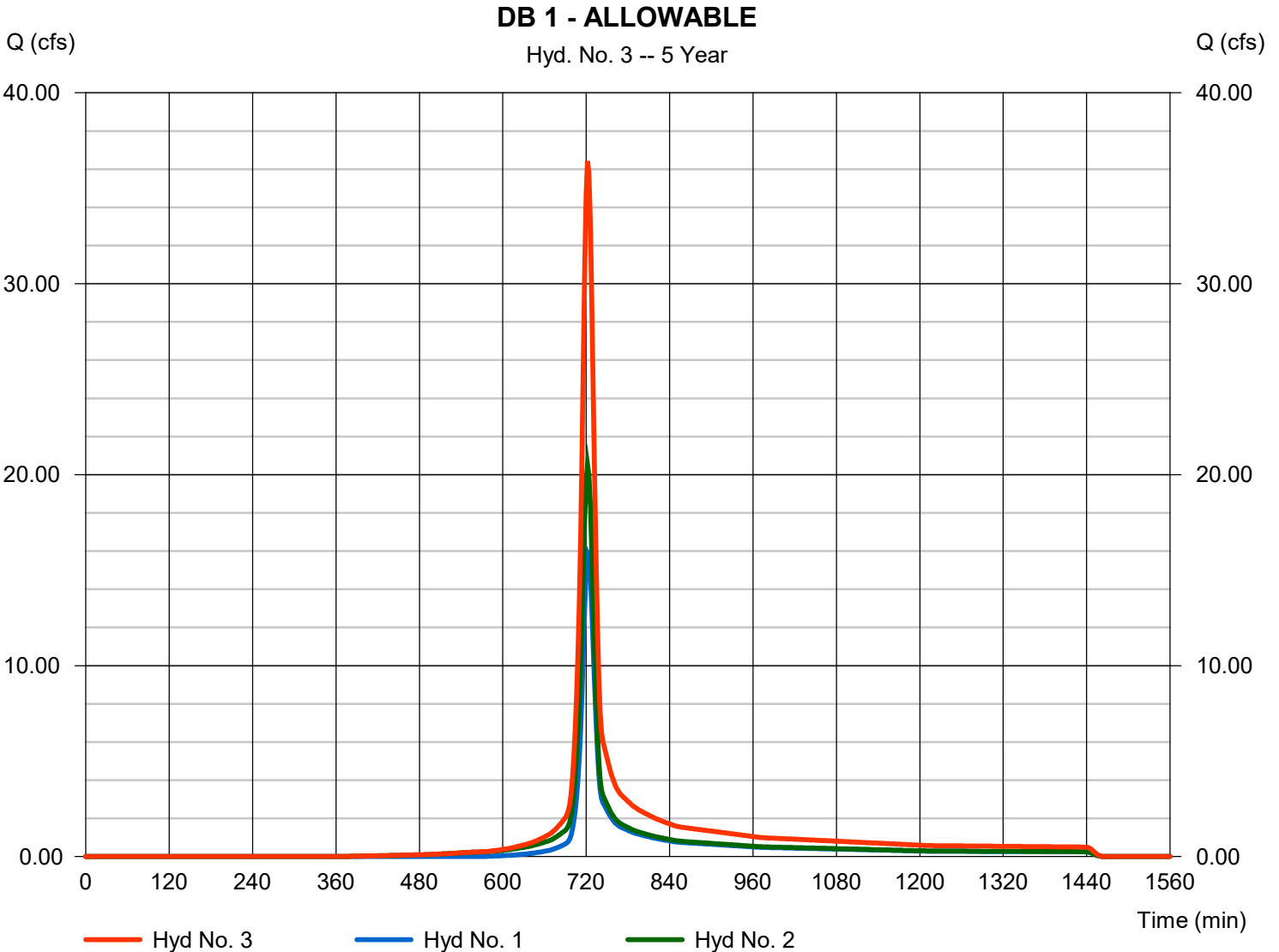
Wednesday, 01 / 29 / 2025

Hyd. No. 3

DB 1 - ALLOWABLE

Hydrograph type = Combine
Storm frequency = 5 yrs
Time interval = 2 min
Inflow hyds. = 1, 2

Peak discharge = 36.43 cfs
Time to peak = 722 min
Hyd. volume = 102,983 cuft
Contrib. drain. area = 14.290 ac



Hydrograph Report

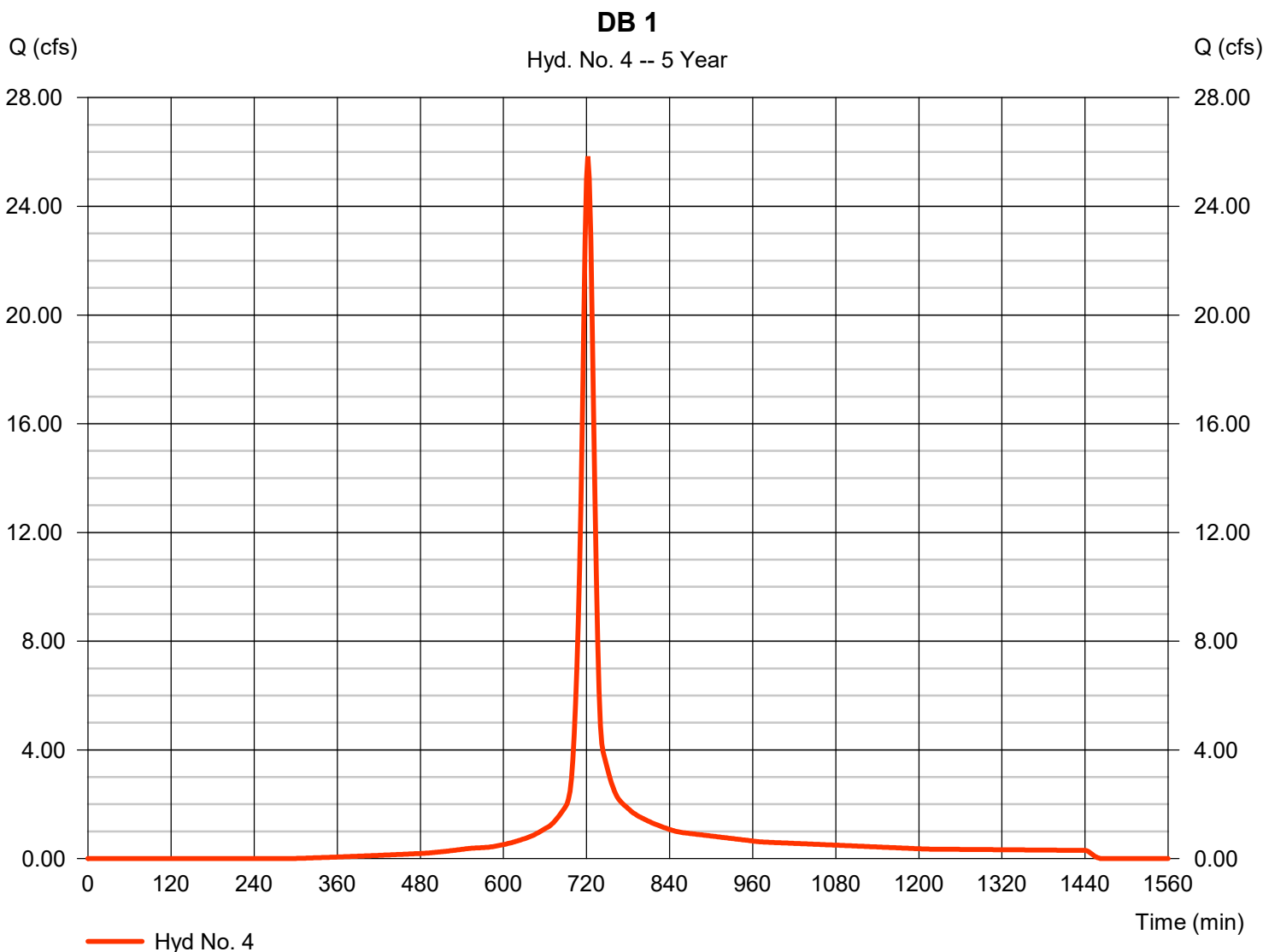
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Wednesday, 01 / 29 / 2025

Hyd. No. 4

DB 1

Hydrograph type	= SCS Runoff	Peak discharge	= 25.84 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 74,073 cuft
Drainage area	= 7.640 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.81 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

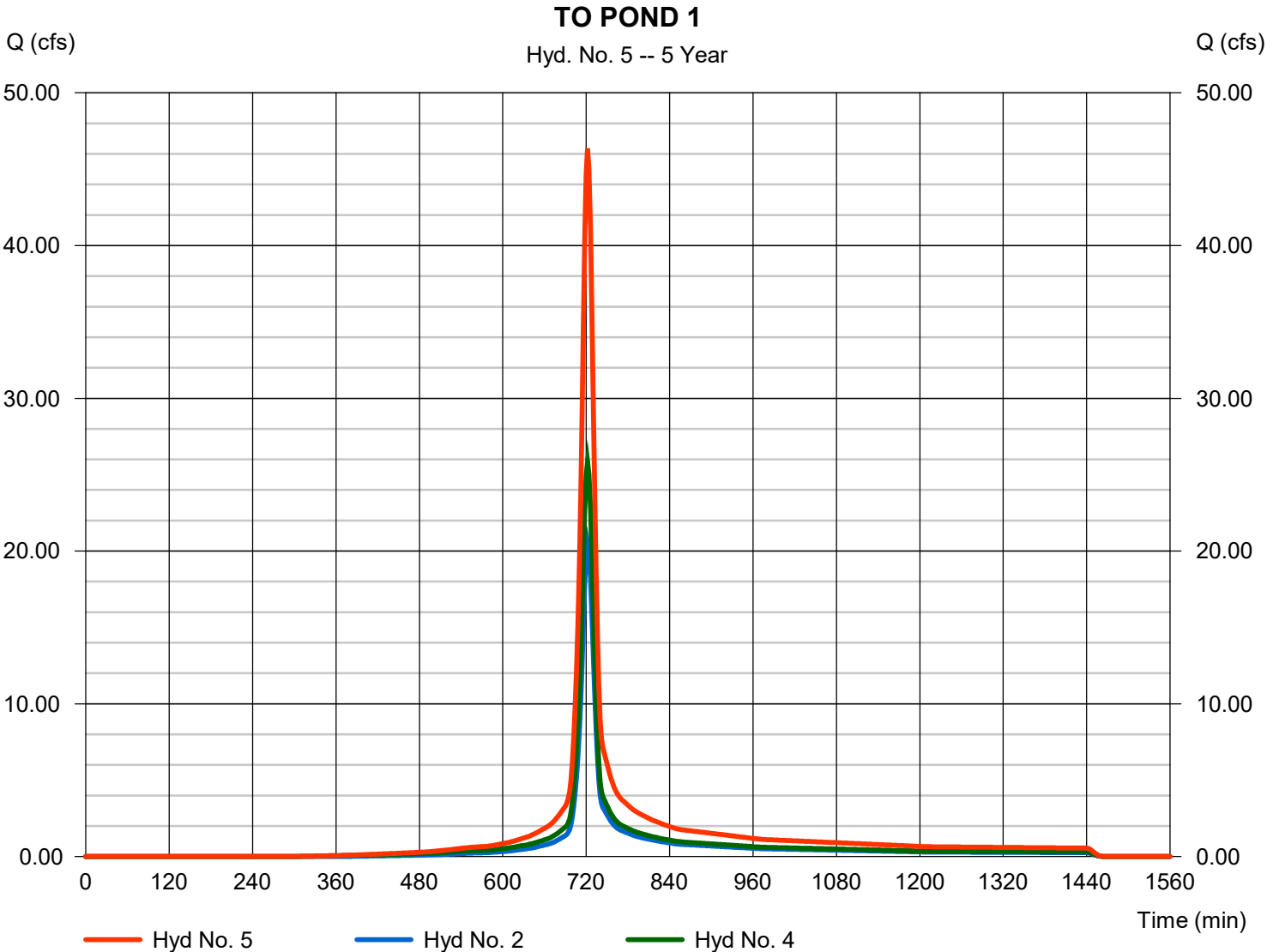
Wednesday, 01 / 29 / 2025

Hyd. No. 5

TO POND 1

Hydrograph type = Combine
Storm frequency = 5 yrs
Time interval = 2 min
Inflow hyds. = 2, 4

Peak discharge = 46.36 cfs
Time to peak = 722 min
Hyd. volume = 132,042 cuft
Contrib. drain. area = 14.290 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

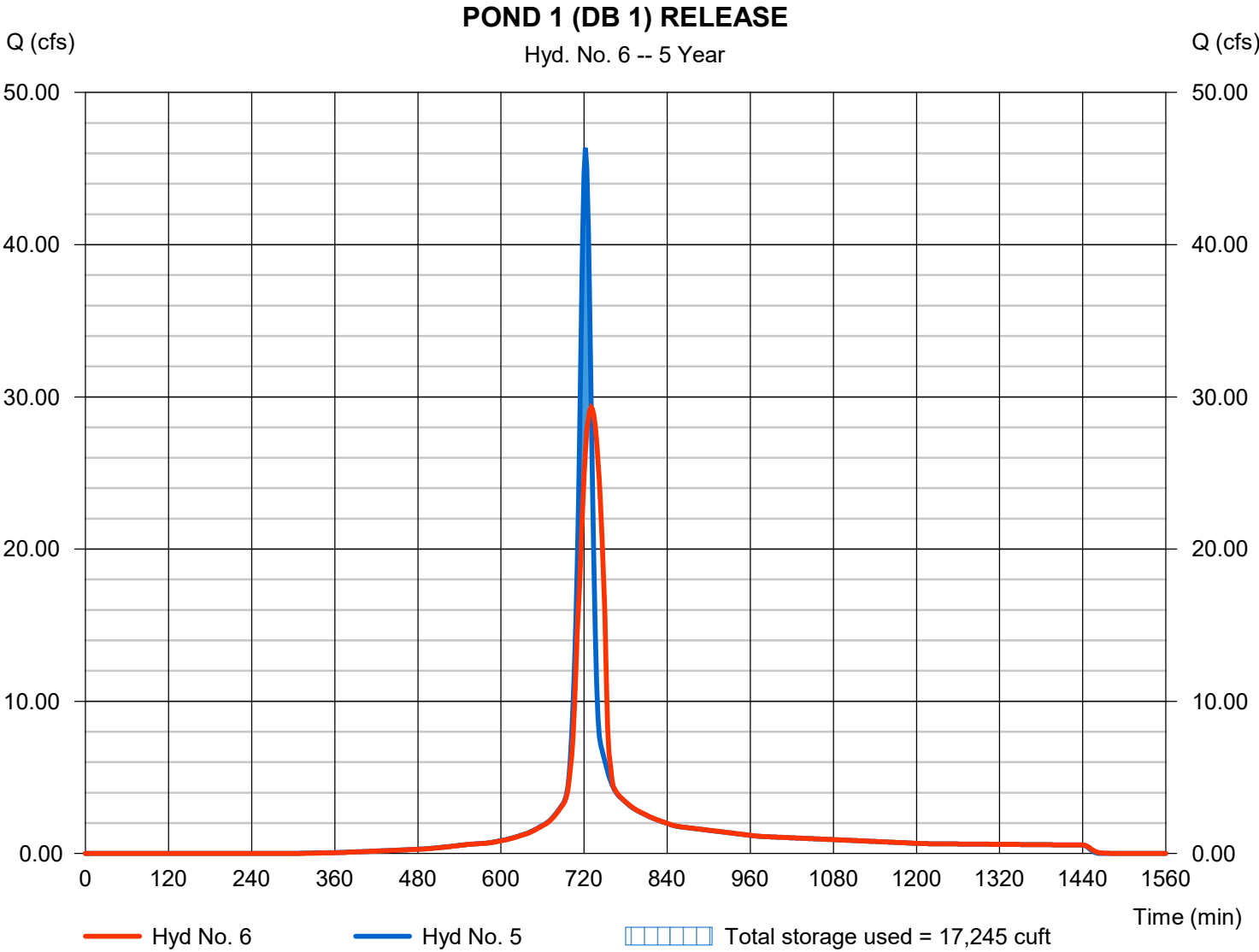
Wednesday, 01 / 29 / 2025

Hyd. No. 6

POND 1 (DB 1) RELEASE

Hydrograph type	= Reservoir	Peak discharge	= 29.30 cfs
Storm frequency	= 5 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 132,041 cuft
Inflow hyd. No.	= 5 - TO POND 1	Max. Elevation	= 951.51 ft
Reservoir name	= POND 1	Max. Storage	= 17,245 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - POND 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 946.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	946.00	00	0	0
1.00	947.00	1,149	383	383
2.00	948.00	2,151	1,624	2,007
3.00	949.00	3,262	2,687	4,694
4.00	950.00	4,470	3,850	8,544
5.00	951.00	5,976	5,204	13,748
6.00	952.00	7,737	6,837	20,585
7.00	953.00	9,791	8,743	29,328
8.00	954.00	12,572	11,151	40,479

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 42.00	9.00	24.00	0.00
Span (in)	= 42.00	66.00	24.00	0.00
No. Barrels	= 1	3	1	0
Invert El. (ft)	= 945.57	951.60	946.00	0.00
Length (ft)	= 59.00	0.00	18.00	0.00
Slope (%)	= 1.00	0.00	1.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	946.00	0.00	0.00	0.00	---	---	---	---	---	---	---	0.000
0.10	38	946.10	1.55 ic	0.00	0.07 ic	---	---	---	---	---	---	---	0.065
0.20	77	946.20	1.55 ic	0.00	0.25 ic	---	---	---	---	---	---	---	0.250
0.30	115	946.30	1.55 ic	0.00	0.56 ic	---	---	---	---	---	---	---	0.562
0.40	153	946.40	1.55 ic	0.00	1.01 ic	---	---	---	---	---	---	---	1.005
0.50	191	946.50	1.55 ic	0.00	1.50 ic	---	---	---	---	---	---	---	1.497
0.60	230	946.60	2.10 ic	0.00	2.10 ic	---	---	---	---	---	---	---	2.104
0.70	268	946.70	2.82 ic	0.00	2.82 ic	---	---	---	---	---	---	---	2.823
0.80	306	946.80	3.65 ic	0.00	3.65 ic	---	---	---	---	---	---	---	3.649
0.90	345	946.90	4.58 ic	0.00	4.47 ic	---	---	---	---	---	---	---	4.466
1.00	383	947.00	5.41 ic	0.00	5.35 ic	---	---	---	---	---	---	---	5.348
1.10	545	947.10	6.39 ic	0.00	6.39 ic	---	---	---	---	---	---	---	6.391
1.20	708	947.20	7.36 ic	0.00	7.36 ic	---	---	---	---	---	---	---	7.361
1.30	870	947.30	8.46 ic	0.00	8.46 ic	---	---	---	---	---	---	---	8.458
1.40	1,033	947.40	9.64 ic	0.00	9.55 ic	---	---	---	---	---	---	---	9.547
1.50	1,195	947.50	10.59 ic	0.00	10.59 ic	---	---	---	---	---	---	---	10.59
1.60	1,357	947.60	11.82 ic	0.00	11.57 ic	---	---	---	---	---	---	---	11.57
1.70	1,520	947.70	12.76 ic	0.00	12.62 ic	---	---	---	---	---	---	---	12.62
1.80	1,682	947.80	13.74 ic	0.00	13.57 ic	---	---	---	---	---	---	---	13.57
1.90	1,844	947.90	14.38 ic	0.00	14.38 ic	---	---	---	---	---	---	---	14.38
2.00	2,007	948.00	15.28 ic	0.00	15.12 ic	---	---	---	---	---	---	---	15.12
2.10	2,276	948.10	15.81 ic	0.00	15.73 ic	---	---	---	---	---	---	---	15.73
2.20	2,544	948.20	16.34 ic	0.00	16.25 ic	---	---	---	---	---	---	---	16.25
2.30	2,813	948.30	16.89 ic	0.00	16.76 ic	---	---	---	---	---	---	---	16.76
2.40	3,082	948.40	17.44 ic	0.00	17.25 ic	---	---	---	---	---	---	---	17.25
2.50	3,350	948.50	18.00 ic	0.00	17.72 ic	---	---	---	---	---	---	---	17.72
2.60	3,619	948.60	18.56 ic	0.00	18.18 ic	---	---	---	---	---	---	---	18.18
2.70	3,888	948.70	18.68 ic	0.00	18.68 ic	---	---	---	---	---	---	---	18.68
2.80	4,156	948.80	19.19 ic	0.00	19.19 ic	---	---	---	---	---	---	---	19.19
2.90	4,425	948.90	19.72 ic	0.00	19.67 ic	---	---	---	---	---	---	---	19.67
3.00	4,694	949.00	20.31 ic	0.00	20.08 ic	---	---	---	---	---	---	---	20.08
3.10	5,079	949.10	20.90 ic	0.00	20.49 ic	---	---	---	---	---	---	---	20.49
3.20	5,464	949.20	20.98 ic	0.00	20.98 ic	---	---	---	---	---	---	---	20.98
3.30	5,849	949.30	21.50 ic	0.00	21.43 ic	---	---	---	---	---	---	---	21.43

Continues on next page...

POND 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.40	6,234	949.40	22.10 ic	0.00	21.82 ic	---	---	---	---	---	---	---	21.82
3.50	6,619	949.50	22.23 ic	0.00	22.23 ic	---	---	---	---	---	---	---	22.23
3.60	7,004	949.60	22.71 ic	0.00	22.70 ic	---	---	---	---	---	---	---	22.70
3.70	7,389	949.70	23.22 oc	0.00	23.07 ic	---	---	---	---	---	---	---	23.07
3.80	7,774	949.80	23.68 oc	0.00	23.42 ic	---	---	---	---	---	---	---	23.42
3.90	8,159	949.90	24.14 oc	0.00	23.77 ic	---	---	---	---	---	---	---	23.77
4.00	8,544	950.00	24.14 oc	0.00	24.14 ic	---	---	---	---	---	---	---	24.14
4.10	9,064	950.10	24.60 oc	0.00	24.59 ic	---	---	---	---	---	---	---	24.59
4.20	9,585	950.20	25.06 oc	0.00	24.93 ic	---	---	---	---	---	---	---	24.93
4.30	10,105	950.30	25.52 oc	0.00	25.26 ic	---	---	---	---	---	---	---	25.26
4.40	10,625	950.40	25.97 oc	0.00	25.59 ic	---	---	---	---	---	---	---	25.59
4.50	11,146	950.50	25.97 oc	0.00	25.97 ic	---	---	---	---	---	---	---	25.97
4.60	11,666	950.60	26.43 oc	0.00	26.35 ic	---	---	---	---	---	---	---	26.35
4.70	12,187	950.70	26.88 oc	0.00	26.66 ic	---	---	---	---	---	---	---	26.66
4.80	12,707	950.80	27.32 oc	0.00	26.97 ic	---	---	---	---	---	---	---	26.97
4.90	13,228	950.90	27.32 oc	0.00	27.32 ic	---	---	---	---	---	---	---	27.32
5.00	13,748	951.00	27.77 oc	0.00	27.70 ic	---	---	---	---	---	---	---	27.70
5.10	14,432	951.10	28.21 oc	0.00	28.00 ic	---	---	---	---	---	---	---	28.00
5.20	15,115	951.20	28.65 oc	0.00	28.29 ic	---	---	---	---	---	---	---	28.29
5.30	15,799	951.30	28.65 oc	0.00	28.65 ic	---	---	---	---	---	---	---	28.65
5.40	16,483	951.40	29.09 oc	0.00	28.98 ic	---	---	---	---	---	---	---	28.98
5.50	17,166	951.50	29.52 oc	0.00	29.27 ic	---	---	---	---	---	---	---	29.27
5.60	17,850	951.60	29.94 oc	0.00	29.56 ic	---	---	---	---	---	---	---	29.56
5.70	18,534	951.70	31.61 oc	1.77 ic	29.54 ic	---	---	---	---	---	---	---	31.31
5.80	19,217	951.80	34.33 oc	5.02 ic	29.23 ic	---	---	---	---	---	---	---	34.25
5.90	19,901	951.90	37.99 oc	9.22 ic	28.60 ic	---	---	---	---	---	---	---	37.82
6.00	20,585	952.00	41.90 oc	14.21 ic	27.61 ic	---	---	---	---	---	---	---	41.82
6.10	21,459	952.10	45.92 oc	19.86 ic	26.06 ic	---	---	---	---	---	---	---	45.92
6.20	22,333	952.20	51.82 oc	26.11 ic	25.71 ic	---	---	---	---	---	---	---	51.82
6.30	23,208	952.30	58.10 oc	32.90 ic	25.20 ic	---	---	---	---	---	---	---	58.10
6.40	24,082	952.40	63.56 oc	38.84 ic	24.71 ic	---	---	---	---	---	---	---	63.56
6.50	24,956	952.50	67.59 oc	43.17 ic	24.42 ic	---	---	---	---	---	---	---	67.59
6.60	25,831	952.60	71.25 oc	47.10 ic	24.15 ic	---	---	---	---	---	---	---	71.25
6.70	26,705	952.70	74.63 oc	50.73 ic	23.90 ic	---	---	---	---	---	---	---	74.63
6.80	27,579	952.80	77.78 oc	54.12 ic	23.66 ic	---	---	---	---	---	---	---	77.78
6.90	28,454	952.90	80.74 oc	57.30 ic	23.44 ic	---	---	---	---	---	---	---	80.74
7.00	29,328	953.00	83.56 oc	60.33 ic	23.23 ic	---	---	---	---	---	---	---	83.56
7.10	30,443	953.10	86.22 ic	63.20 ic	23.02 ic	---	---	---	---	---	---	---	86.22
7.20	31,558	953.20	88.53 ic	65.95 ic	22.58 ic	---	---	---	---	---	---	---	88.53
7.30	32,673	953.30	90.73 ic	68.59 ic	22.15 ic	---	---	---	---	---	---	---	90.73
7.40	33,788	953.40	92.85 ic	71.13 ic	21.72 ic	---	---	---	---	---	---	---	92.85
7.50	34,904	953.50	94.89 ic	73.58 ic	21.31 ic	---	---	---	---	---	---	---	94.89
7.60	36,019	953.60	96.85 ic	75.96 ic	20.90 ic	---	---	---	---	---	---	---	96.85
7.70	37,134	953.70	98.75 ic	78.26 ic	20.49 ic	---	---	---	---	---	---	---	98.75
7.80	38,249	953.80	100.22 ic	79.93 ic	20.29 ic	---	---	---	---	---	---	---	100.22
7.90	39,364	953.90	100.99 ic	80.54 ic	20.44 ic	---	---	---	---	---	---	---	100.99
8.00	40,479	954.00	101.76 ic	81.15 ic	20.60 ic	---	---	---	---	---	---	---	101.75

...End

Pond Report

Pond No. 1 - POND 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 946.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	946.00	00	0	0
1.00	947.00	1,149	383	383
2.00	948.00	2,151	1,624	2,007
3.00	949.00	3,262	2,687	4,694
4.00	950.00	4,470	3,850	8,544
5.00	951.00	5,976	5,204	13,748
6.00	952.00	7,737	6,837	20,585
7.00	953.00	9,791	8,743	29,328
8.00	954.00	12,572	11,151	40,479

Culvert / Orifice Structures

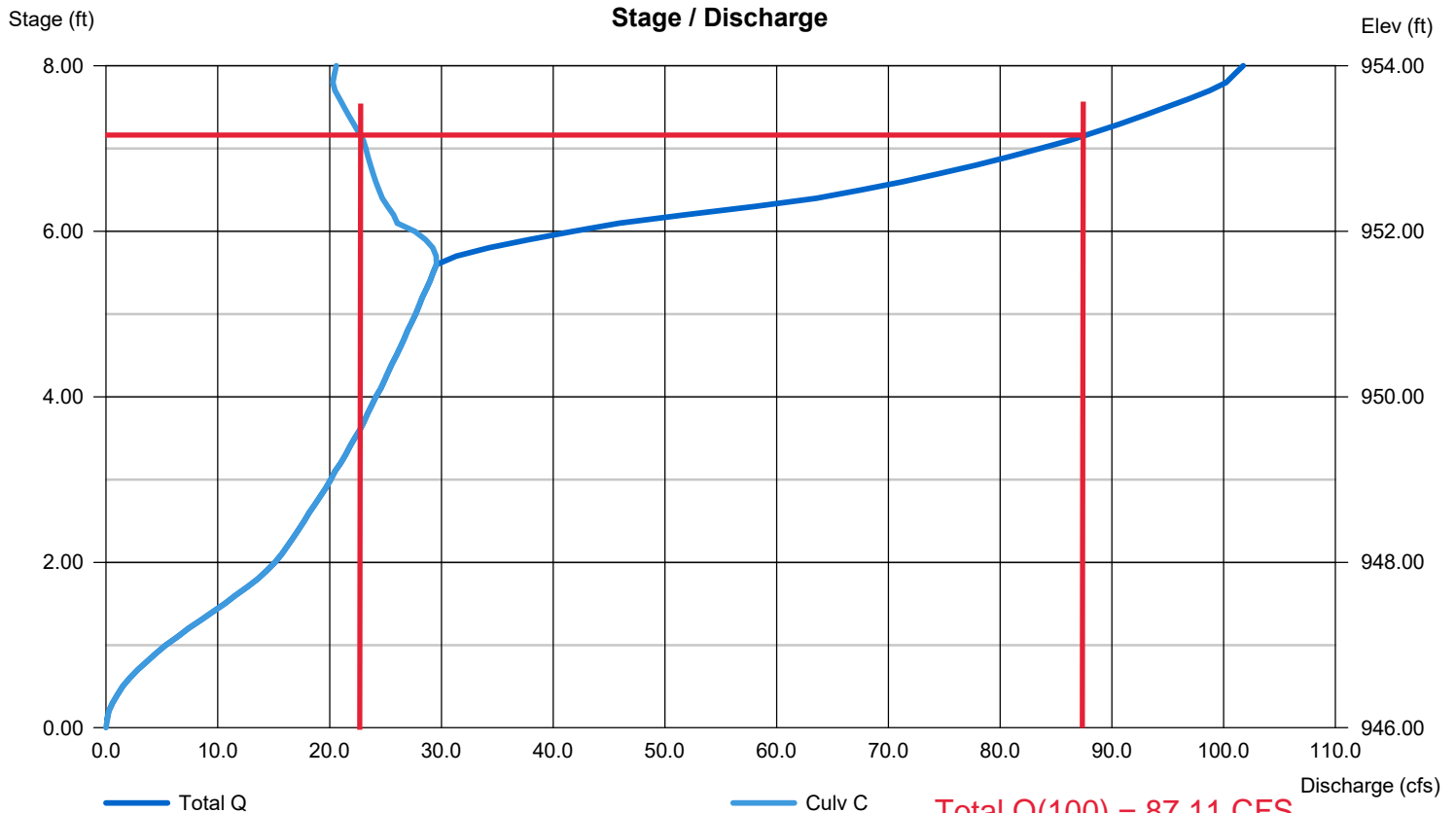
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 42.00	9.00	24.00	0.00
Span (in)	= 42.00	66.00	24.00	0.00
No. Barrels	= 1	3	1	0
Invert El. (ft)	= 945.57	951.60	946.00	0.00
Length (ft)	= 59.00	0.00	18.00	0.00
Slope (%)	= 1.00	0.00	1.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No
Exfil. (in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Culvert C -> ST-3, 24" RCP Apron



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	42.92	2	722	120,971	-----	-----	-----	DB 1 - EX	
2	SCS Runoff	45.01	2	722	131,694	-----	-----	-----	DB 1 - OFF	
3	Combine	87.93	2	722	252,665	1, 2	-----	-----	DB 1 - ALLOWABLE	
4	SCS Runoff	53.82	2	722	160,639	-----	-----	-----	DB 1	
5	Combine	98.83	2	722	292,332	2, 4	-----	-----	TO POND 1	
6	Reservoir	87.11	2	726	292,332	5	953.14	30,874	POND 1 (DB 1) RELEASE	
Existing & Post-Developed.gpw					Return Period: 100 Year			Wednesday, 01 / 29 / 2025		

Hydrograph Report

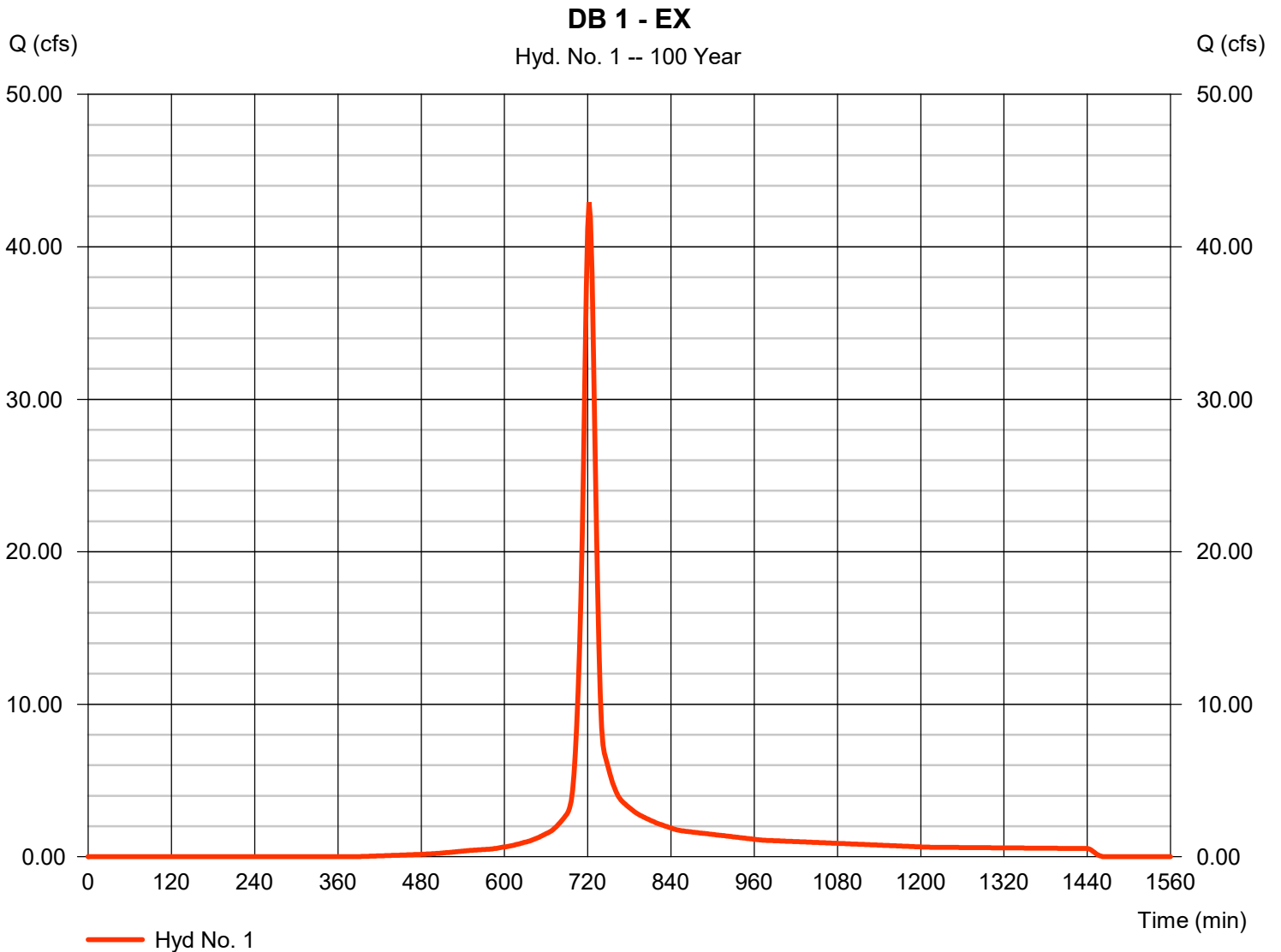
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Wednesday, 01 / 29 / 2025

Hyd. No. 1

DB 1 - EX

Hydrograph type	= SCS Runoff	Peak discharge	= 42.92 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 120,971 cuft
Drainage area	= 7.640 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.30 min
Total precip.	= 7.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

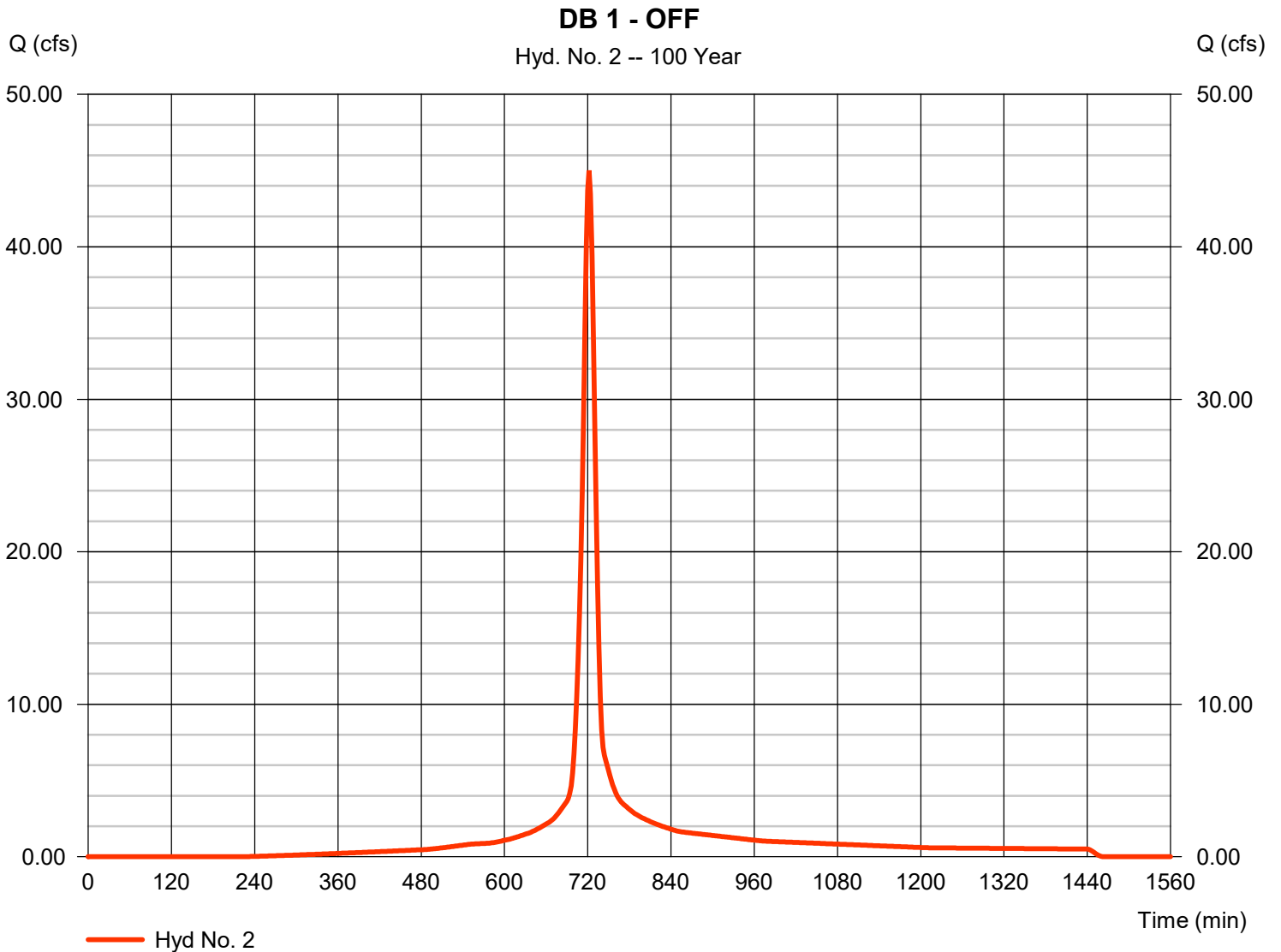
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Wednesday, 01 / 29 / 2025

Hyd. No. 2

DB 1 - OFF

Hydrograph type	= SCS Runoff	Peak discharge	= 45.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 131,694 cuft
Drainage area	= 6.650 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 14.10 min
Total precip.	= 7.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

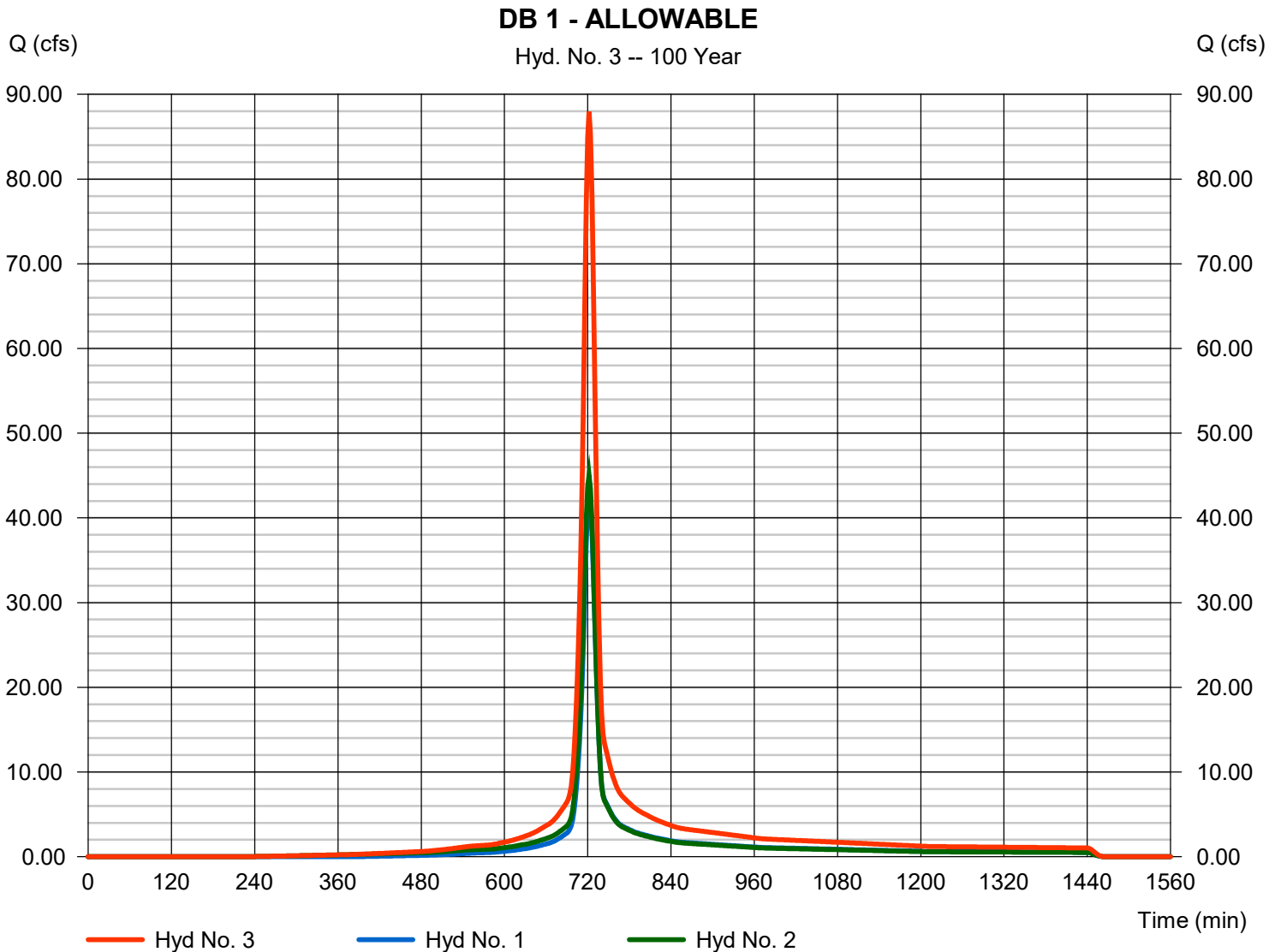
Wednesday, 01 / 29 / 2025

Hyd. No. 3

DB 1 - ALLOWABLE

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 2 min
Inflow hyds. = 1, 2

Peak discharge = 87.93 cfs
Time to peak = 722 min
Hyd. volume = 252,665 cuft
Contrib. drain. area = 14.290 ac



Hydrograph Report

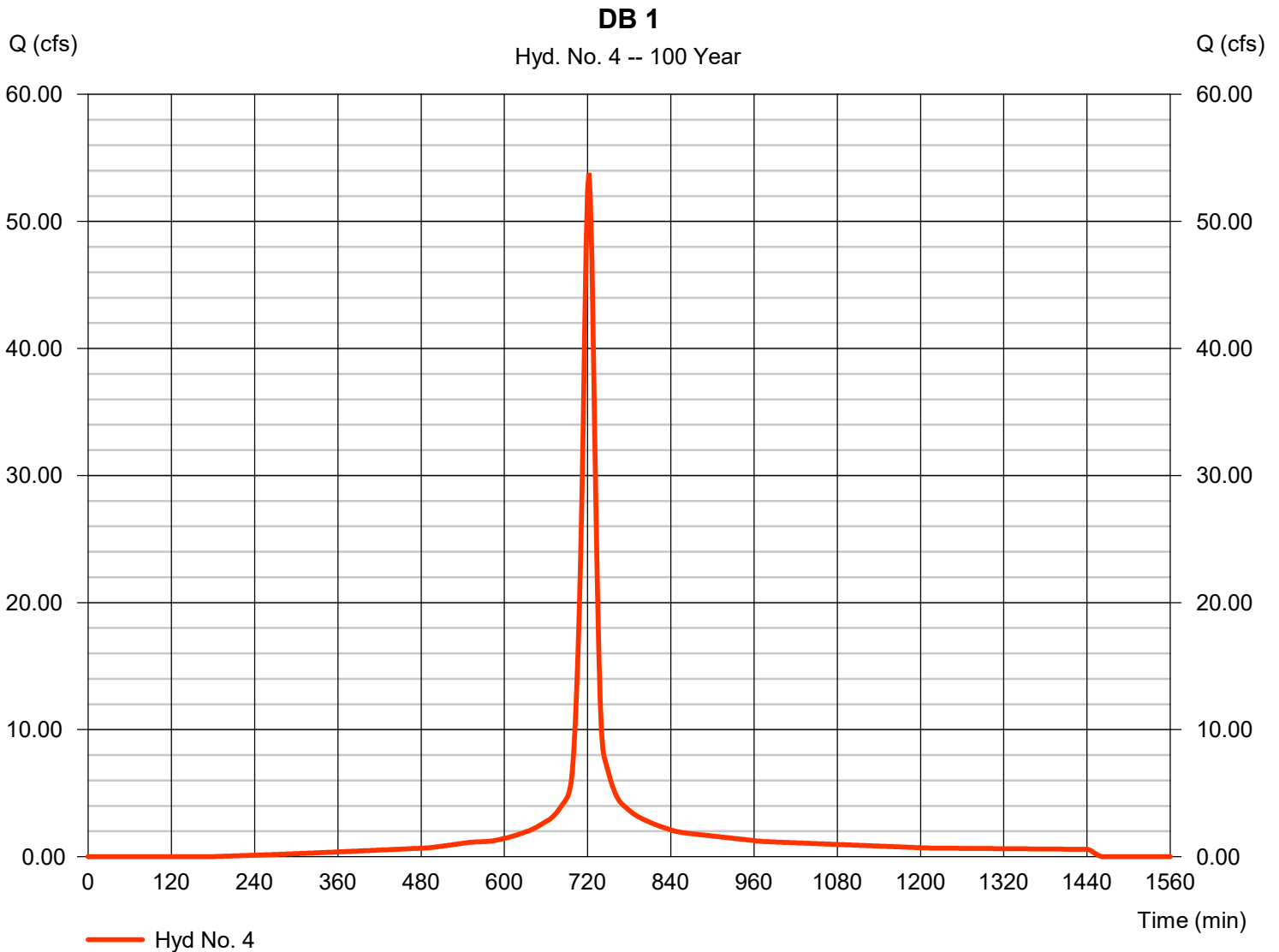
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Wednesday, 01 / 29 / 2025

Hyd. No. 4

DB 1

Hydrograph type	= SCS Runoff	Peak discharge	= 53.82 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 160,639 cuft
Drainage area	= 7.640 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 7.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

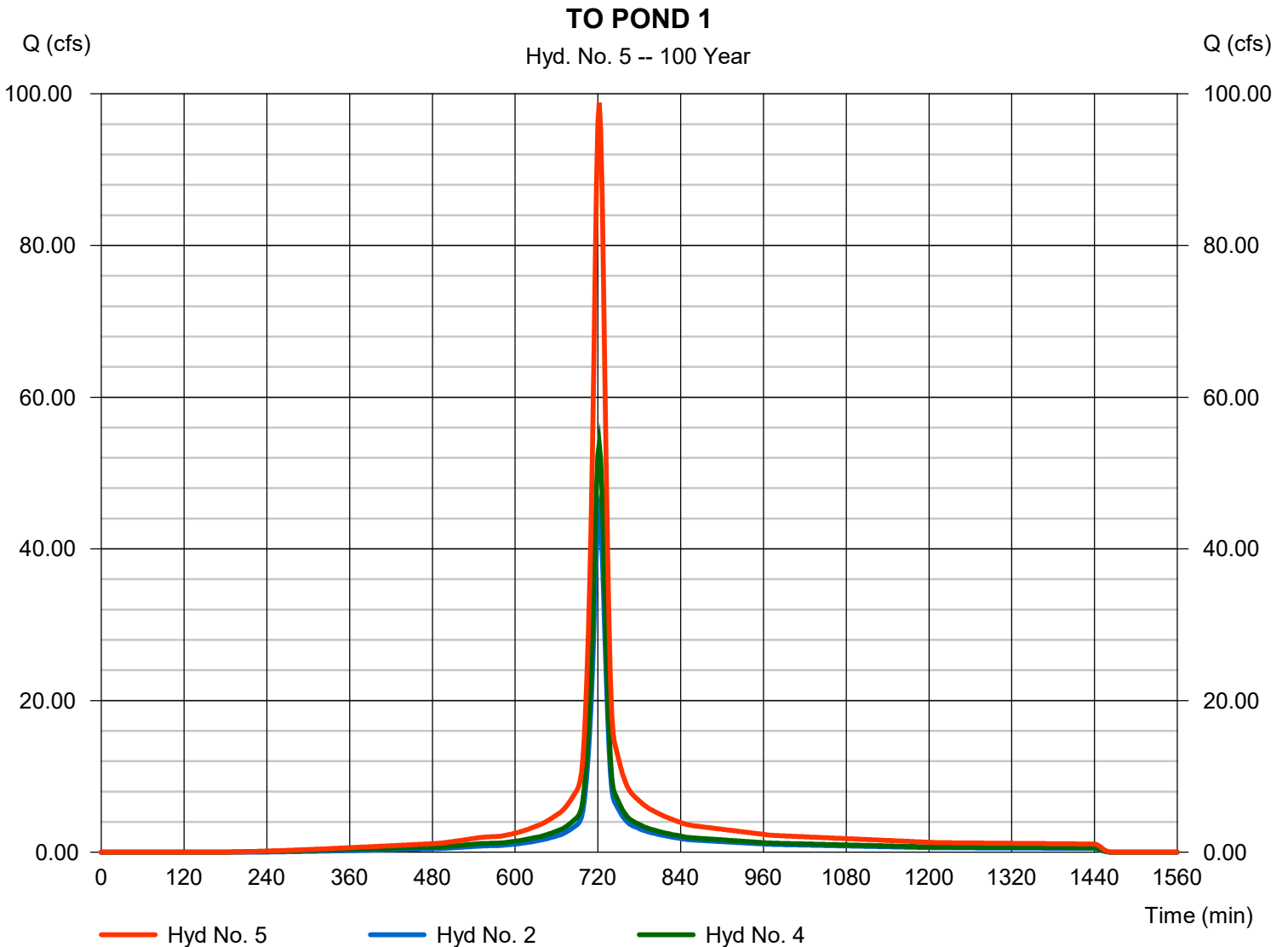
Wednesday, 01 / 29 / 2025

Hyd. No. 5

TO POND 1

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 2 min
Inflow hyds. = 2, 4

Peak discharge = 98.83 cfs
Time to peak = 722 min
Hyd. volume = 292,332 cuft
Contrib. drain. area = 14.290 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

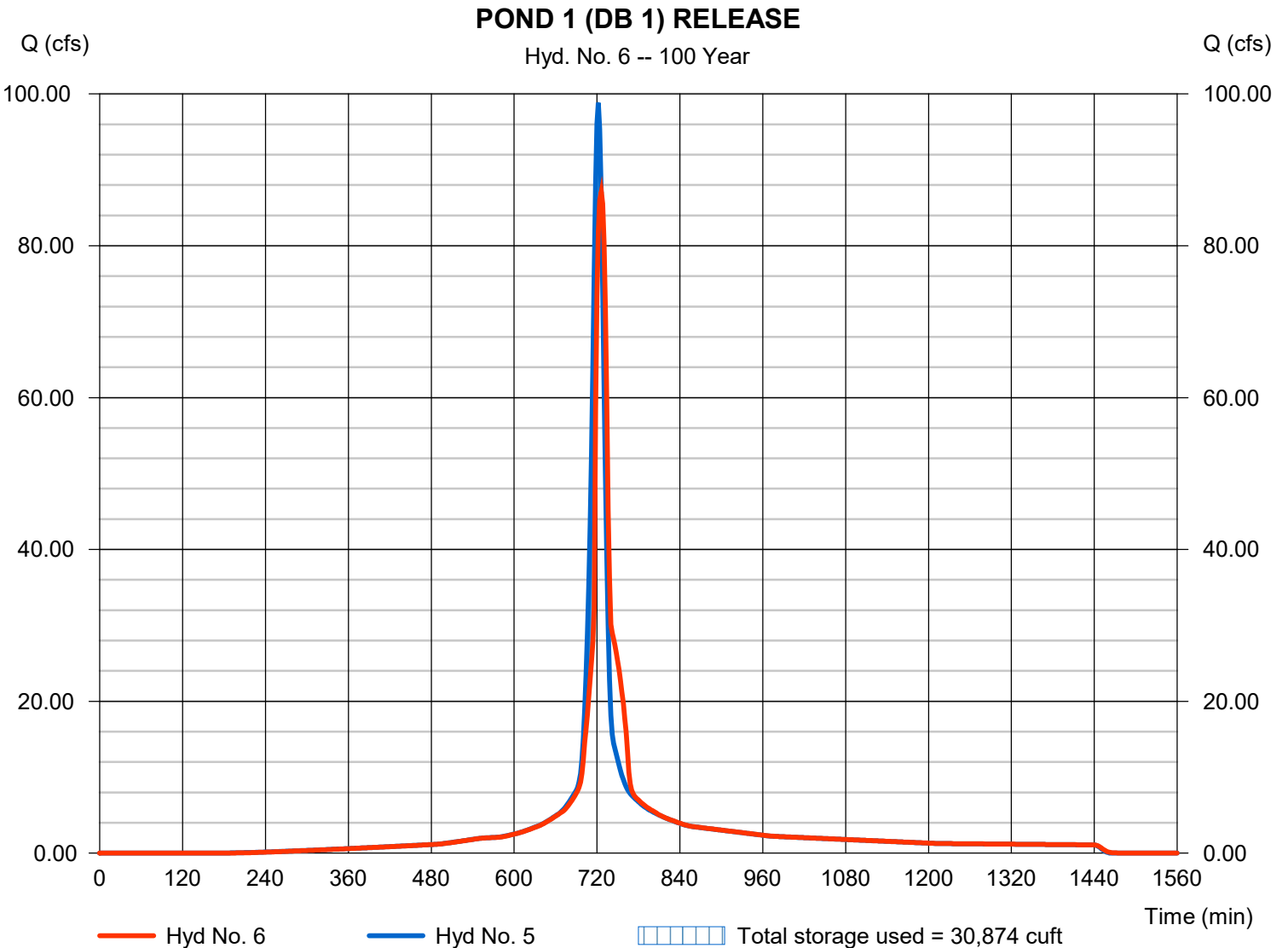
Wednesday, 01 / 29 / 2025

Hyd. No. 6

POND 1 (DB 1) RELEASE

Hydrograph type	= Reservoir	Peak discharge	= 87.11 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 292,332 cuft
Inflow hyd. No.	= 5 - TO POND 1	Max. Elevation	= 953.14 ft
Reservoir name	= POND 1	Max. Storage	= 30,874 cuft

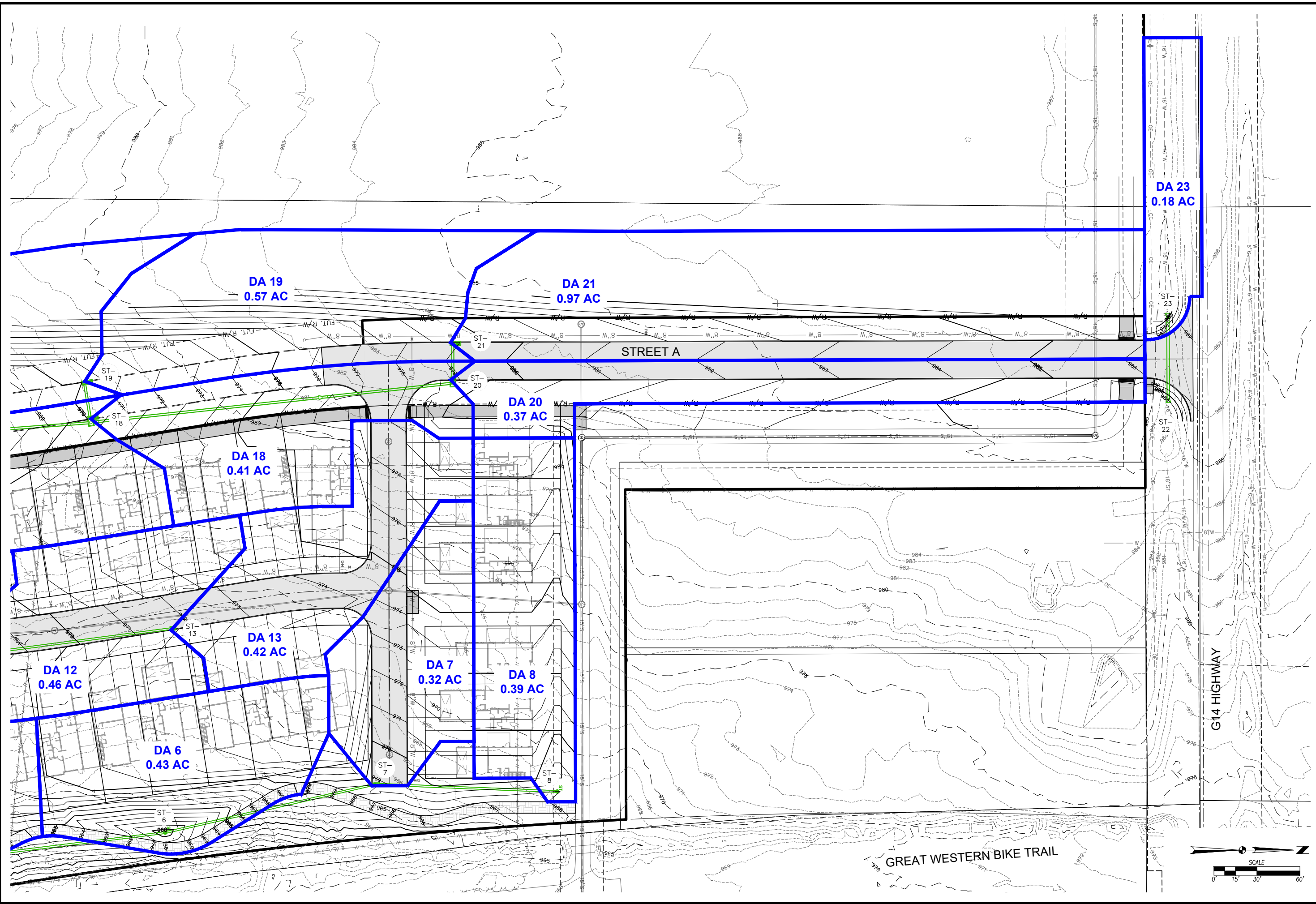
Storage Indication method used.



Section 5

Storm Sewer Analysis

FILE: H:\2024\2405285\2405285-SWMP.DWG
DATE: 1/29/2025 3:35 PM
DRAWN BY: JESSICA STONEBERG
CHECKED BY: ENH



DATE	
REVISIONS	
PREPARED	01/29/2025
ENGINEER: ENH	TECH: JDS
4121 NW URBANDALE DRIVE URBANDALE, IA 50322 PHONE: (515) 369-4400	
GSA CIVIL DESIGN ADVANTAGE	
CUMMING, IOWA	
GREAT WESTERN COTTAGES STORM SEWER MAP	
2	2
2405.385	

Project: GREAT WESTERN COTTAGES
 Proj. No.: 2405.385
 Designed: JDS
 Date: 1/29/2025

List of Intakes and Utility Accesses				
Structure Number ST-#	Location	Type or Standard Road Plan	FL / TC / RIM Elevation	Note
ST- 1		42" RCP APRON	FL 944.98	
ST- 2		6'X6' SW-513 INTAKE	RIM 952.85	
ST- 3		24" RCP APRON	FL 946.00	
ST- 4		15" CMP APRON	FL 948.02	
ST- 5		15" NYLOPLAST INTAKE	RIM 952.00	
ST- 6		15" NYLOPLAST INTAKE	RIM 959.30	
ST- 7		SW-501 INTAKE	TC 968.73	
ST- 8		15" NYLOPLAST INTAKE	RIM 968.00	
ST- 9		15" CMP APRON	FL 948.75	
ST- 10		SW-505 INTAKE	TC 958.23	
ST- 11		SW-505 INTAKE	TC 963.29	
ST- 12		SW-505 INTAKE	TC 967.34	
ST- 13		SW-501 INTAKE	TC 971.90	
ST- 14		15" RCP APRON	FL 955.52	
ST- 15		SW-501 INTAKE	TC 960.38	
ST- 16		SW-506 INTAKE	TC 961.65	
ST- 17		SW-505 INTAKE	TC 961.65	
ST- 18		SW-506 INTAKE	TC 970.63	
ST- 19		SW-505 INTAKE	TC 970.63	
ST- 20		SW-503 INTAKE	TC 979.37	
ST- 21		SW-505 INTAKE	TC 979.42	
ST- 22		18" RCP APRON	FL 982.00	
ST- 23		18" RCP APRON	FL 983.24	

Notes:

List of Storm Sewer Pipe									
Pipe Number L-#	Structure		Storm Sewer				FL(out)	FL(in)	Note
	To ST-#	From ST-#	Material	Diameter inches	Length feet	Slope %			
L- 2	ST- 1	ST- 2	RCP	42	59	1.00	944.98	945.57	
L- 3	ST- 2	ST- 3	RCP	24	18	1.00	945.82	946.00	
L- 5	ST- 4	ST- 5	HDPE	15	79	0.75	948.02	948.61	
L- 6	ST- 5	ST- 6	HDPE	15	201	3.00	948.61	954.64	
L- 7	ST- 6	ST- 7	HDPE	15	150	5.60	954.64	963.04	
L- 8	ST- 7	ST- 8	HDPE	15	124	1.00	963.14	964.38	
L- 10	ST- 9	ST- 10	HDPE	15	32	12.00	948.75	952.59	
L- 11	ST- 10	ST- 11	HDPE	15	89	6.40	952.69	958.38	
L- 12	ST- 11	ST- 12	HDPE	15	134	2.90	958.48	962.37	
L- 13	ST- 12	ST- 13	HDPE	15	169	2.90	962.47	967.37	
L- 15	ST- 14	ST- 15	RCP	18	26	1.00	955.52	955.78	
L- 16	ST- 15	ST- 16	RCP	18	65	1.00	955.88	956.53	
L- 17	ST- 16	ST- 17	RCP	15	23	2.00	956.73	957.19	
L- 18	ST- 16	ST- 18	RCP	15	248	3.40	956.73	965.16	
L- 19	ST- 18	ST- 19	RCP	15	23	2.00	965.46	965.92	
L- 20	ST- 18	ST- 20	RCP	15	252	3.40	965.46	974.03	
L- 21	ST- 20	ST- 21	RCP	15	23	2.00	974.33	974.79	
L- 23	ST- 22	ST- 23	RCP	18	62	2.00	982.00	983.24	

Notes:

Storm Sewer Pipe Design Information														
Manning's n -		RCP = 0.013		PVC = 0.011		Design Storm = 100 year								
Drainage Area A, acres	C	Equiv. Area CA	Accumulated Equiv. Area ΣCA	Time of Conc. min.	Rainfall Intensity in/hr	Storm Runoff cfs	Sump Lines units	Sump Flow cfs	Pipe Capacity Design cfs	Pipe Capacity Full Flow cfs	Flow Velocity Design ft/sec	Flow Velocity Full Flow ft/sec	Travel Time min.	Note
0.00	0.70	0.000	0.000	10	9.15	87.11			87.11	100.61	11.75	10.46	0.08	1
0.00	0.70	0.000	0.000	10	9.15	22.50			22.50	22.62	8.23	7.20	0.04	2
0.37	0.70	0.259	1.057	10	9.15	9.67			9.67	6.60	-17.46	5.38	(0.08)	
0.43	0.70	0.301	0.798	10	9.15	7.30			7.30	13.22	11.07	10.78	0.30	
0.32	0.70	0.224	0.497	10	9.15	4.55			4.55	18.07	12.28	14.72	0.20	
0.39	0.70	0.273	0.273	10	9.15	2.50			2.50	7.63	5.55	6.22	0.37	
0.23	0.70	0.161	1.036	10	9.15	9.48			9.48	26.45	19.68	21.55	0.03	
0.37	0.70	0.259	0.875	10	9.15	8.01			8.01	19.31	14.95	15.73	0.10	
0.46	0.70	0.322	0.616	10	9.15	5.64			5.64	13.01	10.19	10.60	0.22	
0.42	0.70	0.294	0.294	10	9.15	2.69			2.69	13.00	8.41	10.59	0.34	
0.18	0.70	0.126	2.597	10	9.15	23.76			23.76	10.50	-1058.86	5.94	(0.00)	
0.60	0.70	0.420	2.471	10	9.15	22.61			22.61	10.50	-1092.27	5.94	(0.00)	
0.61	0.70	0.427	0.427	10	9.15	3.91			3.91	9.14	7.13	7.44	0.05	
0.41	0.70	0.287	1.624	10	9.15	14.86			14.86	11.91	5.80	9.71	0.71	
0.57	0.70	0.399	0.399	10	9.15	3.65			3.65	9.14	7.00	7.44	0.05	
0.37	0.70	0.259	0.938	10	9.15	8.58			8.58	11.91	10.56	9.71	0.40	
0.97	0.70	0.679	0.679	10	9.15	6.21			6.21	9.14	8.01	7.44	0.05	
0.18	0.70	0.126	0.126	10	9.15	1.15			1.15	14.86	4.93	8.41	0.21	

SOMETHING SEEMS OFF.

Notes:

1 INCLUDES 87.11 CFS (100-YEAR) FROM POND 1. REFER TO HYDRAFLOW ANALYSIS FOR DETAILS.
 2 INCLUDES 22.50 CFS (100-YEAR) FROM POND 1. REFER TO HYDRAFLOW ANALYSIS FOR DETAILS.



PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages

SUBJECT: Area Intake Calculations DATE: 01/29/25 DESIGNED: JDS CHECKED:

INTAKE CAPACITY CALCULATIONS

EQUATIONS

DA 7 Runoff

Q = C * I * A	
C =	0.70
I =	9.15
A =	0.32
Q =	2.05

1. ORIFICE: $Q = 0.67 A_g (2gd)^{0.5}$ (SUDAS Equation 2C-3.12)

WHERE - Q = flow, cfs
 A_g = Clear opening of the grate, ft²
 g = gravitational constant (32.16 ft/s²)
 d = average depth across the grate, ft

2. WEIR: $Q = 3.0 P d^{1.5}$ (SUDAS Equation 2C-3.11)

WHERE - Q = flow, cfs
 P = Perimeter of the grate disregarding the side against the curb, ft
 d = average depth across the grate, ft

CALCULATIONS

1. Solve for required head given flow and open area for casting using Orifice Equation:

LOCATION: **ST - 7**

INPUT: $Q_{100} = 2.05$ cfs (From Rational Equation)
 $A_g = 1.95$ sq. ft. (Open Area of Type R Grate)

Required Depth at Grate: d = 0.038 ft.

2. Solve for required head given flow and open perimeter of casting using Weir Equation:

LOCATION: **ST - 7**

INPUT: $Q_{100} = 2.05$ cfs (From Rational Equation)
 P = 5.86 ft. (Open Perimeter of Type R Grate)

Required Depth at Grate: d = 0.239 ft.

GOVERNING EQUATION: **Weir Equation**
Required Depth = 0.239 ft = 2.86 inches

The 100-year elevation is 968.77 + 0.24 = 969.01
The 100-year elevation is less than the overflow elevation of 969.02; therefore, ponding depth ok.



PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages

SUBJECT: Area Intake Calculations DATE: 01/29/25 DESIGNED: JDS CHECKED:

INTAKE CAPACITY CALCULATIONS

EQUATIONS

1. ORIFICE: $Q = 0.67 A_g (2gd)^{0.5}$ (SUDAS Equation 2C-3.12)

WHERE - Q = flow, cfs
A_g = Clear opening of the grate, ft²
g = gravitational constant (32.16 ft/s²)
d = average depth across the grate, ft

DA 10 Runoff

$Q = C * I * A$	
C =	0.70
I =	9.15
A =	0.23
Q =	1.47 *

2. WEIR: $Q = 3.0 P d^{1.5}$ (SUDAS Equation 2C-3.11)

WHERE - Q = flow, cfs
P = Perimeter of the grate disregarding the side against the curb, ft
d = average depth across the grate, ft

* ST-10 Receives 1.82 cfs (100-YR) bypass from ST-11	
Q* = 1.47 + 1.82 =	3.29

CALCULATIONS

1. Solve for required head given flow and open area for casting using Orifice Equation:

LOCATION: **ST - 10**

INPUT: Q₁₀₀ = **3.29** cfs (From Rational Equation)
A_g = **3.90** sq. ft. (Open Area of 2-Type R Grate)

Required Depth at Grate: d = 0.025 ft.

2. Solve for required head given flow and open perimeter of casting using Weir Equation:

LOCATION: **ST - 10**

INPUT: Q₁₀₀ = **3.29** cfs (From Rational Equation)
P = **11.72** ft. (Open Perimeter of 2-Type R Grate)

Required Depth at Grate: d = 0.206 ft.

GOVERNING EQUATION: **Weir Equation**

Required Depth = 0.206 ft = 2.47 inches

The 100-year elevation is 958.17 + 0.21 = 958.38

The 100-year elevation is less than the overflow elevation of 958.42; therefore, ponding depth ok.



PROJECT: Great Western Cottages JOB NO. 2405.385 Page of Pages

SUBJECT: Area Intake Calculations DATE: 01/29/25 DESIGNED: JDS CHECKED:

INTAKE CAPACITY CALCULATIONS

EQUATIONS

DA 15 Runoff

$Q = C * I * A$	
C =	0.70
I =	9.15
A =	0.18
Q =	1.15

1. ORIFICE: $Q = 0.67 A_g (2gd)^{0.5}$ (SUDAS Equation 2C-3.12)

WHERE - Q = flow, cfs
A_g = Clear opening of the grate, ft²
g = gravitational constant (32.16 ft/s²)
d = average depth across the grate, ft

2. WEIR: $Q = 3.0 P d^{1.5}$ (SUDAS Equation 2C-3.11)

WHERE - Q = flow, cfs
P = Perimeter of the grate disregarding the side against the curb, ft
d = average depth across the grate, ft

CALCULATIONS

1. Solve for required head given flow and open area for casting using Orifice Equation:

LOCATION: **ST - 15**

INPUT: Q₁₀₀ = **1.15** cfs (From Rational Equation)
A_g = **1.95** sq. ft. (Open Area of Type R Grate)

Required Depth at Grate: d = 0.012 ft.

2. Solve for required head given flow and open perimeter of casting using Weir Equation:

LOCATION: **ST - 15**

INPUT: Q₁₀₀ = **1.15** cfs (From Rational Equation)
P = **5.86** ft. (Open Perimeter of Type R Grate)

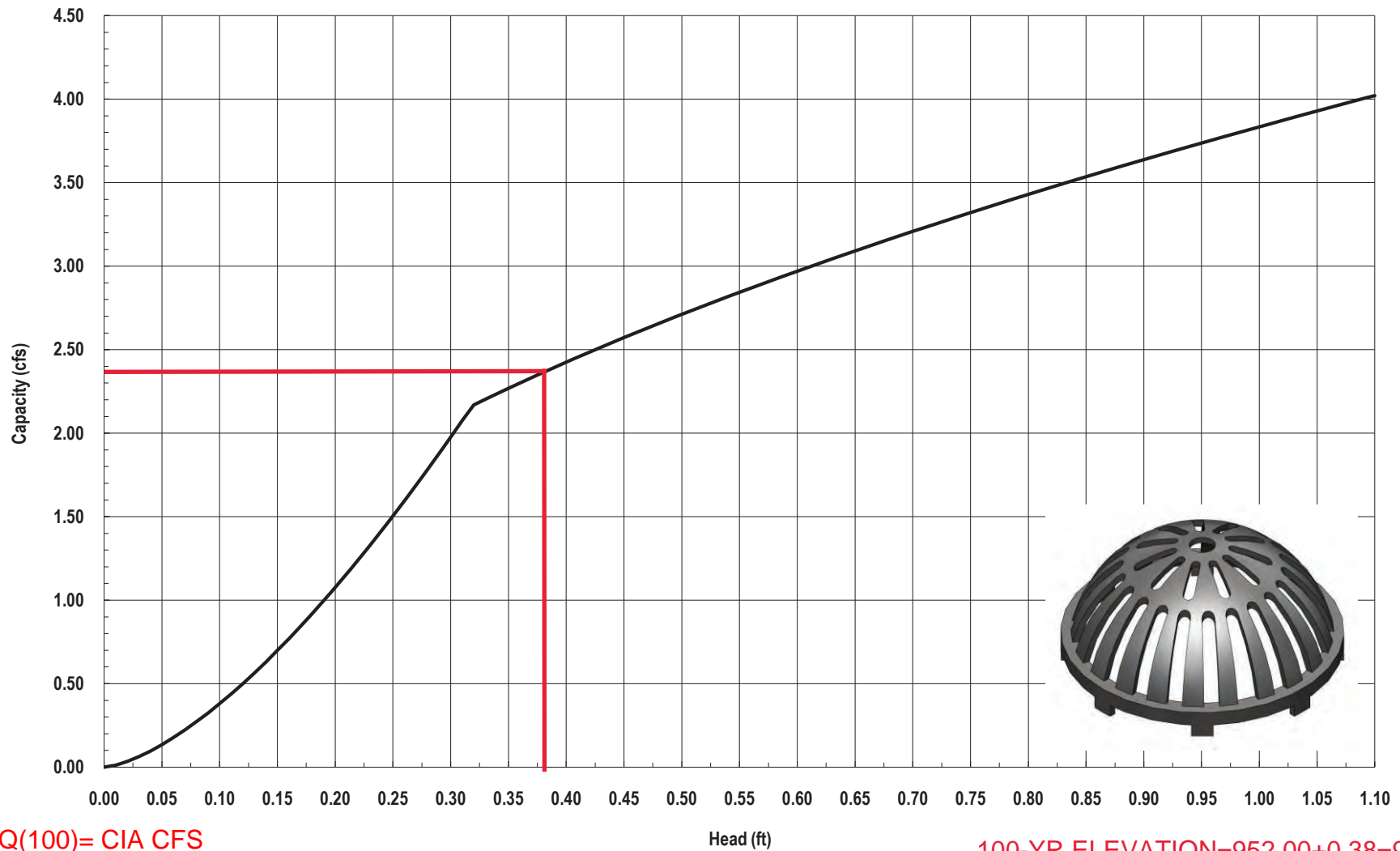
Required Depth at Grate: d = 0.163 ft.

GOVERNING EQUATION: **Weir Equation**
Required Depth = 0.163 ft = 1.95 inches

The 100-year elevation is 960.13 + 0.16 = 960.29
The 100-year elevation is less than the overflow elevation of xxx; therefore, ponding depth ok.

Nyloplast 15" Dome Grate Inlet Capacity Chart

ST-5



$Q(100) = CIA \text{ CFS}$

$Q(100) = 0.70(9.15)(.37) = 2.37 \text{ CFS}$

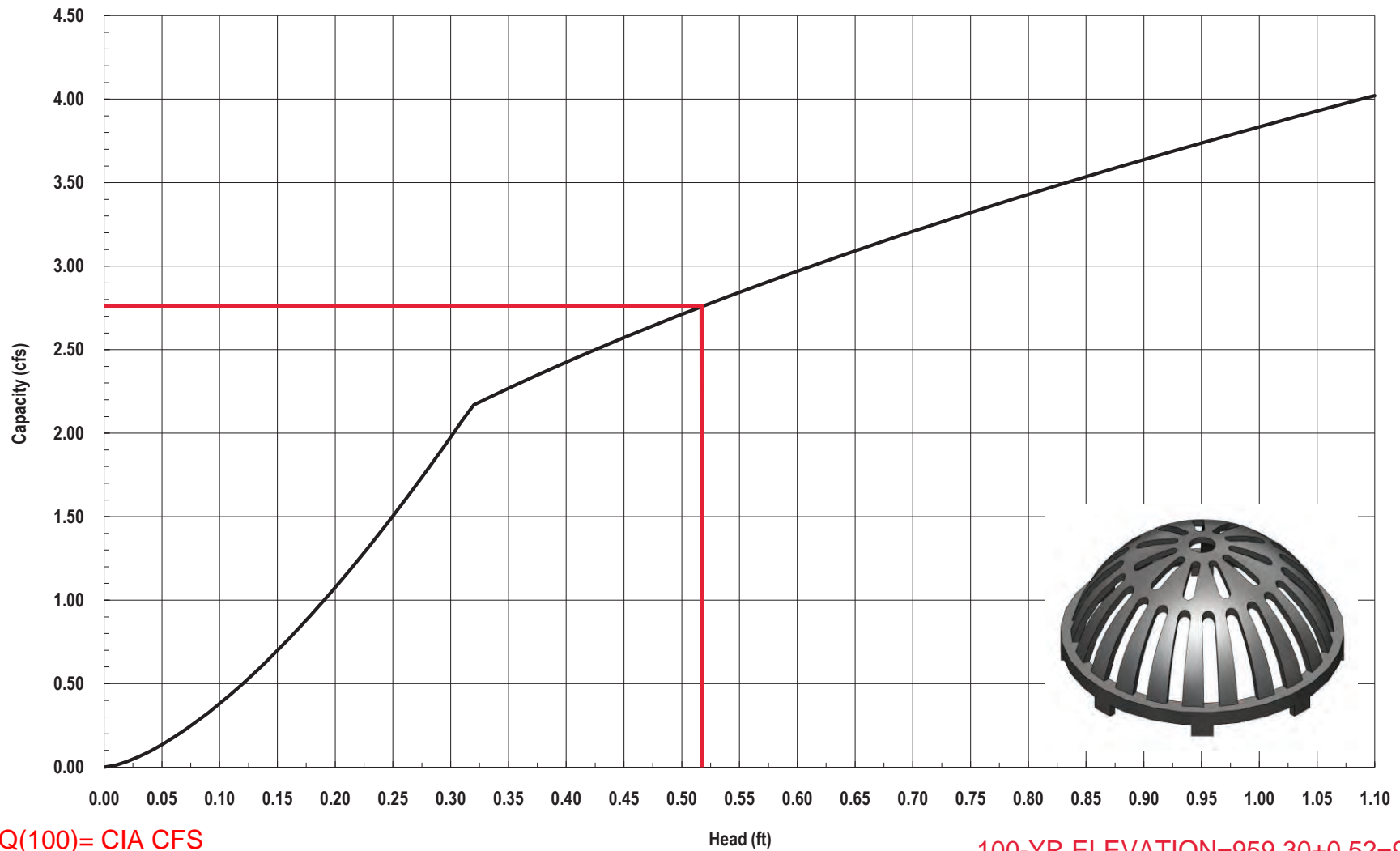
$100\text{-YR ELEVATION} = 952.00 + 0.38 = 952.38$



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 © Nyloplast Inlet Capacity Charts June 2012

Nyloplast 15" Dome Grate Inlet Capacity Chart

ST-6



Q(100)= CIA CFS

Q(100)= 0.70(9.15)(.43) = 2.75 CFS

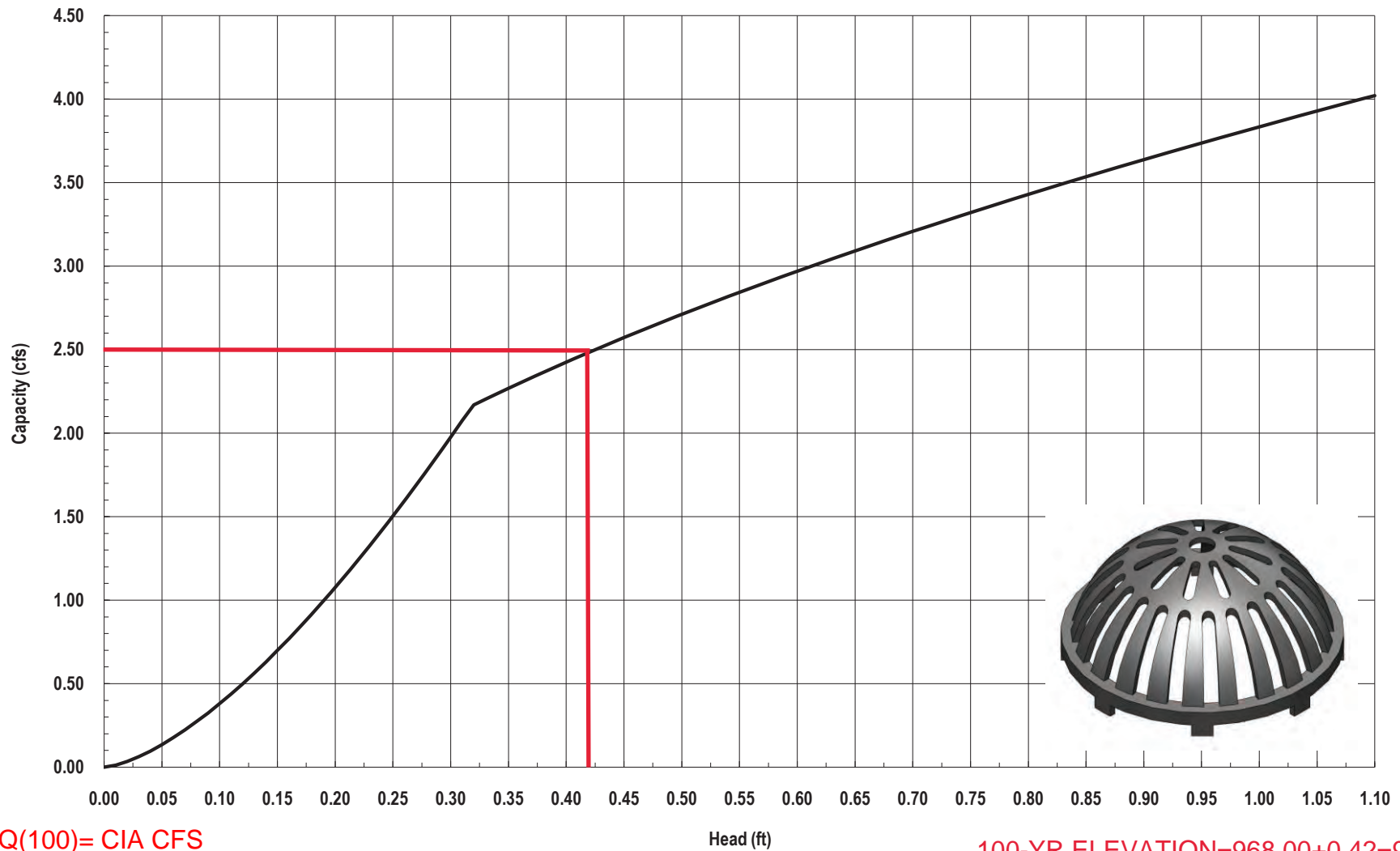
100-YR ELEVATION=959.30+0.52=959.82



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Nyloplast 15" Dome Grate Inlet Capacity Chart

ST-8



Q(100)= CIA CFS

Q(100)= 0.70(9.15)(.39) = 2.50 CFS

100-YR ELEVATION=968.00+0.42=968.42



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 © Nyloplast Inlet Capacity Charts June 2012

Figure 7E-10.03: Design of Outlet Protection, Minimum Tailwater Condition

ST-1

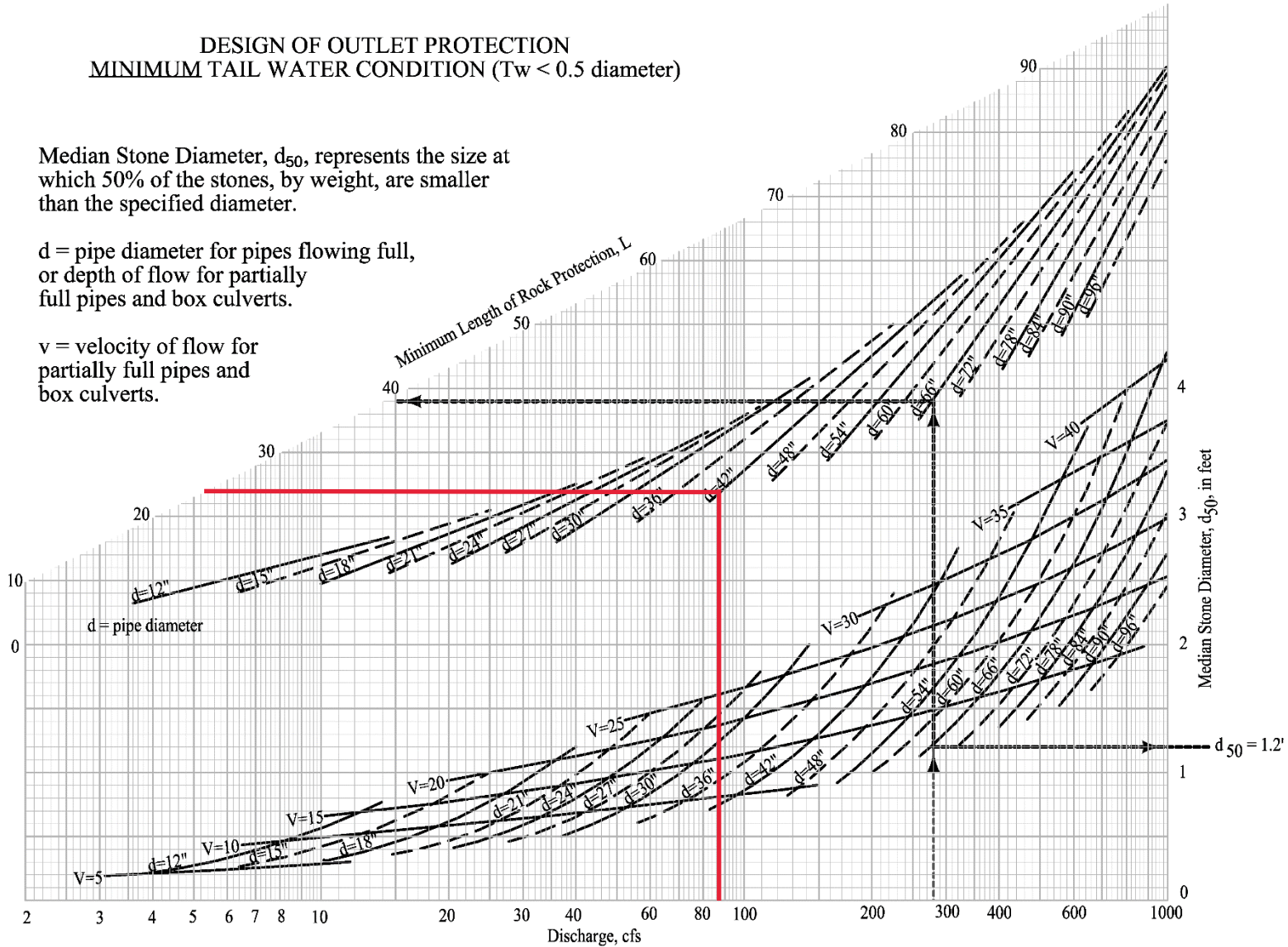
DESIGN OF OUTLET PROTECTION
 MINIMUM TAIL WATER CONDITION ($T_w < 0.5$ diameter)

Source: USDA NRCS, 2004

Median Stone Diameter, d_{50} , represents the size at which 50% of the stones, by weight, are smaller than the specified diameter.

d = pipe diameter for pipes flowing full, or depth of flow for partially full pipes and box culverts.

v = velocity of flow for partially full pipes and box culverts.



$Q(100) = 87.11$ CFS

$L = 24$ Feet

Figure 7E-10.03: Design of Outlet Protection, Minimum Tailwater Condition

ST-4

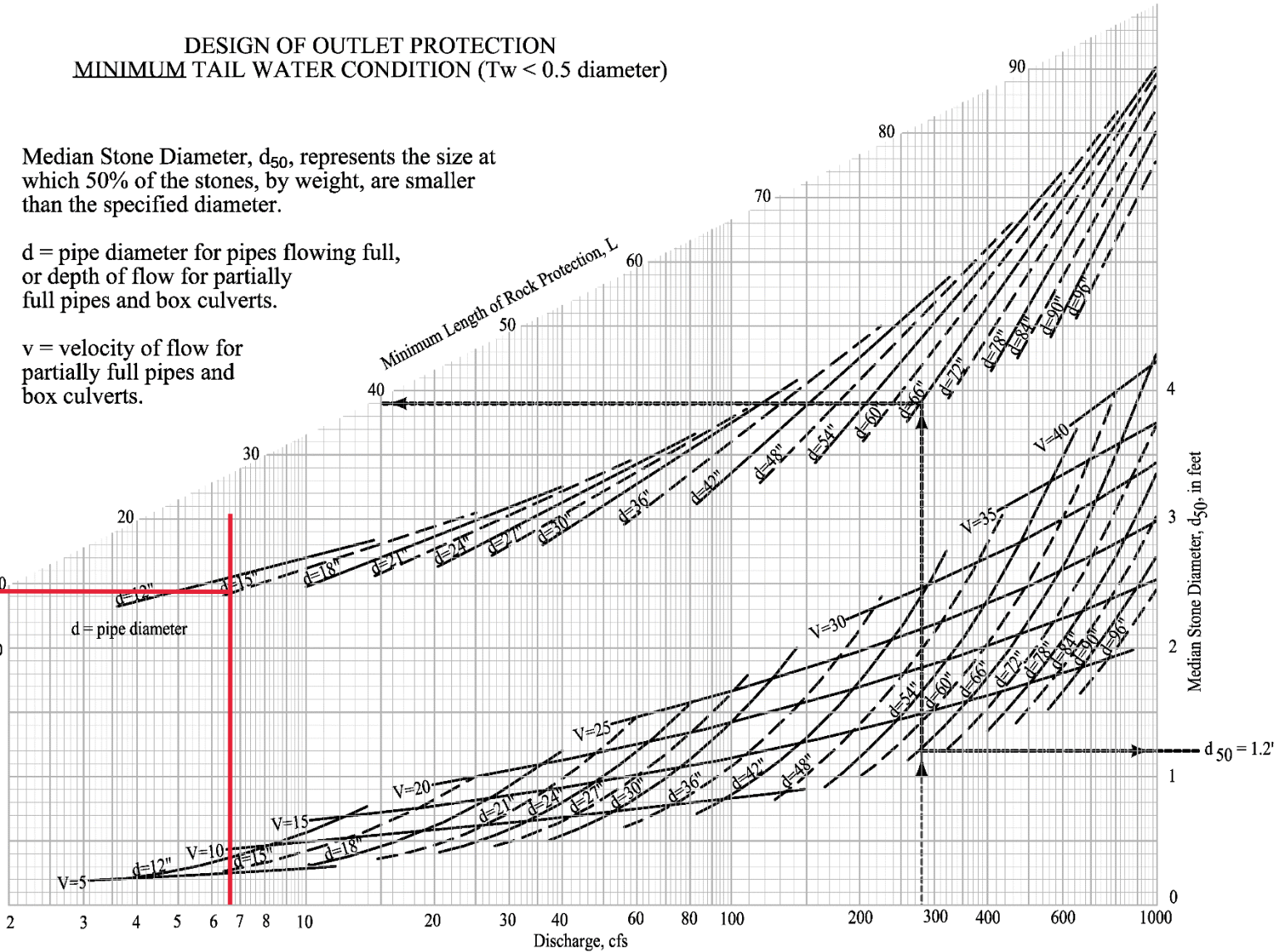
DESIGN OF OUTLET PROTECTION
 MINIMUM TAIL WATER CONDITION ($T_w < 0.5$ diameter)

Source: USDA NRCS, 2004

Median Stone Diameter, d_{50} , represents the size at which 50% of the stones, by weight, are smaller than the specified diameter.

d = pipe diameter for pipes flowing full, or depth of flow for partially full pipes and box culverts.

v = velocity of flow for partially full pipes and box culverts.



$Q(CAP.) = 6.60$ CFS

$L = 8.5$ Feet

d = pipe diameter

Discharge, cfs

Median Stone Diameter, d_{50} , in feet

Figure 7E-10.03: Design of Outlet Protection, Minimum Tailwater Condition

ST-9

DESIGN OF OUTLET PROTECTION
 MINIMUM TAIL WATER CONDITION ($T_w < 0.5$ diameter)

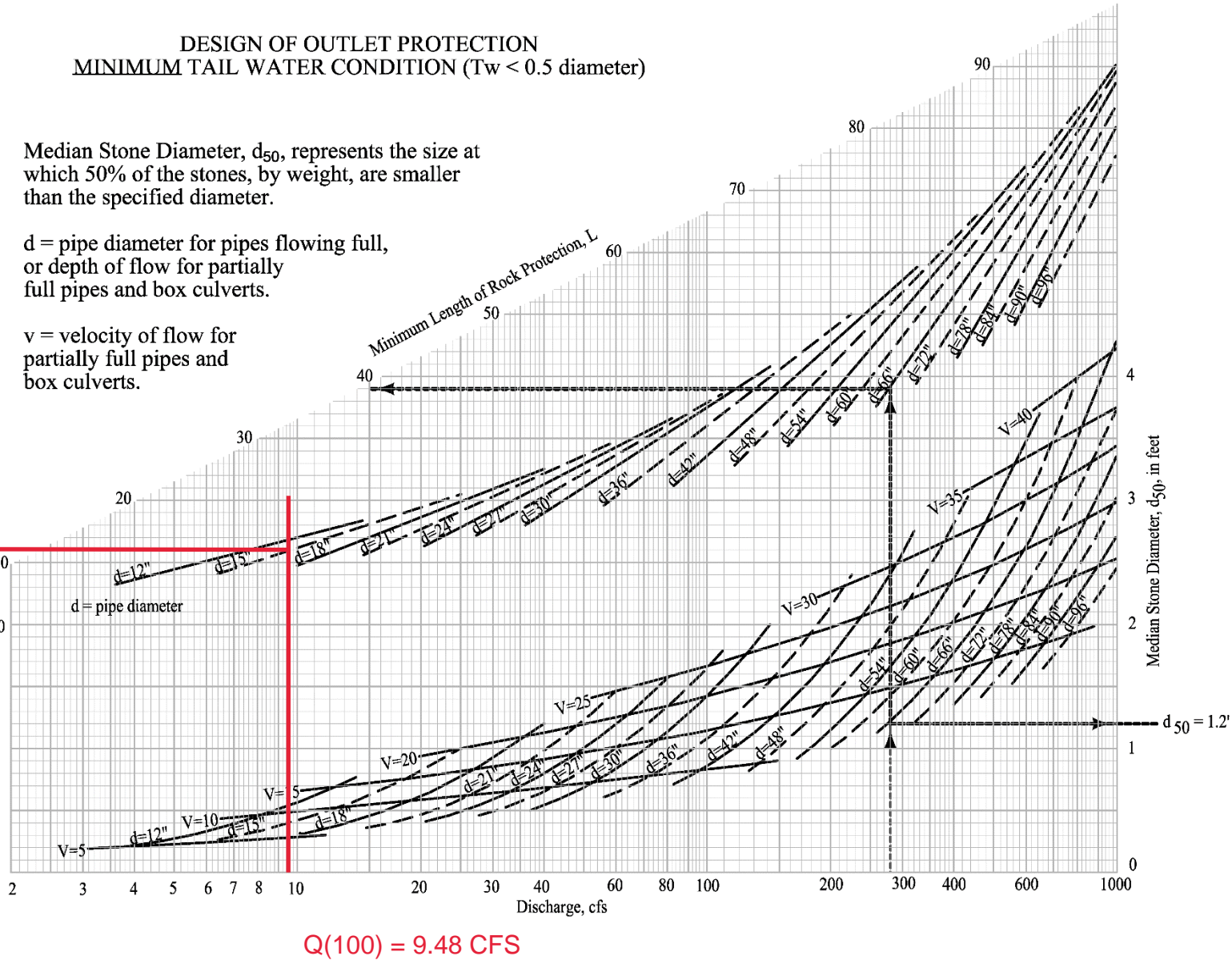
Source: USDA NRCS, 2004

Median Stone Diameter, d_{50} , represents the size at which 50% of the stones, by weight, are smaller than the specified diameter.

d = pipe diameter for pipes flowing full, or depth of flow for partially full pipes and box culverts.

v = velocity of flow for partially full pipes and box culverts.

$L = 12$ Feet



$Q(100) = 9.48$ CFS

ST-14

DESIGN OF OUTLET PROTECTION
 MINIMUM TAIL WATER CONDITION ($T_w < 0.5$ diameter)

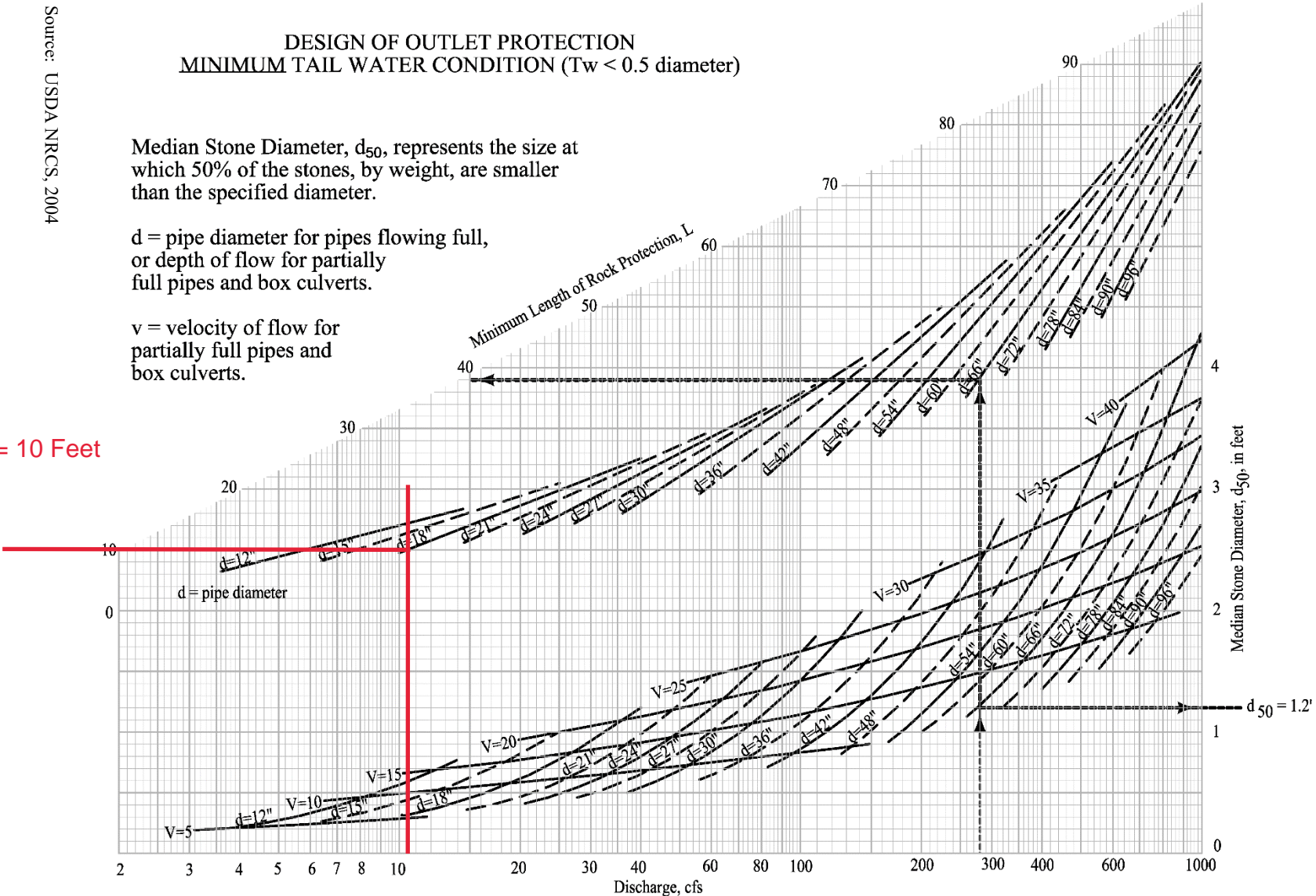
Source: USDA NRCS, 2004

Median Stone Diameter, d_{50} , represents the size at which 50% of the stones, by weight, are smaller than the specified diameter.

d = pipe diameter for pipes flowing full, or depth of flow for partially full pipes and box culverts.

v = velocity of flow for partially full pipes and box culverts.

$L = 10$ Feet



$Q(CAP.) = 10.50$ CFS

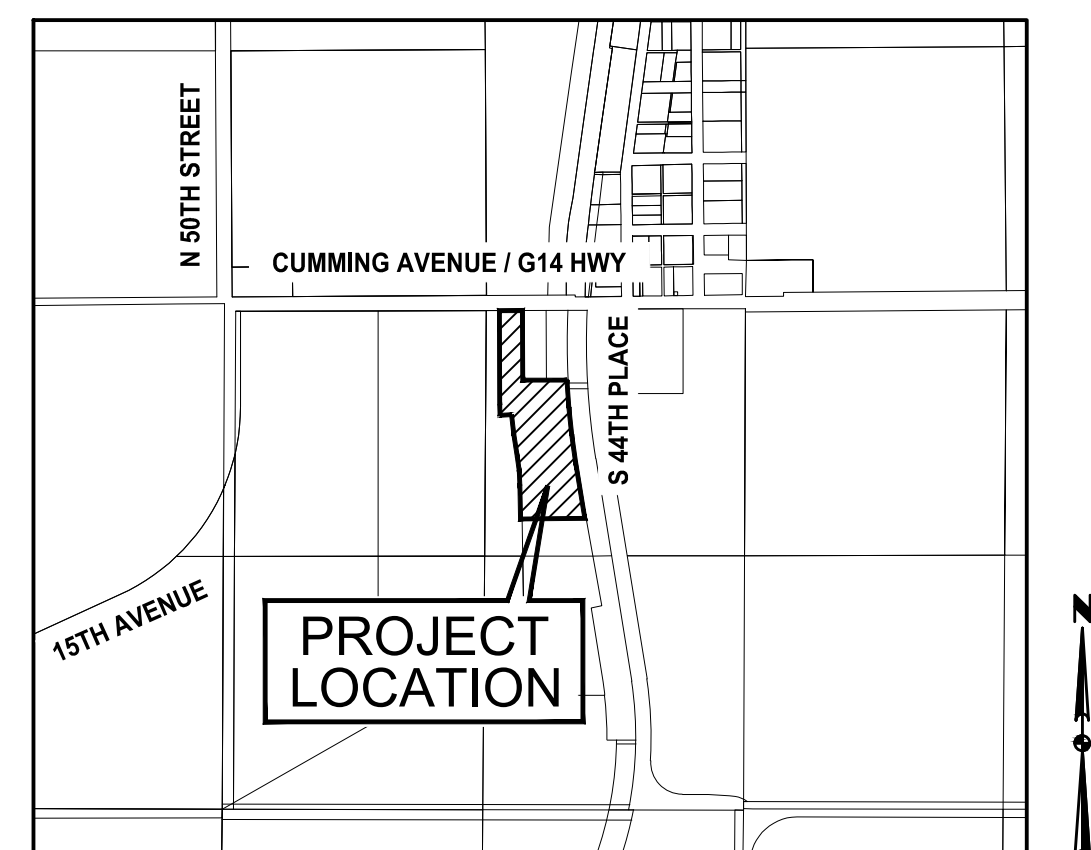
Figure 7E-10.03: Design of Outlet Protection, Minimum Tailwater Condition

PRELIMINARY PLAT / SITE PLAN FOR: GREAT WESTERN COTTAGES

CUMMING, IOWA

VICINITY MAP

SCALE - 1"=1000'



CUMMING, IOWA

INDEX OF SHEETS

NO.	DESCRIPTION
1	COVER SHEET
2-3	GENERAL NOTES & DETAILS
4	DIMENSION PLAN
5-6	GRADING PLAN
7-8	UTILITY PLAN
9	LANDSCAPE PLAN

GENERAL LEGEND

PROPOSED	EXISTING
PROPERTY BOUNDARY	SANITARY MANHOLE
SECTION LINE	WATER VALVE BOX
CENTER LINE	FIRE HYDRANT
RIGHT OF WAY	WATER CURB STOP
BUILDING SETBACK	WELL
PERMANENT EASEMENT	STORM SEWER MANHOLE
TEMPORARY EASEMENT	STORM SEWER SINGLE INTAKE
TYPE SW-501 STORM INTAKE	STORM SEWER DOUBLE INTAKE
TYPE SW-502 STORM INTAKE	FLARED END SECTION
TYPE SW-503 STORM INTAKE	DECIDUOUS TREE
TYPE SW-505 STORM INTAKE	CONIFEROUS TREE
TYPE SW-506 STORM INTAKE	DECIDUOUS SHRUB
TYPE SW-512 STORM INTAKE	CONIFEROUS SHRUB
TYPE SW-513 STORM INTAKE	ELECTRIC POWER POLE
TYPE SW-401 STORM MANHOLE	GUY ANCHOR
TYPE SW-402 STORM MANHOLE	STREET LIGHT
FLARED END SECTION	POWER POLE W/ TRANSFORMER
TYPE SW-301 SANITARY MANHOLE	UTILITY POLE W/ LIGHT
STORM/SANITARY CLEANOUT	ELECTRIC BOX
WATER VALVE	ELECTRIC TRANSFORMER
FIRE HYDRANT ASSEMBLY	ELECTRIC MANHOLE OR VAULT
SIGN	TRAFFIC SIGN
DETECTABLE WARNING PANEL	TELEPHONE JUNCTION BOX
WATER CURB STOP	TELEPHONE MANHOLE/VAULT
SANITARY SEWER	TELEPHONE POLE
SANITARY SERVICE	GAS VALVE BOX
STORM SEWER	CABLE TV JUNCTION BOX
STORM SERVICE	CABLE TV MANHOLE/VAULT
WATERMAIN WITH SIZE	MAIL BOX
WATER SERVICE	BENCHMARK
SAWCUT (FULL DEPTH)	SOIL BORING
SILT FENCE	UNDERGROUND TV CABLE
USE AS CONSTRUCTED	GAS MAIN
MINIMUM PROTECTION ELEVATION	FIBER OPTIC
	UNDERGROUND TELEPHONE
	OVERHEAD ELECTRIC
	UNDERGROUND ELECTRIC
	FIELD TILE
	SANITARY SEWER W/ SIZE
	STORM SEWER W/ SIZE
	WATER MAIN W/ SIZE

OWNER / APPLICANT

MIDDLEBROOK HB LLC / LAND CONCEPTS LLC
CONTACT: TIM PORTZEN
6150 VILLAGE VIEW DR STE 110
WEST DES MOINES, IOWA 50266
PH. (515) 309-0705

ENGINEER

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SURVEYOR

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ARCHITECT

SLINGSHOT ARCHITECTURE
400 LOCUST STREET, SUITE 140
DES MOINES, IOWA 50309
CONTACT: JOSH WILLIAMS
PH. (515) 243-0074

SUBMITTAL DATES

FIRST SUBMITTAL: 1/31/2025

LEGAL DESCRIPTION

A PART OF PARCEL 'M' AS SHOWN ON THE PLAT OF SURVEY RECORDED IN INSTRUMENT NUMBER 2020-01460, BEING A PART OF THE WEST HALF SECTION 17, TOWNSHIP 77 NORTH, RANGE 25 WEST OF THE FIFTH PRINCIPAL MERIDIAN IN THE CITY OF CUMMING, WARREN COUNTY, IOWA AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER F SAID PARCEL 'M'; THENCE SOUTH 00°10'23" EAST ALONG THE EASTERLY LINE OF SAID PARCEL 'M', 363.00 FEET; THENCE NORTH 89°49'14" EAST ALONG SAID EASTERLY LINE, 230.22 FEET; THENCE SOUTHERLY ALONG SAID EASTERLY LINE AND A CURVE CONCAVE EASTERLY WHOSE RADIUS IS 3870.66 FEET, WHOSE ARC LENGTH IS 429.25 FEET AND WHOSE CHORD BEARS SOUTH 06°01'38" EAST, 429.03 FEET; THENCE SOUTH 09°12'15" EAST ALONG SAID EASTERLY LINE, 298.10 FEET; THENCE SOUTH 89°38'56" WEST ALONG SAID EASTERLY LINE, 334.69 FEET; THENCE NORTH 00°59'55" WEST, 176.23 FEET; THENCE NORTHERLY ALONG A CURVE CONCAVE WESTERLY WHOSE RADIUS IS 1030.00 FEET, WHOSE ARC LENGTH IS 147.51 FEET AND WHOSE CHORD BEARS NORTH 05°06'05" WEST, 147.39 FEET; THENCE NORTH 09°12'15" WEST, 120.21 FEET; THENCE NORTHERLY ALONG A CURVE CONCAVE EASTERLY WHOSE RADIUS IS 970.00 FEET, WHOSE ARC LENGTH IS 101.04 FEET AND WHOSE CHORD BEARS NORTH 06°13'12" WEST, 101.00 FEET; THENCE SOUTH 86°45'51" WEST, 60.00 FEET; THENCE NORTHERLY ALONG A CURVE CONCAVE EASTERLY WHOSE RADIUS IS 1030.00 FEET, WHOSE ARC LENGTH IS 55.06 FEET AND WHOSE CHORD BEARS NORTH 01°42'16" WEST, 55.05 FEET; THENCE NORTH 00°10'23" WEST, 491.17 FEET TO THE NORTH LINE OF SAID PARCEL 'M'; THENCE NORTH 89°49'14" EAST ALONG SAID NORTH LINE, 120.00 FEET TO THE POINT OF BEGINNING AND CONTAINING 6.30 ACRES (274,611 SQUARE FEET).

ZONING

MIDDLEBROOK PUD:
ZONE 2: MIDDLEBROOK COMMERCIAL, HIGH INTENSITY
RESIDENTIAL, OR MEDIUM INTENSITY RESIDENTIAL

BULK REGULATIONS

LIVE/WORK TYPOLOGY
LOT WIDTH = 20' - 80'
SETBACKS:
FRONT = 10' MIN.
BUILD-TO-ZONE = 10' - 25'
SIDE = 0' MIN. BETWEEN UNITS,
5' EACH SIDE (10' TOTAL)

BENCHMARKS

WDM GPS #16 (MONUMENT) @ NE CORNER OF SW 80TH & SW
66TH: ELEVATION=966.14



UTILITY WARNING

ANY UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY AND RECORDS OBTAINED BY THIS SURVEYOR. THE SURVEYOR MAKES NO GUARANTEE THAT THE UTILITIES SHOWN COMPRISE ALL THE UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION SHOWN.

UPDATE WITH CORRECT INFORMATION.

THE PROJECT REQUIRES AN IOWA NPDES PERMIT #2 AND CITY OF ANKENY GRADING PERMIT. CIVIL DESIGN ADVANTAGE WILL PROVIDE THE PERMITS AND THE INITIAL STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR THE CONTRACTORS USE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR UPDATING THE SWPPP THROUGHOUT CONSTRUCTION AND MEETING LOCAL, STATE AND FEDERAL REQUIREMENTS.

ALL CONSTRUCTION MATERIALS, DUMPSTERS, DETACHED TRAILERS OR SIMILAR ITEMS ARE PROHIBITED ON PUBLIC STREETS OR WITHIN THE PUBLIC R.O.W.

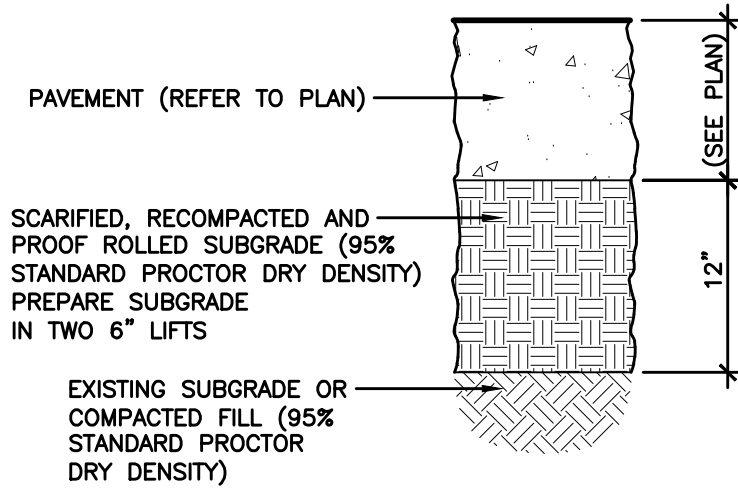
THE 2025 EDITION OF THE SDAS STANDARD SPECIFICATIONS, THE PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG) AND ALL CITY SUPPLEMENTALS, IF APPLICABLE, SHALL APPLY TO ALL WORK ON THIS PROJECT UNLESS OTHERWISE NOTED.

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

PRELIMINARY
NOT FOR CONSTRUCTION

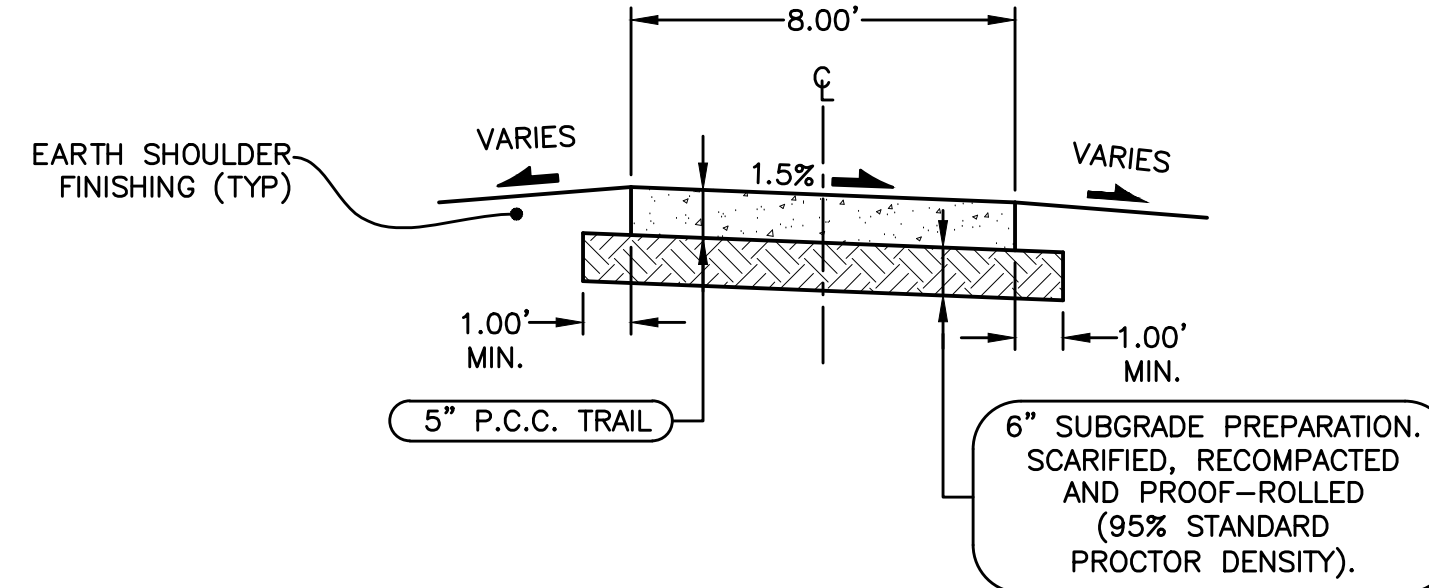
EMILY HARDING, P.E.
19972
DATE: _____
PROJECT NUMBER 19972
MY LICENSE RENEWAL DATE IS DECEMBER 31, 2025
PAGES OR SHEETS COVERED BY THIS SEAL: _____
ALL SHEETS

CDA
CIVIL DESIGN ADVANTAGE
4121 NW URBANDALE DRIVE, URBANDALE, IOWA 50322
PH: (515) 369-4400
PROJECT NO. 2405.385



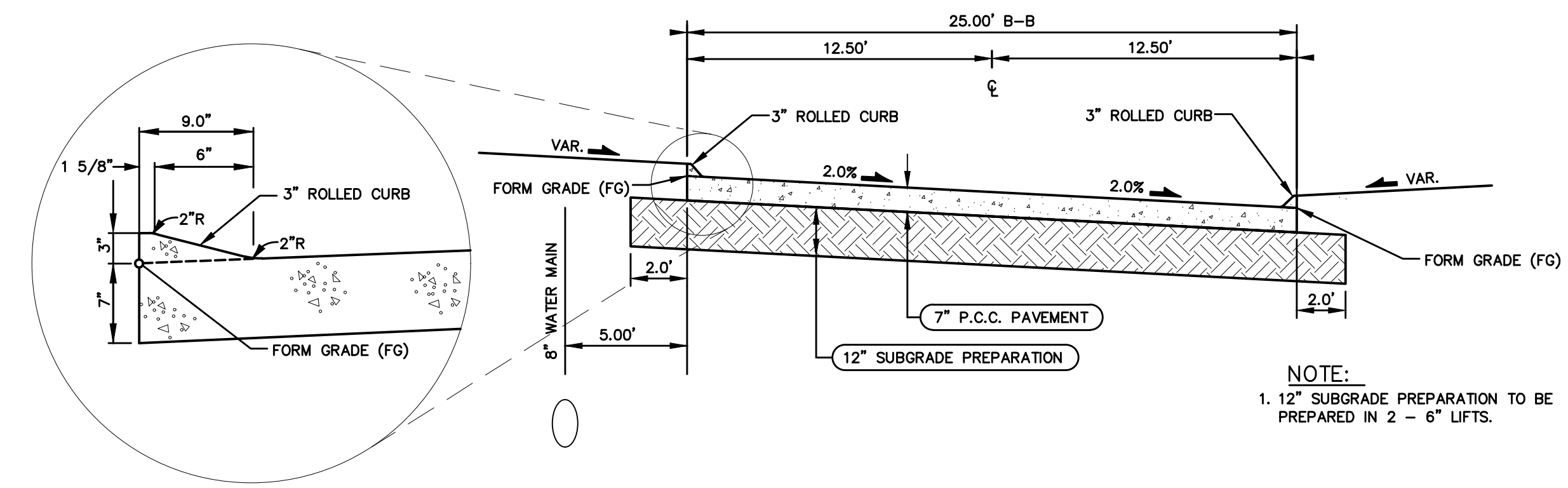
NOTE:
1. SUBGRADE PREPARATION SHALL EXTEND 24" BEYOND EDGE OF PAVING OR BACK OF CURB, EXCEPT WHEN ABUTTING EXISTING PAVEMENT.

12" SUBGRADE PREPARATION DETAIL
NOT TO SCALE



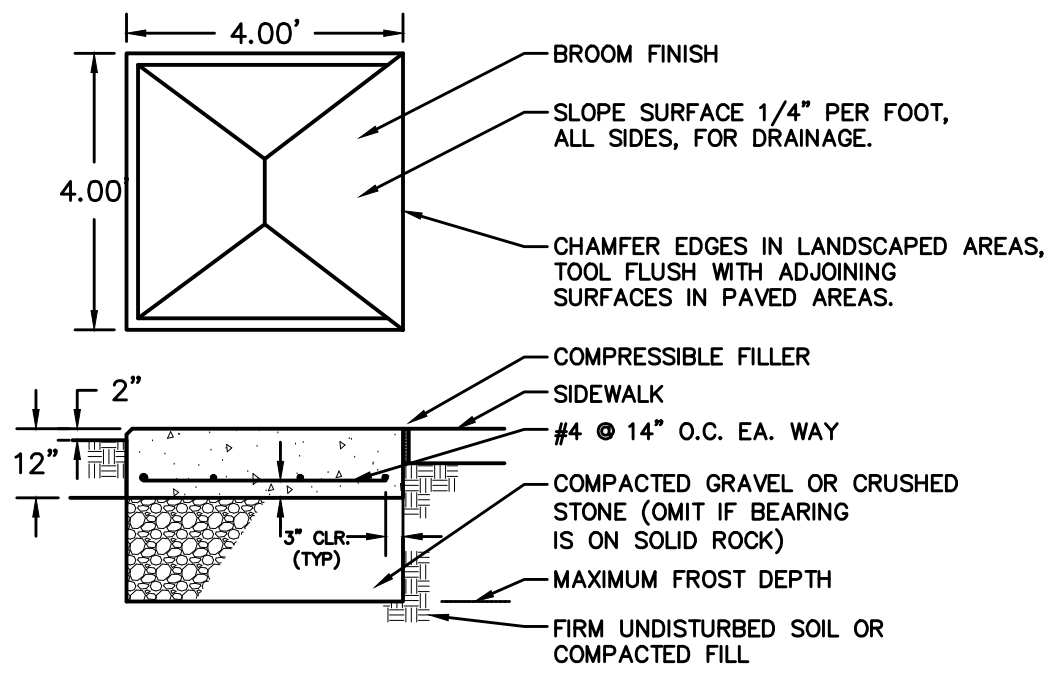
NOTES:
1. TYPICAL C JOINT SPACING IS 8'
2. REFER TO GRADING PLAN FOR TRAIL GRADES.

TYPICAL SECTION - 8" P.C.C. SHARED USE PATH
NOT TO SCALE



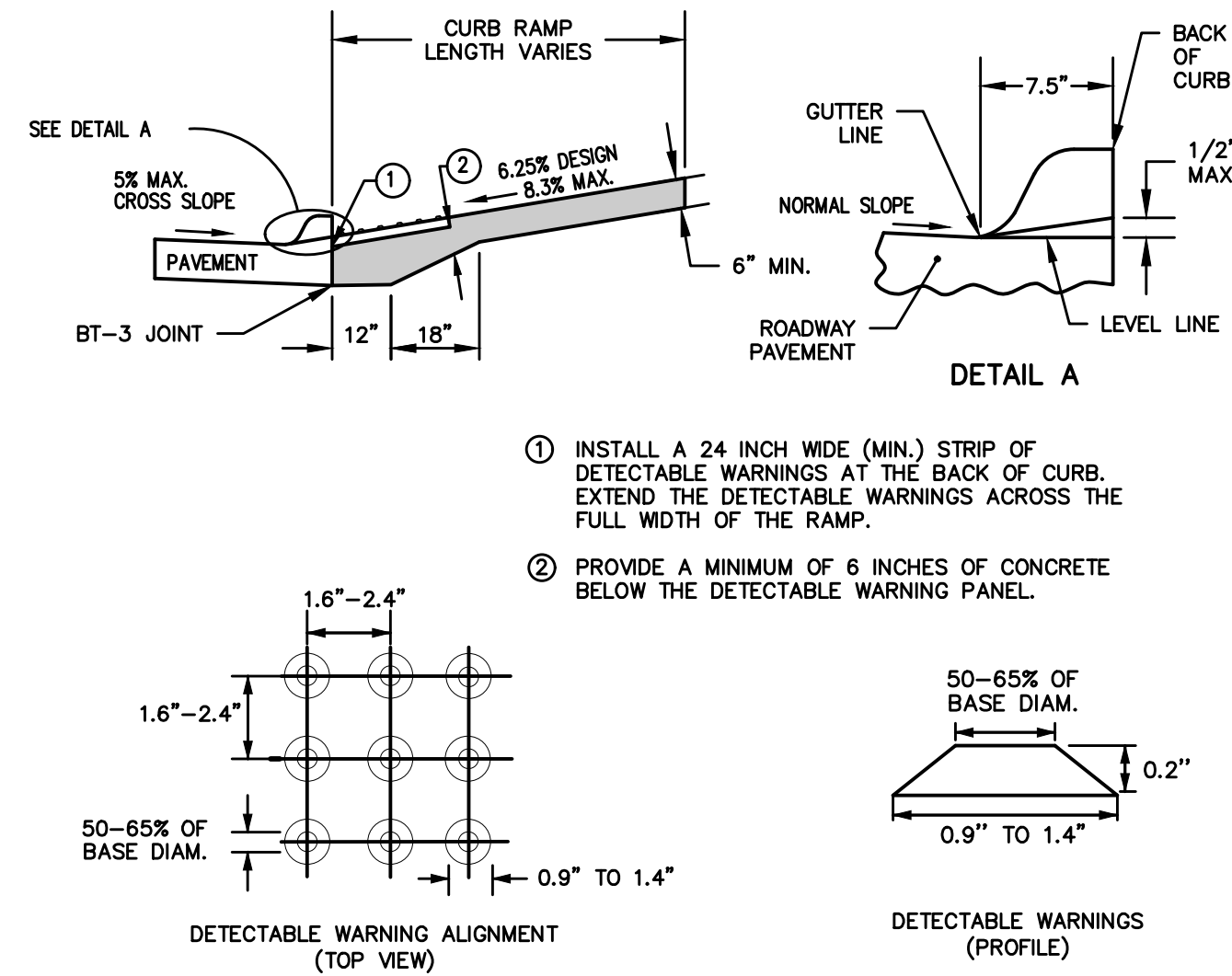
NOTE:
1. 12" SUBGRADE PREPARATION TO BE PREPARED IN 2 - 6" LIFTS.

TYPICAL SECTION - PRIVATE STREETS
NOT TO SCALE



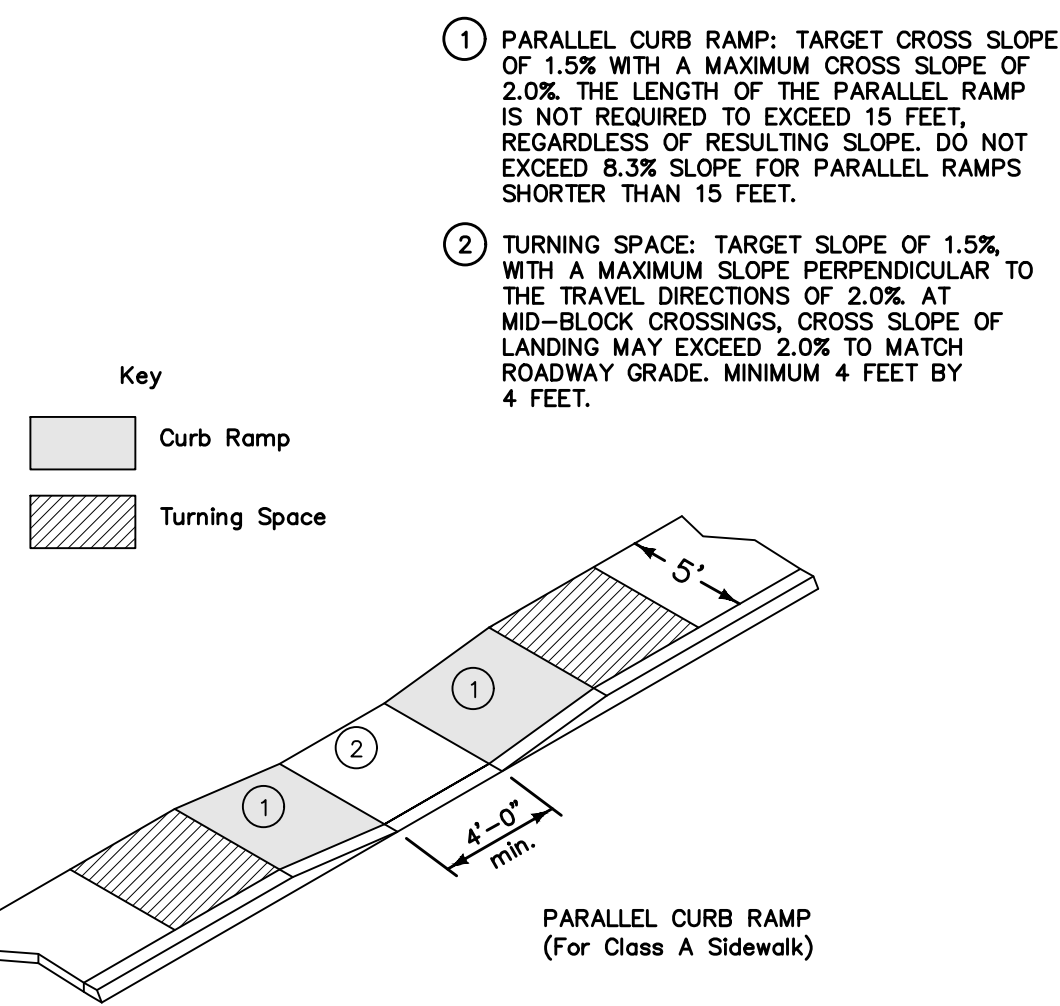
GENERAL NOTES:
1. CONCRETE: 3000 PSI @ 28 DAYS, 6% AIR ENTRAINMENT, 3" SLUMP, PLACE IN ACCORDANCE WITH ACI-301.
2. REINFORCING STEEL: ASTM A615, GRADE 60.
3. THIS BASE DETAIL CAN BE USED FOR NEIGHBORHOOD DELIVERY AND COLLECTION BOX UNITS (NDCBU) CLUSTER BOXES AND PARCEL LOCKERS WITH 4"x10" BOLT PATTERN.
4. REQUIRED EXPANSION BOLT CAPACITY, BASED ON CALCULATED DESIGN LOAD= 3100 LBS TENSION, 2000 LBS SHEAR.
5. MAILBOX PADS TO BE INSTALLED AT TIME OF SIDEWALK INSTALLATION.

CLUSTER MAILBOX PAD DETAIL
NOT TO SCALE



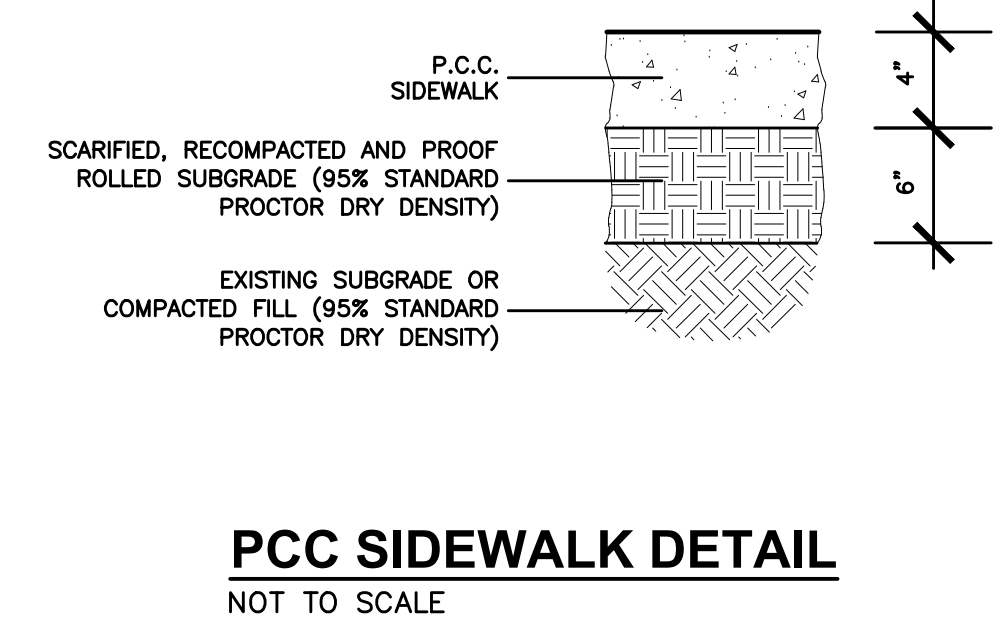
① INSTALL A 24 INCH WIDE (MIN.) STRIP OF DETECTABLE WARNINGS AT THE BACK OF CURB. EXTEND THE DETECTABLE WARNINGS ACROSS THE FULL WIDTH OF THE RAMP.
② PROVIDE A MINIMUM OF 6 INCHES OF CONCRETE BELOW THE DETECTABLE WARNING PANEL.

DETECTABLE WARNING STRIP DETAIL
NOT TO SCALE

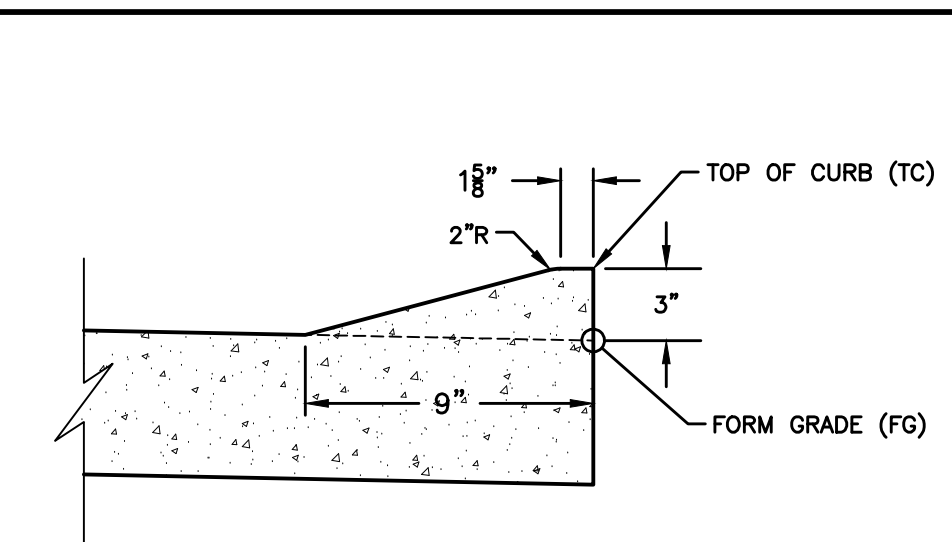


① PARALLEL CURB RAMP: TARGET CROSS SLOPE OF 1.5% WITH A MAXIMUM CROSS SLOPE OF 2.0%. THE LENGTH OF THE PARALLEL RAMP IS NOT REQUIRED TO EXCEED 15 FEET, REGARDLESS OF RESULTING SLOPE. DO NOT EXCEED 8.3% SLOPE FOR PARALLEL RAMP SHORTER THAN 15 FEET.
② TURNING SPACE: TARGET SLOPE OF 1.5% WITH A MAXIMUM SLOPE PERPENDICULAR TO THE TRAVEL DIRECTIONS OF 2.0%. AT MID-BLOCK CROSSINGS, CROSS SLOPE OF LANDING MAY EXCEED 2.0% TO MATCH ROADWAY GRADE. MINIMUM 4 FEET BY 4 FEET.

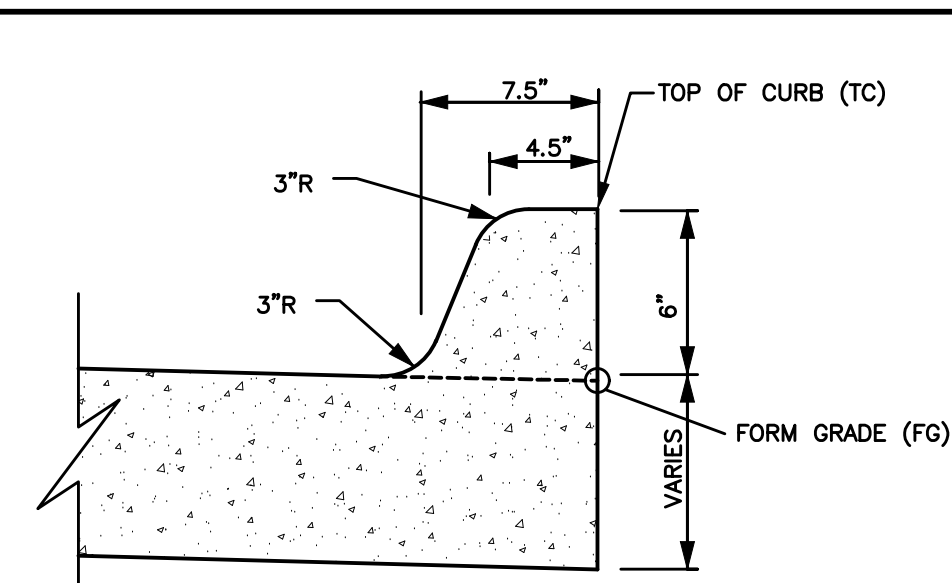
PARALLEL CURB RAMPS AT 3" ROLLED CURB
NOT TO SCALE



PCC SIDEWALK DETAIL
NOT TO SCALE



3" PCC ROLLED CURB
NOT TO SCALE



6" PCC STANDARD CURB
NOT TO SCALE

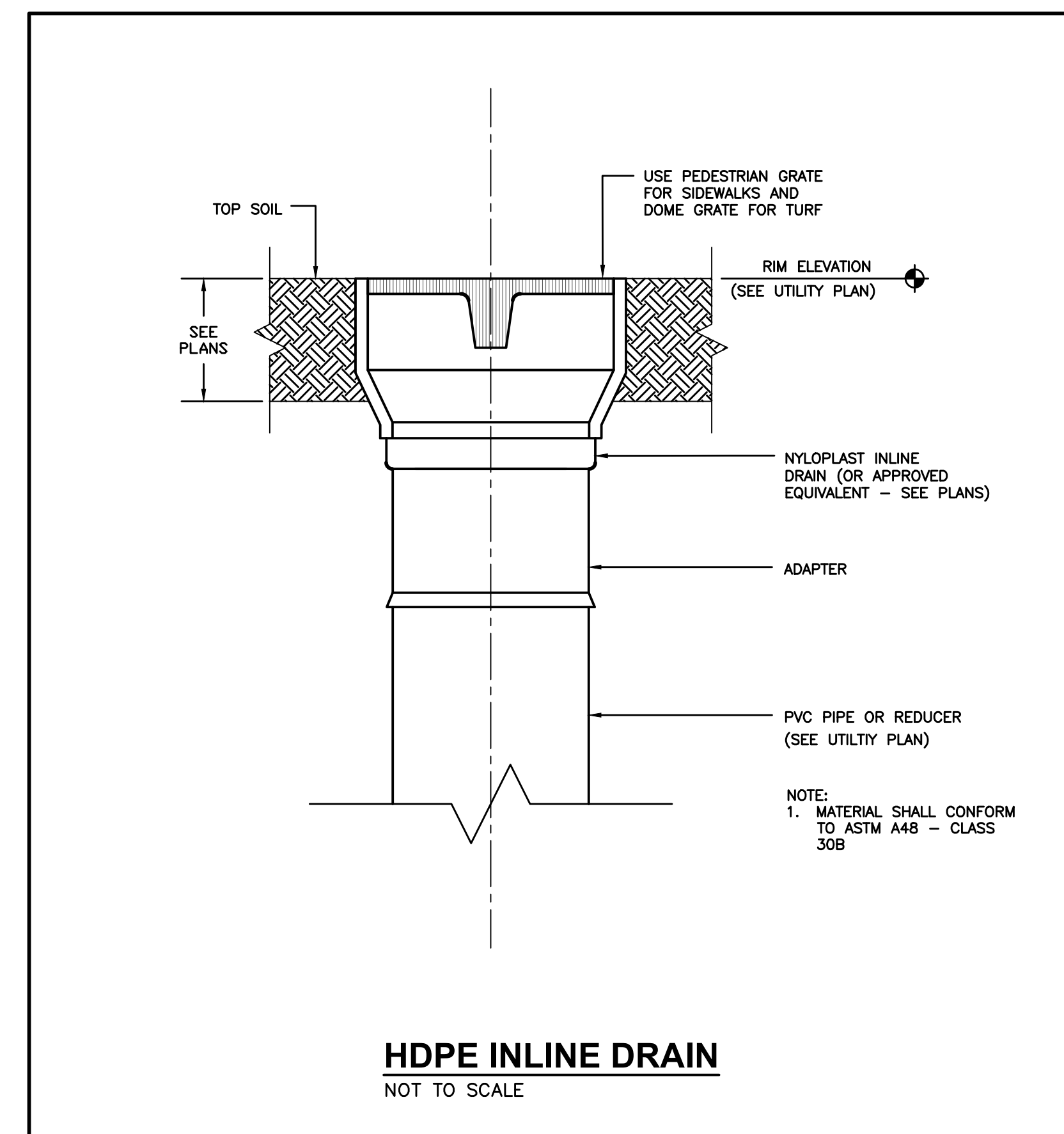
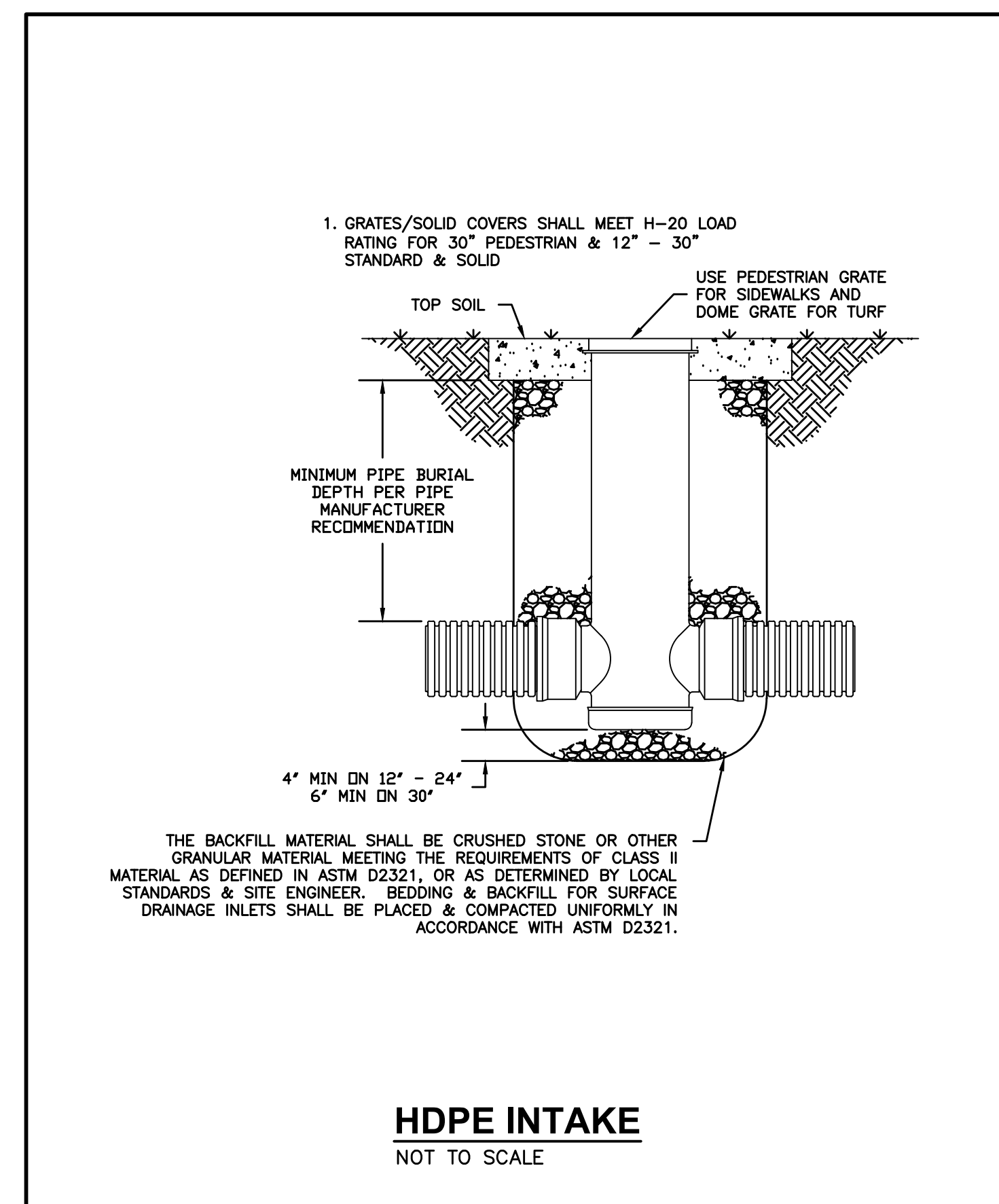
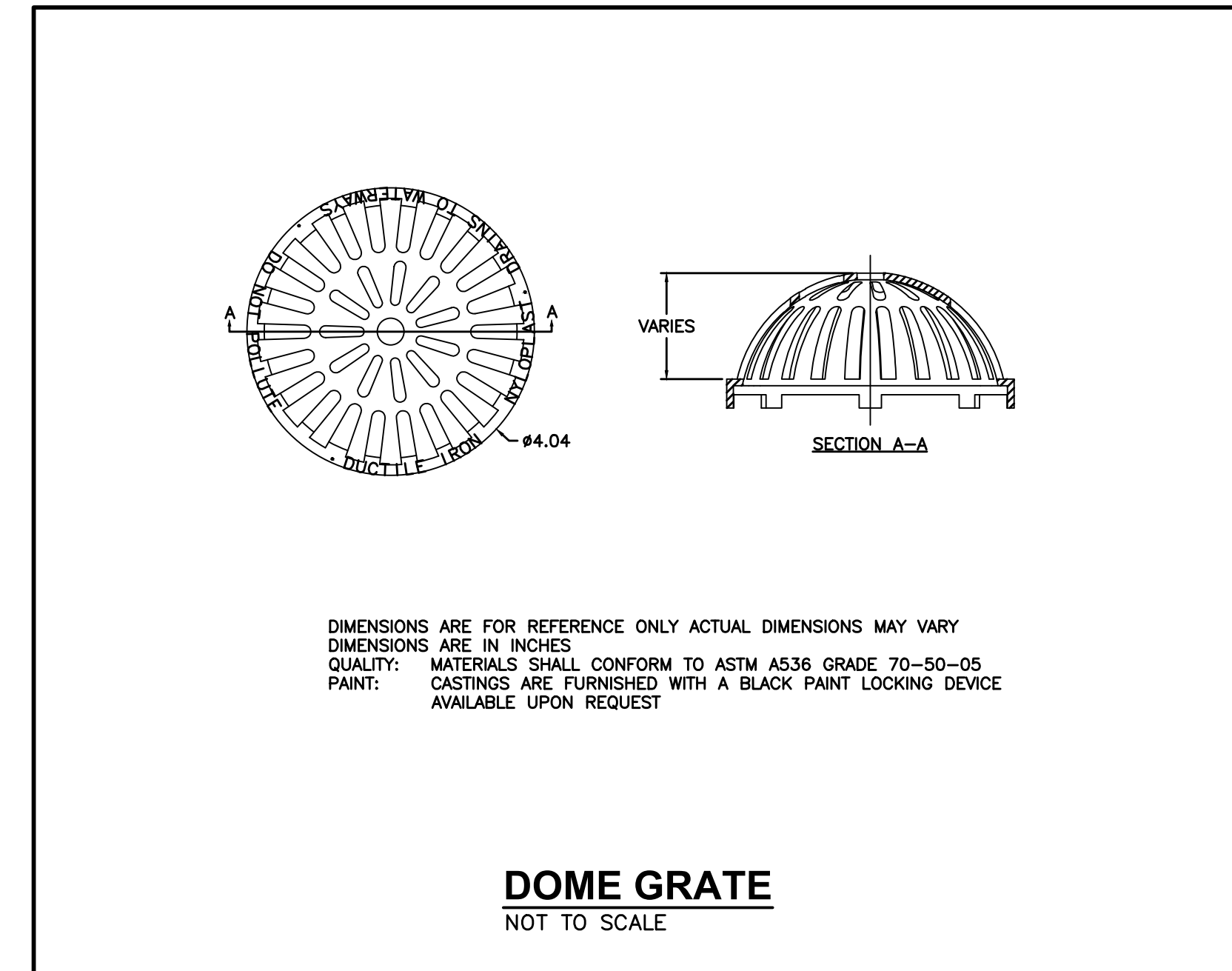
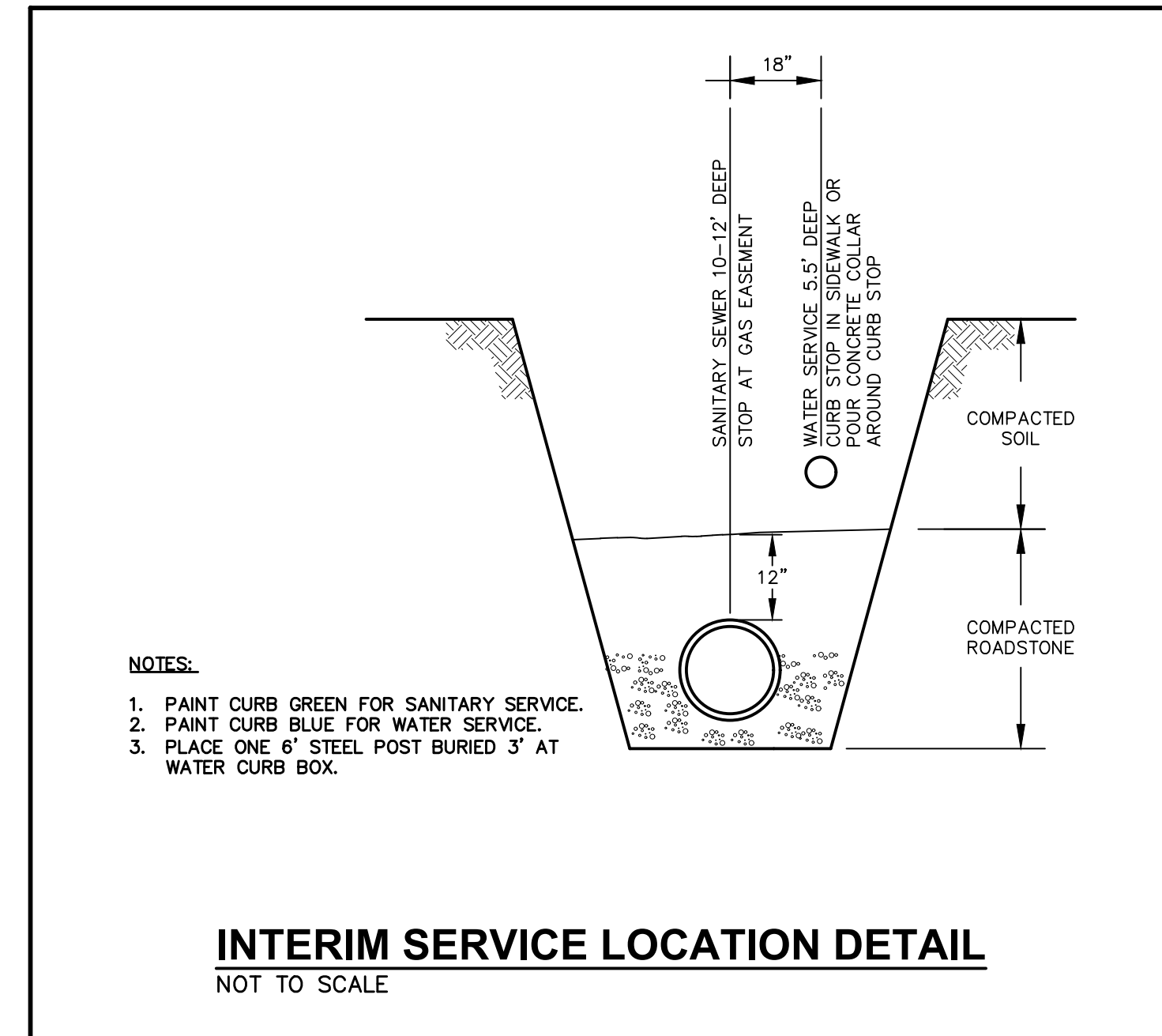
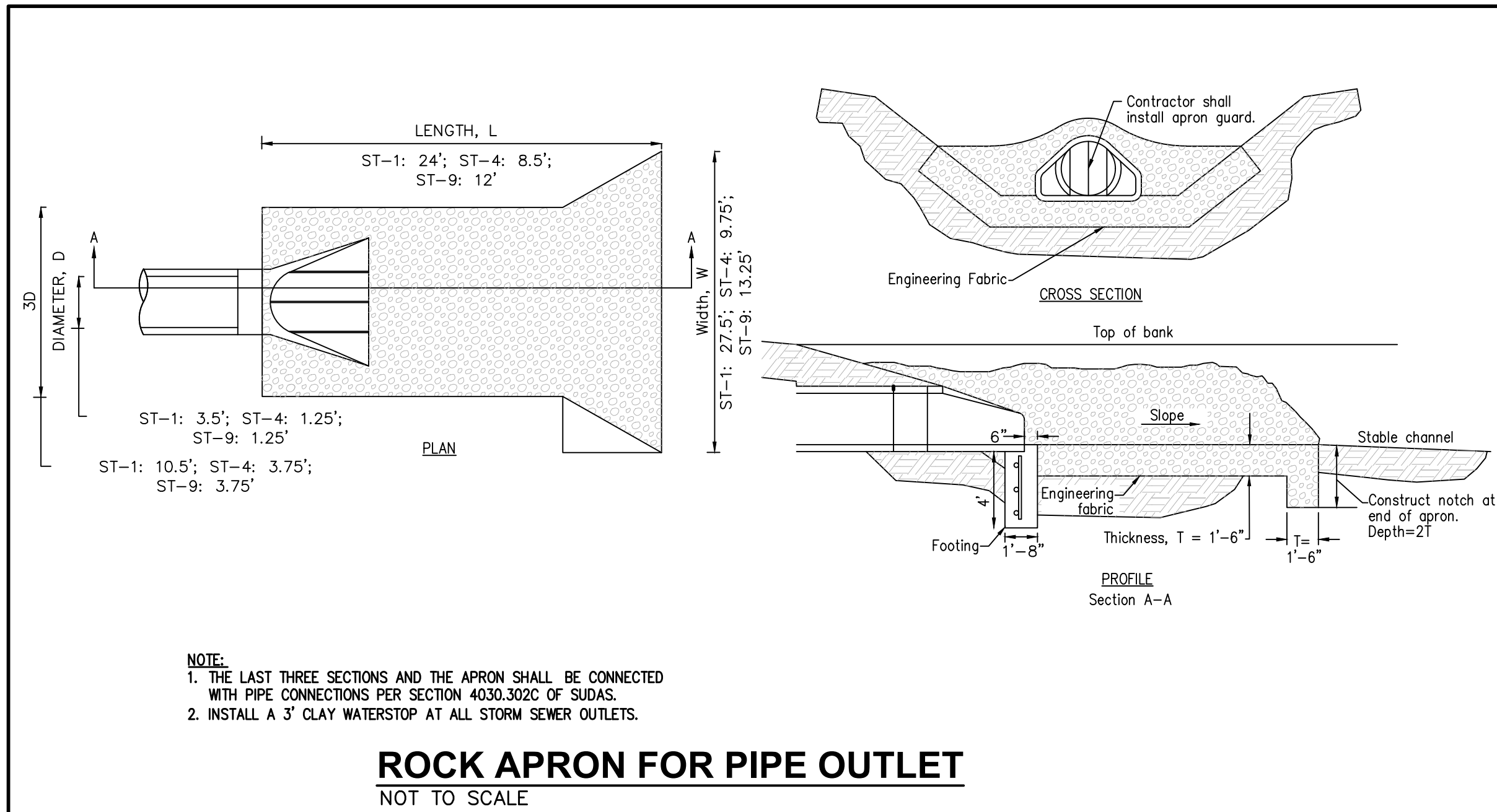
DATE	01/31/2025
REVISIONS	
FIRST SUBMITTAL	

4121 NW URBANDALE DRIVE
URBANDALE, IA 50322
PHONE: (515) 369-4400

TECH: ENH
ENGINEER: ENH

CIVIL DESIGN ADVANTAGE
CUMMING, IOWA

GREAT WESTERN COTTAGES
GENERAL NOTES AND DETAILS



FILE: H:\2024\2405385\DWG\2405385-SITE PLAN.DWG COMMENT: DATE PLOTTED: 1/29/2025 6:00 PM PLOTTED BY: ROSALIA STONEBERG DESIGNED BY: ENR

DATE	
REVISIONS	
FIRST SUBMITTAL	01/31/2025

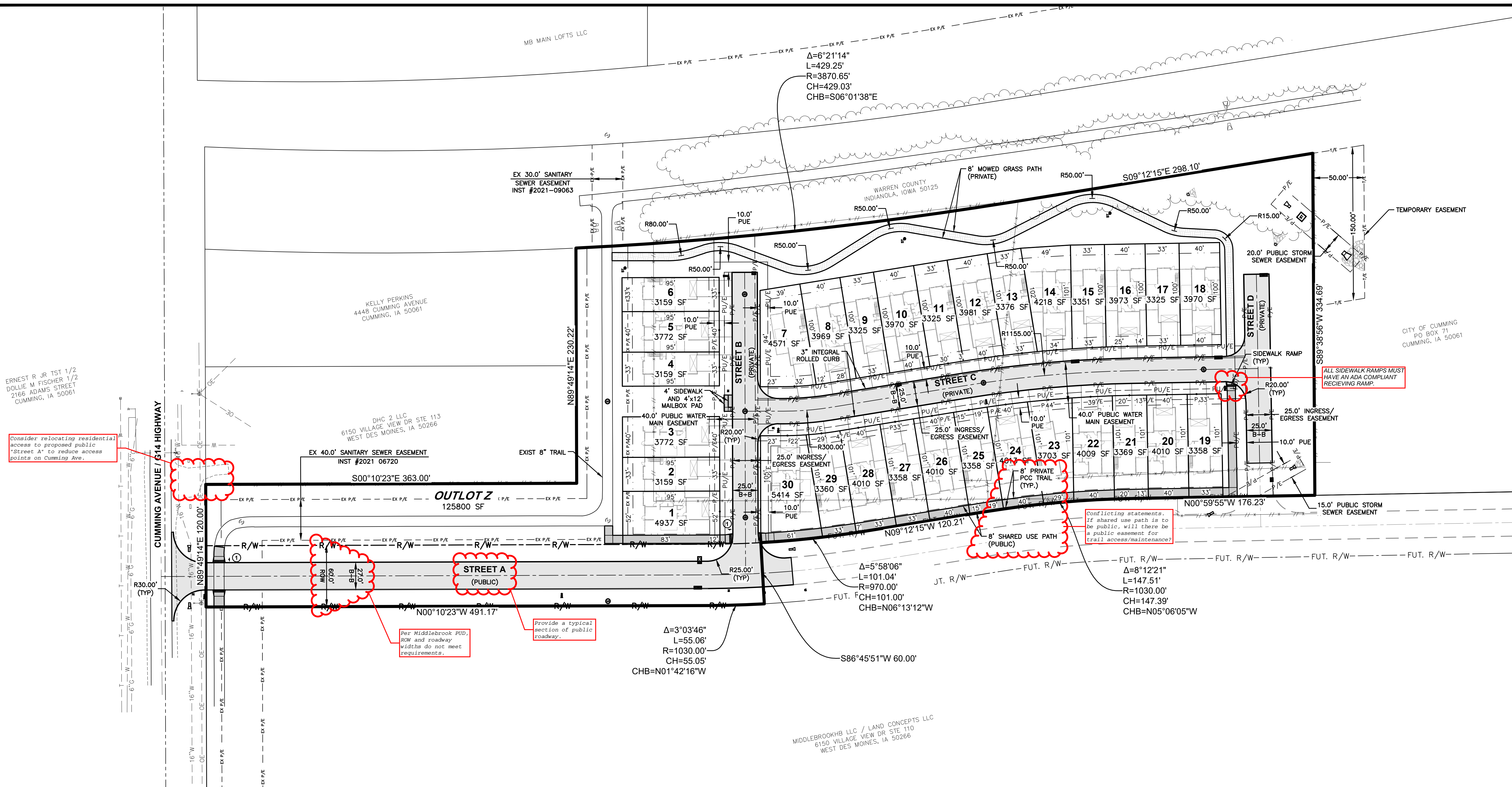
4121 NW URBANDALE DRIVE
 URBANDALE, IA 50322
 PHONE: (515) 369-4400

GSA CIVIL DESIGN ADVANTAGE
 CUMMING, IOWA

GREAT WESTERN COTTAGES
 GENERAL NOTES AND DETAILS

TECH: ENH
 ENGINEER: ENH

3/9
 2405.385



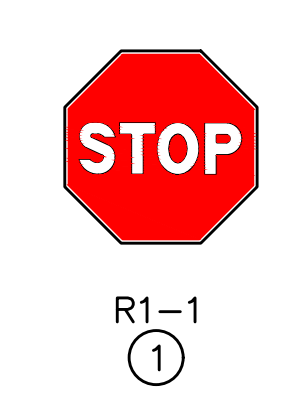
GENERAL NOTES

1. THE MOST RECENT EDITION OF THE SDAS STANDARD SPECIFICATIONS AND ALL CITY SUPPLEMENTALS, IF APPLICABLE, SHALL APPLY TO ALL WORK ON THIS PROJECT UNLESS OTHERWISE NOTED.
2. ALL WORK SHALL COMPLY WITH ADA ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES.
3. ALL WORK SHALL BE IN ACCORDANCE WITH OSHA CODES AND STANDARDS. NOTHING INDICATED ON THE DRAWINGS SHALL RELIEVE THE CONTRACTOR FROM COMPLYING WITH ANY APPROPRIATE SAFETY REGULATIONS.
4. PRIOR TO ANY WORK AT THE SITE, CONTRACTOR SHALL EXAMINE ANY APPLICABLE DRAWINGS AVAILABLE FROM THE OWNER, ENGINEER, AND/OR ARCHITECT, AND CONSULT WITH OWNER'S PERSONNEL AND UTILITY COMPANY REPRESENTATIVES. NO COMPENSATION WILL BE ALLOWED FOR DAMAGE FROM FAILURE TO COMPLY WITH THIS REQUIREMENT.
5. ONE WEEK PRIOR TO CONSTRUCTION WITHIN CITY R.O.W. OR ANY CONNECTION TO PUBLIC SEWERS CONTRACTOR SHALL NOTIFY THE CITY'S CONSTRUCTION DIVISION.
6. ALL CONSTRUCTION WITHIN PUBLIC R.O.W./ EASEMENTS, AND/OR ANY CONNECTION TO PUBLIC SEWERS AND STREETS, SHALL COMPLY WITH THE CITY'S STANDARDS.
7. ALL DIMENSIONS ARE TO BACK OF CURB, BUILDING FACE OR PROPERTY LINE UNLESS OTHERWISE NOTED.
8. CONTRACTOR TO VERIFY BUILDING DIMENSIONS WITH ARCHITECTURAL PLANS.
9. PLACE 3/4 INCH EXPANSION JOINT BETWEEN ALL P.C.C. PAVEMENT/SIDEWALKS AND BUILDING. PLACE 1/2 INCH EXPANSION JOINT BETWEEN SIDEWALKS AND P.C.C. PAVEMENT.
10. REMOVE ALL DEBRIS SPILLED INTO R.O.W. AT THE END OF EACH WORK DAY.
11. ALL PROPERTY PINS SHALL BE PROTECTED FROM GRADING OR OTHER OPERATIONS. ANY PINS DISTURBED SHALL BE RESET AT THE CONTRACTOR'S EXPENSE.
12. DO NOT STORE CONSTRUCTION MATERIALS AND EQUIPMENT IN THE RIGHT OF WAY.
13. THE CONTRACTOR SHALL NOT DISTURB DESIRABLE GRASS AREAS AND DESIRABLE TREES OUTSIDE THE CONSTRUCTION LIMITS. THE CONTRACTOR WILL NOT BE PERMITTED TO PARK OR SERVICE VEHICLES AND EQUIPMENT OR USE THESE AREAS FOR STORAGE OF MATERIALS. STORAGE, PARKING AND SERVICE AREAS WILL BE SUBJECT TO THE APPROVAL OF THE OWNER.
14. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY AREAS OF PAVEMENT OR SIDEWALK NOT TO BE REMOVED THAT IS DAMAGED DUE TO OPERATING EQUIPMENT ON THE PAVEMENT OR SIDEWALK.
15. THE CONTRACTOR MAY BE REQUIRED TO PLACE TEMPORARY WARNING DEVICES AND SAFETY FENCE AT CERTAIN LOCATIONS WHERE REPLACEMENT FEATURES ARE NOT INSTALLED THE SAME DAY, AS DIRECTED BY THE ENGINEER OR THE CITY.
16. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF WORK BETWEEN SUPPLIERS AND SUBCONTRACTORS INVOLVED IN THE PROJECT, INCLUDING STAGING OF CONSTRUCTION DETAILS.
17. CONCRETE REMOVAL FOR DRIVEWAY APPROACHES SHALL BE REMOVED TO THE NEAREST TRANSVERSE JOINT. CONTRACTOR SHALL VERIFY REMOVAL LIMITS WITH CITY'S CONSTRUCTION INSPECTOR PRIOR TO ANY CONCRETE REMOVAL.
18. ALL PERMITS AND ADDITIONAL FEES REQUIRED TO COMPLETE THE WORK SHALL BE INCLUDED IN THE CONTRACTOR BID.

TRAFFIC CONTROL NOTES

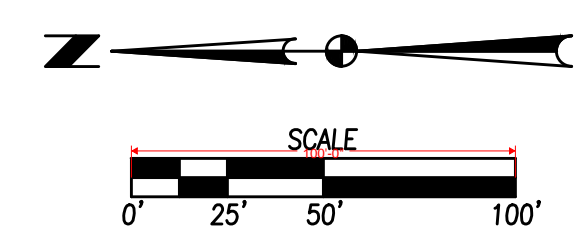
1. ALL TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2. PERMANENT SIGNING THAT CONVEYS A MESSAGE CONTRARY TO THE MESSAGE OF TEMPORARY SIGNING AND NOT APPLICABLE TO THE WORKING CONDITIONS SHALL BE COVERED BY THE CONTRACTOR WHEN DIRECTED BY THE CITY.
3. THE CONTRACTOR SHALL COORDINATE HIS TRAFFIC CONTROL WITH OTHER CONSTRUCTION PROJECTS IN THE AREA.
4. SIDEWALK CLOSED SIGNS REQUIRED FOR ALL SIDEWALK CLOSURES. SIGNAGE AND TEMPORARY PEDESTRIAN ACCESS ROUTE THROUGH CONSTRUCTION AREA SHALL MEET THE REQUIREMENTS OF PUBLIC RIGHT-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG), SECTION R205 AND IOWA DOT DESIGN MANUAL, CHAPTER 12A-4.
5. THE CONTRACTOR IS CAUTIONED NEITHER TO OBSTRUCT NOR REMOVE ANY EXISTING PAVEMENT, NOR TO DISTURB THE EXISTING TRAFFIC PATTERNS MORE THAN IS NECESSARY FOR THE PROPER EXECUTION OF THE WORK.
6. ALL APPLICABLE CITY PERMITS, INCLUDING BUT NOT LIMITED TO CLOSURE PERMITS, SHALL BE OBTAINED PRIOR TO ANY CONSTRUCTION WITHIN CITY R.O.W. OR LANE CLOSURES.
7. ALL SIGNING AND LANE STRIPING WILL NEED TO COMPLY WITH MUTCD. MAINTENANCE AND REPLACEMENT OF THE SIGNING AND STRIPING WILL BE THE RESPONSIBILITY OF THE APPLICANT.

SIGN LEGEND



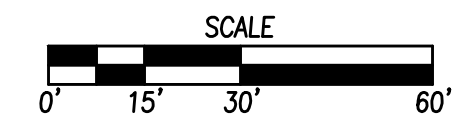
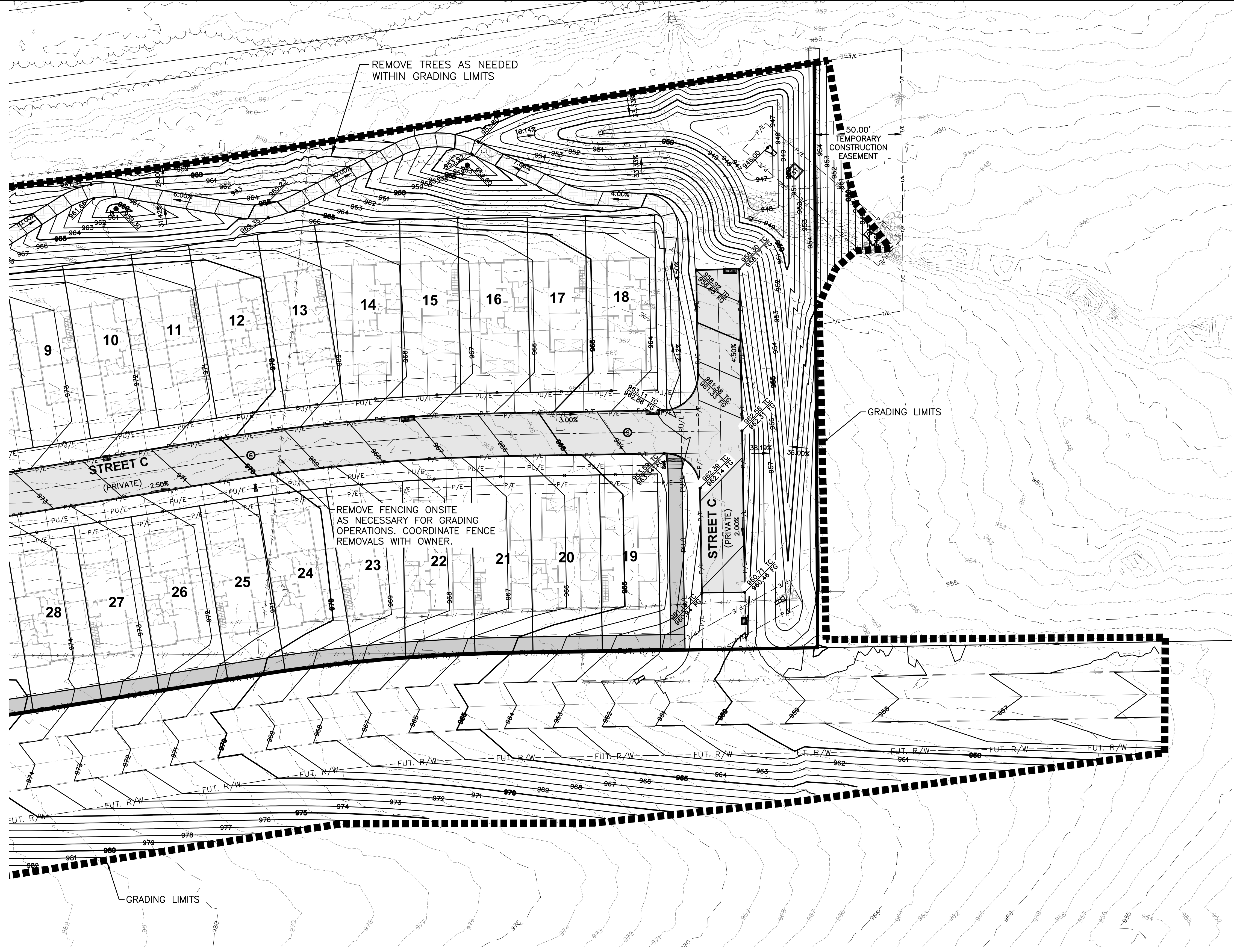
PAVEMENT THICKNESS

- | | |
|--------------------------------|-----------|
| 1. SIDEWALKS | 4" P.C.C. |
| 2. TRAILS | 5" P.C.C. |
| 3. DRIVEWAYS | 6" P.C.C. |
| 4. PRIVATE ROADS | 7" P.C.C. |
| 5. PRIVATE ROADS WITHIN R.O.W. | 7" P.C.C. |



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 PLOTTED BY: ROSA STONEBERG
 DATE: 1/30/2025 6:00 PM

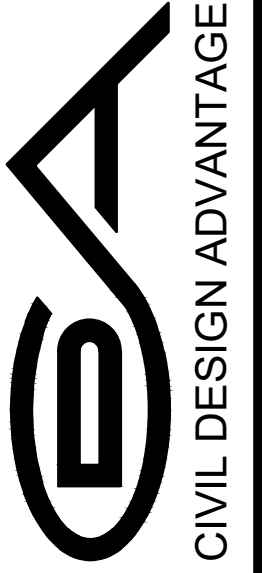
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DATE	REVISIONS	FIRST SUBMITTAL

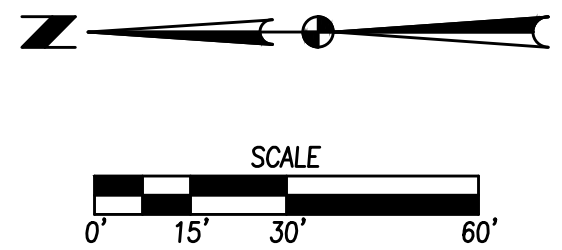
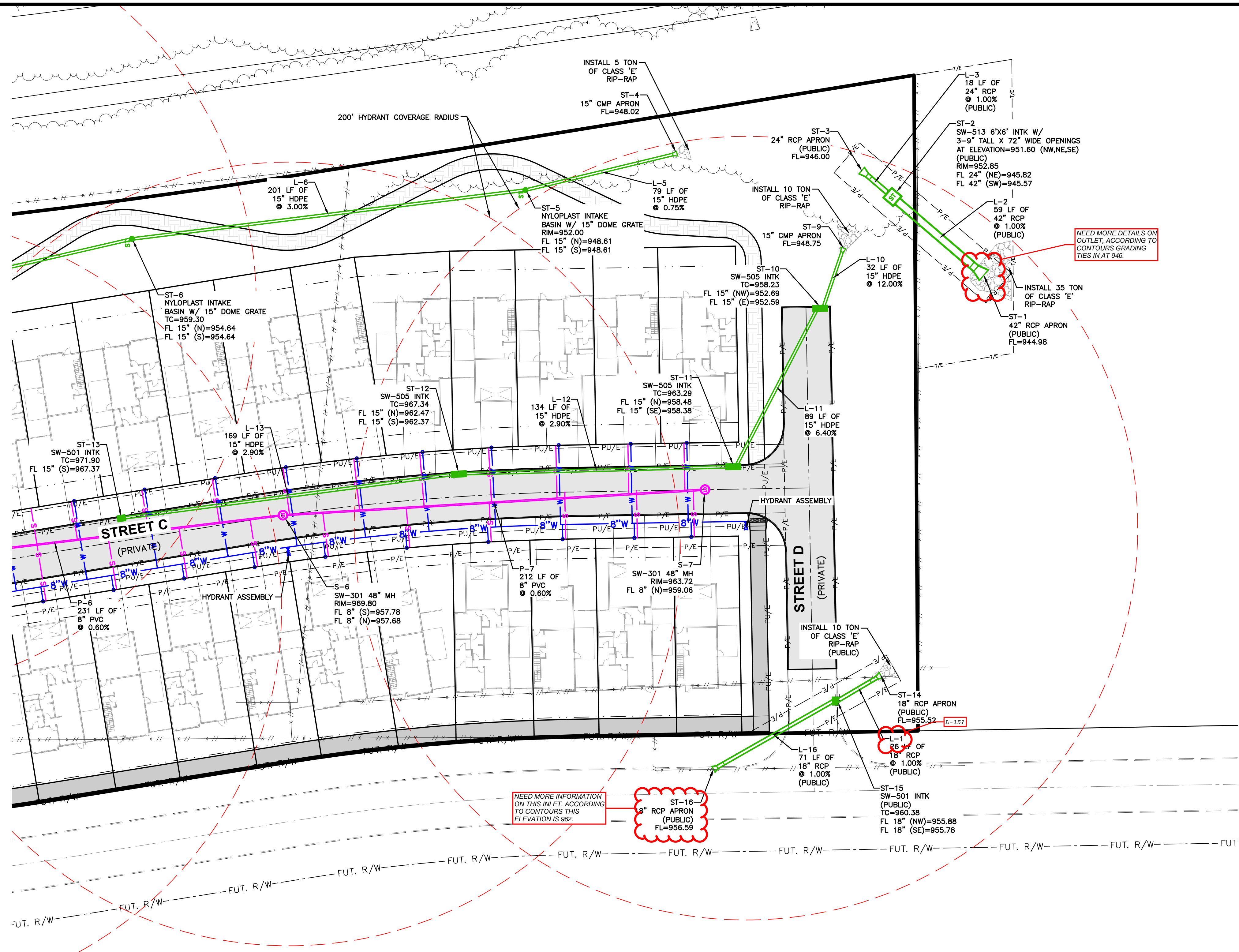
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URBANDALE, IA 50322
PHONE: (515) 369-4400

TECH: ENH
ENGINEER: ENH



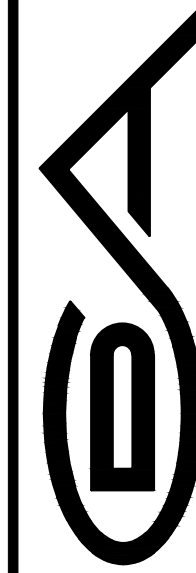
GREAT WESTERN COTTAGES

GRADING PLAN



DATE	REVISIONS	FIRST SUBMITTAL
		01/31/2025

4121 NW URBANDALE DRIVE
 URBANDALE, IA 50322
 PHONE: (515) 369-4400

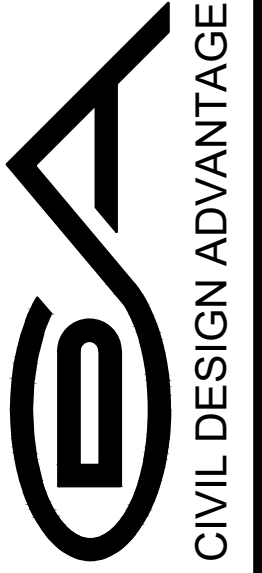


GREAT WESTERN COTTAGES
 UTILITY PLAN

ENGINEER: ENH
 TECH: ENH

DATE	
REVISIONS	
FIRST SUBMITTAL	01/31/2025

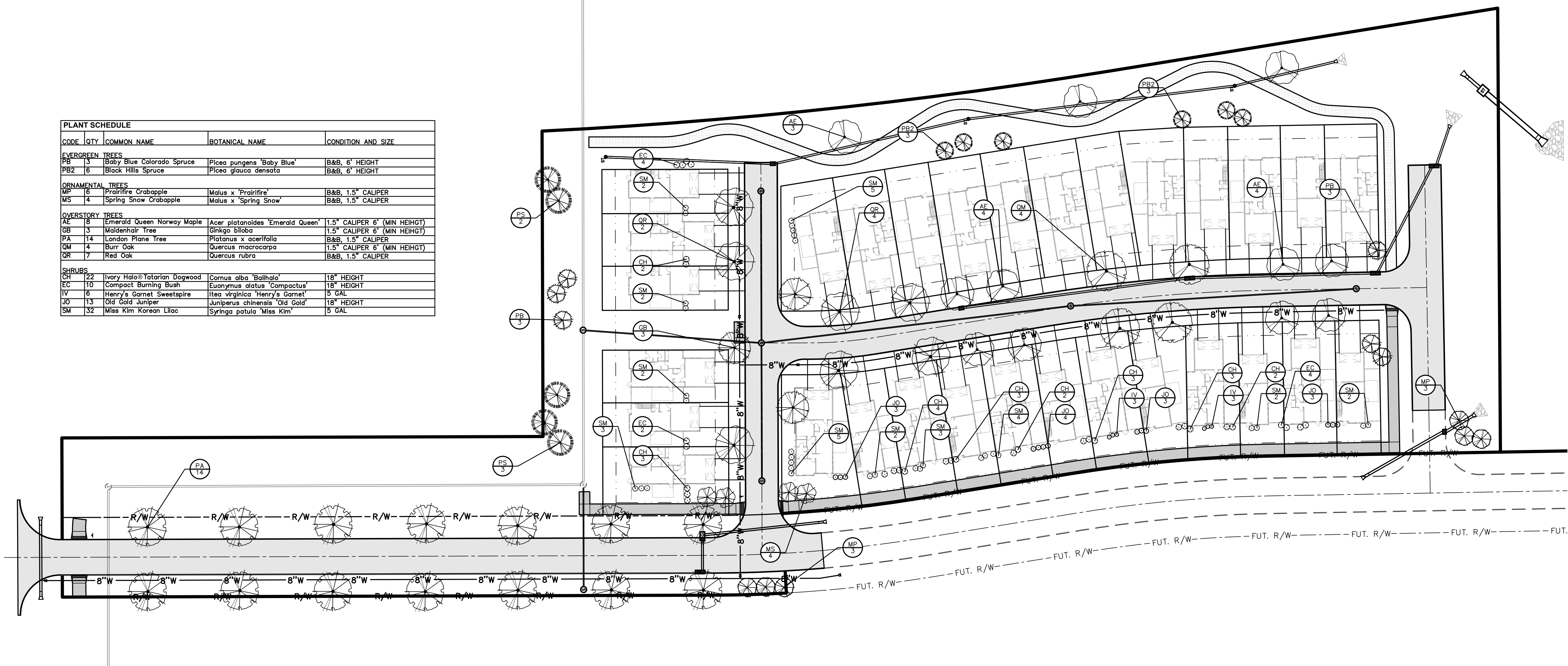
4121 NW URBANDALE DRIVE
 URBANDALE, IA 50322
 PHONE: (515) 369-4400



CIVIL DESIGN ADVANTAGE
 CUMMING, IOWA

GREAT WESTERN COTTAGES
LANDSCAPE PLAN

CODE	QTY	COMMON NAME	BOTANICAL NAME	CONDITION AND SIZE
EVERGREEN TREES				
PB	3	Baby Blue Colorado Spruce	<i>Picea pungens 'Baby Blue'</i>	B&B, 6" HEIGHT
PB2	6	Black Hills Spruce	<i>Picea glauca densata</i>	B&B, 6" HEIGHT
ORNAMENTAL TREES				
MP	6	Prairifire Crabapple	<i>Malus x 'Prairifire'</i>	B&B, 1.5" CALIPER
MS	4	Spring Snow Crabapple	<i>Malus x 'Spring Snow'</i>	B&B, 1.5" CALIPER
OVERSTORY TREES				
AE	8	Emerald Queen Norway Maple	<i>Acer platanoides 'Emerald Queen'</i>	1.5" CALIPER 6" (MIN HEIGHT)
GB	3	Maidenhair Tree	<i>Ginkgo biloba</i>	1.5" CALIPER 6" (MIN HEIGHT)
PA	14	London Plane Tree	<i>Platanus x acerifolia</i>	B&B, 1.5" CALIPER
QM	4	Burr Oak	<i>Quercus macrocarpa</i>	1.5" CALIPER 6" (MIN HEIGHT)
QR	7	Red Oak	<i>Quercus rubra</i>	B&B, 1.5" CALIPER
SHRUBS				
CH	22	Ivory Halo® Tatarian Dogwood	<i>Cornus alba 'Ballhala'</i>	18" HEIGHT
EC	10	Compact Burning Bush	<i>Euonymus alatus 'Compactus'</i>	18" HEIGHT
IV	6	Henry's Garnet Sweetspire	<i>Itea virginica 'Henry's Garnet'</i>	5 GAL
JO	13	Old Gold Juniper	<i>Juniperus chinensis 'Old Gold'</i>	18" HEIGHT
SM	32	Miss Kim Korean Lilac	<i>Syringa patula 'Miss Kim'</i>	5 GAL



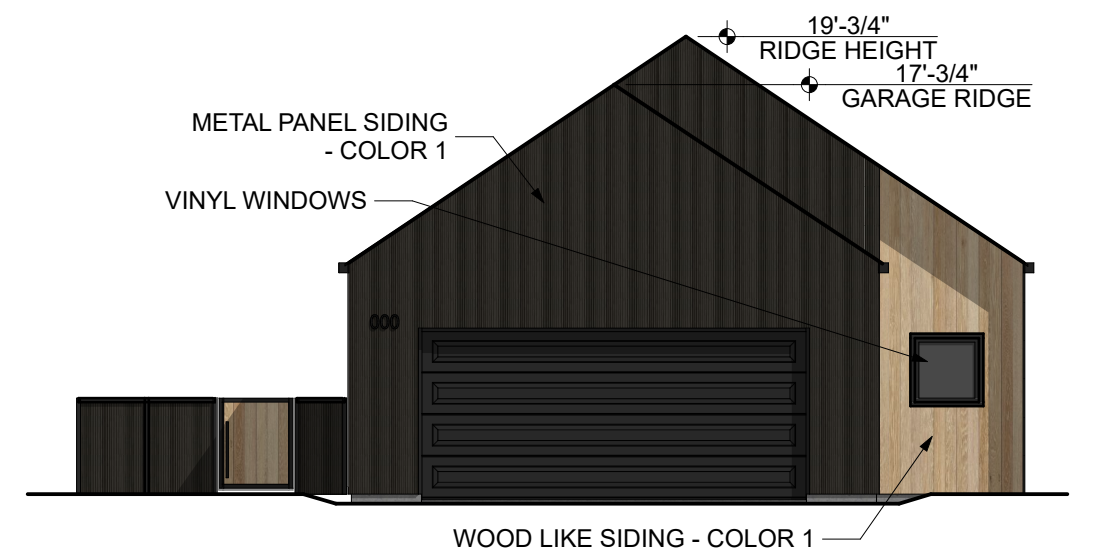
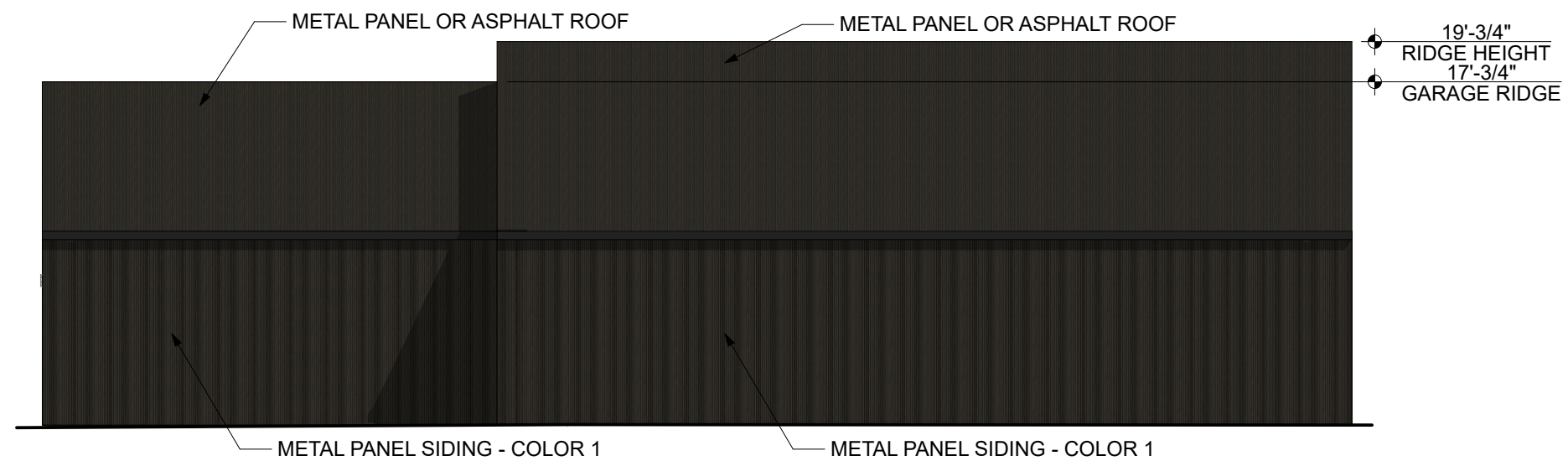
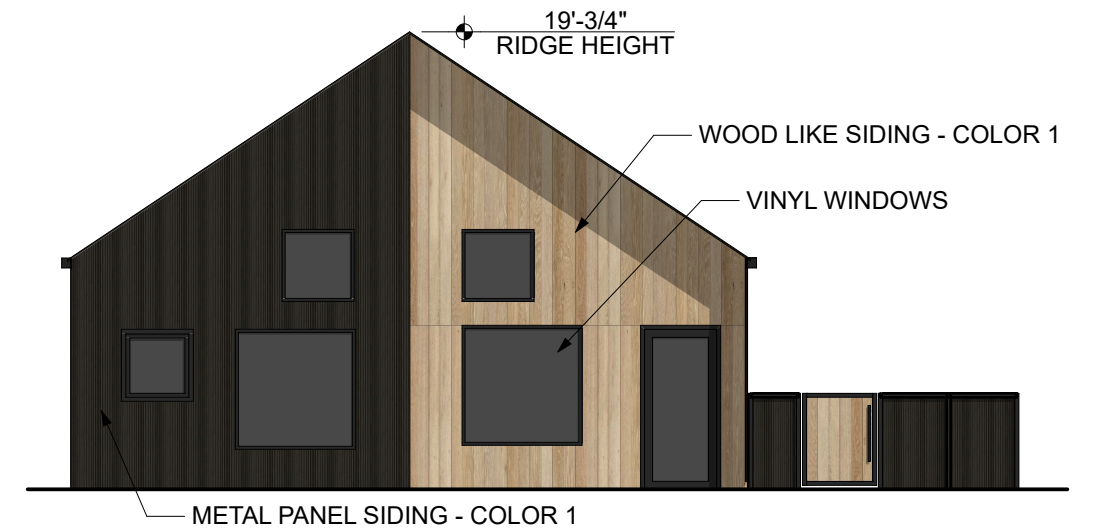
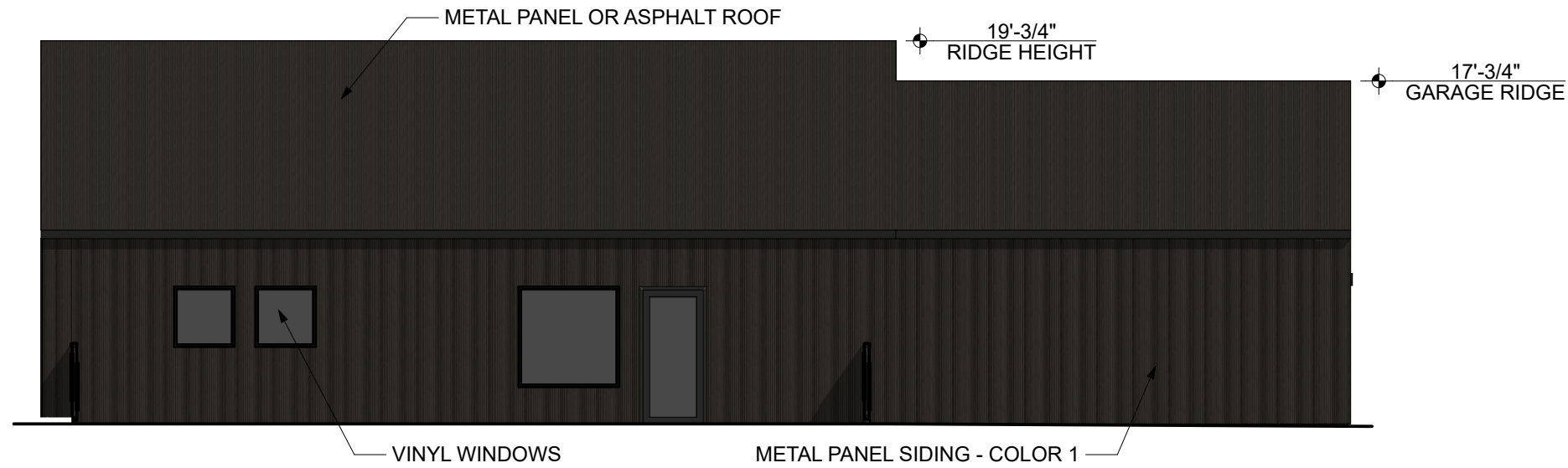
LANDSCAPE NOTES

1. LOCATE ALL UTILITIES BEFORE ANY PLANTING BEGINS.
2. THE 2025 EDITION OF THE SUDAS STANDARD SPECIFICATIONS, AND ALL CITY SUPPLEMENTALS, IF APPLICABLE, SHALL APPLY TO ALL WORK ON THIS PROJECT UNLESS OTHERWISE NOTED.
3. TYPE, SIZE, AND QUALITY OF PLANT MATERIAL SHALL CONFORM TO THE MOST CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK ANSI Z60.1
4. ALL PLANT MATERIAL SHALL BE HEALTHY SPECIMENS WITHOUT DEFORMITIES, VOIDS AND OPEN SPACES, WITH WELL DEVELOPED BRANCH AND ROOT SYSTEMS; TRUE TO HEIGHT, SHAPE AND CHARACTER OF GROWTH OF THE SPECIES OR VARIETY.
5. SEED OR SOD ALL DISTURBED AREAS AS DIRECTED BY OWNER.
6. BACKFILL TO TOP OF CURB. (MINUS 1 1/2" FOR SOD, IF REQ.)
7. WEED PREVENTER (PRE-EMERGENT) SHALL BE SPREAD OVER SOIL AFTER PLANTING AND BEFORE MULCHING IN ALL PLANTING BEDS PER MANUFACTURER'S RECOMMENDATIONS.
8. ALL PLANTING BEDS SHALL INCLUDE NON-LIVING PERMEABLE MATERIALS. SHREDDED HARDWOOD MULCH SHALL BE PLACED AROUND ALL TREES, SHRUBS AND IN ALL PLANTING BEDS TO A MINIMUM DEPTH OF 4", EXCEPT ALONG THE EAST AND NORTH SIDE OF THE BUILDING WHICH SHALL BE ROCK.
9. ALL EDGING SHALL BE 4" SPADE CUT EDGE.
10. PLANT QUANTITIES ARE SHOWN FOR INFORMATION ONLY, THE DRAWING SHALL PREVAIL IF ANY CONFLICTS ARISE.
11. ALL DEBRIS SPILLED IN THE PUBLIC R.O.W. SHALL BE PICKED UP BY THE CONTRACTOR AT THE END OF EACH WORK DAY.
12. CONTRACTOR SHALL WARRANTY ALL PLANT MATERIALS FOR A PERIOD OF ONE YEAR FROM DATE OF INSTALLATION.
13. ALL WIRE, TWINE AND BURLAP SHALL BE REMOVED FROM THE ROOTBALL OF STREET TREES PRIOR TO PLANTING.

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 COMMENT: ENH
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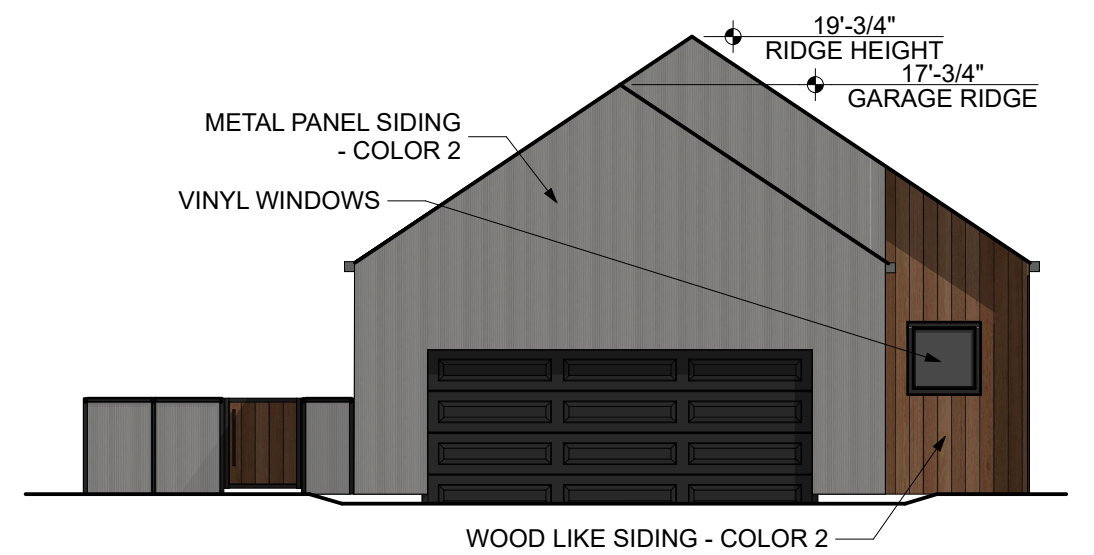
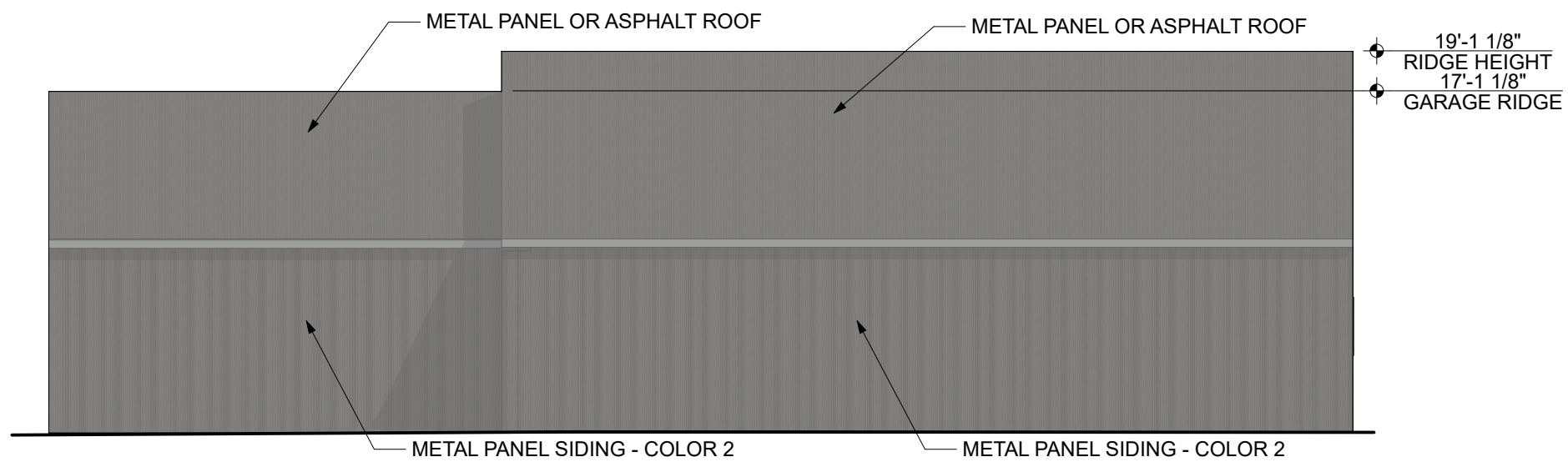
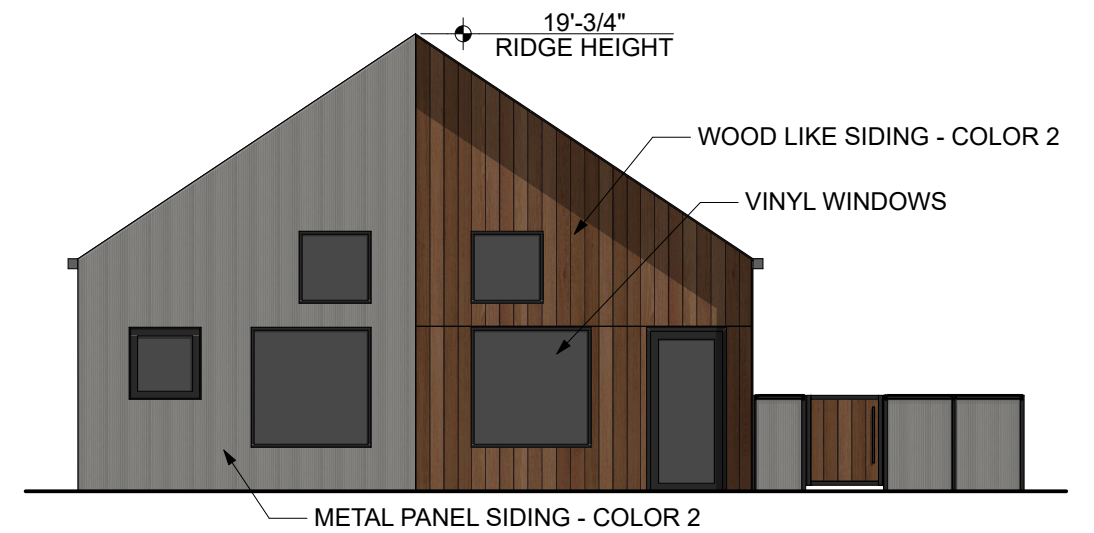
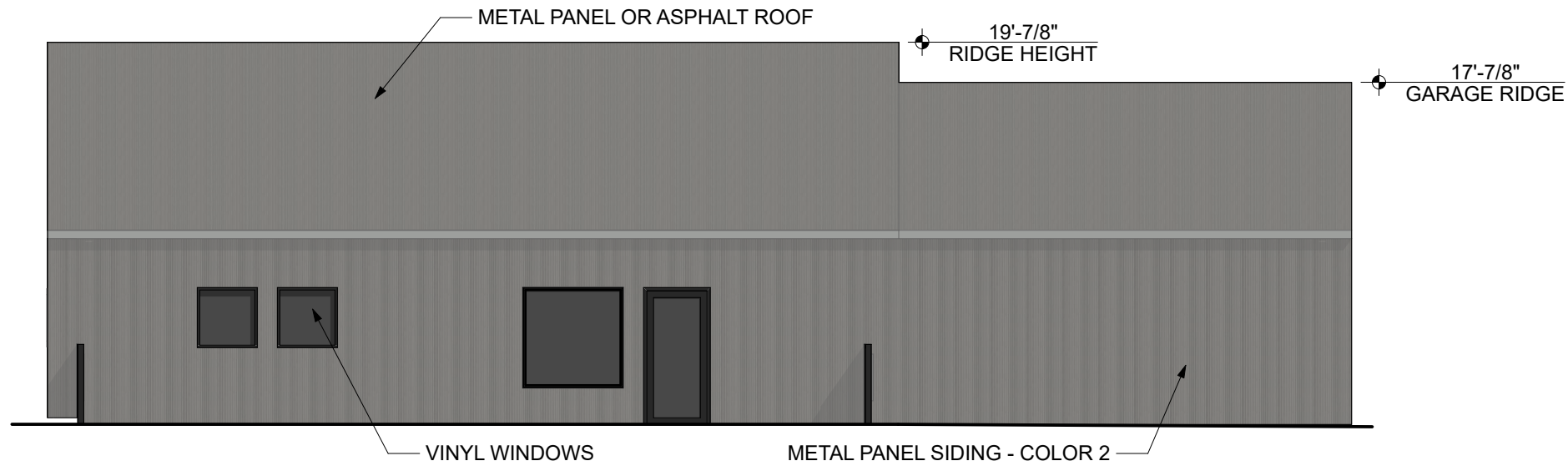
GREAT WESTERN COTTAGES - 1 STORY

Exterior Package 1



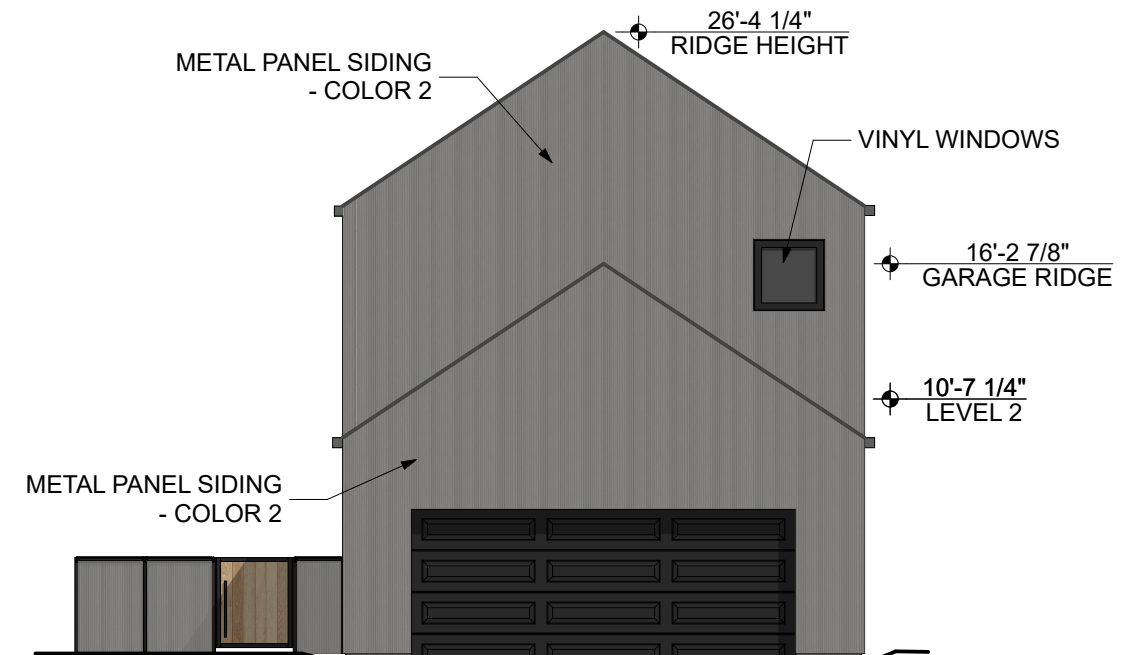
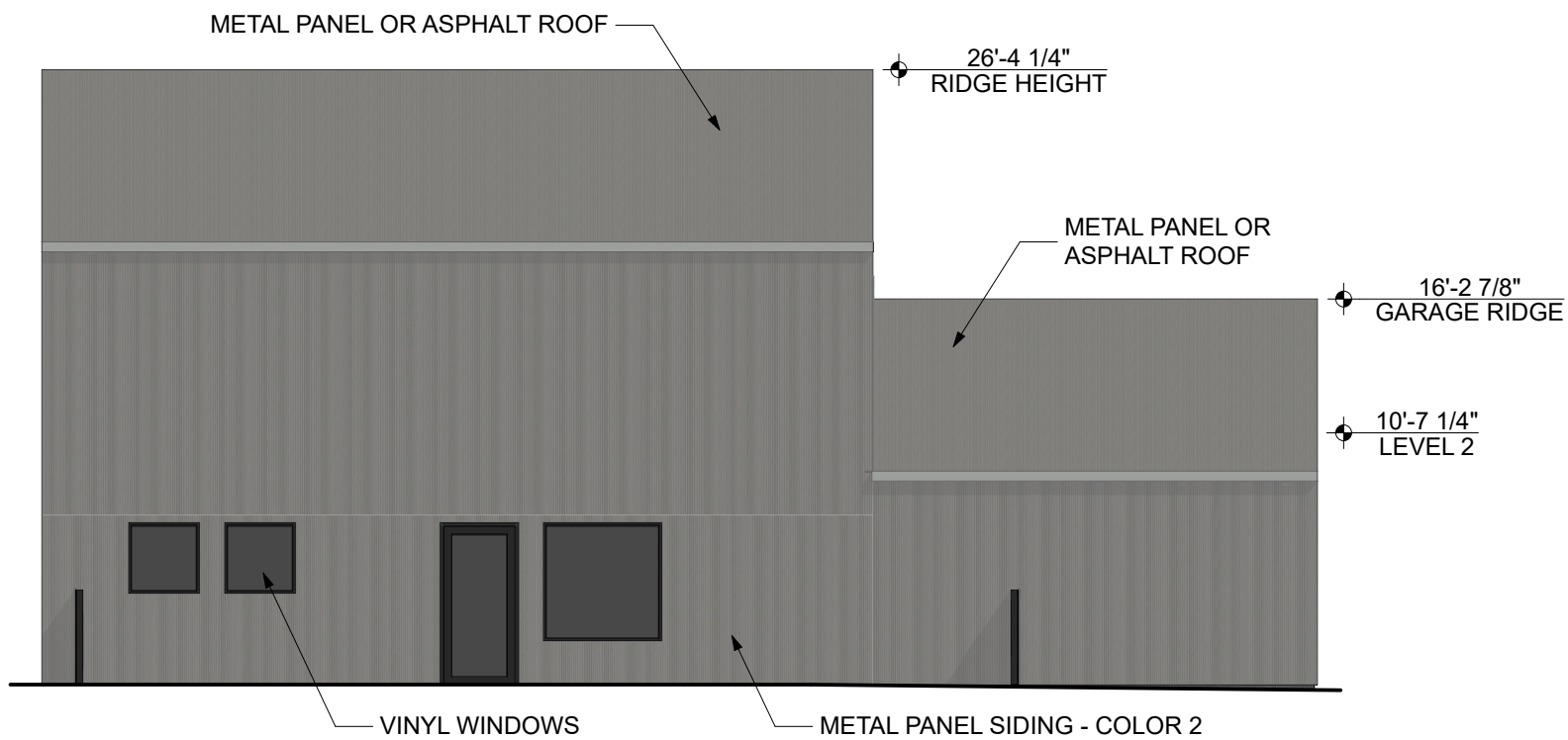
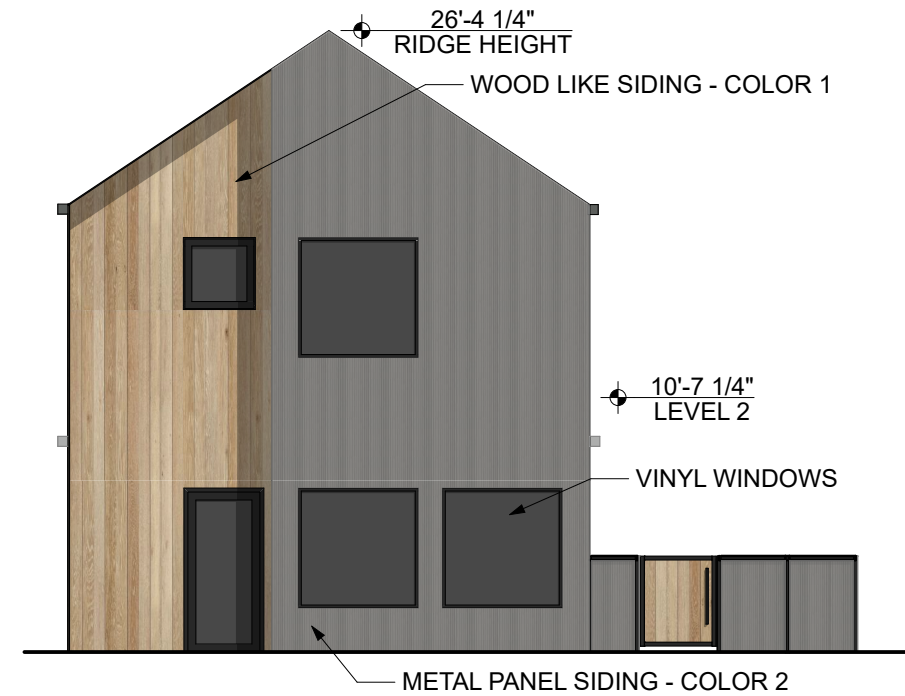
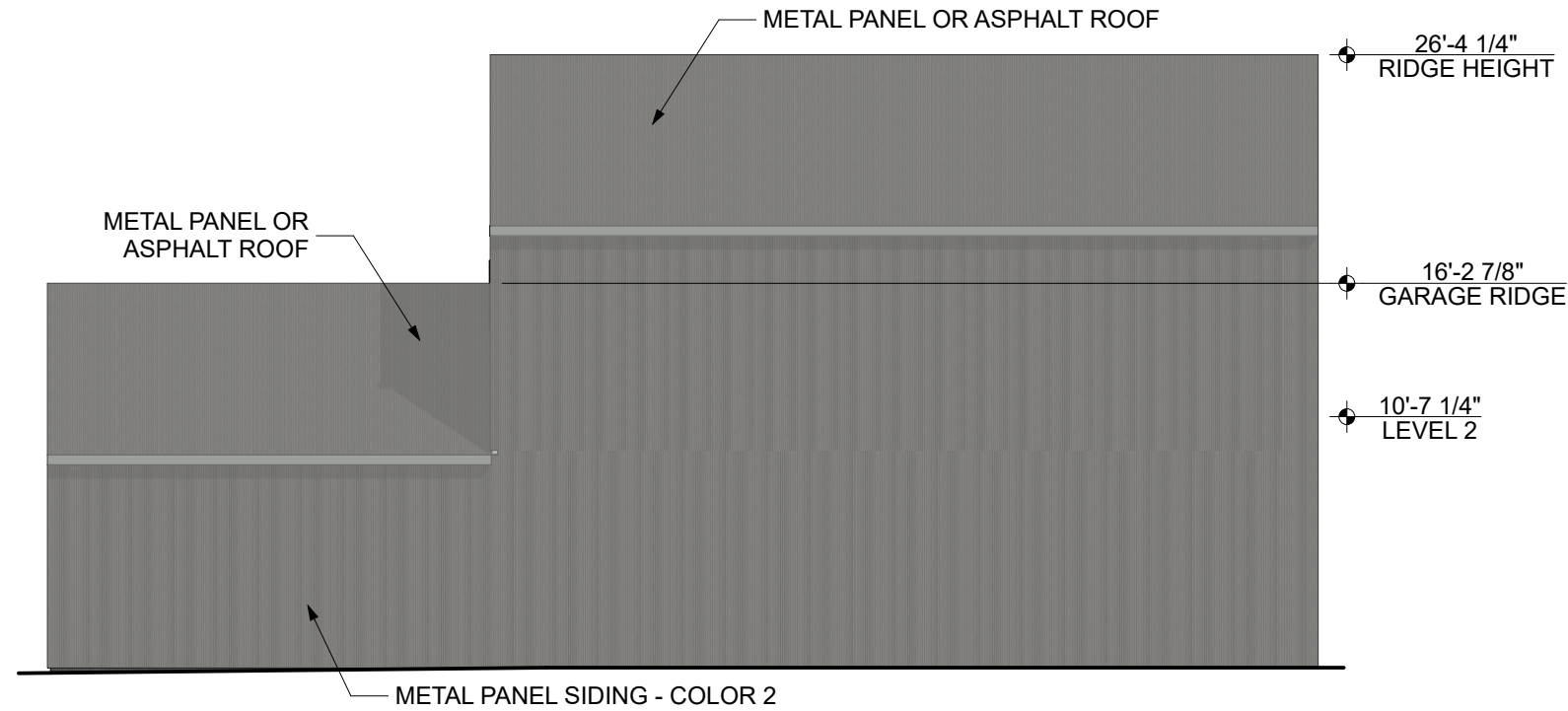
GREAT WESTERN COTTAGES - 1 STORY

Exterior Package 3



GREAT WESTERN COTTAGES - 2 STORY

Exterior Package 2



GREAT WESTERN COTTAGES - 2 STORY

Exterior Package 4

