ROTH PROFESSIONAL SOLUTIONS

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PROJECT STATUS MEMO
TID2 ROADS PROJECT

To: Village of Kronenwetter

From: Robert J. Roth, PE

Re: TID2 Roads South Project A
Kronenwetter Drive North Project B

Date: June 25, 2024

BACKGROUND. The Village of Kronenwetter had previously commissioned the design of the above-referenced roadways including local roads as follows:

TID2 Roads Project South
Kronenwetter Drive South (within TID2)
Sedona Court, Pinedale Lane, Wedgewood Drive, Oakdale Lane, Windwood Drive

Kronenwetter Drive North (Upper) From TID2 to Kowalske Road

This memo is a brief summary memo with the intention of advancing the design and planning process. Documents will change going forward.

CURRENT STATUS. RPS has completed the 50% design as scheduled, after receiving wetland delineations. This includes 50% design report and plans and estimate. However, a recent site meeting and discussion revealed roadway conditions that may alter the design, particularly in the roadway areas in TID2. Recent rainfall has made evident the lack of drainage along Pinedale, Wedgewood in particular. We are in the process of investigating this immediately since it lies within the TID2 area. We are focusing on the TID2 portion of the project over the Kronenwetter Drive North portion, but design information and plans have been developed congruently thusfar.

SCOPE. The following key design elements are included in TID2 portion of the project:

1. Kronenwetter Drive resurfacing from Field Road south to Village Limits
2. Bridge approach surface improvement (bridge is excluded)
3. 100% Sedona, Pinedale, Wedgewood and Windwood resurfacing and potential reconstruction with drainage layer
4. Kronenwetter Drive resurfacing from Maple Ridge north to TID2 limits

5. Exclude pedestrian trail
6. Address roadway design elements (culverts, shoulders, crown, vision, radii, etc.)
7. No ROW acquisition is necessary
8. Panel configuration to remain, with main panel opening to drive side

BUDGET & PRELIMINARY COST. Project costs for the roads within TID2 are TID eligible expenses. The pre-design estimate was $5,185,000 of which $153,000 was engineering/surveying. At that time, $2,785,000 was for the Kronenwetter Drive portion within TID2, and $2,400,000 was for the local roads within the TID2.

Project costs for the Kronenwetter Drive North (Upper) portion would not be TID eligible and would come from the general fund in a future year's allocation if approved. The pre-design estimate was $2,900,000 of which $81,000 was engineering/surveying.

Project cost estimates through the 50% design stage have been prepared and will be attached. These estimates are subject to change as we finalize reconstruction versus reconditioning road segments. As mentioned above, we expect to confirm drainage and related base issues for inclusion in subsequent documents.

	Kronenwetter Drive TID2 Portion Phase I	TID2 Local Roads Phase I	Kronenwetter Drive North Phase 2
Budget Project Cost Estimate	$2,785,000	$2,400,000	$2,900,000
50% Design Construction Cost Estimate (subject to change)	$2,300,000	$2,100,000	$2,200,000

NEXT STEPS. We will release the public involvement plan as the next step, followed by the 90% bid documents stage (plans, estimate, report), set up a public involvement meeting, initiate permitting and pursue finalization of the construction bid package.

Please contact me with any questions or if additional information is needed.

Sincerely,

ROTH PROFESSIONAL SOLUTIONS

Robert J. Roth, PE
Project Engineer

ENGINEER'S PRELIMINARY COST ESTIMATE

Wednesday, November 29, 2023

Village of Kronenwetter - Sedona Ct., Pinedale Lane, Windwood Road, Oakdale Lane, & Wedgewood Dr.

22' wide pavement

OVERALL PROJECT

STREET RECONSTRUCTION & DRAINAGE INFRASTRUCTURE

	#	Item	Item Quantity	Units	Unit Cost	Total Cost
Project Development Costs	a	Comprehensive Mapping & Surveying (See Kronenwetter Drive)	----	---	----	----
	b	Planning, Coordination, Engineering & Administration (See Kronenwetter Drive)	----	---	----	----
	c	Legal Services To-Date	----	---	----	----
	d	Title Services To-Date	----	---	----	----
	e	Land Acquisition (Prof. Fees & Land Rights) Estimate	----	---	----	----
	T1	**Subtotal Project Development Costs**				**$0**
Roadway Construction Costs	1	Erosion Control Items & Maintenance During Construction	1	Lump Sum	$10,000.00	$10,000
	2	Unclassified excavation for Roadway	8,100	CY	$15.00	$121,500
	3	Remove Asphalt Pavement, Main Roadway	23,223	SY	$5.00	$116,115
	4	Remove Asphalt Pavement, Side streets & Driveways	160	SY	$5.00	$800
	5	Remove existing culverts	5	EA	$500.00	$2,500
	6	Sawcut Asphalt Pavement	890	LF	$1.50	$1,335
	7	Topsoil removal	4,000	SY	$2.50	$10,000
	8	Unclassified Excavation for Driveways	328	CY	$10.00	$3,280
	9	Medium Rip Rap over Fabric for Storm Sewer Endwalls	150	CY	$75.00	$11,250
	10	3/4" Crushed Aggregate for Driveway as Needed	328	CY	$50.00	$16,400
	11	18" Breaker Run (50%)	4423.5	CY	$15.00	$66,353
	12	Geogrid (50%)	11611.5	SY	$3.00	$34,835
	13	Open Graded Drainage Layer (Assume 50%)	8000	SY	$20.00	$160,000
	14	1.5" Crushed Aggregate Base Course, 8" Compacted-Road & Intersections	23223	SY	$8.00	$185,784
	15	HMA Asphalt Pavement 2" Surface Course-Intersections	23223	SY	$15.00	$348,345
	16	HMA Asphalt Pavement 2" Binder Course-Intersections	23223	SY	$12.00	$278,676
	17	Hot Tar Butt Joint Sealer	1440	LF	$5.00	$7,200
	18	3/4" Crushed Aggregate for Road Shoulder, 2' wide x 6" thick	737	CY	$50.00	$36,850
	19	HMA Asphalt-2" for path & driveways	986	SY	$20.00	$19,720
	20	Topsoil, Seed & E-Mat all Disturbed areas,	11100	SY	$2.75	$30,525
	21	Install Base, Pole, & Fixture for Street Lights (Light Type Assumed)	40	EA	$4,500.00	$180,000
	22	Electrical in Conduit for Street Lights	40	LS	$ 1,500.00	$60,000
	23	Install 12" CMP & endwalls - Avg 40 LF	5	EA	$ 1,500.00	$7,500
	24	Traffic Control	1	LS	$ 2,000.00	$2,000
	25	Reset Valve lids & Manhole Covers	1	LS	$ 5,000.00	$5,000
	T2	**SubTotal Road Construction & Utility Costs**				**$1,700,000**
Percentage Allocations On Construction Subtotal	A1	Performance & Payment bonds	2	%	----	$34,000
	A2	Mobilization/Demobilization	3	%	----	$51,000
	A3	Funding Requirements	0.0	%	----	$0
	A4	Construction Contingencies	10	%	----	$170,000
	A5	Geotechnical	0	%	----	$0
	A6	Engineering, Permitting, Coordination, Construction Admin.	3	%	----	$51,000
	A7	Surveying (Staking) & Legal	3	%	----	$51,000
	T3	**Subtotal on Construction Allocations**				**$400,000**
	T4	**TOTAL PROJECT SUBTOTAL**				**$2,100,000**

ENGINEER'S PRELIMINARY COST ESTIMATE

Wednesday, November 29, 2023

Village of Kronenwetter - Kronenwetter Dr. Reconstruction South branch (no Bridge Work)

Approx. 8,446 LF Road, existing 30 ft wide pavement

OVERALL PROJECT

STREET RECONSTRUCTION & DRAINAGE INFRASTRUCTURE

	#	Item	Item Quantity	Units	Unit Cost	Total Cost
Project Development Costs	a	Comprehensive Mapping & Surveying	----	---	----	$39,000
	b	Planning, Coordination, Engineering & Administration	----	---	----	$114,000
	c	Legal Services To-Date	----	---	----	----
	d	Title Services To-Date	----	---	----	----
	e	Land Acquisition (Prof. Fees & Land Rights) Estimate	----	---	----	----
	T1	**Subtotal Project Development Costs**				**$153,000**
Roadway Construction Costs	1	Erosion Control Items & Maintenance During Construction	1	Lump Sum	$10,000.00	$10,000
	2	Unclassified excavation for Roadway	12,180	CY	$15.00	$182,700
	3	Remove Asphalt Pavement, Main Roadway	16,940	SY	$5.00	$84,700
	4	Remove Asphalt Pavement, Side streets & Driveways	3,290	SY	$5.00	$16,450
	5	Remove Concrete Driveway	165	SY	$7.00	$1,155
	6	Remove existing culverts	9	EA	$500.00	$4,500
	7	Sawcut Asphalt Pavement	405	LF	$1.50	$608
	8	Topsoil removal	10,000	SY	$2.50	$25,000
	9	Unclassified Excavation for Driveways	115	CY	$10.00	$1,150
	10	Remove beam guard, Re-install	1	LS	$5,000.00	$5,000
	11	Medium Rip Rap over Fabric for Storm Sewer Endwalls	150	CY	$75.00	$11,250
	12	3/4" Crushed Aggregate for Driveway as Needed	100	CY	$50.00	$5,000
	13	12" Breaker Run	3333.333333	CY	$15.00	$50,000
	14	Geogrid	28154	SY	$3.00	$84,462
	15	Open Graded Drainage Layer (Assume 50%)	14000	SY	$20.00	$280,000
	16	1.5" Crushed Aggregate Base Course, 4" Compacted-Road & Intersections	14077	SY	$8.00	$112,616
	17	HMA Asphalt Pavement 1.75" Surface Course-Intersections	28154	SY	$12.00	$337,848
	18	HMA Asphalt Pavement 1.75" Binder Course-Intersections	28154	SY	$12.00	$337,848
	19	Hot Tar Butt Joint Sealer	330	LF	$5.00	$1,650
	20	3/4" Crushed Aggregate for Road Shoulder, 2' wide x 6" thick	380	CY	$50.00	$19,000
	21	6" Concrete Driveway	165	SY	$25.00	$4,125
	22	HMA Asphalt-2" for path & driveways	150	SY	$20.00	$3,000
	23	Topsoil, Seed & E-Mat all Disturbed areas,	18768	SY	$2.75	$51,612
	24	Install Base, Pole, & Fixture for Street Lights (Light Type Assumed)	0	EA	$4,500.00	$0
	25	Electrical in Conduit for Street Lights	20	LS	$ 1,000.00	$20,000
	26	Install 12" CMP & endwalls - Avg 40 LF	9	EA	$ 1,500.00	$13,500
	27	Traffic Control	1	LS	$ 2,000.00	$2,000
	28	Reset Valve lids & Manhole Covers	1	LS	$ 5,000.00	$5,000
	T2	**SubTotal Road Construction & Utility Costs**				**$1,700,000**
Percentage Allocations On Construction Subtotal	A1	Performance & Payment bonds	2	%	----	$34,000
	A2	Mobilization/Demobilization	3	%	----	$51,000
	A3	Funding Requirements	0.0	%	----	$0
	A4	Construction Contingencies	10	%	----	$170,000
	A5	Geotechnical	0	%	----	$0
	A6	Construction Engineering, Admin. Construction Admin.	3	%	----	$51,000
	A7	Surveying (Staking) & Legal	3	%	----	$51,000
	T3	**Subtotal on Construction Allocations**				**$400,000**
	T4	**TOTAL PROJECT SUBTOTAL**				**$2,300,000**

ENGINEER'S PRELIMINARY COST ESTIMATE

Wednesday, December 20, 2023

Village of Kronenwetter - Kronenwetter Dr. Reconstruction North Branch

Approx. 11,351 LF Road, existing 34 ft to tid line , north tid 30 'wide pavement

OVERALL PROJECT

STREET RECONSTRUCTION & DRAINAGE INFRASTRUCTURE

	#	Item	Item Quantity	Units	Unit Cost	Total Cost
Project Development Costs	a	Comprehensive Mapping & Surveying	----	---	----	$21,000
	b	Planning, Coordination, Engineering & Administration	----	---	----	$60,000
	c	Legal Services To-Date	----	---	----	----
	d	Title Services To-Date	----	---	----	----
	e	Land Acquisition (Prof. Fees & Land Rights) Estimate	----	---	----	----
	T1	**Subtotal Project Development Costs**				**$81,000**
Roadway Construction Costs	1	Erosion Control Items & Maintenance During Construction	1	Lump Sum	$10,000.00	$10,000
	2	Unclassified excavation for Roadway	6,728	CY	$15.00	$100,913
	3	Remove Asphalt Pavement, Main Roadway	31,600	SY	$5.00	$158,000
	4	Remove Asphalt Pavement, Side streets & Driveways	5,000	SY	$5.00	$25,000
	5	Remove Concrete Driveway	50	SY	$7.00	$350
	6	Remove existing culverts	4	EA	$1,000.00	$4,000
	7	Sawcut Asphalt Pavement	390	LF	$1.50	$585
	8	Topsoil removal	3,000	SY	$2.50	$7,500
	9	Unclassified Excavation for Driveways	150	CY	$10.00	$1,500
	10	Remove trees	3	LS	$1,000.00	$3,000
	11	Medium Rip Rap over Fabric for Storm Sewer Endwalls	100	CY	$75.00	$7,500
	12	3/4" Crushed Aggregate for Driveway as Needed	100	CY	$50.00	$5,000
	#REF!	Open Graded Drainage Layer (Assume 50%)	6727	SY	$20.00	$134,540
	#REF!	1.5" Crushed Aggregate Base Course, 4" Compacted-Road & Intersections	15800	SY	$8.00	$126,400
	#REF!	HMA Asphalt Pavement 2" Surface Course-Intersections	31600	SY	$13.00	$410,800
	#REF!	HMA Asphalt Pavement 2" Binder Course-Intersections	31600	SY	$12.00	$379,200
	#REF!	Hot Tar Butt Joint Sealer	390	LF	$5.00	$1,950
	#REF!	3/4" Crushed Aggregate for Road Shoulder, 2' wide x 6" thick	840	CY	$50.00	$42,000
	#REF!	Seal Coat portion 1,860 LF.	6196	SY	$10.00	$61,960
	#REF!	HMA Asphalt-2" for path & driveways	500	SY	$20.00	$10,000
	#REF!	Topsoil, Seed & E-Mat all Disturbed areas,	12612	SY	$2.75	$34,683
	#REF!	Install Base, Pole, & Fixture for Street Lights (Light Type Assumed)	20	EA	$4,500.00	$90,000
	#REF!	Electrical in Conduit for Street Lights	20	LS	$ 1,000.00	$20,000
	#REF!	Install 30" CMP & endwalls - Avg 40 LF	4	EA	$ 2,500.00	$10,000
	#REF!	Traffic Control	1	LS	$ 5,000.00	$5,000
	#REF!	Reset Valve lids & Manhole Covers	1	LS	$ 5,000.00	$5,000
	T2	**SubTotal Road Construction & Utility Costs**				**$1,700,000**
Percentage Allocations On Construction Subtotal	A1	Performance & Payment bonds	2	%	----	$34,000
	A2	Mobilization/Demobilization	3	%	----	$51,000
	A3	Funding Requirements	0.5	%	----	$8,500
	A4	Construction Contingencies	10	%	----	$170,000
	A5	Geotechnical	0	%	----	$0
	A6	Engineering, Permitting, Coordination, Construction Admin.	3	%	----	$51,000
	A7	Surveying (Staking) & Legal	3	%	----	$51,000
	T3	**Subtotal on Construction Allocations**				**$400,000**
	T4	**TOTAL PROJECT SUBTOTAL**				**$2,200,000**

KRONENWETTER DRIVE & TID2 ROADS
ROADWAY IMPROVEMENT PROJECT
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SECTION 1 - PROJECT BACKGROUND AND DESCRIPTION

1.1 SUMMARY AND PURPOSE

The purpose of this report is to provide a preliminary planning document for the evaluation of current conditions and roadway improvements for Kronenwetter Drive & roads within the Tax Incremental Financing District (aka "TID2") boundary. This planning report is submitted to provide the Village of Kronenwetter as a comprehensive document that reviews all considerations with a roadway improvement project of this nature.

This document is centered on essential design considerations for planning infrastructure upgrades and changes within existing roadway corridors and streets. Its purpose is to offer an analysis of the potential effects of suggested roadway enhancements, with an emphasis on adhering to contemporary safety and modernization standards. The project addresses a broad array of factors, such as public engagement, financing, cost-effectiveness, and the impact on properties, ensuring a comprehensive approach to infrastructure development.

1.2 PROJECT LOCATION

Kronenwetter is situated in Township 27, Range 7 East, in the southern part of Marathon County, nestled between Wausau and Mosinee. Kronenwetter has a population of 9200, is the largest Village by area in the State of Wisconsin and has a mixture of urban and rural development. The approximate location of the project is at Latitude 44.8066, Longitude -89.6722.

Figure 1.2-1 Project Map and Phases

1.3 PROJECT PHASES

The project is divided into two phases. The first phase (Kronenwetter Drive South) includes six road segments detailed below:

- Kronenwetter Drive, stretching 1.20 miles from Indianhead Drive to Maple Ridge Road, and 0.51 mile from Maple Ridge Road to the north boundary of TID2.
- Sedona Court, covering 0.9 miles
- Pinedale Lane, measuring 0.33 miles
- Windwood Road, extending 0.21 miles
- Oakdale Lane, at 0.23 miles
- Wedgewood Drive, spanning 0.18 miles

The second phase focuses on Kronenwetter Drive North, covering an additional 2.11 miles from the north boundary of Maple Ridge Road to Kowalski Road.

1.4 BRIEF HISTORY AND PREVIOUS WORK

Kronenwetter Drive and its adjoining roads in this project have been key components of the local infrastructure network, primarily constructed to facilitate residential and vehicular access. The most recent significant maintenance updates were applied between 2005 and 2012, where all segments received Hot Mix Asphalt Pavement surfaces, and a specific chip seal was added to Upper Kronenwetter Drive to Kowalski Road in 2012, aimed at prolonging the pavement life and improving overall road quality.

1.5 NEED OF THE PROJECT

The project is aimed at reconstructing and repaving various sections of Kronenwetter Drive and some of its adjoining streets, based on pavement evaluations by the Village of Kronenwetter and our initial assessment of the road condition. This report evaluates all criteria along each designated roadway to confirm the level of improvement to be designed and constructed.

Although these roads are existing, the evaluation process will look at all major considerations for roadway standards, so if a particular repair is warranted, all fundamental aspects of the road are also confirmed so that if a critical issue is discovered, the design and rehabilitation can account for such remedy. This should provide both short-term and long-term value to the TID2, the roads and the public.

The borehole data revealed significant variations in pavement thickness and base course depth, along with diverse subsurface soil conditions, highlighting the need for a systematic reconstruction approach to address differential wear and ensure uniformity across the roadway. Additionally, culvert surveys have identified issues such as cracking, bending, spalling, and chipping at different locations, indicating structural vulnerabilities that require urgent attention. Furthermore, assessments of some cul-de-sacs and intersections have shown that they do not provide adequate turning radii, posing challenges for vehicle maneuverability and safety. This

project seeks to enhance road durability, safety, and functionality by implementing targeted reconstruction and repaving strategies, addressing culvert repairs, and redesigning inadequate traffic features to meet current and future traffic demands efficiently.

SECTION 2 EXISTING CONDITIONS

2.1 TOPOGRAPHIC SURVEY

A comprehensive topographic map was obtained from Point of Beginning, Inc. All civil designs are based on the data provided in that map. Any discrepancies or errors in the map may affect the accuracy and reliability of the design work completed for this project. It is crucial that the provided information be independently verified to ensure compliance with all relevant standards and requirements.

2.2 PAVEMENT CONDITION

The Wisconsin Information System for Local Roads (WiSLR) data for each road is summarized in Tables 1.1 and 1.2. Lower Kronenwetter Drive, Sedona Court, Pinedale Lane, Windwood Road, Oakdale, and Wedgewood Drive share a uniform road width of 22 feet, except Lower Kronenwetter Drive, which varies between 24 and 30 feet. Shoulder widths are consistently 3 feet, with a right-of-way (ROW) of 66 feet common to most, while Lower Kronenwetter Drive varies between 80 and 100 feet. All surfaces are Hot Mix Asphalt Pavement (HMA), with the last application years ranging from 2005 to 2012. The Upper Kronenwetter Drive to Kowalski Road had a chip seal in 2012.

Shoulders are primarily Type 2 gravel, with some segments of Kronenwetter drive including Type 3. Traffic consists of two lanes for each segment, and only Upper Kronenwetter Drive to Kowalski Road registers significant average daily traffic (ADT). The Pavement Surface Evaluation and Rating (PASER) scores vary, indicating diverse road conditions; scores range from 4 to 8, with Lower Kronenwetter Drive showing the broadest range, thus signaling a need for maintenance or upgrades. The Wisconsin Information System for Local Roads (WISLR) ratings also support this, with most segments rated as Fair (FR), one Very Good (VG), and the Upper Kronenwetter Drive to Kowalski Road as Good (G), all assessed in 2023.

Table 2.1-1 Phase 1 WISLR Information

	Kronenwetter Termini-Sedona Ct	Kronenwetter Sedona Ct-Kowalski Rd	Senoda Court	Pinedale Lane	Windwood Road	Oakdale	Wedgewood Drive
Width	30	24	22	22	22	22	22
Shoulder Width	3	5	3	3	3	3	3
ROW width	80	100	66	66	66	66	66
Surface	HMA	HMA	HMA	HMA	HMA	HMA	HMA
Surface year	2005	2012, 2002	2005	2005	2005	2005	2005
Shoulder	Type 2, 3[1] gravel	Type 2, 3 gravel	Type 2 gravel	Type 2 gravel	Type 2 gravel	Type 2 gravel	Type 2 gravel

[1] Type 2 gravel:

One way	No	No	No	No	No	No	No
Traffic Lane	2	2	2	2	2	2	2
ADT			0	0	0	0	0
PASER	4	6 7	5	4	8	5	4
WISLR rating[2]	FR	G	FR	FR	VG	FR	FR
Rating year	2023	2023	2023	2023	2023	2023	2023

Table 2.1-2 Phase 2 WISLR Information

	Upper Kronenwetter Drive to Kowalski Road
Width	24
Shoulder Width	3
ROW width	66, 100
Surface	HMA
Surface year	2002, 2012
Shoulder	Type 2, 3 gravel
One way	No
Traffic Lane	2
ADT	35, and 940
PASER	6
WISLR rating	G
Rating year	2023

Particularly, The bridge on Bull Junior Creek is experiencing issues with deteriorated asphalt being brought onto the bridge, which is detrimental to the concrete. Several gravel roads intersect with Kronenwetter Drive, contributing to the deterioration of the paved surface due to loose gravel being carried onto the asphalt.

2.3 SAFETY

The road meets the sight distance requirements established in the AASHTO Green Book 2011. According to the WisTransPortal System Community Maps search, there have been no recorded crashes in this area.

2.4 GEOTECHNICAL SURVEY SUMMARY

The Geotechnical Exploration Report by CGC, Inc. is included in Appendix 2. The locations of the boreholes are detailed in Appendix 3. As expected, Kronenwetter Drive exhibits variations in asphalt and base course thickness. The subsurface profiles are largely favorable for pavement longevity but highlight specific areas that require ongoing monitoring or tailored maintenance strategies due to the

Type 3 gravel
[2] WISLR rating:

presence of fill, organic materials, or other anomalies. Also, an important factor is the actual visual performance of the existing base and asphalt. The road characteristics may appear satisfactory on paper, but the actual physical condition, combined the presence of occasional highwater, promulgates a higher standard of design for Kronenwetter Drive.

At Kronenwetter Drive South and the adjoining roads, the asphalt pavement thickness spans from 3 inches to 4.5 inches, while the base course thickness shows more dramatic variation, ranging from 8 inches in most boreholes to a substantial 31 inches at STA=41+27.54. The soil across this section is consistently composed of brown fine to medium sand, with descriptions ranging from medium dense to very dense. Gravel is present in all boreholes, boosting the soil's drainage and structural capacity. However, silt presence is minimal to moderate, with specific areas at STA=27+71.15 and STA=47+29.36 potentially posing stability challenges due to higher silt content. There are also organic material present at STA= 47+29.36. Cobbles and boulders are also scattered across various boreholes, posing potential complications for excavation and construction activities.

At Kronenwetter Drive North, the asphalt pavement thickness varies significantly, ranging from 2.5 inches at STA=130+93.87 and STA=144+46.85 to 6.0 inches at STA=199+76.6. The base course is mostly around 8 to 9 inches, except at STA=199+76.6 where it measures 6 inches. The soil here is predominantly medium dense brown fine to medium sand. Gravel content is consistent across most sites, enhancing compaction and drainage. Organic material and possible buried topsoil at STA=194+74.4 indicate reduced subgrade stability.

CGC recommends the following pavement design parameters:

Soil Parameter	**Recommended Design Values**
USCS	SP-SM/SM
AASHTO Classification	A-2/A-4
Frost Index, FI	F-4
Design Group Index, DGI	14
Soil Support Value, SSV	3.9
Subgrade Modulus, K (pci)	125
Estimated California Bearing Ratio	CBR 2-5

CGC also recommends optimizing site construction management by statically recompacting clay subgrades and using vibratory rollers on granular soils, with proof-rolling delayed after rainfall. For areas with soft soil, selectively undercut and stabilize using coarse aggregate, adjusting based on site conditions. Protect exposed subgrades from freezing, limit traffic to reduce disturbance, and ensure deep excavations meet OSHA standards. Manage water accumulation effectively with contractor-handled dewatering. Especially, Budget contingencies should account for these measures, particularly under adverse weather conditions.

2.5 Sidewalks or Path

Sidewalk and paths are not included within this project scope.

2.6 Current Traffic Flow & Configuration

The review of current traffic flow and conditions for each publicly maintained street segment is summarized as follows. Traffic counts were not performed, as the area is identified as a low-volume residential zone, with an assumed Average Daily Traffic (ADT) of less than 400. The 20-year traffic forecast is expected to remain relatively stable, attributed to the dead-end layout of the overall area and the limited availability of new development parcels.

- Lower Kronenwetter Drive: a two-way, residential drive designed to ensure a smooth traffic flow for both residents and visitors. It features two lanes and enhanced by two wide gravel shoulders.
- Sedona Court: Sedona Court is a two-way, residential drive designed to ensure a smooth traffic flow for both residents and visitors. It features two 11' wide lanes and enhanced by two 3’ wide gravel shoulders.
- Pinedale Lane: Pinedale Lane is a two-way, residential drive designed to ensure a smooth traffic flow for both residents and visitors. It features two 11' wide lanes and enhanced by two 3’ wide gravel shoulders.
- Windwood Road: Windwood Road is a two-way, residential drive designed to ensure a smooth traffic flow for both residents and visitors. It features two 11' wide lanes and enhanced by two 3’ wide gravel shoulders.
- Oakdale Lane: Oakdale Lane is a two-way, residential drive designed to ensure a smooth traffic flow for both residents and visitors. It features two 11' wide lanes and enhanced by two 3’ wide gravel shoulders.
- Wedgewood Drive: Wedgewood Drive is a two-way, residential drive designed to ensure a smooth traffic flow for both residents and visitors. It features two 11' wide lanes and enhanced by two 3’ wide gravel shoulders.
- Upper Kronenwetter Drive: a two-way, residential drive designed to ensure a smooth traffic flow for both residents and visitors. It features two lanes and enhanced by two wide gravel shoulders.

Based on traffic volume and Trans 204, Kronenwetter Drive should be classified as Design Class T2, and the associated roads as Design Class T1, according to Trans 204.03. The portion of Kronenwetter Drive south of Maple Ridge Road should be designed for a speed of 35 MPH for reconstruction purposes. The portion of Kronenwetter Drive north of Maple Ridge Road should be designed for a speed of 45 MPH for reconstruction purposes, while the design speed for associated roads can be disregarded during resurfacing. All roads involved in the project are of adequate width.

Table 2.3-1 (TRANS 204 Table A) – Reconstruction

TRAFFIC VOLUME			ROAD WIDTH DIMENSIONS IN FEET		
Design Class	Current ADT (Average	Design Speed (MPH)	Traveled Way (Feet)	Shoulder (Feet)	Roadway (Feet)

	Daily Traffic)				
T1	Under 250	40	20	3	26
T2	250-750	50	22	4	30
T3	Over 750	55	24	6	36

Table 2.3-2 TRANS 204 Table B - Resurfacing and Reconditioning

TRAFFIC VOLUME			ROAD WIDTH DIMENSIONS IN FEET		
Design Class	Current ADT (Average Daily Traffic)	Design Speed (MPH)	Traveled Way (Feet)	Shoulder (Feet)	Roadway (Feet)
TR1	Under 250	-	18	2	22
TR2	250-400	40	20	2	24
TR3	401-750	50	22	2	26
TR4	Over 750	55	22	4	30

2.7 Existing Drainage

2.7.1 Surface Drainage and Crossing Culverts.

The drainage patterns from street to street are outlined as follows:

- Lower Kronenwetter Drive: Drains southward to Bull Junior Creek. The lower Kronenwetter Drive contains a concrete Bridge over the Bull Junior Creek, which will not be part of the project. There are seven culverts along or crossing the lower Kronenwetter Drive.
- Sedona Court: Drainage flows eastward off-site, with no culverts crossing the street.
- Pinedale Lane: Features a high point at its intersection with Windwood Road, directing flow northward and westward.

- Windwood Road: Water flows northward from Oakdale Road to Pinedale Lane. Culvert R-30 crosses Windwood Road along
- Oakdale Lane: A high point between Kronenwetter Drive and Windwood Drive directs drainage eastward and westward.
- Wedgewood Drive: Drains northward. Culvers R-31 and R-32 cross Wedgewood Drive.
- Upper Kronenwetter Drive (from Maple Ridge Road to Kowalski Road): Features 20 culverts across or along the drive following the flow patterns.

A summary table detailing the material, ground cover, and condition of each culvert is presented in the table below.

Table 2.4-1 Culvert Summary

Culvert	MATERIAL	DIA, in	Cover, ft	CONDITION
Phase 1 – Lower Kronenwetter Drive				
R-1	CORUGATED PLASTIC	18	0.34	MINOR DEFLECTION
R-2	CONC	15	1.79	GOOD
R-3	CMP	15	0.72	MINOR DEFLECTION
R-3A	CSM	15	0.59	MINOR DAMAGE
R-4	CONC	15	1.20	GOOD
R-4A	PLASTIC	15	0.82	GOOD
R-5	CONC	15	2.35	SOME CRACK
R-30	CONC	15	0.25	GOOD
R-31	CONC	15	1.36	GOOD
R-32	CONC	12	1.26	GOOD
Phase 2 – Upper Kronenwetter Drive				
R-6, R-7	CONC	24	1.40	MINOR CHIPPING
	CONC	24	1.41	MINOR CHIPPING
R-8, R-9	CONC	24	2.78	MINOR CHIPPING
	CONC	24	2.79	MINOR CHIPPING
R-10, R-11	CONC	24	2.14	SLIGHT SPALLING
	CONC	24	2.18	SLIGHT SPALLING
R-12	CONC	28	1.28	GOOD
R-13	CONC	18	1.71	GOOD
R-15	CMP	24	0.87	HORIZONTAL DEFELCTION 8' INTO PIPE
R-16, R-17, R-18	CONC	15	2.83	GOOD
	CONC	36	-0.33	DAMAGED
	CONC	15	1.27	GOOD
R-19	CONC	30	1.42	CRACK

R-20	CONC	30	1.62	HARD TO TELL
R-21	CMP	24	2.05	GOOD
R-22	CMP	24	1.86	GOOD
R-23	CMP	24	2.32	GOOD
R-24	TIN	12	3.70	GOOD
R-25	TIN	12	3.95	GOOD
R-26	CONC	20	1.28	GOOD

The drainage analysis was conducted using HY8, with the flow generated based on a 100-year, 1-hour duration rainfall event. This flow is calculated using the Rational Method formula

$$Q=ciA$$

where Q is the peak discharge rate, c is the runoff coefficient indicating the fraction of rainfall that becomes runoff, i represents the rainfall intensity, and A is the drainage area in question. The precipitation data, along with the coefficients and drainage areas, are detailed in the table below.

Table 2.4-2 Culvert Drainage Analysis

Culvert	Acre	100 year, 24 hr Rain intensity, in	Coefficient	Peak Flow, cfs
Phase 1 – Lower Kronenwetter Drive				
R-1	3.36	2.88	0.35	3.38
R-2	2.05	2.88	0.35	2.07
R-3	1.94	2.88	0.35	1.95
R-3A	4.29	2.88	0.40	4.94
R-4	6.35	2.88	0.40	7.32
R-4A	3.63	2.88	0.40	4.18
R-5	5.77	2.88	0.40	6.65
R-30	2.33	2.88	0.35	2.35
R-31	1.76	2.88	0.40	2.03
R-32	1.20	2.88	0.40	1.38
Phase 2 – Upper Kronenwetter Drive				
R-6, R-7	6.15	2.88	0.35	6.19
R-8, R-9	20.16	2.88	0.35	0.85
R-10, R-11	5.51	2.88	0.40	0.26
R-12	15.68	2.88	0.35	0.66
R-13	0.57	2.88	0.35	0.02
R-15	4.35	2.88	0.35	0.18
R-16, R-17, R-18	8.813	2.88	0.35	0.4
R-19 R-20	0.875	2.88	0.35	0.0
R-21	9.111	2.88	0.35	0.4

R-22
R-23
R-24
R-25
R-26

All culverts in Phase 1, including R-6 and R-7, were modeled using a 100-year, 1-hour duration rainfall scenario. The additional culverts in Phase 2, due to low flow and specific conditions (such as culverts situated above the surrounding ground or having an inlet lower than the outlet), were modeled with a peak flow of 2 cfs. The data and results are documented in Appendix 5. All culverts are designed with sufficient depth to manage drainage requirements for a 100-year storm event.

2.7.2 STORM SEWER.

Information provided by the Surveyor did not include storm sewer inlets, manholes or drainage pipe runs other than culverts. As such, no such improvements are considered in this evaluation and design.

2.8 EXISTING ROAD GEOMETRY

Road alignment (geometry) is evaluated by comparing the standards in WisDOT FDM 11-15 and local ordinances, if available.

2.5.1 WisDOT FDM 11-15

2.5.2 Local Ordinances. The Village of Kronenwetter Ordinance § 460-40 contains several roadway standards for new subdivision developments but, in this case, these standards form the basis for evaluation criteria to conform to local standards and for consistency the in application of those standards. Roadway grade, visibility, and tangents were evaluated against the standards in the ordinance. There are two issues that need to be addressed

1. According to § 460-40(U)(1), the minimum radius for cul-de-sac pavement should be 45 feet, and it must accommodate a vehicle of 30 feet in length and eight feet in width. However, both the cul-de-sacs at Sedona Drive and Pinedale Lane have a smaller radius. We recommend enlarging the cul-de-sacs to a 45-foot radius.

The right turn from Oakdale Lane onto Kronenwetter Drive is irregular and worn out and may pose sight issues. For this project, we recommend realigning the curb radius to 30 feet.

2.9 FIRE AND EMERGENCY SERVICES

All areas within the scope of work appear to meet NFPA standards for fire apparatus and serviceability. However, as stated in Section 2.5, the minimum turning radius for the cul-de-sac is 45 feet (with a diameter of 96 feet), and the existing Pinedale and Sedona cul-de-sac pavement

area was never built to these standards. While a fire apparatus vehicle will be able to maneuver, it will take multiple movements. There is an opportunity to address this deficiency in the scope of work.

2.10 UTILITIES COORDINATION

The utilities in the project area are summarized in the table below. The utility companies have been contacted, and electric and gas maps have been obtained from WPS. Spectrum... No conflicts are expected for this project. Correspondence from the utility service providers is included in Appendix 6.

Table 2.7-1 Public Utilities Summary

Utility Name	Type of Utility	General Location	Underground/Overhead/Both
Wisconsin Public Service (WPS)	Gas/Electric		Underground
Spectrum - Communication Line	Cable/FO		Underground

SECTION 3 ALTERNATIVES AND COST ANALYSIS

3.1 DO NOTHING

One alternative to the proposed project is to take no action, leaving Kronenwetter Drive and its adjoining streets in their current state. This would mean that the significant variations in pavement thickness and base course depth, as identified by the borehole data, would not be addressed, leading to potential differential wear. Structural issues in culverts, such as cracking and bending, would remain unresolved, possibly worsening over time. Additionally, intersections and cul-de-sacs with inadequate turning radii would continue to pose maneuverability and safety challenges, compromising the overall functionality and safety of the road network.

3.2 RECONDITION & SURFACE TREATMENTS ONLY

This alternative involves reconditioning the existing pavement surface and applying surface treatments to extend the life of the road. Reconditioning would include patching and sealing cracks, followed chip seal and/or slurry fill. While this approach would improve the surface condition and provide temporary relief from minor defects, it would not address underlying structural issues or variations in pavement and base course depth. The benefits would be short-term, and more significant repairs would likely be needed soon.

3.3 RE-SURFACING

Re-surfacing involves milling the top layer of the existing pavement and applying a new layer of asphalt. This would address surface deterioration and improve ride quality. However, it would

not correct underlying base course deficiencies. This approach provides a medium-term solution, offering improved surface conditions and extending pavement life, but it does not address long-term durability or structural integrity concerns. Additionally, issues with culverts and turning radii at intersections would not be resolved.

3.4 PAVEMENT REPLACEMENT

Pavement replacement involves pulverizing and replacing the existing asphalt surface and possibly some of the base course (with pulverized asphalt). This method addresses surface and base course deficiencies, providing a longer-lasting solution compared to re-surfacing. It involves significant construction activities, including excavation, grading, and the installation of new base materials and asphalt.

3.5 FULL RECONSTRUCTION

Full reconstruction is the most comprehensive alternative, involving the complete removal of the existing pavement, base course, and subgrade materials as necessary. This approach includes regarding the subgrade, installing new base and subbase materials, and applying new asphalt pavement. Full reconstruction addresses all identified issues, including variations in pavement and base course thickness, subgrade stability, drainage improvements, and structural deficiencies in culverts. Additionally, it allows for adjustments to road geometry, such as improving turning radii at intersections and cul-de-sacs, ensuring long-term functionality, safety, and durability of the road network. This option, while the most expensive and time-consuming, provides the highest level of improvement and longevity.

Note: The selection of the appropriate alternative may vary for each street or drive within the project area, based on specific conditions and wear patterns.

SECTION 4 – DESIGN CONSIDERATIONS OF THE RECOMMENDED

4.1 ROADWAY GEOMETRY

The cul-de-sacs at Pinedale Road and Sedona Circle will be enlarged to 45 feet to improve vehicle maneuverability and safety. This enhancement will ensure that larger vehicles can navigate these areas more easily, reducing the risk of accidents and improving traffic flow.

The curb return at the right turn from Pinedale Road onto Kronenwetter Drive will be enlarged to 30 feet. This modification will provide a smoother transition for vehicles making the turn, enhancing overall traffic efficiency and safety at this intersection.

Although Kronenwetter Drive is currently wider than necessary, no changes to its width are recommended. Maintaining the current width will accommodate potential future traffic expansion, ensuring that the roadway can handle increased traffic volumes and larger vehicles effectively without requiring additional modifications in the near term.

For the other residential streets, since this project involves milling and repaving, the current road widths will remain unchanged. This approach ensures that the existing dimensions are maintained.

4.2 Approaches and Intersections

To address the issue of deteriorating bridge concrete surface, we recommend adding a 30–40-foot concrete approach on each side of the bridge on Bull Junior Creek. This will provide a durable transition, reducing the amount of loose asphalt on the bridge and protecting the concrete surface from accelerated wear and structural damage.

Similarly, to mitigate the issue on Kronenwetter Drive, we recommend installing asphalt aprons at the intersections with gravel roads. This will not only protect the paved surface from accelerated wear and tear but also enhance overall road safety.

The intersections between Kronenwetter Drive and Maple Ridge Road, as well as between Kronenwetter Drive and Kowalski Road, are outside the scope of this project.

4.3 Pavement Base

As stated in Section 2.4, both Phase 1 and Phase 2 sections of Kronenwetter may have compromised bases. The boreholes at STA=47+29.36 in Phase 1 and STA=194+74.48 in Phase 2 revealed the presence of organic materials in the subbase. During construction, these areas must be meticulously inspected. Any organic materials discovered should be replaced with structural fill to ensure the integrity and safety of the road. is essential that the construction team adheres to these guidelines to prevent future structural problems.

4.4 Pavement

In accordance with Kronenwetter Ordinance § 460-31 - Street Design Standards, the reconstruction project along with the miscellaneous streets along the Kronenwetter Drive will comply with these established guidelines. Key to this effort is the grading process, which mandates laying a foundation consisting of at least six inches of crushed aggregate, topped with three inches of asphaltic concrete type E-, to ensures that the rebuilt streets will meet the structural and durability requirements set forth by the municipality.

4.5 Pavement Marking

The yellow center line and white lane lines on Kronenwetter Drive will be repainted once the reconstruction is complete. For the intersecting streets—Pinedale Lane, Oakdale Lane, and Sedona Court—we recommend adding stop lines and directional arrows.

4.6 Drainage

During the reconstruction of Kronenwetter Drive, any culverts identified as damaged should be replaced to ensure structural integrity and proper drainage. Additionally, during the milling and repaving of miscellaneous streets, significantly damaged culverts should also be replaced. The adjacent areas of the culverts shall be reconstructed to support the new installations, ensuring long-term stability and functionality of the roadways.

For the cul-de-sacs at Sedona Court and Pinedale Lane, ditches will be constructed at the enlarged cul-de-sac areas. The existing culverts will either be relocated or replaced to align with the new driveway ditch crossings. This adjustment ensures proper drainage and accommodates the updated roadway design.

4.7 STREET LIGHTS

The lighting within the project area is governed by Kronenwetter Ordinance § 520-90. Observations confirm that the existing lights probably comply with the height requirements. However, while most of the existing lights are situated outside the project boundaries, adjustments are necessary due to the planned expansion of the cul-de-sacs. Specifically, one light each on Sedona Court and Pinedale Lane cul-de-sacs will need to be relocated. This relocation is essential to accommodate the new dimensions of the expanded cul-de-sacs and ensure adequate lighting coverage.

To ensure full compliance with Kronenwetter Ordinance § 520-90, it is recommended that the Village conduct a detailed verification of the requirements for the new light placements and intensity. Moreover, it is advisable to add lights on the miscellaneous residential streets to improve illumination, even though specific spacing requirements are not mentioned in the ordinance. Given that the existing lights were likely installed prior to the ordinance, this project provides an opportunity to verify and update the lighting to meet current standards.

4.8 MANHOLES

Manhole improvements will include the interior sealing and redoing of the riser rings to ensure surface level alignment. Although not all valves within the manholes have been inspected, specifications will require that valves are operable in their installed condition. The contractor must verify that wrenches can properly fit the valves. Additionally, 2x2 pits around valve boxes and 4x4 concrete pads around manholes are recommended to enhance stability and accessibility.

SECTION 5 PUBLIC PARTICIPATION PLAN

A copy of the public participation plan is included in Appendix 7

SECTION 6 PLANNING, DESIGN & CONTRACT PROCESS

SECTION 7 LIST OF APPENDICES

Appendix 1 WISLR information

Appendix 2 Geotechnical survey

Appendix 3 Borehole locations

Appendix 4 Precipitation data

Appendix 5 Culvert Analysis

Appendix 6 Utility Coordination Information

Appendix 7 Public participation plan

Appendix 1

Wisconsin Department of Transportation

Tuesday Mar 26, 2024

Wisconsin Information System for Local Roads

County: MARATHON (37) **Municipality:** KRONENWETTER (V) (145) County-Muni **Certification Year:** 2024

Global Location

Rd/St Name: Kronenwetter Dr Retrieve Entire Route

At: Indianhead Dr (Termini)

At/Toward Certified Mileage: 20328 feet

Rd/St Length: 20255 feet

Toward: Kowalski Rd (Termini)

View by Intersections? Yes◉ No◯

Unit of Measurement Feet◉ Miles◯

Retrieve At/Toward

View Physical Inventory

Physical Inventory | Administrative Inventory

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
	−	Surface	1 of 13	Indianhead Dr (Termini)	0	450	450	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **30 ft**, Year: **2005**
			2 of 13	Indianhead Dr (Termini)	450	704	254	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **28 ft**, Year: **2010**
			3 of 13	Oakdale Ln	0	1490	1490	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **30 ft**, Year: **2005**
			4 of 13	Pinedale Ln	0	449	449	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **30 ft**, Year: **2005**
			5 of 13	Sedona Ct	0	2412	2412	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **30 ft**, Year: **2005**
			6 of 13	Field Rd	0	1286	1286	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **24 ft**, Year: **2012**
			7 of 13	Maple Ridge Rd	0	350	350	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **24 ft**, Year: **2012**
			8 of 13	Paper Pl	0	956	956	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **24 ft**, Year: **2012**
			9 of 13	Beranek Rd	0	1284	1284	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **24 ft**, Year: **2012**
			10 of 13	Beranek Rd	1284	2908	1624	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **24 ft**, Year: **2002**
			11 of 13	Maple Park Dr	0	2995	2995	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **24 ft**, Year: **2002**
			12 of 13	Jakes Lake Rd	0	3062	3062	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **24 ft**, Year: **2002**
			13 of 13	Plaza Rd	0	3643	3643	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **24 ft**, Year: **2002**
	−	Maintenance Treatment	1 of 6	Maple Ridge Rd	0	350	350	Year: **2012**, Type: **2-Crack Sealing - Overband, 7-Sealcoating - Chip Seal**
			2 of 6	Paper Pl	0	956	956	Year: **2012**, Type: **2-Crack Sealing - Overband, 7-Sealcoating - Chip Seal**
			3 of 6	Beranek Rd	0	2908	2908	Year: **2012**, Type: **2-Crack Sealing - Overband, 7-Sealcoating - Chip Seal**
			4 of 6	Maple Park Dr	0	2995	2995	Year: **2012**, Type: **2-Crack Sealing - Overband, 7-Sealcoating - Chip Seal**
			5 of 6	Jakes Lake Rd	0	3062	3062	Year: **2012**, Type: **2-Crack Sealing - Overband, 7-Sealcoating - Chip Seal**
			6 of 6	Plaza Rd	0	3643	3643	Year: **2012**, Type: **2-Crack Sealing - Overband, 7-Sealcoating - Chip Seal**
	−	Left Shoulder	1 of 12	Indianhead Dr (Termini)	0	704	704	Type: **2-Gravel**, Width: **3 ft**
			2 of 12	Oakdale Ln	0	1490	1490	Type: **2-Gravel**, Width: **3 ft**
			3 of 12	Pinedale Ln	0	449	449	Type: **2-Gravel**, Width: **3 ft**
			4 of 12	Sedona Ct	0	2412	2412	Type: **2-Gravel**, Width: **3 ft**
			5 of 12	Field Rd	0	1286	1286	Type: **3-Paved**, Width: **5 ft**
			6 of 12	Maple Ridge Rd	0	350	350	Type: **3-Paved**, Width: **5 ft**
			7 of 12	Paper Pl	0	956	956	Type: **3-Paved**, Width: **5 ft**
			8 of 12	Beranek Rd	0	1284	1284	Type: **3-Paved**, Width: **5 ft**
			9 of 12	Beranek Rd	1284	2908	1624	Type: **2-Gravel**, Width: **3 ft**
			10 of 12	Maple Park Dr	0	2995	2995	Type: **2-Gravel**, Width: **3 ft**
			11 of 12	Jakes Lake Rd	0	3062	3062	Type: **2-Gravel**, Width: **3 ft**
			12 of 12	Plaza Rd	0	3643	3643	Type: **2-Gravel**, Width: **3 ft**
	−	Right Shoulder	1 of 12	Indianhead Dr (Termini)	0	704	704	Type: **2-Gravel**, Width: **3 ft**
			2 of 12	Oakdale Ln	0	1490	1490	Type: **2-Gravel**, Width: **3 ft**
			3 of 12	Pinedale Ln	0	449	449	Type: **2-Gravel**, Width: **3 ft**
			4 of 12	Sedona Ct	0	2412	2412	Type: **2-Gravel**, Width: **3 ft**
			5 of 12	Field Rd	0	1286	1286	Type: **3-Paved**, Width: **5 ft**
			6 of 12	Maple Ridge Rd	0	350	350	Type: **3-Paved**, Width: **5 ft**
			7 of 12	Paper Pl	0	956	956	Type: **3-Paved**, Width: **5 ft**

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
			8 of 12	Beranek Rd	0	1284	1284	Type: **3-Paved**, Width: **5 ft**
			9 of 12	Beranek Rd	1284	2908	1624	Type: **2-Gravel**, Width: **3 ft**
			10 of 12	Maple Park Dr	0	2995	2995	Type: **2-Gravel**, Width: **3 ft**
			11 of 12	Jakes Lake Rd	0	3062	3062	Type: **2-Gravel**, Width: **3 ft**
			12 of 12	Plaza Rd	0	3643	3643	Type: **2-Gravel**, Width: **3 ft**
		One Way	1 of 11	Indianhead Dr (Termini)	0	704	704	One Way: **No**
			2 of 11	Oakdale Ln	0	1490	1490	One Way: **No**
			3 of 11	Pinedale Ln	0	449	449	One Way: **No**
			4 of 11	Sedona Ct	0	2412	2412	One Way: **No**
			5 of 11	Field Rd	0	1286	1286	One Way: **No**
			6 of 11	Maple Ridge Rd	0	350	350	One Way: **No**
			7 of 11	Paper Pl	0	956	956	One Way: **No**
			8 of 11	Beranek Rd	0	2908	2908	One Way: **No**
			9 of 11	Maple Park Dr	0	2995	2995	One Way: **No**
			10 of 11	Jakes Lake Rd	0	3062	3062	One Way: **No**
			11 of 11	Plaza Rd	0	3643	3643	One Way: **No**
		Right-of-Way	1 of 12	Indianhead Dr (Termini)	0	704	704	Indicator: **A**, Width: **80 ft**
			2 of 12	Oakdale Ln	0	1490	1490	Indicator: **A**, Width: **80 ft**
			3 of 12	Pinedale Ln	0	449	449	Indicator: **A**, Width: **80 ft**
			4 of 12	Sedona Ct	0	2412	2412	Indicator: **A**, Width: **80 ft**
			5 of 12	Field Rd	0	1286	1286	Indicator: **A**, Width: **100 ft**
			6 of 12	Maple Ridge Rd	0	350	350	Indicator: **A**, Width: **100 ft**
			7 of 12	Paper Pl	0	956	956	Indicator: **A**, Width: **100 ft**
			8 of 12	Beranek Rd	0	1284	1284	Indicator: **A**, Width: **100 ft**
			9 of 12	Beranek Rd	1284	2908	1624	Indicator: **E**, Width: **66 ft**
			10 of 12	Maple Park Dr	0	2995	2995	Indicator: **E**, Width: **66 ft**
			11 of 12	Jakes Lake Rd	0	3062	3062	Indicator: **E**, Width: **66 ft**
			12 of 12	Plaza Rd	0	3643	3643	Indicator: **E**, Width: **66 ft**
		Median	1 of 4	Indianhead Dr (Termini)	0	450	450	Type: **0-None**, Width: **0 ft**
			2 of 4	Oakdale Ln	0	1490	1490	Type: **0-None**, Width: **0 ft**
			3 of 4	Pinedale Ln	0	449	449	Type: **0-None**, Width: **0 ft**
			4 of 4	Sedona Ct	0	2412	2412	Type: **0-None**, Width: **0 ft**
		Left Curb	1 of 8	Indianhead Dr (Termini)	0	450	450	Type: **0-None**
			2 of 8	Oakdale Ln	0	1490	1490	Type: **0-None**
			3 of 8	Pinedale Ln	0	449	449	Type: **0-None**
			4 of 8	Sedona Ct	0	2412	2412	Type: **0-None**
			5 of 8	Beranek Rd	1284	2908	1624	Type: **0-None**
			6 of 8	Maple Park Dr	0	2995	2995	Type: **0-None**
			7 of 8	Jakes Lake Rd	0	3062	3062	Type: **0-None**
			8 of 8	Plaza Rd	0	3643	3643	Type: **0-None**
		Right Curb	1 of 8	Indianhead Dr (Termini)	0	450	450	Type: **0-None**
			2 of 8	Oakdale Ln	0	1490	1490	Type: **0-None**
			3 of 8	Pinedale Ln	0	449	449	Type: **0-None**
			4 of 8	Sedona Ct	0	2412	2412	Type: **0-None**
			5 of 8	Beranek Rd	1284	2908	1624	Type: **0-None**
			6 of 8	Maple Park Dr	0	2995	2995	Type: **0-None**
			7 of 8	Jakes Lake Rd	0	3062	3062	Type: **0-None**
			8 of 8	Plaza Rd	0	3643	3643	Type: **0-None**
		Parking	1 of 9	Indianhead Dr (Termini)	0	450	450	Parking: **0-None**
			2 of 9	Indianhead Dr (Termini)	450	704	254	Parking: **3-Both Sides**
			3 of 9	Oakdale Ln	0	1490	1490	Parking: **0-None**
			4 of 9	Pinedale Ln	0	449	449	Parking: **0-None**
			5 of 9	Sedona Ct	0	2412	2412	Parking: **0-None**
			6 of 9	Beranek Rd	1284	2908	1624	Parking: **4-Rural**
			7 of 9	Maple Park Dr	0	2995	2995	Parking: **4-Rural**
			8 of 9	Jakes Lake Rd	0	3062	3062	Parking: **4-Rural**
			9 of 9	Plaza Rd	0	3643	3643	Parking: **4-Rural**

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
	−	Traffic Lanes	1 of 11	Indianhead Dr (Termini)	0	704	704	Traffic Lanes: **2 Lanes**
			2 of 11	Oakdale Ln	0	1490	1490	Traffic Lanes: **2 Lanes**
			3 of 11	Pinedale Ln	0	449	449	Traffic Lanes: **2 Lanes**
			4 of 11	Sedona Ct	0	2412	2412	Traffic Lanes: **2 Lanes**
			5 of 11	Field Rd	0	1286	1286	Traffic Lanes: **2 Lanes**
			6 of 11	Maple Ridge Rd	0	350	350	Traffic Lanes: **2 Lanes**
			7 of 11	Paper Pl	0	956	956	Traffic Lanes: **2 Lanes**
			8 of 11	Beranek Rd	0	2908	2908	Traffic Lanes: **2 Lanes**
			9 of 11	Maple Park Dr	0	2995	2995	Traffic Lanes: **2 Lanes**
			10 of 11	Jakes Lake Rd	0	3062	3062	Traffic Lanes: **2 Lanes**
			11 of 11	Plaza Rd	0	3643	3643	Traffic Lanes: **2 Lanes**
	−	Average Daily Traffic (ADT)	1 of 4	Beranek Rd	0	2908	2908	Indicator: **T**, Count: **940**, Year: **2014**
			2 of 4	Maple Park Dr	0	2995	2995	Indicator: **E**, Count: **35**, Year
			3 of 4	Jakes Lake Rd	0	3062	3062	Indicator: **E**, Count: **35**, Year
			4 of 4	Plaza Rd	0	3643	3643	Indicator: **E**, Count: **35**, Year
	−	Pavement Rating	1 of 11	Indianhead Dr (Termini)	0	704	704	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			2 of 11	Oakdale Ln	0	1490	1490	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			3 of 11	Pinedale Ln	0	449	449	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			4 of 11	Sedona Ct	0	2412	2412	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			5 of 11	Field Rd	0	1286	1286	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **7**, Year: **2023**, WISLR Rating: **G**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			6 of 11	Maple Ridge Rd	0	350	350	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **6**, Year: **2023**, WISLR Rating: **G**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			7 of 11	Paper Pl	0	956	956	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **6**, Year: **2023**, WISLR Rating: **G**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			8 of 11	Beranek Rd	0	2908	2908	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **6**, Year: **2023**, WISLR Rating: **G**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			9 of 11	Maple Park Dr	0	2995	2995	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **6**, Year: **2023**, WISLR Rating: **G**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			10 of 11	Jakes Lake Rd	0	3062	3062	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **6**, Year: **2023**, WISLR Rating: **G**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			11 of 11	Plaza Rd	0	3643	3643	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **6**, Year: **2023**, WISLR Rating: **G**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
	−	Sidewalk	0 of 0		0	0	0	
	−	Vertical	0 of 0		0	0	0	
	−	Horizontal	0 of 0		0	0	0	
	−	Maintenance Agreements	0 of 0		0	0	0	
	−	Local ID	1 of 11	Indianhead Dr (Termini)	0	704	704	Identifier:
			2 of 11	Oakdale Ln	0	1490	1490	Identifier:
			3 of 11	Pinedale Ln	0	449	449	Identifier:
			4 of 11	Sedona Ct	0	2412	2412	Identifier:
			5 of 11	Field Rd	0	1286	1286	Identifier:
			6 of 11	Maple Ridge Rd	0	350	350	Identifier:
			7 of 11	Paper Pl	0	956	956	Identifier:
			8 of 11	Beranek Rd	0	2908	2908	Identifier:
			9 of 11	Maple Park Dr	0	2995	2995	Identifier:
			10 of 11	Jakes Lake Rd	0	3062	3062	Identifier:
			11 of 11	Plaza Rd	0	3643	3643	Identifier:

Wisconsin Department of Transportation

Tuesday Mar 26, 2024

Wisconsin Information System for Local Roads

County: MARATHON (37) **Municipality:** KRONENWETTER (V) (145) County-Muni **Certification Year:** 2024

Global Location

Rd/St Name: Sedona Ct Retrieve Entire Route

At: Kronenwetter Dr (Termini)

At/Toward Certified Mileage: 475 feet

Rd/St Length: 496 feet

Toward: Termini

View by Intersections? Yes◉ No◯

Unit of Measurement Feet◉ Miles◯

Retrieve At/Toward

View Physical Inventory

Physical Inventory | Administrative Inventory

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
		Surface	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **22 ft**, Year: **2005**
		Maintenance Treatment	0 of 0		0	0	0	
		Left Shoulder	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Type: **2-Gravel**, Width: **3 ft**
		Right Shoulder	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Type: **2-Gravel**, Width: **3 ft**
		One Way	1 of 1	Kronenwetter Dr (Termini)	0	496	496	One Way: **No**
		Right-of-Way	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Indicator: **A**, Width: **66 ft**
		Median	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Type: **0-None**, Width: **0 ft**
	+	Left Curb	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Type: **0-None**
	+	Right Curb	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Type: **0-None**
	+	Parking	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Parking: **4-Rural**
	+	Traffic Lanes	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Traffic Lanes: **2 Lanes**
	+	Average Daily Traffic (ADT)	0 of 0		0	0	0	
	+	Pavement Rating	1 of 1	Kronenwetter Dr (Termini)	0	496	496	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **5**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
	+	Sidewalk	0 of 0		0	0	0	
	+	Vertical	0 of 0		0	0	0	
	+	Horizontal	0 of 0		0	0	0	
	+	Maintenance Agreements	0 of 0		0	0	0	
	+	Local ID	1 of 1	Kronenwetter Dr (Termini)	0	496	496	Identifier:

Wisconsin Department of Transportation

Tuesday Mar 26, 2024

Wisconsin Information System for Local Roads

County: MARATHON (37) **Municipality:** KRONENWETTER (V) (145) County-Muni **Certification Year:** 2024

Global Location

Rd/St Name: Pinedale Ln Retrieve Entire Route

At: Kronenwetter Dr (Termini)

At/Toward Certified Mileage: 1742 feet

Rd/St Length: 1686 feet

Toward: Termini

View by Intersections? Yes◉ No○

Unit of Measurement Feet◉ Miles○

Retrieve At/Toward

View Physical Inventory

Physical Inventory | Administrative Inventory

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
	−	Surface	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **22 ft**, Year: **2005**
			2 of 3	Windwood Dr	0	348	348	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **22 ft**, Year: **2005**
			3 of 3	Wedgewood Dr	0	664	664	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **22 ft**, Year: **2005**
	−	Maintenance Treatment	0 of 0		0	0	0	
	−	Left Shoulder	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Type: **2-Gravel**, Width: **3 ft**
			2 of 3	Windwood Dr	0	348	348	Type: **2-Gravel**, Width: **3 ft**
			3 of 3	Wedgewood Dr	0	664	664	Type: **2-Gravel**, Width: **3 ft**
	−	Right Shoulder	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Type: **2-Gravel**, Width: **3 ft**
			2 of 3	Windwood Dr	0	348	348	Type: **2-Gravel**, Width: **3 ft**
			3 of 3	Wedgewood Dr	0	664	664	Type: **2-Gravel**, Width: **3 ft**
	−	One Way	1 of 3	Kronenwetter Dr (Termini)	0	674	674	One Way: **No**
			2 of 3	Windwood Dr	0	348	348	One Way: **No**
			3 of 3	Wedgewood Dr	0	664	664	One Way: **No**
	−	Right-of-Way	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Indicator: **A**, Width: **66 ft**
			2 of 3	Windwood Dr	0	348	348	Indicator: **A**, Width: **66 ft**
			3 of 3	Wedgewood Dr	0	664	664	Indicator: **A**, Width: **66 ft**
	−	Median	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Type: **0-None**, Width: **0 ft**
			2 of 3	Windwood Dr	0	348	348	Type: **0-None**, Width: **0 ft**
			3 of 3	Wedgewood Dr	0	664	664	Type: **0-None**, Width: **0 ft**
	−	Left Curb	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Type: **0-None**
			2 of 3	Windwood Dr	0	348	348	Type: **0-None**
			3 of 3	Wedgewood Dr	0	664	664	Type: **0-None**
	−	Right Curb	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Type: **0-None**
			2 of 3	Windwood Dr	0	348	348	Type: **0-None**
			3 of 3	Wedgewood Dr	0	664	664	Type: **0-None**
	−	Parking	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Parking: **4-Rural**
			2 of 3	Windwood Dr	0	348	348	Parking: **4-Rural**
			3 of 3	Wedgewood Dr	0	664	664	Parking: **4-Rural**
	−	Traffic Lanes	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Traffic Lanes: **2 Lanes**
			2 of 3	Windwood Dr	0	348	348	Traffic Lanes: **2 Lanes**
			3 of 3	Wedgewood Dr	0	664	664	Traffic Lanes: **2 Lanes**
	−	Average Daily Traffic (ADT)	0 of 0		0	0	0	
	−	Pavement Rating	1 of 3	Kronenwetter Dr (Termini)	0	674	674	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
			2 of 3	Windwood Dr	0	348	348	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			3 of 3	Wedgewood Dr	0	664	664	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
		Sidewalk	0 of 0		0	0	0	
		Vertical	0 of 0		0	0	0	
		Horizontal	0 of 0		0	0	0	
		Maintenance Agreements	0 of 0		0	0	0	
		Local ID	1 of 3	Kronenwetter Dr (Termini)	0	674	674	Identifier:
			2 of 3	Windwood Dr	0	348	348	Identifier:
			3 of 3	Wedgewood Dr	0	664	664	Identifier:

Wisconsin Department of Transportation

Tuesday Mar 26, 2024

Wisconsin Information System for Local Roads

County: MARATHON (37) **Municipality:** KRONENWETTER (V) (145) County-Muni **Certification Year:** 2024

Global Location

Rd/St Name: Windwood Dr Retrieve Entire Route

At: Oakdale Ln (Termini)

At/Toward Certified Mileage: 1109 feet

Rd/St Length: 1106 feet

Toward: Pinedale Ln (Termini)

View by Intersections? Yes◉ No○

Unit of Measurement Feet◉ Miles○

Retrieve At/Toward

View Physical Inventory

Physical Inventory | Administrative Inventory

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
	−	Surface	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **22 ft**, Year: **2005**
	−	Maintenance Treatment	0 of 0		0	0	0	
	+	Left Shoulder	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Type: **2-Gravel**, Width: **3 ft**
	+	Right Shoulder	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Type: **2-Gravel**, Width: **3 ft**
	+	One Way	1 of 1	Oakdale Ln (Termini)	0	1106	1106	One Way: **No**
	+	Right-of-Way	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Indicator: **A**, Width: **66 ft**
	+	Median	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Type: **0-None**, Width: **0 ft**
	+	Left Curb	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Type: **0-None**
	+	Right Curb	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Type: **0-None**
	+	Parking	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Parking: **4-Rural**
	+	Traffic Lanes	1 of 1	Oakdale Ln (Termini)	0	1106	1106	Traffic Lanes: **2 Lanes**
	+	Average Daily Traffic (ADT)	0 of 0		0	0	0	
	+	Pavement Rating	1 of 1	Oakdale Ln (Termini)	0	1106	1106	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **8**, Year: **2023**, WISLR Rating: **VG**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
	+	Sidewalk	0 of 0		0	0	0	
	+	Vertical	0 of 0		0	0	0	
	+	Horizontal	0 of 0		0	0	0	
	+	Maintenance Agreements	0 of 0		0	0	0	
	+	Local ID	0 of 0		0	0	0	

Wisconsin Department of Transportation

Tuesday Mar 26, 2024

Wisconsin Information System for Local Roads

County: MARATHON (37) **Municipality:** KRONENWETTER (V) (145) County-Muni **Certification Year:** 2024

Global Location

Rd/St Name: Wedgewood Dr Retrieve Entire Route

At: Oakdale Ln (Termini)

At/Toward Certified Mileage: 950 feet

Rd/St Length: 991 feet

Toward: Pinedale Ln (Termini)

View by Intersections? Yes◉ No○

Unit of Measurement Feet◉ Miles○

Retrieve At/Toward

View Physical Inventory

Physical Inventory | Administrative Inventory

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
	−	Surface	1 of 1	Oakdale Ln (Termini)	0	991	991	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **22 ft**, Year: **2005**
	+	Maintenance Treatment	0 of 0		0	0	0	
	+	Left Shoulder	1 of 1	Oakdale Ln (Termini)	0	991	991	Type: **2-Gravel**, Width: **3 ft**
	+	Right Shoulder	1 of 1	Oakdale Ln (Termini)	0	991	991	Type: **2-Gravel**, Width: **3 ft**
	+	One Way	1 of 1	Oakdale Ln (Termini)	0	991	991	One Way: **No**
	+	Right-of-Way	1 of 1	Oakdale Ln (Termini)	0	991	991	Indicator: **A**, Width: **66 ft**
	+	Median	1 of 1	Oakdale Ln (Termini)	0	991	991	Type: **0-None**, Width: **0 ft**
	+	Left Curb	1 of 1	Oakdale Ln (Termini)	0	991	991	Type: **0-None**
	+	Right Curb	1 of 1	Oakdale Ln (Termini)	0	991	991	Type: **0-None**
	+	Parking	1 of 1	Oakdale Ln (Termini)	0	991	991	Parking: **4-Rural**
	+	Traffic Lanes	1 of 1	Oakdale Ln (Termini)	0	991	991	Traffic Lanes: **2 Lanes**
	+	Average Daily Traffic (ADT)	0 of 0		0	0	0	
	+	Pavement Rating	1 of 1	Oakdale Ln (Termini)	0	991	991	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **5**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
	+	Sidewalk	0 of 0		0	0	0	
	+	Vertical	0 of 0		0	0	0	
	+	Horizontal	0 of 0		0	0	0	
	+	Maintenance Agreements	0 of 0		0	0	0	
	+	Local ID	0 of 0		0	0	0	

Wisconsin Department of Transportation

Tuesday Mar 26, 2024

Wisconsin Information System for Local Roads

County: MARATHON (37) **Municipality:** KRONENWETTER (V) (145) County-Muni **Certification Year:** 2024

Global Location

Rd/St Name: Oakdale Ln Retrieve Entire Route

At: Kronenwetter Dr (Termini)

At/Toward Certified Mileage: 1214 feet

Rd/St Length: 1202 feet

Toward: Wedgewood Dr (Termini)

View by Intersections? Yes◉ No◯

Unit of Measurement Feet◉ Miles◯

Retrieve At/Toward

View Physical Inventory

Physical Inventory | Administrative Inventory

Map		Attribute Name	Occurs	At Intersection	From Offset	To Offset	Section Length	Attribute Value
	−	Surface	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **22 ft**, Year: **2005**
			2 of 2	Windwood Dr	0	402	402	Type: **70-Hot Mix Asphalt Pavement (HMAC)**, Width: **22 ft**, Year: **2005**
	−	Maintenance Treatment	0 of 0		0	0	0	
	−	Left Shoulder	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Type: **2-Gravel**, Width: **3 ft**
			2 of 2	Windwood Dr	0	402	402	Type: **2-Gravel**, Width: **3 ft**
	−	Right Shoulder	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Type: **2-Gravel**, Width: **3 ft**
			2 of 2	Windwood Dr	0	402	402	Type: **2-Gravel**, Width: **3 ft**
	−	One Way	1 of 2	Kronenwetter Dr (Termini)	0	800	800	One Way: **No**
			2 of 2	Windwood Dr	0	402	402	One Way: **No**
	−	Right-of-Way	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Indicator: **A**, Width: **66 ft**
			2 of 2	Windwood Dr	0	402	402	Indicator: **A**, Width: **66 ft**
	−	Median	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Type: **0-None**, Width: **0 ft**
			2 of 2	Windwood Dr	0	402	402	Type: **0-None**, Width: **0 ft**
	−	Left Curb	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Type: **0-None**
			2 of 2	Windwood Dr	0	402	402	Type: **0-None**
	−	Right Curb	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Type: **0-None**
			2 of 2	Windwood Dr	0	402	402	Type: **0-None**
	−	Parking	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Parking: **4-Rural**
			2 of 2	Windwood Dr	0	402	402	Parking: **4-Rural**
	−	Traffic Lanes	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Traffic Lanes: **2 Lanes**
			2 of 2	Windwood Dr	0	402	402	Traffic Lanes: **2 Lanes**
	−	Average Daily Traffic (ADT)	0 of 0		0	0	0	
	−	Pavement Rating	1 of 2	Kronenwetter Dr (Termini)	0	800	800	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
			2 of 2	Windwood Dr	0	402	402	System: **Paser Asphalt Pavement (Hot Mix or Cold Mix Asphalt)**, Rating: **4**, Year: **2023**, WISLR Rating: **FR**, Indicator: **A**, Surf Type: **70-Hot Mix Asphalt Pavement (HMAC)**
	−	Sidewalk	0 of 0		0	0	0	
	−	Vertical	0 of 0		0	0	0	
	−	Horizontal	0 of 0		0	0	0	
	−	Maintenance Agreements	0 of 0		0	0	0	
	+	Local ID	1 of 2	Kronenwetter Dr (Termini)	0	800	800	Identifier:

Appendix 2

CGC, Inc.
Construction • Geotechnical
Consulting Engineering/Testing

April 8, 2024
C24128

Mr. Neil Henriksen
Point of Beginning
4941 Kirschling Court
Stevens Point, WI 54481

Re: Geotechnical Exploration Report
Kronenwetter Streets Reconstruction 2024
Kronenwetter, Wisconsin

Dear Mr. Henriksen:

Based on a subsurface exploration program recently completed by Point of Beginning, Inc. (PoB), Construction • Geotechnical Consultants, Inc. (CGC) has prepared this report to provide geotechnical recommendations regarding site preparation and pavement design/construction for the project reference above. We are sending you an electronic copy of this report, and we can provide a paper copy upon request.

PROJECT DESCRIPTION/SITE CONDITIONS

We understand that the pavement of numerous Village of Kronenwetter streets, including portions Kronenwetter Drive, as well as Oakdale Lane, Windwood Road, Wedgewood Drive and Pinedale Lane will be reconstructed. Based on our review of Google Street View data, the existing pavement appears to be in fair to poor condition, including cracks, potholes and signs of periodic maintenance. The pavement reconstruction is understood to include full-depth base course and pavement replacement.

The various streets are located generally near Kronenwetter Drive and are shown in the Soil Boring Exhibits enclosed in Appendix B. The majority of the soil borings were located along asphalt-paved residential streets, which are surrounded by mainly residential or commercial properties. Site topography varies along the roadways but is generally flat. We anticipate minimal grade changes during reconstruction of the streets.

SUBSURFACE CONDITIONS

Subsurface conditions were explored by drilling a total of 28 Standard Penetration Test (SPT) soil borings to a planned depth of 5 ft below existing site grades. The general boring locations were selected by the project team and located in the field by PoB staff, who also surveyed ground surface elevations at the boring locations. The soil borings were conducted by Point of Beginning (under subcontract to the Village) on March 11 and 12, 2024 using a track mounted D-25 rotary drill rig equipped with solid stem augers and an automatic SPT hammer. The specific procedures used for drilling and sampling are described in Appendix A. The boring locations are shown in plan on the Soil Boring Exhibits presented in Appendix B.

2921 Perry Street, Madison WI 53713
Telephone: 608/288-4100
FAX: 608/288-7887

The subsurface profiles at the borings can be generally described as follows, in descending order:

- About 2.5 to 6.0 in. of ***asphalt*** over 6.0 to 9.5 in. of ***base course***; then
- 1.5 to 2.5 ft of apparent ***fill*** at Borings 6, 11, 12 and 27, consisting of generally loose to medium dense *sand*; furthermore, sand soils encountered in several borings were labeled *possible fill*; then
- Loose to very dense ***sand strata*** with variable silt and gravel contents, as well as scattered cobbles/boulders, to the maximum depths explored.

As exceptions to the general profile listed above, Boring 8 encountered loose *sandy silt* from about 2 ft below the ground surface to the termination depth. Borings 15 and 16 encountered base course thicknesses of 31 and 20 inches, respectively. Boring 27 encountered loose *clayey sand* below a fill layer from about 2.5 to 4 ft below the ground surface.

Apparent groundwater was not encountered within the borings during or shortly after drilling. Water levels can be expected to fluctuate based on seasonal variations in precipitation, infiltration, the level in nearby waterbodies and other factors. A more detailed description of the encountered subsurface conditions is presented on the boring logs contained in Appendix B.

According to the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) *Web Soil Survey*, three major soil series are identified across the project areas. The prevalent soil series are Mahtomedi loamy sand (MbB and McA), Mosinee sandy loam (MsB) and Oesterle sandy loam (Oe), which are mapped in most of the areas.

The aforementioned soils are described as somewhat poorly-drained to well drained soils which formed on drainage ways to outwash plains. A typical profile for Mahtomedi loamy sand and Mosinee sandy loam generally comprises of coarser-grained soils like loamy coarse sand, gravelly sandy loam and gravelly sand. In areas mapped as Oesterle sandy loam, finer-grained soils, such as sandy loam, are typically underlain by coarser-grained soils like very gravelly coarse sand and stratified sand. The seasonal high water table should generally remain 80 in. or more below the ground surface in the mapped areas.

The Soil Maps for these areas, which was generated by the USDA-NRCS *Web Soil Survey*, are attached in Appendix B. The soil profiles in the borings were in general agreement with the profiles from the soil mapping (with the exception of fairly shallow fill soils that were encountered in some of the borings).

DISCUSSION AND RECOMMENDATIONS

Subject to the limitations discussed below and based on the subsurface exploration program, it is our opinion that the streets are generally suitable for construction as planned. Variable soil conditions, based on the presence of existing fill in some of the borings, should be anticipated. *Based on the presence of some marginal shallow fill soils along sections of the streets, as well as signs of pavement distress along the existing streets, subgrade improvement measures will likely be required during construction, at least on an isolated basis, to develop a suitable subgrade for pavement support.*

Our recommendations for site preparation and pavement design/construction are presented in the following subsections. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix C.

A. Pavement Subgrade Preparation

After complete pavement and base course removal and cutting to grade, where needed, the exposed soils are generally expected to consist of sand (fill and native). Exposed clay subgrades (if any) in areas at-grade or requiring minor filling should be statically recompacted (without vibration) and then proof-rolled with a heavy rubber-tired piece of construction equipment to check for soft/yielding areas. Exposed granular soils should be recompacted with a vibratory roller. *Proof-rolling should not be performed within 48 hours of a rainfall exceeding ¼-inch.*

If soft/yielding areas are encountered, these soils should be selectively undercut (e.g., excavation below subgrade, EBS) and replaced with coarse aggregate [e.g., 3-in. dense graded base (DGB) or select crushed material (SCM), WisDOT *Standard Specification for Highway and Structure Construction*, Sections 305 and 312, respectively]. The thickness of the undercut/stabilization layer should be determined in the field during proof-rolling, and the required thickness of the layer will likely vary along the alignment. If long, continuous sections of soft/yielding soils are encountered, a geogrid [e.g., Tensar Type 1 or 2 (BX 1100 or 1200) or equivalents] could be considered to provide additional reinforcement, and potentially reduce the thickness of the aggregate stabilization layer.

The need for undercutting/stabilization will likely depend on the weather conditions during construction, as some of the anticipated subgrade soils are expected to be susceptible to disturbance/weakening from precipitation and construction traffic. If construction occurs during fairly wet weather without adequate time to dry, undercutting/stabilization could be more widespread. Conversely, if warm/dry conditions prevail during construction, less undercutting/ stabilization may be necessary. *Based on the existing pavement conditions in portions of the streets and the presence of fill and possible fill soils, we recommend a contingency in the project budget for EBS.*

B. Pavement Design Parameters

The pavement design parameters contained herein assume a firm or stabilized sand or clay subgrade is present or has been developed according to the recommendations and techniques discussed previously. The recommended design soil parameters outlined in Table 1, which are based on the soils encountered in the performed borings and the soil mapping completed using the USDA-NRCS Web Soil Survey, should be used in conjunction with anticipated traffic loads to develop the design pavement section. The following parameters are based on pavement design methods discussed in the WisDOT *Geotechnical Manual*:

TABLE 1 – Recommended Pavement Design Parameters

Soil Parameter	Recommended Design Values
USCS	SP-SM/SM
AASHTO Classification	A-2/A-4
Frost Index, FI	F-4
Design Group Index, DGI	14
Soil Support Value, SSV	3.9
Subgrade Modulus, K (pci)	125
Estimated California Bearing Ratio, CBR	2-5

Note: These values are based on the following assumptions (based on WisDOT *Geotechnical Manual*):

1) The subgrade has been closely monitored.
2) The subgrade has been thoroughly and adequately compacted.
3) Wet zones have been dried, drained, or removed.
4) Pockets of dissimilar material have been removed, replaced or mixed to achieve a homogeneous subgrade.
5) Adequate subgrade drainage has been achieved.
6) Lower quality soils have been undercut, where encountered.

Note that although we anticipate selective undercutting (EBS) will be completed, where deemed necessary, the soil support value and subgrade modulus can potentially be increased if a ***systematic stabilization layer*** is included below *the entire* planned pavement section, as described in the WisDOT *Facilities Development Manual (FDM)* Section 14-5 incorporating *select materials in subgrade*. The ten alternatives for select materials are discussed in the FDM Section 11-5-15, Attachment 15.2. However, we do not recommend adjusting the recommended pavement design parameters if only isolated undercutting/stabilization will be completed. We can provide additional information upon request. *Note that if the upper (surface) asphalt layer will not be installed immediately after the lower*

(binder) asphalt layer and construction traffic will travel on only the lower layer, consideration should be given to increasing the lower asphalt layer thickness to improve the durability of the lower layer.

Assuming a firm/non-yielding subgrade is developed, including undercutting/stabilization of lower quality soils discussed previously, and assumed traffic loading conditions, consisting of a combination of light passenger vehicles and heavy truck traffic [e.g., less than 10 daily 18-kip Equivalent Single-Axle Loads (ESALs)], a typical flexible pavement design is 4.0 to 6.0 in. of asphalt pavement and 10 to 18 in. of dense graded base course. However, the pavement design should be based on traffic count data, past Village of Kronenwetter projects and the provided soil parameters.

CONSTRUCTION CONSIDERATIONS

Due to variations in weather, construction methods and other factors, specific construction problems are difficult to predict. Soil related difficulties that could be encountered on the site are discussed below:

- Earthwork construction during the early spring or late fall could be complicated as a result of wet weather and freezing temperatures. During cold weather, exposed subgrades should be protected from freezing before and after fill/base course placement. Fill should never be placed while frozen or on frozen ground.

- If the construction schedule requires that construction proceed during adverse weather, typically encountered during fall through spring, the contingency for undercutting disturbed soils should be increased.

- To the extent practical, traffic should be avoided on prepared subgrades to minimize disturbance.

- Excavations extending greater than 4 ft in depth below the existing ground surface should be sloped or braced in accordance with current OSHA standards.

- Based on observations made during the field exploration, groundwater infiltration into excavations should generally not be expected. Water accumulating on prepared subgrades as a result of precipitation or seepage (including perched areas) should be quickly removed using pumps operating from filtered sump pits. Dewatering means and methods are the contractor's responsibility.

RECOMMENDED CONSTRUCTION MONITORING

The quality of the pavement subgrades will be largely determined by the level of care exercised during site development. To check that earthwork and pavement construction proceeds in accordance with our recommendations, the following operations should be monitored by CGC:

- Proof-rolling within roadway areas; and
- Asphalt compaction;

*****

It has been a pleasure to serve you on this project. If you have any questions or need additional consultation, please contact us.

Sincerely,

CGC, Inc.

Brian S. McIlwaine, E.I.T.
Senior Staff Engineer

Tim F. Gassenheimer, P.E.
Senior Staff Engineer

Encl: Appendix A - Field Exploration
Appendix B - Soil Boring Exhibits
Logs of Test Borings (28)
Log of Test Boring-General Notes
Unified Soil Classification System
USDA-NRCS Web Soil Survey Maps & Legends (6 Pages)
Appendix C - Document Qualifications
Appendix D - Recommended Compacted Fill Specifications

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

A total of 28 Standard Penetration Test (SPT) soil borings were drilled to a planned depth of 5 ft below existing site grades. In each SPT boring, soil samples were generally obtained at 2.5-foot intervals to the final depth. The soil samples were obtained in general accordance with specifications for standard penetration testing, ASTM D 1586. The specific procedures used for drilling and sampling are described below.

1. Boring Procedures between Samples

   The boring is extended downward, between samples, by a solid stem auger.

2. Standard Penetration Test and Split-Barrel Sampling of Soils
   (ASTM Designation: D 1586)

   This method consists of driving a 2-inch outside diameter split-barrel sampler using a 140-pound weight falling freely through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven 12 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the log of borings and is known as the Standard Penetration Resistance. Recovered samples are first classified as to texture by the driller.

During the field exploration, the driller visually classified the soil and prepared a field log. *Field screening of the soil samples for possible environmental contaminants was not conducted by the drillers, as environmental site assessment activities is beyond PoB's work scope*. Water level observations were made in each boring during and after drilling and are shown at the bottom of each boring log. Upon completion of drilling, the boreholes were backfilled in accordance with WDNR regulations, and the soil samples were delivered to our laboratory for visual classification. The soils were visually classified by a geotechnical engineer using the Unified Soil Classification System. The final logs prepared by the engineer and a description of the Unified Soil Classification System are presented in Appendix B.

APPENDIX B

SOIL BORING EXHIBITS
LOGS OF TEST BORINGS (28)
LOG OF TEST BORING-GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM
USDA-NRCS WEB SOIL SURVEY MAPS & LEGENDS (6 PAGES)

Legend

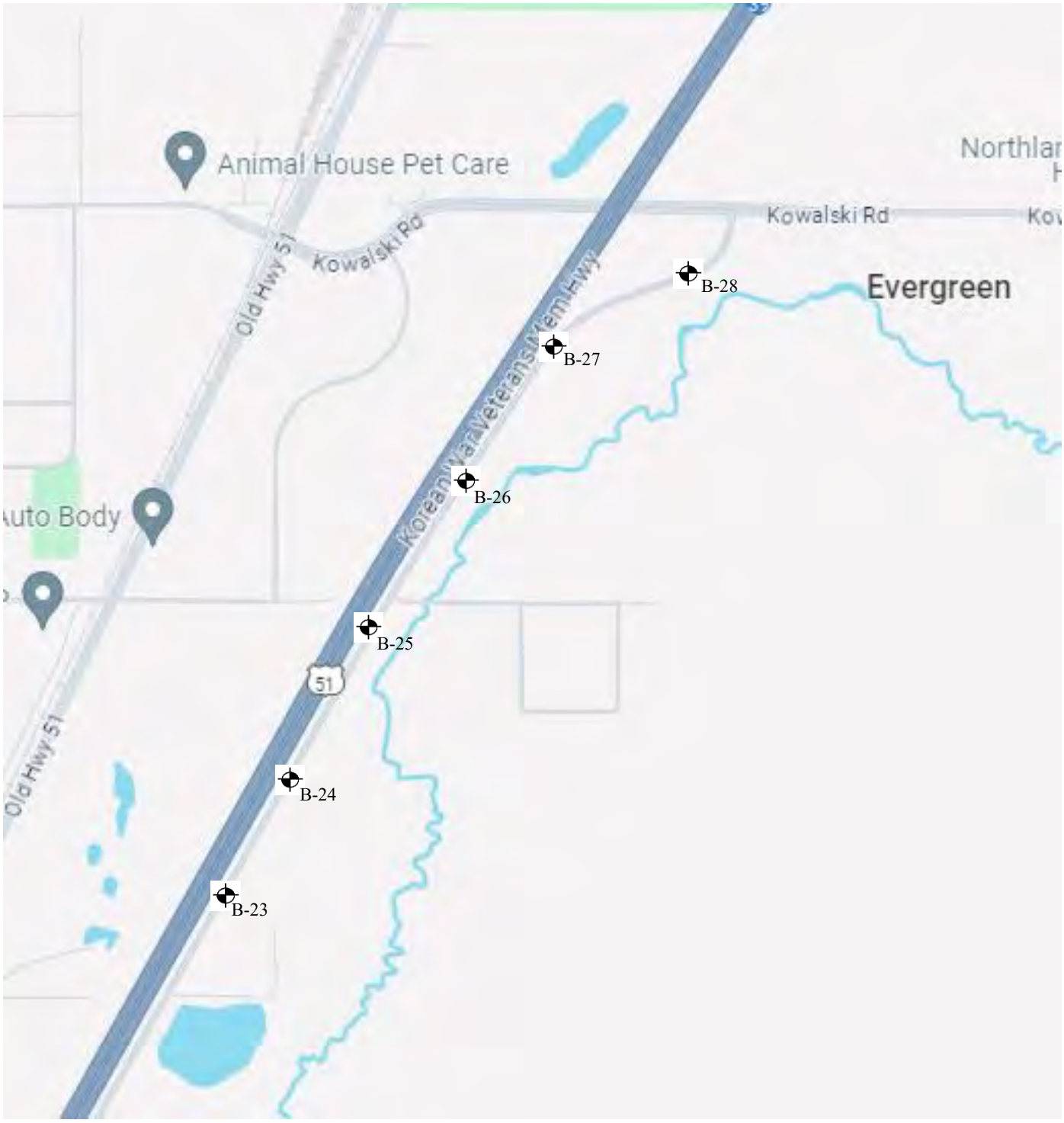
⌖ Denotes Boring Location and Number

Notes

1. Borings were drilled by Point on Beginning on March 11 and 12, 2024.
2. Boring locations are approximate.
3. Base map was obtained from Google.

Scale: Reduced

Job No. C24128	CGC, Inc.	**SOIL BORING EXHIBIT A**
Date: 4/2024		**Kronenwetter Street Improvements 2024**
		Village of Kronenwetter, Wisconsin



N

Legend

⌖ Denotes Boring Location and Number

Notes

1. Borings were drilled by Point on Beginning on March 11 and 12, 2024.
2. Boring locations are approximate.
3. Base map was obtained from Google.

Scale: Reduced

Job No. C24128	CGC, Inc.	**SOIL BORING EXHIBIT B**
Date: 4/2024		**Kronenwetter Street Improvements 2024** **Village of Kronenwetter, Wisconsin**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **1**
Surface Elevation (ft) **1080.6**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±3.5 in. Asphalt / ±8 in. Base Course					
1	■	8	M	12		Loose to Medium Dense, Brown Fine to Medium SAND, Some Gravel, Little to Some Silt, Scattered Cobbles/Boulders (SP-SM/SM - Possible Fill)					
2	■	6	M	9							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **2**
Surface Elevation (ft) **1075.2**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±3.0 in. Asphalt / ±9 in. Base Course					
1		6	M	50/1"		Medium Dense to Very Dense, Brown Fine to Medium SAND, Some Gravel, Little to Some Silt, Scattered Cobbles/Boulders (SP-SM/SM - Possible Fill)					
2		10	M	19							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **3**
Surface Elevation (ft) **1065.0**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±3.0 in. Asphalt / ±9 in. Base Course					
1	■	12	M	12		Medium Dense, Brown Silty Fine SAND, Some Gravel, Scattered Cobbles/Boulders (SM)					
2	■	16	M	12							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **4**
Surface Elevation (ft) **1061.8**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		12	M	21		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Little to Some Silt, Scattered Cobbles/Boulders (SP-SM/SM)					
2		16	M	11							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **5**
Surface Elevation (ft) **1093.5**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1	■	18	M	14		Medium Dense, Gray Fine to Medium SAND, Little Silt, Trace Gravel (SP-SM - Possible Fill)					
						Very Dense, Gray Fine to Medium SAND, Some Silt and Gravel, Scattered Cobbles/Boulders (SM)					
2	■	7	M	50/6"							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **6**
Surface Elevation (ft) **1074.8**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1	■	18	M	18		FILL: Medium Dense, Gray Fine to Medium Sand, Some Silt and Gravel					
2	■	18	M	15		Medium Dense, Brown Fine to Medium SAND, Some Silt and Gravel (SM - Possible Fill)					
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **7**
Surface Elevation (ft) **1069.4**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		16	M	10		Loose to Medium Dense, Gray Fine to Medium SAND, Some Silt, Little Gravel (SM)					
2		18	M	8							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **8**
Surface Elevation (ft) **1058.8**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		12	M	10		Loose to Medium Dense, Gray Fine to Medium SAND, Little Silt and Gravel (SP-SM - Possible Fill)					
						Loose, Brown to Gray Sandy SILT, Some Gravel (ML)					
2		16	M	6							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **9**
Surface Elevation (ft) **1069.2**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		18	M	18		Medium Dense, Gray Fine to Medium SAND, Some Silt, Trace Gravel (SM - Possible Fill)					
						Medium Dense, Brown Fine SAND, Little to Some Silt, Trace Gravel (SP-SM/SM)					
2		18	M	11							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **10**
Surface Elevation (ft) **1074.1**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		14	M	15		Medium Dense, Brown to Gray Fine to Medium SAND, Some Silt, Trace to Little Gravel (SM - Possible Fill)					
2		18	M	11							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **11**
Surface Elevation (ft) **1089.6**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		18	M	16		FILL: Medium Dense, Gray Fine to Medium Sand, Some Silt, Trace Gravel					
						Medium Dense, Brown Fine to Medium SAND, Some Silt, Trace Gravel (SM)					
2		18	M	14							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **12**
Surface Elevation (ft) **1067.2**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1	■	18	M	23		FILL: Medium Dense, Gray Fine to Medium Sand, Some Silt, Trace Gravel					
2	■	18	M	10		Loose to Medium Dense, Brown Fine to Medium SAND, Some Silt, Trace Gravel (SM)					
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **13**
Surface Elevation (ft) **1069.4**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		16	M	23		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Little to Some Silt (SP-SM/SM)					
2		16	M	15							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **14**
Surface Elevation (ft) **1062.3**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						±3.5 in. Asphalt / ±8 in. Base Course					
1		10	M	27		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Little to Some Silt, Scattered Cobbles/Boulders (SP-SM/SM)					
2		12	M	17							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **15**
Surface Elevation (ft) **1051.2**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±4.5 in. Asphalt / ±31 in. Base Course					
1	■	2	M	34							
						Loose, Brown Fine to Medium SAND, Little to Some Gravel, Trace to Little Silt (SP/SP-SM)					
2	■	18	M	9							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **16**
Surface Elevation (ft) **1046.6**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±4.5 in. Asphalt / ±20 in. Base Course					
1		18	M	11		Medium Dense, Dark Brown Fine to Medium SAND, Some Silt and Gravel, Trace Organics (SM)					
						Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt, Scattered Cobbles/Boulders (SP/SP-SM)					
2		10	M	22							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **17**
Surface Elevation (ft) **1049.4**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						±4.5 in. Asphalt / ±7.5 in. Base Course					
1		14	M	25		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt, Scattered Cobbles/Boulders (SP/SP-SM)					
2		12	M	29							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **18**
Surface Elevation (ft) **1048.6**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		12	M	24		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt, Scattered Cobbles/Boulders (SP/SP-SM)					
2		14	M	18							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **19**
Surface Elevation (ft) **1051.2**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		8	M	19		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt, Scattered Cobbles/Boulders (SP/SP-SM)					
2		14	M	22							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **20**
Surface Elevation (ft) **1050.0**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±3.0 in. Asphalt / ±9 in. Base Course					
1		12	M	25		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt (SP/SP-SM)					
2		18	M	19		Thin Silty Sand Seam near 4 ft					
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **21**
Surface Elevation (ft) **1056.7**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±3.0 in. Asphalt / ±9 in. Base Course					
1		12	M	20		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt, Scattered Cobbles/Boulders (SP/SP-SM)					
2		8	M	13		Medium Dense, Brown Fine to Medium SAND, Little to Some Gravel, Some Silt, Scattered Cobbles/Boulders (SM)					
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **22**
Surface Elevation (ft) **1054.8**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±2.5 in. Asphalt / ±9.5 in. Base Course					
1		12	M	20		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt, Scattered Cobbles/Boulders (SP/SP-SM)					
2		12	M	14							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **23**
Surface Elevation (ft) **1056.7**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±2.5 in. Asphalt / ±9.5 in. Base Course					
1		18	M	25		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt (SP/SP-SM)					
2		18	M	22							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/12/24** End **3/12/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **24**
Surface Elevation (ft) **1058.7**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±3.0 in. Asphalt / ±9 in. Base Course					
1		12	M	18		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt (SP/SP-SM)					
2		18	M	25							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **25**
Surface Elevation (ft) **1059.1**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						±3.0 in. Asphalt / ±9 in. Base Course					
1		10	M	22		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt (SP/SP-SM)					
2		18	M	27							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **26**
Surface Elevation (ft) **1058.9**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±4.0 in. Asphalt / ±8 in. Base Course					
1		18	M	28		Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt (SP/SP-SM)					
2		16	M	26							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **27**
Surface Elevation (ft) **1061.5**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±3.0 in. Asphalt / ±9 in. Base Course					
1		14	M	21		FILL: Medium Dense, Brown Fine to Medium Sand, Some Gravel, Trace to Little Silt					
						Loose, Dark Brown to Brown Clayey SAND, Trace Organics (SC - Possible Buried Topsoil)					
2		18	M	7		Loose, Brown Fine to Medium SAND, Little Gravel, Trace Silt (SP)					
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project **Proposed Kronenwetter Street Improvements**

Location **Kronenwetter, WI**

Boring No. **28**
Surface Elevation (ft) **1063.8**
Job No. **C24128**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LOI
						±6.0 in. Asphalt / ±6 in. Base Course					
1		14	M	30		Medium Dense to Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt (SP/SP-SM)					
2		18	M	27							
					5	End of Boring at 5 ft Borehole Backfilled with Soil Cuttings and an Asphalt Patch					
					10						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **3/11/24** End **3/11/24**
Driller **POB** Chief **DC** Rig **D-25**
Logger **RY** Editor **BSM**
Drill Method **4" SSA; Autohammer**

CGC, Inc.

LOG OF TEST BORING

General Notes

DESCRIPTIVE SOIL CLASSIFICATION

Grain Size Terminology

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles	3" to 12"	3" to 12"
Gravel: Coarse	¾" to 3"	¾" to 3"
Fine	4.76 mm to ¾"	#4 to ¾"
Sand: Coarse	2.00 mm to 4.76 mm	#10 to #4
Medium	0.42 to mm to 2.00 mm	#40 to #10
Fine	0.074 mm to 0.42 mm	#200 to #40
Silt	0.005 mm to 0.074 mm	Smaller than #200
Clay	Smaller than 0.005 mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

General Terminology

Physical Characteristics
Color, moisture, grain shape, fineness, etc.
Major Constituents
Clay, silt, sand, gravel
Structure
Laminated, varved, fibrous, stratified, cemented, fissured, etc.
Geologic Origin
Glacial, alluvial, eolian, residual, etc.

Relative Density

Term	"N" Value
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

Relative Proportions Of Cohesionless Soils

Proportional Term	Defining Range by Percentage of Weight
Trace	0% - 5%
Little	5% - 12%
Some	12% - 35%
And	35% - 50%

Consistency

Term	q_u-tons/sq. ft
Very Soft	0.0 to 0.25
Soft	0.25 to 0.50
Medium	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	Over 4.0

Organic Content by Combustion Method

Soil Description	Loss on Ignition
Non Organic	Less than 4%
Organic Silt/Clay	4 – 12%
Sedimentary Peat	12% - 50%
Fibrous and Woody Peat	More than 50%

Plasticity

Term	Plastic Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

SYMBOLS

Drilling and Sampling

CS – Continuous Sampling
RC – Rock Coring: Size AW, BW, NW, 2"W
RQD – Rock Quality Designation
RB – Rock Bit/Roller Bit
FT – Fish Tail
DC – Drove Casing
C – Casing: Size 2 ½", NW, 4", HW
CW – Clear Water
DM – Drilling Mud
HSA – Hollow Stem Auger
FA – Flight Auger
HA – Hand Auger
COA – Clean-Out Auger
SS - 2" Dia. Split-Barrel Sample
2ST – 2" Dia. Thin-Walled Tube Sample
3ST – 3" Dia. Thin-Walled Tube Sample
PT – 3" Dia. Piston Tube Sample
AS – Auger Sample
WS – Wash Sample
PTS – Peat Sample
PS – Pitcher Sample
NR – No Recovery
S – Sounding
PMT – Borehole Pressuremeter Test
VS – Vane Shear Test
WPT – Water Pressure Test

Laboratory Tests

q_a – Penetrometer Reading, tons/sq ft
q_a – Unconfined Strength, tons/sq ft
W – Moisture Content, %
LL – Liquid Limit, %
PL – Plastic Limit, %
SL – Shrinkage Limit, %
LI – Loss on Ignition
D – Dry Unit Weight, lbs/cu ft
pH – Measure of Soil Alkalinity or Acidity
FS – Free Swell, %

Water Level Measurement

▽ - Water Level at Time Shown
NW – No Water Encountered
WD – While Drilling
BCR – Before Casing Removal
ACR – After Casing Removal
CW – Cave and Wet
CM – Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

CGC, Inc.

Madison - Milwaukee

Unified Soil Classification System

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

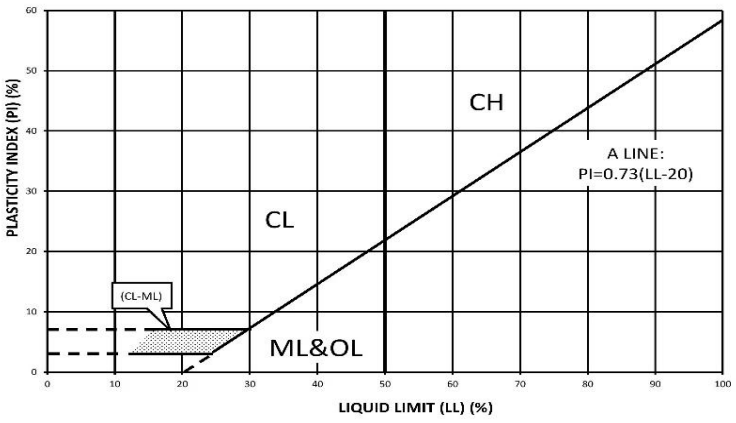
LABORATORY CLASSIFICATION CRITERIA

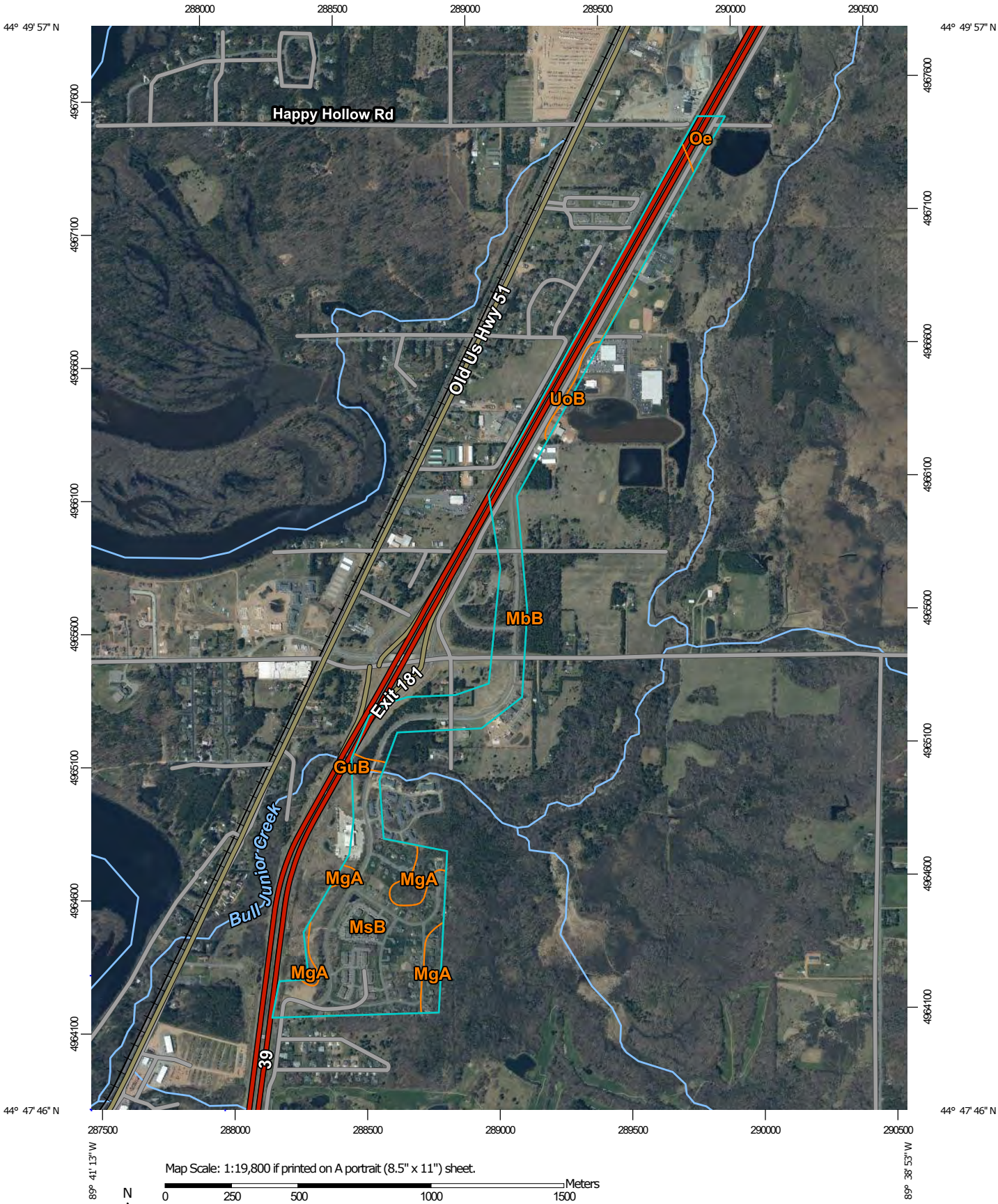
GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limts below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limts above "A" line or P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART





Map Scale: 1:19,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 250 500 1000 1500

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 1:20,000.

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: Marathon County, Wisconsin
Survey Area Data: Version 21, Sep 8, 2023

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

Date(s) aerial images were photographed: May 12, 2020—May 15, 2020

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Fh	Fordum silt loam, 0 to 1 percent slopes	1.3	0.8%
GuB	Guenther loamy sand, 2 to 6 percent slopes	0.0	0.0%
MbB	Mahtomedi loamy sand, 0 to 6 percent slopes	70.9	42.9%
MgA	Meadland loam, 0 to 3 percent slopes	13.6	8.2%
MsB	Mosinee sandy loam, 2 to 6 percent slopes	72.8	44.0%
Oe	Oesterle sandy loam, 0 to 3 percent slopes	4.1	2.5%
UoB	Udorthents, loamy, gently sloping	2.5	1.5%
Totals for Area of Interest		**165.2**	**100.0%**

Map Scale: 1:10,500 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
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- Miscellaneous Water
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- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
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- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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- Rails
- Interstate Highways
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MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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)

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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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Fh	Fordum silt loam, 0 to 1 percent slopes	7.1	8.1%
MbB	Mahtomedi loamy sand, 0 to 6 percent slopes	21.9	25.2%
McA	Mahtomedi loamy sand, moderately well drained, 0 to 3 percent slopes	26.4	30.4%
Oe	Oesterle sandy loam, 0 to 3 percent slopes	27.4	31.6%
Pg	Pits, gravel	3.4	3.9%
UoB	Udorthents, loamy, gently sloping	0.2	0.2%
W	Water	0.5	0.6%
Totals for Area of Interest		**86.8**	**100.0%**

APPENDIX C

DOCUMENT QUALIFICATIONS

APPENDIX C
DOCUMENT QUALIFICATIONS

I. GENERAL RECOMMENDATIONS/LIMITATIONS

CGC, Inc. should be provided the opportunity for a general review of the final design and specifications to confirm that earthwork and foundation requirements have been properly interpreted in the design and specifications. CGC should be retained to provide soil engineering services during excavation and subgrade preparation. This will allow us to observe that construction proceeds in compliance with the design concepts, specifications and recommendations, and also will allow design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction. CGC does not assume responsibility for compliance with the recommendations in this report unless we are retained to provide construction testing and observation services.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and no other warranties are expressed or implied. The opinions and recommendations submitted in this report are based on interpretation of the subsurface information revealed by the test borings indicated on the location plan. The report does not reflect potential variations in subsurface conditions between or beyond these borings. Therefore, variations in soil conditions can be expected between the boring locations and fluctuations of groundwater levels may occur with time. The nature and extent of the variations may not become evident until construction.

II. IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes. While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

READ THE FULL REPORT

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *CGC cannot accept responsibility or liability for problems that occur because our reports do not consider developments of which we were not informed.*

SUBSURFACE CONDITIONS CAN CHANGE

A geotechnical engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL OPINION

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ - sometimes significantly - from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most

effective method of managing the risks associated with unanticipated conditions.

A REPORT'S RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the confirmation-dependent recommendations included in your report. *Those confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *CGC cannot assume responsibility or liability for the report's confirmation-dependent recommendations if we do not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical engineering report. Confront that risk by having CGC participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

DO NOT REDRAW THE ENGINEER'S LOGS

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

GIVE CONSTRUCTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

READ RESPONSIBILITY PROVISIONS CLOSELY

Some clients, design professionals, and constructors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineer's responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

ENVIRONMENTAL CONCERNS ARE NOT COVERED

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

OBTAIN PROFESSIONAL ASSISTANCE TO DEAL WITH MOLD

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Membership in the Geotechnical Business Council (GBC) of Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with CGC, a member of GBC, for more information.

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Geotechnical Business Council
of the Geoprofessional Business Association
8811 Colesville Road, Suite G 106
Silver Spring, MD 20910

APPENDIX D

RECOMMENDED COMPACTED FILL SPECIFICATIONS

APPENDIX D

CGC, INC.

RECOMMENDED COMPACTED FILL SPECIFICATIONS

General Fill Materials

Proposed fill shall contain no vegetation, roots, topsoil, peat, ash, wood or any other non-soil material which by decomposition might cause settlement. Also, fill shall never be placed while frozen or on frozen surfaces. Rock, stone or broken concrete greater than 6 in. in the largest dimension shall not be placed within 10 ft of the building area. Fill used greater than 10 ft beyond the building limits shall not contain rock, boulders or concrete pieces greater than a 2 sq ft area and shall not be placed within the final 2 ft of finish subgrade or in designated utility construction areas. Fill containing rock, boulders or concrete pieces should include sufficient finer material to fill voids among the larger fragments.

Special Fill Materials

In certain cases, special fill materials may be required for specific purposes, such as stabilizing subgrades, backfilling undercut excavations or filling behind retaining walls. For reference, WisDOT gradation specifications for various types of granular fill are attached in Table 1.

Placement Method

The approved fill shall be placed, spread and leveled in layers generally not exceeding 10 in. in thickness before compaction. The fill shall be placed at moisture content capable of achieving the desired compaction level. For clay soils or granular soils containing an appreciable amount of cohesive fines, moisture conditioning will likely be required.

It is the Contractor's responsibility to provide all necessary compaction equipment and other grading equipment that may be required to attain the specified compaction. Hand-guided vibratory or tamping compactors will be required whenever fill is placed adjacent to walls, footings, columns or in confined areas.

Compaction Specifications

Maximum dry density and optimum moisture content of the fill soil shall be determined in accordance with modified Proctor methods (ASTM D1557). The recommended field compaction as a percentage of the maximum dry density is shown in Table 2. Note that these compaction guidelines would generally not apply to coarse gravel/stone fill. Instead, a method specification would apply (e.g., compact in thin lifts with a vibratory compactor until no further consolidation is evident).

Testing Procedures

Representative samples of proposed fill shall be submitted to CGC, Inc. for optimum moisture-maximum density determination (ASTM D1557) prior to the start of fill placement. The sample size should be approximately 50 lb.

CGC, Inc. shall be retained to perform field density tests to determine the level of compaction being achieved in the fill. The tests shall generally be conducted on each lift at the beginning of fill placement and at a frequency mutually agreed upon by the project team for the remainder of the project.

Table 1
Gradation of Special Fill Materials

Material	WisDOT Section 311	WisDOT Section 312	WisDOT Section 305			WisDOT Section 209		WisDOT Section 210
	Breaker Run	Select Crushed Material	3-in. Dense Graded Base	1 1/4-in. Dense Graded Base	3/4-in. Dense Graded Base	Grade 1 Granular Backfill	Grade 2 Granular Backfill	Structure Backfill
Sieve Size	Percent Passing by Weight							
6 in.	100							
5 in.		90-100						
3 in.			90-100					100
1 1/2 in.		20-50	60-85					
1 1/4 in.				95-100				
1 in.					100			
3/4 in.			40-65	70-93	95-100			
3/8 in.				42-80	50-90			
No. 4			15-40	25-63	35-70	100 (2)	100 (2)	25-100
No. 10		0-10	10-30	16-48	15-55			
No. 40			5-20	8-28	10-35	75 (2)		
No. 100						15 (2)	30 (2)	
No. 200			2-12	2-12	5-15	8 (2)	15 (2)	15 (2)

Notes:

1. Reference: Wisconsin Department of Transportation *Standard Specifications for Highway and Structure Construction.*
2. Percentage applies to the material passing the No. 4 sieve, not the entire sample.
3. Per WisDOT specifications, both breaker run and select crushed material can include concrete that is 'substantially free of steel, building materials and other deleterious material'.

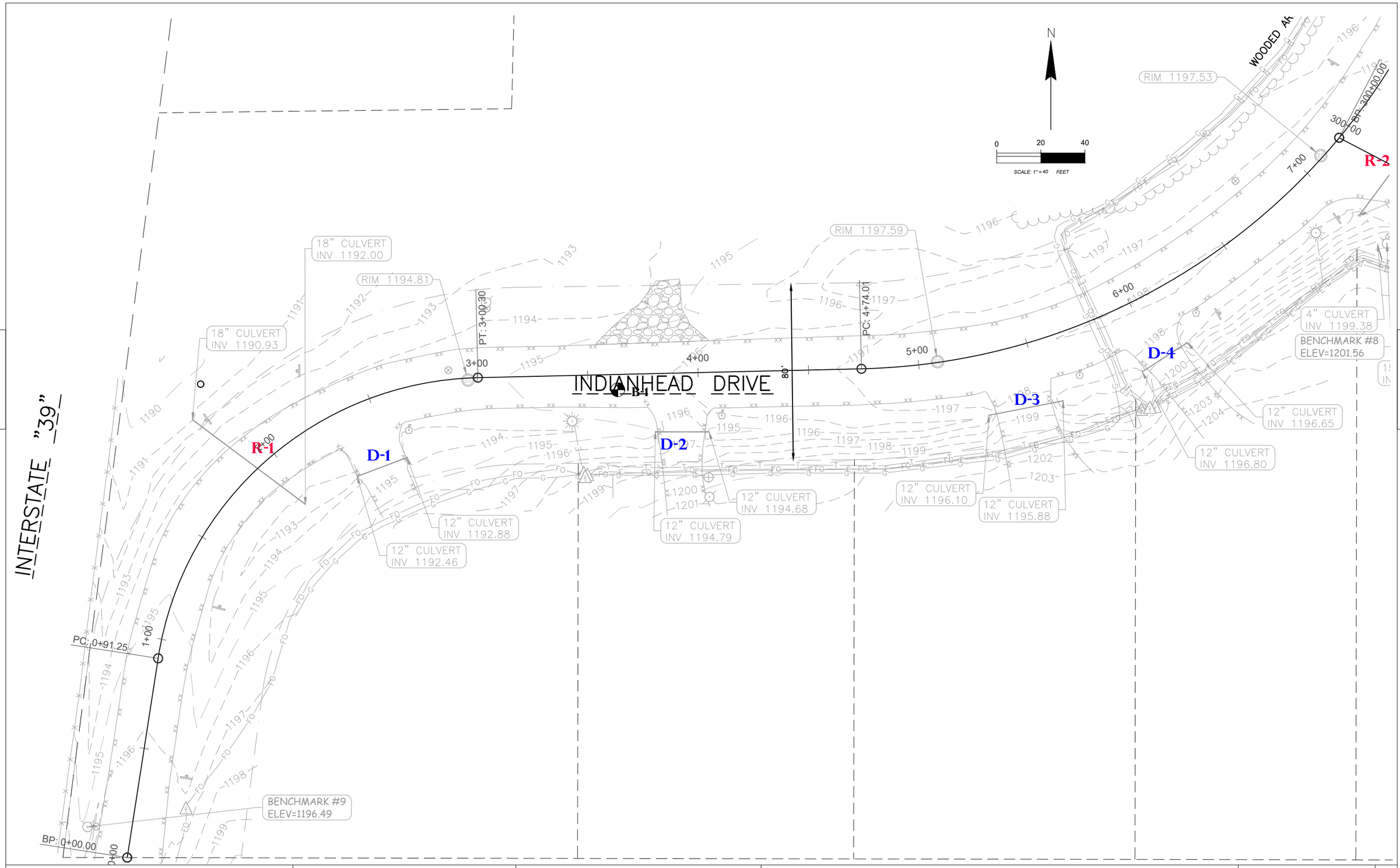
Table 2
Compaction Guidelines

Area	Percent Compaction (1)	
	Clay/Silt	Sand/Gravel
Within 10 ft of building lines		
Footing bearing soils	93 - 95	95
Under floors, steps and walks		
- Lightly loaded floor slab	90	90
- Heavily loaded floor slab and thicker fill zones	92	95
Beyond 10 ft of building lines		
Under walks and pavements		
- Less than 2 ft below subgrade	92	95
- Greater than 2 ft below subgrade	90	90
Landscaping	85	90

Notes:

1. Based on Modified Proctor Dry Density (ASTM D 1557)

Appendix 3



PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

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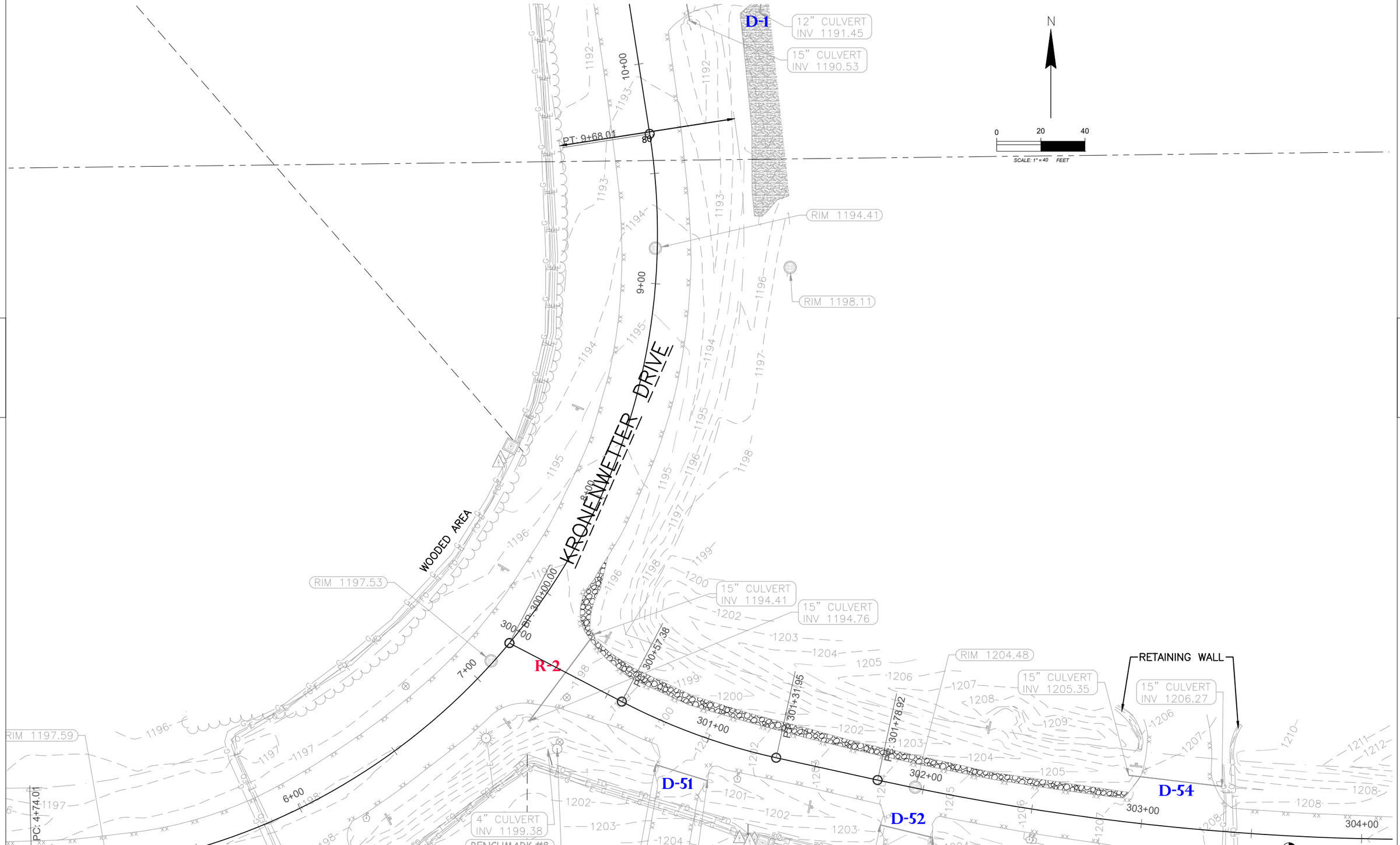
LAYOUT NAME - PLAN 2.0

PLOT DATE : 4/24/2024 8:46 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.0 PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44

5



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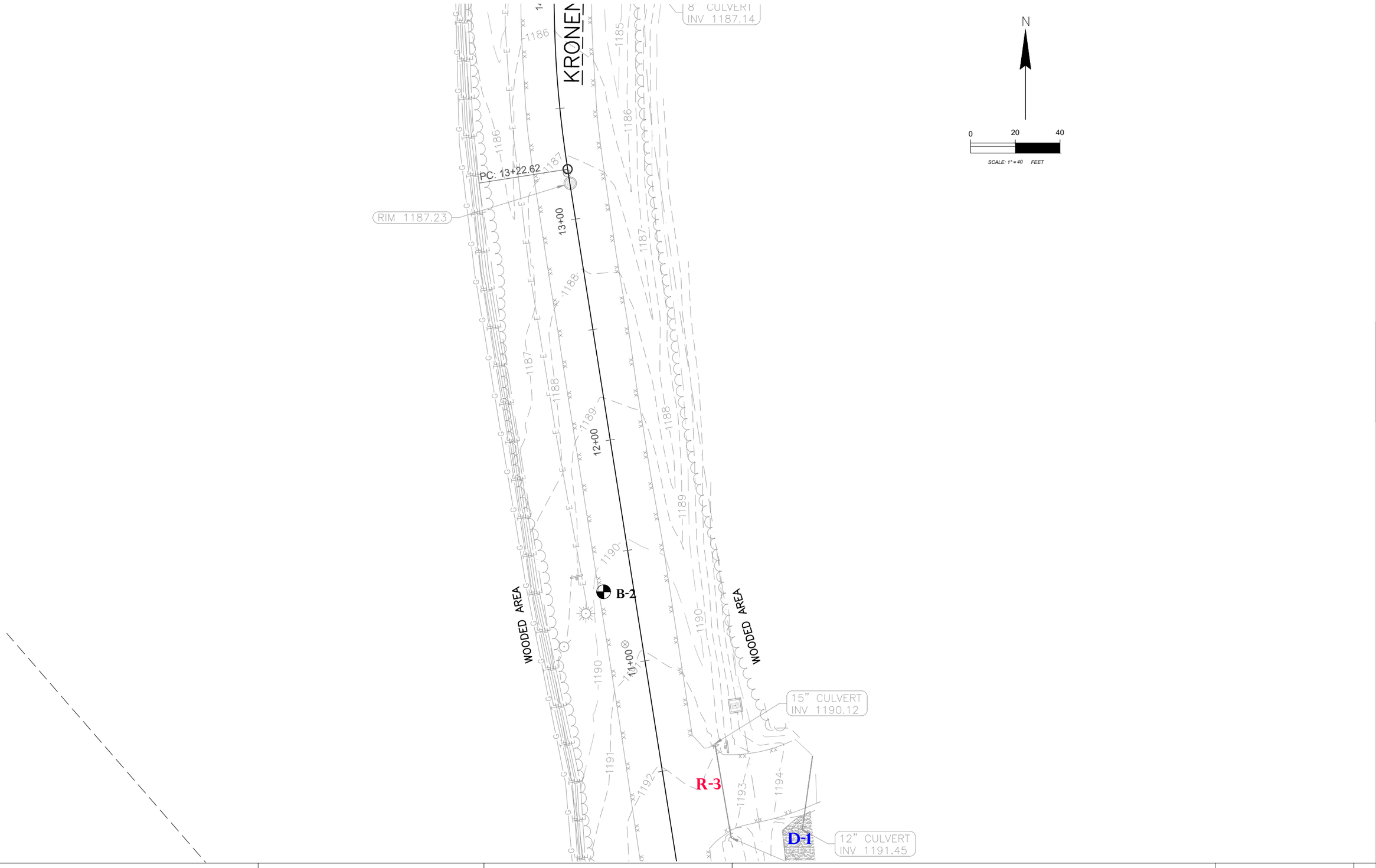

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PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

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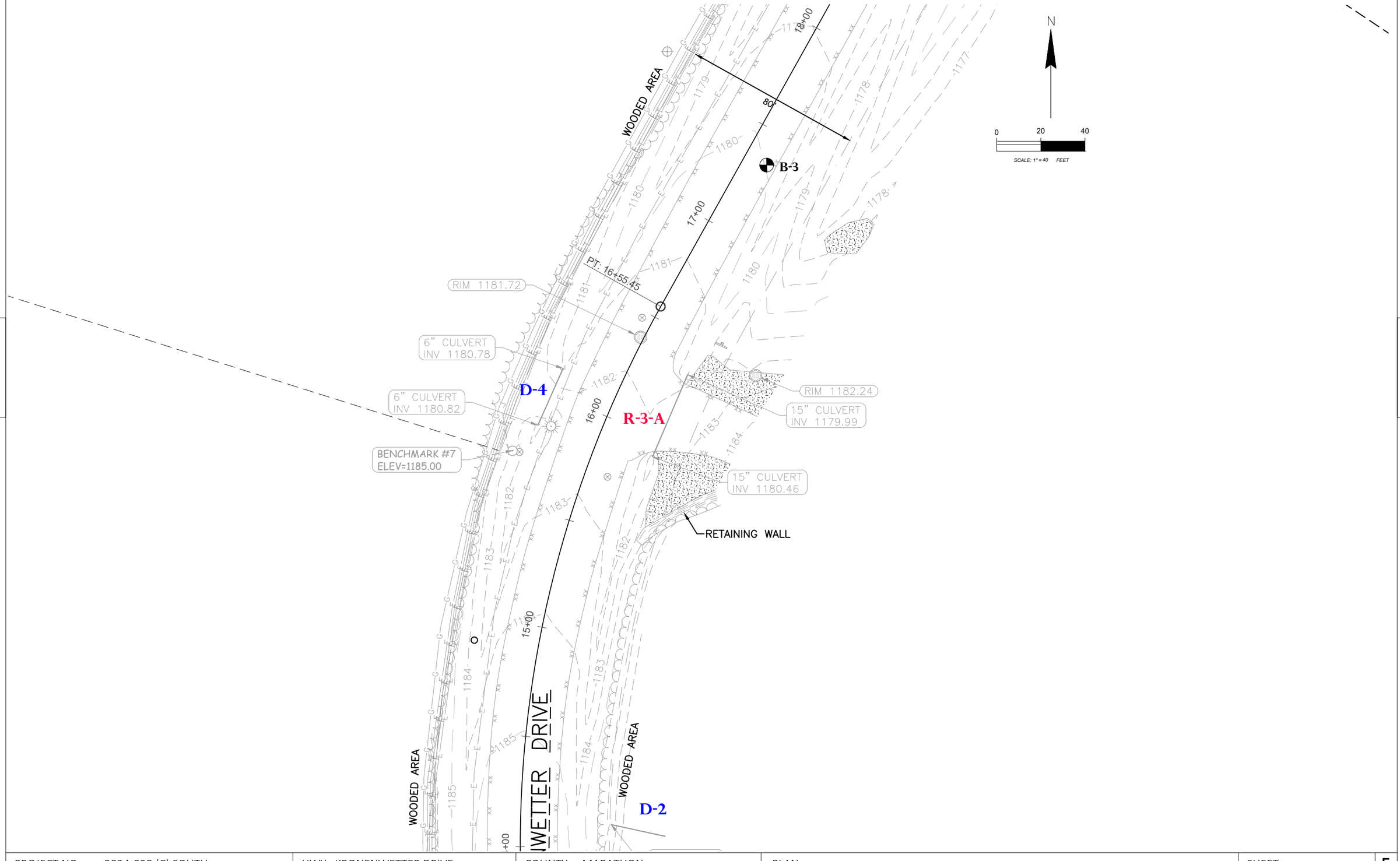

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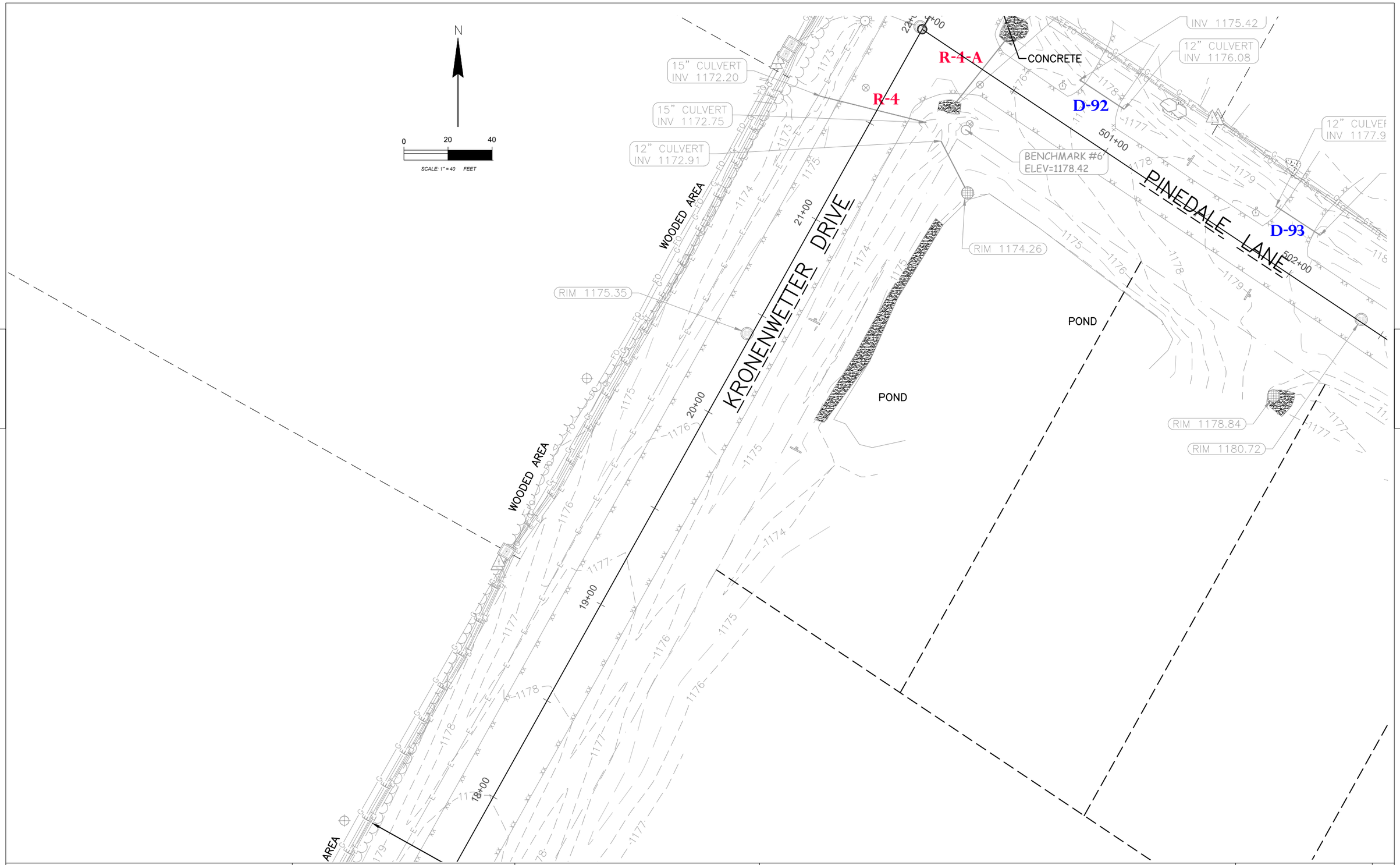
PLOT DATE : 4/24/2024 8:45 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.3** PLOT SCALE : 1" = 40'



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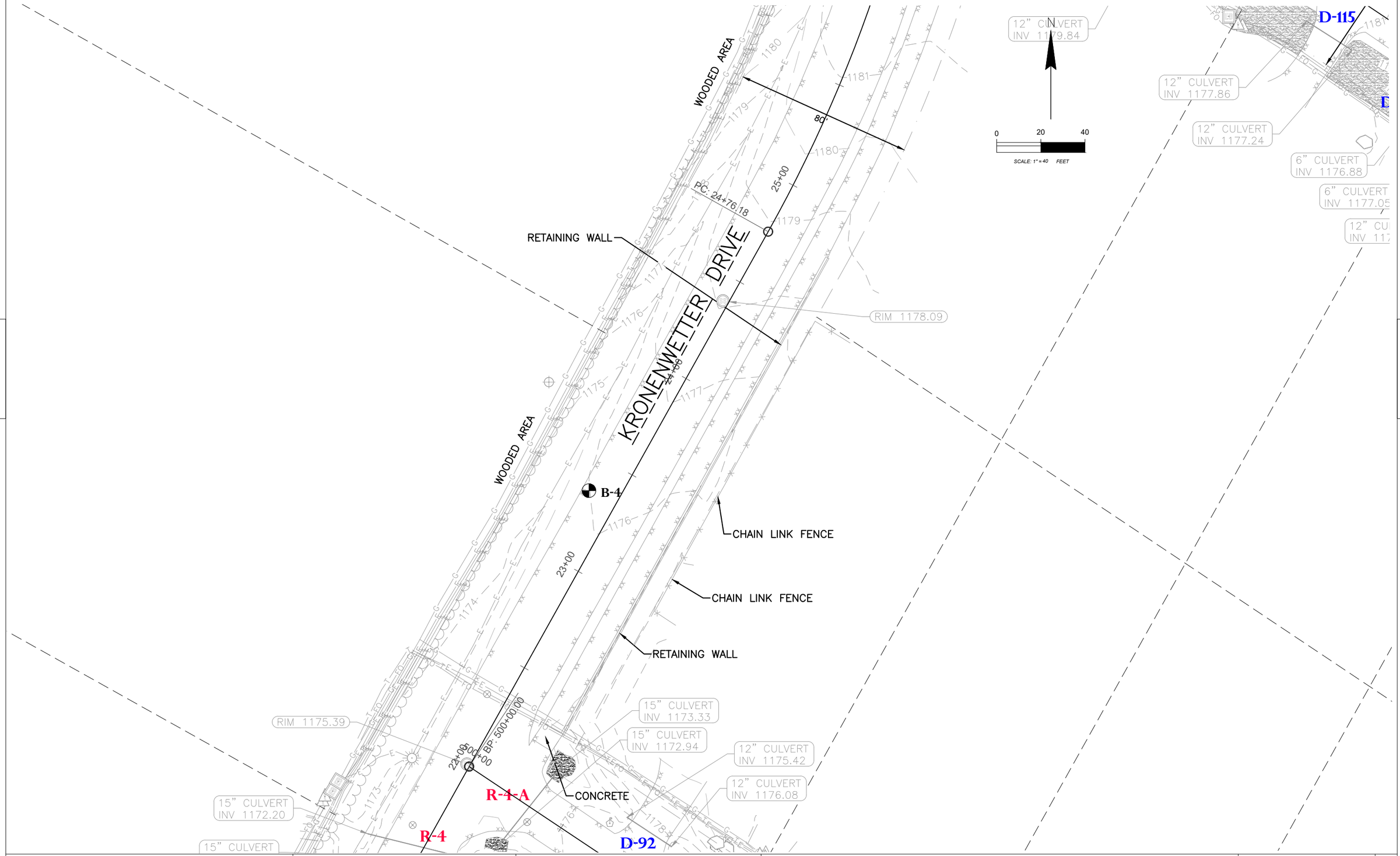
PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.4

PLOT DATE : 4/24/2024 8:44 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.4** PLOT SCALE : 1" = 40'



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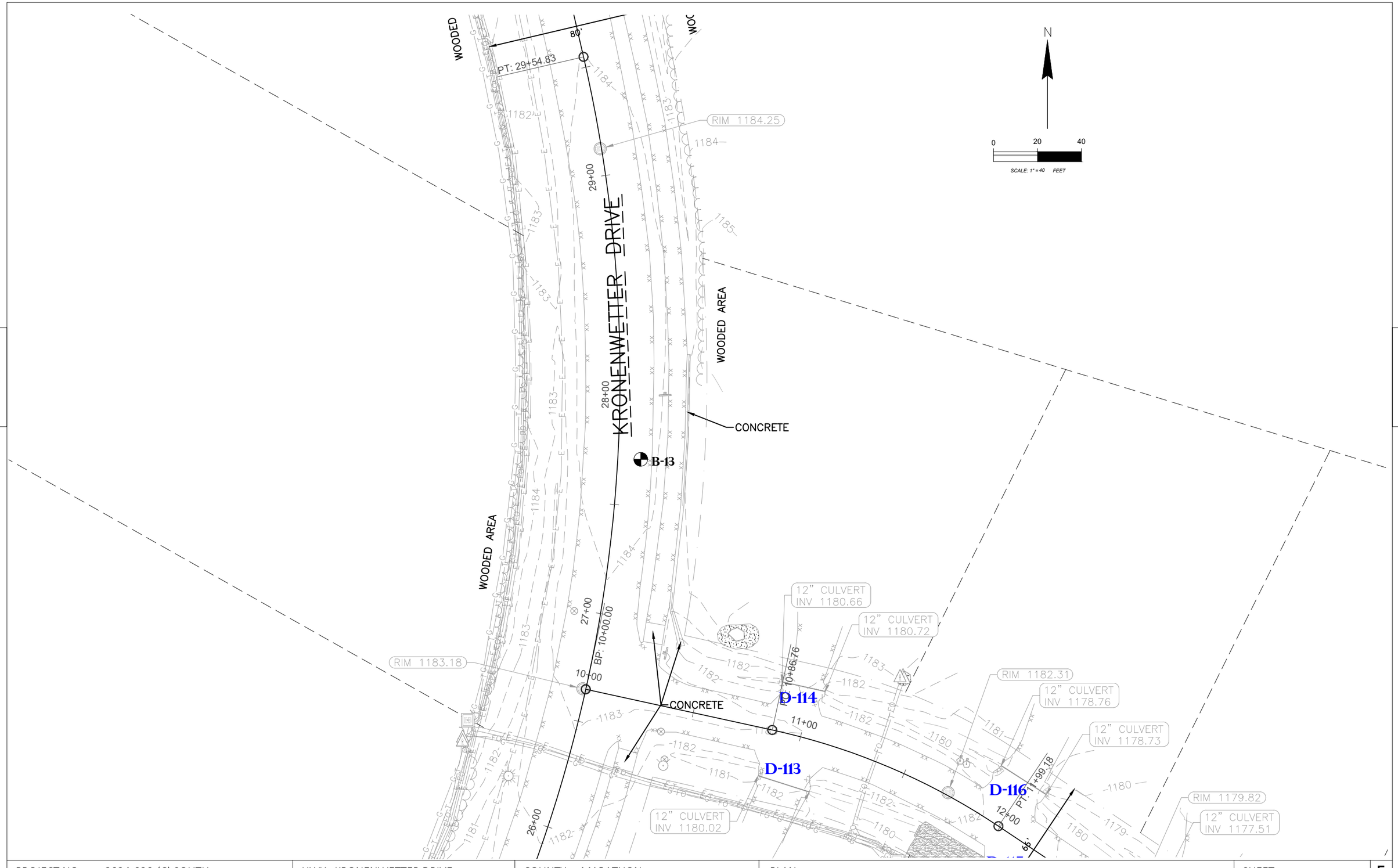
FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.5

PLOT DATE : 4/24/2024 8:44 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.5 PLOT SCALE : 1" = 40'

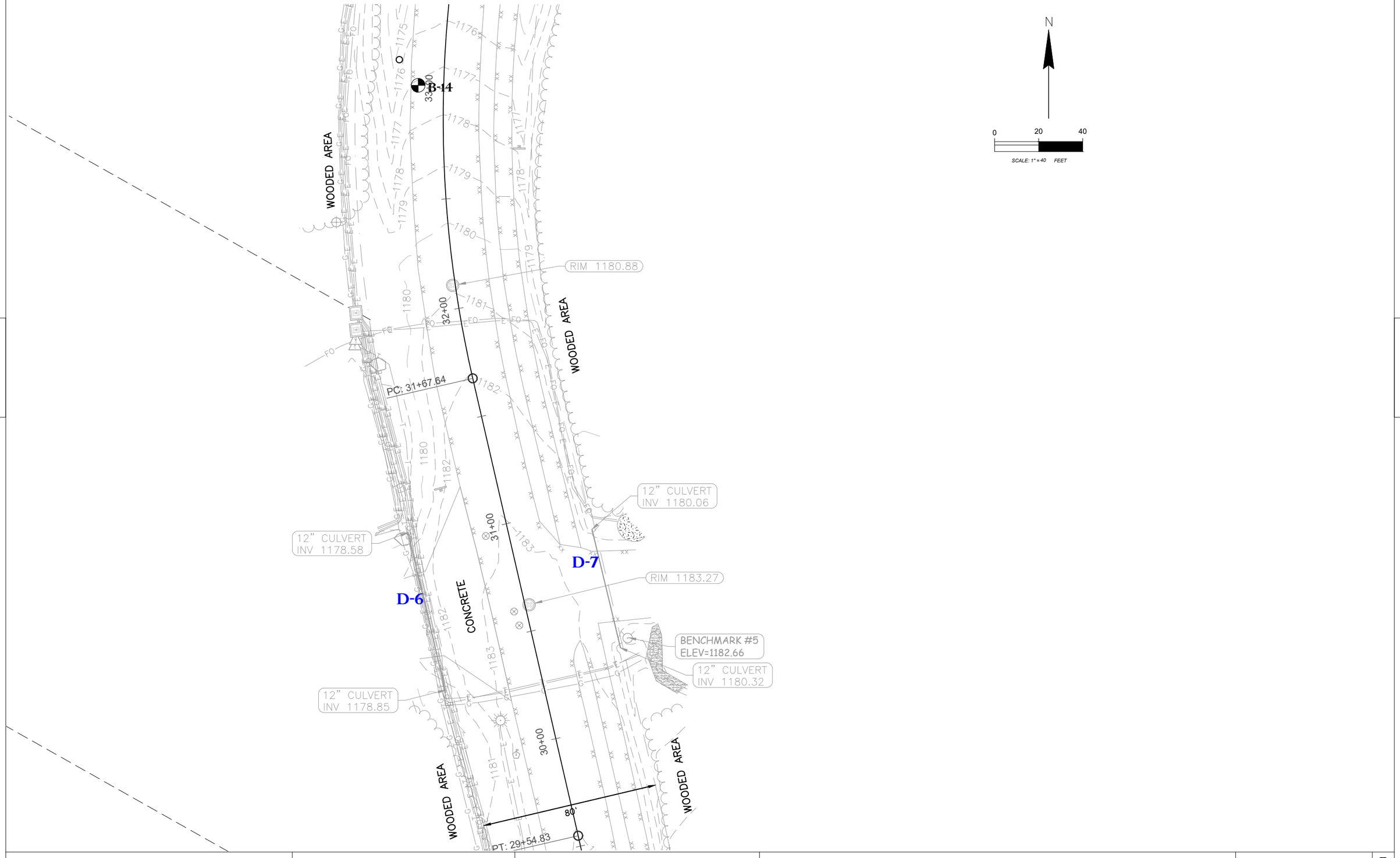
WISDOT/CADDS SHEET 44



PROJECT NO: 2024-020-(C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.6

PLOT DATE : 4/24/2024 8:44 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.6 PLOT SCALE : 1" = 40'

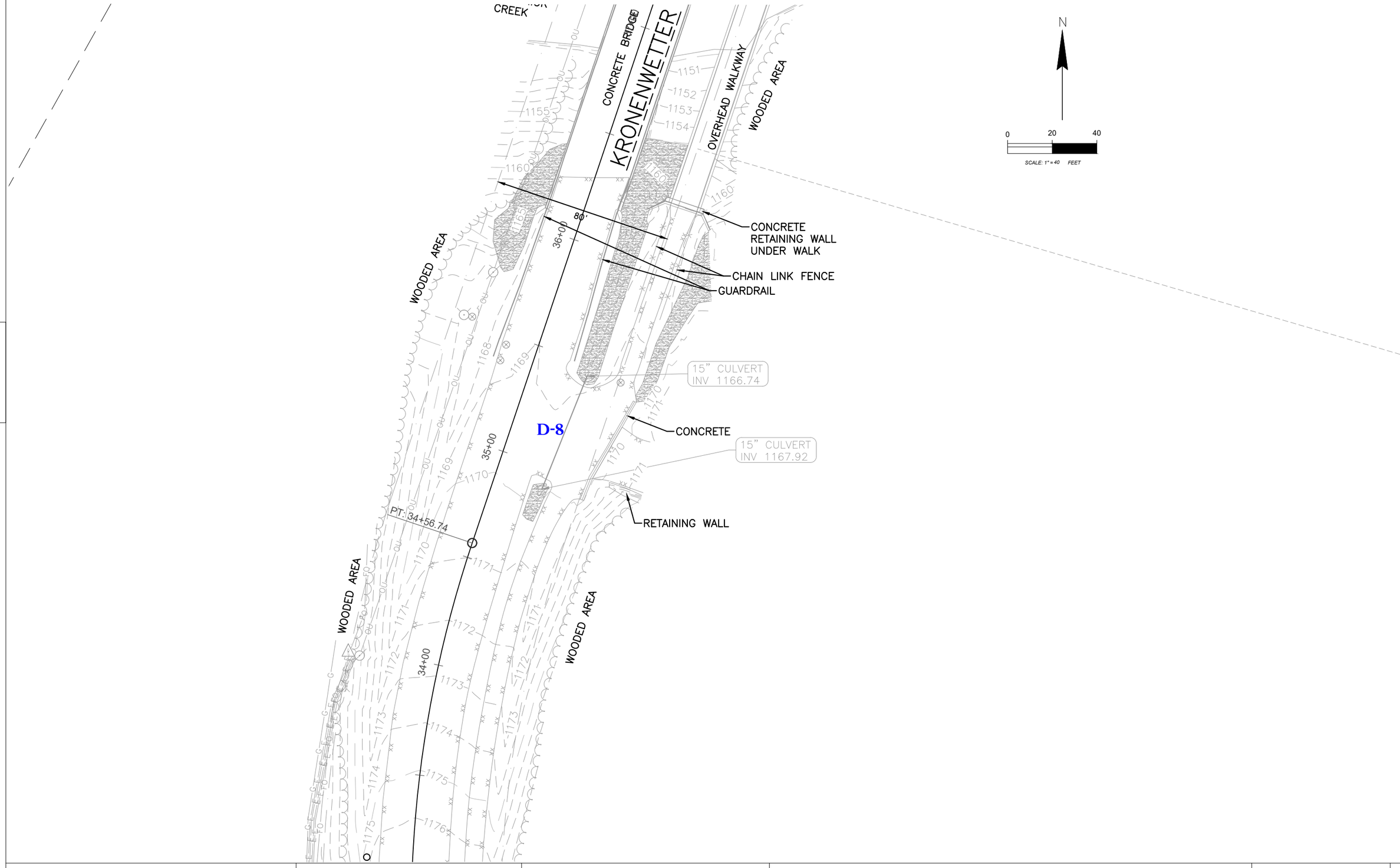


PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.7

PLOT DATE : 4/24/2024 8:43 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.7** PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44



PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.8

PLOT DATE : 4/24/2024 8:43 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.8 PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44

5

BENCHMARK #4
ELEV=1167.53

RIM 1167.81

PC: 40+02.75

40+00

39+00

38+60

CONCRETE BRIDGE

CONCRETE

BENCH

WOODED AREA

CHAIN LINK FENCE

CONCRETE
RETAINING WALL
UNDER WALK

WALKWAY

GUARDRAIL

PILLARS
UNDER
BRIDGE

OVERHEAD

BULL JUNIOR
CREEK

KRONENWETTER DRIVE

N

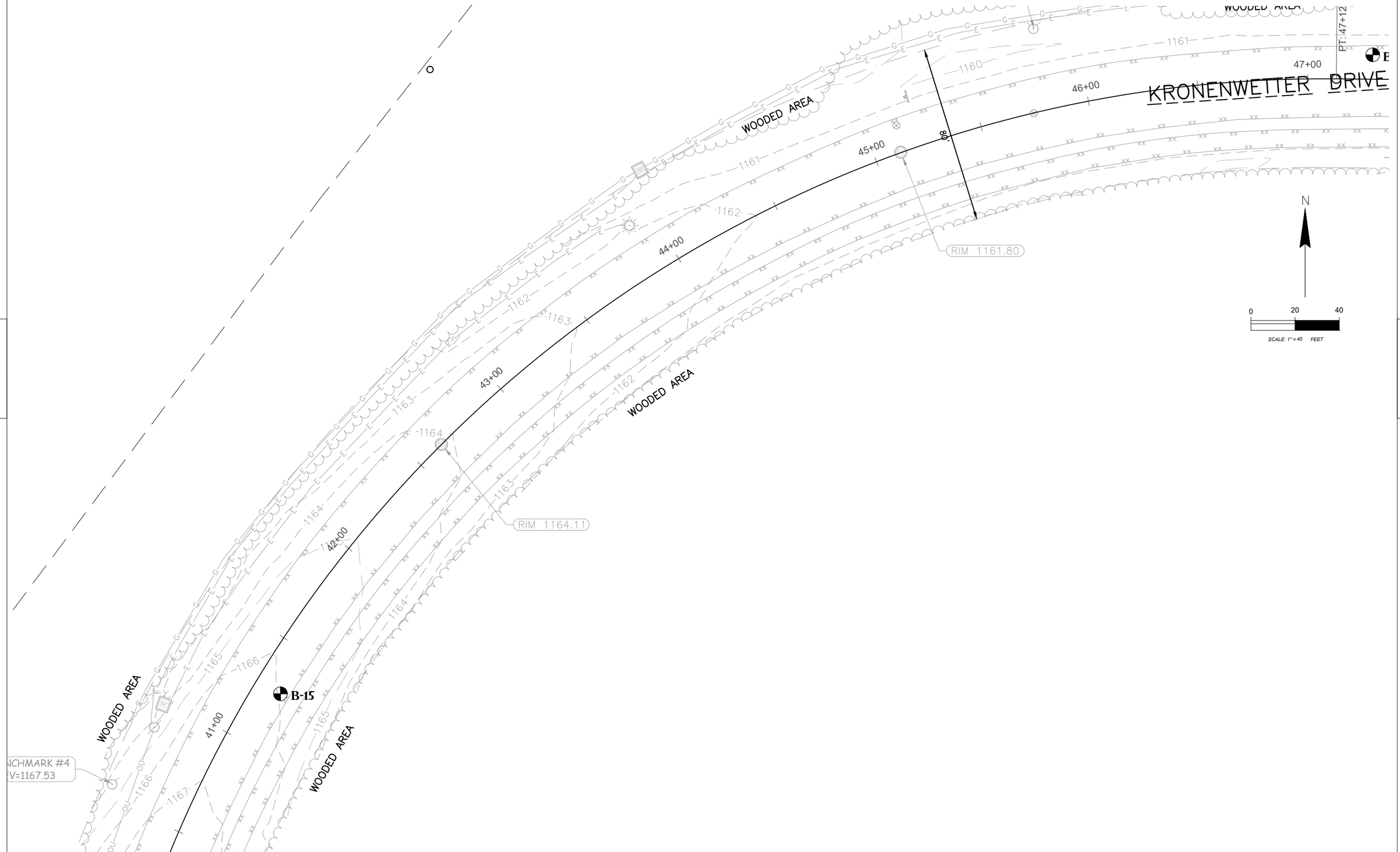
0 20 40

SCALE: 1" = 40 FEET

PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.9

PLOT DATE : 4/24/2024 8:42 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.9 PLOT SCALE : 1" = 40'



5

5

PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.10

PLOT DATE : 4/24/2024 8:42 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.10** PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44

R/W VARIES

FIELD ROAD

N

0 20 40

SCALE: 1" = 40 FEET

12" CULVERT
INV 1159.55

12" CULVERT
INV 1159.33

RIM 1161.65

ED AREA

PT: 47+12.97

B-16

D-9

47+00

48+00

49+00

50+00

51+00

52+00

PC: 52+48.91

95'

ETTER DRIVE

RIM 1161.47

RIM 1162.02

CONCRETE

CONCRETE

RIM 1162.20

WOODED AREA

WOOD FENCE

BUILDING

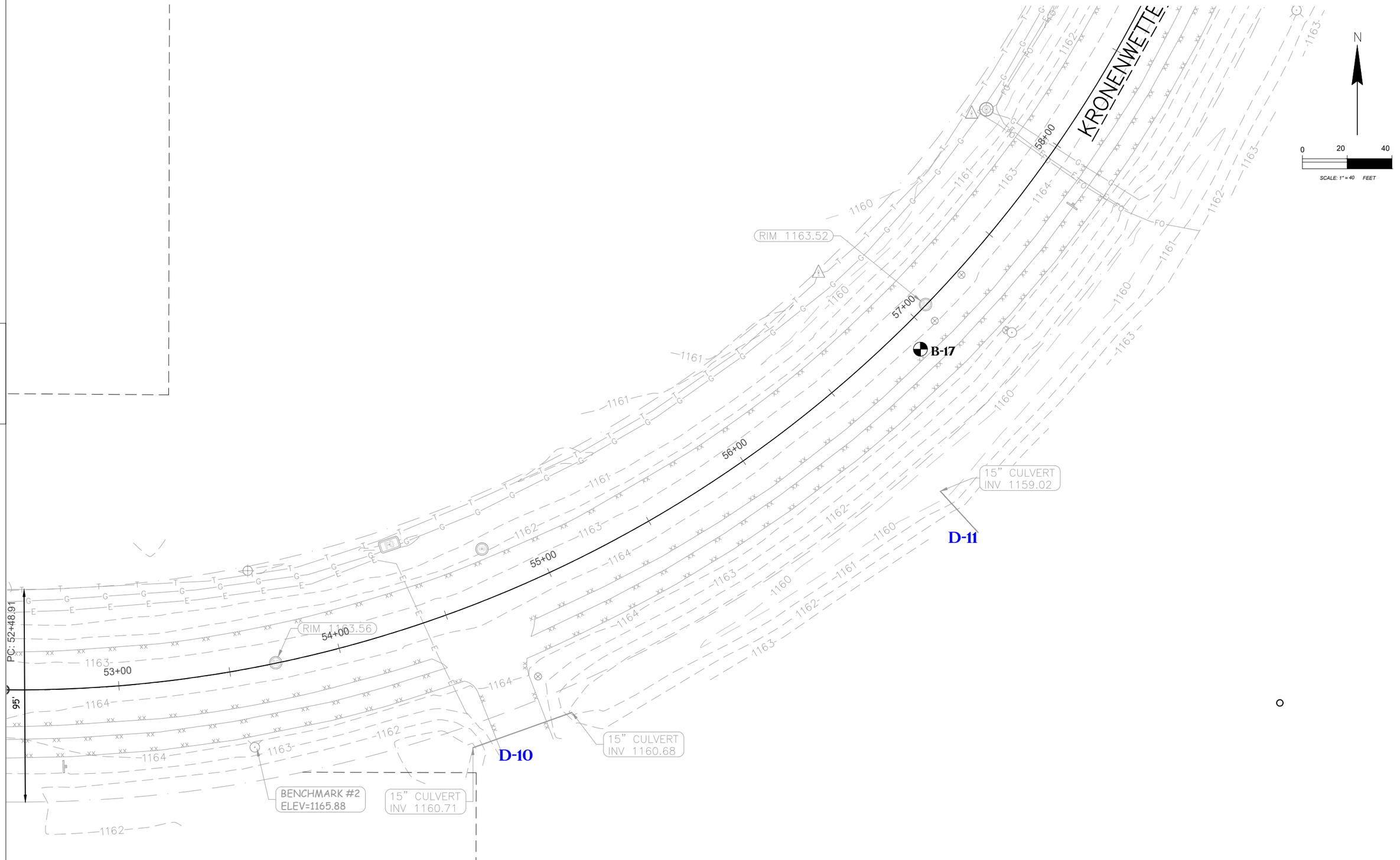
R/W VARIES

PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.11

PLOT DATE : 4/24/2024 8:41 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.11 PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44

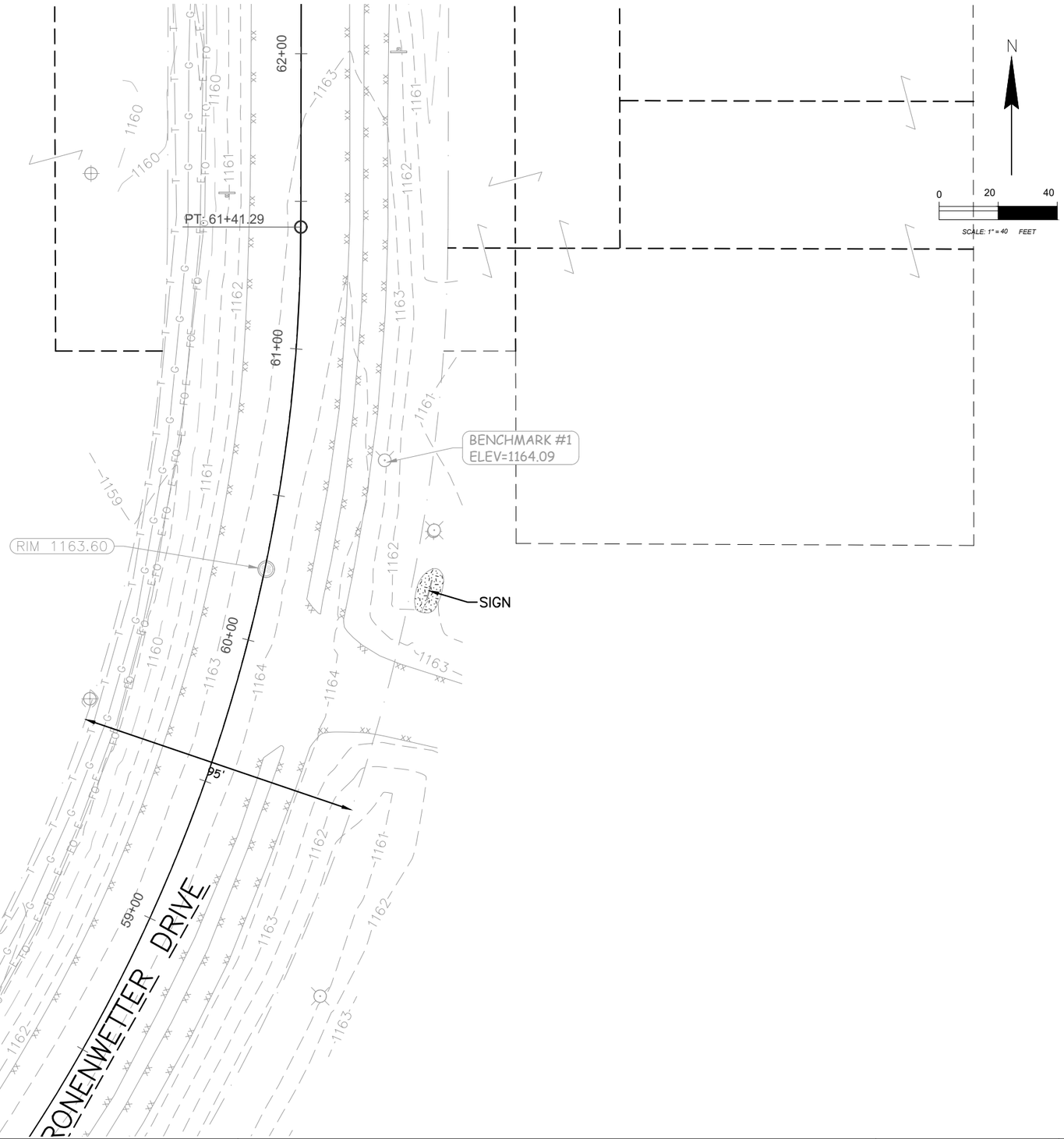


PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.12

PLOT DATE : 4/24/2024 8:41 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.12** PLOT SCALE : 1" = 40'

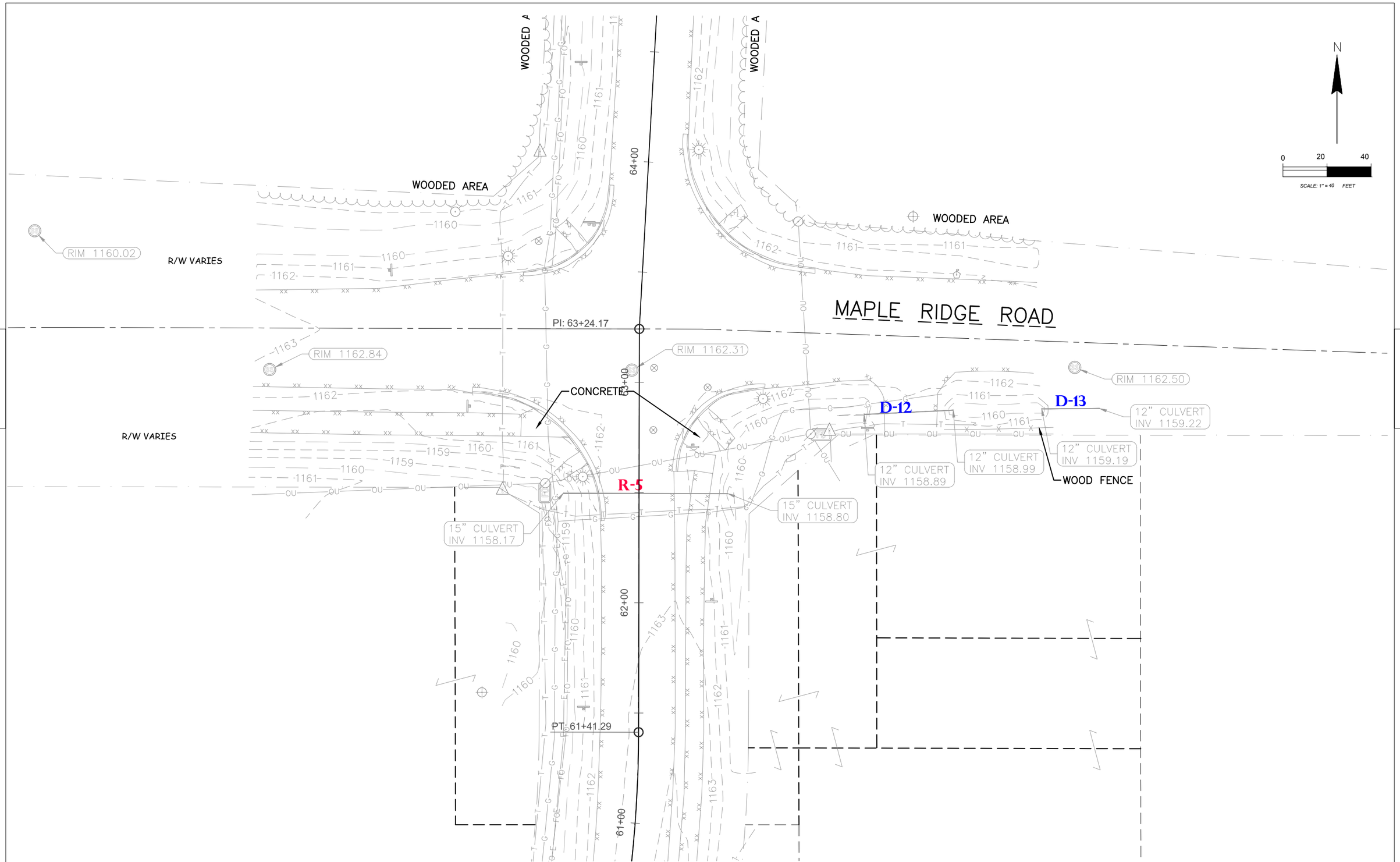
WISDOT/CADDS SHEET 44



PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.13

PLOT DATE : 4/24/2024 8:40 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.13** PLOT SCALE : 1" = 40'



PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.14

PLOT DATE : 4/24/2024 8:40 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.14 PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44

5

N

0 20 40

SCALE: 1" = 40 FEET

RIM 1162.84

WOODED AREA

24" CULVERT INV 1159.09

24" CULVERT INV 1159.10

R-7

R-6

24" CULVERT INV

24" CULVERT INV 1159.06

WOODED AREA

WOODED AREA

WOODED AREA

CONCRETE

PI: 63+24.17

63+00

64+00

65+00

100'

66+00

67+00

68+00

69+0

RIM 1162.31

MAPLE RIDGE ROAD

KRONENWETTER DRIVE

WOODED AREA

RIM 1163.34

WOODED AREA

BENCHMARK #14
ELEV=11

RIM 1159.58

WOODED AREA

D-12

D-13

PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.15

PLOT DATE : 4/24/2024 8:39 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.15 PLOT SCALE : 1" = 40'

N

0 20 40

SCALE: 1" = 40 FEET

24" INV

WOODED

WOODED AREA

WOODED AREA

5

5

69+00

70+00

71+00

72+00

73+00

74+00

75+00

R/W VARIES

R/W VARIES

R/W VARIES

PC: 70+95.27

PT: 73+71.74

60'

60'

60'

KRONENWETTER DRIVE

WOODED AREA

WOODED AREA

24" INV

PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.16

PLOT DATE : 4/24/2024 8:39 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.16** PLOT SCALE : 1" = 40'

N

0 20 40

SCALE: 1" = 40 FEET

12" CULVERT
INV 1162.44

12" CULVERT
INV 1162.05

24" CULVERT
INV 1160.65

24" CULVERT
INV 1160.66

D-14

R-11

R-10

R-8

R-6

BENCHMARK #15
ELEV=1164.08

B-19

75+00 76+00 77+00 78+00 79+00 80+00 81+00

130'

KRONENWETTE

R/W VARIES

24" CULVERT
INV 1160.22

24" CULVERT
INV 1160.21

24" CULVERT
INV 1160.22

WOODED AREA

WOODED AREA

BERANEK ROAD

R/W VARIES

R/W VARIES

5

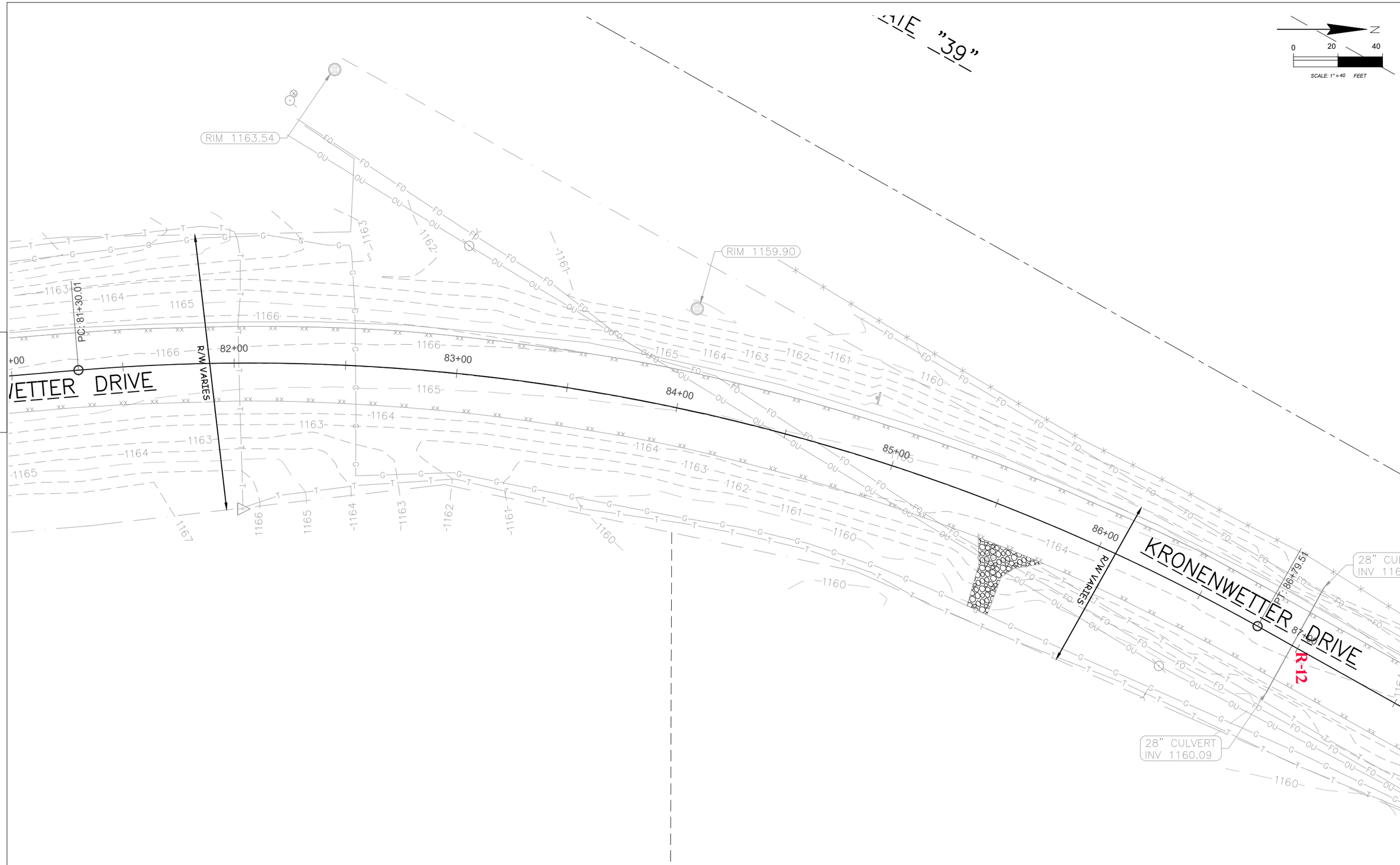
5

PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.17

PLOT DATE : 4/24/2024 8:38 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 2.17 PLOT SCALE : 1" = 40'

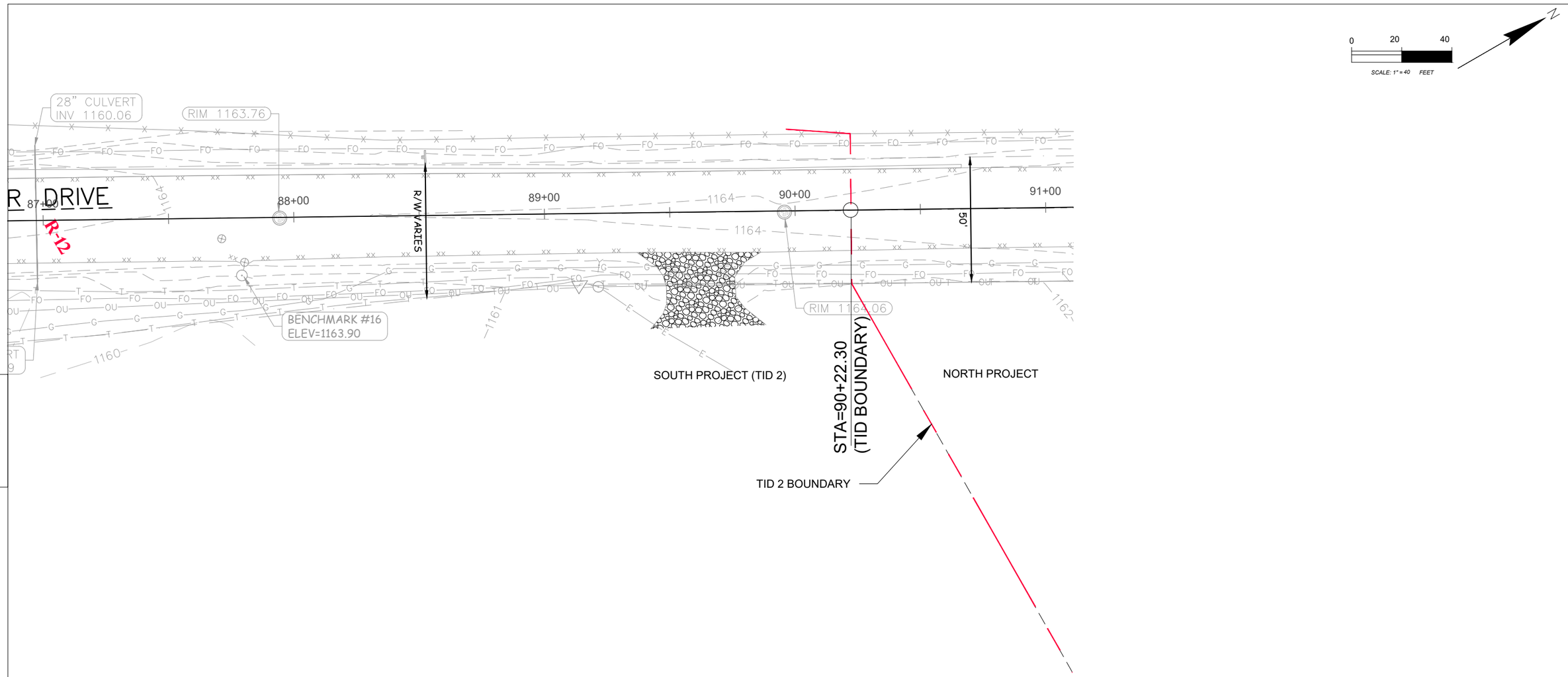
WISDOT/CADDS SHEET 44



PROJECT NO: 2024-020 (C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.18

PLOT DATE : 4/24/2024 8:38 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.18** PLOT SCALE : 1" = 40'



5

5

PROJECT NO: 2024-020-(C) SOUTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 2.19

PLOT DATE : 4/24/2024 8:37 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.19** PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44

5

N

0 20 40

SCALE: 1" = 40 FEET

9+00

TENWETTER DRIVE

RIM 1198.11

15" CULVERT
INV 1194.41

15" CULVERT
INV 1194.76

300+57.38

301+00

301+31.95

301+78.92

302+00

303+00

RIM 1204.48

15" CULVERT
INV 1205.35

RETAINING WALL

15" CULVERT
INV 1206.27

D-51

D-52

D-53

D-54

D-55

D-56

D-57

304+00

305+00

306+00

PT: 306+17.00

OAKDALE LANE

66'

B-5

RETAINING WALL

15" CULVERT
INV 1199.87

15" CULVERT
INV 1202.37

15" CULVERT
INV 1202.60

15" CULVERT
INV 1205.39

15" CULVERT
INV 1206.18

12" CULVERT
INV 1207.25

12" CULVERT
INV 1207.32

12" CULVERT
INV 1207.28

12" CULVERT
INV 1207.37

RIM 1204.

12" CULVE
INV 1202.4

12" CULV
INV 120

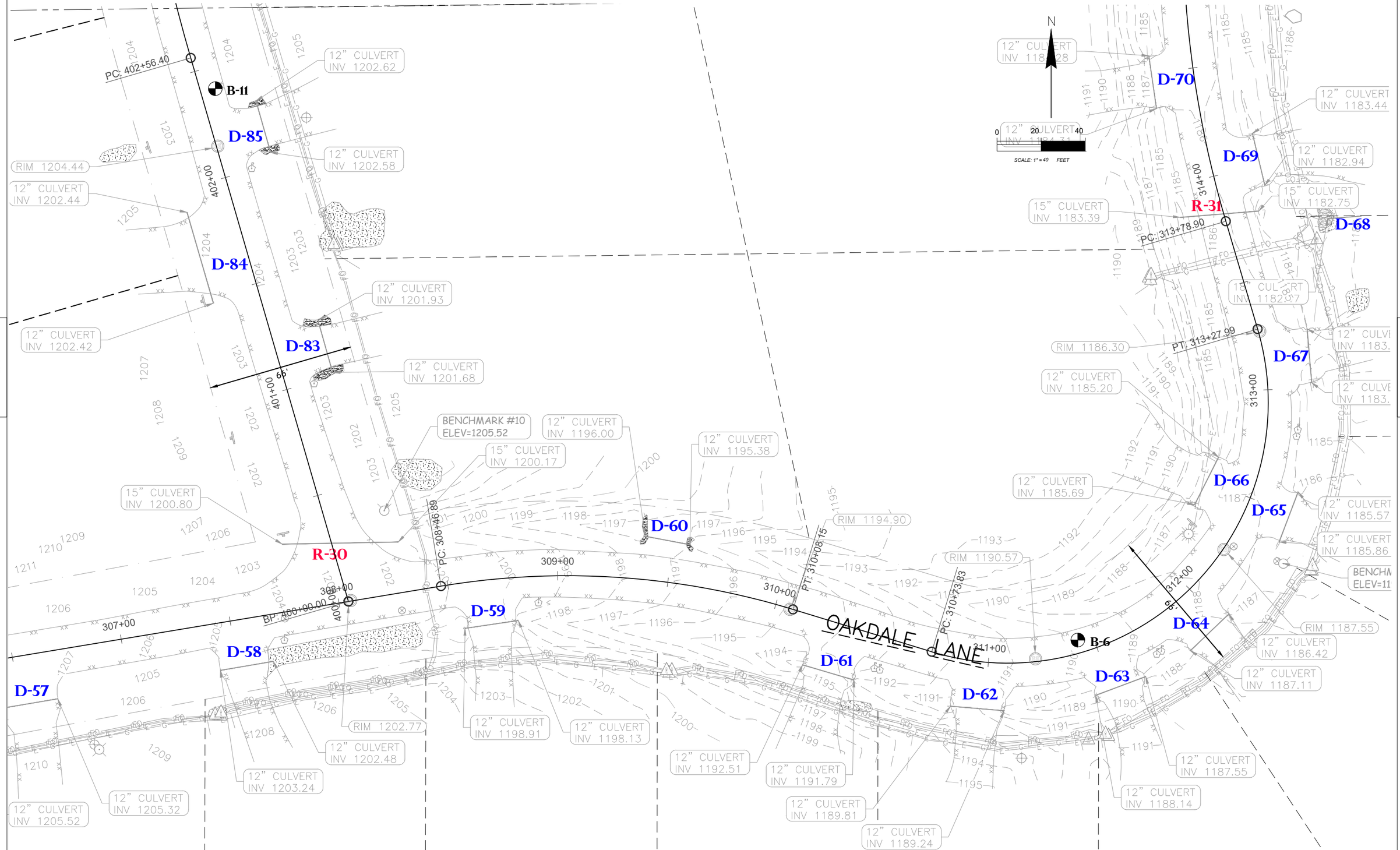
12" CULVER
INV 1205.5

PROJECT NO: 2024-020 (C) SOUTH	HWY: OAKDALE LANE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.0

PLOT DATE : 4/24/2024 8:34 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 3.0 PLOT SCALE : 1" = 40'

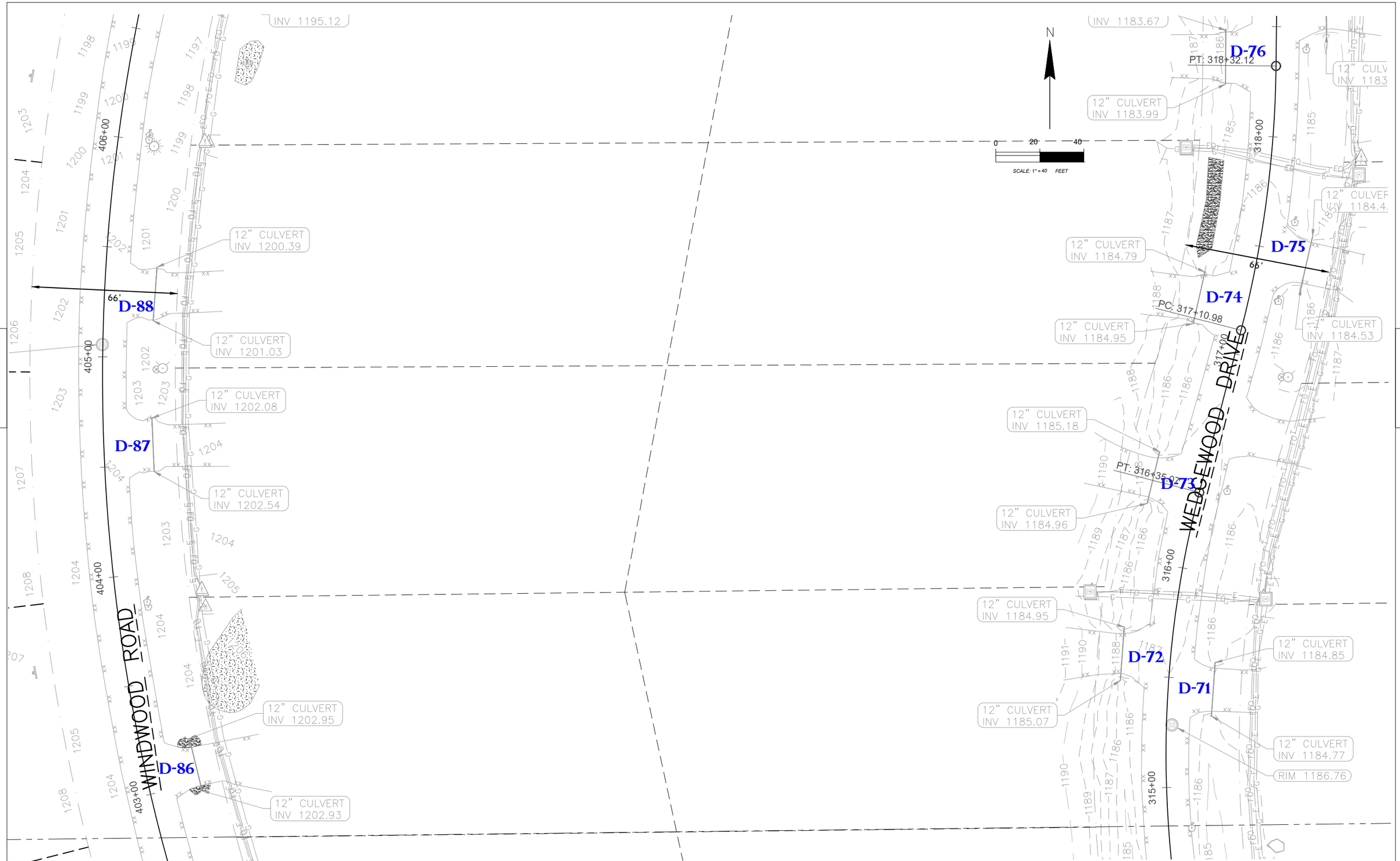
WISDOT/CADDS SHEET 44



5

PROJECT NO: 2024-020 (C) SOUTH	HWY: OAKDALE LANE	COUNTY: MARATHON	PLAN	SHEET	E

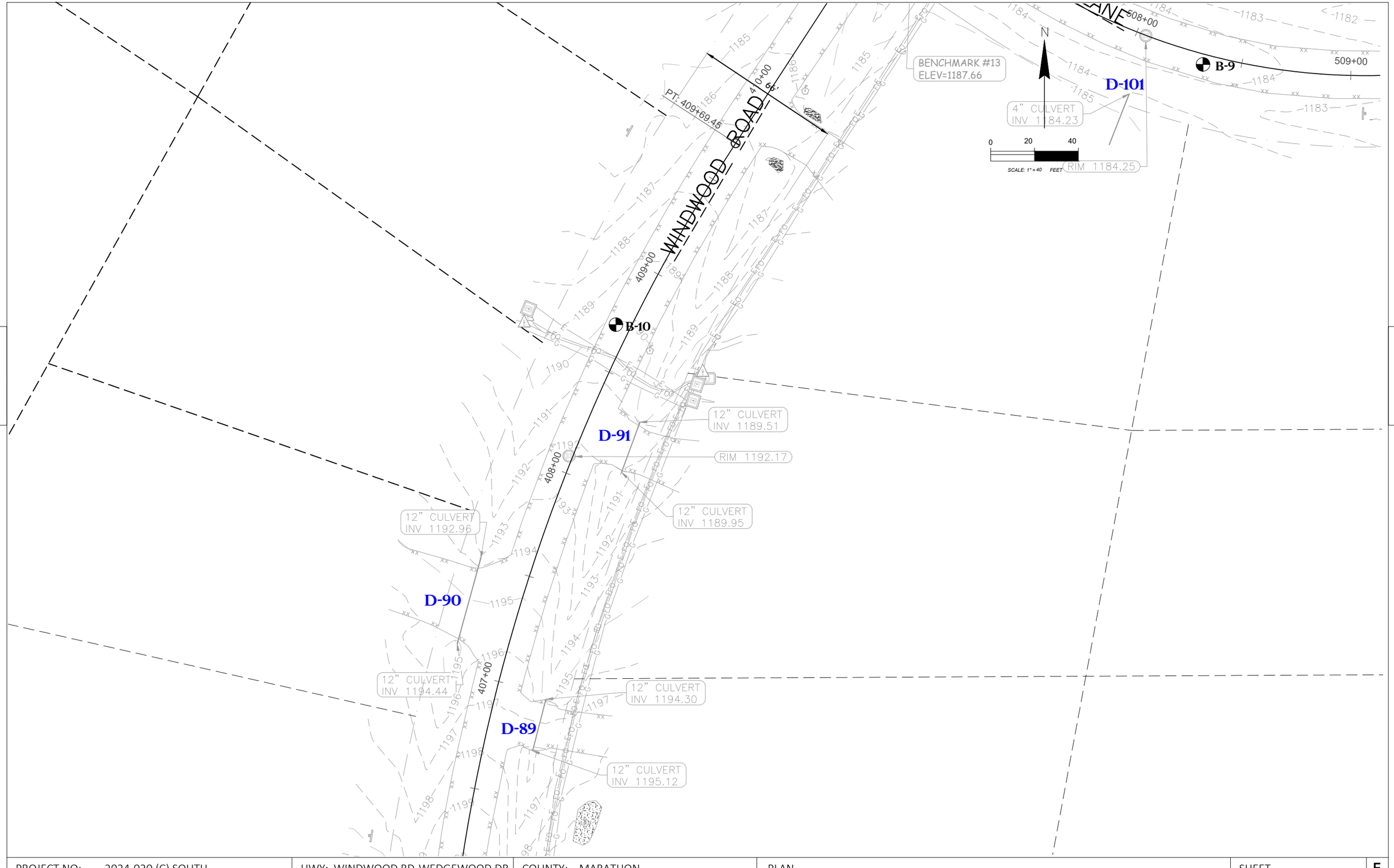
FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.1
PLOT DATE : 4/24/2024 8:34 AM
PLOT BY : WAYNE CASPER
PLOT NAME : PLAN 3.1
PLOT SCALE : 1" = 40'
WISDOT/CADDS SHEET 44



PROJECT NO: 2024-020 (C) SOUTH	HWY: WINDWOOD RD-WEDGEWOOD DR	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.2

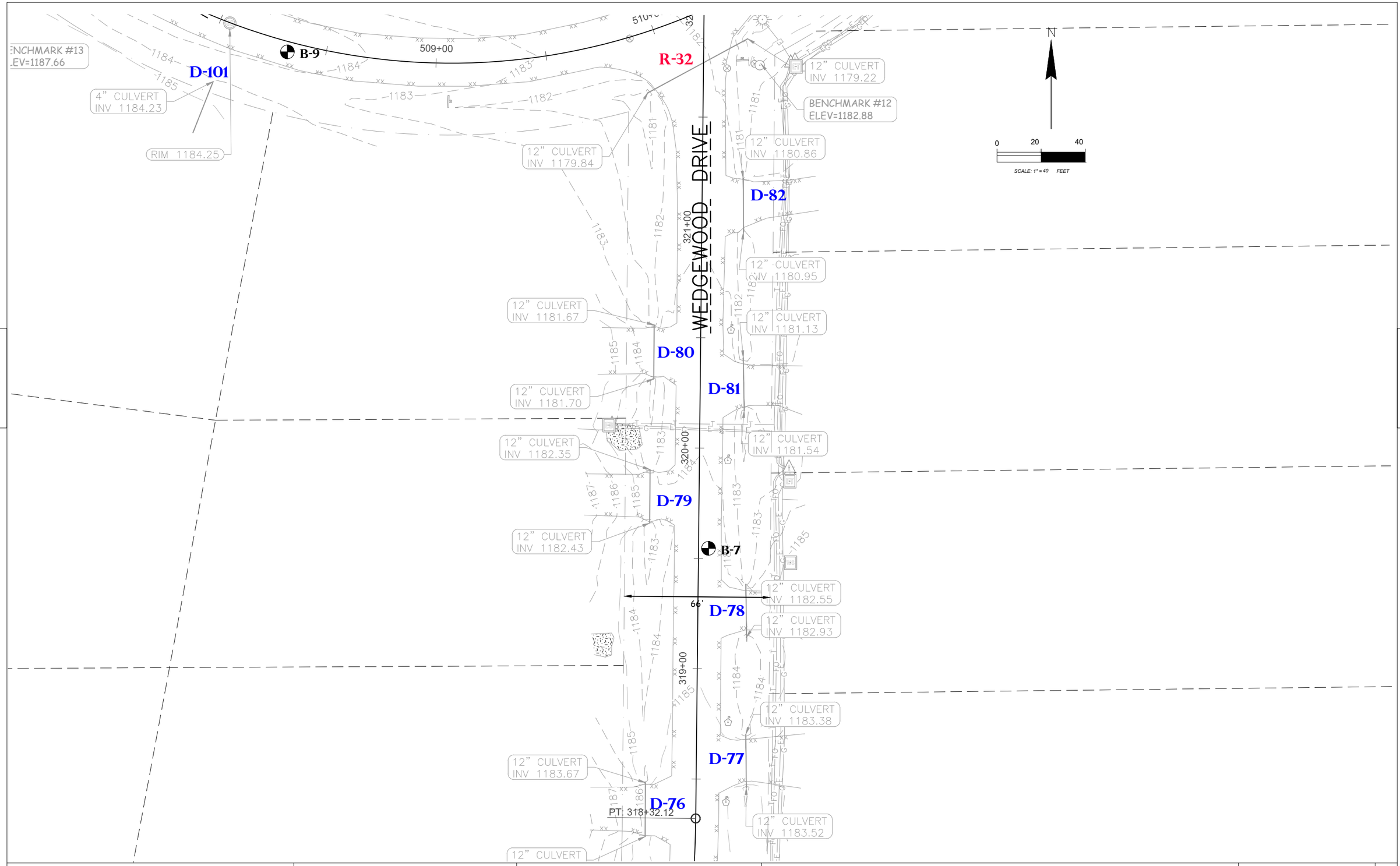
PLOT DATE : 4/24/2024 8:34 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 3.2 PLOT SCALE : 1" = 40'



PROJECT NO: 2024-020 (C) SOUTH	HWY: WINDWOOD RD-WEDGEWOOD DR	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.3

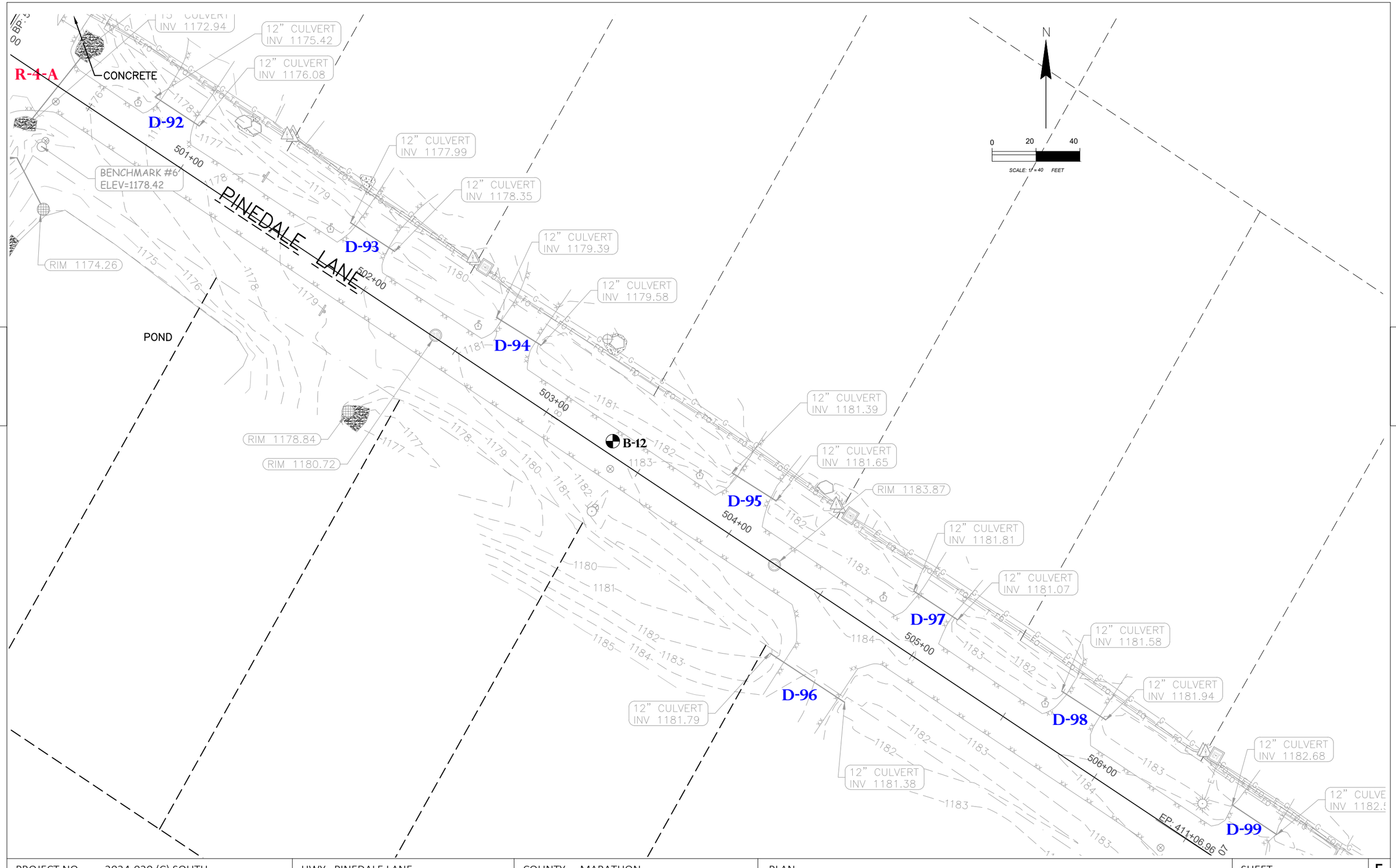
PLOT DATE : 4/24/2024 8:33 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 3.3 PLOT SCALE : 1" = 40'



PROJECT NO: 2024-020 (C) SOUTH	HWY: WINDWOOD RD-WEDGEWOOD DR	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.31

PLOT DATE : 4/24/2024 8:32 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 3.31 PLOT SCALE : 1" = 40'

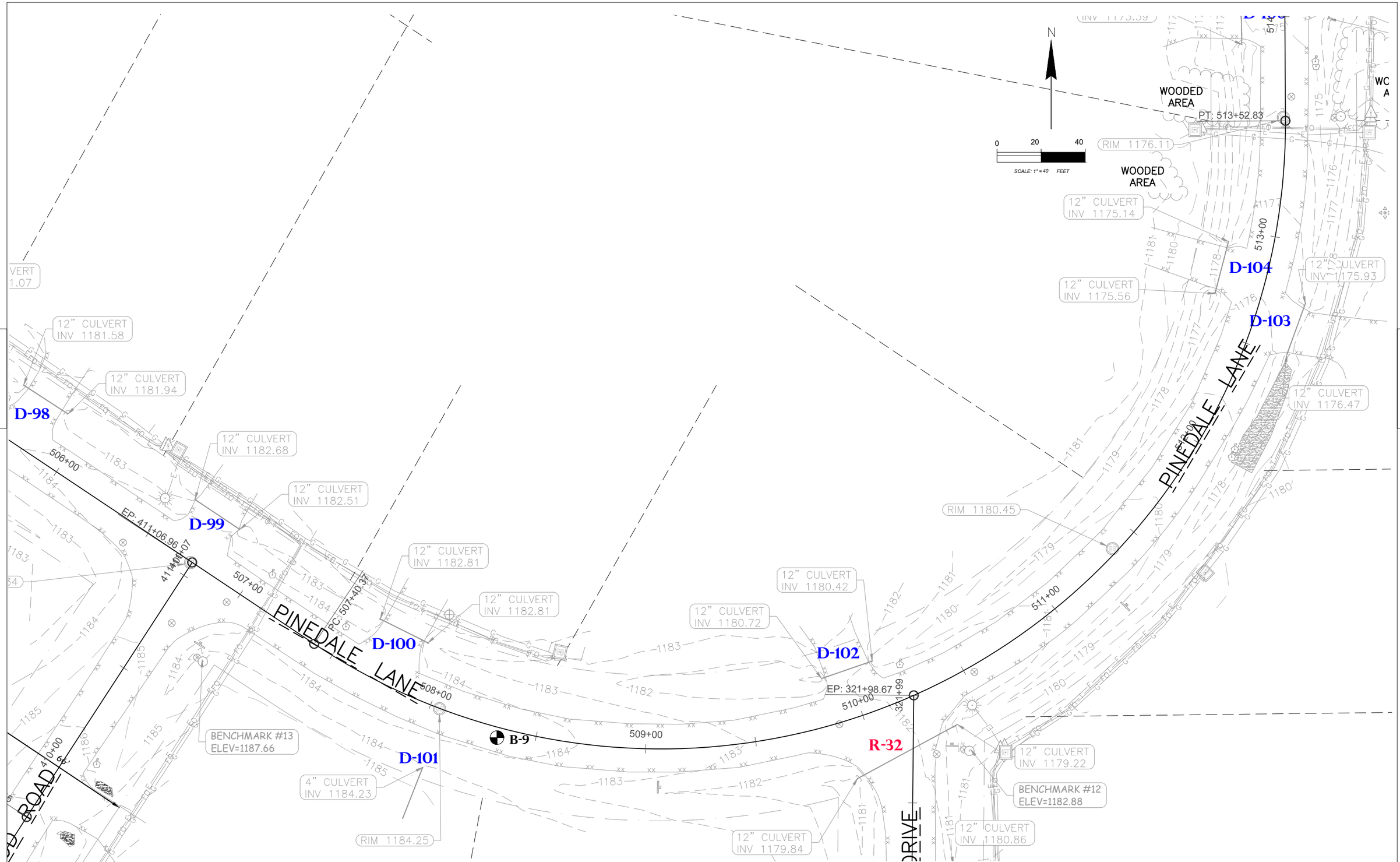


PROJECT NO: 2024-020 (C) SOUTH	HWY: PINEDALE LANE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.4

PLOT DATE : 4/24/2024 8:30 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 3.4 PLOT SCALE : 1" = 40'

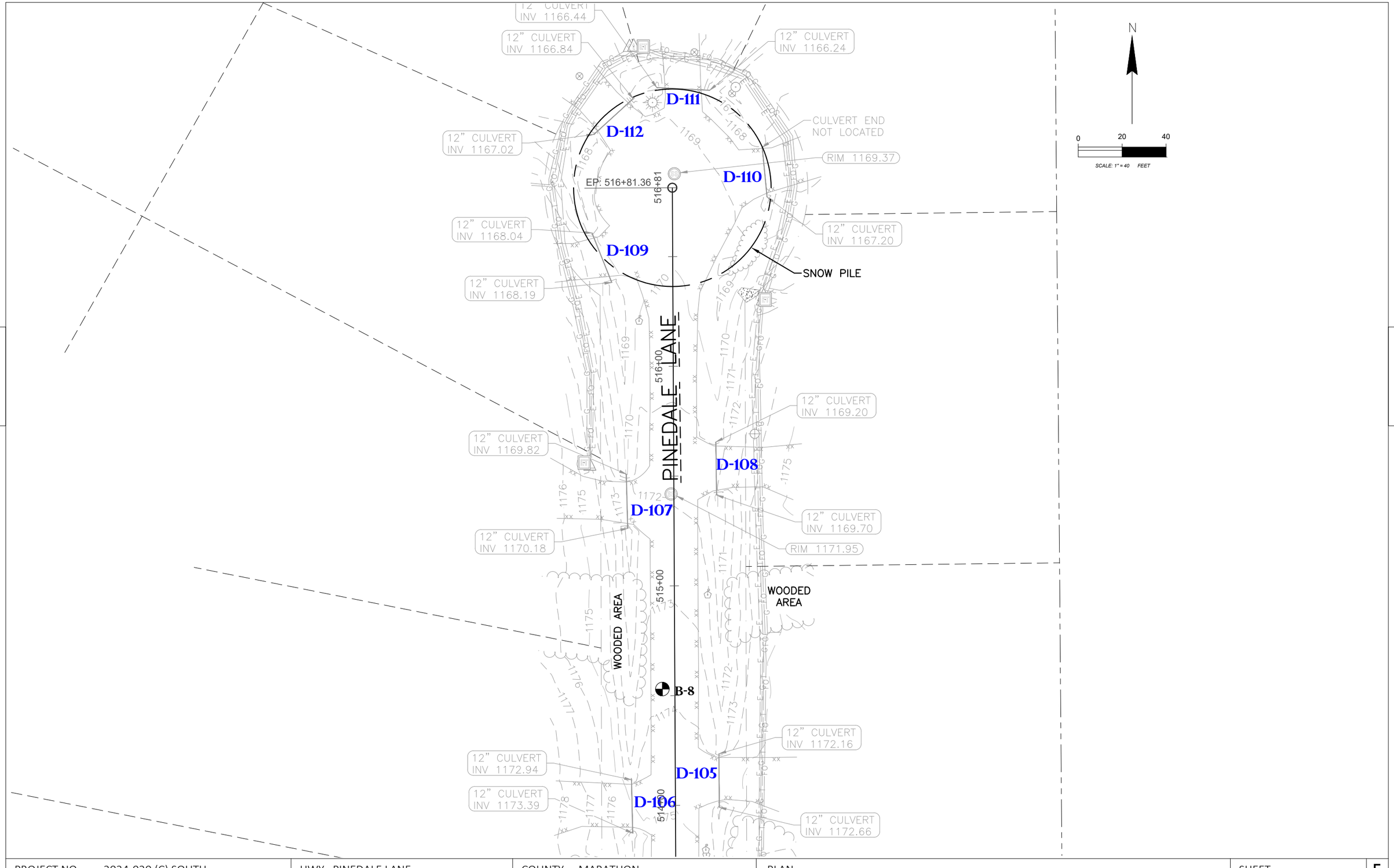
WISDOT/CADDS SHEET 44



PROJECT NO: 2024-020 (C) SOUTH	HWY: PINEDALE LANE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.5

PLOT DATE : 4/24/2024 8:29 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 3.5 PLOT SCALE : 1" = 40'



PROJECT NO: 2024-020 (C) SOUTH	HWY: PINEDALE LANE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.6

PLOT DATE : 4/24/2024 8:28 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 3.6 PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44

5

N

0 20 40

SCALE: 1" = 40 FEET

SEDONA COURT

BP: 10+00.00

10+00

11+00

12+00

PI: 11+99.18

10+86.76

26+00

27+00

D-113

D-114

D-115

D-116

D-117

D-118

D-119

D-120

D-121

D-122

D-123

D-124

D-125

D-126

12" CULVERT INV 1180.66

12" CULVERT INV 1180.72

RIM 1182.31

12" CULVERT INV 1178.76

12" CULVERT INV 1178.73

RIM 1179.82

12" CULVERT INV 1177.51

12" CULVERT INV 1180.02

12" CULVERT INV 1179.84

12" CULVERT INV 1177.14

12" CULVERT INV 1175.36

12" CULVERT INV 1175.20

12" CULVERT INV 1173.76

12" CULVERT INV 1177.86

12" CULVERT INV 1177.24

12" CULVERT INV 1173.53

6" CULVERT INV 1176.88

6" CULVERT INV 1177.05

12" CULVERT INV 1175.61

12" CULVERT INV 1175.58

RIM 1177.85

PI: 14+26.01

EP: 14+71.01

14+00

14+71

RIM 1176.35

12" CULVERT INV 1173.81

12" CULVERT INV 1173.59

12" CULVERT INV 1173.51

12" CULVERT INV 1174.65

12" CULVERT INV 1173.89

12" CULVERT INV 1173.87

12" CULVERT INV 1174.20

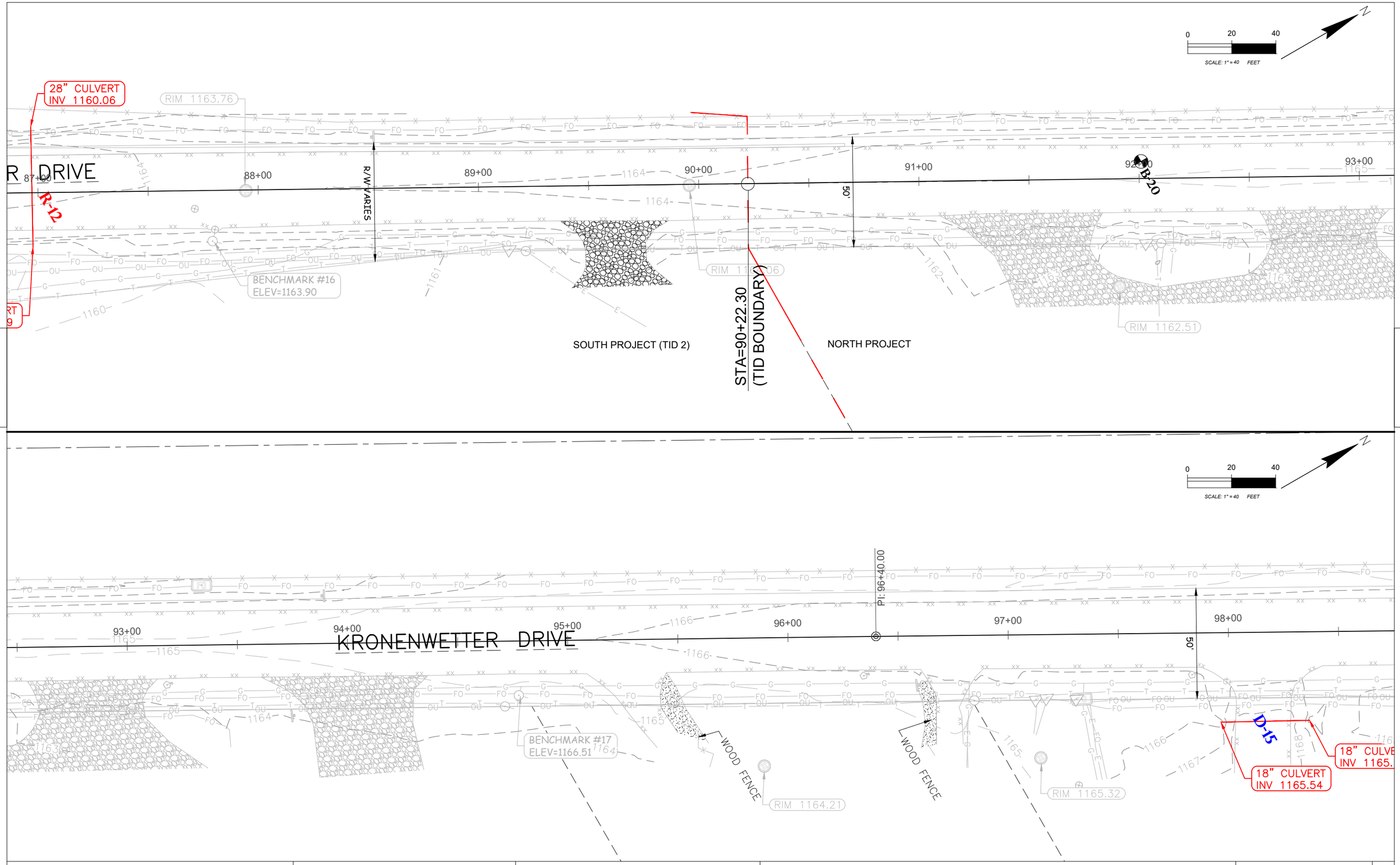
12" CULVERT INV 1173.72

RIM 1178.09

PROJECT NO: 2024-020 (C) SOUTH	HWY: SEDONA COURT	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(C) PHASE A-SOUTH\020-C-SOUTH ROADS.DWG
LAYOUT NAME - PLAN 3.7

PLOT DATE : 4/24/2024 8:28 AM PLOT BY : WAYNE CASPER PLOT NAME : PLAN 3.7 PLOT SCALE : 1" = 40'



PROJECT NO: 2024-020-(D) NORTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

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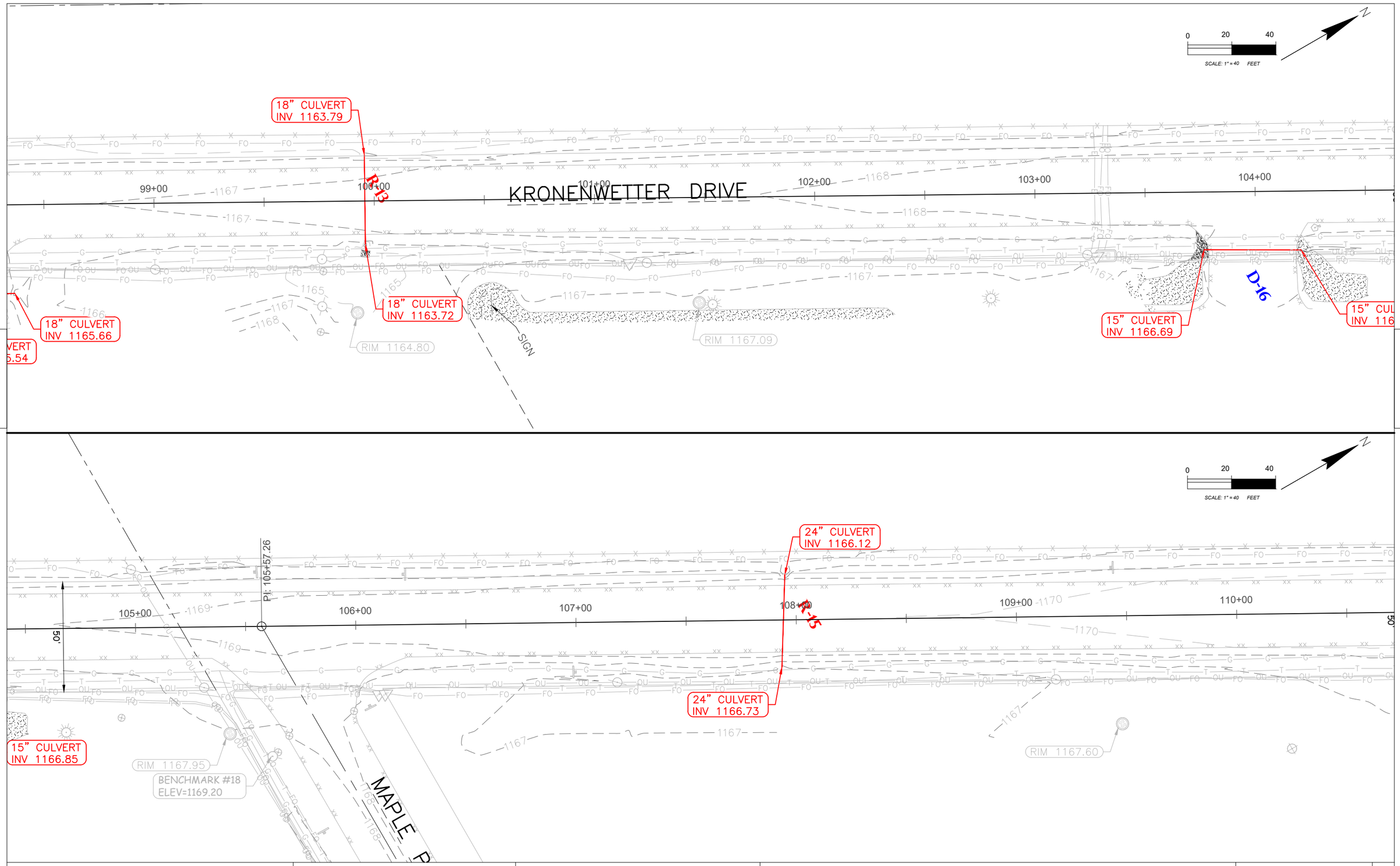
LAYOUT NAME - PLAN 2.4

PLOT DATE : 4/24/2024 8:07 AM PLOT BY : WAYNE CASPER PLOT NAME : **PLAN 2.4** PLOT SCALE : 1" = 40'

WISDOT/CADDS SHEET 44



PROJECT NO: 2024-020-(D) NORTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(D) PHASE B-NORTH\020-D-NORTH ROADS.DWG
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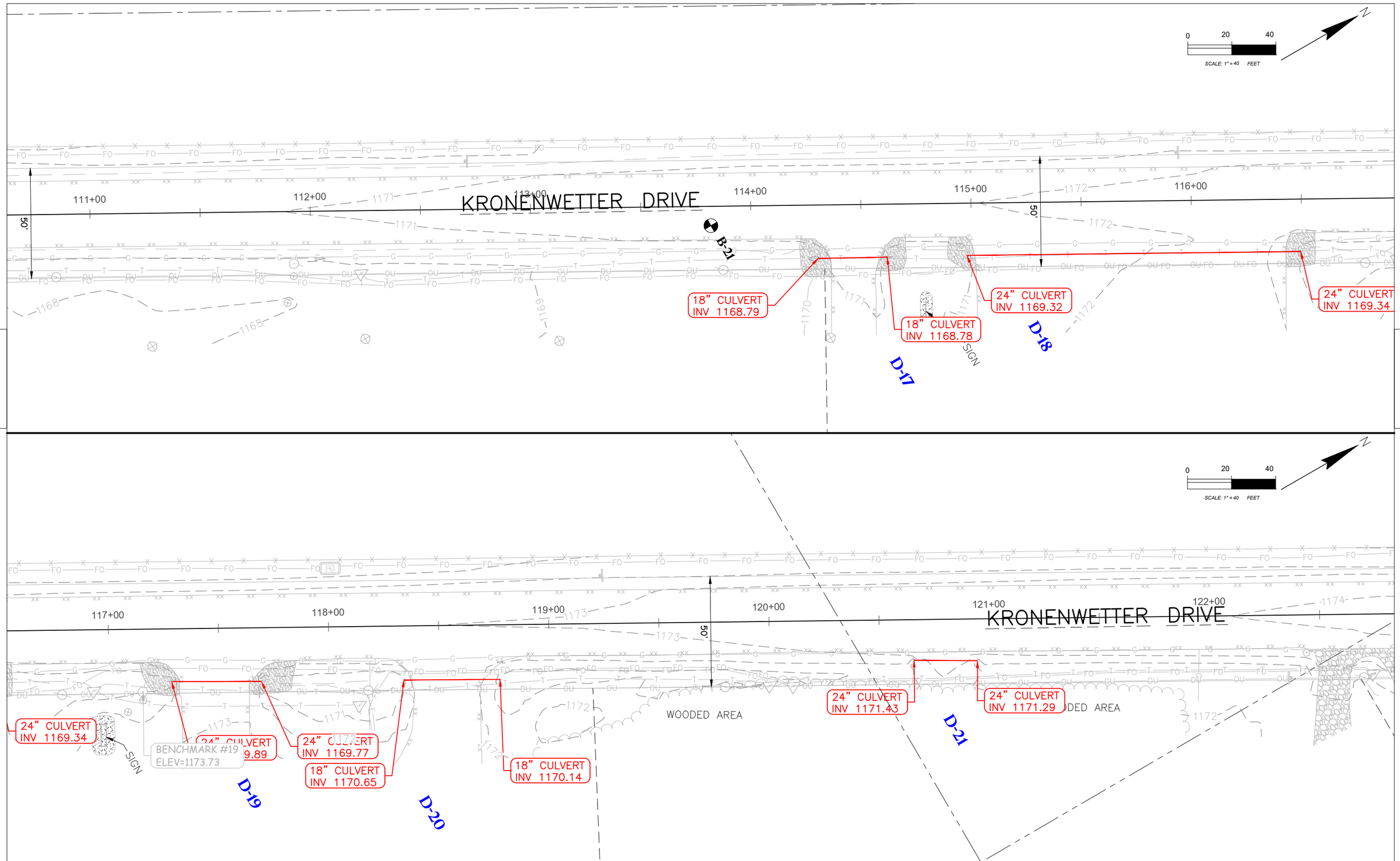

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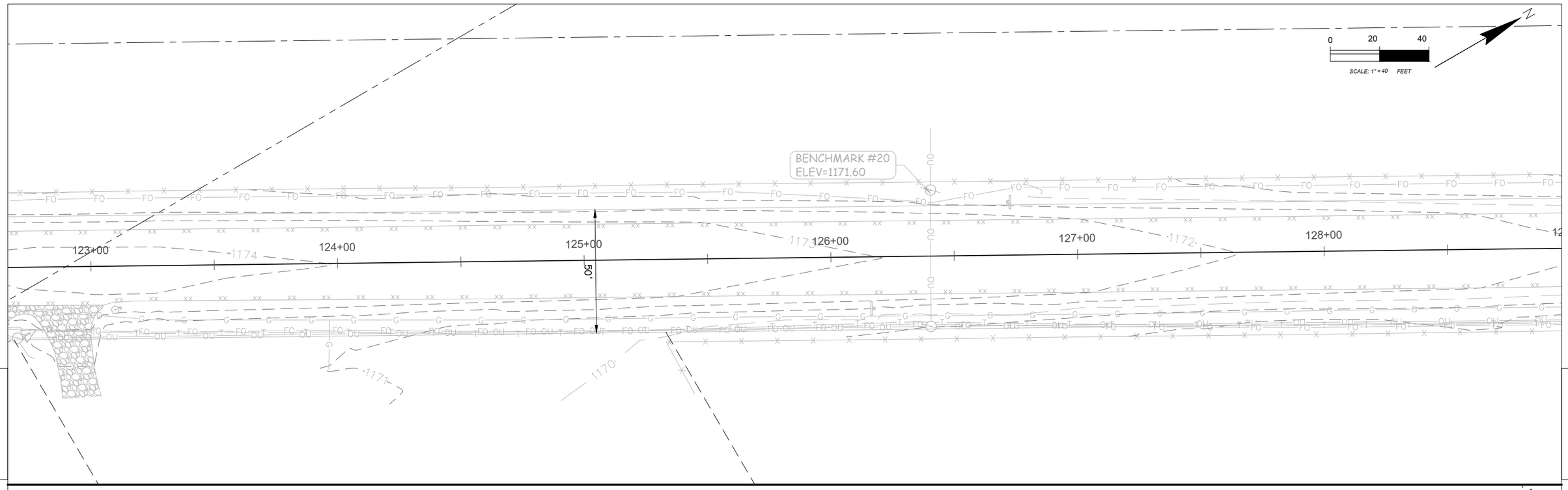

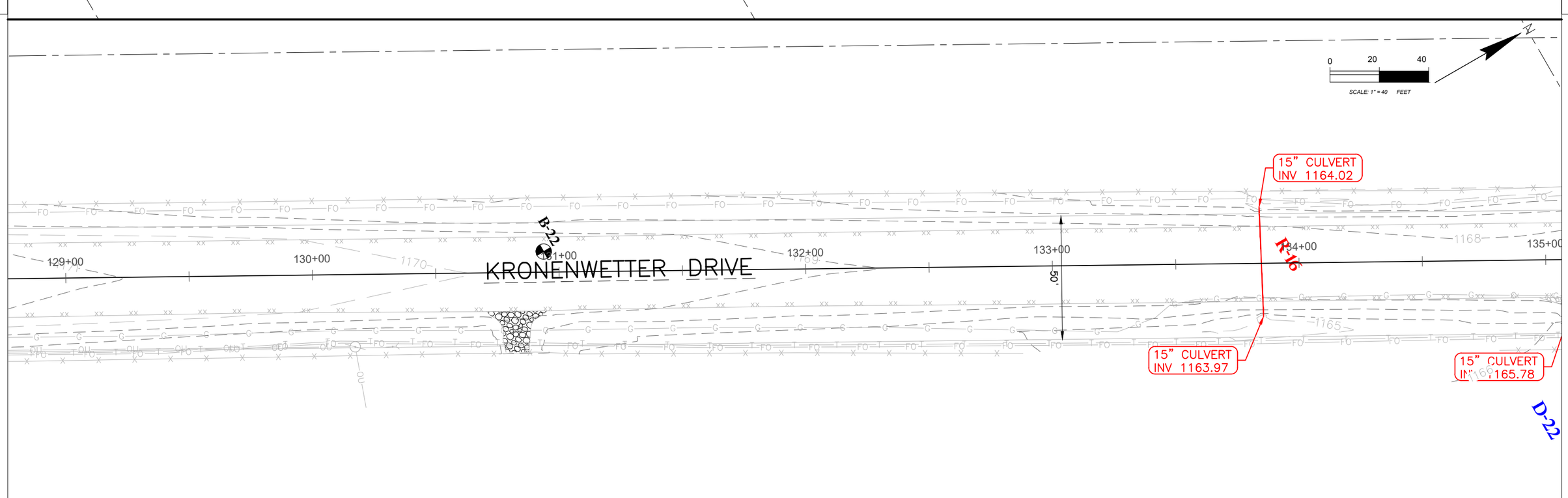

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LAYOUT NAME - PLAN 2.7

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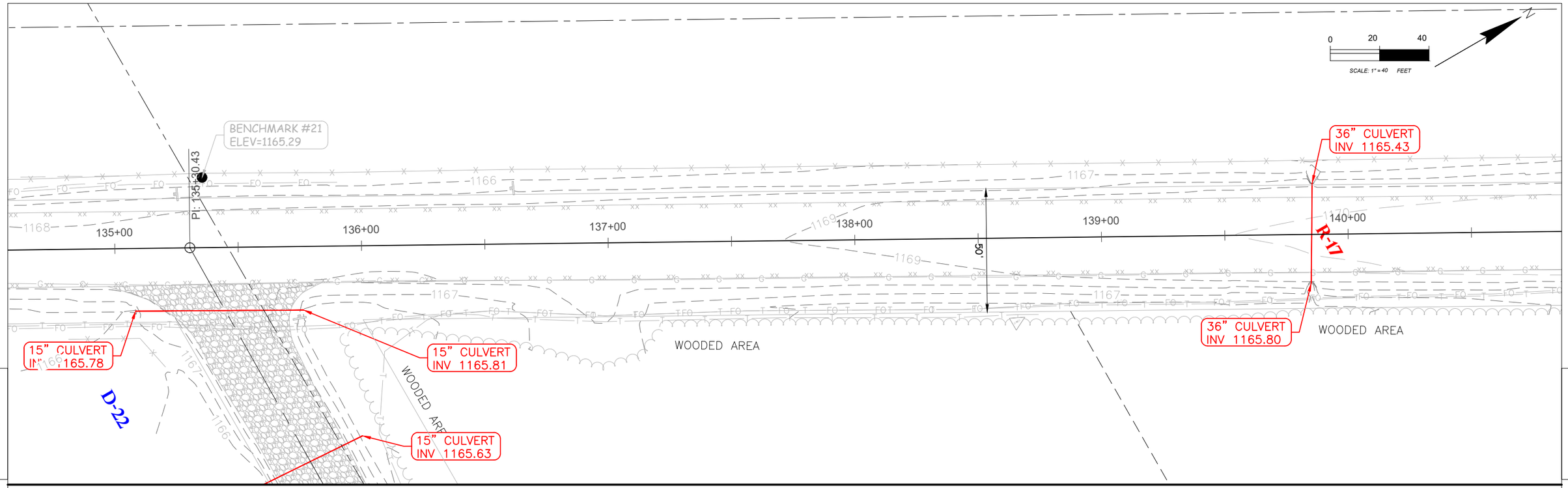

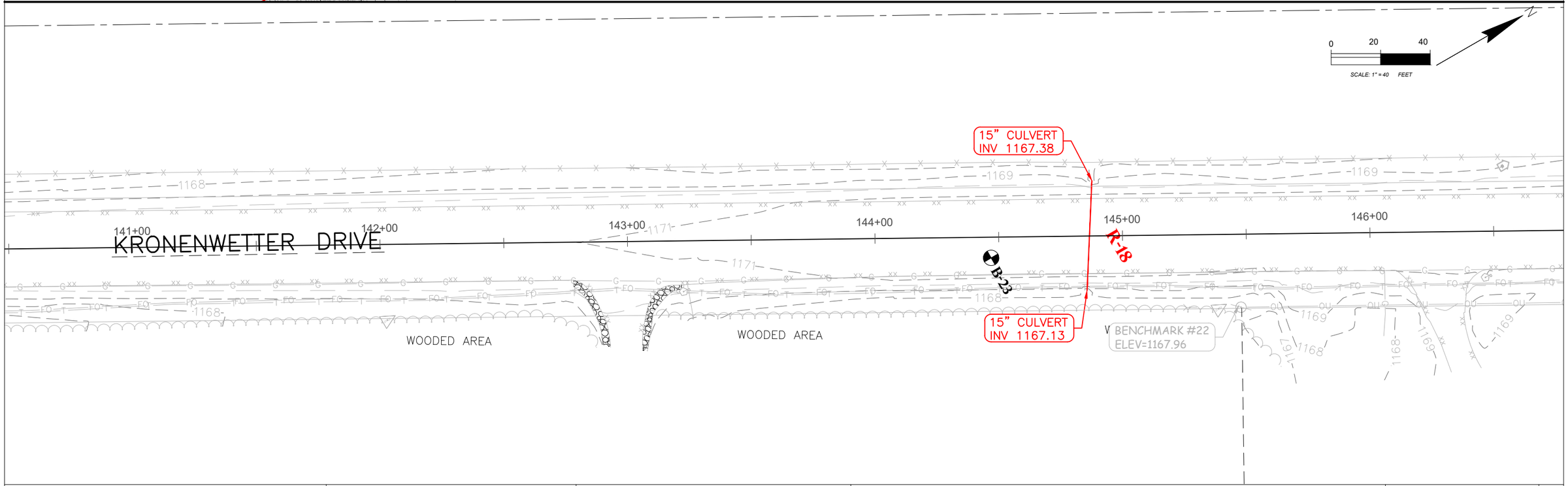

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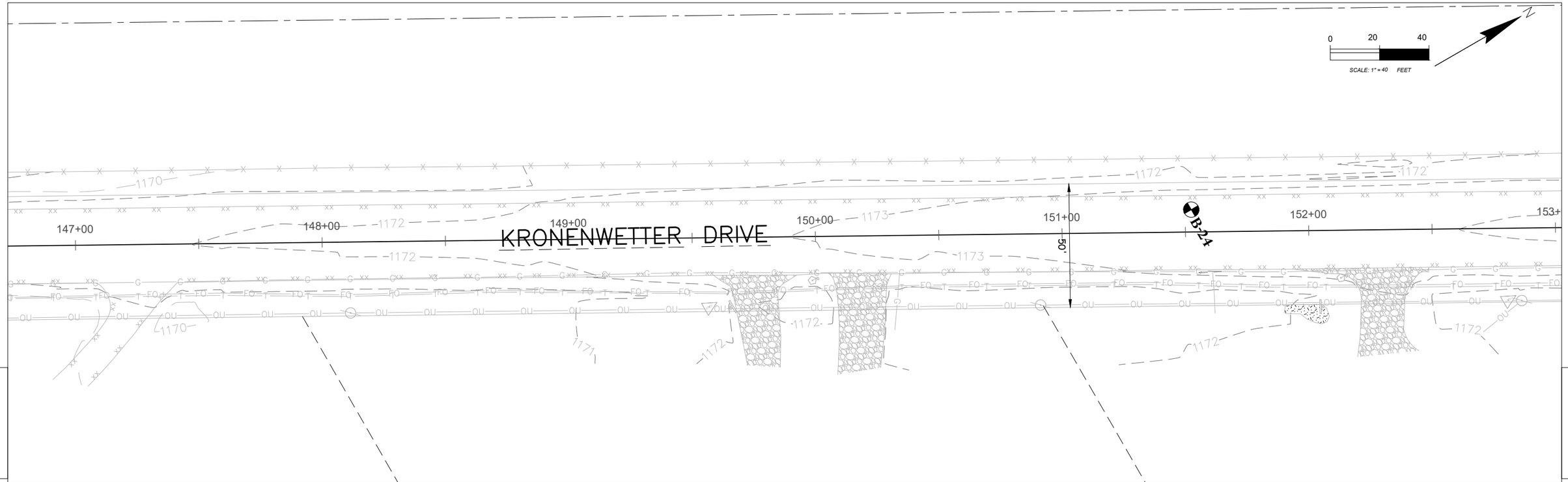

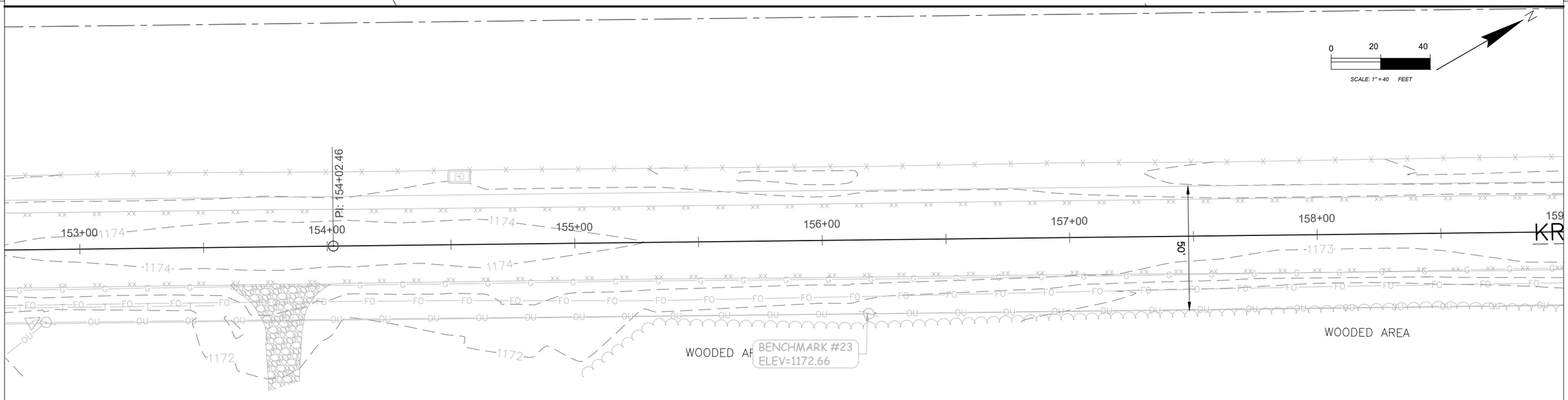

PROJECT NO: 2024-020-(D) NORTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

FILE NAME : D:\1 PROJECT FILES 2024\2024-020 (C) PHASE A-SOUTH-(D) PHASE B-NORTH ROADS\(D) PHASE B-NORTH\020-D-NORTH ROADS.DWG
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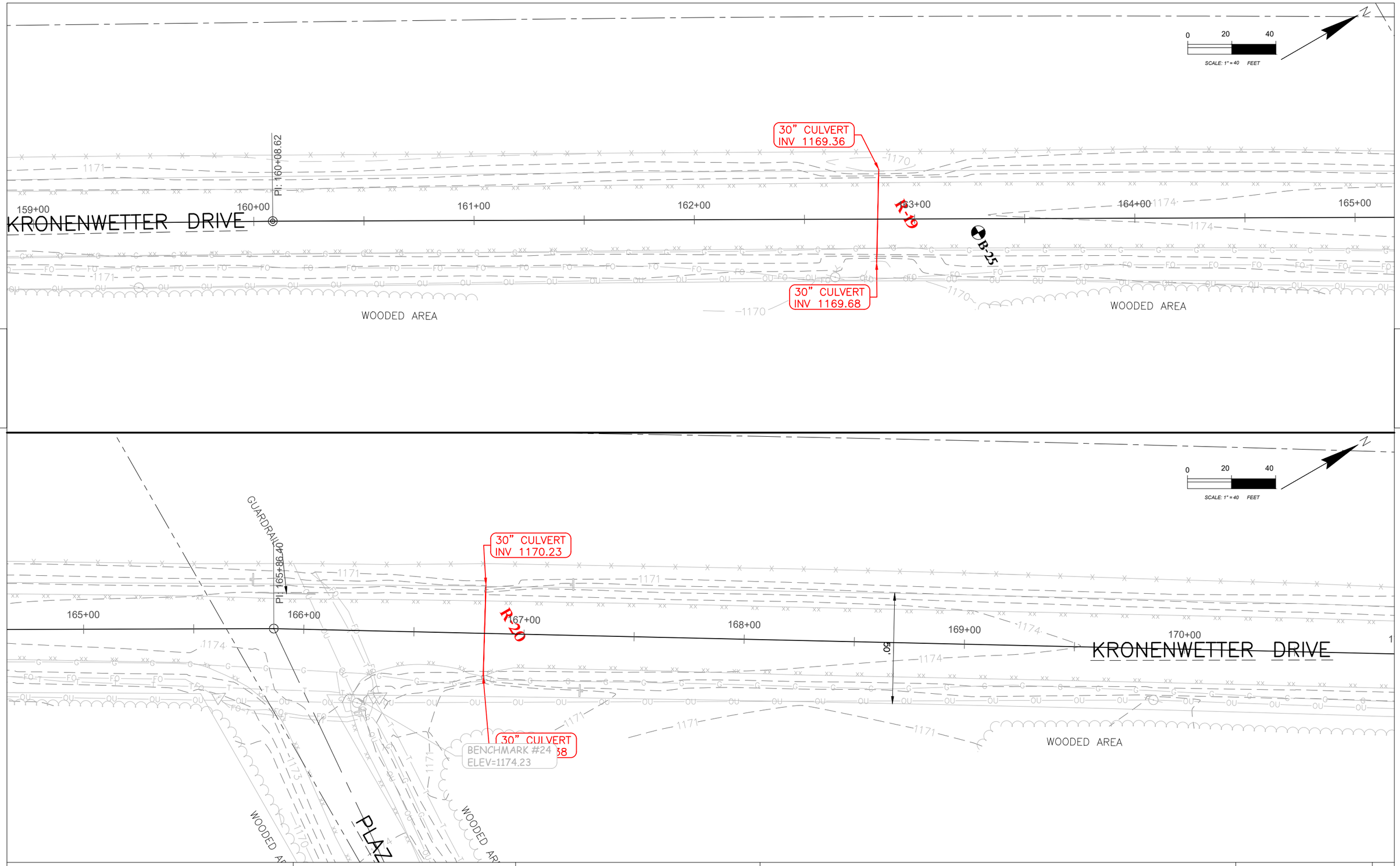

PROJECT NO: 2024-020-(D) NORTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

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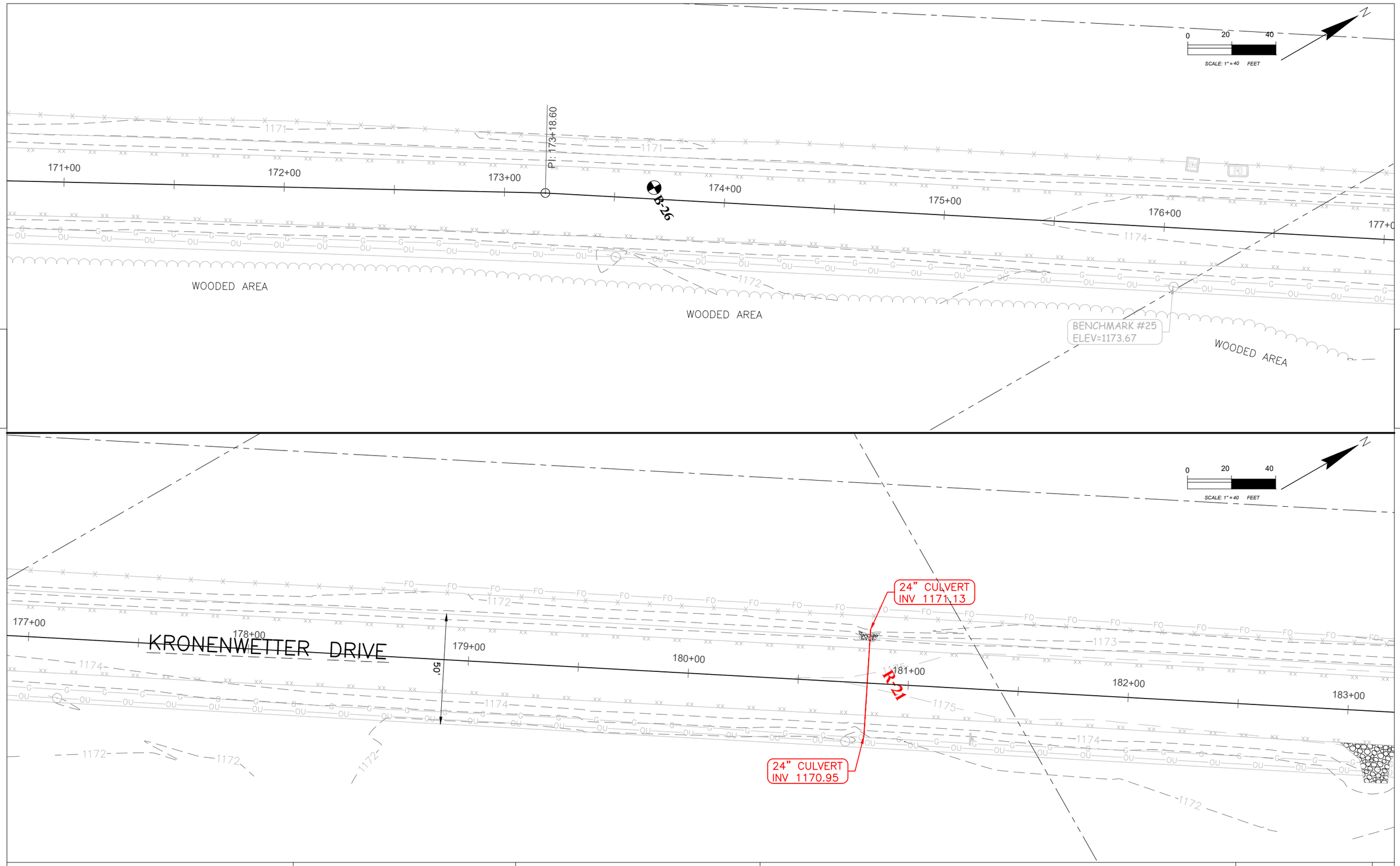

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PROJECT NO: 2024-020-(D) NORTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

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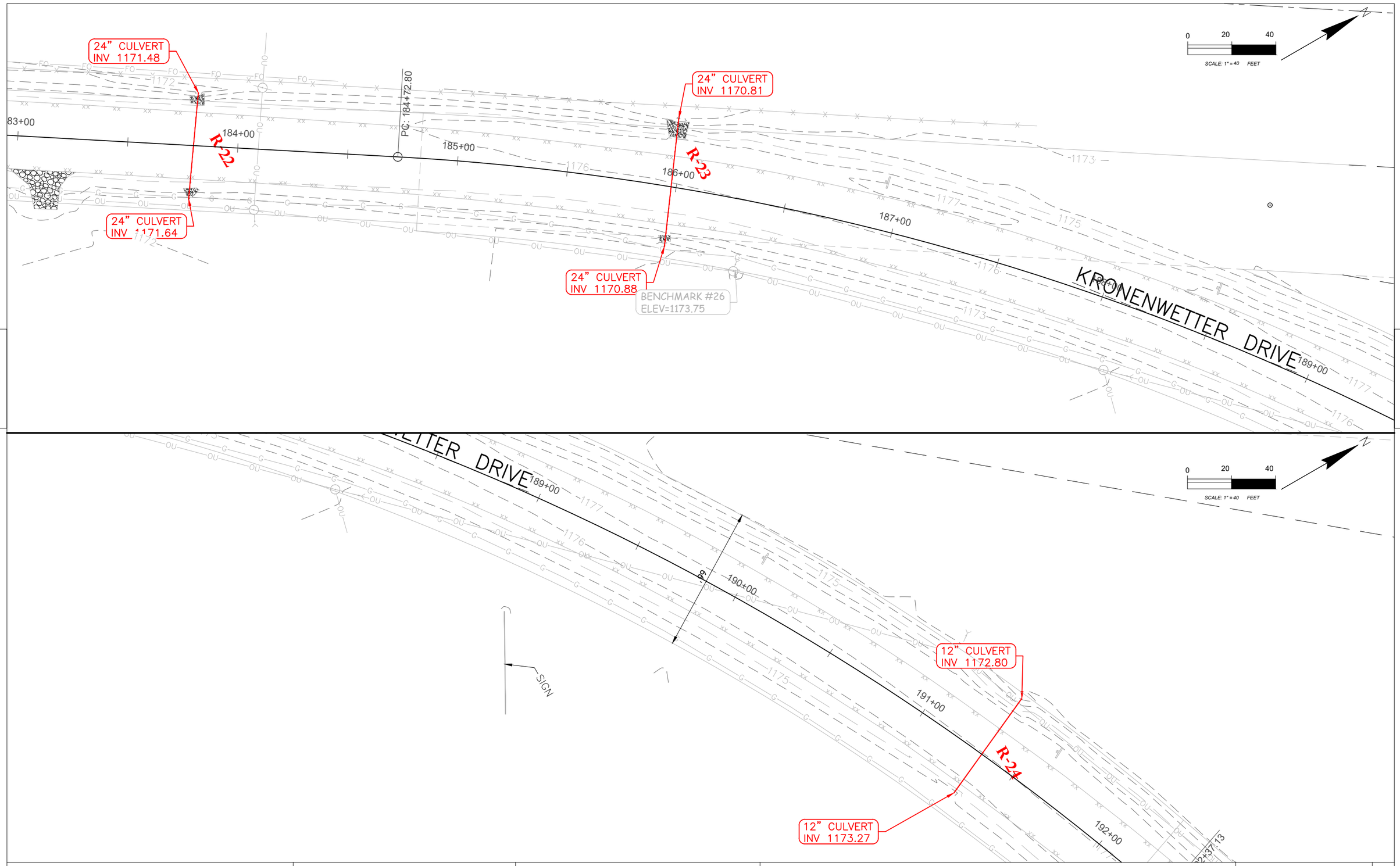

PROJECT NO: 2024-020-(D) NORTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

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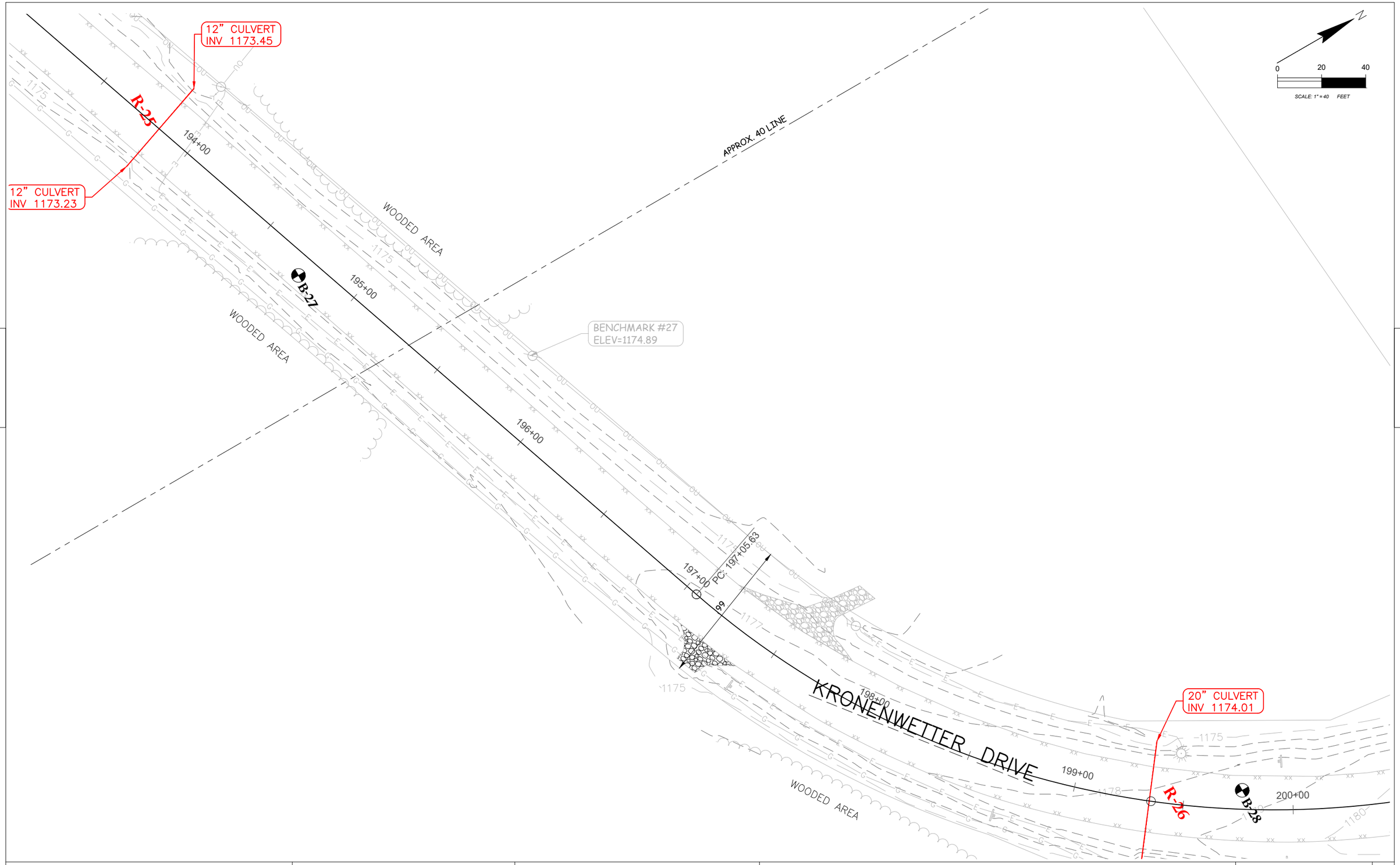

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PROJECT NO: 2024-020 (D) NORTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

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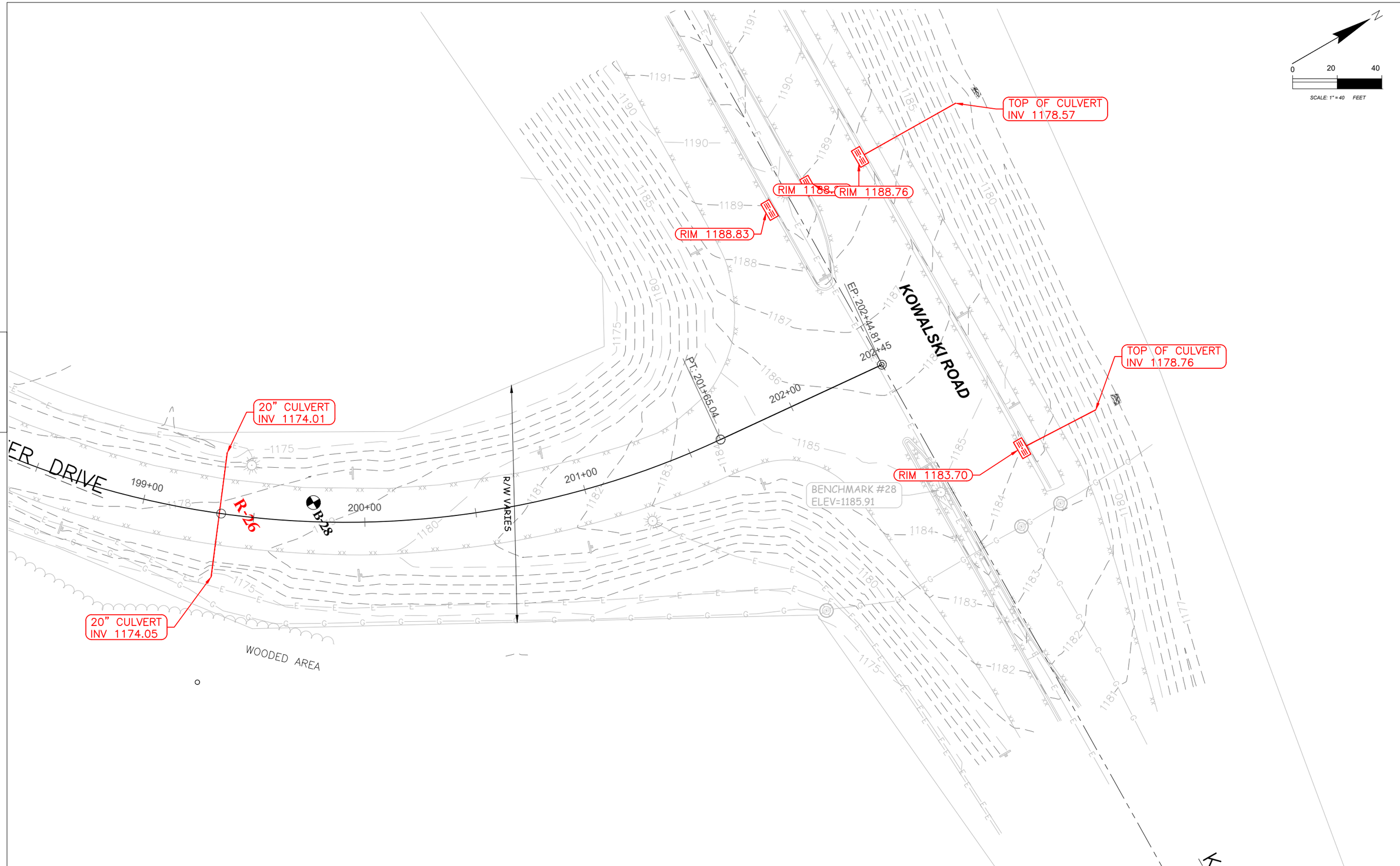

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PROJECT NO: 2024-020 (D) NORTH	HWY: KRONENWETTER DRIVE	COUNTY: MARATHON	PLAN	SHEET	E

Appendix 4

NOAA Atlas 14, Volume 8, Version 2
Location name: Mosinee, Wisconsin, USA*
Latitude: 44.8066°, Longitude: -89.6722°
Elevation: 1168 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.313** (0.258-0.380)	**0.370** (0.304-0.448)	**0.467** (0.383-0.567)	**0.553** (0.451-0.674)	**0.680** (0.540-0.853)	**0.783** (0.607-0.989)	**0.892** (0.668-1.14)	**1.01** (0.724-1.31)	**1.17** (0.808-1.55)	**1.30** (0.872-1.73)
10-min	**0.459** (0.378-0.556)	**0.541** (0.446-0.656)	**0.684** (0.561-0.831)	**0.810** (0.661-0.986)	**0.995** (0.790-1.25)	**1.15** (0.888-1.45)	**1.31** (0.978-1.68)	**1.48** (1.06-1.92)	**1.71** (1.18-2.27)	**1.90** (1.28-2.53)
15-min	**0.559** (0.461-0.678)	**0.660** (0.543-0.800)	**0.834** (0.684-1.01)	**0.988** (0.806-1.20)	**1.21** (0.964-1.52)	**1.40** (1.08-1.77)	**1.59** (1.19-2.04)	**1.80** (1.29-2.35)	**2.09** (1.44-2.77)	**2.32** (1.56-3.09)
30-min	**0.794** (0.655-0.962)	**0.936** (0.770-1.13)	**1.18** (0.969-1.43)	**1.40** (1.14-1.70)	**1.72** (1.37-2.16)	**1.98** (1.54-2.50)	**2.26** (1.69-2.90)	**2.56** (1.84-3.33)	**2.97** (2.05-3.94)	**3.30** (2.21-4.39)
60-min	**1.02** (0.843-1.24)	**1.20** (0.984-1.45)	**1.50** (1.23-1.82)	**1.77** (1.45-2.16)	**2.18** (1.74-2.74)	**2.52** (1.95-3.19)	**2.88** (2.16-3.70)	**3.27** (2.35-4.26)	**3.81** (2.63-5.06)	**4.25** (2.85-5.66)
2-hr	**1.25** (1.04-1.50)	**1.46** (1.20-1.75)	**1.82** (1.50-2.19)	**2.15** (1.76-2.60)	**2.64** (2.12-3.31)	**3.06** (2.39-3.84)	**3.50** (2.64-4.46)	**3.98** (2.88-5.16)	**4.65** (3.25-6.14)	**5.20** (3.52-6.88)
3-hr	**1.39** (1.15-1.66)	**1.60** (1.33-1.92)	**2.00** (1.65-2.40)	**2.35** (1.94-2.83)	**2.89** (2.33-3.61)	**3.35** (2.62-4.19)	**3.83** (2.91-4.88)	**4.36** (3.18-5.64)	**5.12** (3.59-6.73)	**5.72** (3.90-7.54)
6-hr	**1.64** (1.37-1.96)	**1.89** (1.58-2.25)	**2.34** (1.94-2.79)	**2.75** (2.27-3.28)	**3.36** (2.72-4.17)	**3.89** (3.07-4.84)	**4.45** (3.40-5.62)	**5.06** (3.72-6.50)	**5.92** (4.19-7.74)	**6.63** (4.56-8.68)
12-hr	**1.94** (1.63-2.29)	**2.23** (1.87-2.64)	**2.75** (2.30-3.26)	**3.22** (2.68-3.82)	**3.92** (3.19-4.81)	**4.51** (3.58-5.56)	**5.13** (3.95-6.43)	**5.81** (4.30-7.40)	**6.76** (4.83-8.76)	**7.53** (5.23-9.79)
24-hr	**2.28** (1.92-2.67)	**2.61** (2.20-3.06)	**3.20** (2.69-3.76)	**3.72** (3.11-4.39)	**4.50** (3.68-5.47)	**5.14** (4.10-6.29)	**5.82** (4.51-7.23)	**6.55** (4.88-8.28)	**7.57** (5.45-9.74)	**8.39** (5.88-10.8)
2-day	**2.64** (2.24-3.08)	**3.02** (2.56-3.52)	**3.66** (3.10-4.28)	**4.24** (3.56-4.96)	**5.09** (4.18-6.14)	**5.79** (4.65-7.02)	**6.52** (5.09-8.04)	**7.31** (5.50-9.17)	**8.42** (6.11-10.7)	**9.30** (6.58-11.9)
3-day	**2.89** (2.46-3.36)	**3.30** (2.80-3.83)	**4.01** (3.40-4.66)	**4.63** (3.91-5.40)	**5.55** (4.58-6.66)	**6.30** (5.08-7.61)	**7.09** (5.55-8.70)	**7.93** (5.99-9.90)	**9.11** (6.65-11.6)	**10.0** (7.14-12.8)
4-day	**3.12** (2.66-3.60)	**3.55** (3.02-4.11)	**4.30** (3.66-4.99)	**4.97** (4.20-5.78)	**5.93** (4.90-7.09)	**6.72** (5.43-8.09)	**7.54** (5.92-9.23)	**8.42** (6.38-10.5)	**9.64** (7.06-12.2)	**10.6** (7.57-13.5)
7-day	**3.76** (3.22-4.33)	**4.25** (3.63-4.89)	**5.08** (4.33-5.85)	**5.79** (4.92-6.69)	**6.82** (5.65-8.08)	**7.65** (6.21-9.13)	**8.50** (6.71-10.3)	**9.40** (7.16-11.6)	**10.6** (7.84-13.4)	**11.6** (8.35-14.7)
10-day	**4.36** (3.75-5.00)	**4.88** (4.19-5.60)	**5.76** (4.93-6.61)	**6.50** (5.54-7.49)	**7.56** (6.28-8.91)	**8.40** (6.84-9.98)	**9.26** (7.33-11.2)	**10.2** (7.77-12.5)	**11.4** (8.42-14.2)	**12.3** (8.91-15.5)
20-day	**6.09** (5.26-6.93)	**6.72** (5.79-7.65)	**7.74** (6.65-8.82)	**8.58** (7.34-9.81)	**9.73** (8.11-11.3)	**10.6** (8.68-12.5)	**11.5** (9.15-13.7)	**12.4** (9.53-15.0)	**13.6** (10.1-16.8)	**14.4** (10.5-18.1)
30-day	**7.51** (6.50-8.51)	**8.25** (7.14-9.36)	**9.44** (8.15-10.7)	**10.4** (8.94-11.8)	**11.7** (9.76-13.5)	**12.7** (10.4-14.8)	**13.6** (10.8-16.1)	**14.5** (11.2-17.5)	**15.7** (11.7-19.3)	**16.5** (12.1-20.6)
45-day	**9.28** (8.06-10.5)	**10.2** (8.86-11.5)	**11.7** (10.1-13.2)	**12.8** (11.1-14.6)	**14.4** (12.0-16.5)	**15.5** (12.7-17.9)	**16.5** (13.2-19.5)	**17.5** (13.6-21.0)	**18.7** (14.1-22.9)	**19.6** (14.5-24.3)
60-day	**10.8** (9.37-12.1)	**11.9** (10.3-13.4)	**13.6** (11.8-15.4)	**15.0** (13.0-17.0)	**16.8** (14.0-19.2)	**18.0** (14.9-20.8)	**19.2** (15.4-22.5)	**20.3** (15.8-24.2)	**21.6** (16.3-26.3)	**22.5** (16.7-27.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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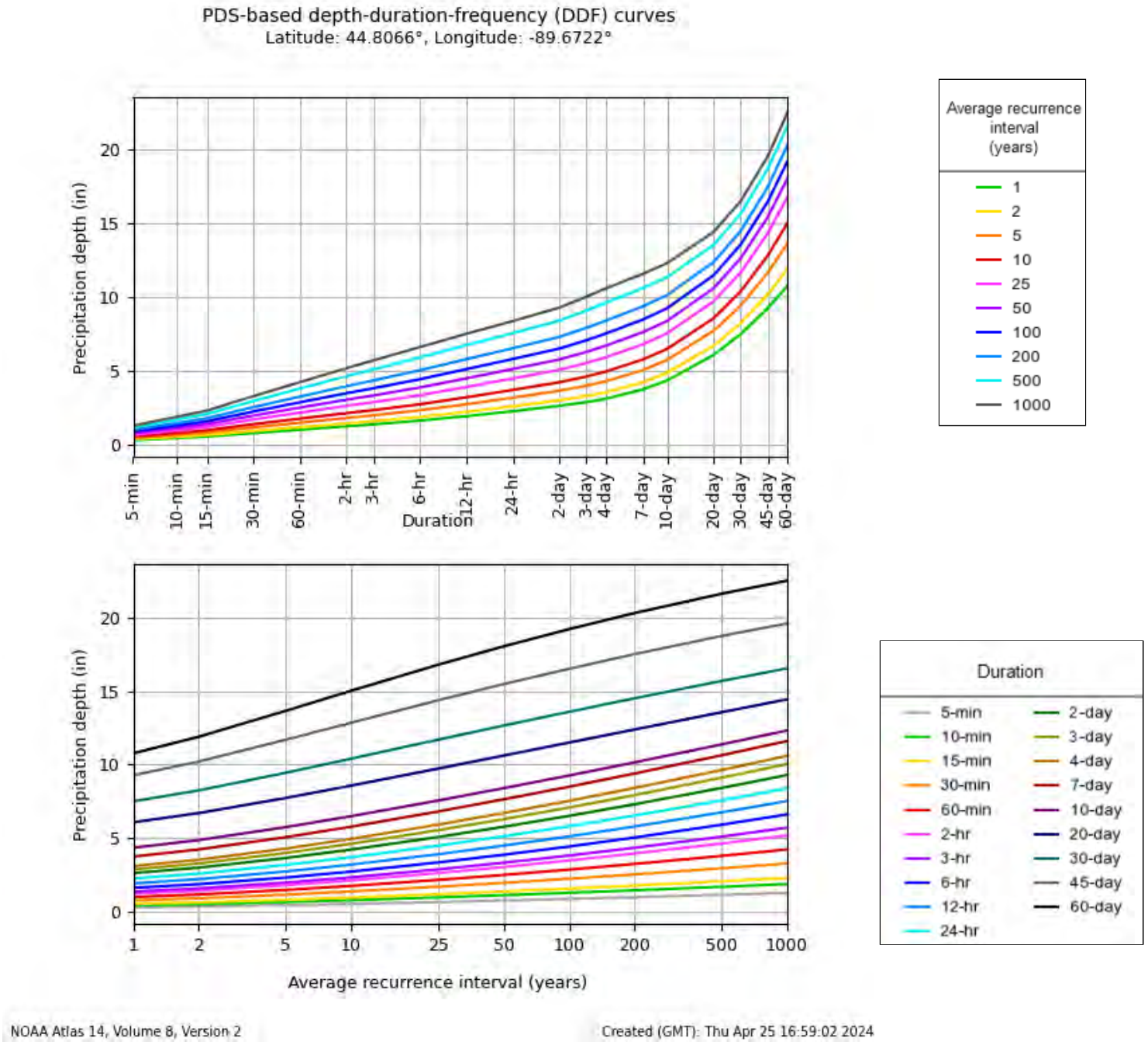
PF graphical



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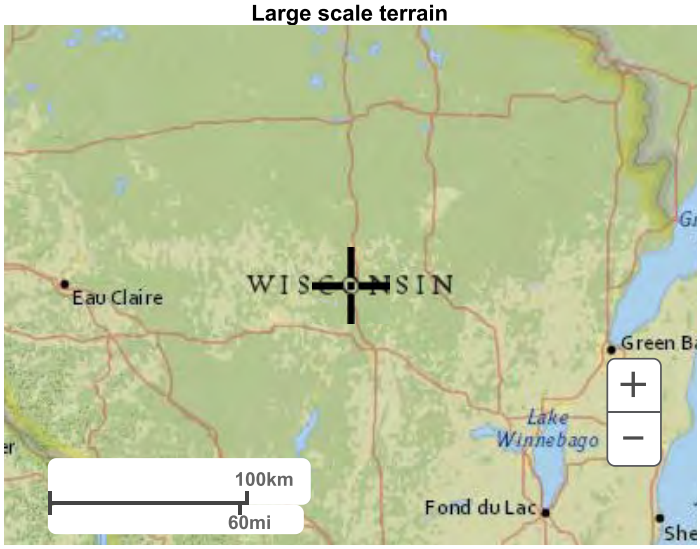
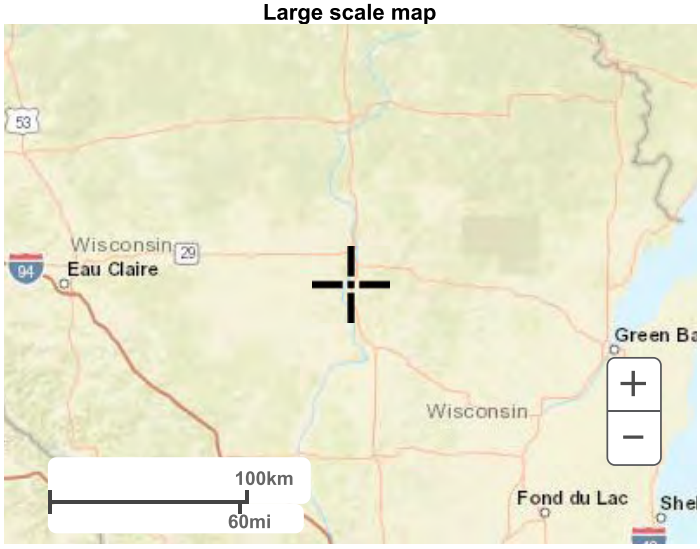
Maps & aerials

Small scale terrain

Large scale terrain



Large scale map



Large scale aerial

Appendix 5

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

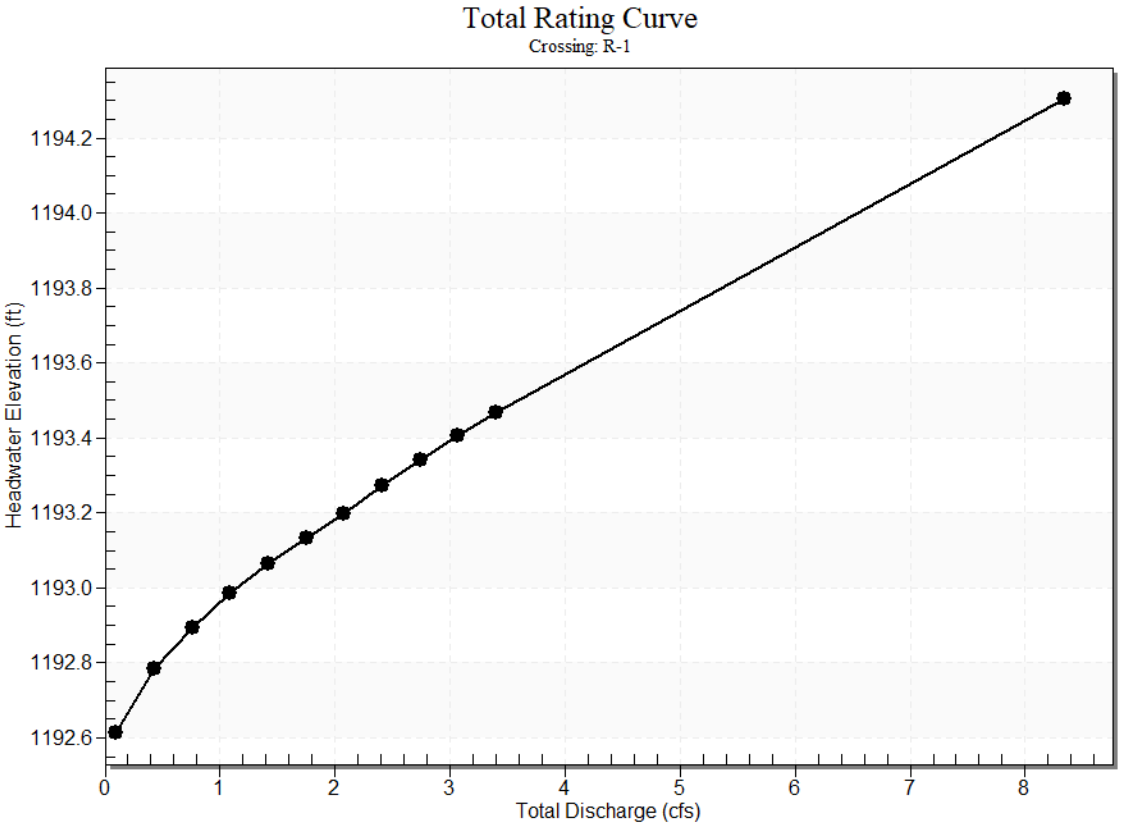
Design Flow: 3.40 cfs

Maximum Flow: 3.40 cfs

Table 1 - Summary of Culvert Flows at Crossing: R-1

Headwater Elevation (ft)	Total Discharge (cfs)	R-1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1192.61	0.10	0.10	0.00	1
1192.78	0.43	0.43	0.00	1
1192.89	0.76	0.76	0.00	1
1192.98	1.09	1.09	0.00	1
1193.06	1.42	1.42	0.00	1
1193.13	1.75	1.75	0.00	1
1193.20	2.08	2.08	0.00	1
1193.27	2.41	2.41	0.00	1
1193.34	2.74	2.74	0.00	1
1193.41	3.07	3.07	0.00	1
1193.47	3.40	3.40	0.00	1
1194.30	8.16	8.16	0.00	Overtopping

Rating Curve Plot for Crossing: R-1



Culvert Data: R-1

Table 1 - Culvert Summary Table: R-1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.10 cfs	0.10 cfs	1192.61	0.15	0.0*	1-S2n	0.08	0.12	0.08	0.00	2.87	0.00
0.43 cfs	0.43 cfs	1192.78	0.32	0.0*	1-S2n	0.15	0.24	0.15	0.00	4.46	0.00
0.76 cfs	0.76 cfs	1192.89	0.43	0.0*	1-S2n	0.20	0.32	0.20	0.00	5.30	0.00
1.09 cfs	1.09 cfs	1192.98	0.52	0.0*	1-S2n	0.24	0.39	0.24	0.00	5.90	0.00

1.42 cfs	1.42 cfs	1193.06	0.60	0.0*	1-S2n	0.28	0.45	0.28	0.00	6.37	0.00
1.75 cfs	1.75 cfs	1193.13	0.67	0.0*	1-S2n	0.31	0.50	0.31	0.00	6.65	0.00
2.08 cfs	2.08 cfs	1193.20	0.74	0.0*	1-S2n	0.33	0.54	0.33	0.00	7.13	0.00
2.41 cfs	2.41 cfs	1193.27	0.81	0.0*	1-S2n	0.36	0.59	0.36	0.00	7.44	0.00
2.74 cfs	2.74 cfs	1193.34	0.88	0.0*	1-S2n	0.38	0.63	0.39	0.00	7.55	0.00
3.07 cfs	3.07 cfs	1193.41	0.95	0.0*	1-S2n	0.40	0.67	0.41	0.00	7.78	0.00
3.40 cfs	3.40 cfs	1193.47	1.01	0.0*	1-S2n	0.43	0.70	0.44	0.00	7.97	0.00

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

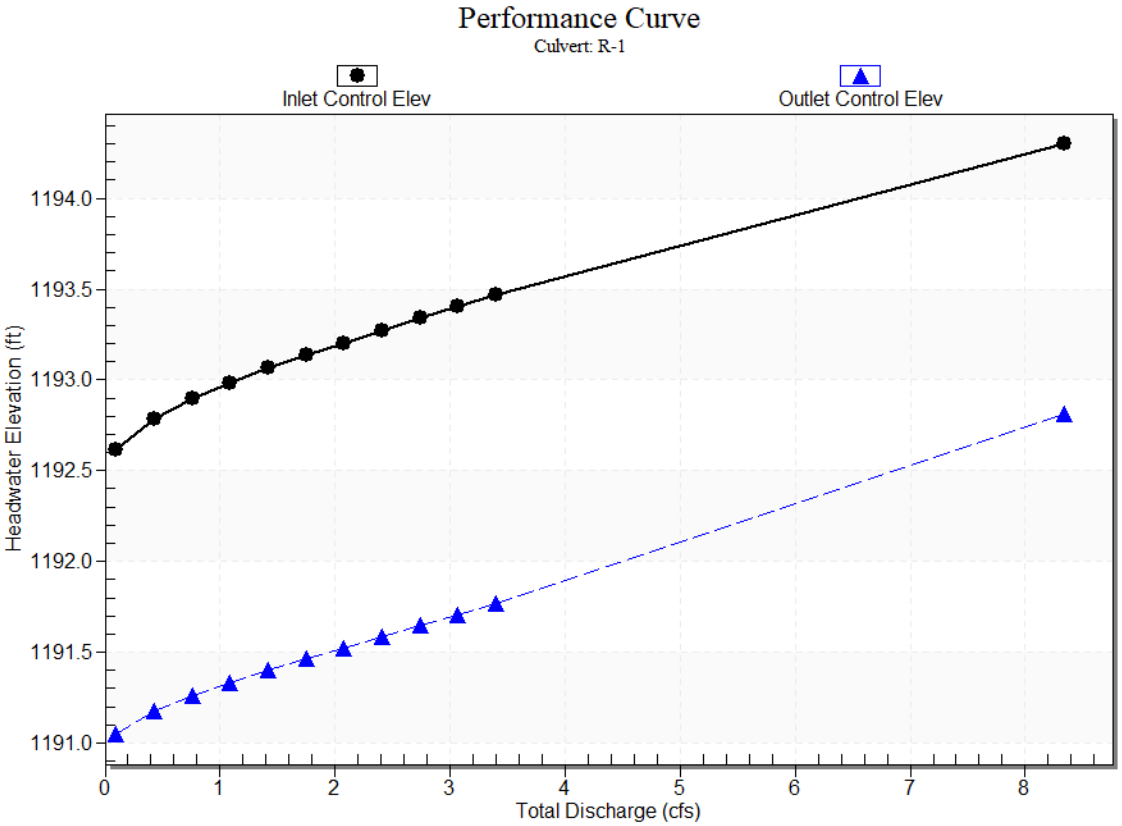
Inlet Elevation (invert): 1192.46 ft,

Outlet Elevation (invert): 1190.93 ft

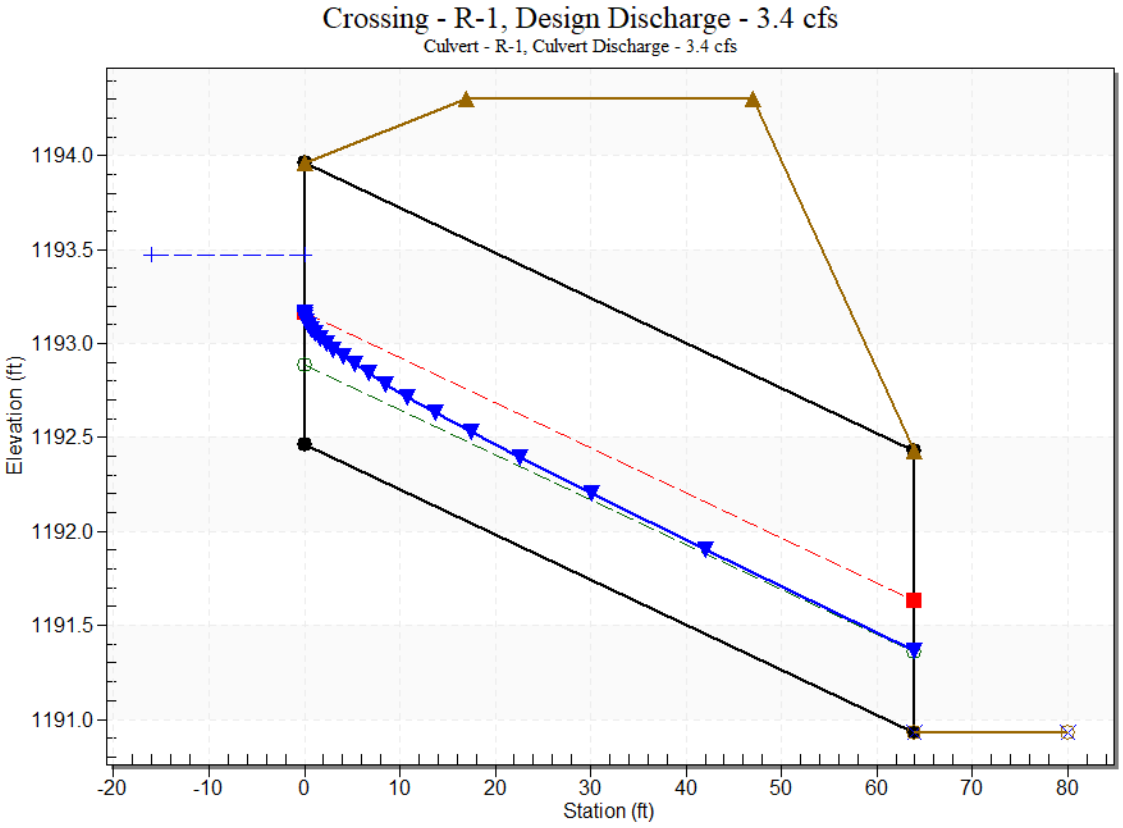
Culvert Length: 64.02 ft,

Culvert Slope: 0.0239

Culvert Performance Curve Plot: R-1



Water Surface Profile Plot for Culvert: R-1



Site Data - R-1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1192.46 ft

Outlet Station: 64.00 ft

Outlet Elevation: 1190.93 ft

Number of Barrels: 1

Culvert Data Summary - R-1

Barrel Shape: Circular

Barrel Diameter: 1.50 ft

Barrel Material: PVC

Embedment: 0.00 in

Barrel Manning's n: 0.0110

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-1

Table 2 - Downstream Channel Rating Curve (Crossing: R-1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1190.93	0.00
0.43	1190.93	0.00
0.76	1190.93	0.00
1.09	1190.93	0.00
1.42	1190.93	0.00
1.75	1190.93	0.00
2.08	1190.93	0.00
2.41	1190.93	0.00
2.74	1190.93	0.00
3.07	1190.93	0.00
3.40	1190.93	0.00

Tailwater Channel Data - R-1

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1190.93 ft

Roadway Data for Crossing: R-1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.50 ft

Crest Elevation: 1194.30 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.10 cfs

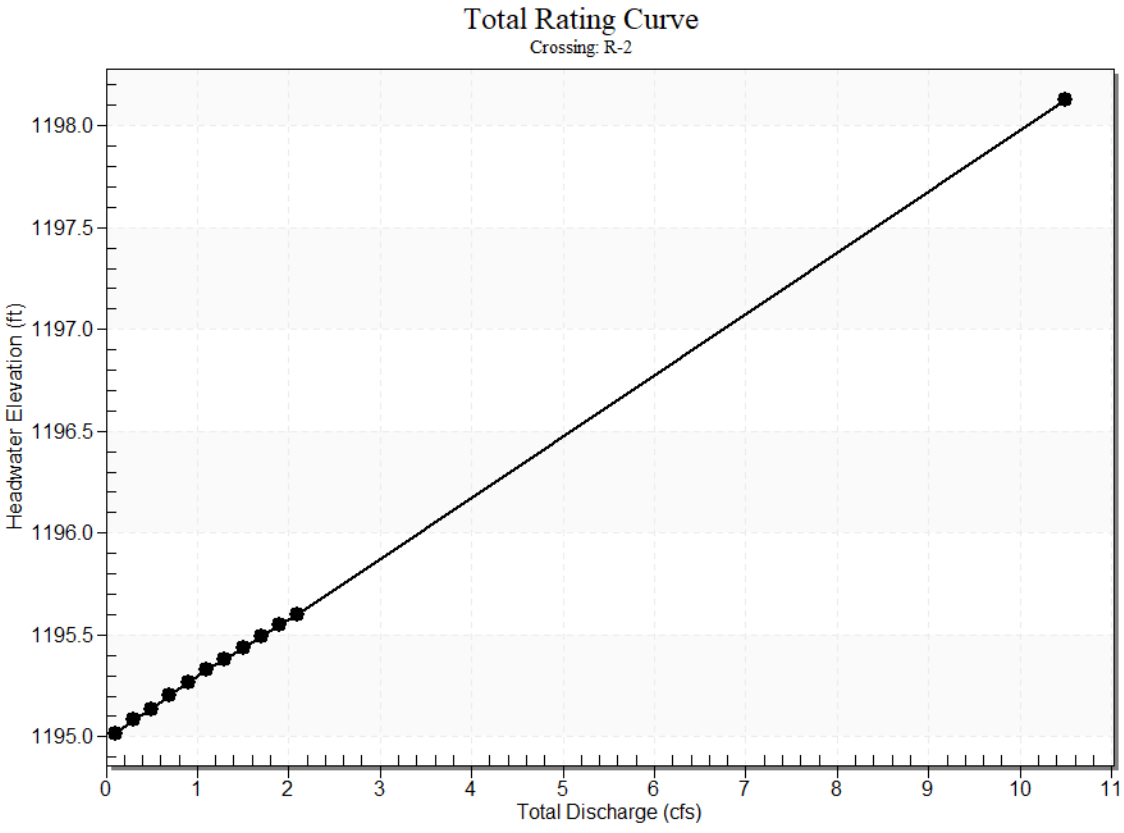
Maximum Flow: 2.10 cfs

Table 3 - Summary of Culvert Flows at Crossing: R-2

Headwater	Total	R-2 Discharge	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	(cfs)	Discharge (cfs)	
1195.02	0.10	0.10	0.00	1
1195.08	0.30	0.30	0.00	1
1195.13	0.50	0.50	0.00	1
1195.21	0.70	0.70	0.00	1
1195.27	0.90	0.90	0.00	1
1195.33	1.10	1.10	0.00	1
1195.38	1.30	1.30	0.00	1
1195.44	1.50	1.50	0.00	1
1195.49	1.70	1.70	0.00	1
1195.55	1.90	1.90	0.00	1
1195.60	2.10	2.10	0.00	1
1197.80	9.16	9.16	0.00	Overtopping

Rating Curve Plot for Crossing: R-2



Culvert Data: R-2

Table 2 - Culvert Summary Table: R-2

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1195.02	0.16	0.256	1-S1t	0.11	0.12	0.60	0.60	0.17	0.00
0.30 cfs	0.30 cfs	1195.08	0.29	0.322	1-S1t	0.19	0.21	0.60	0.60	0.52	0.00
0.50 cfs	0.50 cfs	1195.13	0.37	0.256	1-JS1t	0.24	0.28	0.60	0.60	0.86	0.00
0.70 cfs	0.70 cfs	1195.21	0.45	0.262	1-JS1t	0.29	0.33	0.60	0.60	1.20	0.00
0.90 cfs	0.90 cfs	1195.27	0.51	0.271	1-JS1t	0.33	0.37	0.60	0.60	1.55	0.00
1.10 cfs	1.10 cfs	1195.33	0.57	0.281	1-JS1t	0.36	0.41	0.60	0.60	1.89	0.00
1.30 cfs	1.30 cfs	1195.38	0.62	0.293	1-JS1t	0.40	0.45	0.60	0.60	2.23	0.00
1.50 cfs	1.50 cfs	1195.44	0.68	0.307	1-JS1t	0.43	0.48	0.60	0.60	2.58	0.00
1.70 cfs	1.70 cfs	1195.49	0.73	0.323	1-S2n	0.46	0.52	0.46	0.60	4.17	0.00
1.90 cfs	1.90 cfs	1195.55	0.79	0.342	1-S2n	0.49	0.55	0.49	0.60	4.30	0.00
2.10 cfs	2.10 cfs	1195.60	0.84	0.362	1-S2n	0.51	0.58	0.51	0.60	4.42	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

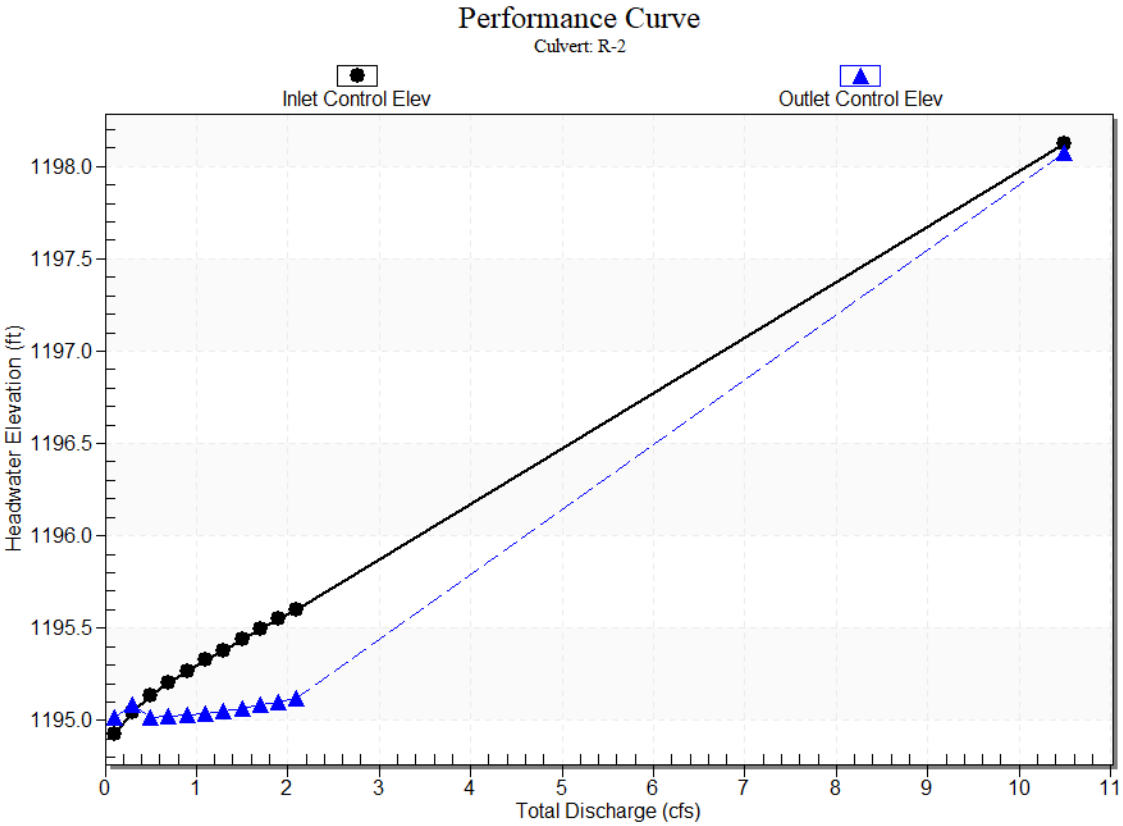
Inlet Elevation (invert): 1194.76 ft,

Outlet Elevation (invert): 1194.41 ft

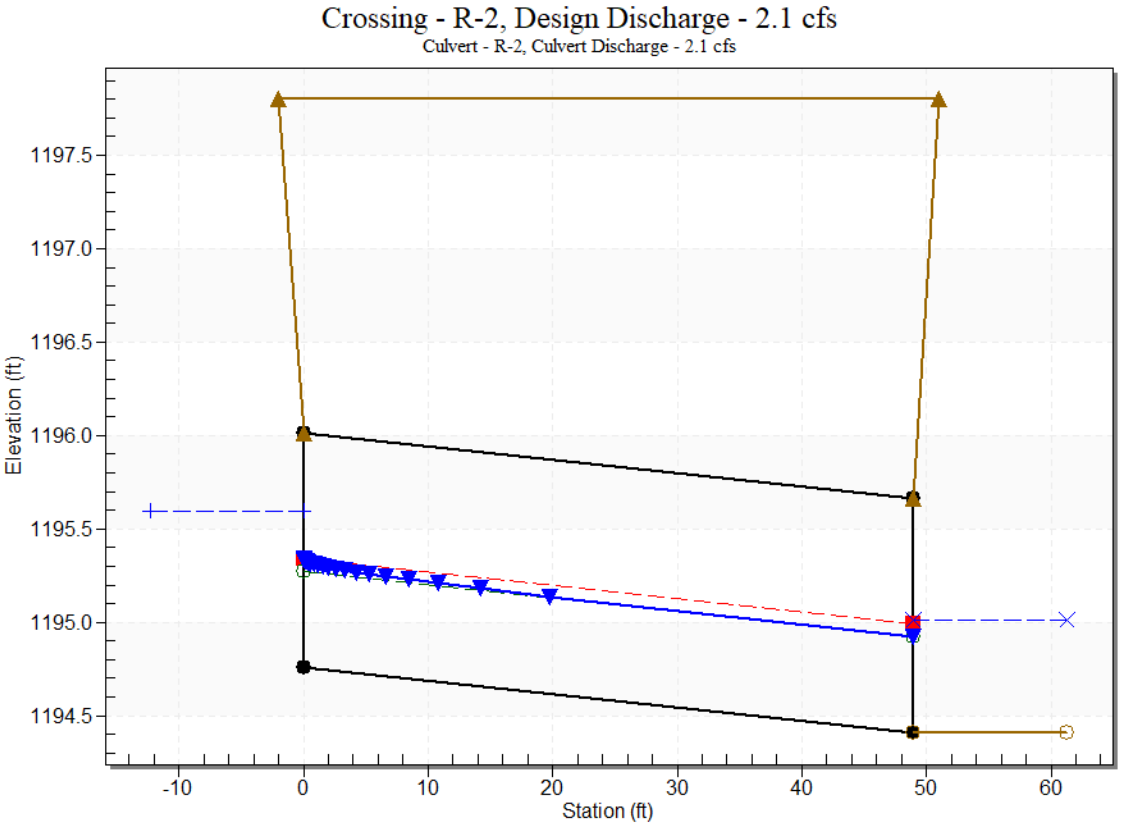
Culvert Length: 49.00 ft,

Culvert Slope: 0.0071

Culvert Performance Curve Plot: R-2



Water Surface Profile Plot for Culvert: R-2



Site Data - R-2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1194.76 ft

Outlet Station: 49.00 ft

Outlet Elevation: 1194.41 ft

Number of Barrels: 1

Culvert Data Summary - R-2

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-2

Table 4 - Downstream Channel Rating Curve (Crossing: R-2)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1195.01	0.60
0.30	1195.01	0.60
0.50	1195.01	0.60
0.70	1195.01	0.60
0.90	1195.01	0.60
1.10	1195.01	0.60
1.30	1195.01	0.60
1.50	1195.01	0.60
1.70	1195.01	0.60
1.90	1195.01	0.60
2.10	1195.01	0.60

Tailwater Channel Data - R-2

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1195.01 ft

Roadway Data for Crossing: R-2

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1197.80 ft

Roadway Surface: Paved

Roadway Top Width: 53.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

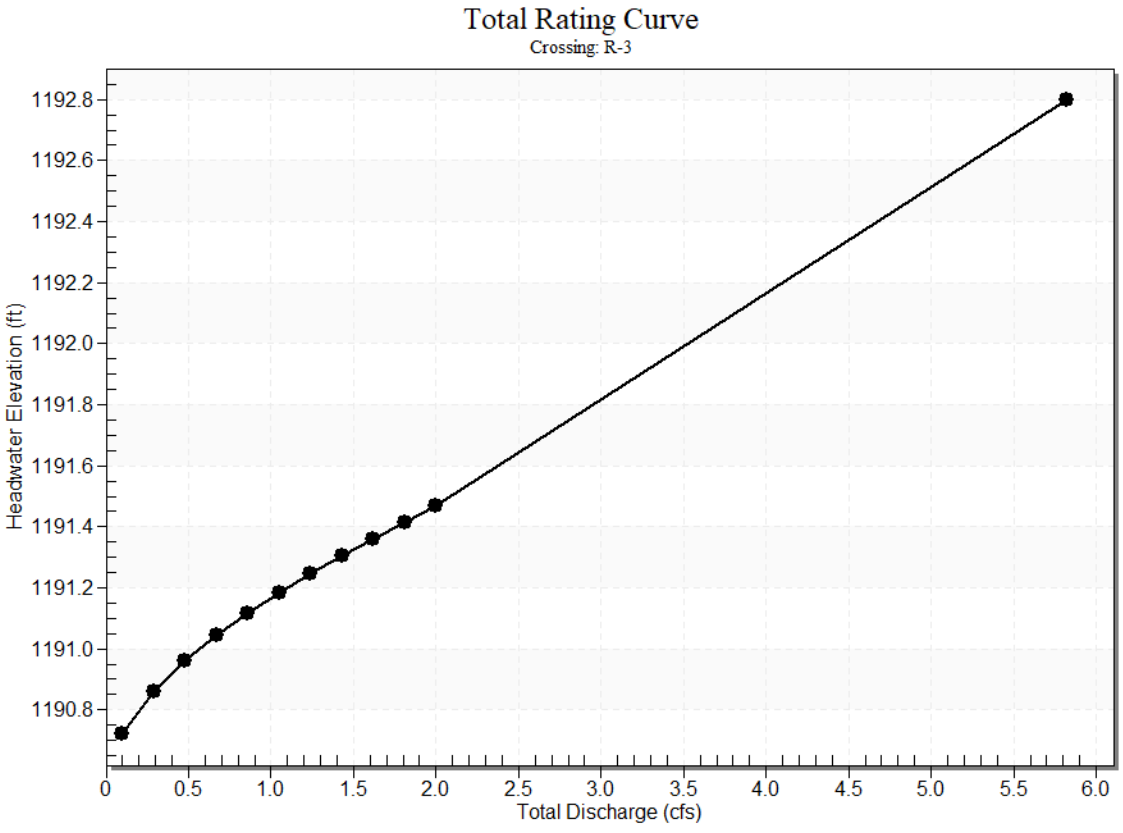
Maximum Flow: 2.00 cfs

Table 5 - Summary of Culvert Flows at Crossing: R-3

Headwater	Total	R-3 Discharge	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	(cfs)	Discharge (cfs)	
1190.72	0.10	0.10	0.00	1
1190.86	0.29	0.29	0.00	1
1190.96	0.48	0.48	0.00	1
1191.04	0.67	0.67	0.00	1
1191.12	0.86	0.86	0.00	1
1191.18	1.05	1.05	0.00	1
1191.25	1.24	1.24	0.00	1
1191.30	1.43	1.43	0.00	1
1191.36	1.62	1.62	0.00	1
1191.42	1.81	1.81	0.00	1
1191.47	2.00	2.00	0.00	1
1192.50	4.77	4.77	0.00	Overtopping

Rating Curve Plot for Crossing: R-3



Culvert Data: R-3

Table 3 - Culvert Summary Table: R-3

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1190.72	0.18	0.193	3-M1t	0.15	0.12	0.42	0.42	0.28	0.00
0.29 cfs	0.29 cfs	1190.86	0.30	0.332	3-M1t	0.25	0.21	0.42	0.42	0.80	0.00
0.48 cfs	0.48 cfs	1190.96	0.39	0.431	3-M1t	0.33	0.27	0.42	0.42	1.33	0.00
0.67 cfs	0.67 cfs	1191.04	0.47	0.514	3-M1t	0.39	0.32	0.42	0.42	1.85	0.00
0.86 cfs	0.86 cfs	1191.12	0.54	0.587	3-M2t	0.44	0.36	0.42	0.42	2.38	0.00
1.05 cfs	1.05 cfs	1191.18	0.60	0.654	3-M2t	0.49	0.40	0.42	0.42	2.90	0.00
1.24 cfs	1.24 cfs	1191.25	0.65	0.716	2-M2c	0.54	0.44	0.44	0.42	3.22	0.00
1.43 cfs	1.43 cfs	1191.30	0.71	0.775	2-M2c	0.58	0.47	0.47	0.42	3.36	0.00
1.62 cfs	1.62 cfs	1191.36	0.76	0.831	2-M2c	0.63	0.50	0.50	0.42	3.49	0.00
1.81 cfs	1.81 cfs	1191.42	0.81	0.886	2-M2c	0.67	0.53	0.53	0.42	3.61	0.00
2.00 cfs	2.00 cfs	1191.47	0.86	0.939	2-M2c	0.71	0.56	0.56	0.42	3.73	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

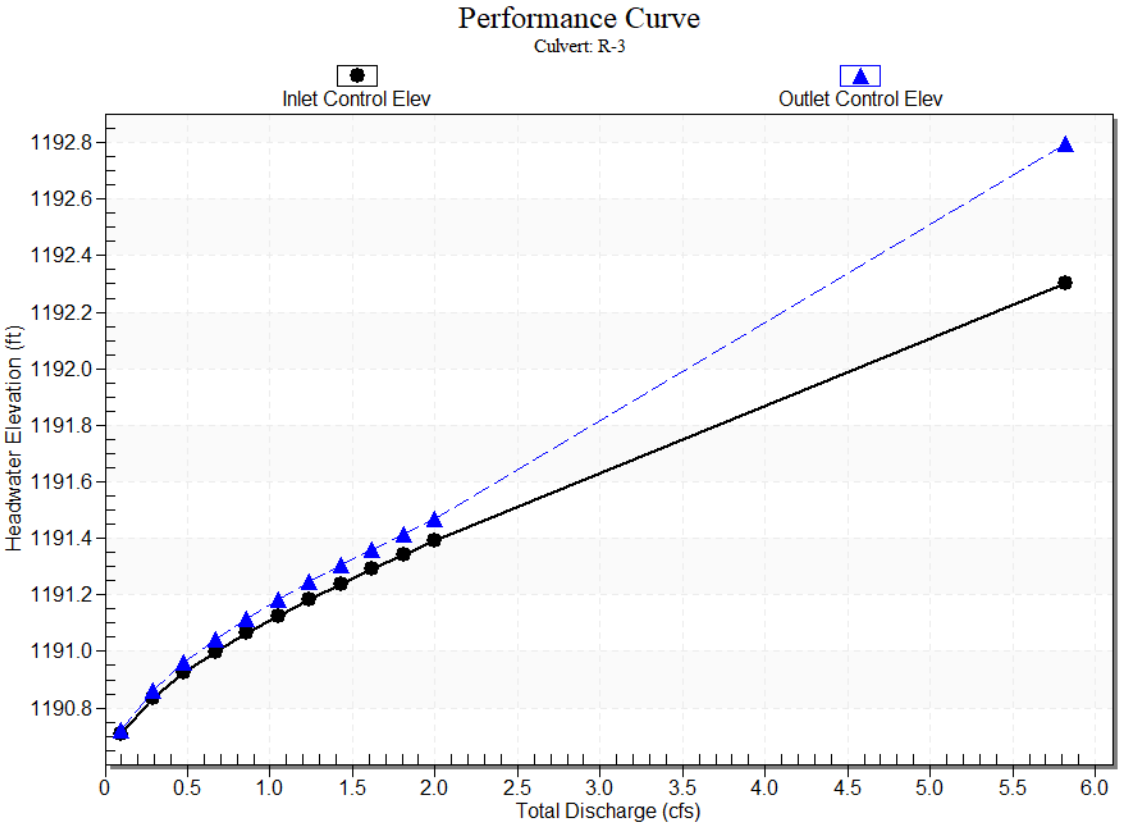
Inlet Elevation (invert): 1190.53 ft,

Outlet Elevation (invert): 1190.12 ft

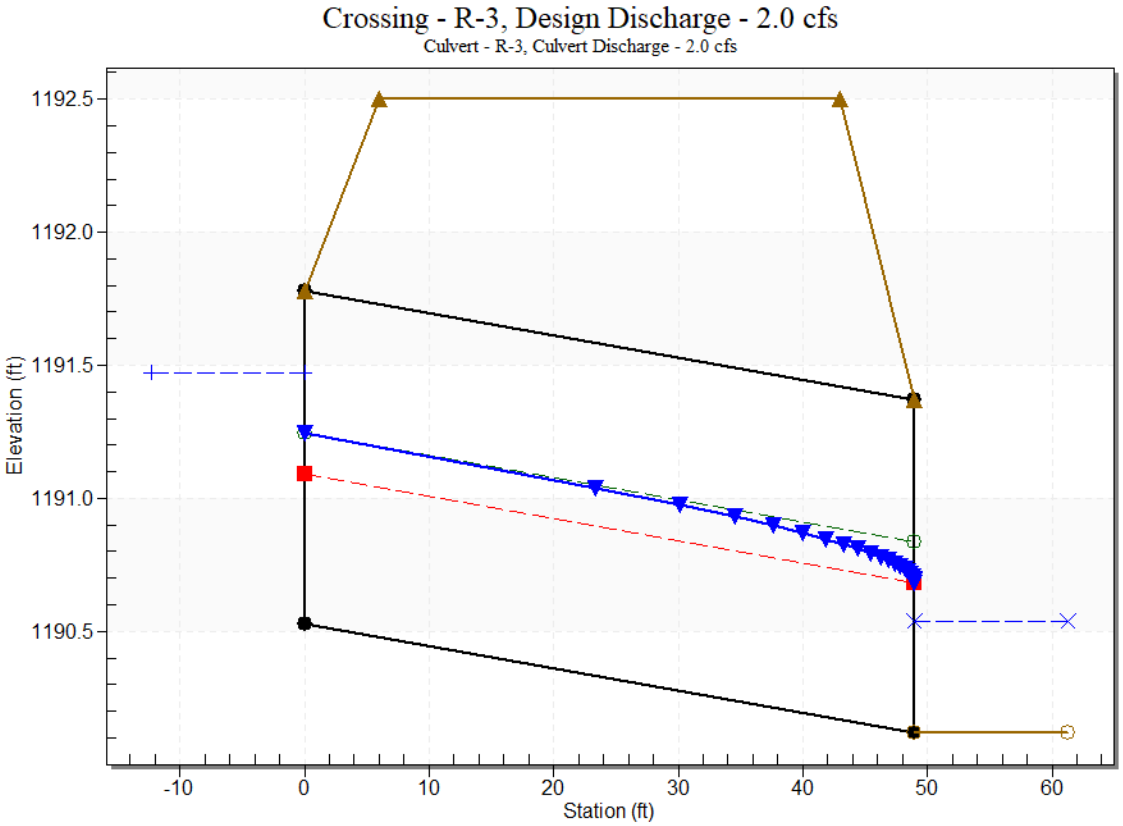
Culvert Length: 49.00 ft,

Culvert Slope: 0.0084

Culvert Performance Curve Plot: R-3



Water Surface Profile Plot for Culvert: R-3



Site Data - R-3

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1190.53 ft

Outlet Station: 49.00 ft

Outlet Elevation: 1190.12 ft

Number of Barrels: 1

Culvert Data Summary - R-3

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: R-3

Table 6 - Downstream Channel Rating Curve (Crossing: R-3)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1190.54	0.42
0.29	1190.54	0.42
0.48	1190.54	0.42
0.67	1190.54	0.42
0.86	1190.54	0.42
1.05	1190.54	0.42
1.24	1190.54	0.42
1.43	1190.54	0.42
1.62	1190.54	0.42
1.81	1190.54	0.42
2.00	1190.54	0.42

Tailwater Channel Data - R-3

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1190.54 ft

Roadway Data for Crossing: R-3

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1192.50 ft

Roadway Surface: Paved

Roadway Top Width: 37.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 4.94 cfs

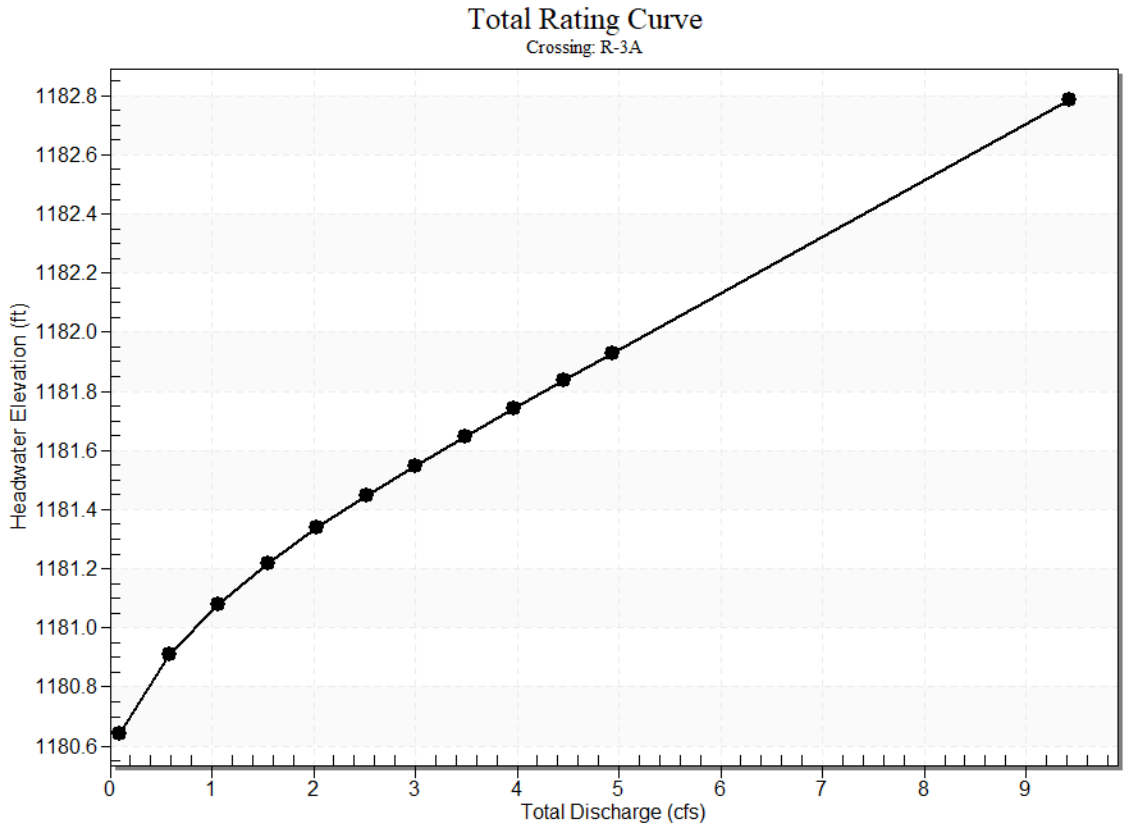
Maximum Flow: 4.94 cfs

Table 7 - Summary of Culvert Flows at Crossing: R-3A

Headwater	Total	R-3A	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1180.64	0.10	0.10	0.00	1
1180.91	0.58	0.58	0.00	1
1181.08	1.07	1.07	0.00	1
1181.22	1.55	1.55	0.00	1
1181.34	2.04	2.04	0.00	1
1181.45	2.52	2.52	0.00	1
1181.55	3.00	3.00	0.00	1
1181.65	3.49	3.49	0.00	1
1181.74	3.97	3.97	0.00	1
1181.84	4.46	4.46	0.00	1
1181.93	4.94	4.94	0.00	1
1182.30	6.68	6.68	0.00	Overtopping

Rating Curve Plot for Crossing: R-3A



Culvert Data: R-3A

Table 4 - Culvert Summary Table: R-3A

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1180.64	0.17	0.183	3-M1t	0.14	0.12	0.38	0.38	0.28	0.00
0.58 cfs	0.58 cfs	1180.91	0.41	0.451	3-M1t	0.33	0.28	0.38	0.38	1.66	0.00
1.07 cfs	1.07 cfs	1181.08	0.57	0.620	2-M2c	0.44	0.39	0.39	0.38	2.97	0.00
1.55 cfs	1.55 cfs	1181.22	0.69	0.757	2-M2c	0.54	0.47	0.47	0.38	3.30	0.00
2.04 cfs	2.04 cfs	1181.34	0.80	0.877	2-M2c	0.63	0.54	0.54	0.38	3.57	0.00
2.52 cfs	2.52 cfs	1181.45	0.90	0.986	2-M2c	0.71	0.60	0.60	0.38	3.81	0.00
3.00 cfs	3.00 cfs	1181.55	1.00	1.089	2-M2c	0.78	0.66	0.66	0.38	4.02	0.00
3.49 cfs	3.49 cfs	1181.65	1.10	1.187	2-M2c	0.86	0.71	0.71	0.38	4.22	0.00
3.97 cfs	3.97 cfs	1181.74	1.19	1.282	2-M2c	0.93	0.76	0.76	0.38	4.40	0.00
4.46 cfs	4.46 cfs	1181.84	1.29	1.375	2-M2c	1.01	0.81	0.81	0.38	4.58	0.00
4.94 cfs	4.94 cfs	1181.93	1.38	1.469	2-M2c	1.10	0.85	0.85	0.38	4.75	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

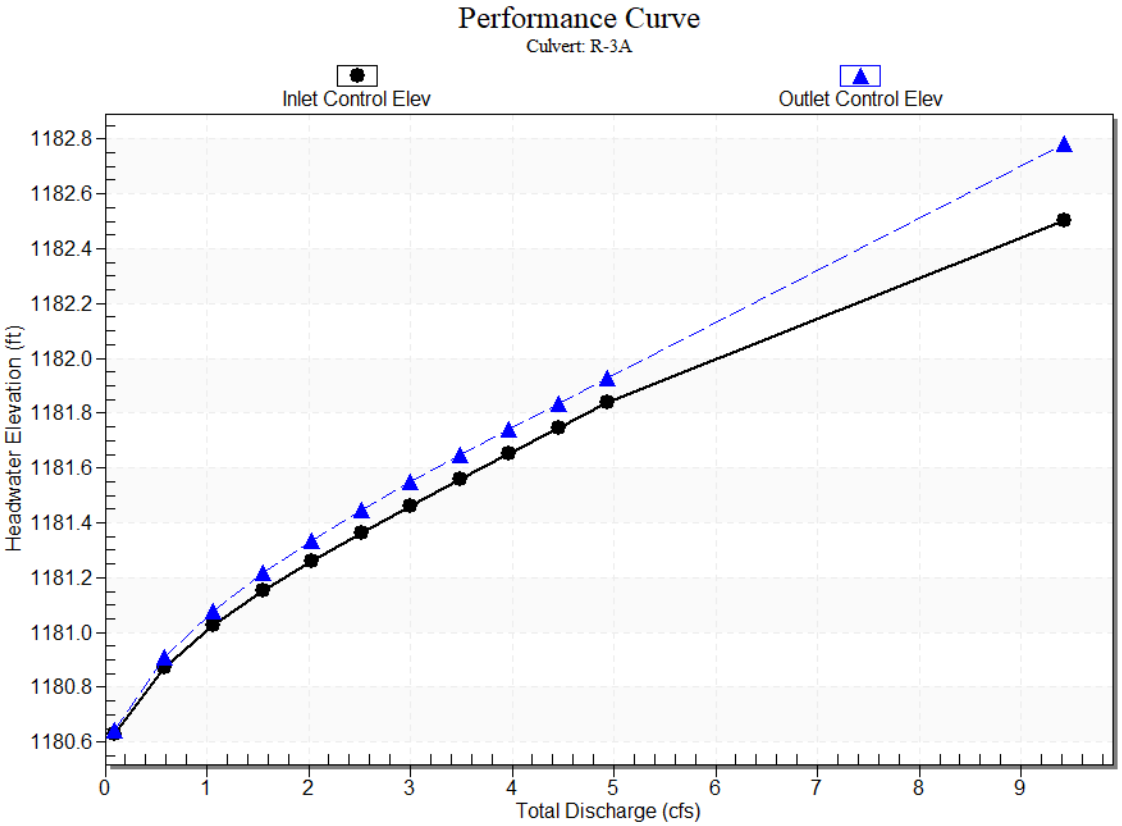
Inlet Elevation (invert): 1180.46 ft,

Outlet Elevation (invert): 1179.99 ft

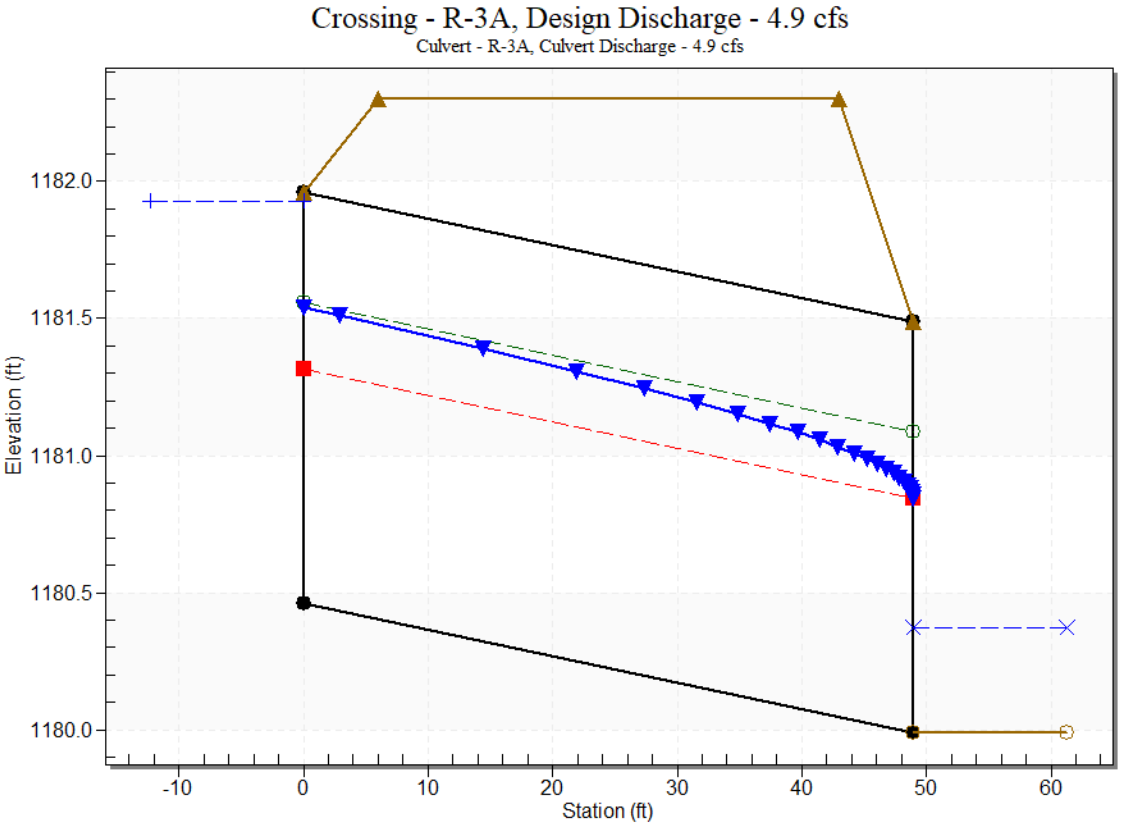
Culvert Length: 49.00 ft,

Culvert Slope: 0.0096

Culvert Performance Curve Plot: R-3A



Water Surface Profile Plot for Culvert: R-3A



Site Data - R-3A

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1180.46 ft

Outlet Station: 49.00 ft

Outlet Elevation: 1179.99 ft

Number of Barrels: 1

Culvert Data Summary - R-3A

Barrel Shape: Circular

Barrel Diameter: 1.50 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: R-3A

Table 8 - Downstream Channel Rating Curve (Crossing: R-3A)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1180.37	0.38
0.58	1180.37	0.38
1.07	1180.37	0.38
1.55	1180.37	0.38
2.04	1180.37	0.38
2.52	1180.37	0.38
3.00	1180.37	0.38
3.49	1180.37	0.38
3.97	1180.37	0.38
4.46	1180.37	0.38
4.94	1180.37	0.38

Tailwater Channel Data - R-3A

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1180.37 ft

Roadway Data for Crossing: R-3A

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.50 ft

Crest Elevation: 1182.30 ft

Roadway Surface: Paved

Roadway Top Width: 37.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 7.32 cfs

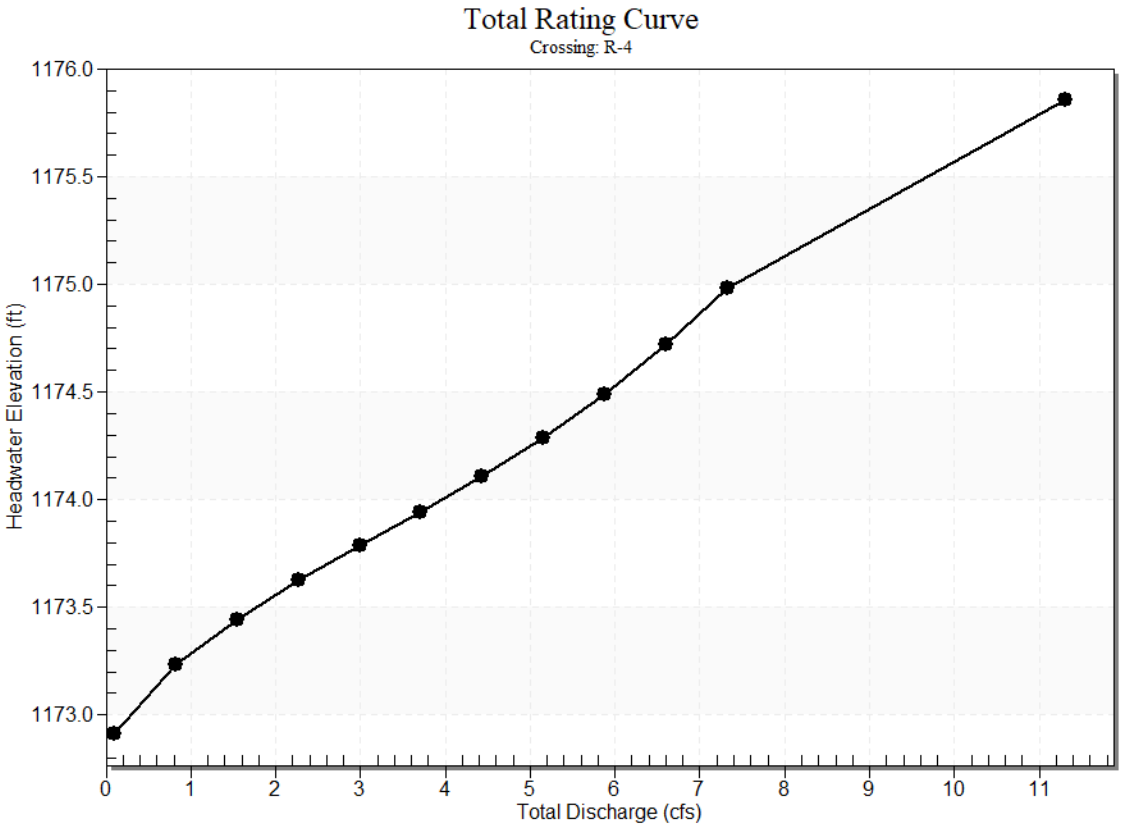
Maximum Flow: 7.32 cfs

Table 9 - Summary of Culvert Flows at Crossing: R-4

Headwater	Total	R-4 Discharge	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	(cfs)	Discharge (cfs)	
1172.91	0.10	0.10	0.00	1
1173.23	0.82	0.82	0.00	1
1173.44	1.54	1.54	0.00	1
1173.62	2.27	2.27	0.00	1
1173.79	2.99	2.99	0.00	1
1173.94	3.71	3.71	0.00	1
1174.11	4.43	4.43	0.00	1
1174.29	5.15	5.15	0.00	1
1174.49	5.88	5.88	0.00	1
1174.72	6.60	6.60	0.00	1
1174.98	7.32	7.32	0.00	1
1175.20	7.86	7.86	0.00	Overtopping

Rating Curve Plot for Crossing: R-4



Culvert Data: R-4

Table 5 - Culvert Summary Table: R-4

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1172.91	0.16	0.000	1-S2n	0.10	0.12	0.10	0.55	2.14	0.00
0.82 cfs	0.82 cfs	1173.23	0.48	0.017	1-JS1t	0.28	0.36	0.55	0.55	1.58	0.00
1.54 cfs	1.54 cfs	1173.44	0.69	0.061	1-S2n	0.39	0.49	0.39	0.55	4.78	0.00
2.27 cfs	2.27 cfs	1173.62	0.87	0.182	1-S2n	0.47	0.60	0.47	0.55	5.31	0.00
2.99 cfs	2.99 cfs	1173.79	1.04	0.372	1-S2n	0.55	0.69	0.56	0.55	5.66	0.00
3.71 cfs	3.71 cfs	1173.94	1.19	0.578	1-S2n	0.62	0.78	0.63	0.55	5.96	0.00
4.43 cfs	4.43 cfs	1174.11	1.36	0.803	5-S2n	0.70	0.85	0.70	0.55	6.22	0.00
5.15 cfs	5.15 cfs	1174.29	1.54	1.046	5-S2n	0.77	0.92	0.78	0.55	6.44	0.00
5.88 cfs	5.88 cfs	1174.49	1.74	1.444	5-S2n	0.84	0.98	0.85	0.55	6.63	0.00
6.60 cfs	6.60 cfs	1174.72	1.97	1.699	5-S2n	0.92	1.03	0.92	0.55	6.78	0.00
7.32 cfs	7.32 cfs	1174.98	2.23	1.978	5-S2n	1.01	1.08	1.01	0.55	6.87	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

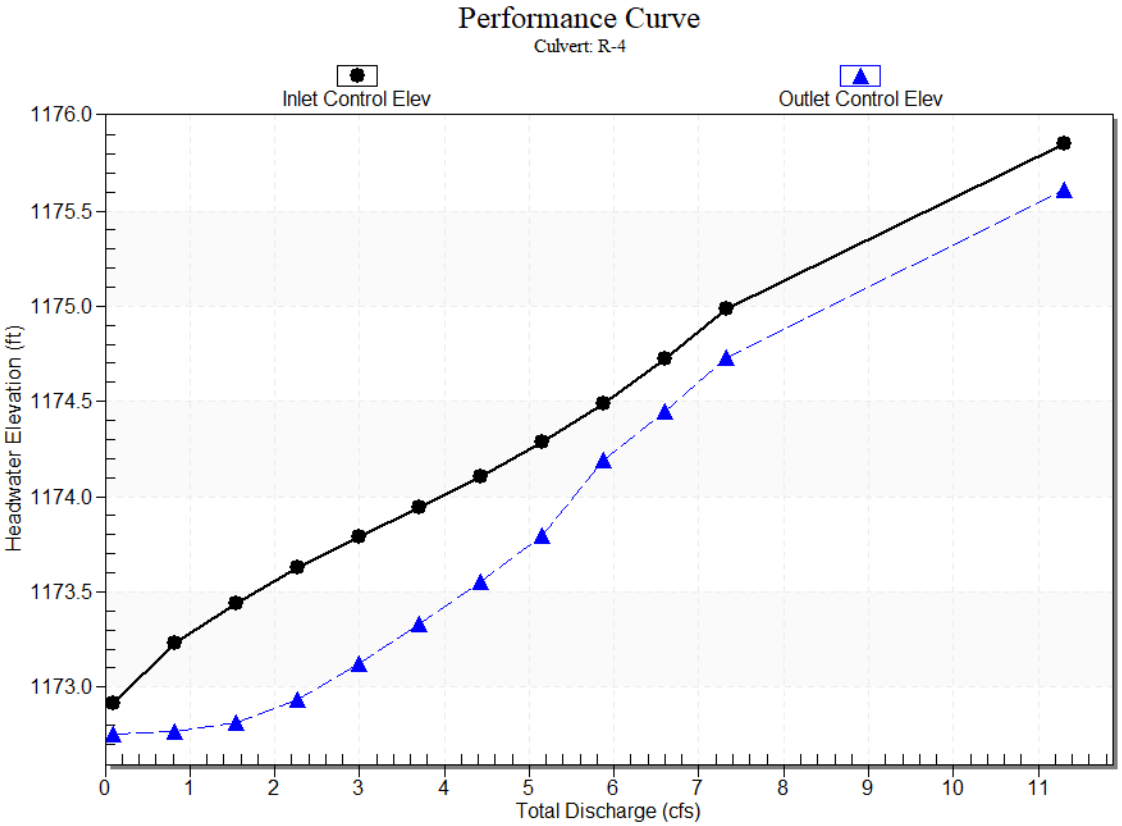
Inlet Elevation (invert): 1172.75 ft,

Outlet Elevation (invert): 1172.20 ft

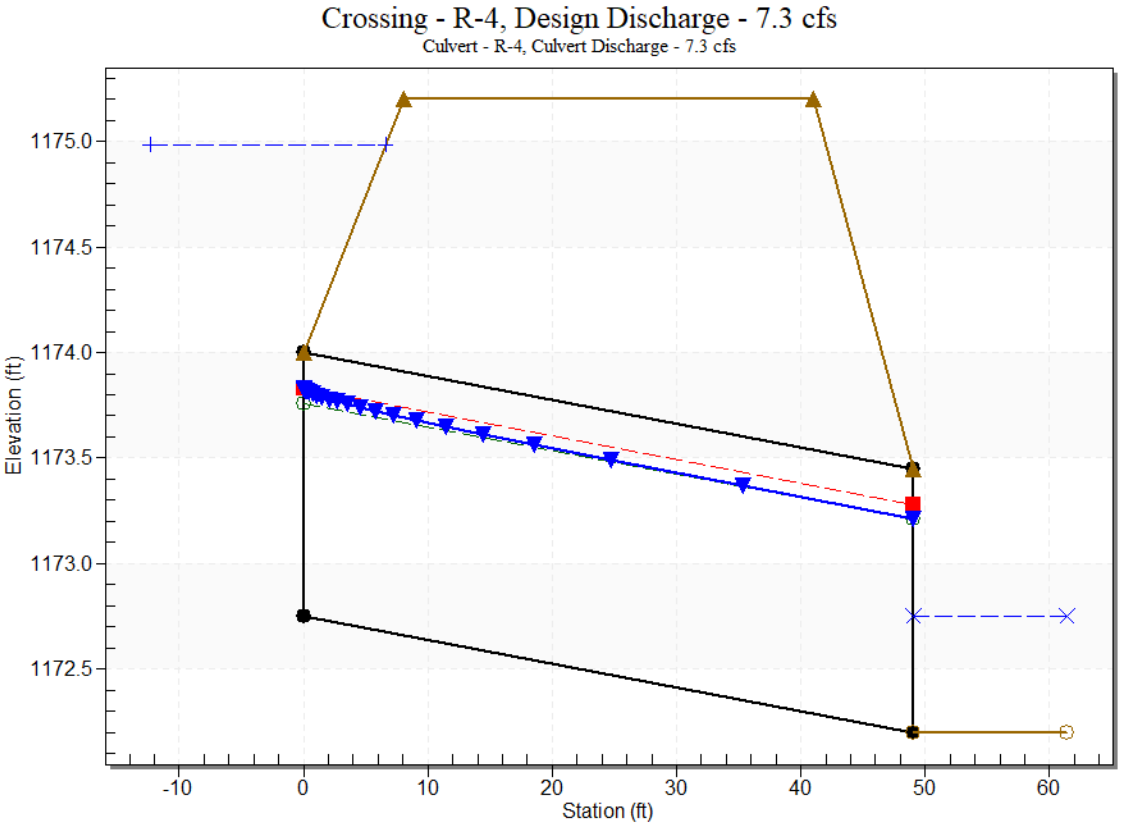
Culvert Length: 49.10 ft,

Culvert Slope: 0.0112

Culvert Performance Curve Plot: R-4



Water Surface Profile Plot for Culvert: R-4



Site Data - R-4

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1172.75 ft

Outlet Station: 49.10 ft

Outlet Elevation: 1172.20 ft

Number of Barrels: 1

Culvert Data Summary - R-4

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-4

Table 10 - Downstream Channel Rating Curve (Crossing: R-4)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1172.75	0.55
0.82	1172.75	0.55
1.54	1172.75	0.55
2.27	1172.75	0.55
2.99	1172.75	0.55
3.71	1172.75	0.55
4.43	1172.75	0.55
5.15	1172.75	0.55
5.88	1172.75	0.55
6.60	1172.75	0.55
7.32	1172.75	0.55

Tailwater Channel Data - R-4

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1172.75 ft

Roadway Data for Crossing: R-4

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1175.20 ft

Roadway Surface: Paved

Roadway Top Width: 33.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 4.18 cfs

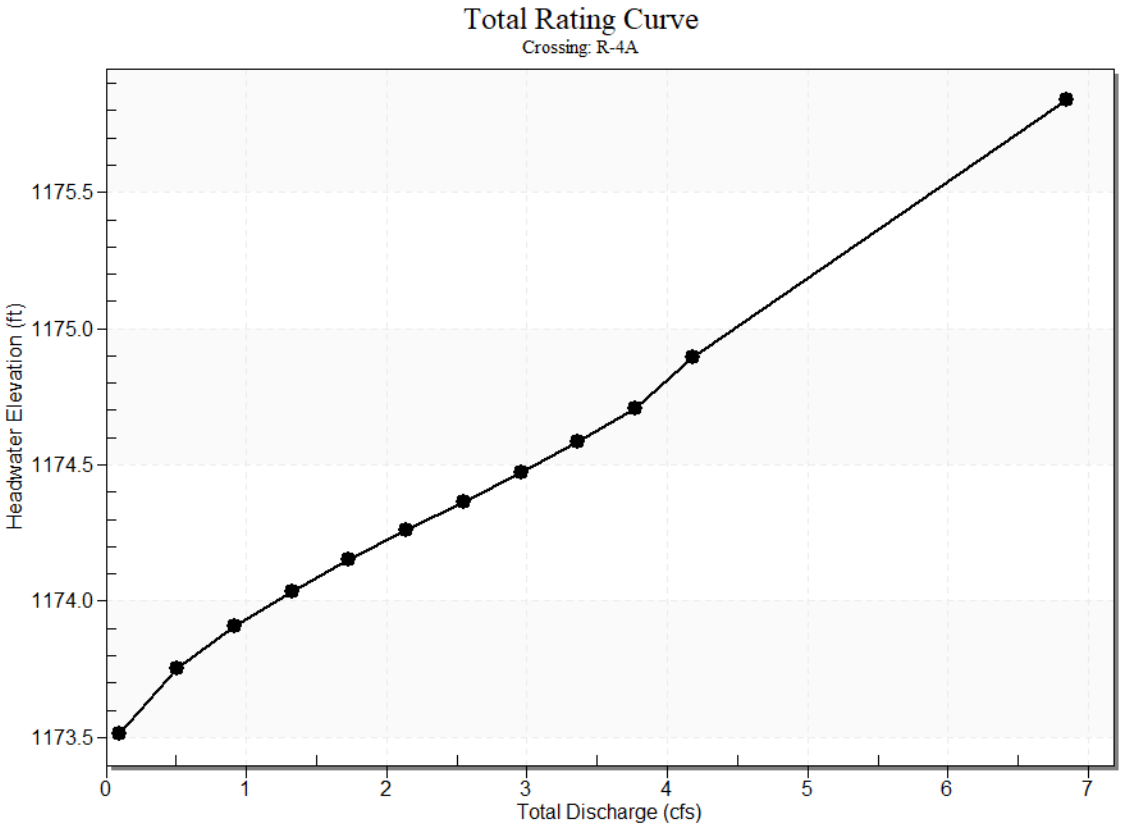
Maximum Flow: 4.18 cfs

Table 11 - Summary of Culvert Flows at Crossing: R-4A

Headwater	Total	R-4A	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1173.51	0.10	0.10	0.00	1
1173.75	0.51	0.51	0.00	1
1173.91	0.92	0.92	0.00	1
1174.04	1.32	1.32	0.00	1
1174.15	1.73	1.73	0.00	1
1174.26	2.14	2.14	0.00	1
1174.37	2.55	2.55	0.00	1
1174.47	2.96	2.96	0.00	1
1174.58	3.36	3.36	0.00	1
1174.70	3.77	3.77	0.00	1
1174.90	4.18	4.18	0.00	1
1175.40	5.07	5.07	0.00	Overtopping

Rating Curve Plot for Crossing: R-4A



Culvert Data: R-4A

Table 6 - Culvert Summary Table: R-4A

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1173.51	0.16	0.184	3-M1t	0.15	0.12	0.32	0.32	0.40	0.00
0.51 cfs	0.51 cfs	1173.75	0.38	0.422	3-M2t	0.34	0.28	0.32	0.32	2.05	0.00
0.92 cfs	0.92 cfs	1173.91	0.51	0.577	2-M2c	0.46	0.38	0.38	0.32	2.95	0.00
1.32 cfs	1.32 cfs	1174.04	0.63	0.705	2-M2c	0.56	0.45	0.45	0.32	3.29	0.00
1.73 cfs	1.73 cfs	1174.15	0.73	0.821	2-M2c	0.66	0.52	0.52	0.32	3.56	0.00
2.14 cfs	2.14 cfs	1174.26	0.83	0.932	2-M2c	0.75	0.58	0.58	0.32	3.81	0.00
2.55 cfs	2.55 cfs	1174.37	0.92	1.036	2-M2c	0.85	0.64	0.64	0.32	4.03	0.00
2.96 cfs	2.96 cfs	1174.47	1.01	1.142	2-M2c	0.96	0.69	0.69	0.32	4.25	0.00
3.36 cfs	3.36 cfs	1174.58	1.10	1.253	7-M2c	1.12	0.74	0.74	0.32	4.45	0.00
3.77 cfs	3.77 cfs	1174.70	1.19	1.375	7-M2c	1.25	0.78	0.78	0.32	4.65	0.00
4.18 cfs	4.18 cfs	1174.90	1.29	1.567	7-M2c	1.25	0.83	0.83	0.32	4.85	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

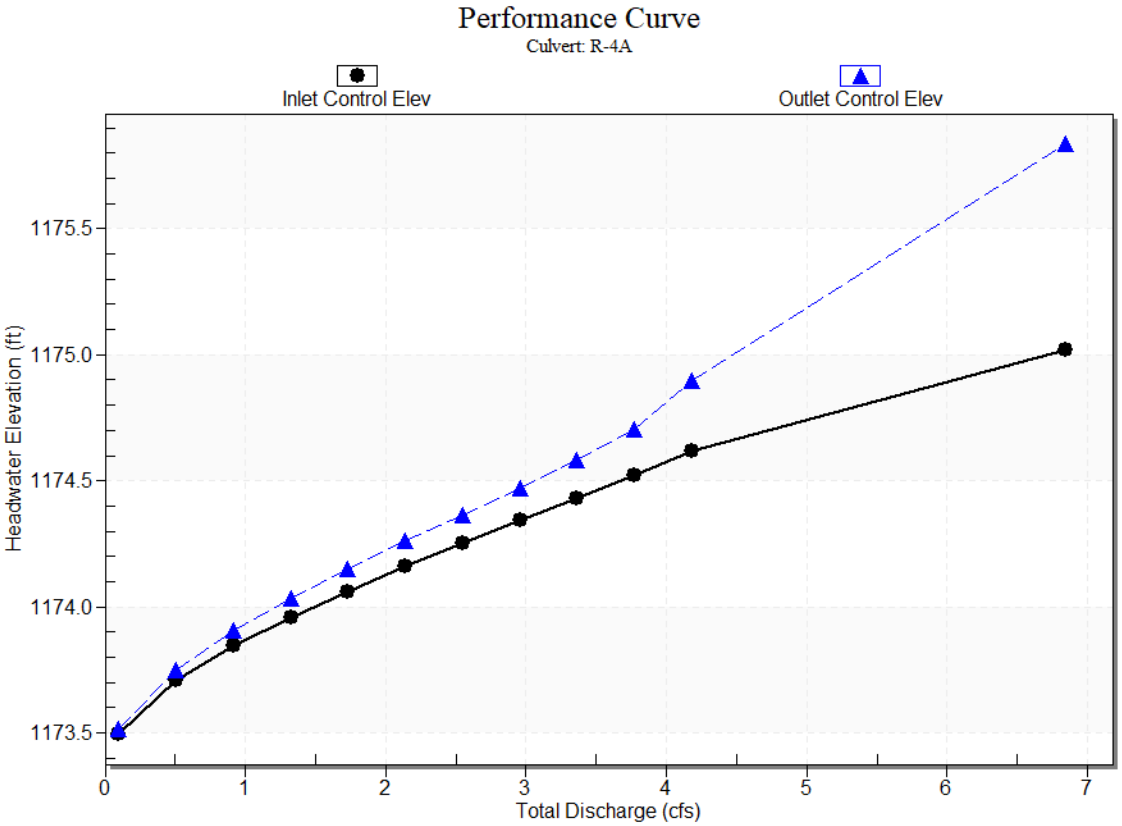
Inlet Elevation (invert): 1173.33 ft,

Outlet Elevation (invert): 1172.94 ft

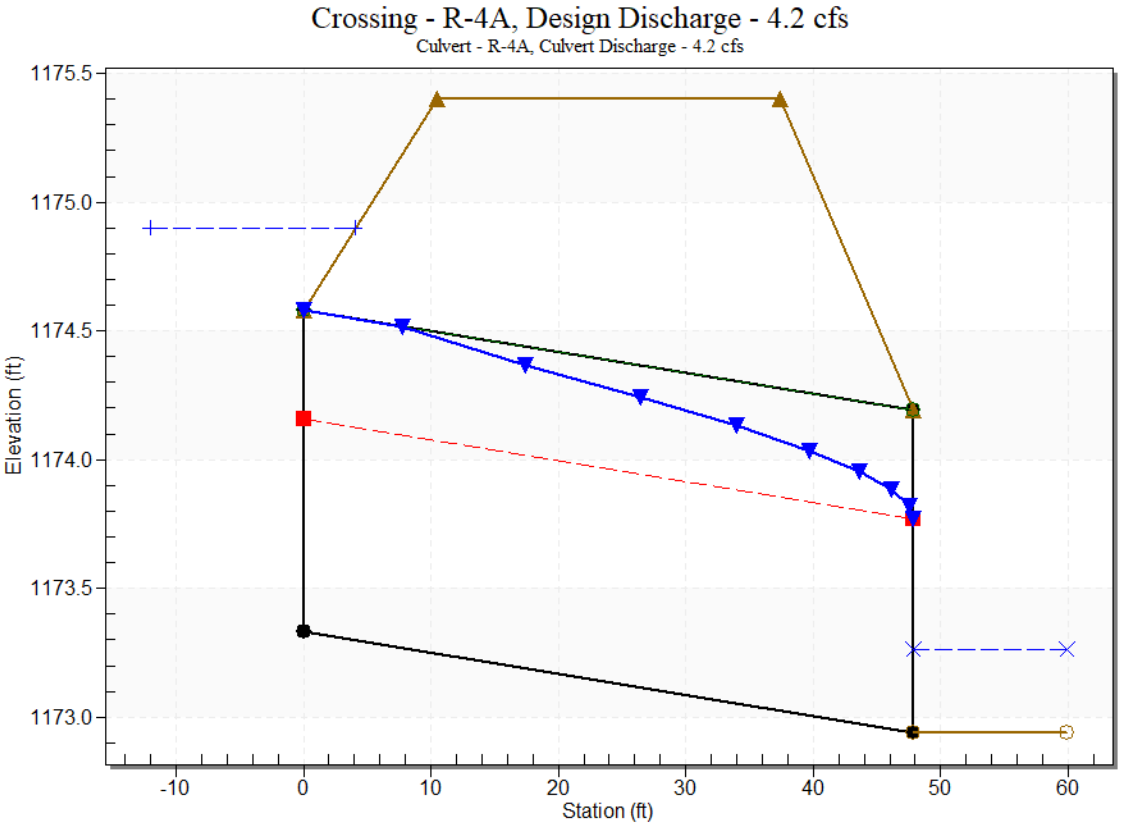
Culvert Length: 47.90 ft,

Culvert Slope: 0.0081

Culvert Performance Curve Plot: R-4A



Water Surface Profile Plot for Culvert: R-4A



Site Data - R-4A

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1173.33 ft

Outlet Station: 47.90 ft

Outlet Elevation: 1172.94 ft

Number of Barrels: 1

Culvert Data Summary - R-4A

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material: Corrugated PE

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-4A

Table 12 - Downstream Channel Rating Curve (Crossing: R-4A)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1173.26	0.32
0.51	1173.26	0.32
0.92	1173.26	0.32
1.32	1173.26	0.32
1.73	1173.26	0.32
2.14	1173.26	0.32
2.55	1173.26	0.32
2.96	1173.26	0.32
3.36	1173.26	0.32
3.77	1173.26	0.32
4.18	1173.26	0.32

Tailwater Channel Data - R-4A

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1173.26 ft

Roadway Data for Crossing: R-4A

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1175.40 ft

Roadway Surface: Paved

Roadway Top Width: 27.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.35 cfs

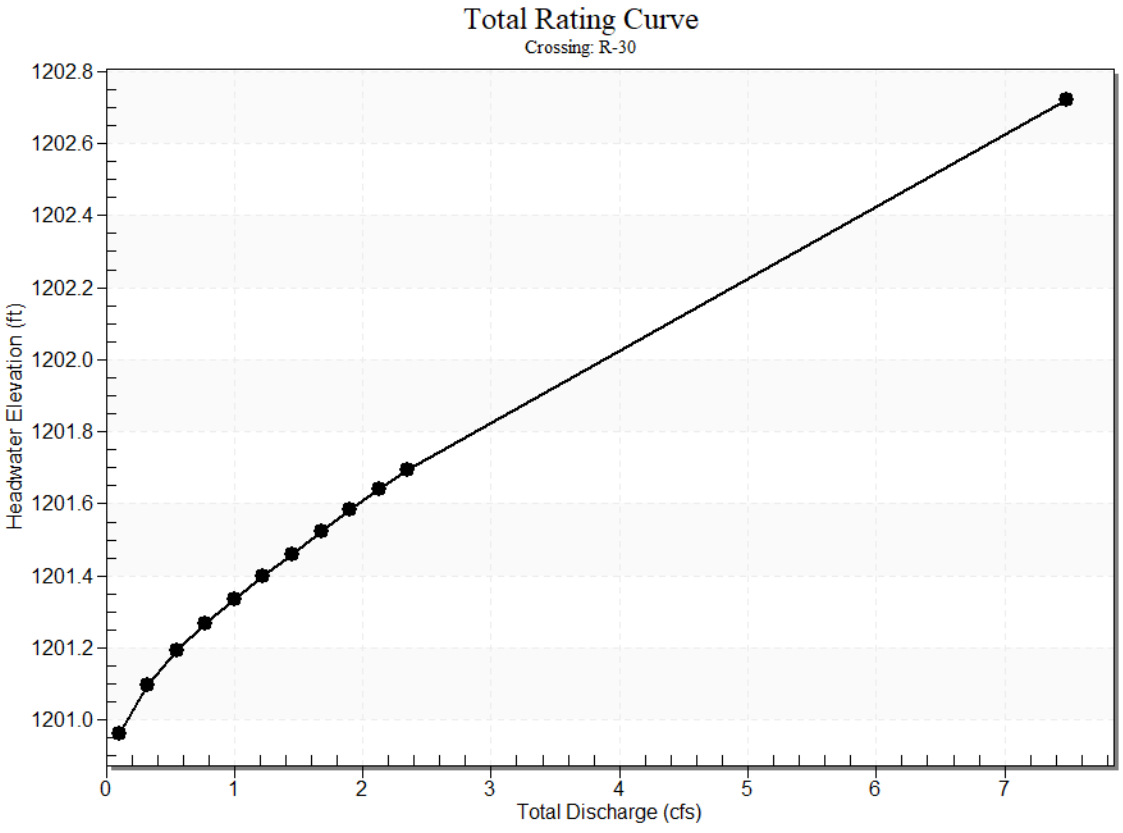
Maximum Flow: 2.35 cfs

Table 13 - Summary of Culvert Flows at Crossing: R-30

Headwater	Total	R-30	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1200.96	0.10	0.10	0.00	1
1201.10	0.33	0.33	0.00	1
1201.19	0.55	0.55	0.00	1
1201.27	0.78	0.78	0.00	1
1201.34	1.00	1.00	0.00	1
1201.40	1.23	1.23	0.00	1
1201.46	1.45	1.45	0.00	1
1201.52	1.68	1.68	0.00	1
1201.58	1.90	1.90	0.00	1
1201.64	2.12	2.12	0.00	1
1201.69	2.35	2.35	0.00	1
1202.30	5.02	5.02	0.00	Overtopping

Rating Curve Plot for Crossing: R-30



Culvert Data: R-30

Table 7 - Culvert Summary Table: R-30

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1200.96	0.16	0.0*	1-S2n	0.10	0.12	0.10	0.00	2.19	0.00
0.33 cfs	0.33 cfs	1201.10	0.30	0.0*	1-S2n	0.17	0.22	0.17	0.00	3.11	0.00
0.55 cfs	0.55 cfs	1201.19	0.39	0.0*	1-S2n	0.23	0.29	0.23	0.00	3.63	0.00
0.78 cfs	0.78 cfs	1201.27	0.47	0.0*	1-S2n	0.27	0.34	0.27	0.00	4.02	0.00
1.00 cfs	1.00 cfs	1201.34	0.54	0.0*	1-S2n	0.30	0.39	0.30	0.00	4.32	0.00
1.23 cfs	1.23 cfs	1201.40	0.60	0.0*	1-S2n	0.34	0.44	0.34	0.00	4.58	0.00
1.45 cfs	1.45 cfs	1201.46	0.66	0.0*	1-S2n	0.37	0.48	0.37	0.00	4.81	0.00
1.68 cfs	1.68 cfs	1201.52	0.72	0.0*	1-S2n	0.40	0.51	0.40	0.00	5.01	0.00
1.90 cfs	1.90 cfs	1201.58	0.78	0.013	1-S2n	0.42	0.55	0.42	0.00	5.19	0.00
2.12 cfs	2.12 cfs	1201.64	0.84	0.070	1-S2n	0.45	0.58	0.45	0.00	5.29	0.00
2.35 cfs	2.35 cfs	1201.69	0.89	0.127	1-S2n	0.47	0.61	0.47	0.00	5.50	0.00

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

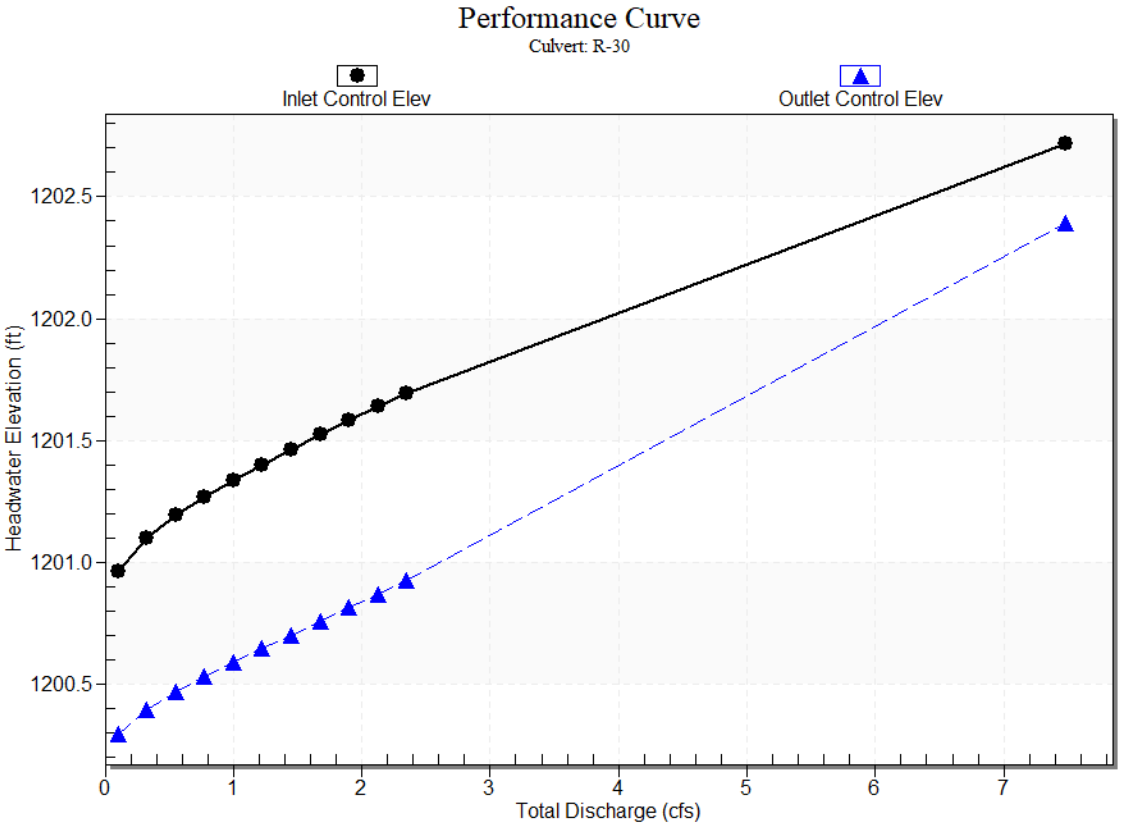
Inlet Elevation (invert): 1200.80 ft,

Outlet Elevation (invert): 1200.17 ft

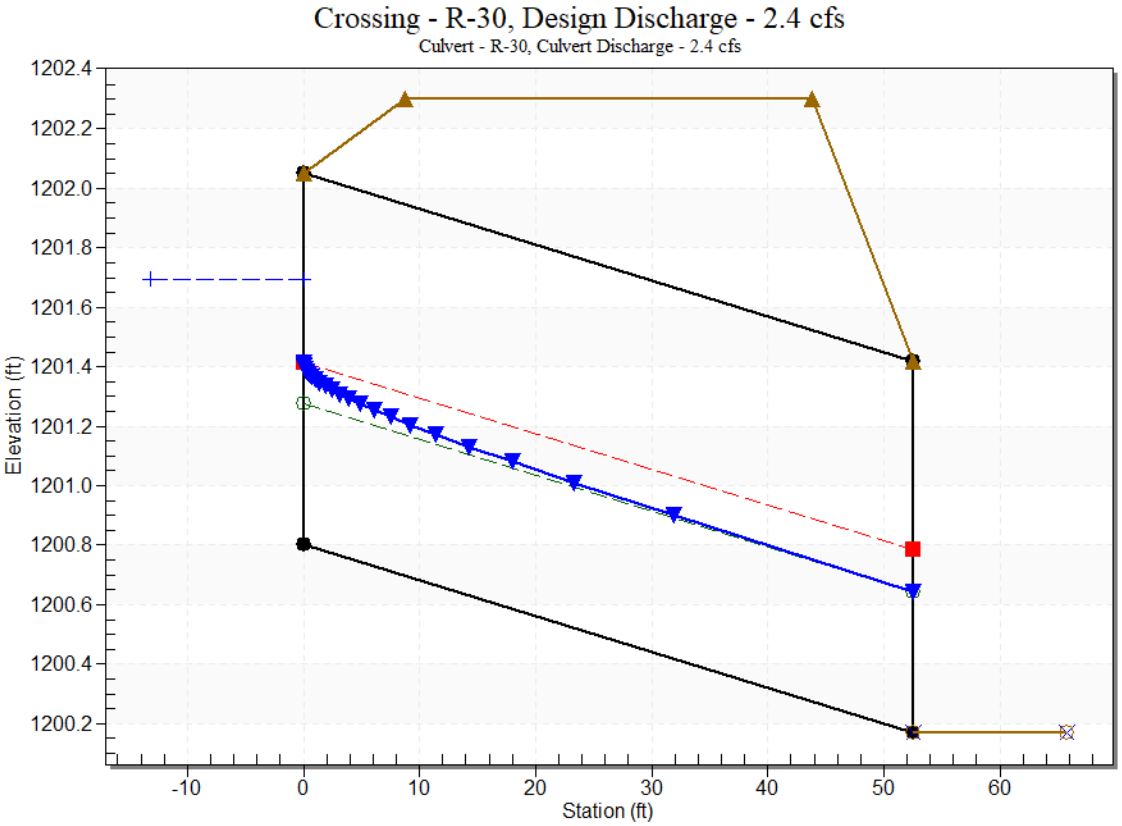
Culvert Length: 52.60 ft,

Culvert Slope: 0.0120

Culvert Performance Curve Plot: R-30



Water Surface Profile Plot for Culvert: R-30



Site Data - R-30

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1200.80 ft

Outlet Station: 52.60 ft

Outlet Elevation: 1200.17 ft

Number of Barrels: 1

Culvert Data Summary - R-30

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-30

Table 14 - Downstream Channel Rating Curve (Crossing: R-30)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1200.17	0.00
0.33	1200.17	0.00
0.55	1200.17	0.00
0.78	1200.17	0.00
1.00	1200.17	0.00
1.23	1200.17	0.00
1.45	1200.17	0.00
1.68	1200.17	0.00
1.90	1200.17	0.00
2.12	1200.17	0.00
2.35	1200.17	0.00

Tailwater Channel Data - R-30

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1200.17 ft

Roadway Data for Crossing: R-30

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1202.30 ft

Roadway Surface: Paved

Roadway Top Width: 35.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.03 cfs

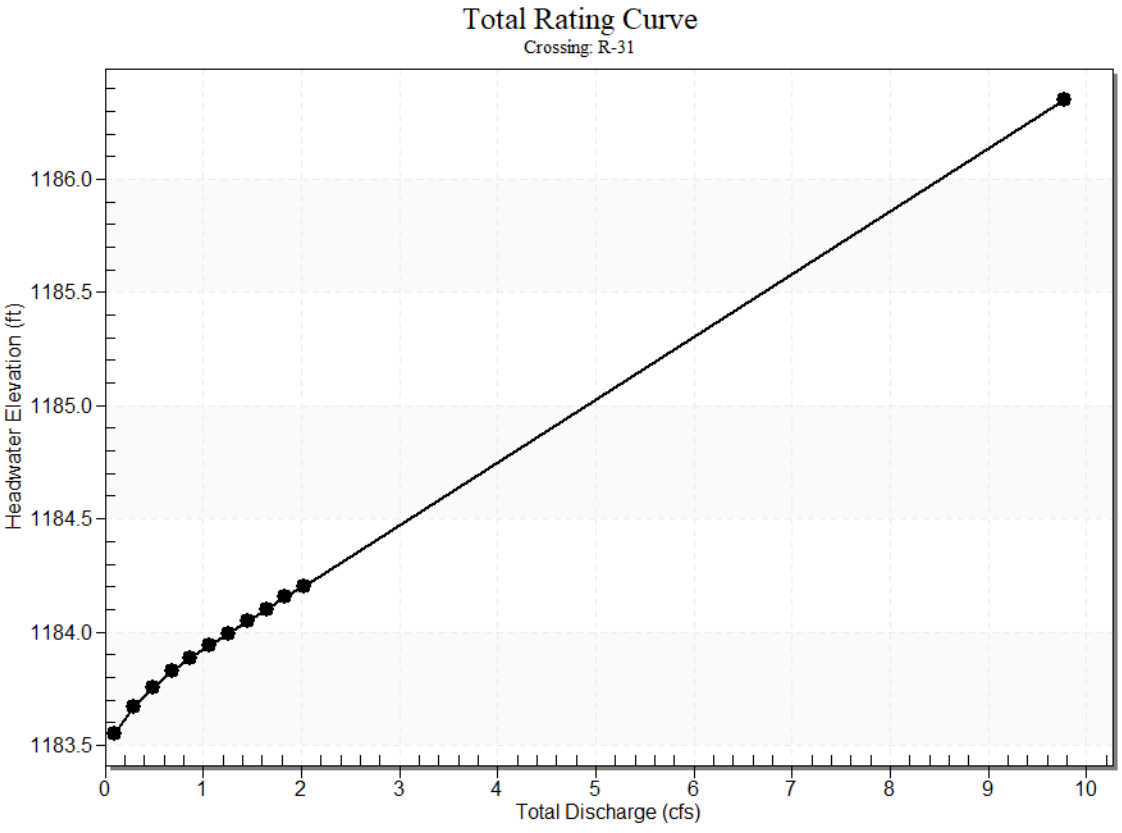
Maximum Flow: 2.03 cfs

Table 15 - Summary of Culvert Flows at Crossing: R-31

Headwater	Total	R-31	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1183.55	0.10	0.10	0.00	1
1183.67	0.29	0.29	0.00	1
1183.76	0.49	0.49	0.00	1
1183.83	0.68	0.68	0.00	1
1183.89	0.87	0.87	0.00	1
1183.94	1.06	1.06	0.00	1
1183.99	1.26	1.26	0.00	1
1184.05	1.45	1.45	0.00	1
1184.10	1.64	1.64	0.00	1
1184.15	1.84	1.84	0.00	1
1184.20	2.03	2.03	0.00	1
1186.00	8.24	8.24	0.00	Overtopping

Rating Curve Plot for Crossing: R-31



Culvert Data: R-31

Table 8 - Culvert Summary Table: R-31

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1183.55	0.16	0.0*	1-JS1t	0.09	0.12	0.60	0.60	0.17	0.00
0.29 cfs	0.29 cfs	1183.67	0.28	0.0*	1-JS1t	0.15	0.21	0.60	0.60	0.50	0.00
0.49 cfs	0.49 cfs	1183.76	0.37	0.0*	1-JS1t	0.19	0.27	0.60	0.60	0.83	0.00
0.68 cfs	0.68 cfs	1183.83	0.44	0.0*	1-JS1t	0.23	0.32	0.60	0.60	1.17	0.00
0.87 cfs	0.87 cfs	1183.89	0.50	0.0*	1-JS1t	0.26	0.37	0.60	0.60	1.50	0.00
1.06 cfs	1.06 cfs	1183.94	0.55	0.0*	1-S2n	0.28	0.41	0.28	0.60	5.08	0.00
1.26 cfs	1.26 cfs	1183.99	0.60	0.0*	1-S2n	0.31	0.44	0.31	0.60	5.24	0.00
1.45 cfs	1.45 cfs	1184.05	0.66	0.008	1-S2n	0.33	0.48	0.34	0.60	5.43	0.00
1.64 cfs	1.64 cfs	1184.10	0.71	0.021	1-S2n	0.35	0.51	0.36	0.60	5.61	0.00
1.84 cfs	1.84 cfs	1184.15	0.76	0.037	1-S2n	0.37	0.54	0.38	0.60	5.77	0.00
2.03 cfs	2.03 cfs	1184.20	0.81	0.054	1-S2n	0.39	0.57	0.40	0.60	5.91	0.00

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

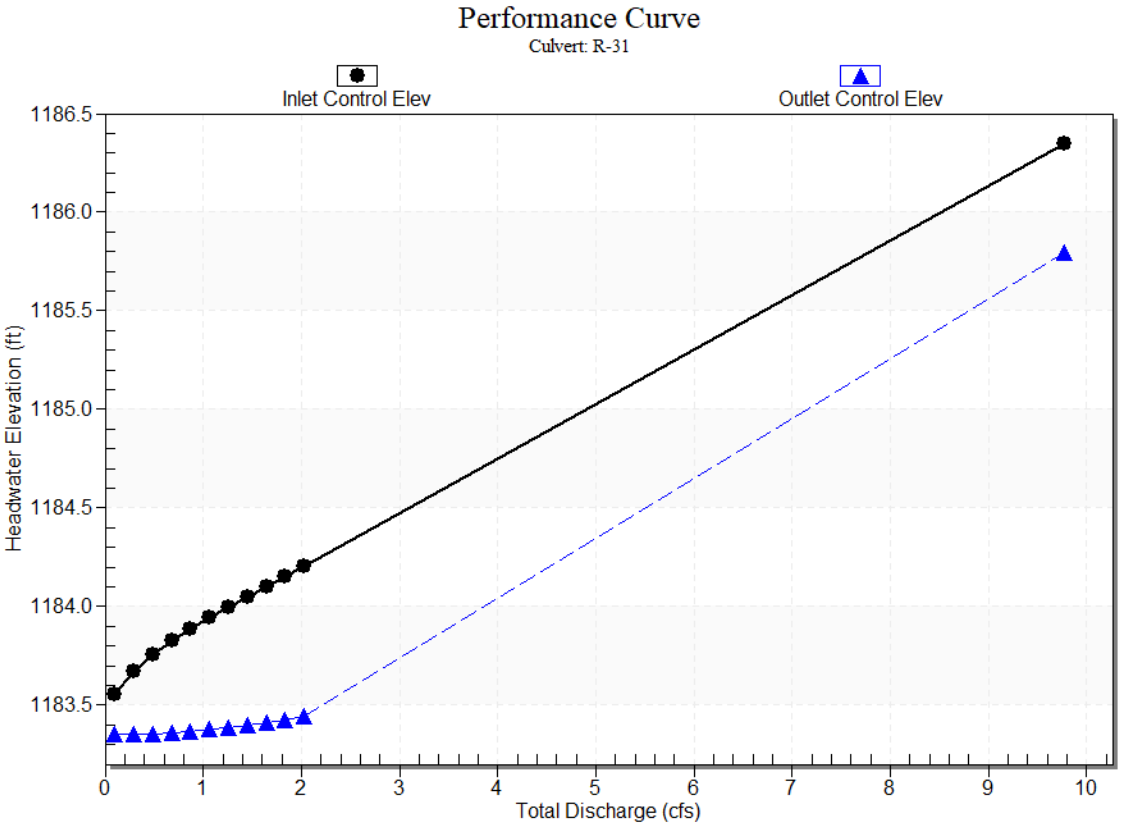
Inlet Elevation (invert): 1183.39 ft,

Outlet Elevation (invert): 1182.75 ft

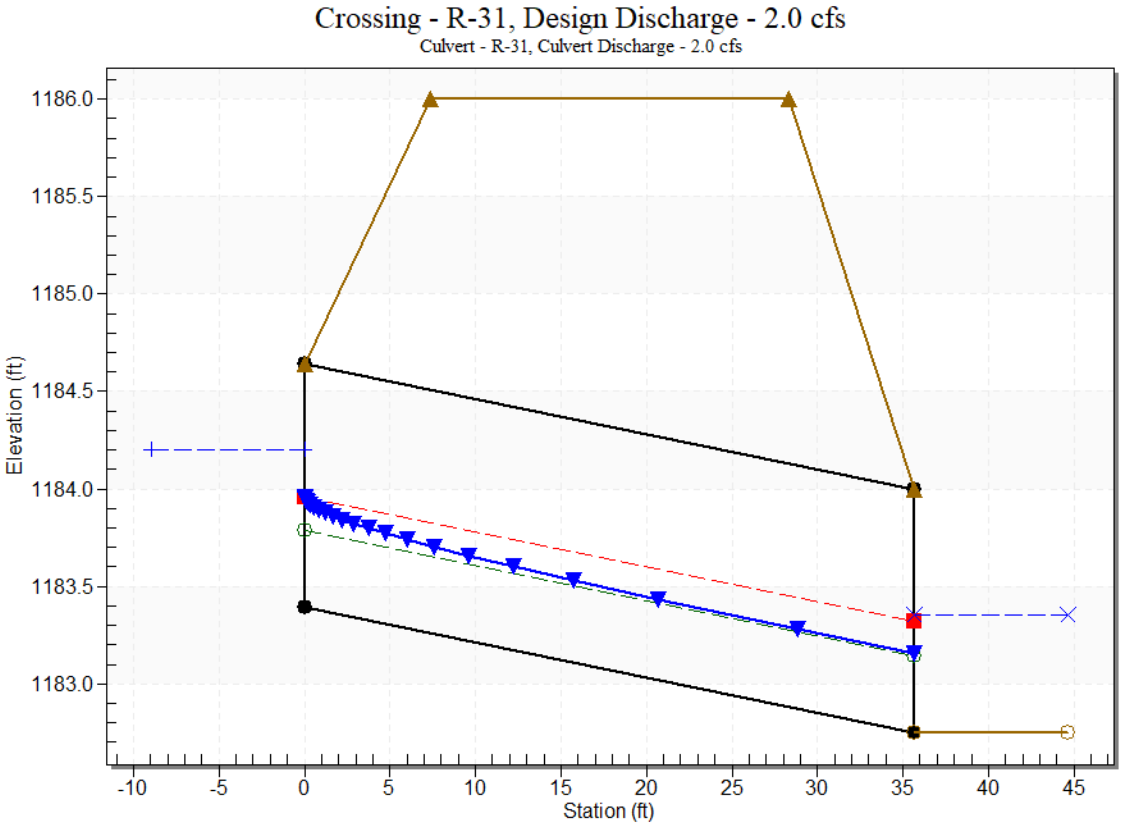
Culvert Length: 35.71 ft,

Culvert Slope: 0.0179

Culvert Performance Curve Plot: R-31



Water Surface Profile Plot for Culvert: R-31



Site Data - R-31

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1183.39 ft

Outlet Station: 35.70 ft

Outlet Elevation: 1182.75 ft

Number of Barrels: 1

Culvert Data Summary - R-31

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-31

Table 16 - Downstream Channel Rating Curve (Crossing: R-31)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1183.35	0.60
0.29	1183.35	0.60
0.49	1183.35	0.60
0.68	1183.35	0.60
0.87	1183.35	0.60
1.06	1183.35	0.60
1.26	1183.35	0.60
1.45	1183.35	0.60
1.64	1183.35	0.60
1.84	1183.35	0.60
2.03	1183.35	0.60

Tailwater Channel Data - R-31

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1183.35 ft

Roadway Data for Crossing: R-31

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1186.00 ft

Roadway Surface: Paved

Roadway Top Width: 21.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 1.38 cfs

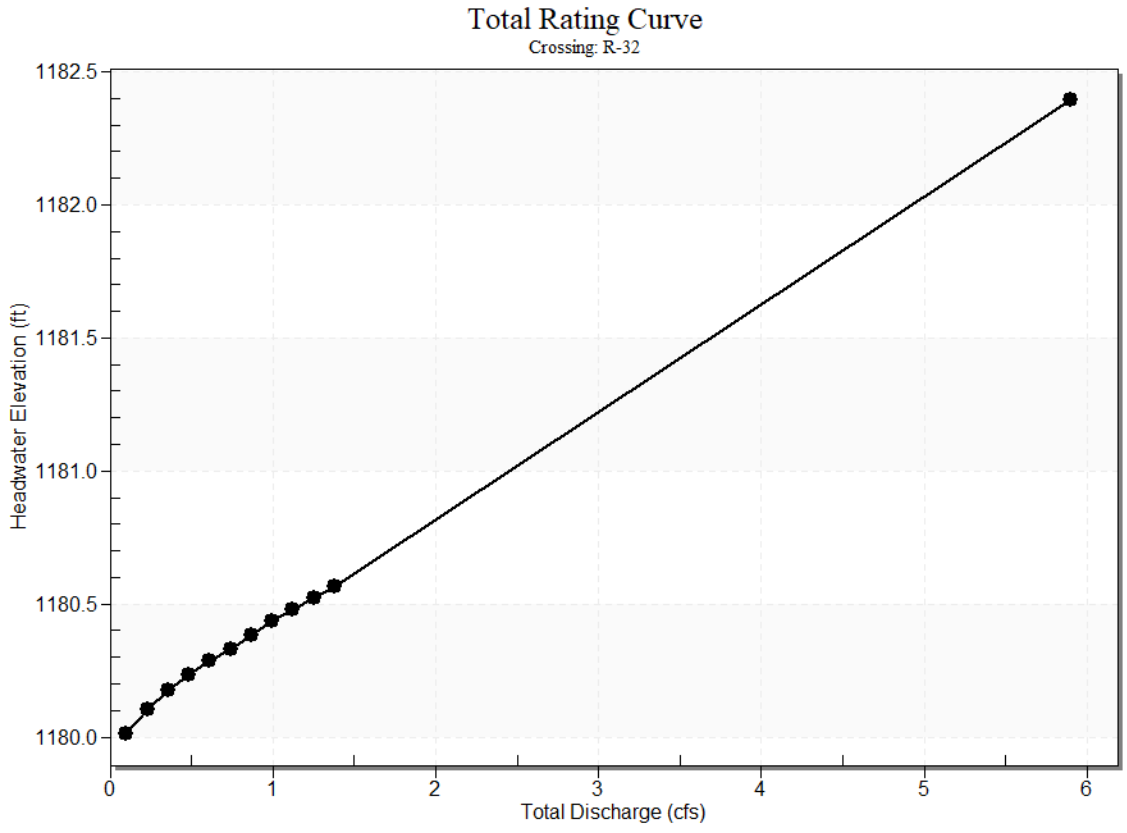
Maximum Flow: 1.38 cfs

Table 17 - Summary of Culvert Flows at Crossing: R-32

Headwater	Total	R-32	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1180.01	0.10	0.10	0.00	1
1180.10	0.23	0.23	0.00	1
1180.17	0.36	0.36	0.00	1
1180.23	0.48	0.48	0.00	1
1180.28	0.61	0.61	0.00	1
1180.33	0.74	0.74	0.00	1
1180.38	0.87	0.87	0.00	1
1180.43	1.00	1.00	0.00	1
1180.48	1.12	1.12	0.00	1
1180.52	1.25	1.25	0.00	1
1180.57	1.38	1.38	0.00	1
1182.10	4.99	4.99	0.00	Overtopping

Rating Curve Plot for Crossing: R-32



Culvert Data: R-32

Table 9 - Culvert Summary Table: R-32

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1180.01	0.17	0.0*	1-S2n	0.11	0.13	0.11	0.00	2.26	0.00
0.23 cfs	0.23 cfs	1180.10	0.26	0.0*	1-S2n	0.16	0.20	0.16	0.00	2.88	0.00
0.36 cfs	0.36 cfs	1180.17	0.33	0.0*	1-S2n	0.20	0.25	0.20	0.00	3.29	0.00
0.48 cfs	0.48 cfs	1180.23	0.39	0.0*	1-S2n	0.23	0.29	0.23	0.00	3.59	0.00
0.61 cfs	0.61 cfs	1180.28	0.44	0.0*	1-S2n	0.26	0.33	0.26	0.00	3.85	0.00
0.74 cfs	0.74 cfs	1180.33	0.49	0.0*	1-S2n	0.28	0.36	0.28	0.00	4.06	0.00
0.87 cfs	0.87 cfs	1180.38	0.54	0.0*	1-S2n	0.31	0.39	0.31	0.00	4.25	0.00
1.00 cfs	1.00 cfs	1180.43	0.59	0.0*	1-S2n	0.33	0.42	0.33	0.00	4.42	0.00
1.12 cfs	1.12 cfs	1180.48	0.64	0.0*	1-S2n	0.35	0.45	0.35	0.00	4.57	0.00
1.25 cfs	1.25 cfs	1180.52	0.68	0.0*	1-S2n	0.37	0.47	0.37	0.00	4.71	0.00
1.38 cfs	1.38 cfs	1180.57	0.73	0.014	1-S2n	0.39	0.50	0.39	0.00	4.83	0.00

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

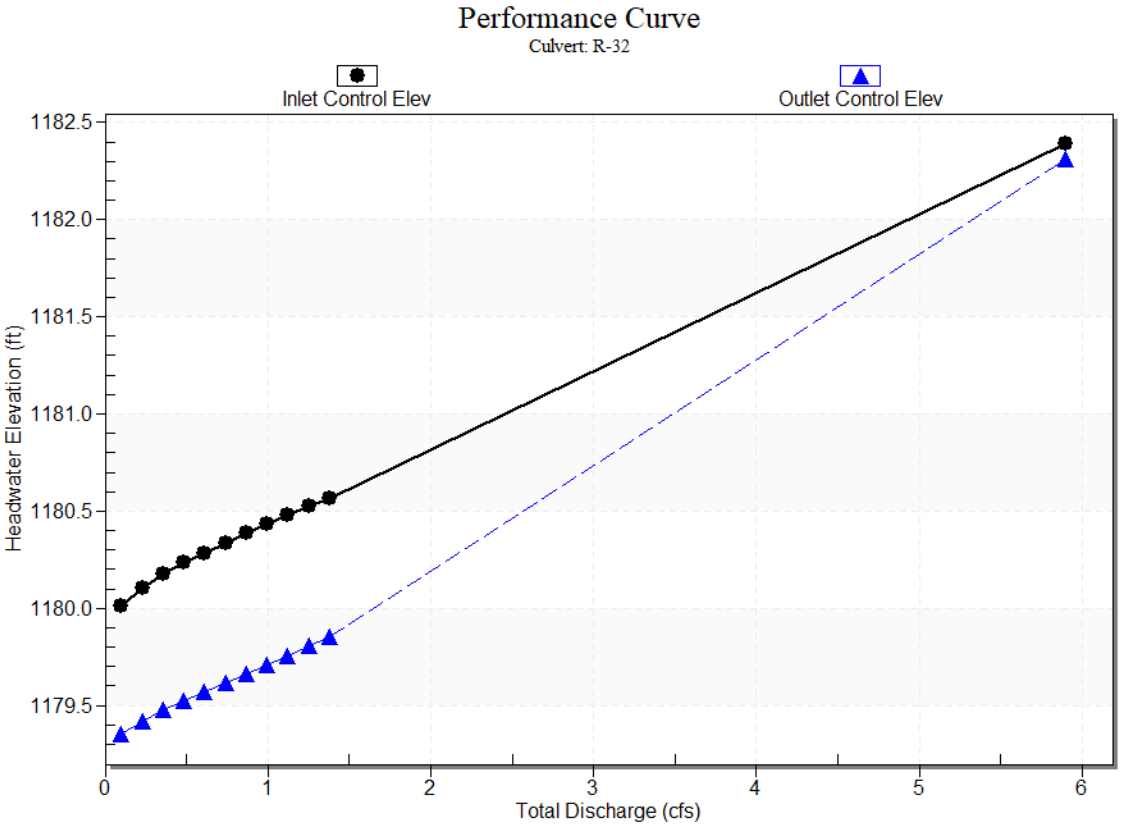
Inlet Elevation (invert): 1179.84 ft,

Outlet Elevation (invert): 1179.22 ft

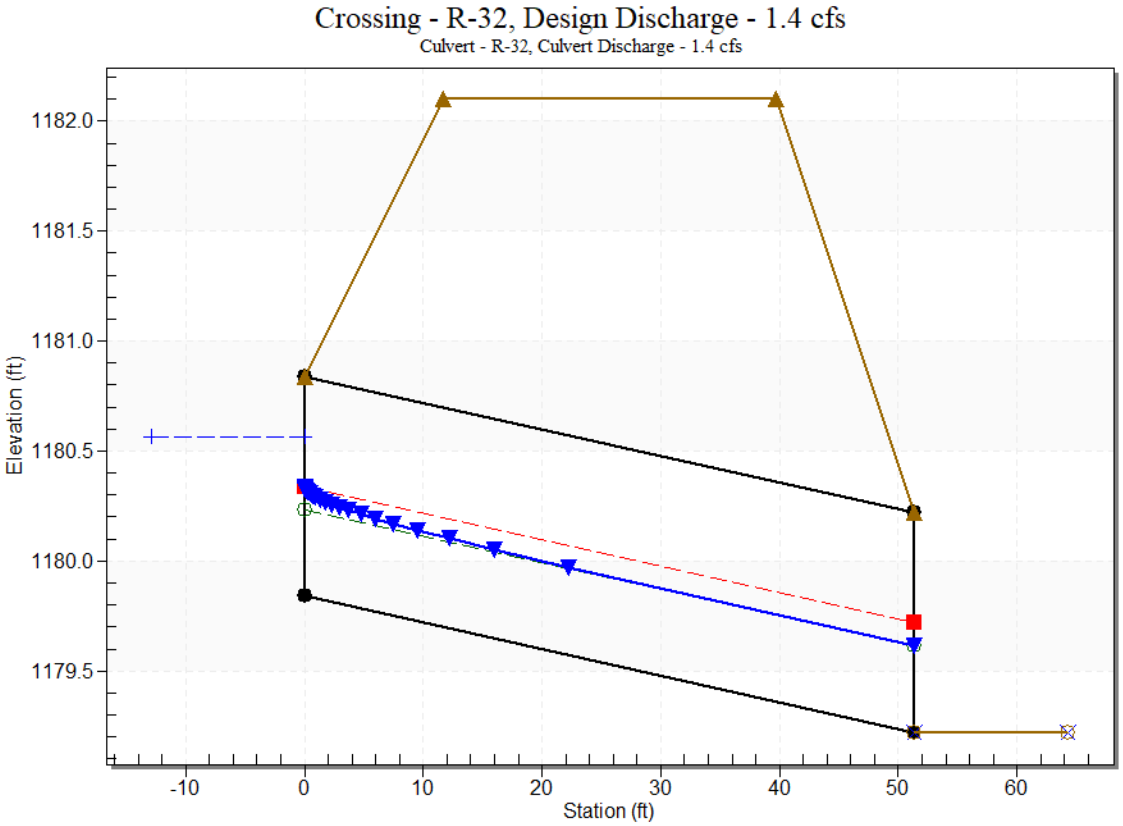
Culvert Length: 51.40 ft,

Culvert Slope: 0.0121

Culvert Performance Curve Plot: R-32



Water Surface Profile Plot for Culvert: R-32



Site Data - R-32

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1179.84 ft

Outlet Station: 51.40 ft

Outlet Elevation: 1179.22 ft

Number of Barrels: 1

Culvert Data Summary - R-32

Barrel Shape: Circular

Barrel Diameter: 1.00 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-32

Table 18 - Downstream Channel Rating Curve (Crossing: R-32)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1179.22	0.00
0.23	1179.22	0.00
0.36	1179.22	0.00
0.48	1179.22	0.00
0.61	1179.22	0.00
0.74	1179.22	0.00
0.87	1179.22	0.00
1.00	1179.22	0.00
1.12	1179.22	0.00
1.25	1179.22	0.00
1.38	1179.22	0.00

Tailwater Channel Data - R-32

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1179.22 ft

Roadway Data for Crossing: R-32

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.00 ft

Crest Elevation: 1182.10 ft

Roadway Surface: Paved

Roadway Top Width: 28.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 6.65 cfs

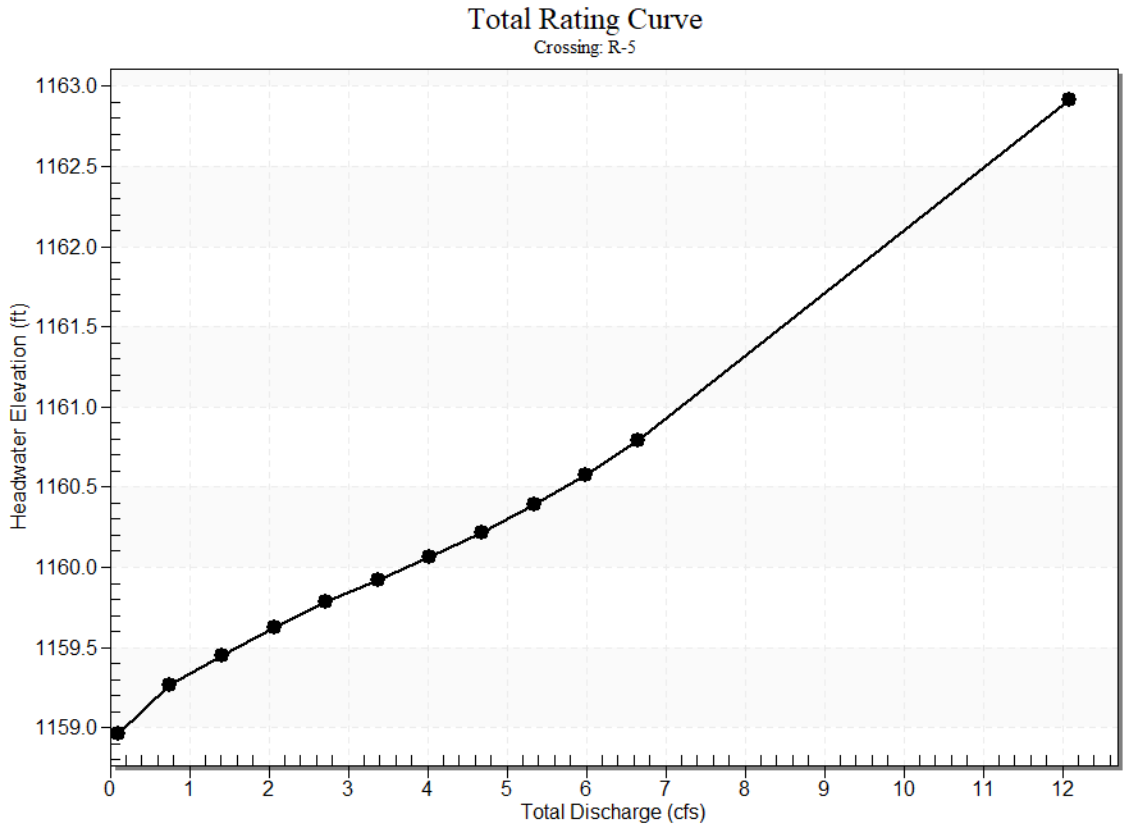
Maximum Flow: 6.65 cfs

Table 19 - Summary of Culvert Flows at Crossing: R-5

Headwater	Total	R-5 Discharge	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	(cfs)	Discharge (cfs)	
1158.96	0.10	0.10	0.00	1
1159.26	0.76	0.76	0.00	1
1159.45	1.41	1.41	0.00	1
1159.63	2.06	2.06	0.00	1
1159.78	2.72	2.72	0.00	1
1159.92	3.38	3.38	0.00	1
1160.07	4.03	4.03	0.00	1
1160.22	4.68	4.68	0.00	1
1160.39	5.34	5.34	0.00	1
1160.58	6.00	6.00	0.00	1
1160.79	6.65	6.65	0.00	1
1162.40	9.91	9.91	0.00	Overtopping

Rating Curve Plot for Crossing: R-5



Culvert Data: R-5

Table 10 - Culvert Summary Table: R-5

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1158.96	0.16	0.0*	1-S2n	0.11	0.12	0.11	0.00	1.94	0.00
0.76 cfs	0.76 cfs	1159.26	0.46	0.0*	1-S2n	0.29	0.34	0.29	0.00	3.51	0.00
1.41 cfs	1.41 cfs	1159.45	0.65	0.0*	1-S2n	0.40	0.47	0.40	0.00	4.21	0.00
2.06 cfs	2.06 cfs	1159.63	0.83	0.073	1-S2n	0.49	0.57	0.49	0.00	4.67	0.00
2.72 cfs	2.72 cfs	1159.78	0.98	0.258	1-S2n	0.57	0.66	0.57	0.00	5.03	0.00
3.38 cfs	3.38 cfs	1159.92	1.12	0.460	1-S2n	0.64	0.74	0.64	0.00	5.31	0.00
4.03 cfs	4.03 cfs	1160.07	1.27	0.680	5-S2n	0.72	0.81	0.72	0.00	5.54	0.00
4.68 cfs	4.68 cfs	1160.22	1.42	0.920	5-S2n	0.79	0.88	0.79	0.00	5.71	0.00
5.34 cfs	5.34 cfs	1160.39	1.59	1.180	5-S2n	0.87	0.94	0.87	0.00	5.87	0.00
6.00 cfs	6.00 cfs	1160.58	1.78	1.591	5-S2n	0.95	0.99	0.96	0.00	5.95	0.00
6.65 cfs	6.65 cfs	1160.79	1.99	1.895	7-M2c	1.07	1.04	1.04	0.00	6.11	0.00

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

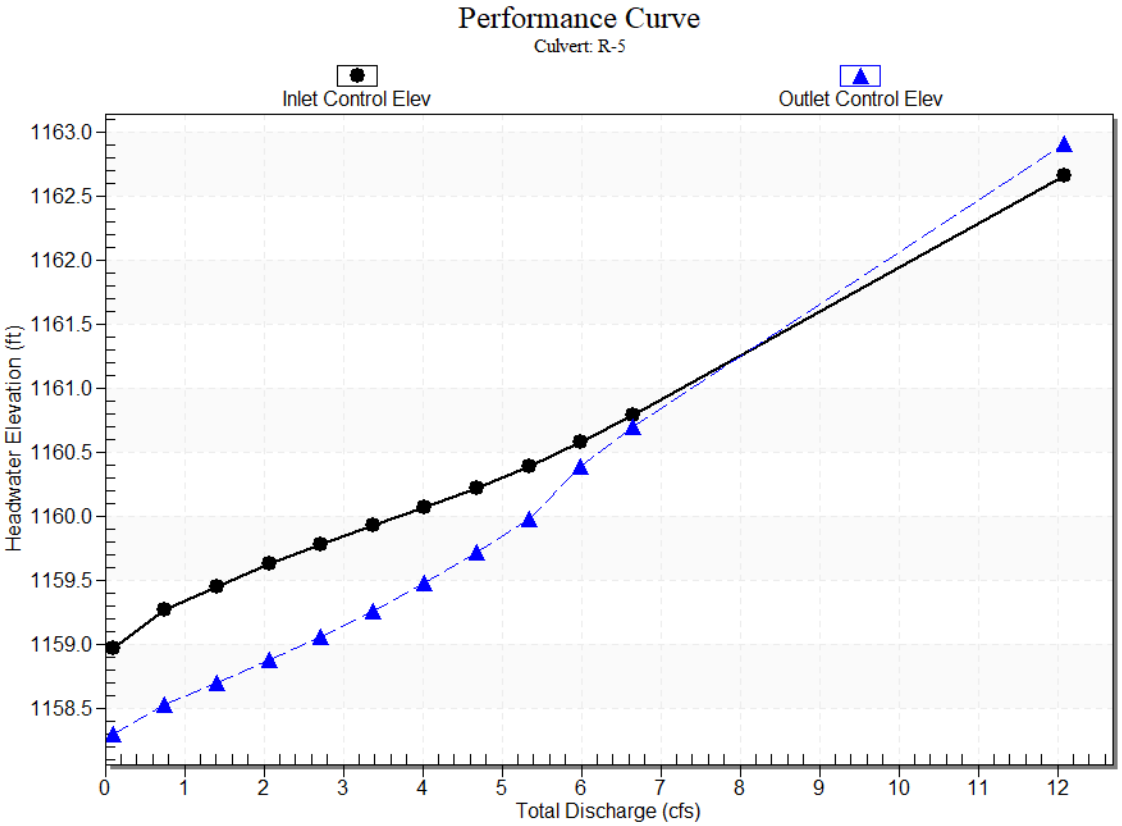
Inlet Elevation (invert): 1158.80 ft,

Outlet Elevation (invert): 1158.17 ft

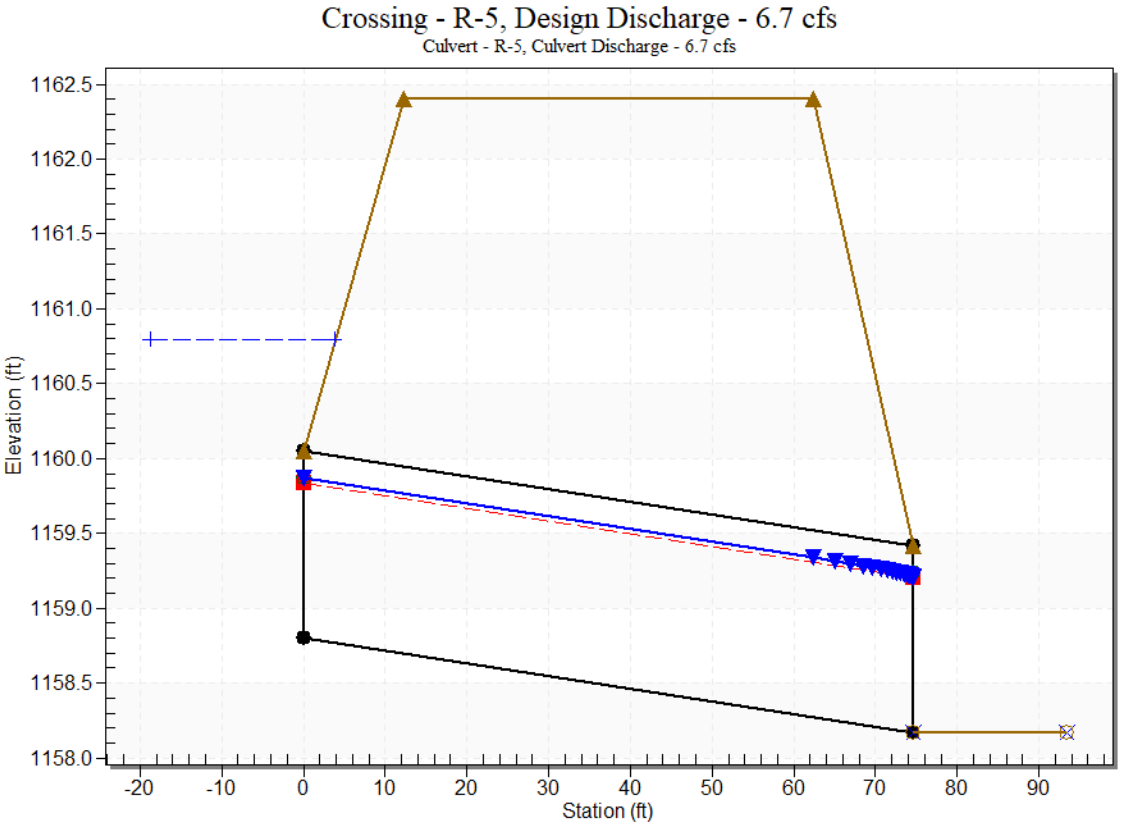
Culvert Length: 74.70 ft,

Culvert Slope: 0.0084

Culvert Performance Curve Plot: R-5



Water Surface Profile Plot for Culvert: R-5



Site Data - R-5

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1158.80 ft

Outlet Station: 74.70 ft

Outlet Elevation: 1158.17 ft

Number of Barrels: 1

Culvert Data Summary - R-5

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-5

Table 20 - Downstream Channel Rating Curve (Crossing: R-5)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1158.17	0.00
0.76	1158.17	0.00
1.41	1158.17	0.00
2.06	1158.17	0.00
2.72	1158.17	0.00
3.38	1158.17	0.00
4.03	1158.17	0.00
4.68	1158.17	0.00
5.34	1158.17	0.00
6.00	1158.17	0.00
6.65	1158.17	0.00

Tailwater Channel Data - R-5

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1158.17 ft

Roadway Data for Crossing: R-5

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1162.40 ft

Roadway Surface: Paved

Roadway Top Width: 50.00 ft

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

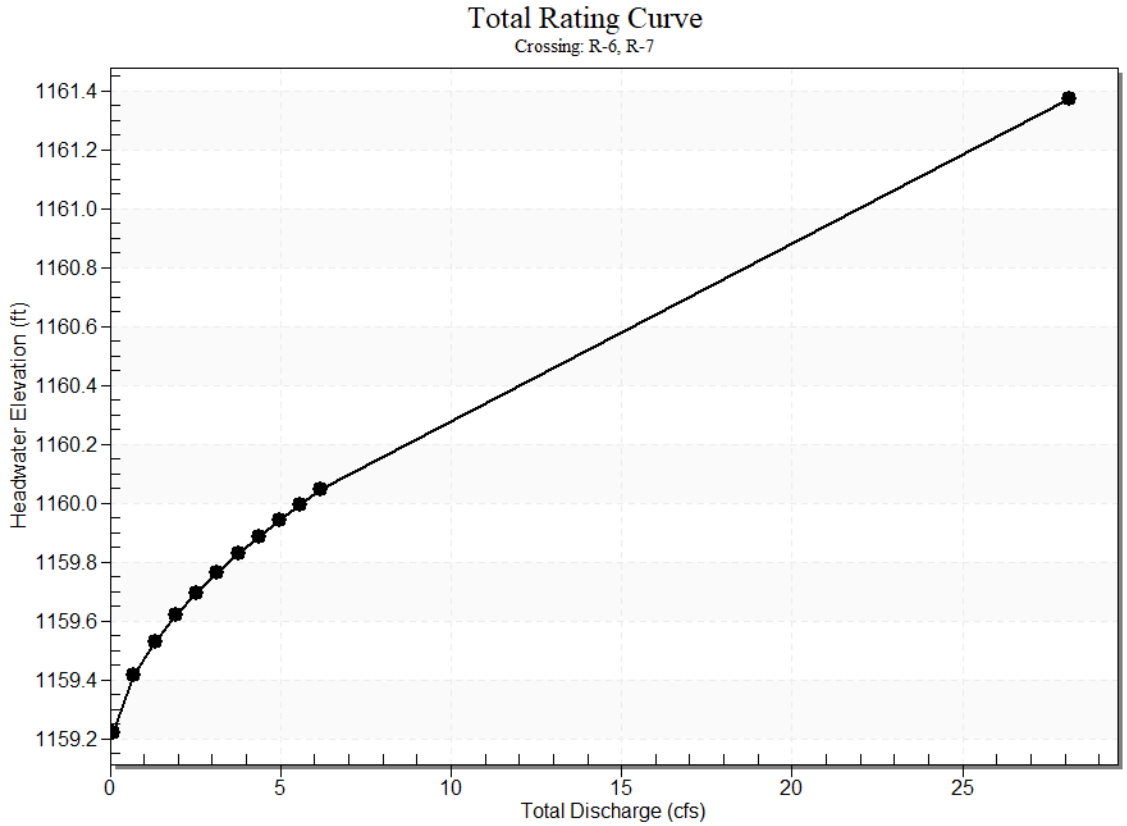
Design Flow: 6.19 cfs

Maximum Flow: 6.19 cfs

Table 1 - Summary of Culvert Flows at Crossing: R-6, R-7

Headwater Elevation (ft)	Total Discharge (cfs)	R-6 Discharge (cfs)	R-7 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1159.22	0.10	0.04	0.06	0.00	56
1159.42	0.71	0.33	0.37	0.00	10
1159.53	1.32	0.63	0.69	0.00	8
1159.62	1.93	0.92	1.00	0.00	7
1159.70	2.54	1.22	1.31	0.00	6
1159.77	3.15	1.52	1.62	0.00	6
1159.83	3.75	1.82	1.93	0.00	6
1159.89	4.36	2.12	2.24	0.00	5
1159.94	4.97	2.43	2.54	0.00	5
1160.00	5.58	2.72	2.85	0.00	5
1160.05	6.19	3.03	3.16	0.00	5
1162.50	44.46	22.04	22.42	0.00	Overtopping

Rating Curve Plot for Crossing: R-6, R-7



Culvert Data: R-6

Table 1 - Culvert Summary Table: R-6

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.10 cfs	0.04 cfs	1159.22	0.09	0.123	2-M2c	0.11	0.07	0.07	0.00	1.24	0.00
0.71 cfs	0.33 cfs	1159.42	0.27	0.316	2-M2c	0.30	0.20	0.20	0.00	2.08	0.00
1.32 cfs	0.63 cfs	1159.53	0.37	0.430	2-M2c	0.42	0.27	0.27	0.00	2.45	0.00
1.93 cfs	0.92 cfs	1159.62	0.45	0.520	2-M2c	0.50	0.33	0.33	0.00	2.72	0.00

2.54 cfs	1.22 cfs	1159.70	0.52	0.597	2-M2c	0.58	0.38	0.38	0.00	2.93	0.00
3.15 cfs	1.52 cfs	1159.77	0.58	0.666	2-M2c	0.65	0.43	0.43	0.00	3.10	0.00
3.75 cfs	1.82 cfs	1159.83	0.64	0.730	2-M2c	0.72	0.47	0.47	0.00	3.26	0.00
4.36 cfs	2.12 cfs	1159.89	0.69	0.788	2-M2c	0.78	0.51	0.51	0.00	3.40	0.00
4.97 cfs	2.43 cfs	1159.94	0.74	0.845	2-M2c	0.84	0.54	0.54	0.00	3.53	0.00
5.58 cfs	2.72 cfs	1160.00	0.79	0.897	2-M2c	0.89	0.58	0.58	0.00	3.65	0.00
6.19 cfs	3.03 cfs	1160.05	0.84	0.947	2-M2c	0.95	0.61	0.61	0.00	3.76	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

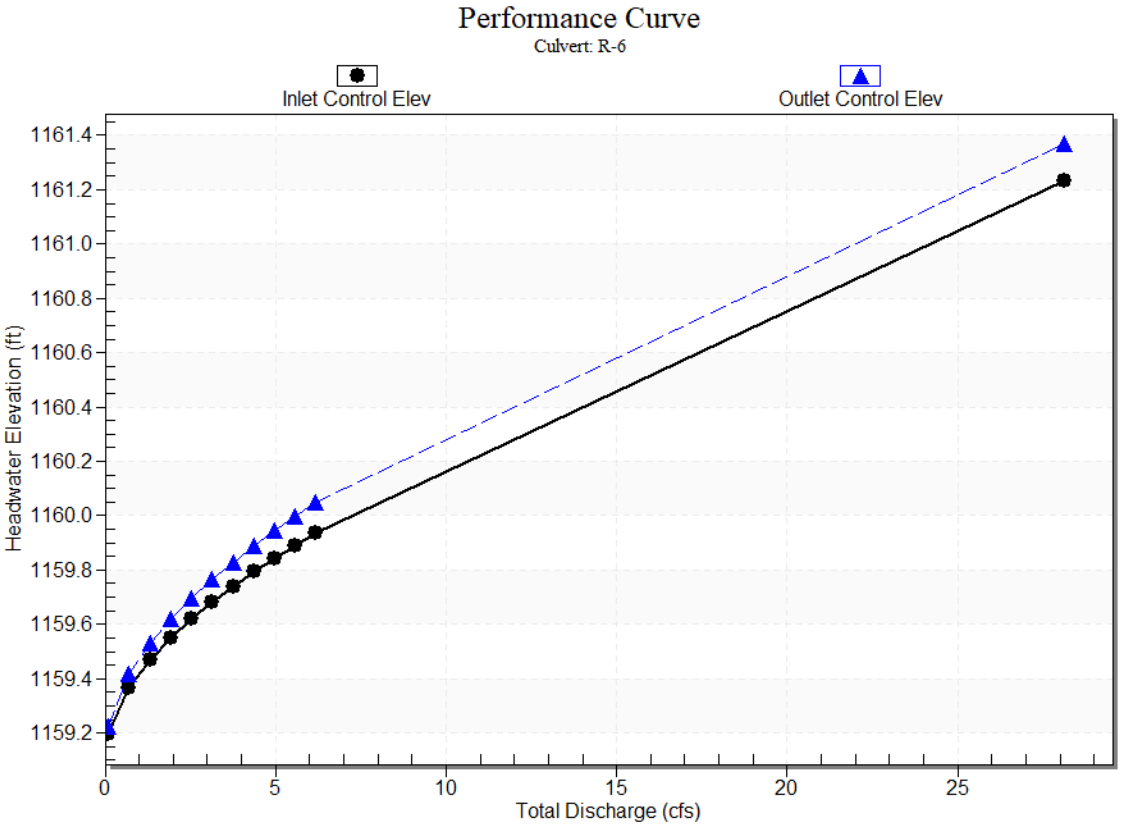
Inlet Elevation (invert): 1159.10 ft,

Outlet Elevation (invert): 1159.06 ft

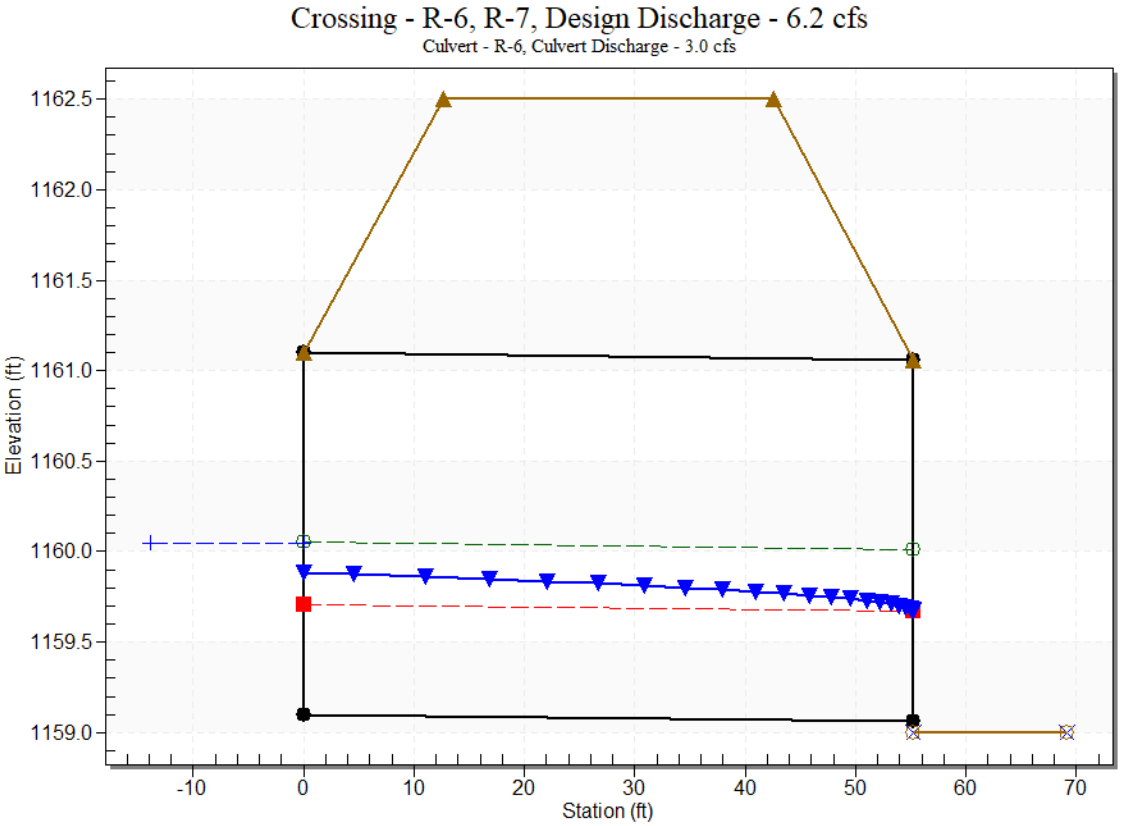
Culvert Length: 55.30 ft,

Culvert Slope: 0.0007

Culvert Performance Curve Plot: R-6



Water Surface Profile Plot for Culvert: R-6



Site Data - R-6

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1159.10 ft

Outlet Station: 55.30 ft

Outlet Elevation: 1159.06 ft

Number of Barrels: 1

Culvert Data Summary - R-6

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Culvert Data: R-7

Table 2 - Culvert Summary Table: R-7

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.10 cfs	0.06 cfs	1159.22	0.11	0.123	2-M2c	0.10	0.08	0.08	0.00	1.32	0.00
0.71 cfs	0.37 cfs	1159.42	0.28	0.316	2-M2c	0.26	0.21	0.21	0.00	2.14	0.00
1.32 cfs	0.69 cfs	1159.53	0.39	0.430	2-M2c	0.35	0.28	0.28	0.00	2.51	0.00
1.93 cfs	1.00 cfs	1159.62	0.47	0.520	2-M2c	0.42	0.34	0.34	0.00	2.77	0.00
2.54 cfs	1.31 cfs	1159.70	0.54	0.597	2-M2c	0.48	0.39	0.39	0.00	2.98	0.00
3.15 cfs	1.62 cfs	1159.77	0.60	0.666	2-M2c	0.53	0.44	0.44	0.00	3.16	0.00
3.75 cfs	1.93 cfs	1159.83	0.66	0.730	2-M2c	0.58	0.48	0.48	0.00	3.31	0.00
4.36 cfs	2.24 cfs	1159.89	0.71	0.788	2-M2c	0.63	0.52	0.52	0.00	3.45	0.00
4.97 cfs	2.54 cfs	1159.94	0.76	0.844	2-M2c	0.67	0.56	0.56	0.00	3.58	0.00
5.58 cfs	2.85 cfs	1160.00	0.81	0.897	2-M2c	0.71	0.59	0.59	0.00	3.69	0.00
6.19 cfs	3.16 cfs	1160.05	0.85	0.947	2-M2	0.75	0.62	0.62	0.00	3.80	0.00

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Culvert Barrel Data

Culvert Barrel Type Straight Culvert

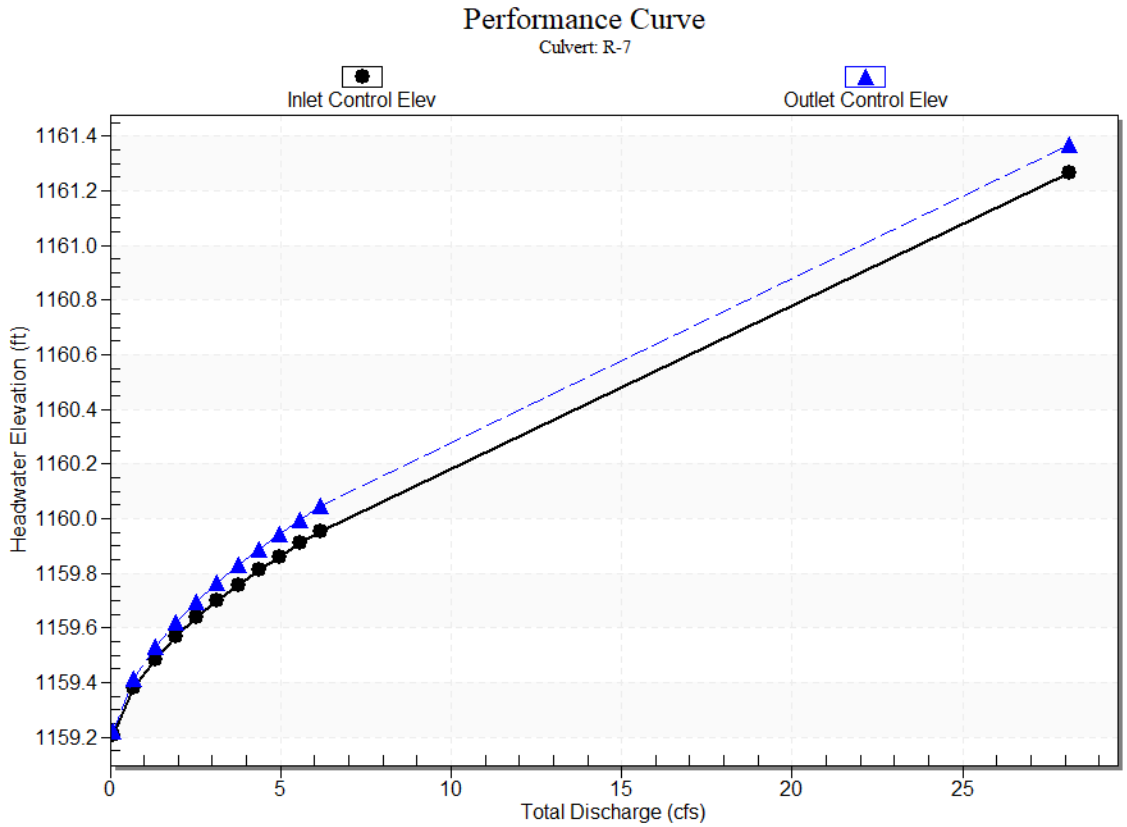
Inlet Elevation (invert): 1159.10 ft,

Outlet Elevation (invert): 1159.00 ft

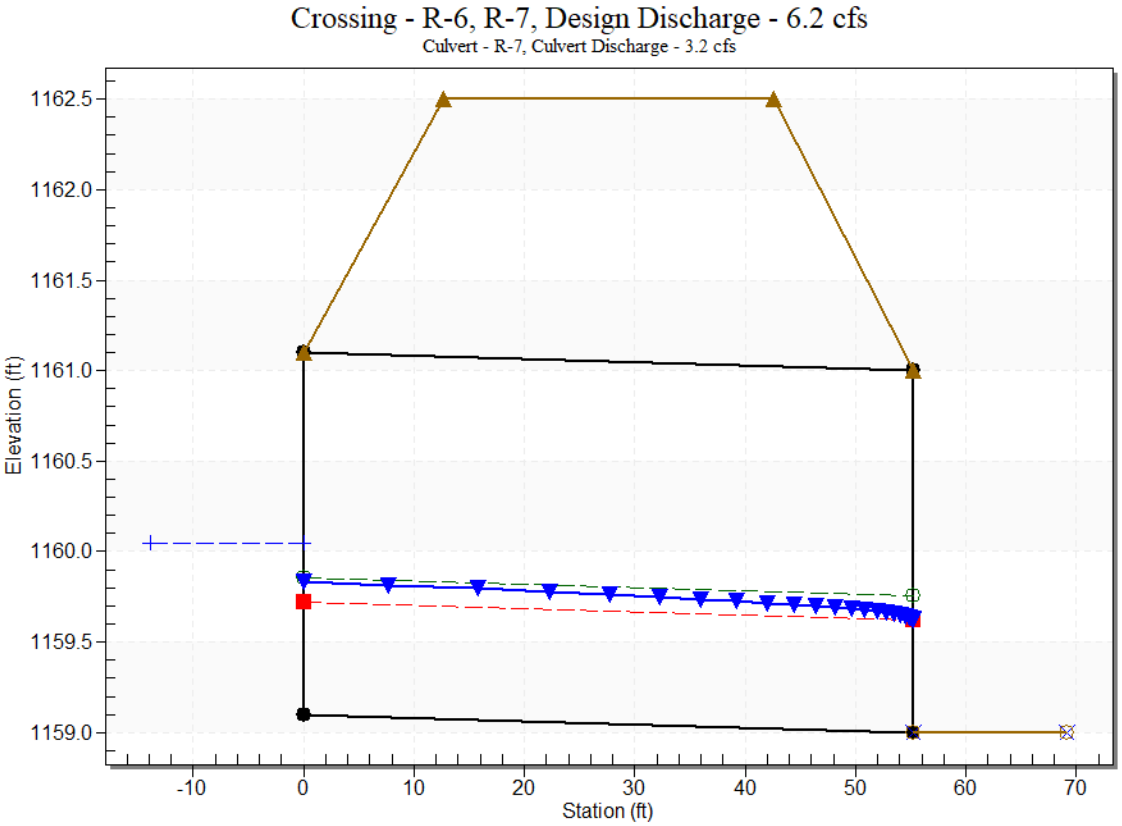
Culvert Length: 55.30 ft,

Culvert Slope: 0.0018

Culvert Performance Curve Plot: R-7



Water Surface Profile Plot for Culvert: R-7



Site Data - R-7

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1159.10 ft

Outlet Station: 55.30 ft

Outlet Elevation: 1159.00 ft

Number of Barrels: 1

Culvert Data Summary - R-7

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-6, R-7

Table 2 - Downstream Channel Rating Curve (Crossing: R-6, R-7)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1159.00	0.00
0.71	1159.00	0.00
1.32	1159.00	0.00
1.93	1159.00	0.00
2.54	1159.00	0.00
3.15	1159.00	0.00
3.75	1159.00	0.00
4.36	1159.00	0.00
4.97	1159.00	0.00
5.58	1159.00	0.00
6.19	1159.00	0.00

Tailwater Channel Data - R-6, R-7

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1159.00 ft

Roadway Data for Crossing: R-6, R-7

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 ft

Crest Elevation: 1162.50 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

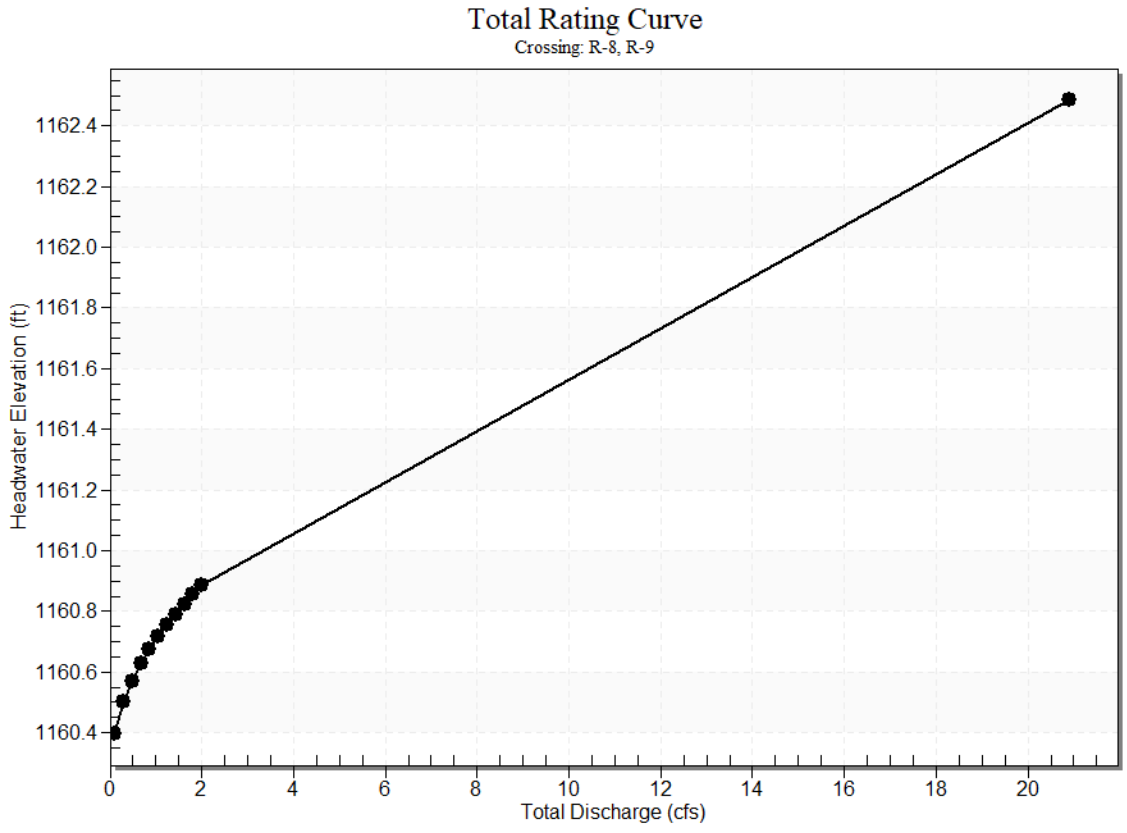
Maximum Flow: 2.00 cfs

Table 3 - Summary of Culvert Flows at Crossing: R-8, R-9

Headwater	Total	R-8	R-9	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1160.40	0.10	0.04	0.06	0.00	52
1160.50	0.29	0.12	0.17	0.00	13
1160.57	0.48	0.20	0.27	0.00	9
1160.63	0.67	0.29	0.37	0.00	8
1160.67	0.86	0.38	0.47	0.00	7
1160.72	1.05	0.47	0.57	0.00	7
1160.76	1.24	0.56	0.67	0.00	7
1160.79	1.43	0.65	0.77	0.00	6
1160.82	1.62	0.74	0.87	0.00	6
1160.86	1.81	0.83	0.97	0.00	6
1160.88	2.00	0.93	1.07	0.00	6
1165.00	49.11	29.67	19.43	0.00	Overtopping

Rating Curve Plot for Crossing: R-8, R-9



Culvert Data: R-8

Table 3 - Culvert Summary Table: R-8

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.04 cfs	1160.40	0.09	0.178	7-H2c	-1.00	0.07	0.07	0.00	1.19	0.00
0.29 cfs	0.12 cfs	1160.50	0.16	0.282	7-H2c	-1.00	0.12	0.12	0.00	1.60	0.00
0.48 cfs	0.20 cfs	1160.57	0.21	0.351	7-H2c	-1.00	0.15	0.15	0.00	1.84	0.00
0.67 cfs	0.29 cfs	1160.63	0.25	0.407	7-H2c	-1.00	0.19	0.19	0.00	2.01	0.00
0.86 cfs	0.38 cfs	1160.67	0.29	0.455	7-H2c	-1.00	0.21	0.21	0.00	2.15	0.00
1.05 cfs	0.47 cfs	1160.72	0.32	0.497	7-H2c	-1.00	0.24	0.24	0.00	2.28	0.00
1.24 cfs	0.56 cfs	1160.76	0.35	0.536	7-H2c	-1.00	0.26	0.26	0.00	2.38	0.00
1.43 cfs	0.65 cfs	1160.79	0.38	0.571	7-H2c	-1.00	0.28	0.28	0.00	2.48	0.00
1.62 cfs	0.74 cfs	1160.82	0.40	0.604	7-H2c	-1.00	0.30	0.30	0.00	2.56	0.00
1.81 cfs	0.83 cfs	1160.86	0.43	0.635	7-H2c	-1.00	0.31	0.31	0.00	2.64	0.00
2.00 cfs	0.93 cfs	1160.88	0.45	0.665	7-H2c	-1.00	0.33	0.33	0.00	2.72	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

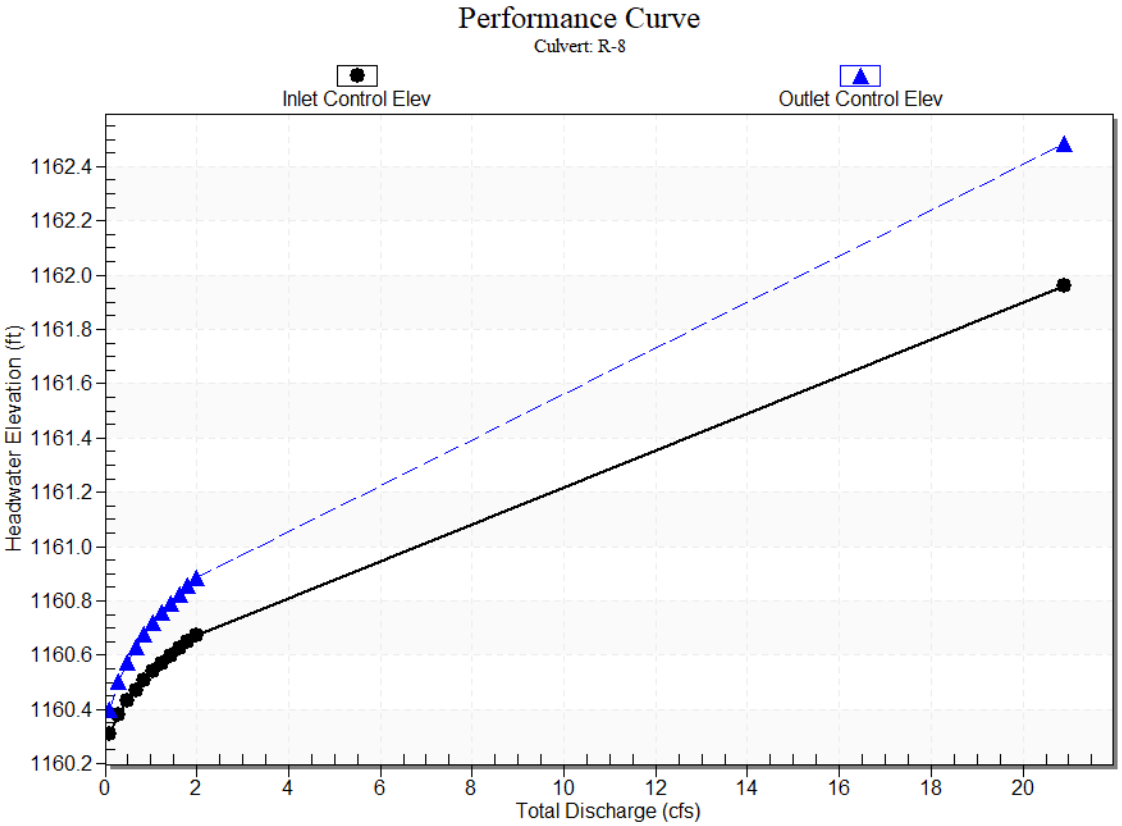
Inlet Elevation (invert): 1160.22 ft,

Outlet Elevation (invert): 1160.22 ft

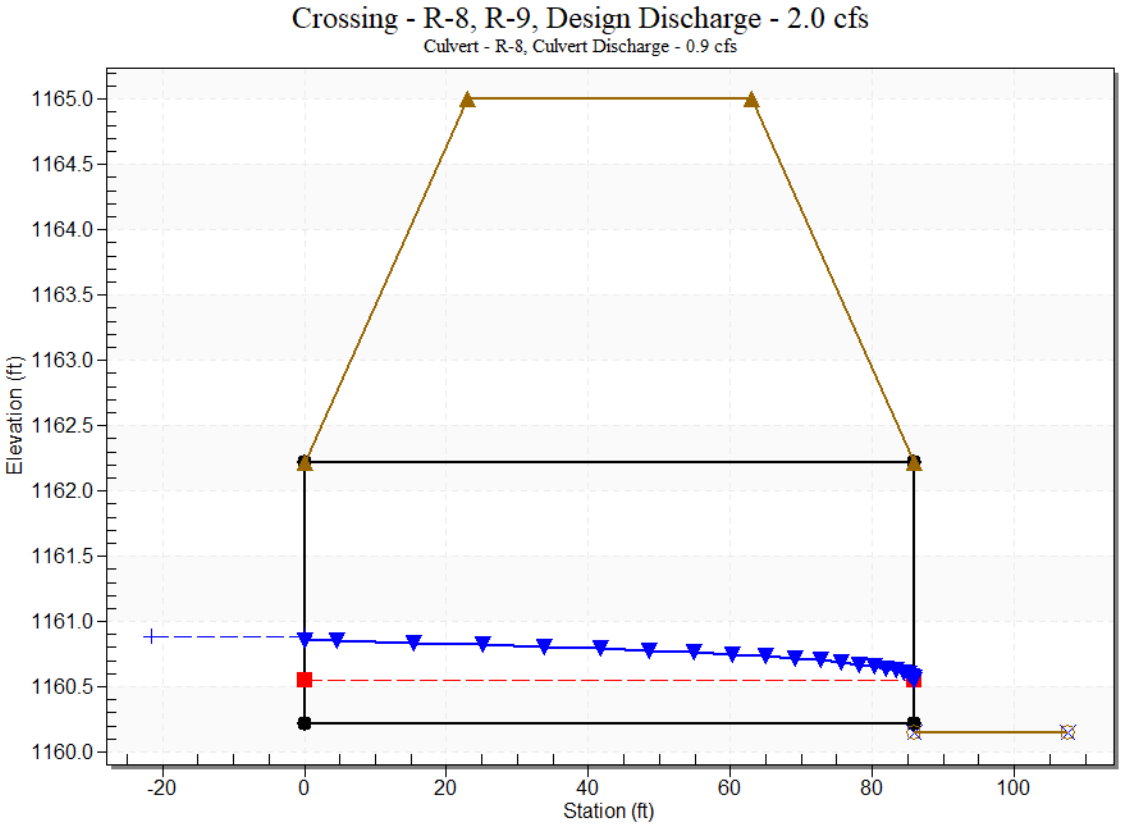
Culvert Length: 86.00 ft,

Culvert Slope: 0.0000

Culvert Performance Curve Plot: R-8



Water Surface Profile Plot for Culvert: R-8



Site Data - R-8

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1160.22 ft

Outlet Station: 86.00 ft

Outlet Elevation: 1160.22 ft

Number of Barrels: 1

Culvert Data Summary - R-8

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated PE

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Culvert Data: R-9

Table 4 - Culvert Summary Table: R-9

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.10 cfs	0.06 cfs	1160.40	0.11	0.188	2-M2c	0.19	0.08	0.08	0.00	1.35	0.00
0.29 cfs	0.17 cfs	1160.50	0.19	0.292	2-M2c	0.31	0.14	0.14	0.00	1.74	0.00
0.48 cfs	0.27 cfs	1160.57	0.24	0.362	2-M2c	0.39	0.18	0.18	0.00	1.97	0.00
0.67 cfs	0.37 cfs	1160.63	0.28	0.417	2-M2c	0.46	0.21	0.21	0.00	2.14	0.00
0.86 cfs	0.47 cfs	1160.67	0.32	0.465	2-M2c	0.52	0.24	0.24	0.00	2.28	0.00
1.05 cfs	0.57 cfs	1160.72	0.35	0.507	2-M2c	0.57	0.26	0.26	0.00	2.40	0.00
1.24 cfs	0.67 cfs	1160.76	0.38	0.546	2-M2c	0.62	0.28	0.28	0.00	2.50	0.00
1.43 cfs	0.77 cfs	1160.79	0.41	0.581	2-M2c	0.66	0.30	0.30	0.00	2.59	0.00
1.62 cfs	0.87 cfs	1160.82	0.44	0.614	2-M2c	0.71	0.32	0.32	0.00	2.68	0.00
1.81 cfs	0.97 cfs	1160.86	0.46	0.646	2-M2c	0.75	0.34	0.34	0.00	2.75	0.00
2.00 cfs	1.07 cfs	1160.89	0.49	0.675	2-M2	0.79	0.36	0.36	0.00	2.82	0.00

C

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

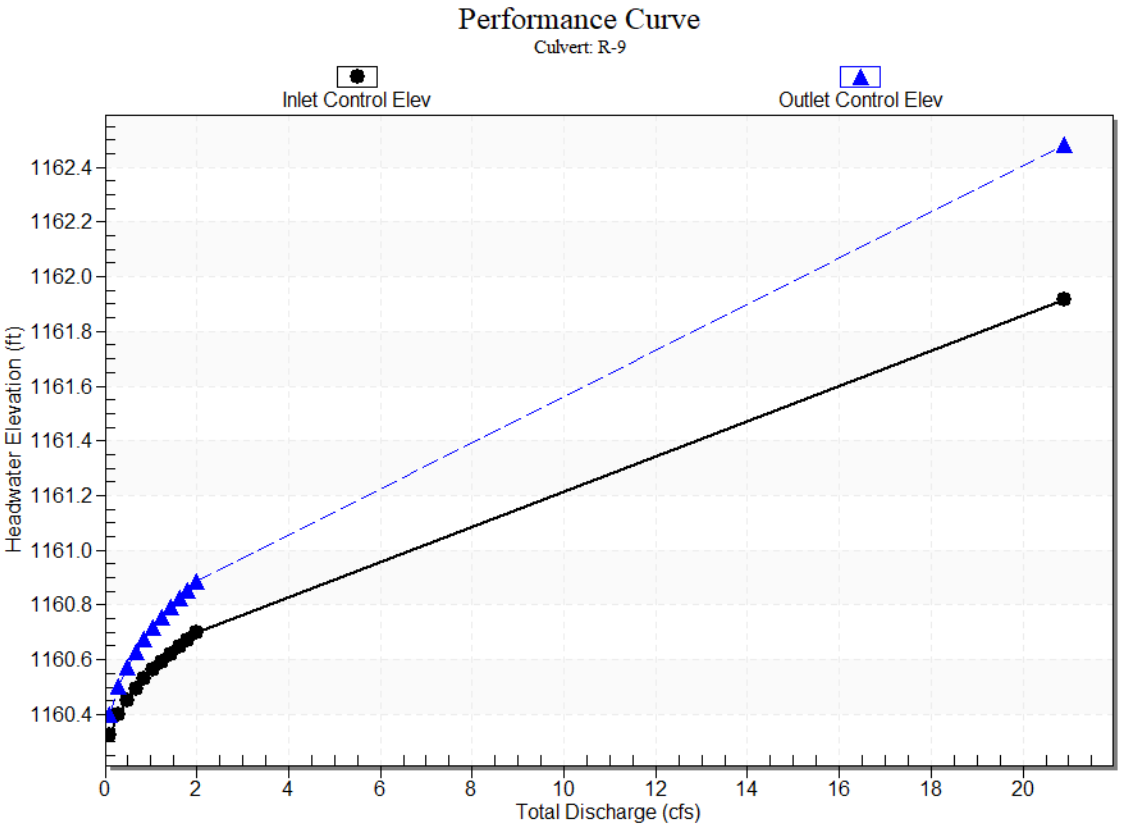
Inlet Elevation (invert): 1160.21 ft,

Outlet Elevation (invert): 1160.15 ft

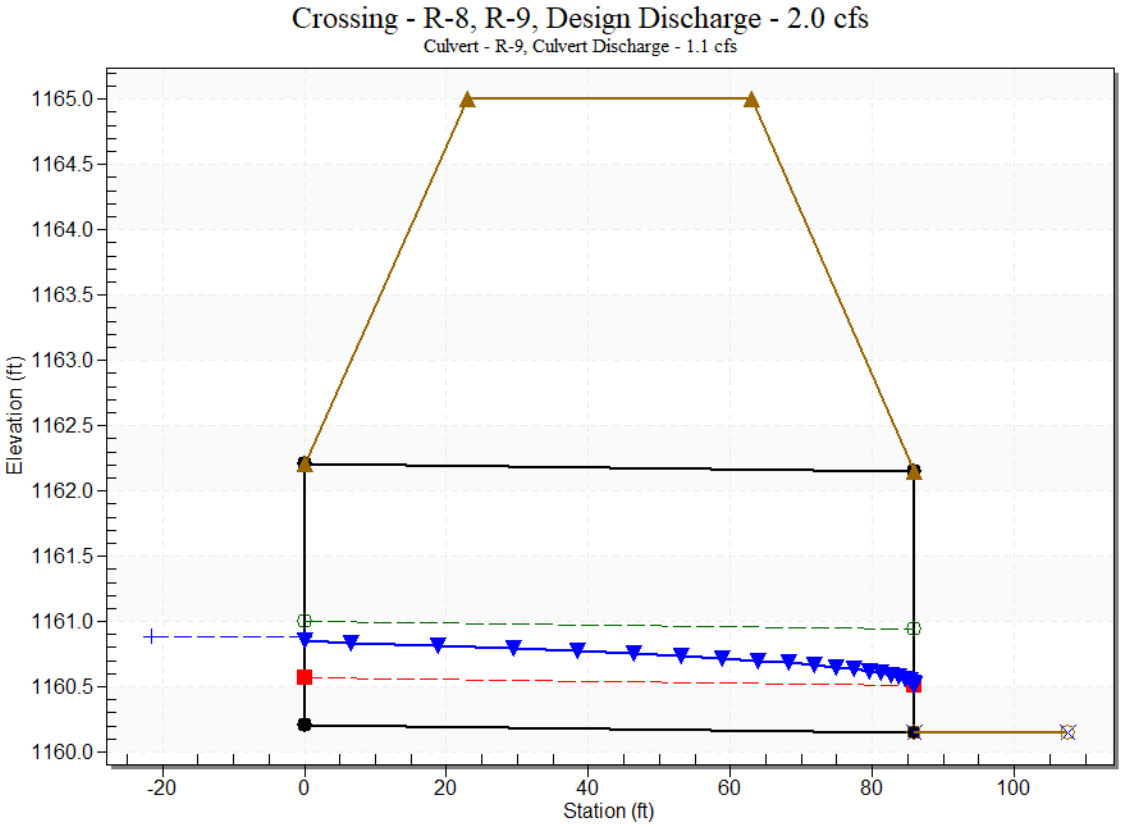
Culvert Length: 86.00 ft,

Culvert Slope: 0.0007

Culvert Performance Curve Plot: R-9



Water Surface Profile Plot for Culvert: R-9



Site Data - R-9

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1160.21 ft

Outlet Station: 86.00 ft

Outlet Elevation: 1160.15 ft

Number of Barrels: 1

Culvert Data Summary - R-9

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated PE

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-8, R-9

Table 4 - Downstream Channel Rating Curve (Crossing: R-8, R-9)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1160.15	0.00
0.29	1160.15	0.00
0.48	1160.15	0.00
0.67	1160.15	0.00
0.86	1160.15	0.00
1.05	1160.15	0.00
1.24	1160.15	0.00
1.43	1160.15	0.00
1.62	1160.15	0.00
1.81	1160.15	0.00
2.00	1160.15	0.00

Tailwater Channel Data - R-8, R-9

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1160.15 ft

Roadway Data for Crossing: R-8, R-9

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 ft

Crest Elevation: 1165.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

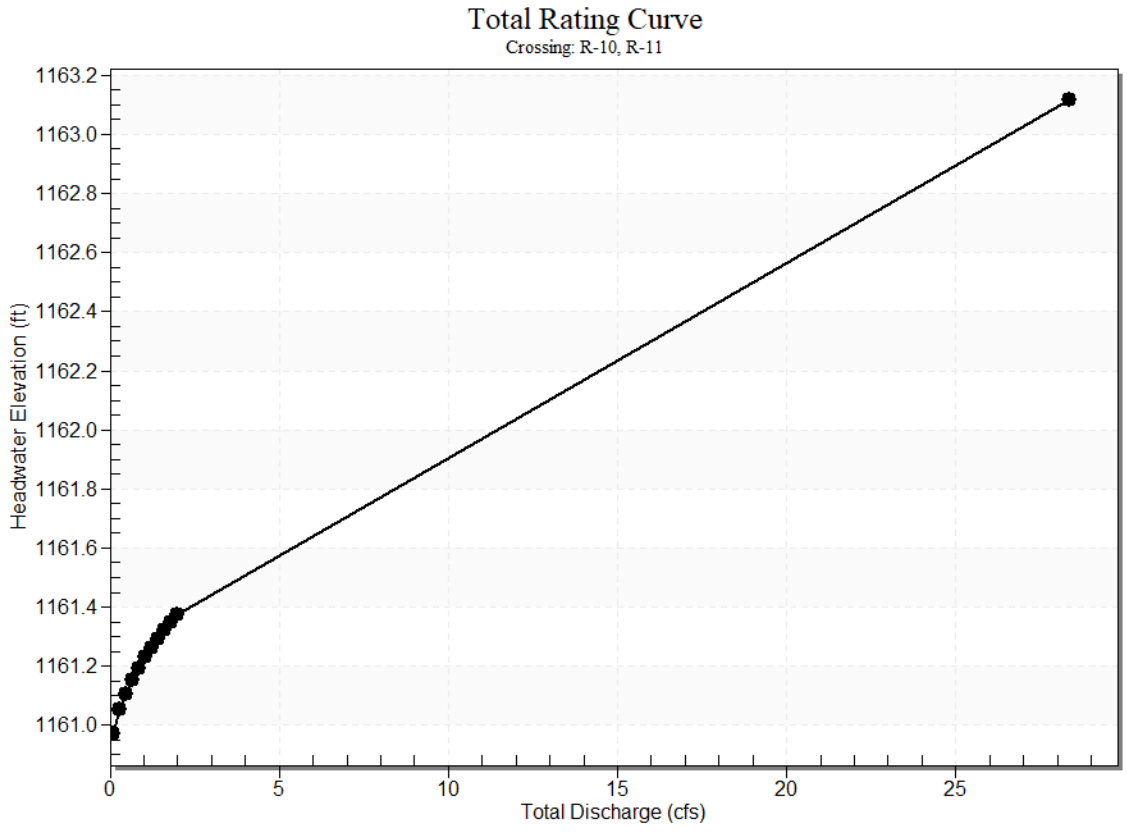
Maximum Flow: 2.00 cfs

Table 5 - Summary of Culvert Flows at Crossing: R-10, R-11

Headwater	Total	R-10	R-11	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1160.97	0.10	0.05	0.05	0.00	72
1161.05	0.29	0.14	0.14	0.00	13
1161.11	0.48	0.24	0.24	0.00	10
1161.15	0.67	0.33	0.33	0.00	8
1161.19	0.86	0.43	0.43	0.00	7
1161.23	1.05	0.52	0.52	0.00	7
1161.26	1.24	0.62	0.62	0.00	6
1161.29	1.43	0.71	0.71	0.00	6
1161.32	1.62	0.81	0.81	0.00	6
1161.35	1.81	0.90	0.90	0.00	6
1161.37	2.00	1.00	1.00	0.00	6
1165.00	51.71	25.84	25.87	0.00	Overtopping

Rating Curve Plot for Crossing: R-10, R-11



Culvert Data: R-10

Table 5 - Culvert Summary Table: R-10

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.05 cfs	1160.97	0.10	0.112	2-M2c	0.09	0.08	0.08	0.00	1.28	0.00
0.29 cfs	0.14 cfs	1161.05	0.17	0.192	2-M2c	0.15	0.13	0.13	0.00	1.68	0.00
0.48 cfs	0.24 cfs	1161.11	0.22	0.248	2-M2c	0.19	0.17	0.17	0.00	1.91	0.00
0.67 cfs	0.33 cfs	1161.15	0.27	0.293	2-M2c	0.22	0.20	0.20	0.00	2.08	0.00
0.86 cfs	0.43 cfs	1161.19	0.30	0.333	2-M2c	0.25	0.22	0.22	0.00	2.22	0.00
1.05 cfs	0.52 cfs	1161.23	0.34	0.369	2-M2c	0.28	0.25	0.25	0.00	2.34	0.00
1.24 cfs	0.62 cfs	1161.26	0.37	0.403	2-M2c	0.30	0.27	0.27	0.00	2.44	0.00
1.43 cfs	0.71 cfs	1161.29	0.39	0.433	2-M2c	0.32	0.29	0.29	0.00	2.54	0.00
1.62 cfs	0.81 cfs	1161.32	0.42	0.461	2-M2c	0.34	0.31	0.31	0.00	2.62	0.00
1.81 cfs	0.90 cfs	1161.35	0.44	0.489	2-M2c	0.36	0.33	0.33	0.00	2.70	0.00
2.00 cfs	1.00 cfs	1161.37	0.47	0.515	2-M2c	0.38	0.34	0.34	0.00	2.77	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

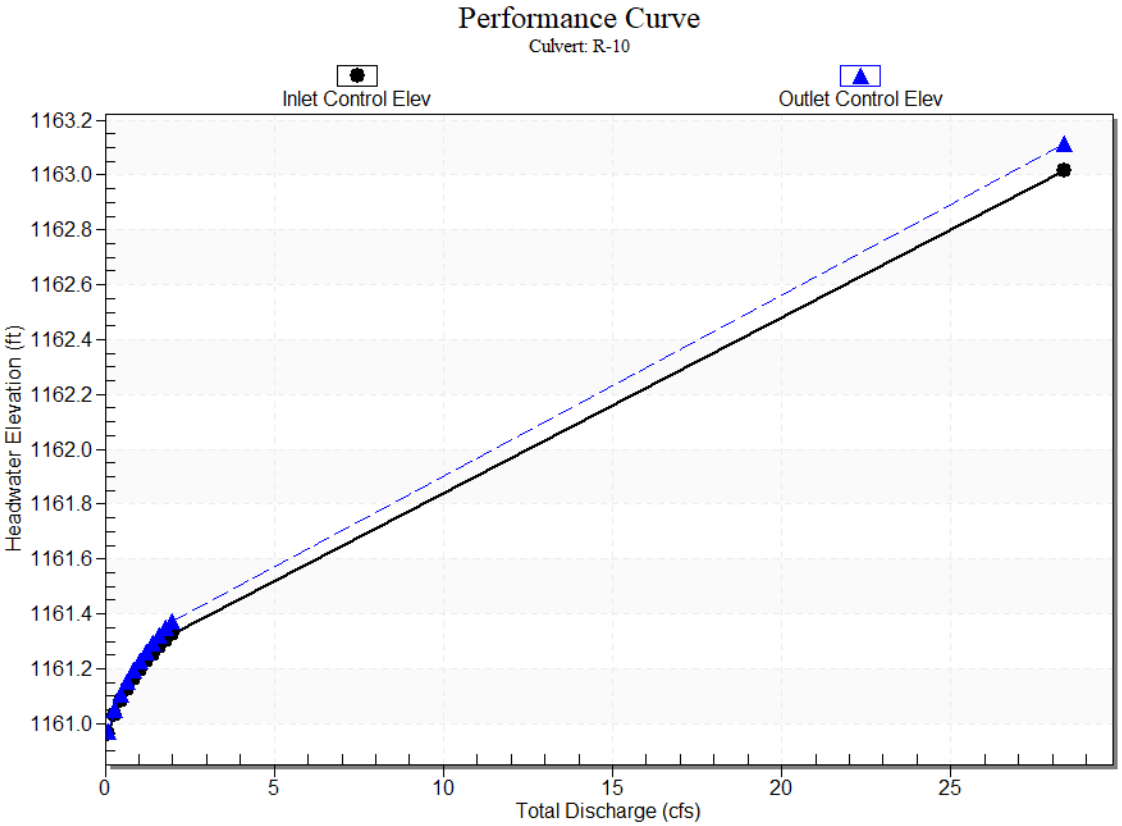
Inlet Elevation (invert): 1160.86 ft,

Outlet Elevation (invert): 1160.66 ft

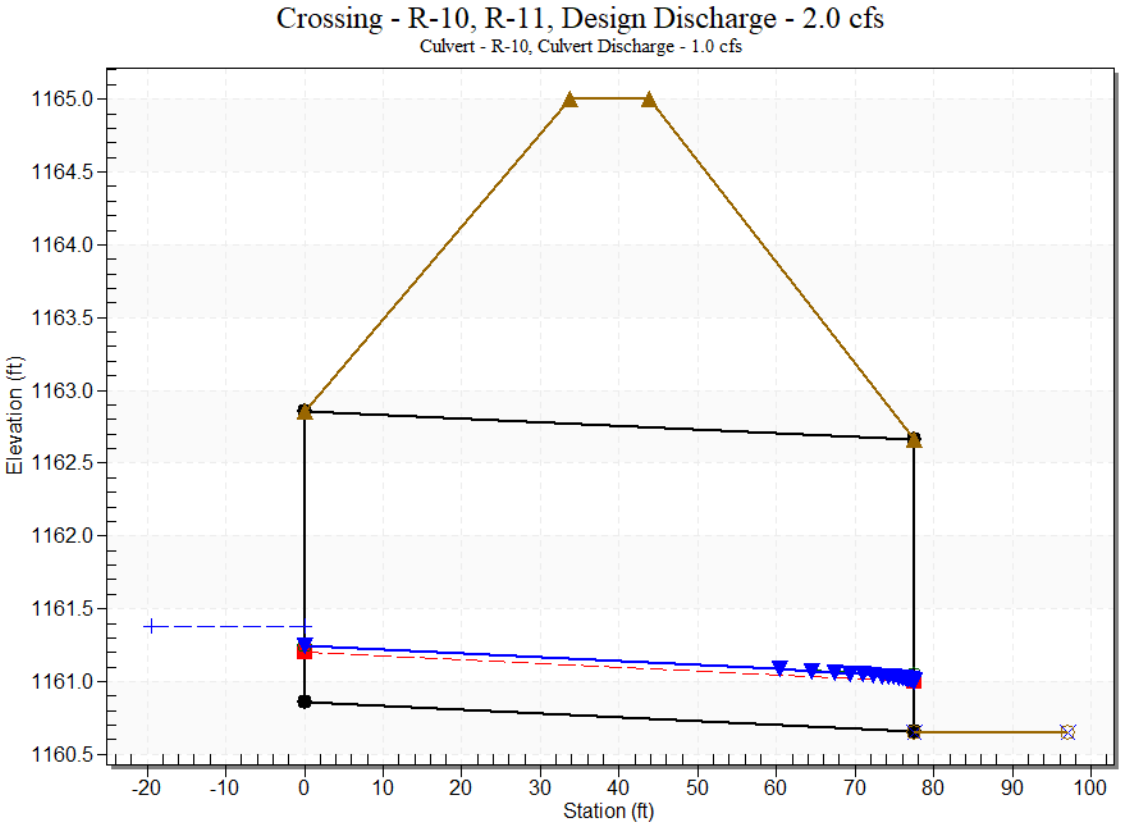
Culvert Length: 77.60 ft,

Culvert Slope: 0.0026

Culvert Performance Curve Plot: R-10



Water Surface Profile Plot for Culvert: R-10



Site Data - R-10

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1160.86 ft

Outlet Station: 77.60 ft

Outlet Elevation: 1160.66 ft

Number of Barrels: 1

Culvert Data Summary - R-10

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Culvert Data: R-11

Table 6 - Culvert Summary Table: R-11

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.10 cfs	0.05 cfs	1160.97	0.10	0.112	2-M2c	0.09	0.08	0.08	0.00	1.28	0.00
0.29 cfs	0.14 cfs	1161.05	0.17	0.192	2-M2c	0.15	0.13	0.13	0.00	1.68	0.00
0.48 cfs	0.24 cfs	1161.11	0.22	0.248	2-M2c	0.19	0.17	0.17	0.00	1.91	0.00
0.67 cfs	0.33 cfs	1161.15	0.27	0.293	2-M2c	0.22	0.20	0.20	0.00	2.08	0.00
0.86 cfs	0.43 cfs	1161.19	0.30	0.333	2-M2c	0.25	0.22	0.22	0.00	2.22	0.00
1.05 cfs	0.52 cfs	1161.23	0.34	0.369	2-M2c	0.28	0.25	0.25	0.00	2.34	0.00
1.24 cfs	0.62 cfs	1161.26	0.37	0.403	2-M2c	0.30	0.27	0.27	0.00	2.44	0.00
1.43 cfs	0.71 cfs	1161.29	0.39	0.433	2-M2c	0.32	0.29	0.29	0.00	2.54	0.00
1.62 cfs	0.81 cfs	1161.32	0.42	0.461	2-M2c	0.34	0.31	0.31	0.00	2.62	0.00
1.81 cfs	0.90 cfs	1161.35	0.44	0.489	2-M2c	0.36	0.33	0.33	0.00	2.70	0.00
2.00 cfs	1.00 cfs	1161.37	0.47	0.515	2-M2	0.38	0.34	0.34	0.00	2.77	0.00

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Culvert Barrel Data

Culvert Barrel Type Straight Culvert

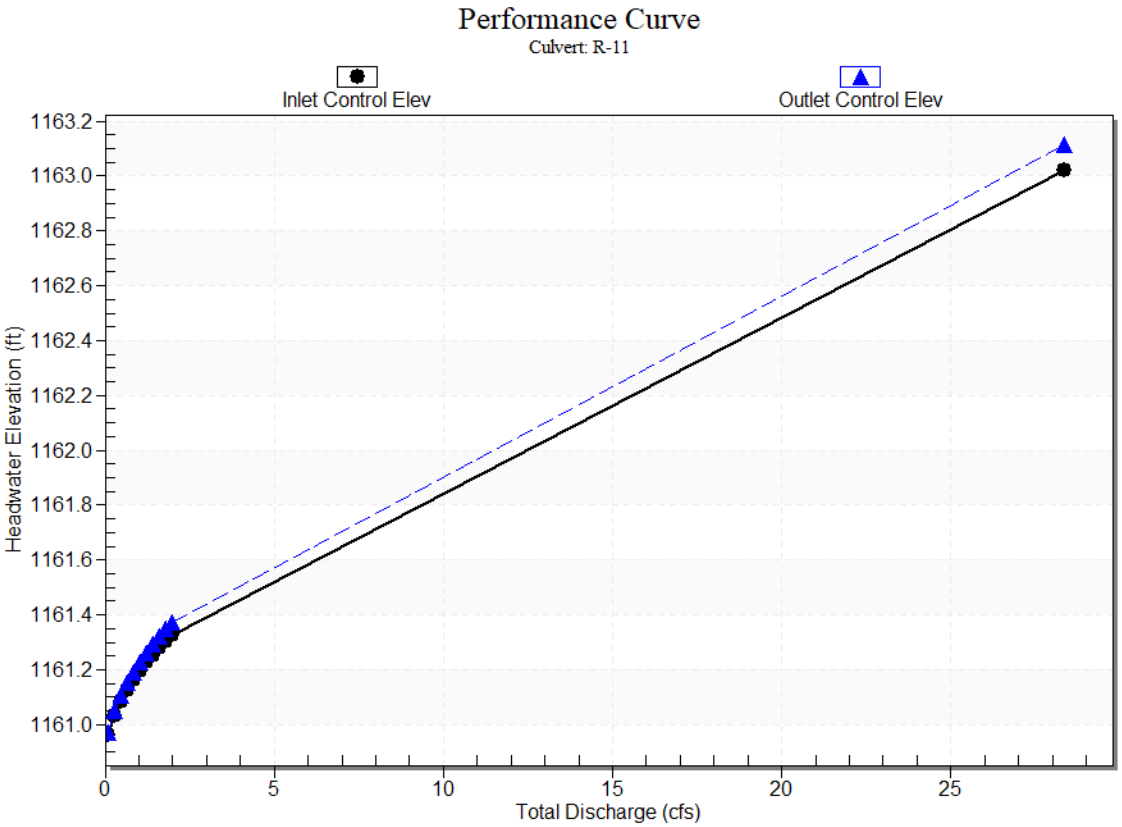
Inlet Elevation (invert): 1160.86 ft,

Outlet Elevation (invert): 1160.65 ft

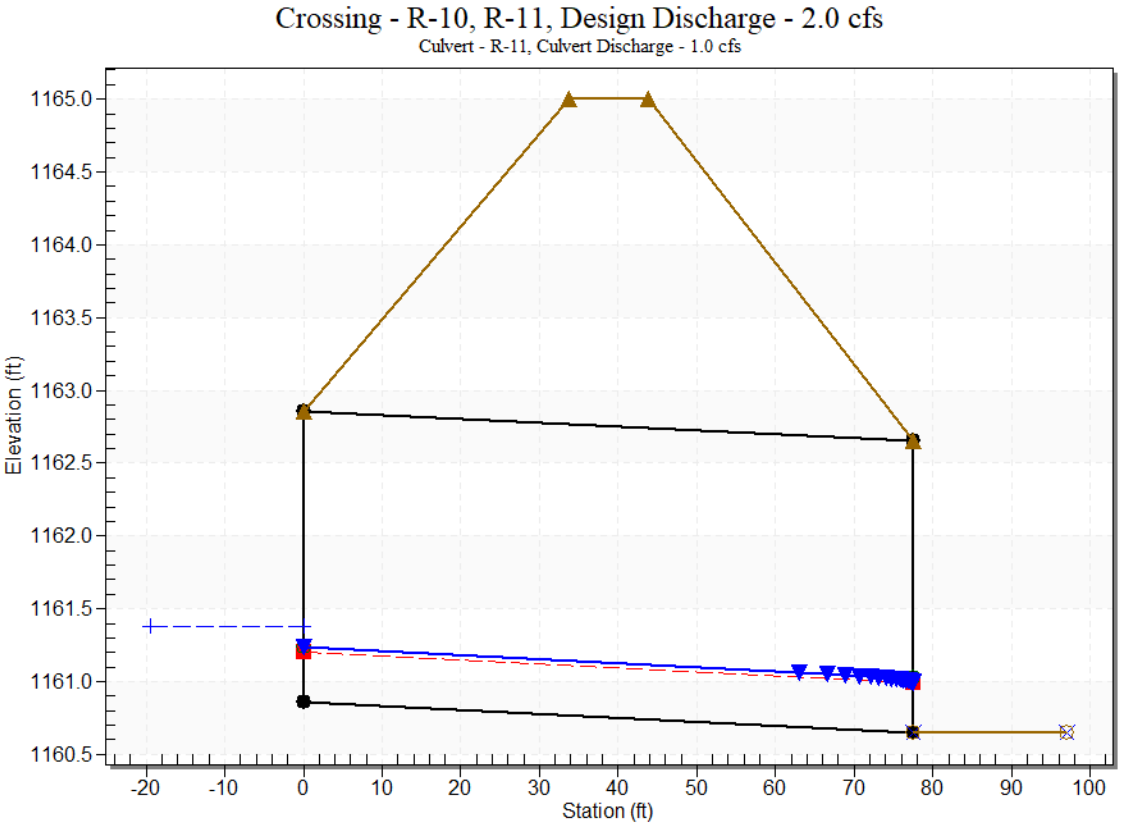
Culvert Length: 77.60 ft,

Culvert Slope: 0.0027

Culvert Performance Curve Plot: R-11



Water Surface Profile Plot for Culvert: R-11



Site Data - R-11

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1160.86 ft

Outlet Station: 77.60 ft

Outlet Elevation: 1160.65 ft

Number of Barrels: 1

Culvert Data Summary - R-11

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-10, R-11

Table 6 - Downstream Channel Rating Curve (Crossing: R-10, R-11)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1160.65	0.00
0.29	1160.65	0.00
0.48	1160.65	0.00
0.67	1160.65	0.00
0.86	1160.65	0.00
1.05	1160.65	0.00
1.24	1160.65	0.00
1.43	1160.65	0.00
1.62	1160.65	0.00
1.81	1160.65	0.00
2.00	1160.65	0.00

Tailwater Channel Data - R-10, R-11

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1160.65 ft

Roadway Data for Crossing: R-10, R-11

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 ft

Crest Elevation: 1165.00 ft

Roadway Surface: Paved

Roadway Top Width: 10.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

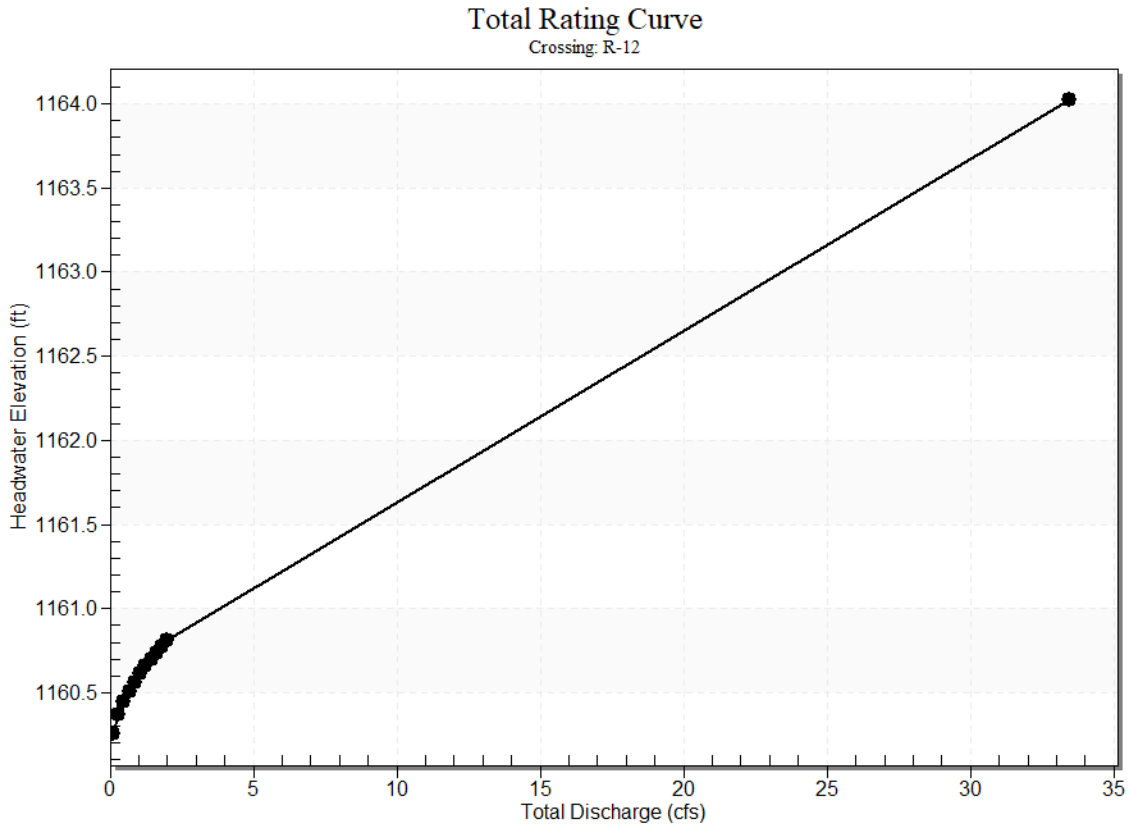
Maximum Flow: 2.00 cfs

Table 7 - Summary of Culvert Flows at Crossing: R-12

Headwater	Total	R-12	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1160.26	0.10	0.10	0.00	1
1160.37	0.29	0.29	0.00	1
1160.44	0.48	0.48	0.00	1
1160.51	0.67	0.67	0.00	1
1160.56	0.86	0.86	0.00	1
1160.61	1.05	1.05	0.00	1
1160.66	1.24	1.24	0.00	1
1160.70	1.43	1.43	0.00	1
1160.74	1.62	1.62	0.00	1
1160.77	1.81	1.81	0.00	1
1160.81	2.00	2.00	0.00	1
1163.70	30.08	30.08	0.00	Overtopping

Rating Curve Plot for Crossing: R-12



Culvert Data: R-12

Table 7 - Culvert Summary Table: R-12

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1160.26	0.14	0.168	2-M2c	0.16	0.10	0.10	0.00	1.50	0.00
0.29 cfs	0.29 cfs	1160.37	0.24	0.278	2-M2c	0.26	0.18	0.18	0.00	1.97	0.00
0.48 cfs	0.48 cfs	1160.44	0.31	0.354	2-M2c	0.33	0.23	0.23	0.00	2.24	0.00
0.67 cfs	0.67 cfs	1160.51	0.37	0.417	2-M2c	0.39	0.27	0.27	0.00	2.44	0.00
0.86 cfs	0.86 cfs	1160.56	0.42	0.472	2-M2c	0.44	0.31	0.31	0.00	2.61	0.00
1.05 cfs	1.05 cfs	1160.61	0.46	0.521	2-M2c	0.49	0.34	0.34	0.00	2.75	0.00
1.24 cfs	1.24 cfs	1160.66	0.50	0.566	2-M2c	0.53	0.37	0.37	0.00	2.87	0.00
1.43 cfs	1.43 cfs	1160.70	0.54	0.608	2-M2c	0.57	0.40	0.40	0.00	2.98	0.00
1.62 cfs	1.62 cfs	1160.74	0.58	0.647	2-M2c	0.61	0.42	0.42	0.00	3.08	0.00
1.81 cfs	1.81 cfs	1160.77	0.61	0.684	2-M2c	0.64	0.45	0.45	0.00	3.17	0.00
2.00 cfs	2.00 cfs	1160.81	0.64	0.720	2-M2c	0.68	0.47	0.47	0.00	3.26	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

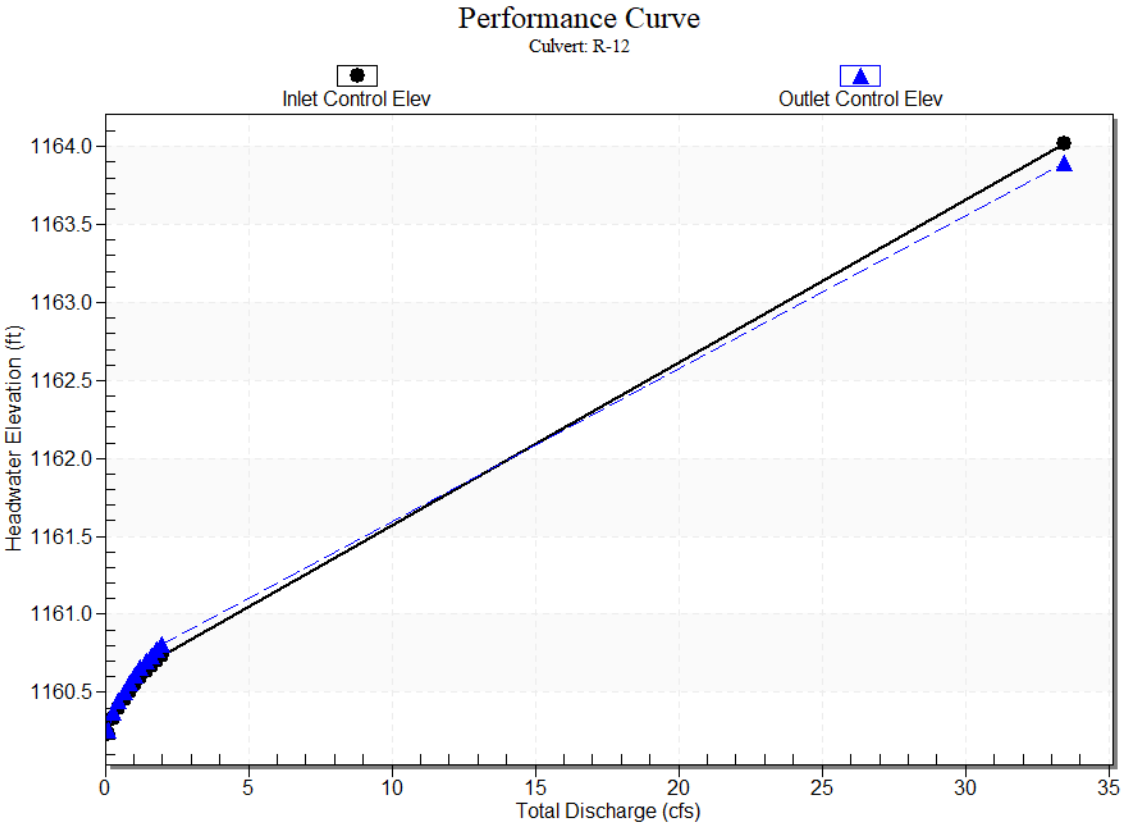
Inlet Elevation (invert): 1160.09 ft,

Outlet Elevation (invert): 1160.06 ft

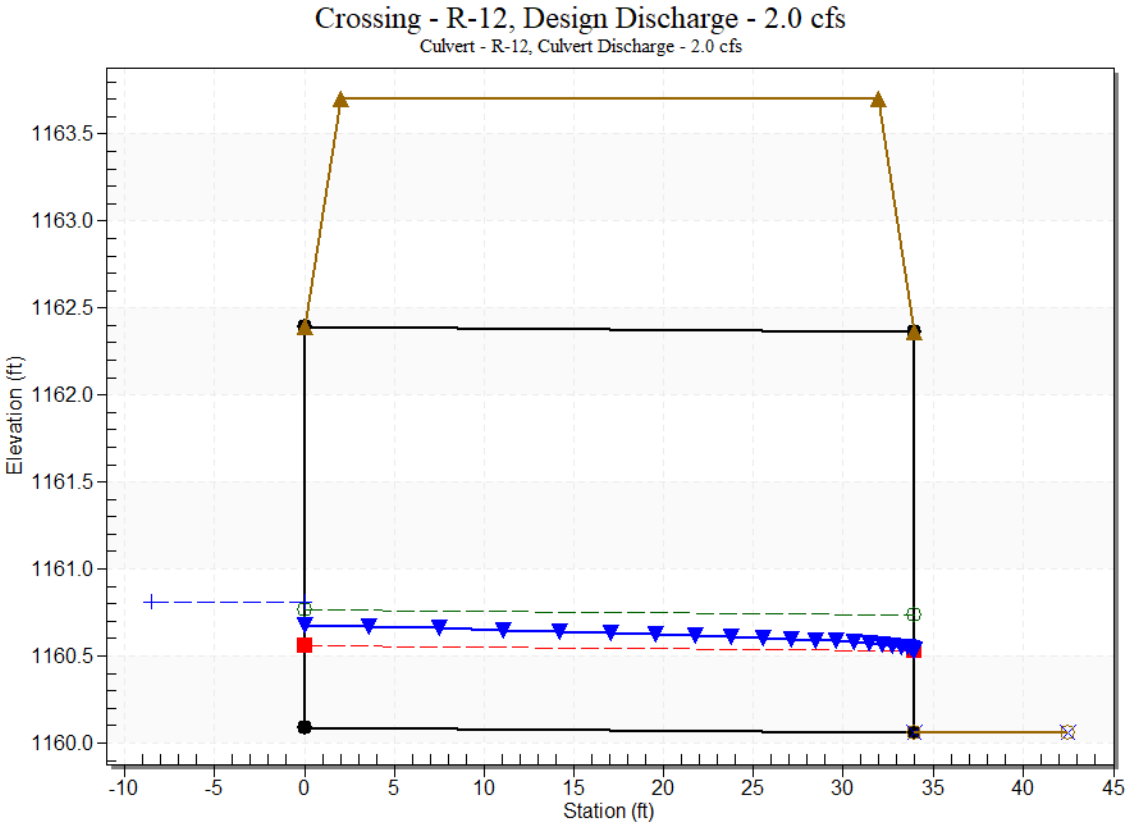
Culvert Length: 34.00 ft,

Culvert Slope: 0.0009

Culvert Performance Curve Plot: R-12



Water Surface Profile Plot for Culvert: R-12



Site Data - R-12

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1160.09 ft

Outlet Station: 34.00 ft

Outlet Elevation: 1160.06 ft

Number of Barrels: 1

Culvert Data Summary - R-12

Barrel Shape: Circular

Barrel Diameter: 2.30 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-12

Table 8 - Downstream Channel Rating Curve (Crossing: R-12)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1160.06	0.00
0.29	1160.06	0.00
0.48	1160.06	0.00
0.67	1160.06	0.00
0.86	1160.06	0.00
1.05	1160.06	0.00
1.24	1160.06	0.00
1.43	1160.06	0.00
1.62	1160.06	0.00
1.81	1160.06	0.00
2.00	1160.06	0.00

Tailwater Channel Data - R-12

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1160.06 ft

Roadway Data for Crossing: R-12

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 ft

Crest Elevation: 1163.70 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

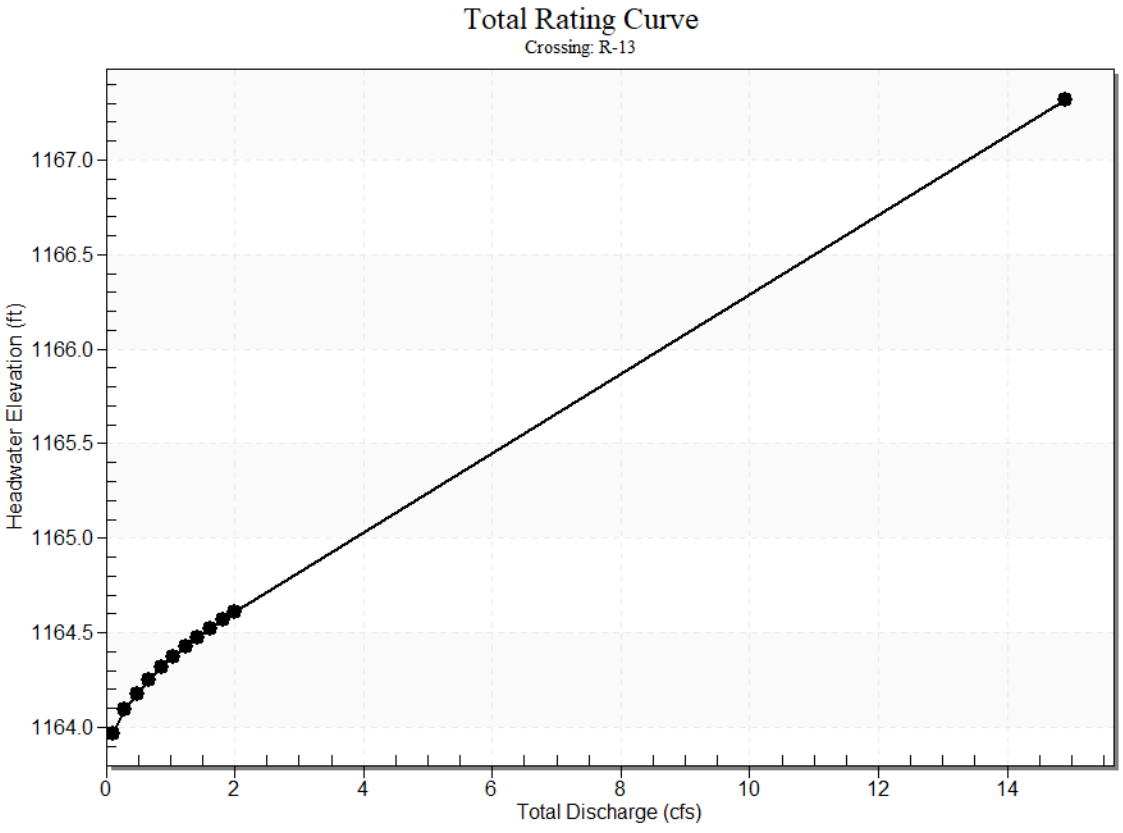
Maximum Flow: 2.00 cfs

Table 9 - Summary of Culvert Flows at Crossing: R-13

Headwater	Total	R-13	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1163.97	0.10	0.10	0.00	1
1164.09	0.29	0.29	0.00	1
1164.18	0.48	0.48	0.00	1
1164.25	0.67	0.67	0.00	1
1164.32	0.86	0.86	0.00	1
1164.37	1.05	1.05	0.00	1
1164.43	1.24	1.24	0.00	1
1164.48	1.43	1.43	0.00	1
1164.52	1.62	1.62	0.00	1
1164.57	1.81	1.81	0.00	1
1164.61	2.00	2.00	0.00	1
1167.00	13.19	13.19	0.00	Overtopping

Rating Curve Plot for Crossing: R-13



Culvert Data: R-13

Table 8 - Culvert Summary Table: R-13

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1163.97	0.16	0.178	2-M2c	0.15	0.12	0.12	0.00	1.59	0.00
0.29 cfs	0.29 cfs	1164.09	0.27	0.302	2-M2c	0.25	0.20	0.20	0.00	2.09	0.00
0.48 cfs	0.48 cfs	1164.18	0.35	0.389	2-M2c	0.32	0.26	0.26	0.00	2.39	0.00
0.67 cfs	0.67 cfs	1164.25	0.41	0.462	2-M2c	0.38	0.30	0.30	0.00	2.62	0.00
0.86 cfs	0.86 cfs	1164.32	0.47	0.525	2-M2c	0.43	0.35	0.35	0.00	2.80	0.00
1.05 cfs	1.05 cfs	1164.37	0.52	0.583	2-M2c	0.48	0.38	0.38	0.00	2.96	0.00
1.24 cfs	1.24 cfs	1164.43	0.57	0.636	2-M2c	0.52	0.42	0.42	0.00	3.10	0.00
1.43 cfs	1.43 cfs	1164.48	0.62	0.686	2-M2c	0.56	0.45	0.45	0.00	3.23	0.00
1.62 cfs	1.62 cfs	1164.52	0.66	0.733	2-M2c	0.60	0.48	0.48	0.00	3.34	0.00
1.81 cfs	1.81 cfs	1164.57	0.70	0.778	2-M2c	0.64	0.51	0.51	0.00	3.45	0.00
2.00 cfs	2.00 cfs	1164.61	0.74	0.821	2-M2c	0.68	0.53	0.53	0.00	3.55	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

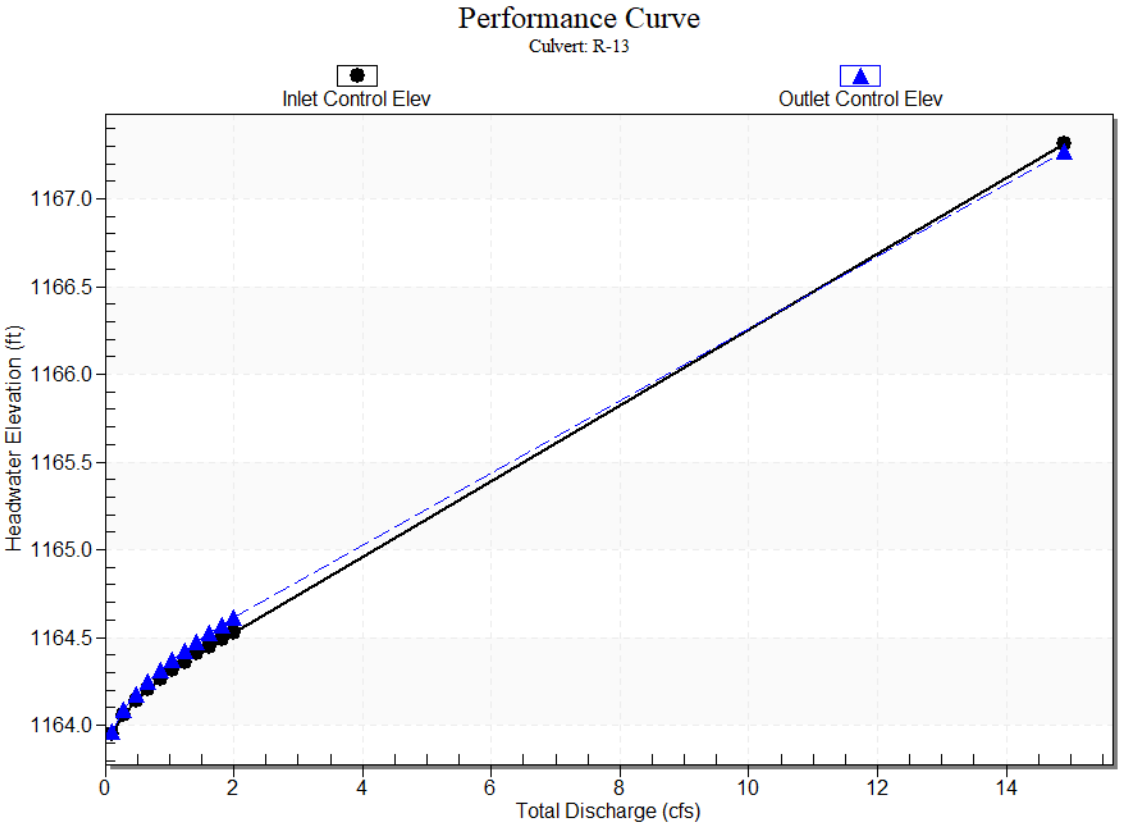
Inlet Elevation (invert): 1163.79 ft,

Outlet Elevation (invert): 1163.72 ft

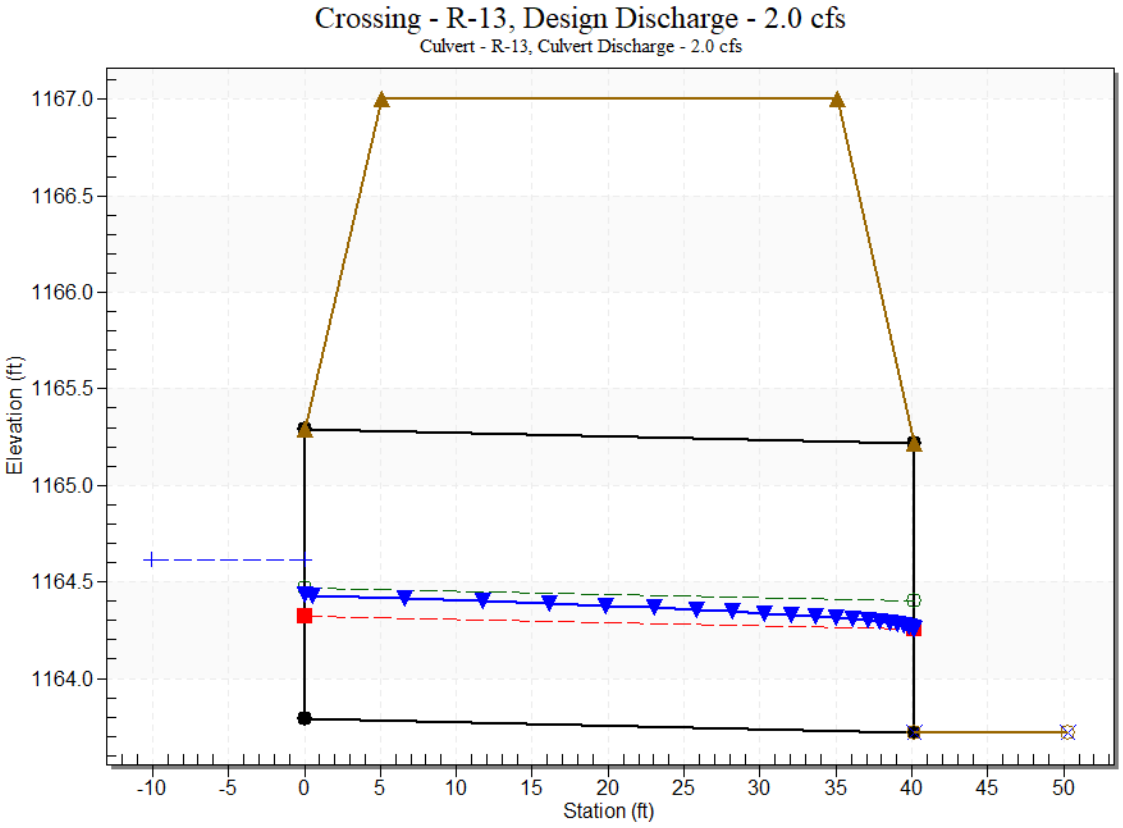
Culvert Length: 40.20 ft,

Culvert Slope: 0.0017

Culvert Performance Curve Plot: R-13



Water Surface Profile Plot for Culvert: R-13



Site Data - R-13

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1163.79 ft

Outlet Station: 40.20 ft

Outlet Elevation: 1163.72 ft

Number of Barrels: 1

Culvert Data Summary - R-13

Barrel Shape: Circular

Barrel Diameter: 1.50 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-13

Table 10 - Downstream Channel Rating Curve (Crossing: R-13)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1163.72	0.00
0.29	1163.72	0.00
0.48	1163.72	0.00
0.67	1163.72	0.00
0.86	1163.72	0.00
1.05	1163.72	0.00
1.24	1163.72	0.00
1.43	1163.72	0.00
1.62	1163.72	0.00
1.81	1163.72	0.00
2.00	1163.72	0.00

Tailwater Channel Data - R-13

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1163.72 ft

Roadway Data for Crossing: R-13

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.50 ft

Crest Elevation: 1167.00 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

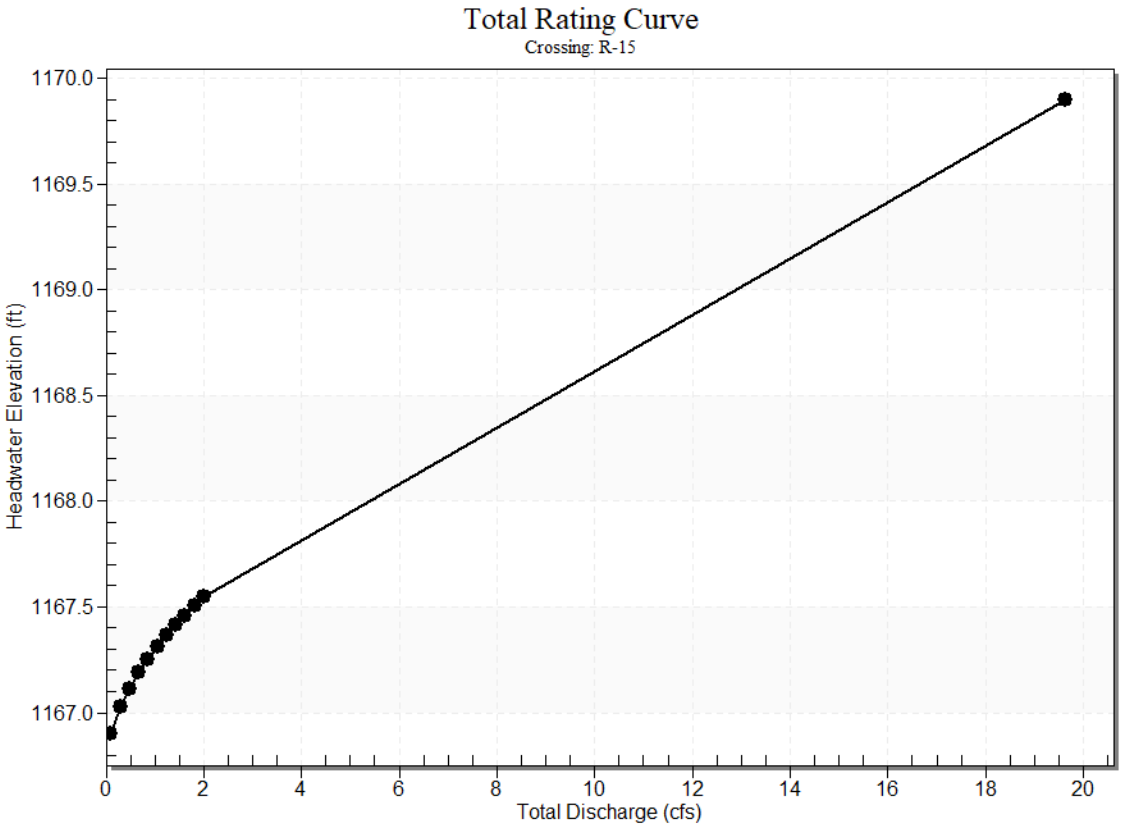
Maximum Flow: 2.00 cfs

Table 11 - Summary of Culvert Flows at Crossing: R-15

Headwater	Total	R-15	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1166.90	0.10	0.10	0.00	1
1167.03	0.29	0.29	0.00	1
1167.11	0.48	0.48	0.00	1
1167.19	0.67	0.67	0.00	1
1167.25	0.86	0.86	0.00	1
1167.31	1.05	1.05	0.00	1
1167.36	1.24	1.24	0.00	1
1167.41	1.43	1.43	0.00	1
1167.46	1.62	1.62	0.00	1
1167.50	1.81	1.81	0.00	1
1167.55	2.00	2.00	0.00	1
1169.60	17.08	17.08	0.00	Overtopping

Rating Curve Plot for Crossing: R-15



Culvert Data: R-15

Table 9 - Culvert Summary Table: R-15

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1166.90	0.15	0.172	2-M2c	0.11	0.11	0.11	0.00	1.53	0.00
0.29 cfs	0.29 cfs	1167.03	0.26	0.296	2-M2c	0.19	0.18	0.18	0.00	2.01	0.00
0.48 cfs	0.48 cfs	1167.11	0.34	0.385	2-M2c	0.25	0.24	0.24	0.00	2.29	0.00
0.67 cfs	0.67 cfs	1167.19	0.41	0.458	2-M2c	0.29	0.28	0.28	0.00	2.49	0.00
0.86 cfs	0.86 cfs	1167.25	0.46	0.523	2-M2c	0.33	0.32	0.32	0.00	2.66	0.00
1.05 cfs	1.05 cfs	1167.31	0.51	0.580	2-M2c	0.36	0.35	0.35	0.00	2.81	0.00
1.24 cfs	1.24 cfs	1167.36	0.56	0.634	2-M2c	0.39	0.38	0.38	0.00	2.94	0.00
1.43 cfs	1.43 cfs	1167.41	0.60	0.683	2-M2c	0.42	0.41	0.41	0.00	3.05	0.00
1.62 cfs	1.62 cfs	1167.46	0.64	0.730	2-M2c	0.45	0.44	0.44	0.00	3.16	0.00
1.81 cfs	1.81 cfs	1167.50	0.68	0.774	2-M2c	0.47	0.47	0.47	0.00	3.25	0.00
2.00 cfs	2.00 cfs	1167.55	0.72	0.816	2-M2c	0.50	0.49	0.49	0.00	3.35	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

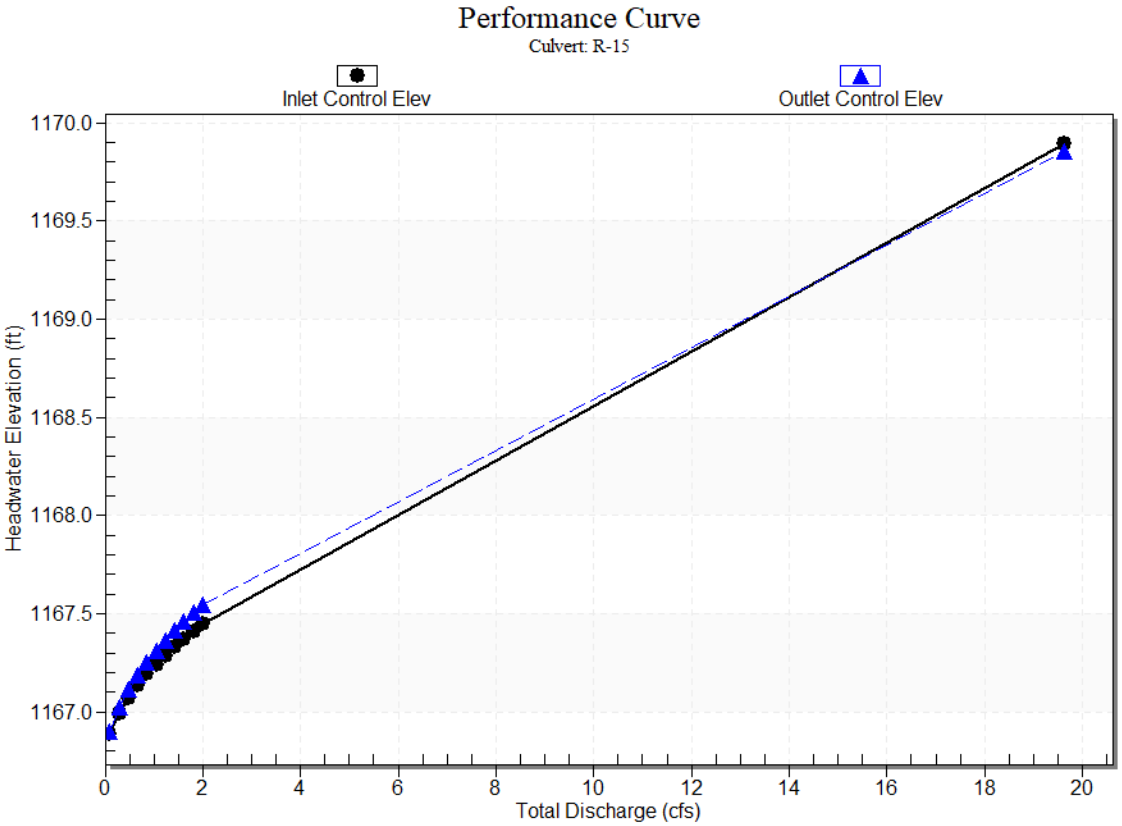
Inlet Elevation (invert): 1166.73 ft,

Outlet Elevation (invert): 1166.12 ft

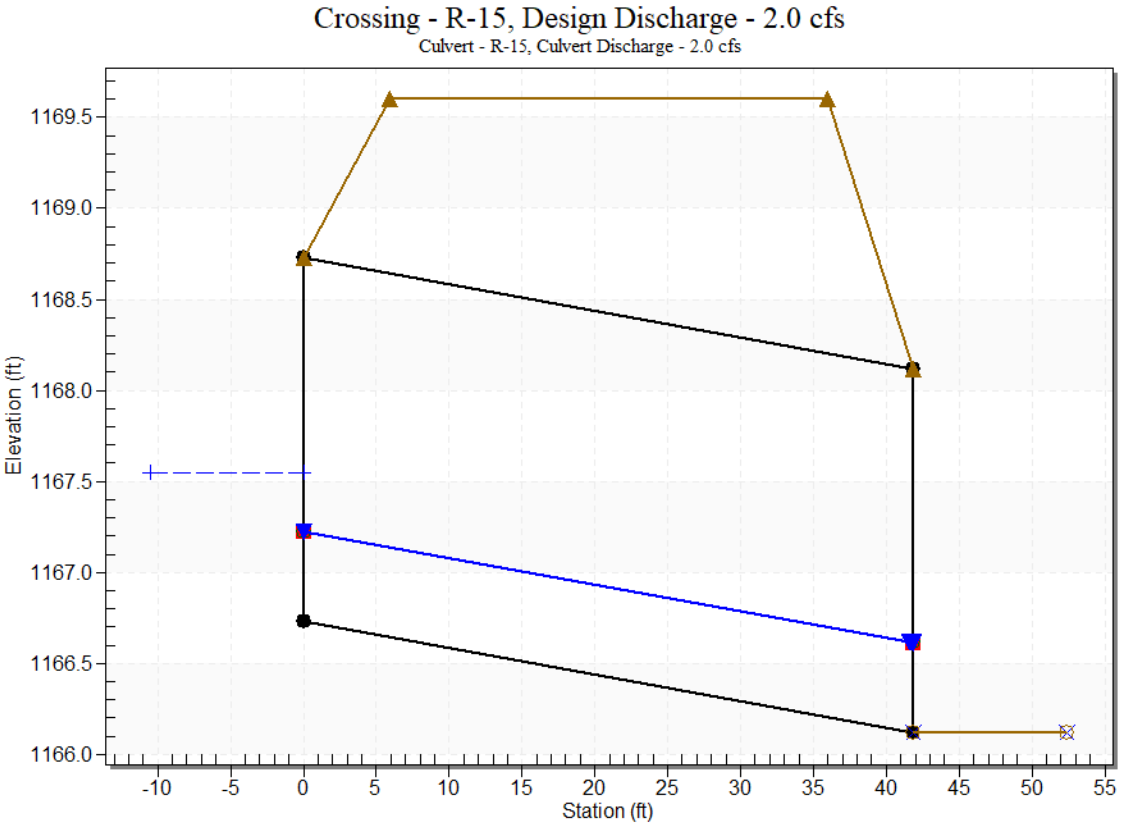
Culvert Length: 41.90 ft,

Culvert Slope: 0.0146

Culvert Performance Curve Plot: R-15



Water Surface Profile Plot for Culvert: R-15



Site Data - R-15

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1166.73 ft

Outlet Station: 41.90 ft

Outlet Elevation: 1166.12 ft

Number of Barrels: 1

Culvert Data Summary - R-15

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: R-15

Table 12 - Downstream Channel Rating Curve (Crossing: R-15)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1166.12	0.00
0.29	1166.12	0.00
0.48	1166.12	0.00
0.67	1166.12	0.00
0.86	1166.12	0.00
1.05	1166.12	0.00
1.24	1166.12	0.00
1.43	1166.12	0.00
1.62	1166.12	0.00
1.81	1166.12	0.00
2.00	1166.12	0.00

Tailwater Channel Data - R-15

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1166.12 ft

Roadway Data for Crossing: R-15

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 ft

Crest Elevation: 1169.60 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

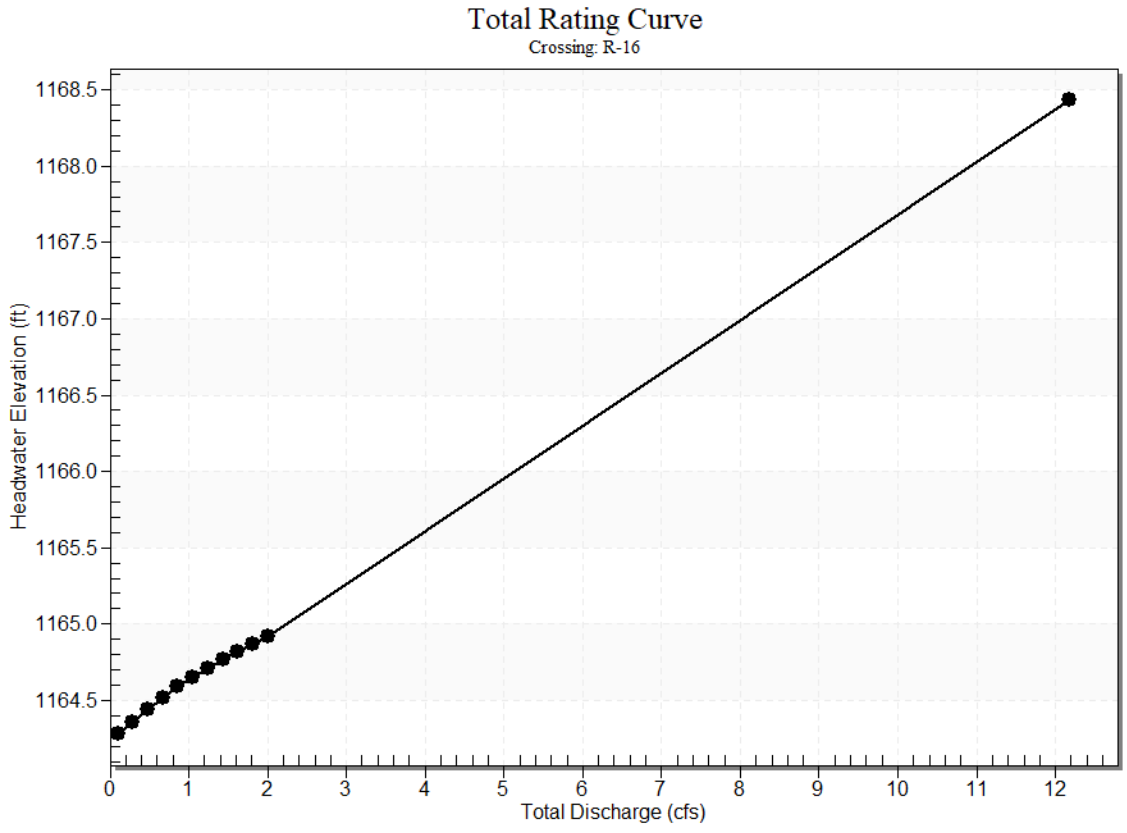
Maximum Flow: 2.00 cfs

Table 13 - Summary of Culvert Flows at Crossing: R-16

Headwater	Total	R-16	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1164.28	0.10	0.10	0.00	1
1164.36	0.29	0.29	0.00	1
1164.44	0.48	0.48	0.00	1
1164.52	0.67	0.67	0.00	1
1164.59	0.86	0.86	0.00	1
1164.65	1.05	1.05	0.00	1
1164.71	1.24	1.24	0.00	1
1164.77	1.43	1.43	0.00	1
1164.82	1.62	1.62	0.00	1
1164.87	1.81	1.81	0.00	1
1164.92	2.00	2.00	0.00	1
1168.10	10.85	10.85	0.00	Overtopping

Rating Curve Plot for Crossing: R-16



Culvert Data: R-16

Table 10 - Culvert Summary Table: R-16

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1164.28	0.16	0.263	3-M1t	0.18	0.12	0.30	0.30	0.44	0.00
0.29 cfs	0.29 cfs	1164.36	0.28	0.337	3-M1t	0.30	0.21	0.30	0.30	1.28	0.00
0.48 cfs	0.48 cfs	1164.44	0.37	0.422	3-M2t	0.38	0.27	0.30	0.30	2.12	0.00
0.67 cfs	0.67 cfs	1164.52	0.44	0.500	2-M2c	0.46	0.32	0.32	0.30	2.70	0.00
0.86 cfs	0.86 cfs	1164.59	0.50	0.569	2-M2c	0.52	0.36	0.36	0.30	2.90	0.00
1.05 cfs	1.05 cfs	1164.65	0.56	0.632	2-M2c	0.59	0.40	0.40	0.30	3.07	0.00
1.24 cfs	1.24 cfs	1164.71	0.61	0.690	2-M2c	0.65	0.44	0.44	0.30	3.22	0.00
1.43 cfs	1.43 cfs	1164.77	0.66	0.746	2-M2c	0.70	0.47	0.47	0.30	3.36	0.00
1.62 cfs	1.62 cfs	1164.82	0.72	0.798	2-M2c	0.76	0.50	0.50	0.30	3.49	0.00
1.81 cfs	1.81 cfs	1164.87	0.77	0.849	2-M2c	0.82	0.53	0.53	0.30	3.61	0.00
2.00 cfs	2.00 cfs	1164.92	0.82	0.898	2-M2c	0.89	0.56	0.56	0.30	3.73	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

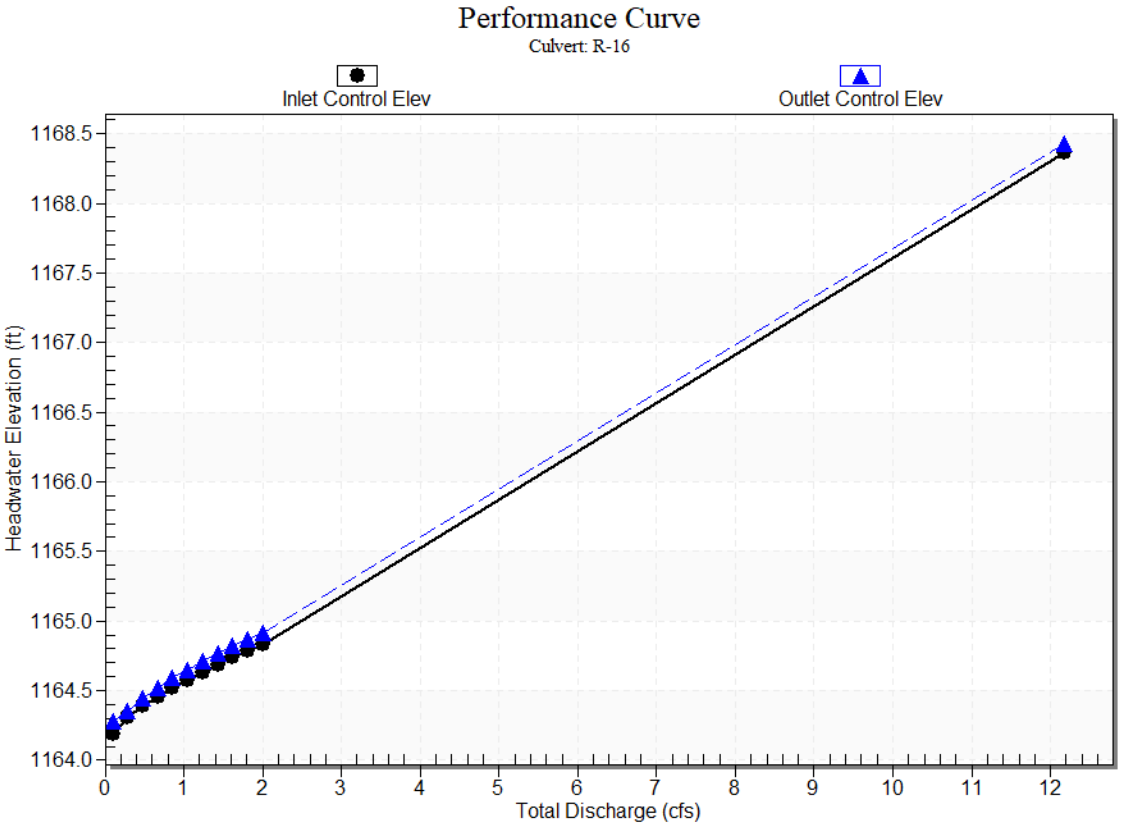
Inlet Elevation (invert): 1164.02 ft,

Outlet Elevation (invert): 1163.97 ft

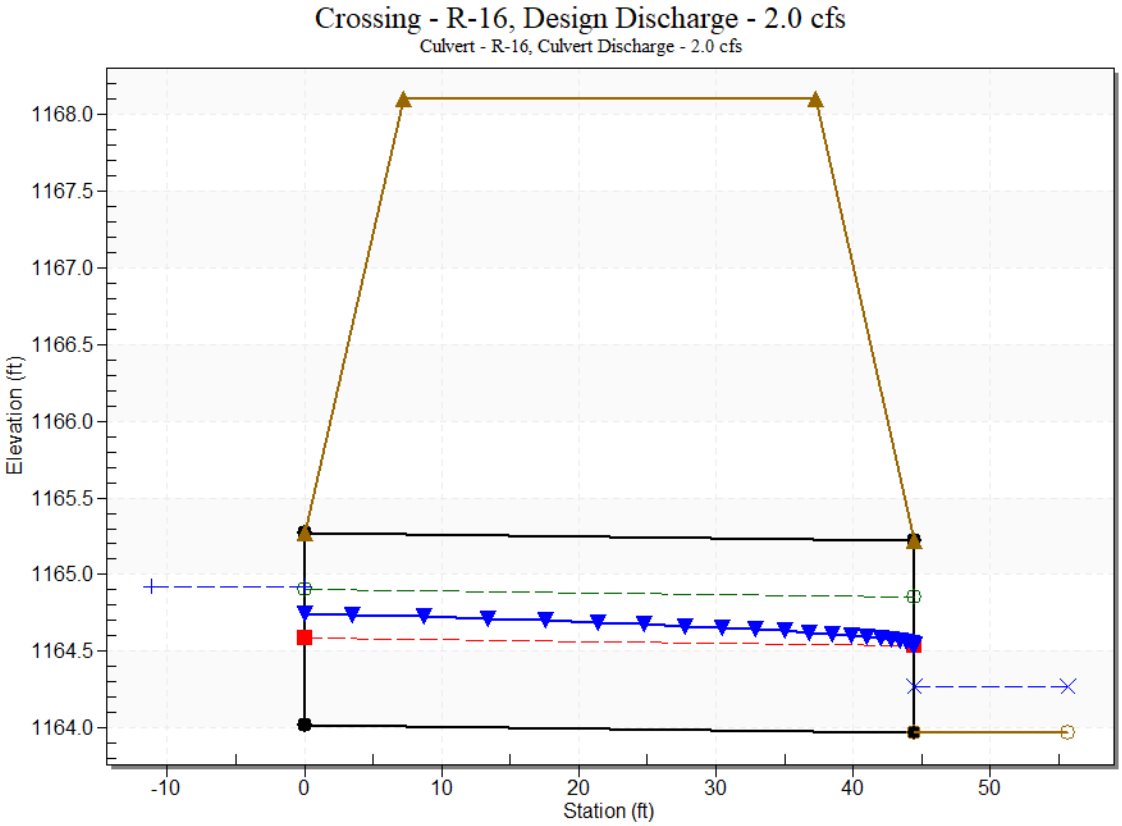
Culvert Length: 44.50 ft,

Culvert Slope: 0.0011

Culvert Performance Curve Plot: R-16



Water Surface Profile Plot for Culvert: R-16



Site Data - R-16

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1164.02 ft

Outlet Station: 44.50 ft

Outlet Elevation: 1163.97 ft

Number of Barrels: 1

Culvert Data Summary - R-16

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-16

Table 14 - Downstream Channel Rating Curve (Crossing: R-16)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1164.27	0.30
0.29	1164.27	0.30
0.48	1164.27	0.30
0.67	1164.27	0.30
0.86	1164.27	0.30
1.05	1164.27	0.30
1.24	1164.27	0.30
1.43	1164.27	0.30
1.62	1164.27	0.30
1.81	1164.27	0.30
2.00	1164.27	0.30

Tailwater Channel Data - R-16

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1164.27 ft

Roadway Data for Crossing: R-16

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1168.10 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

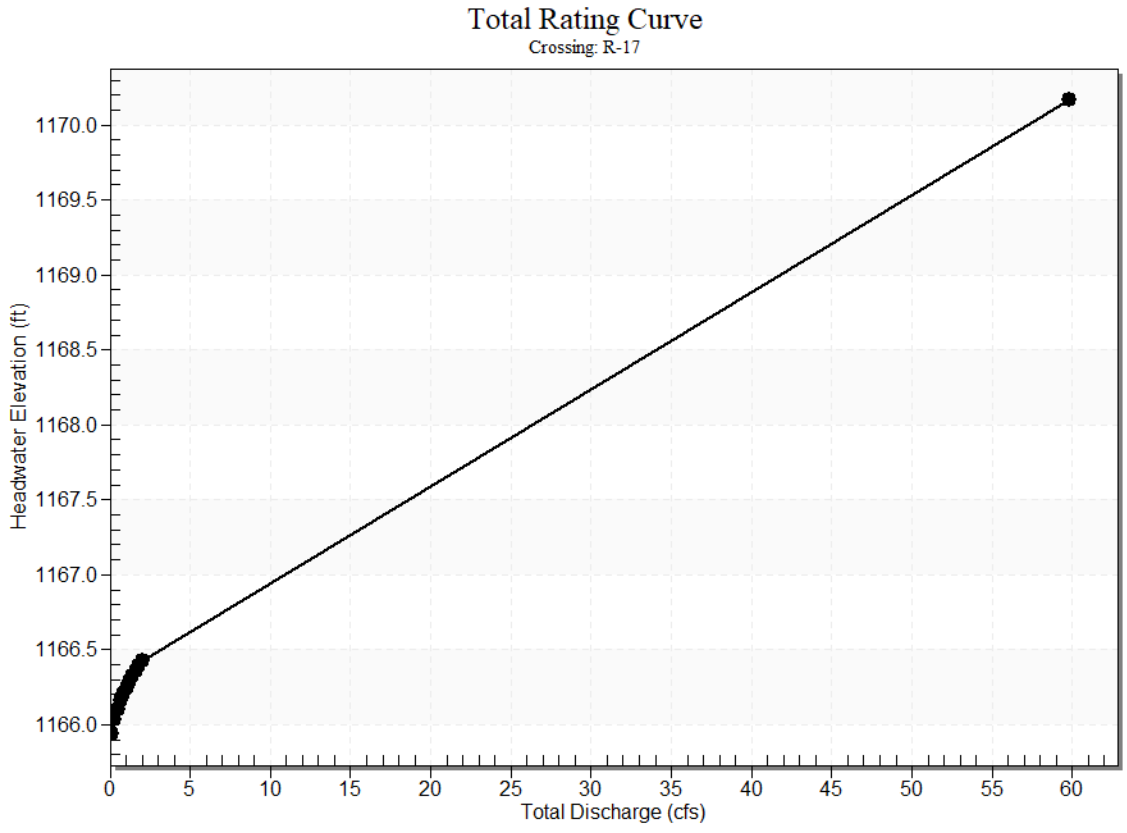
Maximum Flow: 2.00 cfs

Table 15 - Summary of Culvert Flows at Crossing: R-17

Headwater	Total	R-17	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1165.94	0.10	0.10	0.00	1
1166.04	0.29	0.29	0.00	1
1166.10	0.48	0.48	0.00	1
1166.16	0.67	0.67	0.00	1
1166.21	0.86	0.86	0.00	1
1166.25	1.05	1.05	0.00	1
1166.29	1.24	1.24	0.00	1
1166.32	1.43	1.43	0.00	1
1166.36	1.62	1.62	0.00	1
1166.39	1.81	1.81	0.00	1
1166.42	2.00	2.00	0.00	1
1169.90	55.59	55.59	0.00	Overtopping

Rating Curve Plot for Crossing: R-17



Culvert Data: R-17

Table 11 - Culvert Summary Table: R-17

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1165.94	0.13	0.511	7-A2c	-1.00	0.10	0.10	0.00	1.45	0.00
0.29 cfs	0.29 cfs	1166.04	0.22	0.606	7-A2c	-1.00	0.17	0.17	0.00	1.90	0.00
0.48 cfs	0.48 cfs	1166.10	0.29	0.673	7-A2c	-1.00	0.21	0.21	0.00	2.16	0.00
0.67 cfs	0.67 cfs	1166.16	0.34	0.728	7-A2c	-1.00	0.25	0.25	0.00	2.35	0.00
0.86 cfs	0.86 cfs	1166.21	0.39	0.775	7-A2c	-1.00	0.29	0.29	0.00	2.50	0.00
1.05 cfs	1.05 cfs	1166.25	0.43	0.818	7-A2c	-1.00	0.32	0.32	0.00	2.64	0.00
1.24 cfs	1.24 cfs	1166.29	0.47	0.858	7-A2c	-1.00	0.34	0.34	0.00	2.75	0.00
1.43 cfs	1.43 cfs	1166.32	0.51	0.894	7-A2c	-1.00	0.37	0.37	0.00	2.86	0.00
1.62 cfs	1.62 cfs	1166.36	0.54	0.929	7-A2c	-1.00	0.39	0.39	0.00	2.95	0.00
1.81 cfs	1.81 cfs	1166.39	0.57	0.961	7-A2c	-1.00	0.42	0.42	0.00	3.04	0.00
2.00 cfs	2.00 cfs	1166.42	0.60	0.992	7-A2c	-1.00	0.44	0.44	0.00	3.12	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

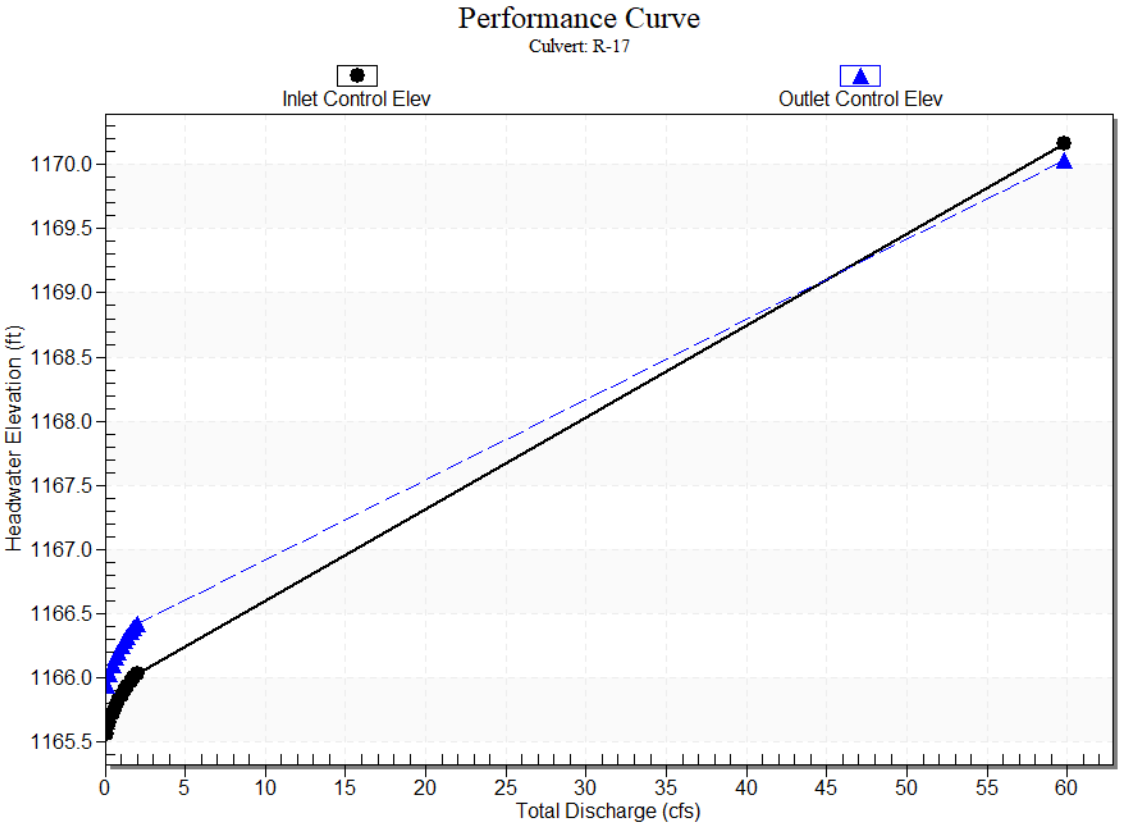
Inlet Elevation (invert): 1165.43 ft,

Outlet Elevation (invert): 1165.80 ft

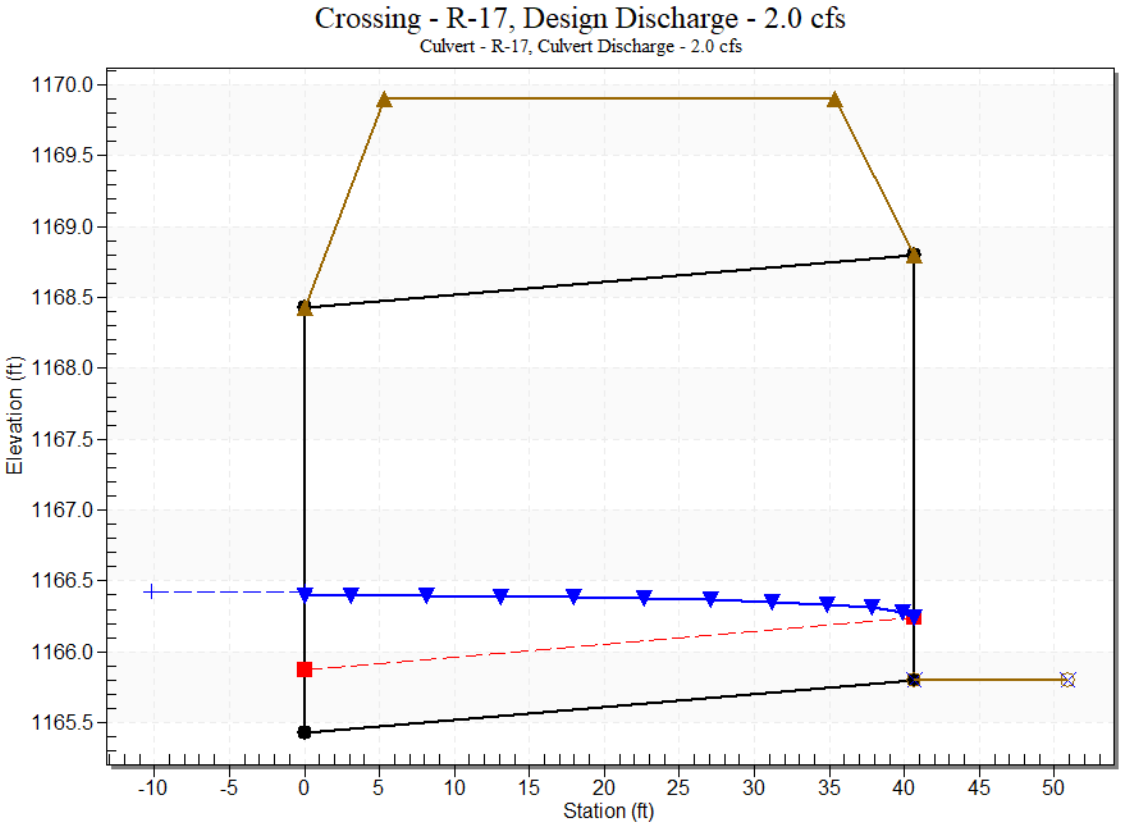
Culvert Length: 40.70 ft,

Culvert Slope: -0.0091

Culvert Performance Curve Plot: R-17



Water Surface Profile Plot for Culvert: R-17



Site Data - R-17

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1165.43 ft

Outlet Station: 40.70 ft

Outlet Elevation: 1165.80 ft

Number of Barrels: 1

Culvert Data Summary - R-17

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-17

Table 16 - Downstream Channel Rating Curve (Crossing: R-17)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1165.80	0.00
0.29	1165.80	0.00
0.48	1165.80	0.00
0.67	1165.80	0.00
0.86	1165.80	0.00
1.05	1165.80	0.00
1.24	1165.80	0.00
1.43	1165.80	0.00
1.62	1165.80	0.00
1.81	1165.80	0.00
2.00	1165.80	0.00

Tailwater Channel Data - R-17

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1165.80 ft

Roadway Data for Crossing: R-17

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 3.00 ft

Crest Elevation: 1169.90 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

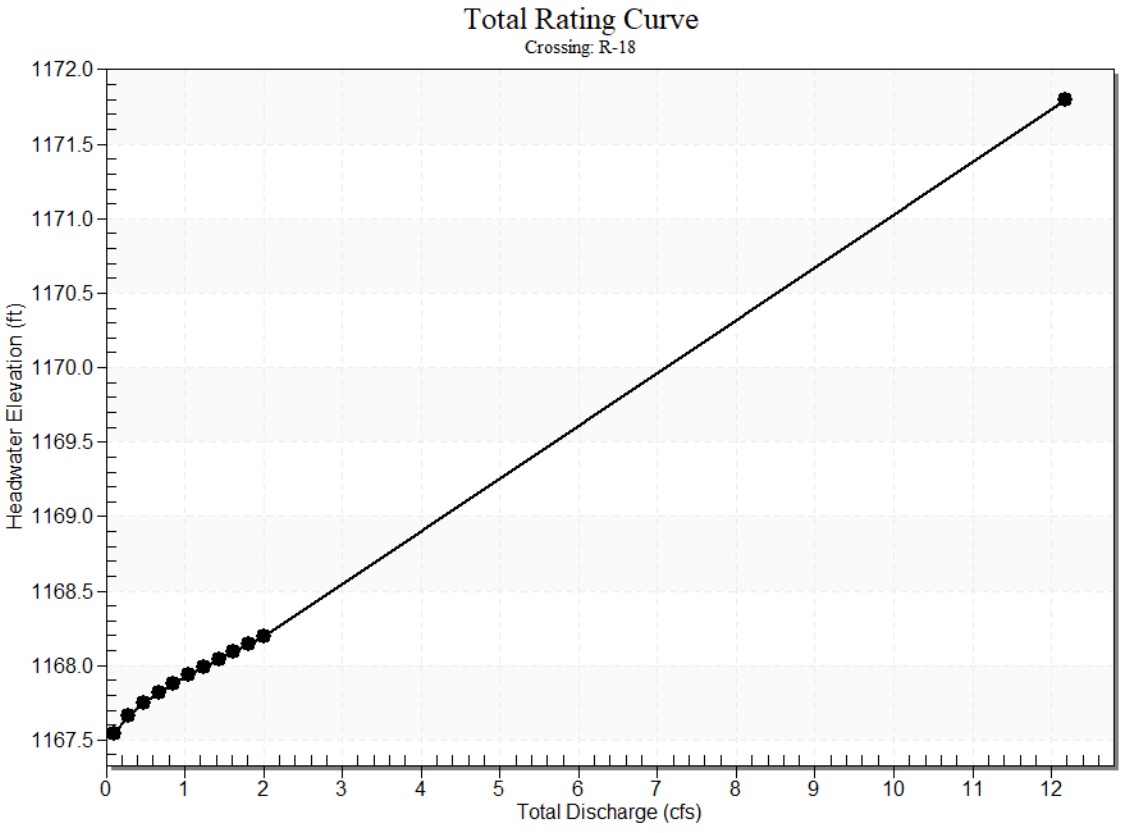
Maximum Flow: 2.00 cfs

Table 17 - Summary of Culvert Flows at Crossing: R-18

Headwater	Total	R-18	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1167.54	0.10	0.10	0.00	1
1167.66	0.29	0.29	0.00	1
1167.75	0.48	0.48	0.00	1
1167.82	0.67	0.67	0.00	1
1167.88	0.86	0.86	0.00	1
1167.93	1.05	1.05	0.00	1
1167.98	1.24	1.24	0.00	1
1168.04	1.43	1.43	0.00	1
1168.09	1.62	1.62	0.00	1
1168.14	1.81	1.81	0.00	1
1168.19	2.00	2.00	0.00	1
1171.50	11.12	11.12	0.00	Overtopping

Rating Curve Plot for Crossing: R-18



Culvert Data: R-18

Table 12 - Culvert Summary Table: R-18

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1167.54	0.16	0.0*	1-S2n	0.12	0.12	0.12	0.00	1.68	0.00
0.29 cfs	0.29 cfs	1167.66	0.28	0.0*	1-S2n	0.20	0.21	0.20	0.00	2.30	0.00
0.48 cfs	0.48 cfs	1167.75	0.37	0.025	1-S2n	0.26	0.27	0.26	0.00	2.67	0.00
0.67 cfs	0.67 cfs	1167.82	0.44	0.081	1-S2n	0.30	0.32	0.30	0.00	2.94	0.00
0.86 cfs	0.86 cfs	1167.88	0.50	0.132	1-S2n	0.34	0.36	0.34	0.00	3.16	0.00
1.05 cfs	1.05 cfs	1167.93	0.55	0.180	1-S2n	0.38	0.40	0.38	0.00	3.35	0.00
1.24 cfs	1.24 cfs	1167.98	0.60	0.227	1-S2n	0.41	0.44	0.41	0.00	3.51	0.00
1.43 cfs	1.43 cfs	1168.04	0.66	0.273	1-S2n	0.45	0.47	0.45	0.00	3.65	0.00
1.62 cfs	1.62 cfs	1168.09	0.71	0.319	1-S2n	0.48	0.50	0.48	0.00	3.78	0.00
1.81 cfs	1.81 cfs	1168.14	0.76	0.365	1-S2n	0.51	0.53	0.51	0.00	3.89	0.00
2.00 cfs	2.00 cfs	1168.19	0.81	0.411	1-S2n	0.53	0.56	0.53	0.00	4.00	0.00

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

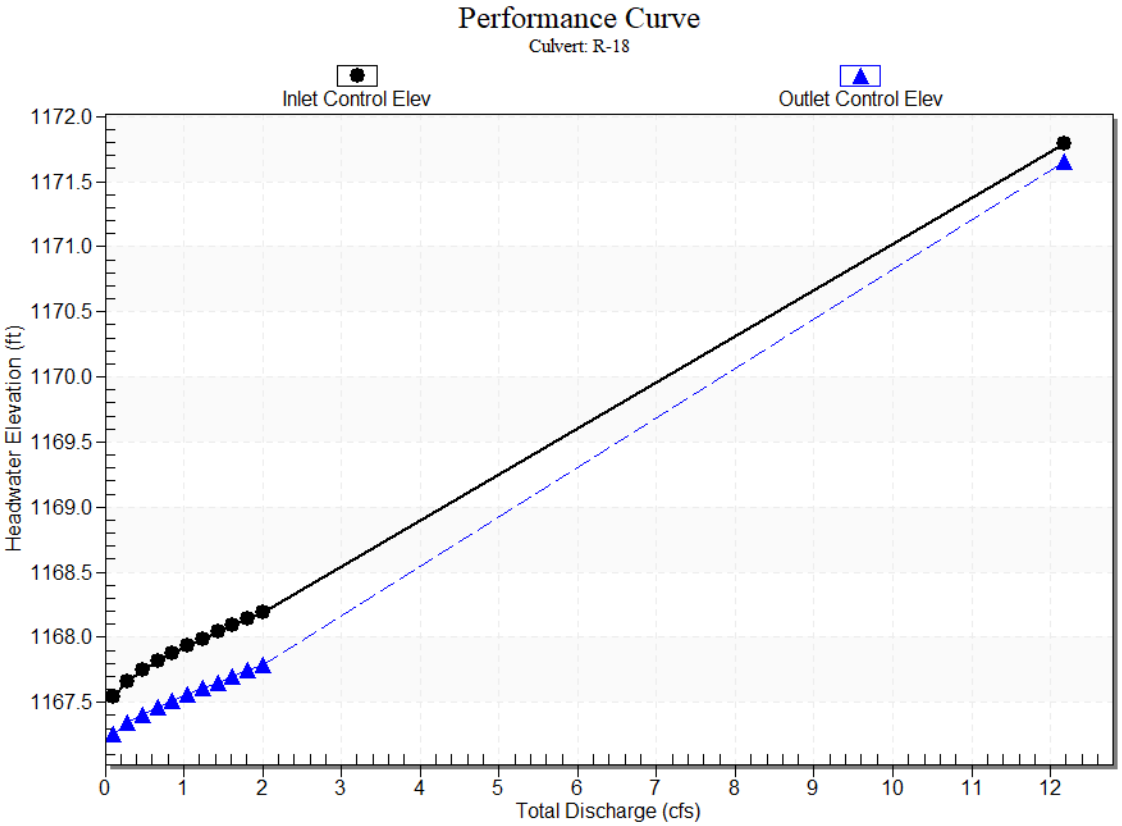
Inlet Elevation (invert): 1167.38 ft,

Outlet Elevation (invert): 1167.13 ft

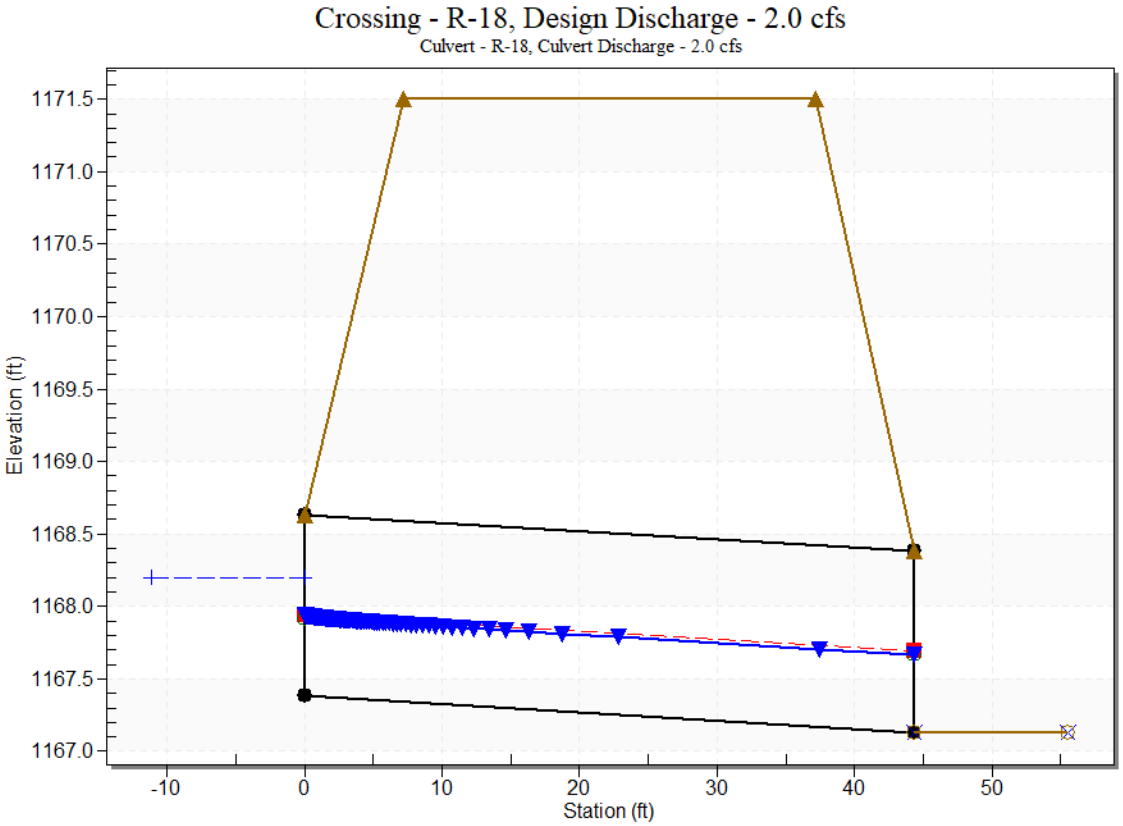
Culvert Length: 44.40 ft,

Culvert Slope: 0.0056

Culvert Performance Curve Plot: R-18



Water Surface Profile Plot for Culvert: R-18



Site Data - R-18

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1167.38 ft

Outlet Station: 44.40 ft

Outlet Elevation: 1167.13 ft

Number of Barrels: 1

Culvert Data Summary - R-18

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-18

Table 18 - Downstream Channel Rating Curve (Crossing: R-18)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1167.13	0.00
0.29	1167.13	0.00
0.48	1167.13	0.00
0.67	1167.13	0.00
0.86	1167.13	0.00
1.05	1167.13	0.00
1.24	1167.13	0.00
1.43	1167.13	0.00
1.62	1167.13	0.00
1.81	1167.13	0.00
2.00	1167.13	0.00

Tailwater Channel Data - R-18

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1167.13 ft

Roadway Data for Crossing: R-18

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.25 ft

Crest Elevation: 1171.50 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

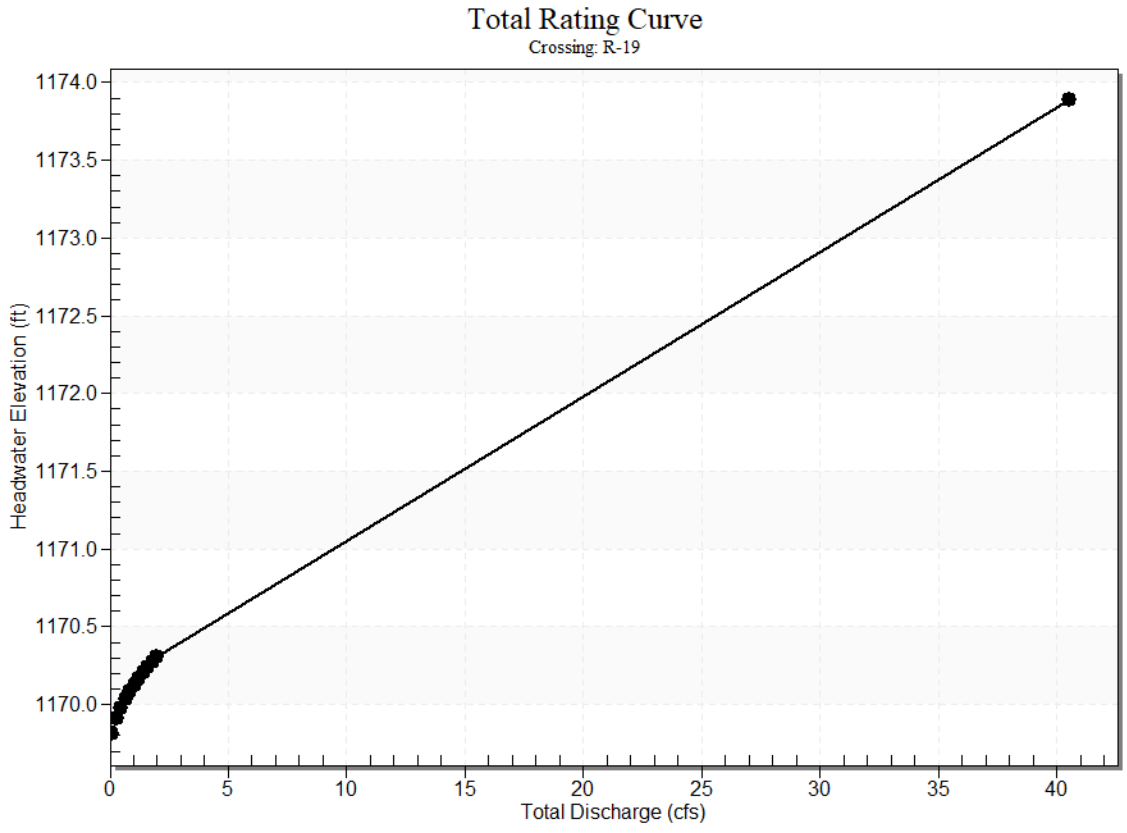
Maximum Flow: 2.00 cfs

Table 19 - Summary of Culvert Flows at Crossing: R-19

Headwater	Total	R-19	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1169.81	0.10	0.10	0.00	1
1169.91	0.29	0.29	0.00	1
1169.98	0.48	0.48	0.00	1
1170.04	0.67	0.67	0.00	1
1170.08	0.86	0.86	0.00	1
1170.13	1.05	1.05	0.00	1
1170.17	1.24	1.24	0.00	1
1170.21	1.43	1.43	0.00	1
1170.24	1.62	1.62	0.00	1
1170.27	1.81	1.81	0.00	1
1170.30	2.00	2.00	0.00	1
1173.60	37.09	37.09	0.00	Overtopping

Rating Curve Plot for Crossing: R-19



Culvert Data: R-19

Table 13 - Culvert Summary Table: R-19

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1169.81	0.13	0.0*	1-S2n	0.09	0.10	0.09	0.00	1.74	0.00
0.29 cfs	0.29 cfs	1169.91	0.23	0.0*	1-S2n	0.15	0.17	0.15	0.00	2.33	0.00
0.48 cfs	0.48 cfs	1169.98	0.30	0.0*	1-S2n	0.20	0.22	0.20	0.00	2.67	0.00
0.67 cfs	0.67 cfs	1170.04	0.36	0.0*	1-S2n	0.23	0.26	0.23	0.00	2.92	0.00
0.86 cfs	0.86 cfs	1170.08	0.40	0.0*	1-S2n	0.26	0.30	0.26	0.00	3.18	0.00
1.05 cfs	1.05 cfs	1170.13	0.45	0.014	1-S2n	0.28	0.33	0.29	0.00	3.34	0.00
1.24 cfs	1.24 cfs	1170.17	0.49	0.043	1-S2n	0.31	0.36	0.31	0.00	3.55	0.00
1.43 cfs	1.43 cfs	1170.21	0.53	0.071	1-S2n	0.33	0.39	0.33	0.00	3.70	0.00
1.62 cfs	1.62 cfs	1170.24	0.56	0.097	1-S2n	0.35	0.41	0.35	0.00	3.82	0.00
1.81 cfs	1.81 cfs	1170.27	0.59	0.122	1-S2n	0.37	0.44	0.37	0.00	3.97	0.00
2.00 cfs	2.00 cfs	1170.30	0.62	0.146	1-S2n	0.39	0.46	0.39	0.00	4.09	0.00

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

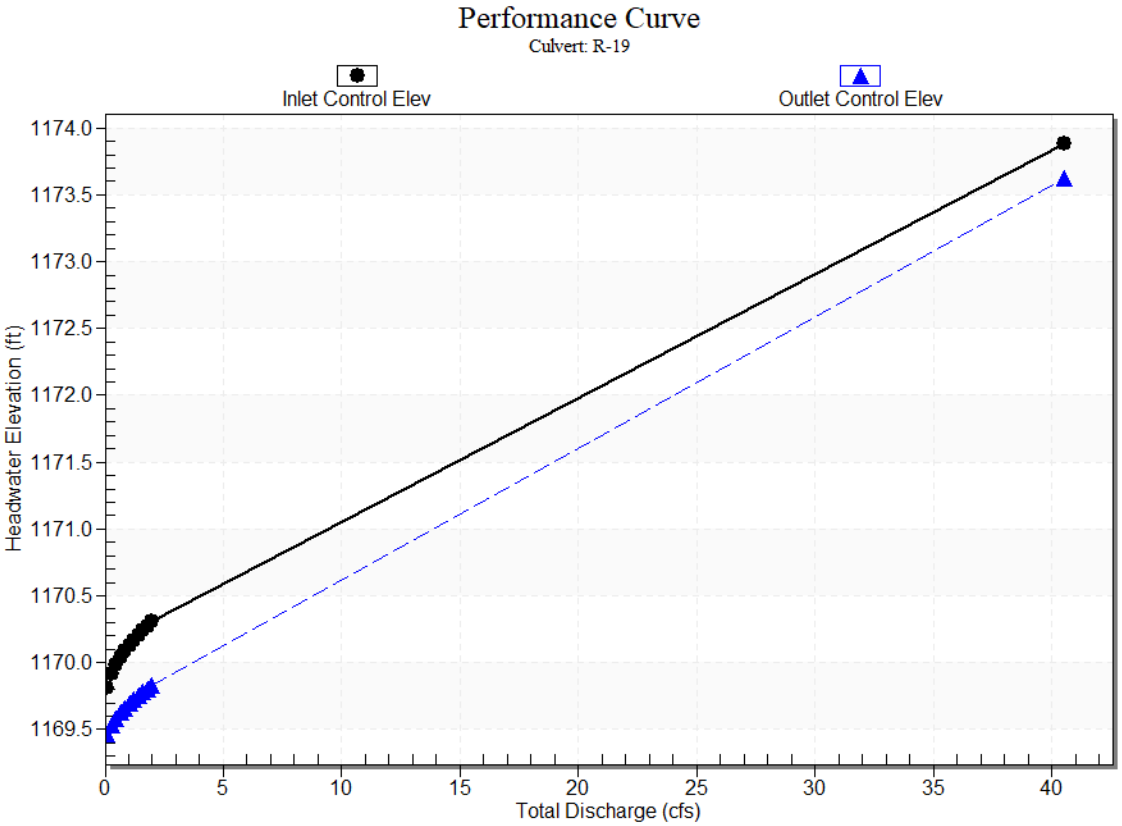
Inlet Elevation (invert): 1169.68 ft,

Outlet Elevation (invert): 1169.36 ft

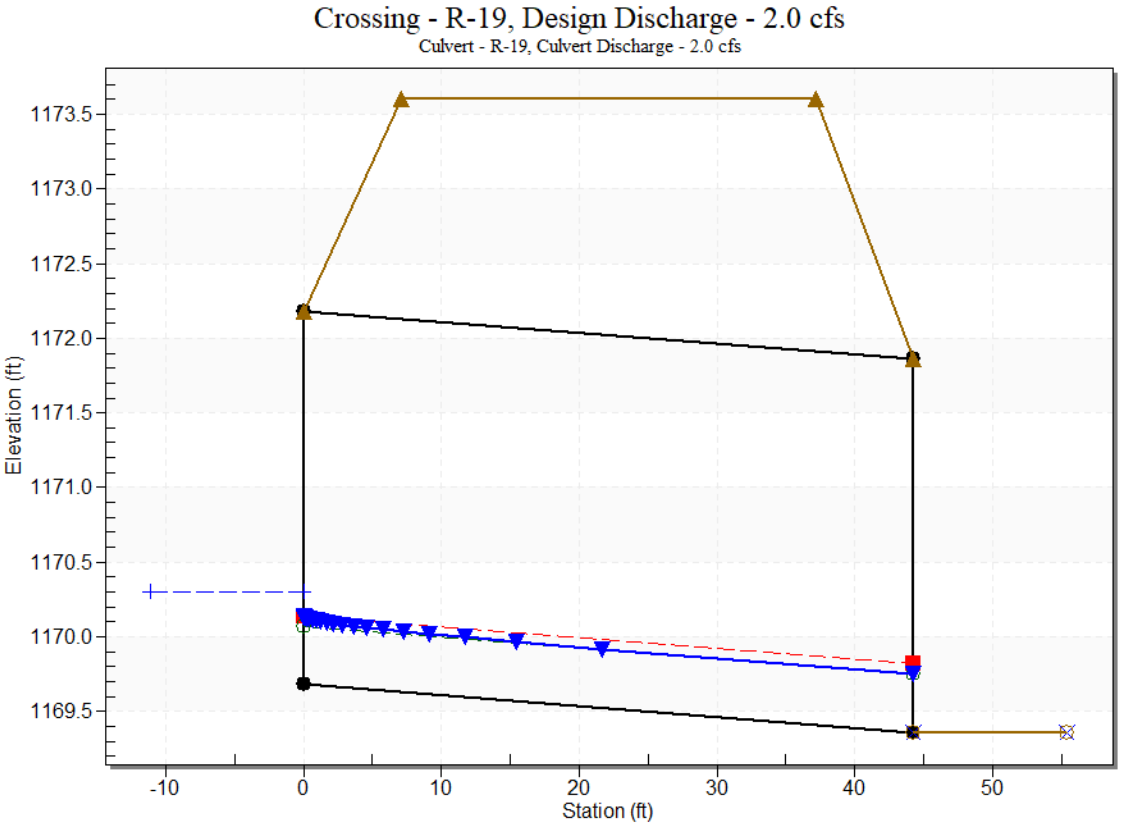
Culvert Length: 44.30 ft,

Culvert Slope: 0.0072

Culvert Performance Curve Plot: R-19



Water Surface Profile Plot for Culvert: R-19



Site Data - R-19

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1169.68 ft

Outlet Station: 44.30 ft

Outlet Elevation: 1169.36 ft

Number of Barrels: 1

Culvert Data Summary - R-19

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-19

Table 20 - Downstream Channel Rating Curve (Crossing: R-19)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1169.36	0.00
0.29	1169.36	0.00
0.48	1169.36	0.00
0.67	1169.36	0.00
0.86	1169.36	0.00
1.05	1169.36	0.00
1.24	1169.36	0.00
1.43	1169.36	0.00
1.62	1169.36	0.00
1.81	1169.36	0.00
2.00	1169.36	0.00

Tailwater Channel Data - R-19

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1169.36 ft

Roadway Data for Crossing: R-19

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.50 ft

Crest Elevation: 1173.60 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

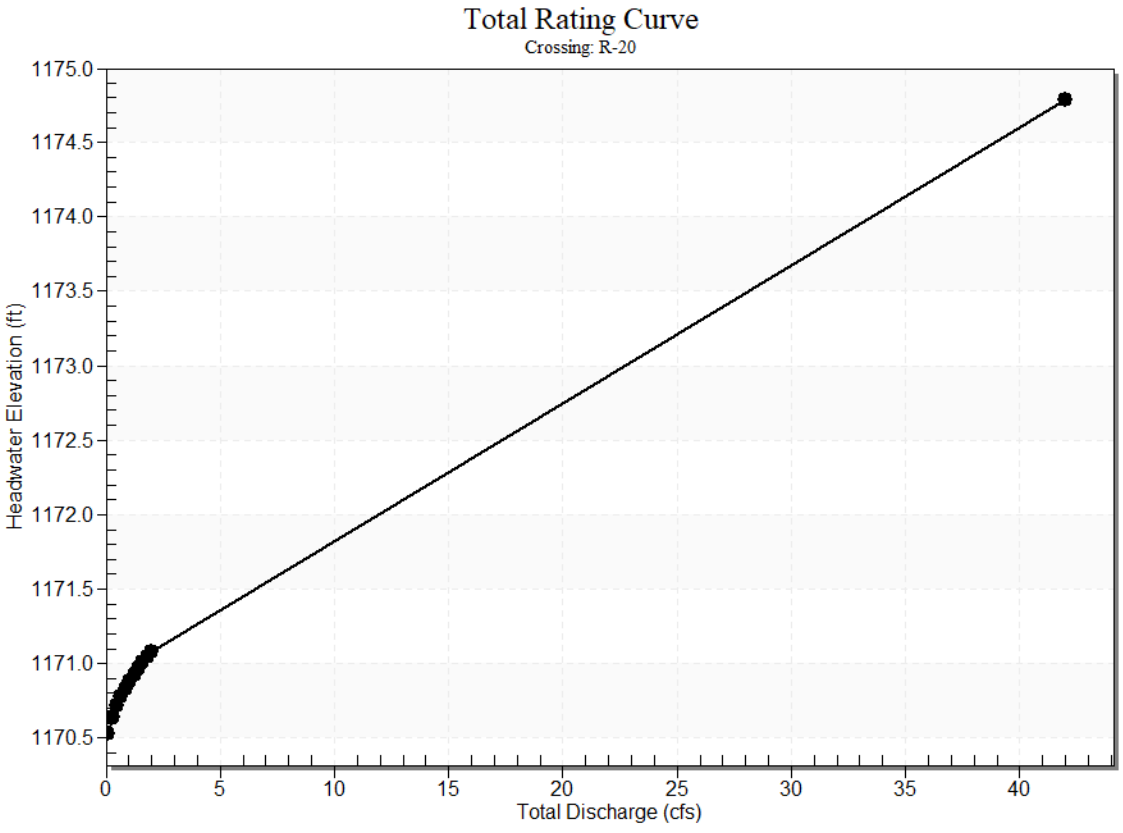
Maximum Flow: 2.00 cfs

Table 21 - Summary of Culvert Flows at Crossing: R-20

Headwater	Total	R-20	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1170.53	0.10	0.10	0.00	1
1170.64	0.29	0.29	0.00	1
1170.71	0.48	0.48	0.00	1
1170.78	0.67	0.67	0.00	1
1170.83	0.86	0.86	0.00	1
1170.88	1.05	1.05	0.00	1
1170.93	1.24	1.24	0.00	1
1170.97	1.43	1.43	0.00	1
1171.01	1.62	1.62	0.00	1
1171.05	1.81	1.81	0.00	1
1171.08	2.00	2.00	0.00	1
1174.50	38.68	38.68	0.00	Overtopping

Rating Curve Plot for Crossing: R-20



Culvert Data: R-20

Table 14 - Culvert Summary Table: R-20

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1170.53	0.13	0.151	3-M1t	0.11	0.10	0.25	0.25	0.39	0.00
0.29 cfs	0.29 cfs	1170.64	0.23	0.259	3-M1t	0.18	0.17	0.25	0.25	1.14	0.00
0.48 cfs	0.48 cfs	1170.71	0.30	0.334	3-M1t	0.23	0.22	0.25	0.25	1.88	0.00
0.67 cfs	0.67 cfs	1170.78	0.36	0.398	2-M2c	0.27	0.26	0.26	0.25	2.41	0.00
0.86 cfs	0.86 cfs	1170.83	0.41	0.452	2-M2c	0.31	0.30	0.30	0.25	2.57	0.00
1.05 cfs	1.05 cfs	1170.88	0.45	0.502	2-M2c	0.34	0.33	0.33	0.25	2.71	0.00
1.24 cfs	1.24 cfs	1170.93	0.49	0.547	2-M2c	0.36	0.36	0.36	0.25	2.83	0.00
1.43 cfs	1.43 cfs	1170.97	0.53	0.589	2-M2c	0.39	0.39	0.39	0.25	2.94	0.00
1.62 cfs	1.62 cfs	1171.01	0.56	0.629	2-M2c	0.42	0.41	0.41	0.25	3.04	0.00
1.81 cfs	1.81 cfs	1171.05	0.60	0.666	2-M2c	0.44	0.44	0.44	0.25	3.13	0.00
2.00 cfs	2.00 cfs	1171.08	0.63	0.702	2-M2c	0.46	0.46	0.46	0.25	3.21	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

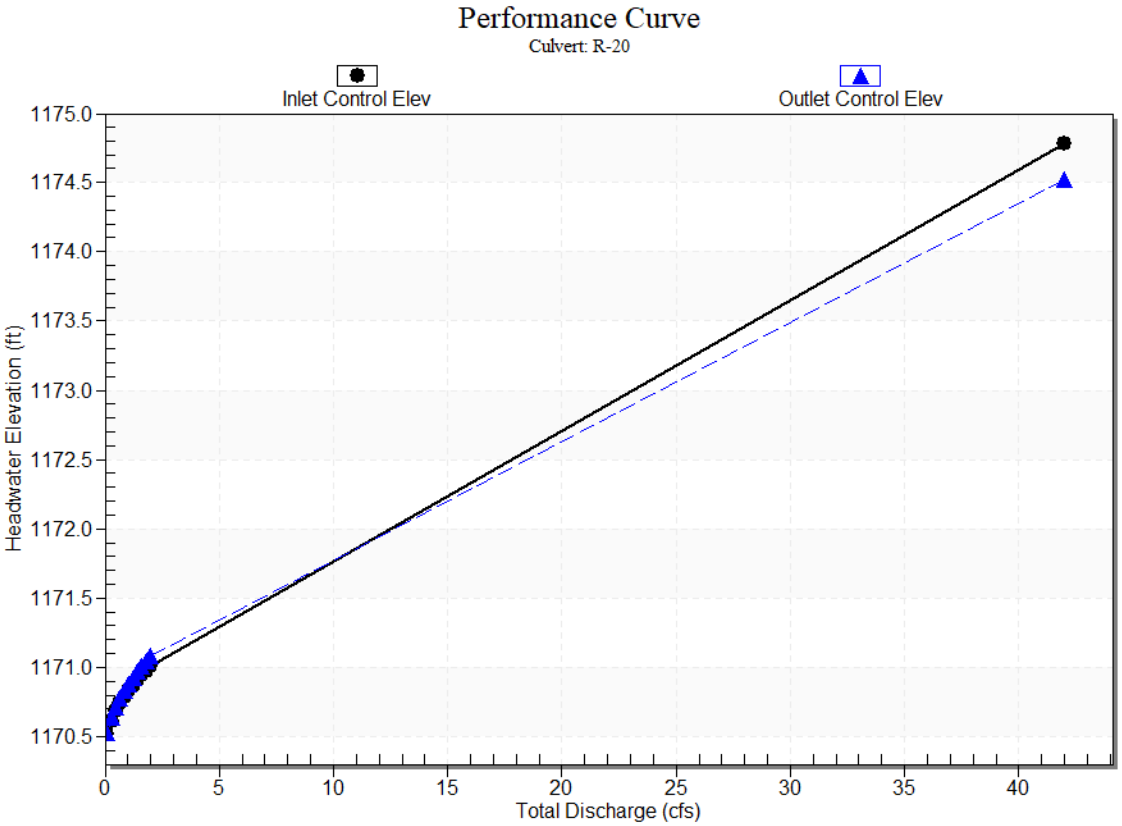
Inlet Elevation (invert): 1170.38 ft,

Outlet Elevation (invert): 1170.23 ft

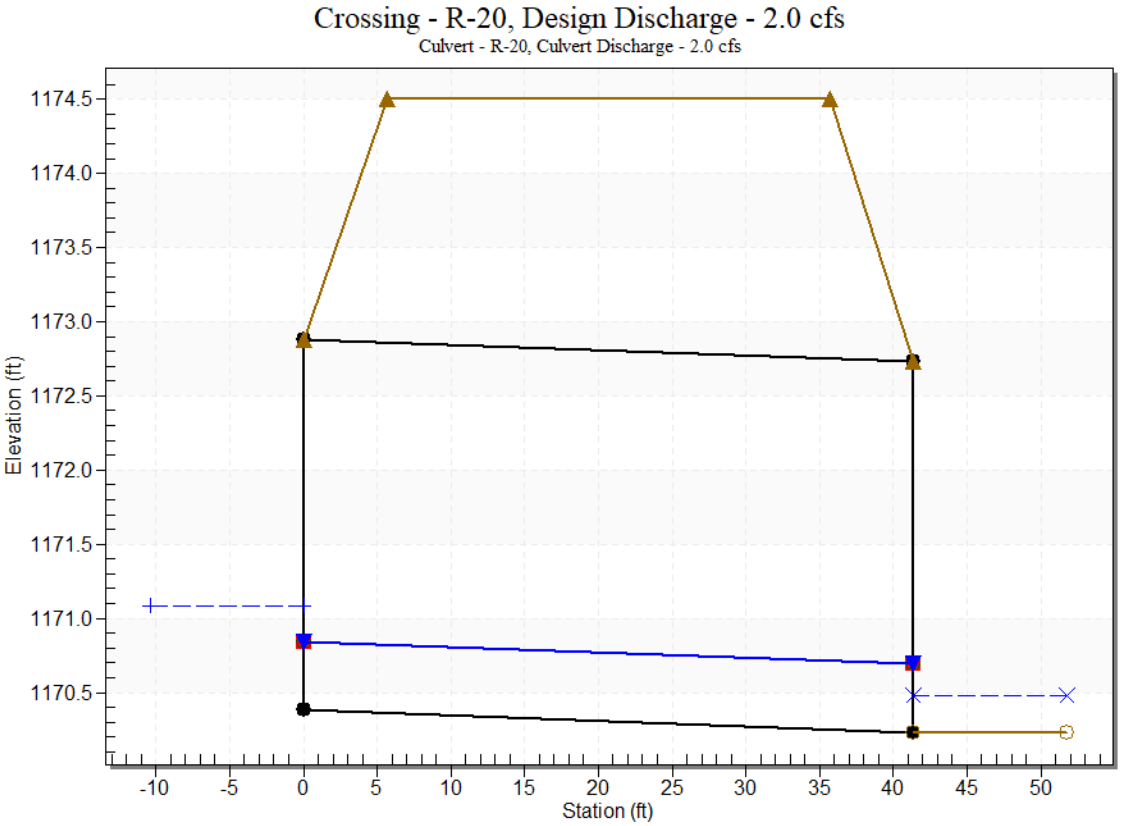
Culvert Length: 41.40 ft,

Culvert Slope: 0.0036

Culvert Performance Curve Plot: R-20



Water Surface Profile Plot for Culvert: R-20



Site Data - R-20

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1170.38 ft

Outlet Station: 41.40 ft

Outlet Elevation: 1170.23 ft

Number of Barrels: 1

Culvert Data Summary - R-20

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-20

Table 22 - Downstream Channel Rating Curve (Crossing: R-20)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1170.48	0.25
0.29	1170.48	0.25
0.48	1170.48	0.25
0.67	1170.48	0.25
0.86	1170.48	0.25
1.05	1170.48	0.25
1.24	1170.48	0.25
1.43	1170.48	0.25
1.62	1170.48	0.25
1.81	1170.48	0.25
2.00	1170.48	0.25

Tailwater Channel Data - R-20

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1170.48 ft

Roadway Data for Crossing: R-20

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.50 ft

Crest Elevation: 1174.50 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

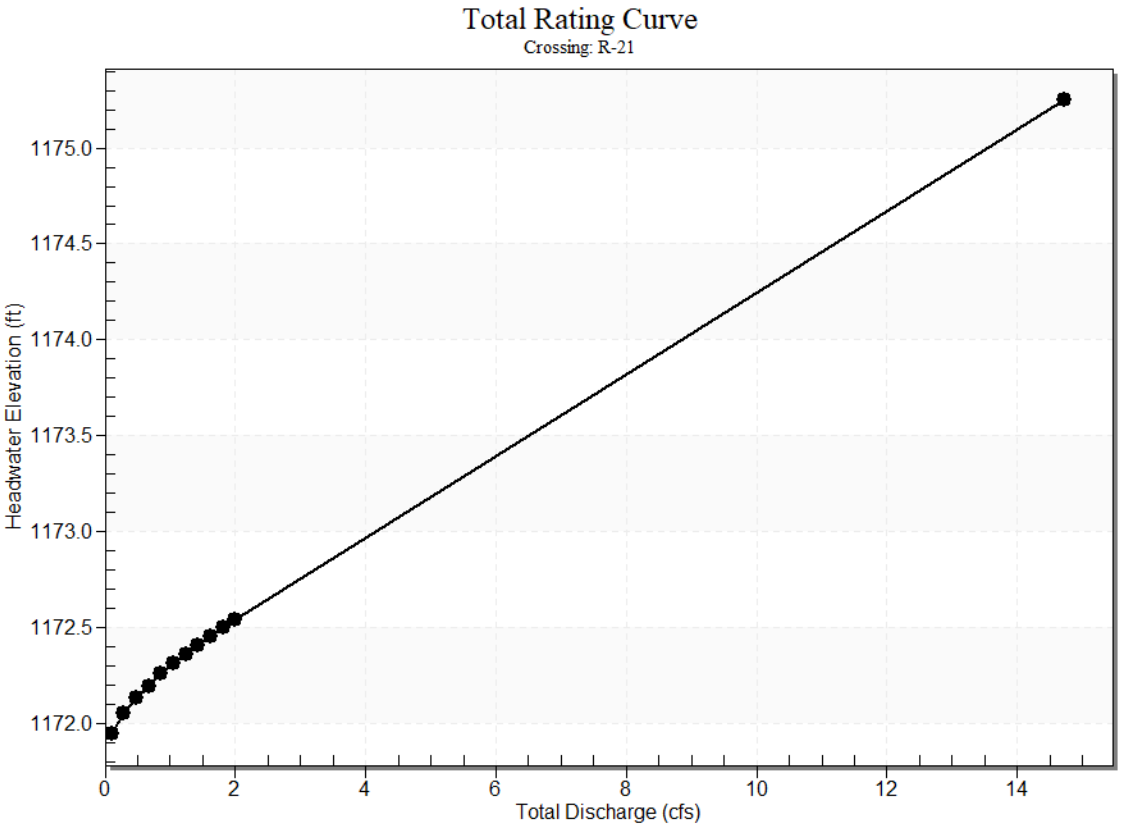
Maximum Flow: 2.00 cfs

Table 23 - Summary of Culvert Flows at Crossing: R-21

Headwater	Total	R-21	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1171.95	0.10	0.10	0.00	1
1172.05	0.29	0.29	0.00	1
1172.13	0.48	0.48	0.00	1
1172.20	0.67	0.67	0.00	1
1172.26	0.86	0.86	0.00	1
1172.31	1.05	1.05	0.00	1
1172.36	1.24	1.24	0.00	1
1172.41	1.43	1.43	0.00	1
1172.45	1.62	1.62	0.00	1
1172.50	1.81	1.81	0.00	1
1172.54	2.00	2.00	0.00	1
1175.00	13.35	13.35	0.00	Overtopping

Rating Curve Plot for Crossing: R-21



Culvert Data: R-21

Table 15 - Culvert Summary Table: R-21

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1171.95	0.09	0.297	7-A2c	-1.00	0.04	0.04	0.00	1.19	0.00
0.29 cfs	0.29 cfs	1172.05	0.15	0.402	7-A2c	-1.00	0.09	0.09	0.00	1.69	0.00
0.48 cfs	0.48 cfs	1172.13	0.22	0.480	7-A2c	-1.00	0.13	0.13	0.00	1.99	0.00
0.67 cfs	0.67 cfs	1172.20	0.28	0.546	7-A2c	-1.00	0.16	0.16	0.00	2.22	0.00
0.86 cfs	0.86 cfs	1172.26	0.33	0.607	7-A2c	-1.00	0.18	0.18	0.00	2.41	0.00
1.05 cfs	1.05 cfs	1172.31	0.39	0.660	7-A2c	-1.00	0.21	0.21	0.00	2.57	0.00
1.24 cfs	1.24 cfs	1172.36	0.44	0.711	7-A2c	-1.00	0.23	0.23	0.00	2.72	0.00
1.43 cfs	1.43 cfs	1172.41	0.48	0.758	7-A2c	-1.00	0.26	0.26	0.00	2.85	0.00
1.62 cfs	1.62 cfs	1172.45	0.53	0.804	7-A2c	-1.00	0.28	0.28	0.00	2.97	0.00
1.81 cfs	1.81 cfs	1172.50	0.57	0.848	7-A2c	-1.00	0.30	0.30	0.00	3.08	0.00
2.00 cfs	2.00 cfs	1172.54	0.61	0.890	7-A2c	-1.00	0.32	0.32	0.00	3.18	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

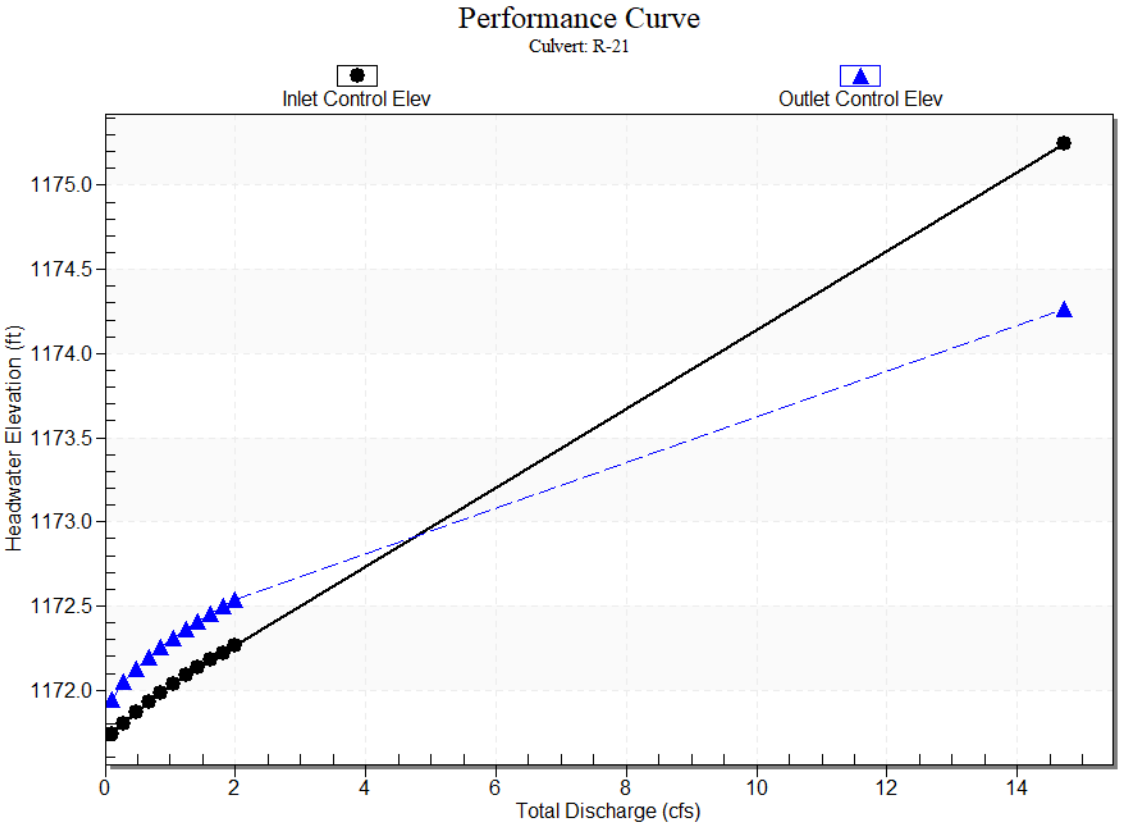
Inlet Elevation (invert): 1171.65 ft,

Outlet Elevation (invert): 1171.83 ft

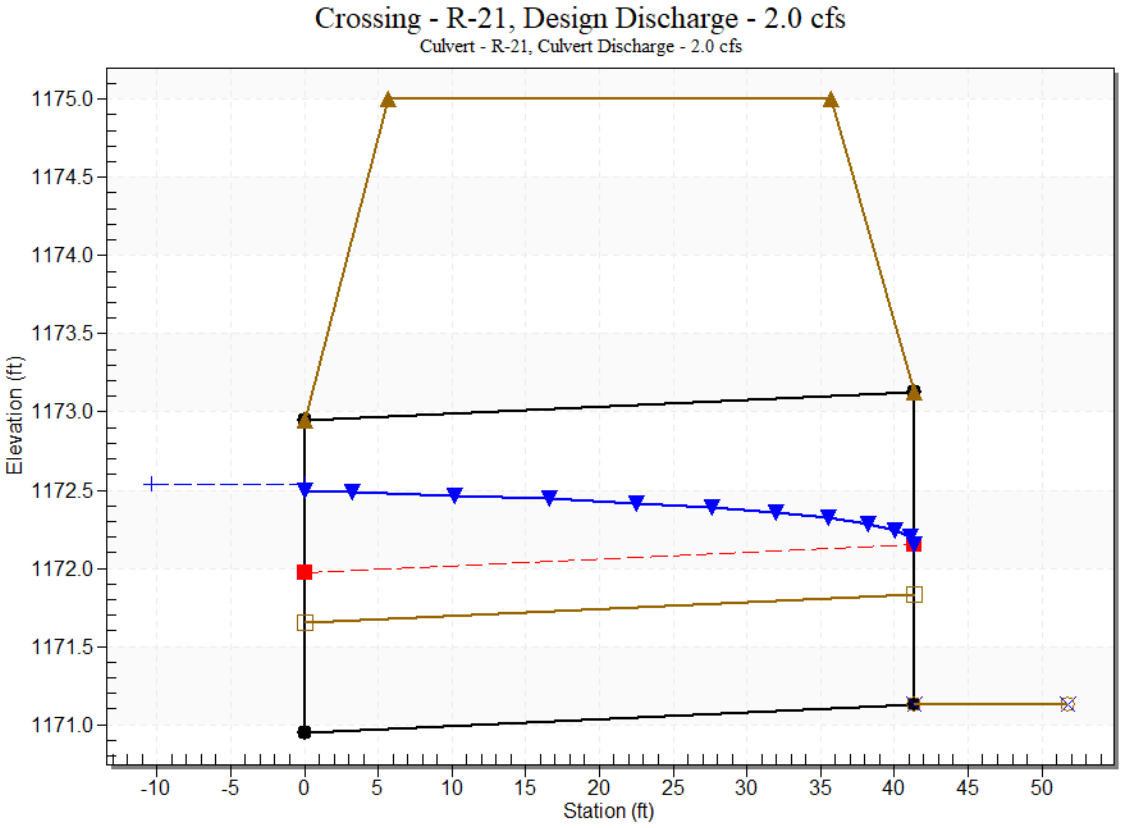
Culvert Length: 41.40 ft,

Culvert Slope: -0.0043

Culvert Performance Curve Plot: R-21



Water Surface Profile Plot for Culvert: R-21



Site Data - R-21

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1170.95 ft

Outlet Station: 41.40 ft

Outlet Elevation: 1171.13 ft

Number of Barrels: 1

Culvert Data Summary - R-21

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated Steel

Embedment: 8.40 in

Barrel Manning's n: 0.0240 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: R-21

Table 24 - Downstream Channel Rating Curve (Crossing: R-21)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1171.13	0.00
0.29	1171.13	0.00
0.48	1171.13	0.00
0.67	1171.13	0.00
0.86	1171.13	0.00
1.05	1171.13	0.00
1.24	1171.13	0.00
1.43	1171.13	0.00
1.62	1171.13	0.00
1.81	1171.13	0.00
2.00	1171.13	0.00

Tailwater Channel Data - R-21

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1171.13 ft

Roadway Data for Crossing: R-21

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 ft

Crest Elevation: 1175.00 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

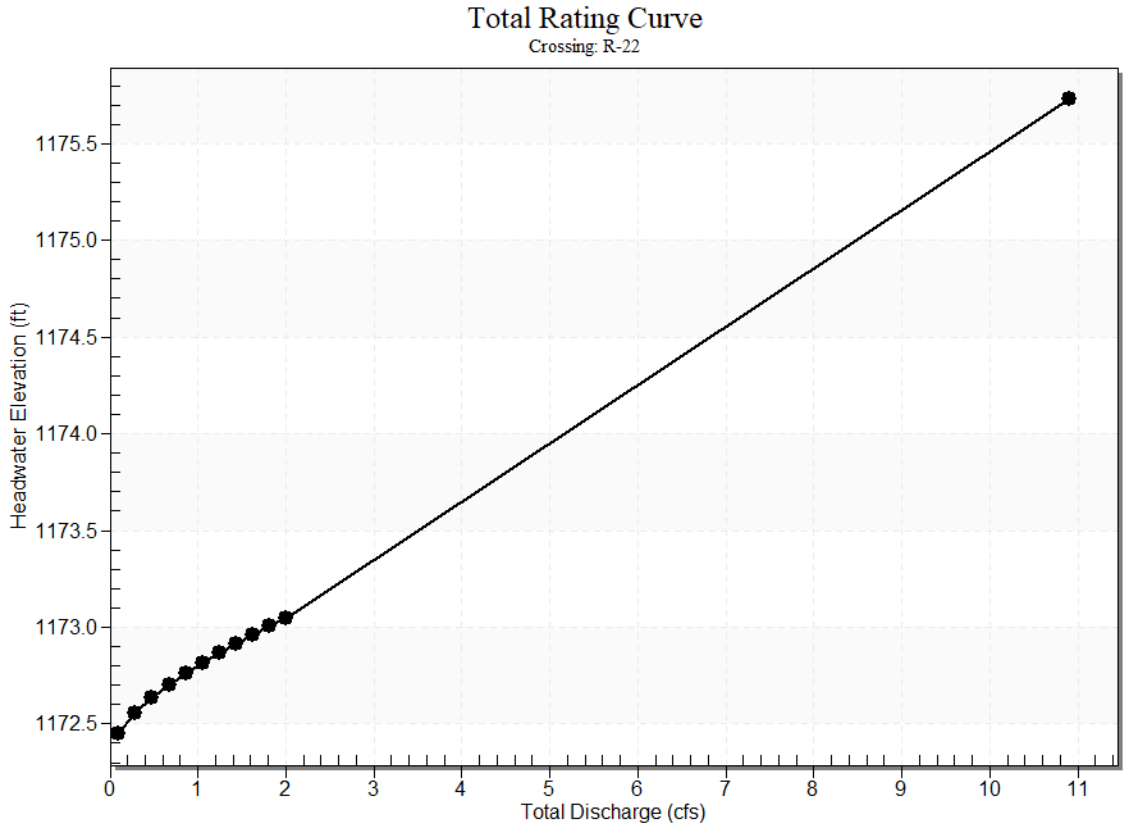
Design Flow: 2.00 cfs

Maximum Flow: 2.00 cfs

Table 25 - Summary of Culvert Flows at Crossing: R-22

Headwater Elevation (ft)	Total Discharge (cfs)	R-22 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1172.45	0.10	0.10	0.00	1
1172.55	0.29	0.29	0.00	1
1172.63	0.48	0.48	0.00	1
1172.70	0.67	0.67	0.00	1
1172.76	0.86	0.86	0.00	1
1172.82	1.05	1.05	0.00	1
1172.87	1.24	1.24	0.00	1
1172.91	1.43	1.43	0.00	1
1172.96	1.62	1.62	0.00	1
1173.01	1.81	1.81	0.00	1
1173.05	2.00	2.00	0.00	1
1175.50	9.75	9.75	0.00	Overtopping

Rating Curve Plot for Crossing: R-22



Culvert Data: R-22

Table 16 - Culvert Summary Table: R-22

Total Disch	Culvert	Headwater	Inlet	Outlet	Flow	Normal	Critical	Outlet	Tailwater	Outlet	Tailwater

arge (cfs)	Discharge (cfs)	Elevation (ft)	Control Depth (ft)	Control Depth (ft)	Type	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Velocity (ft/s)	Velocity (ft/s)
0.10 cfs	0.10 cfs	1172.45	0.08	0.111	2-M2c	0.10	0.04	0.04	0.00	1.19	0.00
0.29 cfs	0.29 cfs	1172.55	0.15	0.215	2-M2c	0.20	0.09	0.09	0.00	1.69	0.00
0.48 cfs	0.48 cfs	1172.63	0.21	0.294	2-M2c	0.28	0.13	0.13	0.00	1.99	0.00
0.67 cfs	0.67 cfs	1172.70	0.27	0.362	2-M2c	0.34	0.16	0.16	0.00	2.22	0.00
0.86 cfs	0.86 cfs	1172.76	0.33	0.421	2-M2c	0.40	0.18	0.18	0.00	2.41	0.00
1.05 cfs	1.05 cfs	1172.82	0.38	0.476	2-M2c	0.45	0.21	0.21	0.00	2.57	0.00
1.24 cfs	1.24 cfs	1172.87	0.43	0.527	2-M2c	0.51	0.23	0.23	0.00	2.72	0.00
1.43 cfs	1.43 cfs	1172.91	0.48	0.575	2-M2c	0.56	0.26	0.26	0.00	2.85	0.00
1.62 cfs	1.62 cfs	1172.96	0.52	0.621	2-M2c	0.61	0.28	0.28	0.00	2.97	0.00
1.81 cfs	1.81 cfs	1173.01	0.57	0.665	2-M2c	0.65	0.30	0.30	0.00	3.08	0.00
2.00 cfs	2.00 cfs	1173.05	0.61	0.708	2-M2c	0.70	0.32	0.32	0.00	3.18	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

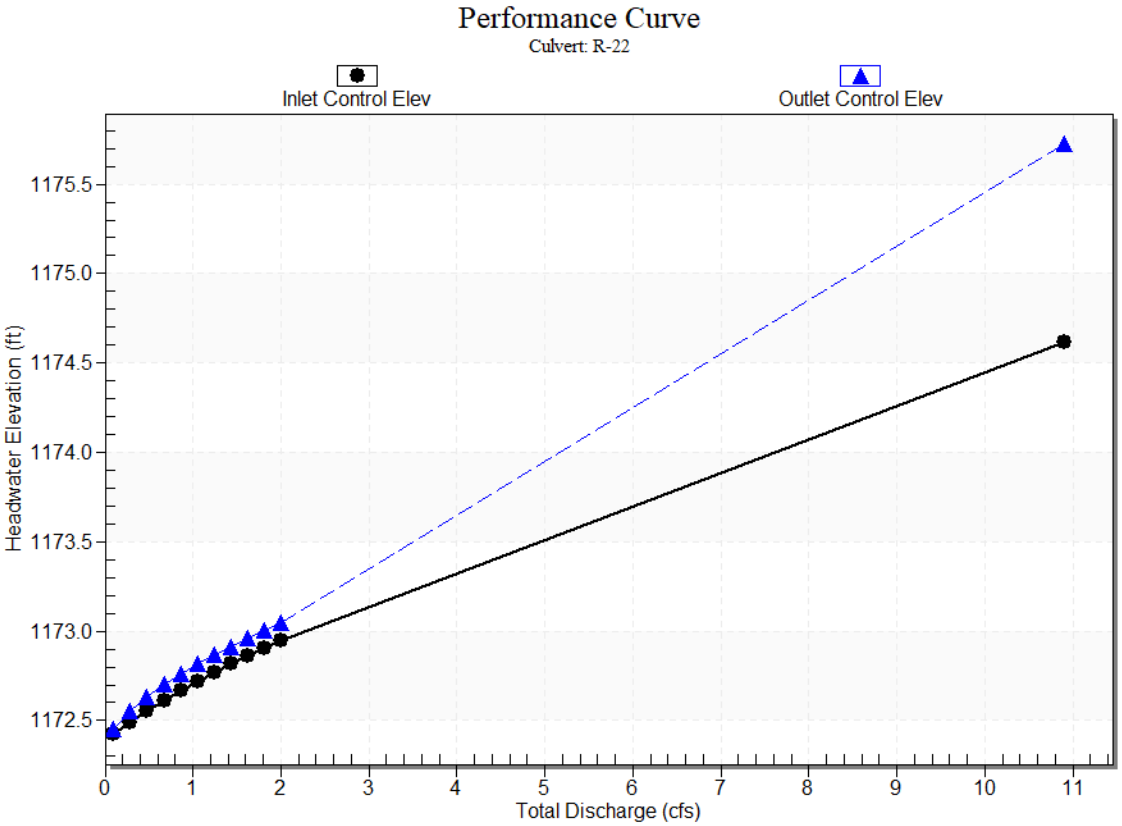
Inlet Elevation (invert): 1172.34 ft,

Outlet Elevation (invert): 1172.18 ft

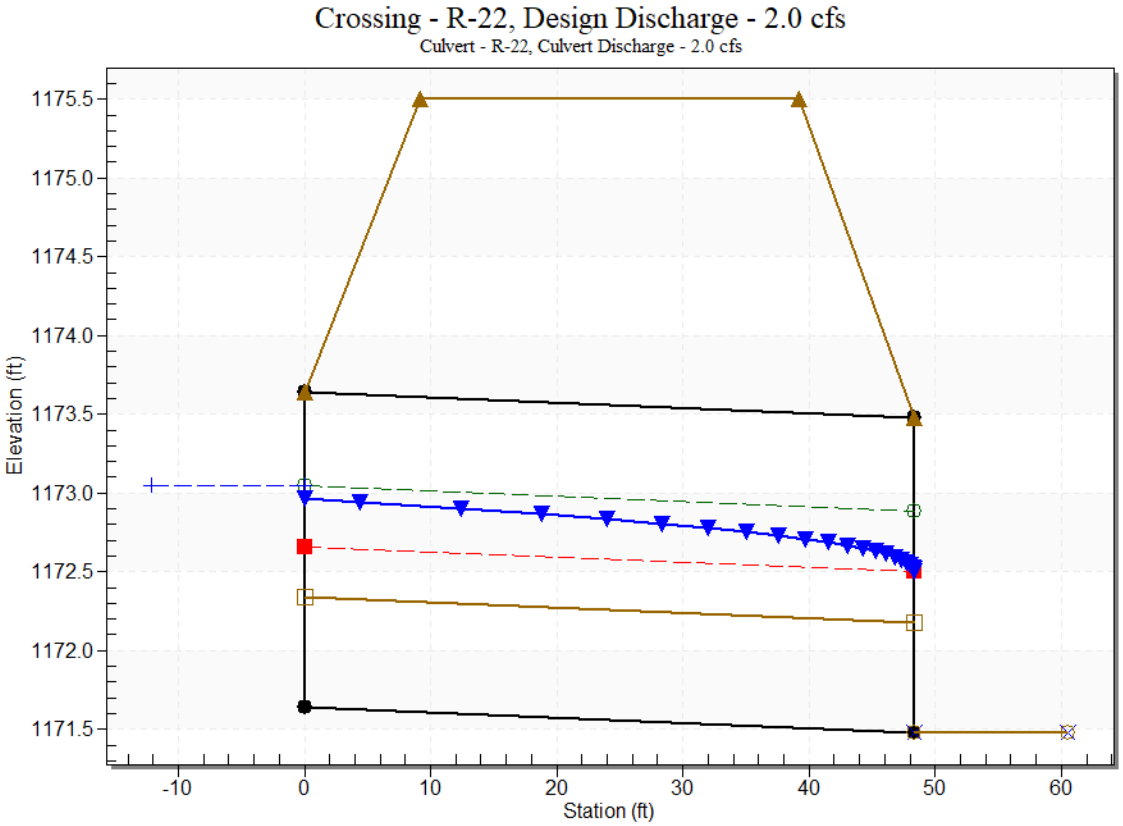
Culvert Length: 48.40 ft,

Culvert Slope: 0.0033

Culvert Performance Curve Plot: R-22



Water Surface Profile Plot for Culvert: R-22



Site Data - R-22

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1171.64 ft

Outlet Station: 48.40 ft

Outlet Elevation: 1171.48 ft

Number of Barrels: 1

Culvert Data Summary - R-22

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated Steel

Embedment: 8.40 in

Barrel Manning's n: 0.0240 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: R-22

Table 26 - Downstream Channel Rating Curve (Crossing: R-22)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1171.48	0.00
0.29	1171.48	0.00
0.48	1171.48	0.00
0.67	1171.48	0.00
0.86	1171.48	0.00
1.05	1171.48	0.00
1.24	1171.48	0.00
1.43	1171.48	0.00
1.62	1171.48	0.00
1.81	1171.48	0.00
2.00	1171.48	0.00

Tailwater Channel Data - R-22

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1171.48 ft

Roadway Data for Crossing: R-22

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 ft

Crest Elevation: 1175.50 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

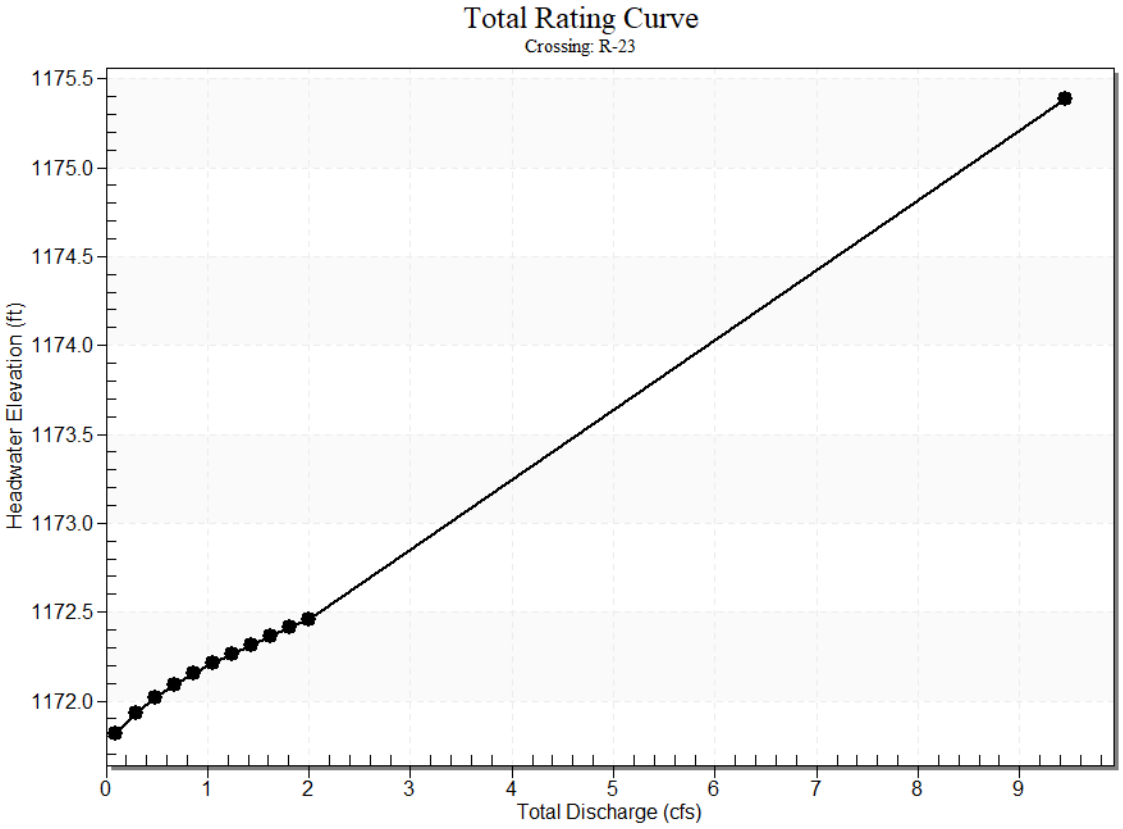
Design Flow: 2.00 cfs

Maximum Flow: 2.00 cfs

Table 27 - Summary of Culvert Flows at Crossing: R-23

Headwater Elevation (ft)	Total Discharge (cfs)	R-23 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1171.82	0.10	0.10	0.00	1
1171.94	0.29	0.29	0.00	1
1172.02	0.48	0.48	0.00	1
1172.09	0.67	0.67	0.00	1
1172.15	0.86	0.86	0.00	1
1172.21	1.05	1.05	0.00	1
1172.26	1.24	1.24	0.00	1
1172.32	1.43	1.43	0.00	1
1172.37	1.62	1.62	0.00	1
1172.41	1.81	1.81	0.00	1
1172.46	2.00	2.00	0.00	1
1175.20	8.69	8.69	0.00	Overtopping

Rating Curve Plot for Crossing: R-23



Culvert Data: R-23

Table 17 - Culvert Summary Table: R-23

Total Disch	Culvert	Headwater	Inlet	Outlet	Flow	Normal	Critical	Outlet	Tailwater	Outlet	Tailwater

arge (cfs)	Discharge (cfs)	Elevation (ft)	Control Depth (ft)	Control Depth (ft)	Type	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Velocity (ft/s)	Velocity (ft/s)
0.10 cfs	0.10 cfs	1171.82	0.06	0.138	2-M2c	0.14	0.04	0.04	0.00	1.18	0.00
0.29 cfs	0.29 cfs	1171.94	0.13	0.255	2-M2c	0.27	0.09	0.09	0.00	1.68	0.00
0.48 cfs	0.48 cfs	1172.02	0.20	0.339	2-M2c	0.37	0.12	0.12	0.00	1.98	0.00
0.67 cfs	0.67 cfs	1172.09	0.27	0.410	2-M2c	0.47	0.15	0.15	0.00	2.21	0.00
0.86 cfs	0.86 cfs	1172.15	0.33	0.473	2-M2c	0.55	0.18	0.18	0.00	2.40	0.00
1.05 cfs	1.05 cfs	1172.21	0.38	0.531	2-M2c	0.64	0.21	0.21	0.00	2.57	0.00
1.24 cfs	1.24 cfs	1172.26	0.43	0.585	2-M2c	0.73	0.23	0.23	0.00	2.72	0.00
1.43 cfs	1.43 cfs	1172.32	0.48	0.636	2-M2c	0.82	0.25	0.25	0.00	2.85	0.00
1.62 cfs	1.62 cfs	1172.37	0.53	0.685	2-M2c	0.92	0.28	0.28	0.00	2.97	0.00
1.81 cfs	1.81 cfs	1172.41	0.57	0.733	2-M2c	1.08	0.30	0.30	0.00	3.09	0.00
2.00 cfs	2.00 cfs	1172.46	0.61	0.779	2-M2c	1.20	0.32	0.32	0.00	3.19	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

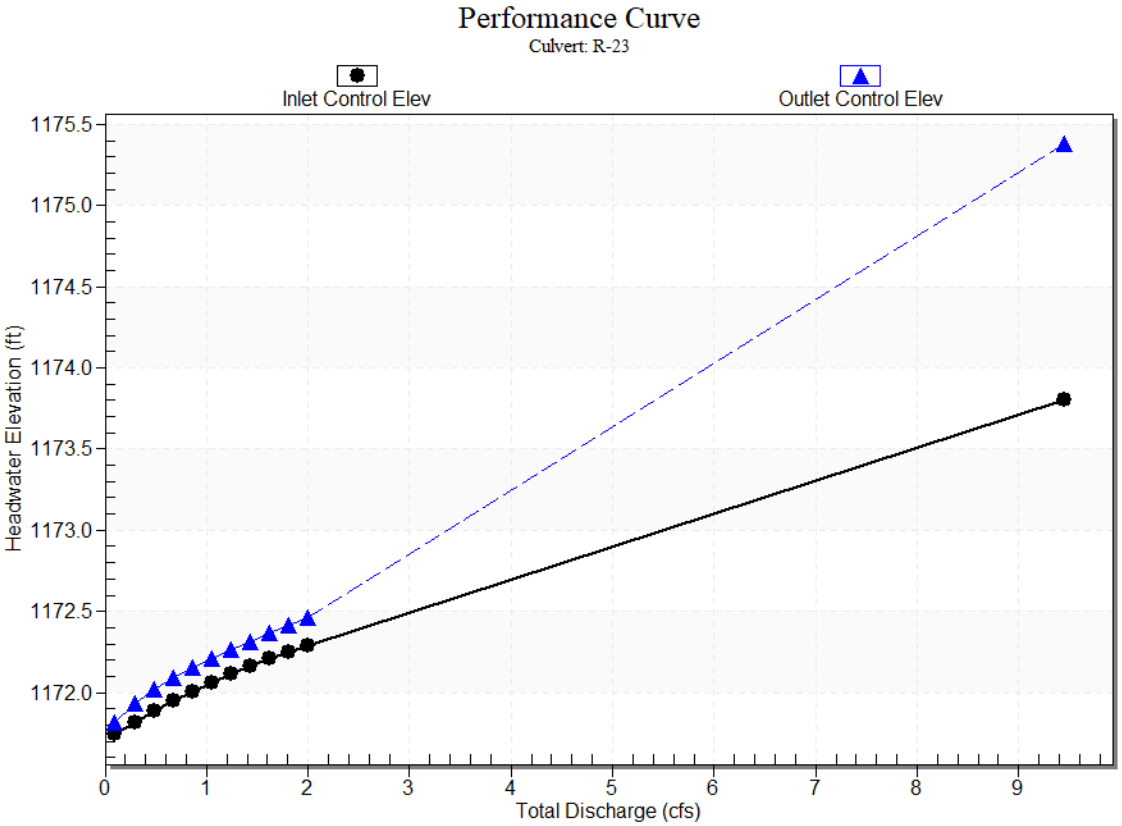
Inlet Elevation (invert): 1171.68 ft,

Outlet Elevation (invert): 1171.61 ft

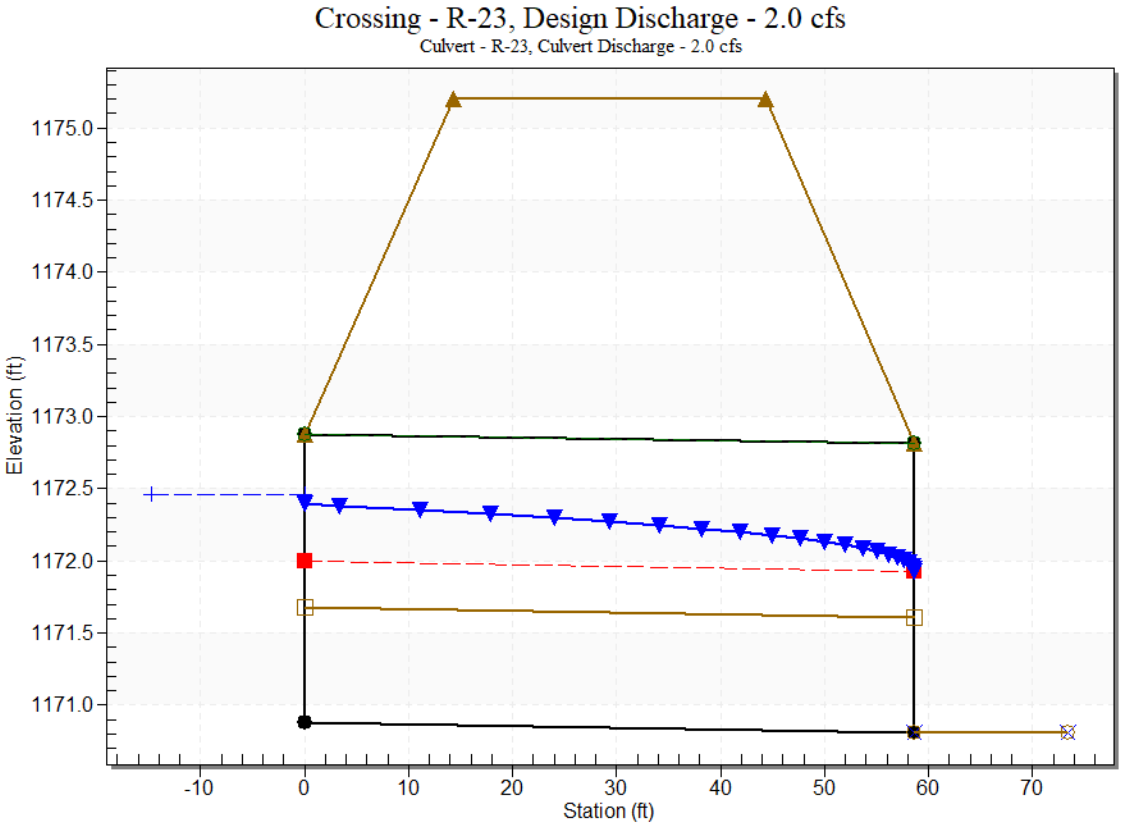
Culvert Length: 58.70 ft,

Culvert Slope: 0.0012

Culvert Performance Curve Plot: R-23



Water Surface Profile Plot for Culvert: R-23



Site Data - R-23

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1170.88 ft

Outlet Station: 58.70 ft

Outlet Elevation: 1170.81 ft

Number of Barrels: 1

Culvert Data Summary - R-23

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated Steel

Embedment: 9.60 in

Barrel Manning's n: 0.0240 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: R-23

Table 28 - Downstream Channel Rating Curve (Crossing: R-23)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1170.81	0.00
0.29	1170.81	0.00
0.48	1170.81	0.00
0.67	1170.81	0.00
0.86	1170.81	0.00
1.05	1170.81	0.00
1.24	1170.81	0.00
1.43	1170.81	0.00
1.62	1170.81	0.00
1.81	1170.81	0.00
2.00	1170.81	0.00

Tailwater Channel Data - R-23

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1170.81 ft

Roadway Data for Crossing: R-23

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2.00 ft

Crest Elevation: 1175.20 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

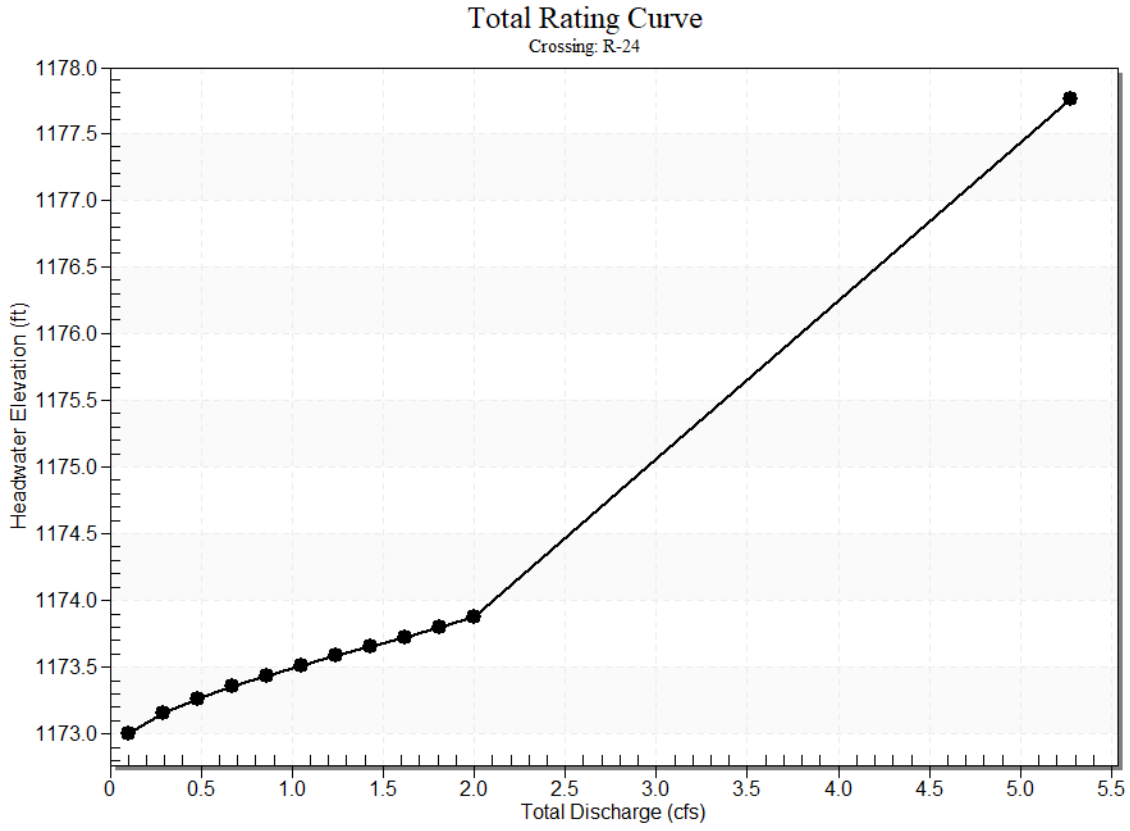
Design Flow: 2.00 cfs

Maximum Flow: 2.00 cfs

Table 29 - Summary of Culvert Flows at Crossing: R-24

Headwater Elevation (ft)	Total Discharge (cfs)	R-24 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1173.00	0.10	0.10	0.00	1
1173.15	0.29	0.29	0.00	1
1173.26	0.48	0.48	0.00	1
1173.35	0.67	0.67	0.00	1
1173.44	0.86	0.86	0.00	1
1173.51	1.05	1.05	0.00	1
1173.58	1.24	1.24	0.00	1
1173.65	1.43	1.43	0.00	1
1173.72	1.62	1.62	0.00	1
1173.80	1.81	1.81	0.00	1
1173.87	2.00	2.00	0.00	1
1177.50	4.75	4.75	0.00	Overtopping

Rating Curve Plot for Crossing: R-24



Culvert Data: R-24

Table 18 - Culvert Summary Table: R-24

Total Disch	Culvert	Headwater	Inlet	Outlet	Flow	Normal	Critical	Outlet	Tailwater	Outlet	Tailwater

arge (cfs)	Discharge (cfs)	Elevation (ft)	Control Depth (ft)	Control Depth (ft)	Type	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Velocity (ft/s)	Velocity (ft/s)
0.10 cfs	0.10 cfs	1173.00	0.19	0.204	2-M2c	0.15	0.13	0.13	0.00	1.69	0.00
0.29 cfs	0.29 cfs	1173.15	0.32	0.354	2-M2c	0.26	0.22	0.22	0.00	2.24	0.00
0.48 cfs	0.48 cfs	1173.26	0.42	0.463	2-M2c	0.34	0.29	0.29	0.00	2.58	0.00
0.67 cfs	0.67 cfs	1173.35	0.51	0.554	2-M2c	0.41	0.34	0.34	0.00	2.83	0.00
0.86 cfs	0.86 cfs	1173.44	0.58	0.636	2-M2c	0.47	0.39	0.39	0.00	3.05	0.00
1.05 cfs	1.05 cfs	1173.51	0.65	0.712	2-M2c	0.52	0.43	0.43	0.00	3.24	0.00
1.24 cfs	1.24 cfs	1173.58	0.72	0.784	2-M2c	0.58	0.47	0.47	0.00	3.42	0.00
1.43 cfs	1.43 cfs	1173.65	0.79	0.854	2-M2c	0.64	0.51	0.51	0.00	3.58	0.00
1.62 cfs	1.62 cfs	1173.72	0.86	0.924	2-M2c	0.70	0.54	0.54	0.00	3.74	0.00
1.81 cfs	1.81 cfs	1173.80	0.93	0.996	2-M2c	0.77	0.57	0.57	0.00	3.89	0.00
2.00 cfs	2.00 cfs	1173.87	1.00	1.073	7-M2c	0.85	0.60	0.60	0.00	4.04	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

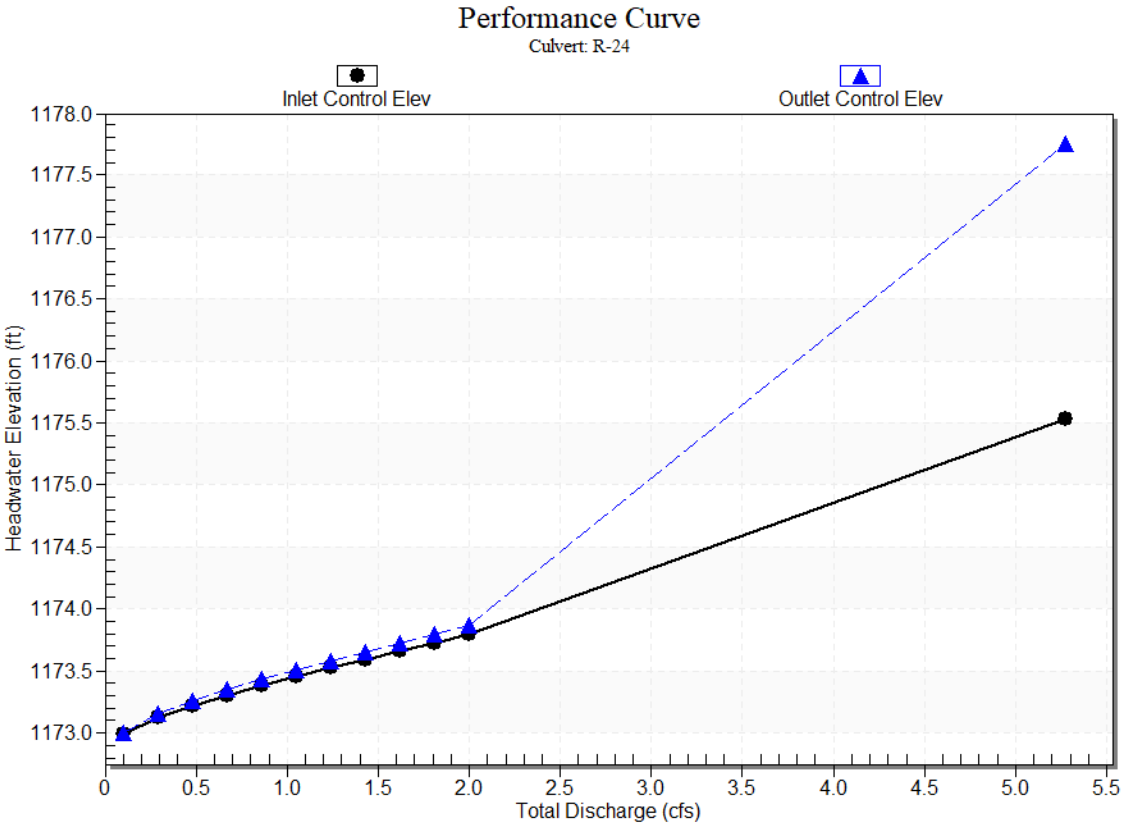
Inlet Elevation (invert): 1172.80 ft,

Outlet Elevation (invert): 1172.27 ft

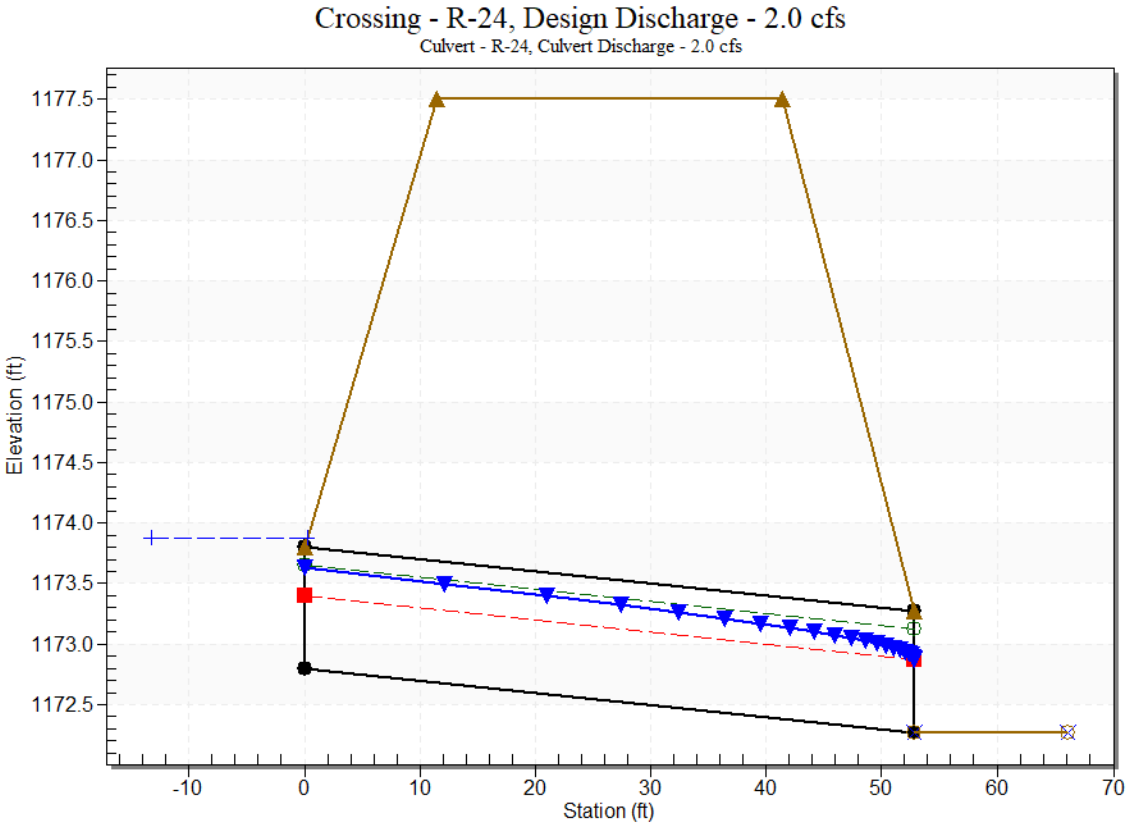
Culvert Length: 52.90 ft,

Culvert Slope: 0.0100

Culvert Performance Curve Plot: R-24



Water Surface Profile Plot for Culvert: R-24



Site Data - R-24

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1172.80 ft

Outlet Station: 52.90 ft

Outlet Elevation: 1172.27 ft

Number of Barrels: 1

Culvert Data Summary - R-24

Barrel Shape: Circular

Barrel Diameter: 1.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: R-24

Table 30 - Downstream Channel Rating Curve (Crossing: R-24)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1172.27	0.00
0.29	1172.27	0.00
0.48	1172.27	0.00
0.67	1172.27	0.00
0.86	1172.27	0.00
1.05	1172.27	0.00
1.24	1172.27	0.00
1.43	1172.27	0.00
1.62	1172.27	0.00
1.81	1172.27	0.00
2.00	1172.27	0.00

Tailwater Channel Data - R-24

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1172.27 ft

Roadway Data for Crossing: R-24

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.00 ft

Crest Elevation: 1177.50 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

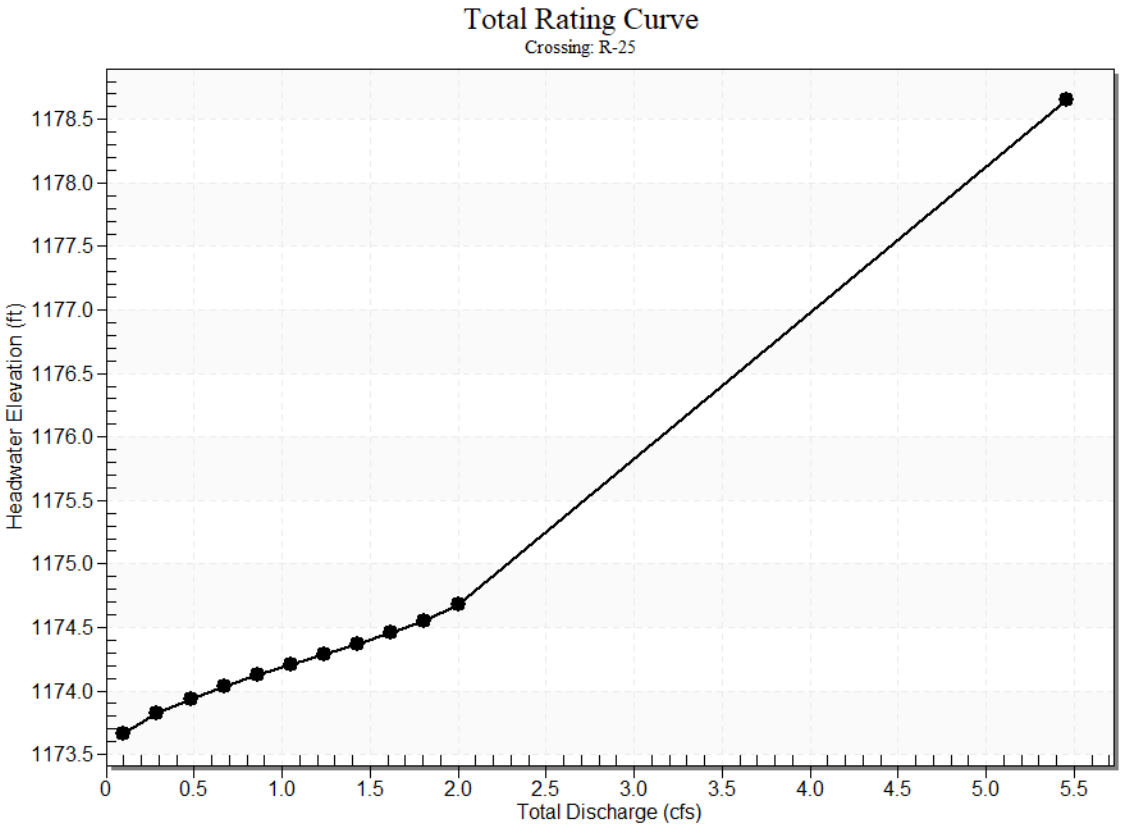
Maximum Flow: 2.00 cfs

Table 31 - Summary of Culvert Flows at Crossing: R-25

Headwater	Total	R-25	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1173.66	0.10	0.10	0.00	1
1173.82	0.29	0.29	0.00	1
1173.94	0.48	0.48	0.00	1
1174.03	0.67	0.67	0.00	1
1174.12	0.86	0.86	0.00	1
1174.21	1.05	1.05	0.00	1
1174.29	1.24	1.24	0.00	1
1174.37	1.43	1.43	0.00	1
1174.46	1.62	1.62	0.00	1
1174.55	1.81	1.81	0.00	1
1174.68	2.00	2.00	0.00	1
1178.40	4.93	4.93	0.00	Overtopping

Rating Curve Plot for Crossing: R-25



Culvert Data: R-25

Table 19 - Culvert Summary Table: R-25

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1173.66	0.19	0.215	2-M2c	0.19	0.13	0.13	0.00	1.69	0.00
0.29 cfs	0.29 cfs	1173.82	0.33	0.372	2-M2c	0.32	0.22	0.22	0.00	2.24	0.00
0.48 cfs	0.48 cfs	1173.94	0.42	0.486	2-M2c	0.42	0.29	0.29	0.00	2.58	0.00
0.67 cfs	0.67 cfs	1174.03	0.51	0.583	2-M2c	0.50	0.34	0.34	0.00	2.83	0.00
0.86 cfs	0.86 cfs	1174.12	0.58	0.672	2-M2c	0.59	0.39	0.39	0.00	3.05	0.00
1.05 cfs	1.05 cfs	1174.21	0.66	0.756	2-M2c	0.67	0.43	0.43	0.00	3.24	0.00
1.24 cfs	1.24 cfs	1174.29	0.73	0.838	2-M2c	0.77	0.47	0.47	0.00	3.42	0.00
1.43 cfs	1.43 cfs	1174.37	0.79	0.920	2-M2c	1.00	0.51	0.51	0.00	3.58	0.00
1.62 cfs	1.62 cfs	1174.46	0.86	1.005	7-M2c	1.00	0.54	0.54	0.00	3.74	0.00
1.81 cfs	1.81 cfs	1174.55	0.93	1.099	7-M2c	1.00	0.57	0.57	0.00	3.89	0.00
2.00 cfs	2.00 cfs	1174.68	1.00	1.230	7-M2c	1.00	0.60	0.60	0.00	4.04	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

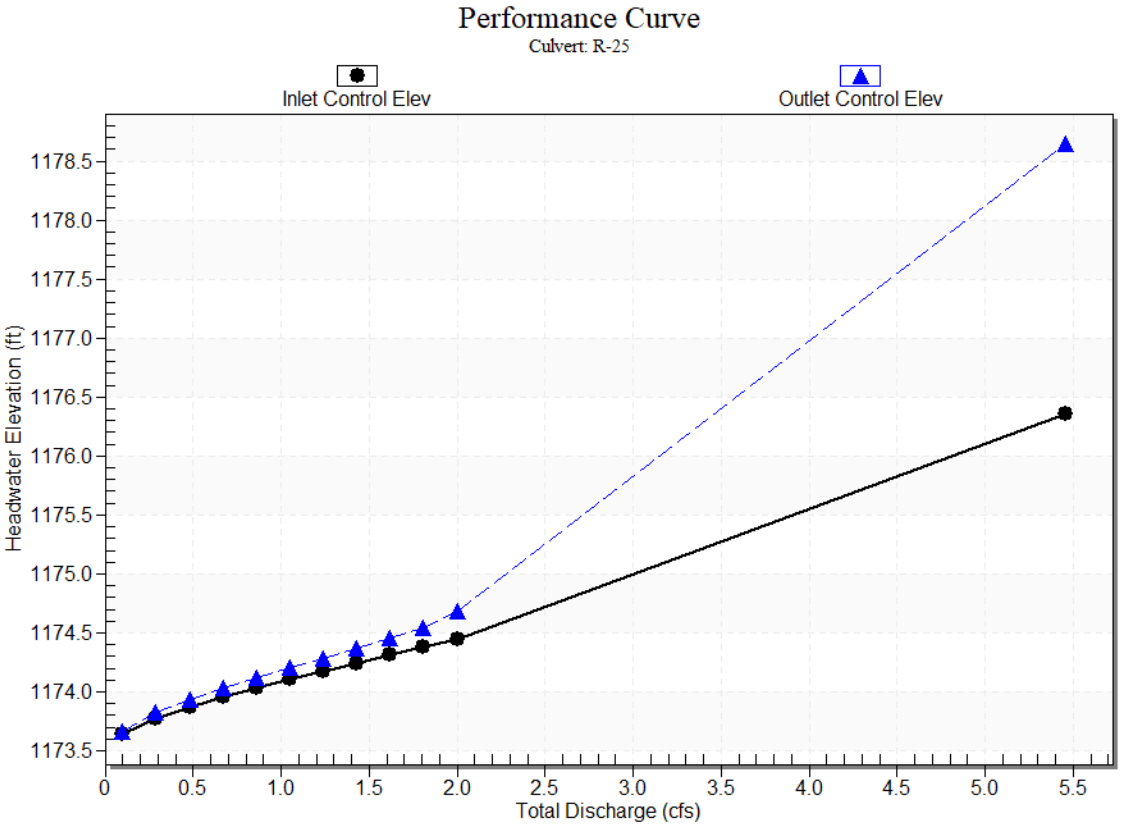
Inlet Elevation (invert): 1173.45 ft,

Outlet Elevation (invert): 1173.23 ft

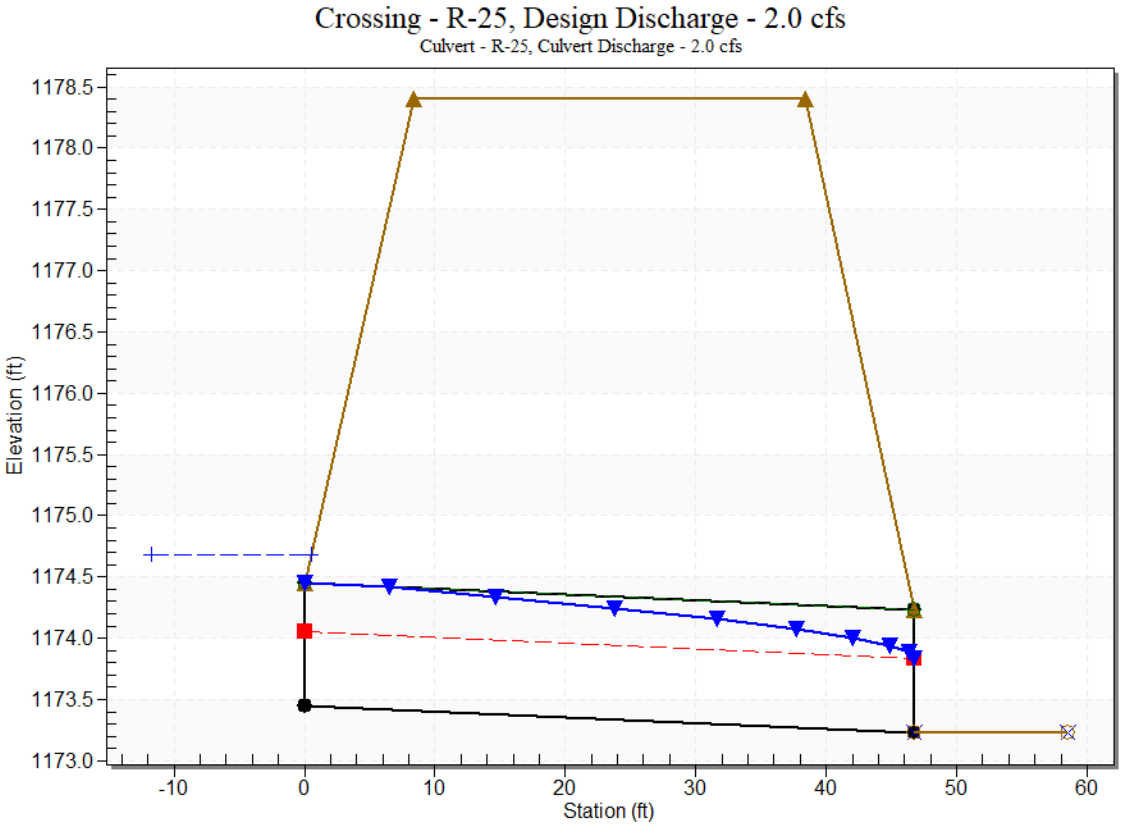
Culvert Length: 46.80 ft,

Culvert Slope: 0.0047

Culvert Performance Curve Plot: R-25



Water Surface Profile Plot for Culvert: R-25



Site Data - R-25

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1173.45 ft

Outlet Station: 46.80 ft

Outlet Elevation: 1173.23 ft

Number of Barrels: 1

Culvert Data Summary - R-25

Barrel Shape: Circular

Barrel Diameter: 1.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: R-25

Table 32 - Downstream Channel Rating Curve (Crossing: R-25)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1173.23	0.00
0.29	1173.23	0.00
0.48	1173.23	0.00
0.67	1173.23	0.00
0.86	1173.23	0.00
1.05	1173.23	0.00
1.24	1173.23	0.00
1.43	1173.23	0.00
1.62	1173.23	0.00
1.81	1173.23	0.00
2.00	1173.23	0.00

Tailwater Channel Data - R-25

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1173.23 ft

Roadway Data for Crossing: R-25

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.00 ft

Crest Elevation: 1178.40 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.10 cfs

Design Flow: 2.00 cfs

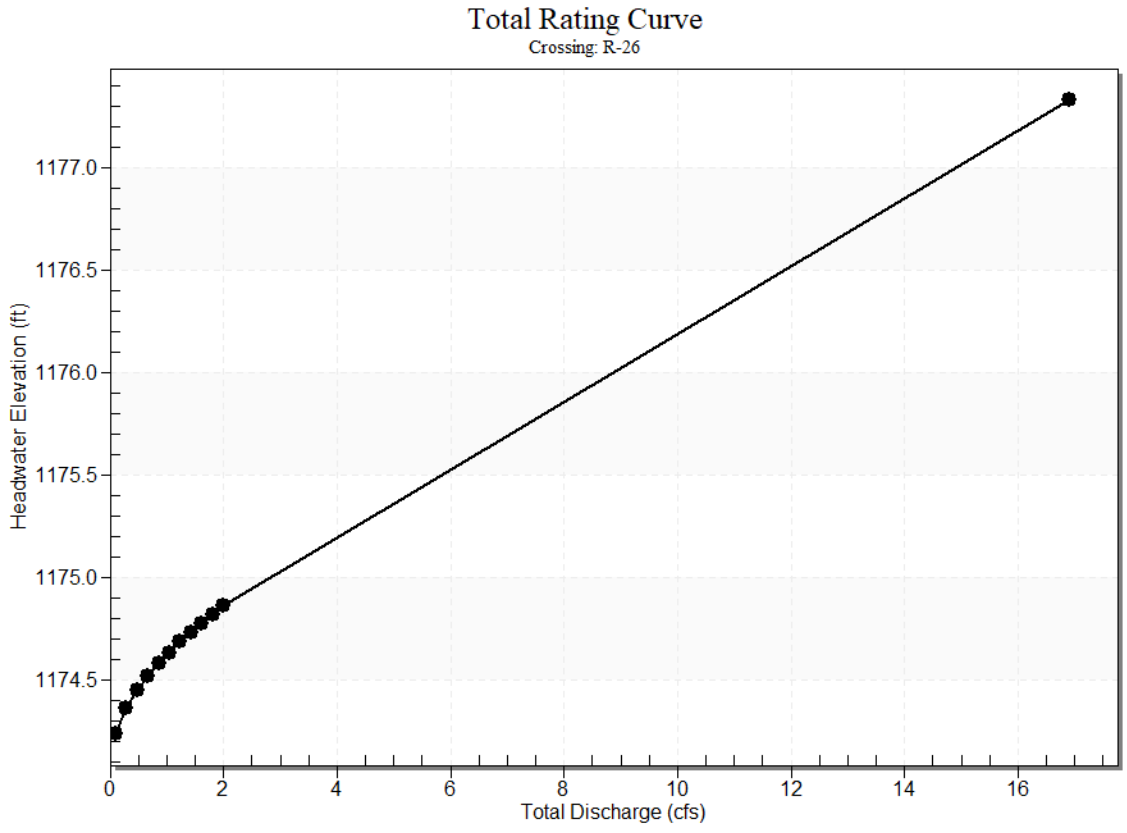
Maximum Flow: 2.00 cfs

Table 33 - Summary of Culvert Flows at Crossing: R-26

Headwater	Total	R-26	Roadway	Iterations

Elevation (ft)	Discharge (cfs)	Discharge (cfs)	Discharge (cfs)	
1174.24	0.10	0.10	0.00	1
1174.36	0.29	0.29	0.00	1
1174.45	0.48	0.48	0.00	1
1174.52	0.67	0.67	0.00	1
1174.58	0.86	0.86	0.00	1
1174.63	1.05	1.05	0.00	1
1174.68	1.24	1.24	0.00	1
1174.73	1.43	1.43	0.00	1
1174.78	1.62	1.62	0.00	1
1174.82	1.81	1.81	0.00	1
1174.86	2.00	2.00	0.00	1
1177.00	14.53	14.53	0.00	Overtopping

Rating Curve Plot for Crossing: R-26



Culvert Data: R-26

Table 20 - Culvert Summary Table: R-26

Total Discharge (cfs)	Culvert Discharge	Headwater Elevation	Inlet Control	Outlet Control	Flow Type	Normal Depth	Critical Depth	Outlet Depth	Tailwater Depth (ft)	Outlet Velocity	Tailwater Velocity

	(cfs)	(ft)	Depth (ft)	Depth (ft)		(ft)	(ft)	(ft)		(ft/s)	(ft/s)
0.10 cfs	0.10 cfs	1174.24	0.15	0.188	2-M2c	0.18	0.11	0.11	0.00	1.56	0.00
0.29 cfs	0.29 cfs	1174.36	0.26	0.311	2-M2c	0.30	0.19	0.19	0.00	2.06	0.00
0.48 cfs	0.48 cfs	1174.45	0.34	0.396	2-M2c	0.39	0.25	0.25	0.00	2.34	0.00
0.67 cfs	0.67 cfs	1174.52	0.40	0.466	2-M2c	0.46	0.29	0.29	0.00	2.56	0.00
0.86 cfs	0.86 cfs	1174.58	0.45	0.527	2-M2c	0.52	0.33	0.33	0.00	2.74	0.00
1.05 cfs	1.05 cfs	1174.63	0.50	0.583	2-M2c	0.58	0.37	0.37	0.00	2.89	0.00
1.24 cfs	1.24 cfs	1174.68	0.55	0.633	2-M2c	0.63	0.40	0.40	0.00	3.02	0.00
1.43 cfs	1.43 cfs	1174.73	0.59	0.681	2-M2c	0.68	0.43	0.43	0.00	3.14	0.00
1.62 cfs	1.62 cfs	1174.78	0.63	0.726	2-M2c	0.73	0.46	0.46	0.00	3.26	0.00
1.81 cfs	1.81 cfs	1174.82	0.67	0.768	2-M2c	0.78	0.49	0.49	0.00	3.36	0.00
2.00 cfs	2.00 cfs	1174.86	0.71	0.809	2-M2c	0.82	0.51	0.51	0.00	3.46	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

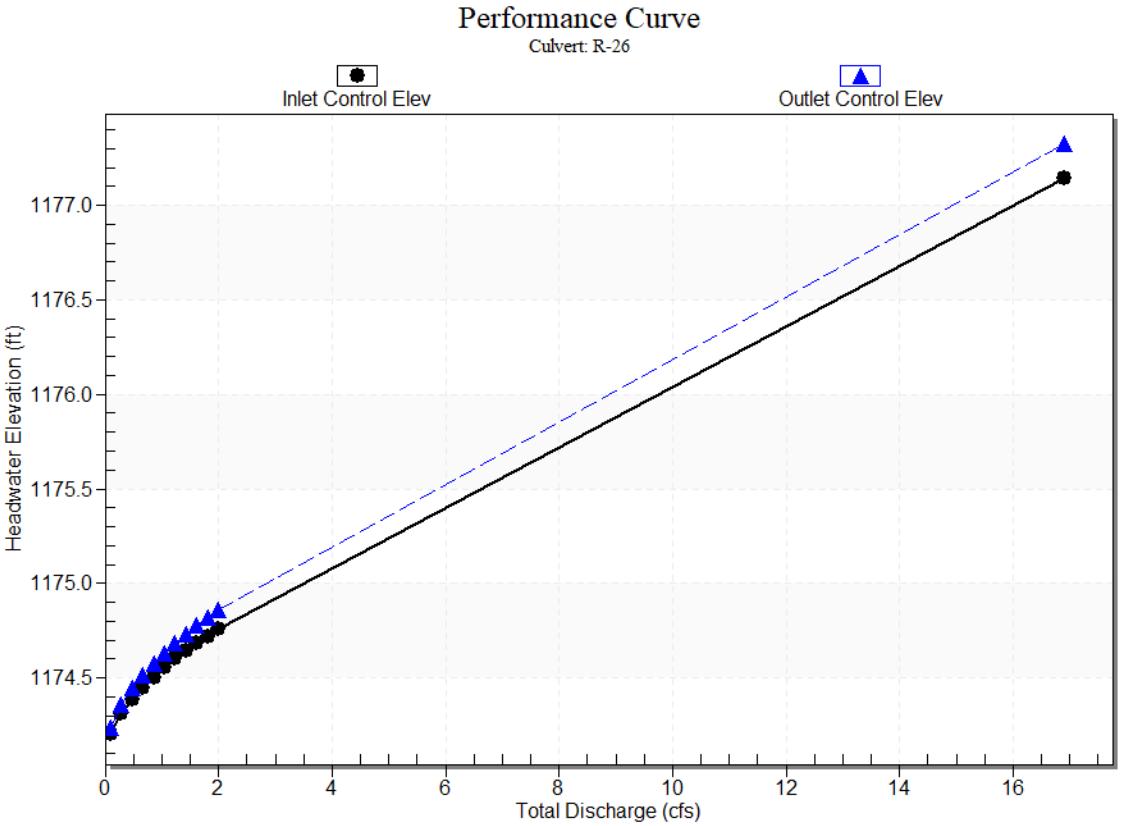
Inlet Elevation (invert): 1174.05 ft,

Outlet Elevation (invert): 1174.01 ft

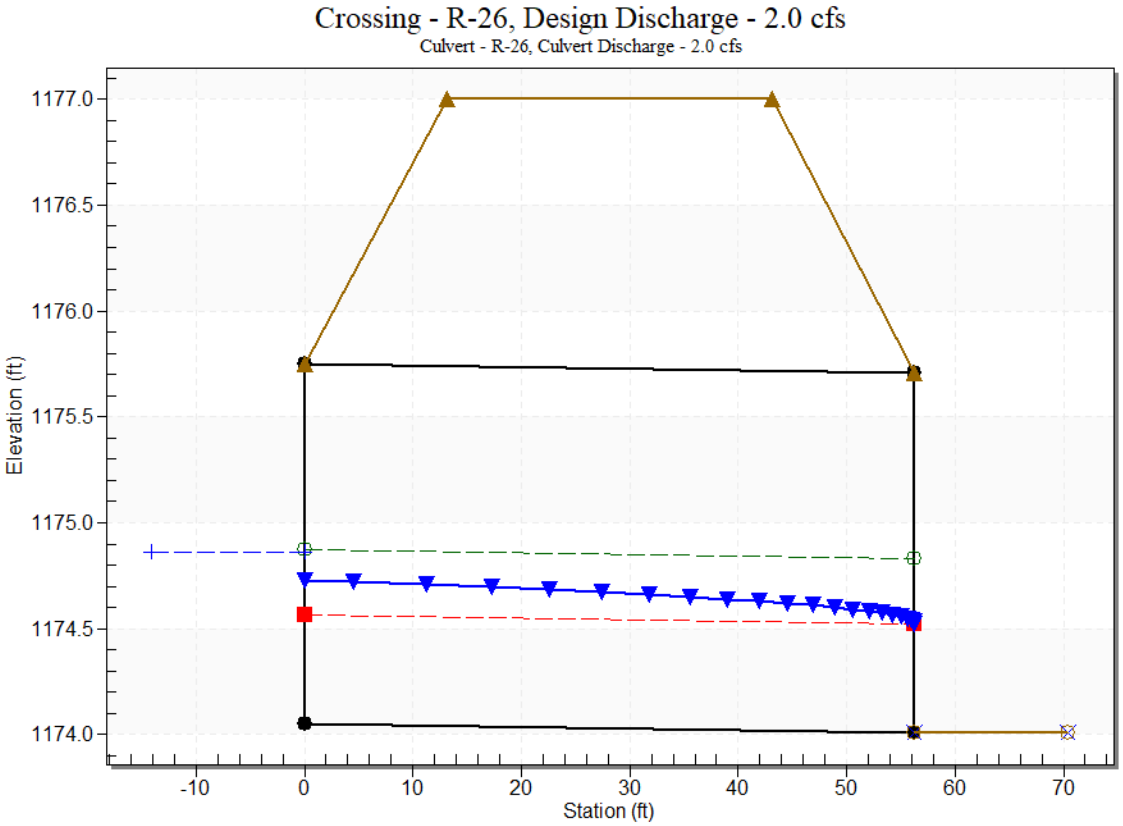
Culvert Length: 56.30 ft,

Culvert Slope: 0.0007

Culvert Performance Curve Plot: R-26



Water Surface Profile Plot for Culvert: R-26



Site Data - R-26

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1174.05 ft

Outlet Station: 56.30 ft

Outlet Elevation: 1174.01 ft

Number of Barrels: 1

Culvert Data Summary - R-26

Barrel Shape: Circular

Barrel Diameter: 1.70 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: R-26

Table 34 - Downstream Channel Rating Curve (Crossing: R-26)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.10	1174.01	0.00
0.29	1174.01	0.00
0.48	1174.01	0.00
0.67	1174.01	0.00
0.86	1174.01	0.00
1.05	1174.01	0.00
1.24	1174.01	0.00
1.43	1174.01	0.00
1.62	1174.01	0.00
1.81	1174.01	0.00
2.00	1174.01	0.00

Tailwater Channel Data - R-26

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 1174.01 ft

Roadway Data for Crossing: R-26

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1.67 ft

Crest Elevation: 1177.00 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Appendix 6

RPS ROTH PROFESSIONAL SOLUTIONS
315 DeWitt Street
Portage, WI 53901

Yuanyuan Zhao <yuanyuan@rpsprofessionalsolutions.com>

Kronenwetter Drive Utility Coordination Letter

WPS_Utilities_Relocation <UtilitiesRelocation@wisconsinpublicservice.com> Mon, Apr 15, 2024 at 9:10 AM
To: "yuanyuan@rpsprofessionalsolutions.com" <yuanyuan@rpsprofessionalsolutions.com>

Good morning Yuanyuan,

Attached is the Wisconsin Public Service System map including both Electric and Gas for the project 2024-020 in the Village of Kronenwater.

Have a great day,

Catrina Thiry

Managerial Specialist

Wisconsin Public Service

mobile: 920-433-1513

utilitiesrelocation@wisconsinpublicservice.com

NOTICE AND DISCLAIMER

At your request, Wisconsin Public Service (WPS) is providing information regarding the location of certain of its underground facilities, including paper maps and/or electronic files (the "Information").

WARNING: UNDERGROUND FACILITY LOCATIONS SHOWN IN THE PAPER MAPS AND/OR ELECTRONIC FILES ARE FOR REFERENCE PURPOSES ONLY AND, THEREFORE, *MUST BE* FIELD VERIFIED. WPS's agreement to provide this Information does not confirm or deny the location of any of WPS's underground facilities. Under the law and pursuant to Wisconsin State Statutes 66.047 and 182.0175, Federal Gas Safety Rule 192.614, and Michigan Act 53 of the Public Acts of 1974, you **MUST** confirm the locations of all underground facilities by requesting an underground locate through Diggers Hotline in Wisconsin by calling 811 or 800-242-8511 or MISS DIG in Michigan at 811 or 800-482-7171. Confirmation of the locations of underground facilities is **YOUR** responsibility.

DISCLAIMER: Anyone using the paper maps and/or electronic files assumes sole responsibility to verify in the field the locations of all underground facilities. To the fullest extent permitted by law, the user of the Information agrees to indemnify, defend, and hold WPS harmless from any and all claims, damages, losses, and expenses, including costs and attorneys' fees, arising out of or resulting from the use of the Information. Any user of the Information also agrees that the use or duplication of the Information constitutes agreement to the above terms and conditions.

Form 159-8200 Rev. 3-11

From: WPS New Service Installation <newserviceinstallation@wisconsinpublicservice.com>
Sent: Wednesday, April 10, 2024 2:50 PM
To: WPS_Utilities_Relocation <UtilitiesRelocation@wisconsinpublicservice.com>
Subject: FW: Kronenwetter Drive Utility Coordination Letter

Good Afternoon,

This was received by NSI. We believe that it would be something you would handle.

Thank you,

Melissa P.

New Service – Utility Service Clerk

Wisconsin Public Service

Phone: 800-242-9772

Fax: 866-430-6021

newserviceinstallation@wisconsinpublicservice.com

From: Yuanyuan Zhao <yuanyuan@rpsprofessionalsolutions.com>
Sent: Wednesday, April 10, 2024 1:32 PM
To: WPS New Service Installation <newserviceinstallation@wisconsinpublicservice.com>
Cc: Robert Roth <robert@rpsprofessionalsolutions.com>; Wayne Casper <wayne@rpsprofessionalsolutions.com>; lludi@kronenwetter.org; bjacobson@kronenwetter.org
Subject: Kronenwetter Drive Utility Coordination Letter

[Quoted text hidden]

DOT_2024-0410 Kronenwetter.dwg
9093K

RPS ROTH PROFESSIONAL SOLUTIONS
315 DeWitt Street
Portage, WI 53901

Yuanyuan Zhao <yuanyuan@rpsprofessionalsolutions.com>

Kronenwetter Drive Utility Coordination Letter

Marciniak, Tony <amarciniak@atcllc.com> Tue, Apr 23, 2024 at 12:25 PM
To: "yuanyuan@rpsprofessionalsolutions.com" <yuanyuan@rpsprofessionalsolutions.com>
Cc: "robert@rpsprofessionalsolutions.com" <robert@rpsprofessionalsolutions.com>, "lludi@kronenwetter.org" <lludi@kronenwetter.org>

Hello,

ATC does not have any transmission facilities within the project limits. There are no conflicts.

Thank you,

Tony Marciniak

Engineering-TLine Services

ATC
Energizing Your Future

PO Box 47

Waukesha, Wisconsin 53187-0047

Ph: 262-506-6814

Email: tmarciniak@atcllc.com

Tony Marciniak

Engineering-TLine Services

From: Robinson, Katie <ktrobinson@atcllc.com>
Sent: Tuesday, April 23, 2024 1:58 PM
To: Braun, Karen <kbraun@atcllc.com>
Cc: Callaway, Jon <jcallaway@atcllc.com>; White, Mike <mwhite@atcllc.com>
Subject: FW: Kronenwetter Drive Utility Coordination Letter

Hi Karen,

Here is some more info on the email I forwarded you yesterday.

Thanks,

Katie

****

Ka e Robinson

Sr. External Affairs Program Manager

ATC| Email: ktrobinson@atcllc.com | Phone: 608-877-3547

WE: care | challenge | commit | communicate | compete | celebrate

[Quoted text hidden]

Appendix 7

PUBLIC PARTICIPATION PLAN

Project Name: Kronenwetter Drive & Misc Streets Renovations

Location: Kronenwetter Wisconsin

Project Description: The Village of Kronenwetter will carry out a road upgrade project on Kronenwetter Drive from the south municipal boundary to Kowalski Road. This includes road resurfacing and reconstruction in some sections. In addition to the Kronenwetter Drive, it encompasses several roadways including Sedona Court, Pinedale Lane, Windwood Road, Oakdale Lane, and Wedgewood Drive.

1. INTRODUCTION

Purpose of the PPP

The primary purpose of this Public Participation Plan is to establish a framework for engaging with the local community and stakeholders throughout the planning and implementation phases of the Kronenwetter Drive Upgrade Project. This plan seeks to ensure that the project team communicates effectively, listens to, and incorporates public input into the decision-making process, enhancing the project's responsiveness to local needs and expectations.

Goals of public participation

Transparency: To maintain open and transparent communication with all stakeholders about the project's progress, decisions, and impacts.

Inclusivity: To ensure that the diverse voices of the Kronenwetter community, including underrepresented groups, are heard, and considered in the project planning.

Collaboration: To foster a collaborative environment where community members feel valued and can actively contribute to the project outcomes.

Accountability: To hold the project team accountable to the community by providing regular updates and justifications for decisions made.

Overview of the project

The Kronenwetter Drive Upgrade Project involves a comprehensive upgrade of Kronenwetter Drive, stretching from the south municipal boundary to Kowalski Road. The upgrade includes:

Reconstruction of Kronenwetter Drive: To improve driving conditions and safety.

Resurfacing in associated streets: To enhance structural integrity and roadway functionality in areas that are critically deteriorated.

Environmental Considerations: The project covers an area of approximately 41 acres, with plans in place to minimize environmental impact and ensure sustainability.

2. STAKEHOLDER IDENTIFICATION

The success of the Kronenwetter Drive Upgrade Project relies on the active participation of various stakeholders who are directly or indirectly affected by the project. These stakeholders include:

Local Residents: Individuals residing in or near the project area, particularly those on Sedona Court, Pinedale Lane, Windwood Road, Oakdale Lane, and Wedgewood Drive.

Business Owners: Operators of businesses located near the affected roadways, whose operations might be impacted by construction activities.

Community Organizations: Local groups including neighborhood associations, environmental advocacy groups, and civic organizations that represent the interests of specific community segments.

Local Government: Village officials and transportation authorities who play a role in the regulation and approval of the project.

Emergency Services: Local police, fire departments, and emergency medical services that require access and might be affected by road closures or detours.

Commuters: Regular users of the roads undergoing upgrades, including non-resident commuters who rely on these routes for accessing workplaces or other destinations.

Utility Companies: Providers of essential services such as electricity, water, gas, and telecommunications whose infrastructure may be impacted or need to be relocated or protected during the construction phase.

3. PUBLIC PARTICIPATION TECHNIQUES

The following methods will be implemented to encourage outreach and participation:

Newsletter: Newsletter in paper format will be sent out to ensure wide accessibility to inform the public about the project.

Public meeting: A Public meeting will be held during the initial planning phase. The dagte will be announced at least one week in advance. To accommodate varying schedules and preferences, meetings will be held in both in-person and virtual formats.

Public comment periods: Comment periods will be open after the public meeting and last for 30 days. Comments can be submitted via mail or email. All comments will be publicly accessible and taken into account in project decisions.

4. SCHEDULE

5. DOCUMENTATION AND FEEDBACK

Comments: All public comments will be compiled and analyzed.

Digital Recording: The public meeting will be recorded.

Comment Forms: During public meeting, comment forms will be provided for attendees to write down their thoughts and suggestions.

Feedback mechanisms: Regular project updates will be provided through newsletters.

6. EVALUATING THE EFFECTIVENESS OF THE PUBLIC PARTICIPATION PROCESS

Community Satisfaction: Utilize post-engagement surveys to gauge community satisfaction with the participation process, focusing on their perceptions of openness, inclusiveness, and the impact of their contributions.

Project Outcomes Alignment: Evaluate how well the final project outcomes align with the community's preferences and concerns as expressed during the participation process.

7. CONTACT INFORMATION

APPENDICES