REDTAIL RANCH

WATER & WASTEWATER UTILITY REPORT (PRELIMINARY PLAT)

PREPARED FOR:

THE TOWN OF ERIE

ON BEHALF OF:

STRATUS REDTAIL

March 9, 2023

Prepared By:

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7157 S. Andes Circle
Centennial, CO 80016
303-903-0918

Job No. 39-004-01

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APPENDICES

SECTION 1: INTRODUCTION

1.1 BACKGROUND

Redtail Ranch is a proposed 293.9-acre residential development located in Weld County and the Town of Erie, CO. Redtail Ranch will contain 587 single-family residential units. Redtail Ranch is being developed by Stratus Companies and this report is specific to the Preliminary Plat application for the entire development.

Redtail Ranch will receive water and wastewater service from the Town of Erie (Erie). This Water & Wastewater Utility Report will summarize the water and wastewater infrastructure required to provide service in accordance with Erie's development standards.

1.2 LOCATION

Redtail Ranch is located within Erie at the northwest corner of the Weld County Road 5 and Weld County Road 4 intersection. The development is bound on the north by the Denver Regional landfill, the west by the Vista Pointe development, the south by the Vista Ridge development and the east by the Republic landfill.

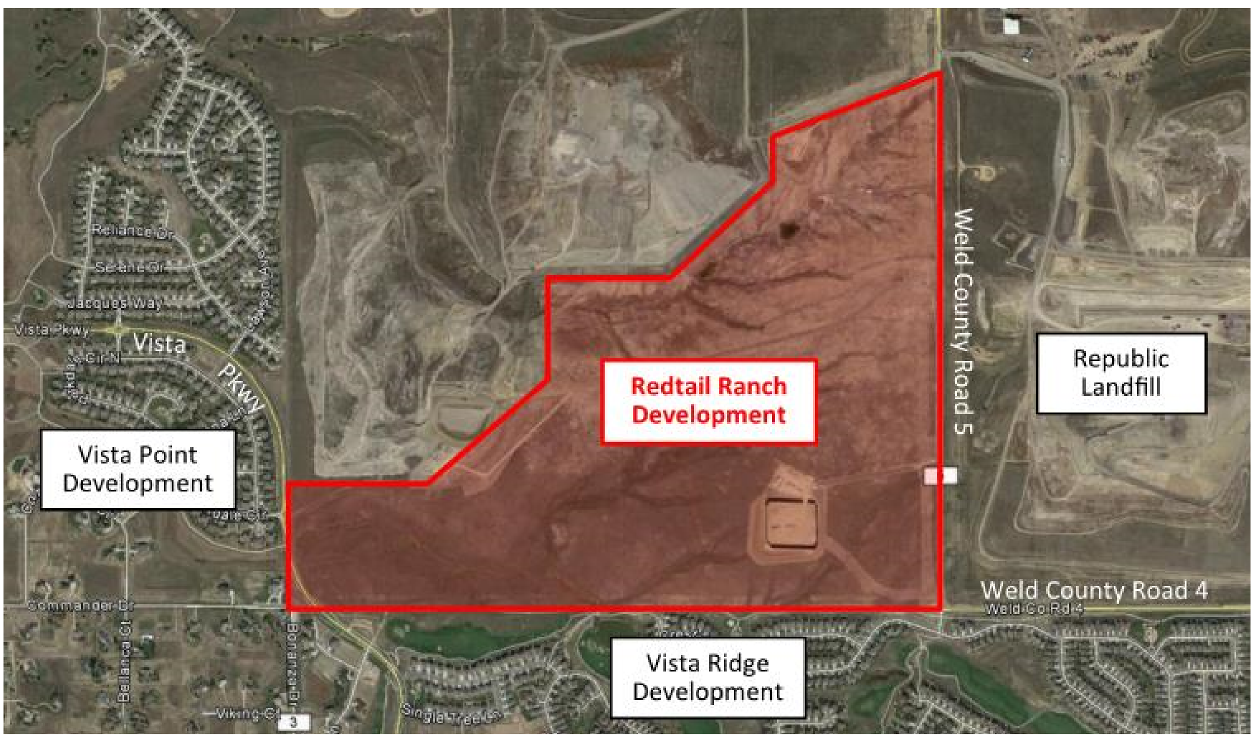

FIGURE 1-1: LOCATION MAP
(NOT TO SCALE)

SECTION 2: DEVELOPMENT SUMMARY

2.1 DEVELOPMENT COMPOSITION

The development boundary for Redtail Ranch is shown in Figure 1-1. It encompasses 293.9 gross acres and is zoned Low Density Residential. The development will be completed in phases.

The proposed development consists of 587 single-family residences. There are no multi-family, commercial, school, or industrial users. Redtail Ranch does not have a club house or other community facility.

The proposed development composition is provided in Table 2-1:

Table 2-1: Proposed Development Summary

Development Type	Total Units
Single-family Residential	587

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SECTION 3: WATER SYSTEM

3.1 WATER SYSTEM DESIGN CRITERIA

The water system within Redtail Ranch will be designed in accordance with Erie's *Standards and Specifications for Design and Construction of Public Improvements, Section 600 Water Supply Facilities*, 2023 Edition. Where criteria is not specifically stated in these standards, the design will conform to general industry practices. Provided below is the water system design criteria that was used to develop the proposed water system:

Table 3-1: Summary Water System Design Criteria

Description	Value
Residential Demand	140 gpd/capita
Capita per Residential Unit	2.89
Average Day Demand (ADD)	404.6 gpd/unit
Maximum Day Demand (MDD)	1,000 gpd/unit
Peak Hour Demand (PHD) Factor	2.0 x MDD
Maximum system pressure	125 psi
Minimum system pressure	43 psi
Fire flow criteria	See section 3.4.3

3.2 WATER DEMAND

Based on the development composition listed in Section 2.1 and the demand unit values, Redtail Ranch will have an average daily water demand of 237,500 gallons per day (gpd) and a maximum day demand of 587,000 gpd. Provided in Table 3-2 is a summary of the water demands for Redtail Ranch.

Table 3-2: Summary of Water Demands

Development Type	Number of Units	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Peak Hour Demand (gpm)
Single-family Residential	587	237,500	587,000	815.3

3.3 EXISTING WATER SYSTEM INFRASTRUCTURE

3.3.1 Existing Pressure Zones

Redtail Ranch is located in two pressure zones: Zone 3 and Zone 4. The information on both pressure zones is provided in Table 3-3. These values were used in the hydraulic model of the system.

Table 3-3: Pressure Zone Information

Zone	Elevation Range (feet)	HGL Static Elevation (feet)
3	5070 to 5210	5313
4	5210 to 5300	5420

The majority of Redtail Ranch will be situated in Pressure Zone 3 with 135 of the homes in Pressure Zone 4.

3.3.3 Existing Pipelines

There are two Zone 3 pipelines near Redtail Ranch. The first is a 24-inch located to the west in Vista Parkway and the second is a 24-inch running along the south boundary of Redtail Ranch. The nearest existing Zone 4 pipeline will be a 20-inch to the east in Weld County Road 5.

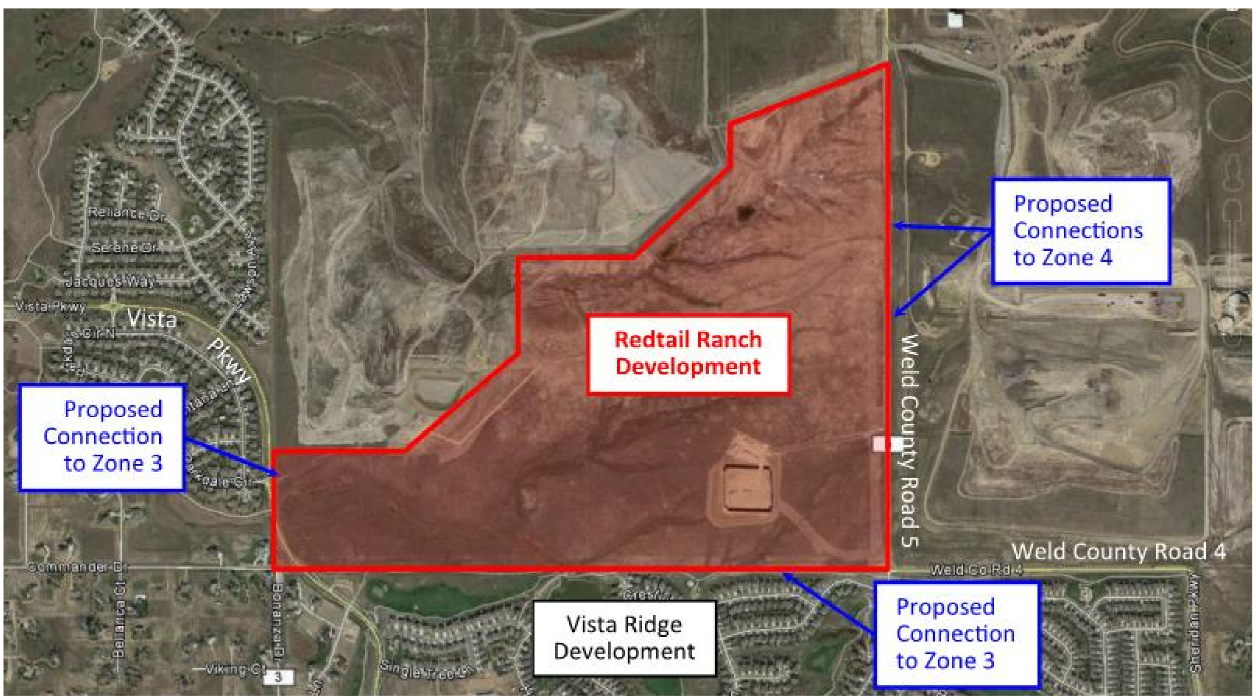

FIGURE 3-3: PROPOSED WATER CONNECTIONS
(NOT TO SCALE)

3.4 WATER MODEL

3.4.1 Methodology

A computer analysis using the Innovyze® software was performed on Redtail Ranch. The water lines throughout the proposed water distribution system were evaluated.

Demands for each lot in the development were clustered to the nearest junction along the water lines. The following scenarios were evaluated by the model:

- Peak Hour Demand
- Maximum Day Demand plus Fire Flow

The final sizing of the proposed waterlines were based on the worst-case demand scenario – Maximum Day plus Fire Flow. The model utilized a Hazen-Williams coefficient of 120 for all pipes.

Table 3-4A: Water System Connection Point Pressures

No.	Location/Description	Junction Number	Elevation	Static Pressure (psi)
1	Zone 3 connection, 24-inch in Vista Parkway	J250	5109.26	87.99
2	Zone 3 connection, 24-inch to the south	Z3_FEED2	5174.00	60.21
3	Zone 4 connection to existing 20-inch in Weld County Road 5	J348	5183.00	82.79

3.4.2 Off-site Demands

The proposed water system pipelines within Redtail Ranch will be incorporated into the Town's existing system and will convey flows to the adjacent developments. However, off-site demands were not included in the hydraulic analysis.

3.4.3 Fire Flow

A fire flow scenario was performed by the water model. It applies a fire flow demand at each fire hydrant location and determines the residual pressure at that point. A minimum of 20 psi residual pressure is required to "pass". Fire flows demands are applied during the maximum day demand scenario. The fire flows demand is 1,000 gpm for a residential unit and is based on Erie's criteria.

3.4.4 Summary of Results

The water model demonstrated the following (detailed results are provided in Appendix B):

Table 3-4B: Zone 3 Water System Model Results

Scenario	Lowest Pressure (psi)	Highest Pressure Drop (psi)	Highest Velocity (fps)	Fire Flow Residual Pressure
PHD	44.03 (J366)	1.14 (multiple)	1.77 (P76)	n/a
MDD plus FF	40.82 (J258)	11.05 (J326)	n/a	Pass

Table 3-4C: Zone 4 Water System Model Results

Scenario	Lowest Pressure (psi)	Highest Pressure Drop (psi)	Highest Velocity (fps)	Fire Flow Residual Pressure
PHD	82.76 (J350)	0.12 (multiple)	0.63 (P128)	n/a
MDD plus FF	82.78 (J306)	5.47 (J350)	n/a	Pass

3.5 Proposed Water System Infrastructure

Based on the water model analysis, the following infrastructure is required to maintain adequate pressures in the development.

3.5.1 Booster Pump Station

A booster pump station is not proposed in order to provide pressure to Redtail Ranch.

3.5.2 Distribution System

The connection to Zone 3 near Hawkeye Street will be 12-inch C900 PVC. Elsewhere in the development, 8-inch diameter C900 PVC pipelines will be installed. All of the pipelines will be located within the public streets or dedicated easements.

SECTION 4: WASTEWATER SYSTEM

4.1 WASTEWATER SYSTEM DESIGN CRITERIA

The wastewater system within Redtail Ranch will be designed in accordance with Erie's *Standards and Specifications for Design and Construction of Public Improvements, Section 700 Sanitary Sewer Facilities*, 2023 Edition. Additional information was taken from the *2020 Wastewater Utility Plan*. Where criteria is not specifically stated in these standards, the design will conform to general industry practices for this region. Provided below is a list of criteria that was used to evaluate the proposed wastewater system:

Table 4-1: Summary Wastewater System Design Criteria

Description	Value
Pipe velocity (maximum)	10 fps
Pipe velocity (minimum)	2 fps
Residential Wastewater Production	90 gpd/capita
Capita per Residential Unit	2.89
Residential Average Daily Flow	260.1 gpd/unit
Peak Demand Factor (Min. 2.0, Max. 4.0)	$2.6*Q_{max}^{-0.16}$
d/D Maximum (12-inch and smaller)	0.5
d/D Maximum (larger than 12-inch)	0.7
Inflow/Infiltration	Included in ADF

4.2 WASTEWATER LOADING

Based on the development's composition and average wastewater loading from Table 4-1, the anticipated daily wastewater flow from Redtail Ranch is 152,679 gpd. Table 4-2 provides a breakdown of the flows.

Table 4-2: Redtail Ranch Summary of Wastewater Loading

Development Type	Total Units	Average Flow (gpd)	Peak Flow (gpm)
Single-family residential	587	152,679	347

4.3 Existing Wastewater System Infrastructure

4.3.1 Existing Interceptors

Per the *2020 Wastewater Master Plan*, flows from Redtail Ranch will discharge into the existing 18-inch Coal Creek Interceptor, which currently extends through Retail Ranch's boundary and serves Vista Ridge. The Coal Creek Interceptor eventually increases to 30-inch diameter and discharges into the South Water Reclamation Facility.

4.3.2 Existing Lift Stations

The flows from Redtail Ranch will reach the South Water Reclamation Facility via the Coal Creek Interceptor without the use of lift stations.

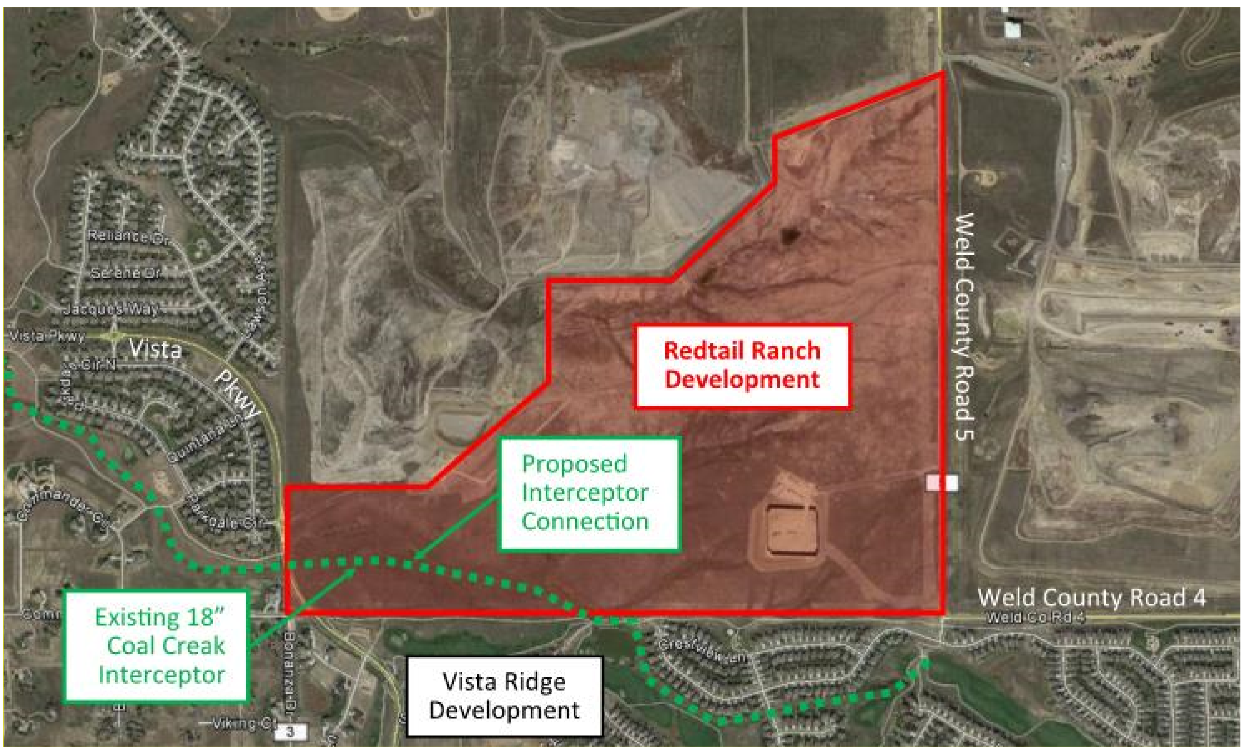

FIGURE 4-3: PROPOSED CONNECTION TO EXISTING INTERCEPTOR
(NOT TO SCALE)

4.4 Wastewater Analysis

4.4.1 Methodology

Calculations were performed on the sanitary sewer outfall from Redtail Ranch. The existing Coal Creek Interceptor was not analyzed as the proposed development composition is within the Annexation Agreement. The flows generated by the proposed 587 units were used to evaluate the proposed sewer outfall. The peaking factor was applied to the average day flows and the sum total was used to analyze the pipe's carrying capacity. The analysis utilized a Manning's coefficient of 0.012.

4.4.2 Off-site Flows

Proposed sanitary sewers in Redtail Ranch will not carry any off-site flows.

4.4.3 Summary of Results

For the Preliminary Plat, preliminary sanitary sewer plan and profiles were prepared by CWC Consulting Group. This report evaluated the pipe's capacity to convey the proposed peak wastewater loads from the service basin. The results below assume the most downstream portion of the collection system including the segment that conveys all of the development's flow prior to connecting to the existing Coal Creek Interceptor.

Table 4-4: Sanitary Sewer Slopes

Number of Lots Served	Pipeline Size (inch)	Slope (%)	Erie's Min. Slope (%)	Meets Erie's Slope Criteria?	d/D	Erie's d/D Criteria	Meets Erie's d/D Criteria?
120	8	1.01%	0.40%	Yes	0.23	0.50	Yes
587	12	0.58%	0.22%	Yes	0.35	0.50	Yes

4.5 Proposed Wastewater System Infrastructure

4.5.1 Lift Stations

Redtail Ranch will not require a lift station to convey wastewater flows within or out of the development.

4.5.2 Collection Pipelines

The sanitary sewer lines within Redtail Ranch will be evaluated for the Final Plat submittal. It is anticipated that some of the most downstream segments will be 12-inch diameter.

Appendix A
Water and Sewer System Exhibits

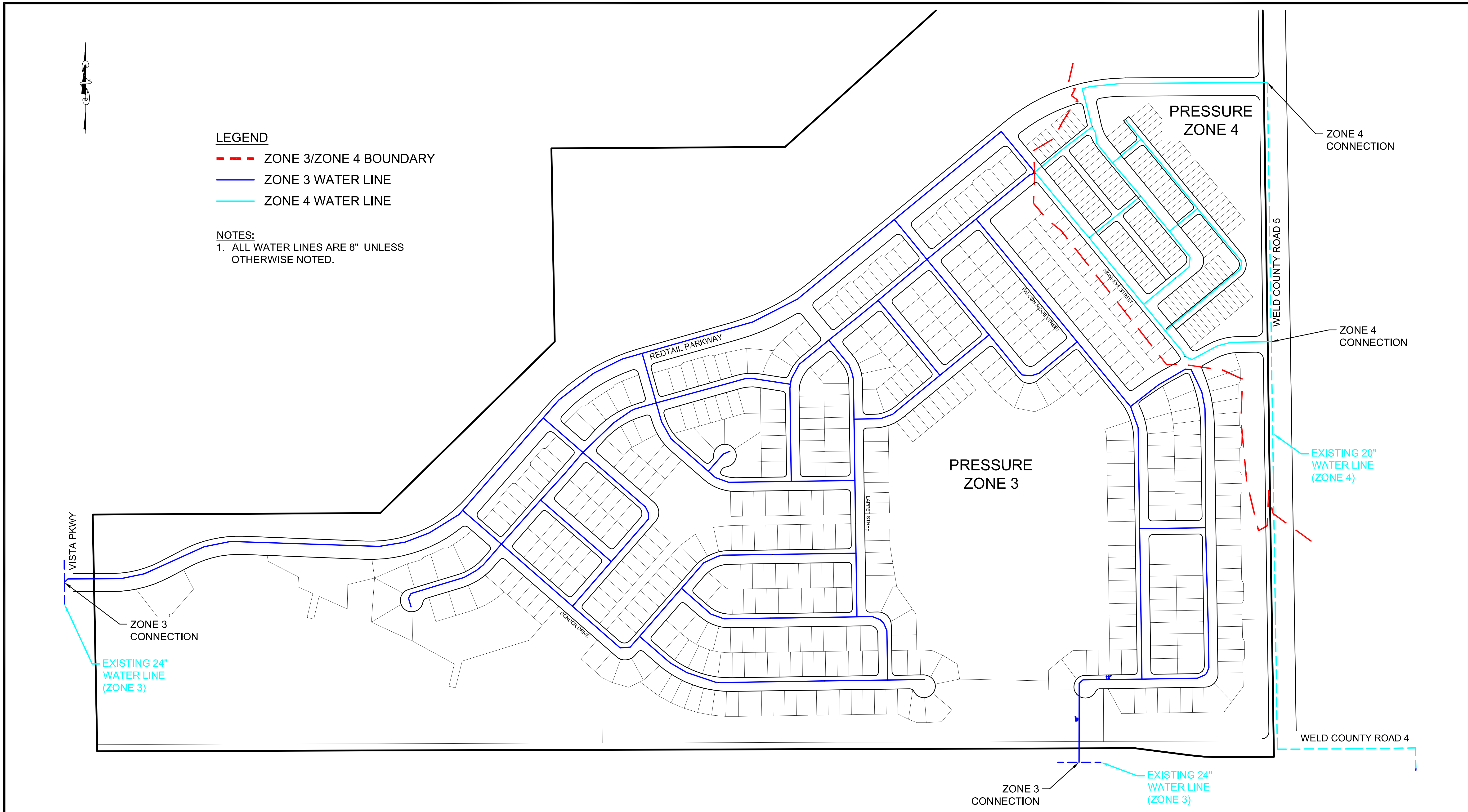

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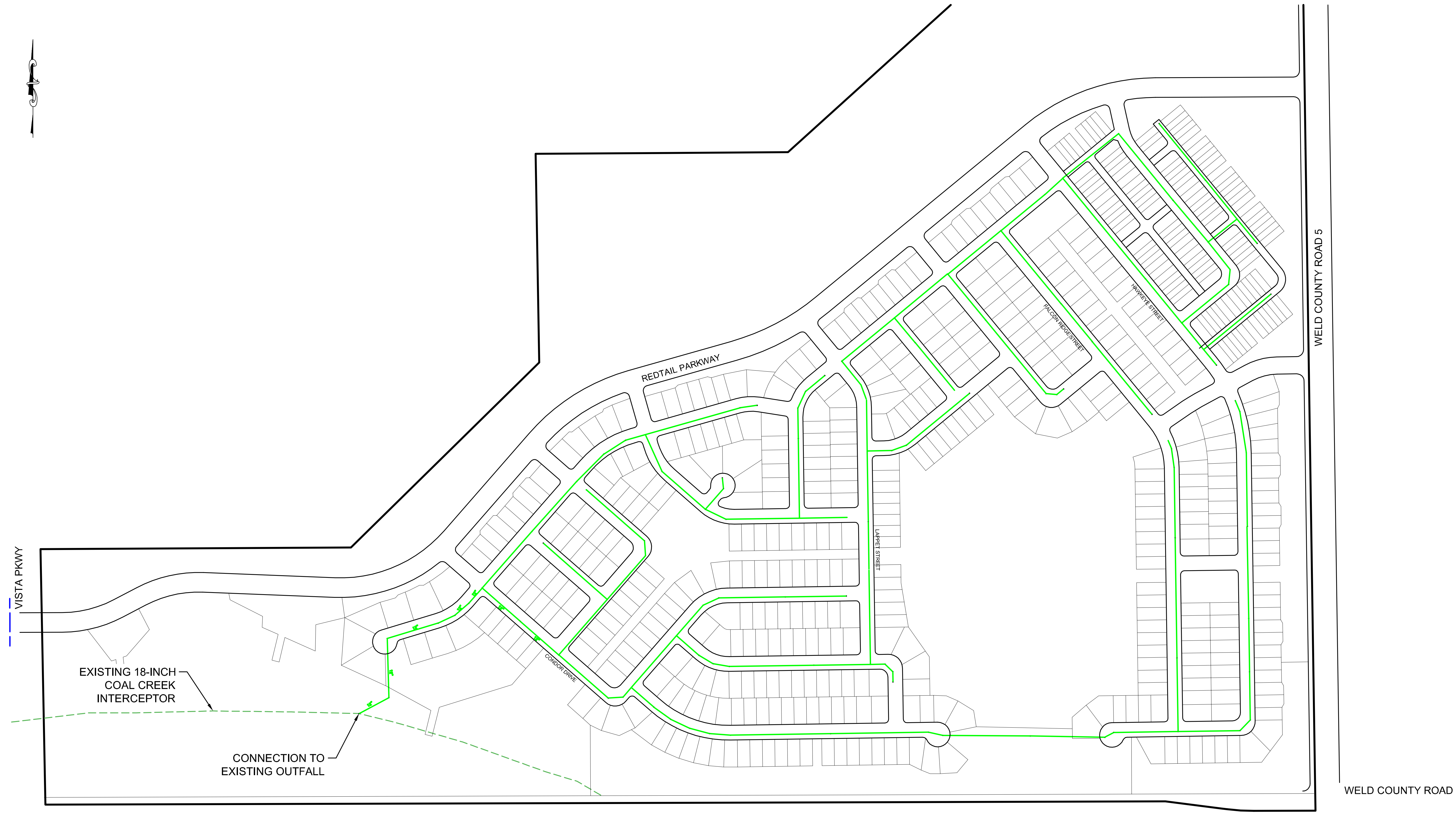
FIGURE A1 - WATER SYSTEM

MARCH 2023

SCALE: 1"=400'



NOTES:
1. ALL SEWER LINES ARE 8" UNLESS OTHERWISE NOTED.

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PRELIMINARY

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FIGURE A2 - SANITARY SEWER SYSTEM	
MARCH 2023	SCALE: 1"=400'

Appendix B
Water Model Results

Redtail Ranch
Utility Report Water & Wastewater Calculations (Preliminary Plat)
Water Demand
Date: March 2023
MSK Project #: 39-004-01
Calc'd by: DLT

PRELIMINARY
3/7/23

Based on Erie Criteria (Section 600 of the Standards and Specifications, dated January 2023)

Residential Demand:	140	gpd/capita
Capita per SF Unit:	2.89	capita/unit
Average Day Demand:	404.6	gpd (per residential unit)
Max. Day Demand Factor:	1,000	gpd/EQR
Peak Hour Demand Factor:	2.0	times MDD

Table B1-1: Buildout Water Demands

A	B	C	D	E	F	G
No.	**Description**	**EQRs**	**Average Day Demand (gpd)**	**Max. Day Demand (gpd)**	**Max. Day Demand (gpm)**	**Peak Hour Demand (gpm)**
1	Single-family Residential (Zone 3)	587.0	237,500	587,000	407.6	815.3
Totals		**587.0**	**237,500**	**587,000**	**407.6**	**815.3**

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Redtail Ranch Preliminary Utility Report ADD= 404.6 gpd/SFE

Water Model Junction Report 0.281 gpm/SFE

Model Run Date: Mar 6, 2023 MDD= 2.4716 x ADD

PHD= 4.9432 x ADD Min. pressure: **44.03**

Table B2-1: Water Model Junction Report

PHD Factor: 4.94

PHD OUTPUT = 815.3 gpm

ID	Description (Char)	DU	Zone (Char)	Elevation (ft)	Static (ft)	Static (psi)	Demand (gpm)	Head (ft)	Pressure (psi)
J10	New Junction	7	3	5,174.00	139.00	60.25	9.72	5,310.59	59.18
J108	FH	13	3	5,154.45	158.55	68.73	18.06	5,310.44	67.59
J12	FH	9	3	5,170.50	142.50	61.77	12.50	5,310.55	60.68
J14	New Junction		3	5,159.49	153.51	66.54	0.00	5,310.58	65.47
J16	FH		3	5,143.78	169.22	73.35	0.00	5,310.59	72.28
J17	New Junction	7	3	5,136.49	176.51	76.51	9.72	5,310.56	75.43
J18	FH		3	5,134.89	178.11	77.20	0.00	5,310.65	76.15
J20	FH		3	5,178.85	134.15	58.15	0.00	5,310.63	57.1
J22	FH	17	3	5,191.58	121.42	52.63	23.61	5,310.66	51.6
J230	FH	8	4	5,214.00	206.00	89.29	11.11	5,419.82	89.18
J24	FH	10	3	5,156.23	156.77	67.95	13.89	5,310.43	66.82
J250	Z3 Feed West		3	5,110.00	203.00	87.99	0.00	5,313.00	87.96
J256	FH		3	5,201.13	111.87	48.49	0.00	5,310.65	47.45
J258	FH		3	5,202.65	110.35	47.83	0.00	5,310.65	46.8
J26	FH	8	3	5,166.00	147.00	63.72	11.11	5,310.43	62.58
J262	FH	14	3	5,168.00	145.00	62.85	19.44	5,310.54	61.76
J278	FH		3	5,169.18	143.82	62.34	0.00	5,310.62	61.28
J28	FH	11	3	5,163.61	149.39	64.76	15.28	5,310.44	63.62
J290	FH	18	3	5,207.76	105.24	45.62	25.00	5,311.89	45.12
J294	New Junction	16	3	5,199.00	114.00	49.41	22.22	5,312.11	49.01
J298	FH	11	3	5,188.96	124.04	53.77	15.28	5,312.44	53.51
J30	New Junction		3	5,127.09	185.91	80.59	0.00	5,310.70	79.56
J306	FH	4	4	5,219.50	200.50	86.91	5.56	5,419.80	86.79
J308	New Junction		4	5,211.06	208.94	90.57	0.00	5,419.87	90.48
J310	FH	22	4	5,220.00	200.00	86.69	30.56	5,419.80	86.57
J312	New Junction	6	4	5,217.80	202.20	87.65	8.33	5,419.80	87.53
J314	New Junction	16	4	5,219.00	201.00	87.13	22.22	5,419.80	87.01
J316	New Junction	6	4	5,215.89	204.11	88.47	8.33	5,419.81	88.36
J318	FH	11	4	5,213.00	207.00	89.73	15.28	5,419.80	89.61
J32	FH	9	3	5,127.24	185.76	80.52	12.50	5,310.58	79.44
J320	FH	7	4	5,219.46	200.54	86.93	9.72	5,419.81	86.81
J322	New Junction	4	3	5,150.00	163.00	70.65	5.56	5,310.54	69.56
J324	FH	3	3	5,152.54	160.46	69.55	4.17	5,310.54	68.46
J326	FH	6	3	5,118.52	194.48	84.30	8.33	5,310.58	83.22
J328	FH	11	3	5,121.59	191.41	82.97	15.28	5,310.53	81.87
J330	FH	14	3	5,128.49	184.51	79.98	19.44	5,310.45	78.84
J332	FH	16	3	5,137.63	175.37	76.02	22.22	5,310.44	74.88
J334	FH	20	3	5,131.58	181.42	78.64	27.78	5,310.54	77.54
J336	New Junction	11	3	5,168.00	145.00	62.85	15.28	5,310.45	61.72
J338	FH	4	3	5,174.10	138.90	60.21	5.56	5,313.00	60.18
J34	FH		4	5,213.00	207.00	89.73	0.00	5,419.86	89.63
J342	FH	20	3	5,191.56	121.44	52.64	27.78	5,312.11	52.23
J344	New Junction	18	3	5,181.00	132.00	57.22	25.00	5,312.84	57.13
J346	New Junction		4	5,228.71	191.29	82.92	0.00	5,419.95	82.86
J348	Z4 Feed		4	5,229.00	191.00	82.79	0.00	5,420.00	82.76
J350	FH	16	4	5,204.00	216.00	93.63	22.22	5,419.81	93.51
J352	New Junction	14	4	5,211.00	209.00	90.59	19.44	5,419.81	90.48
J354	FH		4	5,211.00	209.00	90.59	0.00	5,419.81	90.48
J356	New Junction		3	5,208.07	104.93	45.48	0.00	5,311.73	44.91
J358	New Junction	11	3	5,182.00	131.00	56.78	15.28	5,310.63	55.74
J36	New Junction	15	4	5,212.00	208.00	90.16	20.83	5,419.82	90.05
J360	FH	19	3	5,197.48	115.52	50.07	26.39	5,310.93	49.15
J362	FH	9	3	5,203.01	109.99	47.68	12.50	5,311.65	47.07
J364	New Junction		3	5,209.60	103.40	44.82	0.00	5,311.85	44.31
J366	New Junction		3	5,210.15	102.85	44.58	0.00	5,311.77	44.03
J368	FH		3	5,193.49	119.51	51.80	0.00	5,312.00	51.35
J370	New Junction	16	3	5,156.23	156.77	67.95	22.22	5,310.53	66.86
J372	FH	14	3	5,155.00	158.00	68.49	19.44	5,310.55	67.4
J374	FH	6	3	5,160.94	152.06	65.91	8.33	5,310.55	64.82
J376	New Junction		3	5,167.00	146.00	63.29	0.00	5,310.61	62.23
J378	New Junction	8	3	5,164.28	148.72	64.46	11.11	5,310.54	63.37
J38	FH	17	3	5,137.99	175.01	75.86	23.61	5,310.43	74.72
J380	New Junction	10	3	5,164.84	148.16	64.22	13.89	5,310.51	63.12
J382	New Junction		4	5,210.00	210.00	91.03	0.00	5,419.82	90.91
J384	New Junction	10	4	5,210.28	209.72	90.91	13.89	5,419.81	90.79
J40	FH	13	3	5,150.80	162.20	70.31	18.06	5,310.44	69.17
J42	FH	18	3	5,190.55	122.45	53.08	25.00	5,310.65	52.04
J44	FH	17	3	5,180.01	132.99	57.65	23.61	5,310.59	56.58
J68	New Junction	12	3	5,145.84	167.16	72.46	16.67	5,310.56	71.37
J84	FH	5	3	5,164.00	149.00	64.59	6.94	5,310.43	63.45
J92	FH		3	5,165.58	147.42	63.90	0.00	5,310.48	62.78
		587					815.3		

STRATUS REDTAIL
Redtail Ranch Preliminary Utility Report
Water Model Pipe Report
Model Run Date: Mar 6, 2023

Max. Velocity: 1.77 ft/sec

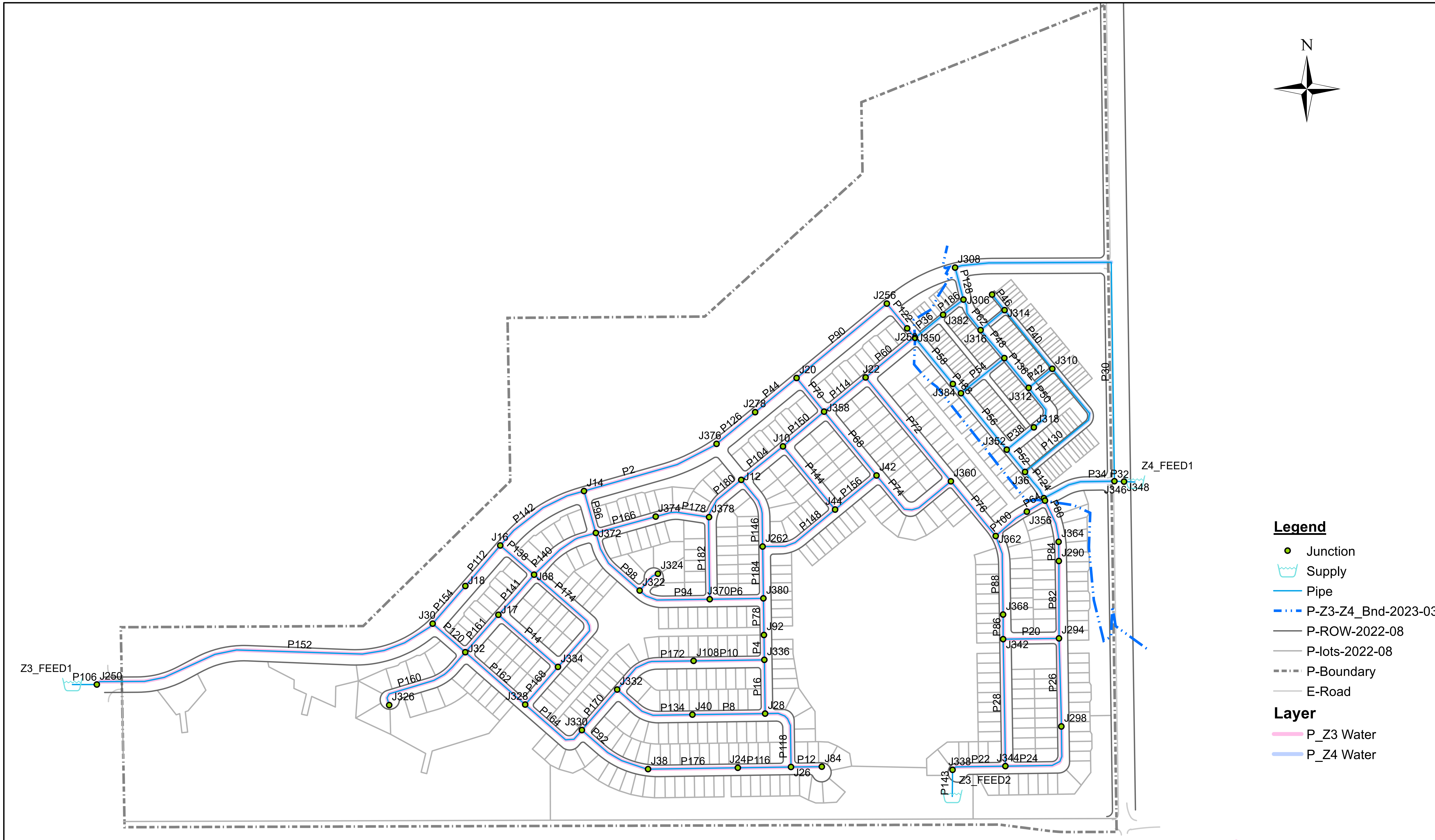
Table B2-2: Water Model Pipe Report

ID	Description (Char)	Zone (Char)	NOTE (Char)	From Node	To Node	Length (ft)	Diameter (in)	Roughness	PHD OUTPUT Flow (gpm)	Velocity (ft/s)	Headloss (ft)	HL/1000 (ft/k-ft)	Status
P10	P_Z3-Water	3		J108	J336	369	8	120	-26.33	0.17	0.01	0.03	Open
P100	P_Z3-Water	3		J362	J356	206.82	8	120	-113.33	0.72	0.08	0.38	Open
P102	P_Z3-Water	3	Closed	J366	J34	13.78	8	120	0	0	0	0	Closed
P104	P_Z3-Water	3		J12	J10	278.88	8	120	-63.71	0.41	0.04	0.13	Open
P106	connection	3		Z3_FEED1	J250	1	8	120	217.56	1.39	0	1.46	Open
P110	connection	4		Z4_FEED1	J348	1	8	120	187.49	1.2	0	0.98	Open
P112	P_Z3-Water	3		J16	J18	278.85	8	120	-82.73	0.53	0.06	0.21	Open
P114	P_Z3-Water	3		J358	J22	280	8	120	-60.96	0.39	0.03	0.12	Open
P116	P_Z3-Water	3		J24	J26	277	8	120	-3.09	0.02	0	0	Open
P118	P_Z3-Water	3		J26	J28	379.62	8	120	-21.14	0.13	0.01	0.02	Open
P12	P_Z3-Water	3		J26	J84	161.25	8	120	6.94	0.04	0	0	Open
P120	P_Z3-Water	3		J30	J32	226.5	8	120	134.83	0.86	0.12	0.52	Open
P122	P_Z3-Water	3		J256	J258	167.35	8	120	-28.4	0.18	0	0.03	Open
P124	P_Z4-Water	4		J34	J36	169.63	8	120	89.16	0.57	0.04	0.24	Open
P126	P_Z3-Water	3		J376	J278	260.44	8	120	-34.6	0.22	0.01	0.04	Open
P128	P_Z4-Water	4		J230	J308	172.47	8	120	-98.33	0.63	0.05	0.29	Open
P130	P_Z4-Water	4		J36	J310	765.59	8	120	22.29	0.14	0.01	0.02	Open
P132	P_Z4-Water	4		J314	J316	162.88	8	120	-26.43	0.17	0	0.03	Open
P134	P_Z3-Water	3		J332	J40	438.96	8	120	15.44	0.1	0	0.01	Open
P136	P_Z4-Water	4		J312	J320	200.02	8	120	-13.59	0.09	0	0.01	Open
P138	P_Z3-Water	3		J16	J68	232.58	8	120	60.2	0.38	0.03	0.12	Open
P14	P_Z3-Water	3		J17	J334	412.85	8	120	36	0.23	0.02	0.04	Open
P140	P_Z3-Water	3		J68	J372	396.79	8	120	21.51	0.14	0.01	0.02	Open
P141	P_Z3-Water	3		J17	J68	280.19	8	120	5.39	0.03	0	0	Open
P142	P_Z3-Water	3		J16	J14	529.95	8	120	22.53	0.14	0.01	0.02	Open
P143	connection	3		Z3_FEED2	J338	1	12	120	410.22	1.16	0	0.49	Open
P144	P_Z3-Water	3		J44	J10	427.13	8	120	3.28	0.02	0	0	Open
P146	P_Z3-Water	3		J12	J262	382.37	8	120	22.69	0.14	0.01	0.02	Open
P148	P_Z3-Water	3		J262	J44	443.17	8	120	-54.96	0.35	0.04	0.1	Open
P150	P_Z3-Water	3		J10	J358	281.16	8	120	-70.15	0.45	0.04	0.15	Open
P152	P_Z3-Water	3		J250	J30	1,829.23	8	120	217.56	1.39	2.3	1.26	Open
P154	P_Z3-Water	3		J30	J18	260	8	120	82.73	0.53	0.05	0.21	Open
P156	P_Z3-Water	3		J42	J44	280	8	120	81.86	0.52	0.06	0.21	Open
P158	P_Z3-Water	3		J322	J324	131.95	8	120	4.17	0.03	0	0	Open
P16	P_Z3-Water	3		J28	J336	280	8	120	-39.04	0.25	0.01	0.05	Open
P160	P_Z3-Water	3		J32	J326	528.84	8	120	8.33	0.05	0	0	Open
P161	P_Z3-Water	3		J32	J17	260.01	8	120	51.11	0.33	0.02	0.08	Open
P162	P_Z3-Water	3		J32	J328	414.86	8	120	62.89	0.4	0.05	0.13	Open
P164	P_Z3-Water	3		J328	J330	386.15	8	120	83.24	0.53	0.08	0.21	Open
P166	P_Z3-Water	3		J372	J374	323.82	8	120	23.92	0.15	0.01	0.02	Open
P168	P_Z3-Water	3		J328	J334	260	8	120	-35.63	0.23	0.01	0.05	Open
P170	P_Z3-Water	3		J330	J332	280	8	120	29.39	0.19	0.01	0.03	Open
P172	P_Z3-Water	3		J332	J108	456.82	8	120	-8.27	0.05	0	0	Open
P174	P_Z3-Water	3		J334	J68	670.45	8	120	-27.41	0.17	0.02	0.03	Open
P176	P_Z3-Water	3		J38	J24	468.56	8	120	10.8	0.07	0	0.01	Open
P178	P_Z3-Water	3		J374	J378	283.12	8	120	15.59	0.1	0	0.01	Open
P180	P_Z3-Water	3		J378	J12	264.28	8	120	-28.52	0.18	0.01	0.03	Open
P182	P_Z3-Water	3		J370	J378	427.60	8	120	-32.99	0.21	0.02	0.04	Open
P184	P_Z3-Water	3		J380	J262	270	8	120	-58.21	0.37	0.03	0.11	Open
P186	P_Z4-Water	4		J382	J230	132.24	8	120	-36.11	0.23	0.01	0.04	Open
P188	P_Z4-Water	4	Closed	J384	J354	64.48	8	120	0	0	0	0	Closed
P2	P_Z3-Water	3		J14	J376	737.55	8	120	-34.6	0.22	0.03	0.04	Open
P20	P_Z3-Water	3		J342	J294	291.36	8	120	-0.49	0	0	0	Open
P22	P_Z3-Water	3		J344	J338	281.88	12	120	-404.66	1.15	0.16	0.55	Open
P24	P_Z3-Water	3		J298	J344	473.34	8	120	-176.32	1.13	0.4	0.85	Open
P26	P_Z3-Water	3		J294	J298	458.9	8	120	-161.04	1.03	0.33	0.72	Open
P28	P_Z3-Water	3		J342	J344	661.45	8	120	-203.34	1.3	0.73	1.11	Open
P30	P_Z4-Water	4		J308	J346	1,957.18	12	120	-98.33	0.28	0.08	0.04	Open
P32	P_Z4-Water	4		J348	J346	49.94	8	120	187.49	1.2	0.05	0.96	Open
P34	P_Z4-Water	4		J34	J346	388.04	8	120	-89.16	0.57	0.09	0.24	Open
P36	P_Z4-Water	4		J350	J382	189.77	8	120	-36.11	0.23	0.01	0.05	Open
P38	P_Z4-Water	4		J352	J318	183.09	8	120	19.63	0.13	0	0.02	Open
P4	P_Z3-Water	3		J336	J92	129.71	8	120	-80.65	0.51	0.03	0.2	Open
P40	P_Z4-Water	4		J310	J314	393.80	8	120	1.35	0.01	0	0	Open
P42	P_Z4-Water	4		J312	J310	158.41	8	120	9.61	0.06	0	0.01	Open
P44	P_Z3-Water	3		J278	J20	280.00	8	120	-34.6	0.22	0.01	0.04	Open
P46	P_Z4-Water	4		J314	J306	104.00	8	120	5.56	0.04	0	0	Open
P48	P_Z4-Water	4		J316	J320	191.45	8	120	16.35	0.1	0	0.01	Open
P50	P_Z4-Water	4		J318	J312	265.22	8	120	4.35	0.03	0	0	Open
P52	P_Z4-Water	4		J352	J36	150.00	8	120	-46.03	0.29	0.01	0.07	Open
P54	P_Z4-Water	4		J320	J354	291.60	8	120	-6.96	0.04	0	0	Open
P56	P_Z4-Water	4		J354	J352	378.88	8	120	-6.96	0.04	0	0	Open
P58	P_Z4-Water	4		J350	J384	310.36	8	120	13.89	0.09	0	0.01	Open
P6	P_Z3-Water	3		J370	J380	280.00	8	120	36.33	0.23	0.01	0.05	Open
P60	P_Z3-Water	3		J22	J258	388.68	8	120	28.4	0.18	0.01	0.03	Open
P62	P_Z4-Water	4		J316	J230	187.96	8	120	-51.11	0.33	0.02	0.09	Open
P64	P_Z3-Water	3		J356	J366	110.63	8	120	-113.33	0.72	0.04	0.38	Open
P68	P_Z3-Water	3		J358	J42	430.54	8	120	-30.66	0.2	0.01	0.03	Open
P70	P_Z3-Water	3		J20	J358	226.50	8	120	-6.2	0.04	0	0	Open
P72	P_Z3-Water	3		J22	J360	700.54	8	120	-112.97	0.72	0.26	0.37	Open
P74	P_Z3-Water	3		J42	J360	522.08	8	120	-137.52	0.88	0.28	0.54	Open
P76	P_Z3-Water	3		J360	J362	368.56	8	120	-276.88	1.77	0.72	1.96	Open
P78	P_Z3-Water	3		J92	J380	190.29	8	120	-80.65	0.51	0.04	0.2	Open
P8	P_Z3-Water	3		J40	J28	379.04	8	120	-2.62	0.02	0	0	Open
P80	P_Z3-Water	3		J364	J366	228.47	8	120	113.33	0.72	0.09	0.38	Open
P82	P_Z3-Water	3		J290	J294	402.60	8	120	-138.33	0.88	0.22	0.54	Open
P84	P_Z3-Water	3		J290	J364	100.23	8	120	113.33	0.72	0.04	0.38	Open
P86	P_Z3-Water	3		J368	J342	127.96	8	120	-176.05	1.12	0.11	0.85	Open
P88	P_Z3-Water	3		J362	J368	415.41	8	120	-176.05	1.12	0.35	0.85	Open
P90	P_Z3-Water	3		J20	J256	610.00	8	120	-28.4	0.18	0.02	0.03	Open
P92	P_Z3-Water	3		J38	J330	407.54	8	120	-34.41	0.22	0.02	0.04	Open
P94	P_Z3-Water	3		J322	J370	379.50	8	120	25.55	0.16	0.01	0.02	Open
P96	P_Z3-Water	3		J372	J14	226.71	8	120	-57.13	0.36	0.02	0.11	Open
P98	P_Z3-Water	3		J372	J322	388.89	8	120	35.28	0.23	0.02	0.04	Open

STRATUS REDTAIL
Redtail Ranch Preliminary Utility Report
Water Model Fire Flow Report
Model Run Date: Mar 6, 2023

Table B2-3: Water Model Fire Flow Report

ID (Char)	Description (Char)	Zone (Char)	Elevation (ft)	Static Demand (gpm)	Static Pressure (psi)	Static Pressure (ft)	Fire-Flow Demand (gpm)	Residual Pressure (psi)	Hydrant Available Flow (gpm)	Hydrant Pressure at Available Flow (psi)	Pass /Fail
J108	FH	3	5,154.45	9.03	68.73	158.55	1,000.00	60.53	2,921.38	20	Pass
J12	FH	3	5,170.50	6.25	61.77	142.50	1,000.00	55.69	3,260.54	20	Pass
J16	FH	3	5,143.78	0	73.35	169.22	1,000.00	67.23	3,716.31	20	Pass
J18	FH	3	5,134.89	0	77.20	178.11	1,000.00	70.80	3,733.26	20	Pass
J20	FH	3	5,178.85	0	58.15	134.15	1,000.00	51.98	3,035.88	20	Pass
J22	FH	3	5,191.58	11.81	52.63	121.42	1,000.00	46.71	2,857.13	20	Pass
J230	FH	4	5,214.00	5.56	89.29	206.00	1,000.00	86.89	6,592.32	20	Pass
J24	FH	3	5,156.23	6.94	67.95	156.77	1,000.00	58.77	2,683.21	20	Pass
J256	FH	3	5,201.13	0	48.49	111.87	1,000.00	41.34	2,305.35	20	Pass
J258	FH	3	5,202.65	0	47.83	110.35	1,000.00	40.82	2,303.77	20	Pass
J26	FH	3	5,166.00	5.56	63.72	147.00	1,000.00	54.82	2,596.87	20	Pass
J262	FH	3	5,168.00	9.72	62.85	145.00	1,000.00	56.69	3,284.25	20	Pass
J278	FH	3	5,169.18	0	62.34	143.82	1,000.00	55.38	2,959.43	20	Pass
J28	FH	3	5,163.61	7.64	64.76	149.39	1,000.00	56.97	2,885.12	20	Pass
J290	FH	3	5,207.76	12.5	45.62	105.24	1,000.00	41.88	3,139.87	20	Pass
J298	FH	3	5,188.96	7.64	53.77	124.04	1,000.00	51.41	4,673.23	20	Pass
J306	FH	4	5,219.50	2.78	86.91	200.50	1,000.00	82.78	4,709.63	20	Pass
J310	FH	4	5,220.00	15.28	86.69	200.00	1,000.00	83.75	5,769.69	20	Pass
J318	FH	4	5,213.00	7.64	89.73	207.00	1,000.00	86.51	5,595.00	20	Pass
J32	FH	3	5,127.24	6.25	80.52	185.76	1,000.00	74.37	3,995.08	20	Pass
J320	FH	4	5,219.46	4.86	86.93	200.54	1,000.00	84.09	5,897.13	20	Pass
J324	FH	3	5,152.54	2.08	69.55	160.46	1,000.00	61.44	2,932.26	20	Pass
J326	FH	3	5,118.52	4.17	84.30	194.48	1,000.00	73.25	2,774.87	20	Pass
J328	FH	3	5,121.59	7.64	82.97	191.41	1,000.00	76.49	3,960.47	20	Pass
J330	FH	3	5,128.49	9.72	79.98	184.51	1,000.00	72.65	3,556.37	20	Pass
J332	FH	3	5,137.63	11.11	76.02	175.37	1,000.00	68.34	3,315.89	20	Pass
J334	FH	3	5,131.58	13.89	78.64	181.42	1,000.00	72.18	3,806.13	20	Pass
J338	FH	3	5,174.10	2.78	60.21	138.90	1,000.00	60.18	269,091.91	20	Pass
J34	FH	4	5,213.00	0	89.73	207.00	1,000.00	87.46	6,789.44	20	Pass
J342	FH	3	5,191.56	13.89	52.64	121.44	1,000.00	50.22	4,789.62	20	Pass
J350	FH	4	5,204.00	11.11	93.63	216.00	1,000.00	88.16	4,230.66	20	Pass
J354	FH	4	5,211.00	0	90.59	209.00	1,000.00	87.13	5,364.28	20	Pass
J360	FH	3	5,197.48	13.19	50.07	115.52	1,000.00	45.15	3,074.51	20	Pass
J362	FH	3	5,203.01	6.25	47.68	109.99	1,000.00	44.25	3,603.57	20	Pass
J368	FH	3	5,193.49	0	51.80	119.51	1,000.00	48.89	4,176.44	20	Pass
J372	FH	3	5,155.00	9.72	68.49	158.00	1,000.00	62.47	3,585.17	20	Pass
J374	FH	3	5,160.94	4.17	65.91	152.06	1,000.00	59.25	3,223.49	20	Pass
J38	FH	3	5,137.99	11.81	75.86	175.01	1,000.00	67.05	3,013.08	20	Pass
J40	FH	3	5,150.80	9.03	70.31	162.20	1,000.00	61.92	2,929.77	20	Pass
J42	FH	3	5,190.55	12.5	53.08	122.45	1,000.00	47.38	2,968.46	20	Pass
J44	FH	3	5,180.01	11.81	57.65	132.99	1,000.00	51.66	3,104.51	20	Pass
J84	FH	3	5,164.00	3.47	64.59	149.00	1,000.00	54.20	2,367.62	20	Pass
J92	FH	3	5,165.58	0	63.90	147.42	1,000.00	56.95	3,069.06	20	Pass



MSK consulting 7157 S. Andes Cir Centennial, CO 80016 303-903-0918	PRELIMINARY	REDTAIL RANCH
		UTILITY REPORT
		FIGURE B1
		POTABLE WATER DISTRIBUTION SYSTEM MODEL
		PIPE & JUNCTION ID
		MARCH 2023 / JN 39-004-01

Appendix C
Wastewater Calculations

Redtail Ranch

Utility Report Water & Wastewater Calculations (Preliminary Plat)

Wastewater Loads
Date: March 2023
MSK Project #: 39-004-01
Calc'd by: DLT

PRELIMINARY
3/3/23

Based on Erie Criteria (Section 700 of the Standards and Specifications, dated January 2023)

Residential Production	90	gpd/capita
Capita per SF Unit:	2.89	capita/unit
Average Daily Flow:	260.1	gpd (per residential unit)
Peaking Factor:	2.6*Qmax-0.16	
Peaking Factor Range:	2.0 to 4.0	

Table C1-1: Buildout Wastewater Production

A	B	C	D	E	F	G
No.	**Description**	**Units**	**Average WW (gpd)**	**Peaking Factor**	**Peak Flow (gpd)**	**Peak Flow (gpm)**
1	Single-family Residential	587.0	152,679	3.3	500,050	347
Totals		**587.0**	**152,679**		**500,050**	**347**

Note:
1. Inflow/infiltration is included in the unit values.

Redtail Ranch
Utility Report Water & Wastewater Calculations (Preliminary Plat)
Sanitary Sewer Analysis - Min. Pipe Slopes
Date: March 2023
MSK Project #: 39-004-01
Calc'd by: DLT

PRELIMINARY
3/3/23

Assumptions

Buildout Peak Flow:	71	gpm
Slope:	1.01%	(Erie's criteria is 0.40% minimum)
Manning's coeff:	0.012	(PVC)
Pipe Diameter:	8 in	0.67 ft
Hydraulic Radius R:	0.333 ft	

Table C2-1: 8-inch Capacity

	Depth, ft	Area, ft^2	Wetted Perimeter, ft	Hydraulic Radius, ft	Slope, ft/ft	Slope, %	Velocity, ft/sec	Flow, cfs	Flow, mgd	Flow, gpm
d/D= 0.20	0.13	0.050	0.618	0.080	0.010	1.01%	2.32	0.1	0.1	52
d/D= 0.23	0.16	0.062	0.673	0.092	0.010	1.01%	2.55	0.2	0.1	71
d/D= 0.40	0.27	0.130	0.913	0.143	0.010	1.01%	3.41	0.4	0.3	200
d/D= 0.50	0.33	0.175	1.047	0.167	0.010	1.01%	3.78	0.7	0.4	296
d/D= 0.60	0.40	0.219	1.181	0.185	0.010	1.01%	4.05	0.9	0.6	398
d/D= 0.70	0.47	0.261	1.322	0.197	0.010	1.01%	4.23	1.1	0.7	496

Redtail Ranch
Utility Report Water & Wastewater Calculations (Preliminary Plat)
Sanitary Sewer Analysis - Min. Pipe Slopes
Date: March 2023
MSK Project #: 39-004-01
Calc'd by: DLT

PRELIMINARY
3/3/23

Assumptions

Buildout Peak Flow:	347	gpm
Slope:	0.58%	(Erie's criteria is 0.22% minimum)
Manning's coeff:	0.012	(PVC)
Pipe Diameter:	12 in	1.00 ft
Hydraulic Radius R:	0.500 ft	

Table C2-3: 12-inch Capacity

	Depth, ft	Area, ft^2	Wetted Perimeter, ft	Hydraulic Radius, ft	Slope, ft/ft	Slope, %	Velocity, ft/sec	Flow, cfs	Flow, mgd	Flow, gpm
d/D= 0.20	0.20	0.112	0.927	0.121	0.006	0.58%	2.31	0.3	0.2	116
d/D= 0.35	0.35	0.245	1.265	0.193	0.006	0.58%	3.16	0.8	0.5	347
d/D= 0.40	0.40	0.293	1.369	0.214	0.006	0.58%	3.39	1.0	0.6	446
d/D= 0.50	0.50	0.393	1.571	0.250	0.006	0.58%	3.75	1.5	1.0	661
d/D= 0.60	0.60	0.492	1.772	0.278	0.006	0.58%	4.02	2.0	1.3	889
d/D= 0.70	0.70	0.587	1.982	0.296	0.006	0.58%	4.20	2.5	1.6	1,107

Prepared for

LAI Design Group and the Town of Erie

A Class III Cultural Resource Inventory for LAI Design Group's Redtail Ranch Project, Weld County, Colorado

May 15, 2015

Prepared by
WCRM
Western Cultural Resource Management, Inc.

Under Contract With
LAI Design Group

A CLASS III CULTURAL RESOURCE INVENTORY FOR LAI DESIGN GROUP'S REDTAIL RANCH PROJECT, WELD COUNTY, COLORADO

Prepared by

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Boulder, Colorado 80306

Thomas J. Lennon
Principal Investigator

Prepared for

The LAI Design Group
8201 Southpark Lane
Littleton, Colorado 80120

and

Town of Erie
645 Holbrook
Erie, Colorado 80516

Colorado State Permit 2015-37

WCRM Project No. LAI-RED/15B048

May 15, 2015

Abstract

From May 1-3, 2015, Western Cultural Resource Management, Inc. (WCRM) conducted a Class III cultural resource survey of 289.92 acres for LAI Design Group of the Redtail Ranch Project area. The Project Area is located southeast of Erie, west of Vista Parkway, and south of the Denver Regional Landfill in Weld County, Colorado. The work was completed for LAI Design Group as per the request of the Town of Erie. The majority of the project area will be directly affected by residential development and associated activities. The pedestrian survey was conducted in order to comply with Section 106 of the National Historic Preservation Act of 1966 (as amended). The purpose of the study was to locate, record, and evaluate cultural resources according to the criteria outlined in 36CFR800 for inclusion of resources in the National Register of Historic Places (NRHP).

Cultural resources have not been documented within the Redtail Ranch Project area. One historic site, a segment of the Burlington Northern Railroad grade (5WL1423.44) and two isolated finds (5WL7793 and 5WL7794) were recorded during the course of the survey. An adjoining segment of the Burlington Northern Railroad grade (5WL1423.8) was recorded immediately west of the Redtail Ranch Project area in the current location of the Vista Pointe housing subdivision (Chambellan and Mehls 2001); it was officially determined not eligible for inclusion in the NRHP on September 14, 2001 and subsequently destroyed by the construction of the subdivision. The railroad segment located within the project area consists of two portions (eastern and western) and both have been heavily altered and impacted by the removal of the tracks and associated structures, modification and use as a two-track road, and the installation of oil and gas facilities. As a result, this segment of the surviving grade has lost its integrity and is not recommended eligible for inclusion in the NRHP. The two isolated finds are also not recommended eligible.

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OAHP1421

History Colorado-Office of Archaeology and Historic Preservation

COLORADO CULTURAL RESOURCE SURVEY

Cultural Resource Survey Management Information Form

I. PROJECT SIZE

Total federal acres in project	N/A		Total federal acres surveyed	N/A
Total state acres in project	N/A		Total state acres surveyed	N/A
Total private acres in project	289.92		Total private acres surveyed	289.92
Total other acres in project	N/A		Total other acres surveyed	N/A

II. PROJECT LOCATION

County:	Weld
USGS Quad Map:	Erie, CO
Principal Meridian:	6th

Township	1N		Range	68W		Section	29			1/4			1/4		SE	1/4		SE	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		NE	1/4		SE	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		SW	1/4		SE	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		NW	1/4		SE	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		SE	1/4		NE	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		SW	1/4		NE	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		NE	1/4		NE	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		SW	1/4		SW	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		NE	1/4		SW	1/4
Township	1N		Range	68W		Section	29			1/4			1/4		SE	1/4		SW	1/4

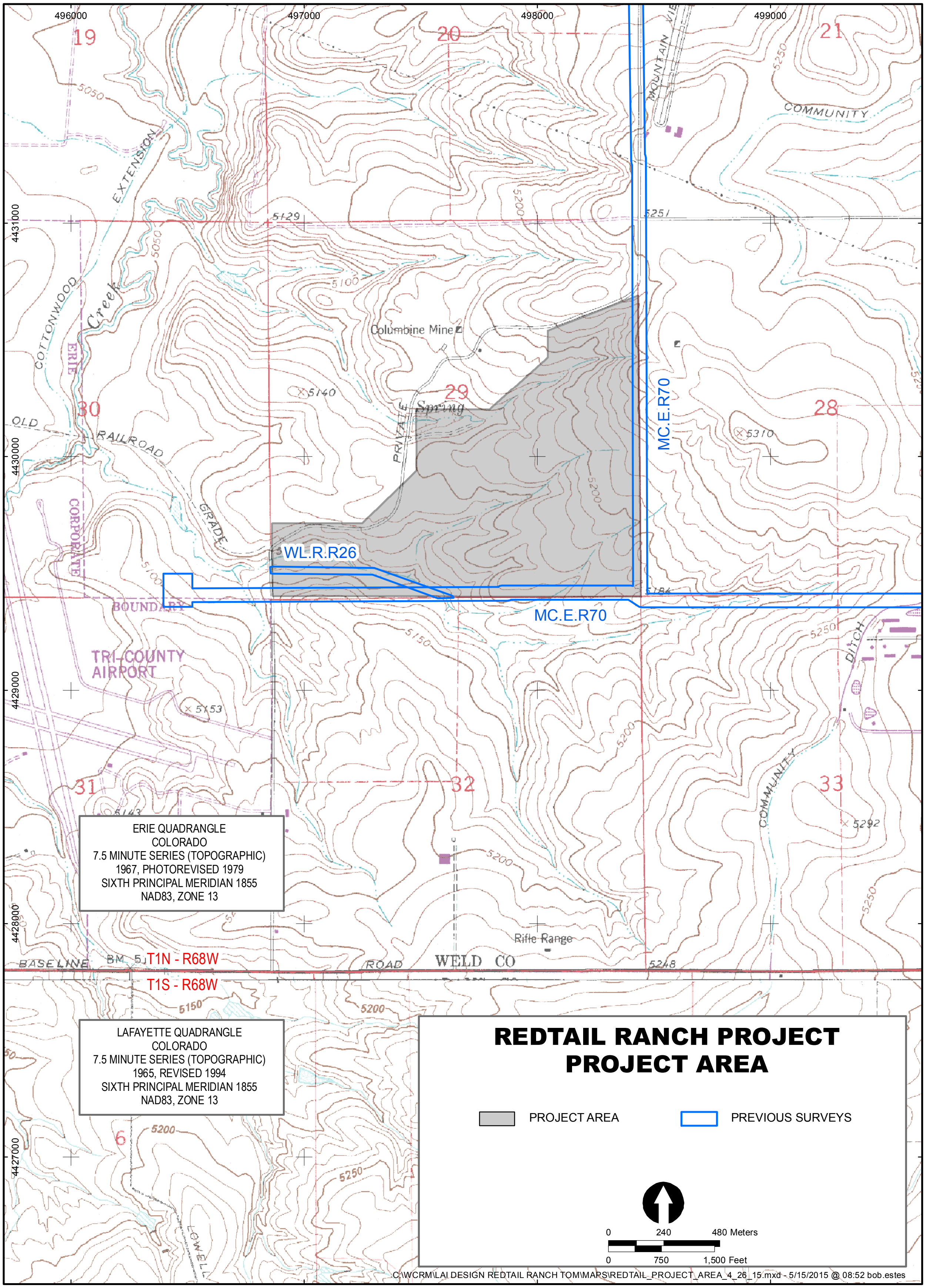
III. SITES

Smithsonian Number	Resource Type				Eligibility				Management Recommendations						
	Prehistoric	Historic	Paleontological	Unknown	Eligible	Not Eligible	Need Data	Contributes to a District	No Further Work	Preserve / Avoid	Monitor	Test	Excavate	Archival Research	Other
5WL1423.44		X				X			X						

IV. ISOLATED FINDS

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown
5WL7793		X		
5WL7794	X			

Smithsonian Number	Resource Type			
	Prehistoric	Historic	Paleontological	Unknown



REDTAIL RANCH PROJECT
PROJECT AREA
PROJECT AREA
PREVIOUS SURVEYS
0
240
480 Meters
0
750
1,500 Feet
ERIE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1967, PHOTOREVISED 1979
SIXTH PRINCIPAL MERIDIAN 1855
NAD83, ZONE 13
LAFAYETTE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1965, REVISED 1994
SIXTH PRINCIPAL MERIDIAN 1855
NAD83, ZONE 13
T1N - R68W
T1S - R68W
WL.R.R26
MC.E.R70
MC.E.R70
Columbine Mine
Spring
TRI-COUNTY AIRPORT
Rifle Range
WELD CO
496000
497000
498000
499000
4431000
4430000
4429000
4428000
4427000
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Introduction

A Class III cultural resource survey of 289.92 acres of the Redtail Ranch Project area was conducted by Western Cultural Resource Management, Inc. (WCRM) on May 1-3, 2015. The Project Area is located in Section 29 of Township 1 North, Range 68 West in southern Weld County (Figure 1). The work was conducted at the request of Joshua Rowland of LAI Design Group and the Town of Erie and supervised by Thomas Hoffert. Thomas J. Lennon served as the Principal Investigator. The majority of the Project Area will be directly impacted by residential construction and related activities.

The evaluation was conducted in compliance with the National Historic Preservation Act of 1966 (as amended), Executive Order 11593, and the Archaeological and Historical Preservation Act of 1974. The purpose was to locate and record all cultural resources within the project area and evaluate them with regard to the National Register of Historic Places (NRHP) criteria.

No resources had been previously recorded within the Project Area. During the course of the pedestrian survey, one historic railroad segment (5WL1423.44) and two isolated finds (5WL7793 and 5WL7794) were documented and evaluated. A stock pond was also noted as being in the area.

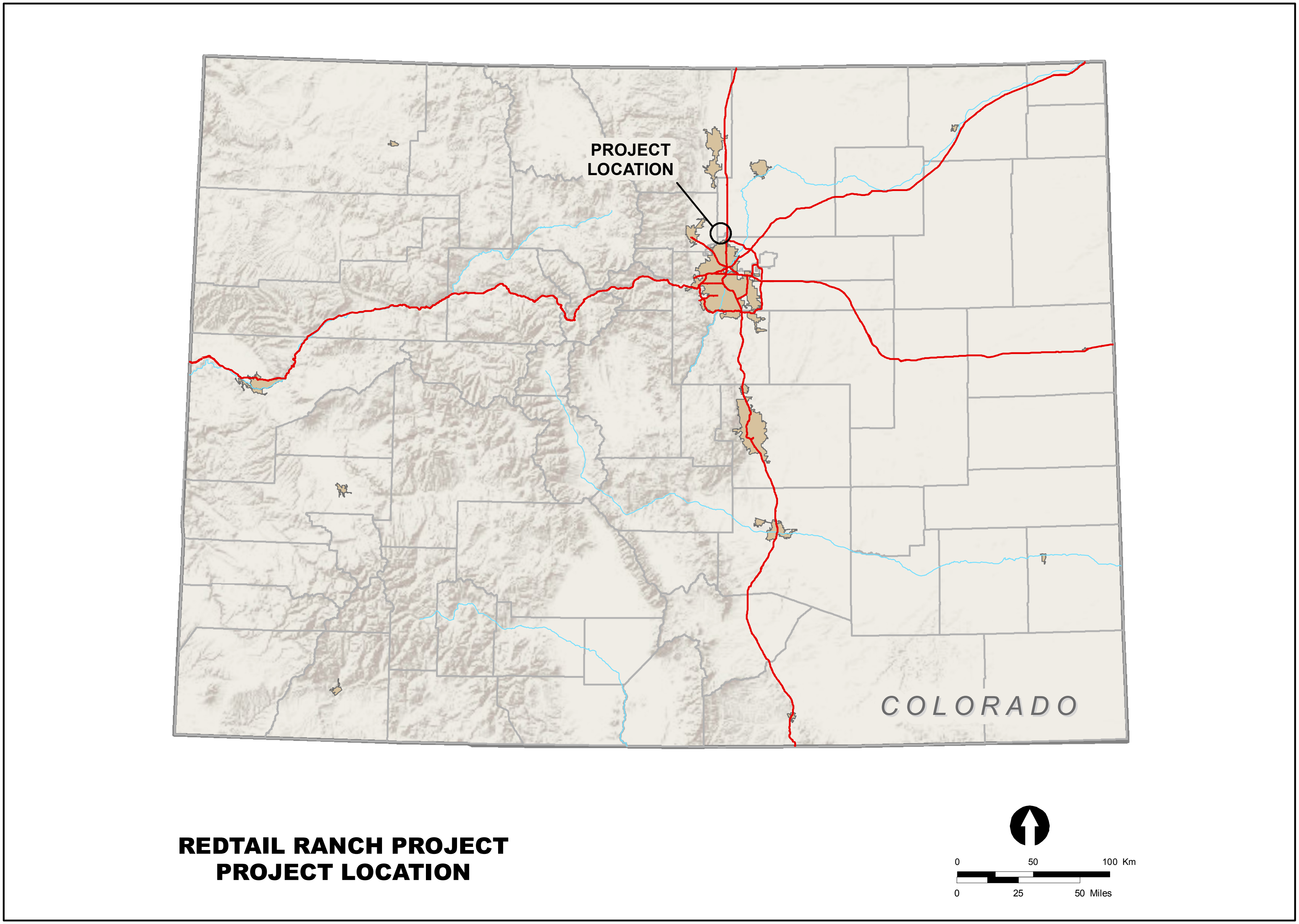

Figure 1. Project Location

Effective Environment

The project area consists primarily of uncultivated prairie cross-cut by intermittent drainages. The Coal Creek Valley lies to the west where it flows from southeast to northwest and joins Boulder Creek to the north. Interstate 25 and the eastern plains of Colorado lie to the east. Housing subdivisions have impacted the area with the Vista Point subdivision to the west and the Vista Ridge subdivision to the south.

The area is located within the "Colorado Piedmont section of the Great Plains Division, one of three major physiographic divisions in Colorado" in the South Platte River drainage system (Anderson and Mehls 1994:8; Gerstle and Mehls 1994:11). Elevations range from 5100 to 5250 feet.

Climate within the area is typical for the Colorado Plains and is characterized by low humidity, sparse rainfall, moderate to high winds, abundant sunshine and a large range in temperatures daily (Anderson and Mehls 1994:8). Most of the annual rainfall occurs in spring and summer falling between April and September. Usually precipitation is in the form of heavy thunderstorms and averages 18 to 24 inches per year. Flooding in this area of the plains may be as a result of these thunderstorms and occasional snow runoff. Droughts can occur lasting several years.

The geology of the area generally dates to the Cretaceous Period when sedimentary rocks were formed by a large inland sea. The soils of the area are composed of clay and some Aeolian deposits. Historically, coal beds contained in these formations were commercially mined.

A number of animal and bird species inhabit the area. Birds include hawks, eagles, meadow larks, owls, robins, prairie pigeons and sparrows. Native carnivorous animals include coyotes, wolves, badgers, foxes and weasels; all are still present within the area except wolves. Jackrabbits, rabbits, mice, raccoons and other small mammals used to be plentiful in the area, but have recently been removed by establishment of housing subdivisions. Likewise, native grazing animals (e.g., mule deer elk, bison and pronghorn antelope) are no longer present in the area.

Environmental Constraints

The quantity and quality of prehistoric and historic materials and resources have been impacted by the removal of the tracks and associated structures from 5WL1423.44 and use of the rail bed as a two-track road, placement of oil field installations, trash dumping, and target shooting activities by historic and modem inhabitants. Prehistoric artifacts may have been displaced by these activities and/or collected.

Culture History and Previous Work

Prehistoric Overview

The Front Range and Plains of Colorado have been occupied for over 12,000 years. Four prehistoric cultural stages have been defined from the archaeological evidence documented from sites in the Foothills and Front Range of the Platte River Basin: the Pre-Projectile, the Paleo-Indian, the Archaic and the Late Prehistoric (Cassells 1983; Eighmy 1984, Gilmore et al. 1999; Guthrie et al. 1984; and Jepson and Hand 1994). For further discussion of these time periods, see these studies and Chambellan and Mehls (2001).

Historic Overview

Historic Indian tribes located within close proximity to the Project Area included the Apache (ca.1700 A.D.), the Comanche (ca. 1700-1820), and the Arapaho and Cheyenne (ca. 1820-1870) (Baker et al. 2007; Cassells 1983:198). After the removal of the Arapaho and Cheyenne to reservations in Oklahoma an expanse of unoccupied grassland was available for Euro-American settlers to claim.

In considering the cultural history of the Historic Period, the study team identified two themes based on a reconnaissance of the area and knowledge of local history. These themes were adapted from the mountains historic period RP3 (Mehls 1984). The themes include Coal Mining (1870-1930) and Farming and Ranch (1859-1945). For a more detailed discussion of these themes see Chambellan and Mehls 2001, Church et al. 2007, and Mehls et al. 1999.

Previous Work

<u>OAHP File Search</u>

A literature search of the Redtail Ranch Project area was submitted by Bob Estes, WCRM’s GIS Specialist, to Historic Colorado’s Office of Archaeology and Historic Preservation (OAHP), and results were received on April 28, 2015. No cultural resources had been previously recorded within the project area; however, two surveys had been conducted (see Project Area map in front matter). The first survey was conducted by WCRM for a proposed sewer line associated with the development of the Vista Ridge subdivision (Chambellan 2001a) across the southwestern corner. The second survey was conducted by Greystone Environmental Services (Späth 1998) for a transmission line along the southern and eastern project boundaries.

The sewer line area was surveyed as an addendum (Chambellan 2001a) to a larger portion of land (920 acres) immediately south of the current project area for the Vista Ridge Project (Chambellan and Mehls 2000a). A refuse pile dating from 1900 to 1960, 16 isolated finds and an additional segment of the Community Ditch (5WL2247.10) were recorded during survey of the Vista Ridge Project area. None of the sites were deemed eligible for the NRHP. A second addendum for the Vista Ridge Project was also conducted in 2001 (Chambellan 2001b). This project consisted of a 20 – 25 acre parcel of land surveyed prior to road improvements intended for access into the proposed Vista Ridge subdivision. No cultural resources were located.

Within a mile surrounding the area, 15 additional cultural resource inventories have been conducted. To the southwest the Parkdale Mine (5WL2951) and one historic isolated find were recorded for the 70 acre Vista Plaza Annexation Project (Chambellan and Mehls 1999). The Parkdale Mine was recommended as not eligible for the NRHP. Immediately east of the project area, 320 acres were surveyed for the Vista Pointe Subdivision Project (Chambellan and Mehls 2001). Two historic sites consisting of a segment of the Burlington Northern Railroad (5WL1423.8) and a segment of the Cottonwood Extension Ditch (5WL2248.6), five prehistoric sites and 12 isolated finds were recorded during the course of the survey. None of the cultural resources were considered eligible for the NRHP. An addendum to this project (Chambellan 2001c) consisted of a 12 acre sanitation right-of-way survey. One historic site, a segment of the Cottonwood Extension Ditch (5WL2248.7) and one historic isolate were recorded during the pedestrian survey. Neither resource was recommended as eligible for the NRHP. Additional work associated with the Vista Pointe Subdivision Project included the evaluation of a stone cabin (Chambellan and Mehls 2000b) located in the proposed subdivision locale. The cabin was recommended not eligible as a result of severe alterations and deterioration. Finally, to the northwest of the project area a segment of the Community Ditch (5WL2247.9) was recorded during a survey of the KN Wattenberg Transmission Pipeline (Späth 1998). This segment was recommended field not eligible for the NRHP. The remaining 12 projects within one mile of the current project area are summarized in Table 1.

Table 1. Projects within One-Mile of the Redtail Ranch Project Area.

Organization	Recording Date	Project/OAHP Report Number	Sites Recorded
CDOT Colorado Department of Transportation	01/07/2009	Unknown/No report	5WL.2247.15
Foothill Engineering Consultants, Inc.	13/07/1995	Cultural Resources Survey of the Flatiron-Erie Transmission Line; Larimer, Boulder and Weld Counties, Colorado/MC.E.R18	5WL.2247.1 5WL.2248.1

Organization	Recording Date	Project/OAHP Report Number	Sites Recorded
Greystone Environmental Services, Inc.	23/02/1998	KN Wattenberg Transmission L.L.C Front Runner Pipeline, Adams, Weld, and Broomfield Counties, Colorado, Cultural Resource Inventory Report #4: Erie Lateral and Tri-Town Lateral Southeast of Erie to the Amoco west Dougan South Mainline/MC.E.R70	5WL.2247.9
James M. Brechtel, Consulting Archaeologist	07/1995	Unknown/No report	5WL.2224
James M. Brechtel, Consulting Archaeologist	30/03/1998	Intensive Cultural Resource Survey of Coal Creek Heights PUD Weld County, Colorado/WL.R.R10	5WL.2248.3 5WL.2248.4
SWCA, Inc.	10/26/2006	Class III Cultural Resource Inventory of the Sunset Real Estate Development Weld County, Colorado/WL.R.R58>MC.E.R41	5WL.3154.1 5WL.5257
URS Corporation	03/10/2002	SHPO Level Documentation of the Burlington Northern Railroad (5WL1423.10), Weld County, Colorado, Erie Commons Development, Colorado: Results of an Intensive Cultural Resource Inventory/WL.R.R46>WL.R.R54	5WL.1423.10
URS Corporation	03/10/2002	SHPO Level II Documentation of the Erie-Coal Creek Ditch (5WL2248.9) Weld County, Colorado. Eire Commons Development, Colorado/WL.R.R44>WL.R.R54	5WL.2248.9
URS Corporation	03/10/2002	Erie Commons Development, Colorado: Results of an Intensive Cultural Resource Inventory/WL.R.R54	5WL.4305 5WL.4306 5WL.4307 5WL.4309
URS Corporation	04/10/2002	Site 5WL4308, Weld County, Colorado: Results of Evaluative Testing at a Historic Refuse Dump/WL.R.R40>WL.R.R54	5WL.4308
URS Corporation	03/10/2002	SHPO Level Documentation of the Leyner-Cottonwood No. 1 Ditch (5WL4310.1), Weld County, Colorado/WL.R.R45>WL.R.R54	5WL.4310.1
Western Cultural Resource Management, Inc. (WCRM)	03/12/1993	Cultural Resources Inventory of the Southern Water Supply Pipeline Right-of-Way. Segment III: Ogallala Road to Broomfield, Boulder, Weld and Adams Counties, Colorado/WL.CH.R25>MC.R.R15	5WL.1043.7 5WL.2141 5WL.2142.1 5WL.2143.1 5WL2144

GLO Records Search

On May 14, 2015, Collette Chambellan conducted a search of General Land Office (GLO) records. The file search of the GLO records yielded the information listed in Table 1 for Township 1N, Range 68W, Section 29. Madore Cushman obtained a patent on July 1, 1868 to purchase 160 acres at the aliquots shown in Table 2. It appears that the land was used historically for agricultural purposes and subsequently crossed by the railroad spur.

Table 2. General Land Office Data for the Redtail Ranch Project Area.

Aliquots for T1N, R68W, Sec. 29	Patentee	Law	Date
E½, NW¼	Madore Cushman	Cash Sale	7/1/1868
W½,NE¼	Madore Cushman	Cash Sale	7/1/1868

Statements of Objectives and Research Design

Objectives

The objective of the cultural resource inventory was to locate, record, and evaluate cultural resources according to the criteria outlined in 36CFR800 for inclusion of resources in the National Register of Historic Places (NRHP). To facilitate the evaluation process with regard to historic resources, WCRM adopted the historic context as defined by the Secretary of Interior and the National Register staff as the vehicle for site eligibility recommendations.

Prehistoric Research Design

Prehistoric research design themes include Chronology and Cultural Relationships, Paleoecology, Geomorphology, Subsistence and Settlement, and Cultural Economy and Technology. See Chambellan and Mehls 2001for an in-depth discussion of the prehistoric research design.

Historic Research Design

Historic research design themes for the area include The Great Depression (1920-1940) and Post-1900 Agriculture—Dryland Farming themes from the Colorado Plains Historic Context Theme (Mehls 1984). See Chambellan and Mehls 2001for an in-depth discussion of the historic research design.

Field Methods

From May 1-3, 2015, Thomas Hoffert and Cathryn Williamson of WCRM conducted a Class III pedestrian inventory of approximately 300 acres of land located two miles southeast of Erie, Colorado. During the survey, the Project Area was 100 % covered by walking parallel 15-20 meter (m) transects. In general, ground visibility in the area was poor due to the presence of trash from the landfill and natural and invasive grasses (Figure 2). Areas of exposed earth (i.e., two track roads, rodent burrows, and disturbed areas) were thoroughly examined. Resources were recorded on the appropriate Colorado Cultural Resource Survey Forms (see Appendix), mapped and photographed. No artifacts were collected nor was laboratory work conducted. All project records, field notes, photographs and negatives are on file at WCRM's Boulder office. All GIS mapping was completed by Bob Estes of WCRM.

Figure 2. View to south of a recent trash scatter and vegetation cover in the southern portion of the Redtail Ranch Project area.

Isolated artifacts/features are the occurrence of four or fewer pieces of debitage, tools or tool fragments not from the same item or the occurrence of an isolated feature. A prehistoric site is defined as five or more artifacts, two or more features or features associated with artifacts. Historic sites consist of linear features, historic buildings or structures, or features with five or more associated artifacts less than 100 feet apart. Historic materials must be 50 more years of age to merit recordation.

Inventory Results

During the 289.92-acre Retail Ranch Class III pedestrian survey, WCRM recorded one historic site (5WL1423.44) and two isolate finds (5WL7793 and 5WL7794); cultural resource documentation is provided in the Appendix. One stock pond was noted just to the south and below the Denver Regional Landfill boundary fence within the project area. Ground visibility, especially in the southern portion of the project area was poor due to presence of dense vegetation. The visibility in the northern portion of the project area was considerably better due to the presence of a large prairie dog colony, which had denuded the vegetation in the area. Additional areas of disturbance consisted of two existing oil and gas well installations, one cleared well pad with no infrastructure present, and access roads constructed to these locations. In total, the oil and gas installations comprised approximately 18 acres. A small portion of the project area had been disturbed by the construction of a sewer pipeline; this area had been previously surveyed by WCRM (Chambellan 2001b). Large amounts of trash associated with the Denver Regional Landfill litter the extreme northern portion of the project area. The landfill abuts the northern boundary of the project area and as such spill off and previous dumping has created a line of trash along the northern fence line. The landfill was created in 1940 and decommissioned in 2011 but still accepts small amounts of refuse on a case by case basis.

Site Description
<u>5WL1423.44</u>

Railroad segment 5WL1423.44, a segment of the Burlington Northern Line (5EP1423) is located on an uncultivated section of prairie cross-cut by intermittent drainages. Site elevations range from 5106 feet to 5147 feet. The Denver Regional Landfill lies to the north, the Vista Pointe housing subdivision lies to the west, the Vista Ridge housing subdivision lies to the south, and Weld County Road 5 lies to the east. Coal Creek Valley is located to the west where the creek flows from southeast to northwest and joins Boulder Creek to the north. An unnamed seasonal drainage lies 100 m south of 5WL1423.44. The geology of the area generally dates to the Cretaceous Period when sedimentary rocks were formed by a large inland sea. The soils of the area are composed of brown clay loam and abundant surface gravels of quartzite, sandstone, and iron stone, and some aeolian deposits. Historically, coal beds contained in these formations were commercially mined. In general, ground visibility in the area was poor due to the presence of dense native and invasive grasses. Areas of exposed earth (i.e., two track roads, rodent burrows, and disturbed areas) were thoroughly examined. Besides native and invasive grasses, vegetation in the project area included weeds, sparse yucca and prickly pear cactus. Today, the aspect from 5WL1423.44 is to the south. Prior to the construction of the Denver Regional Landfill (immediately northeast of the railroad grade) the aspect may have included the northeast, as well.

The segment is part of a spur that diverged from the mainline west of Coal Creek, continued east crossing the Redtail Ranch Project area, and turned north of the project area to the historic Columbine Mine. The overall Burlington Northern route from Chicago to Denver was completed in 1882 (Ubbelohde et al. 2006). The railroad segment that crosses the project area was part of a 2.1 mile spur built in 1919 from the Lyons Branch of the Chicago, Burlington and Quincy Railroad to the Columbine Mine and the town of Serene (5WL749); the coal mine and town were owned by the Rocky Mountain Fuel Company, which was operated from the early to mid-1900s. The spur to the Columbine Mine was abandoned in 1946 and the tracks were removed in the early 1950s (Wilkins 1974:56, 204, 243).

Within the project area, the visible extent of 5WL1423.44 is 1,404 feet in length and 65 feet in width (entire track foundation); it is a continuation of the rail bed from the west previously recorded as segment 5WL1423.8 (Chambellan and Mehls 2001). The full extent of the spur that would have cut across the project area prior to recent impacts would have been approximately 2,001 feet. To the west, 5WL1423.8 has been obliterated by the construction of Vista Parkway and the Vista Pointe housing subdivision. On average, the rail lay down area is 12 feet wide. There is no longer evidence of the rails or ballast.

The western portion of 5WL1423.44 has a pronounced five-foot high berm on the south side; it is far less pronounced on the north side. Sometime in the past, this portion was bladed and graveled for use as a two-track road. The east end of the western portion of the segment was not used as a two-track road but has been completely impacted by oil and gas development operations, has slumped considerably, and no longer has a level surface. A pile of seven pieces of squared lumber and one railroad tie measuring 12 feet north-south by four feet east-west was associated with the western portion. The eastern portion of the segment consists of two pieces; one inside the project area and the other to the north and outside of the project area. They are located east of an oil and gas installation and are separated from each other by a bulldozer cut. These segments have not been used as a two-track, and they have a high (approximately four-foot), well-pronounced berm. These pieces are terminated abruptly by more oil and gas development and a bulldozer cut. No additional segments were observed north of the eastern portion of the segment; the remaining rail bed that would have extended north to the town of Serene (5WL749) and the Columbine Mine was most likely eradicated by the existing Denver Regional landfill.

Isolated Find Descriptions

Two isolated finds were located during the course of the pedestrian survey; they consisted of one prehistoric flake and one piece of historic farm equipment. The quartzite primary flake (5WL7794) was struck from a pebble and is 4 cm by 2.5 cm. It was found on the north facing slope of an east-west trending low ridge approximately 15 m below the rim. The area is badly disturbed by slope wash and is denuded of vegetation, and the artifact is considered to be in a secondary depositional context due to the obvious slope wash. The farm implement (5WL7793) is a “John Deere 400” harrow with two harrows joined together and attached to a triangular series of cables and chain. Each harrow has five teeth and measures 12 feet 8 inches in length and 2 feet 10 inches in width. The tires are no longer present but the rims still exist. There are four rims measuring 2 feet 4 inches in diameter and four rims measuring 1 foot 4 inches in diameter. The implement is situated on a low ridge with a west facing aspect. The harrow was found in an area overlooking a seasonal drainage on the north side of the ridge.

Evaluation and Recommendations

During the course of the Retail Ranch Project cultural resource survey, one railroad segment (5WL1423.44) and two isolated finds (5WL7793 and 5WL7794) were recorded. There were no previously recorded resources within the project area.

5WL1423.44

Segment 5WL1423.44 of the Burlington Northern Railroad is neither individually eligible for inclusion in the NRHP nor does it contribute to the eligibility of the entire railroad system (5WL1423). Although a portion of the spur rail bed within the Redtail Ranch Project area is partially visible, the western section of the segment has been almost completely altered as a result of its use as a road for accessing gas wells. This portion of the grade has been bladed and a two-track road now traverses the top of the berm. The eastern portion of the segment was not used as a two-track road but has been completely impacted by oil and gas development operations, has slumped considerably, and no longer has a level surface. In addition, the spur is no longer associated with the Columbine Mine or the towns of Serene (5WL749), which have both been completely eradicated by the presence of the Denver Region landfill. The original viewshed of the site has been destroyed by landfill, housing, and energy development. Finally, important characteristics, such as bridges, rails, ties, and ballast, are no longer present.

Management Recommendations: No further work.

Isolated Finds

Two isolated finds were recorded during the course of the survey of the Redtail Ranch Project area. One was a prehistoric primary flake (5WL7794) indicating that it was likely that prehistoric inhabitants were present within the project area; however, the flake could not address the research themes as presented above. One set of attached historic harrows (5WL7793) indicates that farming activities were carried out in the project area sometime between 1935 and the present. These isolated resources are not recommended eligible for inclusion in the NRHP.

Management Recommendations: No further work.

Evaluation of Research and Application of Research Design

The Redtail Ranch Project area has been heavily impacted by historic and modern uses. Within the area, there is evidence of target shooting activities, dumping episodes, well pad construction, and transmission line installation.

Site 5WL1423.44, as part of the Burlington Northern Railroad (5WL1423), falls within The Great Depression (1920-1940) Colorado Plains Historic Context Theme; however, it no longer retains integrity of location, design, setting, materials, workmanship, feeling and association related to this theme. Without integrity this segment cannot answer questions posed by the research design and, therefore, is not recommended eligible for inclusion in the NRHP. The GLO record search results in combination with the presence of a historic isolated harrow indicate that a Post-1900 Agriculture—Dryland Farming theme is also represented in the project area.

The prehistoric isolated find did not provide information on the research themes of Chronology and Cultural Relationships, Paleoecology, Geomorphology, Subsistence and Settlement, and Cultural Economy and Technology and cannot answer research questions. It does indicate that flakes were being struck from naturally occurring pebbles (i.e., a possible pebble core technology is present).

Conclusions

A Class III cultural resource inventory of 289.92 acres was conducted from May 1-3, 2015 for LAI Design Group of the aRanch Project Area. The project area will be directly impacted by the development of a housing subdivision and associated facilities. The inventory was conducted so that NRHP evaluations and recommendations could be made with regard to cultural resources located during the pedestrian survey.

One historic site, a segment of the Burlington Northern Railroad grade (5WL1423.44) and two isolated finds (5WL7793 and 5WL7794) were located, documented, and evaluated during the survey. All three resources are recommended not eligible for inclusion in the NRHP; therefore, no further work is recommended.

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APPENDIX: CULTURAL RESOURCE DOCUMENTATION

Management Data Form

A *Management Data Form* should be completed for each cultural resource recorded during an archaeological survey. Isolated finds and revisits are the exception and they do not require a *Management Data Form*. Please attach the appropriate component forms and use continuation pages if necessary. Fields can be expanded or compressed as necessary.

1. **Resource Number**:	5WL1423.44	2. **Temporary Resource Number**:	

3. **Attachments (check as many as apply)**	4. **Official determination (OAHP use only)**
☐ Prehistoric Archaeological Component	☐ Determined Eligible NR\SR ______
☐ Historic Archaeological Component	☒ Determined Not Eligible NR\SR ______
☐ Historic Architectural Component Form	☐ Nominated ______
☒ Linear Component	☐ Need Data NR\SR ______
☐ Sketch/Instrument Map (required)	☐ Contributing to NR Dist.\SR Dist. ______
☒ U.S.G.S. Map Photocopy (required)	☐ Not Contributing to NR Dist.\SR Dist. ______
☒ Photograph(s) (required)	☐ Supports overall linear eligibility NR\SR ______
☐ Other, specify:	☒ Does not support overall linear eligibility NR\SR ______

I. IDENTIFICATION

5. **Resource Name**: Segment of the Burlington Northern Railroad Spur

6. **Project Name/Number**: LAI Design Group - Redtail Ranch/15B048 LAI-RED

7. **Government Involvement**: ☒ Local ☐ State ☐ Federal
Agency: Town of Erie

8. **Site Categories (check as many as apply)**:
Prehistoric: ☐ archaeological site ☐ paleontological site ☐ In existing National Register District
National Register District name:
Historic: ☒ archaeology site ☐ building(s) ☐ structure(s) ☐ object(s) ☐ In existing National Register District
National Register District name: N/A

9. **Owner(s) Name and Address**: LAI Design Group, 8201 Southpark Lane, Littleton, Colorado 80120

10. **Boundary Description and Justification**: 5WL1423.44 is a segment of a 2.1 mile long railroad spur that originally connected the Lyons Branch of the Chicago, Burlington and Quincy Railroad (west of Coal Creek and west of the Redtail Ranch Project area) to the Columbine Mine and town of Serene (north of the project area). The segment is defined by its visible extent within the project area and is 1,404 feet long by 65 feet wide (entire track foundation). Vista Parkway defines its western extent.

11. **Site/Property Dimensions**	Length:	428 m	Width:	20m	Area:	8,560m^2	Acres (m^2/4047):	2.1

Area was calculated as: ☐ Length x Width (rectangle/square) ☐ Length x Width x 0.785 (Ellipse) ☒ GIS

II. LOCATION

12. **Legal Location**

PM	6th	Township	1N	Range	68W	Section	29	SW	¼	SW	¼
PM	6th	Township	1N	Range	68W	Section	29	NE	¼	SW	¼
PM	___	Township	_____	Range	_____	Section	___	__	¼	__	¼
PM	___	Township	_____	Range	_____	Section	___	__	¼	__	¼

If section is irregular, explain alignment method:

13. **USGS Quad**:	Erie	14. **County**:	Weld

15. **UTM Coordinates**: Datum used ☐ NAD 27 ☒ NAD 83 ☐ WGS 84 Other:

A. Zone 13; 496855 mE 4429621 mN Western boundary of western portion

Management Data Form

Resource Number: 5WL1423.44 **Temporary Resource Number**:

B. Zone	13;	497155	mE	4429702	mN Eastern boundary of western portion
C. Zone	13;	497325	mE	4429750	mN Western boundary of eastern portion
D. Zone	13;	497387	mE	4429845	mN Eastern boundary of eastern portion

16. **UTM Source**: ☒ Corrected GPS/rectified survey (<5m error) ☐ Uncorrected GPS ☐ Map template

Other (explain):

17. **Site elevation** (feet): 5106 to 5147

18. **Address**:	N/A	Lot:		Block:		Addition:	

19. **Location/Access**: From the intersection of Vista Parkway and Highway 7, go north on Vista Parkway approximately 1.5 miles to the project area. The western boundary of the western rail bed section is on right (east).

III. NATURAL ENVIRONMENT/SITE CONDITION

20. **General Description** (should include both on site as well as geographical setting with aspect, landforms, vegetation, soils, depositional environment, water, ground visibility):

Rail segment 5WL1423.44 is located on an uncultivated section of prairie cross-cut by intermittent drainages. Site elevations range from 5106 feet to 5147 feet. The Denver Regional Landfill lies to the north, the Vista Pointe housing subdivision lies to the west, the Vista Ridge housing subdivision lies to the south, and Weld County Road 5 lies to the east. Coal Creek Valley is located to the west where the creek flows from southeast to northwest and joins Boulder Creek to the north. An unnamed seasonal drainage lies 100 m south of 5WL1423.44. The geology of the area generally dates to the Cretaceous Period when sedimentary rocks were formed by a large inland sea. The soils of the area are composed of brown clay loam and abundant surface gravels of quartzite, sandstone, and iron stone, and some aeolian deposits. Historically, coal beds contained in these formations were commercially mined. In general, ground visibility in the area was poor due to the presence of dense native and invasive grasses. Areas of exposed earth (i.e., two track roads, rodent burrows, and disturbed areas) were thoroughly examined. Besides native and invasive grasses, vegetation in the project area included weeds, sparse yucca and prickly pear cactus. Today, the aspect from 5WL1423.44 is to the south. Prior to the construction of the Denver Regional Landfill (immediately northeast of the railroad grade) the aspect may have included the northeast, as well.

21. **Soil depth (cm) and description**: The soils of the area are composed of brown clay loam and abundant surface gravels of quartzite, sandstone, and iron stone, and some Aeolian deposits. The depth of the soils is unknown.

22. **Condition**

a. Architectural/Structural	b. Archaeological/Paleontological
☐ Excellent	☐ Undisturbed
☐ Good	☐ Light disturbance
☐ Fair	☐ Moderate disturbance
☒ Deteriorated	☒ Heavy disturbance
☒ Ruin	☒ Total disturbance

23. **Describe condition**: The western portion of 5WL1423.44 has a pronounced five-foot high berm on the south side; it is far less pronounced on the north side. Sometime in the past, this portion was bladed and graveled for use as a two-track road. The east end of the western portion of the segment was not used as a two-track road but has been completely impacted by oil and gas development operations, has slumped considerably, and no longer has a level surface. A pile of seven pieces of squared lumber and one railroad tie measuring 12 feet north-south by four feet east-west was associated with the western portion. The eastern portion of the segment consists of two pieces; one inside the project area and the other to the north and outside of the project area. They are located east of an oil and gas installation and are separated from each other by a bulldozer cut. These segments have not been used as a two-track, and they have a high (approximately four-foot), well-pronounced berm. These pieces are terminated abruptly by more oil and gas development and a bulldozer cut. No additional segments were observed north of the eastern portion of the segment; the remaining rail bed that would have extended north to the town of Serene (5WL749) and the Columbine Mine was most likely eradicated by the existing Denver Regional landfill.

24. **Vandalism**: ☐ Yes ☒ No

Management Data Form

Resource Number: 5WL1423.44 **Temporary Resource Number**:

Describe:	

IV. NATIONAL/STATE REGISTER ELIGIBILITY ASSESSMENT

25. **Context or Theme**: Colorado Plains Historic Context Theme: The Great Depression (1920-1940)

26. **Applicable National Register Criteria**:

☐ A. Associated with events that have made a significant contribution to the broad pattern of our history
☐ B. Associated with the lives of persons significant in our past
☐ C. Embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
☐ D. Has yielded, or may be likely to yield, information important in history or prehistory
☒ Does not meet any of the National Register criteria
☐ Qualifies under exceptions A through G. List exception(s):

27. **Applicable State Register Criteria**:

☐ A. Property is associated with events that have made a significant contribution to history
☐ B. Property is connected with persons significant in history
☐ C. Property has distinctive characteristics of a type, period, method of construction or artisan
☐ D. Property is of geographic importance
☐ E. Property contains the possibility of important discoveries related to prehistory or history
☒ Does not meet any of the State Register criteria

28. **Area(s) of significance**: N/A

29. **Period(s) of significance**: N/A

30. **Level of significance**: ☐ National ☐ State ☐ Local

31. **Statement of significance**: Segment 5WL1423.44 of the Burlington Northern Railroad is neither individually eligible for inclusion in the NRHP nor does it contribute to the eligibility of the entire railroad system (5WL1423). Although a portion of the spur rail bed within the Redtail Ranch Project area is partially visible, the western section of the segment has been almost completely altered as a result of its use as a road for accessing gas wells. This portion of the grade has been bladed and a two-track road now traverses the top of the berm. The eastern portion of the segment was not used as a two-track road but has been completely impacted by oil and gas development operations, has slumped considerably, and no longer has a level surface. In addition, the spur is no longer associated with the Columbine Mine or the towns of Serene, which have both been completely eradicated by the presence of the Denver Region landfill. The original viewshed of the site has been destroyed by landfill, housing, and energy development. Finally, important characteristics, such as bridges, rails, ties, and ballast, are no longer present.

32. **Statement of historic integrity related to significance**: N/A

33. **National Register Eligibility Field Assessment**:	☐ Eligible	☒ Not eligible	☐ Need data
Linear Segment Evaluation (if applicable):	☐ Supporting	☒ Non Supporting	
34. **Status in an Existing National Register District**:	☐ Contributing	☐ Non-contributing	
35. **State Register Eligibility Field Assessment**:	☐ Eligible	☒ Not eligible	☐ Need data
36. **Status in an Existing State Register District**:	☐ Contributing	☐ Non-contributing	

37. **National/State Register District Potential**: ☐ Yes ☒ No Describe: Segment 5WL1423.44 is a spur off of the mainline of the Burlington and Missouri River Railroad, which also includes the Chicago, Burlington and Quincy Railroad, the Burlington Northern Railroad, and the Burlington Northern and Santa Fe Railroad; the mainline was officially determined eligible on August 11, 1993. Due to impacts to the spur including this segment and the dismantling of its features, it cannot contribute to a potential district.

38. **Cultural Landscape Potential**: ☐ Yes ☒ No Describe: The site no longer has significance or context (see #37 above). The site original viewshed has been destroyed by landfill, housing, and energy development in the area.

39. **If Yes to either 37 or 38, is this site**: ☐ Contributing ☐ Non-contributing Explain:

V. MANAGEMENT AND ADMINISTRATIVE DATA

40. **Threats to Resource**: ☒ Water erosion ☒ Wind erosion ☐ Grazing ☐ Neglect ☐ Vandalism
☐ Recreation ☒ Construction ☐ Other (explain):

Management Data Form

Resource Number: 5WL1423.44 **Temporary Resource Number**:

41. **Existing protection**	☐ None	☐ Marked	☒ Fenced	☐ Patrolled	☐ Access controlled
Other (specify):					
Comments:					

42. **Local landmark designation**:	N/A	43. **Easement**:	N/A
44. **Recorder's Management Recommendations**: No further work			

VI. DOCUMENTATION

45. **Previous actions accomplished at the site**:	☐ Tested	☐ Partial excavation	☐ Complete excavation
Date(s):			
a. Excavations:			
b. Stabilization:		Date(s):	
c. HABS/HAER documentation [date(s) and numbers]:			
d. Other:			

46. **Known collections/reports/interviews and other references (list)**: Segment 5WL1423.8 was recorded immediately to the west by WCRM (Chambellan and Mehls 2001) and discussed in a report titled *A Class III Cultural Resource Inventory of the Vista Pointe Subdivision, Weld County, Colorado*. Tivis E. Wilkins (1974) *Colorado Railroads, A Chronological Development*, Pruett Publishing Company, Boulder.

47. **Primary location of additional data**: Office of Archaeology and Historic Preservation, Denver.

48. **State or Federal Permit number**:	Colorado State Permit 2015-37

49. **Collection**:	Artifact collection authorized:	☐ Yes	☒ No	Were artifacts collected:	☐ Yes	☒ No
Artifact repository:						

Collection method:	☐ Diagnostics	☐ Grab Sample	☐ Random Sample
Other (specify):			

50. **Photograph Numbers**:	LAI-RED Digital #DSCF0570-0582
Files or negatives stored at:	Photographs and digital media are on file at WCRM, Inc. Boulder office

51. **Report title**: *A Class III Cultural Resource Inventory for the LAI Design Group's Redtail Ranch Project, Weld County, Colorado*; WCRM Project LAI-RED/15B048

52. **Recorder(s)**:	Tom Hoffert and Cathryn Williamson	Date: 5/3/15
53. **Recorder affiliation**:	Western Cultural Resource Management (WCRM)	
Phone number/Email:	(303) 449-1151	

NOTE: Please attach a site map, a photocopy of the USGS 1:24000 map indicating resource location, and photographs.

Colorado Historical Society - Office of Archaeology & Historic Preservation
1560 Broadway, Suite 400 Denver, CO 80202
303-866-3395

Linear Component Form

This form should be completed for each linear resource or linear segment. Use this form in conjunction with the *Management Data Form.* Call OAHP staff (303-866-5216) prior to assigning a resource number.

I. Resource Identification

1. **Resource Number**:	5WL1423.44	2. **Temporary Resource Number**:	

3. **Site Name**: Segment of the Burlington Northern Railroad Spur

4. **Record of**: ☐ Entire resource ☒ Segment

II. Resource Description

5. **Resource Type**:	☐ Road	☒ Railroad	☐ Trail	☐ Ditch/Canal
Other (specify):				

6. **Component Description**:

Railroad segment 5WL1423.44, a segment of the of the Burlington Northern Line (5EP1423), is part of a spur that diverged from the mainline west of Coal Creek, continued east crossing the Redtail Ranch Project area, and turned north of the project area to the historic Columbine Mine. The overall Burlington Northern route from Chicago to Denver was completed in 1882 (Ubbelohde et al. 2006). The railroad segment that crosses the project area was part of a 2.1 mile spur built in 1919 from the Lyons Branch of the Chicago, Burlington and Quincy Railroad to the Columbine Mine and the town of Serene (5WL749); the coal mine and town were owned by the Rocky Mountain Fuel Company, which was operated from the early to mid-1900s. The spur to the Columbine Mine was abandoned in 1946 and the tracks were removed in the early 1950s (Wilkins 1974:56, 204, 243).

Within the project area, the visible extent of 5WL1423.44 is 1,404 feet in length and 65 feet in width (entire track foundation); it is a continuation of the rail bed from the west previously recorded as segment 5WL1423.8 (Chambellan and Mehls 2001). The full extent of the spur that would have cut across the project area prior to recent impacts would have been approximately 2,001 feet. To the west, 5WL1423.8 has been obliterated by the construction of Vista Parkway and the Vista Pointe housing subdivision. On average, the rail lay down area is 12 feet wide. There is no longer evidence of the rails or ballast.

The western portion of 5WL1423.44 has a pronounced five-foot high berm on the south side; it is far less pronounced on the north side. Sometime in the past, this portion was bladed and graveled for use as a two-track road. The east end of the western portion of the segment was not used as a two-track road but has been completely impacted by oil and gas development operations, has slumped considerably, and no longer has a level surface. A pile of seven pieces of squared lumber and one railroad tie measuring 12 feet north-south by four feet east-west was associated with the western portion. The eastern portion of the segment consists of two pieces; one inside the project area and the other to the north and outside of the project area. They are located east of an oil and gas installation and are separated from each other by a bulldozer cut. These segments have not been used as a two-track, and they have a high (approximately four-foot), well-pronounced berm. These pieces are terminated abruptly by more oil and gas development and a bulldozer cut. No additional segments were observed north of the eastern portion of the segment; the remaining rail bed that would have extended north to the town of Serene (5WL749) and the Columbine Mine was most likely eradicated by the existing Denver Regional landfill.

7. **Original use**: Spur of the Burlington Northern Railroad

8. **Current use**: Abandoned

9. **Modifications (describe and include dates)**: The 2.1 mile railroad spur from the Lyons Branch of the Chicago, Burlington and Quincy Railroad to the Columbine Mine was abandoned in 1946, and the tracks were removed in the early 1950s. The rail bed was subsequently modified for use as a two-track road. Portions of 5WL1423.44 have been impacted by oil and gas installations within the project area. To the north outside of the project area, the spur has been impacted by the construction and use of the Denver Regional landfill.

10. **Extent of Entire Resource**: Railroad segment 5WL1423.44 is a portion of a spur off of the Burlington Northern (5EP1423) (i.e., the Lyons Branch of the Chicago, Burlington and Quincy Railroad), which extended from Chicago to Denver.

Linear Component Form

Resource Number: 5WL1423.44 **Temporary Resource Number**:

11. **Associated Artifacts**: A pile of seven pieces of squared lumber and one railroad tie measuring 12 feet north-south by four feet east-west was associated with the western portion of the segment within the project area.

12. **Associated Features or Resources**: None

III. Research Information

13. **Architect/Engineer**:	Colorado Central Railway Engineering Department
Source(s) of Information:	Tivis E. Wilkins (1974) *Colorado Railroads, A Chronological Development*, Pruett Publishing Company, Boulder.
14. **Builder**:	Denver, Utah and Pacific Railway
Source(s) of Information:	Tivis E. Wilkins (1974) *Colorado Railroads, A Chronological Development*, Pruett Publishing Company, Boulder.
15. **Date of Construction / Date Range**:	1919
Source(s) of Information:	Tivis E. Wilkins (1974) *Colorado Railroads, A Chronological Development*, Pruett Publishing Company, Boulder.

16. **Historical / Archival Data**: The spur was originally built and opened for service in 1919 as a 2.1-mile long connection from the Lyons Branch of the Chicago, Burlington and Quincy Railroad to the Columbine Mine in the town of Serene (5WL749). The Lyons Branch of the Burlington was originally built as the mainline of the Denver, Utah and Pacific Railroad, a narrow gauge line planned to run north and west from Denver to Salt Lake City. The segment from Longmont to Lyons was finished in 1885. The company was financially supported by the Burlington (CB&Q) and subsequently the Denver, Utah and Pacific was absorbed by the Burlington, after plans to cross the mountains to Utah were abandoned. The former Denver, Utah and Pacific line became the Lyons Branch (i.e., the western terminus branch of the Burlington). The spur to the Columbine Mine was abandoned in 1946, and the tracks were removed in the early 1950s (Wilkins 1974:56, 204, 243).

17. **Cultural Affiliation and Justification**: Multi-cultural

IV. Management Recommendations

18. **Eligibility of Entire Resource**

☒ Eligible	☐ Not Eligible	☐ Need Data	Is this an official determination?	☒ Yes	☐ No

Remarks / Justification: The mainline of the Burlington and Missouri River Railroad, which also includes the Chicago, Burlington and Quincy Railroad, the Burlington Northern Railroad, and the Burlington Northern and Santa Fe Railroad, was officially determined eligible on August 11, 1993.

19. **Evaluation of integrity of the segment of the entire linear resource being recorded** (Complete only if "Segment" under item 4 is checked and the entire resource is marked as Eligible under item 18)

☐ Supporting	☒ Non-supporting	☐ Not applicable

Remarks / Justification: The integrity of this segment of a spur from the Lyons Branch of the Chicago, Burlington, and Quincy Railroad to the Columbine Mine has been heavily altered and impacted by removal of the tracks and associated structures, modification and use as a two-track road, and oil and gas facility installations. It can no longer be associated with the Columbine Mine or the town of Serene (5WL749); both of these historic sites have been completely impacted by the Denver Regional landfill constructed to the north of the project area.

20. **Recorder(s)**:	Tom Hoffert and Cathryn Williamson	21. **Date**:	05/02/15

5WL1423.44, western portion of railroad segment. View to the northeast showing the grass covered berm of the railroad segment. The Denver Regional Landfill is in the background.

5WL1423.44, western portion of railroad segment. View to the north showing the grass covered berm of the railroad segment. The vehicle is parked on an existing two-track road on top of the berm. The Denver Regional Landfill is in the background.

5WL1423.44, western portion of railroad segment. View to the northwest showing the grass covered berm of the railroad segment. The west end of the berm is truncated by the Vista Pointe subdivision.

5WL1423.44, western portion of railroad segment. View to the east showing the railroad berm and the existing two-track road on top of it.

5WL1423.44, western portion of railroad segment. View to the southwest showing the western terminus of the railroad berm at Vista Parkway. The Vista Pointe subdivision is in the background.

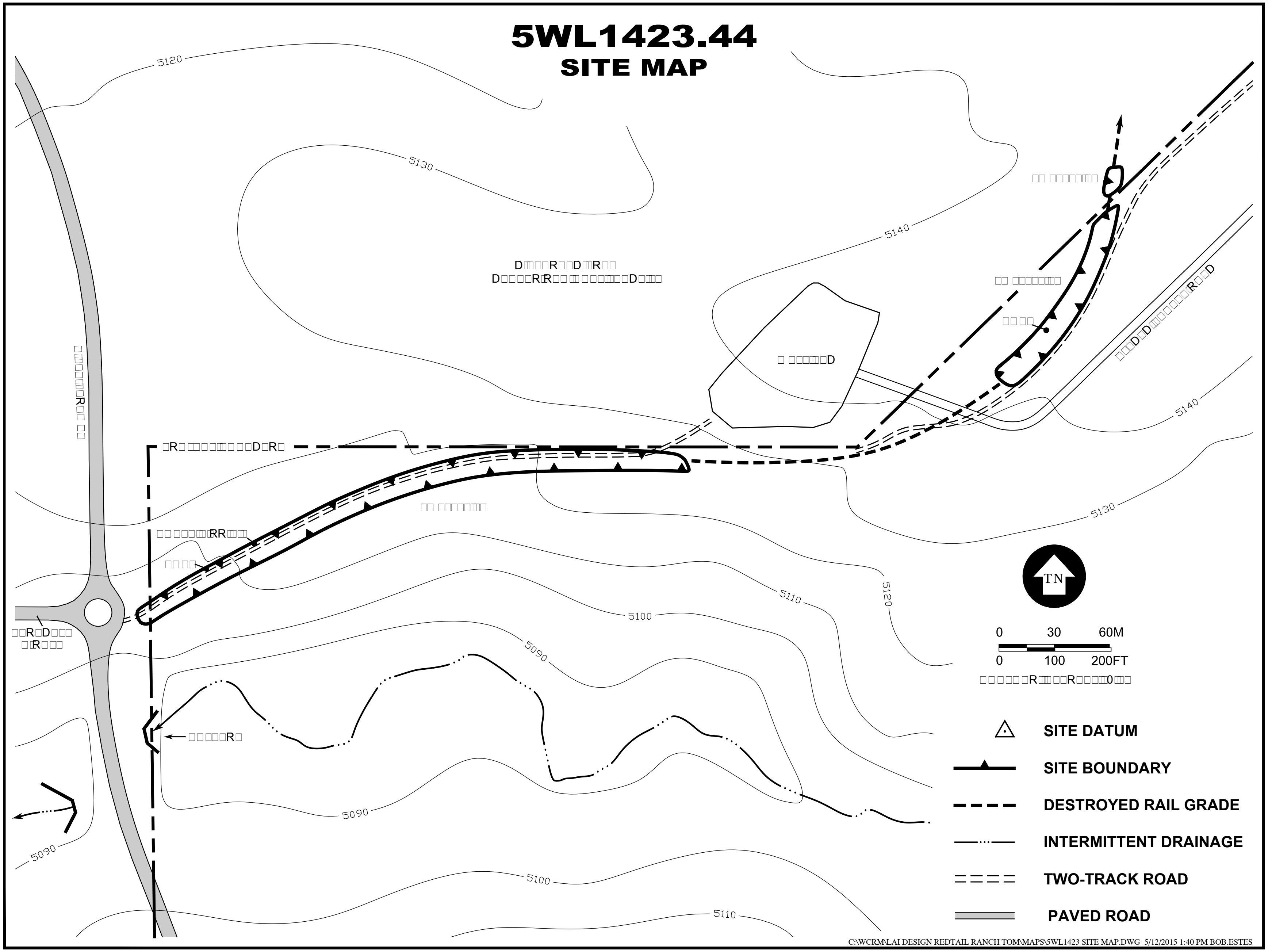
5WL1423.44, western portion of railroad segment. View to the west of wood poles and a railway tie associated with the railroad berm.

5WL1423.44, eastern portion of railroad segment. View to the west showing the bulldozer cut through the railroad segment; the piece on the right is outside of the project area and the piece on the left is inside the project area. The individual is standing at the eastern terminus of the eastern portion of the site within the project area. On the right is a disturbed area from well pad installation.

5WL1423.44, eastern portion of railroad segment. View to the southwest showing the bulldozer cut through the railroad segment at the project boundary. On the right is a disturbed area from well pad installation.

5WL1423.44, eastern portion of railroad segment. View to the east showing the railroad berm east of a disturbed well pad area.

5WL1423.44, eastern portion of railroad segment. View to the southwest showing the railroad berm east of disturbed well pad area. Note the bladed well pad access road in the center of the photo that bisects the berm.


5WL1423.44
SITE MAP
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SITE DATUM
SITE BOUNDARY
DESTROYED RAIL GRADE
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TWO-TRACK ROAD
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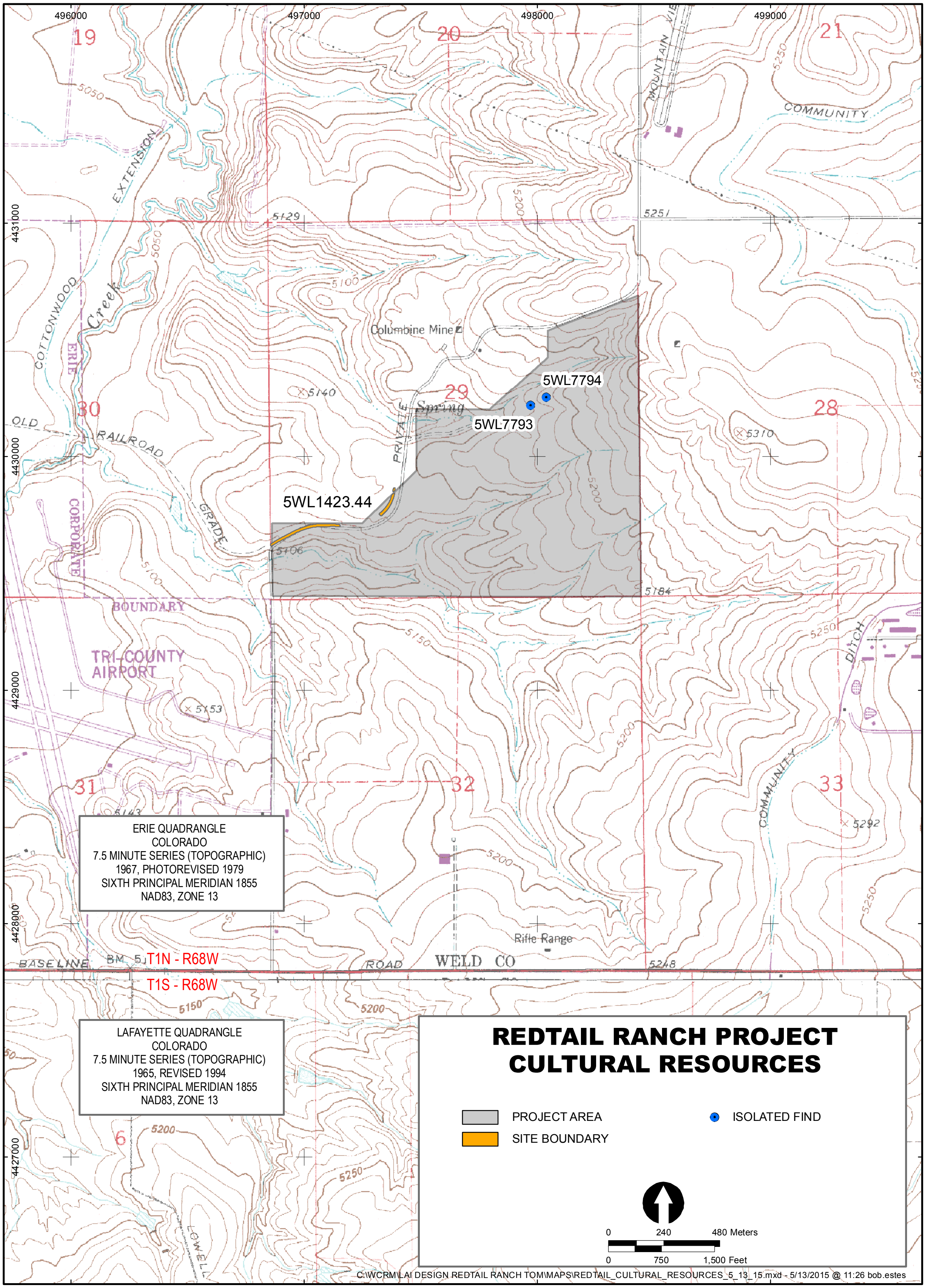

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COTTONWOOD Creek
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OLD RAILROAD GRADE
TRI-COUNTY AIRPORT
Columbine Mine
Spring
PRIVATE
MOUNTAIN VIEW
COMMUNITY
DITCH
Rifle Range
BASELINE ROAD
WELD CO
LOWELL
5WL7794
5WL7793
5WL1423.44
T1N - R68W
T1S - R68W
ERIE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1967, PHOTOREVISED 1979
SIXTH PRINCIPAL MERIDIAN 1855
NAD83, ZONE 13
LAFAYETTE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1965, REVISED 1994
SIXTH PRINCIPAL MERIDIAN 1855
NAD83, ZONE 13
REDTAIL RANCH PROJECT
CULTURAL RESOURCES
PROJECT AREA
SITE BOUNDARY
ISOLATED FIND
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COLORADO CULTURAL RESOURCE SURVEY

Archaeological Isolated Find/Feature Form

OAHP 1408
Rev. 11/10

This form is not to be used for phenomena that are eligible for the National Register or are part of the built environment. To be ***only*** used for phenomena that meet the requirements of the recorder's definition as provided below. A map at 1:24,000 scale with IF clearly plotted must be attached.

1. **Site Number**: 5WL7793 | 2. **Temporary Resource Number**: 1F RT1 | 3. **County**: Weld

4. **Recorder's Definition of Isolated Find**: Historic isolated artifacts/features are the occurrence of four or fewer artifacts not from the same item or the occurrence of an isolated feature.

5. **PM** 6 | **Township** 1N | **Range** 68W | **Section** 29 | ¼ SW | ¼ NE

If section is irregular, explain alignment method:

6. **USGS Quad**: Erie | 7. **Elevation**: 5170 feet

8. **UTM Coordinates**: Datum used ☐ NAD 27 ☒ NAD 83 ☐ WGS 84 Other:

Zone: 13; 497972 mE 4430223 mN

9. **UTM Source**: ☒ Corrected GPS/rectified survey (<5m error) ☐ Uncorrected GPS ☐ Map template

Other (explain):

10. **Landowner**: LAI Design Group, 8201 Southpark Lane, Littleton, Colorado 80120

11. **Describe Artifact(s) and their distribution**: Two historic harrows attached side-by-side. They are made of fabricated metal, and "John Deere 400" is stamped across the front of each piece. The harrows are 12'8" L x 2'10" W, with five harrow blades extending from the back end. Four rims are 2'4" diameter and four rims are 1'4" diameter.

☐ No artifacts

12. **Describe Feature (include dimensions)**:

☒ No features

13. **Cultural Affiliation and Justification**: Unknown

14. **Time Period and Justification**: 1935 to present

15. **Relevant environmental information (e.g., elevation, topography, soils, vegetation, nearby water source)**: The isolated harrows are situated on the bench of a low ridge with a western aspect. There is a 360º view extending approximately 200m to the north, 1m to the east and many miles to the south and west. The locale overlooks a seasonal drainage on the north side of the ridge that feeds into a stock pond. There was standing water in the pond at the time of the survey. The soil is brown clay loam with abundant surface gravels of quartzite, sandstone, and iron stone. Vegetation in the area is comprised of native and invasive grasses, weeds, sparse yucca and prickly pear cactus.

16. **Is this isolate located in a cultural landscape?** ☐ Yes ☒ No

If yes, describe:

17. **Why is this isolated find not eligible for the National Register?** The isolated artifact is not unique, cannot yield additional information, and is not within an intact historic landscape.

18. **Additional Information (e.g., narrative, drawings, photographs, sketch map; attach extra pages if desired)**: Photographs and digital media are on file at WCRM, Inc Boulder, Co office. LAI-TRE Project – Digital #DSCF0560-0562

19. **Artifacts Collected?** ☐ Yes ☒ No

If yes, provide repository information:

20. **Report Title and Project Number**: *A Class III Cultural Resource Inventory for the LAI Design Group's Redtail Ranch Project, Weld County, Colorado*; WCRM Project LAI-RED/15B048

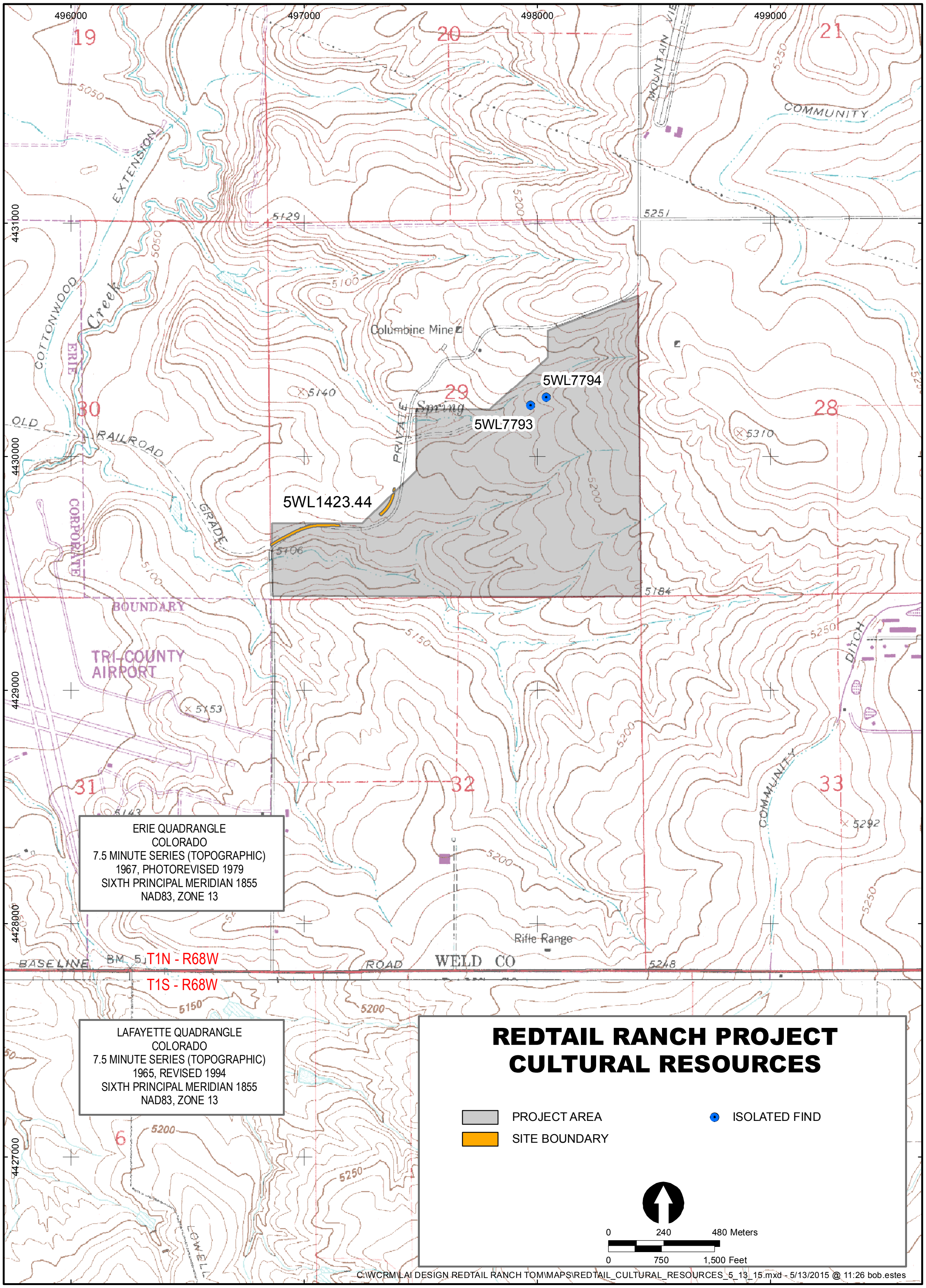
21. **Recorder and Affiliation**: Tom Hoffert and Cathryn Williamson/Western Cultural Resource Management, Inc.

Date: 5/2/15

History Colorado - Office of Archaeology & Historic Preservation
1200 Broadway, Denver, CO 80203
303-866-3395

5WL7793, two isolated historic harrows joined together, looking west. The Denver Regional Landfill is on the right.

5WL7793, two isolated historic harrows joined together, looking north. The Denver Regional Landfill is in the background.



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5WL1423.44
Columbine Mine
Spring
PRIVATE
COTTONWOOD
Creek
EXTENSION
OLD RAILROAD GRADE
ERIE CORPORATE BOUNDARY
TRI-COUNTY AIRPORT
MOUNTAIN VIEW
COMMUNITY
DITCH
Rifle Range
BASELINE ROAD
WELD CO
LOWELL
T1N - R68W
T1S - R68W
ERIE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1967, PHOTOREVISED 1979
SIXTH PRINCIPAL MERIDIAN 1855
NAD83, ZONE 13
LAFAYETTE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1965, REVISED 1994
SIXTH PRINCIPAL MERIDIAN 1855
NAD83, ZONE 13
REDTAIL RANCH PROJECT
CULTURAL RESOURCES
PROJECT AREA
SITE BOUNDARY
ISOLATED FIND
0
240
480 Meters
0
750
1,500 Feet
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COLORADO CULTURAL RESOURCE SURVEY

Archaeological Isolated Find/Feature Form

OAHP 1408
Rev. 11/10

This form is not to be used for phenomena that are eligible for the National Register or are part of the built environment. To be ***only*** used for phenomena that meet the requirements of the recorder's definition as provided below. A map at 1:24,000 scale with IF clearly plotted must be attached.

1. **Site Number**:	5WL7794	2. **Temporary Resource Number**:	1F RT2	3. **County**:	Weld

4. **Recorder's Definition of Isolated Find**: Prehistoric isolated artifacts/features are the occurrence of four or fewer artifacts not from the same item or the occurrence of an isolated feature.

5. **PM**	6	**Township**	1N	**Range**	68W	**Section**	29		¼	SW	¼ NE

If section is irregular, explain alignment method:

6. **USGS Quad**: Erie — 7. **Elevation**: 5185 feet

8. **UTM Coordinates**: Datum used ☐ NAD 27 ☒ NAD 83 ☐ WGS 84 Other:

Zone: 13; 498038 mE 4430256 mN

9. **UTM Source**: ☒ Corrected GPS/rectified survey (<5m error) ☐ Uncorrected GPS ☐ Map template

Other (explain):

10. **Landowner**: LAI Design Group, 8201 Southpark Lane, Littleton, Colorado 80120

11. **Describe Artifact(s) and their distribution**: One fine-grained, tan, quartzite primary flake. Platform and bulb of percussion are intact. It has been struck from a pebble. It measures 4 cm by 2.5 cm.

☐ No artifacts

12. **Describe Feature (include dimensions)**:

☒ No features

13. **Cultural Affiliation and Justification**: Prehistoric – based on artifact type

14. **Time Period and Justification**: Unknown prehistoric; not diagnostic

15. **Relevant environmental information (e.g., elevation, topography, soils, vegetation, nearby water source)**: The isolate is situated on the north slope of an east-west trending low ridge, approximately 15m below the rim. The area is badly disturbed by slope wash and is denuded of vegetation. The artifact is almost certainly in a secondary context having been moved to present position by slope wash. The soil is a clay loam with moderate surficial gravel.

16. **Is this isolate located in a cultural landscape?** ☐ Yes ☒ No

If yes, describe:

17. **Why is this isolated find not eligible for the National Register?** The isolate is not unique, associated with a feature that can yield unique and/or additional information, or within an intact prehistoric landscape.

18. **Additional Information (e.g., narrative, drawings, photographs, sketch map; attach extra pages if desired)**: Photographs and digital media are on file at WCRM, Inc Boulder, Co office. LAI-TRE Project – Digital #DSCF0563.

19. **Artifacts Collected?** ☐ Yes ☒ No

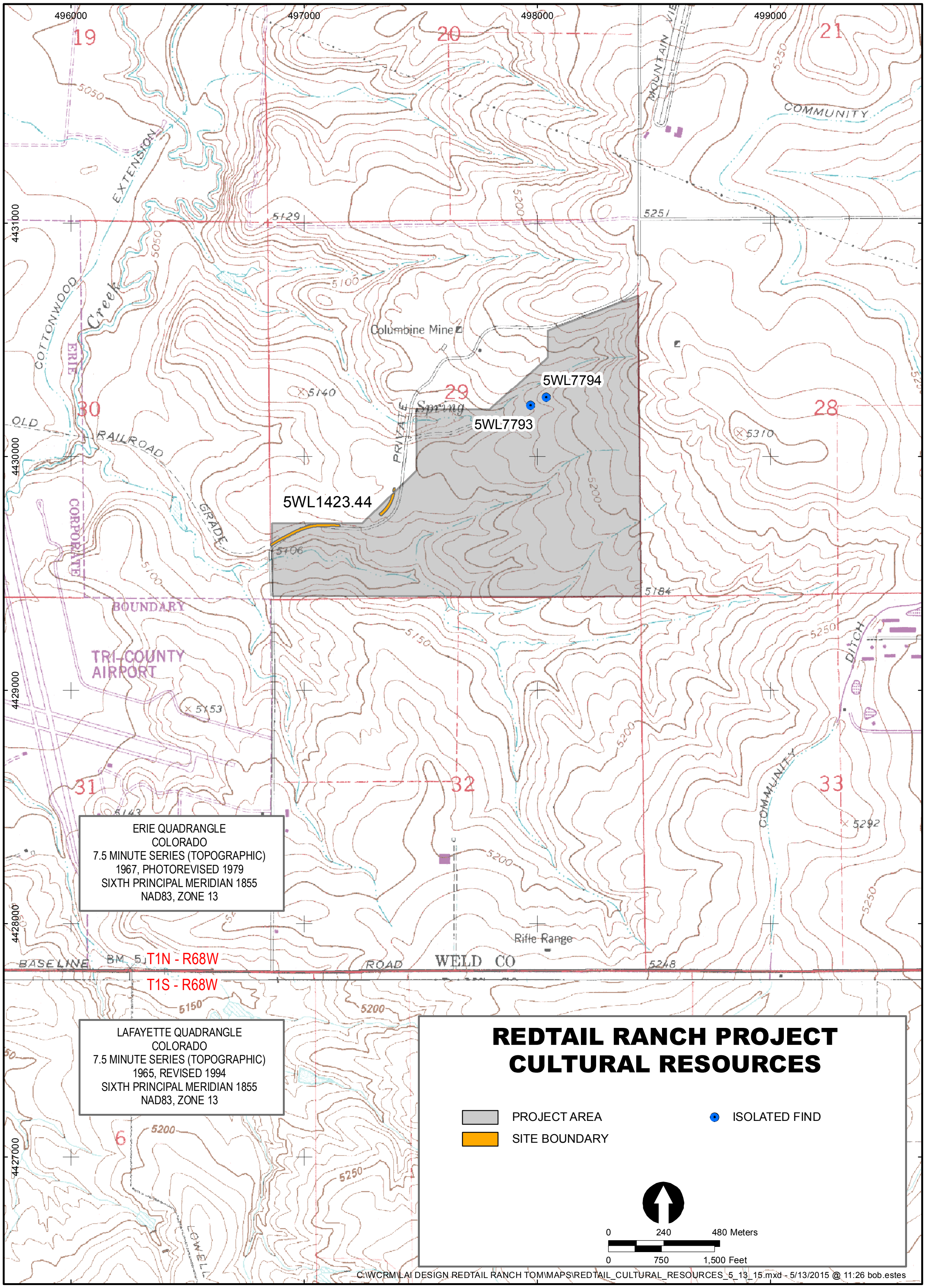
If yes, provide repository information:

20. **Report Title and Project Number**: *A Class III Cultural Resource Inventory for the LAI Design Group's Redtail Ranch Project, Weld County, Colorado*; WCRM Project LAI-RED/15B048

21. **Recorder and Affiliation**: om Hoffert and Cathryn Williamson/Western Cultural Resource Management, Inc.

Date: 5/2/15

History Colorado - Office of Archaeology & Historic Preservation
1200 Broadway, Denver, CO 80203
303-866-3395



REDTAIL RANCH PROJECT
CULTURAL RESOURCES
PROJECT AREA
SITE BOUNDARY
ISOLATED FIND
5WL7794
5WL7793
5WL1423.44
T1N - R68W
T1S - R68W
ERIE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1967, PHOTOREVISED 1979
SIXTH PRINCIPAL MERIDIAN 1855
NAD83, ZONE 13
LAFAYETTE QUADRANGLE
COLORADO
7.5 MINUTE SERIES (TOPOGRAPHIC)
1965, REVISED 1994
SIXTH PRINCIPAL MERIDIAN 1855
NAD83, ZONE 13
0 240 480 Meters
0 750 1,500 Feet
Columbine Mine
TRI-COUNTY AIRPORT
Rifle Range
WELD CO
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MINE SUBSIDENCE INVESTIGATION

Pratt Property, Approximately 330 Acres in Section 29,
Township 1 North, Range 68 West,
Erie, Colorado

Prepared For:

LAI Design Group
88 Inverness Circle East, Suite J101
Englewood, Colorado 80112

WESTERN ENVIRONMENT AND ECOLOGY, INC.

2217 West Powers Avenue
Littleton, Colorado 80210
phone (303) 730-3452
fax (303) 730-3461
www.westernenvironment.com

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Prepared For:

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88 Inverness Circle East, Suite J101
Englewood, Colorado 80112

Project Number 655-001-01

September 19, 2014

Prepared By:

____

Greg D. Sherman, P.G.
President

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Littleton, Colorado 80120
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1.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of the preliminary investigation completed on the property consisting of approximately 330 acres in Section 29, Township 1 North, Range 68 West, Erie, Colorado, Western Environment and Ecology, Inc. (Western Environment) presents the following:

- The average “theoretical void” encountered beneath the property was 0.8 feet.
- The top of the “main” seam ranged from 267 to 309 feet below the surface. However, using the results of subsidence investigations on adjacent projects, a conservative average depth to the top of the main seam of **272** feet was used.

Using these conclusions, the following general subsidence related recommendations for development are presented.

- Areas shown of Figure 2 as not being undermined have no mine subsidence related development restrictions.
- The theoretical “worst case” strains identified for the project will allow construction of buildings or building segments of **115 feet in maximum length.**
- Structures should be limited to two stories and be constructed using wood or metal framing.
- Utility installations should take into account the potential for **0.17%** strains above mine workings.
- Larger structures may be built if additional studies are conducted.

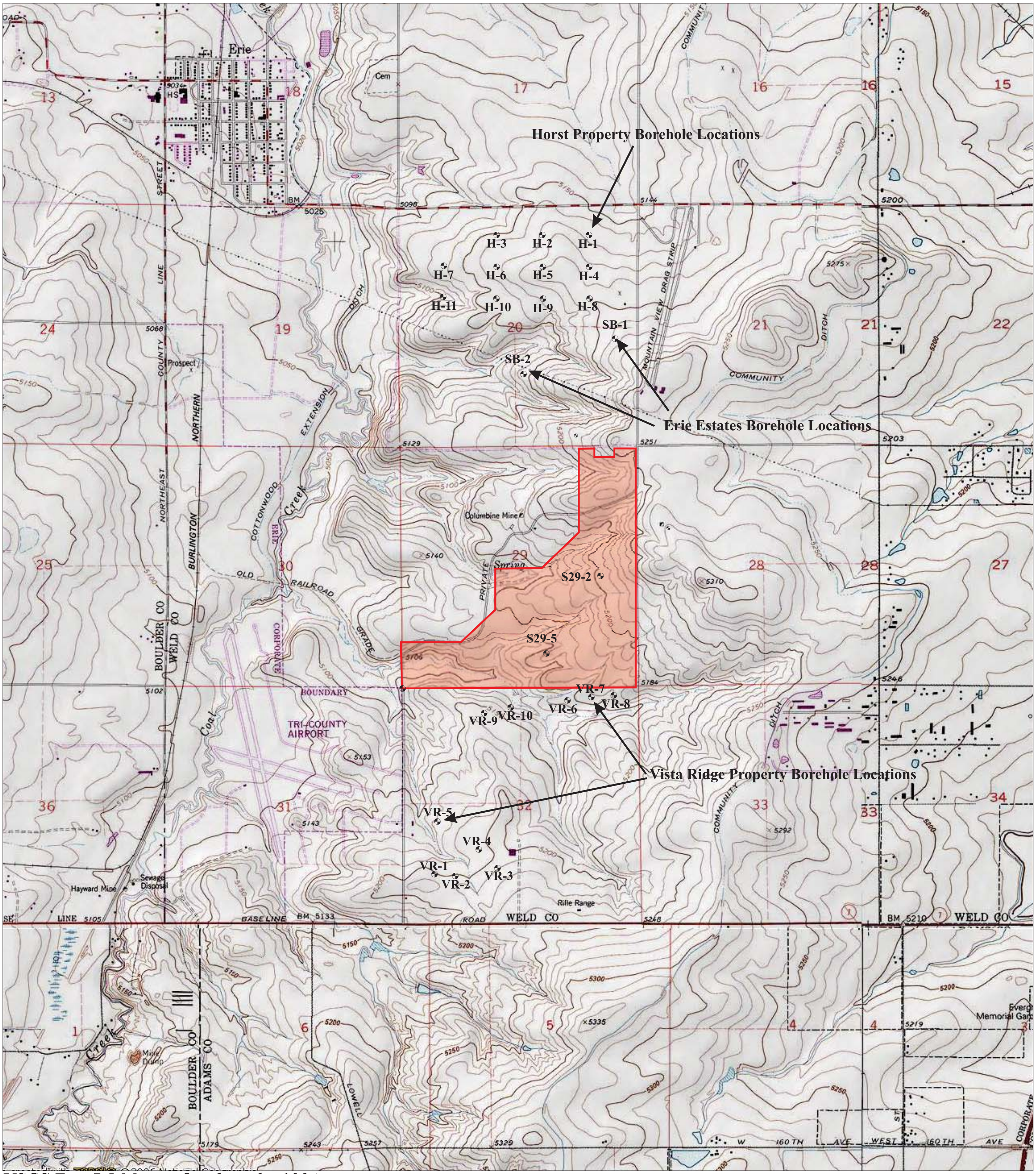
2.0 INTRODUCTION

Western Environment & Ecology, Inc. was retained by Mr. Josh Rowland of LAI Design Group to conduct a mine subsidence investigation of approximately 330 acres in Section 29, Township 1 North, Range 68 West, Weld County, Colorado (Figure 1). This site is referred to as the Pratt Property.

The purpose of this investigation is to evaluate the subsidence potential and condition of the Columbine Mine, and evaluate "theoretical" surface strains from a theoretical "worst case" subsidence event. Additionally, recommendations for subsidence resistant construction procedures and techniques are given.

Western Environment has completed a previous mine subsidence investigation on the Pratt Property for Southwest Investment Group (Project Number 445-001-01) dated November 16, 2006. Additionally, several Western Environment studies on adjacent properties to the north and south have been performed. These investigations were presented in reports entitled *Mine Subsidence Investigation Erie Estates Subdivision, Southwest 1/4 Section 20, Township 1 North, Range 68 West,* dated May 29, 2008*: Mine Subsidence Investigation, Horst Property*, dated April 4, 2000: and *Mine Subsidence Investigation, Vista Ridge Development,* dated March 1, 2001. Data acquired from these studies were utilized to evaluate subsidence induced surface strains. The results of all the assessments have been previously submitted to the Colorado Geological Survey for review, and therefore are public information.

The results and recommendations contained within this report are intended for use as an aid in planning and design. The information herein must be made available to the project geotechnical and structural engineers. Additionally, this, and all subsequent subsidence reports, should accompany the site development plan when submitted to the Town of Erie. The Town will request that the Colorado Geological Survey review and comment on this subsidence investigation. Following these procedures will aid in assuring a more predictable and thus economic development process.



USGS Erie 7.5 Minute Quadrangle, 1994

VR-1 Borehole Locations

N

Scale - 1 inch = 3,000 feet

1500 0 1500 3000

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2217 West Powers Avenue

Littleton, Colorado 80120

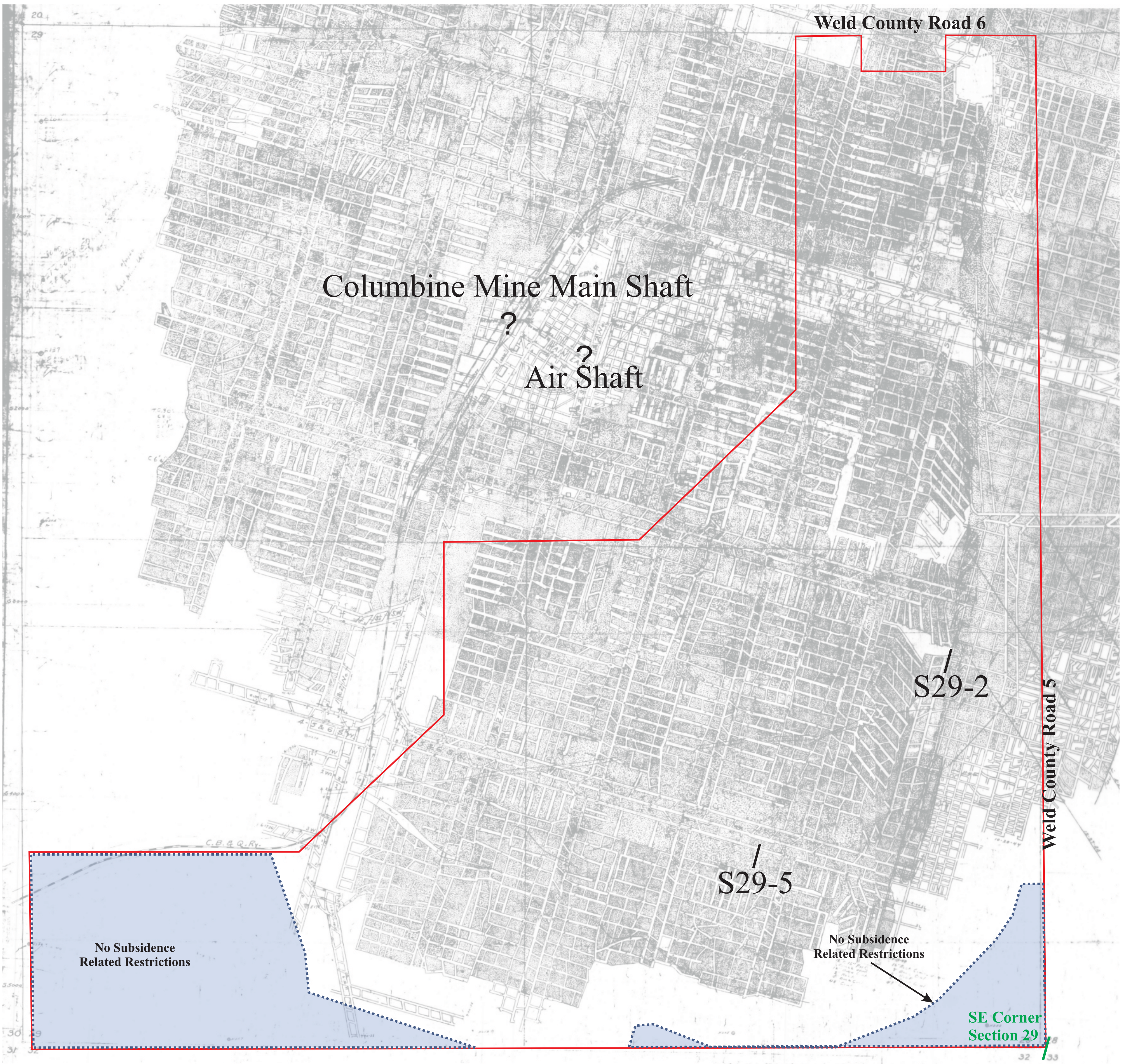
Figure 1 - Site Location Map
Approximately 330 Acres in Section 29,
Township 1 North, Range 68 West,
Erie, Colorado

3.0 SITE CHARACTERISTICS

This mine subsidence investigation was conducted for 330 acres in Section 29, Township 1 North, Range 68 West, in Weld County, Colorado. At the time of the inspection, the site was vacant. The property abuts two active landfills, and encompasses the closed Old Erie Landfill. The Pratt Property occurs southwest of the intersection of Weld County Roads (WCR) 5 and 6 (Figure 2). The site slopes gently to moderately to the west, and ranges from 5,090 to 5,260 feet (USGS Erie 7.5 Minute Quadrangle, 1979).

The abandoned coal mine that underlies the project is referenced in the files of the Colorado Geological Survey as the Columbine Mine. A detailed description of the mine is presented in Section 4.0.

View to the west from onsite, arrow shows approximate location of Serene Townsite



/ **Western Environment and Ecology, Inc. Boring location**

Scale - 1 inch = 600 feet

300 0 300 600

Mine Map from the Colorado Geological Survey, Columbine Mine

W e s t e r n e n v i r o n m e n t a n d e c o l o g y , i n c. 2217 West Powers Avenue Littleton, Colorado 80120	Figure 2 -Borehole Location Map Showing Columbine Mine Approximately 330 Acres in Section 29, Township 1 North, Range 68 West, Eire County, Colorado

4.0 COAL MINE DESCRIPTION

The mine which operated below the Pratt property is the Columbine Mine. The Columbine Mine and it's owner, Josephine Roche, have an important role in Colorado history. The "Columbine Mine Massacre" occurred in 1927 when striking coal miners were attacked by Colorado State Police. The strike was a nationwide work stoppage called by the Industrial Workers of the World (the precursor of the Communist Workers Party). The company town of Serene, located near the center of Section 29, was the site of the Columbine Mine. Strikers had been conducting morning rallies at Serene for two weeks because the Columbine was one of the few coal mines in the state to remain in operation using management and non-striking employees. On November 21, 1927, five hundred miners, some accompanied by their wives and children, arrived at the north gate just before dawn. The miners were surprised to see men dressed in civilian clothes and armed with automatic weapons. After verbal alterations escalated into violence, six miners lay dead or dying.

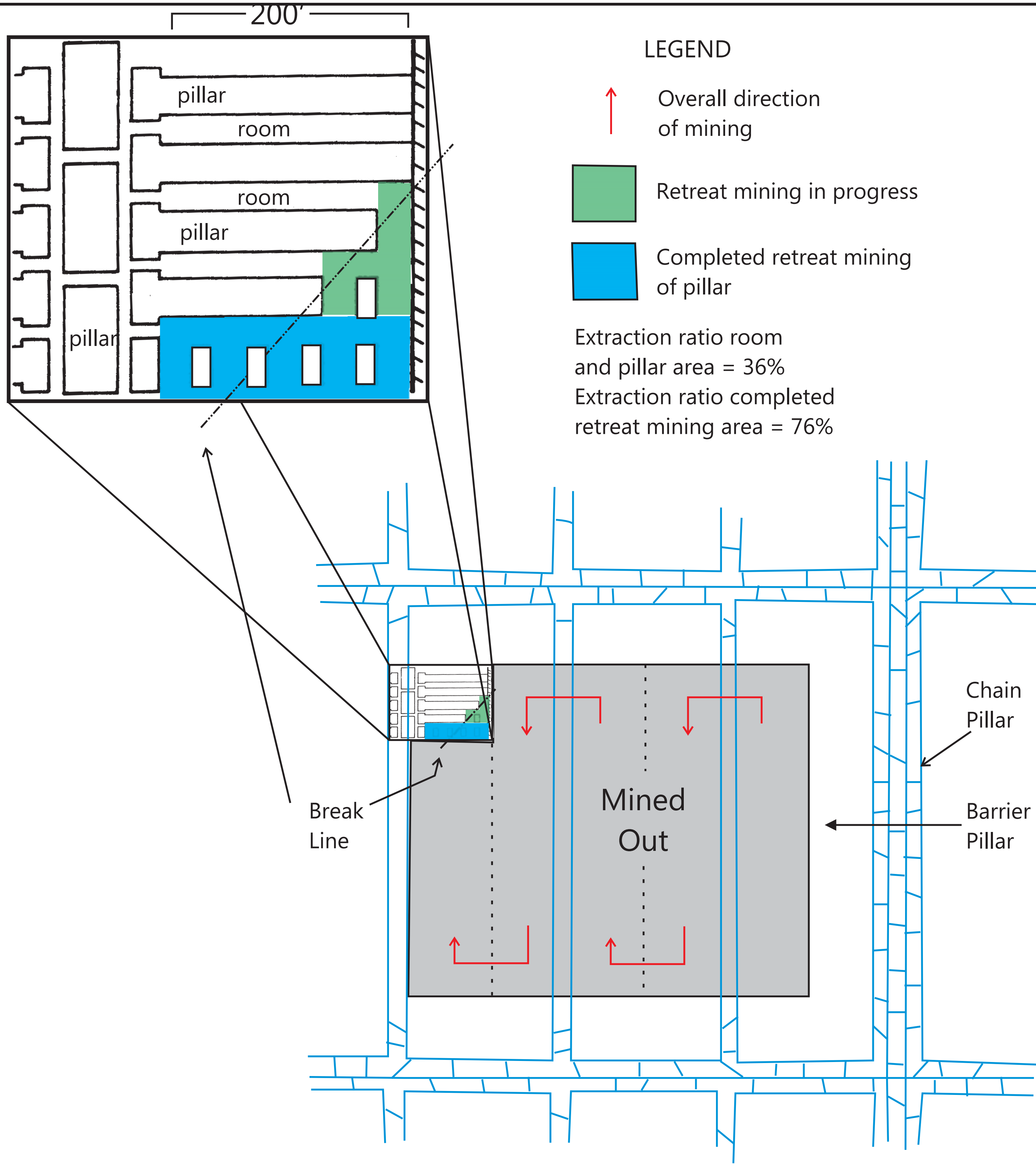
After the death of her father John Roche in 1927, Ms. Josephine Roche gained control of Rocky Mountain Fuel Company in 1929 and instituted a labor policy that allowed the Columbine Mine to be the first United Mine Workers mine in Colorado. She was highly regarded by the miners, obtaining a loan to make sure the striking miners were paid during work stoppage. Later, Ms. Roche was named Assistant Secretary of the Treasury by Franklin Roosevelt during his first term as President.

Crowd gathers outside doctors office after shootings, 1927

Records from the Colorado Division of Mines and the Colorado Geologic Survey show the "Columbine" Mine began operation in 1920 and continued until 1946. Total production from all operations was placed at 7, 216,286 tons. Entry to the mine was gained via a 300 foot deep, two compartment production shaft located north of the Pratt Property, beneath the currently operating Denver Regional Landfill South. The Columbine mine maps indicate that only one level of mining occurs in Section 29. Elevation description on the maps and drilling indicate that the levels were separated by twenty to thirty feet.

The Columbine Mine operation was classified as a modified room and pillar mine (Figure 3). The "pillar retreat" method was utilized during the early years of operation. Haulage ways were ten feet wide and were separated by 30 foot wide "chain pillars". Rooms had approximate widths of fifteen feet and lengths of 200 feet. The Columbine Mine was among the largest in the Boulder/Weld Coal Field. However, it differs somewhat from the other large mines in the district in that it was one of the first to utilize the continuous mining machine. This equipment / technique radically changed coal mining after its wide spread use in the early 1950's. However, review of the original mine map of the Columbine Mine indicate that from approximately 1940 through 1946, when the mine closed, a continuous

Tipple at Columbine Mine, Erie
Rocky Mountain Fuel Co. operated Columbine Mine from 1920 until it was closed in 1946. The mine was located south of Erie and the mine camp of Serene was close by for housing for the miners. 7,316,275 tons of coal were produced at the mine.
Photo from Louisville Public Library and Louisville Historical Museum



Literature Cited: Gray, Richard E. and Robert W. Bruhm, Coal Mine Subsidence - Eastern United States. Geological Society of America, Volume VI, 1984. And Tomlinson, H., "A Study of Falls of Roof and Coal In Northern Colorado", Dept. of Commerce, U.S. Bureau of Mines, Report of Investigations 3199, Jan., 1933.

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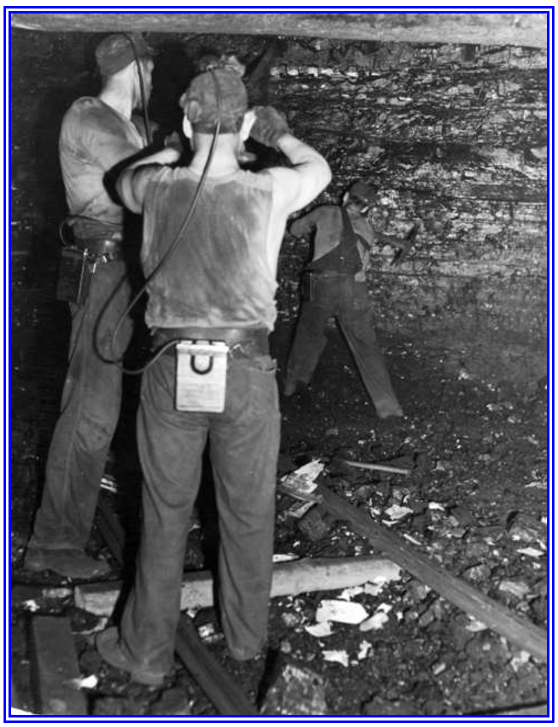
Figure 3 - Pillar Retreat Method for Coal Mining, Approximately 330 Acres in Section 29, Township 1 North, Range 68 West, Erie, Colorado

mining operation was occurring in the northeast potions of the mine. Western Environment has determined that coal extraction rates increased from 50-60% in the older (pillar retreat) mines, to 60-70% or greater in the mines operating after introduction of the continuous miner. This increase in extraction resulted in a reduction in overall roof support, which in turn produced more complete and thorough subsidence in the newer mines. Western Environment calculated, that given similar depth, mine layout, and seam thickness, “theoretical” surface strains could be 30% higher in the older mines.



Workers in Columbine Mine. Photo from the Denver Public Library, Western History Collection

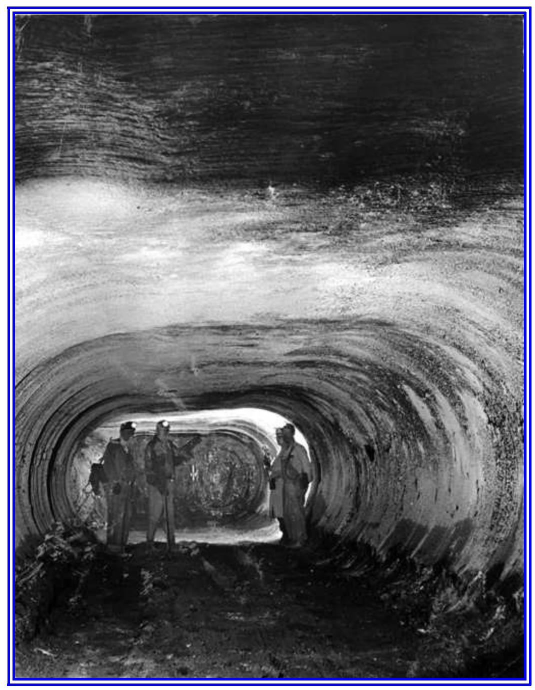


Photo of Room Mined Using Continuous Miner

Western Environment has researched the mining methods utilized in the Boulder/Weld mines. In the report entitled "A Study of Falls of Roof and Coal in Northern Colorado" Tomlinson (1933) describes the mining method used in five operating mines "*The room and pillar and panel methods of mining are employed. Pairs of room entries are advanced to a predetermined point, and rooms in sets of two to four are turned from one room entry or in some places from both entries. Room pillars are recovered immediately after the rooms have been advanced for the required distance, and a uniform break line maintained with each group of retreating pillars.*" This method of retreat mining is illustrated on Figure 3.

Starting The Cross Cut

5.0 DRILLING PROCEDURES

Two rotary holes were drilled on the Pratt Property for the previous Southwest Investment investigation by Plains Water Well Service, Inc. of Cheyenne, Wyoming. All holes were both lithologically and geophysically logged. Lithologic strip logs (Appendix A) were taken of cutting samples at five foot intervals. Geophysical logs consisting of natural gamma, spontaneous potential (SP), resistance and a three arm caliper were run selected holes intercepting the mine workings (Appendix B).

The caliper tool was calibrated prior to each use to graphically show the diameter of the hole. The full extension of the arms would indicate a cavity of at least greater than 21 inches. The drill will normally make a 5.125 inch or 6.25 inch hole. Therefore, a significantly larger or smaller hole could indicate mining activity.

After drilling and logging, each hole required plugging in a manner which would not allow water to enter the workings. On all holes, a simple cement plug was set from 2 to 15 feet with the remaining footage of the hole being filled with Colorado State Mined Land Reclamation Board approved abandonment fluid which is designed to inhibit fluid penetration. Native soil was then replaced from 2 feet to the surface.

Rotary Drill Pratt Property

6.0 REGIONAL GEOLOGY

6.1 Outcropping Units

Outcropping units within and surrounding the Erie area are the Pierre Shale, the Fox Hills Sandstone, the Laramie Formation and Quaternary gravels and soils (Figure 4).

The Pierre Shale is a lead gray to brown and black shale of marine origin. Total thickness in the area is greater than 7,000 feet (Blair 1951), with the majority of the formation made up of shale. Near the top of the Pierre Shale it becomes increasingly sandy and contains beds of fine sandstones and siltstones as it grades into the Fox Hills Sandstone. This unit does not outcrop on the site but can be seen southeast of the project on the east side of the Town of Erie.

The Fox Hills Sandstone is a massive to crossbedded sandstone. It was deposited in a beach and/or delta-front environment and comfortably overlies the Pierre Shale. The lower two-thirds of the formation is a fine to coarse grained, bluff colored sandstone which weathers to a light tan to tan color. The Fox Hills Sandstone contains numerous iron colored calcareous concretions, ranging in size from fractions of an inch to several feet. The upper one-third of the Fox Hills Sandstone is a fine to medium grained, light gray to pale yellow in color, crossbedded sandstone. The total thickness of the formation near this location is about 140 feet as measured in the NW 1/4 of Section 28, T1S, R70W. Thickness varies from 60 feet near Ralston Creek (Van Horn, 1957) to 250 feet near Baseline Reservoir.

The Laramie Formation, which directly underlies the site is predominantly a fresh water deltaic sequence, consisting of clays, sands, silts and coals (Figure 5). The lower portion is approximately 100 feet thick and is composed of sandstones, sandy shales, claystones, and coal beds. These coals have been economically mined in the past. The upper unit has a thickness of approximately 600 feet and is made up of mostly clay shales, very fine sandy shales, and lenticular beds of sandstone. The shales are largely carbonaceous and in places becomes lignitic. The Laramie Formation lies comfortably on the Fox Hills Sandstone.

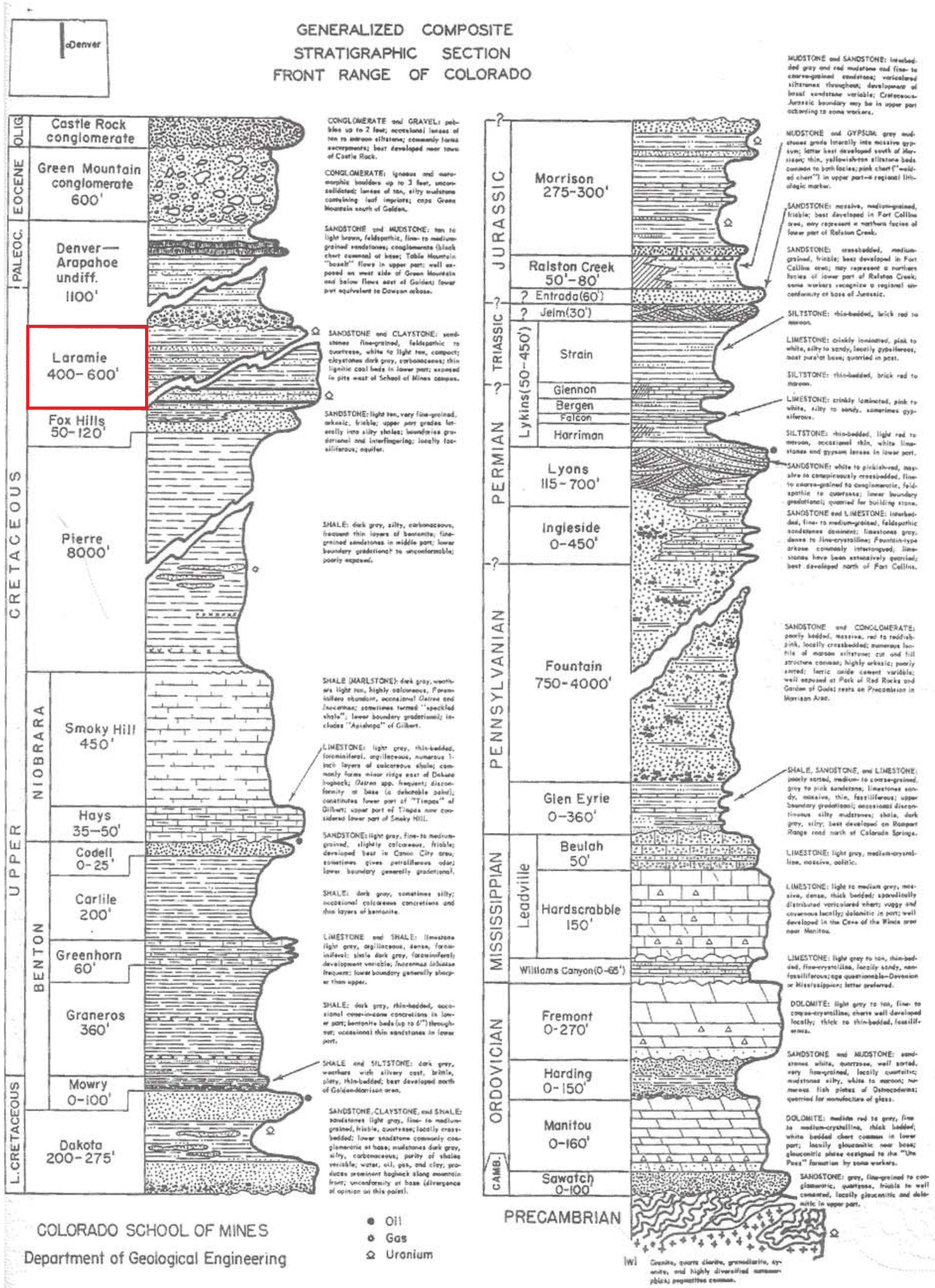


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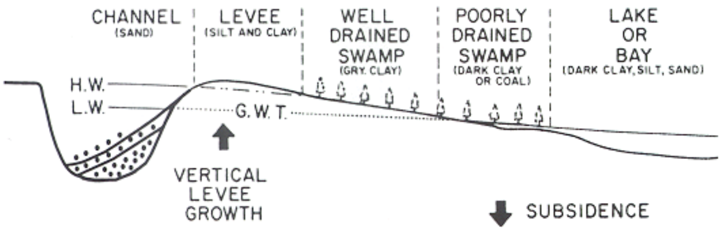
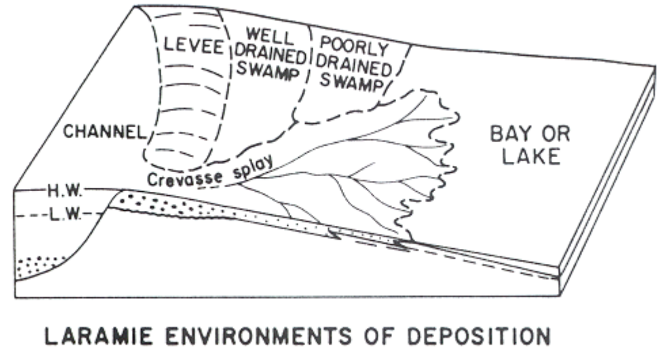
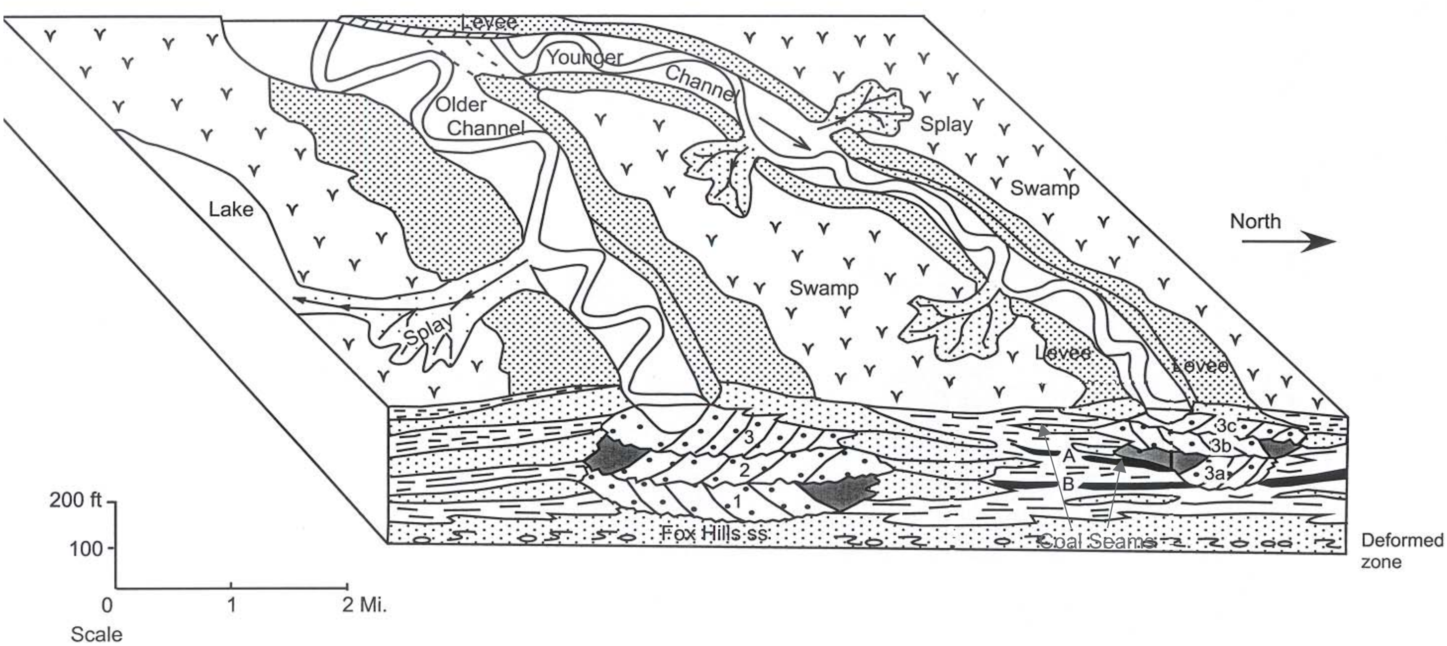
Figure 4 - Generalized Stratigraphic Section, Approximately 330 Acres in Section 29, Township 1 North, Range 68 West, Weld County, Colorado





Channel and channel margin environments for lithologies in Laramie Formation.

Relationship of channel margin environments to crevasse splay deltas.



Figures from: A Guide to the uppermost Cretaceous stratigraphy, central Front Range Colorado, deltaic sedimentation, growth faulting and early Larimde vertical Movement
Weimer, R.J. 1973

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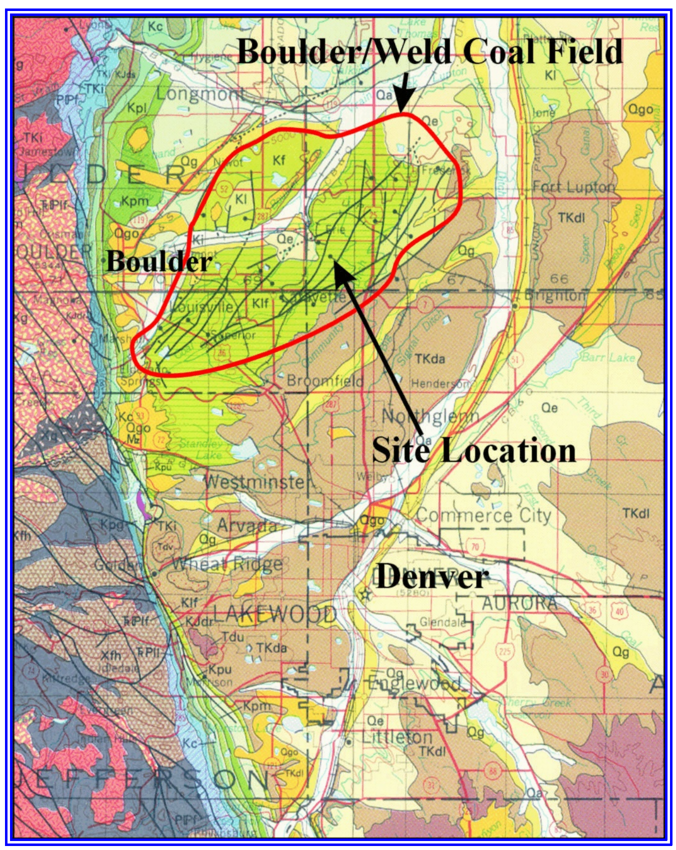
Littleton, Colorado 80120

Figure 5 - Generalized Stratigraphic Models of the Laramie Formation, Approximately 330 Acres in Section 29, Township 1 North, Range 68 West, Erie, Colorado

6.2 Structure

The subject property lies on the western edge of the Denver-Julesberg Basin against the Front Range Uplift. This basin contains up to 13,000 feet of sediments derived from the ancestral Rockies which laid to the west. Two kinds of faulting occur in this portion of the basin. A basement-controlled late Cretaceous Laramide faulting is the most prevalent and is the result of deformation associated with uplift. The second basin has been described by Davis and Weimer (1976) as growth-faulting as a result of differential loading of the deltaic sequence at the time of deposition.

Growth faulting is the major structural feature seen in the area. A zone is present with dominant faults trending in a northeasterly direction. This system is ten miles wide and thirty miles long. These faults are high-angle, normal structures near the surface, but seismic work has shown that they tend to flatten and die out at depth. Work by Davis and Weimer (1976) shows that these listric normal faults do not continue below the Hygiene Member of the Pierre Shale. Antithetic faults resulting from tension then form horst and grabens. This effect had resulted in the increased thickness of sediments in the graben areas. The Fox Hills Sandstone has been reported to have a thickness near a growth fault of 484 feet (Spencer, 1961). The Laramide Formation also has increased thickness in these zones and this is believed to be the reason for the increased thickness of the coal seams in the Boulder-Weld coal field.



Front Range geology, from Tweto, 1979

7.0 SITE GEOLOGY

Two distinct units were encountered during drilling on the Pratt Property. The first unit penetrated was a sandy clay occurring from 0 to15 feet in depth. This unit appears to be aeolian (wind deposited) in occurrence. Western Environment's experience with the geotechnical properties of the unit has shown that, although high swell potentials are unlikely, collapsing upon saturation can occur with aeolian soils.

The next unit that had a transitional boundary between soil, weathered rock, and fresh rock was the interbedded clays, silts, fine-grained sand, and coals of the Cretaceous Age Laramie Formation. This formation extended from approximately 10 to15 feet beneath the surface to greater than 380 feet.

At least six coals have been identified during drilling on the subject property. However, no attempt to correlate the coals was made. The "main" seam of the Columbine Mine occurred at a depth ranging from approximately 267 to 307 feet in the borings advanced on the property. The Fox Hills Formation was not encountered during drilling.

Review of mine maps show that the Columbine Mine and the Boulder Valley Mine operated from within the same coal seam.

8.0 DESCRIPTION OF HOLES

The description of rotary holes drilled on the project and adjacent projects are from the drill cuttings taken every five feet, and interpretation of geophysical logs for each boring. **Horst** indicates borings advanced on the Horst Property, **VR** indicates borings advanced on the Vista Ridge Property, and **S29** indicates borings advanced on the Pratt property. The Erie Estates Project borings are designated as **SB-1** and **SB-2**.

<u>Horst Property</u>

Horst 1 A light brown arenaceous soil occurred from 0 to 20 feet. Light gray to brown claystone was penetrated from 20 to 60 feet. A light gray claystone was encountered from 60 to 275 feet. The “A” seam was encountered from 145 to 150 feet. The “main” seam interval was encountered from 280 to 285 feet. Circulation was lost at 275 feet. A 6 inch caliper deflection occurred at 280 feet. Total depth of the boring was 340 feet. Collapse was complete with no open voids.

Horst 2 A light brown arenaceous soil occurred from 0 to 30 feet. Brown to gray claystone was penetrated from 30 to 320 feet. The “A” seam was encoutnered from 120 to 125 feet. The “main” seam occured from 290 to 295 feet. No mine workings were penetrated. Total depth of the boring was 340 feet.

Horst 3 A light brown arenaceous soil occurred from 0 to 10 feet. Light gray to brown claystone was penetrated from 10 to 80 feet. A light gray claystone was encountered from 80 to 265 feet,. The “A” seam was encountered from 145 to 150 feet. The “main” seam interval occurred from 240 to 245 feet. Circulation was lost at 265 feet. Maximum caliper deflection of 7.2 inches occurred at 249 feet. Total depth of the boring was 300 feet. Collapse was complete with no open voids.

Horst 4 A light brown arenaceous soil occurred from 0 to 20 feet. Light gray to brown claystone was penetrated from 20 to 95 feet. A light to medium gray claystone with carbonaceous stringers was encountered from 95 to 315 feet. The "A" seam was encountered from 160 to 165 feet. The "main" seam interval occurred from 315 to 320 feet. Circulation was lost at 315 feet. Maximum caliper deflection of 6.0 inches occurred at 310 feet. Total depth of the boring was 340 feet. Collapse was complete with no open voids.

Horst 5 A light brown arenaceous soil occurred from 0 to 15 feet. Light gray to brown claystone was penetrated from 15 to 70 feet. A light gray claystone was encountered from 70 to 270 feet,. The "A" seam was encountered from 120 to 125 feet. The "main" seam interval occurred from 285 to 290 feet. Circulation was lost at 275 feet. Maximum caliper deflection of 11 inches occurred at 284 feet. Total depth of the boring was 300 feet. Collapse was complete with no open voids.

Horst 6 A light brown arenaceous soil occurred from 0 to 15 feet. Light gray to brown claystone was penetrated from 15 to 80 feet. A light gray claystone was encountered from 80 to 270 feet. The "A" seam was encountered from 105 to 110 feet. The "main" seam interval occurred from 235 to 240 feet. Circulation was lost at 230 feet. Maximum caliper deflection of 11 inches occurred at 238 feet. Total depth of the boring was 300 feet. Collapse was complete with no open voids.

Horst 7 A light brown arenaceous soil occurred frm 0 to 15 feet. Light gray to brown claystone was penetrated from 15 to 75 feet. A light gray claystone was encountered from 75 to 150 feet. A light gray sandstone was drilled from 155 to 230 feet. No coal seams were penetrated. No mine workings were encountered. Total depth of the boring was 230 feet.

Horst 8 A light brown arenaceous soil occurred from 0 to 20 feet. Light gray to brown claystone was penetrated from 20 to 70 feet. A light to medium gray claystone was encountered from 80 to 260 feet. The "A" seam was encountered from 165 to 170 feet. Circulation was not lost. No mine workings were encountered. Total depth of the boring was 260 feet.

Horst 9 A light brown arenaceous soil occurred from 0 to 15 feet. Light gray claystone was penetrated from 15 to 50 feet. A medium gray claystone was encountered from 50 to 325 feet. The "main" seam was encountered from 230 to 237 feet. No mine workings were penetrated. Total depth of the boring was 340 feet.

Horst 10 A light brown arenaceous soil occurred from 0 to 15 feet. Light gray to brown claystone was penetrated from 15 to 70 feet. A medium gray claystone was encountered from 70 to 200 feet. The "A" seam was encountered from 130 to 135 feet. Circulation was lost at 200 feet. The "main" seam interval occurred from 235 to 240 feet. A maximum caliper deflection of 6 inches occurred at 223 feet. Total depth of the boring was 280 feet. Collapse was complete with no open voids.

Horst 11 A light brown arenaceous soil occurred from 0 to 20 feet. Light gray to brown claystone was penetrated from 20 to 100 feet. A medium gray claystone was encountered from 100 to 340 feet. No mine workings were penetrated. Total depth of the boring was 340 feet.

Vista Ridge Property

VR-6 Tan sandy argillaceous soil occurred from 0 to 20 feet. Tan claystone with carbonaceous clay was observed from 20 to 30 feet. Medium to light grey claystone was encountered from 30 to 60 feet. Medium to dark grey claystone with minor carbonaceous claystone was penetrated from 60 to 200 feet. Medium grey claystone with coal was encountered at 210 feet. Medium grey claystone was observed from 220 to 260 feet. The Columbine Mine "main" seam occurred at 260 to 270 feet. Light grey sandstone, was observed from 260 to 300 feet. Total depth of the hole was 300 feet. No mine workings were encountered.

VR-7 Medium grey argillaceous soil occurred from 0 to 40 feet. Medium grey claystone with carbonaceous clay was observed from 40 to 50 feet. Medium grey claystone was encountered from 50 to 150 feet. Light grey claystone was penetrated from 150 to 170 feet. Medium to light grey claystone was encountered from 170 to 220 feet. Dark grey claystone was observed from 220 to 240 feet. Medium grey claystone was present from 240 to 260 feet. The Columbine Mine "main" seam occurred at 260 to 270 feet. Tan to grey claystone was observed from 270 to 300 feet. Total depth of the hole was 300 feet. No mine workings were encountered.

VR-8 Tan sandy argillaceous soil occurred from 0 to 40 feet. Medium to dark grey claystone was penetrated from 40 to 180 feet. Light grey sandstone was encountered from 180 to 200 feet. Medium grey claystone was present from 200 to 220 feet. Light grey sandstone was observed from 220 to 270 feet. Medium grey claystone was located from 270 to 290 feet. Medium grey sandstone was present at 300 feet. Total depth of the hole was 300 feet. No mine workings were encountered.

VR-9 Tan sandy argillaceous soil occurred from 0 to 30 feet. Tan claystone was observed from 30 to 60 feet. Medium to light grey claystone was encountered from 60 to 170 feet. Medium to dark grey claystone was penetrated from 170 to 220 feet. Medium to light grey claystone was encountered from 220 to 280 feet. The Columbine Mine "main" seam occurred at 280 to 290 feet.. Medium grey claystone was observed from 290 to 300 feet. Total depth of the hole was 300 feet. No mine workings were encountered.

VR-10 Tan sandy argillaceous soil occurred from 0 to 20 feet. Tan and grey claystone was observed from 20 to 40 feet. Light grey claystone was encountered from 40 to 50 feet. Medium grey claystone was penetrated from 50 to 220 feet. The Columbine Mine "main" seam occurred from 230 to 240 feet.. Medium grey claystone was penetrated from 240 to 300 feet. Total depth of the hole was 300 feet. No mine workings were encountered.

<u>Pratt Property</u>

S29-2 Sandy clay soil occurred from 0 to 10 feet. Brown to iron stained claystone was drilled from 10 to 35 feet. From 35 feet to 295 feet, light gray to dark gray claystone was penetrated. Circulation was lost at 295 feet. The Columbine "main" seam occurred from 307 to 315 feet. Maximum caliper deflection of 7.8 inches at 309.8 feet was observed. Total depth of the hole was 320 feet. Collapse was complete, with no open voids.

S29-5 Sandy clay soil occurred from 0 to 15 feet. Light brown to gray to dark gray claystone with interbedded coal was drilled from 15 to 360 feet. Circulation was not lost. The Columbine "main" seam was penetrated from 267 to 275 feet. Negative caliper deflection was observed at this location. Collapse was complete with no open voids.

Erie Estates Property

SB-1 Light brown silty sandy clay was penetrated from 0 to10 feet. From 10 to 45 feet sandy to silty brown grading to gray claystone was encountered. From 45 to 50 feet an oxidized coal seam (clinker) was present. From 50 to 130 feet medium gray claystone occurred. Light gray very fine grained quartzose sandstone was penetrated from 130 to 135 feet. From 135 to 243 feet medium gray claystone with minor carbonaceous intervals was drilled. From 243 to 285 feet interbedded coal and claystone was penetrated. Circulation was lost a 285 feet. From 285 feet to 330 feet claystone was encountered. The Upper Columbine "main" seam interval was drilled from 330 to 337 feet. Collapse was complete with no open voids. Total depth of the hole was 340 feet.

SB-2 Light brown silty sandy clay was penetrated from 0 to10 feet. From 10 to 33 feet brown grading to gray claystone was encountered. From 33 to36 feet carbonaceous claystone was present. From 36 to 101 feet medium gray claystone occurred. Carbonaceous claystone was penetrated from 101 to 106 feet. From 106 to 220 feet, interbedded claystone with carbonaceous layers were encountered. Circulation was lost at 220 feet. From 220 feet to 245 feet, drilling progress indicated undisturbed bedrock was present. From 245 to 275 feet fractured rock was penetrated. Drilling progress from 280 285 feet indicated in-place bedrock. Western Environment interprets that the Upper Columbine "main" seam was penetrated from 245 to 252 feet. The Lower Columbine "main" seam was interpreted to occur from 275 to 280 feet. Due to "Block Caving" at 215 feet no caliper log could be run.

9.0 POTENTIAL MECHANISMS OF COAL MINE ROOF FAILURE

The following presents what appears to be the most obvious progression for collapse and subsidence occurring within the Boulder-Weld Coal Field. This discussion is based upon research conducted by Western Environment personnel. However, it must be emphasized that all of the following explanations are theoretical and inferred interpretations.

The results of the numerous studies conducted by Western Environment show that when coal was removed, often no significant displacement of overlying beds occurred. Two possible explanations exist for this observation: 1) after mining, enough natural roof strength remained across the span of rooms to support the load and not fail, or 2) after roof failure, the collapse is somehow confined to a specific interval. In the majority of Western Environment projects, the caliper logs show that the rooms are not open and that the "back" or roof of the mine is down. Therefore, the collapse and subsequent bed deflections are somehow limited to a specific horizon.

The idea of progressive collapse of overlying units continuing until a "pressure arch" or dome is formed above the collapsed workings is well-documented (U.S.G.S. Prof. Paper 969). Bell (1975) states that from his experiences in rock of similar character as those present in the Boulder-Weld Coal Field, upward migration is commonly one to two times the width of the intervening room. Ackenheil and Doughtery (1970) use a figure of twice the distance between supports for an approximation of arch development. Both of these estimates fit well with the observed results from the drilling on the site that show that collapse is confined to an interval of 20 to 40 feet above the workings. In addition to the "pressure arch", the caliper log indicated that no void is present within the mined zone or at the top of the arch. It is then necessary to increase the volume (decrease the density) of the overlying material in order that the void and developing arch is filled, potentially resulting in additional support (Bell, 1975). Testing performed on the claystone bedrock has shown that the clays can "swell" upon wetting in excess of 20% (ATEC, 1985). Therefore, a five foot void could be filled by the fracturing, wetting, and swelling of 25 feet of claystone.

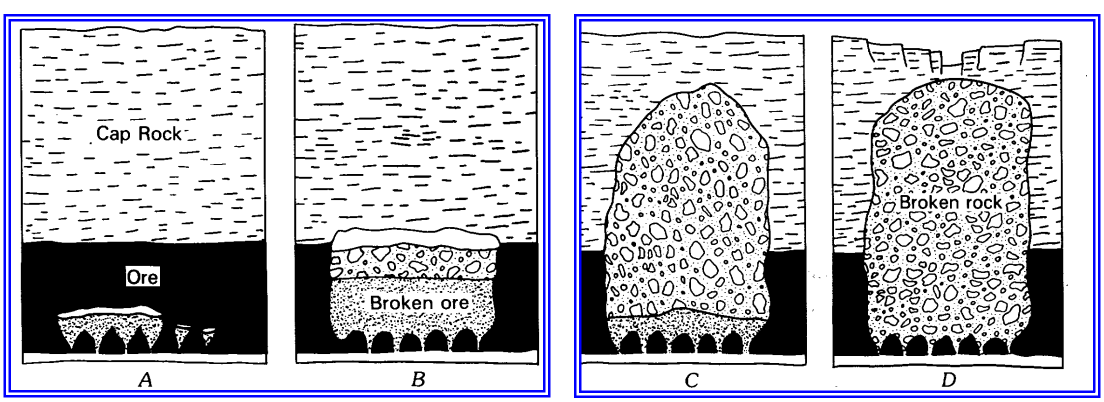
Jeff Hynes, senior engineering geologist with the CGS, has expressed his opinion that the "swelling" of the claystone observed by Western Environment may actually be a result of expansion of the clays when the isostatic confining is removed during drilling. Additionally, Mr. Hynes had commented on his observation that floor "heave" is prevalent in operating Boulder-Weld coal mines. This is likely due to the higher uniaxial compressional strength of the coal (Western Environment, 2004) in relation to the claystone that commonly makes up the floor of the mine.

Regardless of the exact mechanism, it is evident that the following process involving collapse confinement and support are likely to occur within the Boulder-Weld Coal Field:

1) Formation of pressure arches approximately 20 to 40 feet above the mined seam, and

2) Increase in volume (by swelling, depressurizing, or floor heave) of claystone roof and floor rock.

The importance of the concept of the pressure arch increases as the depth to mining decreases. If mine geometry remains consistent, the pressure arch that forms 20-40 feet above the mine will encounter either weakened weathered rock or potential "fluid" soil at a mining depth of 80 feet or less. Should the top of the pressure arch contact either the weathered rock or soil, a "sink hole" can form. Therefore, due to the depth of the working beneath the Pratt Property project, **sinkhole development is unlikely**.



Progress of subsurface subsidence induced by the block caving method (Holzer, 1984)

10.0 STRAIN ANALYSIS

The strain analysis performed for this study is adapted from the United Kingdom National Coal Board's graphical strain profiling system. This method of strain prediction was developed for on-going long wall mining operations. To make the method applicable to abandoned room and pillar mines, several modifications and assumptions were made.

The first modification is to define the thickness of the void space. The standard method is to use the actual mined thickness of coal. However, the drill holes completed on the Pratt Property project and all adjacent sites show collapse to be complete. Therefore, to proceed with a "worst case" theoretical analysis, the following assumption was made: any increase in hole diameter greater than 50% (9 inches for 5 1/8 inch boring) will be treated as an open void. The amount of "theoretical" void for all holes intercepting the mine within the Columbine Mine and equivalent mined intervals was then averaged. Due to hole collapse in SB-2, Western Environment chose to utilize 4.0 feet of "theoretical" void which represents 2 times the maximum theoretical void identified on adjacent projects.. This results in a theoretical void space for the Pratt Property project of **0.80 feet** (Table 1).

Table 1. Depth to top of mined interval / Theoretical Void, Section 29

Boring	Depth to Top of Mined Interval	Theoretical Void (Feet)
Horst 1	280	0.0
Horst 2	290	NM
Horst 3	240	0.0
Horst 4	315	0.0
Horst 5	284	2.0
Horst 6	238	2.0
Horst 7	No Coal	No Coal
Horst 8	No Coal	No Coal
Horst 9	230	NM
Horst 10	235	0.0
Horst 11	No Coal	No Coal
S29-2	307	0.0
S29-5	267	0.0
SB-1	330	0.0
SB-2	245	4.0*
Average	272	0.80

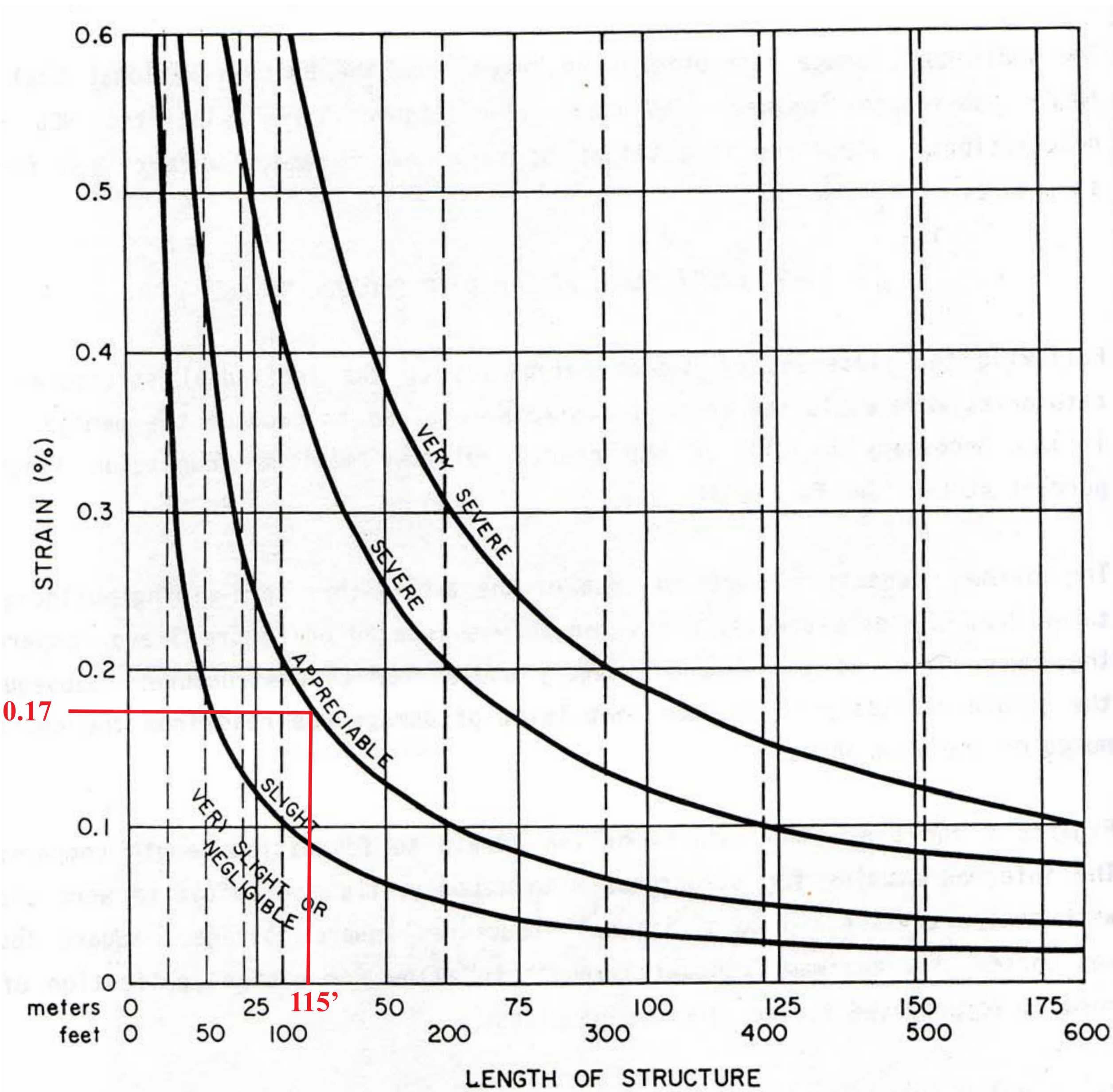
NM - Not Mined

* No caliper run, value taken as 2x the maximum theoretical void encountered on adjacent properties

The width of the extraction is critical to the analysis. Several options are available to use in the analysis. They include distance between drill holes, actual width (length) of the workings, or arbitrary values to produce the maximum amount of subsidence. Due to the apparent accuracy of the mine maps, Western Environment chose to use the width (length) of the workings shown on the mine map, which is approximately **200 feet**.

The reader is here encouraged to review both the United Kingdom National Coal Board's Subsidence Handbook, and the previous studies for the mechanics of the process. By using this information, and assuming that **multi-level mining was present at all undermined locations**, the maximum "worst case" theoretical horizontal strains would be **0.17%** with a maximum surface subsidence of **0.40** feet over a 290 foot profile**.**

These theoretical worst case strains are in-sufficient to cause "appreciable " damage to structures or foundation segments of **115 feet or less** (Figure 5).



CLASS OF DAMAGE	DESCRIPTION OF TYPICAL DAMAGE
VERY SLIGHT OR NEGLIGIBLE	SLIGHT CRACKS SHOWING IN WALLS AND CEILINGS INSIDE BUILDINGS, BUT NOT VISIBLE ON OUTSIDE.
SLIGHT	SLIGHT CRACKS SHOWING INSIDE THE BUILDING. DOORS AND WINDOWS WILL NOT CLOSE.
APPRECIABLE	SLIGHT CRACKS SHOWING BOTH OUTSIDE AND INSIDE BUILDING. DOORS AND WINDOWS WILL NOT CLOSE. DRAINS, SEWERS, AND GAS PIPES FRACTURE.
SEVERE	DRAINS, SEWERS, AND GAS PIPES FRACTURE. OPEN FRACTURES THROUGH WALLS OF BUILDING. WINDOW AND DOOR FRAMES DISTORTED, FLOORS NOTICEABLY SLOPING, WALLS LEANING OR BULGING NOTICEABLY. SOME LOSS OF BEARING OF BEAMS ON WALLS. PORTICOES AND FLOORS BUCKLE.
VERY SEVERE	WORSE THAN ABOVE AND REQUIRING PARTIAL OR COMPLETE REBUILDING. ROOF AND FLOOR BEAMS LOSE BEARING AND WALLS LEAN BADLY AND NEED EXTERNAL SUPPORT. WINDOWS BROKEN AND DISTORTED. SEVERE SLOPES, BUCKLING AND BULGING OF ROOFS AND WALLS OCCUR.

(FROM N.C.B.)

WESTERN ENVIRONMENT AND ECOLOGY, INC.
2217 West Powers Avenue
Littleton, Colorado 80120

Figure 6 - Strain Percent to Length of Structure, Approximately 330 Acres in Section 29, Township 1 North, Range 68 West, Erie, Colorado

11.0 CLOSURE

The recommendations provided herein were developed from the information obtained from field exploration which reflect subsurface conditions only at the specific locations, at the particular times designated. Subsurface conditions at other locations and times may differ from conditions occurring at these locations. The nature and extent of any variations between the drill holes may not become evident until or during the course of construction. If variations then appear, it may be necessary to re-evaluate the recommendations of this report after performing on-site observations during the excavation period and noting the characteristics of any variations.

This report was prepared by a Professional Engineering Geologist, not a Geotechnical Engineer, and should not be construed as, or substituted for, engineering. This report is intended to inform geotechnical and structural engineers working on building design of the potential earth forces that could develop at the site, and to assist the client in determining whether to acquire and develop the site in question.

Our professional services have been performed, our findings, and our recommendations prepared in, accordance with generally accepted geological principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

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APPENDICES

Appendix A

Architectural Techniques to Reduce Subsidence

ARCHITECTURAL TECHNIQUES TO REDUCE STRUCTURAL DAMAGE DUE TO SUBSIDENCE

Numerous papers have been written concerning building techniques designed to accommodate strain associated with subsidence (NTIS 1979). Presented below are some very basic strain reduction techniques which could be incorporated into structures located in these areas.

A structure of simple box form, designed to act as a unit, is best suited to resist the effects of mining subsidence. The smaller the plan of the building, the less likelihood there is of damage, and therefore, attached structures should be avoided. Where it is desired to retain the attached plan, this can be achieved by building units with adequate gaps between them to permit movement. Semi-detached buildings are preferable to detached. Outbuildings should not be attached structurally to the main building; they should be able to move independently.

The gaps between the structural units should be kept free from obstructions and should extend through the foundations; they should be sufficient to prevent adjacent units from coming into contact when the ground is deformed by subsidence. A gap of at least four inches is suggested for two-story buildings. Suitable gaps should be provided in all boundary walls especially when they abut a structure.

If required, areas between units should be paved with a flexible material, such as asphalt, incapable of offering any appreciable resistance to horizontal compression. Solid concrete paving should not be used.

Openings are a source of weakness in walls and should be kept as small as other considerations permit. Windows and doors are best arranged with substantial widths of brickwork around them so that the wall, wether reinforced or not, may be as strong as possible. Arched lintels should not be used. Corner windows, bay windows, and other similar projections weaken the structure, door openings have more serious weakening effects than windows and are best located in the shorter sides of buildings. If in the longer sided, they should be installed in the middle rather than at the ends of the building. Front and back doors should not be arranged closely side by side.

Floors and flat roofs should be fastened to all walls and not merely to those which carry joists and rafters. Plasterboard or fiberboard should be used for ceilings. To ensure continued effective drainage if the building has been tilted by subsidence, the gradients of gutters should be kept higher than normal.

For complete protection against damage due to subsidence, a building would have to be able to resist the effects of vertical and horizontal differential movements. Protection against most damage by differential horizontal movements is comparatively simple and may be obtained by building the structure on a lightly reinforced concrete base slab which is bedded on granular material. The base slab ties the walls together and the flat underside forms slip surface. The total tensile strength of the slab in the direction of either principal axis should be adequate to resists a force equal to the product of half the weight of the structure on the slab and the coefficient of friction between the slab and granular material. Before placing the reinforcement and concrete in the base slab, the granular material in the sub-grade should be covered with a layer of stout waterproof paper (to form a slip plane). The provision of a reinforced base slab, combined with the recommendations already made, should be sufficient to prevent damage except where differential vertical movement occur.

The resistance of the walls to flexure may be increased by the introduction of steel reinforcement in any brickwork. The additional cost of such reinforcement is justifiable only in structures certain to be subjected to severe differential vertical movements, such as those near the boundaries of mine workings. Horizontal reinforcement may be used in brick walls of any thickness, but vertical reinforcement can only be used in wall 9 inches thick or more. Special care is necessary where steel reinforcement is to be used in conjunction with brickwork; the metal will not be protected from corrosion in the same way as rods in well made concrete. Lime mortar should be used in brickwork. Damp-proof courses should be of the bituminous type.

The weakest mortar consistent with the normal load-carrying requirements of the walls should be used. This will allow the walls to adjust themselves to moderate changes of curvature of the ground without serious cracking. If the ground on which the structures are built is of a yielding nature, the conditions will be more favorable than if it is yielding since abrupt changes of curvature are less likely.

APPENDIX B

Lithologic and Geophysical Logs

Hole Number: **S29-2**
Drilled by: Plains Water Well Service
Date: 11/6/06

Location: N40º01.217 W105º01.198
Logged by: D. Greeley
Bit Size: 6.25 inches

State: Colorado
Total Depth: 320'
Drilled with: Mud

Depth	Sample Description
5	Clay, sandy, light brown to brown
10	Clay, sandy, light brown to brown
15	Claystone, silty, brown
20	Claystone, silty, brown
25	Claystone, silty, gray with rust stains
30	Claystone, silty, gray with rust stains
35	Claystone, silty, gray with rust stains
40	Claystone, silty, gray with rust stains
45	Claystone, dark gray
50	Claystone, dark gray
55	Claystone, dark gray
60	Claystone, dark gray
65	Claystone, dark gray
70	Claystone, dark gray
75	Claystone, dark gray
80	Claystone, dark gray
85	Claystone, dark gray
90	Claystone, dark gray
95	Claystone, dark gray
100	Claystone, dark gray
105	Claystone, dark gray
110	Claystone, dark gray
115	Claystone, dark gray
120	Claystone, dark gray
125	Claystone, dark gray
130	Claystone, dark gray
135	Claystone, dark gray
140	Claystone, dark gray
145	Claystone, dark gray
150	Claystone, dark gray
155	Claystone, dark gray
160	Claystone, dark gray
165	Claystone, dark gray
170	Claystone, dark gray
175	Claystone, dark gray

180	Claystone, dark gray	
185	Claystone, dark gray	
190	Claystone, dark gray	
195	Claystone, dark gray	
200	Claystone, dark gray	
205	Claystone, dark gray	
210	Claystone, dark gray	
215	Claystone, dark gray	
220	Claystone, dark gray	
225	Claystone, carbonaceous, dark gray with coal	
230	Claystone, dark gray	
235	Claystone, dark gray	
240	Claystone, dark gray	
245	Claystone, dark gray	
250	Claystone, dark gray to black with coal	
255	Claystone, gray	
260	Claystone, gray	
265	Claystone, gray	
270	Claystone, gray	
275	Claystone, gray	
280	Claystone, gray	
285	Claystone, gray	
290	Claystone, gray	
295	Circulation lost, no sample recovery	
300	No Recovery	
305	No Recovery	
310	No Recovery	
315	No Recovery	
320	No Recovery	Total Depth

Hole Number: **S29-5**
Drilled by: Plains Water Well Service
Date: 11/7/06

Location: N40º01.052 W105º01.413
Logged by: D. Greeley
Bit Size: 6.25 inches

State: Colorado
Total Depth: 360'
Drilled with: Mud

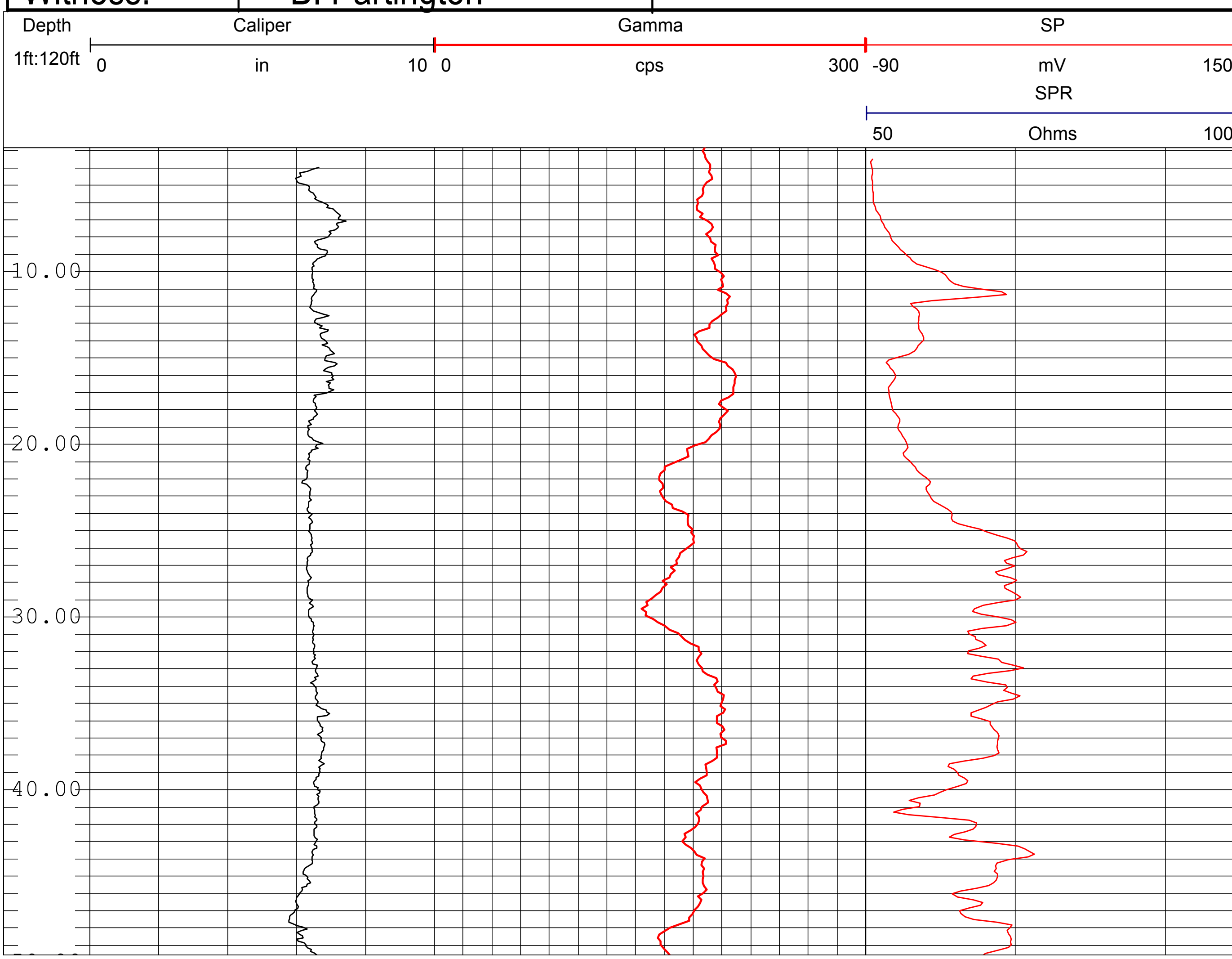
Depth	Sample Description
5	Clay, sandy, light brown to brown
10	Clay, sandy, light brown to brown
15	Clay, sandy, light brown to brown
20	Claystone, silty, light brown with rust
25	Claystone, silty, light brown with rust
30	Claystone, silty, light brown with rust
35	Claystone, silty, light brown with rust
40	Claystone, silty, light brown with rust
45	Claystone, silty, light brown with rust
50	Claystone, silty, light brown with rust
55	Claystone, silty, light brown with rust
60	Claystone, silty, light brown with rust
65	Claystone, silty, light brown with rust
70	Claystone, dark gray
75	Claystone, dark gray
80	Claystone, dark gray
85	Claystone, dark gray
90	Claystone, dark gray
95	Claystone, dark gray
100	Claystone, dark gray
105	Claystone, dark gray
110	Claystone, dark gray
115	Claystone, dark gray
120	Sandstone lense, gray
125	Claystone, dark gray
130	Claystone, dark gray
135	Claystone, dark gray
140	Claystone, dark gray
145	Claystone, dark gray
150	Claystone, dark gray
155	Claystone, dark gray
160	Claystone, dark gray
165	Claystone, dark gray
170	Claystone, dark gray
175	Claystone, dark gray

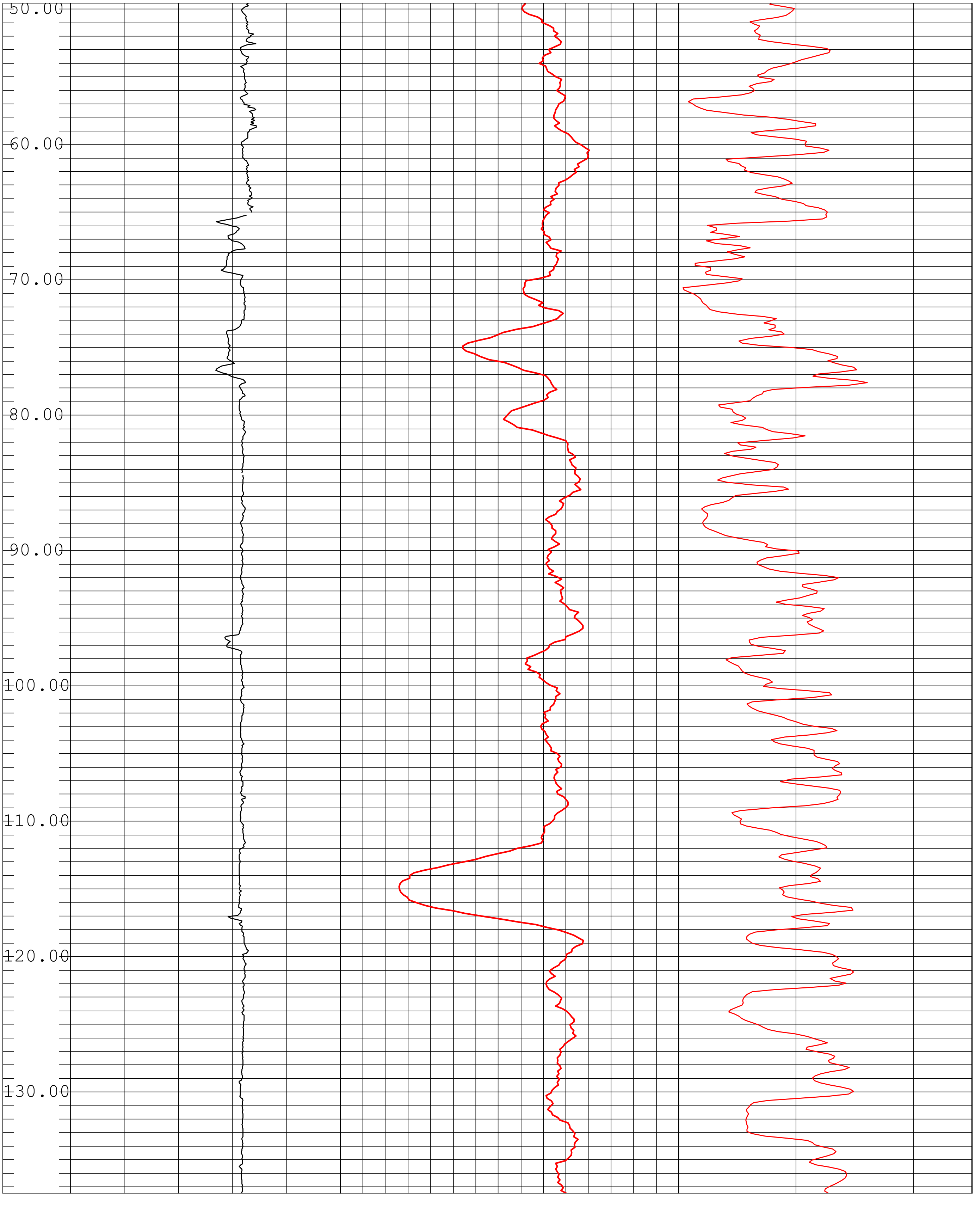
180	Claystone, dark gray	
185	Claystone, dark gray	
190	Claystone, dark gray	
195	Claystone, dark gray	
200	Claystone, dark gray	
205	Claystone, dark gray	
210	Claystone, dark gray, with coal	
215	Claystone, dark gray	
220	Claystone, dark gray	
225	Claystone, carbonaceous, dark gray	
230	Claystone, dark gray	
235	Claystone, dark gray	
240	Claystone, dark gray	
245	Claystone, dark gray	
250	Claystone, dark gray to black with coal	
255	Claystone, gray	
260	Claystone, gray	
265	Claystone, carbonaceous, dark gray, with coal	Columbine Main Seam
270	Claystone, gray	
275	Claystone, gray	
280	Claystone, gray	
285	Claystone, gray	
290	Claystone, gray	
295	Claystone, gray	
300	Claystone, gray	
305	Claystone, gray	
310	Claystone, gray	
315	Claystone, gray	
320	Claystone, gray	
325	Claystone, gray	
330	Claystone, gray	
335	Claystone, gray	
340	Claystone, gray	
345	Claystone, gray	
350	Claystone, gray	
355	Claystone, gray	
360	Claystone, gray	Total Depth

COMPANY:	WESTERN ENVIRONMENT AND ECOLOGY, INC
Location:	N40 01.217, W105 01.198

OTHER SERVICES

Well	S29-2		
Date	11/6/06	BH Fluid	Mud
Casing	None		
File Name	S29-2		
Depth Driller	320		
Depth Logger	318		
Logged by:	D. Greeley		
Witness:	B. Partington		

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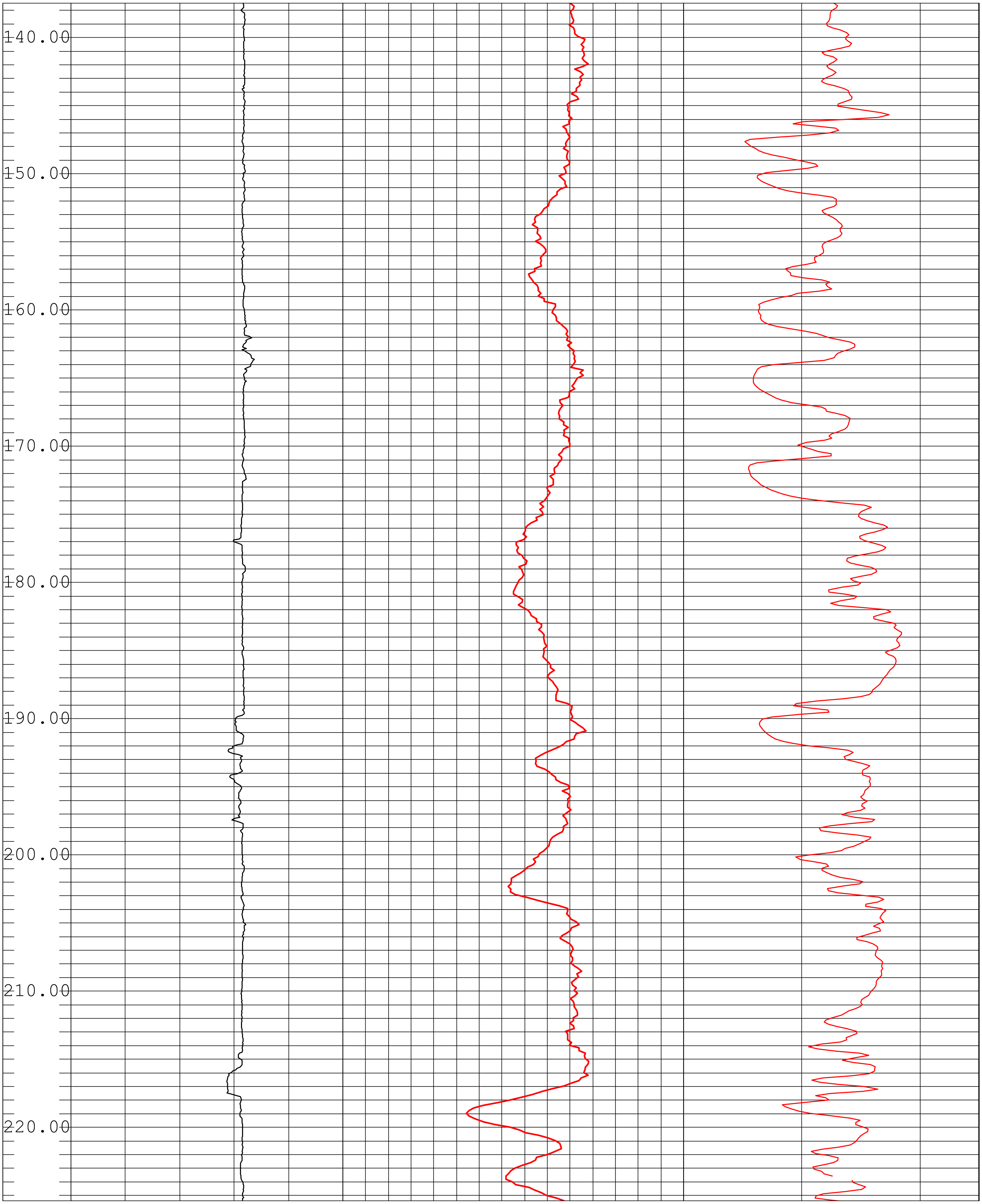
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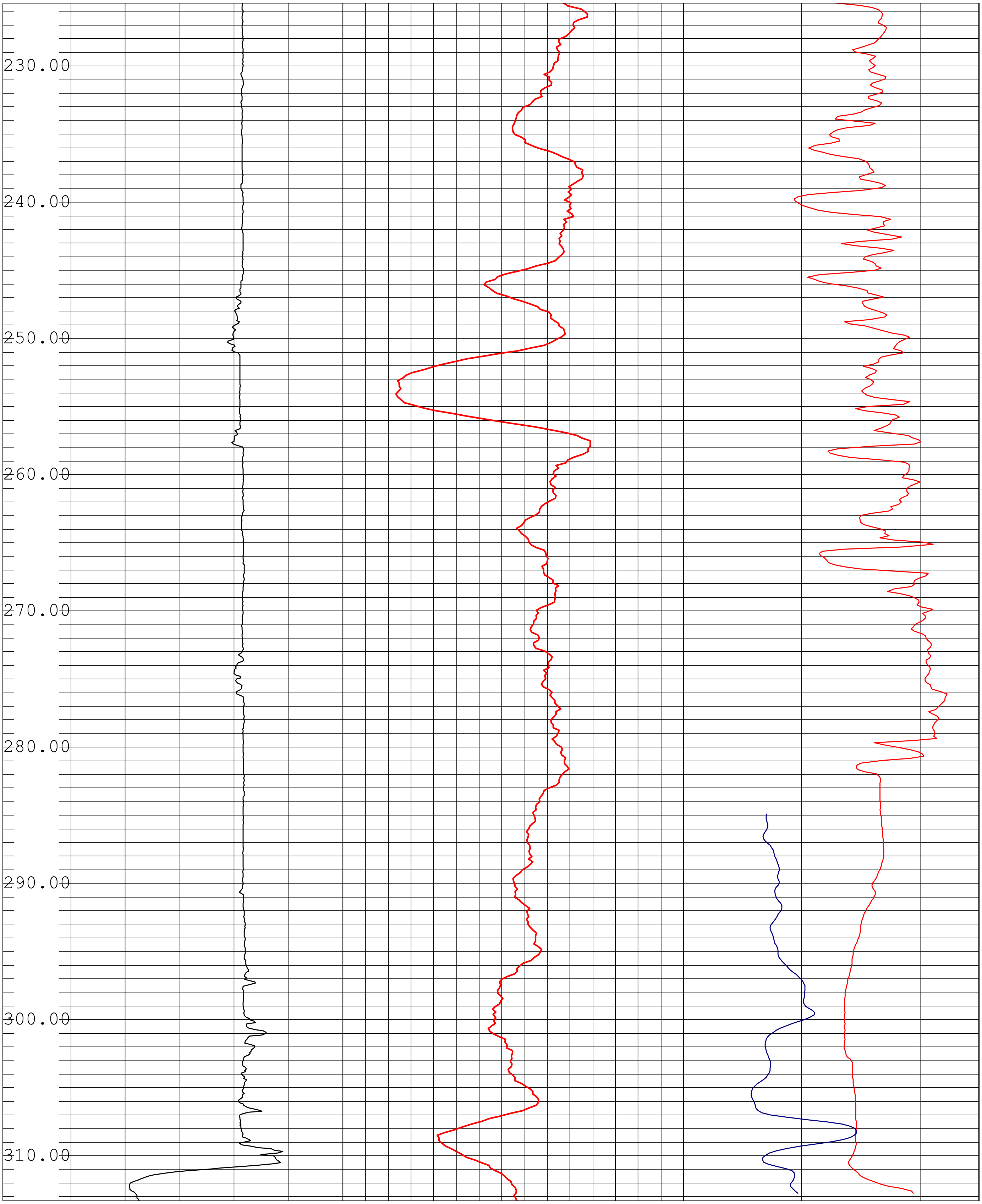
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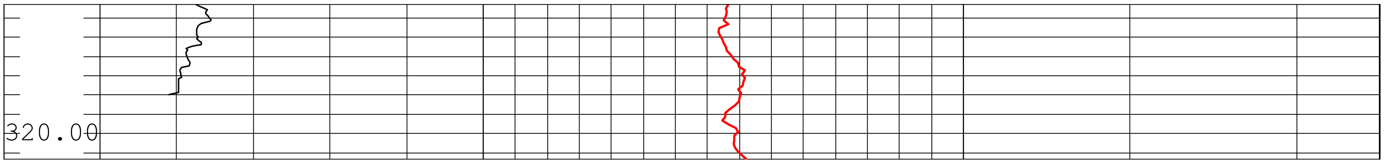
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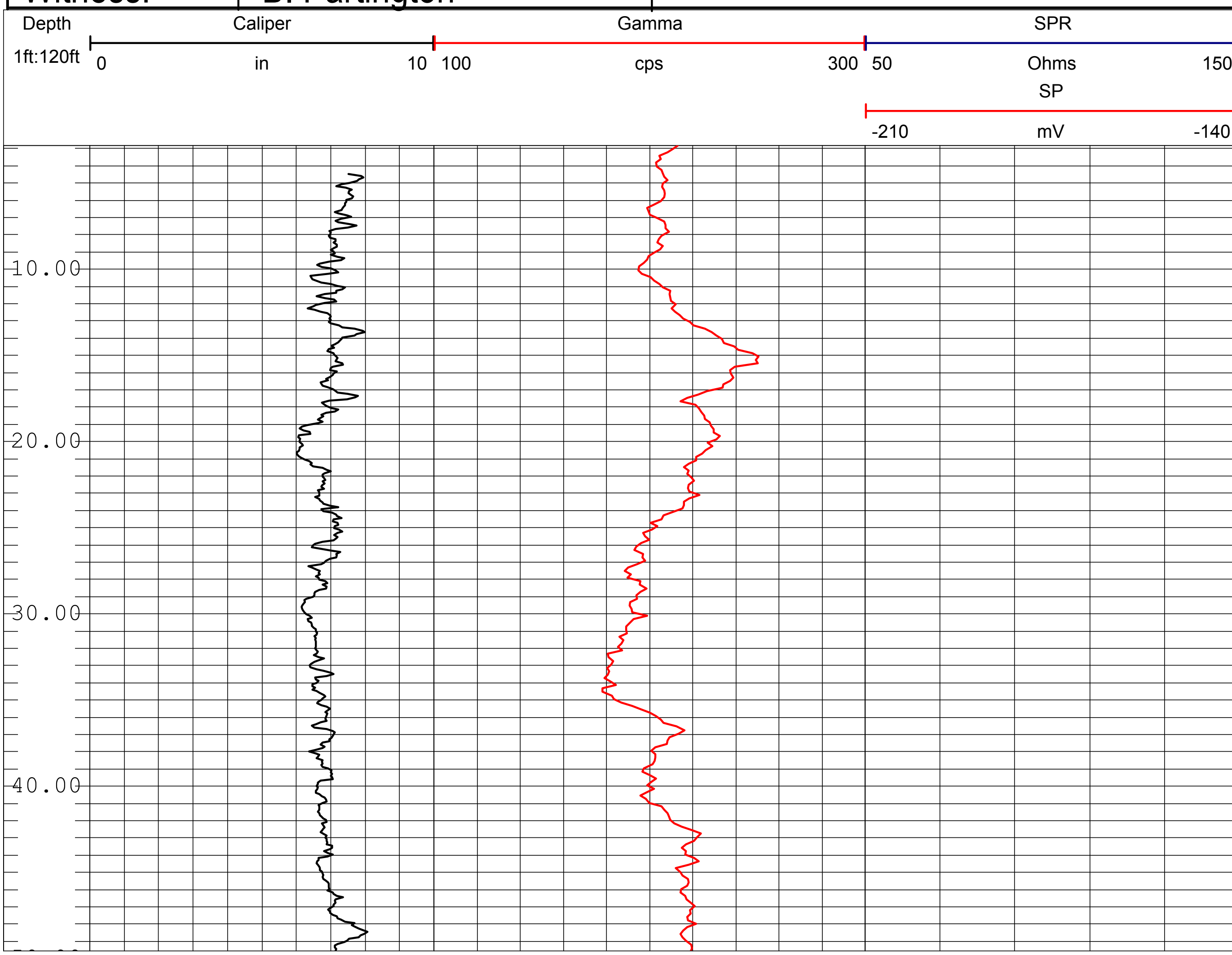
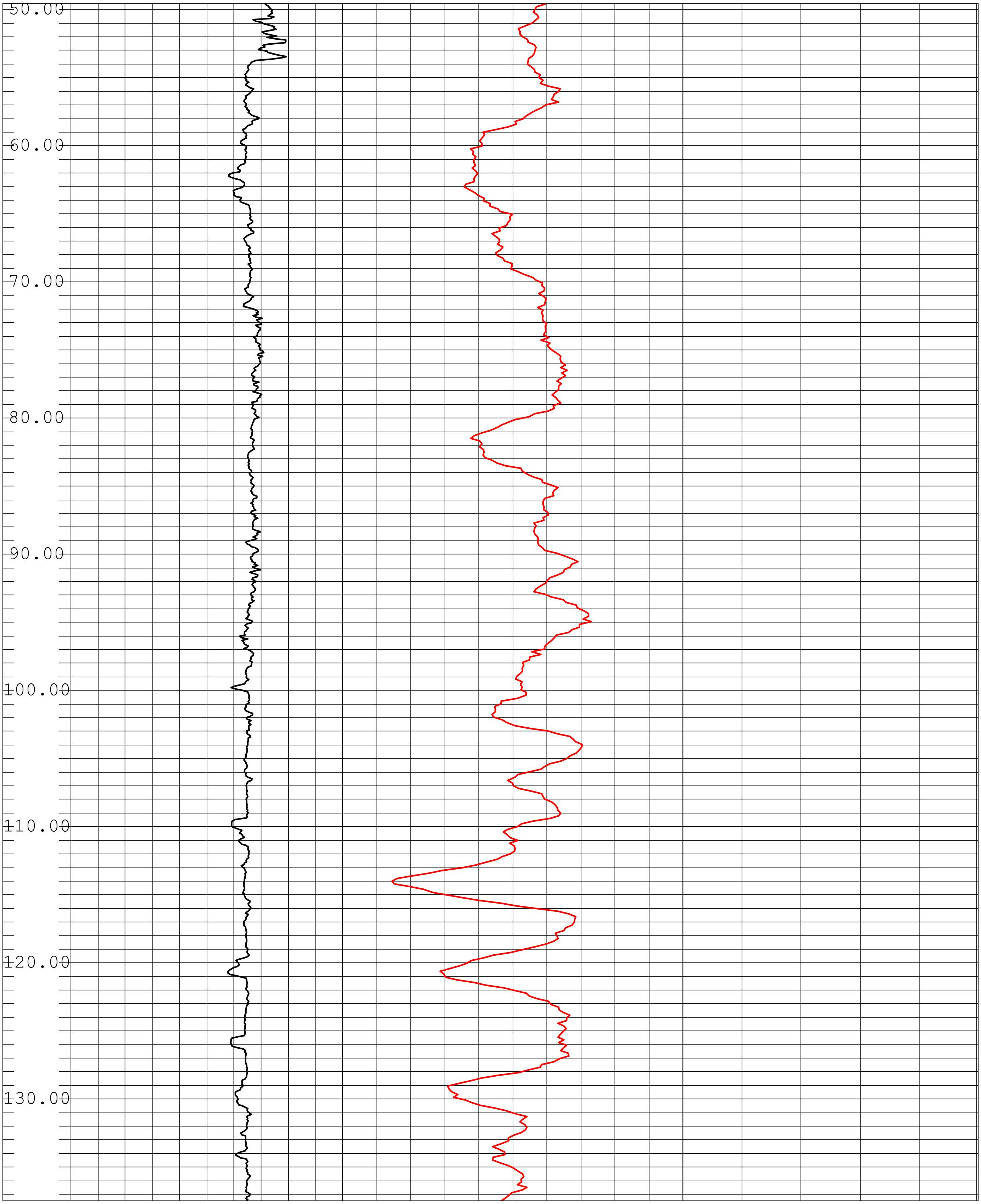
COMPANY:	**WESTERN ENVIRONMENT AND ECOLOGY, INC**
Location:	N40 01.052, W105 01.413

Well	S29-5		
Date	11/7/06	BH Fluid	Mud
Casing	None		
File Name	S29-5		
Depth Driller	380		
Depth Logger	336		
Logged by:	D. Greeley		
Witness:	B. Partington		

OTHER SERVICES





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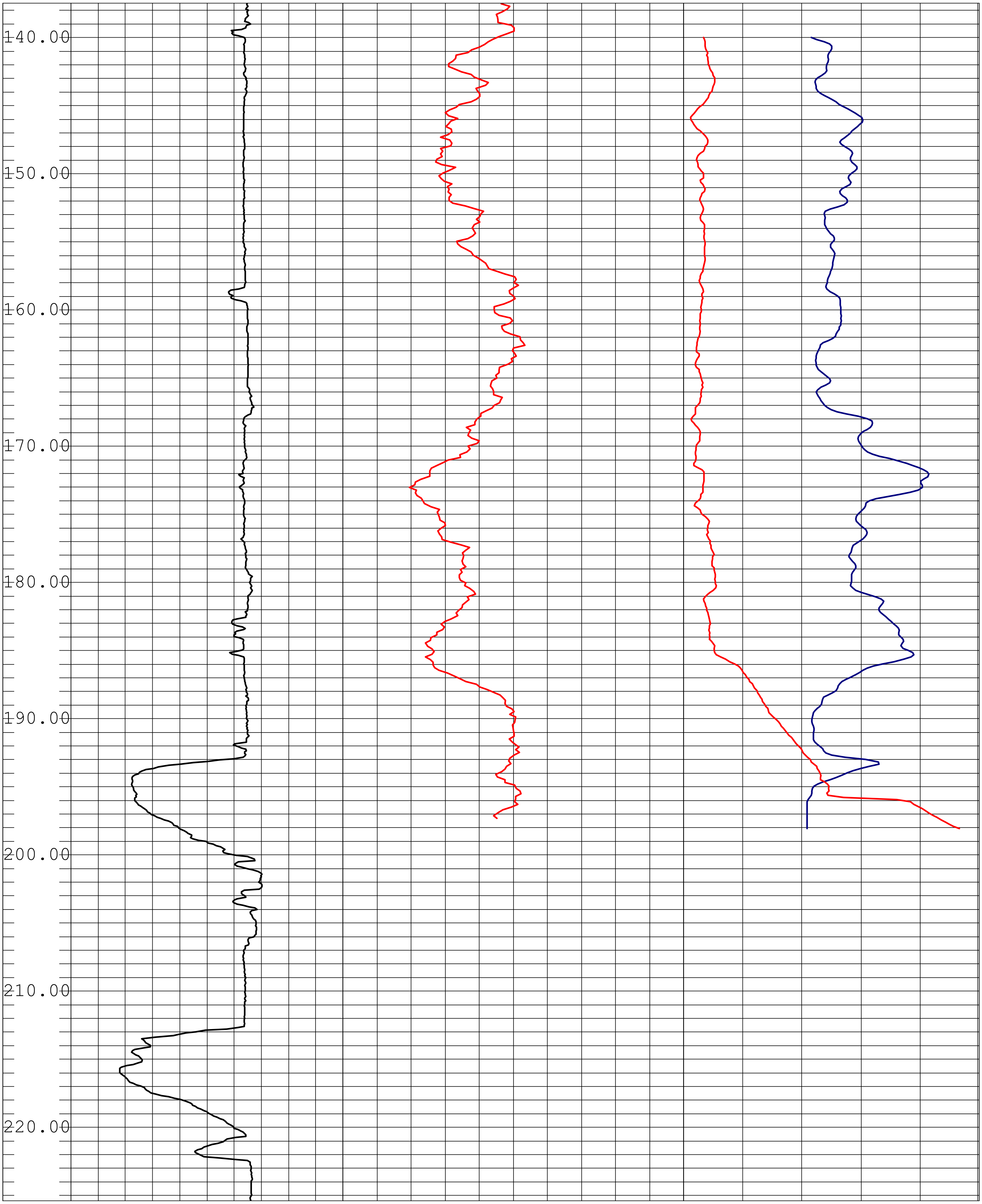
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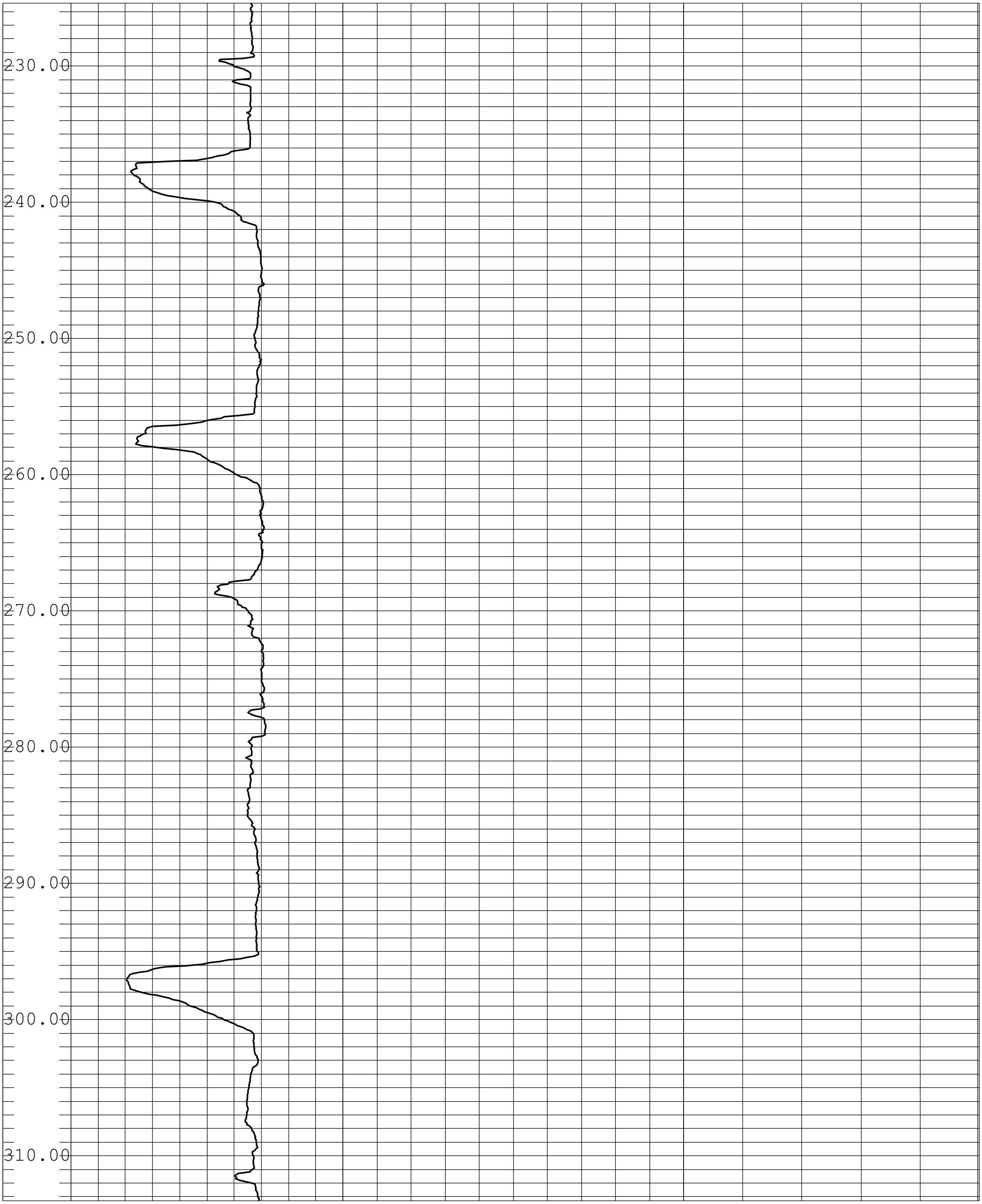
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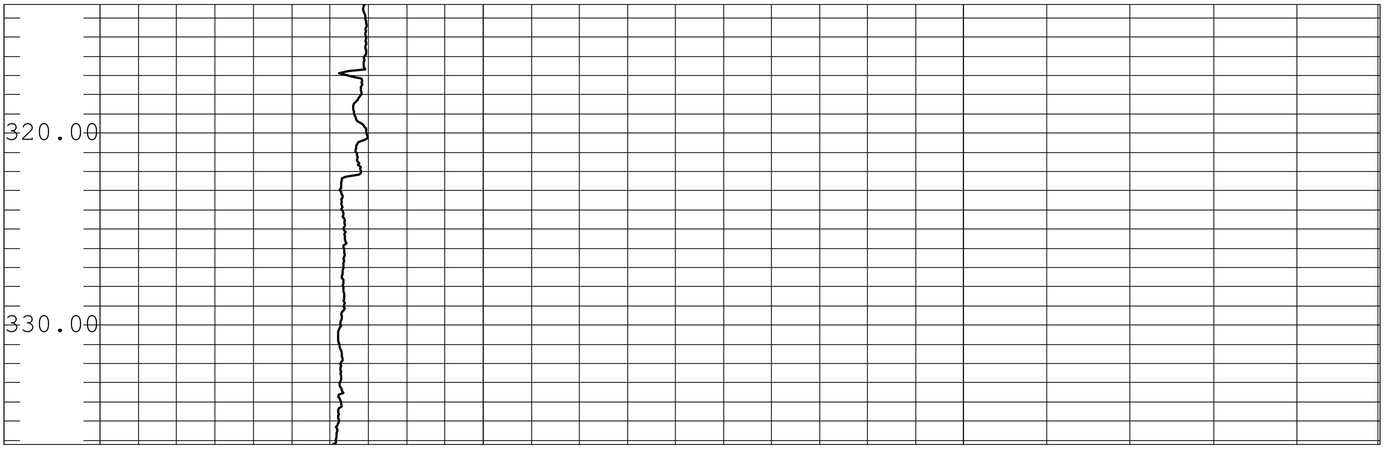
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330.00

LSC TRANSPORTATION CONSULTANTS, INC.

1889 York Street
Denver, CO 80206
(303) 333-1105
FAX (303) 333-1107
E-mail: lsc@lscdenver.com

August 16, 2022

Mr. Richard Dean
Stratus Redtail Ranch, LLC
8480 E. Orchard Road, Suite 150
Greenwood Village, CO 80111

Re: Redtail Ranch Update
Traffic Impact Analysis
Erie, CO
LSC #211310

Dear Mr. Dean:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the proposed Redtail Ranch development. As shown on Figure 1, the site is located north of the Weld County Road (WCR) 4 alignment and west of WCR 5 in Erie, Colorado. This site was studied previously in the September, 2015 *Redtail Ranch TIA* by LSC.

REPORT CONTENTS

The report contains the following: the existing roadway and traffic conditions in the vicinity of the site including the lane geometries, traffic controls, posted speed limits, etc.; the existing weekday peak-hour traffic volumes; the existing daily traffic volumes in the area; the typical weekday site-generated traffic volume projections for the site; the assignment of the projected traffic volumes to the area roadways; the projected short-term and long-term background and resulting total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements to mitigate the site's traffic impacts.

LAND USE AND ACCESS

The site is proposed to include about 400 single-family detached dwelling units, about 119 townhome dwelling units, and about 68 paired home dwelling units. Access is proposed in several locations as shown in the conceptual site plan in Figure 2.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The major roadways in the site's vicinity are shown on Figure 1 and are described below.

- **Erie Parkway** is an east-west, four-lane arterial roadway north of the site. The intersection with WCR 5 is signalized with auxiliary turn lanes with one eastbound and one westbound through lane. The posted speed limit in the vicinity of the site varies between 40 and 50 mph. The *Town of Erie Master Transportation Plan* shows Erie Parkway as a four-lane principal arterial at buildout.

- **Weld County Road 5** is a north-south, two-lane minor arterial roadway east of the site. The intersection with Erie Parkway is signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 45 mph. The *Town of Erie Master Transportation Plan* shows a four-lane minor arterial at buildout.

- **Weld County Road 4** is an east-west, two-lane minor arterial roadway south of the site. The intersection with WCR 5 is all-way stop sign controlled. The posted speed limit in the vicinity of the site is 45 mph. The *Town of Erie Master Transportation Plan* shows two lanes through buildout conditions with a four-lane right-of-way dedication.

- **Vista Parkway** is a north-south, two-lane collector roadway west of the site. The posted speed limit in the vicinity of the site is 35 mph.

Existing Traffic Conditions

Figure 3a shows the existing traffic volumes in the site's vicinity on a typical weekday. The weekday peak-hour traffic volumes and daily traffic counts are from the attached traffic counts conducted by Counter Measures in January, 2022. Figure 3b shows the existing lane geometries, traffic controls, and posted speed limits.

2027 and 2042 Background Traffic

Figure 4a shows the estimated 2027 background traffic. The volumes at Intersection #18 are based on a two percent annual growth rate and the volumes at Intersection #1 are based on the projections in Figure 8 of the May, 2021 *Colliers Hill TIA* by LSC plus one year of growth at a rate of two percent less site-generated trips.

Figure 5a shows the estimated 2042 background traffic. The volumes at Intersection #18 are based the *SH 7 PEL* projections (Figure 4.10 of the SH 7 PEL) grown for seven years at an annual growth rate of two percent less site-generated trips with adjustments based on recent traffic counts. Volumes at Intersection #1 are based on the projections in Figure 9 of the May, 2021 *Colliers Hill TIA* by LSC plus two years of growth at a rate of two percent less site-generated trips.

Figures 4b and 5b show the 2027 and 2042 lane geometries and traffic controls.

Existing, 2027, and 2042 Background Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A is indicative of little congestion or delay and LOS F is indicative of a high level of congestion or delay. Attached are specific level of service definitions for signalized and unsignalized intersections.

The intersections in Figures 3a through 5b were analyzed as appropriate to determine the existing, 2027, and 2042 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **CR 5/Erie Parkway:** This signalized intersection currently operates at an overall LOS "C" during both morning and afternoon peak-hours. By 2025, the morning peak-hour is expected to operate at LOS "E" and the afternoon peak-hour is expected to operate at LOS "C. By 2042, both peak-hours are expected to operate at LOS "C" with the planned improvements.

2. **Intentionally Left Blank**

3. **Vista Parkway/Parkdale Circle:** All movements at this roundabout controlled intersection currently operate at LOS "A" and are expected to do so through 2042.

4. **Redtail Parkway/Site Access #4:** This intersection was analyzed only in the total traffic scenarios.

5. **Redtail Parkway/Site Access #5:** This intersection was analyzed only in the total traffic scenarios.

6. **Redtail Parkway/Site Access #6:** This intersection was analyzed only in the total traffic scenarios.

7. **Redtail Parkway/Site Access #7:** This intersection was analyzed only in the total traffic scenarios.

8. **Redtail Parkway/Site Access #8:** This intersection was analyzed only in the total traffic scenarios.

9. **Redtail Parkway/Site Access #9:** This intersection was analyzed only in the total traffic scenarios.

10. **Redtail Parkway/Site Access #10:** This intersection was analyzed only in the total traffic scenarios.

11. **CR 5/Redtail Parkway:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better through 2042.

12. **CR 5/E. Middle Site Access:** This intersection was analyzed only in the total traffic scenarios.

13. **CR 5/WCR 4:** This all-way stop controlled intersection currently operates at an overall LOS "B" during both morning peak-hours and is expected to operate at an overall LOS "C" during both peak-hours through 2027. By 2042, the morning peak-hour is expected to operate at LOS "D" and the afternoon peak-hour at LOS "E". The intersection may require traffic signal control by 2042.

14. Intentionally Left Blank

15. Sheridan Parkway/Baseline (SH 7): This signalized intersection currently operates at an overall LOS “C” during both peak-hours. By 2027, the morning peak-hour is expected to operate at LOS “C” and the afternoon peak-hour is expected to operate at LOS “D”. By 2042, the morning peak-hour is expected to operate at LOS “C” and the afternoon peak-hour is expected to operate at LOS “E”. The overall LOS “E” is primarily due to the very heavy westbound left-turn movement predicted in the *SH 7 PEL* study.

TRIP GENERATION

Table 2 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the proposed site based on the rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE) for the proposed land use.

The proposed land use is projected to generate about 5,064 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 94 vehicles would enter and about 266 vehicles would exit the site. During the afternoon peak-hour, which generally occurs for one hour between 4:00 and 6:00 p.m., about 297 vehicles would enter and about 178 vehicles would exit.

TRIP DISTRIBUTION

Figure 6 shows the estimated directional distribution of the site-generated traffic volumes on the area roadways. The estimates were based on the location of the site with respect to the regional population, employment, and activity centers; and the site’s proposed land use.

TRIP ASSIGNMENT

Figure 7 shows the estimated site-generated traffic volumes which are the directional distribution percentages (from Figure 6) applied to the trip generation estimate (from Table 2).

2027 and 2042 TOTAL TRAFFIC

Figure 8a shows the 2027 total traffic which is the sum of the 2027 background traffic volumes (from Figure 4a) and the site-generated traffic volumes (from Figure 7). Figure 8b shows the recommended 2027 lane geometry and traffic control.

Figure 9a shows the 2042 total traffic which is the sum of 2042 background traffic volumes (from Figure 5a) and the site-generated traffic volumes (from Figure 7). Figure 9b shows the recommended 2042 lane geometry and traffic control.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 8a through 9b were analyzed to determine the 2027 and 2042 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **CR 5/Erie Parkway:** This signalized intersection is expected to operate at an overall LOS "E" during the morning peak-hour and LOS "D" during the afternoon peak-hour through 2027. By 2042, both peak-hours are expected to operate at LOS "C". The 2027 results suggest two eastbound through lanes, two westbound through lanes, and two southbound left-turn lanes may be needed by 2027 to accommodate growth in background traffic.

2. **Intentionally Left Blank**

3. **Vista Parkway/Parkdale Circle:** All movements at this roundabout controlled intersection are expected to operate at LOS "A" through 2042.

4. **Redtail Parkway/Site Access #4:** All movements at this stop-sign controlled intersection are expected to operate at LOS "B" or better through 2042.

5. **Redtail Parkway/Site Access #5:** All movements at this stop-sign controlled intersection are expected to operate at LOS "A" through 2042.

6. **Redtail Parkway/Site Access #6:** All movements at this stop-sign controlled intersection are expected to operate at LOS "A" through 2042.

7. **Redtail Parkway/Site Access #7:** All movements at this stop-sign controlled intersection are expected to operate at LOS "A" through 2042.

8. **Redtail Parkway/Site Access #8:** All movements at this stop-sign controlled intersection are expected to operate at LOS "A" through 2042.

9. **Redtail Parkway/Site Access #9:** All movements at this stop-sign controlled intersection are expected to operate at LOS "A" through 2042.

10. **Redtail Parkway/Site Access #10:** All movements at this stop-sign controlled intersection are expected to operate at LOS "A" through 2042.

11. **CR 5/Redtail Parkway:** All movements at this unsignalized intersection are expected to operate at LOS "D" or better through 2042.

12. **CR 5/E. Middle Site Access:** All movements at this stop-sign controlled intersection are expected to operate at LOS "C" or better through 2042.

13. **CR 5/WCR 4:** This all-way stop controlled intersection is expected to operate at an overall LOS "C" during both peak-hours through 2027. By 2042, the morning peak-hour is expected to operate at LOS "E" and the afternoon peak-hour is expected to operate at LOS "F". This intersection may require traffic signal control by 2042 with or without development of the site.

14. **Intentionally Left Blank**

15. **Sheridan Parkway/Baseline (SH 7):** This signalized intersection is expected to operate at an overall LOS "D" or better during both peak-hours through 2027. By 2042, the mor-

ning peak-hour is expected to operate at LOS “C” and the afternoon peak-hour is expected to operate at LOS “E”. The overall LOS “E” is primarily due to the very heavy westbound left-turn movement predicted in the *SH 7 PEL* study.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. The site is projected to generate about 5,064 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 94 vehicles would enter and about 266 vehicles would exit the site. During the afternoon peak-hour, about 297 vehicles would enter and about 178 vehicles would exit.

Projected Levels of Service

2. The signalized CR 5/Erie Parkway intersection (#1) is expected to operate at an overall LOS “E” during the morning peak-hour and LOS “D” during the afternoon peak-hour through 2027. By 2042, both peak-hours are expected to operate at LOS “C”. The 2027 results suggest two eastbound through lanes, two westbound through lanes, and two southbound left-turn lanes may be needed by 2027 to accommodate growth in background traffic.

3. The signalized Sheridan Parkway/Baseline (SH 7) intersection (#15) is expected to operate at an overall LOS “D” or better during both peak-hours through 2027. By 2042, the morning peak-hour is expected to operate at LOS “C” and the afternoon peak-hour is expected to operate at LOS “E”. The overall LOS “E” is primarily due to the very heavy westbound left-turn movement predicted in the *SH 7 PEL* study.

4. All movements at the roundabout-controlled intersection (#3) of Vista Parkway/Parkdale Circle/Redtail Parkway are expected to operate at LOS “A” through 2042.

5. All movements at the all-way stop-controlled CR 5/CR 4 intersection (#13) are expected to operate at LOS “D” or better through 2027. By 2042, the southbound approach will likely operate at LOS “E” or “F”. Traffic signal control may be needed by 2042.

6. All movements at the unsignalized CR 5/Redtail Parkway (#11) and CR 5/Middle Site Access (#12) intersections are expected to operate at LOS “D” or better through 2042.

7. All movements at the unsignalized site access intersections are expected to operate at LOS “B” or better through 2042.

Conclusions

The impact of the Redtail Ranch development site can be accommodated by the existing and proposed roadway network with the recommended improvements below.

Recommended Improvements

8. The recommended improvements at the site access and nearby intersections are detailed in Figures 8b and 9b.

* * * * *

We trust our findings will assist you in gaining approval of the proposed Redtail Ranch development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By____________________________________
Christopher S. McGranahan, PE, PTOE
Principal

CSM/wc 8-16-22

Enclosures: Tables 1 and 2
Figures 1 - 9b
Traffic Count Reports
Figures 8 and 9 from May, 2021 *Colliers Hill TIA* by LSC
Figure 4.10 from *SH 7 PEL* study
Level of Service Definitions
Level of Service Reports

W:\LSC\Projects\2021\211310-RedtailRanchUpdate\Report\August-2022\RedtailRanch-081622.wpd

Table 1 (Page 1 of 2)
Intersection Levels of Service Analysis
Redtail Ranch
Erie, CO
LSC #211310; August, 2022

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2027 Background Traffic Level of Service AM	2027 Background Traffic Level of Service PM	2027 Total Traffic Level of Service AM	2027 Total Traffic Level of Service PM	2042 Background Traffic Level of Service AM	2042 Background Traffic Level of Service PM	2042 Total Traffic Level of Service AM	2042 Total Traffic Level of Service PM
1) CR 5/Erie Parkway	Signalized										
EB Left		B	B	E	C	E	D	E	D	E	D
EB Through		B	B	C	D	C	$\boxed{E}$	B	C	B	C
EB Right		A	A	A	A	A	A	A	A	A	A
WB Left		B	B	B	B	B	C	B	B	B	B
WB Through		C	B	$\boxed{F}$	D	$\boxed{F}$	D	C	C	C	C
WB Right		A	A	A	A	A	A	A	A	A	A
NB Left		C	C	D	D	E	D	E	D	E	D
NB Through/Right		D	D	D	D	D	D	--	--	--	--
NB Through		--	--	--	--	--	--	D	D	D	D
NB Right		--	--	--	--	--	--	A	A	A	A
SB Left		D	C	$\boxed{F}$	D	$\boxed{F}$	D	E	D	E	D
SB Through		D	D	D	C	D	C	D	D	D	D
SB Right		A	A	A	A	A	A	C	B	C	B
Entire Intersection Delay (sec /veh)		23.3	22.0	56.1	34.9	62.8	37.1	33.1	28.9	33.4	29.2
Entire Intersection LOS		C	C	$\boxed{E}$	C	$\boxed{E}$	D	C	C	C	C
2) County Line Road/Vista Parkway - Intentionally Left Blank											
3) Vista Parkway/Parkdale Circle/ Redtail Pkwy	Roundabout										
EB Approach		A	A	A	A	A	A	A	A	A	A
WB Approach		--	--	A	A	A	A	A	A	A	A
NB Approach		A	A	A	A	A	A	A	A	A	A
SB Approach		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		3.9	4.1	4.3	4.5	4.8	5.4	4.5	4.7	5.0	5.7
4) Redtail Parkway/Site Access #4	TWSC										
NB Approach		--	--	--	--	B	B	--	--	B	B
WB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	10.0	10.5	--	--	10.0	10.5
5) Redtail Parkway/Site Access #5	TWSC										
NB Approach		--	--	--	--	A	A	--	--	A	A
WB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.3	9.6	--	--	9.3	9.6
6) Redtail Parkway/Site Access #6	TWSC										
NB Approach		--	--	--	--	A	A	--	--	A	A
WB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.5	9.9	--	--	9.5	9.9
7) Redtail Parkway/Site Access #7	TWSC										
NB Approach		--	--	--	--	A	A	--	--	A	A
WB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.5	9.9	--	--	9.5	9.9
8) Redtail Parkway/Site Access #8	TWSC										
NB Approach		--	--	--	--	A	A	--	--	A	A
WB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.6	9.8	--	--	9.6	9.8

Note:
$\boxed{}$ = Indicates LOS "E" or "F" for stop-sign controlled movement, LOS "F" for minor traffic signal movement, and LOS "E" for major traffic signal movements and overall traffic signal operations.

Table 1 (Page 2 of 2)
Intersection Levels of Service Analysis
Redtail Ranch
Erie, CO
LSC #211310; August, 2022

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2027 Background Traffic Level of Service AM	2027 Background Traffic Level of Service PM	2027 Total Traffic Level of Service AM	2027 Total Traffic Level of Service PM	2042 Background Traffic Level of Service AM	2042 Background Traffic Level of Service PM	2042 Total Traffic Level of Service AM	2042 Total Traffic Level of Service PM
9) Redtail Parkway/Site Access #9	TWSC										
NB Approach		--	--	--	--	A	A	--	--	A	A
WB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.6	9.9	--	--	9.6	9.9
10) Redtail Parkway/Site Access #10	TWSC										
NB Approach		--	--	--	--	A	A	--	--	A	A
WB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.5	9.6	--	--	9.5	9.6
11) CR 5/Redtail Parkway	TWSC										
NB Left		A	A	A	A	A	A	A	A	A	A
EB Left		C	C	C	C	D	D	C	C	D	D
EB Right		B	B	B	B	B	B	B	B	B	B
Critical Movement Delay		21.5	19.1	21.5	19.1	30.0	26.8	20.3	20.2	27.4	29.3
12) CR 5/E. Middle Site Access	TWSC										
NB Left		--	--	--	--	A	A	--	--	A	A
EB Approach		--	--	--	--	C	C	--	--	B	C
Critical Movement Delay		--	--	--	--	16.1	15.9	--	--	14.7	15.3
13) CR 5/WCR 4	AWSC										
NB Approach		B	A	B	A	B	B	B	B	C	B
WB Left		--	--	--	--	--	--	--	--	B	B
WB Right		--	--	--	--	--	--	--	--	E	E
WB Approach		B	B	B	B	B	C	C	C	--	--
SB Left		--	--	--	--	C	D	--	--	F	F
SB Through		--	--	--	--	B	B	--	--	B	B
SB Approach		C	C	C	C	--	--	E	F	--	--
Entire Intersection Delay (sec /veh)		14.0	14.0	16.0	16.5	15.6	18.8	30.5	37.4	35.1	52.8
Entire Intersection LOS		B	B	C	C	C	C	D	E	E	F
14) Vista Parkway/E. Baseline Road - Intentionally Left Blank											
15) Sheridan Parkway/Baseline (SH 7)	Signalized										
EB Left		A	A	A	A	A	A	B	B	B	B
EB Through		C	C	C	D	C	D	D	D	D	D
EB Right		A	A	A	A	A	A	A	A	A	A
WB Left		D	E	D	E	D	E	D	F	D	F
WB Through		B	B	B	B	B	B	C	B	C	B
WB Right		A	A	A	A	A	A	A	A	A	A
NB Left		D	E	D	E	D	E	E	D	E	D
NB Through		D	D	D	D	D	D	D	D	D	D
NB Right		B	A	A	A	A	A	A	A	A	A
SB Left		D	E	D	E	D	E	E	E	E	E
SB Through		D	D	D	D	D	D	D	D	D	D
SB Right		A	A	A	A	A	A	A	A	A	A
Entire Intersection Delay (sec /veh)		25.7	31.0	25.7	35.4	26.8	37.5	32.0	63.3	32.2	65.3
Entire Intersection LOS		C	C	C	D	C	D	C	E	C	E

Note:
☐ = Indicates LOS "E" or "F" for stop-sign controlled movement, LOS "F" for minor traffic signal movement, and LOS "E" for major traffic signal movements and overall traffic signal operations.

Table 2
ESTIMATED TRAFFIC GENERATION
Redtail Ranch
Erie, CO
LSC #211310; August, 2022

Trip Generating Category	Quantity	Trip Generation Rates [1] Average Weekday	AM Peak-Hour In	AM Peak-Hour Out	PM Peak-Hour In	PM Peak-Hour Out	Vehicle-Trips Generated Average Weekday	AM Peak-Hour In	AM Peak-Hour Out	PM Peak-Hour In	PM Peak-Hour Out
CURRENTLY PROPOSED LAND USE											
Single-Family Detached Homes [2]	400 DU [3]	9.43	0.182	0.518	0.592	0.348	3,772	73	207	237	139
Townhomes [4]	119 DU [3]	6.74	0.096	0.304	0.321	0.189	802	11	36	38	22
Paired Homes [5]	68 DU [3]	7.20	0.149	0.331	0.325	0.245	490	10	23	22	17
						Total =	**5,064**	**94**	**266**	**297**	**178**

Notes:
(1) Source: *Trip Generation*, Institute of Transportation Engineers, 11th Edition, 2021
(2) ITE Land Use No. 210 - Single-Family Detached Housing
(3) DU = Dwelling Unit
(4) ITE Land Use No. 220 - Multifamily Housing
(5) ITE Land Use No. 215 - Single-Family Attached Housing

Figure 1

Vicinity Map

Redtail Ranch Update (LSC #211310)

Approximate Scale
Scale: NTS

DEVELOPMENT SUMMARY		
LAND USE	**UNITS**	**% UNITS**
Townhomes Alley Loaded (Min. 24' x 105')* (Alley 30' Tract)	119	20.3%
Duplex Front Loaded (Min. 45' x 110')**	68	11.6%
Single-family Detached Lots (Min. 51' x 110')***	374	63.7%
Single-family Detached Large Lots (Min. 10,000 SF)	26	4.4%
TOTAL	**587**	**100.0%**

* Townhomes - Corner lots are a min. 40' x 105' Adjacent To tract 30'x105'

** Duplex - Corner lots are a min. 60' x 110'

*** Standard Lots - Corner lots are a min. 69' x 110'

Park and Open Space Dedication Requirements

Park Type	Acres Required per 1,000 residents*	Required Acres	Provided Acres	Difference (Cash In-Lieu)
Pocket Parks	0.5	0.85	3.12	
Open Space	17	28.84	29.43	
Sub-Total		**29.69**	**32.55**	**2.86**
Neighborhood Parks	3	5.09	0.00	-5.09
Total		**34.78**	**32.55**	

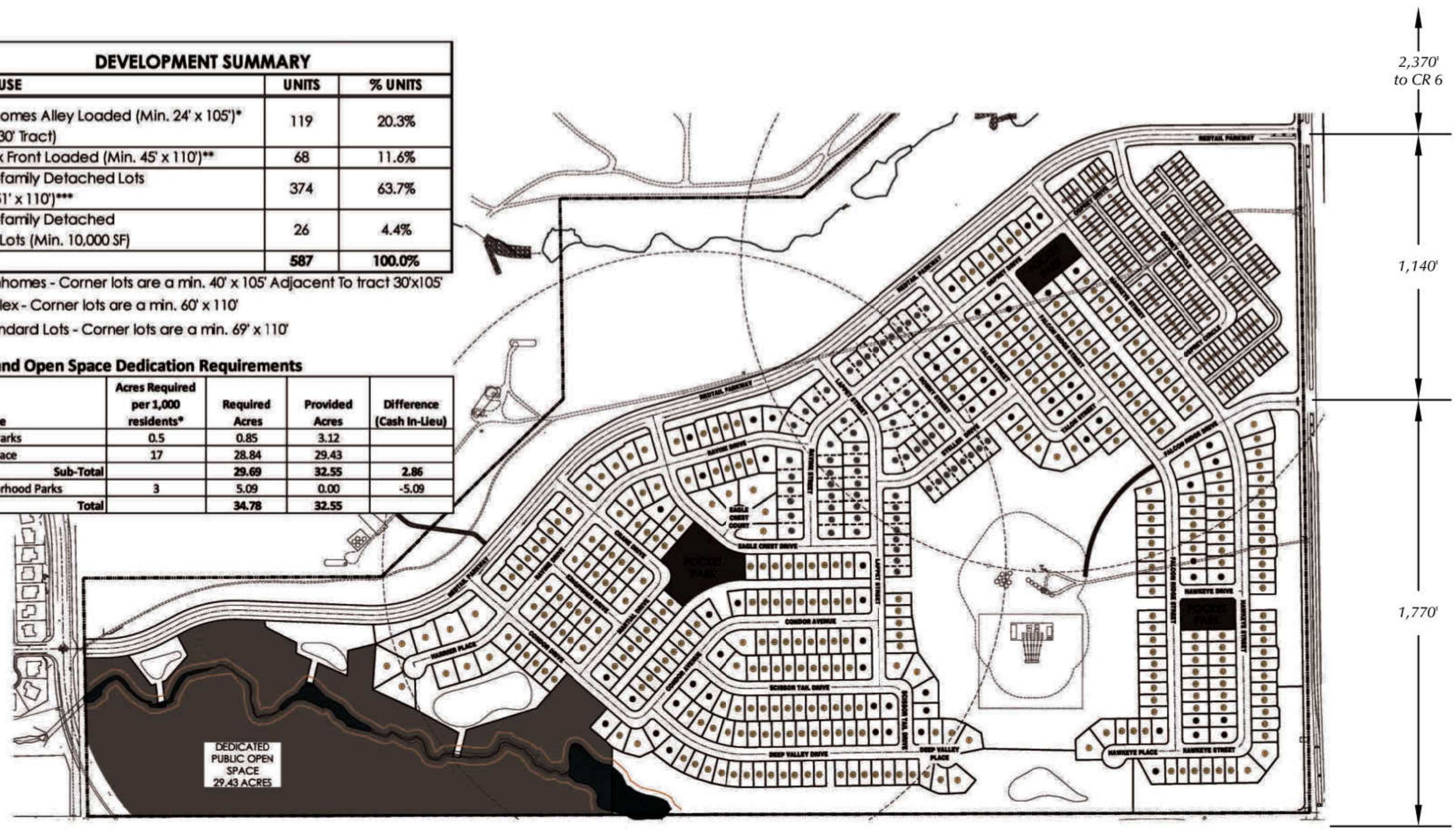


Figure 2

Site Plan

Redtail Ranch Update (LSC #211310)

Figure 3a

Existing Traffic Volumes

Redtail Ranch Update (LSC #211310)

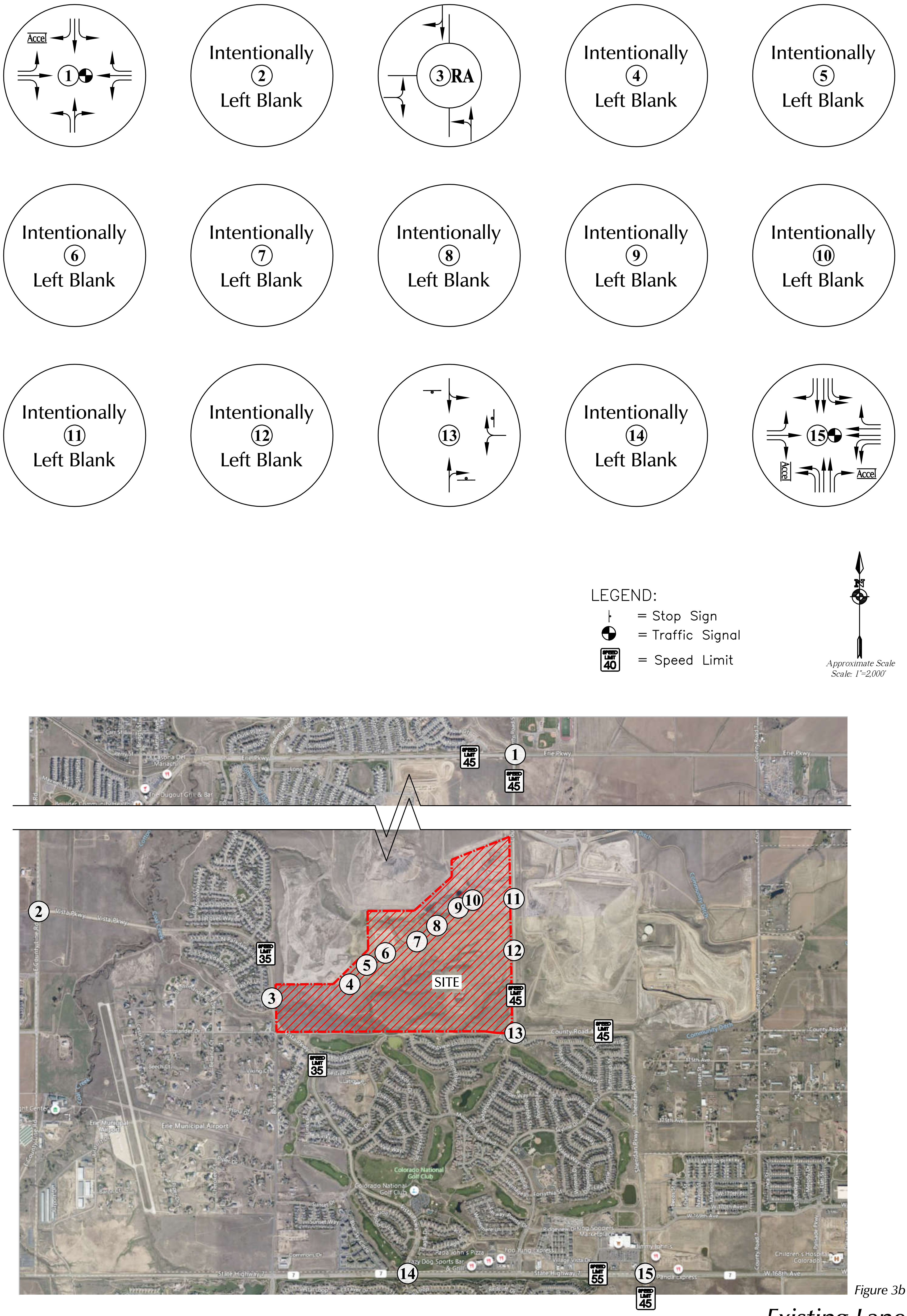
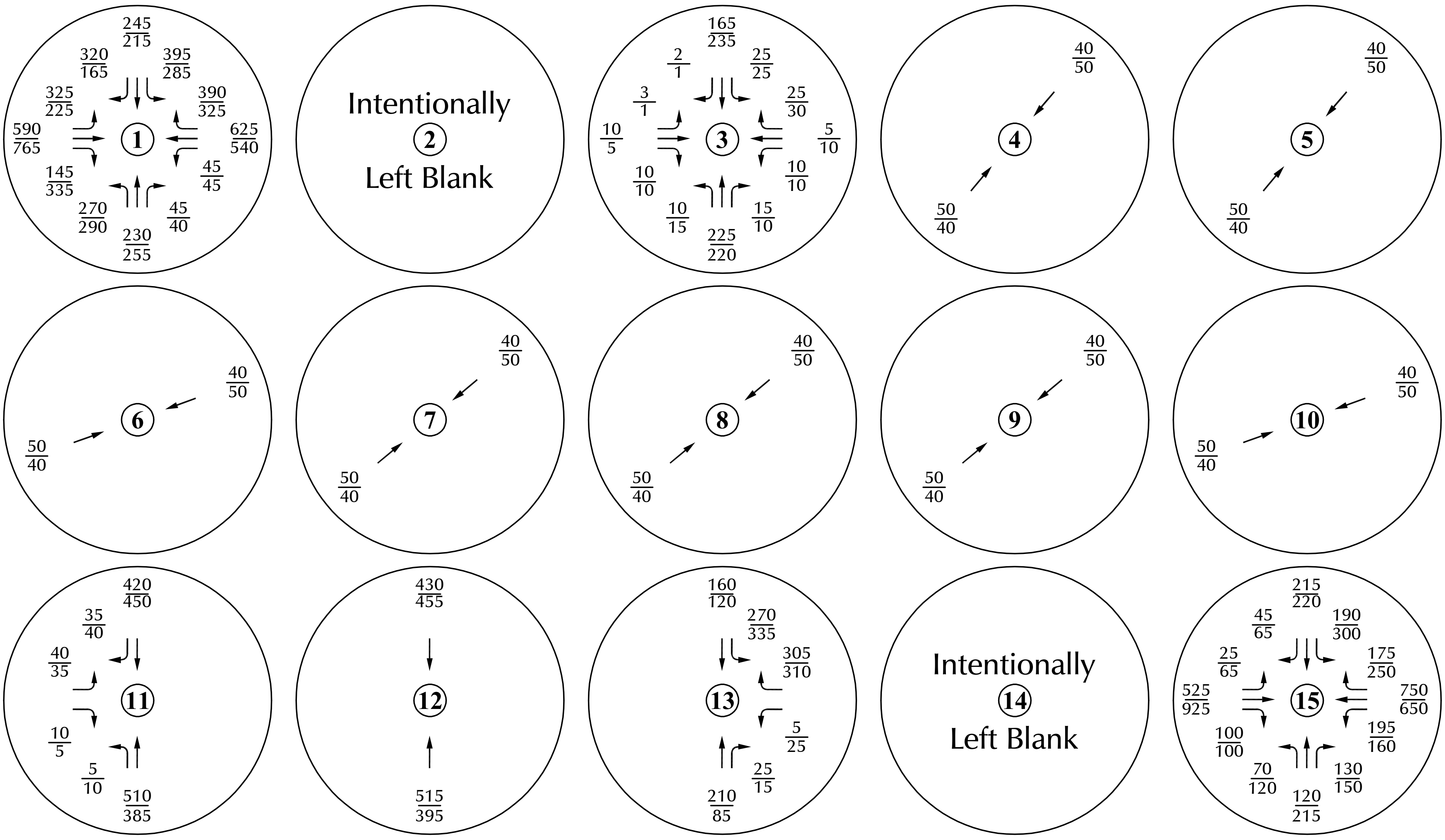


Figure 3b

Existing Lane Geometry and Traffic Control

Redtail Ranch Update (LSC #211310)

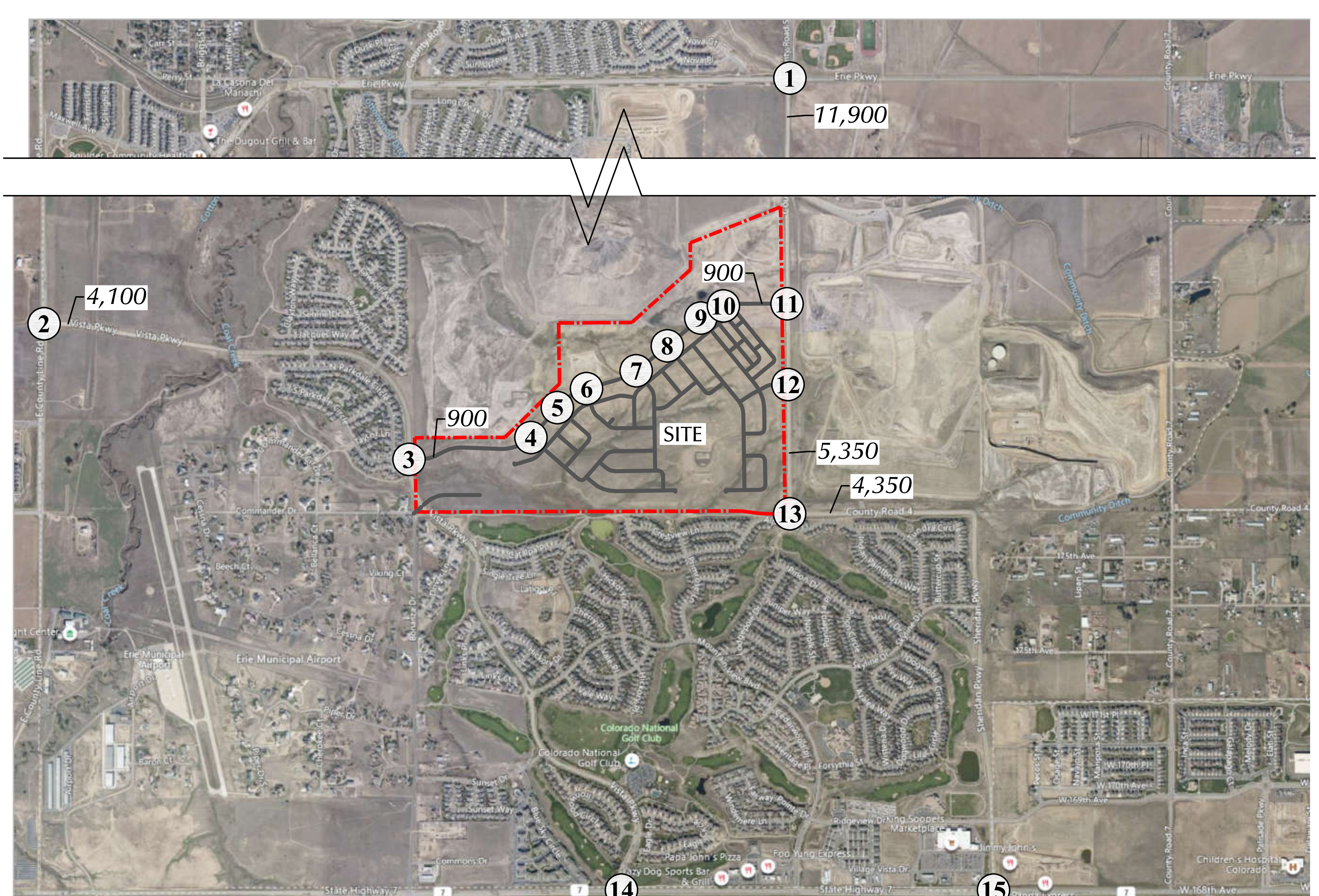


LEGEND:

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=2,000'



Note: Volumes at #18 based on two percent annual growth rate and the volumes at Intersection #1 are based on the projections in Figure 8 of the May, 2021 Colliers Hill TIA by LSC plus one year of growth at a rate of two percent less site-generated trips.

Figure 4a

Year 2027
Background Traffic Volumes

Redtail Ranch Update (LSC #211310)

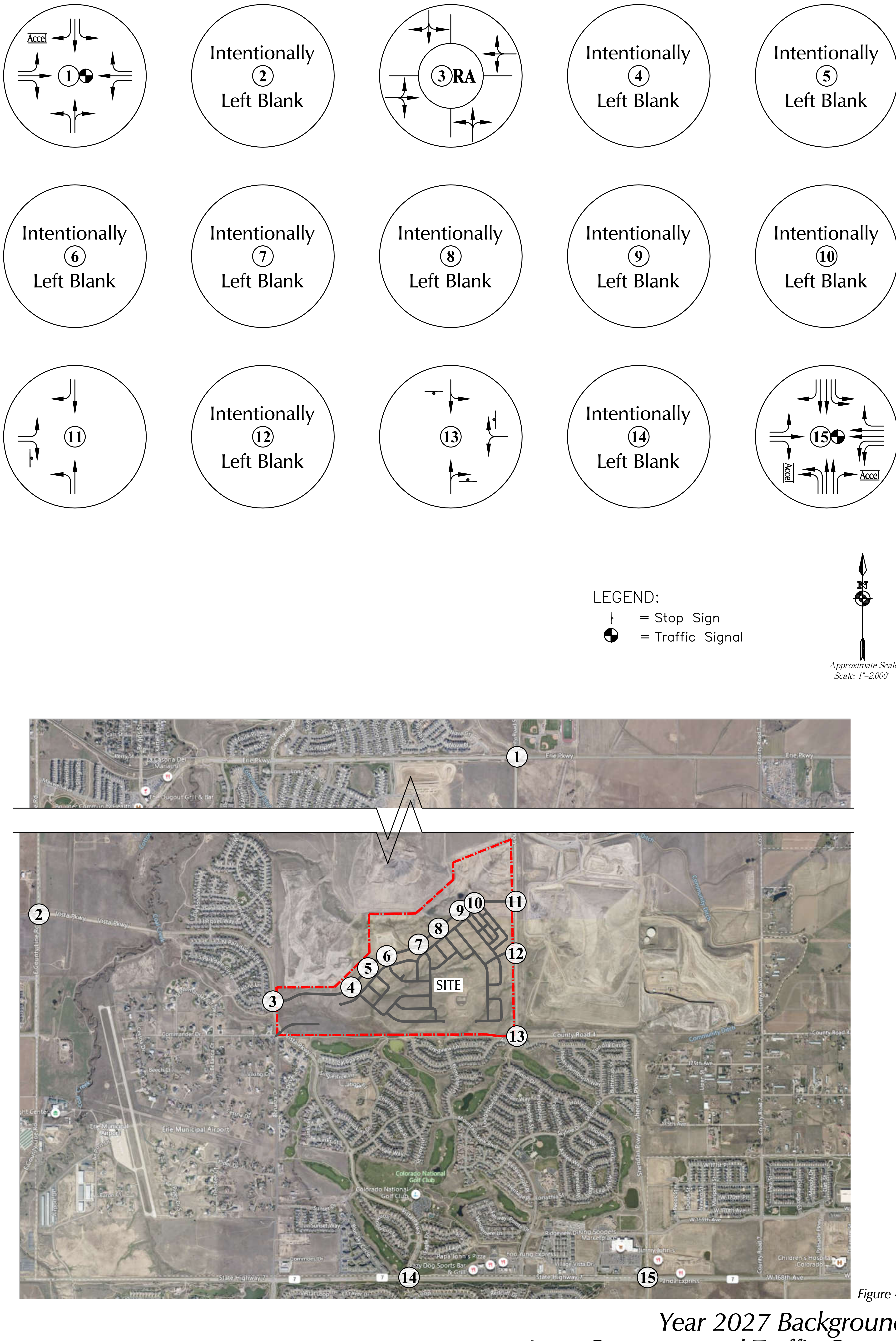
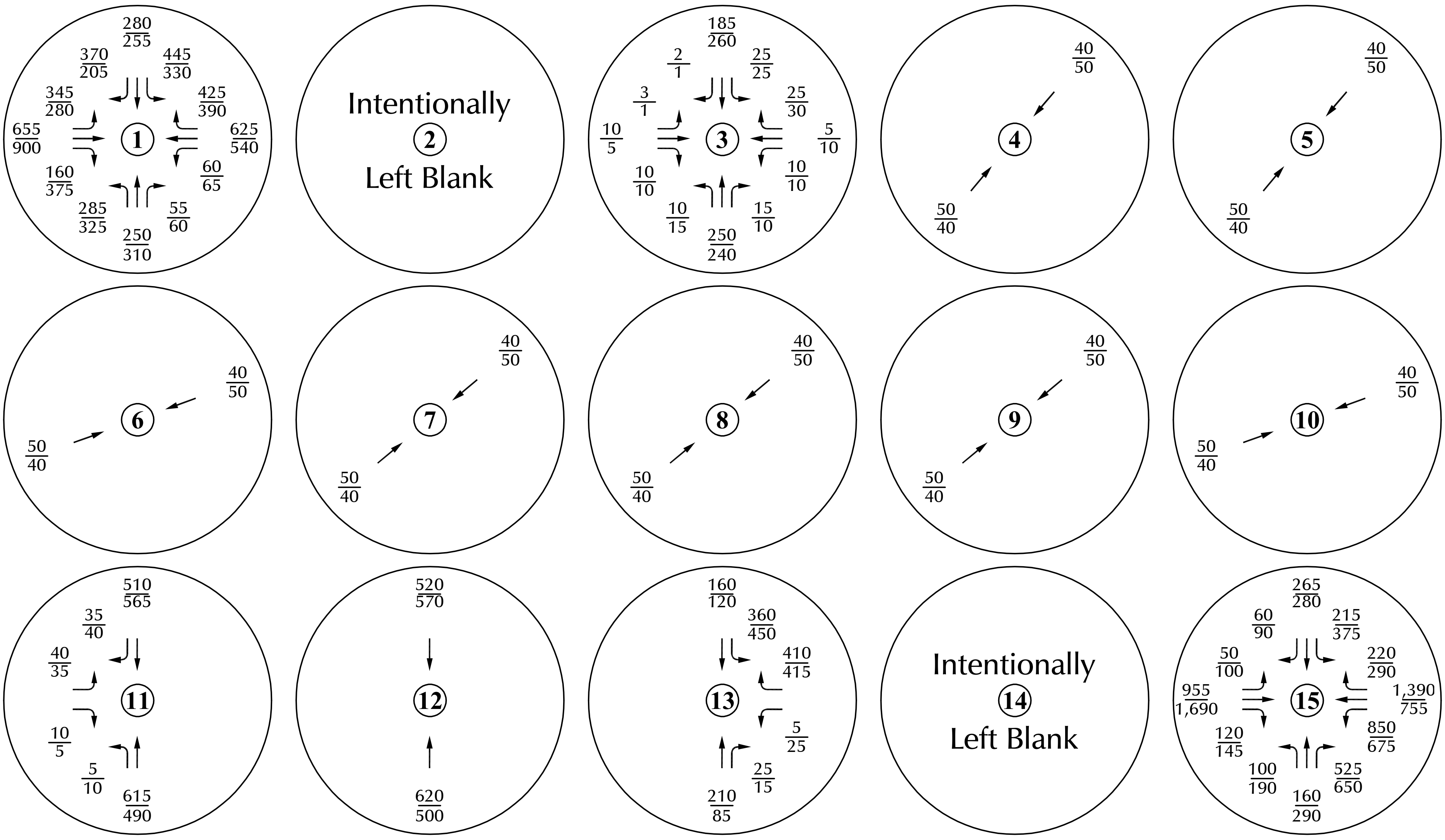


Figure 4b

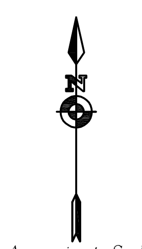
Year 2027 Background
Lane Geometry and Traffic Control

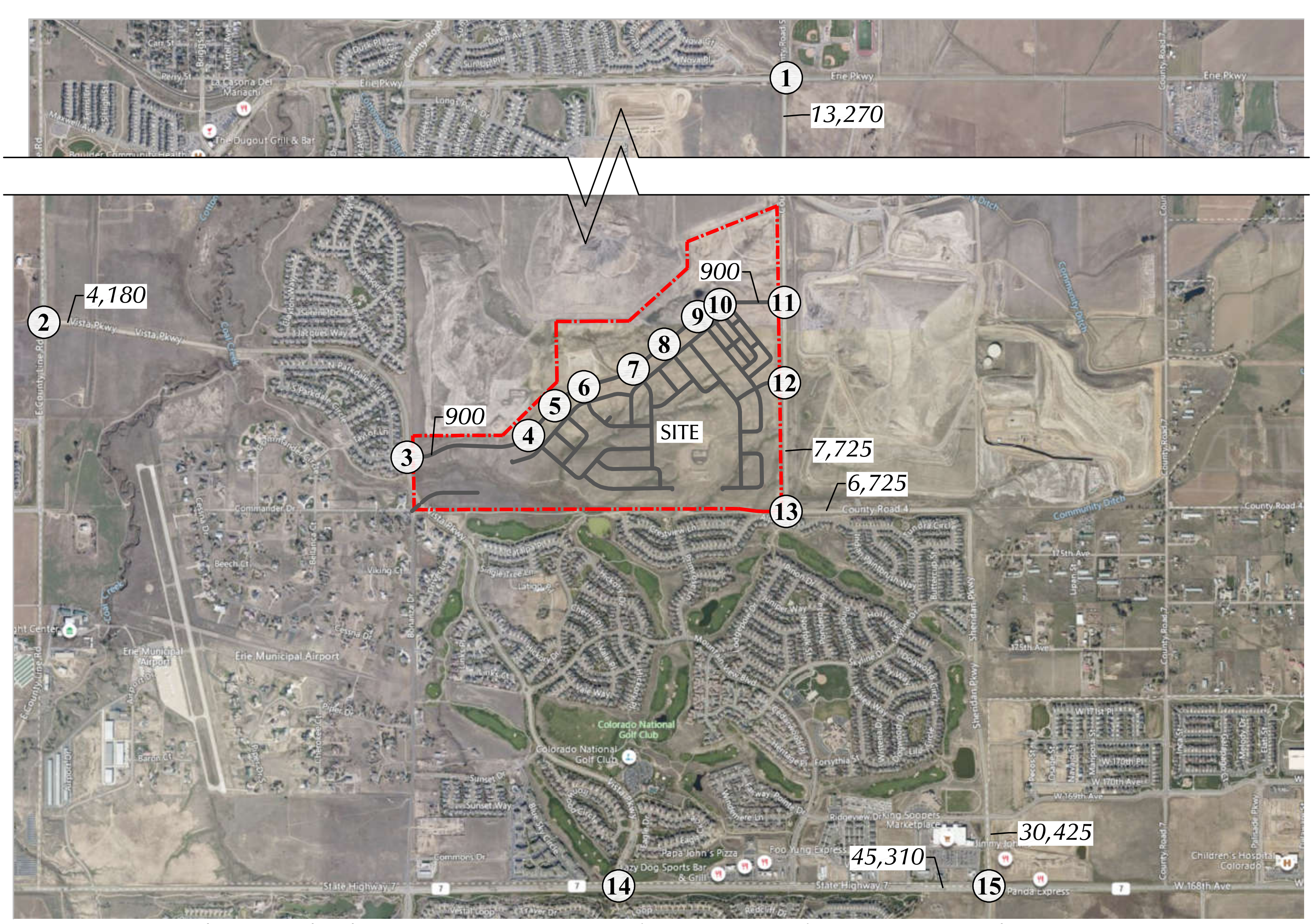
Redtail Ranch Update (LSC #211310)



LEGEND:

26 / 35	=	AM Peak Hour Traffic / PM Peak Hour Traffic
1,000	=	Average Daily Traffic





Note: Volumes at #18 based on SH 7 PEL projections (Figure 4.10 from SH 7 PEL) grown for seven years at an annual rate of two percent less site-generated trips with adjustments based in recent traffic counts. Volumes at #1 based on the projections in Figure 9 of the May, 2021 Colliers Hill TIA by LSC plus two years of growth at a rate of two percent less site-generated trips.

Figure 5a

Year 2042

Background Traffic Volumes

Redtail Ranch Update (LSC #211310)

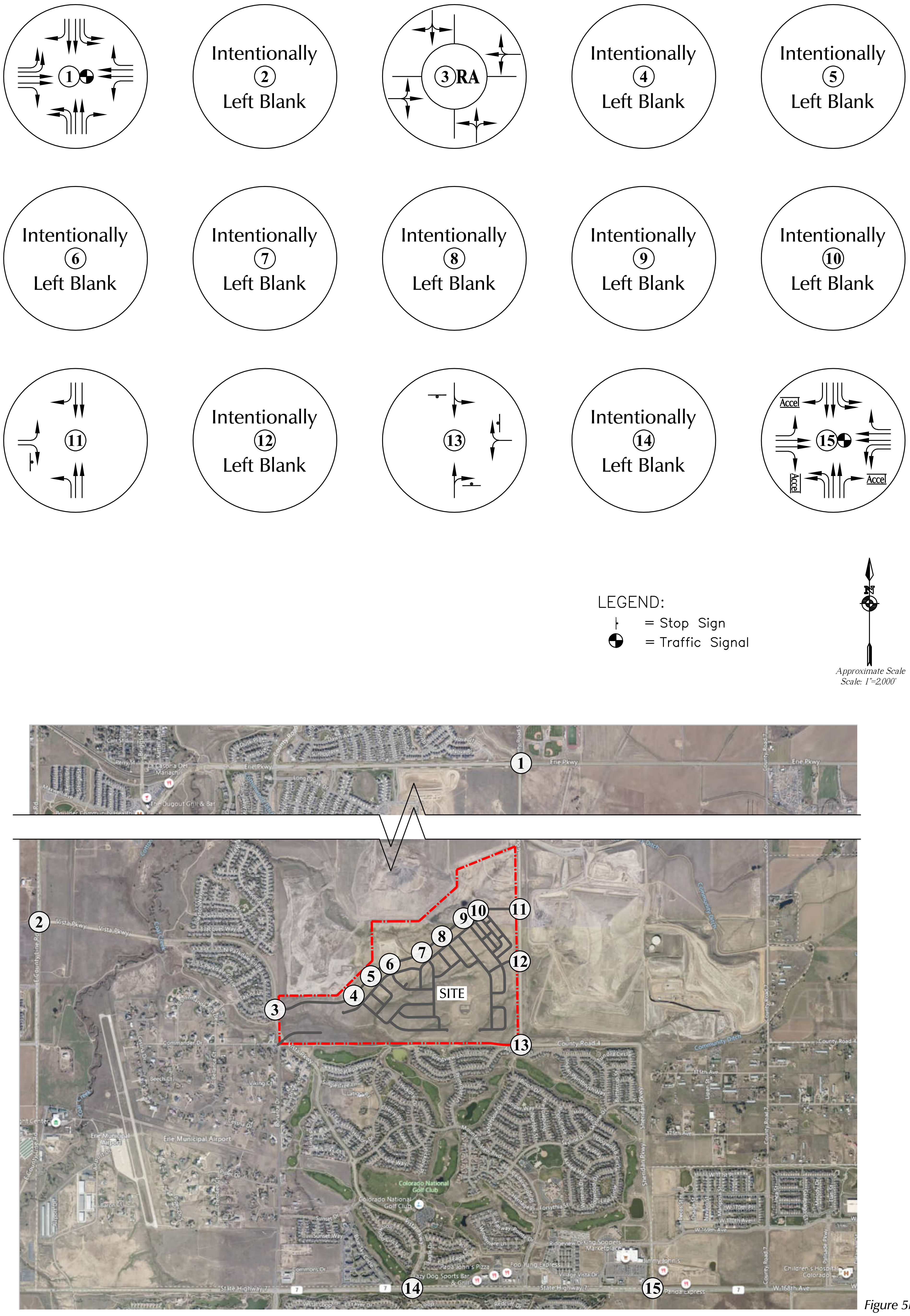


Figure 5b

Year 2042 Background
Lane Geometry and Traffic Control

Redtail Ranch Update (LSC #211310)

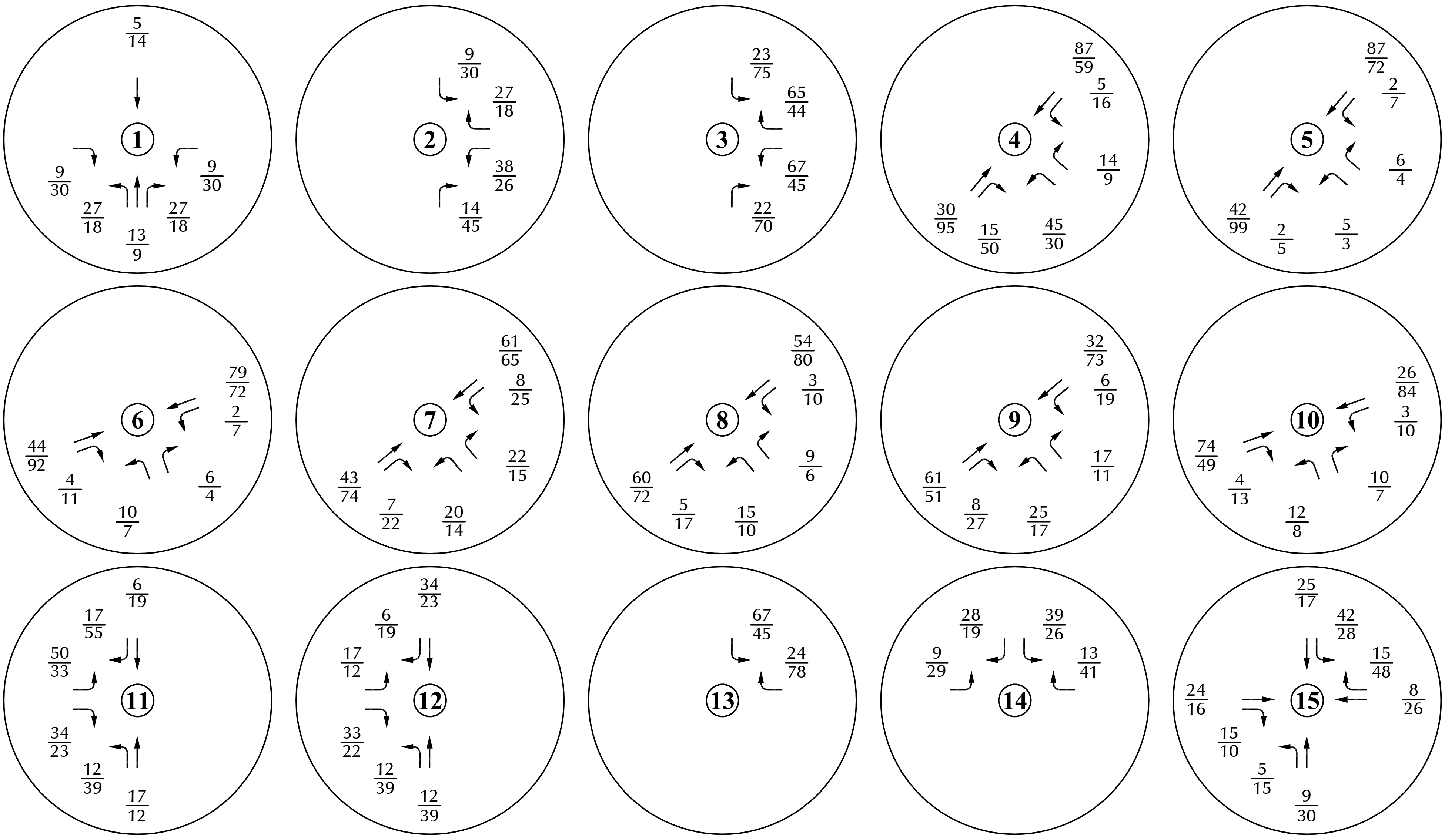
LEGEND:

65% = Percent Directional Distribution

Figure 6

Directional Distribution of Site-Generated Traffic

Redtail Ranch Update (LSC #211310)



LEGEND:

26/35	=	AM Peak Hour Traffic / PM Peak Hour Traffic
1,000	=	Average Daily Traffic

Approximate Scale
Scale: 1"=2,000'

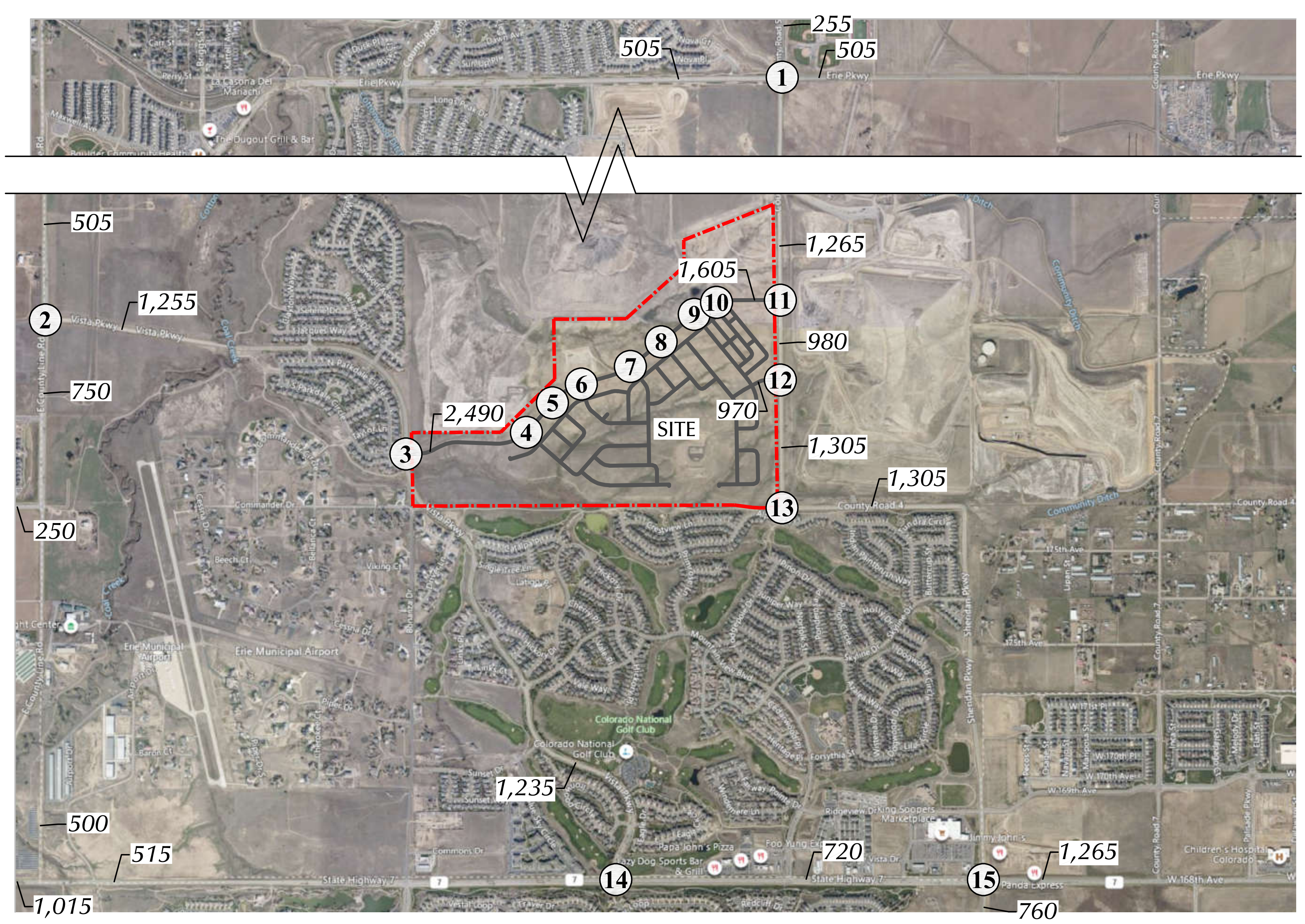
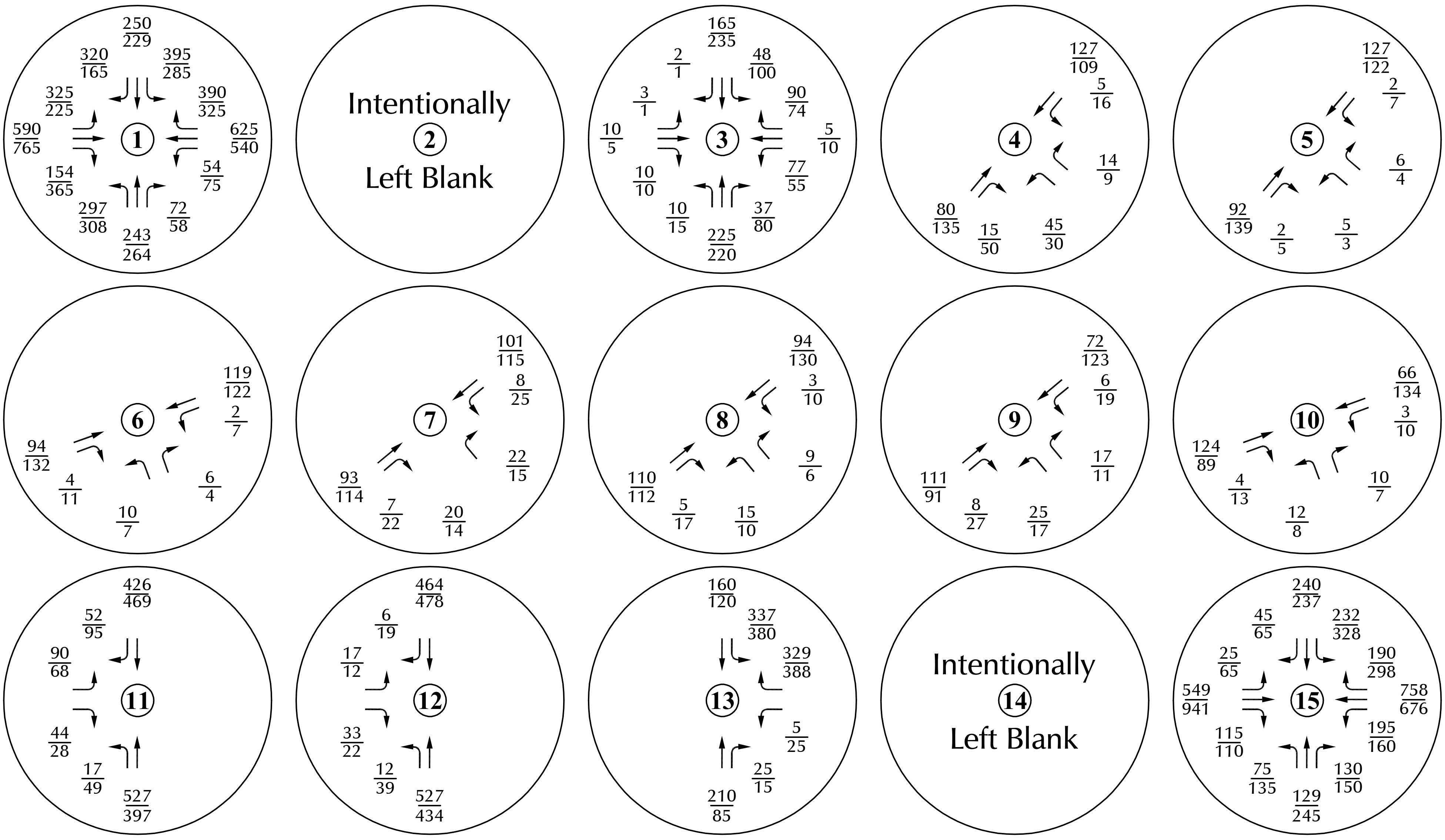


Figure 7

Assignment of Site-Generated Traffic

Redtail Ranch Update (LSC #211310)

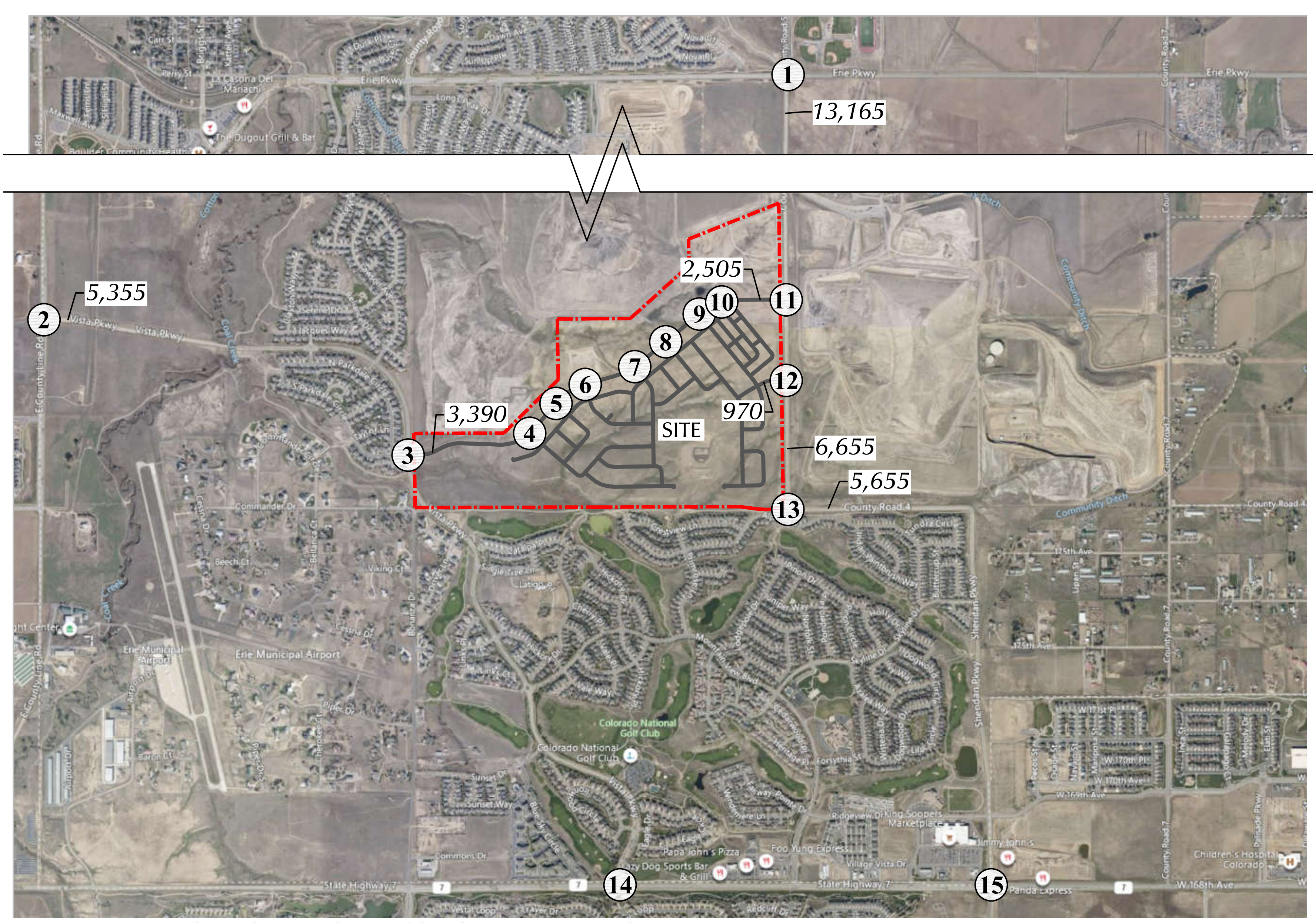


LEGEND:

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=2,000'



Note: These volumes are the sum of the volumes in Figures 4a and 7.

Figure 8a

Year 2027
Total Traffic Volumes

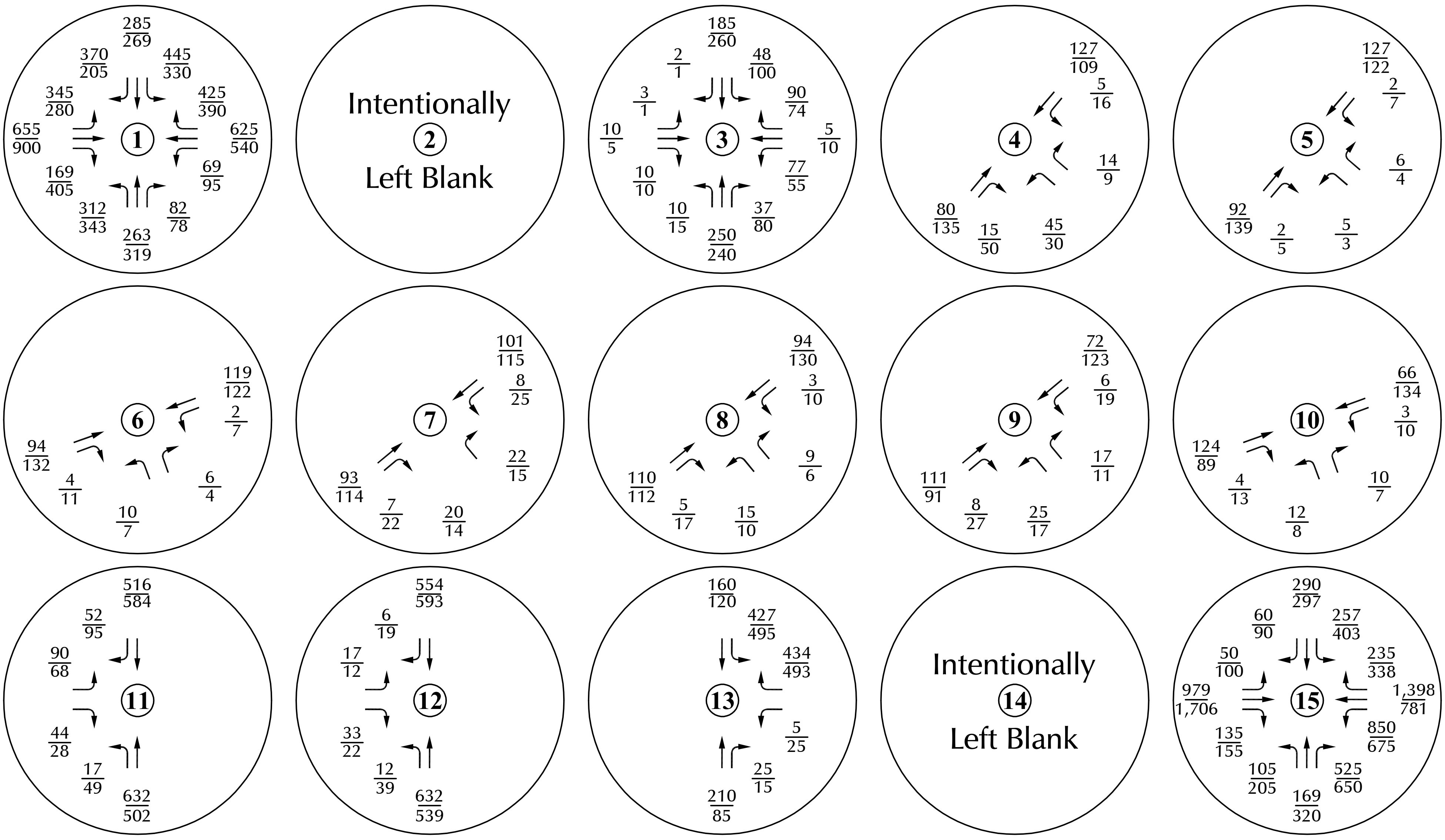
Redtail Ranch Update (LSC #211310)

Figure 8b

1 EB RT = 100 feet + 10:1 taper
2 SB RT = 100 feet + 12:1 taper
3 NB LT = 100 feet + 12:1 taper
4 NB LT = 100 feet + 12:1 taper
5 SB LT = 300 feet + 12:1 taper

Year 2027 Total Lane Geometry and Traffic Control

Redtail Ranch Update (LSC #211310)

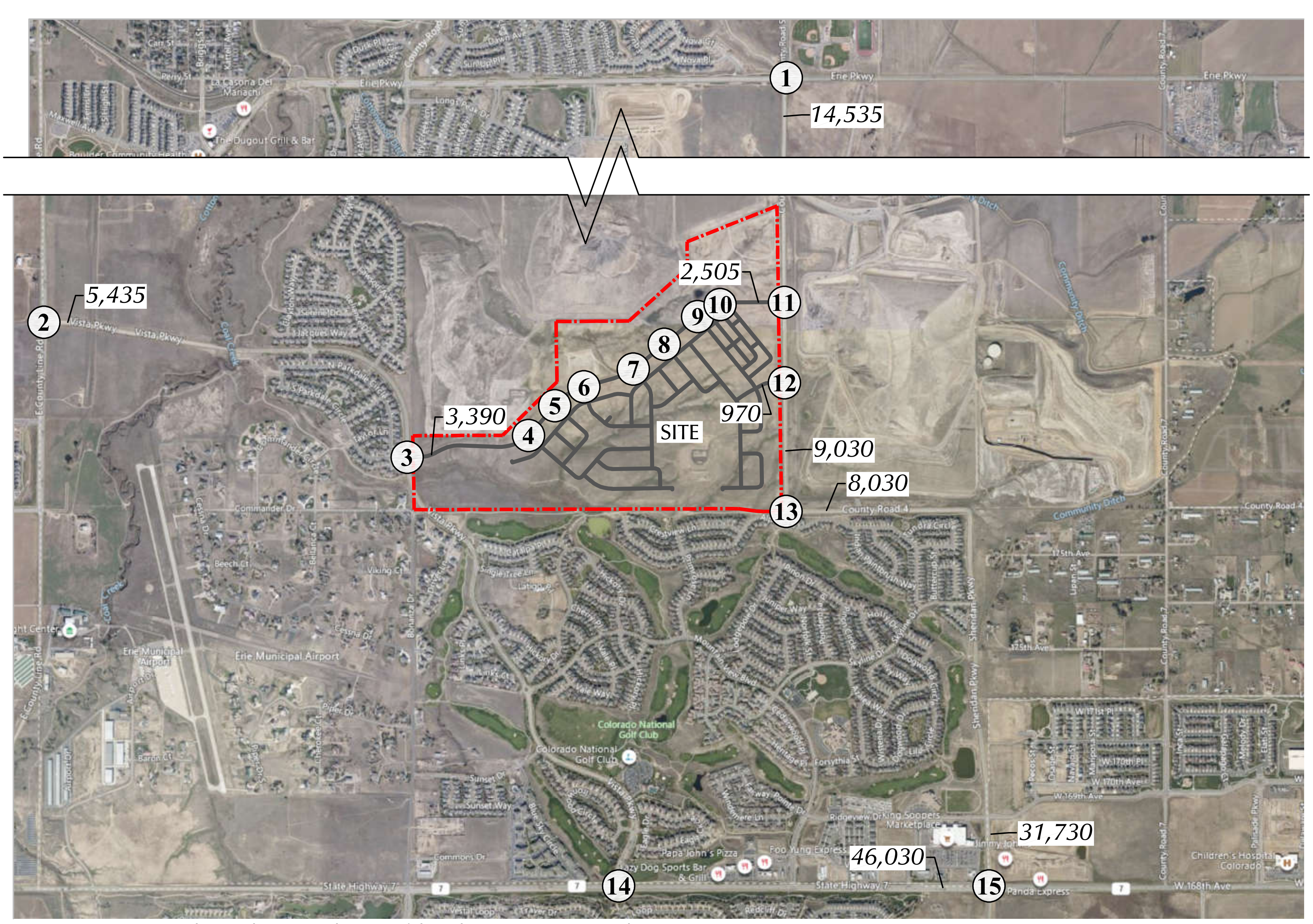


LEGEND:

$\frac{26}{35}$	=	AM Peak Hour Traffic / PM Peak Hour Traffic
1,000	=	Average Daily Traffic

N

Approximate Scale
Scale: 1"=2,000'

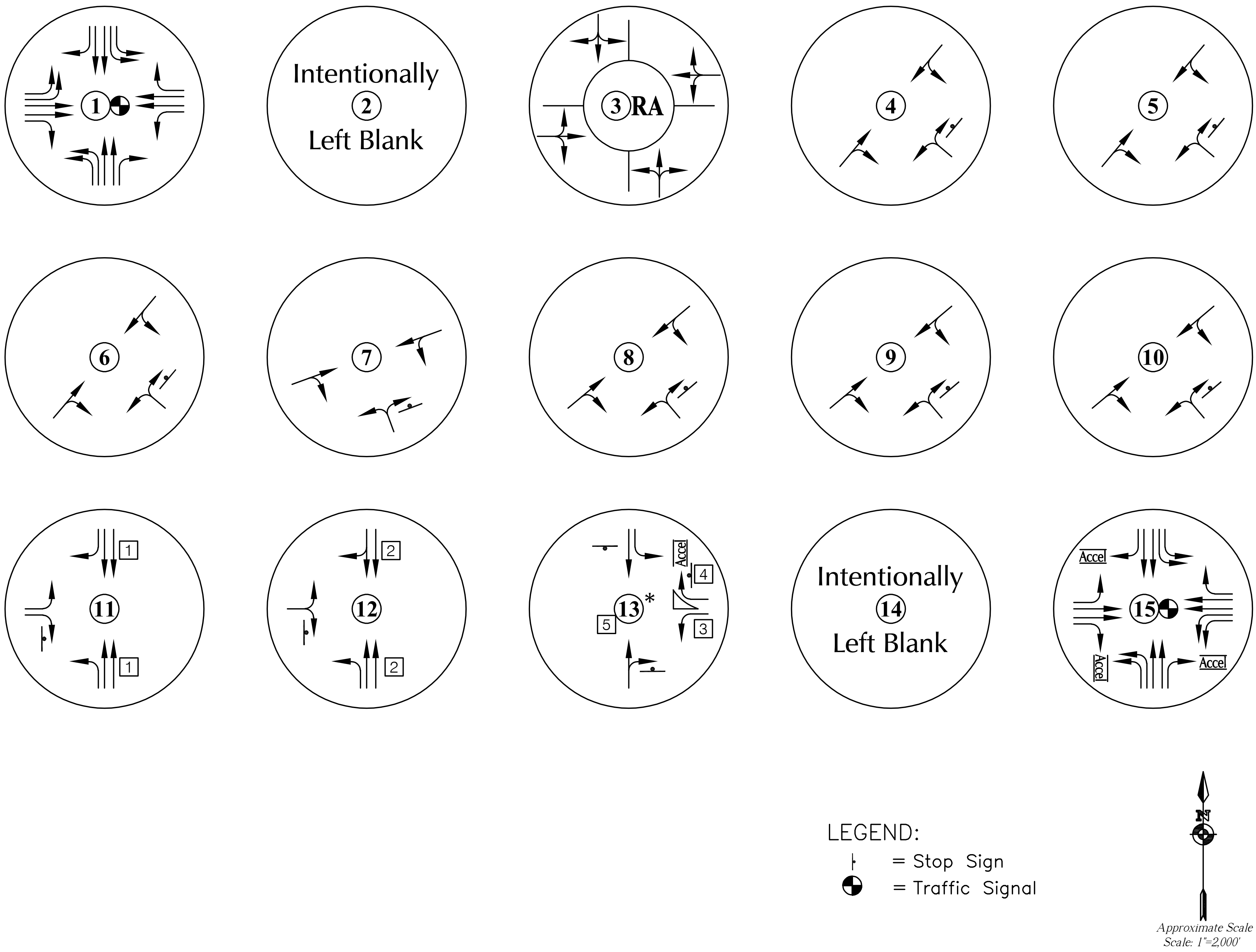


Note: These volumes are the sum of the volumes in Figures 5a and 7.

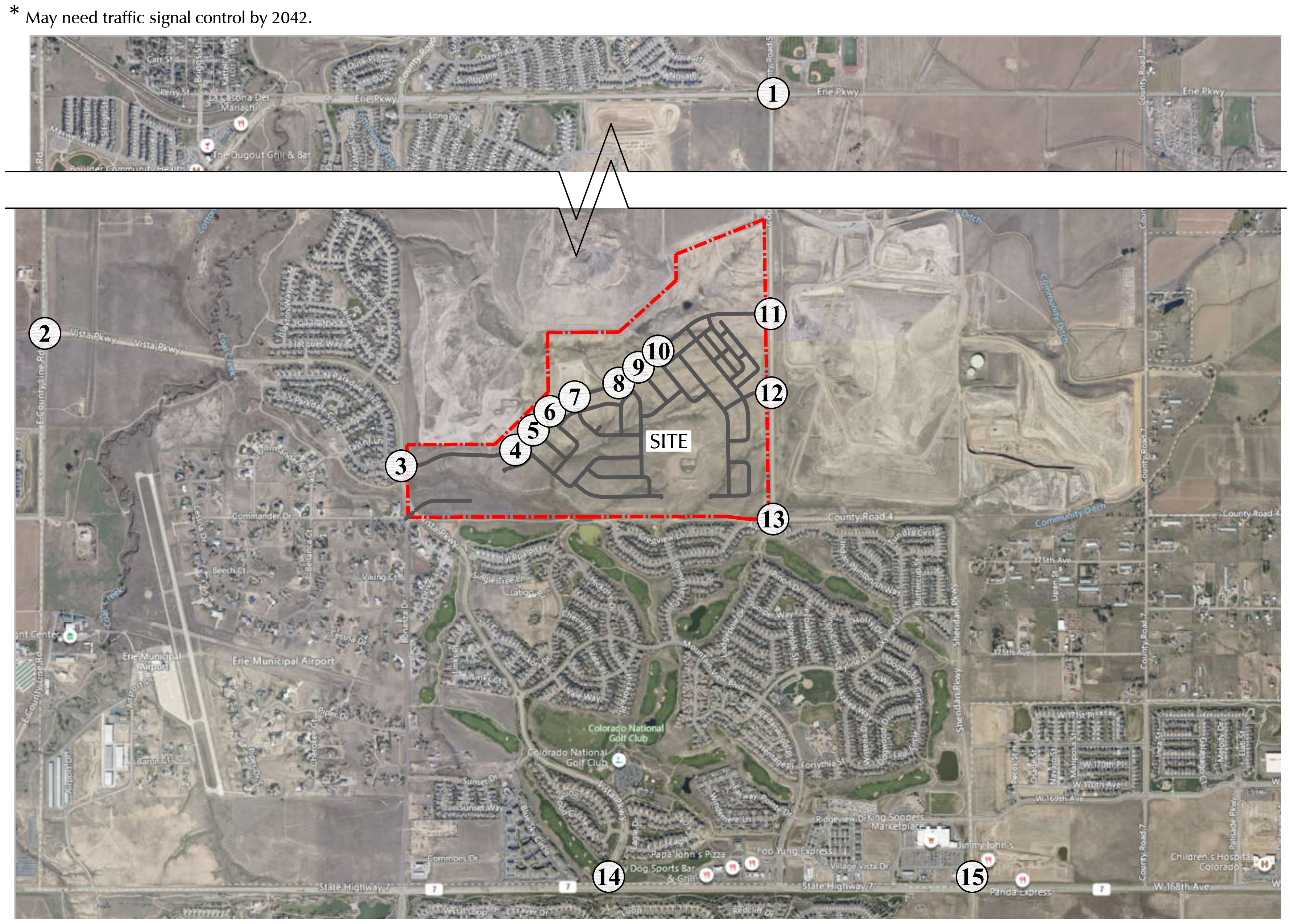
Figure 9a

Year 2042
Total Traffic Volumes

Redtail Ranch Update (LSC #211310)



* May need traffic signal control by 2042.



1 Construct second through lane (by others)

2 Construct second through lane (by others)

3 100 feet + 12:1 taper

4 The westbound to northbound acceleration lane will become the eastern northbound lane (by others).

5 Potential conversion to traffic signal control by 2042.

Figure 9b

Year 2042 Total Lane Geometry and Traffic Control

Redtail Ranch Update (LSC #211310)

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COUNTY RD 5
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: WELD

File Name : CR5ERIEPKWY22
Site Code : 00000005
Start Date : 1/12/2022
Page No : 1

Groups Printed- VEHICLES

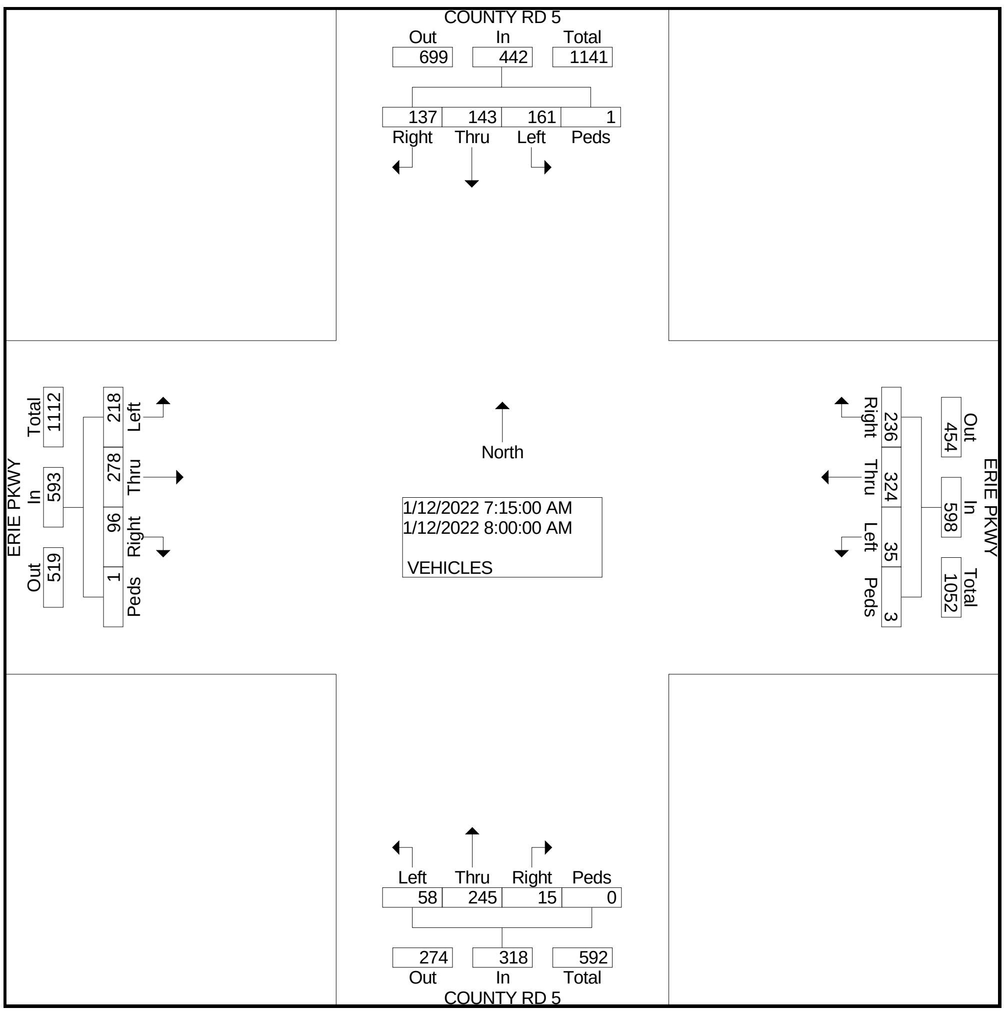
	COUNTY RD 5 Southbound				ERIE PKWY Westbound				COUNTY RD 5 Northbound				ERIE PKWY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	18	10	2	0	20	52	16	0	2	5	2	0	3	60	5	0	195
06:45 AM	28	10	1	0	14	64	30	1	4	15	3	0	7	50	4	0	231
Total	46	20	3	0	34	116	46	1	6	20	5	0	10	110	9	0	426
07:00 AM	17	16	11	0	7	66	38	0	4	24	8	0	15	63	13	0	282
07:15 AM	33	25	27	0	7	76	74	0	12	79	0	0	55	65	19	0	472
07:30 AM	65	36	59	1	6	75	87	2	15	99	7	0	84	59	17	1	613
07:45 AM	34	40	40	0	8	95	31	0	18	26	5	0	31	78	31	0	437
Total	149	117	137	1	28	312	230	2	49	228	20	0	185	265	80	1	1804
08:00 AM	29	42	11	0	14	78	44	1	13	41	3	0	48	76	29	0	429
08:15 AM	51	29	17	0	17	94	36	0	19	25	1	0	24	60	20	0	393
Total	80	71	28	0	31	172	80	1	32	66	4	0	72	136	49	0	822
04:00 PM	25	19	19	1	0	68	31	5	26	28	12	1	28	82	24	0	369
04:15 PM	22	25	25	0	3	65	26	0	25	26	8	0	20	85	25	0	355
04:30 PM	41	32	37	2	4	67	26	0	25	34	10	0	30	83	35	0	426
04:45 PM	22	40	31	0	4	85	35	0	28	48	8	0	29	98	44	0	472
Total	110	116	112	3	11	285	118	5	104	136	38	1	107	348	128	0	1622
05:00 PM	33	39	28	0	3	79	29	1	35	45	3	0	29	110	27	0	461
05:15 PM	34	44	26	0	2	87	35	0	29	40	5	0	43	93	33	0	471
05:30 PM	45	27	27	0	5	74	39	0	26	38	3	0	37	86	28	0	435
05:45 PM	24	22	27	0	5	63	34	0	28	27	3	0	21	75	25	0	354
Total	136	132	108	0	15	303	137	1	118	150	14	0	130	364	113	0	1721
Grand Total	521	456	388	4	119	1188	611	10	309	600	81	1	504	1223	379	1	6395
Apprch %	38.1	33.3	28.3	0.3	6.2	61.6	31.7	0.5	31.2	60.5	8.2	0.1	23.9	58.0	18.0	0.0	
Total %	8.1	7.1	6.1	0.1	1.9	18.6	9.6	0.2	4.8	9.4	1.3	0.0	7.9	19.1	5.9	0.0	

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COUNTY RD 5
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: WELD

File Name : CR5ERIEPKWY22
Site Code : 00000005
Start Date : 1/12/2022

	COUNTY RD 5 Southbound					ERIE PKWY Westbound					COUNTY RD 5 Northbound					ERIE PKWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	161	143	137	1	442	35	324	236	3	598	58	245	15	0	318	218	278	96	1	593	1951
Percent	36.4	32.4	31.0	0.2		5.9	54.2	39.5	0.5		18.2	77.0	4.7	0.0		36.8	46.9	16.2	0.2		
07:30 Volume	65	36	59	1	161	6	75	87	2	170	15	99	7	0	121	84	59	17	1	161	613
Peak Factor																					0.796
High Int.	07:30 AM					07:30 AM					07:30 AM					07:30 AM					
Volume	65	36	59	1	161	6	75	87	2	170	15	99	7	0	121	84	59	17	1	161	
Peak Factor					0.686					0.879					0.657					0.921	

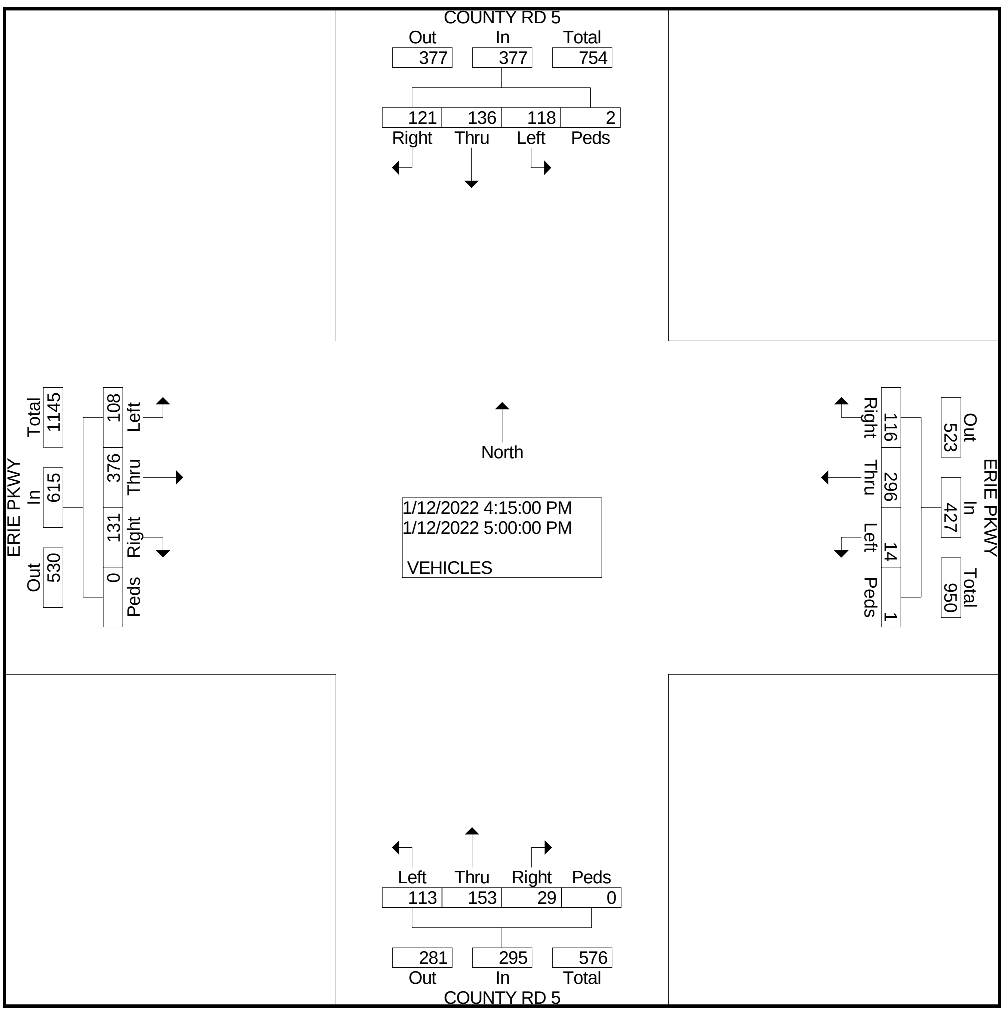


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COUNTY RD 5
E/W STREET: ERIE PKWY
CITY: ERIE
COUNTY: WELD

File Name : CR5ERIEPKWY22
Site Code : 00000005
Start Date : 1/12/2022
Page No : 3

	COUNTY RD 5 Southbound					ERIE PKWY Westbound					COUNTY RD 5 Northbound					ERIE PKWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:15 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	118	136	121	2	377	14	296	116	1	427	113	153	29	0	295	108	376	131	0	615	1714
Percent	31.3	36.1	32.1	0.5		3.3	69.3	27.2	0.2		38.3	51.9	9.8	0.0		17.6	61.1	21.3	0.0		
04:45 Volume	22	40	31	0	93	4	85	35	0	124	28	48	8	0	84	29	98	44	0	171	472
Peak Factor																					0.908
High Int.	04:30 PM					04:45 PM					04:45 PM					04:45 PM					
Volume	41	32	37	2	112	4	85	35	0	124	28	48	8	0	84	29	98	44	0	171	
Peak Factor					0.842					0.861					0.878					0.899	



COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COUNTY RD 5
E/W STREET: COUNTY RD 4
CITY: ERIE
COUNTY: WELD

File Name : CR5CR4
Site Code : 00000025
Start Date : 1/5/2022
Page No : 1

Groups Printed- VEHICLES

	COUNTY RD 5 Southbound				COUNTY RD 4 Westbound				HAMILTON RD Northbound				NO ACCESS Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	20	1	0	1	0	0	13	0	0	3	1	0	0	0	0	1	40
06:45 AM	22	4	0	0	0	0	58	0	0	9	4	0	0	0	0	1	98
Total	42	5	0	1	0	0	71	0	0	12	5	0	0	0	0	2	138
07:00 AM	33	12	0	0	1	0	28	0	0	28	6	0	0	0	0	0	108
07:15 AM	40	20	0	0	0	0	97	0	0	148	8	0	0	0	0	1	314
07:30 AM	54	57	0	0	0	1	100	1	0	120	9	0	0	0	0	1	343
07:45 AM	80	39	0	0	0	0	58	0	1	41	5	0	0	0	0	1	225
Total	207	128	0	0	1	1	283	1	1	337	28	0	0	0	0	3	990
08:00 AM	52	32	0	0	1	0	70	0	0	20	4	0	0	0	0	2	181
08:15 AM	58	28	0	0	0	0	50	0	0	25	2	0	0	0	0	1	164
Grand Total	359	193	0	1	2	1	474	1	1	394	39	0	0	0	0	8	1473
Apprch %	64.9	34.9	0.0	0.2	0.4	0.2	99.2	0.2	0.2	90.8	9.0	0.0	0.0	0.0	0.0	100.0	
Total %	24.4	13.1	0.0	0.1	0.1	0.1	32.2	0.1	0.1	26.7	2.6	0.0	0.0	0.0	0.0	0.5	

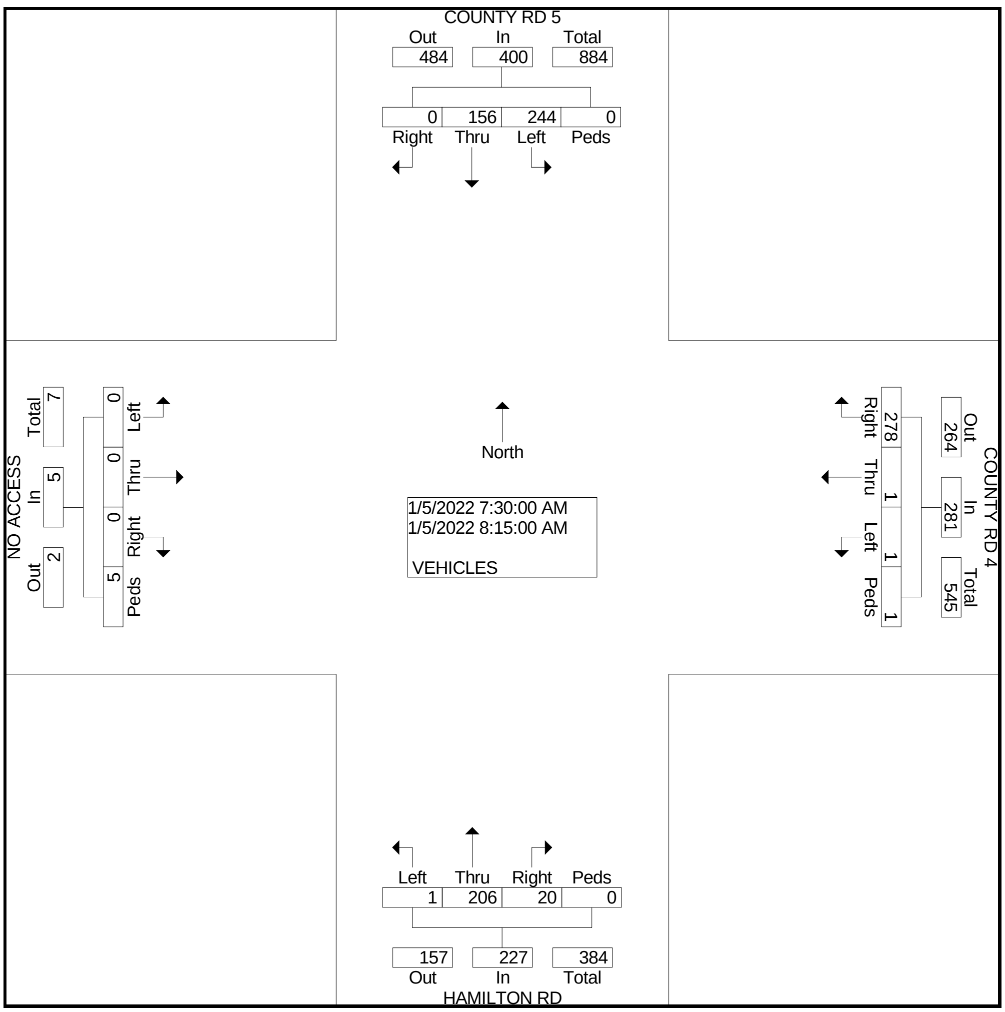
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COUNTY RD 5
E/W STREET: COUNTY RD 4
CITY: ERIE
COUNTY: WELD

File Name : CR5CR4
Site Code : 00000025
Start Date : 1/5/2022

	COUNTY RD 5 Southbound					COUNTY RD 4 Westbound					HAMILTON RD Northbound					NO ACCESS Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	244	156	0	0	400	1	1	278	1	281	1	206	20	0	227	0	0	0	5	5	913
Percent	61.0	39.0	0.0	0.0		0.4	0.4	98.9	0.4		0.4	90.7	8.8	0.0		0.0	0.0	0.0	100.0		
07:30 Volume	54	57	0	0	111	0	1	100	1	102	0	120	9	0	129	0	0	0	1	1	343
Peak Factor																					0.665
High Int.	07:45 AM					07:30 AM					07:30 AM					08:00 AM					
Volume	80	39	0	0	119	0	1	100	1	102	0	120	9	0	129	0	0	0	2	2	
Peak Factor					0.840					0.689					0.440					0.625	



COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COUNTY RD 5
E/W STREET: COUNTY RD 4
CITY: ERIE
COUNTY: WELD

File Name : CR5CR4PM
Site Code : 00000025
Start Date : 1/11/2022
Page No : 1

Groups Printed- VEHICLES

	COUNTY RD 5 Southbound				COUNTY RD 4 Westbound				HAMILTON RD Northbound				NO ACCESS Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	36	20	0	0	4	0	46	0	0	20	0	0	0	0	0	0	126
04:15 PM	52	23	0	0	1	0	50	1	0	10	2	1	0	0	0	1	141
04:30 PM	53	25	0	0	4	0	46	0	0	13	1	0	0	0	0	2	144
04:45 PM	63	24	0	0	3	0	42	0	0	23	2	0	0	0	0	1	158
Total	204	92	0	0	12	0	184	1	0	66	5	1	0	0	0	4	569
05:00 PM	95	31	0	2	4	0	96	0	0	25	1	0	0	0	0	0	254
05:15 PM	95	40	0	0	8	0	98	2	0	23	6	0	0	0	0	1	273
05:30 PM	98	34	0	0	5	0	90	0	0	24	7	0	0	0	0	1	259
05:45 PM	96	42	0	0	4	1	115	0	1	55	8	0	0	0	0	0	322
Total	384	147	0	2	21	1	399	2	1	127	22	0	0	0	0	2	1108
Grand Total	588	239	0	2	33	1	583	3	1	193	27	1	0	0	0	6	1677
Apprch %	70.9	28.8	0.0	0.2	5.3	0.2	94.0	0.5	0.5	86.9	12.2	0.5	0.0	0.0	0.0	100.0	
Total %	35.1	14.3	0.0	0.1	2.0	0.1	34.8	0.2	0.1	11.5	1.6	0.1	0.0	0.0	0.0	0.4	

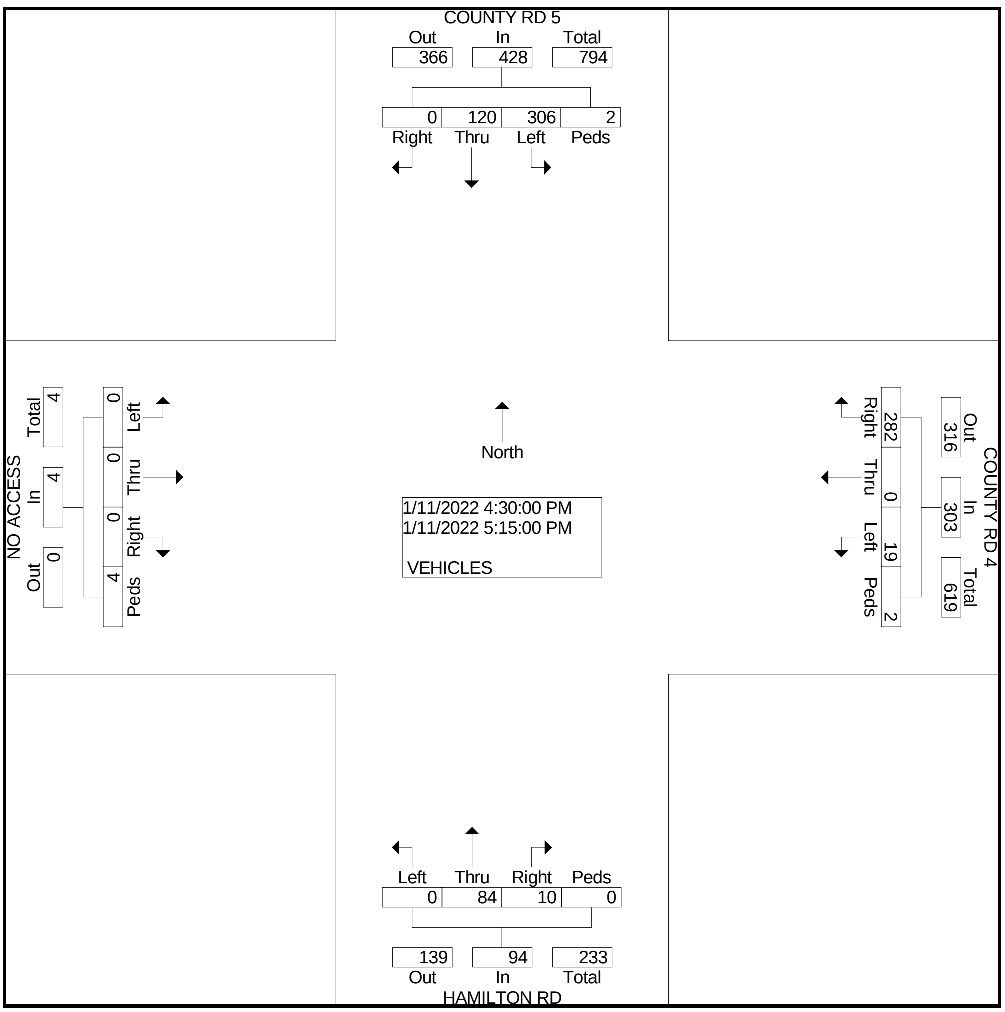
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: COUNTY RD 5
E/W STREET: COUNTY RD 4
CITY: ERIE
COUNTY: WELD

File Name : CR5CR4PM
Site Code : 00000025
Start Date : 1/11/2022
Page No : 2

	COUNTY RD 5 Southbound					COUNTY RD 4 Westbound					HAMILTON RD Northbound					NO ACCESS Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:15 PM to 05:15 PM - Peak 1 of 1																					
Intersection	04:30 PM																				
Volume	306	120	0	2	428	19	0	282	2	303	0	84	10	0	94	0	0	0	4	4	829
Percent	71.5	28.0	0.0	0.5		6.3	0.0	93.1	0.7		0.0	89.4	10.6	0.0		0.0	0.0	0.0	100.0		
05:15 Volume	95	40	0	0	135	8	0	98	2	108	0	23	6	0	29	0	0	0	1	1	273
Peak Factor																					0.759
High Int.	05:15 PM					05:15 PM					05:15 PM					04:30 PM					
Volume	95	40	0	0	135	8	0	98	2	108	0	23	6	0	29	0	0	0	2	2	
Peak Factor					0.793					0.701					0.810					0.500	



COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: VISTA PKWY
E/W STREET: PARKDALE CIR
CITY: ERIE
COUNTY: BOULDER

File Name : VISTPARKDALE
Site Code : 00000020
Start Date : 1/12/2022
Page No : 1

Groups Printed- VEHICLES

	VISTA PKWY Southbound				NO ACCESS Westbound				VISTA PKWY Northbound				PARKDALE CIR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	11	0	0	0	0	0	0	0	12	0	0	0	1	1	0	25
06:45 AM	0	16	0	0	0	0	0	0	0	19	0	0	0	0	5	0	40
Total	0	27	0	0	0	0	0	0	0	31	0	0	0	1	6	0	65
07:00 AM	0	18	0	0	0	0	0	0	0	37	0	0	0	0	3	0	58
07:15 AM	0	24	0	1	0	0	0	0	1	36	2	0	3	0	9	0	76
07:30 AM	0	31	1	0	0	0	0	0	3	69	0	0	0	0	7	0	111
07:45 AM	0	46	0	0	0	0	0	0	2	62	0	0	0	0	3	0	113
Total	0	119	1	1	0	0	0	0	6	204	2	0	3	0	22	0	358
08:00 AM	0	45	1	0	0	0	0	0	2	42	0	0	2	0	4	0	96
08:15 AM	0	30	0	0	0	0	0	0	3	35	0	0	1	0	0	0	69
Total	0	75	1	0	0	0	0	0	5	77	0	0	3	0	4	0	165
04:00 PM	0	58	2	1	0	0	0	0	2	39	0	0	0	0	3	0	105
04:15 PM	0	43	0	0	0	0	0	0	6	36	0	0	0	0	3	0	88
04:30 PM	0	57	0	0	0	0	0	0	2	36	0	0	0	0	4	0	99
04:45 PM	0	63	1	0	0	0	0	0	6	64	0	0	1	0	3	0	138
Total	0	221	3	1	0	0	0	0	16	175	0	0	1	0	13	0	430
05:00 PM	0	53	0	0	0	0	0	0	3	64	0	0	0	0	2	0	122
05:15 PM	0	71	0	0	0	0	0	0	4	35	0	0	0	0	2	0	112
05:30 PM	0	43	1	0	0	0	0	0	5	45	0	0	0	0	7	0	101
05:45 PM	0	43	0	0	0	0	0	0	5	45	0	0	0	0	2	0	95
Total	0	210	1	0	0	0	0	0	17	189	0	0	0	0	13	0	430
Grand Total	0	652	6	2	0	0	0	0	44	676	2	0	7	1	58	0	1448
Apprch %	0.0	98.8	0.9	0.3	0.0	0.0	0.0	0.0	6.1	93.6	0.3	0.0	10.6	1.5	87.9	0.0	
Total %	0.0	45.0	0.4	0.1	0.0	0.0	0.0	0.0	3.0	46.7	0.1	0.0	0.5	0.1	4.0	0.0	

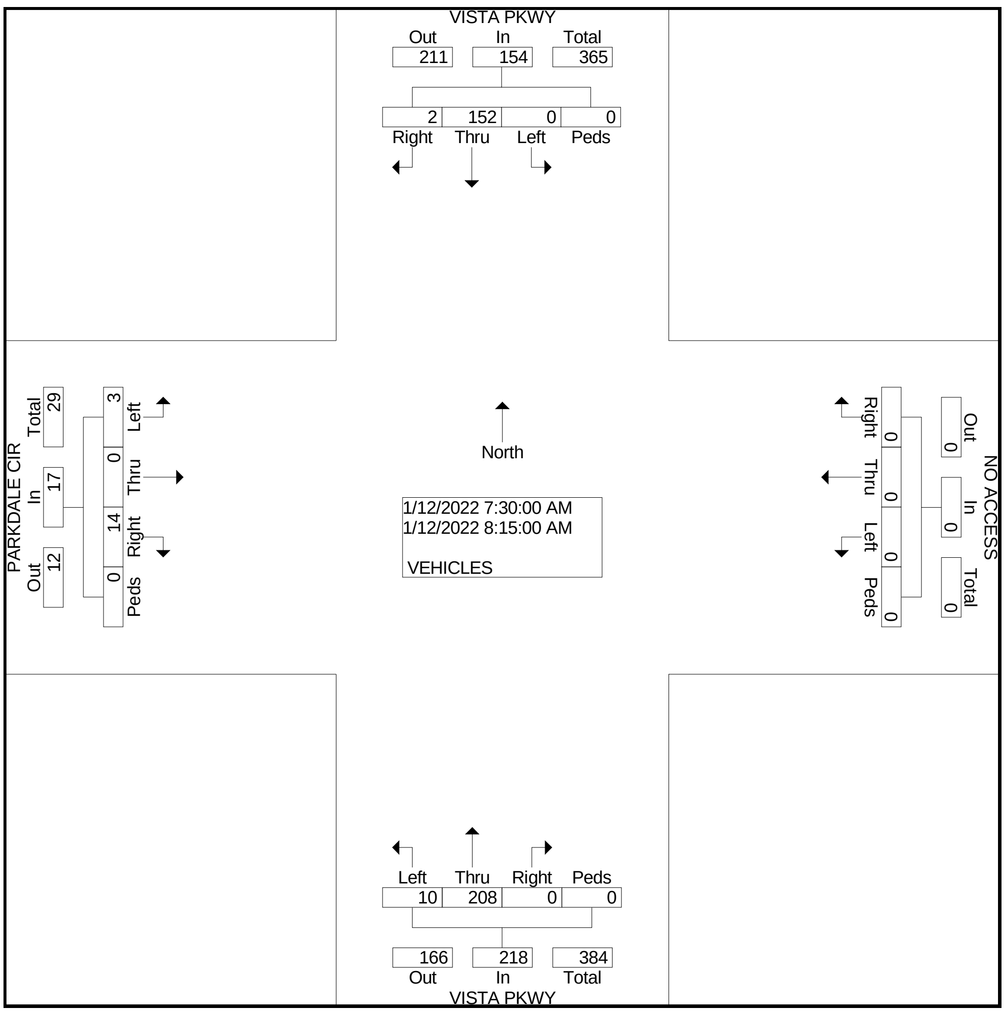
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: VISTA PKWY
E/W STREET: PARKDALE CIR
CITY: ERIE
COUNTY: BOULDER

File Name : VISTPARKDALE
Site Code : 00000020
Start Date : 1/12/2022

	VISTA PKWY Southbound					NO ACCESS Westbound					VISTA PKWY Northbound					PARKDALE CIR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	0	152	2	0	154	0	0	0	0	0	10	208	0	0	218	3	0	14	0	17	389
Percent	0.0	98.7	1.3	0.0		0.0	0.0	0.0	0.0		4.6	95.4	0.0	0.0		17.6	0.0	82.4	0.0		
07:45 Volume	0	46	0	0	46	0	0	0	0	0	2	62	0	0	64	0	0	3	0	3	113
Peak Factor																					0.861
High Int.	07:45 AM										07:30 AM					07:30 AM					
Volume	0	46	0	0	46	0	0	0	0	0	3	69	0	0	72	0	0	7	0	7	
Peak Factor					0.837										0.757					0.607	



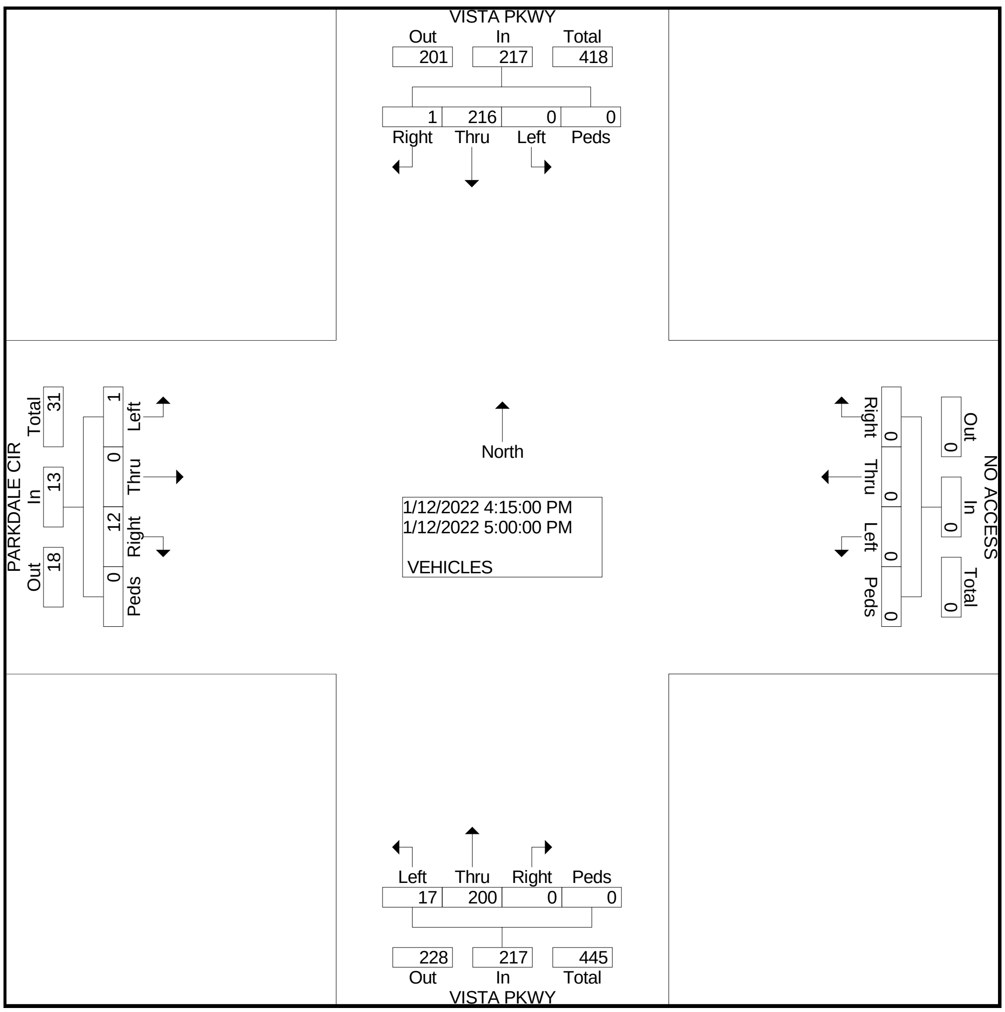
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: VISTA PKWY
E/W STREET: PARKDALE CIR
CITY: ERIE
COUNTY: BOULDER

File Name : VISTPARKDALE
Site Code : 00000020
Start Date : 1/12/2022
Page No : 3

	VISTA PKWY Southbound					NO ACCESS Westbound					VISTA PKWY Northbound					PARKDALE CIR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:15 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	0	216	1	0	217	0	0	0	0	0	17	200	0	0	217	1	0	12	0	13	447
Percent	0.0	99.5	0.5	0.0		0.0	0.0	0.0	0.0		7.8	92.2	0.0	0.0		7.7	0.0	92.3	0.0		
04:45 Volume	0	63	1	0	64	0	0	0	0	0	6	64	0	0	70	1	0	3	0	4	138
Peak Factor																					0.810
High Int.	04:45 PM										04:45 PM					04:30 PM					
Volume	0	63	1	0	64	0	0	0	0	0	6	64	0	0	70	0	0	4	0	4	
Peak Factor					0.848										0.775					0.813	



COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: SHERIDAN PKWY
E/W STREET: E. BASELINE RD
CITY: ERIE
COUNTY: BOULDER

File Name : SHEREBASEAM
Site Code : 00000011
Start Date : 1/5/2022
Page No : 1

Groups Printed- VEHICLES

	SHERIDAN PKWY Southbound				E. BASELINE RD Westbound				SHERIDAN PKWY Northbound				E. BASELINE RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	22	20	3	0	18	131	21	0	4	7	16	0	2	92	2	0	338
06:45 AM	41	19	5	0	38	139	23	0	5	15	15	0	1	76	8	0	385
Total	63	39	8	0	56	270	44	0	9	22	31	0	3	168	10	0	723
07:00 AM	28	24	2	0	31	131	14	0	6	23	25	0	1	104	5	0	394
07:15 AM	34	37	6	0	28	163	23	0	8	19	17	0	3	103	8	0	449
07:30 AM	39	46	7	0	60	172	31	0	12	16	23	0	3	120	17	0	546
07:45 AM	33	50	11	0	45	182	39	0	18	33	27	0	7	117	44	0	606
Total	134	157	26	0	164	648	107	0	44	91	92	0	14	444	74	0	1995
08:00 AM	64	59	13	0	44	162	48	0	21	33	30	0	8	123	20	0	625
08:15 AM	38	41	7	0	28	146	41	0	12	25	35	0	5	116	9	0	503
Grand Total	299	296	54	0	292	1226	240	0	86	171	188	0	30	851	113	0	3846
Apprch %	46.1	45.6	8.3	0.0	16.6	69.7	13.7	0.0	19.3	38.4	42.2	0.0	3.0	85.6	11.4	0.0	
Total %	7.8	7.7	1.4	0.0	7.6	31.9	6.2	0.0	2.2	4.4	4.9	0.0	0.8	22.1	2.9	0.0	

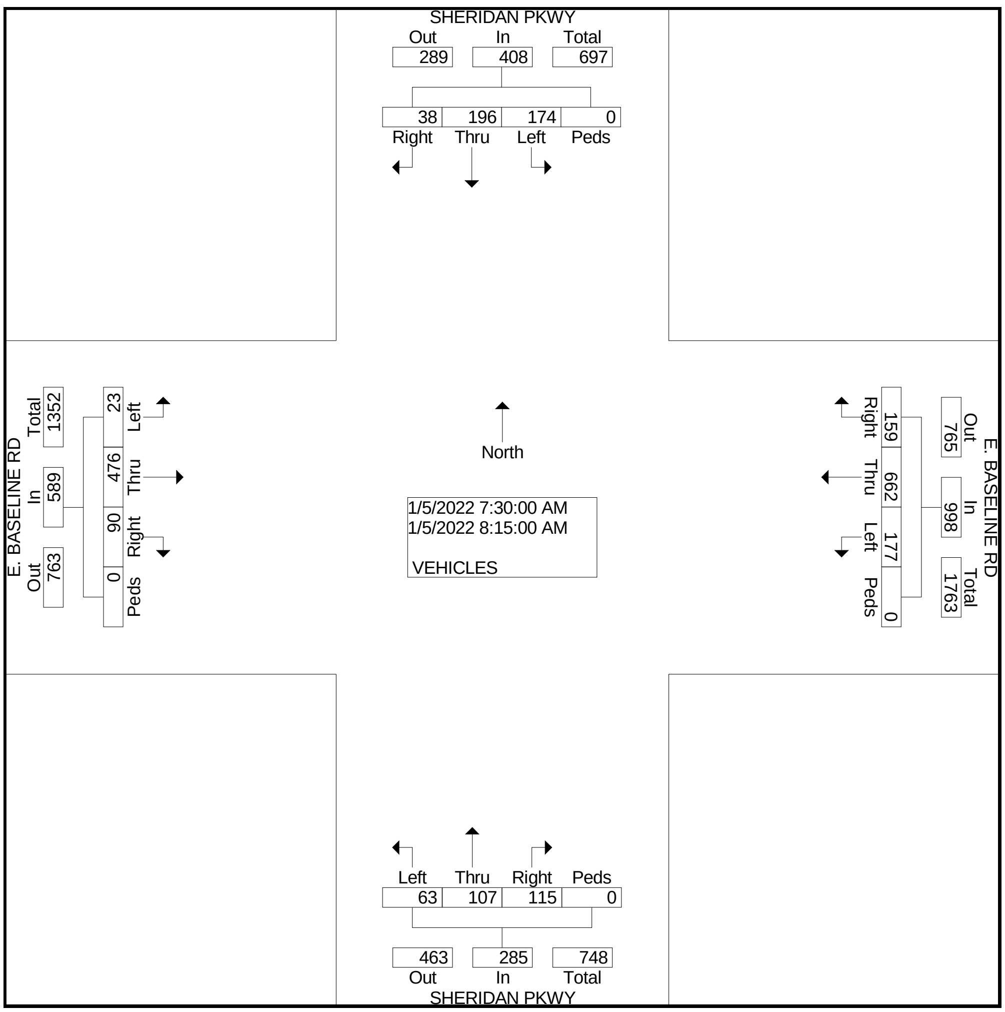
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: SHERIDAN PKWY
E/W STREET: E. BASELINE RD
CITY: ERIE
COUNTY: BOULDER

File Name : SHEREBASEAM
Site Code : 00000011
Start Date : 1/5/2022

	SHERIDAN PKWY Southbound					E. BASELINE RD Westbound					SHERIDAN PKWY Northbound					E. BASELINE RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	174	196	38	0	408	177	662	159	0	998	63	107	115	0	285	23	476	90	0	589	2280
Percent	42.6	48.0	9.3	0.0		17.7	66.3	15.9	0.0		22.1	37.5	40.4	0.0		3.9	80.8	15.3	0.0		
08:00 Volume	64	59	13	0	136	44	162	48	0	254	21	33	30	0	84	8	123	20	0	151	625
Peak Factor																					0.912
High Int.	08:00 AM					07:45 AM					08:00 AM					07:45 AM					
Volume	64	59	13	0	136	45	182	39	0	266	21	33	30	0	84	7	117	44	0	168	
Peak Factor					0.750					0.938					0.848					0.876	



COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: SHERIDAN PKWY
E/W STREET: E. BASELINE RD
CITY: ERIE
COUNTY: BOULDER

File Name : SHEREBASEPM
Site Code : 00000011
Start Date : 1/11/2022
Page No : 1

Groups Printed- VEHICLES

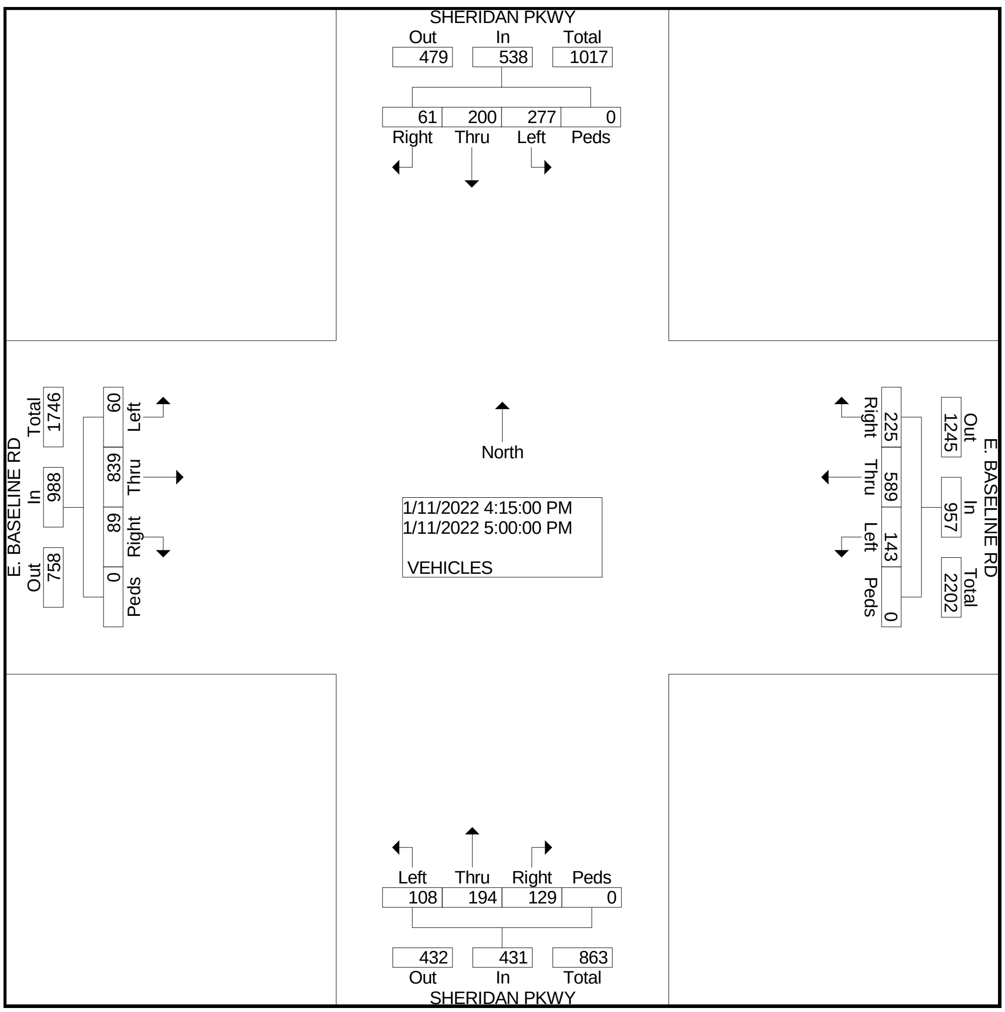
	SHERIDAN PKWY Southbound				E. BASELINE RD Westbound				SHERIDAN PKWY Northbound				E. BASELINE RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	65	49	10	0	37	153	59	4	31	44	38	0	18	167	14	0	689
04:15 PM	68	33	13	0	38	149	52	0	27	47	35	0	11	216	20	0	709
04:30 PM	74	63	12	0	33	131	48	0	27	42	32	0	11	217	19	0	709
04:45 PM	60	49	18	0	33	154	54	0	24	58	29	0	16	205	27	0	727
Total	267	194	53	0	141	587	213	4	109	191	134	0	56	805	80	0	2834
05:00 PM	75	55	18	0	39	155	71	0	30	47	33	0	22	201	23	0	769
05:15 PM	58	57	10	0	33	172	49	0	13	43	29	0	16	189	18	0	687
05:30 PM	62	42	8	0	32	147	53	0	18	46	31	0	21	208	20	0	688
05:45 PM	54	42	14	0	26	151	46	0	10	43	34	0	12	165	13	0	610
Total	249	196	50	0	130	625	219	0	71	179	127	0	71	763	74	0	2754
Grand Total	516	390	103	0	271	1212	432	4	180	370	261	0	127	1568	154	0	5588
Apprch %	51.1	38.7	10.2	0.0	14.1	63.2	22.5	0.2	22.2	45.6	32.2	0.0	6.9	84.8	8.3	0.0	
Total %	9.2	7.0	1.8	0.0	4.8	21.7	7.7	0.1	3.2	6.6	4.7	0.0	2.3	28.1	2.8	0.0	

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: SHERIDAN PKWY
E/W STREET: E. BASELINE RD
CITY: ERIE
COUNTY: BOULDER

File Name : SHEREBASEPM
Site Code : 00000011
Start Date : 1/11/2022
Page No : 2

	SHERIDAN PKWY Southbound					E. BASELINE RD Westbound					SHERIDAN PKWY Northbound					E. BASELINE RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	277	200	61	0	538	143	589	225	0	957	108	194	129	0	431	60	839	89	0	988	2914
Percent	51.5	37.2	11.3	0.0		14.9	61.5	23.5	0.0		25.1	45.0	29.9	0.0		6.1	84.9	9.0	0.0		
05:00 Volume	75	55	18	0	148	39	155	71	0	265	30	47	33	0	110	22	201	23	0	246	769
Peak Factor																					0.947
High Int.	04:30 PM					05:00 PM					04:45 PM					04:45 PM					
Volume	74	63	12	0	149	39	155	71	0	265	24	58	29	0	111	16	205	27	0	248	
Peak Factor					0.903					0.903					0.971					0.996	



COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: COUNTY RD 4 E-O CR 5
City: ERIE
County: BOULDER
Direction: EAST/WEST

Site Code: 220307
Station ID: 220307

Start Time	04-Jan-22 Tue	EAST	WEST							Total
12:00 AM		2	2							4
01:00		9	4							13
02:00		1	3							4
03:00		1	1							2
04:00		2	4							6
05:00		25	22							47
06:00		50	59							109
07:00		83	125							208
08:00		113	131							244
09:00		88	118							206
10:00		111	120							231
11:00		**130**	**156**							**286**
12:00 PM		171	156							327
01:00		168	153							321
02:00		150	129							279
03:00		183	168							351
04:00		**198**	**192**							**390**
05:00		178	159							337
06:00		135	96							231
07:00		98	46							144
08:00		57	64							121
09:00		38	19							57
10:00		12	8							20
11:00		2	0							2
Total		2005	1935							3940
Percent		50.9%	49.1%							
AM Peak	-	11:00	11:00	-	-	-	-	-	-	11:00
Vol.	-	130	156	-	-	-	-	-	-	286
PM Peak	-	16:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	198	192	-	-	-	-	-	-	390
Grand Total		2005	1935							3940
Percent		50.9%	49.1%							
ADT		ADT 3,940		AADT 3,940						

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: COUNTY RD 5 N-O CR 4
City: ERIE
County: BOULDER
Direction: NORTH/SOUTH

Site Code: 220305
Station ID: 220305

Start Time	04-Jan-22 Tue	NORTH	SOUTH							Total
12:00 AM		5	4							9
01:00		8	6							14
02:00		1	5							6
03:00		2	3							5
04:00		5	3							8
05:00		33	19							52
06:00		76	61							137
07:00		132	132							264
08:00		**157**	157							314
09:00		115	133							248
10:00		136	148							284
11:00		155	**165**							**320**
12:00 PM		192	183							375
01:00		189	166							355
02:00		188	146							334
03:00		213	220							433
04:00		**248**	**238**							**486**
05:00		220	213							433
06:00		181	132							313
07:00		129	73							202
08:00		70	111							181
09:00		33	42							75
10:00		19	13							32
11:00		2	4							6
Total		2509	2377							4886
Percent		51.4%	48.6%							
AM Peak	-	08:00	11:00	-	-	-	-	-	-	11:00
Vol.	-	157	165	-	-	-	-	-	-	320
PM Peak	-	16:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	248	238	-	-	-	-	-	-	486
Grand Total		2509	2377							4886
Percent		51.4%	48.6%							
ADT		ADT 4,886		AADT 4,886						

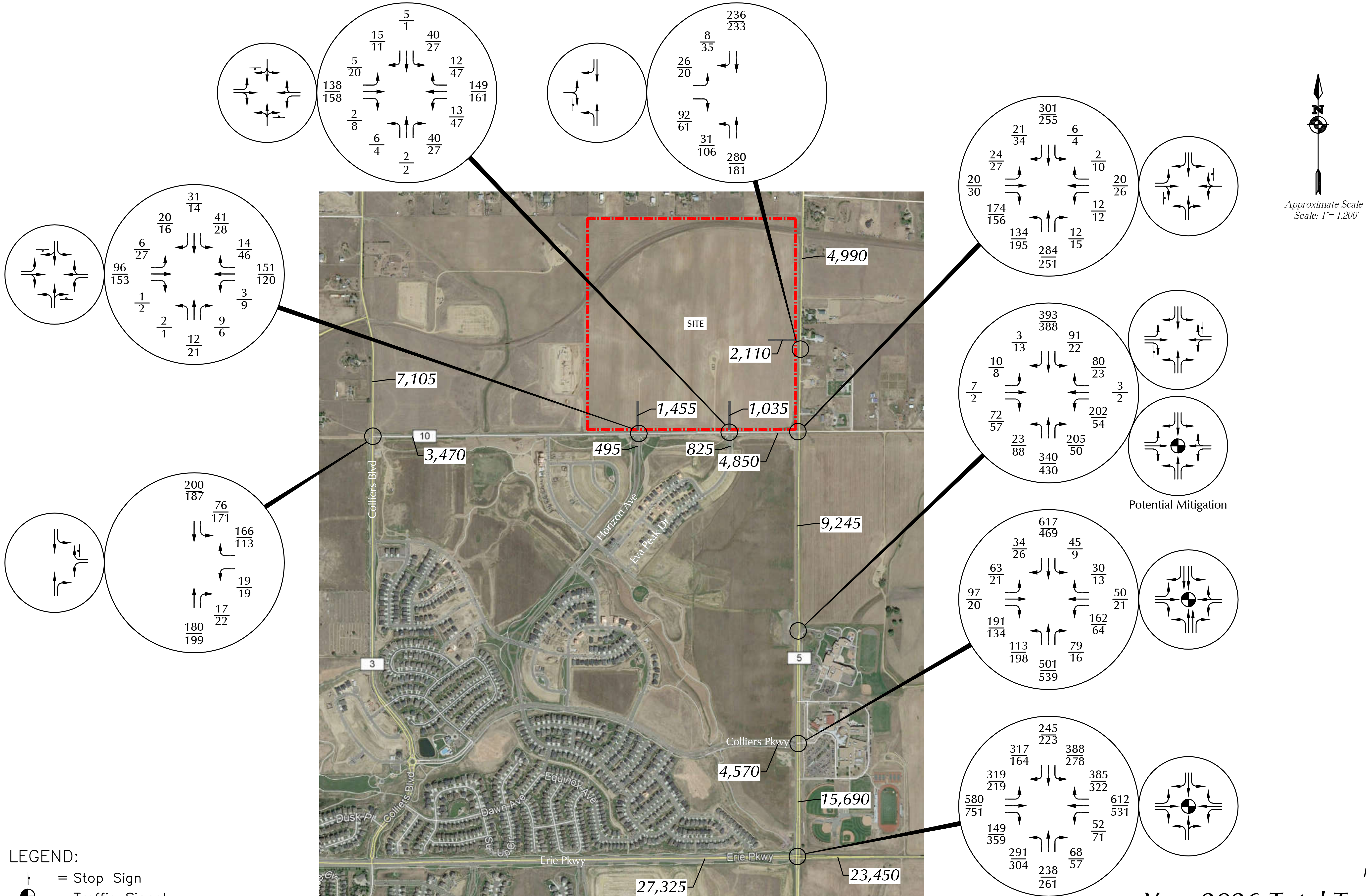
COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: VISTA PKWY E-O COUNTYLINE RD
City: ERIE
County: BOULDER
Direction: EAST/WEST

Site Code: 220320
Station ID: 220320

Start Time	04-Jan-22 Tue	EAST	WEST							Total
12:00 AM		1	6							7
01:00		2	0							2
02:00		2	4							6
03:00		3	1							4
04:00		7	0							7
05:00		29	3							32
06:00		71	14							85
07:00		167	65							232
08:00		**170**	82							**252**
09:00		120	77							197
10:00		136	102							238
11:00		133	**111**							244
12:00 PM		150	143							293
01:00		141	142							283
02:00		136	112							248
03:00		165	180							345
04:00		**170**	**272**							**442**
05:00		132	252							384
06:00		111	141							252
07:00		68	82							150
08:00		60	64							124
09:00		35	44							79
10:00		14	21							35
11:00		10	6							16
Total		2033	1924							3957
Percent		51.4%	48.6%							
AM Peak	-	08:00	11:00	-	-	-	-	-	-	08:00
Vol.	-	170	111	-	-	-	-	-	-	252
PM Peak	-	16:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	170	272	-	-	-	-	-	-	442
Grand Total		2033	1924							3957
Percent		51.4%	48.6%							

ADT	ADT 3,957	AADT 3,957



LEGEND:

= Stop Sign

= Traffic Signal

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

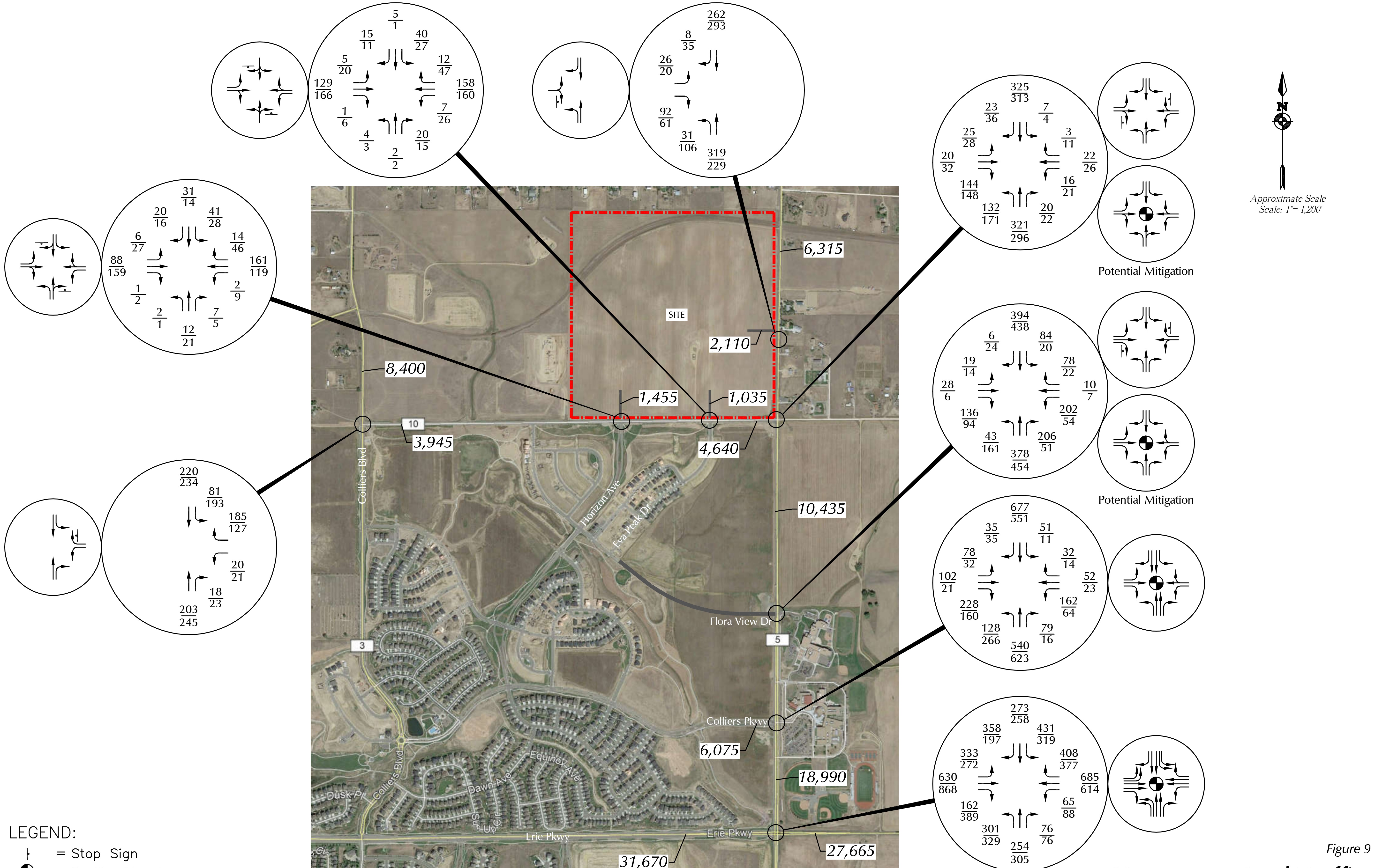
1,000 = Average Daily Traffic

LSC TRANSPORTATION CONSULTANTS, INC.

Figure 8

Year 2026 Total Traffic, Lane Geometry and Traffic Control

Colliers Hill Filing 6 (LSC #200870)



LEGEND:

= Stop Sign

= Traffic Signal

$\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

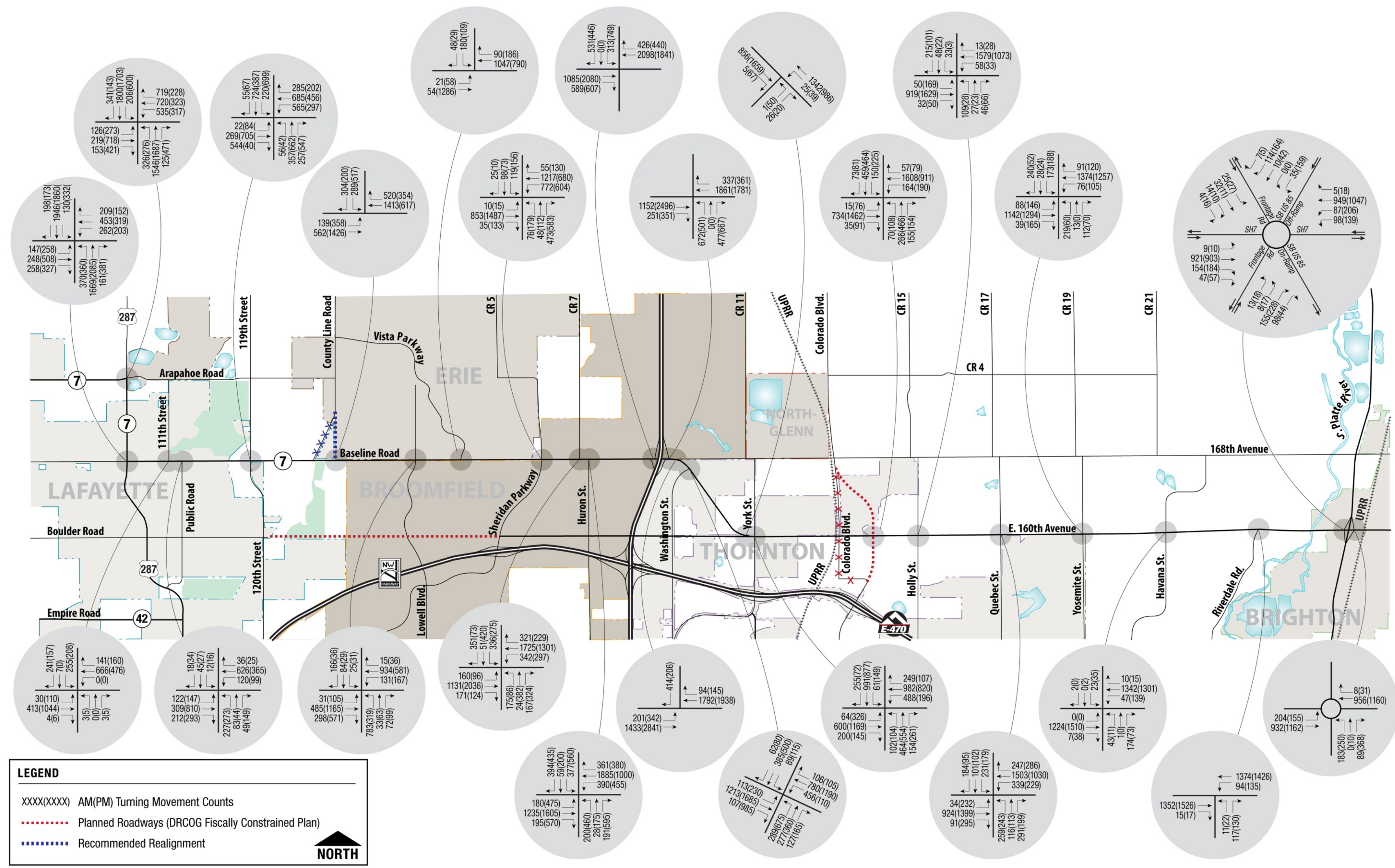
LSC TRANSPORTATION CONSULTANTS, INC.

Figure 9

Year 2040 Total Traffic, Lane Geometry and Traffic Control

Colliers Hill Filing 6 (LSC #200870)

Figure 4.10 2035 Recommended Alternative AM and PM Peak Hour Turning Movement Forecasts



LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2016, 6th Edition

SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

LOS	Average Vehicle Delay sec/vehicle	Operational Characteristics
A	<10 seconds	Describes operations with low control delay, up to 10 sec/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	10 to 20 seconds	Describes operations with control delay greater than 10 seconds and up to 20 sec/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	20 to 35 seconds	Describes operations with control delay greater than 20 and up to 35 sec/veh. These higher delays may result from only fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	35 to 55 seconds	Describes operations with control delay greater than 35 and up to 55 sec/veh. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	55 to 80 seconds	Describes operations with control delay greater than 55 and up to 80 sec/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.
F	>80 seconds	Describes operations with control delay in excess of 80 sec/veh. This level, considered unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2016, 6th Edition

UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

Applicable to Two-Way Stop Control, All-Way Stop Control, and Roundabouts

LOS	Average Vehicle Control Delay	Operational Characteristics
A	<10 seconds	Normally, vehicles on the stop-controlled approach only have to wait up to 10 seconds before being able to clear the intersection. Left-turning vehicles on the uncontrolled street do not have to wait to make their turn.
B	10 to 15 seconds	Vehicles on the stop-controlled approach will experience delays before being able to clear the intersection. The delay could be up to 15 seconds. Left-turning vehicles on the uncontrolled street may have to wait to make their turn.
C	15 to 25 seconds	Vehicles on the stop-controlled approach can expect delays in the range of 15 to 25 seconds before clearing the intersection. Motorists may begin to take chances due to the long delays, thereby posing a safety risk to through traffic. Left-turning vehicles on the uncontrolled street will now be required to wait to make their turn causing a queue to be created in the turn lane.
D	25 to 35 seconds	This is the point at which a traffic signal may be warranted for this intersection. The delays for the stop-controlled intersection are not considered to be excessive. The length of the queue may begin to block other public and private access points.
E	35 to 50 seconds	The delays for all critical traffic movements are considered to be unacceptable. The length of the queues for the stop-controlled approaches as well as the left-turn movements are extremely long. There is a high probability that this intersection will meet traffic signal warrants. The ability to install a traffic signal is affected by the location of other existing traffic signals. Consideration may be given to restricting the accesses by eliminating the left-turn movements from and to the stop-controlled approach.
F	>50 seconds	The delay for the critical traffic movements are probably in excess of 100 seconds. The length of the queues are extremely long. Motorists are selecting alternative routes due to the long delays. The only remedy for these long delays is installing a traffic signal or restricting the accesses. The potential for accidents at this intersection are extremely high due to motorist taking more risky chances. If the median permits, motorists begin making two-stage left-turns.

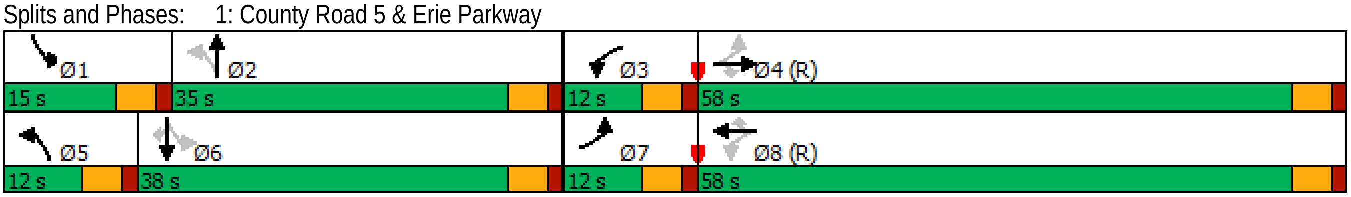
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	278	96	35	324	236	58	245	15	161	143	137
Future Volume (vph)	218	278	96	35	324	236	58	245	15	161	143	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1848	0	1770	1863	1583
Flt Permitted	0.411			0.549			0.619			0.226		
Satd. Flow (perm)	766	1863	1583	1023	1863	1583	1153	1848	0	421	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			268		2				156
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		13.1			15.0			9.8			7.5	
Peak Hour Factor	0.88	0.92	0.92	0.92	0.92	0.88	0.92	0.88	0.92	0.88	0.88	0.88
Adj. Flow (vph)	248	302	104	38	352	268	63	278	16	183	163	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	248	302	104	38	352	268	63	294	0	183	163	156
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0		10.0	23.0	23.0
Total Split (s)	12.0	58.0	58.0	12.0	58.0	58.0	12.0	35.0		15.0	38.0	38.0
Total Split (%)	10.0%	48.3%	48.3%	10.0%	48.3%	48.3%	10.0%	29.2%		12.5%	31.7%	31.7%
Maximum Green (s)	7.0	53.0	53.0	7.0	53.0	53.0	7.0	30.0		10.0	33.0	33.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	72.5	66.1	66.1	66.7	58.3	58.3	34.6	25.8		40.8	31.2	31.2
Actuated g/C Ratio	0.60	0.55	0.55	0.56	0.49	0.49	0.29	0.22		0.34	0.26	0.26
v/c Ratio	0.44	0.29	0.11	0.06	0.39	0.30	0.17	0.74		0.66	0.34	0.30
Control Delay	14.6	17.6	3.4	11.2	22.1	3.1	26.7	54.6		40.2	38.0	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	14.6	17.6	3.4	11.2	22.1	3.1	26.7	54.6		40.2	38.0	6.6
LOS	B	B	A	B	C	A	C	D		D	D	A
Approach Delay		14.2			13.7			49.7			29.0	
Approach LOS		B			B			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 57 (48%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 23.3 Intersection LOS: C
Intersection Capacity Utilization 65.2% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	3.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	0	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	18	0	237	167
Demand Flow Rate, veh/h	18	0	242	170
Vehicles Circulating, veh/h	168	245	3	11
Vehicles Exiting, veh/h	13	0	183	234
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	0.0	4.1	3.7
Approach LOS	-	-	A	A

Lane	Left	Left
Designated Moves	L	R
Assumed Moves	L	R
RT Channelized		
Lane Util	1.000	1.000
Follow-Up Headway, s	2.609	2.609
Critical Headway, s	4.976	4.976
Entry Flow, veh/h	242	170
Cap Entry Lane, veh/h	1376	1364
Entry HV Adj Factor	0.981	0.981
Flow Entry, veh/h	237	167
Cap Entry, veh/h	1350	1338
V/C Ratio	0.176	0.125
Control Delay, s/veh	4.1	3.7
LOS	A	A
95th %tile Queue, veh	1	0

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	10	5	510	420	35
Future Vol, veh/h	40	10	5	510	420	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	11	5	554	457	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1021	457	495	0	-	0
Stage 1	457	-	-	-	-	-
Stage 2	564	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	262	604	1069	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	569	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	261	604	1069	-	-	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	569	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	19.4		0.1		0	
HCM LOS	C					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1069	-	261	604	-	-
HCM Lane V/C Ratio	0.005	-	0.167	0.018	-	-
HCM Control Delay (s)	8.4	-	21.5	11.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	0.1	-	-

Intersection	
Intersection Delay, s/veh	14
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	278	206	20	244	156
Future Vol, veh/h	1	278	206	20	244	156
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	302	224	22	265	170
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	11.9	11.4	16.9
HCM LOS	B	B	C

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	61%
Vol Thru, %	91%	0%	39%
Vol Right, %	9%	100%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	226	279	400
LT Vol	0	1	244
Through Vol	206	0	156
RT Vol	20	278	0
Lane Flow Rate	246	303	435
Geometry Grp	1	1	1
Degree of Util (X)	0.364	0.428	0.633
Departure Headway (Hd)	5.33	5.077	5.24
Convergence, Y/N	Yes	Yes	Yes
Cap	676	707	691
Service Time	3.367	3.118	3.272
HCM Lane V/C Ratio	0.364	0.429	0.63
HCM Control Delay	11.4	11.9	16.9
HCM Lane LOS	B	B	C
HCM 95th-tile Q	1.7	2.2	4.5

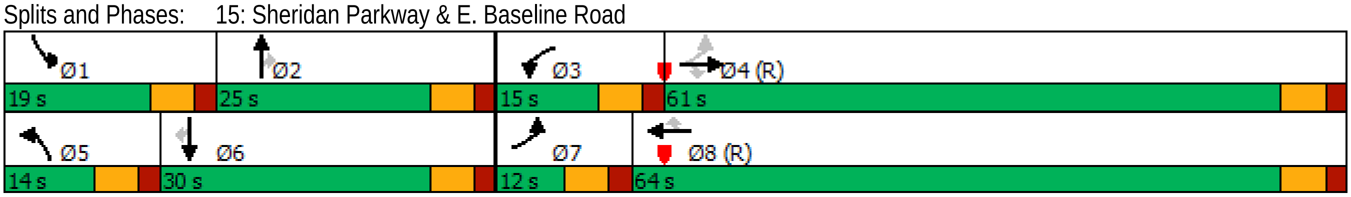
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	476	90	177	566	159	63	107	115	174	196	38
Future Volume (vph)	23	476	90	177	566	159	63	107	115	174	196	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.419			0.950			0.950			0.950		
Satd. Flow (perm)	780	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			173			136			136
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	517	98	192	615	173	68	116	125	189	213	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	517	98	192	615	173	68	116	125	189	213	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	24.0	24.0	11.0	24.0	24.0	11.0	24.0	24.0	11.0	24.0	24.0
Total Split (s)	12.0	61.0	61.0	15.0	64.0	64.0	14.0	25.0	25.0	19.0	30.0	30.0
Total Split (%)	10.0%	50.8%	50.8%	12.5%	53.3%	53.3%	11.7%	20.8%	20.8%	15.8%	25.0%	25.0%
Maximum Green (s)	6.0	55.0	55.0	9.0	58.0	58.0	8.0	19.0	19.0	13.0	24.0	24.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	73.4	65.3	65.3	14.0	75.9	75.9	9.3	11.3	11.3	13.4	17.7	17.7
Actuated g/C Ratio	0.61	0.54	0.54	0.12	0.63	0.63	0.08	0.09	0.09	0.11	0.15	0.15
v/c Ratio	0.05	0.51	0.11	0.48	0.27	0.16	0.26	0.35	0.46	0.49	0.41	0.12
Control Delay	7.3	20.7	1.3	53.3	11.5	2.2	54.3	53.4	12.5	54.4	49.3	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	20.7	1.3	53.3	11.5	2.2	54.3	53.4	12.5	54.4	49.3	0.7
LOS	A	C	A	D	B	A	D	D	B	D	D	A
Approach Delay		17.2			18.1			37.0			47.0	
Approach LOS		B			B			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 43 (36%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 25.7 Intersection LOS: C
Intersection Capacity Utilization 53.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road

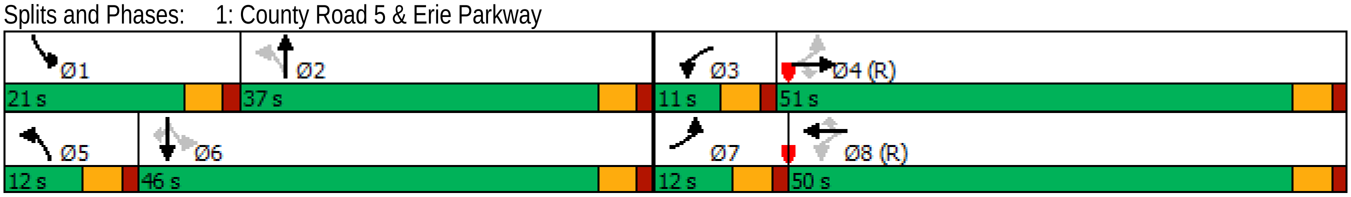


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	376	131	14	296	116	113	153	29	118	136	121
Future Volume (vph)	108	376	131	14	296	116	113	153	29	118	136	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.976				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1818	0	1770	1863	1583
Flt Permitted	0.468			0.486			0.649			0.291		
Satd. Flow (perm)	872	1863	1583	905	1863	1583	1209	1818	0	542	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			155		8				132
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		13.1			15.0			9.8			7.5	
Peak Hour Factor	0.92	0.95	0.92	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	396	142	15	312	126	123	166	32	128	148	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	396	142	15	312	126	123	198	0	128	148	132
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	57.0	57.0	10.0	57.0	57.0	10.0	23.0		10.0	23.0	23.0
Total Split (s)	12.0	51.0	51.0	11.0	50.0	50.0	12.0	37.0		21.0	46.0	46.0
Total Split (%)	10.0%	42.5%	42.5%	9.2%	41.7%	41.7%	10.0%	30.8%		17.5%	38.3%	38.3%
Maximum Green (s)	7.0	46.0	46.0	6.0	45.0	45.0	7.0	32.0		16.0	41.0	41.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	77.0	72.4	72.4	71.2	63.3	63.3	28.9	19.9		36.6	25.0	25.0
Actuated g/C Ratio	0.64	0.60	0.60	0.59	0.53	0.53	0.24	0.17		0.30	0.21	0.21
v/c Ratio	0.18	0.35	0.14	0.03	0.32	0.14	0.37	0.64		0.41	0.38	0.30
Control Delay	10.5	15.7	2.5	10.6	19.3	2.1	32.8	53.9		33.3	41.9	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	10.5	15.7	2.5	10.6	19.3	2.1	32.8	53.9		33.3	41.9	7.5
LOS	B	B	A	B	B	A	C	D		C	D	A
Approach Delay		11.9			14.2			45.8			28.1	
Approach LOS		B			B			D			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 22.0	Intersection LOS: C
Intersection Capacity Utilization 53.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	4.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	0	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	14	0	235	236
Demand Flow Rate, veh/h	14	0	239	241
Vehicles Circulating, veh/h	240	240	1	18
Vehicles Exiting, veh/h	19	0	253	222
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	0.0	4.1	4.2
Approach LOS	-	-	A	A

Lane	Left	Left
Designated Moves	L	R
Assumed Moves	L	R
RT Channelized		
Lane Util	1.000	1.000
Follow-Up Headway, s	2.609	2.609
Critical Headway, s	4.976	4.976
Entry Flow, veh/h	239	241
Cap Entry Lane, veh/h	1378	1355
Entry HV Adj Factor	0.982	0.980
Flow Entry, veh/h	235	236
Cap Entry, veh/h	1353	1328
V/C Ratio	0.173	0.178
Control Delay, s/veh	4.1	4.2
LOS	A	A
95th %tile Queue, veh	1	1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	5	10	385	450	40
Future Vol, veh/h	35	5	10	385	450	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	5	11	418	489	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	929	489	532	0	-	0
Stage 1	489	-	-	-	-	-
Stage 2	440	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	297	579	1036	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	294	579	1036	-	-	-
Mov Cap-2 Maneuver	294	-	-	-	-	-
Stage 1	609	-	-	-	-	-
Stage 2	649	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1036	-	294	579	-	-
HCM Lane V/C Ratio	0.01	-	0.129	0.009	-	-
HCM Control Delay (s)	8.5	-	19.1	11.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	0	-	-

Intersection	
Intersection Delay, s/veh	14
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	282	84	10	306	120
Future Vol, veh/h	19	282	84	10	306	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	307	91	11	333	130
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	11.5	9.3	16.8
HCM LOS	B	A	C

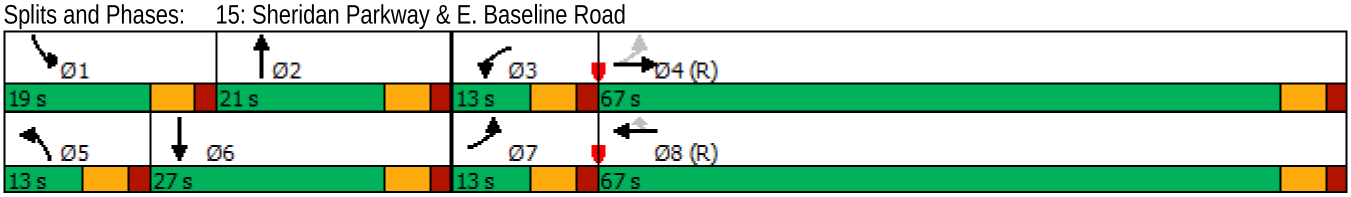
Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	6%	72%
Vol Thru, %	89%	0%	28%
Vol Right, %	11%	94%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	94	301	426
LT Vol	0	19	306
Through Vol	84	0	120
RT Vol	10	282	0
Lane Flow Rate	102	327	463
Geometry Grp	1	1	1
Degree of Util (X)	0.153	0.434	0.642
Departure Headway (Hd)	5.379	4.78	4.993
Convergence, Y/N	Yes	Yes	Yes
Cap	671	746	713
Service Time	3.379	2.864	3.091
HCM Lane V/C Ratio	0.152	0.438	0.649
HCM Control Delay	9.3	11.5	16.8
HCM Lane LOS	A	B	C
HCM 95th-tile Q	0.5	2.2	4.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	839	89	143	589	225	108	194	129	277	200	61
Future Volume (vph)	60	839	89	143	589	225	108	194	129	277	200	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.375			0.950			0.950			0.950		
Satd. Flow (perm)	699	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			245			191			191
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	883	97	155	640	245	117	211	140	301	217	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	883	97	155	640	245	117	211	140	301	217	66
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			8			Free			Free

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0		11.0	24.0	
Total Split (s)	13.0	67.0		13.0	67.0	67.0	13.0	21.0		19.0	27.0	
Total Split (%)	10.8%	55.8%		10.8%	55.8%	55.8%	10.8%	17.5%		15.8%	22.5%	
Maximum Green (s)	7.0	61.0		7.0	61.0	61.0	7.0	15.0		13.0	21.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-3.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	3.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	73.3	65.6	120.0	10.4	68.6	68.6	9.0	14.3	120.0	14.7	20.0	120.0
Actuated g/C Ratio	0.61	0.55	1.00	0.09	0.57	0.57	0.08	0.12	1.00	0.12	0.17	1.00
v/c Ratio	0.13	0.87	0.06	0.52	0.32	0.24	0.46	0.50	0.09	0.71	0.37	0.04
Control Delay	8.6	34.9	0.1	59.3	15.0	2.4	59.3	53.4	0.1	60.8	45.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	34.9	0.1	59.3	15.0	2.4	59.3	53.4	0.1	60.8	45.7	0.0
LOS	A	C	A	E	B	A	E	D	A	E	D	A
Approach Delay		30.0			18.6			39.0			48.3	
Approach LOS		C			B			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 59 (49%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 31.0	Intersection LOS: C
Intersection Capacity Utilization 74.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road



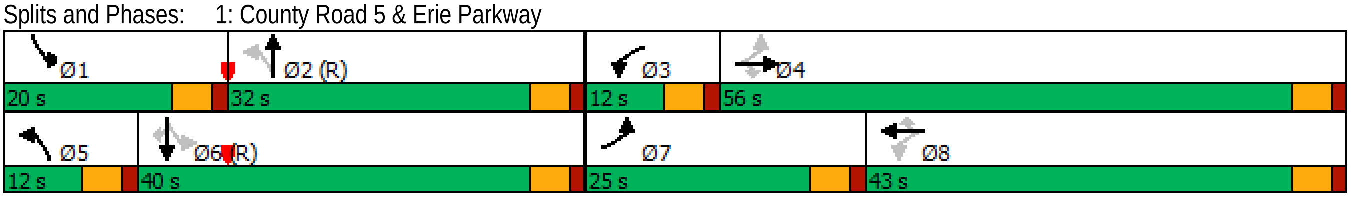
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	590	145	45	625	390	270	230	45	395	245	320
Future Volume (vph)	325	590	145	45	625	390	270	230	45	395	245	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.977				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1820	0	1770	1863	1583
Flt Permitted	0.091			0.257			0.508			0.230		
Satd. Flow (perm)	170	1863	1583	479	1863	1583	946	1820	0	428	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			386		7				343
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		13.1			15.0			9.8			7.5	
Peak Hour Factor	0.88	0.95	0.95	0.95	0.95	0.88	0.95	0.90	0.95	0.88	0.90	0.88
Adj. Flow (vph)	369	621	153	47	658	443	284	256	47	449	272	364
Shared Lane Traffic (%)												
Lane Group Flow (vph)	369	621	153	47	658	443	284	303	0	449	272	364
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0		10.0	23.0	23.0
Total Split (s)	25.0	56.0	56.0	12.0	43.0	43.0	12.0	32.0		20.0	40.0	40.0
Total Split (%)	20.8%	46.7%	46.7%	10.0%	35.8%	35.8%	10.0%	26.7%		16.7%	33.3%	33.3%
Maximum Green (s)	20.0	51.0	51.0	7.0	38.0	38.0	7.0	27.0		15.0	35.0	35.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	65.0	55.5	55.5	48.6	40.0	40.0	38.0	29.0		49.0	37.0	37.0
Actuated g/C Ratio	0.54	0.46	0.46	0.40	0.33	0.33	0.32	0.24		0.41	0.31	0.31
v/c Ratio	0.96	0.72	0.19	0.16	1.06	0.56	0.79	0.68		1.23	0.47	0.50
Control Delay	71.2	32.8	3.6	15.6	92.0	8.2	46.9	49.2		154.3	37.0	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	71.2	32.8	3.6	15.6	92.0	8.2	46.9	49.2		154.3	37.0	6.9
LOS	E	C	A	B	F	A	D	D		F	D	A
Approach Delay		41.3			56.5			48.1			75.4	
Approach LOS		D			E			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.23
Intersection Signal Delay: 56.1 Intersection LOS: E
Intersection Capacity Utilization 101.0% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	4.3
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	25	43	272	208
Demand Flow Rate, veh/h	25	44	277	213
Vehicles Circulating, veh/h	222	264	42	27
Vehicles Exiting, veh/h	18	55	205	281
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	3.9	4.6	4.1
Approach LOS	-	A	A	A

Lane	Left	Left	Left
Designated Moves	T	L	R
Assumed Moves	T	L	R
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	44	277	213
Cap Entry Lane, veh/h	1054	1322	1342
Entry HV Adj Factor	0.975	0.982	0.978
Flow Entry, veh/h	43	272	208
Cap Entry, veh/h	1028	1299	1313
V/C Ratio	0.042	0.210	0.159
Control Delay, s/veh	3.9	4.6	4.1
LOS	A	A	A
95th %tile Queue, veh	0	1	1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	10	5	510	420	35
Future Vol, veh/h	40	10	5	510	420	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	11	5	554	457	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1021	457	495	0	-	0
Stage 1	457	-	-	-	-	-
Stage 2	564	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	262	604	1069	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	569	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	261	604	1069	-	-	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	569	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.4	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1069	-	261	604	-	-
HCM Lane V/C Ratio	0.005	-	0.167	0.018	-	-
HCM Control Delay (s)	8.4	-	21.5	11.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	0.1	-	-

Intersection	
Intersection Delay, s/veh	16
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	305	210	25	270	160
Future Vol, veh/h	5	305	210	25	270	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	332	228	27	293	174
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	13.2	12.1	20.1
HCM LOS	B	B	C

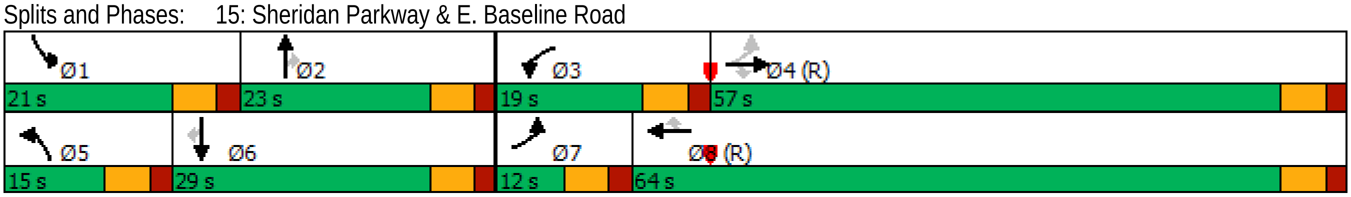
Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	2%	63%
Vol Thru, %	89%	0%	37%
Vol Right, %	11%	98%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	235	310	430
LT Vol	0	5	270
Through Vol	210	0	160
RT Vol	25	305	0
Lane Flow Rate	255	337	467
Geometry Grp	1	1	1
Degree of Util (X)	0.391	0.49	0.7
Departure Headway (Hd)	5.516	5.232	5.395
Convergence, Y/N	Yes	Yes	Yes
Cap	651	687	668
Service Time	3.565	3.281	3.435
HCM Lane V/C Ratio	0.392	0.491	0.699
HCM Control Delay	12.1	13.2	20.1
HCM Lane LOS	B	B	C
HCM 95th-tile Q	1.9	2.7	5.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	525	100	195	750	175	70	120	130	190	215	45
Future Volume (vph)	25	525	100	195	750	175	70	120	130	190	215	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.330			0.950			0.950			0.950		
Satd. Flow (perm)	615	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			190			191			191
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	571	109	212	815	190	76	130	141	207	234	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	571	109	212	815	190	76	130	141	207	234	49
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	24.0	24.0	11.0	24.0	24.0	11.0	24.0	24.0	11.0	24.0	24.0
Total Split (s)	12.0	57.0	57.0	19.0	64.0	64.0	15.0	23.0	23.0	21.0	29.0	29.0
Total Split (%)	10.0%	47.5%	47.5%	15.8%	53.3%	53.3%	12.5%	19.2%	19.2%	17.5%	24.2%	24.2%
Maximum Green (s)	6.0	51.0	51.0	13.0	58.0	58.0	9.0	17.0	17.0	15.0	23.0	23.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	71.4	63.2	63.2	14.7	74.4	74.4	9.8	11.8	11.8	14.3	18.7	18.7
Actuated g/C Ratio	0.60	0.53	0.53	0.12	0.62	0.62	0.08	0.10	0.10	0.12	0.16	0.16
v/c Ratio	0.06	0.58	0.12	0.51	0.37	0.18	0.27	0.37	0.43	0.51	0.43	0.12
Control Delay	8.2	23.9	0.3	53.2	13.3	2.3	53.9	53.3	6.3	53.6	48.8	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	23.9	0.3	53.2	13.3	2.3	53.9	53.3	6.3	53.6	48.8	0.6
LOS	A	C	A	D	B	A	D	D	A	D	D	A
Approach Delay		19.6			18.6			34.4			46.0	
Approach LOS		B			B			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 43 (36%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 56.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road

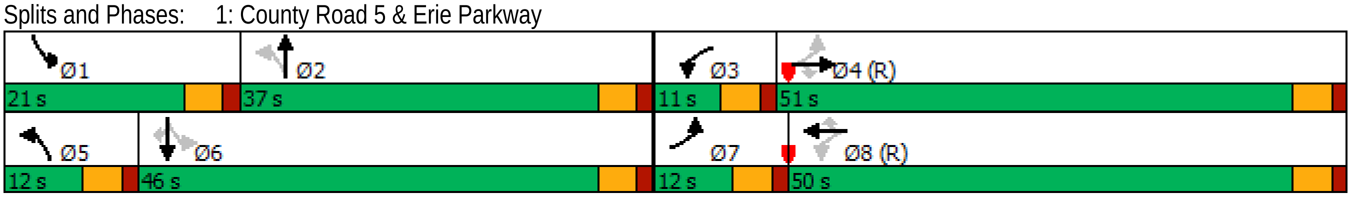


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	765	335	45	540	325	290	255	40	285	215	165
Future Volume (vph)	225	765	335	45	540	325	290	255	40	285	215	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.980				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1825	0	1770	1863	1583
Flt Permitted	0.157			0.083			0.600			0.195		
Satd. Flow (perm)	292	1863	1583	155	1863	1583	1118	1825	0	363	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			364			353		6				179
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		13.1			15.0			9.8			7.5	
Peak Hour Factor	0.92	0.95	0.92	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	805	364	49	568	353	315	277	43	310	234	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	245	805	364	49	568	353	315	320	0	310	234	179
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	57.0	57.0	10.0	57.0	57.0	10.0	23.0		10.0	23.0	23.0
Total Split (s)	12.0	51.0	51.0	11.0	50.0	50.0	12.0	37.0		21.0	46.0	46.0
Total Split (%)	10.0%	42.5%	42.5%	9.2%	41.7%	41.7%	10.0%	30.8%		17.5%	38.3%	38.3%
Maximum Green (s)	7.0	46.0	46.0	6.0	45.0	45.0	7.0	32.0		16.0	41.0	41.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	65.1	56.2	56.2	56.6	48.0	48.0	36.5	27.5		48.4	36.4	36.4
Actuated g/C Ratio	0.54	0.47	0.47	0.47	0.40	0.40	0.30	0.23		0.40	0.30	0.30
v/c Ratio	0.72	0.92	0.39	0.26	0.76	0.42	0.81	0.76		0.87	0.41	0.30
Control Delay	32.1	49.1	3.7	18.3	39.5	4.1	48.2	53.8		51.0	34.8	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	32.1	49.1	3.7	18.3	39.5	4.1	48.2	53.8		51.0	34.8	5.2
LOS	C	D	A	B	D	A	D	D		D	C	A
Approach Delay		34.5			25.5			51.0			34.4	
Approach LOS		C			C			D			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 34.9	Intersection LOS: C
Intersection Capacity Utilization 89.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	4.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	17	55	266	283
Demand Flow Rate, veh/h	17	56	271	289
Vehicles Circulating, veh/h	299	261	34	38
Vehicles Exiting, veh/h	28	44	282	279
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	3.9	4.5	4.6
Approach LOS	-	A	A	A

Lane	Left	Left	Left
Designated Moves	T	L	R
Assumed Moves	T	L	R
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	56	271	289
Cap Entry Lane, veh/h	1057	1333	1327
Entry HV Adj Factor	0.978	0.982	0.979
Flow Entry, veh/h	55	266	283
Cap Entry, veh/h	1034	1309	1299
V/C Ratio	0.053	0.203	0.218
Control Delay, s/veh	3.9	4.5	4.6
LOS	A	A	A
95th %tile Queue, veh	0	1	1

Intersection						
Int Delay, s/veh	0.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	5	10	385	450	40
Future Vol, veh/h	35	5	10	385	450	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	5	11	418	489	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	929	489	532	0	-	0
Stage 1	489	-	-	-	-	-
Stage 2	440	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	297	579	1036	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	294	579	1036	-	-	-
Mov Cap-2 Maneuver	294	-	-	-	-	-
Stage 1	609	-	-	-	-	-
Stage 2	649	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1036	-	294	579	-	-
HCM Lane V/C Ratio	0.01	-	0.129	0.009	-	-
HCM Control Delay (s)	8.5	-	19.1	11.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	0	-	-

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	310	85	15	335	120
Future Vol, veh/h	25	310	85	15	335	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	337	92	16	364	130
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	13.1	9.7	20.5
HCM LOS	B	A	C

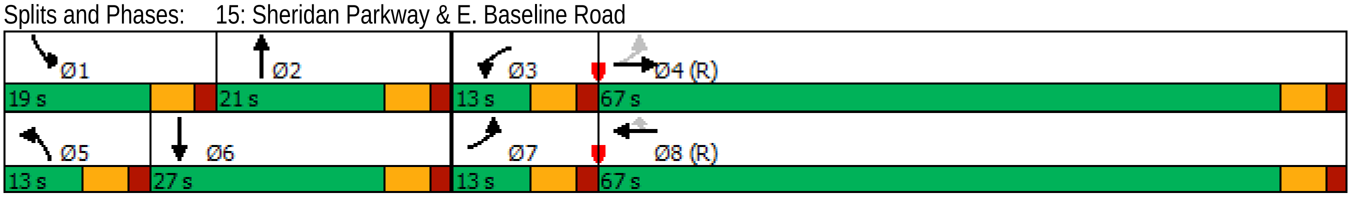
Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	7%	74%
Vol Thru, %	85%	0%	26%
Vol Right, %	15%	93%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	100	335	455
LT Vol	0	25	335
Through Vol	85	0	120
RT Vol	15	310	0
Lane Flow Rate	109	364	495
Geometry Grp	1	1	1
Degree of Util (X)	0.168	0.509	0.719
Departure Headway (Hd)	5.555	5.037	5.232
Convergence, Y/N	Yes	Yes	Yes
Cap	645	721	692
Service Time	3.602	3.037	3.264
HCM Lane V/C Ratio	0.169	0.505	0.715
HCM Control Delay	9.7	13.1	20.5
HCM Lane LOS	A	B	C
HCM 95th-tile Q	0.6	2.9	6.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	925	100	160	650	250	120	215	150	300	220	65
Future Volume (vph)	65	925	100	160	650	250	120	215	150	300	220	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.340			0.950			0.950			0.950		
Satd. Flow (perm)	633	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			272			191			191
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	974	109	174	707	272	130	234	163	326	239	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	974	109	174	707	272	130	234	163	326	239	71
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			8			Free			Free

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0		11.0	24.0	
Total Split (s)	13.0	67.0		13.0	67.0	67.0	13.0	21.0		19.0	27.0	
Total Split (%)	10.8%	55.8%		10.8%	55.8%	55.8%	10.8%	17.5%		15.8%	22.5%	
Maximum Green (s)	7.0	61.0		7.0	61.0	61.0	7.0	15.0		13.0	21.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-3.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	3.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	72.7	64.9	120.0	10.3	67.8	67.8	9.0	14.8	120.0	14.9	20.7	120.0
Actuated g/C Ratio	0.61	0.54	1.00	0.09	0.56	0.56	0.08	0.12	1.00	0.12	0.17	1.00
v/c Ratio	0.15	0.97	0.07	0.59	0.35	0.27	0.51	0.54	0.10	0.77	0.39	0.04
Control Delay	8.9	48.9	0.1	61.8	15.7	2.4	60.7	53.7	0.1	63.6	45.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	48.9	0.1	61.8	15.7	2.4	60.7	53.7	0.1	63.6	45.6	0.0
LOS	A	D	A	E	B	A	E	D	A	E	D	A
Approach Delay		41.8			19.5			38.9			49.8	
Approach LOS		D			B			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 59 (49%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 35.4	Intersection LOS: D
Intersection Capacity Utilization 81.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road



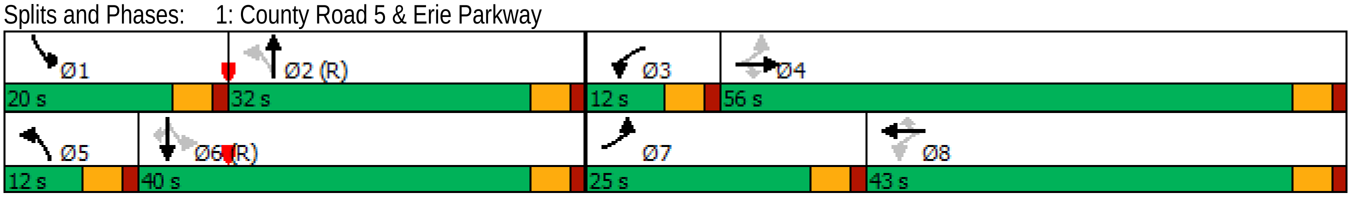
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	590	154	54	625	390	297	243	72	395	250	320
Future Volume (vph)	325	590	154	54	625	390	297	243	72	395	250	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.967				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1801	0	1770	1863	1583
Flt Permitted	0.091			0.257			0.497			0.163		
Satd. Flow (perm)	170	1863	1583	479	1863	1583	926	1801	0	304	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			162			375		11				339
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		13.1			15.0			9.8			7.5	
Peak Hour Factor	0.88	0.95	0.95	0.95	0.95	0.88	0.95	0.90	0.95	0.88	0.90	0.88
Adj. Flow (vph)	369	621	162	57	658	443	313	270	76	449	278	364
Shared Lane Traffic (%)												
Lane Group Flow (vph)	369	621	162	57	658	443	313	346	0	449	278	364
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	23.0	10.0	23.0		10.0	23.0	23.0
Total Split (s)	25.0	56.0	56.0	12.0	43.0	43.0	12.0	32.0		20.0	40.0	40.0
Total Split (%)	20.8%	46.7%	46.7%	10.0%	35.8%	35.8%	10.0%	26.7%		16.7%	33.3%	33.3%
Maximum Green (s)	20.0	51.0	51.0	7.0	38.0	38.0	7.0	27.0		15.0	35.0	35.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	65.0	55.5	55.5	48.6	40.0	40.0	38.0	29.0		49.0	37.0	37.0
Actuated g/C Ratio	0.54	0.46	0.46	0.40	0.33	0.33	0.32	0.24		0.41	0.31	0.31
v/c Ratio	0.96	0.72	0.20	0.20	1.06	0.57	0.88	0.78		1.36	0.48	0.50
Control Delay	71.2	32.8	3.6	16.0	92.0	8.9	58.1	54.7		205.9	37.2	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	71.2	32.8	3.6	16.0	92.0	8.9	58.1	54.7		205.9	37.2	7.1
LOS	E	C	A	B	F	A	E	D		F	D	A
Approach Delay		41.0			56.5			56.3			96.6	
Approach LOS		D			E			E			F	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.36
Intersection Signal Delay: 62.8 Intersection LOS: E
Intersection Capacity Utilization 103.3% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	4.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	25	187	296	233
Demand Flow Rate, veh/h	25	191	302	238
Vehicles Circulating, veh/h	322	264	67	102
Vehicles Exiting, veh/h	18	105	280	353
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.9	5.2	4.9	4.6
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	T	T	LR	LR
Assumed Moves	T	T	LR	LR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	25	191	302	238
Cap Entry Lane, veh/h	994	1054	1289	1244
Entry HV Adj Factor	0.991	0.979	0.980	0.981
Flow Entry, veh/h	25	187	296	233
Cap Entry, veh/h	985	1032	1264	1220
V/C Ratio	0.025	0.181	0.234	0.191
Control Delay, s/veh	3.9	5.2	4.9	4.6
LOS	A	A	A	A
95th %tile Queue, veh	0	1	1	1

Intersection						
Int Delay, s/veh	2.2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	80	15	5	127	45	14
Future Vol, veh/h	80	15	5	127	45	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	16	5	138	49	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	103	0	243	95
Stage 1	-	-	-	-	95	-
Stage 2	-	-	-	-	148	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1489	-	745	962
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	880	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1489	-	742	962
Mov Cap-2 Maneuver	-	-	-	-	742	-
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	876	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	785	-	-	1489	-
HCM Lane V/C Ratio	0.082	-	-	0.004	-
HCM Control Delay (s)	10	-	-	7.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection						
Int Delay, s/veh	0.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	92	2	2	127	5	6
Future Vol, veh/h	92	2	2	127	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	2	2	138	5	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	102	0	243	101
Stage 1	-	-	-	-	101	-
Stage 2	-	-	-	-	142	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1490	-	745	954
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1490	-	744	954
Mov Cap-2 Maneuver	-	-	-	-	744	-
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	884	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	846	-	-	1490	-
HCM Lane V/C Ratio	0.014	-	-	0.001	-
HCM Control Delay (s)	9.3	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.7					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	94	4	2	119	10	6
Future Vol, veh/h	94	4	2	119	10	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	102	4	2	129	11	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	106	0	237	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	133	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1485	-	751	951
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	893	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1485	-	750	951
Mov Cap-2 Maneuver	-	-	-	-	750	-
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	892	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	815	-	-	1485	-
HCM Lane V/C Ratio	0.021	-	-	0.001	-
HCM Control Delay (s)	9.5	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	7	8	101	20	22
Future Vol, veh/h	93	7	8	101	20	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	8	9	110	22	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	109	0	233	105
Stage 1	-	-	-	-	105	-
Stage 2	-	-	-	-	128	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1481	-	755	949
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	898	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1481	-	750	949
Mov Cap-2 Maneuver	-	-	-	-	750	-
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	893	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		0.5		9.5	
HCM LOS					A	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	843	-	-	1481	-
HCM Lane V/C Ratio	0.054	-	-	0.006	-
HCM Control Delay (s)	9.5	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	5	3	94	15	9
Future Vol, veh/h	110	5	3	94	15	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	5	3	102	16	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	125	0	231	123
Stage 1	-	-	-	-	123	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1462	-	757	928
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1462	-	755	928
Mov Cap-2 Maneuver	-	-	-	-	755	-
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	914	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	812	-	-	1462	-
HCM Lane V/C Ratio	0.032	-	-	0.002	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	1.9					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	111	8	6	72	25	17
Future Vol, veh/h	111	8	6	72	25	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	9	7	78	27	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	218	126
Stage 1	-	-	-	-	126	-
Stage 2	-	-	-	-	92	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	770	924
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	766	924
Mov Cap-2 Maneuver	-	-	-	-	766	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	927	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		9.6	
HCM LOS					A	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	823	-	-	1455	-
HCM Lane V/C Ratio	0.055	-	-	0.004	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	124	4	3	66	12	10
Future Vol, veh/h	124	4	3	66	12	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	135	4	3	72	13	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	139	0	215	137
Stage 1	-	-	-	-	137	-
Stage 2	-	-	-	-	78	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1445	-	773	911
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	945	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1445	-	771	911
Mov Cap-2 Maneuver	-	-	-	-	771	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	829	-	-	1445	-
HCM Lane V/C Ratio	0.029	-	-	0.002	-
HCM Control Delay (s)	9.5	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	2.9					
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	90	44	17	527	426	52
Future Vol, veh/h	90	44	17	527	426	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	48	18	573	463	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1072	463	520	0	-	0
Stage 1	463	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	244	599	1046	-	-	-
Stage 1	634	-	-	-	-	-
Stage 2	543	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	240	599	1046	-	-	-
Mov Cap-2 Maneuver	240	-	-	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	543	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.9	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1046	-	240	599	-	-
HCM Lane V/C Ratio	0.018	-	0.408	0.08	-	-
HCM Control Delay (s)	8.5	-	30	11.5	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.9	0.3	-	-

Intersection						
Int Delay, s/veh	0.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	33	12	527	464	6
Future Vol, veh/h	17	33	12	527	464	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	36	13	573	504	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1107	508	511	0	-	0
Stage 1	508	-	-	-	-	-
Stage 2	599	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	233	565	1054	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	549	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	230	565	1054	-	-	-
Mov Cap-2 Maneuver	230	-	-	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	549	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1054	-	378	-	-
HCM Lane V/C Ratio	0.012	-	0.144	-	-
HCM Control Delay (s)	8.5	-	16.1	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection	
Intersection Delay, s/veh	15.6
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	329	210	25	337	160
Future Vol, veh/h	5	329	210	25	337	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	358	228	27	366	174
Number of Lanes	1	0	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	14.5	12.9	17.6
HCM LOS	B	B	C

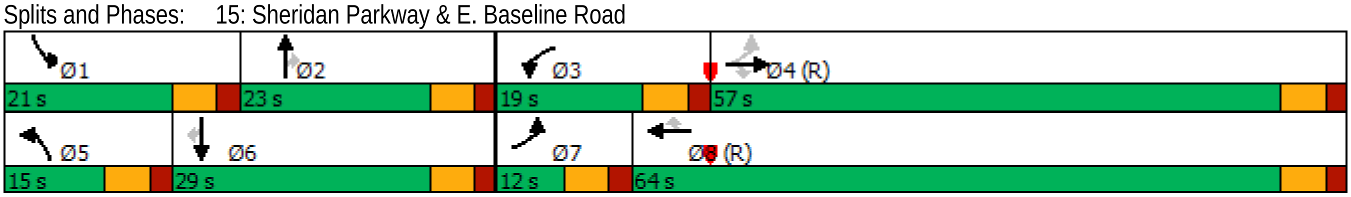
Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	1%	100%	0%
Vol Thru, %	89%	0%	0%	100%
Vol Right, %	11%	99%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	235	334	337	160
LT Vol	0	5	337	0
Through Vol	210	0	0	160
RT Vol	25	329	0	0
Lane Flow Rate	255	363	366	174
Geometry Grp	5	2	7	7
Degree of Util (X)	0.411	0.539	0.656	0.287
Departure Headway (Hd)	5.794	5.341	6.451	5.944
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	621	675	560	603
Service Time	3.842	3.389	4.194	3.686
HCM Lane V/C Ratio	0.411	0.538	0.654	0.289
HCM Control Delay	12.9	14.5	20.7	11.1
HCM Lane LOS	B	B	C	B
HCM 95th-tile Q	2	3.2	4.8	1.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	549	115	195	758	190	75	129	130	232	240	45
Future Volume (vph)	25	549	115	195	758	190	75	129	130	232	240	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.323			0.950			0.950			0.950		
Satd. Flow (perm)	602	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			207			191			191
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	597	125	212	824	207	82	140	141	252	261	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	597	125	212	824	207	82	140	141	252	261	49
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	24.0	24.0	11.0	24.0	24.0	11.0	24.0	24.0	11.0	24.0	24.0
Total Split (s)	12.0	57.0	57.0	19.0	64.0	64.0	15.0	23.0	23.0	21.0	29.0	29.0
Total Split (%)	10.0%	47.5%	47.5%	15.8%	53.3%	53.3%	12.5%	19.2%	19.2%	17.5%	24.2%	24.2%
Maximum Green (s)	6.0	51.0	51.0	13.0	58.0	58.0	9.0	17.0	17.0	15.0	23.0	23.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	70.1	61.9	61.9	14.7	73.0	73.0	9.9	12.1	12.1	15.4	19.9	19.9
Actuated g/C Ratio	0.58	0.52	0.52	0.12	0.61	0.61	0.08	0.10	0.10	0.13	0.17	0.17
v/c Ratio	0.06	0.62	0.14	0.51	0.38	0.20	0.29	0.39	0.43	0.57	0.44	0.12
Control Delay	8.5	25.7	0.7	53.2	14.1	2.4	54.1	53.4	6.2	54.5	48.1	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	25.7	0.7	53.2	14.1	2.4	54.1	53.4	6.2	54.5	48.1	0.6
LOS	A	C	A	D	B	A	D	D	A	D	D	A
Approach Delay		20.9			18.8			35.2			46.8	
Approach LOS		C			B			D			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 43 (36%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 26.8	Intersection LOS: C
Intersection Capacity Utilization 58.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road



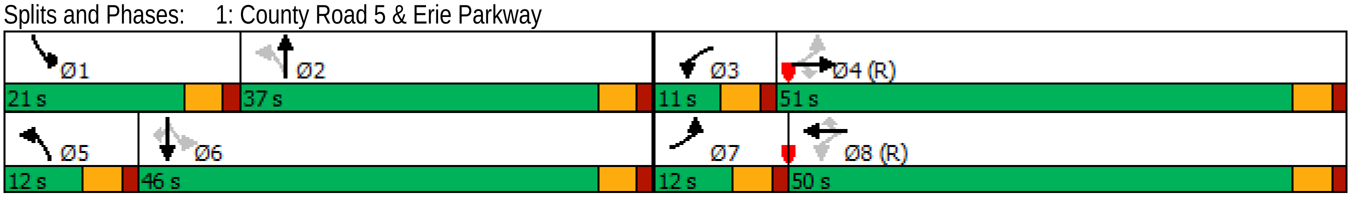
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	765	365	75	540	325	308	264	58	285	229	165
Future Volume (vph)	225	765	365	75	540	325	308	264	58	285	229	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.973				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1812	0	1770	1863	1583
Flt Permitted	0.153			0.084			0.578			0.173		
Satd. Flow (perm)	285	1863	1583	156	1863	1583	1077	1812	0	322	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			397			353		9				179
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		19.7			22.4			14.8			11.3	
Peak Hour Factor	0.92	0.95	0.92	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	805	397	82	568	353	335	287	63	310	249	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	245	805	397	82	568	353	335	350	0	310	249	179
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	57.0	57.0	10.0	57.0	57.0	10.0	23.0		10.0	23.0	23.0
Total Split (s)	12.0	51.0	51.0	11.0	50.0	50.0	12.0	37.0		21.0	46.0	46.0
Total Split (%)	10.0%	42.5%	42.5%	9.2%	41.7%	41.7%	10.0%	30.8%		17.5%	38.3%	38.3%
Maximum Green (s)	7.0	46.0	46.0	6.0	45.0	45.0	7.0	32.0		16.0	41.0	41.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	63.3	54.5	54.5	56.5	47.6	47.6	37.9	28.9		49.9	37.9	37.9
Actuated g/C Ratio	0.53	0.45	0.45	0.47	0.40	0.40	0.32	0.24		0.42	0.32	0.32
v/c Ratio	0.77	0.95	0.42	0.43	0.77	0.42	0.85	0.79		0.89	0.42	0.29
Control Delay	37.8	55.1	3.8	22.8	40.0	4.1	52.3	54.5		53.9	34.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	37.8	55.1	3.8	22.8	40.0	4.1	52.3	54.5		53.9	34.0	5.0
LOS	D	E	A	C	D	A	D	D		D	C	A
Approach Delay		38.1			25.9			53.4			35.4	
Approach LOS		D			C			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 37.1 — Intersection LOS: D
Intersection Capacity Utilization 91.0% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection				
Intersection Delay, s/veh	5.4			
Intersection LOS	A			

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	17	151	342	365
Demand Flow Rate, veh/h	17	154	349	372
Vehicles Circulating, veh/h	432	261	117	88
Vehicles Exiting, veh/h	28	205	332	327
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.3	4.8	5.6	5.6
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	T	T	LR	LR
Assumed Moves	T	T	LR	LR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	17	154	349	372
Cap Entry Lane, veh/h	888	1057	1225	1261
Entry HV Adj Factor	0.994	0.979	0.981	0.981
Flow Entry, veh/h	17	151	342	365
Cap Entry, veh/h	883	1035	1201	1237
V/C Ratio	0.019	0.146	0.285	0.295
Control Delay, s/veh	4.3	4.8	5.6	5.6
LOS	A	A	A	A
95th %tile Queue, veh	0	1	1	1

Intersection						
Int Delay, s/veh	1.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	135	50	16	109	30	9
Future Vol, veh/h	135	50	16	109	30	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	147	54	17	118	33	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	201	0	326	174
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1371	-	668	869
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1371	-	659	869
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	865	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	698	-	-	1371	-
HCM Lane V/C Ratio	0.061	-	-	0.013	-
HCM Control Delay (s)	10.5	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	0.4					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	139	5	7	122	3	4
Future Vol, veh/h	139	5	7	122	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	151	5	8	133	3	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	156	0	303	154
Stage 1	-	-	-	-	154	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1424	-	689	892
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1424	-	685	892
Mov Cap-2 Maneuver	-	-	-	-	685	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	874	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	790	-	-	1424	-
HCM Lane V/C Ratio	0.01	-	-	0.005	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	132	11	7	122	7	4
Future Vol, veh/h	132	11	7	122	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	12	8	133	8	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	155	0	298	149
Stage 1	-	-	-	-	149	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1425	-	693	898
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1425	-	689	898
Mov Cap-2 Maneuver	-	-	-	-	689	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	874	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	753	-	-	1425	-
HCM Lane V/C Ratio	0.016	-	-	0.005	-
HCM Control Delay (s)	9.9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	114	22	25	115	14	15
Future Vol, veh/h	114	22	25	115	14	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	124	24	27	125	15	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	148	0	315	136
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	179	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1434	-	678	913
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	852	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1434	-	664	913
Mov Cap-2 Maneuver	-	-	-	-	664	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	835	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	773	-	-	1434	-
HCM Lane V/C Ratio	0.041	-	-	0.019	-
HCM Control Delay (s)	9.9	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.8					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	112	17	10	130	10	6
Future Vol, veh/h	112	17	10	130	10	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	122	18	11	141	11	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	140	0	294	131
Stage 1	-	-	-	-	131	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1443	-	697	919
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	866	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1443	-	691	919
Mov Cap-2 Maneuver	-	-	-	-	691	-
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	859	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	762	-	-	1443	-
HCM Lane V/C Ratio	0.023	-	-	0.008	-
HCM Control Delay (s)	9.8	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	1.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	91	27	19	123	17	11
Future Vol, veh/h	91	27	19	123	17	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	29	21	134	18	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	128	0	290	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	176	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1458	-	701	939
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1458	-	690	939
Mov Cap-2 Maneuver	-	-	-	-	690	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	841	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	770	-	-	1458	-
HCM Lane V/C Ratio	0.04	-	-	0.014	-
HCM Control Delay (s)	9.9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	89	13	10	134	8	7
Future Vol, veh/h	89	13	10	134	8	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	14	11	146	9	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	111	0	272	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	168	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1479	-	717	951
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	862	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1479	-	711	951
Mov Cap-2 Maneuver	-	-	-	-	711	-
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	855	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	806	-	-	1479	-
HCM Lane V/C Ratio	0.02	-	-	0.007	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	2.3					
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	68	28	49	397	469	95
Future Vol, veh/h	68	28	49	397	469	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	30	53	432	510	103
Major/Minor	**Minor2**		**Major1**		**Major2**	
Conflicting Flow All	1048	510	613	0	-	0
Stage 1	510	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	252	563	966	-	-	-
Stage 1	603	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	238	563	966	-	-	-
Mov Cap-2 Maneuver	238	-	-	-	-	-
Stage 1	570	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Approach	**EB**		**NB**		**SB**	
HCM Control Delay, s	22.4		1		0	
HCM LOS	C					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	966	-	238	563	-	-
HCM Lane V/C Ratio	0.055	-	0.311	0.054	-	-
HCM Control Delay (s)	8.9	-	26.8	11.8	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.3	0.2	-	-

Intersection						
Int Delay, s/veh	0.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	22	39	434	478	19
Future Vol, veh/h	12	22	39	434	478	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	24	42	472	520	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1087	531	541	0	-	0
Stage 1	531	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	239	548	1028	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	229	548	1028	-	-	-
Mov Cap-2 Maneuver	229	-	-	-	-	-
Stage 1	566	-	-	-	-	-
Stage 2	574	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.9	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1028	-	367	-	-
HCM Lane V/C Ratio	0.041	-	0.101	-	-
HCM Control Delay (s)	8.7	-	15.9	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Intersection Delay, s/veh	18.8
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	388	85	15	380	120
Future Vol, veh/h	25	388	85	15	380	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	422	92	16	413	130
Number of Lanes	1	0	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	17.1	10.5	21.9
HCM LOS	C	B	C

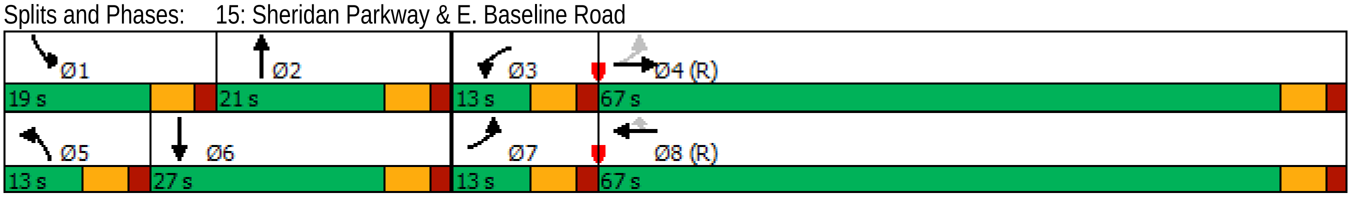
Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	6%	100%	0%
Vol Thru, %	85%	0%	0%	100%
Vol Right, %	15%	94%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	413	380	120
LT Vol	0	25	380	0
Through Vol	85	0	0	120
RT Vol	15	388	0	0
Lane Flow Rate	109	449	413	130
Geometry Grp	5	2	7	7
Degree of Util (X)	0.183	0.645	0.741	0.216
Departure Headway (Hd)	6.049	5.173	6.462	5.955
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	591	705	558	603
Service Time	4.109	3.173	4.206	3.698
HCM Lane V/C Ratio	0.184	0.637	0.74	0.216
HCM Control Delay	10.5	17.1	25.5	10.3
HCM Lane LOS	B	C	D	B
HCM 95th-tile Q	0.7	4.7	6.3	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	941	110	160	676	298	135	245	150	328	237	65
Future Volume (vph)	65	941	110	160	676	298	135	245	150	328	237	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.323			0.950			0.950			0.950		
Satd. Flow (perm)	602	1863	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			324			191			191
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	991	120	174	735	324	147	266	163	357	258	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	991	120	174	735	324	147	266	163	357	258	71
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			8			Free			Free

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0		11.0	24.0	
Total Split (s)	13.0	67.0		13.0	67.0	67.0	13.0	21.0		19.0	27.0	
Total Split (%)	10.8%	55.8%		10.8%	55.8%	55.8%	10.8%	17.5%		15.8%	22.5%	
Maximum Green (s)	7.0	61.0		7.0	61.0	61.0	7.0	15.0		13.0	21.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-3.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	3.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	72.4	64.6	120.0	9.9	67.1	67.1	9.0	15.5	120.0	15.0	21.5	120.0
Actuated g/C Ratio	0.60	0.54	1.00	0.08	0.56	0.56	0.08	0.13	1.00	0.12	0.18	1.00
v/c Ratio	0.16	0.99	0.08	0.62	0.37	0.32	0.57	0.58	0.10	0.83	0.41	0.04
Control Delay	9.2	53.9	0.1	63.6	16.2	2.4	62.9	54.4	0.1	68.6	45.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	53.9	0.1	63.6	16.2	2.4	62.9	54.4	0.1	68.6	45.4	0.0
LOS	A	D	A	E	B	A	E	D	A	E	D	A
Approach Delay		45.7			19.3			41.2			52.8	
Approach LOS		D			B			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 59 (49%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 37.5	Intersection LOS: D
Intersection Capacity Utilization 83.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road

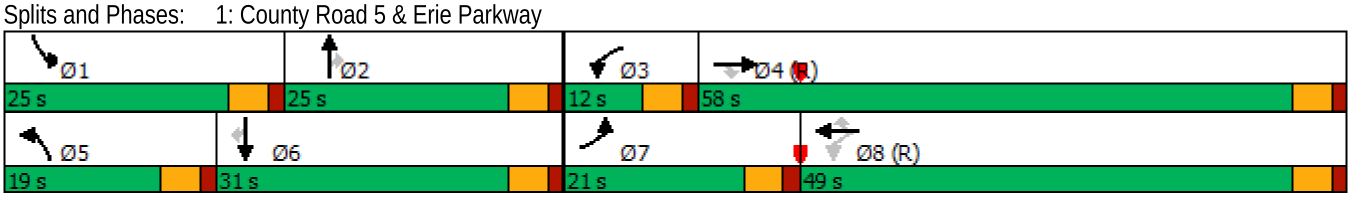


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	655	160	60	625	425	285	250	55	445	280	370
Future Volume (vph)	345	655	160	60	625	425	285	250	55	445	280	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	2		1	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.366			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	682	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			174			432			200			250
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		13.1			15.0			9.8			7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	375	712	174	65	679	462	310	272	60	484	304	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	375	712	174	65	679	462	310	272	60	484	304	402
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	57.0	57.0	10.0	57.0	57.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	21.0	58.0	58.0	12.0	49.0	49.0	19.0	25.0	25.0	25.0	31.0	31.0
Total Split (%)	17.5%	48.3%	48.3%	10.0%	40.8%	40.8%	15.8%	20.8%	20.8%	20.8%	25.8%	25.8%
Maximum Green (s)	16.0	53.0	53.0	7.0	44.0	44.0	14.0	20.0	20.0	20.0	26.0	26.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	18.1	62.5	62.5	59.8	51.0	51.0	15.6	17.5	17.5	21.3	23.3	23.3
Actuated g/C Ratio	0.15	0.52	0.52	0.50	0.42	0.42	0.13	0.15	0.15	0.18	0.19	0.19
v/c Ratio	0.73	0.39	0.19	0.16	0.45	0.50	0.70	0.53	0.15	0.79	0.44	0.79
Control Delay	57.4	19.5	3.3	12.8	26.7	5.3	58.9	50.6	0.8	57.6	44.0	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.4	19.5	3.3	12.8	26.7	5.3	58.9	50.6	0.8	57.6	44.0	28.6
LOS	E	B	A	B	C	A	E	D	A	E	D	C
Approach Delay		28.5			17.8			50.0			44.3	
Approach LOS		C			B			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 33.1	Intersection LOS: C
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	4.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	25	43	299	230
Demand Flow Rate, veh/h	25	44	304	235
Vehicles Circulating, veh/h	244	291	42	27
Vehicles Exiting, veh/h	18	55	227	308
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	4.0	4.7	4.2
Approach LOS	-	A	A	A

Lane	Left	Left	Left
Designated Moves	T	L	R
Assumed Moves	T	L	R
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	44	304	235
Cap Entry Lane, veh/h	1026	1322	1342
Entry HV Adj Factor	0.975	0.982	0.979
Flow Entry, veh/h	43	299	230
Cap Entry, veh/h	1000	1298	1314
V/C Ratio	0.043	0.230	0.175
Control Delay, s/veh	4.0	4.7	4.2
LOS	A	A	A
95th %tile Queue, veh	0	1	1

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	10	5	615	510	35
Future Vol, veh/h	40	10	5	615	510	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	11	5	668	554	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	898	277	592	0	-	0
Stage 1	554	-	-	-	-	-
Stage 2	344	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	279	720	980	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	689	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	278	720	980	-	-	-
Mov Cap-2 Maneuver	278	-	-	-	-	-
Stage 1	536	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.3	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	980	-	278	720	-	-
HCM Lane V/C Ratio	0.006	-	0.156	0.015	-	-
HCM Control Delay (s)	8.7	-	20.3	10.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	0	-	-

Intersection	
Intersection Delay, s/veh	30.5
Intersection LOS	D

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	410	210	25	360	160
Future Vol, veh/h	5	410	210	25	360	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	446	228	27	391	174
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	21.9	14.4	44.7
HCM LOS	C	B	E

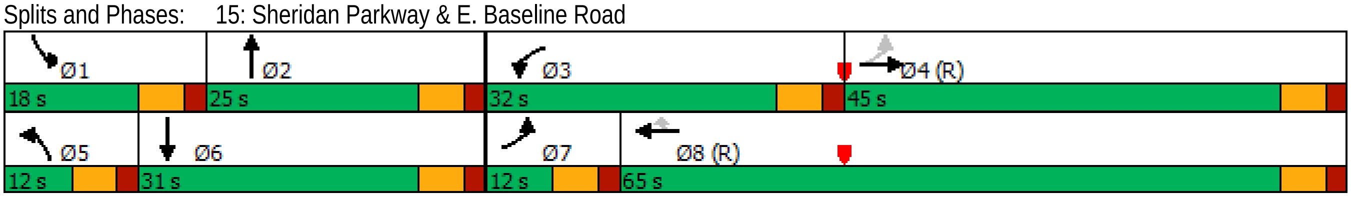
Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	1%	69%
Vol Thru, %	89%	0%	31%
Vol Right, %	11%	99%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	235	415	520
LT Vol	0	5	360
Through Vol	210	0	160
RT Vol	25	410	0
Lane Flow Rate	255	451	565
Geometry Grp	1	1	1
Degree of Util (X)	0.448	0.718	0.924
Departure Headway (Hd)	6.307	5.728	6.002
Convergence, Y/N	Yes	Yes	Yes
Cap	572	636	610
Service Time	4.338	3.728	4.002
HCM Lane V/C Ratio	0.446	0.709	0.926
HCM Control Delay	14.4	21.9	44.7
HCM Lane LOS	B	C	E
HCM 95th-tile Q	2.3	6	11.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	955	120	850	1390	220	100	160	525	215	265	60
Future Volume (vph)	50	955	120	850	1390	220	100	160	525	215	265	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.140			0.950			0.950			0.950		
Satd. Flow (perm)	261	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			245			239			520			245
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	1038	130	924	1511	239	109	174	571	234	288	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	1038	130	924	1511	239	109	174	571	234	288	65
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			8			Free			Free

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0		11.0	24.0	
Total Split (s)	12.0	45.0		32.0	65.0	65.0	12.0	25.0		18.0	31.0	
Total Split (%)	10.0%	37.5%		26.7%	54.2%	54.2%	10.0%	20.8%		15.0%	25.8%	
Maximum Green (s)	6.0	39.0		26.0	59.0	59.0	6.0	19.0		12.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-3.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	49.8	41.0	120.0	37.2	70.8	70.8	8.0	13.2	120.0	13.5	18.8	120.0
Actuated g/C Ratio	0.42	0.34	1.00	0.31	0.59	0.59	0.07	0.11	1.00	0.11	0.16	1.00
v/c Ratio	0.25	0.86	0.08	0.87	0.72	0.23	0.48	0.45	0.36	0.60	0.52	0.04
Control Delay	14.9	45.3	0.1	49.5	21.6	2.3	61.4	53.3	0.6	57.7	49.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	45.3	0.1	49.5	21.6	2.3	61.4	53.3	0.6	57.7	49.6	0.1
LOS	B	D	A	D	C	A	E	D	A	E	D	A
Approach Delay		39.1			29.5			19.1			47.3	
Approach LOS		D			C			B			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 59 (49%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 32.0	Intersection LOS: C
Intersection Capacity Utilization 75.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road



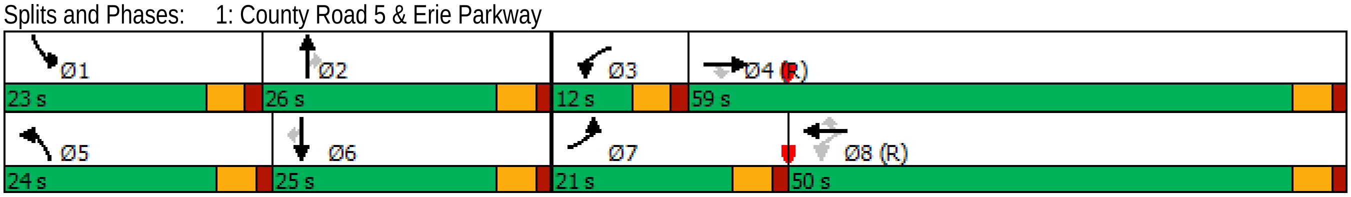
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	900	375	65	540	390	325	310	60	330	255	205
Future Volume (vph)	280	900	375	65	540	390	325	310	60	330	255	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	2		1	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.234			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	436	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			408			424			155			223
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		19.7			22.4			14.8			11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	978	408	71	587	424	353	337	65	359	277	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	978	408	71	587	424	353	337	65	359	277	223
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	57.0	57.0	10.0	57.0	57.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	21.0	59.0	59.0	12.0	50.0	50.0	24.0	26.0	26.0	23.0	25.0	25.0
Total Split (%)	17.5%	49.2%	49.2%	10.0%	41.7%	41.7%	20.0%	21.7%	21.7%	19.2%	20.8%	20.8%
Maximum Green (s)	16.0	54.0	54.0	7.0	45.0	45.0	19.0	21.0	21.0	18.0	20.0	20.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	17.0	63.7	63.7	62.6	53.6	53.6	18.8	18.8	18.8	18.6	18.6	18.6
Actuated g/C Ratio	0.14	0.53	0.53	0.52	0.45	0.45	0.16	0.16	0.16	0.16	0.16	0.16
v/c Ratio	0.63	0.52	0.40	0.22	0.37	0.45	0.66	0.61	0.17	0.68	0.51	0.52
Control Delay	54.4	21.0	3.0	12.9	24.1	3.9	53.5	51.6	1.0	54.6	49.5	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.4	21.0	3.0	12.9	24.1	3.9	53.5	51.6	1.0	54.6	49.5	10.1
LOS	D	C	A	B	C	A	D	D	A	D	D	B
Approach Delay		22.7			15.5			48.1			41.4	
Approach LOS		C			B			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 28.9 Intersection LOS: C
Intersection Capacity Utilization 60.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	4.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	17	55	288	311
Demand Flow Rate, veh/h	17	56	293	318
Vehicles Circulating, veh/h	328	283	34	38
Vehicles Exiting, veh/h	28	44	311	301
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	4.0	4.6	4.8
Approach LOS	-	A	A	A

Lane	Left	Left	Left
Designated Moves	T	L	R
Assumed Moves	T	L	R
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	56	293	318
Cap Entry Lane, veh/h	1034	1333	1327
Entry HV Adj Factor	0.978	0.982	0.979
Flow Entry, veh/h	55	288	311
Cap Entry, veh/h	1011	1309	1300
V/C Ratio	0.054	0.220	0.240
Control Delay, s/veh	4.0	4.6	4.8
LOS	A	A	A
95th %tile Queue, veh	0	1	1

Intersection						
Int Delay, s/veh	0.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	5	10	490	565	40
Future Vol, veh/h	35	5	10	490	565	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	5	11	533	614	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	903	307	657	0	-	0
Stage 1	614	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	277	689	926	-	-	-
Stage 1	502	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	274	689	926	-	-	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	496	-	-	-	-	-
Stage 2	735	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	926	-	274	689	-	-
HCM Lane V/C Ratio	0.012	-	0.139	0.008	-	-
HCM Control Delay (s)	8.9	-	20.2	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	0	-	-

Intersection	
Intersection Delay, s/veh	37.4
Intersection LOS	E

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	415	85	15	450	120
Future Vol, veh/h	25	415	85	15	450	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	451	92	16	489	130
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	21.6	10.9	54.3
HCM LOS	C	B	F

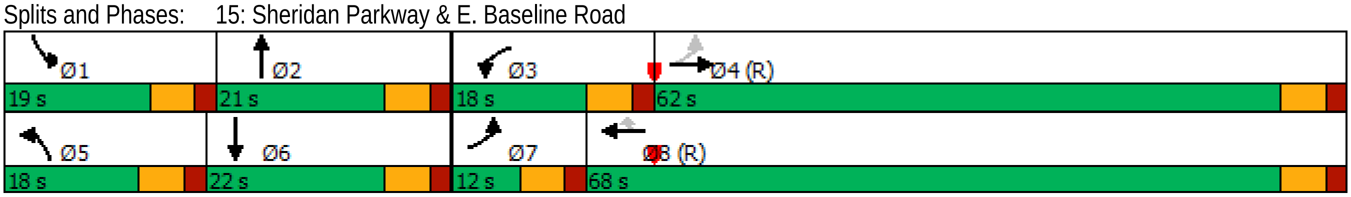
Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	6%	79%
Vol Thru, %	85%	0%	21%
Vol Right, %	15%	94%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	100	440	570
LT Vol	0	25	450
Through Vol	85	0	120
RT Vol	15	415	0
Lane Flow Rate	109	478	620
Geometry Grp	1	1	1
Degree of Util (X)	0.19	0.724	0.978
Departure Headway (Hd)	6.291	5.447	5.682
Convergence, Y/N	Yes	Yes	Yes
Cap	565	660	638
Service Time	4.387	3.524	3.74
HCM Lane V/C Ratio	0.193	0.724	0.972
HCM Control Delay	10.9	21.6	54.3
HCM Lane LOS	B	C	F
HCM 95th-tile Q	0.7	6.2	14.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	1690	145	675	755	290	190	290	650	375	280	90
Future Volume (vph)	100	1690	145	675	755	290	190	290	650	375	280	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.310			0.950			0.950			0.950		
Satd. Flow (perm)	577	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			305			265			191
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.95	0.98	0.95	0.98	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1724	153	689	795	305	200	305	684	395	295	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	1724	153	689	795	305	200	305	684	395	295	95
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			8			Free			Free

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0		11.0	24.0	
Total Split (s)	12.0	62.0		18.0	68.0	68.0	18.0	21.0		19.0	22.0	
Total Split (%)	10.0%	51.7%		15.0%	56.7%	56.7%	15.0%	17.5%		15.8%	18.3%	
Maximum Green (s)	6.0	56.0		12.0	62.0	62.0	12.0	15.0		13.0	16.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	68.3	59.0	120.0	15.9	65.7	65.7	14.2	17.1	120.0	16.0	18.9	120.0
Actuated g/C Ratio	0.57	0.49	1.00	0.13	0.55	0.55	0.12	0.14	1.00	0.13	0.16	1.00
v/c Ratio	0.25	0.99	0.10	1.51	0.41	0.30	0.49	0.61	0.43	0.86	0.53	0.06
Control Delay	10.0	50.1	0.1	278.4	16.8	2.3	53.8	53.7	0.9	70.4	50.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	50.1	0.1	278.4	16.8	2.3	53.8	53.7	0.9	70.4	50.3	0.1
LOS	B	D	A	F	B	A	D	D	A	E	D	A
Approach Delay		44.1			115.1			23.3			54.3	
Approach LOS		D			F			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 59 (49%), Referenced to phase 4:EBTL and 8:WBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.51	
Intersection Signal Delay: 63.3	Intersection LOS: E
Intersection Capacity Utilization 98.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road



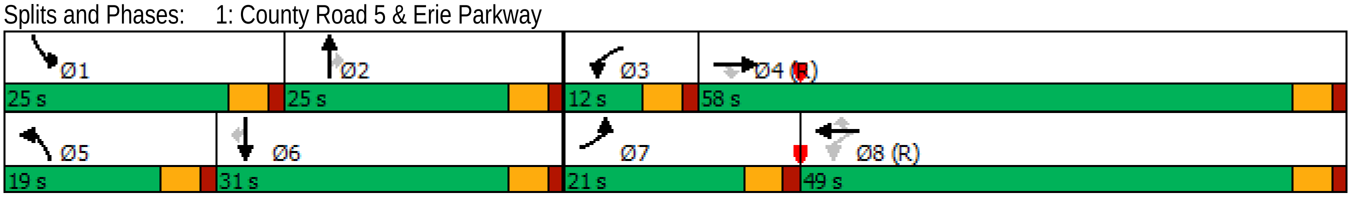
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	655	169	69	625	425	312	263	82	445	285	370
Future Volume (vph)	345	655	169	69	625	425	312	263	82	445	285	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	2		1	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.366			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	682	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			184			425			200			248
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		13.1			15.0			9.8			7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	375	712	184	75	679	462	339	286	89	484	310	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	375	712	184	75	679	462	339	286	89	484	310	402
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	57.0	57.0	10.0	57.0	57.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	21.0	58.0	58.0	12.0	49.0	49.0	19.0	25.0	25.0	25.0	31.0	31.0
Total Split (%)	17.5%	48.3%	48.3%	10.0%	40.8%	40.8%	15.8%	20.8%	20.8%	20.8%	25.8%	25.8%
Maximum Green (s)	16.0	53.0	53.0	7.0	44.0	44.0	14.0	20.0	20.0	20.0	26.0	26.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	18.1	62.1	62.1	59.7	50.8	50.8	15.7	17.8	17.8	21.3	23.4	23.4
Actuated g/C Ratio	0.15	0.52	0.52	0.50	0.42	0.42	0.13	0.15	0.15	0.18	0.20	0.20
v/c Ratio	0.73	0.39	0.20	0.18	0.45	0.51	0.75	0.55	0.22	0.79	0.45	0.79
Control Delay	57.4	19.7	3.2	13.0	26.9	5.6	61.7	50.8	1.3	57.6	44.1	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.4	19.7	3.2	13.0	26.9	5.6	61.7	50.8	1.3	57.6	44.1	28.8
LOS	E	B	A	B	C	A	E	D	A	E	D	C
Approach Delay		28.4			17.9			49.8			44.4	
Approach LOS		C			B			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 33.4 Intersection LOS: C
Intersection Capacity Utilization 60.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	5.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	25	187	323	255
Demand Flow Rate, veh/h	25	191	329	260
Vehicles Circulating, veh/h	344	291	67	102
Vehicles Exiting, veh/h	18	105	302	380
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.0	5.3	5.1	4.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	T	T	LR	LR
Assumed Moves	T	T	LR	LR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	25	191	329	260
Cap Entry Lane, veh/h	972	1026	1289	1244
Entry HV Adj Factor	0.991	0.979	0.980	0.981
Flow Entry, veh/h	25	187	323	255
Cap Entry, veh/h	963	1004	1264	1220
V/C Ratio	0.026	0.186	0.255	0.209
Control Delay, s/veh	4.0	5.3	5.1	4.8
LOS	A	A	A	A
95th %tile Queue, veh	0	1	1	1

Intersection						
Int Delay, s/veh	2.2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	80	15	5	127	45	14
Future Vol, veh/h	80	15	5	127	45	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	16	5	138	49	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	103	0	243	95
Stage 1	-	-	-	-	95	-
Stage 2	-	-	-	-	148	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1489	-	745	962
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	880	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1489	-	742	962
Mov Cap-2 Maneuver	-	-	-	-	742	-
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	876	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	785	-	-	1489	-
HCM Lane V/C Ratio	0.082	-	-	0.004	-
HCM Control Delay (s)	10	-	-	7.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	92	2	2	127	5	6
Future Vol, veh/h	92	2	2	127	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	2	2	138	5	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	102	0	243	101
Stage 1	-	-	-	-	101	-
Stage 2	-	-	-	-	142	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1490	-	745	954
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1490	-	744	954
Mov Cap-2 Maneuver	-	-	-	-	744	-
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	884	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	846	-	-	1490	-
HCM Lane V/C Ratio	0.014	-	-	0.001	-
HCM Control Delay (s)	9.3	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	94	4	2	119	10	6
Future Vol, veh/h	94	4	2	119	10	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	102	4	2	129	11	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	106	0	237	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	133	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1485	-	751	951
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	893	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1485	-	750	951
Mov Cap-2 Maneuver	-	-	-	-	750	-
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	892	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	815	-	-	1485	-
HCM Lane V/C Ratio	0.021	-	-	0.001	-
HCM Control Delay (s)	9.5	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	7	8	101	20	22
Future Vol, veh/h	93	7	8	101	20	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	8	9	110	22	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	109	0	233	105
Stage 1	-	-	-	-	105	-
Stage 2	-	-	-	-	128	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1481	-	755	949
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	898	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1481	-	750	949
Mov Cap-2 Maneuver	-	-	-	-	750	-
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	843	-	-	1481	-
HCM Lane V/C Ratio	0.054	-	-	0.006	-
HCM Control Delay (s)	9.5	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	1.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	5	3	94	15	9
Future Vol, veh/h	110	5	3	94	15	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	5	3	102	16	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	125	0	231	123
Stage 1	-	-	-	-	123	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1462	-	757	928
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1462	-	755	928
Mov Cap-2 Maneuver	-	-	-	-	755	-
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	914	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	812	-	-	1462	-
HCM Lane V/C Ratio	0.032	-	-	0.002	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	111	8	6	72	25	17
Future Vol, veh/h	111	8	6	72	25	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	9	7	78	27	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	218	126
Stage 1	-	-	-	-	126	-
Stage 2	-	-	-	-	92	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	770	924
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	766	924
Mov Cap-2 Maneuver	-	-	-	-	766	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	927	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	823	-	-	1455	-
HCM Lane V/C Ratio	0.055	-	-	0.004	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	124	4	3	66	12	10
Future Vol, veh/h	124	4	3	66	12	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	135	4	3	72	13	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	139	0	215	137
Stage 1	-	-	-	-	137	-
Stage 2	-	-	-	-	78	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1445	-	773	911
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	945	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1445	-	771	911
Mov Cap-2 Maneuver	-	-	-	-	771	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	829	-	-	1445	-
HCM Lane V/C Ratio	0.029	-	-	0.002	-
HCM Control Delay (s)	9.5	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	90	44	17	632	516	52
Future Vol, veh/h	90	44	17	632	516	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	48	18	687	561	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	941	281	618	0	-	0
Stage 1	561	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	262	716	958	-	-	-
Stage 1	535	-	-	-	-	-
Stage 2	661	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	257	716	958	-	-	-
Mov Cap-2 Maneuver	257	-	-	-	-	-
Stage 1	525	-	-	-	-	-
Stage 2	661	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.8	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	958	-	257	716	-	-
HCM Lane V/C Ratio	0.019	-	0.381	0.067	-	-
HCM Control Delay (s)	8.8	-	27.4	10.4	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.7	0.2	-	-

Intersection						
Int Delay, s/veh	0.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	33	12	632	554	6
Future Vol, veh/h	17	33	12	632	554	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	36	13	687	602	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	976	305	609	0	-	0
Stage 1	606	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	248	691	966	-	-	-
Stage 1	507	-	-	-	-	-
Stage 2	669	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	245	691	966	-	-	-
Mov Cap-2 Maneuver	245	-	-	-	-	-
Stage 1	500	-	-	-	-	-
Stage 2	669	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	966	-	427	-	-
HCM Lane V/C Ratio	0.014	-	0.127	-	-
HCM Control Delay (s)	8.8	-	14.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Intersection Delay, s/veh	35.1
Intersection LOS	E

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	434	210	25	427	160
Future Vol, veh/h	5	434	210	25	427	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	472	228	27	464	174
Number of Lanes	1	1	1	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	35.5	17	42
HCM LOS	E	C	E

Lane	NBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	100%	0%
Vol Thru, %	89%	0%	0%	0%	100%
Vol Right, %	11%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	235	5	434	427	160
LT Vol	0	5	0	427	0
Through Vol	210	0	0	0	160
RT Vol	25	0	434	0	0
Lane Flow Rate	255	5	472	464	174
Geometry Grp	4	7	7	7	7
Degree of Util (X)	0.501	0.012	0.851	0.936	0.326
Departure Headway (Hd)	7.064	7.718	6.493	7.262	6.752
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	511	467	561	501	532
Service Time	5.116	5.418	4.193	5.012	4.501
HCM Lane V/C Ratio	0.499	0.011	0.841	0.926	0.327
HCM Control Delay	17	10.5	35.8	52.9	12.8
HCM Lane LOS	C	B	E	F	B
HCM 95th-tile Q	2.8	0	9.1	11.3	1.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	979	135	850	1398	235	105	169	525	257	290	60
Future Volume (vph)	50	979	135	850	1398	235	105	169	525	257	290	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.124			0.950			0.950			0.950		
Satd. Flow (perm)	231	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			245			255			481			245
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	1064	147	850	1520	255	114	184	571	279	315	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	1064	147	850	1520	255	114	184	571	279	315	65
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			8			Free			Free

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0		11.0	24.0	
Total Split (s)	12.0	48.0		29.0	65.0	65.0	12.0	25.0		18.0	31.0	
Total Split (%)	10.0%	40.0%		24.2%	54.2%	54.2%	10.0%	20.8%		15.0%	25.8%	
Maximum Green (s)	6.0	42.0		23.0	59.0	59.0	6.0	19.0		12.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-3.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	52.8	44.0	120.0	33.6	70.1	70.1	8.0	13.6	120.0	13.8	19.4	120.0
Actuated g/C Ratio	0.44	0.37	1.00	0.28	0.58	0.58	0.07	0.11	1.00	0.12	0.16	1.00
v/c Ratio	0.25	0.82	0.09	0.88	0.74	0.25	0.50	0.46	0.36	0.71	0.55	0.04
Control Delay	14.3	40.8	0.1	53.8	22.3	2.3	62.1	53.2	0.6	61.7	49.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	40.8	0.1	53.8	22.3	2.3	62.1	53.2	0.6	61.7	49.8	0.1
LOS	B	D	A	D	C	A	E	D	A	E	D	A
Approach Delay		34.9			30.5			19.8			49.9	
Approach LOS		C			C			B			D	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 59 (49%), Referenced to phase 4:EBTL and 8:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

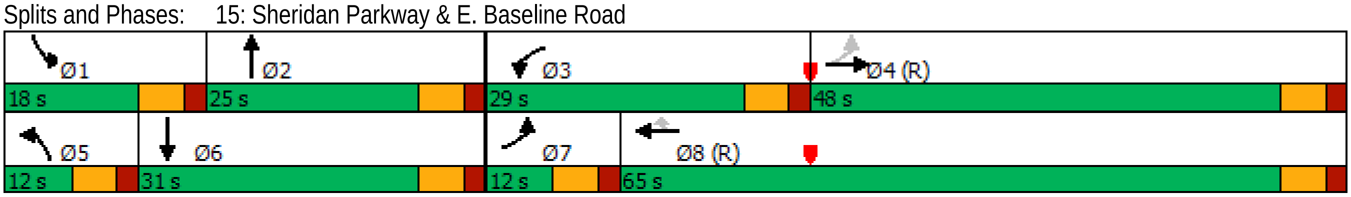
Maximum v/c Ratio: 0.88

Intersection Signal Delay: 32.2 Intersection LOS: C

Intersection Capacity Utilization 76.8% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road

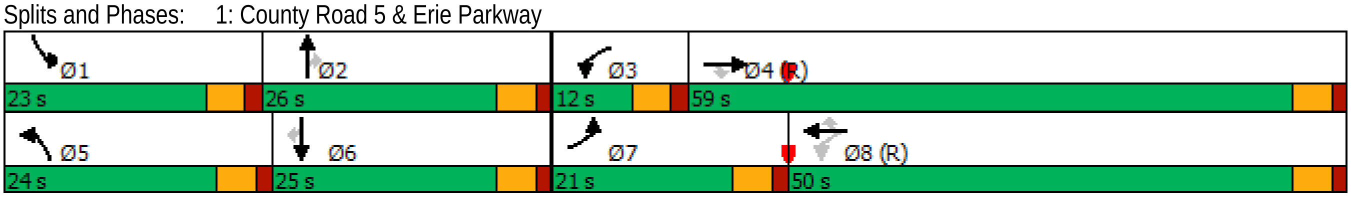


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	900	405	95	540	390	343	319	78	330	269	205
Future Volume (vph)	280	900	405	95	540	390	343	319	78	330	269	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	560		510	505		505	380		350	350		210
Storage Lanes	2		1	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.220			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	410	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			440			424			155			223
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		867			987			650			498	
Travel Time (s)		13.1			15.0			9.8			7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	978	440	103	587	424	373	347	85	359	292	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	978	440	103	587	424	373	347	85	359	292	223
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	57.0	57.0	10.0	57.0	57.0	10.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	21.0	59.0	59.0	12.0	50.0	50.0	24.0	26.0	26.0	23.0	25.0	25.0
Total Split (%)	17.5%	49.2%	49.2%	10.0%	41.7%	41.7%	20.0%	21.7%	21.7%	19.2%	20.8%	20.8%
Maximum Green (s)	16.0	54.0	54.0	7.0	45.0	45.0	19.0	21.0	21.0	18.0	20.0	20.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	17.0	60.9	60.9	63.1	53.5	53.5	19.2	18.9	18.9	18.6	18.3	18.3
Actuated g/C Ratio	0.14	0.51	0.51	0.53	0.45	0.45	0.16	0.16	0.16	0.16	0.15	0.15
v/c Ratio	0.63	0.54	0.43	0.32	0.37	0.45	0.68	0.62	0.22	0.68	0.54	0.52
Control Delay	54.4	22.4	3.1	14.0	24.1	3.9	54.0	52.0	1.4	54.6	50.5	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.4	22.4	3.1	14.0	24.1	3.9	54.0	52.0	1.4	54.6	50.5	10.2
LOS	D	C	A	B	C	A	D	D	A	D	D	B
Approach Delay		23.1			15.5			47.6			41.9	
Approach LOS		C			B			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 29.2	Intersection LOS: C
Intersection Capacity Utilization 61.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: County Road 5 & Erie Parkway



Intersection	
Intersection Delay, s/veh	5.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	17	151	364	393
Demand Flow Rate, veh/h	17	154	371	401
Vehicles Circulating, veh/h	461	283	117	88
Vehicles Exiting, veh/h	28	205	361	349
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.4	4.9	5.8	5.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	T	T	LR	LR
Assumed Moves	T	T	LR	LR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	17	154	371	401
Cap Entry Lane, veh/h	862	1034	1225	1261
Entry HV Adj Factor	0.994	0.979	0.981	0.981
Flow Entry, veh/h	17	151	364	393
Cap Entry, veh/h	857	1012	1201	1237
V/C Ratio	0.020	0.149	0.303	0.318
Control Delay, s/veh	4.4	4.9	5.8	5.8
LOS	A	A	A	A
95th %tile Queue, veh	0	1	1	1

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	135	50	16	109	30	9
Future Vol, veh/h	135	50	16	109	30	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	147	54	17	118	33	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	201	0	326	174
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1371	-	668	869
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	876	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1371	-	659	869
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	865	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	698	-	-	1371	-
HCM Lane V/C Ratio	0.061	-	-	0.013	-
HCM Control Delay (s)	10.5	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	0.4					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	139	5	7	122	3	4
Future Vol, veh/h	139	5	7	122	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	151	5	8	133	3	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	156	0	303	154
Stage 1	-	-	-	-	154	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1424	-	689	892
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1424	-	685	892
Mov Cap-2 Maneuver	-	-	-	-	685	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	874	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	790	-	-	1424	-
HCM Lane V/C Ratio	0.01	-	-	0.005	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.6					
Movement	**EBT**	**EBR**	**WBL**	**WBT**	**NBL**	**NBR**
Lane Configurations						
Traffic Vol, veh/h	132	11	7	122	7	4
Future Vol, veh/h	132	11	7	122	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	12	8	133	8	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	155	0	298	149
Stage 1	-	-	-	-	149	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1425	-	693	898
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1425	-	689	898
Mov Cap-2 Maneuver	-	-	-	-	689	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	874	-
Approach	**EB**		**WB**		**NB**	
HCM Control Delay, s	0		0.4		9.9	
HCM LOS					A	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	753	-	-	1425	-
HCM Lane V/C Ratio	0.016	-	-	0.005	-
HCM Control Delay (s)	9.9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	1.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	114	22	25	115	14	15
Future Vol, veh/h	114	22	25	115	14	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	124	24	27	125	15	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	148	0	315	136
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	179	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1434	-	678	913
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	852	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1434	-	664	913
Mov Cap-2 Maneuver	-	-	-	-	664	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	835	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	773	-	-	1434	-
HCM Lane V/C Ratio	0.041	-	-	0.019	-
HCM Control Delay (s)	9.9	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.8					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	112	17	10	130	10	6
Future Vol, veh/h	112	17	10	130	10	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	122	18	11	141	11	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	140	0	294	131
Stage 1	-	-	-	-	131	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1443	-	697	919
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	866	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1443	-	691	919
Mov Cap-2 Maneuver	-	-	-	-	691	-
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	859	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	762	-	-	1443	-
HCM Lane V/C Ratio	0.023	-	-	0.008	-
HCM Control Delay (s)	9.8	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	91	27	19	123	17	11
Future Vol, veh/h	91	27	19	123	17	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	29	21	134	18	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	128	0	290	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	176	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1458	-	701	939
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1458	-	690	939
Mov Cap-2 Maneuver	-	-	-	-	690	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	841	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	770	-	-	1458	-
HCM Lane V/C Ratio	0.04	-	-	0.014	-
HCM Control Delay (s)	9.9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	0.8					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	89	13	10	134	8	7
Future Vol, veh/h	89	13	10	134	8	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	14	11	146	9	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	111	0	272	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	168	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1479	-	717	951
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	862	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1479	-	711	951
Mov Cap-2 Maneuver	-	-	-	-	711	-
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	855	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	806	-	-	1479	-
HCM Lane V/C Ratio	0.02	-	-	0.007	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	2.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	68	28	49	502	584	95
Future Vol, veh/h	68	28	49	502	584	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	30	53	546	635	103

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1014	318	738	0	-	0
Stage 1	635	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	235	678	864	-	-	-
Stage 1	490	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	221	678	864	-	-	-
Mov Cap-2 Maneuver	221	-	-	-	-	-
Stage 1	460	-	-	-	-	-
Stage 2	662	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.8	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	864	-	221	678	-	-
HCM Lane V/C Ratio	0.062	-	0.334	0.045	-	-
HCM Control Delay (s)	9.4	-	29.3	10.6	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.4	0.1	-	-

Intersection						
Int Delay, s/veh	0.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	22	39	539	593	19
Future Vol, veh/h	12	22	39	539	593	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	24	42	586	645	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1033	333	666	0	-	0
Stage 1	656	-	-	-	-	-
Stage 2	377	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	228	663	919	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	663	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	218	663	919	-	-	-
Mov Cap-2 Maneuver	218	-	-	-	-	-
Stage 1	456	-	-	-	-	-
Stage 2	663	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	919	-	385	-	-
HCM Lane V/C Ratio	0.046	-	0.096	-	-
HCM Control Delay (s)	9.1	-	15.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Intersection Delay, s/veh	52.8
Intersection LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	493	85	15	495	120
Future Vol, veh/h	25	493	85	15	495	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	536	92	16	538	130
Number of Lanes	1	1	1	0	1	1
Approach	WB		NB		SB	
Opposing Approach			SB		NB	
Opposing Lanes	0		2		1	
Conflicting Approach Left	NB				WB	
Conflicting Lanes Left	1		0		2	
Conflicting Approach Right	SB		WB			
Conflicting Lanes Right	2		2		0	
HCM Control Delay	41.8		12.4		68.7	
HCM LOS	E		B		F	

Lane	NBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	100%	0%
Vol Thru, %	85%	0%	0%	0%	100%
Vol Right, %	15%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	25	493	495	120
LT Vol	0	25	0	495	0
Through Vol	85	0	0	0	120
RT Vol	15	0	493	0	0
Lane Flow Rate	109	27	536	538	130
Geometry Grp	4	7	7	7	7
Degree of Util (X)	0.215	0.055	0.91	1.058	0.238
Departure Headway (Hd)	7.349	7.507	6.287	7.081	6.573
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	491	480	579	511	545
Service Time	5.349	5.207	3.987	4.831	4.322
HCM Lane V/C Ratio	0.222	0.056	0.926	1.053	0.239
HCM Control Delay	12.4	10.6	43.4	82.6	11.4
HCM Lane LOS	B	B	E	F	B
HCM 95th-tile Q	0.8	0.2	11.1	16.1	0.9

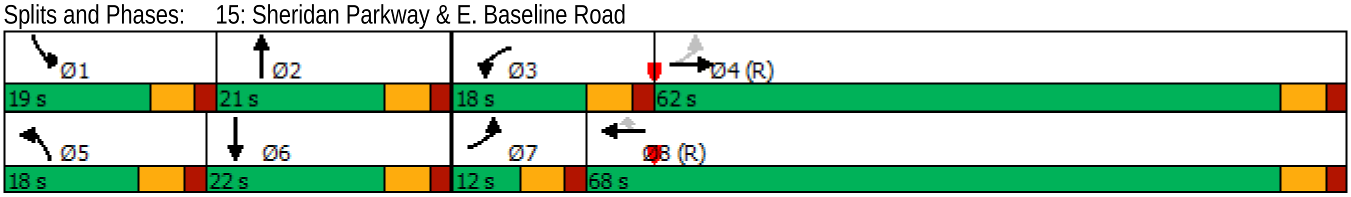
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	1706	155	675	781	338	205	320	650	403	297	90
Future Volume (vph)	100	1706	155	675	781	338	205	320	650	403	297	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	640		640	605		410	265		265	330		330
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.297			0.950			0.950			0.950		
Satd. Flow (perm)	553	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			356			264			191
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		3838			1350			756			732	
Travel Time (s)		47.6			16.7			11.5			11.1	
Peak Hour Factor	0.95	0.98	0.95	0.98	0.95	0.95	0.95	0.96	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1741	163	689	822	356	216	333	684	424	313	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	1741	163	689	822	356	216	333	684	424	313	95
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			8			Free			Free

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0		11.0	24.0	
Total Split (s)	12.0	62.0		18.0	68.0	68.0	18.0	21.0		19.0	22.0	
Total Split (%)	10.0%	51.7%		15.0%	56.7%	56.7%	15.0%	17.5%		15.8%	18.3%	
Maximum Green (s)	6.0	56.0		12.0	62.0	62.0	12.0	15.0		13.0	16.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0	-3.0	-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	68.1	59.0	120.0	15.6	65.5	65.5	14.3	17.4	120.0	16.0	19.0	120.0
Actuated g/C Ratio	0.57	0.49	1.00	0.13	0.55	0.55	0.12	0.14	1.00	0.13	0.16	1.00
v/c Ratio	0.26	1.00	0.10	1.54	0.43	0.35	0.53	0.65	0.43	0.93	0.56	0.06
Control Delay	10.2	52.5	0.1	290.8	17.1	2.4	54.5	54.9	0.9	79.1	50.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	52.5	0.1	290.8	17.1	2.4	54.5	54.9	0.9	79.1	50.9	0.1
LOS	B	D	A	F	B	A	D	D	A	E	D	A
Approach Delay		46.1			115.3			24.8			59.5	
Approach LOS		D			F			C			E	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 59 (49%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.54
Intersection Signal Delay: 65.3 Intersection LOS: E
Intersection Capacity Utilization 100.1% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 15: Sheridan Parkway & E. Baseline Road



Geosyntec consultants

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Memorandum

Date: 17 November 2020

To: Richard Dean, Stratus Redtail Ranch, LLC. (Stratus)

From: Jonathan Gillen, Geosyntec Consultants (Geosyntec)

Subject: Summary of Soil Vapor Observations, Stratus Redtail Ranch 1 and Stratus Redtail Ranch 2

ec: Jonathan Steeler; Roger Hollard; David Folkes; File

This memorandum provides a summary of recent soil vapor observations made at the Stratus Redtail Ranch 1 and Stratus Redtail Ranch 2 Properties (i.e., the Stratus 1 and Stratus 2 Properties). Observations were made on 12 November 2020 in response to Stratus' request on 10 November 2020.

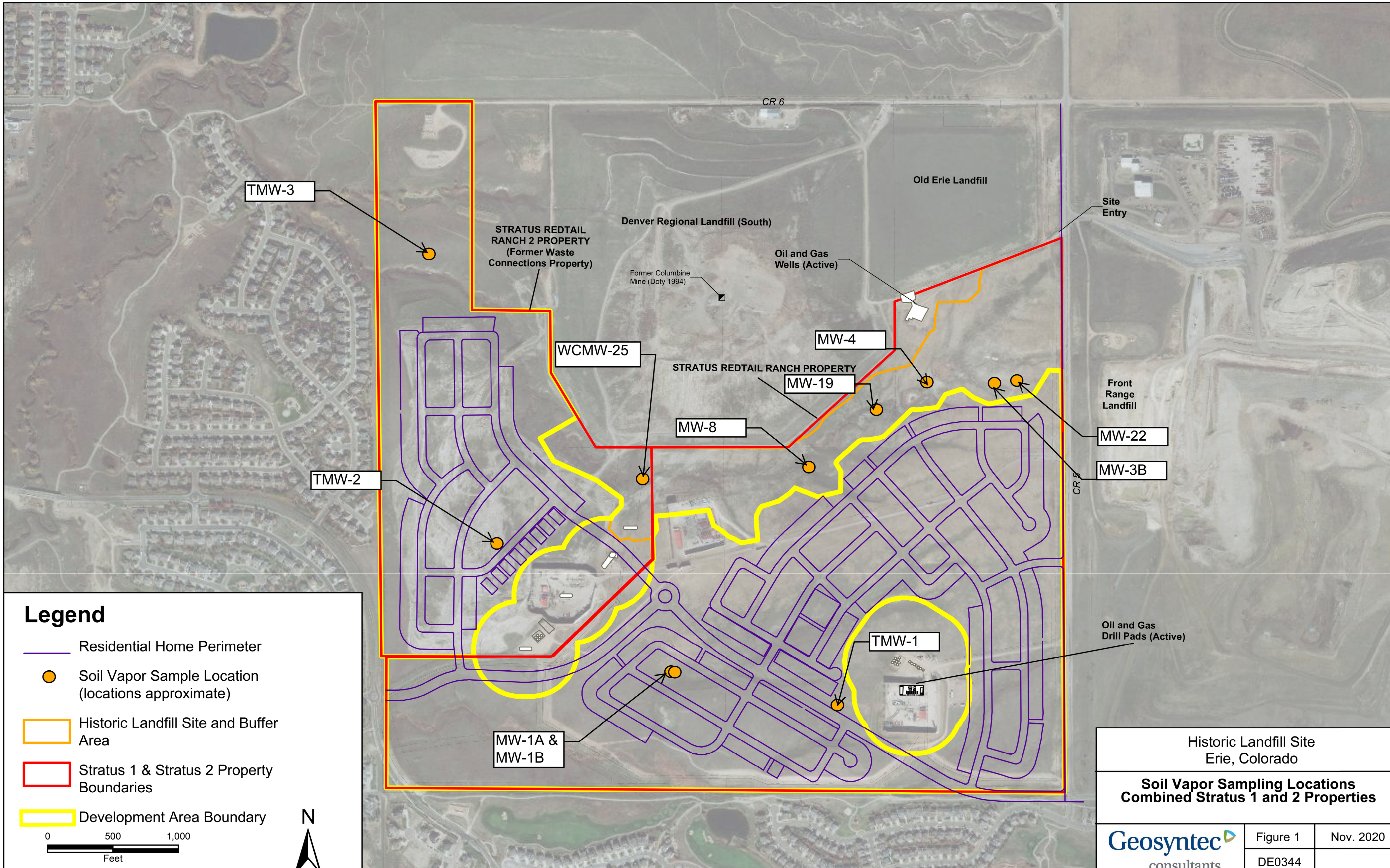
On 6 November 2020, Stratus forwarded an electronic copy of the report titled *Property Development Environmental Review*, dated 5 November 2020 and authored by Pinyon Environmental, Inc. The report presents an independent third-party analysis, performed by Pinyon on behalf of the Town of Erie, of the environmental history, including previously performed remediation work, proposed remediation work, for the Stratus 1 and Stratus 2 properties. In the report, Pinyon summaries information presented in historical reports prepared for those properties, including the recent *Corrective Measures Design (CMD) Report, Revision 1*, dated 1 May 2020 and approved by the Colorado Department of Public Health and Environment (CDPHE) on 12 May 2020. The report includes the following conclusions and recommendations: (i) "… the CMD adequately addresses and mitigates potential concerns associated with future residential development that would occur outside the buffer area"; and (ii) recommendations related to soil vapor monitoring, sampling, and mitigation. Pinyon also points out that "Pinyon was not provided… soil gas data for…Parcel 2".

One 10 November 2020 and based on the conclusions and recommendations discussed above, Stratus requested that Geosyntec obtain additional soil vapor information from existing groundwater wells located within the Historical Landfill Area Buffer Zone, and at several additional locations around the Stratus 1 and Stratus 2 properties. Geosyntec, as part of efforts to collect data for additional characterization of the Stratus 1 and Stratus 2 properties, also obtained methane (CH_4) and photoionization detector (PID) readings, which can be indicative of volatile organic compound (VOC) vapors at 11 locations. Five of these locations were located on the Stratus 1 and Stratus 2 properties outside of the Historical Landfill Area and roughly coincide with the location of future proposed developments. CH_4 and PID readings were obtained using a Landtec GEM 2000 and a MiniRAE 3000 PID, respectively. Readings were obtained at 5 second or 30 second intervals over a 5 minute period. Average CH_4 readings ranged from 0% by volume to 0.2% by volume with a maximum of 0.5% by volume. Average PID readings ranged from 0 parts per million (ppm) to 0.45 ppm, with a maximum of 2.3 ppm. Readings for each location were tabulated and are attached.

* * * *

Attachments:

Figure – Soil Vapor Reading locations
Tables – Soil Vapor Readings for 11 locations


CR 6
Old Erie Landfill
Site Entry
Denver Regional Landfill (South)
STRATUS REDTAIL RANCH 2 PROPERTY (Former Waste Connections Property)
Former Columbine Mine (Doty 1994)
Oil and Gas Wells (Active)
TMW-3
WCMW-25
MW-4
STRATUS REDTAIL RANCH PROPERTY
MW-19
MW-8
MW-22
MW-3B
Front Range Landfill
CR 5
TMW-2
TMW-1
Oil and Gas Drill Pads (Active)
MW-1A & MW-1B
Legend
Residential Home Perimeter
Soil Vapor Sample Location (locations approximate)
Historic Landfill Site and Buffer Area
Stratus 1 & Stratus 2 Property Boundaries
Development Area Boundary
0
500
1,000
Feet
N
Historic Landfill Site
Erie, Colorado
Soil Vapor Sampling Locations
Combined Stratus 1 and 2 Properties
Geosyntec consultants
Figure 1
Nov. 2020
DE0344

Location:	TMW-2			
Start Time:	GEM - 10:22, PID - 10:32			
End Time:	GEM - 10:27, PID - 10:37			
Initial PID Reading:	0.7 ppm			
Water Level:	Dry	50.18 TD - HB		
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:05	0.1	0.3	21.1	0.4
0:10	0.1	0.3	21.0	0
0:15	0.1	0.9	20.8	0
0:20	0.1	1.3	20.4	0
0:30	0.1	1.6	20.1	0
0:45	0.1	1.9	19.7	0
1:00	0.1	2.1	19.2	0
1:15	0.1	2.3	19.0	0
1:30	0.1	2.5	18.7	0
1:45	0.1	2.8	18.4	0
2:00	0.3	3.1	18.1	0
2:15	0.2	3.2	18.0	0
2:30	0	3.3	17.8	0
2:45	0.2	3.5	17.5	0
3:00	0.1	3.7	17.3	0
3:15	0	3.9	17.0	0
3:30	0.1	4.1	16.7	0
3:45	0.1	4.3	16.5	0
4:00	0.1	4.5	16.2	0
4:15	0.1	4.8	15.9	0
4:30	0.1	5.0	15.7	0
4:45	0	5.3	15.3	0
5:00	0.1	5.5	14.9	0

Location:	TMW-3			
Start Time:	GEM - 11:05, PID - 11:16			
End Time:	GEM - 11:10, PID - 11:21			
Initial PID Reading:	0.6 ppm			
Water Level:	Dry	45.16 TD - HB		
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:05	0.1	0.3	21.2	0.2
0:10	0	0.8	21.1	0.3
0:15	0.1	1.1	20.9	0.4
0:20	0.2	1.2	20.7	0.4
0:25	0.2	1.2	20.6	0.4
0:30	0.1	1.2	20.6	0.4
0:45	0.1	1.2	20.5	0.5
1:00	0.1	1.2	20.5	0.5
1:15	0.1	1.2	20.5	0.5
1:30	0.1	1.2	20.5	0.5
1:45	0.1	1.1	20.5	0.5
2:00	0.1	1.2	20.5	0.5
2:15	0.1	1.2	20.5	0.5
2:30	0.2	1.2	20.4	0.5
2:45	0.1	1.2	20.4	0.5
3:00	0.1	1.2	20.3	0.5
3:15	0.1	1.2	20.4	0.5
3:30	0.1	1.2	20.5	0.5
3:45	0	1.2	20.4	0.5
4:00	0.5	1.3	20.4	0.4
4:15	0.1	1.5	20.4	0.4
4:30	0.4	1.3	20.4	0.4
4:45	0.1	1.3	20.4	0.4
5:00	0.5	1.3	20.4	0.4

Location:	WCMW-25			
Start Time:	11:46			
End Time:	11:51			
Initial PID Reading:	2.3 ppm			
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:30	0.1	0.8	21.0	0.2
1:00	0.3	1	20.8	0.2
1:30	0.2	1.1	20.6	0.2
2:00	0.2	1.2	20.5	0.2
2:30	0.1	1.2	20.5	0.1
3:00	0.1	1.2	20.5	0.1
3:30	0.2	1.3	20.4	0.1
4:00	0.1	1.3	20.4	0.1
4:30	0.1	1.3	20.3	0.1
5:00	0.1	1.3	20.4	0.1

Location:	TMW-1
Start Time:	GEM - 12:59, PID - 13:10
End Time:	GEM - 13:04, PID - 13:15
Initial PID Reading:	0.2 ppm

Time	CH_4 %	CO_2 %	O_2 %	PID (ppm)
0:05	0.2	0.3	21.1	0
0:10	0.2	0.6	21.1	0
0:15	0.2	0.8	20.9	0
0:20	0.2	0.8	20.9	0
0:25	0.2	0.8	20.8	0
0:30	0.2	0.8	20.8	0
0:45	0.2	0.8	20.8	0
1:00	0.2	0.8	20.8	0
1:15	0.2	0.8	20.8	0
1:30	0.2	0.8	20.8	0
1:45	0.2	0.8	20.7	0
2:00	0.2	0.8	20.7	0
2:15	0.2	0.8	20.8	0
2:30	0.2	0.8	20.8	0
2:45	0.2	0.8	20.8	0
3:00	0.2	0.8	20.8	0
3:15	0.2	0.8	20.8	0
3:30	0.2	0.8	20.8	0
3:45	0.2	0.8	20.8	0
4:00	0.2	0.8	20.8	0
4:15	0.2	0.8	20.8	0
4:30	0.2	0.8	20.8	0
4:45	0.2	0.8	20.8	0
5:00	0.2	0.8	20.9	0

Location:	MW-1B (Eastern Well)			
Start Time:	13:37			
End Time:	13:42			
Initial PID Reading:	0 ppm			
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:30	0.2	0.4	21.4	0
1:00	0.2	0.4	21.4	0
1:30	0.2	0.4	21.3	0
2:00	0.2	0.4	21.4	0
2:30	0.2	0.3	21.4	0
3:00	0.2	0.3	21.3	0
3:30	0.2	0.3	21.3	0
4:00	0.2	0.3	21.4	0
4:30	0.2	0.3	21.3	0
5:00	0.2	0.3	21.4	0

Location:	MW-1A (Western Well)			
Start Time:	13:51			
End Time:	13:56			
Initial PID Reading:	0 ppm			
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:30	0.2	1.9	20.5	0
1:00	0.2	2.0	20.4	0
1:30	0.2	2.2	20.1	0
2:00	0.2	2.3	20.2	0
2:30	0.2	2.3	20.1	0
3:00	0.2	2.4	20.0	0
3:30	0.2	2.4	20.0	0
4:00	0.2	2.4	20.0	0
4:30	0.2	2.5	20.0	0
5:00	0.2	2.5	20.0	0

Location:	MW-19			
Start Time:	15:26			
End Time:	15:31			
Initial PID Reading:	0 ppm			
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:30	0.2	1.1	21.2	0
1:00	0.2	1.1	21.2	0
1:30	0.2	1.1	21.2	0
2:00	0.2	1.1	21.1	0
2:30	0.2	1.1	21.1	0
3:00	0.2	1.1	21.1	0
3:30	0.2	1.1	21.1	0
4:00	0.2	1.1	21.2	0
4:30	0.2	1.1	21.1	0
5:00	0.2	1.1	21.1	0

Location:	MW-3B			
Start Time:	16:06			
End Time:	16:11			
Initial PID Reading:	0 ppm			
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:30	0.2	0.7	21.8	0
1:00	0.2	0.7	21.7	0
1:30	0.2	0.7	21.8	0
2:00	0.2	0.7	21.8	0
2:30	0.2	0.7	21.8	0
3:00	0.2	0.7	21.8	0
3:30	0.2	0.7	21.8	0
4:00	0.2	0.7	21.8	0
4:30	0.2	0.7	21.8	0
5:00	0.2	0.7	21.8	0

Location:	MW-8			
Start Time:	15:09			
End Time:	15:14			
Initial PID Reading:	0 ppm			
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:30	0.1	6.6	18.3	0
1:00	0	7.9	17.5	0
1:30	0	8.8	16.9	0
2:00	0	8.9	16.8	0
2:30	0	9.0	16.8	0
3:00	0	9.0	16.8	0
3:30	0	9.0	16.9	0
4:00	0	8.9	16.8	0
4:30	0	8.9	16.9	0
5:00	0	8.9	16.9	0

Location:	MW-4			
Start Time:	15:44			
End Time:	15:49			
Initial PID Reading:	0 ppm			
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:30	0.2	1.3	21.4	0
1:00	0.2	1.3	21.3	0
1:30	0.2	1.3	21.4	0
2:00	0.2	1.3	21.4	0
2:30	0.2	1.3	21.4	0
3:00	0.2	1.3	21.4	0
3:30	0.2	1.3	21.4	0
4:00	0.2	1.3	21.5	0
4:30	0.2	1.3	21.5	0
5:00	0.2	1.3	21.6	0

Location:	MW-22			
Start Time:	16:22			
End Time:	16:27			
Initial PID Reading:	0 ppm			
Time	**CH_4 %**	**CO_2 %**	**O_2 %**	**PID (ppm)**
0:30	0.2	0.7	22.0	0
1:00	0.2	0.7	21.9	0
1:30	0.2	0.7	21.9	0
2:00	0.2	0.7	21.9	0
2:30	0.2	0.7	21.9	0
3:00	0.2	0.7	21.9	0
3:30	0.2	0.7	22.0	0
4:00	0.2	0.7	22.0	0
4:30	0.2	0.7	22.0	0
5:00	0.2	0.7	22.0	0

Geotechnical Site Development Study
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Project Number 160388
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ATTACHMENTS

1.0 EXECUTIVE SUMMARY

A. G. Wassenaar, Inc. (AGW) completed the geotechnical site development study for the proposed residential development at the subject site. The report was updated to include a revised site plan. The data collected during our field exploration and laboratory work and our analysis, opinions, and conclusions are presented. The purpose of our study is to provide design recommendations for planning and site development and preliminary design concepts for foundation systems and interior floor support, interior floor support, and streets.

The subsurface materials encountered in our test borings consist of fill, topsoil, and clay overlying sedimentary bedrock. Claystone and/or sandstone bedrock was encountered at depths ranging from 1 to 16 feet. Ground water was measured at depths ranging from 1 to 43 feet.

Site development considerations should include provisions for the presence of existing fill, expansive soils and shallow claystone bedrock, underground coal mines and lignite, and isolated locations of shallow ground water.

Based upon the results of this preliminary study, we anticipate that the structures will be founded on straight shaft piers drilled into competent bedrock. If the site is overexcavated and the excavated soils are placed as moisture treated fill using the recommendations presented in this report, it is likely that most of the structures could be founded on spread or pad-type footings bearing on the moisture treated fill below frost depth. Preliminary foundation design concepts are presented.

Floors and flatwork being considered for construction on-grade will require a specific risk analysis by the Client because of the potential for movement of the soils and bedrock encountered. Where the structures are founded upon straight shaft piers, engineered structural floors or modification of the floor supporting soils or bedrock can be anticipated. Where footings are constructed, slabs-on-grade may be possible depending on the expansion potential of the supporting materials and the Client's analysis of risk. Options for floor support are discussed.

Foundation subsurface drainage systems will be necessary for all below grade areas. Extensive drain systems will be required when foundations are within 4 feet of ground water. Water soluble sulfate test results indicate that site and foundation concrete should be designed for severe sulfate exposure. Preliminary pavement and other geotechnical-related recommendations are presented in the following report. We encourage the Client to read this report in its entirety and not to solely rely on the cursory information contained in this summary.

2.0 PURPOSE

This report presents the results of a geotechnical site development study for the proposed residential to be located northwest of Weld County Road 4 and Weld County Road 5 in Erie, Colorado. The study was conducted by AGW to assist in determining geotechnical design criteria for planning, site evaluation, and development considerations. Preliminary geotechnical design concepts are also presented for foundations, interior floor support, foundation drainage, and street construction.

Factual data gathered during the field and laboratory work are summarized on Figures 1 through 9 and in Appendix A. Our opinions and recommendations presented in this report are based on the data generated during our field exploration and laboratory testing, our understanding of the proposed project, and our experience with similar projects and geotechnical conditions. The information contained in the "Limited Subsurface Exploration Program, Preliminary Geotechnical Evaluation, 216 Acre Parcel – Red Tail Development, Erie, Colorado" by Ground Engineering, Job Number 15-3034, dated May 19, 2015, was considered during the preparation of this report.

This study was performed in general conformance with our Proposal Number 160388, dated February 29, 2016. This report is not intended to provide design criteria for individual foundations or street construction. Additional geotechnical studies will be required to provide final design criteria and construction recommendations.

3.0 PROPOSED CONSTRUCTION

We understand the proposed 216-acre development will include single-family residential structures and the associated utility and roadway infrastructure. Survey data provided by CWC Consulting Group indicate maximum cut depths of 7 feet and maximum fill depths of 10 feet at our test boring locations. Should the grading plans change, the contents of this report must be reviewed by AGW.

4.0 SITE CONDITIONS

The site is vacant with vegetation consisting of native grasses, cacti, and trees. The ground surface slopes moderately downwards to the southwest. The site is bounded by Weld County Road 5 on the east, Weld County Road 4 and a residential subdivision to the south, Vista Parkway and a residential subdivision to the west, and a landfill to the north. Numerous irrigation ponds and natural drainages were located on the site. The drainages generally flow from east to west. A haul road crosses the site along a ridge between the northern and central drainages. No bedrock outcrops were observed on the site. Oil and gas operations were present on the site in various locations. It is our understanding that this site is identified as being underlain by abandoned underground coal mines on the "Statewide Historic Underground Coal Mine Extents and Reported Coal Mine-Related Subsidence Events Map" available on the Colorado Geological Survey's website.

5.0 FIELD EXPLORATION

Subsurface conditions were explored by drilling 38 test borings at the approximate locations indicated on Figure 1. The test borings were advanced using a 4-inch diameter, continuous flight auger powered by track-mounted and buggy-mounted drill rigs. At frequent intervals, samples of the subsurface materials were obtained using a Modified California sampler which was driven into the soil by dropping a 140-pound hammer through a free fall of 30 inches. The Modified California sampler is a 2.5-inch outside diameter by 2-inch inside diameter device. The number of blows required for the sampler to penetrate 12 inches and/or the number of inches that the sampler is driven by 50 blows gives an indication of the consistency or relative density of the soils and bedrock materials encountered. Results of the penetration tests and locations of sampling are presented on the "Test Boring Logs", Figures 2 through 9. Ground water measurements were made at the time of drilling and subsequent to drilling.

6.0 LABORATORY TESTING

The samples obtained during drilling were returned to the laboratory where they were visually classified by a geotechnical engineer. Laboratory testing was then assigned to specific samples to evaluate their engineering properties. The laboratory tests included swell-consolidation tests to evaluate the effect of wetting and loading on the selected samples. Gradation analysis and Atterberg limits tests were conducted to evaluate grain size distribution and plasticity. In addition, representative samples were tested for water soluble sulfates, pH, resistivity, and chlorides. The test results are summarized on Figures 2 through 9 and presented in Appendix A.

7.0 SUBSURFACE CONDITIONS

The subsurface materials encountered in our test borings consist of fill, topsoil, and clay overlying sedimentary bedrock. Claystone and/or sandstone bedrock was encountered at depths ranging from 1 to 16 feet. Ground water was measured at depths ranging from 1 to 43 feet. A more complete description of the subsurface conditions is shown on Figures 2 through 9.

7.1 Fill

Fill was encountered in Test Boring 9 and was 4 feet thick. A gravel pad was located in this area. The fill consisted of sand and was medium dense, silty, very clayey, with scattered gravel, and mottled brown. The existing fill is more fully discussed under "Geotechnical Concerns".

7.2 Natural Soil

Topsoil was found in 37 of the 38 test borings. The topsoil encountered consisted of sandy clay up to 1-foot thick. It was organic, moist, and dark brown.

Clay was found in 35 of the 38 test borings. The clay was medium stiff to very stiff, silty, sandy, slightly moist, and brown. The clay has high to very high expansion potential.

7.3 Bedrock

Claystone bedrock was encountered in all 38 test borings at depths ranging from 1 to 19 feet. The claystone was weathered to very hard, silty, with trace sand to very sandy, iron stained, with sandstone and lignite lenses, slightly moist to moist, and brown to gray to rust to olive. Lignite lenses ranging from ½-foot to 2-feet thick were encountered in five test borings at depths ranging from 12 to 40 feet. The claystone bedrock has high to very high expansion potential.

Sandstone bedrock was encountered in 18 of the 38 test borings at depths ranging from 2½ to 39 feet. The sandstone was firm to very hard, poorly cemented, clayey to very clayey, moist to wet, and brown to rust to gray to olive. The sandstone bedrock has low expansion potential.

Interbedded claystone and sandstone bedrock was encountered in six of the 38 test borings at depths ranging from 1 to 26 feet. This bedrock was hard to very hard, silty, iron stained, moist, and brown to gray to olive to rust. The claystone and sandstone portions of this bedrock should perform as previously discussed. As a mass, this bedrock has moderate expansion potential.

7.4 Ground Water

Ground water was measured at depths ranging from 12½ to 43 feet in six of the 38 test borings at the time of drilling. When we returned 4 to 7 days later, ground water was measured at depths ranging from 1 to 41½ feet in eleven of the 38 test borings. Test Borings 35 and 36 caved at depths of 17½ and 1 foot, respectively. Test Boring 28 was destroyed by others and could not be checked for ground water after drilling. Ground water was measured at a depth of 1 foot in Test Boring 2 which was located south of a pond. Ground water levels fluctuate with changing seasons and irrigation patterns and are expected to rise after construction is complete and landscape irrigation commences.

8.0 GEOTECHNICAL CONCERNS

8.1 Existing Fill

Fill was encountered in Test Boring 9 and was 4 feet thick. It is not known whether the fill encountered was placed as fill capable of supporting a structure or other structural elements. No records of this fill placement have been provided for our review. Unless documentation is provided that is deemed acceptable, with maps indicating original and as built topography, all the existing fill should be excavated prior to placement of new fill, structures, or other structural appurtenances. The excavated fill should be evaluated to determine its suitability for placement as new fill across the site.

8.2 Expansive Soils and Bedrock

Clay, claystone, and interbedded claystone and sandstone bedrock with moderate to very high expansion potential were encountered. We believe that the structures will be constructed near expansive materials should traditional methods of grading be employed. These structures will need to be supported upon straight shaft piers bottomed in bedrock. The interior floors for these structures will need to be supported structurally.

Alternatively, overexcavation and placement of a moisture treated fill to reduce swell potential may be considered. This may allow for shallow foundations and slab-on-grade construction or a reduction in the length of the straight shaft piers. Based upon the materials encountered, we have estimated that the entire site requires overexcavation if the Client desires to reduce the likelihood of foundations supported by straight shaft piers.

8.3 Lignite and Coal Mines

Lignite lenses ranging from ½-foot to 2-feet thick were encountered in five test borings at depths ranging from 12 to 40 feet. Lignite is a soft coal which is commonly found within the bedrock formation which underlies this site. It can be found in thin layers within claystone or in layers that are very soft and wet to relatively hard and dry. Our experience in areas underlain by this bedrock formation indicates that the presence and amount of lignite in the bedrock can be very erratic in consistency and distribution, exhibiting itself in a random manner across the site. Since the material is not considered suitable for foundation support, its presence adds another level of uncertainty to the drilling of piers. Often lignite is encountered only in a portion of the piers for a structure. Where the lignite is wet, it must be cased to prevent caving and inflow of water. If it is encountered at the bottom of a long pier, it may not be possible to extend the pier through the lignite with currently available residential drill rigs. Additionally, placement of excavated lignite during the site grading process will require close monitoring and may require placement in non-structural areas or exporting from the site.

This site is identified as being underlain by abandoned underground coal mines on the "Statewide Historic Underground Coal Mine Extents and Reported Coal Mine-Related Subsidence Events Map" available on the Colorado Geological Survey's website. Western Environment and Ecology, Inc. issued the "Mine Subsidence Investigation, Pratt Property, Approximately 330 Acres in Section 29, Township 1 North, Range 68 West, Erie, Colorado, Project Number 655-001-01, dated September 19, 2014, for this site.

8.4 Ground Water

Ground water was encountered less than 15 feet beneath the existing ground surface in about 13% of the site. Ground water less than 15 feet below the site grading elevation will likely affect utility construction and some site grading operations. Ground water less than 10 feet below the site grading elevation will likely affect foundation excavations. In addition, ground water less than 5 feet below the existing or final ground surface will pose stabilization problems during site grading, foundation construction, and may cause problems during pavement construction. We recommend that foundations be constructed at least 4 feet above ground water level to reduce the potential for future water problems.

Site development should be planned to avoid or manage the ground water. Avoidance may entail raising the site grades to provide sufficient distance between the bottom of foundations and the ground water, allowing only at-grade construction (no basements) or other methods. Removing the ground water may entail the construction of drain systems and/or barriers that draw the ground water down sufficiently to allow below grade construction.

9.0 SITE DEVELOPMENT

9.1 Overlot Grading

We understand the fill materials to be used at the site will be from on-site cut areas. In general, suitable inorganic on-site or off-site soils may be used for structural fill. Existing fill should be excavated prior to placement of new fill. Topsoil, soil containing significant vegetation, organic debris or other deleterious material should be excavated and removed from the structural areas. Off-site material considered for new fill should be evaluated by AGW prior to importing to the site. Construction of the fill embankments throughout the site should consist of proper foundation preparation, constructing embankment benching where necessary, disposition of strippings, proper fill placement and compaction, and designing slopes in accordance with the recommendations provided in this report and the applicable governing regulations. The following are general site grading recommendations:

1. It is recommended that we be retained on an essentially full-time basis to observe and test the fill placement. We should also be retained to provide observations and/or testing of the other items discussed below. The purpose of this observation and testing is to provide the Client with a greater degree of confidence that the work is being performed within the recommendations of this geotechnical study and the project specifications.
2. Existing fill was found in Test Boring 9. The fill was placed under unknown conditions. Therefore, we recommend that the fill be entirely excavated. The fill should be observed during excavation in order to determine whether the excavated material may be re-used in the structural areas as new fill. Excavation of isolated test pits (with or without density-compaction testing) will not provide enough information, in our opinion, to allow the fill to remain in place.
3. All topsoil and vegetation should be stripped and removed prior to fill placement. The vegetation, organic soils, or topsoil should be wasted from the site, placed in non-structural areas (e.g., parks, landscaping, tracts, etc.) and/or stockpiled for future use in revegetating the surface of exposed slopes. In no case should these materials be used in the structural areas or where the stability of slopes will be affected. If placed in lots, topsoil must be placed outside of the structure setbacks and should not be placed where the fill depths exceed 5 feet. If placed in depth across the back of lots, movements of fences and dry utilities should be expected.
4. Drainages should be specifically observed by AGW prior to fill placement. Vegetation found at the base of these areas must be removed. Soft or rutting soils should be removed to firm material or the subgrade stabilized, if necessary. The existing drainages tend to collect subsurface water after fill has been placed. Where the grading fill is more than 12 feet deep, a blanket or "burrito" drain should be constructed along the flow line of the drainages to a gravity daylight outfall.
5. Where the existing slopes are steeper than a 5:1 (horizontal:vertical), benching will be required for structural integrity of any fills (see Figure 10).
6. The stripped foundation areas should be observed by AGW prior to fill placement. Any soft soils found in these areas must be removed or stabilized as necessary prior to fill placement.
7. After the fill areas have been cleared, the exposed soils should be scarified to a minimum depth of 6 inches, brought to the proper moisture content, and then compacted according to Appendix B.
8. Should significant amounts of lignite be excavated by individual scrapers, it should be stockpiled or wasted. Significant layers of lignite must not be constructed within the grading fills.
9. The compaction and moisture content of the soils will be dependent upon material types and the depth and location of placement. The specifications outlined in Appendix B are based upon providing a fill with sufficient shear strength to support structures

and sufficient moisture to reduce the potential of swell of the expansive soil used in the fill.

10. Where fill depths exceed 20 feet, additional compactive effort will be necessary to limit settlement of the fill. Where fill depths exceed 25 feet, we recommend a granular fill (less than 35% passing the U. S. Standard Number 200 Sieve) be placed below the 25-foot depth. If this is not feasible, additional testing of the proposed deep fill material will be required to estimate settlements. In any case, monitoring of fills greater than 25 feet in depth will be necessary. Compaction and moisture content specifications are provided in Appendix B.
11. Particular attention should be paid to compaction of the exterior faces of slopes.
12. Placement and compaction of fill should continue to final overlot grade. We recommend that the lots not be left low or "dished-out" and that placement of fill not stop at foundation elevation.
13. Other specifications outlined in Appendix B should be followed.

9.2 Overexcavation and Placement of Moisture Treated Fill

Based on the expansion potential of the clay and claystone bedrock, we recommend that the site be overexcavated if the use of shallow foundations is desired. Our experience indicates that overexcavation and placement of a moisture treated fill would be most effectively performed using mass grading techniques. The ideal time to do this would be during site development operations. As some overexcavation beneath the roadways will likely be required, it would be advantageous to perform this overexcavation during site grading. The following recommendations should be followed in order to enable the placement of a moisture treated fill that could be used for slab and foundation support. These recommendations may be modified during construction if soil conditions differing from those anticipated are encountered.

1. The site should be excavated to a depth of at least 14 feet below the lowest foundation elevation for basement products and 16 feet below the bottom of footing elevation for crawl space products. The base of the excavation should extend, at a minimum, to a width of at least 5 feet beyond the foundation footprint (including any counterforts, covered porches, patios, decks, etc.). Excavations that do not extend to these minimums risk future foundation performance issues. It may be prudent to extend the base of the excavation to 5 feet outside of the front and rear setbacks in order to accommodate potential changes in structure dimension. Additionally, the street subgrade should be overexcavated to a depth of at least 5 feet which should extend to at least 1 foot beyond back of sidewalk (combination sidewalk) or back of curb (detached sidewalk). The excavation should be sloped following current OSHA regulations. We will not be responsible for testing near excavations that do not meet OSHA regulations. A licensed surveyor must verify the extents of the excavation prior to any fill placement.
2. Water flow into the overexcavation may occur in areas of shallow ground water. We believe that the water can be handled during construction by channeling the water in the excavation(s) and pumping from sumps. It may be prudent to provide permanent drains at the base of the overexcavation in these areas. However, if an

outfall for the drains cannot be found, they should not be constructed. The drain(s) should be sloped to a positive gravity outfall. Depending on the location of the inflow, chimney drains may be necessary to convey water from sidewall seepage areas to the drain. The configuration of these drains should be determined at the time of construction.

3. Where soft, rutting soils are found beneath planned fill areas, removal, in-place drying, or stabilization may be necessary. Stabilization prior to fill placement may be accomplished by placing crushed rock or equivalent material, which should be evaluated by AGW prior to use. The material should be spread across the area and worked into the underlying soft or loose soils with fully-loaded rubber-tired equipment. This procedure should continue until scraper-type equipment can be supported on the rock fill with no significant deflection or rutting. In some instances, a geogrid or geotextile stabilization fabric may be economical for use in conjunction with rock stabilization.
4. Should significant amounts of lignite be excavated by individual scrapers, it should be stockpiled or wasted. Significant layers of lignite must not be constructed within the grading fills.
5. Once the excavation depth and width have been verified, fill placement may begin. The bottom of the excavation should be scarified and moistened prior to fill placement. The fill, consisting of the excavated materials, should be placed in maximum 8-inch loose lifts. Moisture should be added and the lift processed. The use of a construction disc to mix and process each lift is suggested. Mixing should be performed until the moisture content is relatively uniform throughout the lift and the majority of the particles are less than 3 inches in dimension. Additional processing of the excavated claystone bedrock may be required due to the hardness of the material and low moisture content. The earthwork contractor should be made aware of the extra processing required. The fill should then be compacted as described in Appendix B.
6. Essentially full-time observation and testing of fill placement must be performed by AGW. Testing should include in-place moisture content and dry density. Swell-consolidation or other testing may also be performed at the discretion of AGW.
7. Placement and compaction of fill should continue to final overlot grade. We recommend that the lots not be left low or "dished-out" and that placement of fill not stop at foundation elevation. If the residences will not be constructed within two years of completion of the fill, additional effort may be necessary to help maintain the moisture within the fill. This may include the addition of more soil to blanket the compacted fill, the placement of mechanical or chemical barriers, or applying water periodically to the fill surface. We are available to discuss this with you.

It must be understood that while this method is used to reduce the likelihood of future heave, it is not free of risk of foundation movement. While future heave is less likely, the possibility of settlement induced by excess moisture is increased. Therefore, the control and removal of surface water at the site will continue to be very important.

Our experience indicates that clay materials of the type encountered at this site will likely exhibit an average swell of less than 2% under a surcharge load of 1,000 pounds per square foot (psf) when thoroughly mixed with water and processed with typical earthmoving equipment. It is anticipated that if this level of swell reduction is achieved, the foundations may be constructed by placing footings upon the fill. This level of swell should also provide for a low to moderate risk of basement slab movement. However, it must be understood that even with the procedures outlined above, there is a possibility that moderate to high measured swells may be found in the fill. This may require rework of portions of the fill or the use of pier foundations and structural support of interior floors. Additional drilling after the soil modification has been completed will be required to provide final foundation recommendations and basement slab risk assessments for each residence.

9.3 Slopes and Retaining Walls

Slope stability and retaining wall analyses were not conducted as part of this study. In areas where existing slopes exceed 5:1 (horizontal:vertical), benching prior to fill placement will be required (see Figure 10). Construction of conventional fill slopes should be limited to 3 to 1 or flatter. Cut slopes steeper than 2 to 1 should be evaluated for stability. Specific analysis will also be necessary if retaining walls are to be constructed.

9.4 Construction Excavation

In our opinion, the majority of the site grading, utility, and foundation excavations may be constructed using conventional earth-moving equipment for the Front Range area. Excavations deeper than 3 feet should be properly sloped or braced to prevent collapse of potentially caving soils. For planning purposes, fill and any soil influenced by ground water are "Type C" and the underlying bedrock is "Type A" according to OSHA regulations. A final determination of the soil type must be made by the Contractor's "Competent Person" (as defined by OSHA Regulation). Local, city, county, state, and federal (OSHA) regulations should be followed.

In areas of the site, the presence of ground water may be a significant constraint on construction excavation. It will be necessary to dewater all excavations constructed below the ground water level. Dewatering may include pumping from the work area or construction of well points. The excavation and utility contractor(s) must be made aware of the ground water conditions so that contract bidding will include the appropriate provisions.

9.5 Utility Construction

In our experience, utility excavations may be constructed using conventional earth-moving equipment for the Front Range area. All excavations should be sloped or shored in the interest of safety, following local and federal (OSHA) regulations. For planning purposes, OSHA soil type designations are discussed under "Construction Excavations". Final determination of the soil types must be made by the contractor's "Competent Person" (as defined by OSHA) at the time of construction.

In areas, the presence of ground water may be a constraint upon utility construction. It will be necessary to dewater all trenches constructed below the ground water level. A possible method for dewatering would be to begin construction of the deeper (sewer) utilities at their outfall and to work upstream. Other methods include pumping from the trench in the work area or construction of well points along the trenches. The utility contractor must be made aware of the ground water conditions.

Trench backfill within all structural areas should, as a minimum, be compacted using the same methods and to the same specifications as required for overlot grading. This is especially important where utility lines and laterals are constructed beneath foundation, alley, and driveway areas. Trenches in streets should be compacted to the Town of Erie specifications. Observation and testing of fill placement must be performed during trench backfilling.

The choice of compaction equipment can have a significant effect on the performance of trench fills. It is our experience that utility trench backfills compacted with a compaction wheel attached to an excavator experience more settlement (both in area and magnitude) than those compacted with self-propelled equipment. While the contractor has control of the means and methods of construction, the Client should be aware of this issue.

9.6 Subsurface Drainage

The ground water encountered is anticipated to cause significant problems in areas of the site during development, especially if the overexcavation option is selected. As discussed under "Geotechnical Concerns", ground water should be avoided wherever possible. Additionally, clay soils and bedrock were encountered in the test borings drilled for this study. These types of material have a relatively low permeability and can develop a perched water condition. Perched water conditions generally occur after development and construction have taken place, when landscape irrigation and surface drainage conditions are changed.

For these reasons, an overall area drain (underdrain) should be considered for the site. In addition, the overall area drain could also provide for a discharge and collection point for individual foundation drains. If an area drain discharge is not available, the individual foundation drains will discharge collected water to the ground surface near each residence. Surface discharge can result in water recycling to the foundation drain and ponding of water where surface grading is not sufficient for water flow. Foundation drain discharge can also result in algae growth where water continually crosses sidewalks which become ice hazards on walkways and gutters in the winter months.

Typically, overall area drains can be designed and constructed with installation of the sanitary sewer system. However, the Town of Erie should be consulted to determine where an overall system is allowed. The civil engineering company contracted to design the infrastructure should be able to provide this design. We are available to assist in drain design. For the system to work, the area drain must be graded to a positive discharge point. If a permanent outfall for an area drain cannot be determined, the area drain should not be constructed.

If it is decided not to install an overall area drain, an alternative would be to establish points of positive gravity discharge for the gravel bedding beneath the sewer. We also recommend any basement or below grade area be provided with a perimeter subsurface drainage system sloped to drain to a positive gravity discharge such as a sump or connected directly to the overall area drain system.

9.7 Surface Drainage

We recommend that provisions be made to divert surface runoff away from development areas. This may reduce potential problems associated with excess water in structure bearing soils. The site should be designed such that a 10% slope can be established near the structures after foundation construction. Slopes of at least 2% should be planned in landscaped areas once the water is away from the foundations.

10.0 SITE CONCRETE AND CORROSIVITY

Laboratory tests conducted on selected soil samples yielded water soluble sulfates ranging from less than 100 parts per million (ppm) to 5,160 ppm. Based upon these results and our experience in the area, the site soils and bedrock are assigned to possess severe (S2 or RS2) sulfate exposure per ACI 318 or ACI 332. We recommend the "ACI Manual of Concrete Practice", of the most recent edition be used for proper concrete mix design properties as they relate to these conditions.

The pH test results ranged from 7.8 to 8.8, resistivity test results at in-situ moisture ranged from 243 to 3,731 ohm·cm, and chloride test results ranged from 0.0002% to 0.0206%. These results are summarized on Figures 2 through 9 and on Table A-1 in Appendix A. The results of this testing should be used as an aid in choosing the construction materials in contact with these soils which will be resistant to the various corrosive forces. Manufacturer's representatives should be contacted regarding the specific corrosivity resistance for their products. In addition, local specifications should be consulted when selecting pipe materials.

11.0 PRELIMINARY FOUNDATION DESIGN CONCEPTS

The foundation recommendations for each structure are dependent upon the subsurface profile and engineering properties of the materials encountered at and near the depth of the proposed foundation. These are dependent upon the final configuration of and construction methods used during overlot grading at the site. The information in the following sections presents preliminary foundation concepts which must be finalized for each building site upon completion of the overlot grading operations. AGW should be retained to perform design level soil and foundation studies after completion of site grading.

11.1 Straight Shaft Piers

A possible foundation system for structures founded where moderately to highly expansive clay and/or claystone are at or near the bottom of the foundation excavations would be straight shaft piers drilled into bedrock. If soil modification is not employed, we believe that all the structures will require a pier foundation system. The piers will likely be designed for an end bearing pressure in the range of 20,000 to 30,000 psf, a minimum dead load pressure in the range of 20,000 to 30,000 psf, and a side shear in the range of 2,000 to 3,000 psf. Pier lengths on the order of 35 to 45 feet with bedrock penetration from 16 to 22 feet can be anticipated. Casing of the piers should be anticipated in areas with shallow ground water.

11.2 Footings

If the site is overexcavated, spread footings or footing pad foundations may be possible. The footings must be founded below frost depth. The footings will likely be designed for maximum soil bearing pressures ranging from 1,000 to 3,000 pounds per square foot (psf). Minimum dead load pressure on the order of 700 to 1,000 psf will likely be required.

11.3 Lateral Earth Pressures

Foundation walls with fill on only one side will need to be designed for lateral earth pressures. For this site, lateral earth pressures calculated based upon equivalent fluid densities on the order of 50 to 75 pcf should be anticipated. The preliminary estimates are for properly placed and compacted fill at foundation walls. They should not be used for site retaining walls.

11.4 Interior Floors (Basement Products)

If the site is developed using traditional overlot grading techniques, it is likely that the structures be assessed with high to very high slab risk performance. If the site is overexcavated, it is likely that the sites will be assessed with a low to moderate slab risk performance. Slab-on-grade construction may be appropriate for full, unfinished basement construction on sites with low or moderate evaluations. Structural floors are generally recommended on sites with higher risk evaluations and for finished basements or any site where floor movement or cracking cannot be tolerated. If slab movement cannot be tolerated, structural floors should be constructed.

11.5 First Floor Construction (Crawl Space Products)

Some of the structures may be constructed over crawl spaces. Structural floors will be constructed in the living areas of the residences. For the garage areas, it is likely that there will be a low to moderate risk of garage slab movement after the site is overexcavated. If the site is not overexcavated, the risk of garage slab movement is very high.

11.6 Drain Systems

Drain systems will be required around the lowest excavation level for below grade spaces for each structure. Either interior or exterior drains may be used for most of the site. Where ground water is within 4 feet of the foundation, a more extensive drain system will be required. This may include gravel across the entire foundation, drain laterals, or combination interior and exterior drains. The drains must be led to a positive gravity outfall or sump. If an overall subdivision area drain is constructed, individual drains should be connected into this system if allowed by the jurisdiction.

11.7 Backfill and Surface Drainage

Foundation backfill should be moistened and compacted to reduce future settlement. The site grading should consider a slope of 10% away from the foundation at the completion of construction. All other drainage swales in landscaped areas should slope at a minimum of 2%.

12.0 PRELIMINARY STREET PAVEMENT DESIGN

Pavement design is based on the engineering properties of the subgrade and pavement materials, the assumed design traffic conditions, and the Town of Erie pavement regulations. Effective pavement structures are composed of various pavement materials bearing upon properly prepared subgrade soils. The following preliminary pavement recommendations are based upon the subsurface conditions encountered and our experience in the area.

It appears the proposed subgrade materials will likely be clay, claystone, sandstone, or fill constructed from these materials. Their AASHTO soils classifications are A-4, A-6, and A-7-6. The clays and claystone should be overexcavated to a depth of at least 5 feet below the subgrade elevation. The overexcavation should be performed during site grading prior to construction of utilities within the right-of-way. Overexcavation should cover the area from 1 foot beyond back of sidewalk (for attached sidewalk areas) or back of curb (for detached sidewalks). The excavated material may be placed as moisture treated fill (see Appendix B) within the right-of-way. This should result in a reduction in pavement thickness. All fill placed within 5 feet of the subgrade elevation should be placed as moisture treated fill.

Moisture treatment is the process of removing subgrade materials, adding moisture between 0 to 4% above optimum moisture content, and compacting the subgrade to at least 95% of Proctor maximum dry density. The Client should understand soils treated to 4% above optimum moisture content will have low support values and may be soft and yielding under load. Stabilization by chemical or mechanical means may be necessary to achieve a stable paving platform.

Based upon the subgrade soil classifications, we have estimated the relative strengths of the subgrade soils presented above in order to determine the preliminary pavement thicknesses. Based on this information and utilizing the design methodology determined from the pavement design regulations for the Town of Erie, the alternatives presented below were calculated. These preliminary thickness recommendations are based on a design life of 20 years. It should be emphasized that the design alternatives provided below are preliminary for the materials anticipated. The final design thicknesses could be more or less than indicated depending upon the materials sampled during the final pavement design.

Pavement Thickness Alternatives for Interior Streets

Street Type	HBP / ABC (in)	Concrete (in)
Collector	5.5 – 6.5 / 8.0 – 10.0	-
Locals	5.0 – 6.0 / 6.0 – 8.0	-
Alleys	-	6.0 – 8.0 *

HBP = Hot Bituminous Pavement, ABC = Aggregate Base Course, *8.0 if inverted

The above preliminary thickness recommendations are based on a design life of 20 years. It should be emphasized that the design alternatives provided above are preliminary for the materials anticipated. The final design thicknesses could be more or less than indicated depending upon the materials sampled during the final pavement design.

Proper surface and subsurface drainage is essential for adequate performance of pavements. It has been our experience that water from landscaped areas can infiltrate pavement subgrade soils and result in softening of the subgrade followed by pavement damage. Therefore, provisions should be made to maintain adequate drainage and/or contain runoff from such areas. The Town of Erie requires a pavement edge drain be installed behind the curb and gutter for all streets. In addition, water and irrigation lines should be thoroughly pressure tested for leaks prior to placement of pavement materials.

It must be reiterated that the information contained in this section is preliminary in nature. More detailed information will be required by the Town of Erie prior to issuance of a paving permit. Therefore, when overlot grading is complete at the site, a final pavement evaluation must be performed.

13.0 FINAL DESIGN CONSULTATION AND CONSTRUCTION OBSERVATION

This report has been prepared for the exclusive use of Stratus Redtail Ranch, LLC for the purpose of providing geotechnical criteria for the proposed project. The data gathered and the conclusions and recommendations presented herein are based upon the consideration of many factors including, but not limited to, the type of structures proposed, the configuration of the structures, the proposed usage of the site, the configuration of surrounding structures, the geologic setting, the materials encountered, and our understanding of the level of risk acceptable to the Client. Therefore, the conclusions and recommendations contained in this report should not be considered valid for use by others unless accompanied by written authorization from AGW.

AGW should be contacted if the Client desires an explanation of the contents of this report. AGW should be retained to provide future geotechnical services for the site including, but not limited to, design level geotechnical studies, consultation during design, observation and testing during construction, and other geotechnically related services. Failure to contract with AGW for these services or selection of a firm other than AGW to provide these services will eliminate liability for AGW. We are available to discuss this with you.

14.0 GEOTECHNICAL RISK

The concept of risk is an important aspect of any geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be tempered by engineering judgment and experience. Therefore, the solutions or recommendations presented in any geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structures will perform as desired or intended. What the engineering recommendations presented in the preceding sections do constitute is our judgement of those measures that increase the chances for the structures and improvements performing satisfactorily. The Developer, Builder, and Owner must understand this concept of risk, as it is they who must ultimately decide what is an acceptable level of risk for the proposed development of the site.

15.0 LIMITATIONS

We believe the professional judgments expressed in this report are consistent with that degree of skill and care ordinarily exercised by practicing design professionals performing similar design services in the same locality, at the same time, at the same site and under the same or similar circumstances and conditions. No other warranty, express or implied, is made. In the event that any changes in the nature, design or location of the facility are made, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing. Because of the constantly changing state of the practice in geotechnical engineering, and the potential for site changes after our field exploration, this report must not be relied upon after a period of three years without AGW being given the opportunity to review and, if necessary, revise our findings.

The test borings drilled for this study were spaced to obtain an understanding of subsurface conditions for design purposes. Variations frequently occur from these conditions which are not indicated by the test borings. These variations are sometimes sufficient to necessitate modifications in the designs. If unexpected subsurface conditions are observed by any party during site development, we must be notified to review our recommendations.

Our scope of services for this project did not include, either specifically or by implication, any research, identification, testing, or assessment relative to past or present contamination of the site by any source, including biological (i.e., mold, fungi, bacteria, etc.). If such contamination were present, it is likely that the exploration and testing conducted for this report would not reveal its existence. If the Client is concerned about the potential for such contamination or pollution, additional studies should be undertaken. We are available to discuss the scope of such studies with you.

Our scope of services for this project did not include a local or global geological risk assessment. Therefore, issues such as mine subsidence, slope stability, faults, etc. were not researched or addressed as part of this study. If the Client is concerned about these issues, we are available to discuss the scope of such studies upon your request.

Sincerely,

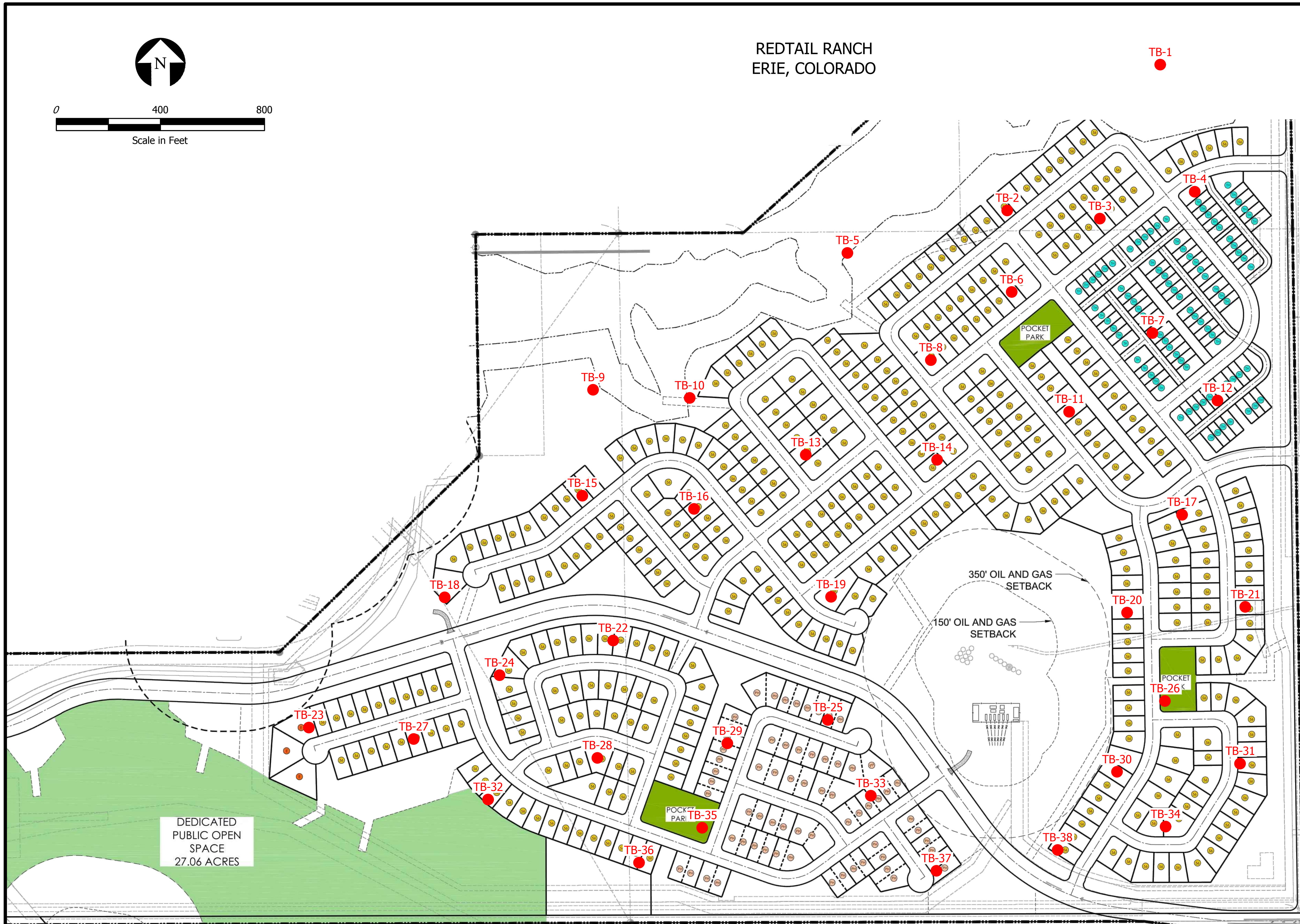
A. G. Wassenaar, Inc.

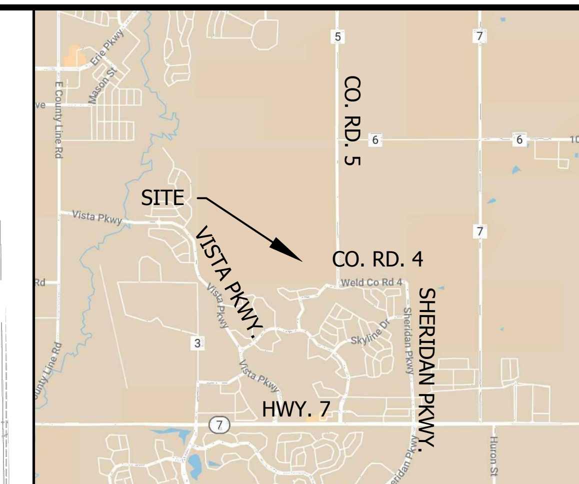
COLORADO LICENSED
KATHLEEN ANN NOONAN
32156
PROFESSIONAL ENGINEER

Kathleen A. Noonan

Kathleen A. Noonan, M.S., P.E.
Senior Geotechnical Engineer

KAN/kan





VICINITY MAP
NOT TO SCALE

NOTES:
1. TEST BORINGS ARE OVERLAID ON THE "REDTAIL RANCH PRELIMINARY SITE PLAN", PREPARED BY TERRACINA DESIGN, DATED FEBRUARY 17, 2021.
2. ALL LOCATIONS ARE APPROXIMATE.

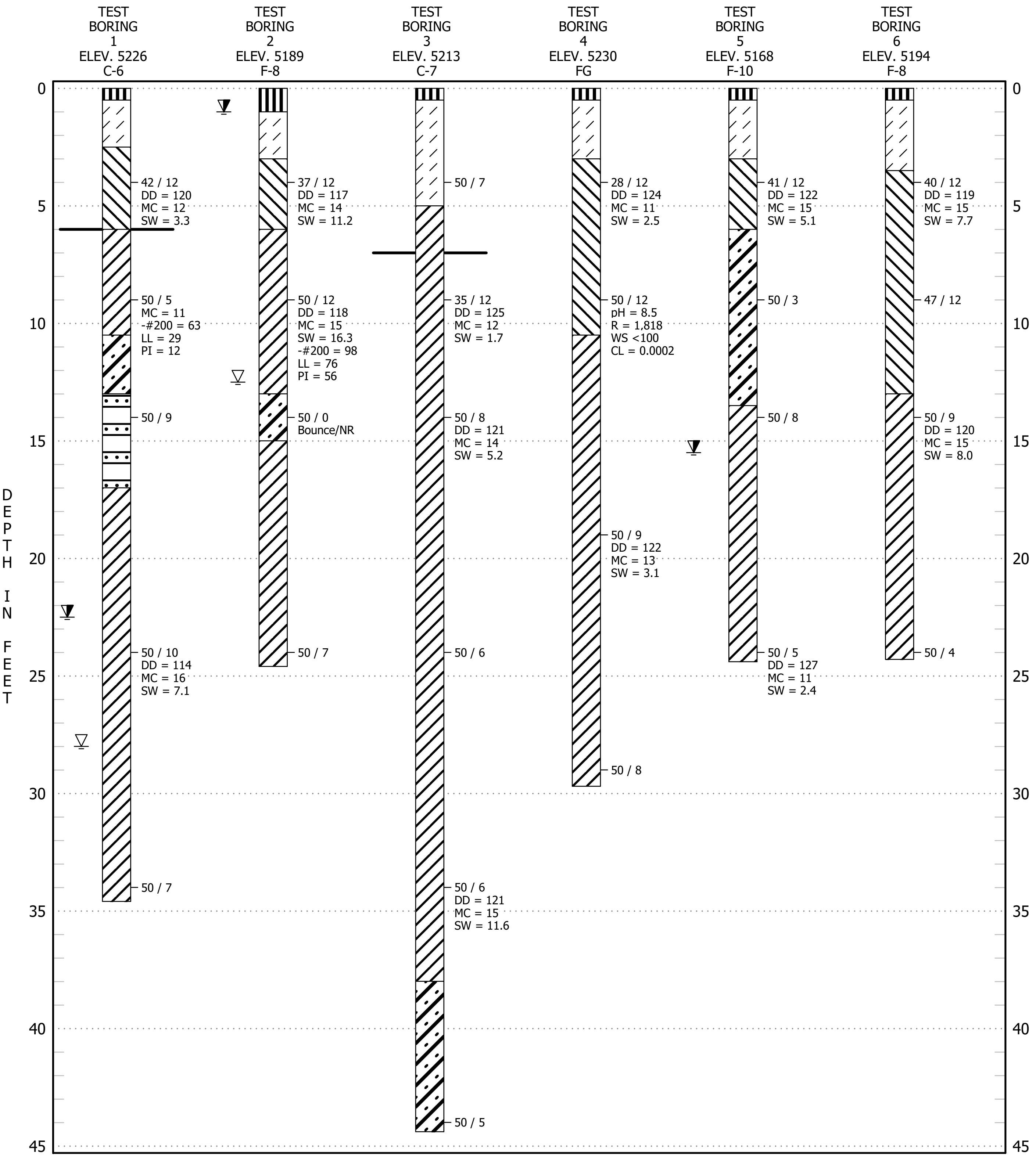
AGW
A.G. WASSENAAR, INC.

SITE PLAN AND VICINITY MAP	PROJECT NO. 160388 FIGURE 1

A.G. WASSENAAR, INC.

CLIENT Stratus Redtail Ranch, LLC **PROJECT NAME** Redtail Ranch

PROJECT NUMBER 160388 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 9 FOR LEGEND AND NOTES

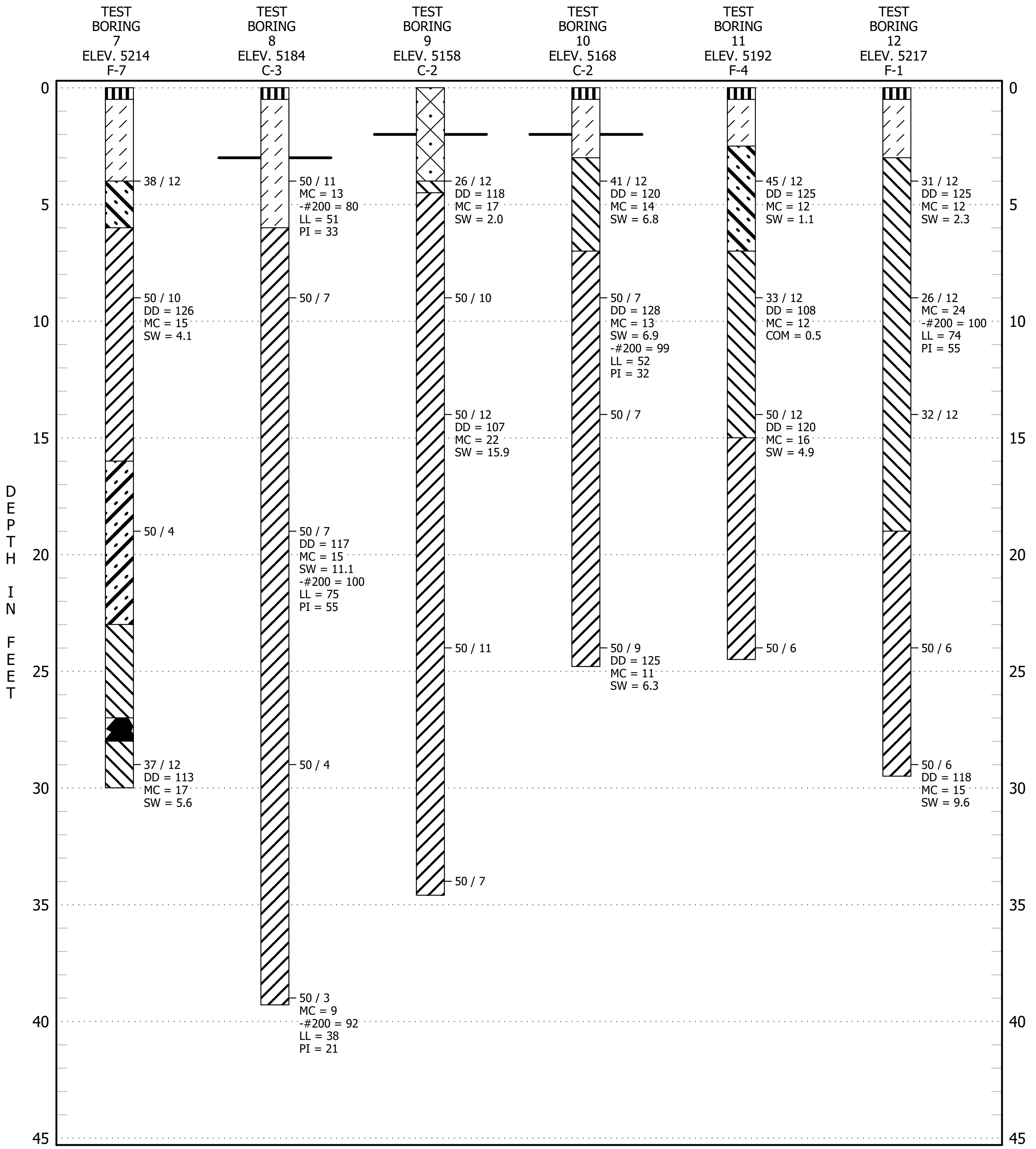
TEST BORING LOGS

FIGURE 2

A.G. WASSENAAR, INC.

CLIENT Stratus Redtail Ranch, LLC **PROJECT NAME** Redtail Ranch

PROJECT NUMBER 160388 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 9 FOR LEGEND AND NOTES

TEST BORING LOGS

FIGURE 3

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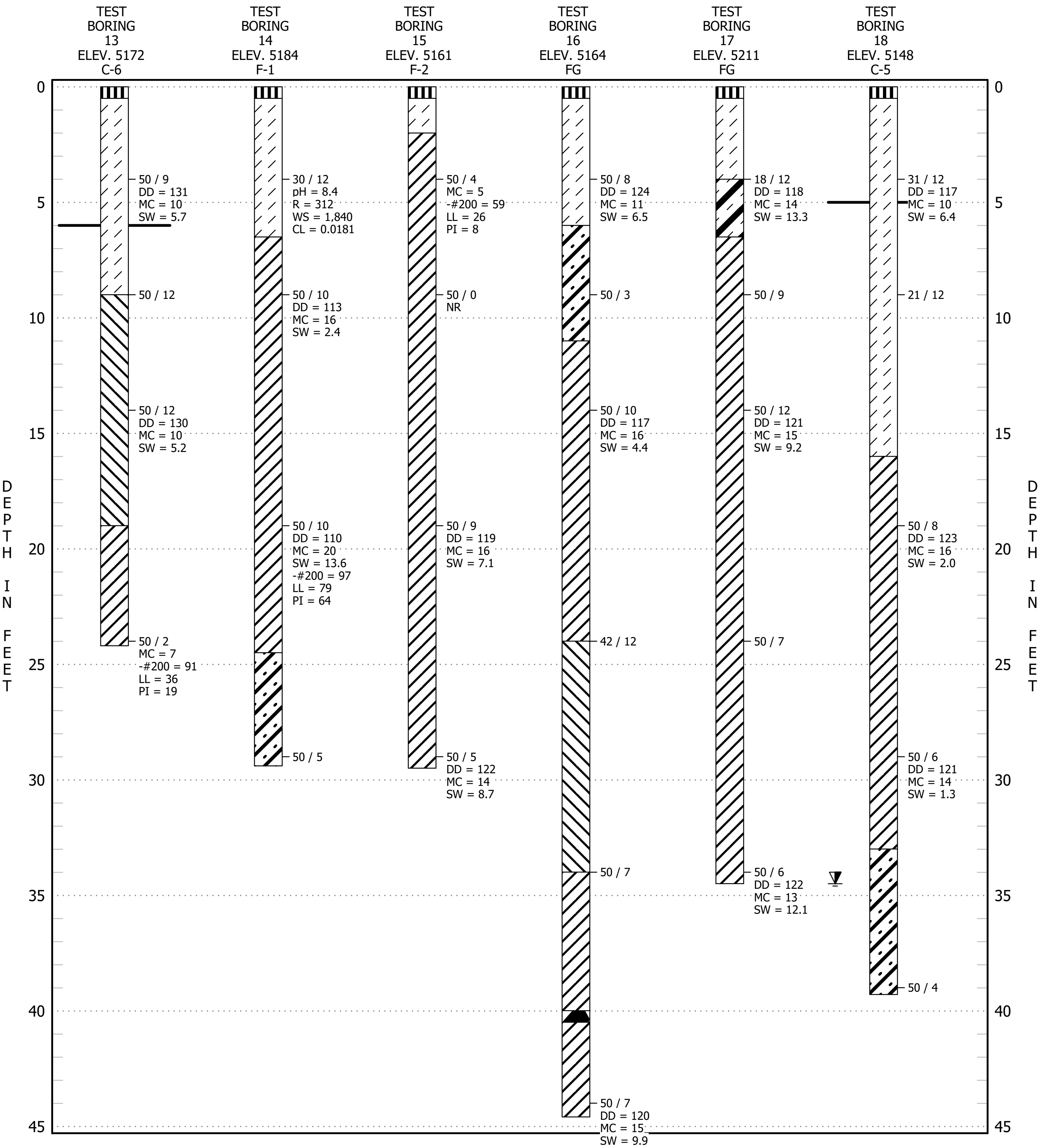
A.G. WASSENAAR, INC.

CLIENT Stratus Redtail Ranch, LLC

PROJECT NAME Redtail Ranch

PROJECT NUMBER 160388

PROJECT LOCATION Erie, Colorado



SEE FIGURE 9 FOR LEGEND AND NOTES

TEST BORING LOGS

FIGURE 4

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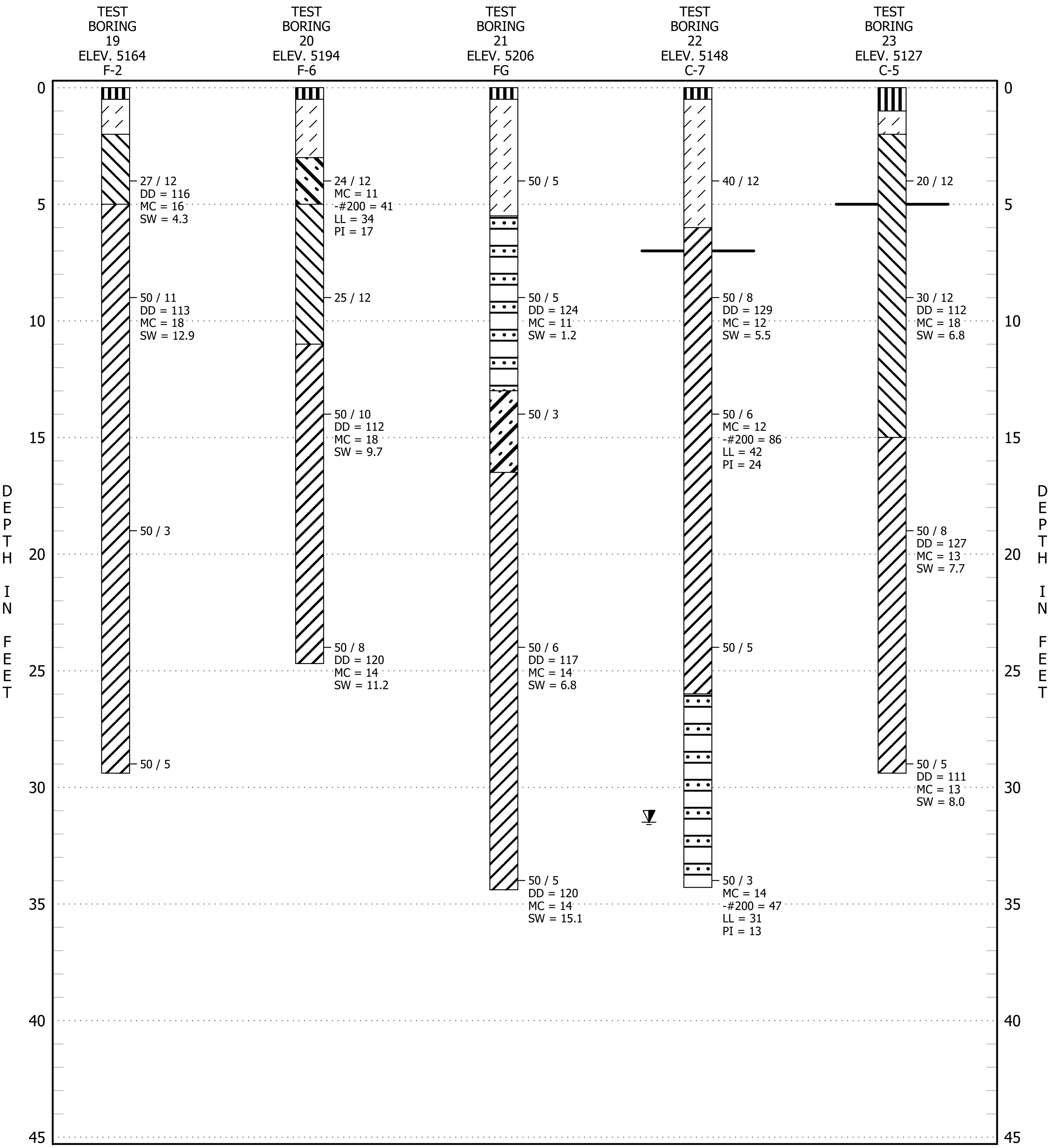
AGW

A.G. WASSENAAR, INC.

CLIENT Stratus Redtail Ranch, LLC **PROJECT NAME** Redtail Ranch

PROJECT NUMBER 160388 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 9 FOR LEGEND AND NOTES

TEST BORING LOGS

FIGURE 5

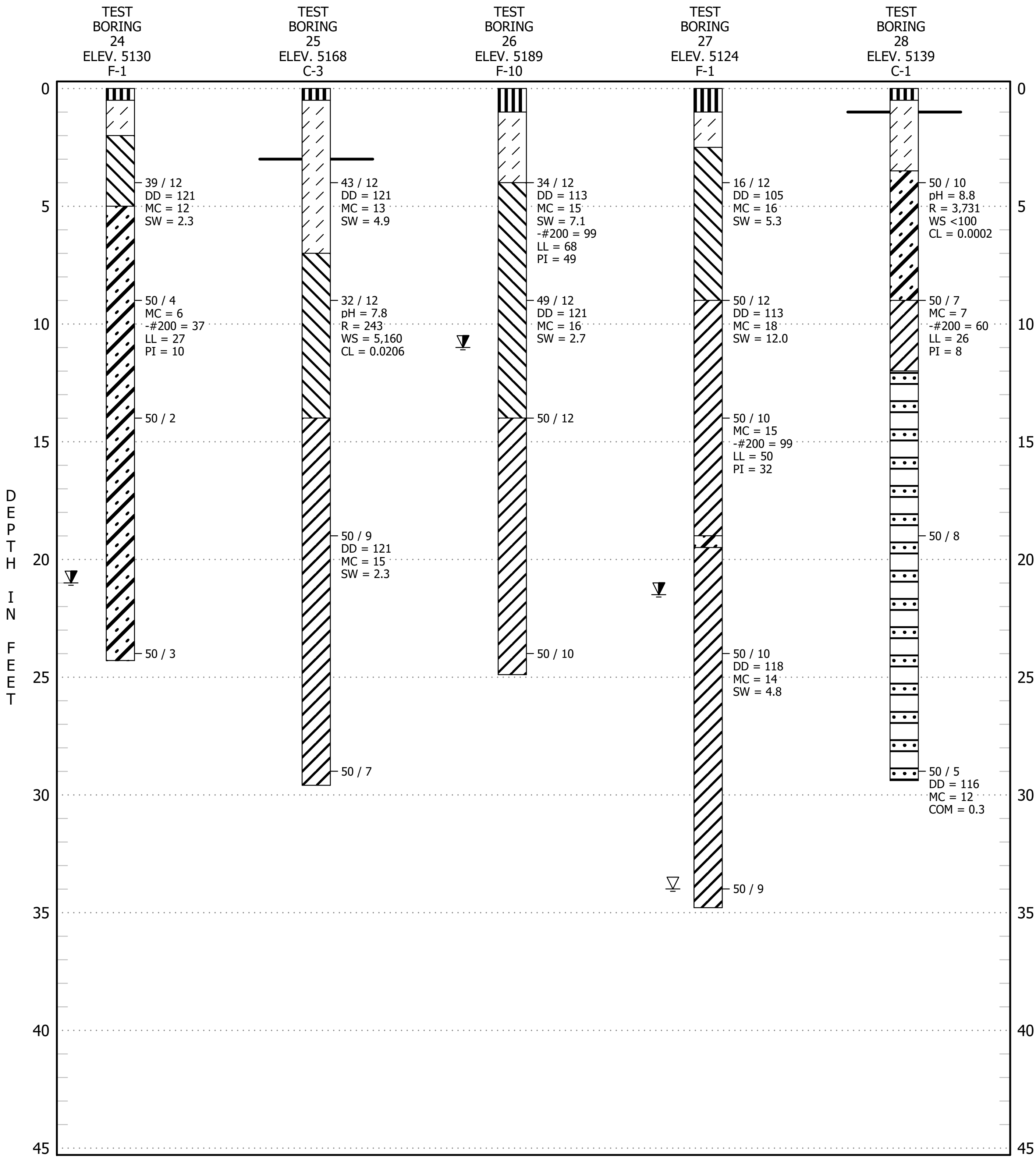
A.G. WASSENAAR, INC.

CLIENT Stratus Redtail Ranch, LLC

PROJECT NAME Redtail Ranch

PROJECT NUMBER 160388

PROJECT LOCATION Erie, Colorado



SEE FIGURE 9 FOR LEGEND AND NOTES

TEST BORING LOGS

FIGURE 6

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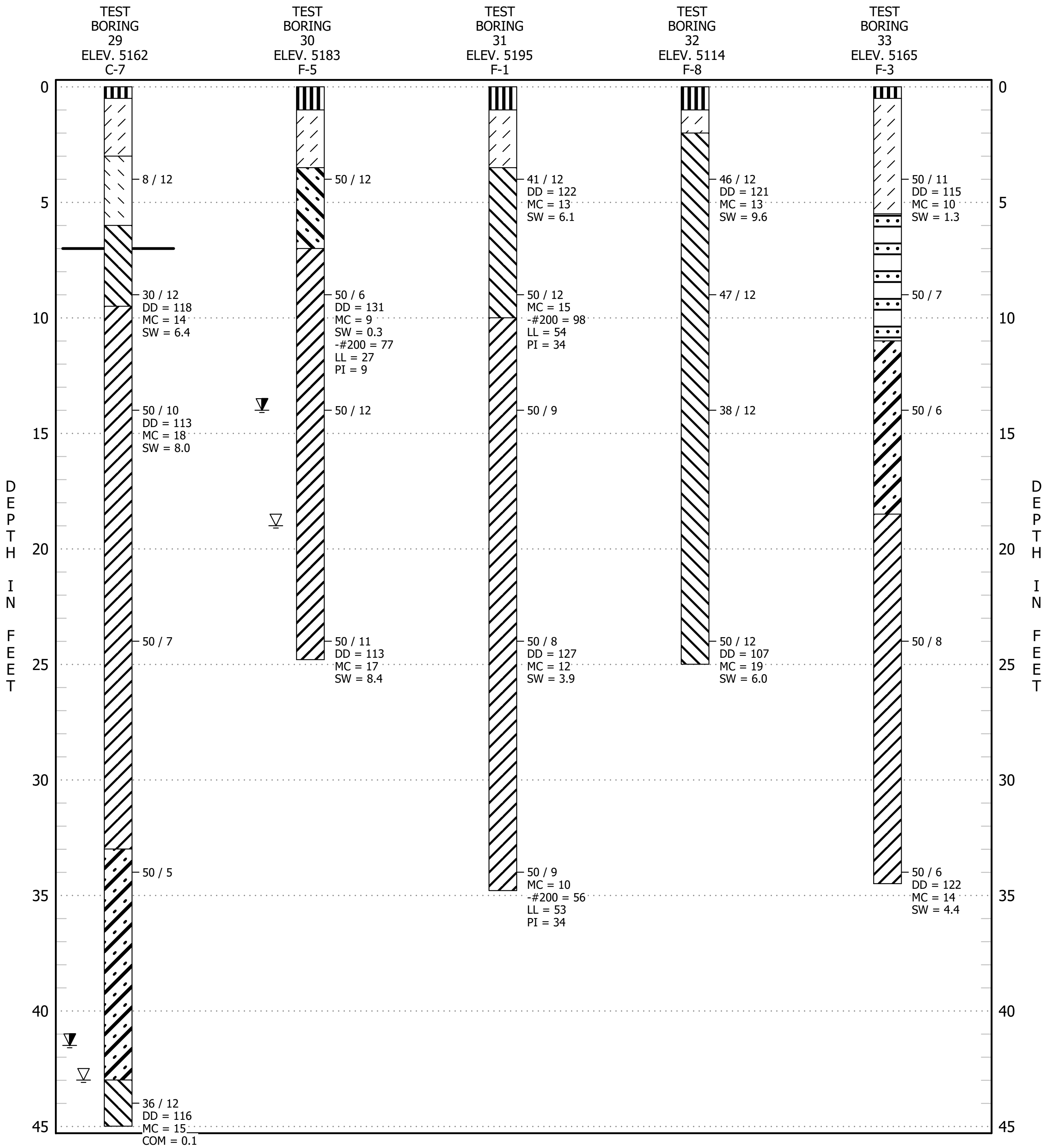
A.G. WASSENAAR, INC.

CLIENT Stratus Redtail Ranch, LLC **PROJECT NAME** Redtail Ranch

PROJECT NUMBER 160388 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 9 FOR LEGEND AND NOTES

TEST BORING LOGS

FIGURE 7

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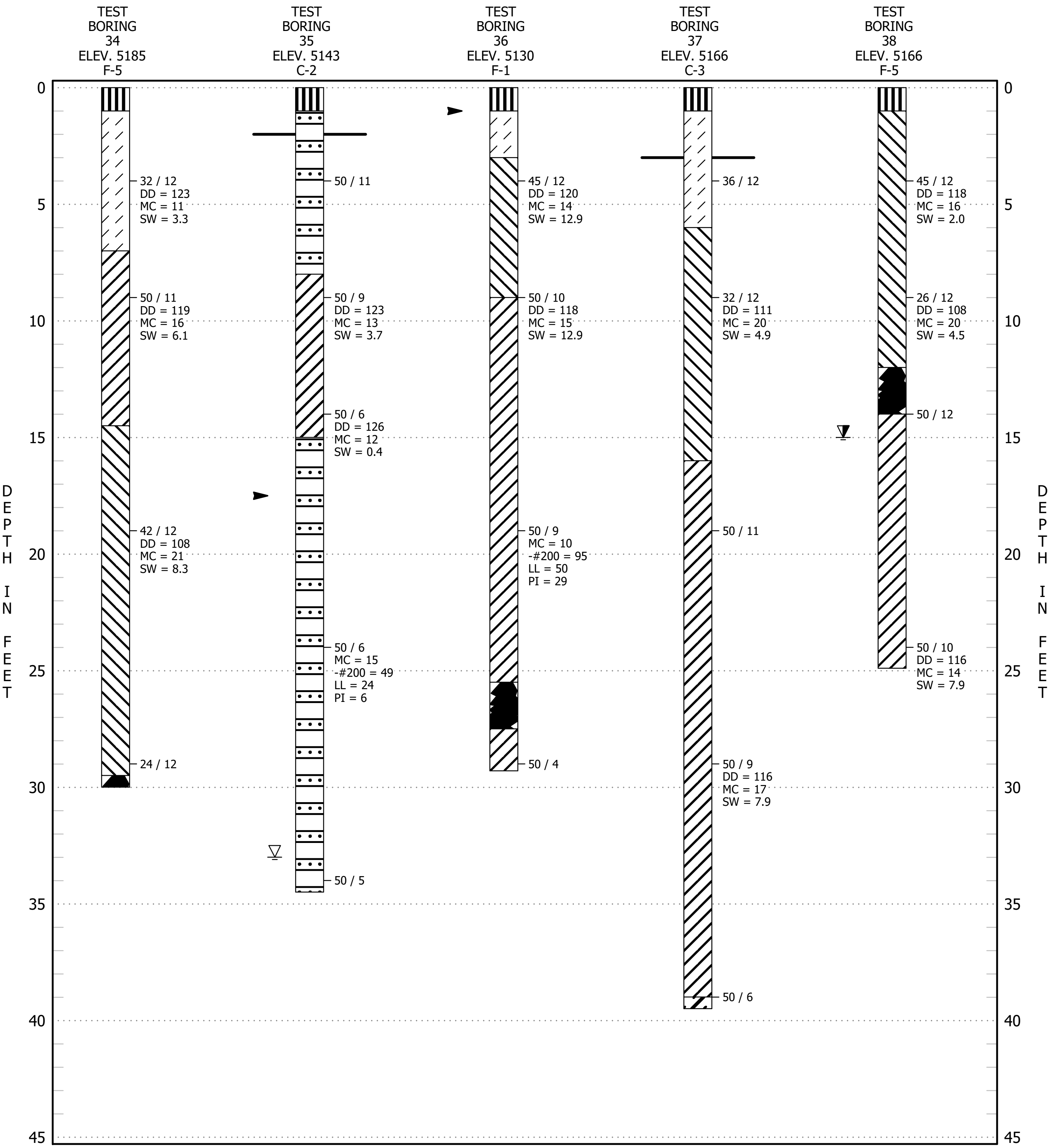
A.G. WASSENAAR, INC.

CLIENT Stratus Redtail Ranch, LLC **PROJECT NAME** Redtail Ranch

PROJECT NUMBER 160388 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 9 FOR LEGEND AND NOTES

TEST BORING LOGS

FIGURE 8

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A.G. WASSENAAR, INC.

CLIENT Stratus Redtail Ranch, LLC

PROJECT NAME Redtail Ranch

PROJECT NUMBER 160388

PROJECT LOCATION Erie, Colorado

SOIL DESCRIPTIONS

- Topsoil, clay, sandy, organic
- Fill, sand, medium dense, silty, clayey
- Clay, medium stiff
- Clay, stiff to very stiff
- Clay (weathered claystone), medium stiff to stiff
- Claystone (Bedrock), firm to medium hard
- Claystone (Bedrock), hard to very hard
- Lignite, black
- Sandstone (Bedrock), firm to medium hard
- Sandstone (Bedrock), hard to very hard
- Claystone/Sandstone (Bedrock), interbedded, hard to very hard

ABBREVIATIONS

DD	Dry density of sample in pounds per cubic foot (pcf)
MC	Moisture content as a percentage of dry weight of soil (%)
SW	Percent swell under a surcharge of 1000 pounds per square foot (psf) upon wetting (%)
COM	Percent compression under a surcharge of 1000 pounds per square foot (psf) upon wetting (%)
UC	Unconfined compressive strength in pounds per square foot (psf)
-#200	Percent passing the Number 200 sieve (%)
LL	Liquid Limit
PI	Plasticity Index
NP	Non-Plastic
NV	No Value
pH	Acidity or alkalinity of sample in pH units
R	Resistivity in ohms.cm
WS	Water soluble sufates in parts per million (ppm)
CL	Chlorides in percent (%)
x/y	X blows of a 140-pound hammer falling 30 inches were required to drive a 2.5-inch outside diameter sampler Y inches
x/y SS	X blows of a 140-pound hammer falling 30 inches were required to drive a 2.0-inch outside diameter sampler Y inches
C-x	Depth of cut to grade (rounded to the nearest foot)
F-x	Depth of fill to grade (rounded to the nearest foot)
FG	Finished grade (rounded to the nearest foot)
NR	No sample recovered
Bounce	Sampler bounced during driving
B	Bulk sample
AS	Auger sample
▤	Moderately to well cemented layer
—	Approximate depth of cut
▲	Depth at which practical drilling refusal was encountered
▽	Water level at time of drilling
▷	Caved depth at time of drilling
▼	Water level 4 to 11 day(s) after drilling
►	Caved depth 4 to 11 day(s) after drilling

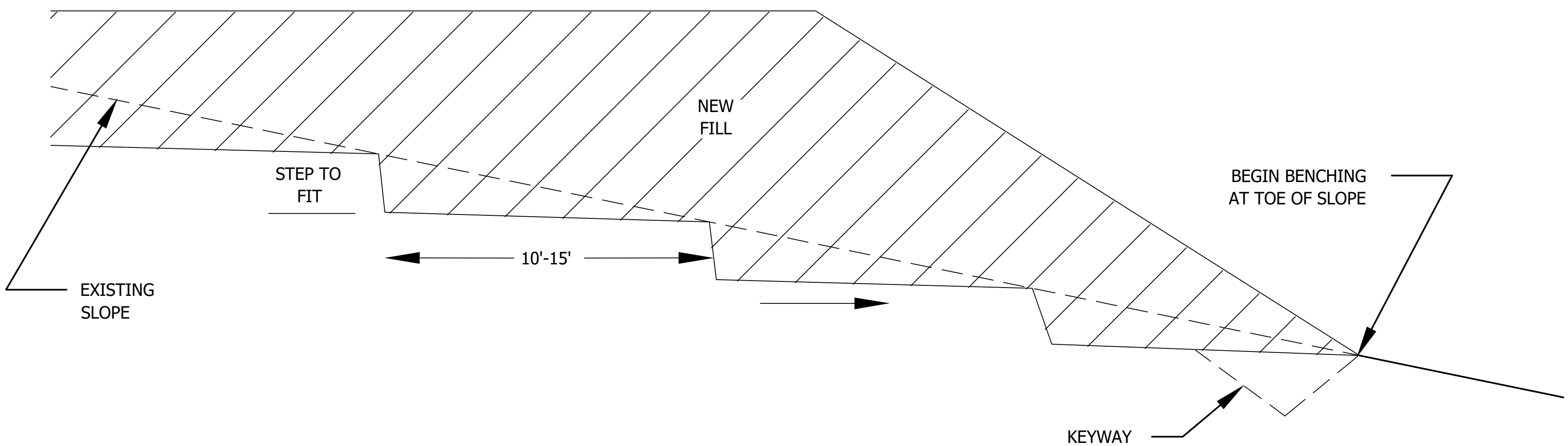
Notes:

1. Test borings were drilled April 1, 2016 to April 7, 2016.
2. Location of the test borings were staked by others at locations chosen by this firm.
3. The horizontal lines shown on the logs are to differentiate materials and represent the approximate boundaries between materials. The transitions between materials may be gradual.
4. Elevations and cut/fill depths were obtained from staking provided by others and have been rounded to the nearest foot.
5. Boring logs shown in this report are subject to the limitations, explanations, and conclusions of this report.

LEGEND AND NOTES

FIGURE 9

3/23/21 - U:\PROJECT FILES\2 - GEOTECHNICAL\160388 REDTAIL RANCH\TO BE SAVED\GINT\160388S_GT2016-04-29 REDTAIL RANCH SD.GPJ



NOTES:

1. BENCHING REQUIRED WHEN EXISTING SLOPE IS 5 : 1 (HORIZONTAL : VERTICAL) OR STEEPER
2. CONTINUE BENCHING UNTIL NATURAL SLOPE FLATTENS OR DAYLIGHTS
3. DRAINS MAY BE REQUIRED IF GROUND WATER IS ENCOUNTERED
4. ADDITIONAL EXCAVATION MAY BE REQUIRED BY AGW IF SLOPE INSTABILITY IS NOTED
5. A KEYWAY MAY BE REQUIRED BY AGW DEPENDING UPON SLOPE CONFIGURATION
6. NOT TO SCALE

AGW
A.G. WASSENAAR, INC.

GENERALIZED BENCHING DETAIL	PROJECT NO. 160388 FIGURE 10

APPENDIX A
LABORATORY TEST RESULTS

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
March 23, 2021

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	% Passing #200 Sieve	Atterberg Liquid Limit LL	Atterberg Plasticity Index PI	pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
1	4	Claystone, sandy	120	12	3.3	9,300							
1	9	Claystone, very sandy		11			63	29	12				
1	24	Claystone, sandy	114	16	7.1	10,900							
2	4	Claystone, silty	117	14	11.2	13,700							
2	9	Claystone, trace sand	118	15	16.3	19,600	98	76	56				
3	9	Claystone, silty	125	12	1.7	3,400							
3	14	Claystone, silty	121	14	5.2	13,600							
3	34	Claystone, silty	121	15	11.6	22,500							
4	4	Claystone, silty	124	11	2.5	6,400							
4	9	Claystone, silty								8.5	1,818	<100	0.0002
4	19	Claystone, silty	122	13	3.1	7,800							
5	4	Claystone, silty	122	15	5.1	10,400							
5	24	Claystone, silty	127	11	2.4	8,800							
6	4	Claystone, silty	119	15	7.7	19,200							
6	14	Claystone, silty	120	15	8.0	20,800							
7	9	Claystone, silty	126	15	4.1	14,100							
7	29	Claystone, silty	113	17	5.6	7,800							
8	4	Clay, sandy		13			80	51	33				
8	19	Claystone	117	15	11.1	16,000	100	75	55				
8	39	Claystone, slightly sandy		9			92	38	21				
9	4	Claystone, silty	118	17	2.0	5,900							
9	14	Claystone, silty	107	22	15.9	22,600							
10	4	Claystone, silty	120	14	6.8	24,500							
10	9	Claystone, trace sand	128	13	6.9	20,000	99	52	32				

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
March 23, 2021

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	% Passing #200 Sieve	Atterberg Liquid Limit LL	Atterberg Plasticity Index PI	pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
10	24	Claystone, silty	125	11	6.3	16,300							
11	4	Sandstone, clayey	125	12	1.1	3,600							
11	9	Claystone, silty	108	12	-0.5	NA							
11	14	Claystone, silty	120	16	4.9	12,500							
12	4	Claystone, silty	125	12	2.3	5,600							
12	9	Claystone		24			100	74	55				
12	29	Claystone, silty	118	15	9.6	26,500							
13	4	Clay, sandy	131	10	5.7	22,400							
13	14	Claystone, silty	130	10	5.2	10,800							
13	24	Claystone, slightly sandy		7			91	36	19				
14	4	Clay, sandy								8.4	312	1,840	0.0181
14	9	Claystone, silty	113	16	2.4	5,700							
14	19	Claystone, trace sand	110	20	13.6	21,000	97	79	64				
15	4	Claystone, very sandy		5			59	26	8				
15	19	Claystone, silty	119	16	7.1	14,100							
15	29	Claystone, silty	122	14	8.7	21,000							
16	4	Clay, sandy	124	11	6.5	16,800							
16	14	Claystone, silty	117	16	4.4	10,400							
16	44	Claystone, silty	120	15	9.9	16,800							
17	4	Clay (Weathered Claystone), silty	118	14	13.3	21,000							
17	14	Claystone, silty	121	15	9.2	18,000							
17	34	Claystone, silty	122	13	12.1	14,300							
18	4	Clay, sandy	117	10	6.4	18,300							
18	19	Claystone, silty	123	16	2.0	6,800							

A.G. WASSENAAR, INC.

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
March 23, 2021

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	% Passing #200 Sieve	Atterberg Liquid Limit LL	Atterberg Plasticity Index PI	pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
18	29	Claystone, silty	121	14	1.3	6,100							
19	4	Claystone, silty	116	16	4.3	9,100							
19	9	Claystone, silty	113	18	12.9	25,100							
20	4	Sandstone, very clayey		11			41	34	17				
20	14	Claystone, silty	112	18	9.7	18,800							
20	24	Claystone, silty	120	14	11.2	28,900							
21	9	Claystone/Sandstone, silty	124	11	1.2	6,300							
21	24	Claystone, silty	117	14	6.8	17,100							
21	34	Claystone, silty	120	14	15.1	14,700							
22	9	Claystone, silty	129	12	5.5	17,400							
22	14	Claystone, sandy		12			86	42	24				
22	34	Claystone/Sandstone, silty		14			47	31	13				
23	9	Claystone, silty	112	18	6.8	8,200							
23	19	Claystone, silty	127	13	7.7	25,200							
23	29	Claystone, silty	111	13	8.0	6,900							
24	4	Claystone, silty	121	12	2.3	8,000							
24	9	Sandstone, very clayey		6			37	27	10				
25	4	Clay, sandy	121	13	4.9	23,300							
25	9	Claystone, silty								7.8	243	5,160	0.0206
25	19	Claystone, silty	121	15	2.3	15,000							
26	4	Claystone, trace sand	113	15	7.1	10,100	99	68	49				
26	9	Claystone, silty	121	16	2.7	9,300							
27	4	Claystone, silty	105	16	5.3	5,800							
27	9	Claystone, silty	113	18	12.0	10,700							

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
March 23, 2021

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	% Passing #200 Sieve	Atterberg Liquid Limit LL	Atterberg Plasticity Index PI	pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
27	14	Claystone, trace sand		15			99	50	32				
27	24	Claystone, silty	118	14	4.8	8,400							
28	4	Sandstone, clayey								8.8	3,731	<100	0.0002
28	9	Claystone, very sandy		7			60	26	8				
28	29	Claystone/Sandstone, silty	116	12	-0.3	NA							
29	9	Claystone, silty	118	14	6.4	13,700							
29	14	Claystone, silty	113	18	8.0	15,200							
29	44	Claystone, silty	116	15	-0.1	NA							
30	9	Claystone, sandy	131	9	0.3	2,000	77	27	9				
30	24	Claystone, silty	113	17	8.4	14,400							
31	4	Claystone, silty	122	13	6.1	20,400							
31	9	Claystone, trace sand		15			98	54	34				
31	24	Claystone, silty	127	12	3.9	25,000							
31	34	Claystone, very sandy		10			56	53	34				
32	4	Claystone, silty	121	13	9.6	18,700							
32	24	Claystone, silty	107	19	6.0	10,000							
33	4	Clay, sandy	115	10	1.3	5,600							
33	34	Claystone, silty	122	14	4.4	15,900							
34	4	Clay, sandy	123	11	3.3	9,300							
34	9	Claystone, silty	119	16	6.1	13,100							
34	19	Claystone, silty	108	21	8.3	9,900							
35	9	Claystone, silty	123	13	3.7	12,300							
35	14	Claystone, silty	126	12	0.4	4,000							
35	24	Claystone/Sandstone, silty		15			49	24	6				

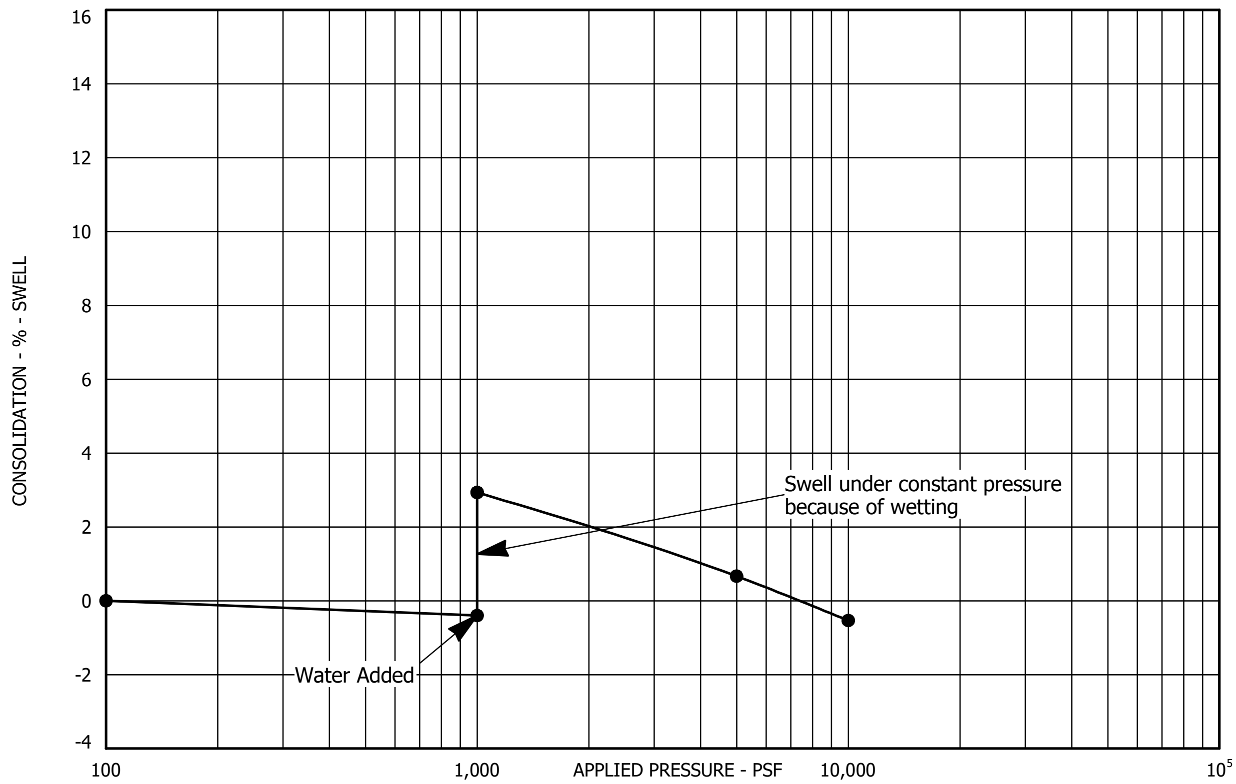
A.G. WASSENAAR, INC.

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
March 23, 2021

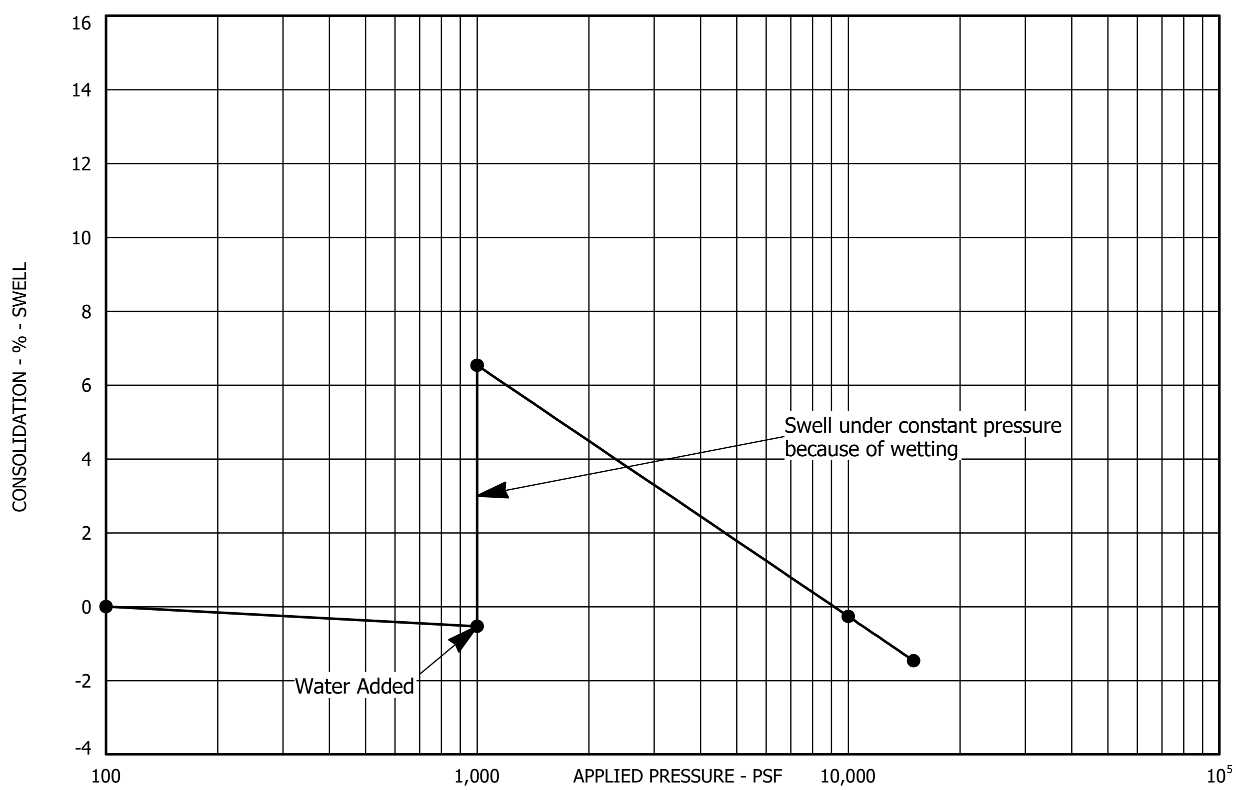
Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	% Passing #200 Sieve	Atterberg Liquid Limit LL	Atterberg Plasticity Index PI	pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
36	4	Claystone, silty	120	14	12.9	21,700							
36	9	Claystone, silty	118	15	12.9	8,500							
36	19	Claystone, slightly sandy		10			95	50	29				
37	9	Claystone, silty	111	20	4.9	8,700							
37	29	Claystone, silty	116	17	7.9	17,000							
38	4	Claystone, silty	118	16	2.0	5,900							
38	9	Claystone, silty	108	20	4.5	6,200							
38	24	Claystone, silty	116	14	7.9	11,100							

Notes:
[1] Indicates percent swell or consolidation when wetted under a 1,000 psf load

NA - Not Applicable



Sample Location Test Boring No. 1 at a depth of 4 feet Dry Unit Weight (pcf) 120
Sample Description Claystone, sandy Moisture Content (%) 12



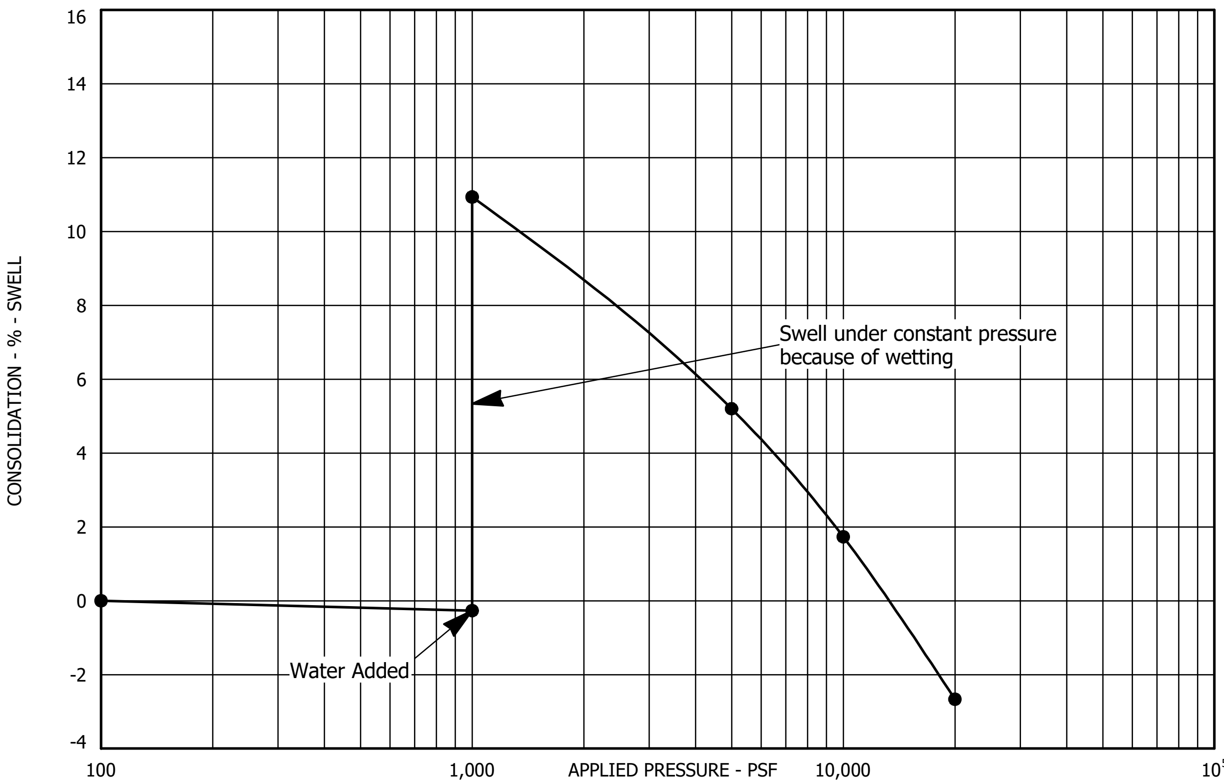
Sample Location Test Boring No. 1 at a depth of 24 feet Dry Unit Weight (pcf) 114
Sample Description Claystone, sandy Moisture Content (%) 16

SWELL - CONSOLIDATION TEST RESULTS

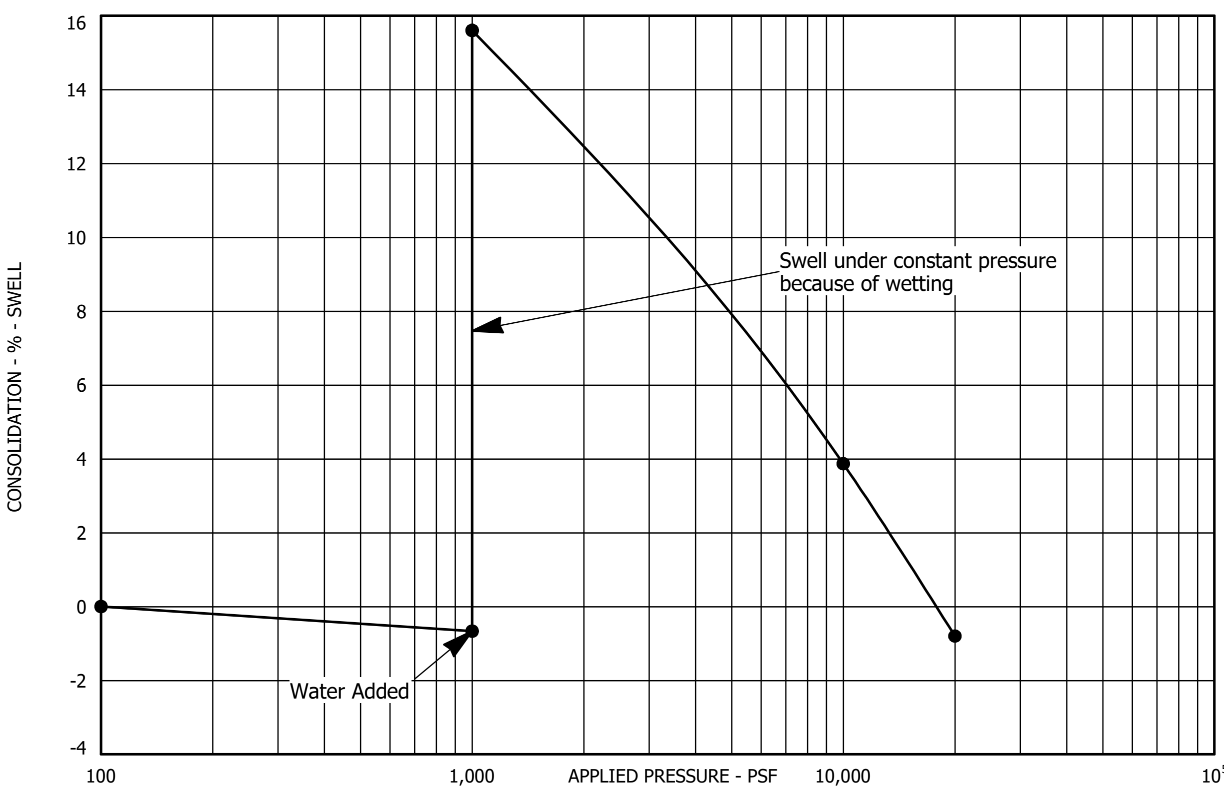
FIGURE A-1

PROJECT NO. 160388

A.G. WASSENAAR, INC.

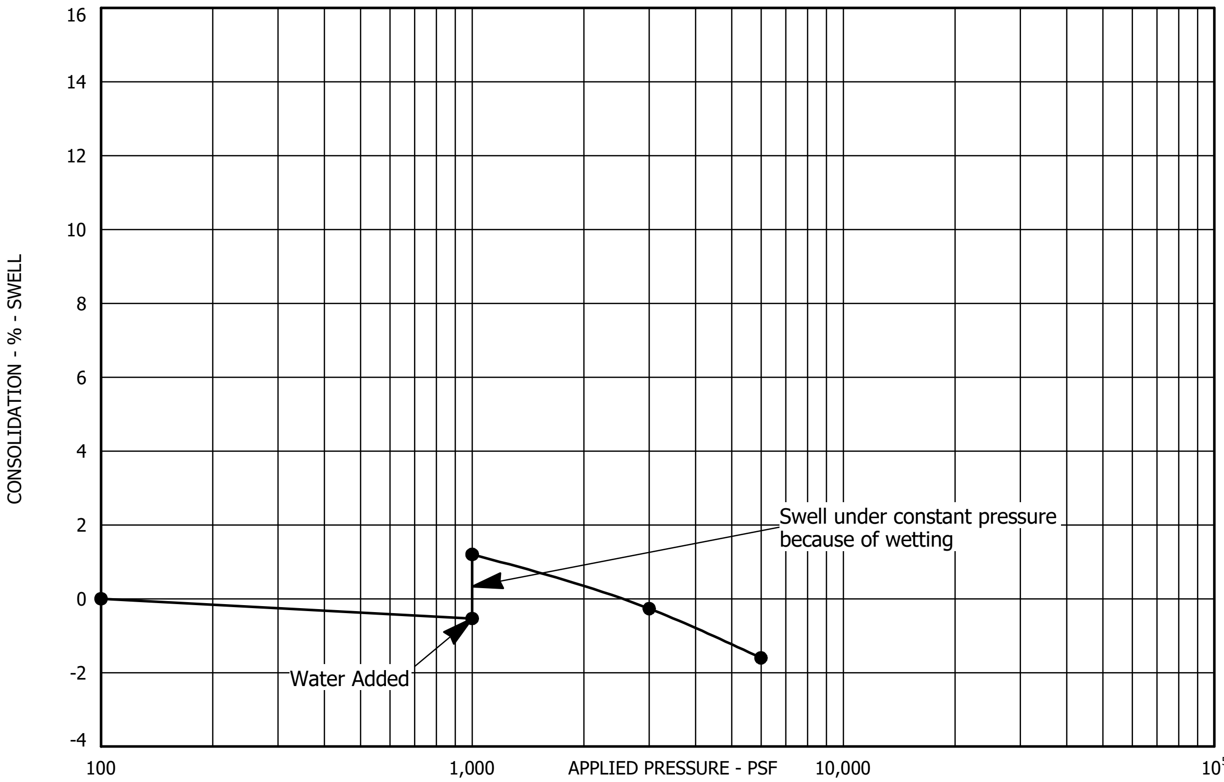


Sample Location Test Boring No. 2 at a depth of 4 feet Dry Unit Weight (pcf) 117
Sample Description Claystone, silty Moisture Content (%) 14

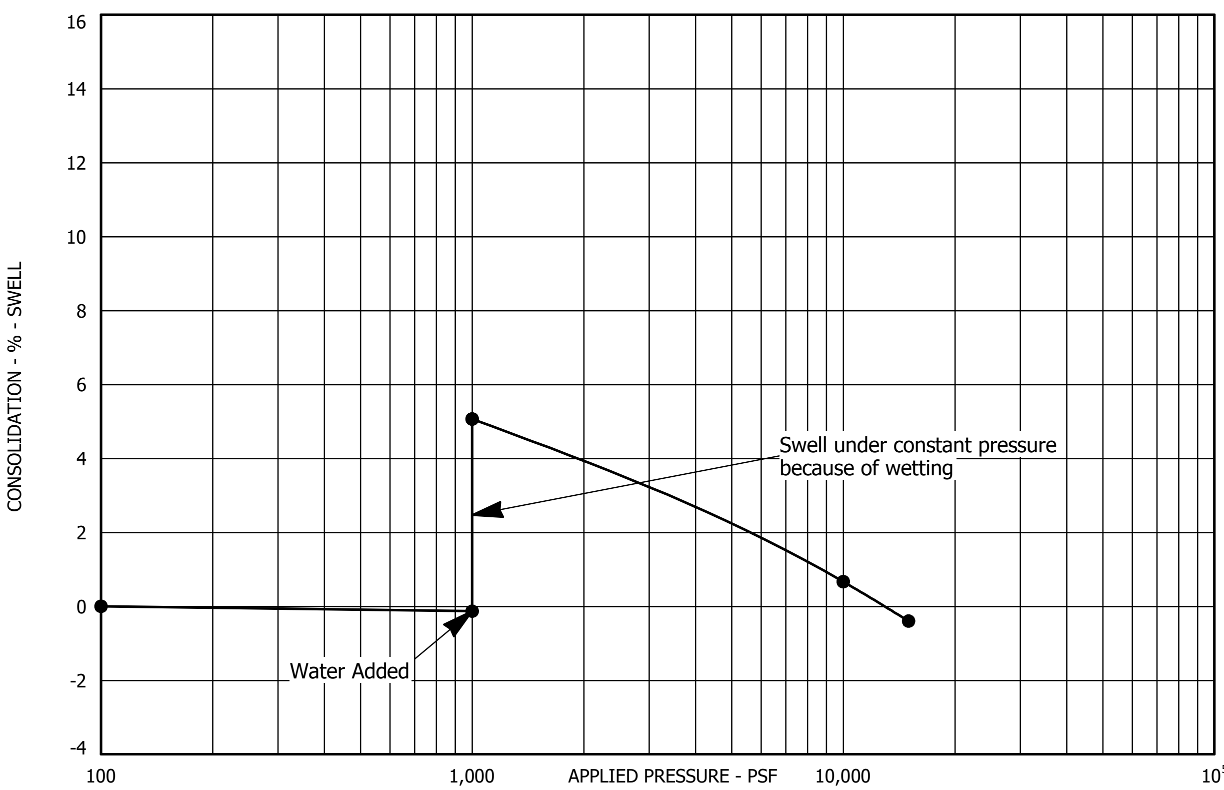


Sample Location Test Boring No. 2 at a depth of 9 feet Dry Unit Weight (pcf) 118
Sample Description Claystone, trace sand Moisture Content (%) 15

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-2
PROJECT NO. 160388



Sample Location Test Boring No. 3 at a depth of 9 feet
Sample Description Claystone, silty
Dry Unit Weight (pcf) 125
Moisture Content (%) 12

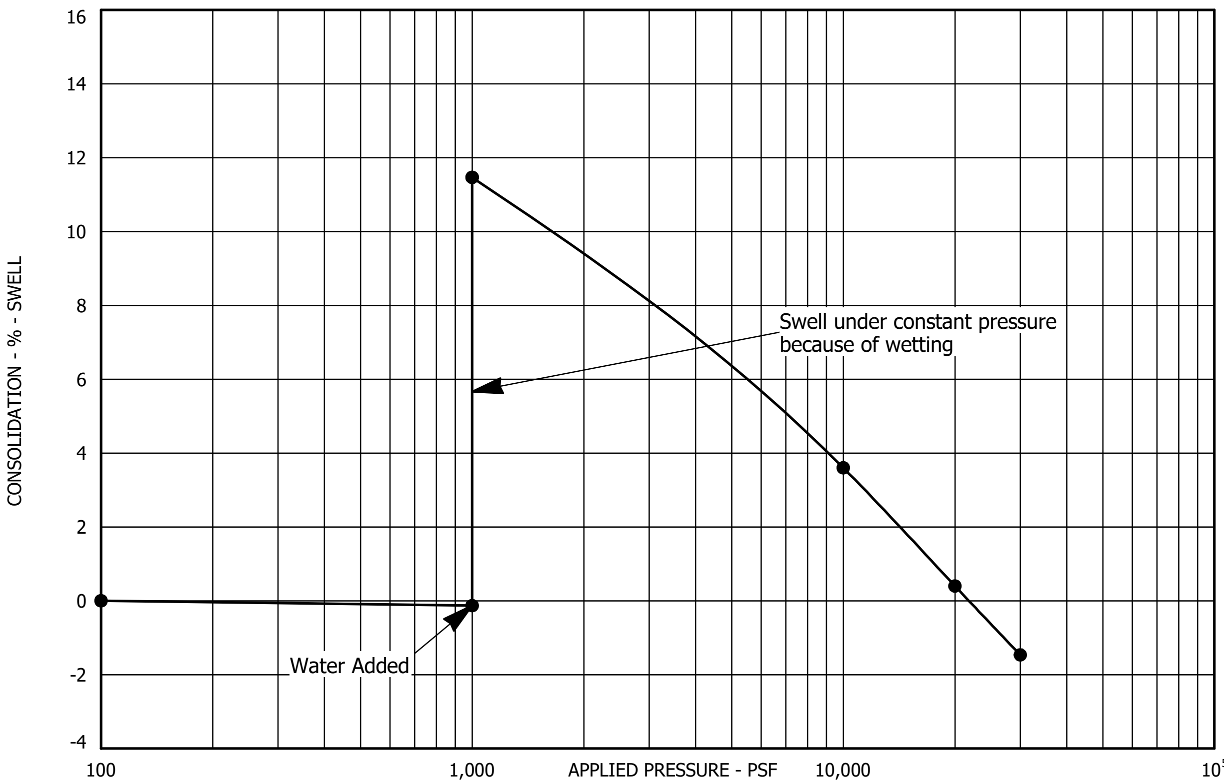


Sample Location Test Boring No. 3 at a depth of 14 feet
Sample Description Claystone, silty
Dry Unit Weight (pcf) 121
Moisture Content (%) 14

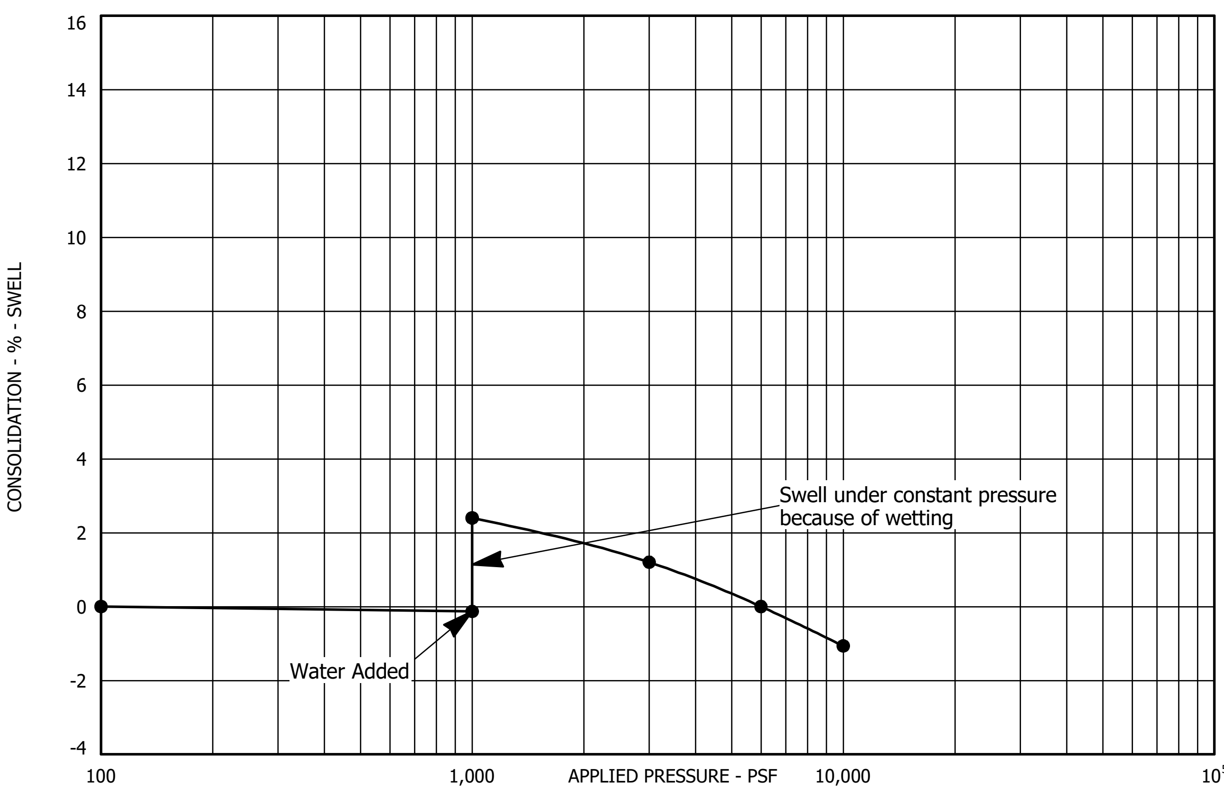
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-3

PROJECT NO. 160388



Sample Location	Test Boring No. 3 at a depth of 34 feet	Dry Unit Weight (pcf)	121
Sample Description	Claystone, silty	Moisture Content (%)	15

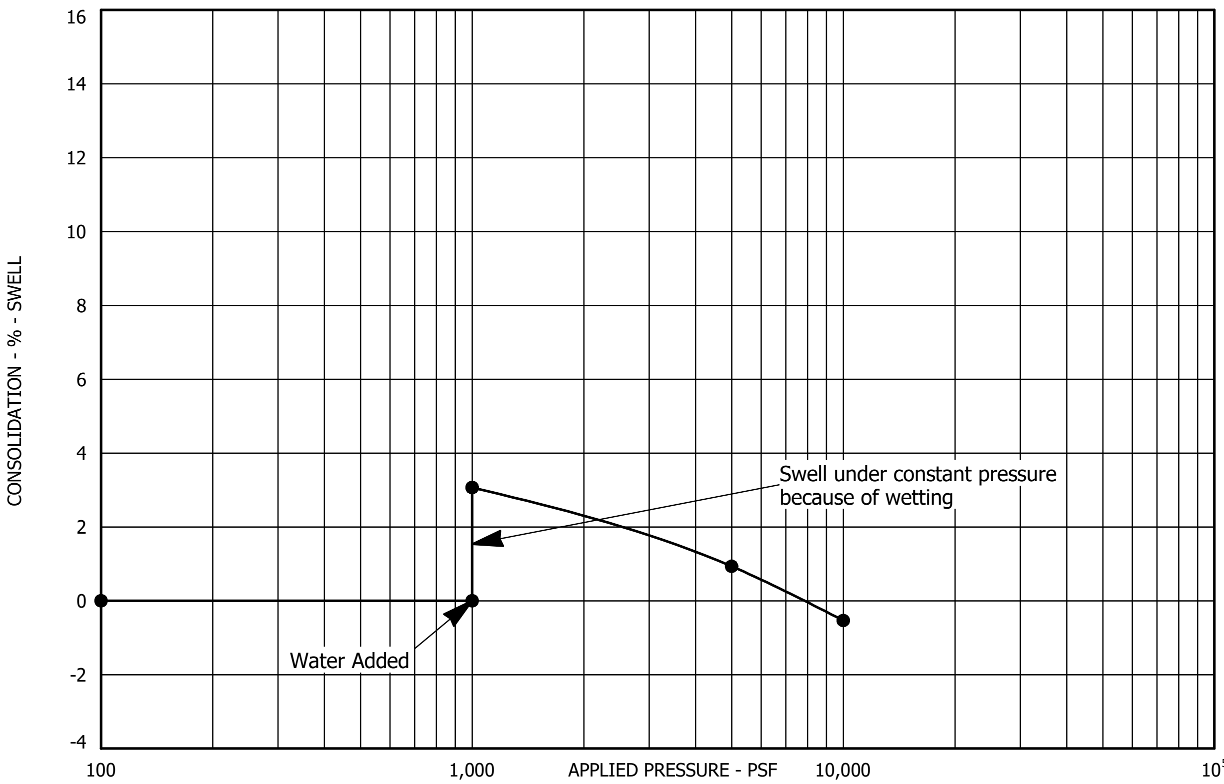


Sample Location	Test Boring No. 4 at a depth of 4 feet	Dry Unit Weight (pcf)	124
Sample Description	Claystone, silty	Moisture Content (%)	11

SWELL - CONSOLIDATION TEST RESULTS

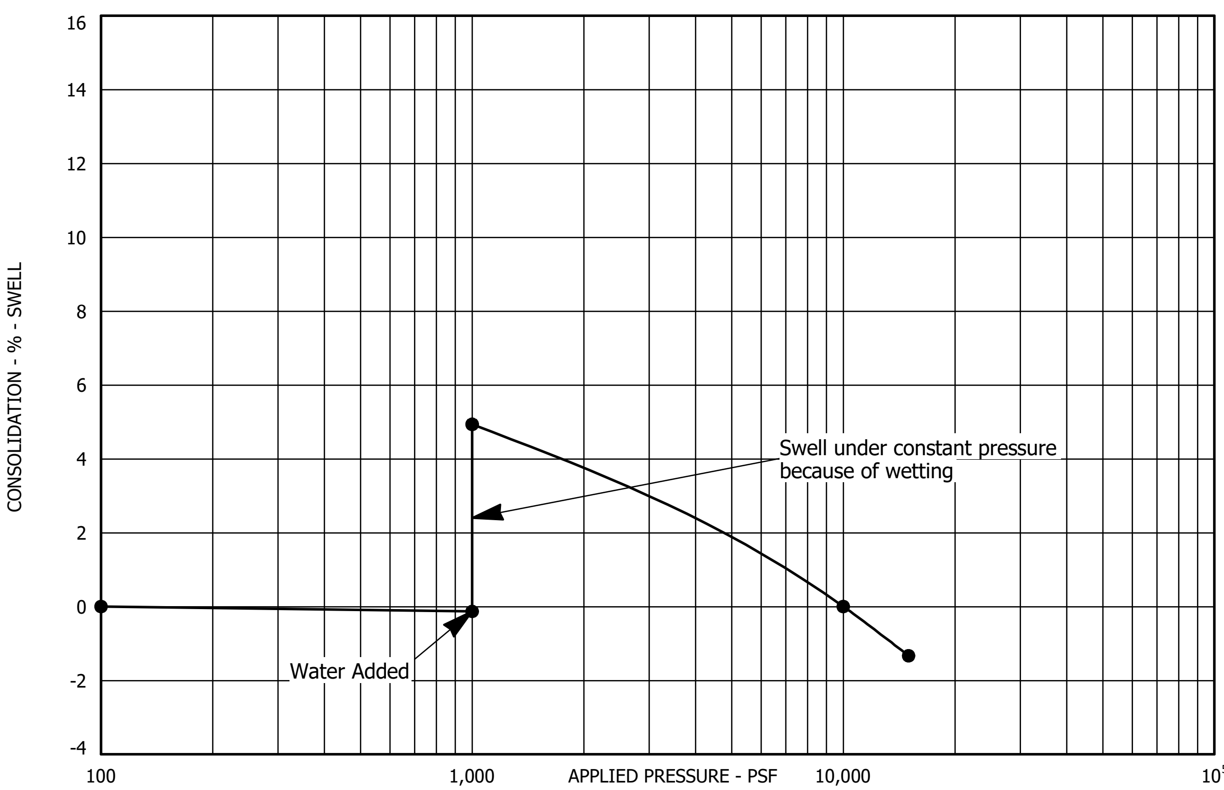
FIGURE A-4

PROJECT NO. 160388



Sample Location Test Boring No. 4 at a depth of 19 feet Dry Unit Weight (pcf) 122

Sample Description Claystone, silty Moisture Content (%) 13



Sample Location Test Boring No. 5 at a depth of 4 feet Dry Unit Weight (pcf) 122

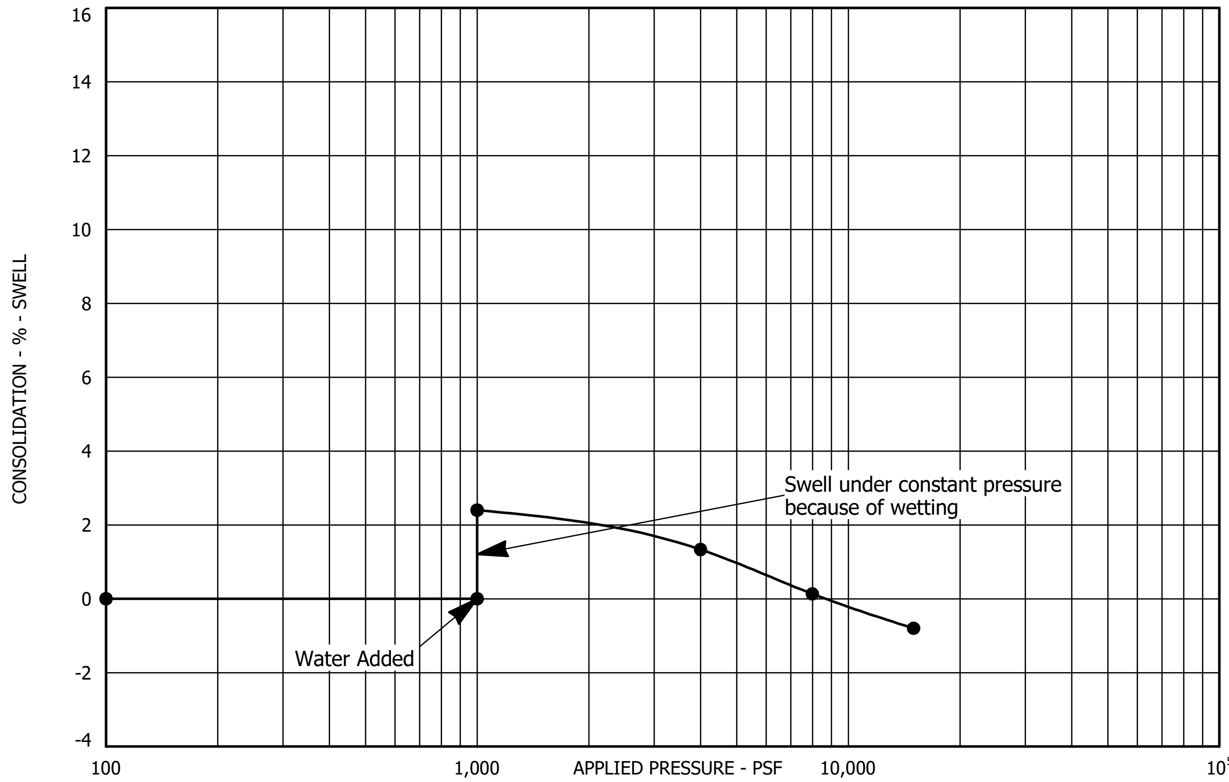
Sample Description Claystone, silty Moisture Content (%) 15

SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-5

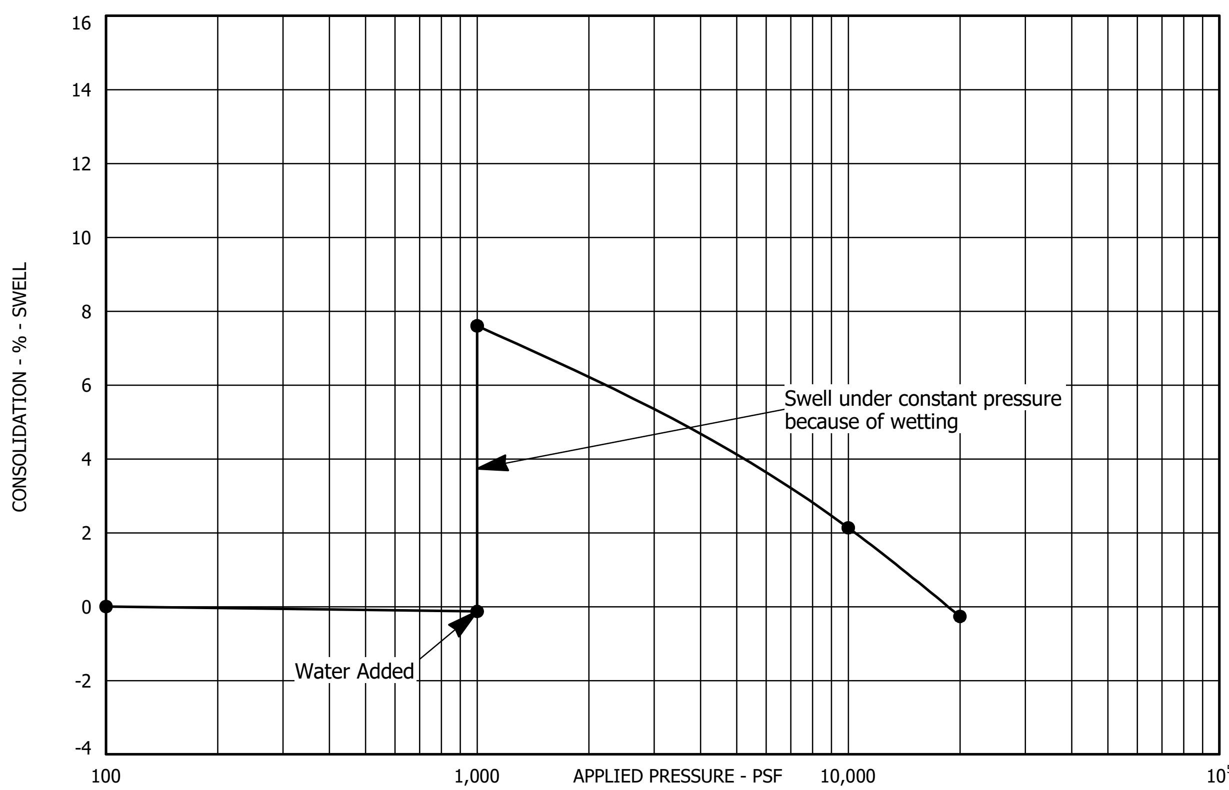
PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 5 at a depth of 24 feet — Dry Unit Weight (pcf): 127

Sample Description: Claystone, silty — Moisture Content (%): 11



Sample Location: Test Boring No. 6 at a depth of 4 feet — Dry Unit Weight (pcf): 119

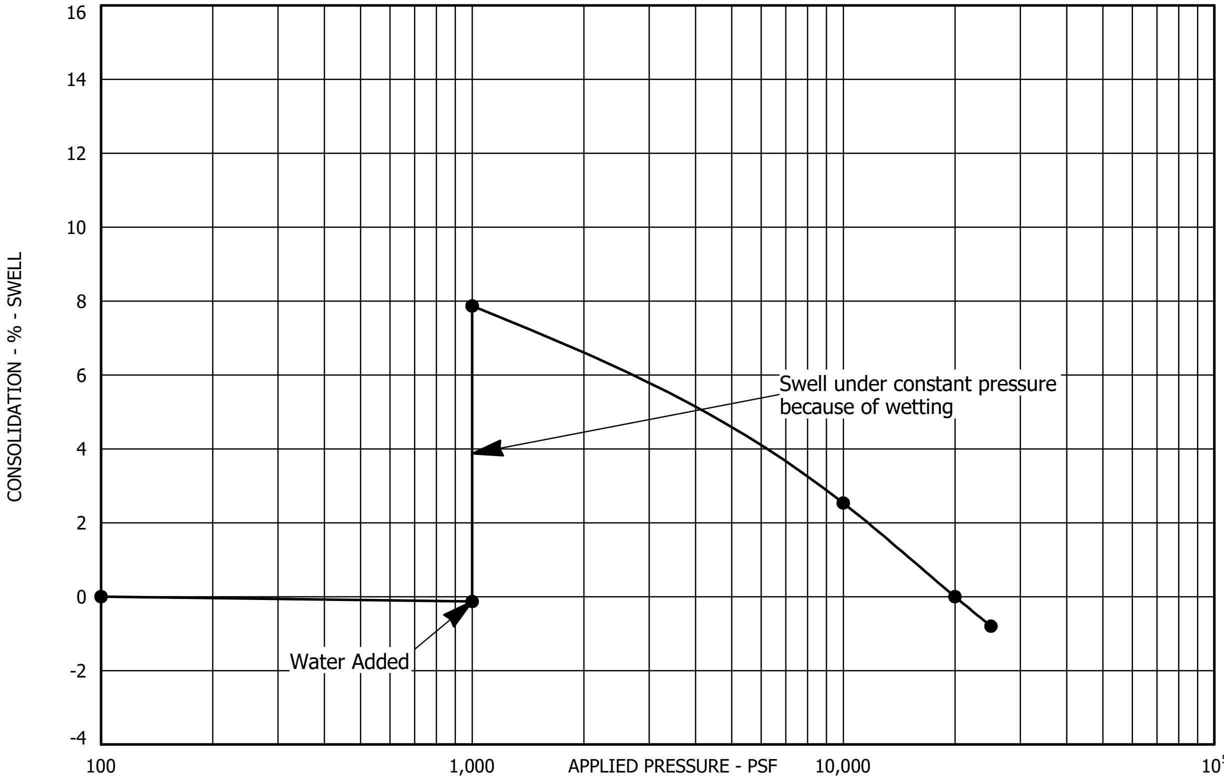
Sample Description: Claystone, silty — Moisture Content (%): 15

SWELL - CONSOLIDATION TEST RESULTS

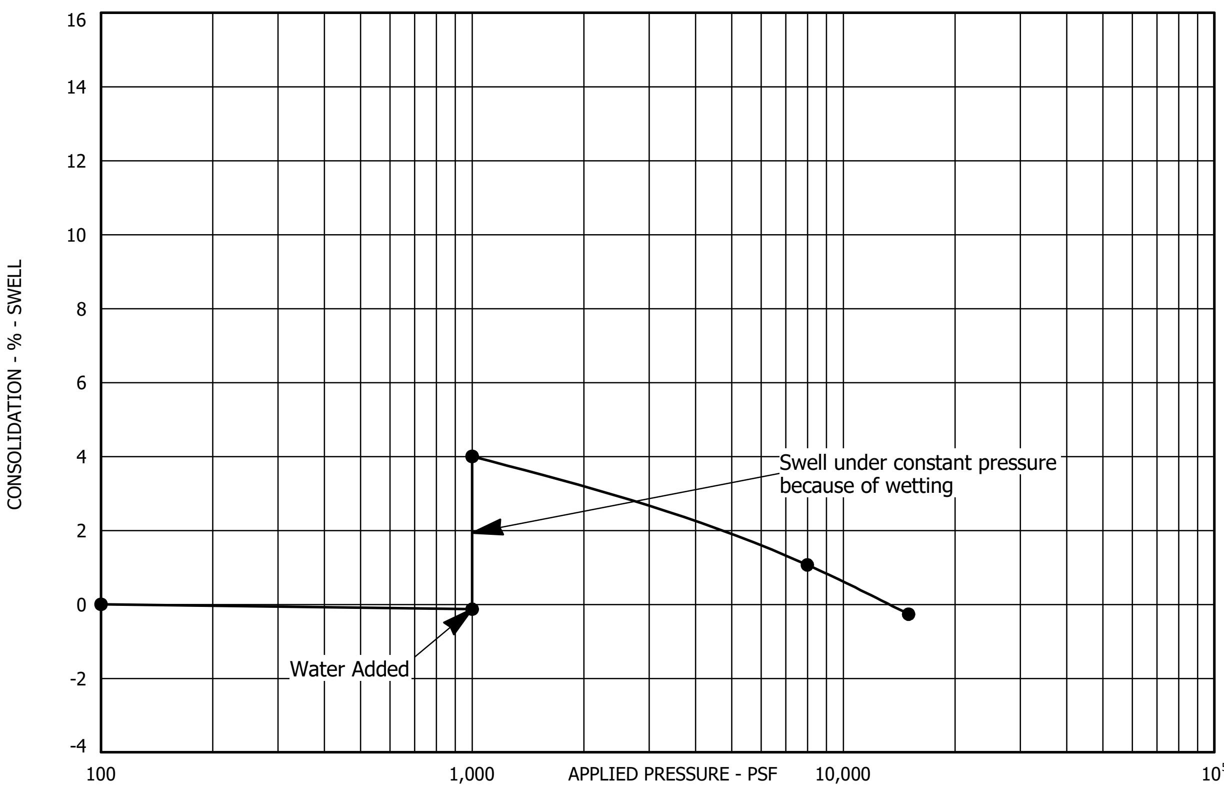
FIGURE A-6

PROJECT NO. 160388

AGW
A.G. WASSENAAR, INC.



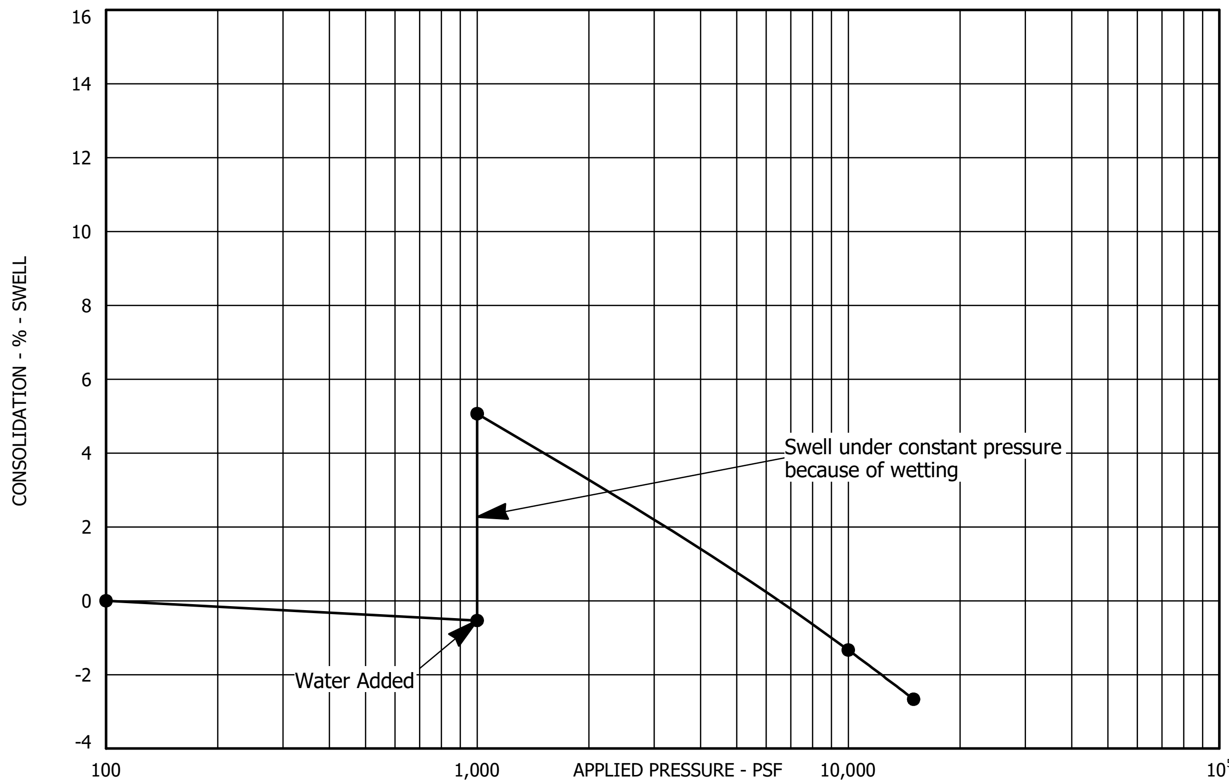
Sample Location Test Boring No. 6 at a depth of 14 feet   Dry Unit Weight (pcf) 120
Sample Description Claystone, silty   Moisture Content (%) 15



Sample Location Test Boring No. 7 at a depth of 9 feet   Dry Unit Weight (pcf) 126
Sample Description Claystone, silty   Moisture Content (%) 15

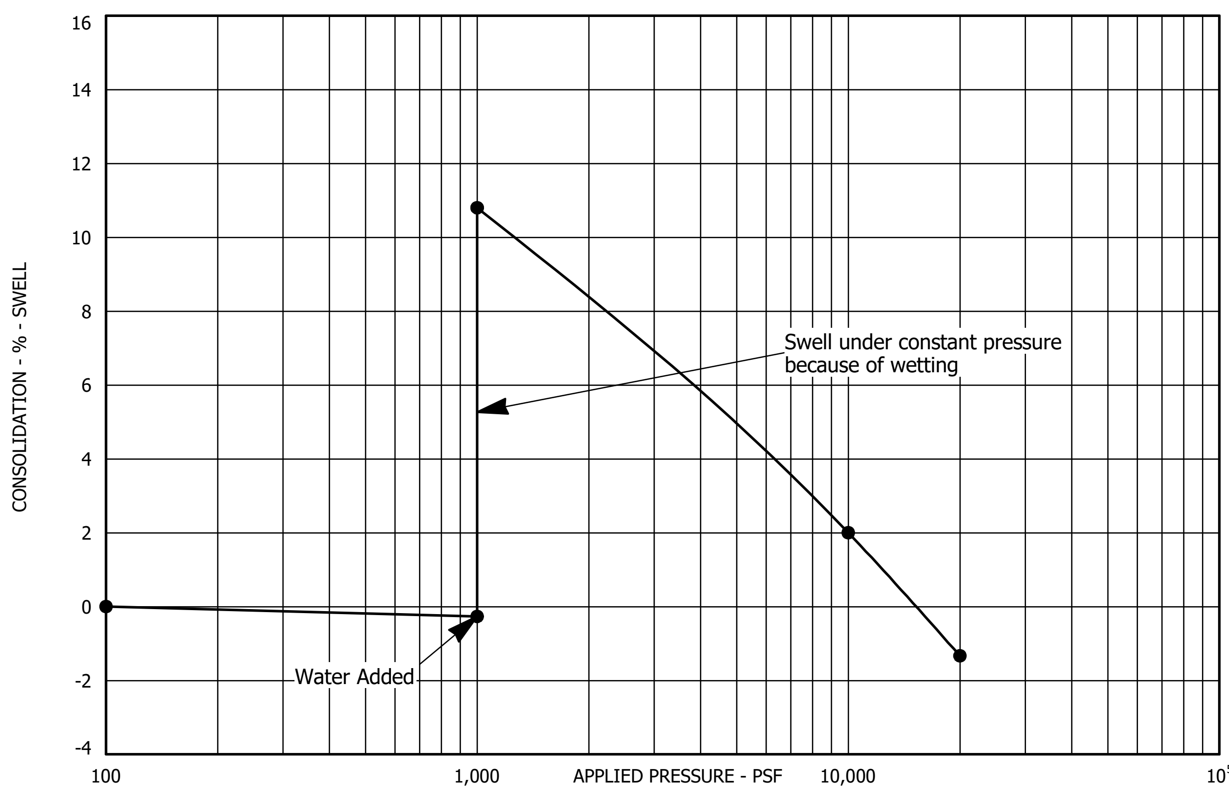
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-7



Sample Location Test Boring No. 7 at a depth of 29 feet Dry Unit Weight (pcf) 113

Sample Description Claystone, silty Moisture Content (%) 17



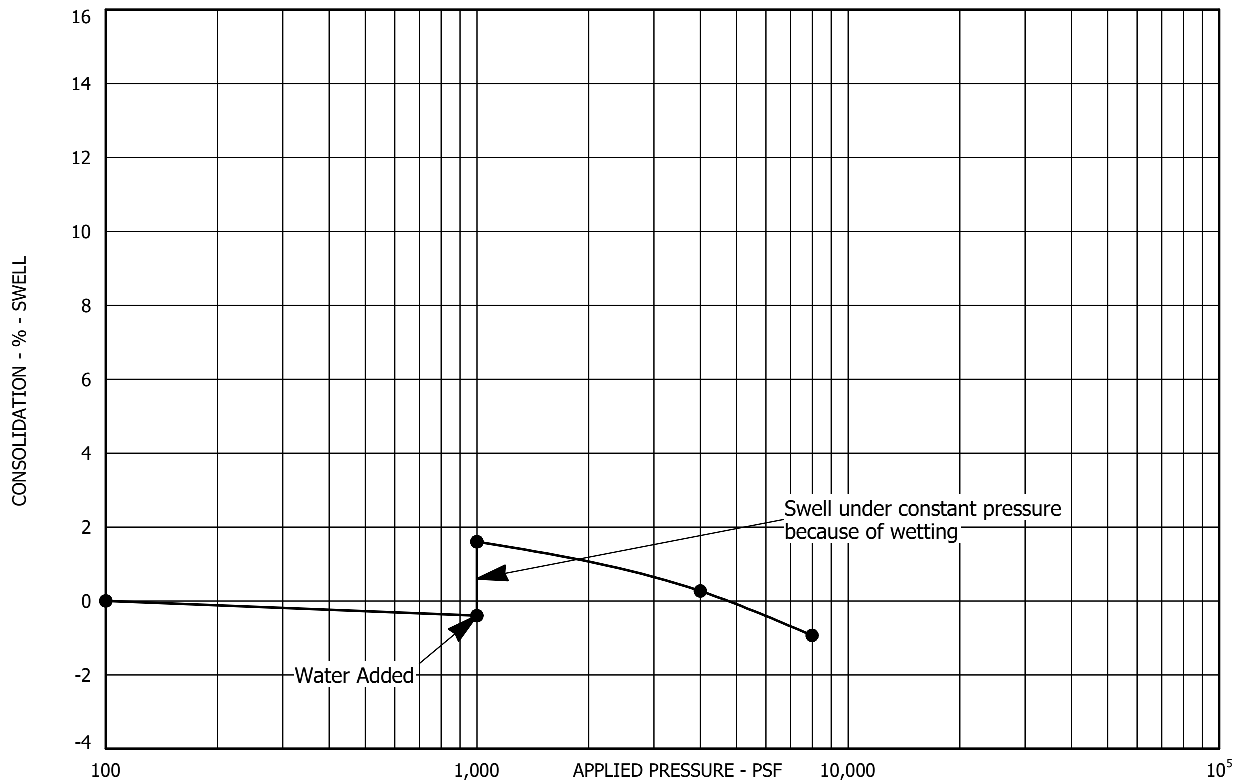
Sample Location Test Boring No. 8 at a depth of 19 feet Dry Unit Weight (pcf) 117

Sample Description Claystone Moisture Content (%) 15

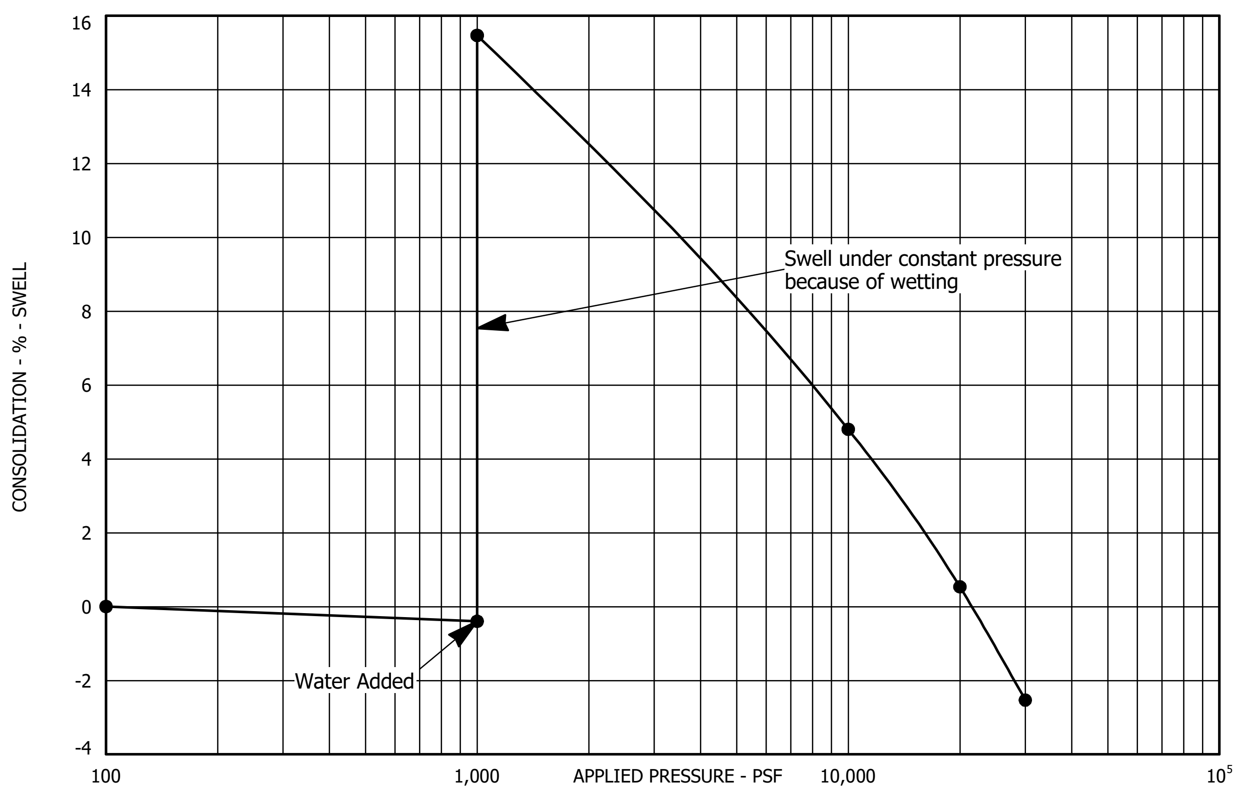
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-8

PROJECT NO. 160388



Sample Location Test Boring No. 9 at a depth of 4 feet
Dry Unit Weight (pcf) 118
Sample Description Claystone, silty
Moisture Content (%) 17

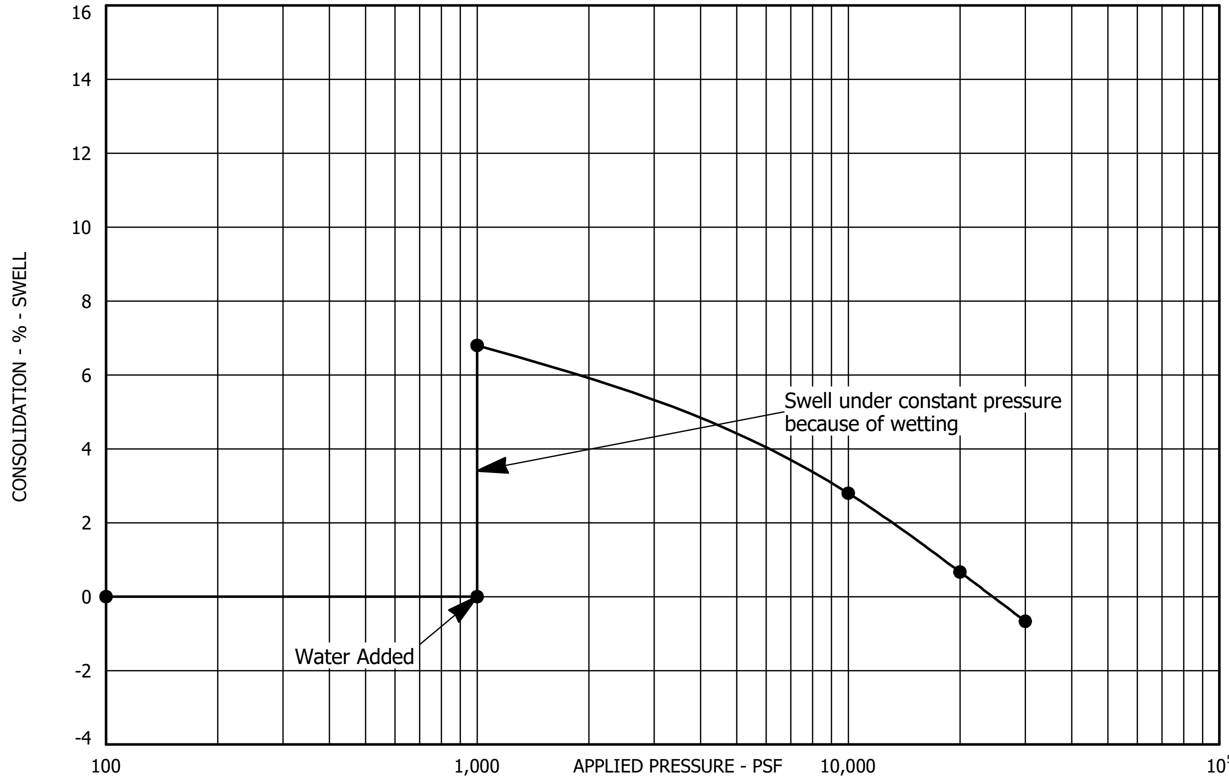


Sample Location Test Boring No. 9 at a depth of 14 feet
Dry Unit Weight (pcf) 107
Sample Description Claystone, silty
Moisture Content (%) 22

SWELL - CONSOLIDATION TEST RESULTS

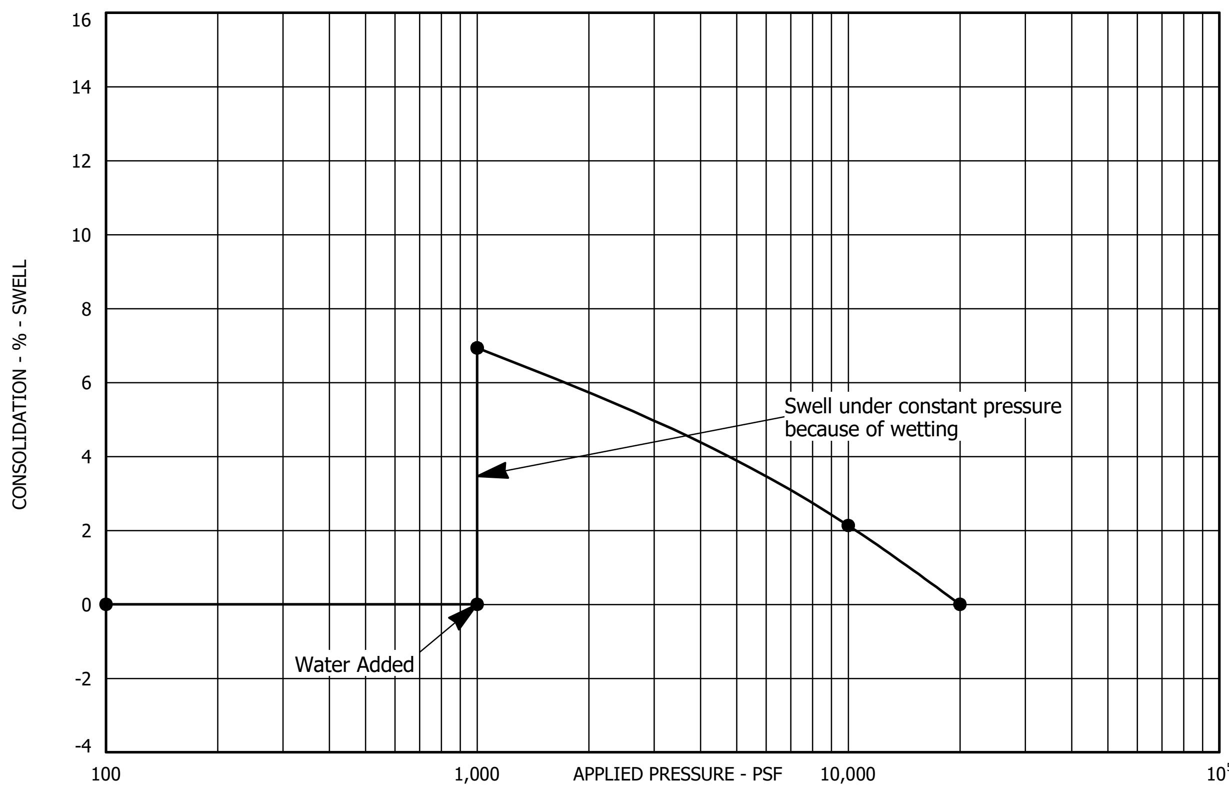
FIGURE A-9

PROJECT NO. 160388



Sample Location: Test Boring No. 10 at a depth of 4 feet — Dry Unit Weight (pcf): 120

Sample Description: Claystone, silty — Moisture Content (%): 14



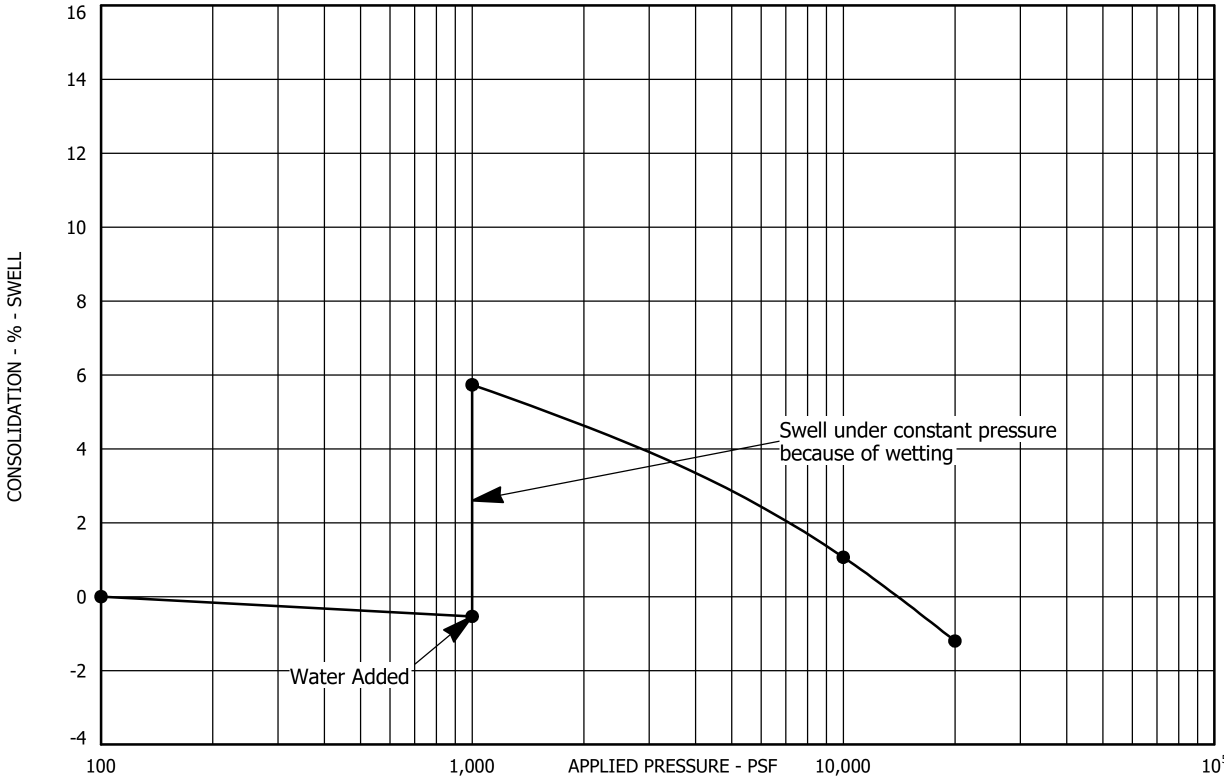
Sample Location: Test Boring No. 10 at a depth of 9 feet — Dry Unit Weight (pcf): 128

Sample Description: Claystone, trace sand — Moisture Content (%): 13

SWELL - CONSOLIDATION TEST RESULTS

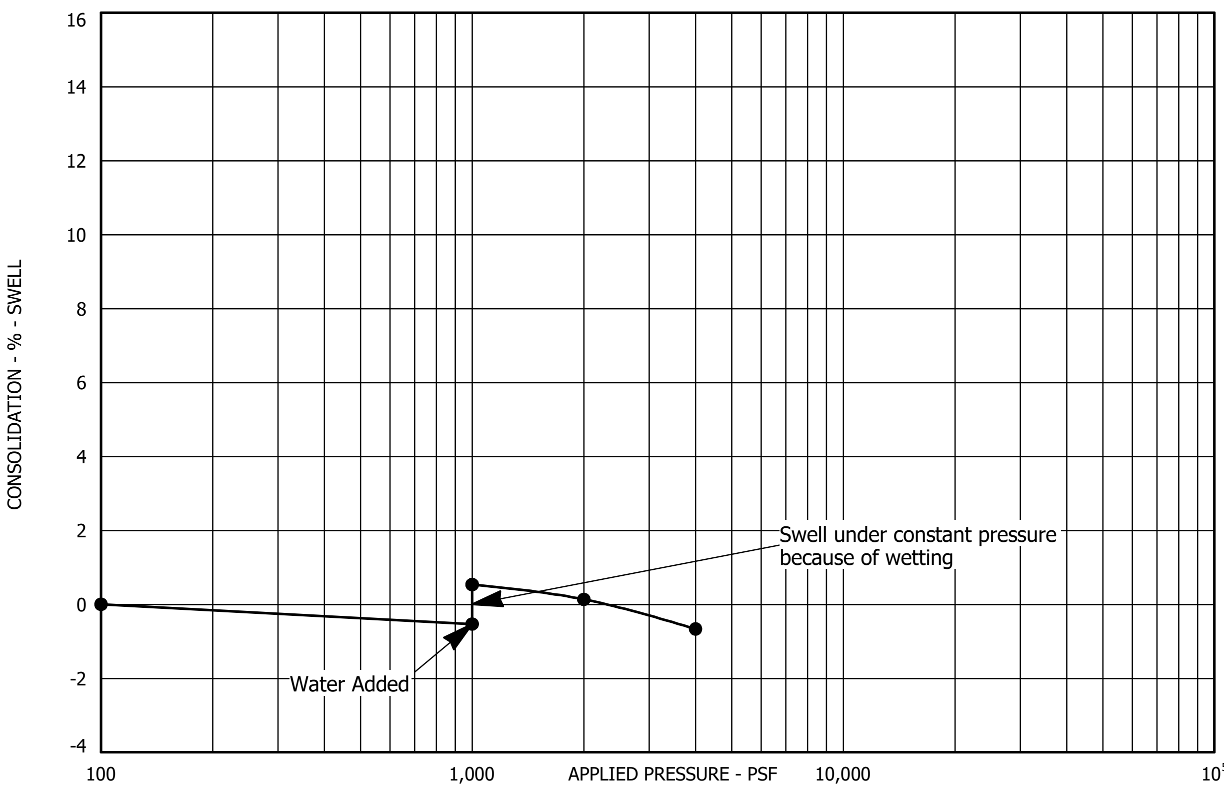
FIGURE A-10

PROJECT NO. 160388



Sample Location Test Boring No. 10 at a depth of 24 feet Dry Unit Weight (pcf) 125

Sample Description Claystone, silty Moisture Content (%) 11



Sample Location Test Boring No. 11 at a depth of 4 feet Dry Unit Weight (pcf) 125

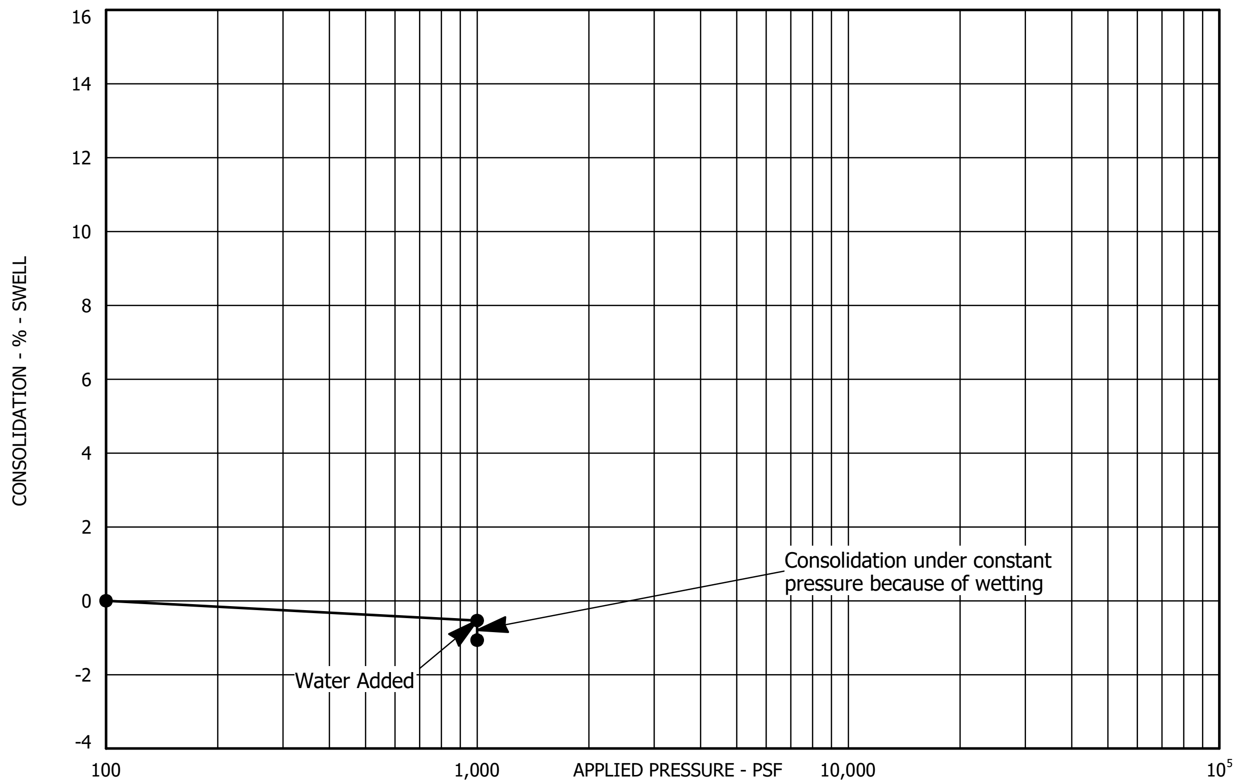
Sample Description Sandstone, clayey Moisture Content (%) 12

SWELL - CONSOLIDATION TEST RESULTS

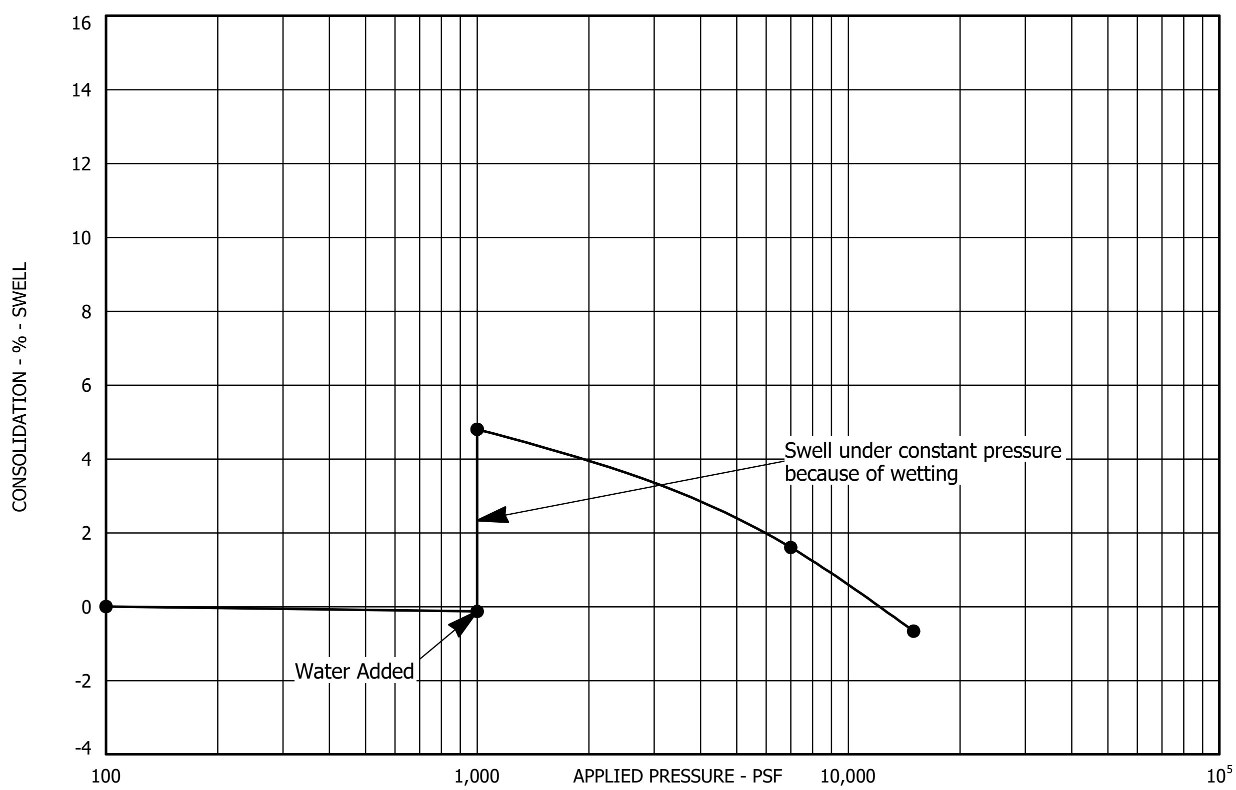
FIGURE A-11

PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 11 at a depth of 9 feet Dry Unit Weight (pcf) 108
Sample Description Claystone, silty Moisture Content (%) 12



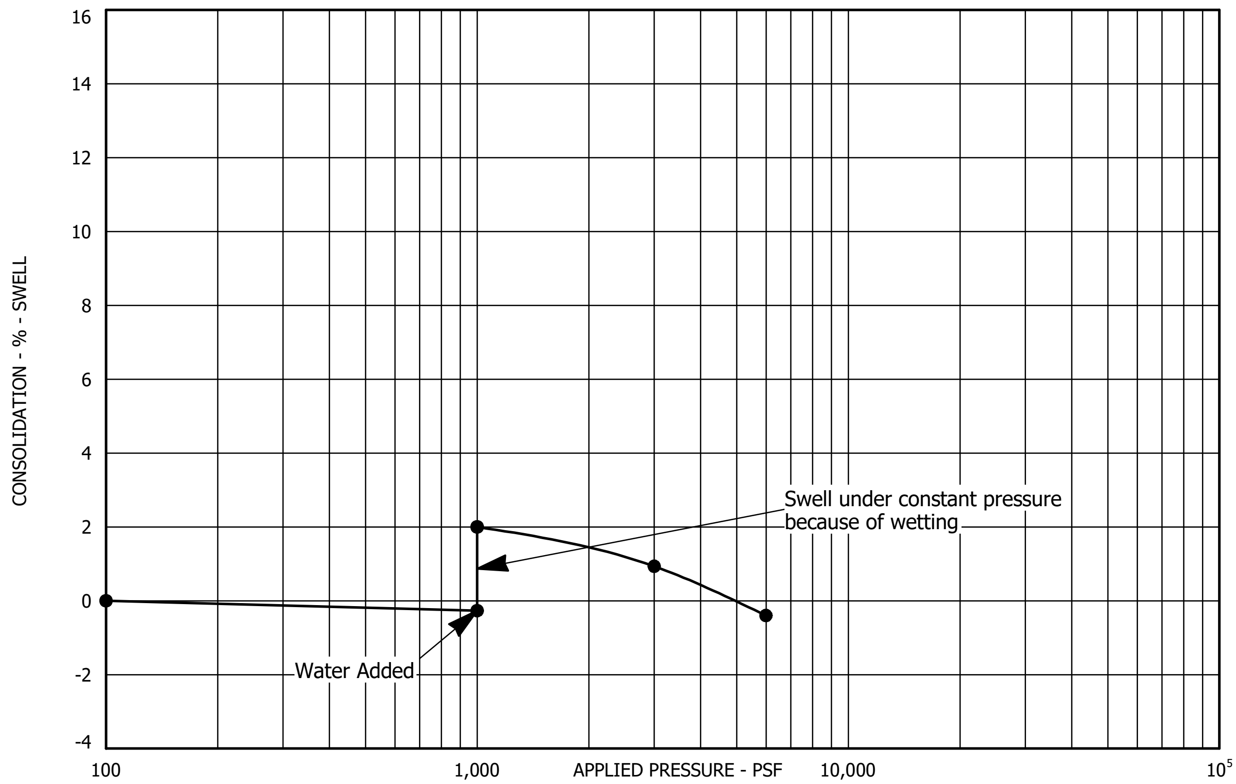
Sample Location Test Boring No. 11 at a depth of 14 feet Dry Unit Weight (pcf) 120
Sample Description Claystone, silty Moisture Content (%) 16

SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-12

PROJECT NO. 160388

A.G. WASSENAAR, INC.

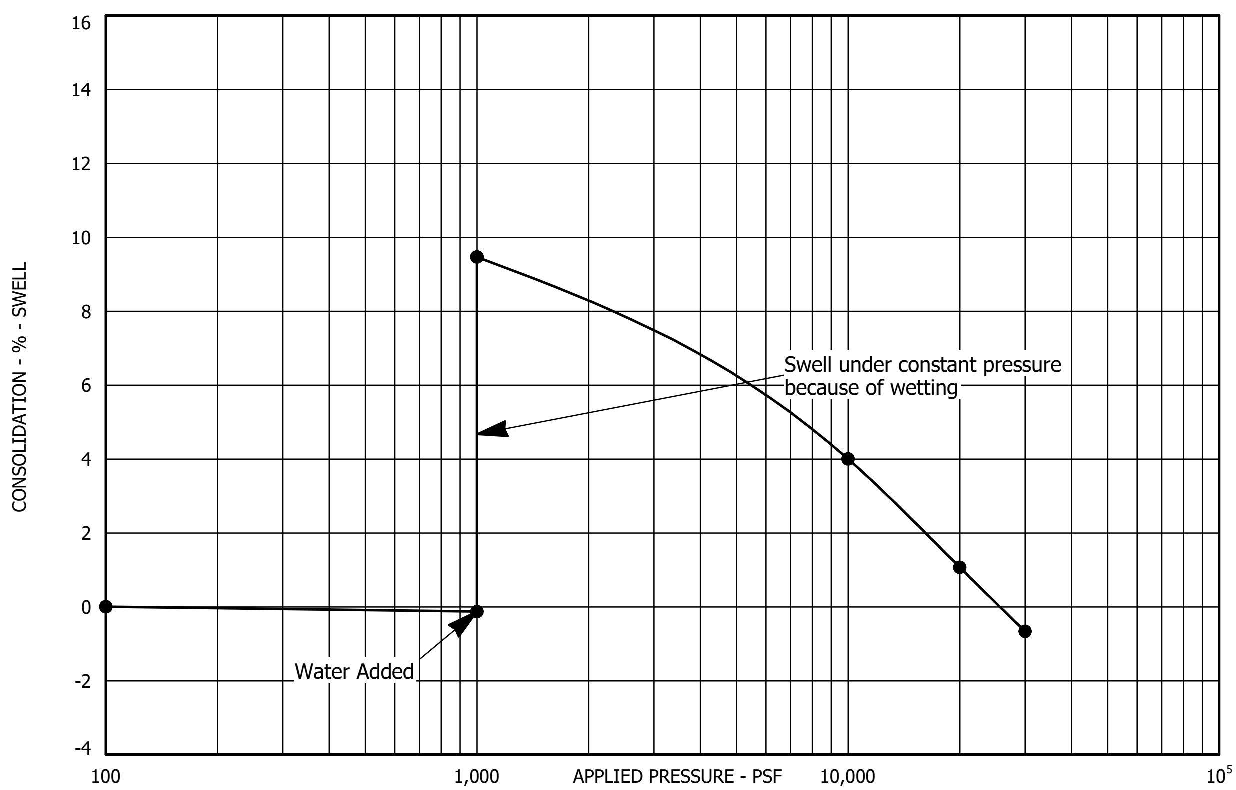


Sample Location Test Boring No. 12 at a depth of 4 feet

Sample Description Claystone, silty

Dry Unit Weight (pcf) 125

Moisture Content (%) 12



Sample Location Test Boring No. 12 at a depth of 29 feet

Sample Description Claystone, silty

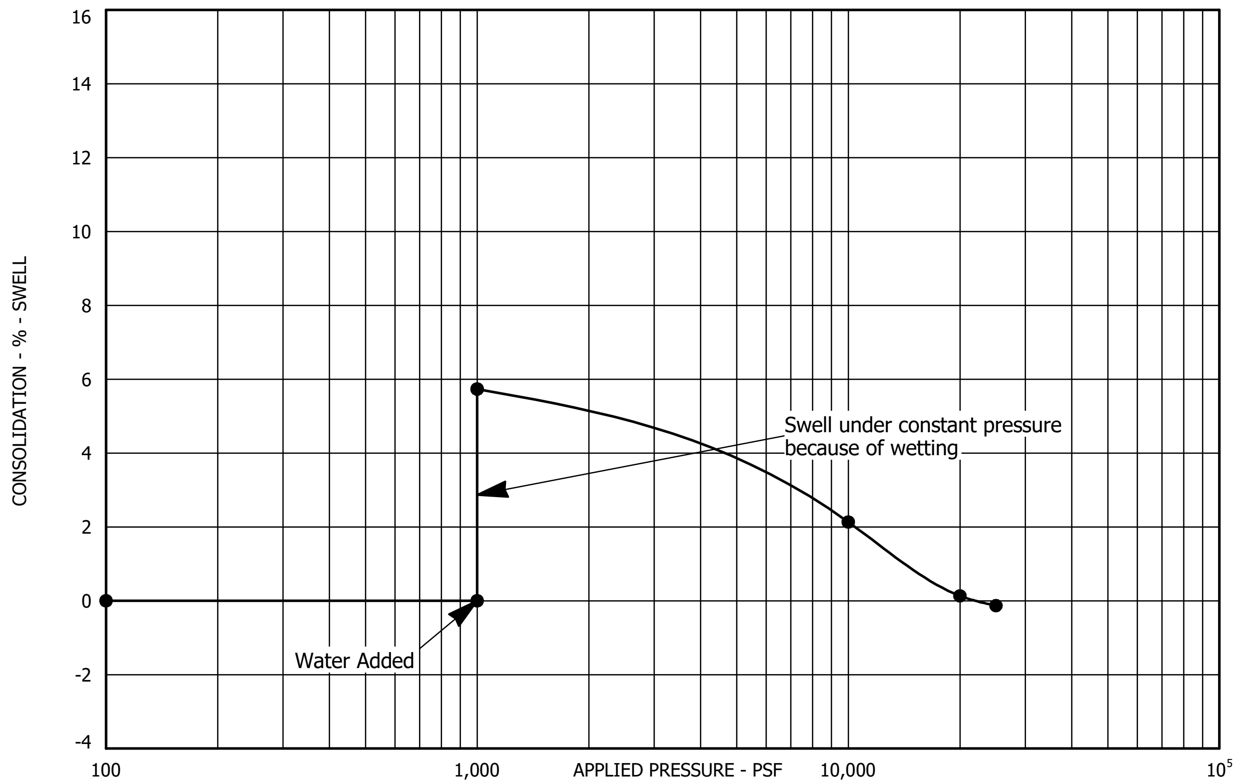
Dry Unit Weight (pcf) 118

Moisture Content (%) 15

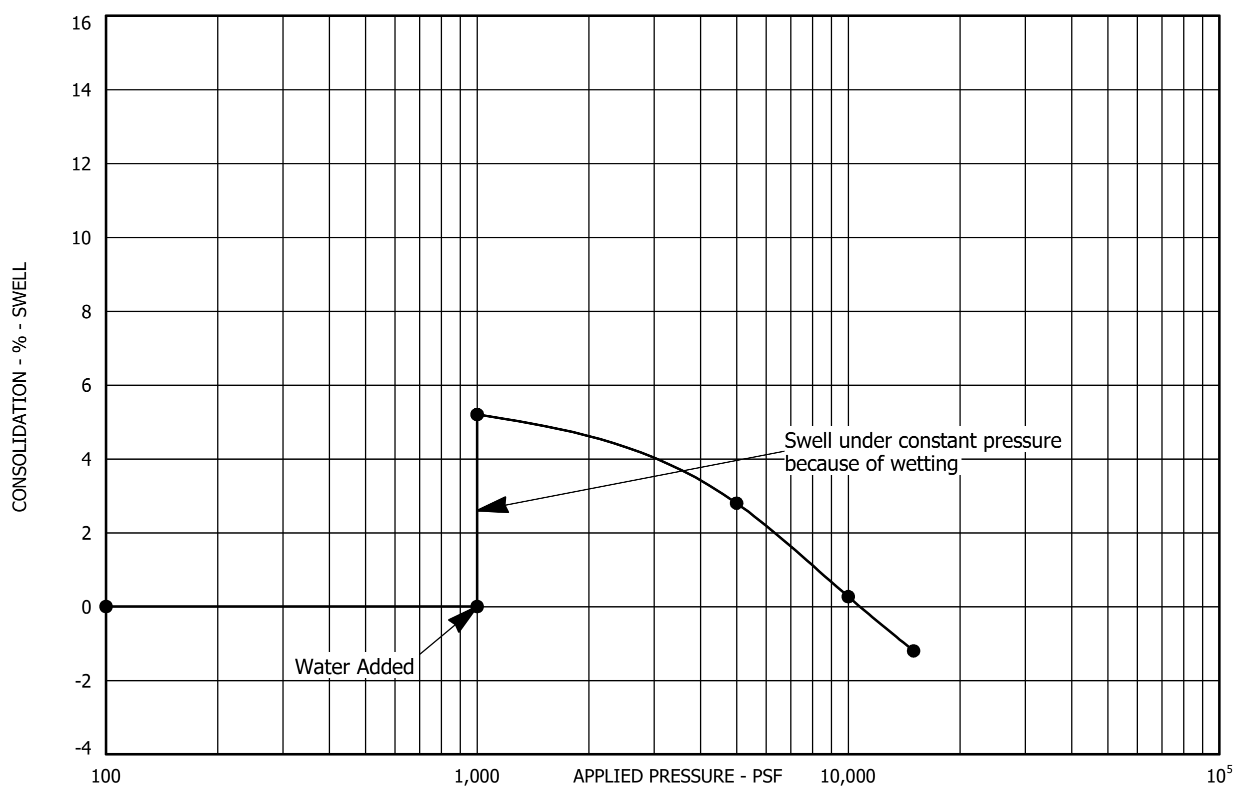
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-13

PROJECT NO. 160388



Sample Location Test Boring No. 13 at a depth of 4 feet Dry Unit Weight (pcf) 131
Sample Description Clay, sandy Moisture Content (%) 10

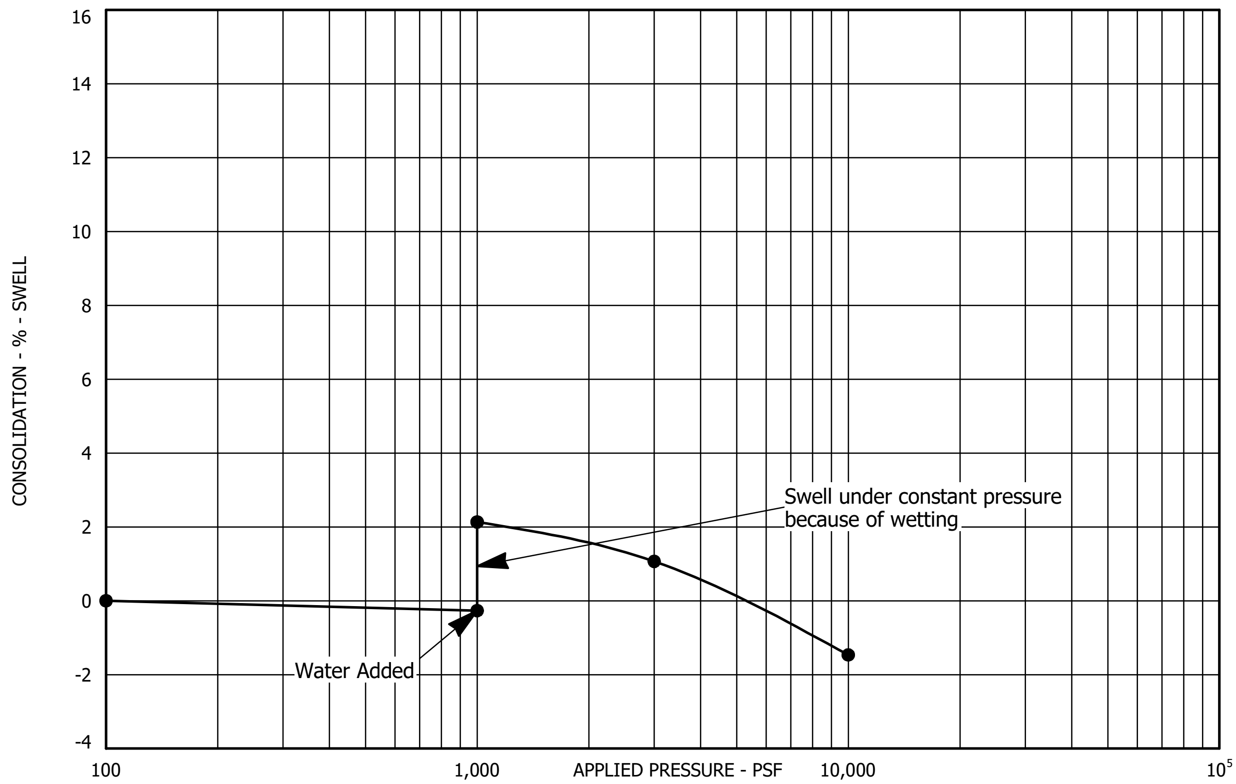


Sample Location Test Boring No. 13 at a depth of 14 feet Dry Unit Weight (pcf) 130
Sample Description Claystone, silty Moisture Content (%) 10

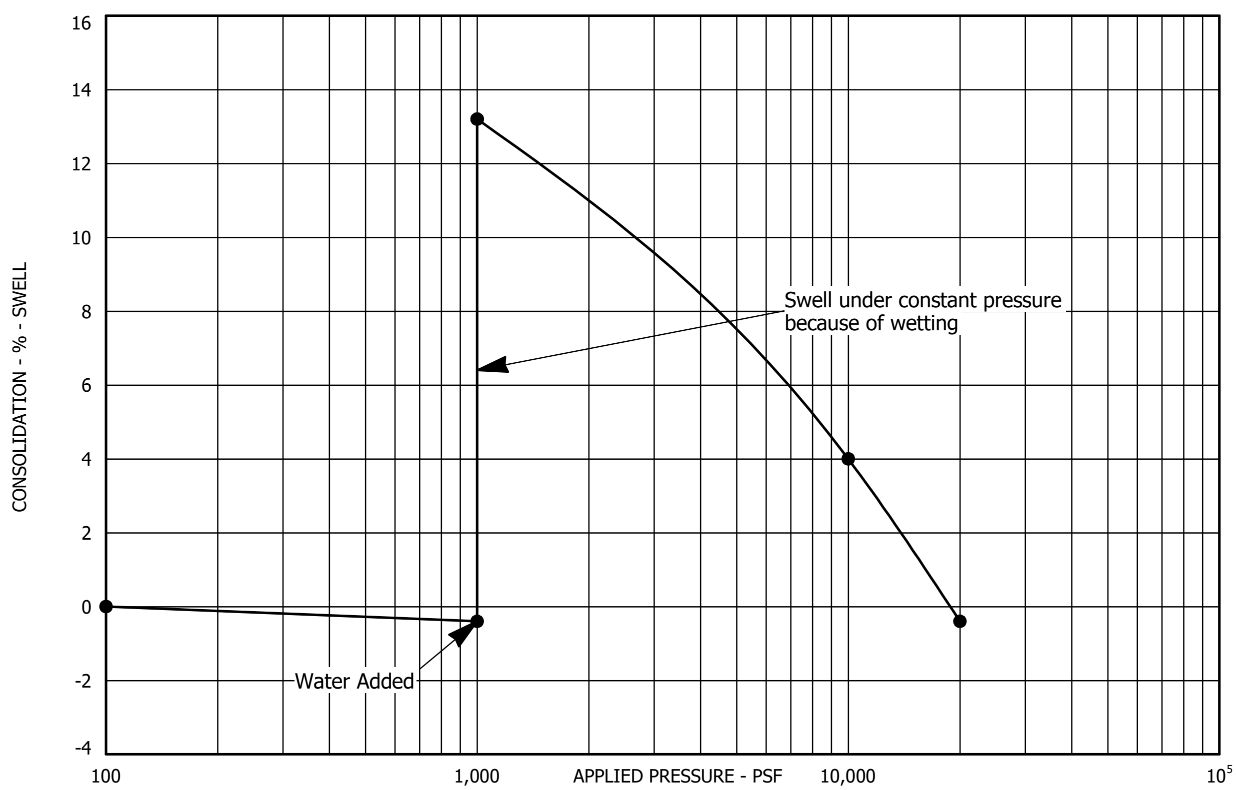
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-14

PROJECT NO. 160388



Sample Location: Test Boring No. 14 at a depth of 9 feet
Dry Unit Weight (pcf): 113
Sample Description: Claystone, silty
Moisture Content (%): 16



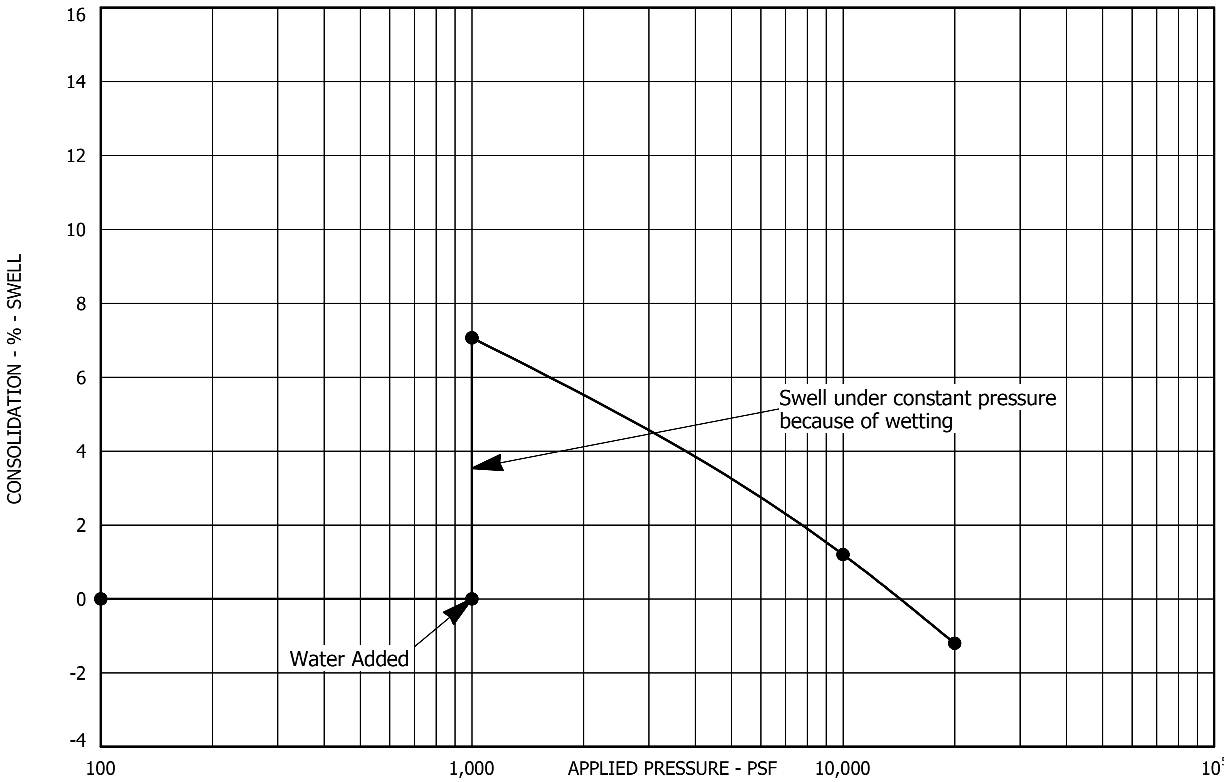
Sample Location: Test Boring No. 14 at a depth of 19 feet
Dry Unit Weight (pcf): 110
Sample Description: Claystone, trace sand
Moisture Content (%): 20

SWELL - CONSOLIDATION TEST RESULTS

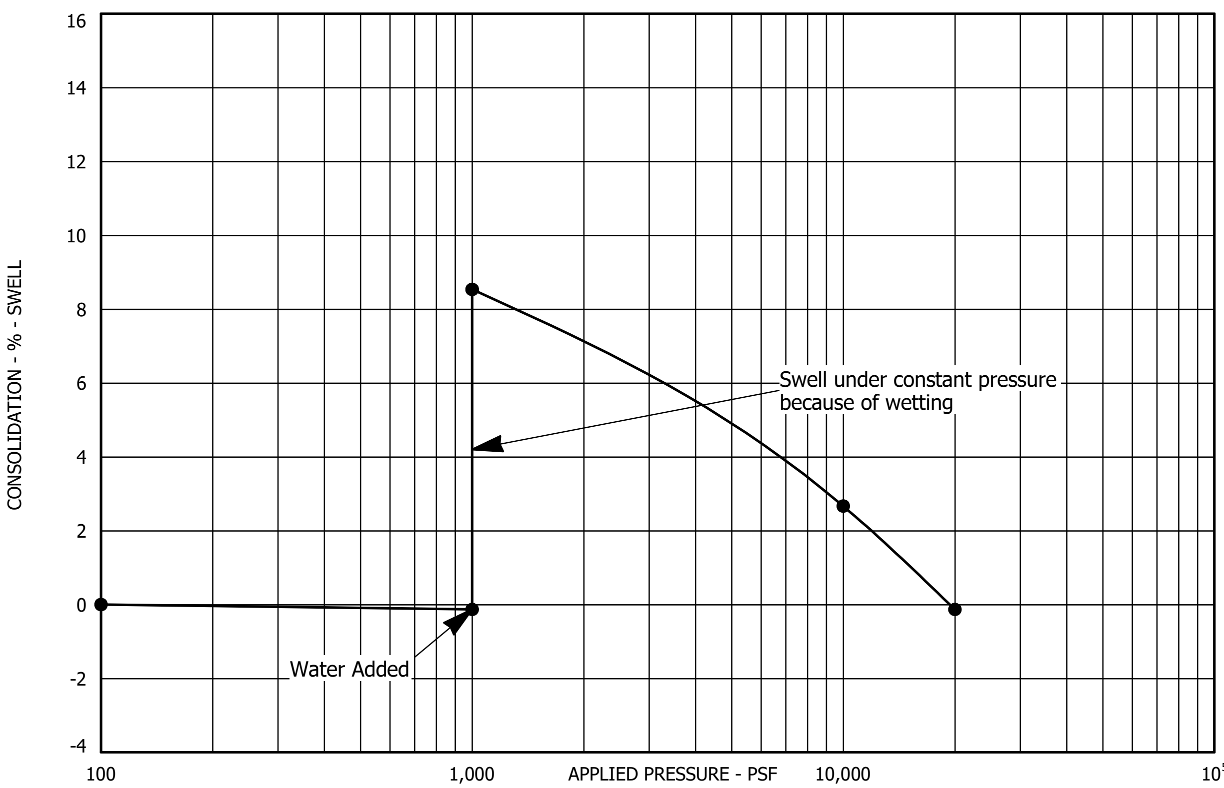
FIGURE A-15

PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location	Test Boring No. 15 at a depth of 19 feet	Dry Unit Weight (pcf)	119
Sample Description	Claystone, silty	Moisture Content (%)	16

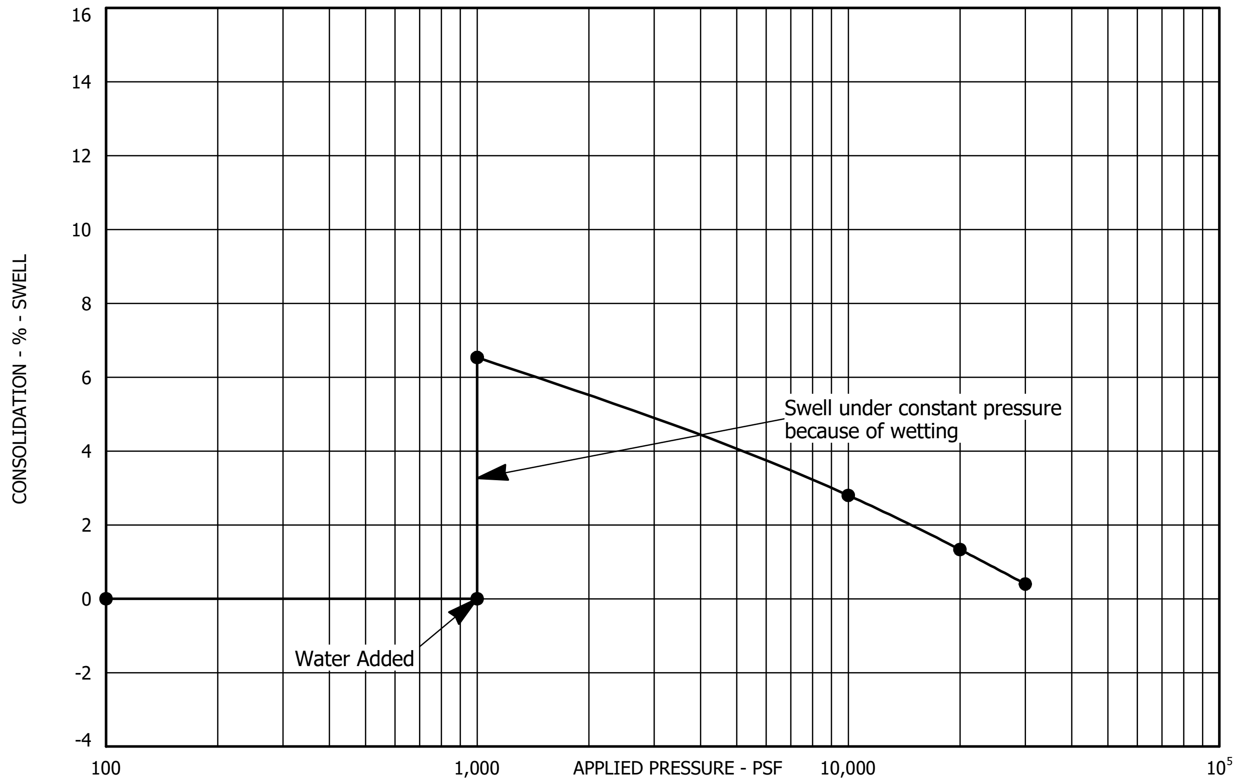


Sample Location	Test Boring No. 15 at a depth of 29 feet	Dry Unit Weight (pcf)	122
Sample Description	Claystone, silty	Moisture Content (%)	14

SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-16

PROJECT NO. 160388

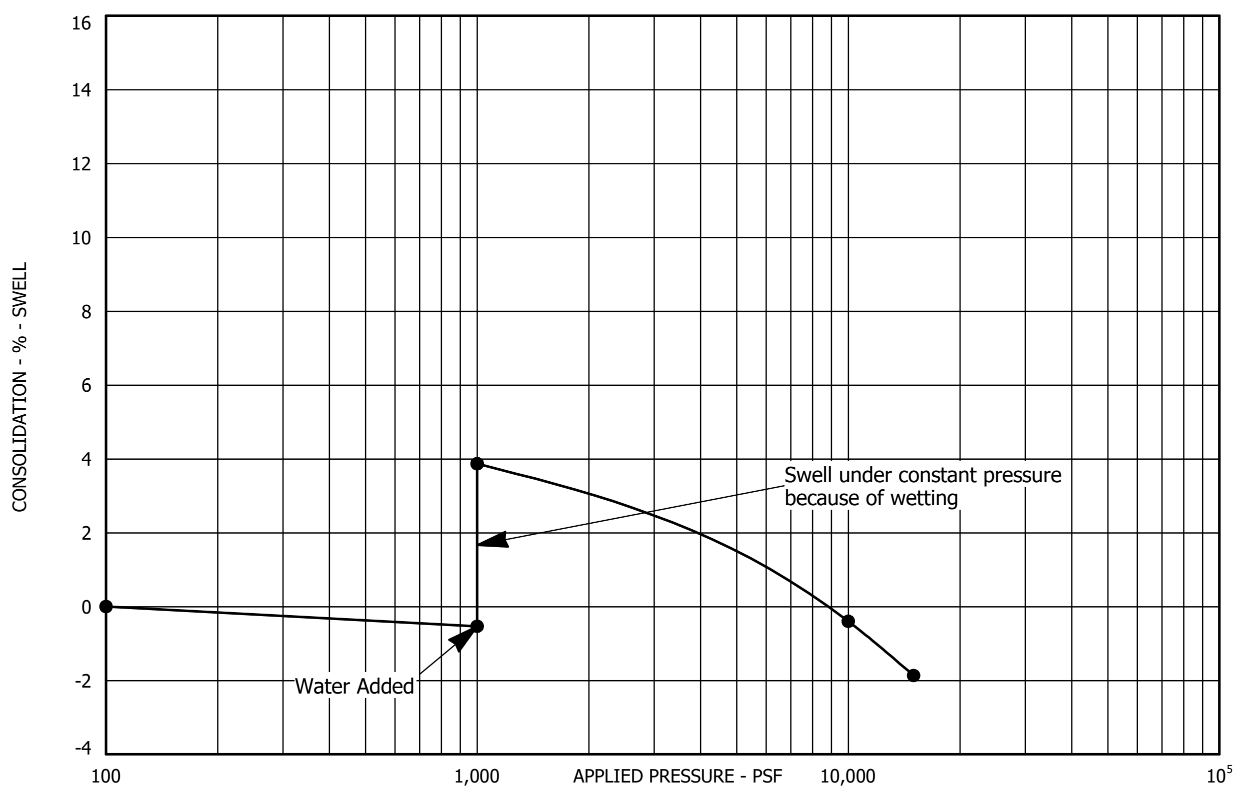


Sample Location Test Boring No. 16 at a depth of 4 feet

Sample Description Clay, sandy

Dry Unit Weight (pcf) 124

Moisture Content (%) 11



Sample Location Test Boring No. 16 at a depth of 14 feet

Sample Description Claystone, silty

Dry Unit Weight (pcf) 117

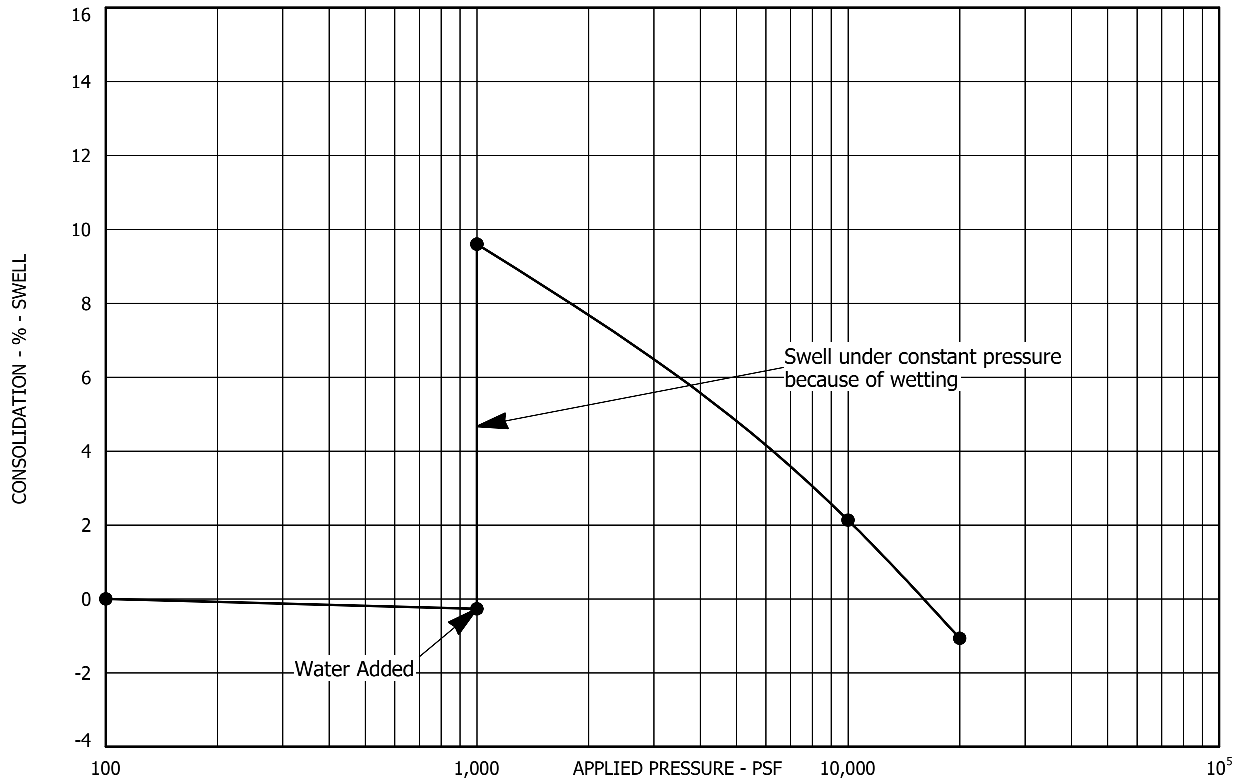
Moisture Content (%) 16

SWELL - CONSOLIDATION TEST RESULTS

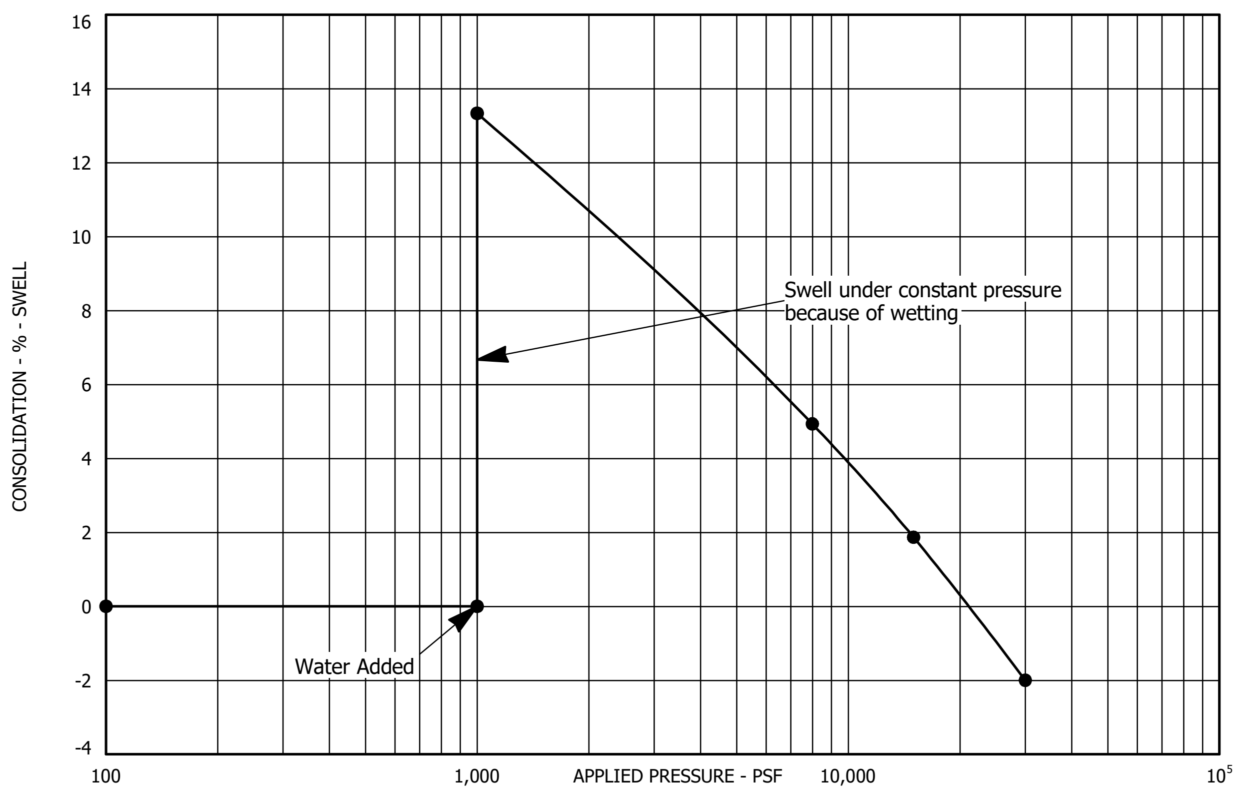
FIGURE A-17

PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 16 at a depth of 44 feet Dry Unit Weight (pcf) 120
Sample Description Claystone, silty Moisture Content (%) 15

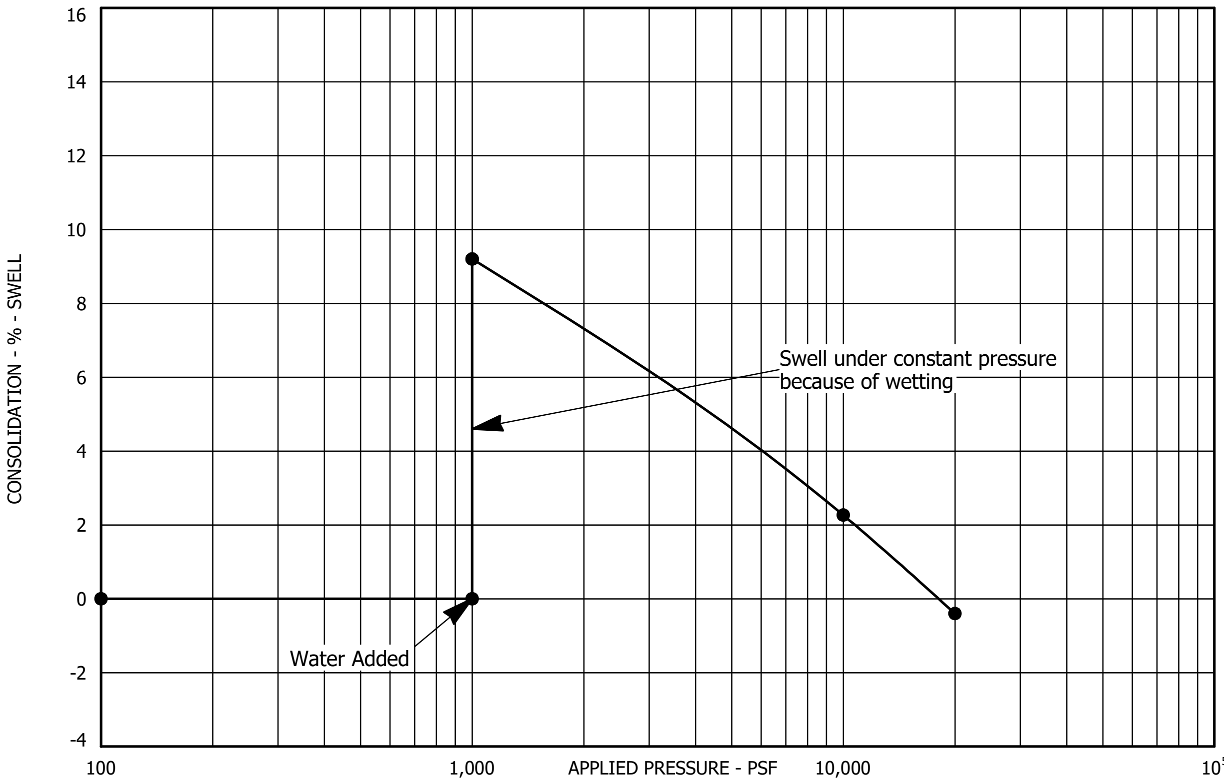


Sample Location Test Boring No. 17 at a depth of 4 feet Dry Unit Weight (pcf) 118
Sample Description Clay (Weathered Claystone), silty Moisture Content (%) 14

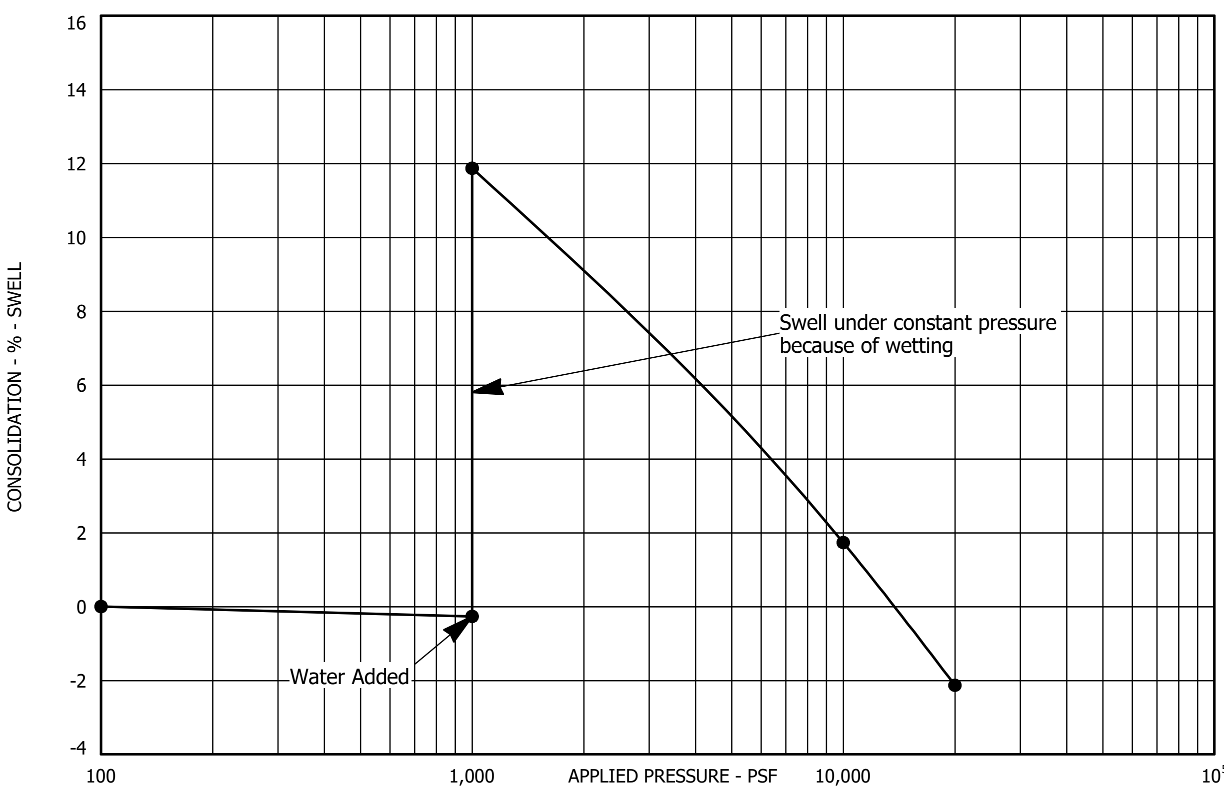
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-18

PROJECT NO. 160388



Sample Location: Test Boring No. 17 at a depth of 14 feet
Dry Unit Weight (pcf): 121
Sample Description: Claystone, silty
Moisture Content (%): 15

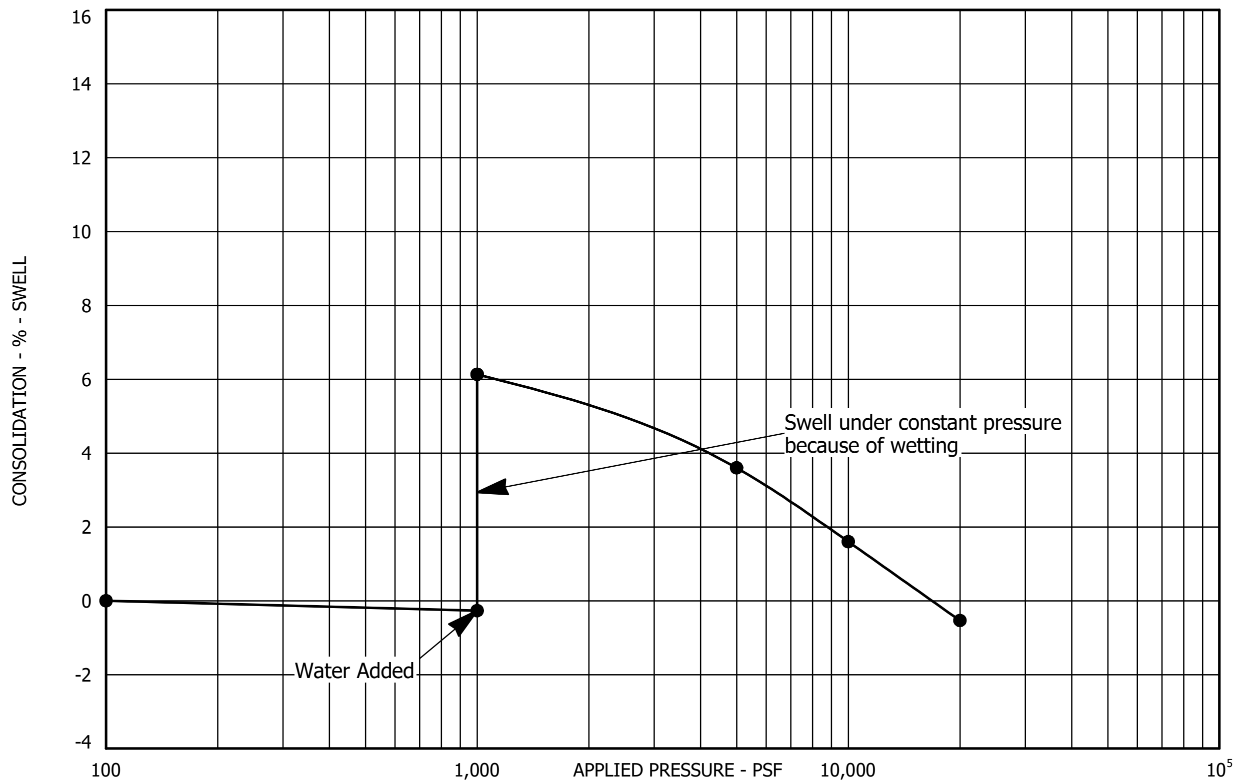


Sample Location: Test Boring No. 17 at a depth of 34 feet
Dry Unit Weight (pcf): 122
Sample Description: Claystone, silty
Moisture Content (%): 13

SWELL - CONSOLIDATION TEST RESULTS

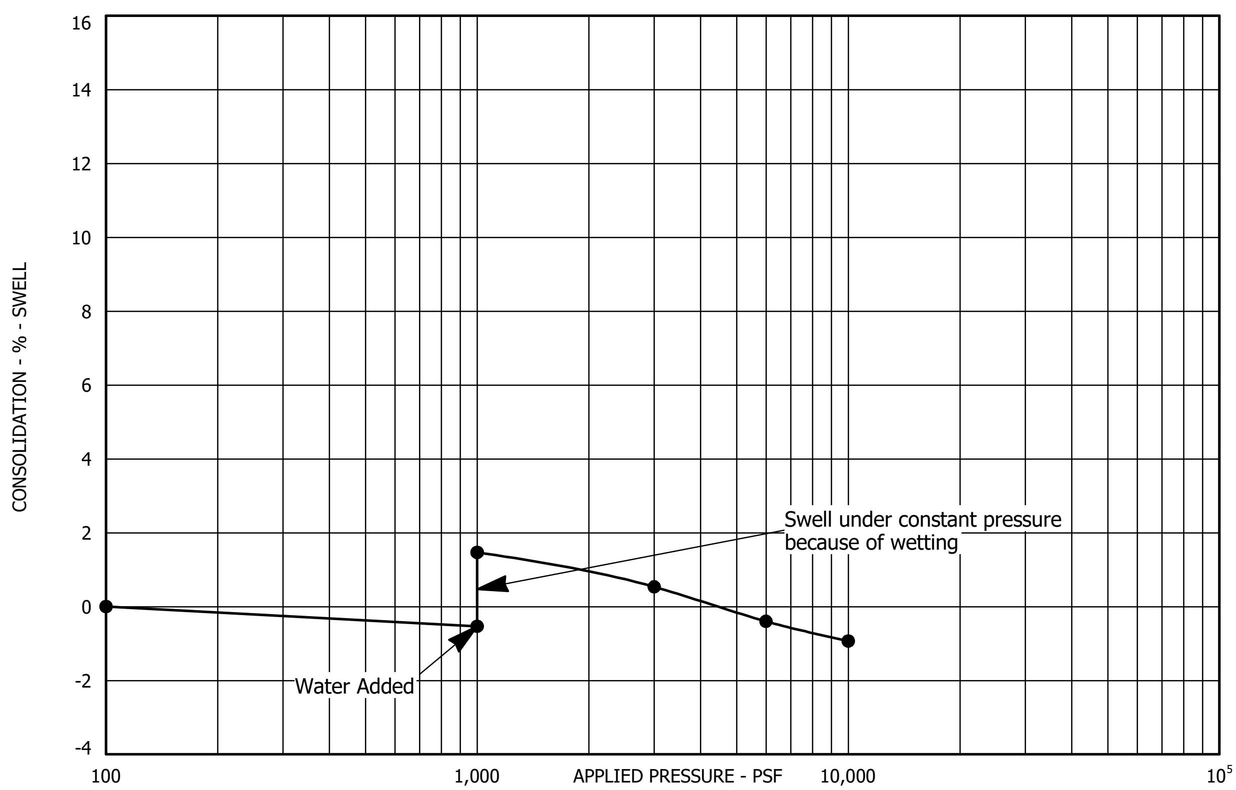
FIGURE A-19

PROJECT NO. 160388



Sample Location Test Boring No. 18 at a depth of 4 feet — Dry Unit Weight (pcf) 117

Sample Description Clay, sandy — Moisture Content (%) 10



Sample Location Test Boring No. 18 at a depth of 19 feet — Dry Unit Weight (pcf) 123

Sample Description Claystone, silty — Moisture Content (%) 16

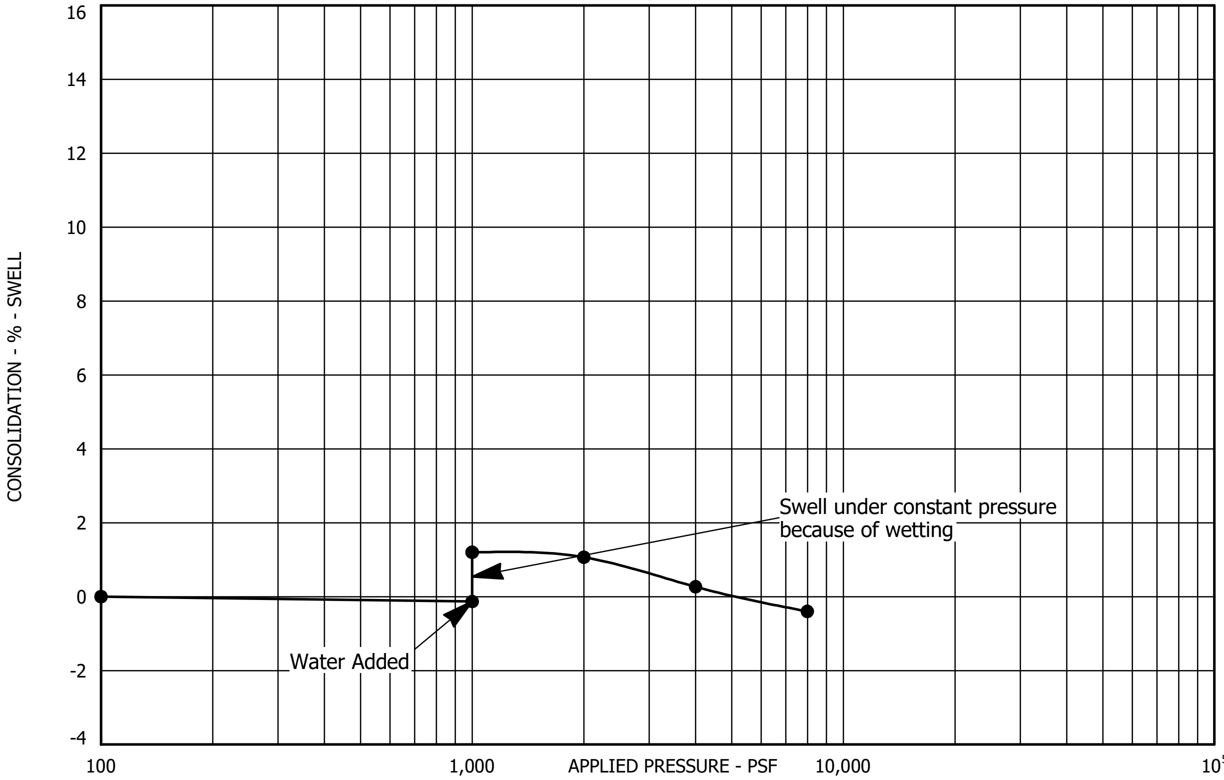
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-20

PROJECT NO. 160388

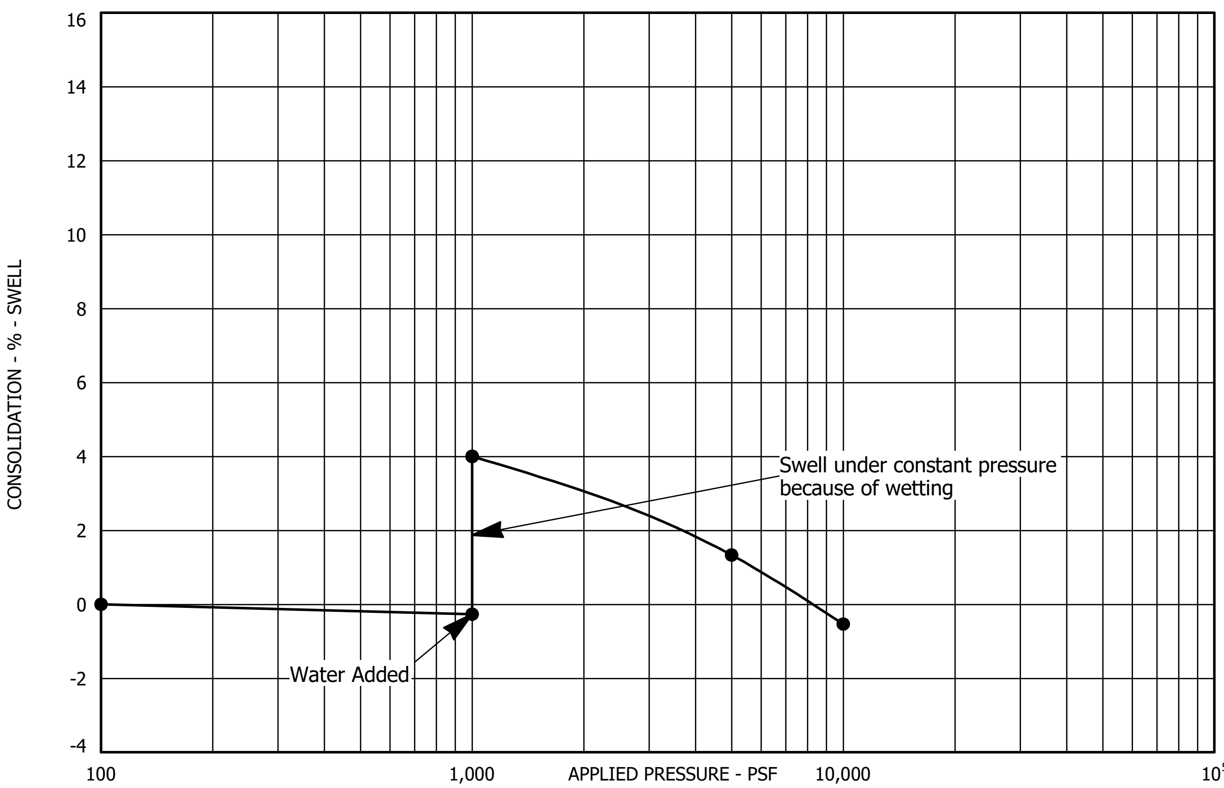
AGW

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 18 at a depth of 29 feet Dry Unit Weight (pcf) 121

Sample Description Claystone, silty Moisture Content (%) 14



Sample Location Test Boring No. 19 at a depth of 4 feet Dry Unit Weight (pcf) 116

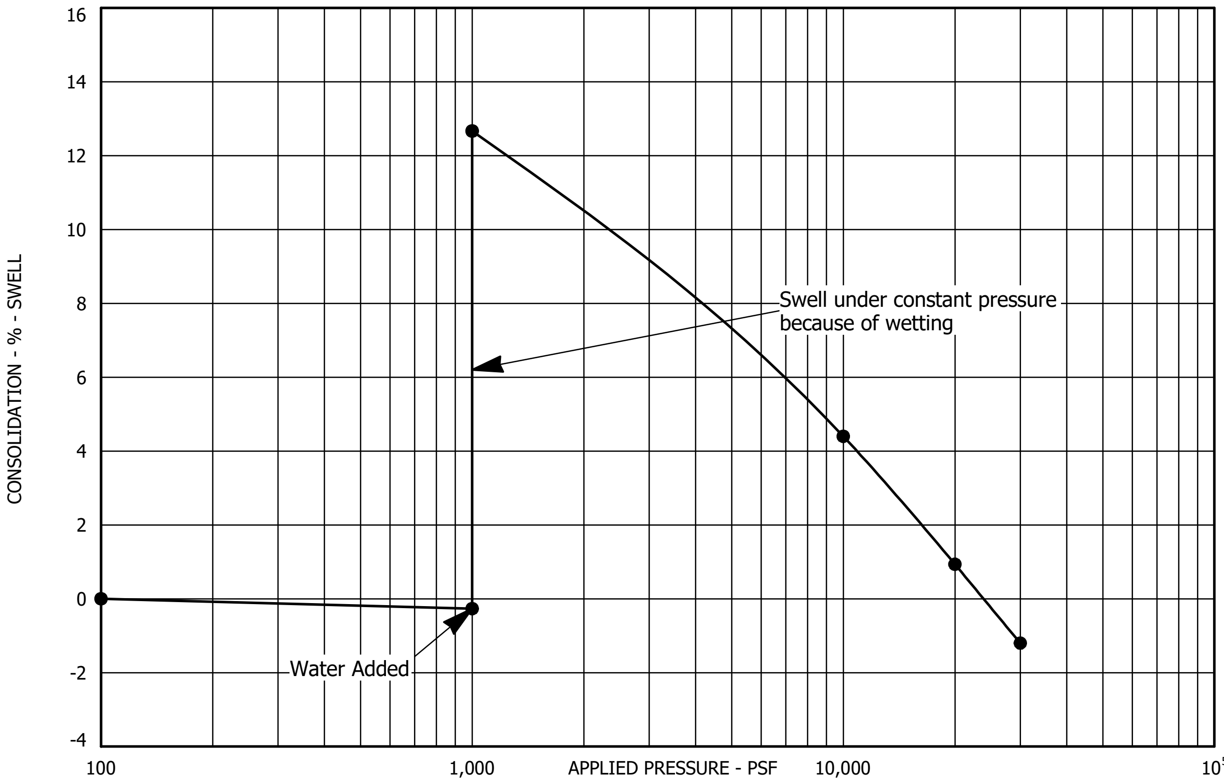
Sample Description Claystone, silty Moisture Content (%) 16

SWELL - CONSOLIDATION TEST RESULTS

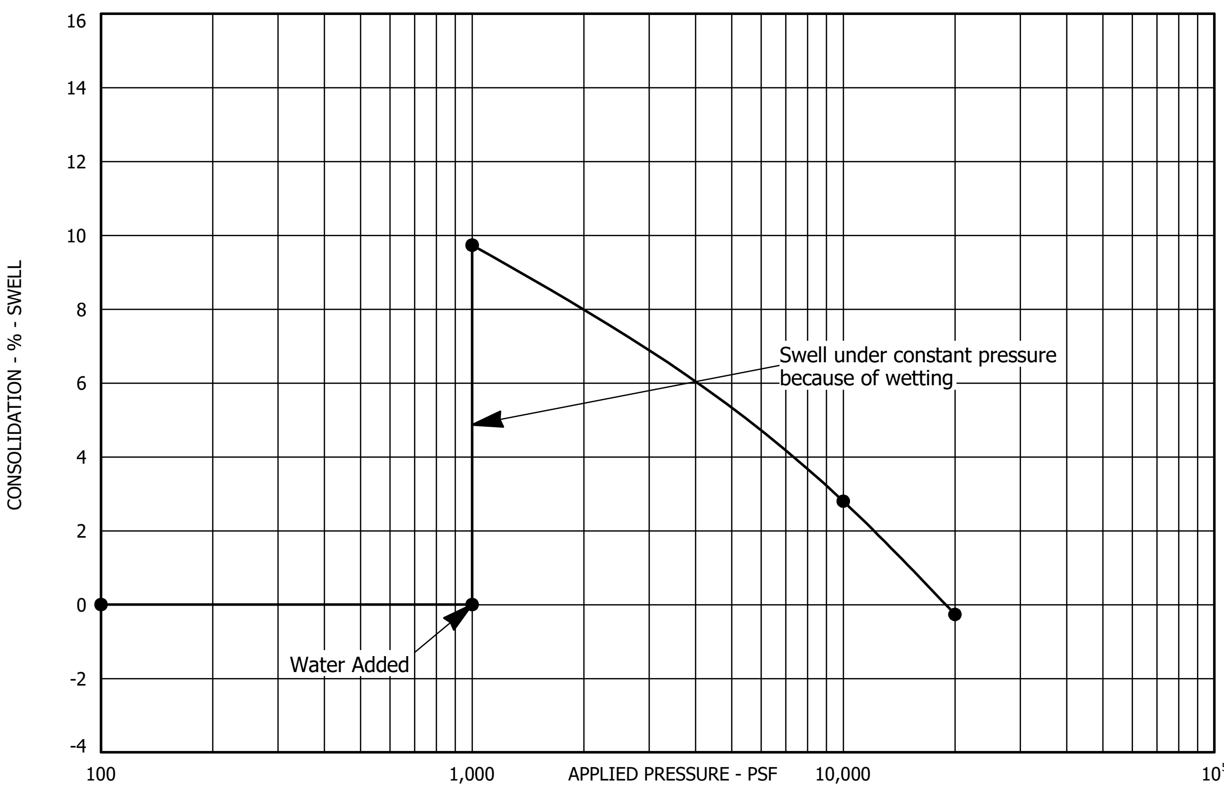
FIGURE A-21

PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 19 at a depth of 9 feet Dry Unit Weight (pcf) 113
Sample Description Claystone, silty Moisture Content (%) 18

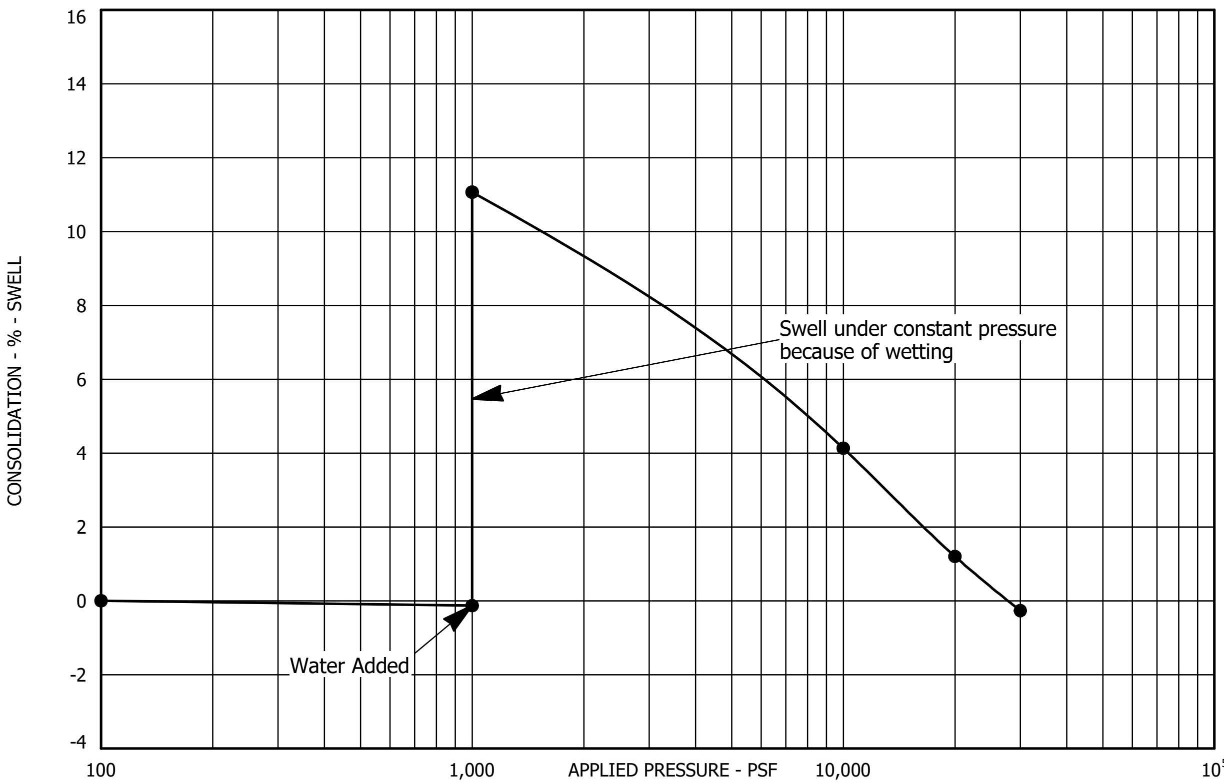


Sample Location Test Boring No. 20 at a depth of 14 feet Dry Unit Weight (pcf) 112
Sample Description Claystone, silty Moisture Content (%) 18

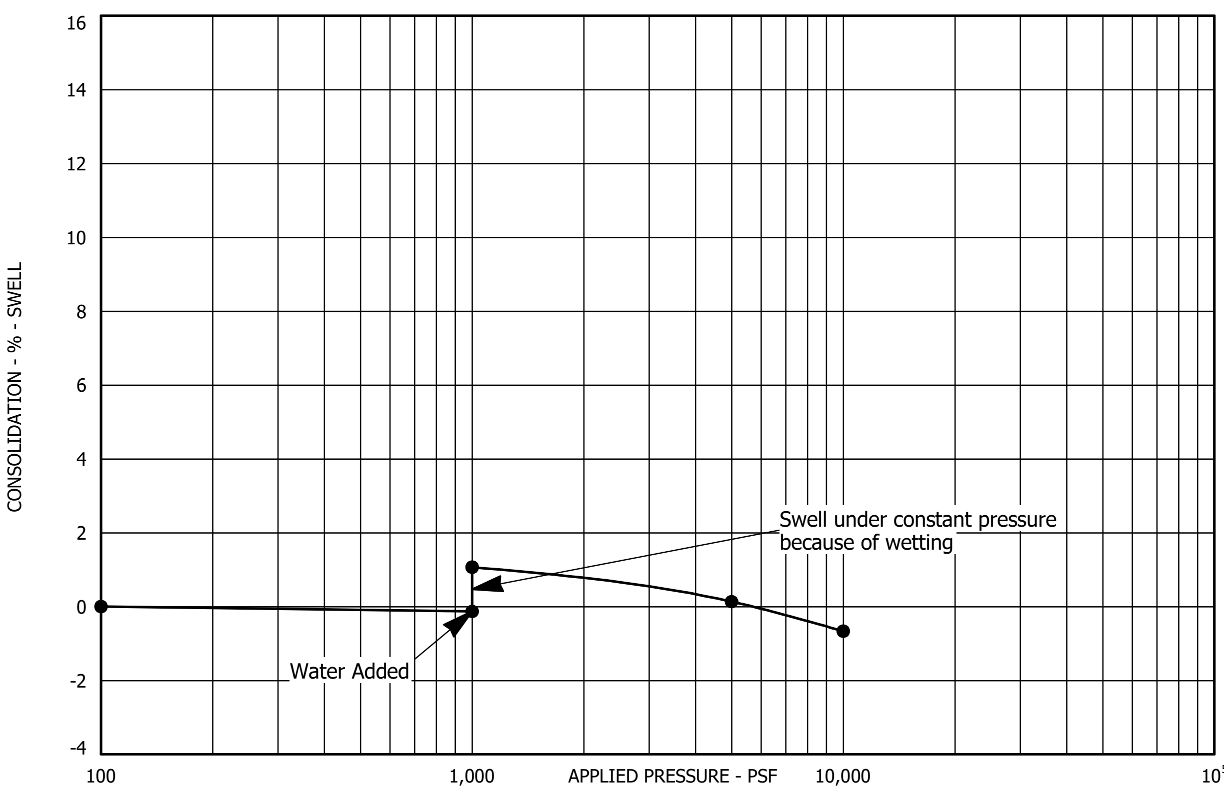
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-22

PROJECT NO. 160388



Sample Location Test Boring No. 20 at a depth of 24 feet Dry Unit Weight (pcf) 120
Sample Description Claystone, silty Moisture Content (%) 14



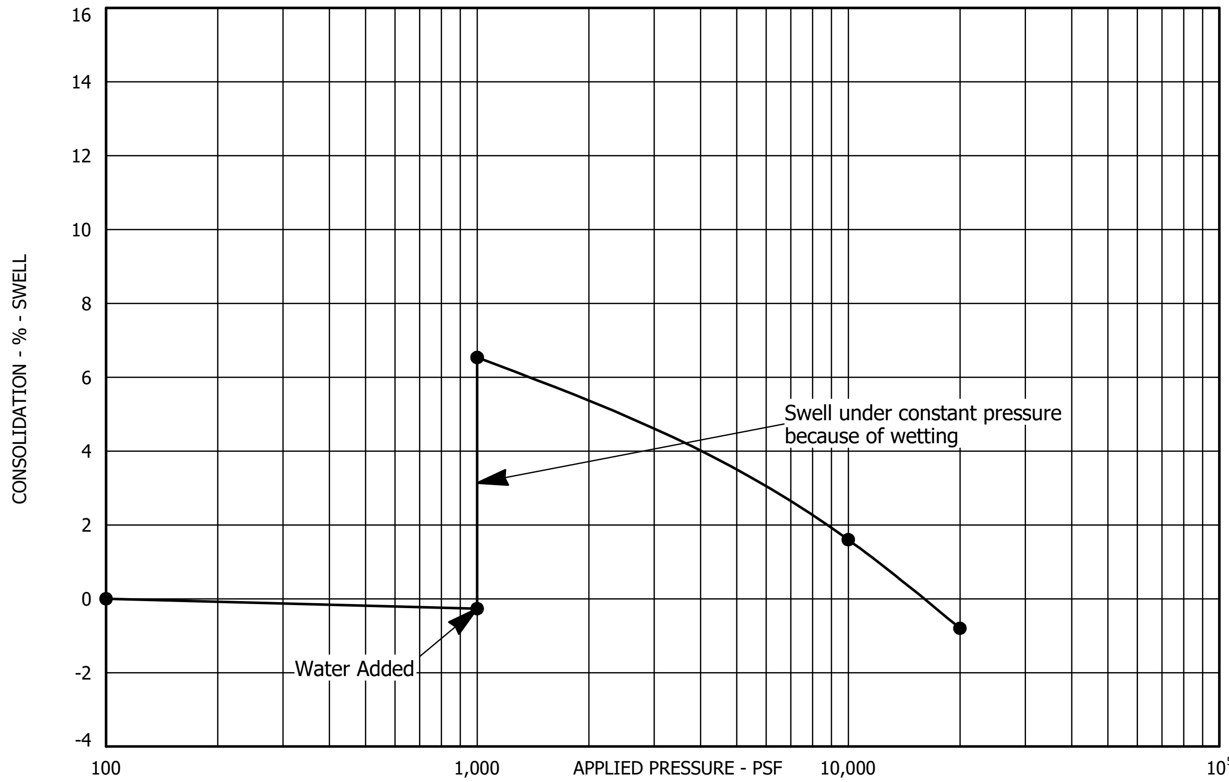
Sample Location Test Boring No. 21 at a depth of 9 feet Dry Unit Weight (pcf) 124
Sample Description Claystone/Sandstone, silty Moisture Content (%) 11

SWELL - CONSOLIDATION TEST RESULTS

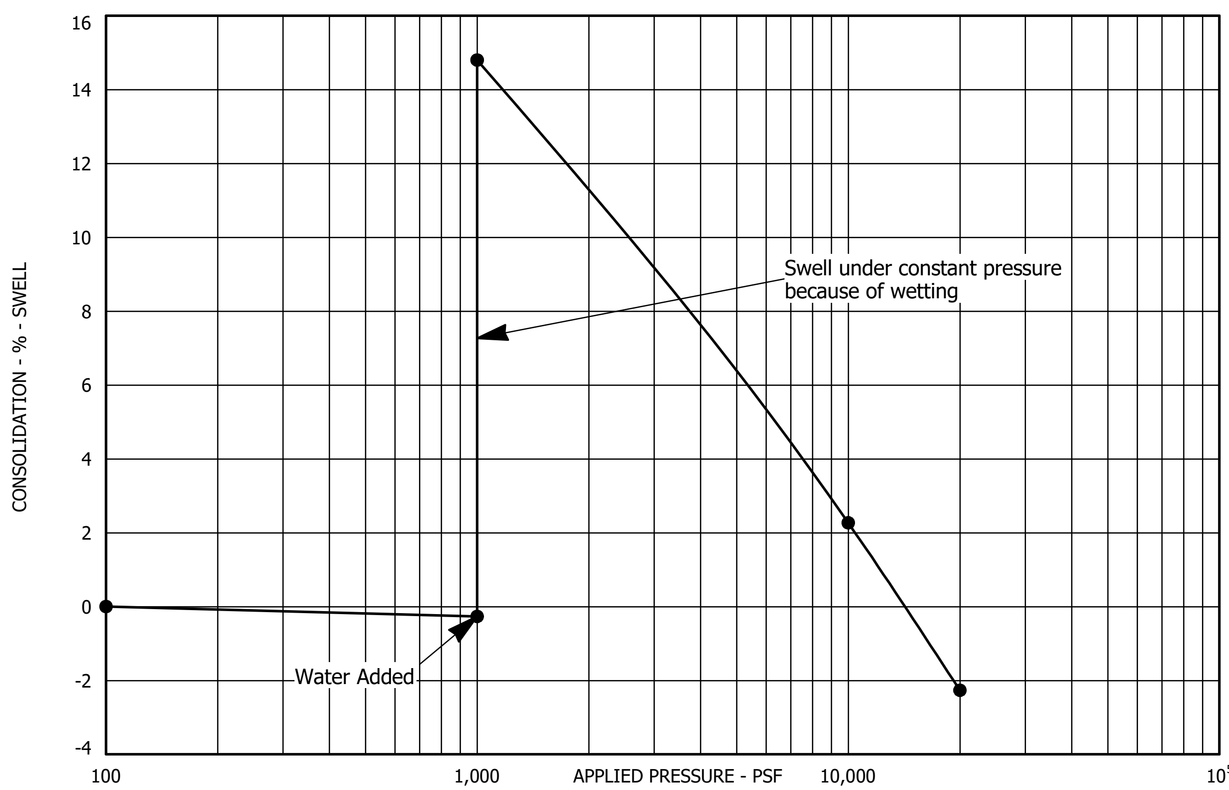
FIGURE A-23

PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 21 at a depth of 24 feet
Dry Unit Weight (pcf): 117
Sample Description: Claystone, silty
Moisture Content (%): 14



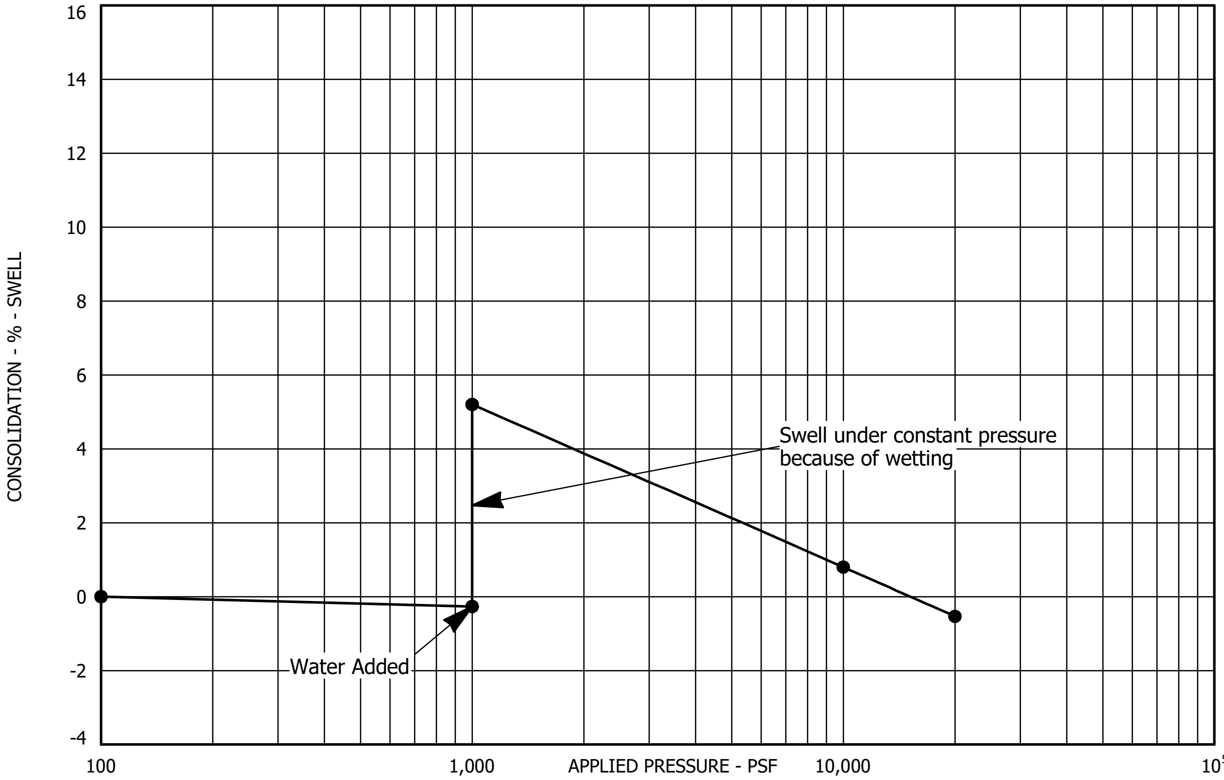
Sample Location: Test Boring No. 21 at a depth of 34 feet
Dry Unit Weight (pcf): 120
Sample Description: Claystone, silty
Moisture Content (%): 14

SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-24

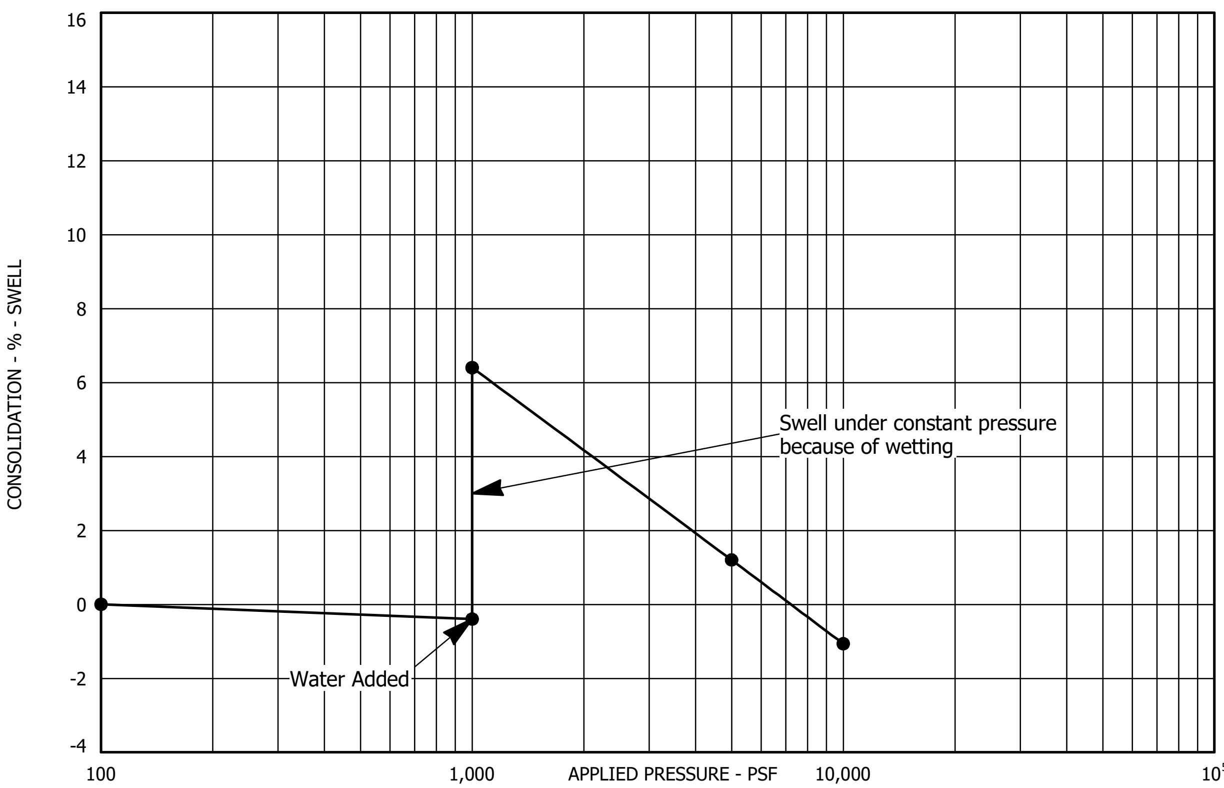
PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 22 at a depth of 9 feet Dry Unit Weight (pcf) 129

Sample Description Claystone, silty Moisture Content (%) 12



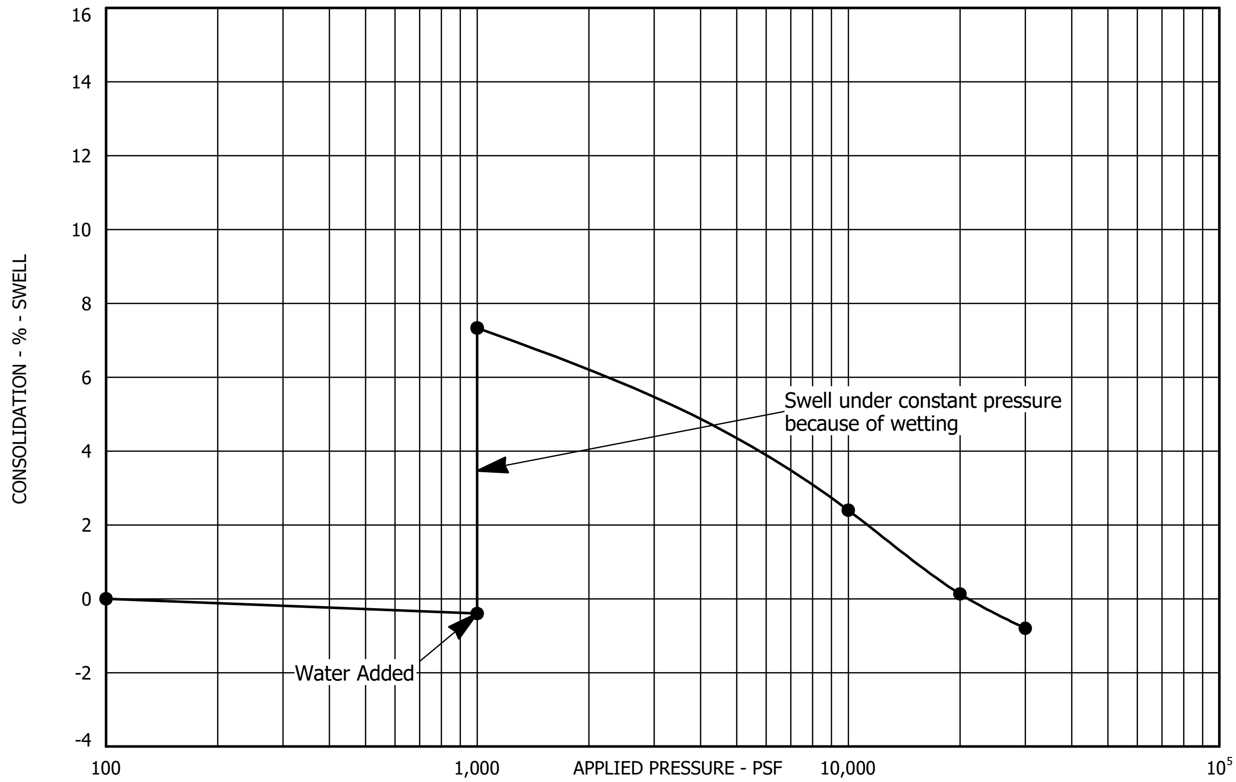
Sample Location Test Boring No. 23 at a depth of 9 feet Dry Unit Weight (pcf) 112

Sample Description Claystone, silty Moisture Content (%) 18

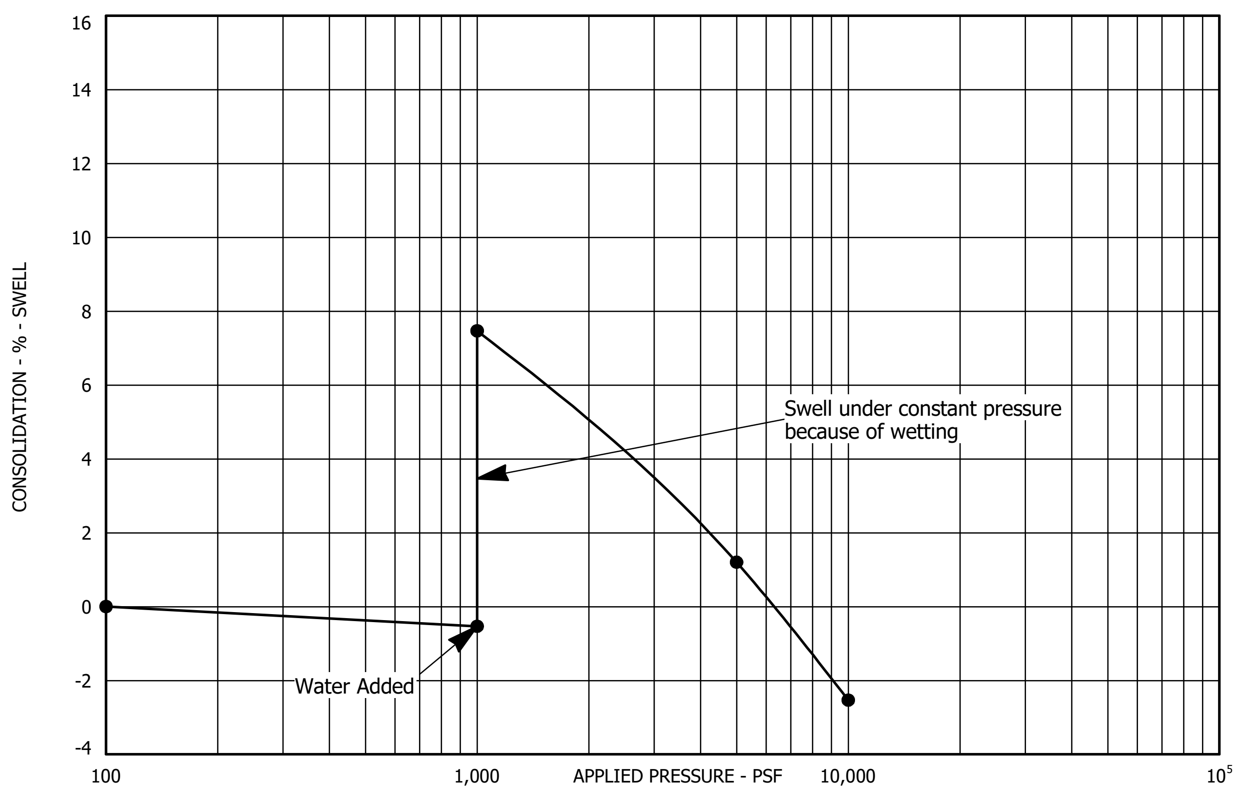
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-25

PROJECT NO. 160388



Sample Location Test Boring No. 23 at a depth of 19 feet
Dry Unit Weight (pcf) 127
Sample Description Claystone, silty
Moisture Content (%) 13

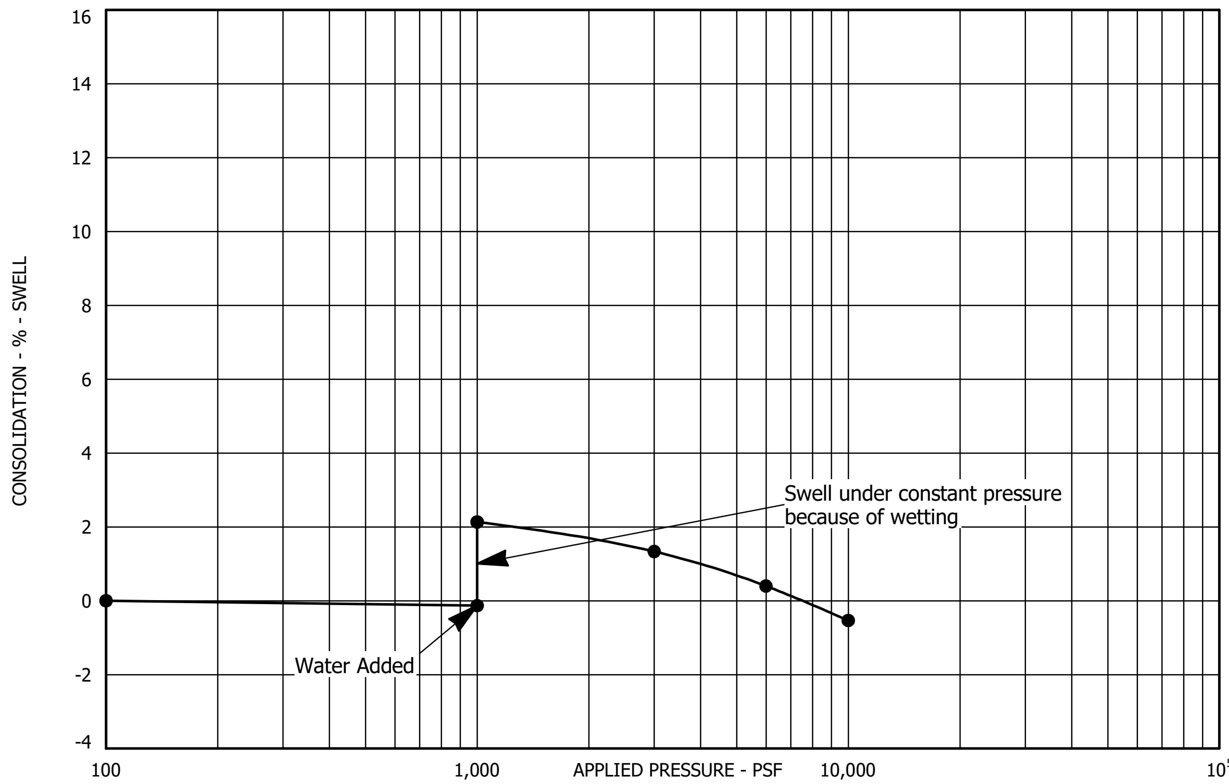


Sample Location Test Boring No. 23 at a depth of 29 feet
Dry Unit Weight (pcf) 111
Sample Description Claystone, silty
Moisture Content (%) 13

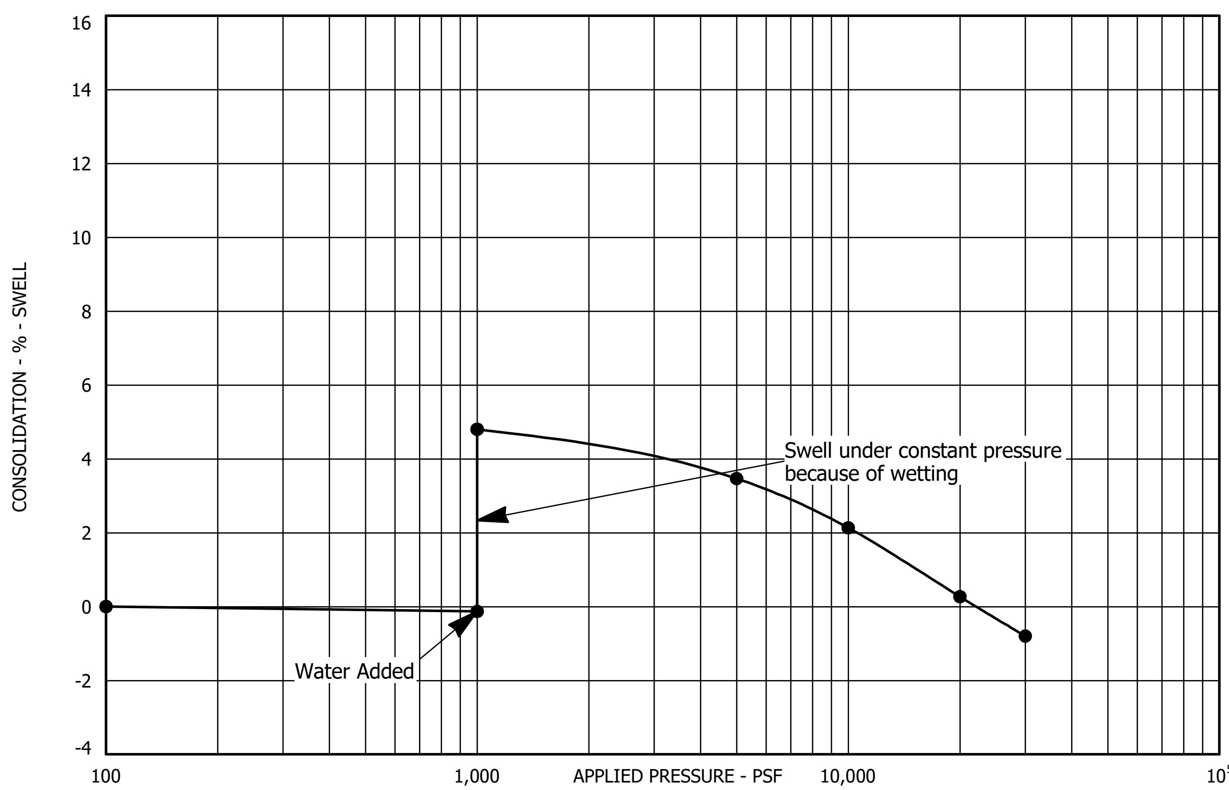
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-26

PROJECT NO. 160388



Sample Location: Test Boring No. 24 at a depth of 4 feet
Sample Description: Claystone, silty
Dry Unit Weight (pcf): 121
Moisture Content (%): 12

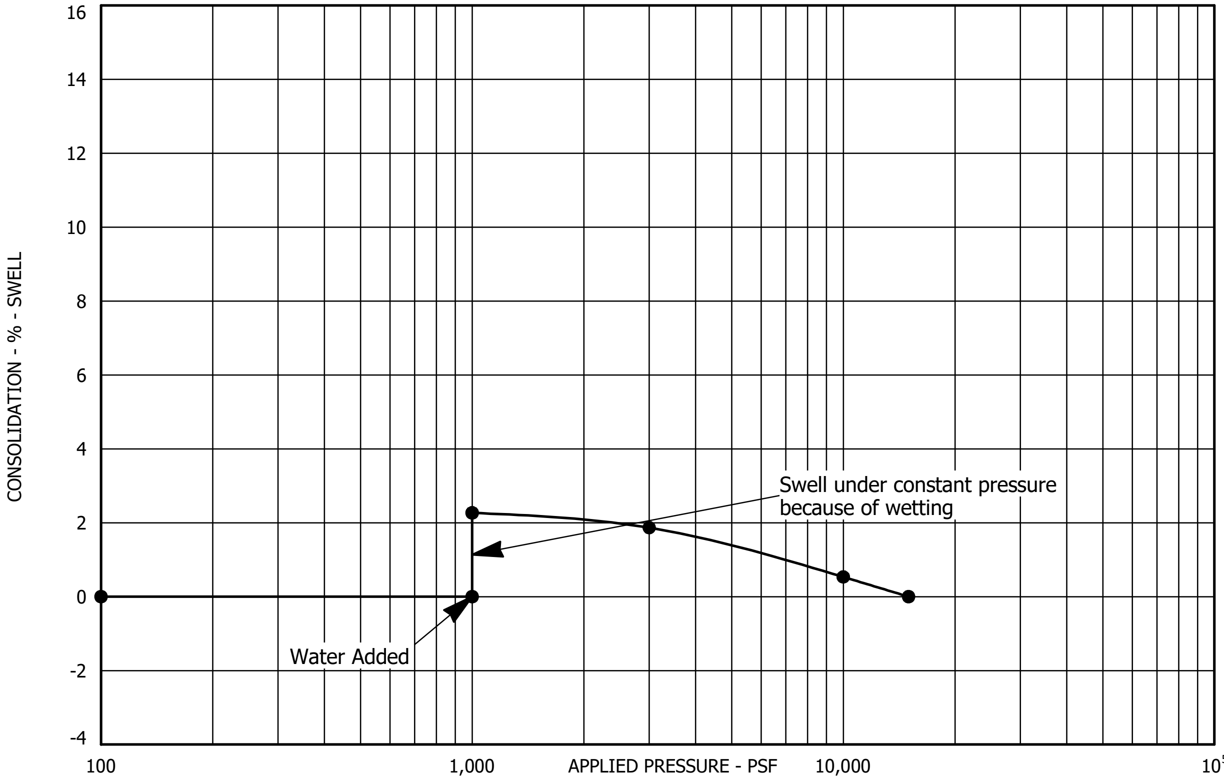


Sample Location: Test Boring No. 25 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 13

SWELL - CONSOLIDATION TEST RESULTS

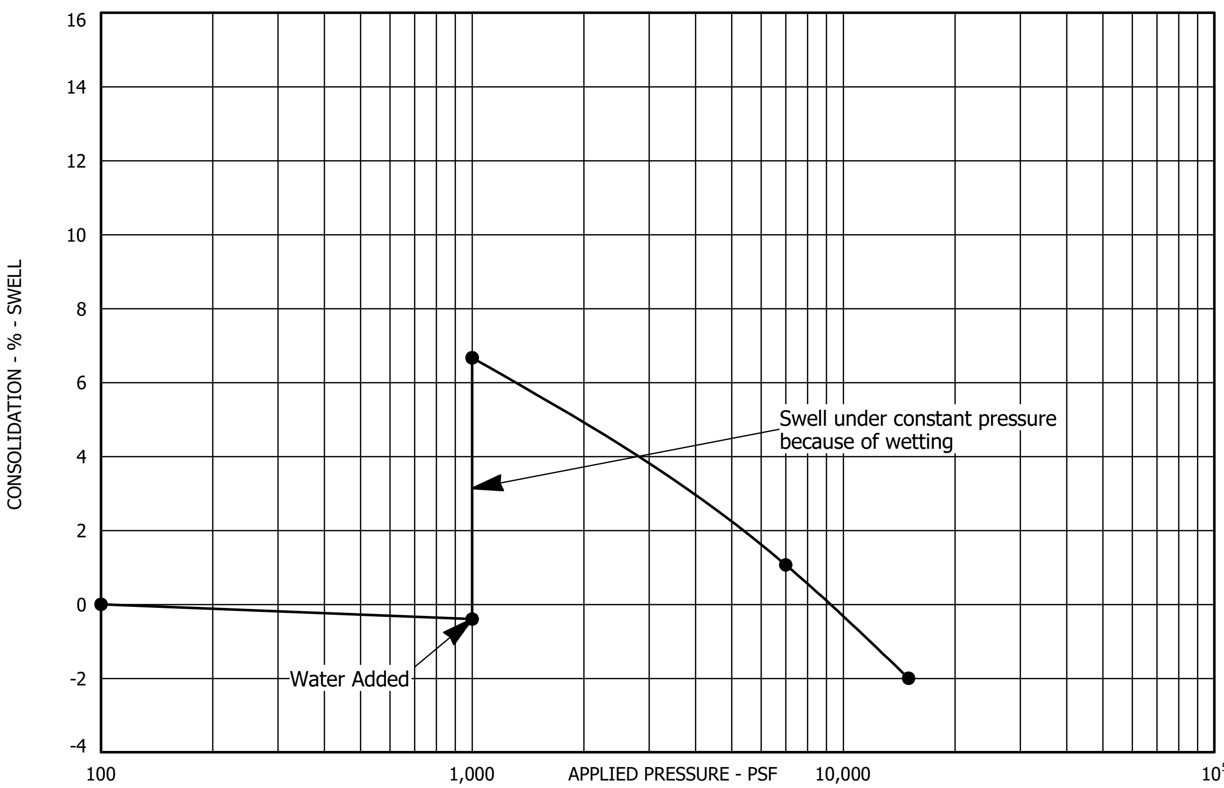
FIGURE A-27

PROJECT NO. 160388



Sample Location Test Boring No. 25 at a depth of 19 feet Dry Unit Weight (pcf) 121

Sample Description Claystone, silty Moisture Content (%) 15

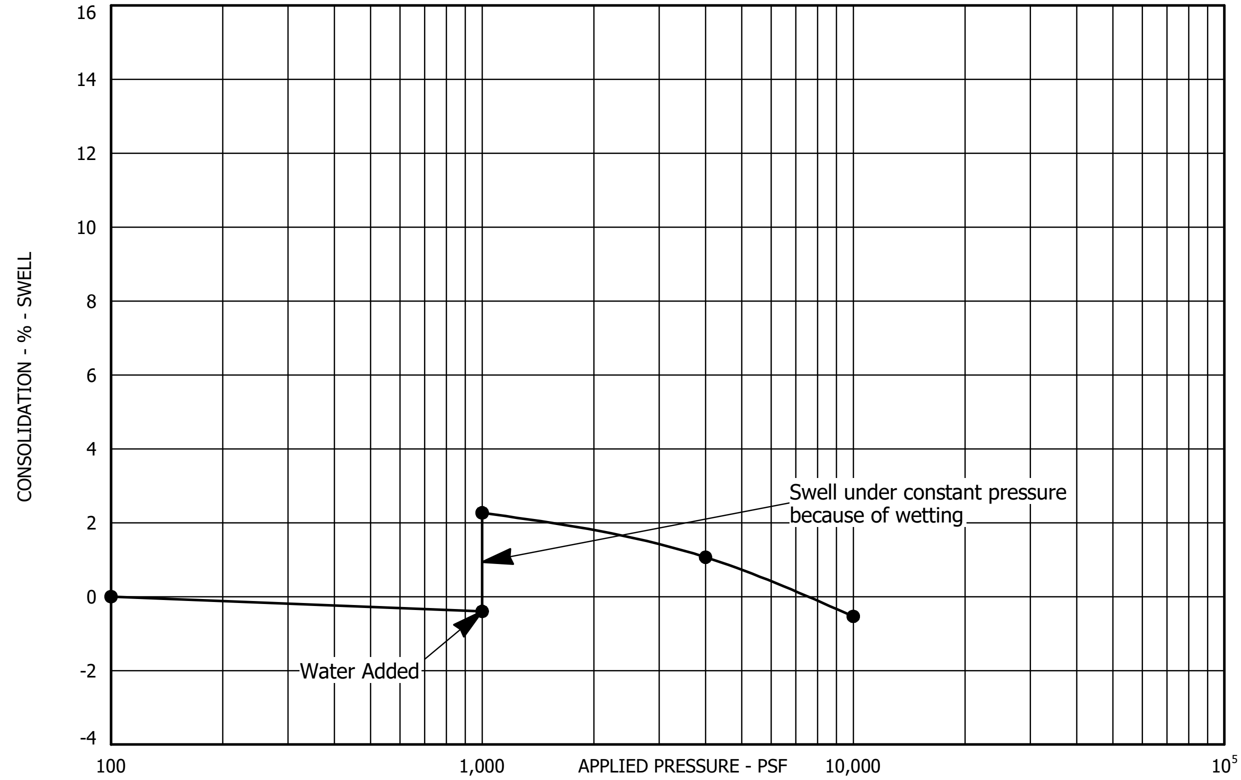


Sample Location Test Boring No. 26 at a depth of 4 feet Dry Unit Weight (pcf) 113

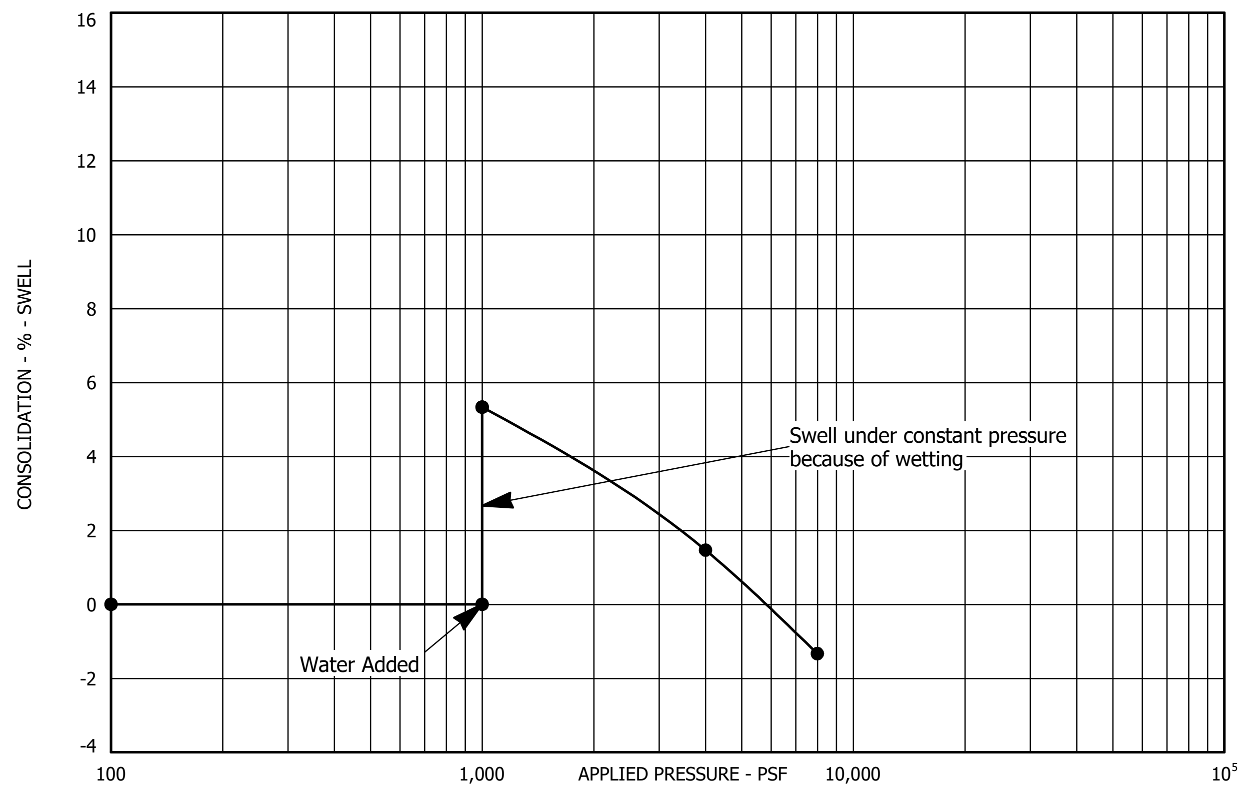
Sample Description Claystone, trace sand Moisture Content (%) 15

SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-28



Sample Location Test Boring No. 26 at a depth of 9 feet | Dry Unit Weight (pcf) 121
Sample Description Claystone, silty | Moisture Content (%) 16

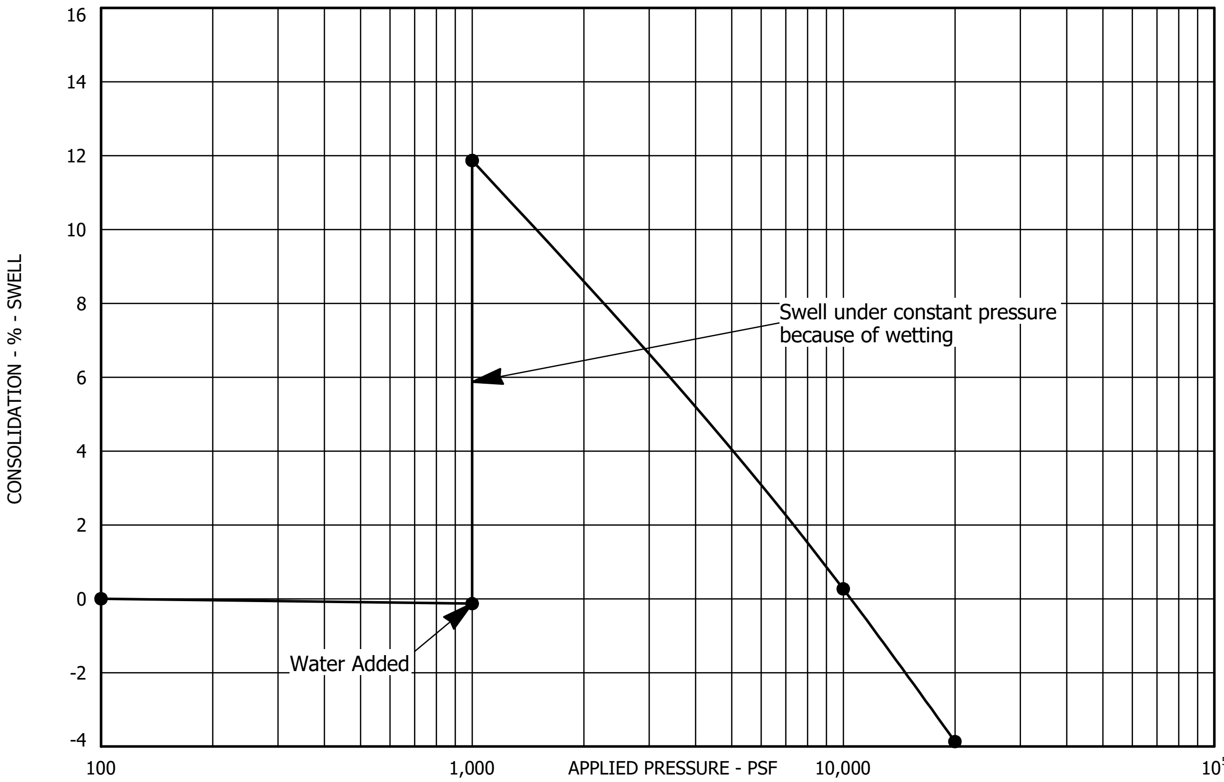


Sample Location Test Boring No. 27 at a depth of 4 feet | Dry Unit Weight (pcf) 105
Sample Description Claystone, silty | Moisture Content (%) 16

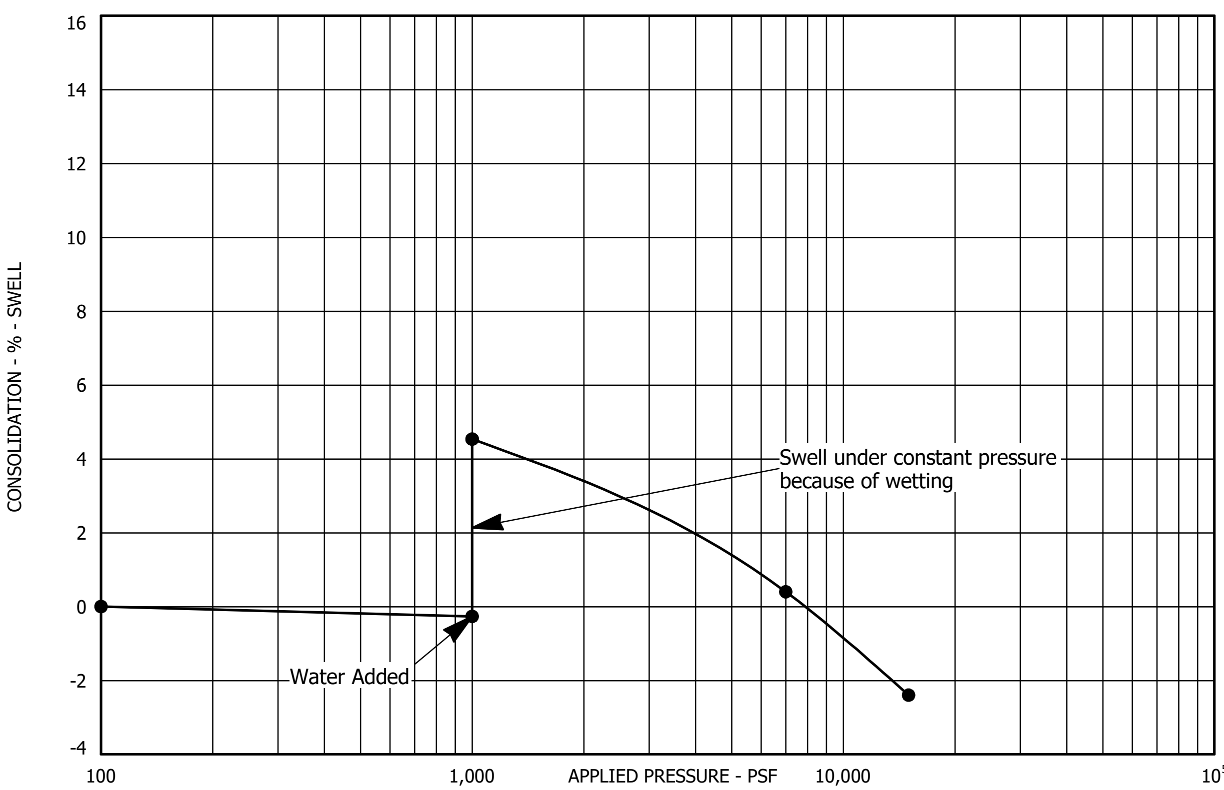
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-29

PROJECT NO. 160388



Sample Location Test Boring No. 27 at a depth of 9 feet Dry Unit Weight (pcf) 113
Sample Description Claystone, silty Moisture Content (%) 18

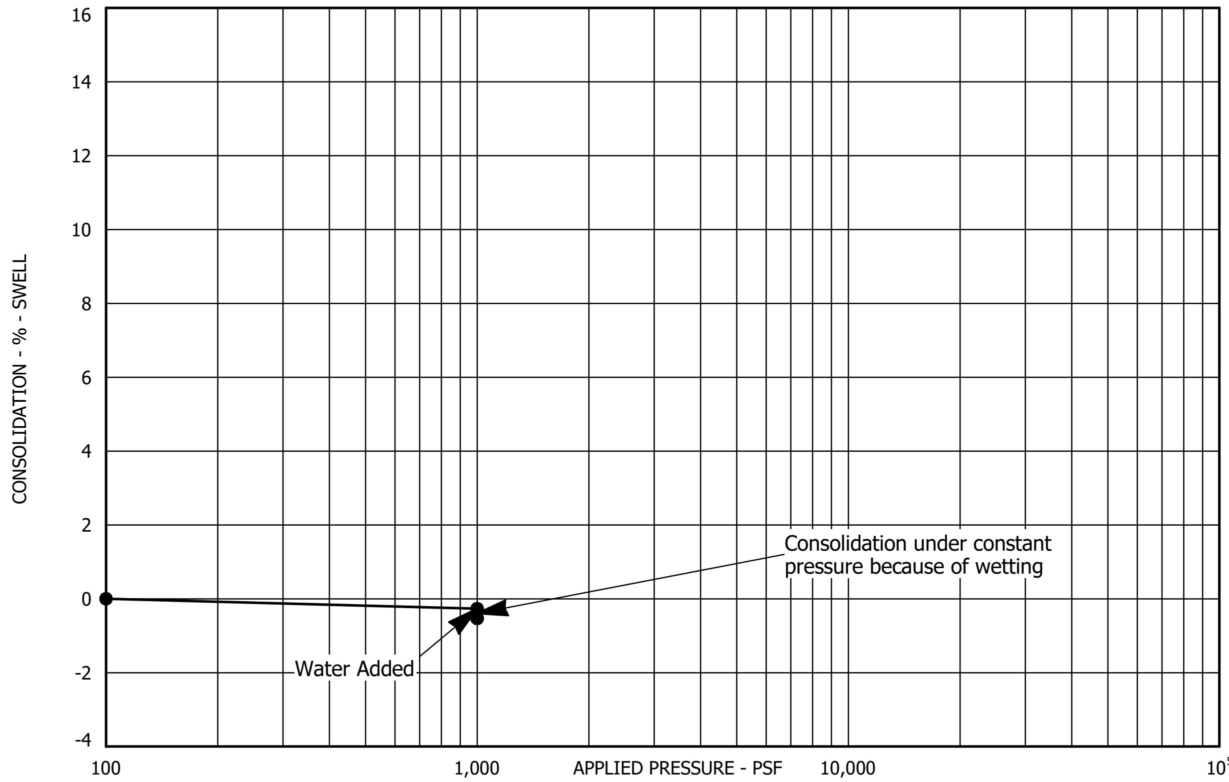


Sample Location Test Boring No. 27 at a depth of 24 feet Dry Unit Weight (pcf) 118
Sample Description Claystone, silty Moisture Content (%) 14

SWELL - CONSOLIDATION TEST RESULTS

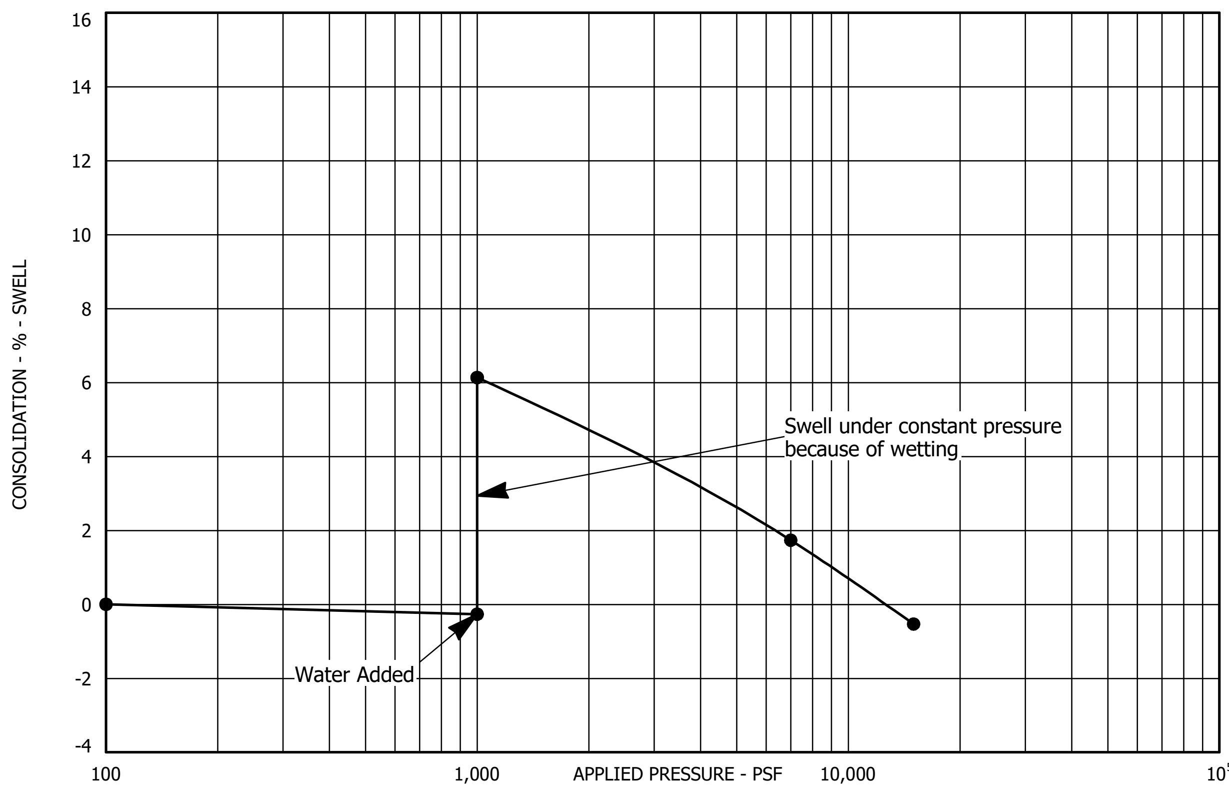
FIGURE A-30

PROJECT NO. 160388



Sample Location: Test Boring No. 28 at a depth of 29 feet — Dry Unit Weight (pcf): 116

Sample Description: Claystone/Sandstone, silty — Moisture Content (%): 12



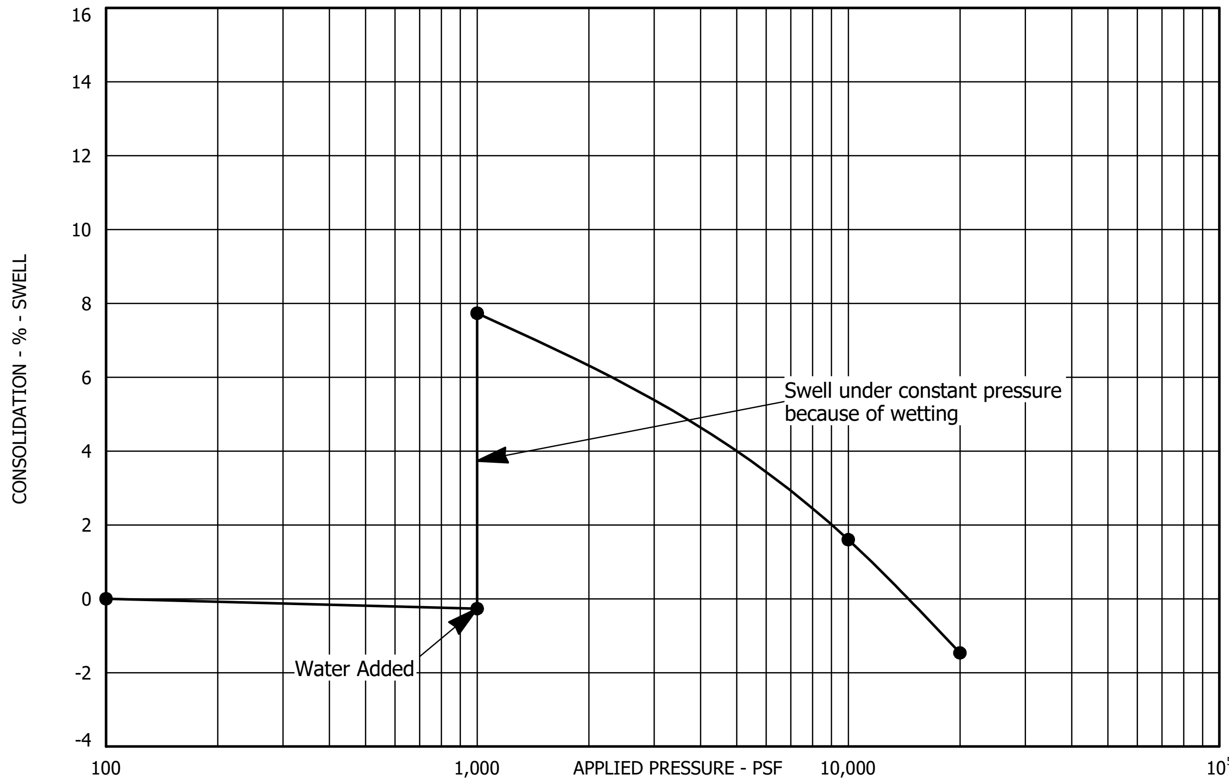
Sample Location: Test Boring No. 29 at a depth of 9 feet — Dry Unit Weight (pcf): 118

Sample Description: Claystone, silty — Moisture Content (%): 14

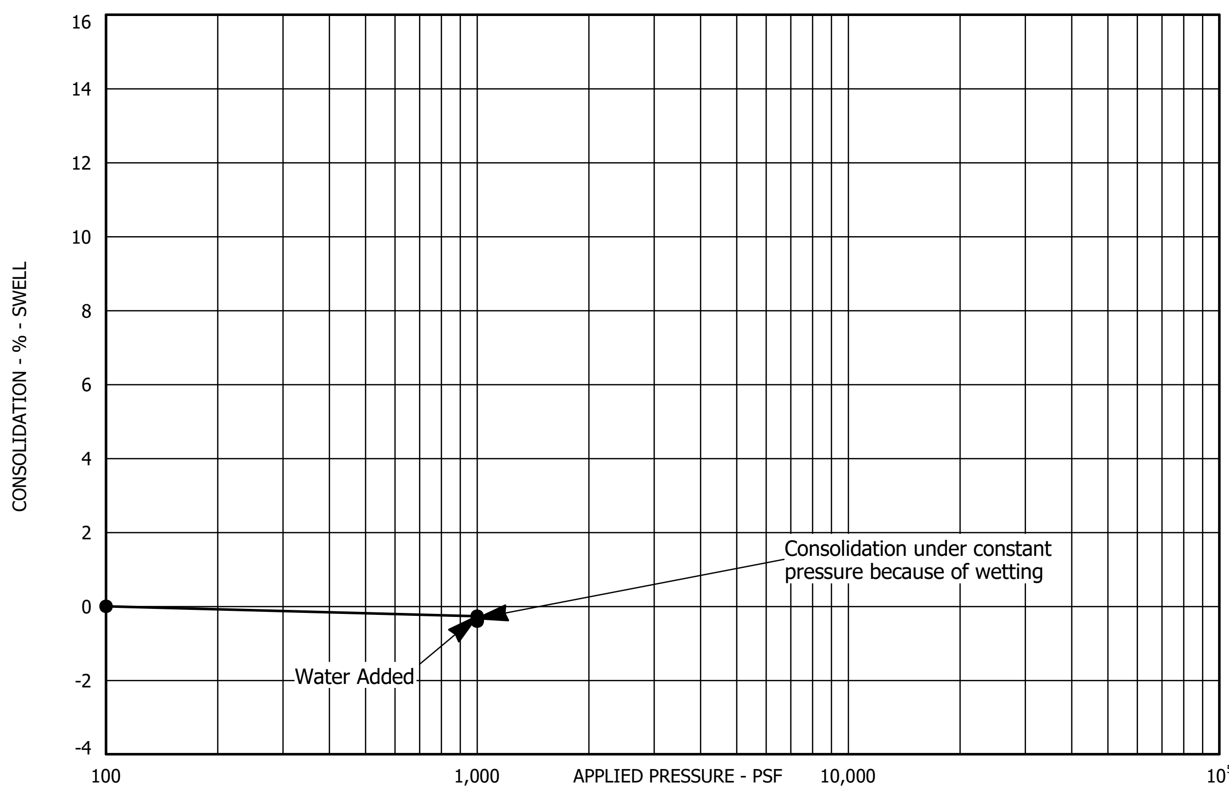
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-31

PROJECT NO. 160388



Sample Location	Test Boring No. 29 at a depth of 14 feet	Dry Unit Weight (pcf)	113
Sample Description	Claystone, silty	Moisture Content (%)	18



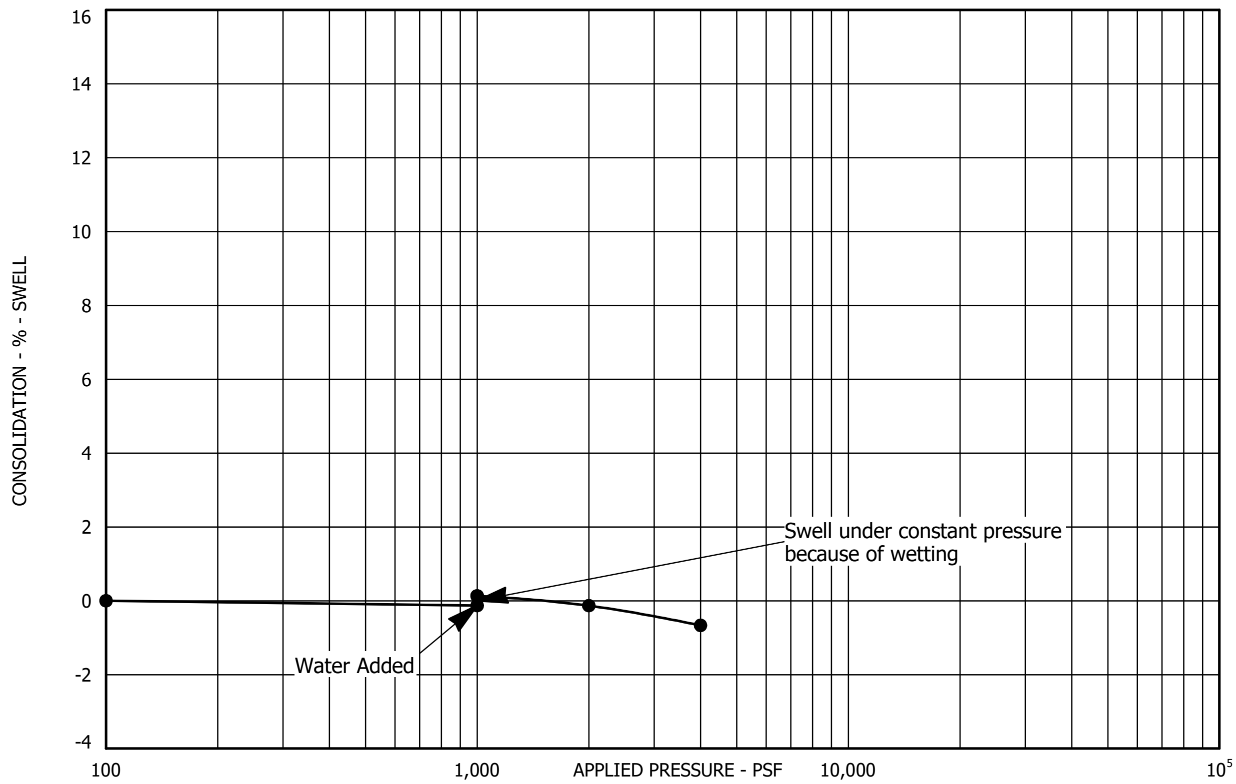
Sample Location	Test Boring No. 29 at a depth of 44 feet	Dry Unit Weight (pcf)	116
Sample Description	Claystone, silty	Moisture Content (%)	15

SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-32

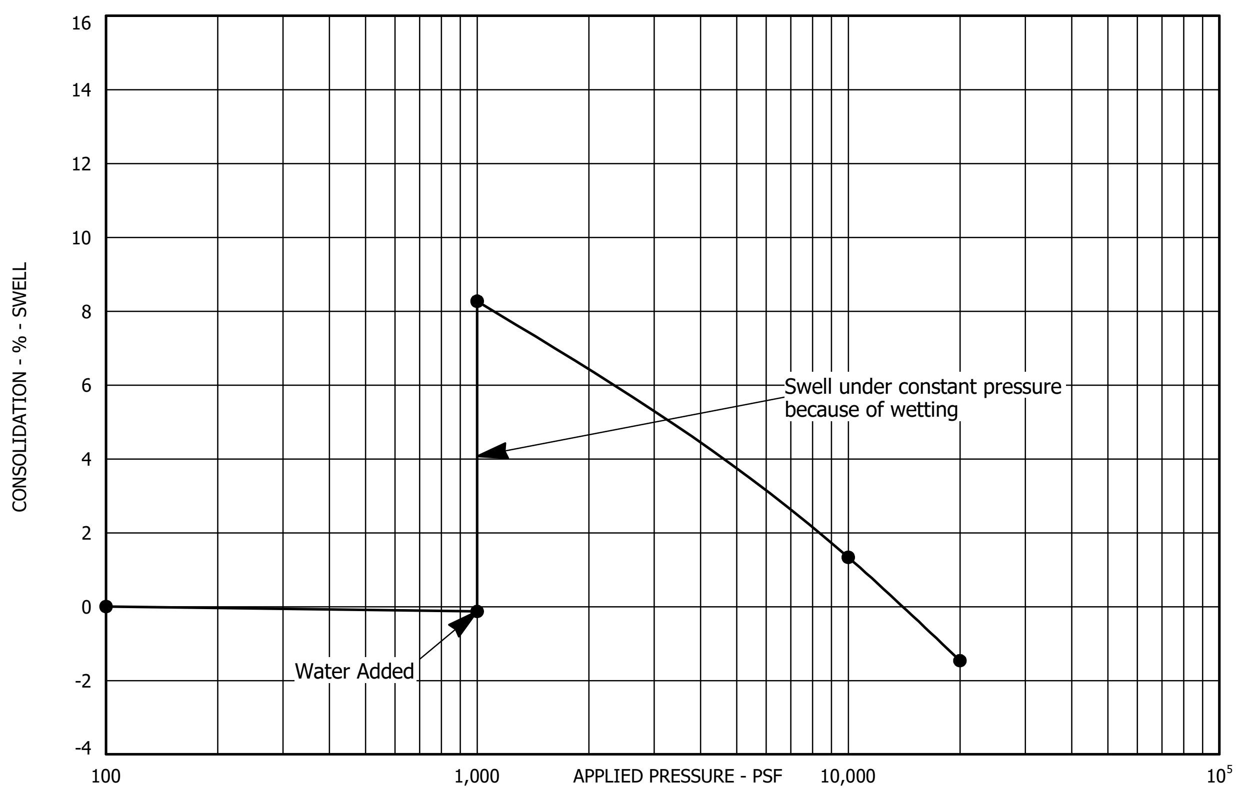
PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 30 at a depth of 9 feet — Dry Unit Weight (pcf): 131

Sample Description: Claystone, sandy — Moisture Content (%): 9



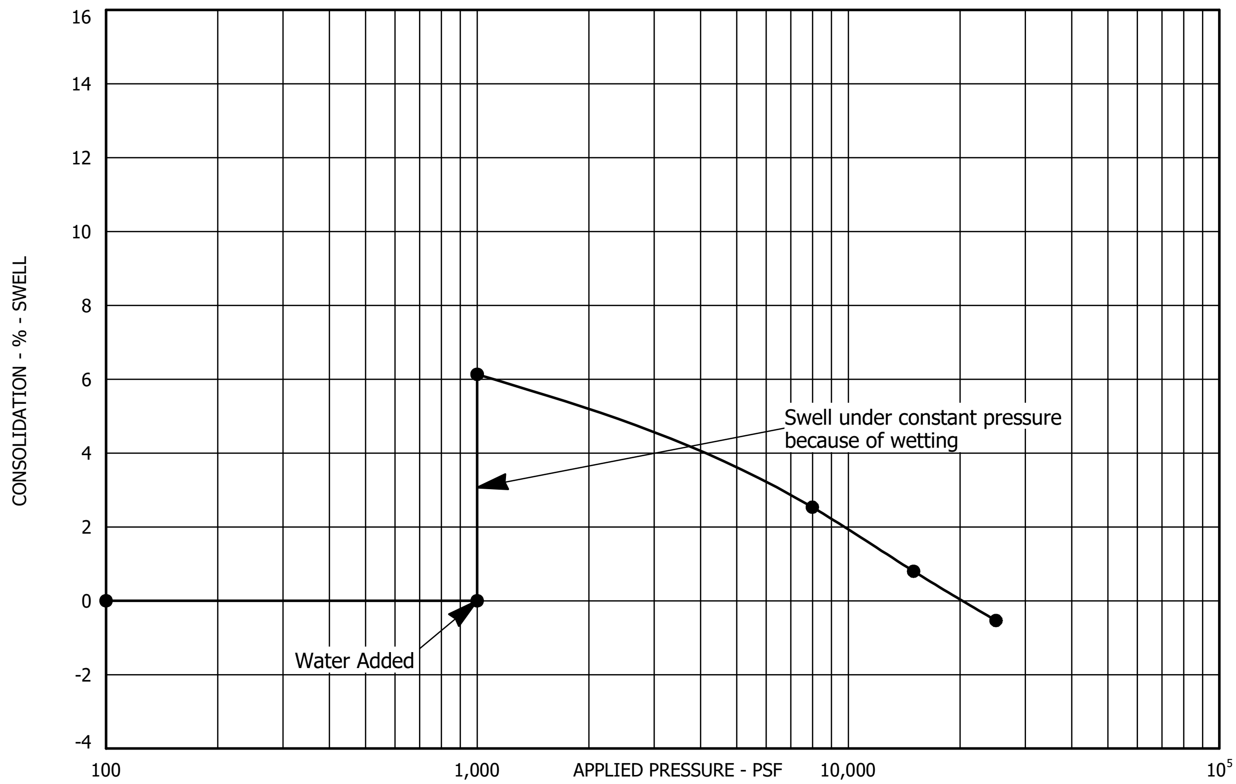
Sample Location: Test Boring No. 30 at a depth of 24 feet — Dry Unit Weight (pcf): 113

Sample Description: Claystone, silty — Moisture Content (%): 17

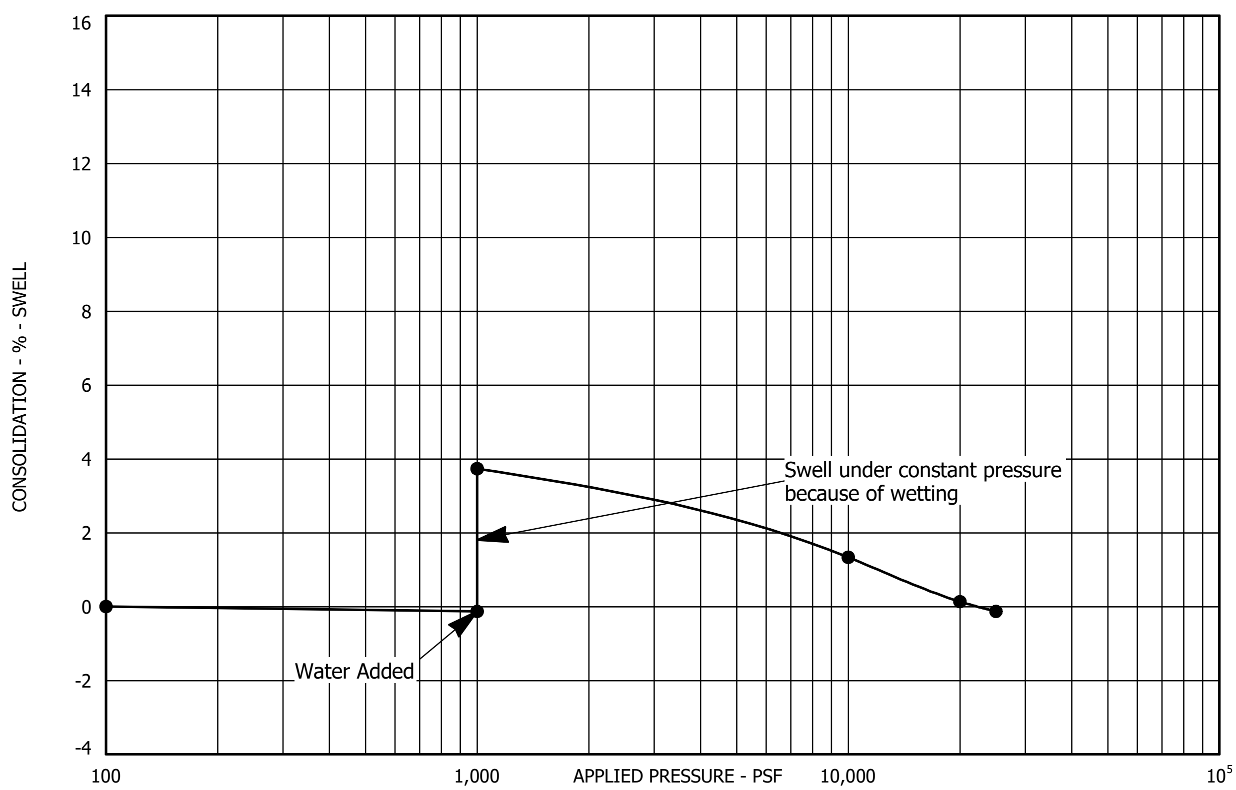
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-33

A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 31 at a depth of 4 feet
Dry Unit Weight (pcf): 122
Sample Description: Claystone, silty
Moisture Content (%): 13

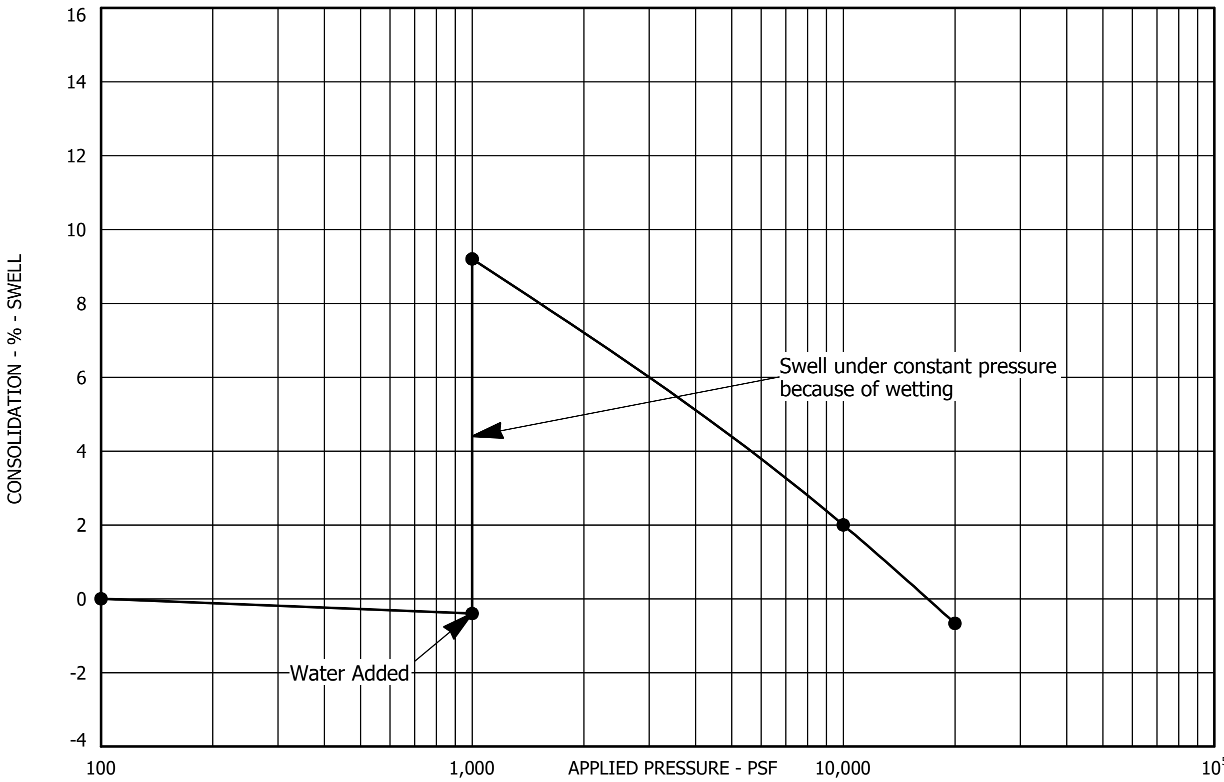


Sample Location: Test Boring No. 31 at a depth of 24 feet
Dry Unit Weight (pcf): 127
Sample Description: Claystone, silty
Moisture Content (%): 12

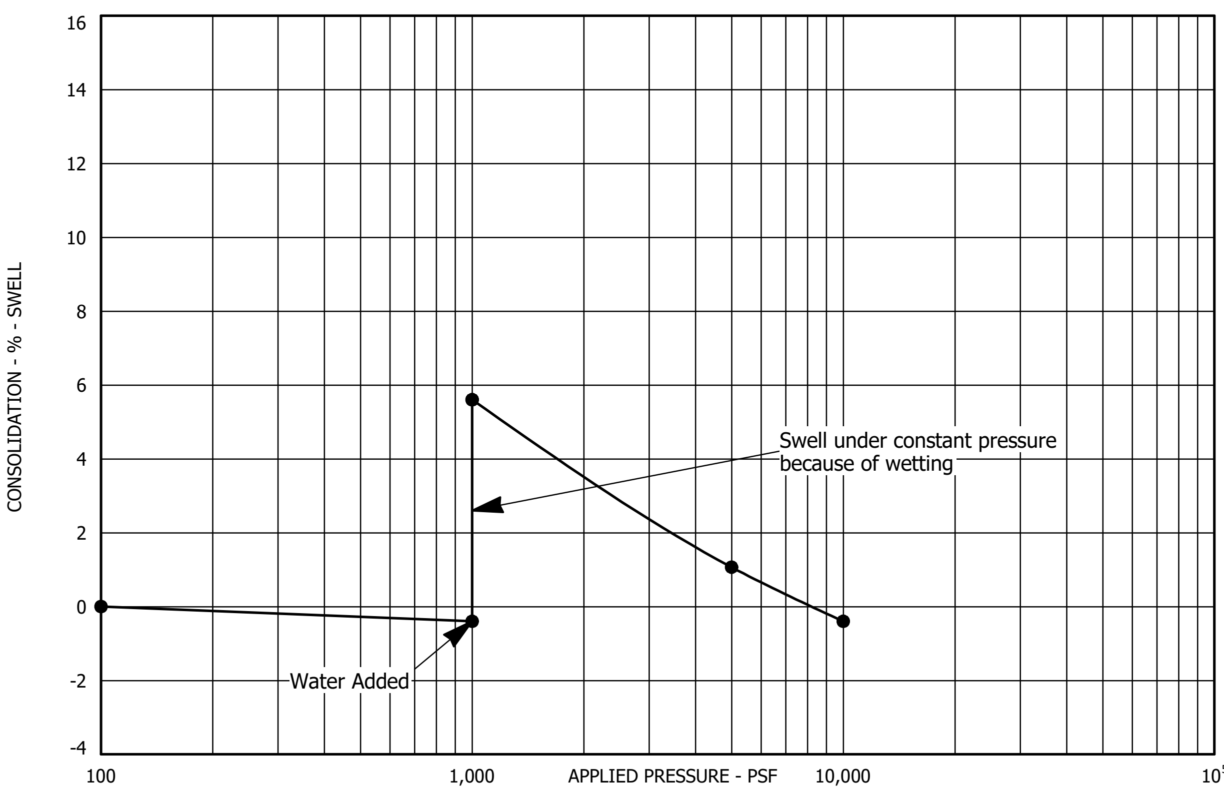
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-34

PROJECT NO. 160388



Sample Location Test Boring No. 32 at a depth of 4 feet Dry Unit Weight (pcf) 121
Sample Description Claystone, silty Moisture Content (%) 13

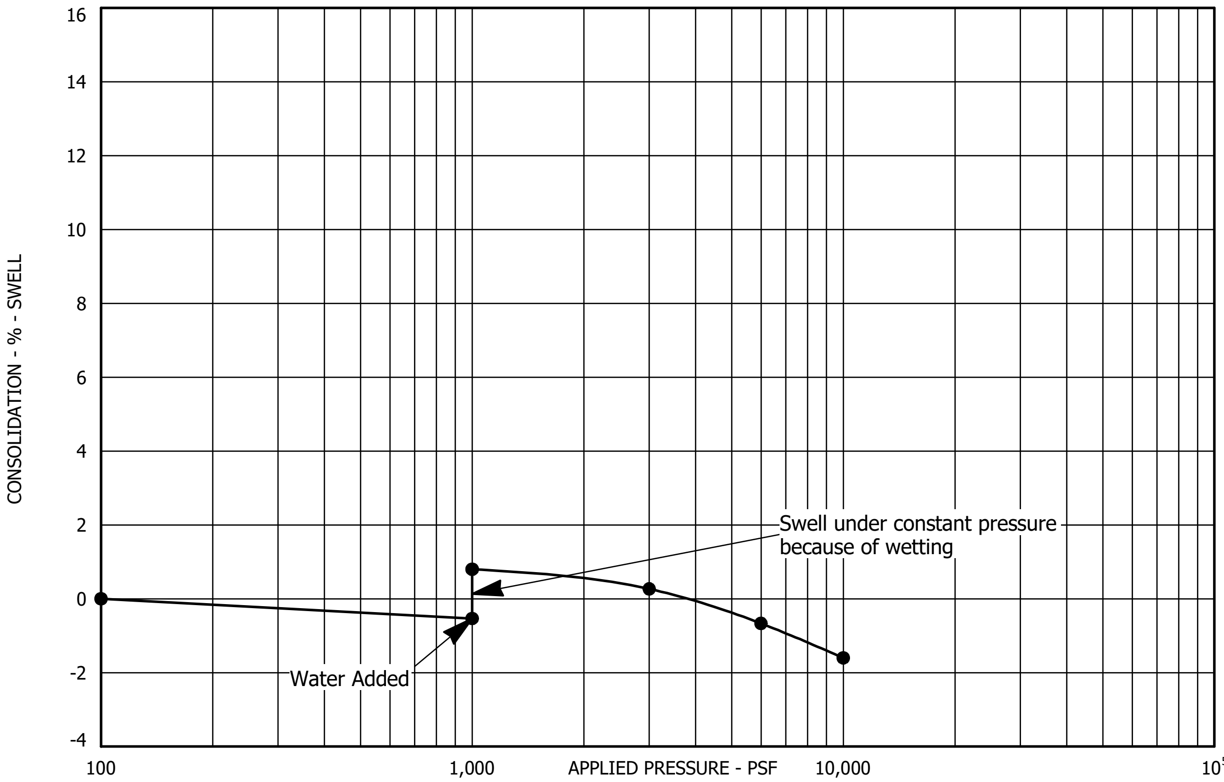


Sample Location Test Boring No. 32 at a depth of 24 feet Dry Unit Weight (pcf) 107
Sample Description Claystone, silty Moisture Content (%) 19

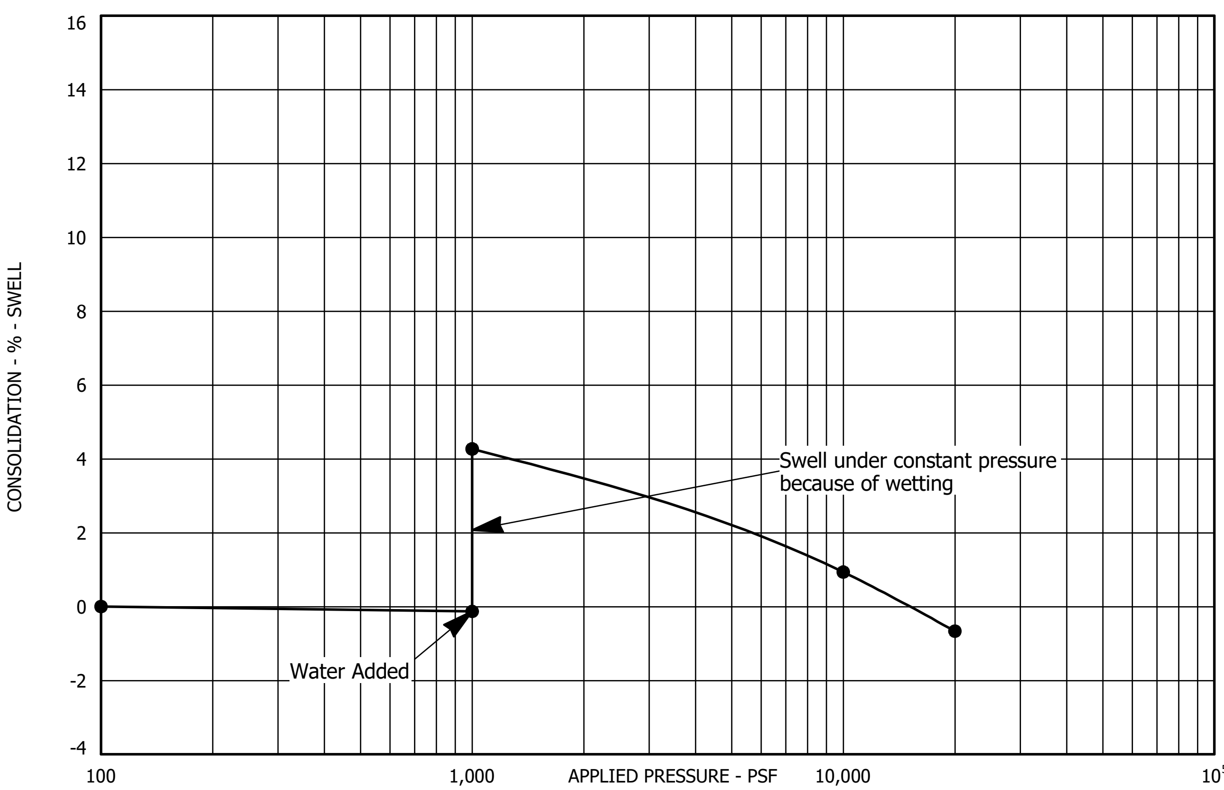
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-35

PROJECT NO. 160388



Sample Location: Test Boring No. 33 at a depth of 4 feet — Dry Unit Weight (pcf): 115
Sample Description: Clay, sandy — Moisture Content (%): 10

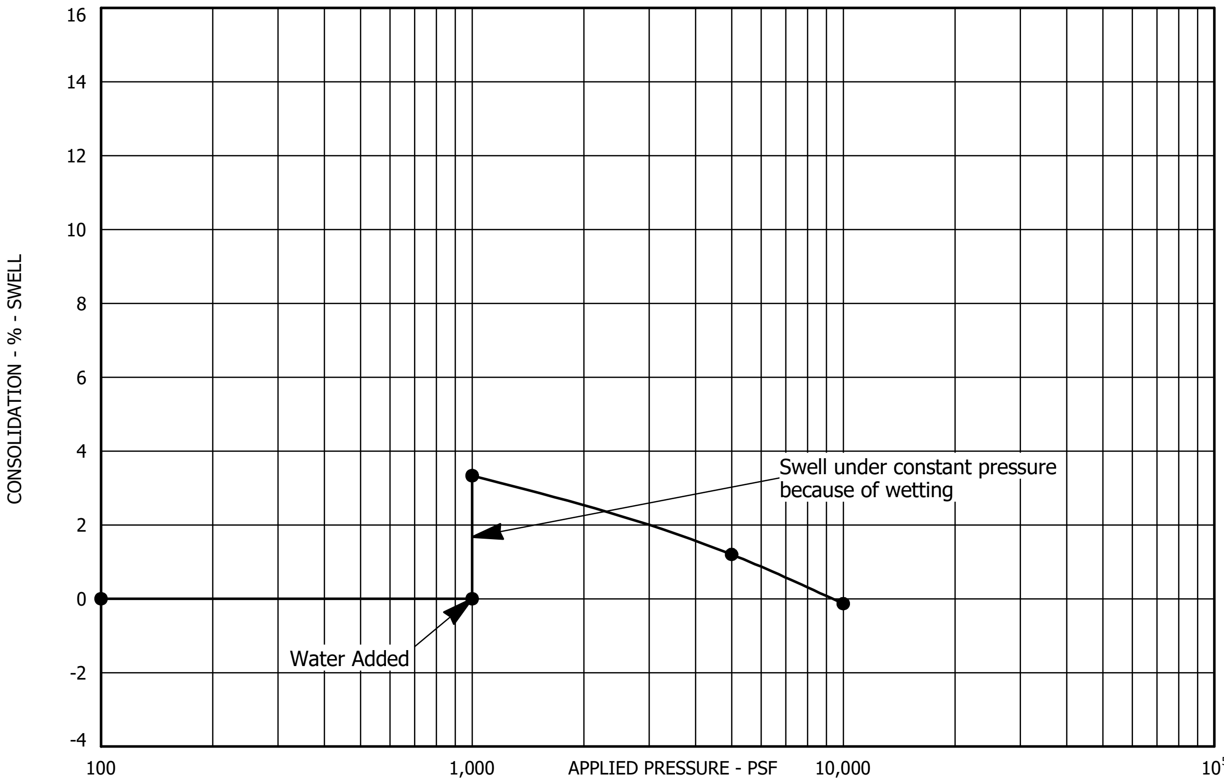


Sample Location: Test Boring No. 33 at a depth of 34 feet — Dry Unit Weight (pcf): 122
Sample Description: Claystone, silty — Moisture Content (%): 14

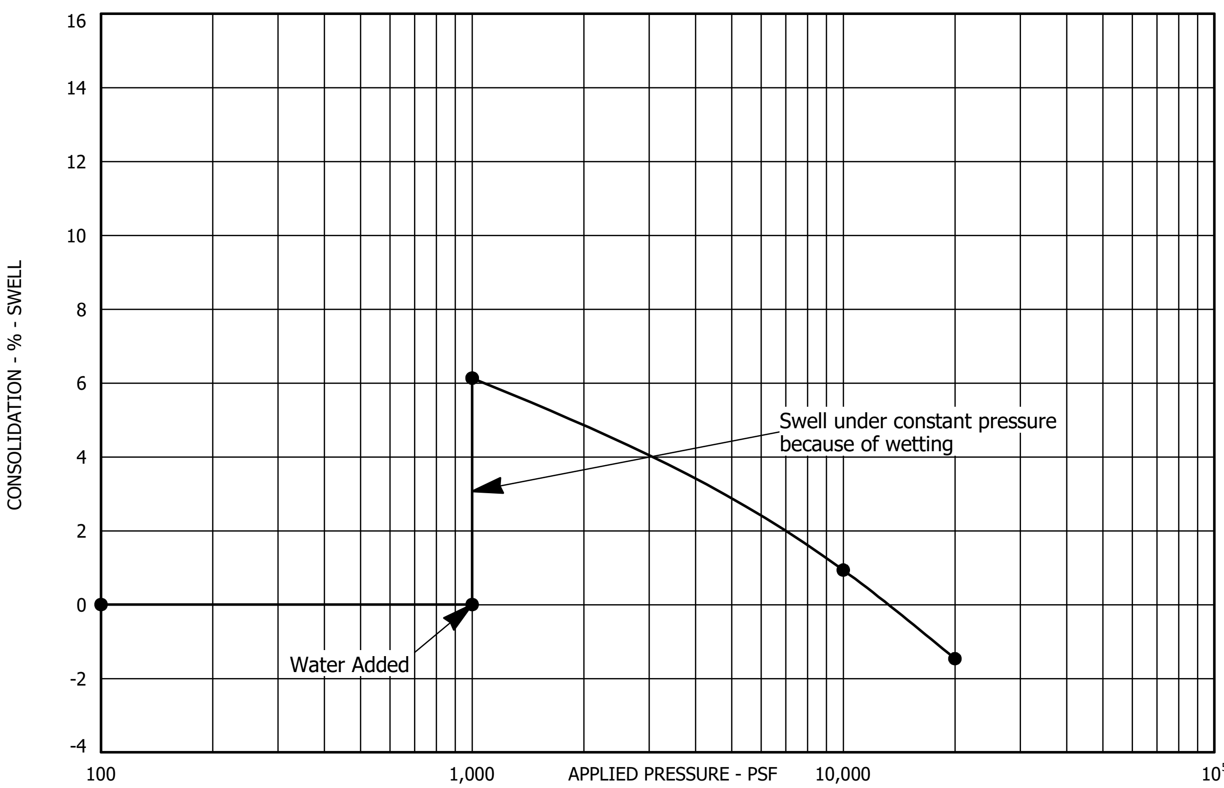
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-36

PROJECT NO. 160388



Sample Location Test Boring No. 34 at a depth of 4 feet
Dry Unit Weight (pcf) 123
Sample Description Clay, sandy
Moisture Content (%) 11



Sample Location Test Boring No. 34 at a depth of 9 feet
Dry Unit Weight (pcf) 119
Sample Description Claystone, silty
Moisture Content (%) 16

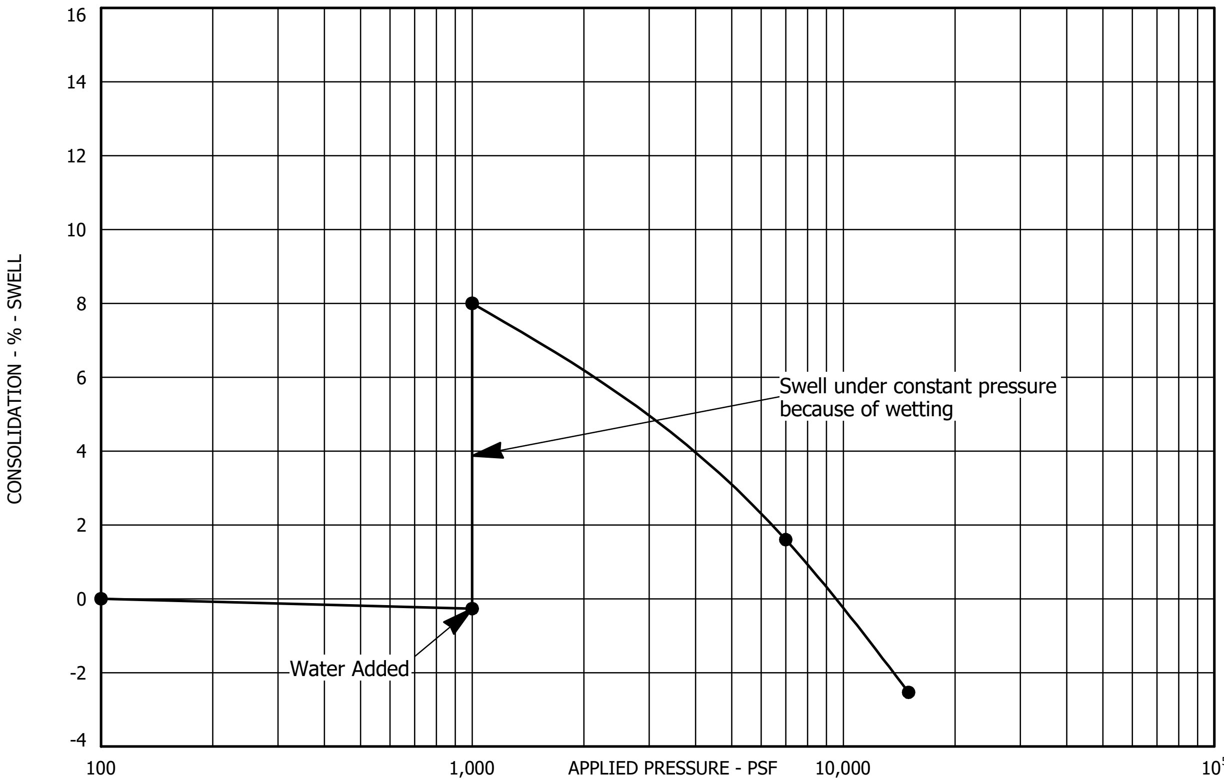
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-37

PROJECT NO. 160388

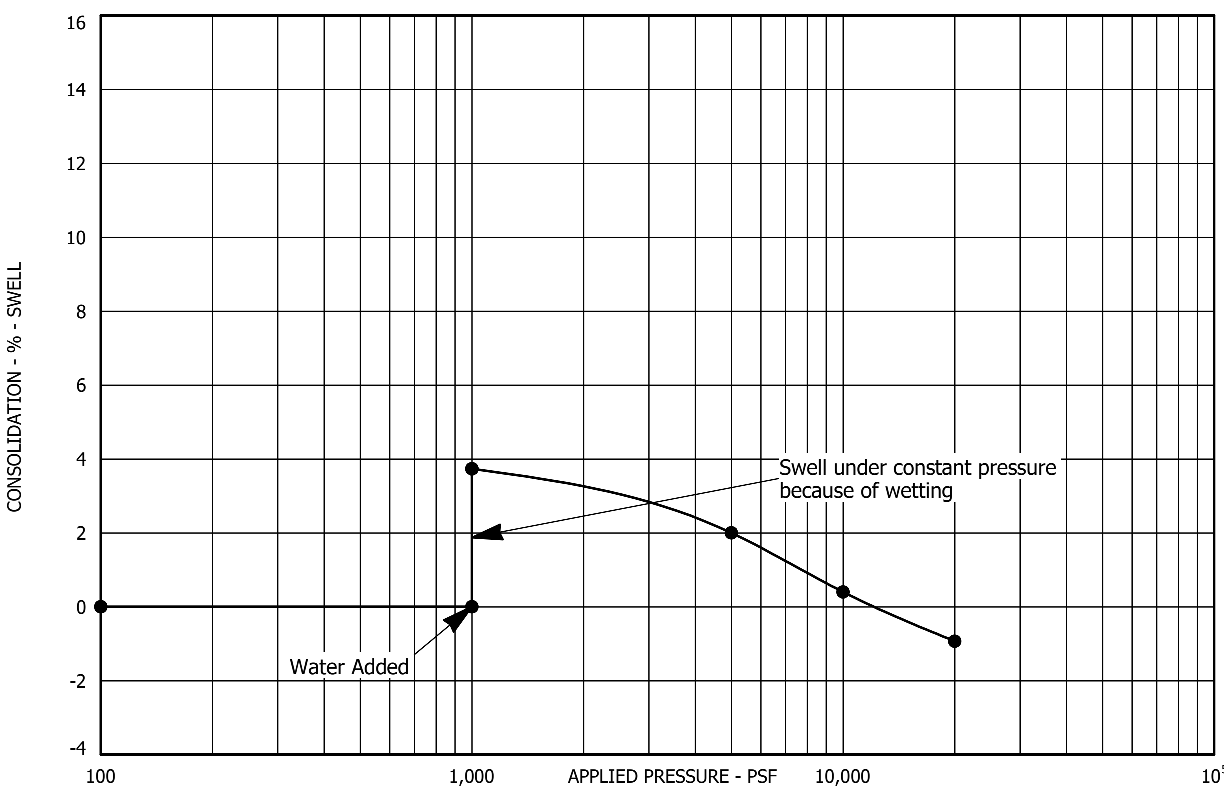
AGW

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 34 at a depth of 19 feet Dry Unit Weight (pcf) 108

Sample Description Claystone, silty Moisture Content (%) 21



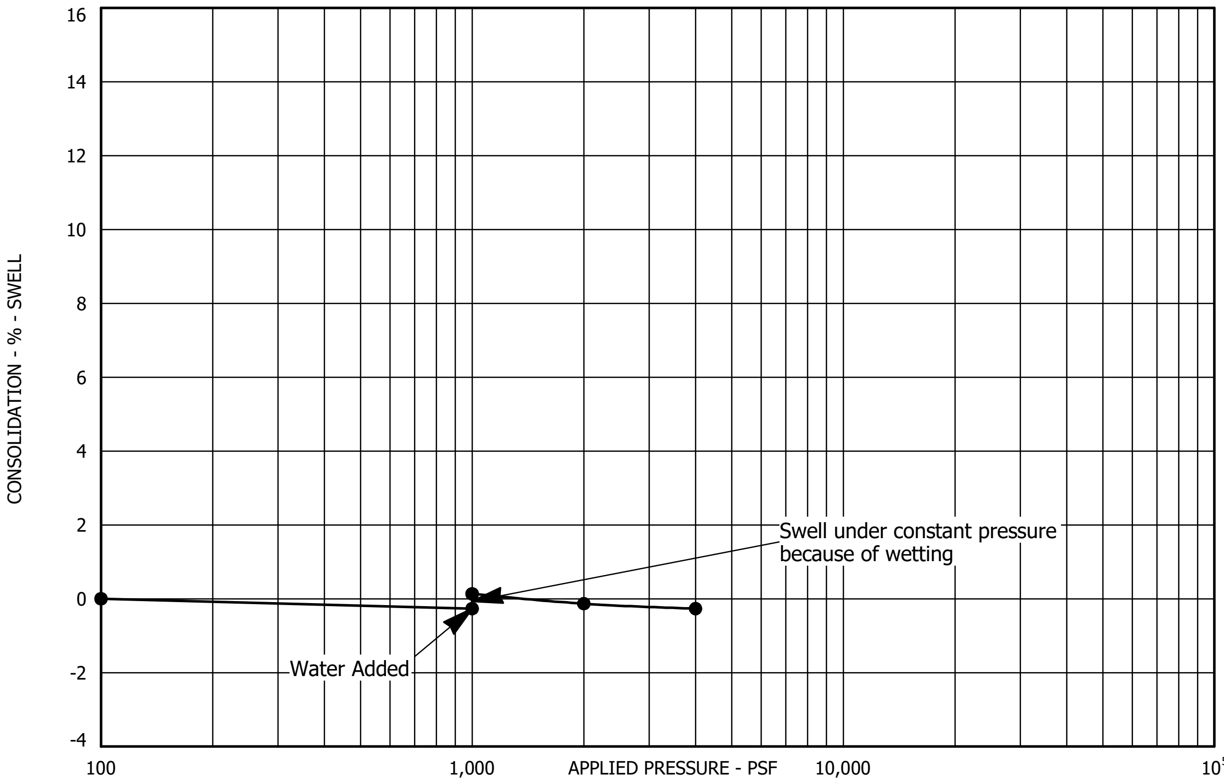
Sample Location Test Boring No. 35 at a depth of 9 feet Dry Unit Weight (pcf) 123

Sample Description Claystone, silty Moisture Content (%) 13

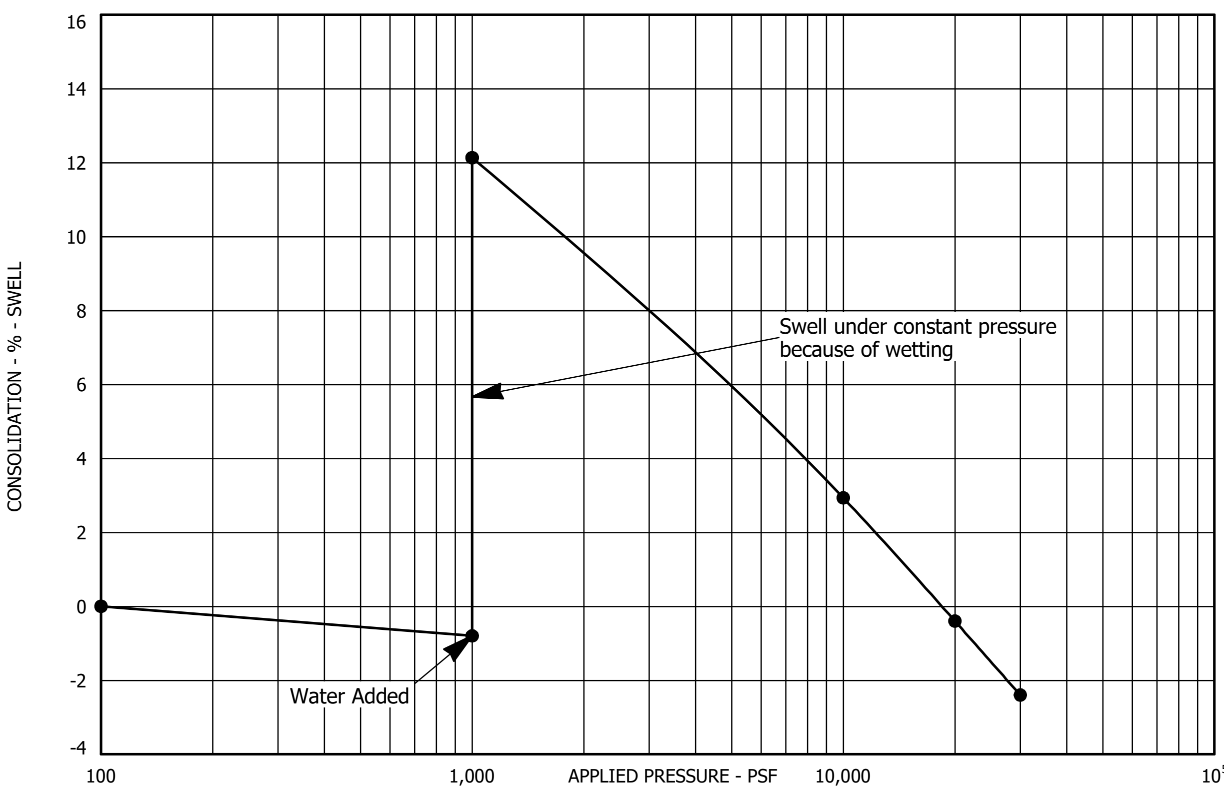
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-38

PROJECT NO. 160388



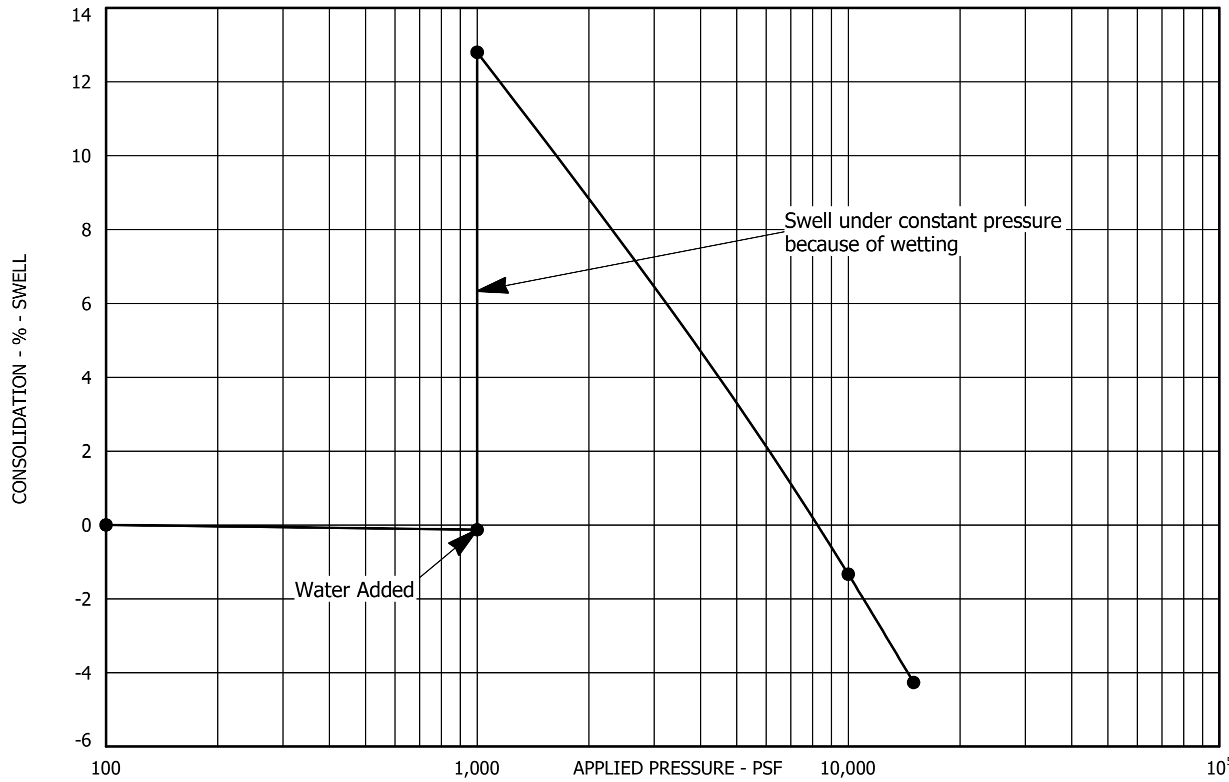
Sample Location Test Boring No. 35 at a depth of 14 feet
Dry Unit Weight (pcf) 126
Sample Description Claystone, silty
Moisture Content (%) 12



Sample Location Test Boring No. 36 at a depth of 4 feet
Dry Unit Weight (pcf) 120
Sample Description Claystone, silty
Moisture Content (%) 14

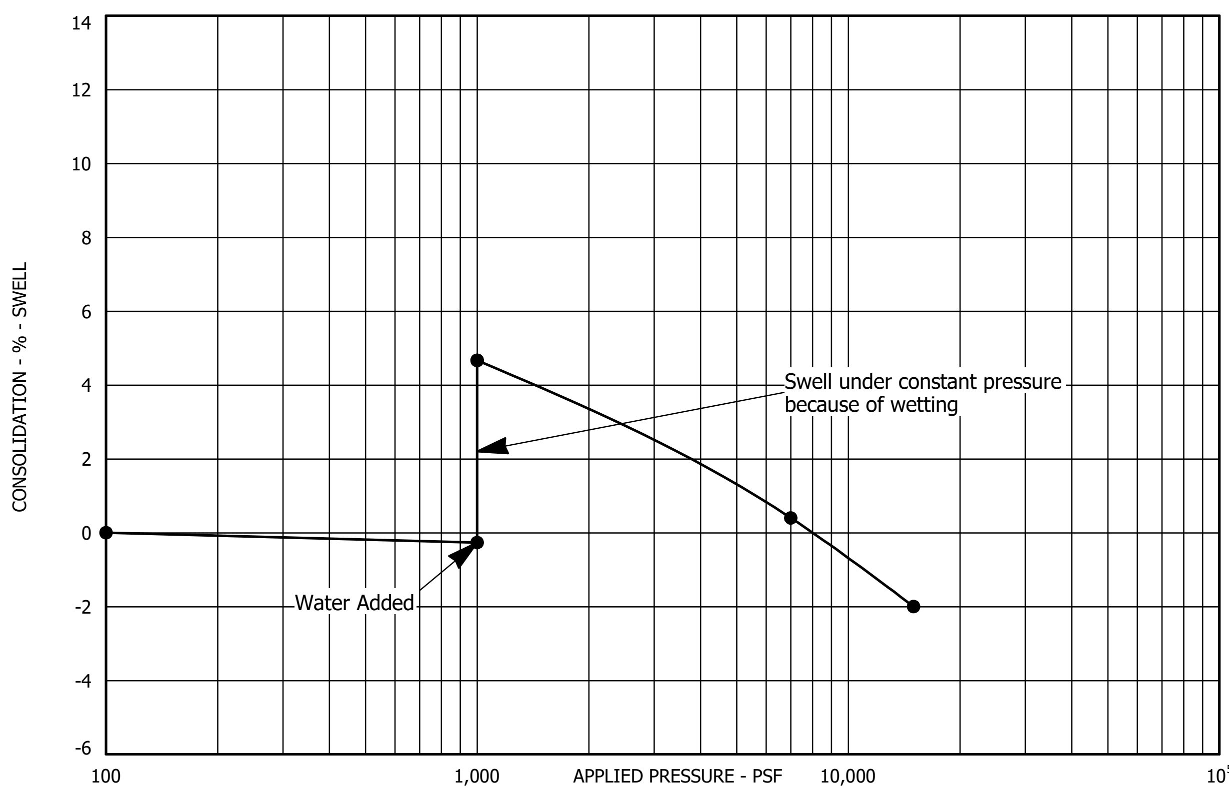
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-39



Sample Location Test Boring No. 36 at a depth of 9 feet | Dry Unit Weight (pcf) 118

Sample Description Claystone, silty | Moisture Content (%) 15



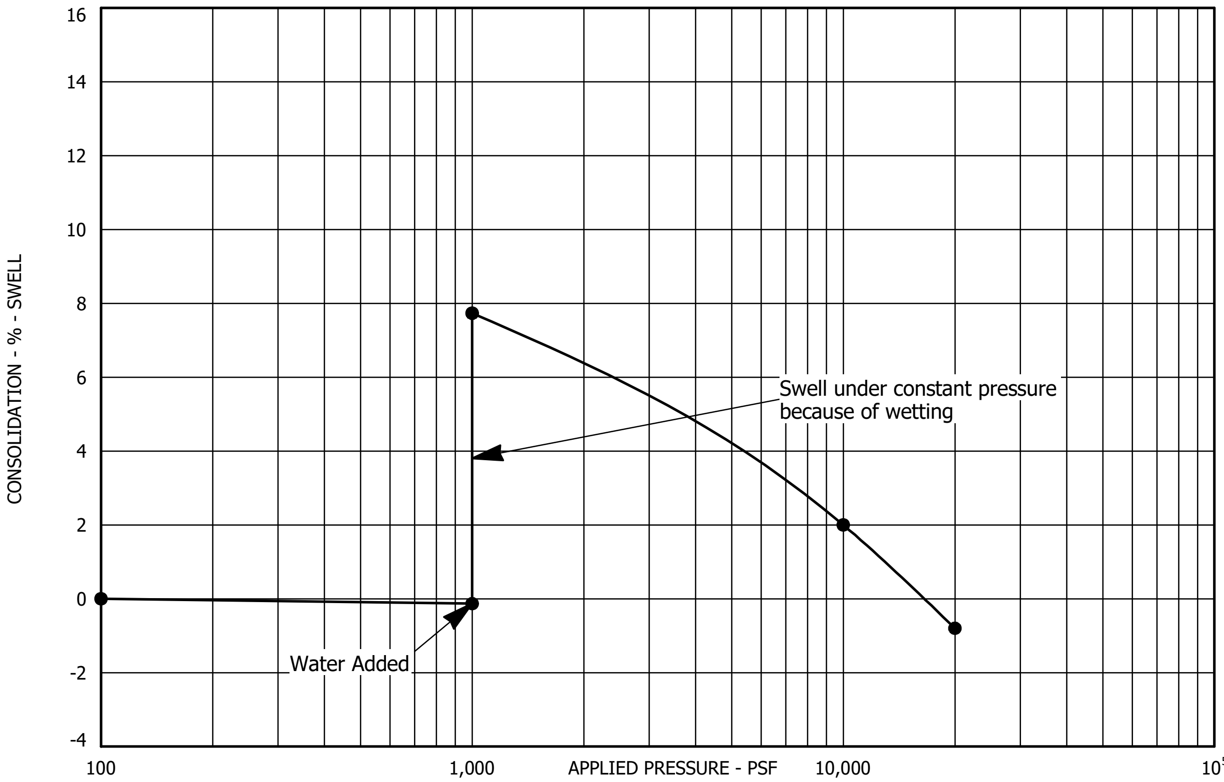
Sample Location Test Boring No. 37 at a depth of 9 feet | Dry Unit Weight (pcf) 111

Sample Description Claystone, silty | Moisture Content (%) 20

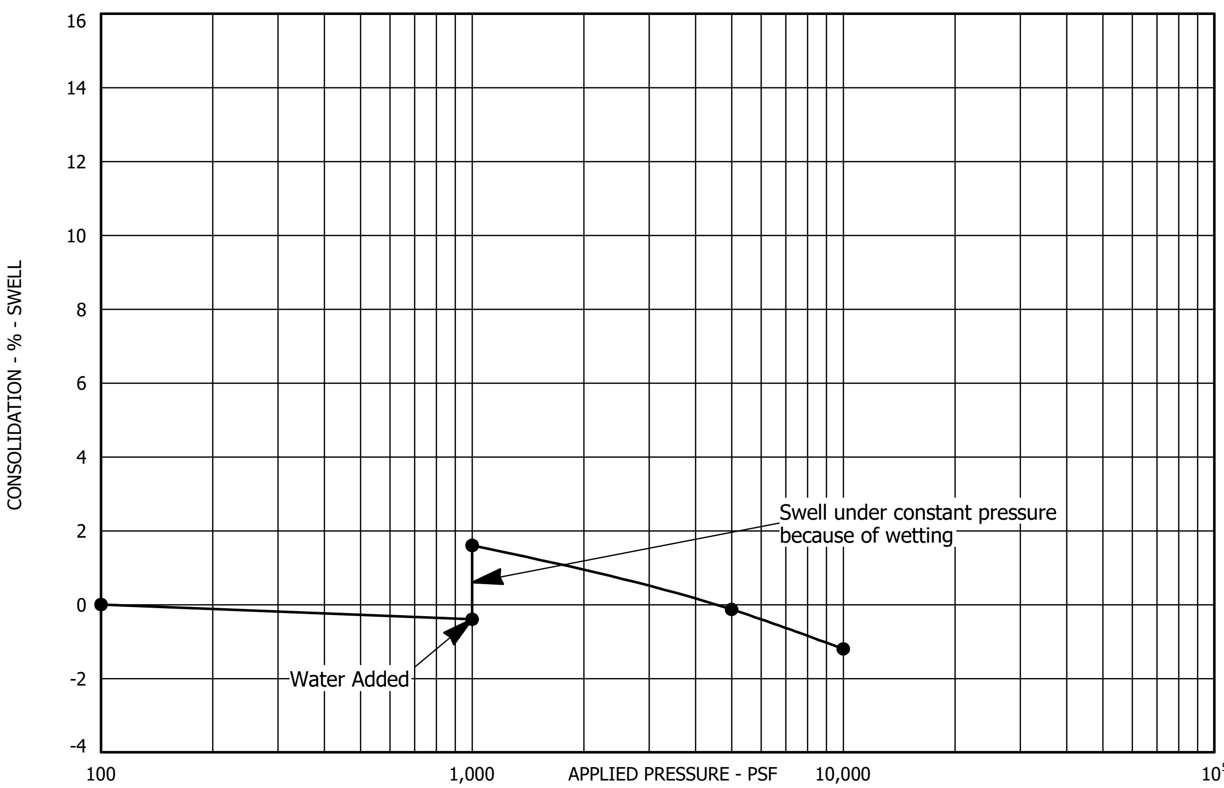
SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-40

PROJECT NO. 160388



Sample Location: Test Boring No. 37 at a depth of 29 feet
Dry Unit Weight (pcf): 116
Sample Description: Claystone, silty
Moisture Content (%): 17



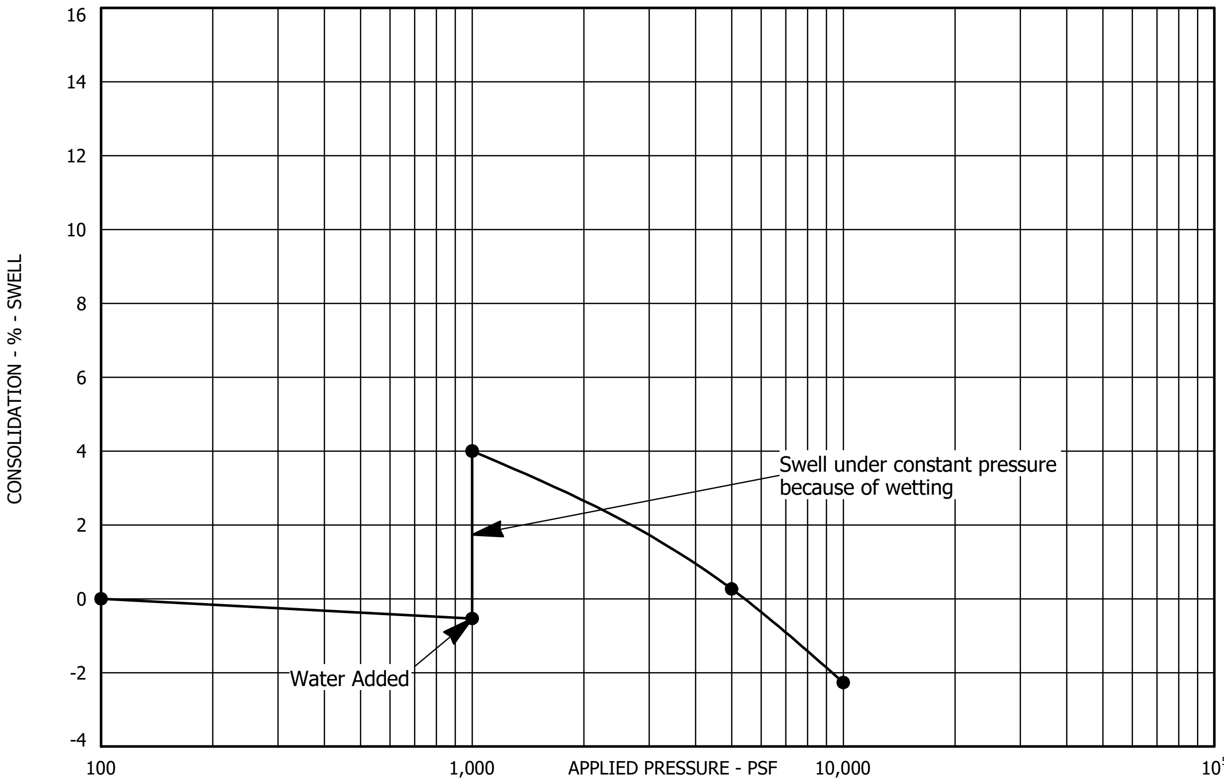
Sample Location: Test Boring No. 38 at a depth of 4 feet
Dry Unit Weight (pcf): 118
Sample Description: Claystone, silty
Moisture Content (%): 16

SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-41

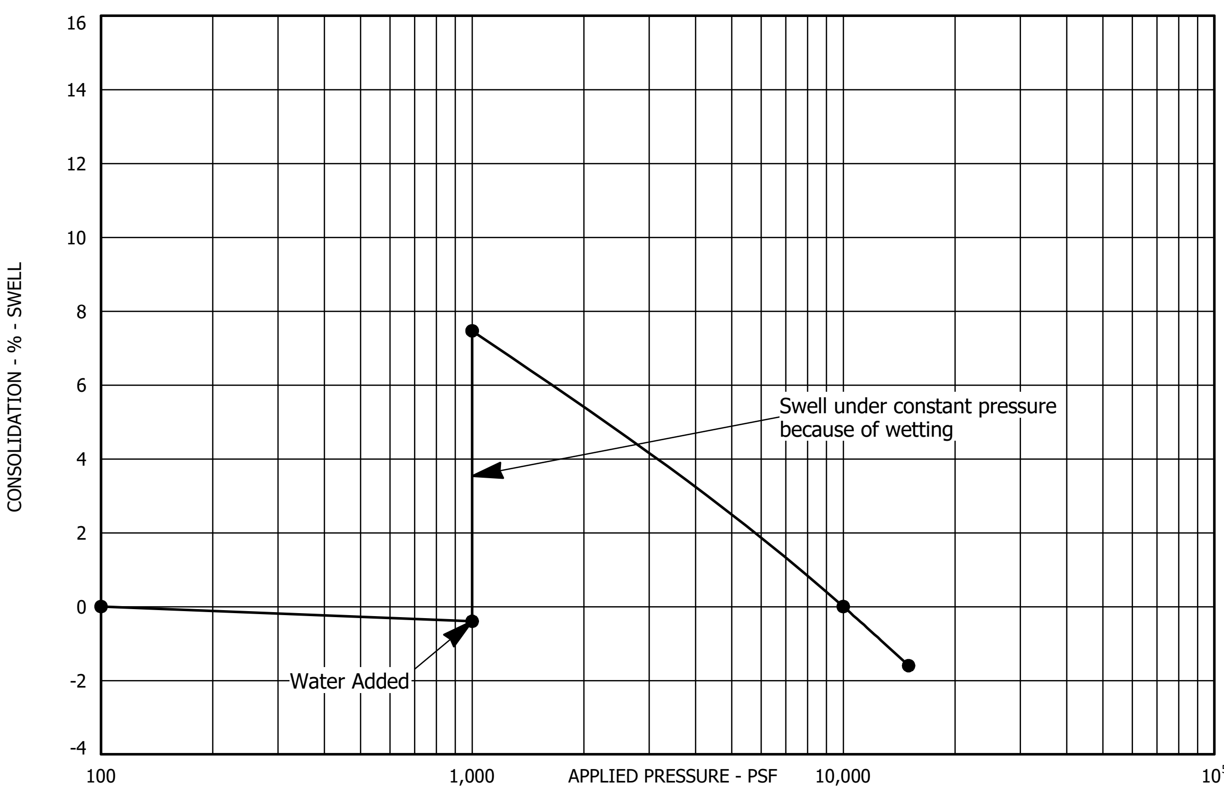
PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 38 at a depth of 9 feet — Dry Unit Weight (pcf) 108

Sample Description Claystone, silty — Moisture Content (%) 20



Sample Location Test Boring No. 38 at a depth of 24 feet — Dry Unit Weight (pcf) 116

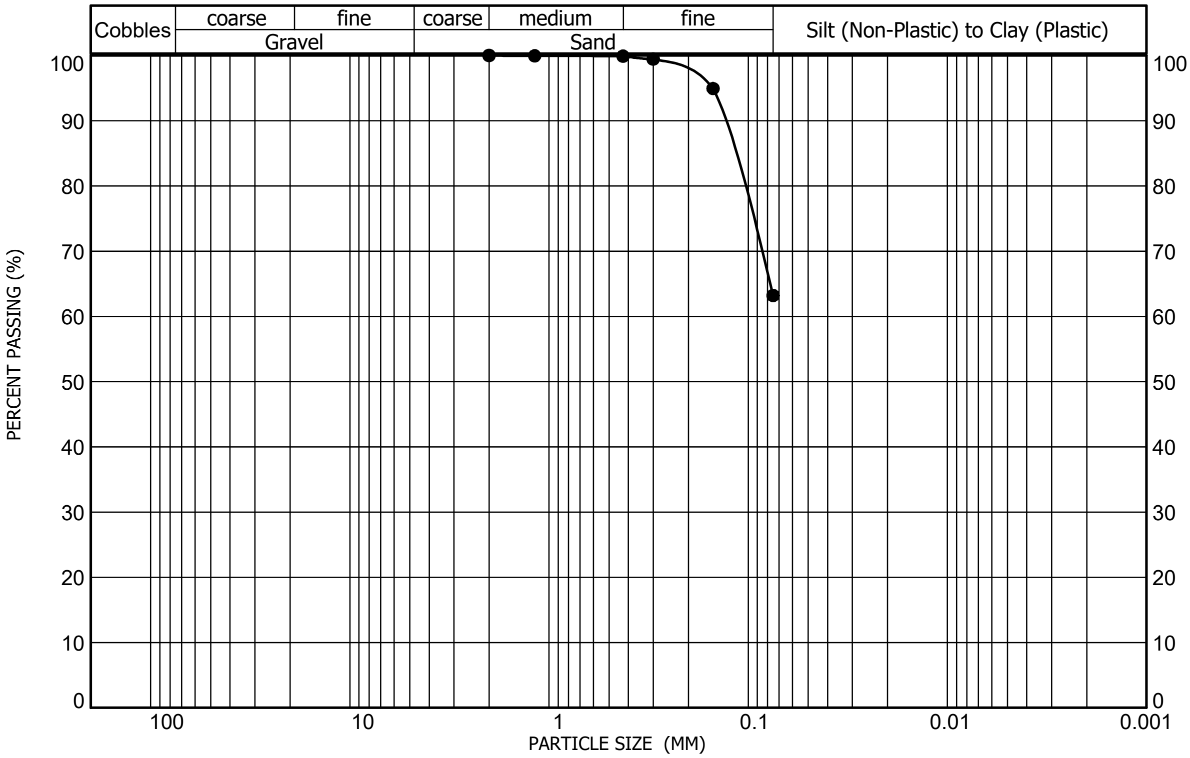
Sample Description Claystone, silty — Moisture Content (%) 14

SWELL - CONSOLIDATION TEST RESULTS

FIGURE A-42

PROJECT NO. 160388

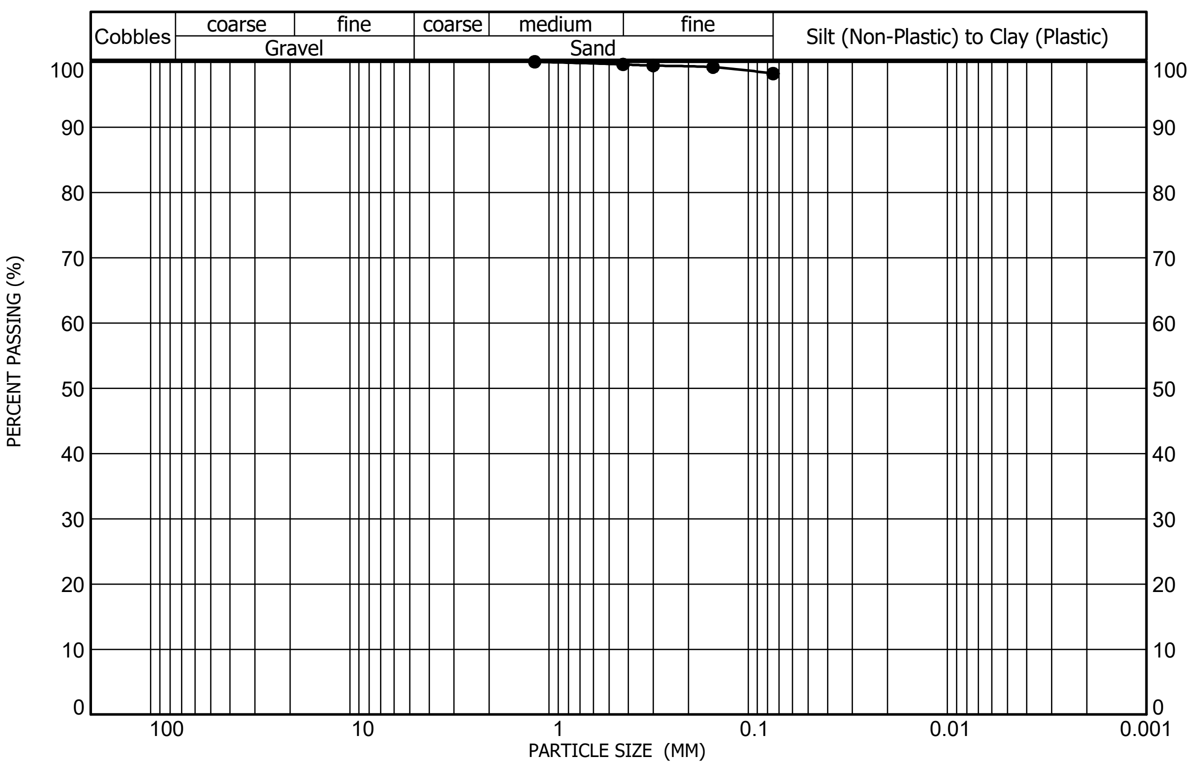
A.G. WASSENAAR, INC.



Sample Location Test Boring No. 1 at a depth of 9 feet
Sample Description Claystone, very sandy
Classification A-6(5), SANDY LEAN CLAY(CL)

Gravel (%) 0
Sand (%) 37
Clay/Silt (%) 63

Liquid Limit 29
Plasticity Index 12



Sample Location Test Boring No. 2 at a depth of 9 feet
Sample Description Claystone, trace sand
Classification A-7-6(62), FAT CLAY(CH)

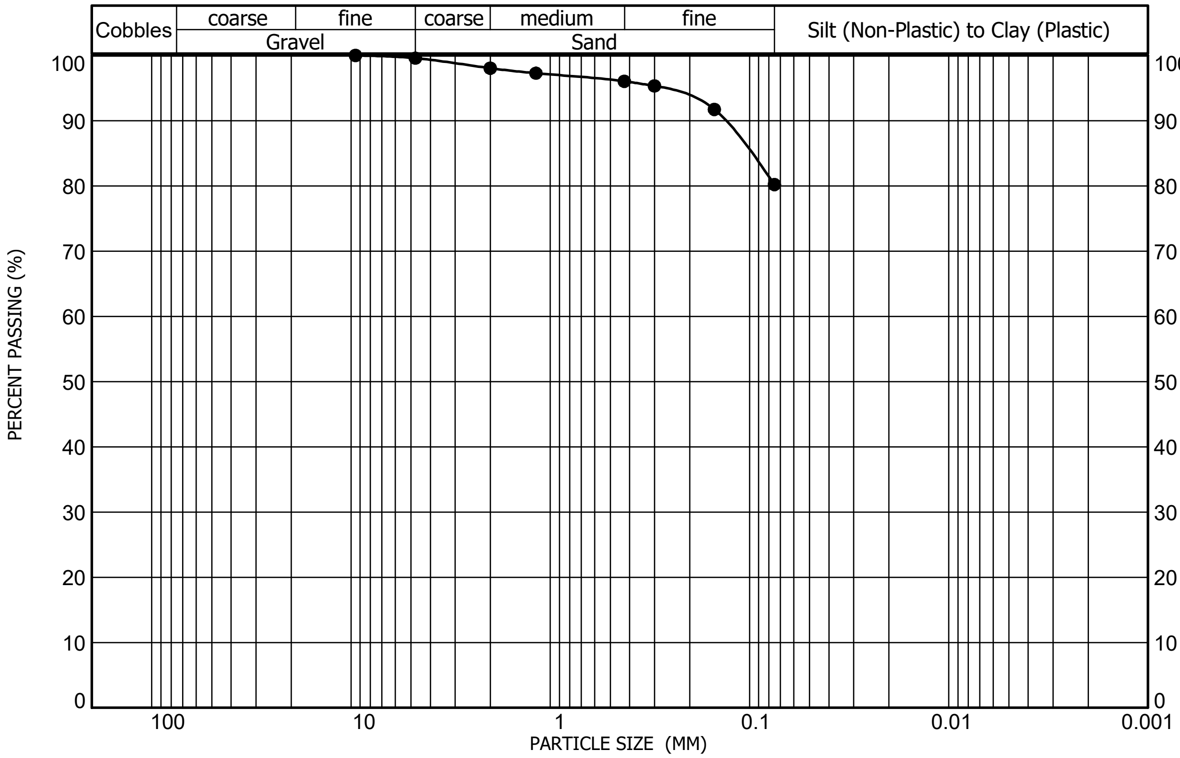
Gravel (%) 0
Sand (%) 2
Clay/Silt (%) 98

Liquid Limit 76
Plasticity Index 56

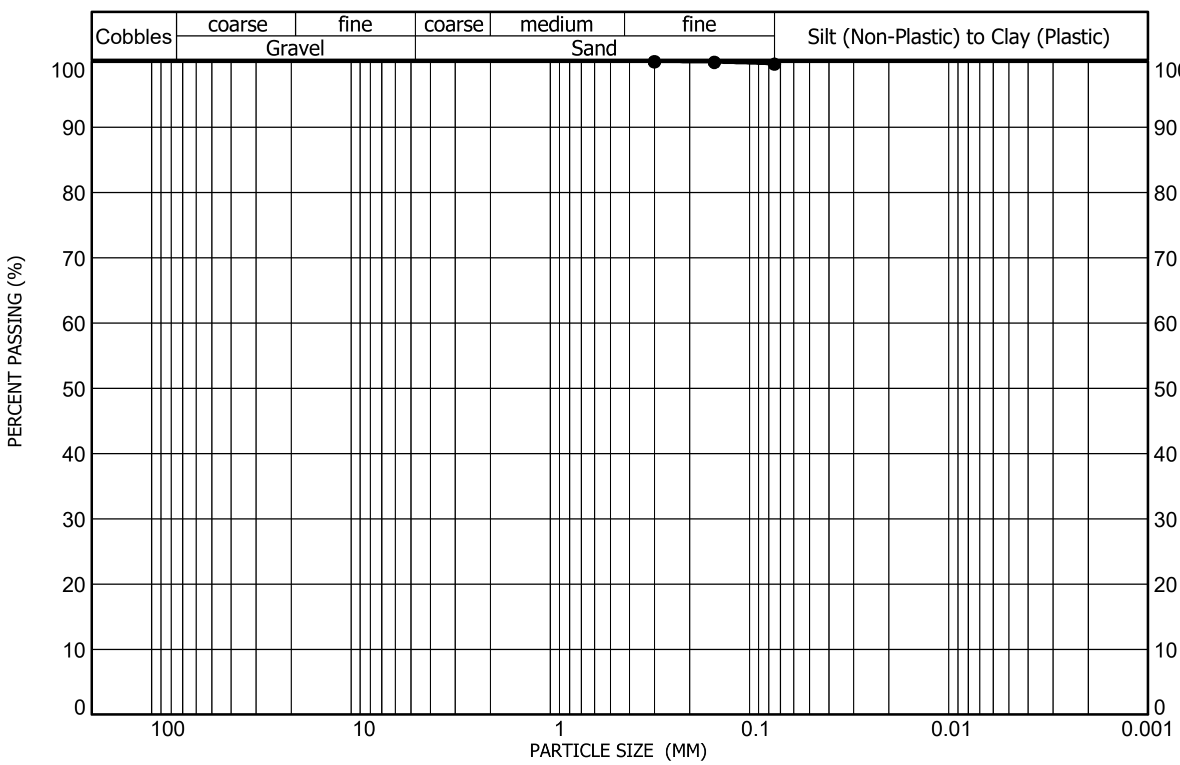
GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-43

PROJECT NO. 160388



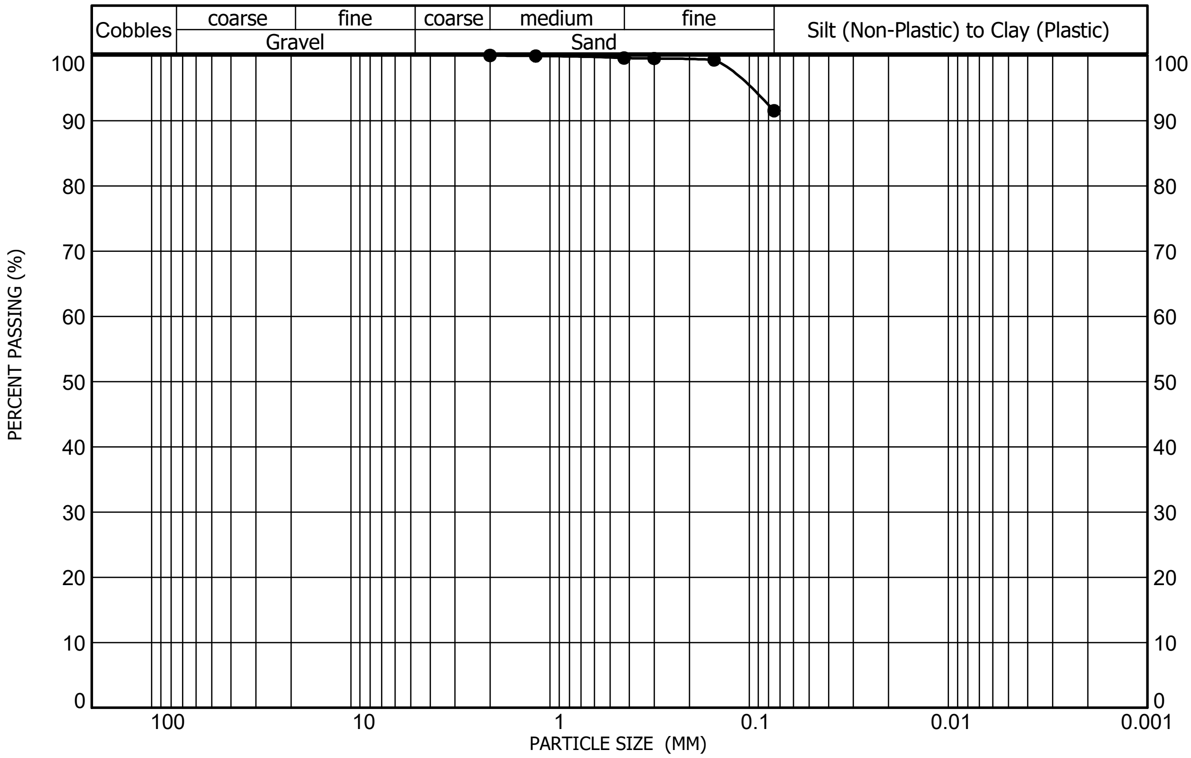
Sample Location: Test Boring No. 8 at a depth of 4 feet
Sample Description: Clay, sandy
Classification: A-7-6(26), FAT CLAY with SAND(CH)
Gravel (%): 0
Sand (%): 19
Clay/Silt (%): 80
Liquid Limit: 51
Plasticity Index: 33



Sample Location: Test Boring No. 8 at a depth of 19 feet
Sample Description: Claystone
Classification: A-7-6(63), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 0
Clay/Silt (%): 100
Liquid Limit: 75
Plasticity Index: 55

GRADATION AND ATTERBERG TEST RESULTS

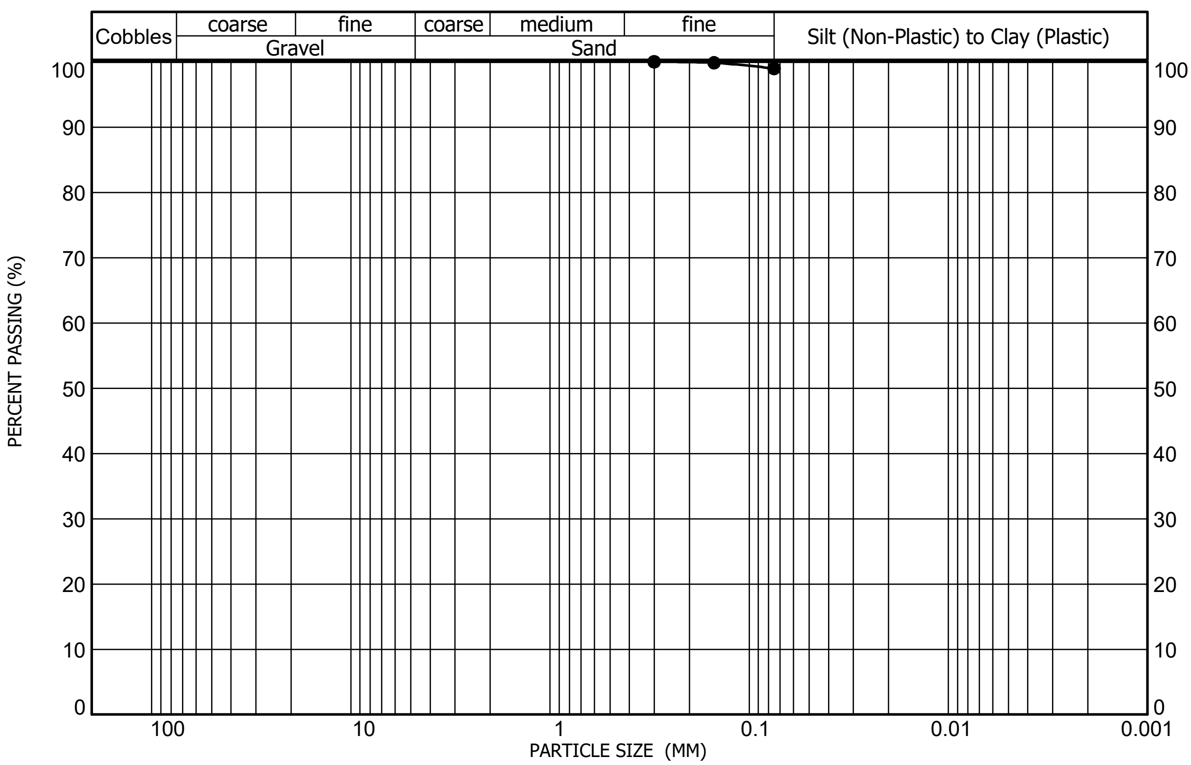
FIGURE A-44



Sample Location: Test Boring No. 8 at a depth of 39 feet — Gravel (%) 0 — Liquid Limit 38

Sample Description: Claystone, slightly sandy — Sand (%) 8 — Plasticity Index 21

Classification: A-6(19), LEAN CLAY(CL) — Clay/Silt (%) 92



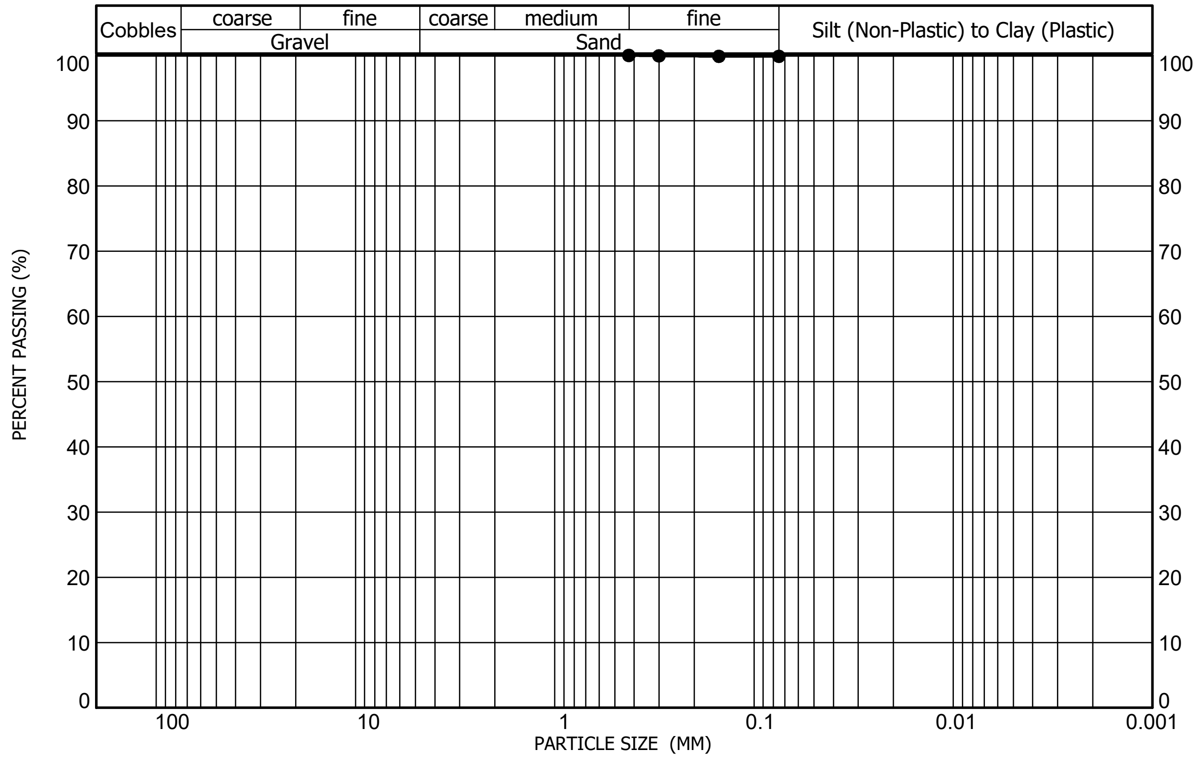
Sample Location: Test Boring No. 10 at a depth of 9 feet — Gravel (%) 0 — Liquid Limit 52

Sample Description: Claystone, trace sand — Sand (%) 1 — Plasticity Index 32

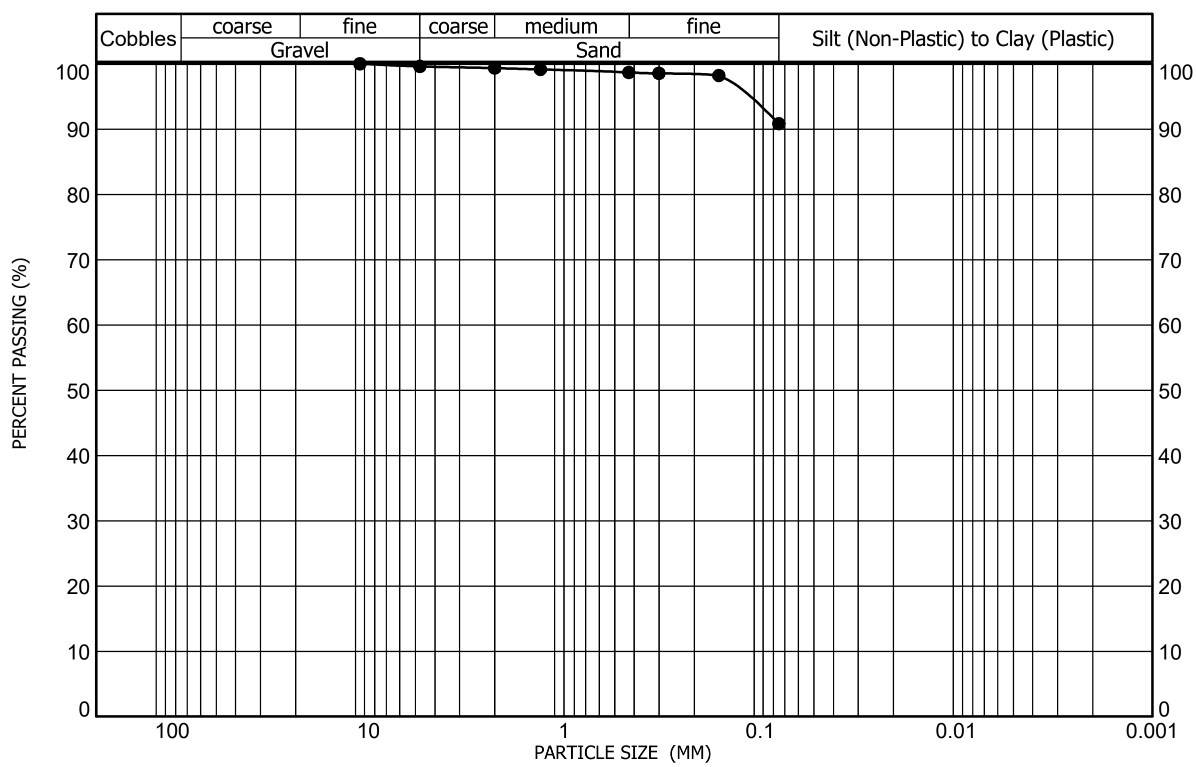
Classification: A-7-6(35), FAT CLAY(CH) — Clay/Silt (%) 99

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-45



Sample Location	Test Boring No. 12 at a depth of 9 feet	Gravel (%)	0	Liquid Limit	74
Sample Description	Claystone	Sand (%)	0	Plasticity Index	55
Classification	A-7-6(62), FAT CLAY(CH)	Clay/Silt (%)	100		



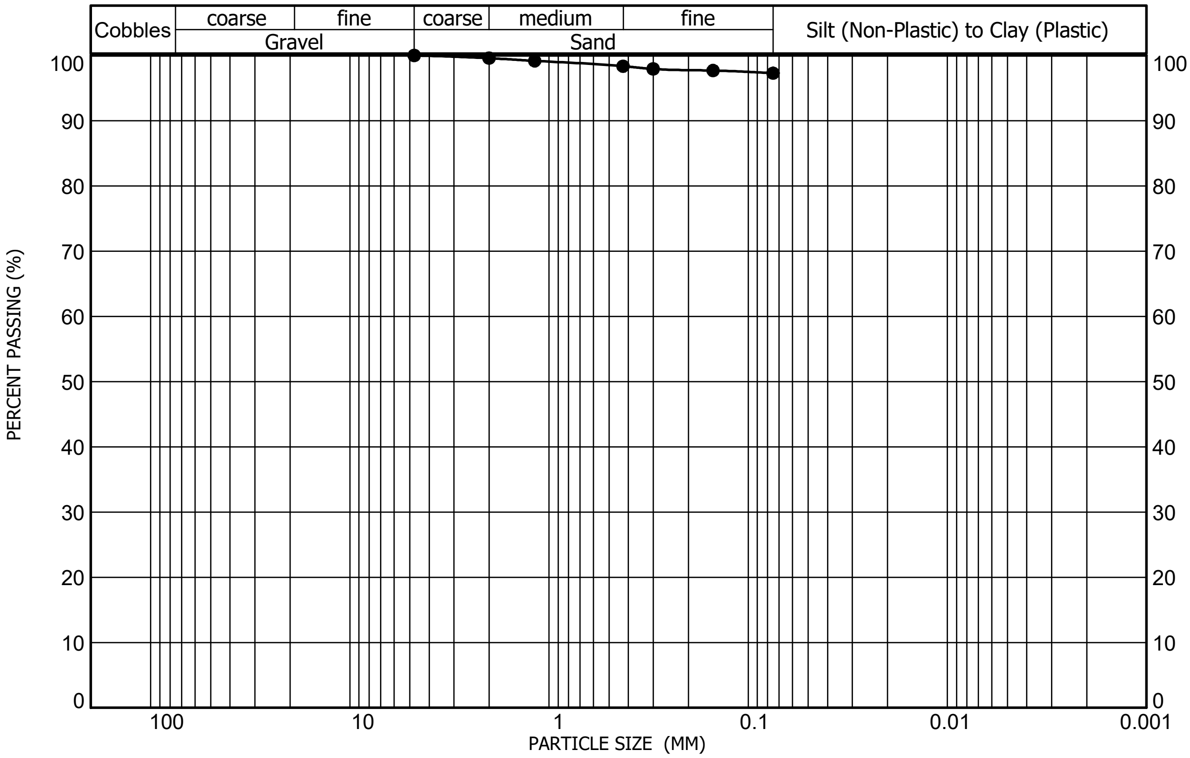
Sample Location	Test Boring No. 13 at a depth of 24 feet	Gravel (%)	0	Liquid Limit	36
Sample Description	Claystone, slightly sandy	Sand (%)	9	Plasticity Index	19
Classification	A-6(17), LEAN CLAY(CL)	Clay/Silt (%)	91		

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-46

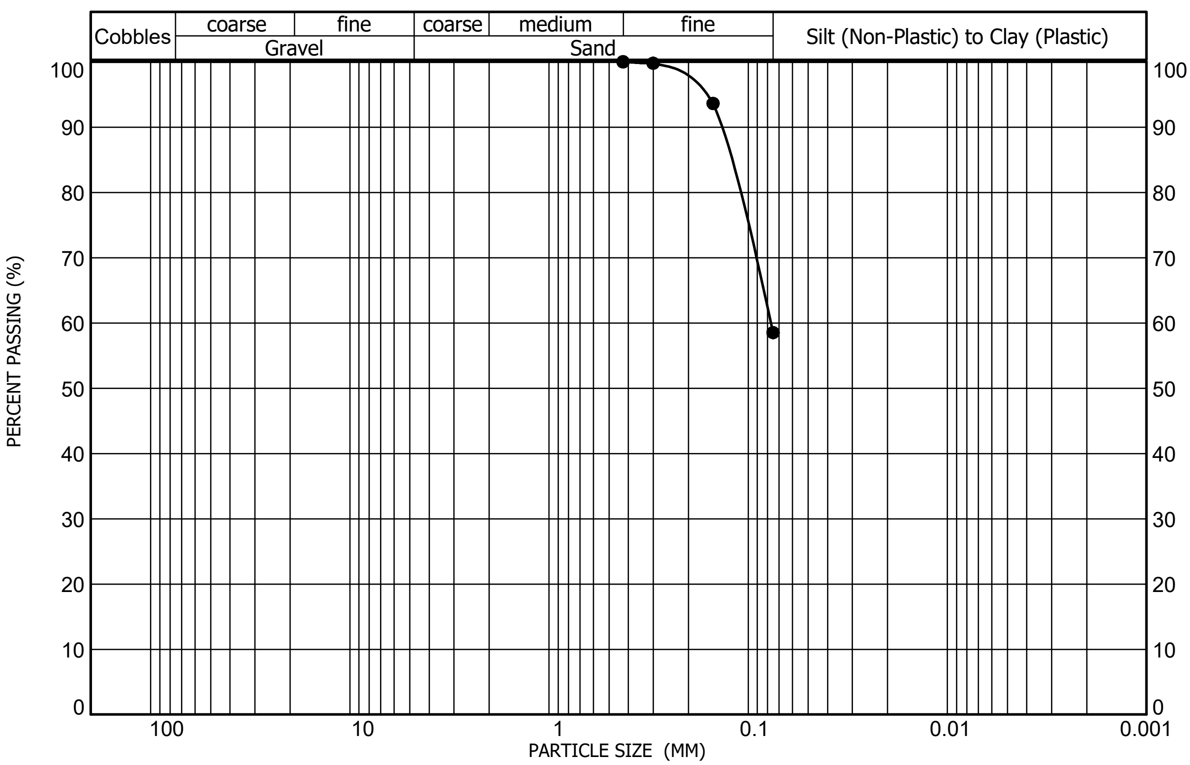
PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location Test Boring No. 14 at a depth of 19 feet
Sample Description Claystone, trace sand
Classification A-7-6(69), FAT CLAY(CH)

Gravel (%) 0
Sand (%) 3
Clay/Silt (%) 97
Liquid Limit 79
Plasticity Index 64



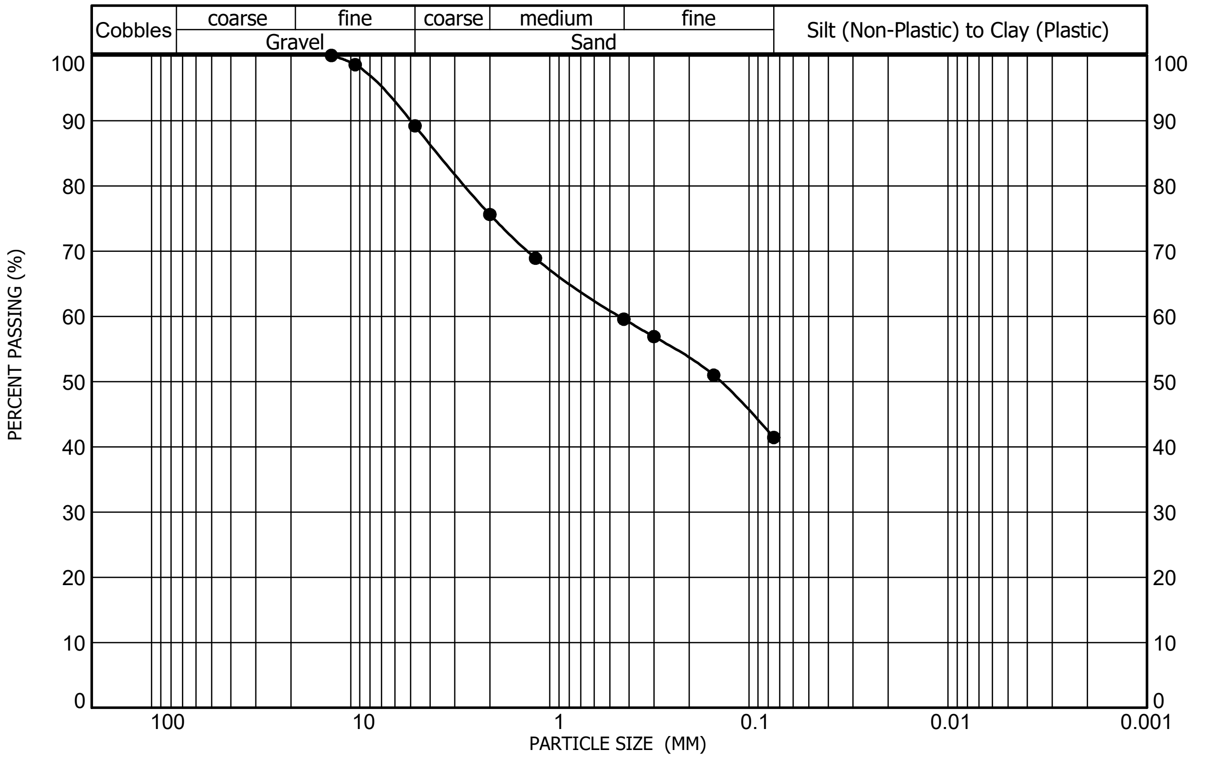
Sample Location Test Boring No. 15 at a depth of 4 feet
Sample Description Claystone, very sandy
Classification A-4(2), SANDY LEAN CLAY(CL)

Gravel (%) 0
Sand (%) 41
Clay/Silt (%) 59
Liquid Limit 26
Plasticity Index 8

GRADATION AND ATTERBERG TEST RESULTS

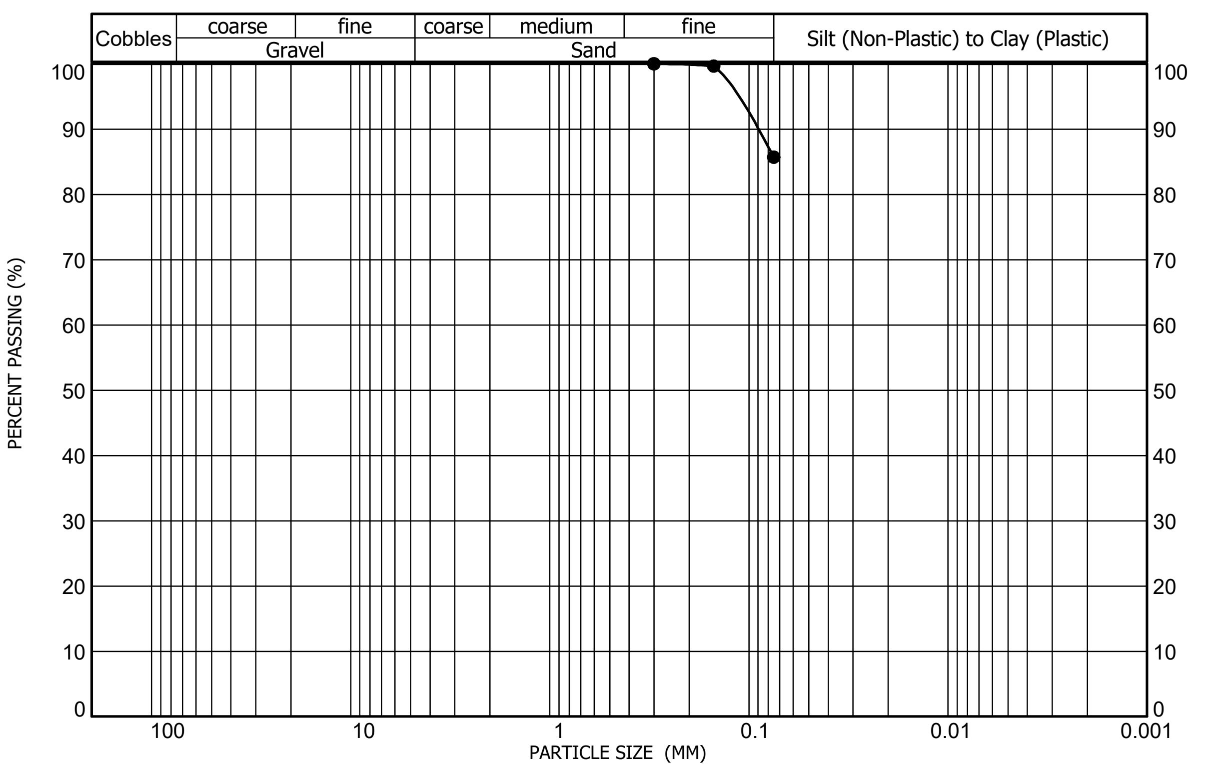
FIGURE A-47

PROJECT NO. 160388



Sample Location Test Boring No. 20 at a depth of 4 feet
Sample Description Sandstone, very clayey
Classification A-6(3), CLAYEY SAND(SC)

Gravel (%) 11 | Liquid Limit 34
Sand (%) 48 | Plasticity Index 17
Clay/Silt (%) 41



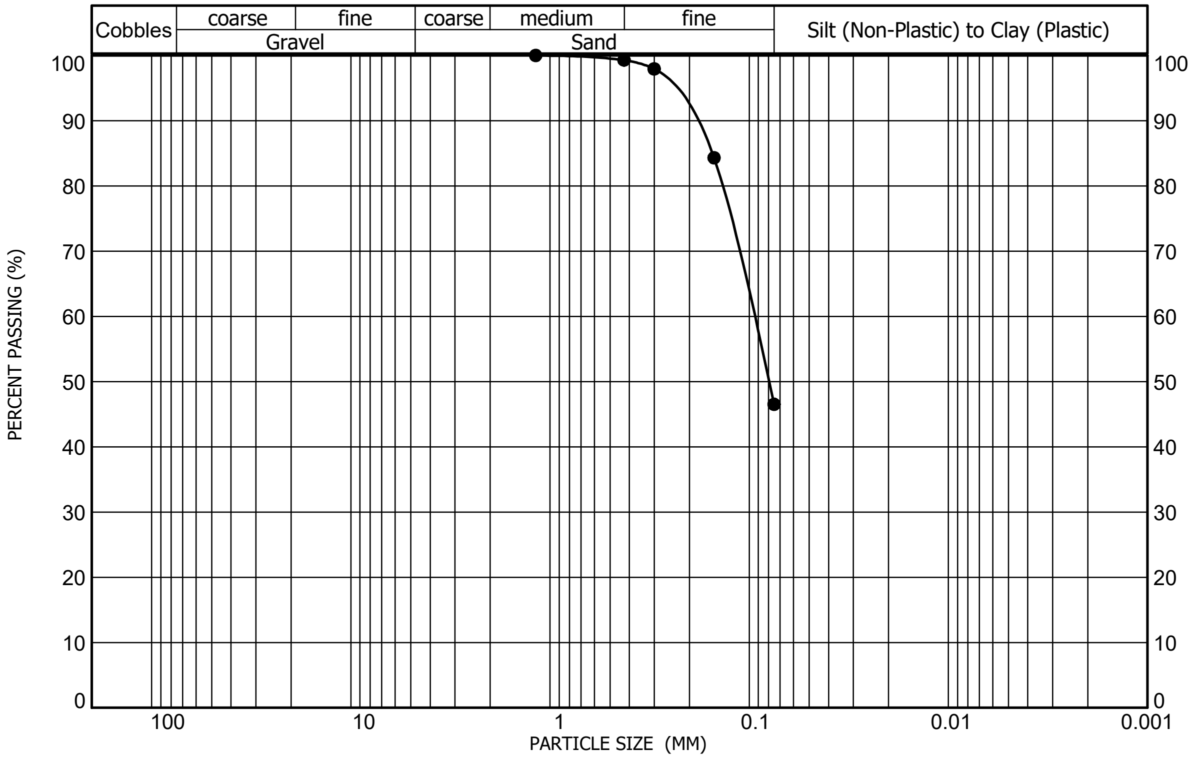
Sample Location Test Boring No. 22 at a depth of 14 feet
Sample Description Claystone, sandy
Classification A-7-6(21), LEAN CLAY(CL)

Gravel (%) 0 | Liquid Limit 42
Sand (%) 14 | Plasticity Index 24
Clay/Silt (%) 86

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-48

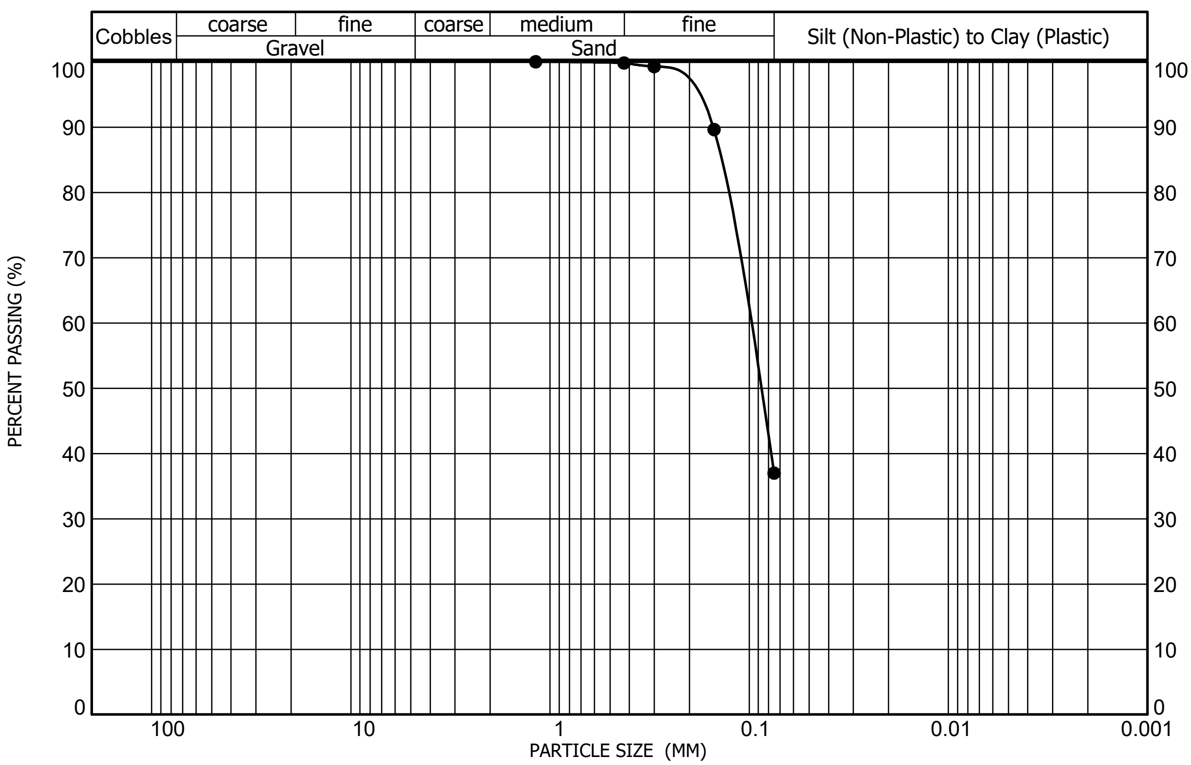
PROJECT NO. 160388



Sample Location Test Boring No. 22 at a depth of 34 feet — Gravel (%) 0 — Liquid Limit 31

Sample Description Claystone/Sandstone, silty — Sand (%) 53 — Plasticity Index 13

Classification A-6(3), CLAYEY SAND(SC) — Clay/Silt (%) 47



Sample Location Test Boring No. 24 at a depth of 9 feet — Gravel (%) 0 — Liquid Limit 27

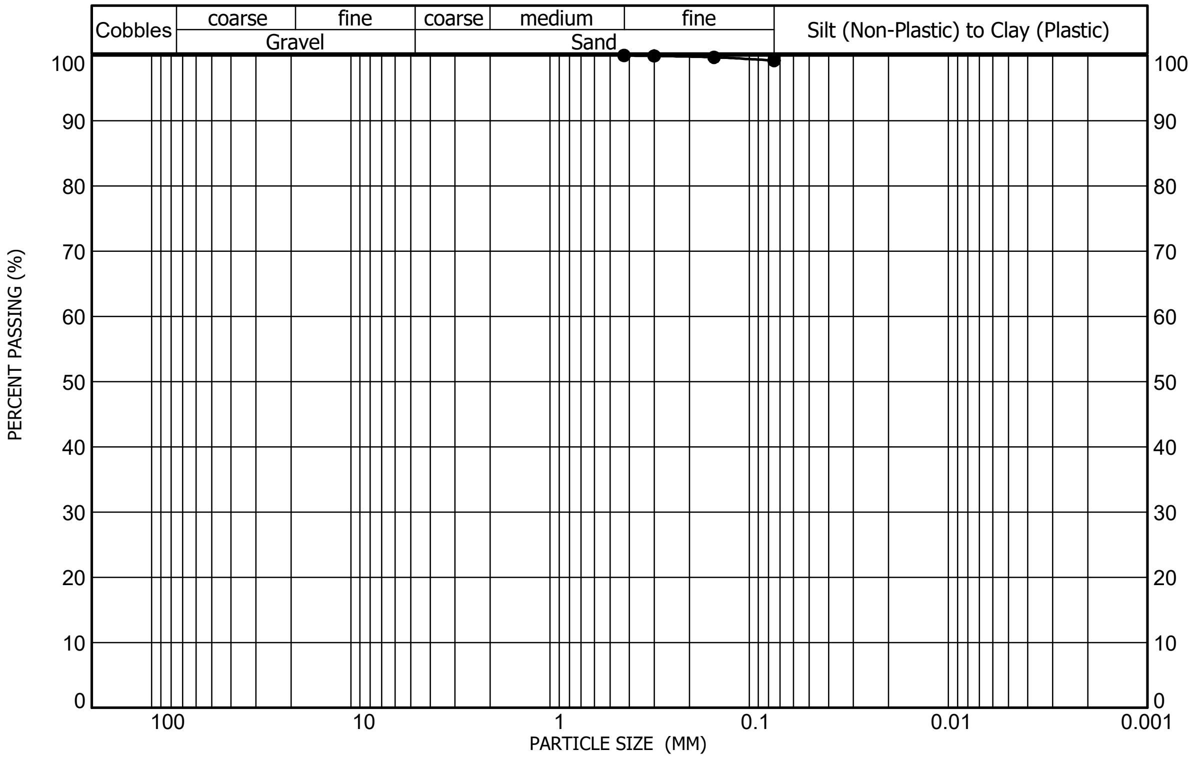
Sample Description Sandstone, very clayey — Sand (%) 63 — Plasticity Index 10

Classification A-4(0), CLAYEY SAND(SC) — Clay/Silt (%) 37

GRADATION AND ATTERBERG TEST RESULTS

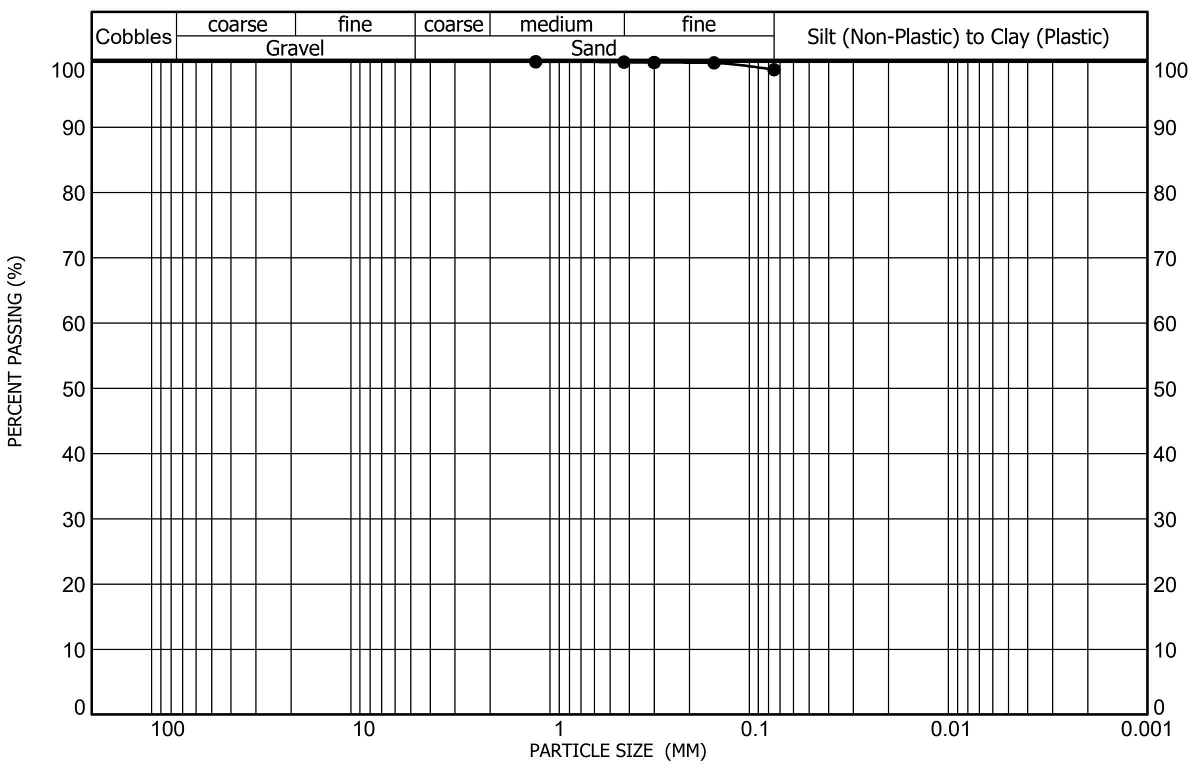
FIGURE A-49

PROJECT NO. 160388



Sample Location Test Boring No. 26 at a depth of 4 feet
Sample Description Claystone, trace sand
Classification A-7-6(55), FAT CLAY(CH)

Gravel (%) 0
Sand (%) 1
Clay/Silt (%) 99
Liquid Limit 68
Plasticity Index 49



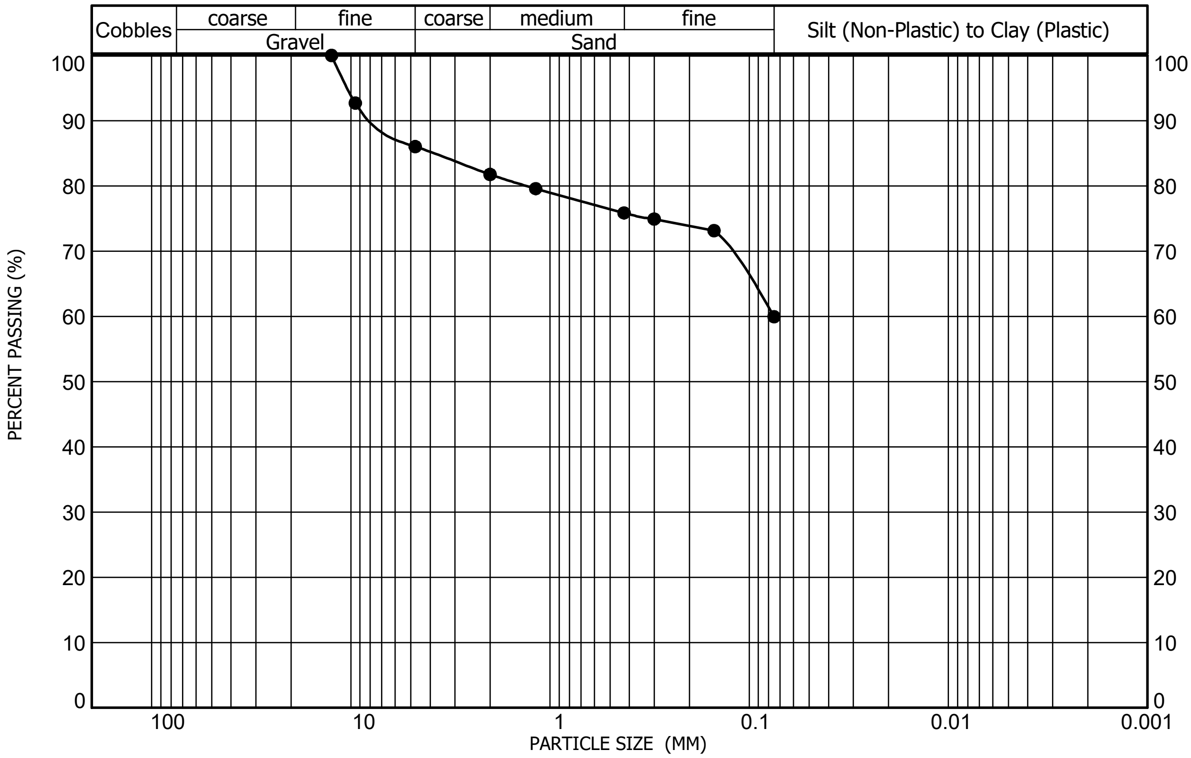
Sample Location Test Boring No. 27 at a depth of 14 feet
Sample Description Claystone, trace sand
Classification A-7-6(34), FAT CLAY(CH)

Gravel (%) 0
Sand (%) 1
Clay/Silt (%) 99
Liquid Limit 50
Plasticity Index 32

GRADATION AND ATTERBERG TEST RESULTS

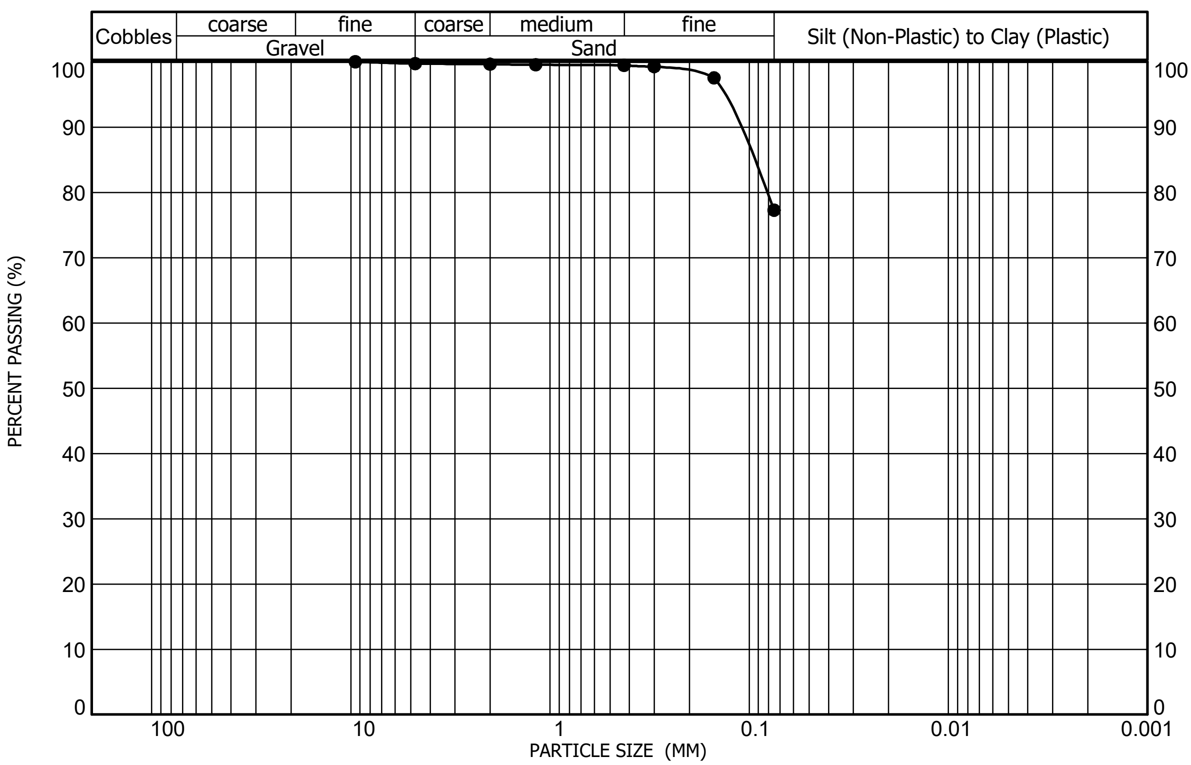
FIGURE A-50

PROJECT NO. 160388



Sample Location: Test Boring No. 28 at a depth of 9 feet
Sample Description: Claystone, very sandy
Classification: A-4(2), SANDY LEAN CLAY(CL)

Gravel (%) 14
Sand (%) 26
Clay/Silt (%) 60
Liquid Limit 26
Plasticity Index 8



Sample Location: Test Boring No. 30 at a depth of 9 feet
Sample Description: Claystone, sandy
Classification: A-4(5), LEAN CLAY with SAND(CL)

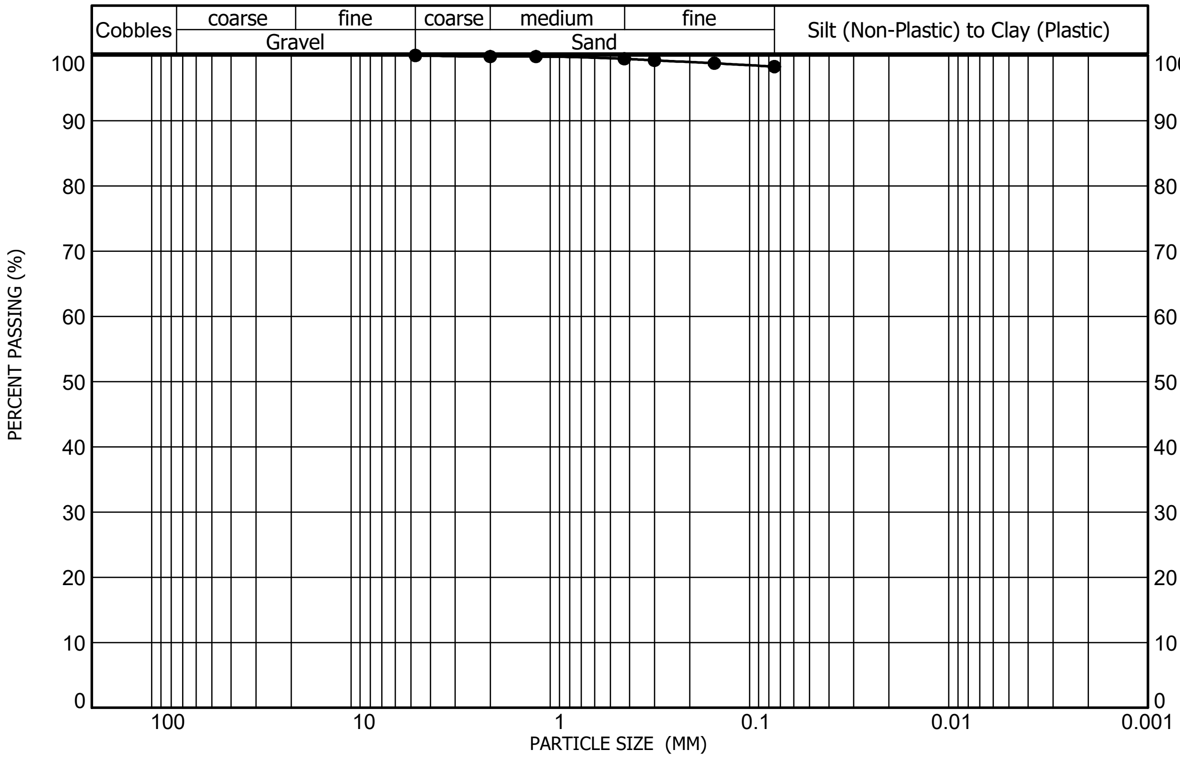
Gravel (%) 0
Sand (%) 22
Clay/Silt (%) 77
Liquid Limit 27
Plasticity Index 9

GRADATION AND ATTERBERG TEST RESULTS

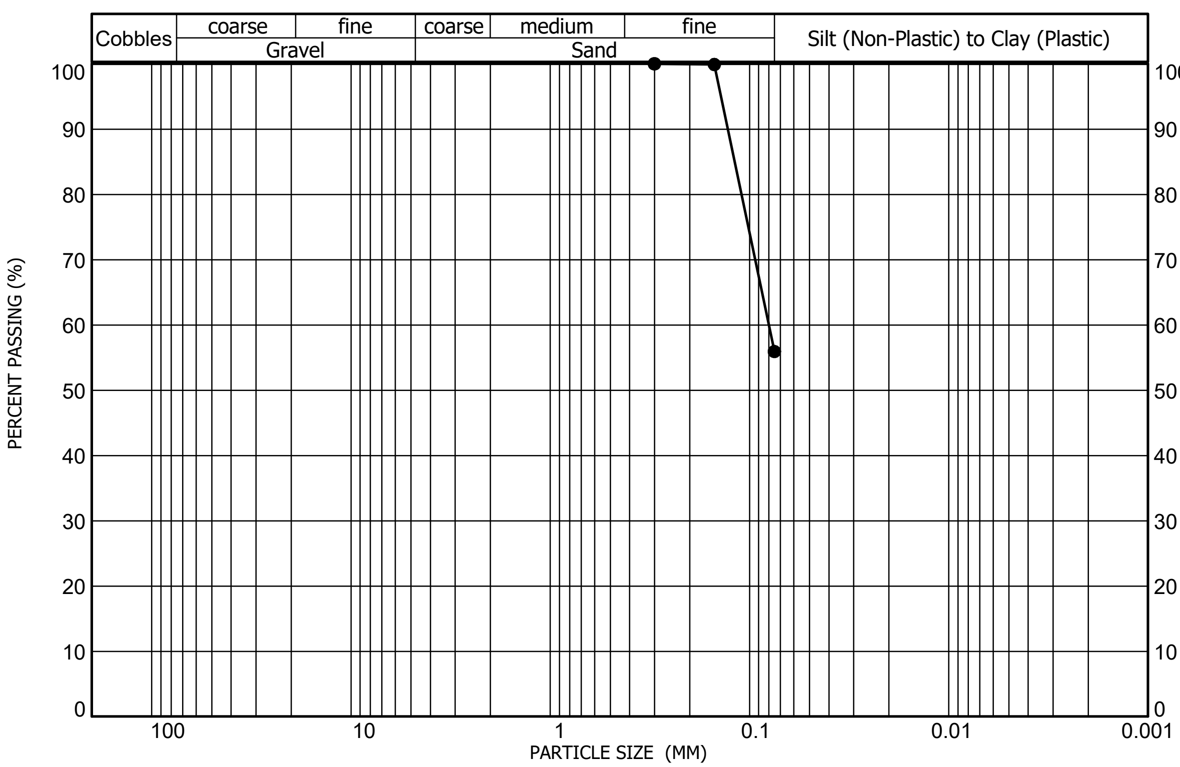
FIGURE A-51

PROJECT NO. 160388

A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 31 at a depth of 9 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(37), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 2
Clay/Silt (%): 98
Liquid Limit: 54
Plasticity Index: 34

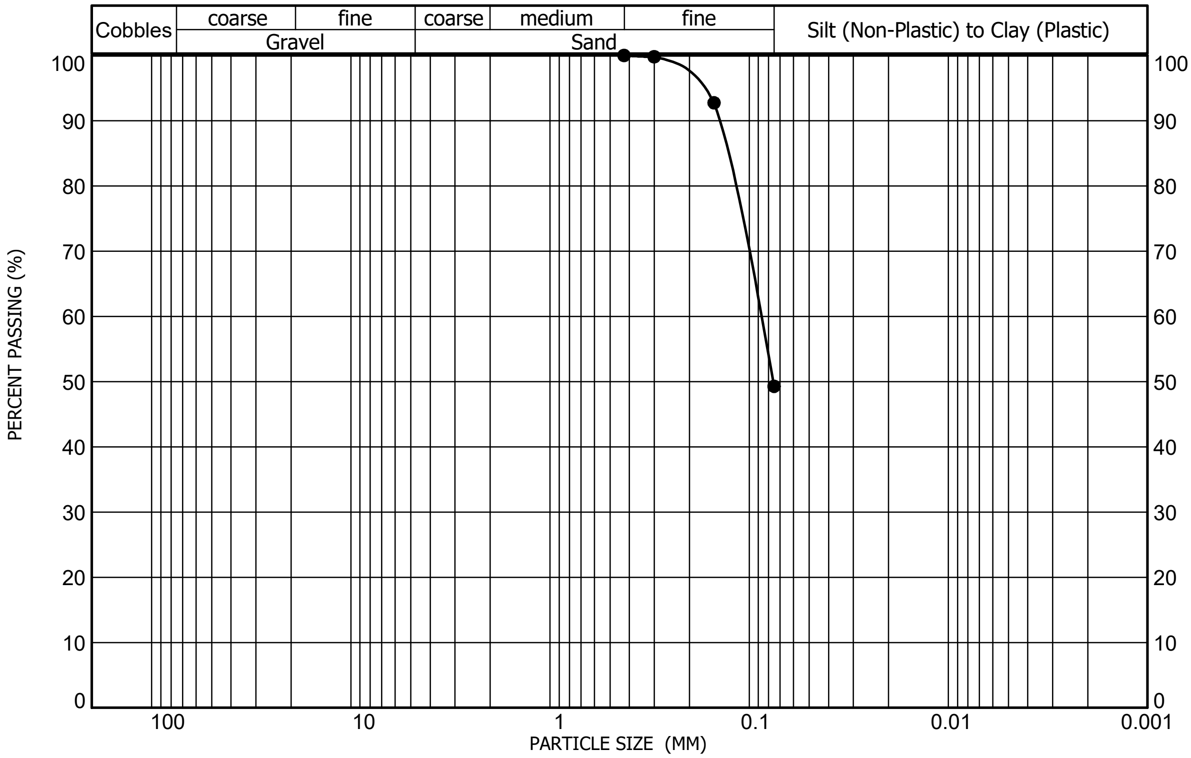


Sample Location: Test Boring No. 31 at a depth of 34 feet
Sample Description: Claystone, very sandy
Classification: A-7-6(15), SANDY FAT CLAY(CH)
Gravel (%): 0
Sand (%): 44
Clay/Silt (%): 56
Liquid Limit: 53
Plasticity Index: 34

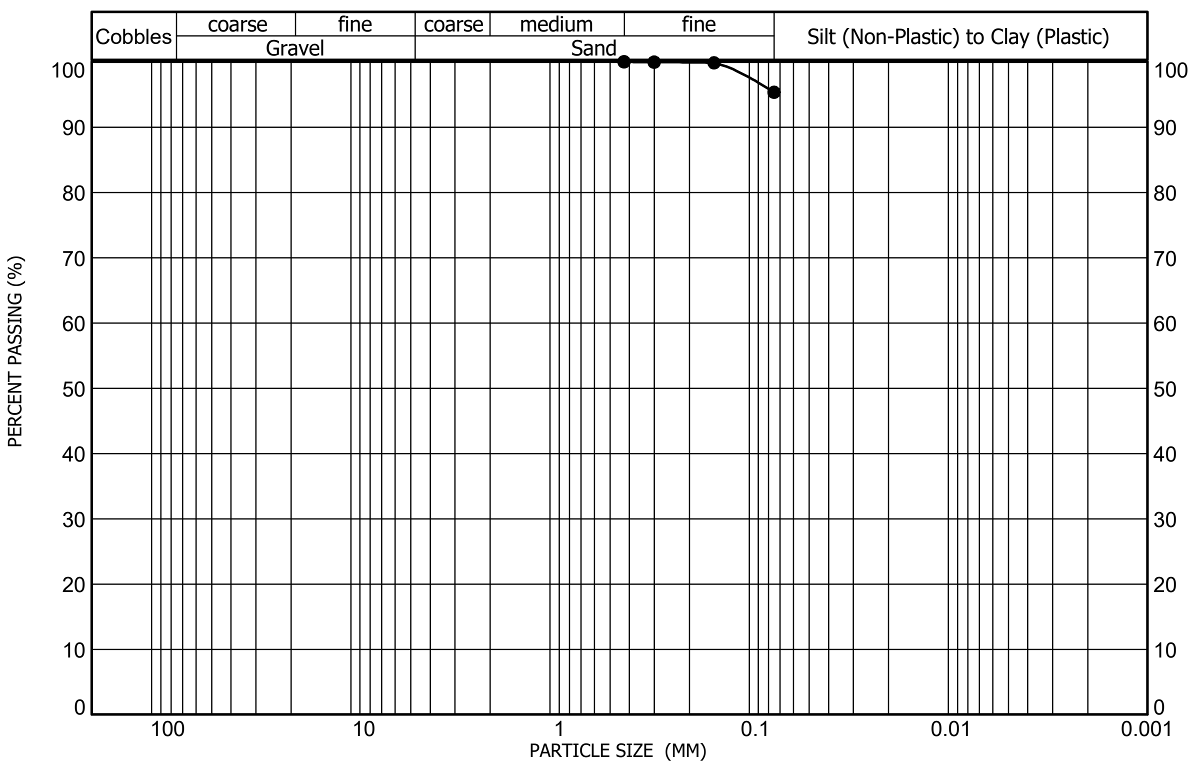
GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-52

PROJECT NO. 160388



Sample Location: Test Boring No. 35 at a depth of 24 feet
Sample Description: Claystone/Sandstone, silty
Classification: A-4(0), SILTY, CLAYEY SAND(SC-SM)
Gravel (%): 0
Sand (%): 51
Clay/Silt (%): 49
Liquid Limit: 24
Plasticity Index: 6



Sample Location: Test Boring No. 36 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Classification: A-7-6(30), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 5
Clay/Silt (%): 95
Liquid Limit: 50
Plasticity Index: 29

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-53

PROJECT NO. 160388

APPENDIX B
SPECIFICATIONS FOR PLACEMENT OF FILL

APPENDIX B
SPECIFICATIONS FOR PLACEMENT OF FILL

General
AGW, as the Client's representative, should observe fill placement and conduct tests to determine if the materials placed, methods of placement, and compaction are in reasonable conformance with these specifications. Specifications presented in this Appendix are general in nature. They should be used for construction except where specifically superseded by those presented in the attendant geotechnical study.

For the purpose of this specification, structural areas include those areas that will support constructed appurtenances (e.g., foundations, slabs, flatwork, pavements, etc.) and fill embankments or slopes that support significant fills or constructed appurtenances. Structural areas will be as defined by AGW.

Fill Material
Fill material should consist of on or off-site soils which are relatively free of vegetable matter and rubble. Off-site materials should be evaluated by AGW prior to importation. No organic, frozen, perishable, rock greater than 6 inches, or other unsuitable material should be placed in the fill. For the purpose of this specification, cohesive soil is defined as a mixture of clay, sand, and silt with more than 35% passing a U. S. Standard #200 sieve and a Plasticity Index of at least 11. These materials will classify as an A-6 or A-7 by the AASHTO Classification system. Granular soils are all materials which do not classify as cohesive.

Preparation of Fill Subgrade
Vegetation, organic topsoil, any existing fill, and any other deleterious materials should be removed from the fill area. The area to be filled should then be scarified, moistened or dried as necessary, and compacted to the moisture content and compaction level specified below prior to placement of subsequent layers of fill.

Placement of Fill Material
The materials should be delivered to the fill in a manner which will permit a well and uniformly compacted fill. Before compacting, the fill material should be properly broken down, mixed, and spread in approximately horizontal layers not greater than 8 inches in loose thickness.

Moisture Control
The material must contain uniformly distributed moisture for proper compaction. The Contractor will be required to add moisture to the materials if, in the opinion of AGW, sufficient and uniform moisture is not present in the fill. If the fill materials are too wet for proper compaction, aerating and/or mixing with drier materials will be required.

Moisture content should be controlled as a percentage deviation from optimum. Optimum moisture content is defined as the moisture content corresponding to the maximum density of a laboratory compacted sample performed according to ASTM D698 for cohesive soils or ASTM D1557 for granular soils. The moisture content specifications for the various areas are as follows:

		Cohesive Soils	Granular Soils
1.	Beneath Structural Areas:	0 to +4%	−2 to +2%
2.	Beneath Non-Structural Areas:	−3 to +3%	−3 to +3%
3.	Moisture Treated Fill:	0 to +4%	−2 to +2%

Compaction

When the moisture content and conditions of each layer spread are satisfactory, the fill should be compacted. Laboratory moisture-density tests should be performed on typical fill materials to determine the maximum density. Field density tests must then be made to determine fill compaction. The compaction standard to be utilized in determining the maximum density is ASTM D698 for cohesive soils or ASTM D1557 for granular soils. The following compaction specifications should be followed for each area:

1.	Beneath Structural Areas:	95% of Maximum Dry Density
2.	Beneath Non-Structural Areas:	90% of Maximum Dry Density
3.	Moisture Treated Fill:	95% of Maximum Dry Density

If the fill contains less than 10% passing the No. 200 sieve, it may be necessary to control compaction based on relative density (ASTM D2049). If this is the case, then compaction around the structures and beneath walkway or other slabs should be to at least 70% relative density, and compaction beneath foundations and vehicle supporting should be to at least 80% relative density.

Deep Fills

In areas where fill depths exceed 20 feet beneath structural areas, additional compaction considerations will be required to reduce fill settlement. Fill placed within 20 feet of final overlot grade should be compacted as required above. Deeper fills should be compacted to 100% of maximum dry density at a moisture content of ±2% of optimum moisture content. Relative density of at least 85% will be required when necessary.

Responsibility

Any mention of essentially full-time testing and observation does not mean AGW will accept responsibility for future fill performance. AGW shall not be responsible for constant or exhaustive inspection of the work, the means and methods of construction or the safety procedures employed by Client's contractor. Performance of construction observation services does not constitute a warranty or guarantee of any type, since even with diligent observation, some construction defects, deficiencies or omissions in the Contractor's work may occur undetected. Client shall hold its contractor solely responsible for the quality and completion of the project, including construction in accordance with the construction documents. Any duty hereunder is for the sole benefit of the Client and not for any third party, including the contractor or any subcontractor.