Community & Economic
Development Department
www.adcogov.org

ADAMS COUNTY
COLORADO

4430 South Adams County Parkway
1st Floor, Suite W2000
Brighton, CO 80601-8204
PHONE 720.523.6800
FAX 720.523.6998

DEVELOPMENT APPLICATION FORM

Application Type:

☐ Conceptual Review	☐ Preliminary PUD	☐ Temporary Use
☒ Subdivision, Preliminary	☐ Final PUD	☐ Variance
☐ Subdivision, Final	☐ Rezone	☐ Conditional Use
☐ Plat Correction/ Vacation	☐ Special Use	☐ Other: _____

PROJECT NAME: Seltzer Heights Filing 1

APPLICANT

Name(s): PCS Group, Inc Phone #: 303-531-4905

Address: 200 Kalamath St

City, State, Zip: Denver, CO 80220

2nd Phone #: Email: john@pcsgroupco.com

OWNER

Name(s): HSG Land LLC Phone #: 720-252-2111

Address: 10450 E 159th CT

City, State, Zip: Brighton, CO 80602-7977

2nd Phone #: Email: thanlon@wspcos.com

TECHNICAL REPRESENTATIVE (Consultant, Engineer, Surveyor, Architect, etc.)

Name: Ken Toland Phone #: 720-638-5190

Address: 12500 W 58th Ave. Ste 230

City, State, Zip: Arvada, CO 80002

2nd Phone #: Email: ktoland@kteng.net

DESCRIPTION OF SITE

Address:	8120 E 168th Ave
City, State, Zip:	Brighton, CO 80602
Area (acres or square feet):	107.7065
Tax Assessor Parcel Number	0157104100005
Existing Zoning:	PUD, A-1
Existing Land Use:	agriculture
Proposed Land Use:	PUD - single family & multi-family residential

Have you attended a Conceptual Review? YES [X] NO [ ]

If Yes, please list PRE#: 2022-00061

I hereby certify that I am making this application as owner of the above described property or acting under the authority of the owner (attached authorization, if not owner). I am familiar with all pertinent requirements, procedures, and fees of the County. I understand that the Application Review Fee is non-refundable. All statements made on this form and additional application materials are true to the best of my knowledge and belief.

Name: George R. Hanlon, Jr. Date: 6/5/2024

Owner's Printed Name

Name:

Owner's Signature

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Application Type:

☐ Conceptual Review	☐ Preliminary PUD	☐ Temporary Use
☒ Subdivision, Preliminary	☐ Final PUD	☐ Variance
☐ Subdivision, Final	☒ Rezone	☐ Conditional Use
☐ Plat Correction/ Vacation	☐ Special Use	☐ Other: _____

PROJECT NAME: Seltzer Heights Filing No. 1 (Seltzer Farms Parcel)

APPLICANT

Name(s): John Prestwich - PCS Group Inc Phone #: 303-531-4905

Address: 200 Kalamath St

City, State, Zip: Denver, CO 80220

2nd Phone #: Email: john@pcsgroupco.com

OWNER

Name(s): Seltzer Farms Investment LLC Phone #: 303-472-4633

Address: 5740 Olde Wadsworth Blvd, Unit A

City, State, Zip: Arvada, CO 80002

2nd Phone #: Email: gp@remingtonhomes.net

TECHNICAL REPRESENTATIVE (Consultant, Engineer, Surveyor, Architect, etc.)

Name: Ken Toland - KT Engineering Phone #: 720-638-5190

Address: 12500 w 58th Ave. Ste 230

City, State, Zip: Arvada, CO 80002

2nd Phone #: Email: ktoland@kteng.net

DESCRIPTION OF SITE

Address:	16705 Yosemite St
City, State, Zip:	Brighton, CO 80602
Area (acres or square feet):	8.7 acres
Tax Assessor Parcel Number	0157104000020
Existing Zoning:	A-1
Existing Land Use:	Agriculture
Proposed Land Use:	PUD

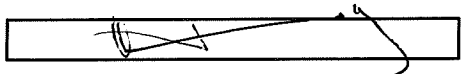
Have you attended a Conceptual Review? YES [X] NO [ ]

If Yes, please list PRE#: 2022-00061

I hereby certify that I am making this application as owner of the above described property or acting under the authority of the owner (attached authorization, if not owner). I am familiar with all pertinent requirements, procedures, and fees of the County. I understand that the Application Review Fee is non-refundable. All statements made on this form and additional application materials are true to the best of my knowledge and belief.

Name: Guillaume Pouchot, Manager Date: 01/21/2025

Owner's Printed Name

Name: 

Owner's Signature

Community & Economic
Development Department
www.adcogov.org

ADAMS COUNTY
COLORADO

4430 South Adams County Parkway
1st Floor, Suite W2000
Brighton, CO 80601-8204
PHONE 720.523.6800
FAX 720.523.6998

Application Type:

☐ Conceptual Review	☐ Preliminary PUD	☐ Temporary Use
☒ Subdivision, Preliminary	☐ Final PUD	☐ Variance
☐ Subdivision, Final	☐ Rezone	☐ Conditional Use
☐ Plat Correction/ Vacation	☐ Special Use	☐ Other: _____

PROJECT NAME: Seltzer Heights Filing No. 1 (Pond Areas)

APPLICANT

Name(s):	John Prestwich - PCS Group Inc	Phone #:	303-531-4905
Address:	200 Kalamth St		
City, State, Zip:	Denver, CO 80223		
2nd Phone #:	720-259-8246	Email:	john@pcsgroupco.com

OWNER

Name(s):	Todd Creek Village Metropolitan District	Phone #:	720-303-7373
Address:	10450 E 159th Ct		
City, State, Zip:	Brighton, Co, 80602		
2nd Phone #:		Email:	don@toddcreekvillage.org

TECHNICAL REPRESENTATIVE (Consultant, Engineer, Surveyor, Architect, etc.)

Name:	Ken Toland - KT Engineering	Phone #:	720-638-5190
Address:	12500 W 58th Ave. Ste 230		
City, State, Zip:	Arvada, CO 80002		
2nd Phone #:		Email:	ktoland@kteng.net

DESCRIPTION OF SITE

Address:	N/A
City, State, Zip:	
Area (acres or square feet):	108.5 acres
Tax Assessor Parcel Number	0157104200001, 0157104000006, 0157104200002
Existing Zoning:	A-3
Existing Land Use:	PL
Proposed Land Use:	PUD

Have you attended a Conceptual Review? YES [X] NO [ ]

If Yes, please list PRE#: 2022-00061

I hereby certify that I am making this application as owner of the above described property or acting under the authority of the owner (attached authorization, if not owner). I am familiar with all pertinent requirements, procedures, and fees of the County. I understand that the Application Review Fee is non-refundable. All statements made on this form and additional application materials are true to the best of my knowledge and belief.

Name: President of the Board Date: 7-1-2024

Owner's Printed Name

Name:

Owner's Signature

SEAL	**GRANTED**	**The moving party is hereby ORDERED to provide a copy of this Order to any pro se parties who have entered an appearance in this action within 10 days from the date of this order.**	**C. Scott Crabtree** **District Court Judge** DATE OF ORDER INDICATED ON ATTACHMENT

DISTRICT COURT, COUNTY OF ADAMS, STATE OF COLORADO

Court Address: Adams County Justice Center
1110 Judicial Center Dr.
Brighton, CO 80601

EFILED Document – District Court
CO Adams County District Court 17th JD
1996CV1930
Filing Date: Mar 28 2008 2:15PM MDT
Filing ID: 19186612

PETITIONER: TODD CREEK FARMS METROPOLITAN DISTRICT NO. 1

Attorneys for District:

Randall J. Feuerstein Atty. Reg # 10479
Dufford & Brown, P.C.
1700 Broadway
Suite 2100
Denver, CO 80290-2101
Phone Number: (303) 861-8013
FAX Number: (303) 832-3804
E-mail: rfeuerstein@duffordbrown.com

^ COURT USE ONLY ^

Case Number: 96CV1930

Div.: Ctrm:

ORDER

THIS MATTER, having come before the Court and the Court having reviewed the Petition for Name Change of Todd Creek Farms Metropolitan District No. 1, which Petition is on file in this proceeding, and having considered the objections, if any, of all interested parties,

THIS COURT FINDS that said Petition is sufficient and regular in form and content, that the desired change of name is proper and not detrimental to the interest of any other person or entity and will not result in the defrauding of any person or entity; now therefore,

IT IS ORDERED:

1. That the name of Todd Creek Farms Metropolitan District No. 1 is hereby changed to Todd Creek Village Metropolitan District, and the District is hereby authorized to have and use the name of Todd Creek Village Metropolitan District as its legal name.

2. That such change of name shall be made and spread upon the records of this Court.

3. That within twenty (20) days of the date of this Order, public notice of such change of name shall be given by publication at least three times in the *Brighton Blade*, a newspaper published in the County of Adams, State of Colorado, wherein the District is located.

4. That notice of such change of name shall be provided within twenty (20) days of the date of this Order to the Adams and Weld County Clerk and Recorder's Offices, the Colorado Division of Local Government, and to such other parties as the District may determine.

Dated this _____ day of _____, 2008.

BY THE COURT

By:_____
District Judge

This document constitutes a ruling of the court and should be treated as such.

Court: CO Adams County District Court 17th JD

Judge: Donald W Marshall

File & Serve Transaction ID: 19151611

Current Date: Mar 28, 2008

Case Number: 1996CV1930

Case Name: In the matter of: TODD CREEK FARMS MET DIST #1

Court Authorizer Comments:

03272008 JEP ORDER RE: PETITION FOR NAME CHANGE.

pcs group

Nick Eagleson | Senior Strategic Planner
Adams County | Planning & Development Division
4430 South Adams County Parkway | 1 st Floor, Suite W2000A
Brighton, CO 80601
Phone: 720-523-6878
Email: neagleson@adcogov.com

January 21, 2025

RE: **SELTZER HEIGHTS FILING NO. 1 PRELIMINARY PLAT SUBMITTAL**
Adams County, Colorado - Written Narrative

Please accept our initial submittal for Seltzer Heights Filing No. 1 Preliminary Plat. This Filing is part of the PRC2023-00020 Todd Creek Preliminary Development Plan Amendment. The Seltzer Heights property is the west property of the Todd Creek PUD Amendment. The first filing will include the development of the single family detached lots, parks, open space and the reservoir ponds. The Seltzer Heights Filing No. 1 property is approximately 227.85 acres with 205 residential lots for the initial phase.

The Preliminary Plat for Seltzer heights Filing No. 1 maintains the goals outlined in the Todd Creek PUD Amendment by providing diversity in lot sizes, creating opportunities for outdoor recreation with large amounts of open space and a robust trail system, and creating more parks for the nearby communities. Further explanation is outlined below.

The PUD Amendment for Todd Creek & the Seltzer Heights Filing No. 1 has been created to be more in alignment with the goals of Adams County as demonstrated in the Amended Comprehensive Plan that was approved on September 27, 2022. The main takeaways from the Comprehensive plan were that the population of Adams County is expected to grow by 1.7% and housing is not on pace to meet the demand. In addition, the rising housing prices will threaten attainability and displacement. Therefore, the PUD Amendment and the Seltzer Heights Filing No. 1 allows for a greater variety of housing than the large lot single-family homes that were initially approved for the PUD. With the greater variety of housing there will be opportunities and products available for first-time home buyers and smaller lot homes for those that may want to down-size.

The Seltzer Heights Filing No. 1 will achieve several of the goals outlined within the Comprehensive Plan. The specific Goals, Policies and Strategies that will be achieve are listed below:

Community and Housing Goals, Policies, and Strategies:

1. **COH Goal 1:** *Support sustainable and responsible land use planning for residential growth and development.*
2. **COH Goal 2:** *Increase housing opportunities throughout Adams County by taking a proactive role in addressing housing affordability, diversity and supply through land use regulations.*
3. **COH Policy 2.1:** *Adams County's policy is to support a diverse and inclusive community. This is achieved by offering a range of housing options that include opportunities for homeownership and rental, a variety of housing types and price ranges, and housing that is designed to meet the needs of all ages and ability levels.*
4. **COH Strategy 2.1.01**: *Support diversity of housing types through updates to the Adams County Development Standards & Regulations and by aligning zoning with future land uses.*

   Adams County endeavors to provide housing that works for people on all paths of life. A central topic raised throughout the community engagement process was access to housing for all residents. Adams County residents expressed a need to support a broad spectrum of opportunities beyond the current predominantly single-family detached homes including manufactured housing, apartments, and townhomes. . Residents also expressed needs for more homeownership opportunities. Responses indicated a need for housing that meets the needs of people at different stages in their life including housing that meets the needs of seniors and those with disabilities. The initial phase of Filing No. 1 includes single family detached in lotting sizes ranging from 45'x110'to 65'x120'. However, an even greater variety of housing opportunities shall follow with the remaining development parcels.

Built Environment and Connections Goals, Policies, and Strategies:

5. **BEC Goal 2**: *An inclusive community that provides opportunities for people to live, work , and achieve their highest level of health and well-being.*
6. **BEC Strategy 1.2.01**: *New development, including new special districts, should mitigate impacts and improve livability in the county by contributing appropriate impact and land dedication fees, including but not limited to traffic, fire districts, school districts, and parks and open space.*
   - The Seltzer Heights Filing No. 1 will meet this criteria by working with the County to assess the impact and land dedication fees. The Todd Creek Planning Team will provide the appropriate studies to determine the impacts and incorporate into the site plan design accordingly.
7. **BEC Strategy 1.2.06:** *Continue to enforce provisions that require groundwater resources be demonstrated for 300 years to ensure long-term viability of groundwater for development. Consider the development of a County Water Analysis to understand the capacity of existing water sources and sanitary resources (See also NRE 2.1.01).*
   - Seltzer Heights Filing No. 1 plans to meet this strategy by incorporating the 3 reservoir sites within the updated PUD. Its water resources will be managed by the Todd Creek HOA.
8. **BEC Strategy 2.2.02**: *Encourage subdivisions to provide internal connectivity to enhance walkability. Encourage public and private connections to public trails when*

adjacent to the subdivision or neighborhood

9. **BEC Strategy 2.2.03:** *Support public health needs by seeking opportunities to enhance access to community resources, such as healthy food, healthcare, childcare, safe neighborhoods and places for physical activity.*
    - The Seltzer Heights Filing No. 1 meets the 2 above strategies by incorporating a robust trail system that interconnects the subdivision and also meets public health needs by providing opportunities for physical activity. This Filing contains over 130 acres of open space, including 3 pocket parks and 3 reservoir ponds with perimeter trails to encourage outdoor activity.

The Seltzer Heights Filing No. 1 will align with the goals, policies, and strategies of the Adams County Comprehensive Plan by incorporating a diversity of housing, and more to follow with the develop of the remaining parcels after the initial first filing, and providing ample opportunities for outdoor recreation. Filing No. 1 will enhance the community by providing more of the housing needs and also retaining and creating outdoor community spaces and connectivity.

We look forward to a partnership with Adams County in the creation of these new and exciting neighborhoods as we continue to refine the design and add more detail as part of the platting process.

Thank you,



John Prestwich - President, PCS Group, Inc. - RLA



TODD CREEK			
SELTZER HEIGHTS			
FILING 1 AREA (AC.)			227.85ac
HOUSING TYPE	PROPOSED LOT SIZE	MINIMUM LOT SIZE PER PUD	DU'S DEPICTED
SFD FRONT LOAD	45' X 110'	40'X90'	78 UNITS
SFD FRONT LOAD	50' X 110'		67 UNITS
SFD FRONT LOAD	60' X 110'		60 UNITS
TOTAL			205

TODD CREEK FARMS - SELTZER HEIGHTS ADAMS COUNTY, COLORADO

SITE PLAN, January 22nd, 2025

pcs group



TODD CREEK FARMS - SELTZER HEIGHTS ADAMS COUNTY, COLORADO

POCKET PARK B, January 22nd, 2025

pcs group



TODD CREEK FARMS - SELTZER HEIGHTS ADAMS COUNTY, COLORADO

NEIGHBORHOOD PARK D, January 22nd, 2025

pcs group



TODD CREEK FARMS – SELTZER HEIGHTS ADAMS COUNTY, COLORADO

NEIGHBORHOOD PARK E, January 22nd, 2025

pcs group

PRELIMINARY PLAT

SELTZER HEIGHTS FILING NO. 1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO

CASE NO: _____

OWNERSHIP AND DEDICATION CERTIFICATE:

KNOW ALL MEN BY THESE PRESENTS THAT THE UNDERSIGNED, BEING THE SOLE OWNERS OF THE FOLLOWING DESCRIBED TRACT OF LAND:

A PARCEL OF LAND LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SECTION 4;

THENCE S 89°33'09" W ALONG THE NORTH LINE OF THE NORTHEAST 1/4 OF SAID SECTION 4 A DISTANCE OF 40.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF YOSEMITE STREET BEING AN EXCEPTION RECORDED IN BOOK 1 AT PAGE 527 AND THE EXTENSION THEREOF AND THE **POINT OF BEGINNING;**

THENCE S 00°19'36" E ALONG SAID WESTERLY RIGHT-OF-WAY LINE A DISTANCE OF 2348.64 FEET TO A POINT ON THE NORTHERLY BOUNDARY OF THAT PARCEL OF LAND RECORED AT RECEPTION NO. 2010000052390;

THENCE ALONG SAID PARCEL OF LAND THE FOLLOWING THREE (3) COURSES:

1) S 88°45'28 W A DISTANCE OF 1509.46 FEET;
2) S 25°55'39" E A DISTANCE OF 17.18 FEET;
3) S 26°31'05" W A DISTANCE OF 16.44 FEET TO A POINT ON THE NORTHERLY BOUNDARY OF TODD CREEK MEADOWS SUBDIVISION, A SUBDIVISION RECORDED AT RECEPTION NO. C0731590;

THENCE S 88°45'09" W ALONG SAID NORTHERLY BOUNDARY A DISTANCE OF 74.40 FEET TO A POINT ON THE EASTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. C1138476;

THENCE ALONG SAID EASTERLY, AND SOUTHERLY BOUNDARY OF SAID PARCEL OF LAND AND THE EXTENSION THEREOF THE FOLLOWING SEVEN (7) COURSES:

1) S 00°30'00" E A DISTANCE OF 291.28 FEET;
2) N 73°15'18" W A DISTANCE OF 293.85 FEET;
3) N 51°17'25" W A DISTANCE OF 149.44 FEET;
4) N 78°17'25" W A DISTANCE OF 154.42 FEET;
5) S 70°02'35" W A DISTANCE OF 169.36 FEET;
6) S 59°09'35" W A DISTANCE OF 244.08 FEET;
7) S 75°34'18" W A DISTANCE OF 665.00 FEET TO A POINT ON THE EASTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. C1138476 AND SHOWN ON A SURVEY BY BRIAN THOMAS BRINKMAN, PLS 38175 DATED 6-29-11 RECORDED AT RECEPTION NO. 2011-102;

THENCE ALONG SAID EASTERLY BOUNDARY OF SAID SURVEY RECORDED AT RECEPTION NO. 2011-102 THE FOLLOWING FOURTEEN (14) COURSES:

1) S 69°25'57" W A DISTANCE OF 314.14 FEET;
2) S 63°15'15" W A DISTANCE OF 135.49 FEET;
3) N 00°42'53" E A DISTANCE OF 559.19 FEET;
4) N 32°57'40" E A DISTANCE OF 800.14 FEET;
5) S 88°46'03" W A DISTANCE OF 830.04 FEET;
6) N 66°07'13" W A DISTANCE OF 53.12 FEET;
7) N 65°25'03" W A DISTANCE OF 290.82 FEET;
8) N 58°20'21" W A DISTANCE OF 389.89 FEET;
9) N 09°57'07" W A DISTANCE OF 301.16 FEET;
10) N 09°22'50" W A DISTANCE OF 187.79 FEET;
11) N 10°47'50" E A DISTANCE OF 103.98 FEET;
12) N 18°17'18" E A DISTANCE OF 214.81 FEET;
13) N 62°21'47" E A DISTANCE OF 439.90 FEET;
14) N 00°31'50" W A DISTANCE OF 428.97 FEET TO A POINT ON THE NORTH LINE OF THE NORTHWEST 1/4 OF SAID SECTION 4;

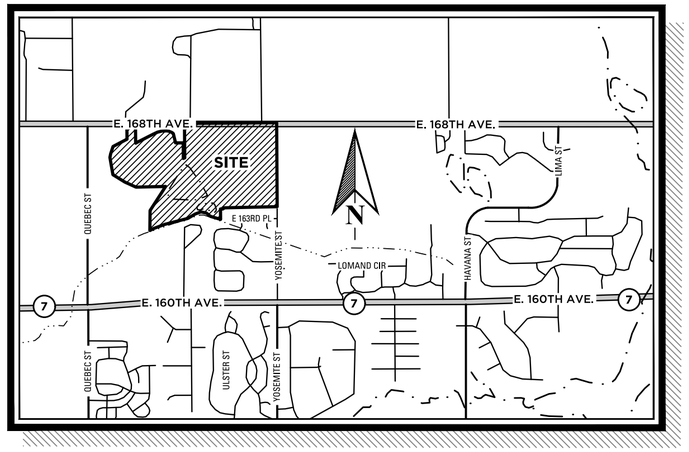
THENCE N 89°32'13" E ALONG SAID NORTH LINE A DISTANCE OF 241.08 FEET TO A POINT ON THE WESTERLY BOUNDARY OF AN AGREEMENT TO RESOLVE DISPUTED BOUNDARY LINE RECORDED AT RECEPTION NO. 2017000099326;

THENCE ALONG SAID AGREEMENT THE FOLLOWING SEVENTEEN (17) COURSES:

1) S 00°24'31" E A DISTANCE OF 542.45 FEET;
2) N 61°21'33" E A DISTANCE OF 75.99 FEET;
3) N 63°03'28" E A DISTANCE OF 101.27 FEET;
4) N 63°18'15" E A DISTANCE OF 97.13 FEET;
5) N 63°03'23" E A DISTANCE OF 120.44 FEET;
6) N 63°17'02" E A DISTANCE OF 100.72 FEET;
7) N 62°28'30" E A DISTANCE OF 56.87 FEET;
8) N 65°01'48" E A DISTANCE OF 131.55 FEET;
9) N 75°57'26" E A DISTANCE OF 131.79 FEET;
10) N 84°04'41" E A DISTANCE OF 99.05 FEET;
11) S 84°31'07" E A DISTANCE OF 26.00 FEET;
12) S 79°17'18" E A DISTANCE OF 63.94 FEET;
13) S 67°17'01" E A DISTANCE OF 98.25 FEET;
14) S 51°09'19" E A DISTANCE OF 47.50 FEET;
15) S 13°28'48" E A DISTANCE OF 154.06 FEET;
16) S 13°09'42" E A DISTANCE OF 112.86 FEET;
17) N 89°38'47" E A DISTANCE OF 214.92 FEET TO A POINT ON THE WESTERLY BOUNDARY OF THAT PARCEL OF LAND RECORED AT RECEPTION NO. 2013000074188;

THENCE ALONG SAID WESTERLY, SOUTHERLY AND EASTERLY BOUNDARY OF SAID PARCEL OF LAND THE FOLLOWING FOUR (4) COURSES:

1) S 00°27'04" E A DISTANCE OF 436.34 FEET;
2) N 65°32'32" E A DISTANCE OF 39.58 FEET;
3) S 87°43'24" E A DISTANCE OF 3.84 FEET;
4) N 00°27'04" W A DISTANCE OF 964.30 FEET TO A POINT ON SAID NORTH LINE OF THE NORTHEAST 1/4 OF SAID SECTION 4;



VICINITY MAP

1" = 3000'

OWNERSHIP AND DEDICATION CERTIFICATE CONTINUED:

THENCE N 89°31'38" E ALONG SAID NORTH LINE A DISTANCE OF 2167.54 FEET TO THE SOUTHEAST CORNER OF SECTION 33, TOWNSHIP 1 NORTH, RANGE 67 WEST BEING AN ANGLE POINT ON SAID NORTH LINE OF THE NORTHEAST 1/4 OF SECTION 4;

THENCE N 89°33'09" E CONTINUING ALONG SAID NORTH LINE OF THE NORTHEAST 1/4 OF SECTION 4 A DISTANCE OF 408.82 FEET TO THE **POINT OF BEGINNING**.

THE ABOVE DESCRIBED PARCEL CONTAINS AN AREA OF 9,925,012 SQUARE FEET, OR 227.8469 ACRES MORE OR LESS.

HAS BY THESE PRESENTS LAID OUT, PLATTED AND SUBDIVIDED THE SAME INTO LOTS, STREETS, TRACTS, AND EASEMENTS AS SHOWN ON THIS PLAT UNDER THE NAME AND STYLE OF SELTZER HEIGHTS FILING NO. 1 PRELIMINARY PLAT.

ALL PUBLIC STREETS ARE HEREBY DEDICATED TO ADAMS COUNTY FOR PUBLIC USE.

THE UNDERSIGNED DOES HEREBY DEDICATE, GRANT AND CONVEY TO ADAMS COUNTY THOSE PUBLIC EASEMENTS AS SHOWN ON THE PLAT; AND FURTHER RESTRICTS THE USE OF ALL PUBLIC EASEMENT TO ADAMS COUNTY AND/OR ITS ASSIGNS, PROVIDED HOWEVER, THAT THE SOLE RIGHT AND AUTHORITY TO RELEASE OR QUITCLAIM ALL OR ANY SUCH PUBLIC EASEMENTS SHALL REMAIN EXCLUSIVELY VESTED IN ADAMS COUNTY.

OWNERS SIGNATURES:

SEE SHEET 2 FOR OWNERS SIGNATURES

BASIS OF BEARINGS:

BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST 1/4 OF SECTION 4 BEING S 00°19'36" E AND MONUMENTED AS FOLLOWS:

-NORTHEAST CORNER SECTION 4, BEING A FOUND 3.25" ALUMINUM CAP IN RANGE BOX MARKED "BASELINE, LS 38285"

-EAST QUARTER CORNER SECTION 4, BEING A FOUND 3.25" ALUMINUM CAP MARKED "EMK, PLS 38584"

SHEET INDEX:

1. COVER SHEET
2. GENERAL NOTES & OWNERS SIGNATURES
3. OVERALL BOUNDARY SHEET
4. TRACT A DETAILED PLAN SHEET
5. DETAILED PLAN SHEET
6. DETAILED PLAN SHEET
7. DETAILED PLAN SHEET
8. DETAILED PLAN SHEET
9. DETAILED PLAN SHEET
10. DETAILED PLAN SHEET
11. DETAILED PLAN SHEET
12. CURVE TAG TABLES
13. CURVE TAG TABLES

LAND USE SUMMARY TABLE

PARCEL	COUNT	AREA SF	AREA AC	% OF TOTAL
RIGHT-OF-WAY	NA	956,673 SF	21.9622 AC	9.64 %
OIL & GAS TRACT	1	523,426 SF	12.0162 AC	5.27 %
OPEN SPACE TRACTS	7	5,535,281 SF	127.0726 AC	55.77 %
FUTURE DEVELOPMENT LOTS	3	1,542,941 SF	35.4210 AC	15.55 %
RESIDENTIAL LOTS	205	1,366,691 SF	31.3749 AC	13.77%
	TOTAL =	**9,925,012 SF**	**227.8469 AC**	**100.00 %**

PLANNING COMMISSION APPROVAL:

APPROVED BY ADAMS COUNTY PLANNING COMMISSION THIS

_____ DAY OF _____A.D. 20_____.

_____
CHAIR

BOARD OF COUNTY COMMISSIONERS' APPROVAL:

APPROVED BY ADAMS COUNTY BOARD OF COUNTY COMMISSIONERS

THIS _____ DAY OF _____A.D. 20____.

_____
CHAIR

ADAMS COUNTY ATTORNEY'S OFFICE:

_____
APPROVED AS TO FORM

SURVEYOR'S CERTIFICATE:

I CHRISTOPHER H. McELVAIN, A REGISTERED LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THE SURVEY OF SELTZER HEIGHTS FILING NO. 1 PRELIMINARY PLAT WAS MADE UNDER MY SUPERVISION AND THE ACCOMPANYING PLAT ACCURATELY AND PROPERLY SHOWS SAID SUBDIVISION.

_____
CHRISTOPHER H. McELVAIN, P.L.S. 36561
FOR AND ON BEHALF OF KT ENGINEERING, LLC

CLERK AND RECORDER'S CERTIFICATE:

THIS FINAL PLAT WAS FILED FOR RECORD IN THE ADAS COUNTY CLERK AND RECORDER

AT _____ M. ON THE _____ DAY OF _____, 20_____

_____ BY: _____
ADAMS COUNTY CLERK AND RECORDER DEPUTY CLERK

RECEPTION NUMBER _____

DATE SUBMITTED: 01.20.2025

REVISION NO.	DATE
1	
2	
3	
4	
5	

PREPARED FOR:
HSG LAND LLC
10450 E. 159TH COURT
BRIGHTON, CO 80602

SCALE:	JOB NO:	BY:
1" = N/A	0109-2207	BSS

SHEET 1 OF 13

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\0109\FILING 1 HSG\SURVEY\PLAT\PRELIMINARY PLAT\DRAWINGS\PLAT SHEETS\2207-HSG-PRELIMINARY-PLAT-CVR.DWG

PRELIMINARY PLAT

SELTZER HEIGHTS FILING NO.1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO

OWNER:

EXECUTED THIS _____ DAY OF _____, 20_____

HSG LAND LLC, A COLORADO LIMITED LIABILITY COMPANY

BY:_____

GEORGE R. HANLON JR., MANAGER

NOTARY:

STATE OF _____)
)SS
COUNTY OF _____)

THE FOREGOING OWNERSHIP AND DEDICATION CERTIFICATE WAS ACKNOWLEDGED BEFORE ME THIS _____ DAY OF _____, 20____,

BY GEORGE R. HANLON JR. AS MANAGER, HSG LAND LLC, A COLORADO LIMITED LIABILITY COMPANY

WITNESS MY HAND AND SEAL _____

MY COMMISSION EXPIRES _____

OWNER:

EXECUTED THIS _____ DAY OF _____, 20_____

TODD CREEK VILLAGE METROPOLITAN DISTRICT, A QUASI-MUNICIPAL CORPORATION AND POLITICAL SUBDIVISION OF THE STATE OF COLORADO

BY:_____

DONALD O. SUMMERS, PRESIDENT

NOTARY:

STATE OF _____)
)SS
COUNTY OF _____)

THE FOREGOING OWNERSHIP AND DEDICATION CERTIFICATE WAS ACKNOWLEDGED BEFORE ME THIS _____ DAY OF _____, 20____,

BY DONALD O. SUMMERS AS PRESIDENT, TODD CREEK VILLAGE METROPOLITAN DISTRICT, A QUASI-MUNICIPAL CORPORATION AND POLITICAL SUBDIVISION OF THE STATE OF COLORADO

WITNESS MY HAND AND SEAL _____

MY COMMISSION EXPIRES _____

OWNER:

EXECUTED THIS _____ DAY OF _____, 20_____

SELTZER FARMS INVESTMENT LLC, A COLORADO LIMITED LIABILITY COMPANY

BY:_____

GUILLAUME POUCHOT, MANAGER

NOTARY:

STATE OF _____)
)SS
COUNTY OF _____)

THE FOREGOING OWNERSHIP AND DEDICATION CERTIFICATE WAS ACKNOWLEDGED BEFORE ME THIS _____ DAY OF _____, 20____,

BY GUILLAUME POUCHOT AS MANAGER, SELTZER FARMS INVESTMENT LLC, A COLORADO LIMITED LIABILITY COMPANY

WITNESS MY HAND AND SEAL _____

MY COMMISSION EXPIRES _____

EASEMENT STATEMENT:

SIX-FOOT (6') WIDE UTILITY EASEMENTS ARE HEREBY DEDICATED ON PRIVATE PROPERTY ADJACENT TO THE FRONT LOT LINES OF EACH LOT IN THE SUBDIVISION. IN ADDITION, EIGHT-FOOT (8') WIDE DRY UTILITY EASEMENTS ARE HEREBY DEDICATED AROUND THE PERIMETER OF TRACTS, PARCELS AND/OR OPEN SPACE AREAS. THESE EASEMENTS ARE DEDICATED TO ADAMS COUNTY FOR THE BENEFIT OF THE APPLICABLE UTILITY PROVIDERS FOR THE INSTALLATION, MAINTENANCE, AND REPLACEMENT OF UTILITIES.

STORM DRAINAGE FACILITY STATEMENT:

THE POLICY OF THE COUNTY REQUIRES THAT MAINTENANCE ACCESS SHALL BE PROVIDED TO ALL STORM DRAINAGE FACILITIES TO ASSURE CONTINUOUS OPERATIONAL CAPABILITY OF THE SYSTEM. THE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL DRAINAGE FACILITIES INCLUDING INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, AND DETENTION BASINS LOCATED ON THEIR LAND UNLESS MODIFIED BY THE SUBDIVISION DEVELOPMENT AGREEMENT. SHOULD THE OWNER FAIL TO MAINTAIN SAID FACILITIES, THE COUNTY SHALL HAVE THE RIGHT TO ENTER SAID LAND FOR THE SOLE PURPOSE OF OPERATIONS AND MAINTENANCE. ALL SUCH MAINTENANCE COST WILL BE ASSESSED TO THE PROPERTY OWNERS.

GENERAL NOTES:

1. NOTICE: ACCORDING TO THE COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.
2. THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY KT ENGINEERING, LLC. TO DETERMINE TITLE OR EASEMENTS OF RECORD. RESEARCH FOR THIS SURVEY WAS PERFORMED IN ACCORDANCE WITH CRS 38-51-106 AND THE RULES OF PROCEDURE AND BOARD POLICY STATEMENTS OF THE STATE BOARD OF LICENSURE FOR ARCHITECTS, PROFESSIONAL ENGINEERS AND PROFESSIONAL LAND SURVEYORS, SPECIFICALLY THOSE BOARD RULES AND POLICY STATEMENTS RELATING TO THE DEPICTION OF EASEMENTS AND RIGHTS OF WAY ON SUBDIVISION PLATS. OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY POLICY NUMBER: PIB70842010.27955509, WITH AN EFFECTIVE DATE OF JANUARY 07, 2025 AT 5:00 P.M. WAS RELIED UPON FOR ALL INFORMATION REGARDING EASEMENTS OF RECORD, RIGHTS OF WAY, TITLE OF RECORD AND CIVIL COURT ACTIONS OF RECORD.
3. DISTANCES ON THIS PLAT ARE EXPRESSED IN U.S. SURVEY FEET AND DECIMALS THEREOF. A U.S. SURVEY FOOT IS DEFINED AS EXACTLY 1200/3937 METERS.
4. ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OR DEFACES ANY PUBLIC LAND SURVEY MONUMENT OR LAND BOUNDARY MONUMENT OR ACCESSORY COMMITS A CLASS TWO (2) MISDEMEANOR PURSUANT TO STATE STATUS 18-4-508, C.R.S.
5. ACCORDING TO THE FIRM FLOOD INSURANCE RATE MAP NO. 08001C0307H, EFFECTIVE: MARCH 5, 2007 A PORTION OF THE SITE LIES WITHIN THE ZONE A 1% ANNUAL CHANCE FLOOD ZONE. THESE ZONE A AREAS ARE REFERENCED AS SIGNAL RESERVOIR NO. 1 AND SIGNAL RESERVOIR NO. 2 AND SHOWN ON SHEET 4.
6. NO LOT SHALL HAVE DIRECT ACCESS TO E. 168TH AVENUE OR YOSEMITE STREET.

GENERAL NOTES CONTINUED:

7. THIS SUBDIVISION CONTAINS ONE EXISTING SEPTIC SYSTEM FOR THE HOME ON LOT 1, BLOCK 12. THE OWNER OF LOT 1, BLOCK 12 SHALL COMPLY WITH TITLE 25-10-101, ET SEQ. COLORADO REVISED STATUTES AND THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT WATER QUALITY CONTROL COMMISSION ON-SITE WASTEWATER TREATMENT SYSTEM REGULATION #43, 5 CCR-1002-43.
8. THE OWNER SHALL COMPLY WITH ALL OIL AND GAS RELATED DESIGN AND PERFORMANCE STANDARDS OUTLINED IN SECTION 4-11-02-03-03 OF THE ADAMS COUNTY DEVELOPMENT STANDARDS AND REGULATIONS INCLUDING:
   - PURSUANT TO SECTION 4-07-01-02-01-12, WHERE A NEW HOME AND/OR OTHER PERMANENT STRUCTURE WITH PLUMBING IS CONSTRUCTED WITHIN THREE HUNDRED (300) FEET OF AN EXISTING OIL AND GAS WELL, THE PROPERTY OWNER SHALL SUBMIT A SIGNED WAIVER ACKNOWLEDGING THE EXISTENCE OF THE FACILITY.
   - ACTIVE OIL AND GAS WELL LOCATIONS SHALL INCLUDE A 250' BUFFER AS DEPICTED ON THIS PLAT. NO STRUCTURES MAY BE CONSTRUCTED WITHIN THIS BUFFER AREA.
   - THE OWNER SHALL DISCLOSE TO PROSPECTIVE PURCHASERS OF LOTS WITHIN A RADIUS OF 200 FEET OF THE PLUGGED AND ABANDONED WELL OF (1) THE LOCATION OF THE PLUGGED AND ABANDONED WELL, (2) THE LOCATION OF THE MAINTENANCE AND WORKOVER SETBACK, AND (3) THE PURPOSE FOR THE WELL MAINTENANCE AND WORKOVER SETBACK.
   - ABANDONED OIL AND GAS WELL WORKOVER SETBACKS AS DEPICTED ON THIS PLAT ARE 50'X100' AND CENTERED OVER THE ABANDONED WELL. NO STRUCTURES SHALL BE LOCATED WITHIN THIS SETBACK.
   - NO UTILITY LINES SHALL BE INSTALLED WITHIN TEN FEET OF ANY PLUGGED AND ABANDONED WELL.
9. THE PROPERTY MAY BE SUBJECT TO THE FOLLOWING SURFACE USE AGREEMENTS AS REFERENCED IN OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY POLICY NUMBER: PIB70842010.27002325, WITH AN EFFECTIVE DATE OF JUNE 18, 2024 AT 5:00 P.M.
   - SURFACE USE AGREEMENT RECORDED JULY 05, 2006 UNDER RECEPTION NO. 20060705000675490 AND SECOND AMENDMENT AND RATIFICATION OF SURFACE USE AGREEMENT RECORDED JANUARY 30, 2017 UNDER RECEPTION NO. 2017000008819.

TRACT TABLE

TRACT	OWNERSHIP	AREA SF	AREA AC	USE
TRACT A	T.C.V.M.D*	4,744,819 SF	108.9261 AC	RESERVOIR / OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT B	DISTRICT*	262,218 SF	6.0197 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT C	DISTRICT*	523,426 SF	12.0162 AC	OIL & GAS OPERATIONS AREA
TRACT D	DISTRICT*	56,993 SF	1.3084 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT E	DISTRICT*	87,814 SF	2.0159 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT F	DISTRICT*	6,640 SF	0.1524 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT G	DISTRICT*	52,276 SF	1.2001 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT H	DISTRICT*	316,184 SF	7.2586 AC	DETENTION POND / OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE

* T.C.V.M.D = TODD CREEK VILLAGE METROPOLITAN DISTRICT
* DISTRICT = FUTURE METROPOLITAN DISTRICT ESTABLISHED PRIOR TO FINAL PLAT

DATE SUBMITTED: 01.20.2025

REVISION NO.	DATE
1	
2	
3	
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5	

PREPARED FOR:
HSG LAND LLC
10450 E. 159TH COURT
BRIGHTON, CO 80602

SCALE:	JOB NO:	BY:
1" = N/A	0109-2207	BSS

SHEET 2 OF 13

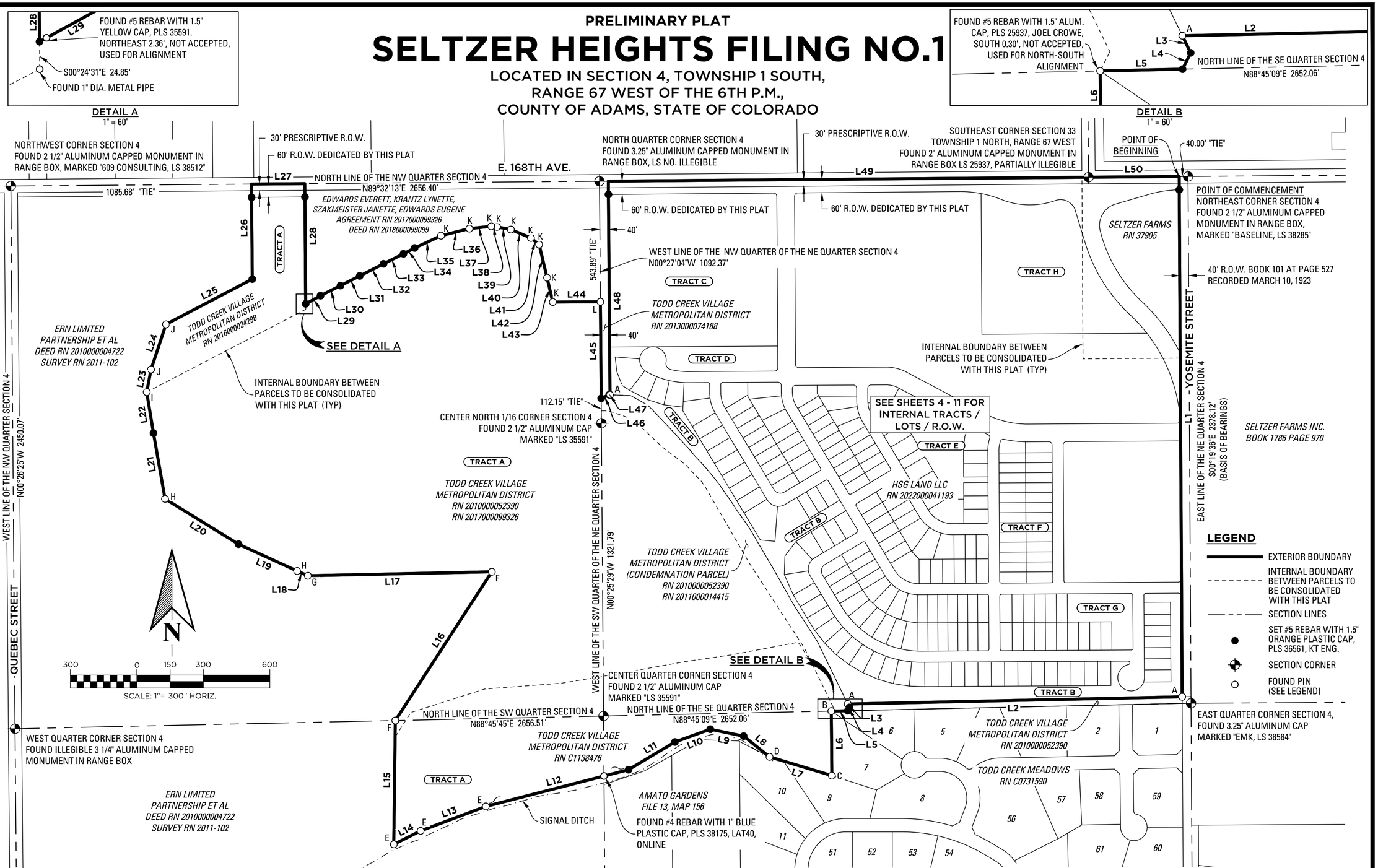
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PRELIMINARY PLAT

SELTZER HEIGHTS FILING NO.1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO



BOUNDARY LINE TABLE

LINE #	LENGTH	BEARING	LINE #	LENGTH	BEARING	LINE #	LENGTH	BEARING	LINE #	LENGTH	BEARING	LINE #	LENGTH	BEARING
L1	2348.64	S00°19'36"E	L11	244.08	S59°09'35"W	L21	301.16	N09°57'07"W	L31	97.13	N63°18'15"E	L41	47.50	S51°09'19"E
L2	1509.46	S88°45'28"W	L12	665.00	S75°34'18"W	L22	187.79	N09°22'50"W	L32	120.44	N63°03'23"E	L42	154.06	S13°28'48"E
L3	17.03	S25°55'39"E	L13	314.14	S69°25'57"W	L23	103.98	N10°47'50"E	L33	100.72	N63°17'02"E	L43	112.86	S13°09'42"E
L4	16.44	S26°31'05"W	L14	135.49	S63°15'15"W	L24	214.81	N18°17'18"E	L34	56.87	N62°28'30"E	L44	214.92	N89°38'47"E
L5	74.40	S88°45'09"W	L15	559.19	N00°42'53"E	L25	439.90	N62°21'47"E	L35	131.55	N65°01'48"E	L45	436.34	S00°27'04"E
L6	291.28	S00°30'00"E	L16	800.14	N32°57'40"E	L26	428.97	N00°31'50"W	L36	131.79	N75°57'26"E	L46	39.58	N65°32'32"E
L7	293.85	N73°15'18"W	L17	830.04	S88°46'03"W	L27	241.08	N89°32'13"E	L37	99.05	N84°04'41"E	L47	3.84	S87°43'24"E
L8	149.44	N51°17'25"W	L18	53.12	N66°07'13"W	L28	542.45	S00°24'31"E	L38	26.00	S84°31'07"E	L48	964.30	N00°27'04"W
L9	154.42	N78°17'25"W	L19	290.82	N65°25'03"W	L29	75.99	N61°21'33"E	L39	63.94	S79°17'18"E	L49	2167.54	N89°31'38"E
L10	169.36	S70°02'35"W	L20	389.89	N58°20'21"W	L30	101.27	N63°03'28"E	L40	98.25	S67°17'01"E	L50	408.82	N89°33'09"E

FOUND PIN LEGEND

- A FOUND #5 REBAR WITH 1.5" YELLOW PLASTIC CAP, LS 28283, ROCK CREEK
- B FOUND #5 REBAR WITH 1.5" ALUMINUM CAP, LS 25937, JOEL CROWE (SEE DETAIL)
- C FOUND #5 REBAR WITH 1.5" YELLOW PLASTIC CAP, PLS 13487
- D FOUND #5 REBAR
- E FOUND #3 REBAR
- F FOUND #4 REBAR WITH 1" BLUE PLASTIC CAP, PLS 38175, LAT40
- G FOUND 1" METAL PIPE
- H FOUND #4 REBAR
- I FOUND #5 REBAR WITH 1.5" ALUMINUM CAP, PLS 31161, SURVCON
- J FOUND #5 REBAR WITH 1.5" ORANGE PLASTIC CAP, NO MARKINGS
- K FOUND #5 REBAR WITH 1.5" YELLOW PLASTIC CAP, PLS 35591, NH SURVEY
- L FOUND 60D NAIL

DATE SUBMITTED: 01.20.2025	
REVISION NO.	DATE
1	
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PREPARED FOR:
HSG LAND LLC
10450 E. 159TH COURT
BRIGHTON, CO 80602

SCALE:	JOB NO:	BY:
1" = 300'	0109-2207	BSS

SHEET 3 OF 13

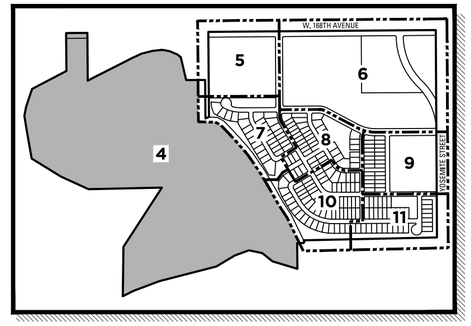
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J:\0109\FILING 1 HSG\SURVEY\PLAT\PRELIMINARY PLAT\DRAWINGS\PLAT SHEETS\2207-HSG-PRELIMINARY-PLAT-OVERALL-BOUNDARY.DWG

PRELIMINARY PLAT

SELTZER HEIGHTS FILING NO.1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO



KEYMAP
NTS

NORTHWEST CORNER SECTION 4
FOUND 2 1/2" ALUMINUM CAPPED MONUMENT IN
RANGE BOX, MARKED "609 CONSULTING, LS 38512"

30' PRESCRIPTIVE R.O.W.
60' R.O.W. DEDICATED BY THIS PLAT
E. 168TH AVE.
1085.68' "TIE"
L27 NORTH LINE OF THE NW QUARTER SECTION 4
N89°32'13"E 2656.40'

NORTH QUARTER CORNER SECTION 4
FOUND 3.25" ALUMINUM CAPPED MONUMENT IN
RANGE BOX, LS NO. ILLEGIBLE

WEST LINE OF THE NW QUARTER SECTION 4
N00°26'25"W 2450.07'

QUEBEC STREET

ZARLENGO #21-4
STATUS: PR
LOCATION PLOTTED PER
ECMC RECORDS

EDWARDS EVERETT, KRANTZ LYNETTE,
SZAKMEISTER JANETTE, EDWARDS EUGENE
DEED RN 2018000099099

8' WIDE DITCH EASEMENT
BOOK 65, PAGE 561
(TO BE VACATED BY SEPARATE DOCUMENT)

WEST LINE OF THE NW QUARTER
OF THE NE QUARTER SECTION 4
N00°27'04"W 1092.37'

543.89' "TIE"

MATCHLINE
SEE SHEET 5

L26 L28 L25 L24 L23 L22 L21 L20 L19 L18 L17 L16 L15 L14 L13 L12 L11 L10 L9 L8 L7 L6 L5 L4 L3 L2 L1
L29 L30 L31 L32 L33 L34 L35 L36 L37 L38 L39 L40 L41 L42 L43 L44 L45 L46 L47

250'

TODD CREEK VILLAGE
METROPOLITAN DISTRICT
RN 2016000024298

SEE DETAIL A
SHEET 3

ZARLENGO #1
STATUS: PR
LOCATION PLOTTED PER
ECMC RECORDS

ZARLENGO #2
STATUS: PR
LOCATION PLOTTED PER
ECMC RECORDS

SIGNAL RESERVOIR #1
STATUS: SI
LOCATION PLOTTED PER
ECMC RECORDS

INTERNAL BOUNDARY BETWEEN
PARCELS TO BE CONSOLIDATED
WITH THIS PLAT (TYP)

TODD CREEK VILLAGE
METROPOLITAN DISTRICT
RN 2013000074188

112.15' "TIE"

CENTER NORTH 1/16 CORNER SECTION 4
FOUND 2 1/2" ALUMINUM CAP
MARKED "LS 35591"

TODD CREEK VILLAGE
METROPOLITAN DISTRICT
RN 2010000052390
RN 2017000099326

TRACT A
4,744,819 SF

TRACT A IS A CONSOLIDATION
OF PARCELS RECORDED AT:
RN 2016000024298
RN 2017000099326
RN 2011000014415
RN C1138476

ERN LIMITED
PARTNERSHIP ET AL
DEED RN 2010000004722
SURVEY RN 2011-102

SIGNAL RESERVOIR NO. 1 ZONE
A FLOOD ZONE AS DEPICTED
ON FIRM NO. 08001C0307H

SIGNAL
RESERVOIR NO. 2
ZONE A FLOOD
ZONE AS
DEPICTED ON
FIRM NO.
08001C0307H

ZARLENGO #6-4
STATUS: PR
LOCATION PLOTTED PER
ECMC RECORDS

WEST LINE OF THE SW QUARTER OF THE NE QUARTER SECTION 4
N00°25'29"W 1321.79'

APPROXIMATE LOCATION OF
SIGNAL RESERVOIR IRRIGATION
PIPELINE AS SHOWN ON
BOOK 2351, PAGE 577

8' WIDE DITCH EASEMENT
BOOK 65 AT PAGE 561
(TO BE VACATED BY
SEPARATE DOCUMENT)

CENTER QUARTER CORNER SECTION 4
FOUND 2 1/2" ALUMINUM CAP
MARKED "LS 35591"

OIL & GAS PIPELINE EASEMENT
BOOK 4001 PAGE 717

WEST QUARTER CORNER SECTION 4
FOUND ILLEGIBLE 3 1/4" ALUMINUM CAPPED
MONUMENT IN RANGE BOX

NORTH LINE OF THE SW QUARTER SECTION 4
N88°45'45"E 2656.51'

NORTH LINE OF THE SE QUARTER SECTION 4
N88°45'09"E 2652.06'

EAST 1/4 CORNER SECTION 4,
FOUND 3.25" ALUMINUM CAP
MARKED "LS 38584, EMK"

SEE DETAIL B
SHEET 3

TODD CREEK VILLAGE
METROPOLITAN DISTRICT
RN C1138476

ZARLENGO #1
STATUS: PA
LOCATION PLOTTED PER
ECMC RECORDS

50'X100' WORKOVER
SETBACK

ZARLENGO #3
STATUS: PR
LOCATION PLOTTED PER
ECMC RECORDS

FLOWLINE
SIGNAL DITCH

ZARLENGO #23-4
STATUS: PR
LOCATION PLOTTED PER
ECMC RECORDS

ERN LIMITED
PARTNERSHIP ET AL
DEED RN 2010000004722
SURVEY RN 2011-102

FLOWLINE
SIGNAL DITCH

FOUND #4 REBAR WITH 1" BLUE
PLASTIC CAP, PLS 38175, LAT40,
ONLINE

AMATO GARDENS
FILE 13, MAP 156

TODD CREEK MEADOWS
RN C0731590

TODD CREEK VILLAGE
METROPOLITAN
DISTRICT
(CONDEMNATION
PARCEL)
RN 2010000052390
RN 2011000014415

S87°43'24"E 93.21'
S61°04'01"E 87.93'
S43°53'10"E 64.97'
S43°34'32"E 50.38'
S43°23'02"E 50.98'
S42°18'21"E 50.05'
S43°10'34"E 51.62'
S40°00'06"E 49.83'
S43°25'44"E 49.64'
S40°32'59"E 53.98'
S38°36'40"E 54.36'
S34°54'52"E 52.47'
S34°53'05"E 51.88'
S32°40'58"E 48.79'
S36°19'29"E 49.08'
S33°43'25"E 55.59'
S29°59'07"E 52.71'
S30°42'04"E 49.34'
S30°43'08"E 50.44'
S30°09'04"E 50.93'
S29°33'39"E 50.29'
S29°40'24"E 50.25'
S29°12'19"E 49.82'
S30°01'48"E 48.04'
S32°55'22"E 182.76'
S25°55'39"E 314.88'

MATCHLINE
SEE SHEET 10

LEGEND

- EXTERIOR BOUNDARY
- INTERNAL BOUNDARY BETWEEN PARCELS TO BE CONSOLIDATED WITH THIS PLAT
- SECTION LINES
- EASEMENT LINE
- ZONE A FLOOD ZONE
- L1 EXTERIOR BOUNDARY TAG SEE SHEET 3
- ⊙ OIL & GAS WELL HEAD
- ● SET #5 REBAR WITH 1.5" ORANGE PLASTIC CAP, PLS 36561, KT ENG.

FOUND PIN LEGEND

- ○A FOUND #5 REBAR WITH 1.5" YELLOW PLASTIC CAP, LS 28283, ROCK CREEK
- ○B FOUND #5 REBAR WITH 1.5" ALUMINUM CAP, LS 25937, JOEL CROWE (SEE DETAIL)
- ○C FOUND #5 REBAR WITH 1.5" YELLOW PLASTIC CAP, PLS 13487
- ○D FOUND #5 REBAR
- ○E FOUND #3 REBAR
- ○F FOUND #4 REBAR WITH 1" BLUE PLASTIC CAP, PLS 38175, LAT40
- ○G FOUND 1" METAL PIPE
- ○H FOUND #4 REBAR
- ○I FOUND #5 REBAR WITH 1.5" ALUMINUM CAP, PLS 31161, SURVCON
- ○J FOUND #5 REBAR WITH 1.5" ORANGE PLASTIC CAP, NO MARKINGS
- ○K FOUND #5 REBAR WITH 1.5" YELLOW PLASTIC CAP, PLS 35591, NH SURVEY
- ○L FOUND 60D NAIL

N

240 0 120 240 480

SCALE: 1"= 240 ' HORIZ.

DATE SUBMITTED:	01.20.2025
REVISION NO.	DATE
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PREPARED FOR:
HSG LAND LLC
10450 E. 159TH COURT
BRIGHTON, CO 80602

SCALE:	JOB NO:	BY:
1" = 240'	0109-2207	BSS

SHEET 4 OF 13

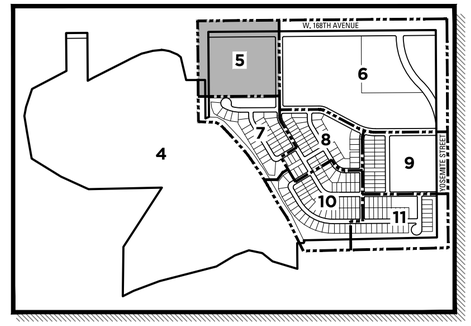
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PRELIMINARY PLAT

SELTZER HEIGHTS FILING NO.1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO



KEYMAP
NTS

NORTH QUARTER CORNER SECTION 4
FOUND 3.25" ALUMINUM CAPPED MONUMENT
IN RANGE BOX, LS NO. ILLEGIBLE

40.00'
"TIE"

60' R.O.W. DEDICATED BY THIS PLAT

30' PRESCRIPTIVE R.O.W.
NO RECORDING INFO FOUND

800.07'

ELECTRICAL UTILITY EASEMENT
RN 2019000035710
(TO REMAIN)

N89° 31' 38"E 2167.54'

25' WATERLINE EASEMENT
RN 2013000074187
(TO REMAIN)

8' IRRIGATION DITCH R.O.W.
BOOK 65, PAGE 559
(TO REMAIN)

744.90'

6' UE

20' ELECTRICAL UTILITY EASEMENT
RN 2019000061659
(TO REMAIN)

6' UE

15' OIL & GAS WATERLINE
EASEMENT / ROW
RN 2022000029681
(TO REMAIN)

C23

TRACT C
523,426 SF
OIL & GAS OPERATIONS AREA

NOTE:
ALL "SELTZER LD" WELLS ARE PRODUCING
AND PLOTTED PER ECMC RECORDS

N49°18'09"W
391.74'

N57°52'29"E
463.65'

250'

SELTZER LD #09-379HN
SELTZER LD #09-379HC
SELTZER LD #09-378HNX
SELTZER LD #09-378HN
SELTZER LD #09-376HN
SELTZER LD #09-376HC
SELTZER LD #09-375HNX
SELTZER LD #09-375HN
SELTZER LD #09-373HN
SELTZER LD #09-373HC
SELTZER LD #09-371HN

SELTZER LD #21-039HN
SELTZER LD #21-039HC
SELTZER LD #21-040HNX
SELTZER LD #21-037HN
SELTZER LD #21-036HN
SELTZER LD #21-036HC
SELTZER LD #21-034HNX
SELTZER LD #21-034HN
SELTZER LD #21-033HN
SELTZER LD #21-033HC
SELTZER LD #21-032HNX
SELTZER LD #21-032HN
SELTZER LD #21-031HC

OIL AND GAS WELL HEAD
SELTZER FARMS #4-2JI
STATUS: PLUGGED & ABANDONED
LOCATION PLOTTED PER ECMC RECORDS

MATCHLINE - SEE SHEET 5

WEST LINE OF THE NW QUARTER OF THE NE QUARTER SECTION 4
N00°27'04"W 1092.37'

TODD CREEK VILLAGE METROPOLITAN DISTRICT
RN 2013000074188

S00° 27' 04"E 436.34'

N00° 27' 04"W 964.30'

688.55'

10' ELECTRICAL
UTILITY EASEMENT
RN 2019000035711
(TO BE VACATED BY
SEPARATE
DOCUMENT)

8' WIDE DITCH EASEMENT
BOOK 65, PAGE 561
(TO BE VACATED BY SEPARATE DOCUMENT)

30' PIPELINE SUB-EASEMENT
RN 2018000025837 & RN 2020000061491
(TO REMAIN)

30' VALVE SITE
EASEMENT
RN 2018000034675

20' OIL & GAS EASEMENT/ROW AMENDMENT
RN 2019000016473
ORIGINAL AGREEMENT AT RN 2018000025834
(TO REMAIN)

50'X100' WORKOVER
SETBACK

S61°54'17"E
527.49'

S57°49'16"E
467.34'

S39°31'02"E
211.12'

S89° 40' 24"W 758.43'

6' UE

S00°19'36"E
888.50'

675.45'

ROAD A
80' ROW

80' ROW
40' 40'

MATCHLINE - SEE SHEET 6

MATCHLINE - SEE SHEET 7

LEGEND

UE	UTILITY EASEMENT
C#	CURVE TAG (REFER TO SHEET 12 FOR CURVE TAG TABLES)
RN	RECEPTION NUMBER
●	SET NO. 5 REBAR W/ 1.5" ORANGE CAP PLS 36561
○	FOUND PROPERTY PIN AS DESCRIBED ON SHEET 3
⊕	SECTION CORNERS AS DESCRIBED
◎	OIL AND GAS WELL HEAD
———	PLAT BOUNDARY
— — —	SHEET MATCHLINE
———	ADJOINER PARCEL BOUNDARIES / RIGHT OF WAY
—— — ——	SECTION LINE
—— — ——	STREET CENTERLINE
- - - - -	UTILITY EASEMENT
—— — ——	OIL AND GAS SETBACK
OG	OIL AND GAS FLOW LINE

N

60 0 30 60 120
SCALE: 1"= 60' HORIZ.

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BRIGHTON, CO 80602

SCALE:	JOB NO:	BY:
1" = 60'	0109-2207	BSS

SHEET 5 OF 13

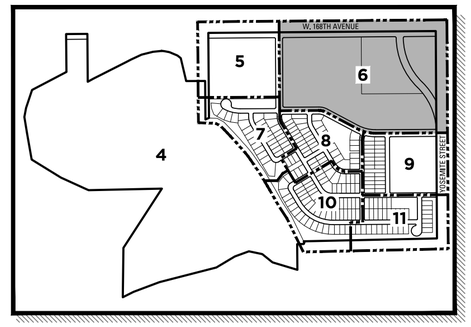
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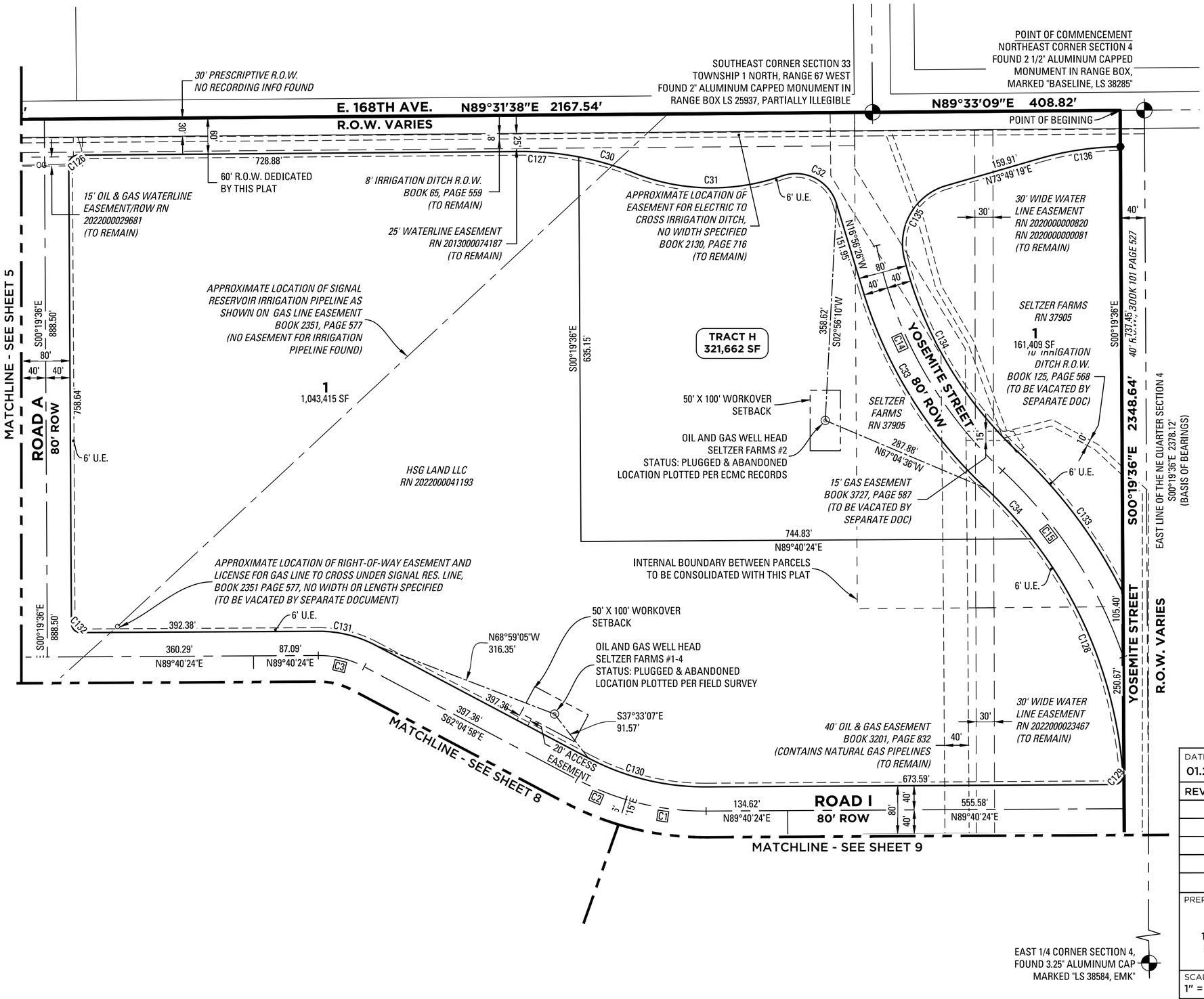
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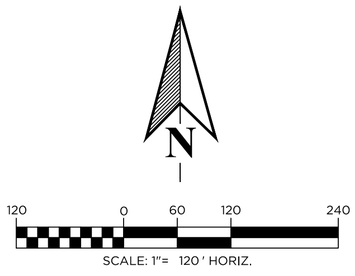


KEYMAP
NTS

LEGEND

- UE — UTILITY EASEMENT
- C# — CURVE TAG (REFER TO SHEET 12 FOR CURVE TAG TABLES)
- RN — RECEPTION NUMBER
- ● — SET NO. 5 REBAR W/ 1.5" ORANGE CAP PLS 36561
- ○ — FOUND PROPERTY PIN AS DESCRIBED ON SHEET 3
- ⊕ — SECTION CORNERS AS DESCRIBED
- ◎ — OIL AND GAS WELL HEAD
- PLAT BOUNDARY
- SHEET MATCHLINE
- ADJOINER PARCEL BOUNDARIES / RIGHT OF WAY
- SECTION LINE
- STREET CENTERLINE
- UTILITY EASEMENT
- OIL AND GAS SETBACK
- OG — OIL AND GAS FLOW LINE





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SCALE:	JOB NO:	BY:
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SHEET 6 OF 13

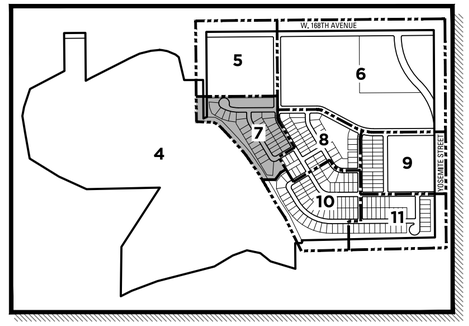
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PRELIMINARY PLAT

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LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO



KEYMAP
NTS

LEGEND

UE	UTILITY EASEMENT
C#	CURVE TAG (REFER TO SHEET 12 FOR CURVE TAG TABLES)
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	PLAT BOUNDARY
	SHEET MATCHLINE
	ADJOINER PARCEL BOUNDARIES / RIGHT OF WAY
	SECTION LINE
	STREET CENTERLINE
	UTILITY EASEMENT
	OIL AND GAS SETBACK
OG	OIL AND GAS FLOW LINE

10' ELECTRICAL UTILITY EASEMENT RN 20190000035711 (TO BE VACATED BY SEPARATE DOCUMENT)

MATCHLINE - SEE SHEET 5

MATCHLINE - SEE SHEET 4

TODD CREEK VILLAGE METROPOLITAN DISTRICT RN 20130000074188

TRACT A 4,744,819 SF

OIL & GAS EASEMENT/ROW RN 20200000061505 (TO REMAIN)

8' WIDE DITCH EASEMENT BOOK 65, PAGE 561 (TO BE VACATED BY SEPARATE DOCUMENT)

TRACT D 57,023 SF

ROAD A 80' ROW

MATCHLINE SEE SHEET 4

ROAD I 50' ROW

BLOCK 1

BLOCK 8

TRACT B 262,295 SF

TRACT A 4,744,819 SF

ROAD H 50' ROW

ROAD A 50' ROW

MATCHLINE - SEE SHEET 8

WEST LINE OF THE NW QUARTER OF THE NE QUARTER SECTION 4 N00°27'04"W 1092.37'

CENTER NORTH 1/16 CORNER SECTION 4 FOUND 2 1/2" ALUMINUM CAP STAMPED "LS 35591"

APPROXIMATE LOCATION OF SIGNAL RESERVOIR IRRIGATION PIPELINE AS SHOWN ON GAS LINE EASEMENT BOOK 2351, PAGE 577 (NO EASEMENT FOR IRRIGATION PIPELINE FOUND)

50' X 100' WORKOVER SETBACK

OIL AND GAS WELL HEAD SELTZER PP#4-7 STATUS: PLUGGED & ABANDONED LOCATION PLOTTED PER FIELD SURVEY

SCALE: 1"= 60' HORIZ.

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SHEET 7 OF 13

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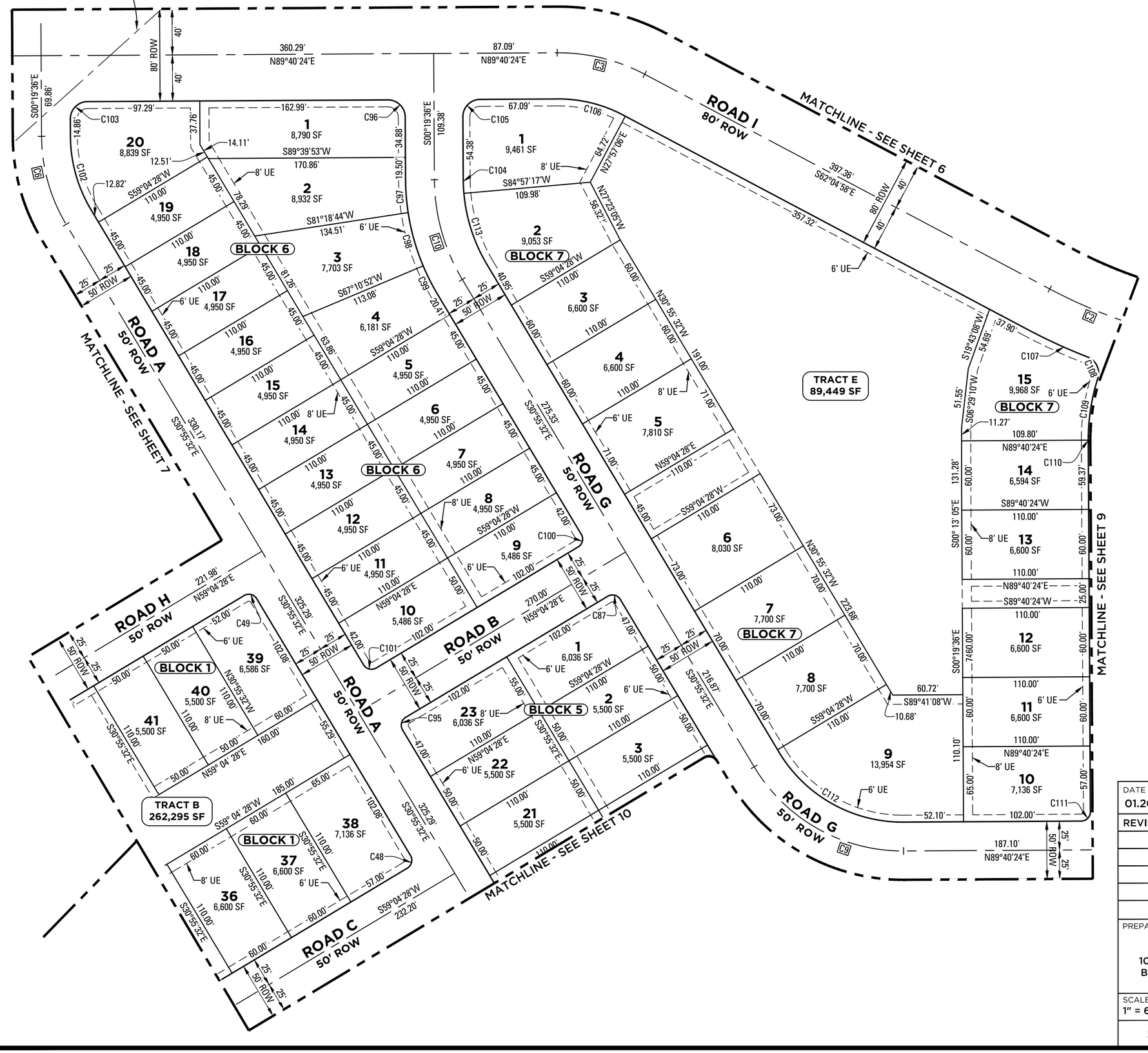
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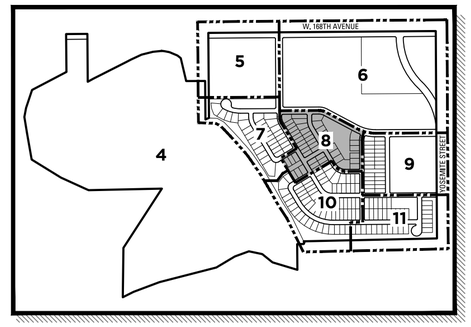
PRELIMINARY PLAT

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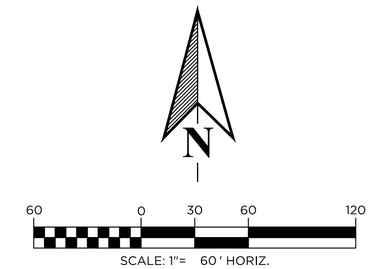
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COUNTY OF ADAMS, STATE OF COLORADO

APPROXIMATE LOCATION OF SIGNAL RESERVOIR IRRIGATION PIPELINE AS SHOWN ON GAS LINE EASEMENT BOOK 2351, PAGE 577 (NO EASEMENT FOR IRRIGATION PIPELINE FOUND)





KEYMAP
NTS



LEGEND

UE	UTILITY EASEMENT
C#	CURVE TAG (REFER TO SHEET 12 FOR CURVE TAG TABLES)
RN	RECEPTION NUMBER
●	SET NO. 5 REBAR W/ 1.5" ORANGE CAP PLS 36561
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⊕	SECTION CORNERS AS DESCRIBED
◎	OIL AND GAS WELL HEAD
———	PLAT BOUNDARY
— — —	SHEET MATCHLINE
———	ADJOINER PARCEL BOUNDARIES / RIGHT OF WAY
———	SECTION LINE
———	STREET CENTERLINE
———	UTILITY EASEMENT
———	OIL AND GAS SETBACK
——— OG ———	OIL AND GAS FLOW LINE

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SCALE:	JOB NO:	BY:
1" = 60'	0109-2207	BSS

SHEET 8 OF 13

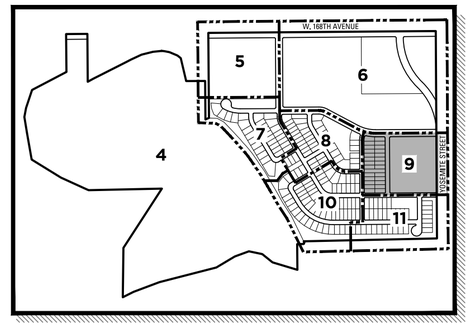
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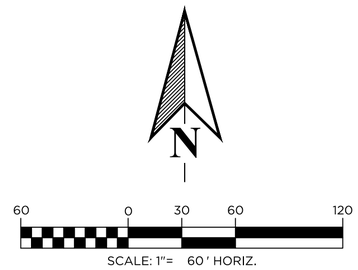
PRELIMINARY PLAT

SELTZER HEIGHTS FILING NO.1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO



KEYMAP
NTS



MATCHLINE - SEE SHEET 6

MATCHLINE - SEE SHEET 8

MATCHLINE - SEE SHEET 10

MATCHLINE - SEE SHEET 11

ROAD I 80' ROW — 134.62' N89°40'24"E — 555.58' N89°40'24"E

ROAD E 50' ROW — 319.37' N00°19'36"W — 305.00' N00°19'36"W

ROAD F 50' ROW — S00°19'36"E 702.56' — N00°19'36"W

ROAD D 50' ROW — 290.00' N89°40'24"E — 301.40' N89°40'24"E — 254.18' N89°40'24"E

YOSEMITE STREET — S00°19'36"E 2348.64' — R.O.W. VARIES — 40' R.O.W. BOOK 101 PAGE 527

EAST LINE OF THE NE QUARTER SECTION 4
S00°19'36"E 2378.12'
(BASIS OF BEARINGS)

1	6,496 SF	26	5,936 SF
2	5,400 SF	25	5,400 SF
3	5,400 SF	24	5,400 SF
4	5,400 SF	23	5,400 SF
5	5,400 SF	22	5,400 SF
6	5,400 SF	21	5,400 SF
7	5,400 SF	20	5,400 SF
8	5,400 SF	19	5,400 SF
9	5,400 SF	18	5,400 SF
10	5,400 SF	17	5,400 SF
11	5,400 SF	16	5,400 SF
12	5,400 SF	15	5,400 SF
13	5,986 SF	14	5,986 SF

BLOCK 4 (×2)

TRACT F
10,244 SF
N89° 40' 24"E 240.00'
S89° 40' 24"W 240.00'

LOT 1
338,116 SF
BLOCK 10
FUTURE DEVELOPMENT

40' OIL & GAS EASEMENT
BOOK 3201, PAGE 832
(CONTAINS NATURAL GAS PIPELINES)
(TO REMAIN)

30' WIDE WATER LINE EASEMENT
RN 2022000023467
(TO REMAIN)

10' IRRIGATION DITCH R.O.W.
BOOK 125, PAGE 568
(TO BE VACATED BY SEPARATE DOC)

LEGEND

UE	UTILITY EASEMENT
C#	CURVE TAG (REFER TO SHEET 12 FOR CURVE TAG TABLES)
RN	RECEPTION NUMBER
●	SET NO. 5 REBAR W/ 1.5" ORANGE CAP PLS 36561
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✣	SECTION CORNERS AS DESCRIBED
◎	OIL AND GAS WELL HEAD
———	PLAT BOUNDARY
— — —	SHEET MATCHLINE
———	ADJOINER PARCEL BOUNDARIES / RIGHT OF WAY
— — —	SECTION LINE
— – —	STREET CENTERLINE
- - - -	UTILITY EASEMENT
— - - —	OIL AND GAS SETBACK
—OG—	OIL AND GAS FLOW LINE

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SHEET 9 OF 13

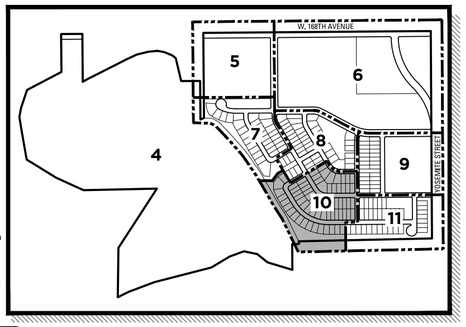
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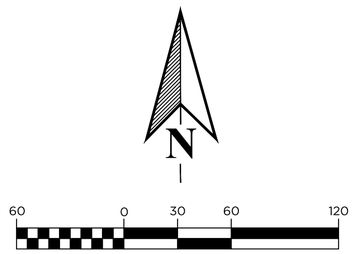
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RANGE 67 WEST OF THE 6TH P.M.,
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KEYMAP
NTS



MATCHLINE SEE SHEET 7

MATCHLINE - SEE SHEET 8

MATCHLINE SEE SHEET 8

MATCHLINE - SEE SHEET 11

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 11

ROAD C
50' ROW

ROAD D
50' ROW

ROAD G
50' ROW

BLOCK 1

BLOCK 3

BLOCK 5

TRACT B
262,295 SF

SIGNAL
RESERVOIR #2

MARCUS RESERVOIR

TODD CREEK VILLAGE
METROPOLITAN DISTRICT
RN 2010000052390
RN 2017000099326

TODD CREEK MEADOWS
RN C0731590

OIL & GAS PIPELINE EASEMENT
BOOK 4001 PAGE 717
(TO REMAIN)

8' WIDE DITCH EASEMENT
BOOK 65 AT PAGE 561
(TO BE VACATED BY SEPARATE
DOCUMENT)

32' PIPELINE EASEMENT
RN 2017000025842
(TO REMAIN)

18' IRRIGATION PIPELINE EASEMENT
FOR MARCUS RESERVOIR
RN 20051103001216190
(TO REMAIN)

30' OIL & GAS PIPELINE EASEMENT/ROW
RN 2018000025834 (TO REMAIN)

FOUND #5 REBAR WITH 1.5" ALUM. CAP, PLS 25937,
JOEL CROWE, SOUTH 0.30', NOT ACCEPTED,
USED FOR NORTH-SOUTH ALIGNMENT

NORTH LINE OF THE SE QUARTER SECTION 4 N88°45'09"E 2652.06'

S88° 45' 09"W 74.40'

S25° 55' 39"E 17.18'

S26° 31' 05"W 16.44'

S88° 45' 28"W 1509.46'

= TODD CREEK VILLAGE METROPOLITAN DISTRICT
RN 2010000052390

LEGEND

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SCALE:	JOB NO:	BY:
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SHEET 10 OF 13

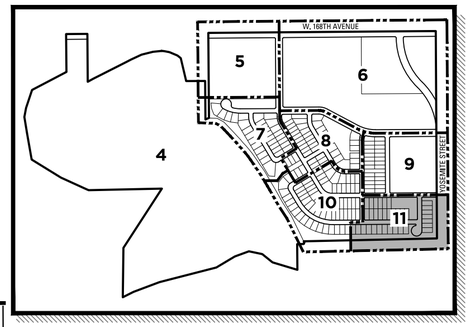
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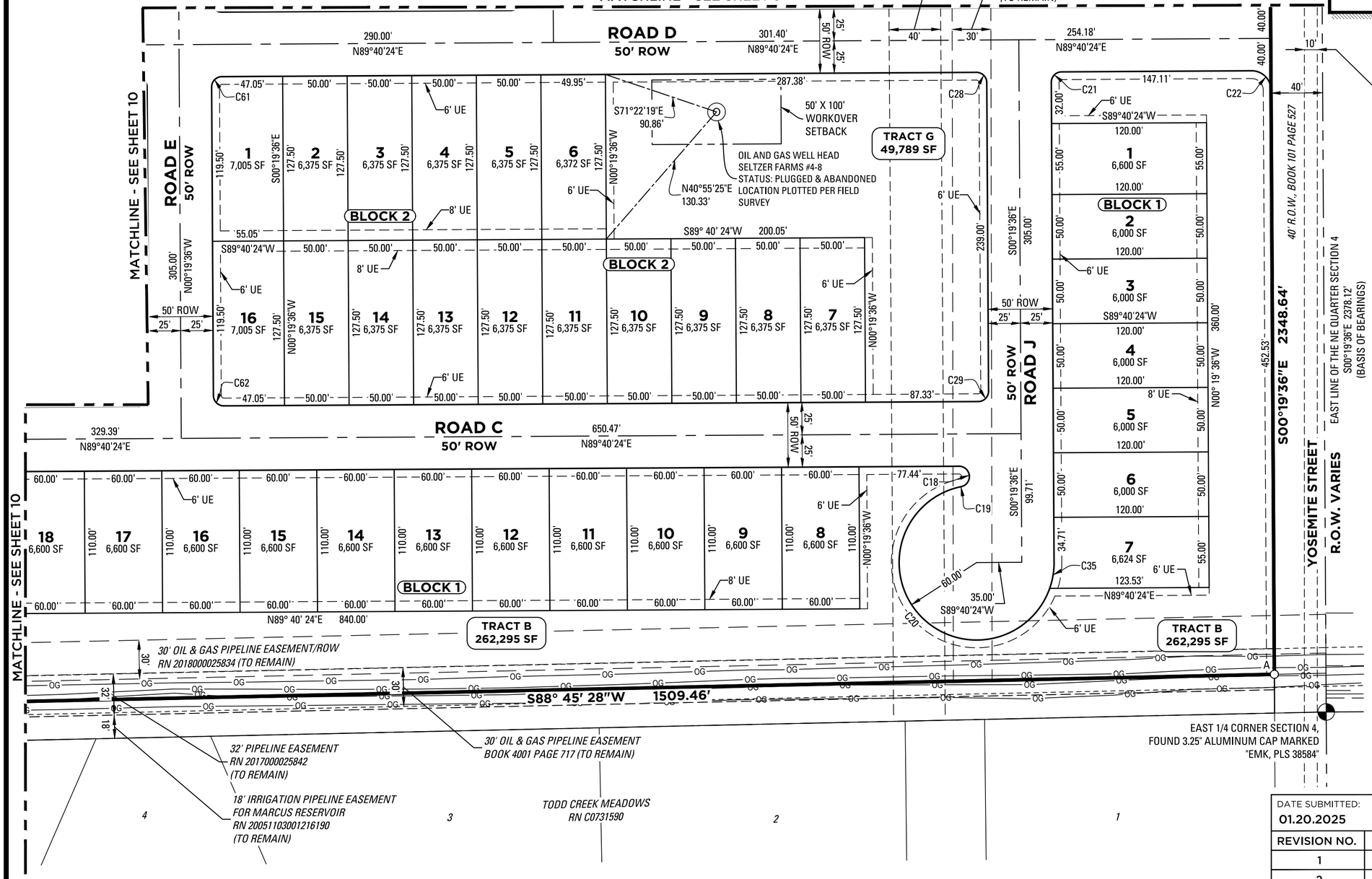
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SELTZER HEIGHTS FILING NO.1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO



KEYMAP
NTS



LEGEND

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C#	CURVE TAG (REFER TO SHEET 12 FOR CURVE TAG TABLES)
RN	RECEPTION NUMBER
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1" = 60'	0109-2207	BSS

SHEET 11 OF 13

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PRELIMINARY PLAT

SELTZER HEIGHTS FILING NO.1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO

CENTERLINE CURVE TABLE

CURVE #	DELTA	RADIUS	LENGHT	CHD BEARING	CHD LENGTH
C1	17°04'51"	450.00'	134.15'	S81°47'10"E	133.66'
C2	11°09'47"	450.00'	87.67'	S67°39'51"E	87.54'
C3	28°14'38"	160.00'	78.87'	S76°12'17"E	78.08'
C4	30°15'25"	350.00'	184.83'	S75°11'53"E	182.69'
C5	59°24'03"	150.00'	155.51'	S60°37'34"E	148.64'
C6	30°35'57"	150.00'	80.11'	S15°37'34"E	79.16'
C7	59°24'03"	445.00'	461.35'	S60°37'34"E	440.96'
C8	90°00'00"	57.80'	90.80'	S14°04'28"W	81.75'
C9	59°24'03"	150.00'	155.51'	S60°37'34"E	148.64'
C10	30°35'57"	170.00'	90.79'	S15°37'34"E	89.71'
C11	89°59'45"	57.98'	91.08'	S75°55'40"E	82.00'
C12	30°36'11"	149.96'	80.10'	S15°37'42"E	79.15'
C13	17°04'51"	150.00'	44.72'	N08°12'50"E	44.55'
C14	35°25'53"	700.00'	432.88'	S29°12'31"E	426.01'
C15	27°55'34"	760.00'	370.42'	S32°57'41"E	366.77'

TRACTS CURVE TABLE

CURVE #	DELTA	RADIUS	LENGTH	CHD BEARING	CHD LENGTH
C16	84°56'57"	60.00'	88.96'	S47°11'56"W	81.03'
C17	35°02'31"	58.00'	35.47'	N76°35'43"E	34.92'
C18	166°15'57"	8.00'	23.22'	S7°11'37"E	15.89'
C19	1°56'02"	28.00'	0.95'	S76°54'22"W	0.95'
C20	238°26'12"	60.00'	249.69'	S41°20'43"E	104.73'
C21	90°00'00"	8.00'	12.57'	N44°40'24"E	11.31'
C22	89°54'30"	15.01'	23.56'	N45°19'36"W	21.21'
C23	90°08'46"	15.00'	23.60'	S45°23'59"E	21.24'
C24	90°00'00"	15.00'	23.56'	S44°40'24"W	21.21'
C25	14°04'03"	325.00'	79.79'	N83°17'35"W	79.59'
C26	86°24'40"	28.00'	42.23'	N33°03'13"W	38.34'
C27	100°28'43"	60.00'	105.22'	N40°05'14"W	92.25'
C28	90°00'00"	8.00'	12.57'	S45°19'36"E	11.31'
C29	90°00'00"	8.00'	12.57'	S44°40'24"W	11.31'
C30	10°48'57"	500.00'	94.39'	N73°44'43"W	94.25'
C31	40°57'04"	350.00'	250.16'	N88°48'47"W	244.87'
C32	92°20'53"	70.00'	112.82'	N63°06'52"W	101.00'

J:\0109\FILING 1 HSG\SURVEY\PLAT\PRELIMINARY PLAT\DRAWINGS\PLAT SHEETS\2207-HSG-PRELIMINARY-PLAT-SHEETS.DWG

DATE SUBMITTED:
01.20.2025

REVISION NO.	DATE
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5	

PREPARED FOR:
HSG LAND LLC
10450 E. 159TH COURT
BRIGHTON, CO 80602

SCALE:	JOB NO:	BY:
1" = N/A	0109-2207	BSS

SHEET 12 OF 13

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

PRELIMINARY PLAT

SELTZER HEIGHTS FILING NO.1

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH,
RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO

LOTS CURVE TABLE

CURVE #	DELTA	RADIUS	LENGTH	CHD BEARING	CHD LENGTH
C35	19°45'47"	60.00'	20.70'	S9°33'18"W	20.59'
C36	5°07'37"	506.00'	45.28'	S87°34'00"E	45.26'
C37	7°08'13"	475.92'	59.28'	S81°11'35"E	59.24'
C38	7°08'13"	475.92'	59.28'	S73°57'58"E	59.24'
C39	7°08'13"	475.92'	59.28'	S66°44'21"E	59.24'
C40	7°08'13"	475.92'	59.28'	S59°30'44"E	59.24'
C41	7°08'13"	475.92'	59.28'	S52°17'07"E	59.24'
C42	7°08'13"	475.92'	59.28'	S45°03'30"E	59.24'
C43	7°08'13"	475.92'	59.28'	S37°49'53"E	59.24'
C44	4°18'57"	358.57'	27.01'	S32°34'18"E	27.00'
C45	22°24'02"	58.00'	22.68'	S19°48'27"E	22.53'
C46	55°57'37"	58.00'	56.65'	S19°22'22"W	54.42'
C47	11°43'17"	58.00'	11.87'	S53°12'49"W	11.84'
C48	89°24'23"	8.00'	12.48'	S14°22'27"W	11.25'
C49	89°24'23"	8.00'	12.48'	S76°13'32"E	11.25'
C50	54°57'29"	58.00'	55.63'	S58°24'17"E	53.53'
C51	0°25'12"	175.00'	1.28'	S30°42'57"E	1.28'
C52	23°14'13"	175.00'	70.97'	S18°53'18"E	70.49'
C53	6°56'32"	175.00'	21.20'	S3°47'39"E	21.19'
C54	90°00'00"	8.00'	12.57'	S45°19'36"E	11.31'
C55	2°51'41"	375.00'	18.73'	S88°53'45"E	18.73'
C56	10°16'26"	375.00'	67.24'	S82°19'42"E	67.15'
C57	9°09'42"	375.00'	59.96'	S72°36'38"E	59.90'
C58	7°57'36"	375.00'	52.10'	S64°02'59"E	52.06'
C59	7°31'58"	60.00'	7.89'	S56°18'12"E	7.88'
C60	57°15'40"	60.00'	59.96'	S23°54'23"E	57.50'
C61	90°00'00"	8.00'	12.57'	N44°40'24"E	11.31'
C62	90°00'00"	8.00'	12.57'	N45°19'36"W	11.31'
C63	89°24'23"	8.00'	12.48'	S76°13'32"E	11.25'
C64	0°36'01"	175.00'	1.83'	N31°13'33"W	1.83'
C65	14°24'17"	175.00'	44.00'	N38°43'42"W	43.88'
C66	14°25'25"	175.00'	44.05'	N53°08'33"W	43.94'
C67	14°26'38"	175.00'	44.12'	N67°34'35"W	44.00'
C68	14°16'54"	175.00'	43.62'	N81°56'21"W	43.51'
C69	1°14'48"	175.00'	3.81'	S89°42'12"E	3.81'

LOTS CURVE TABLE

CURVE #	DELTA	RADIUS	LENGTH	CHD BEARING	CHD LENGTH
C70	90°00'00"	8.00'	12.57'	S45°19'36"E	11.31'
C71	90°00'00"	8.00'	12.57'	S44°40'24"W	11.31'
C72	2°08'59"	420.00'	15.76'	N89°15'06"W	15.76'
C73	10°34'30"	420.00'	77.52'	S82°53'22"E	77.41'
C74	9°42'29"	420.00'	71.16'	S72°44'52"E	71.08'
C75	9°45'22"	420.00'	71.52'	S63°00'57"E	71.43'
C76	9°43'48"	420.00'	71.32'	S53°16'22"E	71.24'
C77	9°43'33"	420.00'	71.29'	S43°32'41"E	71.21'
C78	7°45'22"	420.00'	56.86'	S34°48'13"E	56.81'
C79	90°00'00"	33.00'	51.84'	N14°04'28"E	46.67'
C80	17°04'51"	125.00'	37.26'	N8°12'50"E	37.13'
C81	94°41'11"	15.43'	25.50'	N54°14'53"E	22.69'
C82	11°19'28"	490.15'	96.88'	S83°27'11"E	96.72'
C83	1°12'48"	488.58'	10.35'	S89°43'05"E	10.35'
C84	90°00'00"	15.00'	23.56'	S45°19'36"E	21.21'
C85	90°00'00"	8.00'	12.57'	S44°40'24"W	11.31'
C86	90°00'00"	8.00'	12.57'	N45°19'36"W	11.31'
C87	90°00'00"	8.00'	12.57'	S75°55'32"E	11.31'
C88	4°16'26"	175.00'	13.05'	S33°03'46"E	13.05'
C89	19°03'04"	175.00'	58.19'	S44°43'30"E	57.92'
C90	18°57'44"	175.00'	57.92'	S63°43'54"E	57.65'
C91	17°06'50"	175.00'	52.27'	S81°46'11"E	52.08'
C92	90°00'00"	8.00'	12.57'	S45°19'36"E	11.31'
C93	90°00'00"	8.00'	12.57'	S44°40'24"W	11.31'
C94	59°24'03"	125.00'	129.59'	N60°37'34"W	123.87'
C95	90°00'00"	8.00'	12.57'	N14°04'28"E	11.31'
C96	90°00'00"	15.00'	23.56'	S45°19'36"E	21.21'
C97	8°21'40"	195.00'	28.46'	S4°30'26"E	28.43'
C98	14°07'52"	195.00'	48.09'	S15°45'12"E	47.97'
C99	8°06'25"	195.00'	27.59'	S26°52'20"E	27.57'
C100	90°00'00"	8.00'	12.57'	S14°04'28"W	11.31'
C101	90°00'00"	8.00'	12.57'	N75°55'32"W	11.31'
C102	30°35'57"	125.00'	66.76'	N15°37'34"W	65.97'
C103	90°00'00"	15.00'	23.56'	N44°40'24"E	21.21'
C104	4°43'56"	145.00'	11.98'	S2°41'34"E	11.97'

LOTS CURVE TABLE

CURVE #	DELTA	RADIUS	LENGTH	CHD BEARING	CHD LENGTH
C105	90°00'00"	15.00'	23.56'	S44°40'24"W	21.21'
C106	28°14'38"	120.00'	59.15'	N76°12'17"W	58.56'
C107	6°37'12"	490.00'	56.61'	S65°23'34"E	56.58'
C108	85°27'25"	15.00'	22.37'	S25°58'27"E	20.36'
C109	15°34'56"	200.57'	54.55'	S8°47'21"W	54.38'
C110	2°23'35"	14.98'	0.63'	S0°19'36"E	0.63'
C111	90°00'00"	8.00'	12.57'	S44°40'24"W	11.31'
C112	59°24'03"	125.00'	129.59'	S60°37'34"E	123.87'
C113	25°52'01"	145.00'	65.46'	S17°59'32"E	64.91'
C114	90°00'00"	15.00'	23.56'	S45°19'36"E	21.21'
C115	5°36'11"	175.00'	17.11'	S3°07'42"E	17.11'
C116	20°17'07"	175.00'	61.96'	S16°04'21"E	61.64'
C117	4°42'38"	175.00'	14.39'	S28°34'14"E	14.38'
C118	90°00'00"	8.00'	12.57'	S14°04'28"W	11.31'
C119	90°00'00"	33.00'	51.84'	N75°55'32"W	46.67'
C120	30°35'57"	125.00'	66.76'	N15°37'34"W	65.97'
C121	90°00'00"	8.00'	12.57'	N44°40'24"E	11.31'
C122	90°00'00"	15.00'	23.56'	N44°40'24"E	21.21'
C123	90°00'00"	15.00'	23.56'	S45°19'36"E	21.21'
C124	90°00'00"	15.00'	23.56'	S44°40'24"W	21.21'
C125	90°00'00"	8.00'	12.57'	N45°19'36"W	11.31'
C126	89°51'14"	15.00'	23.52'	N44°36'01"E	21.19'
C127	11°19'10"	500.00'	98.78'	S84°48'47"E	98.62'
C128	33°42'49"	720.00'	423.66'	S21°03'31"E	417.57'
C129	93°52'30"	15.00'	24.58'	S42°44'09"W	21.92'
C130	28°14'38"	410.00'	202.11'	N76°12'17"W	200.07'
C131	28°14'38"	200.00'	98.59'	N76°12'17"W	97.59'
C132	90°00'00"	15.00'	23.56'	N45°19'36"W	21.21'
C133	20°45'21"	800.00'	289.81'	N36°32'47"W	288.22'
C134	32°48'29"	660.00'	377.92'	N30°31'13"W	372.78'
C135	87°56'17"	100.00'	153.48'	N29°51'10"E	138.85'
C136	15°34'29"	500.00'	135.92'	N81°36'33"E	135.50'

DATE SUBMITTED:
01.20.2025

REVISION NO.	DATE
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PREPARED FOR:

HSG LAND LLC

10450 E. 159TH COURT
BRIGHTON, CO 80602

SCALE:	JOB NO:	BY:
1" = N/A	0109-2207	BSS

SHEET 13 OF 13

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\0109\FILING 1 HSG\SURVEY\PLAT\PRELIMINARY PLAT\DRAWINGS\PLAT SHEETS\2207-HSG-PRELIMINARY-PLAT-SHEETS.DWG

KT ENGINEERING
ENGINEERS • SURVEYORS

June 3, 2024
Adam County Planning Department
4430 S Adams County Parkway
Brighton, Colorado 80601

RE: Seltzer Heights Filing No. 1 – Fire protection

The proposed Seltzer Heights Filing No. 1 project is within the service boundary of the Brighton Fire Recuse District.

Regards,
Ken Toland, PE
KT Engineering, LLC

LAND TITLE GUARANTEE COMPANY

Date: January 13, 2025

Subject: Attached Title Policy/Guarantee

Enclosed please find your product relating to the property located at SELTZER HEIGHTS FILING NO. 1, BRIGHTON, CO 80602.

If you have any inquiries or require further assistance, please contact SCOTT CIESLEWICZ at (303) 850-4189 or scieslewicz@ltgc.com

Chain of Title Documents:

Adams county recorded 08/03/1994 under reception no. C0004956

Adams county recorded 05/06/2003 under reception no. C1138476

Adams county recorded 12/02/2015 under reception no. 2015000100601

Adams county recorded 04/01/2016 under reception no. 2016000024298

Adams county recorded 11/09/2017 under reception no. 2017000099326

Adams county recorded 09/27/2018 under reception no. 2018000078743

Adams county recorded 05/06/2022 under reception no. 2022000041193

Adams county recorded 12/09/2024 under reception no. 2024000068378

Property Information Binder

CONDITIONS AND STIPULATIONS

1. Definition of Terms

The following terms when used in this Binder mean:

(a) "Land": The land described, specifically or by reference, in this Binder and improvements affixed thereto which by law constitute real property;

(b) "Public Records"; those records which impart constructive notice of matters relating to said land;

(c) "Date": the effective date;

(d) "the Assured": the party or parties named as the Assured in this Binder, or in a supplemental writing executed by the Company;

(e) "the Company" means Old Republic National Title Insurance Company, a Minnesota stock company.

2. Exclusions from Coverage of this Binder

The company assumes no liability including cost of defense by reason of the following:

(a) Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; taxes and assessments not yet due or payable and special assessments not yet certified to the Treasurer's office.

(b) Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.

(c) Title to any property beyond the lines of the Land, or title to streets, roads, avenues, lanes, ways or waterways on which such land abuts, or the right to maintain therein vaults, tunnels, ramps, or any other structure or improvement; or any rights or easements therein unless such property, rights or easements are expressly and specifically set forth in said description.

(d) Mechanic's lien(s), judgment(s) or other lien(s).

(e) Defects, liens, encumbrances, adverse claims or other matters: (a) created, suffered or agreed to by the Assured;(b) not known to the Company, not recorded in the Public Records as of the Date, but known to the Assured as ofthe Date; or (c) attaching or creating subsequent to the Date.

3. Prosecution of Actions

1. The Company shall have the right at its own costs to institute and prosecute any action or proceeding or do any other act which in its opinion may be necessary or desirable to establish or confirm the matters herein assured; and the Company may take any appropriate action under the terms of this Binder, whether or not it shall be liable thereunder and shall not thereby concede liability or waive any provision hereof.
2. In all cases where the Company does not institute and prosecute any action or proceeding, the Assured shall permit the Company to use, at its option, the name of the Assured for this purpose. Whenever requested by the Company, the Assured shall give the Company all reasonable aid in prosecuting such action or proceeding, and the Company shall reimburse the Assured for any expense so incurred.

4. Notice of Loss - Limitation of Action

A statement in writing of any loss or damage for which it is claimed the Company is liable under this Binder shall be furnished to the Company within sixty days after such loss or damage shall have been determined, and no right of action shall accrue to the Assured under this Binder until thirty days after such statement shall have been furnished, and no recovery shall be had by the Assured under this Binder unless action shall be commenced thereon with two years after expiration of the thirty day period. Failure to furnish the statement of loss or damage or to commence the action within the time herinbefore specified, shall be conclusive bar against maintenance by the Assured of any action under this Binder.

5. Option to Pay, Settle or Compromise Claims

The Company shall have the option to pay, settle or compromise for or in the name of the Assured any claim which could result in loss to the Assured within the coverage of this Binder, or to pay the full amount of this Binder. Such payment or tender of payment of the full amount of the Binder shall terminate all liability of the Company hereunder.

6. Limitation of Liability - Payment of Loss

(a) The liability of the Company under this Binder shall be limited to the amount of actual loss sustained by the Assured because of reliance upon the assurances herein set forth, but in no event shall the liability exceed the amount of the liability stated on the face page hereof.

(b) The Company will pay all costs imposed upon the Assured in litigation carried on by the Company for the Assured, and all costs and attorneys' fees in litigation carried on by the Assured with the written authorization of the Company.

(c) No claim for loss or damages shall arise or be maintainable under this Binder (1) if the Company after having received notice of any alleged defect, lien or encumbrance not shown as an Exception or excluded herein removes such defect, lien or encumbrance within a reasonable time after receipt of such notice, or (2) for liability voluntarily assumed by the Assured in settling any claim or suit without written consent of the Company.

(d) All payments under this Binder, except for attorney's fees as provided for in paragraph 6(b) thereof, shall reduce the amount of the liability hereunder pro tanto, and no payment shall be made without producing this Binder or an acceptable copy thereof for endorsement of the payment unless the Binder be lost or destroyed, in which case proof of the loss or destruction shall be furnished to the satisfaction of the Company.

(e) When liability has been definitely fixed in accordance with the conditions of this Binder, the loss or damage shall be payable within thirty days thereafter.

7. Subrogation Upon Payment or Settlement

Whenever the Company shall have settled a claim under this Binder, all right of subrogation shall vest in the Company unaffected by any act of the Assured, and it shall be subrogated to and be entitled to all rights and remedies which the Assured would have had against any person or property in respect to the claim had this Binder not been issued. If the payment does not cover the loss of the Assured, the Company shall be subrogated to the rights and remedies in the proportion which the payment bears to the amount of said loss. The Assured, if requested by the Company, shall transfer to the Company all rights and remedies against any person or property necessary in order to perfect the right of subrogation, and shall permit the Company to use the name of the Assured in any transaction or litigation involving the rights or remedies.

8. Binder Entire Contract

Any action or actions or rights of action that the Assured may have or may bring against the Company arising out of the subject matter hereof must be based on the provisions of this Binder. No provision or condition of this Binder can be waived or changed except by a writing endorsed or attached hereto signed by the President, a Vice President, the Secretary, an Assistant Secretary or other validating officer of the Company.

9. Notices. Where Sent

All notices required to be given the Company and any statement in writing required to be furnished the Company shall be addressed to it at 400 Second Avenue South, Minneapolis, Minnesota 55401, (612) 371-1111.

10. Arbitration

Unless prohibited by applicable law, either the Company or the insured may demand arbitration pursuant to the Title Insurance Arbitration Rules of the American Arbitration Association.

ANTI-FRAUD STATEMENT: Pursuant to CRS 10-1-128(6)(a), it is unlawful to knowingly provide false, incomplete or misleading facts or information to an insurance company for the purpose of defrauding or attempting to defraud the company. Penalties may include imprisonment, fines, denial of insurance and civil damages. Any insurance company or agent of an insurance company who knowingly provides false, incomplete, or misleading facts or information to a policyholder or claimant for the purpose of defrauding or attempting to defraud the policyholder or claimant with regard to a settlement or award payable from insurance proceeds shall be reported to the Colorado division of insurance within the department of regulatory agencies.

This anti-fraud statement is affixed and made a part of this policy.

Issued by:
Land Title Guarantee Company
3033 East First Avenue Suite 600
Denver, Colorado 80206
303-321-1880

Craig B. Rants, Senior Vice President

OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY
A Stock Company
1408 North Westshore Blvd., Suite 900, Tampa, Florida 33607
(612) 371-1111 *www.oldrepublictitle.com*

By _____ President

Attest _____ Secretary

AMERICAN LAND TITLE ASSOCIATION

Old Republic National Title Insurance Company

PROPERTY INFORMATION BINDER

THIS POLICY IS ISSUED IN LIEU OF POLICY NO. PIB70842010.27002325 WHICH IS HEREBY CANCELLED
Order Number: RND70842010 **Policy No.:** PIB70842010.27955509

Liability: $50,000.00
Fee: $0.00

Subject to the exclusions from coverage, the limits of liability and other provisions of the Conditions and Stipulations hereto annexed and made a part of this Binder,

OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY a Corporation, herein called the Company,

GUARANTEES

EQUINOX LAND GROUP

Herein called the Assured, against loss, not exceeding the liability amount stated above, which the assured shall sustain by reason of any incorrectness in the assurance which the Company hereby gives that, according to the public records as of

January 07, 2025 at 5:00 P.M.

1. Title to said estate or interest at the date hereof is vested in:

SELTZER FARMS INVESTMENT LLC, A COLORADO LIMITED LIABILITY COMPANY; TODD CREEK VILLAGE METROPOLITAN DISTRICT, A QUASI-MUNICIPAL CORPORATION AND POLITICAL SUBDIVISION OF THE STATE OF COLORADO; AND HSG LAND LLC, A COLORADO LIMITED LIABILITY COMPANY, AS THEIR INTERESTS MAY APPEAR

2. The estate or interest in the land hereinafter described or referred to covered by this Binder :

FEE SIMPLE

3. The Land referred to in this Binder is described as follows:

A PARCEL OF LAND LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS: BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST 1/4 OF SECTION 4 BEING S 00°19'36" E AND MONUMENTED AS FOLLOWS:

-NORTHEAST CORNER SECTION 4, BEING A FOUND 3.25" ALUMINUM CAP IN RANGE BOX MARKED “BASELINE, LS 38285”

-EAST QUARTER CORNER SECTION 4, BEING A FOUND 3.25" ALUMINUM CAP MARKED “EMK, PLS 38584”

COMMENCING AT THE NORTHEAST CORNER OF SECTION 4;

THENCE S 89°33'09" W ALONG THE NORTH LINE OF THE NORTHEAST 1/4 OF SAID SECTION 4 A DISTANCE

OF 40.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF YOSEMITE STREET BEING AN EXCEPTION RECORDED IN BOOK 1 AT PAGE 527 AND THE EXTENSION THEREOF AND THE POINT OF BEGINNING;

THENCE S 00°19'36" E ALONG SAID WESTERLY RIGHT-OF-WAY LINE A DISTANCE OF 2348.64 FEET TO A POINT ON THE NORTHERLY BOUNDARY OF THAT PARCEL OF LAND RECORED AT RECEPTION NO. 2010000052390;

THENCE ALONG SAID PARCEL OF LAND THE FOLLOWING THREE (3) COURSES:

1) S 88°45'28 W A DISTANCE OF 1509.46 FEET;
2) S 25°55'39" E A DISTANCE OF 17.18 FEET;
3) S 26°31'05" W A DISTANCE OF 16.44 FEET TO A POINT ON THE NORTHERLY BOUNDARY OF TODD CREEK MEADOWS SUBDIVISION, A SUBDIVISION RECORDED AT RECEPTION NO.C0731590;

THENCE S 88°45'09" W ALONG SAID NORTHERLY BOUNDARY A DISTANCE OF 74.40 FEET TO A POINT ON THE EASTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. C1138476;

THENCE ALONG SAID EASTERLY, AND SOUTHERLY BOUNDARY OF SAID PARCEL OF LAND AND THE EXTENSION THEREOF THE FOLLOWING SEVEN (7) COURSES:

1) S 00°30'00" E A DISTANCE OF 291.28 FEET;
2) N 73°15'18" W A DISTANCE OF 293.85 FEET;
3) N 51°17'25" W A DISTANCE OF 149.44 FEET;
4) N 78°17'25" W A DISTANCE OF 154.42 FEET;
5) S 70°02'35" W A DISTANCE OF 169.36 FEET;
6) S 59°09'35" W A DISTANCE OF 244.08 FEET;
7) S 75°34'18" W A DISTANCE OF 665.00 FEET TO A POINT ON THE EASTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. C1138476 AND SHOWN ON A SURVEY BY BRIAN THOMAS BRINKMAN, PLS 38175 DATED 6-29-11 RECORDED AT RECEPTION NO. 2011- 102;

THENCE ALONG SAID EASTERLY BOUNDARY OF SAID SURVEY RECORDED AT RECEPTION NO. 2011-102 THE FOLLOWING FOURTEEN (14) COURSES:

1) S 69°25'57" W A DISTANCE OF 314.14 FEET;
2) S 63°15'15" W A DISTANCE OF 135.49 FEET;
3) N 00°42'53" E A DISTANCE OF 559.19 FEET;
4) N 32°57'40" E A DISTANCE OF 800.14 FEET;
5) S 88°46'03" W A DISTANCE OF 830.04 FEET;
6) N 66°07'13" W A DISTANCE OF 53.12 FEET;
7) N 65°25'03" W A DISTANCE OF 290.82 FEET;
8) N 58°20'21" W A DISTANCE OF 389.89 FEET;
9) N 09°57'07" W A DISTANCE OF 301.16 FEET;
10) N 09°22'50" W A DISTANCE OF 187.79 FEET;
11) N 10°47'50" E A DISTANCE OF 103.98 FEET;
12) N 18°17'18" E A DISTANCE OF 214.81 FEET;
13) N 62°21'47" E A DISTANCE OF 439.90 FEET;
14) N 00°31'50" W A DISTANCE OF 428.97 FEET TO A POINT ON THE NORTH LINE OF THE NORTHWEST 1/4 OF SAID SECTION 4;

THENCE N 89°32'13" E ALONG SAID NORTH LINE A DISTANCE OF 241.08 FEET TO A POINT ON THE WESTERLY BOUNDARY OF AN AGREEMENT TO RESOLVE DISPUTED BOUNDARY LINE RECORDED AT RECEPTION NO. 2017000099326;

THENCE ALONG SAID AGREEMENT THE FOLLOWING SEVENTEEN (17) COURSES:

1) S 00°24'31" E A DISTANCE OF 542.45 FEET;
2) N 61°21'33" E A DISTANCE OF 75.99 FEET;
3) N 63°03'28" E A DISTANCE OF 101.27 FEET;
4) N 63°18'15" E A DISTANCE OF 97.13 FEET;
5) N 63°03'23" E A DISTANCE OF 120.44 FEET;
6) N 63°17'02" E A DISTANCE OF 100.72 FEET;
7) N 62°28'30" E A DISTANCE OF 56.87 FEET;
8) N 65°01'48" E A DISTANCE OF 131.55 FEET;
9) N 75°57'26" E A DISTANCE OF 131.79 FEET;
10) N 84°04'41" E A DISTANCE OF 99.05 FEET;
11) S 84°31'07" E A DISTANCE OF 26.00 FEET;
12) S 79°17'18" E A DISTANCE OF 63.94 FEET;
13) S 67°17'01" E A DISTANCE OF 98.25 FEET;
14) S 51°09'19" E A DISTANCE OF 47.50 FEET;
15) S 13°28'48" E A DISTANCE OF 154.06 FEET;
16) S 13°09'42" E A DISTANCE OF 112.86 FEET;
17) N 89°38'47" E A DISTANCE OF 214.92 FEET TO A POINT ON THE WESTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. 2013000074188;

THENCE ALONG SAID WESTERLY, SOUTHERLY AND EASTERLY BOUNDARY OF SAID PARCEL OF LAND THE FOLLOWING FOUR (4) COURSES:

1) S 00°27'04" E A DISTANCE OF 436.34 FEET;
2) N 65°32'32" E A DISTANCE OF 39.58 FEET;
3) S 87°43'24" E A DISTANCE OF 3.84 FEET;
4) N 00°27'04" W A DISTANCE OF 964.30 FEET TO A POINT ON SAID NORTH LINE OF THE NORTHEAST 1/4 OF SAID SECTION 4;

THENCE N 89°31'38" E ALONG SAID NORTH LINE A DISTANCE OF 2167.54 FEET TO THE SOUTHEAST CORNER OF SECTION 33, TOWNSHIP 1 NORTH, RANGE 67 WEST BEING AN ANGLE POINT ON SAID NORTH LINE OF THE NORTHEAST 1/4 OF SECTION 4;

THENCE N 89°33'09" E CONTINUING ALONG SAID NORTH LINE OF THE NORTHEAST 1/4 OF SECTION 4 A DISTANCE OF 408.82 FEET TO THE POINT OF BEGINNING,

COUNTY OF ADAMS, STATE OF COLORADO.

4. The following documents affect the land:

1. EXISTING LEASES AND TENANCIES, IF ANY.
2. ANY INCREASE OR DECREASE IN THE AREA OF THE LAND AND ANY ADVERSE CLAIM TO ANY PORTION OF THE LAND WHICH HAS BEEN CREATED BY OR CAUSED BY ACCRETION OR RELICTION, WHETHER NATURAL OR ARTIFICIAL; AND THE EFFECT OF THE GAIN OR LOSS OF AREA BY ACCRETION OR RELICTION UPON THE MARKETABILITY OF THE TITLE OF THE LAND.
3. RIGHTS OF THE PUBLIC IN AND TO THE USE OF EAST 168TH AVENUE
4. RIGHTS AND EASEMENTS FOR NAVIGATION AND FISHERY IN FAVOR OF THE PUBLIC WHICH MAY EXIST OVER THAT PORTION OF SAID LAND LYING BENEATH THE WATER OF SIGNAL DITCH AND THE SIGNAL RESERVIORS.
5. ANY RIGHTS OR INTERESTS OF THIRD PARTIES WHICH EXIST OR ARE CLAIMED TO EXIST IN AND OVER THE PRESENT AND PAST BED, BANKS OR WATERS OF SIGNAL DITCH AND THE SIGNAL RESERVOIRS.

6. RIGHT OF PROPRIETOR OF A VEIN OR LODE TO EXTRACT AND REMOVE HIS ORE THEREFROM SHOULD THE SAME BE FOUND TO PENETRATE OR INTERSECT THE PREMISES AS RESERVED IN UNITED STATES PATENT RECORDED MARCH 25, 1902, IN BOOK A67 AT PAGE 407.
7. EASEMENT GRANTED TO THE SIGNAL RESERVOIR AND IRRIGATION COMPANY BY INSTRUMENT RECORDED SEPTEMBER 13, 1918 IN BOOK 65 AT PAGE 558.
8. EASEMENTS GRANTED TO THE SIGNAL RESERVOIR AND IRRIGATION COMPANY BY INSTRUMENTS RECORDED SEPTEMBER 13, 1918 IN BOOK 65 AT PAGE 559 AND RECORDED SEPTEMBER 13, 1928 IN BOOK 89 AT PAGES 495 AND 496.
9. RIGHTS OF INGRESS AND EGRESS IN AND FROM THE SAID EASEMENT OR RIGHT OF WAY FOR THE PURPOSE OF CONSTRUCTING, MAINTAINING, OR REPAIRING A DITCH AS EVIDENCED BY QUIT CLAIM DEED RECORDED SEPTEMBER 13, 1918 IN BOOK 65 AT PAGE 561.
10. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RIGHT OF WAY DEED RECORDED MAY 09, 1924 UNDER RECEPTION NO. 101711.
11. ANY TAX, LIEN, FEE, OR ASSESSMENT BY REASON OF INCLUSION OF SUBJECT PROPERTY IN THE WEST ADAMS COUNTY SOIL CONSERVATION DISTRICT, AS EVIDENCED BY INSTRUMENT RECORDED NOVEMBER 14, 1946, IN BOOK 327 AT PAGE 315.
12. RESERVATION OF AN UNDIVIDED 1/2 OF ALL MINERALS AND MINERALS RIGHTS IN, ON OR UDERLYING SAID LAND, AS SET FORTH IN INSTRUMENT RECORDED JULY 20, 1948 IN BOOK 360 AT PAGE 474, AND ANY AND ALL ASSIGNMENTS THEREOF OR INTERESTS THEREIN.
13. ANY TAX, LIEN, FEE, OR ASSESSMENT BY REASON OF INCLUSION OF SUBJECT PROPERTY IN THE BRIGHTON AREA FIRE POTECTION DISTRICT, AS EVIDENCED BY INSTRUMENT RECORDED NOVEMBER 27, 1961, IN BOOK 951 AT PAGE 205.
14. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN EASEMENT RECORDED JANUARY 02, 1964 IN BOOK 1122 AT PAGE 330.
15. OIL AND GAS LEASES RECORDED JUNE 9, 1970 IN BOOK 1604 AT PAGE 126, JULY 17, 1970 IN BOOK 1614 AT PAGE 158, AUGUST 4, 1970 IN BOOK 1618 AT PAGE 71, APRIL 24, 1970 IN BOOK 1619 AT PAGE 411, SEPTEMBER 9, 1970 IN BOOK 1627 AT PAGE 131, FEBRUARY 9, 1971 IN BOOK 1666 AT PAGE 308, FEBRUARY 4, 1972 IN BOOK 1779 AT PAGE 447, AUGUST 23, 1973 IN BOOK 1884 AT PAGE 566, APRIL 9, 1975 IN BOOK 1986 AT PAGE 684, MAY 20, 1975 IN BOOK 1995 AT PAGE 2, JUNE 4, 1975 IN BOOK 1997 AT PAGE 875 AND OCTOBER 6, 1982 IN BOOK 2683 AT PAGE 824, AND ANY AND ALL ASSIGNMENTS THEREOF, OR INTEREST THEREIN.

    NOTE: THE PRESENT OWNERSHIP OF THE LEASEHOLD CREATED BY SAID LEASE AND OTHER MATTERS AFFECTING THE INTEREST OF THE LESSEE ARE NOT SHOWN HEREIN.
16. RESERVATION OF ONE-HALF OF ALL EXISTING OIL, GAS AND MINERAL RIGHTS, RESERVED BY WARRANTY DEED RECORDED OCTOBER 25, 1974 IN BOOK 1960 AT PAGE 847, AND ANY AND ALL ASSIGNMENTS THEREOF OR INTERESTS THEREIN.
17. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH IN NOTICE AS TO ROAD RECORDED OCTOBER 25, 1974 IN BOOK 1960 AT PAGE 851.
18. EASEMENT GRANTED TO PANHANDLE EASTERN PIPE LINE COMPANY, FOR A RIGHT OF WAY GRANT, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED APRIL 15, 1975, IN BOOK 1987 AT PAGE 863.
19. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RIGHT OF WAY EASEMENT AND LICENSE RECORDED SEPTEMBER 16, 1975 IN BOOK 2017 AT PAGE 817.
20. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RIGHT OF WAY EASEMENT AND LICENSE RECORDED OCTOBER 31, 1975 IN BOOK 2026 AT PAGE 768.

Old Republic National Title Insurance Company

PROPERTY INFORMATION BINDER

THIS POLICY IS ISSUED IN LIEU OF POLICY NO. PIB70842010.27002325 WHICH IS HEREBY CANCELLED
Order Number: RND70842010 **Policy No.:** PIB70842010.27955509

21. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN EASEMENT AGREEMENT RECORDED MARCH 22, 1977 IN BOOK 2130 AT PAGE 716.
22. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RIGHT OF WAY EASEMENT AND LICENSE RECORDED MAY 31, 1979 IN BOOK 2351 AT PAGE 577.
23. EASEMENT GRANTED TO BYRON OIL INDUSTRIES, INC., FOR GAS PIPELINES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED SEPTEMBER 17, 1979, IN BOOK 2386 AT PAGE 683.
24. EASEMENT GRANTED TO UNION RURAL ELECTRIC ASSOCIATION, INC., FOR ELECTRIC TRANSMISSION OR DISTRIBUTION LINE OR SYSTEM, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED JANUARY 25, 1980, IN BOOK 2425 AT PAGE 725.
25. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AFFIDAVIT OF POSSESSION RECORDED MAY 23, 1980 IN BOOK 2458 AT PAGE 523.
26. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AGREEMENT RECORDED JULY 18, 1980 IN BOOK 2473 AT PAGE 893 AND STIPULATION OF INTEREST AND CORRECTIVE CROSS-CONVEYANCE OF OIL, GAS AND MINERAL INTEREST RECORDED JUNE 9, 1980 IN BOOK 2462 AT PAGE 425.
27. NOTICE OF GENERAL DESCRIPTION OF AREA SERVED BY PANHANDLE EASETERN PIPE LINE COMPANY RECORDED JUNE 25, 1986 IN BOOK 3162 AT PAGE 961.
28. EASEMENT GRANTED TO WESTERN GAS SUPPLY COMPANY, A COLORADO CORPORATION, FOR PIPELINES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED SEPTEMBER 15, 1986, IN BOOK 3201 AT PAGE 832.
29. EASEMENT GRANTED TO WESTERN GAS SUPPLY COMPANY, FOR PIPELINES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED NOVEMBER 14, 1990, IN BOOK 3727 AT PAGE 587.
30. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN ZONING HEARING DECISION - CASE #124-91-E-Z SELTZER FARMS RECORDED JANUARY 30, 1992 IN BOOK 3861 AT PAGE 157.
31. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS TO THE AGREEMENT SET FORTH IN BARGAIN AND SALE DEED RECORDED MAY 22, 1992 IN BOOK 3907 AT PAGE 53.
32. EASEMENT GRANTED TO ASSOCIATED NATURAL GAS, INC., FOR PIPELINE GATE VALVE OR GATE-VALVES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED DECEMBER 18, 1992, IN BOOK 4001 AT PAGE 706.
33. EASEMENT GRANTED TO ASSOCIATED NATURAL GAS INC., A COLORADO CORPORATION, FOR A PIPELINE RIGHT OF WAY GRANT, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED DECEMBER 18, 1992, IN BOOK 4001 AT PAGE 709.
34. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN RIGHT OF WAY GRANT RECORDED DECEMBER 18, 1992 IN BOOK 4001 AT PAGE 713.
35. EASEMENT GRANTED TO ASSOCIATED NATURAL GAS, INC., FOR PIPELINE GATE VALVE OR GATE-VALVES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED DECEMBER 18, 1992, IN BOOK 4001 AT PAGE 718.
36. EASEMENT GRANTED TO ASSOCIATED NATURAL GAS, INC., FOR PIPELINE GATE VALVE OR GATE-VALVES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED SEPTEMBER 23, 1993, IN BOOK 4156 AT PAGE 12.
37. RESERVATION OF 1/2 OF ALL MINERALS AS EVIDENCED IN WARRANTY DEED RECORDED APRIL 04, 1994 IN BOOK 4290 AT PAGE 272.
38. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH IN MEMORANDUM OF UNDERSTANDING RECORDED OCTOBER 20, 1995 IN BOOK 4611 AT PAGE 341.

Old Republic National Title Insurance Company

PROPERTY INFORMATION BINDER

THIS POLICY IS ISSUED IN LIEU OF POLICY NO. PIB70842010.27002325 WHICH IS HEREBY CANCELLED
Order Number: RND70842010 **Policy No.:** PIB70842010.27955509

39. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN BOUNDARY LINE AGREEMENT RECORDED FEBRUARY 04, 1997 IN BOOK 4931 AT PAGE 452.

40. NOTICE OF OIL AND GAS INTERESTS AND SURFACE USE RECORDED DECEMBER 5, 2000 UNDER RECEPTION NO. C0738227.

41. NOTICE OF RIGHT TO USE SURFACE OF THE LANDS RECORDED DECEMBER 19, 2000 UNDER RECEPTION NO. C0742925.

42. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN ZONING HEARING DECISION - CASE #PUD2001-00030 RECORDED MARCH 12, 2002 UNDER RECEPTION NO. C0938822.

43. REQUEST FOR NOTIFICATION RECORDED JULY 08, 2002 UNDER RECEPTION NO. C0993453.

44. EASEMENTS, CONDITIONS, COVENANTS, RESTRICTIONS, RESERVATIONS AND NOTES ON THE TODD CREEK VILLAGE PRELIMINARY PUD PLAN RECORDED AUGUST 23, 2002 UNDER RECEPTION NO. C1014679.

45. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN IRRIGATION PIPELINE EASEMENT AND AGREEMENT RECORDED NOVEMBER 03, 2005 UNDER RECEPTION NO. 20051103001216190.

46. REQUEST FOR NOTIFICATION OF SURFACE DEVELOPMENT RECORDED MARCH 31, 2006 UNDER RECEPTION NO. 20060331000327110.

47. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN SURFACE USE AGREEMENT RECORDED JULY 05, 2006 UNDER RECEPTION NO. 20060705000675490 AND SECOND AMENDMENT AND RATIFICATION OF SURFACE USE AGREEMENT RECORDED JANUARY 30, 2017 UNDER RECEPTION NO. 2017000008819.

48. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AGREEMENT FOR WATER SERVICE RECORDED OCTOBER 02, 2007 UNDER RECEPTION NO. 2007000093311.

49. REQUEST FOR NOTIFICATION OF SURFACE DEVELOPMENT RECORDED OCTOBER 15, 2007 UNDER RECEPTION NO. 2007000097421.

50. REQUEST FOR NOTIFICATION (MINERAL ESTATE OWNER) RECORDED DECEMBER 24, 2007 UNDER RECEPTION NO. 2007000116902.

51. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN RIGHT OF WAY AGREEMENT RECORDED AUGUST 23, 2013 UNDER RECEPTION NO. 2013000074187.

52. ANY AND ALL MINERALS AND MINERAL RIGHTS AS RESERVED IN SPECIAL WARRANTY DEED RECORDED APRIL 1, 2016 UNDER RECEPTION NO. 201600024298, AND ANY AND ALL ASSIGNMENTS THEREOF OR INTERESTS THEREIN.

53. REQUEST FOR NOTIFICATION OF APPLICATION FOR DEVELOPMENT RECORDED JULY 13, 2016 UNDER RECEPTION NO. 2016000055794.

54. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN EASEMENT DEED AND AGREEMENT RECORDED AUGUST 30, 2017 UNDER RECEPTION NO. 2017000075842.

    NOTE: NONEXCLUSIVE SUB-EASEMENT AGREEMENT IN CONNECTION THERETO RECORDED MARCH 30, 2018 UNDER RECEPTION NO. 2018000025837, AMENDMENT TO NONEXCLUSIVE SUBEASEMENT AGREEMENT RECORDED JULY 7, 2020 UNDER RECEPTION NO. 2020000061491.

55. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN AGREEMENT TO RESOLVE DISPUTED BOUNDARY LINE RECORDED NOVEMBER 09, 2017 UNDER RECEPTION NO. 2017000099326.

56. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN MEMORANDUM OF RIGHT OF WAY AGREEMENT RECORDED MARCH 30, 2018 UNDER RECEPTION NO. **2018000025834**, AND AS AMENDED IN INSTRUMENT RECORDED MARCH 6, 2019 UNDER RECEPTION NO. **2019000016473**.
57. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN VALVE SITE AGREEMENT RECORDED APRIL 30, 2018 UNDER RECEPTION NO. **2018000034675**.
58. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN EASEMENT DEED AND AGREEMENT RECORDED MAY 13, 2019 UNDER RECEPTION NO. **2019000035710**.
59. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN EASEMENT DEED AND AGREEMENT RECORDED MAY 13, 2019 UNDER RECEPTION NO. **2019000035711**.
60. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN EASEMENT DEED AND AGREEMENT RECORDED AUGUST 01, 2019 UNDER RECEPTION NO. **2019000061659**.
61. QUIT CLAIM DEED (MINERALS) RECORDED AUGUST 15, 2019 UNDER RECEPTION NO. **2019000066363**.
62. PERSONAL REPRESENTATIVE'S MINERAL DEEDS RECORDED AUGUST 28, 2019 UNDER RECEPTION NO. **2019000070944** AND **2019000070945**.
63. QUIT CLAIM MINERAL DEED RECORDED SEPTEMBER 3, 2019 UNDER RECEPTION NO. **2019000072458**.
64. TRUSTEE'S SPECIAL WARRANTY MINERAL DEED RECORDED SEPTEMBER 17, 2019 UNDER RECEPTION NO. **2019000077475**.
65. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN GRANT OF POCKET UTILITY EASEMENT RECORDED SEPTEMBER 27, 2019 UNDER RECEPTION NO. **4527536** (WELD COUNTY RECORDS).
66. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN WATER GATHERING AND DISPOSAL CONTRACT AS DISCLOSED BY MEMORANDUM OF AGREEMENT RECORDED JANUARY 30, 2020 UNDER RECEPTION NO. **2020000009733**.
67. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN MEMORANDUM OF RIGHT OF WAY AGREEMENT BY AND BETWEEN ROBERT L. SELTZER FAMILY TRUST AND ROCKY MOUNTAIN MIDSTREAM LLC RECORDED JULY 07, 2020 UNDER RECEPTION NO. **2020000061505**.
68. TERMS, CONDITIONS AND PROVISIONS OF MEMORANDUM OF WATER SUPPLY AGREEMENT RECORDED JULY 30, 2020 AT RECEPTION NO. **2020000072946** AND RECORDED JULY 30, 2020 UNDER RECEPTION NO. **2020000072951** AND RECORDED JULY 30, 2020 UNDER RECEPTION NO. **2020000072950** RECORDED JULY 30, 2020 UNDER RECEPTION NO. **2020000072948** AND RECORDED JULY 30, 2020 UNDER RECEPTION NO. **2020000072947** AND RECORDED JULY 30, 2020 UNDER RECEPTION NO. **2020000072949**.
69. TERMS, CONDITIONS AND PROVISIONS OF RESOLUTION APPROVING APPLICATION IN CASE #RCU2020-00004 PIONEER WATER PIPELINE RECORDED SEPTEMBER 10, 2020 AT RECEPTION NO. **2020000089962**.
70. NOTICES OF SALE BY AND BETWEEN BYRON OIL INDUSTRIES, INC. AND TETON ENERGY GROUP, LLC RECORDED OCTOBER 14, 2020 UNDER RECEPTION NOS. **2020000103733** AND **2020000103734** .
71. RESOLUTION APPROVING APPLICATIONI IN CASE #RCU2020-00021 PIONEER PRODUCED WATER PIPELINE CONDITIONAL USE PERMIT EXTENSION RECORDED SEPTEMBER 10, 2021 UNDER RECEPTION NO. **2021000107948**.
72. PERSONAL REPRESENTATIVE'S DEED (MINERALS) RECORDED FEBRUARY 25, 2022 UNDER RECEPTION NO. **2022000017502**.

73. TERMS, CONDITIONS AND PROVISIONS OF EASEMENT DEED AND AGREEMENT RECORDED MARCH 15, 2022 UNDER RECEPTION NO. **2022000023467**.

74. TERMS, CONDITIONS AND PROVISIONS OF QUITCLAIM MINERAL DEED RECORDED MARCH 23, 2022 UNDER RECEPTION NO. **2022000025911**.

75. TERMS, CONDITIONS AND PROVISIONS OF NON-EXCLUSIVE PIPELINE RIGHT-OF-WAY AND EASEMENT AGREEMENT RECORDED APRIL 05, 2022 UNDER RECEPTION NO. **2022000029681**.

76. ANY TAX, LIEN, FEE, OR ASSESSMENT BY REASON OF INCLUSION OF SUBJECT PROPERTY IN THE PROMONTORY METROPOLITAN DISTRICT NOS. 1-5, AS EVIDENCED BY INSTRUMENT RECORDED APRIL 14, 2022, UNDER RECEPTION NO. **2022000033527** AND RECORDED APRIL 28, 2022 UNDER RECEPTION NO. **2022000038299**.

77. RESERVATION OF ALL MINERALS AND MINERAL RIGHTS AS CONTAINED IN THE SPECIAL WARRANTY DEED FROM ROBERT L. SELTZER FAMILY TRUST TO HSG LAND LLC, A COLORADO LIMITED LIABILITY COMPANY RECORDED MAY 6, 2022 UNDER RECEPTION NO. **2022000041193**.

78. DEED OF TRUST DATED MAY 06, 2022, FROM HSG LAND LLC, A COLORADO LIMITED LIABILITY COMPANY TO THE PUBLIC TRUSTEE OF ADAMS COUNTY, COLORADO FOR THE USE OF ROBERT L. SELTZER FAMILY TRUST TO SECURE THE SUM OF $1,400,100.00 RECORDED MAY 06, 2022, UNDER RECEPTION NO. **2022000041194**.

79. RESERVATION OF ALL OIL AND GAS AND THEIR CONSTITUENTS, SULFUR, COAL, LIGNITE, URANIUM, AND OTHER FISSIONABLE MATERIAL, GEOTHERMAL ENERGY, BASE AND PRECIOUS METALS, ROCK, STONE, GRAVEL, AND ALL OTHER MINERAL SUBSTANCES AS MAY EXIST NOW OR IN THE FUTURE ON OR UNDER THE PROPERTY, AS SET FORTH IN SPECIAL WARRANTY DEED RECORDED DECEMBER 9, 2024 UNDER RECEPTION NO. **2024000068378**, AND ANY AND ALL ASSIGNMENTS THEREOF OR INTERESTS THEREIN.

NOTE: THIS BINDER DOES NOT REFLECT THE STATUS OF TITLE TO WATER RIGHTS OR REPRESENTATION OF SAID RIGHTS, RECORDED OR NOT.

NOTE: THIS BINDER IS NOT A REPORT OR REPRESENTATION AS TO MINERAL INTERESTS, AND SHOULD NOT BE USED, OR RELIED UPON, IN CONNECTION WITH THE NOTICE REQUIREMENTS THAT ARE SET FORTH IN CRS 24-65.5-103.

NOTE: ADDITIONAL UPDATES TO THE EFFECTIVE DATE OF THE BINDER MAY BE REQUESTED BY THE PROPOSED INSURED. ONE UPDATE IS INCLUDED WITH THIS BINDER AT NO ADDITIONAL COST. ANY ADDITIONAL UPDATES WILL BE ISSUED AT THE COST OF $135 PER UPDATE. FOR EACH UPDATE PROVIDED, A REVISED BINDER WILL BE ISSUED SHOWING A NEW EFFECTIVE DATE AND ANY MATTERS RECORDED SINCE THE EFFECTIVE DATE OF THE PREVIOUS BINDER.

THIS PRODUCT WILL ONLY BE UPDATED FOR 24 MONTHS FOLLOWING THE EFFECTIVE DATE OF THE ORIGINAL BINDER.

INVOICE

Land Title Guarantee Company
5975 Greenwood Plaza Blvd Suite 125
Greenwood Village, CO 80111
(303) 270-0445
Tax ID: 84-0572036

EQUINOX LAND GROUP
ATTN: JIMMY OGE
10450 E 159TH CT
BRIGHTON, CO 80602

Reference

Your Reference Number:	
Our Order Number:	70842010
Our Customer Number:	51702.7
Invoice (Process) Date:	01/13/2025
Transaction Invoiced By:	Daniel Bennetts
Email Address:	dbennetts@ltgc.com

Invoice Number: 70842010-1
Property Address: SELTZER HEIGHTS FILING NO. 1, BRIGHTON, CO 80602
Parties: HSG LAND LLC

- Charges -

Property Information Binder	$0.00
Amount Credited	$0.00
Total Invoice Amount	$0.00
Total Amount Due	$0.00

Payment due upon receipt

Please reference Invoice No. 70842010-1 on payment
Please make check payable and send to:
Land Title Guarantee Company
5975 Greenwood Plaza Blvd Suite 125
Greenwood Village, CO 80111

TODD CREEK VILLAGE

10450 E 159th Ct.
Brighton, Co. 80602

Phone: 303-637-0344
Fax: 303-637-0423
www.toddcreekvillage.org

May 15, 2024

RE: Conditional Will-Serve Letter for various Parcels in the Todd Creek Village Preliminary PUD Plan Adams County, Colorado

Dear Owner's Representative:

You are the owner's representatives of several parcels included in an application for a change in the Todd Creek Village Preliminary PUD Plan (the "Owners") in Adams County, Colorado (the "Property"). The Property is generally located south of WCR 2 and between Quebec St. and Tucson St. in Adams County, Colorado. The Property is located within the service area of Todd Creek Village Metropolitan District ("TCVMD" or the "District"). It is the understanding of TCVMD that the Owners may develop certain sites within the Property (the "Site") and seek Service (as defined below) to the Site. Therefore, the Site is the subject of this Conditional Will-Serve Letter from TCVMD.

TCVMD is willing and able to provide potable and non-potable water service and sanitary sewer service to the Site (the "Service") for either residential or commercial uses subject to the following conditions, which shall be conditions precedent to any obligation on the part of TCVMD to provide such Service:

1. The Owners shall pay TCVMD's then current water and sewer tap fees and all other applicable fees, rates, tolls and charges imposed pursuant to TCVMD's then current Rules and Regulations, as may be amended from time-to-time.

2. The Owners shall dedicate all groundwater rights to the District as outlined in TCVMD's Rules & Regulations at such time the District requires.

3. This Conditional Will-Serve Letter, as it relates to sewer service availability, is no longer subject to any approvals from Metro Water Recovery. On December 19, 2023 Metro Water Recovery and TCVMD executed the contract bringing in TCVMD as a Special Connector.

4. The Owners shall design, construct, acquire easements and install any and all infrastructure required or deemed necessary by TCVMD to provide Service to the Site (including but not limited to: service taps, service lines, mainlines or any other improvements and facilities required, including any permits or improvements required by Adams County or Weld County). The Owners shall design all such Owner-installed infrastructure according TCVMD's design standards and in accordance with TCVMD's Rules and Regulations, in place at such time as the design is completed. The Owners shall reimburse TCVMD for any and all costs the District incurs related to its review of the infrastructure design, construction and installation, including reimbursement of its engineering, legal and other consultant fees.

TODD CREEK
VILLAGE

10450 E 159th Ct.
Brighton, Co. 80602

Phone: 303-637-0344
Fax: 303-637-0423
www.toddcreekvillage.org

5. The Owners will be required to pay for any off-site capital improvements deemed necessary by TCVMD to provide Service to the Site including, but not limited to, water storage tanks, pipelines, reservoir improvements, pumps, water treatment plant or upgrades needed to any other District infrastructure.

6. TCVMD will provide the Owners with non-monetary assistance in the acquisition of easements necessary to provide for offsite infrastructure to allow TCVMD to provide Service to the Site. In addition, TCVMD will provide the terms of, and administer, reimbursement or cost recovery agreements related to the installation or upsizing of offsite facilities or infrastructure designed and constructed by the Owners benefiting future development receiving service from TVCMD. The standard life span of such reimbursement agreements is fifteen years.

7. The Service will be provided to the Site, subject to and conditioned upon, compliance with the District's policies and Rules and Regulations as may be amended from time-to-time and the payment of all applicable fees, rates, tolls and charges imposed thereunder. This commitment shall run only to the Site and shall not be transferrable or assignable in any manner whatsoever.

This Conditional Will-Serve Letter shall not be effective until the Owners purchase Taps or execute a Tap Purchase Agreement with TCVMD indicating the Owner's willingness to be bound by the terms set forth therein.

If anyone has any follow-up questions or concerns, please do not hesitate to contact me.

Todd Creek Village Metropolitan District

Don Summers
General Manager,
Todd Creek Village Metropolitan District

cc: Blair Dickhoner, District Counsel
Todd Creek Village Metropolitan District - Board of Directors

June 3, 2024

KT Engineering
12500 W 58th Ave
Arvada, CO 80002

Dear Ken Toland:

United Power is the provider of electric service in the area to the proposed project, Seltzer Heights located on the corner of 168th Ave & Yosemite, Brighton, CO. There is electrical distribution in the area that may or may not need to be upgraded, depending on the requirements of the site, in order to provide capacity and safe reliable power to the area.

Service will be provided according to the rules, regulations, and policies in effect by United Power at the time service is requested.

We look forward to this opportunity to provide electric service. If you have any questions, please give me a call at 720-685-5639.

Sincerely,

Michael Neu

Project Manager I

MKN:amv

WILL SERVE LETTER

June 3, 2024

HSG LLC; ATTN Tucker Hanlon
10450 E 159th Court
Brighton, CO 80602

Re: Seltzer Heights Development; SWC of E 168th Ave & Yosemite St, Adams County, CO

Dear Tucker,

This letter is to confirm that Xcel Energy is your utility provider for natural gas. In accordance with our tariffs, on file with and approved by the Colorado Public Utilities Commission, gas facilities can be made available to serve the project at Seltzer Heights Development; SEC of E 168th Ave & Yosemite St, Adams County, CO. The cost, and whether any reinforcements or extensions are required, for the Company to provide those facilities will be determined by your designer upon receipt of application and project plans.

Your utility service(s) will be provided after the following steps are completed:

- ***Application submitted to Xcel Energy's "Builders Call Line (BCL)"*** – once your application is accepted you will be assigned a design department representative who will be your primary point of contact
- ***Utility design is completed*** – you must provide your design representative with the site plan, the one - line diagrams, and panel schedules for electric and gas loads if applicable
- ***All documents provided by design representative are signed and returned***
- ***Payment is received*** (Residential Service Laterals if applicable)
- ***Required easements are granted*** - you must sign and return applicable easement documents to your Right-of-Way agent
- ***Site is ready for utility construction*** - the site ready information can be found on our website at may be viewed at Construction and Inspection | Xcel Energy.

An estimated scheduled in-service date will be provided once these requirements have been met. It is important to keep in mind that the terms and conditions of utility service, per our tariffs, require that you provide adequate space and an easement on your property for all gas and electric facilities required to serve your project, including but not limited to gas and electrical lines and meters, transformers, and pedestals. General guidelines for requirements can be found on our website at xcelenergy.com/InstallAndConnect.

Xcel Energy looks forward to working with you on your project and if I can be of further assistance, please contact me at the phone number or email listed below.

Sincerely,

Jason Bersano
Xcel Energy Builder and Developer Representative

Mailing address: Public Service Company of Colorado
1123 W 3rd Ave
Denver, CO 80231

SELTZER HEIGHTS FILING 1 LAND DESCRIPTION

A PARCEL OF LAND LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS: BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST 1/4 OF SECTION 4 BEING S 00°19'36" E AND MONUMENTED AS FOLLOWS:

-NORTHEAST CORNER SECTION 4, BEING A FOUND 3.25" ALUMINUM CAP IN RANGE BOX MARKED “BASELINE, LS 38285”

-EAST QUARTER CORNER SECTION 4, BEING A FOUND 3.25" ALUMINUM CAP MARKED “EMK, PLS 38584”

COMMENCING AT THE NORTHEAST CORNER OF SECTION 4;

THENCE S 89°33'09" W ALONG THE NORTH LINE OF THE NORTHEAST 1/4 OF SAID SECTION 4 A DISTANCE OF 40.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF YOSEMITE STREET BEING AN EXCEPTION RECORDED IN BOOK 1 AT PAGE 527 AND THE EXTENSION THEREOF AND THE **POINT OF BEGINNING;**

THENCE S 00°19'36" E ALONG SAID WESTERLY RIGHT-OF-WAY LINE A DISTANCE OF 2348.64 FEET TO A POINT ON THE NORTHERLY BOUNDARY OF THAT PARCEL OF LAND RECORED AT RECEPTION NO. 2010000052390;

THENCE ALONG SAID PARCEL OF LAND THE FOLLOWING THREE (3) COURSES:

1) S 88°45'28 W A DISTANCE OF 1509.46 FEET;
2) S 25°55'39" E A DISTANCE OF 17.18 FEET;
3) S 26°31'05" W A DISTANCE OF 16.44 FEET TO A POINT ON THE NORTHERLY BOUNDARY OF TODD CREEK MEADOWS SUBDIVISION, A SUBDIVISION RECORDED AT RECEPTION NO. C0731590;

THENCE S 88°45'09" W ALONG SAID NORTHERLY BOUNDARY A DISTANCE OF 74.40 FEET TO A POINT ON THE EASTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. C1138476;

THENCE ALONG SAID EASTERLY, AND SOUTHERLY BOUNDARY OF SAID PARCEL OF LAND AND THE EXTENSION THEREOF THE FOLLOWING SEVEN (7) COURSES:

1) S 00°30'00" E A DISTANCE OF 291.28 FEET;
2) N 73°15'18" W A DISTANCE OF 293.85 FEET;
3) N 51°17'25" W A DISTANCE OF 149.44 FEET;
4) N 78°17'25" W A DISTANCE OF 154.42 FEET;
5) S 70°02'35" W A DISTANCE OF 169.36 FEET;
6) S 59°09'35" W A DISTANCE OF 244.08 FEET;
7) S 75°34'18" W A DISTANCE OF 665.00 FEET TO A POINT ON THE EASTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. C1138476 AND SHOWN ON A SURVEY BY BRIAN THOMAS BRINKMAN, PLS 38175 DATED 6-29-11 RECORDED AT RECEPTION NO. 2011-102;

THENCE ALONG SAID EASTERLY BOUNDARY OF SAID SURVEY RECORDED AT RECEPTION NO. 2011-102 THE FOLLOWING FOURTEEN (14) COURSES:

1) S 69°25'57" W A DISTANCE OF 314.14 FEET;
2) S 63°15'15" W A DISTANCE OF 135.49 FEET;
3) N 00°42'53" E A DISTANCE OF 559.19 FEET;

4) N 32°57'40" E A DISTANCE OF 800.14 FEET;
5) S 88°46'03" W A DISTANCE OF 830.04 FEET;
6) N 66°07'13" W A DISTANCE OF 53.12 FEET;
7) N 65°25'03" W A DISTANCE OF 290.82 FEET;
8) N 58°20'21" W A DISTANCE OF 389.89 FEET;
9) N 09°57'07" W A DISTANCE OF 301.16 FEET;
10) N 09°22'50" W A DISTANCE OF 187.79 FEET;
11) N 10°47'50" E A DISTANCE OF 103.98 FEET;
12) N 18°17'18" E A DISTANCE OF 214.81 FEET;
13) N 62°21'47" E A DISTANCE OF 439.90 FEET;
14) N 00°31'50" W A DISTANCE OF 428.97 FEET TO A POINT ON THE NORTH LINE OF THE NORTHWEST 1/4 OF SAID SECTION 4;

THENCE N 89°32'13" E ALONG SAID NORTH LINE A DISTANCE OF 241.08 FEET TO A POINT ON THE WESTERLY BOUNDARY OF AN AGREEMENT TO RESOLVE DISPUTED BOUNDARY LINE RECORDED AT RECEPTION NO. 2017000099326;

THENCE ALONG SAID AGREEMENT THE FOLLOWING SEVENTEEN (17) COURSES:

1) S 00°24'31" E A DISTANCE OF 542.45 FEET;
2) N 61°21'33" E A DISTANCE OF 75.99 FEET;
3) N 63°03'28" E A DISTANCE OF 101.27 FEET;
4) N 63°18'15" E A DISTANCE OF 97.13 FEET;
5) N 63°03'23" E A DISTANCE OF 120.44 FEET;
6) N 63°17'02" E A DISTANCE OF 100.72 FEET;
7) N 62°28'30" E A DISTANCE OF 56.87 FEET;
8) N 65°01'48" E A DISTANCE OF 131.55 FEET;
9) N 75°57'26" E A DISTANCE OF 131.79 FEET;
10) N 84°04'41" E A DISTANCE OF 99.05 FEET;
11) S 84°31'07" E A DISTANCE OF 26.00 FEET;
12) S 79°17'18" E A DISTANCE OF 63.94 FEET;
13) S 67°17'01" E A DISTANCE OF 98.25 FEET;
14) S 51°09'19" E A DISTANCE OF 47.50 FEET;
15) S 13°28'48" E A DISTANCE OF 154.06 FEET;
16) S 13°09'42" E A DISTANCE OF 112.86 FEET;
17) N 89°38'47" E A DISTANCE OF 214.92 FEET TO A POINT ON THE WESTERLY BOUNDARY OF THAT PARCEL OF LAND RECORED AT RECEPTION NO. 2013000074188;

THENCE ALONG SAID WESTERLY, SOUTHERLY AND EASTERLY BOUNDARY OF SAID PARCEL OF LAND THE FOLLOWING FOUR (4) COURSES:

1) S 00°27'04" E A DISTANCE OF 436.34 FEET;
2) N 65°32'32" E A DISTANCE OF 39.58 FEET;
3) S 87°43'24" E A DISTANCE OF 3.84 FEET;
4) N 00°27'04" W A DISTANCE OF 964.30 FEET TO A POINT ON SAID NORTH LINE OF THE NORTHEAST 1/4 OF SAID SECTION 4;

THENCE N 89°31'38" E ALONG SAID NORTH LINE A DISTANCE OF 2167.54 FEET TO THE SOUTHEAST CORNER OF SECTION 33, TOWNSHIP 1 NORTH, RANGE 67 WEST BEING AN ANGLE POINT ON SAID NORTH LINE OF THE NORTHEAST 1/4 OF SECTION 4;

THENCE N 89°33'09" E CONTINUING ALONG SAID NORTH LINE OF THE NORTHEAST 1/4 OF SECTION 4 A DISTANCE OF 408.82 FEET TO THE **POINT OF BEGINNING.**

THE ABOVE DESCRIBED PARCEL CONTAINS AN AREA OF 9,925,012 SQUARE FEET, OR 227.8469 ACRES MORE OR LESS.

Mapcheck 2: SELTZER HEIGHTS F1 BOUNDARY

Closure Summary	
Precision, 1 part in:	526894.92'
Error distance:	0.03'
Error direction:	N89° 11' 12"W
Area:	9925019.40 Sq. Ft.
Square area:	9925019.400
Perimeter:	17419.28'
Point of Beginning	
Easting:	3172422.7951'
Northing:	1243578.7265'
Side 1: Line	
Direction:	S0° 19' 36"E
Angle:	[-0° 19' 36"]
Deflection angle:	[179° 40' 24"]
Distance:	2348.64'
Easting:	3172436.1856'
Northing:	1241230.1247'
Side 2: Line	
Direction:	S88° 45' 28"W
Angle:	[-90° 54' 56"]
Deflection angle:	[89° 05' 04"]
Distance:	1509.46'
Easting:	3170927.0804'
Northing:	1241197.4009'
Side 3: Line	
Direction:	S25° 55' 39"E
Angle:	[65° 18' 53"]
Deflection angle:	[-114° 41' 07"]
Distance:	17.18'
Easting:	3170934.5920'
Northing:	1241181.9501'
Side 4: Line	
Direction:	S26° 31' 05"W
Angle:	[-127° 33' 16"]
Deflection angle:	[52° 26' 44"]
Distance:	16.44'
Easting:	3170927.2519'
Northing:	1241167.2397'
Side 5: Line	
Direction:	S88° 45' 09"W
Angle:	[-117° 45' 56"]
Deflection angle:	[62° 14' 04"]
Distance:	74.40'
Easting:	3170852.8695'
Northing:	1241165.6199'
Side 6: Line	
Direction:	S0° 30' 00"E
Angle:	[90° 44' 51"]
Deflection angle:	[-89° 15' 09"]

```
  Distance:             291.28'
  Easting:              3170855.4114'
  Northing:             1240874.3510'
Side 7: Line
  Direction:            N73° 15' 18"W
  Angle:                [-72° 45' 18"]
  Deflection angle:     [107° 14' 42"]
  Distance:             293.85'
  Easting:              3170574.0217'
  Northing:             1240959.0129'
Side 8: Line
  Direction:            N51° 17' 25"W
  Angle:                [-158° 02' 07"]
  Deflection angle:     [21° 57' 53"]
  Distance:             149.44'
  Easting:              3170457.4100'
  Northing:             1241052.4689'
Side 9: Line
  Direction:            N78° 17' 25"W
  Angle:                [153° 00' 00"]
  Deflection angle:     [-27° 00' 00"]
  Distance:             154.42'
  Easting:              3170306.2037'
  Northing:             1241083.8090'
Side 10: Line
  Direction:            S70° 02' 35"W
  Angle:                [148° 20' 00"]
  Deflection angle:     [-31° 40' 00"]
  Distance:             169.36'
  Easting:              3170147.0139'
  Northing:             1241026.0041'
Side 11: Line
  Direction:            S59° 09' 35"W
  Angle:                [169° 07' 00"]
  Deflection angle:     [-10° 53' 00"]
  Distance:             244.08'
  Easting:              3169937.4469'
  Northing:             1240900.8773'
Side 12: Line
  Direction:            S75° 34' 18"W
  Angle:                [-163° 35' 17"]
  Deflection angle:     [16° 24' 43"]
  Distance:             665.00'
  Easting:              3169293.4210'
  Northing:             1240735.1800'
Side 13: Line
  Direction:            S69° 25' 57"W
  Angle:                [173° 51' 39"]
  Deflection angle:     [-6° 08' 21"]
  Distance:             314.14'
```

```
  Easting:              3168999.3046'
  Northing:             1240624.8193'
Side 14: Line
  Direction:            S63° 15' 15"W
  Angle:                [173° 49' 18"]
  Deflection angle:     [-6° 10' 42"]
  Distance:             135.49'
  Easting:              3168878.3104'
  Northing:             1240563.8443'
Side 15: Line
  Direction:            N0° 42' 53"E
  Angle:                [-62° 32' 22"]
  Deflection angle:     [117° 27' 38"]
  Distance:             559.19'
  Easting:              3168885.2857'
  Northing:             1241122.9908'
Side 16: Line
  Direction:            N32° 57' 40"E
  Angle:                [-147° 45' 13"]
  Deflection angle:     [32° 14' 47"]
  Distance:             800.14'
  Easting:              3169320.6176'
  Northing:             1241794.3403'
Side 17: Line
  Direction:            S88° 46' 03"W
  Angle:                [55° 48' 23"]
  Deflection angle:     [-124° 11' 37"]
  Distance:             830.04'
  Easting:              3168490.7697'
  Northing:             1241776.4865'
Side 18: Line
  Direction:            N66° 07' 13"W
  Angle:                [-154° 53' 16"]
  Deflection angle:     [25° 06' 44"]
  Distance:             53.12'
  Easting:              3168442.1969'
  Northing:             1241797.9904'
Side 19: Line
  Direction:            N65° 25' 03"W
  Angle:                [-179° 17' 50"]
  Deflection angle:     [0° 42' 10"]
  Distance:             290.82'
  Easting:              3168177.7359'
  Northing:             1241918.9725'
Side 20: Line
  Direction:            N58° 20' 21"W
  Angle:                [-172° 55' 18"]
  Deflection angle:     [7° 04' 42"]
  Distance:             389.89'
  Easting:              3167845.8731'
```

```
  Northing:              1242123.6218'
Side 21: Line
  Direction:             N9° 57' 07"W
  Angle:                 [-131° 36' 46"]
  Deflection angle:      [48° 23' 14"]
  Distance:              301.16'
  Easting:               3167793.8260'
  Northing:              1242420.2502'
Side 22: Line
  Direction:             N9° 22' 50"W
  Angle:                 [-179° 25' 43"]
  Deflection angle:      [0° 34' 17"]
  Distance:              187.79'
  Easting:               3167763.2179'
  Northing:              1242605.5290'
Side 23: Line
  Direction:             N10° 47' 50"E
  Angle:                 [-159° 49' 20"]
  Deflection angle:      [20° 10' 40"]
  Distance:              103.98'
  Easting:               3167782.6969'
  Northing:              1242707.6682'
Side 24: Line
  Direction:             N18° 17' 18"E
  Angle:                 [-172° 30' 32"]
  Deflection angle:      [7° 29' 28"]
  Distance:              214.81'
  Easting:               3167850.1041'
  Northing:              1242911.6280'
Side 25: Line
  Direction:             N62° 21' 47"E
  Angle:                 [-135° 55' 31"]
  Deflection angle:      [44° 04' 29"]
  Distance:              439.90'
  Easting:               3168239.8135'
  Northing:              1243115.6833'
Side 26: Line
  Direction:             N0° 31' 50"W
  Angle:                 [117° 06' 23"]
  Deflection angle:      [-62° 53' 37"]
  Distance:              428.97'
  Easting:               3168235.8414'
  Northing:              1243544.6349'
Side 27: Line
  Direction:             N89° 32' 13"E
  Angle:                 [-89° 55' 57"]
  Deflection angle:      [90° 04' 03"]
  Distance:              241.08'
  Easting:               3168476.9135'
  Northing:              1243546.5832'
```

Side 28: Line
  Direction: S0° 24' 31"E
  Angle: [-89° 56' 44"]
  Deflection angle: [90° 03' 16"]
  Distance: 542.45'
  Easting: 3168480.7820'
  Northing: 1243004.1470'
Side 29: Line
  Direction: N61° 21' 33"E
  Angle: [61° 46' 04"]
  Deflection angle: [-118° 13' 56"]
  Distance: 75.99'
  Easting: 3168547.4740'
  Northing: 1243040.5704'
Side 30: Line
  Direction: N63° 03' 28"E
  Angle: [-178° 18' 05"]
  Deflection angle: [1° 41' 55"]
  Distance: 101.27'
  Easting: 3168637.7525'
  Northing: 1243086.4550'
Side 31: Line
  Direction: N63° 18' 15"E
  Angle: [-179° 45' 13"]
  Deflection angle: [0° 14' 47"]
  Distance: 97.13'
  Easting: 3168724.5289'
  Northing: 1243130.0910'
Side 32: Line
  Direction: N63° 03' 23"E
  Angle: [179° 45' 08"]
  Deflection angle: [-0° 14' 52"]
  Distance: 120.44'
  Easting: 3168831.8954'
  Northing: 1243184.6640'
Side 33: Line
  Direction: N63° 17' 02"E
  Angle: [-179° 46' 21"]
  Deflection angle: [0° 13' 39"]
  Distance: 100.72'
  Easting: 3168921.8631'
  Northing: 1243229.9447'
Side 34: Line
  Direction: N62° 28' 30"E
  Angle: [179° 11' 28"]
  Deflection angle: [-0° 48' 32"]
  Distance: 56.87'
  Easting: 3168972.2959'
  Northing: 1243256.2263'
Side 35: Line

```
  Direction:            N65° 01' 48"E
  Angle:                [-177° 26' 42"]
  Deflection angle:     [2° 33' 18"]
  Distance:             131.55'
  Easting:              3169091.5498'
  Northing:             1243311.7593'
Side 36: Line
  Direction:            N75° 57' 26"E
  Angle:                [-169° 04' 22"]
  Deflection angle:     [10° 55' 38"]
  Distance:             131.79'
  Easting:              3169219.4012'
  Northing:             1243343.7377'
Side 37: Line
  Direction:            N84° 04' 41"E
  Angle:                [-171° 52' 45"]
  Deflection angle:     [8° 07' 15"]
  Distance:             99.05'
  Easting:              3169317.9226'
  Northing:             1243353.9570'
Side 38: Line
  Direction:            S84° 31' 07"E
  Angle:                [-168° 35' 48"]
  Deflection angle:     [11° 24' 12"]
  Distance:             26.00'
  Easting:              3169343.8038'
  Northing:             1243351.4734'
Side 39: Line
  Direction:            S79° 17' 18"E
  Angle:                [-174° 46' 11"]
  Deflection angle:     [5° 13' 49"]
  Distance:             63.94'
  Easting:              3169406.6296'
  Northing:             1243339.5891'
Side 40: Line
  Direction:            S67° 17' 01"E
  Angle:                [-167° 59' 43"]
  Deflection angle:     [12° 00' 17"]
  Distance:             98.25'
  Easting:              3169497.2581'
  Northing:             1243301.6479'
Side 41: Line
  Direction:            S51° 09' 19"E
  Angle:                [-163° 52' 18"]
  Deflection angle:     [16° 07' 42"]
  Distance:             47.50'
  Easting:              3169534.2534'
  Northing:             1243271.8554'
Side 42: Line
  Direction:            S13° 28' 48"E
```

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  Angle:                [-142° 19' 29"]
  Deflection angle:     [37° 40' 31"]
  Distance:             154.06'
  Easting:              3169570.1657'
  Northing:             1243122.0395'
Side 43: Line
  Direction:            S13° 09' 42"E
  Angle:                [-179° 40' 54"]
  Deflection angle:     [0° 19' 06"]
  Distance:             112.86'
  Easting:              3169595.8639'
  Northing:             1243012.1442'
Side 44: Line
  Direction:            N89° 38' 47"E
  Angle:                [102° 48' 29"]
  Deflection angle:     [-77° 11' 31"]
  Distance:             214.92'
  Easting:              3169810.7798'
  Northing:             1243013.4706'
Side 45: Line
  Direction:            S0° 27' 04"E
  Angle:                [-90° 05' 51"]
  Deflection angle:     [89° 54' 09"]
  Distance:             436.34'
  Easting:              3169814.2152'
  Northing:             1242577.1441'
Side 46: Line
  Direction:            N65° 32' 32"E
  Angle:                [65° 59' 36"]
  Deflection angle:     [-114° 00' 24"]
  Distance:             39.58'
  Easting:              3169850.2436'
  Northing:             1242593.5311'
Side 47: Line
  Direction:            S87° 43' 24"E
  Angle:                [-153° 15' 56"]
  Deflection angle:     [26° 44' 04"]
  Distance:             3.84'
  Easting:              3169854.0806'
  Northing:             1242593.3786'
Side 48: Line
  Direction:            N0° 27' 04"W
  Angle:                [87° 16' 20"]
  Deflection angle:     [-92° 43' 40"]
  Distance:             964.30'
  Easting:              3169846.4883'
  Northing:             1243557.6487'
Side 49: Line
  Direction:            N89° 31' 38"E
  Angle:                [-90° 01' 18"]
```

```
  Deflection angle:      [89° 58' 42"]
  Distance:              2167.54'
  Easting:               3172013.9545'
  Northing:              1243575.5340'
Side 50: Line
  Direction:             N89° 33' 09"E
  Angle:                 [-179° 58' 29"]
  Deflection angle:      [0° 01' 31"]
  Distance:              408.82'
  Easting:               3172422.7621'
  Northing:              1243578.7270'
```

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The amount of taxes due on this page are based on last year's property value assessments.

The actual value is the value before the adjustment and the assessed value is based off the new adjusted value.

Per SB22-238 and SB23-001 the value may be reduced by $55,000.00 for residential and $30,000 for commercial. Click here for further information.

For current year values and for a full breakdown of the values visit the Adams County Assessor's site.

Summary

Account Id	R0181786
Parcel Number	0157104100005
Owners	HSG LAND LLC
Address	10450 E 159TH CT BRIGHTON, CO 80602-7977
Situs Address	8120 E 168TH AVE
Legal	SECT,TWN,RNG:4-1-67 DESC: PT OF NE4 SEC 4 DESC AS FOL BEG AT N4 COR SEC 4 TH S 1092/40 FT TO SW COR NW4 NE4 SD SEC TH E 305 FT TH S 31D 38M E 1377/30 FT TO A PT WHICH IS 298 FT W OF AND 140 FT N OF SW COR SE4 NE4 SEC 4 TH S TO S LN SD NE4 SEC 4 TH E 1583/98 FT TO A PT 40 FT W OF E4 COR SD SEC 4 TH N 1558/89 FT TH W 438/74 FT TH N 820 FT TH W 2177/58 FT TO POB EXC N 30 FT FOR RD AND EXC PARCS (2009000049874/2009000021950) AND (2010000052390) AND EXC PARC (2013000074188) 107/7065A

Inquiry

As Of 01/16/2025

Payment Type
- ○ First
- ◉ Full

Taxes Due $625.56

Total Due $625.56

Value

Area Id		Mill Levy
747 - 747		157.5720000
	Actual	**Assessed**
AG DRY FARMING LAND - 4127	15,031	3,970
Taxes		$625.56

The amount of taxes due on this page are based on last year's property value assessments.

The actual value is the value before the adjustment and the assessed value is based off the new adjusted value.

Per SB22-238 and SB23-001 the value may be reduced by $55,000.00 for residential and $30,000 for commercial. Click here for further information.

For current year values and for a full breakdown of the values visit the Adams County Assessor's site.

Summary

Account Id	R0008224
Parcel Number	0157104000020
Owners	SELTZER FARMS INVESTMENT LLC
Address	5740 OLDE WADSWORTH BLVD ARVADA, CO 80002-2575
Situs Address	16705 YOSEMITE ST
Legal	SECT,TWN,RNG:4-1-67 DESC: PT OF NE4 SEC 4 DESC AS FOL BEG 40 FT W OF NE COR SD SEC TH CONT W 438/74 FT TH S 820 FT TH E 438/74 FT TO A PT 40 FT W OF E LN NE4 SD SEC TH N 820 FT TO TRUE POB EXC N 30 FT FOR RD 7/957A

Inquiry

As Of 01/16/2025

Payment Type ○ First ◉ Full

Taxes Due $1,242.46

Total Due $1,242.46

Value

Area Id		**Mill Levy**
294 - 294		107.5720000
	Actual	**Assessed**
AG DRY FARMING LAND - 4127	1,183	310
FARM/RANCH RESID - 4277	222,710	11,240
Total Value	223,893	11,550
Taxes		$1,242.46

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For current year values and for a full breakdown of the values visit the Adams County Assessor's site.

Summary

Account Id	R0008215
Parcel Number	0157104000006
Owners	TODD CREEK VILLAGE METROPOLITAN
Address	10450 E 159TH CT BRIGHTON, CO 80602-7977
Situs Address	0
Legal	SECT,TWN,RNG:4-1-67 DESC: A PARC OF LAND IN SEC 4 DESC AS FOL BEG AT A PT ON E AND W C/L OF SD SEC THAT IS 298 FT W OF THE SE COR OF SW4 NE4 SD SEC TH S 296 FT TO A PT TH N 71D 48M W 295 FT TH N 50D 36M W 150 FT TH N 77D 36M W 155 FT TH S 70D 44M W 170 FT TH S 59D 51M W 245 FT TH S 75D 49M W 665 FT TH S 69D 28M W 315 FT TH S 63D 30M W 135 FT TH N 482 FT TH N 33D 55M E 130 FT TH N 73D 24M E 350 FT TH N 87D 03M E 347 FT TH N 81D 31M E 236 FT TH N 81D 13M E 334 FT TH N 82D 55M E 210 FT TH N 80D 33M E 305 FT TH S 31D 37M E 200 FT TH S 87D 30M E 50 FT TH S 98 FT TO POB 20A

Inquiry

As Of 01/16/2025

Payment Type
- ○ First
- ◉ Full

Total Due $0.00

Value

Area Id		**Mill Levy**
207 - 207		112.5530000
	Actual	**Assessed**
POLITICAL SUB TOT LD - 9149	7,054	1,970
Taxes		$0.00

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For current year values and for a full breakdown of the values visit the Adams County Assessor's site.

Summary

Account Id	R0178786
Parcel Number	0157104200001
Owners	TODD CREEK FARMS METRO DIST NO 1 WATER
Address	717 17TH ST STE 301 DENVER, CO 80202-3310
Situs Address	0
Legal	SECT,TWN,RNG:4-1-67 DESC: PARC IN SEC 4 DESC AS FOLS COMMENCING AT THE N1/4 COR OF SD SEC 4 TH S 00D 26M 28S E 543/5 FT TO THE POB TH S 00D 26M 26S E 493/04 FT TO A PT BEING 55/73 FT NLY FROM THE CEN N 1/16TH COR OF SD SEC 4 AND BEING A PT ON THE DCRY LN ADJUSTMENT DESC IN BOOK 4931 PAGE 452 TH ALG SD BDRY LN AGREEMENT THE FOL 10 COURSES AND DISTS TH N 89D 31M 59S E 32/19 FT TH S 71D 03M 37S E 115/93 FT TH S 46D 44M 52S E 185/31 FT TH S 52D 43M 55S E 131/26 FT TH S 42D 42M 06S E 70/54 FT TH S 47D 00M 19S E 27/90 FT TH S 34D 53M 37S E 28/74 FT TH S 30D 03M 43S E 404/31 FT TH S 32D 55M 27S E 457/80 FT TH S 25D 59M 02S E 76/03 FT TH DEPARTING SD BDRY LN ADJUSTMENT AND ALG THE N BDRY LN AT A PARC OF LAND FOR TODD CREEK FARMS METRO DIST NO 1 (REC NO C0846354) THE FOL COURSES & DISTS TH N 32D 50M 21S W 114/27 FT TH S 79D 19M 39S W 305 FT TH S 81D 41M 39S W 210 FT TH S 79D 59M 39S W 334 FT TH S 80D 17M 39S W 236 FT TH S 85D 49M 39S W 347 FT TH S 72D 10M 39S W 350 FT TH S 32D 41M 39S W 130 FT TH N 01D 13M 21S W 75 FT TH N 33D 18M 11S E 801/02 FT TH S 88D 46M 39S W 830 FT TH N 65D 28M 27S W 54/31 FT TH N 65D 24M 21S W 291 FT TH N 58D 17M 21S W 390/05 FT TH N 09D 53M 21S W 301 FT TH N 09D 53M 21S W 187/20 FT TH N 62D 38M 48S E 811/12 FT TH N 02D 53M 33S W 27/98 FT TO A PT ON THE SOUTHERN BDRY OF THE EDWARDS PROP THE FOL 16 COURSES TH N 62D 16M 51S E 73/50 FT TH N 63D 04M 07S E 101/27 FT TH N 63D 18M 54S E 97/13 FT TH N 63D 04M 02S E 120/44 FT TH N 63D 17M 41S E 100/72 FT TH N 62D 29M 09S E 56/87 FT TH N 65D 02M 46S E 131/38 FT TH N 75D 55M 20S E 131/74 FT TH N 83D 31M 01S E 98/70 FT TH S 82D 36M 09S E 26/37 FT TH S 79D 22M 49S E 64/20 FT TH S 67D 13M 40S E 98/32 FT TH S 51D 17M 54S E 47/76 FT TH S 13D 24M 16S E 154/59 FT TH S 13D 09M 17S E 112/21 FT TH N 89D 34M 11S E 214/94 FT TO THE POB 79/27A

Inquiry

As Of 01/16/2025

Payment Type
- ○ First
- ◉ Full

Total Due $0.00

Value

Area Id	Mill Levy
290 - 290	105.0480000

	Actual	Assessed
POLITICAL SUB TOT LD - 9149	1,931,050	538,760
Taxes		$0.00

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For current year values and for a full breakdown of the values visit the Adams County Assessor's site.

Summary

Account Id	R0188679
Parcel Number	0157104200002
Owners	TODD CREEK VILLAGE
Address	10450 E 159TH CT BRIGHTON, CO 80602-7977
Situs Address	0
Legal	SECT,TWN,RNG:4-1-67 DESC: PARC OF LAND IN A PORT OF THE NW4 SEC 4 DESC AS FOLS BEG AT THE N4 COR OF SD SEC 4 TH S 89D 32M 47S W 1328/22 FT TH CONT ALG SD LN S 00D 31M 16S E 30 FT TO THE S LN OF THE PRESCRIPTIVE ROW LN TO THE POB STILL CONT ALG SD LN S 00D 31M 16S E 537/92 FT TH S 62D 38M 41S W 811/12 FT TH N 18D 21M 54S E 214/84 FT TH N 62D 38M 41S E 440/19 FT TH N 00D 31M 16S W 398/97 FT TH N 89D 32M 47S E 242/51 FT TO THE POB 6/708 ACRES

Inquiry

As Of 01/16/2025

Payment Type
- ○ First
- ◉ Full

Total Due $0.00

Value

Area Id	Mill Levy
290 - 290	105.0480000

	Actual	Assessed
POLITICAL SUB TOT LD - 9149	167,706	46,790
Taxes		$0.00

Declaration of Wholesale or Entity Sales Tax Exemption

1. Purchaser Information	**License or Exemption Information**	
Legal Name Todd Creek Village Metropolitan District	Sales Tax License or Exemption Number 98-12322-0000	
Trade Name (if different)	State CO	Expiration Date NONE
Mailing Address 10450 E 159th Court	Phone Number (303) 637-0344	
City Brighton	State CO	ZIP Code 80602

2. Wholesale Exemption. Mark the type of exemption, and describe your ordinary course of business.

- ☐ Purchase for Resale
- ☐ Manufacturing - Mark one of the following:
  - ☐ Ingredients or Component Parts
  - ☐ Machinery, Machine Tools, and Parts
  - ☐ Testing, Modification, or Inspection

Ordinary Course of Business, including the product(s) manufactured and/or sold:

3. Entity Exemption. Enter a and b as required.

a. Mark the type of entity.

- ☐ 501(c)(3) Charitable Organization
- ☐ 501(c)(19) Veterans' Organization
- ☒ U.S. or Colorado State or Local Government
- ☐ Affordable Housing Project
- ☐ Tribe or Member – For sales on or delivered to a Colorado reservation. Mark the type of qualifying purchaser:
  - ☐ Tribal Government
  - ☐ Enrolled Tribal Member
  - ☐ Entity owned by tribe or member – Enter the total tribal ownership percentage:

b. Mark the type of qualifying payment, unless the exemption is for a tribal member or entity owned by a tribe or member.

- ☐ Purchase Authorization to be paid later
- ☐ Cash with a purchase order from the entity
- ☒ Check issued by the entity
- ☐ U.S. Government GSA SmartPay3 Card
- ☐ Colorado State or Local Government Credit Card
- ☐ Non-Government Credit Card bearing the entity name or branded for commercial use

4. Other Exemption. Describe the exemption claimed and how your purchase qualifies.

Exemption Claimed	Qualifications

5. Purchaser Signature

I declare that the purchases I make using this form qualify for exemption from Colorado sales and use taxes as entered above, and that I am the purchaser or have the authority to execute this form on behalf of the purchaser.

Printed Name	Title	
Jimmy Oge	District Accountant	
Signature Jimmy Oge		Date (MM/DD/YY) 01/24/2024

DR 0160 (02/16/11)
COLORADO DEPARTMENT OF REVENUE
DENVER CO 80261-0013

CERTIFICATE OF EXEMPTION FOR STATE SALES/USE TAX ONLY

THIS LICENSE IS NOT TRANSFERABLE

USE ACCOUNT NUMBER for all references	LIABILITY INFORMATION	ISSUE DATE
09812322	G 110196	Feb 11 2019

10450 E 159TH CT BRIGHTON, CO 80602-7977

TODD CREEK VILLAGE METROPOLITAN DISTRICT
10450 E 159TH CT
BRIGHTON CO 80602-7977

Executive Director
Department of Revenue

▲ DETACH HERE ▲

GENERAL INFORMATION

Revenue ONLINE

The following services are available at *www.Colorado.gov/RevenueOnline* under **Business**.

Sales:

- Verify a Sales Tax License
- View Local Sales Tax Rates
- View Business Location Rates
- Find Local Taxes by Address
- View Sales Tax Rate Charts

Try Revenue Online today!
www.Colorado.gov/RevenueOnline
Scan this code with your smartphone or tablet to access Revenue Online

Attend our free sales tax classes. Live classes, online CPE and Webinars are available. To sign up, visit *www.TaxSeminars.state.co.us*

SURFACE USE AGREEMENT

THIS SURFACE USE AGREEMENT (the "Agreement") is made and entered into this 5th day of February, 2004, (the "Effective Date") by and among **PATINA OIL & GAS CORPORATION** ("Patina"), a Delaware corporation, 1625 Broadway Suite 2000, Denver, Colorado 80202, and the ROBERT L. SELTZER FAMILY TRUST, ("Seltzer"), by Jack Alden Seltzer as Co-Trustee with an address of P.O. Box 360443, Monument Valley, Utah 84536 and Timothy R. Seltzer as Co-Trustee with an address of 33641 WCR 83, Briggsdale Colorado 80611.

RECITALS

A. Seltzer is the owner of the surface estate of a 114.165 ± acre tract of land of which is located in the NE/4 of Section 4, Township 1 South, Range 67 West of the 6th P.M., County of Adams, State of Colorado (the "Property"). The Property is more specifically described on Exhibit "A-1" attached hereto and made a part hereof.

B. The mineral estate in and under the Property is presently subject to valid and subsisting oil and gas leases (the "Leases"), a portion of which leasehold interest is owned of record by Patina. The Leases are more specifically described on Exhibit "A-2" attached hereto and made a part hereof.

C. Patina's leasehold rights include, among other things, the right of reasonable ingress and egress for the purposes of exploration, development, drilling, re-drilling, testing, completion, re-completion, re-entry, deepening, fracturing, re-fracturing, stimulation, reworking, production and maintenance operations associated with oil and gas wells from the surface to the base of the J-Sand excepting the surface to base of the Sussex formation in the N/2NE/4 of the Property and the associated pipelines and production facilities to be located on the Property.

D. Patina currently operates the Seltzer 1-4 well, the Seltzer PP 4-7 well and the Seltzer PP 4-8 well on the Property and has the right to drill two (2) future vertical wells in the N/2NE/4 (collectively the "Wells") located on the Property, all in the NE/4 of Section 4, Township 1 South, Range 67 West of the 6th P.M., and their associated flow lines and production facilities located on the Property.

E. Seltzer desires to have a Developer undertake certain development of the surface of the Property, including residential housing.

F. Developer shall be defined as the party who will subdivide and develop the Property into residential housing and who acquires this Property as a whole undeveloped parcel for that purpose of surface development. Within this Agreement, the Developer will be referred to as "Subsequent Developer".

The Subsequent Developer shall have all the same rights and obligations as Seltzer as outlined in this Agreement. It is the intention of the parties that this Agreement includes certain rights, provisions and obligations conferred upon Seltzer and the Subsequent Developer, but not to their successors and assigns. These rights and obligations are specifically identified and limited within the Agreement as

"Seltzer/Subsequent Developer" and are included in Section 1.1.a, 1.2, 1.5, 2, 3, 3.1, 3.3, 3.4, 4, 5.1, 5.2, 6.1, 6.2, 8, and 18.

G. Patina and Seltzer enter into this Agreement to provide for the coexistence and joint development of the surface estate and the oil and gas estate of the Property, and to delineate the process by which the parties, the Subsequent Developer, and their successors and assigns shall comply with respect to the development of the two estates.

NOW, THEREFORE, in consideration of the covenants set forth herein and the mutual benefits to be derived by the parties hereto, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties do hereby agree as follows:

1. AREA RESERVED FOR OIL AND GAS OPERATIONS.

1.1. Oil and Gas Operations. Patina shall have the continued right to deepen, recomplete, fracture, re-fracture, stimulate and rework the Wells, and Seltzer agrees that Patina may continue to utilize the area depicted and/or described on Exhibit "B" attached hereto and made a part hereof as the "Operations Area(s)" for the wellsite, production facilities, pipelines and access roads for such operations. The Operations Area(s) shall be deemed to include the areas as follows:

a. New Wellsite Operations Areas: There shall be two new wellsites on the Property; these new wellsites shall be located in the N/2 of the NE/4. The Operations Area for each new wellsite shall be a rectangle area with the dimensions being 275 feet x 250 feet around each new wellsite location. Subject to Patina's consent, which consent shall not be unreasonably withheld, Seltzer/Subsequent Developer shall select each new wellsite location pursuant to the following procedure:

Exhibit "B" reflects two drilling windows, one for each of the new wellsite locations. These drilling windows have dimensions of 400 feet x 400 feet and have been designated by Colorado Oil and Gas Conservation Commission, ("COGCC"), in the N/2 of the NE/4 of the section. Subject to Patina's consent, which consent shall not be unreasonably withheld, Seltzer/Subsequent Developer shall choose one wellsite location in each drilling window; if feasible, such locations shall be in the North half of each drilling window. Unless Patina consents in writing, these new wellsite locations must be a minimum of 1,320 feet from each other and from any other existing wells in the NE/4.

Six (6) months after the date of completion of a New Well, the Operations Area for that completed well will be deemed to be an Existing Wellsite Operations Area pursuant to Section 1.1.b.

b. Existing Wellsite Operations Areas: The Operations Area around Existing Wellsites shall be a square with the dimensions of 225feet x 225 feet. This square of Operations Area shall be centered exactly around the existing wellsite. These existing wellsites are the Seltzer 1-4 well located in the NE/4NE/4 (990'FNL, 990' FEL), the Seltzer PP 4-7 well located in the SW/4NE/4 (1540' FNL, 1799' FEL), and the Seltzer PP 4-8 well located in the SE/4NE/4 (1910' FNL, 470'FEL).

c. Production Facilities Operations Area(s): Pursuant to Section 2 of this Agreement, there shall be a fence around the production facilities. These fence(s) shall delineate the Production Facilities Operations Area(s). At their discretion, Patina may fence each separate piece of production facility equipment, instead of the entire perimeter of the Production Facility. In this event, the non-fenced area between each of the fenced facility pieces of equipment shall be deemed as part of the Production Facilities Operations Area(s). Within the Production Facilities Operations Area(s), there will be no use of the lands of any kind by Seltzer or any of its successors in interest.

Within the Production Facilities Operations Areas, Patina shall place each separate piece of production equipment as close as possible, maintaining a maximum distance of seventy-five (75) feet between each piece of production facility equipment. In the event that Patina is required under COGCC Rule 604, to maintain a distance of more than seventy-five (75) feet between each piece of equipment, Patina shall be allowed to change the seventy-five (75) foot maximum setback in this Agreement to the specific footage as designated in said Rule 604.

On the sides of the facility equipment that comprise the outside parameters of various pieces of equipment of that Production Facility, Patina shall locate the fence a maximum of five (5) feet from the outside of the berm. The berm will be located as close as possible to the production facilities while still in compliance with Rule 604. For the specific production facility equipment that does not require a berm under Rule 604, Patina shall locate the fence a maximum of ten (10) feet from the facility equipment sides which comprise the outside parameters.

Seltzer, its successors and assigns shall place no occupied buildings within one hundred and fifty (150) feet from any piece of production equipment.

d. Access Road Operations Area(s). The Access Road Operations Areas shall be as provided in Section 6. Patina shall have the continued right to utilize the roads as provided in Section 6.

1.2 Operations Area(s). The Production Facilities Operations Area(s) shall be reserved and utilized for the exclusive purpose for operations by Patina. The Operations Area(s) for New Wellsites and for Existing Wellsites shall be reserved and utilized for the purpose of any and all oil and gas operations by Patina, including, but not limited to, drilling and production activities, workovers, well deepenings, recompletions, fracturing, drilling of replacement wells, and re-fracturing, among other things. The limited use of the New Wellsite and Existing Wellsite Operations Areas by Seltzer/Subsequent Developer may be allowed as set forth in Section 1.5 below. Seltzer shall not grant any future easements within the New Wellsite, Existing Wellsite and Production Facilities Operations Areas unless Patina consents in writing.

1.3 Pipeline Easements. Seltzer agrees that Patina may continue to construct, operate and maintain pipelines on the Property, in the areas depicted and/or described on Exhibit "B" as the "Pipeline Easements".

1.4 Limitation on Use of the Property. Except for the Operations Area(s) as provided in Section 1.1, and Pipeline Easements as provided in Section 1.3, and access as provided in Section 6, Patina shall not use or occupy any part of the surface of the Property except in the event of an emergency or for reasonably necessary incidental and temporary activities, provided, however, any incidental or temporary use shall require the prior consent of

Seltzer, such consent to not be unreasonably withheld. As part of the consideration for this limitation by Patina, of what would otherwise be the right to make reasonable use of any part of the Property in the conduct of their operations, and without limiting the applicability of Sections 12 and 13 below, Patina shall not be obligated to pay, and Seltzer hereby waives any right to receive, any surface damage payments, license or use fees, now or in the future, associated with the operations of Patina within the Operations Area(s). Notwithstanding the foregoing, Patina shall continue to be liable for damages to persons or damage to property as set forth in Section 12 below, and this Section 1.4 shall not be deemed to be a limitation of such liability other than for surface damages ordinarily paid for crop damages.

1.5 Limited Allowances: Seltzer shall place no buildings, fences, structures, or similar permanent improvements within any of the Operations Areas as defined in Section 1.1. However, within the New Wellsite and Existing Wellsite Operations Areas and within the Pipeline Easements, Seltzer/Subsequent Developer shall be allowed to place and designate property and boundary lines, and open spaces with no minimum setbacks.

In addition, Seltzer shall be allowed to place leach fields, landscaping, and watering systems ("Limited Improvements") within the New Wellsite Operations Areas, with the following limitations:

> These Limited Improvements within the New Wellsite Operations Areas must be located a minimum of 112.5 feet from the new wellsite, and must be located only on one side of the new wellsite. This one side shall be an area of a maximum of one half of a circle with a radius of three hundred (225) feet around the new wellsite location.

These Limited Allowances and Limited Improvements of Seltzer and Seltzer/Subsequent Developer shall be at their own expense and risk, acknowledging that Patina's normal operations may from time to time disturb or destroy said allowances. Seltzer and Seltzer/Subsequent Developer hereby agrees to install and maintain said allowances in such a way as to not violate the COGCC regulations or impede Patina's access and/or operations. Seltzer and Seltzer/Subsequent Developer hereby accept all responsibility for the cost of installation, repair and/or replacement of said allowances within the Pipeline Easements and Operations Areas and Patina shall not be responsible for damage to said allowances resulting from its future access or operations. Prior to commencing installation of the allowances, Seltzer and Seltzer/Subsequent Developer shall consult with Patina, to ensure that there are no adverse impacts upon Patina's ability to perform future operations. Patina shall not be liable for damage to or replacement of any such allowances. Seltzer, its successors and assigns do hereby indemnify Patina for damages and replacement costs of any of these allowances within any of the Operations Areas.

1.6. Without prior written consent from Patina, Seltzer shall not construct or allow the construction of dwellings or structures that contain an underground ignition source within sixty-five (65) feet on either side of the Pipeline Easements except at those locations where the pipeline is to be sleeved. At the locations where the pipeline is sleeved, without the prior written consent from Patina, Seltzer shall not construct or allow the construction of dwellings or structures that contain an underground ignition source within fifteen (15) feet on either side of the Pipeline Easements.

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1.7 Waiver of Certain Requirements. So long as Patina's operations have not substantially breached any material terms of this Agreement, Seltzer waives all setback requirements in COGCC Rule 603, or any successor rule or amendment to the COGCC setback rules, and to any other state or local setback requirements or other requirements or regulations that are, or become inconsistent with this Agreement or that would prohibit or interfere with the rights of Patina to explore for and produce the oil and gas in accordance with this Agreement. So long as Patina has not substantially breached this Agreement, Seltzer agrees that it will not object in any forum to the use by Patina of the surface of the Property consistent with this Agreement and that it will also provide Patina with whatever support in writing they may reasonably require to obtain permits from the COGCC or any local jurisdiction.

2. PRODUCTION FACILITIES. Patina operates tanks, separators or other production facilities located on the Property within the Operations Area(s) as described in Section 1.1 above. Without the prior written consent of Seltzer, Patina shall not locate additional facilities on the Property or expand the size and/or location of such facilities in the future. Pursuant to negotiations between Patina and Seltzer, and in accordance with Section 5, upon the written request of Seltzer/Subsequent Developer, Patina will use reasonable efforts to relocate the existing production facility currently located in the NW/4NE/4 to the Southwestern portion of the parcel comprising approximately 8 acres in the northeast corner of the NE/4. Any relocation is subject to approval of the new location by the gas gatherer and/or purchaser of said Production Facility.

Patina shall install and maintain fences, gates and locks reasonably necessary for the security of the existing Wells and/or existing production facilities in the Oil and Gas Operations Area. Such fences, gates and locks shall be installed at the expense of Seltzer/Subsequent Developer and maintained at the expense of Patina and shall be of a type and quality agreed between Seltzer/Subsequent Developer and Patina. If Patina drills new wells in the Operations Areas after approval of the final plat by Adams County Commissioners, then the fencing costs shall be borne entirely by Patina.

3. CONSTRUCTION AND REMOVAL. Seltzer/Subsequent Developer may request relocation or removal of certain pipelines and other production facilities in the future. Patina agrees to relocate the production facilities to a location mutually acceptable to Patina and Seltzer/Subsequent Developer. Patina shall install the relocated pipelines from the Wells to the intersection of that portion of pipeline that is not to be relocated within the Pipeline Easement and remove the abandoned segments of the pipeline. The pipeline will be constructed with casing sleeves and risers, all in accordance with the following terms and conditions:

3.1 Construction of Pipeline. In the event Seltzer/Subsequent Developer desires that Patina relocate pipelines in the future, Seltzer/Subsequent Developer shall submit a scaled plat to Patina indicating the exact location of pipelines to be relocated and abandoned as set forth in Section 5. Seltzer/Subsequent Developer shall complete the field staking for the installation of the new pipeline alignment and its required depth as provided below after giving written notice to Patina. The field staking will consist of a marker every thirty (30) feet, marking the desired depth of the pipeline, and the beginning and ending locations of portions of the pipeline. Casing sleeves shall be installed as identified on the scaled plat. [The sleeved segments of the pipeline shall have casing risers at each end of the sleeved segments and the field staking shall identify the location of casing risers and the beginning and ending of each sleeve. Within ninety (90)

TS

days following the completion of the field staking of the pipeline location, Patina will complete the construction of the pipeline along the routes staked in the field and identified by Seltzer/Subsequent Developer on the scaled plat. The pipeline shall be buried to a depth sufficient to result in forty-eight (48) inches below the proposed finished grade of the surface. In no event shall Patina be required to install pipelines at a depth exceeding six (6) feet below the grade existing at the time of installation.

3.2 Removal of Abandoned Pipeline. On the completion of construction of the new pipeline, Patina will remove that portion of the pipeline that was abandoned.

3.3 Line Crossings. If the surface development of the Property requires the crossing of Patina's relocated pipeline (within five (5) feet of a location that is not sleeved or two (2) feet of a location that is sleeved) by a sewer line, water line or other utility, Seltzer/Subsequent Developer shall notify Patina (a) of the date and time of the line crossing (the "Commencement Time"), and (b) when the line crossing has been completed (the "Completion Time"). If in response to Seltzer/Subsequent Developer's notification, Patina suspends production through the pipeline, then Seltzer/Subsequent Developer shall pay Patina for each calendar day or part thereof, beginning forty eight hours after the Commencement Time until the Completion Time. The payment shall be the sum of three hundred and fifty dollars ($350.00) per well per day calculated. Such payments shall be the agreed amount to compensate Patina for its response and any lost or delayed production, and shall be made to Patina within thirty (30) days of receipt of an invoice from Patina. In the event that Seltzer/Subsequent Developer notifies Patina more than once in any fourteen (14) day period, subsequent notices will be charged the full lost or delayed production rate as of the commencement time for said initial notice. Seltzer/Subsequent Developer shall maintain a distance of a minimum two (2) feet above or below the pipeline at any such crossings.

3.4 New Survey and Easement. If pipelines are moved to locations different than those depicted on Exhibit "B", Seltzer/Subsequent Developer shall survey the new locations and revise Exhibit's A & B accordingly.

4. CONSTRUCTION COORDINATION. Upon commencement by Patina of the construction operations pursuant to Sections 2 and 3 above, Seltzer/Subsequent Developer shall cease those operations on the Property that would unreasonably interfere with Patina's obligations pursuant to this Agreement. To the extent that Seltzer/Subsequent Developer's operations delay Patina's operations or upon the occurrence of an event of force majeure, Patina will not be subject to the performance time frames set forth in Sections 3 and 5.

5. CONSTRUCTION AND RELOCATION COSTS.

5.1 Upon written request by Seltzer/Subsequent Developer, in the event that Patina has made a third party contract to relocate the production facilities currently located in the NW/4 of the NE/4 pursuant to Section 2 of this Agreement, Seltzer/Subsequent Developer shall pay to Patina the sum of the consideration for that third party contract, but not to exceed ten thousand dollars ($10,000.00). In the event that Patina is unable to relocate the production facilities to the

said Northeast parcel, Seltzer/Subsequent Developer will not be required to pay any consideration under this Section.

5.2 Should Seltzer/Subsequent Developer desire that Patina relocate production facilities and/or pipelines, including those facilities referred to in Section 5.1; Seltzer/Subsequent Developer shall submit a scaled plat identifying the production facilities and pipelines to be relocated (the "Relocation Cost Request"). Within thirty (30) days from receipt thereof, Patina shall submit to Seltzer/Subsequent Developer an estimate of the cost to relocate the facilities and pipelines. Thirty (30) days prior to the date Seltzer/Subsequent Developer requires Patina to commence relocation operations, Seltzer/Subsequent Developer shall submit written notice and pay to Patina the Relocation Costs. Patina shall complete construction within ninety (90) days from the date the Relocation Costs are paid and notice of staking as set forth in Section 3.1 has been received, whichever is the later. The estimate of Relocation Costs shall expire one hundred twenty (120) days from the date of submitting the Relocation Cost Request. If Seltzer/Subsequent Developer desires at a subsequent date to request relocation of production facilities and pipelines, Seltzer/Subsequent Developer shall resubmit a Relocation Cost Request. Patina will prepare and submit a revised estimate of Relocation Costs. Seltzer/Subsequent Developer shall then pay the revised amount.

6. ACCESS.

6.1 If Seltzer/Subsequent Developer removes any prior access to any of Patina's operations on the property, then Seltzer/Subsequent Developer will provide adequate alternate access to the Operations Area(s) and Pipeline Easements, although the location of that access may vary from time to time in accordance with the needs and progress of such surface development.

6.2 Seltzer/Subsequent Developer will construct paved roads, reinforced curbs, reinforced gutters and reinforced sidewalks to accommodate Patina's access to the Operations Areas and Pipeline Easements and shall provide curb cuts at all "Access Points" as shown on Exhibit "B". The curb cuts at the Access Points shall be at least 30 feet wide. The paved roads leading to the Access Points, and the curbs, gutters and sidewalks at the Access Points shall be reinforced to accommodate a gross vehicle weight of at least 28,000 pounds per axle. Within thirty (30) days following completion of the pipeline relocation or paved road construction, or removal of existing access roads, whichever is the first to occur, Seltzer/Subsequent Developer will construct access roads from the Access Points to the existing wellsites, with a width of 15 feet, provide a 6 inch aggregate base course and turn such roads over to Patina for their further maintenance. Patina will construct all access roads from the Access Points to new wellsites that are not in existence as of the date of this Agreement.

7. NOTICE OF FUTURE OPERATIONS. Patina shall provide at least seven (7) days prior written notice to Seltzer, its successors and assigns in advance of any operations other than the drilling of the new wellsites, within the Operations Area(s) in connection with the reworking, fracturing, deepening or other unusual or other than routine operations on the Wells; provided, however, that Patina shall have immediate access in the event of an emergency. Patina shall provide at least thirty (30) days notice to Seltzer, its successors and assigns for the drilling of the

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new wellsites. The new wellsites locations shall be limited to the two locations shown on Exhibit "B" hereto and as set forth in Section 1.1.a hereof.

8. NOTICES TO HOMEOWNERS AND BUILDERS. Seltzer/Subsequent Developer shall record a plat or map showing the Oil and Gas Operations Area(s), Wells and Pipeline Easements in the real property records of Adams County, Colorado. In addition, Seltzer/Subsequent Developer shall record in the real property records of Adams County, Colorado a "Notice of Oil and Gas Operations", substantially in the form attached hereto as Exhibit "C" that conspicuously states that:

8.1 there may be ongoing oil and gas operations in the Oil and Gas Operations Area(s) and Pipeline Easements;

8.2 Purchasers of all or a portion of the Property, as successors in interest to the surface rights of Seltzer, will be acquiring a proportionate interest in some of Seltzer's rights and obligations under this Agreement, and will be subject to those obligations contained therein, and subject to the waivers and setback requirements as specified in the Agreement.

9. FUTURE OPERATIONS. Patina shall make all reasonable efforts to pursue any drilling, re-drilling, reworking and/or recompletion operations in a diligent and prudent manner so as to minimize the total time period on location, to avoid rig relocations or startup delays during the course of drilling, and to attempt to minimize the amount of surface area actually used. Seltzer waives and shall not assert any right to require that wellhead or production equipment be located in conformance with setback requirements different from those agreed to in this Agreement (including but not limited to those concerning any "high density" rules of the COGCC).

10. GOVERNMENTAL PROCEEDINGS.

10.1 As long as Patina is in compliance with this Agreement, Seltzer shall not, directly or indirectly, oppose or encourage opposition to Patina in any agency, administrative or other governmental proceedings, including but not limited to the COGCC, Adams County or other governing body proceedings, related to the operations of Patina on the Property, including but not limited to drilling and production activities, workovers, well deepenings, recompletions, fracturing, replacement wells and re-fracturing, provided that the position of Patina in such proceedings is not materially inconsistent with this Agreement.

10.2 As long as Seltzer is in compliance with this Agreement, Patina shall not directly or indirectly oppose or encourage opposition to Seltzer in any agency, administrative, Adams County or other governing body proceedings, relating to Seltzer's operations on and development of the Property, including residential and associated development, provided that Seltzer's position in such proceedings is not materially inconsistent with this Agreement.

11. FORCE MAJEURE

11.1 In the event either party is rendered unable, by an event of Force Majeure (defined below) to perform, wholly or in part, any obligation set forth in this Agreement, other than the obligation to pay money, then the performance by the affected party will be suspended during the continuance of such event of Force Majeure. The party experiencing an event of Force Majeure will provide reasonable notice to the other party as soon as possible with all reasonable dispatch. As used herein, the term "Force Majeure" shall mean any act of God, acts of the public enemy, wars, blockages, insurrections, riots, epidemics, landslides, lightning, earthquakes, fires, severe weather, floods, washouts, arrests and restraints of the federal, state or local government, civil disturbances, explosions, breakage or accidents to machinery or lines of pipe, the binding order of any court or governmental authority which has been resisted in good faith by all reasonable legal means, delay in securing environmental approvals, the inability to obtain necessary supplies, material, equipment, machinery or labor and any other causes, whether of the kind herein enumerated or otherwise not within the control of the party claiming suspension and which by the exercise of due diligence such party is unable to prevent or overcome.

12. LIMITATION OF LIABILITY, RELEASE AND INDEMNITY.

12.1. NO PARTY SHALL BE LIABLE FOR, OR BE REQUIRED TO PAY FOR, SPECIAL, PUNITIVE OR EXEMPLARY DAMAGES TO ANY OTHER PARTY FOR ACTIVITIES UNDERTAKEN WITHIN THE SCOPE OF THIS AGREEMENT.

12.2 Each party shall be and remain responsible for all liability for losses, claims, damages, demands, suits, causes of action, fines, penalties, expenses and liabilities, including without limitation reasonable attorneys' fees and other costs associated therewith (all of the aforesaid herein referred to collectively as "Claims"), arising out of or connected with each such party's ownership or operations, including each such parties' employees, agents, contractors, sub-contractors or other invitees on the Property, no matter when asserted, subject to applicable statutes of limitations. Each such party shall release, defend, indemnify and hold the other parties, their officers, directors, employees, successors and assigns, harmless against all such Claims that arise from its negligence and intentional misconduct. This provision does not, and shall not be construed to, create any rights in persons or entities not a party to this Agreement, nor does it create any separate rights in parties to this Agreement other than the right to be indemnified for Claims as provided herein.

13. EXCLUSION FROM INDEMNITIES. The indemnities of any party herein shall not cover or include any amounts, which the indemnified party may recoup from any third party, or that for which the indemnified party is reimbursed by any third party. The indemnities in this Agreement shall not relieve any party from any obligations to third parties.

14. NOTICE OF CLAIM FOR INDEMNIFICATION. If a Claim is asserted against a party for which another party would be liable under the provisions of Section 12 above, it is a condition precedent to the indemnifying party's obligations hereunder that the indemnified party give the indemnifying party written notice of such Claim setting forth all particulars of the Claim, as known by the indemnified party, including a copy of the Claim (if it is a written Claim). The indemnified party shall make a good faith effort to notify the indemnifying party

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within thirty (30) days of receipt of a Claim and shall affect such notice in all events within such time as will allow the indemnifying party to defend against such Claim.

15. REPRESENTATIONS. Each party represents that it has the full right and authority to enter into this Agreement and Seltzer specifically confirms their capacity to validly execute the rights of way and easements provided for herein. Patina represents that it owns the oil and gas leasehold interest in the Leases as set forth in Recitals B and C. Patina does not represent and specifically asserts that it does not have the right to bind any other oil and gas interest owner or lessee for the Property.

16. SUCCESSORS.

16.1 For purposes of this Agreement, the identification of "Seltzer" includes all successors and assigns of Seltzer. The terms, rights and obligations that are limited to Seltzer and the Subsequent Developer shall be covenants appurtenant, which run with the land to the extent that they are binding only on the heirs, executors, administrators, successors, and assigns of the immediate parties.

16.2 Except for the specific rights and obligations conferred only upon Seltzer and the Subsequent Developer pursuant to the limitation by the identification of "Seltzer/Subsequent Developer", the remaining terms, covenants and conditions of this Agreement shall be binding upon and shall inure to the benefit of the parties and their respective heirs, devises, executors, administrators, successors and assigns. This Agreement and all of the covenants herein, with the exception of those terms and covenants identified in Section 16.1, shall be covenants running with the land.

17. NOTICES. Any notice or other communication required or permitted under this Agreement shall be sufficient if in writing and deposited in the U.S. Mail, postage prepaid, with a copy sent via facsimile, or electronic means addressed to each of the following:

If to Patina Oil & Gas Corporation:

Patina Oil & Gas Corporation
1625 Broadway, Suite 2000
Denver, Colorado 80202
Attention: Land Department
FAX (303) 595-7410

If to Seltzer
Mr. Tim Seltzer, Co-Trustee
Robert L. Seltzer Family Trust
33641 Weld County Road 83
Briggsdale, Colorado 80611

Mr. Jack Seltzer, Co-Trustee
Robert L. Seltzer Family Trust
P.O. Box 360443
Monument Valley, Utah 84536

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Any party may, by written notice so delivered to the other party, change the address, fax number or individual to which delivery shall thereafter be made.

18. RECORDING. The Notice of Oil and Gas Operations and the plat or map required pursuant to Section 8 above shall be promptly recorded in the Office of the Clerk and Recorder for Adams County by Seltzer/Subsequent Developer, and Seltzer/Subsequent Developer shall provide the other parties with a copy thereof showing the recording information as soon as practicable thereafter.

19. SURFACE USE AGREEMENT. In consideration of the parties' respective rights, obligations and benefits, as outlined herein, this Agreement shall constitute a surface use or surface damage agreement provided for under the COGCC's Rules and Regulations or under any oil and gas leases covering the Property.

20. APPLICABLE LAW. This Agreement shall be governed by and construed in accordance with the laws of the State of Colorado, without reference to its conflict of laws provisions.

21. ENTIRE AGREEMENT. This Agreement sets forth the entire understanding among the Parties regarding the matters addressed herein, and supersedes any previous communications, representations or agreement, whether oral or written. This Agreement shall not be amended, except by written document signed by all parties.

22. HEADINGS. The section headings contained herein are for convenience in reference and are not intended to define or limit the scope of any provision of this Agreement.

23. TIME OF ESSENCE. Time is of the essence in this Agreement.

24. NON-WAIVER. Waiver by either party or of the failure of any party to insist upon the strict performance of any provision of this Agreement shall not constitute a waiver of the right or prevent any such party from requiring the strict performance of any provision in the future.

25. SEVERABILITY. Any covenant, condition or provision herein contained that is held to be invalid by any court of competent jurisdiction shall be considered deleted from this Agreement, but such deletion shall in no way affect any other covenant, condition or provision herein contained so long as such deletion does not materially prejudice a party in its rights and obligations contained in valid covenants, conditions or provisions. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws.

26. NO JOINT VENTURE. This Agreement is not intended to, nor shall it be interpreted to create a joint venture, partnership or any other relationship among the parties.

27. COUNTERPARTS. This Agreement may be executed by facsimile and in any number of counterparts, each of which shall be deemed an original instrument, but all of which together shall constitute but one and the same instrument.

28. CONFIDENTIALITY. Seltzer agrees to keep confidential this Agreement and all negotiations leading up to or relating to this Agreement. Seltzer shall not copy or distribute this Agreement or disclose the substance hereof or the nature of such negotiations to others outside of Patina and Seltzer unless required to do so by law.

Provided however, Seltzer may utilize this form of Agreement for an agreement with the leasehold owners of other formations in this Property. Additionally, Seltzer may disclose the terms of this Agreement to a Subsequent Developer pursuant to any negotiations/proceedings with that Subsequent Developer. Further, Seltzer agrees to provide a copy of this Agreement to the Subsequent Developer of the surface prior to the closing of any sale of the Property. Subsequent Developer must provide a copy of this Agreement to any other potential successor or assign of surface rights prior to the closing of any sale of all or any portion of the Property.

The parties have executed this Agreement as of the day and year first above written.

PATINA OIL & GAS CORPORATION

By: _____ Date: 2/5/04
David W. Siple, Vice President

THE ROBERT L. SELTZER FAMILY TRUST

By: _____ Date: 2/12/04
Jack Alden Seltzer, Co-Trustee

By: _____ Date: 2/5/04
Timothy R. Seltzer, Co-Trustee

ACKNOWLEDGMENTS

STATE OF COLORADO)
) ss.
CITY & COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this 5th day of February, 2004, by David W. Siple, Vice President for Patina Oil & Gas Corporation, a Delaware corporation, on behalf of that corporation.

Witness my hand and official seal.

My Commission expires: 2/9/2005

KATHRYN PORTUS NOTARY PUBLIC STATE OF COLORADO

_____
Notary Public

STATE OF Utah)
) **ss.**
COUNTY OF Carbon)

The foregoing instrument was acknowledged before me this 12th day of February, 2004, by Jack Alden Seltzer, as Co-Trustee of the Robert L. Seltzer Family Trust
Witness my hand and official seal.

Betty Jordan
Notary Public

My Commission expires: 8/31/04

NOTARY PUBLIC
BETTY JORDAN
45 South Carbon Ave.
Price, Utah 84501
Commission Expires
August 31, 2004
STATE OF UTAH

STATE OF COLORADO)
) **ss.**
COUNTY OF Denver)

The foregoing instrument was acknowledged before me this 5th day of February, 2004, by Timothy R. Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.
Witness my hand and official seal.

Dawn Jelaine DePriest
Notary Public

My Commission expires: February 13, 2007

DAWN JELAINE DEPRIEST NOTARY PUBLIC STATE OF COLORADO

Exhibit "A-1"

Attached to and made a part of that certain Agreement dated February 5, 2004, by and between Patina Oil & Gas Corporation and Robert L. Seltzer Family Trust

PROPERTY DESCRIPTION

The NE ¼ of Section 4, Township 1 South, Range 67 West of the 6th P.M., EXCEPT the East 40 feet conveyed to Adams County in instrument recorded March 10, 1923 in Book 101 at Page 527; also EXCEPT those portions of the Signal Reservoir as described in instruments recorded September 13, 1918 in Book 89 at Page 495 and March 11, 1920 in Book 106 at Page 46; also EXCEPT that part conveyed to Rex A. Seltzer and Lois Seltzer in instrument recorded March 2, 1992 in Book 3873 at Page 28.

Containing 114.165 Acres more or less

Exhibit "A-2"

Attached to and made a part of that certain Agreement dated February 5, 2004, by and between Patina Oil & Gas Corporation and Robert L. Seltzer Family Trust

OIL AND GAS LEASES

DATED: May 21, 1975

LESSOR: Seltzer Farms, Inc

LESSEE: Louis S. Madrid

LAND DESCRIPTION: Township 1 South, Range 67 West 6th P.M.,
Section 4: NE ¼
EXCEPT Plot 6-1/2

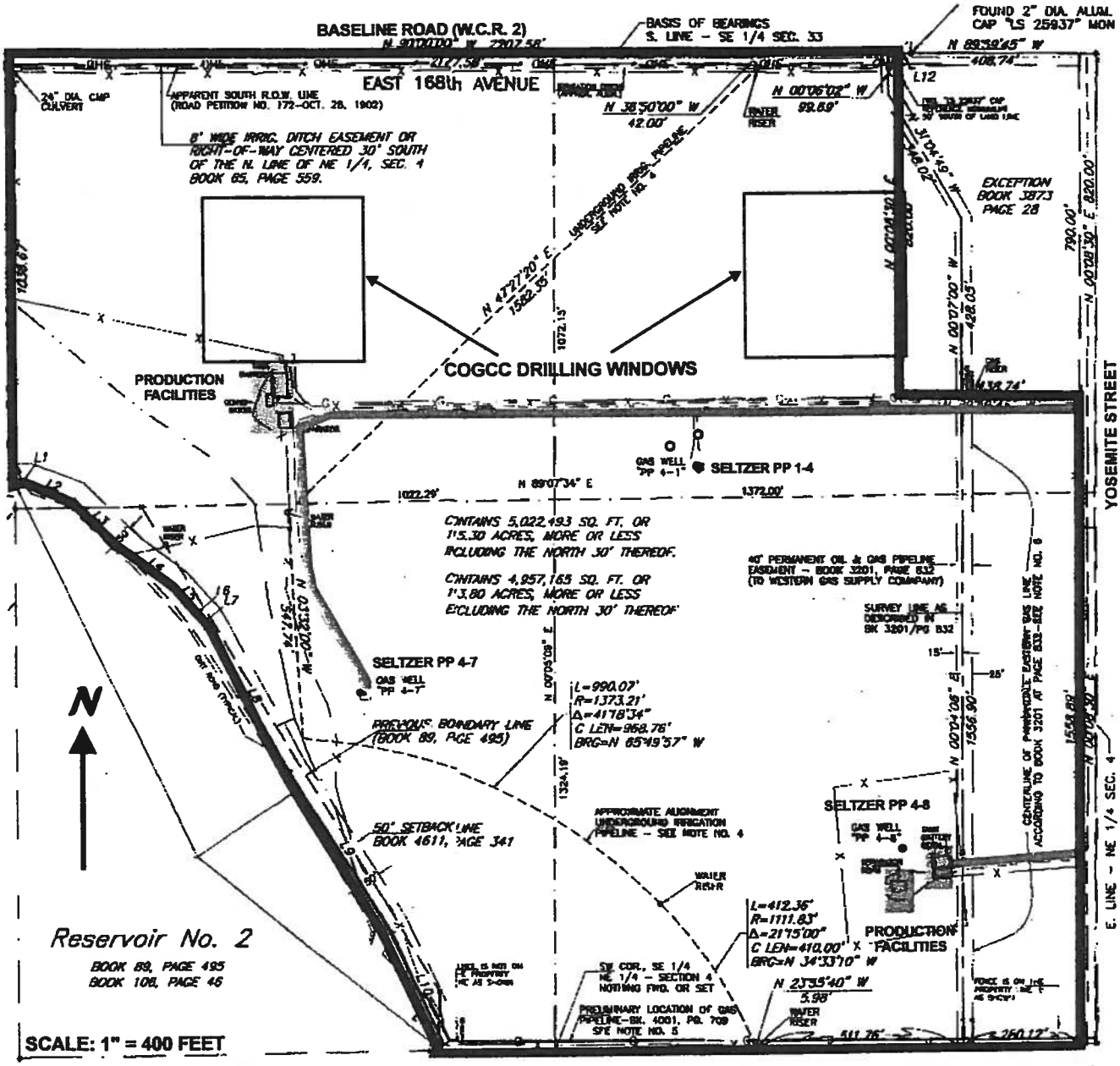
Containing 125.3 Acres m/l

TERM: Five Years from February 24, 1975

RECORDED: June 24, 1975, in Book 1997, Page 875

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EXHIBIT "B"
NE/4 OF SECTION 4
TOWNSHIP 1 SOUTH - RANGE 67 WEST
OF THE SIXTH PRINCIPAL MERIDIAN
ADAMS COUNTY, COLORADO



PRODUCTION FACILITY OPERATIONS AREA

EXISTING WELLSITE OPERATIONS AREA

PROPERTY BOUNDARY

ACCESS ROADS

PIPELINE EASEMENTS

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Exhibit "C"

Attached to and made a part of that certain Agreement dated February 5, 2004, by and between Patina Oil & Gas Corporation and Robert L. Seltzer Family Trust

NOTICE OF OIL AND GAS OPERATIONS

PLEASE TAKE NOTICE THAT PATINA OIL & GAS CORPORATION, a Delaware corporation, with an address of 1625 Broadway, Suite 2000, Denver, Colorado 80202,("Patina") and ROBERT L SELTZER FAMILY TRUST ("Seltzer"), C/O Timothy Robert Seltzer, Co-Trustee, 33641 Weld County Road 83, Briggsdale, Colorado 80611 and Jack Alden Seltzer, Co-Trustee, P.O. Box 360443, Monument Valley, Utah 84536 have entered into a Surface Use Agreement (the "Agreement") dated February 5, 2004 covering the following described lands (the "Property"):

Township 1 South, Range 67 West, 6th P.M.
Section 4: Parts of NE/4
County of Adams, Colorado
Containing 114.165 Acres More or Less

NOTICE IS HEREBY PROVIDED to all interested parties, including surface owners, their heirs, assignees and successors in interest, that pursuant to the Agreement, Patina, its agents, employees, designees, co-owners, successors and assigns have the right to use and access the surface of the Oil and Gas Operations Area and Pipeline Easements as defined in the Agreement for the purpose of , among other things, DRILLING, DEEPENING, WORKOVER, COMPLETION OR RECOMPLETION OPERATIONS OR CONTINUING ACTIVITIES FOR THE EXPLORATION, PRODUCTION OR TRANSPORTATION OF OIL, GAS, OR OTHER HYDROCARBONS OR PRODUCTS ASSOCIATED WITH THE FOREGOING INCLUDING, BUT NOT LIMITED TO, SURFACE USE, INGRESS TO, EGRESS FROM, AND CONSTRUCTION, MAINTENANCE, REPAIR, REPLACEMENT, AND MONITORING OF WELLS, LOCATIONS, EQUIPMENT, MUD AND RESERVE PITS, WELLHEAD EQUIPMENT, SEPARATORS, TANK BATTERIES, PIPELINES, GATHERING LINES, FLOWLINES, PIPELINE INTERCONNECTIONS, AND ANY AND ALL OTHER REASONABLE OR CUSTOMARY USES OF LAND RELATED TO SAID OPERATIONS OR ACTIVITIES.

FURTHERMORE, purchasers of all or any portion of the Property, as successors to Seltzer, acquire a proportionate interest in Seltzer's rights and obligations under the Agreement and are subject to the waivers contained in the Agreement, including the waiver of all setback requirements in Colorado Oil and Gas Conservation Commission ("COGCC") Rule 603, or any successor rule or amendment to the COGCC setback rules, and to any other state or local setback requirements or other requirements or regulations that are or become inconsistent with the Agreement or that would prohibit or interfere with the rights of Patina to explore for and produce oil and gas in accordance with the Agreement.

The Agreement has been recorded in the real property records of the County of Adams, Colorado on _____, 2004 at Reception Number _____.

This notice may be executed by facsimile and in any number of counterparts, each of which shall be deemed an original instrument, but all of which together shall constitute but one and the same instrument.

PATINA OIL & GAS CORPORATION

_____ Date:_____
David W. Siple
Vice President

ROBERT L. SELTZER TRUST

By: _____ Date:_____
Jack Alden Seltzer, Co-Trustee

By: _____ Date:_____
Timothy R. Seltzer, Co-Trustee

ACKNOWLEDGEMENTS

STATE OF COLORADO)
CITY AND) ss.
COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this ____ day of _____, 2004, by David W. Siple as Vice President of Patina Oil & Gas Corporation, a Delaware corporation.

[SEAL]

My commission expires: _____

_____
Notary Public

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2004, by Jack Alden Seltzer, Co-Trustee of the Robert L. Seltzer Trust, on behalf of that trust.

Witness my hand and official seal.

_____
Notary Public

My Commission expires: _____

STATE OF COLORADO)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2004, by Timothy Robert Seltzer, Co-Trustee of the Robert L. Seltzer Trust, on behalf of that trust.

Witness my hand and official seal.

_____
Notary Public

My Commission expires: _____

FIRST AMENDMENT OF SURFACE USE AGREEMENT

THIS FIRST AMENDMENT OF SURFACE USE AGREEMENT (the "Amendment") is made and entered as of 1st day of December 2015, (the "Effective Date") by and among **EXTRACTION OIL & GAS, LLC** ("**Operator**") whose address is 370 17th Street, Suite 5300, Denver, CO 80202, and the **ROBERT L. SELTZER FAMILY TRUST**, ("**Seltzer**"), Jack Alden Seltzer as Co-Trustee with an address of P.O. Box 3154, 4638 N, Caughran Rd., Camp Verde, AZ 86322 and Timothy R. Seltzer as Co-Trustee with an address of 33641 WCR 83, Briggsdale Colorado 80611. Operator and Seltzer may sometimes be referred to in this Amendment individually as a "**Party**" or collectively as the "**Parties**. This Amendment modifies that certain Surface Use Agreement between Seltzer and Patina Oil and Gas Corporation dated February 6, 2004 ("**Noble SUA**") which is attached to and by reference made part of this Agreement as **Exhibit A**.

RECITALS

A. Operator is the successor to Noble Energy, Inc. ("**Noble**"), Operator's predecessor in interest with respect to a leased interest, Noble's rights with respect to explore, develop and produce from certain property ("**Property**") which is specifically described in **Exhibit B**, attached hereto and by reference made a part hereof;

B. Seltzer and Operator wish to amend the Noble SUA with respect to the right to plug and abandon certain wells; and

C. Seltzer and Operator wish to amend the Noble SUA with respect to the right to drill additional wells on the Property.

NOW, THEREFORE, in consideration of the covenants set forth herein and the mutual benefits to be derived by the parties hereto, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties do hereby agree to amend the Noble SUA as follows:

1. In accordance with the letter agreement between Operator and Seltzer dated January 20, 2016, Operator shall pay Seltzer the agreed upon amount within thirty (30) days of the commencement of any future well that is drilled on the Property.

2. The description of the Property in Exhibit "A-1" is replaced by the description in Exhibit B to this Amendment, which is attached to and by reference made part hereof.

3. The two COGCC Drilling Windows shown on Exhibit "B" are replaced by the description of the one area described in Exhibit C of this Amendment, which is attached to and by reference made part hereof. All future wells on the Property will be drilled from the new, single drilling area, the new Designated Area for Operations, described in Exhibit C of this Amendment.

4. Extraction will promptly plug and abandon the below-described four (4) wells on the Property once as generally described in the email message dated December 7th, 2015 from Joseph Silipo, Landman for Extraction, to Mark T. Nesbitt:

   Seltzer 1
   Seltzer PP 4-7
   Seltzer 1-4
   Seltzer 4-8

4. The following provision is added at the end of Subsection 1.4:

Subsurface Right-of-Way. Seltzer further grants Operator a subsurface right-of-way through the Property for the purpose of drilling, completing, operating and maintaining oil and gas wells that may produce and drain oil, natural gas, and associated hydrocarbons from lands other than the Property and lands pooled with the Property.

5. Section 7, Notice of Future Operations is amended by:

a. Deleting the sentence, "Patina shall provide at least thirty (30) days notice to Seltzer, its successors and assigns for the drilling of the new wellsites."

b. Adding the following provision:

No waiver of COGCC notices and other regulatory matters. Seltzer expressly does not waive the following notices and consultations and shall not object or protest any Application for Permit to Drill (Form 2) and Oil and Gas Location Assessment (Form 2A) filed by Operator with the COGCC:

A. Rule 305.a.: Notice of Intent to Conduct Oil and Gas Operations;

B. Rule 305.c.(1): Oil and Gas Location Assessment Notice;

C. Rule 305.c.(2): Buffer Zone Notice;

D. Rule 305.f: Statutory Notice to Surface Seltzers;

E. Rule 305.h.: Move-In, Rig-Up Notice;

F. Rule 306.a.: Surface Seltzer Consultation and Meeting Procedures; and

G. Any other notice or consultation requirements of the COGCC.

H. Operator will incorporate the applicable provisions of this Agreement into the applicable Form 2A.

I. Notwithstanding anything to the contrary in this Amendment, Seltzer may object to the Form 2A, so long as the objection is based on a matter that Seltzer believes is consistent with the Noble SUA as amended by this Agreement.

J. Seltzer grants consent to drill future wells within the drilling area defined by the survey description attached hereto as **Exhibit C** ("Designated Area for Operations").

K. Seltzer understands that Operator may provide a copy of this Agreement to the COGCC in order to obtain a waiver, exception location, or variance from the COGCC rules or from a local jurisdiction. Seltzer also agrees that it will not object in any forum to the use by Operator, provided that Operator's use is in accordance the Noble SUA as amended by this Agreement and that it will also provide Operator with its reasonable written

support which may be reasonably required for Operator to obtain permits from the COGCC or any local jurisdiction.

6. The content of Section 17 is replaced with the following new provision:

NOTICES. All notices shall be given by personal delivery to the intended party to this Agreement by electronic communication, capable of producing a printed transmission, registered or certified mail return receipt requested, or overnight or other express courier service. All notices shall be effective and shall be deemed given when received on the date of receipt at the principal address if received during normal business hours, and, if not received during normal business hours, on the next business day following receipt, or if by electronic communication, on the date of such communication. Any party may change its address for notice purposes by notice properly given.

Seltzer:

Robert L. Seltzer Family Trust
Timothy R, Seltzer, Co-trustee
33641 Weld County Road 83
Briggsdale, CO 80611

Robert L. Seltzer Family Trust
Jack Seltzer, Co-Trustee
4638 N. Caughran Road
Camp Verde, AZ 86322

Operator:

Extraction Oil & Gas, LLC
370 17th Street, Suite 5300
Denver, CO 80202
Phone: (720) 974-2021
Attn: Jamison McIlvain

7. Governing Law. This Agreement shall be construed and enforced in accordance with the laws of the State of Colorado except for conflict of laws and insofar as it may become necessary to comply with federal statutes, rules or regulations.

8. Recording. The Parties agree that either Owner or Operator may record this Agreement in the real estate records of Adams County, Colorado.

9. Counterparts. This Agreement may be executed by facsimile or electronic mail, in counterparts, each of which will be considered an original and enforceable against either Party.

The Parties have executed this Amendment as of the day and year first above written.

Extraction Oil & Gas, LLC

By: _____
Jamison McIlvain
Title: Landman

Robert L. Seltzer Family Trust

By: _____ Title
Jack Alden Seltzer, Co-Trustee

By: _____
Timothy Robert. Seltzer, Co-Trustee

ACKNOWLEDGMENTS

STATE OF ARIZONA)
)ss.
COUNTY OF)

The foregoing instrument was acknowledged before me on this 15th day of December 2015, by **Jack Alden Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.**

Witness my hand and official seal.
My commission expires: 2/9/16

(SEAL)

Heidi Ashby
NOTARY PUBLIC - ARIZONA
YAVAPAI COUNTY
My Commission Expires
February 9, 2016

Notary Public

STATE OF COLORADO)
)ss.
COUNTY OF)

The foregoing instrument was acknowledged before me on this _____ day of _____ 2015, by **Timothy Robert Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.**

Witness my hand and official seal.
My commission expires: _____

(SEAL)

_____
Notary Public

STATE OF COLORADO)
)ss.
COUNTY OF)

The foregoing instrument acknowledged before me on this ____ day of _____ 2015, by **Jamison McIlvain on behalf of, and landman for, Extraction Oil & Gas, LLC.**

Witness my hand and official seal.

My commission expires: _____

(SEAL)

_____
Notary Public

By: Timothy Robert Seltzer TTEE
Timothy Robert. Seltzer, Co-Trustee

ACKNOWLEDGMENTS

STATE OF ARIZONA)
)ss.
COUNTY OF)

The foregoing instrument was acknowledged before me on this _____ day of _____ 2015, by **Jack Alden Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.**

Witness my hand and official seal.

My commission expires: _____

_____
(SEAL) Notary Public

STATE OF COLORADO)
)ss.
COUNTY OF Weld)

The foregoing instrument was acknowledged before me on this 14th day of December 2015, by **Timothy Robert Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.**

Witness my hand and official seal.

My commission expires: 8/10/15

_____
Notary Public

(SEAL) Tonya June Kimble
Notary Public
State of Colorado
Notary ID 20094025447
My Commission Expires August 10, 2017

Exhibit A

to that First Amendment of Surface Use Agreement
between the Robert L. Seltzer Family Trust
and
Extraction Oil & Gas, LLC

That certain Surface Use Agreement between Owner and Patina Oil and Gas Corporation dated February 6, 2004 follows on the next page.

Exhibit B

to that First Amendment of Surface Use Agreement
between the Robert L. Seltzer Family Trust
and
Extraction Oil & Gas, LLC

Property

Parcel B of recorded exemption Case No. 124-91-E-Z recorded April 14, 1992 at Reception No. B1059706, except any portion thereof lying within East 168th Avenue, and except those portions taken by rule and Order of the District Court, Case N0. 2009CV259, a transcript of which was recorded August 6, 2010 at Reception No. 2010000052390 and March 3, 2011 at Reception No. 2011000014415, County of Adams, State of Colorado.

Exhibit C

to that First Amendment of Surface Use Agreement
between the Robert L. Seltzer Family Trust
and
Extraction Oil & Gas, LLC

Designated Area for Operations

LEGAL DESCRIPTION:

A PARCEL OF LAND LOCATED IN THE NORTHWEST QUARTER OF SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEARINGS CONTAINED HEREIN ARE BASED ON ASSUMPTION THAT THE NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN BEARS N 90°00'00" E BETWEEN A FOUND 3.25" ALUMINUM CAP MONUMENT IN RANGE BOX, WITH ILLEGIBLE STAMPING, AT THE NORTH QUARTER CORNER OF SAID SECTION 4 AND A FOUND 3.25" ALUMINUM CAP MONUMENT STAMPED LS 25937 AT THE SOUTHEAST CORNER OF SECTION 33, TOWNSHIP 1 NORTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN.

COMMENCING AT A FOUND 3.25" ALUMINUM CAP MONUMENT IN RANGE BOX, WITH ILLEGIBLE STAMPING, AT THE NORTH QUARTER CORNER OF SECTION 4 TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN;

THENCE N 90°00'00" E ALONG THE NORTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION 4 A DISTANCE OF 127.00 FEET;

THENCE DEPARTING SAID NORTH LINE S 00°00'00" W A DISTANCE OF 229.00 FEET TO THE NORTHWEST CORNER OF AN 8.01 ACRE DRILL AREA AND BEING THE POINT OF BEGINNING;

THENCE S 90°00' 00" E ALONG THE NORTHERLY LINE OF SAID DRILL AREA A DISTANCE OF 590.69 FEET TO THE NORTHEAST CORNER OF SAID DRILL AREA;

THENCE S 00°00' 00" W ALONG THE EASTERLY LINE OF SAID DRILL AREA A DISTANCE OF 590.69 FEET TO THE SOUTHEAST CORNER OF SAID DRILL AREA;

THENCE N 90°00' 00" W ALONG THE SOUTHERLY LINE OF SAID DRILL AREA A DISTANCE OF 590.69 FEET TO THE SOUTHWEST CORNER OF SAID DRILL AREA;

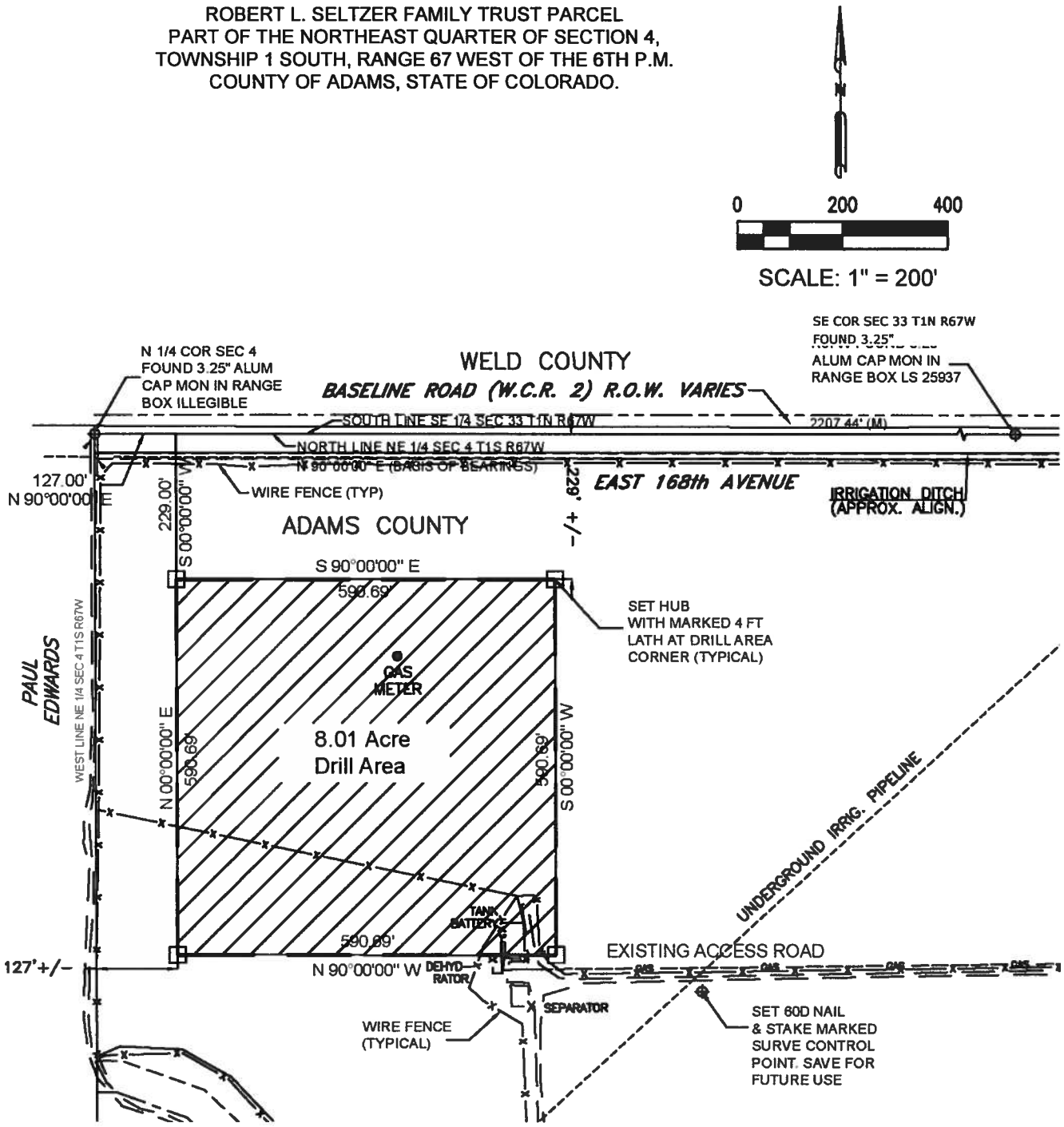
THENCE N 0°00' 00" E ALONG THE WESTERLY LINE OF SAID DRILL AREA A DISTANCE OF 590.69 FEET TO THE POINT OF BEGINNING.

PARCEL CONTAINS: 348,914.676 SQUARE FEET OR 8.01 ACRES MORE OR LESS.

PREPARED BY:

ROBERT A. RICKARD, PLS
COLORADO PROFESSIONAL
LAND SURVEYOR NO. 28283
FOR AND ON BEHALF OF ROCK CREEK SURVEYING, LLC
3021 GARDENIA WAY, SUPERIOR, CO 80027, PHONE: 303-521-7376

OIL & GAS DRILL AREA
ROBERT L. SELTZER FAMILY TRUST PARCEL
PART OF THE NORTHEAST QUARTER OF SECTION 4,
TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH P.M.
COUNTY OF ADAMS, STATE OF COLORADO.



NOTES:

1) THE PURPOSE OF THIS EXHIBIT IS TO DEPICT A PROPOSED 8.01 ACRE DRILL AREA ON A PORTION OF THE ROBERT L. SELTZER FAMILY TRUST PROPERTY.
2) FIELD DATE 8-7-2015.
3) THIS EXHIBIT IS NOT A LAND SURVEY PLAT IN CONFORMANCE WITH CRS 38-51-106.
4) MAP FEATURES FROM FIELD SURVEY AND CLIENT PROVIDED SURVEY INFORMATION.
4) ALL INFORMATION SHOWN SHOULD BE FIELD VERIFIED PRIOR TO DRILL AREA IMPROVEMENTS.

ROCK CREEK
SURVEYING, LLC
LAND SURVEYING SERVICES
3021 GARDENIA WAY
SUPERIOR, CO 80027
Phone: 303-521-7376

Prepared By:
ROBERT A. RICKARD, CO PLS 28283 Date: 10-14-2015

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 1 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

SECOND AMENDMENT AND RATIFICATION OF SURFACE USE AGREEMENT

This **SECOND AMENDMENT AND RATIFICATION OF SURFACE USE AGREEMENT** (the "Second Amendment and Ratification") is made and entered into as of this 19th day of January, 2017 (the "Effective Date") by and among **GRIZZLY PETROLEUM COMPANY, LLC** ("Grizzly"), whose address is 1801 Broadway, Suite 500, Denver, CO 80202, on the one hand and Jack Alden Seltzer, whose address is 4638 N. Caughran Road, Camp Verde, AZ 86322 and Timothy R. Seltzer, whose address is 33641 Weld County Road 83, Briggsdale, CO 80611, each as co-trustee of that certain **ROBERT L. SELTZER FAMILY TRUST** (collectively, "Seltzer") on the other hand. Grizzly and Seltzer may sometimes be referred to in this Second Amendment and Ratification individually as a "Party" or collectively as the "Parties." This Second Amendment and Ratification adopts, ratifies, and amends that certain Surface Use Agreement by and between the Robert L. Seltzer Family Trust and Patina Oil and Gas Corporation dated February 5, 2004 (the "SUA"), and that certain First Amendment of Surface Use Agreement by and between the Robert L. Seltzer Family Trust and Extraction Oil and Gas, LLC dated December 1, 2015 (the "First Amendment").

RECITALS

A. WHEREAS, the Robert L. Seltzer Family Trust and Patina Oil and Gas Corporation ("Patina") previously entered into the SUA;

B. WHEREAS, the Robert L. Seltzer Family Trust and Extraction Oil and Gas, LLC (as successor-in-interest to Patina Oil and Gas Corporation) ("Extraction") previously entered into the First Amendment;

C. WHEREAS, Grizzly is the successor-in-interest to both Patina and Extraction and the assignee of the interests of Patina and Extraction in and to the SUA and the First Amendment;

D. WHEREAS, the Parties desire to adopt, ratify, approve and confirm both the SUA and the First Amendment and further adopt, ratify, approve and confirm that Grizzly, as successor-in-interest to Patina and Extraction, shall be considered a party to the SUA, the First Amendment, and this Second Amendment and Ratification; and

E. WHEREAS, the Parties desire to amend certain provisions of the SUA and the First Amendment regarding Grizzly's planned operations on Seltzer's property.

NOW, THEREFORE, in consideration of the covenants set forth herein and the mutual benefits to be derived by the Parties hereto, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties do hereby agree as follows:

1. The Parties do hereby adopt, ratify, approve and confirm the SUA, which is attached as Exhibit 1 hereto and adopted by reference herein. Further, the Parties adopt, ratify, approve and confirm that, with respect to the SUA, Grizzly is the successor-in-interest to Patina and Extraction and the assignee of the interests of Patina and Extraction in and to the SUA.

2. The Parties do hereby adopt, ratify, approve and confirm the First Amendment, which is attached as Exhibit 2 hereto and adopted by reference herein. Further, the Parties adopt, ratify, approve and confirm that, with respect to the First Amendment, Grizzly is the successor-in-interest to Extraction and the assignee of the interests of Extraction in and to the First Amendment.

3. Exhibit C to the First Amendment, which replaced Exhibit B to the SUA, shall be replaced by Exhibit 3 attached hereto and adopted by reference herein, and the lands depicted on Exhibit 3 shall constitute the "Operations Area(s)" as that term is used in the SUA. All future wells on the Property (as that term is defined in the SUA) shall be drilled from the new, single drilling area described on Exhibit 3 of this Second Amendment and Ratification and all facilities shall be located as described on Exhibit 3 of this Second Amendment and Ratification.

4. Grizzly's address for notices, as set forth in Section 17 of the SUA and thereafter amended by Section 6 of the First Amendment, shall be amended to the following:

Grizzly Petroleum Company, LLC
1801 Broadway, Suite #500
Denver, CO 80202
Phone: (303) 398-0302
Attn: Steve Stacy

5. If an ambiguity or question of intent or interpretation of this Second Amendment and Ratification arises, this Second Amendment and Ratification will be construed as if jointly drafted by the Parties, and no presumption or burden of proof shall arise favoring or disfavoring a Party as a result of authorship or drafting of any provision of the Second Amendment and Ratification.

6. This Second Amendment and Ratification may be executed in counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same instrument. Facsimile and electronic copies of signatures shall be deemed to be original signatures for all purposes.

7. This Second Amendment and Ratification shall be construed and enforced in accordance with the laws of the State of Colorado except for conflict of laws and insofar as it may become necessary to comply with federal statutes, rules or regulations.

8. The Parties agree that either Seltzer or Grizzly may record this Second Amendment and Ratification, including all exhibits attached hereto, in the real estate records of Adams County, Colorado.

9. Except as described in this Second Amendment and Ratification, the SUA, as amended by the First Amendment, remains in full force and effect.

[The remainder of this page has intentionally been left blank. Signature page follows.]

(12)

EXECUTED this 23rd day of January, 2017, but effective as of the Effective Date.

Operator:
Grizzly Petroleum Company, LLC

By: _____
Steve R. Stacy, Vice President

C 515

Seltzer:
Jack Alden Seltzer, as co-trustee of the Robert L. Seltzer Family Trust

By: _____
Jack Alden Seltzer

Timothy R. Seltzer, as co-trustee of the Robert L. Seltzer Family Trust

By: _____
Timothy R. Seltzer

[The remainder of this page has intentionally been left blank. Acknowledgments follow.]

EXECUTED this 24th day of January, 2017, but effective as of the Effective Date.

Operator:
Grizzly Petroleum Company, LLC

By: _____
Steve R. Stacy, Vice President

C SIF

Seltzer:
Jack Alden Seltzer, as co-trustee of the Robert L. Seltzer Family Trust

By: _____
Jack Alden Seltzer

Timothy R. Seltzer, as co-trustee of the Robert L. Seltzer Family Trust

By: _____
Timothy R. Seltzer

[The remainder of this page has intentionally been left blank. Acknowledgments follow.]

4 AS

ACKNOWLEDGEMENTS

STATE OF COLORADO)
) ss
CITY AND COUNTY OF DENVER)

Before me, the undersigned, a Notary Public in and for said County and State, on this 23rd day of January, 2017, personally appeared Steve R. Stacy, personally known to me or proved to me by satisfactory evidence to be the person who executed the within and foregoing instrument as the Vice President of Grizzly Petroleum Company, LLC and acknowledged to me that he executed the same as his free and voluntary act and deed and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires: 8/13/2017

JEFFREY L FARQUHAR
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20134052109
MY COMMISSION EXPIRES AUGUST 13, 2017

Notary Public
Address: 1480 Grape Street
Denver, CO 80220

STATE OF COLORADO)
) ss
COUNTY OF _____)

Before me, the undersigned, a Notary Public in and for said County and State, on this _____ day of January, 2017, personally appeared Jack Alden Seltzer, personally known to me or proved to me by satisfactory evidence to be the person who executed the within and foregoing instrument as the co-trustee of the Robert L. Seltzer Family Trust, and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires: _____

Notary Public
Address:

STATE OF COLORADO)
) ss
COUNTY OF Adams)

Before me, the undersigned, a Notary Public in and for said County and State, on this _____ day of January, 2017, personally appeared Timothy R. Seltzer, personally known to me or proved to me by satisfactory evidence to be the person who executed the within and foregoing instrument as the co-trustee of the Robert L. Seltzer Family Trust, and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires: 8/13/2017

JEFFREY L FARQUHAR
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20134052109
MY COMMISSION EXPIRES AUGUST 13, 2017

Notary Public
Address: 1480 Grape Street
Denver, CO 80220

ACKNOWLEDGEMENTS

STATE OF COLORADO)
) ss
CITY AND COUNTY OF DENVER)

Before me, the undersigned, a Notary Public in and for said County and State, on this 23rd day of January, 2017, personally appeared Steve R. Stacy, personally known to me or proved to me by satisfactory evidence to be the person who executed the within and foregoing instrument as the Vice President of Grizzly Petroleum Company, LLC and acknowledged to me that he executed the same as his free and voluntary act and deed and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires: 8/13/2017

JEFFREY L FAROUHAR
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20134052109
MY COMMISSION EXPIRES AUGUST 13, 2017

Notary Public
Address: 1480 Grape Street
Denver, CO 80220

STATE OF ~~COLORADO~~ ARIZONA)
) ss
COUNTY OF YAVAPAI)

Before me, the undersigned, a Notary Public in and for said County and State, on this 24TH day of January, 2017, personally appeared Jack Alden Seltzer, personally known to me or proved to me by satisfactory evidence to be the person who executed the within and foregoing instrument as the co-trustee of the Robert L. Seltzer Family Trust, and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires: August 19, 2019

OFFICIAL SEAL
STACEY L. MASTERS
NOTARY PUBLIC - State of Arizona
YAVAPAI COUNTY
My Comm. Expires August 19, 2019

Notary Public
Address: 563 FINNIE FLAT RD
CAMP VERDE AZ 86322

STATE OF COLORADO)
) ss
COUNTY OF Adams)

Before me, the undersigned, a Notary Public in and for said County and State, on this _____ day of January, 2017, personally appeared Timothy R. Seltzer, personally known to me or proved to me by satisfactory evidence to be the person who executed the within and foregoing instrument as the co-trustee of the Robert L. Seltzer Family Trust, and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires: 8/13/2017

JEFFREY L FAROUHAR
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20134052109
MY COMMISSION EXPIRES AUGUST 13, 2017

Notary Public
Address: 1480 Grape Street
Denver, CO 80220

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 7 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

Exhibit 1

Attached to, and made a part hereof, that certain Second Amendment and Ratification of Surface Use Agreement dated January 19th, 2017, between Jack Alden Seltzer and Timothy R. Seltzer, each co-trustee of that certain Robert L. Seltzer Family Trust, as Grantors

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 8 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

SURFACE USE AGREEMENT

THIS SURFACE USE AGREEMENT (the "Agreement") is made and entered into this 5th day of February, 2004, (the "Effective Date") by and among **PATINA OIL & GAS CORPORATION** ("Patina"), a Delaware corporation, 1625 Broadway Suite 2000, Denver, Colorado 80202, and the ROBERT L. SELTZER FAMILY TRUST, ("Seltzer"), by Jack Alden Seltzer as Co-Trustee with an address of P.O. Box 360443, Monument Valley, Utah 84536 and Timothy R. Seltzer as Co-Trustee with an address of 33641 WCR 83, Briggsdale Colorado 80611.

RECITALS

A. Seltzer is the owner of the surface estate of a 114.165 ± acre tract of land of which is located in the NE/4 of Section 4, Township 1 South, Range 67 West of the 6th P.M., County of Adams, State of Colorado (the "Property"). The Property is more specifically described on Exhibit "A-1" attached hereto and made a part hereof.

B. The mineral estate in and under the Property is presently subject to valid and subsisting oil and gas leases (the "Leases"), a portion of which leasehold interest is owned of record by Patina. The Leases are more specifically described on Exhibit "A-2" attached hereto and made a part hereof.

C. Patina's leasehold rights include, among other things, the right of reasonable ingress and egress for the purposes of exploration, development, drilling, re-drilling, testing, completion, re-completion, re-entry, deepening, fracturing, re-fracturing, stimulation, reworking, production and maintenance operations associated with oil and gas wells from the surface to the base of the J-Sand excepting the surface to base of the Sussex formation in the N/2NE/4 of the Property and the associated pipelines and production facilities to be located on the Property.

D. Patina currently operates the Seltzer 1-4 well, the Seltzer PP 4-7 well and the Seltzer PP 4-8 well on the Property and has the right to drill two (2) future vertical wells in the N/2NE/4 (collectively the "Wells") located on the Property, all in the NE/4 of Section 4, Township 1 South, Range 67 West of the 6th P.M., and their associated flow lines and production facilities located on the Property.

E. Seltzer desires to have a Developer undertake certain development of the surface of the Property, including residential housing.

F. Developer shall be defined as the party who will subdivide and develop the Property into residential housing and who acquires this Property as a whole undeveloped parcel for that purpose of surface development. Within this Agreement, the Developer will be referred to as "Subsequent Developer".

The Subsequent Developer shall have all the same rights and obligations as Seltzer as outlined in this Agreement. It is the intention of the parties that this Agreement includes certain rights, provisions and obligations conferred upon Seltzer and the Subsequent Developer, but not to their successors and assigns. These rights and obligations are specifically identified and limited within the Agreement as

"Seltzer/Subsequent Developer" and are included in Section 1.1.a, 1.2, 1.5, 2, 3, 3.1, 3.3, 3.4, 4, 5.1, 5.2, 6.1, 6.2, 8, and 18.

G. Patina and Seltzer enter into this Agreement to provide for the coexistence and joint development of the surface estate and the oil and gas estate of the Property, and to delineate the process by which the parties, the Subsequent Developer, and their successors and assigns shall comply with respect to the development of the two estates.

NOW, THEREFORE, in consideration of the covenants set forth herein and the mutual benefits to be derived by the parties hereto, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties do hereby agree as follows:

1. AREA RESERVED FOR OIL AND GAS OPERATIONS.

1.1. Oil and Gas Operations. Patina shall have the continued right to deepen, recomplete, fracture, re-fracture, stimulate and rework the Wells, and Seltzer agrees that Patina may continue to utilize the area depicted and/or described on Exhibit "B" attached hereto and made a part hereof as the "Operations Area(s)" for the wellsite, production facilities, pipelines and access roads for such operations. The Operations Area(s) shall be deemed to include the areas as follows:

a. New Wellsite Operations Areas: There shall be two new wellsites on the Property; these new wellsites shall be located in the N/2 of the NE/4. The Operations Area for each new wellsite shall be a rectangle area with the dimensions being 275 feet x 250 feet around each new wellsite location. Subject to Patina's consent, which consent shall not be unreasonably withheld, Seltzer/Subsequent Developer shall select each new wellsite location pursuant to the following procedure:

Exhibit "B" reflects two drilling windows, one for each of the new wellsite locations. These drilling windows have dimensions of 400 feet x 400 feet and have been designated by Colorado Oil and Gas Conservation Commission, ("COGCC"), in the N/2 of the NE/4 of the section. Subject to Patina's consent, which consent shall not be unreasonably withheld, Seltzer/Subsequent Developer shall choose one wellsite location in each drilling window; if feasible, such locations shall be in the North half of each drilling window. Unless Patina consents in writing, these new wellsite locations must be a minimum of 1,320 feet from each other and from any other existing wells in the NE/4.

Six (6) months after the date of completion of a New Well, the Operations Area for that completed well will be deemed to be an Existing Wellsite Operations Area pursuant to Section 1.1.b.

b. Existing Wellsite Operations Areas: The Operations Area around Existing Wellsites shall be a square with the dimensions of 225feet x 225 feet. This square of Operations Area shall be centered exactly around the existing wellsite. These existing wellsites are the Seltzer 1-4 well located in the NE/4NE/4 (990'FNL, 990' FEL), the Seltzer PP 4-7 well located in the SW/4NE/4 (1540' FNL, 1799' FEL), and the Seltzer PP 4-8 well located in the SE/4NE/4 (1910' FNL, 470'FEL).

9 (15)

c. Production Facilities Operations Area(s): Pursuant to Section 2 of this Agreement, there shall be a fence around the production facilities. These fence(s) shall delineate the Production Facilities Operations Area(s). At their discretion, Patina may fence each separate piece of production facility equipment, instead of the entire perimeter of the Production Facility. In this event, the non-fenced area between each of the fenced facility pieces of equipment shall be deemed as part of the Production Facilities Operations Area(s). Within the Production Facilities Operations Area(s), there will be no use of the lands of any kind by Seltzer or any of its successors in interest.

Within the Production Facilities Operations Areas, Patina shall place each separate piece of production equipment as close as possible, maintaining a maximum distance of seventy-five (75) feet between each piece of production facility equipment. In the event that Patina is required under COGCC Rule 604, to maintain a distance of more than seventy-five (75) feet between each piece of equipment, Patina shall be allowed to change the seventy-five (75) foot maximum setback in this Agreement to the specific footage as designated in said Rule 604.

On the sides of the facility equipment that comprise the outside parameters of various pieces of equipment of that Production Facility, Patina shall locate the fence a maximum of five (5) feet from the outside of the berm. The berm will be located as close as possible to the production facilities while still in compliance with Rule 604. For the specific production facility equipment that does not require a berm under Rule 604, Patina shall locate the fence a maximum of ten (10) feet from the facility equipment sides which comprise the outside parameters.

Seltzer, its successors and assigns shall place no occupied buildings within one hundred and fifty (150) feet from any piece of production equipment.

d. Access Road Operations Area(s). The Access Road Operations Areas shall be as provided in Section 6. Patina shall have the continued right to utilize the roads as provided in Section 6.

1.2 Operations Area(s). The Production Facilities Operations Area(s) shall be reserved and utilized for the exclusive purpose for operations by Patina. The Operations Area(s) for New Wellsites and for Existing Wellsites shall be reserved and utilized for the purpose of any and all oil and gas operations by Patina, including, but not limited to, drilling and production activities, workovers, well deepenings, recompletions, fracturing, drilling of replacement wells, and re-fracturing, among other things. The limited use of the New Wellsite and Existing Wellsite Operations Areas by Seltzer/Subsequent Developer may be allowed as set forth in Section 1.5 below. Seltzer shall not grant any future easements within the New Wellsite, Existing Wellsite and Production Facilities Operations Areas unless Patina consents in writing.

1.3 Pipeline Easements. Seltzer agrees that Patina may continue to construct, operate and maintain pipelines on the Property, in the areas depicted and/or described on Exhibit "B" as the "Pipeline Easements".

1.4 Limitation on Use of the Property. Except for the Operations Area(s) as provided in Section 1.1, and Pipeline Easements as provided in Section 1.3, and access as provided in Section 6, Patina shall not use or occupy any part of the surface of the Property except in the event of an emergency or for reasonably necessary incidental and temporary activities, provided, however, any incidental or temporary use shall require the prior consent of

Seltzer, such consent to not be unreasonably withheld. As part of the consideration for this limitation by Patina, of what would otherwise be the right to make reasonable use of any part of the Property in the conduct of their operations, and without limiting the applicability of Sections 12 and 13 below, Patina shall not be obligated to pay, and Seltzer hereby waives any right to receive, any surface damage payments, license or use fees, now or in the future, associated with the operations of Patina within the Operations Area(s). Notwithstanding the foregoing, Patina shall continue to be liable for damages to persons or damage to property as set forth in Section 12 below, and this Section 1.4 shall not be deemed to be a limitation of such liability other than for surface damages ordinarily paid for crop damages.

1.5 Limited Allowances: Seltzer shall place no buildings, fences, structures, or similar permanent improvements within any of the Operations Areas as defined in Section 1.1. However, within the New Wellsite and Existing Wellsite Operations Areas and within the Pipeline Easements, Seltzer/Subsequent Developer shall be allowed to place and designate property and boundary lines, and open spaces with no minimum setbacks.

In addition, Seltzer shall be allowed to place leach fields, landscaping, and watering systems ("Limited Improvements") within the New Wellsite Operations Areas, with the following limitations:

> These Limited Improvements within the New Wellsite Operations Areas must be located a minimum of 112.5 feet from the new wellsite, and must be located only on one side of the new wellsite. This one side shall be an area of a maximum of one half of a circle with a radius of three hundred (225) feet around the new wellsite location.

These Limited Allowances and Limited Improvements of Seltzer and Seltzer/Subsequent Developer shall be at their own expense and risk, acknowledging that Patina's normal operations may from time to time disturb or destroy said allowances. Seltzer and Seltzer/Subsequent Developer hereby agrees to install and maintain said allowances in such a way as to not violate the COGCC regulations or impede Patina's access and/or operations. Seltzer and Seltzer/Subsequent Developer hereby accept all responsibility for the cost of installation, repair and/or replacement of said allowances within the Pipeline Easements and Operations Areas and Patina shall not be responsible for damage to said allowances resulting from its future access or operations. Prior to commencing installation of the allowances, Seltzer and Seltzer/Subsequent Developer shall consult with Patina, to ensure that there are no adverse impacts upon Patina's ability to perform future operations. Patina shall not be liable for damage to or replacement of any such allowances. Seltzer, its successors and assigns do hereby indemnify Patina for damages and replacement costs of any of these allowances within any of the Operations Areas.

1.6. Without prior written consent from Patina, Seltzer shall not construct or allow the construction of dwellings or structures that contain an underground ignition source within sixty-five (65) feet on either side of the Pipeline Easements except at those locations where the pipeline is to be sleeved. At the locations where the pipeline is sleeved, without the prior written consent from Patina, Seltzer shall not construct or allow the construction of dwellings or structures that contain an underground ignition source within fifteen (15) feet on either side of the Pipeline Easements.

JS

1.7 Waiver of Certain Requirements. So long as Patina's operations have not substantially breached any material terms of this Agreement, Seltzer waives all setback requirements in COGCC Rule 603, or any successor rule or amendment to the COGCC setback rules, and to any other state or local setback requirements or other requirements or regulations that are, or become inconsistent with this Agreement or that would prohibit or interfere with the rights of Patina to explore for and produce the oil and gas in accordance with this Agreement. So long as Patina has not substantially breached this Agreement, Seltzer agrees that it will not object in any forum to the use by Patina of the surface of the Property consistent with this Agreement and that it will also provide Patina with whatever support in writing they may reasonably require to obtain permits from the COGCC or any local jurisdiction.

2. PRODUCTION FACILITIES. Patina operates tanks, separators or other production facilities located on the Property within the Operations Area(s) as described in Section 1.1 above. Without the prior written consent of Seltzer, Patina shall not locate additional facilities on the Property or expand the size and/or location of such facilities in the future. Pursuant to negotiations between Patina and Seltzer, and in accordance with Section 5, upon the written request of Seltzer/Subsequent Developer, Patina will use reasonable efforts to relocate the existing production facility currently located in the NW/4NE/4 to the Southwestern portion of the parcel comprising approximately 8 acres in the northeast corner of the NE/4. Any relocation is subject to approval of the new location by the gas gatherer and/or purchaser of said Production Facility.

Patina shall install and maintain fences, gates and locks reasonably necessary for the security of the existing Wells and/or existing production facilities in the Oil and Gas Operations Area. Such fences, gates and locks shall be installed at the expense of Seltzer/Subsequent Developer and maintained at the expense of Patina and shall be of a type and quality agreed between Seltzer/Subsequent Developer and Patina. If Patina drills new wells in the Operations Areas after approval of the final plat by Adams County Commissioners, then the fencing costs shall be borne entirely by Patina.

3. CONSTRUCTION AND REMOVAL. Seltzer/Subsequent Developer may request relocation or removal of certain pipelines and other production facilities in the future. Patina agrees to relocate the production facilities to a location mutually acceptable to Patina and Seltzer/Subsequent Developer. Patina shall install the relocated pipelines from the Wells to the intersection of that portion of pipeline that is not to be relocated within the Pipeline Easement and remove the abandoned segments of the pipeline. The pipeline will be constructed with casing sleeves and risers, all in accordance with the following terms and conditions:

3.1 Construction of Pipeline. In the event Seltzer/Subsequent Developer desires that Patina relocate pipelines in the future, Seltzer/Subsequent Developer shall submit a scaled plat to Patina indicating the exact location of pipelines to be relocated and abandoned as set forth in Section 5. Seltzer/Subsequent Developer shall complete the field staking for the installation of the new pipeline alignment and its required depth as provided below after giving written notice to Patina. The field staking will consist of a marker every thirty (30) feet, marking the desired depth of the pipeline, and the beginning and ending locations of portions of the pipeline. Casing sleeves shall be installed as identified on the scaled plat. [The sleeved segments of the pipeline shall have casing risers at each end of the sleeved segments and the field staking shall identify the location of casing risers and the beginning and ending of each sleeve. Within ninety (90)

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days following the completion of the field staking of the pipeline location, Patina will complete the construction of the pipeline along the routes staked in the field and identified by Seltzer/Subsequent Developer on the scaled plat. The pipeline shall be buried to a depth sufficient to result in forty-eight (48) inches below the proposed finished grade of the surface. In no event shall Patina be required to install pipelines at a depth exceeding six (6) feet below the grade existing at the time of installation.

3.2 Removal of Abandoned Pipeline. On the completion of construction of the new pipeline, Patina will remove that portion of the pipeline that was abandoned.

3.3 Line Crossings. If the surface development of the Property requires the crossing of Patina's relocated pipeline (within five (5) feet of a location that is not sleeved or two (2) feet of a location that is sleeved) by a sewer line, water line or other utility, Seltzer/Subsequent Developer shall notify Patina (a) of the date and time of the line crossing (the "Commencement Time"), and (b) when the line crossing has been completed (the "Completion Time"). If in response to Seltzer/Subsequent Developer's notification, Patina suspends production through the pipeline, then Seltzer/Subsequent Developer shall pay Patina for each calendar day or part thereof, beginning forty eight hours after the Commencement Time until the Completion Time. The payment shall be the sum of three hundred and fifty dollars ($350.00) per well per day calculated. Such payments shall be the agreed amount to compensate Patina for its response and any lost or delayed production, and shall be made to Patina within thirty (30) days of receipt of an invoice from Patina. In the event that Seltzer/Subsequent Developer notifies Patina more than once in any fourteen (14) day period, subsequent notices will be charged the full lost or delayed production rate as of the commencement time for said initial notice. Seltzer/Subsequent Developer shall maintain a distance of a minimum two (2) feet above or below the pipeline at any such crossings.

3.4 New Survey and Easement. If pipelines are moved to locations different than those depicted on Exhibit "B", Seltzer/Subsequent Developer shall survey the new locations and revise Exhibit's A & B accordingly.

4. CONSTRUCTION COORDINATION. Upon commencement by Patina of the construction operations pursuant to Sections 2 and 3 above, Seltzer/Subsequent Developer shall cease those operations on the Property that would unreasonably interfere with Patina's obligations pursuant to this Agreement. To the extent that Seltzer/Subsequent Developer's operations delay Patina's operations or upon the occurrence of an event of force majeure, Patina will not be subject to the performance time frames set forth in Sections 3 and 5.

5. CONSTRUCTION AND RELOCATION COSTS.

5.1 Upon written request by Seltzer/Subsequent Developer, in the event that Patina has made a third party contract to relocate the production facilities currently located in the NW/4 of the NE/4 pursuant to Section 2 of this Agreement, Seltzer/Subsequent Developer shall pay to Patina the sum of the consideration for that third party contract, but not to exceed ten thousand dollars ($10,000.00). In the event that Patina is unable to relocate the production facilities to the

said Northeast parcel, Seltzer/Subsequent Developer will not be required to pay any consideration under this Section.

5.2 Should Seltzer/Subsequent Developer desire that Patina relocate production facilities and/or pipelines, including those facilities referred to in Section 5.1; Seltzer/Subsequent Developer shall submit a scaled plat identifying the production facilities and pipelines to be relocated (the "Relocation Cost Request"). Within thirty (30) days from receipt thereof, Patina shall submit to Seltzer/Subsequent Developer an estimate of the cost to relocate the facilities and pipelines. Thirty (30) days prior to the date Seltzer/Subsequent Developer requires Patina to commence relocation operations, Seltzer/Subsequent Developer shall submit written notice and pay to Patina the Relocation Costs. Patina shall complete construction within ninety (90) days from the date the Relocation Costs are paid and notice of staking as set forth in Section 3.1 has been received, whichever is the later. The estimate of Relocation Costs shall expire one hundred twenty (120) days from the date of submitting the Relocation Cost Request. If Seltzer/Subsequent Developer desires at a subsequent date to request relocation of production facilities and pipelines, Seltzer/Subsequent Developer shall resubmit a Relocation Cost Request. Patina will prepare and submit a revised estimate of Relocation Costs. Seltzer/Subsequent Developer shall then pay the revised amount.

6. ACCESS.

6.1 If Seltzer/Subsequent Developer removes any prior access to any of Patina's operations on the property, then Seltzer/Subsequent Developer will provide adequate alternate access to the Operations Area(s) and Pipeline Easements, although the location of that access may vary from time to time in accordance with the needs and progress of such surface development.

6.2 Seltzer/Subsequent Developer will construct paved roads, reinforced curbs, reinforced gutters and reinforced sidewalks to accommodate Patina's access to the Operations Areas and Pipeline Easements and shall provide curb cuts at all "Access Points" as shown on Exhibit "B". The curb cuts at the Access Points shall be at least 30 feet wide. The paved roads leading to the Access Points, and the curbs, gutters and sidewalks at the Access Points shall be reinforced to accommodate a gross vehicle weight of at least 28,000 pounds per axle. Within thirty (30) days following completion of the pipeline relocation or paved road construction, or removal of existing access roads, whichever is the first to occur, Seltzer/Subsequent Developer will construct access roads from the Access Points to the existing wellsites, with a width of 15 feet, provide a 6 inch aggregate base course and turn such roads over to Patina for their further maintenance. Patina will construct all access roads from the Access Points to new wellsites that are not in existence as of the date of this Agreement.

7. NOTICE OF FUTURE OPERATIONS. Patina shall provide at least seven (7) days prior written notice to Seltzer, its successors and assigns in advance of any operations other than the drilling of the new wellsites, within the Operations Area(s) in connection with the reworking, fracturing, deepening or other unusual or other than routine operations on the Wells; provided, however, that Patina shall have immediate access in the event of an emergency. Patina shall provide at least thirty (30) days notice to Seltzer, its successors and assigns for the drilling of the

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new wellsites. The new wellsites locations shall be limited to the two locations shown on Exhibit "B" hereto and as set forth in Section 1.1.a hereof.

8. NOTICES TO HOMEOWNERS AND BUILDERS. Seltzer/Subsequent Developer shall record a plat or map showing the Oil and Gas Operations Area(s), Wells and Pipeline Easements in the real property records of Adams County, Colorado. In addition, Seltzer/Subsequent Developer shall record in the real property records of Adams County, Colorado a "Notice of Oil and Gas Operations", substantially in the form attached hereto as Exhibit "C" that conspicuously states that:

8.1 there may be ongoing oil and gas operations in the Oil and Gas Operations Area(s) and Pipeline Easements;

8.2 Purchasers of all or a portion of the Property, as successors in interest to the surface rights of Seltzer, will be acquiring a proportionate interest in some of Seltzer's rights and obligations under this Agreement, and will be subject to those obligations contained therein, and subject to the waivers and setback requirements as specified in the Agreement.

9. FUTURE OPERATIONS. Patina shall make all reasonable efforts to pursue any drilling, re-drilling, reworking and/or recompletion operations in a diligent and prudent manner so as to minimize the total time period on location, to avoid rig relocations or startup delays during the course of drilling, and to attempt to minimize the amount of surface area actually used. Seltzer waives and shall not assert any right to require that wellhead or production equipment be located in conformance with setback requirements different from those agreed to in this Agreement (including but not limited to those concerning any "high density" rules of the COGCC).

10. GOVERNMENTAL PROCEEDINGS.

10.1 As long as Patina is in compliance with this Agreement, Seltzer shall not, directly or indirectly, oppose or encourage opposition to Patina in any agency, administrative or other governmental proceedings, including but not limited to the COGCC, Adams County or other governing body proceedings, related to the operations of Patina on the Property, including but not limited to drilling and production activities, workovers, well deepenings, recompletions, fracturing, replacement wells and re-fracturing, provided that the position of Patina in such proceedings is not materially inconsistent with this Agreement.

10.2 As long as Seltzer is in compliance with this Agreement, Patina shall not directly or indirectly oppose or encourage opposition to Seltzer in any agency, administrative, Adams County or other governing body proceedings, relating to Seltzer's operations on and development of the Property, including residential and associated development, provided that Seltzer's position in such proceedings is not materially inconsistent with this Agreement.

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11. FORCE MAJEURE

11.1 In the event either party is rendered unable, by an event of Force Majeure (defined below) to perform, wholly or in part, any obligation set forth in this Agreement, other than the obligation to pay money, then the performance by the affected party will be suspended during the continuance of such event of Force Majeure. The party experiencing an event of Force Majeure will provide reasonable notice to the other party as soon as possible with all reasonable dispatch. As used herein, the term "Force Majeure" shall mean any act of God, acts of the public enemy, wars, blockages, insurrections, riots, epidemics, landslides, lightning, earthquakes, fires, severe weather, floods, washouts, arrests and restraints of the federal, state or local government, civil disturbances, explosions, breakage or accidents to machinery or lines of pipe, the binding order of any court or governmental authority which has been resisted in good faith by all reasonable legal means, delay in securing environmental approvals, the inability to obtain necessary supplies, material, equipment, machinery or labor and any other causes, whether of the kind herein enumerated or otherwise not within the control of the party claiming suspension and which by the exercise of due diligence such party is unable to prevent or overcome.

12. LIMITATION OF LIABILITY, RELEASE AND INDEMNITY.

12.1. NO PARTY SHALL BE LIABLE FOR, OR BE REQUIRED TO PAY FOR, SPECIAL, PUNITIVE OR EXEMPLARY DAMAGES TO ANY OTHER PARTY FOR ACTIVITIES UNDERTAKEN WITHIN THE SCOPE OF THIS AGREEMENT.

12.2 Each party shall be and remain responsible for all liability for losses, claims, damages, demands, suits, causes of action, fines, penalties, expenses and liabilities, including without limitation reasonable attorneys' fees and other costs associated therewith (all of the aforesaid herein referred to collectively as "Claims"), arising out of or connected with each such party's ownership or operations, including each such parties' employees, agents, contractors, sub-contractors or other invitees on the Property, no matter when asserted, subject to applicable statutes of limitations. Each such party shall release, defend, indemnify and hold the other parties, their officers, directors, employees, successors and assigns, harmless against all such Claims that arise from its negligence and intentional misconduct. This provision does not, and shall not be construed to, create any rights in persons or entities not a party to this Agreement, nor does it create any separate rights in parties to this Agreement other than the right to be indemnified for Claims as provided herein.

13. EXCLUSION FROM INDEMNITIES. The indemnities of any party herein shall not cover or include any amounts, which the indemnified party may recoup from any third party, or that for which the indemnified party is reimbursed by any third party. The indemnities in this Agreement shall not relieve any party from any obligations to third parties.

14. NOTICE OF CLAIM FOR INDEMNIFICATION. If a Claim is asserted against a party for which another party would be liable under the provisions of Section 12 above, it is a condition precedent to the indemnifying party's obligations hereunder that the indemnified party give the indemnifying party written notice of such Claim setting forth all particulars of the Claim, as known by the indemnified party, including a copy of the Claim (if it is a written Claim). The indemnified party shall make a good faith effort to notify the indemnifying party

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within thirty (30) days of receipt of a Claim and shall affect such notice in all events within such time as will allow the indemnifying party to defend against such Claim.

15. REPRESENTATIONS. Each party represents that it has the full right and authority to enter into this Agreement and Seltzer specifically confirms their capacity to validly execute the rights of way and easements provided for herein. Patina represents that it owns the oil and gas leasehold interest in the Leases as set forth in Recitals B and C. Patina does not represent and specifically asserts that it does not have the right to bind any other oil and gas interest owner or lessee for the Property.

16. SUCCESSORS.

16.1 For purposes of this Agreement, the identification of "Seltzer" includes all successors and assigns of Seltzer. The terms, rights and obligations that are limited to Seltzer and the Subsequent Developer shall be covenants appurtenant, which run with the land to the extent that they are binding only on the heirs, executors, administrators, successors, and assigns of the immediate parties.

16.2 Except for the specific rights and obligations conferred only upon Seltzer and the Subsequent Developer pursuant to the limitation by the identification of "Seltzer/Subsequent Developer", the remaining terms, covenants and conditions of this Agreement shall be binding upon and shall inure to the benefit of the parties and their respective heirs, devises, executors, administrators, successors and assigns. This Agreement and all of the covenants herein, with the exception of those terms and covenants identified in Section 16.1, shall be covenants running with the land.

17. NOTICES. Any notice or other communication required or permitted under this Agreement shall be sufficient if in writing and deposited in the U.S. Mail, postage prepaid, with a copy sent via facsimile, or electronic means addressed to each of the following:

If to Patina Oil & Gas Corporation:

Patina Oil & Gas Corporation
1625 Broadway, Suite 2000
Denver, Colorado 80202
Attention: Land Department
FAX (303) 595-7410

If to Seltzer
Mr. Tim Seltzer, Co-Trustee
Robert L. Seltzer Family Trust
33641 Weld County Road 83
Briggsdale, Colorado 80611

Mr. Jack Seltzer, Co-Trustee
Robert L. Seltzer Family Trust
P.O. Box 360443
Monument Valley, Utah 84536

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Any party may, by written notice so delivered to the other party, change the address, fax number or individual to which delivery shall thereafter be made.

18. RECORDING. The Notice of Oil and Gas Operations and the plat or map required pursuant to Section 8 above shall be promptly recorded in the Office of the Clerk and Recorder for Adams County by Seltzer/Subsequent Developer, and Seltzer/Subsequent Developer shall provide the other parties with a copy thereof showing the recording information as soon as practicable thereafter.

19. SURFACE USE AGREEMENT. In consideration of the parties' respective rights, obligations and benefits, as outlined herein, this Agreement shall constitute a surface use or surface damage agreement provided for under the COGCC's Rules and Regulations or under any oil and gas leases covering the Property.

20. APPLICABLE LAW. This Agreement shall be governed by and construed in accordance with the laws of the State of Colorado, without reference to its conflict of laws provisions.

21. ENTIRE AGREEMENT. This Agreement sets forth the entire understanding among the Parties regarding the matters addressed herein, and supersedes any previous communications, representations or agreement, whether oral or written. This Agreement shall not be amended, except by written document signed by all parties.

22. HEADINGS. The section headings contained herein are for convenience in reference and are not intended to define or limit the scope of any provision of this Agreement.

23. TIME OF ESSENCE. Time is of the essence in this Agreement.

24. NON-WAIVER. Waiver by either party or of the failure of any party to insist upon the strict performance of any provision of this Agreement shall not constitute a waiver of the right or prevent any such party from requiring the strict performance of any provision in the future.

25. SEVERABILITY. Any covenant, condition or provision herein contained that is held to be invalid by any court of competent jurisdiction shall be considered deleted from this Agreement, but such deletion shall in no way affect any other covenant, condition or provision herein contained so long as such deletion does not materially prejudice a party in its rights and obligations contained in valid covenants, conditions or provisions. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws.

26. NO JOINT VENTURE. This Agreement is not intended to, nor shall it be interpreted to create a joint venture, partnership or any other relationship among the parties.

27. COUNTERPARTS. This Agreement may be executed by facsimile and in any number of counterparts, each of which shall be deemed an original instrument, but all of which together shall constitute but one and the same instrument.

28. CONFIDENTIALITY. Seltzer agrees to keep confidential this Agreement and all negotiations leading up to or relating to this Agreement. Seltzer shall not copy or distribute this Agreement or disclose the substance hereof or the nature of such negotiations to others outside of Patina and Seltzer unless required to do so by law.

Provided however, Seltzer may utilize this form of Agreement for an agreement with the leasehold owners of other formations in this Property. Additionally, Seltzer may disclose the terms of this Agreement to a Subsequent Developer pursuant to any negotiations/proceedings with that Subsequent Developer. Further, Seltzer agrees to provide a copy of this Agreement to the Subsequent Developer of the surface prior to the closing of any sale of the Property. Subsequent Developer must provide a copy of this Agreement to any other potential successor or assign of surface rights prior to the closing of any sale of all or any portion of the Property.

The parties have executed this Agreement as of the day and year first above written.

PATINA OIL & GAS CORPORATION

By: _____ Date: 2/5/04
David W. Siple, Vice President

THE ROBERT L. SELTZER FAMILY TRUST

By: _____ Date: 2/12/04
Jack Alden Seltzer, Co-Trustee

By: _____ Date: 2/5/04
Timothy R. Seltzer, Co-Trustee

ACKNOWLEDGMENTS

STATE OF COLORADO)
) ss.
CITY & COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this 5th day of February, 2004, by David W. Siple, Vice President for Patina Oil & Gas Corporation, a Delaware corporation, on behalf of that corporation.

Witness my hand and official seal.

My Commission expires: 2/9/2008

_____
Notary Public

STATE OF Utah)
) ss.
COUNTY OF Carbon)

The foregoing instrument was acknowledged before me this 12th day of February, 2004, by Jack Alden Seltzer, as Co-Trustee of the Robert L. Seltzer Family Trust
Witness my hand and official seal.

Betty Jordan
Notary Public

My Commission expires: 8/31/04

NOTARY PUBLIC
BETTY JORDAN
45 South Carbon Ave.
Price, Utah 84501
Commission Expires
August 31, 2004
STATE OF UTAH

STATE OF COLORADO)
) ss.
COUNTY OF Denver)

The foregoing instrument was acknowledged before me this 5th day of February, 2004, by Timothy R. Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust,
Witness my hand and official seal.

Dawn Delaine Deprisest
Notary Public

My Commission expires: February 13, 2007

DAWN DELAINE DEPRIEST
NOTARY PUBLIC
STATE OF COLORADO

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 21 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

Exhibit "A-1"

Attached to and made a part of that certain Agreement dated February 5, 2004, by and between Patina Oil & Gas Corporation and Robert L. Seltzer Family Trust

PROPERTY DESCRIPTION

The NE ¼ of Section 4, Township 1 South, Range 67 West of the 6th P.M., EXCEPT the East 40 feet conveyed to Adams County in instrument recorded March 10, 1923 in Book 101 at Page 527; also EXCEPT those portions of the Signal Reservoir as described in instruments recorded September 13, 1918 in Book 89 at Page 495 and March 11, 1920 in Book 106 at Page 46; also EXCEPT that part conveyed to Rex A. Seltzer and Lois Seltzer in instrument recorded March 2, 1992 in Book 3873 at Page 28.

Containing 114.165 Acres more or less

1 (16)

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 22 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

Exhibit "A-2"

Attached to and made a part of that certain Agreement dated February 5, 2004, by and between Patina Oil & Gas Corporation and Robert L. Seltzer Family Trust

OIL AND GAS LEASES

DATED: May 21, 1975

LESSOR: Seltzer Farms, Inc

LESSEE: Louis S. Madrid

LAND DESCRIPTION: Township 1 South, Range 67 West 6th P.M.,
Section 4: NE ¼
EXCEPT Plot 6-1/2

Containing 125.3 Acres m/l

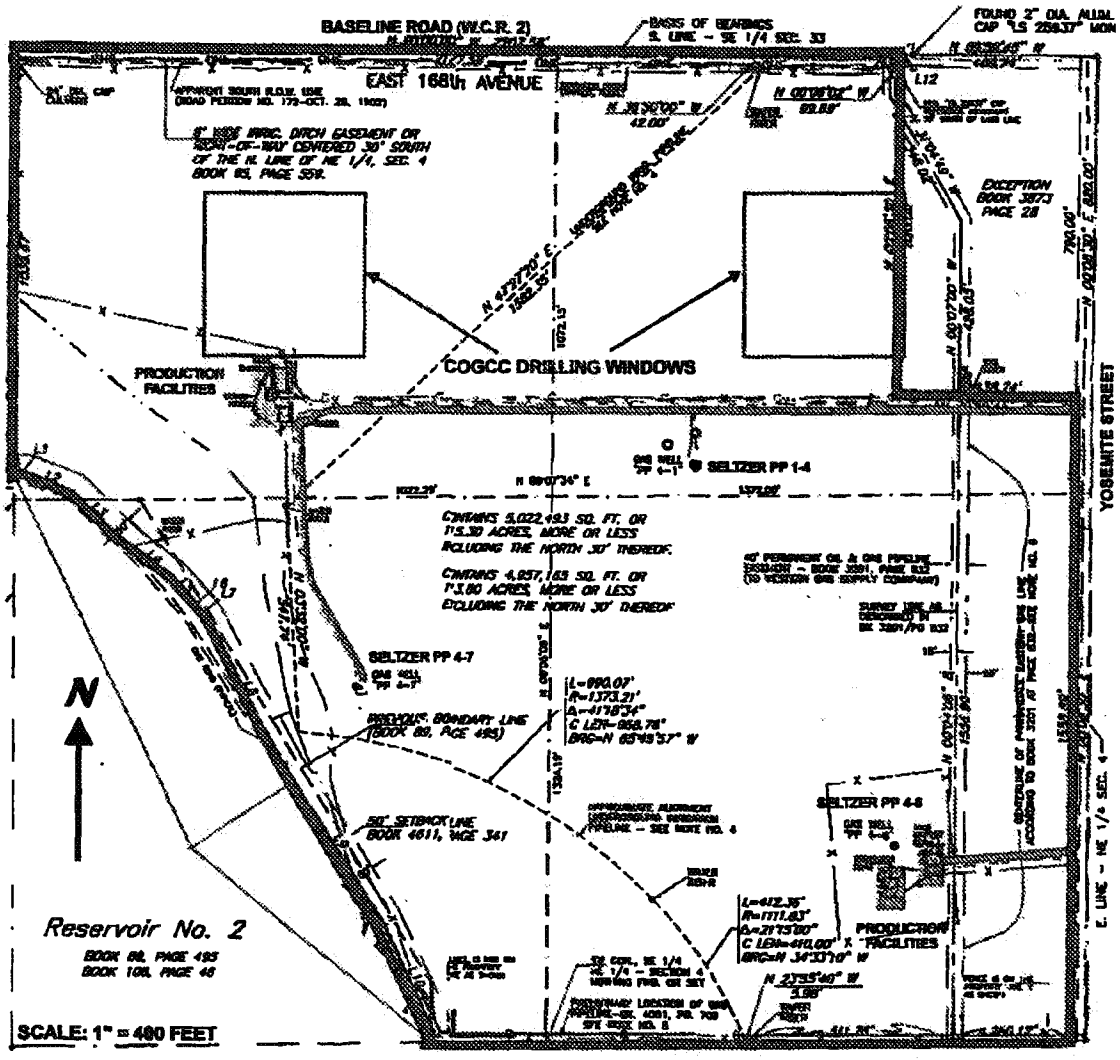
TERM: Five Years from February 24, 1975

RECORDED: June 24, 1975, in Book 1997, Page 875

JS (15)

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 23 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

EXHIBIT "B"
NE/4 OF SECTION 4
TOWNSHIP 1 SOUTH - RANGE 67 WEST
OF THE SIXTH PRINCIPAL MERIDIAN
ADAMS COUNTY, COLORADO



PATINA
OIL & GAS CORPORATION

15-67W-4-NE-2

PRODUCTION FACILITY OPERATIONS AREA

EXISTING WELLSITE OPERATIONS AREA

PROPERTY BOUNDARY

ACCESS ROADS

PIPELINE EASEMENTS

15

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 24 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

Exhibit "C"

Attached to and made a part of that certain Agreement dated February 5, 2004, by and between Patina Oil & Gas Corporation and Robert L. Seltzer Family Trust

NOTICE OF OIL AND GAS OPERATIONS

PLEASE TAKE NOTICE THAT PATINA OIL & GAS CORPORATION, a Delaware corporation, with an address of 1625 Broadway, Suite 2000, Denver, Colorado 80202,("Patina") and ROBERT L SELTZER FAMILY TRUST ("Seltzer"), C/O Timothy Robert Seltzer, Co-Trustee, 33641 Weld County Road 83, Briggsdale, Colorado 80611 and Jack Alden Seltzer, Co-Trustee, P.O. Box 360443, Monument Valley, Utah 84536 have entered into a Surface Use Agreement (the "Agreement") dated February 5, 2004 covering the following described lands (the "Property"):

Township 1 South, Range 67 West, 6th P.M.
Section 4: Parts of NE/4
County of Adams, Colorado
Containing 114.165 Acres More or Less

NOTICE IS HEREBY PROVIDED to all interested parties, including surface owners, their heirs, assignees and successors in interest, that pursuant to the Agreement, Patina, its agents, employees, designees, co-owners, successors and assigns have the right to use and access the surface of the Oil and Gas Operations Area and Pipeline Easements as defined in the Agreement for the purpose of , among other things, DRILLING, DEEPENING, WORKOVER, COMPLETION OR RECOMPLETION OPERATIONS OR CONTINUING ACTIVITIES FOR THE EXPLORATION, PRODUCTION OR TRANSPORTATION OF OIL, GAS, OR OTHER HYDROCARBONS OR PRODUCTS ASSOCIATED WITH THE FOREGOING INCLUDING, BUT NOT LIMITED TO, SURFACE USE, INGRESS TO, EGRESS FROM, AND CONSTRUCTION, MAINTENANCE, REPAIR, REPLACEMENT, AND MONITORING OF WELLS, LOCATIONS, EQUIPMENT, MUD AND RESERVE PITS, WELLHEAD EQUIPMENT, SEPARATORS, TANK BATTERIES, PIPELINES, GATHERING LINES, FLOWLINES, PIPELINE INTERCONNECTIONS, AND ANY AND ALL OTHER REASONABLE OR CUSTOMARY USES OF LAND RELATED TO SAID OPERATIONS OR ACTIVITIES.

FURTHERMORE, purchasers of all or any portion of the Property, as successors to Seltzer, acquire a proportionate interest in Seltzer's rights and obligations under the Agreement and are subject to the waivers contained in the Agreement, including the waiver of all setback requirements in Colorado Oil and Gas Conservation Commission ("COGCC") Rule 603, or any successor rule or amendment to the COGCC setback rules, and to any other state or local setback requirements or other requirements or regulations that are or become inconsistent with the Agreement or that would prohibit or interfere with the rights of Patina to explore for and produce oil and gas in accordance with the Agreement.

The Agreement has been recorded in the real property records of the County of Adams, Colorado on _____, 2004 at Reception Number _____.

This notice may be executed by facsimile and in any number of counterparts, each of which shall be deemed an original instrument, but all of which together shall constitute but one and the same instrument.

PATINA OIL & GAS CORPORATION

_____ Date:_____
David W. Siple
Vice President

ROBERT L. SELTZER TRUST

By: _____ Date:_____
Jack Alden Seltzer, Co-Trustee

By: _____ Date:_____
Timothy R. Seltzer, Co-Trustee

ACKNOWLEDGEMENTS

STATE OF COLORADO)
CITY AND) ss.
COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this ____ day of _____, 2004, by David W. Siple as Vice President of Patina Oil & Gas Corporation, a Delaware corporation.

[SEAL]

My commission expires: _____

_____
Notary Public

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 26 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2004, by Jack Alden Seltzer, Co-Trustee of the Robert L. Seltzer Trust, on behalf of that trust.

Witness my hand and official seal.

_____
Notary Public

My Commission expires: _____

STATE OF COLORADO)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2004, by Timothy Robert Seltzer, Co-Trustee of the Robert L. Seltzer Trust, on behalf of that trust.

Witness my hand and official seal.

_____
Notary Public

My Commission expires: _____

Exhibit 2

Attached to, and made a part hereof, that certain Second Amendment and Ratification of Surface Use Agreement dated January 19th, 2017, between Jack Alden Seltzer and Timothy R. Seltzer, each co-trustee of that certain Robert L. Seltzer Family Trust, as Grantors

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 28 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

FIRST AMENDMENT OF SURFACE USE AGREEMENT

THIS FIRST AMENDMENT OF SURFACE USE AGREEMENT (the "Amendment") is made and entered as of 1st day of December 2015, (the "Effective Date") by and among **EXTRACTION OIL & GAS, LLC** ("**Operator**") whose address is 370 17th Street, Suite 5300, Denver, CO 80202, and the **ROBERT L. SELTZER FAMILY TRUST**, ("**Seltzer**"), Jack Alden Seltzer as Co-Trustee with an address of P.O. Box 3154, 4638 N, Caughran Rd., Camp Verde, AZ 86322 and Timothy R. Seltzer as Co-Trustee with an address of 33641 WCR 83, Briggsdale Colorado 80611. Operator and Seltzer may sometimes be referred to in this Amendment individually as a "**Party**" or collectively as the "**Parties**. This Amendment modifies that certain Surface Use Agreement between Seltzer and Patina Oil and Gas Corporation dated February 6, 2004 ("**Noble SUA**") which is attached to and by reference made part of this Agreement as **Exhibit A.**

RECITALS

A. Operator is the successor to Noble Energy, Inc. ("**Noble**"), Operator's predecessor in interest with respect to a leased interest, Noble's rights with respect to explore, develop and produce from certain property ("**Property**") which is specifically described in **Exhibit B**, attached hereto and by reference made a part hereof;

B. Seltzer and Operator wish to amend the Noble SUA with respect to the right to plug and abandon certain wells; and

C. Seltzer and Operator wish to amend the Noble SUA with respect to the right to drill additional wells on the Property.

NOW, THEREFORE, in consideration of the covenants set forth herein and the mutual benefits to be derived by the parties hereto, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties do hereby agree to amend the Noble SUA as follows:

1. In accordance with the letter agreement between Operator and Seltzer dated January 20, 2016, Operator shall pay Seltzer the agreed upon amount within thirty (30) days of the commencement of any future well that is drilled on the Property.

2. The description of the Property in Exhibit "A-1" is replaced by the description in Exhibit B to this Amendment, which is attached to and by reference made part hereof.

3. The two COGCC Drilling Windows shown on Exhibit "B" are replaced by the description of the one area described in Exhibit C of this Amendment, which is attached to and by reference made part hereof. All future wells on the Property will be drilled from the new, single drilling area, the new Designated Area for Operations, described in Exhibit C of this Amendment.

4. Extraction will promptly plug and abandon the below-described four (4) wells on the Property once as generally described in the email message dated December 7th, 2015 from Joseph Silipo, Landman for Extraction, to Mark T. Nesbitt:

   Seltzer 1
   Seltzer PP 4-7
   Seltzer 1-4
   Seltzer 4-8

4. The following provision is added at the end of Subsection 1.4:

Subsurface Right-of-Way. Seltzer further grants Operator a subsurface right-of-way through the Property for the purpose of drilling, completing, operating and maintaining oil and gas wells that may produce and drain oil, natural gas, and associated hydrocarbons from lands other than the Property and lands pooled with the Property.

5. Section 7, Notice of Future Operations is amended by:

a. Deleting the sentence, "Patina shall provide at least thirty (30) days notice to Seltzer, its successors and assigns for the drilling of the new wellsites."

b. Adding the following provision:

No waiver of COGCC notices and other regulatory matters. Seltzer expressly does not waive the following notices and consultations and shall not object or protest any Application for Permit to Drill (Form 2) and Oil and Gas Location Assessment (Form 2A) filed by Operator with the COGCC:

A. Rule 305.a.: Notice of Intent to Conduct Oil and Gas Operations;

B. Rule 305.c.(1): Oil and Gas Location Assessment Notice;

C. Rule 305.c.(2): Buffer Zone Notice;

D. Rule 305.f: Statutory Notice to Surface Seltzers;

E. Rule 305.h.: Move-In, Rig-Up Notice;

F. Rule 306.a.: Surface Seltzer Consultation and Meeting Procedures; and

G. Any other notice or consultation requirements of the COGCC.

H. Operator will incorporate the applicable provisions of this Agreement into the applicable Form 2A.

I. Notwithstanding anything to the contrary in this Amendment, Seltzer may object to the Form 2A, so long as the objection is based on a matter that Seltzer believes is consistent with the Noble SUA as amended by this Agreement.

J. Seltzer grants consent to drill future wells within the drilling area defined by the survey description attached hereto as **Exhibit C** ("Designated Area for Operations").

K. Seltzer understands that Operator may provide a copy of this Agreement to the COGCC in order to obtain a waiver, exception location, or variance from the COGCC rules or from a local jurisdiction. Seltzer also agrees that it will not object in any forum to the use by Operator, provided that Operator's use is in accordance the Noble SUA as amended by this Agreement and that it will also provide Operator with its reasonable written

support which may be reasonably required for Operator to obtain permits from the COGCC or any local jurisdiction.

6. The content of Section 17 is replaced with the following new provision:

NOTICES. All notices shall be given by personal delivery to the intended party to this Agreement by electronic communication, capable of producing a printed transmission, registered or certified mail return receipt requested, or overnight or other express courier service. All notices shall be effective and shall be deemed given when received on the date of receipt at the principal address if received during normal business hours, and, if not received during normal business hours, on the next business day following receipt, or if by electronic communication, on the date of such communication. Any party may change its address for notice purposes by notice properly given.

Seltzer:

Robert L. Seltzer Family Trust
Timothy R, Seltzer, Co-trustee
33641 Weld County Road 83
Briggsdale, CO 80611

Robert L. Seltzer Family Trust
Jack Seltzer, Co-Trustee
4638 N. Caughran Road
Camp Verde, AZ 86322

Operator:

Extraction Oil & Gas, LLC
370 17th Street, Suite 5300
Denver, CO 80202
Phone: (720) 974-2021
Attn: Jamison McIlvain

7. Governing Law. This Agreement shall be construed and enforced in accordance with the laws of the State of Colorado except for conflict of laws and insofar as it may become necessary to comply with federal statutes, rules or regulations.

8. Recording. The Parties agree that either Owner or Operator may record this Agreement in the real estate records of Adams County, Colorado.

9. Counterparts. This Agreement may be executed by facsimile or electronic mail, in counterparts, each of which will be considered an original and enforceable against either Party.

The Parties have executed this Amendment as of the day and year first above written.

Extraction Oil & Gas, LLC

By: _____
Jamison McIlvain
Title: Landman

Robert L. Seltzer Family Trust

By: Jack Alden Seltzer Title
Jack Alden Seltzer, Co-Trustee

By: _____
Timothy Robert. Seltzer, Co-Trustee

ACKNOWLEDGMENTS

STATE OF ARIZONA)
)ss.
COUNTY OF)

The foregoing instrument was acknowledged before me on this 15th day of December 2015, by **Jack Alden Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.**

Witness my hand and official seal.
My commission expires: 2/9/16

_____
Notary Public

(SEAL)

Heidi Ashby
NOTARY PUBLIC - ARIZONA
YAVAPAI COUNTY
My Commission Expires
February 9, 2016

STATE OF COLORADO)
)ss.
COUNTY OF)

The foregoing instrument was acknowledged before me on this _____ day of _____ 2015, by **Timothy Robert Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.**

Witness my hand and official seal.
My commission expires: _____

_____
Notary Public

(SEAL)

STATE OF COLORADO)
)ss.
COUNTY OF)

The foregoing instrument acknowledged before me on this ____ day of _____ 2015, by **Jamison McIlvain on behalf of, and landman for, Extraction Oil & Gas, LLC.**

Witness my hand and official seal.

My commission expires: _____

_____
Notary Public

(SEAL)

By: Timothy Robert Seltzer TTEE
Timothy Robert. Seltzer, Co-Trustee

ACKNOWLEDGMENTS

STATE OF ARIZONA)
)ss.
COUNTY OF)

The foregoing instrument was acknowledged before me on this _____ day of _____ 2015, by **Jack Alden Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.**

Witness my hand and official seal.

My commission expires: _____

(SEAL)

_____
Notary Public

STATE OF COLORADO)
)ss.
COUNTY OF Weld)

The foregoing instrument was acknowledged before me on this 14th day of December 2015, by **Timothy Robert Seltzer as Co-Trustee of the Robert L. Seltzer Family Trust.**

Witness my hand and official seal.

My commission expires: 8/10/15

(SEAL) Tonya June Kimble
Notary Public
State of Colorado
Notary ID 20094025447
My Commission Expires August 10, 2017

Notary Public

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 34 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO

Exhibit A

to that First Amendment of Surface Use Agreement
between the Robert L. Seltzer Family Trust
and
Extraction Oil & Gas, LLC

That certain Surface Use Agreement between Owner and Patina Oil and Gas Corporation dated February 6, 2004 follows on the next page.

Exhibit B

to that First Amendment of Surface Use Agreement
between the Robert L. Seltzer Family Trust
and
Extraction Oil & Gas, LLC

Property

Parcel B of recorded exemption Case No. 124-91-E-Z recorded April 14, 1992 at Reception No. B1059706, except any portion thereof lying within East 168th Avenue, and except those portions taken by rule and Order of the District Court, Case NO. 2009CV259, a transcript of which was recorded August 6, 2010 at Reception No. 2010000052390 and March 3, 2011 at Reception No. 2011000014415, County of Adams, State of Colorado.

Exhibit C

to that First Amendment of Surface Use Agreement
between the Robert L. Seltzer Family Trust
and
Extraction Oil & Gas, LLC

Designated Area for Operations

LEGAL DESCRIPTION:

A PARCEL OF LAND LOCATED IN THE NORTHWEST QUARTER OF SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEARINGS CONTAINED HEREIN ARE BASED ON ASSUMPTION THAT THE NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN BEARS N 90°00'00" E BETWEEN A FOUND 3.25" ALUMINUM CAP MONUMENT IN RANGE BOX, WITH ILLEGIBLE STAMPING, AT THE NORTH QUARTER CORNER OF SAID SECTION 4 AND A FOUND 3.25" ALUMINUM CAP MONUMENT STAMPED LS 25937 AT THE SOUTHEAST CORNER OF SECTION 33, TOWNSHIP 1 NORTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN.

COMMENCING AT A FOUND 3.25" ALUMINUM CAP MONUMENT IN RANGE BOX, WITH ILLEGIBLE STAMPING, AT THE NORTH QUARTER CORNER OF SECTION 4 TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN;

THENCE N 90°00'00" E ALONG THE NORTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION 4 A DISTANCE OF 127.00 FEET;

THENCE DEPARTING SAID NORTH LINE S 00°00'00" W A DISTANCE OF 229.00 FEET TO THE NORTHWEST CORNER OF AN 8.01 ACRE DRILL AREA AND BEING THE POINT OF BEGINNING;

THENCE S 90°00' 00" E ALONG THE NORTHERLY LINE OF SAID DRILL AREA A DISTANCE OF 590.69 FEET TO THE NORTHEAST CORNER OF SAID DRILL AREA;

THENCE S 00°00' 00" W ALONG THE EASTERLY LINE OF SAID DRILL AREA A DISTANCE OF 590.69 FEET TO THE SOUTHEAST CORNER OF SAID DRILL AREA;

THENCE N 90°00' 00" W ALONG THE SOUTHERLY LINE OF SAID DRILL AREA A DISTANCE OF 590.69 FEET TO THE SOUTHWEST CORNER OF SAID DRILL AREA;

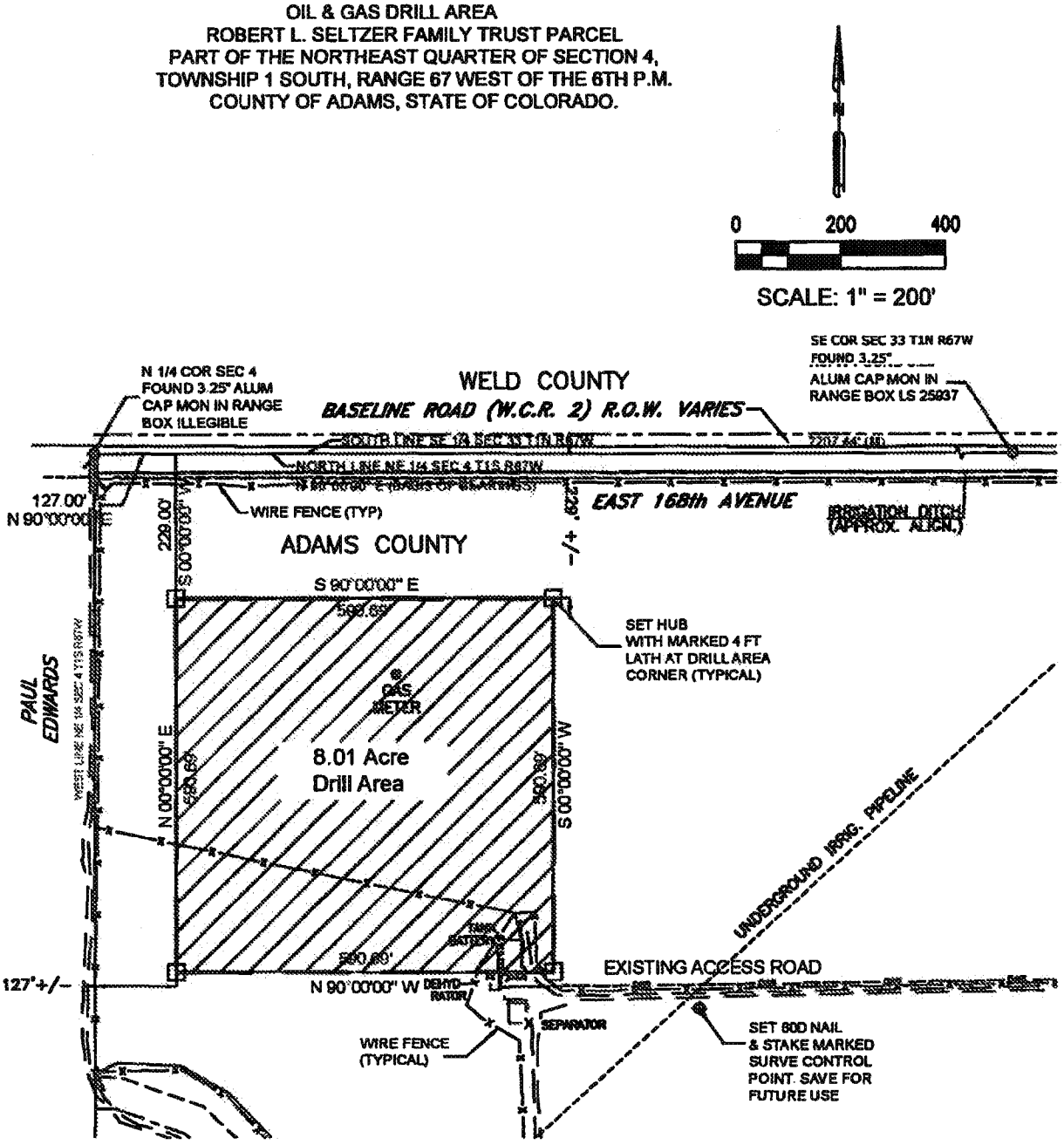
THENCE N 0°00' 00" E ALONG THE WESTERLY LINE OF SAID DRILL AREA A DISTANCE OF 590.69 FEET TO THE POINT OF BEGINNING.

PARCEL CONTAINS: 348,914.676 SQUARE FEET OR 8.01 ACRES MORE OR LESS.

PREPARED BY:

ROBERT A. RICKARD, PLS
COLORADO PROFESSIONAL
LAND SURVEYOR NO. 28283
FOR AND ON BEHALF OF ROCK CREEK SURVEYING, LLC
3021 GARDENIA WAY, SUPERIOR, CO 80027, PHONE: 303-521-7376

OIL & GAS DRILL AREA
ROBERT L. SELTZER FAMILY TRUST PARCEL
PART OF THE NORTHEAST QUARTER OF SECTION 4,
TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH P.M.
COUNTY OF ADAMS, STATE OF COLORADO.



NOTES:

1) THE PURPOSE OF THIS EXHIBIT IS TO DEPICT A PROPOSED 8.01 ACRE DRILL AREA ON A PORTION OF THE ROBERT L. SELTZER FAMILY TRUST PROPERTY.
2) FIELD DATE 8-7-2015.
3) THIS EXHIBIT IS NOT A LAND SURVEY PLAT IN CONFORMANCE WITH CRS 38-51-106.
4) MAP FEATURES FROM FIELD SURVEY AND CLIENT PROVIDED SURVEY INFORMATION.
4) ALL INFORMATION SHOWN SHOULD BE FIELD VERIFIED PRIOR TO DRILL AREA IMPROVEMENTS.

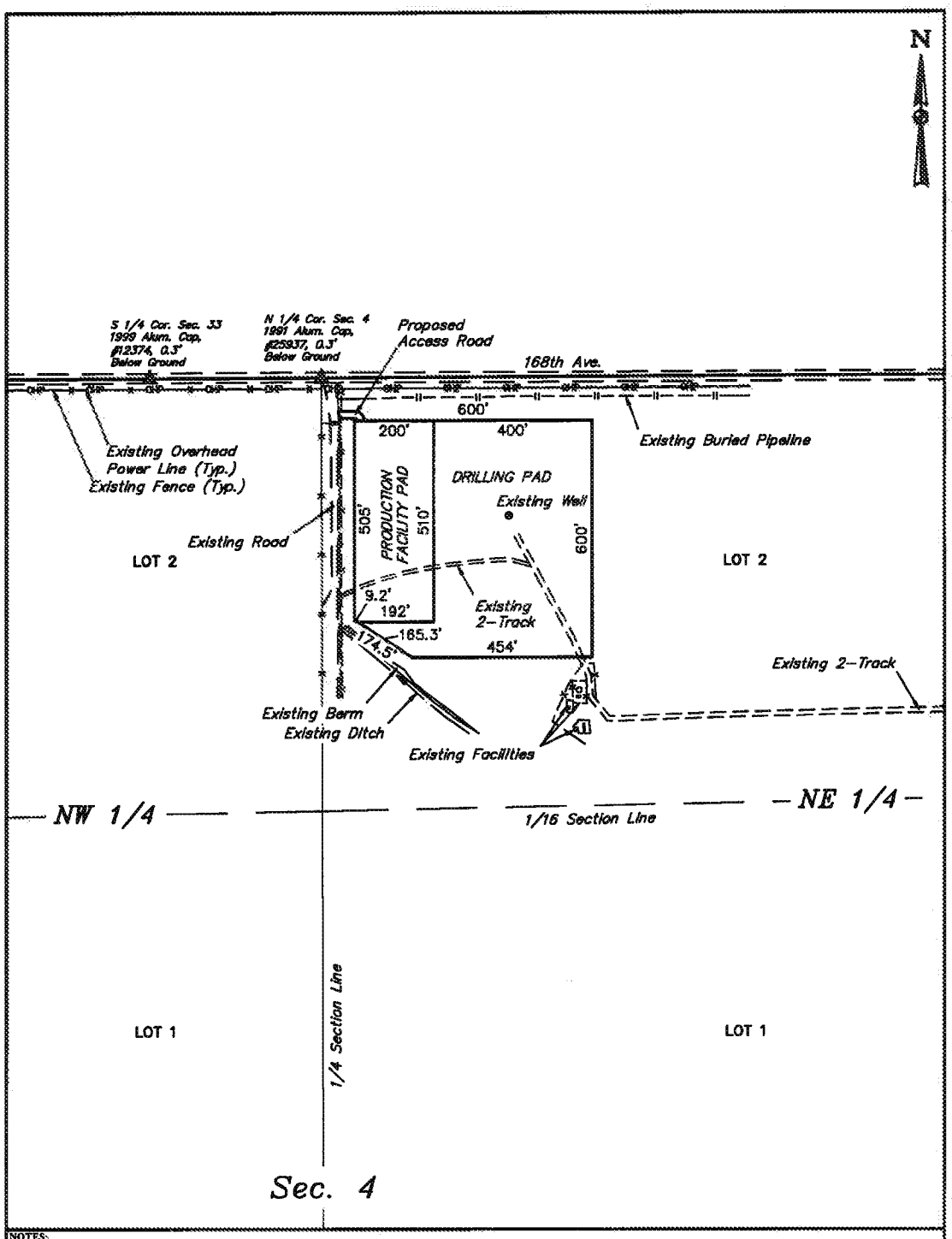
ROCK CREEK
SURVEYING, LLC
LAND SURVEYING SERVICES
3021 GARDENIA WAY
SUPERIOR, CO 80027
Phone: 303-521-7376

Prepared By:
ROBERT A. RICKARD, CO PLS 28283 Date: 10-14-2015

Exhibit 3

Attached to, and made a part hereof, that certain Second Amendment and Ratification of Surface Use Agreement dated January 19th, 2017, between Jack Alden Seltzer and Timothy R. Seltzer, each co-trustee of that certain Robert L. Seltzer Family Trust, as Grantors

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 39 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO



NOTES:

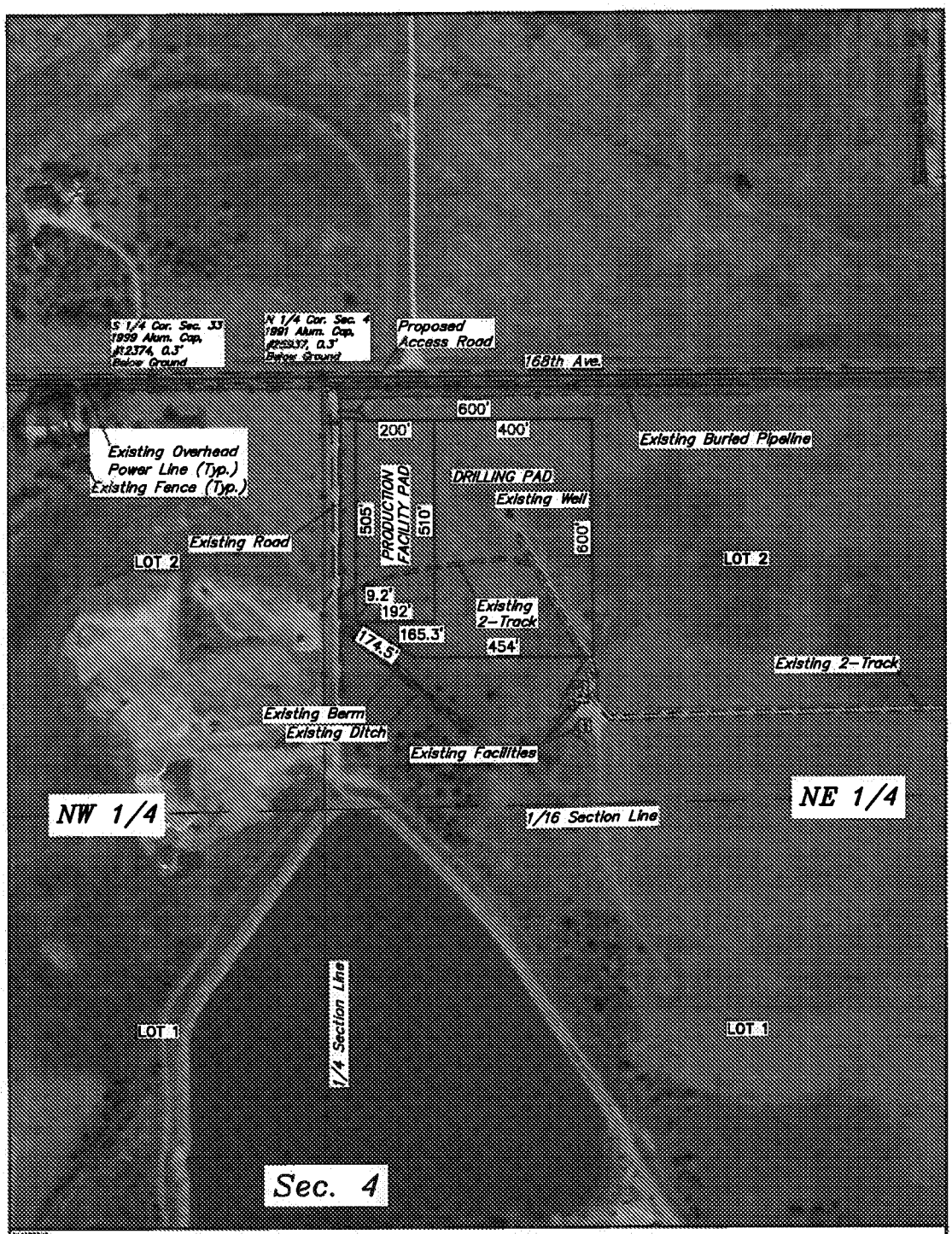
GREAT WESTERN OPERATING COMPANY

SECTION 4, T1S, R67W, 6th P.M.
NW 1/4 NE 1/4

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

DRAWN BY: D.COX	DATE DRAWN: 01-24-17
SCALE: NONE	
SURVEY	EXHIBIT

RECEPTION#: 2017000008819, 01/30/2017 at 10:34:48 AM, 40 OF 40, TD Pgs: 0 Doc Type:RAT Stan Martin, Adams County, CO



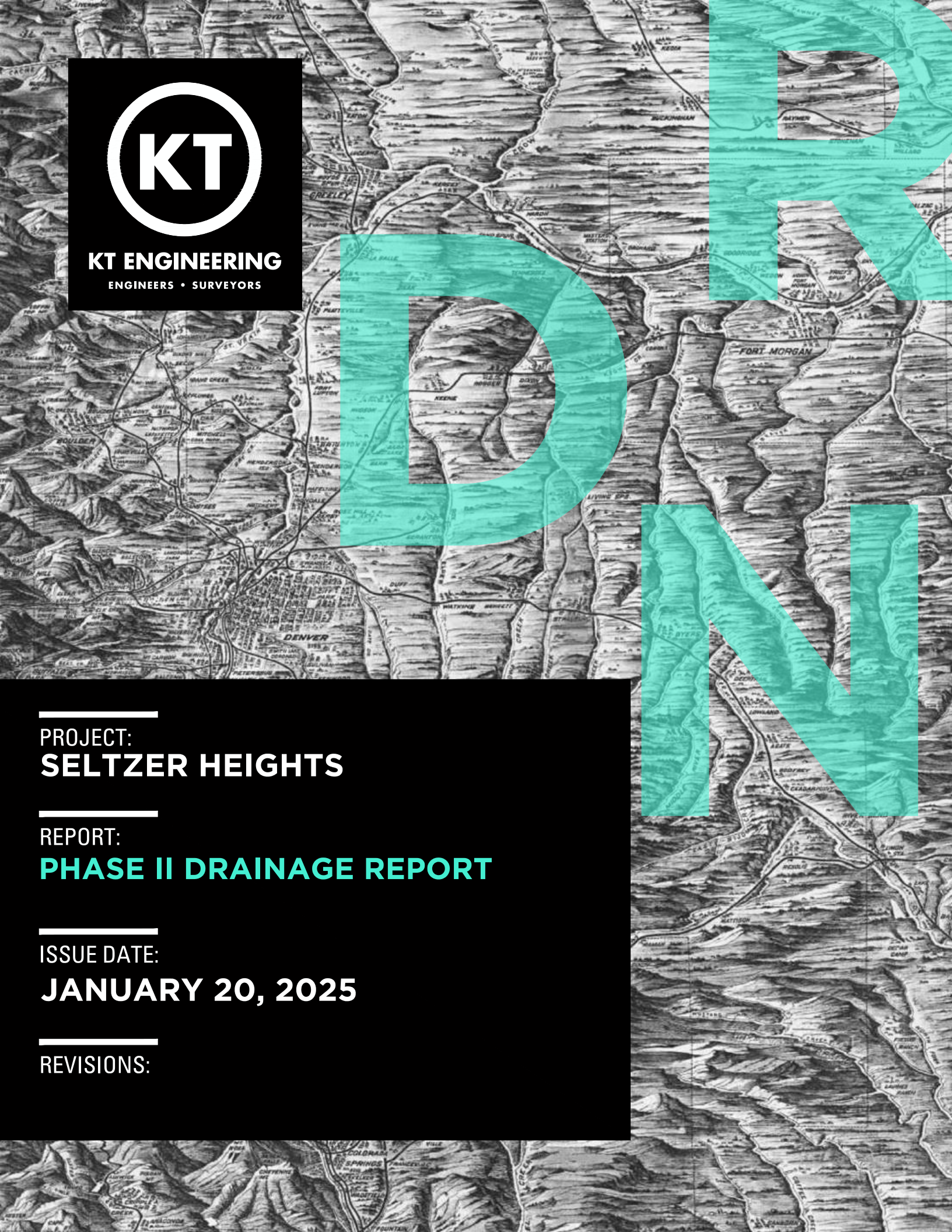
NOTES:

GREAT WESTERN OPERATING COMPANY

SECTION 4, T1S, R67W, 6th P.M.
NW 1/4 NE 1/4

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

DRAWN BY: D.COX	DATE DRAWN: 01-24-17
SCALE: NONE	
SUA	EXHIBIT


KT
KT ENGINEERING
ENGINEERS • SURVEYORS
DRN
PROJECT:
SELTZER HEIGHTS
REPORT:
PHASE II DRAINAGE REPORT
ISSUE DATE:
JANUARY 20, 2025
REVISIONS:

Engineer Certification Statement

I hereby certify that this Preliminary Drainage Report for Seltzer Heights was prepared by me or under my direct supervision in accordance with the provisions of Adams County Storm Drainage Design and Technical Criteria for owners thereof. I understand that Adams County does not and will not assume liability for drainage facilities designed by others.

Kenneth Paul Toland
Registered Professional Engineer
State of Colorado No. 33801
For and on behalf of KT Engineering

Developer Certification Statement

HSG Land LLC hereby certifies that the drainage facilities for the Preliminary Drainage Report for Seltzer Heights shall be constructed according to the design presented in this report. I understand that Adams County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer. I understand that Adams County reviews drainage plans pursuant to Colorado Revised Statutes Title 30, Article 28; but cannot, on behalf of HSG Land LLC, guarantee that final drainage design review will absolve HSG Land LLC and/or their successors and/or assigns the future liability for improper design. I further understand that approval of the Final Plat and/or Final Development Plan does not imply approval of my engineer's drainage design.

_____ _____

HSG Land LLC Date:

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B. Excerpts from Seltzer Farms Phase II Drainage Report
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Proposed CUHP/SWMM Drainage Map
Proposed Drainage Map

I. Purpose and Scope

The Seltzer Heights Subdivision is a proposed master planned community composed of 4 parcels of land totaling approximately 220 acres. The project consists of existing Parcel Numbers 0157104200002, 0157104200001, 0157104000006, and 0157104100005 with an address of 8120 E. 168th Avenue. The Seltzer Heights Subdivision is planned to have 196 single-family houses and future development parcels. The future development parcels are planned to become an assisted and independent living campus and apartment complex. Preliminarily, it is anticipated that the assisted/independent living campus will consist of 235 dwelling units and the apartments will consist of 280 dwelling units. This results in a total of 711 dwelling units potentially proposed with this project. Approximately 109.3 acres of the project that are currently owned by Todd Creek Village Metropolitan district and contain Signal Reservoirs No. 1 and No. 2 will be preserved as open space with the only improvement being a concrete trail. The Seltzer Heights housing development will occur on the 110.3 acre parcel at address 8120 E. 168th Avenue. This area is referred to in this report as the Seltzer Heights Site.

The Seltzer Heights Site is located within a single watershed which drains to an existing roadside channel along the south side of E. 168th Avenue. This is referenced in previous drainage studies as *E. 168th Avenue Drainage #1*. *E. 168th Avenue Drainage #1* is conveyed to the east to the Seltzer Farms development located on the east side of Yosemite Street. Ultimately the roadside channel discharges via 2 existing culverts to the north side of E. 168th Avenue approximately 450 feet east of the Seltzer Farms property boundary into unincorporated Weld County. At this point, the total watershed area of the *E. 168th Avenue Drainage #1* is approximately 423.6 acres.

The overall basin has been studied in detail in the *Seltzer Farms Phase II Drainage Report*. This drainage report analyzes the overall 423.6 acre basin in the historic condition, existing condition, Phase 1 and Ultimate Buildout of the Seltzer Farms Development. The Seltzer Heights project is noted as the "HSG Parcel" in the *Seltzer Farms Phase II Drainage Report*. Because ultimately stormwater is discharged to unincorporated Weld County, the Detention Pond design included the *Seltzer Farms Phase II Drainage Report* adhere to major storm release rates in Chapter 5: Drainage Criteria in the Weld County Engineering and Construction Criteria. This sets the 100-year major storm pond release at the historic 5-year flowrate for both this project and the Seltzer Farms development.

The Seltzer Farms development anticipates receiving flows from Seltzer Heights and has extended and sized storm infrastructure for this purpose. "Pond OS" is noted in the *Seltzer Farms Phase II Drainage Report* and represents a detention pond located within Seltzer Heights. The proposed purpose of this pond was to reduce existing condition flows from Todd Creak Meadows and the undeveloped Seltzer Heights Site to the historic condition. As the Seltzer Heights project is now being developed, proposed Pond B will take the place of "Pond OS" as noted in the *Seltzer Farms Phase II Drainage Report*, however, anticipated 100-year pond release rates will remain the same or less than those in the Seltzer Farms Phase II Drainage Report.

Because the Seltzer Heights Site is within the study area of the *Seltzer Farms Phase II Drainage Report*, this report relies on modeling of the historic and existing conditions previously done in the aforementioned report. This project is located entirely in CUHP Basin 201 (or Rational Method Basin OS5) in the *Seltzer Farms Phase II Drainage Report*. As part of this report we have updated the proposed condition CUHP/SWMM Model to add the Seltzer Heights project and proposed Pond B to the modeling to demonstrate compliance with the major storm (100-year) release rate. Below is a summary of each scenario that has been analyzed including the Historic and Existing conditions included in the *Seltzer Farms Phase II Drainage Report* and the two proposed conditions updated in this report.

that was previously analyzed in the *Seltzer Farms Phase II Drainage Report*:

Historic Condition (*Seltzer Farms Phase II Drainage Report*)
The historic condition assumes all sub-basins are 2% impervious. No existing detention ponds are modeled in this condition. The purpose of this model is to establish a baseline for comparing flowrates in both Seltzer Farms Phase 1 and Seltzer Farms Ultimate Buildout models.

Existing Condition (*Seltzer Farms Phase II Drainage Report*)
The existing condition model uses current land uses to establish a percent impervious for each sub-basin. The purpose of this model is to establish existing flowrates within the watershed.

Seltzer Heights and Seltzer Farms Filing 1
This scenario analyzes the development of Seltzer Heights along with the first Filing of Seltzer Farms. Seltzer Heights consists of 196 single-family residential lots and future development parcels. The future development parcels were assigned an "Apartment" land use with a 75% imperviousness. Pond B will be located within the Seltzer Heights Site. Pond B is a proposed Extended Detention Basin that provides Water Quality Capture Volume (WQCV), 5-year and 100-year detention for the Seltzer Heights Site.

Seltzer Farms Filing 1 consists of 413 dwelling units within the Seltzer Farms development. Pond A is a detention pond located within the Seltzer Farms development and was previously analyzed in the *Seltzer Farms Phase II Drainage Report*. Pond A is an Extended Detention Basin that provides WQCV, 5-year and 100-year detention for the Seltzer Farms Development.

Seltzer Heights and Seltzer Farms Ultimate Buildout
This scenario analyzes the development of Seltzer Heights along with the ultimate buildout of the Seltzer Farms development. Seltzer Heights remains unchanged with 196 single family lots and future development parcels that were assigned an "Apartment" land use with a 75% imperviousness. Pond B remains unchanged in this scenario.

The ultimate buildout of Seltzer farms consists of 936 dwelling units. Pond A is sized for the ultimate buildout scenario only requiring the orifice plate to be replaced. Once replaced Pond A is a proposed Extended Detention Basin that provides WQCV, 5-year and 100-year detention for the Seltzer Farms Development.

II. General Location and Description

Location

The Seltzer Heights Subdvision is located on four separate parcels along the south side of E. 168th Avenue consisting of 220 acres. The Seltzer Heights development only occurs on a 110.3 acre parcel located at 8120 E. 168th Avenue, which is located on the southwest corner of E. 168th Avenue and Yosemite Street. The Seltzer Heights Site is located in the Northeast ¼ of Section 4, Township 1 South and Range 67 West of the Sixth Principal Meridian. The property is bound to the north by E. 168th Avenue and agricultural land uses, to the east by Yosemite Street and the Seltzer Farms development, and to the south by the Todd Creek Meadows larger lot residential subdivision and to the west by agricultural land. A vicinity map has been provided in the appendix of this report.

The Seltzer Heights Site is located within the E. 168th Avenue Drainage #1 watershed area. This watershed area encompasses 423.6 acres on the south side of E. 168th Avenue before being conveyed via existing culverts to the north side of E. 168th Avenue. This watershed area is bound to the west by a high point at E. 168th Avenue and the berms associated with Signal Reservoirs #1 and #2, to the south by a natural ridge in the topography in Todd Creek Meadows Subdivision, a high point in Yosemite Street, and Hi Land Acres and Shook Subdivision and to the east by an existing oil and gas access road, and to the north by E. 168th Avenue.

Description of Property

Existing Conditions

The Seltzer Heights Site (8120 E. 168th Avenue) is currently vacant land. There is a large oil and gas extraction facility present on the northwest corner of the site abutting E. 168th Avenue. There are no buildings located within the Seltzer Heights Site. In general, the Seltzer Heights Site is covered in native grasses common for the area. The developed site tends to slope to the northeast at approximate slopes of 2.0 to 5.0 percent.

The Seltzer Heights Subdivision overall boundary also contains land owned by the Todd Creek Village Metropolitan District. This land contains Signal Reservoirs No. 1 and No. 2, which store water for the Todd Creek Village Metropolitan District. There are outbuildings and drives associated with the reservoir operations present within these areas. It is anticipated that no improvements other than walking trails will be constructed in these areas as they will be preserved as open space. Development into future lots only takes place on the 110.3 acre parcel owned by HSG Land LLC located at 8120 E. 168th Avenue.

According to the USDA Web Soil Survey, the soils within the Seltzer Heights Site are made of Hydrologic Soil Group C soils consisting of Platner Loam (0-3% slopes), Platner Loam (3-5% slopes), and Ulm Loam (3-5% slopes).

As identified in the *Seltzer Farms Phase II Drainage Report*, the Seltzer Heights Site is located in the E. 168th Avenue Drainage #1 as identified in the Todd Creek PUD Amendment Preliminary Regional Drainage Report. From the westernmost extents of the basin at E. 168th Avenue, there are 2

channels that convey runoff to the east along E. 168th Avenue. Both channels are conveyed to the north side of E. 168th Avenue via two separate culverts at the same location at the southwest corner of the property located at 9945 E. 168th Avenue (aka Weld County Road 2). Once on the north side of E. 168th Avenue, the drainage enters Weld County. The E. 168th Avenue Drainage #1 encompasses approximately 1,583 acres. Of which, approximately 423.6 acres are from the south side of E. 168th Avenue and the remaining 1,159 acres of tributary area are on the north side of E. 168th Avenue.

Flows from the existing basin combine at Yosemite Street. The west side of Yosemite Street consists of 144.1 acres and the east side of Yosemite street consists of 279.5 acres.

Seltzer Heights Development

Seltzer Heights will consist of 196 single-family lots and associated street infrastructure and utilities to service the homes. It is anticipated that 2 future development lots will be platted, but not developed at this time. The future development lots are anticipated to be apartments and an assisted/independent living campus. For purposes of this drainage report, the future development lots have been assumed to be 75% impervious which correspond with the Apartment Land Use in MHFD Table 6-3: Recommended percentage imperviousness values. Proposed Pond B will be constructed as part of this development and will provide WQCV, 5-year and 100-year detention as required by Adams County. It is anticipated that outflows from Pond B will be piped along E. 168th Avenue to a storm extension provided by the Seltzer Farms development to the east.

<u>E. 168th Avenue Drainage #1</u>

Pond B will discharge to E. 168th Avenue Drainage #1. Pond B is proposed Extended Detention Basin (EDB) that will provide WQCV, 5-year and 100-year Detention. The proposed 100-year discharge rate will release at or below the 5-year Historic flowrate per Weld County Drainage Criteria since the site runoff will ultimately discharge to Weld County. Per the *Seltzer Farms Phase II Drainage Report*, the allowable 100-year maximum release rate for Pond B (Noted as Pond OS in the *Seltzer Farms Phase II Drainage Report*) is 37.6 cfs.

The Historic 5-year flow to existing culverts under E. 168th Avenue was determined to be 90.4 cfs. Of this Pond A as part of Seltzer Farms development will have a maximum release rate of 52.8 cfs. This leaves 37.6 cfs as the target release rate for Pond B in the Seltzer Heights development. A pipe for the Pond B outfall will be extended in E. 168th Avenue within the Seltzer Development. The Pond B outfall storm will be connected to this pipe.

As part of the Seltzer Farms Development, the existing culvert crossing under W. 168t Avenue will be replaced with dual 36-inch diameter culverts with adequate capacity to convey 100-year flows under W. 168th Avenue, which was previously calculated as 90.4 cfs.

The SWMM Model included in the Seltzer Farms Phase II Drainage Report indicates a peak outflow from Pond A of 50.3 cfs and 52.4 cfs in Phase I and Ultimate Buildout Phases, respectively.

III. Drainage Basin and Sub-Basins

Major Basin Description

The watershed lies within the South Platte River major drainage basin. The Seltzer Heights Site is within the direct watershed of the South Platte River. The South Platte River is a major conveyance in the Colorado Front Range. The watershed extends over an area of 23,000 square miles and is located in 3 states. Development within the South Platte River major drainage basin is controlled by the South Platte Major Drainageway Plan (June 2000), prepared by Camp Dresser & McKee Inc. The site is located along the northern boundary of the study at E. 168th Avenue.

There are no FEMA floodplains within the Seltzer Heights Site. Adjoining properties owned by the Todd Creek Village Metropolitan District have a Zone A FEMA Floodplain designated in Signal Reservoirs No. 1 and No. 2. These properties are shown in Flood Insurance Rate Map Number 08001C0307H with an effective date of March 5, 2007. The only improvements near the Zone A Floodplain are walking paths along the top of the reservoirs. There are no impacts proposed to the Zone A FEMA Floodplain.

Sub-Basin Description

The watershed has been broken up into 39 sub-basins. Storm sewer was preliminarily sized utilizing the Rational Method. The 5-year and 100-year storms have been analyzed by the rational method for storm sewer sizing. Pond B was sized utilizing UD-Detention as well as CUHP incorporated into a SWMM Model. The CUHP and SWMM analysis is an update to the model included in the Seltzer Farms Phase II Drainage Report as it includes development of the Seltzer Heights Site, including Pond B.

The key differences between this report and the Seltzer Farms Phase II Drainage Report is that CUHP Basin 201 (120.1 acres) was broken up into 4 individual CUHP Basins. These are CUHP Basins 201 (24.1 acres), 202 (48.7 acres), 203 (41.5 acres), and 204 (6.9 acres) that correspond to the proposed drainage patterns in the Seltzer Heights Development. Pond OS was also removed and replaced with Pond B which was sized for the Seltzer Heights Development.

Regulations

Pond B has been designed in compliance with the criteria set forth in Chapter 5: Drainage Criteria in the Weld County Engineering and Construction Criteria and in compliance with the *Seltzer Farms Phase II Drainage Report*. Other drainage facilities in Adams County have been designed in compliance with criteria set forth in Chapter 9: Storm Drainage Design and Stormwater Quality Control Regulations in the Adams County Development Standards and Regulations.

All facilities have been designed in compliance with the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manuals, Volumes 1-3.

Hydrological Criteria

1-hour point rainfall data for this watershed was obtained from Adams County Chapter 9 – Storm Drainage Design and Stormwater Quality Regulations. Sub-Basin hydrographs were developed by delineating watershed areas from the proposed storm sewer system. Sub-Basin hydrographs were generated in CUHP 2005 Version 2.0.1. Three storms were analyzed, the 5-year, 10-year and 100-year storm events. This report places emphasis on the 100-year storm event as this event will dictate overall pond and pipe infrastructure sizes. The Weld County Municipal Code does allow for the use of CUHP in areas located in the southwest portion of Weld County, in areas larger than 160 acres that have drainage characteristics similar to an urban area per Chapter 8, Article XI, Section 8-11-60. The minor and major storm events are the 5-year and 100-year, respectively.

Watersheds were delineated from Lidar Topography obtained from the Denver Regional Council of Governments (DRCOG) Regional Data Catalog. The Lidar was collected in 2020 and is Quality Level 2 Lidar (QL2) and was part of the DRCOG Regional Lidar Project 2020.

Hydraulic Criteria

EPA SWMM 5.2 was used to route flows through the drainage basins. Hydraflow AutoCAD extension software was used for preliminary channel and pipe capacities.

IV. Drainage Facility Design

General Concept

In general, drainage patterns remain the same from existing and proposed conditions. It is anticipated that Pond B outflows will be piped to storm infrastructure that will be installed with the Seltzer Farms Development to the east per the *Seltzer Farms Phase II Drainage Report*. Once east of the Seltzer Farms Development it is anticipated that both Ponds A (Seltzer Farms) and B (Seltzer Heights) will discharge to E. 168th Avenue Drainage #1 before crossing via dual 36-inch diameter culverts to the north side of E. 168th Avenue. The Dual 36-inch diameter culverts will be installed as part of the Seltzer Farms Project.

The storm systems included with this report have been designed to capture and convey runoff up to the 100-year storm event.

Pond B

Pond B is a WQCV + 5-yr + 100-yr Detention Pond located within the Seltzer Heights Site. This pond receives runoff from approximately 145.2 acres at 44.9% imperviousness. This includes proposed development of the Seltzer Heights Site. Approximately 24.02 acres is from an off-site basin (Basin OS4) to the south of the Seltzer Heights Site. This area is part of the Todd Creek Meadows rural residential subdivision. In general, flows are collected in 2 roadside channels. The first is located along E. 168th Avenue and conveys storm runoff to the east and the second is along the southern and east sides that conveys runoff north along Yosemite Street.

The SWMM model indicates a maximum 100-year volume of 22.30 acre feet and a peak 100-year release rate of 33.1 cfs. This corresponds to a maximum 100-year water depth of 7.70 feet (5114.70 W.S.E.). This when added to the 52.5 cfs release rate of Ultimate Condition Pond A in the *Seltzer Farms Phase II Drainage Report* is 85.6 cfs, which is less than the 5-year historic flowrate of 90.4 cfs at the culvert crossing under E. 168th Avenue.

V. Conclusion

This drainage report has been prepared in conformity with Chapter 5: Drainage Criteria in the Weld County Engineering and Construction Criteria and Chapter 9: Storm Drainage Design and Stormwater Quality Control Regulations in the Adams County Development Standards and Regulations. This drainage report is also in conformity with the MHFD Urban Storm Drainage Criteria Manuals.

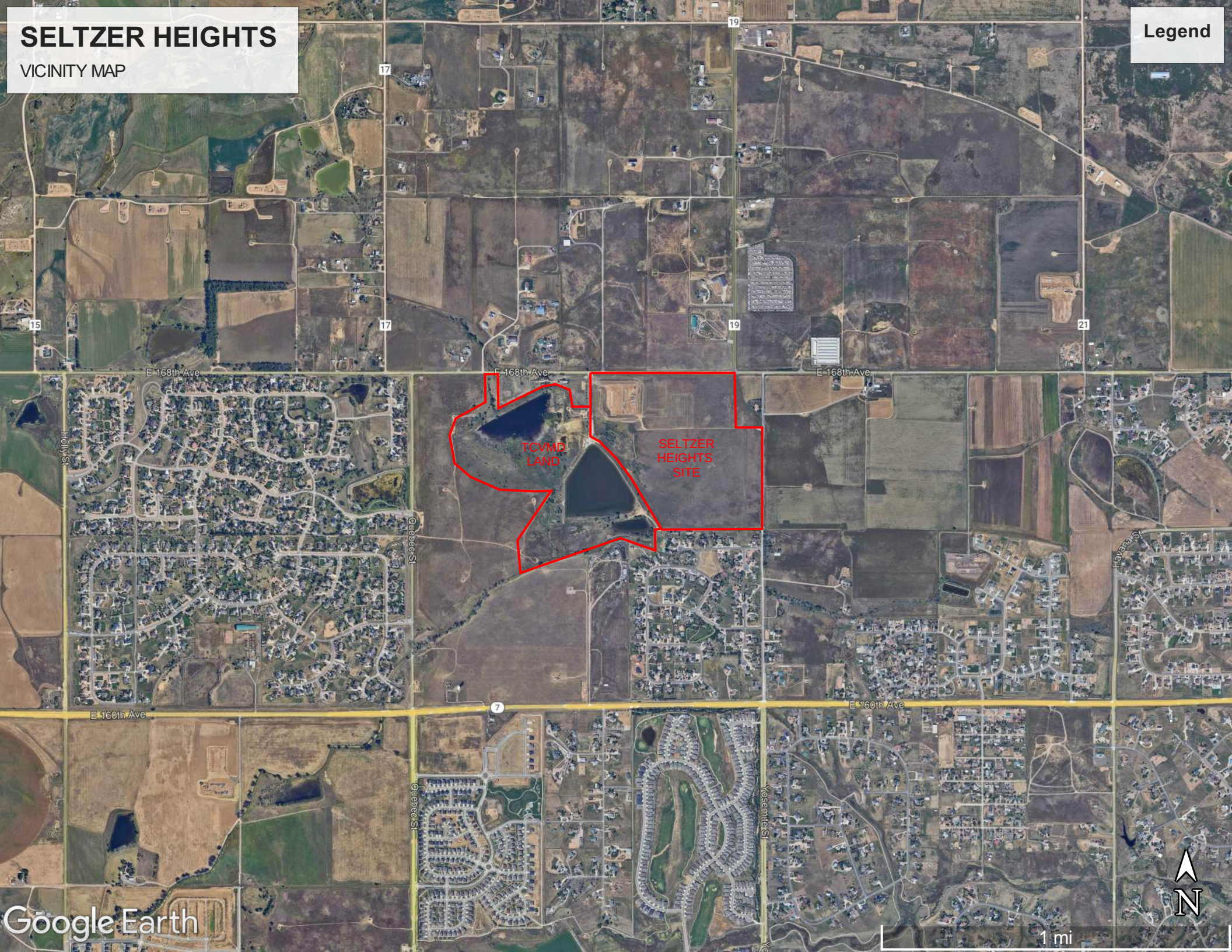
VI. References

1. **Weld County Engineering and Construction Criteria**
   Atkins, January 2021.
2. **Adams County Development Standards and Regulations, Chapter 9**
   Adams County, December 8, 2020.
3. **Urban Storm Drainage Design & Technical Criteria Manual Volumes 1-3**
   Urban Drainage and Flood Control District, Revised August, 2018.
4. **National Resources Conservation Service Web Soil Survey Golden Area, CO**
   U.S. Department of Agriculture, Natural Resources Conservation Service
5. **FIRM Map Number 08001C0307H**
   Federal Emergency Management Agency, Effective Date: March 5, 2007.
6. **Todd Creek PUD Amendment – Preliminary Regional Drainage Report**
   KT Engineering, Dated June 5, 2023.
7. **Seltzer Farms – Phase II Drainage Report**
   KT Engineering, Last Revised April 26, 2024.

APPENDIX A
VICINITY MAP
DESIGN CHARTS
EXISTING LAND USE MAP
SOILS MAP

SELTZER HEIGHTS

VICINITY MAP



plan to determine runoff coefficients and consider changes in flow patterns (from the undeveloped site conditions) caused by the proposed plan (including street alignments). When evaluating the estimated time of concentrations, the proposed lot grading shall be used to calculate the time of concentration. The proposed project shall in no way change historic runoff values, cause downstream damage, or adversely impact adjacent properties. In addition, phased or partial development analysis will not be accepted. The entire platted parcel shall be analyzed for full build-out in order to properly site and size detention/retention areas and conveyance systems.

Different levels of onsite analysis may be required depending on the size of project or as directed by the County. Refer to the Appendices for a copy of the Application Package for analysis requirements.

9-01-04-01-02 OFFSITE FLOW ANALYSIS

The analysis of offsite runoff is dependent on regional drainage characteristics (whether or not the tributary offsite area lies within a major drainage basin) and the existing/proposed land use and topographic features. If an existing Storm Drainage Master Plan has been adopted by resolution for the region being developed, the engineer shall use this as a baseline document (prior approval from the County on the Master Plan is required) and update it with proposed information. However, should no offsite information be available for fully developed flows (5-, 10- and 100-year), the engineer must perform a regional analysis to ensure the proposed development does not change historic runoff values, cause downstream damage, or adversely impact adjacent properties.

Different levels of offsite analysis may be required depending on the size of project or as directed by the County. Refer to the Appendices for a copy of the Application Package for analysis requirements.

9-01-04-02 STORM RETURN PERIOD

The minor and major storm return period shall not be less than those found in Table 9.2 for all vital drainage structures or critical points of surface water flow.

Table 9.2—Return Periods

Land Use	Return Period (Yrs) for Minor Drainage Systems	Return Period (Yrs) for Major Drainage Systems
Residential-Urban	5	100
Residential-Rural	10[a]	100
Commercial	5	100
Industrial	5	100
Open Space	5	100
School	5	100

[a] All roadside ditches and culverts shall be sized to carry the 10-year peak runoff.

9-01-04-03 RAINFALL

Presented in this Section are guidelines for the development of rainfall data to be used in preparing a hydrological analysis (storm runoff) for a proposed development within the County.

The rainfall intensity information published by the National Oceanic and Atmospheric Administration (NOAA) in the "Precipitation-Frequency Atlas of the Western United States" was used to develop incremental rainfall distributions presented in Table 9.5. The incremental rainfall distributions presented in this table are based on procedures developed by the MHFD. However, refinements have been made to closely match conditions within the County.

9-01-04-04 TIME-INTENSITY-FREQUENCY CURVES

A time-intensity-frequency curve was developed for the County by using one-hour point rainfall values (see Table 9.3) and factors for durations of less than one hour (see Table 9.4); both obtained from the NOAA Atlas. The outcomes of this distribution are point values that were then converted to intensities and plotted as Figure 9.1. Rainfall data from the Mile High Flood District (MHFD) may be used as an alternative (see MHFD Criteria Manual).

Table 9.3—One-Hour Point Rainfall (inches)

2-Year	5-Year	10-Year	50-Year	100-Year
1.00	1.42	1.68	2.35	2.71

Table 9.4—Factors for Durations of Less than One Hour

Duration (minutes)	5	10	15	30
Ratio to 1-hour depth	0.29	0.45	0.57	0.79

4.0 Intensity-Duration Curves for Rational Method

To develop depth-duration curves or intensity-duration curves for the Rational Method of runoff analysis take the 1-hour depth(s) obtained from NOAA Atlas 14 and apply Equation 5-1 for the duration (or durations) of interest:

$$I = \frac{28.5\, P_1}{(10 + T_d)^{0.786}} \qquad \text{Equation 5-1}$$

Where:

I = rainfall intensity (inches per hour)

P_1 = 1-hour point rainfall depth (inches)

T_d = storm duration (minutes)

Table 6-3. Recommended percentage imperviousness values

Land Use or Surface Characteristics	Percentage Imperviousness (%)
Business:	
Downtown Areas	95
Suburban Areas	75
Residential lots (lot area only)**:**	
Single-family	
2.5 acres or larger	12
0.75 – 2.5 acres	20
0.25 – 0.75 acres	30
0.25 acres or less	45
Apartments	75
Industrial:	
Light areas	80
Heavy areas	90
Parks, cemeteries	10
Playgrounds	25
Schools	55
Railroad yard areas	50
Undeveloped Areas:	
Historic flow analysis	2
Greenbelts, agricultural	2
Off-site flow analysis (when land use not defined)	45
Streets:	
Paved	100
Gravel (packed)	40
Drive and walks	90
Roofs	90
Lawns, sandy soil	2
Lawns, clayey soil	2

Used 50% for Lot Area

Table 6-5. Runoff coefficients, *c* (continued)

Total or Effective % Impervious	NRCS Hydrologic Soil Group C						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
2%	0.01	0.05	0.15	0.33	0.40	0.49	0.59
5%	0.03	0.08	0.17	0.35	0.42	0.5	0.6
10%	0.06	0.12	0.21	0.37	0.44	0.52	0.62
15%	0.1	0.16	0.24	0.4	0.47	0.55	0.64
20%	0.14	0.2	0.28	0.43	0.49	0.57	0.65
25%	0.18	0.24	0.32	0.46	0.52	0.59	0.67
30%	0.22	0.28	0.35	0.49	0.54	0.61	0.68
35%	0.26	0.32	0.39	0.51	0.57	0.63	0.7
40%	0.3	0.36	0.43	0.54	0.59	0.65	0.71
45%	0.34	0.4	0.46	0.57	0.62	0.67	0.73
50%	0.38	0.44	0.5	0.6	0.64	0.69	0.75
55%	0.43	0.48	0.54	0.63	0.66	0.71	0.76
60%	0.47	0.52	0.57	0.65	0.69	0.73	0.78
65%	0.51	0.56	0.61	0.68	0.71	0.75	0.79
70%	0.56	0.61	0.65	0.71	0.74	0.77	0.81
75%	0.6	0.65	0.68	0.74	0.76	0.79	0.82
80%	0.65	0.69	0.72	0.77	0.79	0.81	0.84
85%	0.7	0.73	0.76	0.79	0.81	0.83	0.86
90%	0.74	0.77	0.79	0.82	0.84	0.85	0.87
95%	0.79	0.81	0.83	0.85	0.86	0.87	0.89
100%	0.83	0.85	0.87	0.88	0.89	0.89	0.9

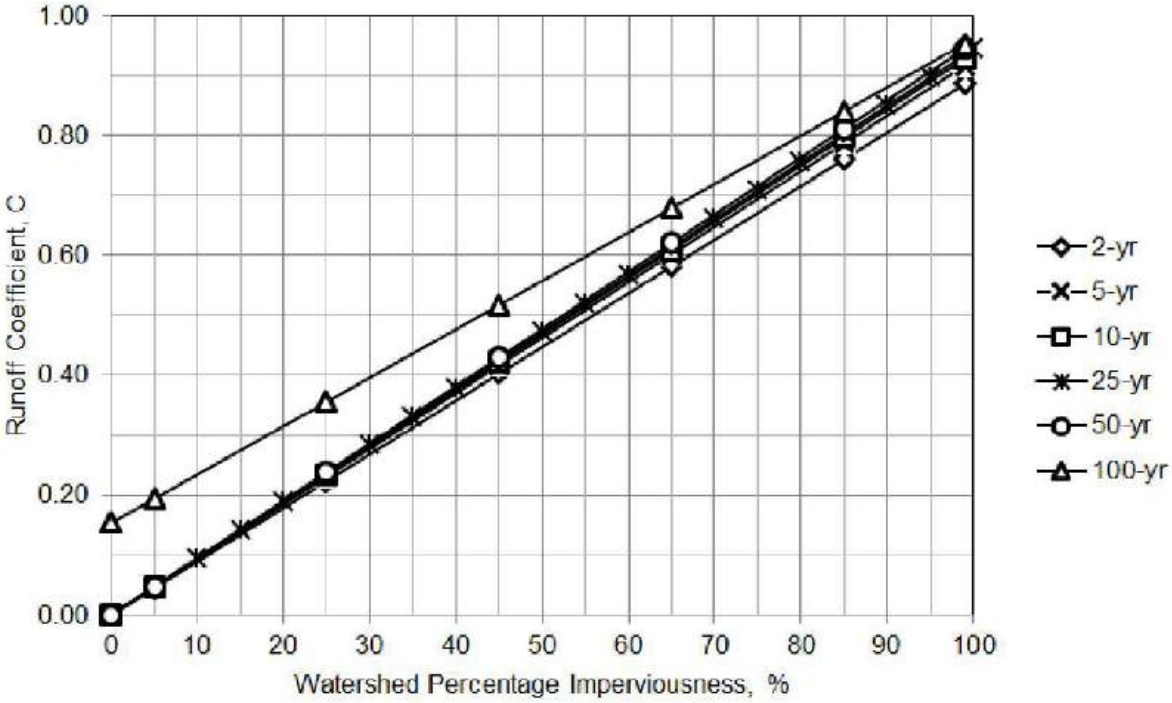


Figure 6-1. Runoff coefficient vs. watershed imperviousness NRCS HSG A

2.3 Limitations

The Rational Method is the simplistic approach for estimating the peak flow rate and total runoff volume from a design rainstorm in a given catchment. Under the assumption of uniform hydrologic losses, the method is limited to catchments smaller than 90 acres. Under the condition of composite soils and land uses, use an area-weighted method to derive the catchment's hydrologic parameters.

The greatest drawback to the Rational Method is that it normally provides only one point (the peak flow rate) on the runoff hydrograph. When the areas become complex and where subcatchments come together, the Rational Method will tend to overestimate the actual flow, which results in oversizing of drainage facilities. The Rational Method provides no means or methodology to generate and route hydrographs through drainage facilities. One reason the Rational Method is limited to small areas is that good design practice requires the routing of hydrographs for larger catchments to achieve an economically sound design.

Another disadvantage of the Rational Method is that with typical design procedures, one normally assumes that all of the design flow is collected at the design point and that there is no water running overland to the next design point. This is not an issue of the Rational Method but of the design procedure. Use additional analysis to account for this scenario.

2.4 Time of Concentration

One of the basic assumptions underlying the Rational Method is that runoff is linearly proportional to the average rainfall intensity during the time required for water to flow from the most remote part of the drainage area to the design point. In practice, the time of concentration is empirically estimated along the selected waterway through the catchment.

To calculate the time of concentration, first divide the waterway into overland flow length and channelized flow lengths, according to the channel characteristics. For urban areas (tributary areas of greater than 20 percent impervious), the time of concentration, t_c, consists of an initial time or overland flow time, t_i, plus the channelized flow travel time, t_t, through the storm drain, paved gutter, roadside ditch, or channel. For non-urban areas, the time of concentration consists of an overland flow time, t_i, plus the time of travel in a defined drainage path, such as a swale, channel, or stream. Estimate the channelized travel time portion, t_t, of the time of concentration from the hydraulic properties of the conveyance element. Initial or overland flow time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. Compute the time of concentration for both urban and non-urban areas using Equation 6-2:

$$t_c = t_i + t_t \qquad \text{Equation 6-2}$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

2.4.1 Initial or Overland Flow Time

The initial or overland flow time, t_i, may be calculated using Equation 6-3:

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}} \qquad \text{Equation 6-3}$$

Where:

t_i = overland (initial) flow time (minutes)
C_5 = runoff coefficient for 5-year frequency (from Table 6-4)
L_i = length of overland flow (ft)
S_o = average slope along the overland flow path (ft/ft).

Equation 6-3 is adequate for distances up to 300 feet in urban areas and 500 feet in rural areas. Note that in a highly urbanized catchment, the overland flow length is typically shorter than 300 feet due to effective man-made drainage systems that collect and convey runoff.

2.4.2 Channelized Flow Time

The channelized flow time (travel time) is calculated using the hydraulic properties of the conveyance element. The channelized flow time, t_t, is estimated by dividing the length of conveyance by the velocity. The following equation, Equation 6-4 (Guo 2013), can be used to determine the flow velocity in conjunction with Table 6-2 for the conveyance factor.

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t} \qquad \text{Equation 6-4}$$

Where:

t_t = channelized flow time (travel time, min)
L_t = waterway length (ft)
S_o = waterway slope (ft/ft)
V_t = travel time velocity (ft/sec) = $K\sqrt{S_o}$
K = NRCS conveyance factor (see Table 6-2).

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

The time of concentration, t_c, is the sum of the initial (overland) flow time, t_i, and the channelized flow time, t_t, as per Equation 6-2.

2.4.3 First Design Point Time of Concentration in Urban Catchments

Equation 6-4 was solely determined by the waterway characteristics and using a set of empirical formulas. A calibration study between the Rational Method and the Colorado Urban Hydrograph Procedure (CUHP) suggests that the time of concentration shall be the lesser of the values calculated by Equation 6-2 and Equation 6-5 (Guo and Urbonas 2013).

$$t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}} \qquad \text{Equation 6-5}$$

Where:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.
L_t = length of channelized flow path (ft)
i = imperviousness (expressed as a decimal)
S_t = slope of the channelized flow path (ft/ft).

Equation 6-5 is the regional time of concentration that warrants the best agreement on peak flow predictions between the Rational Method and CUHP when the imperviousness of the tributary area is greater than 20 percent. It was developed using the UDFCD database that includes 295 sample urban catchments under 2-, 5-, 10-, 50, and 100-yr storm events (MacKenzie 2010). It suggests that both initial flow time and channelized flow velocity are directly related to the catchment's imperviousness (Guo and MacKenzie 2013).

The first design point is defined as a node where surface runoff enters the storm drain system. For example, all inlets are "first design points" because inlets are designed to accept flow into the storm drain.

Typically, but not always, Equation 6-5 will result in a lesser time of concentration at the first design point and will govern in an urbanized watershed. For subsequent design points, add the travel time for each relevant segment downstream.

2.4.4 Minimum Time of Concentration

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

2.4.5 Common Errors in Calculating Time of Concentration

A common mistake in urbanized areas is to assume travel velocities that are too slow. Another common error is to not check the runoff peak resulting from only part of the catchment. Sometimes a lower portion of the catchment or a highly impervious area produces a larger peak than that computed for the whole catchment. This error is most often encountered when the catchment is long or the upper portion contains grassy open land and the lower portion is more developed.

9-01-04-05 RUNOFF COEFFICIENTS

The runoff coefficients to be used within the Rational Method, Colorado Urban Hydrograph Procedure (CUHP) or approved hydrologic models are to be determined based on existing and/or proposed land use and surface characteristics. When using the Rational Method and/or CUHP, the County requires the use of runoff coefficients presented in the Urban Storm Drainage Criteria Manual, Volume 1.

Recycled concrete will not be permitted as a ground covering surface.

9-01-04-06 TIME OF CONCENTRATION

In order to determine the rate of runoff at a designated outfall, the time of concentration must be determined. The time of concentration is the time it takes for water to flow from the most remote part of the drainage basin to the outfall of the study area. For the Rational Method, a separate time of concentration is necessary for the overall basin and each sub-basin. The time of concentration (T_c) is composed of the sheet or overland flow time (t_{ov}) and channel flow time (t_t). The time of concentration formula shall be as described in the Urban Storm Drainage Criteria Manual, Volume 1 for this Section.

9-01-04-07 STORM FLOW ANALYSIS

The engineer shall use the Rational Method for basins less than 90 acres. CUHP or other approved hydrologic models shall be used for basins larger than 160 acres. Basins between 90 acres and 160 acres in area may use either method.

9-01-04-07-01 *RATIONAL METHOD EQUATION*

Equation 9.4

$$Q=CIA$$

Where

Q = Flow Rate, cfs
A = Total Area of Basin, acres
C = Runoff Coefficient (refer to Section 9-01-04-05)
I = Rainfall Intensity, inches per hour (refer to Section 9-01-04-04)

9-01-04-07-02 *COMPUTER AIDED HYDROLOGIC MODELS*

For analyzing larger basins (greater than 90 acres), the engineer may either use the CUHP latest revision. (information detailed in Mile High Flood District's Criteria Manual) or another appropriate hydrology/hydraulics model. When using other hydrology/hydraulics models, the engineer will be required to develop unit, flood, routing and combination hydrographs for use in determining peak flows and time of concentrations at vital drainage structures or critical points of surface water runoff. A unit hydrograph is defined as the direct runoff hydrograph that results from 1-inch

E. 168TH AVENUE DRAINAGE ANALYSIS
EXISTING LAND USES

SELTZER HEIGHTS
SITE BOUNDARY

LAND USE LEGEND

- AGRICULTURE / OPEN SPACE - (2%)
- LARGE LOT RURAL RESIDENTIAL - (10%)
- RURAL RESDIENTIAL (2-5 ACRES) - (18%)
- RURAL RESDIENTIAL (1-2 ACRES) - (25%)
- SINGLE FAMILY LOW DENSITY - (35%)
- LIGHT INDUSTRIAL - (80%)
- STREETS - (100%)

N

600 0 300 600 1200

SCALE: 1"= 600 ' HORIZ.

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ARVADA, CO 80002
PH: 720.638.5190

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E. 168TH AVENUE DRAINAGE ANALYSIS
SOILS CONDITIONS MAP

SELTZER HEIGHTS
SITE BOUNDARY

NRCS SOIL CLASSIFICATION

- A SOILS
- B SOILS
- C SOILS
- D SOILS
- WATER

N

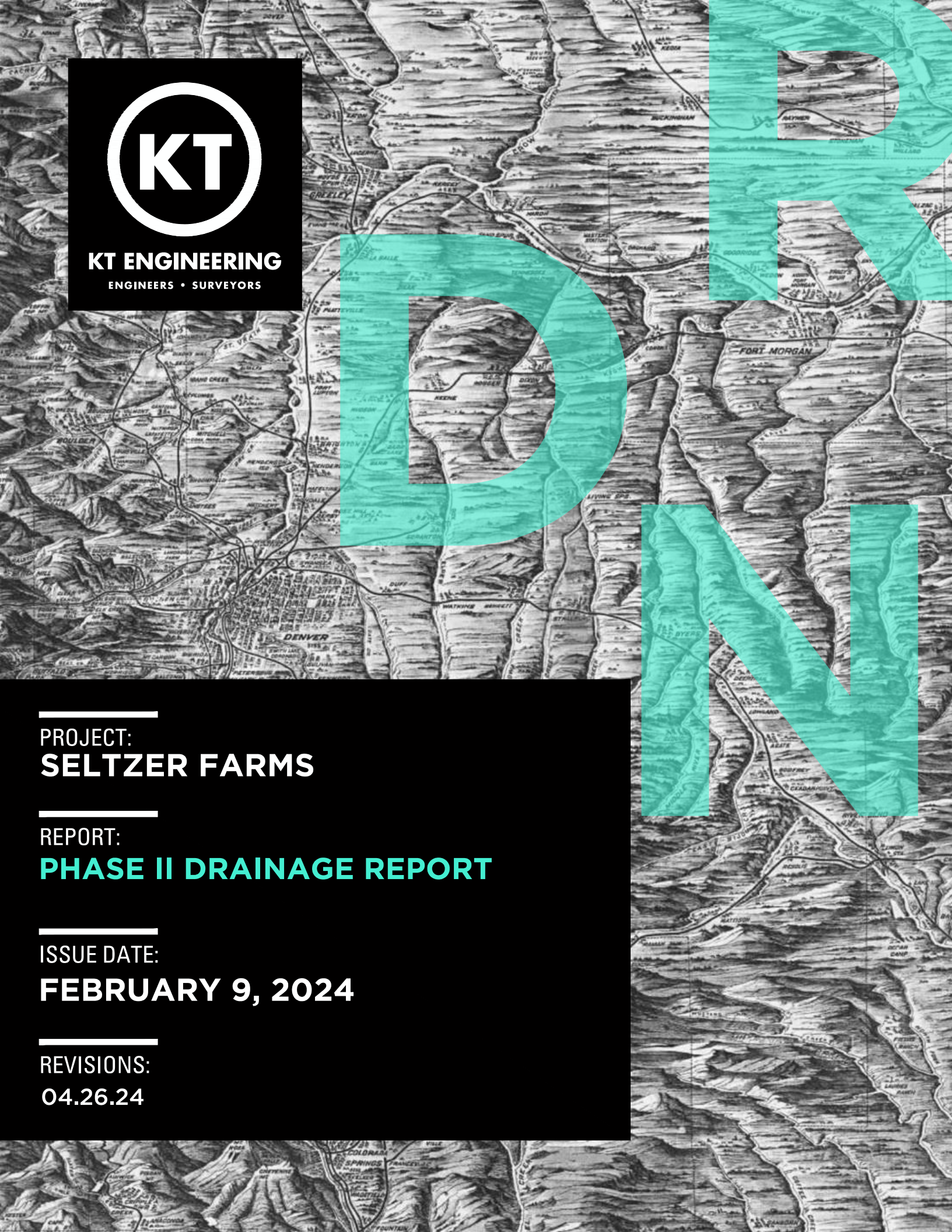
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SCALE: 1"= 50 ' HORIZ.

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APPENDIX B
EXCERPTS FROM THE SELTZER FARMS PHASE II DRAINAGE REPORT



PROJECT:
SELTZER FARMS

REPORT:
PHASE II DRAINAGE REPORT

ISSUE DATE:
FEBRUARY 9, 2024

REVISIONS:
04.26.24

Engineer Certification Statement

I hereby certify that this Preliminary Drainage Report Seltzer Farms was prepared by me or under my direct supervision in accordance with the provisions of Adams County Storm Drainage Design and Technical Criteria for owners thereof. I understand that Adams County does not and will not assume liability for drainage facilities designed by others.

Kenneth Paul Toland
Registered Professional Engineer
State of Colorado No. 33801
For and on behalf of KT Engineering

Developer Certification Statement

Remington Homes hereby certifies that the drainage facilities for the Preliminary Regional Drainage Report of the Seltzer Farms shall be constructed according to the design presented in this report. I understand that Adams County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer. I understand that Adams County reviews drainage plans pursuant to Colorado Revised Statutes Title 30, Article 28; but cannot, on behalf of Remington Homes, guarantee that final drainage design review will absolve Remington Homes and/or their successors and/or assigns the future liability for improper design. I further understand that approval of the Final Plat and/or Final Development Plan does not imply approval of my engineer's drainage design.

_____ _____

Remington Homes Date:

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A. Vicinity Map & Design Charts, Land Use Maps, Soils Map
B. Hydrologic Information & Routing, Pond Sizing, CUHP/SWMM Summary
C. Historic CUHP/SWMM Model
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F. Future Condition CUHP/SWMM Model
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Existing CUHP/SWMM Drainage Map
Phase 1 CUHP/SWMM Drainage Map
Ultimate CUHP/SWMM Drainage Map
Proposed Phase 1 Drainage Map
Proposed Ultimate Condition Drainage Map

I. Purpose and Scope

The Seltzer Farms subdivision is a proposed master planned community composed of 4 parcels of land totaling approximately 216.2 acres. The project consists of existing Parcel Numbers 0157103000014, 0157103300009, 0157103300003, and 0157104000020 with addresses of 16705 Yosemite Street and 9230 E. 168th Avenue. Seltzer Farms subdivision will ultimately consist of 936 dwelling units composed of single-family, duplexes, and townhomes. The first phase of the project will consist of 413 dwelling units composed of duplexes and single-family houses.

The subject properties are located within a single watershed which drains to an existing roadside channel along the south side of E. 168th Avenue. The E. 168th Avenue roadside channel is conveyed via 2 existing culverts to the north side of E. 168th Avenue approximately 450 feet east of the site boundary. The total watershed area of the drainage basin is approximately 423.6 acres.

There are four different scenarios analyzed in this report and are as follows: Historic Condition, Existing Condition, Todd Creek Farms Phase 1, and Seltzer Farms Ultimate Buildout. Each one is discussed in more detail below.

Historic Condition

The historic condition assumes all sub-basins are 2% impervious. No existing detention ponds are modeled in this condition. The purpose of this model is to establish a baseline for comparing flowrates in both Seltzer Farms Phase 1 and Seltzer Farms Ultimate Buildout models.

Existing Condition

The existing condition model uses current land uses to establish a percent impervious for each sub-basin. The purpose of this model is to establish existing flowrates within the watershed.

Seltzer Farms Phase 1

The Seltzer Farms Phase 1 analyzes the development of Phase 1 consisting of 413 dwelling units within the proposed community. Impervious area is increased due to the addition of residential lots, proposed streets and parks. Pond A is a proposed Extended Detention Basin that will provide Water Quality Capture Volume (WQCV), 5-year, and 100-year detention for the development.

Seltzer Farms Ultimate Buildout

The Seltzer Farms Ultimate Buildout analyzes the full development of the Seltzer Farms project consisting of 936 dwelling units. Pond A has been sized to provide WQCV, 5-yr, and 100-yr detention in the Ultimate Buildout scenario.

II. General Location and Description

Location

The Seltzer Farms Subdivision is located on four separate parcels along the south side of E. 168th Avenue consisting of 216.2 acres located at 16705 Yosemite Street and 9230 E. 168th Avenue. The site is located in the West ½ of Section 3, Township 1 South and Range 67 West of the Sixth Principal Meridian. The property is bound to the north by E. 168th Avenue, to the east by undeveloped agricultural land, to the south by larger lot residential subdivisions and to the west by Yosemite Street and agricultural land. It is anticipated that the 107.7 acres parcel of land located immediately west of the site on the west side of Yosemite Street will also be developed and was included in the Todd Creek Farms PUD Amendment Area previously submitted. The parcel immediately west of the Seltzer Heights subdivision is referred to as the HSG Parcel in this report. A vicinity map has been provided in the appendix of this report.

The overall watershed for this project encompasses 423.6 acres and is bound to the west by a high point at E. 168th Avenue and the berms associated with Signal Reservoirs #1 and #2, to the south by a natural ridge in the topography in Todd Creek Meadows, a high point in Yosemite Street, and Hi Land Acres and Shook Subdivision and to the east by an existing oil and gas access road, and to the north by E. 168th Avenue.

Description of Property

Existing Conditions

The site is currently used for agricultural purposes. There are several oil and gas facilities present within the site. The subject properties are mostly undeveloped with the exception of 2 houses and outbuildings located at 9230 E. 168th Avenue, and 1 house and outbuildings located at 16705 Yosemite Street. In general, the subject site is covered in native grasses common for the area. The properties tend to slope to the northeast at approximate slopes of 1.0 to 3.0 percent.

Along the southern portion of the site, there is an existing ditch identified as the Signal Ditch. It appears that the ditch is no longer in use as it has been filled in and abandoned to the east through the Shook Subdivision.

According to the USDA Web Soil Survey, the soils within the Seltzer Farms are made of Hydrologic Soil Group C soils consisting of Platner Loam (0-3% slopes), Platner Loam (3-5% slopes), and Ulm Loam (3-5% slopes).

The Seltzer Farms site is located in the E. 168th Avenue Drainage #1 as identified in the Todd Creek PUD Amendment Preliminary Regional Drainage Report. From the westernmost extents of the basin at E. 168th Avenue, there are 2 channels that convey runoff to the east along E. 168th Avenue. Both channels are conveyed to the north side of E. 168th Avenue via two separate culverts at the same location at the southwest corner of the property located at 9945 E. 168th Avenue (aka Weld County Road 2). Once on the north side of E. 168th Avenue, the drainage enters Weld County. The

E. 168th Avenue Drainage #1 encompasses approximately 1,583 acres. Of which, approximately 424 acres are from the south side of E. 168th Avenue and the remaining 1,159 acres of tributary area are on the north side of E. 168th Avenue.

Flows from the existing basin combine at Yosemite Street. The west side of Yosemite Street consists of 144.1 acres and the east side of Yosemite street consists of 279.5 acres.

Seltzer Farms – Phase 1

Seltzer Farms – Phase 1 will develop 413 dwelling units as single-family and duplex homes and associated street infrastructure and utilities to service the homes. Pond A will be constructed in Phase 1 and will provide WQCV, 5-year and 100-year detention as required by Adams County for the ultimate Seltzer Farms development (936 Dwelling Units).

E. 168th Avenue Drainage #1

The Seltzer Farms Phase 1 site will discharge to the E. 168th Avenue Drainage #1. Pond A is a proposed Extended Detention Basin (EDB) that will provide WQCV, 5-year, and 100-year detention. The proposed 100-year discharge rate will release at or below the 5-year Historic flowrate per Weld County Drainage Criteria since the site runoff will ultimately discharge to Weld County. The Historic 5-year flow to the existing culverts was calculated as 90.4 cfs per Adams County Drainage Criteria. It is proposed that Pond A will have a maximum 100-year release rate of 52.8 cfs. Another Detention Pond on the HSG Parcel will also be needed in order to reduce flows to the 5-year historic flowrate. The HSG Pond is identified as Pond OS and it has been given an allowable 100-year maximum release rate of 37.6 cfs. This pond will be constructed in coordination with the development of the HSG Parcel.

The 100-year combined maximum discharge rate of Ponds A and OS is 90.4 cfs (Pond A: 52.8 cfs, Pond OS:37.6 cfs). These release rates correspond to the release rates generated in the 5-year historic CUHP/SWMM model (90.4 cfs). Flows from the HSG Parcel will be piped through the Seltzer Farms site and combine with outflows from Pond A. The existing culvert crossing under W. 168th Avenue will be replaced with a dual 36-inch culverts with adequate capacity to convey 100-year flows under W. 168th Avenue. The SWMM Model shows a peak outflow of Pond A as 50.3 cfs in the Phase 1 condition.

Seltzer Farms – Ultimate Buildout

Seltzer Farms – Ultimate Buildout will develop an additional 523 dwelling units for a total of 936 dwelling units for the project. Although Pond A is large enough to accommodate the future development, it is anticipated that the Water Quality Plate will need to be modified in the Ultimate Buildout Phase to meet WQCV and 5-year release times.

E. 168th Avenue Drainage #1

The Seltzer Farms Phase 1 site will discharge to the E. 168th Avenue Drainage #1. Pond A is large enough to provide WQCV, 5-year, and 100-year detention for the full 936 unit subdivision. The proposed 100-year discharge rate will release at or below the 5-year Historic flowrate per Weld County Drainage Criteria. The Historic 5-year flow to the existing culverts was calculated at 90.4 cfs

per Adams County Drainage Criteria. It is proposed that Pond A will have a maximum 100-year release rate of 52.8 cfs. Another Detention Pond on the HSG Parcel will also be needed in order to reduce flows to the 5-year historic flowrate. The HSG Pond identified as Pond OS and it has been given an allowable 100-year maximum release rate of 37.6 cfs. This pond will be constructed in coordination with the development of the HSG Parcel.

The 100-year combined maximum discharge rate of Ponds A and OS is 90.4 cfs (Pond A: 52.8 cfs, Pond OS:37.6 cfs). These release rates correspond to the release rates generated in the 5-year historic CUHP/SWMM model (90.4 cfs). Flows from the HSG Parcel will be piped through the Seltzer Farms site and combine with outflows from Pond A. The Ultimate Buildout scenario will utilize the dual 36-inch culverts installed in Phase 1. The SWMM Model shows a peak outflow of Pond A as 52.4 cfs in the Ultimate Buildout condition.

III. Drainage Basin and Sub-Basins

Major Basin Description

The watershed lies within the South Platte River major drainage basin. Seltzer Farms properties are within the direct watershed of the South Platte River. The South Platte River is a major conveyance in the Colorado Front Range. The watershed extends over an area of 23,000 square miles and is located in 3 states. Development within the South Platte River major drainage basin is controlled by the South Platte Major Drainageway Plan (June 2000), prepared by Camp Dresser & McKee Inc. The site islocated along the northern boundary of the study at E. 168th Avenue.

There are no FEMA floodplains within the Todd Creek PUD Amendment properties. According to Flood Insurance Rate Map Numbers 08001C0326H and 08001C0307H with effective dates of March 5, 200, all three properties are located in Zone X, which is an area determined to be outside the 500-year floodplain.

Sub-Basin Description

The watershed has been broken up into 67 sub-basins in the Ultimate Buildout condition and 49 sub-basin in the Phase 1 condition. Storm sewer was preliminarily sized utilizing the Rational Method. The Phase 1 and Ultimate Buildout conditions were both modeled as part of this study. In general, the Ultimate Buildout condition generated higher developed flowrates with the exception of Design Points 49 and 83. Design Points 49 and 83 indicate higher 100-year flowrates are produced I the Phase 1 condition and therefore the pipes have been upsized accordingly to work with the highest flowrates.

The Phase 1 5-year storm was not analyzed in this report. 5-year flows in the ultimate condition were greater than all 5-year flows from Phase 1.

Regulations

Pond OS and Pond A have been designed in compliance with criteria set forth in Chapter 5: Drainage Criteria in the Weld County Engineering and Construction Criteria. Other drainage facilities in Adams County have been designed in compliance with criteria set forth in Chapter 9: Storm Drainage Design and Stormwater Quality Control Regulations in the Adams County Development Standards and Regulations.

All facilities have been designed in compliance with the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manuals, Volumes 1-3.

Hydrological Criteria

1-hour point rainfall data for this watershed was obtained from Adams County Chapter 9 – Storm Drainage Design and Stormwater Quality Regulations. Sub-Basin hydrographs were developed by delineating watershed areas from the proposed storm sewer system. Sub-Basin hydrographs were generated in CUHP 2005 Version 2.0.1. Three storms were analyzed, the 5-year, 10-year and 100-year storm events. This report places emphasis on the 100-year storm event as this event will dictate overall pond and pipe infrastructure sizes. The Weld County Municipal Code does allow for the use of CUHP in

areas located in the southwest portion of Weld County, in areas larger than 160 acres that have drainage characteristics similar to an urban area per Chapter 8, Article XI, Section 8-11-60. The minor and major storm events are the 5-year and 100-year, respectively.

Watersheds were delineated from Lidar Topography obtained from the Denver Regional Council of Governments (DRCOG) Regional Data Catalog. The Lidar was collected in 2020 and is Quality Level 2 Lidar (QL2) and was part of the DRCOG Regional Lidar Project 2020.

Hydraulic Criteria

EPA SWMM 5.2 was used to route flows through the drainage basins. Hydraflow AutoCAD extension software was used for preliminary channel and pipe capacities.

IV. Drainage Facility Design

General Concept

In general, drainage patterns remain the same from existing and proposed conditions. Runoff is conveyed to E. 168th Avenue Drainage #1. Direct outfalls are proposed as part of this report which do not currently exist to minimize impacts to adjacent properties. The storm systems included with this report have been designed to capture and convey runoff up to the 100-year storm event.

Pond OS

Pond OS is an off-site detention pond located on the HSG Parcel immediately west of the Seltzer Farms site. This pond receives runoff from the Todd Creek Meadows residential subdivision and undeveloped flows from the HSG Parcel. In general flows from this basin are conveyed north along the west side of Yosemite Street. Pond OS has a maximum tributary area of 144.1 acres at 6.7% imperviousness (CUHP Basins 200 and 201). The purpose of this pond is to reduce flows entering the Seltzer Farms subject site and ultimately crossing to the north side of E. 168th Avenue to Weld County. The purpose of this pond is to restrict 100-year outflows to a maximum of 37.6 cfs. When these flows combine with outflows from Pond A, they should be no greater than 90.4 cfs total. Flows from this pond will be piped through the Seltzer Farms site.

Pond A

Pond A is a WQCV +5-yr + 100-yr Detention Pond located within the Seltzer Farms site. This pond receives runoff from approximately 279.4 acres at 40.4% imperviousness. In general, proposed runoff from the Seltzer Farms site will enter Pond A. There are 3 primary storm sewer runs conveyed developed runoff from the Seltzer Farms site to Pond A. It is anticipated that outflows from Pond A will combine with those from Pond OS and discharge to a channel on the south side of E. 168th Avenue. The existing culvert crossing under E. 168th Avenue will be upgraded to dual 36-inch diameter RCP culverts capable of conveying 90.4 cfs which matches the Historical 5-year flowrate for the entire basin per Weld County Criteria. The Ultimate Condition 100-year release rate is proposed to be 52.4 cfs. The SWMM model indicates a maximum 100-year volume of 41.81 acre-feet and a 100-yr water depth of 8.89 feet (5070.89 W.S.E.) in the Ultimate Buildout Condition.

The Phase 1 100-year release rate is proposed to be 50.3 cfs. The SWMM model indicates a maximum 100-year volume of 35.20 acre-feet and a 100-yr water depth of 8.22 feet (5070.22 W.S.E.) in the Phase 1 condition. It is anticipated that the Water Quality and 5-year orifice plate will need to be changed out to match drain times upon the Ultimate Buildout.

V. Conclusion

This drainage report has been prepared in conformity with Chapter 5: Drainage Criteria in the Weld County Engineering and Construction Criteria and Chapter 9: Storm Drainage Design and Stormwater Quality Control Regulations in the Adams County Development Standards and Regulations. This drainage report is also in conformity with the MHFD Urban Storm Drainage Criteria Manuals.

VI. References

1. **Weld County Engineering and Construction Criteria**
   Atkins, January 2021.
2. **Adams County Development Standards and Regulations, Chapter 9**
   Adams County, December 8, 2020.
3. **Urban Storm Drainage Design & Technical Criteria Manual Volumes 1-3**
   Urban Drainage and Flood Control District, Revised August, 2018.
4. **National Resources Conservation Service Web Soil Survey Golden Area, CO**
   U.S. Department of Agriculture, Natural Resources Conservation Service
5. **FIRM Map Numbers 08001C0326H & 08001C0307H**
   Federal Emergency Management Agency, Effective Date: March 5, 2007.
6. **Todd Creek PUD Amendment – Preliminary Regional Drainage Report**
   KT Engineering, Dated June 5, 2023.

APPENDIX B
HYDROLOGIC AND ROUTING
POND A – UD DETENTION
CUHP / SWMM MODEL SUMMARY

PROJECT: SELTZER – EXISTING CONDITION
SHEET TITLE: EXISTING COMPOSITE RUNOFF FACTORS

Basin Name	Total Area (sq. miles)	Total Area (Acres)	Total Area (Sq. Ft.)	Agriculture/Open Space (Sq. Ft.)	Large Lot Rural Residential (Sq. Ft.)	Rural Residential (Sq. Ft.)	Rural Estate Residential (Sq. Ft.)	Single Family Low Density (Sq. Ft.)	Light Industrial (Sq. Ft.)	Streets (Sq. Ft.)	Soil Type "C" Composite Runoff Factors		
											C_5	C_{100}	I %
100	0.12759	81.66	3,556,898	3,337,475		19,051	95,768			104,604	0.08	0.50	5.59
101	0.12666	81.07	3,531,201	3,531,201							0.05	0.49	2.00
102	0.08799	56.31	2,453,070	2,453,070							0.05	0.49	2.00
200	0.03753	24.02	1,046,369	74,060			964,891			7,418	0.23	0.58	23.90
201	0.18767	120.11	5,231,875	5,204,422						27,453	0.06	0.49	2.51
300	0.05288	33.84	1,474,165	0	1,459,653					14,512	0.12	0.52	10.89
400	0.02172	13.90	605,492	9,935				595,557			0.31	0.63	34.46
500	0.02089	13.37	582,451	582,451							0.05	0.49	2.00

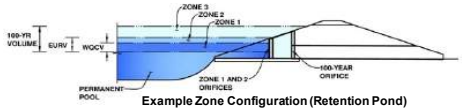
Land Use	Imp., I %
Agriculture/Open Space	2
Large Lot Rural Residential	10
Rural Residential (2-5 ac.)	18
Rural Estate Residential (1-2 ac.	25
Single Family Low Density	35
Light Industrial	80
Streets	100

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Seltzer

Basin ID: Pond A - Ultimate Condition



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	279.44	acres
Watershed Length =	6,286	ft
Watershed Length to Centroid =	3,087	ft
Watershed Slope =	0.012	ft/ft
Watershed Imperviousness =	40.47%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	4.217	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	10.519	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1 in.) =	9.329	acre-feet	1.00	inches
5-yr Runoff Volume (P1 = 1.42 in.) =	17.838	acre-feet	1.42	inches
10-yr Runoff Volume (P1 = 1.68 in.) =	23.720	acre-feet	1.68	inches
25-yr Runoff Volume (P1 = 1.81 in.) =	27.753	acre-feet	1.81	inches
50-yr Runoff Volume (P1 = 2.35 in.) =	40.736	acre-feet	2.35	inches
100-yr Runoff Volume (P1 = 2.71 in.) =	50.528	acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.72 in.) =	75.637	acre-feet	3.72	inches
Approximate 2-yr Detention Volume =	7.714	acre-feet		
Approximate 5-yr Detention Volume =	13.543	acre-feet		
Approximate 10-yr Detention Volume =	15.711	acre-feet		
Approximate 25-yr Detention Volume =	16.263	acre-feet		
Approximate 50-yr Detention Volume =	19.533	acre-feet		
Approximate 100-yr Detention Volume =	23.613	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	4.217	acre-feet
Zone 2 Volume (User Defined - Zone 1) =	13.544	acre-feet
Zone 3 (100yr + 1 / 2 WQCV - Zones 1 & 2) =	7.960	acre-feet
Total Detention Basin Volume =	25.721	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

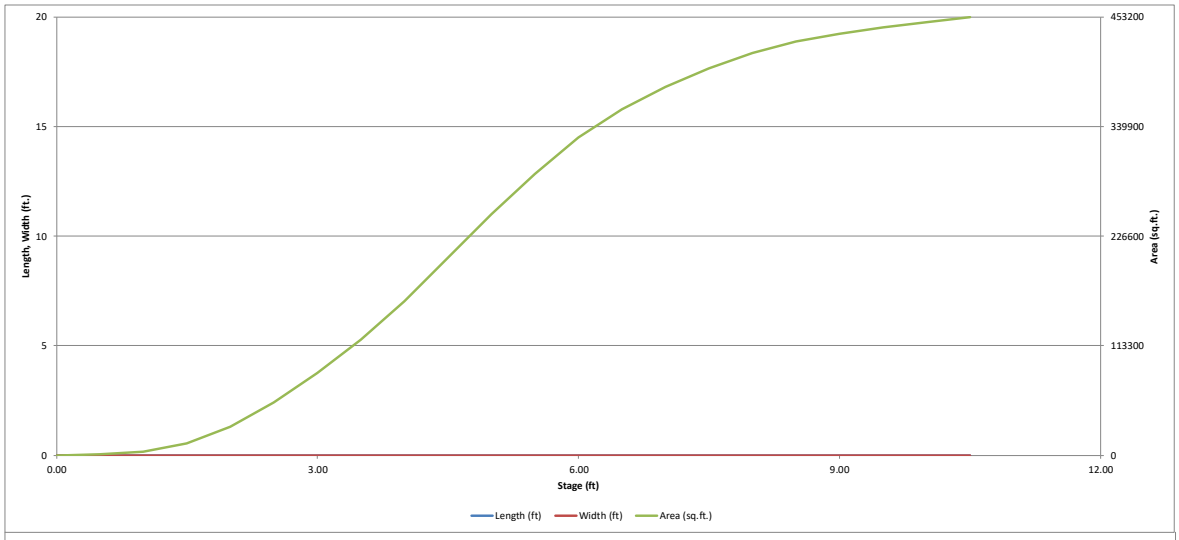
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

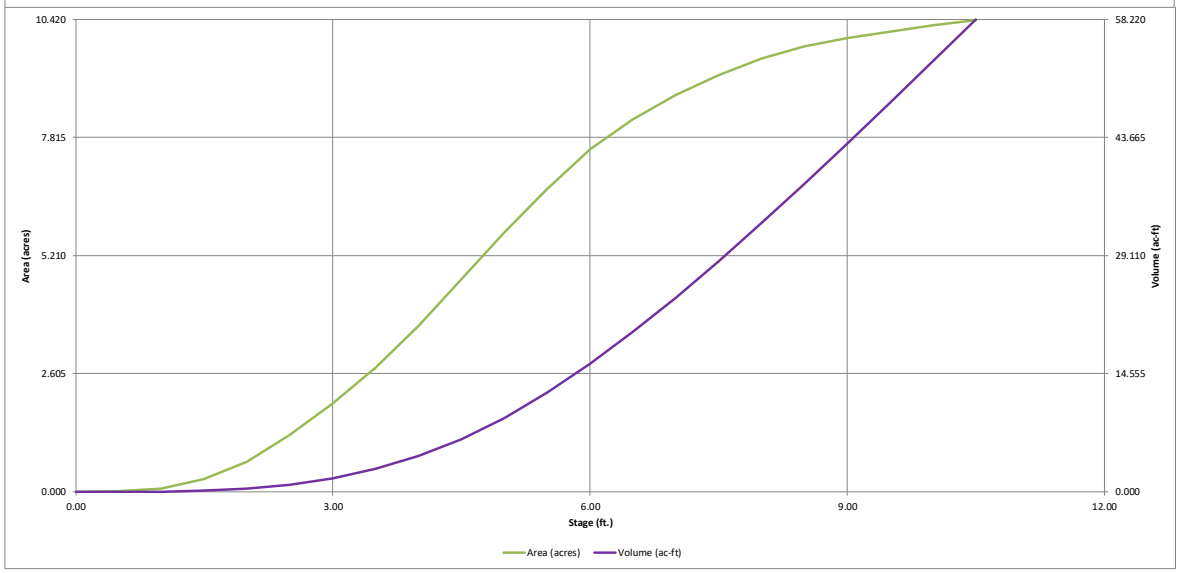
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	90	0.002		
5062.5	--	0.50	--	--	--	530	0.012	155	0.004
5063	--	1.00	--	--	--	3,240	0.074	1,097	0.025
5063.5	--	1.50	--	--	--	12,031	0.276	4,915	0.113
5064	--	2.00	--	--	--	29,125	0.669	15,204	0.349
5064.5	--	2.50	--	--	--	54,707	1.256	36,162	0.830
5065	--	3.00	--	--	--	85,000	1.951	71,088	1.632
5065.5	--	3.50	--	--	--	119,120	2.735	122,118	2.803
5066	--	4.00	--	--	--	159,261	3.656	191,714	4.401
5066.5	--	4.50	--	--	--	203,907	4.681	282,505	6.485
5067	--	5.00	--	--	--	249,169	5.720	395,774	9.086
5067.5	--	5.50	--	--	--	291,073	6.682	530,835	12.186
5068	--	6.00	--	--	--	328,796	7.548	685,802	15.744
5068.5	--	6.50	--	--	--	357,680	8.211	857,421	19.684
5069	--	7.00	--	--	--	380,867	8.744	1,042,058	23.922
5069.5	--	7.50	--	--	--	400,317	9.190	1,237,354	28.406
5070	--	8.00	--	--	--	416,110	9.553	1,441,460	33.091
5070.5	--	8.50	--	--	--	427,976	9.825	1,652,482	37.936
5071	--	9.00	--	--	--	436,088	10.011	1,868,498	42.895
5071.5	--	9.50	--	--	--	442,289	10.154	2,088,092	47.936
5072	--	10.00	--	--	--	447,897	10.282	2,310,639	53.045
5072.5	--	10.50	--	--	--	453,161	10.403	2,535,903	58.216

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



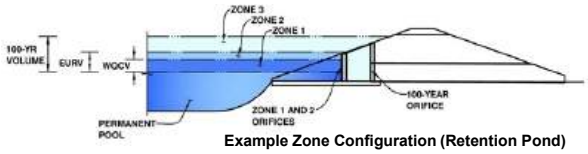


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Seltzer**

Basin ID: **Pond A - Ultimate Condition**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.95	4.217	Orifice Plate
Zone 2 (User)	6.27	13.544	Rectangular Orifice
3 (100+1/2WQCV)	7.21	7.960	Weir&Pipe (Restrict)
Total (all zones)		25.721	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	9.722E-02	ft^2
Depth at top of Zone using Orifice Plate =	7.28	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	14.00	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	2.00						
Orifice Area (sq. inches)	14.00	14.00						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Rectangular	Not Selected			Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	4.25	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	1.33	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	7.28	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.33	N/A	feet
Vertical Orifice Height =	8.00	N/A	inches				
Vertical Orifice Width =	24.00		inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.50	N/A	feet
Overflow Weir Front Edge Length =	11.33	N/A	feet	Overflow Weir Slope Length =	2.92	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	6.92	N/A	
Horiz. Length of Weir Sides =	2.92	N/A	feet	Overflow Grate Open Area w/o Debris =	26.17	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	Close Mesh Grate		Overflow Grate Open Area w/ Debris =	13.08	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	3.78	N/A	ft^2
Outlet Pipe Diameter =	36.00	N/A	inches	Outlet Orifice Centroid =	0.91	N/A	feet
Restrictor Plate Height Above Pipe Invert =	19.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.63	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.49	feet
Spillway Crest Length =	500.00	feet	Stage at Top of Freeboard =	10.49	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	10.40	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	58.11	acre-ft

Calculated Parameters for Spillway

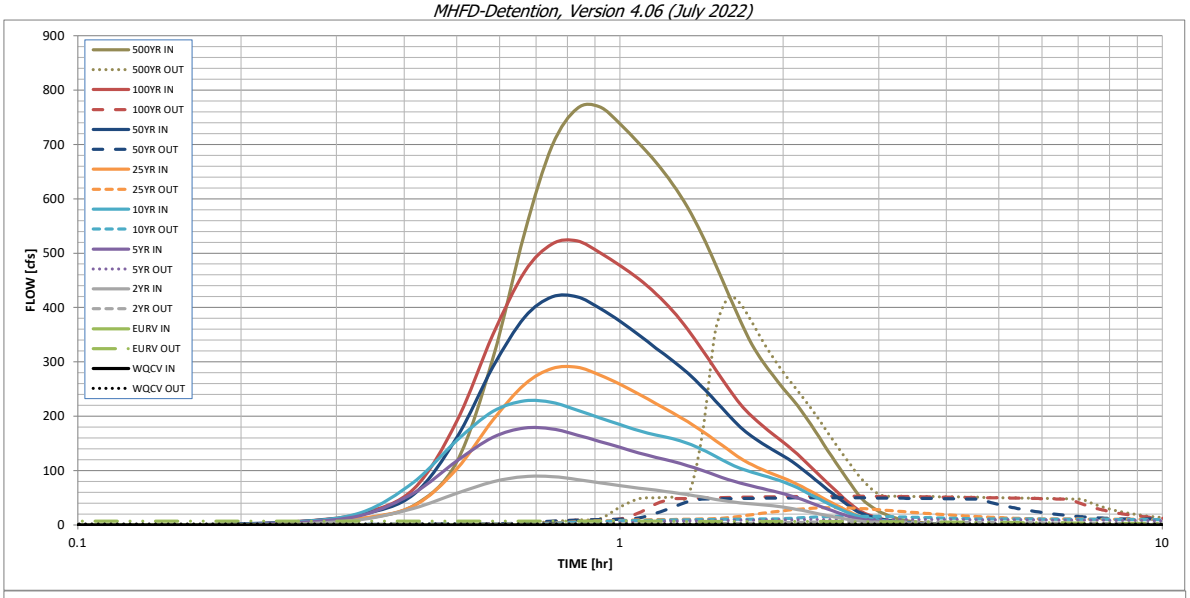
Routed Hydrograph Results

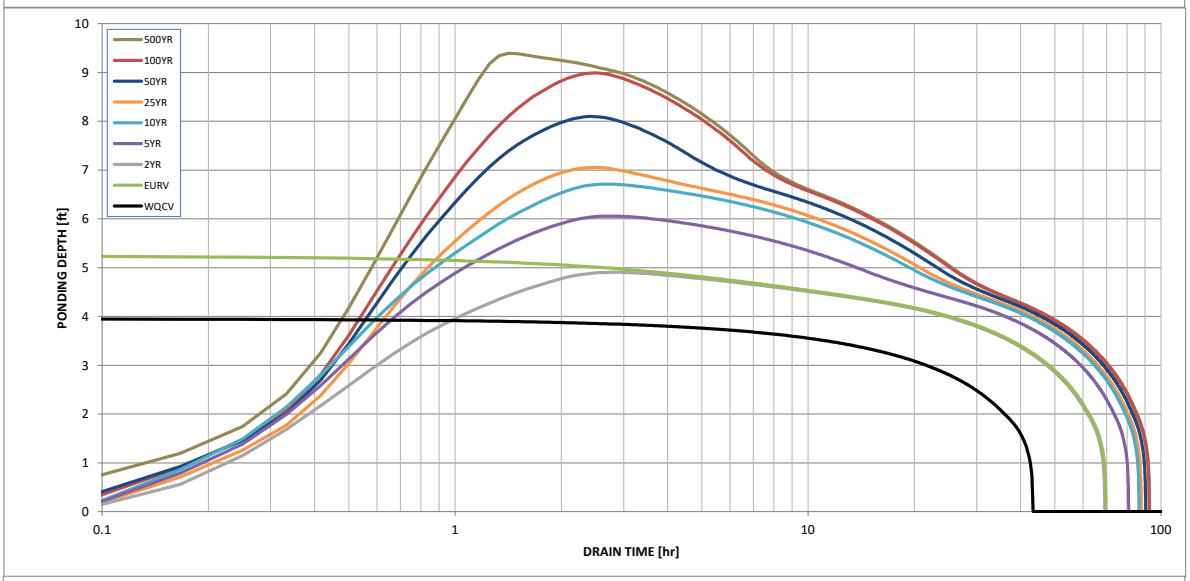
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

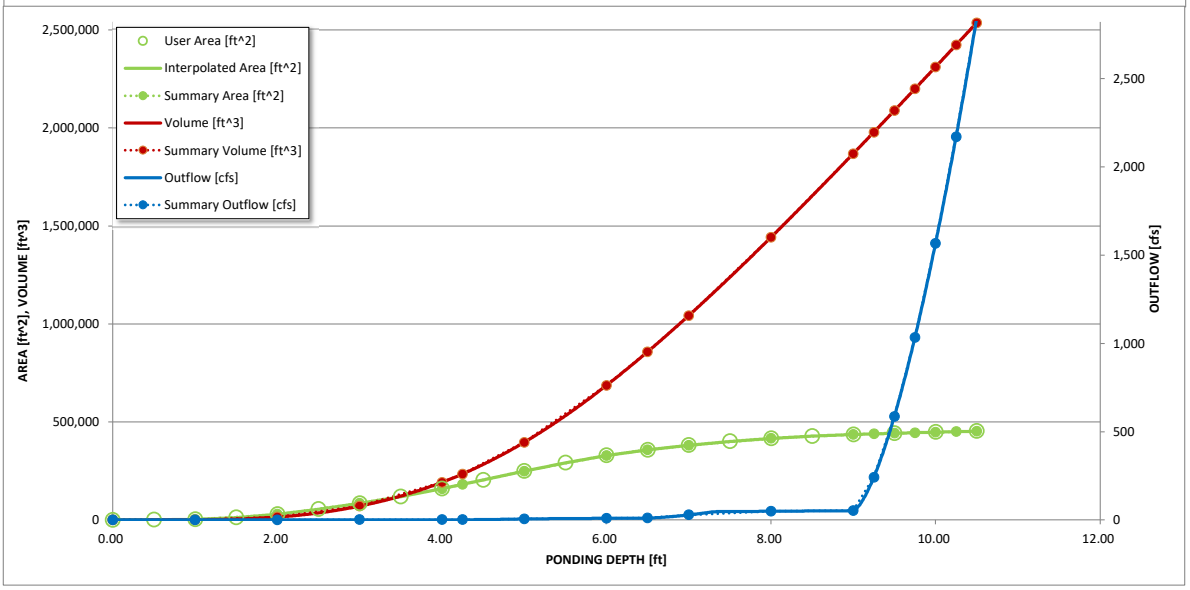
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.00	1.42	1.68	1.81	2.35	2.71	3.72
CUHP Runoff Volume (acre-ft) =	4.217	10.519	9.329	17.838	23.720	27.753	40.736	50.528	75.637
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	9.329	17.838	23.720	27.753	40.736	50.528	75.637
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	9.1	64.6	97.6	142.2	230.4	304.6	474.9
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.03	0.23	0.35	0.51	0.82	1.09	1.70
Peak Inflow Q (cfs) =	N/A	N/A	89.0	178.2	228.1	290.2	419.8	522.6	769.5
Peak Outflow Q (cfs) =	1.6	7.1	5.4	9.9	16.0	31.8	49.9	52.7	417.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.2	0.2	0.2	0.2	0.9
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.2	0.7	1.4	1.4	1.4
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	40	63	63	71	74	74	73	72	65
Time to Drain 99% of Inflow Volume (hours) =	**42**	67	67	77	81	82	82	83	80
Maximum Ponding Depth (ft) =	3.95	5.25	4.90	6.05	6.71	7.05	8.09	8.99	9.39
Area at Maximum Ponding Depth (acres) =	3.56	6.20	5.51	7.61	8.42	8.79	9.60	10.00	10.12
Maximum Volume Stored (acre-ft) =	4.221	10.576	8.524	16.123	21.347	24.361	33.953	42.695	46.720

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	90	0.002	0	0.000	0.00
	1.00	3,240	0.074	1,097	0.025	0.47
	2.00	29,125	0.669	15,204	0.349	0.66
	3.00	85,000	1.951	71,088	1.632	1.28
	4.00	159,261	3.656	191,714	4.401	1.60
	4.25	181,584	4.169	234,319	5.379	1.67
	5.00	249,169	5.720	395,774	9.086	6.00
	6.00	328,796	7.548	685,802	15.744	9.72
	6.50	357,680	8.211	857,421	19.684	11.07
	7.00	380,867	8.744	1,042,058	23.922	29.00
	8.00	416,110	9.553	1,441,460	33.091	49.54
	9.00	436,088	10.011	1,868,498	42.895	52.78
	9.25	439,188	10.082	1,977,908	45.407	241.36
	9.50	442,289	10.154	2,088,092	47.936	586.36
	9.75	445,093	10.218	2,199,015	50.482	1,034.05
	10.00	447,897	10.282	2,310,639	53.045	1,565.44
	10.25	450,529	10.343	2,422,942	55.623	2,169.66
	10.50	453,161	10.403	2,535,903	58.216	2,839.44
	8.16	419,907	9.640	1,508,342	34.627	50.07

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

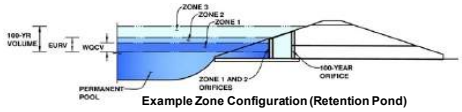
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Seltzer

Basin ID: Pond A - Phase 1



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	270.42	acres
Watershed Length =	6,286	ft
Watershed Length to Centroid =	3,087	ft
Watershed Slope =	0.012	ft/ft
Watershed Imperviousness =	22.80%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

		Optional User Overrides	
Water Quality Capture Volume (WQCV) =	2.857 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	5.478 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1 in.) =	4.989 acre-feet	1.00	inches
5-yr Runoff Volume (P1 = 1.42 in.) =	12.618 acre-feet	1.42	inches
10-yr Runoff Volume (P1 = 1.68 in.) =	18.134 acre-feet	1.68	inches
25-yr Runoff Volume (P1 = 1.81 in.) =	22.317 acre-feet	1.81	inches
50-yr Runoff Volume (P1 = 2.35 in.) =	34.557 acre-feet	2.35	inches
100-yr Runoff Volume (P1 = 2.71 in.) =	44.223 acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.72 in.) =	68.239 acre-feet	3.72	inches
Approximate 2-yr Detention Volume =	3.894 acre-feet		
Approximate 5-yr Detention Volume =	7.882 acre-feet		
Approximate 10-yr Detention Volume =	9.488 acre-feet		
Approximate 25-yr Detention Volume =	10.280 acre-feet		
Approximate 50-yr Detention Volume =	12.429 acre-feet		
Approximate 100-yr Detention Volume =	16.239 acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	2.857	acre-feet
Zone 2 Volume (User Defined - Zone 1) =	7.882	acre-feet
Zone 3 (100yr + 1 / 2 WQCV - Zones 1 & 2) =	6.929	acre-feet
Total Detention Basin Volume =	17.668	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

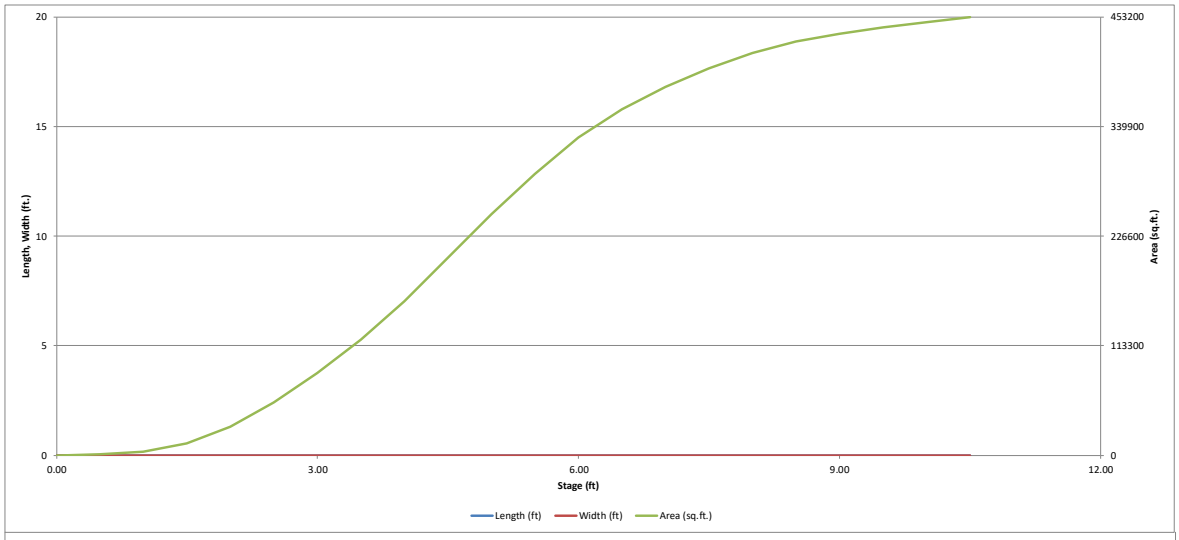
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

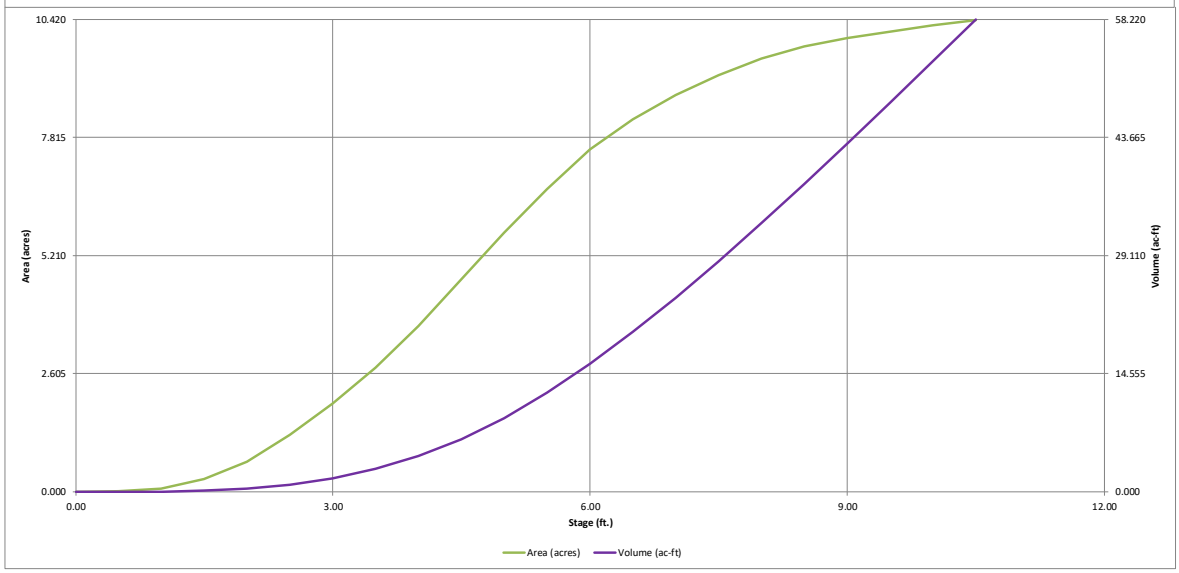
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	90	0.002		
5062.5	--	0.50	--	--	--	530	0.012	155	0.004
5063	--	1.00	--	--	--	3,240	0.074	1,097	0.025
5063.5	--	1.50	--	--	--	12,031	0.276	4,915	0.113
5064	--	2.00	--	--	--	29,125	0.669	15,204	0.349
5064.5	--	2.50	--	--	--	54,707	1.256	36,162	0.830
5065	--	3.00	--	--	--	85,000	1.951	71,088	1.632
5065.5	--	3.50	--	--	--	119,120	2.735	122,118	2.803
5066	--	4.00	--	--	--	159,261	3.656	191,714	4.401
5066.5	--	4.50	--	--	--	203,907	4.681	282,505	6.485
5067	--	5.00	--	--	--	249,169	5.720	395,774	9.086
5067.5	--	5.50	--	--	--	291,073	6.682	530,835	12.186
5068	--	6.00	--	--	--	328,796	7.548	685,802	15.744
5068.5	--	6.50	--	--	--	357,680	8.211	857,421	19.684
5069	--	7.00	--	--	--	380,867	8.744	1,042,058	23.922
5069.5	--	7.50	--	--	--	400,317	9.190	1,237,354	28.406
5070	--	8.00	--	--	--	416,110	9.553	1,441,460	33.091
5070.5	--	8.50	--	--	--	427,976	9.825	1,652,482	37.936
5071	--	9.00	--	--	--	436,088	10.011	1,868,498	42.895
5071.5	--	9.50	--	--	--	442,289	10.154	2,088,092	47.936
5072	--	10.00	--	--	--	447,897	10.282	2,310,639	53.045
5072.5	--	10.50	--	--	--	453,161	10.403	2,535,903	58.216

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



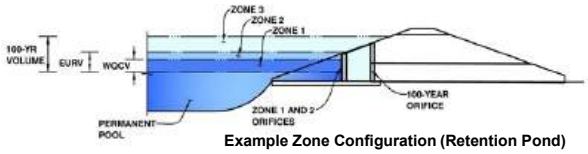


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Seltzer

Basin ID: Pond A - Phase 1



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.52	2.857	Orifice Plate
Zone 2 (User)	5.28	7.882	Rectangular Orifice
3 (100+1/2WQCV)	6.25	6.929	Weir&Pipe (Restrict)
Total (all zones)		17.668	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	7.639E-02	ft^2
Depth at top of Zone using Orifice Plate =	7.28	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	11.00	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	2.00						
Orifice Area (sq. inches)	11.00	11.00						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Rectangular	Not Selected		Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	3.75	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	1.33	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	7.28	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.33	N/A	feet
Vertical Orifice Height =	8.00	N/A	inches				
Vertical Orifice Width =	24.00		inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected		Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.50	N/A	feet
Overflow Weir Front Edge Length =	11.33	N/A	feet	Overflow Weir Slope Length =	2.92	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	6.92	N/A	
Horiz. Length of Weir Sides =	2.92	N/A	feet	Overflow Grate Open Area w/o Debris =	26.17	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	Close Mesh Grate		Overflow Grate Open Area w/ Debris =	13.08	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected		Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	3.78	N/A	ft^2
Outlet Pipe Diameter =	36.00	N/A	inches	Outlet Orifice Centroid =	0.91	N/A	feet
Restrictor Plate Height Above Pipe Invert =	19.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.63	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.49	feet
Spillway Crest Length =	500.00	feet	Stage at Top of Freeboard =	10.49	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	10.40	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	58.11	acre-ft

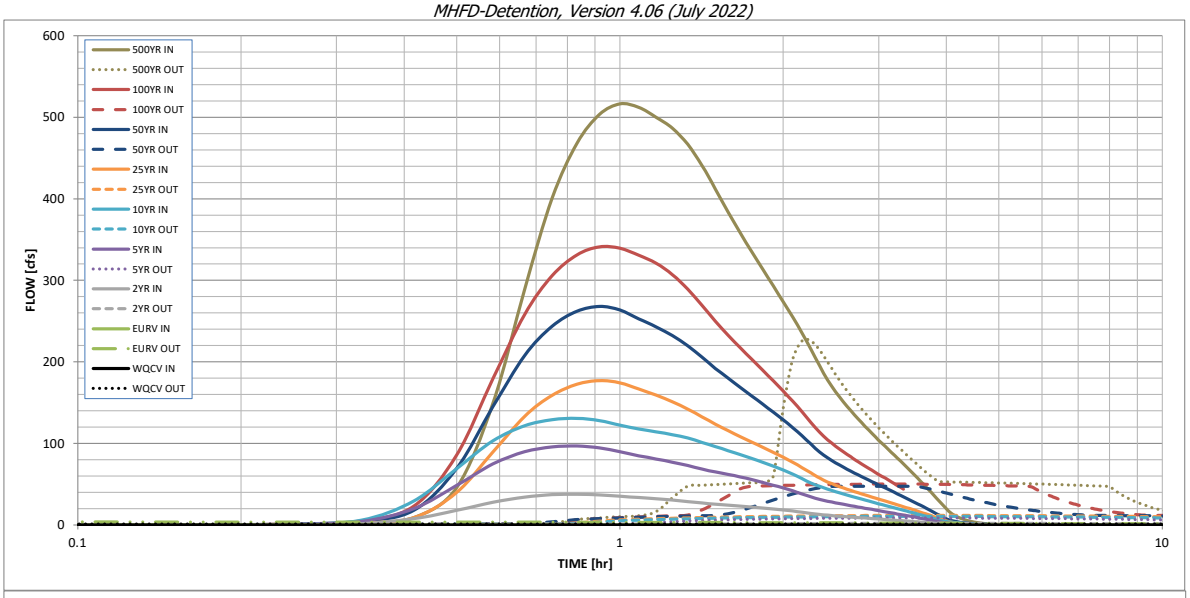
Calculated Parameters for Spillway

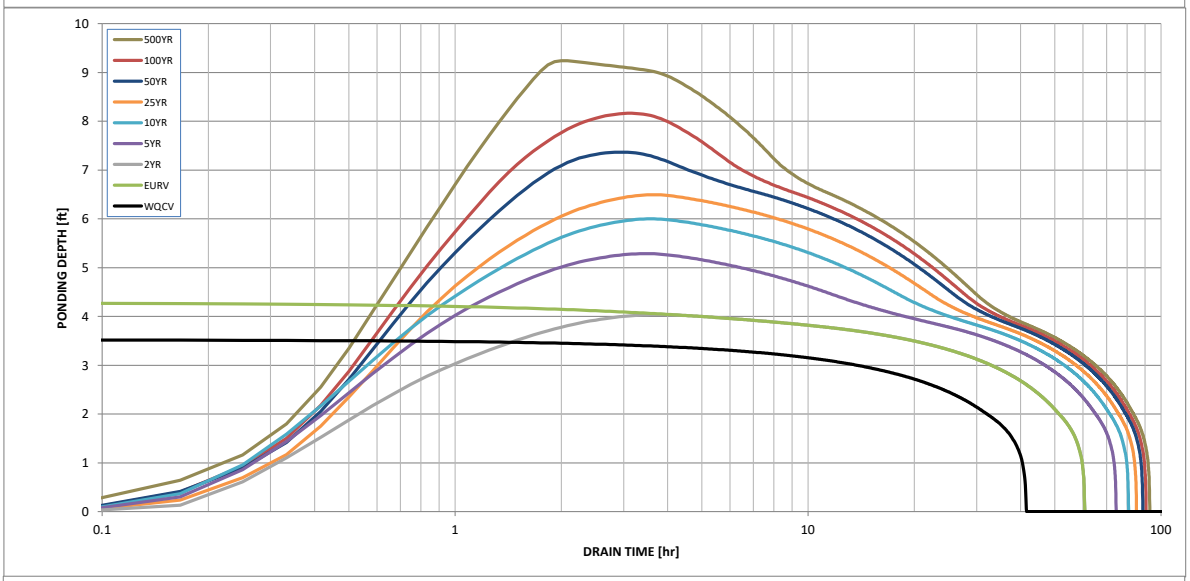
Routed Hydrograph Results *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

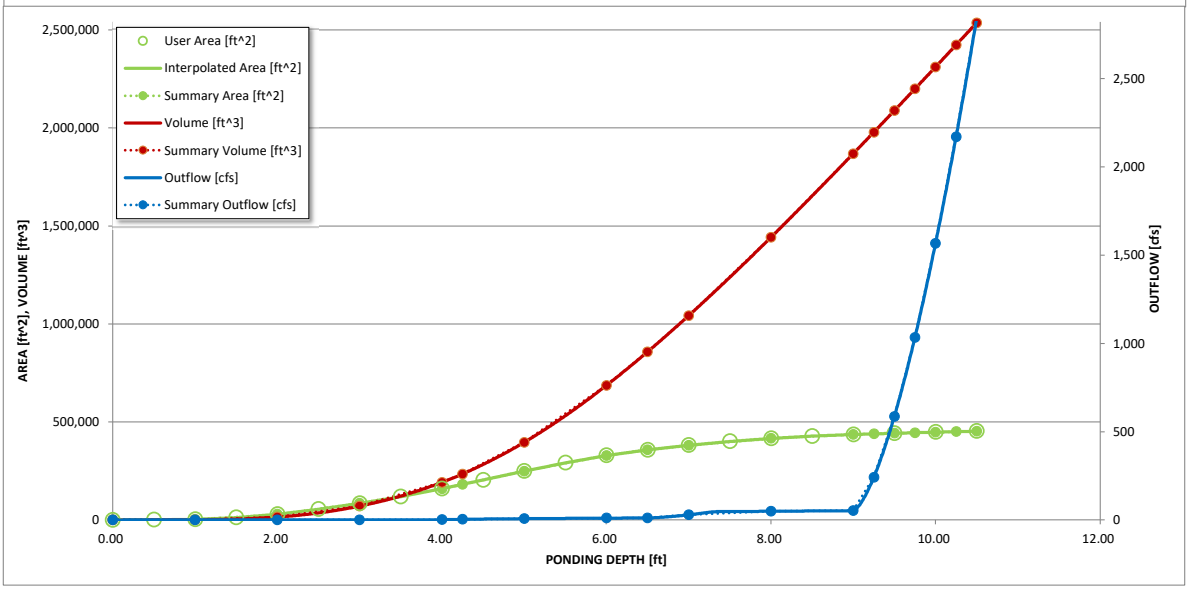
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.00	1.42	1.68	1.81	2.35	2.71	3.72
CUHP Runoff Volume (acre-ft) =	2.857	5.478	4.989	12.618	18.134	22.317	34.557	44.223	68.239
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	4.989	12.618	18.134	22.317	34.557	44.223	68.239
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	8.7	61.9	93.6	136.4	221.0	292.6	456.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.03	0.23	0.35	0.50	0.82	1.08	1.69
Peak Inflow Q (cfs) =	N/A	N/A	37.6	96.7	130.7	177.0	268.0	341.1	516.5
Peak Outflow Q (cfs) =	1.1	3.7	2.1	8.6	10.5	11.7	47.4	50.1	225.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.1	0.1	0.2	0.2	0.5
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	1.3	1.3	1.4
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	56	56	65	68	70	69	67	60
Time to Drain 99% of Inflow Volume (hours) =	**40**	59	59	71	76	79	80	80	78
Maximum Ponding Depth (ft) =	3.52	4.28	4.04	5.29	6.00	6.49	7.36	8.16	9.24
Area at Maximum Ponding Depth (acres) =	2.77	4.23	3.72	6.26	7.53	8.20	9.06	9.63	10.08
Maximum Volume Stored (acre-ft) =	2.859	5.505	4.512	10.763	15.668	19.602	27.128	34.530	45.205

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	90	0.002	0	0.000	0.00
	1.00	3,240	0.074	1,097	0.025	0.37
	2.00	29,125	0.669	15,204	0.349	0.52
	3.00	85,000	1.951	71,088	1.632	1.00
	4.00	159,261	3.656	191,714	4.401	1.88
	4.25	181,584	4.169	234,319	5.379	3.51
	5.00	249,169	5.720	395,774	9.086	7.61
	6.00	328,796	7.548	685,802	15.744	10.52
	6.50	357,680	8.211	857,421	19.684	11.70
	7.00	380,867	8.744	1,042,058	23.922	29.50
	8.00	416,110	9.553	1,441,460	33.091	49.54
	9.00	436,088	10.011	1,868,498	42.895	52.78
	9.25	439,188	10.082	1,977,908	45.407	241.36
	9.50	442,289	10.154	2,088,092	47.936	586.36
	9.75	445,093	10.218	2,199,015	50.482	1,034.05
	10.00	447,897	10.282	2,310,639	53.045	1,565.44
	10.25	450,529	10.343	2,422,942	55.623	2,169.66
	10.50	453,161	10.403	2,535,903	58.216	2,839.44
	8.16	419,907	9.640	1,508,342	34.627	50.07

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Feb 5 2024

E. 168TH AVENUE - CULVERT CROSSING

Invert Elev Dn (ft)	=	52.85
Pipe Length (ft)	=	59.90
Slope (%)	=	1.00
Invert Elev Up (ft)	=	53.45
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

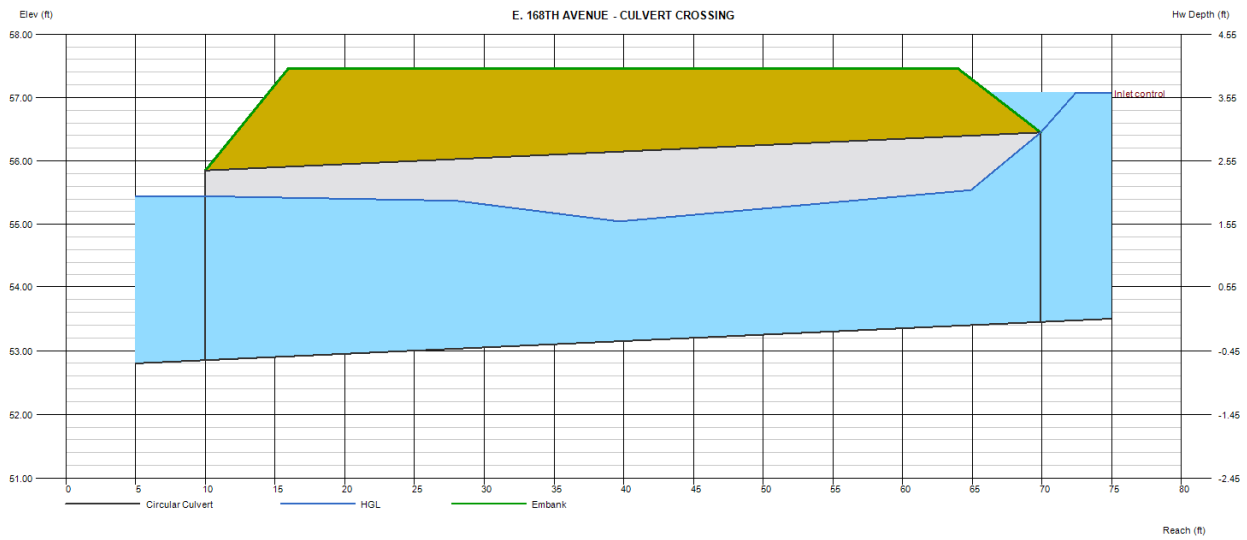
Top Elevation (ft)	=	57.46
Top Width (ft)	=	48.00
Crest Width (ft)	=	100.00

Calculations

Qmin (cfs)	=	90.40
Qmax (cfs)	=	90.40
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	90.40
Qpipe (cfs)	=	90.40
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	6.96
Veloc Up (ft/s)	=	8.18
HGL Dn (ft)	=	55.44
HGL Up (ft)	=	55.64
Hw Elev (ft)	=	57.07
Hw/D (ft)	=	1.21
Flow Regime	=	Inlet Control



PROJECT: SELTZER – SWMM MODEL
SHEET TITLE: PEAK FLOW SUMMARY

	Peak Discharge (cfs) - Historic			Peak Discharge (cfs) - Existing Condition			Peak Discharge (cfs) - Phase 1 Seltzer			Peak Discharge (cfs) - Ultimate Seltzer		
SWMM Node	**5-year**	**10-year**	**100-year**	**5-year**	**10-year**	**100-year**	**5-year**	**10-year**	**100-year**	**5-year**	**10-year**	**100-year**
Pond OS							52.8	78.9	236.8	48.8	73.0	219.4
900	43.9	67.6	212.5	48.4	72.7	220.0	1.7	5.1	37.6	1.4	4.7	37.6
901	36.0	55.6	167.9	46.8	66.7	179.6	46.6	59.0	129.8	62.2	76.6	158.0
902	57.5	94.2	327.8	67.3	104.4	339.0	16.7	23.3	63.6	33.0	41.9	92.5
903	90.4	149.1	523.0	104.0	163.4	540.6	4.0	5.8	16.5	8.7	12.4	34.6
903B	-	-	-	-	-	-	10.0	14.6	42.8	-	-	-
904	90.4	149.1	523.0	104.0	163.4	540.6	9.0	12.9	36.0	4.2	6.0	17.1
905	-	-	-	-	-	-	16.1	21.0	47.0	16.1	21.0	47.0
906	-	-	-	-	-	-	33.8	47.9	130.4	21.9	30.1	76.0
907	-	-	-	-	-	-	38.6	56.2	162.4	77.5	100.9	234.9
908	-	-	-	-	-	-	52.2	73.1	199.1	93.1	120.4	277.0
Pond A	-	-	-	-	-	-	120.2	163.4	425.1	196.8	251.6	565.9
909	-	-	-	-	-	-	8.3	10.4	50.3	9.7	15.8	52.4
910	-	-	-	-	-	-	5.0	9.2	62.4	5.2	10.9	63.5
911	-	-	-	-	-	-	4.2	8.2	60.4	4.3	9.4	61.4

APPENDIX C
HISTORIC CUHP/SWMM MODEL

CUHP SUBCATCHMENTS

Todd Creek Farms - Historical CUHP Inputs

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi^2)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
100	JUNCT_100	100-YR	0.12759	0.43125	0.66932	0.01917	2	0.38	0.1	3	0.0018	0.5	0
101	JUNCT_101	100-YR	0.12666	0.40284	0.79905	0.01731	2	0.38	0.1	3	0.0018	0.5	0
102	JUNCT_102	100-YR	0.08799	0.31345	0.54621	0.01515	2	0.38	0.1	3	0.0018	0.5	0
200	JUNCT_200	100-YR	0.03753	0.21193	0.43182	0.02363	2	0.38	0.1	3	0.0018	0.5	0
201	JUNCT_201	100-YR	0.18767	0.31117	0.52917	0.02	2	0.38	0.1	3	0.0018	0.5	0
300	JUNCT_300	100-YR	0.05288	0.1197	0.25303	0.0205	2	0.38	0.1	3	0.0018	0.5	0
400	JUNCT_400	100-YR	0.02172	0.06742	0.14738	0.04888	2	0.38	0.1	3	0.0018	0.5	0
500	JUNCT_500	100-YR	0.02089	0.21572	0.33542	0.02138	2	0.38	0.1	3	0.0018	0.5	0

Todd Creek Farms - Historic 5-yr

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 01/01/2005 00:00:00
Ending Date 01/02/2005 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Routing Time Step ..... 60.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.005000 ft

**********	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**********	---	---
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000

RDII Inflow	0.000	0.000
External Inflow	10.832	3.530
External Outflow	10.834	3.530
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.005	0.002
Continuity Error (%)	-0.061	

****
Time-Step Critical Elements
****
Link 902 (9.12%)

****
Highest Flow Instability Indexes
****
All links are stable.

****
Most Frequent Nonconverging Nodes
****
Convergence obtained at all time steps.

****
Routing Time Step Summary
****

Minimum Time Step	:	35.84 sec
Average Time Step	:	58.48 sec
Maximum Time Step	:	60.00 sec
% of Time in Steady State	:	0.00

```
Average Iterations per Step :     2.00
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
   60.000 - 23.031 sec      :   100.00 %
   23.031 -  8.841 sec      :     0.00 %
    8.841 -  3.393 sec      :     0.00 %
    3.393 -  1.303 sec      :     0.00 %
    1.303 -  0.500 sec      :     0.00 %


******************
Node Depth Summary
******************

--------------------------------------------------------------------------------
                              Average  Maximum  Maximum  Time of Max    Reported
                                Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type        Feet     Feet     Feet  days hr:min        Feet
--------------------------------------------------------------------------------
JUNCT_201            JUNCTION    0.00     0.00  5113.00     0  00:00        0.00
JUNCT_200            JUNCTION    0.02     0.23  5136.53     0  01:01        0.23
JUNCT_900            JUNCTION    0.05     0.66  5113.46     0  01:02        0.66
JUNCT_902            JUNCTION    0.09     0.96  5060.76     0  01:02        0.96
JUNCT_100            JUNCTION    0.00     0.00  5064.00     0  00:00        0.00
JUNCT_101            JUNCTION    0.00     0.00  5064.00     0  00:00        0.00
JUNCT_903            JUNCTION    0.00     0.03  5055.83     0  01:02        0.03
JUNCT_300            JUNCTION    0.02     0.38  5113.08     0  00:43        0.38
JUNCT_400            JUNCTION    0.01     0.22  5122.52     0  00:43        0.22
JUNCT_500            JUNCTION    0.01     0.16  5086.66     0  00:53        0.16
JUNCT_102            JUNCTION    0.00     0.00  5078.10     0  00:00        0.00
JUNCT_901            JUNCTION    0.05     0.55  5078.55     0  01:07        0.55
OUTFALL_904          OUTFALL     0.00     0.00  5055.70     0  00:00        0.00


******************
Node Inflow Summary
```

****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_201	JUNCTION	41.02	41.02	0 00:43	0.998	0.998	0.000
JUNCT_200	JUNCTION	5.73	5.73	0 00:44	0.2	0.2	0.000
JUNCT_900	JUNCTION	0.00	43.88	0 00:44	0	1.2	0.054
JUNCT_902	JUNCTION	0.00	57.53	0 00:58	0	2.33	-0.025
JUNCT_100	JUNCTION	18.91	18.91	0 00:49	0.68	0.68	0.000
JUNCT_101	JUNCTION	17.49	17.49	0 00:50	0.676	0.676	0.000
JUNCT_903	JUNCTION	0.00	90.40	0 01:02	0	3.53	-0.019
JUNCT_300	JUNCTION	14.07	14.07	0 00:37	0.281	0.281	-1.021
JUNCT_400	JUNCTION	7.46	7.46	0 00:34	0.115	0.115	-1.736
JUNCT_500	JUNCTION	2.72	2.72	0 00:45	0.111	0.111	-0.439
JUNCT_102	JUNCTION	13.28	13.28	0 00:47	0.469	0.469	0.000
JUNCT_901	JUNCTION	0.00	36.01	0 00:47	0	0.981	0.557
OUTFALL_904	OUTFALL	0.00	90.41	0 01:02	0	3.53	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_201	JUNCTION	36.00	0.000	0.000
JUNCT_100	JUNCTION	36.00	0.000	0.000
JUNCT_101	JUNCTION	36.00	0.000	0.000

JUNCT_102 JUNCTION 36.00 0.000 0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_904	99.01	5.16	90.41	3.530
System	99.01	5.16	90.41	3.530

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
200	CONDUIT	4.84	0	01:01	0.63	0.00	0.09
201	DUMMY	41.02	0	00:43			
100	DUMMY	18.91	0	00:49			

101	DUMMY	17.49	0	00:50			
900	CONDUIT	33.50	0	01:02	5.78	0.01	0.07
902	CONDUIT	56.89	0	01:02	6.53	0.03	0.10
901	CONDUIT	24.92	0	01:07	1.77	0.01	0.15
102	DUMMY	13.28	0	00:47			
500	CONDUIT	2.67	0	00:53	0.87	0.00	0.07
400	CONDUIT	6.10	0	00:44	1.70	0.00	0.07
300	CONDUIT	14.18	0	00:47	2.30	0.01	0.08
903	DUMMY	90.41	0	01:02			

****
Flow Classification Summary
****

	Adjusted	---------- Fraction of Time in Flow Class ----------								
	/Actual		Up	Down	Sub	Sup	Up	Down	Norm	Inlet
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
200	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
900	1.00	0.01	0.00	0.00	0.76	0.23	0.00	0.00	0.00	0.00
902	1.00	0.01	0.00	0.00	0.84	0.15	0.00	0.00	0.00	0.00
901	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
500	1.00	0.01	0.25	0.00	0.74	0.00	0.00	0.00	0.99	0.00
400	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00
300	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

```
Analysis begun on:  Mon Feb  5 13:55:23 2024
Analysis ended on:  Mon Feb  5 13:55:23 2024
Total elapsed time: < 1 sec
```

Todd Creek Farms - Historic 10-yr

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 01/01/2005 00:00:00
Ending Date 01/02/2005 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Routing Time Step ..... 60.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.005000 ft

**********	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**********	---	---
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	18.823	6.134

```
External Outflow .........        18.819         6.133
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.005         0.002
Continuity Error (%) .....        -0.007
```

****
Time-Step Critical Elements
****
Link 902 (12.28%)

****
Highest Flow Instability Indexes
****
All links are stable.

****
Most Frequent Nonconverging Nodes
****
Convergence obtained at all time steps.

****
Routing Time Step Summary
****

```
Minimum Time Step           :     1.74 sec
Average Time Step           :    57.45 sec
Maximum Time Step           :    60.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.00
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
   60.000 - 23.031 sec      :    99.96 %
   23.031 -  8.841 sec      :     0.00 %
```

```
    8.841 -  3.393 sec      :     0.00 %
    3.393 -  1.303 sec      :     0.04 %
    1.303 -  0.500 sec      :     0.00 %


******************
Node Depth Summary
******************

--------------------------------------------------------------------------------
                            Average  Maximum  Maximum  Time of Max    Reported
                              Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type      Feet     Feet     Feet  days hr:min        Feet
--------------------------------------------------------------------------------
JUNCT_201            JUNCTION  0.00     0.00  5113.00     0  00:00        0.00
JUNCT_200            JUNCTION  0.03     0.31  5136.61     0  01:00        0.31
JUNCT_900            JUNCTION  0.08     0.88  5113.68     0  01:01        0.88
JUNCT_902            JUNCTION  0.13     1.25  5061.05     0  01:01        1.25
JUNCT_100            JUNCTION  0.00     0.00  5064.00     0  00:00        0.00
JUNCT_101            JUNCTION  0.00     0.00  5064.00     0  00:00        0.00
JUNCT_903            JUNCTION  0.00     0.05  5055.85     0  01:01        0.05
JUNCT_300            JUNCTION  0.03     0.48  5113.18     0  00:41        0.48
JUNCT_400            JUNCTION  0.02     0.28  5122.58     0  00:41        0.28
JUNCT_500            JUNCTION  0.02     0.21  5086.71     0  00:52        0.21
JUNCT_102            JUNCTION  0.00     0.00  5078.10     0  00:00        0.00
JUNCT_901            JUNCTION  0.07     0.74  5078.74     0  01:05        0.74
OUTFALL_904          OUTFALL   0.00     0.00  5055.70     0  00:00        0.00


*******************
Node Inflow Summary
*******************

--------------------------------------------------------------------------------------------------
                            Maximum  Maximum                  Lateral       Total        Flow
                            Lateral    Total  Time of Max      Inflow      Inflow     Balance
                             Inflow   Inflow   Occurrence      Volume      Volume       Error
Node                 Type       CFS      CFS  days hr:min    10^6 gal    10^6 gal     Percent
--------------------------------------------------------------------------------------------------
```

JUNCT_201	JUNCTION	62.39	62.39	0	00:42	1.73	1.73	0.000
JUNCT_200	JUNCTION	8.83	8.83	0	00:45	0.347	0.347	0.028
JUNCT_900	JUNCTION	0.00	67.63	0	00:43	0	2.08	0.017
JUNCT_902	JUNCTION	0.00	94.19	0	00:58	0	4.05	-0.027
JUNCT_100	JUNCTION	29.23	29.23	0	00:49	1.18	1.18	0.000
JUNCT_101	JUNCTION	27.10	27.10	0	00:51	1.17	1.17	0.000
JUNCT_903	JUNCTION	0.00	149.05	0	01:01	0	6.13	-0.005
JUNCT_300	JUNCTION	21.25	21.25	0	00:36	0.487	0.487	-0.980
JUNCT_400	JUNCTION	11.31	11.31	0	00:33	0.2	0.2	-1.752
JUNCT_500	JUNCTION	4.22	4.22	0	00:47	0.194	0.194	-0.380
JUNCT_102	JUNCTION	20.50	20.50	0	00:48	0.815	0.815	0.000
JUNCT_901	JUNCTION	0.00	55.57	0	00:44	0	1.7	0.664
OUTFALL_904	OUTFALL	0.00	149.06	0	01:02	0	6.13	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_201	JUNCTION	36.00	0.000	0.000
JUNCT_100	JUNCTION	36.00	0.000	0.000
JUNCT_101	JUNCTION	36.00	0.000	0.000
JUNCT_102	JUNCTION	36.00	0.000	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****

Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_904	99.29	10.19	149.06	6.132
System	99.29	10.19	149.06	6.132

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
200	CONDUIT	7.86	0	01:00	0.74	0.01	0.12
201	DUMMY	62.39	0	00:42			
100	DUMMY	29.23	0	00:49			
101	DUMMY	27.10	0	00:51			
900	CONDUIT	55.46	0	01:01	6.91	0.02	0.09
902	CONDUIT	93.59	0	01:02	7.89	0.05	0.13
901	CONDUIT	41.85	0	01:05	2.11	0.02	0.20
102	DUMMY	20.50	0	00:48			
500	CONDUIT	4.17	0	00:52	1.00	0.00	0.09
400	CONDUIT	9.69	0	00:42	2.04	0.00	0.10
300	CONDUIT	21.81	0	00:43	2.81	0.01	0.11
903	DUMMY	149.06	0	01:02			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
200	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
900	1.00	0.01	0.00	0.00	0.75	0.24	0.00	0.00	0.00	0.00
902	1.00	0.01	0.00	0.00	0.83	0.16	0.00	0.00	0.00	0.00
901	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
500	1.00	0.01	0.24	0.00	0.75	0.00	0.00	0.00	0.99	0.00
400	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00
300	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon Feb 5 13:56:11 2024
Analysis ended on: Mon Feb 5 13:56:11 2024
Total elapsed time: < 1 sec

Todd Creek Farms - Historic 100-yr

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 01/01/2005 00:00:00
Ending Date 01/02/2005 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Routing Time Step ..... 60.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.005000 ft

**********	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**********	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000

Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	59.884	19.514
External Outflow	59.874	19.511
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.005	0.002
Continuity Error (%)	0.007	

****
Time-Step Critical Elements
****
Link 902 (17.93%)

****
Highest Flow Instability Indexes
****
All links are stable.

****
Most Frequent Nonconverging Nodes
****
Convergence obtained at all time steps.

****
Routing Time Step Summary
****
Minimum Time Step : 22.41 sec
Average Time Step : 54.80 sec
Maximum Time Step : 60.00 sec

```
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.00
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
   60.000 - 23.031 sec      :    97.00 %
   23.031 -  8.841 sec      :     3.00 %
    8.841 -  3.393 sec      :     0.00 %
    3.393 -  1.303 sec      :     0.00 %
    1.303 -  0.500 sec      :     0.00 %


******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
JUNCT_201	JUNCTION	0.00	0.00	5113.00	0 00:00	0.00
JUNCT_200	JUNCTION	0.07	0.62	5136.92	0 01:03	0.62
JUNCT_900	JUNCTION	0.18	1.77	5114.57	0 01:02	1.77
JUNCT_902	JUNCTION	0.29	2.35	5062.15	0 01:03	2.35
JUNCT_100	JUNCTION	0.00	0.00	5064.00	0 00:00	0.00
JUNCT_101	JUNCTION	0.00	0.00	5064.00	0 00:00	0.00
JUNCT_903	JUNCTION	0.01	0.09	5055.89	0 01:03	0.09
JUNCT_300	JUNCTION	0.07	0.87	5113.57	0 00:42	0.87
JUNCT_400	JUNCTION	0.04	0.56	5122.86	0 00:45	0.56
JUNCT_500	JUNCTION	0.05	0.42	5086.92	0 00:59	0.42
JUNCT_102	JUNCTION	0.00	0.00	5078.10	0 00:00	0.00
JUNCT_901	JUNCTION	0.16	1.49	5079.49	0 01:05	1.49
OUTFALL_904	OUTFALL	0.00	0.00	5055.70	0 00:00	0.00

```
******************
```

Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_201	JUNCTION	190.31	190.31	0 00:48	5.52	5.52	0.000
JUNCT_200	JUNCTION	27.97	27.97	0 00:52	1.11	1.11	0.057
JUNCT_900	JUNCTION	0.00	212.46	0 00:49	0	6.62	0.019
JUNCT_902	JUNCTION	0.00	327.79	0 01:02	0	12.9	-0.003
JUNCT_100	JUNCTION	93.13	93.13	0 00:56	3.76	3.76	0.000
JUNCT_101	JUNCTION	87.02	87.02	0 00:59	3.74	3.74	0.000
JUNCT_903	JUNCTION	0.00	522.97	0 01:03	0	19.5	-0.013
JUNCT_300	JUNCTION	62.88	62.88	0 00:42	1.55	1.55	-0.981
JUNCT_400	JUNCTION	32.24	32.24	0 00:38	0.634	0.634	-1.943
JUNCT_500	JUNCTION	13.55	13.55	0 00:55	0.616	0.616	-0.222
JUNCT_102	JUNCTION	65.13	65.13	0 00:55	2.59	2.59	0.000
JUNCT_901	JUNCTION	0.00	167.92	0 00:49	0	5.42	0.617
OUTFALL_904	OUTFALL	0.00	522.98	0 01:03	0	19.5	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_201	JUNCTION	36.00	0.000	0.000
JUNCT_100	JUNCTION	36.00	0.000	0.000

JUNCT_101	JUNCTION	36.00	0.000	0.000
JUNCT_102	JUNCTION	36.00	0.000	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_904	99.07	43.13	522.98	19.509
System	99.07	43.13	522.98	19.509

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
200	CONDUIT	26.85	0	01:03	1.07	0.02	0.24
201	DUMMY	190.31	0	00:48			

100	DUMMY	93.13	0	00:56			
101	DUMMY	87.02	0	00:59			
900	CONDUIT	195.93	0	01:03	10.70	0.08	0.19
902	CONDUIT	327.12	0	01:03	12.72	0.16	0.24
901	CONDUIT	150.35	0	01:05	3.19	0.09	0.38
102	DUMMY	65.13	0	00:55			
500	CONDUIT	13.50	0	00:59	1.35	0.01	0.19
400	CONDUIT	30.61	0	00:45	2.97	0.01	0.20
300	CONDUIT	63.78	0	00:43	3.93	0.03	0.23
903	DUMMY	522.98	0	01:03			

****
Flow Classification Summary
****

	Adjusted	---------- Fraction of Time in Flow Class ----------							
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
200	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
900	1.00	0.00	0.00	0.00	0.74	0.25	0.00	0.00	0.00	0.00
902	1.00	0.01	0.00	0.00	0.82	0.18	0.00	0.00	0.00	0.00
901	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
500	1.00	0.01	0.24	0.00	0.75	0.00	0.00	0.00	0.99	0.00
400	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00
300	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

```
Analysis begun on:  Mon Feb  5 13:56:59 2024
Analysis ended on:  Mon Feb  5 13:56:59 2024
Total elapsed time: < 1 sec
```

APPENDIX D
EXISTING CONDITION CUHP/SWMM MODEL

CUHP SUBCATCHMENTS

Todd Creek Farms - Existing Condition CUHP Inputs

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi^2)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
100	JUNCT_100	10-YR	0.12759	0.43125	0.66932	0.01917	5.59	0.38	0.1	3	0.0018	0.5	0
101	JUNCT_101	10-YR	0.12666	0.40284	0.79905	0.01731	2	0.38	0.1	3	0.0018	0.5	0
102	JUNCT_102	10-YR	0.08799	0.31345	0.54621	0.01515	2	0.38	0.1	3	0.0018	0.5	0
200	JUNCT_200	10-YR	0.03753	0.21193	0.43182	0.02363	23.9	0.38	0.1	3	0.0018	0.5	0
201	JUNCT_201	10-YR	0.18767	0.31117	0.52917	0.02	2.51	0.38	0.1	3	0.0018	0.5	0
300	JUNCT_300	10-YR	0.05288	0.1197	0.25303	0.0205	10.89	0.38	0.1	3	0.0018	0.5	0
400	JUNCT_400	10-YR	0.02172	0.06742	0.14738	0.04888	34.46	0.38	0.1	3	0.0018	0.5	0
500	JUNCT_500	10-YR	0.02089	0.21572	0.33542	0.02138	2	0.38	0.1	3	0.0018	0.5	0

Todd Creek Farms - Existing Condition 5-yr

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

```
  ----------------------------------------------------------

  ****************
  Analysis Options
  ****************
  Flow Units ............... CFS
  Process Models:
    Rainfall/Runoff ........ NO
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 01/01/2005 00:00:00
  Ending Date .............. 01/02/2005 12:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Routing Time Step ........ 60.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.005000 ft


  *************************        Volume        Volume
  Flow Routing Continuity        acre-feet      10^6 gal
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......         0.000         0.000
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........        12.317         4.014
  External Outflow .........        12.315         4.013
```

```
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.005         0.002
Continuity Error (%) .....        -0.022

**************************
Time-Step Critical Elements
**************************
Link 902 (9.67%)

*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.

*********************************
Most Frequent Nonconverging Nodes
*********************************
Convergence obtained at all time steps.

************************
Routing Time Step Summary
************************
Minimum Time Step           :    24.54 sec
Average Time Step           :    58.27 sec
Maximum Time Step           :    60.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.00
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
   60.000 - 23.031 sec      :   100.00 %
   23.031 -  8.841 sec      :     0.00 %
    8.841 -  3.393 sec      :     0.00 %
```

```
    3.393 -  1.303 sec      :     0.00 %
    1.303 -  0.500 sec      :     0.00 %
```

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
JUNCT_201	JUNCTION	0.00	0.00	5113.00	0 00:00	0.00
JUNCT_200	JUNCTION	0.03	0.32	5136.62	0 00:55	0.32
JUNCT_900	JUNCTION	0.06	0.70	5113.50	0 01:02	0.70
JUNCT_902	JUNCTION	0.09	1.05	5060.85	0 01:00	1.05
JUNCT_100	JUNCTION	0.00	0.00	5064.00	0 00:00	0.00
JUNCT_101	JUNCTION	0.00	0.00	5064.00	0 00:00	0.00
JUNCT_903	JUNCTION	0.00	0.04	5055.84	0 01:01	0.04
JUNCT_300	JUNCTION	0.02	0.42	5113.12	0 00:41	0.42
JUNCT_400	JUNCTION	0.02	0.38	5122.68	0 00:38	0.38
JUNCT_500	JUNCTION	0.01	0.16	5086.66	0 00:53	0.16
JUNCT_102	JUNCTION	0.00	0.00	5078.10	0 00:00	0.00
JUNCT_901	JUNCTION	0.05	0.63	5078.63	0 01:02	0.63
OUTFALL_904	OUTFALL	0.00	0.00	5055.70	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_201	JUNCTION	41.49	41.49	0 00:42	1.01	1.01	0.000

JUNCT_200	JUNCTION	9.44	9.44	0	00:42	0.359	0.359	-0.465
JUNCT_900	JUNCTION	0.00	48.41	0	00:44	0	1.38	0.163
JUNCT_902	JUNCTION	0.00	67.29	0	00:57	0	2.64	-0.004
JUNCT_100	JUNCTION	20.56	20.56	0	00:48	0.764	0.764	0.000
JUNCT_101	JUNCTION	17.49	17.49	0	00:50	0.676	0.676	0.000
JUNCT_903	JUNCTION	0.00	103.97	0	01:01	0	4.01	-0.021
JUNCT_300	JUNCTION	16.96	16.96	0	00:36	0.367	0.367	-0.955
JUNCT_400	JUNCTION	16.10	16.10	0	00:31	0.253	0.253	-1.736
JUNCT_500	JUNCTION	2.72	2.72	0	00:45	0.111	0.111	-0.193
JUNCT_102	JUNCTION	13.28	13.28	0	00:47	0.469	0.469	0.000
JUNCT_901	JUNCTION	0.00	46.75	0	00:43	0	1.21	0.779
OUTFALL_904	OUTFALL	0.00	103.97	0	01:01	0	4.01	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_201	JUNCTION	36.00	0.000	0.000
JUNCT_100	JUNCTION	36.00	0.000	0.000
JUNCT_101	JUNCTION	36.00	0.000	0.000
JUNCT_102	JUNCTION	36.00	0.000	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary

****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_904	99.01	6.07	103.97	4.013
System	99.01	6.07	103.97	4.013

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
200	CONDUIT	8.48	0	00:56	1.11	0.01	0.10
201	DUMMY	41.49	0	00:42			
100	DUMMY	20.56	0	00:48			
101	DUMMY	17.49	0	00:50			
900	CONDUIT	37.44	0	01:02	6.00	0.02	0.07
902	CONDUIT	66.59	0	01:01	6.92	0.03	0.11
901	CONDUIT	31.89	0	01:03	1.98	0.02	0.17
102	DUMMY	13.28	0	00:47			
500	CONDUIT	2.67	0	00:53	0.56	0.00	0.08
400	CONDUIT	14.53	0	00:41	2.98	0.01	0.09
300	CONDUIT	17.35	0	00:43	2.45	0.01	0.10
903	DUMMY	103.97	0	01:01			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
200	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00
900	1.00	0.01	0.00	0.00	0.76	0.23	0.00	0.00	0.00	0.00
902	1.00	0.01	0.00	0.00	0.84	0.15	0.00	0.00	0.00	0.00
901	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
500	1.00	0.01	0.26	0.00	0.74	0.00	0.00	0.00	0.99	0.00
400	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00
300	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon Feb 5 13:54:31 2024
Analysis ended on: Mon Feb 5 13:54:31 2024
Total elapsed time: < 1 sec

Todd Creek Farms - Existing Condition 10-yr

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 01/01/2005 00:00:00
Ending Date 01/02/2005 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Routing Time Step ..... 60.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.005000 ft

**********	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**********	---	---
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000

```
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........        20.431         6.658
External Outflow .........        20.431         6.658
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.005         0.002
Continuity Error (%) .....        -0.026


**************************
Time-Step Critical Elements
**************************
Link 902 (12.64%)


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


*******************************
Most Frequent Nonconverging Nodes
*******************************
Convergence obtained at all time steps.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    25.10 sec
Average Time Step           :    57.29 sec
Maximum Time Step           :    60.00 sec
```

```
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.00
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
   60.000 - 23.031 sec      :   100.00 %
   23.031 -  8.841 sec      :     0.00 %
    8.841 -  3.393 sec      :     0.00 %
    3.393 -  1.303 sec      :     0.00 %
    1.303 -  0.500 sec      :     0.00 %


******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
JUNCT_201	JUNCTION	0.00	0.00	5113.00	0 00:00	0.00
JUNCT_200	JUNCTION	0.04	0.39	5136.69	0 00:55	0.39
JUNCT_900	JUNCTION	0.08	0.92	5113.72	0 01:00	0.92
JUNCT_902	JUNCTION	0.13	1.32	5061.12	0 00:59	1.32
JUNCT_100	JUNCTION	0.00	0.00	5064.00	0 00:00	0.00
JUNCT_101	JUNCTION	0.00	0.00	5064.00	0 00:00	0.00
JUNCT_903	JUNCTION	0.00	0.05	5055.85	0 01:00	0.05
JUNCT_300	JUNCTION	0.03	0.52	5113.22	0 00:39	0.52
JUNCT_400	JUNCTION	0.02	0.44	5122.74	0 00:37	0.44
JUNCT_500	JUNCTION	0.02	0.21	5086.71	0 00:52	0.21
JUNCT_102	JUNCTION	0.00	0.00	5078.10	0 00:00	0.00
JUNCT_901	JUNCTION	0.08	0.81	5078.81	0 01:01	0.81
OUTFALL_904	OUTFALL	0.00	0.00	5055.70	0 00:00	0.00

```
******************
```

Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_201	JUNCTION	62.85	62.85	0 00:42	1.75	1.75	0.000
JUNCT_200	JUNCTION	12.79	12.79	0 00:42	0.518	0.518	-0.323
JUNCT_900	JUNCTION	0.00	72.68	0 00:43	0	2.27	0.063
JUNCT_902	JUNCTION	0.00	104.36	0 00:56	0	4.38	-0.010
JUNCT_100	JUNCTION	30.89	30.89	0 00:49	1.27	1.27	0.000
JUNCT_101	JUNCTION	27.10	27.10	0 00:51	1.17	1.17	0.000
JUNCT_903	JUNCTION	0.00	163.44	0 01:00	0	6.66	-0.009
JUNCT_300	JUNCTION	24.20	24.20	0 00:35	0.582	0.582	-0.923
JUNCT_400	JUNCTION	20.89	20.89	0 00:31	0.346	0.346	-1.973
JUNCT_500	JUNCTION	4.22	4.22	0 00:47	0.194	0.194	-0.171
JUNCT_102	JUNCTION	20.50	20.50	0 00:48	0.815	0.815	0.000
JUNCT_901	JUNCTION	0.00	66.74	0 00:40	0	1.95	0.716
OUTFALL_904	OUTFALL	0.00	163.44	0 01:00	0	6.66	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_201	JUNCTION	36.00	0.000	0.000
JUNCT_100	JUNCTION	36.00	0.000	0.000

JUNCT_101	JUNCTION	36.00	0.000	0.000
JUNCT_102	JUNCTION	36.00	0.000	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_904	99.43	11.28	163.44	6.657
System	99.43	11.28	163.44	6.657

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
200	CONDUIT	11.72	0 00:55	1.18	0.01	0.13
201	DUMMY	62.85	0 00:42			

100	DUMMY	30.89	0	00:49			
101	DUMMY	27.10	0	00:51			
900	CONDUIT	59.80	0	01:01	7.10	0.02	0.10
902	CONDUIT	103.69	0	00:59	8.20	0.05	0.14
901	CONDUIT	49.03	0	01:01	2.27	0.03	0.21
102	DUMMY	20.50	0	00:48			
500	CONDUIT	4.16	0	00:52	0.67	0.00	0.10
400	CONDUIT	19.71	0	00:39	3.24	0.01	0.11
300	CONDUIT	24.90	0	00:41	2.78	0.01	0.12
903	DUMMY	163.44	0	01:00			

****
Flow Classification Summary
****

	Adjusted	---------- Fraction of Time in Flow Class ----------							
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
200	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
900	1.00	0.01	0.00	0.00	0.75	0.24	0.00	0.00	0.00	0.00
902	1.00	0.01	0.00	0.00	0.83	0.16	0.00	0.00	0.00	0.00
901	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
500	1.00	0.01	0.25	0.00	0.75	0.00	0.00	0.00	0.99	0.00
400	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00
300	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

```
Analysis begun on:  Mon Feb  5 13:53:40 2024
Analysis ended on:  Mon Feb  5 13:53:40 2024
Total elapsed time: < 1 sec
```

Todd Creek Farms - Existing Condition 100-yr

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

```
  ----------------------------------------------------------------

  ****************
  Analysis Options
  ****************
  Flow Units ............... CFS
  Process Models:
    Rainfall/Runoff ........ NO
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 01/01/2005 00:00:00
  Ending Date .............. 01/02/2005 12:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Routing Time Step ........ 60.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.005000 ft


  *************************        Volume        Volume
  Flow Routing Continuity        acre-feet      10^6 gal
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......         0.000         0.000
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........        61.431        20.018
```

```
External Outflow .........        61.419        20.014
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.005         0.002
Continuity Error (%) .....         0.010

**************************
Time-Step Critical Elements
**************************
Link 902 (17.99%)

********************************
Highest Flow Instability Indexes
********************************
All links are stable.

********************************
Most Frequent Nonconverging Nodes
********************************
Convergence obtained at all time steps.

*************************
Routing Time Step Summary
*************************
Minimum Time Step           :    16.94 sec
Average Time Step           :    54.73 sec
Maximum Time Step           :    60.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     2.00
% of Steps Not Converging   :     0.00
Time Step Frequencies       :
   60.000 - 23.031 sec      :    96.54 %
   23.031 -  8.841 sec      :     3.46 %
```

```
    8.841 -  3.393 sec      :     0.00 %
    3.393 -  1.303 sec      :     0.00 %
    1.303 -  0.500 sec      :     0.00 %


******************
Node Depth Summary
******************

--------------------------------------------------------------------------------
                            Average  Maximum  Maximum  Time of Max    Reported
                              Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type      Feet     Feet     Feet  days hr:min        Feet
--------------------------------------------------------------------------------
JUNCT_201            JUNCTION  0.00     0.00  5113.00     0  00:00        0.00
JUNCT_200            JUNCTION  0.08     0.69  5136.99     0  00:58        0.69
JUNCT_900            JUNCTION  0.19     1.80  5114.60     0  01:02        1.80
JUNCT_902            JUNCTION  0.29     2.38  5062.18     0  01:02        2.38
JUNCT_100            JUNCTION  0.00     0.00  5064.00     0  00:00        0.00
JUNCT_101            JUNCTION  0.00     0.00  5064.00     0  00:00        0.00
JUNCT_903            JUNCTION  0.01     0.09  5055.89     0  01:02        0.09
JUNCT_300            JUNCTION  0.07     0.89  5113.59     0  00:43        0.89
JUNCT_400            JUNCTION  0.04     0.70  5123.00     0  00:38        0.70
JUNCT_500            JUNCTION  0.05     0.42  5086.92     0  00:59        0.42
JUNCT_102            JUNCTION  0.00     0.00  5078.10     0  00:00        0.00
JUNCT_901            JUNCTION  0.17     1.54  5079.54     0  01:01        1.54
OUTFALL_904          OUTFALL   0.00     0.00  5055.70     0  00:00        0.00


*******************
Node Inflow Summary
*******************

--------------------------------------------------------------------------------------------------
                            Maximum  Maximum                  Lateral       Total        Flow
                            Lateral    Total  Time of Max      Inflow      Inflow     Balance
                             Inflow   Inflow   Occurrence      Volume      Volume       Error
Node                 Type       CFS      CFS  days hr:min    10^6 gal    10^6 gal     Percent
--------------------------------------------------------------------------------------------------
```

JUNCT_201	JUNCTION	190.68	190.68	0	00:48	5.53	5.53	0.000
JUNCT_200	JUNCTION	33.37	33.37	0	00:49	1.27	1.27	-0.333
JUNCT_900	JUNCTION	0.00	220.00	0	00:49	0	6.81	0.090
JUNCT_902	JUNCTION	0.00	339.02	0	01:00	0	13.2	0.016
JUNCT_100	JUNCTION	94.75	94.75	0	00:56	3.85	3.85	0.000
JUNCT_101	JUNCTION	87.02	87.02	0	00:59	3.74	3.74	0.000
JUNCT_903	JUNCTION	0.00	540.56	0	01:02	0	20	-0.017
JUNCT_300	JUNCTION	66.04	66.04	0	00:41	1.64	1.64	-0.942
JUNCT_400	JUNCTION	46.86	46.86	0	00:36	0.773	0.773	-2.433
JUNCT_500	JUNCTION	13.55	13.55	0	00:55	0.616	0.616	-0.126
JUNCT_102	JUNCTION	65.13	65.13	0	00:55	2.59	2.59	0.000
JUNCT_901	JUNCTION	0.00	179.63	0	00:47	0	5.66	0.691
OUTFALL_904	OUTFALL	0.00	540.57	0	01:02	0	20	0.000

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
JUNCT_201	JUNCTION	36.00	0.000	0.000
JUNCT_100	JUNCTION	36.00	0.000	0.000
JUNCT_101	JUNCTION	36.00	0.000	0.000
JUNCT_102	JUNCTION	36.00	0.000	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****

Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_904	99.11	44.53	540.57	20.013
System	99.11	44.53	540.57	20.013

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
200	CONDUIT	32.13	0	00:58	1.42	0.02	0.25
201	DUMMY	190.68	0	00:48			
100	DUMMY	94.75	0	00:56			
101	DUMMY	87.02	0	00:59			
900	CONDUIT	202.30	0	01:02	10.82	0.08	0.19
902	CONDUIT	338.27	0	01:02	12.88	0.17	0.25
901	CONDUIT	158.72	0	01:02	3.26	0.09	0.39
102	DUMMY	65.13	0	00:55			
500	CONDUIT	13.50	0	00:59	0.96	0.01	0.20
400	CONDUIT	46.20	0	00:39	4.01	0.02	0.21
300	CONDUIT	65.74	0	00:43	3.80	0.03	0.24
903	DUMMY	540.57	0	01:02			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
200	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.99	0.00
900	1.00	0.00	0.00	0.00	0.75	0.25	0.00	0.00	0.00	0.00
902	1.00	0.00	0.00	0.00	0.82	0.18	0.00	0.00	0.01	0.00
901	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
500	1.00	0.00	0.24	0.00	0.75	0.00	0.00	0.00	0.99	0.00
400	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.98	0.00
300	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.98	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Mon Feb 5 13:44:52 2024
Analysis ended on: Mon Feb 5 13:44:52 2024
Total elapsed time: < 1 sec

MAPS

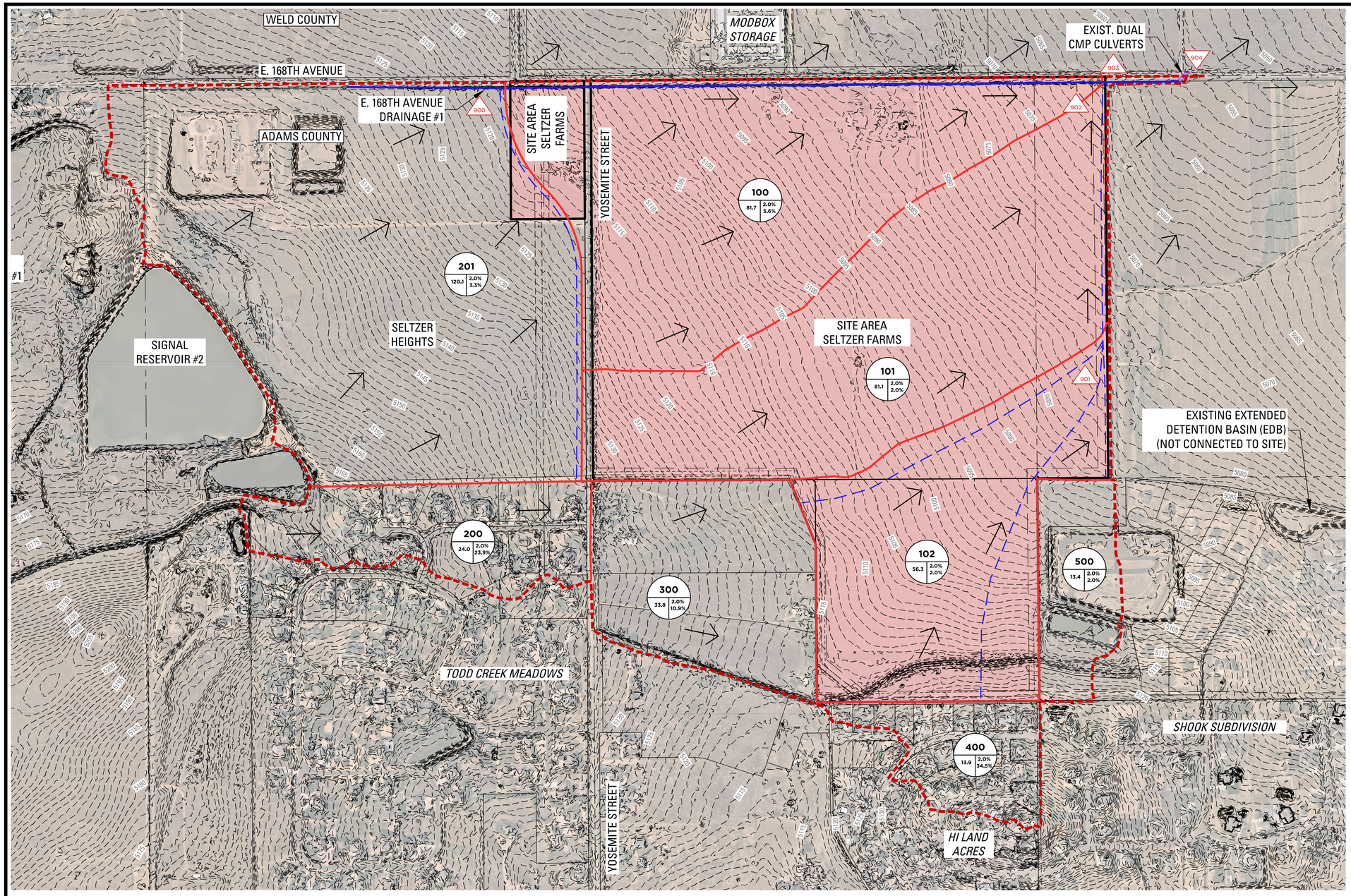
EXISTING CUHP/SWMM DRAINAGE MAP

PHASE 1 CUHP/SWMM DRAINAGE MAP

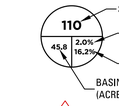
ULTIMATE CUHP/SWMM DRAINAGE MAP

PROPOSED PHASE 1 DRAINAGE MAP

PROPOSED ULTIMATE DRAINAGE MAP



DRAINAGE MAP LEGEND



308 SWMM MODEL DESIGN POINT

MAJOR DRAINAGE BASIN BOUNDARY

MINOR DRAINAGE BASIN BOUNDARY

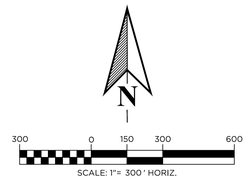
MAJOR DRAINAGE FLOW PATH

MINOR DRAINAGE FLOW PATH

DIRECTIONAL FLOW ARROW

TODD CREEK FARMS SITE AREA

TOPOGRAPHIC DATA OBTAINED FROM THE DENVER REGIONAL COUNCIL OF GOVERNMENTS (DRCOG). 2020 DRCOG BLOCK 2, QL2 LIDAR DATA SET.



DEVELOPED RUNOFF

DESIGN POINT	PEAK DISCHARGE (CFS) - HISTORIC			PEAK DISCHARGE (CFS) - EXISTING CONDITION		
	5-YEAR	10-YEAR	100-YEAR	5-YEAR	10-YEAR	100-YEAR
900	43.9	67.6	212.5	48.4	72.7	220.0
901	36.0	55.6	167.9	46.8	66.7	179.6
902	57.5	94.2	327.8	67.3	104.4	339.0
903	90.4	149.1	523.0	104.0	163.4	540.6
904	90.4	149.1	523.0	104.0	163.4	540.6

SELTZER FARMS FILING NO. 1
PRELIMINARY DRAINAGE REPORT

TITLE: EXISTING CUHP/SWMM MAP

ADDRESS: 9230 E. 168TH AVE
BRIGHTON, COLORADO 80602

LOCATION: SECTIONS 2, 3, & 4
TOWNSHIP 1 SOUTH, RANGE 67 WEST

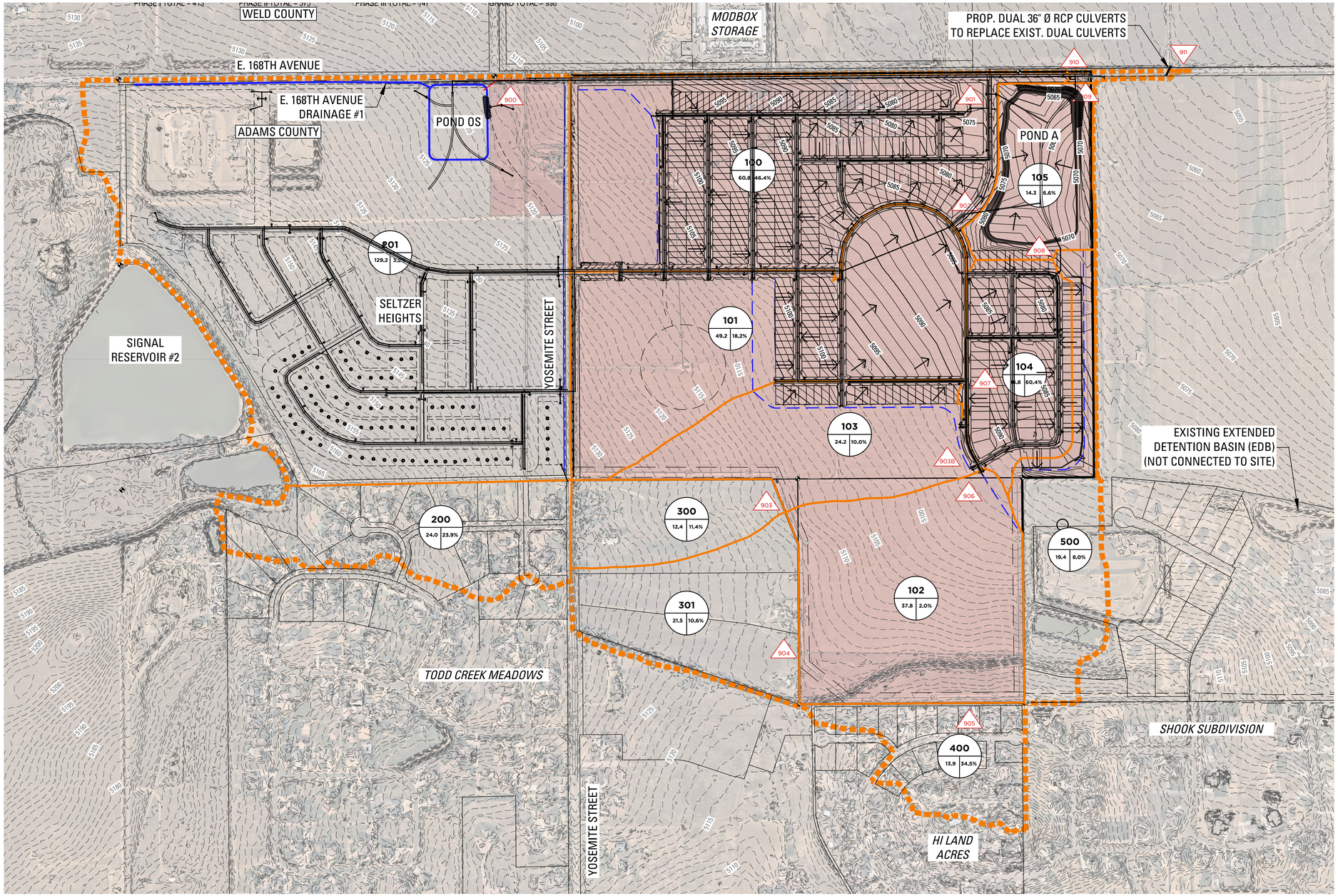
DATE: 02/09/2024

REV 1: 04/26/2024	REV 3:
REV 2:	REV 4:

SHEET 1 OF 5

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\0199\FILING 1 SELTZER\CIVIL\DRAINAGE\PHASE III\CAD FILES\2020-PH2-DRN-EXIST.DWG



DEVELOPED RUNOFF			
	PEAK DISCHARGE (CFS) - PHASE 1 SELTZER		
DESIGN POINT	5-YEAR	10-YEAR	100-YEAR
Pond OS	52.8	78.9	236.8
900	1.7	5.1	37.6
901	46.6	59.0	129.8
902	16.7	23.3	63.6
903	4.0	5.8	16.5
903B	10.0	14.6	42.8
904	9.0	12.9	36.0
905	16.1	21.0	47.0
906	33.8	47.9	130.4
907	38.6	56.2	162.4
908	52.2	73.1	199.1
Pond A	120.2	163.4	425.1
909	8.3	10.4	50.3
910	5.0	9.2	62.4
911	4.2	8.2	60.4

DRAINAGE MAP LEGEND

104 — SUB BASIN NAME
18.2 61.2% — PHASE 1 CONDITION IMPERVIOUSNESS
BASIN AREA (ACRES)

308 — SWMM MODEL DESIGN POINT
MAJOR DRAINAGE BASIN BOUNDARY
MINOR DRAINAGE BASIN BOUNDARY
MAJOR DRAINAGE FLOW PATH
PROPOSED CHANNEL DIVERSION
DIRECTIONAL FLOW ARROW
TODD CREEK FARMS SITE AREA

TOPOGRAPHIC DATA OBTAINED FROM THE DENVER REGIONAL COUNCIL OF GOVERNMENTS (DRCOG), 2020 DRCOG BLOCK 2, QL2 LIDAR DATA SET.

N

300 0 150 300 600
SCALE: 1"= 300 ' HORIZ.

SELTZER FARMS FILING NO. 1
PRELIMINARY DRAINAGE REPORT

TITLE: PHASE 1 CUHP/SWMM MAP

ADDRESS: 8120, 9230, & 11750 E. 168TH AVE BRIGHTON, COLORADO 80602

LOCATION: SECTIONS 2, 3, & 4 TOWNSHIP 1 SOUTH, RANGE 67 WEST

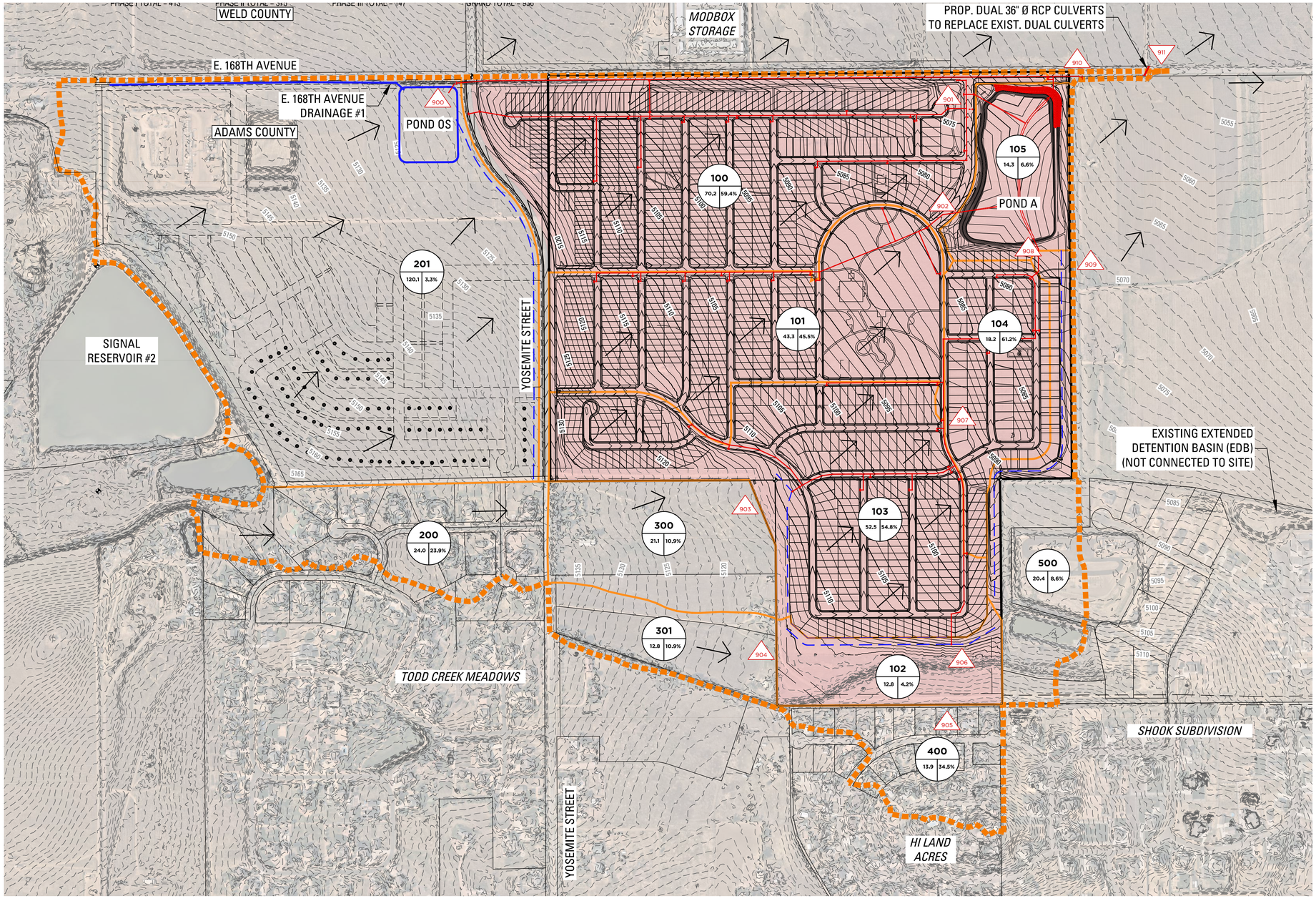
DATE: 02/09/2024

REV 1: 04/26/2024	REV 3:
REV 2:	REV 4:

SHEET 2 OF 5

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\0190\FILING 1 SELTZER\CIVIL\DRAINAGE\PHASE II\CAD FILES\2207-PH2-DRN-CUHP-F1.DWG



DEVELOPED RUNOFF			
	PEAK DISCHARGE (CFS) - ULTIMATE SELTZER		
DESIGN POINT	5-YEAR	10-YEAR	100-YEAR
Pond OS	48.8	73.0	219.4
900	1.4	4.7	37.6
901	62.2	76.6	158.0
902	33.0	41.9	92.5
903	8.7	12.4	34.6
904	4.2	6.0	17.1
905	16.1	21.0	47.0
906	21.9	30.1	76.0
907	77.5	100.9	234.9
908	93.1	120.4	277.0
Pond A	196.8	251.6	565.9
909	9.7	15.8	52.4
910	5.2	10.9	63.5
911	4.3	9.4	61.4

DRAINAGE MAP LEGEND

- 104 / 18.2 / 61.2% — SUB BASIN NAME; ULTIMATE CONDITION IMPERVIOUSNESS; BASIN AREA (ACRES)
- 308 — SWMM MODEL DESIGN POINT
- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- MAJOR DRAINAGE FLOW PATH
- PROPOSED CHANNEL DIVERSION
- DIRECTIONAL FLOW ARROW
- TODD CREEK FARMS SITE AREA

TOPOGRAPHIC DATA OBTAINED FROM THE DENVER REGIONAL COUNCIL OF GOVERNMENTS (DRCOG), 2020 DRCOG BLOCK 2, QL2 LIDAR DATA SET.

N

300 0 150 300 600

SCALE: 1"= 300' HORIZ.

SELTZER FARMS FILING NO. 1
PRELIMINARY DRAINAGE REPORT

TITLE: ULTIMATE CUHP/SWMM MAP

ADDRESS: 8120, 9230, & 11750 E. 168TH AVE BRIGHTON, COLORADO 80602

LOCATION: SECTIONS 2, 3, & 4 TOWNSHIP 1 SOUTH, RANGE 67 WEST

DATE: 02/09/2024

REV 1: 04/26/2024	REV 3:
REV 2:	REV 4:

SHEET 3 OF 5

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ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\8109\FILING 1 SELTZER\CIVIL\DRAINAGE\PHASE II\CAD FILES\2201-PH2-DRN-CUHP-ULT.DWG

APPENDIX C
HYDROLOGIC INFROMATION & ROUTING, POND SIZING
CUHP/SWMM SUMMARY

PROJECT: SELTZER HEIGHTS
SHEET TITLE: PROPOSED COMPOSITE RUNOFF FACTORS

Basin Name	Total Area (Acres)	Total Area (Sq. Ft.)	Undeveloped (Sq. Ft.)	Rural Res. (1-2 Ac.) (Sq. Ft.)	Single Family Low Density (Sq. Ft.)	Gravel (Sq. Ft.)	Apartments (Sq. Ft.)	Single Family (Sq. Ft.)	Local Street ROW (Sq. Ft.)	Collector Street ROW (Sq. Ft.)	Conc. Drives/Walks (Sq. Ft.)	Asphalt Pvmt (Sq. Ft.)	Soil Type "C" Composite Runoff Factors			
													C_5	C_{100}	I %	
OS4	24.02	1,046,369	74,060	964,891								7,418	0.23	0.58	23.90	
F1	2.58	112,446	73,733			441					6,303	31,969	0.32	0.63	34.94	
F2	9.57	416,688	326,843			25,479		53,670			10,696		0.14	0.54	12.76	
F3	7.79	339,411	131,011			208,400							0.24	0.59	25.33	
F4	2.97	129,365	61,584						22,602	31,426	11,187	2,566	0.39	0.66	43.66	
F5A	2.86	124,564	331				109,656			11,726	236	2,615	0.65	0.79	74.70	
F5B	2.90	126,465	0				105,762			20,703			0.64	0.78	73.85	
F6	1.22	53,187	18,550								6,870	27,767	0.56	0.75	64.53	
F7	8.34	363,320	25,136				338,184						0.61	0.77	69.95	
F8	3.22	140,255	0				140,255						0.65	0.79	75.00	
F9	5.71	248,582	154,233					76,202			18,147		0.22	0.58	23.14	
F10	0.54	23,726	5,901					15,951			1,874		0.37	0.65	41.22	
F11	2.39	104,161	0					64,436	39,725				0.58	0.76	66.78	
F12A	3.35	145,863	4,561					106,877	34,176		249		0.51	0.72	58.88	
F12B	2.51	109,154	1,712					67,605	39,316		521		0.56	0.75	65.29	
F13	2.12	92,465	1,415					50,378	28,028	12,416	228		0.56	0.75	65.12	
F14	0.44	19,198	0				2,361			16,837			0.60	0.76	68.86	
F15	2.82	122,634	0					92,092	30,542				0.52	0.73	60.96	
F16	2.75	119,982	74,539					37,034			8,409		0.22	0.58	22.98	
F17	3.41	148,736	0					134,565	14,171				0.47	0.71	54.19	
F18A	1.33	57,881	0					38,220	19,661				0.56	0.75	64.95	
F18B	2.84	123,877	0					96,702	27,175				0.52	0.73	59.65	
F18C	1.97	85,660	2,180					58,724	23,873		883		0.53	0.73	61.45	
F19	3.27	142,304	0					119,686	22,618				0.49	0.72	56.99	
F20	2.56	111,666	792				3,928	37,311	40,378	29,257			0.62	0.77	71.17	
F21	1.63	71,157	120				52,454			18,583			0.63	0.78	73.05	
F22	1.44	62,729	121				8,061			54,547			0.60	0.76	68.77	
F23	5.90	256,920	162,065					80,664			14,191		0.21	0.58	21.93	
F24	2.51	109,459	4,634					59,053	44,766		1,006		0.57	0.75	66.33	
F25	1.00	43,438	15,999					27,000			439		0.30	0.62	32.72	
F26	4.03	175,548	23,150					105,535	46,125		738		0.48	0.71	55.40	
F27	2.58	112,461	30,730					43,066	36,888		1,777		0.45	0.70	51.95	
F28	0.36	15,880	121				2,871		12,888				0.77	0.85	89.86	
F29	6.12	266,444	18,115				248,329						0.61	0.77	70.04	
F30	1.63	71,145	21,199						1,165		9,899	38,882	0.60	0.77	69.31	
F31	7.57	329,751	21,188				308,563						0.61	0.77	70.31	
F32	6.91	300,940	276,153				24,787						0.10	0.51	8.01	
G1	2.40	104,744	30,800							2,091	13,084	58,769	0.60	0.77	69.30	
G2	1.07	46,564	0								5,971	40,593	0.84	0.88	98.72	
Pond B	145.18	6,323,831	1,530,176	964,891	0	234,320	1,345,211	1,364,771	484,097	195,495	93,653	111,217	0.40	0.67	44.91	
200	24.02	1,046,369	74,060	964,891	0	0	0	0	0	0	0	7,418	0.23	0.58	23.90	(OS4)
201	24.13	1,051,295	276,013	0	0	0	251,200	315,318	141,832	0	28,050	38,882	0.46	0.70	52.22	(F23 THRU F30)
202	48.66	2,119,526	266,762	0	0	0	375,367	995,783	319,663	131,640	30,311	0	0.49	0.72	56.71	(F9 THRU F22 + F31)
203	41.45	1,805,701	637,188	0	0	234,320	693,857	53,670	22,602	63,855	35,292	64,917	0.40	0.67	45.14	(F1 THRU F8)
204	6.91	300,940	276,153	0	0	0	24,787	0	0	0	0	0	0.10	0.51	8.01	(F32)

Land Use	Imp., I %
Undeveloped	2
Rural Residential (1-2 Acres)	25
Single Family Low Density	35
Gravel	40
Apartments	75
Single Family Lot Area	50
Local Street ROW	94
Collector ROW	68
Concrete Walks/Drives/Roof	90
Asphalt Pavement	100

PROJECT: SELTZER HEIGHTS

SHEET TITLE: PROPOSED TIME OF CONCENTRATION CALCULATIONS

			TIME (Ti) *[Max. 300']*					TRAVEL TIME (Tt)								Tc CHECK (Urbanized Basins)					FINAL Tc	Time to Peak** Flow	Remarks
Basin No.	Area (acres)	5Yr. co-eff.	Elevations Upstream	Elevations Downstream	Dist. (ft)	Slope (ft/ft)	Ti (min)	Elevations Upstream	Elevations Downstream	Dist. (ft)	Slope (ft/ft)	*	Vel. (fps)	Tt (min)	Tc	Length (ft)	Avg Slope (ft/ft)	Imperv.	Tc (min)	(min)		
OS4	24.02	0.58	5184.5	5175.6	300	0.030	11.4	5175.6	5135.0	1,929	0.021	5.0	2.2	14.8	26.2	1929	0.021	0.24	39.9	26.2	**26.2**	Developed
F1	2.58	0.63	5153.3	5145.3	300	0.027	10.8	5145.3	5132.9	1,089	0.011	6.0	2.1	8.5	19.3	1089	0.011	0.35	32.3	19.3	**19.3**	Developed
F2	9.57	0.54	5177.6	5162.8	198	0.075	7.5	5162.8	5131.3	2,023	0.016	5.0	1.9	18.0	25.5	2023	0.016	0.13	48.9	25.5	**25.5**	Developed
F3	7.79	0.59	5142.5	5139.7	300	0.009	16.6	5139.7	5134.0	344	0.017	5.0	1.9	3.0	19.5	344	0.017	0.25	25.2	19.5	**19.5**	Developed
F4	2.97	0.66	5170.6	5167.0	145	0.025	7.1	5167.0	5132.7	1,165	0.029	6.0	3.4	5.7	12.8	1165	0.029	0.44	26.1	12.8	**12.8**	Developed
F5A	2.86	0.79	5161.2	5159.2	150	0.013	6.4	5159.2	5132.9	742	0.035	6.0	3.8	3.3	9.6	742	0.035	0.75	16.7	9.6	**9.6**	Developed
F5B	2.90	0.78	5161.5	5159.3	150	0.015	6.2	5159.3	5139.4	490	0.041	6.0	4.0	2.0	8.3	490	0.041	0.74	15.5	8.3	**8.3**	Developed
F6	1.22	0.75	5133.2	5132.0	35	0.034	2.5	5132.0	5122.7	836	0.011	6.0	2.1	6.6	9.1	836	0.011	0.65	22.4	9.1	**9.1**	Developed
F7	8.34	0.77	5158.5	5153.4	150	0.034	5.0	5153.4	5120.5	603	0.055	6.0	4.7	2.2	7.1	603	0.055	0.70	16.4	7.1	**7.1**	Developed
F8	3.22	0.79	5157.9	5152.0	150	0.039	4.4	5152.0	5122.0	289	0.104	5.0	4.8	1.0	5.4	289	0.104	0.75	14.0	5.4	**5.4**	Developed
F9	5.71	0.58	5177.6	5167.5	219	0.046	8.4	5167.5	5158.9	439	0.020	5.0	2.1	3.5	11.9	439	0.020	0.23	26.3	11.9	**11.9**	Developed
F10	0.54	0.65	5172.8	5168.5	102	0.042	5.1	5168.5	5165.3	106	0.030	5.0	2.6	0.7	5.8	106	0.030	0.41	19.7	5.8	**5.8**	Developed
F11	2.39	0.76	5177.1	5171.0	123	0.050	4.1	5171.0	5166.5	419	0.011	6.0	2.1	3.4	7.5	419	0.011	0.67	18.3	7.5	**7.5**	Developed
F12A	3.35	0.72	5176.0	5165.1	195	0.056	5.4	5165.1	5160.2	345	0.014	6.0	2.4	2.4	7.8	345	0.014	0.59	18.8	7.8	**7.8**	Developed
F12B	2.51	0.75	5171.5	5169.9	62	0.026	3.7	5169.9	5160.8	673	0.014	6.0	2.3	4.8	8.5	673	0.014	0.65	20.2	8.5	**8.5**	Developed
F13	2.12	0.75	5165.6	5164.2	52	0.027	3.3	5164.2	5158.2	653	0.009	6.0	1.9	5.7	9.0	653	0.009	0.65	21.2	9.0	**9.0**	Developed
F14	0.44	0.76	5161.6	5160.6	26	0.038	2.0	5160.6	5158.2	261	0.009	6.0	1.9	2.3	4.3	261	0.009	0.69	16.7	4.3	**5.0**	Developed
F15	2.82	0.73	5169.0	5164.2	186	0.026	6.7	5164.2	5160.5	444	0.008	6.0	1.8	4.1	10.8	444	0.008	0.61	20.3	10.8	**10.8**	Developed
F17	3.41	0.71	5178.0	5169.4	204	0.042	6.4	5169.4	5155.0	521	0.028	6.0	3.3	2.6	9.0	521	0.028	0.54	19.9	9.0	**9.0**	Developed
F18A	1.33	0.75	5171.0	5169.6	52	0.027	3.3	5169.6	5151.2	748	0.025	6.0	3.1	4.0	7.3	748	0.025	0.65	19.4	7.3	**7.3**	Developed
F18B	2.84	0.73	5170.8	5158.1	204	0.062	5.3	5158.1	5141.5	248	0.067	6.0	5.2	0.8	6.1	248	0.067	0.60	16.8	6.1	**6.1**	Developed
F18C	1.97	0.73	5165.6	5164.2	52	0.027	3.5	5164.2	5146.4	879	0.020	6.0	2.8	5.1	8.6	879	0.020	0.61	21.4	8.6	**8.6**	Developed
F16	2.75	0.58	5163.8	5155.7	200	0.041	8.5	5155.7	5148.2	190	0.039	5.0	3.0	1.1	9.5	190	0.039	0.23	23.4	9.5	**9.5**	Developed
F19	3.27	0.72	5154.1	5143.8	209	0.049	6.0	5143.8	5138.7	524	0.010	6.0	2.0	4.4	10.4	524	0.010	0.57	21.5	10.4	**10.4**	Developed
F20	2.56	0.77	5161.3	5159.0	94	0.024	4.3	5159.0	5136.6	764	0.029	6.0	3.4	3.7	8.0	764	0.029	0.71	17.8	8.0	**8.0**	Developed
F21	1.63	0.78	5139.8	5134.7	150	0.034	4.7	5134.7	5122.8	362	0.033	6.0	3.6	1.7	6.4	362	0.033	0.73	15.3	6.4	**6.4**	Developed
F22	1.44	0.76	5161.4	5160.4	24	0.042	1.9	5160.4	5122.7	1,294	0.029	6.0	3.4	6.3	8.2	1294	0.029	0.69	21.1	8.2	**8.2**	Developed
F23	5.90	0.58	5180.5	5164.5	234	0.068	7.7	5164.5	5133.1	1,444	0.022	5.0	2.2	10.9	18.6	1444	0.022	0.22	35.8	18.6	**18.6**	Developed
F24	2.51	0.75	5180.6	5179.2	52	0.027	3.3	5179.2	5138.2	1,432	0.029	6.0	3.4	7.1	10.3	1432	0.029	0.66	22.4	10.3	**10.3**	Developed
F25	1.00	0.62	5141.5	5130.7	92	0.117	3.7	5130.7	5127.2	346	0.010	5.0	1.5	3.8	7.5	346	0.010	0.33	24.7	7.5	**7.5**	Developed
F26	4.03	0.71	5180.6	5179.2	51	0.027	3.6	5179.2	5136.5	1,497	0.029	6.0	3.4	7.4	11.0	1497	0.029	0.55	25.4	11.0	**11.0**	Developed
F27	2.58	0.70	5157.6	5156.3	52	0.025	3.9	5156.3	5129.7	1,010	0.026	6.0	3.2	5.2	9.1	1010	0.026	0.52	23.5	9.1	**9.1**	Developed
F28	0.36	0.85	5144.4	5143.7	13	0.054	1.0	5143.7	5129.8	469	0.030	6.0	3.4	2.3	3.2	469	0.030	0.90	12.8	3.2	**5.0**	Developed

PROJECT: SELTZER HEIGHTS

SHEET TITLE: PROPOSED TIME OF CONCENTRATION CALCULATIONS

			TIME (Ti) *[Max. 300']*					TRAVEL TIME (Tt)								Tc CHECK (Urbanized Basins)					FINAL Tc	Time to Peak** Flow	Remarks
Basin No.	Area (acres)	5Yr. co-eff.	Elevations Upstream	Elevations Downstream	Dist. (ft)	Slope (ft/ft)	Ti (min)	Elevations Upstream	Elevations Downstream	Dist. (ft)	Slope (ft/ft)	*	Vel. (fps)	Tt (min)	Tc	Length (ft)	Avg Slope (ft/ft)	Imperv.	Tc (min)	(min)		
F29	6.12	0.77	5144.6	5138.1	200	0.033	5.8	5138.1	5120.4	745	0.024	5.0	2.3	5.4	11.1	745	0.024	0.70	18.4	11.1	**11.1**	Developed
F30	1.63	0.77	5136.3	5133.0	95	0.035	3.9	5133.0	5122.0	1,105	0.010	6.0	2.0	9.2	13.2	1105	0.010	0.69	24.1	13.2	**13.2**	Developed
F31	7.57	0.77	5151.8	5143.9	200	0.040	5.4	5143.9	5114.1	971	0.031	6.0	3.5	4.6	10.0	971	0.031	0.70	18.9	10.0	**10.0**	Developed
F32	6.91	0.51	5122.0	5109.5	248	0.050	9.9	5109.5	5107.3	429	0.005	6.0	1.4	5.0	14.9	429	0.005	0.08	34.6	14.9	**14.9**	Developed
G1	2.40	0.77	5122.6	5121.6	52	0.019	3.6	5121.6	5114.0	1,081	0.007	6.0	1.7	10.7	14.3	1081	0.007	0.69	25.7	14.3	**14.3**	Developed
G2	1.07	0.88	5122.2	5121.4	42	0.019	2.1	5121.4	5114.0	1,058	0.007	6.0	1.7	10.5	12.6	1058	0.007	0.99	18.5	12.6	**12.6**	Developed

* Type of Land Surface for Overland Travel Time

1 = Heavy Meadow

2 = Tillage / Field

3 = Short pasture & lawns

4 = Nearly bare ground

5 = Grassed waterway

6 = Paved areas and shallow paved swales

VELOCITY COEFFICIENTS

1	2.5
2	5
3	7
4	10
5	15
6	20

PROJECT: SELTZER HEIGHTS
SHEET TITLE: PROPOSED SF-3 FORM (5-YR)

		DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE			TRAVEL TIME			
BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	CARRYOVER (cfs)	PIPE FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
F1	1	2.58	0.32	19.31	0.82	2.85	**2.32**								2.32	0.5	18	92	4.7	0.3	Total Flow Captured in Inlet at DP 1
F2	2	9.57	0.54	25.47	5.12	2.46	**12.59**								12.59	2.0	24	35	9.5	0.1	Total Flow to FES at DP 2
F4	3	2.97	0.66	12.77	1.97	3.47	**6.85**														Total Flow Captured in Inlet at DP 3
F2+F4	3							**25.53**	**7.09**	**2.45**	**17.35**				17.35	1.0	30	23	7.9	0.0	Combined Flow in Inlet at DP 3
F5B	4	2.90	0.78	8.27	2.28	4.13	**9.40**								9.40	2.0	24	187	8.7	0.4	Total Flow Captured in Inlet at DP 4
F3	5	7.79	0.59	19.54	4.60	2.83	**13.01**								13.01	0.5	30	66	5.7	0.2	Total Flow Captured in Inlet at DP 5
F3+F5B	6							**19.73**	**6.87**	**2.83**	**19.45**				19.45	0.5	36	102	8.2	0.2	Combined Flow in MH at DP 6
F1+F2+F3+F4+F5B	7							**25.58**	**14.78**	**2.45**	**36.17**				36.17	1.0	42	23	9.6	0.0	Combined Flow in MH at DP 7
F5A	8	2.86	0.79	9.65	2.25	3.92	**8.83**														Total Flow Captured in Inlet at DP 8
F1+F2+F3+F4+F5	8							**25.62**	**17.03**	**2.45**	**41.68**										Combined Flow in Inlet at DP 8
F7	9	8.34	0.77	7.11	6.41	4.37	**27.96**	**25.62**	**23.44**	**2.45**	**57.35**										Total Flow in Channel at DP 9
F6	10	1.22	0.75	9.14	0.91	4.00	**3.65**														Total Flow Captured in Inlet at DP 10
F1+F2+F3+F4+F5+F6+F7	11							**25.62**	**24.35**	**2.45**	**59.59**				59.59	0.9	48	79	10.4	0.1	Combined Flow in Inlet at DP 11
F8	12	3.22	0.79	5.41	2.54	4.75	**12.09**														Total Flow to Pond at DP 12
F9	13	5.71	0.58	11.93	3.32	3.60	**11.95**								11.95	0.5	30	460	5.6	1.4	Total Flow to Inlet at DP 13
F10	14	0.54	0.65	5.79	0.36	4.64	**1.65**														Total Flow to Inlet at DP 14
F9+F10	15							**13.30**	**3.68**	**3.41**	**12.55**				12.55	0.5	30	160	5.7	0.5	Combined Flow in Pipe at DP 15
F11	16	2.39	0.76	7.47	1.81	4.32	**7.80**														Total Flow to Inlet at DP 16
F9+F10+F11	17							**13.77**	**5.49**	**3.36**	**18.41**				18.41	0.5	36	481	6.2	1.3	Combined Flow in MH at DP 17
F12A	18	3.35	0.72	7.84	2.42	4.22	**10.23**														Total Flow to Inlet at DP 18
F9+F10+F11+F12A	19							**15.06**	**7.91**	**3.22**	**25.50**				25.50	0.5	42	39	6.8	0.1	Combined Flow in MH at DP 19
F12B	20	2.51	0.75	8.51	1.88	4.08	**7.68**														Total Flow Captured in Inlet at DP 20
F9+F10+F11+F12A+F12B	21							**15.16**	**9.79**	**3.22**	**31.56**				31.56	0.5	42	164	7.2	0.4	Combined Flow in MH at DP 21

PROJECT: SELTZER HEIGHTS
SHEET TITLE: PROPOSED SF-3 FORM (5-YR)

		DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE			TRAVEL TIME			
BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	CARRYOVER (cfs)	PIPE FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
F13	22	2.12	0.75	9.00	1.59	4.00	**6.37**														Total Flow Captured in Inlet at DP 22
F14	23	0.44	0.76	5.00	0.34	4.82	**1.62**														Total Flow Captured in Inlet at DP 23
F9 THRU F14	24							**15.54**	**11.72**	**3.17**	**37.19**				37.19	0.7	42	174	8.4	0.3	Combined Flow in MH at DP 24
F15	25	2.82	0.73	10.76	2.06	3.73	**7.69**														Total Flow Captured in Inlet at DP 25
F9 THRU F15	26							**15.88**	**13.78**	**3.15**	**43.40**				43.40	1.0	42	543	10.0	0.9	Combined Flow in MH at DP 26
F16	27	2.75	0.58	9.52	1.60	3.92	**6.26**														Total Flow Captured in Inlet at DP 27
F9 THRU F16	28							**16.79**	**15.38**	**3.06**	**47.00**				47.00	2.5	42	138	14.3	0.2	Combined Flow in MH at DP 28
F17	29	3.41	0.71	9.00	2.41	4.04	**9.74**								0.00	1.3	24	284	8.4	0.6	Total Flow Captured in Inlet at DP 29
F18A	30	1.33	0.75	7.32	0.99	4.32	**4.29**														Total Flow Captured in Inlet at DP 30
F17+F18A	31							**9.56**	**3.40**	**3.92**	**13.34**				13.34	1.0	24	37	7.4	0.1	Combined Flow in MH at DP 31
F18B	32	2.84	0.73	6.09	2.07	4.58	**9.48**														Total Flow Captured in Inlet at DP 32
F17+F18A+F18B	33							**9.64**	**5.47**	**3.92**	**21.46**				21.46	1.0	30	407	8.4	0.8	Combined Flow in MH at DP 33
F18C	34	1.97	0.73	8.63	1.44	4.08	**5.90**														Total Flow Captured in Inlet at DP 34
F17+F18A+F18B+F18C	35							**10.45**	**6.92**	**3.80**	**26.32**				26.32	1.0	36	53	8.9	0.1	Combined Flow in MH at DP 35
F9 THRU F18	36							**16.95**	**22.29**	**3.06**	**68.15**				68.15	2.5	42	261	15.7	0.3	Combined Flow in MH at DP 36
F19	37	3.27	0.72	10.41	2.34	3.80	**8.90**														Total Flow Captured in Inlet at DP 37
F9 THRU F19	38							**17.22**	**24.63**	**3.03**	**74.75**				74.75	2.6	42	57	16.4	0.1	Combined Flow in MH at DP 38
F20	39	2.56	0.77	8.02	1.98	4.17	**8.28**														Total Flow Captured in Inlet at DP 39
F9 THRU F20	40							**17.28**	**26.62**	**3.01**	**80.19**				80.19	2.6	48	463	16.7	0.5	Combined Flow in MH at DP 40
F23	41	5.90	0.58	18.62	3.40	2.91	**9.88**														Total Flow in Channel at DP 41
F24	42	2.51	0.75	10.34	1.89	3.80	**7.21**														Total Flow Captured in Inlet at DP 42
F25	43	1.00	0.62	7.54	0.62	4.27	**2.64**														Direct Runoff to Channel at DP 43
F23+F24+F25	43							**18.62**	**5.91**	**2.91**	**17.19**				17.19	1.0	30	52	8.0	0.1	Total Combined Flow in Channel at DP 43

PROJECT: SELTZER HEIGHTS
SHEET TITLE: PROPOSED SF-3 FORM (5-YR)

		DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE			TRAVEL TIME			
BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	CARRYOVER (cfs)	PIPE FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
F26	44	4.03	0.71	11.03	2.86	3.70	**10.58**														Total Flow Captured in Inlet at DP 44
F27	45	2.58	0.70	9.12	1.80	4.00	**7.19**														Total Flow Captured in Inlet at DP 45
F23+F24+F25+F27	45							**18.73**	**7.71**	**2.91**	**22.41**				22.41	1.0	36	14	8.5	0.0	Combined Flow in Inlet at DP 45
OS4	46	24.02	0.58	26.17	14.03	2.42	**33.95**								33.95	0.6	42	574	7.8	1.2	Total Flow Captured in Inlet at DP 46
F23 THRU F27+OS4	47							**27.40**	**22.80**	**2.36**	**53.72**				53.72	1.0	48	24	10.6	0.0	Combined Flow in MH at DP 47
F28	48	0.36	0.85	5.00	0.31	4.82	**1.49**														Total Flow Captured in Inlet at DP 48
F23 THRU F28+OS4	48							**27.44**	**23.11**	**2.36**	**54.45**				54.45	1.0	48	50	10.6	0.1	Combined Flow in Inlet at DP 48
F29	49	6.12	0.77	11.15	4.71	3.70	**17.41**														Direct Runoff to Channel at DP 49
F23 THRU F29+OS4	49							**27.52**	**27.82**	**2.34**	**65.21**				65.21	1.0	48	62	11.1	0.1	Total Combined Flow in Channel at DP 49
F21	50	1.63	0.78	6.41	1.28	4.52	**5.78**														Total Flow Captured in Inlet at DP 50
F21+F23 THRU F29+OS4	50							**27.61**	**29.10**	**2.34**	**68.20**				68.20	1.0	60	18	11.2	0.0	Combined Flow in Inlet at DP 50
F30	51	1.63	0.77	13.17	1.25	3.44	**4.31**														Total Flow Captured in Inlet at DP 51
F9 THRU F21+F23 THRU F30+OS4	52							**27.63**	**56.97**	**2.34**	**133.52**				133.52	1.0	72	28	13.1	0.0	Combined Flow in MH at DP 52
F22	53	1.44	0.76	8.19	1.10	4.17	**4.59**														Total Flow Captured in Inlet at DP 53
F9 THRU F30+OS4	53							**27.67**	**58.07**	**2.34**	**136.10**				136.10	1.0	72	50	14.7	0.1	Combined Flow in Inlet at DP 53
F31	54	7.57	0.77	10.03	5.83	3.84	**22.39**														Direct Runoff to Channel at DP 54
F9 THRU F31+OS4	54							**27.73**	**63.89**	**2.34**	**149.76**				149.76	1.0	72	72	14.9	0.1	Total Combined Flow in Channel at DP 54
F32	55	6.91	0.51	14.95	3.54	3.25	**11.49**														Direct Runoff to Pond B at DP 55
F1 THRU F32+OS4	55							**27.81**	**91.78**	**2.33**	**214.01**										Total Peak Inflow to Pond B at DP 55
G1	56	2.40	0.77	14.29	1.84	3.30	**6.08**								6.08	1.0	24	65	6.1	0.2	Total Flow Captured in Inlet at DP 56
G2	57	1.07	0.88	12.61	0.94	3.50	**3.31**	**14.47**	**2.79**	**3.30**	**9.20**										Total Flow Captured in Inlet at DP 57 Combined Flow in Inlet at DP 57

PROJECT: SELTZER HEIGHTS

SHEET TITLE: PROPOSED SF-3 FORM (100-YR)

		DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE			TRAVEL TIME			
BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	CARRYOVER (cfs)	PIPE FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
									0.39		**2.12**	1.1	8.71					959	3.6	4.4	Bypass Flow
F1	1	2.58	0.63	19.31	1.62	5.44	**8.82**		**1.23**		**6.70**				6.70	0.5	18	92	4.7	0.3	Total Flow Captured in Inlet at DP 1
F2	2	9.57	0.54	25.47	5.12	4.70	**24.03**								24.03	2.0	24	35	11.2	0.1	Total Flow to FES at DP 2
									0.30		**1.97**										Bypass Flow
F4	3	2.97	0.66	12.77	1.97	6.63	**13.07**		**1.68**		**11.10**										Total Flow Captured in Inlet at DP 3
F2+F4	3							**25.52**	**6.79**	**4.67**	**31.72**				31.72	1.0	30	23	9.1	0.0	Combined Flow in Inlet at DP 3
									0.59		**4.63**	2.3	4.63					260	4.4	1.0	Bypass Flow
F5B	4	2.90	0.78	8.27	2.28	7.88	**17.93**		**1.69**		**13.30**				13.30	2.0	24	187	9.6	0.3	Total Flow Captured in Inlet at DP 4
F3	5	7.79	0.59	19.54	4.60	5.40	**24.83**								24.83	0.5	30	66	6.6	0.2	Total Flow Captured in Inlet at DP 5
F3+F5B	6							**19.71**	**6.29**	**5.40**	**33.95**				33.95	0.5	36	102	7.2	0.2	Combined Flow in MH at DP 6
F1+F2+F3+F4+F5B	7							**25.56**	**14.31**	**4.67**	**66.83**				66.83	1.0	42	23	11.2	0.0	Combined Flow in MH at DP 7
								9.65	**2.84**	**7.48**	**21.25**										Total Flow To Inlet at DP 8
									0.90		**6.75**										Bypass Flow
F5A	8	2.86	0.79	9.65	2.25	7.48	**16.85**		**1.94**		**14.50**										Total Flow Captured in Inlet at DP 8
F1+F2+F3+F4+F5	8							**25.60**	**16.25**	**4.67**	**75.89**										Combined Flow in Inlet at DP 8
F7	9	8.34	0.77	7.11	6.41	8.33	**53.36**	**25.60**	**22.65**	**4.67**	**105.80**										Total Flow in Channel at DP 9
								23.70	**2.50**	**4.89**	**12.23**										Total Flow To Inlet at DP 10
									0.33		**1.63**	1.6	1.63					554	3.2	2.9	Bypass Flow
F6	10	1.22	0.75	9.14	0.91	7.63	**6.97**		**2.17**		**10.60**										Total Flow Captured in Inlet at DP 10
F1+F2+F3+F4+F5+F6+F7	11							**25.60**	**24.82**	**4.67**	**115.93**				115.93	0.9	48	79	12.1	0.1	Combined Flow in Inlet at DP 11
F8	12	3.22	0.79	5.41	2.54	9.07	**23.08**														Total Flow to Pond at DP 12
F9	13	5.71	0.58	11.93	3.32	6.86	**22.80**								22.80	0.5	30	460	6.5	1.2	Total Flow to Inlet at DP 13
F10	14	0.54	0.65	5.79	0.36	8.85	**3.15**														Total Flow to Inlet at DP 14
F9+F10	15							**13.10**	**3.68**	**6.57**	**24.16**				24.16	0.5	30	160	6.6	0.4	Combined Flow in Pipe at DP 15
									0.34		**2.79**	1.3	2.79					482	3.2	2.5	Bypass Flow
F11	16	2.39	0.76	7.47	1.81	8.24	**14.89**		**1.47**		**12.10**										Total Flow Captured in Inlet at DP 16
F9+F10+F11	17							**13.51**	**5.15**	**6.46**	**33.24**				33.24	0.5	36	481	7.2	1.1	Combined Flow in MH at DP 17
								10.00	**2.76**	**7.40**	**20.46**										Total Flow to Inlet at DP 18
									0.80		**5.96**	1.0	5.96					196	3.3	1.0	Bypass Flow
F12A	18	3.35	0.72	7.84	2.42	8.05	**19.52**		**1.96**		**14.50**										Total Flow Captured in Inlet at DP 18
F9+F10+F11+F12A	19							**14.62**	**7.10**	**6.25**	**44.41**				44.41	0.5	42	39	7.8	0.1	Combined Flow in MH at DP 19
									0.29		**2.25**	1.3	2.25					194	3.1	1.0	Bypass Flow
F12B	20	2.51	0.75	8.51	1.88	7.80	**14.65**		**1.59**		**12.40**										Total Flow Captured in Inlet at DP 20

PROJECT: SELTZER HEIGHTS
SHEET TITLE: PROPOSED SF-3 FORM (100-YR)

		DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE			TRAVEL TIME			
BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	CARRYOVER (cfs)	PIPE FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
F9+F10+F11+F12A+F12B	21							**14.70**	**8.70**	**6.25**	**54.35**				54.35	0.5	42	164	8.1	0.3	Combined Flow in MH at DP 21
F13	22	2.12	0.75	9.00	1.59	7.63	**12.15**	**11.74**	**3.06**	**6.93**	**21.20**										Total Flow Captured in Inlet at DP 22
F14	23	0.44	0.76	5.00	0.34	9.19	**3.10**														Total Flow Captured in Inlet at DP 23
F9 THRU F14	24							**15.04**	**12.09**	**6.15**	**74.40**				74.40	0.7	42	174	9.8	0.3	Combined Flow in MH at DP 24
F15	25	2.82	0.73	10.76	2.06	7.12	**14.68**		**0.38** **1.68**		**2.68** **12.00**	1.3	2.68					184	3.1	1.0	Bypass Flow Total Flow Captured in Inlet at DP 25
F9 THRU F15	26							**15.34**	**14.15**	**6.10**	**86.40**				86.40	1.0	42	543	11.7	0.8	Combined Flow in MH at DP 26
F16	27	2.75	0.58	9.52	1.60	7.48	**11.95**														Total Flow Captured in Inlet at DP 27
F9 THRU F16	28							**16.11**	**15.75**	**5.97**	**93.97**				93.97	2.5	42	138	17.2	0.1	Combined Flow in MH at DP 28
F17	29	3.41	0.71	9.00	2.41	7.71	**18.59**		**0.54** **1.87**		**4.19** **14.40**	3.0	4.19		14.40	1.3	24	623 284	4.8 8.4	2.2 0.6	Bypass Flow Total Flow Captured in Inlet at DP 29
F18A	30	1.33	0.75	7.32	0.99	8.24	**8.19**		**0.16** **0.84**		**1.29** **6.90**	1.1	1.29					440	2.6	2.8	Bypass Flow Total Flow Captured in Inlet at DP 30
F17+F18A	31							**9.56**	**2.70**	**7.48**	**20.23**				20.23	1.0	24	37	17.2	0.0	Combined Flow in MH at DP 31
F18B	32	2.84	0.73	6.09	2.07	8.74	**18.09**		**0.45** **1.63**		**3.89** **14.20**	1.1	3.89		14.20	1.0	24	440 50	3.1 7.6	2.4 0.1	Bypass Flow Total Flow Captured in Inlet at DP 32
F17+F18A+F18B	33							**9.60**	**4.33**	**7.48**	**32.38**				32.38	1.0	30	407	9.2	0.7	Combined Flow in MH at DP 33
F18C	34	1.97	0.73	8.63	1.44	7.80	**11.25**	**8.45**	**2.04** **0.43** **1.61**	**7.88**	**16.11** **3.41** **12.70**	3.0	3.41					369	4.6	1.3	Total Flow to Inlet at DP 34 Bypass Flow Total Flow Captured in Inlet at DP 34
F17+F18A+F18B+F18C	35							**10.33**	**5.94**	**7.26**	**43.14**				43.14	1.0	36	53	9.4	0.1	Combined Flow in MH at DP 35
F9 THRU F18	36							**16.24**	**21.69**	**5.97**	**129.41**				129.41	2.5	42	261	18.4	0.2	Combined Flow in MH at DP 36
F19	37	3.27	0.72	10.41	2.34	7.26	**16.98**		**0.53** **1.80**		**3.88** **13.10**	3.0	3.88					96	4.8	0.3	Bypass Flow Total Flow Captured in Inlet at DP 37
F9 THRU F19	38							**16.48**	**23.50**	**5.92**	**139.13**				139.13	2.6	42	57	18.9	0.0	Combined Flow in MH at DP 38
F20	39	2.56	0.77	8.02	1.98	7.96	**15.80**	**10.74**	**2.95** **0.49** **2.46**	**7.19**	**21.22** **3.52** **17.70**	3.0	3.52					455	4.6	1.6	Total Flow to Inlet at DP 39 Bypass Flow Total Flow Captured in Inlet at DP 39
F9 THRU F20	40							**16.53**	**25.96**	**5.88**	**152.56**				152.56	2.6	48	463	19.6	0.4	Combined Flow in MH at DP 40
F23	41	5.90	0.58	18.62	3.40	5.55	**18.86**														Total Flow in Channel at DP 41
F24	42	2.51	0.75	10.34	1.89	7.26	**13.76**														Total Flow Captured in Inlet at DP 42
F25	43	1.00	0.62	7.54	0.62	8.14	**5.03**														Direct Runoff to Channel at DP 43

PROJECT: SELTZER HEIGHTS
SHEET TITLE: PROPOSED SF-3 FORM (100-YR)

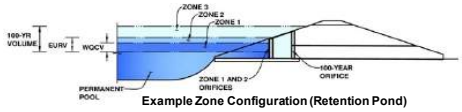
		DIRECT RUNOFF						TOTAL RUNOFF				STREET			PIPE			TRAVEL TIME			
BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	CARRYOVER (cfs)	PIPE FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
F23+F24+F25	43							**18.62**	**5.91**	**5.55**	**32.80**				32.80	1.0	30	52	9.3	0.1	Combined Flow in Channel at DP 43
								11.17	**3.41**	**7.06**	**24.03**										Total Flow to Inlet at DP 44
									0.55		**3.89**										Bypass Flow
F26	44	4.03	0.71	11.03	2.86	7.06	**20.19**		**2.31**		**16.30**	3.0	3.89		16.30	2.5	24	244	10.9	0.4	Total Flow Captured in Inlet at DP 44
								11.79	**2.35**	**6.86**	**16.12**										Total Flow to Inlet at DP 45
									0.41		**2.82**										Bypass Flow
F27	45	2.58	0.70	9.12	1.80	7.63	**13.72**		**1.94**		**13.30**	1.1	2.82					703	3.0	3.9	Total Flow Captured in Inlet at DP 45
F23+F24+F25+F27	45							**18.72**	**7.85**	**5.55**	**43.56**				43.56	1.0	36	14	10.1	0.0	Combined Flow in Inlet at DP 28
OS4	46	24.02	0.58	26.17	14.03	4.62	**64.80**								64.80	0.6	42	574	9.0	1.1	Total Flow Captured in Inlet at DP 46
F23 THRU F27 + OS4	47							**27.23**	**24.19**	**4.52**	**109.34**				109.34	1.0	48	24	12.6	0.0	Combined Flow in MH at DP 47
F28	48	0.36	0.85	5.00	0.31	9.19	**2.84**														Total Flow Captured in Inlet at DP 48
F23 THRU F28 + OS4	48							**27.27**	**24.50**	**4.50**	**110.15**				110.15	1.0	48	50	12.6	0.1	Combined Flow in Inlet at DP 48
F29	49	6.12	0.77	11.15	4.71	7.06	**33.23**														Direct Runoff in Channel at DP 49
F23 THRU F29 + OS4	49							**27.33**	**29.21**	**4.50**	**131.33**				131.33	1.0	48	62	12.6	0.1	Combined Flow in Channel at DP 49
								9.65	**1.77**	**7.48**	**13.22**										Total Flow to Inlet at DP 50
									0.27		**2.02**										Bypass Flow
F21	50	1.63	0.78	6.41	1.28	8.63	**11.03**		**1.50**		**11.20**										Total Flow Captured in Inlet at DP 50
F21+F23 THRU F29+OS4	50							**27.41**	**30.70**	**4.50**	**138.07**				138.07	1.0	60	18	13.4	0.0	Combined Flow in Inlet at DP 50
								15.64	**1.66**	**6.06**	**10.06**										Total Flow to Inlet at DP 51
									0.13		**0.76**										Bypass Flow
F30	51	1.63	0.77	13.17	1.25	6.57	**8.22**		**1.54**		**9.30**										Total Flow Captured in Inlet at DP 51
F9 THRU F21+F23 THRU F30+OS4	52							**27.44**	**58.20**	**4.50**	**261.71**				261.71	1.0	72	28	15.6	0.0	Combined Flow in MH at DP 52
F22	53	1.44	0.76	8.19	1.10	7.96	**8.76**														Total Flow Captured in Inlet at DP 53
F9 THRU F30+OS4	53							**27.47**	**59.30**	**4.50**	**266.66**				266.66	1.0	72	50	15.8	0.1	Combined Flow in Inlet at DP 53
F31	54	7.57	0.77	10.03	5.83	7.33	**42.74**														Direct Runoff in Channel at DP 54
F9 THRU F31+OS4	54							**27.52**	**65.13**	**4.47**	**291.33**				291.33	1.0	72	72	16.0	0.1	Combined Flow in Channel at DP 54
F32	55	6.91	0.51	14.95	3.54	6.20	**21.93**														Direct inflow to Pond B at DP 55
F1 THRU F32+OS4	55							**27.59**	**96.03**	**4.47**	**429.58**										Total Peak inflow to Pond B at DP 55
G1	56	2.40	0.77	14.29	1.84	6.30	**11.61**	**26.63**	**2.30**	**4.57**	**10.51**				11.61	1.0	24	65	7.2	0.2	Total Flow Captured in Inlet at DP 56
																					Total Flow Captured in Inlet at DP 57
G2	57	1.07	0.88	12.61	0.94	6.68	**6.32**	**14.45**	**2.79**	**6.30**	**17.56**										Combined Flow in Inlet at DP 57

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Seltzer Heights

Basin ID: Pond B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	145.18	acres
Watershed Length =	4,838	ft
Watershed Length to Centroid =	1,516	ft
Watershed Slope =	0.017	ft/ft
Watershed Imperviousness =	44.91%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	2.332	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	6.116	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1 in.) =	5.374	acre-feet	1.00	inches
5-yr Runoff Volume (P1 = 1.42 in.) =	9.893	acre-feet	1.42	inches
10-yr Runoff Volume (P1 = 1.68 in.) =	12.985	acre-feet	1.68	inches
25-yr Runoff Volume (P1 = 1.81 in.) =	15.049	acre-feet	1.81	inches
50-yr Runoff Volume (P1 = 2.35 in.) =	21.836	acre-feet	2.35	inches
100-yr Runoff Volume (P1 = 2.71 in.) =	26.902	acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.72 in.) =	39.990	acre-feet	3.72	inches
Approximate 2-yr Detention Volume =	4.510	acre-feet		
Approximate 5-yr Detention Volume =	7.741	acre-feet		
Approximate 10-yr Detention Volume =	8.959	acre-feet		
Approximate 25-yr Detention Volume =	9.204	acre-feet		
Approximate 50-yr Detention Volume =	11.032	acre-feet		
Approximate 100-yr Detention Volume =	13.133	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	2.332	acre-feet
Zone 2 Volume (User Defined - Zone 1) =	7.742	acre-feet
Zone 3 (100yr + 1 / 2 WQCV - Zones 1 & 2) =	4.225	acre-feet
Total Detention Basin Volume =	14.299	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio (R_{LW}) =	user	

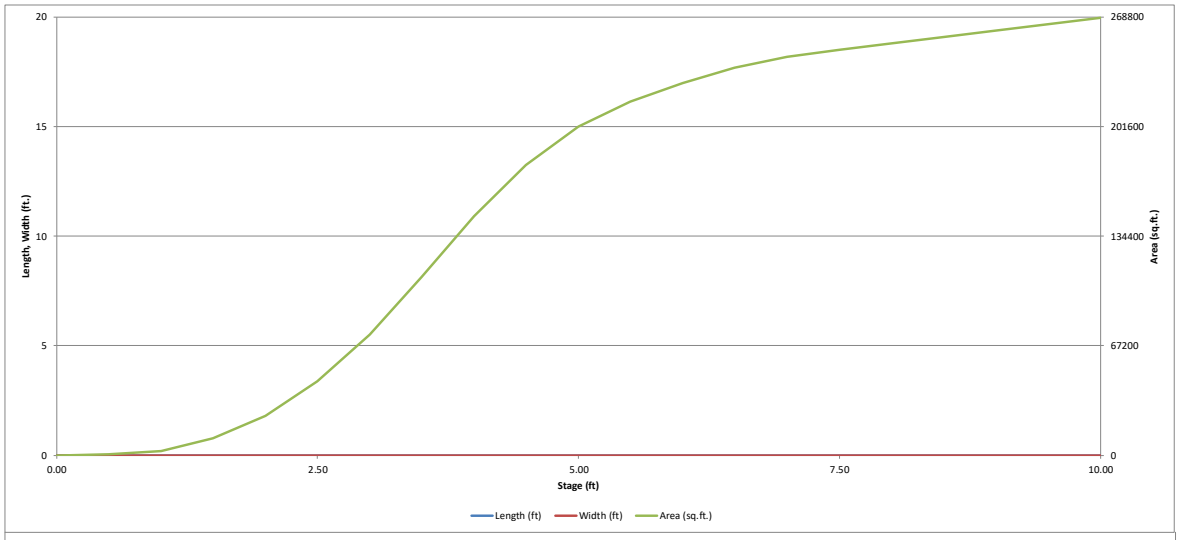
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

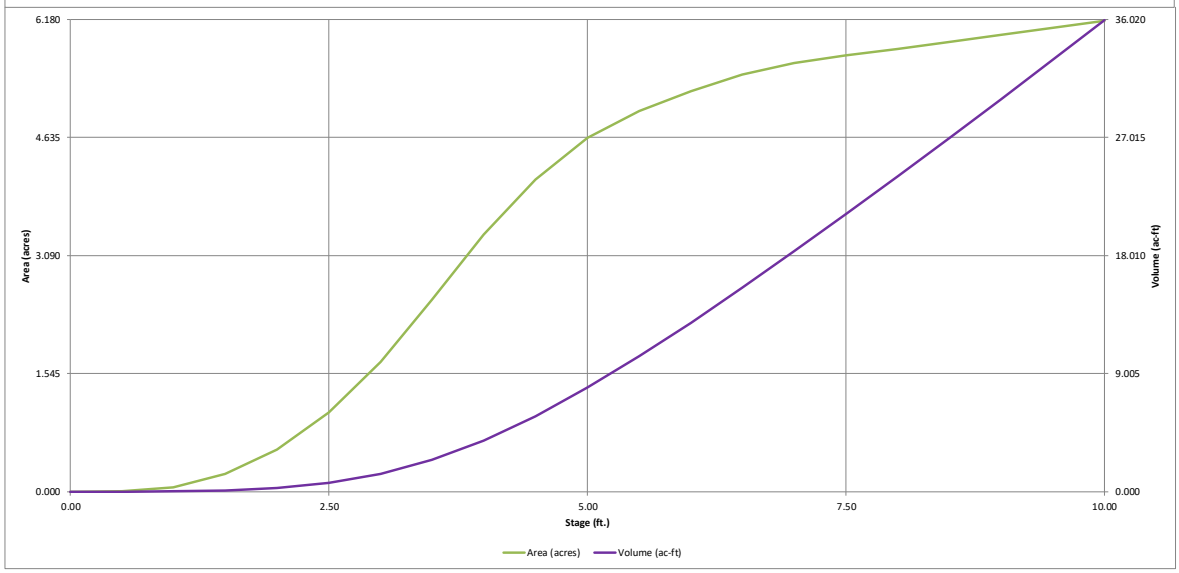
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	50	0.001		
5107.5	--	0.50	--	--	--	337	0.008	97	0.002
5108	--	1.00	--	--	--	2,469	0.057	798	0.018
5108.5	--	1.50	--	--	--	10,288	0.236	3,987	0.092
5109	--	2.00	--	--	--	24,196	0.555	12,608	0.289
5109.5	--	2.50	--	--	--	45,297	1.040	29,981	0.688
5110	--	3.00	--	--	--	73,922	1.697	59,786	1.372
5110.5	--	3.50	--	--	--	109,283	2.509	105,587	2.424
5111	--	4.00	--	--	--	146,724	3.368	169,589	3.893
5111.5	--	4.50	--	--	--	178,006	4.086	250,771	5.757
5112	--	5.00	--	--	--	201,691	4.630	345,696	7.936
5112.5	--	5.50	--	--	--	217,092	4.984	450,391	10.340
5113	--	6.00	--	--	--	228,328	5.242	561,746	12.896
5113.5	--	6.50	--	--	--	237,753	5.458	678,266	15.571
5114	--	7.00	--	--	--	244,381	5.610	798,800	18.338
5114.5	--	7.50	--	--	--	248,555	5.706	922,034	21.167
5115	--	8.00	--	--	--	252,484	5.796	1,047,294	24.043
5115.5	--	8.50	--	--	--	256,438	5.887	1,174,524	26.963
5116	--	9.00	--	--	--	260,417	5.978	1,303,738	29.930
5116.5	--	9.50	--	--	--	264,422	6.070	1,434,948	32.942
5117	--	10.00	--	--	--	268,454	6.163	1,568,167	36.000

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



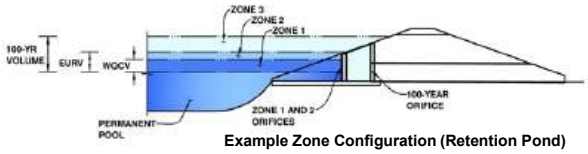


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Seltzer Heights**

Basin ID: **Pond B**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.47	2.332	Orifice Plate
Zone 2 (User)	5.45	7.742	Rectangular Orifice
3 (100+1/2WQCV)	6.27	4.225	Weir&Pipe (Restrict)
Total (all zones)		14.299	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	4.340E-02	ft^2
Depth at top of Zone using Orifice Plate =	3.47	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	6.25	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.17	2.33					
Orifice Area (sq. inches)	6.25	6.25	6.25					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Rectangular	Not Selected		Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	3.58	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.50	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	5.43	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.25	N/A	feet
Vertical Orifice Height =	6.00	N/A	inches				
Vertical Orifice Width =	12.00		inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected		Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	5.50	N/A	feet
Overflow Weir Front Edge Length =	11.33	N/A	feet	Overflow Weir Slope Length =	2.92	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	10.29	N/A	
Horiz. Length of Weir Sides =	2.92	N/A	feet	Overflow Grate Open Area w/o Debris =	26.17	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	Close Mesh Grate		Overflow Grate Open Area w/ Debris =	13.08	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected		Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.30	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	2.54	N/A	ft^2
Outlet Pipe Diameter =	36.00	N/A	inches	Outlet Orifice Centroid =	0.68	N/A	feet
Restrictor Plate Height Above Pipe Invert =	14.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.35	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.99	feet
Spillway Crest Length =	120.00	feet	Stage at Top of Freeboard =	9.99	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	6.16	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	35.94	acre-ft

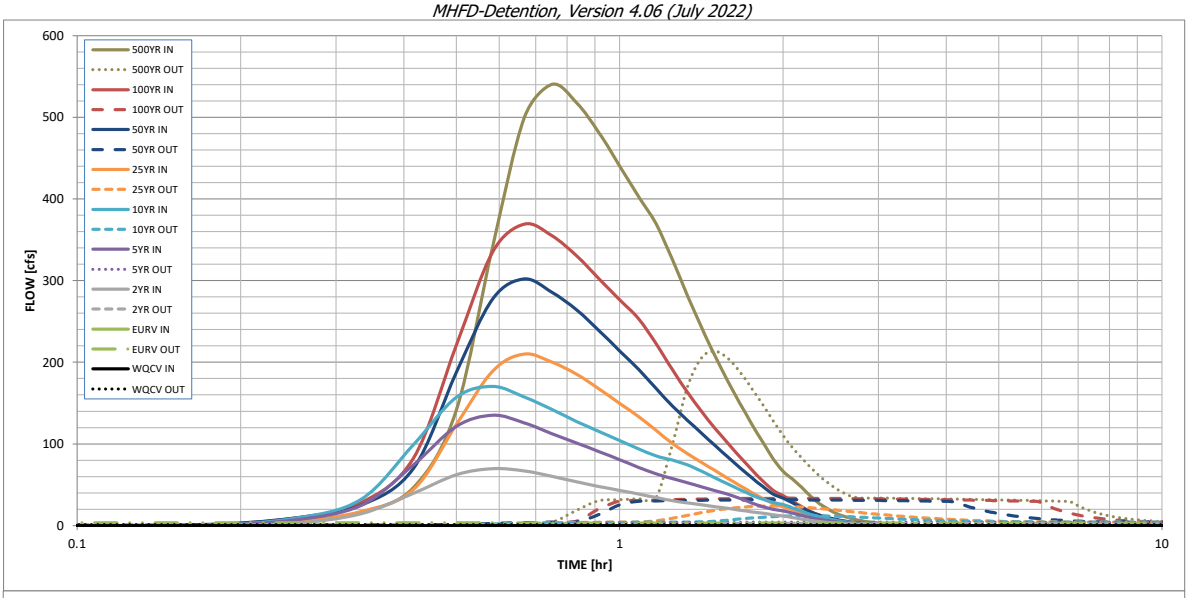
Calculated Parameters for Spillway

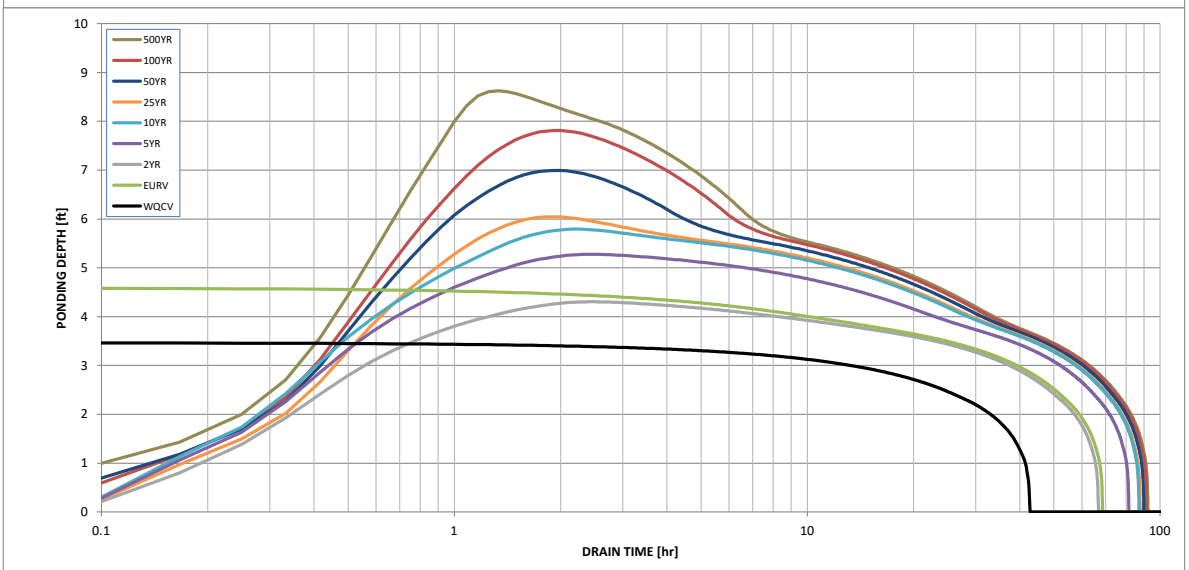
Routed Hydrograph Results *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

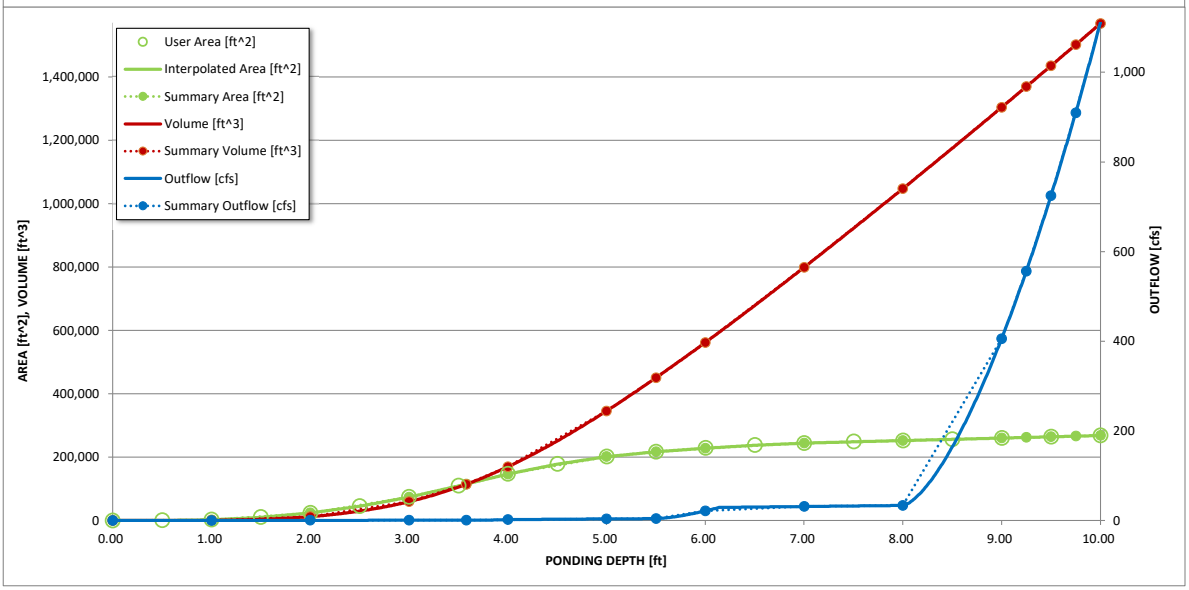
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.00	1.42	1.68	1.81	2.35	2.71	3.72
CUHP Runoff Volume (acre-ft) =	2.332	6.116	5.374	9.893	12.985	15.049	21.836	26.902	39.990
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	5.374	9.893	12.985	15.049	21.836	26.902	39.990
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	6.5	45.3	67.5	97.3	156.3	203.0	315.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.04	0.31	0.47	0.67	1.08	1.40	2.18
Peak Inflow Q (cfs) =	N/A	N/A	69.7	135.1	170.5	210.1	302.0	369.3	540.6
Peak Outflow Q (cfs) =	0.9	3.2	2.7	4.2	12.1	23.8	31.5	33.4	213.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.2	0.2	0.2	0.2	0.7
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.3	0.7	1.0	1.0	1.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	62	61	72	75	74	72	71	66
Time to Drain 99% of Inflow Volume (hours) =	**41**	66	64	77	82	82	82	83	80
Maximum Ponding Depth (ft) =	3.47	4.59	4.30	5.27	5.79	6.04	6.99	7.81	8.62
Area at Maximum Ponding Depth (acres) =	2.46	4.18	3.80	4.82	5.13	5.26	5.61	5.76	5.91
Maximum Volume Stored (acre-ft) =	2.349	6.129	4.968	9.212	11.755	13.106	18.282	22.887	27.612

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.54	3.17
	0:15:00	0.00	0.00	2.77	6.65	8.54	4.96	8.86	8.91	16.05
	0:20:00	0.00	0.00	14.38	24.68	31.83	17.00	25.08	28.10	46.53
	0:25:00	0.00	0.00	39.60	74.37	99.20	44.01	69.88	82.69	141.29
	0:30:00	0.00	0.00	62.11	121.55	156.98	123.59	187.44	220.79	342.49
	0:35:00	0.00	0.00	69.66	135.11	170.47	189.38	277.66	335.58	499.10
	0:40:00	0.00	0.00	66.91	125.87	157.53	210.15	301.98	369.25	540.64
	0:45:00	0.00	0.00	60.24	112.49	142.04	200.12	285.59	354.95	517.71
	0:50:00	0.00	0.00	53.36	100.94	127.42	185.41	263.99	330.24	481.05
	0:55:00	0.00	0.00	47.74	90.58	115.08	167.16	238.50	302.10	440.50
	1:00:00	0.00	0.00	43.02	80.65	103.98	149.55	214.08	276.51	403.36
	1:05:00	0.00	0.00	38.63	71.34	93.79	133.38	191.46	253.57	369.77
	1:10:00	0.00	0.00	34.16	63.47	85.20	116.57	168.11	222.96	326.18
	1:15:00	0.00	0.00	30.46	57.57	80.03	100.58	146.63	190.98	281.80
	1:20:00	0.00	0.00	27.59	52.35	74.16	88.00	128.88	163.33	242.19
	1:25:00	0.00	0.00	25.19	47.30	66.34	77.20	112.87	139.48	207.11
	1:30:00	0.00	0.00	23.03	42.64	58.22	67.11	97.79	118.71	176.37
	1:35:00	0.00	0.00	20.92	38.23	50.80	57.63	83.73	100.64	149.59
	1:40:00	0.00	0.00	18.82	33.17	43.92	48.88	70.78	84.01	125.05
	1:45:00	0.00	0.00	16.79	27.85	37.65	40.78	58.87	68.71	102.49
	1:50:00	0.00	0.00	15.02	23.11	32.21	33.33	47.91	54.84	82.28
	1:55:00	0.00	0.00	13.22	19.97	28.50	26.93	38.78	43.43	66.36
	2:00:00	0.00	0.00	11.61	17.97	25.52	22.97	33.46	36.50	56.64
	2:05:00	0.00	0.00	9.74	15.29	21.57	18.90	27.69	29.70	46.48
	2:10:00	0.00	0.00	7.87	12.26	17.33	14.78	21.70	22.81	35.90
	2:15:00	0.00	0.00	6.27	9.65	13.69	11.34	16.65	17.12	27.08
	2:20:00	0.00	0.00	5.00	7.64	10.79	8.80	12.91	12.86	20.43
	2:25:00	0.00	0.00	3.95	6.03	8.41	6.78	9.91	9.55	15.26
	2:30:00	0.00	0.00	3.11	4.71	6.47	5.20	7.56	7.11	11.42
	2:35:00	0.00	0.00	2.44	3.62	4.90	3.97	5.73	5.41	8.69
	2:40:00	0.00	0.00	1.91	2.75	3.69	3.00	4.31	4.11	6.59
	2:45:00	0.00	0.00	1.48	2.08	2.82	2.29	3.29	3.18	5.10
	2:50:00	0.00	0.00	1.13	1.57	2.17	1.77	2.54	2.48	3.96
	2:55:00	0.00	0.00	0.84	1.15	1.61	1.33	1.91	1.86	2.97
	3:00:00	0.00	0.00	0.58	0.80	1.13	0.96	1.37	1.33	2.11
	3:05:00	0.00	0.00	0.38	0.54	0.74	0.65	0.92	0.89	1.40
	3:10:00	0.00	0.00	0.22	0.33	0.43	0.40	0.55	0.53	0.84
	3:15:00	0.00	0.00	0.11	0.17	0.21	0.21	0.28	0.27	0.41
	3:20:00	0.00	0.00	0.04	0.07	0.07	0.08	0.10	0.09	0.13
	3:25:00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]
	0.00	50	0.001	0	0.000	0.00
	1.00	2,469	0.057	798	0.018	0.21
	2.00	24,196	0.555	12,608	0.289	0.49
	3.00	73,922	1.697	59,786	1.372	0.82
	3.58	115,274	2.646	114,569	2.630	0.95
	4.00	146,724	3.368	169,589	3.893	1.92
	5.00	201,691	4.630	345,696	7.936	3.82
	5.50	217,092	4.984	450,391	10.340	4.41
	6.00	228,328	5.242	561,746	12.896	21.66
	7.00	244,381	5.610	798,800	18.338	31.50
	8.00	252,484	5.796	1,047,294	24.043	33.80
	9.00	260,417	5.978	1,303,738	29.930	405.54
	9.25	262,419	6.024	1,369,093	31.430	556.35
	9.50	264,422	6.070	1,434,948	32.942	724.79
	9.75	266,438	6.117	1,501,305	34.465	909.78
	10.00	268,454	6.163	1,568,167	36.000	1,110.51

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

PROJECT: SELTZER HEIGHTS – CUHP/SWMM MODEL
SHEET TITLE: PEAK FLOW SUMMARY

	Peak Discharge (cfs) - Historic			Peak Discharge (cfs) - Existing Condition			Peak Discharge (cfs) Seltzer Heights w/ Phase 1 Seltzer Farms			Peak Discharge (cfs) Seltzer Heights w/ Ultimate Seltzer Farms		
SWMM Node	**5-year**	**10-year**	**100-year**	**5-year**	**10-year**	**100-year**	**5-year**	**10-year**	**100-year**	**5-year**	**10-year**	**100-year**
897							10.0	13.5	35.1	10.0	13.5	35.1
898							34.7	44.6	100.6	34.8	44.6	100.6
899							81.4	102.5	220.9	81.5	102.6	221.0
Pond B							123.2	156.3	340.8	123.2	156.3	340.8
900	43.9	67.6	212.5	48.4	72.7	220.0	4.1	12.3	33.1	4.1	12.3	33.1
901	36.0	55.6	167.9	46.8	66.7	179.6	53.6	67.8	148.2	62.2	76.6	158.0
902	57.5	94.2	327.8	67.3	104.4	339.0	17.4	24.0	64.4	33.0	41.9	92.5
903	90.4	149.1	523.0	104.0	163.4	540.6	4.0	5.8	16.5	8.7	12.4	34.6
903B	-	-	-	-	-	-	10.0	14.6	42.8	-	-	-
904	90.4	149.1	523.0	104.0	163.4	540.6	9.0	12.9	36.0	4.2	6.0	17.1
905	-	-	-	-	-	-	16.1	21.1	47.0	16.1	21.1	47.0
906	-	-	-	-	-	-	33.5	47.7	130.9	21.5	29.5	75.5
907	-	-	-	-	-	-	43.0	61.4	171.6	78.5	102.2	236.5
908	-	-	-	-	-	-	58.0	80.2	211.6	95.5	123.1	279.6
Pond A	-	-	-	-	-	-	136.3	183.2	459.7	199.7	254.8	568.5
909	-	-	-	-	-	-	8.6	10.6	50.7	9.7	16.4	52.5
910	-	-	-	-	-	-	12.7	22.8	83.7	13.8	28.6	85.6
911	-	-	-	-	-	-	12.7	22.8	83.7	13.8	28.6	85.6

APPENDIX D
SELTZER HEIGHTS + SELTZER FARMS FILING 1
CUHP/SWMM MODEL

CUHP SUBCATCHMENTS

Seltzer Heights + Seltzer Farms Filing 1 - CUHP Inputs

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi^2)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
100	JUNCT_100	100-YR	0.104485	0.31364	0.61932	0.01476	46.88	0.38	0.1	3	0.0018	0.5	0
101	JUNCT_101	100-YR	0.07622	0.27576	0.57841	0.01685	20.47	0.38	0.1	3	0.0018	0.5	0
102	JUNCT_102	100-YR	0.05899	0.175	0.34205	0.01482	2	0.38	0.1	3	0.0018	0.5	0
103	JUNCT_103	100-YR	0.03774	0.21705	0.46288	0.01538	9.99	0.38	0.1	3	0.0018	0.5	0
104	JUNCT_104	100-YR	0.0262	0.15114	0.29394	0.01008	60.43	0.38	0.1	3	0.0018	0.5	0
105	JUNCT_105	100-YR	0.02241	0.08674	0.20114	0.02147	6.64	0.38	0.1	3	0.0018	0.5	0
200	JUNCT_200	100-YR	0.03753	0.21193	0.37411	0.02363	23.9	0.38	0.1	3	0.0018	0.5	0
201	JUNCT_201	100-YR	0.03771	0.13996	0.30704	0.02121	52.22	0.38	0.1	3	0.0018	0.5	0
202	JUNCT_202	100-YR	0.07603	0.34905	0.43598	0.01545	56.71	0.38	0.1	3	0.0018	0.5	0
203	JUNCT_203	100-YR	0.06477	0.18295	0.4024	0.01766	45.14	0.38	0.1	3	0.0018	0.5	0
204	JUNCT_204	100-YR	0.01079	0.05511	0.12955	0.02145	8.01	0.38	0.1	3	0.0018	0.5	0
300	JUNCT_300	100-YR	0.01937	0.13807	0.25549	0.01964	11.4	0.38	0.1	3	0.0018	0.5	0
301	JUNCT_301	100-YR	0.03351	0.10511	0.25455	0.01594	10.59	0.38	0.1	3	0.0018	0.5	0
400	JUNCT_400	100-YR	0.02172	0.06742	0.14738	0.04888	34.46	0.38	0.1	3	0.0018	0.5	0
500	JUNCT_500	100-YR	0.0319	0.3178	0.59905	0.01607	7.98	0.38	0.1	3	0.0018	0.5	0

SELTZER HEIGHTS + SELTZER FARMS FILING 1 - 5YR

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

```
****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... KINWAVE
Starting Date ............ 01/01/2005 00:00:00
Ending Date .............. 01/02/2005 12:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 60.00 sec
```

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	22.519	7.338
External Outflow	17.723	5.775
Flooding Loss	0.000	0.000

```
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         4.789         1.561
Continuity Error (%) .....         0.030


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    60.00 sec
Average Time Step           :    60.00 sec
Maximum Time Step           :    60.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.02
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************

--------------------------------------------------------------------------------
                              Average  Maximum  Maximum  Time of Max    Reported
                                Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type         Feet     Feet     Feet  days hr:min        Feet
--------------------------------------------------------------------------------
JUNCT_910            JUNCTION     0.58     0.88  5060.58     0  02:52        0.88
JUNCT_100            JUNCTION     0.00     0.00  5072.60     0  00:00        0.00
JUNCT_901            JUNCTION     0.04     0.83  5073.33     0  00:37        0.83
```

JUNCT_101	JUNCTION	0.00	0.00	5082.80	0	00:00	0.00
JUNCT_902	JUNCTION	0.04	0.59	5083.29	0	00:44	0.59
JUNCT_300	JUNCTION	0.00	0.00	5112.70	0	00:00	0.00
JUNCT_903	JUNCTION	0.02	0.31	5112.91	0	00:42	0.31
JUNCT_301	JUNCTION	0.00	0.00	5117.00	0	00:00	0.00
JUNCT_904	JUNCTION	0.02	0.47	5117.37	0	00:38	0.47
JUNCT_400	JUNCTION	0.00	0.00	5124.70	0	00:00	0.00
JUNCT_905	JUNCTION	0.02	0.58	5125.18	0	00:31	0.58
JUNCT_906	JUNCTION	0.05	1.29	5093.89	0	00:41	1.29
JUNCT_102	JUNCTION	0.00	0.00	5122.40	0	00:00	0.00
JUNCT_907	JUNCTION	0.06	1.29	5090.39	0	00:42	1.29
JUNCT_103	JUNCTION	0.00	0.00	5091.60	0	00:00	0.00
JUNCT_908	JUNCTION	0.06	1.27	5077.57	0	00:45	1.27
JUNCT_104	JUNCTION	0.00	0.00	5076.40	0	00:00	0.00
JUNCT_500	JUNCTION	0.00	0.00	5072.20	0	00:00	0.00
JUNCT_105	JUNCTION	0.00	0.00	5062.10	0	00:00	0.00
JUNCT_900	JUNCTION	0.37	0.50	5107.30	0	02:43	0.50
JUNCT_903B	JUNCTION	0.02	0.30	5091.80	0	00:50	0.30
JUNCT_909	JUNCTION	0.00	0.00	5059.80	0	00:00	0.00
JUNCT_203	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_204	JUNCTION	0.00	0.00	5122.00	0	00:00	0.00
JUNCT_202	JUNCTION	0.00	0.00	5114.20	0	00:00	0.00
JUNCT_201	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_898	JUNCTION	0.05	1.05	5121.45	0	00:37	1.05
JUNCT_897	JUNCTION	0.04	0.74	5126.54	0	00:43	0.74
JUNCT_200	JUNCTION	0.04	0.74	5133.24	0	00:42	0.74
JUNCT_899	JUNCTION	0.05	1.05	5115.15	0	00:38	1.05
OUTFALL_911	OUTFALL	0.58	0.88	5059.37	0	02:52	0.88
STOR_PONDA	STORAGE	4.11	5.34	5067.34	0	02:53	5.34
STOR_PONDB	STORAGE	4.25	5.22	5112.22	0	02:43	5.22

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_910	JUNCTION	0.00	12.67	0	02:52	0	5.78	0.000
JUNCT_100	JUNCTION	53.59	53.59	0	00:37	1.5	1.5	0.000
JUNCT_901	JUNCTION	0.00	53.59	0	00:37	0	1.5	0.000
JUNCT_101	JUNCTION	17.42	17.42	0	00:44	0.679	0.679	0.000
JUNCT_902	JUNCTION	0.00	17.42	0	00:44	0	0.679	0.000
JUNCT_300	JUNCTION	4.03	4.03	0	00:42	0.137	0.137	0.000
JUNCT_903	JUNCTION	0.00	4.03	0	00:42	0	0.137	0.000
JUNCT_301	JUNCTION	9.02	9.02	0	00:38	0.232	0.232	0.000
JUNCT_904	JUNCTION	0.00	9.02	0	00:38	0	0.232	0.000
JUNCT_400	JUNCTION	16.10	16.10	0	00:31	0.255	0.255	0.000
JUNCT_905	JUNCTION	0.00	16.10	0	00:31	0	0.255	0.000
JUNCT_906	JUNCTION	0.00	33.50	0	00:41	0	0.808	0.000
JUNCT_102	JUNCTION	11.70	11.70	0	00:42	0.315	0.315	0.000
JUNCT_907	JUNCTION	0.00	42.98	0	00:43	0	1.2	0.000
JUNCT_103	JUNCTION	6.11	6.11	0	00:47	0.257	0.257	0.000
JUNCT_908	JUNCTION	0.00	57.95	0	00:44	0	1.65	0.000
JUNCT_104	JUNCTION	17.38	17.38	0	00:34	0.45	0.45	0.000
JUNCT_500	JUNCTION	3.56	3.56	0	00:55	0.206	0.206	0.000
JUNCT_105	JUNCTION	5.97	5.97	0	00:38	0.139	0.139	0.000
JUNCT_900	JUNCTION	0.00	4.08	0	02:43	0	2.34	0.000
JUNCT_903B	JUNCTION	0.00	9.99	0	00:49	0	0.397	0.000
JUNCT_909	JUNCTION	0.00	8.59	0	02:53	0	3.44	0.000
JUNCT_203	JUNCTION	39.24	39.24	0	00:34	0.907	0.907	0.000
JUNCT_204	JUNCTION	3.20	3.20	0	00:36	0.0696	0.0696	0.000
JUNCT_202	JUNCTION	47.34	47.34	0	00:36	1.25	1.25	0.000
JUNCT_201	JUNCTION	27.65	27.65	0	00:33	0.583	0.583	0.000
JUNCT_898	JUNCTION	0.00	34.74	0	00:37	0	0.943	0.000
JUNCT_897	JUNCTION	0.00	9.98	0	00:43	0	0.359	0.000
JUNCT_200	JUNCTION	9.99	9.99	0	00:42	0.36	0.36	0.000
JUNCT_899	JUNCTION	0.00	81.44	0	00:37	0	2.19	0.000

OUTFALL_911	OUTFALL	0.00	12.67	0	02:52	0	5.77	0.000
STOR_PONDA	STORAGE	0.00	136.31	0	00:41	0	4.17	0.036
STOR_PONDB	STORAGE	0.00	123.20	0	00:36	0	3.17	0.021

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR_PONDA	230.986	9	0	0	484.407	19	0 02:53	8.59
STOR_PONDB	221.661	14	0	0	391.556	25	0 02:43	4.08

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_911	99.40	5.99	12.67	5.775

System 99.40 5.99 12.67 5.775

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
910	CONDUIT	12.67	0	02:52	6.21	0.11	0.22
100	DUMMY	53.59	0	00:37			
901	CONDUIT	53.60	0	00:38	22.61	0.04	0.14
101	DUMMY	17.42	0	00:44			
902	CONDUIT	17.42	0	00:45	14.99	0.05	0.15
300	DUMMY	4.03	0	00:42			
301	DUMMY	9.02	0	00:38			
400	DUMMY	16.10	0	00:31			
102	DUMMY	11.70	0	00:42			
905	CONDUIT	15.05	0	00:37	4.12	0.01	0.11
904	CONDUIT	8.62	0	00:46	3.02	0.01	0.09
903	CONDUIT	3.90	0	00:50	2.38	0.00	0.06
906	CONDUIT	33.48	0	00:42	7.53	0.10	0.21
103	DUMMY	6.11	0	00:47			
907	CONDUIT	42.87	0	00:45	9.90	0.10	0.21
104	DUMMY	17.38	0	00:34			
908	CONDUIT	57.93	0	00:44	25.31	0.04	0.14
105	DUMMY	5.97	0	00:38			
900	CONDUIT	4.08	0	02:50	5.93	0.09	0.20
903B	DUMMY	9.99	0	00:49			
16	DUMMY	3.56	0	00:55			
909	DUMMY	8.59	0	02:53			
203	DUMMY	39.24	0	00:34			
204	DUMMY	3.20	0	00:36			

202	DUMMY	47.34	0	00:36			
201	DUMMY	27.65	0	00:33			
200	CONDUIT	9.98	0	00:43	6.75	0.10	0.21
897	CONDUIT	9.94	0	00:46	2.41	0.03	0.19
898	CONDUIT	34.58	0	00:38	3.60	0.07	0.30
899	DUMMY	81.44	0	00:37			
PONDA	DUMMY	8.59	0	02:53			
PONDB	DUMMY	4.08	0	02:43			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 22 15:57:40 2024
Analysis ended on: Wed May 22 15:57:41 2024
Total elapsed time: 00:00:01

SELTZER HEIGHTS + SELTZER FARMS FILING 1 - 10YR

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

```
****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... KINWAVE
Starting Date ............ 01/01/2005 00:00:00
Ending Date .............. 01/02/2005 12:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 60.00 sec


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.000         0.000
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........        31.215        10.172
External Outflow .........        25.192         8.209
Flooding Loss ............         0.000         0.000
```

```
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         5.998         1.955
Continuity Error (%) .....         0.081


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    60.00 sec
Average Time Step           :    60.00 sec
Maximum Time Step           :    60.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.03
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************

-------------------------------------------------------------------------------
                              Average  Maximum  Maximum  Time of Max    Reported
                                Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type         Feet     Feet     Feet  days hr:min        Feet
-------------------------------------------------------------------------------
JUNCT_910            JUNCTION     0.69     1.18  5060.88     0  02:31        1.18
JUNCT_100            JUNCTION     0.00     0.00  5072.60     0  00:00        0.00
JUNCT_901            JUNCTION     0.04     0.93  5073.43     0  00:37        0.93
```

JUNCT_101	JUNCTION	0.00	0.00	5082.80	0	00:00	0.00
JUNCT_902	JUNCTION	0.04	0.69	5083.39	0	00:45	0.69
JUNCT_300	JUNCTION	0.00	0.00	5112.70	0	00:00	0.00
JUNCT_903	JUNCTION	0.02	0.37	5112.97	0	00:42	0.37
JUNCT_301	JUNCTION	0.00	0.00	5117.00	0	00:00	0.00
JUNCT_904	JUNCTION	0.02	0.57	5117.47	0	00:38	0.57
JUNCT_400	JUNCTION	0.00	0.00	5124.70	0	00:00	0.00
JUNCT_905	JUNCTION	0.02	0.66	5125.26	0	00:31	0.66
JUNCT_906	JUNCTION	0.07	1.54	5094.14	0	00:40	1.54
JUNCT_102	JUNCTION	0.00	0.00	5122.40	0	00:00	0.00
JUNCT_907	JUNCTION	0.08	1.54	5090.64	0	00:41	1.54
JUNCT_103	JUNCTION	0.00	0.00	5091.60	0	00:00	0.00
JUNCT_908	JUNCTION	0.08	1.52	5077.82	0	00:44	1.52
JUNCT_104	JUNCTION	0.00	0.00	5076.40	0	00:00	0.00
JUNCT_500	JUNCTION	0.00	0.00	5072.20	0	00:00	0.00
JUNCT_105	JUNCTION	0.00	0.00	5062.10	0	00:00	0.00
JUNCT_900	JUNCTION	0.43	0.87	5107.67	0	02:24	0.87
JUNCT_903B	JUNCTION	0.02	0.37	5091.87	0	00:50	0.37
JUNCT_909	JUNCTION	0.00	0.00	5059.80	0	00:00	0.00
JUNCT_203	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_204	JUNCTION	0.00	0.00	5122.00	0	00:00	0.00
JUNCT_202	JUNCTION	0.00	0.00	5114.20	0	00:00	0.00
JUNCT_201	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_898	JUNCTION	0.06	1.19	5121.59	0	00:36	1.19
JUNCT_897	JUNCTION	0.05	0.86	5126.66	0	00:43	0.86
JUNCT_200	JUNCTION	0.05	0.86	5133.36	0	00:42	0.86
JUNCT_899	JUNCTION	0.06	1.19	5115.29	0	00:38	1.19
OUTFALL_911	OUTFALL	0.69	1.18	5059.67	0	02:31	1.18
STOR_PONDA	STORAGE	4.57	6.05	5068.05	0	03:02	6.05
STOR_PONDB	STORAGE	4.56	5.73	5112.73	0	02:24	5.73

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_910	JUNCTION	0.00	22.81	0	02:31	0	8.21	0.000
JUNCT_100	JUNCTION	67.82	67.82	0	00:37	1.97	1.97	0.000
JUNCT_901	JUNCTION	0.00	67.82	0	00:37	0	1.97	0.000
JUNCT_101	JUNCTION	23.98	23.98	0	00:45	1	1	0.000
JUNCT_902	JUNCTION	0.00	23.98	0	00:45	0	1	0.000
JUNCT_300	JUNCTION	5.78	5.78	0	00:42	0.217	0.217	0.000
JUNCT_903	JUNCTION	0.00	5.78	0	00:42	0	0.217	0.000
JUNCT_301	JUNCTION	12.93	12.93	0	00:38	0.37	0.37	0.000
JUNCT_904	JUNCTION	0.00	12.93	0	00:38	0	0.37	0.000
JUNCT_400	JUNCTION	21.06	21.06	0	00:31	0.35	0.35	0.000
JUNCT_905	JUNCTION	0.00	21.06	0	00:31	0	0.35	0.000
JUNCT_906	JUNCTION	0.00	47.72	0	00:40	0	1.27	0.000
JUNCT_102	JUNCTION	17.80	17.80	0	00:42	0.548	0.548	0.000
JUNCT_907	JUNCTION	0.00	61.43	0	00:42	0	1.9	0.000
JUNCT_103	JUNCTION	8.93	8.93	0	00:48	0.411	0.411	0.000
JUNCT_908	JUNCTION	0.00	80.20	0	00:41	0	2.47	0.000
JUNCT_104	JUNCTION	21.38	21.38	0	00:33	0.57	0.57	0.000
JUNCT_500	JUNCTION	5.31	5.31	0	00:58	0.335	0.335	0.000
JUNCT_105	JUNCTION	8.76	8.76	0	00:37	0.229	0.229	0.000
JUNCT_900	JUNCTION	0.00	12.29	0	02:24	0	3.2	0.000
JUNCT_903B	JUNCTION	0.00	14.60	0	00:49	0	0.631	0.000
JUNCT_909	JUNCTION	0.00	10.63	0	03:02	0	5.03	0.000
JUNCT_203	JUNCTION	49.88	49.88	0	00:34	1.19	1.19	0.000
JUNCT_204	JUNCTION	4.64	4.64	0	00:36	0.113	0.113	0.000
JUNCT_202	JUNCTION	58.64	58.64	0	00:35	1.59	1.59	0.000
JUNCT_201	JUNCTION	34.62	34.62	0	00:32	0.753	0.753	0.000
JUNCT_898	JUNCTION	0.00	44.58	0	00:36	0	1.27	0.000
JUNCT_897	JUNCTION	0.00	13.50	0	00:43	0	0.519	-0.000
JUNCT_200	JUNCTION	13.51	13.51	0	00:42	0.52	0.52	0.000
JUNCT_899	JUNCTION	0.00	102.54	0	00:36	0	2.87	0.000

OUTFALL_911	OUTFALL	0.00	22.81	0	02:31	0	8.21	0.000
STOR_PONDA	STORAGE	0.00	183.16	0	00:41	0	6	0.032
STOR_PONDB	STORAGE	0.00	156.25	0	00:36	0	4.17	0.030

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR_PONDA	330.226	13	0	0	701.603	28	0 03:02	10.63
STOR_PONDB	275.303	18	0	0	500.545	32	0 02:24	12.29

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_911	99.40	8.52	22.81	8.208

System 99.40 8.52 22.81 8.208

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
910	CONDUIT	22.81	0	02:31	7.35	0.19	0.30
100	DUMMY	67.82	0	00:37			
901	CONDUIT	67.79	0	00:37	24.18	0.05	0.16
101	DUMMY	23.98	0	00:45			
902	CONDUIT	23.98	0	00:45	16.46	0.07	0.17
300	DUMMY	5.78	0	00:42			
301	DUMMY	12.93	0	00:38			
400	DUMMY	21.06	0	00:31			
102	DUMMY	17.80	0	00:42			
905	CONDUIT	19.83	0	00:35	4.44	0.01	0.13
904	CONDUIT	12.49	0	00:45	3.35	0.01	0.11
903	CONDUIT	5.68	0	00:50	2.65	0.00	0.07
906	CONDUIT	47.68	0	00:41	8.33	0.14	0.26
103	DUMMY	8.93	0	00:48			
907	CONDUIT	61.32	0	00:44	10.96	0.14	0.25
104	DUMMY	21.38	0	00:33			
908	CONDUIT	80.28	0	00:41	27.95	0.05	0.16
105	DUMMY	8.76	0	00:37			
900	CONDUIT	12.26	0	02:30	8.15	0.26	0.35
903B	DUMMY	14.60	0	00:49			
16	DUMMY	5.31	0	00:58			
909	DUMMY	10.63	0	03:02			
203	DUMMY	49.88	0	00:34			
204	DUMMY	4.64	0	00:36			

202	DUMMY	58.64	0	00:35			
201	DUMMY	34.62	0	00:32			
200	CONDUIT	13.50	0	00:43	7.37	0.13	0.25
897	CONDUIT	13.48	0	00:45	2.64	0.04	0.22
898	CONDUIT	44.47	0	00:38	3.85	0.09	0.34
899	DUMMY	102.54	0	00:36			
PONDA	DUMMY	10.63	0	03:02			
PONDB	DUMMY	12.29	0	02:24			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 22 15:56:40 2024
Analysis ended on: Wed May 22 15:56:40 2024
Total elapsed time: < 1 sec

SELTZER HEIGHTS + SELTZER FARMS FILING 1 - 100YR

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... KINWAVE
Starting Date 01/01/2005 00:00:00
Ending Date 01/02/2005 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Routing Time Step ..... 60.00 sec

**********	Volume	Volume
Flow Routing Continuity	acre-feet	10^6 gal
**********	---	---
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	71.847	23.412
External Outflow	63.771	20.781
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000

```
Final Stored Volume ......         7.939         2.587
Continuity Error (%) .....         0.190

*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    60.00 sec
Average Time Step           :    60.00 sec
Maximum Time Step           :    60.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.07
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************

--------------------------------------------------------------------------------
                            Average  Maximum  Maximum  Time of Max    Reported
                              Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type      Feet     Feet     Feet  days hr:min        Feet
--------------------------------------------------------------------------------
JUNCT_910            JUNCTION     1.04     2.46  5062.16     0  02:25        2.46
JUNCT_100            JUNCTION     0.00     0.00  5072.60     0  00:00        0.00
JUNCT_901            JUNCTION     0.06     1.37  5073.87     0  00:43        1.37
JUNCT_101            JUNCTION     0.00     0.00  5082.80     0  00:00        0.00
JUNCT_902            JUNCTION     0.07     1.14  5083.84     0  00:52        1.14
JUNCT_300            JUNCTION     0.00     0.00  5112.70     0  00:00        0.00
JUNCT_903            JUNCTION     0.03     0.65  5113.25     0  00:49        0.65
JUNCT_301            JUNCTION     0.00     0.00  5117.00     0  00:00        0.00
JUNCT_904            JUNCTION     0.04     0.94  5117.84     0  00:45        0.94
```

JUNCT_400	JUNCTION	0.00	0.00	5124.70	0	00:00	0.00
JUNCT_905	JUNCTION	0.03	0.98	5125.58	0	00:36	0.98
JUNCT_906	JUNCTION	0.11	2.62	5095.22	0	00:46	2.62
JUNCT_102	JUNCTION	0.00	0.00	5122.40	0	00:00	0.00
JUNCT_907	JUNCTION	0.13	2.62	5091.72	0	00:46	2.62
JUNCT_103	JUNCTION	0.00	0.00	5091.60	0	00:00	0.00
JUNCT_908	JUNCTION	0.13	2.60	5078.90	0	00:49	2.60
JUNCT_104	JUNCTION	0.00	0.00	5076.40	0	00:00	0.00
JUNCT_500	JUNCTION	0.00	0.00	5072.20	0	00:00	0.00
JUNCT_105	JUNCTION	0.00	0.00	5062.10	0	00:00	0.00
JUNCT_900	JUNCTION	0.61	1.54	5108.34	0	02:10	1.54
JUNCT_903B	JUNCTION	0.04	0.64	5092.14	0	00:55	0.64
JUNCT_909	JUNCTION	0.00	0.00	5059.80	0	00:00	0.00
JUNCT_203	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_204	JUNCTION	0.00	0.00	5122.00	0	00:00	0.00
JUNCT_202	JUNCTION	0.00	0.00	5114.20	0	00:00	0.00
JUNCT_201	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_898	JUNCTION	0.08	1.76	5122.16	0	00:42	1.76
JUNCT_897	JUNCTION	0.08	1.41	5127.21	0	00:50	1.41
JUNCT_200	JUNCTION	0.08	1.42	5133.92	0	00:49	1.42
JUNCT_899	JUNCTION	0.08	1.75	5115.85	0	00:44	1.75
OUTFALL_911	OUTFALL	1.04	2.46	5060.95	0	02:26	2.46
STOR_PONDA	STORAGE	5.57	8.35	5070.35	0	02:36	8.35
STOR_PONDB	STORAGE	5.03	7.70	5114.70	0	02:10	7.70

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min		Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_910	JUNCTION	0.00	83.69	0	02:25	0	20.8	0.000
JUNCT_100	JUNCTION	148.17	148.17	0	00:43	4.05	4.05	0.000
JUNCT_901	JUNCTION	0.00	148.17	0	00:43	0	4.05	0.000

JUNCT_101	JUNCTION	64.40	64.40	0	00:52	2.54	2.54	0.000
JUNCT_902	JUNCTION	0.00	64.40	0	00:52	0	2.54	0.000
JUNCT_300	JUNCTION	16.53	16.53	0	00:49	0.609	0.609	0.000
JUNCT_903	JUNCTION	0.00	16.53	0	00:49	0	0.609	0.000
JUNCT_301	JUNCTION	36.02	36.02	0	00:45	1.05	1.05	0.000
JUNCT_904	JUNCTION	0.00	36.02	0	00:45	0	1.05	0.000
JUNCT_400	JUNCTION	46.97	46.97	0	00:36	0.785	0.785	0.000
JUNCT_905	JUNCTION	0.00	46.97	0	00:36	0	0.785	0.000
JUNCT_906	JUNCTION	0.00	130.87	0	00:46	0	3.58	-0.000
JUNCT_102	JUNCTION	54.80	54.80	0	00:48	1.74	1.74	0.000
JUNCT_907	JUNCTION	0.00	171.56	0	00:48	0	5.36	0.000
JUNCT_103	JUNCTION	26.40	26.40	0	00:55	1.17	1.17	0.000
JUNCT_908	JUNCTION	0.00	211.62	0	00:47	0	6.44	0.000
JUNCT_104	JUNCTION	43.07	43.07	0	00:40	1.09	1.09	0.000
JUNCT_500	JUNCTION	16.67	16.67	0	01:08	0.98	0.98	0.000
JUNCT_105	JUNCTION	25.05	25.05	0	00:43	0.683	0.683	0.000
JUNCT_900	JUNCTION	0.00	33.10	0	02:10	0	7.53	-0.000
JUNCT_903B	JUNCTION	0.00	42.82	0	00:55	0	1.79	0.000
JUNCT_909	JUNCTION	0.00	50.66	0	02:36	0	13.3	0.000
JUNCT_203	JUNCTION	107.65	107.65	0	00:40	2.49	2.49	0.000
JUNCT_204	JUNCTION	12.99	12.99	0	00:42	0.332	0.332	0.000
JUNCT_202	JUNCTION	120.89	120.89	0	00:42	3.11	3.11	0.000
JUNCT_201	JUNCTION	71.42	71.42	0	00:38	1.5	1.5	0.000
JUNCT_898	JUNCTION	0.00	100.56	0	00:42	0	2.78	0.000
JUNCT_897	JUNCTION	0.00	35.05	0	00:50	0	1.27	0.000
JUNCT_200	JUNCTION	35.07	35.07	0	00:49	1.28	1.28	0.000
JUNCT_899	JUNCTION	0.00	220.90	0	00:43	0	5.89	0.000
OUTFALL_911	OUTFALL	0.00	83.69	0	02:26	0	20.8	0.000
STOR_PONDA	STORAGE	0.00	459.69	0	00:47	0	14.7	0.074
STOR_PONDB	STORAGE	0.00	340.81	0	00:42	0	8.71	0.080

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR_PONDA	616.189	24	0	0	1586.788	63	0 02:36	50.66
STOR_PONDB	372.594	24	0	0	971.149	62	0 02:10	33.10

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_911	99.44	21.56	83.69	20.779
System	99.44	21.56	83.69	20.779

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
910	CONDUIT	83.69	0 02:26	10.33	0.70	0.61
100	DUMMY	148.17	0 00:43			
901	CONDUIT	148.18	0 00:43	30.46	0.11	0.23

101	DUMMY	64.40	0	00:52			
902	CONDUIT	64.40	0	00:53	21.91	0.18	0.28
300	DUMMY	16.53	0	00:49			
301	DUMMY	36.02	0	00:45			
400	DUMMY	46.97	0	00:36			
102	DUMMY	54.80	0	00:48			
905	CONDUIT	45.64	0	00:40	5.48	0.02	0.19
904	CONDUIT	35.70	0	00:50	4.42	0.02	0.19
903	CONDUIT	16.42	0	00:55	3.56	0.01	0.13
906	CONDUIT	130.84	0	00:46	11.03	0.39	0.44
103	DUMMY	26.40	0	00:55			
907	CONDUIT	171.34	0	00:49	14.57	0.39	0.43
104	DUMMY	43.07	0	00:40			
908	CONDUIT	211.53	0	00:47	37.07	0.14	0.26
105	DUMMY	25.05	0	00:43			
900	CONDUIT	33.10	0	02:14	10.47	0.70	0.61
903B	DUMMY	42.82	0	00:55			
16	DUMMY	16.67	0	01:08			
909	DUMMY	50.66	0	02:36			
203	DUMMY	107.65	0	00:40			
204	DUMMY	12.99	0	00:42			
202	DUMMY	120.89	0	00:42			
201	DUMMY	71.42	0	00:38			
200	CONDUIT	35.05	0	00:50	9.62	0.34	0.40
897	CONDUIT	35.00	0	00:52	3.44	0.11	0.36
898	CONDUIT	100.43	0	00:44	4.77	0.21	0.50
899	DUMMY	220.90	0	00:43			
PONDA	DUMMY	50.66	0	02:36			
PONDB	DUMMY	33.10	0	02:10			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 22 15:55:49 2024

Analysis ended on: Wed May 22 15:55:49 2024
Total elapsed time: < 1 sec

APPENDIX E
SELTZER HEIGHTS + SELTZER FARMS (ULTIMATE BUILDOUT)
CUHP/SWMM MODEL

CUHP SUBCATCHMENTS

Seltzer Heights + Seltzer Farms (Ultimate Buildout) - CUHP Inputs

Columns with this color heading are for required user-input
Columns with this color heading are for optional override values
Columns with this color heading are for program-calculated values

								Maximum Depression Storage (Watershed inches)		Horton's Infiltration Parameters			DCIA
Subcatchment Name	EPA SWMM Target Node	Raingage	Area (mi^2)	Length to Centroid (mi)	Length (mi)	Slope (ft/ft)	Percent Imperviousness	Pervious	Impervious	Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)	Level 0, 1, or 2
100	JUNCT_100	100-YR	0.10963	0.36402	0.79186	0.01182	59.4	0.38	0.1	3	0.0018	0.5	0
101	JUNCT_101	100-YR	0.06762	0.24792	0.5572	0.01592	45.52	0.38	0.1	3	0.0018	0.5	0
102	JUNCT_102	100-YR	0.02002	0.09905	0.22235	0.0138	4.24	0.38	0.1	3	0.0018	0.5	0
103	JUNCT_103	100-YR	0.08203	0.23939	0.63371	0.01316	54.84	0.38	0.1	3	0.0018	0.5	0
104	JUNCT_104	100-YR	0.02841	0.16345	0.40284	0.01143	61.16	0.38	0.1	3	0.0018	0.5	0
105	JUNCT_105	100-YR	0.02241	0.08674	0.20114	0.02147	6.64	0.38	0.1	3	0.0018	0.5	0
200	JUNCT_200	100-YR	0.03753	0.21193	0.37411	0.02363	23.9	0.38	0.1	3	0.0018	0.5	0
201	JUNCT_201	100-YR	0.03771	0.13996	0.30704	0.02121	52.22	0.38	0.1	3	0.0018	0.5	0
202	JUNCT_202	100-YR	0.07603	0.34905	0.43598	0.01545	56.71	0.38	0.1	3	0.0018	0.5	0
203	JUNCT_203	100-YR	0.06477	0.18295	0.4024	0.01766	45.14	0.38	0.1	3	0.0018	0.5	0
204	JUNCT_204	100-YR	0.01079	0.05511	0.12955	0.02145	8.01	0.38	0.1	3	0.0018	0.5	0
300	JUNCT_300	100-YR	0.03296	0.1286	0.2447	0.01954	10.9	0.38	0.1	3	0.0018	0.5	0
301	JUNCT_301	100-YR	0.01992	0.11989	0.2608	0.01572	10.86	0.38	0.1	3	0.0018	0.5	0
400	JUNCT_400	100-YR	0.02172	0.06742	0.14738	0.04888	34.46	0.38	0.1	3	0.0018	0.5	0
500	JUNCT_500	100-YR	0.0319	0.3178	0.59905	0.01607	8.57	0.38	0.1	3	0.0018	0.5	0

SELTZER HEIGHTS + SELTZER FARMS ULTIMATE - 5YR

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... KINWAVE
Starting Date 01/01/2005 00:00:00
Ending Date 01/02/2005 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Routing Time Step ..... 5.00 sec

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	27.224	8.871
External Outflow	20.578	6.706
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000

```
Final Stored Volume ......         6.635         2.162
Continuity Error (%) .....         0.039


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     5.00 sec
Average Time Step           :     5.00 sec
Maximum Time Step           :     5.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.00
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************

--------------------------------------------------------------------------------
                            Average  Maximum  Maximum  Time of Max    Reported
                              Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type      Feet     Feet     Feet  days hr:min        Feet
--------------------------------------------------------------------------------
JUNCT_910            JUNCTION     0.62     0.92  5060.62     0  02:44        0.92
JUNCT_100            JUNCTION     0.00     0.00  5072.60     0  00:00        0.00
JUNCT_901            JUNCTION     0.04     0.89  5073.39     0  00:37        0.89
JUNCT_101            JUNCTION     0.00     0.00  5082.80     0  00:00        0.00
JUNCT_902            JUNCTION     0.04     0.81  5083.51     0  00:36        0.81
JUNCT_300            JUNCTION     0.00     0.00  5112.70     0  00:00        0.00
JUNCT_903            JUNCTION     0.02     0.53  5113.13     0  00:38        0.53
JUNCT_301            JUNCTION     0.00     0.00  5117.00     0  00:00        0.00
JUNCT_904            JUNCTION     0.02     0.39  5117.29     0  00:41        0.39
```

JUNCT_400	JUNCTION	0.00	0.00	5124.70	0	00:00	0.00
JUNCT_905	JUNCTION	0.01	0.53	5125.13	0	00:30	0.53
JUNCT_906	JUNCTION	0.04	0.98	5105.78	0	00:35	0.98
JUNCT_102	JUNCTION	0.00	0.00	5104.90	0	00:00	0.00
JUNCT_907	JUNCTION	0.08	1.72	5090.82	0	00:36	1.72
JUNCT_103	JUNCTION	0.00	0.00	5090.60	0	00:00	0.00
JUNCT_908	JUNCTION	0.08	1.72	5078.02	0	00:37	1.72
JUNCT_104	JUNCTION	0.00	0.00	5076.40	0	00:00	0.00
JUNCT_500	JUNCTION	0.00	0.00	5072.20	0	00:00	0.00
JUNCT_105	JUNCTION	0.00	0.00	5062.10	0	00:00	0.00
JUNCT_900	JUNCTION	0.37	0.50	5107.30	0	02:42	0.50
JUNCT_909	JUNCTION	0.00	0.00	5059.80	0	00:00	0.00
JUNCT_203	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_204	JUNCTION	0.00	0.00	5122.00	0	00:00	0.00
JUNCT_899	JUNCTION	0.05	1.05	5115.15	0	00:37	1.05
JUNCT_898	JUNCTION	0.05	1.05	5121.45	0	00:35	1.05
JUNCT_897	JUNCTION	0.04	0.74	5126.54	0	00:41	0.74
JUNCT_200	JUNCTION	0.04	0.74	5133.24	0	00:41	0.74
JUNCT_201	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_202	JUNCTION	0.00	0.00	5114.20	0	00:00	0.00
OUTFALL_911	OUTFALL	0.62	0.92	5059.41	0	02:44	0.92
STOR_PONDA	STORAGE	4.72	6.00	5068.00	0	02:42	6.00
STOR_PONDB	STORAGE	4.26	5.22	5112.22	0	02:42	5.22

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min		Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_910	JUNCTION	0.00	13.81	0	02:44	0	6.71	0.000
JUNCT_100	JUNCTION	62.18	62.18	0	00:37	1.86	1.86	0.000
JUNCT_901	JUNCTION	0.00	62.18	0	00:37	0	1.86	0.000
JUNCT_101	JUNCTION	33.01	33.01	0	00:36	0.952	0.952	0.000

JUNCT_902	JUNCTION	0.00	33.01	0	00:36	0	0.952	0.000
JUNCT_300	JUNCTION	8.66	8.66	0	00:38	0.231	0.231	0.000
JUNCT_903	JUNCTION	0.00	8.66	0	00:38	0	0.231	0.000
JUNCT_301	JUNCTION	4.16	4.16	0	00:41	0.139	0.139	0.000
JUNCT_904	JUNCTION	0.00	4.16	0	00:41	0	0.139	0.000
JUNCT_400	JUNCTION	16.10	16.10	0	00:30	0.255	0.255	0.000
JUNCT_905	JUNCTION	0.00	16.10	0	00:30	0	0.255	0.000
JUNCT_906	JUNCTION	0.00	21.49	0	00:35	0	0.511	0.000
JUNCT_102	JUNCTION	4.05	4.05	0	00:40	0.115	0.115	0.000
JUNCT_907	JUNCTION	0.00	78.50	0	00:36	0	2.05	0.000
JUNCT_103	JUNCTION	49.22	49.22	0	00:35	1.31	1.31	0.000
JUNCT_908	JUNCTION	0.00	95.48	0	00:37	0	2.54	0.000
JUNCT_104	JUNCTION	17.47	17.47	0	00:34	0.492	0.492	0.000
JUNCT_500	JUNCTION	3.61	3.61	0	00:53	0.209	0.209	0.000
JUNCT_105	JUNCTION	5.97	5.97	0	00:37	0.139	0.139	0.000
JUNCT_900	JUNCTION	0.00	4.08	0	02:42	0	2.34	0.000
JUNCT_909	JUNCTION	0.00	9.73	0	02:42	0	4.37	0.000
JUNCT_203	JUNCTION	39.24	39.24	0	00:33	0.907	0.907	0.000
JUNCT_204	JUNCTION	3.20	3.20	0	00:35	0.0696	0.0696	0.000
JUNCT_899	JUNCTION	0.00	81.48	0	00:36	0	2.19	0.000
JUNCT_898	JUNCTION	0.00	34.77	0	00:35	0	0.943	0.000
JUNCT_897	JUNCTION	0.00	9.98	0	00:41	0	0.36	0.000
JUNCT_200	JUNCTION	9.99	9.99	0	00:41	0.36	0.36	0.000
JUNCT_201	JUNCTION	27.65	27.65	0	00:32	0.583	0.583	0.000
JUNCT_202	JUNCTION	47.34	47.34	0	00:35	1.25	1.25	0.000
OUTFALL_911	OUTFALL	0.00	13.81	0	02:44	0	6.71	0.000
STOR_PONDA	STORAGE	0.00	199.72	0	00:37	0	5.7	-0.000
STOR_PONDB	STORAGE	0.00	123.18	0	00:35	0	3.17	-0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary

****

Storage Unit	Average Volume 1000 ft³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR_PONDA	354.375	14	0	0	686.854	27	0 02:42	9.73
STOR_PONDB	221.726	14	0	0	391.586	25	0 02:42	4.08

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_911	99.39	6.96	13.81	6.705
System	99.39	6.96	13.81	6.705

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
910	CONDUIT	13.81	0 02:44	6.37	0.11	0.23
100	DUMMY	62.18	0 00:37			
901	CONDUIT	62.18	0 00:37	23.63	0.05	0.15
101	DUMMY	33.01	0 00:36			
902	CONDUIT	33.00	0 00:36	18.08	0.09	0.20

300	DUMMY	8.66	0	00:38			
301	DUMMY	4.16	0	00:41			
400	DUMMY	16.10	0	00:30			
102	DUMMY	4.05	0	00:40			
905	CONDUIT	16.05	0	00:31	5.90	0.01	0.13
904	CONDUIT	4.10	0	00:46	2.37	0.01	0.10
903	CONDUIT	8.63	0	00:40	7.06	0.02	0.09
906	CONDUIT	21.35	0	00:37	8.00	0.08	0.19
103	DUMMY	49.22	0	00:35			
907	CONDUIT	78.41	0	00:37	11.75	0.18	0.29
104	DUMMY	17.47	0	00:34			
908	CONDUIT	95.48	0	00:37	29.44	0.06	0.17
105	DUMMY	5.97	0	00:37			
900	CONDUIT	4.08	0	02:49	5.93	0.09	0.20
500	DUMMY	3.61	0	00:53			
909	DUMMY	9.73	0	02:42			
203	DUMMY	39.24	0	00:33			
204	DUMMY	3.20	0	00:35			
202	DUMMY	47.34	0	00:35			
201	DUMMY	27.65	0	00:32			
200	CONDUIT	9.98	0	00:41	6.75	0.10	0.21
897	CONDUIT	9.96	0	00:44	2.41	0.03	0.19
898	CONDUIT	34.66	0	00:37	3.60	0.07	0.30
899	DUMMY	81.48	0	00:36			
PONDA	DUMMY	9.73	0	02:42			
PONDB	DUMMY	4.08	0	02:42			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 22 15:53:52 2024
Analysis ended on: Wed May 22 15:53:52 2024
Total elapsed time: < 1 sec

SELTZER HEIGHTS + SELTZER FARMS ULTIMATE - 10YR

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

```
****************
Analysis Options
****************
Flow Units ..............  CFS
Process Models:
  Rainfall/Runoff ........  NO
  RDII ...................  NO
  Snowmelt ...............  NO
  Groundwater ............  NO
  Flow Routing ...........  YES
  Ponding Allowed ........  NO
  Water Quality ..........  NO
Flow Routing Method ......  KINWAVE
Starting Date ............  01/01/2005 00:00:00
Ending Date ..............  01/02/2005 12:00:00
Antecedent Dry Days ......  0.0
Report Time Step .........  00:01:00
Routing Time Step ........  5.00 sec
```

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	36.194	11.794
External Outflow	28.316	9.227
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000

```
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         7.864         2.563
Continuity Error (%) .....         0.039


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     5.00 sec
Average Time Step           :     5.00 sec
Maximum Time Step           :     5.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.00
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************

--------------------------------------------------------------------------------
                            Average  Maximum  Maximum  Time of Max    Reported
                              Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type      Feet     Feet     Feet  days hr:min        Feet
--------------------------------------------------------------------------------
JUNCT_910            JUNCTION  0.73     1.33  5061.03     0  02:33        1.33
JUNCT_100            JUNCTION  0.00     0.00  5072.60     0  00:00        0.00
JUNCT_901            JUNCTION  0.05     0.99  5073.49     0  00:37        0.99
JUNCT_101            JUNCTION  0.00     0.00  5082.80     0  00:00        0.00
JUNCT_902            JUNCTION  0.04     0.91  5083.61     0  00:36        0.91
JUNCT_300            JUNCTION  0.00     0.00  5112.70     0  00:00        0.00
JUNCT_903            JUNCTION  0.03     0.63  5113.23     0  00:37        0.63
JUNCT_301            JUNCTION  0.00     0.00  5117.00     0  00:00        0.00
```

JUNCT_904	JUNCTION	0.02	0.47	5117.37	0	00:41	0.47
JUNCT_400	JUNCTION	0.00	0.00	5124.70	0	00:00	0.00
JUNCT_905	JUNCTION	0.02	0.61	5125.21	0	00:30	0.61
JUNCT_906	JUNCTION	0.05	1.14	5105.94	0	00:34	1.14
JUNCT_102	JUNCTION	0.00	0.00	5104.90	0	00:00	0.00
JUNCT_907	JUNCTION	0.09	1.97	5091.07	0	00:36	1.97
JUNCT_103	JUNCTION	0.00	0.00	5090.60	0	00:00	0.00
JUNCT_908	JUNCTION	0.09	1.97	5078.27	0	00:37	1.97
JUNCT_104	JUNCTION	0.00	0.00	5076.40	0	00:00	0.00
JUNCT_500	JUNCTION	0.00	0.00	5072.20	0	00:00	0.00
JUNCT_105	JUNCTION	0.00	0.00	5062.10	0	00:00	0.00
JUNCT_900	JUNCTION	0.43	0.87	5107.67	0	02:23	0.87
JUNCT_909	JUNCTION	0.00	0.00	5059.80	0	00:00	0.00
JUNCT_203	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_204	JUNCTION	0.00	0.00	5122.00	0	00:00	0.00
JUNCT_899	JUNCTION	0.06	1.19	5115.29	0	00:36	1.19
JUNCT_898	JUNCTION	0.06	1.19	5121.59	0	00:35	1.19
JUNCT_897	JUNCTION	0.05	0.86	5126.66	0	00:41	0.86
JUNCT_200	JUNCTION	0.05	0.86	5133.36	0	00:41	0.86
JUNCT_201	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_202	JUNCTION	0.00	0.00	5114.20	0	00:00	0.00
OUTFALL_911	OUTFALL	0.73	1.33	5059.82	0	02:33	1.33
STOR_PONDA	STORAGE	5.12	6.65	5068.65	0	02:38	6.65
STOR_PONDB	STORAGE	4.56	5.73	5112.73	0	02:23	5.73

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_910	JUNCTION	0.00	28.55	0	02:33	0	9.23	0.000
JUNCT_100	JUNCTION	76.56	76.56	0	00:37	2.36	2.36	0.000
JUNCT_901	JUNCTION	0.00	76.56	0	00:37	0	2.36	0.000

JUNCT_101	JUNCTION	41.88	41.88	0	00:36	1.25	1.25	0.000
JUNCT_902	JUNCTION	0.00	41.88	0	00:36	0	1.25	0.000
JUNCT_300	JUNCTION	12.41	12.41	0	00:37	0.366	0.366	0.000
JUNCT_903	JUNCTION	0.00	12.41	0	00:37	0	0.366	0.000
JUNCT_301	JUNCTION	5.97	5.97	0	00:41	0.221	0.221	0.000
JUNCT_904	JUNCTION	0.00	5.97	0	00:41	0	0.221	0.000
JUNCT_400	JUNCTION	21.06	21.06	0	00:30	0.35	0.35	0.000
JUNCT_905	JUNCTION	0.00	21.06	0	00:30	0	0.35	0.000
JUNCT_906	JUNCTION	0.00	29.50	0	00:34	0	0.767	0.000
JUNCT_102	JUNCTION	6.06	6.06	0	00:40	0.195	0.195	0.000
JUNCT_907	JUNCTION	0.00	102.18	0	00:36	0	2.82	0.000
JUNCT_103	JUNCTION	61.15	61.15	0	00:35	1.68	1.68	0.000
JUNCT_908	JUNCTION	0.00	123.10	0	00:36	0	3.43	0.000
JUNCT_104	JUNCTION	21.44	21.44	0	00:33	0.623	0.623	0.000
JUNCT_500	JUNCTION	5.37	5.37	0	00:57	0.339	0.339	0.000
JUNCT_105	JUNCTION	8.76	8.76	0	00:36	0.229	0.229	0.000
JUNCT_900	JUNCTION	0.00	12.28	0	02:23	0	3.2	0.000
JUNCT_909	JUNCTION	0.00	16.38	0	02:38	0	6.04	0.000
JUNCT_203	JUNCTION	49.88	49.88	0	00:33	1.19	1.19	0.000
JUNCT_204	JUNCTION	4.64	4.64	0	00:35	0.113	0.113	0.000
JUNCT_899	JUNCTION	0.00	102.63	0	00:35	0	2.87	0.000
JUNCT_898	JUNCTION	0.00	44.62	0	00:35	0	1.27	0.000
JUNCT_897	JUNCTION	0.00	13.51	0	00:41	0	0.52	0.000
JUNCT_200	JUNCTION	13.51	13.51	0	00:41	0.52	0.52	-0.000
JUNCT_201	JUNCTION	34.62	34.62	0	00:31	0.753	0.753	0.000
JUNCT_202	JUNCTION	58.64	58.64	0	00:34	1.59	1.59	0.000
OUTFALL_911	OUTFALL	0.00	28.55	0	02:33	0	9.23	0.000
STOR_PONDA	STORAGE	0.00	254.81	0	00:37	0	7.61	-0.000
STOR_PONDB	STORAGE	0.00	156.31	0	00:35	0	4.17	-0.000

****
Node Flooding Summary
****

No nodes were flooded.

****

Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR_PONDA	461.290	18	0	0	910.925	36	0 02:38	16.38
STOR_PONDB	275.420	18	0	0	500.498	32	0 02:23	12.28

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_911	99.43	9.57	28.55	9.226
System	99.43	9.57	28.55	9.226

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
910	CONDUIT	28.55	0 02:33	7.83	0.24	0.33
100	DUMMY	76.56	0 00:37			
901	CONDUIT	76.56	0 00:37	25.13	0.06	0.16
101	DUMMY	41.88	0 00:36			

902	CONDUIT	41.87	0	00:36	19.37	0.11	0.23
300	DUMMY	12.41	0	00:37			
301	DUMMY	5.97	0	00:41			
400	DUMMY	21.06	0	00:30			
102	DUMMY	6.06	0	00:40			
905	CONDUIT	20.95	0	00:30	6.35	0.01	0.15
904	CONDUIT	5.93	0	00:46	2.64	0.01	0.12
903	CONDUIT	12.36	0	00:39	7.87	0.02	0.10
906	CONDUIT	29.39	0	00:36	8.78	0.11	0.23
103	DUMMY	61.15	0	00:35			
907	CONDUIT	102.07	0	00:37	12.67	0.23	0.33
104	DUMMY	21.44	0	00:33			
908	CONDUIT	123.10	0	00:36	31.69	0.08	0.20
105	DUMMY	8.76	0	00:36			
900	CONDUIT	12.26	0	02:28	8.15	0.26	0.35
500	DUMMY	5.37	0	00:57			
909	DUMMY	16.38	0	02:38			
203	DUMMY	49.88	0	00:33			
204	DUMMY	4.64	0	00:35			
202	DUMMY	58.64	0	00:34			
201	DUMMY	34.62	0	00:31			
200	CONDUIT	13.51	0	00:41	7.37	0.13	0.25
897	CONDUIT	13.49	0	00:44	2.63	0.04	0.22
898	CONDUIT	44.51	0	00:36	3.85	0.09	0.34
899	DUMMY	102.63	0	00:35			
PONDA	DUMMY	16.38	0	02:38			
PONDB	DUMMY	12.28	0	02:23			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 22 15:52:32 2024
Analysis ended on: Wed May 22 15:52:32 2024
Total elapsed time: < 1 sec

SELTZER HEIGHTS + SELTZER FARMS ULTIMATE - 100YR

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.1)

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Flow Routing Method ..... KINWAVE
Starting Date 01/01/2005 00:00:00
Ending Date 01/02/2005 12:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Routing Time Step ..... 5.00 sec

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	76.926	25.068
External Outflow	67.492	21.993
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000

```
Final Stored Volume ......         9.367         3.053
Continuity Error (%) .....         0.087

*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :     5.00 sec
Average Time Step           :     5.00 sec
Maximum Time Step           :     5.00 sec
% of Time in Steady State   :     0.00
Average Iterations per Step :     1.01
% of Steps Not Converging   :     0.00


******************
Node Depth Summary
******************

-------------------------------------------------------------------------------
                            Average  Maximum  Maximum  Time of Max    Reported
                              Depth    Depth      HGL   Occurrence   Max Depth
Node                 Type      Feet     Feet     Feet  days hr:min        Feet
-------------------------------------------------------------------------------
JUNCT_910            JUNCTION     1.06     2.50  5062.20     0  02:18        2.50
JUNCT_100            JUNCTION     0.00     0.00  5072.60     0  00:00        0.00
JUNCT_901            JUNCTION     0.06     1.42  5073.92     0  00:43        1.42
JUNCT_101            JUNCTION     0.00     0.00  5082.80     0  00:00        0.00
JUNCT_902            JUNCTION     0.06     1.37  5084.07     0  00:42        1.37
JUNCT_300            JUNCTION     0.00     0.00  5112.70     0  00:00        0.00
JUNCT_903            JUNCTION     0.05     1.04  5113.64     0  00:45        1.04
JUNCT_301            JUNCTION     0.00     0.00  5117.00     0  00:00        0.00
JUNCT_904            JUNCTION     0.04     0.79  5117.69     0  00:48        0.79
```

JUNCT_400	JUNCTION	0.00	0.00	5124.70	0	00:00	0.00
JUNCT_905	JUNCTION	0.02	0.90	5125.50	0	00:35	0.90
JUNCT_906	JUNCTION	0.08	1.85	5106.65	0	00:40	1.85
JUNCT_102	JUNCTION	0.00	0.00	5104.90	0	00:00	0.00
JUNCT_907	JUNCTION	0.13	3.14	5092.24	0	00:42	3.14
JUNCT_103	JUNCTION	0.00	0.00	5090.60	0	00:00	0.00
JUNCT_908	JUNCTION	0.13	3.14	5079.44	0	00:43	3.14
JUNCT_104	JUNCTION	0.00	0.00	5076.40	0	00:00	0.00
JUNCT_500	JUNCTION	0.00	0.00	5072.20	0	00:00	0.00
JUNCT_105	JUNCTION	0.00	0.00	5062.10	0	00:00	0.00
JUNCT_900	JUNCTION	0.61	1.54	5108.34	0	02:09	1.54
JUNCT_909	JUNCTION	0.00	0.00	5059.80	0	00:00	0.00
JUNCT_203	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_204	JUNCTION	0.00	0.00	5122.00	0	00:00	0.00
JUNCT_899	JUNCTION	0.08	1.76	5115.86	0	00:42	1.76
JUNCT_898	JUNCTION	0.08	1.76	5122.16	0	00:41	1.76
JUNCT_897	JUNCTION	0.08	1.42	5127.22	0	00:48	1.42
JUNCT_200	JUNCTION	0.08	1.42	5133.92	0	00:48	1.42
JUNCT_201	JUNCTION	0.00	0.00	5120.50	0	00:00	0.00
JUNCT_202	JUNCTION	0.00	0.00	5114.20	0	00:00	0.00
OUTFALL_911	OUTFALL	1.06	2.50	5060.99	0	02:19	2.50
STOR_PONDA	STORAGE	5.85	8.91	5070.91	0	02:22	8.91
STOR_PONDB	STORAGE	5.03	7.70	5114.70	0	02:09	7.70

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min		Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
JUNCT_910	JUNCTION	0.00	85.59	0	02:18	0	22	0.000
JUNCT_100	JUNCTION	157.97	157.97	0	00:43	4.54	4.54	0.000
JUNCT_901	JUNCTION	0.00	157.97	0	00:43	0	4.54	0.000
JUNCT_101	JUNCTION	92.45	92.45	0	00:42	2.6	2.6	0.000

JUNCT_902	JUNCTION	0.00	92.45	0	00:42	0	2.6	0.000
JUNCT_300	JUNCTION	34.62	34.62	0	00:45	1.03	1.03	0.000
JUNCT_903	JUNCTION	0.00	34.62	0	00:45	0	1.03	0.000
JUNCT_301	JUNCTION	17.14	17.14	0	00:48	0.624	0.624	0.000
JUNCT_904	JUNCTION	0.00	17.14	0	00:48	0	0.624	0.000
JUNCT_400	JUNCTION	46.97	46.97	0	00:35	0.785	0.785	0.000
JUNCT_905	JUNCTION	0.00	46.97	0	00:35	0	0.785	0.000
JUNCT_906	JUNCTION	0.00	75.49	0	00:40	0	2.01	0.000
JUNCT_102	JUNCTION	18.28	18.28	0	00:47	0.601	0.601	0.000
JUNCT_907	JUNCTION	0.00	236.48	0	00:42	0	6.36	0.000
JUNCT_103	JUNCTION	127.52	127.52	0	00:41	3.32	3.32	0.000
JUNCT_908	JUNCTION	0.00	279.56	0	00:42	0	7.53	0.000
JUNCT_104	JUNCTION	43.54	43.54	0	00:41	1.19	1.19	0.000
JUNCT_500	JUNCTION	16.74	16.74	0	01:07	0.984	0.984	0.000
JUNCT_105	JUNCTION	25.05	25.05	0	00:42	0.683	0.683	0.000
JUNCT_900	JUNCTION	0.00	33.10	0	02:09	0	7.54	0.000
JUNCT_909	JUNCTION	0.00	52.50	0	02:22	0	14.5	0.000
JUNCT_203	JUNCTION	107.65	107.65	0	00:39	2.49	2.49	0.000
JUNCT_204	JUNCTION	12.99	12.99	0	00:41	0.332	0.332	0.000
JUNCT_899	JUNCTION	0.00	220.95	0	00:41	0	5.89	0.000
JUNCT_898	JUNCTION	0.00	100.62	0	00:41	0	2.78	0.000
JUNCT_897	JUNCTION	0.00	35.06	0	00:48	0	1.27	0.000
JUNCT_200	JUNCTION	35.07	35.07	0	00:48	1.28	1.28	0.000
JUNCT_201	JUNCTION	71.42	71.42	0	00:37	1.5	1.5	0.000
JUNCT_202	JUNCTION	120.89	120.89	0	00:41	3.11	3.11	0.000
OUTFALL_911	OUTFALL	0.00	85.59	0	02:19	0	22	0.000
STOR_PONDA	STORAGE	0.00	568.54	0	00:43	0	16.3	0.001
STOR_PONDB	STORAGE	0.00	340.76	0	00:41	0	8.71	0.000

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary

****

Storage Unit	Average Volume 1000 ft³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
STOR_PONDA	699.716	28	0	0	1831.044	72	0 02:22	52.50
STOR_PONDB	372.867	24	0	0	971.318	62	0 02:09	33.10

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OUTFALL_911	99.45	22.81	85.59	21.992
System	99.45	22.81	85.59	21.992

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
910	CONDUIT	85.59	0 02:19	10.38	0.71	0.62
100	DUMMY	157.97	0 00:43			
901	CONDUIT	157.97	0 00:43	31.01	0.12	0.24
101	DUMMY	92.45	0 00:42			
902	CONDUIT	92.44	0 00:42	24.27	0.25	0.34

300	DUMMY	34.62	0	00:45			
301	DUMMY	17.14	0	00:48			
400	DUMMY	46.97	0	00:35			
102	DUMMY	18.28	0	00:47			
905	CONDUIT	46.83	0	00:35	7.88	0.03	0.23
904	CONDUIT	17.09	0	00:52	3.51	0.03	0.20
903	CONDUIT	34.61	0	00:46	10.63	0.07	0.17
906	CONDUIT	75.37	0	00:42	11.41	0.29	0.37
103	DUMMY	127.52	0	00:41			
907	CONDUIT	236.36	0	00:43	15.81	0.54	0.52
104	DUMMY	43.54	0	00:41			
908	CONDUIT	279.56	0	00:42	40.15	0.19	0.29
105	DUMMY	25.05	0	00:42			
900	CONDUIT	33.10	0	02:13	10.47	0.70	0.61
500	DUMMY	16.74	0	01:07			
909	DUMMY	52.50	0	02:22			
203	DUMMY	107.65	0	00:39			
204	DUMMY	12.99	0	00:41			
202	DUMMY	120.89	0	00:41			
201	DUMMY	71.42	0	00:37			
200	CONDUIT	35.06	0	00:48	9.62	0.34	0.40
897	CONDUIT	35.03	0	00:50	3.44	0.11	0.36
898	CONDUIT	100.49	0	00:42	4.77	0.21	0.50
899	DUMMY	220.95	0	00:41			
PONDA	DUMMY	52.50	0	02:22			
PONDB	DUMMY	33.10	0	02:09			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 22 15:51:42 2024
Analysis ended on: Wed May 22 15:51:43 2024
Total elapsed time: 00:00:01

APPENDIX F
FEMA FLOODPLAIN MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided by the Adams County and Commerce City GIS departments. The coordinate system used for the production of the digital FIRM is Universe Transverse Mercator, Zone 13N, referenced to North American Datum of 1983 and the GRS 80 spheroid, Western Hemisphere.

This map reflects more detailed and up- to- date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de- annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

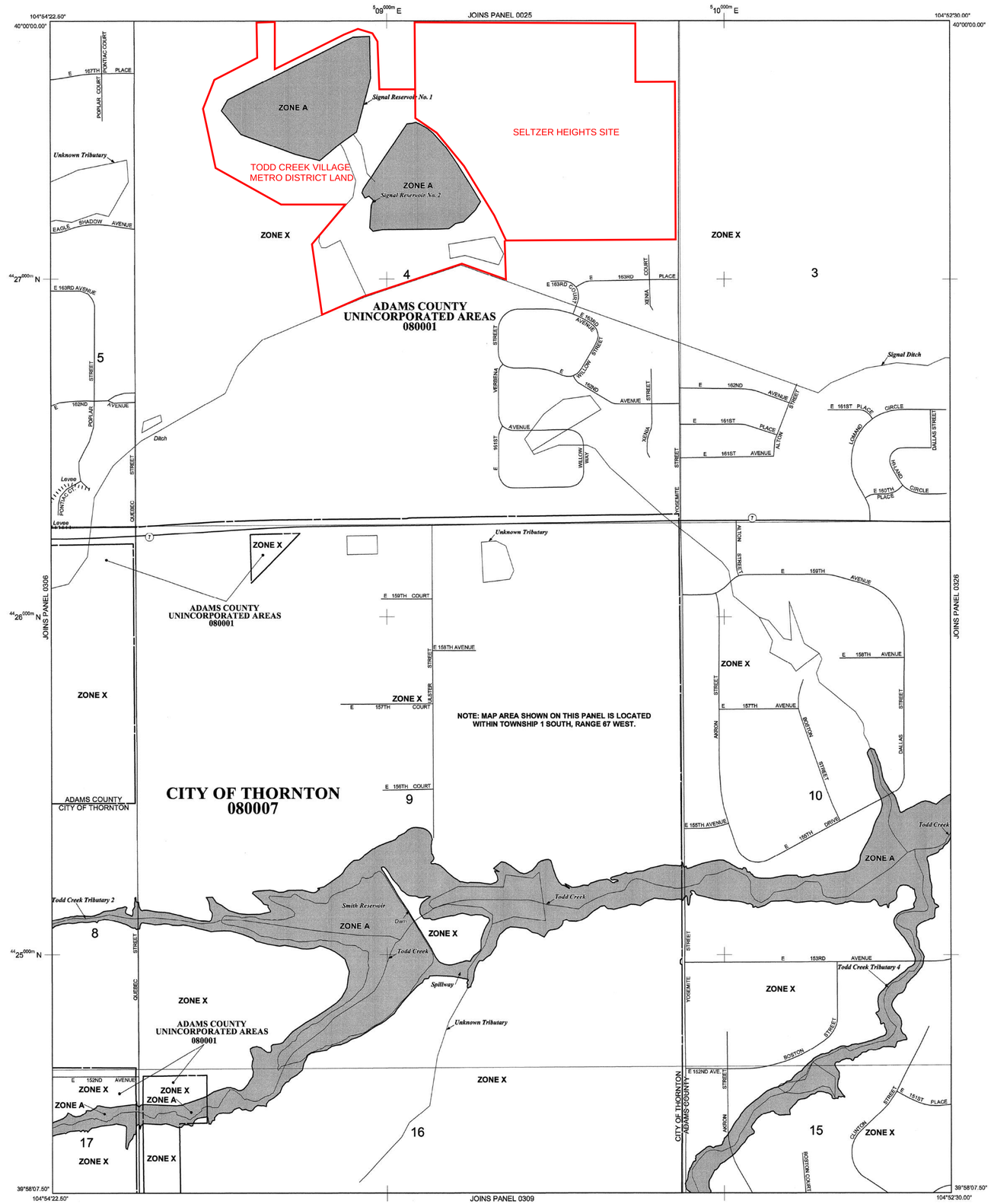
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1- 800- 358- 9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1- 800- 358- 9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1- 877- 336- 2627) or visit the FEMA website at http://www.fema.gov/.

This digital Flood Insurance Rate Map (FIRM) was produced through a cooperative partnership between the State of Colorado Water Conservation Board, the Urban Drainage and Flood Control District, and the Federal Emergency Management Agency (FEMA). The State of Colorado Water Conservation Board and the Urban Drainage and Flood Control District have implemented a long-term approach of floodplain management to reduce the costs associated with flooding. As part of this effort, both the State of Colorado and the Urban Drainage and Flood Control District have joined in Cooperating Technical Partner agreements with FEMA to produce this digital FIRM.

Additional flood hazard information and resources are available from local communities, the Colorado Water Conservation Board, and the Urban Drainage and Flood Control District.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A Cross section line

23 — 23 Transect line

97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

$^{42}75^{000m}$N 1000-meter Universal Transverse Mercator grid ticks, zone 13

6000000 M 5000-foot grid ticks: Alabama State Plane coordinate system, east zone (FIPSZONE 0101), Transverse Mercator

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 16, 1995
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
March 5, 2007 - to update map format

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1- 800- 638- 6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0307H

FIRM
FLOOD INSURANCE RATE MAP
ADAMS COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 307 OF 1150
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ADAMS COUNTY	080001	0307	H
THORNTON, CITY OF	080007	0307	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08001C0307H

MAP REVISED
MARCH 5, 2007

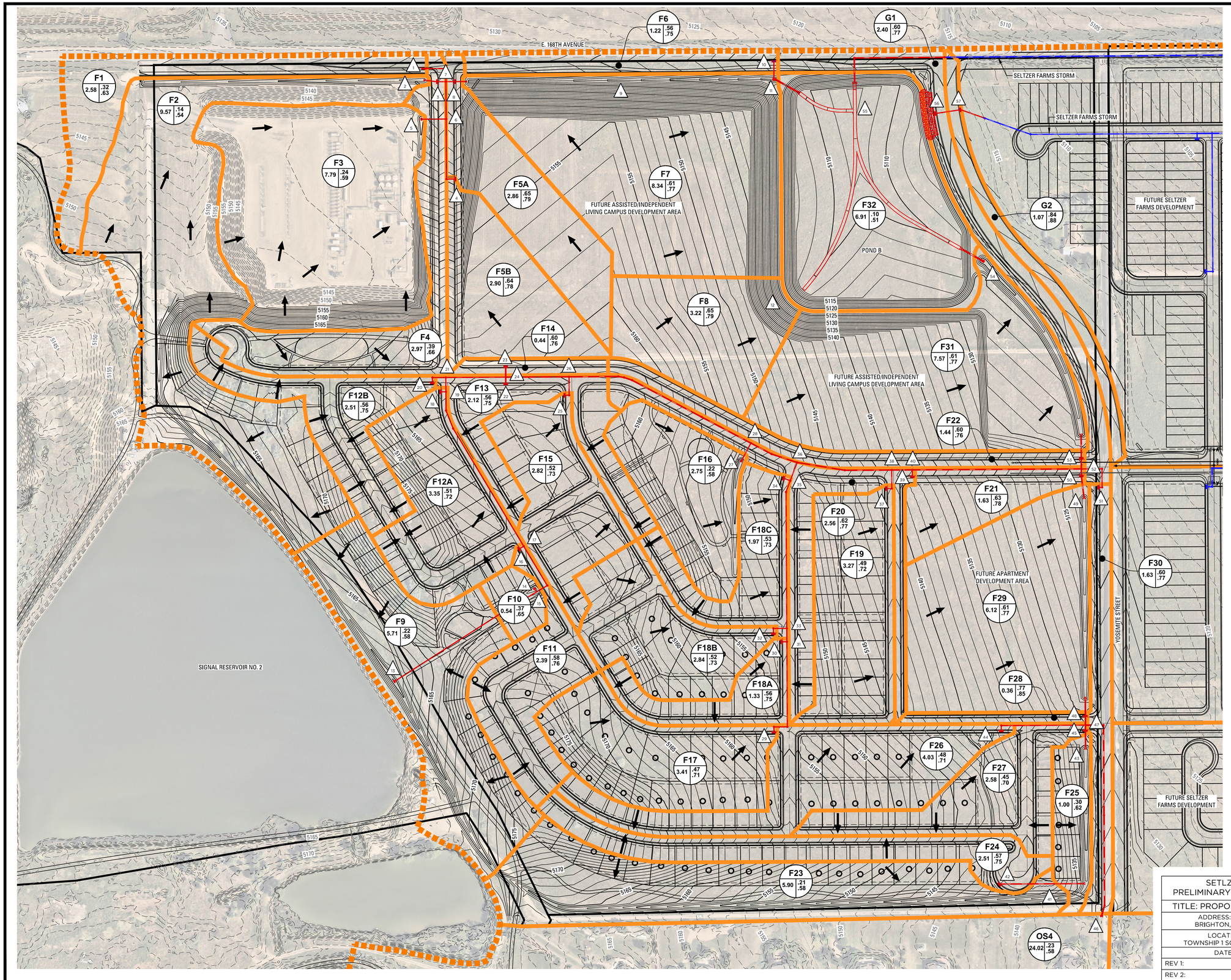
Federal Emergency Management Agency

MAPS

PROPOSED DRAINAGE MAP

SELTZER HEIGHTS + SELTZER FARMS FILING 1 CUHP/SWMM DRAINAGE MAP

SELTZER HEIGHTS + SELTZER FARMS (ULTIMATE BUILDOUT) CUHP/SWMM DRAINAGE MAP



DEVELOPED RUN OFF

DESIGN POINT	BASIN	DIRECT RUNOFF Q5 CFS	DIRECT RUNOFF Q100 CFS	ROUTED FLOWRATES Q5 CFS	ROUTED FLOWRATES Q100 CFS
1	F1	2.32	9.82	-	-
2	F2	12.59	24.03	-	-
3	F4	6.85	13.07	-	-
3	F2+F4	-	-	17.35	31.72
4	F5B	9.40	17.93	-	-
5	F3	13.01	24.83	-	-
6	F3+F5B	-	-	19.45	33.95
7	F1+F2+F3+F4+F5B	-	-	36.17	66.83
8	F5A	8.83	16.85	-	-
8	F1 THRU F5	-	-	41.66	75.89
9	F7	27.96	53.36	57.35	105.80
10	F6	3.66	6.97	-	-
11	F1 THRU F7	-	-	59.59	115.93
12	F8	12.09	23.08	-	-
13	F9	11.95	22.80	-	-
14	F10	1.65	3.15	-	-
15	F9+F10	-	-	12.55	24.16
16	F11	7.80	14.89	-	-
17	F9+F10+F11	-	-	16.41	33.24
18	F12A	10.23	19.52	-	-
19	F9+F10+F11+F12A	-	-	25.50	44.41
20	F12B	7.68	14.65	-	-
21	F9 THRU F12	-	-	31.56	54.35
22	F13	6.37	12.15	-	-
23	F14	1.62	3.10	-	-
24	F9 THRU F14	-	-	37.19	74.40
25	F15	7.69	14.66	-	-
26	F9 THRU F15	-	-	43.40	86.40
27	F16	6.26	11.95	-	-
28	F9 THRU F16	-	-	47.00	93.97
29	F17	9.74	18.59	-	-
30	F18A	4.29	8.19	-	-
31	F17+F18A	-	-	13.34	20.23
32	F18B	9.48	18.09	-	-
33	F17+F18A+F18B	-	-	21.46	32.38
34	F18C	5.90	11.25	-	-
35	F17+F18A+F18B+F18C	-	-	26.32	43.14
36	F9 THRU F18	-	-	68.15	129.41
37	F19	8.90	16.98	-	-
38	F9 THRU F19	-	-	74.75	139.13
39	F20	8.26	15.80	-	-
40	F9 THRU F20	-	-	80.19	152.56
41	F23	9.88	18.86	-	-
42	F24	7.21	13.76	-	-
43	F25	2.64	5.03	-	-
43	F23+F24+F25	-	-	17.19	32.80
44	F26	10.58	20.19	-	-
45	F27	7.19	13.72	-	-
45	F23+F24+F25+F27	-	-	22.41	43.56
46	OS4	33.95	64.80	-	-
47	F3 THRU F27+OS4	-	-	53.72	109.34
48	F28	1.49	2.84	-	-
48	F23 THRU F28+OS4	-	-	54.45	110.15
49	F29	17.41	33.23	-	-
49	F23 THRU F29+OS4	-	-	65.21	131.33
50	F21	5.76	11.03	-	-
50	F21+F23-F29+OS4	-	-	68.20	136.07
51	F30	4.31	8.22	-	-
52	F9-F21+F23-F30+OS4	-	-	133.52	261.71
53	F22	4.59	8.76	-	-
53	F9-F30+OS4	-	-	136.10	266.66
54	F31	22.39	42.74	-	-
54	F9 THRU F31+OS4	-	-	149.76	291.33
55	F32	11.49	21.93	-	-
55	F1 THRU F32+OS4	-	-	214.01	429.58
56	G1	6.08	11.61	-	-
57	G2	3.31	6.32	9.20	17.56

BASINS DESIGNATION — A
BASINS AREA (ACRES) — 9.42 | .19 .52 — 5YR & 100YR RUNOFF COEFFICIENTS

- DESIGN POINT
- FLOW ARROW
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY

N

50 0 25 50 100
SCALE: 1"= 50 ' HORIZ.

SETLZER HEIGHTS
PRELIMINARY DRAINAGE REPORT

TITLE: PROPOSED DRAINAGE MAP

ADDRESS: 8120 E. 168TH AVE
BRIGHTON, COLORADO 80602

LOCATION: SECTION 4
TOWNSHIP 1 SOUTH, RANGE 67 WEST

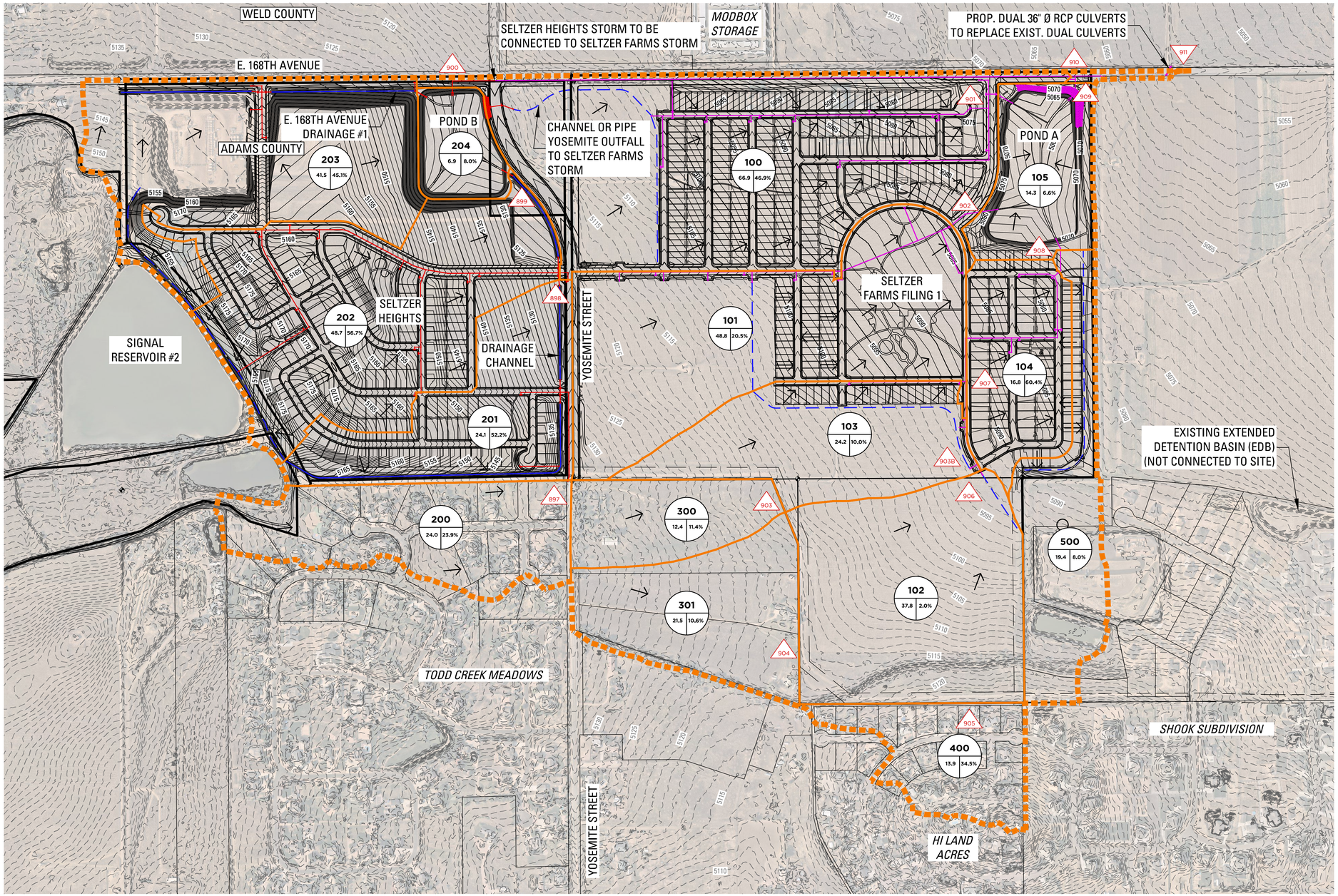
DATE: 05/24/2024

REV 1:	REV 3:
REV 2:	REV 4:

SHEET 1 OF 3

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

J:\01\08\FILING 1 HSS\CIVIL\DRAINAGE\PHASE III\CAD FILES\2201-PH2-HSS-DRN.DWG



DEVELOPED RUNOFF SELTZER HEIGHTS + SELTZER FARMS F1			
	PEAK DISCHARGE		
DESIGN POINT	5-YEAR	10-YEAR	100-YEAR
	CFS	CFS	CFS
897	10.0	13.5	35.1
898	34.7	44.6	100.6
899	81.4	102.5	220.9
POND B	123.2	156.3	340.8
900	4.1	12.3	33.1
901	53.6	67.8	148.2
902	17.4	24.0	64.4
903	4.0	5.8	16.5
903B	10.0	14.6	42.8
904	9.0	12.9	36.0
905	16.1	21.1	47.0
906	33.5	47.7	130.9
907	43.0	61.4	171.6
908	58.0	80.2	211.6
POND A	136.3	183.2	459.7
909	8.6	10.6	50.7
910	12.7	22.8	83.7
911	12.7	22.8	83.7

DRAINAGE MAP LEGEND

- 104 — 18.2 / 61.2% — SUB BASIN NAME; SELTZER HEIGHTS AND SELTZER FARMS FILING 1 IMPERVIOUSNESS; BASIN AREA (ACRES)
- 308 — SWMM MODEL DESIGN POINT
- MAJOR DRAINAGE BASIN BOUNDARY
- MINOR DRAINAGE BASIN BOUNDARY
- MAJOR DRAINAGE FLOW PATH
- PROPOSED CHANNEL DIVERSION DIRECTIONAL FLOW ARROW
- SELTZER FARMS STORM DRAIN
- SELTZER HEIGHTS STORM DRAIN

TOPOGRAPHIC DATA OBTAINED FROM THE DENVER REGIONAL COUNCIL OF GOVERNMENTS (DRCOG). 2020 DRCOG BLOCK 2, QL2 LIDAR DATA SET.

N

300 0 150 300 600

SCALE: 1"= 300 ' HORIZ.

SELTZER HEIGHTS
PRELIMINARY DRAINAGE REPORT

TITLE: CUHP/SWMM MAP
SELTZER HEIGHTS W/ SELTZER FARMS F1

ADDRESS: 8120 E. 168TH AVE
BRIGHTON, COLORADO 80602

LOCATION: SECTION 4
TOWNSHIP 1 SOUTH, RANGE 67 WEST

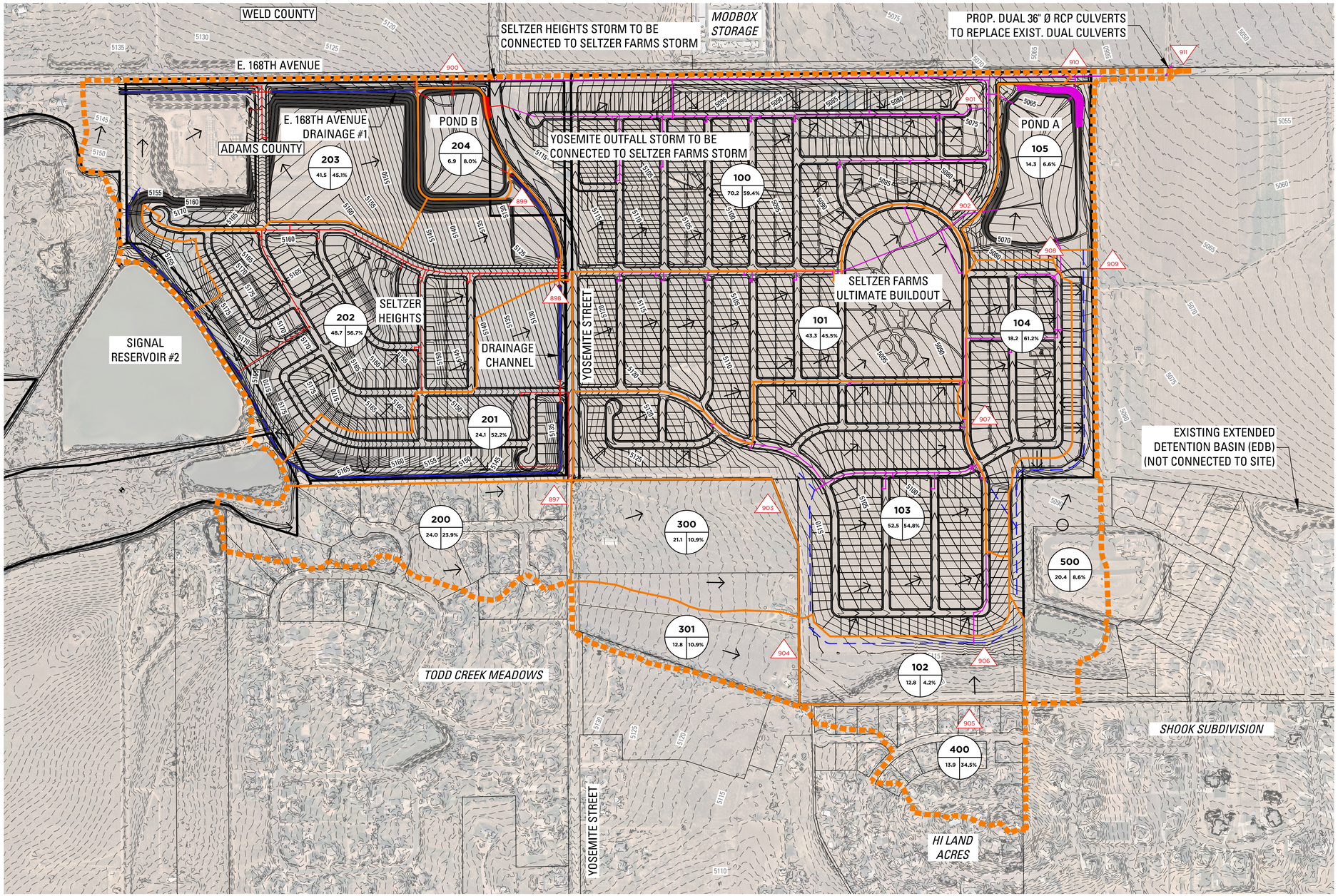
DATE: 05/24/2024

REV 1:	REV 3:
REV 2:	REV 4:

SHEET 2 OF 3

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ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

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DEVELOPED RUNOFF SELTZER HEIGHTS + SELTZER FARMS ULT.			
	PEAK DISCHARGE		
DESIGN POINT	5-YEAR	10-YEAR	100-YEAR
	CFS	CFS	CFS
897	10.0	13.5	35.1
898	34.8	44.6	100.6
899	81.5	102.6	221.0
POND B	123.2	156.3	340.8
900	4.1	12.3	33.1
901	62.2	76.6	158.0
902	33.0	41.9	92.5
903	8.7	12.4	34.6
904	4.2	6.0	17.1
905	16.1	21.1	47.0
906	21.5	29.5	75.5
907	78.5	102.2	236.5
908	95.5	123.1	279.6
POND A	199.7	254.8	568.5
909	9.7	16.4	52.5
910	13.8	28.6	85.6
911	13.8	28.6	85.6

DRAINAGE MAP LEGEND

104 — SUB BASIN NAME
18.2 — BASIN AREA (ACRES)
61.2% — SELTZER HEIGHTS AND SELTZER FARMS FILING 1 IMPERVIOUSNESS

308 — SWMM MODEL DESIGN POINT
MAJOR DRAINAGE BASIN BOUNDARY
MINOR DRAINAGE BASIN BOUNDARY
MAJOR DRAINAGE FLOW PATH
PROPOSED CHANNEL DIVERSION
DIRECTIONAL FLOW ARROW
SELTZER FARMS STORM DRAIN
SELTZER HEIGHTS STORM DRAIN

TOPOGRAPHIC DATA OBTAINED FROM THE DENVER REGIONAL COUNCIL OF GOVERNMENTS (DRCOG). 2020 DRCOG BLOCK 2, QL2 LIDAR DATA SET.

N

300 0 150 300 600

SCALE: 1"= 300 ' HORIZ.

SELTZER HEIGHTS PRELIMINARY DRAINAGE REPORT	
TITLE: CUHP/SWMM MAP SELTZER HEIGHTS W/ SELTZER FARMS ULT.	
ADDRESS: 8120 E. 168TH AVE BRIGHTON, COLORADO 80602	
LOCATION: SECTION 4 TOWNSHIP 1 SOUTH, RANGE 67 WEST	
DATE: 05/24/2024	
REV 1:	REV 3:
REV 2:	REV 4:
SHEET 3 OF 3	

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LSC TRANSPORTATION CONSULTANTS, INC.

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

January 20, 2025

Mr. George R. Hanlon Jr.
HSG Land LLC
10450 E. 159th Court
Brighton, CO 80602

Re: Seltzer Heights Filing No. 1
Traffic Impact Analysis
Adams County, CO
LSC #221152

Dear Mr. Hanlon:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact study for the proposed Seltzer Heights Filing No. 1. As shown on Figure 1, the site is generally located south of E. 168th Avenue and west of Yosemite Street in Adams County, Colorado. LSC completed a *Master Traffic Impact Study* (MTIS) for the entire Todd Creek Village development, August 28, 2024, and a Traffic Impact Analysis (TIA) for Seltzer Farms Filing No. 1, dated April 23, 2024.

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 Seltzer Heights Filing No. 1; 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 Seltzer Heights Filing No. 1 projected traffic impacts; and any recommended roadway improvements to mitigate the Seltzer Heights Filing No. 1 traffic impacts.

LAND USE AND ACCESS

LSC completed a *Master Traffic Impact Study* (MTIS) for the entire Todd Creek Village development, dated August 28, 2024. The first filing within the Todd Creek Village Development, Seltzer Farms Filing No. 1, was recently approved for 414 residential dwelling units. Seltzer Farms Filing No. 1 is located south of E. 168th Avenue and east of Yosemite Street and includes the areas shown as Planning Areas 6 and 7 in the MTIS.

The currently proposed Seltzer Heights Filing No. 1 will be the second filing within the Todd Creek Village development. This filing is located south of E. 168th Avenue and west of Yosemite Street and includes the areas shown as Planning Area 1 in the MTIS.

Figure 2 shows the proposed site plan for Seltzer Heights Filing No. 1. It is planned to include 205 single-family detached homes. This is about 14 more single-family detached homes than were assumed for the same area in the MTIS.

Two full movement access points are proposed to Yosemite Street just south of E. 168th Avenue and one full movement access point is proposed to E. 168th Avenue just west of Yosemite Street. Yosemite Street is planned to be reconstructed to align with Weld County Road (WCR) 19 at E. 168th Avenue as part this filing. The realigned intersection of E. 168th Avenue/Yosemite Street/ WCR 19 is planned to be constructed as a two-lane modern roundabout per coordination with Adams County and the City of Thornton.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

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

- **E. 160th Avenue (SH 7)** is an east-west, two-lane state highway south of the site. It is classified by CDOT as Regional Highway (R-A). The intersections with Quebec Street, Yosemite Street, and Havana Street are signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 60 mph west of Riverdale Road and 50 mph east of Riverdale Road. Adams County plans for a four-lane roadway in the future per the *Adams County Transportation Plan*.

- **E. 168th Avenue** is an east-west, two-lane arterial roadway north of the site. The intersections with CR 17, Quebec Street, CR 19, Yosemite Street, CR 23½, and Lima Street are stop-sign controlled. The posted speed limit is 45 mph in the vicinity of the site. This roadway will likely be widened to four lanes in the long term per the *Adams County Transportation Plan*.

- **Quebec Street** is a two-lane, north-south roadway west of the site. The *City of Thornton Transportation and Mobility Master Plan* shows Quebec as a six-lane Major Arterial south of E. 160th Avenue (SH 7), a four-lane Minor Arterial north of E. 160th Avenue (SH 7), and a two-lane Minor Arterial just south of E. 168th Avenue. The intersection of Quebec Street and E. 160th Avenue (SH 7) is currently traffic signal controlled with auxiliary turn lanes. The intersection of Quebec Street and E. 168th Avenue is currently stop-sign controlled with no auxiliary turn lanes.

- **Yosemite Street** is a north-south, two-lane collector roadway that extends through the site. The posted speed limit in the vicinity of the site is 40 mph. The intersection with E. 160th Avenue (SH 7) is signalized with auxiliary turn lanes and the intersection with E. 168th Avenue is stop-sign controlled. Yosemite Street is planned to be realigned as part of the currently proposed Seltzer Heights Filing No. 1 to align with Weld County Road 19 at E. 168th Avenue.

- **Havana Street/Lima Street** is a north-south, two-lane collector roadway east of the site. The intersection with E. 160th Avenue (SH 7) is signalized with auxiliary turn lanes and the intersection with E. 168th Avenue is stop-sign controlled with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 40 mph.

Existing Traffic Conditions

Figure 3a shows the existing traffic volumes in the vicinity of the site on a typical weekday. The weekday peak-hour traffic and daily traffic volumes are from the attached traffic counts conducted by Counter Measures in December, 2022 and January, February, and March, 2023. Figure 3b shows the existing lane geometries, traffic controls, and posted speed limits.

2028 and 2044 Background Traffic

Figure 4a shows the estimated 2028 background traffic and Figure 5a shows the estimated 2044 background traffic. The background traffic is based on an annual growth rate of two percent for traffic on E. 168th Avenue and E. 160th Avenue (SH 7) plus traffic projected to be generated by buildout of the Baseline Lakes development located west of Havana Street/Lima Street.

The annual growth rate is based on a comparison of the existing daily traffic volumes on E. 160th Avenue (SH 7) and the Denver Area Council of Governments (DRCOG) projected 2050 daily traffic volumes.

Figures 4b and 5b show the estimated lane geometry and traffic control.

Existing and 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 the study area were analyzed to determine the existing, 2028 background and 2044 background levels of service using Synchro version 11. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **E. 168th Avenue/CR 17:** All movements at this unsignalized intersection currently operate at LOS "B" or better and are expected to do so through 2044.

2. **E. 168th Avenue/Quebec Street:** All movements at this unsignalized intersection currently operate at LOS "B" or better and are expected to do so through 2044.

3. **E. 168th Avenue/Road A:** This intersection was analyzed only in the total traffic scenarios.

4. **E. 168th Avenue/CR 19:** All movements at this unsignalized intersection currently operate at LOS "B" or better and are expected to do so through 2044.

5. **E. 168th Avenue/Yosemite Street:** All movements at this unsignalized intersection currently operate at LOS "B" or better. Yosemite Street is planned to be realigned to align with CR 19 (Intersection #4) as part of the Seltzer Heights Filing No. 1 development. This realignment will result in the existing Yosemite Street intersection being removed.

6. **E. 168th Avenue/Seltzer Farms Access:** This intersection was analyzed only in the total traffic scenarios.

7. **E. 168th Avenue/Lima Street:** All movements at this unsignalized intersection currently operate at LOS "B" or better and are expected to do so through 2044.

8. **E. 168th Avenue/CR 23½:** All movements at this unsignalized intersection currently operate at LOS "B" or better and are expected to do so through 2044.

9. **E. 168th Avenue/Tucson Street:** All movements at this unsignalized intersection currently operate at LOS "B" or better and are expected to do so through 2044.

10. **E. 160th Avenue (SH 7)/Quebec Street:** This signalized intersection currently operates at an overall LOS "C" during both morning and afternoon peak-hours and is expected to do so through 2028. By 2044 it was assumed that E. 160th Avenue (SH 7) will be widened to a four-lane roadway per the *Adams County TMP*. This intersection is expected to operate at an overall LOS "C" or better during both morning and afternoon peak-hours with two eastbound and two westbound through lanes.

11. **E. 160th Avenue (SH 7)/Yosemite Street:** This signalized intersection currently operates at an overall LOS "B" during both morning and afternoon peak-hours through 2028 with no improvements. By 2044 it was assumed that E. 160th Avenue (SH 7) will be widened to a four-lane roadway per the *Adams County TMP*. This intersection is expected to operate at LOS "A" through 2044 with two eastbound and two westbound through lanes.

12. **E. 160th Avenue (SH 7)/Havana Street:** This signalized intersection currently operates at an overall LOS "A" during the morning peak-hour and LOS "B" during the afternoon peak-hour. In 2028, both peak-hours are expected to operate at LOS "B" with no improvements. By 2044 it was assumed that E. 160th Avenue (SH 7) will be widened to a four-lane roadway per the *Adams County TMP*. This intersection is expected to operate at LOS "A" through 2044 with two eastbound and two westbound through lanes.

13. **E. 160th Avenue (SH 7)/Riverdale Road:** The southbound approach at this unsignaizled intersection currently operates at LOS "B" during the morning peak hour and LOS "E" during the afternoon peak hour. All other movements are currently operating at LOS "D" or better. By 2028 the northbound shared left/through lane is also expected to operate at LOS "E" during the afternoon peak hour. By 2044 the northbound shared left/through lane is expected to operate at LOS "F" during both morning and the afternoon peak hours and the southbound approach is expected to operate at LOS "F" during the afternoon peak hour. This intersection may need to be converted to three-quarter movement over time.

14. **E. 160th Avenue (SH 7)/Tucson Street:** All movements at this unsignalized intersection currently operate at LOS "D" or better and are expected to operate at LOS "E" or better by 2028. By 2044, this intersection is expected to be signalized and operate at an overall LOS "A".

15. **Quebec Street/Eagle Shadow Avenue:** All movements at this unsignalized intersection currently operate at LOS "A" and are expected to do so through 2044.

16. **Quebec Street/E. 162nd Avenue:** All movements at this unsignalized intersection currently operate at LOS "A" and are expected to do so through 2044.

17. **Yosemite Street/Road I:** This intersection was analyzed only in the total traffic scenarios.

18. **Yosemite Street/Road A:** This intersection was analyzed only in the total traffic scenarios.

19. **Yosemite Street/E. 163rd Place:** All movements at this unsignalized intersection are expected to operate at LOS "A" through 2044.

20. **Yosemite Street/E. 162nd Avenue:** All movements at this unsignalized intersection currently operate at LOS "A" and are expected to do so through 2044.

21. **Lima Street/Lansing Court:** All movements at this unsignalized intersection currently operate at LOS "A" and are expected to do so through 2044.

22. **Lima Street/E. 166th Avenue:** All movements at this unsignalized intersection currently operate at LOS "A" and are expected to do so through 2044.

TRIP GENERATION

Table 2 shows the estimated average weekday trip generation for the proposed Seltzer Heights Filing No. 1 land uses based on the rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE). Table 2 also shows a comparison to the trip generation assumed for the same planning area in the MTIS.

Seltzer Heights Filing No. 1 is projected to generate about 1,933 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. This is about 132 more vehicle-trips per day than was assumed for the same planning area in the MTIS. During the morning peak-hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 36 vehicles would enter and about 108 vehicles would exit the site. This is about three more entering vehicles and seven more exiting vehicles than was assumed for the same planning area in the MTIS. During the afternoon peak-hour, which generally occurs for one hour between 4:00 and 6:00 p.m., about 121 vehicles would enter and about 72 vehicles would exit. This is about eight more entering vehicles and five more exiting vehicles than was assumed for the same planning area in the MTIS.

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; the site's proposed land use; and the traffic counts.

TRIP ASSIGNMENT

Figure 7a shows the traffic volumes estimated to be generated by Seltzer Heights Filing No. 1 based on the directional distribution percentages (from Figure 6) and the trip generation estimate (from Table 2).

Figure 7b shows the traffic volumes estimated to be generated by Seltzer Farms Filing No. 1 which was recently approved based on the directional distribution percentages and the trip generation estimate taken from the MTIS.

Figure 7c shows the traffic volumes estimated to be generated by future filings within the Todd Creek Farms development based on the directional distribution percentages and the trip generation estimate taken from the MTIS.

2028 AND 2044 TOTAL TRAFFIC

Figure 8a shows the 2028 total traffic which is the sum of the 2028 background traffic volumes (from Figure 4a) and the Seltzer Heights Filing No. 1 generated traffic volumes (from Figure 7a) and the Seltzer Farms Filing No. 1 generated traffic volumes (from Figure 7b). Figure 8b shows the recommended 2028 lane geometry and traffic control.

Figure 9a shows the 2044 total traffic which is the sum of 2044 background traffic volumes (from Figure 5a), the Seltzer Heights Filing No. 1 generated traffic volumes (from Figure 7a) and the Seltzer Farms Filing No. 1 generated traffic volumes (from Figure 7b) and the Todd Creek Farms future filings generated traffic (from Figures 7c). Figure 9b shows the recommended 2044 lane geometry and traffic control.

TRAFFIC SIGNAL WARRANT ANALYSIS

The intersections of E. 160th Avenue (SH 7)/Riverdale Road (#13) and E. 160th Avenue (SH 7)/ Tucson Street (#14) were analyzed to determine if and when Eight-Hour, Four-Hour, and Peak-Hour Vehicular Volume Traffic Signal Warrants would be met based on the projected 2028 and 2044 traffic volumes.

Table 3 shows the results of the analysis for the intersection of E. 160th Avenue (SH 7)/Riverdale Road (#13). As shown on the table this intersection will not likely meet any of the traffic signal warrants based on the projected 2044 total traffic volumes.

Table 4 shows the results of the analysis for the intersection of E. 160th Avenue (SH 7)/Tuscon Street (#14). As shown on the table this intersection is **not** expected to meet the eight-hour and four-hour vehicular volume traffic signal warrants based on the projected 2028 total traffic volumes. The intersection is expected to meet the peak hour warrant by 2028, however, this warrant may not be applicable for this intersection as it should only be applied to intersections that attract or discharge large numbers of vehicles over a short time. By 2044 both the four-hour and the eight-hour vehicular volume traffic signal warrants are anticipated to be met.

PROJECTED LEVELS OF SERVICE

The intersections in the study area were analyzed to determine the 2028 and 2044 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **E. 168th Avenue/CR 17:** All movements at this unsignalized intersection are expected to operate at LOS “B” or better through 2044.

2. **E. 168th Avenue/Quebec Street:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better through 2044.

3. **E. 168th Avenue/Road A:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better through 2044.

4. **E. 168th Avenue/CR 19:** All approaches at this intersection are expected to operate at LOS "A" during the peak-hours through 2044 if it is constructed as a modern two-lane roundabout.

5. **E. 168th Avenue/Yosemite Street:** Yosemite Street is planned to be realigned to align with CR 19 (Intersection #4) as part of the currently proposed Seltzer Heights Filing No. 1. This realignment will result in the existing Yosemite Street intersection being removed.

6. **E. 168th Avenue/Seltzer Farms Access:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better through 2044.

7. **E. 168th Avenue/Lima Street:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better through 2028. This intersection is planned to be reconstructed as a modern roundabout as part of a future Todd Creek Farms filings. It is expected to operate at an overall LOS "A" through 2044 as a modern roundabout.

8. **E. 168th Avenue/CR 23½:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better through 2044.

9. **E. 168th Avenue/Tucson Street:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better through 2044.

10. **E. 160th Avenue (SH 7)/Quebec Street:** This signalized intersection is expected to operate "C" during the morning peak-hour and at LOS "D" during the afternoon peak-hour in 2028 if E. 160th Avenue (SH 7) remains a two-lane roadway. By 2044 it was assumed that E. 160th Avenue (SH 7) will be widened to provide two eastbound and two westbound through lanes per the *Adams County TMP*. Based on the lane geometry shown in Figure 9b both peak-hours are expected to operate at an overall LOS "C" or better during both morning and afternoon peak-hours through 2044.

11. **E. 160th Avenue (SH 7)/Yosemite Street:** This signalized intersection is expected to operate at an overall LOS "B" during the peak-hours through 2028. By 2044 it was assumed that E. 160th Avenue (SH 7) will be widened to a four-lane roadway per the *Adams County TMP*. Based on the lane geometry shown in Figure 9b this intersection is expected to operate at LOS "B" during both morning and afternoon peak-hours through 2044.

12. **E. 160th Avenue (SH 7)/Havana Street:** This signalized intersection is expected to operate at an overall LOS "B" or better during both morning and afternoon peak-hours through 2028. By 2044 it was assumed that E. 160th Avenue (SH 7) will be widened to a four-lane roadway per the *Adams County TMP*. Based on the lane geometry shown in Figure 9b this intersection is expected to operate at LOS "A" during both morning and afternoon peak-hours through 2044.

13. **E. 160th Avenue (SH 7)/Riverdale Road:** The northbound left-turn movement at this unsignalized intersection is expected to operate at "E" or "F" in one or both peak-hours through 2044 if this intersections remains a stop-sign controlled full-movement intersection. Potential mitigation would be conversion to three-quarter movement.

14. **E. 160th Avenue (SH 7)/Tucson Street:** The southbound left-turn movement is expected to operate at LOS "F" by 2028 if this intersection remains stop-sign controlled. This intersection is planned to be converted to traffic signal control, however, as discussed in the Signal Warrant section above traffic signal warrants are not anticipated to be met in the short term. By 2044 it was assumed that E. 160th Avenue (SH 7) will be widened to a four-lane roadway per the *Adams County TMP* and this intersection will be converted to traffic signal control. As a signal controlled intersection it is expected to operate at an overall LOS "A" through 2044.

15. **Quebec Street/Eagle Shadow Avenue:** All movements at this unsignalized intersection are expected to operate at LOS "A" through 2044.

16. **Quebec Street/E. 162nd Avenue:** All movements at this unsignalized intersection are expected to operate at LOS "A" through 2044.

17. **Yosemite Street/Road I:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better through 2044.

18. **Yosemite Street/Road A:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better through 2044.

19. **Yosemite Street/E. 163rd Place:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better through 2044.

20. **Yosemite Street/E. 162nd Avenue:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better through 2044.

21. **Lima Street/Lansing Court:** All movements at this unsignalized intersection are expected to operate at LOS "A" through 2044.

22. **Lima Street/E. 166th Avenue:** All movements at this unsignalized intersection are expected to operate at LOS "B" or better through 2044.

QUEUING ANALYSIS

Table 5 shows the estimated 95th percentile queue lengths at the study area intersections. Table 5 also shows the existing and recommended turn lane lengths. The recommended improvements are based on the criteria found in the *Adams County Development Standards and Regulations*, in the *Colorado State Highway Access Code*, and City of Thornton Standards.

RECOMMENDED IMPROVEMENTS

The recommended improvements needed by 2028 are shown in Figure 8b and detailed in Tables 5 and 6. The 2044 recommended improvements are shown in Figure 9b and Tables 5 and 6.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. Seltzer Heights Filing No. 1 of the Todd Creek Village development is projected to generate about 1,933 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 36 vehicles would enter and about 108 vehicles would exit the site. During the afternoon peak-hour, about 121 vehicles would enter and about 72 vehicles would exit.

Projected Levels of Service

2. All of the existing signalized intersections analyzed are expected to operate at an overall LOS "D" or better during both peak-hours through 2044 with the recommended improvements.

3. The southbound approach at the intersection of E. 160th Avenue (SH 7)/Tucson Street (#14) is expected to operate at LOS "F" during the peak-hours by 2028. This intersection is expected to meet multiple traffic signal warrants in the future, however, it is not expected to meet either a four-hour vehicular volume traffic signal warrant nor an eight-hour vehicular volume traffic signal warrant with buildout of Seltzer Farms Filing No. 1, which was recently approved, and the proposed Seltzer Heights Filing No. 1. It is not uncommon for the minor movements at an unsignalized intersection to operate at LOS "F" as the volumes approach those where a traffic signal warrant will be met. The warrant should be re-evaluated with future traffic studies in this area.

4. The northbound left-turn movement at the E. 160th Avenue (SH 7)/Riverdale Road intersection is expected to operate at LOS "E" of "F" in one or both peak-hours through 2044 if this intersections remains a stop-sign controlled full-movement intersection. Potential mitigation would be conversion to three-quarter movement.

5. All movements at all of the other unsignalized intersections analyzed are expected to operate at LOS "D" or better through 2044.

Conclusions

6. The impact of the proposed Seltzer Heights Filing No. 1 development can be accommodated by the existing roadway network with the recommended improvements.

Recommendations

7. The recommended improvements for buildout of Seltzer Farms Filing No. 1 and Seltzer Heights Filing No. 1 are shown in Figures 8b and 9b and are detailed in Tables 5 and 6.

8. After initial review by Adams County it will be determined if the County or applicant should prepare State Highway Access Permit applications for either intersection #10 (SH 7/Quebec Street) or #11 (SH 7/Yosemite Street).

* * * * *

We trust our findings will assist you in gaining approval of the proposed Seltzer Heights Filing No. 1 development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

COLORADO LICENSED CHRISTOPHER S. McGRANAHAN 39018 PROFESSIONAL ENGINEER

1-20-25

By _____
Christopher S. McGranahan, PE
Principal/President

CSM/wc

Enclosures: Tables 1 - 6
Figures 1 - 9b
Traffic Count Reports
Level of Service Definitions
Level of Service Reports
Queuing Reports

G:\Shared drives\Denver Projects 2021-2030\2022\221152-ToddCreekFiling2\Report\2025 01 Jan\Seltzer HeightsFilingNo1-012025.wpd

Table 1 (Page 1 of 6)
Intersection Levels of Service Analysis
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2028 Background Traffic Level of Service AM	2028 Background Traffic Level of Service PM	2028 Total Traffic Level of Service AM	2028 Total Traffic Level of Service PM	2044 Background Traffic Level of Service AM	2044 Background Traffic Level of Service PM	2044 Total Traffic Level of Service AM	2044 Total Traffic Level of Service PM
1) E. 168th Avenue/CR 17	TWSC										
EB Left/Through		A	A	A	A	A	A	A	A	A	A
SB Approach		A	B	A	B	B	B	A	A	B	B
Critical Movement Delay		9.6	10.5	9.8	10.9	10.6	12.7	9.7	9.7	11.5	13.9
2) E. 168th Avenue/Quebec Street	TWSC										
NB Approach		A	B	A	B	--	--	--	--	--	--
NB Left		--	--	--	--	B	C	B	B	B	C
NB Right		--	--	--	--	A	B	A	A	A	B
WB Left or Left/Through		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		9.4	10.6	9.6	11.0	11.9	15.5	10.7	10.7	12.9	20.2
3) E. 168th Avenue/Road A	TWSC										
NB Left		--	--	--	--	B	B	--	--	B	C
NB Right		--	--	--	--	A	A	--	--	A	B
WB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	12.0	14.0	--	--	12.8	18.3
4) E. 168th Avenue/CR 19	TWSC										
NB Left		--	--	--	--	--	--	B	B	--	--
NB Through/Right		--	--	--	--	--	--	A	A	--	--
EB Left/Through or Left		A	A	A	A	--	--	A	A	--	--
WB Left		--	--	--	--	--	--	A	A	--	--
SB Approach		B	B	B	B	--	--	--	--	--	--
SB Left		--	--	--	--	--	--	B	B	--	--
SB Through/Right		--	--	--	--	--	--	A	A	--	--
Critical Movement Delay		10.4	11.0	10.6	11.3	--	--	11.9	11.9	--	--
EB Approach	Roundabout	--	--	--	--	A	A	--	--	A	A
WB Approach		--	--	--	--	A	A	--	--	A	A
NB Approach		--	--	--	--	A	A	--	--	A	A
SB Approach		--	--	--	--	A	A	--	--	A	A
Entire Intersection Delay (sec /veh)		--	--	--	--	4.1	4.6	--	--	3.9	4.7
Entire Intersection LOS		--	--	--	--	A	A	--	--	A	A

Table 1 (Page 2 of 6)
Intersection Levels of Service Analysis
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2028 Background Traffic Level of Service AM	2028 Background Traffic Level of Service PM	2028 Total Traffic Level of Service AM	2028 Total Traffic Level of Service PM	2044 Background Traffic Level of Service AM	2044 Background Traffic Level of Service PM	2044 Total Traffic Level of Service AM	2044 Total Traffic Level of Service PM
5) E. 168th Avenue/Yosemite Street	TWSC										
NB Approach		B	B	B	B	Intersection To Be Closed With Development of Seltzer Heights Filing No. 1					
WB Left/Through		A	A	A	A						
Critical Movement Delay		10.5	10.9	10.6	11.3						
6) E. 168th Avenue/Seltzer Farms Access	TWSC										
NB Approach		--	--	--	--	B	B	--	--	B	B
WB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	10.4	12.1	--	--	10.5	13.1
7) E. 168th Avenue/Lima Street	TWSC										
NB Left		B	B	B	B	B	B	B	B	--	--
NB Right		A	A	A	B	A	B	A	A	--	--
WB Left		A	A	A	A	A	A	A	A	--	--
Critical Movement Delay		10.5	12.2	10.9	13.0	11.9	14.9	10.7	10.7	--	--
	Roundabout										
EB Approach		--	--	--	--	--	--	--	--	A	A
WB Approach		--	--	--	--	--	--	--	--	A	A
NB Approach		--	--	--	--	--	--	--	--	A	A
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	--	--	3.9	4.6
Entire Intersection LOS		--	--	--	--	--	--	--	--	A	A
8) E. 168th Avenue/CR 23 1/2	TWSC										
EB Left/Through or Left		A	A	A	A	A	A	A	A	A	A
SB Approach		A	B	B	B	B	B	B	B	B	B
Critical Movement Delay		9.8	11.0	10.1	11.4	10.6	12.7	10.1	10.1	11.0	14.3
9) E. 168th Avenue/Tucson Street	TWSC										
NB Approach		A	B	A	B	B	B	A	A	B	C
WB Left/Through or Left		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		9.6	10.3	9.8	10.9	11.0	13.4	9.8	9.8	12.2	18.1

Table 1 (Page 3 of 6)
Intersection Levels of Service Analysis
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2028 Background Traffic Level of Service AM	2028 Background Traffic Level of Service PM	2028 Total Traffic Level of Service AM	2028 Total Traffic Level of Service PM	2044 Background Traffic Level of Service AM	2044 Background Traffic Level of Service PM	2044 Total Traffic Level of Service AM	2044 Total Traffic Level of Service PM
10) E. 160th Avenue (SH 7)/Quebec Street	Signalized										
EB Left		D	D	D	E	E	E	D	D	D	D
EB Through		B	C	B	C	B	D	B	B	C	C
EB Right		B	B	B	B	B	B	A	A	A	A
WB Left		D	D	D	E	E	E	D	C	D	D
WB Through		B	B	B	B	C	B	B	B	C	B
WB Right		A	A	A	A	A	A	A	A	B	B
NB Left		D	D	D	E	E	E	D	C	D	D
NB Through		C	C	C	D	D	D	C	C	C	C
NB Right		C	C	C	D	D	D	A	A	A	A
SB Left		D	D	D	E	E	E	D	C	D	D
SB Through/Right or Through		C	D	D	D	D	D	D	C	D	D
SB Right		--	--	--	--	D	D	D	C	D	D
Entire Intersection Delay (sec /veh)		21.4	24.0	24.0	31.6	28.8	36.1	21.2	18.6	28.4	26.7
Entire Intersection LOS		C	C	C	C	C	D	C	B	C	C
11) E. 160th Avenue (SH 7)/Yosemite Street	Signalized										
EB Left		A	A	A	A	B	A	A	A	B	B
EB Through		A	B	A	B	A	B	A	A	B	B
EB Right		A	A	A	A	A	A	A	A	A	A
WB Left		A	A	A	A	A	A	A	A	A	B
WB Through		B	A	B	A	B	A	A	A	B	B
WB Right		A	A	A	A	A	A	A	A	A	A
NB Left		C	C	C	C	C	C	C	C	C	C
NB Through/Right		C	C	C	C	C	C	C	C	C	C
SB Left		C	C	C	C	C	C	C	C	C	C
SB Through/Right or Through		C	C	C	C	C	C	B	B	C	C
SB Right		--	--	--	--	C	C	B	B	C	C
Entire Intersection Delay (sec /veh)		10.1	10.2	10.6	10.4	15.4	12.4	8.3	8.3	15.1	13.9
Entire Intersection LOS		B	B	B	B	B	B	A	A	B	B

Table 1 (Page 4 of 6)
Intersection Levels of Service Analysis
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2028 Background Traffic Level of Service AM	2028 Background Traffic Level of Service PM	2028 Total Traffic Level of Service AM	2028 Total Traffic Level of Service PM	2044 Background Traffic Level of Service AM	2044 Background Traffic Level of Service PM	2044 Total Traffic Level of Service AM	2044 Total Traffic Level of Service PM
12) E. 160th Avenue (SH 7)/Havana Street	Signalized										
EB Left		A	A	A	A	A	A	A	A	A	A
EB Through		A	B	A	B	A	B	A	A	A	A
EB Right		A	A	A	A	A	A	A	A	A	A
WB Left		A	A	A	B	A	B	A	A	A	A
WB Through		B	A	B	A	B	A	A	A	A	A
WB Right		A	A	A	A	A	A	A	A	A	A
NB Left		B	C	C	C	C	C	B	B	B	C
NB Through/Right		B	C	C	C	C	C	B	B	C	C
SB Left		B	C	C	C	C	C	B	B	C	C
SB Through/Right		B	C	B	C	C	C	--	--	--	--
SB Through		--	--	--	--	--	--	B	B	B	C
SB Right		--	--	--	--	--	--	B	B	C	C
Entire Intersection Delay (sec /veh)		9.8	10.4	10.1	10.8	10.1	11.0	8.5	8.5	9.2	9.9
Entire Intersection LOS		A	B	B	B	B	B	A	A	A	A
13) E. 160th Avenue (SH 7)/Riverdale Road	TWSC										
NB Left/Through		D	D	D	**E**	D	**E**	**F**	**F**	**F**	**F**
NB Right		A	A	A	A	A	A	A	A	A	A
EB Left/Through or Left		A	A	A	A	A	A	A	A	A	A
WB Left		A	B	B	B	B	B	B	C	C	C
SB Approach		B	**E**	B	**E**	B	**F**	B	**F**	B	**F**
Critical Movement Delay		27.4	37.1	32.8	49.8	33.9	57.7	58.4	143.9	71.0	>240

Table 1 (Page 5 of 6)
Intersection Levels of Service Analysis
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2028 Background Traffic Level of Service AM	2028 Background Traffic Level of Service PM	2028 Total Traffic Level of Service AM	2028 Total Traffic Level of Service PM	2044 Background Traffic Level of Service AM	2044 Background Traffic Level of Service PM	2044 Total Traffic Level of Service AM	2044 Total Traffic Level of Service PM
14) E. 160th Avenue (SH 7)/Tucson Street	TWSC										
EB Left		B	B	B	B	B	B	--	--	--	--
SB Approach		D	D	**E**	**E**	**F**	**F**	--	--	--	--
Critical Movement Delay		28.8	30.0	38.4	41.6	203.1	>240	--	--	--	--
	Signalized										
EB Left		--	--	--	--	--	--	A	A	A	A
EB Through		--	--	--	--	--	--	A	A	A	A
WB Through		--	--	--	--	--	--	A	A	A	A
WB Right		--	--	--	--	--	--	A	A	A	A
SB Left		--	--	--	--	--	--	D	D	D	D
SB Right		--	--	--	--	--	--	D	D	D	D
Entire Intersection Delay (sec /veh)		--	--	--	--	--	--	6.4	6.4	8.1	7.4
Entire Intersection LOS		--	--	--	--	--	--	A	A	A	A
15) Quebec Street/Eagle Shadow Avenue	TWSC										
NB Left		A	A	A	A	A	A	A	A	A	A
EB Approach		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		8.7	8.7	8.7	8.7	8.8	8.7	8.6	8.6	8.7	8.6
16) Quebec Street/E. 162nd Avenue	TWSC										
NB Left/Through or Left		A	A	A	A	A	A	A	A	A	A
EB Approach		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		9.0	8.8	9.0	8.8	9.0	8.9	8.8	8.8	8.8	8.8
17) Yosemite Street/Road I	TWSC										
NB Left		--	--	--	--	A	A	--	--	A	A
EB Left		--	--	--	--	A	A	--	--	B	B
EB Through/Right		--	--	--	--	A	A	--	--	A	A
WB Left		--	--	--	--	A	B	--	--	B	B
WB Through/Right		--	--	--	--	A	A	--	--	A	A
SB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.4	10.0	--	--	10.9	13.7

Table 1 (Page 6 of 6)
Intersection Levels of Service Analysis
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January 2025

Intersection No. & Location	Traffic Control	Existing Traffic Level of Service AM	Existing Traffic Level of Service PM	2028 Background Traffic Level of Service AM	2028 Background Traffic Level of Service PM	2028 Total Traffic Level of Service AM	2028 Total Traffic Level of Service PM	2044 Background Traffic Level of Service AM	2044 Background Traffic Level of Service PM	2044 Total Traffic Level of Service AM	2044 Total Traffic Level of Service PM
18) Yosemite Street/Road A	TWSC										
NB Left		--	--	--	--	A	A	--	--	A	A
EB Left		--	--	--	--	A	B	--	--	B	B
EB Through/Right		--	--	--	--	A	A	--	--	A	A
WB Left		--	--	--	--	A	B	--	--	B	C
WB Through/Right		--	--	--	--	A	A	--	--	A	A
SB Left		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	9.8	11.2	--	--	12.2	16.7
19) Yosemite Street/E. 163rd Place	TWSC										
NB Left/Through		A	A	A	A	A	A	A	A	A	A
EB Approach		A	A	A	A	A	A	A	A	B	A
Critical Movement Delay		8.5	8.5	8.5	8.5	9.7	9.0	8.4	8.4	10.7	9.7
20) Yosemite Street/E. 162nd Avenue	TWSC										
NB Left/Through		A	A	A	A	A	A	A	A	A	A
EB Approach		A	A	A	A	A	A	A	A	B	B
Critical Movement Delay		8.5	8.5	8.5	8.5	9.6	9.2	8.5	8.5	10.6	10.2
21) Lima Street/Lansing Court	TWSC										
NB Approach		A	A	A	A	A	A	A	A	A	A
EB Approach		A	A	A	A	A	A	A	A	A	A
WB 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		9.2	9.4	8.6	8.7	8.6	8.7	8.6	8.6	9.4	9.4
22) Lima Street/E. 166th Avenue	TWSC										
NB Approach		A	A	A	A	A	A	A	A	A	A
EB Approach		A	A	A	A	A	A	A	A	A	A
WB Approach		--	--	--	--	--	--	--	--	A	B
SB Approach		--	--	--	--	--	--	--	--	A	A
Critical Movement Delay		8.4	8.7	8.4	8.7	8.4	8.7	8.4	8.4	9.4	10.0

Table 2
Trip Generation Estimate
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Planning Area	Land Use Description	Trip Generation Units	Trip Generation Rates [1] Average Weekday Traffic	Morning Peak Hour In	Morning Peak Hour Out	Afternoon Peak Hour In	Afternoon Peak Hour Out	Total Trips Generated Average Weekday Traffic	Morning Peak Hour In	Morning Peak Hour Out	Afternoon Peak Hour In	Afternoon Peak Hour Out
Trip Generation Estimate Based on the Currently Proposed Seltzer Heights Filing No. 1 Land Uses												
1	Single Family Detached Housing[2]	**205 DU[3]**	9.43	0.175	0.525	0.592	0.348	**1,933**	**36**	**108**	**121**	**72**
Trip Generation Estimate Assumed in the *Todd Creek Village Master Traffic Impact Analysis*, August 28, 2024												
1	Single Family Detached Housing	191 DU	9.43	0.175	0.525	0.592	0.348	1,801	33	101	113	67
	Change	**14 DU**						**132**	**3**	**7**	**8**	**5**

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

Table 3
Intersection #13 - E. 160th Avenue (SH 7)/Riverdale Road
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Warrant Analysis[1]

Hour	Traffic Volumes (vehicles per hour)		Warrant 1: Eight Hour Vehicular Volume Evaluation						Warrant 2: Four Hour Vehicular Volume		Warrant 3: Peak Hour Vehicular Volume	
			Warrant Thresholds				Warrant Threshold Met?		70% Warrant Threshold Minor Minimum	Warrant Threshold Met?	70% Warrant Threshold Minor Minimum	Warrant Threshold Met?
	Major[2]	Minor Leg[3]	Condition A (70%)		Condition B (70%)							
			Major	Minor	Major	Minor	A	B				
2044 Total Traffic												
6-7 AM	1907	8	420	105	630	53	No	No	80	No	75	No
7-8 AM	2395	14	420	105	630	53	No	No	80	No	75	No
8-9 AM	2872	35	420	105	630	53	No	No	80	No	75	No
9-10 AM	2307	42	420	105	630	53	No	No	80	No	75	No
10-11 AM	2205	39	420	105	630	53	No	No	80	No	75	No
11-12 PM	2418	38	420	105	630	53	No	No	80	No	75	No
12-1 PM	2420	16	420	105	630	53	No	No	80	No	75	No
1-2 PM	2372	15	420	105	630	53	No	No	80	No	75	No
2-3 PM	2460	15	420	105	630	53	No	No	80	No	75	No
3-4 PM	2756	15	420	105	630	53	No	No	80	No	75	No
4-5 PM	2974	24	420	105	630	53	No	No	80	No	75	No
5-6 PM	3113	32	420	105	630	53	No	No	80	No	75	No
6-7 PM	2209	29	420	105	630	53	No	No	80	No	75	No
7-8 PM	1429	19	420	105	630	53	No	No	80	No	75	No
8-9 PM	939	15	420	105	630	53	No	No	80	No	145	No
9-10 PM	614	11	420	105	630	53	No	No	126	No	245	No
Numbers of Hours the Warrant Thresholds Are Met							**0**	**0**		**0**		**0**
Warrant Met?							**No**			**No**		**No**

Notes:
(1) Thresholds are based on 2 or more lanes on the major approach and 1 lane on the minor approach with the 70% factor applied for a posted speed limit above 40 mph
(2) The major street traffic includes all movements (left, through, and right)
(3) The minor street traffic includes left-turn only volume from the minor street

Source: LSC Transportation Consultants, Inc.

Table 4
Intersection #14 - E. 160th Avenue (SH 7)/Tuscon Street
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Warrant Analysis[1]

Hour	Traffic Volumes (vehicles per hour)		Warrant 1: Eight Hour Vehicular Volume Evaluation						Warrant 2: Four Hour Vehicular Volume		Warrant 3: Peak Hour Vehicular Volume	
			Warrant Thresholds				Warrant Threshold Met?		70% Warrant Threshold Minor Minimum	Warrant Threshold Met?	70% Warrant Threshold Minor Minimum	Warrant Threshold Met?
			Condition A (70%)		Condition B (70%)							
	Major[2]	Minor Leg[3]	Major	Minor	Major	Minor	A	B				
2028 Total Traffic												
6-7 AM	1629	51	350	140	525	70	No	No	80	No	75	No
7-8 AM	1916	66	350	140	525	70	No	No	80	No	75	No
8-9 AM	1666	129	350	140	525	70	No	Yes	80	Yes	75	Yes
9-10 AM	1569	113	350	140	525	70	No	Yes	80	Yes	75	Yes
10-11 AM	1515	89	350	140	525	70	No	Yes	80	Yes	75	Yes
11-12 PM	1772	75	350	140	525	70	No	Yes	80	No	75	Yes
12-1 PM	1819	48	350	140	525	70	No	No	80	No	75	No
1-2 PM	1799	30	350	140	525	70	No	No	80	No	75	No
2-3 PM	1898	34	350	140	525	70	No	No	80	No	75	No
3-4 PM	2183	31	350	140	525	70	No	No	80	No	75	No
4-5 PM	2312	45	350	140	525	70	No	No	80	No	75	No
5-6 PM	2397	61	350	140	525	70	No	No	80	No	75	No
6-7 PM	1704	52	350	140	525	70	No	No	80	No	75	No
7-8 PM	1094	39	350	140	525	70	No	No	80	No	115	No
8-9 PM	666	28	350	140	525	70	No	No	110	No	245	No
9-10 PM	437	21	350	140	525	70	No	No	197	No	340	No
Numbers of Hours the Warrant Thresholds Are Met							**0**	**4**		**3**		**4**
Warrant Met?							**No**			**No**		**Yes**
2044 Total Traffic												
6-7 AM	2313	96	350	140	525	70	No	Yes	80	Yes	75	Yes
7-8 AM	2730	123	350	140	525	70	No	Yes	80	Yes	75	Yes
8-9 AM	2378	240	350	140	525	70	Yes	Yes	80	Yes	75	Yes
9-10 AM	2234	208	350	140	525	70	Yes	Yes	80	Yes	75	Yes
10-11 AM	2157	165	350	140	525	70	Yes	Yes	80	Yes	75	Yes
11-12 PM	2523	139	350	140	525	70	No	Yes	80	Yes	75	Yes
12-1 PM	2609	87	350	140	525	70	No	Yes	80	Yes	75	Yes
1-2 PM	2581	54	350	140	525	70	No	No	80	No	75	No
2-3 PM	2721	63	350	140	525	70	No	No	80	No	75	No
3-4 PM	3130	57	350	140	525	70	No	No	80	No	75	No
4-5 PM	3321	82	350	140	525	70	No	Yes	80	Yes	75	Yes
5-6 PM	3448	112	350	140	525	70	No	Yes	80	Yes	75	Yes
6-7 PM	2447	95	350	140	525	70	No	Yes	80	Yes	75	Yes
7-8 PM	1568	71	350	140	525	70	No	Yes	80	No	75	No
8-9 PM	958	52	350	140	525	70	No	No	80	No	145	No
9-10 PM	627	38	350	140	525	70	No	No	122	No	245	No
Numbers of Hours the Warrant Thresholds Are Met							**3**	**12**		**11**		**10**
Warrant Met?							**Yes**			**Yes**		**Yes**

Notes:
(1) Thresholds are based on 1 lane on the major approach and 2 or more lanes on the minor approach with the 70% factor applied for a posted speed limit above 40 mph
(2) The major street traffic includes all movements (left, through, and right)
(3) The minor street traffic includes left-turn only volume from the minor street

Source: LSC Transportation Consultants, Inc.

Table 5 (Page 1 of 4)
95th Percentile Queue Lengths
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Intersection No. & Location	Jurisdiction	Classification	Posted Speed Limit (mph)	Existing Lane Lengths (feet)	Proposed Lane Lengths (feet)	95th Percentile Queue Length 2044 Total AM Peak (feet)	95th Percentile Queue Length 2044 Total PM Peak (feet)
1) E. 168th Avenue/CR 17							
EB Left	Adams County	Minor Arterial	45	- - -	295	<25	<25
SB Approach	Weld County	Arterial	- - -	- - -	- - -	<25	<25
2) E. 168th Avenue/Quebec Street							
NB Left	Adams County	Major Arterial	40	- - -	- - -	<25	<25
NB Right	Adams County	Major Arterial	40	- - -	226	<25	<25
WB Left	Adams County	Minor Arterial	45	- - -	340	<25	<25
EB Right	Adams County	Minor Arterial	45	- - -	273	<25	<25
3) E. 168th Avenue/Road A							
NB Left	Adams County	Collector	35	- - -	250	<25	<25
NB Right	Adams County	Collector	35	- - -	- - -	<25	<25
WB Left	Adams County	Minor Arterial	45	- - -	298	<25	<25
EB Right	Adams County	Minor Arterial	45	- - -	273	<25	<25
4) E. 168th Avenue/CR 19/Yosemite Street							
EB Approach	Adams County	Minor Arterial	40	- - -	Construct as a modern roundabout	<25	25
WB Approach	Adams County	Minor Arterial	40	- - -		25	25
NB Approach	Adams County	Collector	40	- - -		<25	<25
SB Approach	Adams County	Collector	55	- - -		<25	<25
6) E. 168th Avenue/East Remington Access/Seltzer Farms Access							
NB Approach	Adams County	Collector	35	- - -	- - -	<25	<25
WB Left	Adams County	Minor Arterial	45	- - -	367	<25	<25
EB Right	Adams County	Minor Arterial	45	- - -	273	<25	<25
7) E. 168th Avenue/Lima Street							
EB Approach	Adams County	Collector	40	- - -	Reconstruct as a modern roundabout	<25	25
WB Left	Adams County	Collector	40	250		<25	25
NB Right	Adams County	Minor Arterial	40	100		<25	<25
8) E. 168th Avenue/CR 23 1/2							
EB Left	Adams County	Minor Arterial	45	- - -	298	<25	<25
SB Approach	Weld County	Collector	- - -	- - -	- - -	<25	<25

Table 5 (Page 2 of 4)
95th Percentile Queue Lengths
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Intersection No. & Location	Jurisdiction	Classification	Posted Speed Limit (mph)	Existing Lane Lengths (feet)	Proposed Lane Lengths (feet)	95th Percentile Queue Length 2044 Total AM Peak (feet)	95th Percentile Queue Length 2044 Total PM Peak (feet)
9) E. 168th Avenue/Tucson Street							
NB Approach	Adams County	Collector	40	- - -	- - -	<25	40
WB Left	Adams County	Minor Arterial	45	- - -	347	<25	<25
EB Right	Adams County	Minor Arterial	45	- - -	273	<25	<25
10) E. 160th Avenue (SH 7)/Quebec Street							
EB Left	CDOT	R-A	60	550	550	46	84
EB Through	CDOT	R-A	60	- - -	- - -	306	722
EB Right	CDOT	R-A	60	415	415	29	0
WB Left	CDOT	R-A	60	525	590	218	161
WB Through	CDOT	R-A	60	- - -	- - -	490	356
WB Right	CDOT	R-A	60	415	415	0	0
NB Left	Thornton	Major Arterial	45	250	**300**	192	283
NB Through	Thornton	Major Arterial	45	- - -	- - -	42	93
NB Right	Thornton	Major Arterial	45	570	570	0	0
SB Left	Adams County	Major Arterial	40	230	250	51	52
SB Through	Adams County	Major Arterial	40	- - -	- - -	65	63
SB Right	Adams County	Major Arterial	40	- - -	**226**	0	0
11) E. 160th Avenue (SH 7)/Yosemite Street							
EB Left	CDOT	R-A	60	440	600	32	76
EB Through	CDOT	R-A	60	- - -	- - -	190	387
EB Right	CDOT	R-A	60	615	615	4	18
WB Left	CDOT	R-A	60	800	800	23	23
WB Through	CDOT	R-A	60	- - -	- - -	406	258
WB Right	CDOT	R-A	60	700	700	19	28
NB Left	Adams County	Collector	50	lane drop	lane drop	68	68
NB Through/Right	Adams County	Collector	50	- - -	- - -	51	85
SB Left	Adams County	Collector	40	140	395	179	126
SB Through	Adams County	Collector	40	- - -	- - -	49	43
SB Right	Adams County	Collector	40	- - -	**226**	83	48

Table 5 (Page 3 of 4)
95th Percentile Queue Lengths
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Intersection No. & Location	Jurisdiction	Classification	Posted Speed Limit (mph)	Existing Lane Lengths (feet)	Proposed Lane Lengths (feet)	95th Percentile Queue Length 2044 Total AM Peak (feet)	95th Percentile Queue Length 2044 Total PM Peak (feet)
12) E. 160th Avenue (SH 7)/Havana Street							
EB Left	CDOT	R-A	60	515	515	10	25
EB Through	CDOT	R-A	60	- - -	- - -	161	316
EB Right	CDOT	R-A	60	430	430	9	15
WB Left	CDOT	R-A	60	550	550	9	67
WB Through	CDOT	R-A	60	- - -	- - -	228	253
WB Right	CDOT	R-A	60	420	420	0	4
NB Left	Adams County	Collector	40	200	275	40	59
NB Through/Right	Adams County	Collector	40	- - -	- - -	41	51
SB Left	Adams County	Collector	40	275	275	23	20
SB Through	Adams County	Collector	40	- - -	- - -	23	24
SB Right	Adams County	Collector	40	- - -	**226**	38	29
13) E. 160th Avenue (SH 7)/Riverdale Road							
NB Left/Through	Adams County	Collector	45	- - -	- - -	<25	50
NB Right	Adams County	Collector	45	80	273	<25	<25
EB Right	CDOT	R-A	50	460	460	<25	<25
WB Left	CDOT	R-A	50	475	650	80	90
SB Approach	Adams County	Local	25	- - -	- - -	<25	<25
14) E. 160th Avenue (SH 7)/Tucson Street							
EB Left	CDOT	R-A	50	450	450	14	18
EB Through	CDOT	R-A	50	- - -	- - -	180	258
WB Through	CDOT	R-A	50	- - -	- - -	382	383
WB Right	CDOT	R-A	50	325	325	11	17
SB Left	Adams County	Collector	40	- - -	- - -	118	89
SB Right	Adams County	Collector	40	- - -	**226**	40	33
15) Quebec Street/Eagle Shadow Avenue							
EB Approach	Local	Local	25	- - -	- - -	<25	<25
NB Left	Adams County	Major Arterial	40	155	155	<25	<25
16) Quebec Street/E. 162nd Avenue							
EB Approach	Local	Local	25	- - -	- - -	<25	<25
NB Left	Adams County	Major Arterial	40	- - -	**250**	<25	<25

Table 5 (Page 4 of 4)
95th Percentile Queue Lengths
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Intersection No. & Location	Jurisdiction	Classification	Posted Speed Limit (mph)	Existing Lane Lengths (feet)	Proposed Lane Lengths (feet)	95th Percentile Queue Length 2044 Total AM Peak (feet)	95th Percentile Queue Length 2044 Total PM Peak (feet)
17) Yosemite Street/Road I							
NB Left	Adams County	Collector	40	- - -	226	<25	<25
EB Left	Adams County	Collector	35	- - -	190	<25	<25
EB Through/Right	Adams County	Collector	35	- - -	- - -	<25	<25
WB Left	Adams County	Collector	35	- - -	190	<25	<25
WB Through/Right	Adams County	Collector	35	- - -	- - -	<25	<25
SB Left	Adams County	Collector	40	- - -	226	<25	<25
18) Yosemite Street/Road A							
NB Left	Adams County	Collector	40	- - -	226	<25	<25
EB Left	Adams County	Local	25	- - -	90	<25	<25
EB Through/Right	Adams County	Local	25	- - -	- - -	<25	<25
WB Left	Adams County	Collector	35	- - -	190	<25	<25
WB Through/Right	Adams County	Collector	35	- - -	- - -	<25	<25
SB Left	Adams County	Collector	40	- - -	226	<25	<25
19) Yosemite Street/E. 163rd Place							
EB Approach	Adams County	Local	25	- - -	- - -	<25	<25
NB Approach	Adams County	Collector	40	- - -	- - -	<25	<25
20) Yosemite Street/E. 162nd Avenue							
EB Approach	Adams County	Local	25	- - -	- - -	<25	<25
NB Approach	Adams County	Collector	40	- - -	- - -	<25	<25
21) Lima Street/Lansing Court							
NB Approach	Adams County	Collector	40	- - -	- - -	<25	<25
EB Approach	Adams County	Local	25	- - -	- - -	<25	<25
WB Approach	Adams County	Local	25	- - -	- - -	<25	<25
SB Approach	Adams County	Collector	40	- - -	- - -	<25	<25
22) Lima Street/E. 166th Avenue							
NB Approach	Adams County	Collector	40	- - -	- - -	<25	<25
EB Approach	Adams County	Local	25	- - -	- - -	<25	<25
WB Approach	Adams County	Local	25	- - -	- - -	<25	<25
SB Approach	Adams County	Collector	40	- - -	- - -	<25	<25

Table 6 (Page 1 of 3)
Recommended Improvements to Public Street Network
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Inter-section No.	Intersection Location	Recommended Improvements by 2030 (1)	Responsibility	Recommended Improvements by 2044 (1)	Responsibility
	Yosemite Street	Widen to 4 Lanes adjacent to the site and align with WCR 19 at E. 168th Avenue	Seltzer Heights Fil No. 1		
	Quebec Street			Widen to 4 Lanes	Others(2)
	E. 168th Avenue			Widen to 4 Lanes	Others(2)
	E. 160th Avenue (SH 7)			Widen to 4 Lanes plus 2 transit lanes	Others(2)
#1	E. 168th Avenue/WCR 17			EB LT - construct lane - 1 @ 295 feet and 162-foot transition taper	Others(3)
#2	E. 168th Avenue/	WB LT - construct lane - 1 @ 340 feet and 162-foot transition taper	Seltzer Heights Fil No. 1	EB RT - construct lane - 1 @ 273 feet and 162-foot transition taper	Others(3)
	Quebec Street	NB RT - construct lane - 1 @ 226 feet and 144-foot transition taper	Seltzer Heights Fil No. 1		
#3	E. 168th Avenue/	WB LT - construct lane - 1 @ 298 feet and 162-foot transition taper	Seltzer Heights Fil No. 1		
	Road A	EB RT - construct lane - 1 @ 273 feet and 162-foot transition taper	Seltzer Heights Fil No. 1		
		NB LT - construct lane - 1 @ 250 feet and 120-foot transition taper	Seltzer Heights Fil No. 1		
#4	E. 168th Avenue/ Yosemite Street (realigned)/ WCR 19	Construct as modern roundabout	Seltzer Heights Fil No. 1		
#5	E. 168th Avenue/ Yosemite Street (existing)	To be closed when Yosemite Street is realigned south of E. 168th Avenue	Seltzer Heights Fil No. 1		
#6	E. 168th Avenue/	WB LT - construct lane - 1 @ 367 feet and 162-foot transition taper	Seltzer Farms Fil No. 1		
	Seltzer Farms Access	EB RT - construct lane - 1 @ 273 feet and 162-foot transition taper	Seltzer Farms Fil No. 1		
#7	E. 168th Avenue/Lima Street			Reconstruct as a modern roundabout	Future Todd Creek Farms Filings

(1) A transition taper of 18.5:1 was used for all streets with a posted speed limit of 60 mph (222 feet). An appropriate redirect taper for 60 mph is 45:1
A transition taper of 15:1 was used for all streets with a posted speed limit of 50 mph (162 feet). An appropriate redirect taper for 50 mph is 50:1
A transition taper of 13.5:1 was used for all streets with a posted speed limit of 45 mph (162 feet). An appropriate redirect taper for 45 mph is 45:1
A transition taper of 12:1 was used for all streets with a posted speed limit of 40 mph (144 feet). An appropriate redirect taper for 40 mph is 35:1
A transition taper of 10:1 was used for all streets with a posted speed limit of 35 mph (120 feet). An appropriate redirect taper for 35 mph is 20:1
A transition taper of 7.5:1 was used for all streets with a posted speed limit of 25 mph (90 feet). An appropriate redirect taper for 25 mph is 15:1
(2) As shown on the *Thornton Transportation and Mobility Plan* adopted April 26, 2022. Widening of E. 160th Avenue (SH 7) will need to be coordinated with Adams County
(3) Assumed to be constructed as part of future widening of E. 160th to 4 lanes per the *Adams County Transportation Master Plan*.
(4) The proposed Seltzer Heights Filing No. 1 development is not expected to add vehicles to this turning movement. The improvement will likely be the responsibity of other area developments
(5) Assumed to be constructed as part of future widening of Quebec Street to 4 lanes

Table 6 (Page 2 of 3)
Recommended Improvements to Public Street Network
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Inter-section No.	Intersection Location	Recommended Improvements by 2030 [1]	Responsibility	Recommended Improvements by 2044 [1]	Responsibility
#8	E. 168th Avenue/WCR 23 1/2			EB LT - construct lane - 1 @ 298 feet and 162-foot transition taper	Others[3]
#9	E. 168th Avenue/Tucson Street			EB RT - construct lane - 1 @ 273 feet and 162-foot transition taper	Future Todd Creek Farms Filings
				WB LT - construct lane - 1 @ 347 feet and 162-foot transition taper	Others[3]
#10	E. 160th Avenue (SH 7)/ Quebec Street	SB RT - construct lane - 1 @ 226 feet and 144-foot transition taper	Seltzer Heights Fil No. 1	NB LT - extend existing left-turn lane if needed over time	Others[4]
				WB LT - extend existing left-turn lane if needed over time	Others[4]
				SB LT - extend existing left-turn lane if needed over time	Others[4]
#11	E. 160th Avenue (SH 7)/ Yosemite Street	SB RT - construct lane - 1 @ 226 feet and 144-foot transition taper	Seltzer Farms Fil No. 1	EB LT - extend existing left-turn lane if needed over time	Others[4]/ Future Todd Creek Farms Filings
				SB LT - extend existing left-turn lane if needed over time	Others[4]/ Future Todd Creek Farms Filings
#12	E. 160th Avenue (SH 7)/ Lima Street			SB RT - construct lane - 1 @ 226 feet and 144-foot transition taper	Others[4]/ Future Todd Creek Farms Filings
#13	E. 160th Avenue (SH 7)/ Riverdale Road			This intersection may need to be restricted to three-quarter movement (left-in/right-in/right-out only) over time by others	
#14	E. 160th Avenue (SH 7)/ Tucson Street			SB RT - construct lane - 1 @ 226 feet and 144-foot transition taper	Others
				Traffic signalization when warranted	Others
#15	Quebec Street/ Eagle Shadow Avenue	No improvements recommended			
#16	Quebec Street/E. 162nd Avenue			NB LT - construct lane - 1 @ 250 feet and 144-foot transition taper	Others[5]

(1) A transition taper of 18.5:1 was used for all streets with a posted speed limit of 60 mph (222 feet). An appropriate redirect taper for 60 mph is 45:1
A transition taper of 15:1 was used for all streets with a posted speed limit of 50 mph (162 feet). An appropriate redirect taper for 50 mph is 50:1
A transition taper of 13.5:1 was used for all streets with a posted speed limit of 45 mph (162 feet). An appropriate redirect taper for 45 mph is 45:1
A transition taper of 12:1 was used for all streets with a posted speed limit of 40 mph (144 feet). An appropriate redirect taper for 40 mph is 35:1
A transition taper of 10:1 was used for all streets with a posted speed limit of 35 mph (120 feet). An appropriate redirect taper for 35 mph is 20:1
A transition taper of 7.5:1 was used for all streets with a posted speed limit of 25 mph (90 feet). An appropriate redirect taper for 25 mph is 15:1
(2) As shown on the *Thornton Transportation and Mobility Plan* adopted April 26, 2022. Widening of E. 160th Avenue (SH 7) will need to be coordinated with Adams County
(3) Assumed to be constructed as part of future widening of E. 160th to 4 lanes per the *Adams County Transportation Master Plan*.
(4) The proposed Seltzer Heights Filing No. 1 development is not expected to add vehicles to this turning movement. The improvement will likely be the responsibity of other area developments
(5) Assumed to be constructed as part of future widening of Quebec Street to 4 lanes

Table 6 (Page 3 of 3)
Recommended Improvements to Public Street Network
Seltzer Heights Filing No. 1
Adams County, CO
LSC #221152; January, 2025

Inter-section No.	Intersection Location	Recommended Improvements by 2030 (1)	Responsibility	Recommended Improvements by 2044 (1)	Responsibility
#17	Yosemite Street/ Road I	EB LT - construct lane - 1 @ 190 feet and 120-foot transition taper	Seltzer Heights Fil No. 1		
		WB LT - construct lane - 1 @ 190 feet and 120-foot transition taper	Seltzer Farms Fil No. 1		
		NB LT - construct lane - 1 @ 226 feet and 144-foot transition taper	Seltzer Heights Fil No. 1		
		SB LT - construct lane - 1 @ 226 feet and 144-foot transition taper	Seltzer Farms Fil No. 1		
#18	Yosemite Street/ South Site Access	EB LT - construct lane - 1 @ 90 feet and 90-foot transition taper	Seltzer Heights Fil No. 1		
		WB LT - construct lane - 1 @ 190 feet and 120-foot transition taper	Seltzer Farms Fil No. 1		
		NB LT - construct lane - 1 @ 226 feet and 144-foot transition taper	Seltzer Heights Fil No. 1		
		SB LT - construct lane - 1 @ 226 feet and 144-foot transition taper	Seltzer Farms Fil No. 1		
#19	Yosemite Street/ E. 163rd Avenue	No improvements recommended			
#20	Quebec Street/ E. 162nd Avenue	No improvements recommended			
#21	Lima Street/ Lansing Court	No improvements recommended			
#22	Lima Street/E. 166th Avenue			Construct east leg of the intersection	Future Todd Creek Farms Filings

(1) A transition taper of 18.5:1 was used for all streets with a posted speed limit of 60 mph (222 feet). An appropriate redirect taper for 60 mph is 45:1
A transition taper of 15:1 was used for all streets with a posted speed limit of 50 mph (162 feet). An appropriate redirect taper for 50 mph is 50:1
A transition taper of 13.5:1 was used for all streets with a posted speed limit of 45 mph (162 feet). An appropriate redirect taper for 45 mph is 45:1
A transition taper of 12:1 was used for all streets with a posted speed limit of 40 mph (144 feet). An appropriate redirect taper for 40 mph is 35:1
A transition taper of 10:1 was used for all streets with a posted speed limit of 35 mph (120 feet). An appropriate redirect taper for 35 mph is 20:1
A transition taper of 7.5:1 was used for all streets with a posted speed limit of 25 mph (90 feet). An appropriate redirect taper for 25 mph is 15:1
(2) As shown on the *Thornton Transportation and Mobility Plan* adopted April 26, 2022. Widening of E. 160th Avenue (SH 7) will need to be coordinated with Adams County
(3) Assumed to be constructed as part of future widening of E. 160th to 4 lanes per the *Adams County Transportation Master Plan*.
(4) The proposed Seltzer Heights Filing No. 1 development is not expected to add vehicles to this turning movement. The improvement will likely be the responsibity of other area developments
(5) Assumed to be constructed as part of future widening of Quebec Street to 4 lanes

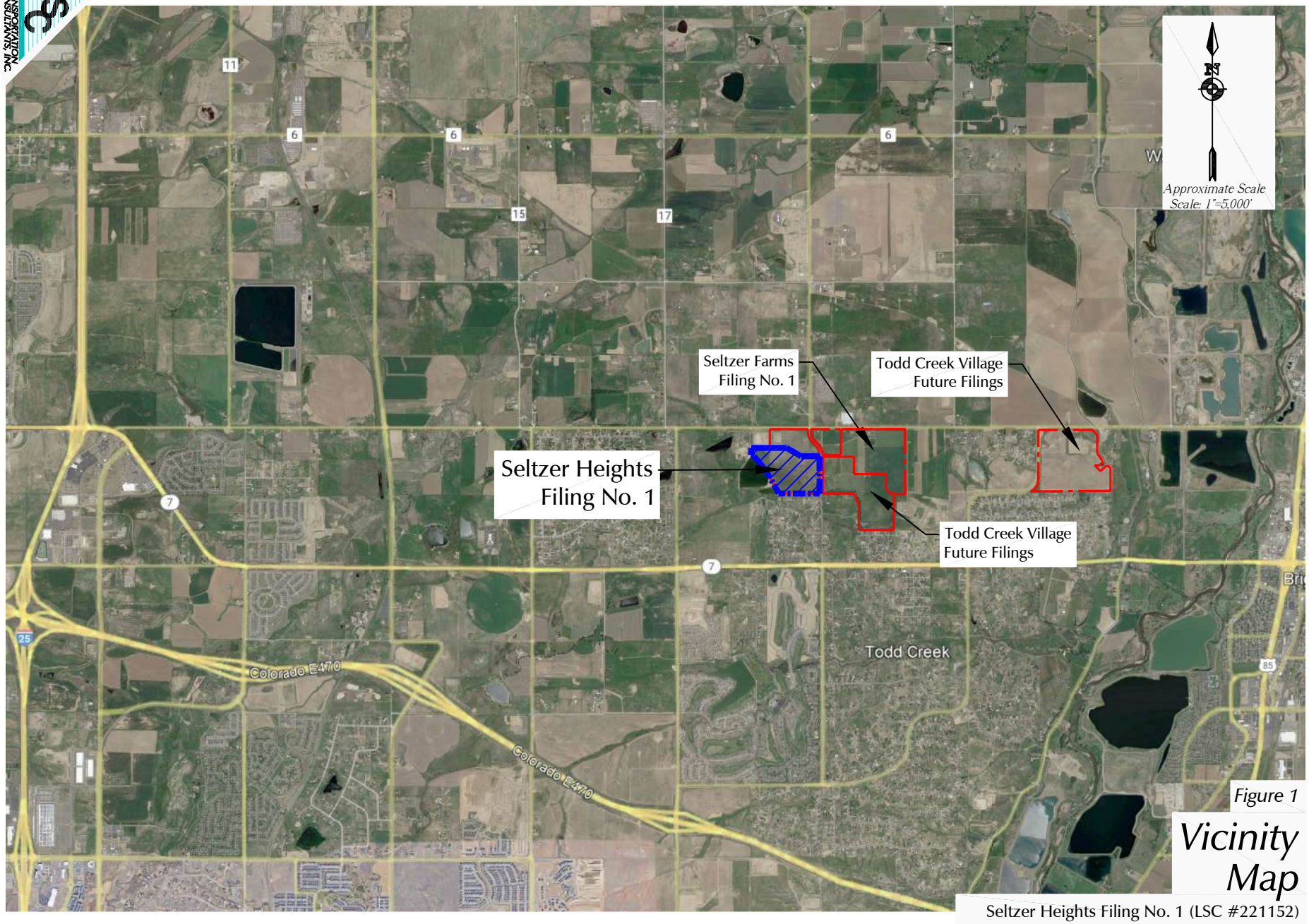


Figure 1

Vicinity Map

Seltzer Heights Filing No. 1 (LSC #221152)

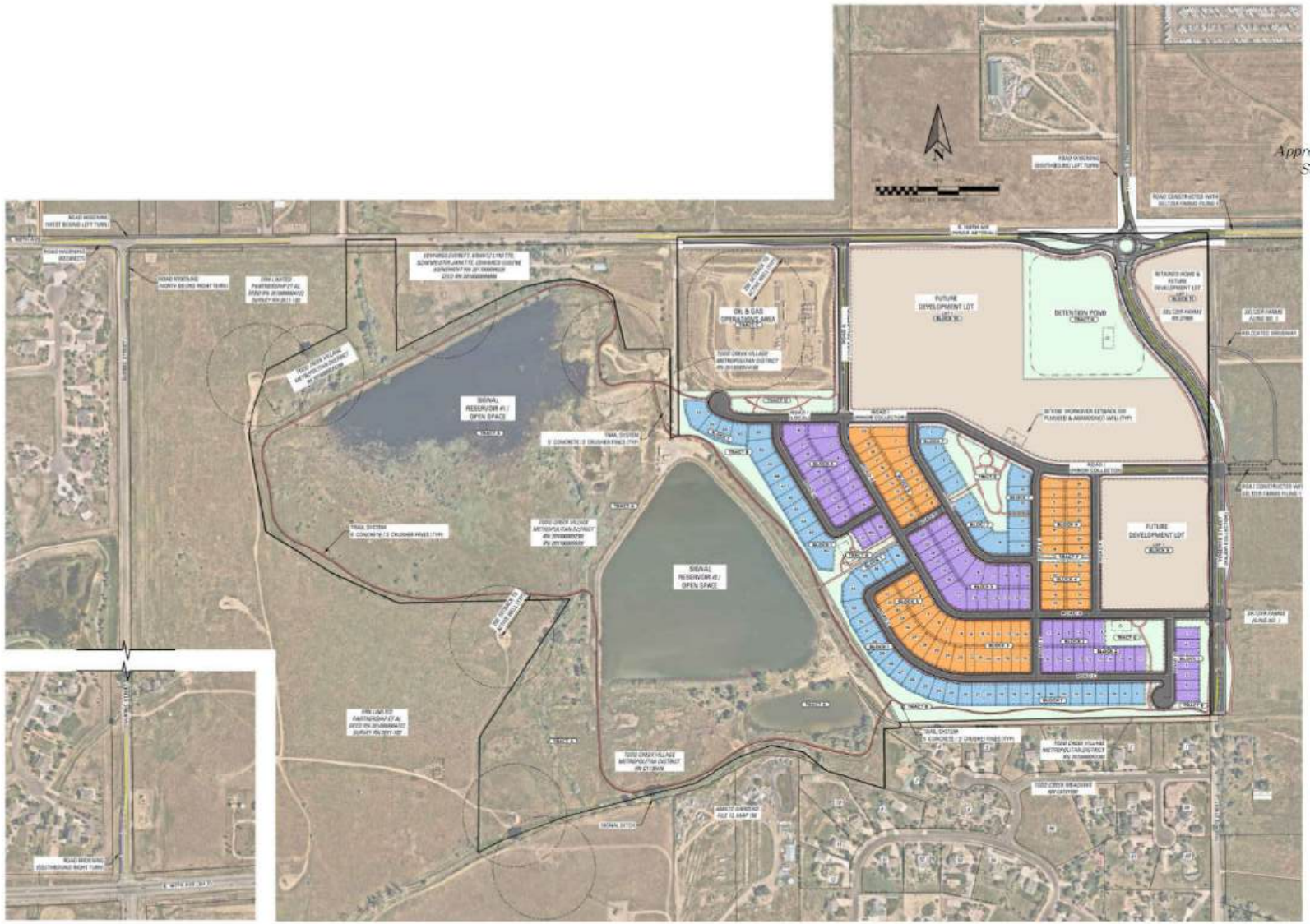
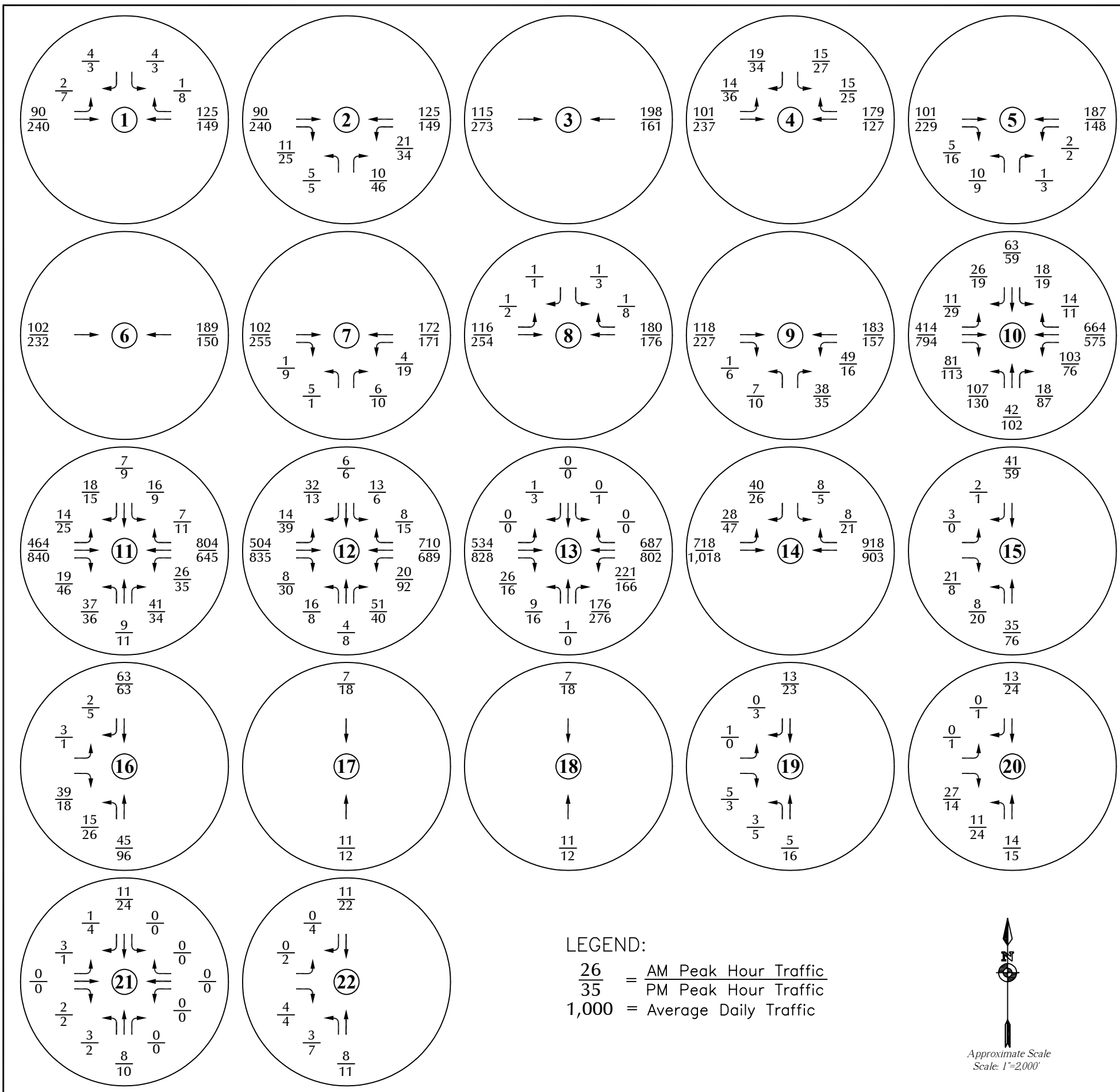


Figure 2

Site Plan

Seltzer Heights Filing No. 1 (LSC #221152)



LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=2,000'

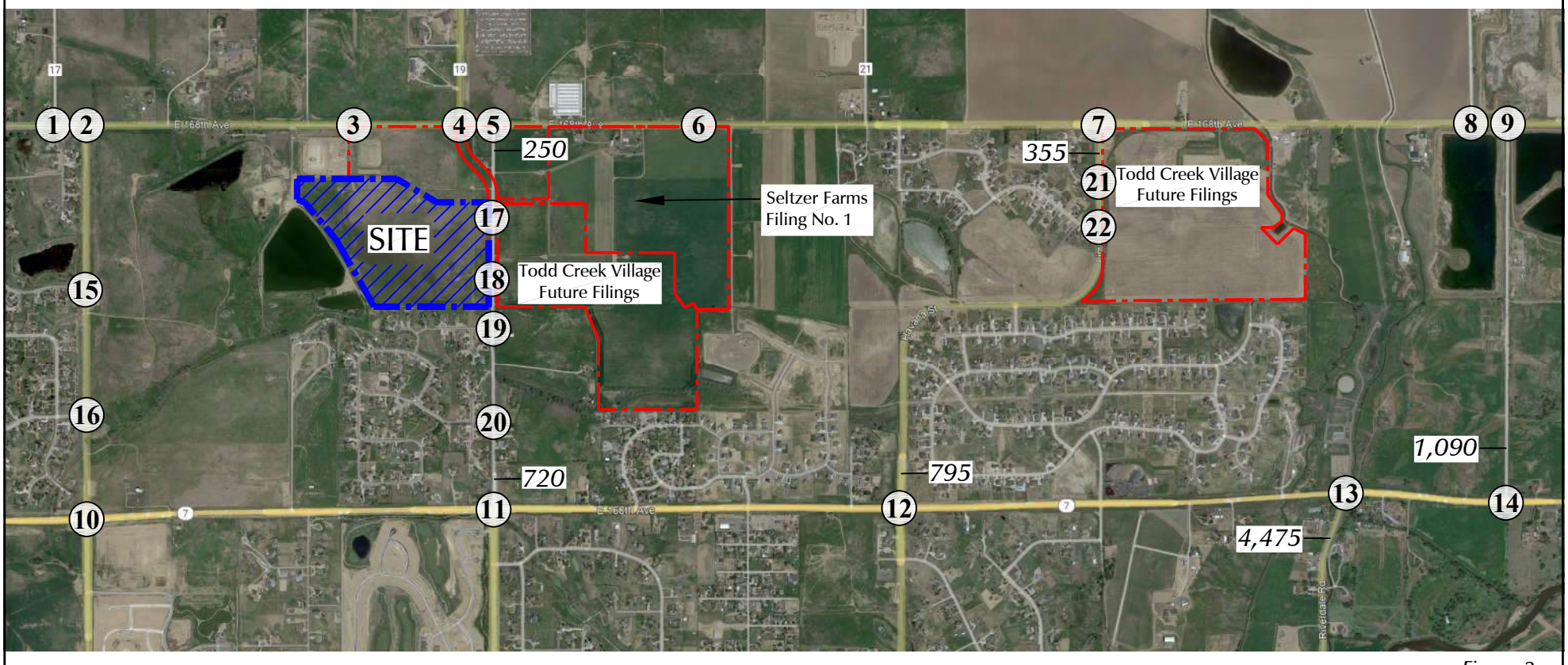
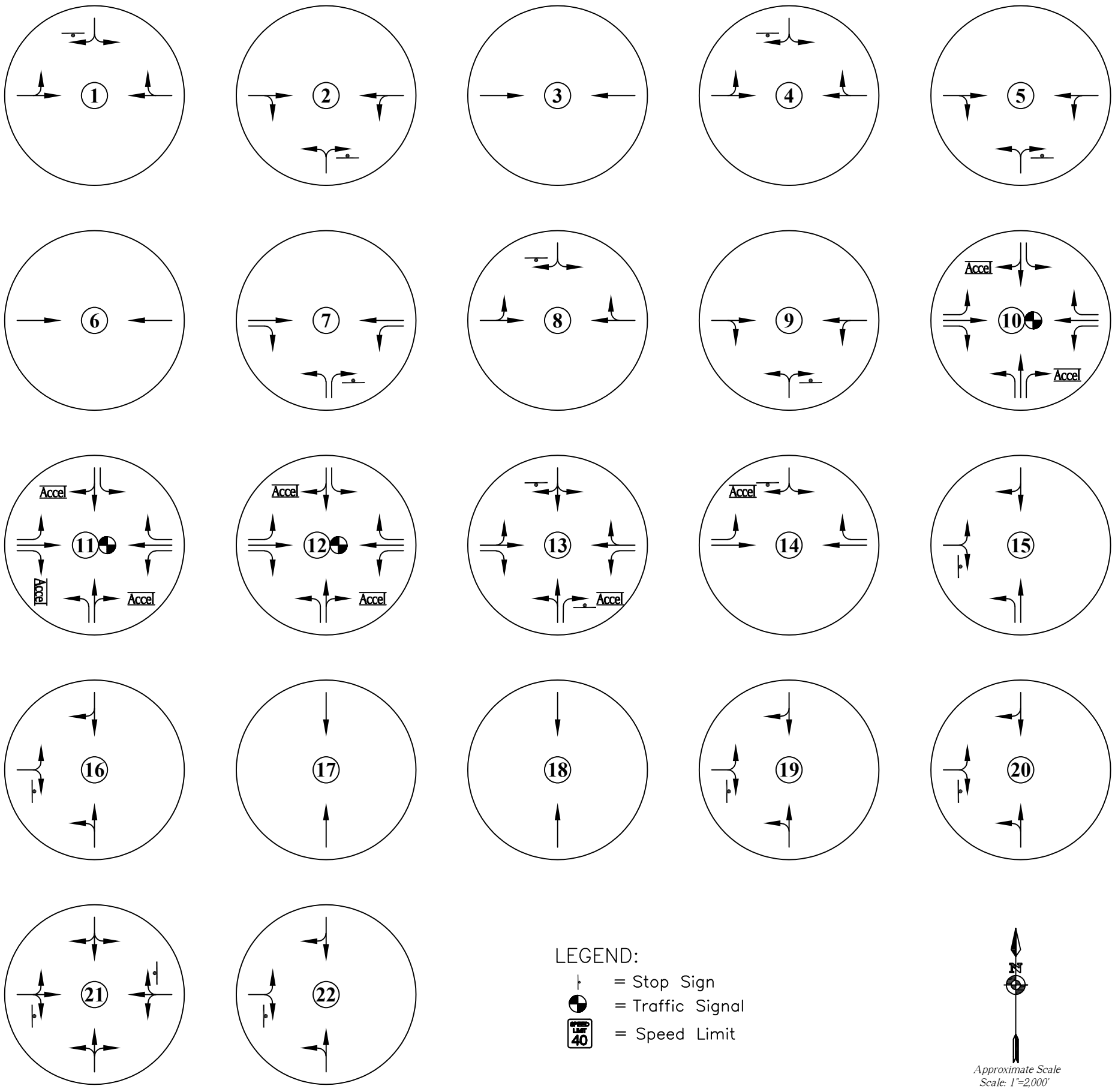


Figure 3a

Existing Traffic

Seltzer Heights Filing No. 1 (LSC #221152)



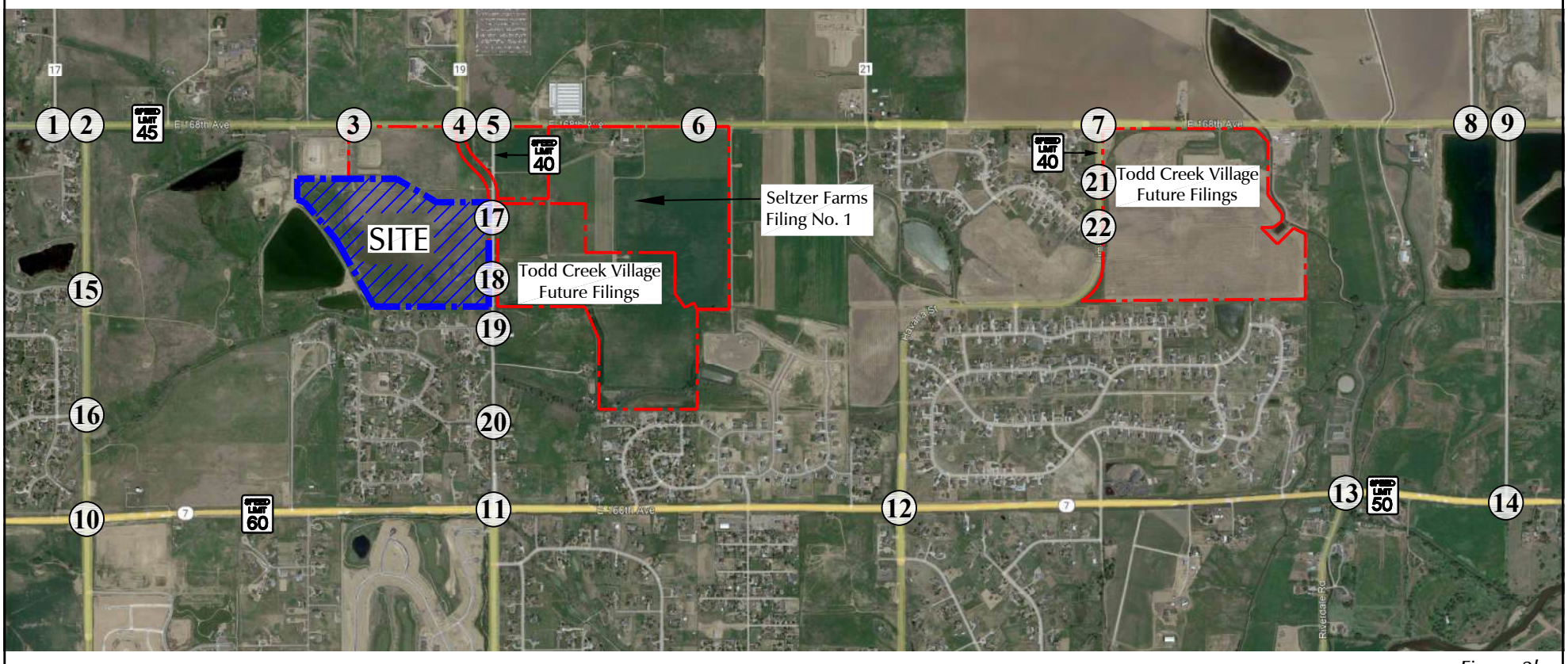
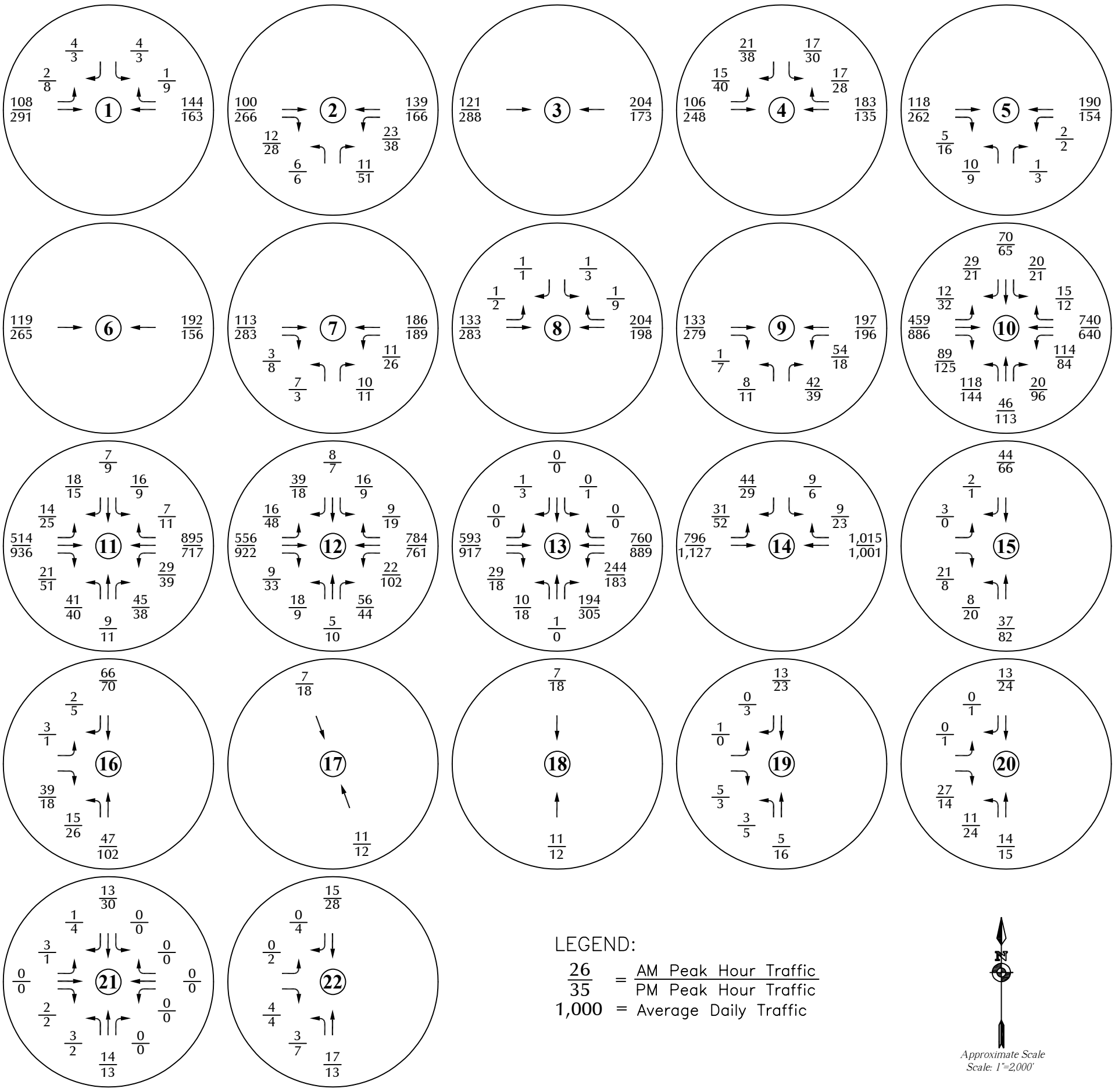


Figure 3b

Existing Lane Geometry and Traffic Control

Seltzer Heights Filing No. 1 (LSC #221152)



LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=2,000'



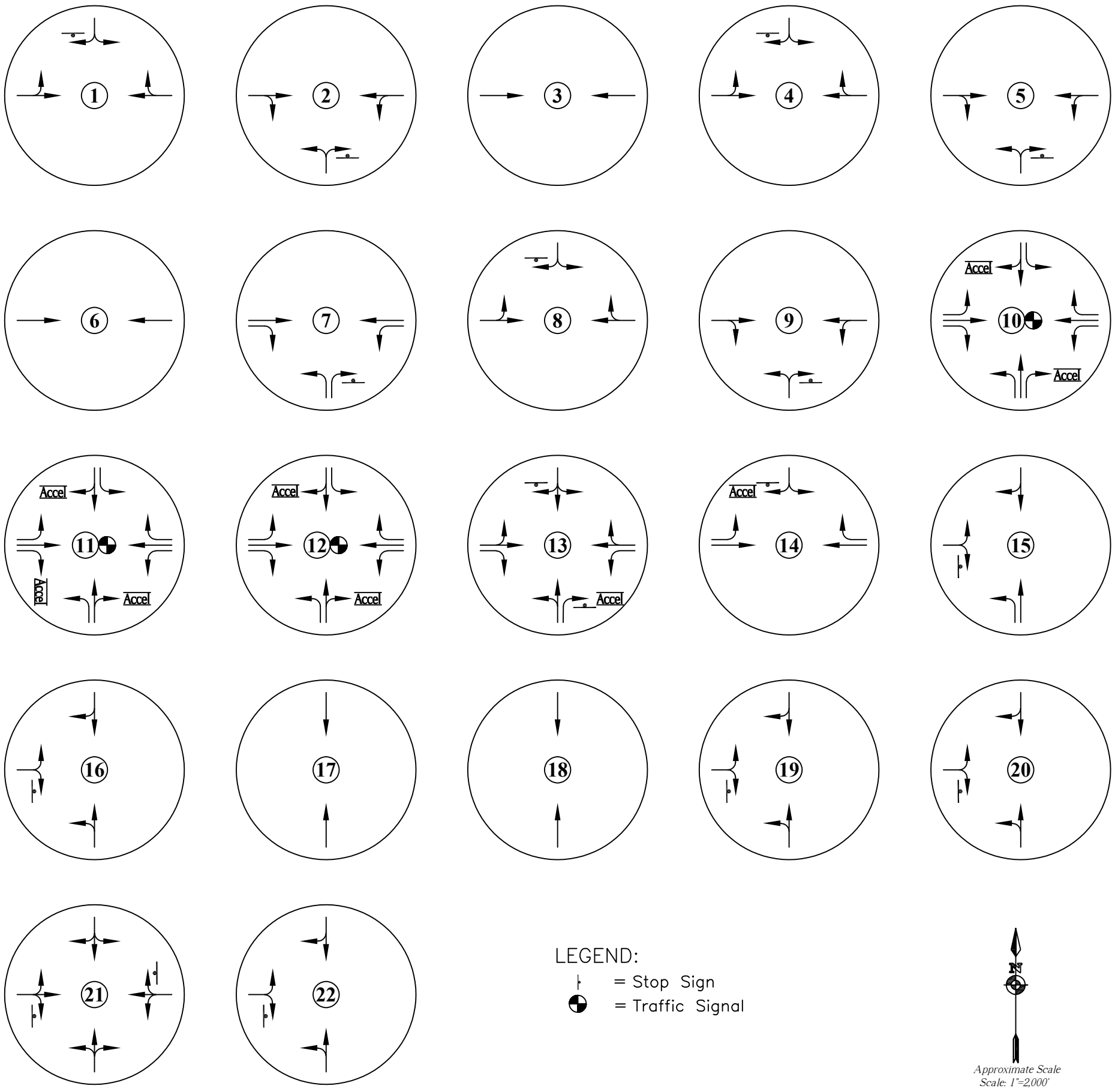
Note: Based on annual growth rate of two percent plus trips from the nearby Baseline Lakes development.

Figure 4a

Year 2028 Background Traffic

Seltzer Heights Filing No. 1 (LSC #221152)

LSC TRANSPORTATION



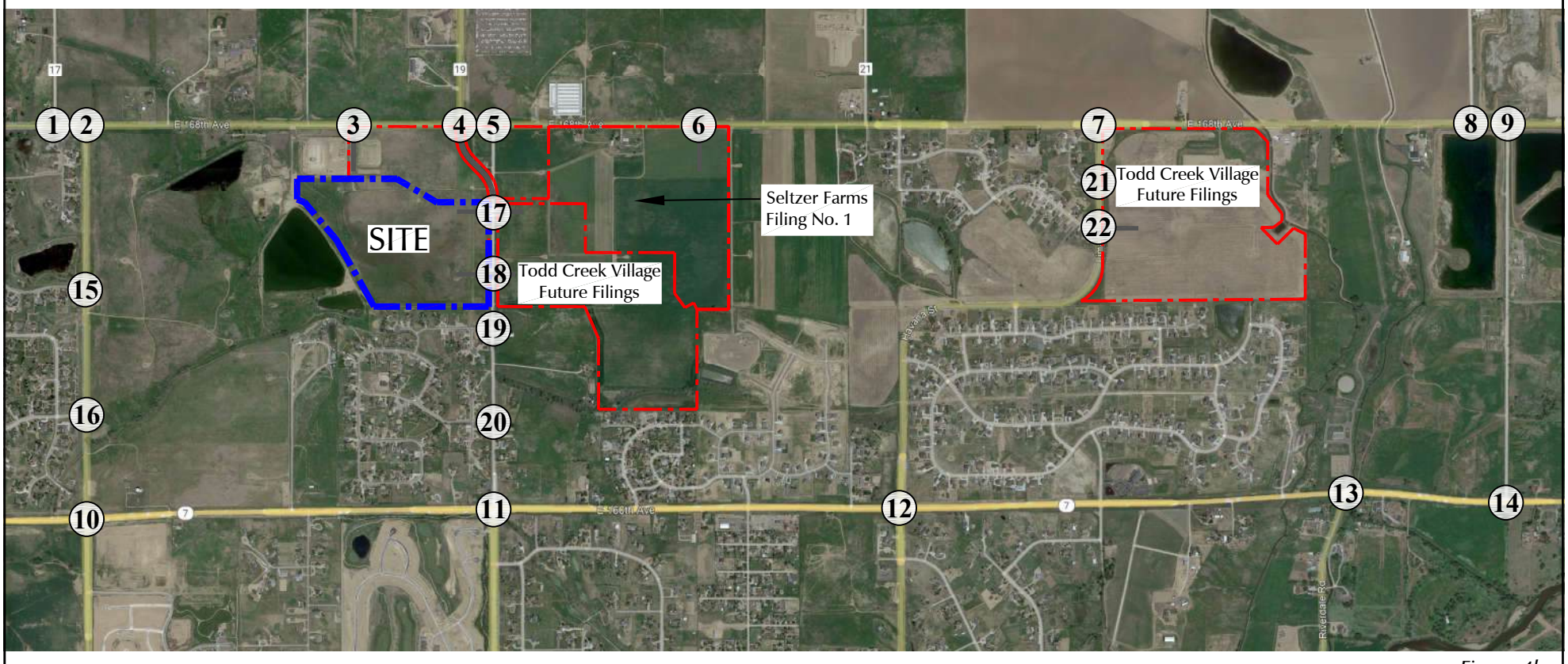
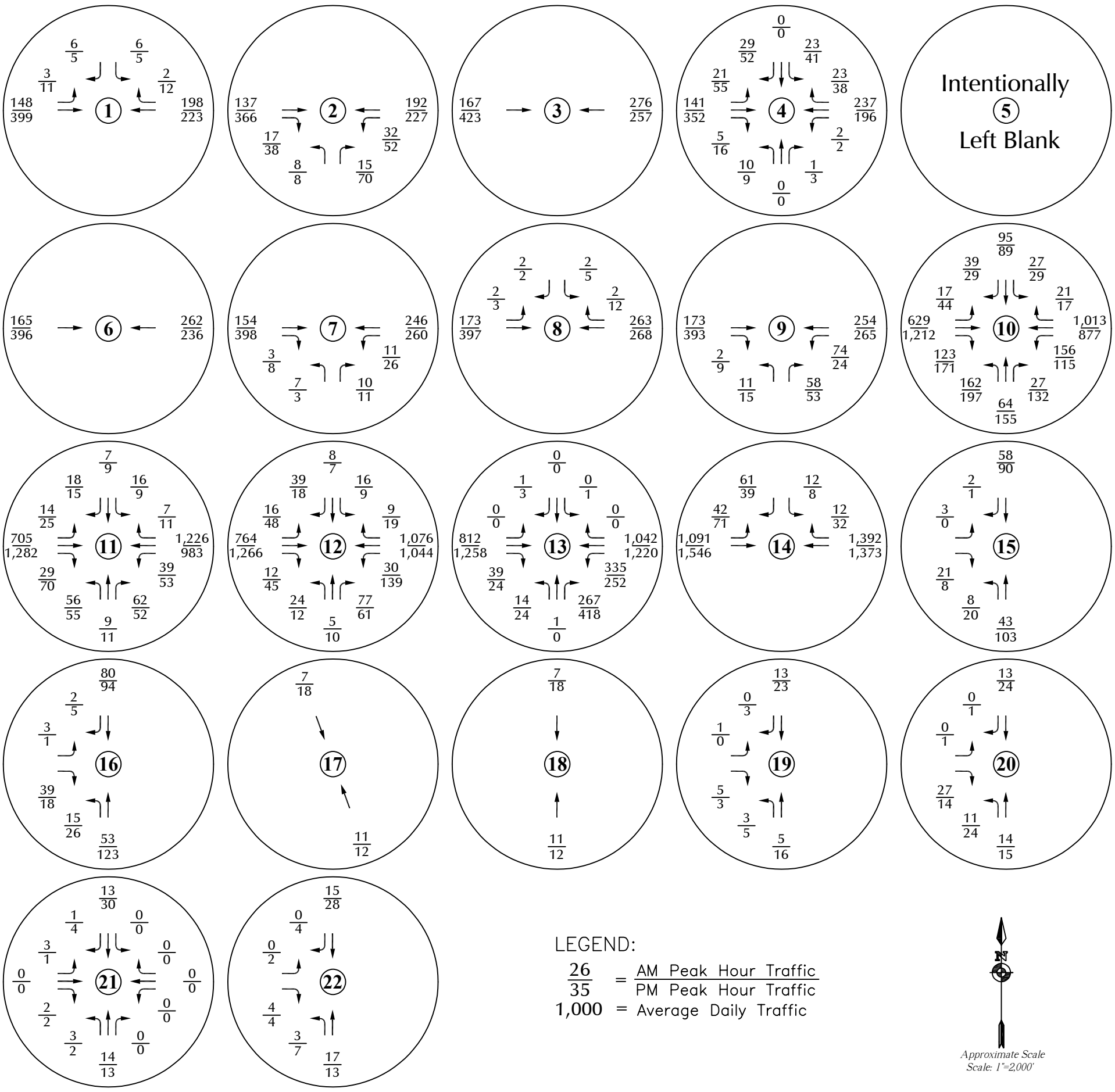


Figure 4b

Year 2028 Background Lane Geometry and Traffic Control

Seltzer Heights Filing No. 1 (LSC #221152)

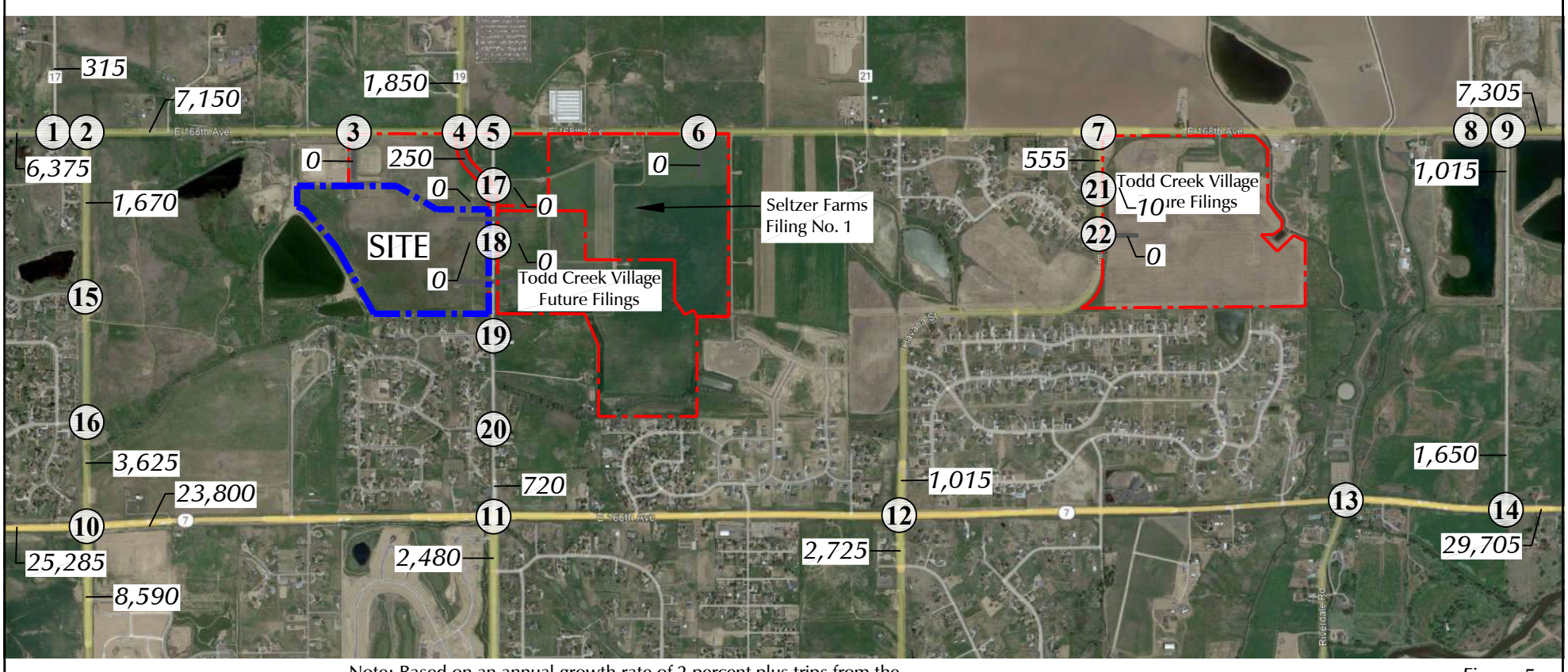


LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=2,000'



Note: Based on an annual growth rate of 2 percent plus trips from the nearby Baseline Lakes development.

Figure 5a

Year 2044 Background Traffic

Seltzer Heights Filing No. 1 (LSC #221152)

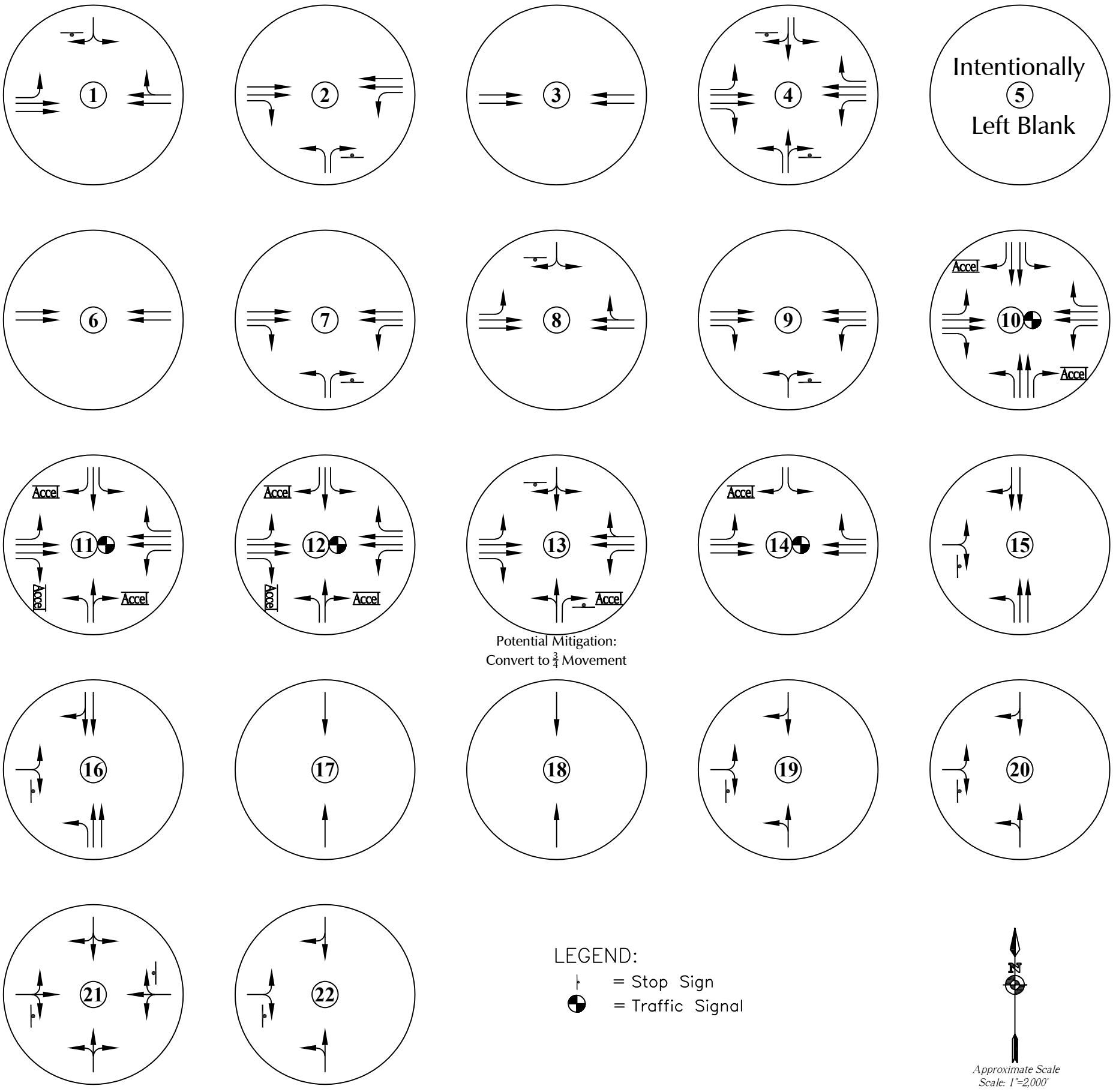
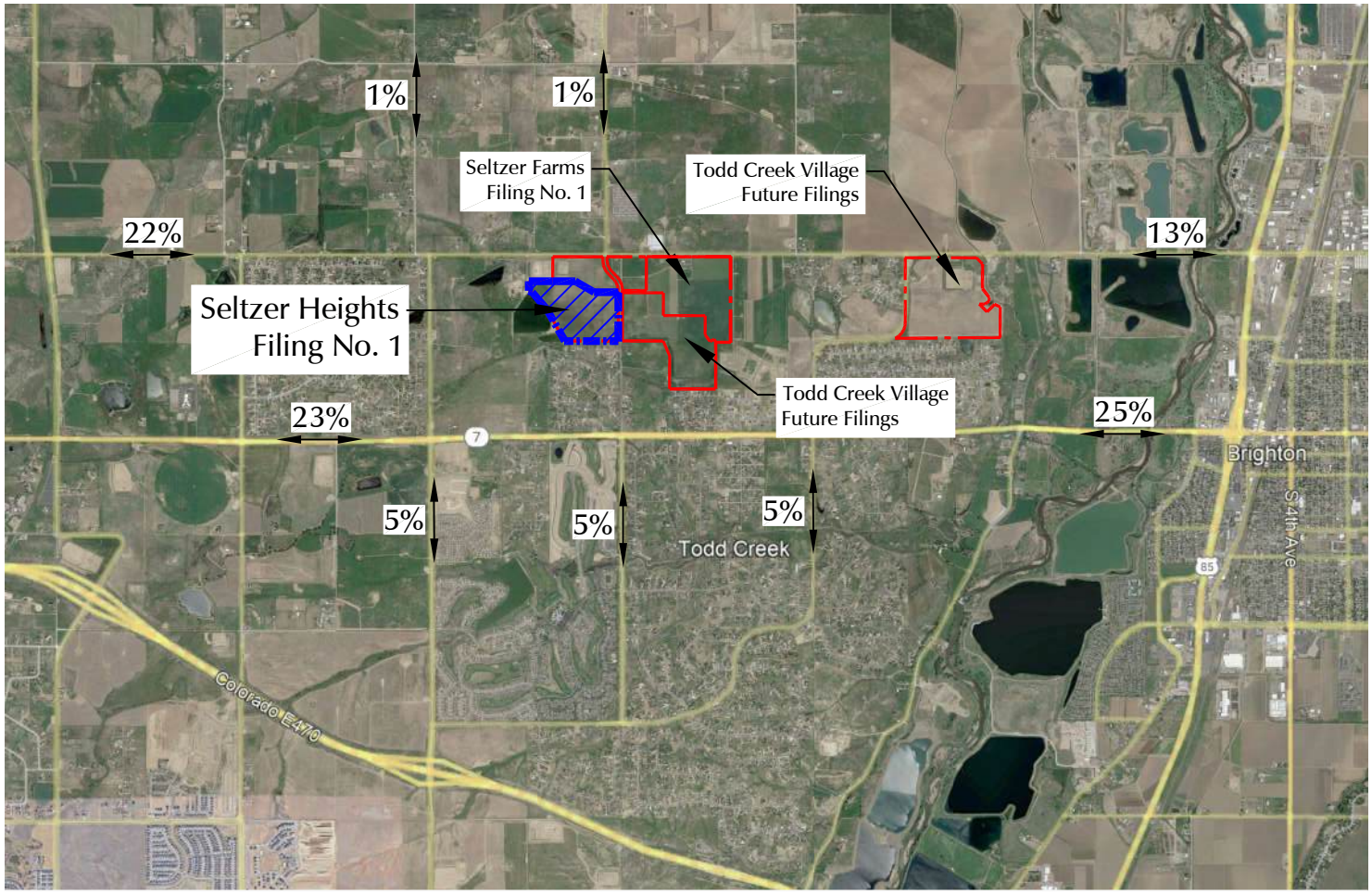




Figure 5b

Year 2044 Background Lane Geometry and Traffic Control

Seltzer Heights Filing No. 1 (LSC #221152)



Approximate Scale
Scale: 1"=5,000'

LEGEND:

65% = Percent Directional Distribution

Figure 6

Directional Distribution of Site-Generated Traffic

Seltzer Heights Filing No. 1 (LSC #221152)

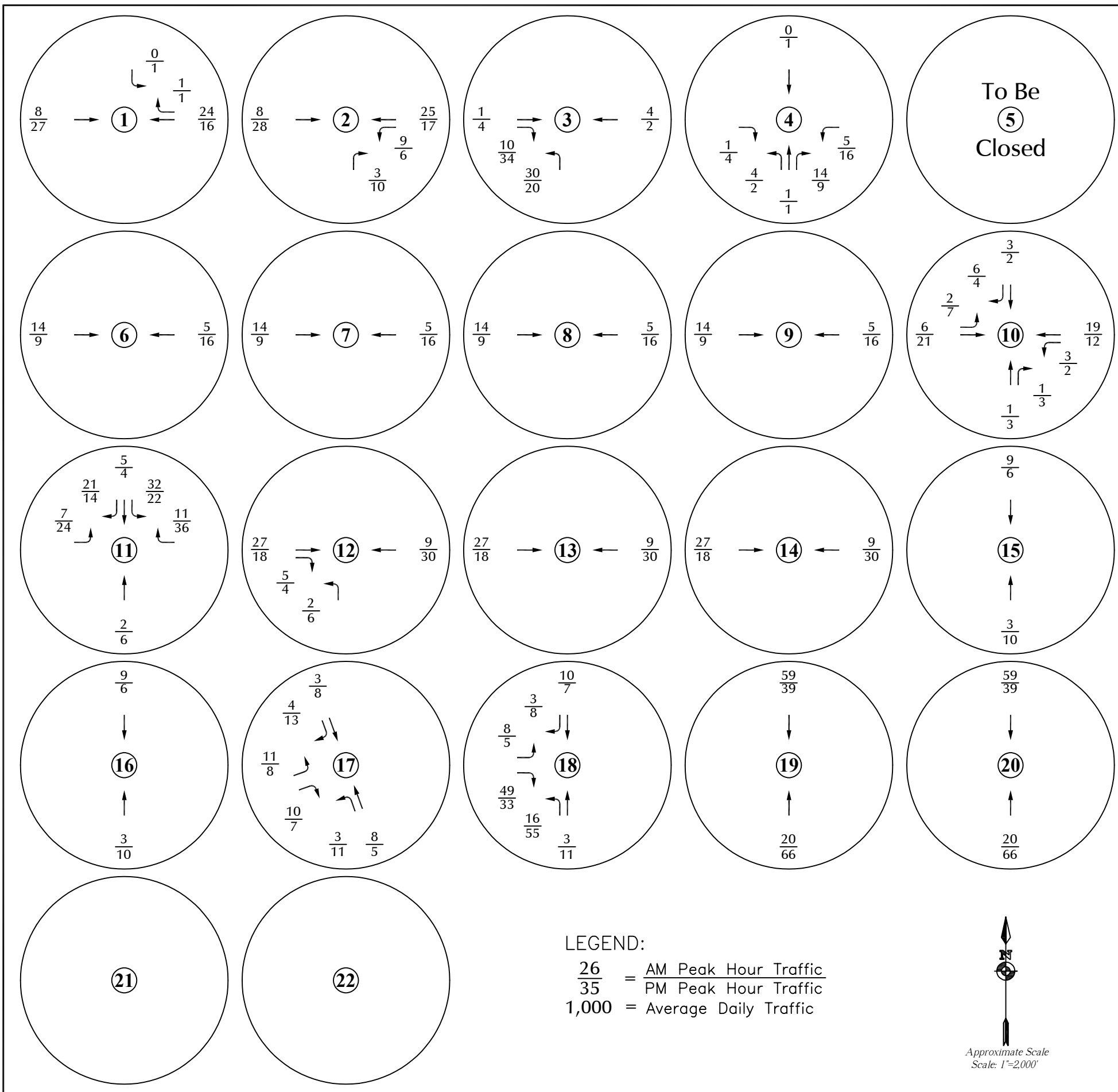
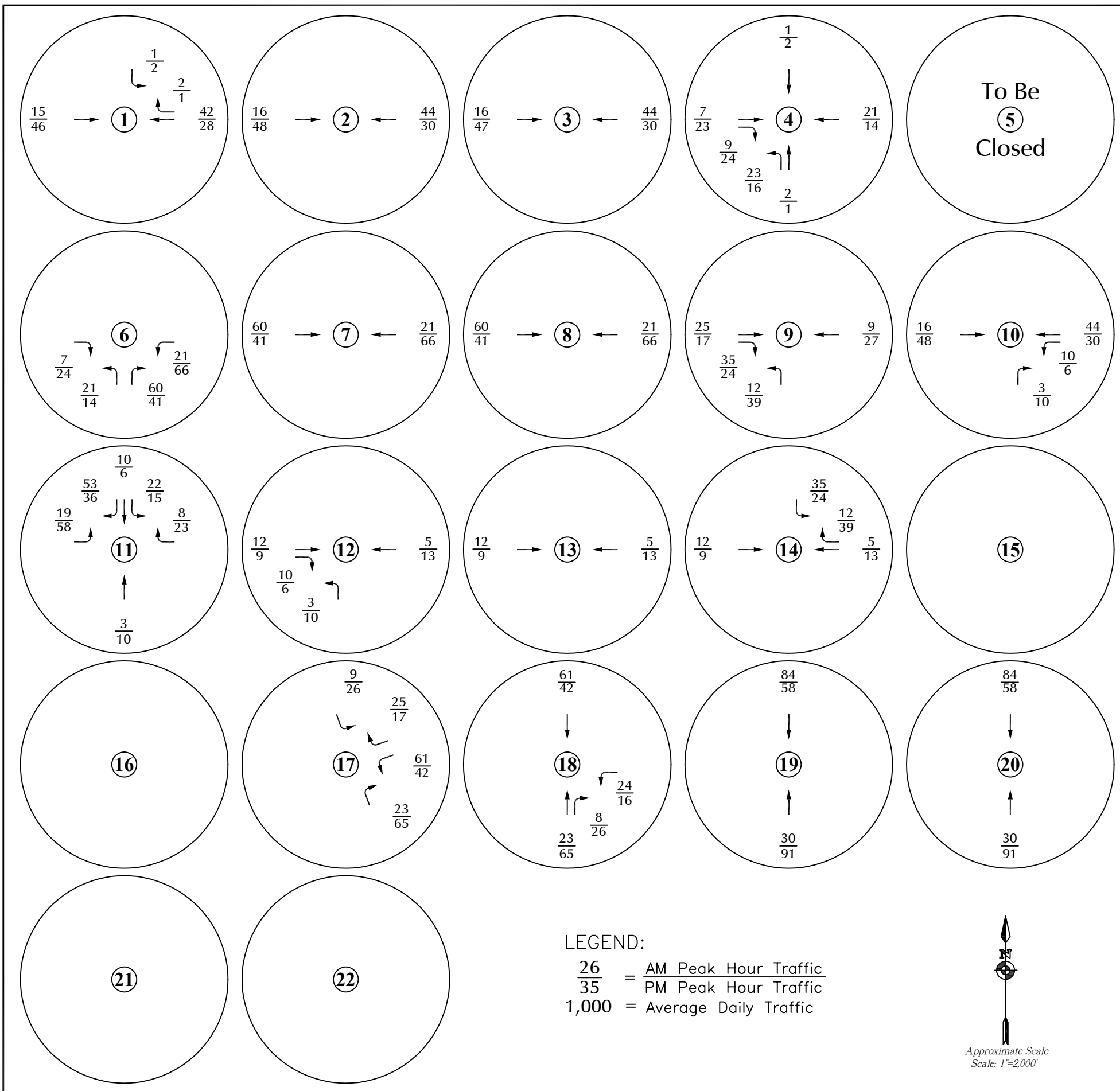


Figure 7a

Assignment of Seltzer Heights Filing No. 1 Generated Traffic

Seltzer Heights Filing No. 1 (LSC #221152)



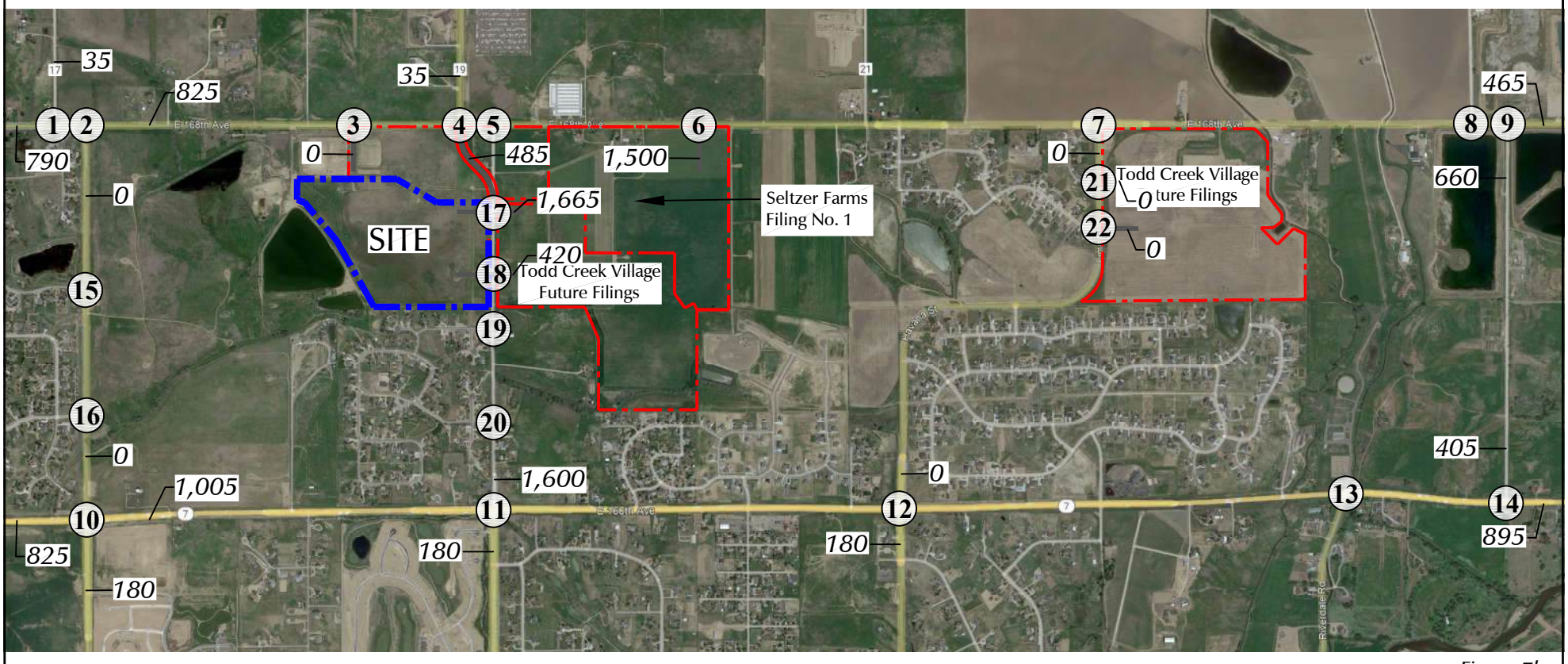
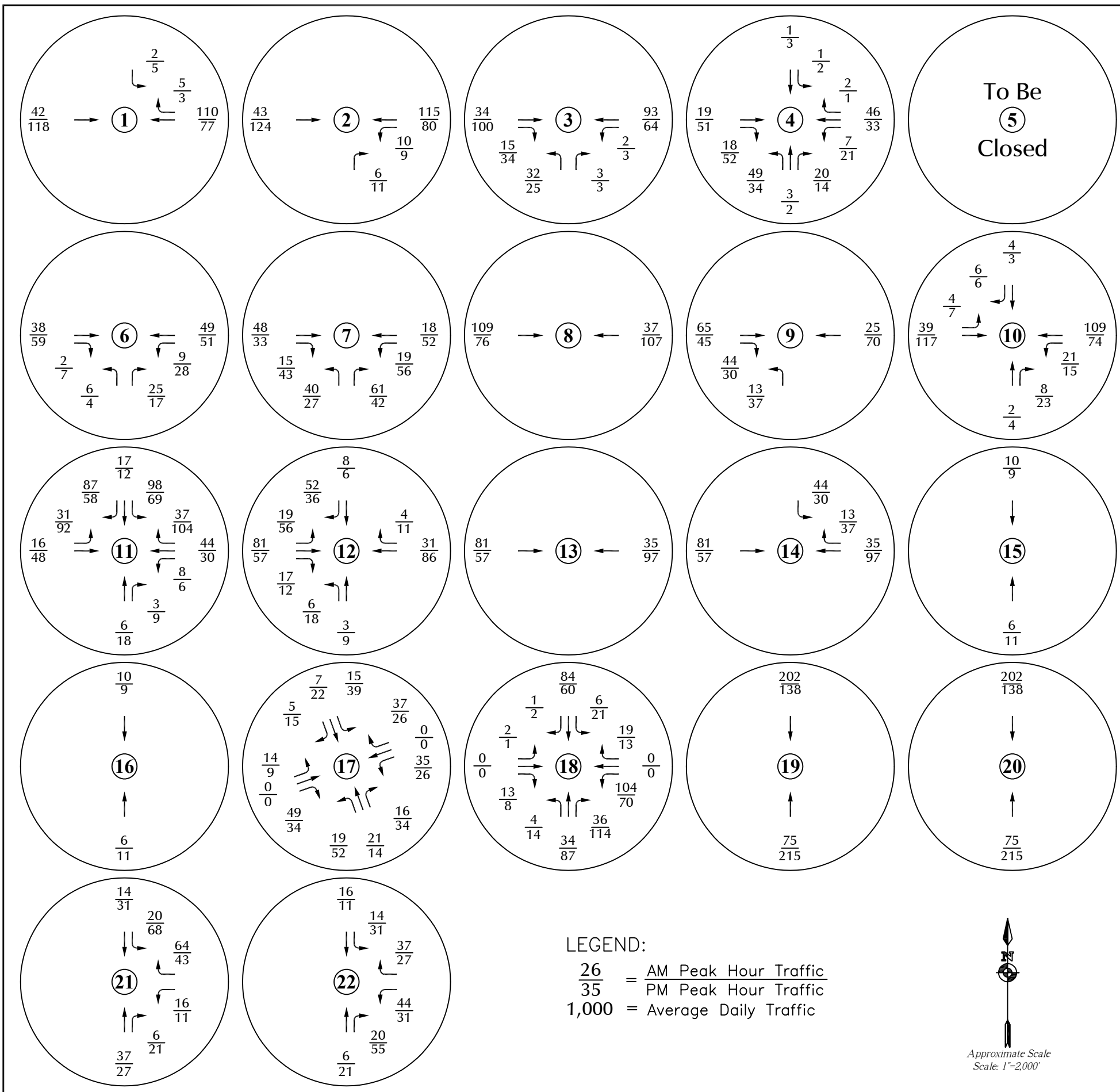


Figure 7b

Assignment of Seltzer Farms Filing No. 1 Generated Traffic

Seltzer Heights Filing No. 1 (LSC #221152)



LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=2,000'



Figure 7c

Assignment of Todd Creek Farms Future Phases Generated Traffic

Seltzer Heights Filing No. 1 (LSC #221152)

LSC TRANSPORTATION

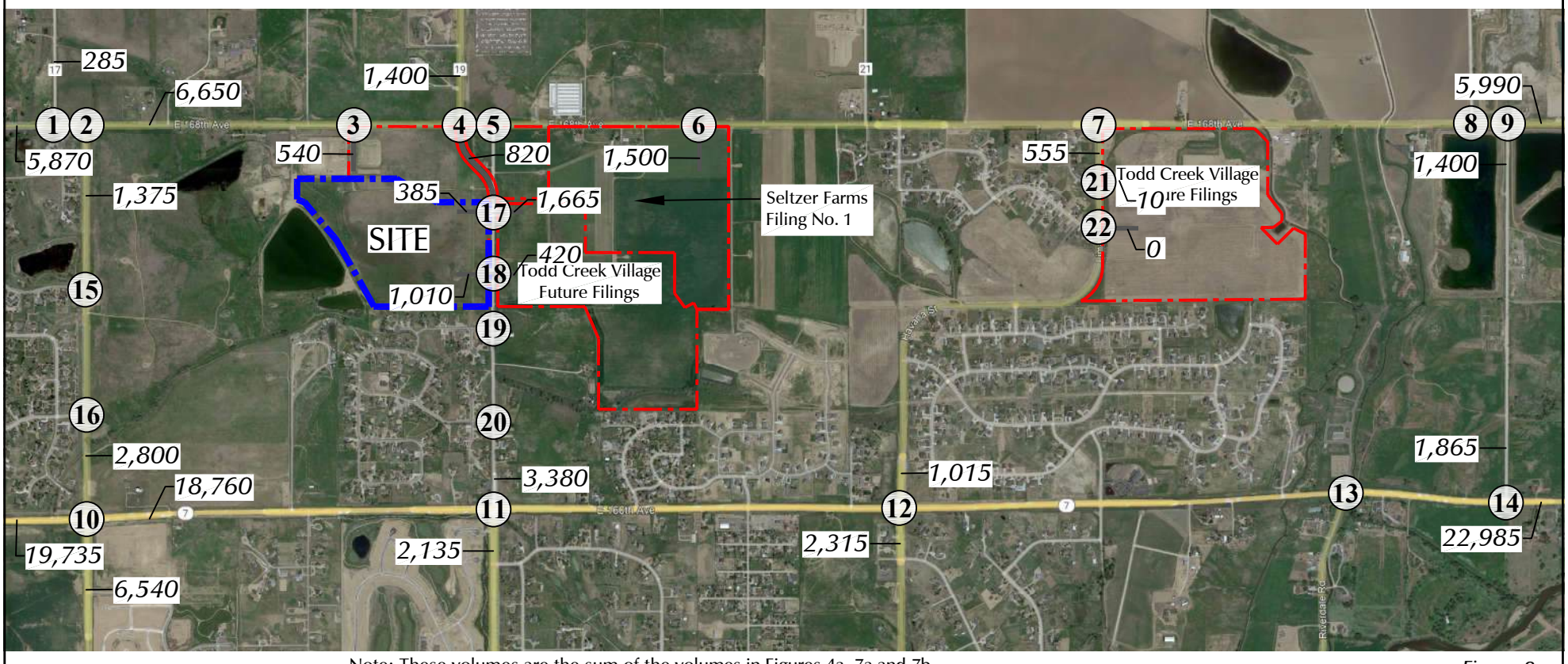
To Be
5
Closed

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'

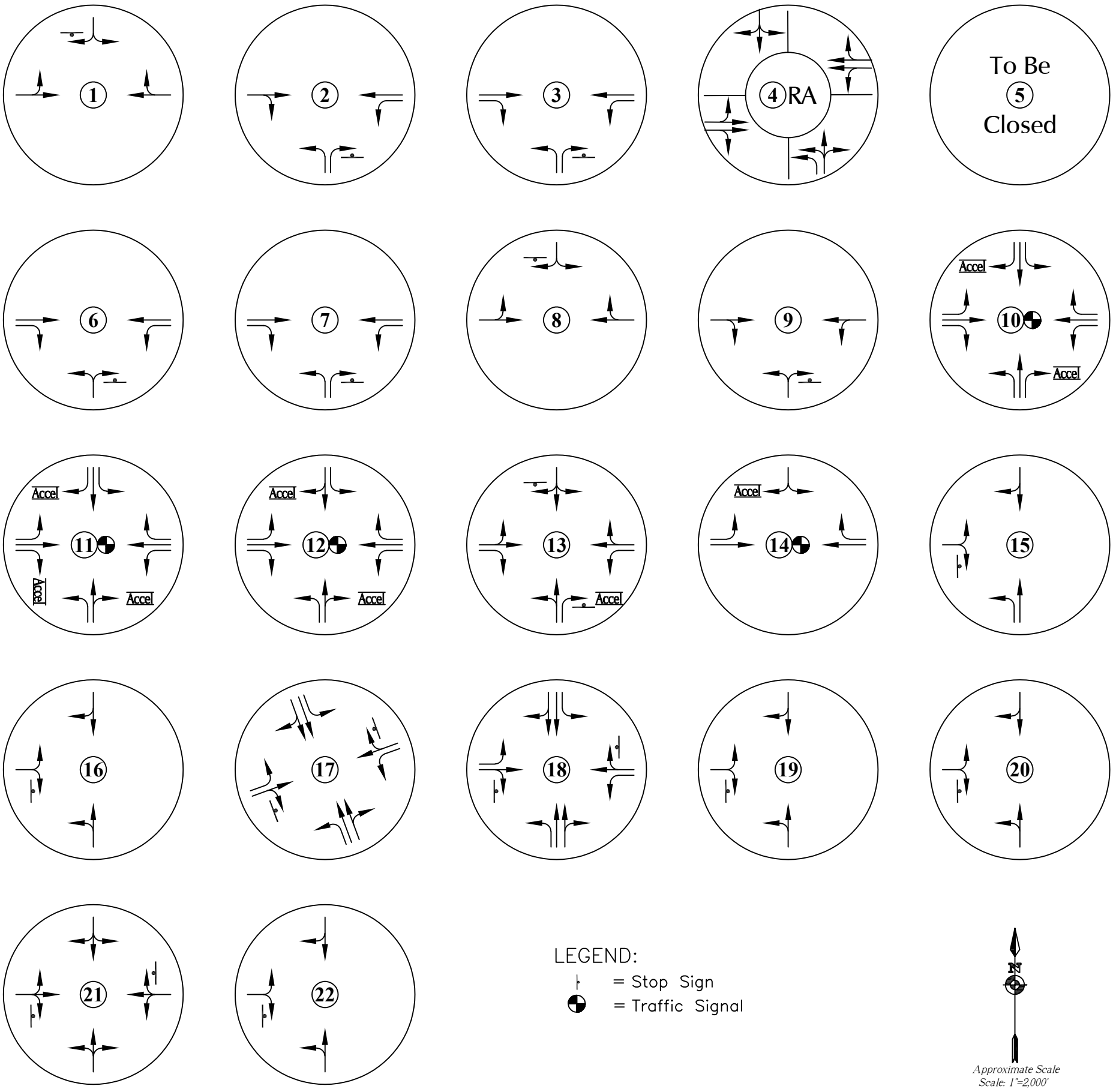


Note: These volumes are the sum of the volumes in Figures 4a, 7a and 7b.

Figure 8a

Year 2028 Total Traffic

Seltzer Heights Filing No. 1 (LSC #221152)



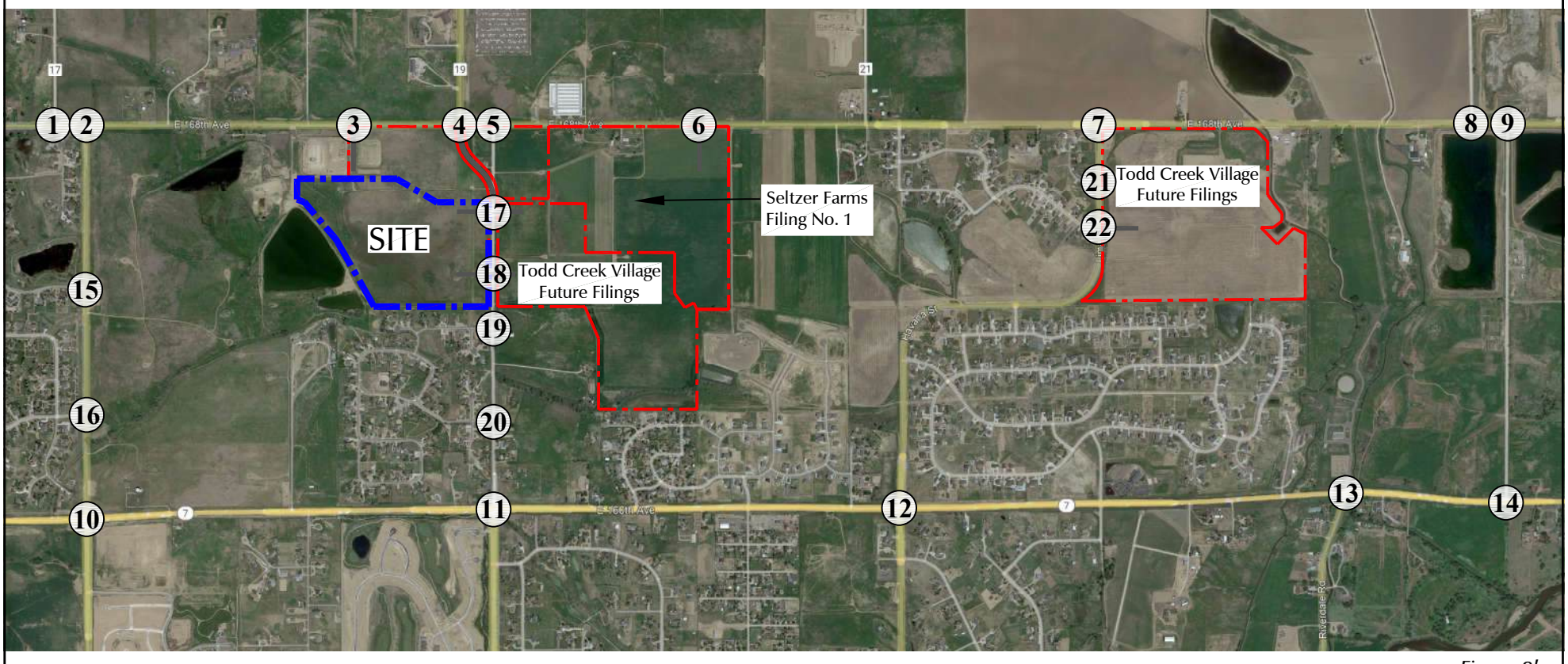
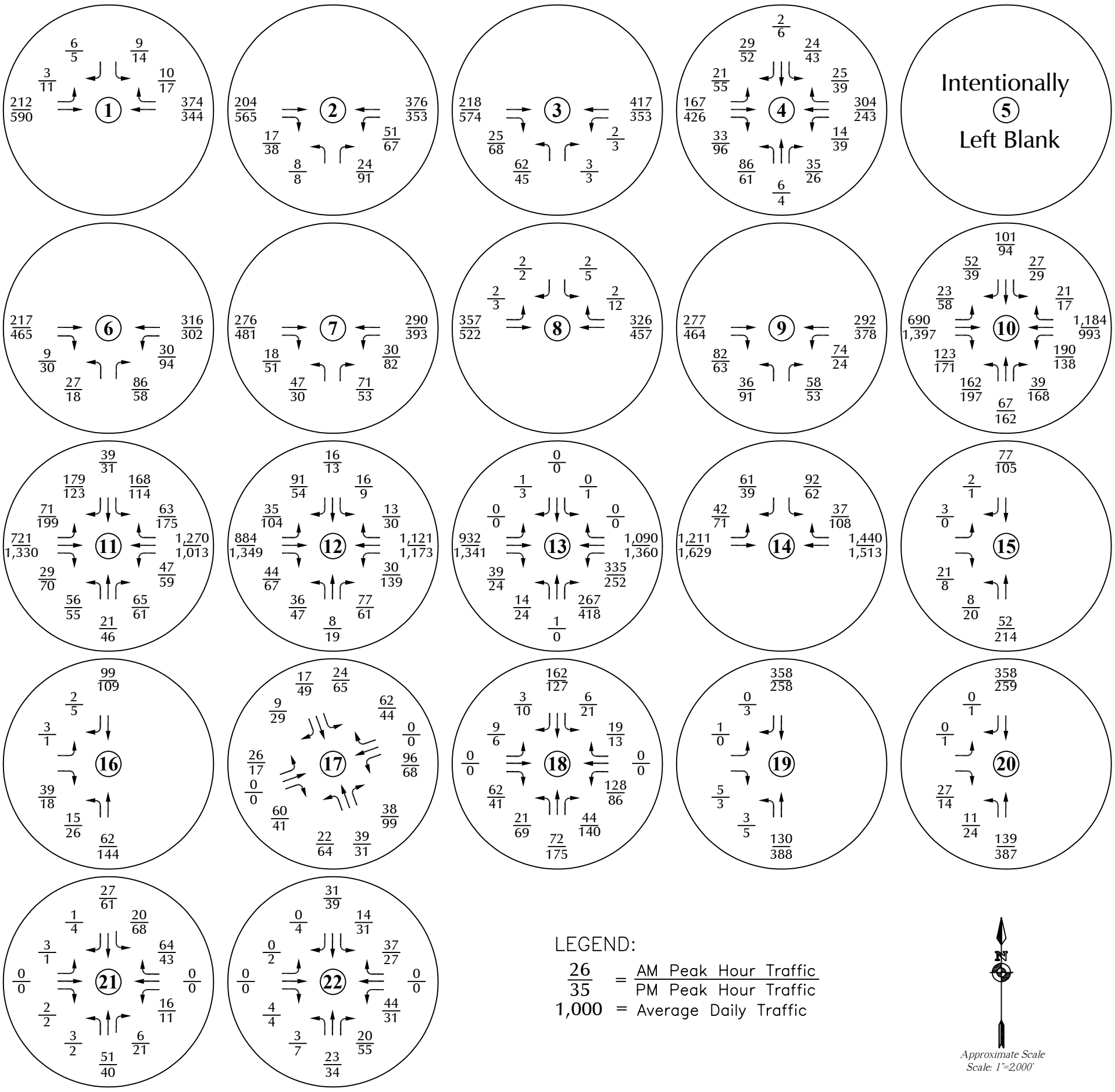


Figure 8b

Year 2028 Total Lane Geometry and Traffic Control

Seltzer Heights Filing No. 1 (LSC #221152)



LEGEND:

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

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=2,000'

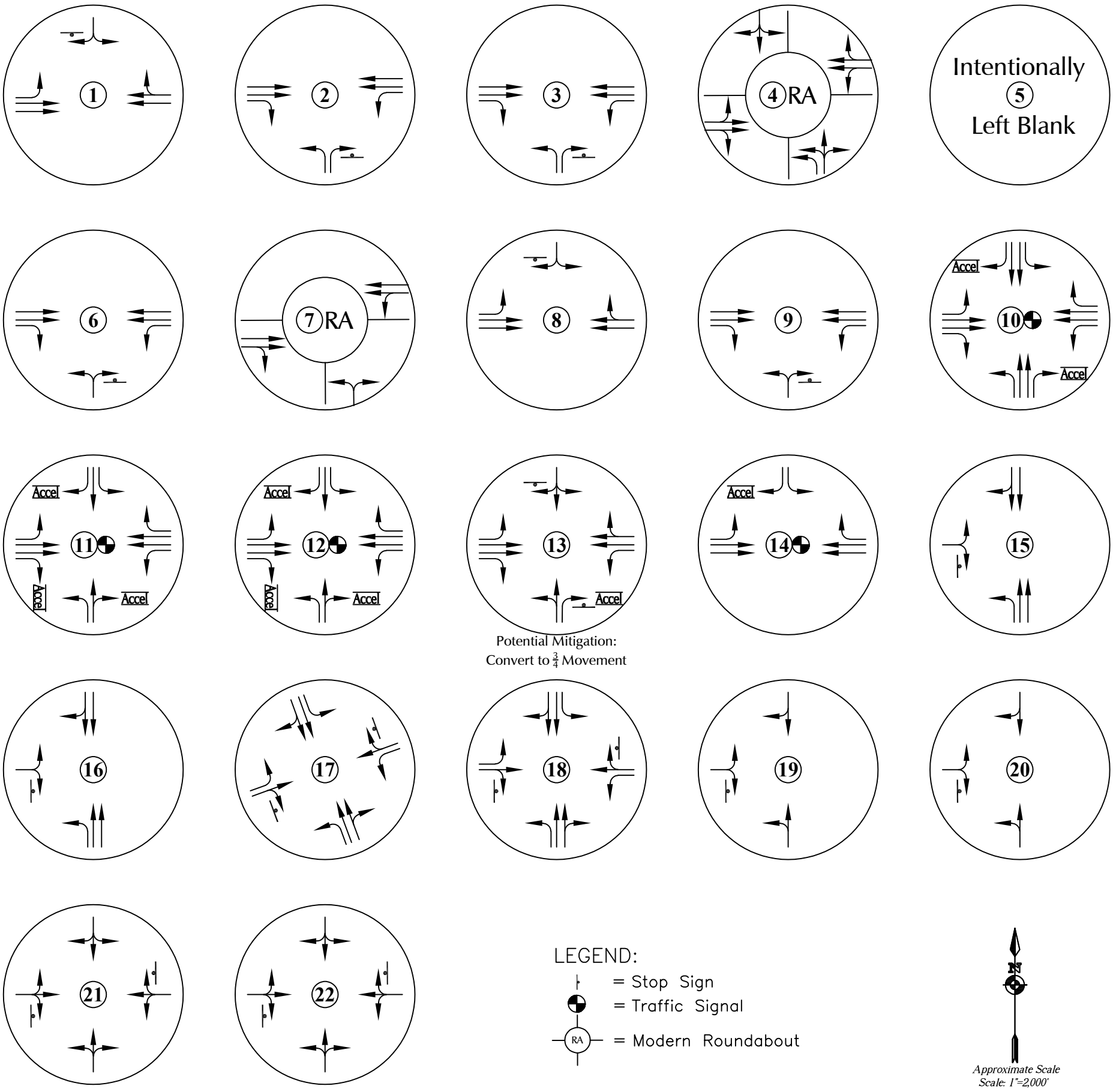


Note: These volumes are the sum of the volumes in Figures 5a, 7a, 7b and 7c.

Figure 9a

Year 2044 Total Traffic

Seltzer Heights Filing No. 1 (LSC #221152)



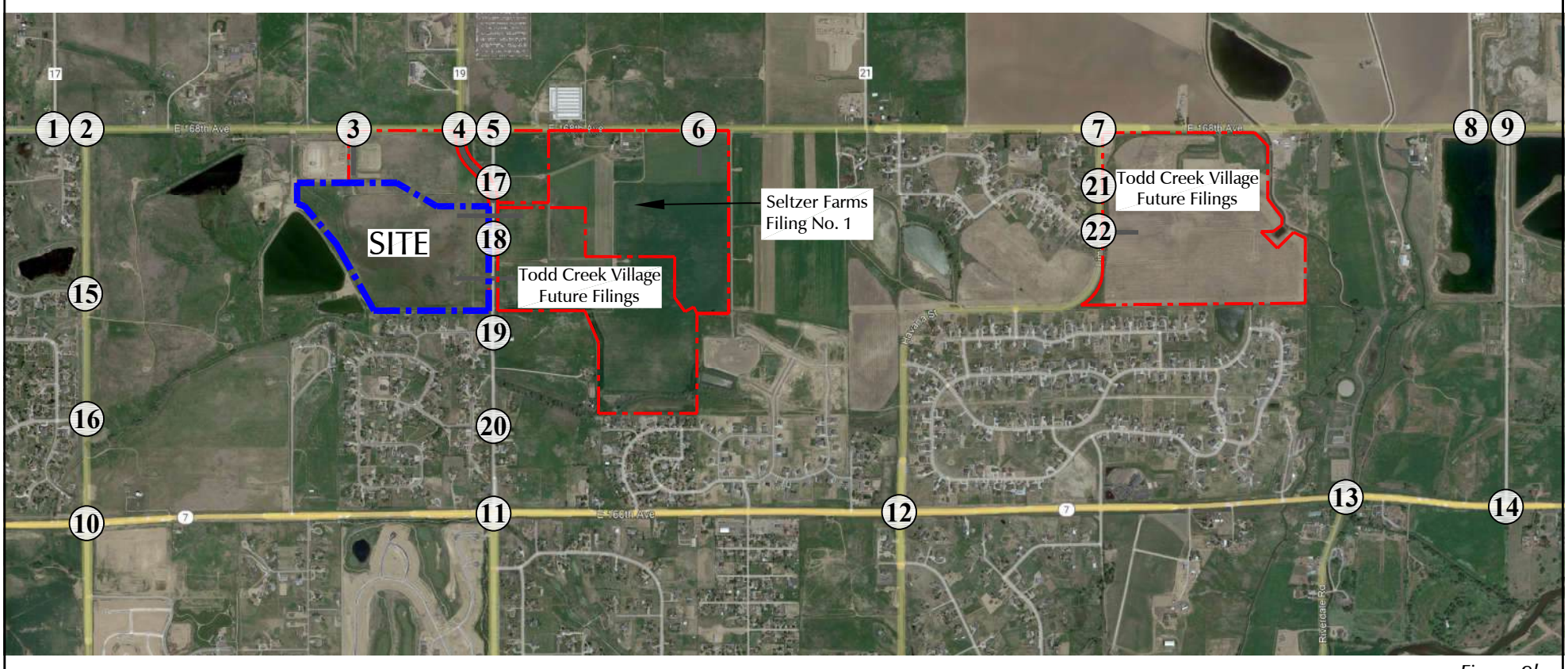


Figure 9b

Year 2044 Total Lane Geometry and Traffic Control

Seltzer Heights Filing No. 1 (LSC #221152)

LSC TRANSPORTATION

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board

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

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.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	90	125	1	4	4
Future Vol, veh/h	2	90	125	1	4	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	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	113	156	1	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	157	0	-	0	276	157
Stage 1	-	-	-	-	157	-
Stage 2	-	-	-	-	119	-
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	1423	-	-	-	714	889
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	906	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1423	-	-	-	713	889
Mov Cap-2 Maneuver	-	-	-	-	713	-
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	906	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1423	-	-	-	791
HCM Lane V/C Ratio	0.002	-	-	-	0.013
HCM Control Delay (s)	7.5	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	90	11	21	125	5	10
Future Vol, veh/h	90	11	21	125	5	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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	107	13	25	149	6	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	120	0	313	114
Stage 1	-	-	-	-	114	-
Stage 2	-	-	-	-	199	-
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	-	-	1468	-	680	939
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1468	-	667	939
Mov Cap-2 Maneuver	-	-	-	-	667	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	819	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	827	-	-	1468	-
HCM Lane V/C Ratio	0.022	-	-	0.017	-
HCM Control Delay (s)	9.4	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	101	179	15	15	19
Future Vol, veh/h	14	101	179	15	15	19
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	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	125	221	19	19	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	240	0	-	0	390	231
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	159	-
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	1327	-	-	-	614	808
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1327	-	-	-	605	808
Mov Cap-2 Maneuver	-	-	-	-	605	-
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	870	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1327	-	-	-	704
HCM Lane V/C Ratio	0.013	-	-	-	0.06
HCM Control Delay (s)	7.7	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	101	5	2	187	10	1
Future Vol, veh/h	101	5	2	187	10	1
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	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	117	6	2	217	12	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	123	0	341	120
Stage 1	-	-	-	-	120	-
Stage 2	-	-	-	-	221	-
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	-	-	1464	-	655	931
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	816	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1464	-	654	931
Mov Cap-2 Maneuver	-	-	-	-	654	-
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	814	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	672	-	-	1464	-
HCM Lane V/C Ratio	0.019	-	-	0.002	-
HCM Control Delay (s)	10.5	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	102	1	4	172	5	6
Future Vol, veh/h	102	1	4	172	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	-	170	250	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	119	1	5	200	6	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	120	0	329	119
Stage 1	-	-	-	-	119	-
Stage 2	-	-	-	-	210	-
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	-	-	1468	-	665	933
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	825	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1468	-	663	933
Mov Cap-2 Maneuver	-	-	-	-	663	-
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	823	-

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

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	663	933	-	-	1468	-
HCM Lane V/C Ratio	0.009	0.007	-	-	0.003	-
HCM Control Delay (s)	10.5	8.9	-	-	7.5	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	116	180	1	1	1
Future Vol, veh/h	1	116	180	1	1	1
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	125	194	1	1	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	195	0	-	0	322	195
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	127	-
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	1378	-	-	-	672	846
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	899	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1378	-	-	-	671	846
Mov Cap-2 Maneuver	-	-	-	-	671	-
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	899	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1378	-	-	-	748
HCM Lane V/C Ratio	0.001	-	-	-	0.003
HCM Control Delay (s)	7.6	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	118	1	49	183	7	38
Future Vol, veh/h	118	1	49	183	7	38
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	1	53	197	8	41

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	128	0	431	128
Stage 1	-	-	-	-	128	-
Stage 2	-	-	-	-	303	-
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	-	581	922
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	749	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1458	-	557	922
Mov Cap-2 Maneuver	-	-	-	-	557	-
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	718	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	9.6
HCM LOS			A

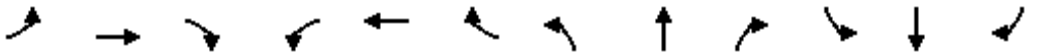
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	837	-	-	1458	-
HCM Lane V/C Ratio	0.058	-	-	0.036	-
HCM Control Delay (s)	9.6	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	11	414	81	103	664	14	107	42	18	18	63
Future Volume (vph)	11	414	81	103	664	14	107	42	18	18	63
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	5	2		1	6		3	8		7	4
Permitted Phases			2			6			8		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0	10.0	20.0
Total Split (s)	12.0	71.0	71.0	12.0	71.0	71.0	12.0	25.0	25.0	12.0	25.0
Total Split (%)	10.0%	59.2%	59.2%	10.0%	59.2%	59.2%	10.0%	20.8%	20.8%	10.0%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.4	30.7	30.7	7.5	41.9	41.9	7.5	19.1	19.1	6.6	10.1
Actuated g/C Ratio	0.08	0.40	0.40	0.10	0.54	0.54	0.10	0.25	0.25	0.09	0.13
v/c Ratio	0.09	0.70	0.14	0.71	0.77	0.02	0.74	0.11	0.04	0.14	0.43
Control Delay	44.2	23.4	2.4	63.3	20.3	0.0	66.0	33.4	0.2	44.1	37.2
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	44.2	23.4	2.4	63.3	20.3	0.0	66.0	33.4	0.2	44.1	37.2
LOS	D	C	A	E	C	A	E	C	A	D	D
Approach Delay		20.7			25.6			50.8			38.3
Approach LOS		C			C			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 77.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 64.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	414	81	103	664	14	107	42	18	18	63	26
Future Volume (veh/h)	11	414	81	103	664	14	107	42	18	18	63	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	518	95	121	781	16	126	49	21	21	74	31
Peak Hour Factor	0.85	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	29	780	661	154	912	773	160	298	253	43	117	49
Arrive On Green	0.02	0.42	0.42	0.09	0.49	0.49	0.09	0.16	0.16	0.02	0.09	0.09
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1252	524
Grp Volume(v), veh/h	13	518	95	121	781	16	126	49	21	21	0	105
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	0	1776
Q Serve(g_s), s	0.5	14.3	2.4	4.3	23.5	0.3	4.4	1.4	0.7	0.7	0.0	3.6
Cycle Q Clear(g_c), s	0.5	14.3	2.4	4.3	23.5	0.3	4.4	1.4	0.7	0.7	0.0	3.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.30
Lane Grp Cap(c), veh/h	29	780	661	154	912	773	160	298	253	43	0	166
V/C Ratio(X)	0.45	0.66	0.14	0.78	0.86	0.02	0.79	0.16	0.08	0.48	0.00	0.63
Avail Cap(c_a), veh/h	195	1928	1634	195	1928	1634	195	584	495	195	0	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.2	15.0	11.6	28.7	14.4	8.5	28.5	23.2	22.9	30.8	0.0	28.0
Incr Delay (d2), s/veh	10.7	1.0	0.1	14.9	2.4	0.0	15.8	0.3	0.1	8.1	0.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	4.9	0.7	2.3	7.7	0.1	2.4	0.6	0.3	0.4	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	16.0	11.7	43.5	16.9	8.5	44.3	23.5	23.1	39.0	0.0	31.9
LnGrp LOS	D	B	B	D	B	A	D	C	C	D	A	C
Approach Vol, veh/h		626			918			196			126	
Approach Delay, s/veh		15.9			20.2			36.8			33.0	
Approach LOS		B			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	31.7	10.8	11.0	6.0	36.2	6.6	15.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	66.0	7.0	20.0	7.0	66.0	7.0	20.0
Max Q Clear Time (g_c+I1), s	6.3	16.3	6.4	5.6	2.5	25.5	2.7	3.4
Green Ext Time (p_c), s	0.0	3.5	0.0	0.4	0.0	5.7	0.0	0.2

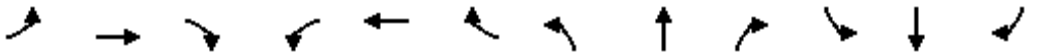
Intersection Summary	
HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	14	464	19	26	804	7	37	9	16	7
Future Volume (vph)	14	464	19	26	804	7	37	9	16	7
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	36.6	34.7	34.7	37.2	36.5	36.5	8.7	8.7	8.7	8.7
Actuated g/C Ratio	0.63	0.60	0.60	0.64	0.63	0.63	0.15	0.15	0.15	0.15
v/c Ratio	0.05	0.49	0.02	0.05	0.80	0.01	0.21	0.20	0.10	0.11
Control Delay	3.1	8.7	0.1	3.1	14.4	0.0	33.2	15.8	32.7	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	8.7	0.1	3.1	14.4	0.0	33.2	15.8	32.7	19.8
LOS	A	A	A	A	B	A	C	B	C	B
Approach Delay		8.2			13.9			23.2		24.9
Approach LOS		A			B			C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 58.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	464	19	26	804	7	37	9	41	16	7	18
Future Volume (veh/h)	14	464	19	26	804	7	37	9	41	16	7	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	540	0	30	935	8	43	10	48	19	8	21
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	1089		556	1115	945	248	27	129	222	44	115
Arrive On Green	0.02	0.58	0.00	0.03	0.60	0.60	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1381	281	1347	1345	456	1198
Grp Volume(v), veh/h	16	540	0	30	935	8	43	0	58	19	0	29
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1381	0	1628	1345	0	1655
Q Serve(g_s), s	0.2	8.8	0.0	0.3	21.0	0.1	1.5	0.0	1.7	0.7	0.0	0.8
Cycle Q Clear(g_c), s	0.2	8.8	0.0	0.3	21.0	0.1	2.4	0.0	1.7	2.4	0.0	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.83	1.00		0.72
Lane Grp Cap(c), veh/h	288	1089		556	1115	945	248	0	156	222	0	159
V/C Ratio(X)	0.06	0.50		0.05	0.84	0.01	0.17	0.00	0.37	0.09	0.00	0.18
Avail Cap(c_a), veh/h	492	2799		735	2799	2372	646	0	625	609	0	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.2	6.4	0.0	4.7	8.5	4.3	22.8	0.0	22.1	23.2	0.0	21.7
Incr Delay (d2), s/veh	0.1	0.4	0.0	0.0	1.8	0.0	0.3	0.0	1.5	0.2	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.8	0.0	0.1	4.4	0.0	0.5	0.0	0.6	0.2	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	6.7	0.0	4.7	10.3	4.3	23.1	0.0	23.5	23.4	0.0	22.2
LnGrp LOS	A	A		A	B	A	C	A	C	C	A	C
Approach Vol, veh/h		556			973			101			48	
Approach Delay, s/veh		6.8			10.0			23.4			22.7	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	35.4		10.0	6.0	36.1		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	10.8		4.4	2.2	23.0		4.4				
Green Ext Time (p_c), s	0.0	3.3		0.1	0.0	8.1		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		10.1	
HCM 6th LOS		B	

Notes

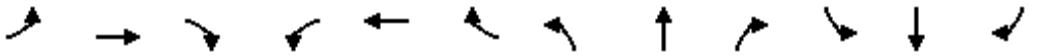
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	14	504	8	20	710	8	16	4	13	6
Future Volume (vph)	14	504	8	20	710	8	16	4	13	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	25.2	24.4	24.4	25.0	24.3	24.3	6.9	6.9	6.9	6.9
Actuated g/C Ratio	0.58	0.56	0.56	0.57	0.55	0.55	0.16	0.16	0.16	0.16
v/c Ratio	0.04	0.52	0.01	0.04	0.73	0.01	0.08	0.19	0.07	0.14
Control Delay	3.0	8.1	0.0	3.0	12.3	0.0	24.0	11.3	23.9	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	8.1	0.0	3.0	12.3	0.0	24.0	11.3	23.9	13.1
LOS	A	A	A	A	B	A	C	B	C	B
Approach Delay		7.8			11.9			14.2		15.9
Approach LOS		A			B			B		B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 43.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	504	8	20	710	8	16	4	51	13	6	32
Future Volume (veh/h)	14	504	8	20	710	8	16	4	51	13	6	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	15	536	9	21	755	9	17	4	54	14	6	34
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	328	940	797	477	952	807	301	13	176	284	29	163
Arrive On Green	0.02	0.50	0.50	0.03	0.51	0.51	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1367	110	1491	1345	243	1379
Grp Volume(v), veh/h	15	536	9	21	755	9	17	0	58	14	0	40
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1367	0	1602	1345	0	1622
Q Serve(g_s), s	0.2	8.5	0.1	0.2	14.1	0.1	0.5	0.0	1.4	0.4	0.0	0.9
Cycle Q Clear(g_c), s	0.2	8.5	0.1	0.2	14.1	0.1	1.4	0.0	1.4	1.8	0.0	0.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.93	1.00		0.85
Lane Grp Cap(c), veh/h	328	940	797	477	952	807	301	0	189	284	0	191
V/C Ratio(X)	0.05	0.57	0.01	0.04	0.79	0.01	0.06	0.00	0.31	0.05	0.00	0.21
Avail Cap(c_a), veh/h	588	3440	2916	725	3440	2916	784	0	756	760	0	765
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.2	7.4	5.3	5.6	8.6	5.1	17.6	0.0	17.1	17.9	0.0	16.9
Incr Delay (d2), s/veh	0.1	0.5	0.0	0.0	1.5	0.0	0.1	0.0	0.9	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.7	0.0	0.0	2.9	0.0	0.1	0.0	0.5	0.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.2	7.9	5.3	5.7	10.1	5.1	17.6	0.0	18.0	18.0	0.0	17.5
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h		560			785			75			54	
Approach Delay, s/veh		7.8			9.9			17.9			17.6	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	26.3		10.0	5.8	26.6		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.2	10.5		3.8	2.2	16.1		3.4				
Green Ext Time (p_c), s	0.0	3.3		0.1	0.0	5.5		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		9.8	
HCM 6th LOS		A	

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	534	26	221	687	0	9	1	176	0	0	1
Future Vol, veh/h	0	534	26	221	687	0	9	1	176	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	475	475	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	98	98	98	98	85	98	85	98	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	545	27	226	701	0	9	1	180	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	701	0	0	572	0	0	1699	1698	-	1712	1725	701
Stage 1	-	-	-	-	-	-	545	545	-	1153	1153	-
Stage 2	-	-	-	-	-	-	1154	1153	-	559	572	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	896	-	-	1001	-	-	73	92	0	71	89	439
Stage 1	-	-	-	-	-	-	523	519	0	240	272	-
Stage 2	-	-	-	-	-	-	240	272	0	513	504	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	896	-	-	1001	-	-	60	71	-	58	69	439
Mov Cap-2 Maneuver	-	-	-	-	-	-	169	191	-	58	69	-
Stage 1	-	-	-	-	-	-	523	519	-	240	211	-
Stage 2	-	-	-	-	-	-	185	211	-	512	504	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.3	27.4	13.2
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	171	-	896	-	-	1001	-	-	439
HCM Lane V/C Ratio	0.061	-	-	-	-	0.225	-	-	0.003
HCM Control Delay (s)	27.4	0	0	-	-	9.6	-	-	13.2
HCM Lane LOS	D	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	0	-	-	0.9	-	-	0

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	718	918	8	8	40
Future Vol, veh/h	28	718	918	8	8	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	325	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	30	780	998	9	9	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1007	0	-	0	1838	998
Stage 1	-	-	-	-	998	-
Stage 2	-	-	-	-	840	-
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	688	-	-	-	83	296
Stage 1	-	-	-	-	357	-
Stage 2	-	-	-	-	424	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	688	-	-	-	79	296
Mov Cap-2 Maneuver	-	-	-	-	79	-
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	424	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	28.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	688	-	-	-	203
HCM Lane V/C Ratio	0.044	-	-	-	0.257
HCM Control Delay (s)	10.5	-	-	-	28.8
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	21	8	35	41	2
Future Vol, veh/h	3	21	8	35	41	2
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	-	155	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	25	10	42	49	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	112	50	51	0	-	0
Stage 1	50	-	-	-	-	-
Stage 2	62	-	-	-	-	-
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	885	1018	1555	-	-	-
Stage 1	972	-	-	-	-	-
Stage 2	961	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	880	1018	1555	-	-	-
Mov Cap-2 Maneuver	880	-	-	-	-	-
Stage 1	966	-	-	-	-	-
Stage 2	961	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1555	-	998	-	-
HCM Lane V/C Ratio	0.006	-	0.029	-	-
HCM Control Delay (s)	7.3	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	39	15	45	63	2
Future Vol, veh/h	3	39	15	45	63	2
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	49	19	57	80	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	177	82	83	0	-	0
Stage 1	82	-	-	-	-	-
Stage 2	95	-	-	-	-	-
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	813	978	1514	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	929	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	802	978	1514	-	-	-
Mov Cap-2 Maneuver	802	-	-	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	929	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1514	-	963	-	-
HCM Lane V/C Ratio	0.013	-	0.055	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	3	5	13	0
Future Vol, veh/h	1	5	3	5	13	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	66	66	66	66	66	66
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	8	5	8	20	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	38	20	20	0	-	0
Stage 1	20	-	-	-	-	-
Stage 2	18	-	-	-	-	-
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	974	1058	1596	-	-	-
Stage 1	1003	-	-	-	-	-
Stage 2	1005	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	971	1058	1596	-	-	-
Mov Cap-2 Maneuver	971	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	1005	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	2.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	1042	-	-
HCM Lane V/C Ratio	0.003	-	0.009	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	11	14	13	0
Future Vol, veh/h	0	27	11	14	13	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	38	15	20	18	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	68	18	18	0	-	0
Stage 1	18	-	-	-	-	-
Stage 2	50	-	-	-	-	-
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	937	1061	1599	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	972	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	929	1061	1599	-	-	-
Mov Cap-2 Maneuver	929	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	972	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	3.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1599	-	1061	-	-
HCM Lane V/C Ratio	0.01	-	0.036	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	3	0	2	0	1	0	3	8	0	0	11	1
Future Vol, veh/h	3	0	2	0	1	0	3	8	0	0	11	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	2	0	1	0	3	9	0	0	13	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	30	29	14	30	29	9	14	0	0	9	0	0
Stage 1	14	14	-	15	15	-	-	-	-	-	-	-
Stage 2	16	15	-	15	14	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	979	864	1066	979	864	1073	1604	-	-	1611	-	-
Stage 1	1006	884	-	1005	883	-	-	-	-	-	-	-
Stage 2	1004	883	-	1005	884	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	976	862	1066	975	862	1073	1604	-	-	1611	-	-
Mov Cap-2 Maneuver	976	862	-	975	862	-	-	-	-	-	-	-
Stage 1	1004	884	-	1003	881	-	-	-	-	-	-	-
Stage 2	1001	881	-	1003	884	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	9.2	2	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1604	-	-	1010	862	1611	-	-
HCM Lane V/C Ratio	0.002	-	-	0.006	0.001	-	-	-
HCM Control Delay (s)	7.2	0	-	8.6	9.2	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	3	8	11	0
Future Vol, veh/h	0	4	3	8	11	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	4	11	15	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	34	15	15	0	-	0
Stage 1	15	-	-	-	-	-
Stage 2	19	-	-	-	-	-
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	979	1065	1603	-	-	-
Stage 1	1008	-	-	-	-	-
Stage 2	1004	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	976	1065	1603	-	-	-
Mov Cap-2 Maneuver	976	-	-	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	1004	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1603	-	1065	-	-
HCM Lane V/C Ratio	0.003	-	0.005	-	-
HCM Control Delay (s)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	240	149	8	3	3
Future Vol, veh/h	7	240	149	8	3	3
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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	286	177	10	4	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	187	0	-	0	484	182
Stage 1	-	-	-	-	182	-
Stage 2	-	-	-	-	302	-
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	1387	-	-	-	542	861
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	750	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1387	-	-	-	538	861
Mov Cap-2 Maneuver	-	-	-	-	538	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	750	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1387	-	-	-	662
HCM Lane V/C Ratio	0.006	-	-	-	0.011
HCM Control Delay (s)	7.6	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	240	25	34	149	5	46
Future Vol, veh/h	240	25	34	149	5	46
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	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	282	29	40	175	6	54

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	311	0	552	297
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	255	-
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	-	-	1249	-	495	742
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1249	-	478	742
Mov Cap-2 Maneuver	-	-	-	-	478	-
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	760	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	704	-	-	1249	-
HCM Lane V/C Ratio	0.085	-	-	0.032	-
HCM Control Delay (s)	10.6	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	36	237	127	25	27	34
Future Vol, veh/h	36	237	127	25	27	34
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	266	143	28	30	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	171	0	-	0	503	157
Stage 1	-	-	-	-	157	-
Stage 2	-	-	-	-	346	-
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	1406	-	-	-	528	889
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	716	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1406	-	-	-	511	889
Mov Cap-2 Maneuver	-	-	-	-	511	-
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	716	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1406	-	-	-	670
HCM Lane V/C Ratio	0.029	-	-	-	0.102
HCM Control Delay (s)	7.6	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	229	16	2	148	9	3
Future Vol, veh/h	229	16	2	148	9	3
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	252	18	2	163	10	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	270	0	428	261
Stage 1	-	-	-	-	261	-
Stage 2	-	-	-	-	167	-
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	-	-	1293	-	584	778
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	863	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1293	-	583	778
Mov Cap-2 Maneuver	-	-	-	-	583	-
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	861	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	622	-	-	1293	-
HCM Lane V/C Ratio	0.021	-	-	0.002	-
HCM Control Delay (s)	10.9	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	255	9	19	171	1	10
Future Vol, veh/h	255	9	19	171	1	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	-	170	250	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	293	10	22	197	1	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	303	0	534	293
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	241	-
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	-	-	1258	-	507	746
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	799	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1258	-	498	746
Mov Cap-2 Maneuver	-	-	-	-	498	-
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	785	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	498	746	-	-	1258	-
HCM Lane V/C Ratio	0.002	0.015	-	-	0.017	-
HCM Control Delay (s)	12.2	9.9	-	-	7.9	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	254	176	8	3	1
Future Vol, veh/h	2	254	176	8	3	1
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	273	189	9	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	198	0	-	0	471	194
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	277	-
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	1375	-	-	-	551	847
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	770	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1375	-	-	-	550	847
Mov Cap-2 Maneuver	-	-	-	-	550	-
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	770	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1375	-	-	-	603
HCM Lane V/C Ratio	0.002	-	-	-	0.007
HCM Control Delay (s)	7.6	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	227	6	16	157	10	35
Future Vol, veh/h	227	6	16	157	10	35
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	241	6	17	167	11	37

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	247	0	445	244
Stage 1	-	-	-	-	244	-
Stage 2	-	-	-	-	201	-
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	-	-	1319	-	571	795
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	833	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1319	-	563	795
Mov Cap-2 Maneuver	-	-	-	-	563	-
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	821	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	10.3
HCM LOS			B

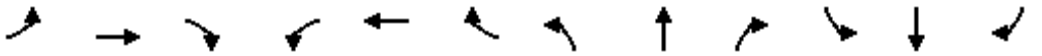
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	728	-	-	1319	-
HCM Lane V/C Ratio	0.066	-	-	0.013	-
HCM Control Delay (s)	10.3	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	29	794	113	76	575	11	130	102	87	19	59
Future Volume (vph)	29	794	113	76	575	11	130	102	87	19	59
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	5	2		1	6		3	8		7	4
Permitted Phases			2			6			8		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0	10.0	20.0
Total Split (s)	12.0	68.0	68.0	12.0	68.0	68.0	15.0	25.0	25.0	15.0	25.0
Total Split (%)	10.0%	56.7%	56.7%	10.0%	56.7%	56.7%	12.5%	20.8%	20.8%	12.5%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.6	50.8	50.8	7.2	56.6	56.6	10.2	20.6	20.6	6.9	9.8
Actuated g/C Ratio	0.07	0.52	0.52	0.07	0.57	0.57	0.10	0.21	0.21	0.07	0.10
v/c Ratio	0.27	0.90	0.14	0.65	0.58	0.01	0.77	0.29	0.23	0.17	0.45
Control Delay	55.0	34.8	2.6	72.7	17.5	0.0	74.0	41.2	8.1	51.6	46.9
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	55.0	34.8	2.6	72.7	17.5	0.0	74.0	41.2	8.1	51.6	46.9
LOS	D	C	A	E	B	A	E	D	A	D	D
Approach Delay		31.6			23.6			45.5			47.8
Approach LOS		C			C			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 98.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 31.9	Intersection LOS: C
Intersection Capacity Utilization 72.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	794	113	76	575	11	130	102	87	19	59	19
Future Volume (veh/h)	29	794	113	76	575	11	130	102	87	19	59	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	863	123	83	625	12	141	111	95	21	64	21
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	56	972	824	107	1025	868	176	280	237	41	100	33
Arrive On Green	0.03	0.52	0.52	0.06	0.55	0.55	0.10	0.15	0.15	0.02	0.07	0.07
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1348	442
Grp Volume(v), veh/h	32	863	123	83	625	12	141	111	95	21	0	85
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	0	1791
Q Serve(g_s), s	1.4	33.2	3.3	3.7	18.3	0.3	6.3	4.3	4.4	0.9	0.0	3.7
Cycle Q Clear(g_c), s	1.4	33.2	3.3	3.7	18.3	0.3	6.3	4.3	4.4	0.9	0.0	3.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.25
Lane Grp Cap(c), veh/h	56	972	824	107	1025	868	176	280	237	41	0	133
V/C Ratio(X)	0.57	0.89	0.15	0.78	0.61	0.01	0.80	0.40	0.40	0.51	0.00	0.64
Avail Cap(c_a), veh/h	154	1459	1236	154	1459	1236	221	463	393	221	0	443
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.6	17.3	10.1	37.4	12.4	8.3	35.6	31.1	31.1	39.0	0.0	36.3
Incr Delay (d2), s/veh	8.6	4.8	0.1	14.2	0.6	0.0	15.5	0.9	1.1	9.3	0.0	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	12.5	1.0	1.9	6.1	0.1	3.3	1.9	1.7	0.5	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.2	22.1	10.2	51.7	13.0	8.3	51.1	32.0	32.2	48.2	0.0	41.4
LnGrp LOS	D	C	B	D	B	A	D	C	C	D	A	D
Approach Vol, veh/h		1018			720			347			106	
Approach Delay, s/veh		21.4			17.4			39.8			42.8	
Approach LOS		C			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.8	47.0	13.0	11.0	7.6	49.3	6.9	17.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	63.0	10.0	20.0	7.0	63.0	10.0	20.0
Max Q Clear Time (g_c+I1), s	5.7	35.2	8.3	5.7	3.4	20.3	2.9	6.4
Green Ext Time (p_c), s	0.0	6.7	0.1	0.3	0.0	4.1	0.0	0.6

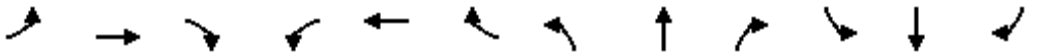
Intersection Summary	
HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	25	840	46	35	645	11	36	11	9	9
Future Volume (vph)	25	840	46	35	645	11	36	11	9	9
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	37.1	34.1	34.1	37.9	36.1	36.1	8.3	8.3	8.3	8.3
Actuated g/C Ratio	0.62	0.57	0.57	0.64	0.61	0.61	0.14	0.14	0.14	0.14
v/c Ratio	0.05	0.81	0.05	0.10	0.59	0.01	0.19	0.18	0.05	0.10
Control Delay	2.9	17.5	1.3	3.3	9.9	0.0	33.9	17.7	32.4	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.9	17.5	1.3	3.3	9.9	0.0	33.9	17.7	32.4	22.1
LOS	A	B	A	A	A	A	C	B	C	C
Approach Delay		16.2			9.4			24.9		24.9
Approach LOS		B			A			C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 59.4	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 61.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	840	46	35	645	11	36	11	34	9	9	15
Future Volume (veh/h)	25	840	46	35	645	11	36	11	34	9	9	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	866	0	36	665	11	37	11	35	9	9	15
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	450	1046		329	1063	901	266	39	126	246	63	105
Arrive On Green	0.03	0.56	0.00	0.04	0.57	0.57	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1387	393	1252	1360	630	1051
Grp Volume(v), veh/h	26	866	0	36	665	11	37	0	46	9	0	24
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1387	0	1645	1360	0	1681
Q Serve(g_s), s	0.3	18.9	0.0	0.4	11.9	0.2	1.2	0.0	1.3	0.3	0.0	0.6
Cycle Q Clear(g_c), s	0.3	18.9	0.0	0.4	11.9	0.2	1.9	0.0	1.3	1.6	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.76	1.00		0.63
Lane Grp Cap(c), veh/h	450	1046		329	1063	901	266	0	165	246	0	169
V/C Ratio(X)	0.06	0.83		0.11	0.63	0.01	0.14	0.00	0.28	0.04	0.00	0.14
Avail Cap(c_a), veh/h	647	2927		509	2927	2481	683	0	660	655	0	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.6	9.0	0.0	7.9	7.2	4.7	21.3	0.0	20.7	21.5	0.0	20.5
Incr Delay (d2), s/veh	0.1	1.7	0.0	0.1	0.6	0.0	0.2	0.0	0.9	0.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	4.2	0.0	0.1	2.5	0.0	0.4	0.0	0.5	0.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.7	10.8	0.0	8.1	7.8	4.7	21.6	0.0	21.7	21.5	0.0	20.8
LnGrp LOS	A	B		A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		892			712			83			33	
Approach Delay, s/veh		10.6			7.8			21.6			21.0	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	32.9		10.0	6.5	33.3		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	20.9		3.6	2.3	13.9		3.9				
Green Ext Time (p_c), s	0.0	6.9		0.1	0.0	4.5		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		10.2
HCM 6th LOS		B

Notes

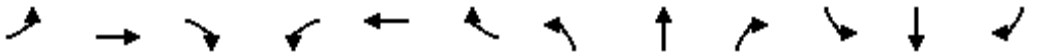
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	39	835	30	92	689	15	8	8	6	6
Future Volume (vph)	39	835	30	92	689	15	8	8	6	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	39.3	34.6	34.6	40.6	37.1	37.1	6.7	6.7	6.7	6.7
Actuated g/C Ratio	0.65	0.57	0.57	0.67	0.61	0.61	0.11	0.11	0.11	0.11
v/c Ratio	0.08	0.79	0.03	0.25	0.61	0.02	0.05	0.22	0.04	0.10
Control Delay	2.7	17.2	0.5	4.2	10.9	0.0	31.6	16.5	31.5	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	17.2	0.5	4.2	10.9	0.0	31.6	16.5	31.5	21.4
LOS	A	B	A	A	B	A	C	B	C	C
Approach Delay		16.1			9.9			18.6		23.8
Approach LOS		B			A			B		C

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 60.6		
Natural Cycle: 70		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.79		
Intersection Signal Delay: 13.5	Intersection LOS: B	
Intersection Capacity Utilization 68.2%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	835	30	92	689	15	8	8	40	6	6	13
Future Volume (veh/h)	39	835	30	92	689	15	8	8	40	6	6	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	39	843	30	93	696	15	8	8	40	6	6	13
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	449	1016	861	372	1071	908	259	26	131	232	51	110
Arrive On Green	0.04	0.54	0.54	0.07	0.57	0.57	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1393	271	1355	1357	526	1139
Grp Volume(v), veh/h	39	843	30	93	696	15	8	0	48	6	0	19
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1393	0	1626	1357	0	1665
Q Serve(g_s), s	0.5	19.4	0.5	1.1	13.1	0.2	0.3	0.0	1.4	0.2	0.0	0.5
Cycle Q Clear(g_c), s	0.5	19.4	0.5	1.1	13.1	0.2	0.8	0.0	1.4	1.6	0.0	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.83	1.00		0.68
Lane Grp Cap(c), veh/h	449	1016	861	372	1071	908	259	0	157	232	0	161
V/C Ratio(X)	0.09	0.83	0.03	0.25	0.65	0.02	0.03	0.00	0.31	0.03	0.00	0.12
Avail Cap(c_a), veh/h	615	2814	2385	486	2814	2385	662	0	627	625	0	642
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.9	9.9	5.5	8.3	7.5	4.8	21.8	0.0	21.8	22.6	0.0	21.4
Incr Delay (d2), s/veh	0.1	1.8	0.0	0.3	0.7	0.0	0.0	0.0	1.1	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	4.8	0.1	0.2	2.8	0.0	0.1	0.0	0.5	0.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.0	11.7	5.5	8.7	8.2	4.8	21.8	0.0	22.9	22.6	0.0	21.7
LnGrp LOS	A	B	A	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		912			804			56			25	
Approach Delay, s/veh		11.2			8.2			22.7			21.9	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.7	33.2		10.0	7.1	34.7		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.1	21.4		3.6	2.5	15.1		3.4				
Green Ext Time (p_c), s	0.1	6.7		0.0	0.0	4.9		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			10.4									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	828	16	166	802	0	16	0	276	1	0	3
Future Vol, veh/h	0	828	16	166	802	0	16	0	276	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	475	475	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	99	99	99	99	85	99	85	99	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	836	16	168	810	0	16	0	279	1	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	810	0	0	852	0	0	1984	1982	-	1990	1998	810
Stage 1	-	-	-	-	-	-	836	836	-	1146	1146	-
Stage 2	-	-	-	-	-	-	1148	1146	-	844	852	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	816	-	-	787	-	-	46	61	0	45	60	380
Stage 1	-	-	-	-	-	-	362	382	0	242	274	-
Stage 2	-	-	-	-	-	-	242	274	0	358	376	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	816	-	-	787	-	-	38	48	-	38	47	380
Mov Cap-2 Maneuver	-	-	-	-	-	-	161	182	-	38	47	-
Stage 1	-	-	-	-	-	-	362	382	-	242	216	-
Stage 2	-	-	-	-	-	-	189	216	-	358	376	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.9	29.8	37.1
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	161	-	816	-	-	787	-	-	117
HCM Lane V/C Ratio	0.1	-	-	-	-	0.213	-	-	0.04
HCM Control Delay (s)	29.8	0	0	-	-	10.8	-	-	37.1
HCM Lane LOS	D	A	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.3	-	0	-	-	0.8	-	-	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	47	1018	903	21	5	26
Future Vol, veh/h	47	1018	903	21	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	325	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	1060	941	22	5	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	963	0	-	0	2099	941
Stage 1	-	-	-	-	941	-
Stage 2	-	-	-	-	1158	-
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	715	-	-	-	57	319
Stage 1	-	-	-	-	380	-
Stage 2	-	-	-	-	299	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	715	-	-	-	53	319
Mov Cap-2 Maneuver	-	-	-	-	53	-
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	299	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	30
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	715	-	-	-	176
HCM Lane V/C Ratio	0.068	-	-	-	0.183
HCM Control Delay (s)	10.4	-	-	-	30
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	8	20	76	59	1
Future Vol, veh/h	0	8	20	76	59	1
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	-	155	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	9	23	87	68	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	202	69	69	0	-	0
Stage 1	69	-	-	-	-	-
Stage 2	133	-	-	-	-	-
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	787	994	1532	-	-	-
Stage 1	954	-	-	-	-	-
Stage 2	893	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	775	994	1532	-	-	-
Mov Cap-2 Maneuver	775	-	-	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	893	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1532	-	994	-	-
HCM Lane V/C Ratio	0.015	-	0.009	-	-
HCM Control Delay (s)	7.4	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	18	26	96	63	5
Future Vol, veh/h	1	18	26	96	63	5
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	21	30	110	72	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	245	75	78	0	-	0
Stage 1	75	-	-	-	-	-
Stage 2	170	-	-	-	-	-
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	743	986	1520	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	727	986	1520	-	-	-
Mov Cap-2 Maneuver	727	-	-	-	-	-
Stage 1	928	-	-	-	-	-
Stage 2	860	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1520	-	968	-	-
HCM Lane V/C Ratio	0.02	-	0.023	-	-
HCM Control Delay (s)	7.4	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	3	5	16	23	3
Future Vol, veh/h	0	3	5	16	23	3
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	6	19	28	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	61	30	32	0	-	0
Stage 1	30	-	-	-	-	-
Stage 2	31	-	-	-	-	-
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	945	1044	1580	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	992	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	941	1044	1580	-	-	-
Mov Cap-2 Maneuver	941	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	992	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1580	-	1044	-	-
HCM Lane V/C Ratio	0.004	-	0.003	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	14	24	15	24	1
Future Vol, veh/h	1	14	24	15	24	1
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	16	28	17	28	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	102	29	29	0	-	0
Stage 1	29	-	-	-	-	-
Stage 2	73	-	-	-	-	-
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	896	1046	1584	-	-	-
Stage 1	994	-	-	-	-	-
Stage 2	950	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	880	1046	1584	-	-	-
Mov Cap-2 Maneuver	880	-	-	-	-	-
Stage 1	976	-	-	-	-	-
Stage 2	950	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	4.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1584	-	1033	-	-
HCM Lane V/C Ratio	0.018	-	0.017	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	2	0	1	0	2	10	0	0	24	4
Future Vol, veh/h	1	0	2	0	1	0	2	10	0	0	24	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	3	0	1	0	3	15	0	0	36	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	61	60	39	62	63	15	42	0	0	15	0	0
Stage 1	39	39	-	21	21	-	-	-	-	-	-	-
Stage 2	22	21	-	41	42	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	934	831	1033	933	828	1065	1567	-	-	1603	-	-
Stage 1	976	862	-	998	878	-	-	-	-	-	-	-
Stage 2	996	878	-	974	860	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	931	829	1033	929	826	1065	1567	-	-	1603	-	-
Mov Cap-2 Maneuver	931	829	-	929	826	-	-	-	-	-	-	-
Stage 1	974	862	-	996	876	-	-	-	-	-	-	-
Stage 2	992	876	-	971	860	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	9.4	1.2	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1567	-	-	997	826	1603	-	-
HCM Lane V/C Ratio	0.002	-	-	0.004	0.002	-	-	-
HCM Control Delay (s)	7.3	0	-	8.6	9.4	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	4	7	11	22	4
Future Vol, veh/h	2	4	7	11	22	4
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	6	11	17	35	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	77	38	41	0	-	0
Stage 1	38	-	-	-	-	-
Stage 2	39	-	-	-	-	-
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	926	1034	1568	-	-	-
Stage 1	984	-	-	-	-	-
Stage 2	983	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	920	1034	1568	-	-	-
Mov Cap-2 Maneuver	920	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	983	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	2.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1568	-	993	-	-
HCM Lane V/C Ratio	0.007	-	0.01	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	108	144	1	4	4
Future Vol, veh/h	2	108	144	1	4	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	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	135	180	1	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	181	0	-	0	322	181
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	141	-
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	1394	-	-	-	672	862
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	886	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1394	-	-	-	671	862
Mov Cap-2 Maneuver	-	-	-	-	671	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	886	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1394	-	-	-	755
HCM Lane V/C Ratio	0.002	-	-	-	0.013
HCM Control Delay (s)	7.6	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	100	12	23	139	6	11
Future Vol, veh/h	100	12	23	139	6	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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	119	14	27	165	7	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	133	0	345	126
Stage 1	-	-	-	-	126	-
Stage 2	-	-	-	-	219	-
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	-	-	1452	-	652	924
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	817	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1452	-	639	924
Mov Cap-2 Maneuver	-	-	-	-	639	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	801	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	798	-	-	1452	-
HCM Lane V/C Ratio	0.025	-	-	0.019	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	106	183	17	17	21
Future Vol, veh/h	15	106	183	17	17	21
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	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	131	226	21	21	26

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	247	0	-	0	406	237
Stage 1	-	-	-	-	237	-
Stage 2	-	-	-	-	169	-
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	1319	-	-	-	601	802
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	861	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1319	-	-	-	591	802
Mov Cap-2 Maneuver	-	-	-	-	591	-
Stage 1	-	-	-	-	789	-
Stage 2	-	-	-	-	861	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1319	-	-	-	692
HCM Lane V/C Ratio	0.014	-	-	-	0.068
HCM Control Delay (s)	7.8	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	118	5	2	190	10	1
Future Vol, veh/h	118	5	2	190	10	1
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	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	137	6	2	221	12	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	143	0	365	140
Stage 1	-	-	-	-	140	-
Stage 2	-	-	-	-	225	-
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	-	-	1440	-	635	908
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1440	-	634	908
Mov Cap-2 Maneuver	-	-	-	-	634	-
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	810	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	652	-	-	1440	-
HCM Lane V/C Ratio	0.02	-	-	0.002	-
HCM Control Delay (s)	10.6	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	113	3	11	186	7	10
Future Vol, veh/h	113	3	11	186	7	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	-	170	250	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	131	3	13	216	8	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	134	0	373	131
Stage 1	-	-	-	-	131	-
Stage 2	-	-	-	-	242	-
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	-	-	1451	-	628	919
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1451	-	622	919
Mov Cap-2 Maneuver	-	-	-	-	622	-
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	791	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	622	919	-	-	1451	-
HCM Lane V/C Ratio	0.013	0.013	-	-	0.009	-
HCM Control Delay (s)	10.9	9	-	-	7.5	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	133	204	1	1	1
Future Vol, veh/h	1	133	204	1	1	1
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	143	219	1	1	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	220	0	-	0	365	220
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	145	-
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	1349	-	-	-	635	820
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1349	-	-	-	634	820
Mov Cap-2 Maneuver	-	-	-	-	634	-
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	882	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1349	-	-	-	715
HCM Lane V/C Ratio	0.001	-	-	-	0.003
HCM Control Delay (s)	7.7	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	133	1	54	197	8	42
Future Vol, veh/h	133	1	54	197	8	42
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	1	58	212	9	45

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	144	0	472	144
Stage 1	-	-	-	-	144	-
Stage 2	-	-	-	-	328	-
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	-	-	1438	-	551	903
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	730	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1438	-	526	903
Mov Cap-2 Maneuver	-	-	-	-	526	-
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	696	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	9.8
HCM LOS			A

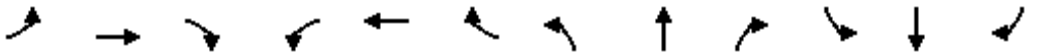
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	810	-	-	1438	-
HCM Lane V/C Ratio	0.066	-	-	0.04	-
HCM Control Delay (s)	9.8	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	12	459	89	114	740	15	118	46	20	20	70
Future Volume (vph)	12	459	89	114	740	15	118	46	20	20	70
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	5	2		1	6		3	8		7	4
Permitted Phases			2			6			8		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0	10.0	20.0
Total Split (s)	12.0	65.0	65.0	15.0	68.0	68.0	15.0	25.0	25.0	15.0	25.0
Total Split (%)	10.0%	54.2%	54.2%	12.5%	56.7%	56.7%	12.5%	20.8%	20.8%	12.5%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.4	37.2	37.2	10.5	49.3	49.3	10.5	22.7	22.7	7.1	11.1
Actuated g/C Ratio	0.07	0.41	0.41	0.12	0.54	0.54	0.12	0.25	0.25	0.08	0.12
v/c Ratio	0.11	0.75	0.15	0.65	0.86	0.02	0.67	0.12	0.05	0.17	0.50
Control Delay	50.9	28.2	3.1	60.1	28.9	0.1	61.6	37.0	0.2	49.7	43.9
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	50.9	28.2	3.1	60.1	28.9	0.1	61.6	37.0	0.2	49.7	43.9
LOS	D	C	A	E	C	A	E	D	A	D	D
Approach Delay		24.9			32.5			48.7			44.9
Approach LOS		C			C			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 90.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 32.5	Intersection LOS: C
Intersection Capacity Utilization 68.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	459	89	114	740	15	118	46	20	20	70	29
Future Volume (veh/h)	12	459	89	114	740	15	118	46	20	20	70	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	574	105	134	871	18	139	54	24	24	82	34
Peak Hour Factor	0.85	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	30	838	710	169	984	834	175	312	264	47	119	49
Arrive On Green	0.02	0.45	0.45	0.09	0.53	0.53	0.10	0.17	0.17	0.03	0.09	0.09
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1256	521
Grp Volume(v), veh/h	14	574	105	134	871	18	139	54	24	24	0	116
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	0	1777
Q Serve(g_s), s	0.6	18.5	3.0	5.6	31.3	0.4	5.8	1.9	1.0	1.0	0.0	4.8
Cycle Q Clear(g_c), s	0.6	18.5	3.0	5.6	31.3	0.4	5.8	1.9	1.0	1.0	0.0	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.29
Lane Grp Cap(c), veh/h	30	838	710	169	984	834	175	312	264	47	0	168
V/C Ratio(X)	0.47	0.69	0.15	0.79	0.89	0.02	0.80	0.17	0.09	0.51	0.00	0.69
Avail Cap(c_a), veh/h	165	1483	1257	235	1557	1319	235	494	419	235	0	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.9	16.6	12.3	33.5	15.9	8.6	33.4	27.1	26.7	36.4	0.0	33.2
Incr Delay (d2), s/veh	10.8	1.0	0.1	11.7	4.0	0.0	12.6	0.3	0.1	8.5	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	6.7	0.9	2.8	11.2	0.1	3.0	0.8	0.4	0.5	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.7	17.6	12.4	45.3	20.0	8.6	46.0	27.3	26.8	44.9	0.0	38.1
LnGrp LOS	D	B	B	D	B	A	D	C	C	D	A	D
Approach Vol, veh/h		693			1023			217			140	
Approach Delay, s/veh		17.5			23.1			39.2			39.3	
Approach LOS		B			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.2	38.9	12.4	12.2	6.3	44.8	7.0	17.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	10.0	60.0	10.0	20.0	7.0	63.0	10.0	20.0
Max Q Clear Time (g_c+I1), s	7.6	20.5	7.8	6.8	2.6	33.3	3.0	3.9
Green Ext Time (p_c), s	0.1	3.9	0.1	0.4	0.0	6.6	0.0	0.2

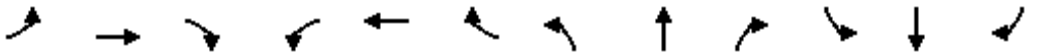
Intersection Summary	
HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	14	514	21	29	895	7	41	9	16	7
Future Volume (vph)	14	514	21	29	895	7	41	9	16	7
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	47.1	43.8	43.8	48.1	46.4	46.4	9.3	9.3	9.3	9.3
Actuated g/C Ratio	0.67	0.62	0.62	0.68	0.66	0.66	0.13	0.13	0.13	0.13
v/c Ratio	0.06	0.52	0.02	0.06	0.85	0.01	0.27	0.24	0.11	0.12
Control Delay	3.0	9.5	0.0	2.9	18.3	0.0	41.4	18.1	40.4	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	9.5	0.0	2.9	18.3	0.0	41.4	18.1	40.4	23.2
LOS	A	A	A	A	B	A	D	B	D	C
Approach Delay		9.0			17.6			28.2		30.0
Approach LOS		A			B			C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 70.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.6	Intersection LOS: B
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	514	21	29	895	7	41	9	45	16	7	18
Future Volume (veh/h)	14	514	21	29	895	7	41	9	45	16	7	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	598	0	34	1041	8	48	10	52	19	8	21
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	260	1175		555	1205	1022	218	23	120	188	40	105
Arrive On Green	0.02	0.63	0.00	0.04	0.64	0.64	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1381	262	1363	1340	456	1198
Grp Volume(v), veh/h	16	598	0	34	1041	8	48	0	62	19	0	29
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1381	0	1625	1340	0	1655
Q Serve(g_s), s	0.2	10.6	0.0	0.4	27.0	0.1	2.0	0.0	2.2	0.8	0.0	1.0
Cycle Q Clear(g_c), s	0.2	10.6	0.0	0.4	27.0	0.1	3.0	0.0	2.2	3.0	0.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.84	1.00		0.72
Lane Grp Cap(c), veh/h	260	1175		555	1205	1022	218	0	143	188	0	146
V/C Ratio(X)	0.06	0.51		0.06	0.86	0.01	0.22	0.00	0.43	0.10	0.00	0.20
Avail Cap(c_a), veh/h	432	2412		697	2412	2044	553	0	537	514	0	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.5	6.2	0.0	4.4	8.6	3.8	27.0	0.0	26.1	27.6	0.0	25.6
Incr Delay (d2), s/veh	0.1	0.3	0.0	0.0	2.0	0.0	0.5	0.0	2.1	0.2	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.3	0.0	0.1	5.8	0.0	0.6	0.0	0.9	0.3	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	6.5	0.0	4.5	10.6	3.8	27.5	0.0	28.2	27.8	0.0	26.3
LnGrp LOS	A	A		A	B	A	C	A	C	C	A	C
Approach Vol, veh/h		614			1083			110			48	
Approach Delay, s/veh		6.6			10.4			27.9			26.9	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	43.0		10.3	6.2	44.0		10.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	12.6		5.0	2.2	29.0		5.0				
Green Ext Time (p_c), s	0.0	3.9		0.1	0.0	10.0		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		10.6
HCM 6th LOS		B

Notes

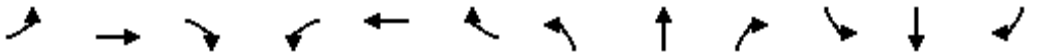
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	16	556	9	22	784	9	18	5	16	8
Future Volume (vph)	16	556	9	22	784	9	18	5	16	8
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	28.6	26.7	26.7	29.2	28.5	28.5	7.2	7.2	7.2	7.2
Actuated g/C Ratio	0.59	0.55	0.55	0.60	0.59	0.59	0.15	0.15	0.15	0.15
v/c Ratio	0.04	0.58	0.01	0.04	0.76	0.01	0.10	0.22	0.09	0.18
Control Delay	3.0	10.1	0.0	2.9	12.9	0.0	27.1	12.3	27.1	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	10.1	0.0	2.9	12.9	0.0	27.1	12.3	27.1	14.3
LOS	A	B	A	A	B	A	C	B	C	B
Approach Delay		9.8			12.5			15.7		17.5
Approach LOS		A			B			B		B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 48.4	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 57.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	556	9	22	784	9	18	5	56	16	8	39
Future Volume (veh/h)	16	556	9	22	784	9	18	5	56	16	8	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	591	10	23	834	10	19	5	60	17	9	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	313	1012	858	474	1024	868	263	13	160	249	32	144
Arrive On Green	0.02	0.54	0.54	0.03	0.55	0.55	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1355	123	1480	1337	293	1336
Grp Volume(v), veh/h	17	591	10	23	834	10	19	0	65	17	0	50
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1355	0	1604	1337	0	1630
Q Serve(g_s), s	0.2	9.8	0.1	0.3	16.9	0.1	0.6	0.0	1.7	0.6	0.0	1.3
Cycle Q Clear(g_c), s	0.2	9.8	0.1	0.3	16.9	0.1	1.9	0.0	1.7	2.3	0.0	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.82
Lane Grp Cap(c), veh/h	313	1012	858	474	1024	868	263	0	173	249	0	176
V/C Ratio(X)	0.05	0.58	0.01	0.05	0.81	0.01	0.07	0.00	0.38	0.07	0.00	0.28
Avail Cap(c_a), veh/h	544	3145	2665	693	3145	2665	701	0	691	681	0	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.5	7.1	4.9	5.4	8.6	4.8	19.9	0.0	19.2	20.3	0.0	19.1
Incr Delay (d2), s/veh	0.1	0.5	0.0	0.0	1.6	0.0	0.1	0.0	1.3	0.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.0	0.0	0.0	3.5	0.0	0.2	0.0	0.6	0.2	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.6	7.7	4.9	5.5	10.2	4.8	20.0	0.0	20.6	20.4	0.0	19.9
LnGrp LOS	A	A	A	A	B	A	C	A	C	C	A	B
Approach Vol, veh/h		618			867			84			67	
Approach Delay, s/veh		7.6			10.0			20.5			20.1	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	30.1		10.0	6.0	30.4		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	11.8		4.3	2.2	18.9		3.9				
Green Ext Time (p_c), s	0.0	3.8		0.2	0.0	6.5		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		10.1	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	593	29	244	760	0	10	1	194	0	0	1
Future Vol, veh/h	0	593	29	244	760	0	10	1	194	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	475	475	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	98	98	98	98	85	98	85	98	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	605	30	249	776	0	10	1	198	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	776	0	0	635	0	0	1880	1879	-	1895	1909	776
Stage 1	-	-	-	-	-	-	605	605	-	1274	1274	-
Stage 2	-	-	-	-	-	-	1275	1274	-	621	635	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	840	-	-	948	-	-	54	71	0	53	68	397
Stage 1	-	-	-	-	-	-	485	487	0	205	238	-
Stage 2	-	-	-	-	-	-	205	238	0	475	472	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	840	-	-	948	-	-	43	52	-	42	50	397
Mov Cap-2 Maneuver	-	-	-	-	-	-	139	159	-	42	50	-
Stage 1	-	-	-	-	-	-	485	487	-	205	175	-
Stage 2	-	-	-	-	-	-	151	175	-	474	472	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.5	32.8	14.1
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	141	-	840	-	-	948	-	-	397
HCM Lane V/C Ratio	0.081	-	-	-	-	0.263	-	-	0.003
HCM Control Delay (s)	32.8	0	0	-	-	10.1	-	-	14.1
HCM Lane LOS	D	A	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	0.3	-	0	-	-	1.1	-	-	0

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	796	1015	9	9	44
Future Vol, veh/h	31	796	1015	9	9	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	325	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	34	865	1103	10	10	48

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1113	0	-	0	2036	1103
Stage 1	-	-	-	-	1103	-
Stage 2	-	-	-	-	933	-
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	627	-	-	-	62	257
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	383	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	627	-	-	-	59	257
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	301	-
Stage 2	-	-	-	-	383	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	38.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	627	-	-	-	164
HCM Lane V/C Ratio	0.054	-	-	-	0.351
HCM Control Delay (s)	11.1	-	-	-	38.4
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.2	-	-	-	1.5

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	21	8	37	44	2
Future Vol, veh/h	3	21	8	37	44	2
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	-	155	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	25	10	45	53	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	119	54	55	0	-	0
Stage 1	54	-	-	-	-	-
Stage 2	65	-	-	-	-	-
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	877	1013	1550	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	958	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	872	1013	1550	-	-	-
Mov Cap-2 Maneuver	872	-	-	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	958	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1550	-	993	-	-
HCM Lane V/C Ratio	0.006	-	0.029	-	-
HCM Control Delay (s)	7.3	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	39	15	47	66	2
Future Vol, veh/h	3	39	15	47	66	2
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	49	19	59	84	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	183	86	87	0	-	0
Stage 1	86	-	-	-	-	-
Stage 2	97	-	-	-	-	-
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	806	973	1509	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	927	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	796	973	1509	-	-	-
Mov Cap-2 Maneuver	796	-	-	-	-	-
Stage 1	925	-	-	-	-	-
Stage 2	927	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1509	-	958	-	-
HCM Lane V/C Ratio	0.013	-	0.055	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	3	5	13	0
Future Vol, veh/h	1	5	3	5	13	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	66	66	66	66	66	66
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	8	5	8	20	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	38	20	20	0	-	0
Stage 1	20	-	-	-	-	-
Stage 2	18	-	-	-	-	-
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	974	1058	1596	-	-	-
Stage 1	1003	-	-	-	-	-
Stage 2	1005	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	971	1058	1596	-	-	-
Mov Cap-2 Maneuver	971	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	1005	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	2.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	1042	-	-
HCM Lane V/C Ratio	0.003	-	0.009	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	11	14	13	0
Future Vol, veh/h	0	27	11	14	13	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	38	15	20	18	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	68	18	18	0	-	0
Stage 1	18	-	-	-	-	-
Stage 2	50	-	-	-	-	-
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	937	1061	1599	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	972	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	929	1061	1599	-	-	-
Mov Cap-2 Maneuver	929	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	972	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	3.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1599	-	1061	-	-
HCM Lane V/C Ratio	0.01	-	0.036	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	3	0	2	0	0	0	3	14	0	0	13	1
Future Vol, veh/h	3	0	2	0	0	0	3	14	0	0	13	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	2	0	0	0	3	16	0	0	15	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	38	38	16	39	38	16	16	0	0	16	0	0
Stage 1	16	16	-	22	22	-	-	-	-	-	-	-
Stage 2	22	22	-	17	16	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	967	854	1063	966	854	1063	1602	-	-	1602	-	-
Stage 1	1004	882	-	996	877	-	-	-	-	-	-	-
Stage 2	996	877	-	1002	882	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	965	852	1063	962	852	1063	1602	-	-	1602	-	-
Mov Cap-2 Maneuver	965	852	-	962	852	-	-	-	-	-	-	-
Stage 1	1002	882	-	994	875	-	-	-	-	-	-	-
Stage 2	994	875	-	1000	882	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	0	1.3	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	1002	-	1602	-	-
HCM Lane V/C Ratio	0.002	-	-	0.006	-	-	-	-
HCM Control Delay (s)	7.3	0	-	8.6	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	3	17	15	0
Future Vol, veh/h	0	4	3	17	15	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	4	23	21	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	52	21	21	0	-	0
Stage 1	21	-	-	-	-	-
Stage 2	31	-	-	-	-	-
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	957	1056	1595	-	-	-
Stage 1	1002	-	-	-	-	-
Stage 2	992	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	954	1056	1595	-	-	-
Mov Cap-2 Maneuver	954	-	-	-	-	-
Stage 1	999	-	-	-	-	-
Stage 2	992	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1595	-	1056	-	-
HCM Lane V/C Ratio	0.003	-	0.005	-	-
HCM Control Delay (s)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	291	163	9	3	3
Future Vol, veh/h	8	291	163	9	3	3
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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	346	194	11	4	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	205	0	-	0	566	200
Stage 1	-	-	-	-	200	-
Stage 2	-	-	-	-	366	-
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	1366	-	-	-	486	841
Stage 1	-	-	-	-	834	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1366	-	-	-	482	841
Mov Cap-2 Maneuver	-	-	-	-	482	-
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	702	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1366	-	-	-	613
HCM Lane V/C Ratio	0.007	-	-	-	0.012
HCM Control Delay (s)	7.7	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	266	28	38	166	6	51
Future Vol, veh/h	266	28	38	166	6	51
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	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	313	33	45	195	7	60

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	346	0	615	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	285	-
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	-	-	1213	-	455	712
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	763	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1213	-	436	712
Mov Cap-2 Maneuver	-	-	-	-	436	-
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	731	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	11
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	668	-	-	1213	-
HCM Lane V/C Ratio	0.1	-	-	0.037	-
HCM Control Delay (s)	11	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	248	135	28	30	38
Future Vol, veh/h	40	248	135	28	30	38
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	279	152	31	34	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	183	0	-	0	537	168
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	369	-
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	1392	-	-	-	505	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1392	-	-	-	486	876
Mov Cap-2 Maneuver	-	-	-	-	486	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1392	-	-	-	647
HCM Lane V/C Ratio	0.032	-	-	-	0.118
HCM Control Delay (s)	7.7	0	-	-	11.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	262	16	2	154	9	3
Future Vol, veh/h	262	16	2	154	9	3
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	288	18	2	169	10	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	306	0	470	297
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	173	-
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	-	-	1255	-	552	742
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	857	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1255	-	551	742
Mov Cap-2 Maneuver	-	-	-	-	551	-
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	855	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	589	-	-	1255	-
HCM Lane V/C Ratio	0.022	-	-	0.002	-
HCM Control Delay (s)	11.3	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	283	8	26	189	3	11
Future Vol, veh/h	283	8	26	189	3	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	-	170	250	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	325	9	30	217	3	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	334	0	602	325
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	277	-
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	-	-	1225	-	463	716
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	770	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1225	-	452	716
Mov Cap-2 Maneuver	-	-	-	-	452	-
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	752	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	452	716	-	-	1225	-
HCM Lane V/C Ratio	0.008	0.018	-	-	0.024	-
HCM Control Delay (s)	13	10.1	-	-	8	-
HCM Lane LOS	B	B	-	-	A	-
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	283	198	9	3	1
Future Vol, veh/h	2	283	198	9	3	1
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	304	213	10	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	223	0	-	0	526	218
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	308	-
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	1346	-	-	-	512	822
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	745	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1346	-	-	-	511	822
Mov Cap-2 Maneuver	-	-	-	-	511	-
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	745	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1346	-	-	-	564
HCM Lane V/C Ratio	0.002	-	-	-	0.008
HCM Control Delay (s)	7.7	0	-	-	11.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	279	7	18	196	11	39
Future Vol, veh/h	279	7	18	196	11	39
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	297	7	19	209	12	41

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	304	0	548	301
Stage 1	-	-	-	-	301	-
Stage 2	-	-	-	-	247	-
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	-	-	1257	-	497	739
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	794	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1257	-	489	739
Mov Cap-2 Maneuver	-	-	-	-	489	-
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	781	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	664	-	-	1257	-
HCM Lane V/C Ratio	0.08	-	-	0.015	-
HCM Control Delay (s)	10.9	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	32	886	125	84	640	12	144	113	96	21	65
Future Volume (vph)	32	886	125	84	640	12	144	113	96	21	65
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	5	2		1	6		3	8		7	4
Permitted Phases			2			6			8		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0	10.0	20.0
Total Split (s)	12.0	63.0	63.0	12.0	63.0	63.0	20.0	33.0	33.0	12.0	25.0
Total Split (%)	10.0%	52.5%	52.5%	10.0%	52.5%	52.5%	16.7%	27.5%	27.5%	10.0%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.6	58.1	58.1	7.0	63.2	63.2	13.5	24.2	24.2	6.4	10.4
Actuated g/C Ratio	0.06	0.53	0.53	0.06	0.58	0.58	0.12	0.22	0.22	0.06	0.10
v/c Ratio	0.33	0.97	0.15	0.81	0.65	0.01	0.72	0.30	0.24	0.22	0.52
Control Delay	59.2	48.5	2.1	96.0	21.4	0.0	65.5	39.0	8.3	55.7	51.5
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	59.2	48.5	2.1	96.0	21.4	0.0	65.5	39.0	8.3	55.7	51.5
LOS	E	D	A	F	C	A	E	D	A	E	D
Approach Delay		43.3			29.5			41.5			52.3
Approach LOS		D			C			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 109	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 38.9	Intersection LOS: D
Intersection Capacity Utilization 78.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	886	125	84	640	12	144	113	96	21	65	21
Future Volume (veh/h)	32	886	125	84	640	12	144	113	96	21	65	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	35	963	136	91	696	13	157	123	104	23	71	23
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	56	1025	869	116	1088	922	190	295	250	42	101	33
Arrive On Green	0.03	0.55	0.55	0.06	0.58	0.58	0.11	0.16	0.16	0.02	0.07	0.07
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1353	438
Grp Volume(v), veh/h	35	963	136	91	696	13	157	123	104	23	0	94
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	0	1791
Q Serve(g_s), s	1.9	46.7	4.1	4.9	24.1	0.3	8.4	5.8	5.8	1.2	0.0	5.0
Cycle Q Clear(g_c), s	1.9	46.7	4.1	4.9	24.1	0.3	8.4	5.8	5.8	1.2	0.0	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	56	1025	869	116	1088	922	190	295	250	42	0	134
V/C Ratio(X)	0.63	0.94	0.16	0.79	0.64	0.01	0.82	0.42	0.42	0.54	0.00	0.70
Avail Cap(c_a), veh/h	128	1115	945	128	1115	945	275	538	456	128	0	368
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.6	20.5	10.9	44.8	13.6	8.6	42.6	36.9	36.9	47.0	0.0	44.0
Incr Delay (d2), s/veh	10.9	14.1	0.1	25.0	1.2	0.0	12.6	0.9	1.1	10.4	0.0	6.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	20.7	1.3	2.9	8.7	0.1	4.2	2.6	2.2	0.7	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.4	34.6	11.0	69.8	14.8	8.6	55.2	37.9	38.0	57.3	0.0	50.5
LnGrp LOS	E	C	B	E	B	A	E	D	D	E	A	D
Approach Vol, veh/h		1134			800			384			117	
Approach Delay, s/veh		32.5			20.9			45.0			51.8	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	58.3	15.4	12.3	8.1	61.6	7.3	20.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	58.0	15.0	20.0	7.0	58.0	7.0	28.0
Max Q Clear Time (g_c+I1), s	6.9	48.7	10.4	7.0	3.9	26.1	3.2	7.8
Green Ext Time (p_c), s	0.0	4.7	0.1	0.3	0.0	4.6	0.0	0.9

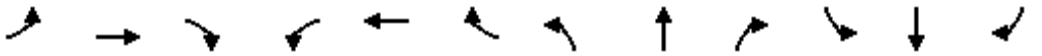
Intersection Summary	
HCM 6th Ctrl Delay	31.6
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	25	936	51	39	717	11	40	11	9	9
Future Volume (vph)	25	936	51	39	717	11	40	11	9	9
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	47.0	43.9	43.9	47.9	46.1	46.1	8.8	8.8	8.8	8.8
Actuated g/C Ratio	0.67	0.63	0.63	0.69	0.66	0.66	0.13	0.13	0.13	0.13
v/c Ratio	0.05	0.82	0.05	0.13	0.60	0.01	0.24	0.21	0.05	0.11
Control Delay	2.7	17.5	1.3	3.4	9.4	0.0	40.5	19.5	38.7	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	17.5	1.3	3.4	9.4	0.0	40.5	19.5	38.7	25.4
LOS	A	B	A	A	A	A	D	B	D	C
Approach Delay		16.3			8.9			29.0		29.0
Approach LOS		B			A			C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 69.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 66.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	936	51	39	717	11	40	11	38	9	9	15
Future Volume (veh/h)	25	936	51	39	717	11	40	11	38	9	9	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	965	0	40	739	11	41	11	39	9	9	15
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	442	1133		309	1155	979	231	32	113	208	56	93
Arrive On Green	0.03	0.61	0.00	0.04	0.62	0.62	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1387	361	1279	1355	630	1051
Grp Volume(v), veh/h	26	965	0	40	739	11	41	0	50	9	0	24
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1387	0	1640	1355	0	1681
Q Serve(g_s), s	0.3	23.8	0.0	0.5	14.2	0.2	1.6	0.0	1.6	0.4	0.0	0.7
Cycle Q Clear(g_c), s	0.3	23.8	0.0	0.5	14.2	0.2	2.3	0.0	1.6	2.0	0.0	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.78	1.00		0.63
Lane Grp Cap(c), veh/h	442	1133		309	1155	979	231	0	145	208	0	148
V/C Ratio(X)	0.06	0.85		0.13	0.64	0.01	0.18	0.00	0.35	0.04	0.00	0.16
Avail Cap(c_a), veh/h	609	2574		455	2574	2182	598	0	579	566	0	593
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.5	9.1	0.0	9.0	6.9	4.2	25.0	0.0	24.3	25.2	0.0	23.9
Incr Delay (d2), s/veh	0.1	1.9	0.0	0.2	0.6	0.0	0.4	0.0	1.4	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	5.4	0.0	0.1	2.9	0.0	0.5	0.0	0.6	0.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.5	11.0	0.0	9.2	7.5	4.2	25.3	0.0	25.7	25.3	0.0	24.4
LnGrp LOS	A	B		A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		991			790			91			33	
Approach Delay, s/veh		10.9			7.5			25.5			24.6	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	39.3		10.0	6.7	40.0		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.5	25.8		4.0	2.3	16.2		4.3				
Green Ext Time (p_c), s	0.0	8.5		0.1	0.0	5.3		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		10.4
HCM 6th LOS		B

Notes

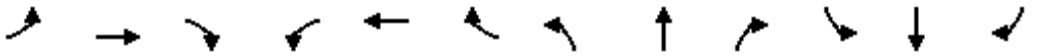
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	48	922	33	102	761	19	9	10	9	7
Future Volume (vph)	48	922	33	102	761	19	9	10	9	7
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	45.7	40.9	40.9	47.0	43.5	43.5	7.0	7.0	7.0	7.0
Actuated g/C Ratio	0.68	0.61	0.61	0.70	0.65	0.65	0.10	0.10	0.10	0.10
v/c Ratio	0.10	0.82	0.03	0.31	0.64	0.02	0.06	0.26	0.06	0.13
Control Delay	2.7	18.2	0.5	5.0	11.0	0.1	36.1	18.5	36.2	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.7	18.2	0.5	5.0	11.0	0.1	36.1	18.5	36.2	22.1
LOS	A	B	A	A	B	A	D	B	D	C
Approach Delay		16.9			10.1			21.0		25.9
Approach LOS		B			B			C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 67.4	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 73.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	922	33	102	761	19	9	10	44	9	7	18
Future Volume (veh/h)	48	922	33	102	761	19	9	10	44	9	7	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	48	931	33	103	769	19	9	10	44	9	7	18
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	437	1094	927	350	1138	964	224	26	115	199	40	103
Arrive On Green	0.05	0.58	0.58	0.07	0.61	0.61	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1386	302	1329	1350	464	1192
Grp Volume(v), veh/h	48	931	33	103	769	19	9	0	54	9	0	25
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1386	0	1631	1350	0	1656
Q Serve(g_s), s	0.6	23.8	0.5	1.2	15.8	0.3	0.4	0.0	1.8	0.4	0.0	0.8
Cycle Q Clear(g_c), s	0.6	23.8	0.5	1.2	15.8	0.3	1.2	0.0	1.8	2.2	0.0	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.81	1.00		0.72
Lane Grp Cap(c), veh/h	437	1094	927	350	1138	964	224	0	141	199	0	143
V/C Ratio(X)	0.11	0.85	0.04	0.29	0.68	0.02	0.04	0.00	0.38	0.05	0.00	0.17
Avail Cap(c_a), veh/h	570	2518	2134	441	2518	2134	583	0	563	548	0	571
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.0	9.9	5.1	9.6	7.5	4.5	25.1	0.0	25.0	26.0	0.0	24.6
Incr Delay (d2), s/veh	0.1	2.0	0.0	0.5	0.7	0.0	0.1	0.0	1.7	0.1	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	6.0	0.1	0.4	3.5	0.1	0.1	0.0	0.7	0.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.1	11.9	5.1	10.1	8.3	4.5	25.2	0.0	26.7	26.1	0.0	25.1
LnGrp LOS	A	B	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h		1012			891			63			34	
Approach Delay, s/veh		11.4			8.4			26.5			25.4	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	38.9		10.0	7.7	40.3		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	25.8		4.2	2.6	17.8		3.8				
Green Ext Time (p_c), s	0.1	8.1		0.1	0.0	5.7		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			10.8									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	917	18	183	889	0	18	0	305	1	0	3
Future Vol, veh/h	0	917	18	183	889	0	18	0	305	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	475	475	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	99	99	99	99	85	99	85	99	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	926	18	185	898	0	18	0	308	1	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	898	0	0	944	0	0	2196	2194	-	2203	2212	898
Stage 1	-	-	-	-	-	-	926	926	-	1268	1268	-
Stage 2	-	-	-	-	-	-	1270	1268	-	935	944	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	756	-	-	727	-	-	32	45	0	32	44	338
Stage 1	-	-	-	-	-	-	322	347	0	207	240	-
Stage 2	-	-	-	-	-	-	206	240	0	318	341	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	756	-	-	727	-	-	25	34	-	26	33	338
Mov Cap-2 Maneuver	-	-	-	-	-	-	131	152	-	26	33	-
Stage 1	-	-	-	-	-	-	322	347	-	207	179	-
Stage 2	-	-	-	-	-	-	152	179	-	318	341	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2	36.9	49.8
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	131	-	756	-	-	727	-	-	85
HCM Lane V/C Ratio	0.139	-	-	-	-	0.254	-	-	0.055
HCM Control Delay (s)	36.9	0	0	-	-	11.6	-	-	49.8
HCM Lane LOS	E	A	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.5	-	0	-	-	1	-	-	0.2

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	1127	1001	23	6	29
Future Vol, veh/h	52	1127	1001	23	6	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	325	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	1174	1043	24	6	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1067	0	-	0	2325	1043
Stage 1	-	-	-	-	1043	-
Stage 2	-	-	-	-	1282	-
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	653	-	-	-	41	279
Stage 1	-	-	-	-	339	-
Stage 2	-	-	-	-	260	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	653	-	-	-	38	279
Mov Cap-2 Maneuver	-	-	-	-	38	-
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	260	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	41.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	653	-	-	-	134
HCM Lane V/C Ratio	0.083	-	-	-	0.272
HCM Control Delay (s)	11	-	-	-	41.6
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.3	-	-	-	1

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	8	20	82	66	1
Future Vol, veh/h	0	8	20	82	66	1
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	-	155	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	9	23	94	76	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	217	77	77	0	-	0
Stage 1	77	-	-	-	-	-
Stage 2	140	-	-	-	-	-
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	771	984	1522	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	759	984	1522	-	-	-
Mov Cap-2 Maneuver	759	-	-	-	-	-
Stage 1	932	-	-	-	-	-
Stage 2	887	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1522	-	984	-	-
HCM Lane V/C Ratio	0.015	-	0.009	-	-
HCM Control Delay (s)	7.4	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	18	26	102	70	5
Future Vol, veh/h	1	18	26	102	70	5
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	21	30	117	80	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	260	83	86	0	-	0
Stage 1	83	-	-	-	-	-
Stage 2	177	-	-	-	-	-
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	729	976	1510	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	854	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	714	976	1510	-	-	-
Mov Cap-2 Maneuver	714	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	854	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	1.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1510	-	958	-	-
HCM Lane V/C Ratio	0.02	-	0.023	-	-
HCM Control Delay (s)	7.4	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	3	5	16	23	3
Future Vol, veh/h	0	3	5	16	23	3
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	6	19	28	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	61	30	32	0	-	0
Stage 1	30	-	-	-	-	-
Stage 2	31	-	-	-	-	-
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	945	1044	1580	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	992	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	941	1044	1580	-	-	-
Mov Cap-2 Maneuver	941	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	992	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1580	-	1044	-	-
HCM Lane V/C Ratio	0.004	-	0.003	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	14	24	15	24	1
Future Vol, veh/h	1	14	24	15	24	1
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	16	28	17	28	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	102	29	29	0	-	0
Stage 1	29	-	-	-	-	-
Stage 2	73	-	-	-	-	-
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	896	1046	1584	-	-	-
Stage 1	994	-	-	-	-	-
Stage 2	950	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	880	1046	1584	-	-	-
Mov Cap-2 Maneuver	880	-	-	-	-	-
Stage 1	976	-	-	-	-	-
Stage 2	950	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	4.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1584	-	1033	-	-
HCM Lane V/C Ratio	0.018	-	0.017	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	2	0	0	0	2	13	0	0	30	4
Future Vol, veh/h	1	0	2	0	0	0	2	13	0	0	30	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	3	0	0	0	3	19	0	0	45	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	73	73	48	75	76	19	51	0	0	19	0	0
Stage 1	48	48	-	25	25	-	-	-	-	-	-	-
Stage 2	25	25	-	50	51	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	918	817	1021	915	814	1059	1555	-	-	1597	-	-
Stage 1	965	855	-	993	874	-	-	-	-	-	-	-
Stage 2	993	874	-	963	852	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	916	815	1021	911	812	1059	1555	-	-	1597	-	-
Mov Cap-2 Maneuver	916	815	-	911	812	-	-	-	-	-	-	-
Stage 1	963	855	-	991	872	-	-	-	-	-	-	-
Stage 2	991	872	-	960	852	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.7	0	1	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1555	-	-	983	-	1597	-	-
HCM Lane V/C Ratio	0.002	-	-	0.005	-	-	-	-
HCM Control Delay (s)	7.3	0	-	8.7	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	4	7	13	28	4
Future Vol, veh/h	2	4	7	13	28	4
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	6	11	21	44	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	90	47	50	0	-	0
Stage 1	47	-	-	-	-	-
Stage 2	43	-	-	-	-	-
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	910	1022	1557	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	904	1022	1557	-	-	-
Mov Cap-2 Maneuver	904	-	-	-	-	-
Stage 1	968	-	-	-	-	-
Stage 2	979	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	2.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1557	-	979	-	-
HCM Lane V/C Ratio	0.007	-	0.01	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	131	210	4	5	4
Future Vol, veh/h	2	131	210	4	5	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	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	164	263	5	6	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	268	0	-	0	436	266
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	170	-
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	1296	-	-	-	578	773
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	860	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1296	-	-	-	576	773
Mov Cap-2 Maneuver	-	-	-	-	576	-
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	860	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1296	-	-	-	650
HCM Lane V/C Ratio	0.002	-	-	-	0.017
HCM Control Delay (s)	7.8	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	124	12	32	208	6	14
Future Vol, veh/h	124	12	32	208	6	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	-	-	200	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	148	14	38	248	7	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	162	0	479	155
Stage 1	-	-	-	-	155	-
Stage 2	-	-	-	-	324	-
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	-	-	1417	-	545	891
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	733	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1417	-	530	891
Mov Cap-2 Maneuver	-	-	-	-	530	-
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	713	-

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

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	530	891	-	-	1417	-
HCM Lane V/C Ratio	0.013	0.019	-	-	0.027	-
HCM Control Delay (s)	11.9	9.1	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	143	10	0	261	30	0
Future Vol, veh/h	143	10	0	261	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	168	12	0	307	35	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	180	0	475	168
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	307	-
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	-	-	1396	-	548	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	746	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1396	-	548	876
Mov Cap-2 Maneuver	-	-	-	-	548	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	746	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	548	-	-	-	1396	-
HCM Lane V/C Ratio	0.064	-	-	-	-	-
HCM Control Delay (s)	12	0	-	-	0	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	-	0	-

Intersection	
Intersection Delay, s/veh	4.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	177	281	66	48
Demand Flow Rate, veh/h	180	286	67	49
Vehicles Circulating, veh/h	30	68	183	310
Vehicles Exiting, veh/h	329	182	27	44
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.7	4.6	3.4	3.8
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	R	LT	R	L	TR	LTR	
Assumed Moves	LT	R	LT	R	L	TR	LTR	
RT Channelized								
Lane Util	0.900	0.100	0.927	0.073	0.672	0.328	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	162	18	265	21	45	22	49	
Cap Entry Lane, veh/h	1313	1384	1268	1340	1141	1216	1091	
Entry HV Adj Factor	0.983	1.000	0.981	1.000	0.978	0.996	0.979	
Flow Entry, veh/h	159	18	260	21	44	22	48	
Cap Entry, veh/h	1290	1384	1244	1340	1115	1211	1068	
V/C Ratio	0.123	0.013	0.209	0.016	0.039	0.018	0.045	
Control Delay, s/veh	3.8	2.7	4.7	2.8	3.6	3.1	3.8	
LOS	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	0	0	0	0	

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	138	7	21	207	21	60
Future Vol, veh/h	138	7	21	207	21	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	162	8	25	244	25	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	170	0	456	162
Stage 1	-	-	-	-	162	-
Stage 2	-	-	-	-	294	-
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	-	-	1407	-	562	883
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	756	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1407	-	552	883
Mov Cap-2 Maneuver	-	-	-	-	552	-
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	742	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	764	-	-	1407	-
HCM Lane V/C Ratio	0.125	-	-	0.018	-
HCM Control Delay (s)	10.4	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	187	3	11	212	7	10
Future Vol, veh/h	187	3	11	212	7	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	-	170	250	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	217	3	13	247	8	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	220	0	490	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	273	-
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	-	-	1349	-	537	823
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1349	-	532	823
Mov Cap-2 Maneuver	-	-	-	-	532	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	765	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	532	823	-	-	1349	-
HCM Lane V/C Ratio	0.015	0.014	-	-	0.009	-
HCM Control Delay (s)	11.9	9.4	-	-	7.7	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	207	230	1	1	1
Future Vol, veh/h	1	207	230	1	1	1
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	223	247	1	1	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	248	0	-	0	473	248
Stage 1	-	-	-	-	248	-
Stage 2	-	-	-	-	225	-
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	1318	-	-	-	550	791
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1318	-	-	-	549	791
Mov Cap-2 Maneuver	-	-	-	-	549	-
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	812	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1318	-	-	-	648
HCM Lane V/C Ratio	0.001	-	-	-	0.003
HCM Control Delay (s)	7.7	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	172	36	54	211	20	42
Future Vol, veh/h	172	36	54	211	20	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	185	39	58	227	22	45

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	224	0	548	205
Stage 1	-	-	-	-	205	-
Stage 2	-	-	-	-	343	-
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	-	-	1345	-	497	836
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	719	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1345	-	473	836
Mov Cap-2 Maneuver	-	-	-	-	473	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	684	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	11
HCM LOS			B

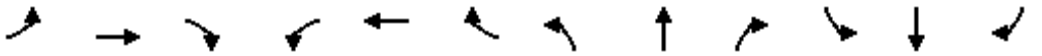
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	670	-	-	1345	-
HCM Lane V/C Ratio	0.1	-	-	0.043	-
HCM Control Delay (s)	11	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	481	89	126	802	15	118	47	24	20	73	35
Future Volume (vph)	14	481	89	126	802	15	118	47	24	20	73	35
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	61.0	61.0	18.0	67.0	67.0	15.0	26.0	26.0	15.0	26.0	26.0
Total Split (%)	10.0%	50.8%	50.8%	15.0%	55.8%	55.8%	12.5%	21.7%	21.7%	12.5%	21.7%	21.7%
Yellow 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
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)	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 Lost Time (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
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
Recall Mode	None	Max	Max	None	Max	Max	None	Min	Min	None	Min	Min
Act Effct Green (s)	6.3	56.1	56.1	12.3	68.7	68.7	10.0	20.2	20.2	7.0	10.4	10.4
Actuated g/C Ratio	0.06	0.52	0.52	0.11	0.63	0.63	0.09	0.19	0.19	0.06	0.10	0.10
v/c Ratio	0.16	0.63	0.12	0.74	0.80	0.02	0.86	0.16	0.07	0.21	0.49	0.14
Control Delay	53.4	23.1	1.0	69.6	23.9	0.0	91.0	42.0	0.3	53.3	56.1	1.0
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	53.4	23.1	1.0	69.6	23.9	0.0	91.0	42.0	0.3	53.3	56.1	1.0
LOS	D	C	A	E	C	A	F	D	A	D	E	A
Approach Delay		20.6			29.6			67.4			40.7	
Approach LOS		C			C			E			D	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 108.8		
Natural Cycle: 90		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.86		
Intersection Signal Delay: 31.2	Intersection LOS: C	
Intersection Capacity Utilization 72.1%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	481	89	126	802	15	118	47	24	20	73	35
Future Volume (veh/h)	14	481	89	126	802	15	118	47	24	20	73	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	601	105	148	944	18	139	55	28	24	86	41
Peak Hour Factor	0.85	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	32	1016	861	179	1170	992	168	259	219	43	127	108
Arrive On Green	0.02	0.54	0.54	0.10	0.63	0.63	0.09	0.14	0.14	0.02	0.07	0.07
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	16	601	105	148	944	18	139	55	28	24	86	41
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.9	22.3	3.3	8.4	39.3	0.4	7.9	2.7	1.6	1.4	4.6	2.6
Cycle Q Clear(g_c), s	0.9	22.3	3.3	8.4	39.3	0.4	7.9	2.7	1.6	1.4	4.6	2.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	32	1016	861	179	1170	992	168	259	219	43	127	108
V/C Ratio(X)	0.50	0.59	0.12	0.83	0.81	0.02	0.83	0.21	0.13	0.56	0.68	0.38
Avail Cap(c_a), veh/h	121	1016	861	225	1170	992	173	381	323	173	381	323
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	15.8	11.5	45.5	14.6	7.3	45.8	39.4	39.0	49.7	46.9	45.9
Incr Delay (d2), s/veh	11.8	2.5	0.3	18.3	6.0	0.0	26.6	0.4	0.3	10.9	6.1	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	8.9	1.2	4.5	15.1	0.1	4.6	1.2	0.6	0.7	2.3	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.0	18.4	11.8	63.8	20.6	7.3	72.4	39.8	39.2	60.6	53.0	48.1
LnGrp LOS	E	B	B	E	C	A	E	D	D	E	D	D
Approach Vol, veh/h		722			1110			222			151	
Approach Delay, s/veh		18.4			26.1			60.1			52.9	
Approach LOS		B			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.3	61.0	14.7	12.0	6.8	69.5	7.5	19.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	13.0	56.0	10.0	21.0	7.0	62.0	10.0	21.0
Max Q Clear Time (g_c+I1), s	10.4	24.3	9.9	6.6	2.9	41.3	3.4	4.7
Green Ext Time (p_c), s	0.1	4.1	0.0	0.4	0.0	6.7	0.0	0.2

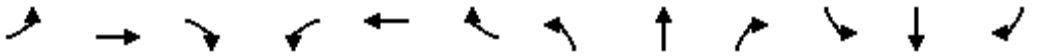
Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	40	514	21	29	895	26	41	14	70	22	93
Future Volume (vph)	40	514	21	29	895	26	41	14	70	22	93
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	78.0	78.0	12.0	78.0	78.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	10.0%	65.0%	65.0%	10.0%	65.0%	65.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	60.4	56.9	56.9	59.6	56.5	56.5	11.7	11.7	11.7	11.7	11.7
Actuated g/C Ratio	0.71	0.67	0.67	0.70	0.66	0.66	0.14	0.14	0.14	0.14	0.14
v/c Ratio	0.17	0.48	0.02	0.06	0.84	0.03	0.25	0.25	0.45	0.10	0.35
Control Delay	4.6	9.4	0.0	3.4	20.6	0.3	43.7	19.2	49.0	40.8	12.1
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	4.6	9.4	0.0	3.4	20.6	0.3	43.7	19.2	49.0	40.8	12.1
LOS	A	A	A	A	C	A	D	B	D	D	B
Approach Delay		8.7			19.5			29.3		29.5	
Approach LOS		A			B			C		C	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 85.5		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.84		
Intersection Signal Delay: 17.6	Intersection LOS: B	
Intersection Capacity Utilization 69.5%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	514	21	29	895	26	41	14	45	70	22	93
Future Volume (veh/h)	40	514	21	29	895	26	41	14	45	70	22	93
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	47	598	0	34	1041	30	48	16	52	81	26	108
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	1185		536	1170	992	246	51	165	221	245	207
Arrive On Green	0.04	0.63	0.00	0.03	0.63	0.63	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1256	387	1257	1333	1870	1585
Grp Volume(v), veh/h	47	598	0	34	1041	30	48	0	68	81	26	108
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1256	0	1644	1333	1870	1585
Q Serve(g_s), s	0.7	12.8	0.0	0.5	34.9	0.5	2.6	0.0	2.8	4.4	0.9	4.7
Cycle Q Clear(g_c), s	0.7	12.8	0.0	0.5	34.9	0.5	3.5	0.0	2.8	7.1	0.9	4.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.76	1.00		1.00
Lane Grp Cap(c), veh/h	253	1185		536	1170	992	246	0	215	221	245	207
V/C Ratio(X)	0.19	0.50		0.06	0.89	0.03	0.20	0.00	0.32	0.37	0.11	0.52
Avail Cap(c_a), veh/h	347	1837		643	1837	1557	504	0	553	495	629	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	7.3	0.0	5.4	11.8	5.3	30.0	0.0	29.3	32.5	28.5	30.1
Incr Delay (d2), s/veh	0.3	0.3	0.0	0.0	3.7	0.0	0.4	0.0	0.8	1.0	0.2	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.4	0.0	0.1	10.5	0.1	0.8	0.0	1.1	1.4	0.4	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	7.7	0.0	5.5	15.5	5.3	30.4	0.0	30.1	33.5	28.7	32.1
LnGrp LOS	B	A		A	B	A	C	A	C	C	C	C
Approach Vol, veh/h		645			1105			116			215	
Approach Delay, s/veh		8.1			14.9			30.2			32.2	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	52.1		14.7	8.1	51.5		14.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	73.0		25.0	7.0	73.0		25.0				
Max Q Clear Time (g_c+I1), s	2.5	14.8		9.1	2.7	36.9		5.5				
Green Ext Time (p_c), s	0.0	3.8		0.6	0.0	9.6		0.4				

Intersection Summary			
HCM 6th Ctrl Delay		15.4	
HCM 6th LOS		B	

Notes

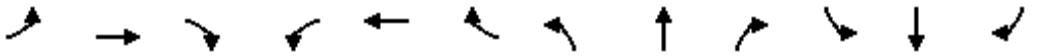
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	16	595	24	22	798	9	23	5	16	8
Future Volume (vph)	16	595	24	22	798	9	23	5	16	8
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	29.8	27.9	27.9	30.4	29.7	29.7	7.4	7.4	7.4	7.4
Actuated g/C Ratio	0.60	0.56	0.56	0.61	0.60	0.60	0.15	0.15	0.15	0.15
v/c Ratio	0.04	0.61	0.03	0.05	0.77	0.01	0.12	0.22	0.09	0.18
Control Delay	3.0	10.6	0.2	3.0	13.1	0.0	28.3	12.5	28.0	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	10.6	0.2	3.0	13.1	0.0	28.3	12.5	28.0	14.6
LOS	A	B	A	A	B	A	C	B	C	B
Approach Delay		10.0			12.6			16.8		18.0
Approach LOS		B			B			B		B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 49.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 58.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	595	24	22	798	9	23	5	56	16	8	39
Future Volume (veh/h)	16	595	24	22	798	9	23	5	56	16	8	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	633	26	23	849	10	24	5	60	17	9	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	1026	870	448	1038	880	258	13	157	244	31	142
Arrive On Green	0.02	0.55	0.55	0.03	0.56	0.56	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1355	123	1480	1337	293	1336
Grp Volume(v), veh/h	17	633	26	23	849	10	24	0	65	17	0	50
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1355	0	1604	1337	0	1630
Q Serve(g_s), s	0.2	10.9	0.4	0.3	17.5	0.1	0.8	0.0	1.8	0.6	0.0	1.3
Cycle Q Clear(g_c), s	0.2	10.9	0.4	0.3	17.5	0.1	2.1	0.0	1.8	2.3	0.0	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.82
Lane Grp Cap(c), veh/h	309	1026	870	448	1038	880	258	0	170	244	0	173
V/C Ratio(X)	0.05	0.62	0.03	0.05	0.82	0.01	0.09	0.00	0.38	0.07	0.00	0.29
Avail Cap(c_a), veh/h	536	3092	2620	663	3092	2620	688	0	680	669	0	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	7.3	4.9	5.6	8.6	4.7	20.4	0.0	19.7	20.7	0.0	19.5
Incr Delay (d2), s/veh	0.1	0.6	0.0	0.0	1.6	0.0	0.2	0.0	1.4	0.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.2	0.1	0.0	3.7	0.0	0.2	0.0	0.6	0.2	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	7.9	4.9	5.6	10.2	4.7	20.6	0.0	21.1	20.9	0.0	20.4
LnGrp LOS	A	A	A	A	B	A	C	A	C	C	A	C
Approach Vol, veh/h		676			882			89			67	
Approach Delay, s/veh		7.8			10.0			20.9			20.5	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	30.9		10.0	6.0	31.2		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	12.9		4.3	2.2	19.5		4.1				
Green Ext Time (p_c), s	0.0	4.3		0.2	0.0	6.7		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		10.1	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	632	29	244	774	0	10	1	194	0	0	1
Future Vol, veh/h	0	632	29	244	774	0	10	1	194	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	475	475	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	98	98	98	98	85	98	85	98	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	645	30	249	790	0	10	1	198	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	790	0	0	675	0	0	1934	1933	-	1949	1963	790
Stage 1	-	-	-	-	-	-	645	645	-	1288	1288	-
Stage 2	-	-	-	-	-	-	1289	1288	-	661	675	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	830	-	-	916	-	-	50	66	0	49	63	390
Stage 1	-	-	-	-	-	-	461	467	0	201	234	-
Stage 2	-	-	-	-	-	-	201	234	0	452	453	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	830	-	-	916	-	-	39	48	-	39	46	390
Mov Cap-2 Maneuver	-	-	-	-	-	-	134	154	-	39	46	-
Stage 1	-	-	-	-	-	-	461	467	-	201	170	-
Stage 2	-	-	-	-	-	-	146	170	-	451	453	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.5	33.9	14.3
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	136	-	830	-	-	916	-	-	390
HCM Lane V/C Ratio	0.084	-	-	-	-	0.272	-	-	0.003
HCM Control Delay (s)	33.9	0	0	-	-	10.4	-	-	14.3
HCM Lane LOS	D	A	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	0.3	-	0	-	-	1.1	-	-	0

Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	835	1029	21	44	44
Future Vol, veh/h	31	835	1029	21	44	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	325	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	34	908	1118	23	48	48

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	1141	0	-	0	2094	1118			
Stage 1	-	-	-	-	1118	-			
Stage 2	-	-	-	-	976	-			
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	612	-	-	-	57	252			
Stage 1	-	-	-	-	312	-			
Stage 2	-	-	-	-	365	-			
Platoon blocked, %		-	-	-					
Mov Cap-1 Maneuver	612	-	-	-	54	252			
Mov Cap-2 Maneuver	-	-	-	-	54	-			
Stage 1	-	-	-	-	295	-			
Stage 2	-	-	-	-	365	-			

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	203.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	612	-	-	-	89
HCM Lane V/C Ratio	0.055	-	-	-	1.075
HCM Control Delay (s)	11.2	-	-	-	203.1
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	6.4

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	21	8	40	53	2
Future Vol, veh/h	3	21	8	40	53	2
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	-	155	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	25	10	48	64	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	133	65	66	0	-	0
Stage 1	65	-	-	-	-	-
Stage 2	68	-	-	-	-	-
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	861	999	1536	-	-	-
Stage 1	958	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	855	999	1536	-	-	-
Mov Cap-2 Maneuver	855	-	-	-	-	-
Stage 1	951	-	-	-	-	-
Stage 2	955	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	1.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1536	-	978	-	-
HCM Lane V/C Ratio	0.006	-	0.03	-	-
HCM Control Delay (s)	7.4	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	39	15	50	75	2
Future Vol, veh/h	3	39	15	50	75	2
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	49	19	63	95	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	198	97	98	0	-	0
Stage 1	97	-	-	-	-	-
Stage 2	101	-	-	-	-	-
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	791	959	1495	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	923	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	781	959	1495	-	-	-
Mov Cap-2 Maneuver	781	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	923	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1495	-	944	-	-
HCM Lane V/C Ratio	0.013	-	0.056	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	0	10	61	0	25	3	19	23	9	10	4
Future Vol, veh/h	11	0	10	61	0	25	3	19	23	9	10	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	180	-	-	180	-	-	180	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	0	12	72	0	29	4	22	27	11	12	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	56	94	9	72	83	25	17	0	0	49	0	0
Stage 1	37	37	-	44	44	-	-	-	-	-	-	-
Stage 2	19	57	-	28	39	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	935	795	1070	911	806	1045	1599	-	-	1556	-	-
Stage 1	974	864	-	965	858	-	-	-	-	-	-	-
Stage 2	997	847	-	985	862	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	902	787	1070	895	798	1045	1599	-	-	1556	-	-
Mov Cap-2 Maneuver	902	787	-	895	798	-	-	-	-	-	-	-
Stage 1	971	858	-	962	855	-	-	-	-	-	-	-
Stage 2	967	844	-	967	856	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.7	9.1	0.5	2.9
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1599	-	-	902	1070	895	1045	1556	-	-
HCM Lane V/C Ratio	0.002	-	-	0.014	0.011	0.08	0.028	0.007	-	-
HCM Control Delay (s)	7.3	-	-	9	8.4	9.4	8.5	7.3	-	-
HCM Lane LOS	A	-	-	A	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0.3	0.1	0	-	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	49	24	0	0	16	37	8	0	78	3
Future Vol, veh/h	8	0	49	24	0	0	16	37	8	0	78	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	58	28	0	0	19	44	9	0	92	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	154	185	48	133	183	27	96	0	0	53	0	0
Stage 1	94	94	-	87	87	-	-	-	-	-	-	-
Stage 2	60	91	-	46	96	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	798	708	1011	825	710	1042	1496	-	-	1551	-	-
Stage 1	902	816	-	911	822	-	-	-	-	-	-	-
Stage 2	944	819	-	962	815	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	790	699	1011	771	701	1042	1496	-	-	1551	-	-
Mov Cap-2 Maneuver	790	699	-	771	701	-	-	-	-	-	-	-
Stage 1	890	816	-	899	811	-	-	-	-	-	-	-
Stage 2	932	808	-	907	815	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	9.8	2	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1496	-	-	790	1011	771	-	1551	-	-
HCM Lane V/C Ratio	0.013	-	-	0.012	0.057	0.037	-	-	-	-
HCM Control Delay (s)	7.4	-	-	9.6	8.8	9.8	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	3	55	156	0
Future Vol, veh/h	1	5	3	55	156	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	66	66	66	66	66	66
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	8	5	83	236	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	329	236	236	0	-	0
Stage 1	236	-	-	-	-	-
Stage 2	93	-	-	-	-	-
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	665	803	1331	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	931	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	662	803	1331	-	-	-
Mov Cap-2 Maneuver	662	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	931	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1331	-	775	-	-
HCM Lane V/C Ratio	0.003	-	0.012	-	-
HCM Control Delay (s)	7.7	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	11	64	156	0
Future Vol, veh/h	0	27	11	64	156	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	38	15	90	220	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	340	220	220	0	-	0
Stage 1	220	-	-	-	-	-
Stage 2	120	-	-	-	-	-
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	656	820	1349	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	648	820	1349	-	-	-
Mov Cap-2 Maneuver	648	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	905	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1349	-	820	-	-
HCM Lane V/C Ratio	0.011	-	0.046	-	-
HCM Control Delay (s)	7.7	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	2	0	0	0	3	14	0	0	13	1
Future Vol, veh/h	3	0	2	0	0	0	3	14	0	0	13	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	2	0	0	0	3	16	0	0	15	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	38	38	16	39	38	16	16	0	0	16	0	0
Stage 1	16	16	-	22	22	-	-	-	-	-	-	-
Stage 2	22	22	-	17	16	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	967	854	1063	966	854	1063	1602	-	-	1602	-	-
Stage 1	1004	882	-	996	877	-	-	-	-	-	-	-
Stage 2	996	877	-	1002	882	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	965	852	1063	962	852	1063	1602	-	-	1602	-	-
Mov Cap-2 Maneuver	965	852	-	962	852	-	-	-	-	-	-	-
Stage 1	1002	882	-	994	875	-	-	-	-	-	-	-
Stage 2	994	875	-	1000	882	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	0	1.3	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	1002	-	1602	-	-
HCM Lane V/C Ratio	0.002	-	-	0.006	-	-	-	-
HCM Control Delay (s)	7.3	0	-	8.6	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	3	17	15	0
Future Vol, veh/h	0	4	3	17	15	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	4	23	21	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	52	21	21	0	-	0
Stage 1	21	-	-	-	-	-
Stage 2	31	-	-	-	-	-
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	957	1056	1595	-	-	-
Stage 1	1002	-	-	-	-	-
Stage 2	992	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	954	1056	1595	-	-	-
Mov Cap-2 Maneuver	954	-	-	-	-	-
Stage 1	999	-	-	-	-	-
Stage 2	992	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1595	-	1056	-	-
HCM Lane V/C Ratio	0.003	-	0.005	-	-
HCM Control Delay (s)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	363	207	11	6	3
Future Vol, veh/h	8	363	207	11	6	3
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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	432	246	13	7	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	259	0	-	0	705	253
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	452	-
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	1306	-	-	-	403	786
Stage 1	-	-	-	-	789	-
Stage 2	-	-	-	-	641	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1306	-	-	-	399	786
Mov Cap-2 Maneuver	-	-	-	-	399	-
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	641	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1306	-	-	-	477
HCM Lane V/C Ratio	0.007	-	-	-	0.022
HCM Control Delay (s)	7.8	0	-	-	12.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	341	28	44	212	6	61
Future Vol, veh/h	341	28	44	212	6	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	200	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	401	33	52	249	7	72

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	434	0	771	418
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	353	-
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	-	-	1126	-	368	635
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	711	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1126	-	351	635
Mov Cap-2 Maneuver	-	-	-	-	351	-
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	678	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	351	635	-	-	1126	-
HCM Lane V/C Ratio	0.02	0.113	-	-	0.046	-
HCM Control Delay (s)	15.5	11.4	-	-	8.4	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	356	34	0	214	20	0
Future Vol, veh/h	356	34	0	214	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	419	40	0	252	24	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	459	0	671	419
Stage 1	-	-	-	-	419	-
Stage 2	-	-	-	-	252	-
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	-	-	1102	-	422	634
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	790	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1102	-	422	634
Mov Cap-2 Maneuver	-	-	-	-	422	-
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	790	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	14
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	422	-	-	-	1102	-
HCM Lane V/C Ratio	0.056	-	-	-	-	-
HCM Control Delay (s)	14	0	-	-	0	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	-	0	-

Intersection	
Intersection Delay, s/veh	4.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	401	219	49	81
Demand Flow Rate, veh/h	409	223	50	83
Vehicles Circulating, veh/h	60	82	391	225
Vehicles Exiting, veh/h	248	359	78	80
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.1	4.0	4.1	3.7
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	R	LT	R	L	TR	LTR	
Assumed Moves	LT	R	LT	R	L	TR	LTR	
RT Channelized								
Lane Util	0.870	0.130	0.857	0.143	0.680	0.320	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	356	53	191	32	34	16	83	
Cap Entry Lane, veh/h	1277	1349	1252	1324	942	1019	1173	
Entry HV Adj Factor	0.980	0.981	0.983	0.969	0.971	0.998	0.975	
Flow Entry, veh/h	349	52	188	31	33	16	81	
Cap Entry, veh/h	1252	1324	1230	1283	914	1016	1144	
V/C Ratio	0.279	0.039	0.153	0.024	0.036	0.016	0.071	
Control Delay, s/veh	5.4	3.0	4.2	3.0	4.3	3.7	3.7	
LOS	A	A	A	A	A	A	A	
95th %tile Queue, veh	1	0	1	0	0	0	0	

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	290	24	66	181	14	41
Future Vol, veh/h	290	24	66	181	14	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	341	28	78	213	16	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	369	0	710	341
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	369	-
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	-	-	1190	-	400	701
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1190	-	374	701
Mov Cap-2 Maneuver	-	-	-	-	374	-
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	653	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	573	-	-	1190	-
HCM Lane V/C Ratio	0.113	-	-	0.065	-
HCM Control Delay (s)	12.1	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	333	8	26	271	3	11
Future Vol, veh/h	333	8	26	271	3	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	-	170	250	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	383	9	30	311	3	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	392	0	754	383
Stage 1	-	-	-	-	383	-
Stage 2	-	-	-	-	371	-
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	-	-	1167	-	377	664
Stage 1	-	-	-	-	689	-
Stage 2	-	-	-	-	698	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1167	-	367	664
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	689	-
Stage 2	-	-	-	-	680	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	367	664	-	-	1167	-
HCM Lane V/C Ratio	0.009	0.019	-	-	0.026	-
HCM Control Delay (s)	14.9	10.5	-	-	8.2	-
HCM Lane LOS	B	B	-	-	A	-
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	333	280	9	3	1
Future Vol, veh/h	2	333	280	9	3	1
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	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	358	301	10	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	311	0	-	0	668	306
Stage 1	-	-	-	-	306	-
Stage 2	-	-	-	-	362	-
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	1249	-	-	-	423	734
Stage 1	-	-	-	-	747	-
Stage 2	-	-	-	-	704	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1249	-	-	-	422	734
Mov Cap-2 Maneuver	-	-	-	-	422	-
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	704	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1249	-	-	-	472
HCM Lane V/C Ratio	0.002	-	-	-	0.009
HCM Control Delay (s)	7.9	0	-	-	12.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	305	31	18	239	50	39
Future Vol, veh/h	305	31	18	239	50	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	324	33	19	254	53	41

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	357	0	633	341
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	292	-
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	-	-	1202	-	444	701
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	758	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1202	-	436	701
Mov Cap-2 Maneuver	-	-	-	-	436	-
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	744	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	13.4
HCM LOS			B

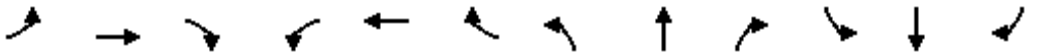
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	523	-	-	1202	-
HCM Lane V/C Ratio	0.181	-	-	0.016	-
HCM Control Delay (s)	13.4	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	954	125	92	682	12	144	116	109	21	67	25
Future Volume (vph)	39	954	125	92	682	12	144	116	109	21	67	25
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	64.0	64.0	15.0	67.0	67.0	16.0	29.0	29.0	12.0	25.0	25.0
Total Split (%)	10.0%	53.3%	53.3%	12.5%	55.8%	55.8%	13.3%	24.2%	24.2%	10.0%	20.8%	20.8%
Yellow 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
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)	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 Lost Time (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
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
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	6.6	59.0	59.0	9.5	66.5	66.5	11.0	21.0	21.0	6.4	9.7	9.7
Actuated g/C Ratio	0.06	0.54	0.54	0.09	0.61	0.61	0.10	0.19	0.19	0.06	0.09	0.09
v/c Ratio	0.39	1.03	0.15	0.65	0.65	0.01	0.88	0.35	0.30	0.22	0.44	0.11
Control Delay	61.3	62.9	2.7	69.3	19.2	0.0	92.5	43.5	9.9	55.3	55.8	1.0
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	61.3	62.9	2.7	69.3	19.2	0.0	92.5	43.5	9.9	55.3	55.8	1.0
LOS	E	E	A	E	B	A	F	D	A	E	E	A
Approach Delay		56.1			24.8			52.8			43.7	
Approach LOS		E			C			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 109.2	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 44.7	Intersection LOS: D
Intersection Capacity Utilization 82.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	954	125	92	682	12	144	116	109	21	67	25
Future Volume (veh/h)	39	954	125	92	682	12	144	116	109	21	67	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	1037	136	100	741	13	157	126	118	23	73	27
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	1064	902	126	1133	960	187	265	225	42	113	96
Arrive On Green	0.03	0.57	0.57	0.07	0.61	0.61	0.10	0.14	0.14	0.02	0.06	0.06
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	42	1037	136	100	741	13	157	126	118	23	73	27
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.4	55.0	4.1	5.7	26.5	0.3	8.9	6.4	7.1	1.3	3.9	1.7
Cycle Q Clear(g_c), s	2.4	55.0	4.1	5.7	26.5	0.3	8.9	6.4	7.1	1.3	3.9	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	61	1064	902	126	1133	960	187	265	225	42	113	96
V/C Ratio(X)	0.69	0.97	0.15	0.79	0.65	0.01	0.84	0.48	0.53	0.55	0.65	0.28
Avail Cap(c_a), veh/h	122	1076	912	174	1133	960	191	438	371	122	365	309
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.0	21.4	10.4	46.9	13.2	8.0	45.1	40.5	40.8	49.6	47.1	46.1
Incr Delay (d2), s/veh	13.2	21.3	0.1	15.7	1.4	0.0	26.7	1.3	1.9	10.9	6.1	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	26.1	1.3	3.0	9.6	0.1	5.2	2.9	2.8	0.7	2.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.3	42.7	10.5	62.6	14.6	8.0	71.8	41.8	42.7	60.4	53.2	47.7
LnGrp LOS	E	D	B	E	B	A	E	D	D	E	D	D
Approach Vol, veh/h		1215			854			401			123	
Approach Delay, s/veh		39.8			20.1			53.8			53.3	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	63.4	15.8	11.2	8.5	67.2	7.4	19.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	10.0	59.0	11.0	20.0	7.0	62.0	7.0	24.0
Max Q Clear Time (g_c+I1), s	7.7	57.0	10.9	5.9	4.4	28.5	3.3	9.1
Green Ext Time (p_c), s	0.0	1.4	0.0	0.3	0.0	5.1	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	36.1
HCM 6th LOS	D

Notes

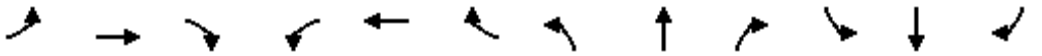
User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	107	936	51	39	717	70	40	27	46	19	65
Future Volume (vph)	107	936	51	39	717	70	40	27	46	19	65
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	48.3	44.9	44.9	45.8	41.3	41.3	9.2	9.2	9.2	9.2	9.2
Actuated g/C Ratio	0.68	0.63	0.63	0.64	0.58	0.58	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.25	0.82	0.05	0.13	0.69	0.08	0.23	0.26	0.27	0.08	0.26
Control Delay	4.1	17.7	1.3	3.6	13.9	1.7	40.6	23.5	41.6	38.6	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	17.7	1.3	3.6	13.9	1.7	40.6	23.5	41.6	38.6	13.7
LOS	A	B	A	A	B	A	D	C	D	D	B
Approach Delay		15.6			12.4			30.0		27.2	
Approach LOS		B			B			C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 71.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	936	51	39	717	70	40	27	38	46	19	65
Future Volume (veh/h)	107	936	51	39	717	70	40	27	38	46	19	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	110	965	0	40	739	72	41	28	39	47	20	67
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	440	1123		294	1068	905	250	77	107	216	204	173
Arrive On Green	0.07	0.60	0.00	0.04	0.57	0.57	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1310	708	985	1334	1870	1585
Grp Volume(v), veh/h	110	965	0	40	739	72	41	0	67	47	20	67
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1310	0	1693	1334	1870	1585
Q Serve(g_s), s	1.4	25.6	0.0	0.5	16.8	1.2	1.7	0.0	2.2	2.0	0.6	2.4
Cycle Q Clear(g_c), s	1.4	25.6	0.0	0.5	16.8	1.2	2.3	0.0	2.2	4.2	0.6	2.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.58	1.00		1.00
Lane Grp Cap(c), veh/h	440	1123		294	1068	905	250	0	184	216	204	173
V/C Ratio(X)	0.25	0.86		0.14	0.69	0.08	0.16	0.00	0.36	0.22	0.10	0.39
Avail Cap(c_a), veh/h	523	2430		430	2430	2060	544	0	564	516	623	528
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.9	9.9	0.0	9.7	9.1	5.8	25.1	0.0	24.8	26.8	24.1	24.9
Incr Delay (d2), s/veh	0.3	2.0	0.0	0.2	0.8	0.0	0.3	0.0	1.2	0.5	0.2	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	6.3	0.0	0.1	4.3	0.3	0.5	0.0	0.9	0.6	0.2	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.2	11.9	0.0	9.9	9.9	5.8	25.4	0.0	26.0	27.3	24.3	26.3
LnGrp LOS	A	B		A	A	A	C	A	C	C	C	C
Approach Vol, veh/h		1075			851			108			134	
Approach Delay, s/veh		11.5			9.6			25.8			26.3	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	41.1		11.5	9.2	39.3		11.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.5	27.6		6.2	3.4	18.8		4.3				
Green Ext Time (p_c), s	0.0	8.5		0.3	0.1	5.5		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		12.4	
HCM 6th LOS		B	

Notes

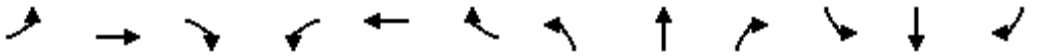
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	48	949	43	102	804	19	25	10	9	7
Future Volume (vph)	48	949	43	102	804	19	25	10	9	7
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		1	6			8		4
Permitted Phases	2		2	6		6	8		4	
Detector Phase	5	2	2	1	6	6	8	8	4	4
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
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	49.0	44.2	44.2	50.4	46.9	46.9	7.5	7.5	7.5	7.5
Actuated g/C Ratio	0.69	0.62	0.62	0.71	0.66	0.66	0.11	0.11	0.11	0.11
v/c Ratio	0.11	0.83	0.04	0.33	0.66	0.02	0.17	0.26	0.06	0.13
Control Delay	2.8	18.6	0.8	5.3	11.4	0.1	39.8	19.2	38.4	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	18.6	0.8	5.3	11.4	0.1	39.8	19.2	38.4	23.0
LOS	A	B	A	A	B	A	D	B	D	C
Approach Delay		17.1			10.5			25.7		27.1
Approach LOS		B			B			C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 71.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 14.7	Intersection LOS: B
Intersection Capacity Utilization 76.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	949	43	102	804	19	25	10	44	9	7	18
Future Volume (veh/h)	48	949	43	102	804	19	25	10	44	9	7	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	48	959	43	103	812	19	25	10	44	9	7	18
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	420	1120	949	341	1162	984	216	25	111	190	39	99
Arrive On Green	0.05	0.60	0.60	0.07	0.62	0.62	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1386	302	1329	1350	464	1192
Grp Volume(v), veh/h	48	959	43	103	812	19	25	0	54	9	0	25
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1386	0	1631	1350	0	1656
Q Serve(g_s), s	0.6	25.4	0.7	1.2	17.5	0.3	1.0	0.0	1.9	0.4	0.0	0.8
Cycle Q Clear(g_c), s	0.6	25.4	0.7	1.2	17.5	0.3	1.9	0.0	1.9	2.3	0.0	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.81	1.00		0.72
Lane Grp Cap(c), veh/h	420	1120	949	341	1162	984	216	0	136	190	0	138
V/C Ratio(X)	0.11	0.86	0.05	0.30	0.70	0.02	0.12	0.00	0.40	0.05	0.00	0.18
Avail Cap(c_a), veh/h	546	2430	2059	427	2430	2059	562	0	543	527	0	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.2	9.9	5.0	10.1	7.6	4.4	26.5	0.0	26.1	27.2	0.0	25.6
Incr Delay (d2), s/veh	0.1	2.0	0.0	0.5	0.8	0.0	0.2	0.0	1.9	0.1	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	6.4	0.1	0.5	3.9	0.1	0.3	0.0	0.7	0.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	11.9	5.0	10.6	8.4	4.4	26.7	0.0	28.0	27.3	0.0	26.2
LnGrp LOS	A	B	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h		1050			934			79			34	
Approach Delay, s/veh		11.4			8.6			27.6			26.5	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	40.9		10.0	7.8	42.3		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	27.4		4.3	2.6	19.5		3.9				
Green Ext Time (p_c), s	0.1	8.6		0.1	0.0	6.3		0.2				

Intersection Summary												
HCM 6th Ctrl Delay			11.0									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	944	18	183	932	0	18	0	305	1	0	3
Future Vol, veh/h	0	944	18	183	932	0	18	0	305	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	475	475	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	99	99	99	99	85	99	85	99	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	954	18	185	941	0	18	0	308	1	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	941	0	0	972	0	0	2267	2265	-	2274	2283	941
Stage 1	-	-	-	-	-	-	954	954	-	1311	1311	-
Stage 2	-	-	-	-	-	-	1313	1311	-	963	972	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	729	-	-	709	-	-	29	41	0	28	40	319
Stage 1	-	-	-	-	-	-	311	337	0	195	229	-
Stage 2	-	-	-	-	-	-	195	229	0	307	331	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	729	-	-	709	-	-	23	30	-	22	30	319
Mov Cap-2 Maneuver	-	-	-	-	-	-	123	144	-	22	30	-
Stage 1	-	-	-	-	-	-	311	337	-	195	169	-
Stage 2	-	-	-	-	-	-	143	169	-	307	331	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.9	39.3	57.7
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	123	-	729	-	-	709	-	-	73
HCM Lane V/C Ratio	0.148	-	-	-	-	0.261	-	-	0.064
HCM Control Delay (s)	39.3	0	0	-	-	11.9	-	-	57.7
HCM Lane LOS	E	A	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.5	-	0	-	-	1	-	-	0.2

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	1154	1044	62	30	29
Future Vol, veh/h	52	1154	1044	62	30	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	325	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	1202	1088	65	31	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1153	0	-	0	2398	1088
Stage 1	-	-	-	-	1088	-
Stage 2	-	-	-	-	1310	-
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	606	-	-	-	37	262
Stage 1	-	-	-	-	323	-
Stage 2	-	-	-	-	252	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	606	-	-	-	34	262
Mov Cap-2 Maneuver	-	-	-	-	34	-
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	252	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	244.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	606	-	-	-	59
HCM Lane V/C Ratio	0.089	-	-	-	1.042
HCM Control Delay (s)	11.5	-	-	-	244.8
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.3	-	-	-	5

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	8	20	92	72	1
Future Vol, veh/h	0	8	20	92	72	1
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	-	155	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	9	23	106	83	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	236	84	84	0	-	0
Stage 1	84	-	-	-	-	-
Stage 2	152	-	-	-	-	-
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	752	975	1513	-	-	-
Stage 1	939	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	741	975	1513	-	-	-
Mov Cap-2 Maneuver	741	-	-	-	-	-
Stage 1	925	-	-	-	-	-
Stage 2	876	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1513	-	975	-	-
HCM Lane V/C Ratio	0.015	-	0.009	-	-
HCM Control Delay (s)	7.4	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	18	26	112	76	5
Future Vol, veh/h	1	18	26	112	76	5
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	21	30	129	87	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	279	90	93	0	-	0
Stage 1	90	-	-	-	-	-
Stage 2	189	-	-	-	-	-
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	711	968	1501	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	843	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	695	968	1501	-	-	-
Mov Cap-2 Maneuver	695	-	-	-	-	-
Stage 1	913	-	-	-	-	-
Stage 2	843	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1501	-	948	-	-
HCM Lane V/C Ratio	0.02	-	0.023	-	-
HCM Control Delay (s)	7.4	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	7	42	0	17	11	17	65	26	26	13
Future Vol, veh/h	8	0	7	42	0	17	11	17	65	26	26	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	180	-	-	180	-	-	180	-	-	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	8	49	0	20	13	20	76	31	31	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	137	223	23	162	192	48	46	0	0	96	0	0
Stage 1	101	101	-	84	84	-	-	-	-	-	-	-
Stage 2	36	122	-	78	108	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	820	675	1048	788	702	1011	1560	-	-	1496	-	-
Stage 1	894	811	-	915	824	-	-	-	-	-	-	-
Stage 2	975	794	-	922	805	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	786	655	1048	764	682	1011	1560	-	-	1496	-	-
Mov Cap-2 Maneuver	786	655	-	764	682	-	-	-	-	-	-	-
Stage 1	887	794	-	908	817	-	-	-	-	-	-	-
Stage 2	948	788	-	896	788	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.1	9.6	0.9	3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1560	-	-	786	1048	764	1011	1496	-	-
HCM Lane V/C Ratio	0.008	-	-	0.012	0.008	0.065	0.02	0.02	-	-
HCM Control Delay (s)	7.3	-	-	9.6	8.5	10	8.6	7.5	-	-
HCM Lane LOS	A	-	-	A	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0.2	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	33	16	0	0	55	88	26	0	67	8
Future Vol, veh/h	5	0	33	16	0	0	55	88	26	0	67	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	39	19	0	0	65	104	31	0	79	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	266	349	44	290	338	68	88	0	0	135	0	0
Stage 1	84	84	-	250	250	-	-	-	-	-	-	-
Stage 2	182	265	-	40	88	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	665	574	1017	640	582	981	1506	-	-	1447	-	-
Stage 1	915	824	-	732	699	-	-	-	-	-	-	-
Stage 2	802	688	-	970	821	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	643	549	1017	595	557	981	1506	-	-	1447	-	-
Mov Cap-2 Maneuver	643	549	-	595	557	-	-	-	-	-	-	-
Stage 1	876	824	-	701	669	-	-	-	-	-	-	-
Stage 2	767	658	-	933	821	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	11.2	2.4	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1506	-	-	643	1017	595	-	1447	-	-
HCM Lane V/C Ratio	0.043	-	-	0.009	0.038	0.032	-	-	-	-
HCM Control Delay (s)	7.5	-	-	10.7	8.7	11.2	0	0	-	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0	0.1	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	3	5	174	120	3
Future Vol, veh/h	0	3	5	174	120	3
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	6	210	145	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	369	147	149	0	-	0
Stage 1	147	-	-	-	-	-
Stage 2	222	-	-	-	-	-
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	631	900	1432	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	815	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	628	900	1432	-	-	-
Mov Cap-2 Maneuver	628	-	-	-	-	-
Stage 1	876	-	-	-	-	-
Stage 2	815	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1432	-	900	-	-
HCM Lane V/C Ratio	0.004	-	0.004	-	-
HCM Control Delay (s)	7.5	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	14	24	173	121	1
Future Vol, veh/h	1	14	24	173	121	1
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	16	28	201	141	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	399	142	142	0	-	0
Stage 1	142	-	-	-	-	-
Stage 2	257	-	-	-	-	-
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	607	906	1441	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	594	906	1441	-	-	-
Mov Cap-2 Maneuver	594	-	-	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	786	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1441	-	875	-	-
HCM Lane V/C Ratio	0.019	-	0.02	-	-
HCM Control Delay (s)	7.5	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	0	2	0	0	0	2	13	0	0	30	4
Future Vol, veh/h	1	0	2	0	0	0	2	13	0	0	30	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	3	0	0	0	3	19	0	0	45	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	73	73	48	75	76	19	51	0	0	19	0	0
Stage 1	48	48	-	25	25	-	-	-	-	-	-	-
Stage 2	25	25	-	50	51	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	918	817	1021	915	814	1059	1555	-	-	1597	-	-
Stage 1	965	855	-	993	874	-	-	-	-	-	-	-
Stage 2	993	874	-	963	852	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	916	815	1021	911	812	1059	1555	-	-	1597	-	-
Mov Cap-2 Maneuver	916	815	-	911	812	-	-	-	-	-	-	-
Stage 1	963	855	-	991	872	-	-	-	-	-	-	-
Stage 2	991	872	-	960	852	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.7	0	1	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1555	-	-	983	-	1597	-	-
HCM Lane V/C Ratio	0.002	-	-	0.005	-	-	-	-
HCM Control Delay (s)	7.3	0	-	8.7	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	4	7	13	28	4
Future Vol, veh/h	2	4	7	13	28	4
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	6	11	21	44	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	90	47	50	0	-	0
Stage 1	47	-	-	-	-	-
Stage 2	43	-	-	-	-	-
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	910	1022	1557	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	904	1022	1557	-	-	-
Mov Cap-2 Maneuver	904	-	-	-	-	-
Stage 1	968	-	-	-	-	-
Stage 2	979	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	2.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1557	-	979	-	-
HCM Lane V/C Ratio	0.007	-	0.01	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	148	198	2	6	6
Future Vol, veh/h	3	148	198	2	6	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	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	157	211	2	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	213	0	-	0	297	107
Stage 1	-	-	-	-	212	-
Stage 2	-	-	-	-	85	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1355	-	-	-	670	926
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	929	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1355	-	-	-	669	926
Mov Cap-2 Maneuver	-	-	-	-	669	-
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	929	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1355	-	-	-	777
HCM Lane V/C Ratio	0.002	-	-	-	0.016
HCM Control Delay (s)	7.7	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	137	17	32	192	8	15
Future Vol, veh/h	137	17	32	192	8	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	-	250	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	18	34	204	9	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	164	0	316	73
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	170	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1412	-	652	974
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	843	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	636	974
Mov Cap-2 Maneuver	-	-	-	-	636	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	823	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	636	974	-	-	1412	-
HCM Lane V/C Ratio	0.013	0.016	-	-	0.024	-
HCM Control Delay (s)	10.7	8.8	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	141	5	2	237	23	10	0	1	23	0	29
Future Vol, veh/h	21	141	5	2	237	23	10	0	1	23	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	250	-	250	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	150	5	2	252	24	11	0	1	24	0	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	276	0	0	155	0	0	324	474	75	375	455	126
Stage 1	-	-	-	-	-	-	194	194	-	256	256	-
Stage 2	-	-	-	-	-	-	130	280	-	119	199	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1284	-	-	1423	-	-	605	488	971	557	500	901
Stage 1	-	-	-	-	-	-	789	739	-	726	694	-
Stage 2	-	-	-	-	-	-	860	678	-	873	735	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1284	-	-	1423	-	-	576	479	971	549	491	901
Mov Cap-2 Maneuver	-	-	-	-	-	-	576	479	-	549	491	-
Stage 1	-	-	-	-	-	-	776	726	-	714	693	-
Stage 2	-	-	-	-	-	-	829	677	-	857	723	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.1	11.2	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	576	971	1284	-	-	1423	-	-	549	901
HCM Lane V/C Ratio	0.018	0.001	0.017	-	-	0.001	-	-	0.045	0.034
HCM Control Delay (s)	11.4	8.7	7.9	-	-	7.5	-	-	11.9	9.1
HCM Lane LOS	B	A	A	-	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	0	0.1	-	-	0	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	154	3	11	246	7	10
Future Vol, veh/h	154	3	11	246	7	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	-	170	250	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	3	12	262	7	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	167	0	319	82
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	155	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1408	-	649	961
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	857	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1408	-	643	961
Mov Cap-2 Maneuver	-	-	-	-	643	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	849	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	643	961	-	-	1408	-
HCM Lane V/C Ratio	0.012	0.011	-	-	0.008	-
HCM Control Delay (s)	10.7	8.8	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	173	263	2	2	2
Future Vol, veh/h	2	173	263	2	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	184	280	2	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	282	0	-	0	377	141
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	96	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1277	-	-	-	597	881
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	917	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1277	-	-	-	596	881
Mov Cap-2 Maneuver	-	-	-	-	596	-
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	917	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1277	-	-	-	711
HCM Lane V/C Ratio	0.002	-	-	-	0.006
HCM Control Delay (s)	7.8	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	173	2	74	254	11	58
Future Vol, veh/h	173	2	74	254	11	58
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	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	184	2	79	270	12	62

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	186	0	477	92
Stage 1	-	-	-	-	184	-
Stage 2	-	-	-	-	293	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1386	-	517	947
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	731	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1386	-	488	947
Mov Cap-2 Maneuver	-	-	-	-	488	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	689	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	9.8
HCM LOS			A

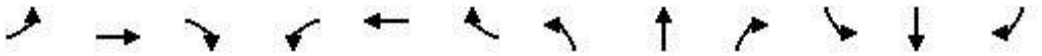
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	824	-	-	1386	-
HCM Lane V/C Ratio	0.089	-	-	0.057	-
HCM Control Delay (s)	9.8	-	-	7.8	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	629	123	156	1013	21	162	64	27	27	95	39
Future Volume (vph)	17	629	123	156	1013	21	162	64	27	27	95	39
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
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	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0	10.0	20.0	20.0
Total Split (s)	12.0	43.0	43.0	27.0	58.0	58.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	35.8%	35.8%	22.5%	48.3%	48.3%	20.8%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow 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
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)	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 Lost Time (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
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
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	6.4	40.2	40.2	14.4	55.5	55.5	14.5	17.7	17.7	7.2	8.3	8.3
Actuated g/C Ratio	0.07	0.42	0.42	0.15	0.58	0.58	0.15	0.19	0.19	0.08	0.09	0.09
v/c Ratio	0.15	0.45	0.17	0.62	0.52	0.02	0.64	0.10	0.07	0.22	0.33	0.15
Control Delay	50.1	23.1	3.1	50.0	15.7	0.0	51.0	35.2	0.3	49.5	47.0	1.1
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	50.1	23.1	3.1	50.0	15.7	0.0	51.0	35.2	0.3	49.5	47.0	1.1
LOS	D	C	A	D	B	A	D	D	A	D	D	A
Approach Delay		20.5			19.9			41.6			36.4	
Approach LOS		C			B			D			D	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 94.9		
Natural Cycle: 70		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.64		
Intersection Signal Delay: 23.5	Intersection LOS: C	
Intersection Capacity Utilization 60.3%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	629	123	156	1013	21	162	64	27	27	95	39
Future Volume (veh/h)	17	629	123	156	1013	21	162	64	27	27	95	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	669	0	166	1078	22	172	68	0	29	101	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	1745		204	2081	928	210	514		51	196	88
Arrive On Green	0.02	0.49	0.00	0.11	0.59	0.59	0.12	0.14	0.00	0.03	0.06	0.06
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	18	669	0	166	1078	22	172	68	0	29	101	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.9	10.7	0.0	8.2	16.3	0.5	8.5	1.5	0.0	1.5	2.5	2.3
Cycle Q Clear(g_c), s	0.9	10.7	0.0	8.2	16.3	0.5	8.5	1.5	0.0	1.5	2.5	2.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	36	1745		204	2081	928	210	514		51	196	88
V/C Ratio(X)	0.50	0.38		0.81	0.52	0.02	0.82	0.13		0.57	0.51	0.47
Avail Cap(c_a), veh/h	138	1745		433	2081	928	394	785		394	785	350
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.9	14.4	0.0	39.1	11.2	7.9	39.0	33.8	0.0	43.4	41.6	41.5
Incr Delay (d2), s/veh	10.5	0.6	0.0	7.6	0.9	0.0	7.6	0.1	0.0	9.6	2.1	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.9	0.0	3.8	5.4	0.2	4.0	0.6	0.0	0.8	1.1	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.4	15.1	0.0	46.7	12.1	7.9	46.6	33.9	0.0	53.0	43.6	45.3
LnGrp LOS	D	B		D	B	A	D	C		D	D	D
Approach Vol, veh/h		687			1266			240			171	
Approach Delay, s/veh		16.1			16.5			43.0			45.6	
Approach LOS		B			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.4	49.4	15.7	10.0	6.8	58.0	7.6	18.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	22.0	38.0	20.0	20.0	7.0	53.0	20.0	20.0
Max Q Clear Time (g_c+I1), s	10.2	12.7	10.5	4.5	2.9	18.3	3.5	3.5
Green Ext Time (p_c), s	0.3	4.2	0.3	0.5	0.0	8.3	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

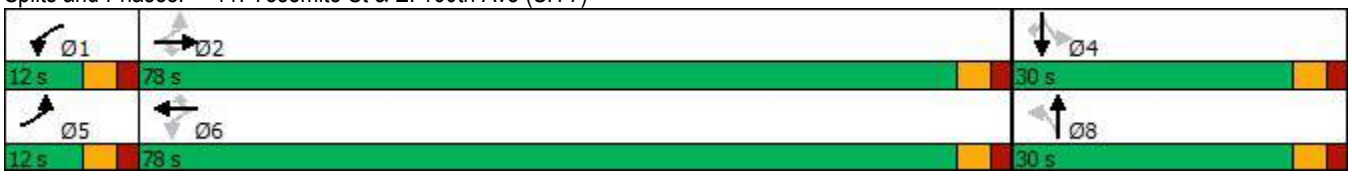
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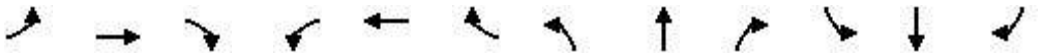
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	14	705	29	39	1226	7	56	9	16	7	18
Future Volume (vph)	14	705	29	39	1226	7	56	9	16	7	18
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	78.0	78.0	12.0	78.0	78.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	10.0%	65.0%	65.0%	10.0%	65.0%	65.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	27.2	25.3	25.3	28.1	27.2	27.2	8.6	8.6	8.6	8.6	8.6
Actuated g/C Ratio	0.56	0.52	0.52	0.58	0.56	0.56	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.04	0.41	0.04	0.08	0.65	0.01	0.24	0.22	0.07	0.02	0.06
Control Delay	3.9	8.5	0.8	4.0	9.5	0.0	24.8	10.9	23.5	23.1	0.3
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	3.9	8.5	0.8	4.0	9.5	0.0	24.8	10.9	23.5	23.1	0.3
LOS	A	A	A	A	A	A	C	B	C	C	A
Approach Delay		8.1			9.3			17.0		13.2	
Approach LOS		A			A			B		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 48.3	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 54.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	705	29	39	1226	7	56	9	62	16	7	18
Future Volume (veh/h)	14	705	29	39	1226	7	56	9	62	16	7	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	15	750	0	41	1304	7	60	10	66	17	7	19
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	312	1882		520	1971	879	296	23	150	236	199	169
Arrive On Green	0.02	0.53	0.00	0.04	0.55	0.55	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1385	213	1405	1323	1870	1585
Grp Volume(v), veh/h	15	750	0	41	1304	7	60	0	76	17	7	19
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1385	0	1618	1323	1870	1585
Q Serve(g_s), s	0.2	5.9	0.0	0.5	12.1	0.1	1.9	0.0	2.1	0.6	0.2	0.5
Cycle Q Clear(g_c), s	0.2	5.9	0.0	0.5	12.1	0.1	2.1	0.0	2.1	2.6	0.2	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	312	1882		520	1971	879	296	0	172	236	199	169
V/C Ratio(X)	0.05	0.40		0.08	0.66	0.01	0.20	0.00	0.44	0.07	0.04	0.11
Avail Cap(c_a), veh/h	544	5530		707	5530	2466	887	0	862	800	997	845
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	6.6	0.0	4.8	7.3	4.7	19.7	0.0	19.6	20.9	18.8	19.0
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.1	0.4	0.0	0.3	0.0	1.8	0.1	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.0	0.1	2.2	0.0	0.5	0.0	0.7	0.2	0.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	6.7	0.0	4.8	7.7	4.7	20.1	0.0	21.4	21.0	18.9	19.2
LnGrp LOS	A	A		A	A	A	C	A	C	C	B	B
Approach Vol, veh/h		765			1352			136			43	
Approach Delay, s/veh		6.7			7.6			20.8			19.9	
Approach LOS		A			A			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	29.8		10.0	5.9	31.0		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	73.0		25.0	7.0	73.0		25.0				
Max Q Clear Time (g_c+I1), s	2.5	7.9		4.6	2.2	14.1		4.1				
Green Ext Time (p_c), s	0.0	5.2		0.1	0.0	11.9		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

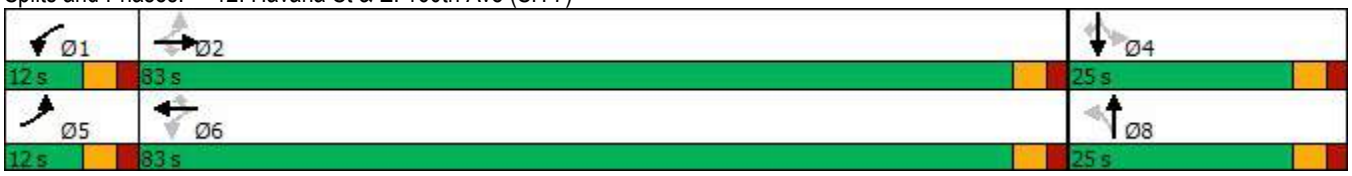
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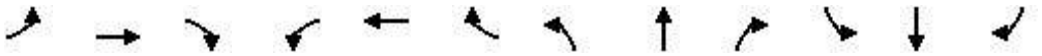
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	16	764	12	30	1076	9	24	5	16	8	39
Future Volume (vph)	16	764	12	30	1076	9	24	5	16	8	39
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	22.1	20.2	20.2	22.9	22.1	22.1	6.9	6.9	6.9	6.9	6.9
Actuated g/C Ratio	0.54	0.49	0.49	0.55	0.54	0.54	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.04	0.47	0.02	0.07	0.61	0.01	0.11	0.26	0.08	0.03	0.13
Control Delay	3.5	8.8	0.0	3.6	8.5	0.0	21.2	9.4	21.1	20.4	5.6
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	3.5	8.8	0.0	3.6	8.5	0.0	21.2	9.4	21.1	20.4	5.6
LOS	A	A	A	A	A	A	C	A	C	C	A
Approach Delay		8.5			8.3			12.1		11.5	
Approach LOS		A			A			B		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 41.3	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 50.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	764	12	30	1076	9	24	5	77	16	8	39
Future Volume (veh/h)	16	764	12	30	1076	9	24	5	77	16	8	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	813	13	32	1145	10	26	5	82	17	9	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	341	1751	781	462	1806	806	323	11	177	257	220	186
Arrive On Green	0.02	0.49	0.49	0.04	0.51	0.51	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1355	92	1507	1310	1870	1585
Grp Volume(v), veh/h	17	813	13	32	1145	10	26	0	87	17	9	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1355	0	1599	1310	1870	1585
Q Serve(g_s), s	0.2	6.4	0.2	0.4	9.9	0.1	0.7	0.0	2.2	0.5	0.2	1.0
Cycle Q Clear(g_c), s	0.2	6.4	0.2	0.4	9.9	0.1	0.9	0.0	2.2	2.7	0.2	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.94	1.00		1.00
Lane Grp Cap(c), veh/h	341	1751	781	462	1806	806	323	0	188	257	220	186
V/C Ratio(X)	0.05	0.46	0.02	0.07	0.63	0.01	0.08	0.00	0.46	0.07	0.04	0.22
Avail Cap(c_a), veh/h	596	6518	2907	690	6518	2907	801	0	752	719	880	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	7.1	5.5	5.3	7.6	5.2	17.0	0.0	17.5	18.8	16.6	17.0
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.1	0.4	0.0	0.1	0.0	1.8	0.1	0.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.2	0.0	0.1	1.8	0.0	0.2	0.0	0.7	0.1	0.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	7.3	5.5	5.4	8.0	5.2	17.1	0.0	19.3	18.9	16.7	17.6
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	B	B
Approach Vol, veh/h		843			1187			113			67	
Approach Delay, s/veh		7.2			7.9			18.8			17.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	26.0		10.0	5.9	26.6		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	8.4		4.7	2.2	11.9		4.2				
Green Ext Time (p_c), s	0.0	5.9		0.1	0.0	9.7		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			8.5									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	812	39	335	1042	0	14	1	267	0	0	1
Future Vol, veh/h	0	812	39	335	1042	0	14	1	267	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	475	-	475	475	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	864	41	356	1109	0	15	1	284	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1109	0	0	905	0	0	2131	2685	-	2254	2726	555
Stage 1	-	-	-	-	-	-	864	864	-	1821	1821	-
Stage 2	-	-	-	-	-	-	1267	1821	-	433	905	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	-	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	625	-	-	747	-	-	28	22	0	23	20	475
Stage 1	-	-	-	-	-	-	315	369	0	80	127	-
Stage 2	-	-	-	-	-	-	179	127	0	571	353	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	625	-	-	747	-	-	17	12	-	14	10	475
Mov Cap-2 Maneuver	-	-	-	-	-	-	85	62	-	14	10	-
Stage 1	-	-	-	-	-	-	315	369	-	80	66	-
Stage 2	-	-	-	-	-	-	93	66	-	569	353	-

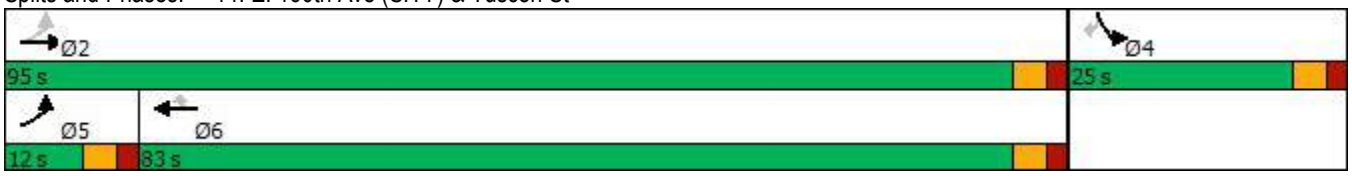
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.4	58.4	12.6
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	83	-	625	-	-	747	-	-	475
HCM Lane V/C Ratio	0.192	-	-	-	-	0.477	-	-	0.002
HCM Control Delay (s)	58.4	0	0	-	-	14.1	-	-	12.6
HCM Lane LOS	F	A	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	0.7	-	0	-	-	2.6	-	-	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	42	1091	1392	12	12	61
Future Volume (vph)	42	1091	1392	12	12	61
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0	15.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	95.0	83.0	83.0	25.0	25.0
Total Split (%)	10.0%	79.2%	69.2%	69.2%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effct Green (s)	93.0	94.0	85.1	85.1	10.0	10.0
Actuated g/C Ratio	0.85	0.85	0.77	0.77	0.09	0.09
v/c Ratio	0.15	0.38	0.54	0.01	0.08	0.32
Control Delay	3.0	2.7	7.4	2.2	47.2	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	2.7	7.4	2.2	47.2	16.1
LOS	A	A	A	A	D	B
Approach Delay		2.7	7.4		21.3	
Approach LOS		A	A		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 110	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 5.8	Intersection LOS: A
Intersection Capacity Utilization 55.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: E. 160th Ave (SH 7) & Tuscon St





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	42	1091	1392	12	12	61
Future Volume (veh/h)	42	1091	1392	12	12	61
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	1161	1481	13	13	65
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	325	2933	2648	1181	148	132
Arrive On Green	0.03	0.83	0.75	0.75	0.08	0.08
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	45	1161	1481	13	13	65
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	0.6	9.2	19.8	0.2	0.7	4.3
Cycle Q Clear(g_c), s	0.6	9.2	19.8	0.2	0.7	4.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	325	2933	2648	1181	148	132
V/C Ratio(X)	0.14	0.40	0.56	0.01	0.09	0.49
Avail Cap(c_a), veh/h	379	2933	2648	1181	327	291
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.8	2.5	6.1	3.6	46.2	47.8
Incr Delay (d2), s/veh	0.2	0.4	0.9	0.0	0.3	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.5	5.3	0.1	0.3	3.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.0	2.9	6.9	3.6	46.4	50.7
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1206	1494		78	
Approach Delay, s/veh		3.0	6.9		49.9	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		95.0		14.1	8.7	86.3
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		90.0		20.0	7.0	78.0
Max Q Clear Time (g_c+I1), s		11.2		6.3	2.6	21.8
Green Ext Time (p_c), s		9.9		0.1	0.0	14.9

Intersection Summary	
HCM 6th Ctrl Delay	6.4
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	21	8	43	58	2
Future Vol, veh/h	3	21	8	43	58	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	22	9	46	62	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	104	32	64	0	-	0
Stage 1	63	-	-	-	-	-
Stage 2	41	-	-	-	-	-
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	883	1035	1536	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	878	1035	1536	-	-	-
Mov Cap-2 Maneuver	878	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	976	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	1.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1536	-	1012	-	-
HCM Lane V/C Ratio	0.006	-	0.025	-	-
HCM Control Delay (s)	7.4	-	8.6	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	39	15	53	80	2
Future Vol, veh/h	3	39	15	53	80	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	41	16	56	85	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	146	44	87	0	-	0
Stage 1	86	-	-	-	-	-
Stage 2	60	-	-	-	-	-
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	832	1017	1507	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	823	1017	1507	-	-	-
Mov Cap-2 Maneuver	823	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	955	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1507	-	1000	-	-
HCM Lane V/C Ratio	0.011	-	0.045	-	-
HCM Control Delay (s)	7.4	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	3	5	13	0
Future Vol, veh/h	1	5	3	5	13	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	5	3	5	14	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	25	14	14	0	-	0
Stage 1	14	-	-	-	-	-
Stage 2	11	-	-	-	-	-
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	991	1066	1604	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	1012	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	989	1066	1604	-	-	-
Mov Cap-2 Maneuver	989	-	-	-	-	-
Stage 1	1007	-	-	-	-	-
Stage 2	1012	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	2.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1604	-	1052	-	-
HCM Lane V/C Ratio	0.002	-	0.006	-	-
HCM Control Delay (s)	7.2	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	11	14	13	0
Future Vol, veh/h	0	27	11	14	13	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	29	12	15	14	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	53	14	14	0	-	0
Stage 1	14	-	-	-	-	-
Stage 2	39	-	-	-	-	-
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	955	1066	1604	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	983	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	947	1066	1604	-	-	-
Mov Cap-2 Maneuver	947	-	-	-	-	-
Stage 1	1001	-	-	-	-	-
Stage 2	983	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	3.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1604	-	1066	-	-
HCM Lane V/C Ratio	0.007	-	0.027	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	2	0	0	0	3	14	0	0	13	1
Future Vol, veh/h	3	0	2	0	0	0	3	14	0	0	13	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	2	0	0	0	3	15	0	0	14	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	36	36	15	37	36	15	15	0	0	15	0	0
Stage 1	15	15	-	21	21	-	-	-	-	-	-	-
Stage 2	21	21	-	16	15	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	970	856	1065	968	856	1065	1603	-	-	1603	-	-
Stage 1	1005	883	-	998	878	-	-	-	-	-	-	-
Stage 2	998	878	-	1004	883	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	968	854	1065	964	854	1065	1603	-	-	1603	-	-
Mov Cap-2 Maneuver	968	854	-	964	854	-	-	-	-	-	-	-
Stage 1	1003	883	-	996	876	-	-	-	-	-	-	-
Stage 2	996	876	-	1002	883	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	0	1.3	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1603	-	-	1005	-	1603	-	-
HCM Lane V/C Ratio	0.002	-	-	0.005	-	-	-	-
HCM Control Delay (s)	7.2	0	-	8.6	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	3	17	15	0
Future Vol, veh/h	0	4	3	17	15	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	4	23	21	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	52	21	21	0	-	0
Stage 1	21	-	-	-	-	-
Stage 2	31	-	-	-	-	-
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	957	1056	1595	-	-	-
Stage 1	1002	-	-	-	-	-
Stage 2	992	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	954	1056	1595	-	-	-
Mov Cap-2 Maneuver	954	-	-	-	-	-
Stage 1	999	-	-	-	-	-
Stage 2	992	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1595	-	1056	-	-
HCM Lane V/C Ratio	0.003	-	0.005	-	-
HCM Control Delay (s)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	148	198	2	6	6
Future Vol, veh/h	3	148	198	2	6	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	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	157	211	2	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	213	0	-	0	297	107
Stage 1	-	-	-	-	212	-
Stage 2	-	-	-	-	85	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1355	-	-	-	670	926
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	929	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1355	-	-	-	669	926
Mov Cap-2 Maneuver	-	-	-	-	669	-
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	929	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1355	-	-	-	777
HCM Lane V/C Ratio	0.002	-	-	-	0.016
HCM Control Delay (s)	7.7	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	137	17	32	192	8	15
Future Vol, veh/h	137	17	32	192	8	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	-	250	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	146	18	34	204	9	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	164	0	316	73
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	170	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1412	-	652	974
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	843	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	636	974
Mov Cap-2 Maneuver	-	-	-	-	636	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	823	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	636	974	-	-	1412	-
HCM Lane V/C Ratio	0.013	0.016	-	-	0.024	-
HCM Control Delay (s)	10.7	8.8	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	141	5	2	237	23	10	0	1	23	0	29
Future Vol, veh/h	21	141	5	2	237	23	10	0	1	23	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	250	-	250	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	150	5	2	252	24	11	0	1	24	0	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	276	0	0	155	0	0	324	474	75	375	455	126
Stage 1	-	-	-	-	-	-	194	194	-	256	256	-
Stage 2	-	-	-	-	-	-	130	280	-	119	199	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1284	-	-	1423	-	-	605	488	971	557	500	901
Stage 1	-	-	-	-	-	-	789	739	-	726	694	-
Stage 2	-	-	-	-	-	-	860	678	-	873	735	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1284	-	-	1423	-	-	576	479	971	549	491	901
Mov Cap-2 Maneuver	-	-	-	-	-	-	576	479	-	549	491	-
Stage 1	-	-	-	-	-	-	776	726	-	714	693	-
Stage 2	-	-	-	-	-	-	829	677	-	857	723	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.1	11.2	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	576	971	1284	-	-	1423	-	-	549	901
HCM Lane V/C Ratio	0.018	0.001	0.017	-	-	0.001	-	-	0.045	0.034
HCM Control Delay (s)	11.4	8.7	7.9	-	-	7.5	-	-	11.9	9.1
HCM Lane LOS	B	A	A	-	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	0	0.1	-	-	0	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	154	3	11	246	7	10
Future Vol, veh/h	154	3	11	246	7	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	-	170	250	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	3	12	262	7	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	167	0	319	82
Stage 1	-	-	-	-	164	-
Stage 2	-	-	-	-	155	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1408	-	649	961
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	857	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1408	-	643	961
Mov Cap-2 Maneuver	-	-	-	-	643	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	849	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	643	961	-	-	1408	-
HCM Lane V/C Ratio	0.012	0.011	-	-	0.008	-
HCM Control Delay (s)	10.7	8.8	-	-	7.6	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	173	263	2	2	2
Future Vol, veh/h	2	173	263	2	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	184	280	2	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	282	0	-	0	377	141
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	96	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1277	-	-	-	597	881
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	917	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1277	-	-	-	596	881
Mov Cap-2 Maneuver	-	-	-	-	596	-
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	917	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1277	-	-	-	711
HCM Lane V/C Ratio	0.002	-	-	-	0.006
HCM Control Delay (s)	7.8	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	173	2	74	254	11	58
Future Vol, veh/h	173	2	74	254	11	58
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	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	184	2	79	270	12	62

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	186	0	477	92
Stage 1	-	-	-	-	184	-
Stage 2	-	-	-	-	293	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1386	-	517	947
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	731	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1386	-	488	947
Mov Cap-2 Maneuver	-	-	-	-	488	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	689	-

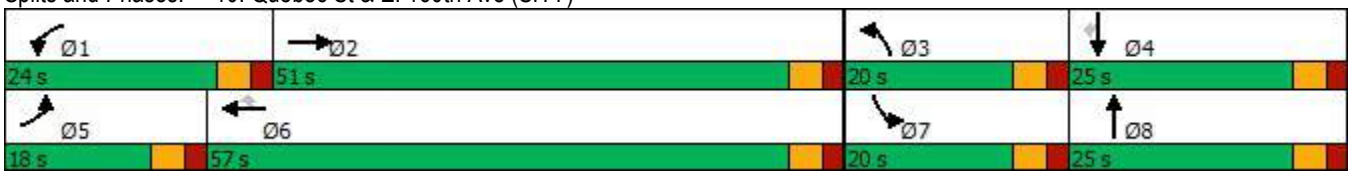
Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	824	-	-	1386	-
HCM Lane V/C Ratio	0.089	-	-	0.057	-
HCM Control Delay (s)	9.8	-	-	7.8	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	629	123	156	1013	21	162	64	27	27	95	39
Future Volume (vph)	17	629	123	156	1013	21	162	64	27	27	95	39
Turn Type	Prot	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			Free			4
Detector Phase	5	2		1	6	6	3	8		7	4	4
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
Minimum Split (s)	10.0	20.0		10.0	20.0	20.0	10.0	20.0		10.0	20.0	20.0
Total Split (s)	18.0	51.0		24.0	57.0	57.0	20.0	25.0		20.0	25.0	25.0
Total Split (%)	15.0%	42.5%		20.0%	47.5%	47.5%	16.7%	20.8%		16.7%	20.8%	20.8%
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	6.6	22.3	77.0	13.0	36.3	36.3	12.9	21.6	77.0	7.1	8.0	8.0
Actuated g/C Ratio	0.09	0.29	1.00	0.17	0.47	0.47	0.17	0.28	1.00	0.09	0.10	0.10
v/c Ratio	0.12	0.65	0.08	0.56	0.65	0.03	0.58	0.07	0.02	0.18	0.27	0.14
Control Delay	40.5	27.7	0.1	39.4	19.0	0.0	41.4	27.7	0.0	40.3	37.9	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.5	27.7	0.1	39.4	19.0	0.0	41.4	27.7	0.0	40.3	37.9	0.9
LOS	D	C	A	D	B	A	D	C	A	D	D	A
Approach Delay		23.5			21.3			33.5			29.4	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 77	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 23.9	Intersection LOS: C
Intersection Capacity Utilization 60.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	629	123	156	1013	21	162	64	27	27	95	39
Future Volume (veh/h)	17	629	123	156	1013	21	162	64	27	27	95	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	669	0	166	1078	22	172	68	0	29	101	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	39	1163		215	1515	676	221	631		57	304	136
Arrive On Green	0.02	0.33	0.00	0.12	0.43	0.43	0.12	0.18	0.00	0.03	0.09	0.09
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	18	669	0	166	1078	22	172	68	0	29	101	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	0.6	9.1	0.0	5.3	14.6	0.5	5.5	0.9	0.0	0.9	1.6	1.4
Cycle Q Clear(g_c), s	0.6	9.1	0.0	5.3	14.6	0.5	5.5	0.9	0.0	0.9	1.6	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	39	1163		215	1515	676	221	631		57	304	136
V/C Ratio(X)	0.47	0.58		0.77	0.71	0.03	0.78	0.11		0.51	0.33	0.30
Avail Cap(c_a), veh/h	396	2798		579	3163	1411	457	1217		457	1217	543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	16.3	0.0	24.9	13.8	9.7	24.8	20.1	0.0	27.8	25.1	25.1
Incr Delay (d2), s/veh	8.5	0.5	0.0	5.7	0.6	0.0	5.9	0.1	0.0	6.8	0.6	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.0	0.0	2.3	4.4	0.1	2.4	0.4	0.0	0.5	0.6	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.7	16.7	0.0	30.6	14.4	9.8	30.7	20.2	0.0	34.6	25.8	26.3
LnGrp LOS	D	B		C	B	A	C	C		C	C	C
Approach Vol, veh/h		687			1266			240			171	
Approach Delay, s/veh		17.3			16.5			27.7			27.4	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	24.1	12.2	10.0	6.3	29.9	6.9	15.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	19.0	46.0	15.0	20.0	13.0	52.0	15.0	20.0
Max Q Clear Time (g_c+I1), s	7.3	11.1	7.5	3.6	2.6	16.6	2.9	2.9
Green Ext Time (p_c), s	0.3	4.4	0.2	0.5	0.0	8.3	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

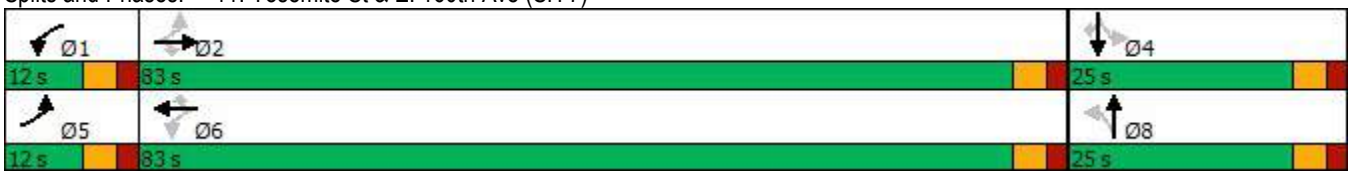
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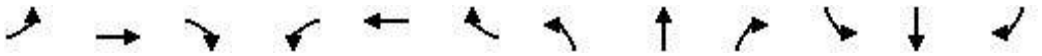
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	14	705	29	39	1226	7	56	9	16	7	18
Future Volume (vph)	14	705	29	39	1226	7	56	9	16	7	18
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	27.2	25.3	25.3	28.2	27.3	27.3	8.4	8.4	8.4	8.4	8.4
Actuated g/C Ratio	0.56	0.52	0.52	0.59	0.57	0.57	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.04	0.40	0.04	0.08	0.65	0.01	0.25	0.23	0.07	0.02	0.06
Control Delay	3.8	8.4	0.8	3.9	9.3	0.0	25.0	11.0	23.7	23.3	0.3
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	3.8	8.4	0.8	3.9	9.3	0.0	25.0	11.0	23.7	23.3	0.3
LOS	A	A	A	A	A	A	C	B	C	C	A
Approach Delay		8.0			9.1			17.2		13.3	
Approach LOS		A			A			B		B	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 48.2		
Natural Cycle: 60		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.65		
Intersection Signal Delay: 9.3	Intersection LOS: A	
Intersection Capacity Utilization 54.7%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	705	29	39	1226	7	56	9	62	16	7	18
Future Volume (veh/h)	14	705	29	39	1226	7	56	9	62	16	7	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	15	750	0	41	1304	7	60	10	66	17	7	19
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	312	1885		520	1974	881	296	23	149	236	199	169
Arrive On Green	0.02	0.53	0.00	0.04	0.56	0.56	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1385	213	1405	1323	1870	1585
Grp Volume(v), veh/h	15	750	0	41	1304	7	60	0	76	17	7	19
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1385	0	1618	1323	1870	1585
Q Serve(g_s), s	0.2	5.9	0.0	0.5	12.1	0.1	1.9	0.0	2.1	0.6	0.2	0.5
Cycle Q Clear(g_c), s	0.2	5.9	0.0	0.5	12.1	0.1	2.1	0.0	2.1	2.6	0.2	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	312	1885		520	1974	881	296	0	172	236	199	169
V/C Ratio(X)	0.05	0.40		0.08	0.66	0.01	0.20	0.00	0.44	0.07	0.04	0.11
Avail Cap(c_a), veh/h	543	5898		707	5898	2631	738	0	688	658	796	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	6.6	0.0	4.7	7.3	4.7	19.8	0.0	19.7	20.9	18.8	19.0
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.1	0.4	0.0	0.3	0.0	1.8	0.1	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.0	0.1	2.2	0.0	0.6	0.0	0.7	0.2	0.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	6.7	0.0	4.8	7.7	4.7	20.1	0.0	21.5	21.1	18.9	19.3
LnGrp LOS	A	A		A	A	A	C	A	C	C	B	B
Approach Vol, veh/h		765			1352			136			43	
Approach Delay, s/veh		6.7			7.6			20.9			19.9	
Approach LOS		A			A			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	29.9		10.0	5.9	31.1		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.5	7.9		4.6	2.2	14.1		4.1				
Green Ext Time (p_c), s	0.0	5.3		0.1	0.0	12.0		0.4				

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

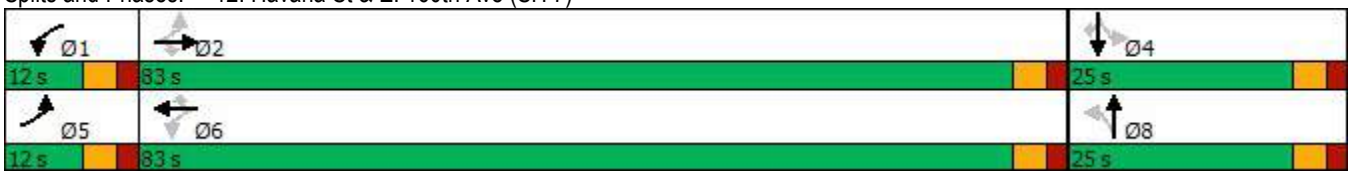
Notes

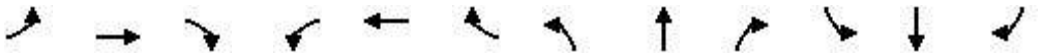
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	16	764	12	30	1076	9	24	5	16	8	39
Future Volume (vph)	16	764	12	30	1076	9	24	5	16	8	39
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	22.1	20.2	20.2	22.9	22.1	22.1	6.9	6.9	6.9	6.9	6.9
Actuated g/C Ratio	0.54	0.49	0.49	0.55	0.54	0.54	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.04	0.47	0.02	0.07	0.61	0.01	0.11	0.26	0.08	0.03	0.13
Control Delay	3.5	8.8	0.0	3.6	8.5	0.0	21.2	9.4	21.1	20.4	5.6
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	3.5	8.8	0.0	3.6	8.5	0.0	21.2	9.4	21.1	20.4	5.6
LOS	A	A	A	A	A	A	C	A	C	C	A
Approach Delay		8.5			8.3			12.1		11.5	
Approach LOS		A			A			B		B	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 41.3		
Natural Cycle: 60		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.61		
Intersection Signal Delay: 8.7	Intersection LOS: A	
Intersection Capacity Utilization 50.6%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	764	12	30	1076	9	24	5	77	16	8	39
Future Volume (veh/h)	16	764	12	30	1076	9	24	5	77	16	8	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	813	13	32	1145	10	26	5	82	17	9	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	341	1751	781	462	1806	806	323	11	177	257	220	186
Arrive On Green	0.02	0.49	0.49	0.04	0.51	0.51	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1355	92	1507	1310	1870	1585
Grp Volume(v), veh/h	17	813	13	32	1145	10	26	0	87	17	9	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1355	0	1599	1310	1870	1585
Q Serve(g_s), s	0.2	6.4	0.2	0.4	9.9	0.1	0.7	0.0	2.2	0.5	0.2	1.0
Cycle Q Clear(g_c), s	0.2	6.4	0.2	0.4	9.9	0.1	0.9	0.0	2.2	2.7	0.2	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.94	1.00		1.00
Lane Grp Cap(c), veh/h	341	1751	781	462	1806	806	323	0	188	257	220	186
V/C Ratio(X)	0.05	0.46	0.02	0.07	0.63	0.01	0.08	0.00	0.46	0.07	0.04	0.22
Avail Cap(c_a), veh/h	596	6518	2907	690	6518	2907	801	0	752	719	880	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	7.1	5.5	5.3	7.6	5.2	17.0	0.0	17.5	18.8	16.6	17.0
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.1	0.4	0.0	0.1	0.0	1.8	0.1	0.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.2	0.0	0.1	1.8	0.0	0.2	0.0	0.7	0.1	0.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	7.3	5.5	5.4	8.0	5.2	17.1	0.0	19.3	18.9	16.7	17.6
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	B	B
Approach Vol, veh/h		843			1187			113			67	
Approach Delay, s/veh		7.2			7.9			18.8			17.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	26.0		10.0	5.9	26.6		10.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	8.4		4.7	2.2	11.9		4.2				
Green Ext Time (p_c), s	0.0	5.9		0.1	0.0	9.7		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			8.5									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1258	24	252	1220	0	24	0	418	1	0	3
Future Vol, veh/h	0	1258	24	252	1220	0	24	0	418	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	475	-	475	475	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1338	26	268	1298	0	26	0	445	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1298	0	0	1364	0	0	2523	3172	-	2503	3198	649
Stage 1	-	-	-	-	-	-	1338	1338	-	1834	1834	-
Stage 2	-	-	-	-	-	-	1185	1834	-	669	1364	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	-	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	530	-	-	500	-	-	~ 14	10	0	14	10	412
Stage 1	-	-	-	-	-	-	161	220	0	79	125	-
Stage 2	-	-	-	-	-	-	201	125	0	413	214	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	530	-	-	500	-	-	~ 8	5	-	8	5	412
Mov Cap-2 Maneuver	-	-	-	-	-	-	57	43	-	8	5	-
Stage 1	-	-	-	-	-	-	161	220	-	79	58	-
Stage 2	-	-	-	-	-	-	93	58	-	413	214	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.5	111.8	143.9
HCM LOS			F	F

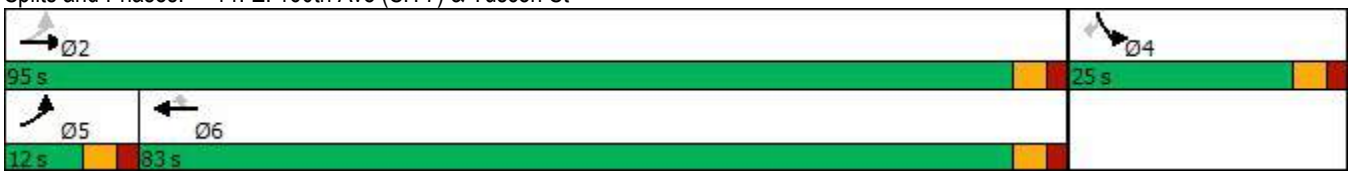
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	57	-	530	-	-	500	-	-	30
HCM Lane V/C Ratio	0.448	-	-	-	-	0.536	-	-	0.142
HCM Control Delay (s)	111.8	0	0	-	-	20.2	-	-	143.9
HCM Lane LOS	F	A	A	-	-	C	-	-	F
HCM 95th %tile Q(veh)	1.7	-	0	-	-	3.1	-	-	0.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	42	1091	1392	12	12	61
Future Volume (vph)	42	1091	1392	12	12	61
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0	15.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	95.0	83.0	83.0	25.0	25.0
Total Split (%)	10.0%	79.2%	69.2%	69.2%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effct Green (s)	93.0	94.0	85.1	85.1	10.0	10.0
Actuated g/C Ratio	0.85	0.85	0.77	0.77	0.09	0.09
v/c Ratio	0.15	0.38	0.54	0.01	0.08	0.32
Control Delay	3.0	2.7	7.4	2.2	47.2	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	2.7	7.4	2.2	47.2	16.1
LOS	A	A	A	A	D	B
Approach Delay		2.7	7.4		21.3	
Approach LOS		A	A		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 110	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 5.8	Intersection LOS: A
Intersection Capacity Utilization 55.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: E. 160th Ave (SH 7) & Tuscon St





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	42	1091	1392	12	12	61
Future Volume (veh/h)	42	1091	1392	12	12	61
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	1161	1481	13	13	65
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	325	2933	2648	1181	148	132
Arrive On Green	0.03	0.83	0.75	0.75	0.08	0.08
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	45	1161	1481	13	13	65
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	0.6	9.2	19.8	0.2	0.7	4.3
Cycle Q Clear(g_c), s	0.6	9.2	19.8	0.2	0.7	4.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	325	2933	2648	1181	148	132
V/C Ratio(X)	0.14	0.40	0.56	0.01	0.09	0.49
Avail Cap(c_a), veh/h	379	2933	2648	1181	327	291
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.8	2.5	6.1	3.6	46.2	47.8
Incr Delay (d2), s/veh	0.2	0.4	0.9	0.0	0.3	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.5	5.3	0.1	0.3	3.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.0	2.9	6.9	3.6	46.4	50.7
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1206	1494		78	
Approach Delay, s/veh		3.0	6.9		49.9	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		95.0		14.1	8.7	86.3
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		90.0		20.0	7.0	78.0
Max Q Clear Time (g_c+I1), s		11.2		6.3	2.6	21.8
Green Ext Time (p_c), s		9.9		0.1	0.0	14.9

Intersection Summary	
HCM 6th Ctrl Delay	6.4
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	21	8	43	58	2
Future Vol, veh/h	3	21	8	43	58	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	22	9	46	62	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	104	32	64	0	-	0
Stage 1	63	-	-	-	-	-
Stage 2	41	-	-	-	-	-
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	883	1035	1536	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	878	1035	1536	-	-	-
Mov Cap-2 Maneuver	878	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	976	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	1.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1536	-	1012	-	-
HCM Lane V/C Ratio	0.006	-	0.025	-	-
HCM Control Delay (s)	7.4	-	8.6	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	39	15	53	80	2
Future Vol, veh/h	3	39	15	53	80	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	41	16	56	85	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	146	44	87	0	-	0
Stage 1	86	-	-	-	-	-
Stage 2	60	-	-	-	-	-
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	832	1017	1507	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	823	1017	1507	-	-	-
Mov Cap-2 Maneuver	823	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	955	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1507	-	1000	-	-
HCM Lane V/C Ratio	0.011	-	0.045	-	-
HCM Control Delay (s)	7.4	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	3	5	13	0
Future Vol, veh/h	1	5	3	5	13	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	5	3	5	14	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	25	14	14	0	-	0
Stage 1	14	-	-	-	-	-
Stage 2	11	-	-	-	-	-
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	991	1066	1604	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	1012	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	989	1066	1604	-	-	-
Mov Cap-2 Maneuver	989	-	-	-	-	-
Stage 1	1007	-	-	-	-	-
Stage 2	1012	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	2.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1604	-	1052	-	-
HCM Lane V/C Ratio	0.002	-	0.006	-	-
HCM Control Delay (s)	7.2	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	11	14	13	0
Future Vol, veh/h	0	27	11	14	13	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	29	12	15	14	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	53	14	14	0	-	0
Stage 1	14	-	-	-	-	-
Stage 2	39	-	-	-	-	-
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	955	1066	1604	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	983	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	947	1066	1604	-	-	-
Mov Cap-2 Maneuver	947	-	-	-	-	-
Stage 1	1001	-	-	-	-	-
Stage 2	983	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	3.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1604	-	1066	-	-
HCM Lane V/C Ratio	0.007	-	0.027	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	2	0	0	0	3	14	0	0	13	1
Future Vol, veh/h	3	0	2	0	0	0	3	14	0	0	13	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	2	0	0	0	3	15	0	0	14	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	36	36	15	37	36	15	15	0	0	15	0	0
Stage 1	15	15	-	21	21	-	-	-	-	-	-	-
Stage 2	21	21	-	16	15	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	970	856	1065	968	856	1065	1603	-	-	1603	-	-
Stage 1	1005	883	-	998	878	-	-	-	-	-	-	-
Stage 2	998	878	-	1004	883	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	968	854	1065	964	854	1065	1603	-	-	1603	-	-
Mov Cap-2 Maneuver	968	854	-	964	854	-	-	-	-	-	-	-
Stage 1	1003	883	-	996	876	-	-	-	-	-	-	-
Stage 2	996	876	-	1002	883	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	0	1.3	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1603	-	-	1005	-	1603	-	-
HCM Lane V/C Ratio	0.002	-	-	0.005	-	-	-	-
HCM Control Delay (s)	7.2	0	-	8.6	0	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	3	17	15	0
Future Vol, veh/h	0	4	3	17	15	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	6	5	27	24	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	61	24	24	0	-	0
Stage 1	24	-	-	-	-	-
Stage 2	37	-	-	-	-	-
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	945	1052	1591	-	-	-
Stage 1	999	-	-	-	-	-
Stage 2	985	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	942	1052	1591	-	-	-
Mov Cap-2 Maneuver	942	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	985	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1591	-	1052	-	-
HCM Lane V/C Ratio	0.003	-	0.006	-	-
HCM Control Delay (s)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	212	374	10	9	6
Future Vol, veh/h	3	212	374	10	9	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	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	226	398	11	10	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	409	0	-	0	523	205
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	119	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1146	-	-	-	484	802
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	893	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1146	-	-	-	483	802
Mov Cap-2 Maneuver	-	-	-	-	483	-
Stage 1	-	-	-	-	641	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1146	-	-	-	574
HCM Lane V/C Ratio	0.003	-	-	-	0.028
HCM Control Delay (s)	8.2	-	-	-	11.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	204	17	51	376	8	24
Future Vol, veh/h	204	17	51	376	8	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	217	18	54	400	9	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	235	0	525	109
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	308	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1329	-	482	924
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	719	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1329	-	462	924
Mov Cap-2 Maneuver	-	-	-	-	462	-
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	690	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	462	924	-	-	1329	-
HCM Lane V/C Ratio	0.018	0.028	-	-	0.041	-
HCM Control Delay (s)	12.9	9	-	-	7.8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	218	25	2	417	62	3
Future Vol, veh/h	218	25	2	417	62	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	232	27	2	444	66	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	259	0	458	116
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	226	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1303	-	531	914
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	790	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1303	-	530	914
Mov Cap-2 Maneuver	-	-	-	-	530	-
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	788	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	530	914	-	-	1303	-
HCM Lane V/C Ratio	0.124	0.003	-	-	0.002	-
HCM Control Delay (s)	12.8	9	-	-	7.8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-

Intersection	
Intersection Delay, s/veh	3.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	235	365	134	59
Demand Flow Rate, veh/h	240	372	137	61
Vehicles Circulating, veh/h	44	121	231	437
Vehicles Exiting, veh/h	454	247	53	56
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.5	4.2	3.8	4.4
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	L	LTR	LTR	
Assumed Moves	LT	TR	LT	TR	L	LTR	LTR	
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.533	0.467	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	113	127	175	197	73	64	61	
Cap Entry Lane, veh/h	1296	1368	1208	1281	1091	1167	979	
Entry HV Adj Factor	0.979	0.983	0.979	0.981	0.972	0.983	0.967	
Flow Entry, veh/h	111	125	171	193	71	63	59	
Cap Entry, veh/h	1269	1344	1182	1257	1061	1147	947	
V/C Ratio	0.087	0.093	0.145	0.154	0.067	0.055	0.062	
Control Delay, s/veh	3.5	3.4	4.3	4.2	4.0	3.6	4.4	
LOS	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	1	1	0	0	0	

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	217	9	30	316	27	86
Future Vol, veh/h	217	9	30	316	27	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	231	10	32	336	29	91

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	241	0	463	116
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	232	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1323	-	528	914
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	785	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1323	-	515	914
Mov Cap-2 Maneuver	-	-	-	-	515	-
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	766	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	771	-	-	1323	-
HCM Lane V/C Ratio	0.156	-	-	0.024	-
HCM Control Delay (s)	10.5	-	-	7.8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	3.9
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	1
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	313	341	126
Demand Flow Rate, veh/h	319	348	129
Vehicles Circulating, veh/h	33	51	300
Vehicles Exiting, veh/h	366	378	52
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.7	3.9	4.4
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left
Designated Moves	LT	TR	LT	TR	LR
Assumed Moves	LT	TR	LT	TR	LR
RT Channelized					
Lane Util	0.470	0.530	0.471	0.529	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328
Entry Flow, veh/h	150	169	164	184	129
Cap Entry Lane, veh/h	1309	1381	1288	1360	1100
Entry HV Adj Factor	0.981	0.982	0.977	0.982	0.977
Flow Entry, veh/h	147	166	160	181	126
Cap Entry, veh/h	1285	1356	1258	1335	1075
V/C Ratio	0.115	0.122	0.127	0.135	0.117
Control Delay, s/veh	3.7	3.6	3.9	3.8	4.4
LOS	A	A	A	A	A
95th %tile Queue, veh	0	0	0	0	0

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	357	326	2	2	2
Future Vol, veh/h	2	357	326	2	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	380	347	2	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	349	0	-	0	542	175
Stage 1	-	-	-	-	348	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1207	-	-	-	470	838
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	820	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1207	-	-	-	469	838
Mov Cap-2 Maneuver	-	-	-	-	469	-
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	820	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1207	-	-	-	601
HCM Lane V/C Ratio	0.002	-	-	-	0.007
HCM Control Delay (s)	8	-	-	-	11
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	277	82	74	292	36	58
Future Vol, veh/h	277	82	74	292	36	58
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	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	295	87	79	311	38	62

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	382	0	609	148
Stage 1	-	-	-	-	295	-
Stage 2	-	-	-	-	314	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1173	-	427	872
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	714	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1173	-	398	872
Mov Cap-2 Maneuver	-	-	-	-	398	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	666	-

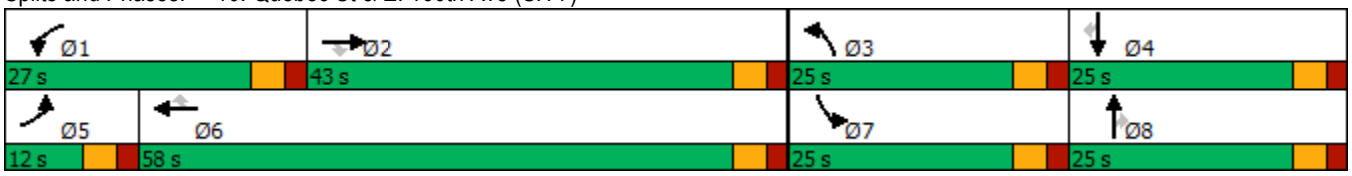
Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	599	-	-	1173	-
HCM Lane V/C Ratio	0.167	-	-	0.067	-
HCM Control Delay (s)	12.2	-	-	8.3	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	690	123	190	1184	21	162	67	39	27	101	52
Future Volume (vph)	23	690	123	190	1184	21	162	67	39	27	101	52
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	12.0	20.0	20.0	12.0	20.0	20.0	12.0	20.0	20.0	12.0	20.0	20.0
Total Split (s)	12.0	43.0	43.0	27.0	58.0	58.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	35.8%	35.8%	22.5%	48.3%	48.3%	20.8%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow 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
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)	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 Lost Time (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
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
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	7.0	39.3	39.3	16.9	54.4	54.4	15.2	27.8	27.8	7.8	15.1	15.1
Actuated g/C Ratio	0.07	0.37	0.37	0.16	0.51	0.51	0.14	0.26	0.26	0.07	0.14	0.14
v/c Ratio	0.21	0.56	0.19	0.72	0.70	0.03	0.68	0.08	0.08	0.22	0.21	0.15
Control Delay	54.8	30.0	3.4	58.4	24.1	0.0	58.4	34.0	0.3	53.5	44.0	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	30.0	3.4	58.4	24.1	0.0	58.4	34.0	0.3	53.5	44.0	0.9
LOS	D	C	A	E	C	A	E	C	A	D	D	A
Approach Delay		26.8			28.4			43.9			33.0	
Approach LOS		C			C			D			C	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 106.6		
Natural Cycle: 80		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.72		
Intersection Signal Delay: 29.7	Intersection LOS: C	
Intersection Capacity Utilization 66.7%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	690	123	190	1184	21	162	67	39	27	101	52
Future Volume (veh/h)	23	690	123	190	1184	21	162	67	39	27	101	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	734	0	202	1260	22	172	71	0	29	107	55
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	1468		237	1821	812	206	790		68	515	230
Arrive On Green	0.03	0.41	0.00	0.13	0.51	0.51	0.12	0.22	0.00	0.04	0.14	0.14
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	24	734	0	202	1260	22	172	71	0	29	107	55
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	1.4	15.8	0.0	11.5	27.7	0.7	9.8	1.6	0.0	1.6	2.7	3.2
Cycle Q Clear(g_c), s	1.4	15.8	0.0	11.5	27.7	0.7	9.8	1.6	0.0	1.6	2.7	3.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	60	1468		237	1821	812	206	790		68	515	230
V/C Ratio(X)	0.40	0.50		0.85	0.69	0.03	0.84	0.09		0.43	0.21	0.24
Avail Cap(c_a), veh/h	121	1468		379	1821	812	344	790		344	687	306
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	22.4	0.0	43.8	19.1	12.5	44.8	31.9	0.0	48.6	39.0	39.2
Incr Delay (d2), s/veh	4.2	1.2	0.0	10.2	2.2	0.1	8.6	0.0	0.0	4.2	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	6.3	0.0	5.5	10.5	0.3	4.7	0.7	0.0	0.8	1.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.2	23.7	0.0	54.1	21.2	12.5	53.4	32.0	0.0	52.8	39.2	39.7
LnGrp LOS	D	C		D	C	B	D	C		D	D	D
Approach Vol, veh/h		758			1484			243			191	
Approach Delay, s/veh		24.6			25.6			47.1			41.4	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.8	47.7	17.0	20.0	8.5	58.0	9.0	28.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	22.0	38.0	20.0	20.0	7.0	53.0	20.0	20.0
Max Q Clear Time (g_c+I1), s	13.5	17.8	11.8	5.2	3.4	29.7	3.6	3.6
Green Ext Time (p_c), s	0.3	4.4	0.3	0.6	0.0	9.1	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	28.4
HCM 6th LOS	C

Notes

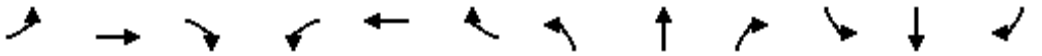
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	71	721	29	47	1270	63	56	21	168	39	179
Future Volume (vph)	71	721	29	47	1270	63	56	21	168	39	179
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	78.0	78.0	12.0	78.0	78.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	10.0%	65.0%	65.0%	10.0%	65.0%	65.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	45.8	42.2	42.2	44.2	39.4	39.4	16.4	16.4	16.4	16.4	16.4
Actuated g/C Ratio	0.60	0.56	0.56	0.58	0.52	0.52	0.22	0.22	0.22	0.22	0.22
v/c Ratio	0.28	0.39	0.03	0.11	0.73	0.08	0.20	0.22	0.64	0.10	0.42
Control Delay	8.3	11.3	0.7	6.0	17.8	3.1	30.7	12.9	42.5	28.9	12.6
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	8.3	11.3	0.7	6.0	17.8	3.1	30.7	12.9	42.5	28.9	12.6
LOS	A	B	A	A	B	A	C	B	D	C	B
Approach Delay		10.7			16.7			20.0		27.3	
Approach LOS		B			B			C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 75.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 16.5	Intersection LOS: B
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	721	29	47	1270	63	56	21	65	168	39	179
Future Volume (veh/h)	71	721	29	47	1270	63	56	21	65	168	39	179
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	767	0	50	1351	67	60	22	69	179	41	190
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	1853		455	1815	809	336	88	275	331	412	349
Arrive On Green	0.06	0.52	0.00	0.04	0.51	0.51	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1149	398	1248	1306	1870	1585
Grp Volume(v), veh/h	76	767	0	50	1351	67	60	0	91	179	41	190
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1149	0	1646	1306	1870	1585
Q Serve(g_s), s	1.4	9.2	0.0	0.9	21.0	1.5	3.1	0.0	3.2	9.2	1.2	7.4
Cycle Q Clear(g_c), s	1.4	9.2	0.0	0.9	21.0	1.5	4.3	0.0	3.2	12.4	1.2	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.76	1.00		1.00
Lane Grp Cap(c), veh/h	280	1853		455	1815	809	336	0	363	331	412	349
V/C Ratio(X)	0.27	0.41		0.11	0.74	0.08	0.18	0.00	0.25	0.54	0.10	0.54
Avail Cap(c_a), veh/h	360	3699		554	3699	1650	492	0	587	508	667	565
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.9	10.2	0.0	7.7	13.5	8.8	23.5	0.0	22.6	27.7	21.8	24.2
Incr Delay (d2), s/veh	0.5	0.1	0.0	0.1	0.6	0.0	0.3	0.0	0.4	1.4	0.1	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.7	0.0	0.3	6.4	0.4	0.8	0.0	1.2	2.8	0.5	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.4	10.4	0.0	7.8	14.2	8.8	23.8	0.0	22.9	29.1	21.9	25.5
LnGrp LOS	B	B		A	B	A	C	A	C	C	C	C
Approach Vol, veh/h		843			1468			151			410	
Approach Delay, s/veh		10.5			13.7			23.3			26.7	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	41.6		20.5	8.9	40.8		20.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	73.0		25.0	7.0	73.0		25.0				
Max Q Clear Time (g_c+I1), s	2.9	11.2		14.4	3.4	23.0		6.3				
Green Ext Time (p_c), s	0.0	5.4		1.1	0.0	12.8		0.6				

Intersection Summary			
HCM 6th Ctrl Delay		15.1	
HCM 6th LOS		B	

Notes

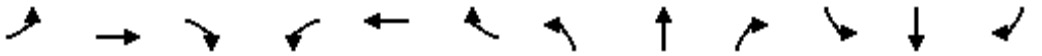
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	35	884	44	30	1121	13	36	8	16	16	91
Future Volume (vph)	35	884	44	30	1121	13	36	8	16	16	91
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	27.3	25.3	25.3	27.0	25.1	25.1	7.5	7.5	7.5	7.5	7.5
Actuated g/C Ratio	0.58	0.54	0.54	0.57	0.53	0.53	0.16	0.16	0.16	0.16	0.16
v/c Ratio	0.10	0.49	0.05	0.07	0.63	0.02	0.17	0.28	0.08	0.06	0.29
Control Delay	3.7	8.5	1.8	3.5	10.2	0.0	24.9	10.9	24.3	23.6	9.4
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	3.7	8.5	1.8	3.5	10.2	0.0	24.9	10.9	24.3	23.6	9.4
LOS	A	A	A	A	B	A	C	B	C	C	A
Approach Delay		8.0			9.9			15.0		13.2	
Approach LOS		A			A			B		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 47.1	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	884	44	30	1121	13	36	8	77	16	16	91
Future Volume (veh/h)	35	884	44	30	1121	13	36	8	77	16	16	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	37	940	47	32	1193	14	38	9	82	17	17	97
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	356	1847	824	420	1831	817	295	18	168	240	217	184
Arrive On Green	0.04	0.52	0.52	0.04	0.52	0.52	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1279	159	1450	1306	1870	1585
Grp Volume(v), veh/h	37	940	47	32	1193	14	38	0	91	17	17	97
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1279	0	1609	1306	1870	1585
Q Serve(g_s), s	0.4	7.9	0.7	0.4	11.2	0.2	1.3	0.0	2.4	0.6	0.4	2.6
Cycle Q Clear(g_c), s	0.4	7.9	0.7	0.4	11.2	0.2	1.6	0.0	2.4	3.0	0.4	2.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.90	1.00		1.00
Lane Grp Cap(c), veh/h	356	1847	824	420	1831	817	295	0	187	240	217	184
V/C Ratio(X)	0.10	0.51	0.06	0.08	0.65	0.02	0.13	0.00	0.49	0.07	0.08	0.53
Avail Cap(c_a), veh/h	555	6060	2703	628	6060	2703	706	0	704	659	818	693
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	7.2	5.4	5.4	8.1	5.4	18.8	0.0	18.9	20.3	18.0	19.0
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.1	0.4	0.0	0.2	0.0	2.0	0.1	0.2	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.5	0.1	0.1	2.2	0.0	0.3	0.0	0.9	0.2	0.1	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	7.4	5.5	5.4	8.5	5.4	19.0	0.0	20.9	20.5	18.2	21.4
LnGrp LOS	A	A	A	A	A	A	B	A	C	C	B	C
Approach Vol, veh/h		1024			1239			129			131	
Approach Delay, s/veh		7.3			8.4			20.3			20.9	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	28.8		10.3	6.9	28.6		10.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	9.9		5.0	2.4	13.2		4.4				
Green Ext Time (p_c), s	0.0	7.3		0.3	0.0	10.4		0.5				

Intersection Summary			
HCM 6th Ctrl Delay		9.2	
HCM 6th LOS		A	

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	932	39	335	1090	0	14	1	267	0	0	1
Future Vol, veh/h	0	932	39	335	1090	0	14	1	267	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	475	-	475	475	-	-	-	-	85	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	991	41	356	1160	0	15	1	284	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1160	0	0	1032	0	0	2283	2863	-	2368	2904	580
Stage 1	-	-	-	-	-	-	991	991	-	1872	1872	-
Stage 2	-	-	-	-	-	-	1292	1872	-	496	1032	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	-	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	598	-	-	669	-	-	21	16	0	18	15	458
Stage 1	-	-	-	-	-	-	264	322	0	74	120	-
Stage 2	-	-	-	-	-	-	172	120	0	524	308	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	598	-	-	669	-	-	~ 12	7	-	10	7	458
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	52	-	10	7	-
Stage 1	-	-	-	-	-	-	264	322	-	74	56	-
Stage 2	-	-	-	-	-	-	80	56	-	522	308	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.8	71	12.9
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	70	-	598	-	-	669	-	-	458
HCM Lane V/C Ratio	0.228	-	-	-	-	0.533	-	-	0.002
HCM Control Delay (s)	71	0	0	-	-	16.3	-	-	12.9
HCM Lane LOS	F	A	A	-	-	C	-	-	B
HCM 95th %tile Q(veh)	0.8	-	0	-	-	3.2	-	-	0

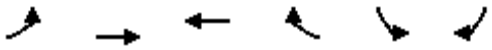
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	42	1211	1440	37	92	61
Future Volume (vph)	42	1211	1440	37	92	61
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0	15.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	90.0	78.0	78.0	30.0	30.0
Total Split (%)	10.0%	75.0%	65.0%	65.0%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effct Green (s)	85.1	85.1	76.1	76.1	11.9	11.9
Actuated g/C Ratio	0.80	0.80	0.71	0.71	0.11	0.11
v/c Ratio	0.18	0.46	0.61	0.03	0.50	0.28
Control Delay	4.1	4.3	10.0	2.1	53.6	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	4.3	10.0	2.1	53.6	13.9
LOS	A	A	A	A	D	B
Approach Delay		4.3	9.8		37.8	
Approach LOS		A	A		D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 107	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 56.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: E. 160th Ave (SH 7) & Tuscon St





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	42	1211	1440	37	92	61
Future Volume (veh/h)	42	1211	1440	37	92	61
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	45	1288	1532	39	98	65
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	301	2879	2586	1153	168	150
Arrive On Green	0.03	0.81	0.73	0.73	0.09	0.09
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	45	1288	1532	39	98	65
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	0.6	11.3	21.6	0.7	5.5	4.1
Cycle Q Clear(g_c), s	0.6	11.3	21.6	0.7	5.5	4.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	301	2879	2586	1153	168	150
V/C Ratio(X)	0.15	0.45	0.59	0.03	0.58	0.43
Avail Cap(c_a), veh/h	358	2879	2586	1153	424	378
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.7	3.0	6.8	4.0	45.5	44.9
Incr Delay (d2), s/veh	0.2	0.5	1.0	0.1	3.2	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.0	5.9	0.2	2.5	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.9	3.5	7.8	4.0	48.7	46.8
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1333	1571		163	
Approach Delay, s/veh		3.6	7.7		47.9	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		90.0		14.9	8.7	81.3
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		85.0		25.0	7.0	73.0
Max Q Clear Time (g_c+I1), s		13.3		7.5	2.6	23.6
Green Ext Time (p_c), s		11.8		0.4	0.0	15.6

Intersection Summary	
HCM 6th Ctrl Delay	8.1
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	21	8	52	77	2
Future Vol, veh/h	3	21	8	52	77	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	22	9	55	82	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	129	42	84	0	-	0
Stage 1	83	-	-	-	-	-
Stage 2	46	-	-	-	-	-
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	852	1019	1511	-	-	-
Stage 1	931	-	-	-	-	-
Stage 2	971	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	847	1019	1511	-	-	-
Mov Cap-2 Maneuver	847	-	-	-	-	-
Stage 1	925	-	-	-	-	-
Stage 2	971	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1511	-	994	-	-
HCM Lane V/C Ratio	0.006	-	0.026	-	-
HCM Control Delay (s)	7.4	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	39	15	62	99	2
Future Vol, veh/h	3	39	15	62	99	2
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	41	16	66	105	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	171	54	107	0	-	0
Stage 1	106	-	-	-	-	-
Stage 2	65	-	-	-	-	-
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	803	1002	1482	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	950	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	794	1002	1482	-	-	-
Mov Cap-2 Maneuver	794	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	950	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	1.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1482	-	984	-	-
HCM Lane V/C Ratio	0.011	-	0.045	-	-
HCM Control Delay (s)	7.5	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	0	60	96	0	62	22	39	38	24	17	9
Future Vol, veh/h	26	0	60	96	0	62	22	39	38	24	17	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	0	64	102	0	66	23	41	40	26	18	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	142	202	14	168	187	41	28	0	0	81	0	0
Stage 1	75	75	-	107	107	-	-	-	-	-	-	-
Stage 2	67	127	-	61	80	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	814	693	1062	780	706	1021	1584	-	-	1515	-	-
Stage 1	926	832	-	887	806	-	-	-	-	-	-	-
Stage 2	936	790	-	943	828	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	743	671	1062	715	683	1021	1584	-	-	1515	-	-
Mov Cap-2 Maneuver	743	671	-	715	683	-	-	-	-	-	-	-
Stage 1	912	818	-	874	794	-	-	-	-	-	-	-
Stage 2	863	778	-	871	814	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	10.1	1.6	3.6
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1584	-	-	743	1062	715	1021	1515	-	-
HCM Lane V/C Ratio	0.015	-	-	0.037	0.06	0.143	0.065	0.017	-	-
HCM Control Delay (s)	7.3	-	-	10	8.6	10.9	8.8	7.4	-	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.5	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	62	128	0	19	21	72	44	6	162	3
Future Vol, veh/h	9	0	62	128	0	19	21	72	44	6	162	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	66	136	0	20	22	77	47	6	172	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	269	354	88	243	332	62	175	0	0	124	0	0
Stage 1	186	186	-	145	145	-	-	-	-	-	-	-
Stage 2	83	168	-	98	187	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	662	570	953	691	586	990	1399	-	-	1461	-	-
Stage 1	798	745	-	843	776	-	-	-	-	-	-	-
Stage 2	916	758	-	898	744	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	639	559	953	634	574	990	1399	-	-	1461	-	-
Mov Cap-2 Maneuver	639	559	-	634	574	-	-	-	-	-	-	-
Stage 1	785	742	-	830	764	-	-	-	-	-	-	-
Stage 2	883	746	-	832	741	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	11.7	1.2	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1399	-	-	639	953	634	990	1461	-	-
HCM Lane V/C Ratio	0.016	-	-	0.015	0.069	0.215	0.02	0.004	-	-
HCM Control Delay (s)	7.6	-	-	10.7	9.1	12.2	8.7	7.5	-	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0.8	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	3	130	358	0
Future Vol, veh/h	1	5	3	130	358	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	5	3	138	381	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	525	381	381	0	-	0
Stage 1	381	-	-	-	-	-
Stage 2	144	-	-	-	-	-
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	513	666	1177	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	511	666	1177	-	-	-
Mov Cap-2 Maneuver	511	-	-	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	883	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1177	-	634	-	-
HCM Lane V/C Ratio	0.003	-	0.01	-	-
HCM Control Delay (s)	8.1	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	11	139	358	0
Future Vol, veh/h	0	27	11	139	358	0
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	29	12	148	381	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	553	381	381	0	-	0
Stage 1	381	-	-	-	-	-
Stage 2	172	-	-	-	-	-
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	494	666	1177	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	858	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	489	666	1177	-	-	-
Mov Cap-2 Maneuver	489	-	-	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	858	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1177	-	666	-	-
HCM Lane V/C Ratio	0.01	-	0.043	-	-
HCM Control Delay (s)	8.1	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	2	16	0	64	3	51	6	20	27	1
Future Vol, veh/h	3	0	2	16	0	64	3	51	6	20	27	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	2	17	0	68	3	54	6	21	29	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	169	138	30	136	135	57	30	0	0	60	0	0
Stage 1	72	72	-	63	63	-	-	-	-	-	-	-
Stage 2	97	66	-	73	72	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	795	753	1044	835	756	1009	1583	-	-	1544	-	-
Stage 1	938	835	-	948	842	-	-	-	-	-	-	-
Stage 2	910	840	-	937	835	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	732	741	1044	823	744	1009	1583	-	-	1544	-	-
Mov Cap-2 Maneuver	732	741	-	823	744	-	-	-	-	-	-	-
Stage 1	936	823	-	946	840	-	-	-	-	-	-	-
Stage 2	847	838	-	922	823	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9.1	0.4	3.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1583	-	-	831	965	1544	-	-
HCM Lane V/C Ratio	0.002	-	-	0.006	0.088	0.014	-	-
HCM Control Delay (s)	7.3	0	-	9.4	9.1	7.4	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.3	0	-	-

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	4	44	0	37	3	23	20	14	31	0
Future Vol, veh/h	0	0	4	44	0	37	3	23	20	14	31	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	85	85	85	73	73	85	85	73	73
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	5	52	0	44	4	32	24	16	42	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	148	138	42	129	126	44	42	0	0	56	0	0
Stage 1	74	74	-	52	52	-	-	-	-	-	-	-
Stage 2	74	64	-	77	74	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	820	753	1029	844	764	1026	1567	-	-	1549	-	-
Stage 1	935	833	-	961	852	-	-	-	-	-	-	-
Stage 2	935	842	-	932	833	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	777	742	1029	830	753	1026	1567	-	-	1549	-	-
Mov Cap-2 Maneuver	777	742	-	830	753	-	-	-	-	-	-	-
Stage 1	932	824	-	958	849	-	-	-	-	-	-	-
Stage 2	893	839	-	917	824	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.5	9.4	0.5	2.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1567	-	-	1029	909	1549	-	-
HCM Lane V/C Ratio	0.003	-	-	0.005	0.105	0.011	-	-
HCM Control Delay (s)	7.3	0	-	8.5	9.4	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.3	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	590	344	17	14	5
Future Vol, veh/h	11	590	344	17	14	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	628	366	18	15	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	384	0	-	0	713	192
Stage 1	-	-	-	-	375	-
Stage 2	-	-	-	-	338	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1171	-	-	-	366	817
Stage 1	-	-	-	-	665	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1171	-	-	-	362	817
Mov Cap-2 Maneuver	-	-	-	-	362	-
Stage 1	-	-	-	-	658	-
Stage 2	-	-	-	-	694	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1171	-	-	-	424
HCM Lane V/C Ratio	0.01	-	-	-	0.048
HCM Control Delay (s)	8.1	-	-	-	13.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	565	38	67	353	8	91
Future Vol, veh/h	565	38	67	353	8	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	601	40	71	376	9	97

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	641	0	931	301
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	330	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	939	-	266	695
Stage 1	-	-	-	-	510	-
Stage 2	-	-	-	-	701	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	939	-	246	695
Mov Cap-2 Maneuver	-	-	-	-	246	-
Stage 1	-	-	-	-	510	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	246	695	-	-	939	-
HCM Lane V/C Ratio	0.035	0.139	-	-	0.076	-
HCM Control Delay (s)	20.2	11	-	-	9.1	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.5	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	575	68	3	353	45	3
Future Vol, veh/h	575	68	3	353	45	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	612	72	3	376	48	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	684	0	806	306
Stage 1	-	-	-	-	612	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	905	-	320	690
Stage 1	-	-	-	-	504	-
Stage 2	-	-	-	-	820	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	905	-	319	690
Mov Cap-2 Maneuver	-	-	-	-	319	-
Stage 1	-	-	-	-	504	-
Stage 2	-	-	-	-	818	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	319	690	-	-	905	-
HCM Lane V/C Ratio	0.15	0.005	-	-	0.004	-
HCM Control Delay (s)	18.3	10.2	-	-	9	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-

Intersection	
Intersection Delay, s/veh	4.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	614	341	97	107
Demand Flow Rate, veh/h	626	348	99	109
Vehicles Circulating, veh/h	95	130	569	372
Vehicles Exiting, veh/h	386	538	152	106
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.0	4.2	5.0	4.5
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	L	LTR	LTR	
Assumed Moves	LT	TR	LT	TR	L	LTR	LTR	
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.525	0.475	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	294	332	164	184	52	47	109	
Cap Entry Lane, veh/h	1237	1310	1198	1272	800	875	1035	
Entry HV Adj Factor	0.981	0.980	0.977	0.982	0.988	0.969	0.981	
Flow Entry, veh/h	289	325	160	181	51	46	107	
Cap Entry, veh/h	1214	1284	1170	1248	790	849	1015	
V/C Ratio	0.238	0.253	0.137	0.145	0.065	0.054	0.105	
Control Delay, s/veh	5.1	5.0	4.2	4.1	5.2	4.8	4.5	
LOS	A	A	A	A	A	A	A	
95th %tile Queue, veh	1	1	0	1	0	0	0	

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	465	30	94	303	18	58
Future Vol, veh/h	465	30	94	303	18	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	250	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	495	32	100	322	19	62

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	527	0	856	248
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	361	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1036	-	297	752
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	676	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1036	-	268	752
Mov Cap-2 Maneuver	-	-	-	-	268	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	610	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	13.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	527	-	-	1036	-
HCM Lane V/C Ratio	0.153	-	-	0.097	-
HCM Control Delay (s)	13.1	-	-	8.8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.3	-

Intersection	
Intersection Delay, s/veh	4.6
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	1
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	566	505	88
Demand Flow Rate, veh/h	577	515	90
Vehicles Circulating, veh/h	89	33	522
Vehicles Exiting, veh/h	459	579	144
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.8	4.3	5.0
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left
Designated Moves	LT	TR	LT	TR	LR
Assumed Moves	LT	TR	LT	TR	LR
RT Channelized					
Lane Util	0.470	0.530	0.470	0.530	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328
Entry Flow, veh/h	271	306	242	273	90
Cap Entry Lane, veh/h	1244	1317	1309	1381	911
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.978
Flow Entry, veh/h	266	300	237	267	88
Cap Entry, veh/h	1220	1290	1283	1353	891
V/C Ratio	0.218	0.232	0.185	0.198	0.099
Control Delay, s/veh	4.9	4.8	4.4	4.3	5.0
LOS	A	A	A	A	A
95th %tile Queue, veh	1	1	1	1	0

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	522	457	12	5	2
Future Vol, veh/h	3	522	457	12	5	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	555	486	13	5	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	499	0	-	0	777	250
Stage 1	-	-	-	-	493	-
Stage 2	-	-	-	-	284	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1061	-	-	-	334	750
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	739	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1061	-	-	-	333	750
Mov Cap-2 Maneuver	-	-	-	-	333	-
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	739	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1061	-	-	-	396
HCM Lane V/C Ratio	0.003	-	-	-	0.019
HCM Control Delay (s)	8.4	-	-	-	14.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	464	63	24	378	91	53
Future Vol, veh/h	464	63	24	378	91	53
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	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	494	67	26	402	97	56

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	561	0	747	247
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	253	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1006	-	349	753
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	766	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1006	-	340	753
Mov Cap-2 Maneuver	-	-	-	-	340	-
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	746	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	18.1
HCM LOS			C

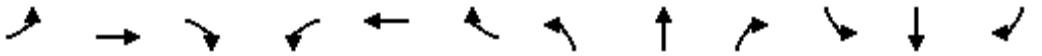
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	426	-	-	1006	-
HCM Lane V/C Ratio	0.36	-	-	0.025	-
HCM Control Delay (s)	18.1	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.6	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	1397	171	138	993	17	197	162	168	29	94	39
Future Volume (vph)	58	1397	171	138	993	17	197	162	168	29	94	39
Turn Type	Prot	NA	Free	Prot	NA	Perm	Prot	NA	Free	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			Free			4
Detector Phase	5	2		1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	7.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	20.0		10.0	20.0	20.0	10.0	20.0		10.0	20.0	20.0
Total Split (s)	18.0	51.0		24.0	57.0	57.0	20.0	25.0		20.0	25.0	25.0
Total Split (%)	15.0%	42.5%		20.0%	47.5%	47.5%	16.7%	20.8%		16.7%	20.8%	20.8%
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Min		None	Min	Min
Act Effct Green (s)	9.2	46.1	103.2	13.7	53.2	53.2	15.0	20.6	103.2	7.3	8.3	8.3
Actuated g/C Ratio	0.09	0.45	1.00	0.13	0.52	0.52	0.15	0.20	1.00	0.07	0.08	0.08
v/c Ratio	0.39	0.94	0.11	0.63	0.58	0.02	0.82	0.24	0.11	0.25	0.35	0.15
Control Delay	52.7	40.9	0.1	54.7	20.1	0.1	68.9	38.8	0.1	51.4	49.2	1.2
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	52.7	40.9	0.1	54.7	20.1	0.1	68.9	38.8	0.1	51.4	49.2	1.2
LOS	D	D	A	D	C	A	E	D	A	D	D	A
Approach Delay		37.0			24.0			37.7			38.2	
Approach LOS		D			C			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 103.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 32.9	Intersection LOS: C
Intersection Capacity Utilization 78.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 10: Quebec St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	1397	171	138	993	17	197	162	168	29	94	39
Future Volume (veh/h)	58	1397	171	138	993	17	197	162	168	29	94	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	62	1486	0	147	1056	18	210	172	0	31	100	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	1690		184	1837	819	247	587		54	201	90
Arrive On Green	0.06	0.48	0.00	0.10	0.52	0.52	0.14	0.17	0.00	0.03	0.06	0.06
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	62	1486	0	147	1056	18	210	172	0	31	100	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.0	33.3	0.0	7.1	18.1	0.5	10.2	3.8	0.0	1.5	2.4	2.2
Cycle Q Clear(g_c), s	3.0	33.3	0.0	7.1	18.1	0.5	10.2	3.8	0.0	1.5	2.4	2.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	1690		184	1837	819	247	587		54	201	90
V/C Ratio(X)	0.56	0.88		0.80	0.57	0.02	0.85	0.29		0.58	0.50	0.46
Avail Cap(c_a), veh/h	262	1848		383	2089	932	302	803		302	803	358
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.3	20.9	0.0	38.8	14.7	10.4	37.2	32.4	0.0	42.3	40.5	40.4
Incr Delay (d2), s/veh	4.4	4.9	0.0	7.8	0.3	0.0	17.2	0.3	0.0	9.4	1.9	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	12.8	0.0	3.3	6.1	0.2	5.4	1.6	0.0	0.8	1.1	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.8	25.8	0.0	46.6	15.0	10.5	54.4	32.7	0.0	51.8	42.4	44.0
LnGrp LOS	D	C		D	B	B	D	C		D	D	D
Approach Vol, veh/h		1548			1221			382			172	
Approach Delay, s/veh		26.6			18.7			44.6			44.5	
Approach LOS		C			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	47.1	17.3	10.0	10.5	50.7	7.7	19.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	19.0	46.0	15.0	20.0	13.0	52.0	15.0	20.0
Max Q Clear Time (g_c+I1), s	9.1	35.3	12.2	4.4	5.0	20.1	3.5	5.8
Green Ext Time (p_c), s	0.2	6.7	0.2	0.5	0.1	7.9	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C

Notes

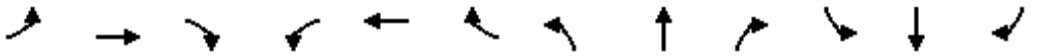
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	199	1330	70	59	1013	175	55	46	114	31	123
Future Volume (vph)	199	1330	70	59	1013	175	55	46	114	31	123
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	47.4	42.1	42.1	44.7	38.0	38.0	13.3	13.3	13.3	13.3	13.3
Actuated g/C Ratio	0.63	0.56	0.56	0.60	0.51	0.51	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.60	0.71	0.08	0.24	0.60	0.21	0.24	0.33	0.54	0.10	0.34
Control Delay	13.8	15.3	2.6	6.7	14.0	2.1	33.0	22.4	41.1	30.5	9.1
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	13.8	15.3	2.6	6.7	14.0	2.1	33.0	22.4	41.1	30.5	9.1
LOS	B	B	A	A	B	A	C	C	D	C	A
Approach Delay		14.6			12.0			26.0		25.2	
Approach LOS		B			B			C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 74.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 15.0	Intersection LOS: B
Intersection Capacity Utilization 66.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Yosemite St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	1330	70	59	1013	175	55	46	61	114	31	123
Future Volume (veh/h)	199	1330	70	59	1013	175	55	46	61	114	31	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	212	1415	0	63	1078	186	59	49	65	121	33	131
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	384	1911		287	1793	800	319	137	182	272	351	298
Arrive On Green	0.08	0.54	0.00	0.05	0.50	0.50	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1222	729	967	1279	1870	1585
Grp Volume(v), veh/h	212	1415	0	63	1078	186	59	0	114	121	33	131
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1222	0	1696	1279	1870	1585
Q Serve(g_s), s	3.7	20.6	0.0	1.1	14.5	4.4	2.8	0.0	3.9	6.1	1.0	4.9
Cycle Q Clear(g_c), s	3.7	20.6	0.0	1.1	14.5	4.4	3.8	0.0	3.9	10.1	1.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.57	1.00		1.00
Lane Grp Cap(c), veh/h	384	1911		287	1793	800	319	0	319	272	351	298
V/C Ratio(X)	0.55	0.74		0.22	0.60	0.23	0.19	0.00	0.36	0.44	0.09	0.44
Avail Cap(c_a), veh/h	419	4118		380	4118	1837	452	0	504	412	556	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.5	11.9	0.0	9.9	11.9	9.4	24.2	0.0	23.8	28.2	22.6	24.2
Incr Delay (d2), s/veh	1.3	0.6	0.0	0.4	0.3	0.1	0.3	0.0	0.7	1.1	0.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	5.9	0.0	0.3	4.3	1.2	0.8	0.0	1.5	1.8	0.4	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.8	12.5	0.0	10.3	12.2	9.5	24.4	0.0	24.5	29.3	22.7	25.2
LnGrp LOS	B	B		B	B	A	C	A	C	C	C	C
Approach Vol, veh/h		1627			1327			173			285	
Approach Delay, s/veh		12.3			11.7			24.5			26.7	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	41.2		17.7	10.7	39.0		17.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.1	22.6		12.1	5.7	16.5		5.9				
Green Ext Time (p_c), s	0.0	13.6		0.6	0.1	9.7		0.6				

Intersection Summary			
HCM 6th Ctrl Delay		13.9	
HCM 6th LOS		B	

Notes

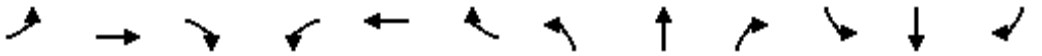
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	104	1349	67	139	1173	30	47	19	9	13	54
Future Volume (vph)	104	1349	67	139	1173	30	47	19	9	13	54
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4	
Permitted Phases	2		2	6		6	8		4		4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
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	20.0	20.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	83.0	83.0	12.0	83.0	83.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	10.0%	69.2%	69.2%	10.0%	69.2%	69.2%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	43.3	36.4	36.4	44.6	39.3	39.3	8.2	8.2	8.2	8.2	8.2
Actuated g/C Ratio	0.65	0.54	0.54	0.67	0.59	0.59	0.12	0.12	0.12	0.12	0.12
v/c Ratio	0.32	0.75	0.08	0.51	0.60	0.03	0.29	0.33	0.06	0.06	0.23
Control Delay	5.6	14.3	2.2	15.2	11.1	0.6	35.0	16.4	31.1	30.7	10.6
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	5.6	14.3	2.2	15.2	11.1	0.6	35.0	16.4	31.1	30.7	10.6
LOS	A	B	A	B	B	A	C	B	C	C	B
Approach Delay		13.2			11.3			23.3		16.6	
Approach LOS		B			B			C		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 67	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 12.9	Intersection LOS: B
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Havana St & E. 160th Ave (SH 7)





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	1349	67	139	1173	30	47	19	61	9	13	54
Future Volume (veh/h)	104	1349	67	139	1173	30	47	19	61	9	13	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	1435	71	148	1248	32	50	20	65	10	14	57
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	402	2035	907	360	2057	918	238	36	118	181	175	148
Arrive On Green	0.07	0.57	0.57	0.08	0.58	0.58	0.09	0.09	0.09	0.09	0.09	0.09
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1329	387	1257	1313	1870	1585
Grp Volume(v), veh/h	111	1435	71	148	1248	32	50	0	85	10	14	57
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1329	0	1644	1313	1870	1585
Q Serve(g_s), s	1.4	17.0	1.2	1.9	13.4	0.5	2.1	0.0	2.9	0.4	0.4	2.0
Cycle Q Clear(g_c), s	1.4	17.0	1.2	1.9	13.4	0.5	2.5	0.0	2.9	3.3	0.4	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.76	1.00		1.00
Lane Grp Cap(c), veh/h	402	2035	907	360	2057	918	238	0	154	181	175	148
V/C Ratio(X)	0.28	0.71	0.08	0.41	0.61	0.03	0.21	0.00	0.55	0.06	0.08	0.38
Avail Cap(c_a), veh/h	487	4733	2111	434	4733	2111	568	0	561	506	639	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.9	9.0	5.6	8.2	8.0	5.3	25.4	0.0	25.4	27.0	24.2	25.0
Incr Delay (d2), s/veh	0.4	0.5	0.0	0.8	0.3	0.0	0.4	0.0	3.1	0.1	0.2	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.9	0.2	0.4	3.0	0.1	0.6	0.0	1.2	0.1	0.2	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.3	9.4	5.6	8.9	8.3	5.3	25.8	0.0	28.4	27.1	24.4	26.6
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	C	C
Approach Vol, veh/h		1617			1428			135			81	
Approach Delay, s/veh		9.0			8.3			27.5			26.3	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	38.5		10.5	9.2	38.9		10.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.9	19.0		5.3	3.4	15.4		4.9				
Green Ext Time (p_c), s	0.1	14.6		0.2	0.1	11.3		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			9.9									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1341	24	252	1360	0	24	0	418	1	0	3
Future Vol, veh/h	0	1341	24	252	1360	0	24	0	418	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	475	-	475	475	-	-	-	-	85	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1427	26	268	1447	0	26	0	445	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1447	0	0	1453	0	0	2687	3410	-	2697	3436	724
Stage 1	-	-	-	-	-	-	1427	1427	-	1983	1983	-
Stage 2	-	-	-	-	-	-	1260	1983	-	714	1453	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	-	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	-	3.52	4.02	3.32
Pot Cap-1 Maneuver	464	-	-	462	-	-	~ 10	7	0	10	7	368
Stage 1	-	-	-	-	-	-	142	199	0	63	105	-
Stage 2	-	-	-	-	-	-	180	105	0	388	194	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	464	-	-	462	-	-	~ 5	3	-	5	3	368
Mov Cap-2 Maneuver	-	-	-	-	-	-	47	34	-	5	3	-
Stage 1	-	-	-	-	-	-	142	199	-	63	44	-
Stage 2	-	-	-	-	-	-	75	44	-	388	194	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.6	150	242.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	47	-	464	-	-	462	-	-	19
HCM Lane V/C Ratio	0.543	-	-	-	-	0.58	-	-	0.224
HCM Control Delay (s)	150	0	0	-	-	23	-	-	242.5
HCM Lane LOS	F	A	A	-	-	C	-	-	F
HCM 95th %tile Q(veh)	2	-	0	-	-	3.6	-	-	0.6

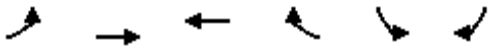
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	71	1629	1513	108	62	39
Future Volume (vph)	71	1629	1513	108	62	39
Turn Type	pm+pt	NA	NA	Perm	Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0	15.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	95.0	83.0	83.0	25.0	25.0
Total Split (%)	10.0%	79.2%	69.2%	69.2%	20.8%	20.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effct Green (s)	92.7	93.7	84.6	84.6	10.8	10.8
Actuated g/C Ratio	0.84	0.85	0.77	0.77	0.10	0.10
v/c Ratio	0.29	0.58	0.59	0.09	0.38	0.21
Control Delay	4.9	4.3	8.8	1.2	53.6	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.3	8.8	1.2	53.6	16.7
LOS	A	A	A	A	D	B
Approach Delay		4.4	8.3		39.5	
Approach LOS		A	A		D	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 110.4		
Natural Cycle: 65		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.59		
Intersection Signal Delay: 7.2	Intersection LOS: A	
Intersection Capacity Utilization 66.8%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 14: E. 160th Ave (SH 7) & Tuscon St





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	71	1629	1513	108	62	39
Future Volume (veh/h)	71	1629	1513	108	62	39
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	1733	1610	115	66	41
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	284	2918	2610	1164	156	139
Arrive On Green	0.04	0.82	0.73	0.73	0.09	0.09
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585
Grp Volume(v), veh/h	76	1733	1610	115	66	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585
Q Serve(g_s), s	1.0	18.7	24.1	2.3	3.8	2.7
Cycle Q Clear(g_c), s	1.0	18.7	24.1	2.3	3.8	2.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	284	2918	2610	1164	156	139
V/C Ratio(X)	0.27	0.59	0.62	0.10	0.42	0.29
Avail Cap(c_a), veh/h	324	2918	2610	1164	325	289
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.7	3.4	7.1	4.2	47.4	46.8
Incr Delay (d2), s/veh	0.5	0.9	1.1	0.2	1.8	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.2	6.8	0.6	1.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.2	4.3	8.2	4.3	49.2	48.0
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1809	1725		107	
Approach Delay, s/veh		4.4	7.9		48.7	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		95.0		14.6	9.5	85.5
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		90.0		20.0	7.0	78.0
Max Q Clear Time (g_c+I1), s		20.7		5.8	3.0	26.1
Green Ext Time (p_c), s		21.0		0.2	0.0	17.9

Intersection Summary	
HCM 6th Ctrl Delay	7.4
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	8	20	124	105	1
Future Vol, veh/h	0	8	20	124	105	1
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	9	21	132	112	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	221	57	113	0	-	0
Stage 1	113	-	-	-	-	-
Stage 2	108	-	-	-	-	-
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	747	997	1474	-	-	-
Stage 1	899	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	737	997	1474	-	-	-
Mov Cap-2 Maneuver	737	-	-	-	-	-
Stage 1	886	-	-	-	-	-
Stage 2	904	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1474	-	997	-	-
HCM Lane V/C Ratio	0.014	-	0.009	-	-
HCM Control Delay (s)	7.5	-	8.6	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	18	26	144	109	5
Future Vol, veh/h	1	18	26	144	109	5
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	19	28	153	116	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	252	61	121	0	-	0
Stage 1	119	-	-	-	-	-
Stage 2	133	-	-	-	-	-
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	715	991	1464	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	701	991	1464	-	-	-
Mov Cap-2 Maneuver	701	-	-	-	-	-
Stage 1	876	-	-	-	-	-
Stage 2	879	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1464	-	970	-	-
HCM Lane V/C Ratio	0.019	-	0.021	-	-
HCM Control Delay (s)	7.5	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	0	41	68	0	44	64	31	99	65	49	28
Future Vol, veh/h	17	0	41	68	0	44	64	31	99	65	49	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	0	44	72	0	47	68	33	105	69	52	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	358	479	41	386	442	69	82	0	0	138	0	0
Stage 1	205	205	-	222	222	-	-	-	-	-	-	-
Stage 2	153	274	-	164	220	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	573	484	1021	547	508	980	1513	-	-	1443	-	-
Stage 1	778	731	-	760	718	-	-	-	-	-	-	-
Stage 2	834	682	-	822	720	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	508	440	1021	487	462	980	1513	-	-	1443	-	-
Mov Cap-2 Maneuver	508	440	-	487	462	-	-	-	-	-	-	-
Stage 1	743	696	-	726	686	-	-	-	-	-	-	-
Stage 2	758	651	-	749	685	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	11.8	2.5	3.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1513	-	-	508	1021	487	980	1443	-	-
HCM Lane V/C Ratio	0.045	-	-	0.036	0.043	0.149	0.048	0.048	-	-
HCM Control Delay (s)	7.5	-	-	12.3	8.7	13.7	8.9	7.6	-	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0.5	0.1	0.2	-	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	41	86	0	13	69	175	140	21	127	10
Future Vol, veh/h	6	0	41	86	0	13	69	175	140	21	127	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	44	91	0	14	73	186	149	22	135	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	424	666	73	519	597	168	146	0	0	335	0	0
Stage 1	185	185	-	407	407	-	-	-	-	-	-	-
Stage 2	239	481	-	112	190	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	514	379	974	440	415	847	1434	-	-	1221	-	-
Stage 1	799	746	-	592	596	-	-	-	-	-	-	-
Stage 2	743	552	-	881	742	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	480	353	974	399	387	847	1434	-	-	1221	-	-
Mov Cap-2 Maneuver	480	353	-	399	387	-	-	-	-	-	-	-
Stage 1	758	733	-	562	566	-	-	-	-	-	-	-
Stage 2	694	524	-	826	729	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	15.7	1.4	1.1
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1434	-	-	480	974	399	847	1221	-	-
HCM Lane V/C Ratio	0.051	-	-	0.013	0.045	0.229	0.016	0.018	-	-
HCM Control Delay (s)	7.6	-	-	12.6	8.9	16.7	9.3	8	-	-
HCM Lane LOS	A	-	-	B	A	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0	0.1	0.9	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	3	5	388	258	3
Future Vol, veh/h	0	3	5	388	258	3
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	3	5	413	274	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	699	276	277	0	-	0
Stage 1	276	-	-	-	-	-
Stage 2	423	-	-	-	-	-
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	406	763	1286	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	661	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	404	763	1286	-	-	-
Mov Cap-2 Maneuver	404	-	-	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	661	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1286	-	763	-	-
HCM Lane V/C Ratio	0.004	-	0.004	-	-
HCM Control Delay (s)	7.8	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	14	24	387	259	1
Future Vol, veh/h	1	14	24	387	259	1
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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	15	26	412	276	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	741	277	277	0	-	0
Stage 1	277	-	-	-	-	-
Stage 2	464	-	-	-	-	-
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	384	762	1286	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	374	762	1286	-	-	-
Mov Cap-2 Maneuver	374	-	-	-	-	-
Stage 1	750	-	-	-	-	-
Stage 2	633	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1286	-	713	-	-
HCM Lane V/C Ratio	0.02	-	0.022	-	-
HCM Control Delay (s)	7.9	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	0	2	11	0	43	2	40	21	68	61	4
Future Vol, veh/h	1	0	2	11	0	43	2	40	21	68	61	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	2	12	0	46	2	43	22	72	65	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	292	280	67	270	271	54	69	0	0	65	0	0
Stage 1	211	211	-	58	58	-	-	-	-	-	-	-
Stage 2	81	69	-	212	213	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	660	628	997	683	636	1013	1532	-	-	1537	-	-
Stage 1	791	728	-	954	847	-	-	-	-	-	-	-
Stage 2	927	837	-	790	726	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	606	597	997	656	604	1013	1532	-	-	1537	-	-
Mov Cap-2 Maneuver	606	597	-	656	604	-	-	-	-	-	-	-
Stage 1	790	692	-	953	846	-	-	-	-	-	-	-
Stage 2	884	836	-	750	690	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9.2	0.2	3.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1532	-	-	821	912	1537	-	-
HCM Lane V/C Ratio	0.001	-	-	0.004	0.063	0.047	-	-
HCM Control Delay (s)	7.4	0	-	9.4	9.2	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0.1	-	-

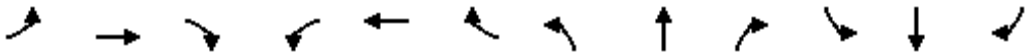
Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	2	0	4	31	0	27	7	34	55	31	39	4
Future Vol, veh/h	2	0	4	31	0	27	7	34	55	31	39	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	85	63	85	85	85	63	63	85	85	63	63
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	6	36	0	32	11	54	65	36	62	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	262	278	65	249	249	87	68	0	0	119	0	0
Stage 1	137	137	-	109	109	-	-	-	-	-	-	-
Stage 2	125	141	-	140	140	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	691	630	999	705	654	971	1533	-	-	1469	-	-
Stage 1	866	783	-	896	805	-	-	-	-	-	-	-
Stage 2	879	780	-	863	781	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	652	609	999	683	632	971	1533	-	-	1469	-	-
Mov Cap-2 Maneuver	652	609	-	683	632	-	-	-	-	-	-	-
Stage 1	859	763	-	889	799	-	-	-	-	-	-	-
Stage 2	843	774	-	836	761	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	10	0.6	2.6
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1533	-	-	848	792	1469	-	-
HCM Lane V/C Ratio	0.007	-	-	0.011	0.086	0.025	-	-
HCM Control Delay (s)	7.4	0	-	9.3	10	7.5	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.3	0.1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	734	131	202	1260	22	172	71	41	29	107	55
v/c Ratio	0.21	0.56	0.19	0.72	0.70	0.03	0.68	0.08	0.08	0.22	0.21	0.15
Control Delay	54.8	30.0	3.4	58.4	24.1	0.0	58.4	34.0	0.3	53.5	44.0	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	30.0	3.4	58.4	24.1	0.0	58.4	34.0	0.3	53.5	44.0	0.9
Queue Length 50th (ft)	17	212	0	138	371	0	118	21	0	20	36	0
Queue Length 95th (ft)	46	306	29	218	490	0	192	42	0	51	65	0
Internal Link Dist (ft)		888			1060			849			1281	
Turn Bay Length (ft)	550		415	525		415	250		570	230		200
Base Capacity (vph)	116	1305	681	367	1807	861	334	921	527	334	668	424
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.56	0.19	0.55	0.70	0.03	0.51	0.08	0.08	0.09	0.16	0.13

Intersection Summary



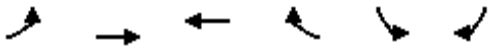
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	76	767	31	50	1351	67	60	91	179	41	190
v/c Ratio	0.28	0.39	0.03	0.11	0.73	0.08	0.20	0.22	0.64	0.10	0.42
Control Delay	8.3	11.3	0.7	6.0	17.8	3.1	30.7	12.9	42.5	28.9	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	11.3	0.7	6.0	17.8	3.1	30.7	12.9	42.5	28.9	12.6
Queue Length 50th (ft)	11	113	0	7	256	0	24	9	80	16	18
Queue Length 95th (ft)	32	190	4	23	406	19	68	51	179	49	83
Internal Link Dist (ft)		1070			840			637		1040	
Turn Bay Length (ft)	435		615	800		700	200		140		150
Base Capacity (vph)	280	3150	1416	481	3150	1416	501	652	479	687	676
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.24	0.02	0.10	0.43	0.05	0.12	0.14	0.37	0.06	0.28

Intersection Summary



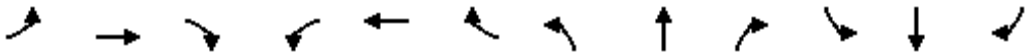
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	37	940	47	32	1193	14	38	91	17	17	97
v/c Ratio	0.10	0.49	0.05	0.07	0.63	0.02	0.17	0.28	0.08	0.06	0.29
Control Delay	3.7	8.5	1.8	3.5	10.2	0.0	24.9	10.9	24.3	23.6	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	8.5	1.8	3.5	10.2	0.0	24.9	10.9	24.3	23.6	9.4
Queue Length 50th (ft)	3	51	0	3	72	0	8	2	4	4	0
Queue Length 95th (ft)	10	161	9	9	228	0	40	41	23	23	38
Internal Link Dist (ft)		861			1065			1073		396	
Turn Bay Length (ft)	515		425	550		425	200		275		
Base Capacity (vph)	412	3539	1583	487	3539	1583	649	796	606	869	791
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.27	0.03	0.07	0.34	0.01	0.06	0.11	0.03	0.02	0.12

Intersection Summary



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	45	1288	1532	39	98	65
v/c Ratio	0.18	0.46	0.61	0.03	0.50	0.28
Control Delay	4.1	4.3	10.0	2.1	53.6	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	4.3	10.0	2.1	53.6	13.9
Queue Length 50th (ft)	5	112	258	0	64	0
Queue Length 95th (ft)	14	180	382	11	118	40
Internal Link Dist (ft)		1375	1198		2530	
Turn Bay Length (ft)	450			325		
Base Capacity (vph)	270	2813	2517	1137	413	419
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.46	0.61	0.03	0.24	0.16

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	62	1486	182	147	1056	18	210	172	179	31	100	41
v/c Ratio	0.39	0.94	0.11	0.63	0.58	0.02	0.82	0.24	0.11	0.25	0.35	0.15
Control Delay	52.7	40.9	0.1	54.7	20.1	0.1	68.9	38.8	0.1	51.4	49.2	1.2
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	52.7	40.9	0.1	54.7	20.1	0.1	68.9	38.8	0.1	51.4	49.2	1.2
Queue Length 50th (ft)	39	478	0	93	254	0	136	53	0	20	33	0
Queue Length 95th (ft)	84	#722	0	161	356	0	#283	93	0	52	63	0
Internal Link Dist (ft)		888			1060			849			1281	
Turn Bay Length (ft)	550		415	525		415	250		570	230		200
Base Capacity (vph)	223	1581	1583	326	1847	878	257	785	1583	257	687	432
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.94	0.11	0.45	0.57	0.02	0.82	0.22	0.11	0.12	0.15	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	212	1415	74	63	1078	186	59	114	121	33	131
v/c Ratio	0.60	0.71	0.08	0.24	0.60	0.21	0.24	0.33	0.54	0.10	0.34
Control Delay	13.8	15.3	2.6	6.7	14.0	2.1	33.0	22.4	41.1	30.5	9.1
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	13.8	15.3	2.6	6.7	14.0	2.1	33.0	22.4	41.1	30.5	9.1
Queue Length 50th (ft)	29	248	0	8	166	0	24	27	52	13	0
Queue Length 95th (ft)	#76	387	18	23	258	28	68	85	126	43	48
Internal Link Dist (ft)		1070			840			637		1040	
Turn Bay Length (ft)	435		615	800		700	200		140		150
Base Capacity (vph)	352	3314	1487	283	3314	1494	390	519	362	530	544
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.43	0.05	0.22	0.33	0.12	0.15	0.22	0.33	0.06	0.24

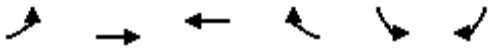
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	111	1435	71	148	1248	32	50	85	10	14	57
v/c Ratio	0.32	0.75	0.08	0.51	0.60	0.03	0.29	0.33	0.06	0.06	0.23
Control Delay	5.6	14.3	2.2	15.2	11.1	0.6	35.0	16.4	31.1	30.7	10.6
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	5.6	14.3	2.2	15.2	11.1	0.6	35.0	16.4	31.1	30.7	10.6
Queue Length 50th (ft)	10	211	0	14	169	0	19	7	4	5	0
Queue Length 95th (ft)	25	316	15	67	253	4	59	51	20	24	29
Internal Link Dist (ft)		861			1065			1073		396	
Turn Bay Length (ft)	515		425	550		425	200		275		
Base Capacity (vph)	359	3470	1554	297	3470	1553	430	554	403	575	532
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.41	0.05	0.50	0.36	0.02	0.12	0.15	0.02	0.02	0.11

Intersection Summary



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	76	1733	1610	115	66	41
v/c Ratio	0.29	0.58	0.59	0.09	0.38	0.21
Control Delay	4.9	4.3	8.8	1.2	53.6	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.3	8.8	1.2	53.6	16.7
Queue Length 50th (ft)	8	173	273	0	45	0
Queue Length 95th (ft)	18	258	383	17	89	33
Internal Link Dist (ft)		1375	1198		2530	
Turn Bay Length (ft)	450			325		
Base Capacity (vph)	271	3003	2710	1239	320	320
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.58	0.59	0.09	0.21	0.13

Intersection Summary

SELTZER HEIGHTS FILING NO. 1

PRELIMINARY ROADWAY & UTILITY CONSTRUCTION PLANS

LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO
227.85 ACRES - 208 LOTS / 8 TRACTS

LEGAL DESCRIPTION:

A PARCEL OF LAND LOCATED IN SECTION 4, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SECTION 4;

THENCE S 89°33'09" W ALONG THE NORTH LINE OF THE NORTHEAST 1/4 OF SAID SECTION 4 A DISTANCE OF 40.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF YOSEMITE STREET BEING AN EXCEPTION RECORDED IN BOOK 1 AT PAGE 527 AND THE EXTENSION THEREOF AND THE POINT OF BEGINNING;

THENCE S 00°19'36" E ALONG SAID WESTERLY RIGHT-OF-WAY LINE A DISTANCE OF 2348.64 FEET TO A POINT ON THE NORTHERLY BOUNDARY OF THAT PARCEL OF LAND RECORED AT RECEPTION NO. 2010000052390;

THENCE ALONG SAID PARCEL OF LAND THE FOLLOWING THREE (3) COURSES:

1) S 88°45'28 W A DISTANCE OF 1509.46 FEET;
2) S 25°55'39" E A DISTANCE OF 17.18 FEET;
3) S 26°31'05" W A DISTANCE OF 16.44 FEET TO A POINT ON THE NORTHERLY BOUNDARY OF TODD CREEK MEADOWS SUBDIVISION, A SUBDIVISION RECORDED AT RECEPTION NO. C0731590;

THENCE S 88°45'09" W ALONG SAID NORTHERLY BOUNDARY A DISTANCE OF 74.40 FEET TO A POINT ON THE EASTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. C1138476;

THENCE ALONG SAID EASTERLY, AND SOUTHERLY BOUNDARY OF SAID PARCEL OF LAND AND THE EXTENSION THEREOF THE FOLLOWING SEVEN (7) COURSES:

1) S 00°30'00" E A DISTANCE OF 291.28 FEET;
2) N 73°15'18" W A DISTANCE OF 293.85 FEET;
3) N 51°17'25" W A DISTANCE OF 149.44 FEET;
4) N 78°17'25" W A DISTANCE OF 154.42 FEET;
5) S 70°02'35" W A DISTANCE OF 169.36 FEET;
6) S 59°09'35" W A DISTANCE OF 244.08 FEET;
7) S 75°34'18" W A DISTANCE OF 665.00 FEET TO A POINT ON THE EASTERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. C1138476 AND SHOWN ON A SURVEY BY BRIAN THOMAS BRINKMAN, PLS 38175 DATED 6-29-11 RECORDED AT RECEPTION NO. 2011-102;

THENCE ALONG SAID EASTERLY BOUNDARY OF SAID SURVEY RECORDED AT RECEPTION NO. 2011-102 THE FOLLOWING FOURTEEN (14) COURSES:

1) S 69°25'57" W A DISTANCE OF 314.14 FEET;
2) S 63°15'15" W A DISTANCE OF 135.49 FEET;
3) N 00°42'53" E A DISTANCE OF 559.19 FEET;
4) N 32°57'40" E A DISTANCE OF 800.14 FEET;
5) S 88°46'03" W A DISTANCE OF 830.04 FEET;
6) N 66°07'13" W A DISTANCE OF 53.12 FEET;
7) N 65°25'03" W A DISTANCE OF 290.82 FEET;
8) N 58°20'21" W A DISTANCE OF 389.89 FEET;
9) N 09°57'07" W A DISTANCE OF 301.16 FEET;
10) N 09°22'50" W A DISTANCE OF 187.79 FEET;
11) N 10°47'50" E A DISTANCE OF 103.98 FEET;
12) N 18°17'18" E A DISTANCE OF 214.81 FEET;
13) N 62°21'47" E A DISTANCE OF 439.90 FEET;
14) N 00°31'50" W A DISTANCE OF 428.97 FEET TO A POINT ON THE NORTH LINE OF THE NORTHWEST 1/4 OF SAID SECTION 4;

THENCE N 89°32'13" E ALONG SAID NORTH LINE A DISTANCE OF 241.08 FEET TO A POINT ON THE WESTERLY BOUNDARY OF AN AGREEMENT TO RESOLVE DISPUTED BOUNDARY LINE RECORDED AT RECEPTION NO. 2017000093326;

THENCE ALONG SAID AGREEMENT THE FOLLOWING SEVENTEEN (17) COURSES:

1) S 00°24'31" E A DISTANCE OF 542.45 FEET;
2) N 61°21'33" E A DISTANCE OF 75.99 FEET;
3) N 63°03'28" E A DISTANCE OF 101.27 FEET;
4) N 63°18'15" E A DISTANCE OF 97.13 FEET;
5) N 63°03'23" E A DISTANCE OF 120.44 FEET;
6) N 63°17'02" E A DISTANCE OF 100.72 FEET;
7) N 62°28'30" E A DISTANCE OF 56.87 FEET;
8) N 65°01'48" E A DISTANCE OF 131.55 FEET;
9) N 75°57'26" E A DISTANCE OF 131.79 FEET;
10) N 84°04'41" E A DISTANCE OF 99.05 FEET;
11) S 84°31'07" E A DISTANCE OF 26.00 FEET;
12) S 79°17'18" E A DISTANCE OF 63.94 FEET;
13) S 67°17'01" E A DISTANCE OF 98.25 FEET;
14) S 51°09'19" E A DISTANCE OF 47.50 FEET;
15) S 13°28'48" E A DISTANCE OF 154.06 FEET;
16) S 13°09'42" E A DISTANCE OF 112.86 FEET;
17) N 89°38'47" E A DISTANCE OF 214.92 FEET TO A POINT ON THE WESTERLY BOUNDARY OF THAT PARCEL OF LAND RECORED AT RECEPTION NO. 2013000074188;

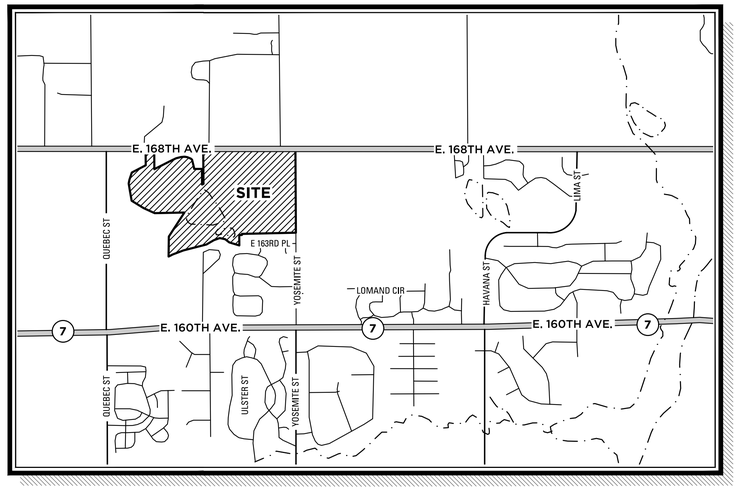
THENCE ALONG SAID WESTERLY, SOUTHERLY AND EASTERLY BOUNDARY OF SAID PARCEL OF LAND THE FOLLOWING FOUR (4) COURSES:

1) S 00°27'04" E A DISTANCE OF 436.34 FEET;
2) N 65°32'32" E A DISTANCE OF 39.58 FEET;
3) S 87°43'24" E A DISTANCE OF 3.84 FEET;
4) N 00°27'04" W A DISTANCE OF 964.30 FEET TO A POINT ON SAID NORTH LINE OF THE NORTHEAST 1/4 OF SAID SECTION 4;

THENCE N 89°31'38" E ALONG SAID NORTH LINE A DISTANCE OF 2167.54 FEET TO THE SOUTHEAST CORNER OF SECTION 33, TOWNSHIP 1 NORTH, RANGE 67 WEST BEING AN ANGLE POINT ON SAID NORTH LINE OF THE NORTHEAST 1/4 OF SECTION 4;

THENCE N 89°33'09" E CONTINUING ALONG SAID NORTH LINE OF THE NORTHEAST 1/4 OF SECTION 4 A DISTANCE OF 408.82 FEET TO THE POINT OF BEGINNING.

THE ABOVE DESCRIBED PARCEL CONTAINS AN AREA OF 9,925,012 SQUARE FEET, OR 227.8469 ACRES MORE OR LESS.



VICINITY MAP
1" = 2000'

SHEET INDEX:

SHEET #	SHEET TITLE
01	COVER SHEET
02	TYPICAL STREET SECTIONS
03	EXISTING CONDITION
04	OVERALL UTILITY
05	OVERALL LAND USE
06	OVERALL GRADING
07	DETAILED INTERSECTIONS - E. 168TH AVE & YOSEMITE
08	DETAILED INTERSECTIONS - E. 168TH AVE & SITE ENTRANCE
09	DETAILED INTERSECTIONS - YOSEMITE & SITE ENTRANCES
10	EROSION CONTROL PLAN
11	SITE DETAILS - 1
12	SITE DETAILS - 2
13	SITE DETAILS - 3
14	SITE DETAILS - 4
15	STORM DETAILS - 1

BASIS OF BEARING:

BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST 1/4 OF SECTION 4 BEING S 00°19'36" E AND MONUMENTED AS FOLLOWS:

-NORTHEAST CORNER SECTION 4, BEING A FOUND 3.25" ALUMINUM CAP IN RANGE BOX MARKED "BASELINE, LS 38285"

-EAST QUARTER CORNER SECTION 4, BEING A FOUND 3.25" ALUMINUM CAP MARKED "EMK, PLS 38584"

VERTICAL DATUM - SITE BENCHMARK:

CENTER 1/4 CORNER, SECTION 3, TOWNSHIP 1 SOUTH, RANGE 67 WEST OF THE 6TH P.M., COUNTY OF ADAMS. BEING A FOUND 2.5" ALUMINUM CAP, STAMPED PLS 25937 AND HAVING AN ELEVATION OF 5090.02 (NAVD 88). ELEVATION BASED ON NGS OPUS OBSERVATIONS - NAVD 88 COMPUTED USING GEOID 18.

LIST OF CONTACTS:

PROJECT DEVELOPER
HSG LAND, LLC
10450 E. 159TH CT.
BRIGHTON, CO 80602
PHONE: 303-637-0344

ENGINEER
KT ENGINEERING
12500 58TH AVENUE, SUITE 230
ARVADA, CO 80002
PHONE: 720-638-5190
CONTACT: KEN TOLAND, PE

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BRIGHTON FIRE RESCUE
500 S. 4TH AVE., 3RD FLOOR
BRIGHTON, CO 80601
PHONE:303-659-4101

PLANNING CONSULTANT
PCS GROUP INC.
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PHONE: 720-259-8246
CONTACT: JOHN PRESTWICH

SURVEYOR
KT ENGINEERING
12500 58TH AVENUE, SUITE 230
ARVADA, CO 80002
PHONE: 720-638-5190
CONTACT: CHRIS McELVAIN, PLS

PLANNING DEPARTMENT
ADAMS COUNTY
4430 S. ADAMS COUNTY PKWY
BRIGHTON, CO 80601
PHONE:303-659-2120
CONTACT: GREG BARNES

GAS
XCEL ENERGY
2655 N. 63RD
BOULDER, CO, 80301
PHONE:720.491.0568

ELECTRIC
UNTIED POWER
500 COOPERATIVE WAY
BRIGHTON, CO 80603
PHONE: 303-637-1300

LEGEND:

5400	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
E	EXISTING ELECTRIC UTILITY LINE
	EXISTING UTILITY POLE
	EXISTING ELECTRICAL TRANSFORMER
G	EXISTING GAS UTILITY LINE
	EXISTING WATER MAIN
	EXISTING FIRE HYDRANT
5400	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	PROPOSED BOUNDARY LINE
	PROPOSED CENTER LINE
	PROPOSED EASEMENT
	PROPOSED LOT LINE
	PROPOSED RIGHT-OF-WAY
	PROPOSED SETBACK
100 LF 8" SAN	PROPOSED SANITARY SEWER LINE
SS STA: 1+00.00	PROPOSED SANITARY SEWER SERVICE
	PROPOSED SANITARY SEWER MANHOLE
	PROPOSED UNDERDRAIN
100 LF 18" RCP	PROPOSED STORM SEWER LINE
	PROPOSED TYPE R INLET
	PROPOSED TYPE 16 INLET
	PROPOSED BOX BASE MANHOLE
	PROPOSED CIRCULAR MANHOLE
	PROPOSED FLARED END SECTION
	PROPOSED RIPRAP
100 LF 8" WAT	PROPOSED WATER LINE
	PROPOSED WATER SERVICE AND METER
	PROPOSED IRRIGATION SERVICE AND METER
	PROPOSED WATER GATE VALVE
	PROPOSED FIRE HYDRANT
	PROPOSED REDUCER
	PROPOSED BLOW-OFF
	PROPOSED BEND W/ THRUST BLOCK
	PROPOSED CROSS
	PROPOSED TEE
	PROPOSED AIR RELEASE VALVE
	PROPOSED PRESSURE REDUCING VALVE
	PROPOSED 100 YR WATER SURFACE ELEVATION
	PROPOSED FLOWLINE SWALE

KT ENGINEERING
12500 W. 58TH AVE. #230
ARVADA, CO 80002
P: 720.638.5190
WWW.KTENG.NET

PREPARED FOR:
HSG LAND LLC

REVISIONS:

NO.	REVISION DESCRIPTION	DATE	BY
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

STAMP:
NOT FOR CONSTRUCTION

SHEET INFO:
SELTZER HEIGHTS FILING 1
COVER SHEET

PROJECT NO:
0109-2207

DRAWN BY:
EST

DESIGNED BY:
KPT

SCALE:
1" = NA'

SUBMITTED ON:
01/20/2025

01 OF 15

J:\0109\FILING 1 HSG\CIVIL\PLANNING\0207-HSG-CVR.dwg

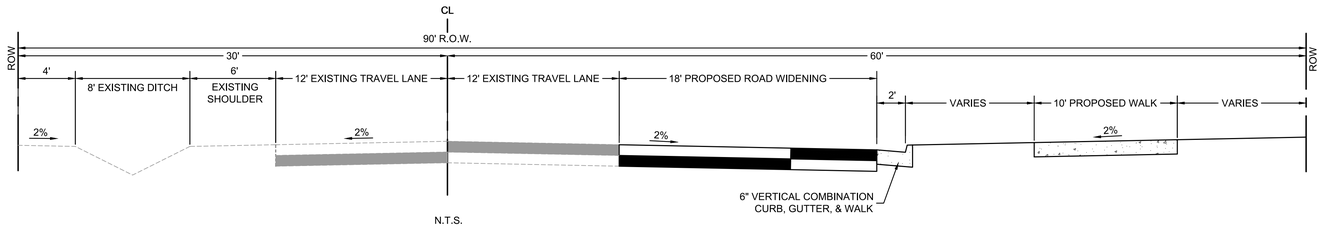
TYPICAL STREET SECTION

TYPE

MINOR ARTERIAL

E. 168TH AVENUE

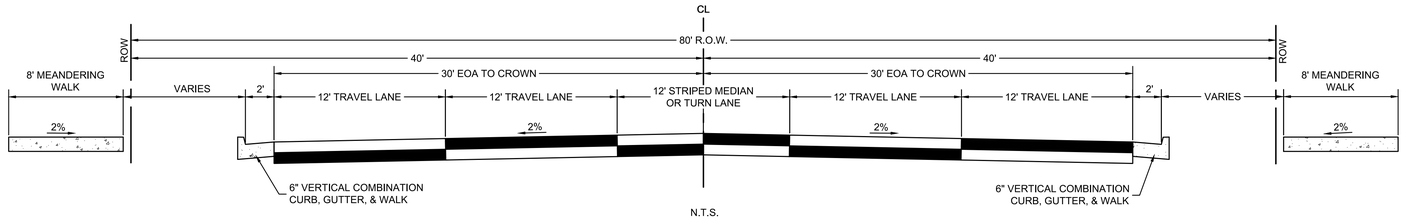
SOUTH SIDE BUILT TO ULTIMATE WIDTH



MAJOR COLLECTOR

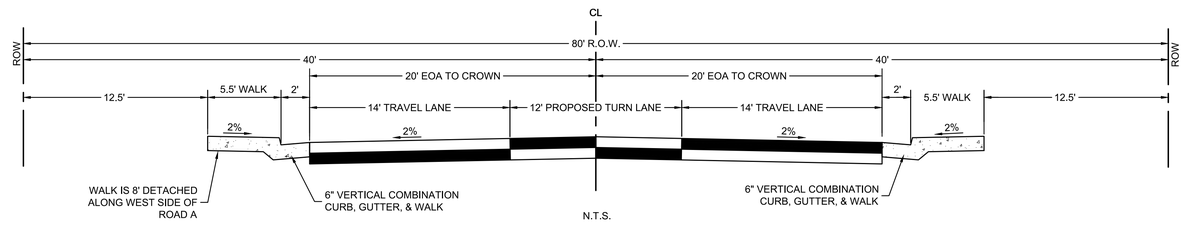
YOSEMITE STREET

BUILT TO ULTIMATE WIDTH



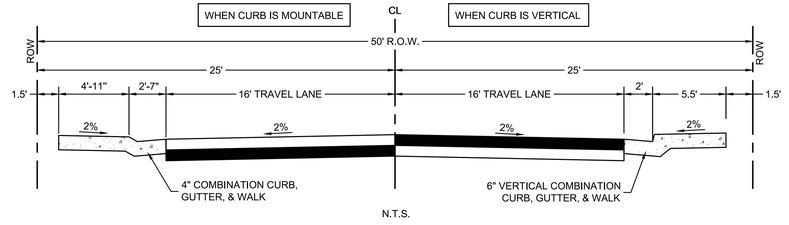
MINOR COLLECTOR

A PORTION OF ROAD A & ROAD I



LOCAL (RESIDENTIAL)

ROAD A, B, C, D, E, F, G, H, I



KT ENGINEERING

12500 W. 58TH AVE. #230
ARVADA, CO 80002

P: 720.638.5190

WWW.KTENG.NET

PREPARED FOR:
HSG LAND LLC

REVISIONS:

NO.	REVISION DESCRIPTION	DATE	BY
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

STAMP:

NOT FOR CONSTRUCTION

SHEET INFO:

SELTZER HEIGHTS FILING 1

TYPICAL STREET SECTION

PROJECT NO: 0109-2207

DRAWN BY: EST

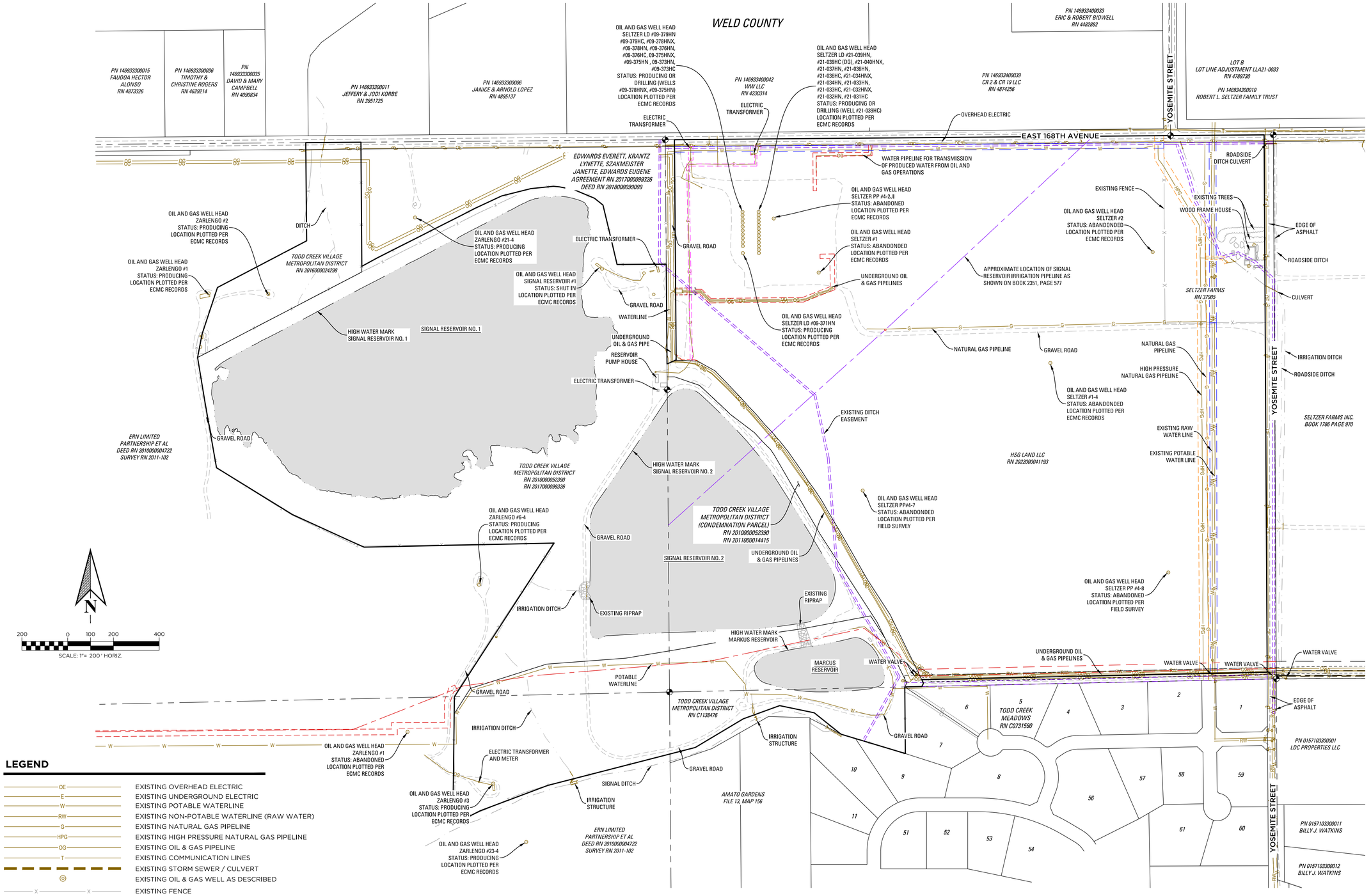
DESIGNED BY: KPT

SCALE: 1" = N/A

SUBMITTED ON: 01/20/2025

02 OF 15

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LEGEND

- EXISTING OVERHEAD ELECTRIC
- EXISTING UNDERGROUND ELECTRIC
- EXISTING POTABLE WATERLINE
- EXISTING NON-POTABLE WATERLINE (RAW WATER)
- EXISTING NATURAL GAS PIPELINE
- EXISTING HIGH PRESSURE NATURAL GAS PIPELINE
- EXISTING OIL & GAS PIPELINE
- EXISTING COMMUNICATION LINES
- EXISTING STORM SEWER / CULVERT
- EXISTING OIL & GAS WELL AS DESCRIBED
- EXISTING FENCE
- EXISTING SWALE / DITCH
- EXISTING WATERLINE EASEMENT
- EXISTING IRRIGATION EASEMENT
- EXISTING OIL & GAS EASEMENT
- EXISTING ELECTRIC EASEMENT
- EXISTING NATURAL GAS EASEMENT

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KT ENGINEERING
12500 W. 58TH AVE. #230
ARVADA, CO 80002
P: 720.638.5190
WWW.KTENG.NET

PREPARED FOR:
HSG LAND LLC

REVISIONS:

NO.	REVISION DESCRIPTION	DATE	BY
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STAMP:
NOT FOR CONSTRUCTION

SHEET INFO:

SELTZER HEIGHTS FILING 1

EXISTING CONDITIONS

PROJECT NO: 0109-2207
DRAWN BY: EST
DESIGNED BY: KPT
SCALE: 1" = 200'
SUBMITTED ON: 01/20/2025

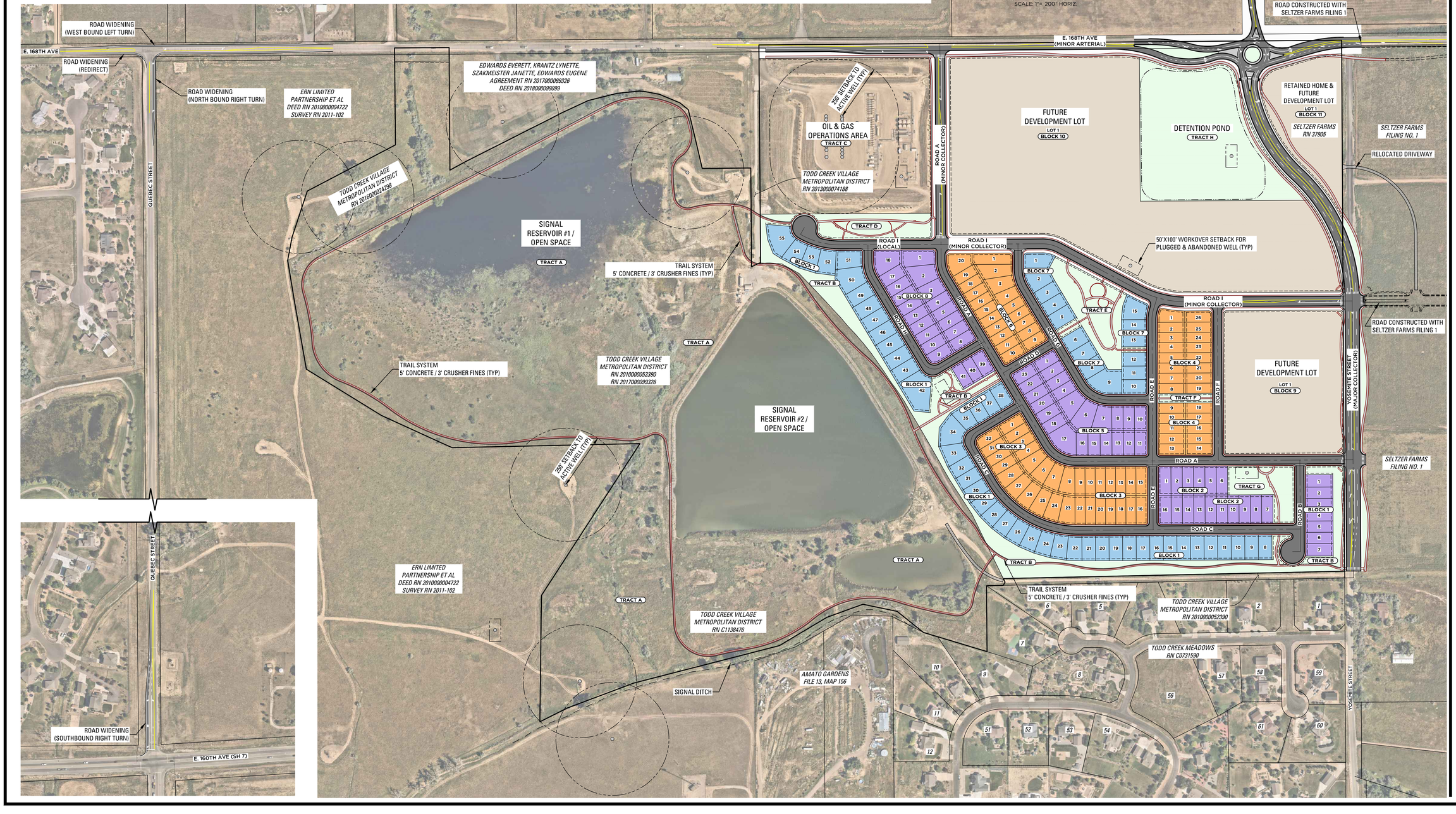
LAND USE SUMMARY TABLE

PARCEL	COUNT	AREA SF	AREA AC	% OF TOTAL
RIGHT-OF-WAY	NA	956,673 SF	21.9622 AC	9.64 %
OIL & GAS TRACT	1	523,426 SF	12.0162 AC	5.27 %
OPEN SPACE TRACTS	7	5,535,281 SF	127.0726 AC	55.77 %
FUTURE DEVELOPMENT LOTS	3	1,542,941 SF	35.4210 AC	15.55 %
45' WIDE RESIDENTIAL LOTS	78	459,950 SF	10.5590 AC	4.63 %
50' WIDE RESIDENTIAL LOTS	67	436,127 SF	10.0121 AC	4.40 %
60' WIDE RESIDENTIAL LOTS	60	470,614 SF	10.8038 AC	4.74 %
TOTAL =		9,925,012 SF	227.8469 AC	100.00 %

TRACT TABLE

TRACT	OWNERSHIP	AREA SF	AREA AC	USE
TRACT A	T.C.V.M.D*	4,744,819 SF	108.9261 AC	RESERVOIR / OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT B	DISTRICT	262,218 SF	6.0197 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT C	DISTRICT	523,426 SF	12.0162 AC	OIL & GAS OPERATIONS AREA
TRACT D	DISTRICT	56,993 SF	1.3084 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT E	DISTRICT	87,814 SF	2.0159 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT F	DISTRICT	6,640 SF	0.1524 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT G	DISTRICT	52,276 SF	1.2001 AC	OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE
TRACT H	DISTRICT	316,184 SF	7.2586 AC	DETENTION POND / OPEN SPACE / PUBLIC ACCESS / UTILITIES / DRAINAGE

* T.C.V.M.D = TODD CREEK VILLAGE METROPOLITAN DISTRICT



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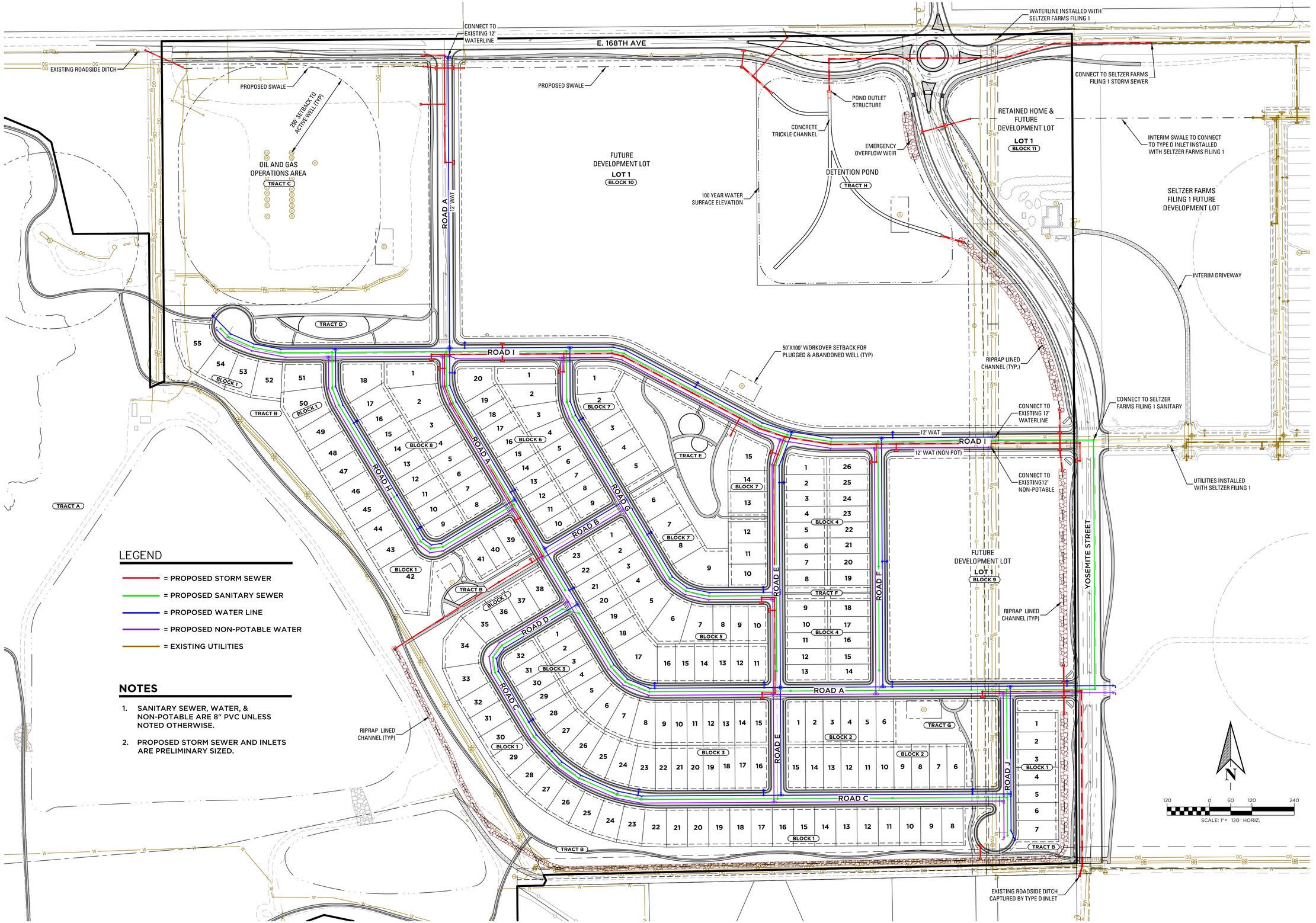
SHEET INFO:

SELTZER HEIGHTS FILING 1

OVERALL LAND USE

PROJECT NO: 0109-2207
DRAWN BY: EST
DESIGNED BY: KPT
SCALE: 1" = 200'
SUBMITTED ON: 01/20/2025

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SELTZER HEIGHTS FILING 1

OVERALL UTILITY

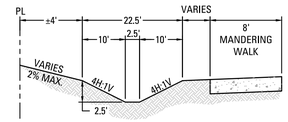
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DRAWN BY: EST
DESIGNED BY: KPT
SCALE: 1" = 120'
SUBMITTED ON: 01/20/2025

05 OF 15

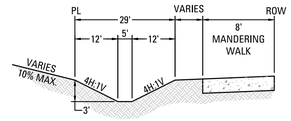
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LEGEND

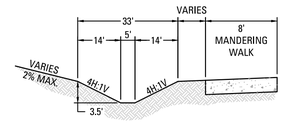
2.6%	= PROPOSED GRADE
3:1	= PROPOSED SLOPE
	= EXISTING CONTOUR MINOR
	= EXISTING CONTOUR MAJOR
	= PROPOSED CONTOUR MINOR
	= PROPOSED CONTOUR MAJOR
LP	= LOW POINT
HP	= HIGH POINT
A	= LOT TYPE " A "
B	= LOT TYPE " B "
G	= LOT TYPE " G "
T	= LOT TYPE " T "
WO	= LOT TYPE " WO "



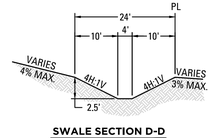
SWALE SECTION A-A



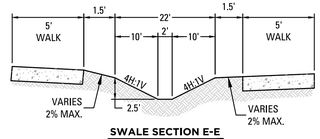
SWALE SECTION B-B



SWALE SECTION C-C



SWALE SECTION D-D



SWALE SECTION E-E



120 0 60 120 240

SCALE: 1"= 120 ' HORIZ.

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SHEET INFO:

SELTZER HEIGHTS FILING 1

OVERALL GRADING

PROJECT NO:
0109-2207

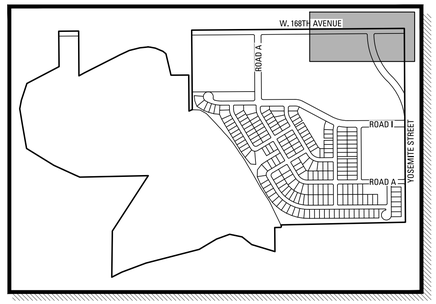
DRAWN BY:
EST

DESIGNED BY:
KPT

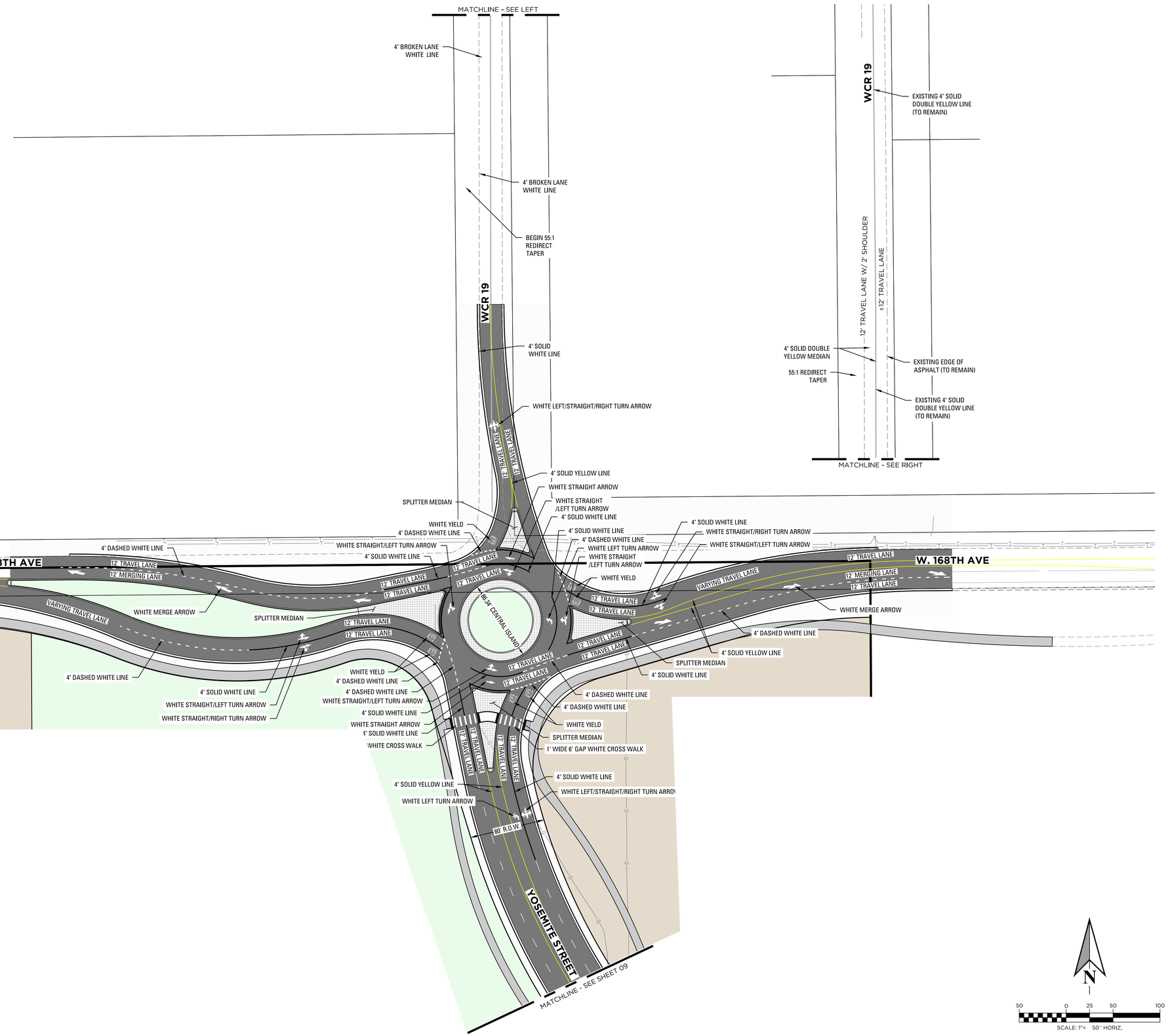
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1" = 120'

SUBMITTED ON:
01/20/2025

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KEYMAP
NTS



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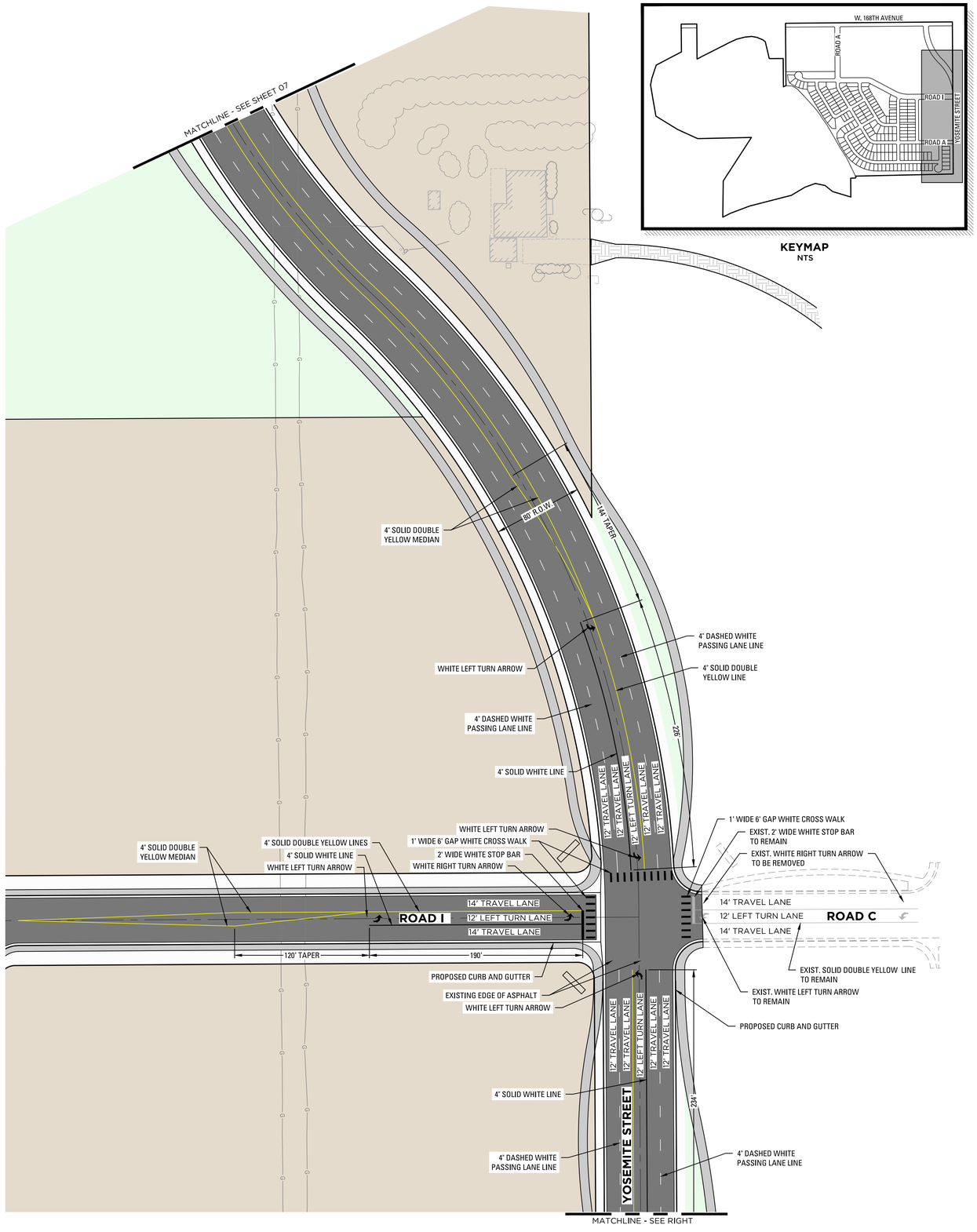
SELTZER HEIGHTS FILING 1

DETAILED INTERSECTIONS 168TH AVE & YOSEMITE

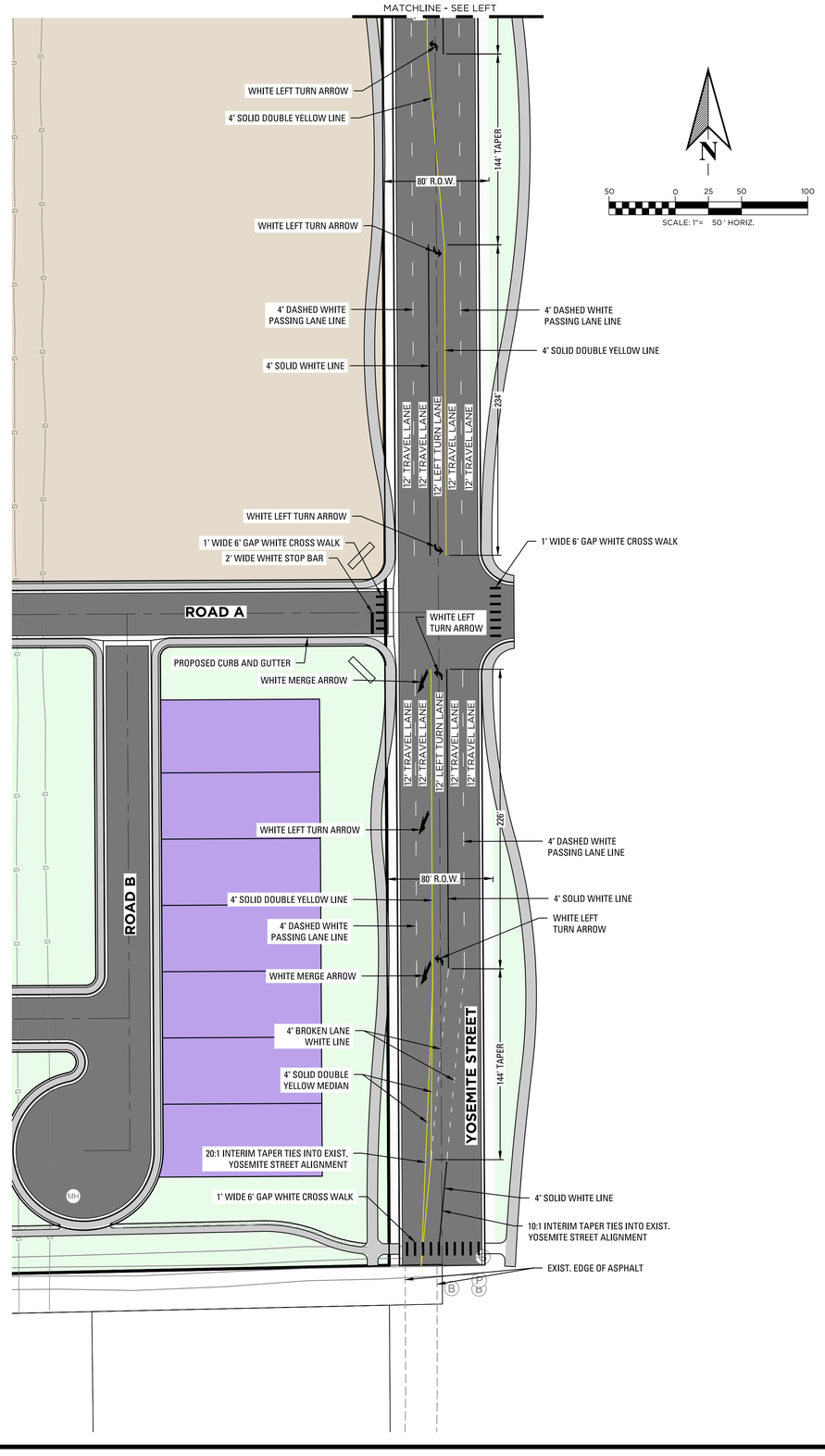
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DRAWN BY: EST
DESIGNED BY: KPT
SCALE: AS SHOWN
SUBMITTED ON: 01/20/2025

07 OF 15

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KEYMAP
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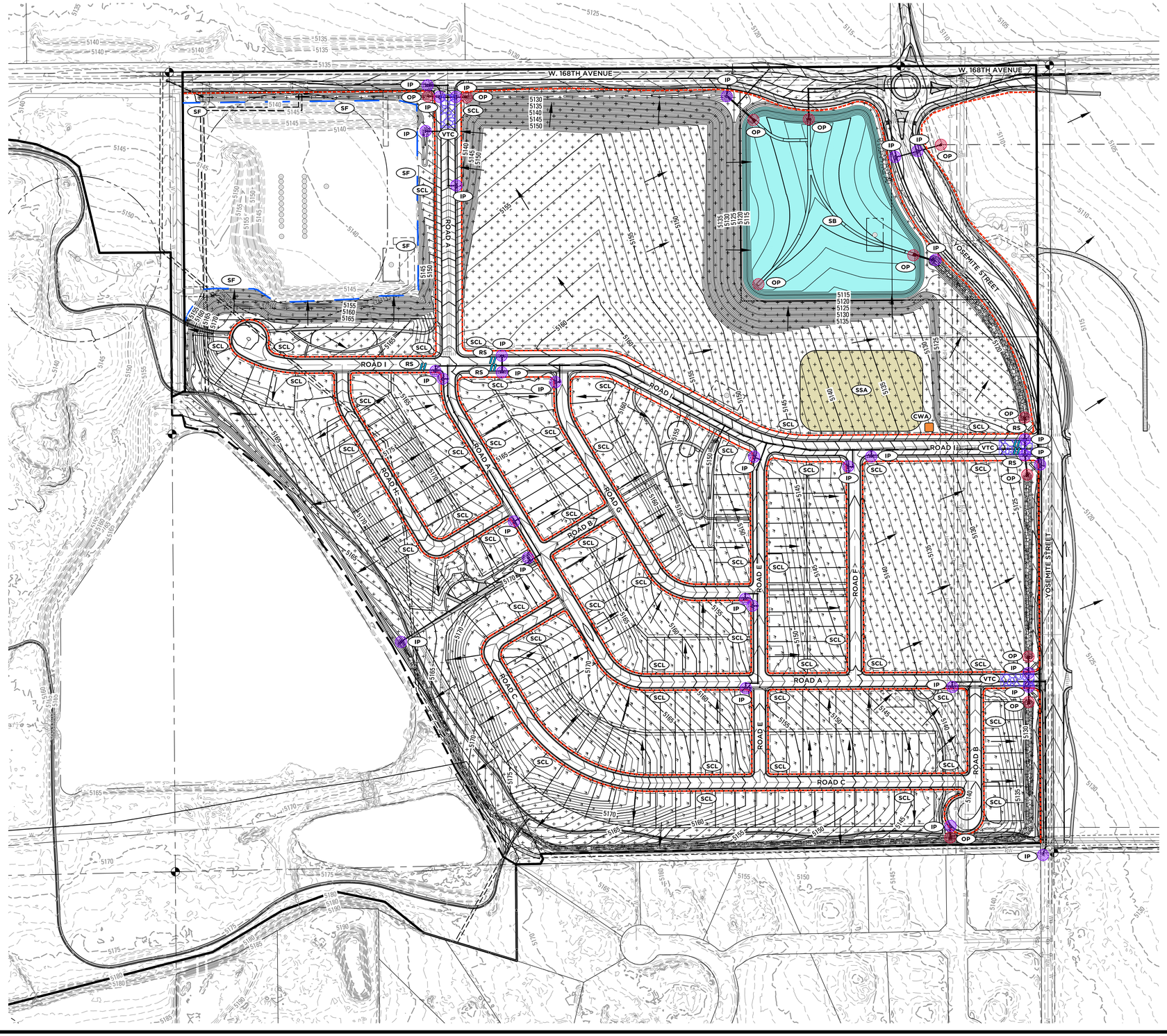
STAMP:
NOT FOR CONSTRUCTION

SHEET INFO:
SELTZER HEIGHTS FILING 1
DETAILED INTERSECTIONS
YOSEMITE & SITE ENTRANCES

PROJECT NO: 0109-2207
DRAWN BY: EST
DESIGNED BY: KPT
SCALE: AS SHOWN
SUBMITTED ON: 01/20/2025

09 OF 15

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BMP LEGEND

CHECK DAM	CD	
INLET PROTECTION	IP	
OUTLET PROTECTION	OP	
SILT FENCE	SF	
CONSTRUCTION FENCE	CF	
SEDIMENT CONTROL LOG	SCL	
EXISTING CONTOUR MINOR		
EXISTING CONTOUR MAJOR		
PROPOSED CONTOUR MINOR		
PROPOSED CONTOUR MAJOR		
VEHICLE TRACKING CONTROL	VTC	
SEDIMENT BASIN	SB	
STABILIZED STAGING AREA	SSA	
CONCRETE WASHOUT AREA	CWA	
TEMPORARY SEEDING/MULCHING	TS	
PERMANENT SEEDING/MULCHING	PS	
SURFACE FLOW ARROW		
LIMITS OF CONSTRUCTION		
ROCK SOCK	RS	

N

150 0 75 150 300

SCALE: 1"= 150 ' HORIZ.

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SHEET INFO:

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EROSION CONTROL PLAN

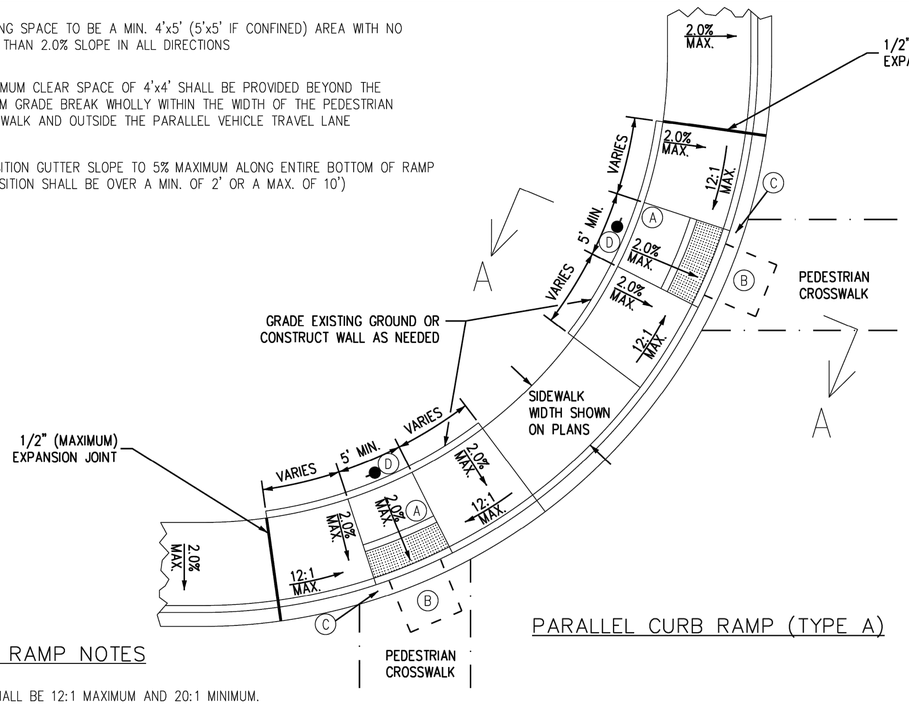
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DRAWN BY: EST
DESIGNED BY: KPT
SCALE: 1" = 150'
SUBMITTED ON: 01/20/2025

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Ⓐ TURNING SPACE TO BE A MIN. 4'x5' (5'x5' IF CONFINED) AREA WITH NO MORE THAN 2.0% SLOPE IN ALL DIRECTIONS

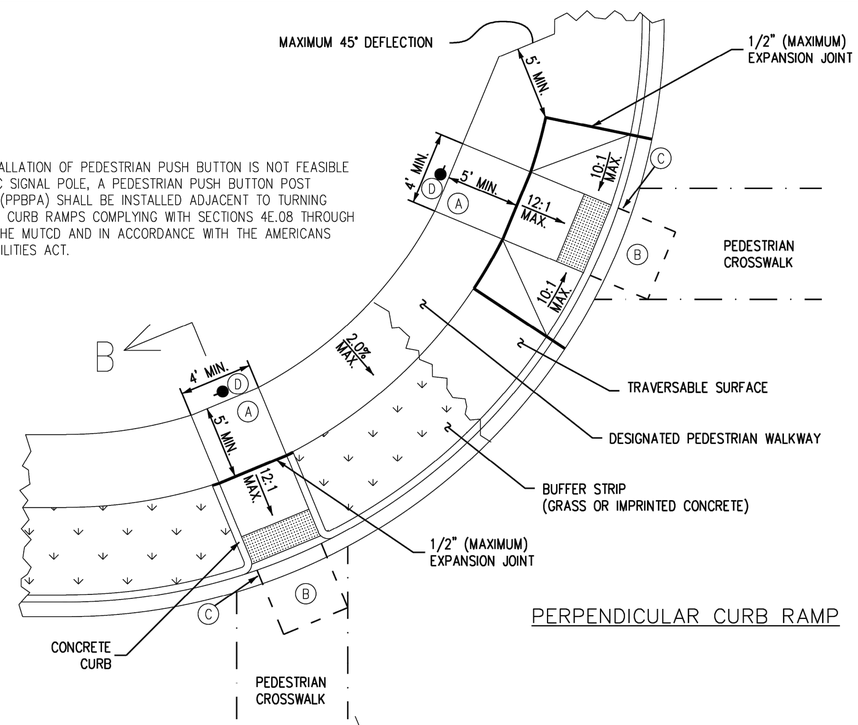
Ⓑ A MINIMUM CLEAR SPACE OF 4'x4' SHALL BE PROVIDED BEYOND THE BOTTOM GRADE BREAK WHOLLY WITHIN THE WIDTH OF THE PEDESTRIAN CROSSWALK AND OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE

Ⓒ TRANSITION GUTTER SLOPE TO 5% MAXIMUM ALONG ENTIRE BOTTOM OF RAMP (TRANSITION SHALL BE OVER A MIN. OF 2' OR A MAX. OF 10')



PARALLEL CURB RAMP (TYPE A)

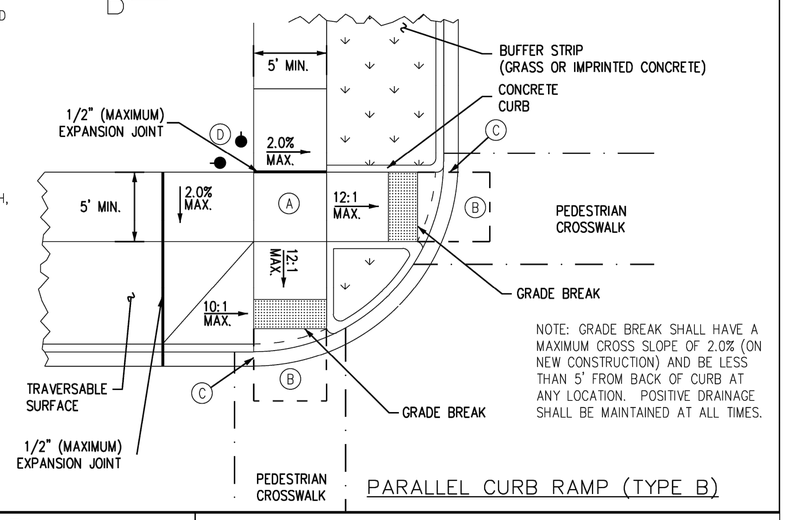
Ⓓ WHEN INSTALLATION OF PEDESTRIAN PUSH BUTTON IS NOT FEASIBLE ON TRAFFIC SIGNAL POLE, A PEDESTRIAN PUSH BUTTON POST ASSEMBLY (PPBPA) SHALL BE INSTALLED ADJACENT TO TURNING SPACES OF CURB RAMPS COMPLYING WITH SECTIONS 4E.08 THROUGH 4E.13 OF THE MUTCD AND IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT.



PERPENDICULAR CURB RAMP

CURB RAMP NOTES

1. RAMP SLOPES SHALL BE 12:1 MAXIMUM AND 20:1 MINIMUM.
2. RAMP GRADE BREAKS MUST BE PERPENDICULAR TO THE RUNNING SLOPE.
3. CURB RAMPS SHALL BE A MINIMUM OF 6" THICK. CURB RAMPS ADJACENT TO A CROSS PAN SHALL BE POURED MONOLITHIC AND THE GUTTER THICKNESS SHALL MATCH THE THICKNESS OF THE CROSS PAN (8" MINIMUM).
4. CURB RAMP OPENINGS SHALL BE WHOLLY LOCATED WITHIN PEDESTRIAN CROSSWALK. GUTTERLINE PROFILE SHALL MATCH ROADWAY SLOPE. CROSSWALKS ON NEW CONSTRUCTION SHALL MEET ADA REQUIREMENTS AS DESCRIBED IN THE CODE OF FEDERAL REGULATIONS TITLE II.
5. ALL CONCRETE SIDEWALK AND CURB RAMP SURFACES SHALL HAVE A BROOM FINISH PERPENDICULAR TO THE DIRECTION OF TRAVEL.
6. EXPANSION JOINTS (SEE JOINT DETAIL) SHALL BE PROVIDED AT ALL LOCATIONS WHERE NEW CONCRETE MEETS EXISTING CONCRETE OR AT LOCATIONS SHOWN IN THESE DETAILS.
7. DETECTABLE WARNING SURFACES SHALL BE INSTALLED AT SIDEWALK TO STREET TRANSITIONS AND BE OF A CONTRASTING COLOR. THE U.S. ACCESS BOARD PROPOSED GUIDELINES FOR ACCESSIBLE RIGHTS-OF-WAY (PROWAG) CHAPTER R3 TECHNICAL REQUIREMENTS PROVIDES GUIDANCE ON DETECTABLE WARNING SURFACES. FOR REFERENCE, THE COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) HAS AN APPROVED PRODUCTS LIST (APL) OF TRUNCATED DOME PANELS. THE COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY PROPOSED DETECTABLE WARNING SURFACES.
8. ALL DETECTABLE WARNING SURFACE AREAS SHALL BE WITHIN A MAXIMUM OF 2 IN. FROM THE BACK OF CURB (EXCEPT AS SHOWN IN TYPE B PARALLEL RAMP). ALL DETECTABLE WARNING SURFACES SHALL BE 2 FT. IN LENGTH, MEASURED ALONG THE DIRECTION OF PEDESTRIAN TRAVEL, AND COVER THE COMPLETE WIDTH OF THE RAMP AREA.
9. DO NOT INSTALL DRAINAGE STRUCTURES, TRAFFIC SIGNAL EQUIPMENT, JUNCTION BOXES, AND OTHER OBSTRUCTIONS IN FRONT OF OR WITHIN THE RAMP CLEAR SPACE.
10. PERPENDICULAR AND PARALLEL CURB RAMPS SHOWN ARE ACCEPTABLE FOR USE AT MID-BLOCK INSTALLATIONS.
11. THE CONTRACTOR SHOULD ACCOUNT FOR CONSTRUCTION TOLERANCES TO PREVENT EXCEEDING MAXIMUM SLOPES AND MINIMUM DIMENSIONS SHOWN. THE COUNTY MAY REQUIRE REMOVAL AND RECONSTRUCTION TO ACHIEVE SPECIFIED DIMENSIONS AND SLOPES.
12. WHEN ISSUES ARISE THAT REQUIRE ADJUSTMENTS TO PROVIDE AN ADA COMPLIANT CURB RAMP, THE CURB RAMP SHOWN ON THE PLANS MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTOR TO ACCOMMODATE DIFFERING ELEVATIONS, VARIANCES IN SLOPE, OR TRANSITIONS TO EXISTING FEATURES AS LONG AS THE MINIMUM DIMENSIONS ARE ACHIEVED AND THE MAXIMUM SLOPES ARE NOT EXCEEDED.
13. WHEN ISSUES ARISE THAT REQUIRE MODIFICATIONS (I.E. CHANGE CURB RAMP TYPE, ADDITION OR DELETION OF CURB RAMP FEATURES, ETC.) THE ENGINEER OF RECORD SHALL SUBMIT REVISIONS TO THE COUNTY USING THE APPROVED CONSTRUCTION PLANS FOR REVIEW AND APPROVAL.
14. THE CONTRACTOR SHALL NOTIFY THE COUNTY AT LEAST TWO (2) BUSINESS DAYS PRIOR TO NEEDING A CONCRETE FORM INSPECTION.
15. FOR ADDITIONAL GUIDANCE ON CURB RAMP LAYOUT AND CONSTRUCTION, PROWAG SHALL BE REFERENCED.



NOTE: GRADE BREAK SHALL HAVE A MAXIMUM CROSS SLOPE OF 2.0% (ON NEW CONSTRUCTION) AND BE LESS THAN 5' FROM BACK OF CURB AT ANY LOCATION. POSITIVE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES.

PARALLEL CURB RAMP (TYPE B)

Computer File Information					
Creation Date:	12/03/15	Initials:	BPM		
Last Modification Date:	12/10/16	Initials:	JEH		
Full Path:	Q:\2015 ADA TRANSITION PLAN\CURB RAMP DETAILS				
Drawing File Name:	CURB RAMP DETAILS.DWG				
Acad Ver.	2013	Scale:	N/A	Units:	ENGLISH

	Sheet Revisions		
1	03/31/17	ADAMS COUNTY	ACS

ADAMS COUNTY
TRANSPORTATION DEPARTMENT
4430 S. ADAMS COUNTY PARKWAY
BRIGHTON, CO 80601

CURB RAMP DETAILS

Sheet Number: 1 of 3

KT ENGINEERING
12500 W. 58TH AVE. #230
ARVADA, CO 80002
P: 720.638.5190
WWW.KTENG.NET

PREPARED FOR:
HSG LAND LLC

REVISIONS:

NO.	REVISION DESCRIPTION	DATE	BY
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STAMP:
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SHEET INFO:
SELTZER HEIGHTS FILING 1
DETALS
DETAILS SITE 1

PROJECT NO: 0109-2207
DRAWN BY: EST
DESIGNED BY: KPT
SCALE: 1" = NA'
SUBMITTED ON: 01/20/2025

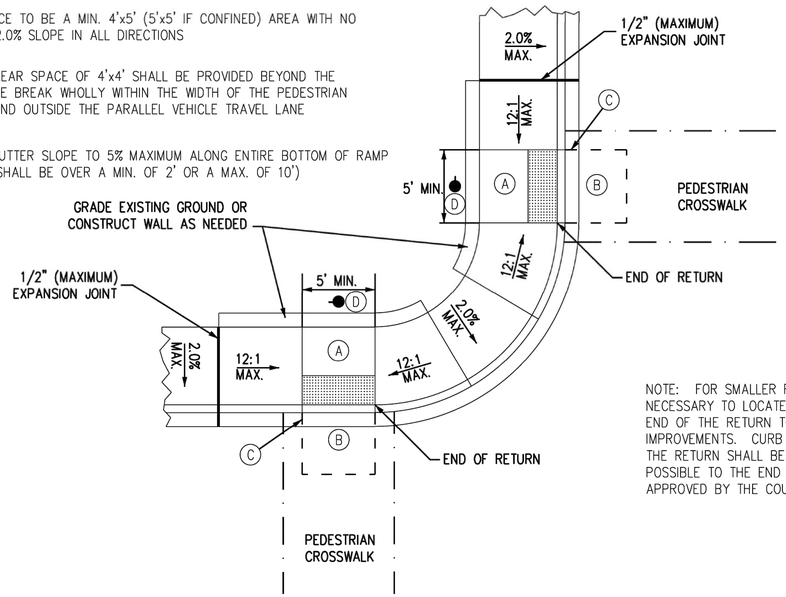
11 OF 15

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(A) TURNING SPACE TO BE A MIN. 4'x5' (5'x5' IF CONFINED) AREA WITH NO MORE THAN 2.0% SLOPE IN ALL DIRECTIONS

(B) A MINIMUM CLEAR SPACE OF 4'x4' SHALL BE PROVIDED BEYOND THE BOTTOM GRADE BREAK WHOLLY WITHIN THE WIDTH OF THE PEDESTRIAN CROSSWALK AND OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE

(C) TRANSITION GUTTER SLOPE TO 5% MAXIMUM ALONG ENTIRE BOTTOM OF RAMP (TRANSITION SHALL BE OVER A MIN. OF 2' OR A MAX. OF 10')

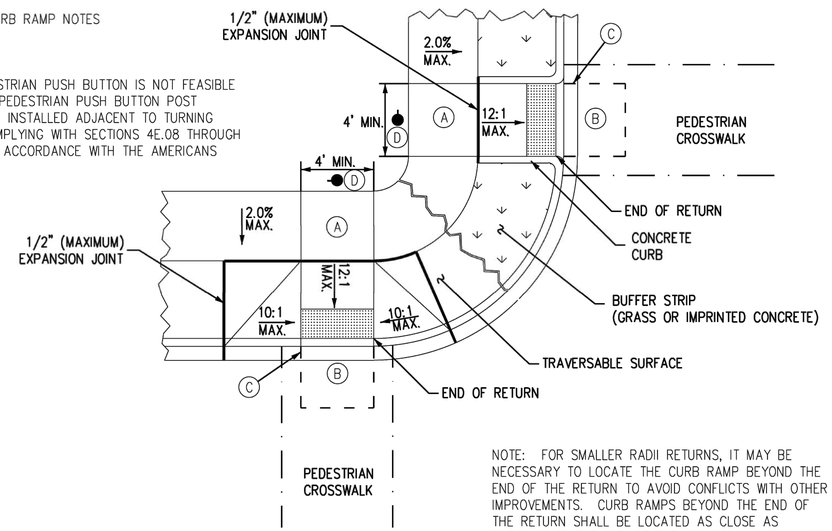


PARALLEL CURB RAMPS – SMALL RADIUS

* SEE SHEET 1 FOR CURB RAMP NOTES

(D) WHEN INSTALLATION OF PEDESTRIAN PUSH BUTTON IS NOT FEASIBLE ON TRAFFIC SIGNAL POLE, A PEDESTRIAN PUSH BUTTON POST ASSEMBLY (PPBPA) SHALL BE INSTALLED ADJACENT TO TURNING SPACES OF CURB RAMPS COMPLYING WITH SECTIONS 4E.08 THROUGH 4E.13 OF THE MUTCD AND IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT.

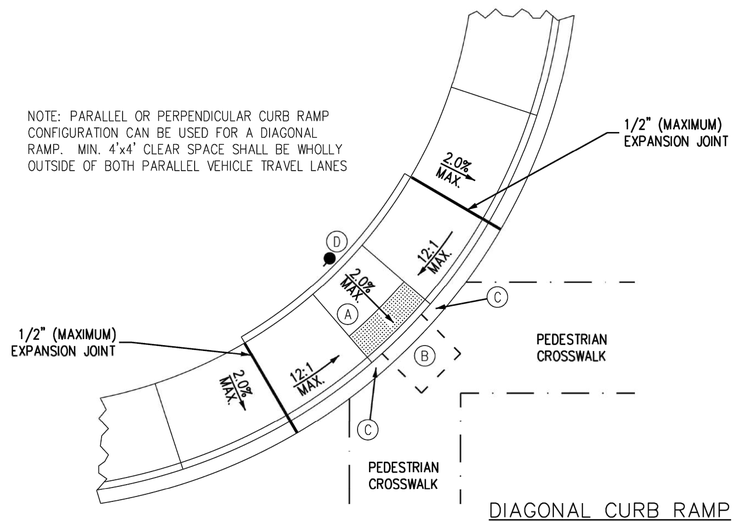
NOTE: FOR SMALLER RADII RETURNS, IT MAY BE NECESSARY TO LOCATE THE CURB RAMP BEYOND THE END OF THE RETURN TO AVOID CONFLICTS WITH OTHER IMPROVEMENTS. CURB RAMPS BEYOND THE END OF THE RETURN SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE END OF THE RETURN AND SHALL BE APPROVED BY THE COUNTY.



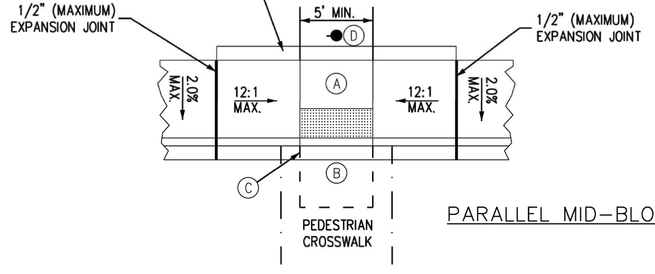
NOTE: FOR SMALLER RADII RETURNS, IT MAY BE NECESSARY TO LOCATE THE CURB RAMP BEYOND THE END OF THE RETURN TO AVOID CONFLICTS WITH OTHER IMPROVEMENTS. CURB RAMPS BEYOND THE END OF THE RETURN SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE END OF THE RETURN AND SHALL BE APPROVED BY THE COUNTY.

PERPENDICULAR CURB RAMPS – SMALL RADIUS

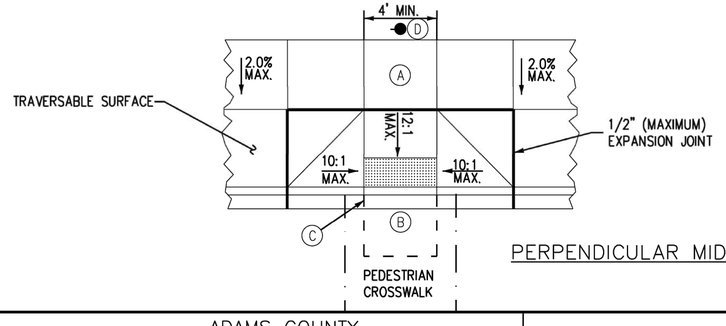
NOTE: PARALLEL OR PERPENDICULAR CURB RAMP CONFIGURATION CAN BE USED FOR A DIAGONAL RAMP. MIN. 4'x4' CLEAR SPACE SHALL BE WHOLLY OUTSIDE OF BOTH PARALLEL VEHICLE TRAVEL LANES



DIAGONAL CURB RAMP



PARALLEL MID-BLOCK CURB RAMP



PERPENDICULAR MID-BLOCK CURB RAMP

Computer File Information			
Creation Date:	12/03/15	Initials:	BPM
Last Modification Date:	12/10/16	Initials:	JEH
Full Path:	Q:\2015 ADA TRANSITION PLAN\CURB RAMP DETAILS		
Drawing File Name:	CURB RAMP DETAILS.DWG		
Acad Ver. 2013	Scale: N/A	Units:	ENGLISH

Sheet Revisions		
1	03/31/17	ADAMS COUNTY	ACS

ADAMS COUNTY
TRANSPORTATION DEPARTMENT
4430 S. ADAMS COUNTY PARKWAY
BRIGHTON, CO 80601

CURB RAMP DETAILS

Sheet Number: 2 of 3

KT ENGINEERING
12500 W. 58TH AVE. #230
ARVADA, CO 80002
P: 720.638.5190
WWW.KTENG.NET

PREPARED FOR:
HSG LAND LLC

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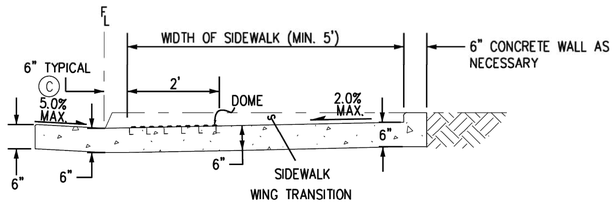
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DETAILS SITE 2

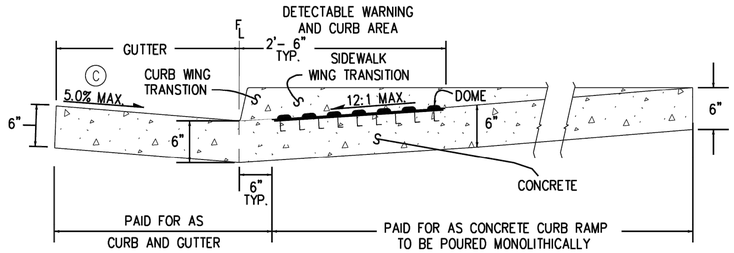
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DESIGNED BY: KPT
SCALE: 1" = NA'
SUBMITTED ON: 01/20/2025

12 OF 15

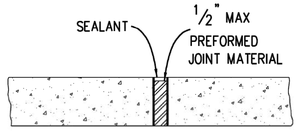
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SECTION A–A CURB RAMP PROFILE

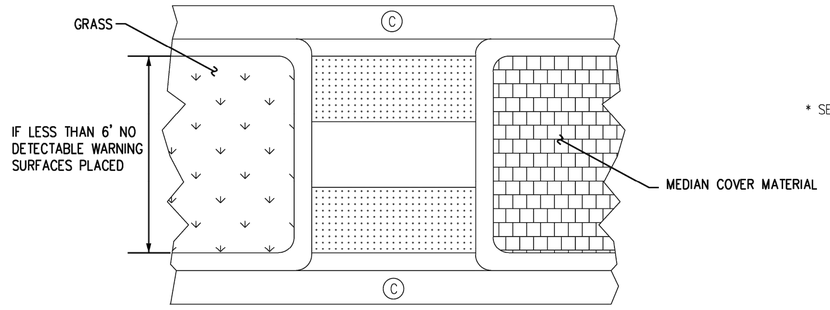


SECTION B–B CURB RAMP PROFILE



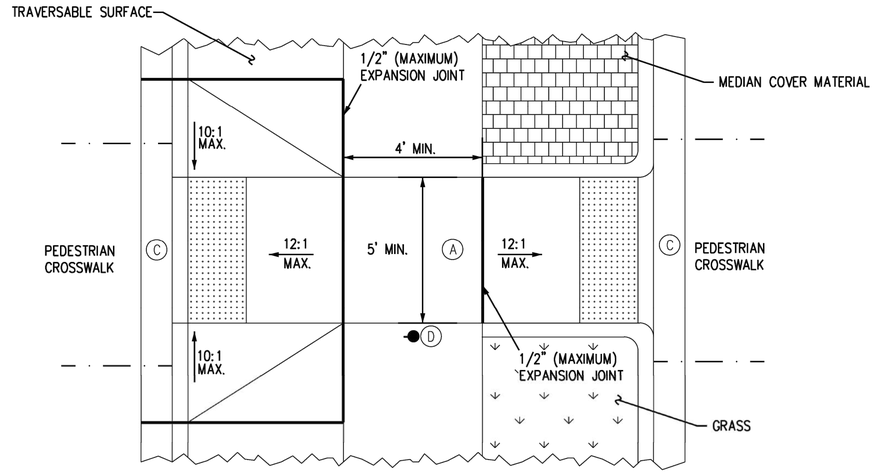
NOTE:
EXPANSION JOINTS SHALL NOT BE PLACED WITHIN THE RAMP AREA

EXPANSION JOINT



MEDIAN CUT THROUGH CROSSING

* SEE SHEET 1 FOR CURB RAMP NOTES



PEDESTRIAN MEDIAN REFUGE

1. DETECTABLE WARNING SURFACES SHALL BE OF A CONTRASTING COLOR AND MEET CHAPTER R3 TECHNICAL REQUIREMENTS IN THE U.S. ACCESS BOARD PROPOSED GUIDELINES FOR ACCESSIBLE RIGHTS–OF–WAY (PROWAG) AS APPROVED BY THE COUNTY. FOR REFERENCE, THE COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) HAS AN APPROVED PRODUCTS LIST (APL) OF TRUNCATED DOME PANELS. THE COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY PROPOSED DETECTABLE WARNING SURFACES.
2. DETECTABLE WARNINGS SHALL BE INSTALLED AT SIDEWALK TO STREET TRANSITIONS.
3. THE TRUNCATED DOME PANEL SHALL BE EMBEDDED IN THE CONCRETE CURB RAMP WHILE CONCRETE IS PLASTIC.
4. WHEN DETECTABLE WARNING SURFACE IS CUT, GRIND OFF REMAINING PORTION OF ANY CUT DOMES. SEAL ALL CUT PANEL EDGES TO PREVENT WATER DAMAGE.
5. IF BRICKS OR PAVERS ARE USED FOR DETECETABLE WARNING SURFACE, THE UNDERLYING CONCRETE SHALL BE A MINIMUM OF 4 INCHES THICK.
6. JOINT SEALANT SHALL BE A PRODUCT ON THE CDOT APL OR AN APPROVED EQUAL BY THE COUNTY.

DOME PANEL NOTES

(A) TURNING SPACE TO BE A MIN. 4'x5' (5'x5' IF CONFINED) AREA WITH NO MORE THAN 2.0% SLOPE IN ALL DIRECTIONS

(C) TRANSITION GUTTER SLOPE TO 5% MAXIMUM ALONG ENTIRE BOTTOM OF RAMP (TRANSITION SHALL BE OVER A MIN. OF 2' OR A MAX. OF 10')

(D) WHEN INSTALLATION OF PEDESTRIAN PUSH BUTTON IS NOT FEASIBLE ON TRAFFIC SIGNAL POLE, A PEDESTRIAN PUSH BUTTON POST ASSEMBLY (PPBPA) SHALL BE INSTALLED ADJACENT TO TURNING SPACES OF CURB RAMPS COMPLYING WITH SECTIONS 4E.08 THROUGH 4E.13 OF THE MUTCD AND IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT.

Computer File Information					
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Last Modification Date:	12/10/16	Initials:	JEH		
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Sheet Revisions		
03/31/17	ADAMS COUNTY	ACS

ADAMS COUNTY
TRANSPORTATION DEPARTMENT
4430 S. ADAMS COUNTY PARKWAY
BRIGHTON, CO 80601

CURB RAMP DETAILS

Sheet Number: 3 of 3

KT ENGINEERING
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PREPARED FOR:
HSG LAND LLC

REVISIONS:

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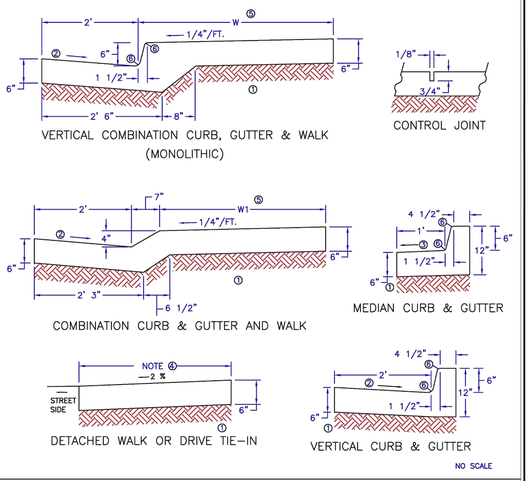
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SHEET INFO:
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DETAILS SITE 3

PROJECT NO: 0109-2207
DRAWN BY: EST
DESIGNED BY: KPT
SCALE: 1" = NA'
SUBMITTED ON: 01/20/2025

13 OF 15

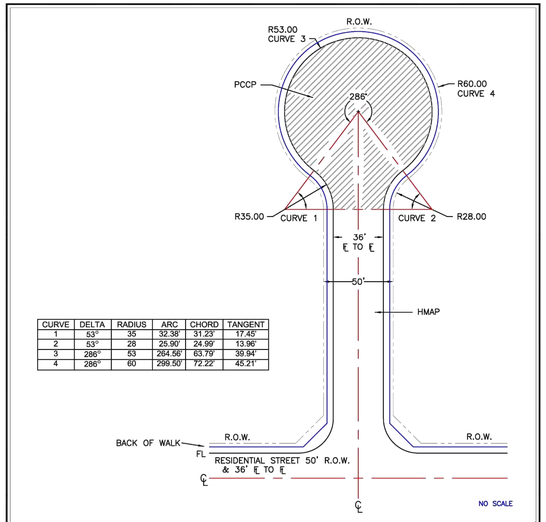
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NOTES:

① COMPACTED SUBGRADE
② GUTTER CROSS SLOPE SHALL BE 1"/ft
③ GUTTER CROSS SLOPE SHALL BE 1/2"/ft
④ DETACHED SIDEWALK WIDTH SHALL BE 5'–0" FOR NEW CONSTRUCTION
⑤ W=5'–6" AND W1=4'–11" TYPICAL (MIN. REQUIRED FOR NEW CONSTRUCTION)
⑥ 1 1/2" RADIUS

ADAMS COUNTY TRANSPORTATION DEPARTMENT /ENGINEERING	CURB, GUTTER & WALK	ADAMS COUNTY TRANSPORTATION DEPARTMENT /CONSTRUCTION INSPECTION
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601	REVISION DATE: 06/02/14 — FILE NAME: CG&W_D.DWG	4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601

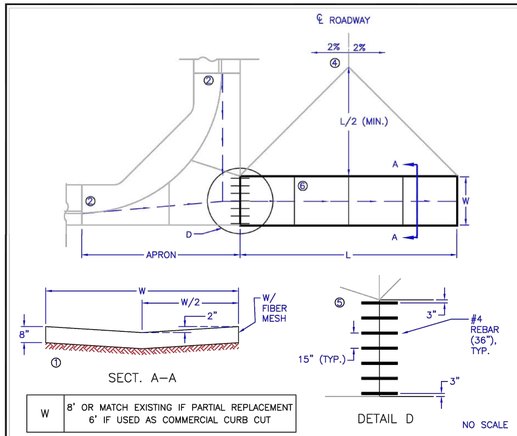


CURVE	DELTA	RADIUS	ARC	CHORD	TANGENT
1	53°	35	32.38'	31.23'	17.45'
2	53°	28	25.90'	24.99'	13.96'
3	286°	53	264.56'	63.79'	39.94'
4	286°	60	299.50'	72.22'	45.21'

NOTES:

① SEE SUBDIVISION REGULATIONS FOR MAXIMUM DISTANCE, CENTER OF INTERSECTION TO RADIUS POINT.
② 5.5' COMBINATION CURB, GUTTER & WALK, SEE CURB, GUTTER AND WALK & RADIUS DETAILS
③ HANDICAP RAMPS WILL BE REQUIRED, SEE DETAILS
④ FOR MINIMUM RADIUS RETURN VALUES – SEE CHAPT. 7 OF ROADWAY STANDARDS

ADAMS COUNTY TRANSPORTATION DEPARTMENT /ENGINEERING	PAVED CUL-DE-SAC LOCAL, RESIDENTIAL	ADAMS COUNTY TRANSPORTATION DEPARTMENT /CONSTRUCTION INSPECTION
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601	REVISION DATE: 06/02/14 — FILE NAME: RESIDENT_CULDESAC.DWG	4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601



W	8' OR MATCH EXISTING IF PARTIAL REPLACEMENT 6' IF USED AS COMMERCIAL CURB CUT

NOTES:

① COMPACTED SUBGRADE
② 1/8" WIDE CONTROL JOINT WITH 3/4" MINIMUM DEPTH
③ ADAMS COUNTY TO DETERMINE REINFORCEMENT REQUIREMENTS IF REINFORCEMENT IS NEEDED
④ WHERE PAVEMENT IS TO BE RECONSTRUCTED CROWN SHALL BE TRANSITIONED OVER L/2' (MIN). NO CROWN SHALL EXIST AT THE CROSSPAN
⑤ COLD JOINTS SHALL BE DOWELED AS PER "D" (MINIMUM, 2 BARS). JOINT TO BE FILLED WITH JOINT FILLER
⑥ CONTRACTION JOINTS SHALL BE SPACED @ MAXIMUM 10' INTERVALS
⑦ CROSSPANS SHALL BE CONSTRUCTED IN HALVES TO ALLOW TRAFFIC MOVEMENT

ADAMS COUNTY TRANSPORTATION DEPARTMENT /ENGINEERING	TYPICAL CROSSPAN	ADAMS COUNTY TRANSPORTATION DEPARTMENT /CONSTRUCTION INSPECTION
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601	REVISION DATE: 06/02/14 — FILE NAME: TYP_XPAN_D.DWG	4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601

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PREPARED FOR:
HSG LAND LLC

REVISIONS:

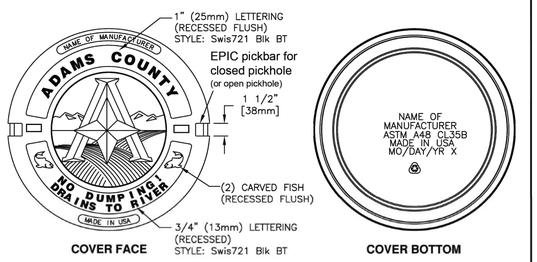
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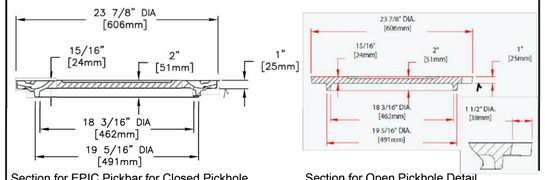
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DETAILS SITE 4

PROJECT NO: 0109-2207
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SUBMITTED ON: 01/20/2025

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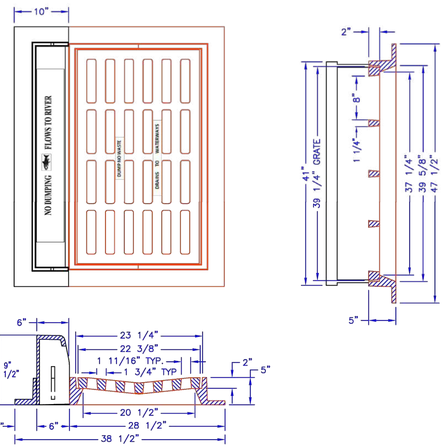




Section for EPIC Pickbar for Closed Pickhole Alternative

Section for Open Pickhole Detail Alternative

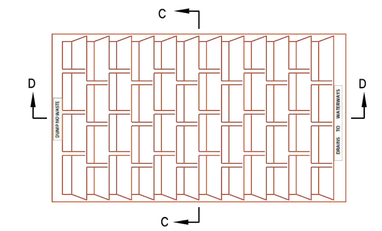
ADAMS COUNTY PUBLIC WORKS DEPARTMENT /ENGINEERING	STANDARD MANHOLE COVER for Public Structures	ADAMS COUNTY PUBLIC WORKS DEPARTMENT /CONSTRUCTION INSPECTION
4430 S. Adams County Pkwy. Brighton, CO 80601	REVISION DATE: 1/17/2019 · FILE NAME: STORM MANHOLE	4955 E. 74TH AVE. COMMERCE CITY, CO 80022



NO SCALE

NOTE:
1. GRATE SHOWN IS THE DEETER–2502. SIMILAR GRATES BY OTHER MANUFACTURERS MUST BE APPROVED BY THE COUNTY PRIOR TO USE.
2. REQUIRED FRAME IS NEENAH R–3362–1 (SINGLE) OR R–3363–1 (DOUBLE). SIMILAR FRAMES BY OTHER MANUFACTURERS MUST BE APPROVED BY THE COUNTY PRIOR TO USE.
3. GRATE & FRAME SHOWN FLAT FOR ILLUSTRATION PURPOSES ONLY.
4. ALSO SEE INLET BOX, TYPES 13 & 16 DETAIL

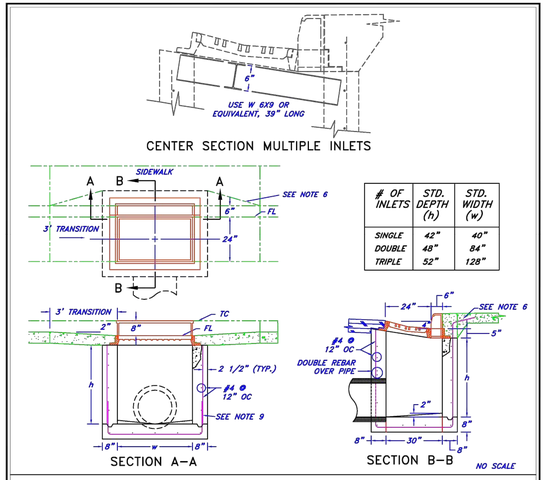
Adams County Public Works Engineering	TYPE 13 GRATE & FRAME for Public and Private Structures	Adams County Public Works Construction Insp.
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601	REVISION DATE: 9/15/2017 · FILE NAME: 13GRATE.DWG	4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601



NO SCALE

NOTE:
1. GRATE SHOWN IS NEENAH R–3362 TYPE "L". SIMILAR GRATES BY OTHER MANUFACTURERS MUST BE APPROVED BY THE COUNTY PRIOR TO USE.
2. REQUIRED FRAME IS NEENAH R–3362–1 (SINGLE) OR R–3363–1 (DOUBLE). SIMILAR FRAMES BY OTHER MANUFACTURERS MUST BE APPROVED BY THE COUNTY PRIOR TO USE.
3. GRATE SHOWN FLAT FOR ILLUSTRATION PURPOSES ONLY.
4. ALSO SEE INLET BOX, TYPES 13 & 16 DETAIL

Adams County Public Works Engineering	TYPE 16 GRATE for Public and Private Structures	Adams County Public Works Construction Insp.
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601	REVISION DATE: 9/15/2017 · FILE NAME: 16GRATE.DWG	4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601

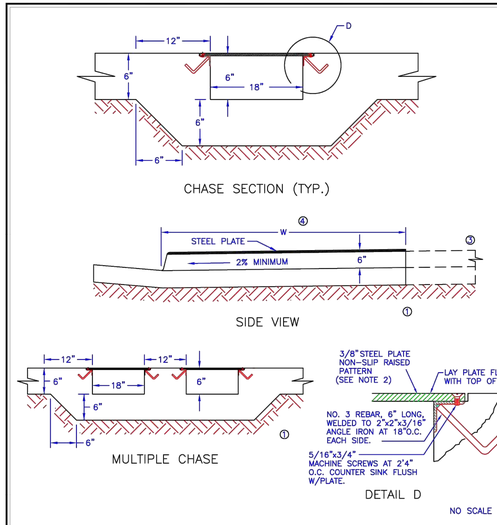


# OF INLETS	STD. DEPTH (h)	STD. WIDTH (w)
SINGLE	42"	40"
DOUBLE	48"	84"
TRIPLE	52"	128"

NO SCALE

NOTES:
1. FOR PAYMENT PURPOSES, INLET STRUCTURES SHALL INCLUDE 5'–0" CURB & GUTTER TRANSITION SECTION AT EACH END OF INLET PLUS SIDEWALK SECTIONS WHERE REQUIRED BEHIND INLET STRUCTURE AND TRANSITION SECTIONS.
2. FLOOR SLOPE MAY BE POURED MONOLITHICALLY WITH BASE.
3. OUTLET PIPES TO BE SET FLUSH WITH INSIDE FACE OF INLET WALL. BELL END TO BE PLACED ON UPSTREAM SIDE.
4. UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER, ALL TYPE 16 INLETS SHALL BE CONSTRUCTED WITH AN ADJUSTABLE CURB BOX.
5. REQUIRED FRAME IS NEENAH R–3362–1 (SINGLE) OR R–3363–1 (DOUBLE). SIMILAR FRAMES BY OTHER MANUFACTURERS MUST BE APPROVED BY THE COUNTY PRIOR TO USE.
6. EXTEND REINFORCING INTO SIDEWALK SECTION A MINIMUM OF 12". WHERE NO SIDEWALK IS TO BE PLACED, EXTEND REINFORCING INTO BACK WALL OF INLET BEHIND CURB FRAME.
7. WHERE INVERT ELEVATION IS GIVEN, IT SHALL BE CONSIDERED TO BE LOCATED AT THE FLOW LINE OF THE PIPE (OUT). BOX DIMENSIONS TO BE ADJUSTED ACCORDINGLY.
8. ALL INLET BOXES SHALL BE CAST IN PLACE CONCRETE UNLESS OTHERWISE AUTHORIZED BY THE COUNTY.
9. WHERE VERTICAL BARS ARE TO BE SPLICED, MINIMUM SPLICE LENGTH =12" OR 25d.

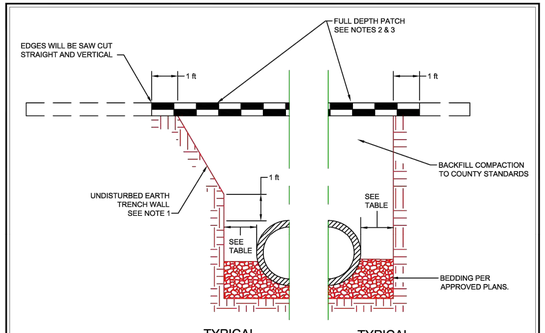
ADAMS COUNTY TRANSPORTATION DEPARTMENT /ENGINEERING	INLET BOX TYPES 13 & 16	ADAMS COUNTY TRANSPORTATION DEPARTMENT /CONSTRUCTION INSPECTION
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601	REVISION DATE: 06/02/14 · FILE NAME: INLET_BOX.DWG	4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601



NO SCALE

NOTES:
① COMPACTED SUBGRADE MATERIAL
② CHASE SECTIONS WITHIN 25' OF INTERSECTIONS OR DRIVEWAYS ARE REQUIRED TO USE 1/2" STEEL PLATE
③ CONSTRUCT CONCRETE CHANNEL WHERE REQUIRED
④ W = 5' 6" OR MATCH EXISTING

ADAMS COUNTY TRANSPORTATION DEPARTMENT /ENGINEERING	SIDEWALK CHASE DETAILS	ADAMS COUNTY TRANSPORTATION DEPARTMENT /CONSTRUCTION INSPECTION
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601	REVISION DATE: 06/02/14 · FILE NAME: SWLK_CHASE_D.DWG	4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601



1. TRENCH TO BE SLOPED OR BRACED AND SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKMEN AND PROTECTION OF UTILITIES IN COMPLIANCE WITH APPLICABLE STATE AND FEDERAL REQUIREMENTS.
2. ALL PATCHES SHALL BE HOT MIX ASPHALT GRADING SX.
3. TRENCH WIDTH SHALL MEET TABLE BELOW.
4. SELECT BACKFILL AND DENSITY TESTING BY OTHERS MAY BE REQUIRED BY THE DIRECTOR OF PUBLIC WORKS.
5. FLOWFILL WILL BE REQUIRED ON ALL TRENCH BACKFILL UNLESS OTHERWISE DIRECTED BY THE COUNTY.
6. TEMPORARY COLD PATCHING WILL BE REQUIRED WHEN HOT MIX IS NOT AVAILABLE.
7. OPEN STREET CUTS WILL HAVE THE FOLLOWING MINIMUM PATCH REQUIREMENTS:
   OR MATCH EXISTING PAVEMENT THICKNESS - WHICHEVER IS GREATER
   RESIDENTIAL 5 INCHES
   COLLECTOR 7 INCHES
   ARTERIAL OR INDUSTRIAL - 9 INCHES
8. ALL CUTS WILL BE PATCHED (OR COLD PATCHED) THE SAME DAY THE CUT IS MADE.
9. CONSTRUCTION SIGNING AND BARRICADES WILL BE MAINTAINED BY THE CONTRACTOR.
10. APPROVED TRAFFIC CONTROL PLAN WILL BE REQUIRED PRIOR TO CONSTRUCTION.

NOMINAL SIZE OF PIPE, I.D.	MAXIMUM TRENCH WIDTH AT TOP OF PIPE	MINIMUM TRENCH WIDTH AT PIPE SPRINGLINE
Less than 18"	Pipe O.D. + 18"	Pipe O.D. + 12"
18" thru 48"	Pipe O.D. + 30"	Pipe O.D. + 24"
49" or more	Must have submitted Engineering Plan	

SOIL CLASSIFICATION	MINIMUM RELATIVE COMPACTION (%)	
AASHTO M 145	AASHTO T 99	AASHTO T 180
A-1	100	95
A-3	100	95
A-2-4	100	95
A-2-5	100	95
All Others	95	90

NO SCALE

ADAMS COUNTY TRANSPORTATION DEPARTMENT /ENGINEERING	TRENCH PATCHING DETAIL	ADAMS COUNTY TRANSPORTATION DEPARTMENT /CONSTRUCTION INSPECTION
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601	REVISION DATE: 06/02/14 · FILE NAME: TRENCHPATCH_REV.DWG	4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601

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PREPARED FOR:
HSG LAND LLC

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SHEET INFO:
SELTZER HEIGHTS FILING 1
DETAILS
DETAILS STORM 1

PROJECT NO:
0109-2207

DRAWN BY:
EST

DESIGNED BY:
KPT

SCALE:
1" = NA'

SUBMITTED ON:
01/20/2025

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