Planning and Referral Agency Comment Letters – presented in reverse chronological order

<u>Summary</u>

1. Planning comments
    a. Fees applied to property to date
    b. Revisions to documents
    c. For more information see pages 1-6
2. Public Works comments
    a. Revisions to documents
    b. For more information see pages 7-300
        i. Annexation/vacation plat and survey information pages 13-28
        ii. Traffic study pages 29-142
        iii. Drainage letter and reports pages 143-300
3. South Adams Fire District
    a. Fees applied to property
    b. No other comments
    c. For more information see pages 301-302
4. South Adams County Water and Sanitation District
    a. General comments responses
    b. No special conditions
    c. For more information see pages 303-304
5. Tri-County Health Department
    a. Informational comments
    b. For more information see pages 305-312
6. GIS
    a. Revisions to documents
    b. For more information see pages 313-316
7. Adams County
    a. No concerns
    b. For more information see page 317
8. Adams 14 School District
    a. Have capacity for students
    b. For more information see pages 318-323
9. Parks, Recreation, and Golf Department
    a. Fees applied to property – revised as more information provided
    b. City plans for trail
    c. For more information see pages 324-325
10. The Farmers Reservoir and Irrigation Company
    a. General comments
    b. For more information see page 326
11. Xcel
    a. No conflicts
    b. No easements in scope of work
    c. For more information see pages 327-332

4/26/2022

Scott McFadden
Prospect LLC
4100 East Iliff Avenue, #20
Denver, CO, 80205

Re: Comments for Case AN-265-22, Z-984--22, V-94-22

To Scott McFadden

The submitted applications for Annexation, Zone Change, and Vacation have been reviewed and discussed by the Development Review Team (DRT) and staff has visited the property to assess the site. As a result, the following items were identified for your team to address:

DRT General Comments:

- ❒ Once the items identified in this comment letter have been addressed, staff is generally supportive of your requests.
- ❒ Staff has referenced certain sections of our Land Development Code (LDC) in this comment letter and our enclosed redlines. A copy of this document is available at http://www.c3gov.com/LDC.
- ❒ Staff would encourage you to review Article IX of the LDC in order to get a sense of some of the fees that are associated with development. **Please note:** there may be additional fees associated with your development that are not identified in Article IX.
- ❒ The city encourages sustainable development and green building practices to help balance growth with protection of our region's valuable natural resources. Staff encourages your team to utilize sustainable development practices in regards to site design, energy efficiency, water conservation, waste minimization, pollution prevention, and the use of resource efficient materials in the development of this site.
- ❒ Continue to work with the Farmers Reservoir and Irrigation Company (FRICO) to address all comments and requirements identified in comment letter from FRICO, dated April 6, 2022.
- ❒ It is important to note that while staff has made every effort to make this comment letter all-inclusive, there may be additional comments on future submittals that have not been identified here based on the changes to your plans.

Planning Division – Comments provided by Anita Riley

- ❒ General Comments
  - To date, the following fees have been, or will be, applied to the subject property:
    1. South Adams County Fire District (SACFD) impact fee: $250/dwelling unit;
    2. Commerce City park fee-in-lieu: $62,379; and
    3. Adams 14 School District school land dedication fee-in-lieu: $396.24/dwelling unit.
  - Be aware that the GSA will assign 25% of the required ERUs for water resources at the subject property. The applicant must work with the South Adams County Water and Sanitation District to obtain the remainder

❒ Annexation

- Comments related to Annexation Information Sheet:
    4. No further comments from the Planning Division.
- Comments related to Pre-Annexation Agreement:
    5. Staff is working with the applicant to complete the pre-annexation agreement.

❒ Zone Change

- Comments related to Zone Change Document:
    6. Be aware that the approval criteria for a setback variance for accessory structures at development plan can be difficult to meet, particularly the hardship requirement. You may want to consider the minor modification process that would allow for a 50% decrease in setback requirement.

❒ Vacation

- General Comments:
    7. No further comments from the Planning Division.

Please see additional enclosed redlines as well as comment letters from the following referral agencies:

- FRICO – Cheryl Plucker
- Parks, Recreation, and Golf – Traci Ferguson
- Public Works – Lee Alverson
- South Adams County Fire District – Savannah Elliott

Please be aware that there are multiple comments from the Public Works Department, provided over a number of days. Due to the expedited nature of this application, these and other comments have been forwarded to you. The comments may or may not have already been addressed. Please review and address all new and/or outstanding comments.

Next Steps:
Please include the following information in your next submittal or as final documents:

❒ Digital copies of all revised documents;
❒ Two paper copies of all revised documents and
❒ Digital copies of a response letter addressing each item above as well as the comments made by each referral agency.

Each subsequent submittal undergoes a four-week review cycle. Please feel free to contact me via email at ariley@c3gov.com or by phone at 303.329.3716 to further discuss any of these comments.

Sincerely,

Anita Riley, City Planner

Enclosures

3/16/2022

Scott McFadden
Prospect LLC
4100 East Iliff Avenue, #20
Denver, CO, 80205

Re: Comments for Case AN-265-22, Z-984--22, V-94-22

To Scott McFadden

The submitted Zone Change application has been reviewed and discussed by the Development Review Team (DRT) and staff has visited the property to assess the site. As a result, the following items were identified for your team to address:

DRT General Comments:

- The City would like to thank Prospect LLC for a very professional submittal.
- Once the items identified in this comment letter have been addressed, staff is generally supportive of your requests.
- Staff has referenced certain sections of our Land Development Code (LDC) in this comment letter and our enclosed redlines. A copy of this document is available at http://www.c3gov.com/LDC.
- Staff would encourage you to review Article IX of the LDC in order to get a sense of some of the fees that are associated with development. **Please note:** there may be additional fees associated with your development that are not identified in Article IX.
- The city encourages sustainable development and green building practices to help balance growth with protection of our region's valuable natural resources. Staff encourages your team to utilize sustainable development practices in regards to site design, energy efficiency, water conservation, waste minimization, pollution prevention, and the use of resource efficient materials in the development of this site.
- It is important to note that while staff has made every effort to make this comment letter all-inclusive, there may be additional comments on future submittals that have not been identified here based on the changes to your plans.

Planning Division – Comments provided by Anita Riley

- Annexation
  - General Comments:
    1. At this time, the office of the City Attorney has not provided comments regarding this case. Once planning obtains those comments, they will be provided to the applicant for review.
  - Comments related to Annexation Petition:
    1. Please provide an Exhibit A: Legal Description Attached to the Petition with header/title of Exhibit A with the next submittal.

Comments related to Annexation Information Sheet:

    1. Please revise information sheet to list all special districts of which the subject property is a part.
- Comments related to Pre-Annexation Agreement:
    1. Staff will work to create the language for the pre-annexation agreement.
- Comments related to Annexation Map:
    1. All sheets: This annexation has been assigned case number AN-265-22. Please update the title in the annexation map on both sheets to reflect this on the next submittal.
    2. Sheet 1: The basis of bearings statement must state that the bearings are based on Commerce City Control Diagram.
    3. Sheet 1: The Reception No. line should be located at the lower right hand corner of the sheet, if possible.

❒ <u>Zone Change</u>

- General Comments:
    1. The Commerce City Station Area Master Plan designates the property as high density residential in the future land use plan. The proposed R-3 zoning is consistent with this future land use designation.
    2. It also indicates a multimodal access that bisects the property at 71st Avenue at terminates at the O'Brien Canal. An easement must be provided to the City on the plat at the subdivision application stage.
    3. Fifteen percent of all usable land will need to be developed as private parks or open space in order meet the zone change approval criteria. Please confirm in a revised narrative that this requirement will be met.
    4. Please provide a revised narrative for the proposed zone change and make sure to emphasize the desired zoning and the proposed uses that are envisioned for that site.
- Comments related to the Narrative:
    1. Please revise the narrative to reflect a zone change to Multi-Family (R-3).
- Comments related to Zone Change Document:
    1. This zone change has been assigned case number Z-984-22. Please update the title in the annexation map to reflect this on the next submittal.
    2. Section 21-4310 of the LDC requires a 30-foot side yard setback where the side in on a street. The applicant may provide a second minimum side yard dimension to reflect this requirement or revise the existing minimum requirement shown since there is no interior side to the lot.
    3. Setback requirements for accessory structures are listed in Section 21-5450 of the LDC. Please revise the document to specify this section and identify the types of accessory structures to which the setbacks will be applied.
    4. A minor modification will be required to reduce the parking requirements to 50%. A parking study will be required to verify that amount of reduction in parking is sustainable.
    5. Be aware that the request for Modification 1 would more likely be supported if a maximum number of accessory structures as well as the type of structures were identified.
    6. Applications must be submitted for all minor modifications.

- ❐ Vacation
  - General Comments:
    1. Narrative
    2. A vacation plat was not part of the original submittal, however, a draft vacation plat was provided March 10, 2022. The following revisions must be made:
       - Provide the width of the right-of-way at Colorado at various locations, with particular attention to width at the location of the requested vacation. Please note whether the dimensions are existing or proposed.
       - Delineate and note setbacks and easements on the subject property.
       - Indicate the location of 71st Avenue on the east side of Colorado Boulevard.
    3. Provide no objection letters from Xcel Energy, Qwest Communications, Comcast Cable, and the Commerce City Public Works Department with the next submittal.

Please see additional enclosed redlines as well as comment letters from the following referral agencies:

- FRICO – Scott Edgar and Victoria Schumm
- GIS
- Public Works – Lee Alverson
- South Adams County Fire District – Savannah Elliott
- South Adams County Water and Sanitation District – Jeff Nelson
- Tri County Health Department – Annemarie Heinrich Fortune
- Xcel Energy – Adam Hutchinson and Donna George

Next Steps:
Please include the following information in your next submittal:

- ❐ Digital copies of the revised narrative, Annexation Information Sheet, Annexation Map, and Vacation Plat; and
- ❐ Digital copies of a response letter addressing each item above as well as the comments made by each referral agency.

Each subsequent submittal undergoes a five-week review cycle. Please feel free to contact me via email at ariley@c3gov.com or by phone at 303.329.3716 to further discuss any of these comments.

Sincerely,

Anita Riley, City Planner

Enclosed: List of enclosures

INTEROFFICE MEMORANDUM

TO: Anita Riley, Planner
FROM: Lee Alverson, Development Review Engineer
DATE: June 8, 2022
SUBJECT: AN-265-22 Z-984-22 V-94-22; 7001 Colorado Blvd, 2nd Comments

Public Works has reviewed the above submittal and has the following comments.

Annexation Map

1. No additional comments.

Right of Way Vacation

1. No additional comment.

Drainage Report:

1. A drainage report will be required to accompany future development permits. Prepare the report using the latest City of Commerce City Storm Drainage Design and Technical Criteria Manual.
2. Additional comments will be made when the drainage report is reviewed.

Traffic Study:

An updated traffic study is still being drafted by the developer's design team. Until the City has an opportunity to review the revised study, the follow statements from the first review are still valid. The traffic study shall be submitted for review and approval with the future development permit.

1. Revise the traffic study to include an analysis of the intersections of 72nd/Colorado and 68th/Colorado. Discuss the impacts to Colorado Boulevard from this development.
2. The north bound left turn lane at the site access may require the reconstruction of Colorado Boulevard. Demonstrate that the left turn lane will not eliminate or adversely affect the existing bicycle lanes on Colorado Blvd.
3. The City will be improving Colorado Blvd from East 70th Avenue to East 68th Avenue with a roadway section similar to the existing section on Colorado Blvd fronting this property. This study should reference this upcoming project. If you have questions, contact Mike McGoldrick. This would be of interest to this

development as it will provide a walking route to Alsup Elementary School on 68th Ave.

4. Revise the study to include a discussion of how pedestrian traffic will use the proposed and existing improvements to get to the neighborhood schools and the RTD station.

For Information:

1. This site is not currently in an area that has an assessed Road Impact Fee or Drainage Impact Fee.
2. Please provide a comment response letter with your next submittal.

Civil Plans and Grading Permit:

1. After this site is annexed and a development permit is reviewed Civil Construction plans including Erosion and Sediment Control (ESC) Plans will need to be submitted directly to Public Works for review.
2. As part of the review of the ESC Plans, and in preparation for a Grading Permit, the City requires that a Grading Plan Review Application be completed, and a review fee be paid.

Developer's Agreement:

1. A Developer's Agreement will be required to be executed prior to approval and recordation of a subdivision plat for this development.

If you have any questions, please call me at extension 8176.

ec: Joe WIlson, Director of Public Works
Chris Hodyl, P.E., Development Review Manager

INTEROFFICE MEMORANDUM

TO:	Anita Riley, Planner
FROM:	Lee Alverson, Development Review Engineer
DATE:	April 18, 2022
SUBJECT:	AN-265-22 Z-984-22 V-94-22; 7001 Colorado Blvd, 2nd Comments

Public Works has reviewed the above submittal and has the following comments.

Annexation Map

1. See attached red lines for annexation comments.

Right of Way Vacation

1. The basis of bearing is inaccurate. Basis of bearing for the plans must tie and be rotated to an established point in the Commerce City Control Point System. Benchmark locations, elevations and bearings may be obtained from the engineering department of Public Works. Contact Rose Clawson for more information.

Drainage Report:

1. A drainage report will be required to accompany future development permits. Prepare the report using the latest City of Commerce City Storm Drainage Design and Technical Criteria Manual.
2. Additional comments will be made when the drainage report is reviewed.

Traffic Study:

An updated traffic study is still being drafted by the developer's design team. Until the City has an opportunity to review the revised study, the follow statements from the first review are still valid.

1. Revise the traffic study to include an analysis of the intersections of 72nd/Colorado and 68th/Colorado. Discuss the impacts to Colorado Boulevard from this development.
2. The north bound left turn lane at the site access may require the reconstruction of Colorado Boulevard. Demonstrate that the left turn lane will not eliminate or adversely affect the existing bicycle lanes on Colorado Blvd.
3. The City will be improving Colorado Blvd from East 70th Avenue to East 68th Avenue with a roadway section similar to the existing section on Colorado Blvd

fronting this property. This study should reference this upcoming project. If you have questions, contact Mike McGoldrick. This would be of interest to this development as it will provide a walking route to Alsup Elementary School on 68th Ave.

4. Revise the study to include a discussion of how pedestrian traffic will use the proposed and existing improvements to get to the neighborhood schools and the RTD station.

For Information:

1. This site is not currently in an area that has an assessed Road Impact Fee or Drainage Impact Fee.
2. Please provide a comment response letter with your next submittal.

Civil Plans and Grading Permit:

1. After this site is annexed and a development permit is reviewed Civil Construction plans including Erosion and Sediment Control (ESC) Plans will need to be submitted directly to Public Works for review.
2. As part of the review of the ESC Plans, and in preparation for a Grading Permit, the City requires that a Grading Plan Review Application be completed, and a review fee be paid.

Developer's Agreement:

1. A Developer's Agreement will be required to be executed prior to approval and recordation of a subdivision plat for this development.

If you have any questions, please call me at extension 8176.

ec: Joe WIlson, Director of Public Works
Chris Hodyl, P.E., Development Review Manager

INTEROFFICE MEMORANDUM

TO:	Anita Riley, Planner
FROM:	Lee Alverson, Development Review Engineer
DATE:	March 4, 2022
SUBJECT:	AN-265-22 Z-984-22 V-94-22; 7001 Colorado Blvd, Annexation 1st Comments

Public Works has reviewed the above submittal and has the following comments.

Annexation Map

1. Provide an annexation map for review.
2. Additional comments will be made when the annexation map is reviewed.

Right of Way Vacation

1. Provide a right of way vacation map for review.
2. Additional comments will be made when the annexation map is reviewed.

Drainage Report:

1. Provide a drainage report with the next submittal. Prepare the report using the latest City of Commerce City Storm Drainage Design and Technical Criteria Manual.
2. Additional comments will be made when the drainage report is reviewed.

Traffic Study:

1. Revise the traffic study to include an analysis of the intersections of 72nd/Colorado and 68th/Colorado. Discuss the impacts to Colorado Boulevard from this development.
2. The north bound left turn lane at the site access may require the reconstruction of Colorado Boulevard. Demonstrate that the left turn lane will not eliminate or adversely affect the existing bicycle lanes on Colorado Blvd.
3. The City will be improving Colorado Blvd from East 70th Avenue to East 68th Avenue with a roadway section similar to the existing section on Colorado Blvd fronting this property. This study should reference this upcoming project. If you have questions, contact Mike McGoldrick. This would be of interest to this development as it will provide a walking route to Alsup Elementary School on 68th Ave.

4. Revise the study to include a discussion of how pedestrian traffic will use the proposed and existing improvements to get to the neighborhood schools and the RTD station.

For Information:

1. This site is not currently in an area that has an assessed Road Impact Fee or Drainage Impact Fee.
2. Please provide a comment response letter with your next submittal.

Civil Plans and Grading Permit:

1. After this site is annexed and a development permit is reviewed Civil Construction plans including Erosion and Sediment Control (ESC) Plans will need to be submitted directly to Public Works for review.
2. As part of the review of the ESC Plans, and in preparation for a Grading Permit, the City requires that a Grading Plan Review Application be completed, and a review fee be paid.

Developer's Agreement:

1. A Developer's Agreement will be required to be executed prior to approval and recordation of a subdivision plat for this development.

If you have any questions, please call me at extension 8176.

ec: Joe WIlson, Director of Public Works
Brent Soderlin, P.E., City Engineer
Chris Hodyl, P.E., Development Review Manager

7001 COLORADO

A PORTION OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN, CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO

LEGAL DESCRIPTION & DEDICATION:

KNOW ALL MEN BY THESE PRESENTS THAT ____________________ BEING THE OWNER/MORTGAGEE/LIEN HOLDER OF THAT PART OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN, CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., BEARING S 00°00'00" E, A DISTANCE OF 1320.79 FEET, AS MONUMENTED AT THE NORTHEAST CORNER OF SECTION 1 BY A FOUND 3-1/4" ALUMINUM CAP, STAMPED "RLS 24673", AND AS MONUMENTED AT THE NORTH SIXTEENTH CORNER OF SECTION 1 BY A FOUND 2" ILLEGIBLE ALUMINUM CAP.

COMMENCING AT THE NORTHEAST CORNER SAID SECTION 1, THENCE ON AN ASSUMED BEARING ALONG THE NORTH LINE OF SAID SECTION 1, N 89°53'22" W, A DISTANCE OF 30.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF COLORADO BOULEVARD; THENCE ALONG SAID WESTERLY RIGHT-OF-WAY LINE, S 00°00'00" E, A DISTANCE OF 253.52 FEET; THENCE S 54°35'02" W, A DISTANCE OF 12.27 FEET TO A POINT ON THE WESTERLY LINE OF A 10 FOOT RIGHT-OF-WAY DEDICATION CONVEYED IN THE DEED RECORDED APRIL 11, 2000 IN BOOK 6083 AT PAGE 635 OF THE ADAMS COUNTY RECORDS, AND THE POINT OF BEGINNING;

THENCE DEPARTING SAID WESTERLY RIGHT-OF-WAY DEDICATION, S 35°24'58" E, A DISTANCE OF 62.13 FEET TO A POINT OF CURVATURE; THENCE ALONG A NON-TANGENT CURVE TO THE LEFT WITH A CENTRAL ANGLE OF 18°47'55", A RADIUS OF 675.00 FEET, AN ARC LENGTH OF 221.46 FEET AND A CHORD BEARING AND DISTANCE OF S 09°23'57" W, 220.47 FEET TO A POINT ON SAID WESTERLY RIGHT-OF-WAY DEDICATION LINE;

THENCE ALONG SAID WESTERLY RIGHT-OF-WAY DEDICATION LINE, S 00°00'00" E, A DISTANCE OF 752.48 FEET TO A POINT ON THE NORTH LINE OF THE PROPERTY AS DESCRIBED IN FINAL RULE AND ORDER RECORDED JUNE 6, 2017 UNDER RECEPTION NO. 2017000048567 OF SAID ADAMS COUNTY RECORDS; THENCE ALONG SAID NORTH LINE THE FOLLOWING THREE (3) COURSES:

1. S 69°25'46" W, A DISTANCE OF 16.61 FEET;
2. N 89°50'33" W, A DISTANCE OF 136.41 FEET TO A POINT OF CURVATURE;
3. ALONG A TANGENT CURVE TO THE RIGHT WITH A CENTRAL ANGLE OF 16°38'33", A RADIUS OF 171.60 FEET, AN ARC LENGTH OF 49.84 FEET AND A CHORD BEARING AND DISTANCE OF N 81°31'10" W, 49.67 FEET;

THENCE DEPARTING SAID NORTH LINE, N 70°00'48" E, A DISTANCE OF 1.08 FEET; THENCE N 19°41'12" E, A DISTANCE OF 120.85 FEET; THENCE N 05°45'16" E, A DISTANCE OF 112.51 FEET; THENCE N 05°20'36" W, A DISTANCE OF 72.62 FEET; THENCE N 15°35'09" W, A DISTANCE OF 82.02 FEET; THENCE N 11°24'39" E, A DISTANCE OF 63.82 FEET; THENCE N 23°41'00" W, A DISTANCE OF 175.95 FEET; THENCE N 06°23'33" E, A DISTANCE OF 163.66 FEET; THENCE N 39°15'46" E, A DISTANCE OF 85.08 FEET; THENCE N 29°15'42" E, A DISTANCE OF 119.15 FEET; THENCE N 47°04'09" E, A DISTANCE OF 67.34 FEET; THENCE N 54°35'02" E, A DISTANCE OF 67.87 FEET TO A POINT ON SAID WESTERLY RIGHT-OF-WAY DEDICATION LINE, AND THE POINT OF BEGINNING;

CONTAINING AN AREA OF 177,333 SQUARE FEET OR 4.071 ACRES, MORE OR LESS;

HAVE BY THESE PRESENTS LAID OUT, PLATTED AND SUBDIVIDED THE SAME INTO LOTS AND BLOCKS AS SHOWN ON THIS PLAT UNDER THE NAME AND STYLE OF 7001 COLORADO AND DO HEREBY GRANT TO THE CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO, FOR THE USE OF THE PUBLIC, THE STREETS AND OTHER PUBLIC WAYS AND EASEMENTS HEREON SHOWN, FOR PUBLIC UTILITY, CABLE TV, AND DETENTION POND AREAS, FLOODWAY AND FLOODPLAIN LIMITS, DRAINAGE AND OTHER PUBLIC PURPOSES AS DETERMINED BY COMMERCE CITY.

EXECUTED THIS _________ DAY OF __________________________________, AD 20____

____
OWNER(S') SIGNATURE AND PRINTED NAME

____
MORTGAGEE OR LIEN HOLDER(S') SIGNATURE AND PRINTED NAME

OWNERSHIP AND TITLE CERTIFICATE:

I, __________ A DULY AUTHORIZED OFFICER OF ____________ HEREBY CERTIFY THAT THE PARTIES EXECUTING THIS PLAT AS OWNERS OF THE ABOVE DESCRIBED PROPERTY ARE THE OWNERS THEREOF IN FEE SIMPLE; AND FURTHER, THAT ALL PUBLIC RIGHT-OF-WAY, EASEMENTS OR IMPROVEMENTS, IF ANY, THAT ARE DEDICATED BY THIS PLAT ARE FREE AND CLEAR OF ALL LIENS AND ENCUMBRANCES, EXCEPT THOSE SHOWN ON THIS PLAT.

______________________________ ____________
AUTHORIZED SIGNATURE AND PRINTED NAME DATE

LIEN HOLDER(S):

THE UNDERSIGNED, BEING THE HOLDER OF A DEED OF TRUST ENCUMBERING THE PROPERTY DESCRIBED IN THE PLAT OF _________________ JOINS IN AND CONSENTS TO THE FILING HEREOF.

STATE OF COLORADO BY:____

COUNTY OF ADAMS AUTHORIZED SIGNATURE AND PRINTED NAME

NOTARY SEAL:

THE FOREGOING DEDICATION WAS ACKNOWLEDGE BEFORE ME THIS ______ DAY OF __________, A.D. 20____.

STATE OF:____

COUNTY OF:_______________________________________

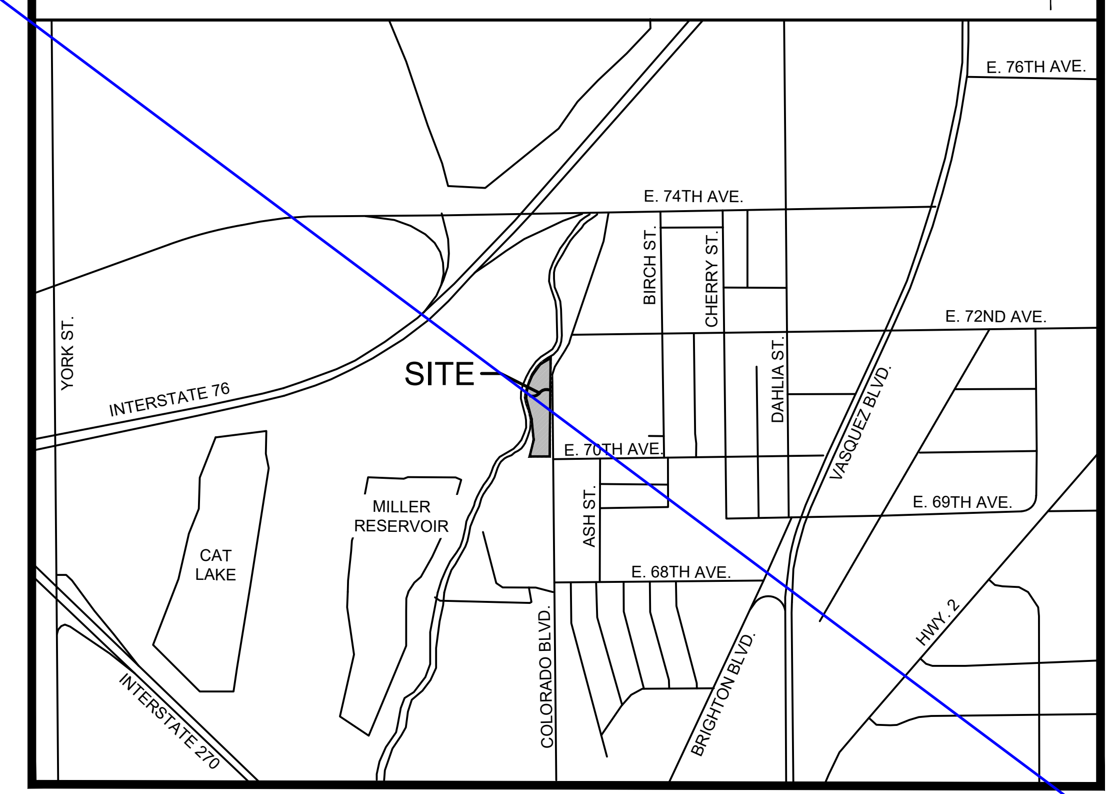
CITY OF:____

MY COMMISSION EXPIRES:___________________________

NOTARY PUBLIC:___________________________________

NOTARY SEAL

VICINITY MAP SCALE: 1" = 2,000'



NOTICE IS HEREBY GIVEN:

1. ANY CONSTRUCTION ACROSS AN EXISTING SUBDIVISION LOT LINE IS IN VIOLATION OF THE SUBDIVISION REGULATION OF THE CITY, EXCEPT AS HEREIN AUTHORIZED.
2. ANY DIVISION OF AN EXISTING LOT, CONVEYANCE OF A PART OF AN EXISTING SUBDIVISION LOT, IS IN VIOLATION OF THIS ARTICLE UNLESS (1) APPROVED BY THE CITY OF COMMERCE CITY; OR (2) IS EXCEPTED FROM THE DEFINITION OF "SUBDIVISION" AS PROVIDED BY THE SUBDIVISION REGULATIONS.
3. THIS PLAT DOES NOT ESTABLISH WATER AVAILABILITY FOR THE SUBJECT PROPERTY. WATER AND WASTEWATER SERVICE IS PROVIDED BY THE SOUTH ADAMS COUNTY WATER AND SANITATION DISTRICT. INVESTIGATION OF THE CURRENT WATER AVAILABILITY FOR THE PROPERTY AND ACQUISITION OF ANY ADDITIONAL WATER REQUIRED FOR DEVELOPMENT OF THE PROPERTY SHALL BE THE SOLE RESPONSIBILITY OF THE DEVELOPER, ITS SUCCESSOR AND ASSIGNS. DEVELOPMENT APPROVALS WILL NOT BE GRANTED WITHOUT PROOF OF WATER AVAILABILITY.
4. THE STORM WATER DETENTION AREA SHOWN HEREON SHALL BE CONSTRUCTED AND MAINTAINED BY THE OWNER AND THE SUBSEQUENT OWNERS, HEIRS, SUCCESSORS AND ASSIGNS. IN THE EVENT THAT SAID CONSTRUCTION AND MAINTENANCE IS NOT PERFORMED BY SAID OWNER, THE CITY OF COMMERCE CITY SHALL HAVE THE RIGHT TO ENTER SUCH AREA AND PERFORM THE NECESSARY WORK, THE COST OF WHICH, SAID OWNER, HEIRS, SUCCESSORS, AND ASSIGNS AGREES TO PAY UPON BILLING.
5. NO BUILDING OR STRUCTURE WILL BE CONSTRUCTED IN THE DETENTION AREA AND NO CHANGES OR ALTERATIONS AFFECTING THE HYDRAULIC CHARACTERISTICS OF THE DETENTION AREA WILL BE MADE WITHOUT THE APPROVAL OF THE CITY.

CITY COUNCIL CERTIFICATE:

APPROVED BY THE CITY COUNCIL OF THE CITY OF COMMERCE CITY

THIS ______ DAY OF ____________________________, AD 20____.

ATTEST:

____
CITY CLERK

____
MAYOR

ADAMS COUNTY CLERK AND RECORDER'S CERTIFICATE:

THIS PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE ADAMS COUNTY CLERK AND RECORDER, IN THE STATE OF COLORADO,

AT ______M. ON THE _______ DAY OF ______________________________, A.D. 20____.

CLERK AND RECORDER: ________________________________

BY DEPUTY: ____

RECEPTION NO. ______________________

SURVEYORS CERTIFICATION:

I, DARREN R. WOLTERSTORFF, A REGISTERED LAND SURVEYOR, REGISTERED IN THE STATE OF COLORADO DO HEREBY CERTIFY THAT THERE ARE NO ROADS PIPELINES, IRRIGATION DITCHES, OR OTHER EASEMENTS IN EVIDENCE OF KNOWN BY ME TO EXIST ON OR ACROSS THE HEREIN BEFORE DESCRIBED PROPERTY EXCEPT AS SHOWN ON THIS PLAT. I FURTHER CERTIFY THAT I HAVE PERFORMED THE SURVEY SHOWN HEREON, OR SUCH SURVEY WAS PREPARED UNDER MY DIRECT RESPONSIBILITY AND SUPERVISION, THAT THIS PLAT ACCURATELY REPRESENTS SAID SURVEY, AND THAT ALL MONUMENTS EXIST AS SHOWN HEREIN.

____
DARREN R. WOLTERSTORFF, P.L.S. 38281
FOR AND ON BEHALF OF:
KIMLEY-HORN AND ASSOCIATES, INC.
4582 SOUTH ULSTER STREET,
SUITE 1500, DENVER, COLORADO 80237

PRELIMINARY
THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

CITY STAFF CERTIFICATE:

APPROVAL BY THE CITY ENGINEER OF THE CITY OF COMMERCE CITY

THIS ______ DAY OF ____________________________, AD 20____.

____
CITY ENGINEER

APPROVAL BY THE DIRECTOR OF COMMUNITY DEVELOPMENT OF THE CITY OF COMMERCE

CITY THIS ______ DAY OF ____________________________, AD 20____.

____
DIRECTOR, COMMUNITY DEVELOPMENT

THE SITE, BASIS OF BEARINGS, AND ALL ASSOCIATED BEARINGS WILL BE ROATED AND UPDATED TO MATCH THE CITY OF COMMERCE CITY CONTROL DIAGRAM. THIS WILL BE COMPLETED ALONG WITH ALL OTHER CITY COMMENTS AND ADDRESSED AND RESUBMITTED. SEE 7001 COLORADO ANNEXATION PLAT REV 1 FOR THE UPDATED ROTATION AND BEARINGS.

NOTES:

1. ACCORDING TO 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 THE CERTIFICATION SHOWN HEREON.
2. ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OF DEFACES ANY PUBLIC LAND SURVEY MONUMENT OR LAND BOUNDARY MONUMENT OR ACCESSORY COMMITS A CLASS TWO (2) MISDEMEANOR PURSUANT TO STATE STATUTE 18-4-508, C.R.S.
3. FIELD SURVEY WAS COMPLETED ON NOVEMBER 11, 2021.
4. BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., BEARING S 00°00'00" W, A DISTANCE OF 1320.79 FEET, AS MONUMENTED AT THE NORTHEAST CORNER OF SECTION 1 BY A FOUND 3-1/4" ALUMINUM CAP, STAMPED "RLS 24673", AND AS MONUMENTED AT THE NORTH SIXTEENTH CORNER OF SECTION 1 BY A FOUND 1-1/4" ILLEGIBLE ALUMINUM CAP.
5. ALL DISTANCE SHOWN HEREON ARE GROUND DISTANCES MEASURED IN U.S. SURVEY FEET.
6. THIS PLAT DOES NOT CONSTITUTE A TITLE SEARCH BY KIMLEY-HORN AND ASSOCIATES, INC. TO DETERMINE OWNERSHIP OF THIS TRACT, VERIFY THE DESCRIPTION SHOWN, VERIFY THE COMPATIBILITY OF THIS DESCRIPTION WITH THAT OF ADJACENT TRACTS, OR VERIFY EASEMENTS OF RECORD. FOR ALL INFORMATION REGARDING EASEMENTS, RIGHTS-OF-WAY OR TITLE OF RECORD, KIMLEY-HORN AND ASSOCIATES, INC. RELIED UPON TITLE COMMITMENT NO. 1334156, EFFECTIVE DATE JULY 31, 2021 AT 8:00 A.M., PREPARED BY STEWART TITLE COMPANY.
7. EXCEPT AS SPECIFICALLY STATED OR SHOWN ON THIS PLAT, THIS SURVEY DOES NOT PURPORT TO REFLECT ANY OF THE FOLLOWING WHICH MAY BE APPLICABLE TO THE SUBJECT TRACT: RESTRICTIVE COVENANTS, SUBDIVISION RESTRICTIONS, ZONING OR OTHER LAND-USE REGULATIONS, AGREEMENTS, LEASE AGREEMENTS AND OWNERSHIP TITLE EVIDENCE.
8. THE WORD "CERTIFY" OR "CERTIFICATE" AS SHOWN AND USED HEREON MEANS AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THE FACTS OF THE SURVEY AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE, EXPRESSED OR IMPLIED.
9. THIS PROPERTY IS LOCATED WITHIN ZONE X, AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, AS SHOWN ON THE FLOOD INSURANCE RATE MAP FOR COUNTY OF ADAMS, COMMUNITY PANEL NUMBER 08001C604H, MAP EFFECTIVE DATE MARCH 5, 2007. THE ACCURACY OF ANY FLOOD HAZARD DATA SHOWN ON THIS SURVEY IS SUBJECT TO MAP SCALE UNCERTAINTY AND TO ANY OTHER UNCERTAINTY IN LOCATION OR ELEVATION ON THE REFERENCED FLOOD INSURANCE RATE MAPS.

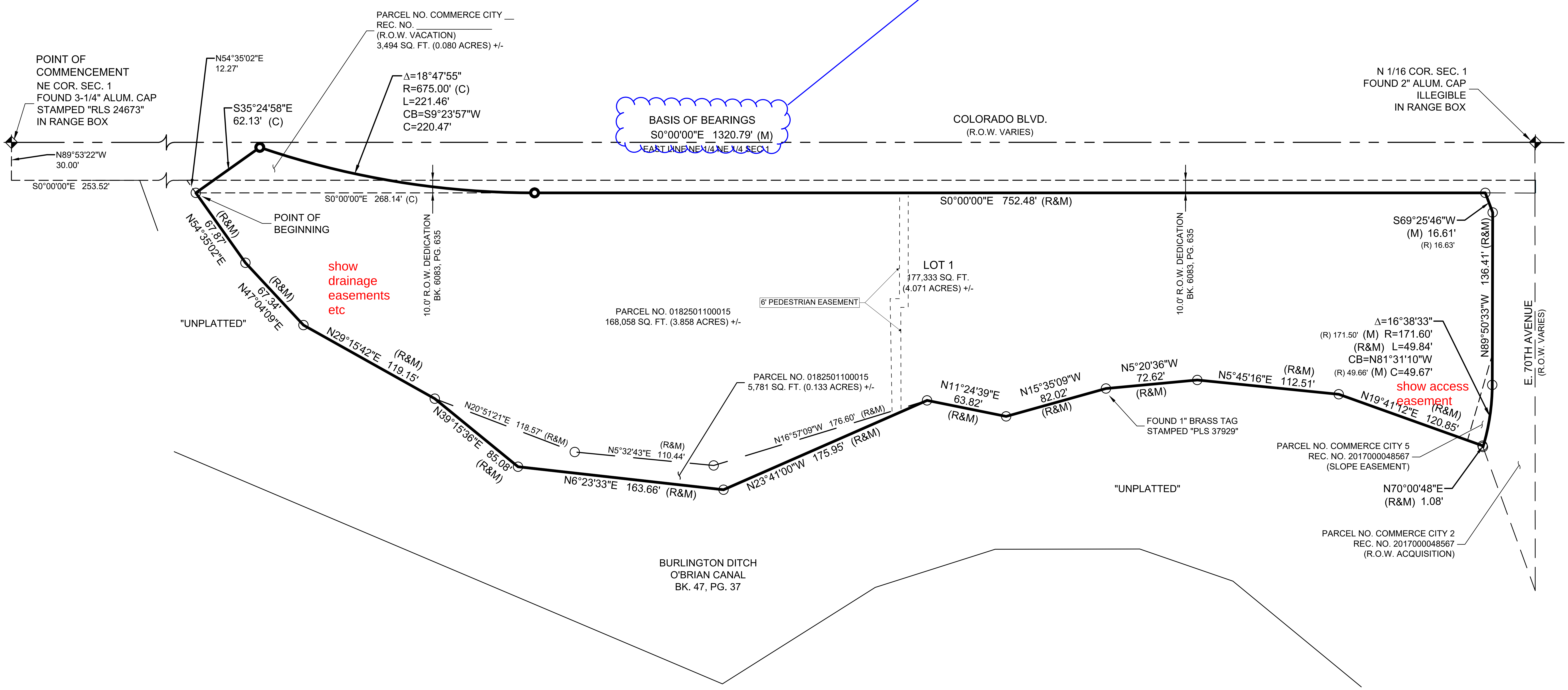
Kimley»Horn
4582 SOUTH ULSTER ST., # 1300
DENVER, COLORADO 80237
Tel. No. (303) 228-2300
www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N.T.S	CAD	DRW	3/17/2022	096216004	1 OF 2

7001 COLORADO

A PORTION OF THE NORTHEAST QUARTER OF THE
NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH,
RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN,
CITY OF COMMERCE CITY, COUNTY OF ADAMS,
STATE OF COLORADO

THE SITE, BASIS OF BEARINGS, AND ALL ASSOCIATED BEARINGS WILL BE ROATED AND UPDATED TO MATCH THE CITY OF COMMERCE CITY CONTROL DIAGRAM. THIS WILL BE COMPLETED ALONG WITH ALL OTHER CITY COMMENTS AND ADDRESSED AND RESUBMITTED. SEE 7001 COLORADO ANNEXATION PLAT REV 1 FOR THE UPDATED ROTATION AND BEARINGS.



LEGEND

	SECTION CORNER FOUND AS NOTED
○	PROPERTY CORNER - FOUND 1-1/4" YELLOW PLASTIC CAP STAMPED "PLS 37929" UNLESS OTHERWISE NOTED
●	PROPERTY CORNER SET - SET 18" LONG NO. 5 REBAR WITH 1-1/2" ALUM. CAP STAMPED "PLS 38281"
(R)	RECORD DIMENSION
(M)	MEASURED DIMENSION
(C)	CALCULATED DIMENSION
	BOUNDARY LINE
	SECTION LINE
	EASEMENT/RIGHT-OF-WAY LINE

NORTH

GRAPHIC SCALE IN FEET

60 0 30 60 120

1" = 60' @ 18X24

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Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 60'	CAD	DRW	3/17/2022	096216004	2 OF 2

AN-265-22

ANNEXATION MAP
TO THE CITY OF COMMERCE CITY, COLORADO

FOR ANNEXATION PURPOSES ONLY

A PORTION OF THE NORTHEAST QUARTER OF THE
NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH,
RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN,
CITY OF COMMERCE CITY, COUNTY OF ADAMS,
STATE OF COLORADO

ANNEXATION DESCRIPTION:

A PARCEL OF LAND LOCATED IN THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN, ADAMS COUNTY, COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS NEEDS TO BE BASED ON THE COMMERCE CITY CONTROL MONUMENTS EAST LINE OF THE NORTHEAST QUARTER OF NORTHEAST QUARTER OF SECTION 1, N00° 14' 18"W 2641.42'

BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., BEARING S 00°00'00" W, A DISTANCE OF 1320.79 FEET, AS MONUMENTED AT THE NORTHEAST CORNER OF SECTION 1 BY A FOUND 3-1/4" ALUMINUM CAP, STAMPED "RLS 24673", AND AS MONUMENTED AT THE NORTH SIXTEENTH CORNER OF SECTION 1 BY A FOUND 1-1/4" ILLEGIBLE ALUMINUM CAP.

PARCEL A:

COMMENCING AT THE NORTHEAST CORNER SAID SECTION 1; THENCE ON AN ASSUMED BEARING ALONG THE NORTH LINE OF SAID SECTION 1, N 89°53'22" W, A DISTANCE OF 30.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF COLORADO BOULEVARD; THENCE ALONG SAID WESTERLY RIGHT-OF-WAY LINE, S 00°00'00" W, A DISTANCE OF 253.52 FEET; THENCE S 54°35'02" W, A DISTANCE OF 12.27 FEET TO A POINT ON THE WESTERLY LINE OF A 10 FOOT RIGHT-OF-WAY DEDICATION CONVEYED IN DEED RECORDED APRIL 11, 2000 IN BOOK 6093 AT PAGE 635 OF THE ADAMS COUNTY RECORDS, AND THE POINT OF BEGINNING;

THENCE ALONG SAID WESTERLY RIGHT-OF-WAY DEDICATION LINE, S 00°00'00" W, A DISTANCE OF 1020.62 FEET TO A POINT ON THE NORTH LINE OF THE PROPERTY AS DESCRIBED IN FINAL RULE AND ORDER RECORDED JUNE 6, 2017 UNDER RECEPTION NO. 2017000048567 OF SAID ADAMS COUNTY RECORDS; THENCE ALONG SAID NORTH LINE THE FOLLOWING THREE (3) COURSES:

1. S 69°25'46" W, A DISTANCE OF 16.61 FEET;
2. N 89°50'33" W, A DISTANCE OF 136.41 FEET TO A POINT OF CURVATURE;
3. ALONG A TANGENT CURVE TO THE RIGHT WITH A CENTRAL ANGLE OF 16°38'33", A RADIUS OF 171.60 FEET, AN ARC LENGTH OF 49.84 FEET AND A CHORD BEARING AND DISTANCE OF N 81°31'10" W, 49.67 FEET;

THENCE DEPARTING SAID NORTH LINE, N 70°00'48" E, A DISTANCE OF 1.08 FEET; THENCE N 19°41'12" E, A DISTANCE OF 120.85 FEET; THENCE N 05°45'16" E, A DISTANCE OF 112.51 FEET; THENCE N 05°20'36" W, A DISTANCE OF 72.62 FEET; THENCE N 15°35'09" W, A DISTANCE OF 82.02 FEET; THENCE N 11°24'39" E, A DISTANCE OF 63.82 FEET; THENCE N 16°57'09" W, A DISTANCE OF 176.60 FEET; THENCE N 05°32'43" E, A DISTANCE OF 110.44 FEET; THENCE N 20°51'16" E, A DISTANCE OF 118.57 FEET; THENCE N 29°15'42" E, A DISTANCE OF 119.15 FEET; THENCE N 47°04'09" E, A DISTANCE OF 67.34 FEET; THENCE N 54°35'02" E, A DISTANCE OF 67.87 FEET TO A POINT ON SAID WESTERLY RIGHT-OF-WAY DEDICATION LINE, AND THE POINT OF BEGINNING,

CONTAINING AN AREA OF 168,133 SQUARE FEET OR 3.860 ACRES, MORE OR LESS.

TOGETHER WITH

REVISE LEGAL TO BE ONE AREA TO INCLUDE BOTH PACEL AND THE ROW FOR 2017000048567

PARCEL B:

COMMENCING AT THE NORTHEAST CORNER SAID SECTION 1; THENCE ON AN ASSUMED BEARING ALONG THE NORTH LINE OF SAID SECTION 1, N 89°53'22" W, A DISTANCE OF 30.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF COLORADO BOULEVARD; THENCE ALONG SAID WESTERLY RIGHT-OF-WAY LINE, S 00°00'00" W, A DISTANCE OF 253.52 FEET; THENCE S 54°35'02" W, A DISTANCE OF 12.27 FEET TO A POINT ON THE WESTERLY LINE OF A 10 FOOT RIGHT-OF-WAY DEDICATION CONVEYED IN DEED RECORDED APRIL 11, 2000 IN BOOK 6093 AT PAGE 635 OF THE ADAMS COUNTY RECORDS; THENCE CONTINUING ALONG THE LAST DESCRIBED COURSE, S 54°35'02" W, A DISTANCE OF 67.87 FEET; THENCE S 47°04'09" W, A DISTANCE OF 67.34 FEET; THENCE S 29°15'42" W, A DISTANCE OF 119.15 FEET TO THE POINT OF BEGINNING;

THENCE S 39°15'46" W, A DISTANCE OF 85.08 FEET; THENCE S 06°23'33" W, A DISTANCE OF 163.66 FEET; THENCE S 23°41'00" E, A DISTANCE OF 175.95 FEET; THENCE N 16°57'09" W, A DISTANCE OF 176.60 FEET; THENCE N 05°32'43" E, A DISTANCE OF 110.44 FEET; THENCE N 20°51'16" E, A DISTANCE OF 118.57 FEET TO THE POINT OF BEGINNING;

REVISE THIS PER REVISED BOUNDARY

CONTAINING AN AREA OF 5,781 SQUARE FEET OR 0.133 ACRES, MORE OR LESS.

TOTAL ANNEXATION AREA CONTAINS 173,914 SQUARE FEET OR 3.993 ACRES, MORE OR LESS.

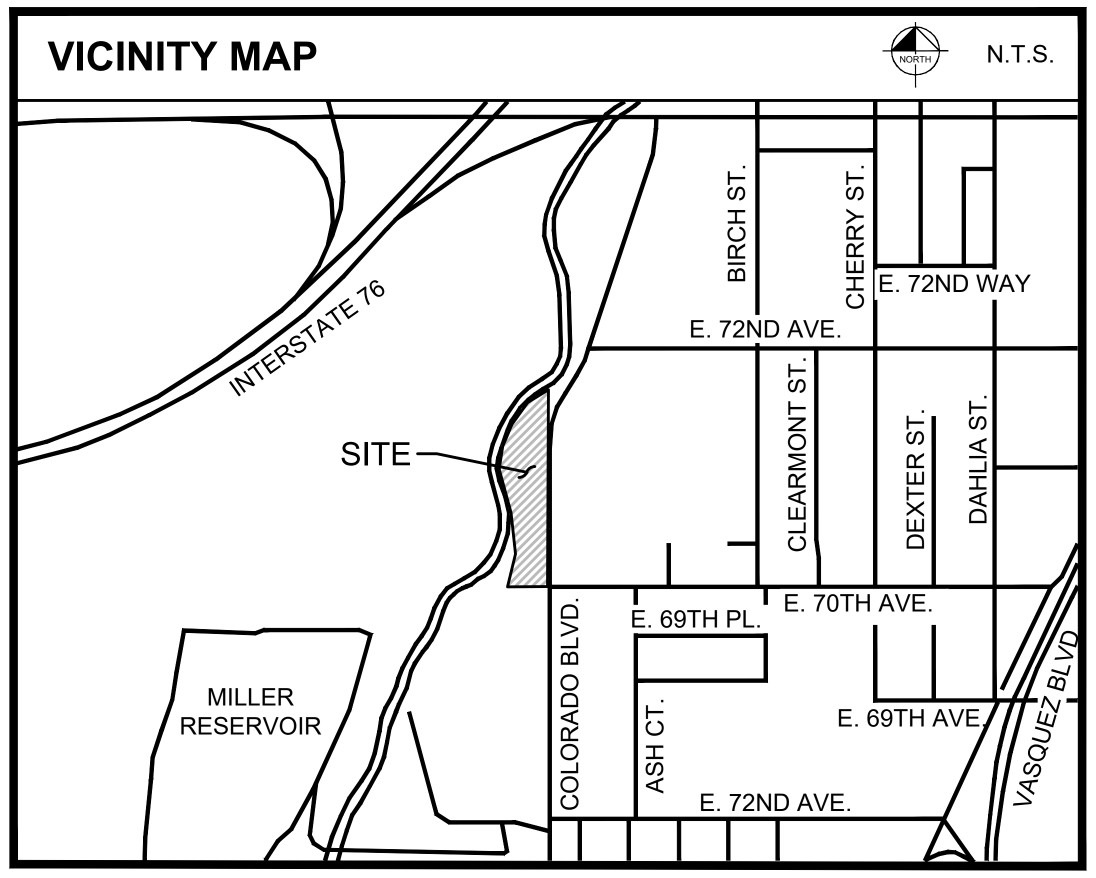
EXECUTED THIS __________ DAY OF ________________________________, AD 20____

____

OWNER(S') SIGNATURE AND PRINTED NAME

____

MORTGAGEE OR LIEN HOLDER(S') SIGNATURE AND PRINTED NAME



CITY COUNCIL CERTIFICATE:

APPROVAL BY CITY OF COMMERCE CITY, CITY COUNCIL

THIS ______ DAY OF ___________________________, AD 20____.

ATTEST:

____

CITY CLERK

____

MAYOR

ADAMS COUNTY CLERK AND RECORDER'S CERTIFICATE:

THIS MAP WAS FILED FOR RECORD IN THE OFFICE OF THE ADAMS COUNTY CLERK AND RECORDER, IN THE STATE OF COLORADO,

AT ______M. ON THE _______ DAY OF ____________________________, A.D. 20____.

____

DEPUTY COUNTY CLERK AND RECORDER

RECEPTION NO. _____________________

NOTES:

1. ACCORDING TO 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 THE CERTIFICATION SHOWN HEREON.
2. ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OF DEFACES ANY PUBLIC LAND SURVEY MONUMENT OR LAND BOUNDARY MONUMENT OR ACCESSORY COMMITS A CLASS TWO (2) MISDEMEANOR PURSUANT TO STATE STATUTE 18-4-508, C.R.S.
3. FIELD SURVEY WAS COMPLETED ON NOVEMBER 11, 2021.
4. BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., BEARING S 00°00'00" W, A DISTANCE OF 1320.79 FEET, AS MONUMENTED AT THE NORTHEAST CORNER OF SECTION 1 BY A FOUND 3-1/4" ALUMINUM CAP, STAMPED "RLS 24673", AND AS MONUMENTED AT THE NORTH SIXTEENTH CORNER OF SECTION 1 BY A FOUND 1-1/4" ILLEGIBLE ALUMINUM CAP.

   COMMERCE CITY BASIS OF BEARINGS PER CONTROL MONUMENTS DIAGRAM N00° 14' 18"W 2641.42'
5. ALL DISTANCE SHOWN HEREON ARE GROUND DISTANCES MEASURED IN U.S. SURVEY FEET.
6. EXCEPT AS SPECIFICALLY STATED OR SHOWN ON THIS PLAT, THIS SURVEY DOES NOT PURPORT TO REFLECT ANY OF THE FOLLOWING WHICH MAY BE APPLICABLE TO THE SUBJECT TRACT: RESTRICTIVE COVENANTS, SUBDIVISION RESTRICTIONS, ZONING OR OTHER LAND-USE REGULATIONS, AGREEMENTS, LEASE AGREEMENTS AND OWNERSHIP TITLE EVIDENCE.
7. THE WORD "CERTIFY" OR "CERTIFICATE" AS SHOWN AND USED HEREON MEANS AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THE FACTS OF THE SURVEY AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE, EXPRESSED OR IMPLIED.

SURVEYORS CERTIFICATION:

THE ABOVE DESCRIBED LAND IS CONTIGUOUS TO THE CITY OF COMMERCE CITY AND MEETS THE REQUIREMENTS SET FORTH IN CRS 31-12-104-(1)(A) THAT ONE-SIXTH OR MORE OF THE PERIMETER TO BE ANNEXED IS CONTIGUOUS WITH THE ANNEXING MUNICIPALITY.

CONTIGUITY STATEMENT:
TOTAL PERIMETER OF AREA CONSIDERED FOR ANNEXATION = 2,355.44'
ONE-SIXTH OF THE TOTAL PERIMETER OF AREA = 392.57'
PERIMETER OF THE AREA CONTIGUOUS WITH EXISTING CITY LIMITS = 1,223.49'
THE TOTAL CONTIGUOUS PERIMETER IS 52%, WHICH MEETS OR EXCEEDS THE 1/6 AREA REQUIRED.

REVISE TO AMENDED BOUNDARY

PURSUANT TO COLORADO STATE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS RULE 6.2.2 THE UNDERSIGNED FURTHER CERTIFIES THAT THIS MAP OR PLAT WAS PREPARED BY ME OR UNDER MY RESPONSIBLE CHARGE, IS ACCURATE TO THE BEST OF MY INFORMATION, KNOWLEDGE AND BELIEF, IS IN ACCORDANCE WITH APPLICABLE STANDARDS OF PRACTICE AND IS NOT A GUARANTY OR WARRANTY, EITHER EXPRESSED OR IMPLIED.

PRELIMINARY
THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

____

DARREN R. WOLTERSTORFF, PLS 38281
FOR AND ON BEHALF OF KIMLEY-HORN AND ASSOCIATES, INC.
4582 SOUTH ULSTER STREET, SUITE 1500
DENVER, COLORADO 80237
DARREN.WOLTERSTORFF@KIMLEY-HORN.COM

Kimley»Horn

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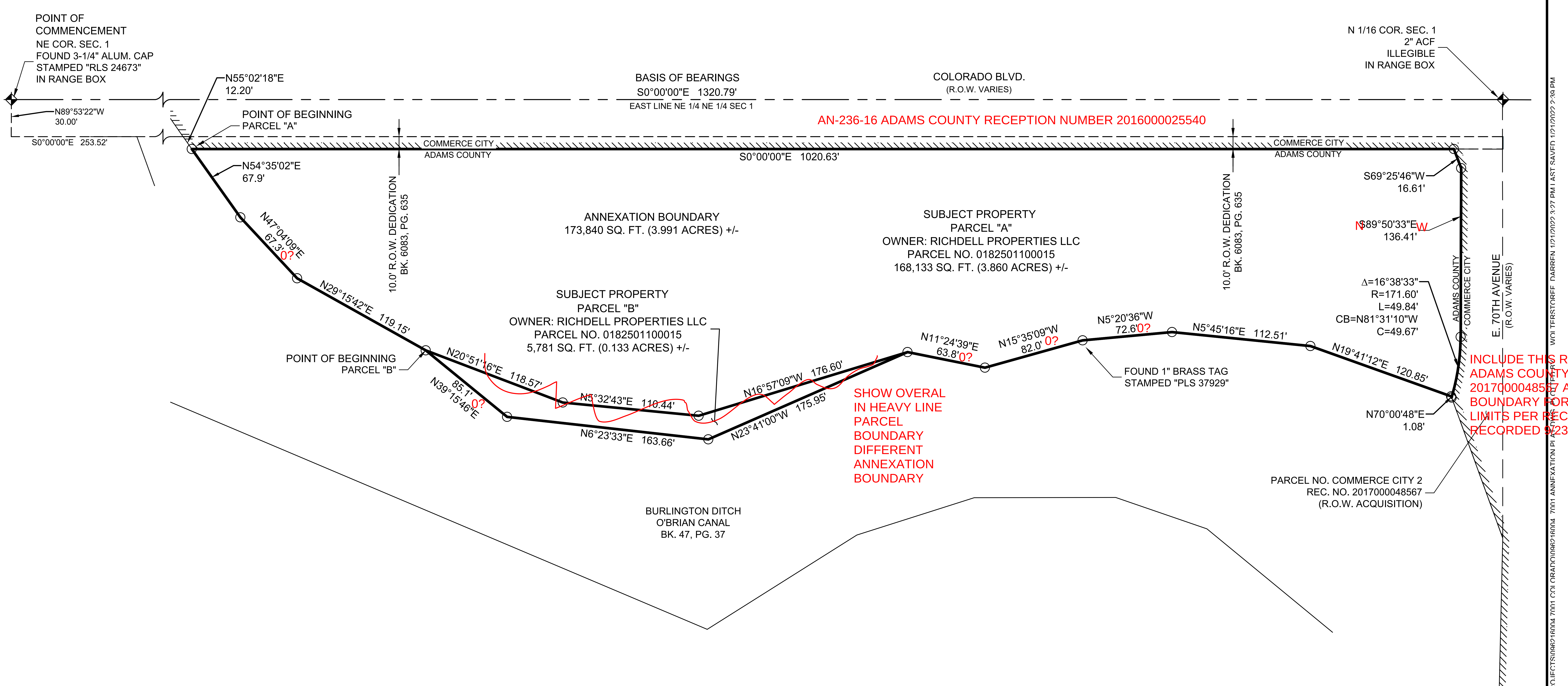
Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N.T.S	CAD	DRW	1/21/2022	096216004	1 OF 2

AN-265-22

ANNEXATION MAP
TO THE CITY OF COMMERCE CITY, COLORADO

FOR ANNEXATION PURPOSES ONLY

A PORTION OF THE NORTHEAST QUARTER OF THE
NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH,
RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN,
CITY OF COMMERCE CITY, COUNTY OF ADAMS,
STATE OF COLORADO



LEGEND

✦	SECTION CORNER FOUND AS NOTED
○	PROPERTY CORNER - FOUND 1-1/4" YELLOW PLASTIC CAP STAMPED "PLS 37929" UNLESS OTHERWISE NOTED
———	ANNEXATION BOUNDARY
\\\\\\\\	EXISTING CITY OF COMMERCE CITY BOUNDARY
— — —	SECTION LINE

NORTH

GRAPHIC SCALE IN FEET
60 0 30 60 120
1" = 60' @ 18X24

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Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 60'	CAD	DRW	1/21/2022	096216004	2 OF 2

Case #: AN-265-22

CITY OF COMMERCE CITY ANNEXATION MAP CHECKLIST					
		COMPLIES			
	DESCRIPTION	YES	NO	COMMENTS	
1.	The precise case number of the annexation (to be assigned by city), township, section, range, city, county, state, & page numbers	☐	☑	Case # AN-265-22	P
2.	Suitable scale (written and graphic)	☑	☐		P
3.	North arrow	☑	☐		P
4.	Annexed area shaded and annexed area marked "SITE" add bold arrow if needed	☑	☐		E
5.	Location and width dimensions of all recorded and apparent rights-of-ways	☐	☑	widths of row	E
6.	Former City of Commerce City annexations with letters and numbers, which are contiguous with new annexations	☐	☑	Show former annexations	E
7.	City limit lines of abutting cities, and name(s) of cities	☐	☑	Show City Limits Correctly the ROW for E 70th Ave nee	E
8.	Basis of bearings statement and labeled line on plat. **State the basis of bearing and label on the drawing. Bearings shall be based on Commerce City Control Diagram.**	☐	☑	The Basis of Bearings from the Control Diagram	E
9.	Description of all monuments both found and set.	☑	☐		E
10.	18" x 24" sheet with ½" top, bottom and right-hand border, and 2" border on the left-hand side.	☑	☐		P
11.	Significant man-made and natural features such as interstate highways, lakes, drainageways, railroads, etc.	☑	☐		E
12..	All boundary lines shall have lengths to 100th of a foot. Surveyor to provide error of closure check (within 1:20,000).	☐	☐		E
13.	All section, range, and township lines that are within annexation boundary or border the property within 100 feet.	☑	☐		E
14.	All curve data shown in chart form on the face of the plat. Radii, internal angles, points of curvature, and lengths of all arcs shown.	☑	☐		E
15.	Vicinity map on the cover sheet, scale of 1"=2000'. All roadways (by name) which are adjacent and within one mile from the peripheral boundaries of the platted land.	☑	☐		E
16.	Total area in square feet and acres.	☑	☐		E
17.	Dedication shall be worded as follows: ANNEXATION DESCRIPTION:	☑	☐		P
	(INSERT LEGAL DESCRIPTION) Executed this ___ day of _____, AD 20____ ______________________________ Owner(s') Signature and Printed Name ____________________________________ Mortgagee or Lien Holder(s) Signature and Printed Name	☐	☑	Legal Description. When existing annexed boundary of city is reached, so state; at each subsequent call, so indicate; and when departing existing boundary of city, so state.	E
18.	Show the outline of area to be annexed with boldest line.	☐	☑	One overall boundary	E
19.	For all references show book, page, map number, etc., and place where publicly recorded for all references.	☑	☐		E

	CITY OF COMMERCE CITY ***ANNEXATION MAP CHECKLIST***				
		COMPLIES			
	DESCRIPTION	*YES*	*NO*	*COMMENTS*	
20.	Show contiguous and coincident boundary by the following symbol: *//////////*	☐	☑	E 70th Ave ROW has not been annexed yet please include with this annexation.	E
21.	Include this statement within the Surveyor's Certification for the annexation map: The above described land is contiguous to the City of Commerce City and meets the requirements set forth in CRS 31-12-104-(1)(a) that one-sixth or more of the perimeter to be annexed is contiguous with the annexing municipality. Contiguity Statement: • Total perimeter of area considered for annexation = __________ • One-sixth of total perimeter of area = __________ • Perimeter of the area contiguous with existing city limits = __________ The total contiguous perimeter is __________ %, which meets or exceeds the 1/6 area required. Signature and printed name PLS No. ____ (seal and date) _______ Address _______________________	☐	☑	Format the Contiguity Statement as shown on the Checklist with title. Recalculate with single area.	P
22.	The following certificate of City Council shall be added and worded as follows: CITY COUNCIL CERTIFICATE: Approval by City of Commerce City, City Council this __ day of __, A.D.__. Attest: ______________________________ City Clerk ______________________________ Mayor	☑	☐		P

		COMPLIES			
CITY OF COMMERCE CITY ANNEXATION MAP CHECKLIST					
	DESCRIPTION	*YES*	*NO*	*COMMENTS*	
23.	Certificate of the Clerk and Recorder shall be worded as follows: ADAMS COUNTY CLERK AND RECORDER'S CERTIFICATE: This map was filed for record in the office of Adams County Clerk and Recorder, in the State of Colorado, at __M. on the ___ day of ______, A.D.____. BY:_________________________________ Deputy County Clerk and Recorder	☑	☐		P
24.	In the lower right-hand corner of the cover sheet the following shall appear: Reception No.________________________	☐	☑	lower right	P
25.	Show at top of each sheet, "AN-XX-XX, ANNEXATION MAP, to the City of Commerce City, Colorado. SHEET ______ of _______" (Obtain XX-XX number from Community Development Department).	☐	☑		P
26.	Additional Planning Comments:				P
27.	Additional Engineering Comments Upon final approval, in addition to the Mylars, AutoCAD files must be submitted to the city.				P

CONTROL DIAGRAM

CITY OF COMMERCE CITY

GPS SURVEY OF SELECTED MONUMENTS LOCATED IN T1S,T2S AND T3S, R66W,R67W AND R68W ALL OF THE 6TH P.M. COUNTY OF ADAMS, STATE OF COLORADO

COMMERCE CITY COLORADO
PEOPLE AND INDUSTRY TOGETHER

NOTICE:

ACCORDING TO 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 THE CERTIFICATION SHOWN HEREON.

THIS SURVEY DOES NOT ADDRESS BOUNDARY OR RIGHT-OF-WAY ISSUES.

ALL COORDINATES SHOWN ARE COLORADO CENTRAL ZONE STATE PLANE COORDINATES, NAD 1983 (1992).

HORIZONTAL DISTANCES SHOWN ARE AT SURFACE (MODIFIED)

ELEVATIONS (NAVD 1988) AND DISTANCES ARE IN U.S. SURVEY FEET.

TO OBTAIN GROUND (MODIFIED) COORDINATES, USE COMBINED FACTOR 1/X

TO OBTAIN GRID DISTANCES USED COMBINED FACTOR X=0.99979199

OWNERSHIP OF THIS MAP RESTS WITH THE CITY OF COMMERCE CITY.

BASIS OF ELEVATION: ELEVATIONS OF MONUMENTS ARE BASED UPON ADAMS COUNTY SECONDARY CONTROL NETWORK PUBLISHED BY JOHN E. CHANCE AND ASSOCIATES. ELEVATIONS WERE TAKEN TO THE TOP OF MONUMENTS. POSITIONS AND ELEVATIONS OF MONUMENTS WERE DETERMINED THROUGH REAL TIME KINEMATIC GPS TECHNIQUES.

THE PURPOSE OF THIS SURVEY WAS TO RECOVER EXISTING APPARENT SECTION AND QUARTER-SECTION MONUMENTS BASED UPON EXISTING MONUMENT RECORDS, UPGRADE MONUMENT IF IT DID NOT MEET STATE BOARD OF REGISTRATION SPECIFICATIONS AND DETERMINE THE HORIZONTAL POSITION AND ELEVATION THROUGH GPS TECHNIQUES. NO VERIFICATION OF SECTION OR QUARTER-SECTION CORNERS WAS PERFORMED. THE SECTION AND QUARTER-SECTION CORNERS CONTAINED IN THIS SURVEY ARE IDENTIFIED AS GIS LAND POSITIONS AS DEFINED BY CRS 38-51-109.3.

DISCLAIMER:
EXISTING MONUMENTS OF RECORD OR THEIR RECORD LOCATIONS AS FILED WITH THE COLORADO STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS WERE USED FOR THE SECTION AND QUARTER-SECTION CORNERS IN THIS SURVEY. NEITHER COMMERCE CITY NOR JR ENGINEERING, LTD., MAKES ANY WARRANTIES, EITHER EXPRESSED OF IMPLIED, AS TO THE ACCURACY OR VALIDITY OF THE RECORD MONUMENTS.

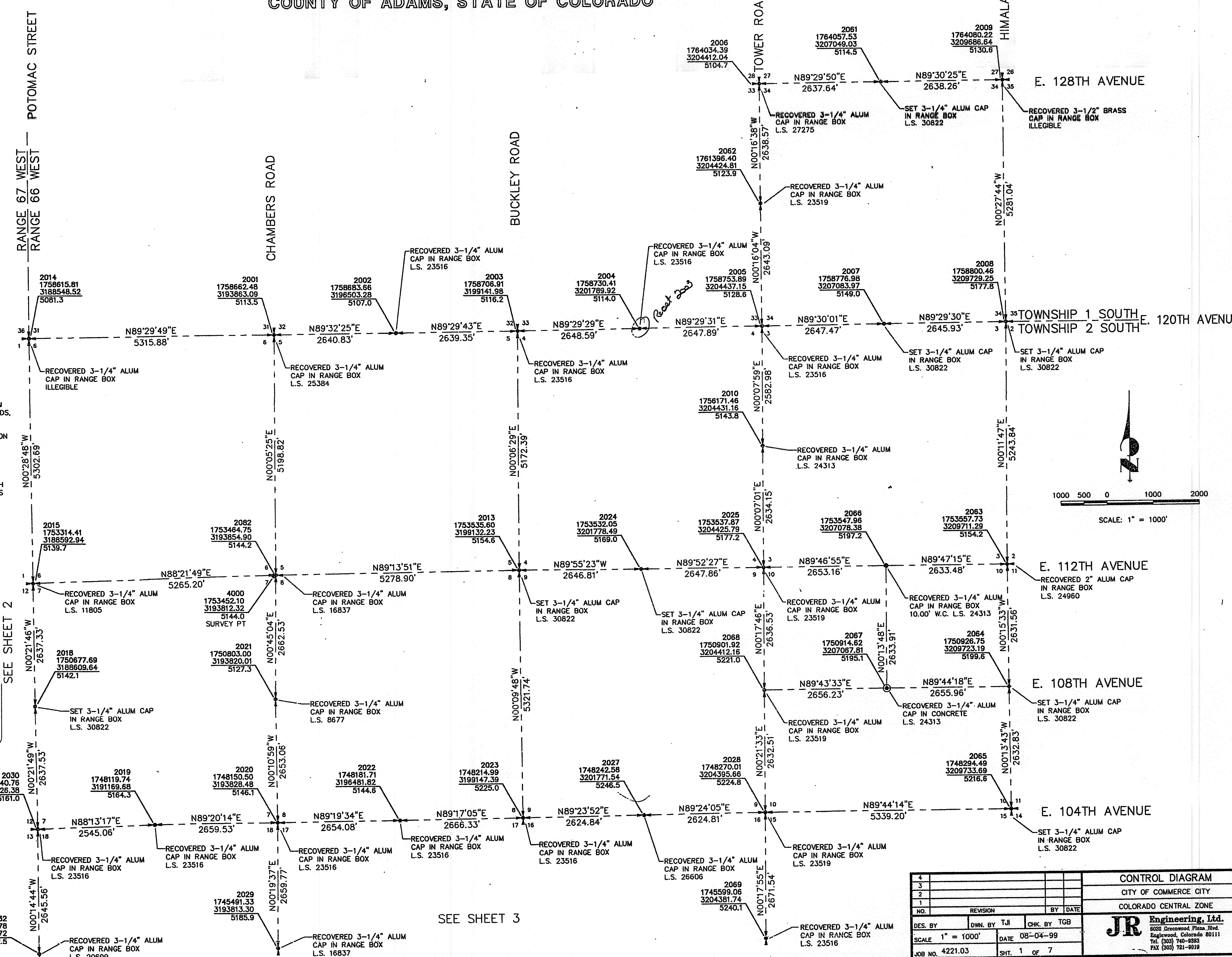
SURVEYORS CERTIFICATE:

I CERTIFY THAT THE SURVEY SHOWN HEREON WAS PERFORMED UNDER MY DIRECT RESPONSIBILITY, SUPERVISION, AND CHECKING.

6-30-99
DATE OF SURVEY

TODD G. BEERS
COLORADO P.L.S. #30822
DATE

Todd G. Beers
8-11-99



LEGEND

✛	APPARENT SECTION CORNER (AS NOTED)
•–•	APPARENT QUARTER-SECTION CORNER (AS NOTED)
◉	APPARENT CENTER QUARTER-SECTION CORNER (AS NOTED)
— — —	APPARENT SECTION LINE
N89°19'34"E	MODIFIED (GROUND) BEARING
2654.08'	MODIFIED PLANE (GROUND) DISTANCE (TO MEAN ELEV. 5000 FEET)
2001	GPS STATION NUMBER

POINT NUMBER
NORTHING
EASTING
ELEVATION

NO.	REVISION	BY	DATE
4			
3			
2			
1			

CONTROL DIAGRAM
CITY OF COMMERCE CITY
COLORADO CENTRAL ZONE

DES. BY	DWN. BY TJI	CHK. BY TGB
SCALE 1" = 1000'	DATE 08-04-99	
JOB NO. 4221.03	SHT. 1 OF 7	

JR Engineering, Ltd.
6020 Greenwood Plaza Blvd.
Englewood, Colorado 80111
Tel. (303) 740-9393
FAX (303) 721-9019

PLOT SCALE 1=1000, DATE 08/11/99, TIME 08:29, FILE X:\42100\ACAD\SHEET1.DWG

Book 1 1/7
Page 3776
Reception Number 2009-146

CONTROL DIAGRAM

CITY OF COMMERCE CITY
GPS SURVEY OF SELECTED MONUMENTS LOCATED IN T1S,T2S AND T3S, R66W,R67W AND R68W ALL OF THE 6TH P.M.
COUNTY OF ADAMS, STATE OF COLORADO

COMMERCE CITY COLORADO
PEOPLE AND INDUSTRY TOGETHER

NOTICE:

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THIS SURVEY DOES NOT ADDRESS BOUNDARY OR RIGHT-OF-WAY ISSUES.

ALL COORDINATES SHOWN ARE COLORADO CENTRAL ZONE STATE PLANE COORDINATES, NAD 1983 (1992).

HORIZONTAL DISTANCES SHOWN ARE AT SURFACE (MODIFIED)

ELEVATIONS (NAVD 1988) AND DISTANCES ARE IN U.S. SURVEY FEET.

TO OBTAIN GROUND (MODIFIED) COORDINATES, USE COMBINED FACTOR 1/X

TO OBTAIN GRID DISTANCES USED COMBINED FACTOR X=0.99979199

OWNERSHIP OF THIS MAP RESTS WITH THE CITY OF COMMERCE CITY.

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SURVEYORS CERTIFICATE:

I CERTIFY THAT THE SURVEY SHOWN HEREON WAS PERFORMED UNDER MY DIRECT RESPONSIBILITY, SUPERVISION, AND CHECKING.

6-30-99
DATE OF SURVEY

TODD G. BEERS
COLORADO P.L.S. #30822
DATE

Todd G. Beers
8-11-99

FILING CERTIFICATION

DEPOSITED THIS ________ DAY OF ____________

19____, AT ____.M., IN BOOK __________ OF THE COUNTY

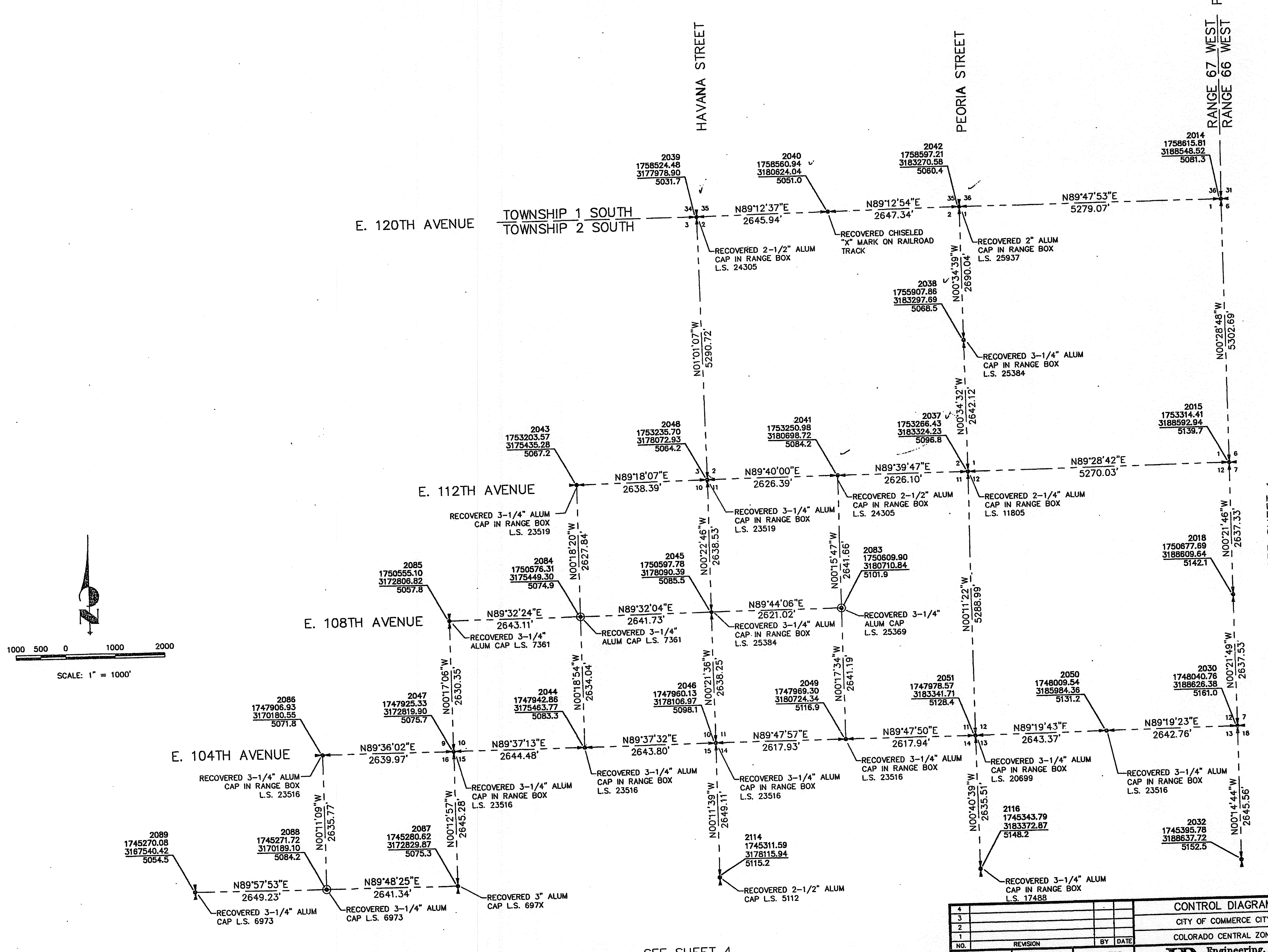
SURVEYOR'S LAND SURVEY PLATS/RIGHT-OF-WAY SURVEYS AT

PAGE ________, RECEPTION NUMBER ____________

LEGEND

	APPARENT SECTION CORNER (AS NOTED)
	APPARENT QUARTER-SECTION CORNER (AS NOTED)
	APPARENT CENTER QUARTER-SECTION CORNER (AS NOTED)
— — —	APPARENT SECTION LINE
N89°19'34"E	MODIFIED (GROUND) BEARING
2654.08'	MODIFIED PLANE (GROUND) DISTANCE (TO MEAN ELEV. 5000 FEET)
2001	GPS STATION NUMBER

POINT NUMBER
NORTHING
EASTING
ELEVATION



NO.	REVISION	BY	DATE
4			
3			
2			
1			

DES. BY	DWN. BY TJI	CHK. BY TGB
SCALE 1" = 1000'		DATE 08-04-99
JOB NO. 4221.03		SHT. 2 OF 7

CONTROL DIAGRAM
CITY OF COMMERCE CITY
COLORADO CENTRAL ZONE

JR Engineering, Ltd.
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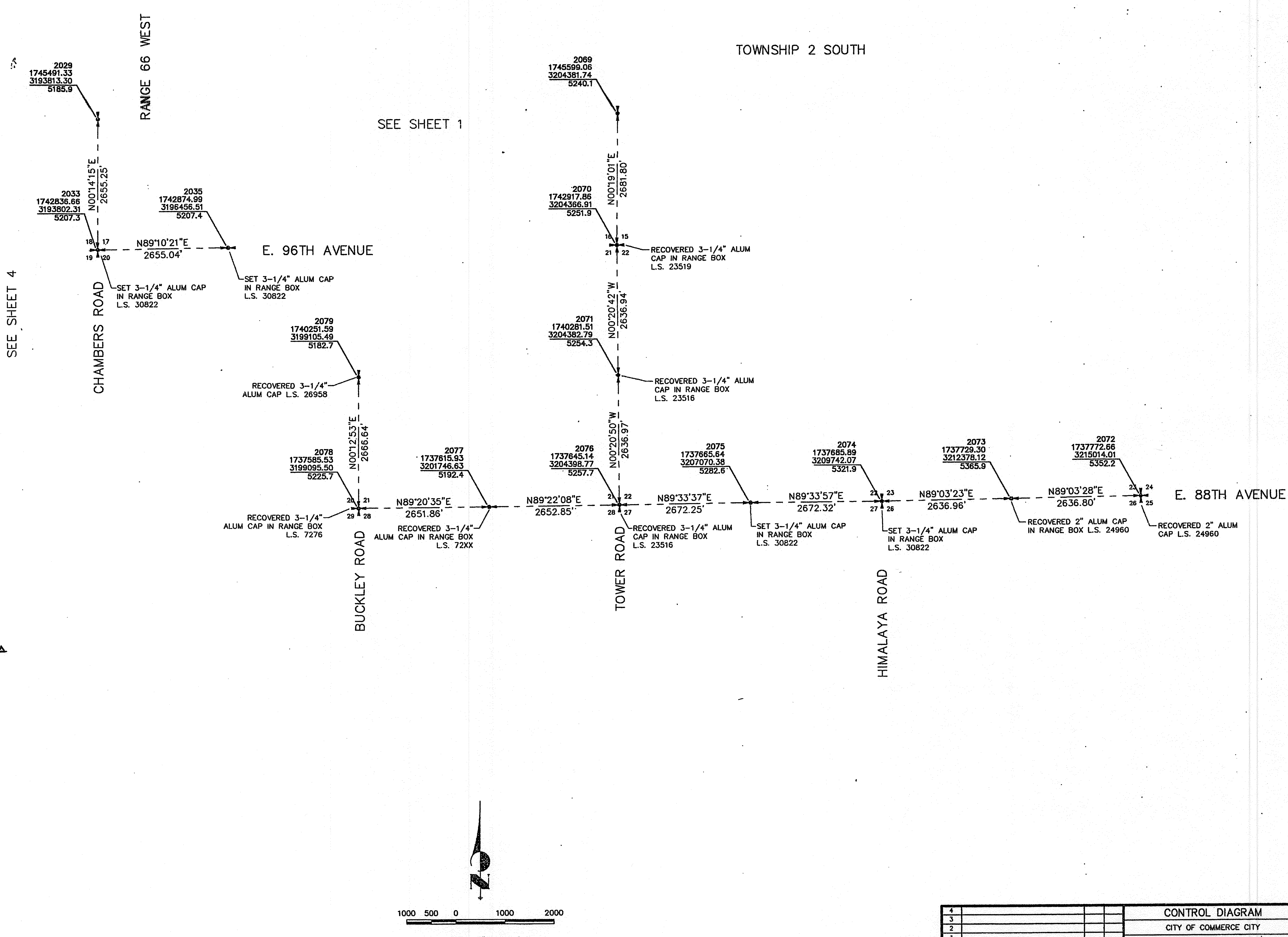
Book 1 2/7
Page 3776
Reception Number 2009-146

CONTROL DIAGRAM

CITY OF COMMERCE CITY
GPS SURVEY OF SELECTED MONUMENTS LOCATED IN T1S,T2S AND T3S, R66W,R67W AND R68W ALL OF THE 6TH P.M.
COUNTY OF ADAMS, STATE OF COLORADO

COMMERCE CITY COLORADO
PEOPLE AND INDUSTRY TOGETHER



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TO OBTAIN GRID DISTANCES USED COMBINED FACTOR X=0.99979199

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SURVEYORS CERTIFICATE:

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6-30-99
DATE OF SURVEY

TODD G. BEERS
COLORADO P.L.S. #30822
DATE

Todd G. Beers
8-11-99

FILING CERTIFICATION

DEPOSITED THIS ________ DAY OF ____________,

19____, AT ____.M., IN BOOK ________ OF THE COUNTY

SURVEYOR'S LAND SURVEY PLATS/RIGHT-OF-WAY SURVEYS AT

PAGE ________, RECEPTION NUMBER ____________.

LEGEND

✛	APPARENT SECTION CORNER (AS NOTED)
•—•	APPARENT QUARTER-SECTION CORNER (AS NOTED)
◉	APPARENT CENTER QUARTER-SECTION CORNER (AS NOTED)
— — —	APPARENT SECTION LINE
N89°19'34"E	MODIFIED (GROUND) BEARING
2654.08'	MODIFIED PLANE (GROUND) DISTANCE (TO MEAN ELEV. 5000 FEET)
2001	GPS STATION NUMBER

POINT NUMBER
NORTHING
EASTING
ELEVATION

4			
3			
2			
1			
NO.	REVISION	BY	DATE
DES. BY	DWN. BY TJI	CHK. BY TGB	
SCALE 1" = 1000'	DATE 08-04-99		
JOB NO. 4221.03	SHT. 3 OF 7		

CONTROL DIAGRAM
CITY OF COMMERCE CITY
COLORADO CENTRAL ZONE

JR Engineering, Ltd.
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Englewood, Colorado 80111
Tel. (303) 740-9393
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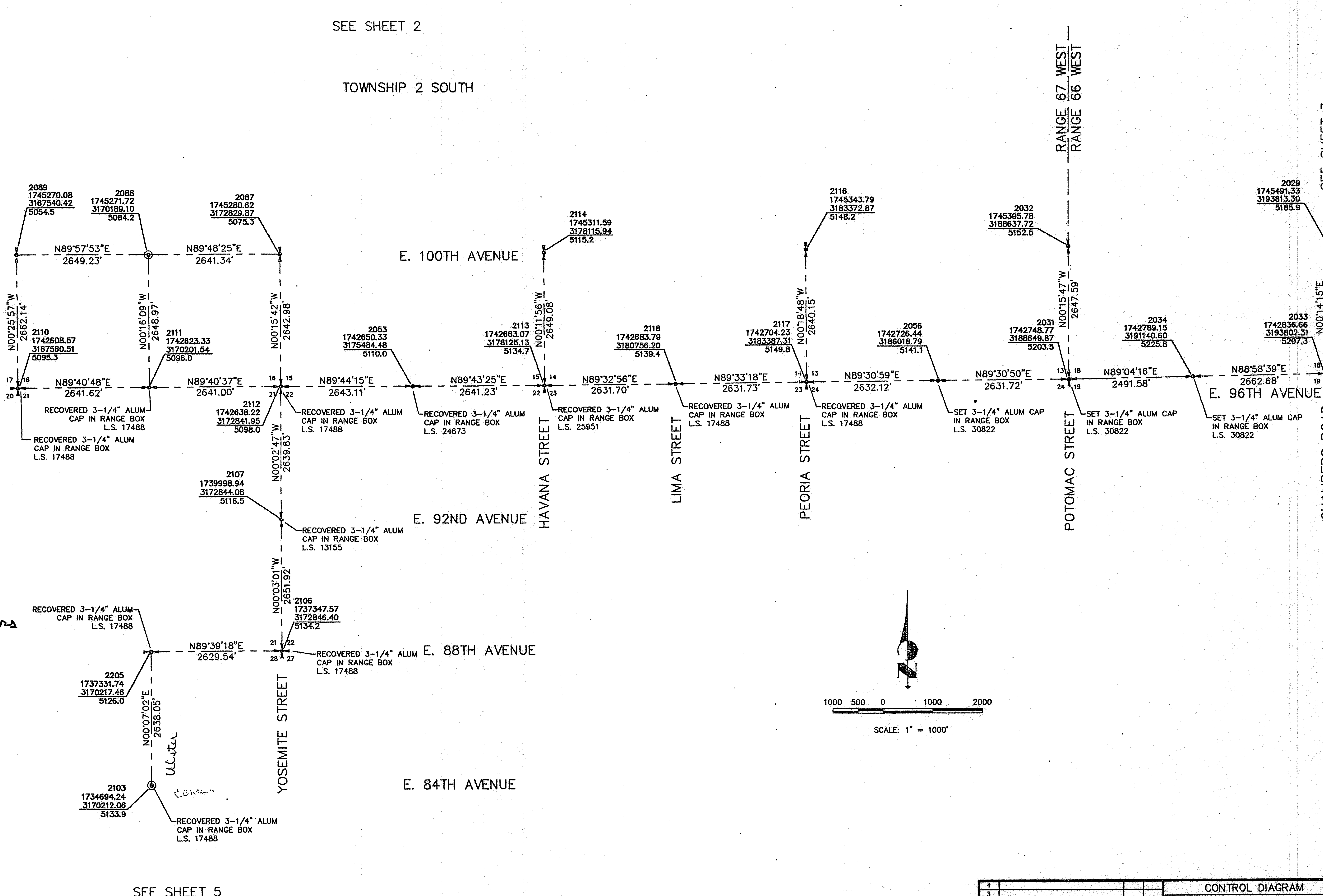
Book 1 3/7
Page 3776
Reception Number 2009-146

CONTROL DIAGRAM

CITY OF COMMERCE CITY
GPS SURVEY OF SELECTED MONUMENTS LOCATED IN T1S,T2S AND T3S, R66W,R67W AND R68W ALL OF THE 6TH P.M.
COUNTY OF ADAMS, STATE OF COLORADO

COMMERCE · CITY · COLORADO
PEOPLE AND INDUSTRY TOGETHER



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6-30-99
DATE OF SURVEY

TODD G. BEERS
COLORADO P.L.S. #30822
DATE

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR TODD G. BEERS 30822
Todd G. Beers
8-11-99

FILING CERTIFICATION

DEPOSITED THIS ________ DAY OF ________________.

19____, AT ____.M., IN BOOK __________ OF THE COUNTY

SURVEYOR'S LAND SURVEY PLATS/RIGHT-OF-WAY SURVEYS AT

PAGE ________, RECEPTION NUMBER ________________.

LEGEND

APPARENT SECTION CORNER (AS NOTED)

APPARENT QUARTER-SECTION CORNER (AS NOTED)

APPARENT CENTER QUARTER-SECTION CORNER (AS NOTED)

— — — — APPARENT SECTION LINE

N89°19'34"E MODIFIED (GROUND) BEARING

2654.08' MODIFIED PLANE (GROUND) DISTANCE (TO MEAN ELEV. 5000 FEET)

2001 GPS STATION NUMBER

POINT NUMBER
NORTHING
EASTING
ELEVATION

PLOT SCALE 1=1000, DATE 08/11/99, TIME 08:35, FILE X:\422100\ACAD\SHEET4.DWG

NO.	REVISION	BY	DATE
4			
3			
2			
1			

DES. BY	DWN. BY TJI	CHK. BY TGB
SCALE 1" = 1000'	DATE 08-04-99	
JOB NO. 4221.03	SHT. 4 OF 7	

CONTROL DIAGRAM
CITY OF COMMERCE CITY
COLORADO CENTRAL ZONE

JR Engineering, Ltd.
6020 Greenwood Plaza Blvd.
Englewood, Colorado 80111
Tel. (303) 740-9393
FAX (303) 721-9019

Book 1 4/7
Page 3776
Number 2009-146

CONTROL DIAGRAM

CITY OF COMMERCE CITY
GPS SURVEY OF SELECTED MONUMENTS LOCATED IN T1S,T2S AND T3S, R66W,R67W AND R68W ALL OF THE 6TH P.M.
COUNTY OF ADAMS, STATE OF COLORADO

COMMERCE · CITY · COLORADO
PEOPLE AND INDUSTRY TOGETHER

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6-30-99
DATE OF SURVEY

TODD G. BEERS
COLORADO P.L.S. #30822
DATE 8-11-99

FILING CERTIFICATION

DEPOSITED THIS ________ DAY OF ____________,

19____, AT ____.M., IN BOOK ________ OF THE COUNTY

SURVEYOR'S LAND SURVEY PLATS/RIGHT-OF-WAY SURVEYS AT

PAGE ________, RECEPTION NUMBER ____________.

LEGEND

APPARENT SECTION CORNER (AS NOTED)

APPARENT QUARTER-SECTION CORNER (AS NOTED)

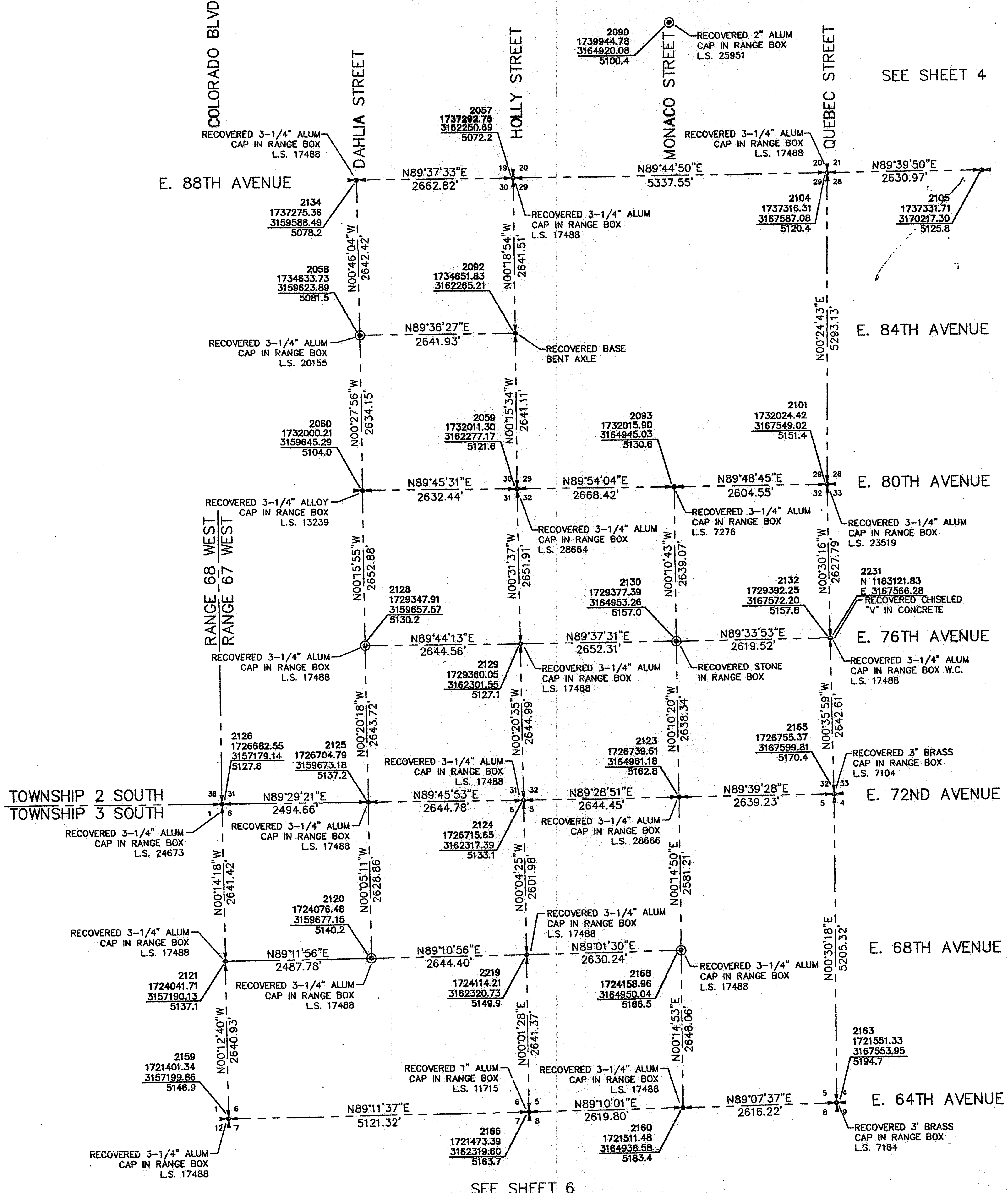
APPARENT CENTER QUARTER-SECTION CORNER (AS NOTED)

APPARENT SECTION LINE

N89°19'34"E 2654.08' — MODIFIED (GROUND) BEARING; MODIFIED PLANE (GROUND) DISTANCE (TO MEAN ELEV. 5000 FEET)

2001 — GPS STATION NUMBER

POINT NUMBER / NORTHING / EASTING / ELEVATION



1000 500 0 1000 2000
SCALE: 1" = 1000'

NO.	REVISION	BY	DATE
4			
3			
2			
1			

DES. BY ____ DWN. BY TJI CHK. BY TGB
SCALE 1" = 1000' DATE 08-04-99
JOB NO. 4221.00 SHT. 5 OF 7

CONTROL DIAGRAM
CITY OF COMMERCE CITY
COLORADO CENTRAL ZONE

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Book 1 5/7
Page 3776
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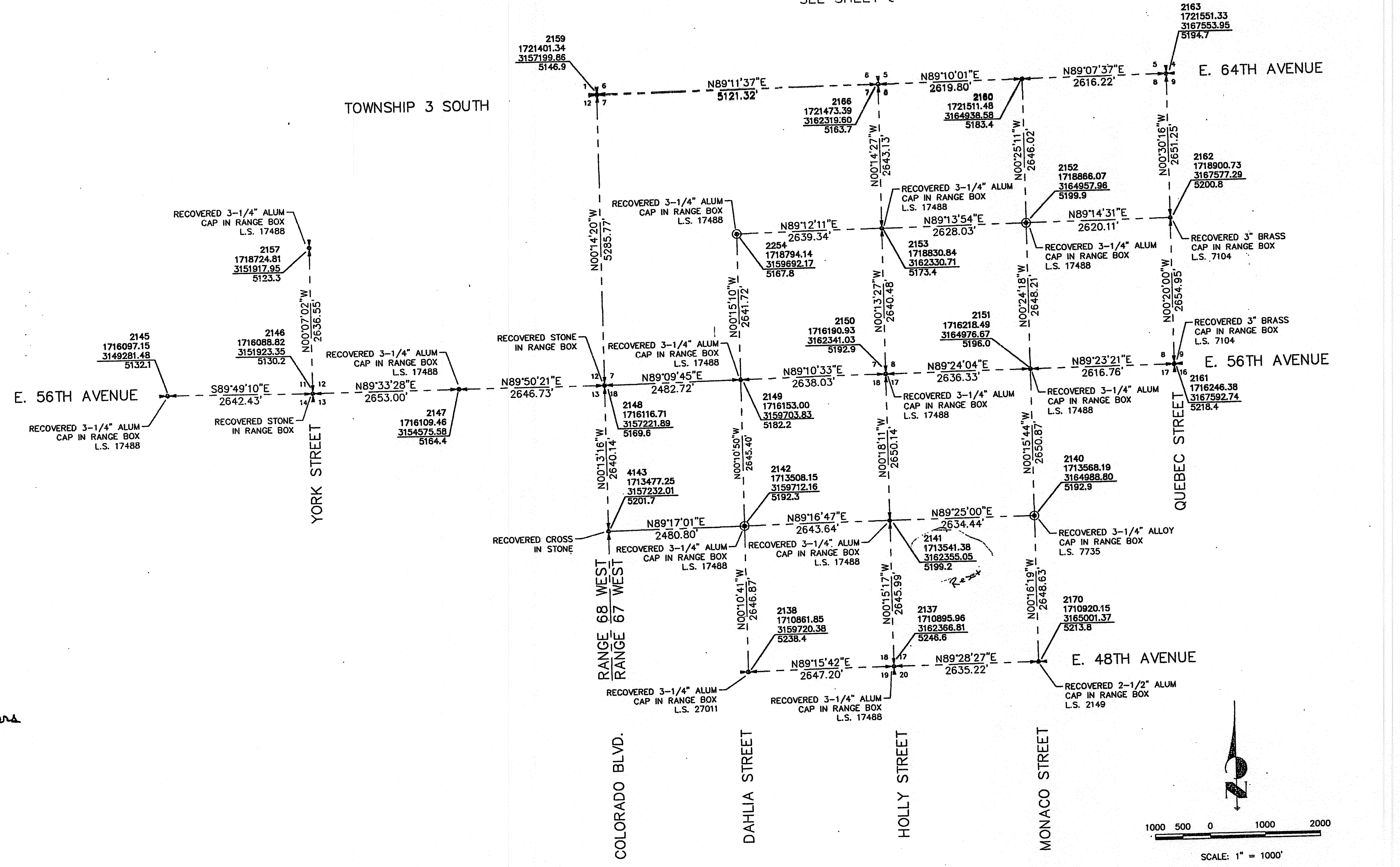
CONTROL DIAGRAM

CITY OF COMMERCE CITY

GPS SURVEY OF SELECTED MONUMENTS LOCATED IN T1S,T2S AND T3S, R66W,R67W AND R68W ALL OF THE 6TH P.M. COUNTY OF ADAMS, STATE OF COLORADO

SEE SHEET 5



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6-30-99
DATE OF SURVEY

TODD G. BEERS
COLORADO P.L.S. #30822
DATE

Todd G. Beers
8-11-99

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19____, AT ____.M., IN BOOK __________ OF THE COUNTY
SURVEYOR'S LAND SURVEY PLATS/RIGHT-OF-WAY SURVEYS AT
PAGE ________, RECEPTION NUMBER ______________.

LEGEND

┼	APPARENT SECTION CORNER (AS NOTED)
•─•	APPARENT QUARTER-SECTION CORNER (AS NOTED)
◎	APPARENT CENTER QUARTER-SECTION CORNER (AS NOTED)
— — — —	APPARENT SECTION LINE
N89°19'34"E	MODIFIED (GROUND) BEARING
2654.08'	MODIFIED PLANE (GROUND) DISTANCE (TO MEAN ELEV. 5000 FEET)
2001	GPS STATION NUMBER

POINT NUMBER
NORTHING
EASTING
ELEVATION

NO.	REVISION	BY	DATE
4			
3			
2			
1			

DES. BY	DWN. BY TJI	CHK. BY TGB	
SCALE 1" = 1000'		DATE 08-04-99	
JOB NO. 4221.00		SHT. 6 OF 7	

CONTROL DIAGRAM
CITY OF COMMERCE CITY
COLORADO CENTRAL ZONE

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Book 1 6/7
Page 3776
Reception Number 2009-146

CONTROL DIAGRAM

CITY OF COMMERCE CITY

GPS SURVEY OF SELECTED MONUMENTS LOCATED IN T1S,T2S AND T3S, R66W,R67W AND R68W ALL OF THE 6TH P.M. COUNTY OF ADAMS, STATE OF COLORADO

POINT NUMBER	SECTION CORNER: CORNER	RANGE	TOWNSHIP	SEC	LATITUDE DEG MIN SEC	LONGITUDE DEG MIN SEC	SCALE FACTOR	CONVERGENG ANGLE DEG MIN SEC	COLORADO STATE PLANE CENTRAL ZONE NORTHING US FEET (NAD83/92)	EASTING US FEET	ELEVATION NAVD 1988 US FEET	COLORADO STATE PLANE CENTRAL ZONE NORTHING METERS (NAD83/92)	EASTING METERS	ELEVATION NAVD 1988 METERS	MODIFIED (GROUND) COORDINATES NORTHING US FEET	EASTING US FEET	ELEVATION NAVD 1988 US FEET	MODIFIED (GROUND) COORDINATES NORTHING METERS	EASTING METERS	ELEVATION NAVD 1988 METERS	MONUMENT DESCRIPTION
2001	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3193863.09	5113.5	536041.40	973491.42	1558.60	1759028.38	3194527.58	5113.5	536152.92	973693.95	1558.60	3.25" ALUM. CAP LS25384 IN RANGE BOX
2002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3196503.28	5107.0	536047.85	974296.15	1556.61	1759049.56	3197168.32	5107.0	536159.38	974498.85	1556.61	3.25" ALUM. CAP LS23516 IN RANGE BOX
2003	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3199141.98	5116.2	536054.94	975100.43	1559.43	1759072.81	3199807.58	5116.2	536166.47	975303.30	1559.43	3.25" ALUM. CAP LS23516 IN RANGE BOX
2004	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3201789.92	5114.0	536062.10	975907.52	1558.74	1759096.32	3202456.06	5114.0	536173.63	976110.56	1558.74	3.25" ALUM. CAP LS23516 IN RANGE BOX
2005	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204437.15	5128.6	536069.26	976714.40	1563.21	1759119.81	3205103.85	5128.6	536180.79	976917.61	1563.21	3.25" ALUM. CAP LS23516 IN RANGE BOX
2006	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5104.7	537678.76	976706.74	1555.92	1764481.49	3205078.73	5104.7	537790.62	976909.95	1555.92	3.25" ALUM. CAP LS27275 IN RANGE BOX
2007	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3207083.07	5149.0	536078.30	977621.16	1569.41	1759149.90	[illegible]	5149.0	536187.83	[illegible]	1569.41	3.25" ALUM. CAP LS30822 IN RANGE BOX
2008	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3209729.25	5177.8	536083.45	978327.43	1578.20	1759166.38	3210397.04	5177.8	536194.98	978530.98	1578.20	3.25" ALUM. CAP LS30822 IN RANGE BOX
2009	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3209686.64	5130.6	537692.73	978314.45	1563.82	1764447.24	3210354.43	5130.6	537804.60	978517.99	1563.82	3.5" BRASS CAP IN RANGE BOX
2010	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204431.16	5143.8	535282.13	976712.57	1567.83	1756536.84	3205097.86	5143.8	535393.50	976915.78	1567.83	3.25" ALUM. CAP LS24313 IN RANGE BOX
2011	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3199132.23	5154.6	534478.72	975097.45	1571.11	1753900.43	3199797.82	5154.6	534589.92	975300.33	1571.11	3.25" ALUM. CAP LS30822 IN RANGE BOX
2012	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3188548.52	5081.3	536027.17	971871.53	1548.79	1758981.70	3189211.90	5081.3	536138.69	972073.73	1548.79	3.25" ALUM. CAP IN RANGE BOX
2013	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3188592.94	5139.7	534411.30	971885.07	1566.57	1753679.20	3189256.34	5139.7	534522.49	972087.28	1566.57	3.25" ALUM. CAP LS11805 IN RANGE BOX
2014	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3188609.64	5142.1	533607.63	971890.16	1567.31	1751041.92	3189273.04	5142.1	533718.65	972092.37	1567.31	3.25" ALUM. CAP LS30822 IN RANGE BOX
2015	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3191169.68	5164.3	532827.96	972670.46	1574.07	1748483.44	3191833.61	5164.3	532938.82	972872.83	1574.07	3.25" ALUM. CAP LS23516 IN RANGE BOX
2018	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3193828.48	5146.1	532837.34	973480.87	1568.54	1748514.21	3194492.97	5146.1	532948.20	973683.40	1568.54	3.25" ALUM. CAP LS23516 IN RANGE BOX
2019	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3193820.01	5127.3	533645.82	973478.29	1562.79	1751167.26	3194484.49	5127.3	533756.85	973680.82	1562.79	3.25" ALUM. CAP LS8677 IN RANGE BOX
2020	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3196481.82	5144.6	532846.85	974289.61	1568.07	1748545.43	3197146.86	5144.6	532957.71	974492.31	1568.07	3.25" ALUM. CAP LS23516 IN RANGE BOX
2021	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3199147.39	5225.0	532857.00	975102.08	1592.59	1748578.72	3199812.99	5225.0	532967.86	975304.95	1592.59	3.25" ALUM. CAP LS23516 IN RANGE BOX
2022	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3201778.49	5169.0	534477.64	975904.03	1575.52	1753896.88	3202444.63	5169.0	534588.84	976107.07	1575.52	3.25" ALUM. CAP LS30822 IN RANGE BOX
2023	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204425.79	5177.2	534479.41	976710.93	1578.01	1753902.70	3205092.48	5177.2	534590.61	976914.14	1578.01	3.25" ALUM. CAP LS23519 IN RANGE BOX
2024	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3201771.54	5246.5	532865.41	975901.97	1599.13	1748606.31	3202437.68	5246.5	532976.27	976104.96	1599.13	3.25" ALUM. CAP LS26606 IN RANGE BOX
2025	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204395.66	5224.8	532873.76	976701.75	1592.52	1748633.74	3205062.35	5224.8	532984.63	976904.96	1592.52	3.25" ALUM. CAP LS23519 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3193813.30	5185.9	532026.82	973476.24	1580.66	1745854.48	3194477.79	5185.9	532137.51	973678.78	1580.66	3.25" ALUM. CAP LS16837 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3188626.38	5161.0	532803.89	971895.26	1573.09	1748404.45	3189289.78	5161.0	532914.74	972097.47	1573.09	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3188649.87	5203.5	531190.89	971902.42	1586.04	1743111.35	3189313.28	5203.5	531301.40	972104.63	1586.04	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3188637.72	5152.5	531997.70	971898.72	1570.48	1745758.91	3189301.12	5152.5	532108.38	972100.93	1570.48	3.25" ALUM. CAP LS20699 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3193802.31	5207.3	531217.67	973472.89	1587.19	1743199.26	3194466.79	5207.3	531328.20	973675.42	1587.19	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3191140.50	5225.8	531203.20	972661.60	1592.84	1743151.75	3191804.53	5225.8	531313.72	972863.97	1592.84	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3196456.51	5207.4	531229.36	974281.89	1587.21	1743237.60	3197121.55	5207.4	531339.88	974484.60	1587.21	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3183324.23	5096.8	534396.68	970279.17	1553.50	1753631.20	3183986.53	5096.8	534507.86	970481.04	1553.50	2.25" ALUM. CAP LS11805 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3183297.69	5068.5	535201.79	970271.08	1544.88	1756273.19	3183959.98	5068.5	535313.14	970472.94	1544.88	3.25" ALUM. CAP LS25384 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3177978.90	5031.7	535999.33	968649.91	1533.67	1758890.35	3178640.09	5031.7	536110.85	968851.44	1533.67	2.5" ALUM. CAP LS24305 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3180624.04	5051.0	536010.45	969456.15	1539.56	1758926.81	3181285.78	5051.0	536121.97	969657.84	1539.56	CHISLED "X" IN RAILROAD TRACK
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3180698.72	5084.2	534391.97	969478.91	1549.67	1753615.75	3181360.48	5084.2	534503.15	969680.61	1549.67	2.5" ALUM. CAP LS24305 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3183270.58	5060.4	536021.50	970262.81	1542.41	1758963.09	3183932.87	5060.4	536133.02	970464.68	1542.41	2" ALUM. CAP LS25937 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3175435.28	5067.2	534377.52	967874.61	1544.48	1753568.33	3176095.94	5067.2	534488.70	968075.98	1544.48	3.25" ALUM. CAP LS23519 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3175463.77	5083.3	532774.05	967883.29	1549.40	1748306.52	3176124.44	5083.3	532884.89	968084.66	1549.40	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3178090.39	5085.5	533583.27	968683.89	1550.05	1750962.00	3178751.60	5085.5	533694.28	968885.43	1550.05	3.25" ALUM. CAP LS25384 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3178106.97	5098.1	532779.31	968688.94	1553.91	1748323.80	3178768.18	5098.1	532890.16	968890.48	1553.91	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3172819.90	5075.7	532768.71	967077.44	1547.09	1748288.99	3173480.02	5075.7	532879.55	967278.64	1547.09	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3178072.93	5064.2	534387.31	968678.56	1543.56	1753600.47	3178734.13	5064.2	534498.49	968880.10	1543.56	3.25" ALUM. CAP LS23519 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3180724.34	5116.9	532782.11	969486.72	1559.65	1748332.97	3181386.10	5116.9	532892.95	969688.42	1559.65	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3185984.36	5131.2	532794.37	971089.97	1563.99	1748373.22	3186647.21	5131.2	532905.22	971292.01	1563.99	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3183341.71	5128.4	532784.93	970284.49	1563.14	1748342.24	3184004.02	5128.4	532895.78	970486.37	1563.14	3.25" ALUM. CAP LS20699 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3175484.48	5110.0	531160.88	967889.60	1557.54	1743012.90	3176145.15	5110.0	531271.39	968090.98	1557.54	3.25" ALUM. CAP LS24673 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3186018.79	5141.1	531184.08	971100.47	1567.00	1743089.02	3186681.65	5141.1	531294.60	971302.51	1567.00	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162250.69	5072.2	529527.89	963855.94	1546.02	1737654.20	3162908.61	5072.2	529638.06	964056.47	1546.02	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159623.89	5081.5	528717.42	963055.29	1548.85	1734994.63	3160281.26	5081.5	528827.42	963255.66	1548.85	3.25" ALUM. CAP LS20155 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162277.17	5121.6	527918.10	963864.01	1561.07	1732371.65	3162935.09	5121.6	528027.93	964064.54	1561.07	3.25" ALUM. CAP LS28664 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159645.29	5104.0	527914.72	963061.81	1555.70	1732360.56	3160302.67	5104.0	528024.56	963262.18	1555.70	3.25" ALLOY CAP LS13239 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3207049.03	5114.5	537685.81	977510.50	1558.90	1764424.55	3207716.27	5114.5	537797.68	977713.87	1558.90	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204424.81	5123.9	536874.70	976710.63	1561.78	1761762.87	3205091.50	5123.9	536986.40	976913.84	1561.78	3.25" ALUM. CAP LS23519 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3209711.29	5154.2	534485.47	978321.96	1570.99	1753922.57	3210379.08	5154.2	534596.67	978525.50	1570.99	2" ALUM. CAP LS24960 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3209723.19	5199.6	533683.54	978325.59	1584.85	1751291.04	3210390.99	5199.6	533794.58	978529.13	1584.85	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3209733.69	5216.6	532881.22	978328.79	1590.03	1748658.22	3210401.49	5216.6	532992.09	978532.33	1590.03	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3207078.38	5197.2	534482.49	977519.44	1584.10	1753912.80	3207745.62	5197.2	534593.69	977722.82	1584.10	3.25" ALUM. CAP LS24313 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3207067.81	5195.1	533679.84	977516.22	1583.48	1751278.90	3207735.05	5195.1	533790.88	977719.60	1583.48	3.25" ALUM. CAP LS24313
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204412.16	5221.0	533675.97	976706.78	1591.36	1751266.20	3205078.85	5221.0	533787.00	976909.99	1591.36	3.25" ALUM. CAP LS23519 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204381.74	5240.1	532059.66	976697.51	1597.20	1745962.24	3205048.42	5240.1	532170.35	976900.71	1597.20	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204366.91	5251.9	531242.43	976692.99	1600.77	1743280.48	3205033.59	5251.9	531352.95	976896.19	1600.77	3.25" ALUM. CAP LS23519 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204382.79	5254.3	530436.87	976697.83	1601.52	1740643.58	3205049.47	5254.3	530549.22	976901.03	1601.52	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3215014.01	5352.2	529674.16	979938.23	1631.35	1738134.20	3215682.91	5352.2	529784.37	980142.11	1631.35	2" ALUM. CAP LS24960
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3212378.12	5365.9	529660.95	979134.81	1635.53	1738090.84	3213046.47	5365.9	529771.15	979338.52	1635.53	2" ALUM. CAP LS24960 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3209742.07	5321.9	529647.72	978331.34	1622.12	1738047.42	3210409.87	5321.9	529757.91	978534.89	1622.12	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3207070.38	5282.6	529641.35	977517.01	1610.13	1738027.17	3207737.63	5282.6	529751.74	977720.38	1610.13	3.25" ALUM. CAP LS30822 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3204398.77	5257.7	529635.30	976702.70	1602.55	1738006.66	3205065.46	5257.7	529745.49	976905.90	1602.55	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3201746.63	5192.4	529626.39	975894.32	1582.64	1737977.44	3202412.76	5192.4	529736.58	976097.36	1582.64	3.25" ALUM. CAP LS72XX IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3199095.50	5225.7	529617.13	975086.26	1592.80	1737947.04	3199761.08	5225.7	529727.32	975289.13	1592.80	3.25" ALUM. CAP LS7276 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3199105.49	5182.7	530429.75	975089.30	1579.68	1740613.66	3199771.07	5182.7	530540.10	975292.17	1579.68	3.25" ALUM. CAP LS26958
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3193854.90	5144.2	534457.12	973488.92	1567.96	1753829.56	3194519.39	5144.2	534568.32	973691.46	1567.96	3.25" ALUM. CAP LS16837 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3180710.84	5101.9	533586.96	969482.60	1555.06	1750974.12	3181372.60	5101.9	533697.98	969684.31	1555.06	3.25" ALUM. CAP LS25369
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3175449.30	5074.9	533576.73	967878.88	1546.84	1750940.52	3176109.96	5074.9	533687.74	968080.25	1546.84	3.25" ALUM. CAP LS7361
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3172806.82	5057.8	533570.26	967073.45	1541.63	1750919.31	3173466.93	5057.8	533681.27	967274.66	1541.63	3.25" ALUM. CAP LS7361
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3170180.55	5071.8	532763.10	966272.96	1545.90	1748270.58	3170840.11	5071.8	532873.94	966474.00	1545.90	3.25" ALUM. CAP LS23516 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3172829.87	5075.3	531962.60	967080.48	1546.95	1745643.73	3173489.99	5075.3	532073.27	967281.68	1546.95	3" ALUM. CAP LS697X
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3170189.10	5084.2	531959.88	966275.57	1549.68	1745634.83	3170848.66	5084.2	532070.56	966476.61	1549.68	3.25" ALUM. CAP LS6973
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3167540.42	5054.5	531959.38	965468.25	1540.63	1745633.19	3168199.44	5054.5	532070.06	965669.12	1540.63	3.25" ALUM. CAP LS6973
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3164920.08	5100.4	530336.23	964669.57	1554.61	1740306.78	3165578.55	5100.4	530446.57	964870.27	1554.61	2" ALUM. CAP LS25951 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162265.21		528722.93	963860.36		1735012.73	3162923.13		528832.94	964060.90		BASE OF BENT AXLE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3164945.03	5130.6	527919.50	964677.17	1563.80	1732376.25	3165603.50	5130.6	528029.34	964877.88	1563.80	3.25" ALUM. CAP LS7276 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3193812.32	5144.0	534453.27	973475.94	1567.91	1753816.91	3194476.80	5144.0	534564.46	973678.48	1567.91	3.25" ALUM. CAP LS10734 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3167549.02	5151.4	527922.10	965470.87	1570.14	1732384.77	3168208.04	5151.4	528031.93	965671.74	1570.14	3.25" ALUM. CAP LS23519 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3170212.06	5133.9	528735.86	966282.57	1564.80	1735055.15	3170871.63	5133.9	528845.87	966483.61	1564.80	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3167587.08	5120.4	529535.07	965482.47	1560.70	1737677.76	3168246.11	5120.4	529645.24	965683.35	1560.70	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3170217.46	5126.0	529539.77	966284.21	1562.41	1737693.19	3170877.03	5126.0	529649.94	966485.25	1562.41	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3172846.40	5134.2	529544.60	967085.52	1564.90	1737709.03	3173506.52	5134.2	529654.77	967286.72	1564.90	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3172844.08	5116.5	530352.74	967084.81	1559.50	1740360.95	3173504.20	5116.5	530463.08	967286.02	1559.50	3.25" ALUM. CAP LS13155 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3167560.51	5095.3	531148.16	965474.37	1553.05	1742971.13	3168219.53	5095.3	531258.66	965675.24	1553.05	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3170201.54	5096.0	531152.65	966279.36	1553.27	1742985.88	3170861.11	5096.0	531263.16	966480.40	1553.27	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3172841.95	5098.0	531157.19	967084.16	1553.87	1743000.78	3173502.07	5098.0	531267.70	967285.36	1553.87	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3178125.13	5134.7	531164.77	968694.48	1565.06	1743025.64	3178786.35	5134.7	531275.28	968896.02	1565.06	3.25" ALUM. CAP LS25951 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3178115.94	5115.2	531972.04	968691.68	1559.12	1745674.70	3178777.16	5115.2	532082.71	968893.22	1559.12	2.5" ALUM. CAP LS5112
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3183372.87	5148.2	531981.85	970293.99	1569.18	1745706.92	3184035.18	5148.2	532092.53	970495.86	1569.18	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3183387.31	5149.8	531177.31	970298.39	1569.65	1743066.81	3184049.63	5149.8	531287.83	970500.27	1569.65	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3180756.20	5139.4	531171.08	969496.43	1566.48	1743046.36	3181417.97	5139.4	531281.59	969698.14	1566.48	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162320.73	5149.9	525511.06	963877.29	1569.70	1724472.92	3162978.66	5149.9	525620.40	964077.82	1569.70	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159677.15	5140.2	525499.56	963071.52	1566.72	1724435.18	3160334.53	5140.2	525608.89	963271.89	1566.72	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3157190.13	5137.1	525488.96	962313.48	1565.80	1724400.40	3157846.99	5137.1	525598.29	962513.69	1565.80	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3164961.18	5162.8	526311.29	964682.10	1573.64	1727098.86	3165619.66	5162.8	526420.79	964882.80	1573.64	3.25" ALUM. CAP LS28666 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162317.39	5133.1	526303.98	963876.27	1564.58	1727074.90	3162975.32	5133.1	526413.48	964076.81	1564.58	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159673.18	5137.2	526300.67	963070.31	1565.81	1727064.04	3160330.56	5137.2	526410.17	963270.68	1565.81	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3157179.14	5127.6	526293.89	962310.13	1562.89	1727041.79	3157836.00	5127.6	526403.39	962510.34	1562.89	3.25" ALUM. CAP LS24673 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159657.57	5130.2	527106.30	963065.55	1563.68	1729707.71	3160314.95	5130.2	527215.96	963265.92	1563.68	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162301.55	5127.1	527110.00	963871.44	1562.75	1729719.85	3162959.48	5127.1	527219.66	964071.98	1562.75	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3164953.26	5157.0	527115.28	964679.68	1571.87	1729737.19	3165611.73	5157.0	527224.95	964880.39	1571.87	STONE IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3167572.16		527121.34	965477.92		1729757.09	3168231.18		527231.01	965678.79		CHISELED "V" IN WALL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3167572.20	5157.8	527119.81	965477.94	1572.09	1729752.05	3168231.23	5157.8	527229.48	965678.81	1572.09	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159588.49	5078.2	529522.59	963044.50	1547.85	1737636.81	3160245.85	5078.2	529632.76	963244.86	1547.85	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162366.81	5246.6	521482.13	963891.33	1599.18	1711251.92	3163024.75	5246.6	521590.63	964091.87	1599.18	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159720.38	5238.4	521471.74	963084.70	1596.67	1711217.80	3160377.77	5238.4	521580.23	963285.07	1596.67	3.25" ALUM. CAP LS27011 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3164988.80	5192.9	522296.63	964690.52	1582.79	1713924.71	3165647.29	5192.9	522405.30	964891.22	1582.79	3.25" ALLOY CAP LS7735 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162355.05	5199.2	522288.46	963887.75	1584.72	1713897.89	3163012.98	5199.2	522397.12	964088.29	1584.72	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159712.16	5192.3	522278.33	963082.19	1582.61	1713864.65	3160369.55	5192.3	522386.99	963282.57	1582.61	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3157232.08	5201.7	522268.88	962326.26	1585.48	1713833.64	3157888.95	5201.7	522377.54	962526.48	1585.48	CROSS IN STONE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3149281.48	5132.1	523067.46	959902.91	1564.27	1716454.19	3149936.69	5132.1	523176.28	960102.62	1564.27	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3151923.35	5130.2	523064.92	960708.16	1563.68	1716445.85	3152579.11	5130.2	523173.74	960908.04	1563.68	STONE IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3154575.72	5164.4	523071.16	961516.60	1574.12	1716466.33	3155232.04	5164.4	523179.98	961716.65	1574.12	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3157221.89	5169.6	523073.42	962323.16	1575.69	1716473.76	3157878.76	5169.6	523182.25	962523.37	1575.69	STONE IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159703.83	5182.2	523084.48	963079.65	1579.54	1716510.05	3160361.21	5182.2	523193.31	963280.02	1579.54	3.25" ALUM. CAP LS17488 IN RANGE BOX
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3164976.67	5196.0	523104.44	964686.82	1583.75	1716575.55	3165635.16	5196.0	523213.27	964887.53	1583.75	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3164957.96	5199.9	523911.43	964681.11	1584.94	1719223.69	3165616.43	5199.9	524020.43	964881.82	1584.94	3.25" ALUM. CAP LS17488 IN RANGE BOX
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3162330.71	5173.4	523900.69	963880.33	1576.86	1719188.45	3162988.64	5173.4	524009.69	964080.87	1576.86	3.25" ALUM. CAP LS17488 IN RANGE BOX
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2254	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3159692.17	5167.8	523889.50	963076.10	1575.14	1719151.74	3160349.55	5167.8	523998.50	963276.47	1575.14	3.25" ALUM. CAP LS17488 IN RANGE BOX

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4			
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2			
1			

CONTROL DIAGRAM

CITY OF COMMERCE CITY

COLORADO CENTRAL ZONE

DES. BY	DWN. BY TJI	CHK. BY TGB	
SCALE 1" = 1000'	DATE 08-04-99		
JOB NO. 4221.03	SHT. 7 OF 7		

JR Engineering, Ltd.
6020 Greenwood Plaza Blvd.
Englewood, Colorado 80111
Tel. (303) 740-9393
FAX (303) 721-9019

PLOT SCALE 1=1, DATE 08/04/99, TIME 11:35, FILE X:\4221.03\ACAD\SHEET7.DWG

EXHIBIT A

LOCATED WITHIN THE NORTHEAST QUARTER OF THE
NORTHEAST QUARTER OF SECTION 1,
TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M.
CITY OF COMMERCE CITY, COUNTY OF ADAMS,
STATE OF COLORADO

PARCEL DESCRIPTION

A PARCEL OF LAND LOCATED THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 1, AS MONUMENTED BY 3-1/4" ALUMINUM CAP, STAMPED "RLS 24673", WHENCE NORTH SIXTEENTH CORNER OF SAID SECTION 1, AS MONUMENTED BY A 2" ILLEGIBLE ALUMINUM CAP, BEARS S 00°00'00" W, A DISTANCE OF 1320.79 FEET, FORMING THE BASIS OF BEARINGS USED IN THIS DESCRIPTION;

THENCE SOUTH 08°43'40" WEST, A DISTANCE OF 263.61 FEET TO A POINT ON THE WEST LINE OF A 10 FOOT RIGHT-OF-WAY DEDICATION AT BOOK 6083, PAGE 635 OF THE ADAMS COUNTY RECORDS, AND THE **POINT OF BEGINNING**;

THENCE DEPARTING SAID WEST LINE, SOUTH 35°24'58" EAST, A DISTANCE OF 62.13 FEET TO A POINT OF CURVATURE;

THENCE ALONG A NON-TANGENT CURVE TO THE LEFT WITH A CENTRAL ANGLE OF 18°47'52", A RADIUS OF 675.00 FEET, AN ARC LENGTH OF 221.46 FEET AND A CHORD BEARING AND DISTANCE OF SOUTH 09°23'56" WEST, 220.47 FEET TO A POINT ON SAID WEST LINE;

THENCE ALONG SAID WEST LINE, NORTH 00°00'00" EAST, A DISTANCE OF 268.14 FEET TO THE **POINT OF BEGINNING**.

CONTAINING AN AREA OF 3,493 SQ. FT. OR 0.080 ACRES, MORE OR LESS.

I, DARREN R. WOLTERSTORFF, BEING A PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY STATE THAT THIS EXHIBIT WAS PREPARED BY ME OR UNDER MY RESPONSIBLE CHARGE IN ACCORDANCE WITH APPLICABLE STANDARDS OF PRACTICE AND IS ACCURATE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF. THIS CERTIFICATION IS NOT A GUARANTY OR WARRANTY, EITHER EXPRESSED OR IMPLIED.

PRELIMINARY
THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

DARREN R. WOLTERSTORFF, PLS 38281
FOR AND ON BEHALF OF KIMLEY-HORN AND ASSOCIATES, INC.

NOTES:

1. ACCORDING TO 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 THE CERTIFICATION SHOWN HEREON.

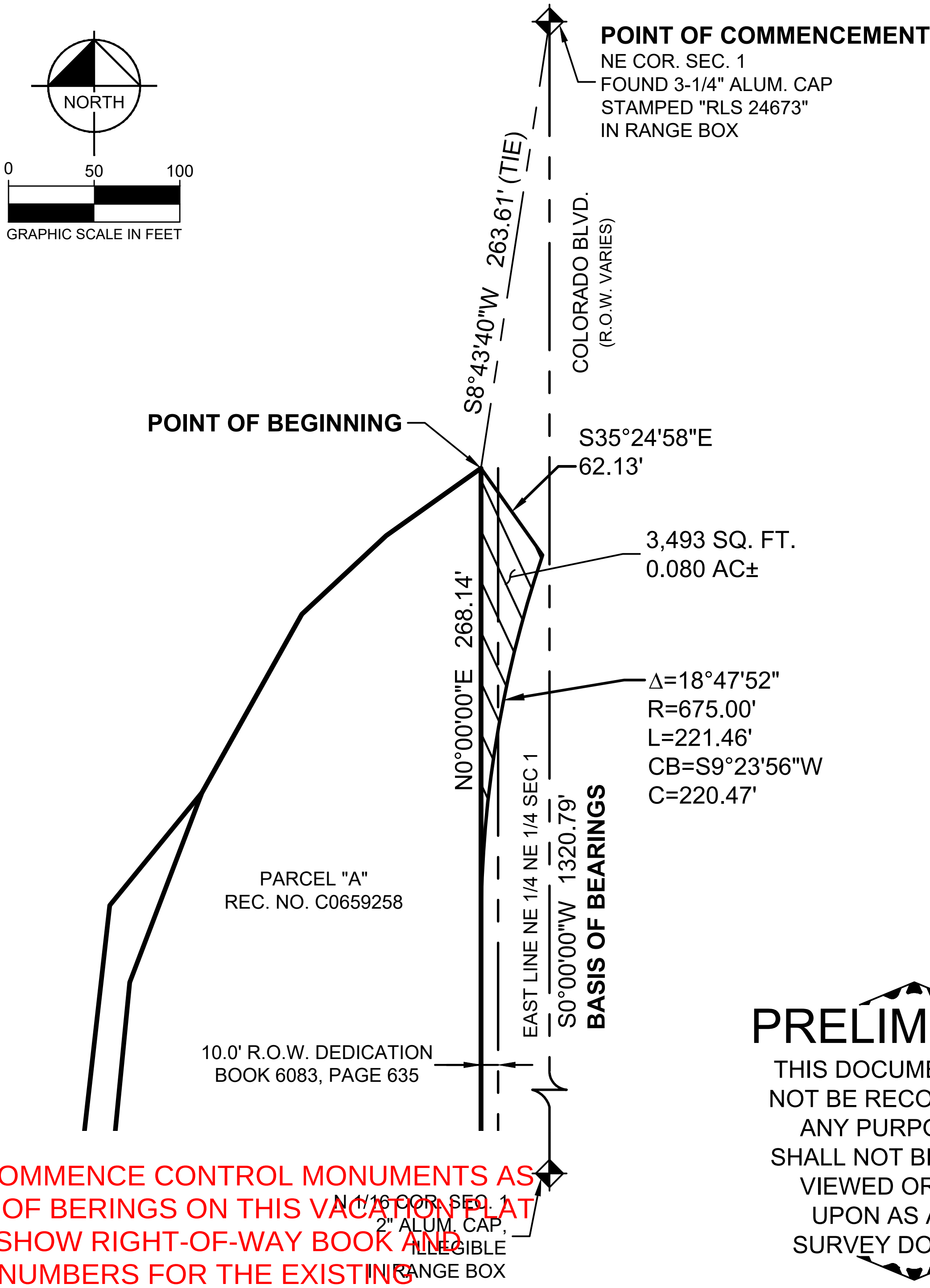
2. THIS DOCUMENT IS NOT A LAND SURVEY PLAT OR AN IMPROVEMENT SURVEY PLAT AND DOES NOT REPRESENT A MONUMENTED LAND SURVEY.

Kimley»Horn
4582 SOUTH ULSTER ST., # 1500
DENVER, COLORADO 80237
Tel. No. (303) 228-2300
www.kimley-horn.com

Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
N/A	CAD	DRW	1/21/2022	096216004	1 OF 2

EXHIBIT A

LOCATED WITHIN THE NORTHEAST QUARTER OF THE
NORTHWEST QUARTER OF SECTION 1,
TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M.
CITY OF COMMERCE CITY, COUNTY OF ADAMS,
STATE OF COLORADO



USE COMMENCE CONTROL MONUMENTS AS BASIS OF BERINGS ON THIS VACATION PLAT ALSO SHOW RIGHT-OF-WAY BOOK AND PAGE NUMBERS FOR THE EXISTING RIGHT-OF-WAY

PRELIMINARY
THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

NOTES:

1. ACCORDING TO 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 THE CERTIFICATION SHOWN HEREON.

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Scale	Drawn by	Checked by	Date	Project No.	Sheet No.
1" = 100'	CAD	DRW	1/21/2022	096216004	2 OF 2

Traffic Impact Study

7001 Colorado Boulevard

Commerce City, Colorado

Prepared for:

Prospect, LLC

Kimley»Horn

TRAFFIC IMPACT STUDY

City of Commerce City Engineering
APPROVED
04/21/2022

7001 Colorado Boulevard

Commerce City, Colorado

Prepared for
Prospect, LLC
PO Box 103190
Denver, Colorado 80250

Prepared by
Kimley-Horn and Associates, Inc.
4582 South Ulster Street
Suite 1500
Denver, Colorado 80237
(303) 228-2300

COLORADO REGISTERED PROFESSIONAL ENGINEER
JEFFREY RANDOLPH PLANCK
53006
04/20/2022

April 2022

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 EXECUTIVE SUMMARY

This report has been prepared to document the results of a Traffic Impact Study for 7001 Colorado Boulevard in Commerce City, Colorado. 7001 Colorado Boulevard is proposed to include approximately 92 multifamily housing dwelling units. It is expected that 7001 Colorado Boulevard will be completed in the next couple of years; therefore, analysis was conducted for the 2024 short-term buildout horizon as well as the 2045 long-term twenty-year planning horizon.

The purpose of this traffic study is to identify project traffic generation characteristics to determine potential project traffic related impacts on the local street system and to develop the necessary mitigation measures required for the identified traffic impacts. The following intersections were incorporated into this traffic study in accordance with the City of Commerce City standards and requirements:

- 72nd Avenue and Colorado Boulevard (#1)
- 70th Avenue and Colorado Boulevard (#2)
- 68th Avenue and Colorado Boulevard (#3)

In addition, the proposed full movement access at the intersection of 71st Avenue and Colorado Boulevard was evaluated.

Regional access to 7001 Colorado Boulevard will be provided by Interstate 76 (I-76), Interstate 270 (I-270) and US Highway 85 (US-85). Primary access will be provided by Colorado Boulevard. Direct access will be provided by a full movement access located along the west side of Colorado Boulevard to align with 71st Avenue.

7001 Colorado Boulevard is expected to generate approximately 394 weekday daily trips, with 30 of these trips occurring during the morning peak hour and 38 of these trips occurring during the afternoon peak hour.

Based on the analysis presented in this report, Kimley-Horn believes 7001 Colorado Boulevard will be successfully incorporated into the existing and future roadway network. Analysis of the existing street network, the proposed project development, and expected traffic volumes resulted in the following conclusions and recommendations:

2024 Recommendations:

- With completion of the 7001 Colorado Boulevard project, an access is proposed along the west side of Colorado Boulevard to align with 71st Avenue and serve the proposed residential development. It is recommended that a R1-1 "STOP" sign be installed on the eastbound approach exiting the development. Also, to meet Commerce City Standards, a 130 foot with 165-foot taper northbound left turn lane may need to be constructed at this access. Although this access meets City warrants for implementation of a northbound left turn lane, left turn lanes were not provided (although warranted) with the recent reconstruction of the 70th Avenue and Colorado Boulevard. Therefore, it is believed existing geometric constraints may have prevented implementation of left turn lanes at the 70th Avenue and Colorado Boulevard intersection. Therefore, additional design coordination will be required with the City to determine if a northbound left turn lane is needed at the project access. Of note, there are expected to be nine (9) vehicles making this left turn during the peak hour of the day. If a northbound left turn lane is implemented at the project access, bike lanes will be continued through the widened section of the street. Further, if the northbound left turn lane is implemented at the project access, the City may desire to designate a southbound left turn lane in the created shadow space of the northbound left turn lane.

2045 Recommendations:

- A signal may be needed at the intersection of 72nd Avenue and Colorado Boulevard (#1) if future traffic volumes are realized.

General Recommendations:

- Any on-site or offsite improvements should be incorporated into the Civil Drawings and conform to standards of the City of Commerce City and the Manual on Uniform Traffic Control Devices (MUTCD) – 2009 Edition.

2.0 INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this report to document the results of a Traffic Impact Study for 7001 Colorado Boulevard in Commerce City, Colorado. A vicinity map illustrating the 7001 Colorado Boulevard development location is shown in **Figure 1**. 7001 Colorado Boulevard is proposed to include approximately 92 multifamily housing dwelling units. A conceptual site plan is attached in **Appendix H**. It is expected that 7001 Colorado Boulevard will be completed in the next couple of years; therefore, analysis was conducted for the 2024 short-term buildout horizon as well as the 2045 long-term twenty-year planning horizon.

The purpose of this traffic study is to identify project traffic generation characteristics to determine potential project traffic related impacts on the local street system and to develop the necessary mitigation measures required for the identified traffic impacts. The following intersections were incorporated into this traffic study in accordance with the City of Commerce City standards and requirements:

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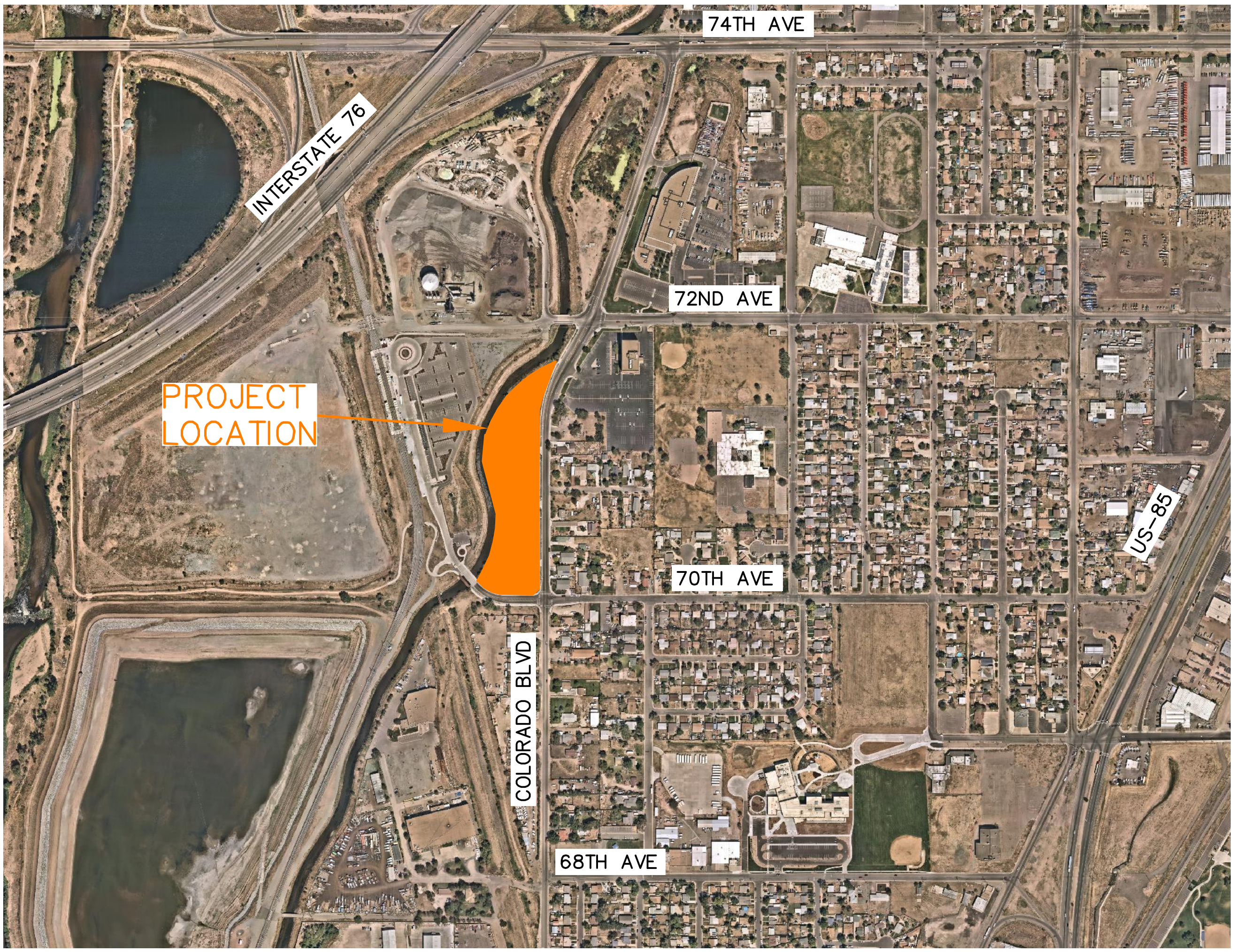


7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
VICINITY MAP

FIGURE 1

Kimley»Horn

3.0 EXISTING AND FUTURE CONDITIONS

3.1 Existing Study Area/Site Visit

The existing site is comprised of industrial uses and vacant land. Industrial uses are located to the south of the site while vacant land and industrial uses are located to the north. To the west is The Commerce City and 72nd RTD Station is located directly west of the site. Single family residences are located to the east of the project.

3.2 Existing Roadway Network

Colorado Boulevard extends in the north-south direction with one through lane in each direction and has a posted speed limit of 35 miles per hour. The Commerce City C3 Vision Plan classifies Colorado Boulevard as a major collector. 72nd Avenue, 70th Avenue, and 68th Avenue extend in the east-west direction as two-lane roadways. 72nd Avenue has a posted speed limit of 25 miles per hour west of Colorado Boulevard and a speed limit of 30 miles per hour east of Colorado Boulevard. 70th Avenue and 68th Avenue have a posted speed limit of 25 miles per hour.

The unsignalized intersection of 72nd Avenue and Colorado Boulevard (#1) operates with stop control on the eastbound and westbound 72nd Avenue approaches. The northbound and southbound approaches consist of a left turn lane, one through lane, and a right turn lane. The eastbound approach consists of one shared lane for all movements while the westbound approach consists of a left turn lane and a shared through/right turn lane. An aerial photo of the existing intersection configuration is below (north is up - typical).

72nd Avenue and Colorado Boulevard (#1)

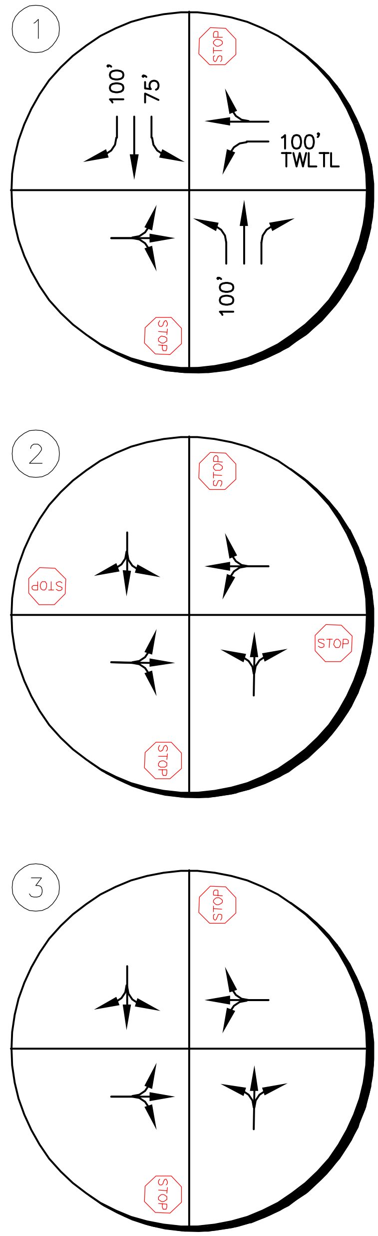
The unsignalized intersection of 70th Avenue and Colorado Boulevard (#2) operates with stop control on all four approaches. All four approaches consist of one shared lane for all movements. An aerial photo of the existing intersection configuration is below.

70th Avenue and Colorado Boulevard (#2)

The unsignalized intersection of 68th Avenue and Colorado Boulevard (#3) operates with stop control on the eastbound and westbound 68th Avenue approaches. The west leg of this intersection is slightly offset and is a private driveway access. All four approaches consist of one shared lane for all movements. An aerial photo of the existing intersection configuration is below.

68th Avenue and Colorado Boulevard (#3)

The intersection lane configuration and control for the key intersection is shown in **Figure 2**.



LEGEND

X	Study Area Key Intersection
STOP	Stop Controlled Approach
SPEED LIMIT XX	Roadway Speed Limit
100'	Turn Lane Length (feet)

7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
EXISTING GEOMETRY AND CONTROL

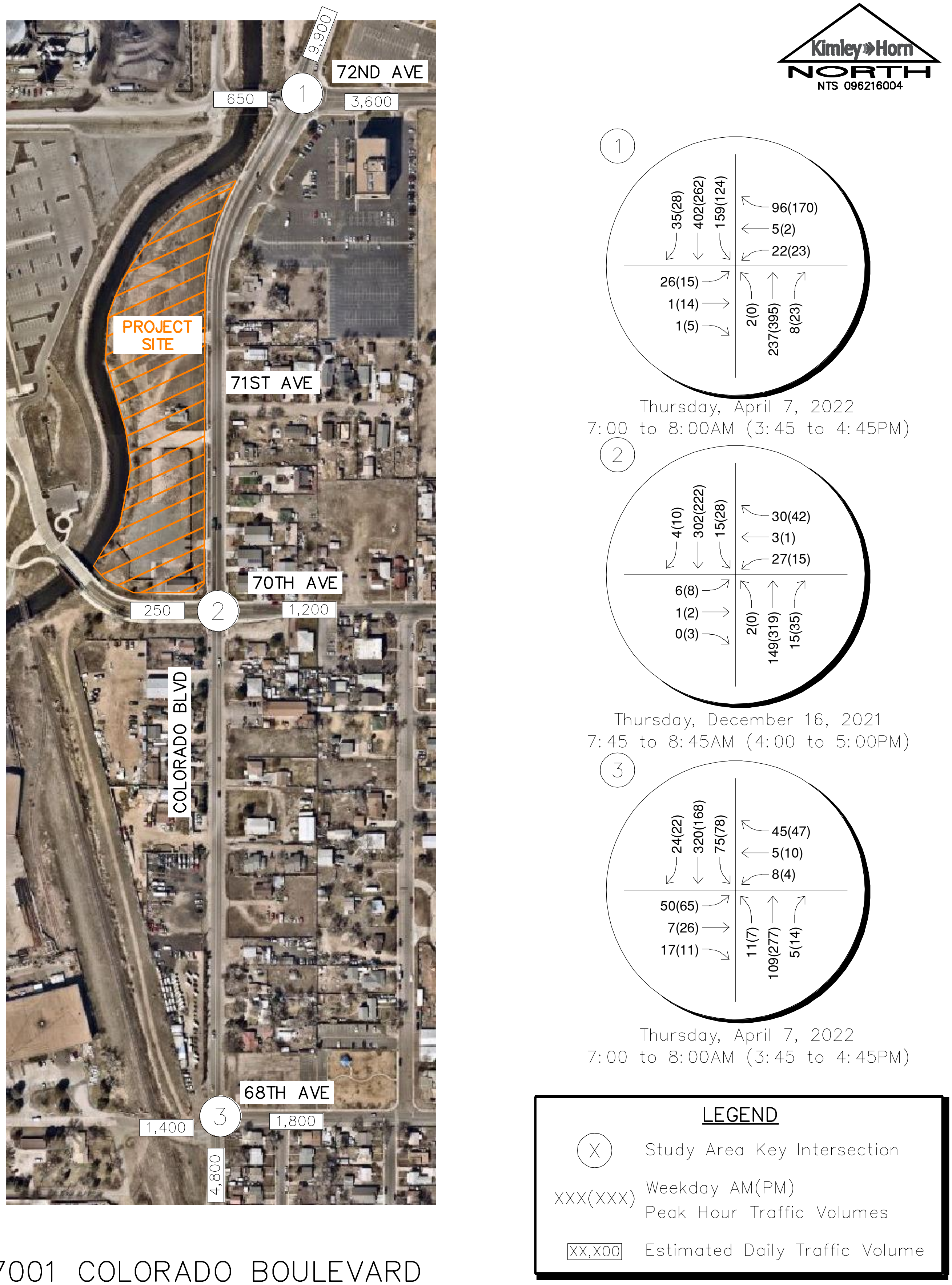
FIGURE 2

3.3 Existing Traffic Volumes

Existing turning movement counts were conducted at the intersection of 70th Avenue and Colorado Boulevard (#2) on Thursday, December 16, 2021 and at all other intersections on Thursday, April 7, 2022 during the morning and afternoon peak hours. The counts collected on December 16, 2021 were conducted during the morning and afternoon peak hours of adjacent street traffic in 15-minute intervals from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on this count date. The counts collected on April 7, 2022 were conducted during the morning and afternoon peak hours of adjacent street traffic in 15-minute intervals from 7:00 AM to 9:00 AM and 2:00 PM to 6:00 PM on this count date. The existing intersection traffic volumes are shown in **Figure 3** with count sheets provided in **Appendix A**.

3.4 Unspecified Development Traffic Growth

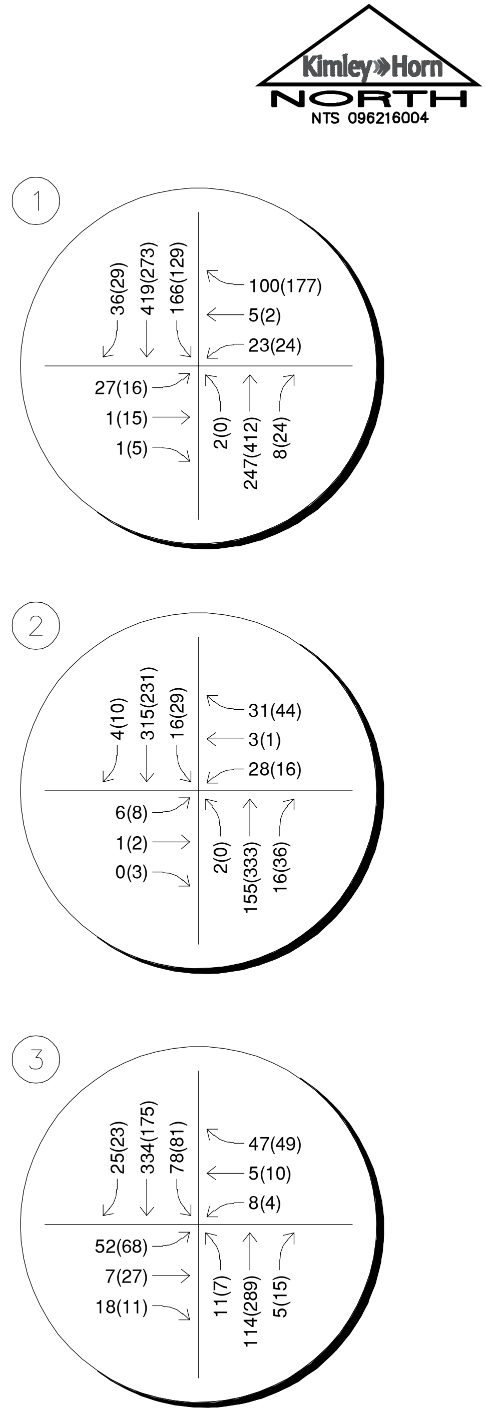
According to traffic projections from the Denver Regional Council of Governments (DRCOG) traffic model, the area surrounding the site is expected to have an average 25-year growth factor of 1.43. This growth factor equates to an annual growth rate of 1.6 percent. Future traffic volume projections and growth rate calculations are provided in **Appendix B**. This annual growth rate was used to estimate short-term 2024 and long-term 2045 traffic volume projections at the key intersection. The calculated background traffic volumes for 2024 and 2045 are shown in **Figure 4** and **Figure 5,** respectively.



7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
EXISTING TRAFFIC VOLUMES

FIGURE 3

Kimley»Horn



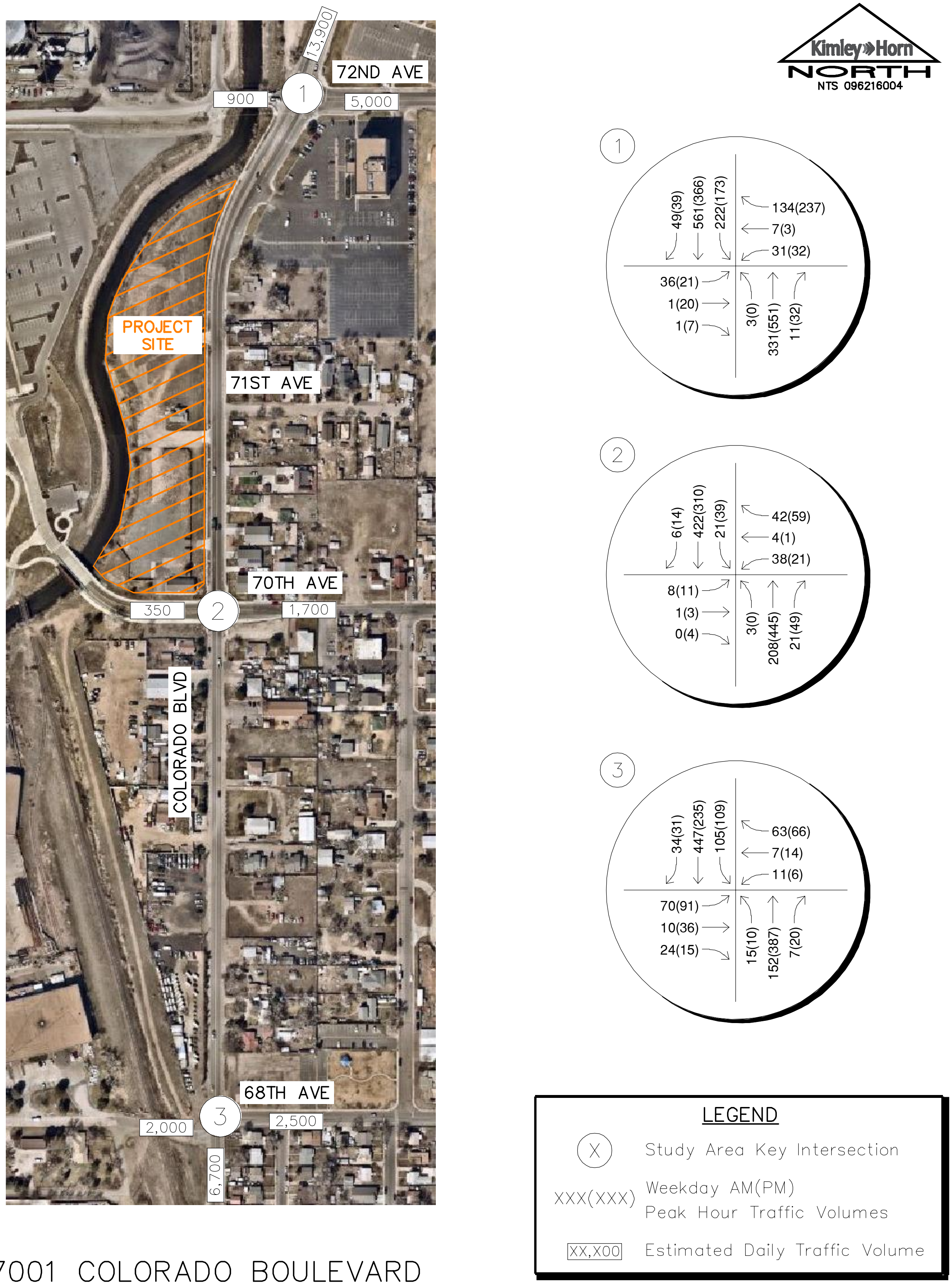
LEGEND

X	Study Area Key Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
2024 BACKGROUND TRAFFIC VOLUMES

FIGURE 4

Kimley»Horn



7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
2045 BACKGROUND TRAFFIC VOLUMES

FIGURE 5

Kimley»Horn

4.0 PROJECT TRAFFIC CHARACTERISTICS

4.1 Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged source for trip generation rates is the *Trip Generation Manual*[1] published by the Institute of Transportation Engineers (ITE). ITE has established trip rates in nationwide studies of similar land uses. For this study, Kimley-Horn used the ITE Trip Generation Report fitted curve equations that applies to Multifamily Mid-Rise Housing (ITE Land Use Code 221), for traffic associated with the development.

7001 Colorado Boulevard is expected to generate approximately 394 weekday daily trips, with 30 of these trips occurring during the morning peak hour and 38 of these trips occurring during the afternoon peak hour. Calculations were based on the procedure and information provided in the ITE *Trip Generation Manual, 11th Edition – Volume 1: User's Guide and Handbook*, 2021. **Table 1** summarizes the estimated trip generation for the 7001 Colorado Boulevard. The trip generation worksheets are included in **Appendix C**.   Although this project site is in the direct vicinity of a RTD station, no trip reduction credits were taken to remain conservative.

Table 1 – 7001 Colorado Boulevard Traffic Generation

Land Use and Size	Weekday Vehicle Trips						
	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Multifamily Mid-Rise Housing (ITE 221) – 92 Dwelling Units	394	7	23	30	23	15	38

[1] Institute of Transportation Engineers, *Trip Generation Manual*, Eleventh Edition, Washington DC, 2021.

4.2 Trip Distribution

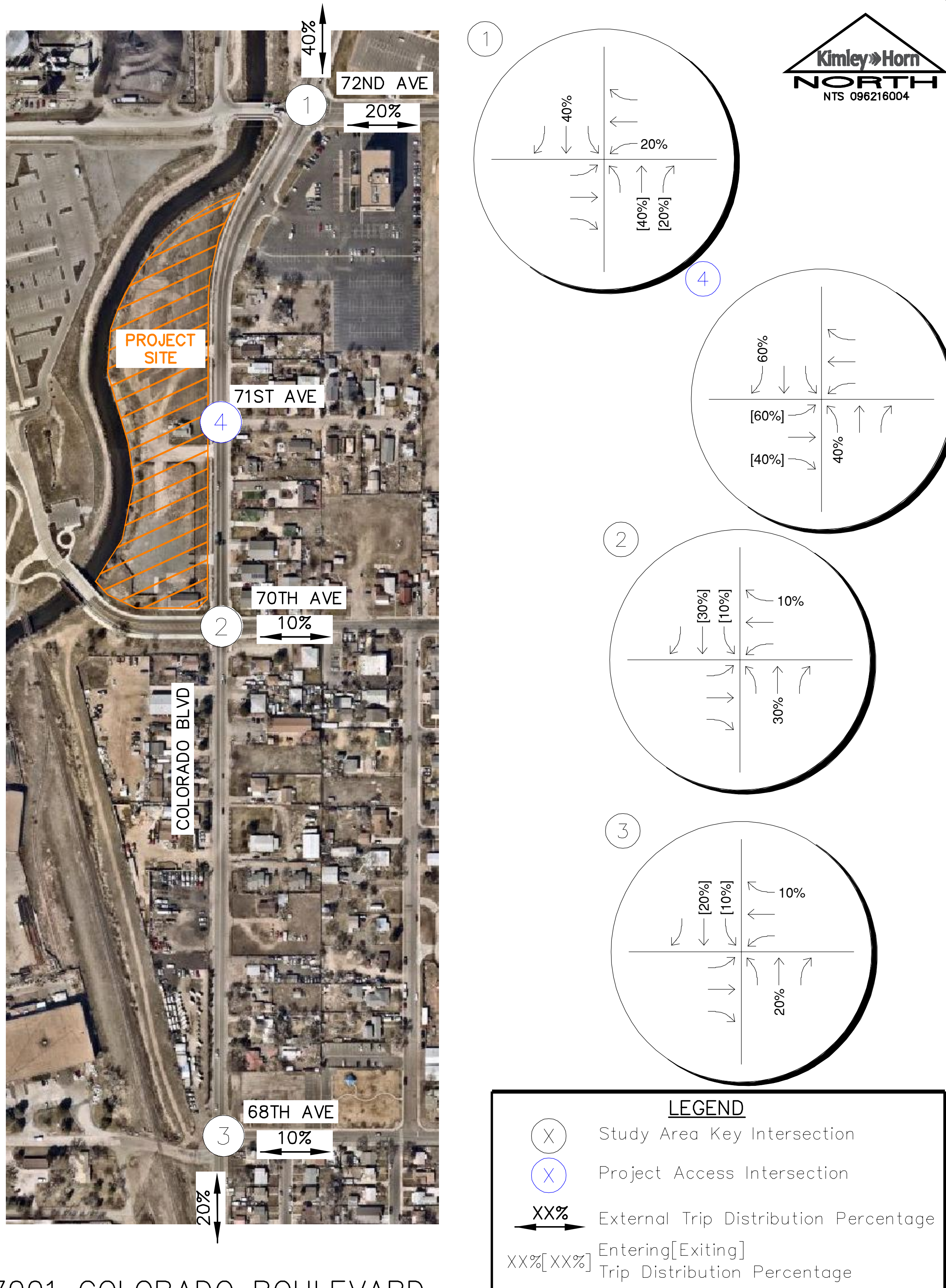
Distribution of site traffic on the street system was based on the area street system characteristics, existing traffic patterns, existing and anticipated surrounding demographic information, and the proposed access system for the project. The directional distribution of traffic is a means to quantify the percentage of site-generated traffic that approaches the site from a given direction and departs the site back to the original source. The project trip distribution for the proposed development is illustrated in **Figure 6**.

4.3 Traffic Assignment

7001 Colorado Boulevard traffic assignment was obtained by applying the project trip distribution to the estimated traffic generation of the development shown in **Table 1**. Traffic assignment is shown in **Figure 7.**

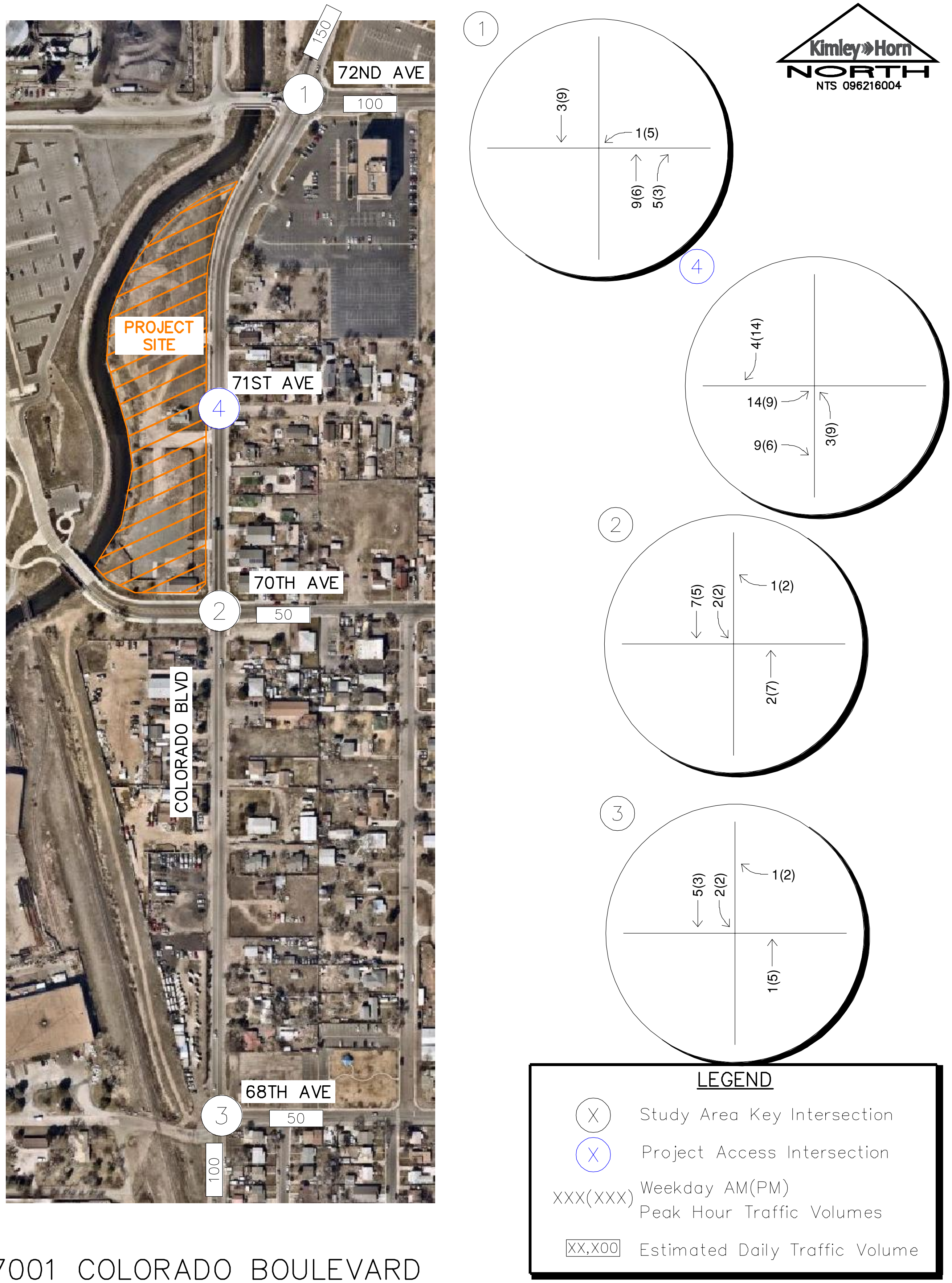
4.4 Total (Background Plus Project) Traffic

Site traffic volumes were added to the background volumes to represent estimated traffic conditions for the short-term 2024 buildout horizon and long-term 2045 twenty-year planning horizon. These total traffic volumes for the study area are illustrated for the 2024 and 2045 horizon years in **Figures 8** and **9**, respectively.



7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
PROJECT TRIP DISTRIBUTION

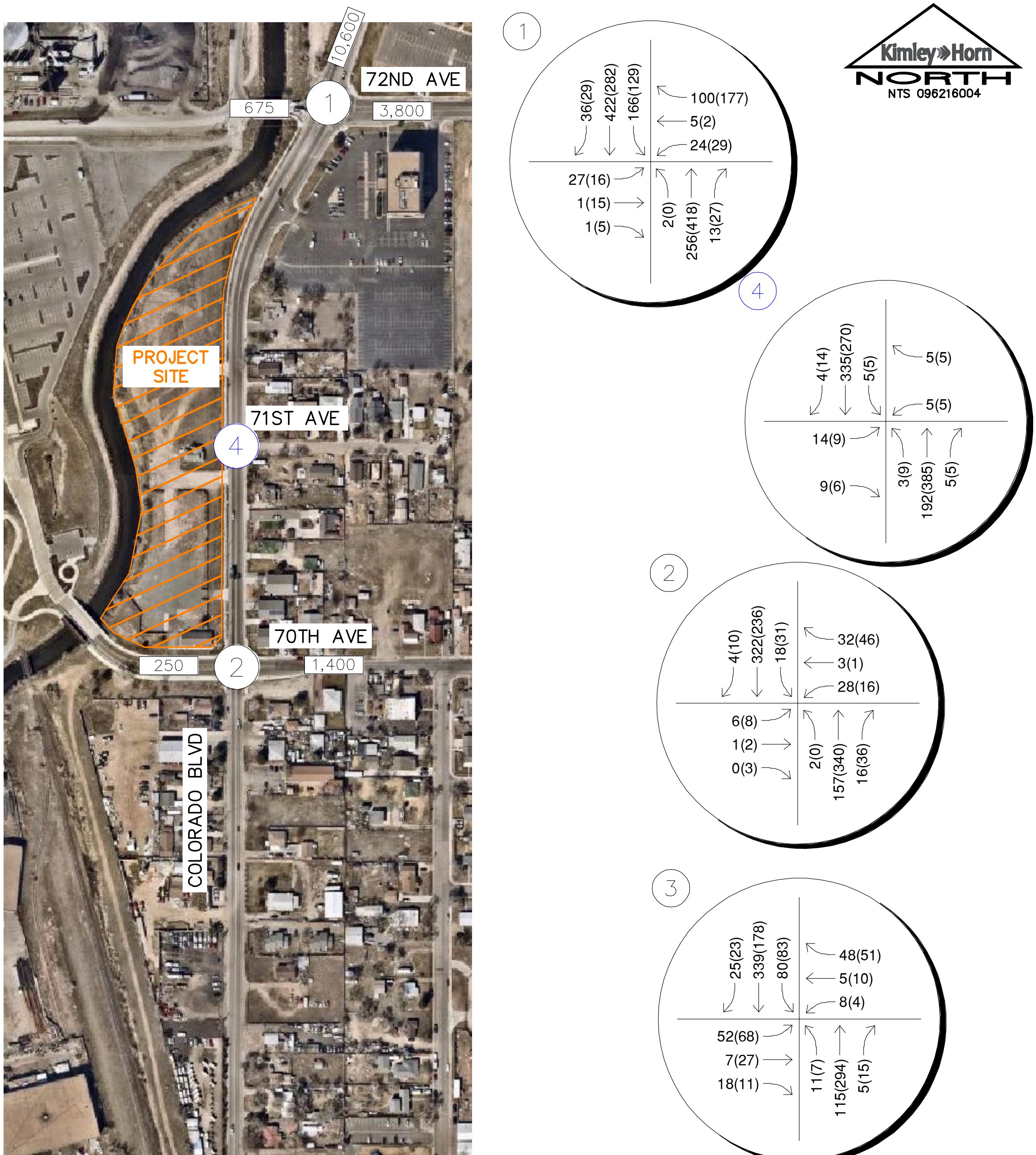
FIGURE 6



7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
PROJECT TRAFFIC ASSIGNMENT

FIGURE 7

Kimley»Horn

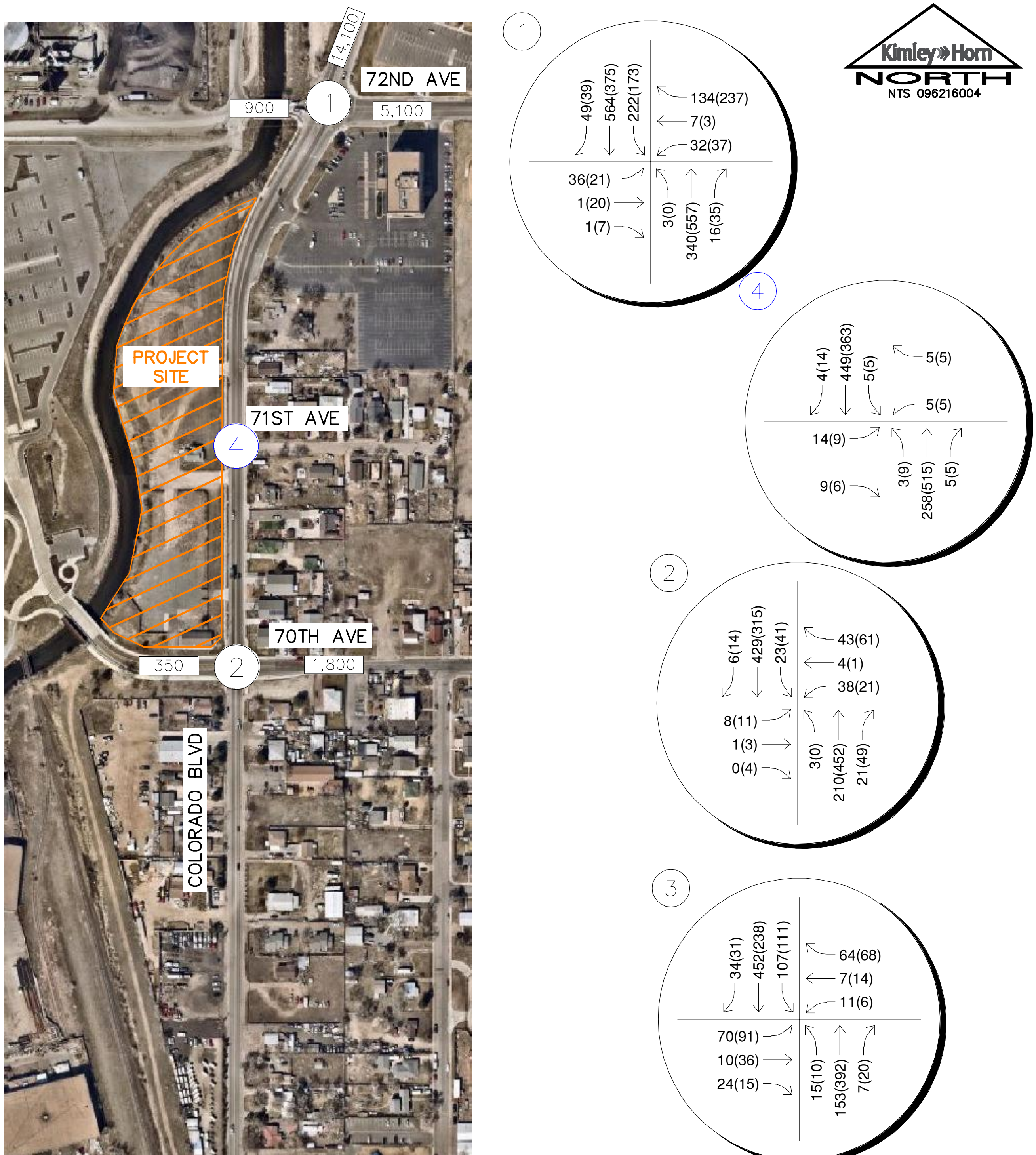


LEGEND

X	Study Area Key Intersection
X	Project Access Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00	Estimated Daily Traffic Volume

7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
2024 TOTAL TRAFFIC VOLUMES

FIGURE 8



LEGEND

X (circle)	Study Area Key Intersection
X (blue circle)	Project Access Intersection
XXX(XXX)	Weekday AM(PM) Peak Hour Traffic Volumes
XX,X00 (box)	Estimated Daily Traffic Volume

7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
2045 TOTAL TRAFFIC VOLUMES

FIGURE 9

Kimley»Horn

5.0 TRAFFIC OPERATIONS ANALYSIS

Kimley-Horn's analysis of traffic operations in the site vicinity was conducted to determine potential capacity deficiencies in the 2024 and 2045 development horizons at the identified key intersections. The acknowledged source for determining overall capacity is the current edition of the *Highway Capacity Manual (HCM)*[2].

5.1 Analysis Methodology

Capacity analysis results are listed in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion). For intersections and roadways in this study area, standard traffic engineering practice recommends overall intersection LOS D and movement/approach LOS E as the minimum desirable thresholds for acceptable operations. **Table 2** shows the definition of level of service for signalized and unsignalized intersections.

Table 2 – Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Definitions provided from the Highway Capacity Manual, Sixth Edition, Transportation Research Board, 2016.

Study area intersections were analyzed based on average total delay analysis for unsignalized intersections. Under the unsignalized analysis, the LOS for a two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS for a two-way stop-controlled intersection is not defined for the intersection as a whole. LOS for signalized, roundabout, and all-way stop controlled intersections are defined for each approach and for the overall intersection.

[2] Transportation Research Board, *Highway Capacity Manual*, Sixth Edition, Washington DC, 2016.

5.2 Key Intersection Operational Analysis

Calculations for the operational level of service at the key intersections for the study area are provided in **Appendix D**. The existing year analysis is based on the lane geometry and intersection control shown in **Figure 2.** Existing peak hour factors were utilized in the existing, 2024 horizon, and 2045 horizon analysis years. Synchro traffic analysis software was used to analyze the signalized, and unsignalized key intersections for HCM level of service.

72nd Avenue and Colorado Boulevard (#1)

The unsignalized intersection of 72nd Avenue and Colorado Boulevard (#1) operates with stop control on the eastbound and westbound 72nd Avenue approaches. The movements at this intersection operate acceptably at LOS C or better during both peak hours under existing conditions. With project traffic and the existing lane configurations, all movements are anticipated to continue operating at an acceptable level of service in 2024. By 2045, the eastbound approach may operate poorly with or without the addition of project traffic.

An alternative analysis was also provided in 2024 and 2045 with this intersection operating with all-way stop control. The conversion of this intersection from two-way stop control to all-way stop control would allow for implementation of crosswalks while improving pedestrian connectivity with Adams City Middle School located to the east. With all-way stop control, this intersection is expected to operate acceptably during the peak hours in 2024 but with long delays by 2045. A total of four of the eight hourly volume all-way stop control warrants are expected to be met by 2024. It is believed that each hour could meet warrants with the addition pedestrian units once crosswalks were provided with all-way stop control. Independent of this project, the City of Commerce City could consider implementing all-way stop control and crosswalks at the 72nd Avenue and Colorado Boulevard intersection for the short-term horizon.

A signal warrant analysis was completed for this intersection and it was found that a signal may be warranted in 2045 without the addition of project traffic. If future traffic volumes are realized by 2045, signalization should be considered at this intersection by the long-term horizon. With signalization, the intersection is anticipated to operate acceptably in 2045 with the addition of project traffic. The all-way stop control and signal warrant calculations and figure is provided in **Appendix E**. The results of the LOS analysis conducted at this intersection is shown in **Table 3**.

Table 3 – 72nd Avenue & Colorado Boulevard LOS Results

Scenario	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
2021 Existing				
Northbound Left	8.3	A	0.0	A
Eastbound Approach	20.1	C	19.3	C
Westbound Left	19.0	C	16.7	C
Westbound Through/Right	10.8	B	12.7	B
Southbound Left	8.2	A	8.6	A
2024 Background				
Northbound Left	8.3	A	0.0	A
Eastbound Approach	21.2	C	20.6	C
Westbound Left	19.9	C	17.4	C
Westbound Through/Right	11.0	B	13.1	B
Southbound Left	8.2	A	8.7	A
2024 Total Traffic				
Northbound Left	8.3	A	0.0	A
Eastbound Approach	21.5	C	21.0	C
Westbound Left	20.1	C	17.8	C
Westbound Through/Right	11.0	B	13.2	B
Southbound Left	8.3	A	8.7	A
2024 Total Traffic (AWSC) #	**17.3**	**C**	**20.7**	**C**
Eastbound Approach	11.4	B	11.9	B
Westbound Approach	11.1	B	13.1	B
Northbound Approach	15.4	C	30.1	D
Southbound Approach	19.6	C	15.6	C
2045 Background				
Northbound Left	8.8	A	0.0	A
Eastbound Approach	37.5	E	88.3	F
Westbound Left	30.8	D	24.4	C
Westbound Through/Right	12.8	B	18.0	C
Southbound Left	8.7	A	9.5	A
2045 Total Traffic (AWSC) #	**48.7**	**E**	**67.6**	**F**
Eastbound Approach	13.1	B	14.3	B
Westbound Approach	13.6	B	18.8	C
Northbound Approach	27.3	D	133.6	F
Southbound Approach	66.8	F	28.3	D
2045 Total Traffic (Signalized) ##	9.8	A	14.4	B

= All-Way Stop Control (AWSC); ## = Signalized

70th Avenue and Colorado Boulevard (#2)

The unsignalized intersection of 70th Avenue and Colorado Boulevard operates with stop control on all four approaches. The intersection operates acceptably at LOS B during both peak hours under existing conditions. With project traffic and the existing lane configurations, all movements are anticipated to continue operating at an acceptable level of service throughout the 2045 horizon. Therefore, no modifications to the existing control or lane configurations are recommended at this intersection. **Table 4** provides the results of the LOS analysis conducted at this intersection.

Table 4 – 70th Avenue & Colorado Boulevard LOS Results

Scenario	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
2021 Existing	10.3	B	10.7	B
2024 Background	10.6	B	11.1	B
2024 Background Plus Project	10.7	B	11.3	B
2045 Background	14.6	B	16.0	C
2045 Background Plus Project	15.0	B	16.5	C

68th Avenue and Colorado Boulevard (#3)

The unsignalized intersection of 68th Avenue and Colorado Boulevard (#3) operates with stop control on the eastbound and westbound 68th Avenue approaches. The movements at this intersection operate acceptably at LOS C or better during both peak hours under existing conditions. With project traffic and the existing lane configurations, all movements are anticipated to continue operating at an acceptable level of service throughout the 2045 horizon. Therefore, no modifications to the existing control or lane configurations are recommended at this intersection. **Table 5** provides the results of the LOS analysis conducted at this intersection.

Table 5 – 68th Avenue & Colorado Boulevard LOS Results

Scenario	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
2021 Existing				
Northbound Left	8.0	A	7.7	A
Eastbound Approach	14.2	B	17.2	C
Westbound Approach	10.4	B	11.6	B
Southbound Left	7.6	A	8.1	A
2024 Background				
Northbound Left	8.1	A	7.7	A
Eastbound Approach	14.6	B	18.0	C
Westbound Approach	10.5	B	11.8	B
Southbound Left	7.6	A	8.2	A
2024 Background Plus Project				
Northbound Left	8.1	A	7.7	A
Eastbound Approach	14.7	B	18.3	C
Westbound Approach	10.5	B	11.8	B
Southbound Left	7.6	A	8.2	A
2045 Background				
Northbound Left	8.4	A	7.9	A
Eastbound Approach	19.8	C	32.8	D
Westbound Approach	11.8	B	14.0	B
Southbound Left	7.8	A	8.7	A
2045 Background Plus Project				
Northbound Left	8.4	A	7.9	A
Eastbound Approach	20.0	C	34.0	D
Westbound Approach	11.8	B	14.1	B
Southbound Left	7.8	A	8.7	A

Project Access

With completion of the 7001 Colorado Boulevard project, an access is proposed along the west side of Colorado Boulevard to align with 71st Avenue and serve the proposed residential development. It is recommended that a R1-1 “STOP” sign be installed on the eastbound approach exiting the development. Also, to meet Commerce City Standards, a 130 foot with 165-foot taper northbound left turn lane may need to be constructed at this access. Although this access meets City warrants for implementation of a northbound left turn lane, left turn lanes were not provided (although warranted) with the recent reconstruction of the 70th Avenue and Colorado Boulevard. Therefore, it is believed existing geometric constraints may have prevented implementation of left turn lanes at the 70th Avenue and Colorado Boulevard intersection. Therefore, additional design coordination will be required with the City to determine if a northbound left turn lane is needed at the project access. A conceptual exhibit is attached in **Appendix F** showing the proposed configuration of the project access with a northbound left turn lane. Of note, there are expected to be nine (9) vehicles making this left turn during the peak hour of the day. If a northbound left turn lane is implemented at the project access, bike lanes will be continued through the widened section of the street. Further, if the northbound left turn lane is implemented at the project access, the City may desire to designate a southbound left turn lane in the created shadow space of the northbound left turn lane. **Table 6** provides the results of the level of service for this project street access with and without a northbound left turn lane. As shown in the table, the project access intersection along Colorado Boulevard to align with 71st Avenue is anticipated to have all movements operating with acceptable LOS C or better during the peak hours in both the buildout year 2024 and the 2045 long term horizons with or without a northbound left turn lane.

Table 6 – Project Access Level of Service Results

Intersection	2024 Total				2045 Total			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay (sec/ veh)	LOS	Delay (sec/ veh)	LOS	Delay (sec/ veh)	LOS	Delay (sec/ veh)	LOS
71st Avenue and Colorado Boulevard Access								
Northbound Left	8.0	A	7.9	A	8.4	A	8.2	A
Eastbound Approach	12.8	B	14.1	B	15.4	C	17.9	C
Westbound Approach	11.8	B	13.7	B	13.6	B	17.2	C
Southbound Left	7.7	A	8.2	A	7.8	A	8.6	A
71st Avenue and Colorado Boulevard Access #								
Northbound Left	8.0	A	7.9	A	8.4	A	8.2	A
Eastbound Approach	12.8	B	14.1	B	15.4	C	17.8	C
Westbound Approach	11.8	B	13.7	B	13.6	B	17.2	C
Southbound Left	7.7	A	8.2	A	7.8	A	8.6	A

= Northbound Left Turn Lane

5.3 Project Access Auxiliary Lane Analysis

The City of Commerce City Engineering Construction Standards and Specifications were used to determine if turn lanes are warranted at the project access. The City of Commerce City classifies Colorado Boulevard as a major collector roadway.

According to section 3.04.1 for Major Collector roadways, a left turn lane with storage length plus taper length is required for all accesses, a right turn lane with storage length plus taper is required for any access with a projected peak hour right ingress turning volume greater than 25 vehicles per hour (vph), and a right turn acceleration lane is required for any access with a projected peak hour right egress turning volume greater than 10 vph.

Based on the major collector roadway classification and 2045 traffic volume projections, turn lane requirements at the project intersection along Colorado Boulevard are as follows:

<u>71st Avenue and Colorado Boulevard Access (#4)</u>

- A northbound left turn lane **<u>is</u>** warranted for the 71st Avenue and Colorado Boulevard Access based on Colorado Boulevard being a major collector roadway. To meet City standard the northbound left turn lane would need to be 130 feet long (calculated as a 90-foot deceleration length plus 40-foot storage length) plus a 165-foot taper. Although this access meets City warrants for implementation of a northbound left turn lane, it has been noticed that left turn lanes were not provided (although warranted) with the recent reconstruction of the 70th Avenue and Colorado Boulevard. Therefore, it is believed that current geometric constraints may prevent this northbound left turn lane and northbound left turn lane may not be desired by the City at this access. Of note, there are expected to be nine (9) vehicles making this left turn during the peak hour of the day.

- A southbound right turn lane **is not** warranted for the 71st Avenue and Colorado Boulevard Access based on projected 2045 background plus project traffic volumes being 14 southbound right turns during the peak hour and the threshold being 25 vph.

- An eastbound right turn to southbound acceleration lane **is not** warranted for the 71st Avenue and Colorado Boulevard Access based on projected 2024 background plus project traffic volumes being 9 eastbound right turns during the peak hour and the threshold being 10 vph.

It should be noted that the intersection of 70th Avenue and Colorado Boulevard was recently reconstructed in 2019 and did not incorporate left turn lanes at this intersection. Technically, based on City standards, left turn lanes should be incorporated on each approach of this intersection. However, it is believed that these left turn lanes were not included with the recent reconstruction of the 70th Avenue and Colorado Boulevard intersection due to this intersection operating with all-way stop control and to avoid driver confusion with this control and the additional lanes. As such, no modifications to the existing control or lane configurations are recommended at this intersection.

5.4 Vehicle Queuing Analysis

A vehicle queuing analysis was conducted for the study area intersections. The queuing analysis was performed using Synchro presenting the results of the 95th percentile queue lengths. Results are shown in the following **Table 7** with calculations provided within the level of service operational sheets of **Appendix D** for unsignalized intersections and **Appendix G** for signalized intersections.

Table 7 – Turn Lane Queuing Analysis Results

Intersection Turn Lane	Existing Turn Lane Length (feet)	2024 Calculated Queue (feet)	2024 Recommended Length (feet)	2045 Calculated Queue (feet)	2045 Recommended Length (feet)
72nd & Colorado (#1)					
Northbound Left	100’	25’	100’	25’	100’
Westbound Left	100’ TWLTL	25’	100’ TWLTL	45’	100’ TWLTL
Southbound Left	75’	25’	75’	56’	75’
Southbound Right	100’	25’	100’	25’	100’
71st & Colorado Access (#4)					
Northbound Left	DNE	25’	**130’+165’T (CC)**	25’	130’+165’T (CC)

TWLTL = Two-Way Left Turn Lane; DNE = Does Not Exist; T = Taper; CC=Commerce City Standard; **Blue** Text = Recommendation

As shown in the table above, if a northbound left turn lane is implemented at the 71st Avenue and Colorado Boulevard access (#4), it should be designated with 130 feet of length plus a 165-foot taper to meet Commerce City Standards.

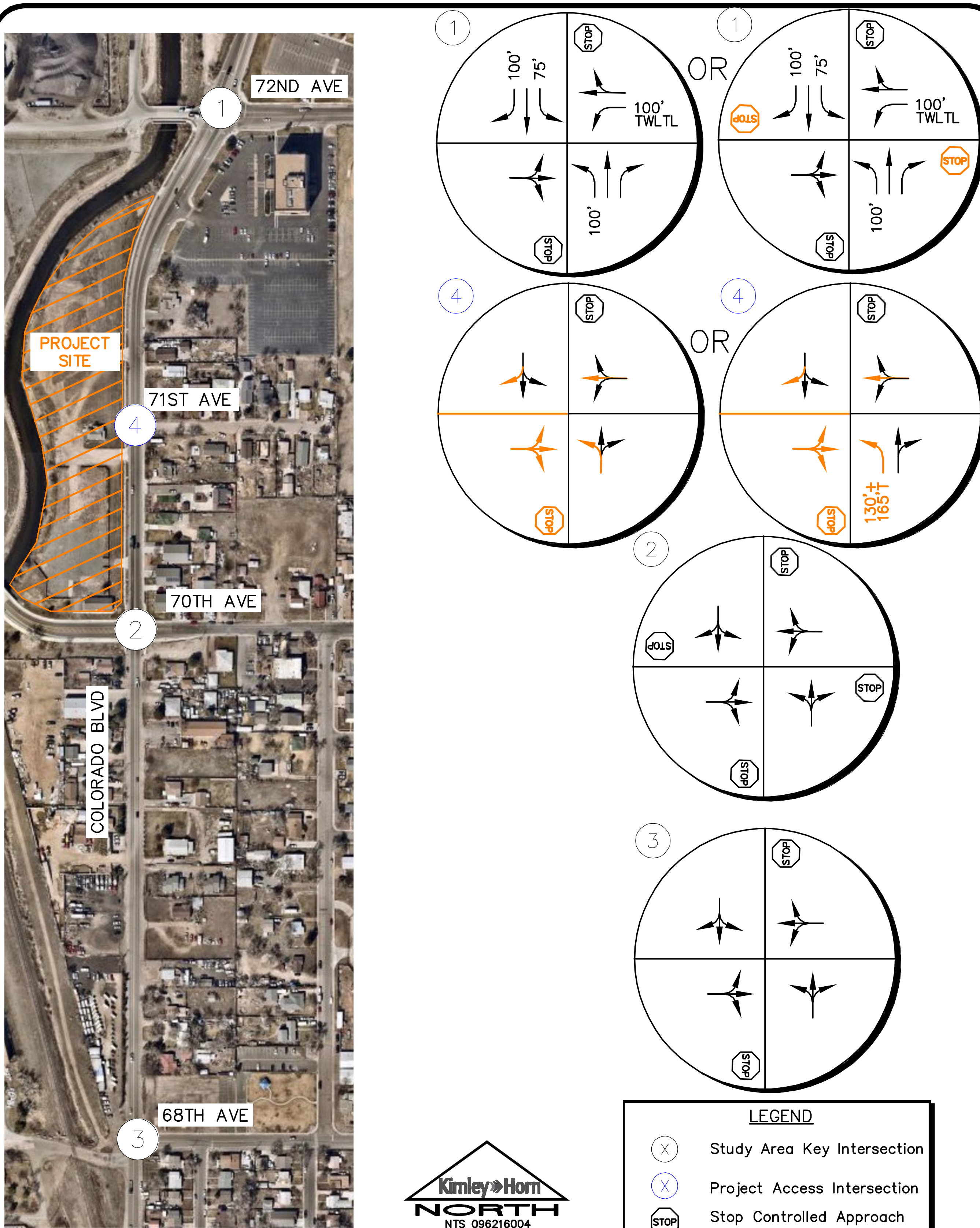
5.5 Bicycle and Pedestrian Access

Sidewalks are provided along both sides of the Colorado Boulevard between 72nd Avenue and 70th Avenue. The City recently improved Colorado Boulevard from 72nd Avenue to 70th Avenue as a complete street with incorporation of bike lanes, sidewalks, and curb and gutter. North of 72nd Avenue, Colorado Boulevard provides a sidewalk on the east side of the roadway. There are not any sidewalks present on either side of Colorado Boulevard south of 70th Avenue. However, the City will be improving Colorado Boulevard from 70th Avenue to 68th Avenue to match the roadway section to the north with sidewalks, bike lanes, and curb and gutter along both sides of Colorado Boulevard. This improvement to Colorado Boulevard would provide a complete sidewalk walking route to Alsup Elementary School on 68th Avenue as well as Adams City Middle School on 72nd Avenue. Sidewalk is provided on the north side of 72nd Avenue from Colorado Boulevard to Adams City Middle School and on the immediate southeast corner of the intersection with Colorado Boulevard. Therefore, the walking route to Adams City Middle School would be on the north side of 72nd Avenue. To the west of Colorado Boulevard, a sidewalk is provided on the south side of 72nd Avenue. There are sidewalks present on both sides of 70th Avenue adjacent to the site. The Commerce City and 72nd RTD Station is located directly west of the site along 70th Avenue. The sidewalks along 70th Avenue will be used by the proposed development to provide access to the RTD station. Sidewalks are provided on both sides of 68th Avenue east of Colorado Boulevard. A bike lane currently exists on Colorado Boulevard between 72nd Avenue and 70th Avenue and will be extended to 68th Avenue in the future.

Crosswalks are provided on all four legs of the all-way stop control intersection of 70th Avenue and Colorado Boulevard. A crosswalk is provided on the east leg of the 72nd Avenue and Colorado Boulevard intersection while there are not any crosswalks at the intersection of 68th Avenue and Colorado Boulevard. Vehicle traffic does not stop along Colorado Boulevard at the intersections with 72nd Avenue and 68th Avenue. As such, and due to the proximity of the Adams City Middle School to the east along 72nd Avenue, all-way stop control (evaluated previously) could be considered in the short-term at the intersection of 72nd Avenue and Colorado Boulevard. Crosswalks could then be incorporated on all four legs of this intersection improving pedestrian connectivity with the school to the east.

5.6 Improvement Summary

Based on the results of the intersection operational and vehicle queuing analysis, the key intersection recommended improvements and control are shown in **Figure 10** for the 2024 horizon and **Figure 11** for the 2045 horizon.



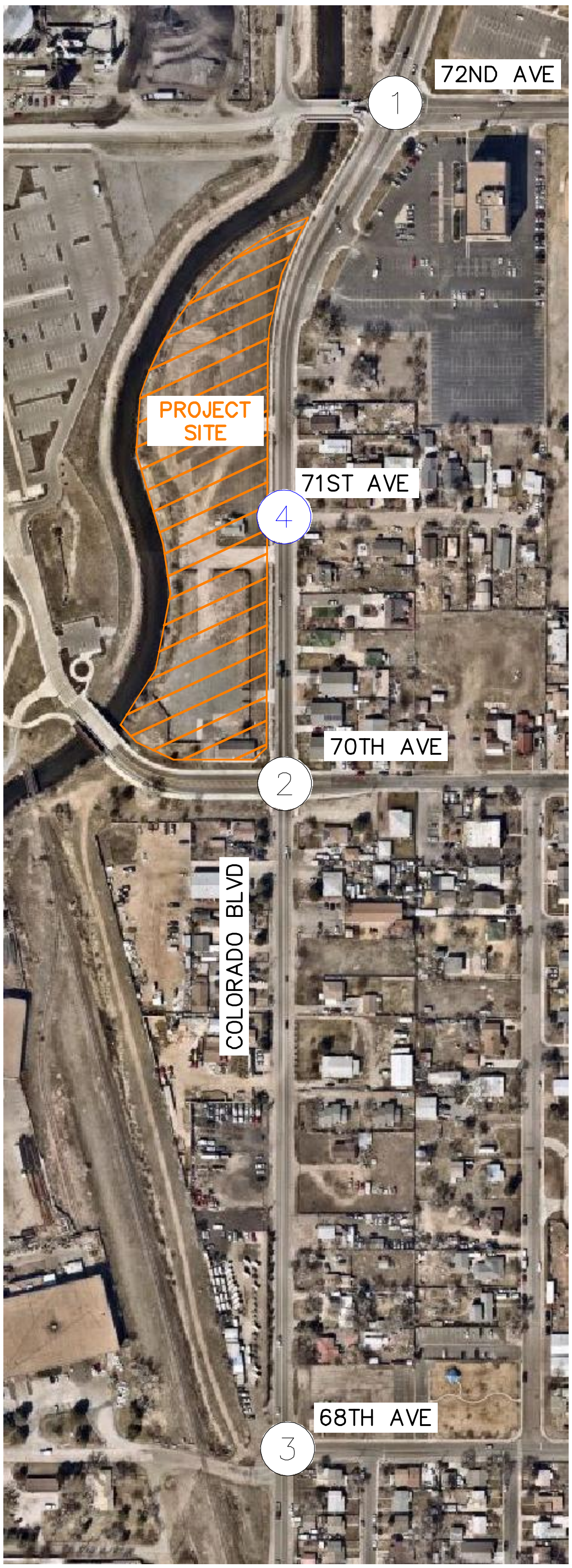
LEGEND

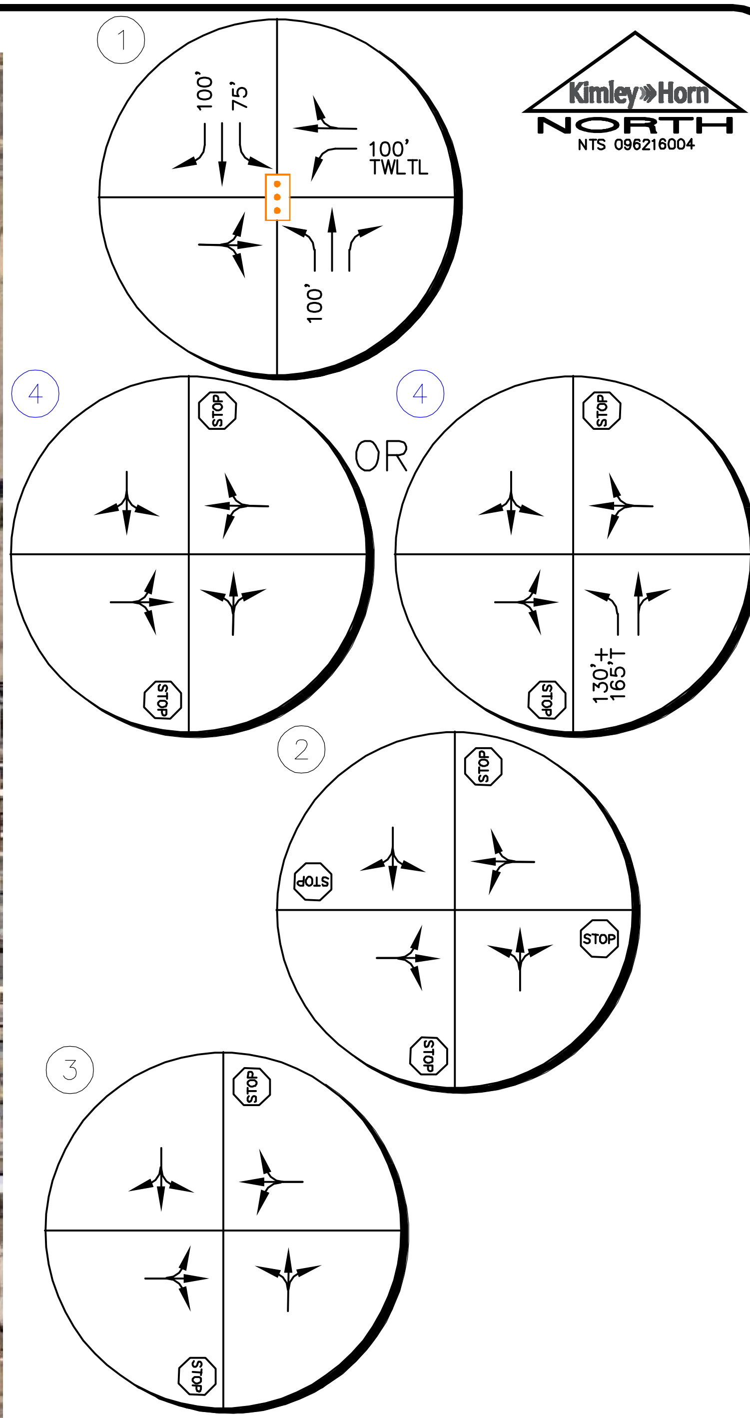
- X Study Area Key Intersection
- X Project Access Intersection
- STOP Stop Controlled Approach
- Improvement
- 100' Turn Lane Length (feet)

7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
2024 RECOMMENDED GEOMETRY AND CONTROL

FIGURE 10

Kimley»Horn





LEGEND

X	Study Area Key Intersection
X	Project Access Intersection
	Signalized Intersection
STOP	Stop Controlled Approach
	Improvement
100'	Turn Lane Length (feet)

7001 COLORADO BOULEVARD
COMMERCE CITY, COLORADO
2045 RECOMMENDED GEOMETRY
AND CONTROL

FIGURE 11

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis presented in this report, Kimley-Horn believes 7001 Colorado Boulevard will be successfully incorporated into the existing and future roadway network. Analysis of the existing street network, the proposed project development, and expected traffic volumes resulted in the following conclusions and recommendations:

2024 Recommendations:

- With completion of the 7001 Colorado Boulevard project, an access is proposed along the west side of Colorado Boulevard to align with 71st Avenue and serve the proposed residential development. It is recommended that a R1-1 "STOP" sign be installed on the eastbound approach exiting the development. Also, to meet Commerce City Standards, a 130 foot with 165-foot taper northbound left turn lane may need to be constructed at this access. Although this access meets City warrants for implementation of a northbound left turn lane, left turn lanes were not provided (although warranted) with the recent reconstruction of the 70th Avenue and Colorado Boulevard. Therefore, it is believed existing geometric constraints may have prevented implementation of left turn lanes at the 70^{th} Avenue and Colorado Boulevard intersection. Therefore, additional design coordination will be required with the City to determine if a northbound left turn lane is needed at the project access. Of note, there are expected to be nine (9) vehicles making this left turn during the peak hour of the day. If a northbound left turn lane is implemented at the project access, bike lanes will be continued through the widened section of the street. Further, if the northbound left turn lane is implemented at the project access, the City may desire to designate a southbound left turn lane in the created shadow space of the northbound left turn lane.

2045 Recommendations:

- A signal may be needed at the intersection of 72nd Avenue and Colorado Boulevard (#1) if future traffic volumes are realized.

General Recommendations:

- Any on-site or offsite improvements should be incorporated into the Civil Drawings and conform to standards of the City of Commerce City and the Manual on Uniform Traffic Control Devices (MUTCD) – 2009 Edition.

APPENDICES

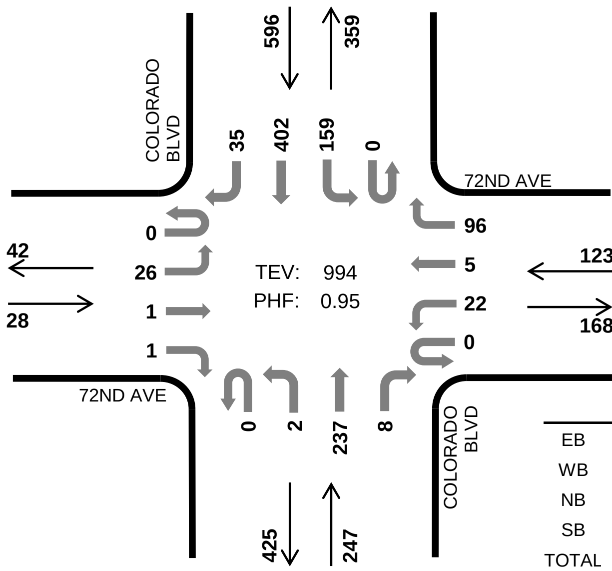
APPENDIX A

Intersection Count Sheets

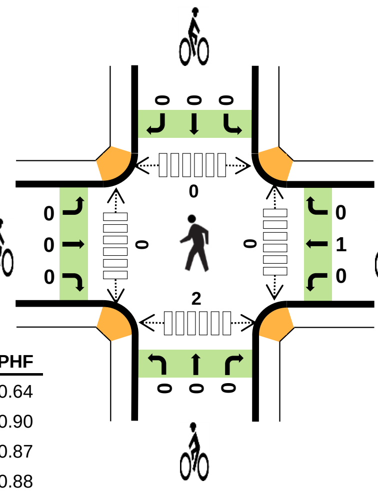
COLORADO BLVD
72ND AVE

Date: 04/07/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM

Peak Hour



	HV %:	PHF
EB	89.3%	0.64
WB	11.4%	0.90
NB	34.8%	0.87
SB	11.7%	0.88
TOTAL	19.6%	0.95



Two-Hour Count Summaries

Interval Start	72ND AVE Eastbound UT	LT	TH	RT	72ND AVE Westbound UT	LT	TH	RT	COLORADO BLVD Northbound UT	LT	TH	RT	COLORADO BLVD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	11	0	0	0	4	0	25	0	1	69	1	0	37	97	7	252	0
7:15 AM	0	5	0	0	0	7	1	25	0	0	57	2	0	34	96	3	230	0
7:30 AM	0	3	1	0	0	6	3	25	0	1	57	3	0	36	104	12	251	0
7:45 AM	0	7	0	1	0	5	1	21	0	0	54	2	0	52	105	13	261	994
8:00 AM	0	8	0	0	0	6	0	26	0	1	45	8	0	30	106	11	241	983
8:15 AM	0	8	1	0	0	10	3	16	0	0	56	6	0	23	83	7	213	966
8:30 AM	0	12	1	1	1	5	0	27	0	0	42	5	0	22	73	8	197	912
8:45 AM	0	5	0	0	0	8	1	20	0	0	32	5	0	18	61	10	160	811
Count Total	0	59	3	2	1	51	9	185	0	3	412	32	0	252	725	71	1,805	0
Peak Hour All	0	26	1	1	0	22	5	96	0	2	237	8	0	159	402	35	994	0
Peak Hour HV	0	25	0	0	0	4	4	6	0	1	80	5	0	2	44	24	195	0
Peak Hour HV%	-	96%	0%	0%	-	18%	80%	6%	-	50%	34%	63%	-	1%	11%	69%	20%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	11	3	28	11	*53*	0	1	0	0	*1*	0	0	0	0	*0*
7:15 AM	5	6	25	21	*57*	0	0	0	0	*0*	0	0	0	1	*1*
7:30 AM	2	3	21	20	*46*	0	0	0	0	*0*	0	0	0	0	*0*
7:45 AM	7	2	12	18	*39*	0	0	0	0	*0*	0	0	0	1	*1*
8:00 AM	7	5	9	25	*46*	0	0	0	0	*0*	1	0	0	1	*2*
8:15 AM	8	4	20	16	*48*	0	0	0	0	*0*	4	0	0	4	*8*
8:30 AM	12	2	17	18	*49*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	4	1	9	20	*34*	0	0	0	0	*0*	0	1	1	0	*2*
Count Total	56	26	141	149	*372*	0	1	0	0	*1*	5	1	1	7	*14*
Peak Hour	25	14	86	70	*195*	0	1	0	0	*1*	0	0	0	2	*2*

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	72ND AVE				72ND AVE				COLORADO BLVD				COLORADO BLVD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**11**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**28**	**0**	**0**	**1**	**10**	**0**	**53**	0
7:15 AM	**0**	**5**	**0**	**0**	**0**	**3**	**1**	**2**	**0**	**0**	**24**	**1**	**0**	**1**	**18**	**2**	**57**	0
7:30 AM	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**1**	**17**	**3**	**0**	**0**	**10**	**10**	**46**	0
7:45 AM	**0**	**7**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**11**	**1**	**0**	**0**	**6**	**12**	**39**	**195**
8:00 AM	0	7	0	0	0	0	0	5	0	0	6	3	0	1	14	10	46	188
8:15 AM	0	8	0	0	0	2	1	1	0	0	20	0	0	0	9	7	48	179
8:30 AM	0	11	1	0	0	2	0	0	0	0	14	3	0	1	9	8	49	182
8:45 AM	0	4	0	0	0	0	1	0	0	0	9	0	0	2	10	8	34	177
Count Total	0	55	1	0	0	8	6	12	0	1	129	11	0	6	86	57	372	0
Peak Hour	**0**	**25**	**0**	**0**	**0**	**4**	**4**	**6**	**0**	**1**	**80**	**5**	**0**	**2**	**44**	**24**	**195**	**0**

Two-Hour Count Summaries - Bikes

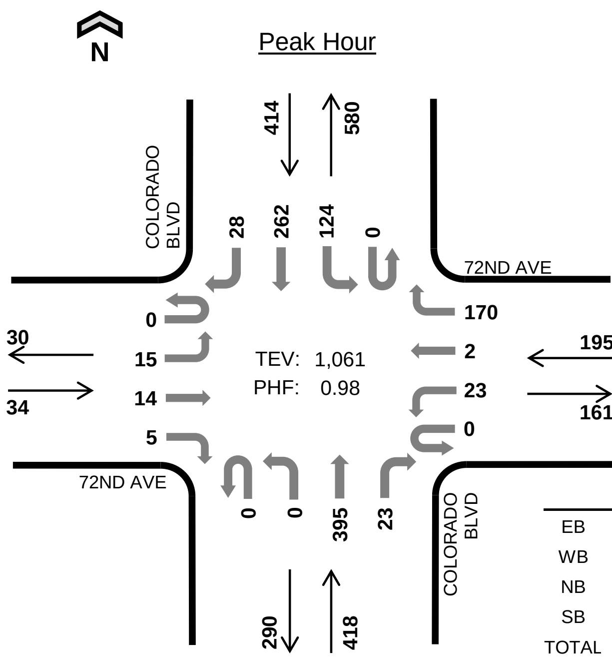
Interval Start	72ND AVE			72ND AVE			COLORADO BLVD			COLORADO BLVD			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

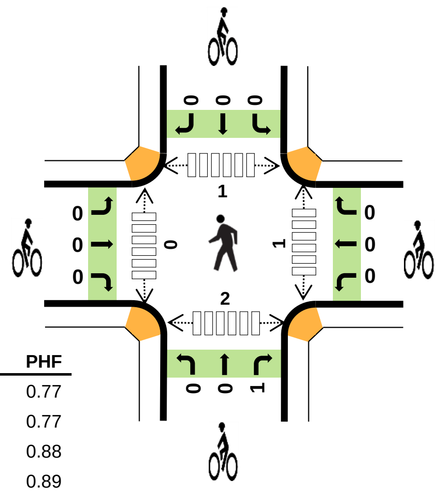
COLORADO BLVD
72ND AVE

Date: 04/07/2022
Count Period: 2:00 PM to 6:00 PM
Peak Hour: 3:45 PM to 4:45 PM

Peak Hour



	HV %:	PHF
EB	79.4%	0.77
WB	5.6%	0.77
NB	11.2%	0.88
SB	23.4%	0.89
TOTAL	17.2%	0.98



Four-Hour Count Summaries

Interval Start		72ND AVE Eastbound UT	LT	TH	RT	72ND AVE Westbound UT	LT	TH	RT	COLORADO BLVD Northbound UT	LT	TH	RT	COLORADO BLVD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
3:45 PM		0	4	5	2	0	4	2	37	0	0	107	5	0	23	68	9	266	0
4:00 PM		0	7	3	1	0	2	0	39	0	0	101	1	0	37	73	6	270	0
4:15 PM		0	3	5	1	0	11	0	52	0	0	77	8	0	32	63	10	262	0
4:30 PM		0	1	1	1	0	6	0	42	0	0	110	9	0	32	58	3	263	1,061
Peak Hour	All	0	15	14	5	0	23	2	170	0	0	395	23	0	124	262	28	1,061	0
	HV	0	12	12	3	0	6	1	4	0	0	43	4	0	7	64	26	182	0
	HV%	-	80%	86%	60%	-	26%	50%	2%	-	-	11%	17%	-	6%	24%	93%	17%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:45 PM	8	1	17	22	*48*	0	0	0	0	*0*	0	0	0	0	*0*
4:00 PM	8	1	11	24	*44*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	8	8	9	34	*59*	0	0	1	0	*1*	1	0	1	2	*4*
4:30 PM	3	1	10	17	*31*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	27	11	47	97	*182*	0	0	1	0	*1*	1	0	1	2	*4*

Four-Hour Count Summaries

Interval Start	72ND AVE Eastbound				72ND AVE Westbound				COLORADO BLVD Northbound				COLORADO BLVD Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	8	1	1	0	5	0	10	0	0	56	2	0	28	45	9	165	0
2:15 PM	0	9	2	0	0	7	1	15	0	0	44	1	0	13	46	9	147	0
2:30 PM	0	10	1	0	0	4	3	13	0	1	58	12	1	20	68	7	198	0
2:45 PM	0	9	0	1	0	6	0	22	0	0	65	3	0	25	64	4	199	709
3:00 PM	0	5	2	0	0	7	1	23	0	0	78	8	0	33	63	12	232	776
3:15 PM	0	9	1	2	0	5	1	25	0	0	69	7	1	34	71	5	230	859
3:30 PM	0	6	1	2	0	4	0	28	0	1	99	6	0	26	60	6	239	900
3:45 PM	**0**	**4**	**5**	**2**	**0**	**4**	**2**	**37**	**0**	**0**	**107**	**5**	**0**	**23**	**68**	**9**	**266**	967
4:00 PM	**0**	**7**	**3**	**1**	**0**	**2**	**0**	**39**	**0**	**0**	**101**	**1**	**0**	**37**	**73**	**6**	**270**	1,005
4:15 PM	**0**	**3**	**5**	**1**	**0**	**11**	**0**	**52**	**0**	**0**	**77**	**8**	**0**	**32**	**63**	**10**	**262**	1,037
4:30 PM	**0**	**1**	**1**	**1**	**0**	**6**	**0**	**42**	**0**	**0**	**110**	**9**	**0**	**32**	**58**	**3**	**263**	**1,061**
4:45 PM	0	4	3	1	0	4	0	33	0	0	122	3	0	26	54	7	257	1,052
5:00 PM	0	6	1	2	0	3	0	39	0	0	101	4	0	23	54	8	241	1,023
5:15 PM	0	3	3	1	0	6	1	41	0	0	62	3	0	32	45	7	204	965
5:30 PM	0	3	2	0	0	2	0	34	0	0	79	5	0	15	41	2	183	885
5:45 PM	0	3	2	2	0	5	1	22	0	0	64	4	0	27	37	2	169	797
Count Total	0	90	33	17	0	81	10	475	0	2	1,292	81	2	426	910	106	3,525	0
Peak Hour All	**0**	**15**	**14**	**5**	**0**	**23**	**2**	**170**	**0**	**0**	**395**	**23**	**0**	**124**	**262**	**28**	**1,061**	**0**
Peak Hour HV	**0**	**12**	**12**	**3**	**0**	**6**	**1**	**4**	**0**	**0**	**43**	**4**	**0**	**7**	**64**	**26**	**182**	**0**
Peak Hour HV%	**-**	**80%**	**86%**	**60%**	**-**	**26%**	**50%**	**2%**	**-**	**-**	**11%**	**17%**	**-**	**6%**	**24%**	**93%**	**17%**	**0**

Note: Four-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
2:00 PM	9	4	19	32	*64*	0	0	0	0	*0*	0	0	0	0	*0*
2:15 PM	10	7	10	28	*55*	0	0	0	0	*0*	0	0	0	0	*0*
2:30 PM	10	3	17	31	*61*	0	0	0	0	*0*	0	0	0	0	*0*
2:45 PM	10	2	17	29	*58*	0	0	0	0	*0*	0	0	0	2	*2*
3:00 PM	5	3	17	29	*54*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	10	3	12	33	*58*	0	0	0	0	*0*	0	0	0	1	*1*
3:30 PM	8	2	25	25	*60*	0	0	0	0	*0*	1	1	1	0	*3*
3:45 PM	**8**	**1**	**17**	**22**	***48***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:00 PM	**8**	**1**	**11**	**24**	***44***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**8**	**8**	**9**	**34**	***59***	**0**	**0**	**1**	**0**	***1***	**1**	**0**	**1**	**2**	*4*
4:30 PM	**3**	**1**	**10**	**17**	***31***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:45 PM	6	2	13	17	*38*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	6	2	12	20	*40*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	5	4	3	16	*28*	0	0	0	0	*0*	0	0	0	1	*1*
5:30 PM	4	1	11	12	*28*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	4	2	4	9	*19*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	114	46	207	378	*745*	0	0	1	0	*1*	2	1	2	6	*11*
Peak Hour	**27**	**11**	**47**	**97**	***182***	**0**	**0**	**1**	**0**	***1***	**1**	**0**	**1**	**2**	***4***

Four-Hour Count Summaries - Heavy Vehicles

Interval Start	72ND AVE				72ND AVE				COLORADO BLVD				COLORADO BLVD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	7	1	1	0	4	0	0	0	0	18	1	0	5	18	9	64	0
2:15 PM	0	9	1	0	0	5	1	1	0	0	10	0	0	1	18	9	55	0
2:30 PM	0	9	1	0	0	1	2	0	0	1	11	5	0	1	23	7	61	0
2:45 PM	0	9	0	1	0	1	0	1	0	0	17	0	0	5	21	3	58	238
3:00 PM	0	4	1	0	0	1	1	1	0	0	16	1	0	2	16	11	54	228
3:15 PM	0	8	1	1	0	2	1	0	0	0	11	1	0	1	27	5	58	231
3:30 PM	0	6	1	1	0	2	0	0	0	1	22	2	0	1	18	6	60	230
3:45 PM	**0**	**2**	**5**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**16**	**1**	**0**	**2**	**13**	**7**	**48**	220
4:00 PM	**0**	**6**	**2**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**11**	**0**	**0**	**1**	**17**	**6**	**44**	210
4:15 PM	**0**	**3**	**4**	**1**	**0**	**5**	**0**	**3**	**0**	**0**	**8**	**1**	**0**	**4**	**20**	**10**	**59**	211
4:30 PM	**0**	**1**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**8**	**2**	**0**	**0**	**14**	**3**	**31**	**182**
4:45 PM	0	3	2	1	0	1	0	1	0	0	12	1	0	2	10	5	38	172
5:00 PM	0	3	1	2	0	1	0	1	0	0	10	2	0	1	12	7	40	168
5:15 PM	0	2	2	1	0	2	1	1	0	0	3	0	0	0	9	7	28	137
5:30 PM	0	3	1	0	0	1	0	0	0	0	9	2	0	0	11	1	28	134
5:45 PM	0	1	1	2	0	1	1	0	0	0	3	1	0	1	6	2	19	115
Count Total	0	76	25	13	0	28	8	10	0	2	185	20	0	27	253	98	745	0
Peak Hour	**0**	**12**	**12**	**3**	**0**	**6**	**1**	**4**	**0**	**0**	**43**	**4**	**0**	**7**	**64**	**26**	**182**	**0**

Four-Hour Count Summaries - Bikes

Interval Start	72ND AVE			72ND AVE			COLORADO BLVD			COLORADO BLVD			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	1
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

RDC
Ridgeview Data Collection

Commerce City, CO
7001 Colorado Blvd
AM Peak
70th Ave and Colorado Blvd

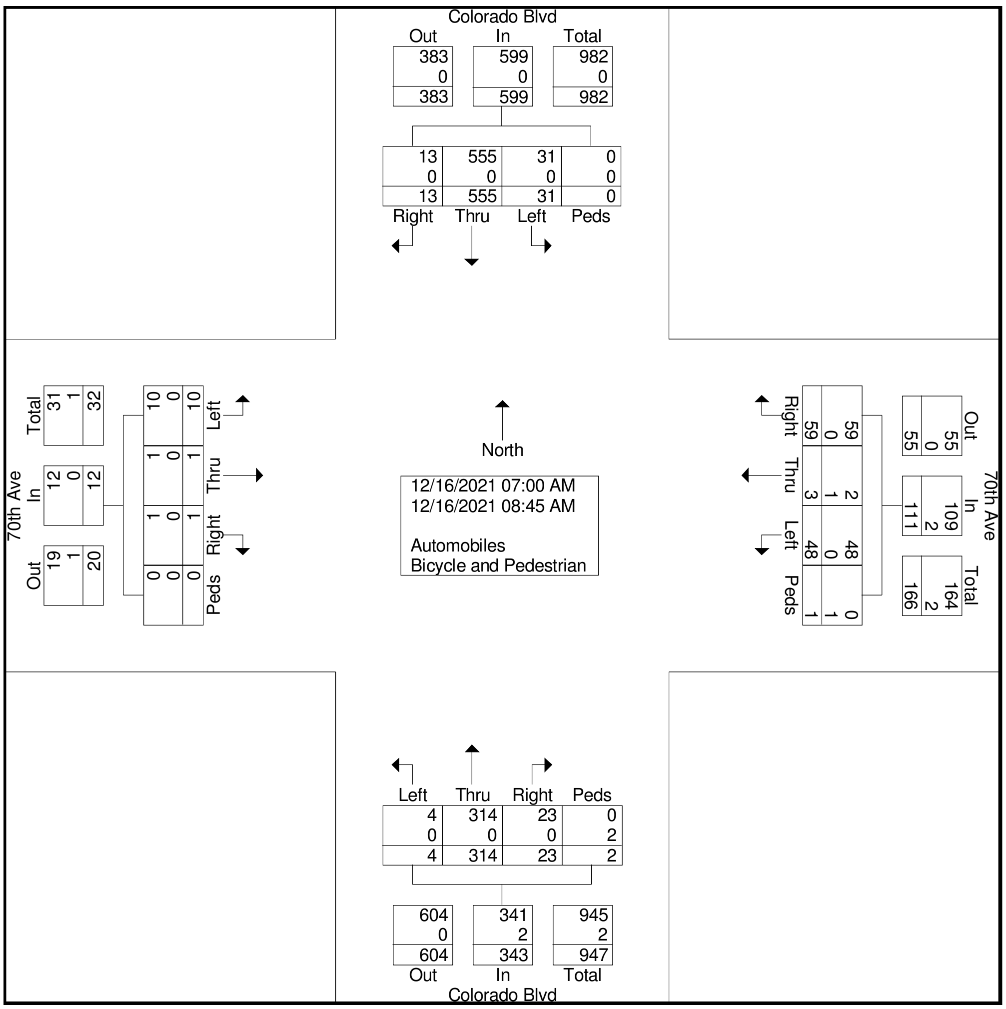
File Name : 70th and Colorado AM
Site Code : IPO 585
Start Date : 12/16/2021
Page No : 1

Groups Printed- Automobiles - Bicycle and Pedestrian

	70th Ave Eastbound					70th Ave Westbound					Colorado Blvd Northbound					Colorado Blvd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	7	0	10	0	17	0	55	1	0	56	2	61	0	0	63	136
07:15 AM	0	0	0	0	0	7	0	4	0	11	1	55	2	0	58	3	63	4	0	70	139
07:30 AM	3	0	1	0	4	4	0	8	0	12	1	24	1	0	26	6	61	1	0	68	110
07:45 AM	1	0	0	0	1	6	0	10	0	16	1	37	4	0	42	6	87	0	0	93	152
Total	4	0	1	0	5	24	0	32	0	56	3	171	8	0	182	17	272	5	0	294	537
08:00 AM	2	1	0	0	3	7	1	10	0	18	1	21	3	0	25	3	74	0	0	77	123
08:15 AM	1	0	0	0	1	10	2	8	0	20	0	46	5	1	52	3	90	3	0	96	169
08:30 AM	2	0	0	0	2	4	0	2	0	6	0	45	3	0	48	3	51	1	0	55	111
08:45 AM	1	0	0	0	1	3	0	7	1	11	0	31	4	1	36	5	68	4	0	77	125
Total	6	1	0	0	7	24	3	27	1	55	1	143	15	2	161	14	283	8	0	305	528
Grand Total	10	1	1	0	12	48	3	59	1	111	4	314	23	2	343	31	555	13	0	599	1065
Apprch %	83.3	8.3	8.3	0		43.2	2.7	53.2	0.9		1.2	91.5	6.7	0.6		5.2	92.7	2.2	0		
Total %	0.9	0.1	0.1	0	1.1	4.5	0.3	5.5	0.1	10.4	0.4	29.5	2.2	0.2	32.2	2.9	52.1	1.2	0	56.2	
Automobiles	10	1	1	0	12	48	2	59	0	109	4	314	23	0	341	31	555	13	0	599	1061
% Automobiles	100	100	100	0	100	100	66.7	100	0	98.2	100	100	100	0	99.4	100	100	100	0	100	99.6
Bicycle and Pedestrian	0	0	0	0	0	0	1	0	1	2	0	0	0	2	2	0	0	0	0	0	4
% Bicycle and Pedestrian	0	0	0	0	0	0	33.3	0	100	1.8	0	0	0	100	0.6	0	0	0	0	0	0.4

RDC
Ridgeview Data Collection

Commerce City, CO	File Name : 70th and Colorado AM
7001 Colorado Blvd	Site Code : IPO 585
AM Peak	Start Date : 12/16/2021
70th Ave and Colorado Blvd	Page No : 2

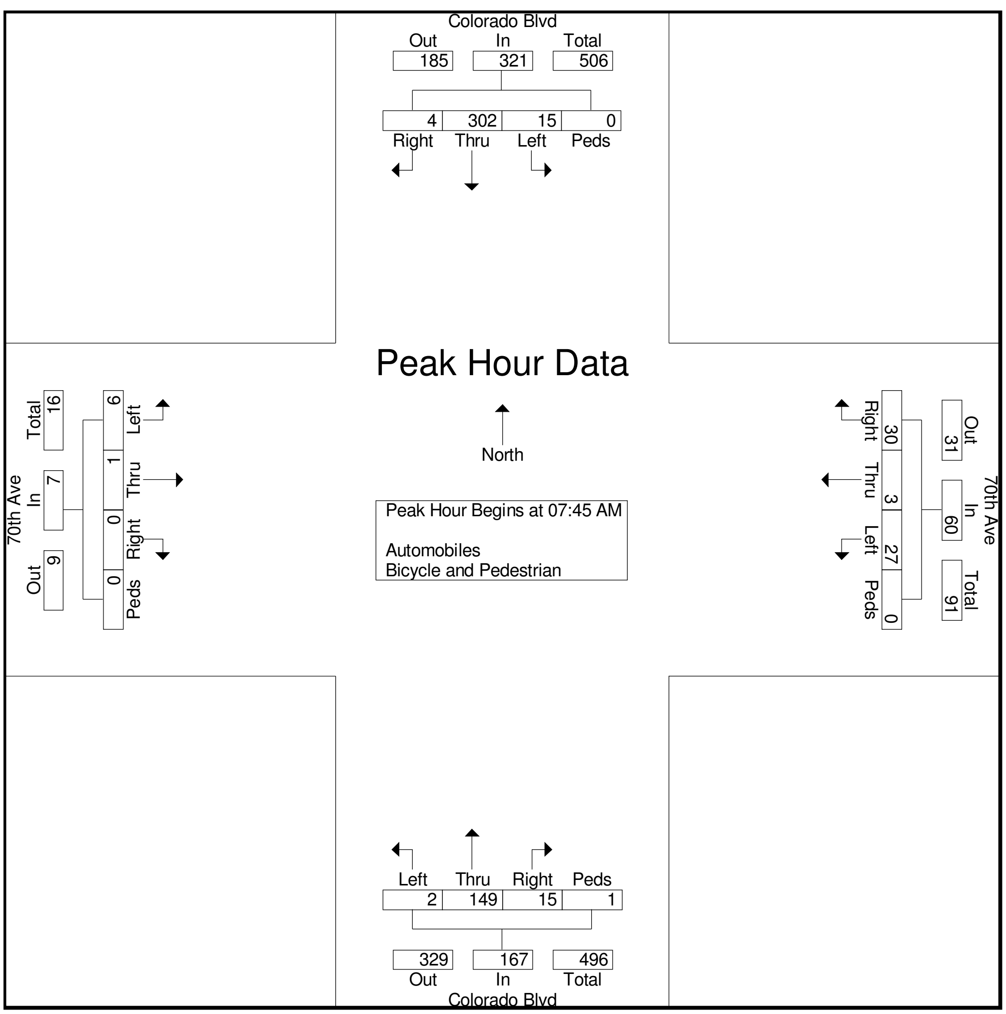


RDC
Ridgeview Data Collection

Commerce City, CO
7001 Colorado Blvd
AM Peak
70th Ave and Colorado Blvd

File Name : 70th and Colorado AM
Site Code : IPO 585
Start Date : 12/16/2021
Page No : 3

	70th Ave Eastbound					70th Ave Westbound					Colorado Blvd Northbound					Colorado Blvd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	1	0	0	0	1	6	0	**10**	0	16	**1**	37	4	0	42	**6**	87	0	0	93	152
08:00 AM	**2**	**1**	0	0	**3**	7	1	10	0	18	1	21	3	0	25	3	74	0	0	77	123
08:15 AM	1	0	0	0	1	**10**	**2**	8	0	**20**	0	**46**	**5**	**1**	**52**	3	**90**	**3**	0	**96**	**169**
08:30 AM	2	0	0	0	2	4	0	2	0	6	0	45	3	0	48	3	51	1	0	55	111
Total Volume	6	1	0	0	7	27	3	30	0	60	2	149	15	1	167	15	302	4	0	321	555
% App. Total	85.7	14.3	0	0		45	5	50	0		1.2	89.2	9	0.6		4.7	94.1	1.2	0		
PHF	.750	.250	.000	.000	.583	.675	.375	.750	.000	.750	.500	.810	.750	.250	.803	.625	.839	.333	.000	.836	.821



Ridgeview Data Collection

Commerce City, CO
7001 Colorado Blvd
PM Peak
70th Ave and Colorado Blvd

File Name : 70th and Colorado PM
Site Code : IPO 585
Start Date : 12/16/2021
Page No : 1

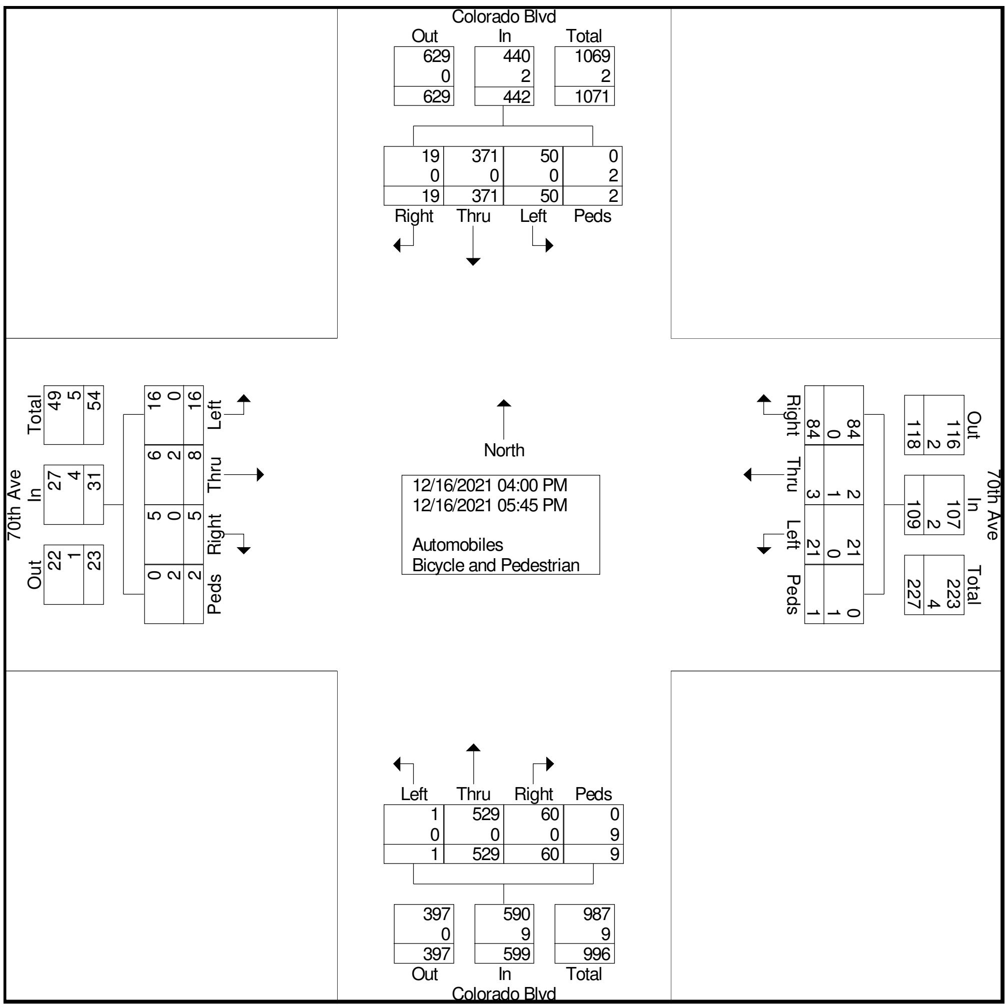
Groups Printed- Automobiles - Bicycle and Pedestrian

	70th Ave Eastbound					70th Ave Westbound					Colorado Blvd Northbound					Colorado Blvd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	2	0	1	0	3	2	0	11	1	14	0	74	5	2	81	11	65	2	0	78	176
04:15 PM	1	0	0	0	1	7	1	13	0	21	0	73	9	1	83	8	58	5	0	71	176
04:30 PM	4	2	1	0	7	4	0	10	0	14	0	95	15	4	114	7	52	1	0	60	195
04:45 PM	1	0	1	2	4	2	0	8	0	10	0	77	6	0	83	2	47	2	2	53	150
Total	8	2	3	2	15	15	1	42	1	59	0	319	35	7	361	28	222	10	2	262	697
05:00 PM	2	3	1	0	6	2	2	16	0	20	0	62	9	0	71	6	54	3	0	63	160
05:15 PM	1	1	0	0	2	2	0	11	0	13	0	60	9	1	70	8	35	2	0	45	130
05:30 PM	2	2	0	0	4	0	0	6	0	6	1	44	4	0	49	2	23	3	0	28	87
05:45 PM	3	0	1	0	4	2	0	9	0	11	0	44	3	1	48	6	37	1	0	44	107
Total	8	6	2	0	16	6	2	42	0	50	1	210	25	2	238	22	149	9	0	180	484
Grand Total	16	8	5	2	31	21	3	84	1	109	1	529	60	9	599	50	371	19	2	442	1181
Apprch %	51.6	25.8	16.1	6.5		19.3	2.8	77.1	0.9		0.2	88.3	10	1.5		11.3	83.9	4.3	0.5		
Total %	1.4	0.7	0.4	0.2	2.6	1.8	0.3	7.1	0.1	9.2	0.1	44.8	5.1	0.8	50.7	4.2	31.4	1.6	0.2	37.4	
Automobiles	16	6	5	0	27	21	2	84	0	107	1	529	60	0	590	50	371	19	0	440	1164
% Automobiles	100	75	100	0	87.1	100	66.7	100	0	98.2	100	100	100	0	98.5	100	100	100	0	99.5	98.6
Bicycle and Pedestrian	0	2	0	2	4	0	1	0	1	2	0	0	0	9	9	0	0	0	2	2	17
% Bicycle and Pedestrian	0	25	0	100	12.9	0	33.3	0	100	1.8	0	0	0	100	1.5	0	0	0	100	0.5	1.4

Ridgeview Data Collection

Commerce City, CO
7001 Colorado Blvd
PM Peak
70th Ave and Colorado Blvd

File Name : 70th and Colorado PM
Site Code : IPO 585
Start Date : 12/16/2021
Page No : 2

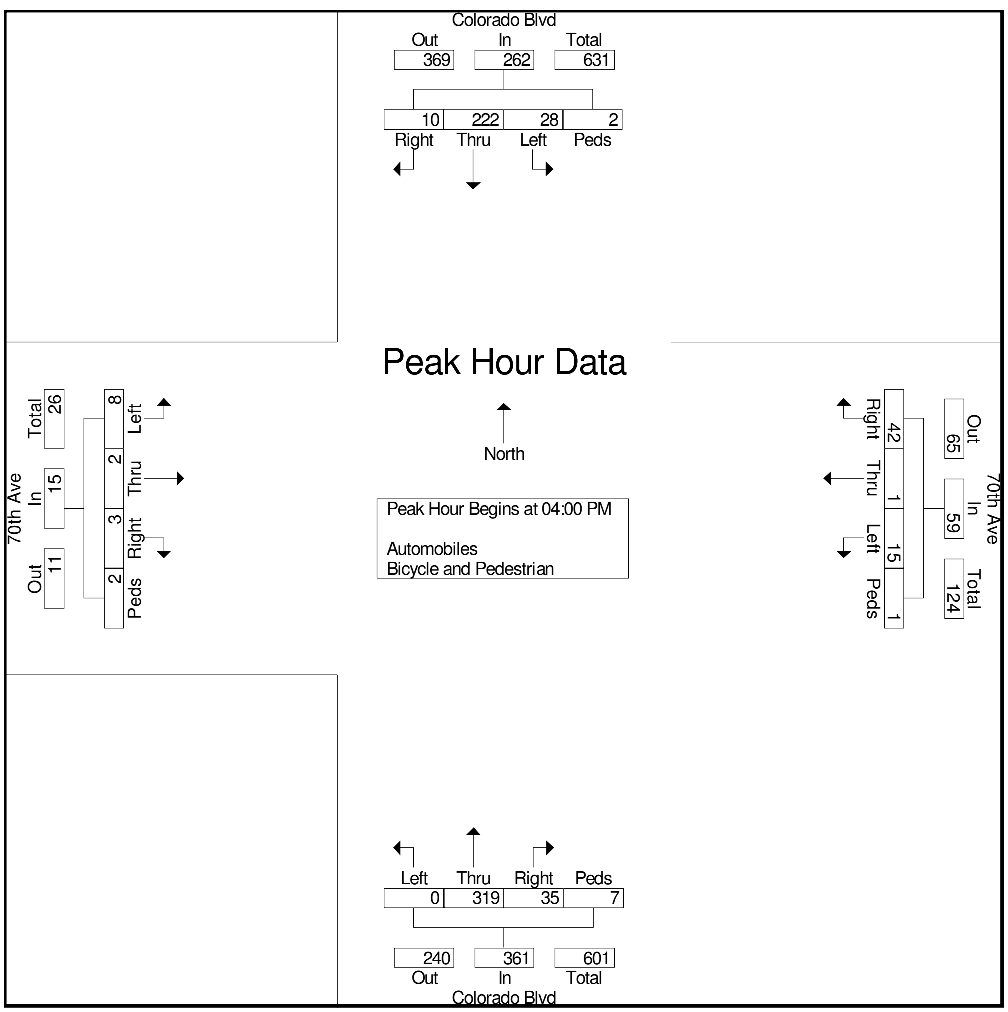


RDC
Ridgeview Data Collection

Commerce City, CO
7001 Colorado Blvd
PM Peak
70th Ave and Colorado Blvd

File Name : 70th and Colorado PM
Site Code : IPO 585
Start Date : 12/16/2021

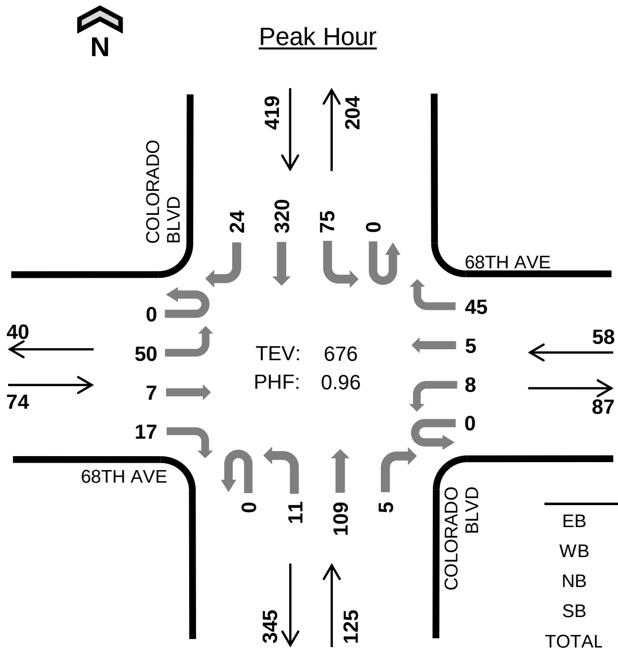
	70th Ave Eastbound					70th Ave Westbound					Colorado Blvd Northbound					Colorado Blvd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	2	0	**1**	0	3	2	0	11	**1**	14	0	74	5	2	81	**11**	**65**	2	0	**78**	176
04:15 PM	1	0	0	0	1	**7**	**1**	**13**	0	**21**	0	73	9	1	83	8	58	**5**	0	71	176
04:30 PM	**4**	**2**	1	0	**7**	4	0	10	0	14	0	**95**	**15**	**4**	**114**	7	52	1	0	60	**195**
04:45 PM	1	0	1	**2**	4	2	0	8	0	10	0	77	6	0	83	2	47	2	**2**	53	150
Total Volume	8	2	3	2	15	15	1	42	1	59	0	319	35	7	361	28	222	10	2	262	697
% App. Total	53.3	13.3	20	13.3		25.4	1.7	71.2	1.7		0	88.4	9.7	1.9		10.7	84.7	3.8	0.8		
PHF	.500	.250	.750	.250	.536	.536	.250	.808	.250	.702	.000	.839	.583	.438	.792	.636	.854	.500	.250	.840	.894



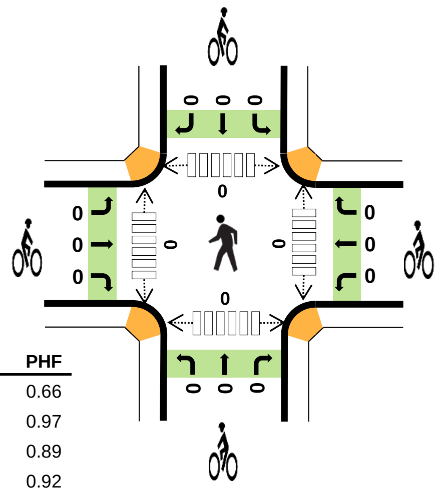
COLORADO BLVD
68TH AVE

Date: 04/07/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM

Peak Hour



	HV %:	PHF
EB	52.7%	0.66
WB	1.7%	0.97
NB	49.6%	0.89
SB	11.2%	0.92
TOTAL	22.0%	0.96



Two-Hour Count Summaries

Interval Start	68TH AVE Eastbound UT	LT	TH	RT	68TH AVE Westbound UT	LT	TH	RT	COLORADO BLVD Northbound UT	LT	TH	RT	COLORADO BLVD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	20	2	6	0	1	3	11	0	4	31	0	0	11	74	7	170	0
7:15 AM	0	13	0	5	0	4	0	11	0	1	23	0	0	16	79	8	160	0
7:30 AM	0	11	2	2	0	1	1	12	0	5	24	2	0	20	84	6	170	0
7:45 AM	0	6	3	4	0	2	1	11	0	1	31	3	0	28	83	3	176	676
8:00 AM	0	1	1	1	0	1	2	14	0	0	21	2	0	18	77	3	141	647
8:15 AM	0	2	0	0	0	6	0	21	0	2	33	4	0	19	73	2	162	649
8:30 AM	0	0	0	1	0	4	0	9	0	0	18	0	0	8	64	2	106	585
8:45 AM	0	2	0	2	0	1	0	6	0	2	23	2	0	7	46	5	96	505
Count Total	0	55	8	21	0	20	7	95	0	15	204	13	0	127	580	36	1,181	0
Peak Hour All	0	50	7	17	0	8	5	45	0	11	109	5	0	75	320	24	676	0
Peak Hour HV	0	31	5	3	0	0	0	1	0	5	56	1	0	0	39	8	149	0
Peak Hour HV%	-	62%	71%	18%	-	0%	0%	2%	-	45%	51%	20%	-	0%	12%	33%	22%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	17	1	16	10	*44*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	11	0	13	15	*39*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	7	0	15	14	*36*	0	0	0	0	*0*	0	0	0	0	*0*
7:45 AM	4	0	18	8	*30*	0	0	0	0	*0*	0	0	0	0	*0*
8:00 AM	1	0	6	10	*17*	0	0	0	0	*0*	0	0	1	1	*2*
8:15 AM	1	0	20	9	*30*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	2	10	12	*24*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	10	9	*19*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	41	3	108	87	*239*	0	0	0	0	*0*	0	0	1	1	*2*
Peak Hour	39	1	62	47	*149*	0	0	0	0	*0*	0	0	0	0	*0*

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	68TH AVE Eastbound UT	LT	TH	RT	68TH AVE Westbound UT	LT	TH	RT	COLORADO BLVD Northbound UT	LT	TH	RT	COLORADO BLVD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	**0**	**13**	**2**	**2**	**0**	**0**	**0**	**1**	**0**	**2**	**14**	**0**	**0**	**0**	**7**	**3**	**44**	0
7:15 AM	**0**	**10**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**0**	**0**	**13**	**2**	**39**	0
7:30 AM	**0**	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**13**	**0**	**0**	**0**	**12**	**2**	**36**	0
7:45 AM	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**16**	**1**	**0**	**0**	**7**	**1**	**30**	**149**
8:00 AM	0	0	1	0	0	0	0	0	0	0	6	0	0	0	10	0	17	122
8:15 AM	0	1	0	0	0	0	0	0	0	1	19	0	0	1	8	0	30	113
8:30 AM	0	0	0	0	0	0	0	2	0	0	10	0	0	0	12	0	24	101
8:45 AM	0	0	0	0	0	0	0	0	0	1	9	0	0	1	7	1	19	90
Count Total	0	32	6	3	0	0	0	3	0	7	100	1	0	2	76	9	239	0
Peak Hour	**0**	**31**	**5**	**3**	**0**	**0**	**0**	**1**	**0**	**5**	**56**	**1**	**0**	**0**	**39**	**8**	**149**	**0**

Two-Hour Count Summaries - Bikes

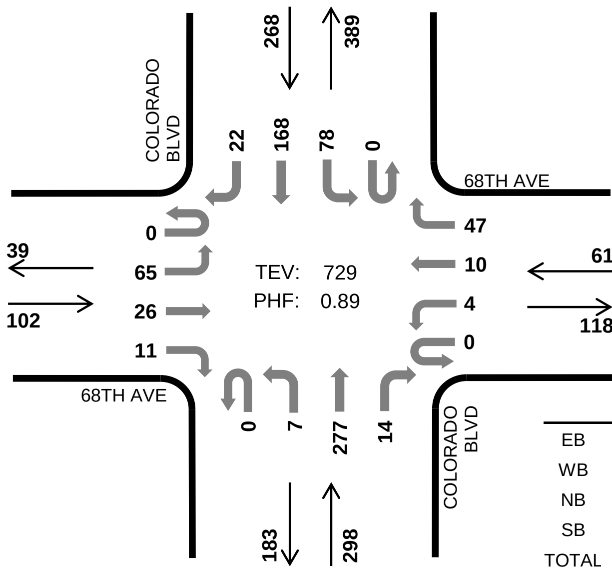
Interval Start	68TH AVE Eastbound LT	TH	RT	68TH AVE Westbound LT	TH	RT	COLORADO BLVD Northbound LT	TH	RT	COLORADO BLVD Southbound LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

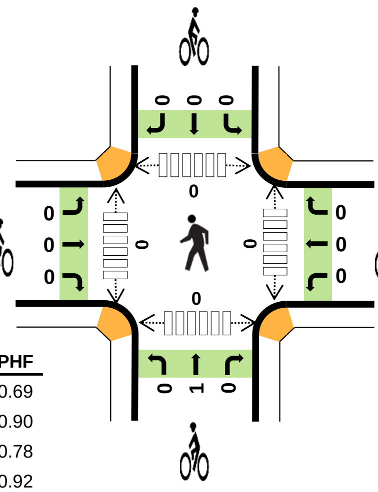
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

COLORADO BLVD
68TH AVE

Date: 04/07/2022
Count Period: 2:00 PM to 6:00 PM
Peak Hour: 3:45 PM to 4:45 PM

Peak Hour





	HV %:	PHF
EB	3.9%	0.69
WB	11.5%	0.90
NB	16.4%	0.78
SB	28.7%	0.92
TOTAL	18.8%	0.89

Four-Hour Count Summaries

Interval Start		68TH AVE				68TH AVE				COLORADO BLVD				COLORADO BLVD				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:45 PM		0	11	9	0	0	1	2	12	0	2	71	3	0	15	47	4	177	0
4:00 PM		0	26	5	6	0	0	6	11	0	3	64	3	0	21	43	9	197	0
4:15 PM		0	9	7	2	0	2	1	9	0	0	52	4	0	21	39	4	150	0
4:30 PM		0	19	5	3	0	1	1	15	0	2	90	4	0	21	39	5	205	729
Peak Hour	All	0	65	26	11	0	4	10	47	0	7	277	14	0	78	168	22	729	0
	HV	0	1	1	2	0	1	6	0	0	5	44	0	0	3	58	16	137	0
	HV%	-	2%	4%	18%	-	25%	60%	0%	-	71%	16%	0%	-	4%	35%	73%	19%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:45 PM	0	1	18	14	*33*	0	0	0	0	*0*	0	0	0	0	*0*
4:00 PM	2	4	11	22	*39*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	1	1	7	25	*34*	0	0	1	0	*1*	0	0	0	0	*0*
4:30 PM	1	1	13	16	*31*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	4	7	49	77	*137*	0	0	1	0	*1*	0	0	0	0	*0*

Four-Hour Count Summaries

Interval Start	68TH AVE Eastbound UT	LT	TH	RT	68TH AVE Westbound UT	LT	TH	RT	COLORADO BLVD Northbound UT	LT	TH	RT	COLORADO BLVD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
2:00 PM	0	7	1	0	0	2	0	4	0	0	31	0	0	12	23	6	86	0
2:15 PM	0	1	1	0	0	1	1	8	0	0	30	3	2	5	29	10	91	0
2:30 PM	0	7	4	2	0	0	2	9	0	1	46	3	0	15	38	2	129	0
2:45 PM	0	13	1	1	0	0	1	9	0	2	42	6	1	17	49	1	143	449
3:00 PM	1	9	9	1	0	3	0	6	0	5	59	2	0	18	37	7	157	520
3:15 PM	0	6	1	0	0	2	1	10	0	0	52	0	1	17	45	6	141	570
3:30 PM	0	24	6	2	0	0	3	9	0	3	62	0	0	15	29	14	167	608
3:45 PM	**0**	**11**	**9**	**0**	**0**	**1**	**2**	**12**	**0**	**2**	**71**	**3**	**0**	**15**	**47**	**4**	**177**	642
4:00 PM	**0**	**26**	**5**	**6**	**0**	**0**	**6**	**11**	**0**	**3**	**64**	**3**	**0**	**21**	**43**	**9**	**197**	682
4:15 PM	**0**	**9**	**7**	**2**	**0**	**2**	**1**	**9**	**0**	**0**	**52**	**4**	**0**	**21**	**39**	**4**	**150**	691
4:30 PM	**0**	**19**	**5**	**3**	**0**	**1**	**1**	**15**	**0**	**2**	**90**	**4**	**0**	**21**	**39**	**5**	**205**	**729**
4:45 PM	0	6	0	5	0	5	1	17	0	0	88	3	0	16	35	0	176	728
5:00 PM	0	3	0	0	0	4	0	15	0	0	77	4	0	20	32	0	155	686
5:15 PM	0	1	0	0	0	3	0	10	0	0	46	5	0	16	25	0	106	642
5:30 PM	0	3	0	0	0	3	1	10	0	0	63	2	0	14	23	1	120	557
5:45 PM	0	1	0	0	0	1	0	16	0	0	43	3	0	13	20	0	97	478
Count Total	1	146	49	22	0	28	20	170	0	18	916	45	4	256	553	69	2,297	0
Peak Hour All	**0**	**65**	**26**	**11**	**0**	**4**	**10**	**47**	**0**	**7**	**277**	**14**	**0**	**78**	**168**	**22**	**729**	**0**
Peak Hour HV	**0**	**1**	**1**	**2**	**0**	**1**	**6**	**0**	**0**	**5**	**44**	**0**	**0**	**3**	**58**	**16**	**137**	**0**
Peak Hour HV%	**-**	**2%**	**4%**	**18%**	**-**	**25%**	**60%**	**0%**	**-**	**71%**	**16%**	**0%**	**-**	**4%**	**35%**	**73%**	**19%**	**0**

Note: Four-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
2:00 PM	1	2	13	20	*36*	0	0	0	0	*0*	0	0	0	0	*0*
2:15 PM	0	2	11	17	*30*	0	0	0	0	*0*	0	0	0	0	*0*
2:30 PM	1	2	14	19	*36*	0	0	0	0	*0*	0	0	0	1	*1*
2:45 PM	2	0	14	20	*36*	0	0	0	0	*0*	0	0	0	0	*0*
3:00 PM	0	0	14	16	*30*	1	0	0	0	*1*	0	0	0	0	*0*
3:15 PM	2	1	12	29	*44*	0	0	0	0	*0*	0	0	1	0	*1*
3:30 PM	3	2	22	24	*51*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	**0**	**1**	**18**	**14**	***33***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:00 PM	**2**	**4**	**11**	**22**	***39***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**1**	**1**	**7**	**25**	***34***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**1**	**1**	**13**	**16**	***31***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:45 PM	5	2	10	8	*25*	0	0	0	0	*0*	0	1	0	0	*1*
5:00 PM	0	1	9	16	*26*	0	0	0	0	*0*	0	0	1	1	*2*
5:15 PM	0	0	3	8	*11*	0	0	0	0	*0*	0	0	0	1	*1*
5:30 PM	0	1	8	12	*21*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	1	4	5	*10*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	18	21	183	271	*493*	1	0	1	0	*2*	0	1	2	3	*6*
Peak Hour	**4**	**7**	**49**	**77**	***137***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***

Four-Hour Count Summaries - Heavy Vehicles

Interval Start	68TH AVE Eastbound UT	LT	TH	RT	68TH AVE Westbound UT	LT	TH	RT	COLORADO BLVD Northbound UT	LT	TH	RT	COLORADO BLVD Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
2:00 PM	0	1	0	0	0	1	0	1	0	0	13	0	0	1	15	4	36	0
2:15 PM	0	0	0	0	0	1	1	0	0	0	11	0	0	0	11	6	30	0
2:30 PM	0	1	0	0	0	0	2	0	0	0	14	0	0	1	18	0	36	0
2:45 PM	0	2	0	0	0	0	0	0	0	0	14	0	0	0	19	1	36	138
3:00 PM	0	0	0	0	0	0	0	0	0	2	12	0	0	0	13	3	30	132
3:15 PM	0	2	0	0	0	0	1	0	0	0	12	0	0	3	20	6	44	146
3:30 PM	0	3	0	0	0	0	2	0	0	2	20	0	0	1	10	13	51	161
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**17**	**0**	**0**	**0**	**12**	**2**	**33**	158
4:00 PM	**0**	**0**	**0**	**2**	**0**	**0**	**4**	**0**	**0**	**2**	**9**	**0**	**0**	**1**	**14**	**7**	**39**	167
4:15 PM	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**7**	**0**	**0**	**1**	**20**	**4**	**34**	157
4:30 PM	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**11**	**0**	**0**	**1**	**12**	**3**	**31**	**137**
4:45 PM	0	1	0	4	0	0	0	2	0	0	10	0	0	2	6	0	25	129
5:00 PM	0	0	0	0	0	0	0	1	0	0	8	1	0	2	14	0	26	116
5:15 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	1	7	0	11	93
5:30 PM	0	0	0	0	0	0	0	1	0	0	8	0	0	0	11	1	21	83
5:45 PM	0	0	0	0	0	0	0	1	0	0	4	0	0	0	5	0	10	68
Count Total	0	11	1	6	0	3	12	6	0	9	173	1	0	14	207	50	493	0
Peak Hour	**0**	**1**	**1**	**2**	**0**	**1**	**6**	**0**	**0**	**5**	**44**	**0**	**0**	**3**	**58**	**16**	**137**	**0**

Four-Hour Count Summaries - Bikes

Interval Start	68TH AVE Eastbound LT	TH	RT	68TH AVE Westbound LT	TH	RT	COLORADO BLVD Northbound LT	TH	RT	COLORADO BLVD Southbound LT	TH	RT	15-min Total	Rolling One Hour
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	1
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	1
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	1	0	0	0	0	0	1	0	0	0	0	2	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

APPENDIX B

Future Traffic Projections

DRCOG Traffic Projections: 7001 Colorado Blvd

Location	Daily Volumes 2015	2040	Growth Factor	Annual Growth
Colorado Blvd N/O 72nd Ave	5,000	7,000	1.40	1.4%
Colorado Blvd S/O 72nd Ave	2,000	3,000	1.50	1.6%
Total	7,000	10,000	1.43	1.4%

APPENDIX C

Trip Generation Worksheets

Kimley»Horn

Project	7001 Colorado Boulevard				
Subject	Trip Generation for Multifamily Housing (Mid-Rise)				
Designed by	TES	*Date*	January 06, 2022	*Job No.*	096216004
Checked by		*Date*		*Sheet No.*	of

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 11th Edition, Fitted Curve Equations

Land Use Code - Multifamily Housing (Mid-Rise) (221)

Independent Variable - Dwelling Units (X)

X = 92
T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (200 Series Page 275)

Directional Distribution: 23% ent. 77% exit.

(T) = 0.44 (X) - 11.61
(T) = 0.44 * (92.0) - 11.61

T = 30 Average Vehicle Trip Ends
7 entering 23 exiting

7 + 23 = 30

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (200 Series Page 276)

Directional Distribution: 61% ent. 39% exit.

(T) = 0.39 (X) + 0.34
(T) = 0.39 * (92.0) + 0.34

T = 38 Average Vehicle Trip Ends
23 entering 15 exiting

23 + 15 = 38

Weekday (200 Series Page 274)

Directional Distribution: 50% ent. 50% exit.

(T) = 4.77 (X) - 46.46
(T) = 4.77 * (92.0) - 46.46

T = 394 Average Vehicle Trip Ends
197 entering 197 exiting

197 + 197 = 394

APPENDIX D

Intersection Analysis Worksheets

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	1	1	22	5	96	2	237	8	159	402	35
Future Vol, veh/h	26	1	1	22	5	96	2	237	8	159	402	35
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	-	-	-	100	-	-	100	-	0	75	-	100
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	1	1	23	5	101	2	249	8	167	423	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1067	1018	423	1030	1047	249	460	0	0	257	0	0
Stage 1	757	757	-	253	253	-	-	-	-	-	-	-
Stage 2	310	261	-	777	794	-	-	-	-	-	-	-
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	200	237	631	212	228	790	1101	-	-	1308	-	-
Stage 1	400	416	-	751	698	-	-	-	-	-	-	-
Stage 2	700	692	-	390	400	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	155	206	631	190	198	790	1101	-	-	1308	-	-
Mov Cap-2 Maneuver	261	284	-	280	285	-	-	-	-	-	-	-
Stage 1	399	363	-	749	697	-	-	-	-	-	-	-
Stage 2	605	691	-	339	349	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.1	12.3	0.1	2.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1101	-	-	267	280	726	1308	-	-
HCM Lane V/C Ratio	0.002	-	-	0.11	0.083	0.146	0.128	-	-
HCM Control Delay (s)	8.3	-	-	20.1	19	10.8	8.2	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.3	0.5	0.4	-	-

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	15	14	5	23	2	170	0	395	23	124	262	28
Future Vol, veh/h	15	14	5	23	2	170	0	395	23	124	262	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	-	-	-	100	-	-	100	-	0	75	-	100
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	14	5	23	2	173	0	403	23	127	267	29

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1023	947	267	948	953	403	296	0	0	426	0	0
Stage 1	521	521	-	403	403	-	-	-	-	-	-	-
Stage 2	502	426	-	545	550	-	-	-	-	-	-	-
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	214	261	772	241	259	647	1265	-	-	1133	-	-
Stage 1	539	532	-	624	600	-	-	-	-	-	-	-
Stage 2	552	586	-	523	516	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	143	232	772	212	230	647	1265	-	-	1133	-	-
Mov Cap-2 Maneuver	221	318	-	330	339	-	-	-	-	-	-	-
Stage 1	539	472	-	624	600	-	-	-	-	-	-	-
Stage 2	403	586	-	447	458	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.3	13.2	0	2.6
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1265	-	-	287	330	640	1133	-	-
HCM Lane V/C Ratio	-	-	-	0.121	0.071	0.274	0.112	-	-
HCM Control Delay (s)	0	-	-	19.3	16.7	12.7	8.6	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.2	1.1	0.4	-	-

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	27	1	1	23	5	100	2	247	8	166	419	36
Future Vol, veh/h	27	1	1	23	5	100	2	247	8	166	419	36
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	-	-	-	100	-	-	100	-	0	75	-	100
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	1	1	24	5	105	2	260	8	175	441	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1114	1063	441	1075	1093	260	479	0	0	268	0	0
Stage 1	791	791	-	264	264	-	-	-	-	-	-	-
Stage 2	323	272	-	811	829	-	-	-	-	-	-	-
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	185	223	616	197	214	779	1083	-	-	1296	-	-
Stage 1	383	401	-	741	690	-	-	-	-	-	-	-
Stage 2	689	685	-	373	385	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	141	192	616	176	185	779	1083	-	-	1296	-	-
Mov Cap-2 Maneuver	246	270	-	265	272	-	-	-	-	-	-	-
Stage 1	382	347	-	740	689	-	-	-	-	-	-	-
Stage 2	590	684	-	321	333	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.2	12.6	0.1	2.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1083	-	-	252	265	715	1296	-	-
HCM Lane V/C Ratio	0.002	-	-	0.121	0.091	0.155	0.135	-	-
HCM Control Delay (s)	8.3	-	-	21.2	19.9	11	8.2	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.3	0.5	0.5	-	-

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	16	15	5	24	2	177	0	412	24	129	273	29
Future Vol, veh/h	16	15	5	24	2	177	0	412	24	129	273	29
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	-	-	-	100	-	-	100	-	0	75	-	100
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	15	5	24	2	181	0	420	24	132	279	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1067	987	279	988	993	420	309	0	0	444	0	0
Stage 1	543	543	-	420	420	-	-	-	-	-	-	-
Stage 2	524	444	-	568	573	-	-	-	-	-	-	-
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	200	247	760	226	245	633	1252	-	-	1116	-	-
Stage 1	524	520	-	611	589	-	-	-	-	-	-	-
Stage 2	537	575	-	508	504	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	129	218	760	196	216	633	1252	-	-	1116	-	-
Mov Cap-2 Maneuver	202	305	-	315	327	-	-	-	-	-	-	-
Stage 1	524	459	-	611	589	-	-	-	-	-	-	-
Stage 2	382	575	-	430	445	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.6	13.6	0	2.6
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1252	-	-	267	315	626	1116	-	-
HCM Lane V/C Ratio	-	-	-	0.138	0.078	0.292	0.118	-	-
HCM Control Delay (s)	0	-	-	20.6	17.4	13.1	8.7	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.3	1.2	0.4	-	-

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	27	1	1	24	5	100	2	256	13	166	422	36
Future Vol, veh/h	27	1	1	24	5	100	2	256	13	166	422	36
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	-	-	-	100	-	-	100	-	0	75	-	100
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	1	1	25	5	105	2	269	14	175	444	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1129	1081	444	1087	1105	269	482	0	0	283	0	0
Stage 1	794	794	-	273	273	-	-	-	-	-	-	-
Stage 2	335	287	-	814	832	-	-	-	-	-	-	-
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	181	218	614	194	211	770	1081	-	-	1279	-	-
Stage 1	381	400	-	733	684	-	-	-	-	-	-	-
Stage 2	679	674	-	372	384	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	138	188	614	173	182	770	1081	-	-	1279	-	-
Mov Cap-2 Maneuver	242	267	-	263	270	-	-	-	-	-	-	-
Stage 1	380	345	-	732	683	-	-	-	-	-	-	-
Stage 2	581	673	-	320	331	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.5	12.7	0.1	2.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1081	-	-	248	263	708	1279	-	-
HCM Lane V/C Ratio	0.002	-	-	0.123	0.096	0.156	0.137	-	-
HCM Control Delay (s)	8.3	-	-	21.5	20.1	11	8.3	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.3	0.6	0.5	-	-

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	16	15	5	29	2	177	0	418	27	129	282	29
Future Vol, veh/h	16	15	5	29	2	177	0	418	27	129	282	29
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	-	-	-	100	-	-	100	-	0	75	-	100
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	15	5	30	2	181	0	427	28	132	288	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1085	1007	288	1004	1009	427	318	0	0	455	0	0
Stage 1	552	552	-	427	427	-	-	-	-	-	-	-
Stage 2	533	455	-	577	582	-	-	-	-	-	-	-
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	194	241	751	220	240	628	1242	-	-	1106	-	-
Stage 1	518	515	-	606	585	-	-	-	-	-	-	-
Stage 2	531	569	-	502	499	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	125	212	751	191	211	628	1242	-	-	1106	-	-
Mov Cap-2 Maneuver	198	300	-	311	322	-	-	-	-	-	-	-
Stage 1	518	454	-	606	585	-	-	-	-	-	-	-
Stage 2	377	569	-	424	440	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21	13.8	0	2.5
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1242	-	-	262	311	621	1106	-	-
HCM Lane V/C Ratio	-	-	-	0.14	0.095	0.294	0.119	-	-
HCM Control Delay (s)	0	-	-	21	17.8	13.2	8.7	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.3	1.2	0.4	-	-

Intersection	
Intersection Delay, s/veh	17.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	1	1	24	5	100	2	256	13	166	422	36
Future Vol, veh/h	27	1	1	24	5	100	2	256	13	166	422	36
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	1	1	25	5	105	2	269	14	175	444	38
Number of Lanes	0	1	0	1	1	0	1	1	1	1	1	1
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			1			3			3		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	3			3			1			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	3			3			2			1		
HCM Control Delay	11.4			11.1			15.4			19.6		
HCM LOS	B			B			C			C		

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	93%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	3%	0%	5%	0%	100%	0%
Vol Right, %	0%	0%	100%	3%	0%	95%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	256	13	29	24	105	166	422	36
LT Vol	2	0	0	27	24	0	166	0	0
Through Vol	0	256	0	1	0	5	0	422	0
RT Vol	0	0	13	1	0	100	0	0	36
Lane Flow Rate	2	269	14	31	25	111	175	444	38
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.004	0.495	0.022	0.068	0.055	0.203	0.314	0.735	0.055
Departure Headway (Hd)	7.125	6.619	5.912	7.995	7.771	6.599	6.459	5.954	5.247
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	501	542	602	446	459	542	556	604	680
Service Time	4.892	4.386	3.678	5.781	5.545	4.373	4.209	3.704	2.997
HCM Lane V/C Ratio	0.004	0.496	0.023	0.07	0.054	0.205	0.315	0.735	0.056
HCM Control Delay	9.9	15.8	8.8	11.4	11	11.1	12.2	23.5	8.3
HCM Lane LOS	A	C	A	B	B	B	B	C	A
HCM 95th-tile Q	0	2.7	0.1	0.2	0.2	0.8	1.3	6.3	0.2

Intersection	
Intersection Delay, s/veh	20.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	15	5	29	2	177	0	418	27	129	282	29
Future Vol, veh/h	16	15	5	29	2	177	0	418	27	129	282	29
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	15	5	30	2	181	0	427	28	132	288	30
Number of Lanes	0	1	0	1	1	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	1
HCM Control Delay	11.9	13.1	30.1	15.6
HCM LOS	B	B	D	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	0%	44%	100%	0%	100%	0%	0%
Vol Thru, %	100%	100%	0%	42%	0%	1%	0%	100%	0%
Vol Right, %	0%	0%	100%	14%	0%	99%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	418	27	36	29	179	129	282	29
LT Vol	0	0	0	16	29	0	129	0	0
Through Vol	0	418	0	15	0	2	0	282	0
RT Vol	0	0	27	5	0	177	0	0	29
Lane Flow Rate	0	427	28	37	30	183	132	288	30
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0.802	0.046	0.085	0.067	0.351	0.268	0.545	0.05
Departure Headway (Hd)	6.766	6.766	6.055	8.332	8.135	6.923	7.331	6.823	6.129
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	537	595	429	440	519	490	529	586
Service Time	4.467	4.467	3.756	6.092	5.883	4.67	5.074	4.565	3.853
HCM Lane V/C Ratio	0	0.795	0.047	0.086	0.068	0.353	0.269	0.544	0.051
HCM Control Delay	9.5	31.5	9	11.9	11.5	13.4	12.8	17.5	9.2
HCM Lane LOS	N	D	A	B	B	B	B	C	A
HCM 95th-tile Q	0	7.7	0.1	0.3	0.2	1.6	1.1	3.2	0.2

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	1	1	31	7	134	3	331	11	222	561	49
Future Vol, veh/h	36	1	1	31	7	134	3	331	11	222	561	49
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	-	-	-	100	-	-	100	-	0	75	-	100
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	1	1	33	7	141	3	348	12	234	591	52

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1493	1425	591	1440	1465	348	643	0	0	360	0	0
Stage 1	1059	1059	-	354	354	-	-	-	-	-	-	-
Stage 2	434	366	-	1086	1111	-	-	-	-	-	-	-
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	102	136	507	111	128	695	942	-	-	1199	-	-
Stage 1	271	301	-	663	630	-	-	-	-	-	-	-
Stage 2	600	623	-	262	285	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	67	109	507	94	103	695	942	-	-	1199	-	-
Mov Cap-2 Maneuver	146	182	-	172	185	-	-	-	-	-	-	-
Stage 1	270	242	-	661	628	-	-	-	-	-	-	-
Stage 2	471	621	-	210	229	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.5	16	0.1	2.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	942	-	-	150	172	611	1199	-	-
HCM Lane V/C Ratio	0.003	-	-	0.267	0.19	0.243	0.195	-	-
HCM Control Delay (s)	8.8	-	-	37.5	30.8	12.8	8.7	-	-
HCM Lane LOS	A	-	-	E	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1	0.7	0.9	0.7	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	20	7	32	3	237	0	551	32	173	366	39
Future Vol, veh/h	21	20	7	32	3	237	0	551	32	173	366	39
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	-	-	-	100	-	-	100	-	0	75	-	100
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	20	7	33	3	242	0	562	33	177	373	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1428	1322	373	1323	1329	562	413	0	0	595	0	0
Stage 1	727	727	-	562	562	-	-	-	-	-	-	-
Stage 2	701	595	-	761	767	-	-	-	-	-	-	-
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	113	156	673	133	155	526	1146	-	-	981	-	-
Stage 1	415	429	-	512	510	-	-	-	-	-	-	-
Stage 2	429	492	-	398	411	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	52	128	673	105	127	526	1146	-	-	981	-	-
Mov Cap-2 Maneuver	48	210	-	218	240	-	-	-	-	-	-	-
Stage 1	415	352	-	512	510	-	-	-	-	-	-	-
Stage 2	230	492	-	304	337	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	88.3	18.8	0	2.8
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1146	-	-	88	218	518	981	-	-
HCM Lane V/C Ratio	-	-	-	0.557	0.15	0.473	0.18	-	-
HCM Control Delay (s)	0	-	-	88.3	24.4	18	9.5	-	-
HCM Lane LOS	A	-	-	F	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.5	0.5	2.5	0.7	-	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	36	1	32	7	3	340	16	222	564	49
Future Volume (vph)	36	1	32	7	3	340	16	222	564	49
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	27.0	27.0	27.0	27.0	63.0	63.0	63.0	63.0	63.0	63.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		8.3	8.3	8.3	72.7	72.7	72.7	72.7	72.7	72.7
Actuated g/C Ratio		0.09	0.09	0.09	0.81	0.81	0.81	0.81	0.81	0.81
v/c Ratio		0.49	0.27	0.54	0.00	0.24	0.01	0.28	0.39	0.04
Control Delay		57.8	42.4	15.4	2.3	2.7	1.1	3.4	3.6	0.8
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		57.8	42.4	15.4	2.3	2.7	1.1	3.4	3.6	0.8
LOS		E	D	B	A	A	A	A	A	A
Approach Delay		57.8		20.4		2.6			3.4	
Approach LOS		E		C		A			A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 6.7	Intersection LOS: A
Intersection Capacity Utilization 61.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Colorado Blvd & 72nd Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	1	1	32	7	134	3	340	16	222	564	49
Future Volume (veh/h)	36	1	1	32	7	134	3	340	16	222	564	49
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	38	1	1	34	7	141	3	358	17	234	594	52
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	4	2	320	11	213	589	1422	1205	789	1422	1205
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.76	0.76	0.76	0.76	0.76	0.76
Sat Flow, veh/h	443	27	12	1415	76	1521	785	1870	1585	1008	1870	1585
Grp Volume(v), veh/h	40	0	0	34	0	148	3	358	17	234	594	52
Grp Sat Flow(s),veh/h/ln	482	0	0	1415	0	1597	785	1870	1585	1008	1870	1585
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.0	7.9	0.1	5.1	0.2	8.1	10.0	0.7
Cycle Q Clear(g_c), s	10.6	0.0	0.0	1.5	0.0	7.9	10.2	5.1	0.2	13.2	10.0	0.7
Prop In Lane	0.95		0.02	1.00		0.95	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	145	0	0	320	0	223	589	1422	1205	789	1422	1205
V/C Ratio(X)	0.28	0.00	0.00	0.11	0.00	0.66	0.01	0.25	0.01	0.30	0.42	0.04
Avail Cap(c_a), veh/h	284	0	0	476	0	399	589	1422	1205	789	1422	1205
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	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.2	0.0	0.0	33.9	0.0	36.7	5.6	3.2	2.6	5.2	3.8	2.7
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.1	0.0	3.4	0.0	0.4	0.0	1.0	0.9	0.1
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	0.9	0.0	0.0	0.7	0.0	3.2	0.0	1.5	0.1	1.6	3.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.2	0.0	0.0	34.1	0.0	40.1	5.6	3.6	2.6	6.1	4.7	2.7
LnGrp LOS	D	A	A	C	A	D	A	A	A	A	A	A
Approach Vol, veh/h		40			182			378			880	
Approach Delay, s/veh		42.2			38.9			3.6			5.0	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		72.9		17.1		72.9		17.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		58.5		22.5		58.5		22.5				
Max Q Clear Time (g_c+I1), s		12.2		12.6		15.2		9.9				
Green Ext Time (p_c), s		2.5		0.1		6.3		0.7				
Intersection Summary												
HCM 6th Ctrl Delay			9.8									
HCM 6th LOS			A									

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	21	20	37	3	557	35	173	375	39
Future Volume (vph)	21	20	37	3	557	35	173	375	39
Turn Type	Perm	NA	Perm	NA	NA	Perm	Perm	NA	Perm
Protected Phases		4		8	2			6	
Permitted Phases	4		8			2	6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	28.0	28.0	28.0	28.0	62.0	62.0	62.0	62.0	62.0
Total Split (%)	31.1%	31.1%	31.1%	31.1%	68.9%	68.9%	68.9%	68.9%	68.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		8.6	8.6	8.6	72.4	72.4	72.4	72.4	72.4
Actuated g/C Ratio		0.10	0.10	0.10	0.80	0.80	0.80	0.80	0.80
v/c Ratio		0.75	0.25	0.66	0.38	0.03	0.28	0.26	0.03
Control Delay		91.1	40.0	14.5	3.7	1.0	3.9	3.0	0.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		91.1	40.0	14.5	3.7	1.0	3.9	3.0	0.9
LOS		F	D	B	A	A	A	A	A
Approach Delay		91.1		17.9	3.5			3.1	
Approach LOS		F		B	A			A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Colorado Blvd & 72nd Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	20	7	37	3	237	0	557	35	173	375	39
Future Volume (veh/h)	21	20	7	37	3	237	0	557	35	173	375	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	21	20	7	38	3	242	0	568	36	177	383	40
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	64	14	261	4	286	80	1342	1138	565	1342	1138
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.00	0.72	0.72	0.72	0.72	0.72
Sat Flow, veh/h	114	350	79	1383	19	1569	964	1870	1585	816	1870	1585
Grp Volume(v), veh/h	48	0	0	38	0	245	0	568	36	177	383	40
Grp Sat Flow(s),veh/h/ln	543	0	0	1383	0	1588	964	1870	1585	816	1870	1585
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	13.4	0.0	11.1	0.6	10.1	6.5	0.7
Cycle Q Clear(g_c), s	13.8	0.0	0.0	3.2	0.0	13.4	0.0	11.1	0.6	21.2	6.5	0.7
Prop In Lane	0.44		0.15	1.00		0.99	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	156	0	0	261	0	290	80	1342	1138	565	1342	1138
V/C Ratio(X)	0.31	0.00	0.00	0.15	0.00	0.85	0.00	0.42	0.03	0.31	0.29	0.04
Avail Cap(c_a), veh/h	269	0	0	370	0	415	80	1342	1138	565	1342	1138
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	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	0.0	0.0	31.4	0.0	35.6	0.0	5.2	3.7	9.4	4.5	3.7
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.3	0.0	10.6	0.0	1.0	0.1	1.4	0.5	0.1
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	0.9	0.0	0.0	0.7	0.0	5.9	0.0	3.8	0.2	1.9	2.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.7	0.0	0.0	31.6	0.0	46.2	0.0	6.1	3.7	10.9	5.0	3.7
LnGrp LOS	C	A	A	C	A	D	A	A	A	B	A	A
Approach Vol, veh/h		48			283			604			600	
Approach Delay, s/veh		32.7			44.3			6.0			6.7	
Approach LOS		C			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		69.1		20.9		69.1		20.9				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		57.5		23.5		57.5		23.5				
Max Q Clear Time (g_c+I1), s		13.1		15.8		23.2		15.4				
Green Ext Time (p_c), s		4.5		0.1		4.1		1.0				
Intersection Summary												
HCM 6th Ctrl Delay			14.1									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	48.7
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	1	1	32	7	134	3	340	16	222	564	49
Future Vol, veh/h	36	1	1	32	7	134	3	340	16	222	564	49
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	1	1	34	7	141	3	358	17	234	594	52
Number of Lanes	0	1	0	1	1	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	1
HCM Control Delay	13.1	13.6	27.3	66.8
HCM LOS	B	B	D	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	95%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	3%	0%	5%	0%	100%	0%
Vol Right, %	0%	0%	100%	3%	0%	95%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	340	16	38	32	141	222	564	49
LT Vol	3	0	0	36	32	0	222	0	0
Through Vol	0	340	0	1	0	7	0	564	0
RT Vol	0	0	16	1	0	134	0	0	49
Lane Flow Rate	3	358	17	40	34	148	234	594	52
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.007	0.731	0.031	0.101	0.081	0.309	0.463	1.094	0.085
Departure Headway (Hd)	8.113	7.603	6.89	9.36	8.918	7.735	7.138	6.631	5.92
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	444	480	523	385	404	468	502	546	600
Service Time	5.813	5.303	4.59	7.06	6.618	5.435	4.922	4.414	3.703
HCM Lane V/C Ratio	0.007	0.746	0.033	0.104	0.084	0.316	0.466	1.088	0.087
HCM Control Delay	10.9	28.3	9.8	13.1	12.4	13.9	16	91.8	9.3
HCM Lane LOS	B	D	A	B	B	B	C	F	A
HCM 95th-tile Q	0	5.9	0.1	0.3	0.3	1.3	2.4	18.3	0.3

Intersection	
Intersection Delay, s/veh	67.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	20	7	37	3	237	0	557	35	173	375	39
Future Vol, veh/h	21	20	7	37	3	237	0	557	35	173	375	39
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	20	7	38	3	242	0	568	36	177	383	40
Number of Lanes	0	1	0	1	1	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	1
HCM Control Delay	14.3	18.8	133.6	28.3
HCM LOS	B	C	F	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	0%	44%	100%	0%	100%	0%	0%
Vol Thru, %	100%	100%	0%	42%	0%	1%	0%	100%	0%
Vol Right, %	0%	0%	100%	15%	0%	99%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	557	35	48	37	240	173	375	39
LT Vol	0	0	0	21	37	0	173	0	0
Through Vol	0	557	0	20	0	3	0	375	0
RT Vol	0	0	35	7	0	237	0	0	39
Lane Flow Rate	0	568	36	49	38	245	177	383	40
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	1.219	0.07	0.129	0.093	0.524	0.393	0.798	0.075
Departure Headway (Hd)	7.724	7.724	7.006	10.088	9.491	8.261	8.532	8.017	7.297
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	472	514	358	380	438	425	455	494
Service Time	5.429	5.429	4.711	7.788	7.191	5.961	6.232	5.717	4.997
HCM Lane V/C Ratio	0	1.203	0.07	0.137	0.1	0.559	0.416	0.842	0.081
HCM Control Delay	10.4	141.4	10.2	14.3	13.2	19.7	16.6	35.6	10.6
HCM Lane LOS	N	F	B	B	B	C	C	E	B
HCM 95th-tile Q	0	22.3	0.2	0.4	0.3	3	1.8	7.2	0.2

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	6	1	0	27	3	30	2	149	15	15	302	4
Future Vol, veh/h	6	1	0	27	3	30	2	149	15	15	302	4
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	0	33	4	37	2	182	18	18	368	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	8.7	9.1	11.3
HCM LOS	A	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	86%	45%	5%
Vol Thru, %	90%	14%	5%	94%
Vol Right, %	9%	0%	50%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	166	7	60	321
LT Vol	2	6	27	15
Through Vol	149	1	3	302
RT Vol	15	0	30	4
Lane Flow Rate	202	9	73	391
Geometry Grp	1	1	1	1
Degree of Util (X)	0.253	0.013	0.102	0.474
Departure Headway (Hd)	4.498	5.529	5.038	4.361
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	798	645	710	826
Service Time	2.526	3.579	3.08	2.384
HCM Lane V/C Ratio	0.253	0.014	0.103	0.473
HCM Control Delay	9.1	8.7	8.7	11.3
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	1	0	0.3	2.6

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	8	2	3	15	1	42	0	319	35	28	222	10
Future Vol, veh/h	8	2	3	15	1	42	0	319	35	28	222	10
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	3	17	1	47	0	358	39	31	249	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	8.6	11.5	10.2
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	62%	26%	11%
Vol Thru, %	90%	15%	2%	85%
Vol Right, %	10%	23%	72%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	354	13	58	260
LT Vol	0	8	15	28
Through Vol	319	2	1	222
RT Vol	35	3	42	10
Lane Flow Rate	398	15	65	292
Geometry Grp	1	1	1	1
Degree of Util (X)	0.485	0.022	0.092	0.369
Departure Headway (Hd)	4.394	5.532	5.073	4.551
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	819	644	703	789
Service Time	2.423	3.596	3.127	2.584
HCM Lane V/C Ratio	0.486	0.023	0.092	0.37
HCM Control Delay	11.5	8.7	8.6	10.2
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	2.7	0.1	0.3	1.7

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	1	0	28	3	31	2	155	16	16	315	4
Future Vol, veh/h	6	1	0	28	3	31	2	155	16	16	315	4
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	0	34	4	38	2	189	20	20	384	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	8.8	9.2	11.7
HCM LOS	A	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	86%	45%	5%
Vol Thru, %	90%	14%	5%	94%
Vol Right, %	9%	0%	50%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	173	7	62	335
LT Vol	2	6	28	16
Through Vol	155	1	3	315
RT Vol	16	0	31	4
Lane Flow Rate	211	9	76	409
Geometry Grp	1	1	1	1
Degree of Util (X)	0.265	0.013	0.107	0.497
Departure Headway (Hd)	4.525	5.593	5.095	4.379
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	793	637	702	821
Service Time	2.555	3.649	3.141	2.406
HCM Lane V/C Ratio	0.266	0.014	0.108	0.498
HCM Control Delay	9.2	8.7	8.8	11.7
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	1.1	0	0.4	2.8

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	3	16	1	44	0	333	36	29	231	10
Future Vol, veh/h	8	2	3	16	1	44	0	333	36	29	231	10
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	3	18	1	49	0	374	40	33	260	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.8	8.8	12	10.5
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	62%	26%	11%
Vol Thru, %	90%	15%	2%	86%
Vol Right, %	10%	23%	72%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	369	13	61	270
LT Vol	0	8	16	29
Through Vol	333	2	1	231
RT Vol	36	3	44	10
Lane Flow Rate	415	15	69	303
Geometry Grp	1	1	1	1
Degree of Util (X)	0.509	0.023	0.098	0.386
Departure Headway (Hd)	4.419	5.605	5.14	4.582
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	813	635	694	783
Service Time	2.453	3.676	3.199	2.621
HCM Lane V/C Ratio	0.51	0.024	0.099	0.387
HCM Control Delay	12	8.8	8.8	10.5
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	2.9	0.1	0.3	1.8

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	6	1	0	28	3	32	2	157	16	18	322	4
Future Vol, veh/h	6	1	0	28	3	32	2	157	16	18	322	4
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1	0	34	4	39	2	191	20	22	393	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.8	8.8	9.2	11.9
HCM LOS	A	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	86%	44%	5%
Vol Thru, %	90%	14%	5%	94%
Vol Right, %	9%	0%	51%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	175	7	63	344
LT Vol	2	6	28	18
Through Vol	157	1	3	322
RT Vol	16	0	32	4
Lane Flow Rate	213	9	77	420
Geometry Grp	1	1	1	1
Degree of Util (X)	0.269	0.013	0.109	0.511
Departure Headway (Hd)	4.541	5.627	5.119	4.388
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	790	633	698	822
Service Time	2.573	3.685	3.167	2.414
HCM Lane V/C Ratio	0.27	0.014	0.11	0.511
HCM Control Delay	9.2	8.8	8.8	11.9
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	1.1	0	0.4	3

Intersection	
Intersection Delay, s/veh	11.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	3	16	1	46	0	340	36	31	236	10
Future Vol, veh/h	8	2	3	16	1	46	0	340	36	31	236	10
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	3	18	1	52	0	382	40	35	265	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.9	8.8	12.2	10.7
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	62%	25%	11%
Vol Thru, %	90%	15%	2%	85%
Vol Right, %	10%	23%	73%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	376	13	63	277
LT Vol	0	8	16	31
Through Vol	340	2	1	236
RT Vol	36	3	46	10
Lane Flow Rate	422	15	71	311
Geometry Grp	1	1	1	1
Degree of Util (X)	0.521	0.023	0.102	0.398
Departure Headway (Hd)	4.437	5.648	5.168	4.602
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	811	629	689	781
Service Time	2.474	3.723	3.232	2.642
HCM Lane V/C Ratio	0.52	0.024	0.103	0.398
HCM Control Delay	12.2	8.9	8.8	10.7
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	3.1	0.1	0.3	1.9

Intersection	
Intersection Delay, s/veh	14.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	1	0	38	4	42	3	208	21	21	422	6
Future Vol, veh/h	8	1	0	38	4	42	3	208	21	21	422	6
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	1	0	46	5	51	4	254	26	26	515	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.4	9.7	10.8	17.5
HCM LOS	A	A	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	89%	45%	5%
Vol Thru, %	90%	11%	5%	94%
Vol Right, %	9%	0%	50%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	232	9	84	449
LT Vol	3	8	38	21
Through Vol	208	1	4	422
RT Vol	21	0	42	6
Lane Flow Rate	283	11	102	548
Geometry Grp	1	1	1	1
Degree of Util (X)	0.377	0.019	0.159	0.695
Departure Headway (Hd)	4.797	6.283	5.577	4.572
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	744	573	636	788
Service Time	2.863	4.283	3.671	2.627
HCM Lane V/C Ratio	0.38	0.019	0.16	0.695
HCM Control Delay	10.8	9.4	9.7	17.5
HCM Lane LOS	B	A	A	C
HCM 95th-tile Q	1.8	0.1	0.6	5.7

Intersection	
Intersection Delay, s/veh	16
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	3	4	21	1	59	0	445	49	39	310	14
Future Vol, veh/h	11	3	4	21	1	59	0	445	49	39	310	14
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	3	4	24	1	66	0	500	55	44	348	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.6	9.8	18.8	13.8
HCM LOS	A	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	61%	26%	11%
Vol Thru, %	90%	17%	1%	85%
Vol Right, %	10%	22%	73%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	494	18	81	363
LT Vol	0	11	21	39
Through Vol	445	3	1	310
RT Vol	49	4	59	14
Lane Flow Rate	555	20	91	408
Geometry Grp	1	1	1	1
Degree of Util (X)	0.718	0.036	0.147	0.55
Departure Headway (Hd)	4.655	6.39	5.816	4.858
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	772	563	620	734
Service Time	2.734	4.396	3.817	2.946
HCM Lane V/C Ratio	0.719	0.036	0.147	0.556
HCM Control Delay	18.8	9.6	9.8	13.8
HCM Lane LOS	C	A	A	B
HCM 95th-tile Q	6.2	0.1	0.5	3.4

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	1	0	38	4	43	3	210	21	23	429	6
Future Vol, veh/h	8	1	0	38	4	43	3	210	21	23	429	6
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	1	0	46	5	52	4	256	26	28	523	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.4	9.8	10.9	18.2
HCM LOS	A	A	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	89%	45%	5%
Vol Thru, %	90%	11%	5%	94%
Vol Right, %	9%	0%	51%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	234	9	85	458
LT Vol	3	8	38	23
Through Vol	210	1	4	429
RT Vol	21	0	43	6
Lane Flow Rate	285	11	104	559
Geometry Grp	1	1	1	1
Degree of Util (X)	0.382	0.019	0.161	0.711
Departure Headway (Hd)	4.815	6.324	5.602	4.581
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	742	569	633	788
Service Time	2.883	4.324	3.701	2.636
HCM Lane V/C Ratio	0.384	0.019	0.164	0.709
HCM Control Delay	10.9	9.4	9.8	18.2
HCM Lane LOS	B	A	A	C
HCM 95th-tile Q	1.8	0.1	0.6	6.1

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	11	3	4	21	1	61	0	452	49	41	315	14
Future Vol, veh/h	11	3	4	21	1	61	0	452	49	41	315	14
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	3	4	24	1	69	0	508	55	46	354	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.7	9.9	19.5	14.2
HCM LOS	A	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	61%	25%	11%
Vol Thru, %	90%	17%	1%	85%
Vol Right, %	10%	22%	73%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	501	18	83	370
LT Vol	0	11	21	41
Through Vol	452	3	1	315
RT Vol	49	4	61	14
Lane Flow Rate	563	20	93	416
Geometry Grp	1	1	1	1
Degree of Util (X)	0.731	0.036	0.152	0.563
Departure Headway (Hd)	4.675	6.441	5.851	4.879
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	766	559	616	732
Service Time	2.758	4.448	3.852	2.971
HCM Lane V/C Ratio	0.735	0.036	0.151	0.568
HCM Control Delay	19.5	9.7	9.9	14.2
HCM Lane LOS	C	A	A	B
HCM 95th-tile Q	6.5	0.1	0.5	3.5

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	7	17	8	5	45	11	109	5	75	320	24
Future Vol, veh/h	50	7	17	8	5	45	11	109	5	75	320	24
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	52	7	18	8	5	47	11	114	5	78	333	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	667	643	346	653	653	117	358	0	0	119	0	0
Stage 1	502	502	-	139	139	-	-	-	-	-	-	-
Stage 2	165	141	-	514	514	-	-	-	-	-	-	-
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	372	392	697	380	387	935	1201	-	-	1469	-	-
Stage 1	552	542	-	864	782	-	-	-	-	-	-	-
Stage 2	837	780	-	543	535	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	330	362	697	344	358	935	1201	-	-	1469	-	-
Mov Cap-2 Maneuver	426	422	-	410	417	-	-	-	-	-	-	-
Stage 1	546	506	-	855	774	-	-	-	-	-	-	-
Stage 2	782	772	-	487	499	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.2	10.4	0.7	1.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1201	-	-	467	728	1469	-	-
HCM Lane V/C Ratio	0.01	-	-	0.165	0.083	0.053	-	-
HCM Control Delay (s)	8	0	-	14.2	10.4	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	0.2	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	26	11	4	10	47	7	277	14	78	168	22
Future Vol, veh/h	65	26	11	4	10	47	7	277	14	78	168	22
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	73	29	12	4	11	53	8	311	16	88	189	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	745	721	202	733	725	319	214	0	0	327	0	0
Stage 1	378	378	-	335	335	-	-	-	-	-	-	-
Stage 2	367	343	-	398	390	-	-	-	-	-	-	-
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	330	353	839	336	352	722	1356	-	-	1233	-	-
Stage 1	644	615	-	679	643	-	-	-	-	-	-	-
Stage 2	653	637	-	628	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	280	322	839	292	321	722	1356	-	-	1233	-	-
Mov Cap-2 Maneuver	381	400	-	401	415	-	-	-	-	-	-	-
Stage 1	639	565	-	674	638	-	-	-	-	-	-	-
Stage 2	590	633	-	539	559	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.2	11.6	0.2	2.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1356	-	-	410	615	1233	-	-
HCM Lane V/C Ratio	0.006	-	-	0.28	0.111	0.071	-	-
HCM Control Delay (s)	7.7	0	-	17.2	11.6	8.1	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.1	0.4	0.2	-	-

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	52	7	18	8	5	47	11	114	5	78	334	25
Future Vol, veh/h	52	7	18	8	5	47	11	114	5	78	334	25
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	7	19	8	5	49	11	119	5	81	348	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	694	669	361	680	680	122	374	0	0	124	0	0
Stage 1	523	523	-	144	144	-	-	-	-	-	-	-
Stage 2	171	146	-	536	536	-	-	-	-	-	-	-
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	357	379	684	365	373	929	1184	-	-	1463	-	-
Stage 1	537	530	-	859	778	-	-	-	-	-	-	-
Stage 2	831	776	-	529	523	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	315	349	684	329	344	929	1184	-	-	1463	-	-
Mov Cap-2 Maneuver	413	411	-	396	405	-	-	-	-	-	-	-
Stage 1	532	493	-	850	770	-	-	-	-	-	-	-
Stage 2	774	768	-	471	486	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.6	10.5	0.7	1.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1184	-	-	455	722	1463	-	-
HCM Lane V/C Ratio	0.01	-	-	0.176	0.087	0.056	-	-
HCM Control Delay (s)	8.1	0	-	14.6	10.5	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	0.2	-	-

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	68	27	11	4	10	49	7	289	15	81	175	23
Future Vol, veh/h	68	27	11	4	10	49	7	289	15	81	175	23
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	30	12	4	11	55	8	325	17	91	197	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	775	750	210	763	755	334	223	0	0	342	0	0
Stage 1	392	392	-	350	350	-	-	-	-	-	-	-
Stage 2	383	358	-	413	405	-	-	-	-	-	-	-
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	315	340	830	321	338	708	1346	-	-	1217	-	-
Stage 1	633	606	-	666	633	-	-	-	-	-	-	-
Stage 2	640	628	-	616	598	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	264	309	830	277	307	708	1346	-	-	1217	-	-
Mov Cap-2 Maneuver	367	389	-	387	403	-	-	-	-	-	-	-
Stage 1	629	554	-	661	629	-	-	-	-	-	-	-
Stage 2	576	624	-	524	547	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18	11.8	0.2	2.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1346	-	-	396	604	1217	-	-
HCM Lane V/C Ratio	0.006	-	-	0.301	0.117	0.075	-	-
HCM Control Delay (s)	7.7	0	-	18	11.8	8.2	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.2	0.4	0.2	-	-

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	52	7	18	8	5	48	11	115	5	80	339	25
Future Vol, veh/h	52	7	18	8	5	48	11	115	5	80	339	25
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	7	19	8	5	50	11	120	5	83	353	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	704	679	366	690	690	123	379	0	0	125	0	0
Stage 1	532	532	-	145	145	-	-	-	-	-	-	-
Stage 2	172	147	-	545	545	-	-	-	-	-	-	-
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	352	374	679	359	368	928	1179	-	-	1462	-	-
Stage 1	531	526	-	858	777	-	-	-	-	-	-	-
Stage 2	830	775	-	523	519	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	309	344	679	323	338	928	1179	-	-	1462	-	-
Mov Cap-2 Maneuver	408	406	-	391	401	-	-	-	-	-	-	-
Stage 1	526	488	-	849	769	-	-	-	-	-	-	-
Stage 2	772	767	-	465	482	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.7	10.5	0.7	1.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1179	-	-	450	721	1462	-	-
HCM Lane V/C Ratio	0.01	-	-	0.178	0.088	0.057	-	-
HCM Control Delay (s)	8.1	0	-	14.7	10.5	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	0.2	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	68	27	11	4	10	51	7	294	15	83	178	23
Future Vol, veh/h	68	27	11	4	10	51	7	294	15	83	178	23
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	30	12	4	11	57	8	330	17	93	200	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	788	762	213	775	767	339	226	0	0	347	0	0
Stage 1	399	399	-	355	355	-	-	-	-	-	-	-
Stage 2	389	363	-	420	412	-	-	-	-	-	-	-
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	309	335	827	315	332	703	1342	-	-	1212	-	-
Stage 1	627	602	-	662	630	-	-	-	-	-	-	-
Stage 2	635	625	-	611	594	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	258	304	827	271	301	703	1342	-	-	1212	-	-
Mov Cap-2 Maneuver	360	384	-	382	399	-	-	-	-	-	-	-
Stage 1	623	549	-	657	626	-	-	-	-	-	-	-
Stage 2	569	621	-	519	542	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.3	11.8	0.2	2.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1342	-	-	389	601	1212	-	-
HCM Lane V/C Ratio	0.006	-	-	0.306	0.122	0.077	-	-
HCM Control Delay (s)	7.7	0	-	18.3	11.8	8.2	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.3	0.4	0.2	-	-

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	70	10	24	11	7	63	15	152	7	105	447	34
Future Vol, veh/h	70	10	24	11	7	63	15	152	7	105	447	34
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	73	10	25	11	7	66	16	158	7	109	466	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	932	899	484	913	913	162	501	0	0	165	0	0
Stage 1	702	702	-	194	194	-	-	-	-	-	-	-
Stage 2	230	197	-	719	719	-	-	-	-	-	-	-
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	247	279	583	254	273	883	1063	-	-	1413	-	-
Stage 1	429	440	-	808	740	-	-	-	-	-	-	-
Stage 2	773	738	-	420	433	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	204	245	583	215	240	883	1063	-	-	1413	-	-
Mov Cap-2 Maneuver	313	320	-	286	313	-	-	-	-	-	-	-
Stage 1	422	393	-	794	727	-	-	-	-	-	-	-
Stage 2	696	725	-	349	387	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.8	11.8	0.7	1.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1063	-	-	351	613	1413	-	-
HCM Lane V/C Ratio	0.015	-	-	0.309	0.138	0.077	-	-
HCM Control Delay (s)	8.4	0	-	19.8	11.8	7.8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.3	0.5	0.3	-	-

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	91	36	15	6	14	66	10	387	20	109	235	31
Future Vol, veh/h	91	36	15	6	14	66	10	387	20	109	235	31
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	102	40	17	7	16	74	11	435	22	122	264	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1039	1005	282	1022	1011	446	299	0	0	457	0	0
Stage 1	526	526	-	468	468	-	-	-	-	-	-	-
Stage 2	513	479	-	554	543	-	-	-	-	-	-	-
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	209	241	757	214	240	612	1262	-	-	1104	-	-
Stage 1	535	529	-	575	561	-	-	-	-	-	-	-
Stage 2	544	555	-	517	520	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	157	207	757	167	206	612	1262	-	-	1104	-	-
Mov Cap-2 Maneuver	254	296	-	283	316	-	-	-	-	-	-	-
Stage 1	529	459	-	568	554	-	-	-	-	-	-	-
Stage 2	459	548	-	400	451	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.8	14	0.2	2.5
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1262	-	-	284	496	1104	-	-
HCM Lane V/C Ratio	0.009	-	-	0.562	0.195	0.111	-	-
HCM Control Delay (s)	7.9	0	-	32.8	14	8.7	0	-
HCM Lane LOS	A	A	-	D	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	3.2	0.7	0.4	-	-

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	70	10	24	11	7	64	15	153	7	107	452	34
Future Vol, veh/h	70	10	24	11	7	64	15	153	7	107	452	34
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	73	10	25	11	7	67	16	159	7	111	471	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	943	909	489	923	923	163	506	0	0	166	0	0
Stage 1	711	711	-	195	195	-	-	-	-	-	-	-
Stage 2	232	198	-	728	728	-	-	-	-	-	-	-
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	243	275	579	250	270	882	1059	-	-	1412	-	-
Stage 1	424	436	-	807	739	-	-	-	-	-	-	-
Stage 2	771	737	-	415	429	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	200	241	579	211	236	882	1059	-	-	1412	-	-
Mov Cap-2 Maneuver	309	316	-	282	309	-	-	-	-	-	-	-
Stage 1	417	388	-	793	726	-	-	-	-	-	-	-
Stage 2	694	724	-	344	382	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20	11.8	0.7	1.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1059	-	-	347	611	1412	-	-
HCM Lane V/C Ratio	0.015	-	-	0.312	0.14	0.079	-	-
HCM Control Delay (s)	8.4	0	-	20	11.8	7.8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.3	0.5	0.3	-	-

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	91	36	15	6	14	68	10	392	20	111	238	31
Future Vol, veh/h	91	36	15	6	14	68	10	392	20	111	238	31
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, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	102	40	17	7	16	76	11	440	22	125	267	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1054	1019	285	1036	1025	451	302	0	0	462	0	0
Stage 1	535	535	-	473	473	-	-	-	-	-	-	-
Stage 2	519	484	-	563	552	-	-	-	-	-	-	-
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	204	237	754	210	235	608	1259	-	-	1099	-	-
Stage 1	529	524	-	572	558	-	-	-	-	-	-	-
Stage 2	540	552	-	511	515	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	152	202	754	163	200	608	1259	-	-	1099	-	-
Mov Cap-2 Maneuver	248	291	-	278	310	-	-	-	-	-	-	-
Stage 1	523	452	-	565	551	-	-	-	-	-	-	-
Stage 2	453	545	-	393	444	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	34	14.1	0.2	2.5
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1259	-	-	278	493	1099	-	-
HCM Lane V/C Ratio	0.009	-	-	0.574	0.201	0.113	-	-
HCM Control Delay (s)	7.9	0	-	34	14.1	8.7	0	-
HCM Lane LOS	A	A	-	D	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	3.3	0.7	0.4	-	-

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	14	0	9	5	0	5	3	192	5	5	335	4
Future Vol, veh/h	14	0	9	5	0	5	3	192	5	5	335	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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	10	5	0	5	3	209	5	5	364	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	596	596	366	599	596	212	368	0	0	214	0	0
Stage 1	376	376	-	218	218	-	-	-	-	-	-	-
Stage 2	220	220	-	381	378	-	-	-	-	-	-	-
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	415	417	679	413	417	828	1191	-	-	1356	-	-
Stage 1	645	616	-	784	723	-	-	-	-	-	-	-
Stage 2	782	721	-	641	615	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	410	414	679	405	414	828	1191	-	-	1356	-	-
Mov Cap-2 Maneuver	410	414	-	405	414	-	-	-	-	-	-	-
Stage 1	643	613	-	782	721	-	-	-	-	-	-	-
Stage 2	775	719	-	629	612	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	11.8	0.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1191	-	-	485	544	1356	-	-
HCM Lane V/C Ratio	0.003	-	-	0.052	0.02	0.004	-	-
HCM Control Delay (s)	8	0	-	12.8	11.8	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	6	5	0	5	9	385	5	5	270	14
Future Vol, veh/h	9	0	6	5	0	5	9	385	5	5	270	14
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	7	5	0	5	10	418	5	5	293	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	754	754	301	755	759	421	308	0	0	423	0	0
Stage 1	311	311	-	441	441	-	-	-	-	-	-	-
Stage 2	443	443	-	314	318	-	-	-	-	-	-	-
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	326	338	739	325	336	632	1253	-	-	1136	-	-
Stage 1	699	658	-	595	577	-	-	-	-	-	-	-
Stage 2	594	576	-	697	654	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	319	333	739	319	331	632	1253	-	-	1136	-	-
Mov Cap-2 Maneuver	319	333	-	319	331	-	-	-	-	-	-	-
Stage 1	692	655	-	589	571	-	-	-	-	-	-	-
Stage 2	583	570	-	687	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.1	13.7	0.2	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1253	-	-	413	424	1136	-	-
HCM Lane V/C Ratio	0.008	-	-	0.039	0.026	0.005	-	-
HCM Control Delay (s)	7.9	0	-	14.1	13.7	8.2	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

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	14	0	9	5	0	5	3	192	5	5	335	4
Future Vol, veh/h	14	0	9	5	0	5	3	192	5	5	335	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	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	10	5	0	5	3	209	5	5	364	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	596	596	366	599	596	212	368	0	0	214	0	0
Stage 1	376	376	-	218	218	-	-	-	-	-	-	-
Stage 2	220	220	-	381	378	-	-	-	-	-	-	-
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	415	417	679	413	417	828	1191	-	-	1356	-	-
Stage 1	645	616	-	784	723	-	-	-	-	-	-	-
Stage 2	782	721	-	641	615	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	410	414	679	405	414	828	1191	-	-	1356	-	-
Mov Cap-2 Maneuver	410	414	-	405	414	-	-	-	-	-	-	-
Stage 1	643	613	-	782	721	-	-	-	-	-	-	-
Stage 2	775	719	-	629	612	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	11.8	0.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1191	-	-	485	544	1356	-	-
HCM Lane V/C Ratio	0.003	-	-	0.052	0.02	0.004	-	-
HCM Control Delay (s)	8	-	-	12.8	11.8	7.7	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	6	5	0	5	9	385	5	5	270	14
Future Vol, veh/h	9	0	6	5	0	5	9	385	5	5	270	14
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	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	7	5	0	5	10	418	5	5	293	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	754	754	301	755	759	421	308	0	0	423	0	0
Stage 1	311	311	-	441	441	-	-	-	-	-	-	-
Stage 2	443	443	-	314	318	-	-	-	-	-	-	-
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	326	338	739	325	336	632	1253	-	-	1136	-	-
Stage 1	699	658	-	595	577	-	-	-	-	-	-	-
Stage 2	594	576	-	697	654	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	320	334	739	319	332	632	1253	-	-	1136	-	-
Mov Cap-2 Maneuver	320	334	-	319	332	-	-	-	-	-	-	-
Stage 1	693	655	-	590	572	-	-	-	-	-	-	-
Stage 2	584	571	-	687	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.1	13.7	0.2	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1253	-	-	414	424	1136	-	-
HCM Lane V/C Ratio	0.008	-	-	0.039	0.026	0.005	-	-
HCM Control Delay (s)	7.9	-	-	14.1	13.7	8.2	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	0	9	5	0	5	3	258	5	5	449	4
Future Vol, veh/h	14	0	9	5	0	5	3	258	5	5	449	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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	10	5	0	5	3	280	5	5	488	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	791	791	490	794	791	283	492	0	0	285	0	0
Stage 1	500	500	-	289	289	-	-	-	-	-	-	-
Stage 2	291	291	-	505	502	-	-	-	-	-	-	-
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	307	322	578	306	322	756	1071	-	-	1277	-	-
Stage 1	553	543	-	719	673	-	-	-	-	-	-	-
Stage 2	717	672	-	549	542	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	303	319	578	299	319	756	1071	-	-	1277	-	-
Mov Cap-2 Maneuver	303	319	-	299	319	-	-	-	-	-	-	-
Stage 1	551	540	-	717	671	-	-	-	-	-	-	-
Stage 2	710	670	-	537	539	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	13.6	0.1	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1071	-	-	372	429	1277	-	-
HCM Lane V/C Ratio	0.003	-	-	0.067	0.025	0.004	-	-
HCM Control Delay (s)	8.4	0	-	15.4	13.6	7.8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	6	5	0	5	9	515	5	5	363	14
Future Vol, veh/h	9	0	6	5	0	5	9	515	5	5	363	14
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	7	5	0	5	10	560	5	5	395	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	998	998	403	999	1003	563	410	0	0	565	0	0
Stage 1	413	413	-	583	583	-	-	-	-	-	-	-
Stage 2	585	585	-	416	420	-	-	-	-	-	-	-
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	223	244	647	222	242	526	1149	-	-	1007	-	-
Stage 1	616	594	-	498	499	-	-	-	-	-	-	-
Stage 2	497	498	-	614	589	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	217	239	647	217	237	526	1149	-	-	1007	-	-
Mov Cap-2 Maneuver	217	239	-	217	237	-	-	-	-	-	-	-
Stage 1	608	590	-	492	493	-	-	-	-	-	-	-
Stage 2	485	492	-	604	585	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.9	17.2	0.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1149	-	-	296	307	1007	-	-
HCM Lane V/C Ratio	0.009	-	-	0.055	0.035	0.005	-	-
HCM Control Delay (s)	8.2	0	-	17.9	17.2	8.6	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	0	9	5	0	5	3	258	5	5	449	4
Future Vol, veh/h	14	0	9	5	0	5	3	258	5	5	449	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	-	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	0	10	5	0	5	3	280	5	5	488	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	791	791	490	794	791	283	492	0	0	285	0	0
Stage 1	500	500	-	289	289	-	-	-	-	-	-	-
Stage 2	291	291	-	505	502	-	-	-	-	-	-	-
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	307	322	578	306	322	756	1071	-	-	1277	-	-
Stage 1	553	543	-	719	673	-	-	-	-	-	-	-
Stage 2	717	672	-	549	542	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	303	319	578	299	319	756	1071	-	-	1277	-	-
Mov Cap-2 Maneuver	303	319	-	299	319	-	-	-	-	-	-	-
Stage 1	551	540	-	717	671	-	-	-	-	-	-	-
Stage 2	710	670	-	537	539	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	13.6	0.1	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1071	-	-	372	429	1277	-	-
HCM Lane V/C Ratio	0.003	-	-	0.067	0.025	0.004	-	-
HCM Control Delay (s)	8.4	-	-	15.4	13.6	7.8	0	-
HCM Lane LOS	A	-	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	6	5	0	5	9	515	5	5	363	14
Future Vol, veh/h	9	0	6	5	0	5	9	515	5	5	363	14
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	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	7	5	0	5	10	560	5	5	395	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	998	998	403	999	1003	563	410	0	0	565	0	0
Stage 1	413	413	-	583	583	-	-	-	-	-	-	-
Stage 2	585	585	-	416	420	-	-	-	-	-	-	-
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	223	244	647	222	242	526	1149	-	-	1007	-	-
Stage 1	616	594	-	498	499	-	-	-	-	-	-	-
Stage 2	497	498	-	614	589	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	218	240	647	217	238	526	1149	-	-	1007	-	-
Mov Cap-2 Maneuver	218	240	-	217	238	-	-	-	-	-	-	-
Stage 1	610	590	-	494	495	-	-	-	-	-	-	-
Stage 2	488	494	-	604	585	-	-	-	-	-	-	-

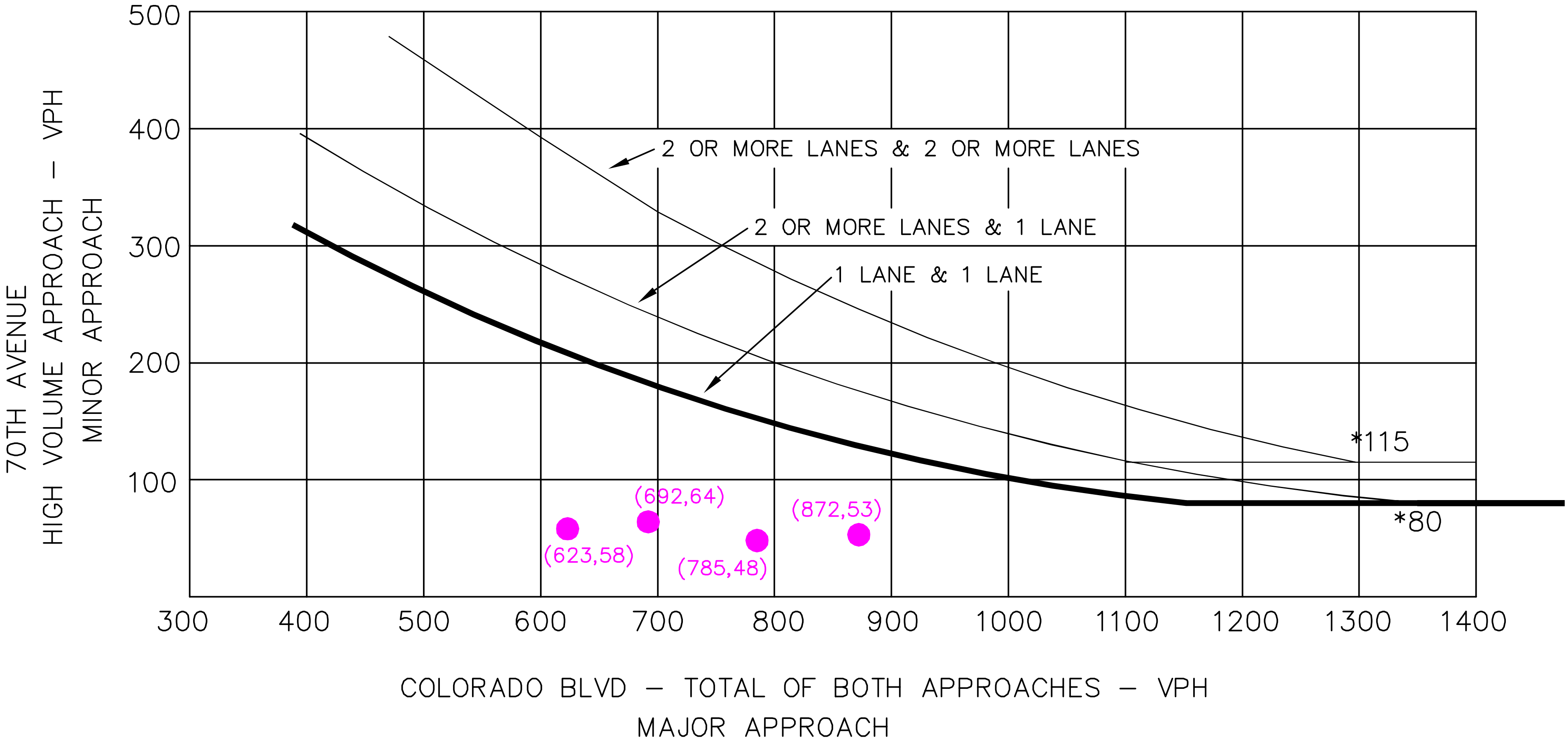
Approach	EB	WB	NB	SB
HCM Control Delay, s	17.8	17.2	0.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1149	-	-	297	307	1007	-	-
HCM Lane V/C Ratio	0.009	-	-	0.055	0.035	0.005	-	-
HCM Control Delay (s)	8.2	-	-	17.8	17.2	8.6	0	-
HCM Lane LOS	A	-	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

APPENDIX E

Signal & All-Way Stop Control Warrant Worksheets

WARRANT 2 - FOUR HOUR VEHICULAR VOLUME



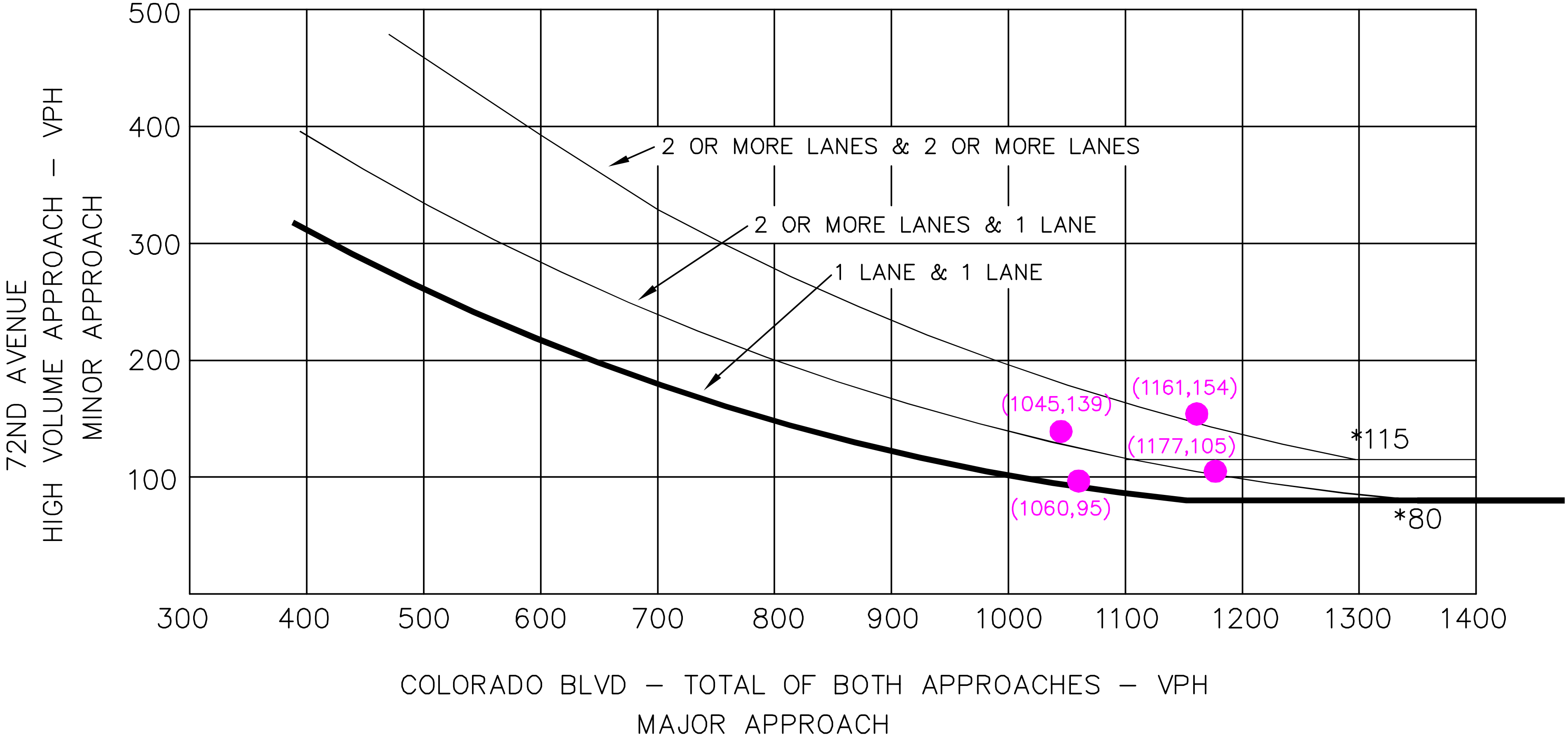
* NOTE: 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SIGNAL WARRANT ANALYSIS
70TH AVE & COLORADO BLVD
FOUR HOUR VOLUME WARRANT

● 2045 TRAFFIC DATA POINT

Source: Manual of Uniform Traffic Control Devices 2009

WARRANT 2 - FOUR HOUR VEHICULAR VOLUME



* NOTE: 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

SIGNAL WARRANT ANALYSIS
72ND AVE & COLORADO BLVD
FOUR HOUR VOLUME WARRANT

● 2045 TRAFFIC DATA POINT

Source: Manual of Uniform Traffic Control Devices 2009

Kimley»Horn

All Way Stop Control Warrants: 7001 Colorado Boulevard Project

72nd Avenue & Colorado Boulevard (2024 Total Traffic Volumes)						
Hour	Minor Volume	Minor Threshold	Met	Major Volume	Major Threshold	Met
7:00 AM - 8:00 AM	160	200		895	300	X
8:00 AM - 9:00 AM	144	200		806	300	X
9:00 AM - 10:00 AM	144*	200		806*	300	X
10:00 AM - 11:00 AM	130*	200		725*	300	X
2:00 PM - 3:00 PM	202*	200	X	717*	300	X
3:00 PM - 4:00 PM	224*	200	X	797*	300	X
4:00 PM - 5:00 PM	249	200	X	885	300	X
5:00 PM - 6:00 PM	224	200	X	797	300	X

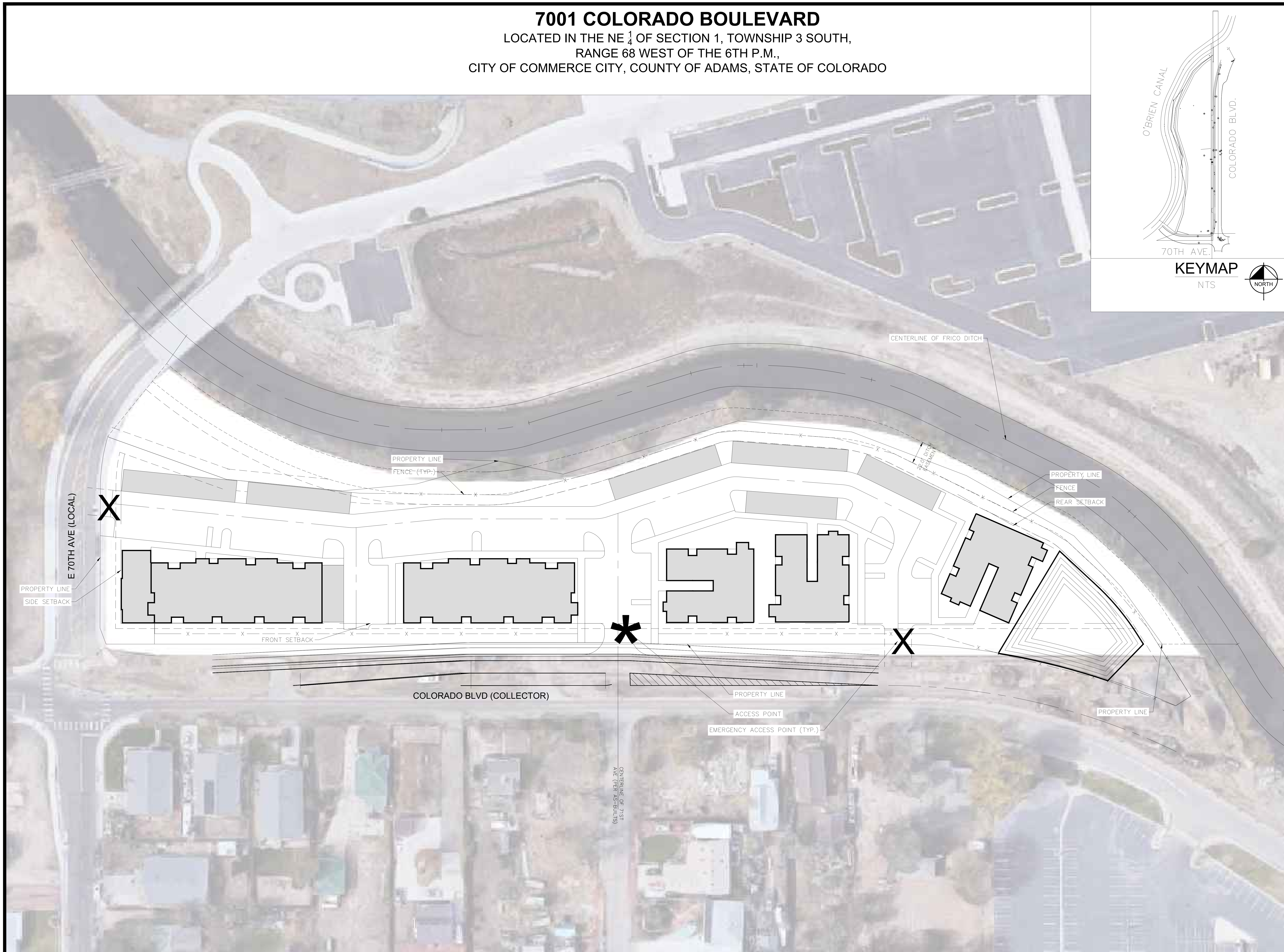
* = 90 Percent Factor Applied

APPENDIX F

Site Access Improvement Exhibit

7001 COLORADO BOULEVARD

LOCATED IN THE NE $\frac{1}{4}$ OF SECTION 1, TOWNSHIP 3 SOUTH,
RANGE 68 WEST OF THE 6TH P.M.,
CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO



CONCEPT SITE PLAN

SCALE: 1":60'

NO	REVISION	BY	DATE	APPR

Kimley»Horn

KIMLEY-HORN AND ASSOCIATES, INC.
4582 South Ulster Street, Suite 1500
Denver, Colorado 80237 (303) 228-2300

7001 COLORADO BOULEVARD
CITY OF COMMERCE CITY, COUNTY OF ADAMS
CONCEPT SITE PLAN

DATE: 01/28/2022
DESIGNED BY: PMB
DRAWN BY: PMB
CHECKED BY: PMB

FILE NO. 2022.01.25
PROJECT NO. 096216004

SHEET NO.
2

APPENDIX G

Queue Analysis Worksheets

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	40	34	148	3	358	17	234	594	52
v/c Ratio	0.49	0.27	0.54	0.00	0.24	0.01	0.28	0.39	0.04
Control Delay	57.8	42.4	15.4	2.3	2.7	1.1	3.4	3.6	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	42.4	15.4	2.3	2.7	1.1	3.4	3.6	0.8
Queue Length 50th (ft)	22	18	4	0	34	0	23	67	0
Queue Length 95th (ft)	53	46	57	2	71	4	56	134	7
Internal Link Dist (ft)	213		149		566			1312	
Turn Bay Length (ft)		100		100			75		100
Base Capacity (vph)	219	340	504	626	1505	1282	823	1505	1288
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.10	0.29	0.00	0.24	0.01	0.28	0.39	0.04

Intersection Summary

Lane Group	EBT	WBL	WBT	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	48	38	245	568	36	177	383	40
v/c Ratio	0.75	0.25	0.66	0.38	0.03	0.28	0.26	0.03
Control Delay	91.1	40.0	14.5	3.7	1.0	3.9	3.0	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.1	40.0	14.5	3.7	1.0	3.9	3.0	0.9
Queue Length 50th (ft)	23	21	2	62	0	17	37	0
Queue Length 95th (ft)	#65	47	66	143	6	52	87	7
Internal Link Dist (ft)	213		149	566			1312	
Turn Bay Length (ft)		100				75		100
Base Capacity (vph)	164	421	593	1497	1279	640	1497	1280
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.09	0.41	0.38	0.03	0.28	0.26	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX H

Conceptual Site Plan

ZONING: R-3

OPEN SPACE CALCS:
NET SITE AREA: 181,632 SF
4.17 AC

REQUIRED 15%
OPEN SPACE: 0.67 AC
29,082 SF

PROVIDED
OPEN SPACE: ~73,657 SF

PARKING INFO:
PARKING REQ'D: 156 (1.7/UN)
1.20 / 1 BED = 8.4
1.4 / 2 BED = 35
1.6 / 3 BED = 38.4
1.6 / 4 BED = 57.6
12% GUEST = 16.7

20% REDUCTION DUE TO PROXIMITY TO TRANSIT

PARKING PROVIDED: 156 (1.7/UN)
SURFACE 91
GARAGE 65 (40%)

20% ADMINISTRATIVE REDUCTION IN GARAGES DUE TO AFFORDABLE
40% VS 50%

UNIT INFO:

1 BED	7
2 BED	25
3 BED	24
4 BED	36
TOTAL	92

DENSITY:
MAX HGT = 50 FEET
MAX = 24 DU/AC
PROPOSED = 23.98

7001 COLORADO BLVD

PROSPECT PROPERTIES
2021.12.10

Godden|Sudik ARCHITECTS
SEE WHAT COULD BE

Kimley»Horn

April 21, 2022

City of Commerce City
Attn: Lee Alverson, P.E. Development Review and Coordination Engineer
Public Works Department
8602 Rosemary Street
Commerce City, CO 80022

RE: ***7001 Colorado Boulevard***
Preliminary Drainage Letter

The following letter is intended to serve as a preliminary drainage letter for the multi-family development at 7001 Colorado Boulevard, "The Project," which is located Northwest of the intersection of East 70th Avenue and Colorado Boulevard, and is bounded on the west side by the O'Brien Canal, an irrigation ditch managed by Farmer's Reservoir and Irrigation Company (FRICO). This area was accounted for in the *72nd Avenue and Colorado Boulevard 90% Drainage Report*, prepared by Atkins on July 23, 2018 (the Overall Drainage Report). As such, the project described herein is subject to meeting the criteria and expected design flows as stated within the aforementioned drainage report.

PROJECT DESCRIPTION

The Project consists of the addition of a new multi-family development, and associated widening for a left turn lane to enter the site from the northbound direction on Colorado Blvd. The onsite development will occur on a parcel of land consisting of 3.99 acres. The onsite area will be treated in a proposed water quality and detention pond to the north of the parcel.

The site is currently an unplatted parcel with 3 buildings, gravel parking areas, and limited vegetation. The area is subdivided into 4 different basins per the Overall Drainage Report. These basins are named Basin A-A-CO-IN-1, Basin A-B-CO-IN-1, Basin A-C-CO-IN-1, and Basin A-D-CO-IN-1. These basins total to 5.33 acres with a % imperviousness of 58%. The site does not have any existing stormwater infrastructure onsite and appears to drain via overland sheet flow towards the south, north or west sides of the site. The drainage map from the Overall Drainage Report indicates that our site falls within tributary area to the Colorado Blvd system.

DESIGN CRITERIA AND APPROACH

The project is intended to be designed in accordance with "City of Commerce City Storm Drainage Design and Technical Criteria Manual," revised December 2021 (the "Criteria") and the "Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual" Volumes 1, 2 and 3 (the "Manual"). The project is subject to the design criteria as stated in the Overall Drainage Report). A proposed Water Quality and Detention pond is proposed on the north side of the site. The preliminary design is per the Criteria and Manual above. Rational Calculations and a MHFD detention spreadsheet calculation are provided as an attachment to this memo.

PROPOSED DRAINAGE CONDITIONS

The development of the Project will include the addition of a left turn lane on Colorado Blvd, five new multi-story apartment buildings and covered parking areas (1.24 acres), surface parking and sidewalks (1.10 acres), and landscaping (1.65 acres) for a site imperviousness of 54%. The runoff coefficients have been calculated as 0.51 and 0.69 for the 5-year and 100-year events, respectively. The site will drain by surface flow and then through proposed storm infrastructure from south to north conveyed to curb inlets, or valley inlets. Existing drainage patterns will shift slightly, in accordance with the various plans and studies that anticipate the Project's development. The ultimate pond outfall will drain by standard gravity outfall into the existing storm infrastructure within Colorado Blvd per the Overall Drainage Report. There will be a new driveway cut for the site access, as well as up to two emergency access points. The areas behind the ROW (within the Property) will drain to onsite storm infrastructure, to the extent practical.

The pond emergency overflow will be designed to overflow into the O'Brien Canal to the west. This will only occur in the event of a storm event above the 100-year occurrence.

CONCLUSIONS

In conclusion, the proposed improvements with this Project are in substantial conformance with the 72nd Avenue and Colorado Boulevard 90% Drainage Report (July 23, 2018) and are in compliance with City of Commerce City requirements.

City of Commerce City Engineering
APPROVED
04/21/2022

Commerce CITY

KIMLEY-HORN AND ASSOCIATES, INC.

Randall J Phelps

By: Randall J. Phelps, P.E.
Project Manager

References:

- 72nd Avenue and Colorado Boulevard 90% Drainage Report (July 23, 2018)

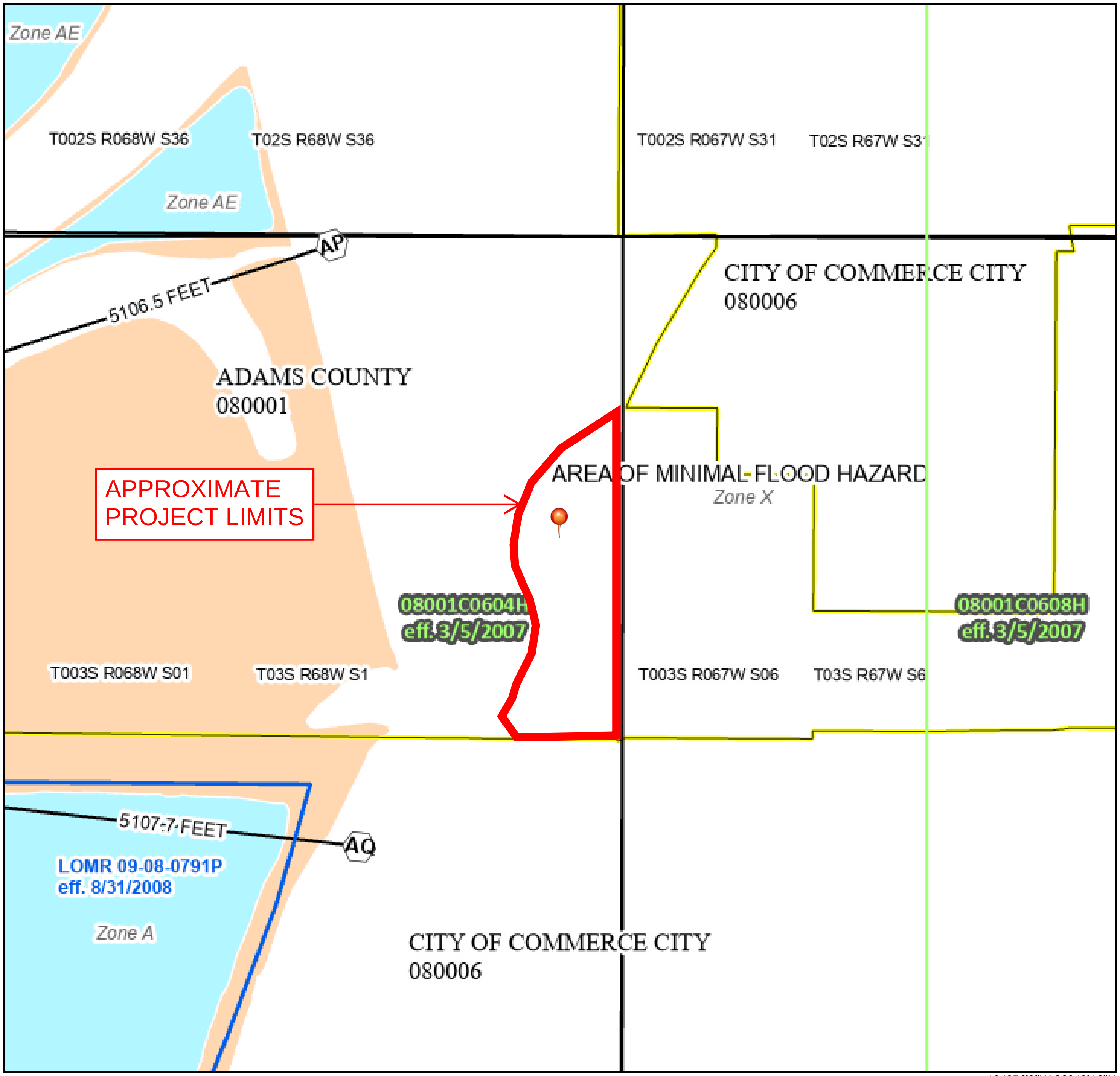
Attachments:

- FEMA FIRMette Map
- NRCS Web Soil Survey
- Proposed Drainage Plan
- Hydrology Calculations
- Pond Detention Calculation
- Excerpts from 72nd Avenue and Colorado Boulevard 90% Drainage Report
- Excerpts from As-Built E 72nd Ave and CO Blvd (21142)

National Flood Hazard Layer FIRMette

FEMA

104°56'46"W 39°49'44"N



104°56'9"W 39°49'16"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/4/2021 at 10:11 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Adams County Area, Parts of Adams and Denver Counties, Colorado

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

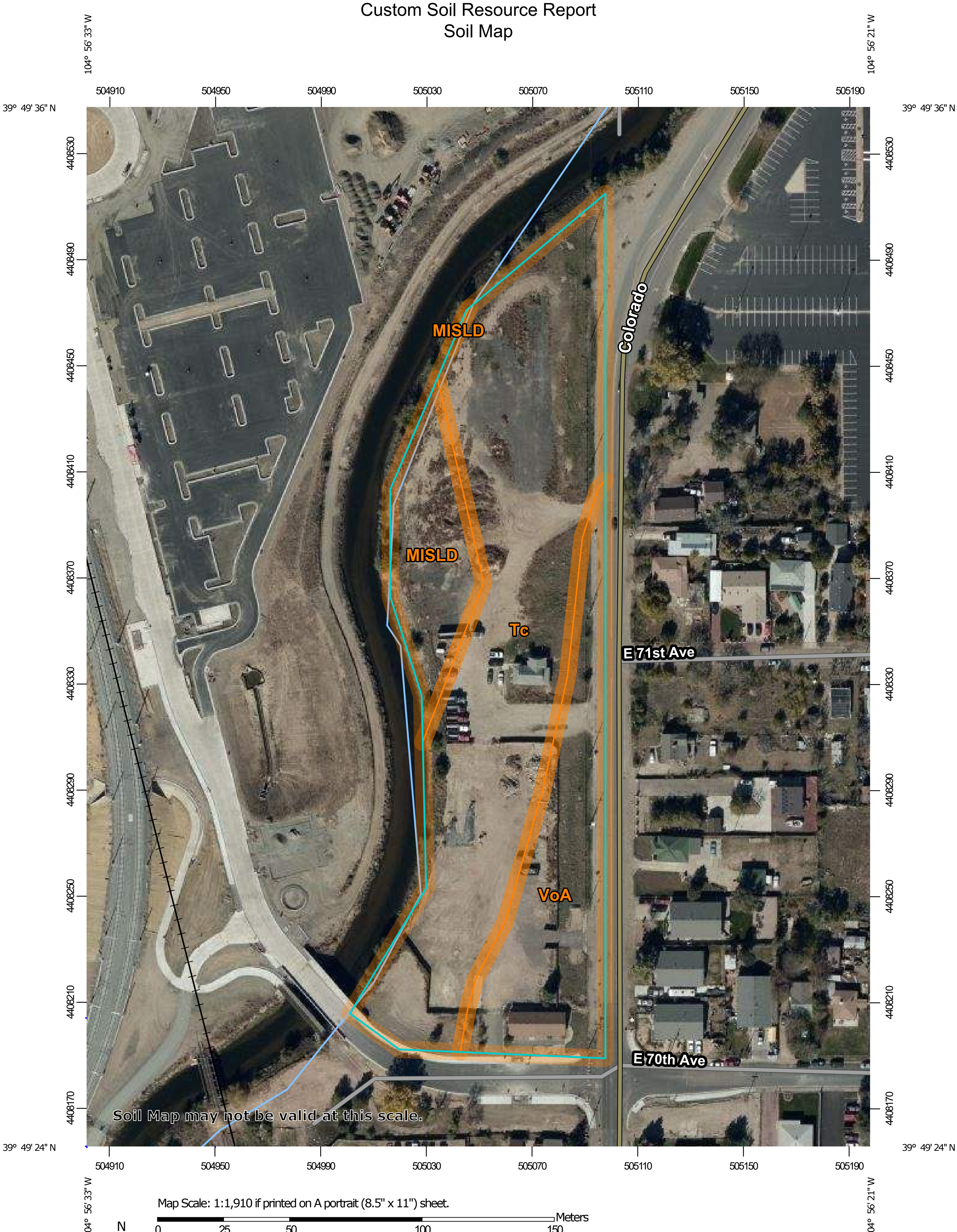
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:1,910 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 25, 50, 100, 150

Feet: 0, 50, 100, 200, 300

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

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

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

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

Water Features
Streams and Canals

Transportation
Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background
Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties, Colorado
Survey Area Data: Version 18, Aug 31, 2021

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

Date(s) aerial images were photographed: Oct 20, 2018—Oct 26, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MISLD	Gravel pits	0.7	12.2%
Tc	Terrace escarpments	3.4	62.8%
VoA	Vona sandy loam, 0 to 1 percent slopes	1.4	25.1%
Totals for Area of Interest		**5.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Adams County Area, Parts of Adams and Denver Counties, Colorado

MISLD—Gravel pits

Map Unit Setting

National map unit symbol: 34w6
Mean annual precipitation: 12 to 14 inches
Farmland classification: Not prime farmland

Map Unit Composition

Gravel pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel Pits

Typical profile

H1 - 0 to 6 inches: extremely gravelly sand
H2 - 6 to 60 inches: extremely gravelly sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: A
Hydric soil rating: No

Tc—Terrace escarpments

Map Unit Setting

National map unit symbol: 34ws
Elevation: 4,400 to 5,500 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Terrace escarpments: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terrace Escarpments

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 3 inches: gravelly sand

H2 - 3 to 60 inches: gravelly sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R067BY063CO - Gravel Breaks
Hydric soil rating: No

Minor Components

Dacono

Percent of map unit: 5 percent
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Hydric soil rating: No

VoA—Vona sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 34x9
Elevation: 4,000 to 5,600 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 125 to 155 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

Vona and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vona

Setting

Landform: Plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 22 inches: sandy loam
H3 - 22 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: A
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Dacono

Percent of map unit: 5 percent
Hydric soil rating: No

Truckton

Percent of map unit: 5 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

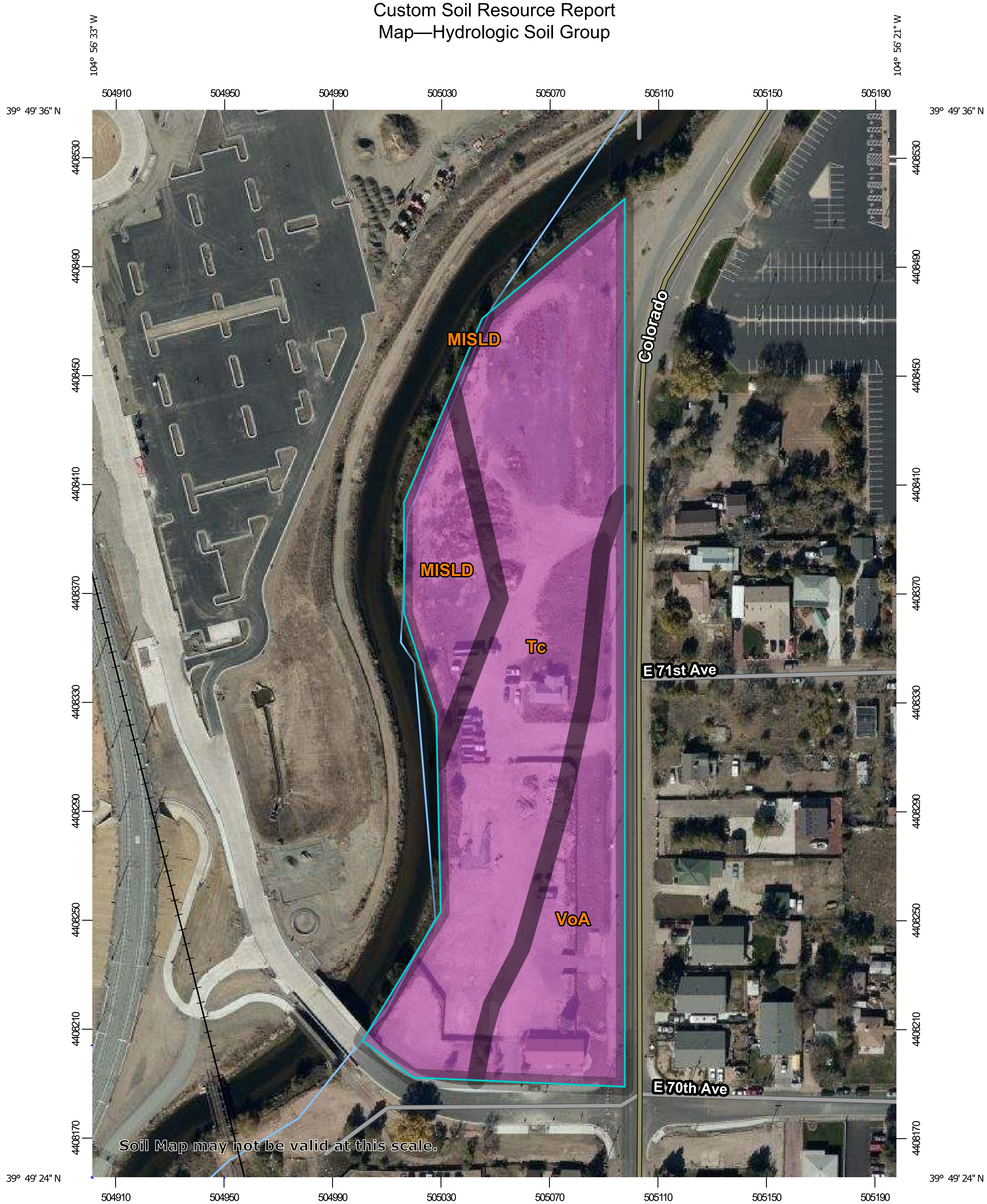
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

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

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

Map—Hydrologic Soil Group



Map Scale: 1:1,910 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 25, 50, 100, 150

Feet: 0, 50, 100, 200, 300

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

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Coordinate System: Web Mercator (EPSG:3857)

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	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
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Totals for Area of Interest			**5.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

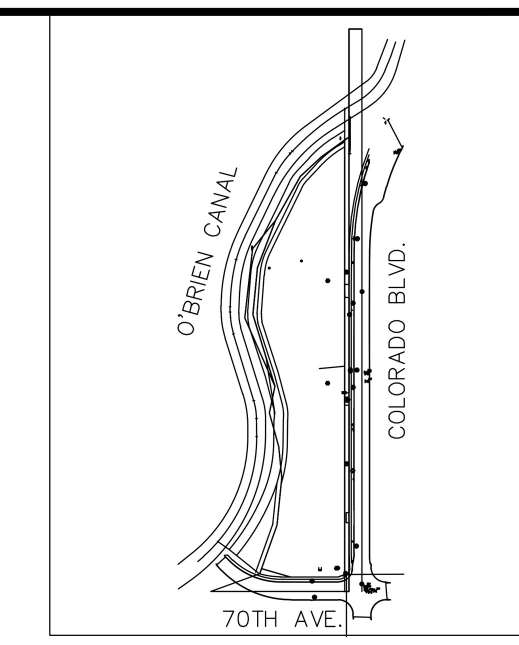
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

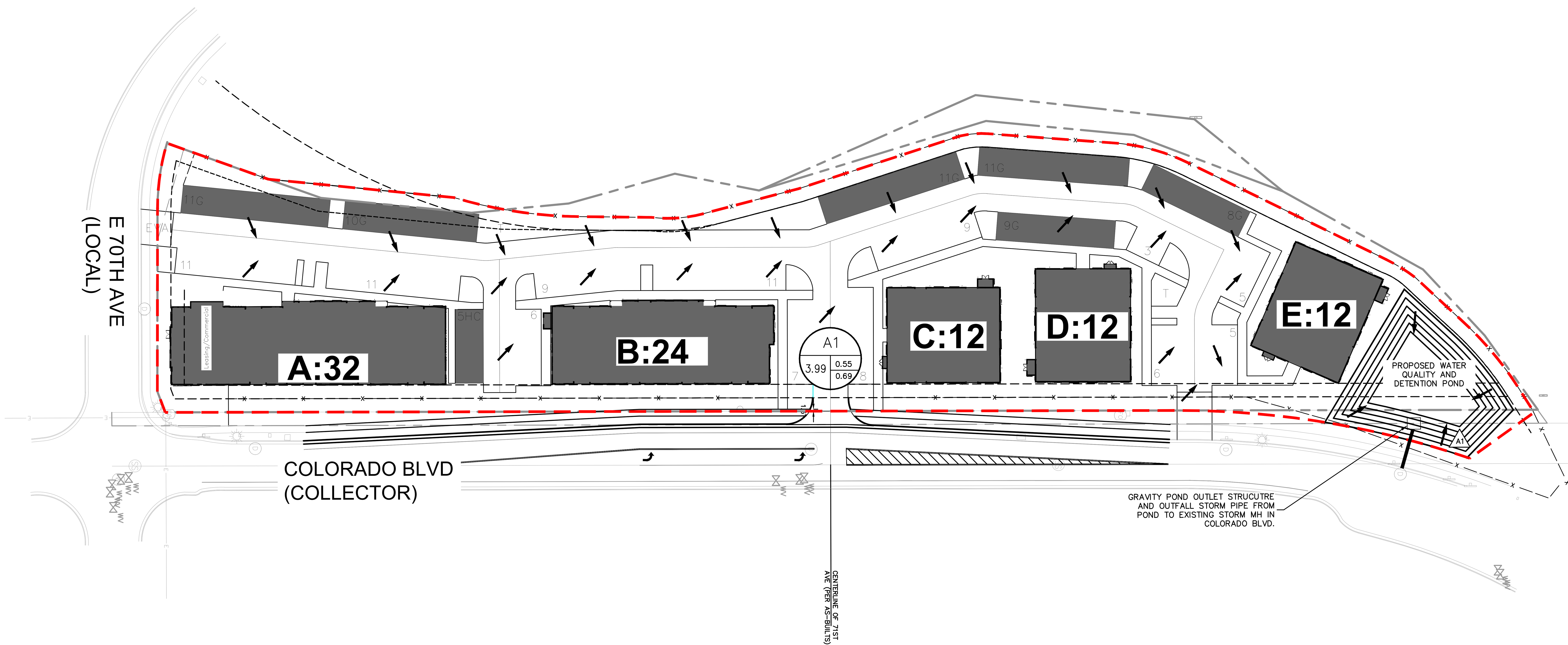
United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

7001 COLORADO BOULEVARD

LOCATED IN THE NE ¼ OF SECTION 1, TOWNSHIP 3 SOUTH,
RANGE 68 WEST OF THE 6TH P.M.,
CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO



KEYMAP
NTS



LEGEND

- PROPERTY LINE
- EASEMENT LINE
- DRAINAGE BASIN DELINEATION
- PROPOSED STORM PIPE
- FLOW ARROW

A – DRAINAGE BASIN
B – BASIN ACREAGE
C – 5-YEAR RUNOFF COEFFICIENT
D – 100-YEAR RUNOFF COEFICIENT

BASIN DESIGN POINT

GENERAL NOTES

1. THIS PLAN HAS BEEN PREPARED TO ILLUSTRATE THE INTENT OF THE DEVELOPMENT THAT ALL NEW STRUCTURES AND PAVING WILL DRAIN THROUGH THE SITE AND INTO THE ON-SITE DETENTION POND. PERIMETER AREAS THAT ARE LOW IMPERVIOUS AND SLOPE AWAY FROM THE SITE WILL BE LIMITED TO AREAS WHERE THE SITE IS RAISED ABOVE EXISTING CONDITION.

BENCHMARK:

THE MARK IS A STANDARD NGS BENCHMARK DISK STAMPED "A 314 1956", 5.9 MILES NORTHEAST OF DENVER ALONG THE UNION PACIFIC RAILROAD AT THE UNDERPASS OF U.S. HIGHWAY 85, 14 FEET EAST OF THE EAST RAIL OF THE EAST TRACK, 4 FEET BELOW THE TOP OF THE RAILS, AT THE NORTHEAST CORNER OF THE UNDERPASS, SET IN THE TOP OF THE NORTH END OF THE EAST RETAINING WALL.

PUBLISHED ELEVATION: 5146.67 (NAVD88)

CITY STAFF CERTIFICATE:

APPROVED BY THE DEPARTMENT OF COMMUNITY DEVELOPMENT OF THE CITY OF COMMERCE CITY,

THIS DAY OF , 20 .

DEPARTMENT OF COMMUNITY DEVELOPMENT

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn

4852 South Ulster Street, Suite 1500
Denver, Colorado 80237 (303) 228-2300

DESIGNED BY: KTS
DRAWN BY: KTS
CHECKED BY: RJP
DATE: 4/21/2022

LEGAL DESCRIPTION:
LOCATED IN THE NE ¼ OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO

7001 COLORADO BOULEVARD
CITY OF COMMERCE CITY, COUNTY OF ADAMS

PROPOSED DRAINAGE MAP

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
096216004

DRAWING NAME
Drainage Map.dwg

SHEET

Kimley»Horn

STANDARD FORM SF-1
RUNOFF COEFFICIENTS - IMPERVIOUS CALCULATION

PROJECT NAME: 7001 Colorado Blvd
PROJECT NUMBER: 96216004
CALCULATED BY: JMD
CHECKED BY:

3/18/2022

SOIL: Hydrologic Group A (NRCS Soil Survey)

LAND USE:	LANDSCAPE AREA	ROOF AREA	PAVEMENT AREA
2-YEAR COEFF.	0.05	0.80	0.87
5-YEAR COEFF.	0.10	0.85	0.87
100-YEAR COEFF.	0.40	0.90	0.89
IMPERVIOUS %	0%	90%	96%

DESIGN BASIN	DESIGN POINT	LANDSCAPE AREA (AC)	ROOF AREA (AC)	PAVEMENT AREA (AC)	TOTAL AREA (AC)	C(2)	C(5)	C(100)	Imp %
On-Site Basins									
A1	A1	1.65	1.24	1.10	**3.99**	0.51	0.55	0.69	54%
BASIN SUBTOTAL		**1.65**	**1.24**	**1.10**	**3.99**	**0.51**	**0.55**	**0.69**	**54%**
		41%	**31%**	**28%**	**100%**				

Kimley»Horn

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: 7001 Colorado Blvd
PROJECT NUMBER: 96216004
CALCULATED BY: JMD
CHECKED BY:

DATE: 3/18/2022

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)					FINAL Tc
DESIGN BASIN (1)	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE % (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	C_v (9)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	TOTAL SLOPE (15)	TOTAL IMP. (16)	Tc Min. (17)	Min.
On-Site Basins																
A1	3.990	0.545	300	2.0%	14.0	685	2.0%	20.0	2.8	4.0	18.0	985	2.0%	54%	23.7	18.0

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

$$t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 5 YEAR EVENT

PROJECT NAME: 7001 Colorado Blvd
DATE: 3/18/2022
PROJECT NUMBER: 96216004
P_1 (1-Hour Rainfall) = 1.12
CALCULATED BY: JMD
CHECKED BY: 0

STORM LINE		DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(max)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY	tt (min)	
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
On-Site Basins																						
		A1	A1	3.99	0.51	18.02	2.03	2.32	4.72													

STANDARD FORM SF-3

STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: 7001 Colorado Blvd

DATE: 3/18/2022

PROJECT NUMBER: 96216004

P_1 (1-Hour Rainfall) = 2.43

CALCULATED BY: JMD

CHECKED BY: 0

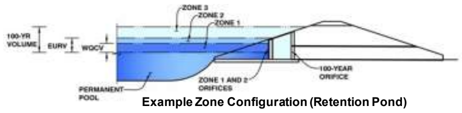
		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
STORM LINE	DESIGN POINT	DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(max)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCIT Y	tt (min)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
On-Site Basins																					
	A1	A1	3.99	0.69	18.02	2.75	5.04	13.89													

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: **7001 Colorado Blvd**

Basin ID: **On-site Detention Pond**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**			
Watershed Area =	3.99	acres		
Watershed Length =	985	ft		
Watershed Length to Centroid =	290	ft		
Watershed Slope =	0.020	ft/ft		
Watershed Imperviousness =	54.00%	percent		
Percentage Hydrologic Soil Group A =	100.0%	percent		
Percentage Hydrologic Soil Group B =	0.0%	percent		
Percentage Hydrologic Soil Groups C/D =	0.0%	percent		
Target WQCV Drain Time =	40.0	hours		
Location for 1-hr Rainfall Depths =	Commerce City - Civic Center			

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) =	0.072	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.254	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.84 in.) =	0.126	acre-feet		inches
5-yr Runoff Volume (P1 = 1.12 in.) =	0.172	acre-feet		inches
10-yr Runoff Volume (P1 = 1.37 in.) =	0.219	acre-feet		inches
25-yr Runoff Volume (P1 = 1.75 in.) =	0.299	acre-feet		inches
50-yr Runoff Volume (P1 = 2.08 in.) =	0.388	acre-feet		inches
100-yr Runoff Volume (P1 = 2.43 in.) =	0.497	acre-feet		inches
500-yr Runoff Volume (P1 = 3.35 in.) =	0.782	acre-feet		inches
Approximate 2-yr Detention Volume =	0.116	acre-feet		
Approximate 5-yr Detention Volume =	0.161	acre-feet		
Approximate 10-yr Detention Volume =	0.205	acre-feet		
Approximate 25-yr Detention Volume =	0.279	acre-feet		
Approximate 50-yr Detention Volume =	0.327	acre-feet		
Approximate 100-yr Detention Volume =	0.381	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.072	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.182	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.127	acre-feet
Total Detention Basin Volume =	0.381	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 = 1.00 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	--	--	--	1,351	0.031		
	--	1.00	--	--	--	2,973	0.068	2,162	0.050
	--	2.00	--	--	--	3,957	0.091	5,627	0.129
	--	3.00	--	--	--	5,072	0.116	10,141	0.233
	--	4.00	--	--	--	6,321	0.145	15,838	0.364
	--	5.00	--	--	--	7,702	0.177	22,850	0.525
	--	6.00	--	--	--	9,217	0.212	31,309	0.719
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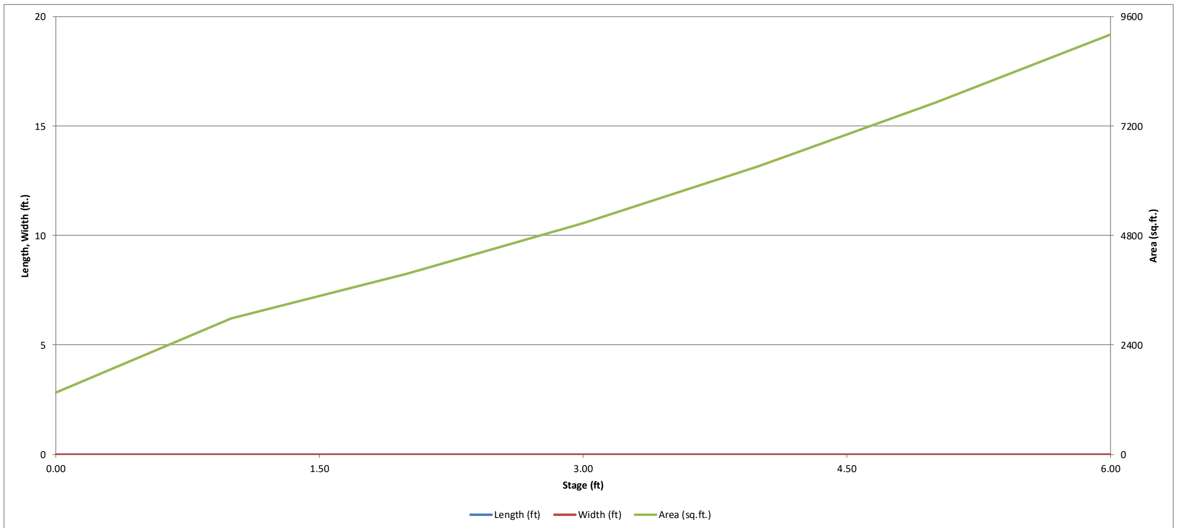
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10
5
0
9600
7200
4800
2400
0
Length, Width (ft.)
Area (sq.ft.)
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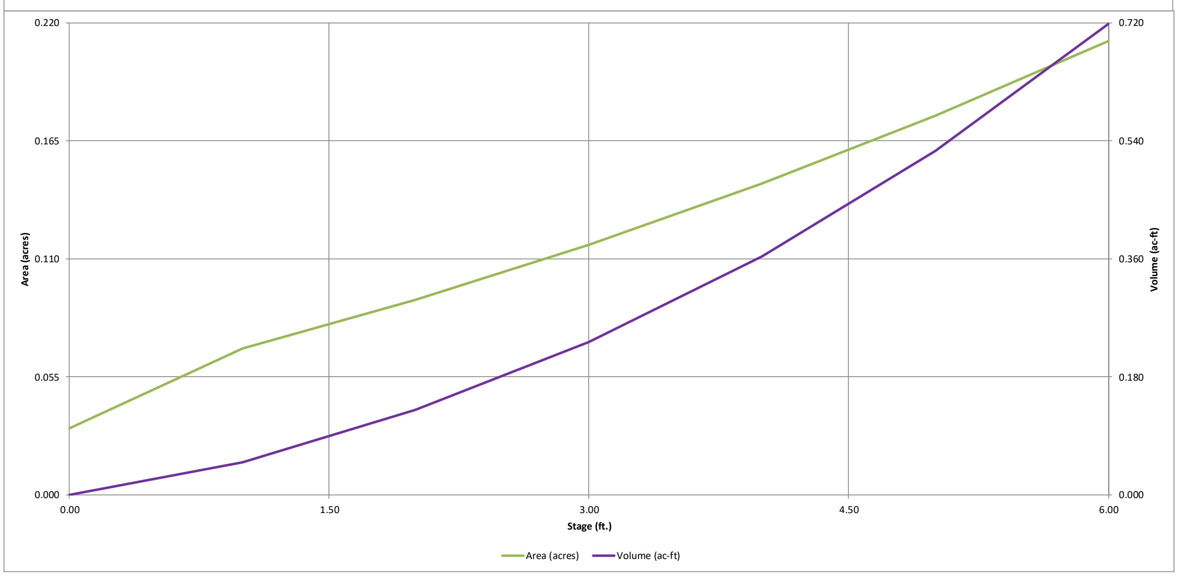
1.50
3.00
4.50
6.00
Stage (ft)
Length (ft)
Width (ft)
Area (sq.ft.)

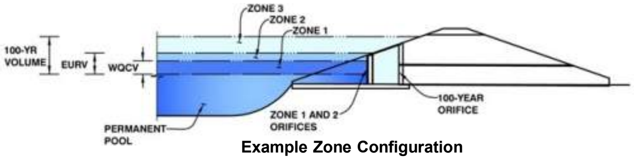

0.220
0.165
0.110
0.055
0.000
0.720
0.540
0.360
0.180
0.000
Area (acres)
Volume (ac-ft)
0.00
1.50
3.00
4.50
6.00
Stage (ft.)
Area (acres)
Volume (ac-ft)

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: **7001 Colorado Blvd**

Basin ID: **On-site Detention Pond**



Example Zone Configuration

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
(WQCV)	1.32	0.072	Orifice Plate
! (EURV)	3.18	0.182	Orifice Plate
00-year)	4.13	0.127	Weir&Pipe (Restrict)
Total (all zones)		0.381	

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 Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

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)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	3.18	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	12.70	inches
Orifice Plate: Orifice Area per Row =	0.85	sq. inches (diameter = 1 inch)

Calculated Parameters for Plate

WQ Orifice Area per Row =	5.903E-03	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

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	1.06	2.12					
Orifice Area (sq. inches)	0.85	0.85	0.85					

	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)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

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	
Overflow Weir Front Edge Height, Ho =	3.20	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	3.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	3.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	3.20	N/A	feet
Overflow Weir Slope Length =	3.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	1.99	N/A	
Overflow Grate Open Area w/o Debris =	6.26	N/A	ft^2
Overflow Grate Open Area w/ Debris =	3.13	N/A	ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	24.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	3.14	N/A	ft^2
Outlet Orifice Centroid =	1.00	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	3.55	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	15.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	0.50	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.28	feet
Stage at Top of Freeboard =	4.33	feet
Basin Area at Top of Freeboard =	0.16	acres
Basin Volume at Top of Freeboard =	0.41	acre-ft

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	0.84	1.12	1.37	1.75	2.08	2.43	3.35
CUHP Runoff Volume (acre-ft) =	0.072	0.254	0.126	0.172	0.219	0.299	0.388	0.497	0.782
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.126	0.172	0.219	0.299	0.388	0.497	0.782
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.0	0.0	0.1	0.8	1.8	4.2
'TIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.00	0.00	0.01	0.02	0.20	0.45	1.06
Peak Inflow Q (cfs) =	N/A	N/A	1.6	2.2	2.8	4.1	5.6	7.4	11.7
Peak Outflow Q (cfs) =	0.0	0.1	0.1	0.1	0.1	0.5	1.8	3.8	9.0
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	5.9	3.1	6.2	2.3	2.1	2.1
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.1	0.3	0.6	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) =	37	58	47	53	57	60	58	56	51
Time to Drain 99% of Inflow Volume (hours) =	**40**	64	51	57	62	67	66	64	62
Maximum Ponding Depth (ft) =	1.32	3.18	1.85	2.32	2.73	3.27	3.40	3.53	3.69
Area at Maximum Ponding Depth (acres) =	0.08	0.12	0.09	0.10	0.11	0.12	0.13	0.13	0.14
Maximum Volume Stored (acre-ft) =	0.073	0.254	0.115	0.159	0.202	0.265	0.280	0.297	0.319

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

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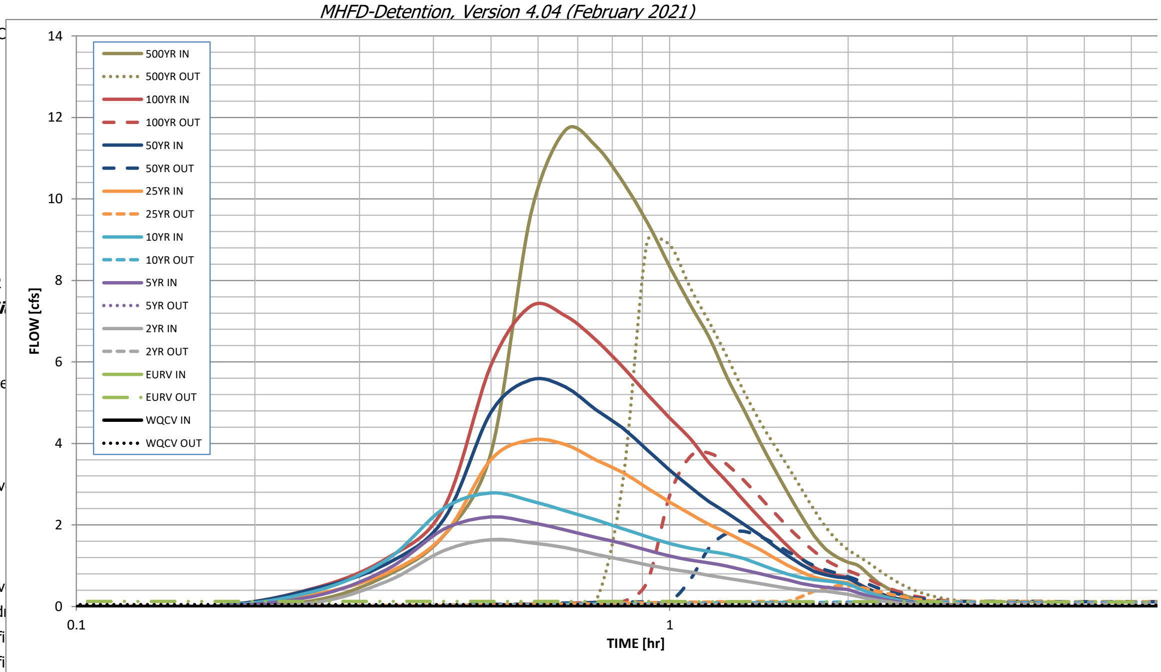

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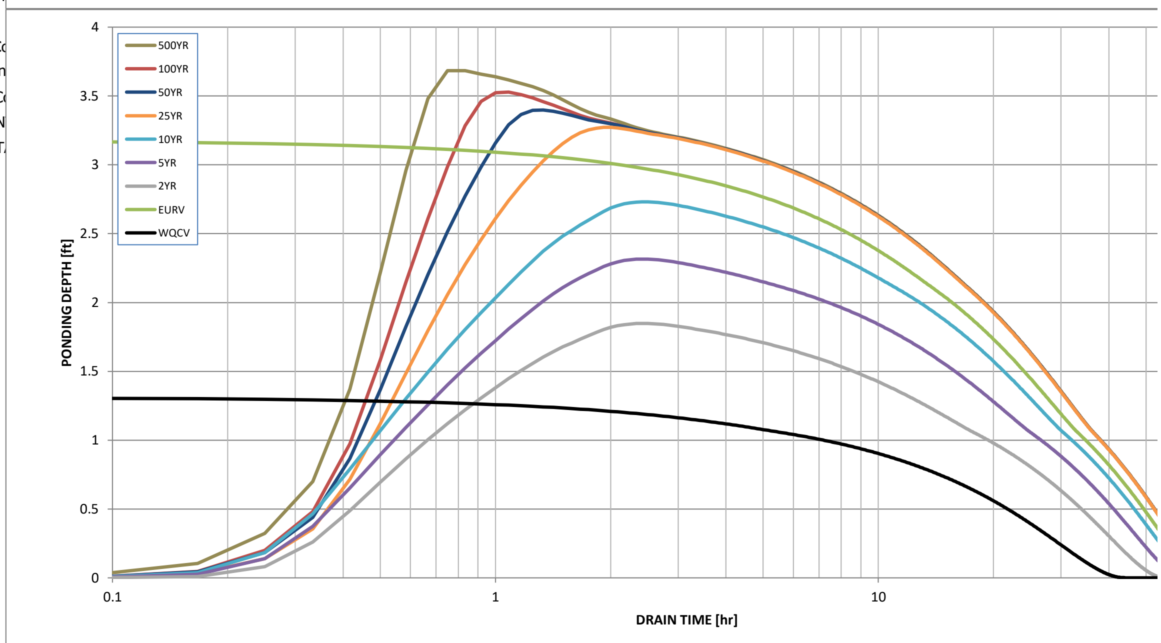
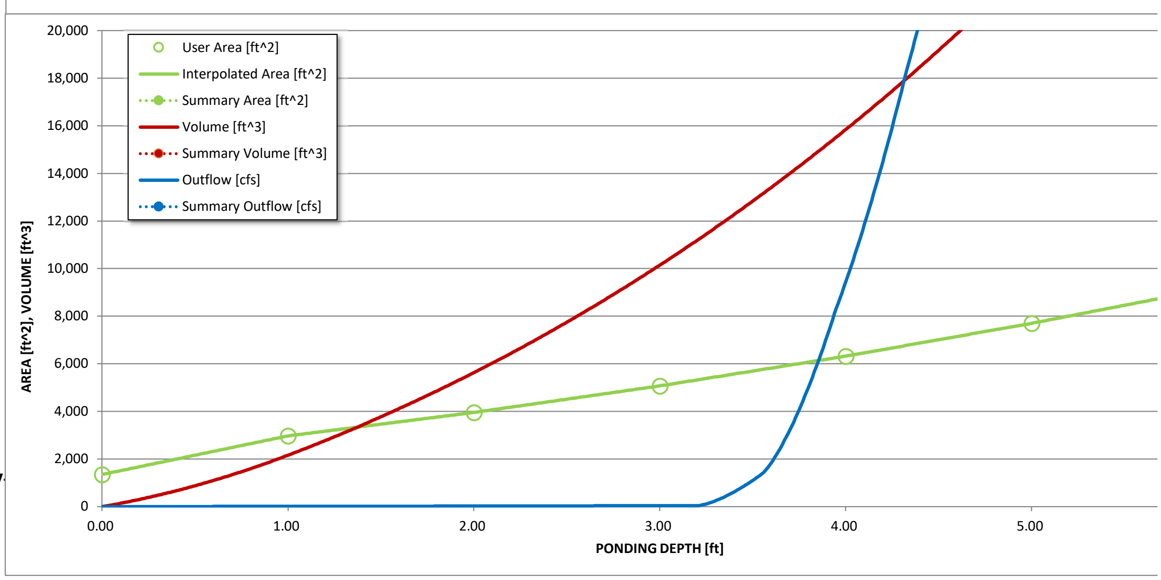


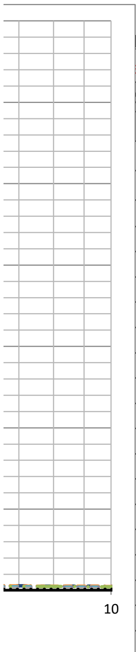
S-A-V-

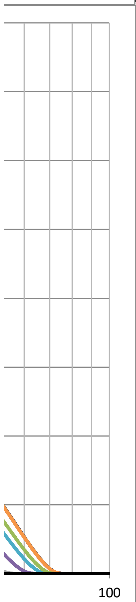


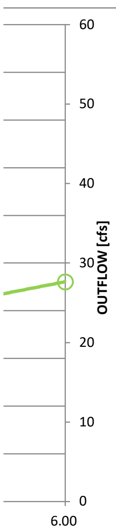
S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:







low Hydrographs

e 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	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]
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	0.00	0.00	0.14
0:15:00	0.00	0.00	0.08	0.24	0.36	0.29	0.42	0.44	0.75
0:20:00	0.00	0.00	0.61	0.90	1.14	0.82	1.04	1.18	1.74
0:25:00	0.00	0.00	1.37	1.89	2.41	1.75	2.15	2.43	3.77
0:30:00	0.00	0.00	1.64	2.19	2.78	3.61	4.77	5.92	9.61
0:35:00	0.00	0.00	1.56	2.06	2.59	4.08	5.56	7.37	11.69
0:40:00	0.00	0.00	1.44	1.88	2.35	3.98	5.39	7.14	11.31
0:45:00	0.00	0.00	1.28	1.70	2.13	3.60	4.83	6.55	10.43
0:50:00	0.00	0.00	1.15	1.54	1.91	3.29	4.38	5.88	9.43
0:55:00	0.00	0.00	1.02	1.38	1.71	2.91	3.84	5.21	8.35
1:00:00	0.00	0.00	0.92	1.23	1.54	2.56	3.35	4.63	7.40
1:05:00	0.00	0.00	0.84	1.14	1.43	2.27	2.93	4.12	6.60
1:10:00	0.00	0.00	0.76	1.07	1.35	2.01	2.57	3.52	5.61
1:15:00	0.00	0.00	0.69	0.99	1.28	1.81	2.30	3.06	4.83
1:20:00	0.00	0.00	0.62	0.89	1.17	1.60	2.01	2.59	4.06
1:25:00	0.00	0.00	0.56	0.81	1.03	1.40	1.75	2.18	3.38
1:30:00	0.00	0.00	0.50	0.72	0.90	1.19	1.48	1.81	2.78
1:35:00	0.00	0.00	0.44	0.65	0.79	1.01	1.24	1.47	2.22
1:40:00	0.00	0.00	0.40	0.56	0.70	0.84	1.02	1.18	1.75
1:45:00	0.00	0.00	0.38	0.51	0.65	0.72	0.86	0.96	1.41
1:50:00	0.00	0.00	0.37	0.47	0.62	0.65	0.77	0.83	1.21
1:55:00	0.00	0.00	0.33	0.44	0.59	0.61	0.72	0.76	1.08
2:00:00	0.00	0.00	0.30	0.41	0.55	0.58	0.68	0.71	1.00
2:05:00	0.00	0.00	0.24	0.33	0.44	0.46	0.54	0.55	0.77
2:10:00	0.00	0.00	0.19	0.25	0.34	0.36	0.42	0.42	0.58
2:15:00	0.00	0.00	0.14	0.20	0.27	0.28	0.33	0.32	0.44
2:20:00	0.00	0.00	0.11	0.15	0.21	0.21	0.25	0.24	0.33
2:25:00	0.00	0.00	0.09	0.12	0.16	0.16	0.19	0.19	0.25
2:30:00	0.00	0.00	0.07	0.09	0.12	0.12	0.14	0.14	0.19
2:35:00	0.00	0.00	0.05	0.07	0.09	0.09	0.11	0.11	0.14
2:40:00	0.00	0.00	0.04	0.05	0.07	0.07	0.08	0.08	0.11
2:45:00	0.00	0.00	0.03	0.04	0.05	0.05	0.06	0.06	0.08
2:50:00	0.00	0.00	0.02	0.02	0.03	0.04	0.04	0.04	0.06
2:55:00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.03	0.04
3:00:00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02
3:05:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	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 4.04 (February 2021)

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]

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).

72nd Avenue and Colorado Boulevard

90% Drainage Report

City of Commerce City

23 July 2018

1. Introduction and Background

The Project, Colorado Boulevard and East 72nd Avenue Rail Line Station Area Improvement Project, has had significant changes to the scope of work and design approach since the 30% submittals in March and April of 2017. These changes are the result of coordination with the City of Commerce City (City) and recommendations from Atkins. This report documents the changes and design approach for the 90% design submittal. The changes include:

- Full depth reconstruction of Colorado Boulevard
- 10' wide shared use trail in lieu of full construction of 72nd Avenue, west of the Burlington Ditch
- Removal of the surface sand filter along Colorado Boulevard
- Replacing the existing 36-inch storm drain in Colorado Boulevard with a 48-inch pipe

2. General Location and Description

2.1. Location

The Project consist of roadway, drainage, and pedestrian connectivity to the new Regional Transportation District (RTD) station located on 72nd Avenue, west of Colorado Boulevard. The improvements will be to Colorado Boulevard from 70th Avenue to north of 72nd Avenue, along with a temporary trail along 72nd Avenue from the Burlington Ditch to the North Metro Rail Line tracks. The project is approximately 0.28 miles in length within the City of Commerce City, which is located within Adams County, Colorado.

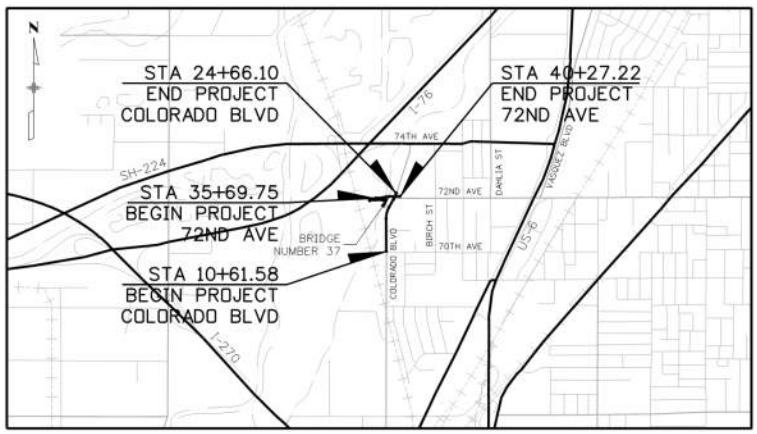


Figure 2-1 - Vicinity Map

The project site begins in Range 67 West and ends on the border between Range 67 West and Range 68 West, the northern portion of the project is the border of Township 2 South and Township 3 South and extends south into Township 3 South, and the project crosses from the southwest corner of Section 31 to the northwest corner of Section 6.

2.2. Description of Improvements

The project will reconstruct and widen Colorado Boulevard between 70th Avenue and 72nd Avenue to accommodate new bike lanes and sidewalks. Minor improvements are proposed to the surface of the 72nd Avenue bridge over Burlington Ditch. West of the bridge, a 10-foot-wide trail will be constructed to provide pedestrian access to the new North Metro Rail Station. The total area for the improvements is approximately 2.4 acres.

3. Drainage Basins and Sub-Basins

3.1. Major Basin Description

This project is part of a watershed tributary to the South Platte River. There are currently no known Major Drainageway Plans or Outfall System Plans for this watershed. Adams County is in the process of preparing a Major Drainageway Plan, but it was not made available for this project.

The Burlington Ditch nearly parallels Colorado Boulevard approximately 50 to 250 feet to the west. Only this portion of Colorado Boulevard and the 72^{nd} Avenue drains directly to the canal.

3.2. Sub-Basin Description

72^{nd} Avenue, west of the bridge over the Burlington Ditch, generally sheet flows northerly into and through the private Brannon property or to a ditch along the RTD tracks' maintenance access road at the west end of the project. The RTD property to the south generally routes all runoff overland westerly to storm sewer that is then routed to a detention pond to the south.

Colorado Boulevard generally slopes northerly from 70^{th} Avenue to 72^{nd} Avenue. A shallow roadside ditch along the west shoulder conveys runoff northerly to the Burlington Ditch near 72^{nd} Avenue. The east half of the road generally flows into the adjacent residential properties and continues northerly to a depression south of the Adams County Human Services Building. Approximately 27 acres of tributary area drains to the Adams County Human Services Building parking lot and is inadvertently detained. Flows from the parking lot drain to the existing storm drain in Colorado Boulevard. Figure 2-1 shows the existing drainage patterns.

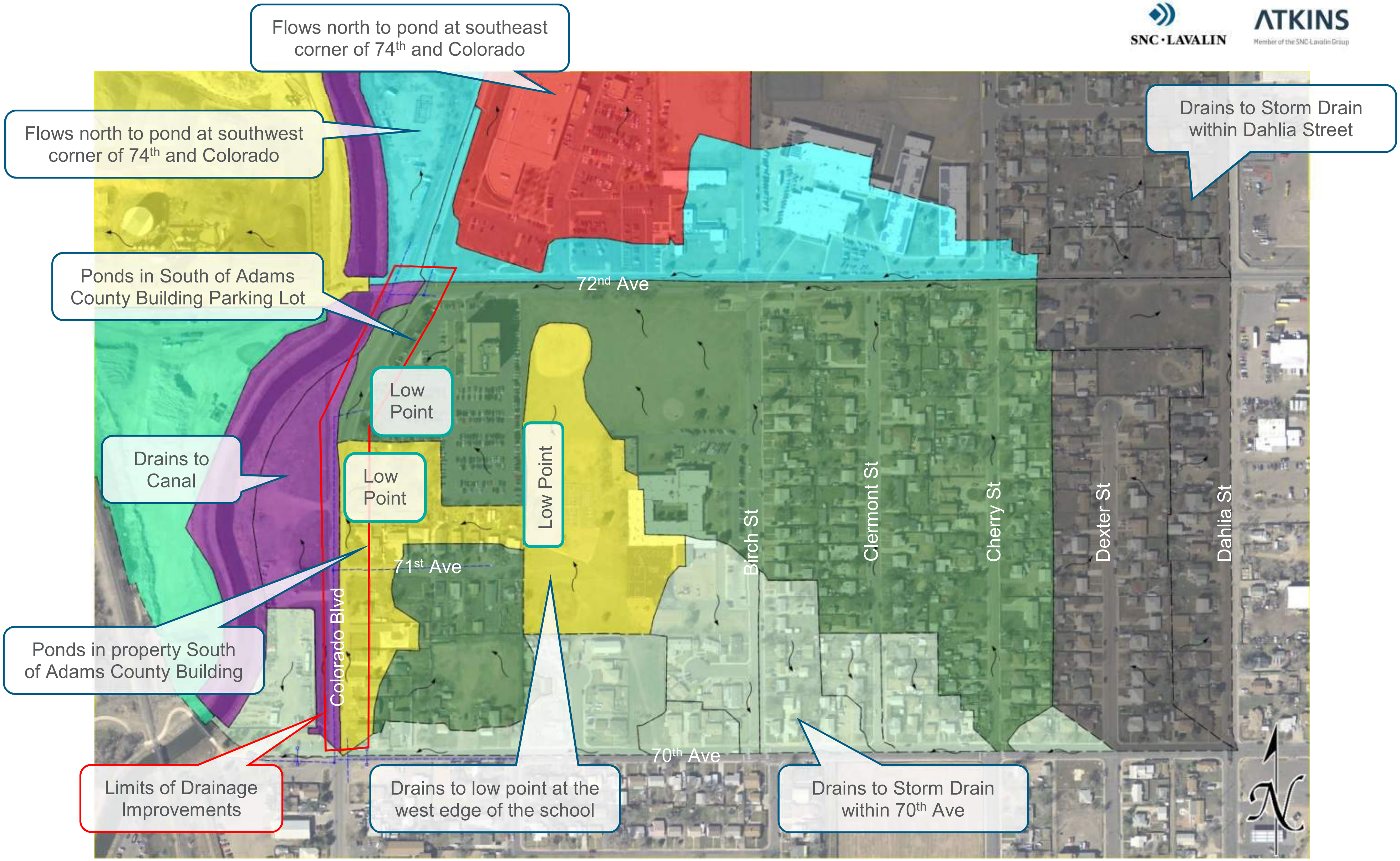


Figure 3-1 - Existing Drainage Patterns

5.2.5.3. Tailwater Analysis

Once the City confirmed that the existing storm drain system in 70th Avenue would be the outfall for the project, an appropriate tailwater elevation for the existing system needed to be determined.

Initially, the entire downstream system was modeled to the outfall at the South Platte River. This analysis showed that the existing 72-inch storm drain between the outfall and the RTD corridor would require the HGL to be well above the existing ground. Figure 5-3 shows the profile for this model.

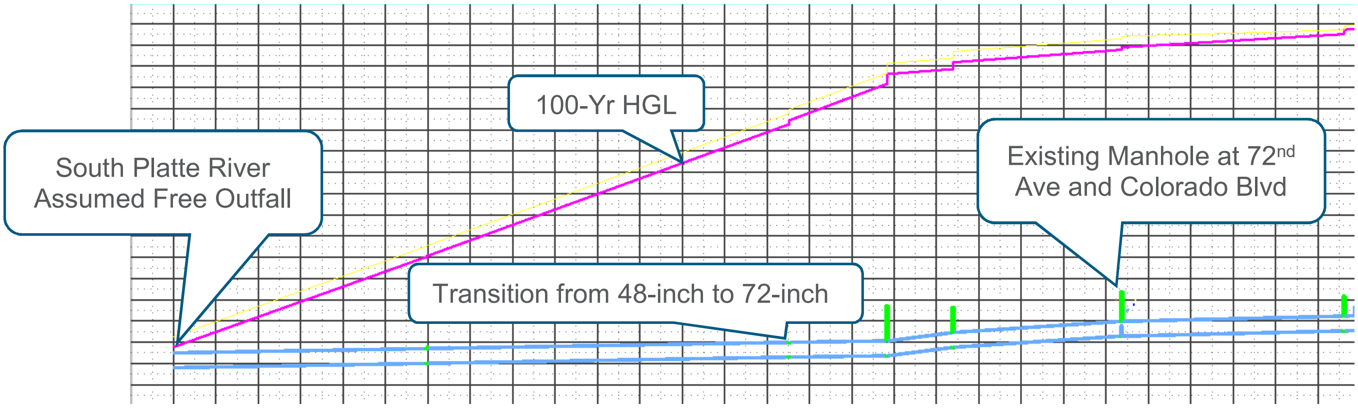


Figure 5-3 - 100-Year HGL, Assuming Free Outfall at South Platte River

Based on the results of this analysis, it was assumed that the system that the system would surcharge the manhole at the transition between the 48-inch pipe and 72-inch pipe. The tailwater for this assumption was set to the rim of the manhole, 5109.74 feet. Figure 5-4 shows the assumed HGL in the existing downstream pipe system.

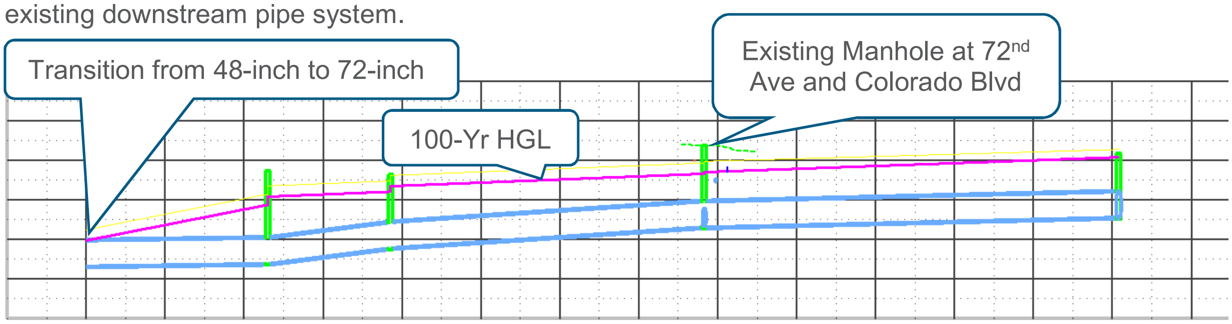


Figure 5-4 – 100-Year HGL, Assuming Relief at Manhole

5.2.5.4. Water Quality

The original plan was to treat the Water Quality Capture Volume (WQCV) for Colorado Boulevard in a surface sand filter located southwest of the 72nd Avenue and Colorado Blvd intersection. However, trying to drain the low point of the road to the basin was severely limiting the allowable storage volume of the sand filter. In addition, conveying runoff to the sand filter would require parallel storm drain alignments. As an alternative, Atkins' proposed using a hydrodynamic separator. This change was approved by the City in June 2018.

5.2.6. Analysis Scenarios

Three different analysis were considered: 5-Year proposed, 100-Year proposed, 100-Year future. The 5-Year and 100-Year scenarios include the project improvements only, and do not consider future improvements to the 70th Avenue storm drain and the option for additional improvements along 72nd Avenue.

The 100-Year future scenario includes recommendations from the *Fairfax Park Outfall Improvements Hydrologic Analysis* to upsizing the existing storm in 70th Avenue and make modifications to the Fairfax Park detention basin.

The scenario also includes recommendations from Atkins to construct an additional storm drain system along 72nd and a new detention pond at Alsup Elementary School. These improvements along 72nd Avenue will provide attenuation that is crucial for the proposed 48-inch storm drain Colorado Boulevard to meet design criteria. The existing drainage basin contributing flow to Colorado from 72nd is approximately 27 acres, generating roughly 85 cfs in the 100-year storm. Intercepting this entire flow at the intersection of 72nd Avenue and Colorado Boulevard is impractical. Intercepting this flow would require a large bank of inlets and a much larger trunk line within Colorado Boulevard.

5.2.6.1. 5-Year Proposed

The 5-Year Proposed analysis was conducted to analyze the minor storm event upon completion of the project. The *Fairfax Park Outfall Improvements Hydrologic Analysis* includes 100-yearr flow rates for the existing, the interim, and final condition for the storm drain within 70th Avenue. The system is currently in the “interim” condition. The 100-year peak flow directly upstream of the project tie in has been estimated at 126.7 cfs. The 5-year flow rate was determined by scaling the 100-year flow by the ratio of rainfall intensities. This assumes that the runoff coefficients are the same in the 5-year and 100-year. While the 5-year runoff coefficient would be smaller than the 100-year, resulting in less runoff, this is a conservative assumption. The 5-year flow rate injected upstream of the project was 70 cfs. Figure 5-3 summarizes the proposed 5-year analysis. Table 5-1 summarizes the flow rates, depth of flow, and spread at each proposed inlet.

Table 5-1 – 5-Year Proposed Analysis Inlet Summary

Inlet ID	Flow Rate (cfs)	By-Passed (cfs)	Depth of Flow* (in)	Spread (ft)
A-CO-IN-1	1.2	0.0	4.5	18.7
A-CO-IN-2	35.4	29.1	7.6	25.4
B-CO-IN-1	4.7	2.0	4.7	13.5
B-CO-IN-2	3.1	0.9	4.3	11.5
C-CO-IN-1	5.6	2.7	5.3	15.7
C-CO-IN-2	3.4	1.1	4.6	12.7
D-CO-IN-1	6.1	1.7	3.7	32.0
D-CO-IN-2	29.6	15.9	8.7	16.9

*Governing Criteria is that the max depth in the gutter cannot exceed 6-inches

5.2.6.2. 100-Year Proposed

The 100-Year proposed analysis was conducted to analyze the major storm event upon completion of the project. The 126.7 cfs determined by the *Fairfax Park Outfall Improvements Hydrologic Analysis* was injected directly upstream of the project location. The results of this analysis show that in the 100-year event, the system will surcharge on to the street. Flows along Colorado will flow north and inundate the Adams County Parking Lot. This matches the existing condition. Figure 5-4 summarizes the proposed 100-year analysis. Table 5-2 summarizes the flow rates, depth of flow, and spread at each proposed inlet.

Table 5-2 – 100-Year Proposed Analysis Inlet Summary

Inlet ID	Flow Rate (cfs)	By-Passed (cfs)	Depth of Flow* (in)	Spread (ft)
A-CO-IN-1	20.7	0.0	7.0	29.0
A-CO-IN-2	85.5	76.6	10.1	35.6
B-CO-IN-1	13.8	9.5	6.5	18.0
B-CO-IN-2	9.1	5.5	5.9	18.0
C-CO-IN-1	13.5	9.2	6.9	18.0
C-CO-IN-2	7.9	4.5	5.8	18.0
D-CO-IN-1	17.5	10.6	4.9	32.0
D-CO-IN-2	77.6	56.3	12.1	24.4

*Governing Criteria is that the max depth in the gutter cannot exceed 12-inches

5.2.6.3. 100-Year Future

The 100-Year future model incorporates conceptual recommendations from both the *Fairfax Park Outfall Improvements Hydrologic Analysis* and Atkins. The City has plans to redevelop the area around the new RTD station. As such, it is expected that the drainage system within the area will be improved in the coming years.

The 100-year future model was analyzed to document that the Project improvements, while not meeting all the design criteria due to limitations with the existing adjacent systems, will meet the design criteria once future improvements are made.

The future conditions analysis assumes that:

- The existing 72-inch pipe between the west side of the RTD corridor and the South Platte River will be upsized. Initial calculations indicate that it will need to be a 7-foot x 6-foot box culvert.
- The 48-inch pipe in 72nd Avenue will be upsized to 72-inch pipe, per the recommendation in the *Fairfax Park Outfall Improvement Hydrologic Analysis.*
- The 100-year flow rate in the future 72-inch pipe will be 317.83 cfs, per the *Fairfax Park Outfall Improvement Hydrologic Analysis.*
- A new storm drain system will be constructed along 72nd Avenue, to the east of the project. This system includes:
    - Trunk line along 72nd, between Colorado Boulevard and Cherry Street.
    - Full spectrum detention pond at Alsup Elementary School. The basin would be in the north-east corner of the school. It would provide water quality, and 100-year detention. The peak 100-year flow rate from the pond would be 21 cfs. The conceptual design calls for a smaller, deeper portion of the pond to detain smaller, more frequent events. The 100-year event would be contained in higher portion of the basin. This section of the basin would be roughly the size of a soccer field, and depressed 3 feet from the surrounding area.

To accommodate the future work, the project will upsize, extend, and vertically realign the existing storm drain line in Colorado Boulevard. This work will provide a connection for the future improvements to the outfall pipe in 70th Avenue.

Results from the 100-year future analysis shows major improvements to the new 48-inch pipe under Colorado Blvd (Line A), as well as reduction in peak flows being by-passed into the Adams County Parking Lot. This will result in a reduction of flooding within the parking lot. Figure 5-5 summarizes the future 100-year analysis. Table 5-3 summarizes the flow rates, depth of flow, and spread at each proposed inlet, while table 5-4 summarizes compliance with the design criteria.

Table 5-3 – 100-Year Future Analysis Inlet Summary

Inlet ID	Flow Rate (cfs)	By-Passed (cfs)	Depth of Flow (in)	Spread (ft)
A-CO-IN-1	20.7	0.0	7.0	29.0
A-CO-IN-2	1.1	0.0	2.8	5.4
B-CO-IN-1	13.8	9.5	6.5	18.0
B-CO-IN-2	9.1	5.5	5.9	18.0
C-CO-IN-1	13.5	9.2	6.9	18.0
C-CO-IN-2	7.9	4.5	5.8	18.0
D-CO-IN-1	17.5	10.6	4.9	32.0
D-CO-IN-2	1.0	0.0	2.9	4.0

Table 5-4 – Design Criteria Compliance Summary

Criteria	5-Year Proposed	100-Year Proposed	100-Year Future
Spread	Fail	n/a	n/a
Depth	Fail	Fail	Pass
HGL	n/a	Fail	Pass
Pipe Capacity	Pass	n/a	n/a

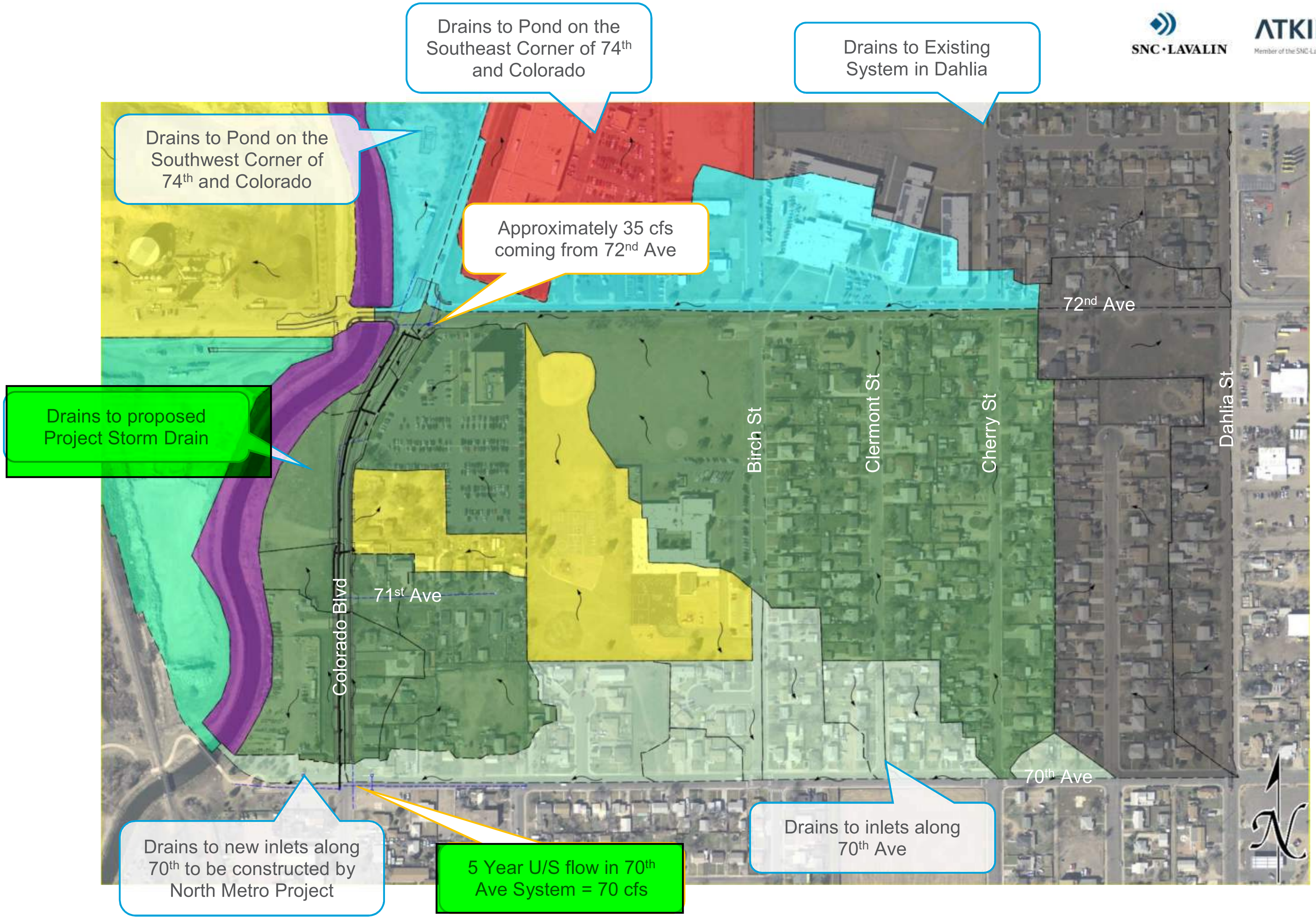


Figure 5-5 – 5-Year Proposed Layout

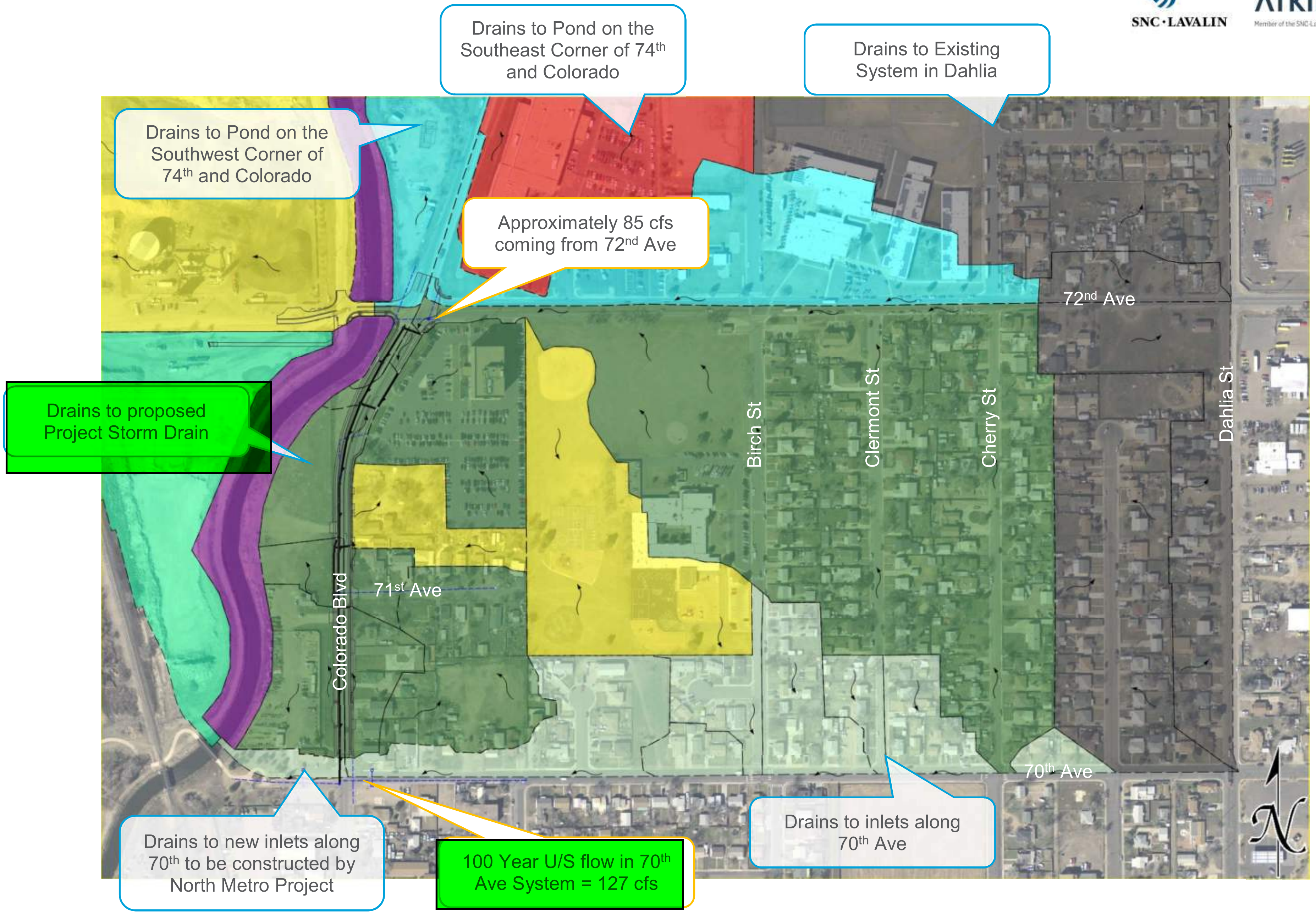


Figure 5-6 - 100 -Year Proposed Layout

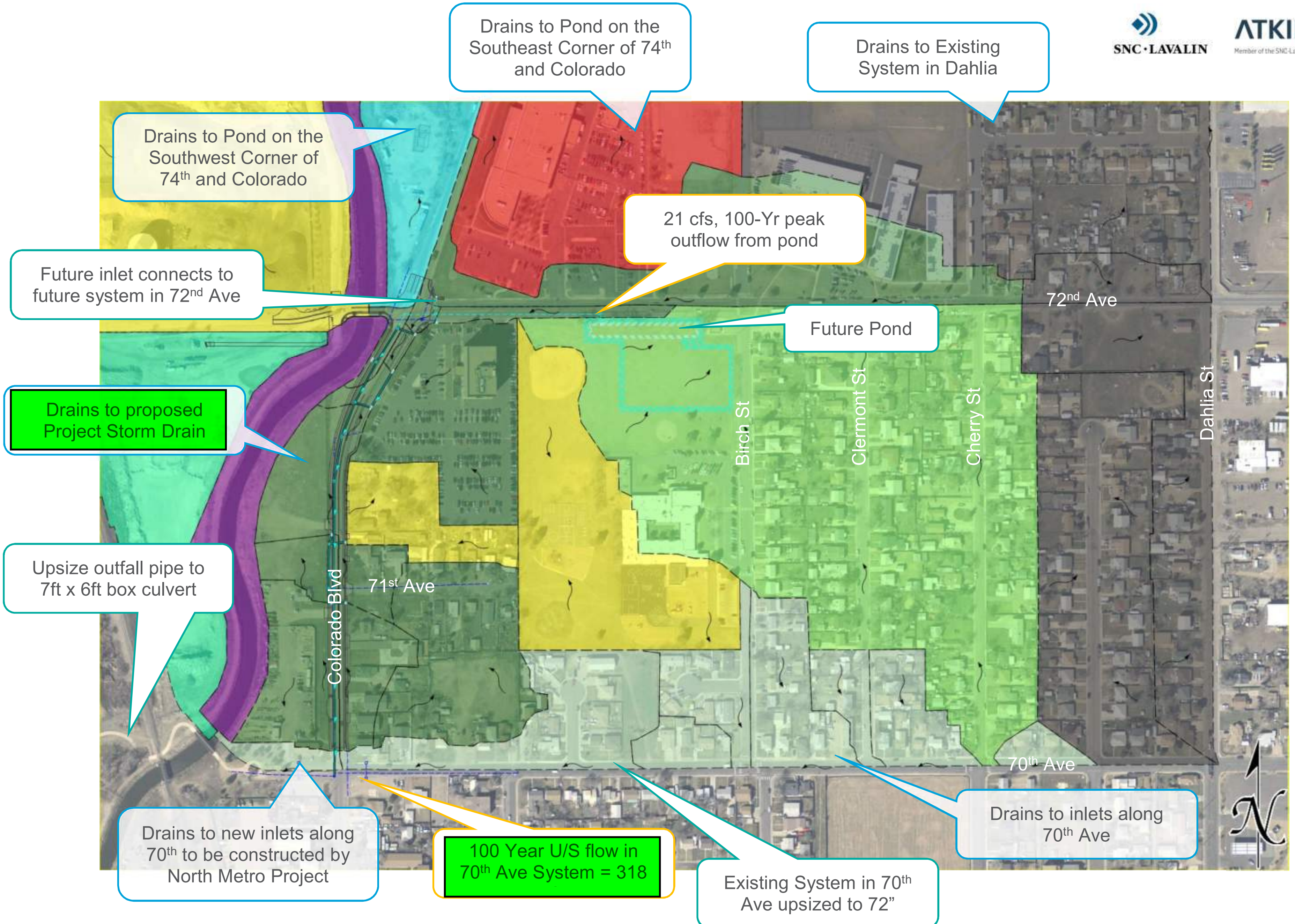


Figure 5-7 – 100-Year Future Layout

Appendices

A. Hydrologic Computations
    1. Existing Drainage Area Map
    2. Proposed Drainage Area Map
    3. Future Drainage Area Map
    4. Minor and Major Storm Runoff Calculations
    5. Excerpts from the City of Commerce City *Storm Drainage Design and Technical Criteria Manual*

B. Hydraulic Computations
    1. InRoads Results
    2. UD-Inlet Results

C. Reference Material
    1. Flood Insurance Rate Map
    2. NRCS Web Soils Survey
    3. Fairfax Park Outfall Hydrologic Analysis

Appendix A. Hydrologic Computations

A.1. Existing Drainage Area Map

The existing drainage area maps show the existing drainage patterns for the Project Area. The patterns assume that the RTD North Metro Station is fully constructed and is an existing drainage feature.


74th Avenue
Colorado Boulevard
72nd Avenue
RTD North Metro Station
(Under Construction)
Burlington Ditch
71st Avenue
Birtch Street
Clermont Street
Cheery Street
Dexter Street
Dahlia Street
70th Avenue
72nd and Colorado Roadway Improvements
Existing Drainage Area Maps
City of Commerce City
SNC·LAVALIN
ATKINS
Member of the SNC-Lavalin Group
Legend
Area is tributary to Colorado Blvd system
Area is tributary to 72nd Ave system
Area is tributary to a local low point
Area is tributary to RTD North Metro Station
Area is tributary to pond @ southwest 74th and Colorado pond
Area is tributary to pond @ southeast 74th and Colorado pond
Area is tributary to Dahlia St system
Area is tributary to O'Brien Canal/Burlington Ditch
N
0'
75'
150'
300'

A.2. Proposed Drainage Area Map

The proposed drainage area maps show the drainage patterns and tributary area once the Project has been constructed. They do not account for any future work.

72nd and Colorado Roadway Improvements

Proposed Drainage Area Maps

City of Commerce City

SNC·LAVALIN ATKINS Member of the SNC-Lavalin Group

Legend

- Area is tributary to Colorado Blvd system
- Area is tributary to 72nd Ave system
- Area is tributary to a local low point
- Area is tributary to RTD North Metro Station
- Area is tributary to pond @ southwest 74th and Colorado pond
- Area is tributary to pond @ southeast 74th and Colorado pond
- Area is tributary to Dahlia St system
- Area is tributary to O'Brien Canal/Burlington Ditch

\# Design Point

AREA ID / AREA (ac) / 100YR C

N

0' 75' 150' 300'

DESIGN POINT	STRUCTURE ID	Tc_5 (MIN)	Tc_{100} (MIN)	Q_5 (cfs)	Q_{100} (cfs)
0	EX-70-MH-1	--	--	70.00	317.83
1	EX-70-MH-2	29.11	28.66	101.49	374.44
2	A-CO-MH-1	27.87	27.59	32.62	58.32
3	B-CO-HS-1	5.56	5.51	10.27	14.81
4	B-CO-MH-1	5.21	5.19	4.81	7.28
5	A-CO-MH-3	26.79	26.68	26.13	51.59
6	A-CO-MH-4	26.50	26.41	18.89	28.15
7	A-CO-MH-5	26.02	25.98	6.53	8.98
8	A-CO-MH-6	25.59	25.58	5.98	7.90

AREA ID	DISCHARGE TO	AREA (ac)	Tc (MIN)	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
A-A-CO-IN-1	A-CO-IN-1	0.30	5.00	0.86	0.92	1.23	2.45
A-A-CO-IN-2	A-CO-IN-2	27.50	25.51	0.53	0.67	35.40	85.47
A-B-CO-IN-1	B-CO-IN-1	0.78	5.00	0.52	0.66	1.96	4.60
A-B-CO-IN-2	B-CO-IN-2	0.76	5.00	0.55	0.68	2.01	4.63
A-C-CO-IN-1	C-CO-IN-1	2.32	5.00	0.50	0.64	5.63	13.43
A-C-CO-IN-2	C-CO-IN-2	1.35	5.00	0.52	0.66	3.38	7.96
A-D-CO-IN-1	D-CO-IN-1	1.93	5.00	0.57	0.69	5.28	12.03
A-D-CO-IN-2	D-CO-IN-2	0.12	5.00	0.88	0.93	0.51	1.00
A-EX-71-IN-1	EX-71-IN-1	4.38	5.00	0.47	0.62	9.90	24.27
A-EX-CO-IN-1	EX-CO-IN-1	4.61	5.00	0.85	0.91	18.81	37.62
A-CO-LOT	--	2.11	5.00	0.45	0.60	4.56	11.40

A.3. Future Drainage Area Map

The future drainage area maps show the drainage patterns and tributary area used in the future conditions analysis. They are based upon the recommendations in the *Fairfax Park Outfall Improvements Hydrologic Analysis* as well as recommendations from Atkins.

72nd and Colorado Roadway Improvements

Future Drainage Area Maps

City of Commerce City

SNC·LAVALIN ATKINS Member of the SNC-Lavalin Group

Legend

- Area is tributary to Colorado Blvd system
- Area is tributary to 72nd Ave system
- Area is tributary to a local low point
- Area is tributary to RTD North Metro Station
- Area is tributary to pond @ southwest 74th and Colorado pond
- Area is tributary to pond @ southeast 74th and Colorado pond
- Area is tributary to Dahlia St system
- Area is tributary to O'Brien Canal/Burlington Ditch

\# Design Point

AREA ID / AREA (ac) / 100YR C

N

0' 75' 150' 300'

DESIGN POINT	STRUCTURE ID	Tc_{100} (MIN)	Q_{100} (cfs)
0	EX-70-MH-1	--	317.83
1	EX-70-MH-2	28.66	424.09
2	A-CO-MH-1	27.59	110.79
3	B-CO-HS-1	5.51	14.81
4	B-CO-MH-1	5.19	7.28
5	A-CO-MH-3	26.68	95.99
6	A-CO-MH-4	26.41	86.42
7	A-CO-MH-5	25.98	78.24
8	A-CO-MH-6	25.58	76.87
9	FUT-MH-2	7.53	76.27
10	FUT-POND	--	21.00

AREA ID	DISCHARGE TO	AREA (ac)	Tc (MIN)	C_{100}	Q_{100} (cfs)
A-A-CO-IN-1	A-CO-IN-1	0.30	5.00	0.92	2.45
A-A-CO-IN-2	A-CO-IN-2	0.14	5.00	0.93	1.15
A-B-CO-IN-1	B-CO-IN-1	0.78	5.00	0.66	4.60
A-B-CO-IN-2	B-CO-IN-2	0.76	5.00	0.68	4.63
A-C-CO-IN-1	C-CO-IN-1	2.32	5.00	0.64	13.43
A-C-CO-IN-2	C-CO-IN-2	1.35	5.00	0.66	7.96
A-D-CO-IN-1	D-CO-IN-1	1.93	5.00	0.69	12.03
A-D-CO-IN-2	D-CO-IN-2	0.12	5.00	0.93	1.00
A-EX-71-IN-1	EX-71-IN-1	4.38	5.00	0.62	24.27
A-EX-CO-IN-1	EX-CO-IN-1	4.61	5.00	0.91	37.62
A-CO-LOT	--	2.11	5.00	0.60	11.40
A-EX-72-IN-1	EX-72-IN-1	0.56	5.00	0.93	4.72
A-FUT-IN-4	FUT-IN-4	8.15	5.00	0.80	52.04
A-FUT-POND	FUT-POND	27.37	--	0.67	--

A.4. Minor and Major Storm Runoff Calculations

Equations used:

$$Q = CiA$$

Where:
Q = Peak Flow Rate (cfs)
i = Rainfall Intensity (in/hr)
A = Runoff Area (ac)

$$t_i = \frac{1.8(1.1 - C_5)\sqrt{L}}{3\sqrt{S}}$$

Where:
t_i = Initial Overland Flow Travel Time (min)
C_5 = 5-Year runoff coefficient
L = Length of Overland Flow Path (ft)
S = Slope of Overland Flow Path (ft/ft)

$$T_{c\,max} = \frac{L}{180} + 10$$

Where:
$T_{c\,max}$ = Maximum Time of Concentration
L = Length of Basin Flow Path (ft)

City of Commerce City C Values

C3 Storm Drainage Design and Technical Criteria Manual Table 501

Land Use	% Impervious	2-Yr	5-Yr	100-YR	Land Use full
Res.	45%	0.40	0.45	0.60	Single Family
Paved	100%	0.87	0.88	0.93	Paved Streets
Walks	96%	0.87	0.87	0.89	Drives and Walks
Schools	50%	0.45	0.50	0.70	Schools

Rainfall Data

City of Commerce City Storm Drainage Design and Criteria Manual Table 402

Tc	2-Yr	5-Yr	10-Yr	50-Yr	100-Yr
5	3.36	4.80	5.40	7.80	9.00
10	2.58	3.72	4.20	6.06	6.96
15	2.16	3.12	3.52	5.12	5.88
30	1.50	2.16	2.44	3.54	4.08
60	0.95	1.37	1.55	2.24	2.58

Legend

Input Value
Calculated Value / Looked up Input
Copied Value from another sheet

Travel Time Velocity Tables

C3 Storm Draiange Design Criteria Manual Figure 501

Slope	Paved	Gutter	Bare Ground	Short Grass
0.0%	0.00	0.00	0.00	0.00
0.5%	1.55	1.55	0.70	0.50
1.0%	1.95	1.95	1.05	0.70
2.0%	2.80	2.80	1.40	1.00
3.0%	3.50	3.50	1.75	1.30
5.0%	4.50	4.50	2.20	1,7
10.0%	6.40	6.40	3.10	2.20
20.0%	8.00	8.00	4.40	3.20
30.0%	11.50	11.50	5.50	3.90
50.0%	15.00	15.00	7.00	5.00

72nd and Colorado
5-YR RUNOFF COEFFICENTS

By: JPL Date: 07-21-2018
Checked By: TYE Date: 07-21-2018

Condition Proposed **Return Period** 5-Yr

Area ID	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area (ac)	% Impervious	C Value	Total Area (ac)	Weighted C	Weighted % Impervious	Paved Area (ac)
A-A-CO-IN-1	Paved	0.2841	100%	0.8800	Res.	0.0132	45%	0.4500													0.2973	0.8610	97.6%	0.2841
A-A-CO-IN-2	Paved	4.0933	100%	0.8800	Res.	16.9064	45%	0.4500	Schools	6.5044	50%	0.5000									27.5040	0.5258	54.4%	4.0933
A-B-CO-IN-1	Paved	0.1321	100%	0.8800	Res.	0.6472	45%	0.4500													0.7793	0.5229	54.3%	0.1321
A-B-CO-IN-2	Paved	0.1749	100%	0.8800	Res.	0.5872	45%	0.4500													0.7621	0.5487	57.6%	0.1749
A-C-CO-IN-1	Paved	0.2949	100%	0.8800	Res.	2.0293	45%	0.4500													2.3242	0.5046	52.0%	0.2949
A-C-CO-IN-2	Paved	0.2301	100%	0.8800	Res.	1.1169	45%	0.4500													1.3471	0.5235	54.4%	0.2301
A-D-CO-IN-1	Paved	0.5327	100%	0.8800	Res.	1.4012	45%	0.4500													1.9339	0.5684	60.1%	0.5327
A-D-CO-IN-2	Paved	0.1196	100%	0.8800																	0.1196	0.8800	100.0%	0.1196
A-EX-71-IN-1	Paved	0.2149	100%	0.8800	Res.	4.1617	45%	0.4500													4.3766	0.4711	47.7%	0.2149
A-EX-CO-IN-1	Paved	4.2909	100%	0.8800	Res.	0.3157	45%	0.4500													4.6066	0.8505	96.2%	4.2909
A-CO-LOT	Res.	2.1111	45%	0.4500																	2.1111	0.4500	45.0%	0.0000
A-A-CO-IN-2 (Fut)	Paved	0.1373	100%	0.8800																	0.1373	0.8800	100.0%	0.1373

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72nd and Colorado

100-YR RUNOFF COEFFICENTS

By: JPL Date: 07-21-2018
Checked By: TYE Date: 07-21-2018

Condition Proposed **Return Period** 100-YR

Area ID	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area(ac)	% Impervious	C Value	Land Use	Area(ac)	% Impervious	C Value	Land Use	Area(ac)	% Impervious	C Value	Land Use	Area(ac)	% Impervious	C Value	Total Area (ac)	Weighted C	Weighted % Impervious	Paved Area (ac)
A-A-CO-IN-1	Paved	0.2841	100%	0.93	Res.	0.0132	45%	0.60													0.2973	0.9154	0.9756	0.2841
A-A-CO-IN-2	Paved	4.0933	100%	0.93	Res.	16.9064	45%	0.60	Schools	6.5044	50%	0.70									27.5040	0.6728	0.5437	4.0933
A-B-CO-IN-1	Paved	0.1321	100%	0.93	Res.	0.6472	45%	0.60													0.7793	0.6559	0.5432	0.1321
A-B-CO-IN-2	Paved	0.1749	100%	0.93	Res.	0.5872	45%	0.60													0.7621	0.6757	0.5762	0.1749
A-C-CO-IN-1	Paved	0.2949	100%	0.93	Res.	2.0293	45%	0.60													2.3242	0.6419	0.5198	0.2949
A-C-CO-IN-2	Paved	0.2301	100%	0.93	Res.	1.1169	45%	0.60													1.3471	0.6564	0.5440	0.2301
A-D-CO-IN-1	Paved	0.5327	100%	0.93	Res.	1.4012	45%	0.60													1.9339	0.6909	0.6015	0.5327
A-D-CO-IN-2	Paved	0.1196	100%	0.93																	0.1196	0.9300	1.0000	0.1196
A-EX-71-IN-1	Paved	0.2149	100%	0.93	Res.	4.1617	45%	0.60													4.3766	0.6162	0.4770	0.2149
A-EX-CO-IN-1	Paved	4.2909	100%	0.93	Res.	0.3157	45%	0.60													4.6066	0.9074	0.9623	4.2909
A-CO-LOT	Res.	2.1111	45%	0.60																	2.1111	0.6000	0.4500	0.0000
A-A-CO-IN-2 (Fut)	Paved	0.1373	100%	0.93																	0.1373	0.9300	1.0000	0.1373

72nd and Colorado
RATIONAL METHOD PEAK FLOW RATES

By: JPL Date: 07-21-2018
Checked By: TYE Date: 07-21-2018

Area ID	Discharge To	Total Area	Propsed C Values		Propsed Tc	Rainfall Intensity		Peak Flow Rate	
			5-Yr	100-Yr		5-Yr	100-Yr	5-Yr	100-Yr
		(ac)			(min)	(in/hr)	(in/hr)	(cfs)	(cfs)
A-A-CO-IN-1	A-CO-IN-1	0.30	0.86	0.92	5.00	4.80	9.00	1.23	2.45
A-A-CO-IN-2	A-CO-IN-2	27.50	0.53	0.67	25.51	2.45	4.62	35.40	85.47
A-B-CO-IN-1	B-CO-IN-1	0.78	0.52	0.66	5.00	4.80	9.00	1.96	4.60
A-B-CO-IN-2	B-CO-IN-2	0.76	0.55	0.68	5.00	4.80	9.00	2.01	4.63
A-C-CO-IN-1	C-CO-IN-1	2.32	0.50	0.64	5.00	4.80	9.00	5.63	13.43
A-C-CO-IN-2	C-CO-IN-3	1.35	0.52	0.66	5.00	4.80	9.00	3.38	7.96
A-D-CO-IN-1	D-CO-IN-1	1.93	0.57	0.69	5.00	4.80	9.00	5.28	12.03
A-D-CO-IN-2	D-CO-IN-2	0.12	0.88	0.93	5.00	4.80	9.00	0.51	1.00
A-EX-71-IN-1	EX-71-IN-1	4.38	0.47	0.62	5.00	4.80	9.00	9.90	24.27
A-EX-CO-IN-1	EX-CO-IN-1	4.61	0.85	0.91	5.00	4.80	9.00	18.81	37.62
A-CO-LOT	--	2.11	0.45	0.60	5.00	4.80	9.00	4.56	11.40
A-A-CO-IN-2 (Fut)	A-CO-IN-2 (Fut)	0.1373	0.88	0.93	5.00	4.80	9.00	0.58	1.15

Note: Flows for A-FUT-IN-4, A-FUT-Pond, A-EX-72-IN-1 were calculated in InRoads. The C and TC values were estimated using engineering judgment to accommodate future development. These values are only used to conceptually design the future system.

Appendix B. Hydraulic Computations

B.1. InRoads Results

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72nd Avenue & Colorado Blvd

InRoads Report

5-Yr Manholes

ID	HGL	Inv. In		Inv. Out		Rim El.	Total Flow	Time to Structure
	(ft)		(ft)		(ft)	(ft)	(cfs)	(min)
A-CO-MH-1	5120.76	(N)	5116.29	(S)	5116.09	5131.49	32.62	27.87
		(E)	5119.68					
		(W)	5122.11					
A-CO-MH-2	5120.91	(N)	5118.00	(S)	5117.80	5130.36	26.03	27.11
A-CO-MH-3	5119.99	(N)	5118.81	(S)	5118.61	5129.42	26.13	26.79
		(E)	5123.25					
A-CO-MH-4	5120.38	(NE)	5119.51	(S)	5119.31	5128.55	18.89	26.50
		(E)	5121.63					
A-CO-MH-5	5120.81	(NE)	5120.33	(SW)	5120.13	5127.59	6.53	26.02
		(NW)	5123.56					
A-CO-MH-6	5123.12	(NE)	5121.07	(SW)	5120.87	5128.48	5.98	25.59
		(E)	5121.87					
B-CO-HS-1	5123.92	(N)	5122.35	(E)	5122.15	5131.96	10.27	5.56
		(S)	5122.35					
B-CO-MH-1	5125.01	(N)	5124.30	(S)	5123.78	5131.41	4.81	5.21
		(E)	5123.98					
C-CO-BEND-1	5124.55	(SE)	5122.70	(N)	5122.50	5132.10	5.63	5.21
EX-70-MH-1	5117.80	(NE)	5115.80	(W)	5115.80	5131.73	70.00	0.00
EX-70-MH-2	5117.69	(N)	5113.44	(W)	5113.33	5133.87	101.49	29.11
		(E)	5113.33					
EX-70-MH-3	5112.48	(E)	5108.12	(NW)	5107.98	5126.46	101.05	29.60
EX-70-MH-4	5110.49	(SE)	5104.14	(W)	5104.11	5127.31	100.92	29.75
EX-CO-MH-1	0.00	(N)	5118.23	(S)	5117.97	5132.17	0.00	0.00
EX-CO-MH-3	0.00		0.00	(S)	5122.81	5129.69	0.00	0.00
FUT-MH-1	5126.54	(N)	5125.86	(SW)	5121.26	5128.93	0.10	0.00

72nd Avenue & Colorado Blvd

InRoads Report

5-Yr Pipes

ID	Shape	Width	Height	Material	Inv. In	Inv. Out	Pipe length	Slope	Depth of Flow	HGL In	HGL Out	Capacity	Total Flow	Velocity
		(in)	(in)		(ft)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft/sec)
A-CO-P-1	Circular	48	48	RCP	5116.09	5113.44	530.31	0.50	4.00	5120.75	5117.69	101.57	32.62	2.60
A-CO-P-2	Circular	48	48	RCP	5117.80	5116.29	302.53	0.50	4.00	5120.90	5120.76	101.57	25.91	2.06
A-CO-P-3	Circular	48	48	RCP	5118.61	5118.00	122.47	0.50	1.38	5119.99	5120.91	101.57	26.13	6.77
A-CO-P-4	Circular	48	48	RCP	5119.31	5118.81	99.57	0.50	1.07	5120.38	5119.99	101.57	15.98	5.89
A-CO-P-5	Circular	48	48	RCP	5120.13	5119.51	124.10	0.50	0.69	5120.81	5120.38	101.57	6.53	4.54
A-CO-P-6	Circular	48	48	RCP	5120.87	5120.33	108.40	0.50	0.66	5121.53	5120.99	101.57	5.98	4.42
A-CO-P-7	Circular	18	18	RCP	5124.82	5121.87	49.49	5.97	0.49	5125.31	5122.36	25.66	5.89	11.78
A-CO-P-8	Circular	18	18	RCP	5123.65	5123.56	9.50	1.00	0.35	5124.00	5123.90	10.50	1.23	3.98
B-CO-P-1	Circular	18	18	RCP	5122.15	5122.11	7.02	0.50	1.50	5123.74	5123.61	7.43	10.27	5.81
B-CO-P-2	Circular	18	18	RCP	5123.78	5122.35	123.06	1.16	1.50	5124.60	5123.92	11.32	4.81	2.72
B-CO-P-3	Circular	18	18	RCP	5124.41	5124.30	22.62	0.50	0.62	5125.38	5125.36	7.43	2.65	3.85
B-CO-P-4	Circular	18	18	RCP	5124.20	5123.98	43.25	0.50	0.56	5125.23	5125.01	7.43	2.21	3.67
C-CO-P-1	Circular	18	18	RCP	5122.50	5122.35	30.69	0.50	1.50	5124.42	5123.95	7.43	5.63	3.18
C-CO-P-2	Circular	18	18	RCP	5122.72	5122.70	4.57	0.50	1.50	5124.57	5124.55	7.43	5.63	3.19
C-CO-P-3	Circular	18	18	RCP	5123.10	5122.92	37.00	0.50	1.50	5124.82	5124.67	7.43	2.44	1.38
D-CO-P-1	Circular	24	24	RCP	5122.24	5121.63	43.83	1.40	1.24	5123.48	5122.87	26.77	18.89	9.23
D-CO-P-2	Circular	24	24	RCP	5123.00	5122.44	111.39	0.50	2.00	5125.83	5124.35	16.00	13.78	4.39
EX-70-P-1	Circular	72	72	RCP	5115.80	5113.33	518.92	0.48	2.00	5117.80	5117.69	292.19	70.00	8.49
EX-70-P-2	Circular	72	72	RCP	5113.33	5108.12	391.37	1.33	1.86	5117.69	5112.48	488.49	101.49	13.63
EX-70-P-3	Circular	72	72	RCP	5107.98	5104.14	149.82	2.57	6.00	5110.57	5110.49	678.78	101.05	3.57
EX-71-P-1	Circular	15	15	RCP	5125.86	5119.68	435.60	1.42	0.70	5126.56	5120.76	7.69	4.62	6.55
EX-CO-P-3	Circular	24	24	RCP	5123.95	5123.25	61.75	1.13	1.44	5125.39	5124.69	24.05	20.85	8.62
FUT-P-1	Circular	48	48	RCP	5121.26	5121.07	38.33	0.50	0.10	5123.34	5123.12	101.57	0.10	1.28
P1	Circular	72	72	RCP	5116.02	5115.80	22.38	1.00	1.65	5117.67	5117.80	423.51	70.00	11.08
P2	Circular	15	15	RCP	5125.93	5125.86	14.24	0.50	0.13	5126.63	5126.54	4.57	0.10	1.51
P3	Circular	72	72	RCP	5104.11	5103.47	226.91	0.28	6.00	5110.39	5109.74	100.83	100.92	3.57

Min Velocity = 3 ft/sec.

Pipes A-CO-P-1, A-CO-P-2 are sized to convey the 100 yr flows. Decreasing the pipe size or increasing the slope would go against the original intention of being able to convey flows from a future storm drain system in 72nd Ave.
The slope on pipes B-CO-P-3, C-CO-P-3 is controled by the downstream hydrodynamic separator, and cannot be lowered. U/S is constrained by min cover. Pipe is already as small as it can be.
Fut-P-1 and P1, P2, P3 are existing or dummy pipes used to model the tailwater.

Capacity>5 Yr Flow

Pipes B-CO-P-1 can be upsized b/c it needs to match the other pipes connecting to the hydrodyamic separator. P3 is an existing pipe.

72nd Avenue & Colorado Blvd

InRoads Report

100-Yr Manholes (Proposed)

ID	HGL	Inv. In		Inv. Out		Rim El.	Total Flow	Time to Structure
	(ft)		(ft)		(ft)	(ft)	(cfs)	(min)
A-CO-MH-1	5131.77	(N)	5116.29	(S)	5116.09	5131.49	58.32	27.59
		(E)	5119.68					
		(W)	5122.11					
A-CO-MH-2	5130.85	(N)	5118.00	(S)	5117.80	5130.36	48.60	26.95
A-CO-MH-3	5131.13	(N)	5118.81	(S)	5118.61	5129.42	51.59	26.68
		(E)	5123.25					
A-CO-MH-4	5131.36	(NE)	5119.51	(S)	5119.31	5128.55	28.15	26.41
		(E)	5121.63					
A-CO-MH-5	5131.41	(NE)	5120.33	(SW)	5120.13	5127.59	8.98	25.98
		(NW)	5123.56					
A-CO-MH-6	5131.42	(NE)	5121.07	(SW)	5120.87	5128.48	7.90	25.58
		(E)	5121.87					
B-CO-HS-1	5132.36	(N)	5122.35	(E)	5122.15	5131.96	14.81	5.51
		(S)	5122.35					
B-CO-MH-1	5133.97	(N)	5124.30	(S)	5123.78	5131.41	7.28	5.19
		(E)	5123.98					
C-CO-BEND-1	5133.82	(SE)	5122.70	(N)	5122.50	5132.10	7.76	5.19
EX-70-MH-1	5132.63	(NE)	5115.80	(W)	5115.80	5131.73	317.83	0.00
EX-70-MH-2	5126.97	(N)	5113.44	(W)	5113.33	5133.87	374.44	28.66
		(E)	5113.33					
EX-70-MH-3	5123.50	(E)	5108.12	(NW)	5107.98	5126.46	373.88	29.01
EX-70-MH-4	5120.85	(SE)	5104.14	(W)	5104.11	5127.31	373.71	29.12
EX-CO-MH-1	0.00	(N)	5118.23	(S)	5117.97	5132.17	0.00	0.00
EX-CO-MH-3	0.00		0.00	(S)	5122.81	5129.69	0.00	0.00
FUT-MH-1	5131.43	(N)	5125.86	(SW)	5121.26	5128.93	0.10	0.00

HGLs are known to surcharge the 100-yr proposed condition. Existing and proposed overland flow patterns are similar.

72nd Avenue & Colorado Blvd

InRoads Report

100-Yr Pipes (Proposed)

ID	Shape	Width	Height	Material	Inv. In	Inv. Out	Pipe length	Slope	Depth of Flow	HGL In	HGL Out	Capacity	Total Flow	Velocity
		(in)	(in)		(ft)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft/sec)
A-CO-P-1	Circular	48	48	RCP	5116.09	5113.44	530.31	0.50	4.00	5130.25	5126.97	101.57	58.32	4.64
A-CO-P-2	Circular	48	48	RCP	5117.80	5116.29	302.53	0.50	4.00	5130.77	5130.31	101.57	48.36	3.85
A-CO-P-3	Circular	48	48	RCP	5118.61	5118.00	122.47	0.50	4.00	5131.00	5130.85	101.57	48.70	3.88
A-CO-P-4	Circular	48	48	RCP	5119.31	5118.81	99.57	0.50	4.00	5131.34	5131.13	101.57	23.20	1.85
A-CO-P-5	Circular	48	48	RCP	5120.13	5119.51	124.10	0.50	4.00	5131.41	5131.36	101.57	8.98	0.71
A-CO-P-6	Circular	48	48	RCP	5120.87	5120.33	108.40	0.50	4.00	5131.42	5131.41	101.57	7.90	0.63
A-CO-P-7	Circular	18	18	RCP	5124.82	5121.87	49.49	5.97	1.50	5131.43	5131.43	25.66	7.81	4.42
A-CO-P-8	Circular	18	18	RCP	5123.65	5123.56	9.50	1.00	1.50	5131.40	5131.41	10.50	2.30	1.30
B-CO-P-1	Circular	18	18	RCP	5122.15	5122.11	7.02	0.50	1.50	5131.61	5132.11	7.43	14.81	8.38
B-CO-P-2	Circular	18	18	RCP	5123.78	5122.35	123.06	1.16	1.50	5133.81	5132.36	11.32	7.28	4.12
B-CO-P-3	Circular	18	18	RCP	5124.41	5124.30	22.62	0.50	1.50	5134.26	5134.03	7.43	3.95	2.23
B-CO-P-4	Circular	18	18	RCP	5124.20	5123.98	43.25	0.50	1.50	5134.23	5133.97	7.43	3.39	1.92
C-CO-P-1	Circular	18	18	RCP	5122.50	5122.35	30.69	0.50	1.50	5133.40	5132.41	7.43	7.75	4.38
C-CO-P-2	Circular	18	18	RCP	5122.72	5122.70	4.57	0.50	1.50	5133.86	5133.82	7.43	7.76	4.39
C-CO-P-3	Circular	18	18	RCP	5123.10	5122.92	37.00	0.50	1.50	5134.47	5134.18	7.43	3.41	1.93
D-CO-P-1	Circular	24	24	RCP	5122.24	5121.63	43.84	1.40	2.00	5124.29	5123.54	26.77	28.15	8.96
D-CO-P-2	Circular	24	24	RCP	5123.00	5122.44	111.30	0.50	2.00	5126.96	5125.40	16.00	19.76	6.29
EX-70-P-1	Circular	72	72	RCP	5115.80	5113.33	518.92	0.48	6.00	5130.77	5127.05	292.19	317.83	11.24
EX-70-P-2	Circular	72	72	RCP	5113.33	5108.12	391.37	1.33	6.00	5126.60	5123.50	488.49	374.44	13.24
EX-70-P-3	Circular	72	72	RCP	5107.98	5104.14	149.82	2.57	6.00	5122.06	5120.85	678.78	373.88	13.22
EX-71-P-1	Circular	15	15	RCP	5125.86	5119.68	435.60	1.42	1.25	5136.90	5131.77	7.69	7.10	5.78
EX-CO-P-3	Circular	36	36	RCP	5123.95	5123.25	61.75	1.13	3.00	5126.32	5125.92	70.90	51.59	7.30
FUT-P-1	Circular	48	48	RCP	5121.26	5121.07	38.33	0.50	4.00	5131.43	5131.42	101.57	0.10	0.01
P1	Circular	72	72	RCP	5116.02	5115.80	22.38	1.00	6.00	5132.78	5132.63	423.51	317.83	11.24
P2	Circular	15	15	RCP	5125.93	5125.86	14.24	0.50	1.25	5131.43	5131.43	4.57	0.10	0.08
P3	Circular	72	72	RCP	5104.11	5103.47	226.91	0.28	6.00	5118.65	5109.74	100.83	373.71	13.22

HGLs are known to surcharge the 100-yr proposed condition. Existing and proposed overland flow patterns are similar.

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72nd Avenue & Colorado Blvd

InRoads Report

100-Yr Manholes (Future)

ID	HGL	Inv. In		Inv. Out		Rim El.	Total Flow	Time to Structure
	(ft)		(ft)		(ft)	(ft)	(cfs)	(min)
A-CO-MH-1	5121.59	(N)	5116.29	(S)	5116.09	5131.49	110.79	9.23
		(E)	5119.68					
		(W)	5122.11					
A-CO-MH-2	5123.54	(N)	5118.00	(S)	5117.80	5130.36	95.06	8.67
A-CO-MH-3	5124.88	(N)	5118.81	(S)	5118.61	5129.42	95.99	8.44
		(E)	5123.25					
A-CO-MH-4	5124.97	(NE)	5119.51	(S)	5119.31	5128.55	86.42	8.24
		(E)	5121.63					
A-CO-MH-5	5125.60	(NE)	5120.33	(SW)	5120.13	5127.59	78.24	8.00
		(NW)	5123.56					
A-CO-MH-6	5126.05	(NE)	5121.07	(SW)	5120.87	5128.48	76.87	7.78
		(E)	5121.87					
B-CO-HS-1	5124.28	(N)	5122.35	(E)	5122.15	5131.96	14.81	5.51
		(S)	5122.35					
B-CO-MH-1	5125.82	(N)	5124.30	(S)	5123.78	5131.41	7.28	5.19
		(E)	5123.98					
C-CO-BEND-1	5125.60	(SE)	5122.70	(N)	5122.50	5132.10	7.76	5.19
EX-70-MH-1	5123.41	(NE)	5115.80	(W)	5115.80	5131.73	317.83	0.00
EX-70-MH-2	5118.34	(N)	5113.44	(W)	5113.33	5133.87	424.09	10.24
		(E)	5113.33					
EX-70-MH-3	5111.42	(E)	5108.12	(NW)	5107.98	5126.46	423.18	10.58
EX-70-MH-4	5111.07	(SE)	5104.14	(W)	5104.11	5127.31	422.91	10.69
FUT-MH-1	5126.67	(E)	5121.46	(SW)	5121.26	5128.93	75.78	7.70
FUT-MH-2	5126.94	(N)	5126.70	(W)	5121.88	5129.00	76.27	7.53
		(E)	5122.08					
		(S)	5125.76					

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72nd Avenue & Colorado Blvd

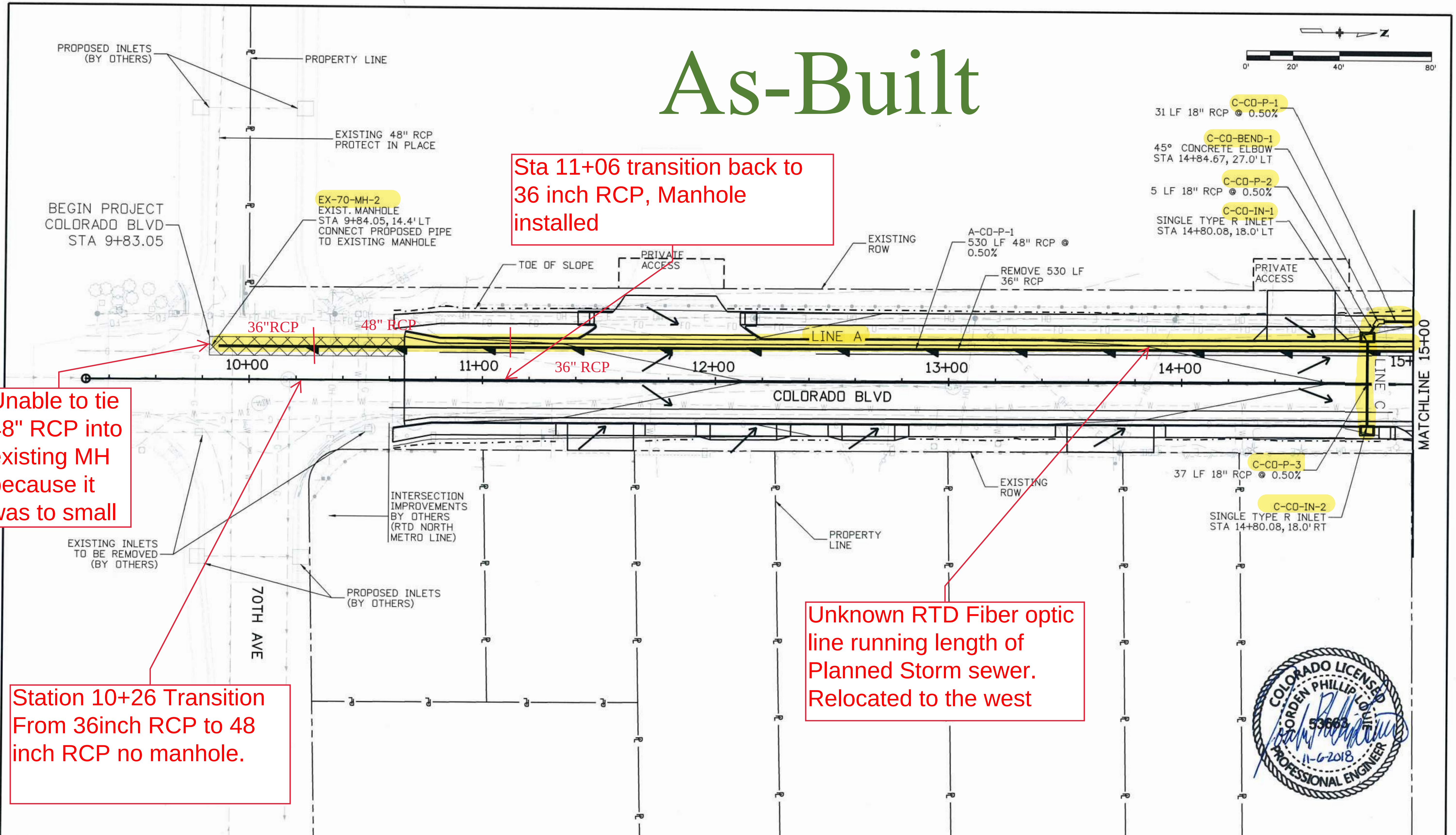
InRoads Report

100-Yr Pipes (Future)

ID	Shape	Width	Height	Material	Inv. In	Inv. Out	Pipe length	Slope	Depth of Flow	HGL In	HGL Out	Capacity	Total Flow	Velocity
		(in)	(in)		(ft)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft/sec)
A-CO-P-1	Circular	48	48	RCP	5116.09	5113.44	530.31	0.50	4.00	5121.53	5118.34	101.57	110.79	8.82
A-CO-P-2	Circular	48	48	RCP	5117.80	5116.29	302.53	0.50	4.00	5123.34	5121.67	101.57	95.06	7.56
A-CO-P-3	Circular	48	48	RCP	5118.61	5118.00	122.47	0.50	4.00	5124.10	5123.54	101.57	95.99	7.64
A-CO-P-4	Circular	48	48	RCP	5119.31	5118.81	99.57	0.50	4.00	5124.90	5124.35	101.57	86.42	6.88
A-CO-P-5	Circular	48	48	RCP	5120.13	5119.51	124.10	0.50	4.00	5125.58	5125.06	101.57	78.24	6.23
A-CO-P-6	Circular	48	48	RCP	5120.87	5120.33	108.40	0.50	4.00	5126.02	5125.67	101.57	76.87	6.12
A-CO-P-7	Circular	18	18	RCP	5124.82	5121.87	49.49	5.97	1.50	5126.63	5126.05	25.66	1.52	0.86
A-CO-P-8	Circular	18	18	RCP	5123.65	5123.56	9.50	1.00	1.50	5126.18	5125.60	10.50	2.30	1.30
B-CO-P-1	Circular	18	18	RCP	5122.15	5122.11	7.02	0.50	1.50	5123.87	5123.61	7.43	14.81	8.38
B-CO-P-2	Circular	18	18	RCP	5123.78	5122.35	123.06	1.16	1.50	5125.73	5124.28	11.32	7.28	4.12
B-CO-P-3	Circular	18	18	RCP	5124.41	5124.30	22.62	0.50	1.50	5126.08	5125.86	7.43	3.95	2.23
B-CO-P-4	Circular	18	18	RCP	5124.20	5123.98	43.25	0.50	1.50	5126.08	5125.82	7.43	3.39	1.92
C-CO-P-1	Circular	18	18	RCP	5122.50	5122.35	30.69	0.50	1.50	5125.30	5124.31	7.43	7.75	4.38
C-CO-P-2	Circular	18	18	RCP	5122.72	5122.70	4.57	0.50	1.50	5125.65	5125.60	7.43	7.76	4.39
C-CO-P-3	Circular	18	18	RCP	5123.10	5122.92	37.00	0.50	1.50	5126.17	5125.88	7.43	3.41	1.93
D-CO-P-1	Circular	24	24	RCP	5122.24	5121.63	43.84	1.40	2.00	5125.64	5124.97	26.77	10.14	3.23
D-CO-P-2	Circular	24	24	RCP	5123.00	5122.44	111.30	0.50	2.00	5125.99	5125.83	16.00	1.51	0.48
EX-70-P-1	Circular	72	72	RCP	5115.80	5113.33	518.92	0.48	6.00	5122.29	5119.33	292.19	317.83	11.24
EX-70-P-2	Circular	72	72	RCP	5113.33	5108.12	391.37	1.33	4.32	5117.65	5112.44	488.49	424.09	19.46
EX-70-P-3	Circular	72	72	RCP	5107.98	5104.14	149.82	2.57	3.43	5111.42	5111.07	678.78	423.18	25.32
EX-71-P-1	Circular	15	15	RCP	5125.86	5119.68	435.60	1.42	1.25	5127.59	5121.59	7.69	7.10	5.78
EX-CO-P-3	Circular	24	24	RCP	5123.95	5123.25	61.75	1.13	1.01	5125.58	5124.88	24.05	12.14	7.67
FUT-P-1	Circular	48	48	RCP	5121.26	5121.07	38.33	0.50	4.00	5126.24	5126.10	101.57	75.78	6.03
FUT-P-2	Circular	48	48	RCP	5121.88	5121.46	84.80	0.49	4.00	5126.92	5126.67	100.50	76.27	6.07
FUT-P-3	Circular	42	42	RCP	5123.70	5122.08	463.67	0.35	3.50	5127.71	5127.01	59.41	21.00	2.18
FUT-P-4	Circular	18	18	RCP	5125.85	5125.76	18.76	0.46	0.77	5127.36	5126.94	7.09	3.73	4.06
FUT-P-5	Circular	18	18	RCP	5126.94	5126.70	47.61	0.49	1.50	5141.00	5128.20	7.38	52.04	29.45
P1	Circular	72	72	RCP	5116.02	5115.80	22.38	1.00	6.00	5123.56	5123.41	423.51	317.83	11.24
P3	Box	84	72	RCB	5104.11	5103.47	226.91	0.28	6.00	5110.30	5109.36	351.02	422.91	10.07

Analysis for future pipes, and upsizing of the existing outfall (P1 & P3) to be completed by a future designer. Values used in the Future Conditions Model are conceptual.

As-Built



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Unit Information	Unit Leader Initials

Sheet Revisions

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No Revisions:
Revised: 11/06/2020
Void:

72ND AVE AND COLORADO BLVD GRADING AND DRAINAGE PLANS

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD	Subset Sheets: 1	of 5

Project No./Code
STA M245-011
21142
Sheet Number 57

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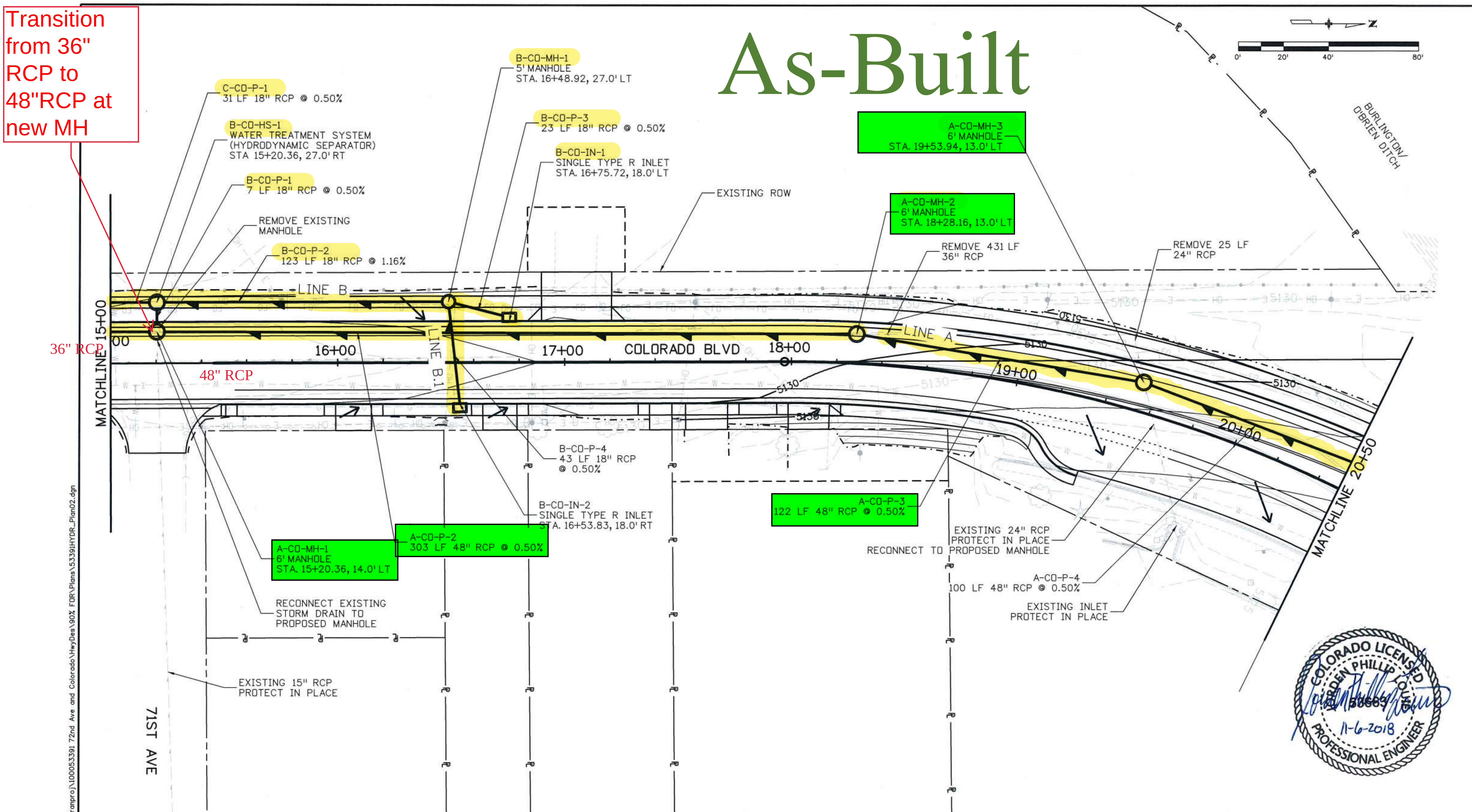
Mark Winnen, Project Manager, Commerce City - PW



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Revised: 11/06/2020
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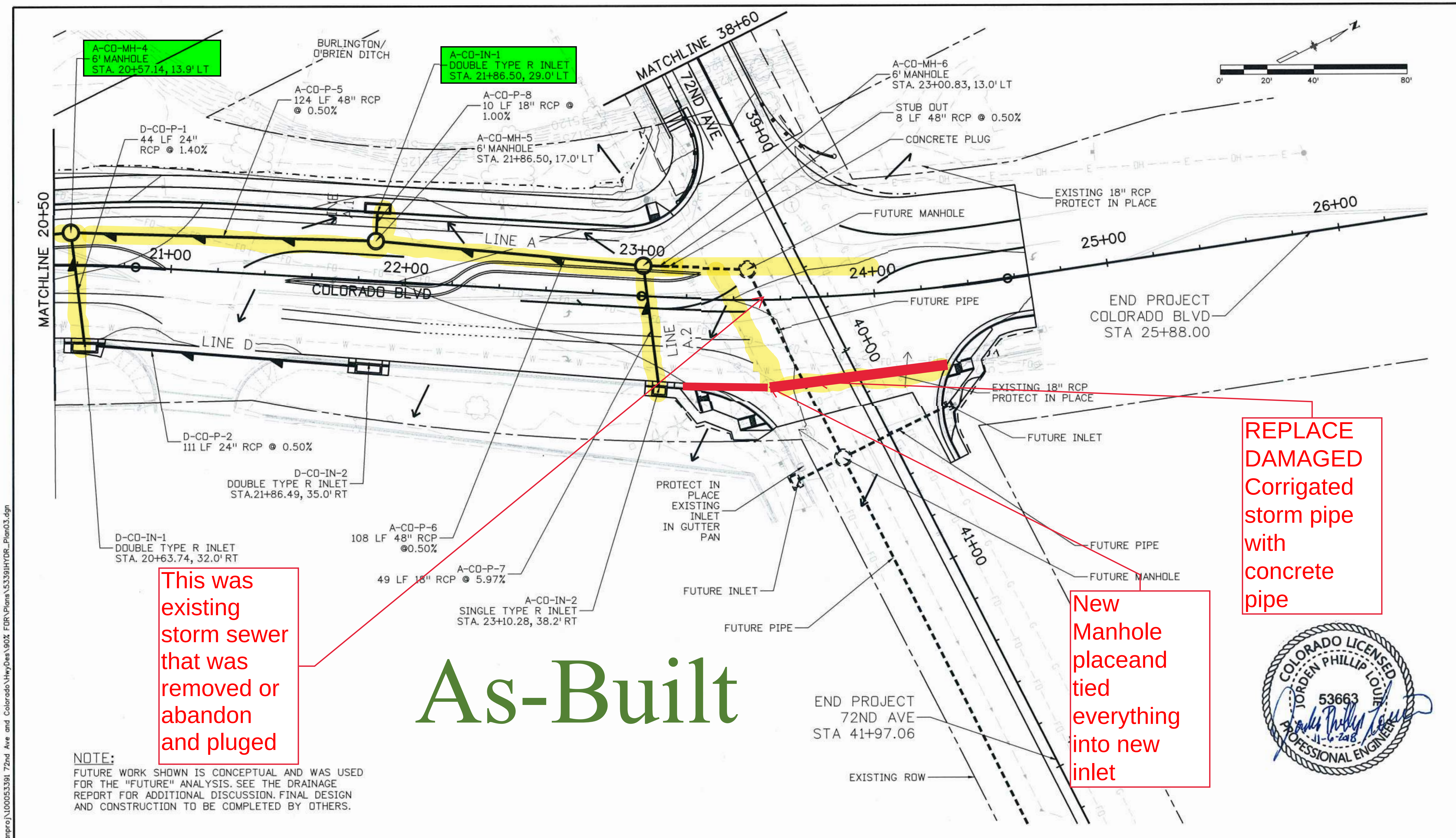
72ND AVE AND COLORADO BLVD
GRADING AND DRAINAGE PLANS

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD	Subset Sheets: 2 of 5	

Project No./Code	
STA M245-011	
21142	
Sheet Number	58

Mark Winnen, Project Manager, Commerce City - PW



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Unit Information Unit Leader Initials

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Revised: 11/06/2020
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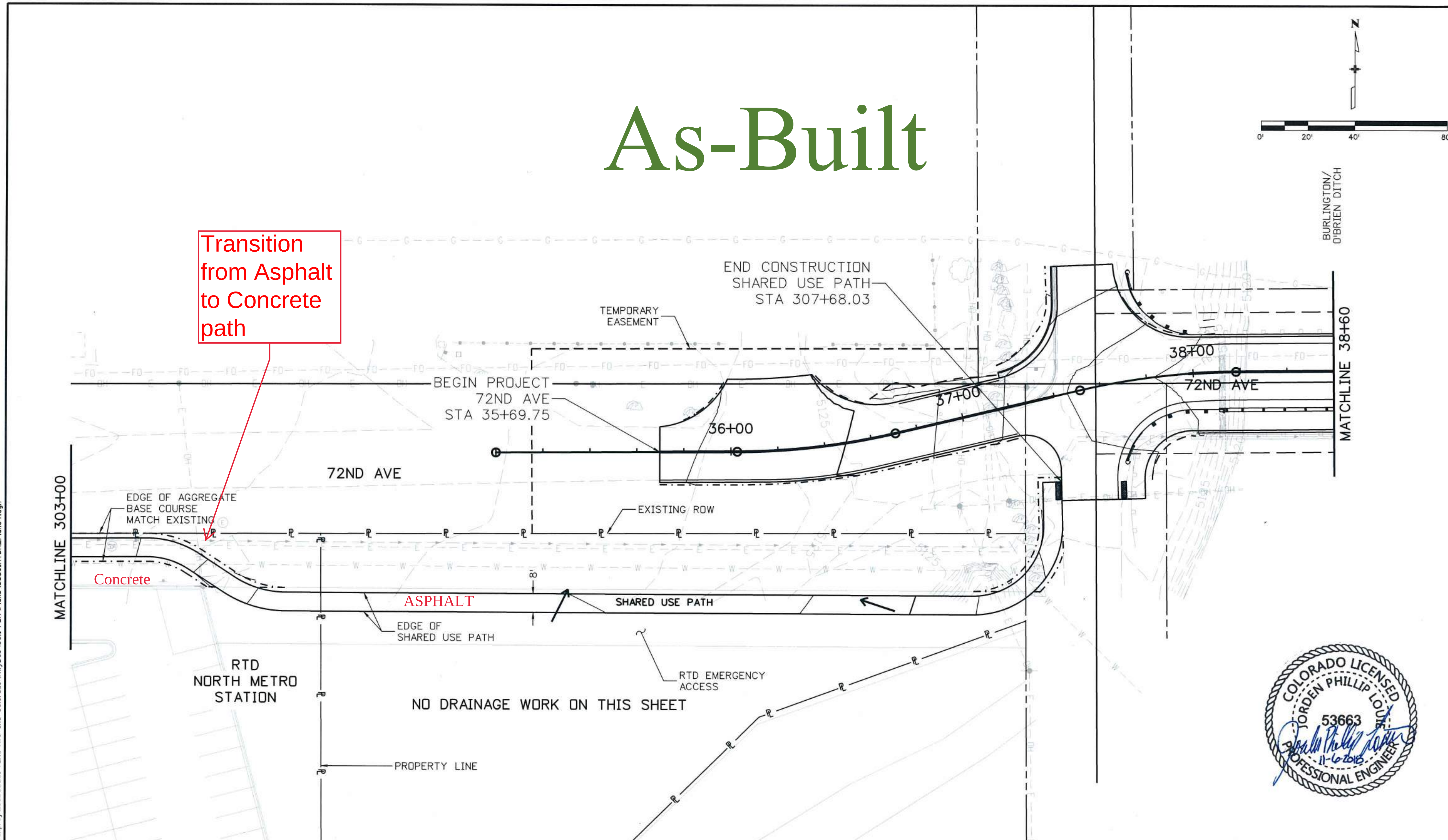
72ND AVE AND COLORADO BLVD
GRADING AND DRAINAGE PLANS

Designer: J. Louie
Detailer: S. Lynn
Sheet Subset: HYD
Structure Numbers
Subset Sheets: 3 of 5

Project No./Code
STA M245-011
21142
Sheet Number 59

Mark Winnen, Project Manager, Commerce City - PW



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72ND AVE AND COLORADO BLVD GRADING AND DRAINAGE PLANS

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
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Project No./Code
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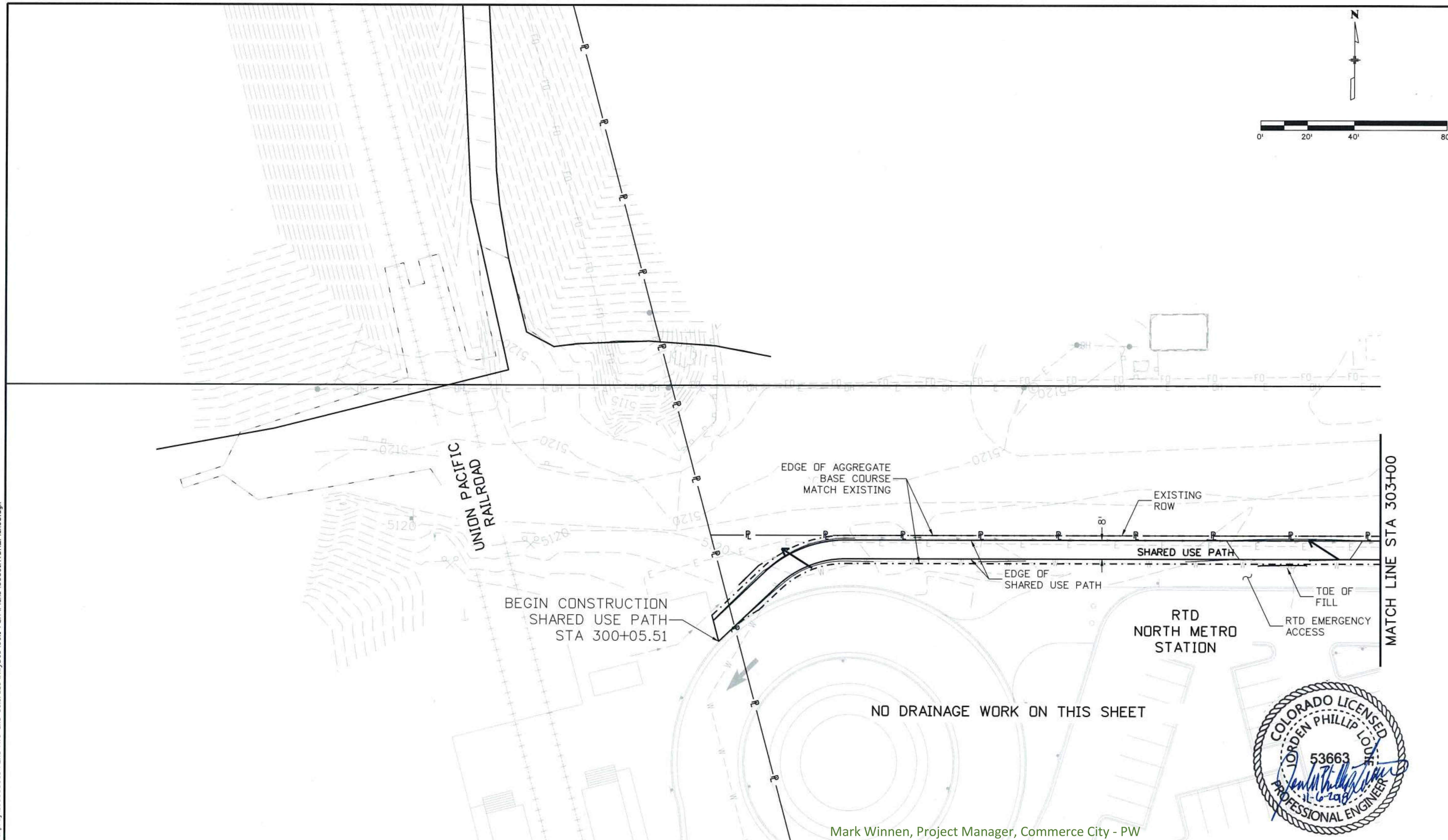
21142
Sheet Number 60

Mark Winnen, Project Manager, Commerce City - PW



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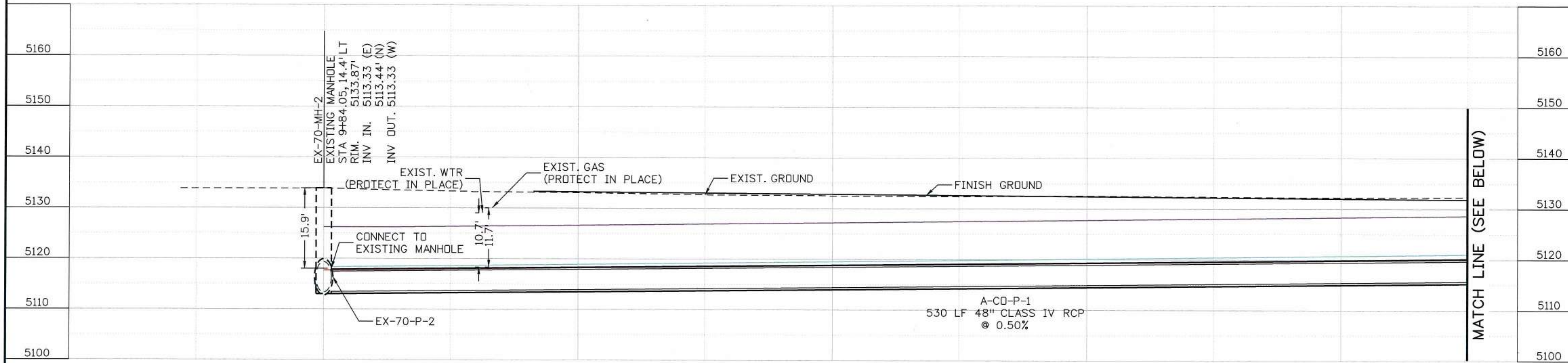
72ND AVE AND COLORADO BLVD
GRADING AND DRAINAGE PLANS

Designer: J. Louie
Detailer: S. Lynn
Sheet Subset: HYD
Structure Numbers
Subset Sheets: 5 of 5

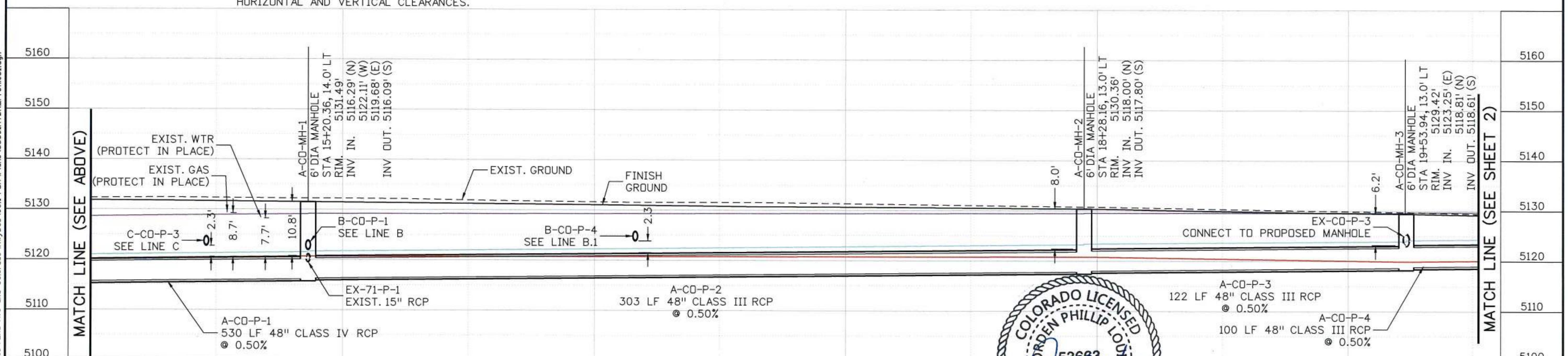
Project No./Code
STA M245-011
21142
Sheet Number 61



LEGEND & NOTES

5-YR HGL (PROP)	1. ALL STATION OFFSET VALUES ARE MEASURED TO COLORADO BLVD CENTER LINE.
100-YR HGL (PROP)	2. ALL CLEARANCES TO UTILITES AND DISPOSITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF THE SUBMITTAL. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL CLEARANCES.
100-YR HGL (FUTURE)	
EXISTING STORM DRAIN	
FUTURE STORM DRAIN	

LINE A
EX-70-MH-2 to A-CO-P-1



COLORADO LICENSED
JORDEN PHILLIP LOUIE
53663
11-6-2018
PROFESSIONAL ENGINEER

LINE A
A-CO-P-1 to A-CO-P-4

Print Date: 9/20/2018			
File Name: 53391HYDR_Profile01.dgn			
Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

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72ND AVE AND COLORADO BLVD
DRAINAGE PROFILES

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD PRO	Subset Sheets: 1 of 3	

Project No./Code
STA M245-011
21142
Sheet Number 62

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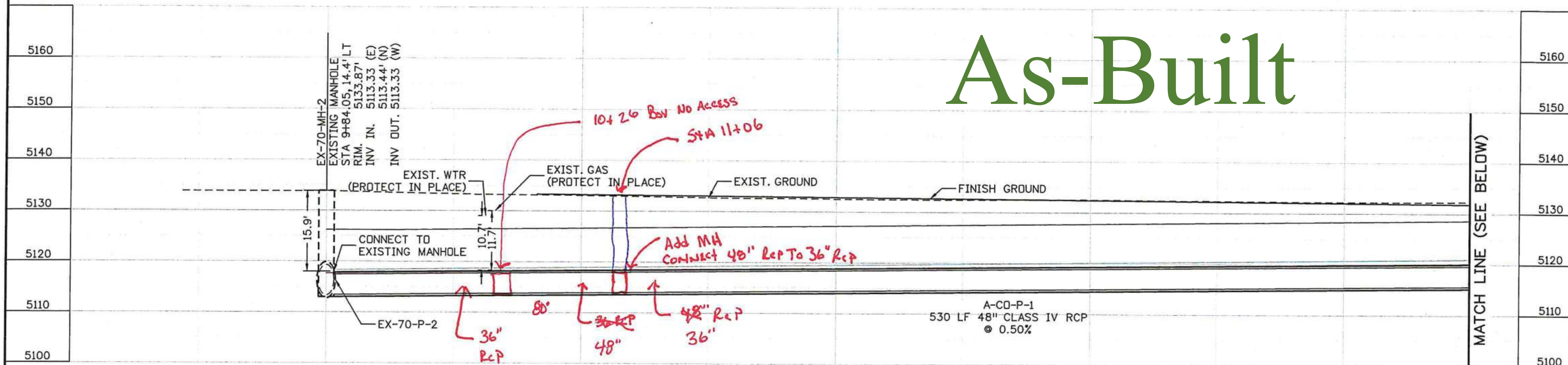
Mark Winnen, Project Manager, Commerce City - PW

As-Built

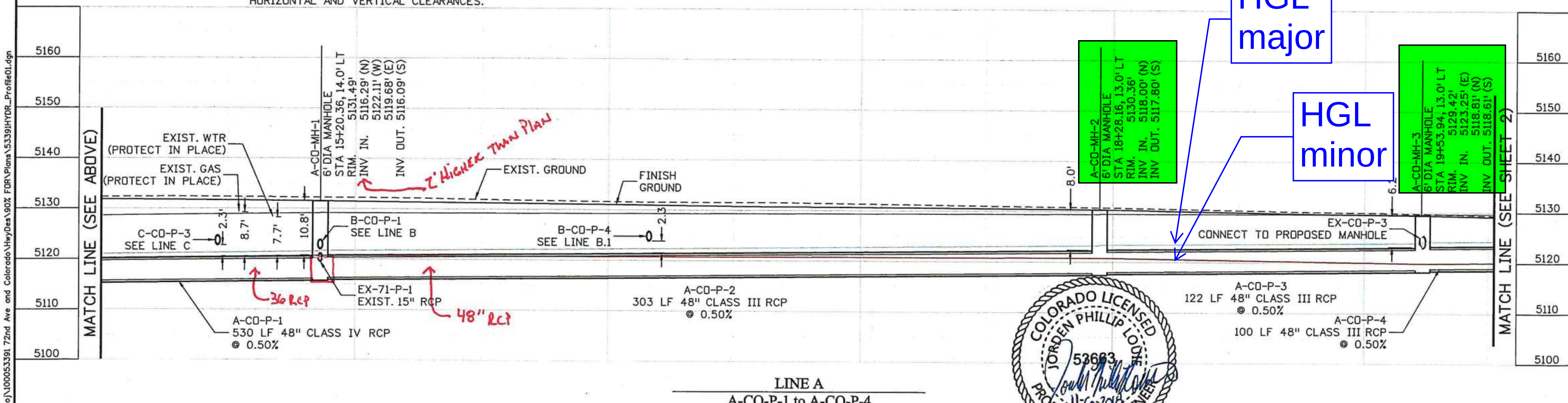


LEGEND & NOTES

- 5-YR HGL (PROP)
- 100-YR HGL (PROP)
- 100-YR HGL (FUTURE)
- EXISTING STORM DRAIN
- FUTURE STORM DRAIN

1. ALL STATION OFFSET VALUES ARE MEASURED TO COLORADO BLVD CENTER LINE.
2. ALL CLEARANCES TO UTILITES AND DISPOSITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF THE SUBMITTAL. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL CLEARANCES.

LINE A
EX-70-MH-2 to A-CO-P-1



LINE A
A-CO-P-1 to A-CO-P-4

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Unit Information	Unit Leader Initials		

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Revised: 11/06/2020
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72ND AVE AND COLORADO BLVD
DRAINAGE PROFILES

Designer: J. Louie	Structure Numbers
Detailer: S. Lynn	
Sheet Subset: HYD PRO	Subset Sheets: 1 of 3

Project No./Code
STA M245-011
21142
Sheet Number 62

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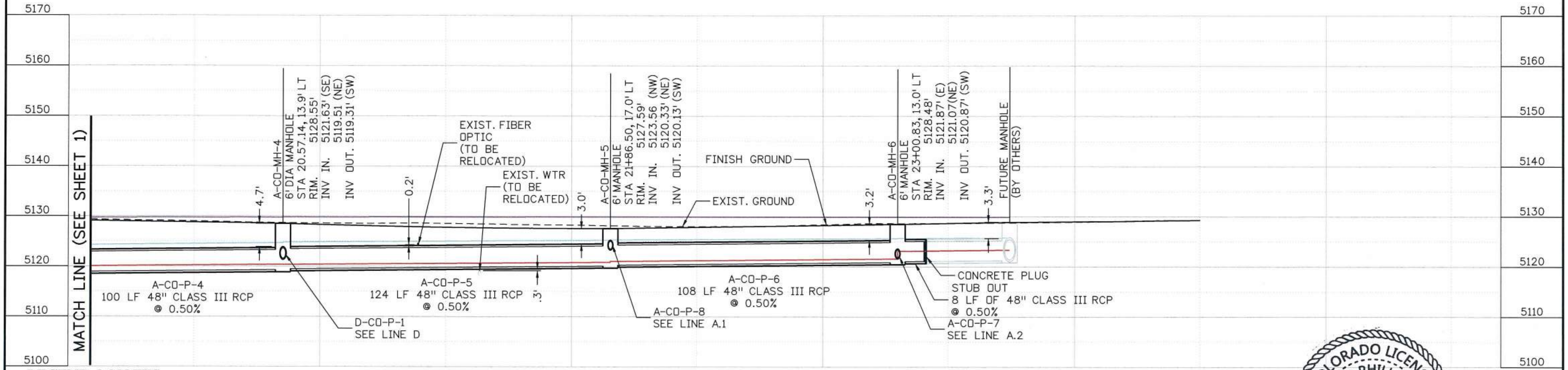
Mark Winnen, Project Manager, Commerce City - PW



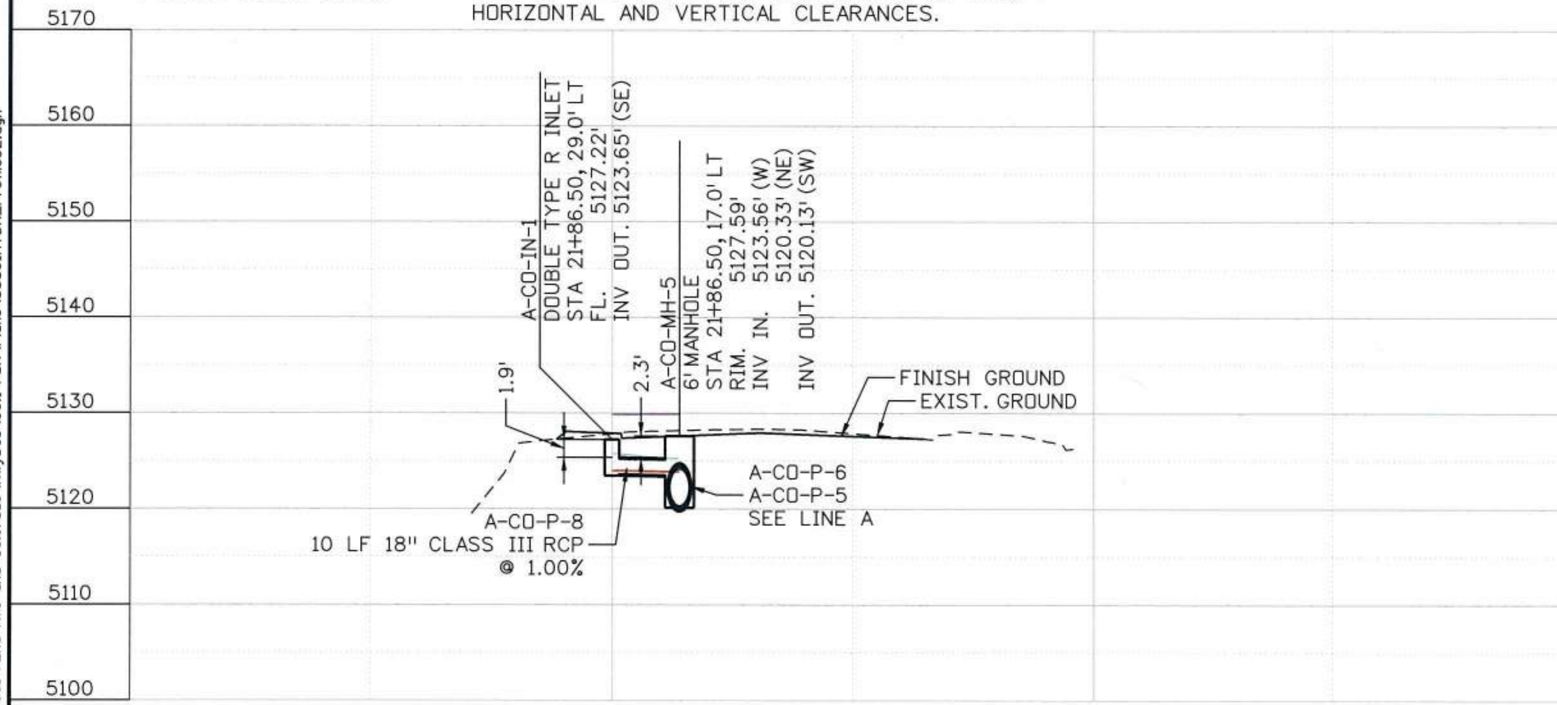
LEGEND & NOTES

- 5-YR HGL (PROP)
- 100-YR HGL (PROP)
- 100-YR HGL (FUTURE)
- EXISTING STORM DRAIN
- FUTURE STORM DRAIN

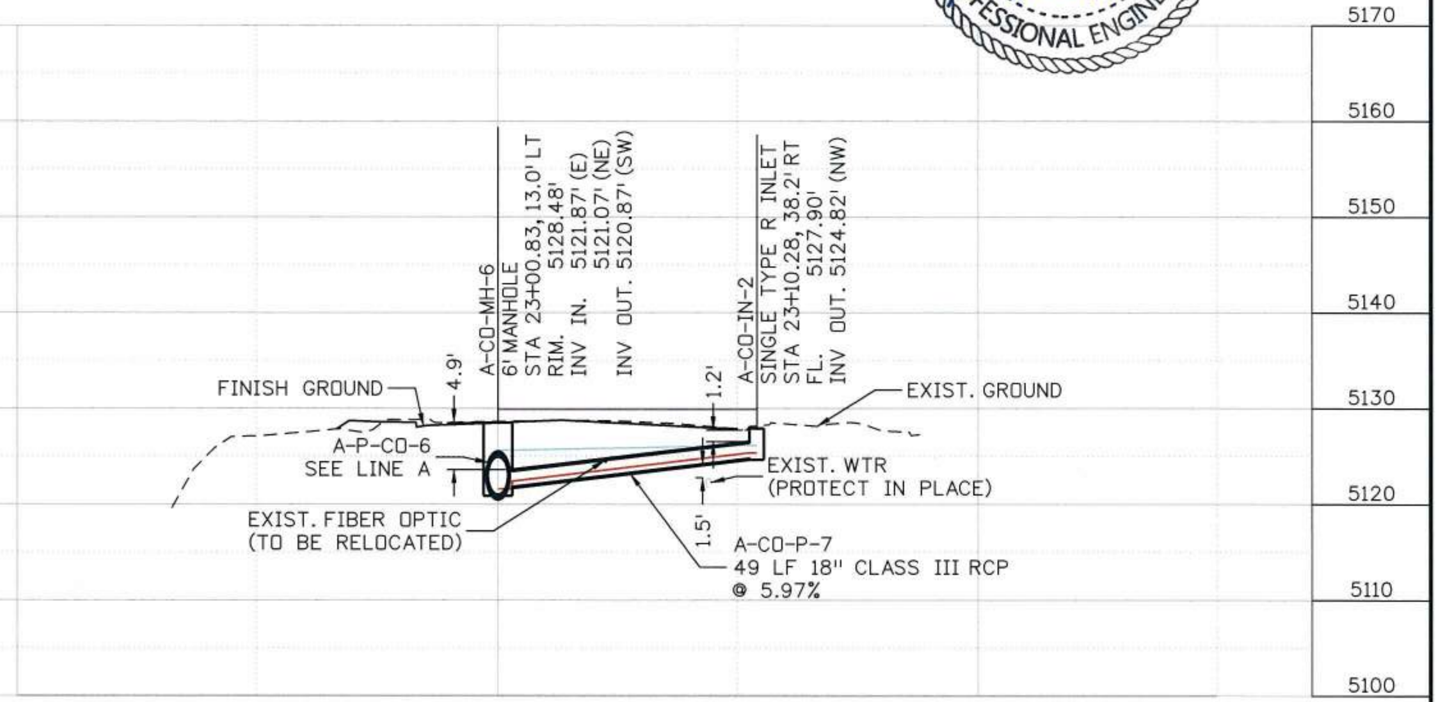
1. ALL STATION OFFSET VALUES ARE MEASURED TO COLORADO BLVD CENTER LINE.
2. ALL CLEARANCES TO UTILITES AND DISPOSITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF THE SUBMITTAL. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL CLEARANCES.

LINE A
A-CO-P-4 to A-CO-MH-6

COLORADO LICENSED PROFESSIONAL ENGINEER
JORDEN PHILLIP LOUIE
53663
11-6-2018



LINE A.1
A-CO-IN-1 to A-CO-MH-5



LINE A.2
A-CO-MH-6 TO A-CO-IN-2

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City of Commerce City
Public Works
8602 Rosemary St.
Commerce City, CO
80022
Ph: 303-289-8150

ATKINS
7604 Technology Way
Suite 400
Denver, CO 80237
Phone: 303/221-7275
Fax: 303/221-7276

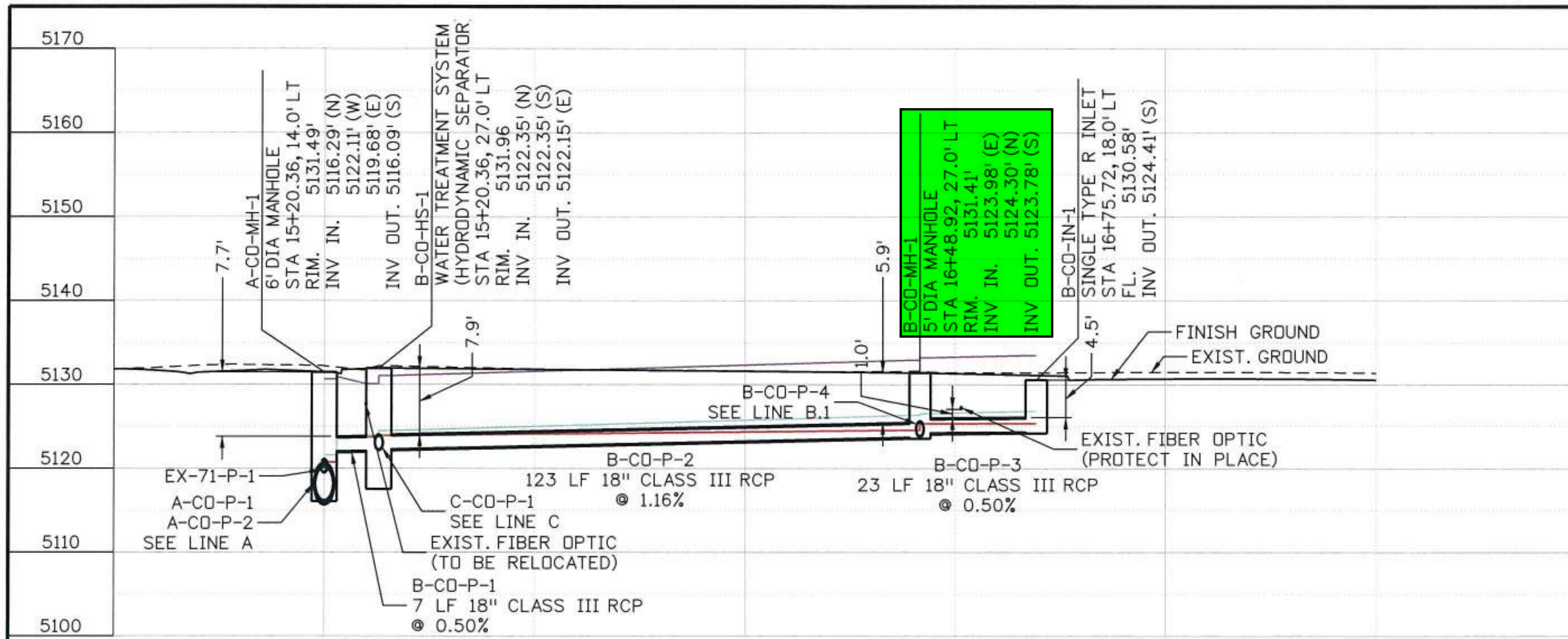
AS CONSTRUCTED
No Revisions: 11/06/2020
Revised:
Void:

72ND AVE AND COLORADO BLVD
DRAINAGE PROFILES

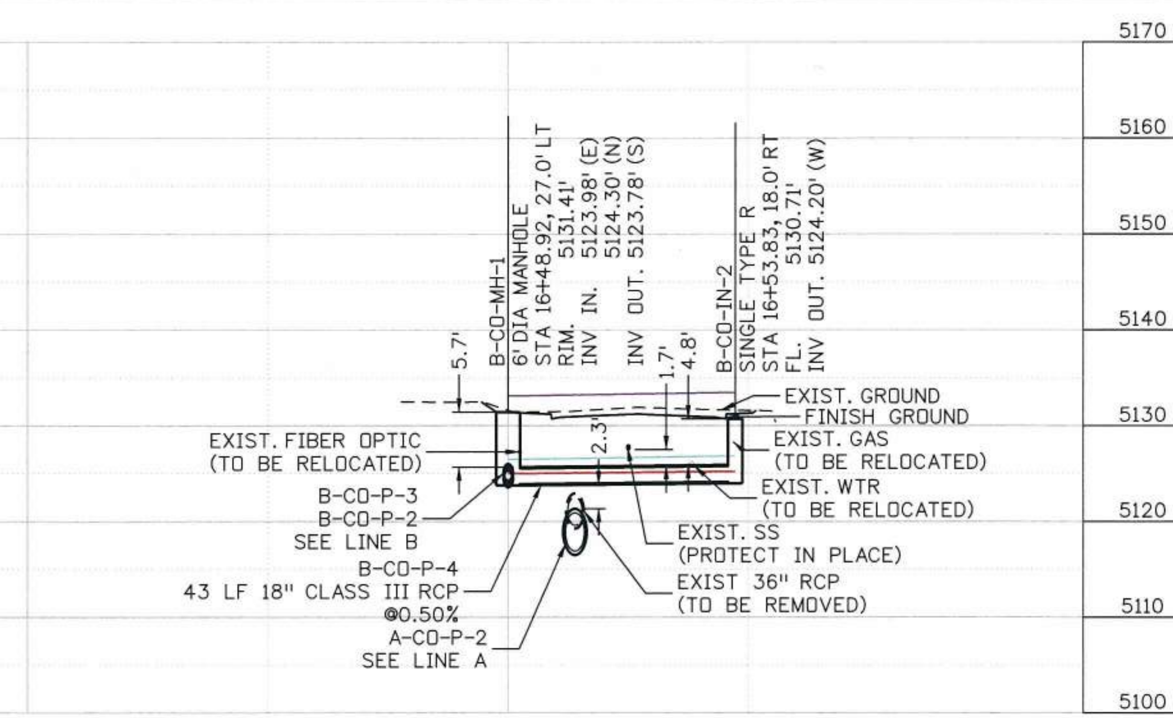
Designer: J. Louie
Detailer: S. Lynn
Sheet Subset: HYD PRO
Structure Numbers
Subset Sheets: 2 of 3

Project No./Code
STA M245-011
21142
Sheet Number 63

Mark Winnen, Project Manager, Commerce City - PW



LINE B
A-CO-MH-1 to B-CO-IN-1

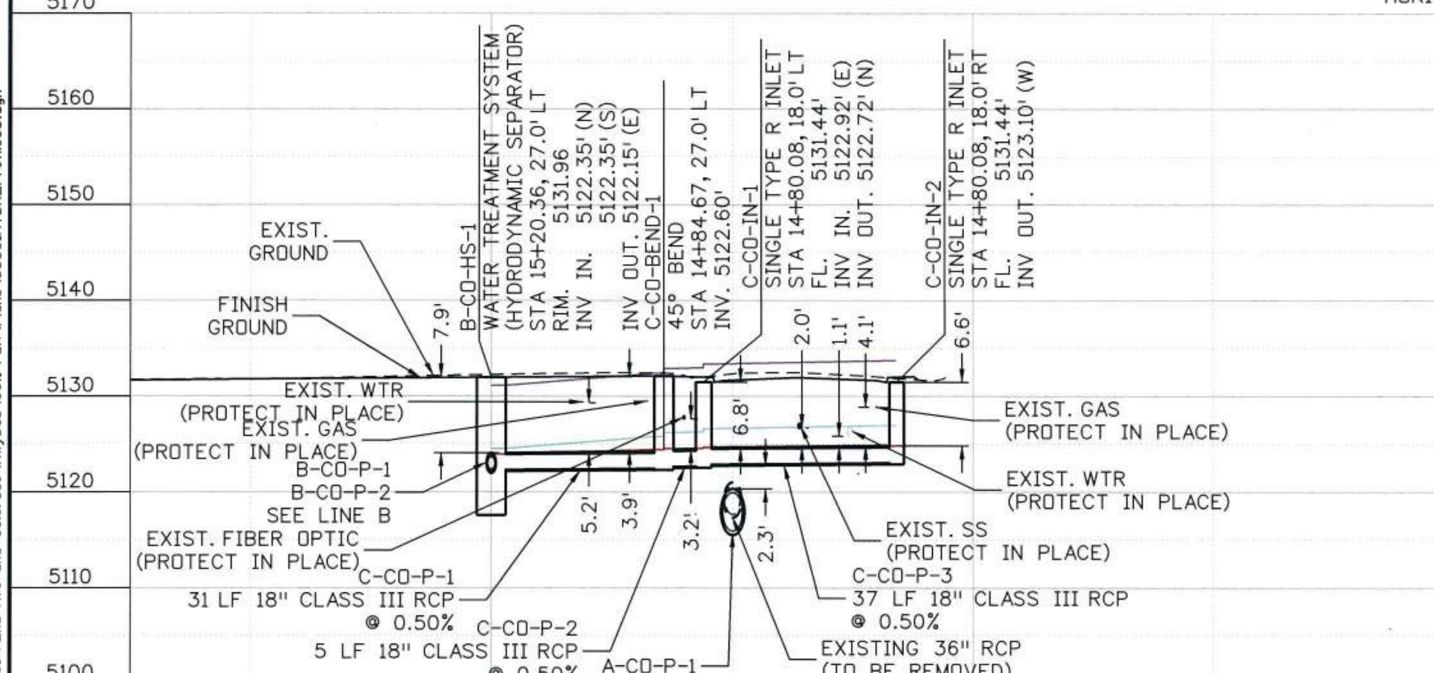


LINE B.1
B-CO-MH-1 to B-CO-IN-2

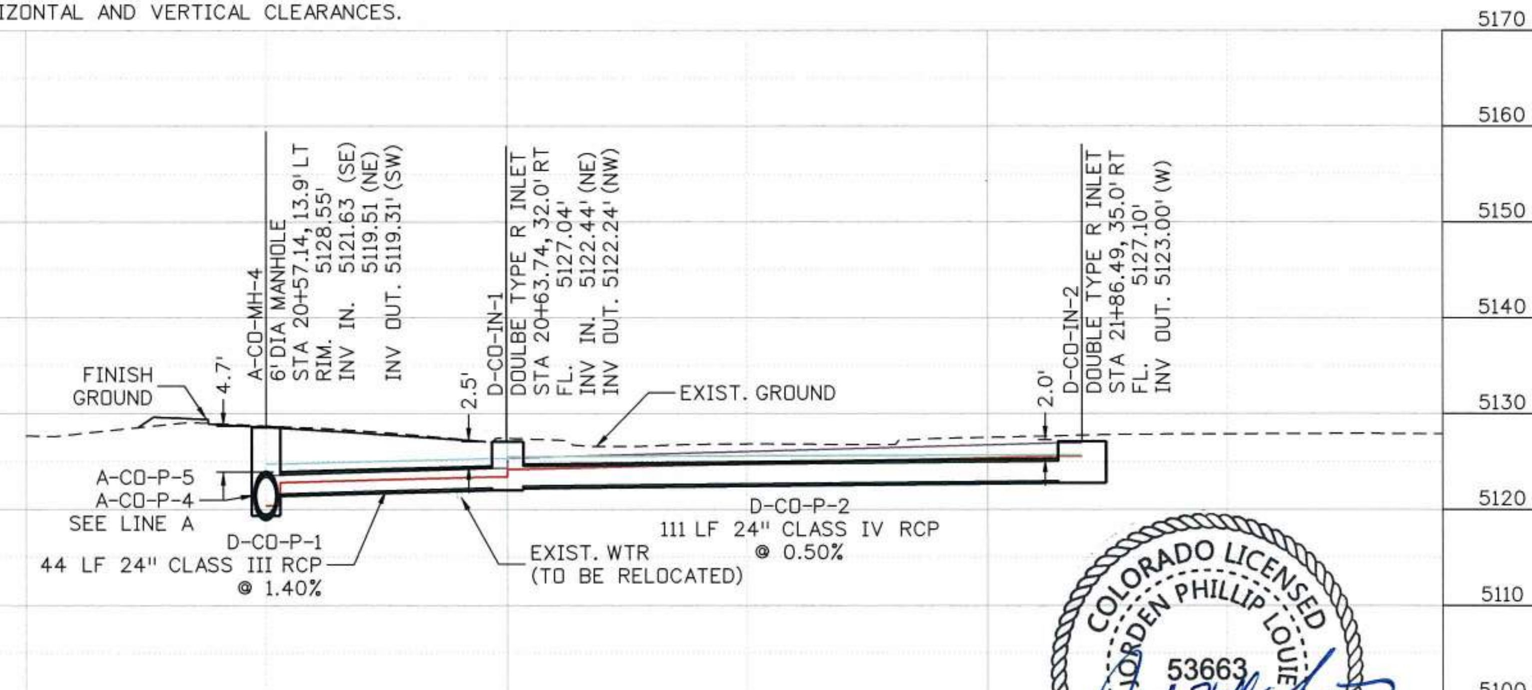
LEGEND & NOTES

- 5-YR HGL (PROP)
- 100-YR HGL (PROP)
- 100-YR HGL (FUTURE)
- EXISTING STORM DRAIN
- FUTURE STORM DRAIN

1. ALL STATION OFFSET VALUES ARE MEASURED TO COLORADO BLVD CENTER LINE.
2. ALL CLEARANCES TO UTILITES AND DISPOSITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF THE SUBMITTAL. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL CLEARANCES.



LINE C
B-CO-HS-1 to C-CO-IN-2



LINE D
A-CO-MH-4 to D-CO-IN-2

COLORADO LICENSED
JORDEN PHILLIP LOUIE
53663
11-6-2018
PROFESSIONAL ENGINEER

Mark Winnen, Project Manager, Commerce City - PW

Print Date: 9/20/2018	
File Name: 53391HYDR_Profile03.dgn	
Horiz. Scale: 1:40	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

Sheet Revisions

Date:	Comments	Init.

COMMERCE CITY, CO

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72ND AVE AND COLORADO BLVD
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Designer:	J. Louie	Structure Numbers	
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Sheet Subset:	HYD PRO	Subset Sheets: 3 of 3	

Project No./Code
STA M245-011
21142
Sheet Number 64

LOUI8727 10:20:04 AM S:\Tranproj\100053391 72nd Ave and Colorado\HwyDes\90% FOR\Plans\53391HYDR_Profile03.dgn

Kimley»Horn

March 28, 2022

City of Commerce City
Attn: Lee Alverson, P.E. Development Review and Coordination Engineer
Public Works Department
8602 Rosemary Street
Commerce City, CO 80022

RE: ***7001 Colorado Boulevard***
Preliminary Drainage Letter

The following letter is intended to serve as a preliminary drainage letter for the multi-family development at 7001 Colorado Boulevard, "The Project," which is located Northwest of the intersection of East 70th Avenue and Colorado Boulevard, and is bounded on the west side by the O'Brien Canal, an irrigation ditch managed by Farmer's Reservoir and Irrigation Company (FRICO). This area was accounted for in the *72nd Avenue and Colorado Boulevard 90% Drainage Report*, prepared by Atkins on July 23, 2018 (the Overall Drainage Report). As such, the project described herein is subject to meeting the criteria and expected design flows as stated within the aforementioned drainage report.

PROJECT DESCRIPTION

The Project consists of the addition of a new multi-family development, and associated widening for a left turn lane to enter the site from the northbound direction on Colorado Blvd. The onsite development will occur on a parcel of land consisting of 3.99 acres. The onsite area will be treated in a proposed water quality and detention pond to the north of the parcel.

The site is currently an unplatted parcel with 3 buildings, gravel parking areas, and limited vegetation. The area is subdivided into 4 different basins per the Overall Drainage Report. These basins are named Basin A-A-CO-IN-1, Basin A-B-CO-IN-1, Basin A-C-CO-IN-1, and Basin A-D-CO-IN-1. These basins total to 5.33 acres with a % imperviousness of 58%. The site does not have any existing stormwater infrastructure onsite and appears to drain via overland sheet flow towards the south, north or west sides of the site. The drainage map from the Overall Drainage Report indicates that our site falls within tributary area to the Colorado Blvd system.

DESIGN CRITERIA AND APPROACH

The project is designed in accordance with "City of Commerce City Storm Drainage Design and Technical Criteria Manual," revised December 2021 (the "Criteria") and the "Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual" Volumes 1, 2 and 3 (the "Manual"). The project is subject to the design criteria as stated in the Overall Drainage Report). A proposed Water Quality and Detention pond is proposed on the north side of the site. It has been designed per the Criteria and Manual above. Rational Calculations and a MHFD detention spreadsheet calculation are provided as an attachment to this memo.

PROPOSED DRAINAGE CONDITIONS

The development of the Project will include the addition of a left turn lane on Colorado Blvd, five new multi-story apartment buildings and covered parking areas (1.24 acres), surface parking and sidewalks (1.10 acres), and landscaping (1.65 acres) for a site imperviousness of 54%. The runoff coefficients have been calculated as 0.51 and 0.69 for the 5-year and 100-year events, respectively. The site will drain through proposed storm infrastructure from South to North. Existing drainage patterns will shift slightly, to drain to the proposed detention pond. The ultimate pond outfall will drain into the existing storm infrastructure within Colorado Blvd per the Overall Drainage Report. Stormwater runoff will generally be conveyed to curb inlets, or valley inlets. There will be a new driveway cut for the site access, as well as two emergency access points. The areas behind the ROW (within the Property) will drain to onsite storm infrastructure, to the extent practical.

The pond emergency overflow will be designed to overflow into the O'Brien Canal to the west. This will only occur in the event of a storm event above the 100-year recurrence.

CONCLUSIONS

In conclusion, the proposed improvements with this Project are in substantial conformance with the 72nd Avenue and Colorado Boulevard 90% Drainage Report (July 23, 2018) and are in compliance with City of Commerce City requirements.

KIMLEY-HORN AND ASSOCIATES, INC.

Randall J Phelps

By: Randall J. Phelps, P.E.
Project Manager

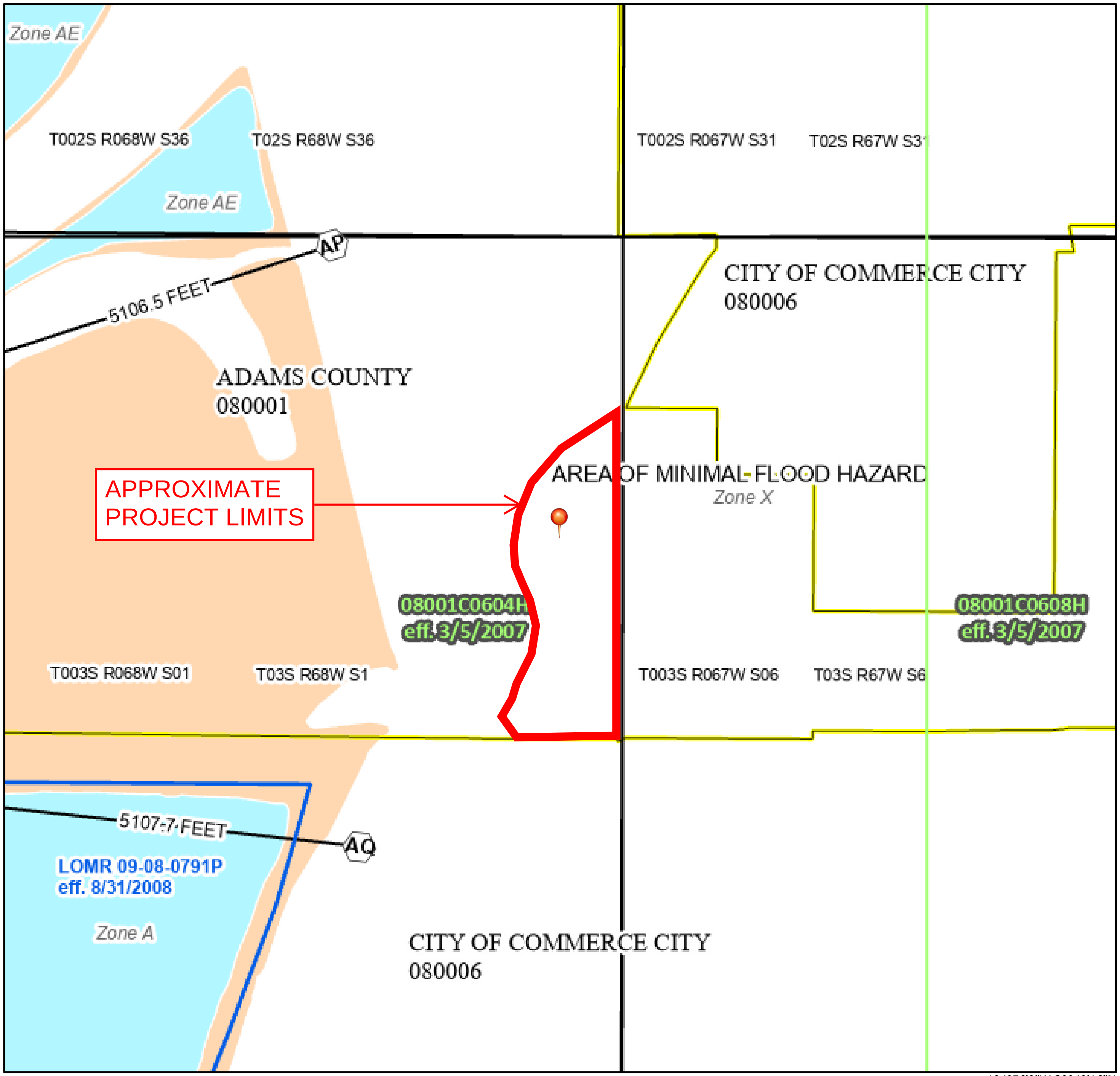
References:
- 72nd Avenue and Colorado Boulevard 90% Drainage Report (July 23, 2018)

Attachments:
- FEMA FIRMette Map
- NRCS Web Soil Survey
- Proposed Drainage Plan
- Hydrology Calculations
- Pond Detention Calculation
- Excerpts from 72nd Avenue and Colorado Boulevard 90% Drainage Report
- Excerpts from As-Built E 72nd Ave and CO Blvd (21142)

National Flood Hazard Layer FIRMette

FEMA

104°56'46"W 39°49'44"N



104°56'9"W 39°49'16"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/4/2021 at 10:11 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Adams County Area, Parts of Adams and Denver Counties, Colorado

November 4, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

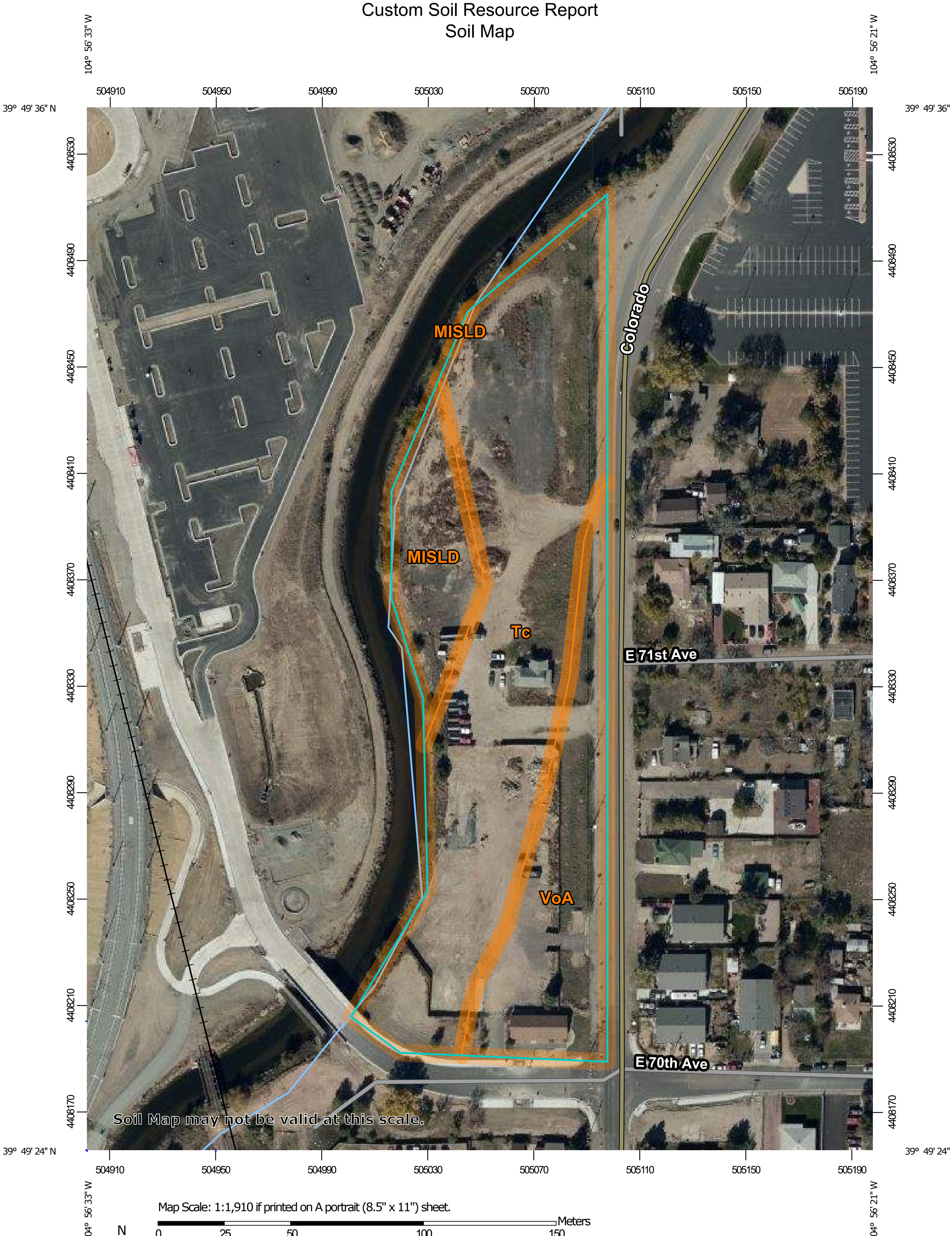
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:1,910 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 25, 50, 100, 150

Feet: 0, 50, 100, 200, 300

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

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

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

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

Water Features
Streams and Canals

Transportation
Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background
Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties, Colorado
Survey Area Data: Version 18, Aug 31, 2021

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

Date(s) aerial images were photographed: Oct 20, 2018—Oct 26, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MISLD	Gravel pits	0.7	12.2%
Tc	Terrace escarpments	3.4	62.8%
VoA	Vona sandy loam, 0 to 1 percent slopes	1.4	25.1%
Totals for Area of Interest		**5.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Adams County Area, Parts of Adams and Denver Counties, Colorado

MISLD—Gravel pits

Map Unit Setting

National map unit symbol: 34w6
Mean annual precipitation: 12 to 14 inches
Farmland classification: Not prime farmland

Map Unit Composition

Gravel pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel Pits

Typical profile

H1 - 0 to 6 inches: extremely gravelly sand
H2 - 6 to 60 inches: extremely gravelly sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: A
Hydric soil rating: No

Tc—Terrace escarpments

Map Unit Setting

National map unit symbol: 34ws
Elevation: 4,400 to 5,500 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Terrace escarpments: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terrace Escarpments

Setting

Landform: Terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 3 inches: gravelly sand

H2 - 3 to 60 inches: gravelly sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R067BY063CO - Gravel Breaks
Hydric soil rating: No

Minor Components

Dacono

Percent of map unit: 5 percent
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Hydric soil rating: No

VoA—Vona sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 34x9
Elevation: 4,000 to 5,600 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 125 to 155 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

Vona and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vona

Setting

Landform: Plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 22 inches: sandy loam
H3 - 22 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: A
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Dacono

Percent of map unit: 5 percent
Hydric soil rating: No

Truckton

Percent of map unit: 5 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

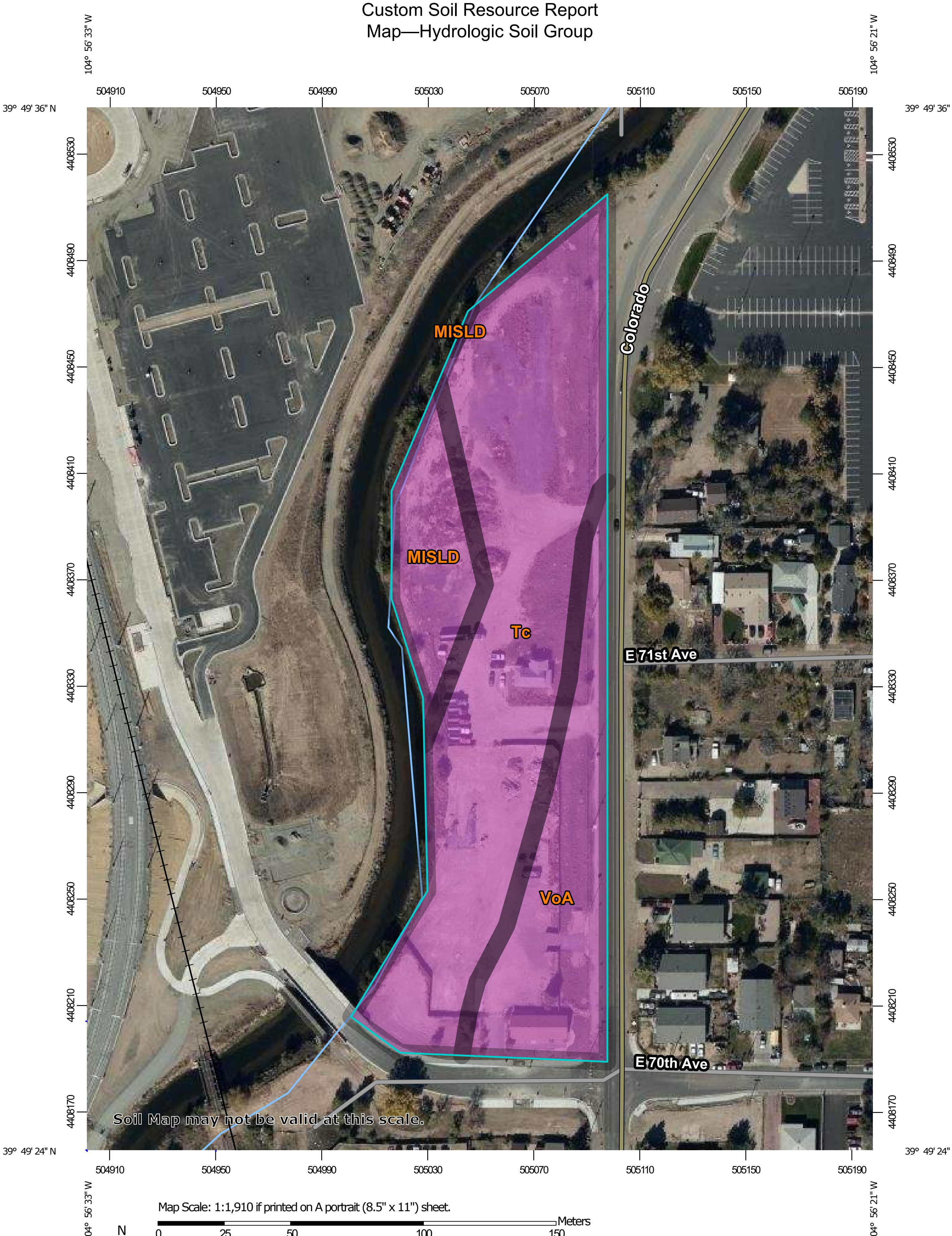
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

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

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

Map—Hydrologic Soil Group



Map Scale: 1:1,910 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 25, 50, 100, 150

Feet: 0, 50, 100, 200, 300

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties, Colorado
Survey Area Data: Version 18, Aug 31, 2021

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

Date(s) aerial images were photographed: Oct 20, 2018—Oct 26, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MISLD	Gravel pits	A	0.7	12.2%
Tc	Terrace escarpments	A	3.4	62.8%
VoA	Vona sandy loam, 0 to 1 percent slopes	A	1.4	25.1%
Totals for Area of Interest			**5.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

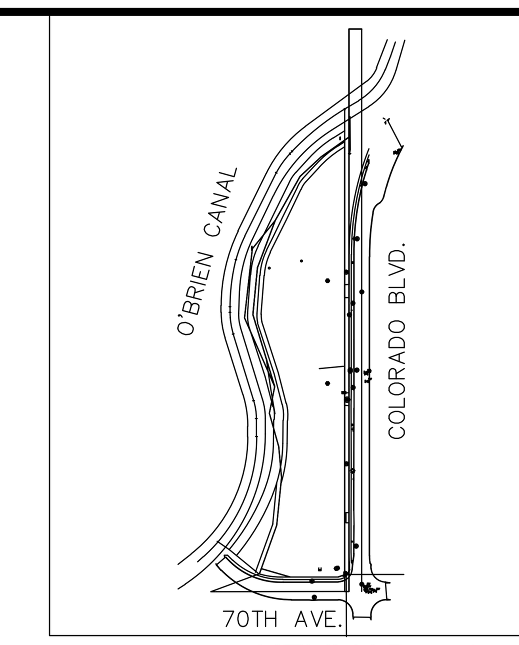
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

7001 COLORADO BOULEVARD

LOCATED IN THE NE $\frac{1}{4}$ OF SECTION 1, TOWNSHIP 3 SOUTH,
RANGE 68 WEST OF THE 6TH P.M.,
CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO



KEYMAP
NTS

LEGEND

- PROPERTY LINE
- EASEMENT LINE
- DRAINAGE BASIN DELINEATION
- PROPOSED STORM PIPE
- FLOW ARROW

A – DRAINAGE BASIN
B – BASIN ACREAGE
C – 5-YEAR RUNOFF COEFFICIENT
D – 100-YEAR RUNOFF COEFICIENT

BASIN DESIGN POINT

GENERAL NOTES

Update general notes

1. CITY IF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

Correct spelling

2. ALL STORM SEWER POPES AND INLETS DESIGNED TO MEET FLOW FROM 100-YEAR STORM DRAINAGE REQUIREMENTS.

Correct basin designation

3. BASIN A10 DEPICTS ONLY THE ADDED AREA PER OUR PROJECT. THE NUMBERS REFLECT THE MODIFIED TOTAL BASIN AREA AND COEFFICIENTS.

Detention pond shall flow to public storm system by gravity. Pumped storm detention is prohibited.

BENCHMARK:

THE MARK IS A STANDARD NGS BENCHMARK DISK STAMPED "A 314 1956", 5.9 MILES NORTHEAST OF DENVER ALONG THE UNION PACIFIC RAILROAD AT THE UNDERPASS OF U.S. HIGHWAY 85, 14 FEET EAST OF THE EAST RAIL OF THE EAST TRACK, 4 FEET BELOW THE TOP OF THE RAILS, AT THE NORTHEAST CORNER OF THE UNDERPASS, SET IN THE TOP OF THE NORTH END OF THE EAST RETAINING WALL.

PUBLISHED ELEVATION: 5146.67 (NAVD88)

GRAPHIC SCALE IN FEET
0 25 50 100

NORTH

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
© 2022 KIMLEY-HORN AND ASSOCIATES, INC.
4852 South Ulster Street, Suite 1500
Denver, Colorado 80237 (303) 228-2300

DESIGNED BY: JMD
DRAWN BY: JMD
CHECKED BY: XXX
DATE: 3/18/2022

LEGAL DESCRIPTION:
LOCATED IN THE NE $\frac{1}{4}$ OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO

7001 COLORADO BOULEVARD
CITY OF COMMERCE CITY, COUNTY OF ADAMS

PROPOSED DRAINAGE MAP

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
096216004

DRAWING NAME
Drainage Map.dwg

SHEET

Kimley»Horn

STANDARD FORM SF-1
RUNOFF COEFFICIENTS - IMPERVIOUS CALCULATION

PROJECT NAME: 7001 Colorado Blvd 3/18/2022
PROJECT NUMBER: 96216004
CALCULATED BY: JMD
CHECKED BY:

SOIL: Hydrologic Group A (NRCS Soil Survey)

LAND USE:	LANDSCAPE AREA	ROOF AREA	PAVEMENT AREA
2-YEAR COEFF.	0.05	0.80	0.87
5-YEAR COEFF.	0.10	0.85	0.87
100-YEAR COEFF.	0.40	0.90	0.89
IMPERVIOUS %	0%	90%	96%

DESIGN BASIN	DESIGN POINT	LANDSCAPE AREA (AC)	ROOF AREA (AC)	PAVEMENT AREA (AC)	TOTAL AREA (AC)	C(2)	C(5)	C(100)	Imp %
On-Site Basins									
A1	A1	1.65	1.24	1.10	**3.99**	0.51	0.55	0.69	54%
BASIN SUBTOTAL		**1.65**	**1.24**	**1.10**	**3.99**	**0.51**	**0.55**	**0.69**	**54%**
		41%	**31%**	**28%**	**100%**				

Kimley»Horn

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: 7001 Colorado Blvd
PROJECT NUMBER: 96216004
CALCULATED BY: JMD
CHECKED BY:

DATE: 3/18/2022

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)					FINAL Tc
DESIGN BASIN (1)	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE % (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	C_v (9)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	TOTAL SLOPE (15)	TOTAL IMP. (16)	Tc Min. (17)	Min.
On-Site Basins																
A1	3.990	0.545	300	2.0%	14.0	685	2.0%	20.0	2.8	4.0	18.0	985	2.0%	54%	23.7	18.0

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

$$t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 5 YEAR EVENT

PROJECT NAME: 7001 Colorado Blvd

DATE: 3/18/2022

PROJECT NUMBER: 96216004

P_1 (1-Hour Rainfall) = **1.12**

CALCULATED BY: JMD

CHECKED BY: 0

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
STORM LINE	DESIGN POINT	DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(max)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCIT Y	tt (min)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
On-Site Basins																					
	A1	A1	3.99	0.51	18.02	2.03	2.32	4.72													

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: 7001 Colorado Blvd

PROJECT NUMBER: 96216004

CALCULATED BY: JMD

CHECKED BY: 0

P_1 (1-Hour Rainfall) = **2.43**

DATE: 3/18/2022

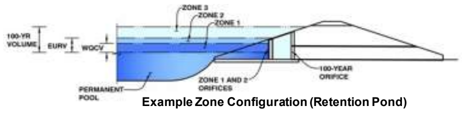
		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
STORM LINE	DESIGN POINT	DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(max)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCIT Y	tt (min)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
On-Site Basins																					
	A1	A1	3.99	0.69	18.02	2.75	5.04	13.89													

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: **7001 Colorado Blvd**

Basin ID: **On-site Detention Pond**



Example Zone Configuration (Retention Pond)

Depth Increment = 1.00 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	--	--	--	1,351	0.031		
	--	1.00	--	--	--	2,973	0.068	2,162	0.050
	--	2.00	--	--	--	3,957	0.091	5,627	0.129
	--	3.00	--	--	--	5,072	0.116	10,141	0.233
	--	4.00	--	--	--	6,321	0.145	15,838	0.364
	--	5.00	--	--	--	7,702	0.177	22,850	0.525
	--	6.00	--	--	--	9,217	0.212	31,309	0.719
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Watershed Information

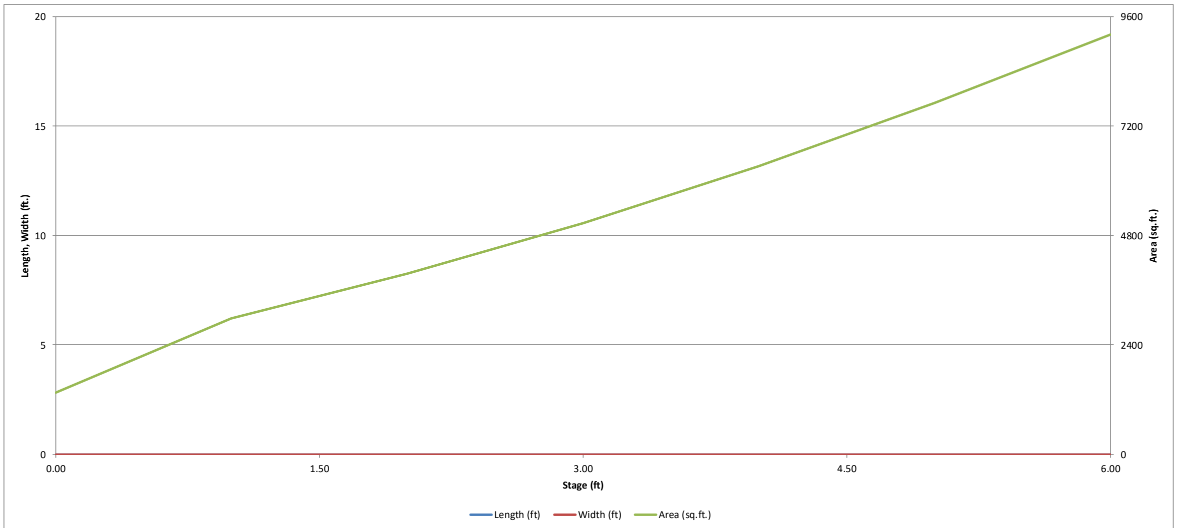
Selected BMP Type =	**EDB**	
Watershed Area =	3.99	acres
Watershed Length =	985	ft
Watershed Length to Centroid =	290	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	54.00%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Commerce City - Civic Center	

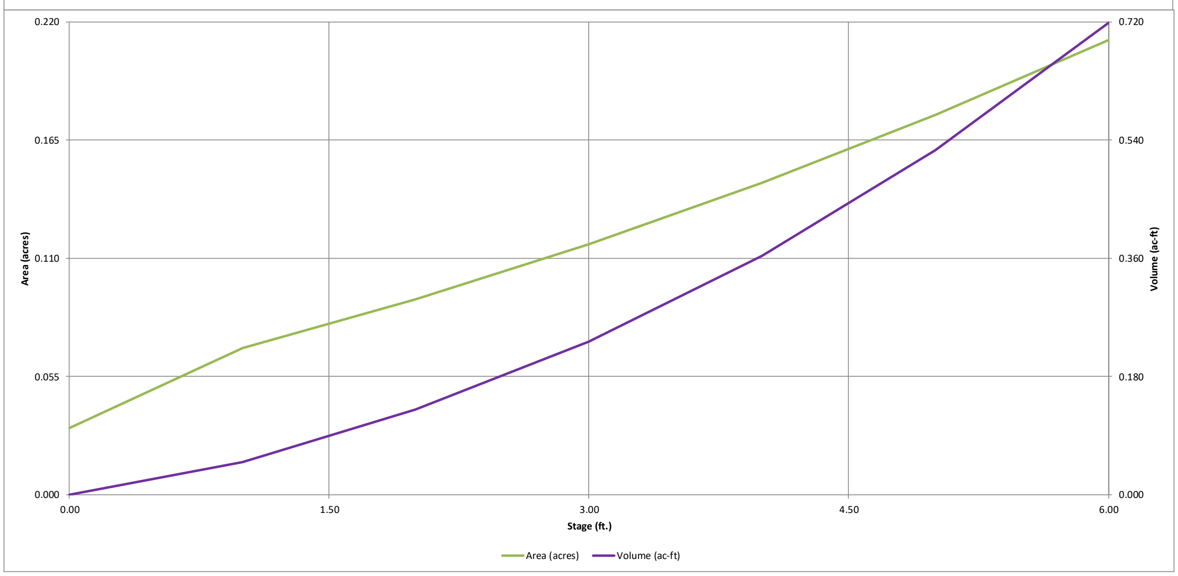
After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.072	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.254	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.84 in.) =	0.126	acre-feet		inches
5-yr Runoff Volume (P1 = 1.12 in.) =	0.172	acre-feet		inches
10-yr Runoff Volume (P1 = 1.37 in.) =	0.219	acre-feet		inches
25-yr Runoff Volume (P1 = 1.75 in.) =	0.299	acre-feet		inches
50-yr Runoff Volume (P1 = 2.08 in.) =	0.388	acre-feet		inches
100-yr Runoff Volume (P1 = 2.43 in.) =	0.497	acre-feet		inches
500-yr Runoff Volume (P1 = 3.35 in.) =	0.782	acre-feet		inches
Approximate 2-yr Detention Volume =	0.116	acre-feet		
Approximate 5-yr Detention Volume =	0.161	acre-feet		
Approximate 10-yr Detention Volume =	0.205	acre-feet		
Approximate 25-yr Detention Volume =	0.279	acre-feet		
Approximate 50-yr Detention Volume =	0.327	acre-feet		
Approximate 100-yr Detention Volume =	0.381	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.072	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.182	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.127	acre-feet
Total Detention Basin Volume =	0.381	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


Length, Width (ft.)
Area (sq.ft.)
Stage (ft)
0
5
10
15
20
0
2400
4800
7200
9600
0.00
1.50
3.00
4.50
6.00
Length (ft)
Width (ft)
Area (sq.ft.)

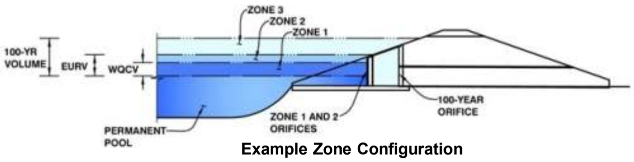

Area (acres)
Volume (ac-ft)
Stage (ft.)
0.000
0.055
0.110
0.165
0.220
0.000
0.180
0.360
0.540
0.720
0.00
1.50
3.00
4.50
6.00
Area (acres)
Volume (ac-ft)

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: 7001 Colorado Blvd

Basin ID: On-site Detention Pond



Example Zone Configuration

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
(WQCV)	1.32	0.072	Orifice Plate
: (EURV)	3.18	0.182	Orifice Plate
00-year)	4.13	0.127	Weir&Pipe (Restrict)
Total (all zones)		0.381	

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 Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

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)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	3.18	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	12.70	inches
Orifice Plate: Orifice Area per Row =	0.85	sq. inches (diameter = 1 inch)

Calculated Parameters for Plate

WQ Orifice Area per Row =	5.903E-03	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

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	1.06	2.12					
Orifice Area (sq. inches)	0.85	0.85	0.85					

	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)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

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	
Overflow Weir Front Edge Height, Ho =	3.20	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	3.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	3.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	3.20	N/A	feet
Overflow Weir Slope Length =	3.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	1.99	N/A	
Overflow Grate Open Area w/o Debris =	6.26	N/A	ft^2
Overflow Grate Open Area w/ Debris =	3.13	N/A	ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	24.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	3.14	N/A	ft^2
Outlet Orifice Centroid =	1.00	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	3.55	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	15.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	0.50	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.28	feet
Stage at Top of Freeboard =	4.33	feet
Basin Area at Top of Freeboard =	0.16	acres
Basin Volume at Top of Freeboard =	0.41	acre-ft

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	0.84	1.12	1.37	1.75	2.08	2.43	3.35
CUHP Runoff Volume (acre-ft) =	0.072	0.254	0.126	0.172	0.219	0.299	0.388	0.497	0.782
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.126	0.172	0.219	0.299	0.388	0.497	0.782
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.0	0.0	0.1	0.8	1.8	4.2
TIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.00	0.00	0.01	0.02	0.20	0.45	1.06
Peak Inflow Q (cfs) =	N/A	N/A	1.6	2.2	2.8	4.1	5.6	7.4	11.7
Peak Outflow Q (cfs) =	0.0	0.1	0.1	0.1	0.1	0.5	1.8	3.8	9.0
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	5.9	3.1	6.2	2.3	2.1	2.1
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.1	0.3	0.6	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) =	37	58	47	53	57	60	58	56	51
Time to Drain 99% of Inflow Volume (hours) =	**40**	64	51	57	62	67	66	64	62
Maximum Ponding Depth (ft) =	1.32	3.18	1.85	2.32	2.73	3.27	3.40	3.53	3.69
Area at Maximum Ponding Depth (acres) =	0.08	0.12	0.09	0.10	0.11	0.12	0.13	0.13	0.14
Maximum Volume Stored (acre-ft) =	0.073	0.254	0.115	0.159	0.202	0.265	0.280	0.297	0.319

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

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WQ Plate
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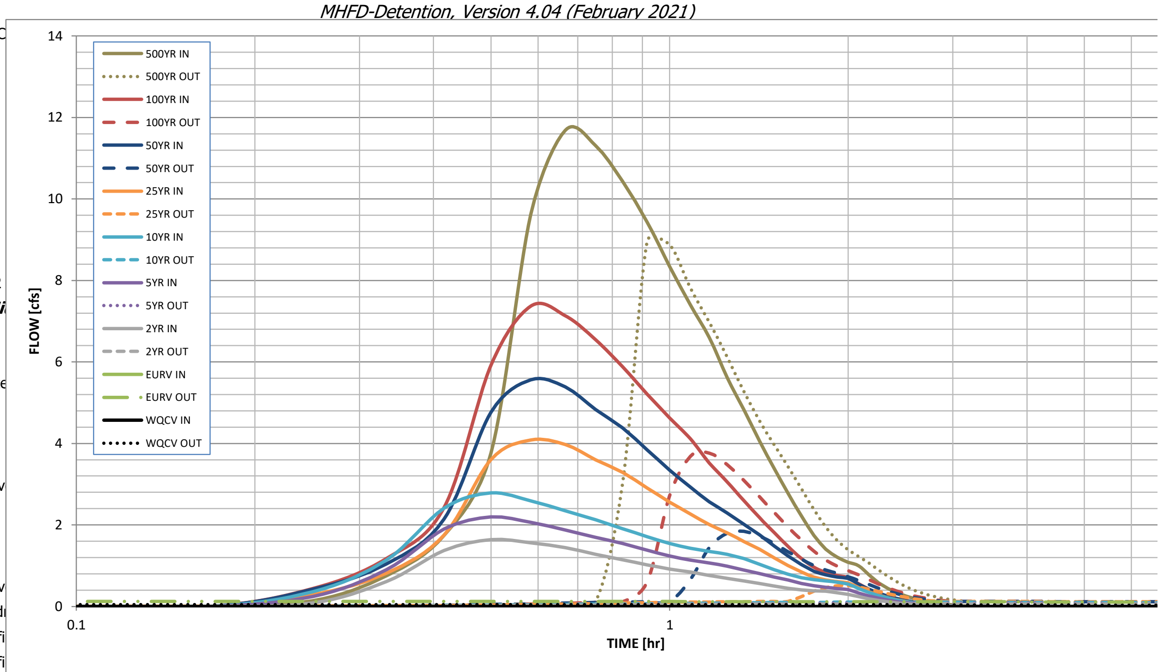

Co
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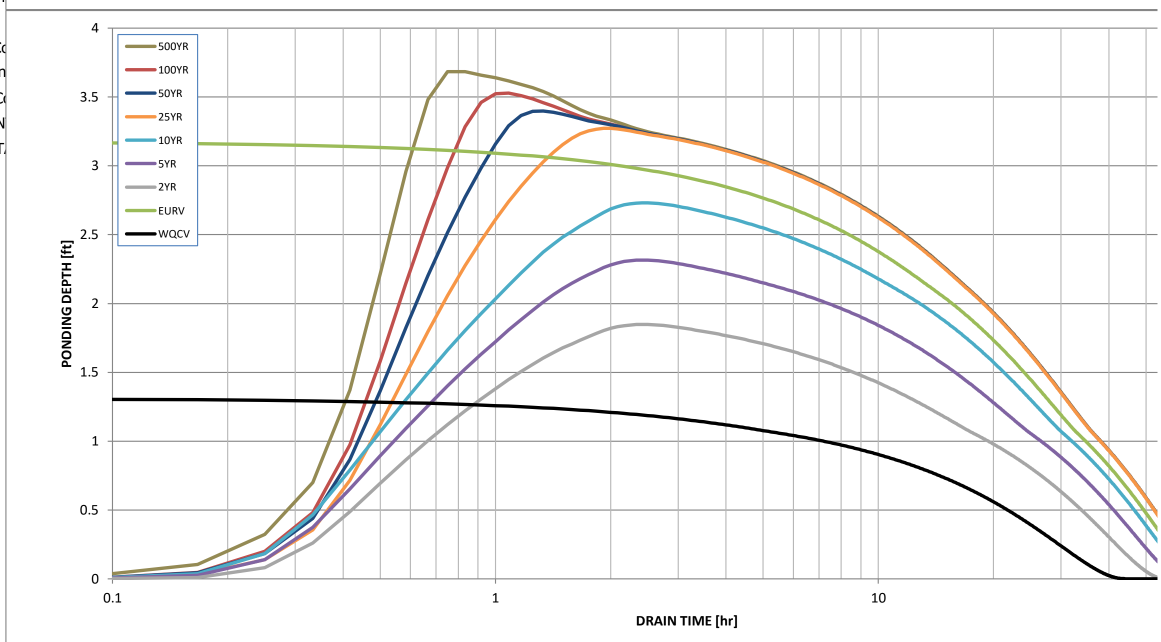
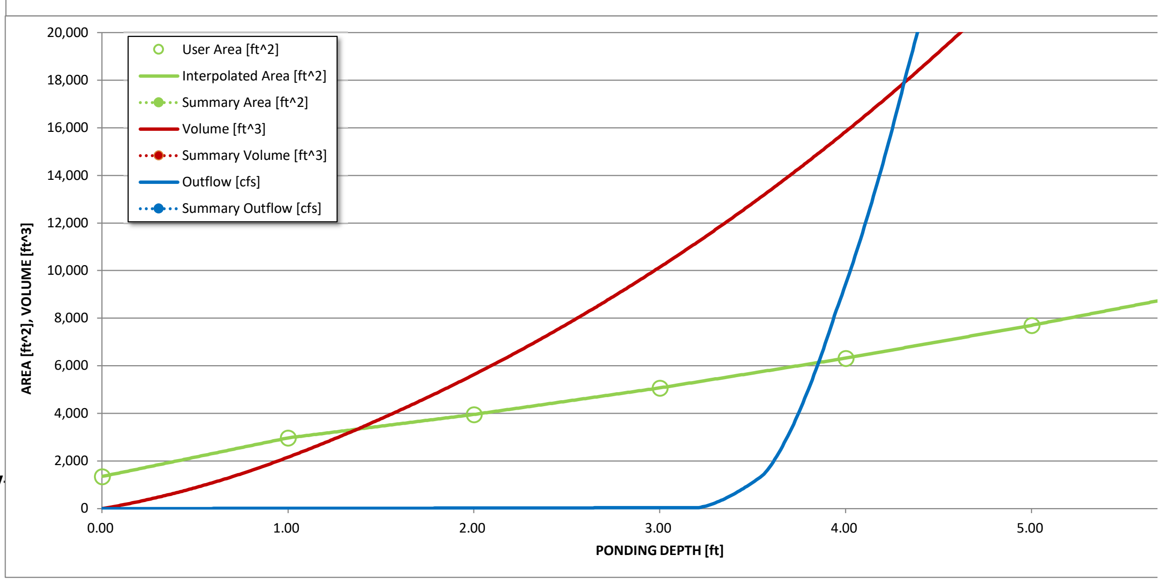


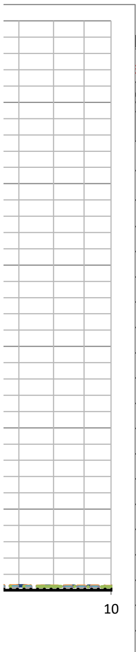
S-A-V-

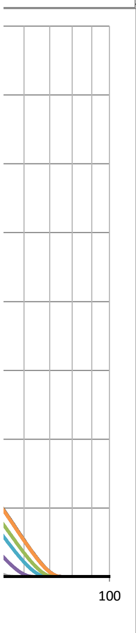


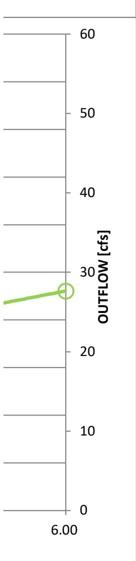
S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:







low Hydrographs

e 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	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]
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	0.00	0.00	0.14
0:15:00	0.00	0.00	0.08	0.24	0.36	0.29	0.42	0.44	0.75
0:20:00	0.00	0.00	0.61	0.90	1.14	0.82	1.04	1.18	1.74
0:25:00	0.00	0.00	1.37	1.89	2.41	1.75	2.15	2.43	3.77
0:30:00	0.00	0.00	1.64	2.19	2.78	3.61	4.77	5.92	9.61
0:35:00	0.00	0.00	1.56	2.06	2.59	4.08	5.56	7.37	11.69
0:40:00	0.00	0.00	1.44	1.88	2.35	3.98	5.39	7.14	11.31
0:45:00	0.00	0.00	1.28	1.70	2.13	3.60	4.83	6.55	10.43
0:50:00	0.00	0.00	1.15	1.54	1.91	3.29	4.38	5.88	9.43
0:55:00	0.00	0.00	1.02	1.38	1.71	2.91	3.84	5.21	8.35
1:00:00	0.00	0.00	0.92	1.23	1.54	2.56	3.35	4.63	7.40
1:05:00	0.00	0.00	0.84	1.14	1.43	2.27	2.93	4.12	6.60
1:10:00	0.00	0.00	0.76	1.07	1.35	2.01	2.57	3.52	5.61
1:15:00	0.00	0.00	0.69	0.99	1.28	1.81	2.30	3.06	4.83
1:20:00	0.00	0.00	0.62	0.89	1.17	1.60	2.01	2.59	4.06
1:25:00	0.00	0.00	0.56	0.81	1.03	1.40	1.75	2.18	3.38
1:30:00	0.00	0.00	0.50	0.72	0.90	1.19	1.48	1.81	2.78
1:35:00	0.00	0.00	0.44	0.65	0.79	1.01	1.24	1.47	2.22
1:40:00	0.00	0.00	0.40	0.56	0.70	0.84	1.02	1.18	1.75
1:45:00	0.00	0.00	0.38	0.51	0.65	0.72	0.86	0.96	1.41
1:50:00	0.00	0.00	0.37	0.47	0.62	0.65	0.77	0.83	1.21
1:55:00	0.00	0.00	0.33	0.44	0.59	0.61	0.72	0.76	1.08
2:00:00	0.00	0.00	0.30	0.41	0.55	0.58	0.68	0.71	1.00
2:05:00	0.00	0.00	0.24	0.33	0.44	0.46	0.54	0.55	0.77
2:10:00	0.00	0.00	0.19	0.25	0.34	0.36	0.42	0.42	0.58
2:15:00	0.00	0.00	0.14	0.20	0.27	0.28	0.33	0.32	0.44
2:20:00	0.00	0.00	0.11	0.15	0.21	0.21	0.25	0.24	0.33
2:25:00	0.00	0.00	0.09	0.12	0.16	0.16	0.19	0.19	0.25
2:30:00	0.00	0.00	0.07	0.09	0.12	0.12	0.14	0.14	0.19
2:35:00	0.00	0.00	0.05	0.07	0.09	0.09	0.11	0.11	0.14
2:40:00	0.00	0.00	0.04	0.05	0.07	0.07	0.08	0.08	0.11
2:45:00	0.00	0.00	0.03	0.04	0.05	0.05	0.06	0.06	0.08
2:50:00	0.00	0.00	0.02	0.02	0.03	0.04	0.04	0.04	0.06
2:55:00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.03	0.04
3:00:00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02
3:05:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	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 4.04 (February 2021)

<u>Summary Stage-Area-Volume-Discharge Relationships</u>

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]

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).

72nd Avenue and Colorado Boulevard

90% Drainage Report

City of Commerce City

23 July 2018

1. Introduction and Background

The Project, Colorado Boulevard and East 72nd Avenue Rail Line Station Area Improvement Project, has had significant changes to the scope of work and design approach since the 30% submittals in March and April of 2017. These changes are the result of coordination with the City of Commerce City (City) and recommendations from Atkins. This report documents the changes and design approach for the 90% design submittal. The changes include:

- Full depth reconstruction of Colorado Boulevard
- 10' wide shared use trail in lieu of full construction of 72nd Avenue, west of the Burlington Ditch
- Removal of the surface sand filter along Colorado Boulevard
- Replacing the existing 36-inch storm drain in Colorado Boulevard with a 48-inch pipe

2. General Location and Description

2.1. Location

The Project consist of roadway, drainage, and pedestrian connectivity to the new Regional Transportation District (RTD) station located on 72nd Avenue, west of Colorado Boulevard. The improvements will be to Colorado Boulevard from 70th Avenue to north of 72nd Avenue, along with a temporary trail along 72nd Avenue from the Burlington Ditch to the North Metro Rail Line tracks. The project is approximately 0.28 miles in length within the City of Commerce City, which is located within Adams County, Colorado.

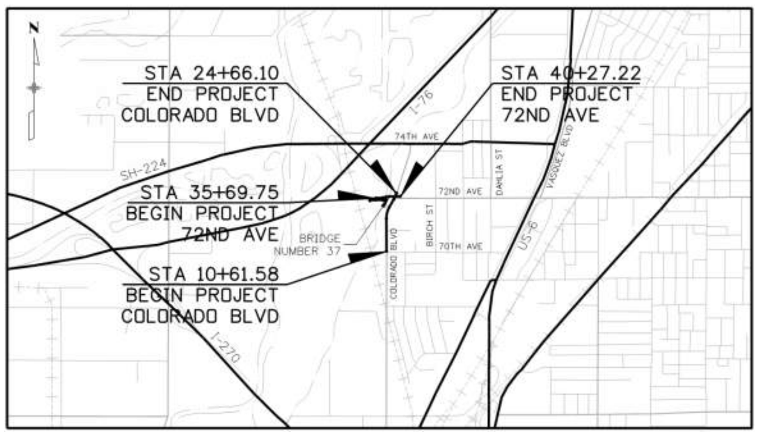


Figure 2-1 - Vicinity Map

The project site begins in Range 67 West and ends on the border between Range 67 West and Range 68 West, the northern portion of the project is the border of Township 2 South and Township 3 South and extends south into Township 3 South, and the project crosses from the southwest corner of Section 31 to the northwest corner of Section 6.

2.2. Description of Improvements

The project will reconstruct and widen Colorado Boulevard between 70th Avenue and 72nd Avenue to accommodate new bike lanes and sidewalks. Minor improvements are proposed to the surface of the 72nd Avenue bridge over Burlington Ditch. West of the bridge, a 10-foot-wide trail will be constructed to provide pedestrian access to the new North Metro Rail Station. The total area for the improvements is approximately 2.4 acres.

3. Drainage Basins and Sub-Basins

3.1. Major Basin Description

This project is part of a watershed tributary to the South Platte River. There are currently no known Major Drainageway Plans or Outfall System Plans for this watershed. Adams County is in the process of preparing a Major Drainageway Plan, but it was not made available for this project.

The Burlington Ditch nearly parallels Colorado Boulevard approximately 50 to 250 feet to the west. Only this portion of Colorado Boulevard and the 72nd Avenue drains directly to the canal.

3.2. Sub-Basin Description

72nd Avenue, west of the bridge over the Burlington Ditch, generally sheet flows northerly into and through the private Brannon property or to a ditch along the RTD tracks' maintenance access road at the west end of the project. The RTD property to the south generally routes all runoff overland westerly to storm sewer that is then routed to a detention pond to the south.

Colorado Boulevard generally slopes northerly from 70th Avenue to 72nd Avenue. A shallow roadside ditch along the west shoulder conveys runoff northerly to the Burlington Ditch near 72nd Avenue. The east half of the road generally flows into the adjacent residential properties and continues northerly to a depression south of the Adams County Human Services Building. Approximately 27 acres of tributary area drains to the Adams County Human Services Building parking lot and is inadvertently detained. Flows from the parking lot drain to the existing storm drain in Colorado Boulevard. Figure 2-1 shows the existing drainage patterns.

SNC·LAVALIN ATKINS

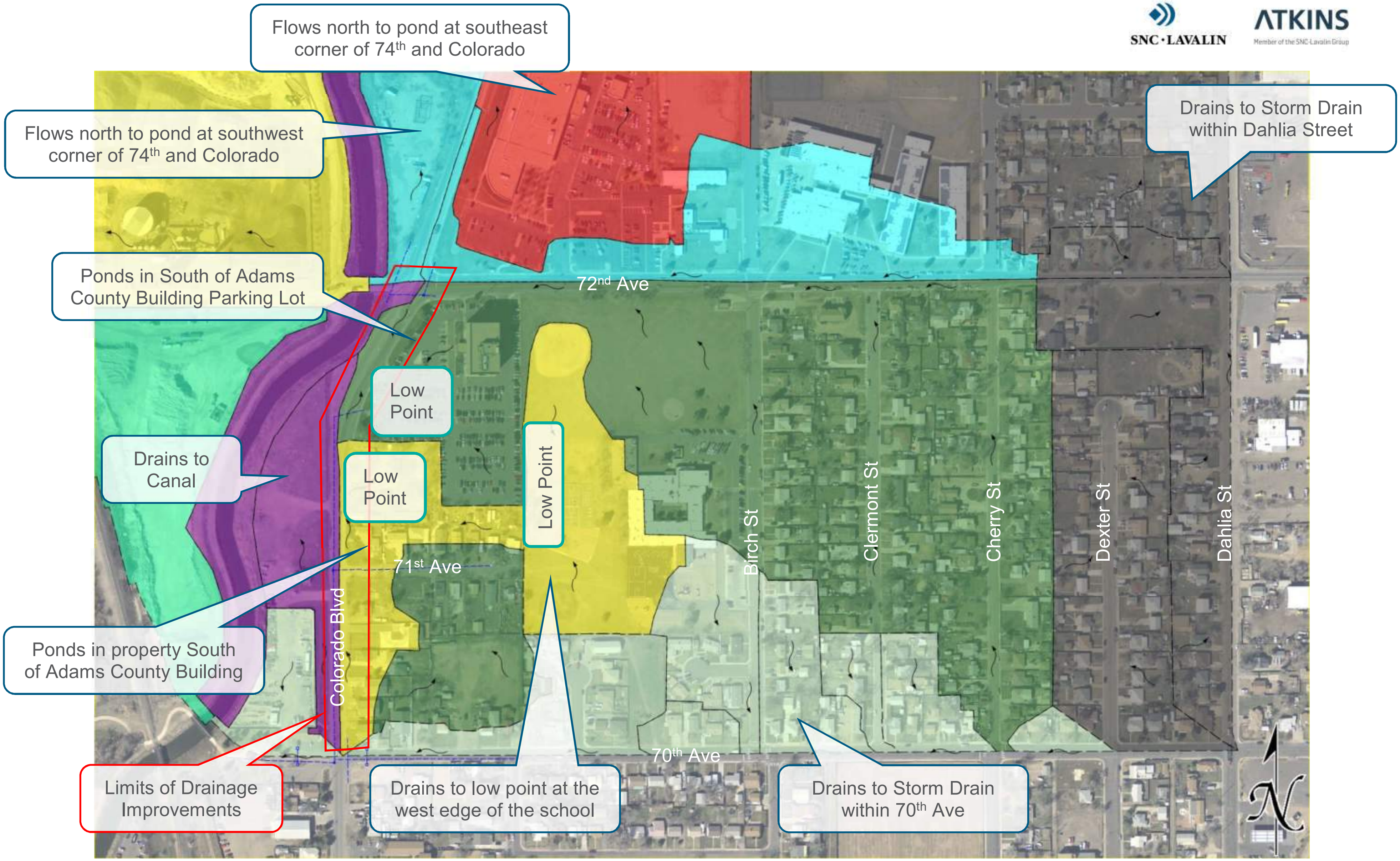


Figure 3-1 - Existing Drainage Patterns

5.2.5.3. Tailwater Analysis

Once the City confirmed that the existing storm drain system in 70th Avenue would be the outfall for the project, an appropriate tailwater elevation for the existing system needed to be determined.

Initially, the entire downstream system was modeled to the outfall at the South Platte River. This analysis showed that the existing 72-inch storm drain between the outfall and the RTD corridor would require the HGL to be well above the existing ground. Figure 5-3 shows the profile for this model.

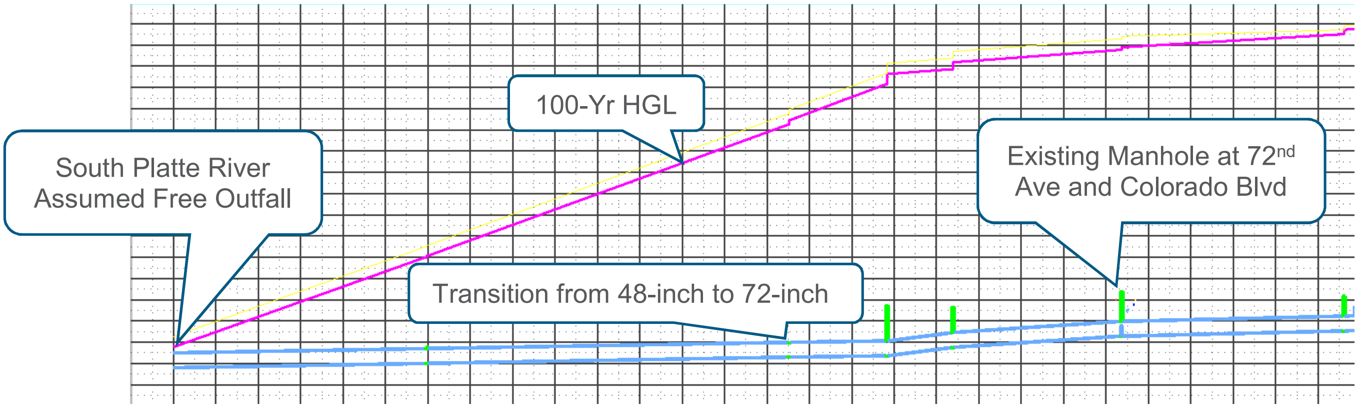


Figure 5-3 - 100-Year HGL, Assuming Free Outfall at South Platte River

Based on the results of this analysis, it was assumed that the system that the system would surcharge the manhole at the transition between the 48-inch pipe and 72-inch pipe. The tailwater for this assumption was set to the rim of the manhole, 5109.74 feet. Figure 5-4 shows the assumed HGL in the existing downstream pipe system.

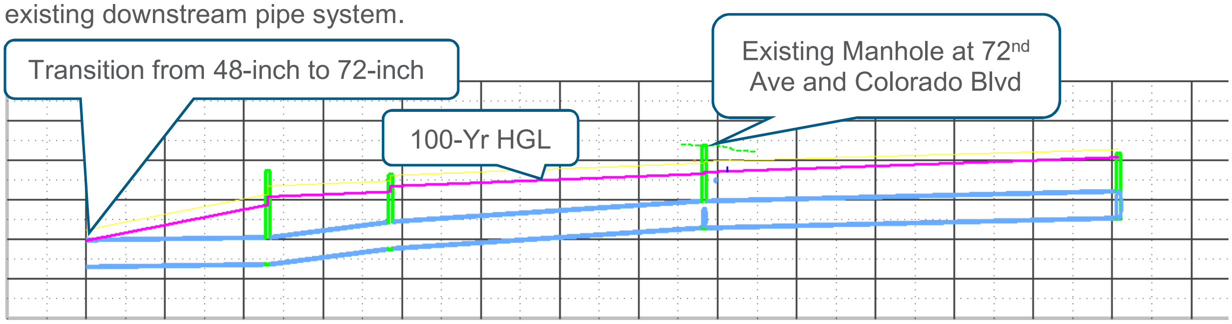


Figure 5-4 – 100-Year HGL, Assuming Relief at Manhole

5.2.5.4. Water Quality

The original plan was to treat the Water Quality Capture Volume (WQCV) for Colorado Boulevard in a surface sand filter located southwest of the 72nd Avenue and Colorado Blvd intersection. However, trying to drain the low point of the road to the basin was severely limiting the allowable storage volume of the sand filter. In addition, conveying runoff to the sand filter would require parallel storm drain alignments. As an alternative, Atkins' proposed using a hydrodynamic separator. This change was approved by the City in June 2018.

5.2.6. Analysis Scenarios

Three different analysis were considered: 5-Year proposed, 100-Year proposed, 100-Year future. The 5-Year and 100-Year scenarios include the project improvements only, and do not consider future improvements to the 70th Avenue storm drain and the option for additional improvements along 72nd Avenue.

The 100-Year future scenario includes recommendations from the *Fairfax Park Outfall Improvements Hydrologic Analysis* to upsizing the existing storm in 70th Avenue and make modifications to the Fairfax Park detention basin.

The scenario also includes recommendations from Atkins to construct an additional storm drain system along 72nd and a new detention pond at Alsup Elementary School. These improvements along 72nd Avenue will provide attenuation that is crucial for the proposed 48-inch storm drain Colorado Boulevard to meet design criteria. The existing drainage basin contributing flow to Colorado from 72nd is approximately 27 acres, generating roughly 85 cfs in the 100-year storm. Intercepting this entire flow at the intersection of 72nd Avenue and Colorado Boulevard is impractical. Intercepting this flow would require a large bank of inlets and a much larger trunk line within Colorado Boulevard.

5.2.6.1. 5-Year Proposed

The 5-Year Proposed analysis was conducted to analyze the minor storm event upon completion of the project. The *Fairfax Park Outfall Improvements Hydrologic Analysis* includes 100-yearr flow rates for the existing, the interim, and final condition for the storm drain within 70th Avenue. The system is currently in the “interim” condition. The 100-year peak flow directly upstream of the project tie in has been estimated at 126.7 cfs. The 5-year flow rate was determined by scaling the 100-year flow by the ratio of rainfall intensities. This assumes that the runoff coefficients are the same in the 5-year and 100-year. While the 5-year runoff coefficient would be smaller than the 100-year, resulting in less runoff, this is a conservative assumption. The 5-year flow rate injected upstream of the project was 70 cfs. Figure 5-3 summarizes the proposed 5-year analysis. Table 5-1 summarizes the flow rates, depth of flow, and spread at each proposed inlet.

Table 5-1 – 5-Year Proposed Analysis Inlet Summary

Inlet ID	Flow Rate (cfs)	By-Passed (cfs)	Depth of Flow* (in)	Spread (ft)
A-CO-IN-1	1.2	0.0	4.5	18.7
A-CO-IN-2	35.4	29.1	7.6	25.4
B-CO-IN-1	4.7	2.0	4.7	13.5
B-CO-IN-2	3.1	0.9	4.3	11.5
C-CO-IN-1	5.6	2.7	5.3	15.7
C-CO-IN-2	3.4	1.1	4.6	12.7
D-CO-IN-1	6.1	1.7	3.7	32.0
D-CO-IN-2	29.6	15.9	8.7	16.9

*Governing Criteria is that the max depth in the gutter cannot exceed 6-inches

5.2.6.2. 100-Year Proposed

The 100-Year proposed analysis was conducted to analyze the major storm event upon completion of the project. The 126.7 cfs determined by the *Fairfax Park Outfall Improvements Hydrologic Analysis* was injected directly upstream of the project location. The results of this analysis show that in the 100-year event, the system will surcharge on to the street. Flows along Colorado will flow north and inundate the Adams County Parking Lot. This matches the existing condition. Figure 5-4 summarizes the proposed 100-year analysis. Table 5-2 summarizes the flow rates, depth of flow, and spread at each proposed inlet.

Table 5-2 – 100-Year Proposed Analysis Inlet Summary

Inlet ID	Flow Rate (cfs)	By-Passed (cfs)	Depth of Flow* (in)	Spread (ft)
A-CO-IN-1	20.7	0.0	7.0	29.0
A-CO-IN-2	85.5	76.6	10.1	35.6
B-CO-IN-1	13.8	9.5	6.5	18.0
B-CO-IN-2	9.1	5.5	5.9	18.0
C-CO-IN-1	13.5	9.2	6.9	18.0
C-CO-IN-2	7.9	4.5	5.8	18.0
D-CO-IN-1	17.5	10.6	4.9	32.0
D-CO-IN-2	77.6	56.3	12.1	24.4

*Governing Criteria is that the max depth in the gutter cannot exceed 12-inches

5.2.6.3. 100-Year Future

The 100-Year future model incorporates conceptual recommendations from both the *Fairfax Park Outfall Improvements Hydrologic Analysis* and Atkins. The City has plans to redevelop the area around the new RTD station. As such, it is expected that the drainage system within the area will be improved in the coming years.

The 100-year future model was analyzed to document that the Project improvements, while not meeting all the design criteria due to limitations with the existing adjacent systems, will meet the design criteria once future improvements are made.

The future conditions analysis assumes that:

- The existing 72-inch pipe between the west side of the RTD corridor and the South Platte River will be upsized. Initial calculations indicate that it will need to be a 7-foot x 6-foot box culvert.
- The 48-inch pipe in 72nd Avenue will be upsized to 72-inch pipe, per the recommendation in the *Fairfax Park Outfall Improvement Hydrologic Analysis.*
- The 100-year flow rate in the future 72-inch pipe will be 317.83 cfs, per the *Fairfax Park Outfall Improvement Hydrologic Analysis.*
- A new storm drain system will be constructed along 72nd Avenue, to the east of the project. This system includes:
  - Trunk line along 72nd, between Colorado Boulevard and Cherry Street.
  - Full spectrum detention pond at Alsup Elementary School. The basin would be in the north-east corner of the school. It would provide water quality, and 100-year detention. The peak 100-year flow rate from the pond would be 21 cfs. The conceptual design calls for a smaller, deeper portion of the pond to detain smaller, more frequent events. The 100-year event would be contained in higher portion of the basin. This section of the basin would be roughly the size of a soccer field, and depressed 3 feet from the surrounding area.

To accommodate the future work, the project will upsize, extend, and vertically realign the existing storm drain line in Colorado Boulevard. This work will provide a connection for the future improvements to the outfall pipe in 70th Avenue.

Results from the 100-year future analysis shows major improvements to the new 48-inch pipe under Colorado Blvd (Line A), as well as reduction in peak flows being by-passed into the Adams County Parking Lot. This will result in a reduction of flooding within the parking lot. Figure 5-5 summarizes the future 100-year analysis. Table 5-3 summarizes the flow rates, depth of flow, and spread at each proposed inlet, while table 5-4 summarizes compliance with the design criteria.

Table 5-3 – 100-Year Future Analysis Inlet Summary

Inlet ID	Flow Rate (cfs)	By-Passed (cfs)	Depth of Flow (in)	Spread (ft)
A-CO-IN-1	20.7	0.0	7.0	29.0
A-CO-IN-2	1.1	0.0	2.8	5.4
B-CO-IN-1	13.8	9.5	6.5	18.0
B-CO-IN-2	9.1	5.5	5.9	18.0
C-CO-IN-1	13.5	9.2	6.9	18.0
C-CO-IN-2	7.9	4.5	5.8	18.0
D-CO-IN-1	17.5	10.6	4.9	32.0
D-CO-IN-2	1.0	0.0	2.9	4.0

Table 5-4 – Design Criteria Compliance Summary

Criteria	5-Year Proposed	100-Year Proposed	100-Year Future
Spread	Fail	n/a	n/a
Depth	Fail	Fail	Pass
HGL	n/a	Fail	Pass
Pipe Capacity	Pass	n/a	n/a

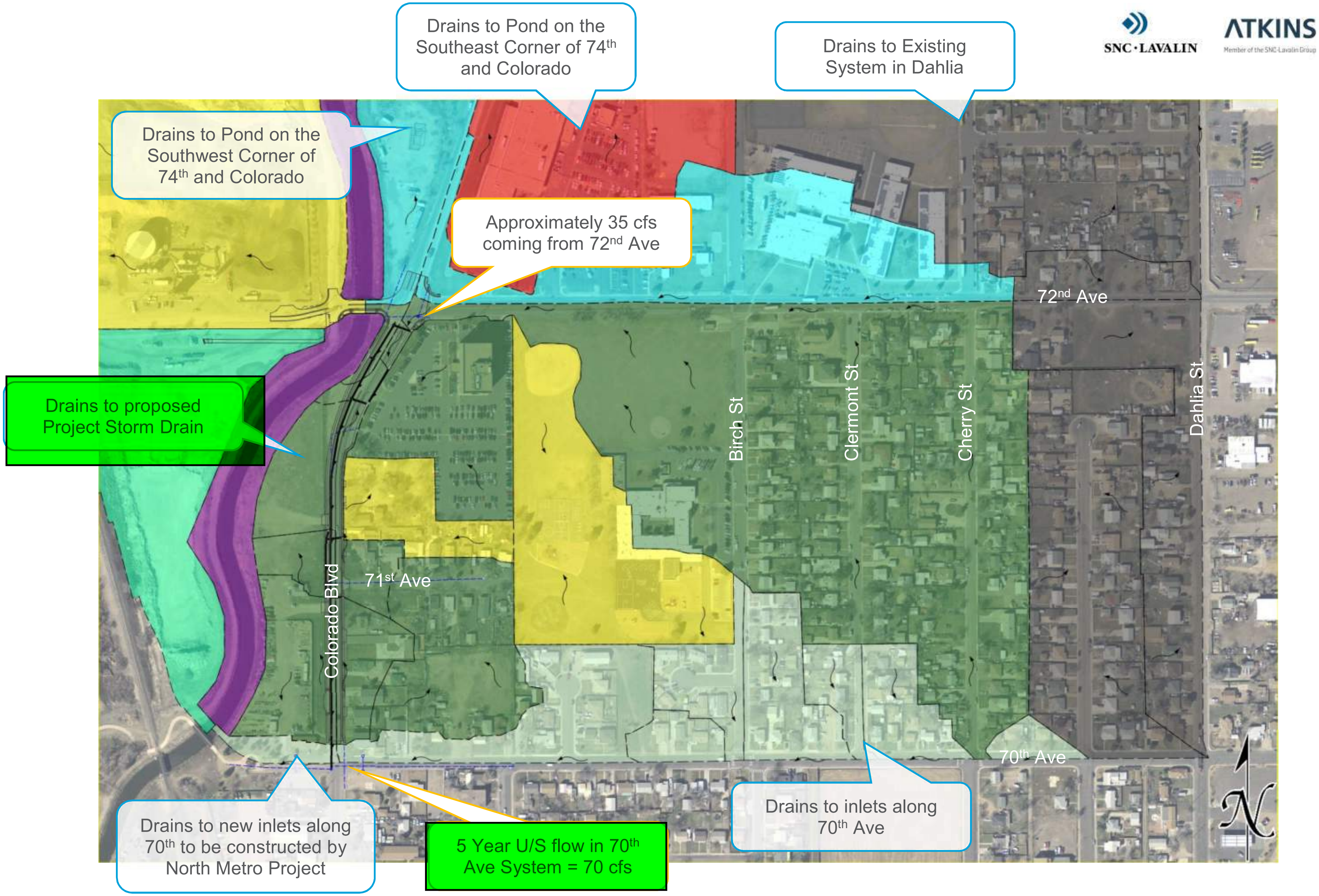


Figure 5-5 – 5-Year Proposed Layout

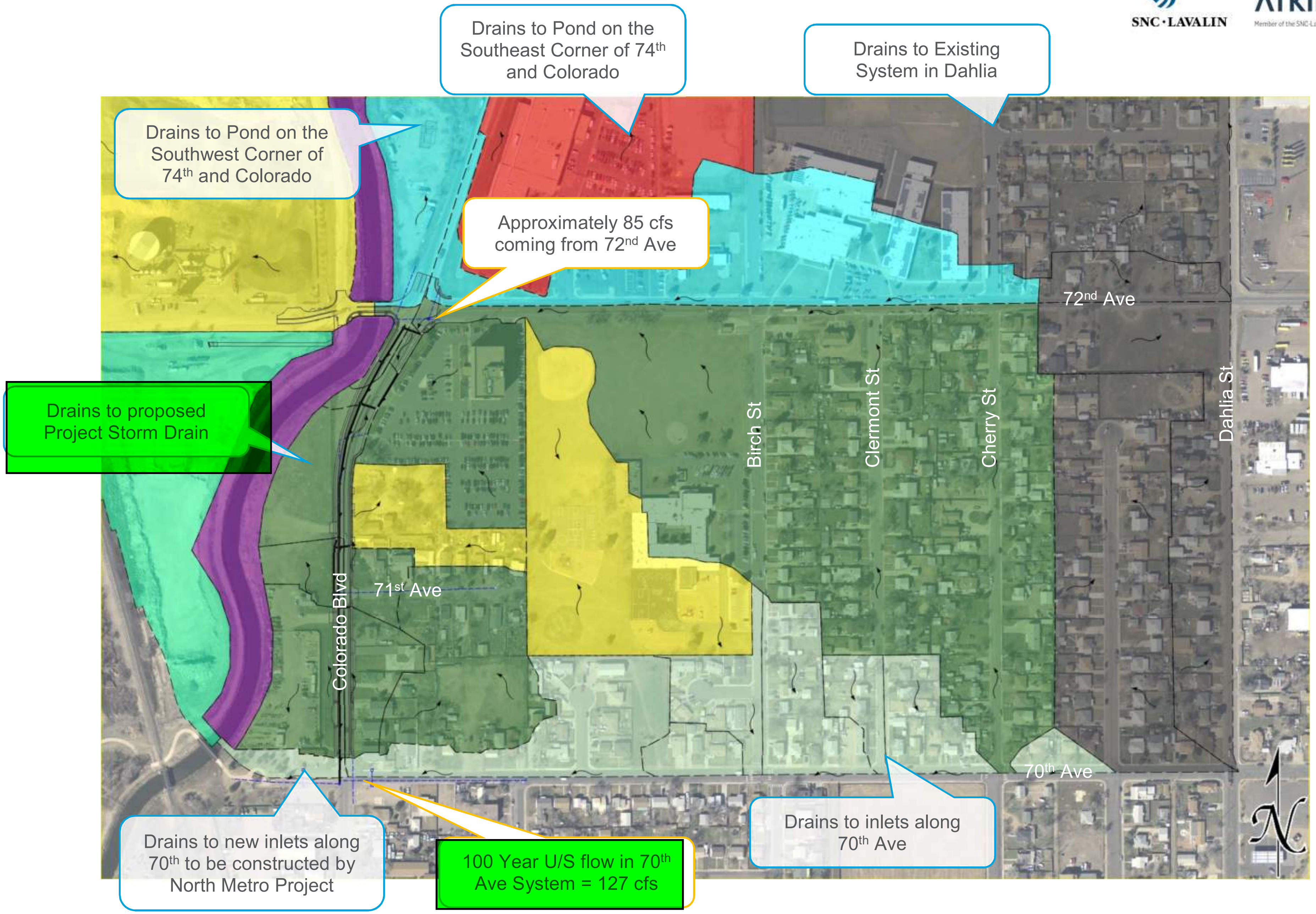


Figure 5-6 - 100 -Year Proposed Layout

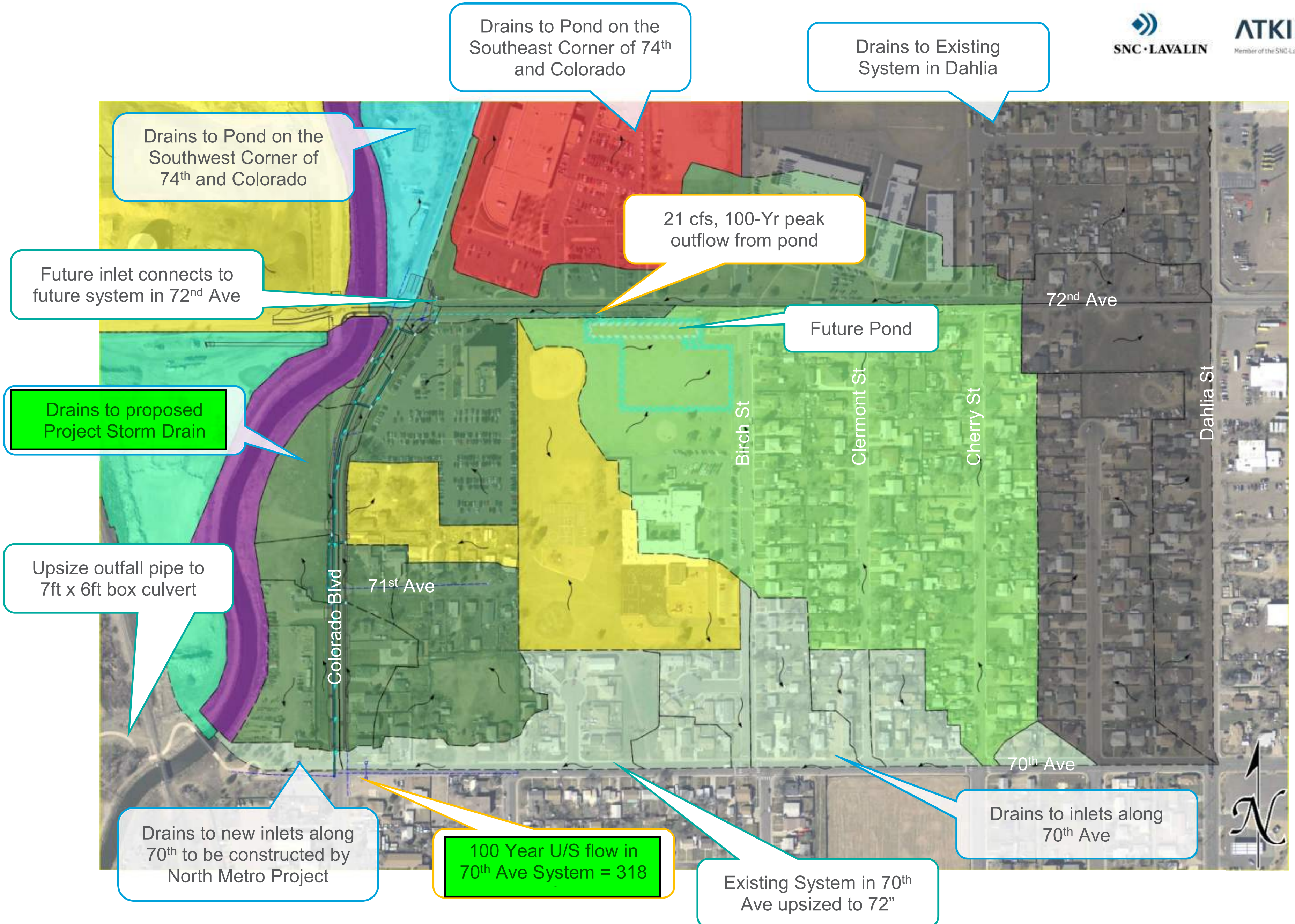


Figure 5-7 – 100-Year Future Layout

Appendices

A. Hydrologic Computations
   1. Existing Drainage Area Map
   2. Proposed Drainage Area Map
   3. Future Drainage Area Map
   4. Minor and Major Storm Runoff Calculations
   5. Excerpts from the City of Commerce City *Storm Drainage Design and Technical Criteria Manual*

B. Hydraulic Computations
   1. InRoads Results
   2. UD-Inlet Results

C. Reference Material
   1. Flood Insurance Rate Map
   2. NRCS Web Soils Survey
   3. Fairfax Park Outfall Hydrologic Analysis

Appendix A. Hydrologic Computations

A.1. Existing Drainage Area Map

The existing drainage area maps show the existing drainage patterns for the Project Area. The patterns assume that the RTD North Metro Station is fully constructed and is an existing drainage feature.

74th Avenue
Colorado Boulevard
72nd Avenue
RTD North Metro Station
(Under Construction)
Burlington Ditch
71st Avenue
Birtch Street
Clermont Street
Cheery Street
Dexter Street
Dahlia Street
70th Avenue
72nd and Colorado Roadway Improvements
Existing Drainage Area Maps
City of Commerce City
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Legend
Area is tributary to Colorado Blvd system
Area is tributary to 72nd Ave system
Area is tributary to a local low point
Area is tributary to RTD North Metro Station
Area is tributary to pond @ southwest 74th and Colorado pond
Area is tributary to pond @ southeast 74th and Colorado pond
Area is tributary to Dahlia St system
Area is tributary to O'Brien Canal/Burlington Ditch
N
0'
75'
150'
300'

A.2. Proposed Drainage Area Map

The proposed drainage area maps show the drainage patterns and tributary area once the Project has been constructed. They do not account for any future work.

72nd and Colorado Roadway Improvements

Proposed Drainage Area Maps

City of Commerce City

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Legend

- Area is tributary to Colorado Blvd system
- Area is tributary to 72nd Ave system
- Area is tributary to a local low point
- Area is tributary to RTD North Metro Station
- Area is tributary to pond @ southwest 74th and Colorado pond
- Area is tributary to pond @ southeast 74th and Colorado pond
- Area is tributary to Dahlia St system
- Area is tributary to O'Brien Canal/Burlington Ditch

\# Design Point

AREA ID / AREA (ac) / 100YR C

N

0' 75' 150' 300'

DESIGN POINT	STRUCTURE ID	Tc_5 (MIN)	Tc_{100} (MIN)	Q_5 (cfs)	Q_{100} (cfs)
0	EX-70-MH-1	--	--	70.00	317.83
1	EX-70-MH-2	29.11	28.66	101.49	374.44
2	A-CO-MH-1	27.87	27.59	32.62	58.32
3	B-CO-HS-1	5.56	5.51	10.27	14.81
4	B-CO-MH-1	5.21	5.19	4.81	7.28
5	A-CO-MH-3	26.79	26.68	26.13	51.59
6	A-CO-MH-4	26.50	26.41	18.89	28.15
7	A-CO-MH-5	26.02	25.98	6.53	8.98
8	A-CO-MH-6	25.59	25.58	5.98	7.90

AREA ID	DISCHARGE TO	AREA (ac)	Tc (MIN)	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
A-A-CO-IN-1	A-CO-IN-1	0.30	5.00	0.86	0.92	1.23	2.45
A-A-CO-IN-2	A-CO-IN-2	27.50	25.51	0.53	0.67	35.40	85.47
A-B-CO-IN-1	B-CO-IN-1	0.78	5.00	0.52	0.66	1.96	4.60
A-B-CO-IN-2	B-CO-IN-2	0.76	5.00	0.55	0.68	2.01	4.63
A-C-CO-IN-1	C-CO-IN-1	2.32	5.00	0.50	0.64	5.63	13.43
A-C-CO-IN-2	C-CO-IN-2	1.35	5.00	0.52	0.66	3.38	7.96
A-D-CO-IN-1	D-CO-IN-1	1.93	5.00	0.57	0.69	5.28	12.03
A-D-CO-IN-2	D-CO-IN-2	0.12	5.00	0.88	0.93	0.51	1.00
A-EX-71-IN-1	EX-71-IN-1	4.38	5.00	0.47	0.62	9.90	24.27
A-EX-CO-IN-1	EX-CO-IN-1	4.61	5.00	0.85	0.91	18.81	37.62
A-CO-LOT	--	2.11	5.00	0.45	0.60	4.56	11.40

A.3. Future Drainage Area Map

The future drainage area maps show the drainage patterns and tributary area used in the future conditions analysis. They are based upon the recommendations in the *Fairfax Park Outfall Improvements Hydrologic Analysis* as well as recommendations from Atkins.

72nd and Colorado Roadway Improvements

Future Drainage Area Maps

City of Commerce City

SNC·LAVALIN ATKINS Member of the SNC-Lavalin Group

Legend

- Area is tributary to Colorado Blvd system
- Area is tributary to 72nd Ave system
- Area is tributary to a local low point
- Area is tributary to RTD North Metro Station
- Area is tributary to pond @ southwest 74th and Colorado pond
- Area is tributary to pond @ southeast 74th and Colorado pond
- Area is tributary to Dahlia St system
- Area is tributary to O'Brien Canal/Burlington Ditch

\# Design Point

AREA ID / AREA (ac) / 100YR C

0' 75' 150' 300'

DESIGN POINT	STRUCTURE ID	Tc_{100} (MIN)	Q_{100} (cfs)
0	EX-70-MH-1	--	317.83
1	EX-70-MH-2	28.66	424.09
2	A-CO-MH-1	27.59	110.79
3	B-CO-HS-1	5.51	14.81
4	B-CO-MH-1	5.19	7.28
5	A-CO-MH-3	26.68	95.99
6	A-CO-MH-4	26.41	86.42
7	A-CO-MH-5	25.98	78.24
8	A-CO-MH-6	25.58	76.87
9	FUT-MH-2	7.53	76.27
10	FUT-POND	--	21.00

AREA ID	DISCHARGE TO	AREA (ac)	Tc (MIN)	C_{100}	Q_{100} (cfs)
A-A-CO-IN-1	A-CO-IN-1	0.30	5.00	0.92	2.45
A-A-CO-IN-2	A-CO-IN-2	0.14	5.00	0.93	1.15
A-B-CO-IN-1	B-CO-IN-1	0.78	5.00	0.66	4.60
A-B-CO-IN-2	B-CO-IN-2	0.76	5.00	0.68	4.63
A-C-CO-IN-1	C-CO-IN-1	2.32	5.00	0.64	13.43
A-C-CO-IN-2	C-CO-IN-2	1.35	5.00	0.66	7.96
A-D-CO-IN-1	D-CO-IN-1	1.93	5.00	0.69	12.03
A-D-CO-IN-2	D-CO-IN-2	0.12	5.00	0.93	1.00
A-EX-71-IN-1	EX-71-IN-1	4.38	5.00	0.62	24.27
A-EX-CO-IN-1	EX-CO-IN-1	4.61	5.00	0.91	37.62
A-CO-LOT	--	2.11	5.00	0.60	11.40
A-EX-72-IN-1	EX-72-IN-1	0.56	5.00	0.93	4.72
A-FUT-IN-4	FUT-IN-4	8.15	5.00	0.80	52.04
A-FUT-POND	FUT-POND	27.37	--	0.67	--

A.4. Minor and Major Storm Runoff Calculations

Equations used:

$$Q = CiA$$

Where:
Q = Peak Flow Rate (cfs)
i = Rainfall Intensity (in/hr)
A = Runoff Area (ac)

$$t_i = \frac{1.8(1.1 - C_5)\sqrt{L}}{3\sqrt{S}}$$

Where:
t_i = Initial Overland Flow Travel Time (min)
C_5 = 5-Year runoff coefficient
L = Length of Overland Flow Path (ft)
S = Slope of Overland Flow Path (ft/ft)

$$T_{c\,max} = \frac{L}{180} + 10$$

Where:
$T_{c\,max}$ = Maximum Time of Concentration
L = Length of Basin Flow Path (ft)

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72nd and Colorado
REFERENCE MATERIAL

By: JPL Date: 07-21-2018
Checked By: TYE Date: 07-21-2018

City of Commerce City C Values

C3 Storm Drainage Design and Technical Criteria Manual Table 501

Land Use	% Impervious	2-Yr	5-Yr	100-YR	Land Use full
Res.	45%	0.40	0.45	0.60	Single Family
Paved	100%	0.87	0.88	0.93	Paved Streets
Walks	96%	0.87	0.87	0.89	Drives and Walks
Schools	50%	0.45	0.50	0.70	Schools

Rainfall Data

City of Commerce City Storm Drainage Design and Criteria Manual Table 402

Tc	2-Yr	5-Yr	10-Yr	50-Yr	100-Yr
5	3.36	4.80	5.40	7.80	9.00
10	2.58	3.72	4.20	6.06	6.96
15	2.16	3.12	3.52	5.12	5.88
30	1.50	2.16	2.44	3.54	4.08
60	0.95	1.37	1.55	2.24	2.58

Legend

Input Value
Calculated Value / Looked up Input
Copied Value from another sheet

Travel Time Velocity Tables

C3 Storm Draiange Design Criteria Manual Figure 501

Slope	Paved	Gutter	Bare Ground	Short Grass
0.0%	0.00	0.00	0.00	0.00
0.5%	1.55	1.55	0.70	0.50
1.0%	1.95	1.95	1.05	0.70
2.0%	2.80	2.80	1.40	1.00
3.0%	3.50	3.50	1.75	1.30
5.0%	4.50	4.50	2.20	1,7
10.0%	6.40	6.40	3.10	2.20
20.0%	8.00	8.00	4.40	3.20
30.0%	11.50	11.50	5.50	3.90
50.0%	15.00	15.00	7.00	5.00

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72nd and Colorado

5-YR RUNOFF COEFFICENTS

By: JPL Date: 07-21-2018
Checked By: TYE Date: 07-21-2018

Condition Proposed **Return Period** 5-Yr

Area ID	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area (ac)	% Impervious	C Value	Total Area (ac)	Weighted C	Weighted % Impervious	Paved Area (ac)
A-A-CO-IN-1	Paved	0.2841	100%	0.8800	Res.	0.0132	45%	0.4500													0.2973	0.8610	97.6%	0.2841
A-A-CO-IN-2	Paved	4.0933	100%	0.8800	Res.	16.9064	45%	0.4500	Schools	6.5044	50%	0.5000									27.5040	0.5258	54.4%	4.0933
A-B-CO-IN-1	Paved	0.1321	100%	0.8800	Res.	0.6472	45%	0.4500													0.7793	0.5229	54.3%	0.1321
A-B-CO-IN-2	Paved	0.1749	100%	0.8800	Res.	0.5872	45%	0.4500													0.7621	0.5487	57.6%	0.1749
A-C-CO-IN-1	Paved	0.2949	100%	0.8800	Res.	2.0293	45%	0.4500													2.3242	0.5046	52.0%	0.2949
A-C-CO-IN-2	Paved	0.2301	100%	0.8800	Res.	1.1169	45%	0.4500													1.3471	0.5235	54.4%	0.2301
A-D-CO-IN-1	Paved	0.5327	100%	0.8800	Res.	1.4012	45%	0.4500													1.9339	0.5684	60.1%	0.5327
A-D-CO-IN-2	Paved	0.1196	100%	0.8800																	0.1196	0.8800	100.0%	0.1196
A-EX-71-IN-1	Paved	0.2149	100%	0.8800	Res.	4.1617	45%	0.4500													4.3766	0.4711	47.7%	0.2149
A-EX-CO-IN-1	Paved	4.2909	100%	0.8800	Res.	0.3157	45%	0.4500													4.6066	0.8505	96.2%	4.2909
A-CO-LOT	Res.	2.1111	45%	0.4500																	2.1111	0.4500	45.0%	0.0000
A-A-CO-IN-2 (Fut)	Paved	0.1373	100%	0.8800																	0.1373	0.8800	100.0%	0.1373

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72nd and Colorado
100-YR RUNOFF COEFFICENTS

By: JPL Date: 07-21-2018
Checked By: TYE Date: 07-21-2018

Condition Proposed **Return Period** 100-YR

Area ID	Land Use	Area (ac)	% Impervious	C Value	Land Use	Area(ac)	% Impervious	C Value	Land Use	Area(ac)	% Impervious	C Value	Land Use	Area(ac)	% Impervious	C Value	Land Use	Area(ac)	% Impervious	C Value	Total Area (ac)	Weighted C	Weighted % Impervious	Paved Area (ac)
A-A-CO-IN-1	Paved	0.2841	100%	0.93	Res.	0.0132	45%	0.60													0.2973	0.9154	0.9756	0.2841
A-A-CO-IN-2	Paved	4.0933	100%	0.93	Res.	16.9064	45%	0.60	Schools	6.5044	50%	0.70									27.5040	0.6728	0.5437	4.0933
A-B-CO-IN-1	Paved	0.1321	100%	0.93	Res.	0.6472	45%	0.60													0.7793	0.6559	0.5432	0.1321
A-B-CO-IN-2	Paved	0.1749	100%	0.93	Res.	0.5872	45%	0.60													0.7621	0.6757	0.5762	0.1749
A-C-CO-IN-1	Paved	0.2949	100%	0.93	Res.	2.0293	45%	0.60													2.3242	0.6419	0.5198	0.2949
A-C-CO-IN-2	Paved	0.2301	100%	0.93	Res.	1.1169	45%	0.60													1.3471	0.6564	0.5440	0.2301
A-D-CO-IN-1	Paved	0.5327	100%	0.93	Res.	1.4012	45%	0.60													1.9339	0.6909	0.6015	0.5327
A-D-CO-IN-2	Paved	0.1196	100%	0.93																	0.1196	0.9300	1.0000	0.1196
A-EX-71-IN-1	Paved	0.2149	100%	0.93	Res.	4.1617	45%	0.60													4.3766	0.6162	0.4770	0.2149
A-EX-CO-IN-1	Paved	4.2909	100%	0.93	Res.	0.3157	45%	0.60													4.6066	0.9074	0.9623	4.2909
A-CO-LOT	Res.	2.1111	45%	0.60																	2.1111	0.6000	0.4500	0.0000
A-A-CO-IN-2 (Fut)	Paved	0.1373	100%	0.93																	0.1373	0.9300	1.0000	0.1373

72nd and Colorado
RATIONAL METHOD PEAK FLOW RATES

By: JPL Date: 07-21-2018
Checked By: TYE Date: 07-21-2018

Area ID	Discharge To	Total Area	Propsed C Values		Propsed Tc	Rainfall Intensity		Peak Flow Rate	
			5-Yr	100-Yr		5-Yr	100-Yr	5-Yr	100-Yr
		(ac)			(min)	(in/hr)	(in/hr)	(cfs)	(cfs)
A-A-CO-IN-1	A-CO-IN-1	0.30	0.86	0.92	5.00	4.80	9.00	1.23	2.45
A-A-CO-IN-2	A-CO-IN-2	27.50	0.53	0.67	25.51	2.45	4.62	35.40	85.47
A-B-CO-IN-1	B-CO-IN-1	0.78	0.52	0.66	5.00	4.80	9.00	1.96	4.60
A-B-CO-IN-2	B-CO-IN-2	0.76	0.55	0.68	5.00	4.80	9.00	2.01	4.63
A-C-CO-IN-1	C-CO-IN-1	2.32	0.50	0.64	5.00	4.80	9.00	5.63	13.43
A-C-CO-IN-2	C-CO-IN-3	1.35	0.52	0.66	5.00	4.80	9.00	3.38	7.96
A-D-CO-IN-1	D-CO-IN-1	1.93	0.57	0.69	5.00	4.80	9.00	5.28	12.03
A-D-CO-IN-2	D-CO-IN-2	0.12	0.88	0.93	5.00	4.80	9.00	0.51	1.00
A-EX-71-IN-1	EX-71-IN-1	4.38	0.47	0.62	5.00	4.80	9.00	9.90	24.27
A-EX-CO-IN-1	EX-CO-IN-1	4.61	0.85	0.91	5.00	4.80	9.00	18.81	37.62
A-CO-LOT	--	2.11	0.45	0.60	5.00	4.80	9.00	4.56	11.40
A-A-CO-IN-2 (Fut)	A-CO-IN-2 (Fut)	0.1373	0.88	0.93	5.00	4.80	9.00	0.58	1.15

Note: Flows for A-FUT-IN-4, A-FUT-Pond, A-EX-72-IN-1 were calculated in InRoads. The C and TC values were estimated using engineering judgment to accommodate future development. These values are only used to conceptually design the future system.

Appendix B. Hydraulic Computations

B.1. InRoads Results

ID	HGL	Inv. In		Inv. Out		Rim El.	Total Flow	Time to Structure
	(ft)		(ft)		(ft)	(ft)	(cfs)	(min)
A-CO-MH-1	5120.76	(N)	5116.29	(S)	5116.09	5131.49	32.62	27.87
		(E)	5119.68					
		(W)	5122.11					
A-CO-MH-2	5120.91	(N)	5118.00	(S)	5117.80	5130.36	26.03	27.11
A-CO-MH-3	5119.99	(N)	5118.81	(S)	5118.61	5129.42	26.13	26.79
		(E)	5123.25					
A-CO-MH-4	5120.38	(NE)	5119.51	(S)	5119.31	5128.55	18.89	26.50
		(E)	5121.63					
A-CO-MH-5	5120.81	(NE)	5120.33	(SW)	5120.13	5127.59	6.53	26.02
		(NW)	5123.56					
A-CO-MH-6	5123.12	(NE)	5121.07	(SW)	5120.87	5128.48	5.98	25.59
		(E)	5121.87					
B-CO-HS-1	5123.92	(N)	5122.35	(E)	5122.15	5131.96	10.27	5.56
		(S)	5122.35					
B-CO-MH-1	5125.01	(N)	5124.30	(S)	5123.78	5131.41	4.81	5.21
		(E)	5123.98					
C-CO-BEND-1	5124.55	(SE)	5122.70	(N)	5122.50	5132.10	5.63	5.21
EX-70-MH-1	5117.80	(NE)	5115.80	(W)	5115.80	5131.73	70.00	0.00
EX-70-MH-2	5117.69	(N)	5113.44	(W)	5113.33	5133.87	101.49	29.11
		(E)	5113.33					
EX-70-MH-3	5112.48	(E)	5108.12	(NW)	5107.98	5126.46	101.05	29.60
EX-70-MH-4	5110.49	(SE)	5104.14	(W)	5104.11	5127.31	100.92	29.75
EX-CO-MH-1	0.00	(N)	5118.23	(S)	5117.97	5132.17	0.00	0.00
EX-CO-MH-3	0.00		0.00	(S)	5122.81	5129.69	0.00	0.00
FUT-MH-1	5126.54	(N)	5125.86	(SW)	5121.26	5128.93	0.10	0.00

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InRoads Report

5-Yr Pipes

ID	Shape	Width	Height	Material	Inv. In	Inv. Out	Pipe length	Slope	Depth of Flow	HGL In	HGL Out	Capacity	Total Flow	Velocity
		(in)	(in)		(ft)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft/sec)
A-CO-P-1	Circular	48	48	RCP	5116.09	5113.44	530.31	0.50	4.00	5120.75	5117.69	101.57	32.62	2.60
A-CO-P-2	Circular	48	48	RCP	5117.80	5116.29	302.53	0.50	4.00	5120.90	5120.76	101.57	25.91	2.06
A-CO-P-3	Circular	48	48	RCP	5118.61	5118.00	122.47	0.50	1.38	5119.99	5120.91	101.57	26.13	6.77
A-CO-P-4	Circular	48	48	RCP	5119.31	5118.81	99.57	0.50	1.07	5120.38	5119.99	101.57	15.98	5.89
A-CO-P-5	Circular	48	48	RCP	5120.13	5119.51	124.10	0.50	0.69	5120.81	5120.38	101.57	6.53	4.54
A-CO-P-6	Circular	48	48	RCP	5120.87	5120.33	108.40	0.50	0.66	5121.53	5120.99	101.57	5.98	4.42
A-CO-P-7	Circular	18	18	RCP	5124.82	5121.87	49.49	5.97	0.49	5125.31	5122.36	25.66	5.89	11.78
A-CO-P-8	Circular	18	18	RCP	5123.65	5123.56	9.50	1.00	0.35	5124.00	5123.90	10.50	1.23	3.98
B-CO-P-1	Circular	18	18	RCP	5122.15	5122.11	7.02	0.50	1.50	5123.74	5123.61	7.43	10.27	5.81
B-CO-P-2	Circular	18	18	RCP	5123.78	5122.35	123.06	1.16	1.50	5124.60	5123.92	11.32	4.81	2.72
B-CO-P-3	Circular	18	18	RCP	5124.41	5124.30	22.62	0.50	0.62	5125.38	5125.36	7.43	2.65	3.85
B-CO-P-4	Circular	18	18	RCP	5124.20	5123.98	43.25	0.50	0.56	5125.23	5125.01	7.43	2.21	3.67
C-CO-P-1	Circular	18	18	RCP	5122.50	5122.35	30.69	0.50	1.50	5124.42	5123.95	7.43	5.63	3.18
C-CO-P-2	Circular	18	18	RCP	5122.72	5122.70	4.57	0.50	1.50	5124.57	5124.55	7.43	5.63	3.19
C-CO-P-3	Circular	18	18	RCP	5123.10	5122.92	37.00	0.50	1.50	5124.82	5124.67	7.43	2.44	1.38
D-CO-P-1	Circular	24	24	RCP	5122.24	5121.63	43.83	1.40	1.24	5123.48	5122.87	26.77	18.89	9.23
D-CO-P-2	Circular	24	24	RCP	5123.00	5122.44	111.39	0.50	2.00	5125.83	5124.35	16.00	13.78	4.39
EX-70-P-1	Circular	72	72	RCP	5115.80	5113.33	518.92	0.48	2.00	5117.80	5117.69	292.19	70.00	8.49
EX-70-P-2	Circular	72	72	RCP	5113.33	5108.12	391.37	1.33	1.86	5117.69	5112.48	488.49	101.49	13.63
EX-70-P-3	Circular	72	72	RCP	5107.98	5104.14	149.82	2.57	6.00	5110.57	5110.49	678.78	101.05	3.57
EX-71-P-1	Circular	15	15	RCP	5125.86	5119.68	435.60	1.42	0.70	5126.56	5120.76	7.69	4.62	6.55
EX-CO-P-3	Circular	24	24	RCP	5123.95	5123.25	61.75	1.13	1.44	5125.39	5124.69	24.05	20.85	8.62
FUT-P-1	Circular	48	48	RCP	5121.26	5121.07	38.33	0.50	0.10	5123.34	5123.12	101.57	0.10	1.28
P1	Circular	72	72	RCP	5116.02	5115.80	22.38	1.00	1.65	5117.67	5117.80	423.51	70.00	11.08
P2	Circular	15	15	RCP	5125.93	5125.86	14.24	0.50	0.13	5126.63	5126.54	4.57	0.10	1.51
P3	Circular	72	72	RCP	5104.11	5103.47	226.91	0.28	6.00	5110.39	5109.74	100.83	100.92	3.57

Min Velocity = 3 ft/sec. Pipes A-CO-P-1, A-CO-P-2 are sized to convey the 100 yr flows. Decreasing the pipe size or increasing the slope would go against the original intention of being able to convey flows from a future storm drain system in 72nd Ave.
The slope on pipes B-CO-P-3, C-CO-P-3 is controled by the downstream hydrodynamic separator, and cannot be lowered. U/S is constrained by min cover. Pipe is already as small as it can be.
Fut-P-1 and P1, P2, P3 are existing or dummy pipes used to model the tailwater.

Capacity>5 Yr Flow Pipes B-CO-P-1 can be upsized b/c it needs to match the other pipes connecting to the hydrodyamic separator. P3 is an existing pipe.

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100-Yr Manholes (Proposed)

ID	HGL	Inv. In		Inv. Out		Rim El.	Total Flow	Time to Structure
	(ft)		(ft)		(ft)	(ft)	(cfs)	(min)
A-CO-MH-1	5131.77	(N)	5116.29	(S)	5116.09	5131.49	58.32	27.59
		(E)	5119.68					
		(W)	5122.11					
A-CO-MH-2	5130.85	(N)	5118.00	(S)	5117.80	5130.36	48.60	26.95
A-CO-MH-3	5131.13	(N)	5118.81	(S)	5118.61	5129.42	51.59	26.68
		(E)	5123.25					
A-CO-MH-4	5131.36	(NE)	5119.51	(S)	5119.31	5128.55	28.15	26.41
		(E)	5121.63					
A-CO-MH-5	5131.41	(NE)	5120.33	(SW)	5120.13	5127.59	8.98	25.98
		(NW)	5123.56					
A-CO-MH-6	5131.42	(NE)	5121.07	(SW)	5120.87	5128.48	7.90	25.58
		(E)	5121.87					
B-CO-HS-1	5132.36	(N)	5122.35	(E)	5122.15	5131.96	14.81	5.51
		(S)	5122.35					
B-CO-MH-1	5133.97	(N)	5124.30	(S)	5123.78	5131.41	7.28	5.19
		(E)	5123.98					
C-CO-BEND-1	5133.82	(SE)	5122.70	(N)	5122.50	5132.10	7.76	5.19
EX-70-MH-1	5132.63	(NE)	5115.80	(W)	5115.80	5131.73	317.83	0.00
EX-70-MH-2	5126.97	(N)	5113.44	(W)	5113.33	5133.87	374.44	28.66
		(E)	5113.33					
EX-70-MH-3	5123.50	(E)	5108.12	(NW)	5107.98	5126.46	373.88	29.01
EX-70-MH-4	5120.85	(SE)	5104.14	(W)	5104.11	5127.31	373.71	29.12
EX-CO-MH-1	0.00	(N)	5118.23	(S)	5117.97	5132.17	0.00	0.00
EX-CO-MH-3	0.00		0.00	(S)	5122.81	5129.69	0.00	0.00
FUT-MH-1	5131.43	(N)	5125.86	(SW)	5121.26	5128.93	0.10	0.00

HGLs are known to surcharge the 100-yr proposed condition. Existing and proposed overland flow patterns are similar.

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100-Yr Pipes (Proposed)

ID	Shape	Width	Height	Material	Inv. In	Inv. Out	Pipe length	Slope	Depth of Flow	HGL In	HGL Out	Capacity	Total Flow	Velocity
		(in)	(in)		(ft)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft/sec)
A-CO-P-1	Circular	48	48	RCP	5116.09	5113.44	530.31	0.50	4.00	5130.25	5126.97	101.57	58.32	4.64
A-CO-P-2	Circular	48	48	RCP	5117.80	5116.29	302.53	0.50	4.00	5130.77	5130.31	101.57	48.36	3.85
A-CO-P-3	Circular	48	48	RCP	5118.61	5118.00	122.47	0.50	4.00	5131.00	5130.85	101.57	48.70	3.88
A-CO-P-4	Circular	48	48	RCP	5119.31	5118.81	99.57	0.50	4.00	5131.34	5131.13	101.57	23.20	1.85
A-CO-P-5	Circular	48	48	RCP	5120.13	5119.51	124.10	0.50	4.00	5131.41	5131.36	101.57	8.98	0.71
A-CO-P-6	Circular	48	48	RCP	5120.87	5120.33	108.40	0.50	4.00	5131.42	5131.41	101.57	7.90	0.63
A-CO-P-7	Circular	18	18	RCP	5124.82	5121.87	49.49	5.97	1.50	5131.43	5131.43	25.66	7.81	4.42
A-CO-P-8	Circular	18	18	RCP	5123.65	5123.56	9.50	1.00	1.50	5131.40	5131.41	10.50	2.30	1.30
B-CO-P-1	Circular	18	18	RCP	5122.15	5122.11	7.02	0.50	1.50	5131.61	5132.11	7.43	14.81	8.38
B-CO-P-2	Circular	18	18	RCP	5123.78	5122.35	123.06	1.16	1.50	5133.81	5132.36	11.32	7.28	4.12
B-CO-P-3	Circular	18	18	RCP	5124.41	5124.30	22.62	0.50	1.50	5134.26	5134.03	7.43	3.95	2.23
B-CO-P-4	Circular	18	18	RCP	5124.20	5123.98	43.25	0.50	1.50	5134.23	5133.97	7.43	3.39	1.92
C-CO-P-1	Circular	18	18	RCP	5122.50	5122.35	30.69	0.50	1.50	5133.40	5132.41	7.43	7.75	4.38
C-CO-P-2	Circular	18	18	RCP	5122.72	5122.70	4.57	0.50	1.50	5133.86	5133.82	7.43	7.76	4.39
C-CO-P-3	Circular	18	18	RCP	5123.10	5122.92	37.00	0.50	1.50	5134.47	5134.18	7.43	3.41	1.93
D-CO-P-1	Circular	24	24	RCP	5122.24	5121.63	43.84	1.40	2.00	5124.29	5123.54	26.77	28.15	8.96
D-CO-P-2	Circular	24	24	RCP	5123.00	5122.44	111.30	0.50	2.00	5126.96	5125.40	16.00	19.76	6.29
EX-70-P-1	Circular	72	72	RCP	5115.80	5113.33	518.92	0.48	6.00	5130.77	5127.05	292.19	317.83	11.24
EX-70-P-2	Circular	72	72	RCP	5113.33	5108.12	391.37	1.33	6.00	5126.60	5123.50	488.49	374.44	13.24
EX-70-P-3	Circular	72	72	RCP	5107.98	5104.14	149.82	2.57	6.00	5122.06	5120.85	678.78	373.88	13.22
EX-71-P-1	Circular	15	15	RCP	5125.86	5119.68	435.60	1.42	1.25	5136.90	5131.77	7.69	7.10	5.78
EX-CO-P-3	Circular	36	36	RCP	5123.95	5123.25	61.75	1.13	3.00	5126.32	5125.92	70.90	51.59	7.30
FUT-P-1	Circular	48	48	RCP	5121.26	5121.07	38.33	0.50	4.00	5131.43	5131.42	101.57	0.10	0.01
P1	Circular	72	72	RCP	5116.02	5115.80	22.38	1.00	6.00	5132.78	5132.63	423.51	317.83	11.24
P2	Circular	15	15	RCP	5125.93	5125.86	14.24	0.50	1.25	5131.43	5131.43	4.57	0.10	0.08
P3	Circular	72	72	RCP	5104.11	5103.47	226.91	0.28	6.00	5118.65	5109.74	100.83	373.71	13.22

HGLs are known to surcharge the 100-yr proposed condition. Existing and proposed overland flow patterns are similar.

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100-Yr Manholes (Future)

ID	HGL	Inv. In		Inv. Out		Rim El.	Total Flow	Time to Structure
	(ft)		(ft)		(ft)	(ft)	(cfs)	(min)
A-CO-MH-1	5121.59	(N)	5116.29	(S)	5116.09	5131.49	110.79	9.23
		(E)	5119.68					
		(W)	5122.11					
A-CO-MH-2	5123.54	(N)	5118.00	(S)	5117.80	5130.36	95.06	8.67
A-CO-MH-3	5124.88	(N)	5118.81	(S)	5118.61	5129.42	95.99	8.44
		(E)	5123.25					
A-CO-MH-4	5124.97	(NE)	5119.51	(S)	5119.31	5128.55	86.42	8.24
		(E)	5121.63					
A-CO-MH-5	5125.60	(NE)	5120.33	(SW)	5120.13	5127.59	78.24	8.00
		(NW)	5123.56					
A-CO-MH-6	5126.05	(NE)	5121.07	(SW)	5120.87	5128.48	76.87	7.78
		(E)	5121.87					
B-CO-HS-1	5124.28	(N)	5122.35	(E)	5122.15	5131.96	14.81	5.51
		(S)	5122.35					
B-CO-MH-1	5125.82	(N)	5124.30	(S)	5123.78	5131.41	7.28	5.19
		(E)	5123.98					
C-CO-BEND-1	5125.60	(SE)	5122.70	(N)	5122.50	5132.10	7.76	5.19
EX-70-MH-1	5123.41	(NE)	5115.80	(W)	5115.80	5131.73	317.83	0.00
EX-70-MH-2	5118.34	(N)	5113.44	(W)	5113.33	5133.87	424.09	10.24
		(E)	5113.33					
EX-70-MH-3	5111.42	(E)	5108.12	(NW)	5107.98	5126.46	423.18	10.58
EX-70-MH-4	5111.07	(SE)	5104.14	(W)	5104.11	5127.31	422.91	10.69
FUT-MH-1	5126.67	(E)	5121.46	(SW)	5121.26	5128.93	75.78	7.70
FUT-MH-2	5126.94	(N)	5126.70	(W)	5121.88	5129.00	76.27	7.53
		(E)	5122.08					
		(S)	5125.76					

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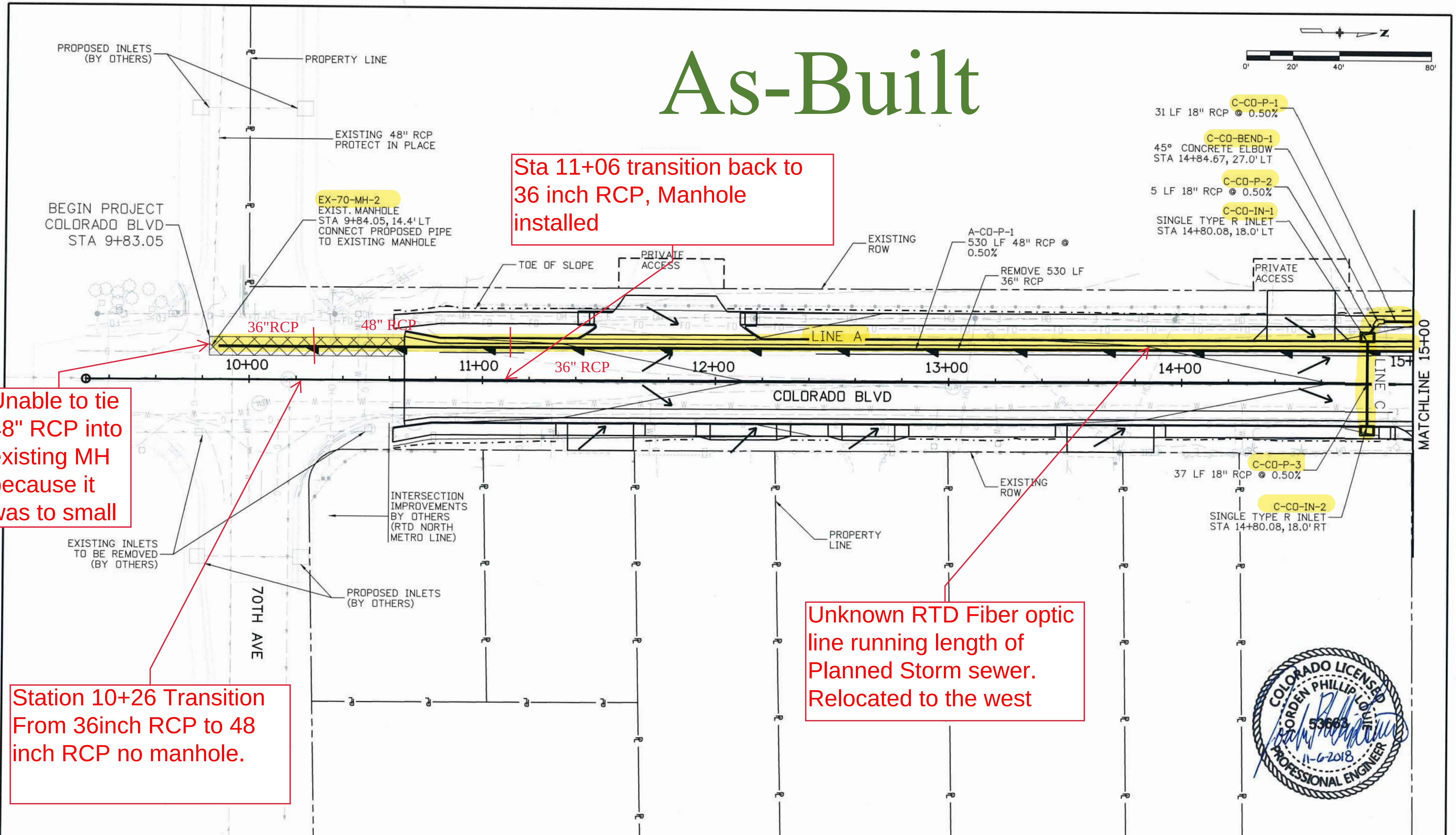
100-Yr Pipes (Future)

ID	Shape	Width	Height	Material	Inv. In	Inv. Out	Pipe length	Slope	Depth of Flow	HGL In	HGL Out	Capacity	Total Flow	Velocity
		(in)	(in)		(ft)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft/sec)
A-CO-P-1	Circular	48	48	RCP	5116.09	5113.44	530.31	0.50	4.00	5121.53	5118.34	101.57	110.79	8.82
A-CO-P-2	Circular	48	48	RCP	5117.80	5116.29	302.53	0.50	4.00	5123.34	5121.67	101.57	95.06	7.56
A-CO-P-3	Circular	48	48	RCP	5118.61	5118.00	122.47	0.50	4.00	5124.10	5123.54	101.57	95.99	7.64
A-CO-P-4	Circular	48	48	RCP	5119.31	5118.81	99.57	0.50	4.00	5124.90	5124.35	101.57	86.42	6.88
A-CO-P-5	Circular	48	48	RCP	5120.13	5119.51	124.10	0.50	4.00	5125.58	5125.06	101.57	78.24	6.23
A-CO-P-6	Circular	48	48	RCP	5120.87	5120.33	108.40	0.50	4.00	5126.02	5125.67	101.57	76.87	6.12
A-CO-P-7	Circular	18	18	RCP	5124.82	5121.87	49.49	5.97	1.50	5126.63	5126.05	25.66	1.52	0.86
A-CO-P-8	Circular	18	18	RCP	5123.65	5123.56	9.50	1.00	1.50	5126.18	5125.60	10.50	2.30	1.30
B-CO-P-1	Circular	18	18	RCP	5122.15	5122.11	7.02	0.50	1.50	5123.87	5123.61	7.43	14.81	8.38
B-CO-P-2	Circular	18	18	RCP	5123.78	5122.35	123.06	1.16	1.50	5125.73	5124.28	11.32	7.28	4.12
B-CO-P-3	Circular	18	18	RCP	5124.41	5124.30	22.62	0.50	1.50	5126.08	5125.86	7.43	3.95	2.23
B-CO-P-4	Circular	18	18	RCP	5124.20	5123.98	43.25	0.50	1.50	5126.08	5125.82	7.43	3.39	1.92
C-CO-P-1	Circular	18	18	RCP	5122.50	5122.35	30.69	0.50	1.50	5125.30	5124.31	7.43	7.75	4.38
C-CO-P-2	Circular	18	18	RCP	5122.72	5122.70	4.57	0.50	1.50	5125.65	5125.60	7.43	7.76	4.39
C-CO-P-3	Circular	18	18	RCP	5123.10	5122.92	37.00	0.50	1.50	5126.17	5125.88	7.43	3.41	1.93
D-CO-P-1	Circular	24	24	RCP	5122.24	5121.63	43.84	1.40	2.00	5125.64	5124.97	26.77	10.14	3.23
D-CO-P-2	Circular	24	24	RCP	5123.00	5122.44	111.30	0.50	2.00	5125.99	5125.83	16.00	1.51	0.48
EX-70-P-1	Circular	72	72	RCP	5115.80	5113.33	518.92	0.48	6.00	5122.29	5119.33	292.19	317.83	11.24
EX-70-P-2	Circular	72	72	RCP	5113.33	5108.12	391.37	1.33	4.32	5117.65	5112.44	488.49	424.09	19.46
EX-70-P-3	Circular	72	72	RCP	5107.98	5104.14	149.82	2.57	3.43	5111.42	5111.07	678.78	423.18	25.32
EX-71-P-1	Circular	15	15	RCP	5125.86	5119.68	435.60	1.42	1.25	5127.59	5121.59	7.69	7.10	5.78
EX-CO-P-3	Circular	24	24	RCP	5123.95	5123.25	61.75	1.13	1.01	5125.58	5124.88	24.05	12.14	7.67
FUT-P-1	Circular	48	48	RCP	5121.26	5121.07	38.33	0.50	4.00	5126.24	5126.10	101.57	75.78	6.03
FUT-P-2	Circular	48	48	RCP	5121.88	5121.46	84.80	0.49	4.00	5126.92	5126.67	100.50	76.27	6.07
FUT-P-3	Circular	42	42	RCP	5123.70	5122.08	463.67	0.35	3.50	5127.71	5127.01	59.41	21.00	2.18
FUT-P-4	Circular	18	18	RCP	5125.85	5125.76	18.76	0.46	0.77	5127.36	5126.94	7.09	3.73	4.06
FUT-P-5	Circular	18	18	RCP	5126.94	5126.70	47.61	0.49	1.50	5141.00	5128.20	7.38	52.04	29.45
P1	Circular	72	72	RCP	5116.02	5115.80	22.38	1.00	6.00	5123.56	5123.41	423.51	317.83	11.24
P3	Box	84	72	RCB	5104.11	5103.47	226.91	0.28	6.00	5110.30	5109.36	351.02	422.91	10.07

Analysis for future pipes, and upsizing of the existing outfall (P1 & P3) to be completed by a future designer. Values used in the Future Conditions Model are conceptual.

As-Built



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File Name: 53391HYDR_Plan01.dgn
Horiz. Scale: 1:40 Vert. Scale: As Noted
Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

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Fax: 303/221-7276

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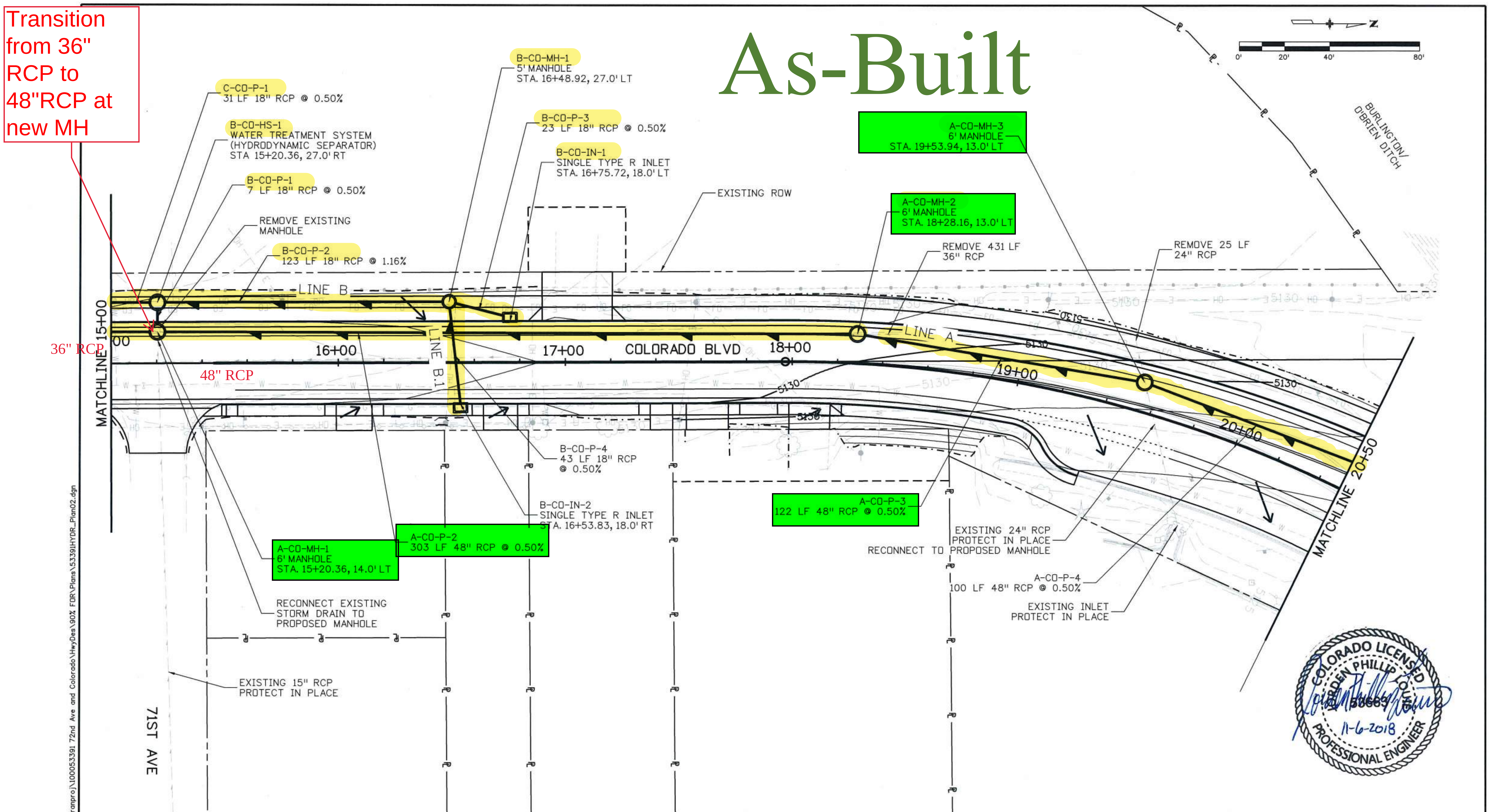
No Revisions:
Revised: 11/06/2020
Void:

72ND AVE AND COLORADO BLVD GRADING AND DRAINAGE PLANS

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD	Subset Sheets: 1 of 5	

Project No./Code
STA M245-011
21142
Sheet Number 57

Mark Winnen, Project Manager, Commerce City - PW



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Unit Information	Unit Leader Initials		

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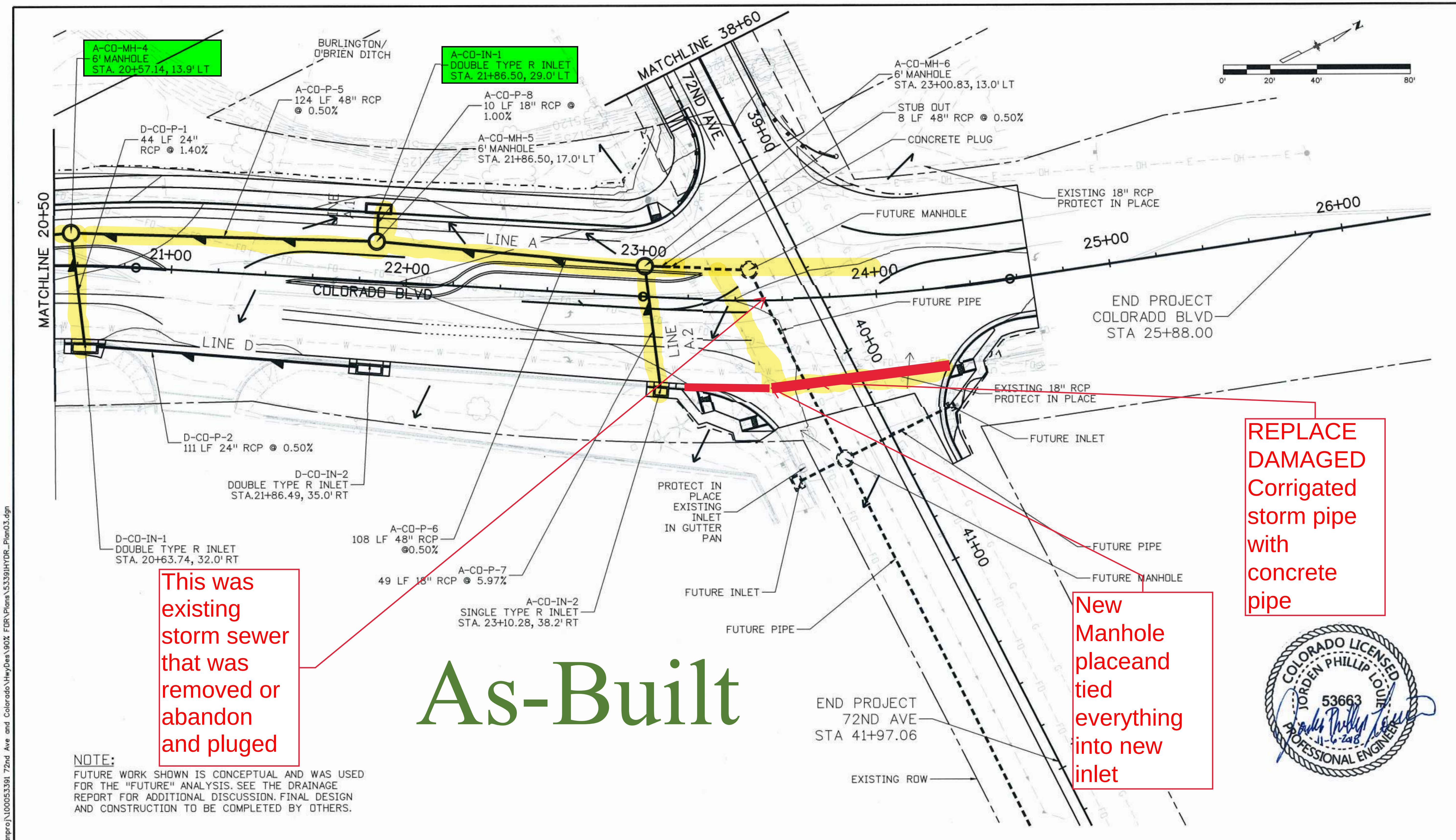
No Revisions:
Revised: 11/06/2020
Void:

72ND AVE AND COLORADO BLVD
GRADING AND DRAINAGE PLANS

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD	Subset Sheets: 2 of 5	

Project No./Code
STA M245-011
21142
Sheet Number 58

Mark Winnen, Project Manager, Commerce City - PW



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Print Date: 9/21/2018			
File Name: 53391HYDR_Plan03.dgn			
Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

Sheet Revisions

Date:	Comments	Init.

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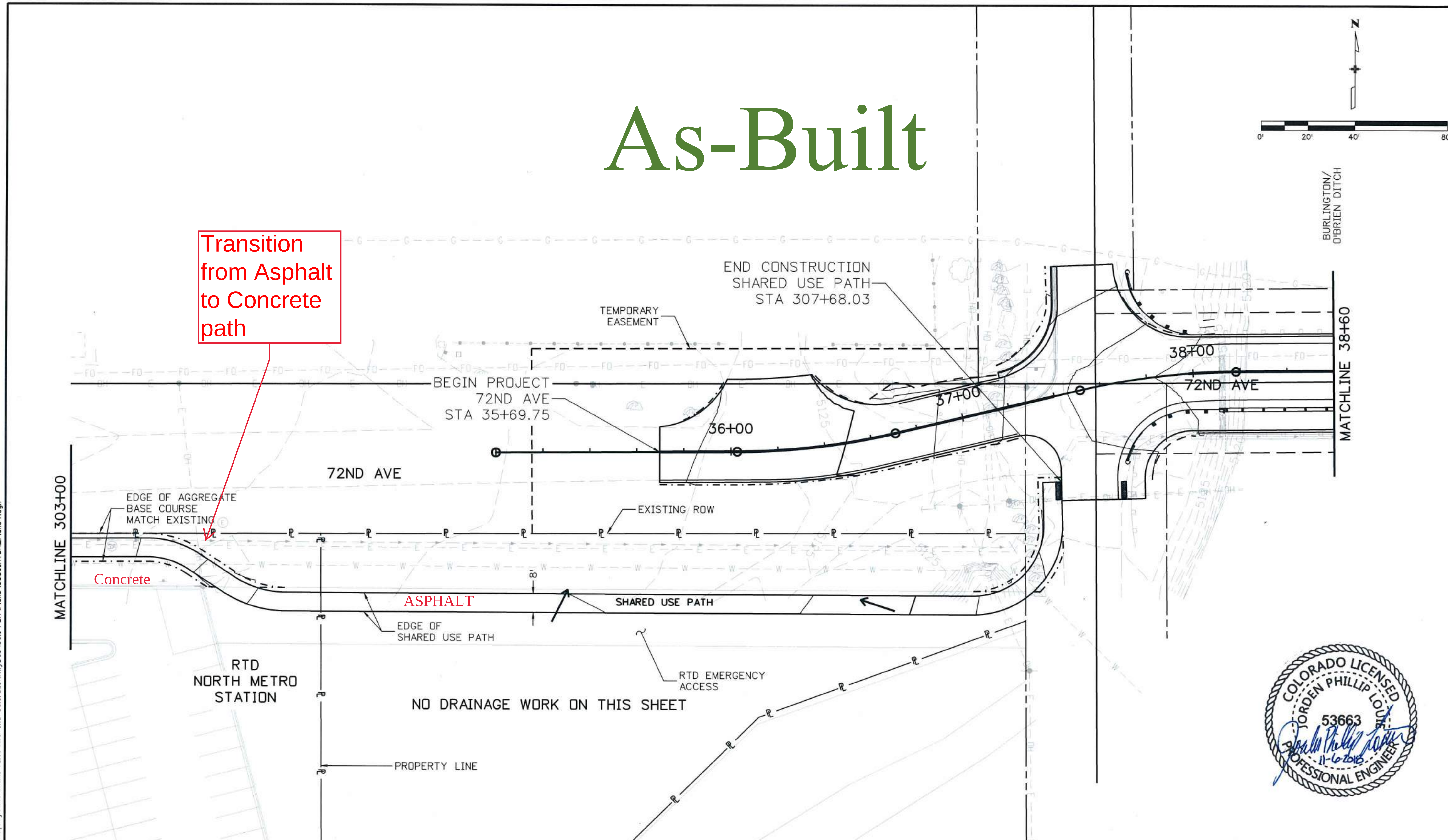
AS CONSTRUCTED
No Revisions:
Revised: 11/06/2020
Void:

72ND AVE AND COLORADO BLVD GRADING AND DRAINAGE PLANS

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD	Subset Sheets: 3 of 5	

Project No./Code
STA M245-011
21142
Sheet Number 59

Mark Winnen, Project Manager, Commerce City - PW



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Unit Information	Unit Leader Initials		

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Date:	Comments	Init.

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Revised: 11/06/2020
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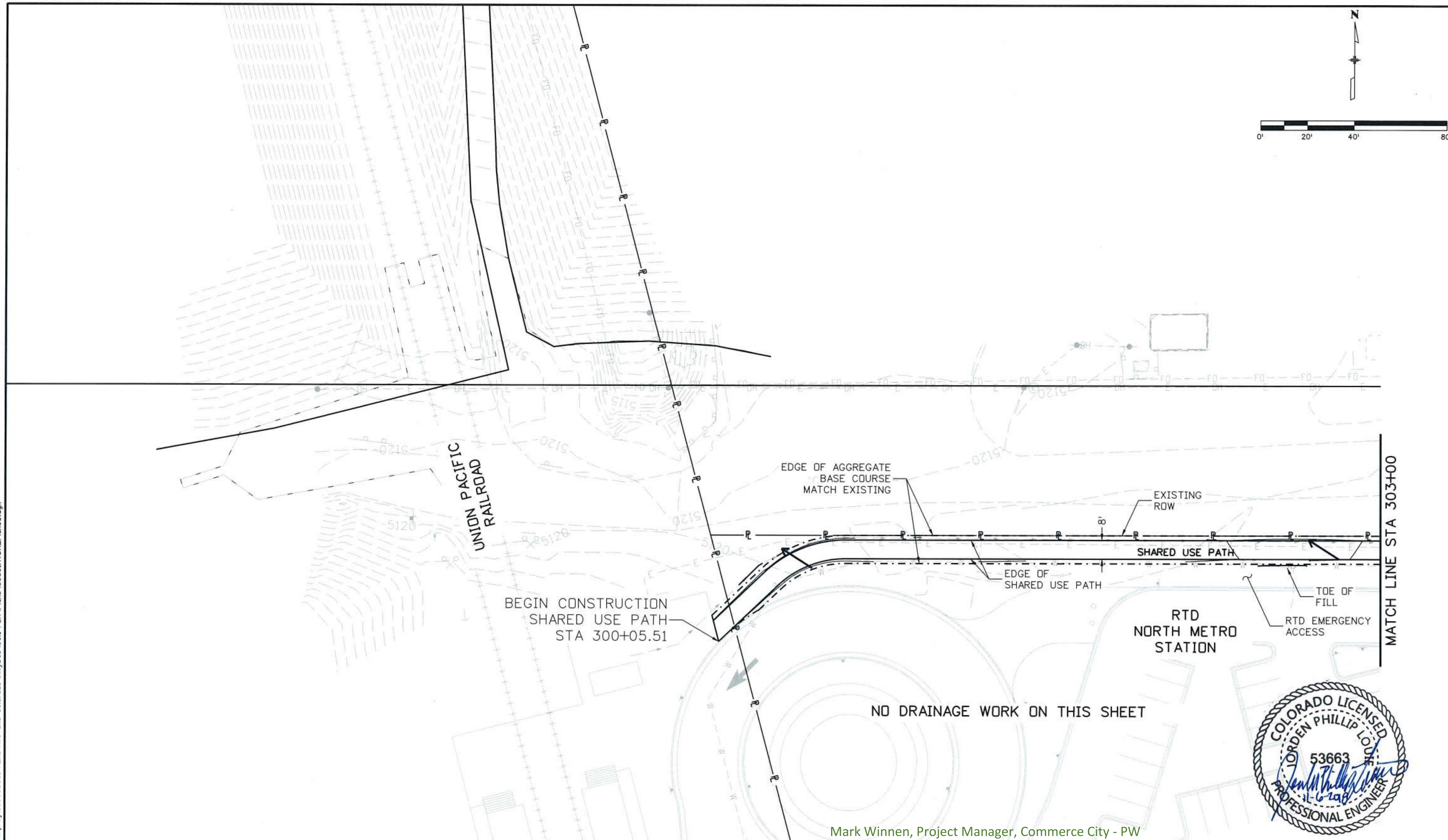
72ND AVE AND COLORADO BLVD
GRADING AND DRAINAGE PLANS

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD	Subset Sheets: 4 of 5	

Project No./Code	
STA M245-011	
21142	
Sheet Number	60

Mark Winnen, Project Manager, Commerce City - PW



Mark Winnen, Project Manager, Commerce City - PW

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Date:	Comments	Init.

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Revised:
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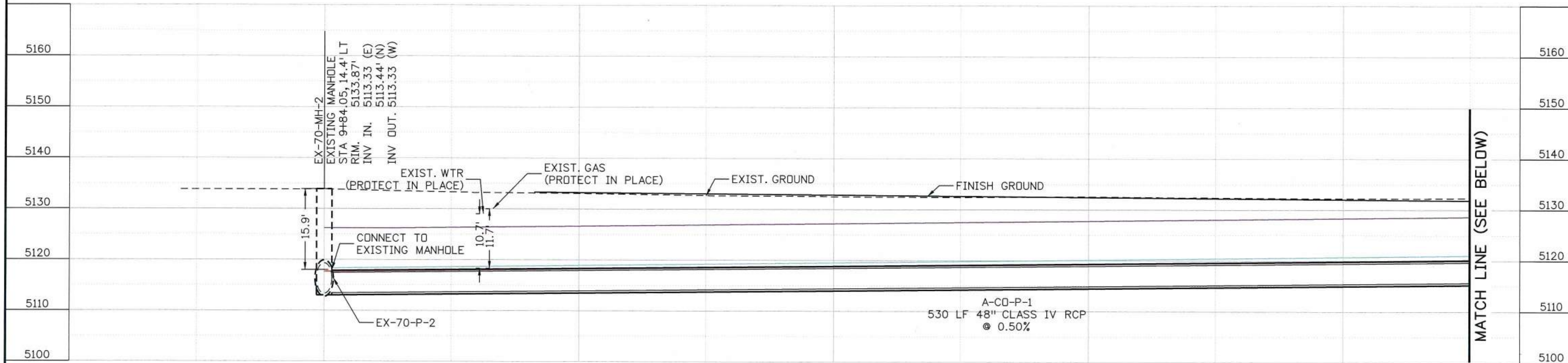
72ND AVE AND COLORADO BLVD
GRADING AND DRAINAGE PLANS

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD	Subset Sheets: 5 of 5	

Project No./Code
STA M245-011
21142
Sheet Number 61

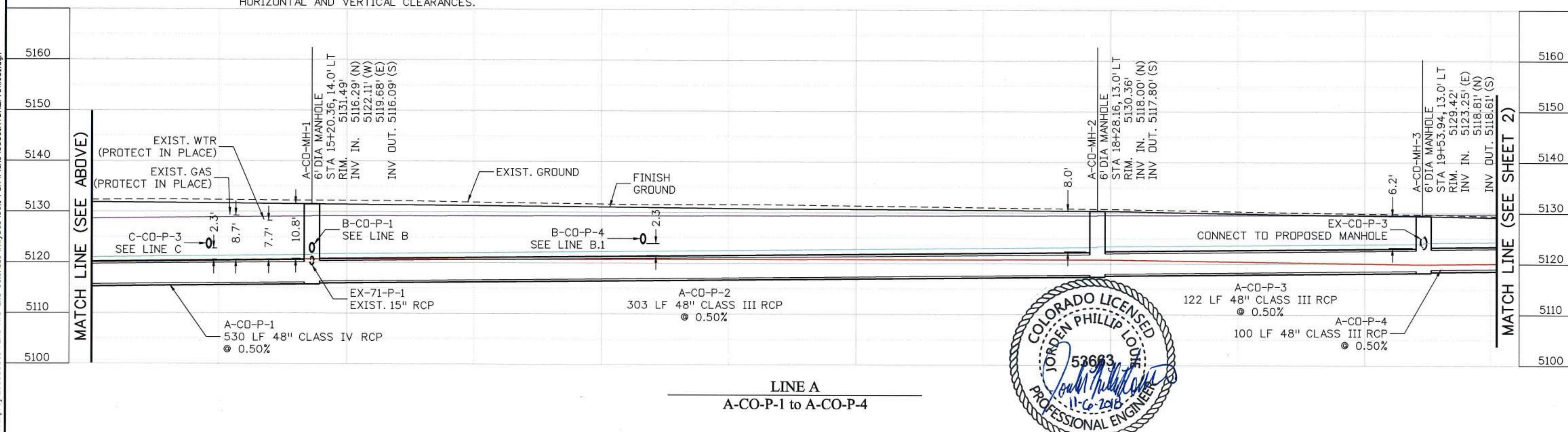


LEGEND & NOTES

- 5-YR HGL (PROP)
- 100-YR HGL (PROP)
- 100-YR HGL (FUTURE)
- - - - EXISTING STORM DRAIN
- FUTURE STORM DRAIN

1. ALL STATION OFFSET VALUES ARE MEASURED TO COLORADO BLVD CENTER LINE.
2. ALL CLEARANCES TO UTILITES AND DISPOSITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF THE SUBMITTAL. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL CLEARANCES.

LINE A
EX-70-MH-2 to A-CO-P-1



LINE A
A-CO-P-1 to A-CO-P-4

Print Date: 9/20/2018	
File Name: 53391HYDR_Profile01.dgn	
Horiz. Scale: 1:40	Vert. Scale: As Noted
Unit Information	Unit Leader Initials

Sheet Revisions

Date:	Comments	Init.

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No Revisions: 11/06/2020
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Void:

72ND AVE AND COLORADO BLVD
DRAINAGE PROFILES

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD PRO	Subset Sheets: 1	of 3

Project No./Code
STA M245-011
21142
Sheet Number 62

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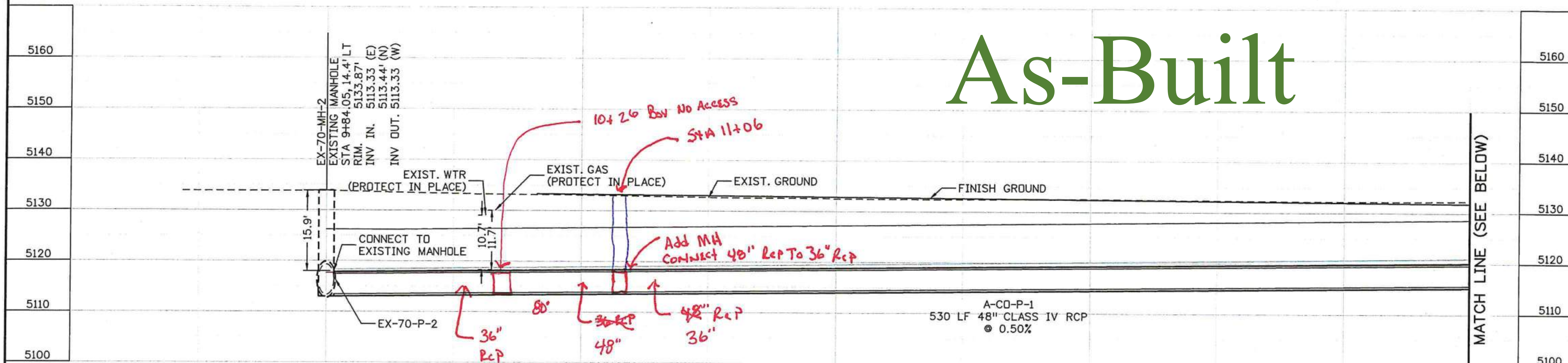
Mark Winnen, Project Manager, Commerce City - PW

As-Built

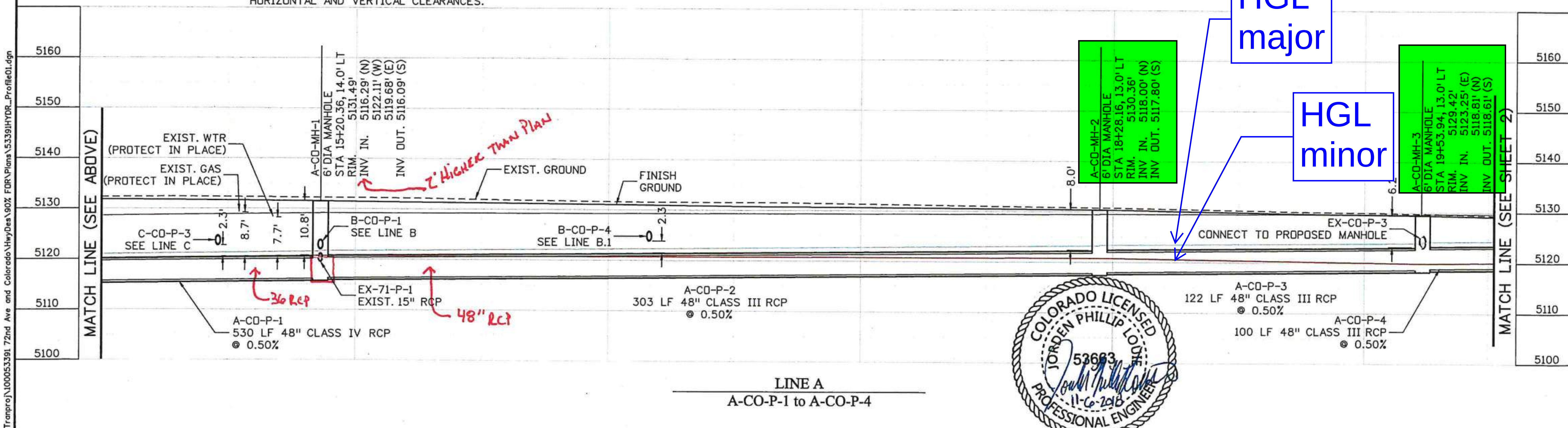


LINE A
EX-70-MH-2 to A-CO-P-1

LEGEND & NOTES

5-YR HGL (PROP)
100-YR HGL (PROP)
100-YR HGL (FUTURE)
EXISTING STORM DRAIN
FUTURE STORM DRAIN

1. ALL STATION OFFSET VALUES ARE MEASURED TO COLORADO BLVD CENTER LINE.
2. ALL CLEARANCES TO UTILITES AND DISPOSITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF THE SUBMITTAL. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL CLEARANCES.



LINE A
A-CO-P-1 to A-CO-P-4

Print Date: 9/20/2018			
File Name: 53391HYDR_Profile01.dgn			
Horiz. Scale: 1:40	Vert. Scale: As Noted		
Unit Information	Unit Leader Initials		

Sheet Revisions

Date:	Comments	Init.

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No Revisions:
Revised: 11/06/2020
Void:

72ND AVE AND COLORADO BLVD
DRAINAGE PROFILES

Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD PRO	Subset Sheets: 1 of 3	

Project No./Code
STA M245-011
21142
Sheet Number 62

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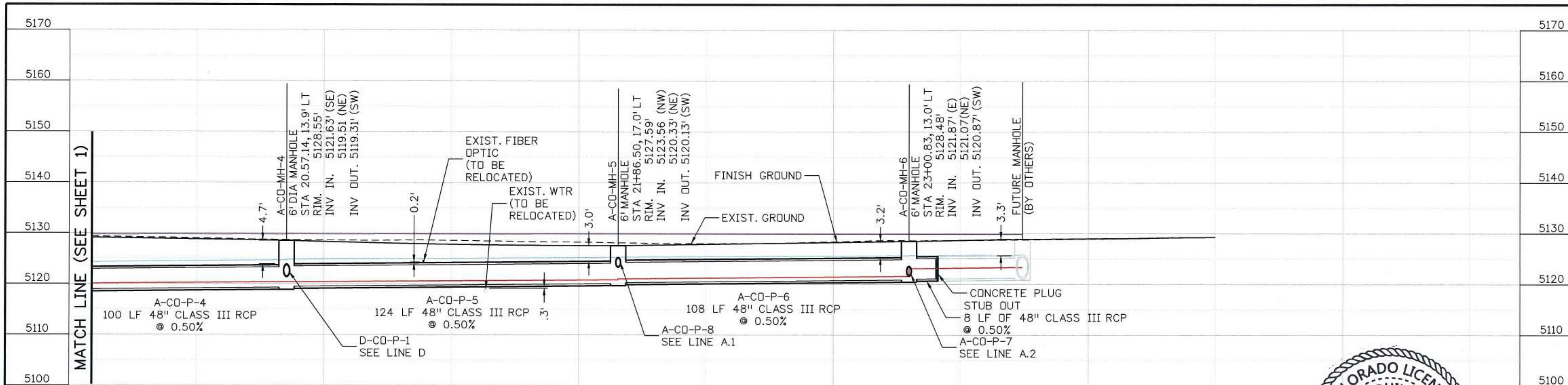
Mark Winnen, Project Manager, Commerce City - PW



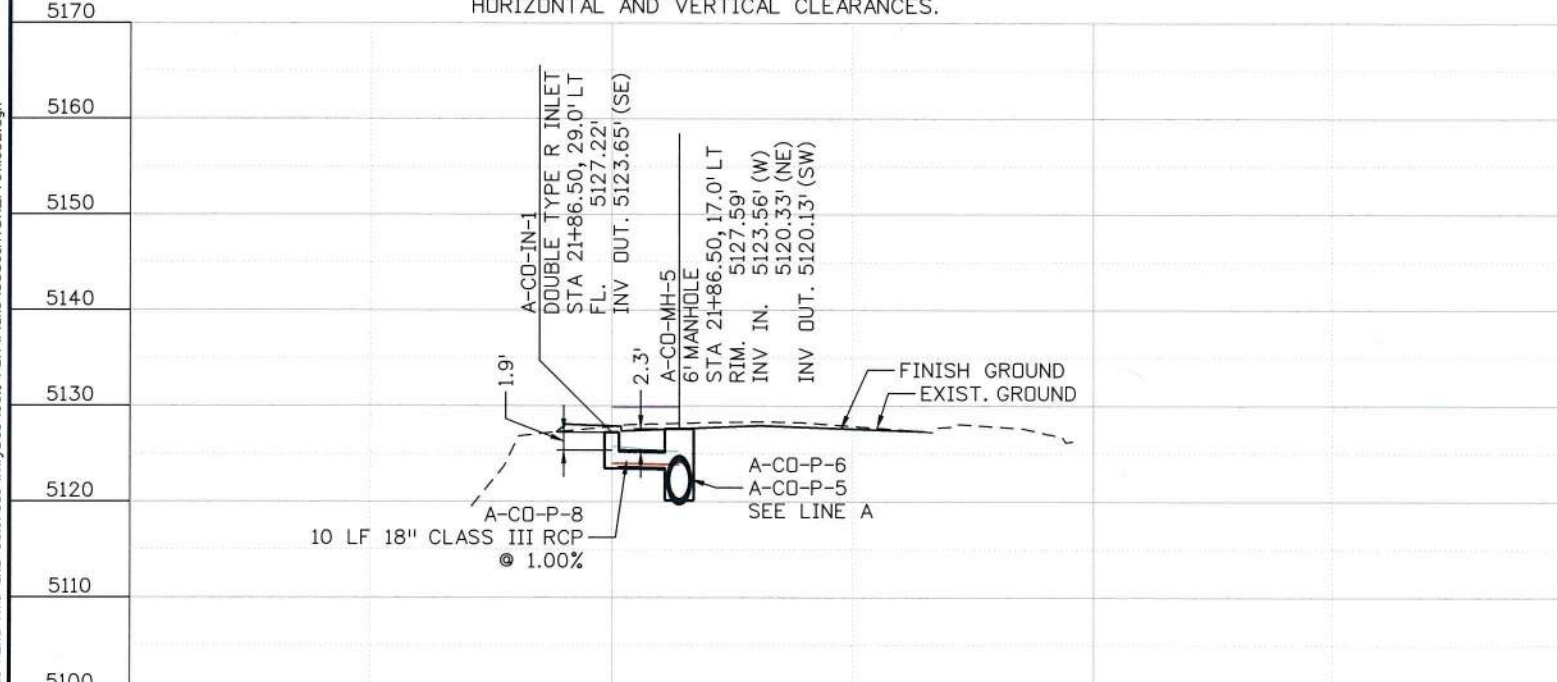
LINE A
A-CO-P-4 to A-CO-MH-6

LEGEND & NOTES

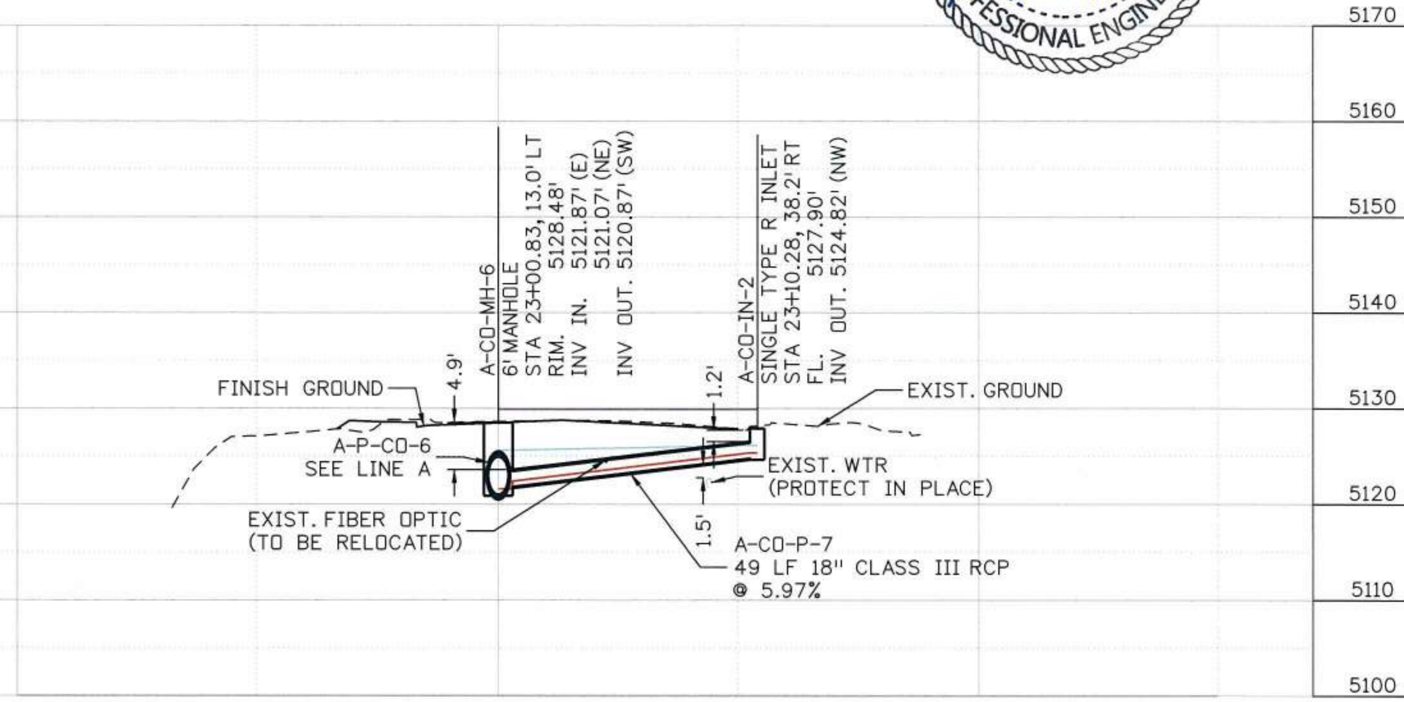
- 5-YR HGL (PROP)
- 100-YR HGL (PROP)
- 100-YR HGL (FUTURE)
- EXISTING STORM DRAIN
- FUTURE STORM DRAIN

1. ALL STATION OFFSET VALUES ARE MEASURED TO COLORADO BLVD CENTER LINE.
2. ALL CLEARANCES TO UTILITES AND DISPOSITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF THE SUBMITTAL. CONTRACTOR TO VERIFY HORIZONTAL AND VERTICAL CLEARANCES.

COLORADO LICENSED
JORDEN PHILLIP LOUIE
53663
11-6-2018
PROFESSIONAL ENGINEER



LINE A.1
A-CO-IN-1 to A-CO-MH-5



LINE A.2
A-CO-MH-6 TO A-CO-IN-2

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Sheet Revisions

Date:	Comments	Init.

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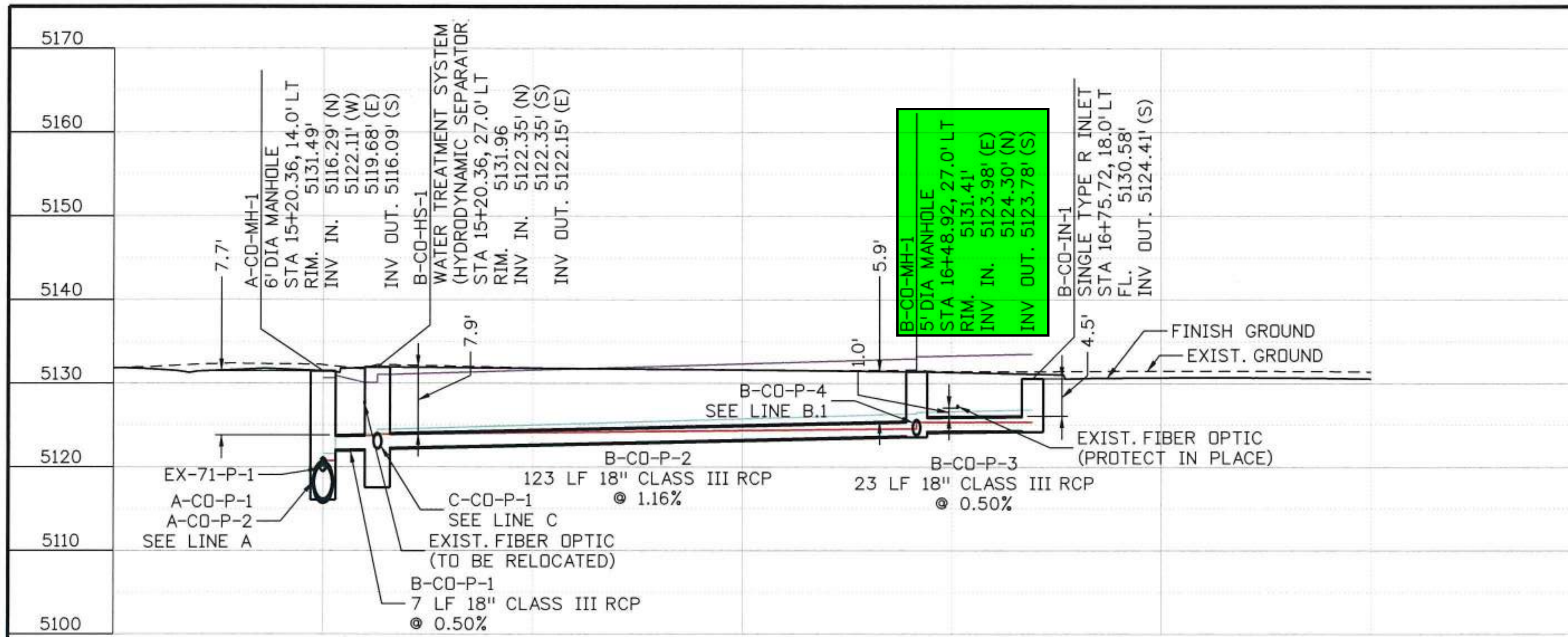
No Revisions: 11/06/2020
Revised:
Void:

72ND AVE AND COLORADO BLVD
DRAINAGE PROFILES

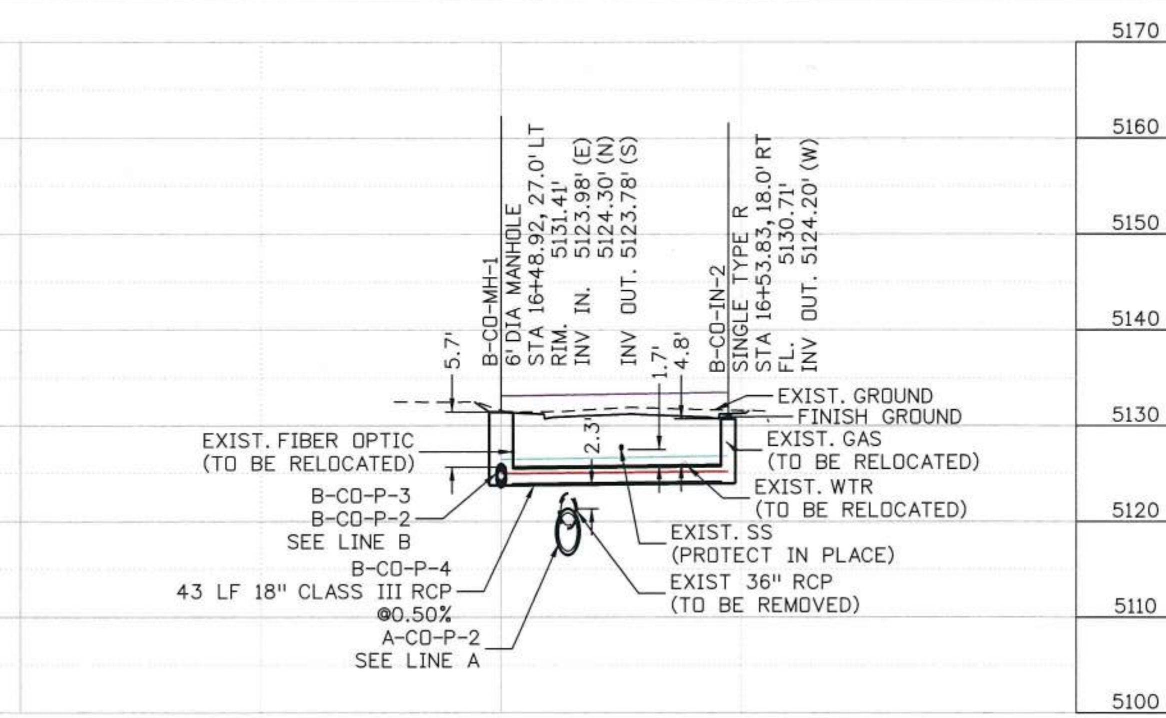
Designer:	J. Louie	Structure Numbers	
Detailer:	S. Lynn		
Sheet Subset:	HYD PRO	Subset Sheets: 2 of 3	

Project No./Code
STA M245-011
21142
Sheet Number 63

Mark Winnen, Project Manager, Commerce City - PW



LINE B
A-CO-MH-1 to B-CO-IN-1



LINE B.1
B-CO-MH-1 to B-CO-IN-2

LEGEND & NOTES

- 5-YR HGL (PROP)
- 100-YR HGL (PROP)
- 100-YR HGL (FUTURE)
- EXISTING STORM DRAIN
- FUTURE STORM DRAIN

1. ALL STATION OFFSET VALUES ARE MEASURED TO COLORADO BLVD CENTER LINE.
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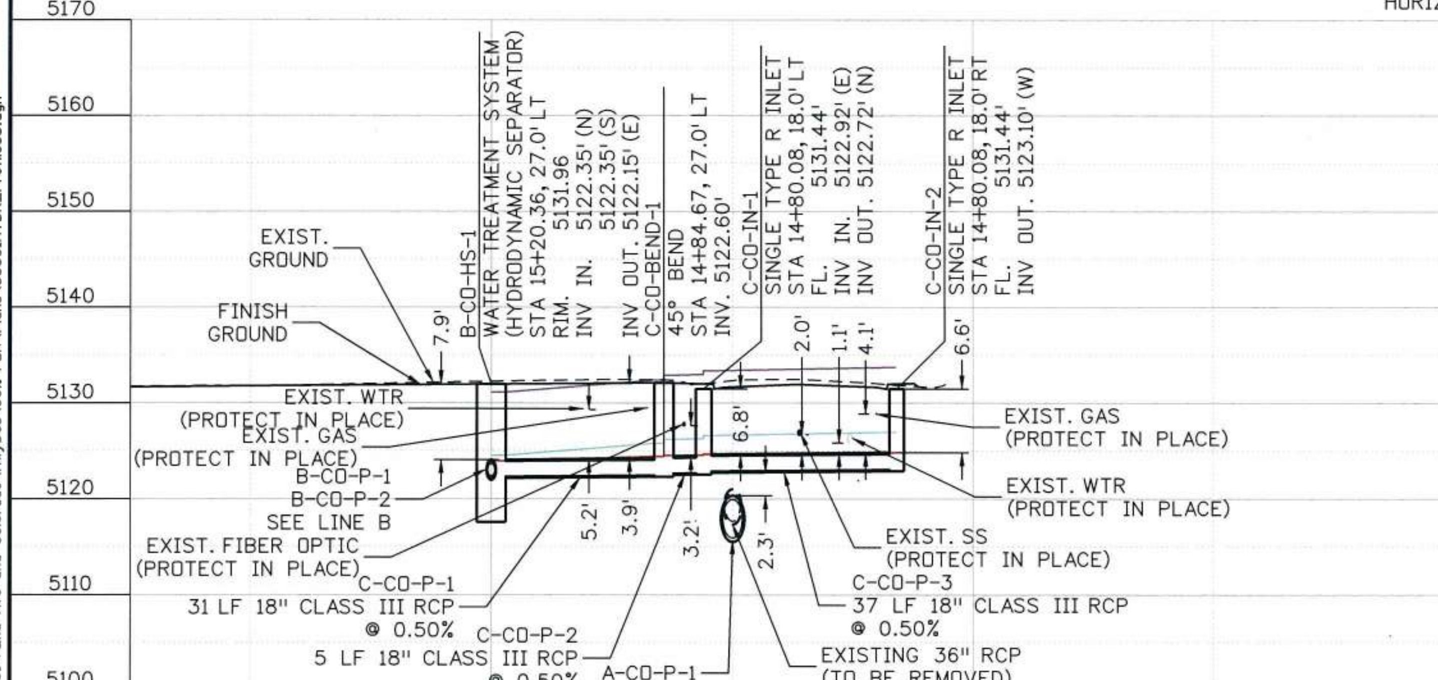
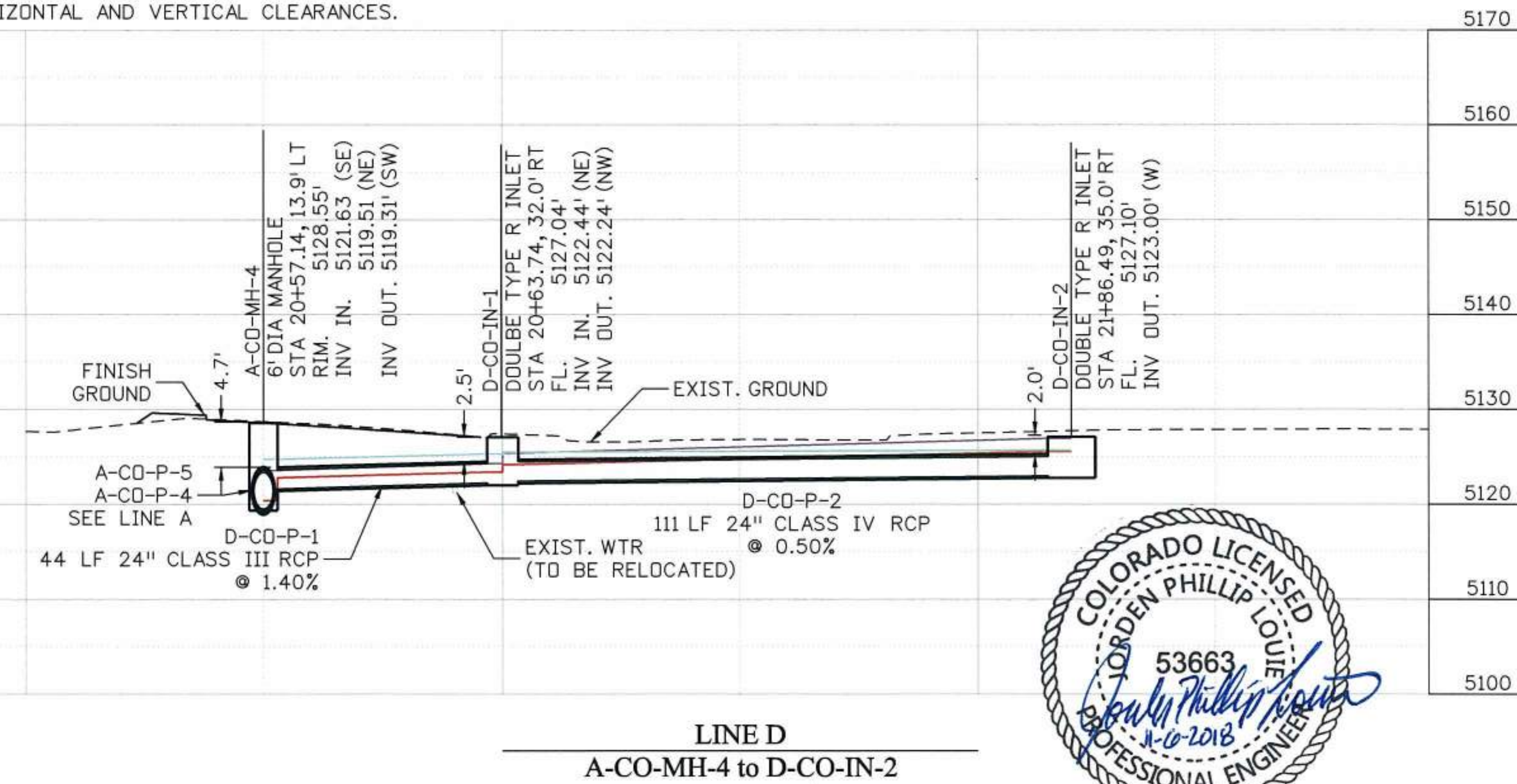


LINE C
B-CO-HS-1 to C-CO-IN-2



LINE D
A-CO-MH-4 to D-CO-IN-2

Mark Winnen, Project Manager, Commerce City - PW

Print Date: 9/20/2018		Sheet Revisions		
File Name: 53391HYDR_Profile03.dgn		Date:	Comments	Init.
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Unit Information	Unit Leader Initials			

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AS CONSTRUCTED	72ND AVE AND COLORADO BLVD DRAINAGE PROFILES			Project No./Code
No Revisions:				STA M245-011
Revised:	Designer: J. Louie	Structure Numbers		21142
	Detailer: S. Lynn			
Void:	Sheet Subset: HYD PRO	Subset Sheets: 3 of 3		Sheet Number 64

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Project:	Z-984-22
Location:	7001 Colorado Ave
Review Type:	Annexation, Zone Change, and Vacation of ROW
Fire Code:	2018 International Fire Code with Local Amendments
Planner:	Anita Riley
Date:	04/20/2022
Reviewer:	Savannah Elliott, Fire Prevention Specialist

Comments specific to the Development Review will be in red. These comments require response from the applicant. In addition to submitting a response to Commerce City, South Adams County Fire Department requires responses to be submitted directly to the Reviewer. The 2018 International Fire Code may be referenced at: https://codes.iccsafe.org/content/IFC2018?site_type=public

General

1. South Adams County Fire Department (SACFD) requires an impact fee of $250.00 per unit for multi-family, $668.00 per single family dwelling, $0.06 per square foot for industrial/warehouse, and $0.46 per square foot for commercial/retail of any proposed building. For fees and other information see https://sacfd.org/fireandemergencyservicesimpactfees/
2. SACFD has no comments for the annexation, zone change, or vacation of ROW. That is subject to change as more information is received or if there are changes to the plans during subsequent reviews.

If/when application for construction/building permits are submitted, SACFD will review related plans at that time, to include any related comments.

Please contact your assigned SACFD plans examiner by phone or e-mail if you have any questions regarding the comments on the following pages or if you would like to set up a meeting.

Savannah Elliott
Fire Prevention Specialist
International Code Council – Fire Inspector II Cert #9533641

Project:	AN-265-22, Z984-22, V-94-22
Location:	7001 Colorado Ave
Review Type:	Annexation, Zone Change, and Vacation of ROW
Fire Code:	2018 International Fire Code with Local Amendments
Planner:	Anita Riley
Date:	03/16/2022
Reviewer:	Savannah Elliott, Fire Prevention Specialist

Comments specific to the Development Review will be in red. These comments require response from the applicant. In addition to submitting a response to Commerce City, South Adams County Fire Department requires responses to be submitted directly to the Reviewer. The 2018 International Fire Code may be referenced at: https://codes.iccsafe.org/content/IFC2018?site_type=public

General

1. South Adams County Fire Department (SACFD) requires an impact fee of $250.00 per unit for multi-family, $668.00 per single family dwelling, $0.06 per square foot for industrial/warehouse, and $0.46 per square foot for commercial/retail of any proposed building. For fees and other information see https://sacfd.org/fireandemergencyservicesimpactfees/
2. At this time SACFD has no comments regarding the Annexation, Zone Change, and Vacation of ROW. This is subject to change as more information is received or if there are changes to the plans during subsequent reviews.

If/when application for construction/building permits are submitted, SACFD will review related plans at that time, to include any related comments.

Please contact your assigned SACFD plans examiner by phone or e-mail if you have any questions regarding the comments on the following pages or if you would like to set up a meeting.

Savannah Elliott
Fire Prevention Specialist
International Code Council – Fire Inspector II Cert #9533641

Re:	**AN-265-22, Z-984-22, V-94-22, S-822-22**
Date:	**6/9/2022**
Review Type:	**Multiple Types: Annexation, Vacation, Zoning, Subdivision**
Applicant Name:	Prospect
Applicant Address:	4100 E. Iliff Ave. #20, Devner, CO 80205
Project Name:	**7001 Colorado Blvd. – Multi Family**
Project Location:	7001 Colorado Blvd.
Reviewer:	Jeff Nelson, Development Review Supervisor

SACWSD Rules & Regulations can be found here:
https://www.sacwsd.org/DocumentCenter/View/776/Rules-and-Regulations?bidId=
SACWSD Design & Construction Standards can be found here:
https://www.sacwsd.org/DocumentCenter/View/773/SACWSD-Design-Standards-and-Specifications?bidId=
SACWSD Service Application can be found here:
https://www.sacwsd.org/DocumentCenter/View/912/Development-Service-Application-2021?bidId=
SACWSD Developer Checklist can be found here:
https://www.sacwsd.org/DocumentCenter/View/774/General-DevelopmentChecklist?bidId=

General comments to the referenced review can be found below. Any response from the applicant must be sent to SACWSD Development by emailing Development@sacwsd.org.

General Comments:

1. Determine whether the parcel is included in the District. If not, initiate the inclusion process and become included within the District's service area. This process typically takes between 90-180 days to complete. If the parcel is not included, offsite utility construction may be required to provide adequate fire flows to this site.
2. Identify the source and amount of water owned in order to serve the entire development as envisioned and present evidence to support ownership of adequate Equivalent Residential Units (ERUs).
3. Complete the District's service application with corresponding design plans including site, potable water, irrigation water, and wastewater utility plans, plumbing plans, and District standard details.
4. Design and construct the District's water and sewer infrastructure in accordance with current approved Design Standards and Construction Specifications.
5. Per SACWSD rules and regulations each building will be required to have individual water meters and sanitary sewer service lines.
6. Pay appropriate connection fees and pass all required inspections.

Project Special Comments:

No Special Comments.

If you have any questions about the comments given, please contact the SACWSD Development department at **(720) 206 – 0595** or email Development@sacwsd.org.

Sincerely,
Jeff Nelson
Development Review Supervisor

From: Tolbert, James - CD
To: Riley, Anita - CD
Subject: FW: 7001 Colorado Blvd
Date: Friday, February 25, 2022 8:23:51 AM
Attachments: image002.png
image004.png
image003.png

---

fyi

From: Adame, Kimberly - CD <kadame@c3gov.com>
Sent: Friday, February 25, 2022 8:22 AM
To: Tolbert, James - CD <jtolbert@c3gov.com>
Subject: FW: 7001 Colorado Blvd

Comment from SACWD

From: Jeff Nelson <JNelson@sacwsd.org>
Sent: Friday, February 25, 2022 8:22 AM
To: Adame, Kimberly - CD <kadame@c3gov.com>; Sharleen Maier <smaier@sacwsd.org>
Subject: 7001 Colorado Blvd

Sharleen
The below project has the general comments response from SACWSD. No Special Conditions.

Sincerely,

Jeff Nelson
Development Review Supervisor
jnelson@sacwsd.org

South Adams County Water & Sanitation District
10200 East 102nd Avenue, Henderson, CO 80640

Direct: 720-206-0593, Cell: 720-530-8396

South Adams County Water & Sanitation District

From: Adame, Kimberly - CD <kadame@c3gov.com>
Sent: Friday, February 25, 2022 8:15 AM
To: Soderlin, Brent - PW <bsoderlin@c3gov.com>; Claymore, Michelle - CM <mclaymore@c3gov.com>; Jones, Jennifer - CD <jjones@c3gov.com>; Rogers, Jason - CM <jrogers@c3gov.com>; Alverson, Lee - PW <lalverson@c3gov.com>; Renk, Michael - PW <mrenk@c3gov.com>; Hader, Matt - CA <mhader@c3gov.com>; Jeff Nelson <JNelson@sacwsd.org>; Lowery, Jenna - CM <jlowery@c3gov.com>;

June 9, 2022

Anita Riley
City of Commerce City
Community Development Department
7887 East 60th Avenue
Commerce City, CO 80022

RE: Prospect, S-822-22 & AN-265-22 - Revised
TCHD Case No. 7615 & 7616

Dear Ms. Riley,

Thank you for the opportunity to review and comment on the Plat to create a 4.06-acre lot and the second submittal of the Annexation, rezoning, and right-of-way (ROW) vacation for a multi-family housing development located at 7001 Colorado Boulevard. Tri-County Health Department (TCHD) staff previously reviewed the application for the Annexation, Zone Change, and Vacation of ROW and, in a letter dated March 9, 2022 responded with the comments included below. The applicant noted our comments in a letter dated March 28, 2022. TCHD has no further comments.

Historic Landfill
According to TCHD's records, there are historic landfills located within 1,000 feet of the subject property referenced as Landfill No. AD-111, AD-235, AD-065, AD-064, and AD-154. Flammable gas from decomposing organic matter in landfills may travel up to 1,000 feet from the source. At such time that construction is planned on this property, we recommend the following:

1. A flammable gas investigation should be conducted to determine if flammable gas (methane) is present in the subsurface soils at the property. The plan for the investigation should be submitted to TCHD for review and approval.

2. TCHD will review the results of the investigation. If the investigation indicates that methane is not present at or above 20% of the lower explosive limit for methane (1% by volume in air) in the soils, no further action is required.

3. In lieu of the investigation, a flammable gas control system shall be designed and constructed to protect buildings and subsurface access to utilities, i.e. vaults, manholes, etc. from flammable gas. Health and safety practices shall be followed during construction to protect site workers. A copy of TCHD guidelines for safe construction in areas on or near former landfills has been attached.

Questions regarding this may be directed to Warren Brown at 720-200-1568 or wbrown@tchd.org.

Community design to support walking and bicycling
Because chronic diseases related to physical inactivity and obesity now rank among the country's greatest public health risks, TCHD encourages community designs that make it easy for people to include regular physical activity, such as walking and bicycling, in their daily routines. Because research shows that the way we design our communities can encourage regular physical activity, TCHD strongly supports community plans that incorporate pedestrian and bicycle amenities that support the use of a broader pedestrian and bicycle network. Increasing multi-modal transportation has additional co-benefits including improved air quality, which can reduce contributions to climate change and exposure to pollutants associated with a number of health problems including asthma, lung cancer, and heart disease.

In order to promote walking and bicycling through this development, TCHD encourages the applicant to consider the inclusion of the following as they design the community.

1. A system of sidewalks, bike paths and open space trail networks that are well-designed and well-lit, safe, and attractive so as to promote bicycle and pedestrian use.

2. Bicycle and pedestrian networks that provide direct connections between destinations in and adjacent to the community.

3. Where public transportation systems exist, direct pedestrian access should be provided to increase transit use and reduce unnecessary vehicle trips, and related vehicle emissions. The pedestrian/bicycle networks should be integrated with the existing and future transit plans for the area.

4. Streets that are designed to be pedestrian/bike friendly and to reduce vehicle and pedestrian/bicycle fatalities.

5. Bicycle facilities and racks are provided in convenient locations.

Connections to Transit:
Communities that promote walking, bicycling and transit trips can also help protect air quality by reducing vehicle trips and related emissions. TCHD supports projects that address the needs of groups (e.g., seniors, the disabled) who cannot or do not drive. Transit-friendly developments can make it easier for these groups to access services and to maintain connections within the community, which can also have health benefits. The proposed development is located adjacent to the Commerce City & 72nd Station. TCHD recommends the applicant consider how best to connect the development to the transit station.

Fugitive Dust – Building Demolition
Exposure to air pollution is associated with a number of health problems including asthma, lung cancer, and heart disease. The Colorado Department of Public Health and Environment Air Pollution Control Division (APCD) regulates air emissions. The application indicates that the existing building on the site will be demolished. State air quality regulations require that precautions be taken prior to demolition of buildings to evaluate the presence of asbestos fibers that may present a health risk. If asbestos is present, actions must be taken to prevent their release into the environment. State regulations also address control of ozone depleting compounds (chlorofluorocarbons) that may be contained in air conditioning or refrigerating equipment. The applicant shall contact the APCD at (303) 692-3100 for more information. Additional information is available at http://www.cdphe.state.co.us/ap/asbestos.

Vector Control – Building Demolition
Rodents such as mice and rats carry diseases which can be spread to humans through contact with rodents, rodent feces, urine, saliva, or through rodent bites. For example, Hantavirus Pulmonary Syndrome (HPS), a rare but potentially lethal viral infection, can be found in the droppings and urine of rodents commonly found in southwestern United States. When buildings are demolished, rodents can spread to surrounding properties and increase the risk of vector exposure to humans. The applicant should plan for vectors and eliminate any known infestations prior to demolition. Information on rodent control can be found at http://www.tchd.org/400/Rodent-Control.

Please feel free to contact me at 720-200-1575 or kboyer@tchd.org if you have any questions on TCHD's comments.

Sincerely,

KBoyer

Kathy Boyer, REHS
Land Use and Built Environment Specialist III

cc: Keith Homersham, Warren Brown, TCHD

HEALTH AND SAFETY PRACTICES DURING CONSTRUCTION ON OR NEAR FORMER LANDFILLS

If it has not been demonstrated that flammable gas is not present, the following health and safety practices shall be followed:

1. A flammable gas indicator will be utilized at all times during trenching, excavation, drilling, or when working within ten (10) feet of an open excavation.

2. Before personnel are permitted to enter an open trench or excavation, the trench or excavation will be monitored to ensure that flammable gas is not present in concentrations exceeding 1% and that oxygen is present at a minimum concentration of 19.5%. When in an excavation or trench, each work party will work no more than five (5) feet from a continuous flammable gas and oxygen monitor.

3. When trenching, excavating, or drilling deeper than two (2) feet into the fill, or in the presence of detectable concentrations of flammable gas, the soils will be wetted and the operating equipment will be provided with spark proof exhausts.

4. A dry chemical fire extinguisher, ABC rated, will be provided on all equipment used in the landfill.

5. Personnel within or near an open trench or drill hole will be fully clothed, and wear shoes with non-metallic soles, a hard hat and safety goggles or glasses.

6. Exhaust blowers will be used where trenches show a concentration of 1% flammable gas or a concentration of less than 19.5% oxygen.

7. Smoking will not be permitted in any area within one hundred (100) feet of the excavation.

8. Personnel will be kept upwind of any open trench unless the trench is continuously monitored.

9. All other applicable Safety and Health Regulations for Construction, as promulgated in 29 CFR by the Occupational Safety and Health Administration, shall be met. Applicable regulations include, but may not be limited to, the confined space standard (Part 1926.21(b)(6)(i) and (ii) in Subpart C); gases, vapors, fumes, dusts and mists (Part 1926.55 in Part 1926 Subpart E); fire protection and prevention (Part 1926 Subpart F); and trenching and excavation (Part 1926 Subpart P).

10. Compliance with the Occupational Safety and Health Administration’s confined space requirements for general industry, as promulgated in 29 CFR 1910.146 and Appendices A- F.

March 9, 2022

Anita Riley
City of Commerce City
Community Development Department
7887 East 60th Avenue
Commerce City, CO 80022

RE: Prospect, AN-265-22, Z-984-11, V-95-22
TCHD Case No. 7541

Dear Ms. Riley,

Thank you for the opportunity to review and comment on the Annexation, Zone Change, and Vacation of Right-of-Way (ROW) for a multi-family housing development located at 7001 Colorado Boulevard. Tri-County Health Department (TCHD) staff has reviewed the application for compliance with applicable environmental and public health regulations and principles of healthy community design. After reviewing the application, TCHD has the following comments.

Historic Landfill
According to TCHD's records, there are historic landfills located within 1,000 feet of the subject property referenced as Landfill No. AD-111, AD-235, AD-065, AD-064, and AD-154. Flammable gas from decomposing organic matter in landfills may travel up to 1,000 feet from the source. Because construction is planned on this property, we recommend the following:

1. A flammable gas investigation should be conducted to determine if flammable gas (methane) is present in the subsurface soils at the property. The plan for the investigation should be submitted to TCHD for review and approval.

2. TCHD will review the results of the investigation. If the investigation indicates that methane is not present at or above 20% of the lower explosive limit for methane (1% by volume in air) in the soils, no further action is required.

3. In lieu of the investigation, a flammable gas control system shall be designed and constructed to protect buildings and subsurface access to utilities, i.e. vaults, manholes, etc. from flammable gas. Health and safety practices shall be followed during construction to protect site workers. A copy of TCHD guidelines for safe construction in areas on or near former landfills has been attached.

Questions regarding this may be directed to Sheila Lynch at 720-200-1571 or slynch@tchd.org.

Community design to support walking and bicycling

Because chronic diseases related to physical inactivity and obesity now rank among the country's greatest public health risks, TCHD encourages community designs that make it easy for people to include regular physical activity, such as walking and bicycling, in their daily routines. Because research shows that the way we design our communities can encourage regular physical activity, TCHD strongly supports community plans that incorporate pedestrian and bicycle amenities that support the use of a broader pedestrian and bicycle network. Increasing multi-modal transportation has additional co-benefits including improved air quality, which can reduce contributions to climate change and exposure to pollutants associated with a number of health problems including asthma, lung cancer, and heart disease.

In order to promote walking and bicycling through this development, TCHD encourages the applicant to consider the inclusion of the following as they design the community.

1. A system of sidewalks, bike paths and open space trail networks that are well-designed and well-lit, safe, and attractive so as to promote bicycle and pedestrian use.

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5. Bicycle facilities and racks are provided in convenient locations.

Connections to Transit:

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Fugitive Dust – Building Demolition

Exposure to air pollution is associated with a number of health problems including asthma, lung cancer, and heart disease. The Colorado Department of Public Health and

Environment Air Pollution Control Division (APCD) regulates air emissions. The application indicates that the existing building on the site will be demolished. State air quality regulations require that precautions be taken prior to demolition of buildings to evaluate the presence of asbestos fibers that may present a health risk. If asbestos is present, actions must be taken to prevent their release into the environment. State regulations also address control of ozone depleting compounds (chlorofluorocarbons) that may be contained in air conditioning or refrigerating equipment. The applicant shall contact the APCD at (303) 692-3100 for more information. Additional information is available at http://www.cdphe.state.co.us/ap/asbestos.

Vector Control – Building Demolition
Rodents such as mice and rats carry diseases which can be spread to humans through contact with rodents, rodent feces, urine, saliva, or through rodent bites. For example, Hantavirus Pulmonary Syndrome (HPS), a rare but potentially lethal viral infection, can be found in the droppings and urine of rodents commonly found in southwestern United States. When buildings are demolished, rodents can spread to surrounding properties and increase the risk of vector exposure to humans. The applicant should plan for vectors and eliminate any known infestations prior to demolition. Information on rodent control can be found at http://www.tchd.org/400/Rodent-Control.

Please feel free to contact me at 720-200-1585 or aheinrich@tchd.org if you have any questions on TCHD's comments.

Sincerely,

AHF

Annemarie Heinrich Fortune, MPH/MURP
Land Use and Built Environment Specialist

cc: Sheila Lynch, Keith Homersham, Warren Brown, TCHD

HEALTH AND SAFETY PRACTICES DURING CONSTRUCTION ON OR NEAR FORMER LANDFILLS

If it has not been demonstrated that flammable gas is not present, the following health and safety practices shall be followed:

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2. Before personnel are permitted to enter an open trench or excavation, the trench or excavation will be monitored to ensure that flammable gas is not present in concentrations exceeding 1% and that oxygen is present at a minimum concentration of 19.5%. When in an excavation or trench, each work party will work no more than five (5) feet from a continuous flammable gas and oxygen monitor.

3. When trenching, excavating, or drilling deeper than two (2) feet into the fill, or in the presence of detectable concentrations of flammable gas, the soils will be wetted and the operating equipment will be provided with spark proof exhausts.

4. A dry chemical fire extinguisher, ABC rated, will be provided on all equipment used in the landfill.

5. Personnel within or near an open trench or drill hole will be fully clothed, and wear shoes with non-metallic soles, a hard hat and safety goggles or glasses.

6. Exhaust blowers will be used where trenches show a concentration of 1% flammable gas or a concentration of less than 19.5% oxygen.

7. Smoking will not be permitted in any area within one hundred (100) feet of the excavation.

8. Personnel will be kept upwind of any open trench unless the trench is continuously monitored.

9. All other applicable Safety and Health Regulations for Construction, as promulgated in 29 CFR by the Occupational Safety and Health Administration, shall be met. Applicable regulations include, but may not be limited to, the confined space standard (Part 1926.21(b)(6)(i) and (ii) in Subpart C); gases, vapors, fumes, dusts and mists (Part 1926.55 in Part 1926 Subpart E); fire protection and prevention (Part 1926 Subpart F); and trenching and excavation (Part 1926 Subpart P).

10. Compliance with the Occupational Safety and Health Administration's confined space requirements for general industry, as promulgated in 29 CFR 1910.146 and Appendices A- F.

From: GIS

Subject: GIS Approved Subdivisions

Date: 06/09/2022

The city of Commerce City GIS Division has approved the following subdivision address plats.

S-822-22, AN-265-22, Z-984-22, V-94-22 located at 7001 COLORAD BLVD
S-772-20-21 Legato Filing 1
S-771-20-21 Legato Filing 2

These subdivision cases have satisfied the criteria of the Roadway Naming and Addressing Standards for the city of Commerce City. GIS has no further comments on the addresses for these cases. Final approved address plats have been issued.

Commerce CITY

GIS Division, Information Technology Department
City of Commerce City | 7887 E. 60th Avenue | Commerce City, CO 80022
gis@c3gov.com | www.c3gov.com

Quality Community for a Lifetime

From: Commerce City GIS
To: Riley, Anita - CD
Cc: Commerce City GIS
Subject: 7001 Colorado Blvd review
Date: Friday, March 11, 2022 3:57:43 PM
Attachments: image001.png
REDLINES_7001ColoradoBlvd.pdf
COMMENTS_7001ColoradoBlvd_2.docx

Good afternoon,
Attached are updated redlines and comments from GIS for 7001 Colorado Blvd, Case No. AN-265-22, Z-984-22.
GIS has suggested some addresses to use on the conceptual photo.
Please provide an address plat with these addresses as well as units or a drawing showing units and locations when appropriate in the review process.

Please let us know if you have any questions.

Thank you and enjoy your weekend.

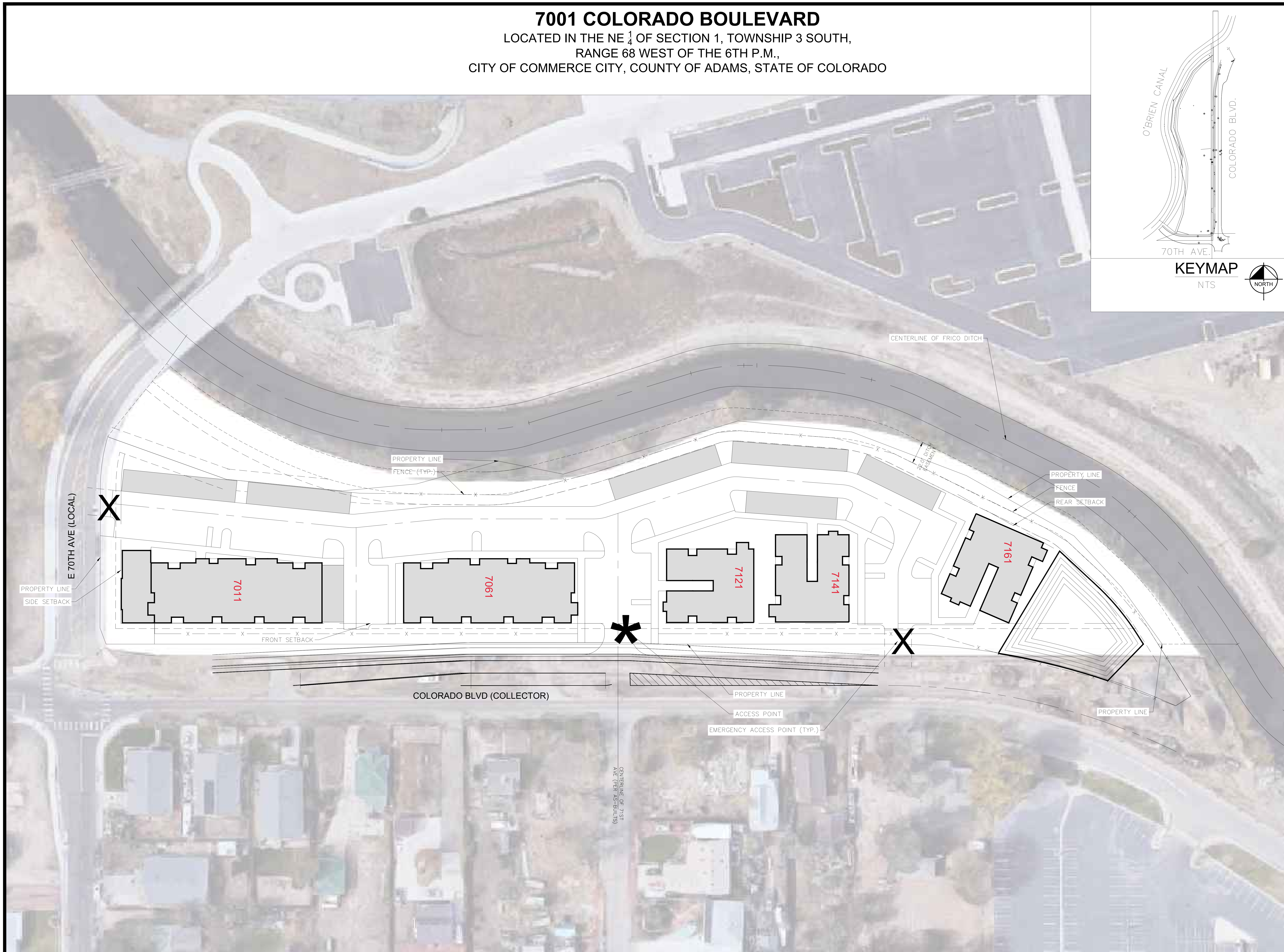
GIS Division, Information Technology Department
City of Commerce City | 7887 E. 60th Avenue | Commerce City, CO 80022
gis@c3gov.com | www.c3gov.com

Quality Community for a Lifetime

City of Commerce City - GIS
Roadway Naming & Addressing Standards
ANOT PPROVED
Date: 03/11/2022 JA

7001 COLORADO BOULEVARD

LOCATED IN THE NE $\frac{1}{4}$ OF SECTION 1, TOWNSHIP 3 SOUTH,
RANGE 68 WEST OF THE 6TH P.M.,
CITY OF COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO



CONCEPT SITE PLAN

SCALE: 1":60'

NO	REVISION	BY	DATE	APPR

Kimley»Horn
KIMLEY-HORN AND ASSOCIATES, INC.
4582 South Ulster Street, Suite 1500
Denver, Colorado 80237 (303) 228-2300

7001 COLORADO BOULEVARD
CITY OF COMMERCE CITY, COUNTY OF ADAMS
CONCEPT SITE PLAN

DATE: 01/28/2022
DESIGNED BY: PMB
DRAWN BY: PMB
CHECKED BY: PMB

FILE NO. 2022.01.25
PROJECT NO. 096216004

SHEET NO.
2

From: DevelopmentSubmittals
To: Riley, Anita - CD
Subject: RE: Case Referral AN-265-22, Z-984-22, V-94-22
Date: Friday, March 18, 2022 3:46:06 PM
Attachments: image006.png
image007.png
image008.png

Hi Anita,

Thank you for including Adams County in the review for Case Referral AN-265-22, Z-984-22, V-94-22. Adams County has no concern with the proposed annexation and zone change to allow for multifamily.

Thank you!

Thanks,

Layla Bajelan
Senior Long Range Planner, *Community and Economic Development*
ADAMS COUNTY, COLORADO
4430 S. Adams County Parkway, 1st Floor, Suite W2000A
Brighton, CO 80601
720.523.6863 | LBajelan@adcogov.org | www.adcogov.org

** New Schedule: Tuesday-Friday 7 a.m. to 5:30 p.m.**

County operating hours: Tuesday through Friday, 7 a.m. to 5:30 p.m.

From: Memmer, Katelyn - CD <kmemmer@c3gov.com>
Sent: Tuesday, February 22, 2022 11:02 AM
Cc: Riley, Anita - CD <ariley@c3gov.com>; Mason, Tricia - CD <tmason@c3gov.com>; Adame, Kimberly - CD <kadame@c3gov.com>
Subject: Case Referral AN-265-22, Z-984-22, V-94-22

Please be cautious: This email was sent from outside Adams County

Hello,

On behalf of the Community Development Department of Commerce City, we invite you to review and comment on this land use application referral. Information on the application, including where and when to send comments, can be found below.

AN-265-22, Z-984-22, V-94-22

Subject: Fwd: 7001 Colorado Boulevard
Date: Friday, January 21, 2022 at 9:44:59 AM Mountain Standard Time
From: Melba Velazquez-Rosario
To: E. Scott McFadden
Attachments: image001.jpg

Good morning Mr McFadden,

Happy to hear our community is growing! We are more than happy to welcome the possibility of serving 100 new families.

Please see the response below from our Executive Director of Operations, Mr. Schwartz.

At your service,

---------- Forwarded message ---------
From: **Matt Schwartz** <mschwart@adams14.org>
Date: Fri, Jan 21, 2022 at 8:00 AM
Subject: Re: 7001 Colorado Boulevard
To: Melba Velazquez-Rosario <mvelazquez@adams14.org>
Cc: Mario Marquez <mcmarquez@adams14.org>

Hi Melba and Mario,

We have the capacity between Alsup and ACMS and / or KMS to add up to 100 families to these sites. The capacity for Alsup is 600 students. Current enrollment is 463. Last I heard on ACMS it was at around 740 students as well as KMS. Both schools have had as many as 840+ We should have space available for this increase and welcome this potential increase in enrollment.

Kind regards,
Matt

From:	Matt Schwartz
To:	Riley, Anita - CD
Cc:	Melba Velazquez-Rosario
Subject:	Re: Case Referral S-822-22
Date:	Thursday, April 28, 2022 2:43:02 PM
Attachments:	image001.png image004.png

Hi Anita,

I've added Melba Velasquez, our Director of Community Engagement, to add any additional information that I may be missing.

Adams 14 is happily accepting students in our district. Students have a choice to attend any of our schools. The closest schools to this site are:

Alsup Elementary School (Stem): 4413 East 68th Avenue
Adams City Middle School: 4451 E. 72nd Avenue
Adams City High School: 7200 Quebec Parkway
Lester Arnold Alternative High School: 6500 East 72nd Avenue

Other schools include:
Dupont Elementary School (Dual Language) PS-5
Monaco Elementary School PS-5
Hanson Elementary School (Dual Language) PS-5
Kemp Elementary School (Dual Language) PS-5
Central Elementary School (Dual Language) PS-5
Rose Hill Elementary School PS-5
Kearney Middle School 6-8
STARS Preschool
Sanville Preschool

If you have any questions, feel free to give me a call.

Kind regards,
Matt

On Tue, Apr 26, 2022 at 5:56 PM Riley, Anita - CD <ariley@c3gov.com> wrote:

> Hello Matt,
>
> Please excuse my late response.
>
> According to the calculations provided in the Commerce City Land Development Code (LDC), this development is expected to generate approximately 18 students. The calculation is based on market rate housing where the applicant anticipates that this development will have affordable housing . If this is the case, the student rate will likely be higher.
>
> Attached is a copy of a Facts to Know for Park, School, and Water Acquisition Fees. It identifies a school land dedication fee-in-lieu in the amount of $396.24/student that will be due at building

permit.

A letter from you indicating the elementary, middle, and high schools that would accept the expected students, as well as whether they have capacity to accept them would be very helpful.

Let me know if you need anything else from me.

Regards,

Commerce CITY

Anita Riley, AICP | Principal Planner

7887 E. 60th Ave. | Commerce City, CO 80022

(303) 289 –3716 | ariley@c3gov.com

From: Matt Schwartz <mschwart@adams14.org>
Sent: Monday, April 4, 2022 10:37 AM
To: Memmer, Katelyn - CD <kmemmer@c3gov.com>
Cc: Riley, Anita - CD <ariley@c3gov.com>; Mason, Tricia - CD <tmason@c3gov.com>; Adame, Kimberly - CD <kadame@c3gov.com>
Subject: Re: Case Referral S-822-22

Hi Katelyn,

Thank you for sharing the planning document. Is there an estimated number of school-aged students that we might expect from these additional residential units?

Kind regards,

Matt

On Thu, Mar 31, 2022 at 12:36 PM Memmer, Katelyn - CD <kmemmer@c3gov.com> wrote:

Hello,

On behalf of the Community Development Department of Commerce City, we invite you to review and comment on this land use application referral. Information on the application, including where and when to send comments, can be found below.

S-822-22

Commerce CITY

REQUEST FOR COMMENT/REVIEW

March 31, 2022

The Community Development Department requests comments on the following:

Case No:	S-822-22	**Type:** S	**Phone:** 303.289.3716
Case Planner:	Anita Riley	**Email:**	ariley@c3gov.com
Location:	7001 Colorado Ave.		
Applicant:	Prospect 4100 E. Iliff Ave., #20 Denver, CO 80205 smcfadden@prospect.com	**Owner:**	Richdell Properties LLC 7905 W. 120th Ave. Broomfield, CO 80020

Case Summary

Request:	Subdivision plat
Project Description:	Plat a 3.98 acre parcel along with.08 acres of vacated ROW. This would result in a 4.06 acre lot for a multi-family housing development.
Current Zone District:	A-1 Agricultural (ADCO)
Comp Plan:	Mixed Use Commercial

Background Information

Site Information	
Site Size:	4.06
Current Conditions:	Commercial and residential
Existing Right-of-Way:	Colorado Boulevard to the east and 70th Avenue to the south
Neighborhood:	Adams City
Existing Structures:	1768 square-foot office building constructed in 1940 and 1000 square-foot residential structure constructed in 1932
Structures to Remain?	☐ Yes ☒ No ☐ N/A

Referral Information

Electronic Submittal Uploaded to Case folder? ☒ Yes ☐ No Electronic Submittal not provided by applicant ☐

Please review the proposal and forward written comments to:

City of Commerce City
Community Development Department
Attn: Anita Riley

7887 East 60th Avenue
Commerce City, CO 80022

If *no response* is received by the date below, the assumption will be made that you have *no objections or concerns* regarding the above proposal.

Comments Due:	**April 27, 2022 – This is an expedited review** **Given certain time constraints, efforts to provide comments early in referral period are much appreciated! Thank you!**
PRT/DRT Date:	**April 21, 2022**

Commerce CITY

Best,

Katelyn Memmer

Administrative Specialist III

City of Commerce City | Community Development

303-289-3679
7887 East 60th Avenue
Commerce City, CO 80022

--

Matt Schwartz

Executive Director of Operations

Adams County School District 14

m: 720.210.3698 | p: 303.853.8105
5291 East 60th Ave., Commerce City, CO 80022

mschwart@adams14.org | www.adams14.org

--

Matt Schwartz

Executive Director of Operations

Adams County School District 14

m: 720.210.3698 | p: 303.853.8105
5291 East 60th Ave., Commerce City, CO 80022

mschwart@adams14.org | www.adams14.org

To: Anita Riley, Planner

From: Traci Ferguson, Parks Planner

Subject: AN-265-22 Z-984-22 V-94-22 7001 Colorado Blvd. Prospect

Date: April 20, 2022

Parks has reviewed the above proposal and has the following comments, which have been previously acknowledged by the applicant. The park fee-in-lieu has been updated to equal the annexation boundary square footage. The final fee will be determined once the plat is finalized.

1.) There will be a park fee-in-lieu associated with any residential portions of this development. Per the current plat it shall be calculated as follows. This calculation will be updated if the developable square footage changes.

$45,364/$12,000 x $0.09 x 183,344 sq. ft. = **$62,379**

2.) The park fee will be due at the time a building permit is obtained.

3.) The city has explored constructing a trail along the O'Brian Canal in this area. It would be on the opposite side of the canal from this development and would be contained within the canal right-of-way, utilizing the existing maintenance road. If this project moves forward, (there is currently no timeline) staff will communicate with the developer.

Please feel free to contact me at 303-227-8788 or tferguson@c3gov.com with any questions.

To: Anita Riley, Planner

From: Traci Ferguson, Parks Planner

Subject: AN-265-22 Z-984-22 V-94-22 7001 Colorado Blvd. Prospect

Date: March 16, 2022

Parks has reviewed the above proposal and has the following comments.

1.) There will be a park fee-in-lieu associated with any residential portions of this development. Per the current plat it shall be calculated as follows. This calculation will be updated if the developable square footage changes.

$45,364/$12,000 x $0.09 x 168,133 sq. ft. = **$57,203**

2.) The park fee will be due at the time a building permit is obtained.

3.) The city has explored constructing a trail along the O'Brian Canal in this area. It would be on the opposite side of the canal from this development and would be contained within the canal right-of-way, utilizing the existing maintenance road. If this project moves forward, (there is currently no timeline) staff will communicate with the developer.

Please feel free to contact me at 303-227-8788 or tferguson@c3gov.com with any questions.

Commerce CITY

The Farmers Reservoir and Irrigation Company
80 South 27th Avenue
Brighton, CO 80601
PH: 303-659-7373 / FX: 303-659-6077

TO: Anita Riley
DATE: April 6, 2022
FRICO Project# Referrals Commerce City

EMAILED: April 6, 2022
EMAILED TO:
ariley@c3gov.com

APPLICANT: Prospect
RE: Development Plan
CASE #: AN-265, Z-984-22, V-94-22

DEAR Ms. Riley:

I wish to submit the following information regarding the above referenced project.

__X__ The concerns of Farmers Reservoir and Irrigation Company are in the area of encroachment to the Right of Way of the canal. FRICO requires a **minimum** of 25' on each side of the canal for a maintenance road plus the distance to the toe of the ditch embankment. The boundaries of the Right of Way must be agreed upon.

__X__ Drainage is another concern that must be addressed as FRICO does not allow any developed storm flow into our canals. This will apply if any development happens.

____ Property concerns need to be resolved.

__X__ No construction of any structure can be put on our ROW. No use of any sort including pedestrian or vehicle on our ROW is approved.

__X__ Please send drainage study and additional information regarding your project so that we may complete our review and that review criteria can be sent to you, if applicable.

__X__ FRICO does not accept retention ponds adjacent to our facilities, however, we may grant a variance with submittal of application and engineering deposit for review of drainage plan and other documents.

__X__ Canal road may not be used for access without approval and executed agreement.

_____ FRICO will require a license agreement

__X__ FRICO may require an access permit

__X__ FRICO will require a seepage agreement

____ FRICO No comments on application/proposal

__X__ We request to comment again.

The applicant _____ has or __X__ has not completed a Project Review Application and submitted a deposit for review fees with the Ditch Company. In addition to the above comments, FRICO's comments are limited to this set of plans.

Please email should you have any questions.

Sincerely,

Cheryl Plucker
Cheryl@farmersres.com
720-297-0877

From:	Memmer, Katelyn - CD
To:	Riley, Anita - CD
Subject:	FW: Case Referral AN-265-22, Z-984-22, V-94-22
Date:	Monday, March 7, 2022 4:01:45 PM
Attachments:	image001.png image002.png image003.png

From: Hutchinson, Adam W <Adam.W.Hutchinson@xcelenergy.com>
Sent: Monday, March 7, 2022 3:43 PM
To: Memmer, Katelyn - CD <kmemmer@c3gov.com>
Subject: RE: Case Referral AN-265-22, Z-984-22, V-94-22

Katelyn,

Thank you for sending this new link over to me. I was able to confirm that we do not have any easements or fee property within your scope of work.

Thank you for reach our to Xcel to confirm.

Adam Hutchinson
Xcel Energy
Contract Agent, Siting & Land Rights
1800 Larimer St, Suite 400 Denver, CO 80202
C: 303.547.4717
E: adam.w.hutchinson@xcelenergy.com

From: Memmer, Katelyn - CD <kmemmer@c3gov.com>
Sent: Monday, March 7, 2022 3:14 PM
To: Hutchinson, Adam W <Adam.W.Hutchinson@xcelenergy.com>
Subject: RE: Case Referral AN-265-22, Z-984-22, V-94-22

Hi Adam,

Please try this link: AN-265-22, Z-984-22, V-94-22

Best,

Katelyn Memmer
Administrative Specialist III
City of Commerce City | Community Development

303-289-3679
7887 East 60th Avenue
Commerce City, CO 80022

From: Hutchinson, Adam W <Adam.W.Hutchinson@xcelenergy.com>
Sent: Monday, March 7, 2022 1:42 PM
To: Memmer, Katelyn - CD <kmemmer@c3gov.com>
Subject: RE: Case Referral AN-265-22, Z-984-22, V-94-22

Afternoon Katelyn,

I was forwarded your request for Xcel's review of the development site in Commerce City. It doesn't look like we have any Transmission Lines our own any fee property around the around in question. However, I was unable to open up the link that was provided and could only base this one looking at the area around Colorado Blvd & E 70th Ave. Would you please resend that link so I may confirm what I am telling you.

Thank you,

Adam Hutchinson
Xcel Energy
Contract Agent, Siting & Land Rights
1800 Larimer St, Suite 400 Denver, CO 80202
C: 303.547.4717
E: adam.w.hutchinson@xcelenergy.com

From: Memmer, Katelyn - CD <kmemmer@c3gov.com>
Sent: Tuesday, February 22, 2022 11:02 AM
Cc: Riley, Anita - CD <ariley@c3gov.com>; Mason, Tricia - CD <tmason@c3gov.com>; Adame, Kimberly - CD <kadame@c3gov.com>
Subject: Case Referral AN-265-22, Z-984-22, V-94-22

EXTERNAL - STOP & THINK before opening links and attachments.

Hello,

On behalf of the Community Development Department of Commerce City, we invite you to review and comment on this land use application referral. Information on the application, including where and when to send comments, can be found below.

AN-265-22, Z-984-22, V-94-22

REQUEST FOR COMMENT/REVIEW

February 16, 2022

The Community Development Department requests comments on the following:

Case No:	AN-265-22, Z-984-22, V-94-22	**Type:**	E	**Phone:**	303.289.3716
Case Planner:	Anita Riley	**Email:**	ariley@c3gov.com		
Location:	7001 Colorado Ave.				
Applicant:	Prospect 4100 E. Iliff Ave., #20 Denver, CO 80205 smcfadden@prospect.com	**Owner:**	Richdell Properties LLC 7905 W. 120th Ave. Broomfield, CO 80020		

Case Summary

Request:	Annexation, Zone Change, and Vacation of ROW
Project Description:	An annexation and zone change for a multi-family housing development on 3.98 acres along with .08 acres of vacated ROW. This would result in a total in a total of 4.06 acre parcel zoned Multi-Family Residential
Current Zone District:	A-1 Agricultural (ADCO)
Comp Plan:	Mixed Use Commercial

Background Information

Site Information	
Site Size:	4.06
Current Conditions:	Commercial and residential
Existing Right-of-Way:	Colorado Boulevard to the east and 70th Avenue to the south
Neighborhood:	Adams City
Existing Structures:	1768 square-foot office building constructed in 1940 and 1000 square-foot residential structure constructed in 1932
Structures to Remain?	☐ Yes ☒ No ☐ N/A

Referral Information

Electronic Submittal Uploaded to Case folder? ☒ Yes ☐ No **Electronic Submittal not provided by applicant** ☐

Please review the proposal and forward written comments to:

City of Commerce City
Community Development Department
Attn: Anita Riley
7887 East 60th Avenue
Commerce City, CO 80022

If *no response* is received by the date below, the assumption will be made that you have *no objections or concerns* regarding the above proposal.

Comments Due:	March 16, 2022 – This is an expedited review
PRT/DRT Date:	March 17, 2022

Best,

Katelyn Memmer

Administrative Specialist III
City of Commerce City | Community Development
303-289-3679
7887 East 60th Avenue
Commerce City, CO 80022

From: Diedrich, Cheryl L
To: Phelps, Randall; Riley, Anita - CD
Cc: Van Laere, Jacob; George, Donna L; Scott McFadden; JP Aymon
Subject: RE: Commerce City Cases: AN-265-22, Z-984-22, V-94-22 @ 7001 Colorado Blvd
Date: Thursday, June 9, 2022 11:20:11 AM
Attachments: Xcel-Annexation letter response.pdf

Randall,

Thanks for your time this morning, as discussed and detailed in Donna's March 15, 2022 letter
(attached) as long as the party adheres to the terms as set forth in Donna's response letter we have
no objection to the proposed rezone.

Regards,

Cheryl L. Diedrich, CPL
Xcel Energy | Responsible By Nature
Senior Agent, Right of Way & Permits
1123 West 3rd Ave., Denver, CO. 80223
P: 303-571-3116 **C:** 303-908-0299 **F:** 303-571-3284
cheryl.diedrich@xcelenergy.com

From: Phelps, Randall <randall.phelps@kimley-horn.com>
Sent: Thursday, June 9, 2022 11:08 AM
To: Diedrich, Cheryl L <Cheryl.Diedrich@xcelenergy.com>
Cc: Van Laere, Jacob <Jacob.Van.Laere@xcelenergy.com>; George, Donna L <Donna.L.George@xcelenergy.com>; Riley, Anita - CD <ariley@c3gov.com>; Scott McFadden <smcfadden@prospectprop.com>; JP Aymon <jpaymon@prospectprop.com>
Subject: Commerce City Cases: AN-265-22, Z-984-22, V-94-22 @ 7001 Colorado Blvd

Hello Cheryl,

As requested by Anita yesterday, below is our response to the attached letter

Xcel Energy,

Thank you for your supportive response to the above cases with Commerce City. We have reviewed the requirements of the letter and recognize that further applications will be required as demolition, relocation or new services are needed associated with forthcoming site and building design. We expect that work to prgress this fall, but not at this time.

The annexation is scheduled to be heard at the City Council meeting on June 20th. Anita Riley with Commerce City can follow up with Jacob Van Laere, also copied here, to assist with the mapping department updates.

Regards,

Randall

Randall J. Phelps, P.E., LEED AP
Kimley-Horn | 4582 South Ulster Street, Suite 1500, Denver, CO 80237
Universal Number: 303 228 2336 | Mobile: 303 905 7415 | Main: 303 228 2300
Connect with us: Kimley-Horn.com | Twitter | LinkedIn | Facebook | Instagram | Randall's LinkedIn Profile

Right of Way & Permits
1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: **303.571.3306**
Facsimile: 303.571.3284
donna.l.george@xcelenergy.com

March 15, 2022

City of Commerce City Community Development Department
7887 East 60th Avenue
Commerce City, CO 80022

Attn: Anita Riley

Re: 7001 Colorado Boulevard, Case #s AN-265-22 / Z-984-22 / V-94-22

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the plans for **7001 Colorado Boulevard Annexation, Rezone, and Right of Way Vacation**. Please be advised that Public Service Company has existing electric distribution facilities within the areas indicated in this proposed rezone. Public Service Company has no objection to this proposed rezone, contingent upon Public Service Company of Colorado's ability to maintain all existing rights and this amendment should not hinder our ability for future expansion, including all present and any future accommodations for natural gas transmission and electric transmission related facilities.

The City of Commerce City must send us notification after approval of the proposed annexation has been finalized. This notification should be sent to Jacob Van Laere (303-571-3818) at: Xcel Energy, 1123 West 3rd Avenue, Denver, Colorado 80223 or jacob.van.laere@xcelenergy.com. This will allow our mapping department to make the necessary updates to our mapping system.

PSCo has no conflict with the Right of Way vacation.

The property owner/developer/contractor must complete the application process for any new natural gas or electric service, or modification to existing facilities via xcelenergy.com/InstallAndConnect. It is then the responsibility of the developer to contact the Designer assigned to the project for approval of design details.

Additional easements *will* need to be acquired by separate document for new facilities (i.e. transformers) – be sure to have the Designer contact a Right-of-Way and Permits Agent.

As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 to have all utilities located prior to any construction.

Donna George
Right of Way and Permits
Public Service Company of Colorado dba Xcel Energy
Office: 303-571-3306 – Email: donna.l.george@xcelenergy.com