Final Drainage Report

Leeper Industrial Park

(JN: 21087)

3700 E. 64th Avenue
Commerce City, CO

April 27, 2022
Revised: July 22, 2022
Revised: August 18, 2022

Prepared for:

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Denver, CO 80203
303.325.5709

Certification

ENGINEER CERTIFICATION OF DRAINAGE REPORT

I hereby certify that this report (plan) for the Preliminary Drainage design of Leeper Industrial Park was prepared by me or under my direct supervision in accordance with the provisions of Commerce City Storm Drainage Design and Technical Criteria for the owners thereof. I understand that Commerce City does not and will not assume liability for drainage facilities designed by others.

_____

Date

_____

Registered Professional Engineer
State of Colorado PE No. 45332
For and on behalf of Proof Civil Co.

Table of Contents

I. Introduction

This final drainage report for Leeper Industrial Park will address the on-site stormwater conveyance and treatment for the development in accordance with criteria set forth by applicable governing agencies as well as previously approved relevant drainage studies.

II. General Location and Description

A. Project Location

The subject property is a 20.08 industrial facility located at 3700 E. 64th Avenue in Commerce City, Colorado. The property consists of Lot 3, and a previously unplatted parcel in the Leeper Industrial Park Subdivision. The property is bound to the west by Monroe Street, to the north by an unplatted parcel, to the east by other lots within the Leeper Industrial Park Subdivision and Colorado Boulevard, and to the south by East 64th Avenue.

B. Project Description

The property is an existing industrial facility with two offices, auxillary buildings, storage yard area, and associated drivelanes. Aside from the existing buildings, the groundcover of the property consists largely of existing recycled asphalt. A significant portion of the site (approximately 60% of the site area) along the western boundary lies on a buried inactive landfill. The site contains permanent and temporary easements for energy pipeline purposes. No wetlands are known to exist onsite.

C. Floodplain Information

According to FEMA Flood Insurance Rate Map Panel #08001C0604H, the subject site is located within flood hazard area Zone X. Zone X is defined as area outside the 0.2-percent-chance (or 500-year) flood. Refer to Appendix A for the applicable FEMA flood map.

D. Soils Description

According to the United States Department of Agriculture Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey, onsite soils are identified as Terrace Escarpments and Vona Sandy Loam and are classified as Hydrologic Soil Group A. Group A is sand, loamy sand or sandy loam types of soils. It has low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission. See Appendix A for the site soil map.

III. Historic Drainage

A. Existing Drainage Pattern

The site generally drains from south to north and west to east at a general slope of 0.5%. Flows are then generally conveyed to Monroe Street, and eventually to the O'Brien Canal in the existing condition. The site is covered by compacted earth with little vegetation.

B. Existing Basins

The existing site is divided into drainage basins described as follows:

a. Basin EX-A (9.25 Acres)

Basin EX-A consists of the western portion of the development. The basin is covered with buildings, small concrete pads, and largely made up of recycled earth storage area and undeveloped slope down to Monroe Street. Runoff generated from Basin EX-A sheet flows north and west to Monroe Street. The existing basin is 68% impervious.

b. Basin EX-B (9.60 Acres)

Basin EX-B consists of an eastern portion of the bulk area of the site. The basin is covered with buildings, small concrete pads, driveways, and largely made up of recycled asphalt storage yard. Runoff generated from Basin EX-B sheet flows north and east to a low point within the site. Flows either percolate into the soil at this location or overflow into Basin EX-A. The existing basin is 83% impervious.

c. Basin EX-C (1.64 Acres)

Basin EX-C consists generally of access to the site from Colorado Boulevard. The basin is covered with asphalt roadway and recycled asphalt storage yard. Runoff generated from Basin EX-C flows onto neighboring properties and the Colorado Boulevard right-of-way. The existing basin is 62% impervious.

IV. Drainage Criteria

A. Regulation

Methods described in the UDFCD Urban Storm Drainage Criteria Manual and in the Commerce City Storm Drainage Design and Technical Criteria were used for the drainage design of the Site.

B. Hydrology

The Rational Method analysis, utilizing the Intensity-Duration-Frequency curves for the area established by the National Oceanic and Atmospheric Administration was used to determine the on-site runoff generated for the 5-year (minor), and 100-year (major) storm events. Runoff coefficients were based on the type of proposed development outlined in the UDFCD manual. Runoff coefficients used in the analysis were weighted according to the existing and proposed land uses in each basin or sub-basin and the time of concentration values have been calculated for each of the basins or sub-basins per Urban Drainage criteria. Detention storage and release rate have been calculated using the UDFCD full-spectrum design criteria. Hydrologic calculations can be found in Appendix B.

V. Drainage Design

A. General Concept

Proposed on-site drainage design will follow historical drainage patterns. The site will not be altered in any way with the exception of the addition of fresh recycled asphalt for some storage areas and the introduction of an infiltration pond.

B. Proposed Drainage Basins

The improved site is divided into drainage basins described as follows:

a. Basin A (7.96 Acres)

Basin A consists of the western portion of the development. The basin is covered with buildings, small concrete pads, aggregate all-weather access material for fire lane, and largely made up of recycled asphalt storage yard. Runoff generated from Basin A will sheet flow north and west to Monroe Street. A Mile High Flood District grass swale has been designed along the sites western boundary to provide additional water quality to the runoff from the basin. The basin is 68% impervious.

b. Basin B (10.09 Acres)

Basin B consists of an eastern portion of the bulk area of the site. The basin is covered with buildings, small concrete pads, driveways, aggregate all-weather access material for fire lane, and largely made up of recycled asphalt storage yard. Runoff generated from B will sheet flow toward a proposed infiltration pond. Flows from Basin B will infiltrate into the soil and recharge groundwater. Minimal depth grading has been proposed in order to maximize the size of Basin B and direct runoff toward the infiltration basin to the extent possible. The entire site cannot be graded toward the basin due to restrictions of cut over the existing landfill. The basin is 69% impervious.

c. Basin C (1.26 Acres)

Basin C consists generally of access to the site from Colorado Boulevard. The basin is covered with asphalt roadway, aggregate all-weather access material for fire lane, recycled asphalt storage yard. Runoff generated from Basin C will flow onto neighboring properties and the Colorado Boulevard right-of-way to match historical drainage patterns. The basin is 40% impervious.

C. Storage

As the O'Brien Canal barricades the natural drainage pattern of the relatively flat existing site, conventional methods of detention and release are not feasible for the site. In order to prevent discharge of stormwater into the Canal, site drainage will be directed to a proposed infiltration pond. To prevent any overflow from the infiltration pond to the O'Brien Canal, the ponds have been sized to contain the entire 100-year runoff event (see Appendix C for site basin characteristics) with a pond capacity of 2.97 acre-ft. The 100-year water surface elevation is more than one foot below the crest of the basin, so freeboard in excess of one foot has been provided.

The surface infiltration rate of 1.0 in/hr. determined via borehole infiltration testing in the pond area has been used to determine the overall infiltration rate of the pond. The infiltration rate observed was 2.0 in/hr, but a 0.5 scale down factor applied. Given the proposed pond bottom area, the pond will infiltrate 97% the 100-year event runoff within 63.4 hours, complying the state regulation of 72 hours or less. Similarly, the pond will infiltrate 99% of the 100-year event runoff volume within 63.6 hours, in compliance with the state regulation of 120 hours or less. See Appendix C for pond volume calculations.

Water quality for Basins B and C is provided by the infiltration ponds. Water quality for Basin A is provided by the MHFD water quality swale along the site's western boundary.

D. Groundwater Management

No groundwater impacts are anticipated at this time. The Infiltration Report has been provided in the report appendix.

VI. Conclusion

A. Compliance with Standards

This report presents the description and calculations for the drainage analysis and design of Leeper Industrial Park. The drainage system was designed in accordance with the Commerce City Storm Drainage Design and Technical Criteria and the UDFCD Urban Storm Drain Criteria Manual. As impacts to the subject site are minimal and historic drainage patterns will be maintained, the site will not have adverse effect on downstream properties.

B. Variances from Criteria

No variances from applicable criteria are being requested as a part of this drainage design.

VII. References

(2016, June). *Urban Storm Drainage Criteria Manual Volumes 1, 2, and 3.* Mile High Flood District.

(2022) *Storm Drainage Design and Technical Criteria Manual.* City of Commerce City Department of Public Works

- APPENDIX A – MAPS AND SITE DESCRIPTIONS

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole- foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided by the Adams County and Commerce City GIS departments. The coordinate system used for the production of the digital FIRM is Universe Transverse Mercator, Zone 13N, referenced to North American Datum of 1983 and the GRS 80 spheroid, Western Hemisphere.

This map reflects more detailed and up- to- date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de- annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

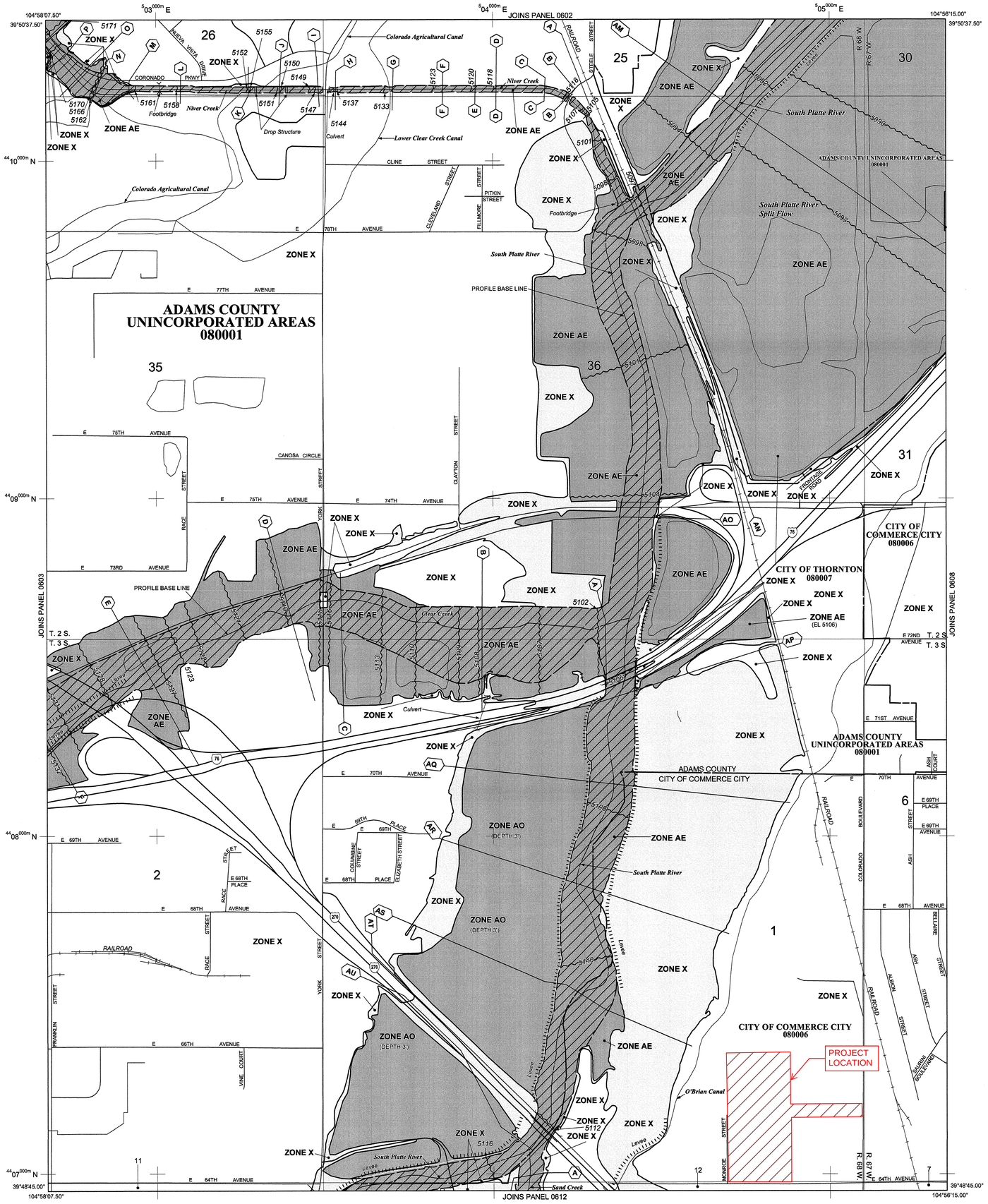
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1- 800- 358- 9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1- 800- 358- 9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1- 877- 336- 2627) or visit the FEMA website at http://www.fema.gov/.

This digital Flood Insurance Rate Map (FIRM) was produced through a cooperative partnership between the State of Colorado Water Conservation Board, the Urban Drainage and Flood Control District, and the Federal Emergency Management Agency (FEMA). The State of Colorado Water Conservation Board and the Urban Drainage and Flood Control District have implemented a long-term approach of floodplain management to reduce the costs associated with flooding. As part of this effort, both the State of Colorado and the Urban Drainage and Flood Control District have joined in Cooperating Technical Partner agreements with FEMA to produce this digital FIRM.

Additional flood hazard information and resources are available from local communities, the Colorado Water Conservation Board, and the Urban Drainage and Flood Control District.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A — Cross section line

23 — 23 — Transect line

97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 13

6000000 M — 5000-foot grid ticks: Alabama State Plane coordinate system, east zone (FIPSZONE 0101), Transverse Mercator

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 16, 1995
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
March 5, 2007 - to update map format.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1- 800- 638- 6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0604H

FIRM
FLOOD INSURANCE RATE MAP
ADAMS COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 604 OF 1150
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ADAMS COUNTY	080001	0604	H
COMMERCE CITY, CITY OF	080006	0604	H
THORNTON, CITY OF	080007	0604	H

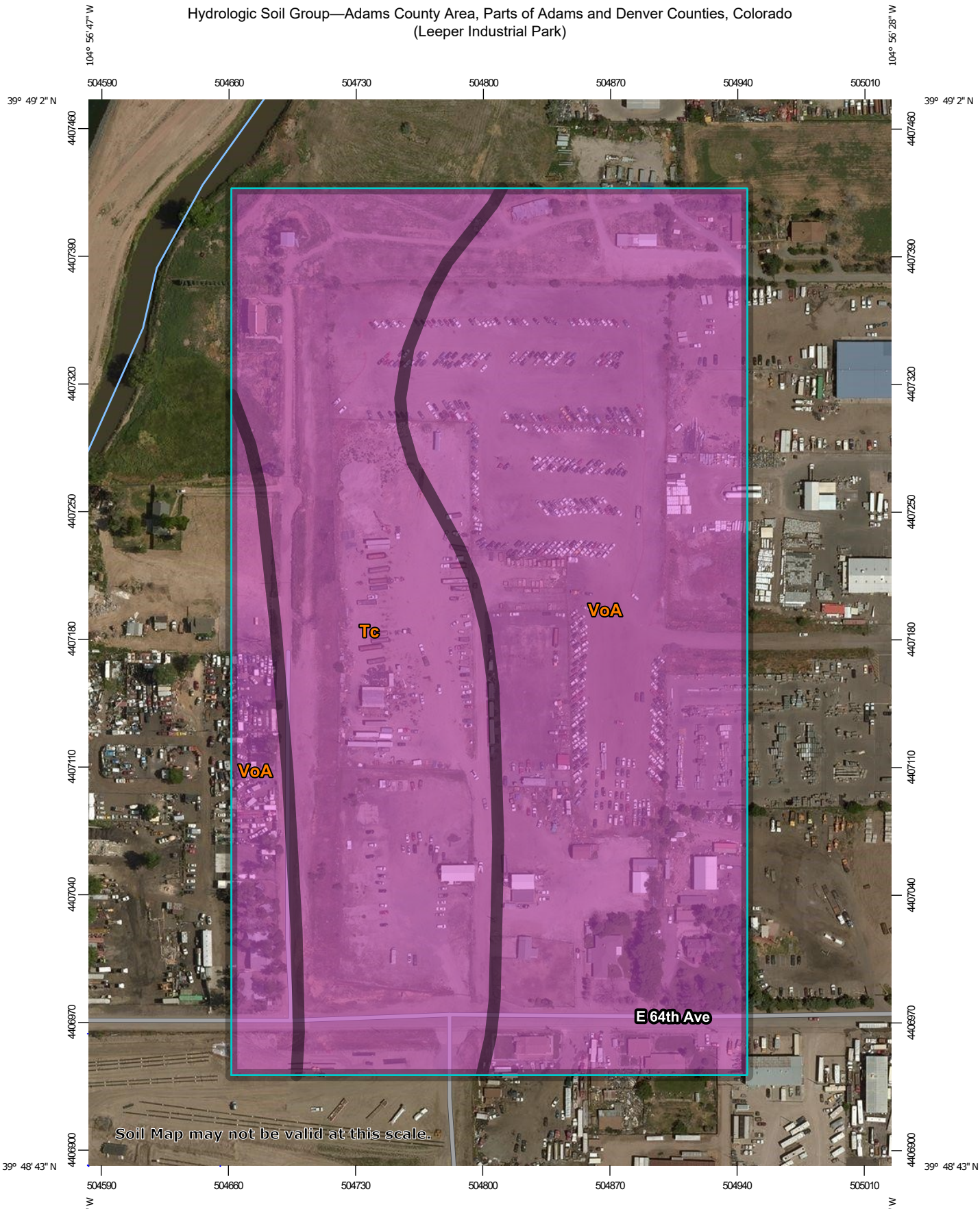
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08001C0604H

MAP REVISED
MARCH 5, 2007

Federal Emergency Management Agency

Hydrologic Soil Group—Adams County Area, Parts of Adams and Denver Counties, Colorado
(Leeper Industrial Park)



Map Scale: 1:2,850 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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 15, Sep 13, 2018

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

Date(s) aerial images were photographed: Jun 10, 2014—Aug 21, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Tc	Terrace escarpments	A	13.2	38.5%
VoA	Vona sandy loam, 0 to 1 percent slopes	A	21.1	61.5%
Totals for Area of Interest			**34.3**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOAA Atlas 14, Volume 8, Version 2
Location name: Commerce City, Colorado, USA*
Latitude: 39.8126°, Longitude: -104.9436°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.218 (0.171-0.278)	0.268 (0.210-0.342)	0.359 (0.280-0.459)	0.443 (0.344-0.569)	0.570 (0.434-0.771)	0.678 (0.502-0.923)	0.795 (0.568-1.11)	0.922 (0.633-1.31)	1.10 (0.728-1.61)	1.25 (0.800-1.83)
10-min	0.319 (0.250-0.407)	0.392 (0.308-0.501)	0.525 (0.411-0.673)	0.648 (0.504-0.833)	0.835 (0.636-1.13)	0.993 (0.735-1.35)	1.16 (0.832-1.62)	1.35 (0.926-1.92)	1.62 (1.07-2.35)	1.83 (1.17-2.68)
15-min	0.389 (0.305-0.496)	0.478 (0.375-0.611)	0.641 (0.501-0.820)	0.790 (0.614-1.02)	1.02 (0.775-1.38)	1.21 (0.897-1.65)	1.42 (1.01-1.97)	1.65 (1.13-2.34)	1.97 (1.30-2.87)	2.23 (1.43-3.27)
30-min	0.548 (0.430-0.699)	0.673 (0.528-0.859)	0.898 (0.701-1.15)	1.10 (0.858-1.42)	1.42 (1.08-1.91)	1.68 (1.24-2.29)	1.96 (1.40-2.73)	2.27 (1.56-3.23)	2.71 (1.79-3.95)	3.07 (1.96-4.49)
60-min	0.681 (0.535-0.869)	0.834 (0.654-1.07)	1.11 (0.867-1.42)	1.36 (1.06-1.75)	1.75 (1.33-2.36)	2.07 (1.53-2.81)	2.42 (1.73-3.36)	2.79 (1.92-3.97)	3.33 (2.20-4.85)	3.77 (2.41-5.52)
2-hr	0.814 (0.645-1.03)	0.995 (0.788-1.26)	1.32 (1.04-1.68)	1.62 (1.27-2.06)	2.08 (1.59-2.77)	2.46 (1.84-3.31)	2.87 (2.07-3.94)	3.32 (2.30-4.67)	3.95 (2.63-5.69)	4.47 (2.89-6.47)
3-hr	0.885 (0.705-1.11)	1.08 (0.859-1.36)	1.43 (1.13-1.80)	1.75 (1.38-2.21)	2.23 (1.73-2.96)	2.64 (1.99-3.53)	3.08 (2.24-4.21)	3.56 (2.48-4.97)	4.24 (2.84-6.06)	4.79 (3.11-6.89)
6-hr	1.05 (0.847-1.31)	1.27 (1.02-1.58)	1.67 (1.34-2.08)	2.03 (1.62-2.54)	2.57 (2.01-3.37)	3.03 (2.30-4.00)	3.52 (2.58-4.75)	4.05 (2.85-5.59)	4.80 (3.25-6.79)	5.41 (3.55-7.69)
12-hr	1.30 (1.05-1.60)	1.56 (1.26-1.92)	2.02 (1.63-2.49)	2.43 (1.96-3.01)	3.05 (2.39-3.94)	3.56 (2.72-4.64)	4.10 (3.03-5.46)	4.68 (3.33-6.39)	5.51 (3.76-7.69)	6.17 (4.09-8.67)
24-hr	1.58 (1.29-1.92)	1.89 (1.55-2.31)	2.43 (1.99-2.97)	2.91 (2.36-3.57)	3.60 (2.85-4.58)	4.16 (3.21-5.35)	4.75 (3.54-6.23)	5.37 (3.85-7.22)	6.23 (4.30-8.58)	6.91 (4.64-9.61)
2-day	1.84 (1.53-2.22)	2.21 (1.83-2.67)	2.84 (2.34-3.43)	3.37 (2.77-4.09)	4.12 (3.28-5.16)	4.72 (3.67-5.98)	5.33 (4.01-6.90)	5.97 (4.31-7.91)	6.84 (4.76-9.28)	7.51 (5.09-10.3)
3-day	1.99 (1.66-2.39)	2.38 (1.98-2.85)	3.02 (2.51-3.63)	3.57 (2.95-4.31)	4.35 (3.48-5.41)	4.97 (3.89-6.25)	5.60 (4.24-7.20)	6.26 (4.55-8.24)	7.15 (5.01-9.64)	7.85 (5.35-10.7)
4-day	2.11 (1.77-2.52)	2.50 (2.09-2.98)	3.16 (2.63-3.77)	3.71 (3.08-4.46)	4.51 (3.62-5.58)	5.14 (4.04-6.43)	5.78 (4.40-7.40)	6.46 (4.72-8.46)	7.38 (5.19-9.90)	8.09 (5.54-11.0)
7-day	2.41 (2.04-2.85)	2.81 (2.37-3.33)	3.49 (2.94-4.14)	4.07 (3.41-4.84)	4.89 (3.97-6.00)	5.54 (4.39-6.88)	6.21 (4.76-7.87)	6.91 (5.09-8.96)	7.86 (5.57-10.4)	8.59 (5.94-11.6)
10-day	2.68 (2.28-3.15)	3.10 (2.63-3.65)	3.80 (3.21-4.48)	4.40 (3.70-5.20)	5.24 (4.27-6.38)	5.91 (4.71-7.28)	6.59 (5.08-8.29)	7.29 (5.40-9.39)	8.24 (5.88-10.9)	8.98 (6.24-12.0)
20-day	3.47 (2.98-4.04)	3.95 (3.39-4.59)	4.74 (4.05-5.52)	5.39 (4.58-6.31)	6.31 (5.19-7.57)	7.01 (5.64-8.52)	7.73 (6.02-9.59)	8.46 (6.33-10.7)	9.43 (6.80-12.3)	10.2 (7.15-13.4)
30-day	4.11 (3.55-4.74)	4.66 (4.02-5.39)	5.57 (4.78-6.44)	6.31 (5.39-7.33)	7.32 (6.05-8.71)	8.09 (6.55-9.75)	8.86 (6.94-10.9)	9.63 (7.24-12.1)	10.6 (7.71-13.7)	11.4 (8.06-14.9)
45-day	4.87 (4.23-5.59)	5.56 (4.83-6.39)	6.66 (5.77-7.67)	7.55 (6.50-8.72)	8.74 (7.26-10.3)	9.63 (7.83-11.5)	10.5 (8.26-12.8)	11.3 (8.58-14.2)	12.4 (9.06-15.9)	13.2 (9.42-17.2)
60-day	5.50 (4.80-6.28)	6.33 (5.51-7.23)	7.64 (6.63-8.74)	8.68 (7.50-9.98)	10.1 (8.37-11.8)	11.1 (9.03-13.1)	12.0 (9.50-14.6)	13.0 (9.85-16.1)	14.2 (10.3-18.0)	15.0 (10.7-19.4)

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

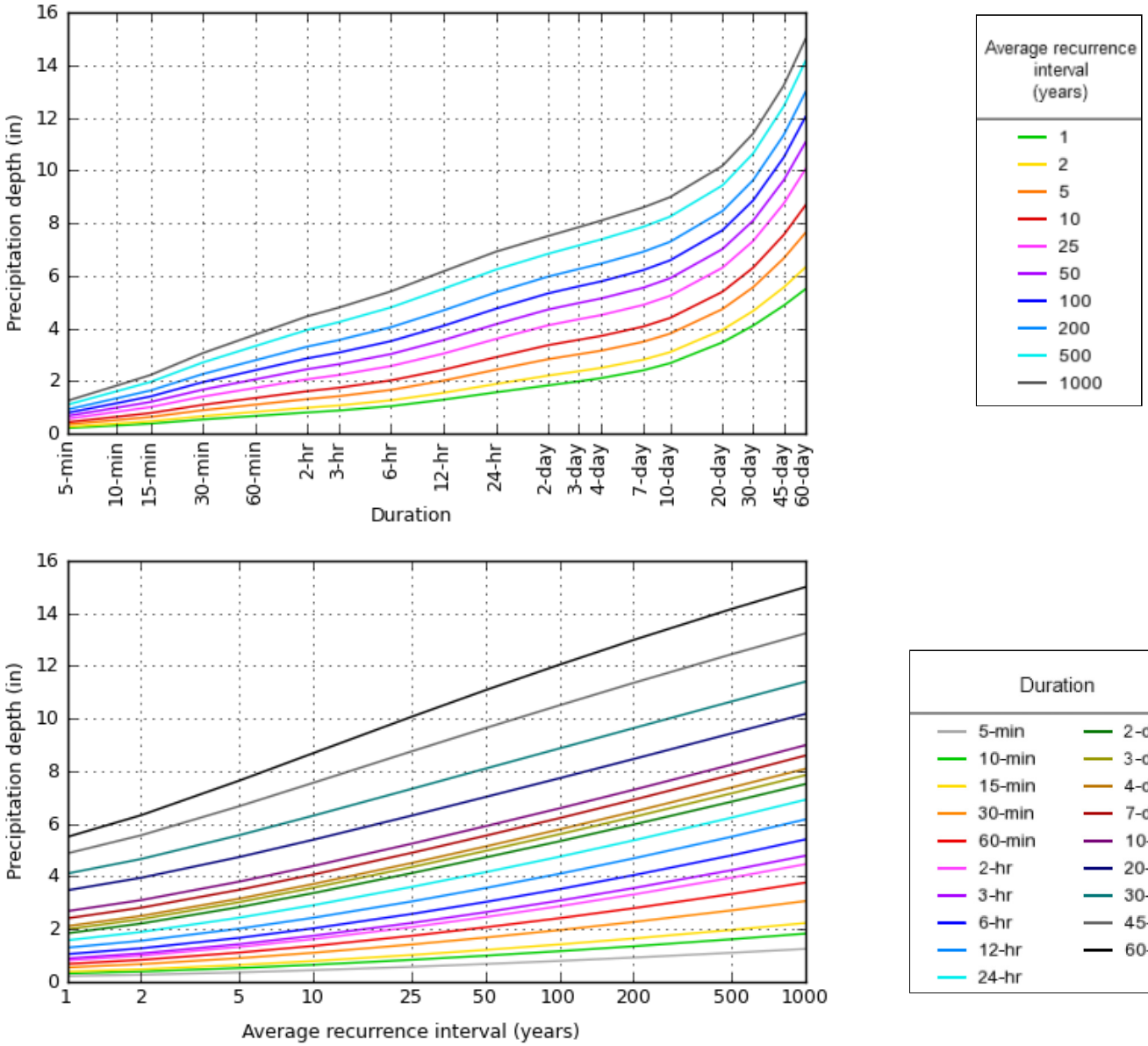
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 39.8126°, Longitude: -104.9436°



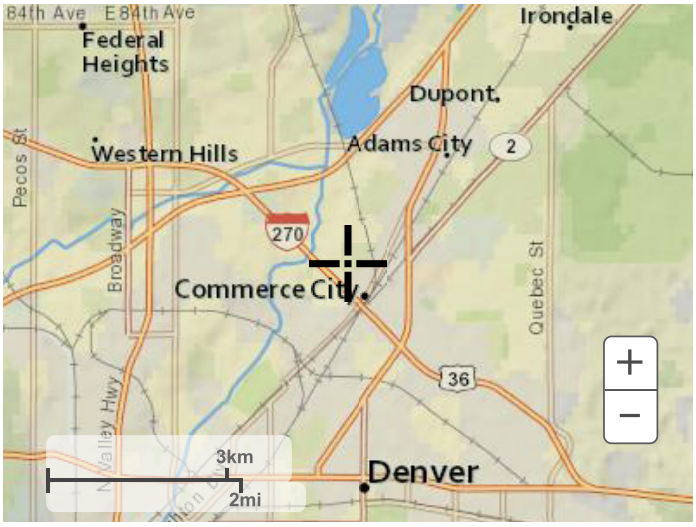
NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Wed May 1 16:58:04 2019

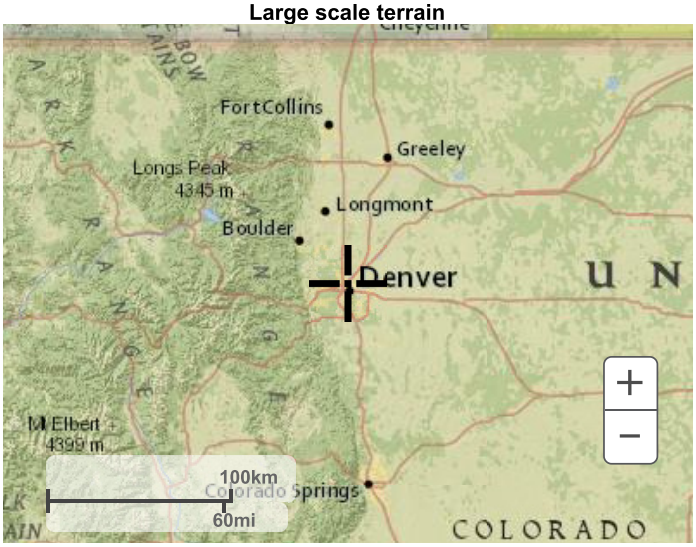
Back to Top

Maps & aerials

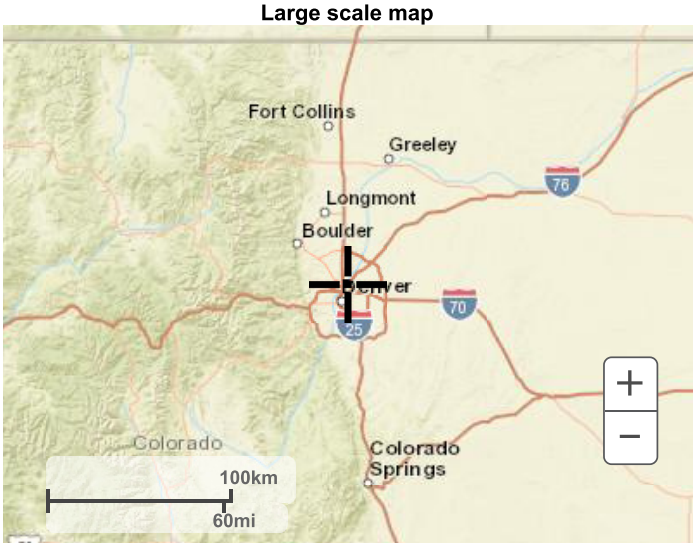
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

AMERICAN GEOSERVICES

Infiltration Testing Report

AMERICAN GEOSERVICES

GEOTECHNICAL & MATERIALS
ENVIRONMENTAL
STRUCTURAL
CIVIL
ENGINEERING AND SCIENCE

888-276-4027

April 01, 2020

PROJECT NO: 0156-D20

CLIENT: Mr. John Draft

Reference: Infiltration Test Report, 3740 E. 64th Avenue, Commerce City, CO

Dear Mr. Draft,

At your request, we have completed the above referenced services for the referenced project in accordance with the American GeoServices, LLC (AGS) proposal. Results of our evaluation and design recommendations are described below.

PROJECT INFORMATION

The site is located as shown in Figure 1 and Figure 2. The parcel is located in a commercial/industrial area. The proposed development will consist of building a roadway and associated structures. We do not anticipate significant site grading (fill placement) for this project.

INFILTRATION TESTING

In March 2020, we performed three soil explorations at locations B1 through B3 as shown in Figure 2 as a profile borehole. In addition, three infiltration tests were performed within proximity of locations B1 through B3. Details of subsurface exploration and infiltration testing results are summarized below. Also, see attached soil borehole logs in an appendix.

Subsurface soil conditions: In boreholes B1 through B3, generally medium stiff to stiff sandy silts (ML) to medium dense silty sands (SM) were encountered extending to a maximum explored depth of 8 feet. A restricting or limiting layer was not noted. Groundwater table was not noted. Soil mottling suggesting or the possible indication of perched high groundwater table was not noted. It should be noted that soil classification and identification is based on commonly accepted methods employed in the practice of geotechnical engineering. In some cases, the stratigraphic boundaries shown on Boring Logs represents transitions between soil types rather than distinct lithological boundaries. It should be recognized that subsurface conditions often vary both with depth and laterally between individual boring locations.

Seasonal High Water Table: Subsurface exploration did not reveal the presence of a seasonal high water table. No water seepage, static water table, or soil caving was noted. In our opinion, seasonal high or perched groundwater conditions may not exist within 5 feet below existing ground surface during heavy rains, throughout the site. This observation may not be indicative of other times or at locations other than the site. Some variations in the groundwater level may be experienced in the future. The magnitude of the variation will largely depend upon the duration and intensity of precipitation, temperature and the surface and subsurface drainage characteristics of the surrounding area.

Field Infiltration Rate: We performed three infiltration tests in general accordance with EPA test procedures and Commerce City, CO general guidelines. Following infiltration rates and results were noted in the field.

Test Location	Test Depth (Ft)	SCS Soil Description (USCS Soil Classification)	Groundwater Table (Ft)	Field Infiltration Rate (in/hr)
B1	2.0	Silt loam (ML)	Not encountered	2.5
B2	2.0	Silt loam (ML)	Not encountered	2.0
B3	2.5	Silty sandy loam (SM)	Not encountered	4.0

Design Infiltration Rate: The field infiltration rate should be scaled down by the factor of 0.5: Therefore, design infiltration rate = 2.0*0.5 = 1.0 inch/hour.

Setback: All infiltration facilities should have a setback of 10 feet from proposed structures to minimize the adverse impact of any local mounting of groundwater table.

LIMITATIONS

The given infiltration rates obtained in the field may vary from location to location due to variations in subsurface soil conditions. Moreover, design storm events may not accurately account for actual storm events during the design life of the drainage structures. Therefore, the potential for overflow should be considered and properly discharged into suitable receptacles in a controlled manner. All stormwater disposal systems should be designed in such a way that the groundwater quality of local aquifers is not adversely affected.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory evaluation, and our present knowledge of the proposed construction. It is possible that soil conditions could vary between or beyond the points explored. If soil conditions are encountered during construction that differ from those described herein, we

should be notified so that we can review and make any supplemental recommendations necessary. If the scope of the proposed construction, including the proposed loads or structural locations, changes from that described in this report, our recommendations should also be reviewed and revised by AGS.

Local regulations regarding land or facility use, on and off-site conditions, or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report within one year from the date of report preparation, AGS may recommend additional work and report updates. Non-compliance with any of these requirements by the client or anyone else will release AGS from any liability resulting from the use of this report by any unauthorized party. Client agrees to defend, indemnify, and hold harmless AGS from any claim or liability associated with such unauthorized use or non-compliance.

In this report, we have presented judgments based partly on our understanding of the proposed construction and partly on the data we have obtained. This report meets professional standards expected for reports of this type in this area. Our company is not responsible for the conclusions, opinions or recommendations made by others based on the data we have presented. This report has been prepared exclusively for the client, its' engineers and subcontractors for the purpose of design and construction of the proposed structure. No other engineer, consultant, or contractor shall be entitled to rely on information, conclusions or recommendations presented in this document without the prior written approval of AGS.

We appreciate the opportunity to be of service to you on this project. If we can provide additional assistance or observation and testing services during design and construction phases, please call us at 1 888 276 4027.

Sincerely,

Sam Adettiwar, MS, PE, GE, P.Eng, M.ASCE
Senior Engineer
Attachments

NOTE:
SCHEMATIC PLAN TO SHOW APPROXIMATE SUBSURFACE EXPLORATION LOCATION ONLY; NOT SURVEYED.

N

LEGEND:

DESIGNATES INFILTRATION TEST LOCATION, BY AMERICAN GEOSERVICES, LLC. , MARCH 2020 SEE EXPLORATION LOG IN APPENDIX FOR FURTHER DETAILS.

REFERENCE:
LEEPER INDUSTRIAL PARK DEVELOPMENT PLAN

AMERICAN GEOSERVICES
888.276.4027 · americangeoservices.com

FIGURE 2: SCHEMATIC SITE PLAN

- APPENDIX B – HYDROLOGIC CALCUATIONS

Project : Leeper Industrial Park
Project No. : 21087

Date : 4/27/2022
By : JGD

Drainage Basin Imperviousness

Soil Type : **A**

	Roof	Concrete	Recycled Asphalt	Asphalt	Playground	Gravel	Undeveloped						
Imperviousness :	90%	90%	89%	100%	10%	40%	2%	Total Area (sq.ft.)	Composite % Imp.	Runoff Coefficients			
Basin Name	**Areas (sq.ft.)**									C_2	C_5	C_{10}	C_{100}
EX-A	3,556	4,832	294,715	1,234			98,423	402,760	68%	0.51	0.52	0.54	0.64
EX-B	8,024	645	373,790	3,746			31,763	417,968	83%	0.65	0.67	0.69	0.75
EX-C			29,704	17,121			24,645	71,470	62%	0.45	0.46	0.48	0.59
Total Existing	**11,580**	**5,477**		**22,101**			**154,831**	**892,198**	**5%**	**0.02**	**0.02**	**0.02**	**0.15**
A	3,556	4,400	234,002	1,234			103,574	346,766	63%	0.46	0.48	0.49	0.60
B	8,024	419	325,726	2,846			102,719	439,734	69%	0.52	0.53	0.55	0.65
C			20,520	2,990			31,638	55,148	40%	0.25	0.26	0.28	0.42
Total Proposed	**11,580**	**4,819**	**580,248**	**7,070**			**237,931**	**841,648**	**65%**	**0.47**	**0.49**	**0.51**	**0.61**

Project : Leeper Industrial Park
Project No. : 21087

Date : 4/27/2022
By : JGD

SF2 - Time of Concentration

			Initial/Overland Time			Travel Time					Time of Concentration		Final
Basin ID	Area (AC.)	C_5	L_i (ft.)	S (%)	T_i (min.)	L_t (ft.)	S (%)	Conveyance Factor	Vel (fps)	T_t (min.)	Comp. T_C (min.)	Regional T_C (Min.)	T_C (Min.)
EX-A	9.25	0.52	373	0.50	25.3	559	1.2	10	1.1	8.5	33.8	19.1	19.1
EX-B	9.60	0.67	500	0.50	21.7	121	0.7	10	0.8	2.4	24.1	13.1	13.1
EX-C	1.64	0.46	17	2.00	3.8	227	0.5	15	1.1	3.6	7.3	18.6	7.3
A	7.96	0.48	373	0.50	27.3	559	1.2	10	1.1	8.5	35.8	20.0	20.0
B	10.09	0.53	500	0.50	28.8	121	0.7	10	0.8	2.4	31.2	15.6	15.6
C	1.27	0.26	17	2.00	4.9	227	0.5	15	1.1	3.6	8.5	22.9	8.5

Project : Leeper Industrial Park
Project No. : 21087

Date : 4/27/2022
By : JGD

SF3 - Minor Storm

1-hr Point Rainfall **0.83** in. (2-year Event)

		Direct Runoff						Total Runoff				Street		Travel Time			
Description	Design Point	Area (ac.)	C_5	Tc (min.)	CA (ac.)	I (in/hr)	Q (cfs)	Tc (min.)	CA (ac.)	I (in/hr)	Q (cfs)	Slope (%)	Flow (cfs)	Length (ft)	Vel. (fps)	tt (min.)	Comments
EX-A		9.25	0.52	19.1	4.8	1.67	8.10										
EX-B		9.60	0.67	13.1	6.5	2.00	12.93										
EX-C		1.64	0.46	7.3	0.8	2.51	1.91										
Total		**20.48**					**22.94**										
A		7.96	0.48	20.0	3.8	1.63	6.20										
B		10.09	0.53	15.6	5.4	1.85	9.96										
C		1.27	0.26	8.5	0.3	2.39	0.80										
Total		**19.32**					**16.96**										

Project : Leeper Industrial Park
Project No. : 21087

Date : 4/27/2022
By : JGD

SF3 - Minor Storm

1-hr Point Rainfall **1.11** in. (5-year Event)

		Direct Runoff						Total Runoff				Street		Travel Time			
Description	Design Point	Area (ac.)	C_5	Tc (min.)	CA (ac.)	I (in/hr)	Q (cfs)	Tc (min.)	CA (ac.)	I (in/hr)	Q (cfs)	Slope (%)	Flow (cfs)	Length (ft)	Vel. (fps)	tt (min.)	Comments
EX-A		9.25	0.52	19.1	4.8	2.24	10.84										
EX-B		9.60	0.67	13.1	6.5	2.68	17.29										
EX-C		1.64	0.46	7.3	0.8	3.36	2.56										
Total		**20.48**					**30.68**										
A		7.96	0.48	20.0	3.8	2.18	8.29										
B		10.09	0.53	15.6	5.4	2.47	13.32										
C		1.27	0.26	8.5	0.3	3.19	1.07										
Total		**19.32**					**22.68**										

Project : Leeper Industrial Park
Project No. : 21087

Date : 4/27/2022
By : JGD

SF3 - Major Storm

1-hr Point Rainfall **2.42** in. (100-year Event)

		Direct Runoff						Total Runoff				Street		Travel Time			
Description	Design Point	Area (ac.)	C_{100}	Tc (min.)	CA (ac.)	I (in/hr)	Q (cfs)	Tc (min.)	CA (ac.)	I (in/hr)	Q (cfs)	Slope (%)	Flow (cfs)	Length (ft)	Vel. (fps)	tt (min.)	Comments
EX-A		9.25	0.64	19.1	5.9	4.88	28.82										
EX-B		9.60	0.75	13.1	7.2	5.84	42.20										
EX-C		1.64	0.59	7.3	1.0	7.33	7.10										
Total		**20.48**					**78.12**										
A		7.96	0.60	20.0	4.8	4.75	22.79										
B		10.09	0.65	15.6	6.5	5.39	35.18										
C		1.27	0.42	8.5	0.5	6.96	3.69										
Total		**19.32**					**61.66**										

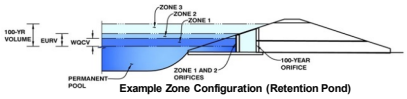
- APPENDIX C – INFILTRATION BASIN CALCULATIONS

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Leeper Industrial Site

Basin ID:



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	RP	
Watershed Area =	10.09	acres
Watershed Length =	1,345	ft
Watershed Slope =	0.005	ft/ft
Watershed Imperviousness =	69.00%	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
Desired WQCV Drain Time =	12.0	hours
Location for 1-hr Rainfall Depths =	Commerce City - Civic Center	
Water Quality Capture Volume (WQCV) =	0.182	acre-feet
Excess Urban Runoff Volume (EURV) =	0.879	acre-feet
2-yr Runoff Volume (P1 = 0.83 in.) =	0.424	acre-feet
5-yr Runoff Volume (P1 = 1.11 in.) =	0.584	acre-feet
10-yr Runoff Volume (P1 = 1.36 in.) =	0.745	acre-feet
25-yr Runoff Volume (P1 = 1.75 in.) =	1.009	acre-feet
50-yr Runoff Volume (P1 = 2.07 in.) =	1.252	acre-feet
100-yr Runoff Volume (P1 = 2.42 in.) =	1.541	acre-feet
500-yr Runoff Volume (P1 = 3.33 in.) =	2.290	acre-feet
Approximate 2-yr Detention Volume =	0.402	acre-feet
Approximate 5-yr Detention Volume =	0.554	acre-feet
Approximate 10-yr Detention Volume =	0.699	acre-feet
Approximate 25-yr Detention Volume =	0.943	acre-feet
Approximate 50-yr Detention Volume =	1.090	acre-feet
Approximate 100-yr Detention Volume =	1.241	acre-feet

Optional User Override 1-hr Precipitation	
0.83	inches
1.11	inches
1.36	inches
1.75	inches
2.07	inches
2.42	inches
3.33	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.182	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.696	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.362	acre-feet
Total Detention Basin Volume =	1.241	acre-feet
Initial Surcharge Volume (ISV) =	N/A	ft^3
Initial Surcharge Depth (ISD) =	N/A	ft
Total Available Detention Depth (H_{total}) =		ft
Depth of Trickle Channel (H_{TC}) =	N/A	ft
Slope of Trickle Channel (S_{TC}) =	N/A	ft/ft
Slopes of Main Basin Sides (S_{main}) =		H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =		

Initial Surcharge Area (A_{ISV}) =		ft^2
Surcharge Volume Length (L_{ISV}) =		ft
Surcharge Volume Width (W_{ISV}) =		ft
Depth of Basin Floor (H_{FLOOR}) =		ft
Length of Basin Floor (L_{FLOOR}) =		ft
Width of Basin Floor (W_{FLOOR}) =		ft
Area of Basin Floor (A_{FLOOR}) =		ft^2
Volume of Basin Floor (V_{FLOOR}) =		ft^3
Depth of Main Basin (H_{MAIN}) =		ft
Length of Main Basin (L_{MAIN}) =		ft
Width of Main Basin (W_{MAIN}) =		ft
Area of Main Basin (A_{MAIN}) =		ft^2
Volume of Main Basin (V_{MAIN}) =		ft^3
Calculated Total Basin Volume (V_{total}) =		acre-feet

Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Permanent Pool									

Project : Leeper Industrial Park
Project No. : 21087

Calculated By : JGD
Date : 4/27/2022

Pond Volume by Contour Area

Contour Elevation	Areas (sq.ft.)	Area (Acre)	Volume (ft^3)	Cumulative Volume (ac-ft)
5138	19,156	0.44	0	0.00
5139	21,729	0.50	20,429	0.47
5140	24,402	0.56	43,482	1.00
5141	27,176	0.62	69,258	1.59
5142	30,056	0.69	97,862	2.25
5143	33,025	0.76	129,391	2.97

Design Procedure Form: Grass Swale (GS)

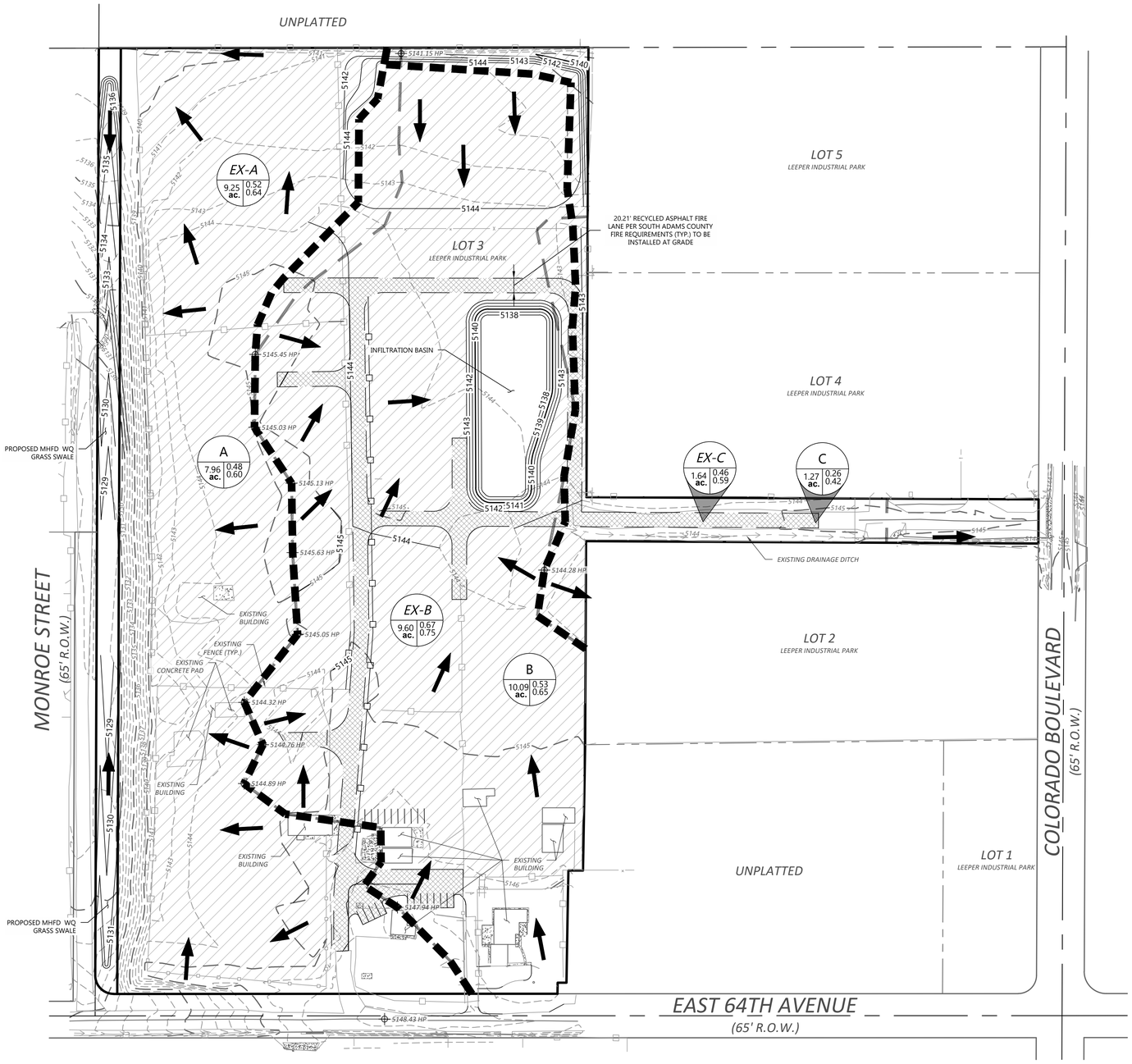
UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

Designer: Jason DeYoung
Company: Proof Civil Consulting Engineers
Date: July 22, 2022
Project: Leeper Industrial Park
Location: 64th Avenue & Monroe Street

1. Design Discharge for 2-Year Return Period	Q_2 = 5.54 cfs
2. Hydraulic Residence Time	
A) : Length of Grass Swale	L_S = 285.0 ft
B) Calculated Residence Time (based on design velocity below)	T_{HR} = 4.8 minutes
3. Longitudinal Slope (vertical distance per unit horizontal)	
A) Available Slope (based on site constraints)	S_{avail} = 0.008 ft / ft
B) Design Slope	S_D = 0.007 ft / ft
4. Swale Geometry	
A) Channel Side Slopes (Z = 4 min., horiz. distance per unit vertical)	Z = 16.00 ft / ft
B) Bottom Width of Swale (enter 0 for triangular section)	W_B = 0.00 ft
5. Vegetation A) Type of Planting (seed vs. sod, affects vegetal retardance factor)	Choose One ● Grass From Seed ○ Grass From Sod
6. Design Velocity (0.95 ft / s maximum for desirable 5-minute residence time)	V_2 = 0.99 ft / s
7. Design Flow Depth (1 foot maximum)	D_2 = 0.59 ft
A) Flow Area	A_2 = 5.6 sq ft
B) Top Width of Swale	W_T = 18.9 ft
C) Froude Number (0.50 maximum)	F = 0.32
D) Hydraulic Radius	R_H = 0.29
E) Velocity-Hydraulic Radius Product for Vegetal Retardance	VR = 0.29
F) Manning's n (based on SCS vegetal retardance curve E for seeded grass)	n = 0.055
G) Cumulative Height of Grade Control Structures Required	H_D = 0.10 ft
8. Underdrain (Is an underdrain necessary?)	Choose One ● YES ○ NO **AN UNDERDRAIN IS REQUIRED IF THE DESIGN SLOPE < 2.0%**
9. Soil Preparation (Describe soil amendment)	
10. Irrigation	Choose One ● Temporary ○ Permanent

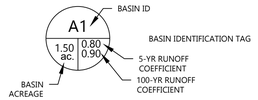
Notes:

- APPENDIX D – DRAINAGE PLAN



LEGEND:

- PROPERTY LINE
- PROPOSED BUILDING
- EXISTING BUILDING
- PROPOSED EASEMENT
- EXISTING EASEMENT
- PROPOSED BASIN BOUNDARY
- HISTORICAL BASIN BOUNDARY
- 5400 — PROPOSED 5' CONTOUR
- 5401 — PROPOSED 1' CONTOUR
- 5400 — EXISTING 5' CONTOUR
- 5401 — EXISTING 1' CONTOUR
- PROPOSED RECYCLED ASPHALT PAVEMENT
- XSD> — EXISTING STORM LINE W/F.E.S.
- FLOW DIRECTION
- 25.25 — PROPOSED SPOT GRADE
- 25.25 — EXISTING SPOT GRADE
- 2.00% — SLOPE AND DIRECTION
- HP — HIGH POINT
- LP — LOW POINT
- GB — GRADE BREAK



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REVISIONS

NO.	DESCRIPTION	DATE

PROJ. NO.: 21087
DATE: 4/30/19
DRAWN BY: MRR
CHECKED BY: JGD

DRAINAGE PLAN

LEEPER INDUSTRIAL PARK

COMMERCE CITY COLORADO

DRAWING NO.

DRN-1