

PHASE I DRAINAGE REPORT

for

ST. FRANCIS OF ASSISI CHURCH

at

UNINCORPORATED DOUGLAS COUNTY

STATE OF COLORADO

CD25-0034

October 11, 2024

Prepared for:

Diocese of Colorado Springs

228 N. Cascade Ave.

Colorado Springs, CO 80903

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RLEG NO. 240702

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II. GENERAL LOCATION AND DESCRIPTION

A. SITE LOCATION

The St. Francis of Assisi Catholic Church and property (hereafter referred to as the 'Project' and/or 'Site') is in Unincorporated Douglas County located within the Town of Castle Rock limits. The project is situated at the southwest corner of N Ridge Rd and Fifth St in the Town of Castle Rock.

The project is located in the northeast quarter of Section 12, Township 8 South, Range 67 West of the 6th P.M. It is directly south of Fifth St and 500 feet east of Valley Drive. It is approximately 1.5 miles east of I-25. The project is surrounded by single family homes and rural residential type existing development.

Vicinity Map:



VICINITY MAP
SCALE 1" = 1000'

B. DESCRIPTION OF PROPERTY AND LAND USE

The area of the Project is 16.51 acres. The site is fully developed and consists mostly of paved asphalt parking lot and landscape buffer. It also contains two detention ponds and the church building is situated on a large rock cliff. The site is well maintained. The site generally slopes from northeast to southwest at 4%-6% average grade towards Valley Drive. The NRCS hydrologic soil classification of the site is Type C, Fondis-Kutch association type soil and determined to have a slow infiltration rate. There are no minor drainageways other than Fifth

St. The site's stormwater is collectively discharged into the Fifth St storm sewer system and then discharged into the East Plum Creek near I-25 west of the site. The site is not located within a FEMA floodplain area. There are no irrigation canals run through site. There are two existing drainage ditches on site, one for the detention pond #1 outfall which dissipates from the Detention Pond #1 outfall onto Valley Drive west of the site. The other ditch discharges from the Detention Pond #2 outfall into an existing storm pipe offsite near Gordon Drive south of the site and into an existing curb inlet along Gordon Drive. The church building and western property edge are situated on a raised rock cliff abutment. The site currently has a sole use and is a church service.

III. DRAINAGE BASIN AND SUB-BASINS

A. Major Drainage Basin

This Project is part of the Plum Creek Watershed. There are no offsite flows onto the site. Runoff from the site is collected onsite via inlets and discharged into the two onsite detention ponds. The ponds are then released into the Fifth St storm sewer system. The site's current existing condition is fully developed.

B. Minor Drainage Basins

The project is located within the Parkview Tributary minor drainageway as part of the Plum Creek Basin. Minor drainage basins for the site are shown on the Drainage Map. Basins are divided into 'A' basins that drain to the existing detention pond #1, 'B' basins that drain to the existing detention pond #2 and undetained basins whose runoff is not collected onsite.

IV. EXISTING STORMWATER CONVEYANCE OR STORAGE FACILITIES

A. Existing Stormwater Conveyance Facilities

There are several existing storm pipes, roof drains, sidewalk chases, manholes, inlets, area drains, pond micropools, forebays, trickle channels and outlet structures on site that facilitate drainage conveyance of the site.

B. Existing Stormwater Storage Facilities

The site is currently served by two existing water quality and detention ponds on site that provide storage for the 10-year and 100-year storm events.

V. PROPOSED STORMWATER CONVEYANCE OR STORAGE FACILITIES

A. Proposed Stormwater Conveyance Facilities

There are no proposed stormwater improvements for the site.

B. Proposed Stormwater Storage Facilities

There are no proposed stormwater improvements for the site.

VI. WATER QUALITY ENHANCEMENT BEST MANAGEMENT PRACTICES

A. Non-Structural Best Management Practices

The site is currently fully developed and maintained. BMP practices include regular mowing of the lawn areas, proper disposal of onsite maintenance, trash collection, proper material storage, keeping inlets free of debris, no use of the site other than those outlined in the PD guidelines, and cleaning and maintaining of the onsite detention ponds and outlet structures.

B. Structural Best Management Practices

The site currently has two existing water quality and detention ponds, outfall structures and outfall pipes and riprap pads that facilitate water quality enhancement for the site. Measures should be taken not to disturb this infrastructure and to keep them free of any debris and in working order.

VII. FLOODPLAIN MODIFICATIONS

There are no proposed modifications to the floodplain or site.

VIII. MASTER PLAN RECOMMENDATIONS

The project is part of the Parkview Tributary Drainageways Master Plan and located directly south of the Castle North Neighborhood subdivision. There are no proposed improvements for the Project site, however.

The project is indirectly part of the 'Fifth Street Improvements Rock Street to Four Corners' project where Fifth Street and associated stormwater infrastructure will be removed and replaced to update the area. No drainage report was found for the 'Fifth Street Improvements' plan.

XI. POTENTIAL PERMITTING REQUIREMENTS

Currently the project is in the process of Annexation into the Town of Castle Rock as well as establishing its own Planned Development Plan (PD) zoning regulations and guidelines.

IX. REFERENCES

‘Fifth Street Improvements Rock Street to Four Corners Project (CIP22-0011)’ by Stanley Consultants. Dated 11/22/22.

‘NRCS Web Soil Survey.’ Geological Research. Dated 10/14/24.

‘St. Francis of Assisi Construction Plans’ by Martin and Martin Inc., Dated March 1, 2006.

‘Stormwater Master Plan Update 2017’. Castle Rock Water – Stormwater Division. Dated 2017.

X. APPENDICES

Appendix A – Maps

Appendix B – Tables and Figures

Appendix C - Hydrology

Appendix D – Existing Studies and Maps



APPENDIX A – FEMA FIRM MAP, SOIL REPORT

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 shown on 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 Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

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 Floodway Data table shown on this FIRM.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD 83, GRS 1980 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, NINGS12
National Geodetic Survey
SSM-C-3, #9222
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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 Douglas County GIS Department and the Town of Castle Rock GIS Department. Additional input was provided by the City of Lone Tree and Town of Parker. These data are current as of 2010.

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 **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

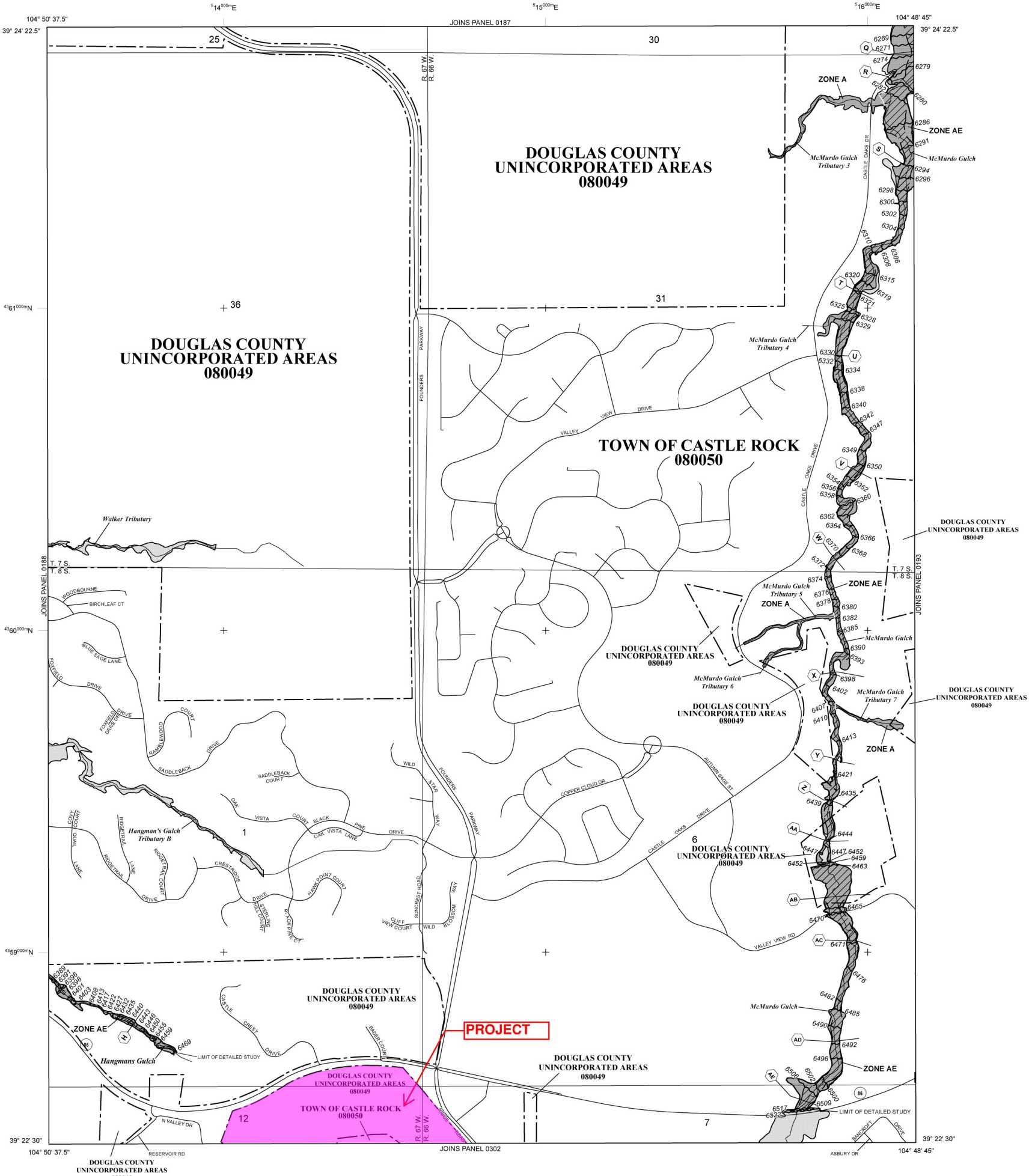
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

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.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/nfip>.



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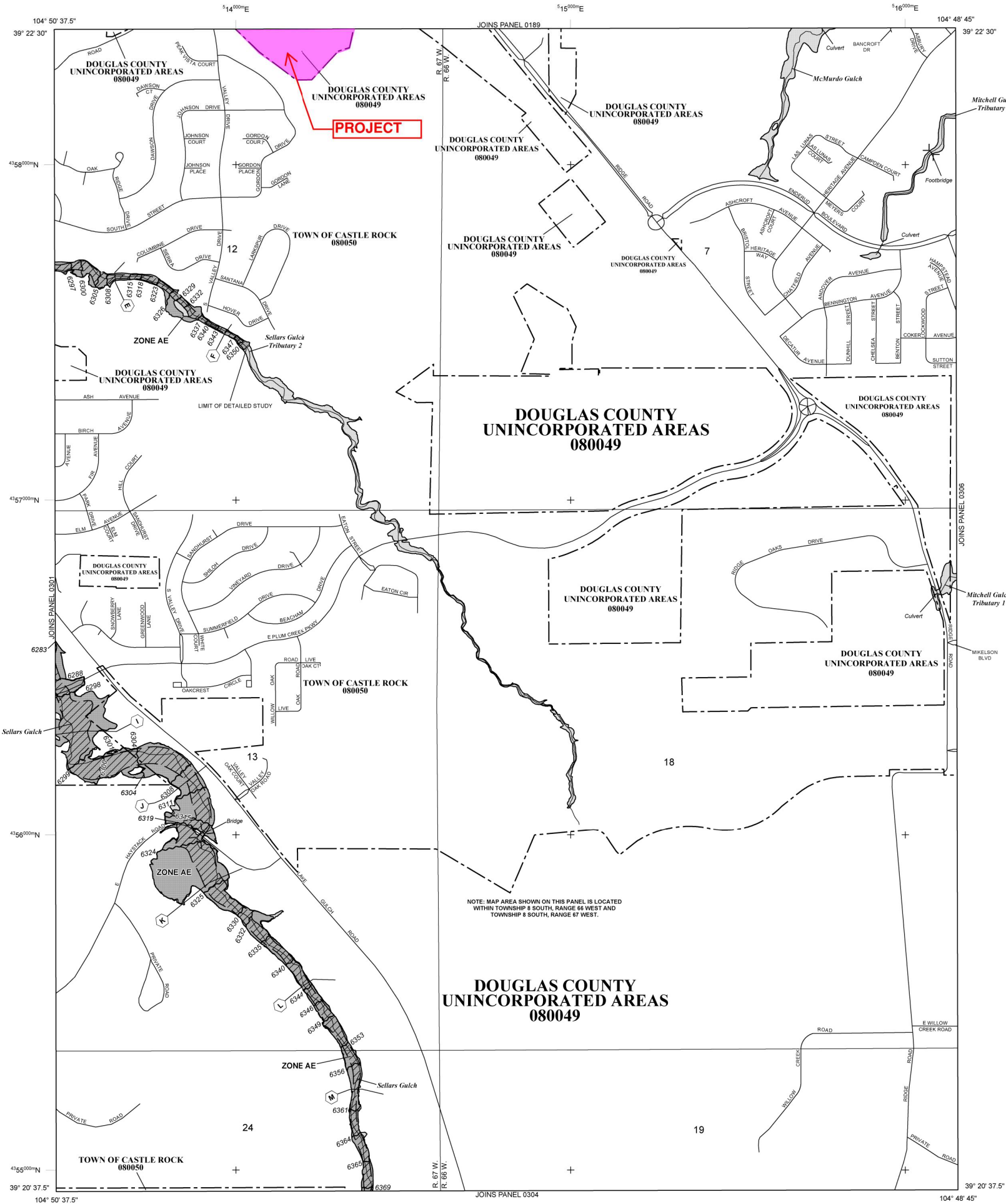
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LEGEND

- 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 Areas 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.
- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transsect line

45° 02' 08", 93° 02' 12"

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

1000-meter Universal Transverse Mercator grid values, zone 13

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

SEPTEMBER 30, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

MARCH 16, 2016: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to update map format, to add roads and road names, to reflect updated topographic information, to incorporate previously issued letters of map revision.

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
150 0 150 300
FEET
METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0302G

FIRM

FLOOD INSURANCE RATE MAP

DOUGLAS COUNTY, COLORADO

AND INCORPORATED AREAS

PANEL 302 OF 495

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CASTLE ROCK, TOWN OF	080050	0302	G
DOUGLAS COUNTY	080049	0302	G

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.

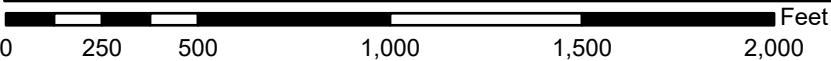
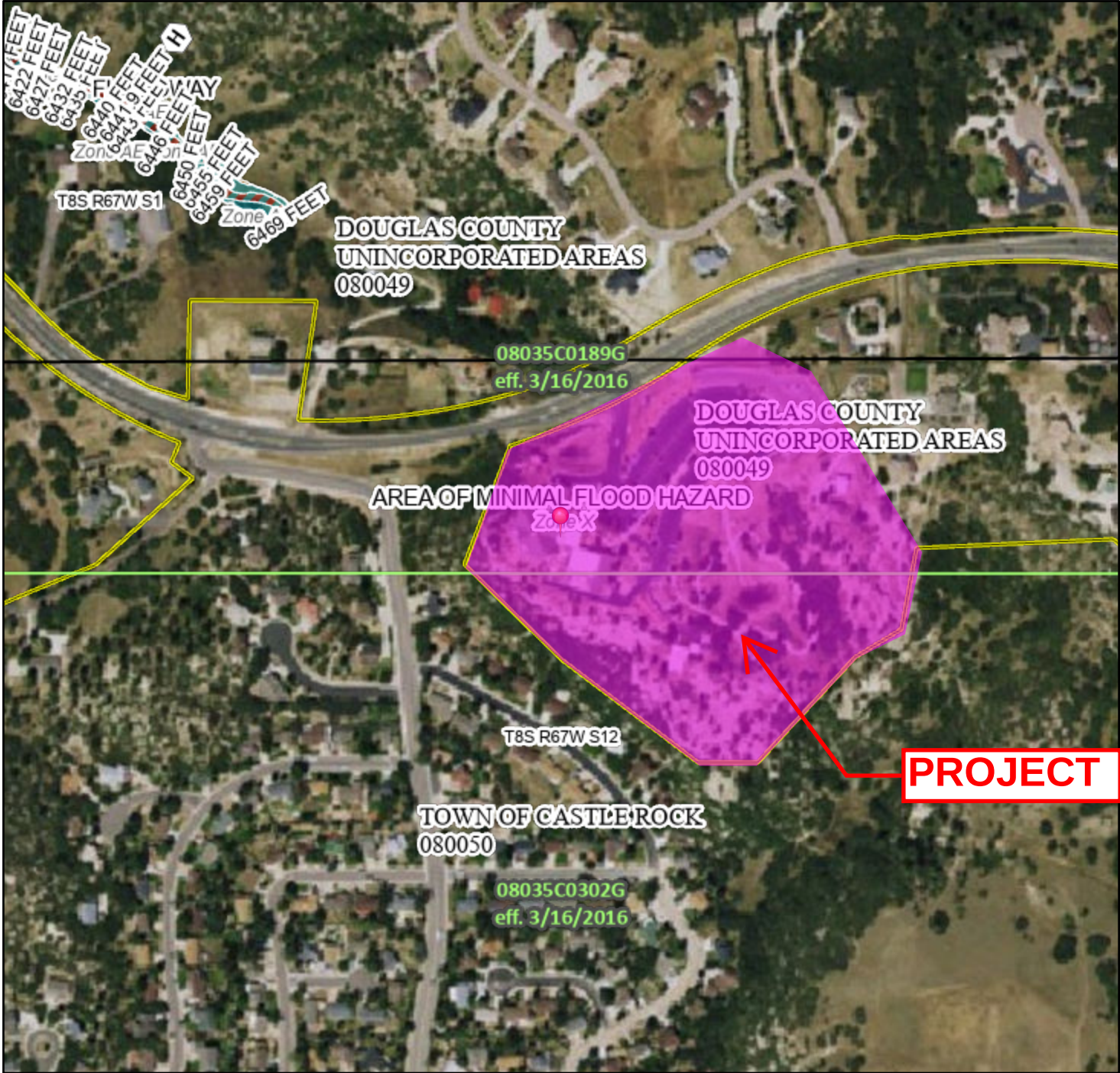
MAP NUMBER
08035C0302G
MAP REVISED
MARCH 16, 2016

Federal Emergency Management Agency

National Flood Hazard Layer FIRMette



104°50'31"W 39°22'45"N



1:6,000

104°49'53"W 39°22'17"N

Basemap Imagery Source: USGS National Map 2023

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 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



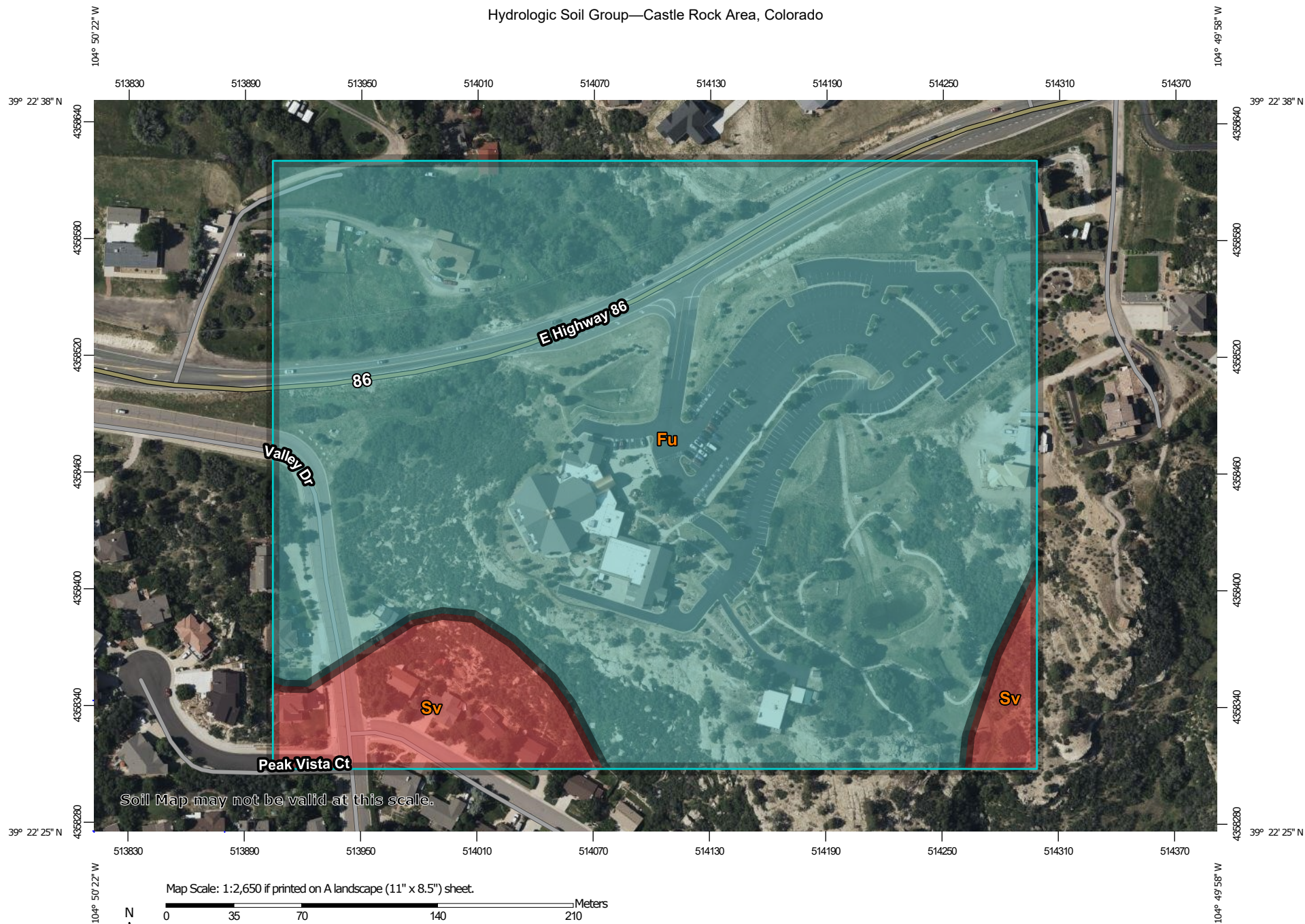
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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 **10/14/2024 at 4:59 PM** 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.

Hydrologic Soil Group—Castle Rock Area, Colorado



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: Castle Rock Area, Colorado
 Survey Area Data: Version 17, Aug 29, 2024

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

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

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
Fu	Fondis-Kutch association	C	27.6	90.3%
Sv	Stony steep land	D	3.0	9.7%
Totals for Area of Interest			30.6	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



APPENDIX B – TABLES AND FIGURES

TABLE 6-3. RECOMMENDED IMPERVIOUSNESS BY SURFACE TYPES

SURFACE TYPES		IMPERVIOUSNESS
Roadways and Paved Streets		95%
Concrete Driveways and Walks		95%
Roofs		95%
Gravel	No Traffic (Pedestrian Use)	40%
	Low-traffic Areas (Maintenance Paths and Substations)	60%
	High-traffic Areas (Roadways and Parking)	80%
Disturbed Soil (Including Lawns, Managed/Active Turf, Landscaped Areas with Water-Wise Vegetation, and Uncompacted Gravel/Mulch Planting Beds)		20%
Undisturbed or Decompacted Soil (Native Grasses and Open Space Areas)		5%
Artificial Turfs ¹	Landscape Applications (without Subgrade Drainage Layer)	25% – 45%
	Sport Fields (with Underdrain Pipe System)	60% – 80%
Water Surfaces (Lakes/Reservoirs/Irrigation Ponds)		100%
Solar Fields ²	Grass Cover (Varies with Panel Orientation Relative to Ground Contours)	10% – 45%
	Gravel Cover (Varies with Panel Orientation Relative to Ground Contours)	50% – 75%
Historic Flow Analysis, Greenbelts, Agricultural		5%
Newly Graded Areas		65%
Stormwater Control Measures ³	Retention Ponds & Constructed Wetland Ponds	100%
	Rooftop Systems – Blue Roofs	95%
	Rooftop Systems – Green Roofs (extensive)	65%
	Rooftop Systems – Green Roofs (intensive)	50%
	Permeable Pavement – CGP/PGP/RGP	55%
	Permeable Pavement – PICP	45%
	Extended Detention Basins	25%
	Receiving Pervious Areas (incl. Grass Buffers & Grass Swales)	20%
	Bioretention & Sand Filters	10%

¹ Consult with the manufacturer to get a recommended value.

² Assumes 1:1 ratio of panels to aisles. See MHFD's technical memorandum regarding *Determination of Solar Panel Field Runoff Coefficients and Imperviousness Values* for additional information on procedures for determining percent imperviousness based on panel width, panel spacing, and panel orientation relative to ground contours and how to reflect other impervious areas such as roads and pads that may be part of a solar field and layouts with wider inter-panel spacing.

³ See MHFD's technical memorandum regarding *Evaluation of Percent Imperviousness for Stormwater Control Measures* for background information.

4.5 RAINFALL INTENSITY

The calculated rainfall intensity, I , is the average rainfall rate in inches per hour over a duration equal to t_c . Obtain 1-hour point precipitation depths from National Oceanic and Atmospheric Administration (NOAA) Atlas 14 for the average return periods of interest and apply Equation 5-1 in the *Rainfall* chapter using t_c as the storm duration, t_d . Use the centroid of the catchment to determine the 1-hour point precipitation depths. The MHFD-Rational and MHFD-Inlet Excel workbooks automatically calculate rainfall intensity based on 1-hour point precipitation depths for a specified location.

4.6 RUNOFF COEFFICIENTS

Any watershed can be conceptualized as a combination of pervious and impervious surfaces. Pervious surfaces allow water to infiltrate into the ground, while impervious surfaces do not allow for infiltration. In urban hydrology, the relationships between pervious and impervious surfaces is important. Urbanization increases impervious area, causing rainfall-runoff relationships to change significantly. In the absence of stormwater management controls that infiltrate or detain runoff, urbanization increases peak runoff rates, volumes, and frequency of runoff and decreases the time to peak.

When analyzing a catchment for planning or design purposes, estimates of the existing and probable future imperviousness of the drainage area are needed. In some cases, the pre-development (i.e., historic) condition also must be analyzed. Table 6-2 provides recommended imperviousness values based on land use types and is appropriate for master planning analysis and conceptual design. Note that the land use classifications in Table 6-2 incorporate roads that are included within the land use. Table 6-3 provides recommended imperviousness values for different surface types and is appropriate for use during later stages of design when the layout of different types of impervious and pervious areas on the site is known and the area of each surface type can be quantified.

The runoff coefficient, C , represents the integrated effects of infiltration, evaporation, depression storage, and interception, all of which affect the rate and volume of runoff. Determining representative runoff coefficients requires judgment based on the experience and expertise of the engineer.

Volume-based runoff coefficients were derived to improve consistency between CUHP and the Rational Method for peak flow predictions (Guo 2013; Guo and Urbonas 2013). The coefficients developed by Dr. Guo were recalibrated using CUHP Version 2.0.0 (Rapp et al. 2017). Using imperviousness, expressed as a decimal, and the Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG), the equations in Table 6-5 can be used to calculate runoff coefficients for design storm return periods for the Rational Method.

TABLE 6-5. RUNOFF COEFFICIENT EQUATIONS BASED ON NRCS HSG AND STORM RETURN PERIOD							
NRCS HSG	STORM RETURN PERIOD						
	WQE & 2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.840I^{1.302}$	$C_A = 0.861I^{1.276}$	$C_A = 0.873I^{1.232}$	$C_A = 0.884I^{1.124}$	$C_A = 0.854I + 0.025$	$C_A = 0.779I + 0.110$	$C_A = 0.645I + 0.254$
B	$C_B = 0.835I^{1.169}$	$C_B = 0.857I^{1.088}$	$C_B = 0.807I + 0.057$	$C_B = 0.628I + 0.249$	$C_B = 0.558I + 0.328$	$C_B = 0.465I + 0.426$	$C_B = 0.366I + 0.536$
C/D	$C_{C/D} = 0.834I^{1.122}$	$C_{C/D} = 0.815I + 0.035$	$C_{C/D} = 0.735I + 0.132$	$C_{C/D} = 0.560I + 0.319$	$C_{C/D} = 0.494I + 0.393$	$C_{C/D} = 0.409I + 0.484$	$C_{C/D} = 0.315I + 0.588$



APPENDIX C – HYDROLOGY



**COMPOSITE IMPERVIOUSNESS AND
RUNOFF COEFFICIENT CALCULATIONS
EXISTING HISTORIC CONDITIONS**

**ST FRANCIS CHURCH
10/15/2024
DRT**

SUB-BASIN	EXISTING LAND USE ^a (sf)					TOTAL AREA (sf)	TOTAL AREA (acres)	COMPOSITE PERCENT IMPERVIOUS <i>i</i>	RUNOFF COEFFICIENTS ^b HYDROLOGIC SOIL GROUP C ^c				NOTES
	PAVED STREET (ASPHALT)	DRIVE & WALKS (CONC)	ROOF	LAWN					C ₂	C ₅	C ₁₀	C ₁₀₀	
A1	78,170			34,977		113,147	2.597	69.7%	0.56	0.60	0.64	0.77	
A2				167,033		167,033	3.835	2.0%	0.01	0.05	0.15	0.49	
A3	13,507		19,759			33,266	0.764	94.1%	0.78	0.80	0.82	0.87	
B1	52,522	17,111		17,824		87,457	2.008	78.1%	0.63	0.67	0.71	0.80	
B2			11,555			11,555	0.265	90.0%	0.74	0.77	0.79	0.85	
UD1		-	-	276,168		276,168	6.340	2.0%	0.01	0.05	0.15	0.49	
UD2				30,700		30,700	0.705	2.0%	0.01	0.05	0.15	0.49	
Total	144,199	17,111	31,314	526,702	-	719,326	16.513	27.57%	0.20	0.26	0.33	0.60	

NOTES:

- a. UDFCD, USDCM Volume 1, Table 6-3
- b. UDFCD, USDCM Volume 1, Table 6-5
- c. NRCS Web Soil Survey



APPENDIX D – EXISTING STUDIES AND MAPS

GENERAL NOTES:

- ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH DOUGLAS COUNTY STANDARDS AND SPECIFICATIONS (LATEST REVISION). ALL STREETS, WATER MAIN, STORM SEWER AND SANITARY SEWER CONSTRUCTION SHALL CONFORM TO THE REGULATIONS OF AND BE SUBJECT TO INSPECTION BY THE LOCAL JURISDICTION.
- THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS AT AND ADJACENT TO THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
- THE DUTY OF THE COUNTY/OWNER/ENGINEER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON OR NEAR THE CONSTRUCTION SITE.
- ALL TRENCHES SHALL BE ADEQUATELY SUPPORTED AND THE SAFETY OF WORKERS PROVIDED FOR AS REQUIRED BY THE MOST RECENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) "SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION". THESE REGULATIONS ARE DESCRIBED IN SUBPART P, PART 1926 OF THE CODE OF FEDERAL REGULATIONS. SHEETING AND SHORING SHALL BE UTILIZED WHERE NECESSARY TO PREVENT ANY EXCESSIVE WIDENING OR SLOUGHING OF THE TRENCH WHICH MAY BE DETRIMENTAL TO HUMAN SAFETY, TO THE PIPE BEING PLACED, TO TREES, OR TO ANY EXISTING STRUCTURE. WHERE EXCAVATIONS ARE MADE UNDER SEVERE WATER CONDITIONS, THE CONTRACTOR MAY BE REQUIRED TO USE AN APPROVED PILING INSTEAD OF SHEETING AND SHORING.
- IN ALL CASES MAINTAIN TEN FEET (10') HORIZONTAL DISTANCE BETWEEN WATER AND SANITARY SEWER.
- COMPACTION OF ALL TRENCHES MUST BE ATTAINED AND COMPACTION TEST RESULTS SUBMITTED TO THE ENGINEER AND DOUGLAS COUNTY PRIOR TO FINAL ACCEPTANCE.
- THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF PLANS APPROVED BY DOUGLAS COUNTY AND ONE COPY OF THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ON THE JOB SITE AT ALL TIMES.
- CONTRACTOR SHALL NOTIFY THE ENGINEER, OWNER AND DOUGLAS COUNTY FORTY EIGHT (48) HOURS PRIOR TO THE START OF CONSTRUCTION.
- CONTRACTOR SHALL OBTAIN ALL PERMITS FOR STREET CUTS, UTILITY INTERFERENCES AND TRAFFIC CONTROL.
- THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION AND SEDIMENT CONTROL MEASURES AT ALL TIMES DURING CONSTRUCTION. THE PLAN MAY BE MODIFIED WITH APPROPRIATE APPROVALS AS FIELD CONDITIONS WARRANT.
- REFER TO THE APPROVED GEOTECHNICAL INVESTIGATION REPORT FOR PAVEMENT DESIGN, RECOMMENDATIONS REGARDING EXCAVATION, COMPACTION, EMBANKMENT, TOPSOIL REMOVAL AND REPLACEMENT.
- REPAIR OF ANY DAMAGE TO EXISTING IMPROVEMENTS OR LANDSCAPING IS THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL DAMAGED EXISTING CURB, GUTTER AND SIDEWALK SHALL BE REPAIRED PRIOR TO ACCEPTANCE OF COMPLETED IMPROVEMENTS.
- THE TYPE, SIZE, LOCATION AND NUMBER OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES ALONG THE ROUTE OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR UNKNOWN UNDERGROUND UTILITIES.
- CONTRACTOR SHALL STRAIGHT SAWCUT EXISTING ASPHALT PAVEMENT WHEN JOINING WITH NEW ASPHALT PAVEMENT. APPLY SS-1 TACK COAT.
- ALL DRIVE LANES SHALL BE HEAVY DUTY ASPHALT AS SPECIFIED IN THE SOILS REPORT. ALL PARKING AREAS SHALL BE LIGHT DUTY.
- ALL ELEVATIONS SHOWN ARE TO FLOW LINE UNLESS OTHERWISE NOTED.
- CAUTION: LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY CONTRACTOR PRIOR TO DATE OF CONSTRUCTION. FOR INFORMATION CONTACT: DENVER INTER-UTILITY GROUP, 1-800-922-1987. THE CONTRACTOR SHALL FIELD VERIFY SIZE AND HORIZONTAL AND VERTICAL LOCATIONS OF EXISTING FACILITIES PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER AND COUNTY OF ANY DISCREPANCIES.

BENCHMARK:

USGS BENCH MARK #U336, A 3-1/2" BRASS CAP SET IN THE TOP OF THE EAST END OF A LARGE GRANITE BOULDER AT THE FOOT OF A ROCK OUTCROP. NAVD88 ELEVATION = 6571.41

BASIS OF BEARINGS:

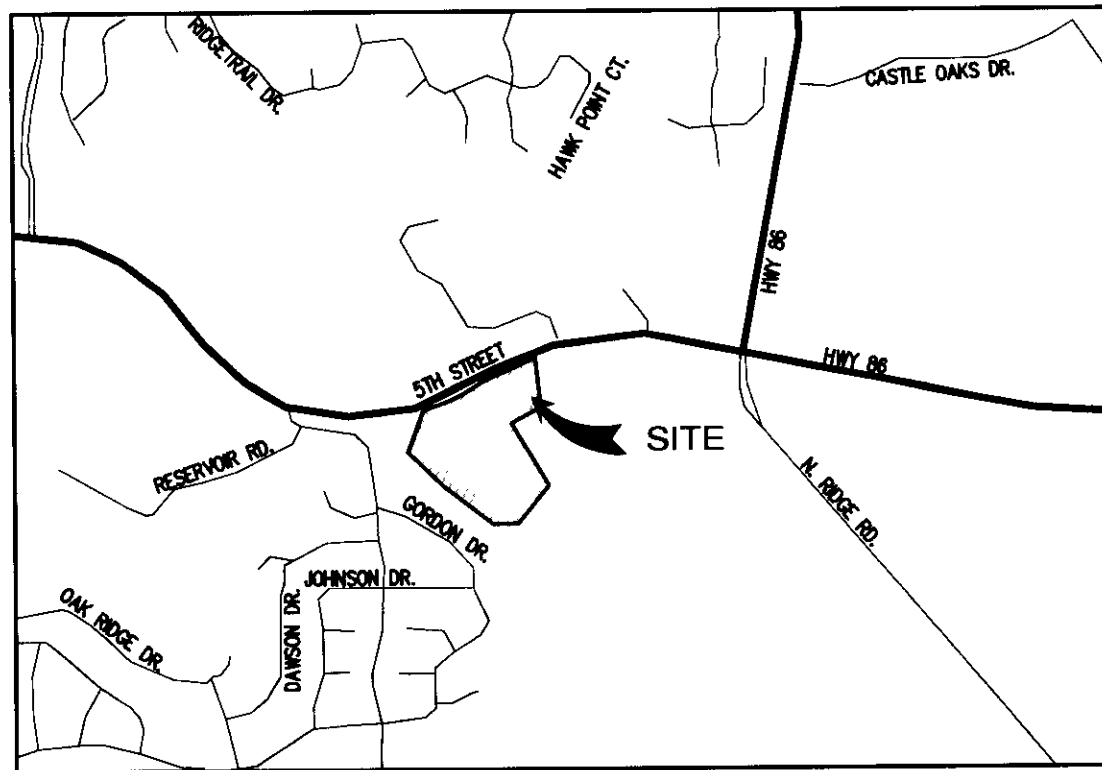
THE NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 12, TOWNSHIP 8 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN IS ASSUMED TO BEAR N88°55'29"E, AS MONUMENTED BY A 2 1/2" ALUMINUM CAP STAMPED P.L.S. # 12046 ON THE NORTHEAST QUARTER CORNER, AND A 2 1/2" ALUMINUM CAP STAMPED P.L.S. #6935 ON THE NORTH QUARTER CORNER.

DOUGLAS COUNTY ROADWAY NOTES:

- THE DOUGLAS COUNTY ENGINEER'S SIGNATURE AFFIXED TO THIS DOCUMENT INDICATES THE ENGINEERING DIVISION HAS REVIEWED THE DOCUMENT AND FOUND IT IN GENERAL CONFORMANCE WITH THE DOUGLAS COUNTY SUBDIVISION RESOLUTION OR APPROVED VARIANCES TO THOSE REGULATIONS. THE DOUGLAS COUNTY ENGINEER, THROUGH ACCEPTANCE OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY, OTHER THAN STATED ABOVE, FOR THE COMPLETENESS, AND/OR ACCURACY OF THESE DOCUMENTS. THE OWNER AND ENGINEER UNDERSTAND THAT THE RESPONSIBILITY FOR THE ENGINEERING ADEQUACY OF THE FACILITIES DEPICTED IN THIS DOCUMENT LIES SOLELY WITH THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE IS AFFIXED TO THIS DOCUMENT.
- ALL ROADWAY CONSTRUCTION SHALL CONFORM TO DOUGLAS COUNTY ROADWAY DESIGN AND CONSTRUCTION STANDARDS.
- ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE DOUGLAS COUNTY ENGINEERING DIVISION. THE COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO ITS STANDARDS AND SPECIFICATIONS.
- THE CONTRACTOR SHALL NOTIFY THE DOUGLAS COUNTY ENGINEERING DIVISION INSPECTION SECTION, (303)660-7490, A MINIMUM OF 48 HOURS AND A MAXIMUM OF 96 HOURS PRIOR TO STARTING CONSTRUCTION.
- LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION. FOR INFORMATION CONTACT: DENVER INTER-UTILITY GROUP, (303)534-6700 OR 1-800-922-1987.
- THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF THE PLANS (ACCEPTED BY THE DOUGLAS COUNTY ENGINEER) AND ONE (1) COPY OF THE ROADWAY DESIGN AND CONSTRUCTION STANDARDS AT THE JOB SITE AT ALL TIMES.
- THE CONSTRUCTION PLANS SHALL BE CONSIDERED VALID FOR TWO (2) YEARS FROM THE DATE OF COUNTY ACCEPTANCE AFTER WHICH TIME THESE PLANS SHALL BE VOID AND WILL BE SUBJECT TO RE-REVIEW AND REACCEPTANCE BY DOUGLAS COUNTY.

ST. FRANCIS OF ASSISI CONSTRUCTION DRAWINGS

LOCATED IN THE NORTH EAST QUARTER OF SECTION 12 TOWNSHIP
8 SOUTH, RANGE 67 WEST OF THE 6TH. PRINCIPAL MERIDIAN
COUNTY OF DOUGLAS, STATE OF COLORADO



VICINITY MAP
SCALE: 1" = 1000'

LEGEND

EXISTING		PROPOSED
---	PROPERTY LINE	---
---	EASEMENT	---
---	TYPE I CURB & GUTTER (SPILL)	---
---	TYPE II CURB & GUTTER (CATCH)	---
---	HEAVY DUTY DRIVE LANES	---
---	CONCRETE	---
---	HANDICAP RAMPS	---
---	CONTOURS	---
---	STORM SEWER	---
---	STORM MANHOLE	---
---	ROOF DRAIN	---
---	STORM INLET	---
---	FLARED END SECTION	---
---	SANITARY SEWER	---
---	SANITARY MANHOLE	---
---	CLEAN OUT	---
---	WATER LINE	---
---	WATER VALVE	---
---	FIRE HYDRANT	---
---	WATER METER	---
---	IRRIGATION CONTROL	---
---	OVERHEAD ELECTRIC	---
---	ELECTRIC LINE	---
---	LIGHT POLE	---
---	POWER POLE	---
---	ELECTRIC METER	---
---	TELEPHONE LINE	---
---	TELEPHONE PEDESTAL	---
---	CABLE TV	---
---	SIGN	---
---	DECIDUOUS TREE	---
---	EVERGREEN TREE	---
---	BUSH/SHRUB	---
---	MONITOR WELL	---
---	GAS LINE	---
---	DRIVE	---
---	DRIVE	---

INDEX

C1.0	COVER SHEET
C2.0	EXISTING SITE AND DEMO PLAN
C3.0	HORIZONTAL CONTROL
C4.0	GRADING PLAN
C4.1	INITIAL GESC PLAN
C4.2	INTERIM GESC PLAN
C4.3	FINAL GESC PLAN
1 of 3	GESC PLAN STANDARD NOTES AND DETAILS
2 of 3	GESC PLAN STANDARD NOTES AND DETAILS
3 of 3	GESC PLAN STANDARD NOTES AND DETAILS
C6.0	DETAIL SHEET
C6.1	DETAIL SHEET
C6.2	DETAIL SHEET
C6.3	DETAIL SHEET
ST1.1	STORM SEWER PLAN AND PROFILE
ST1.2	STORM SEWER PLAN AND PROFILE
ST1.3	STORM SEWER PLAN AND PROFILE
ST1.4	POND DETAILS
ST2.0	STORM SEWER OUTLET STRUCTURES
U1.1	OVERALL UTILITY PLAN

MARTIN/MARTIN assumes no responsibility for utility locations. The utilities shown on this drawing have been plotted from the best available information. It is, however, the contractors responsibility to field verify the location of all utilities prior to the commencement of any construction.

CALL UTILITY NOTIFICATION
CENTER OF COLORADO
1-800-922-1987
OR 534-6700 IN METRO DENVER

CALL 2-BUSINESS DAYS IN ADVANCE
BEFORE YOU DIG, GRADE OR EXCAVATE
FOR MARKING OF UNDERGROUND
MEMBER UTILITIES

DOUGLAS COUNTY ROADWAY NOTES (CONT.):

- CONTRACTOR SHALL NOTIFY DOUGLAS COUNTY ENGINEERING INSPECTION WHEN WORKING OUTSIDE OF THE PUBLIC RIGHT-OF-WAY ON ANY FACILITY WHICH WILL BE CONVEYED TO THE COUNTY, URBAN DRAINAGE & FLOOD CONTROL DISTRICT, OR OTHER SPECIAL DISTRICT FOR MAINTENANCE (STORM SEWER, ENERGY DISSIPATORS, DETENTION OUTLET STRUCTURES, OR OTHER DRAINAGE INFRASTRUCTURES). FAILURE TO NOTIFY ENGINEERING INSPECTION TO ALLOW THEM TO INSPECT THE CONSTRUCTION MAY RESULT IN NON-ACCEPTANCE OF THE FACILITY/INFRASTRUCTURE BY THE COUNTY AND/OR URBAN DRAINAGE.
- INSPECTION: CONSTRUCTION SHALL NOT BEGIN UNTIL A PERMIT HAS BEEN ISSUED. IF A DOUGLAS COUNTY ENGINEERING INSPECTOR IS NOT AVAILABLE AFTER PROPER NOTICE OF CONSTRUCTION ACTIVITY HAS BEEN PROVIDED, THE PERMITTEE MAY COMMENCE WORK IN THE INSPECTOR'S ABSENCE. HOWEVER, DOUGLAS COUNTY RESERVES THE RIGHT NOT TO ACCEPT THE IMPROVEMENT IF SUBSEQUENT TESTING REVEALS AN IMPROPER INSTALLATION.
- PAVING SHALL NOT START UNTIL A SOILS REPORT AND PAVEMENT DESIGN IS ACCEPTED BY THE ENGINEERING DIVISION AND SUBGRADE COMPACTION TESTS ARE TAKEN AND ACCEPTED BY THE INSPECTION SECTION.
- STANDARD DOUGLAS COUNTY HANDICAP RAMPS ARE TO BE CONSTRUCTED AT ALL CURB RETURNS AND AT ALL "T" INTERSECTIONS, UNLESS OTHERWISE NOTED FOR PRIVATE RAMPS.
- DOUGLAS COUNTY SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OF PRIVATE ROADWAY AND APPURTENANT IMPROVEMENTS, INCLUDING STORM DRAINAGE STRUCTURES AND PIPES.
- EXCEPT WHERE OTHERWISE PROVIDED FOR IN THESE PLANS AND SPECIFICATIONS, THE COLORADO DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND THE COLORADO DEPARTMENT OF HIGHWAYS M STANDARDS, LATEST EDITION, SHALL APPLY.
- ALL ELEVATIONS SHOWN ARE FLOW LINE UNLESS OTHERWISE NOTED.
- A PLAN FOR TRAFFIC CONTROL DURING CONSTRUCTION SHALL BE SUBMITTED TO DOUGLAS COUNTY FOR ACCEPTANCE WITH THE PERMIT APPLICATION. A RIGHT-OF-WAY USE AND CONSTRUCTION PERMIT WILL NOT BE ISSUED WITHOUT AN APPROVED TRAFFIC CONTROL PLAN FOR TRAFFIC CONTROL DURING CONSTRUCTION. A TEMPORARY CONSTRUCTION ACCESS PERMIT FROM DOUGLAS COUNTY MAY BE REQUIRED.
- ALL PROPOSED STREET CUTS TO EXISTING PAVEMENTS FOR UTILITIES, STORM SEWER OR FOR OTHER PURPOSES ARE LISTED AND REFERENCED BELOW:
FIRE LINE EXTENSION SHEET U1.1
ENTRANCE CONNECTIONS N/A
SANITARY SEWER TIE-IN N/A
- TWO (2) MANHOLE ACCESS POINTS ARE REQUIRED ON ALL TYPE "R" CURB INLETS GREATER THAN OR EQUAL TO TEN (10) FEET IN LENGTH. PLEASE SEE CDOT M&S -M-604-12.
- JOINT RESTRAINTS ARE REQUIRED FOR A MINIMUM OF THE LAST TWO PIPE JOINTS AND FLARED END SECTION OF AN RCP OUTFALL.
- TOE WALLS ARE REQUIRED AT THE END OF ALL FLARED END SECTIONS.

STORM SEWER NOTES:

- ALL STORM SEWER SHALL BE A WATERTIGHT CLASS III REINFORCED CONCRETE PIPE IN ACCORDANCE WITH ASTM C76-90 AND ASTM C990-92, UNLESS NOTED OTHERWISE.
- THE CONTRACTOR SHALL FURNISH THE ENGINEER WITH A SET OF PLANS MARKED WITH "AS-BUILT." THE PLANS SHALL SHOW MANHOLE AND INLET LOCATIONS, PIPE SIZES AND ANY VARIATIONS FORM THE APPROVED PLAN.
- RAMNEK (MASTIC) GASKETS FOR RCP STORM SEWER IS NO LONGER ACCEPTED IN THE STORM SEWER DESIGN. ALL RCP STORM SEWERS MUST USE O-RING WATERTIGHT GASKETS (R-4 JOINTS) PER THE CURRENT URBAN DRAINAGE AND DOUGLAS COUNTY DESIGN CRITERIA.
- EPOXY COATED REBAR IS NOW REQUIRED ON ALL DRAINAGE STRUCTURES.
- DOUGLAS COUNTY REQUIRES CLASS D CONCRETE FOR ALL DRAINAGE STRUCTURES.
- A MINIMUM OF COMPACTED 6" AGGREGATE BASE COURSE (CLASS 6) IS REQUIRED PRIOR TO PLACING ANY PRECAST INLET OR MANHOLE BASE.
- DOUGLAS COUNTY CRITERIA PREVAILS FOR ANY DISCREPANCIES ON ALL STANDARD DETAILS.

CERTIFICATION:

THESE CONSTRUCTION PLANS FOR ST. FRANCIS OF ASSISI WERE PREPARED BY ME (OR UNDER MY DIRECT SUPERVISION) IN ACCORDANCE WITH THE REQUIREMENTS OF THE ROADWAY DESIGN AND CONSTRUCTION STANDARDS AND THE STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA OF DOUGLAS COUNTY.

WAYNE WRAY HARRIS P.E., P.L.S.
MARTIN/MARTIN INC.

AUG 27 2008

RECORD COPY

RECORD COPY

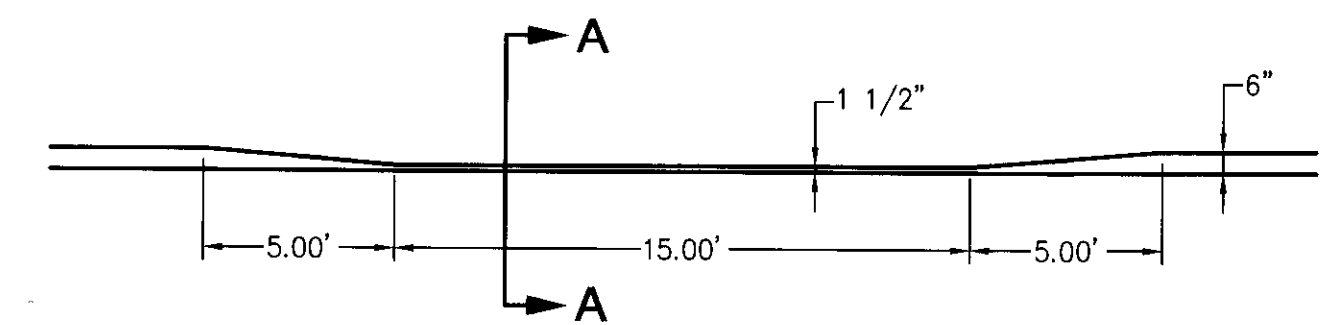
COUNTY ENGINEER	DATE
9/4/08	
THESE CONSTRUCTION PLANS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR STREET, AND DRAINAGE IMPROVEMENTS ONLY.	
ENGINEERING DIVISION ACCEPTANCE BLOCK	



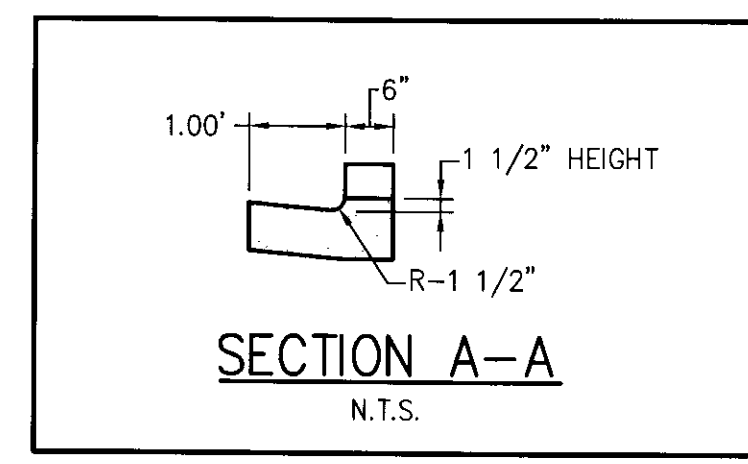
NOTE:

- ANY WALL OR MONUMENT OVER FOUR FEET IN HEIGHT REQUIRES A PERMIT FROM DOUGLAS COUNTY BUILDING DIVISION PRIOR TO CONSTRUCTION. DETAILED PLANS FOR ANY WALL OVER FOUR (4) FEET IN HEIGHT WILL BE SUBMITTED TO THE DOUGLAS COUNTY BUILDING DIVISION PRIOR TO THE ISSUANCE OF THE REQUIRED BUILDING PERMIT.
- SEE CONSTRUCTION PLANS BY YENTER COMPANIES FOR ROCK FALL MITIGATION WORK. PROVIDE H.D.EXCELSIOR EROSION CONTROL BLANKETS ON ALL DISTURBED SLOPES STEEPER THAN 3:1.

MARTIN/MARTIN ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS, HOWEVER, THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.



DRIVEWAY DEPRESSED CURB
DETAIL
N.T.S.



SECTION A-A
N.T.S.

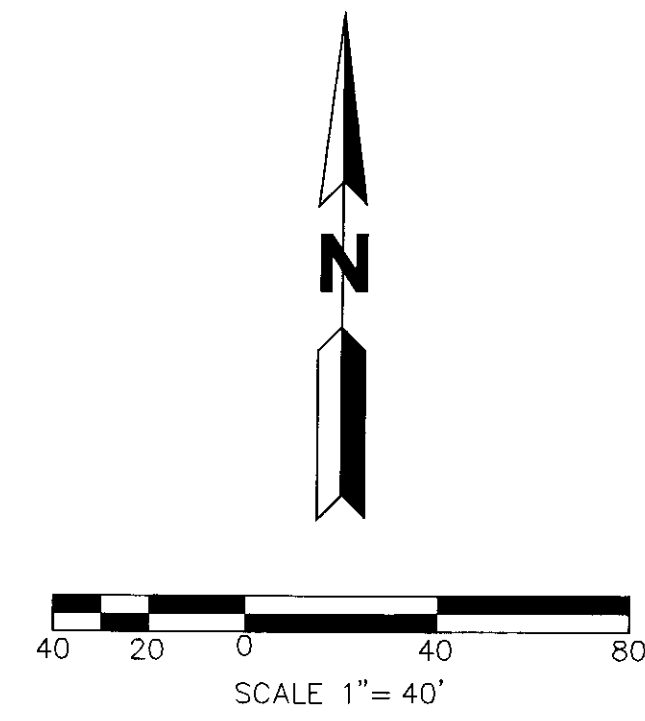
DATE

9/4/08

COUNTY ENGINEER

THESE CONSTRUCTION PLANS HAVE BEEN REVIEWED BY DOUGLAS COUNTY FOR STREET, AND DRAINAGE IMPROVEMENTS ONLY.

ENGINEERING DIVISION ACCEPTANCE BLOCK



MARTIN / MARTIN
CONSULTING ENGINEERS
12499 WEST COLFAX AVE.
P.O. BOX 151500
LAKEWOOD, CO 80215
303.431.6100
FAX 303.431.4028

AUG 26 2008

ST. FRANCIS OF ASSISI
CONSTRUCTION PLANS
GRADING PLAN

No.	Description of Revisions	Date	Name
9	VE. OWNER COMMENTS	08/25/08	AMK
2	COUNTY COMMENTS	08/08/06	FOR
3	COUNTY COMMENTS	09/15/06	FOR
4	COUNTY COMMENTS	10/06/06	FOR
5	DESIGN LAYOUT CHANGES	04/12/07	FOR
6	PER COUNTY COMMENTS	07/17/07	AMK
7	PRECAST BASES	08/29/07	AMK
8	PHASE 2 DEMO TO REMAIN	04/15/08	AMK

DATE

MARCH 1, 2006

Job Number:

17259.C.04

Design By:

P. RICE

Drawn By:

R. SILVAS

Checked By:

W. W. HARRIS

Sheet Number:

C4.0

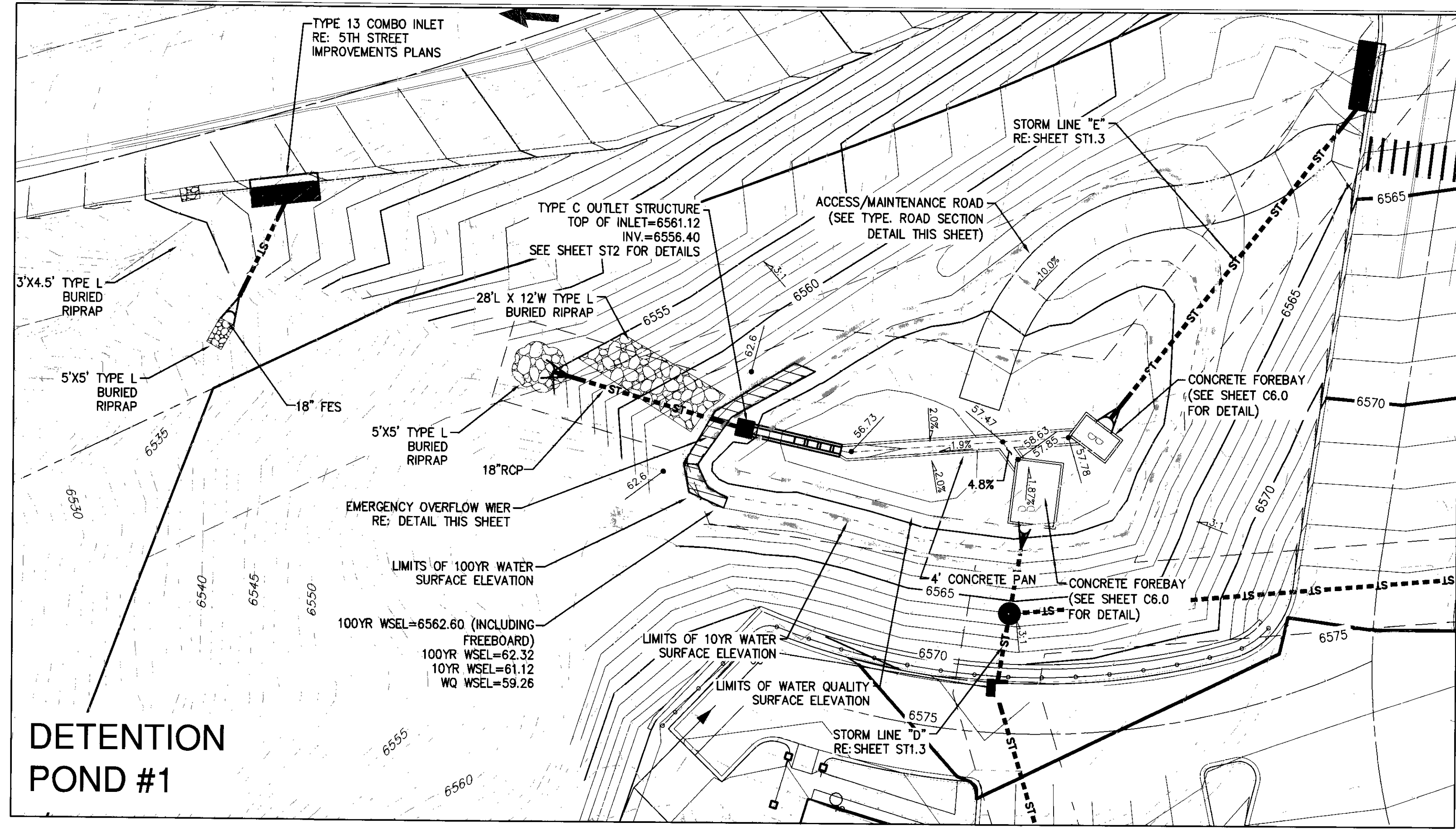
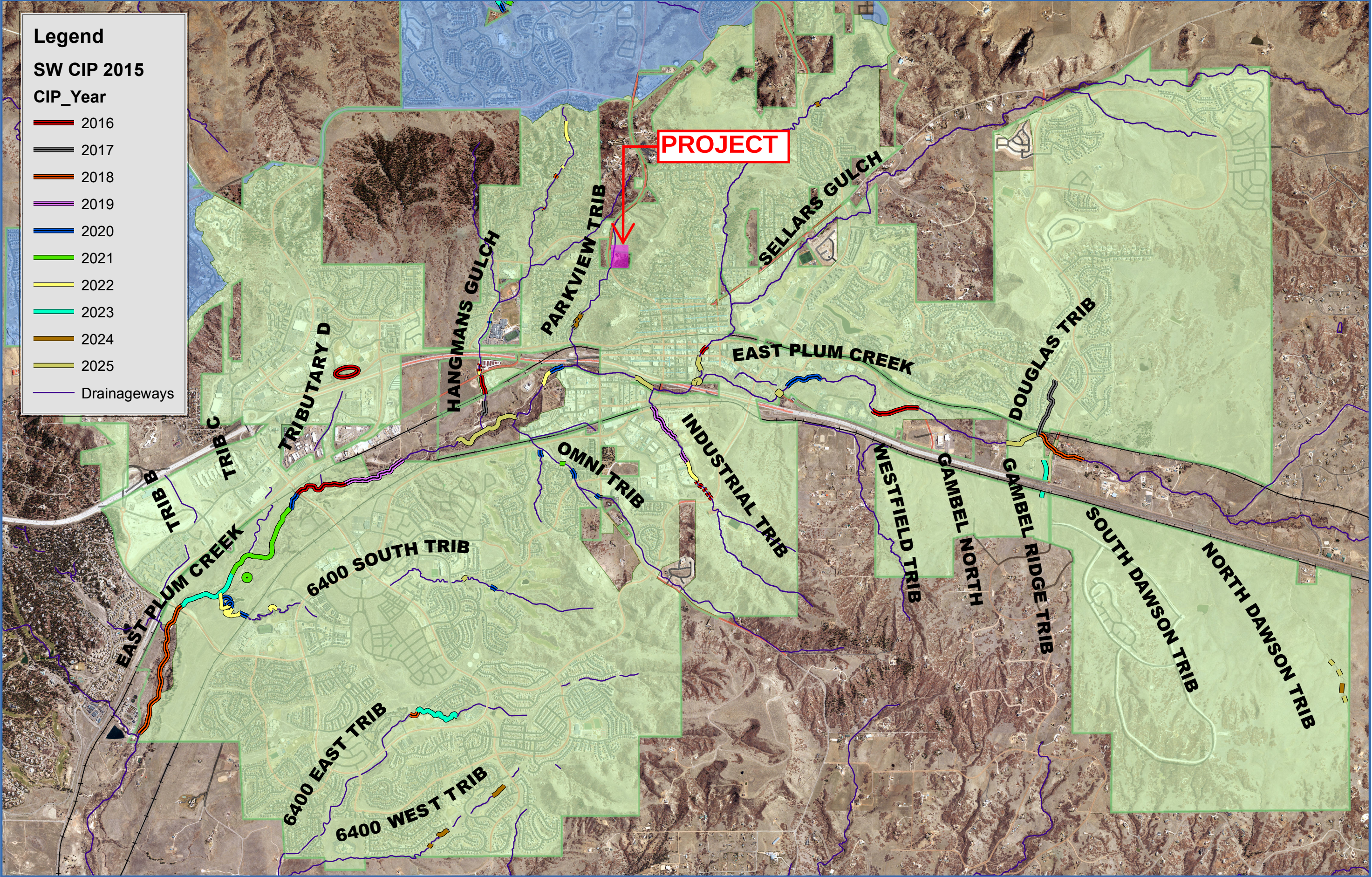
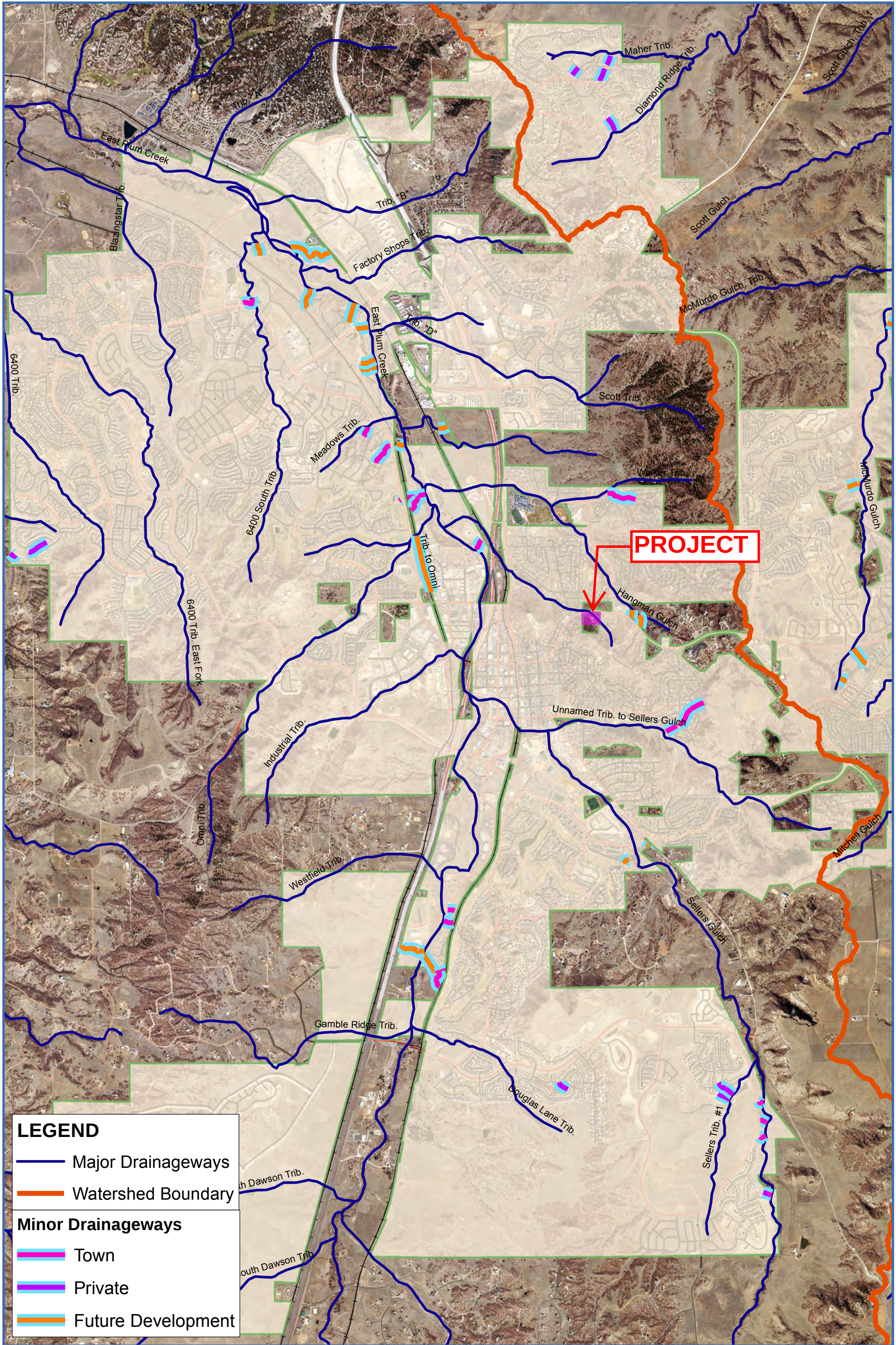


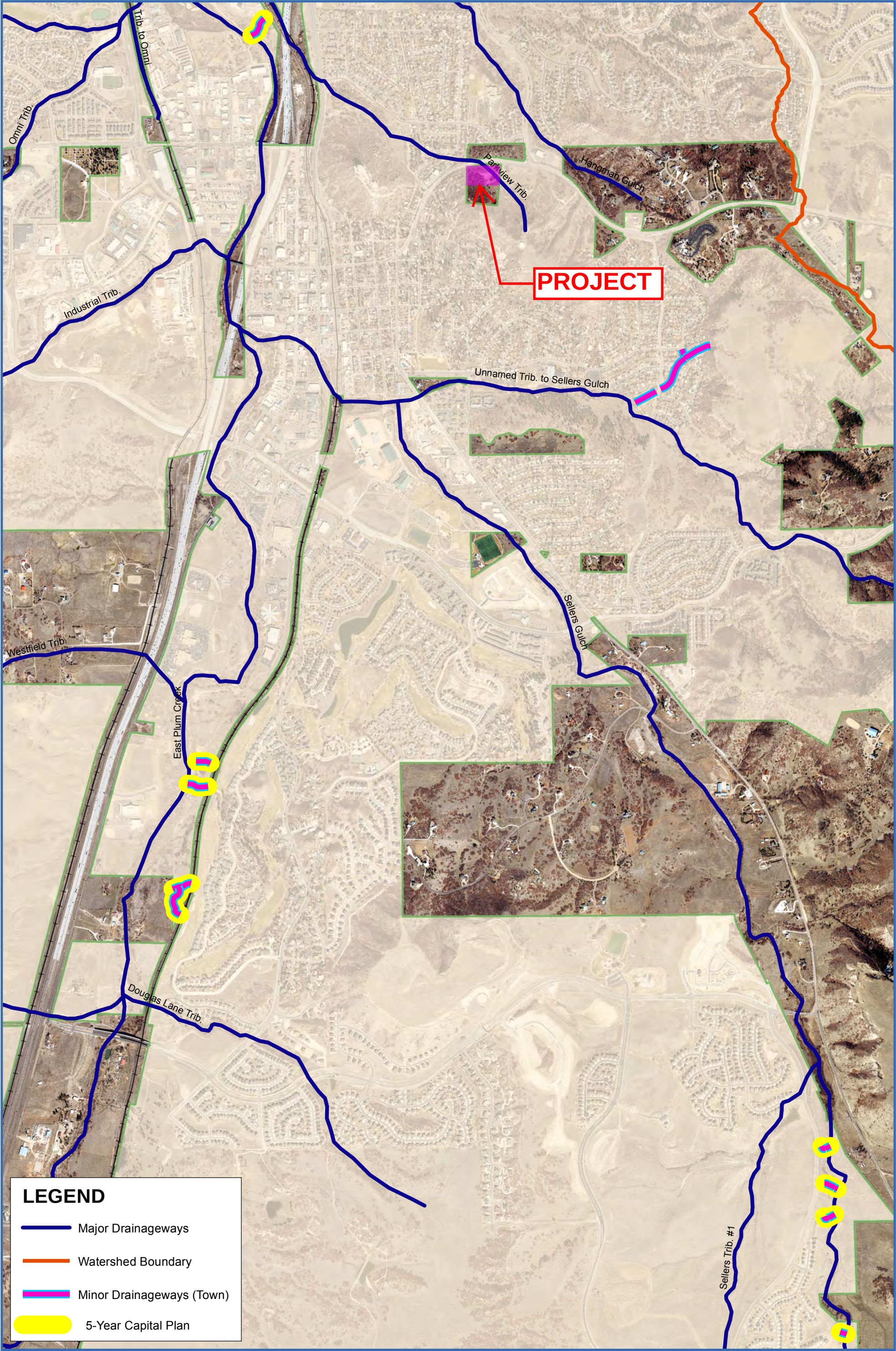
Figure 5.12 - Ten Year CIP Plum Creek Basin



10-YEAR CAPITAL PLAN
PLUM CREEK BASIN

Disclaimer: The data presented has been compiled from various sources, each of which introduces varying degrees of inaccuracies or inconsistencies. Such discrepancies in data are inherent and in supplying this product the Town of Castle Rock makes no warranty, expressed or implied, and assumes no liability for omissions, errors, omissions, corrections, and/or updates, should be directed to the United Department, Town of Castle Rock, (720) 733-4087. Copyright 2012, Town of Castle Rock Utilities Mapping.



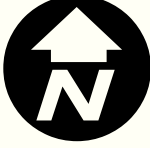


LEGEND

- Major Drainageways
- Watershed Boundary
- Minor Drainageways (Town)
- 5-Year Capital Plan



1 inch = 1,500 feet



Disclaimer: The data presented has been compiled from various sources, each of which introduces varying degrees of inaccuracies or inconsistencies. Such discrepancies in data are inherent and in supplying this product the Town of Castle Rock assumes no liability for it's use or accuracy. Questions or comments regarding the cartographic composition of this map including, but not limited to, errors, omissions, corrections, and/or updates, should be directed to the Utilities Department, Town of Castle Rock, (720) 733-6087. Copyright 2012, Town of Castle Rock Utilities Mapping.

**MINOR DRAINAGEWAY
5-YEAR CAPITAL PLAN
PLUM CREEK BASIN**

PLOT DRIVER: ...\\CDDT_PDF - High Quality_ORD.pltcfgr
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11/18/2022 4:04:32 PM 9356
001_Fifth St_Title Sheet.dgn

PoDI / NHS

FHWA PROJECT OF DIVISION INTEREST (PoDI)?

☒ NO ☐ YES

NATIONAL HIGHWAY SYSTEM?

☒ NO ☐ YES

TOWN OF CASTLE ROCK, COLORADO

DEPARTMENT OF PUBLIC WORKS

CONSTRUCTION PLANS OF PROPOSED
PROJECT NO. STU M185-017

TOWN OF CASTLE ROCK PROJECT NO. CIP22-0011

FIFTH STREET IMPROVEMENTS ROCK STREET TO FOUR CORNERS PROJECT

DOUGLAS COUNTY

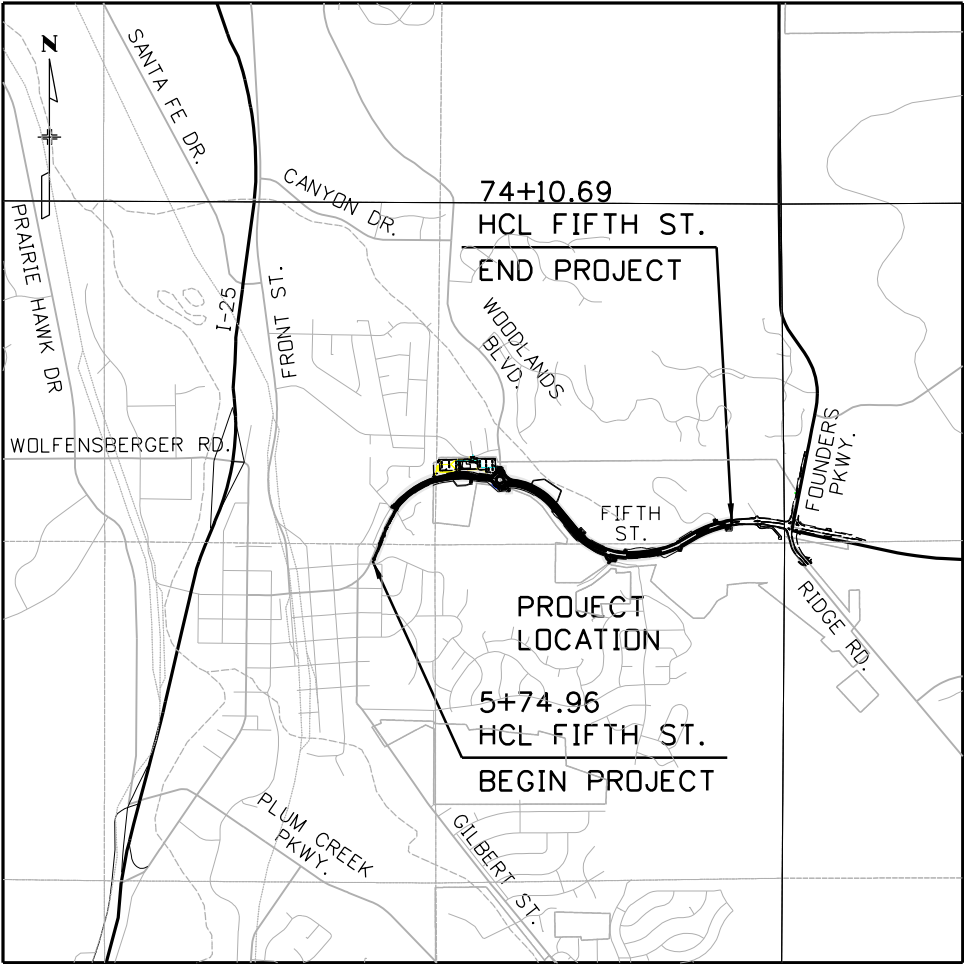
CONSTRUCTION PROJECT CODE NO. 24529

F.O.R. SUBMITTAL

NOVEMBER 22, 2022

DESIGN DATA:

DESIGN DATA	FIFTH STREET	WOODLANDS BLVD	VALLEY DRIVE
MAXIMUM RADIUS OF CURVE	2175.08'	800.00'	250.00'
MAXIMUM GRADE	6.17%	4.98%	2.71%
MINIMUM S.S.D. HORIZONTAL	305'	250'	250'
MINIMUM S.S.D. VERTICAL	305'	250'	250'
MAXIMUM DESIGN SPEED	40 MPH	35 MPH	35 MPH
20XX DESIGN TRAFFIC	20,000	5,000	1,300
DHV TRUCK %	2%	2%	2%
CLEAR ZONE DISTANCE (TANGENT)	12'	12'	12'
CLEAR ZONE DISTANCE (730' MIN. RADIUS)	14'	14'	14'



PROJECT LOCATION MAP

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16 - 18	TABULATION OF QUANTITIES - ROADWAY
19	SURVEY TABULATION
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31 - 36	GEOMETRIC DATA
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189	TESC COVER SHEET
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287 - 344	CONSTRUCTION TRAFFIC CONTROL PLANS
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407	SANITARY SEWER TABULATION
408 - 411	SANITARY SEWER PLAN AND PROFILES
412 - 479	CROSS SECTIONS (FOR INFORMATION ONLY)

Print Date: 11/18/2022

File: 001_Fifth St_Title Sheet.dgn



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Sheet Revisions

Date:	Comments	Init.



PUBLIC WORKS DEPT.
4175 NORTH CASTLETON CT.
CASTLE ROCK, CO 80109
PHONE 303 660-1020
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As Constructed

No Revisions:

Revised:

Void:

FIFTH STREET IMPROVEMENTS

TITLE SHEET

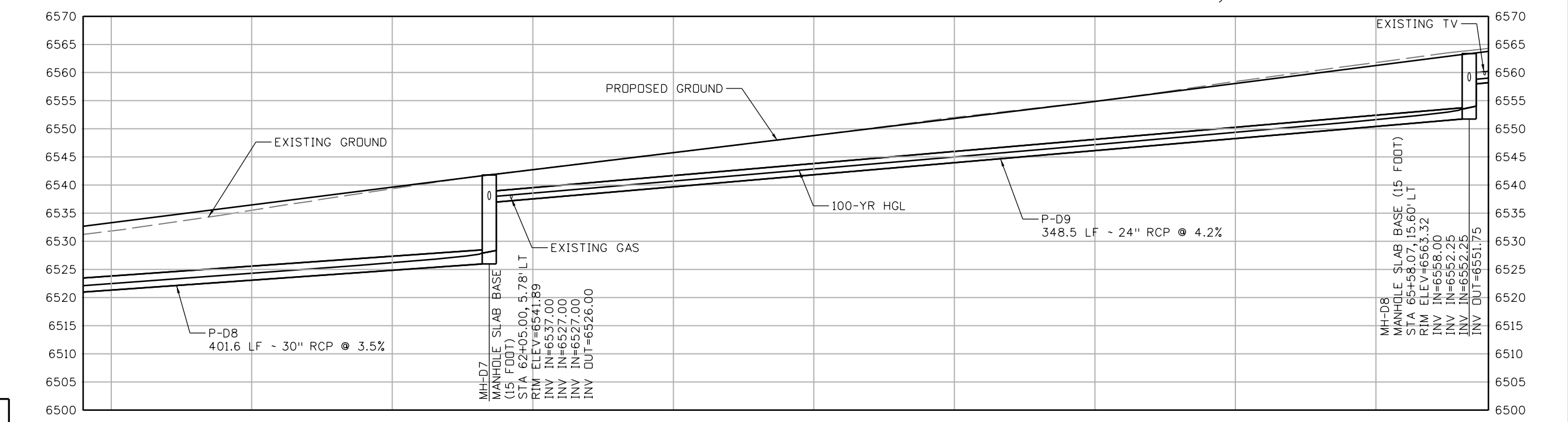
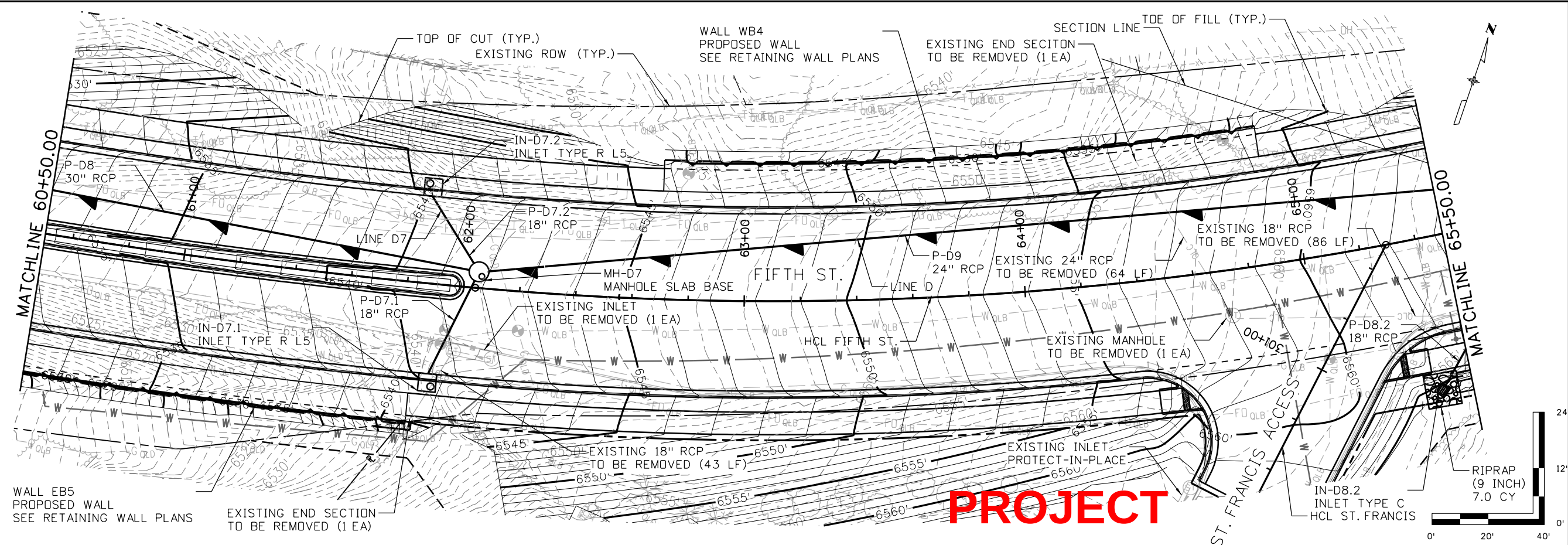
Designer:	R. HANSON	Checker:	D. DYER
Detailer:	R. HANSON	Str. No.	
Subset Sheets:	TITLE	Subset Sheets:	1 of 1

Project No./Code

STU M185-017

24529

Sheet Number 1



LINE D PROFILE

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PEN TABLE: ...\\CDDT_DES-PenTable.tbl
11/17/2022 9:59:35 AM 9628
Fifth St_Drainage Sheets.dgn

Print Date: 11/17/2022		Sheet Revisions				PUBLIC WORKS DEPT. 4175 NORTH CASTLETON CT. CASTLE ROCK, CO 80109 PHONE 303 660-1020 FAX 303 660-1025	As Constructed		FIFTH STREET IMPROVEMENTS DRAINAGE PLAN & PROFILES STA 60+50 TO STA 65+50		Project No./Code	
File Name: Fifth St_Drainage Sheets.dgn							No Revisions:				STU M185-017	
 8000 South Chester St. Suite 500 Centennial, CO 80112 Phone: 303-799-6806								Revised:	Designer: A. PANKOW	Checker: D. DYER	24529	
									Detailer: A. CYR	Str. No.	Sheet Number 160	
									Subset Sheets: DRAINAGE			
									Void:			