

PRELIMINARY DRAINAGE STUDY

FOR

**FOUNDERS VISTA SUBDIVISION
TOWN OF CASTLE ROCK
DOUGLAS COUNTY, COLORADO
Case No. PDP19-0002**

Revised September 1, 2020

PREPARED FOR:

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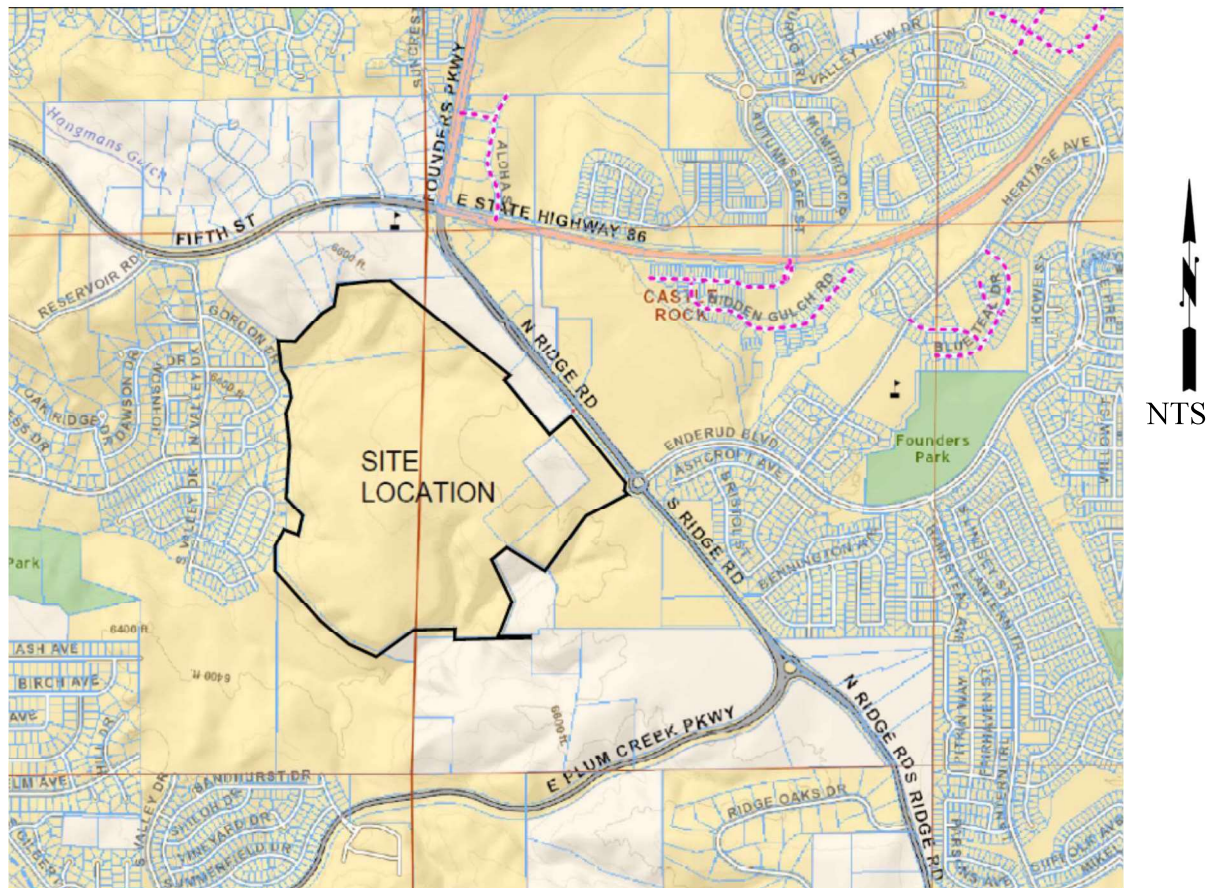
Job No. Founders

“This report for the Phase I Drainage design of Founders Vista Subdivision, was prepared by me or under my direct supervision in accordance with the provisions of the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual . I understand that the Town of Castle Rock and its designated town authority do not and will not assume liability for drainage facilities designed by others.”

Russell B. Hall, PE & PLS
Colorado Registration No. 26715

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VICINITY MAP

II. GENERAL LOCATION AND DESCRIPTION

A. Site Location

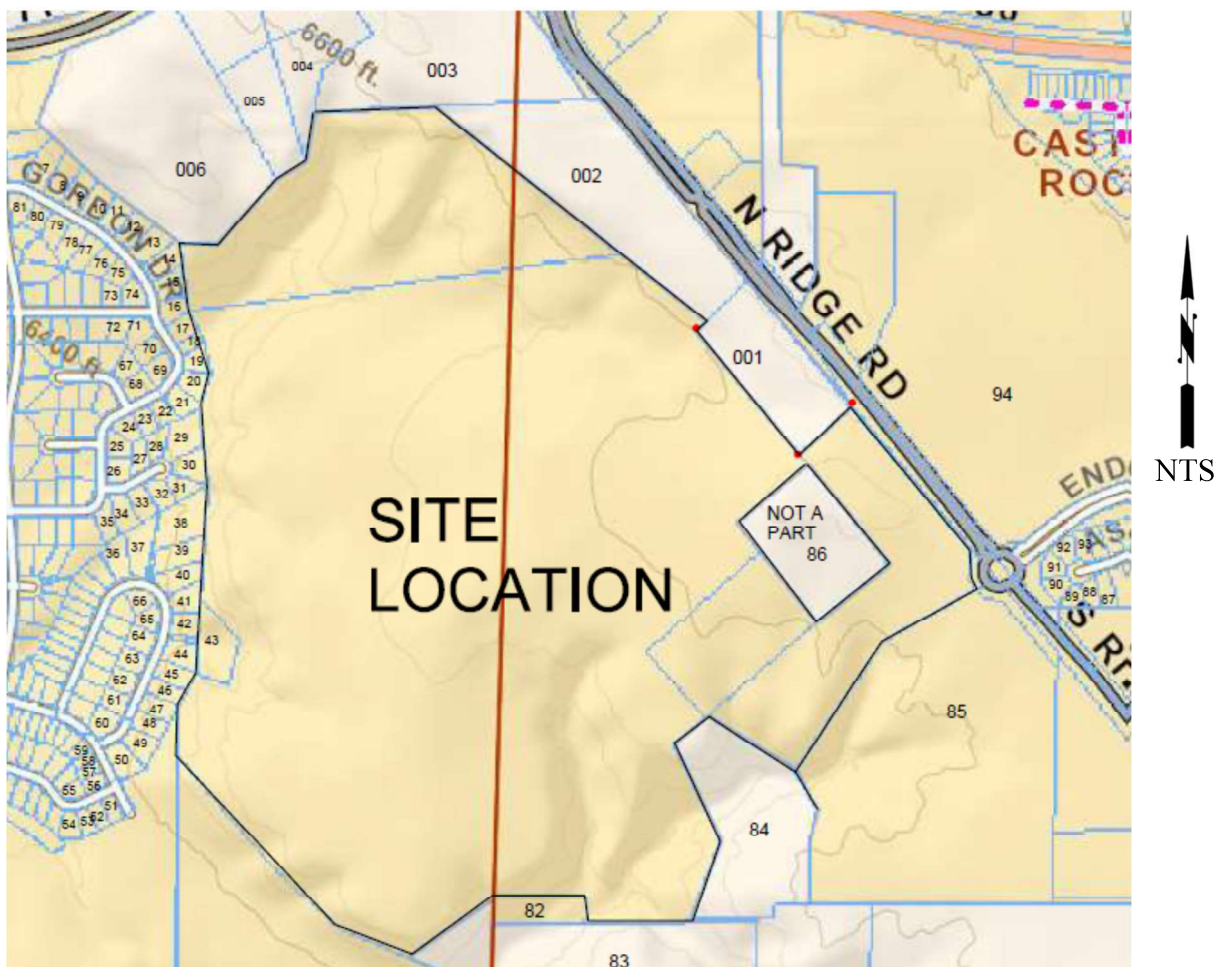
2. Township

Founders Vista is located within part of the West ½ of Section 7, Township 8 South, Range 66 West of the Sixth Principal Meridian, Town of Castle Rock, County of Douglas, State of Colorado.

3. Surrounding Streets and Properties

(See Parcel Map – Below)

The proposed site is bound to the northeast by Ridge Road and 5-acre parcels containing single family detached homesites (See 001-002), to the Southeast by undeveloped agricultural land (See 84-86), to the Southwest and West by single family detached homes within subdivisions “Memmen's 3rd Add To Castle Rock” and “Michael's 2nd Addition To Castle Rock” and to the Northwest by unincorporated Douglas County homesites (See 003-005) and the St. Francis of Assissi Church (See 006).



B. Description of Property

1. Area of Property

Founders Vista Subdivision is a proposed Single Family Subdivision consisting of approximately 181.5 acres.

2. Ground Cover

The project site is presently mostly undeveloped Pasture land with exposed outcroppings of rock and boulders. Native grasses and shrubs cover most of the site with clusters of ponderosa pine trees located along the western perimeter. Ridge Road is presently paved with water main and dry utilities.

3. NRCS

The Natural Resources Conservation Service (NRCS) web soils survey map identify soils for this site as predominately Fondis Clay Loam and Fondis-Kutch association. According to the NRCS, Hydrologic soil group C are recommended for purposes of this report

4. Major and Minor drainageways

The entire project site is tributary to Plum Creek. No Major drainageways exist onsite. Minor tributaries to Sellars Gulch are located along the western edge and Eastern edge of the project site. The Town GIS map showing watersheds indicate a portion of the project identified in State Parcel No. 2507-072-00-028 to be tributary to Cherry Creek, but is actually tributary to Plum Creek.

5. Floodplains

The project site is tributary to Plum Creek Southwest of the project site. According to the FEMA panel number 08035C0302G, Effective date 03/16/2016, the project site is located within Zone X, which is defined as an area having minimal flood hazard, and is not located within any 100 year floodplain.

6. Existing Canals and Ditches

No ditches or canals exist on the project site.

7. Significant Geological Features

The Southwestern edge of the site is a steep cliff, having slopes ranging from 20 to 35 percent grade, with exposed rock out croppings.

8. Proposed Land Uses

Founders Vista Subdivision is a proposed single family subdivision consisting of approximately 550 lots for 360 single family detached and 190 attached duplex homes. The site layout was designed to provide a centralized urban development with approximately 50 percent open space buffers along the South and Southwestern edge of the property. A public street network will

provide access through the site with two points of access onto Ridge Road.

III. DRAINAGE BASINS AND SUB-BASINS

A. Major Drainage Basins

1. Flow Patterns

Historic Basins H-1 through H-6 have a plateau with moderate slopes ranging from 1 - 10 percent sloping towards the southwest, (see historic drainage map in appendix). Minor tributaries have formed due to wind and runoff erosion to convey surface runoff from the plateau to the south and southwest property line. Slopes significantly steepen at the southwestern edge of the plateau with slopes ranging from 20-40 percent down to the base of the plateau. The steep downward slope is approximately 250 feet long dropping approximately 100 feet in elevation. Runoff continues overland to Sellars Gulch located approximately 750 feet southwest of the project site.

Historic Basin H-1 consists of 57.8 acres located at the Norwest portion of the site. Offsite sub-basins O-1 and O-2 consisting of 7.5 acres and 10.5 acres respectively, are tributary to Basin H-1. Runoff is conveyed overland, sheet flowing in a westerly direction toward an existing ravine at the northwest portion of the site. Steep Slopes ranging from 25-35 percent in the ravine reduce significantly to slopes ranging from 1-10 percent near the northwest property line and runoff continues conveyance overland in a southwesterly direction to Sellars Gulch.

Historic Basin H-2 consists of 60.1 acres located on the western portion of the site. Runoff is conveyed overland, sheet flowing at slopes ranging from 1-10 percent in a westerly direction toward the west property line. Slopes steepen significantly, ranging from 25 to 40 percent, approximately 100 feet east of the west property line. Runoff conveyance is continued overland down the steeper slope within numerous gullies and minor tributaries exist. The steep slope reduces approximately 100 feet west of the west property line, and continues west to Sellars Gulch

Basins H-4 through H-6 are located at the southern portion of the site. Offsite Basin O-3 is tributary to Basin H-3 approximately 600 feet east of Design Point 3, (See Historic Drainage Map). A steep ravine, having slopes from 20 – 40 percent, starts at the southern edge of Basin H-6, runs westerly through offsite basin O-3 to the south portion of Basin H-3. Runoff from each Basin H-3 through H-6 sheet flows overland to the existing ravine.

2. Land Use

The property is currently vacant agricultural land use.

The proposed land use is for and urban development of single family attached and detached homes.

Basin A contains 54.3 acres having approximately 24 acres of single family detached home lots, 15 acres of duplex lots, and 15 acres of open space. Basin B contains 46.8 acres having approximately 27 acres of single family detached home lots, 10 acres of duplex lots, and 10 acres of open space. Basin C contains 38.9 acres having approximately 15 acres of single family detached home lots and 24 acres of open space. A public street network will provide access through the site with two points of access onto Ridge Road.

Offsite basins O-1 and O-2 depicted on the Historic Drainage Map contain approximate 5-acre single family detached home sites. Offsite basin O-3 is presently undeveloped agricultural land use.

3. FHAD Studies and Master Planning Studies

No FHAD or Master Planning studies are known to have been prepared for this site.

4. Developed Flow Impacts

This Preliminary Drainage Plan depicts 3 onsite detention ponds for Basins A, B and C to attenuate developed runoff for the Full Spectrum storm events. Basin A consists of 54.3 acres located on the northern half of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to a sump inlet located at design point 4. During the 100 year storm event, runoff not intercepted by inlets upstream will be intercepted by an inlet in a sump condition at design point 4. The intercepted runoff will continue conveyance via storm sewer pipe to Detention pond A located on the Northwest corner of the site in Sub-basin A-4. The attenuated runoff from detention pond A will be conveyed via storm sewer west to Memmen's 3rd Addition to Castle Rock Subdivision. An energy dissipator may be necessary to be constructed at the end of the storm sewer entering Detention Pond A to reduce flow velocity to minimize turbulence and erosion from occurring in the detention pond.

B-Lots, Garden Level and Walkout type lots proposed along the western edge of the plateau in Basin A-4 will sheet flow down the cliff embankment. The amount of runoff from the perimeter lots will be less than historic flow rate and will have less erosion potential than historic to the rocky incline.

Basin B consists of 46.8 acres located on the Central portion of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to detention pond B located on the West edge of the top plateau in Sub-basin B-3. The attenuated runoff from detention pond B will be conveyed via storm sewer west to the base of the plateau to Memmens 2nd Addition to Castle Rock Subdivision. An energy dissipator may be necessary to be constructed prior to existing the property downstream.

Basin C consists of 38.9 acres located on the southern portion of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to detention pond C located on the Southwest edge of the top plateau in Sub-basin C-3. The attenuated runoff from detention pond C will be conveyed via storm sewer

west to an existing minor tributary Sellars Gulch located at the base of the plateau in Sub-basin C-4. An energy dissipator may be necessary to be constructed prior to entering the minor tributary.

B-Lots, Garden Level and Walkout type lots proposed along the northern edge of Sub-basin C-4 A will sheet flow down the cliff embankment. The amount of runoff from the perimeter lots will be less than historic flow rate and will have less erosion potential than historic to the rocky incline.

Basin D, consisting of 36.7 acres, is a proposed open space buffers located along the west portion of the site. Drainage patterns within this open space area will remain mostly undisturbed.

B-Lots, Garden Level and Walkout type lots proposed along the northwestern edge of the plateau in Basin D will sheet flow down the cliff embankment. The amount of runoff from the perimeter lots will be less than historic flow rate and will have less erosion potential than historic to the rocky incline.

B. Minor Drainage Basins

1. Characteristics and Developed flow patterns

Developed runoff from Sub-basins A, B and C will be conveyed via storm sewer and roadways to detention ponds within the respective basins. Storm sewer inlets are proposed at locations where the amount of developed runoff within roadways approach street capacity as required by the Town of Castle Rock criteria. During the 100 year storm event, the remainder of the developed runoff is intercepted by the storm sewer inlets in a sump condition at the end of the basins.

Sub-Basin A-1 contains 3.3 acres located at the northwest portion of the site. The sub-basin has steep slopes ranging from 25-35 percent down toward sub-basin A-3. Runoff from sub-basin A-1 will sheet flow to sub-basin A-3 and continue conveyance via streets and storm sewer within sub-basin A-3 to Detention pond A.

Sub-Basin A-2 contains 16.4 acres located south of Sub basin A-3 in the central portion of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to a sump inlet located at design point 4. During the 100 year storm event, runoff not intercepted by inlets upstream will be intercepted by an inlet in a sump condition at design point 4. The intercepted runoff will continue conveyance via storm sewer pipe to Detention pond A located on the Northwest corner of the site in Sub-basin A-4 at design point 5. The attenuated runoff from detention pond A will be conveyed via storm sewer west to Memmen's 3rd Addition to Castle Rock Subdivision.

Sub-basin A-3 contains 18.6 acres located at the northwest portion of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to a sump inlet located at design point 4. During the 100 year storm event, runoff not intercepted by inlets upstream will be intercepted by an inlet in a sump condition at design point 4. The intercepted runoff will continue conveyance via storm sewer pipe to Detention pond A located on the Northwest corner of the site in Sub-basin A-4 at design point 5.

Sub-basin A-4 contains 16.0 acres located at the northwest portion of the site. Sub-basin A-4 is planned to remain open space which contains a ravine. Developed runoff for the major and minor storm events will be conveyed overland within the ravine to Detention pond A located at design point 5. Developed runoff for the minor and major storm event from upstream sub basins A-1 through A-3 are tributary to the Detention pond A and will be detained for the full spectrum storm event. The attenuated runoff from detention pond A will be conveyed via storm sewer west to Memmen's 3rd Addition to Castle Rock Subdivision.

Sub-basin B-1 consists of 8.2 acres located at the central portion of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to Detention pond B located on the west edge of the top plateau in Sub-basin B-3. During the 100 year storm event, the remainder of the developed runoff not intercepted by storm sewer inlets upstream will be intercepted by a storm sewer inlets in a sump condition at the end of the cul de sac located just north of Pond B at design point 6. Conveyance will continue from design point 6 to detention pond B via storm sewer.

Sub-basin B-2 consists of 28.7 acres located at the central portion of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to Detention pond B located on the west edge of the top plateau in Sub-basin B-3. During the 100 year storm event, the remainder of the developed runoff not intercepted by storm sewer inlets upstream will be intercepted by a storm sewer inlets in a sump condition at the end of the cul de sac located just north of Pond B at design point 7. Conveyance will continue from design point 7 to detention pond B via storm sewer.

Sub-basin C-1 consists of 10.3 acres located at the southern portion of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to Detention pond B located on the southwest edge of the top plateau in Sub-basin C-3 at design point 11. During the 100 year storm event, the remainder of the developed runoff not intercepted by storm sewer inlets upstream will be intercepted by a storm sewer inlets in a sump condition at the end of the cul de sac at design point 9, and conveyance continued to detention pond B via storm sewer.

Sub-basin C-2 consists of 4.5 acres located at the southwestern portion of the site. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to Detention pond B located on the southwest edge of the top

plateau in Sub-basin C-3. During the 100 year storm event, the remainder of the developed runoff not intercepted by storm sewer inlets upstream will be intercepted by a storm sewer inlets in a sump condition at the end of the cul de sac at design point 10, and conveyance continued to detention pond B via storm sewer.

Sub-basin C-3 consists of 6.2 acres located at the southwestern portion of the site. Sub-basin C-3 contains the west portion of B-lots and open space tributary to Detention pond C. Developed runoff for the major and minor storm events will be conveyed overland to a natural grass line swale running south to Detention pond C in sub basin C-3 at design point 11. Developed runoff for the minor and major storm event from upstream sub basins C-1 and C-2 are tributary to the Detention pond C and will be detained for the full spectrum storm event. The attenuated runoff from detention pond C will be conveyed via storm sewer south to a minor tributary to Sellars Gulch at design point 12 in sub basin C-4.

Sub-basin C-4 contains 17.9 acres located at the south portion of the site. Sub-basin C-4 is planned to remain open space which contains a ravine. Developed runoff for the major and minor storm events will be conveyed overland within the ravine to a minor tributary to Sellars Gulch at design point 12. Attenuated runoff from Detention pond C and upstream offsite sub basins O-3 combine in the Sellars Gulch tributary at design point 12.

2. Land Use

The property is currently vacant agricultural land use.

The proposed land use is for and urban development of single family attached and detached homes. Basin A contains 54.3 acres having approximately 24 acres of single family detached home lots, 15 acres of duplex lots, and 15 acres of open space. Basin B contains 46.8 acres having approximately 27 acres of single family detached home lots, 10 acres of duplex lots, and 10 acres of open space. Basin C contains 38.9 acres having approximately 15 acres of single family detached home lots and 24 acres of open space. A public street network will provide access through the site with two points of access onto Ridge Road.

3. Developed Flow Impacts

Presently, runoff from the plateau sheet flows in a southerly direction. Numerous gullies have formed along the north, west and south edge of the western plateau for conveyance of runoff down the slope to the base. The use of multiple detention ponds will convey developed runoff to the base of the cliff similar to the historic runoff patterns to mitigate any impact to downstream drainage minor tributaries.

Detention Pond A is designed to attenuate developed runoff for the full spectrum storm event for Basin A. The attenuated runoff from Detention Pond A will be conveyed via storm sewer pipe through Tract A of Memmens 3rd Addition to Castle Rock Subdivision

to an existing 36-inch storm sewer outfall in Gordan Drive. The attenuated runoff from Detention Pond A will combine with developed runoff from Memmens 3rd Addition to Castle Rock Subdivision and continue conveyance overland via public streets to Sellers Gulch as described in the Final Drainage Report for Memmens 3rd Addition to Castle Rock. The attenuated will be released at historic rate and will is not anticipated to have any significant impact to the existing drainage facilities downstream. In the event the storm sewer is plugged or the drainage facilities do not function as intended, an over flow structure is proposed to convey developed runoff overland to an existing swale located in Tract A which is tributary to Gordan Drive. In the event that the detention B and C ponds plug or do not function as intended, Overflow weirs will be constructed to convey the developed runoff downstream overland within the respective existing ravines.

Detention Pond B is designed to attenuate developed runoff for the full spectrum storm event for Basin B. Historically, runoff from basin B is conveyed overland to the existing single family lots and Outlot A of Michaels 2nd Addition to Castle Rock and continues overland to S. Larkspur Drive. Outlot A does not have an existing storm sewer outfall to convey the attenuated runoff from Basin B. Therefor, the attenuated runoff from Detention Pond B is proposed to be conveyed South via storm sewer pipe to the proposed storm sewer outfall from Detention Pond C which daylights at a tributary to Sellers Gulch located in Sub-basin C-3. The attenuated will be released at historic rate and will have no significant impact to the existing drainage facilities downstream. In the event the storm sewer is plugged or the drainage facilities do not function as intended, an over flow structure is proposed to convey developed runoff overland to an existing swale located in Outlot A of Michaels 2nd Addition to Castle Rock Subdivision. Outlot A is tributary to S. Larkspur Drive.

Detention Pond C will be designed to attenuate developed runoff for the full spectrum storm event for Basin C. The attenuated runoff from Detention Pond C will be conveyed via storm sewer pipe, combining with the attenuated runoff from Basin B, to the existing tributary to Sellers Gulch located in Sub-basin C-3. In the event the storm sewer is plugged or the drainage facilities do not function as intended, an over flow structure is proposed to convey developed runoff overland from Detention Pond C to the existing tributary to Sellers Gulch.

IV. EXISTING STORMWATER CONVEYANCE OR STORAGE FACILITES

A. Existing Stormwater Conveyance Facilities

No Existing Stormwater Conveyance Facilities or water quality facilities exist onsite or near the project site.

V. PROPOSED STORMWATER CONVEYANCE OR STORAGE FACILITES

A. Proposed Stormwater Conveyance Facilities

1. Proposed drainage facility concept

This Preliminary Drainage Plan depicts 3 onsite detention ponds for Basins A, B and C to attenuate developed runoff for the Full Spectrum storm events. Developed runoff for the major and minor storm events will be conveyed via public roadways and storm sewer to detention ponds A, B and C respectively.

Detention pond A is located at the base of the ravine in sub basin A-4. Access will be available to detention pond through Memmen's 2nd Addition to Castle Rock to allow maintenance and repair as required.

Detention ponds B and C are located near the western edge of the plateau. Access will be available to both ponds through the open space areas contained in Sub-basins B-3 and C-3 to allow maintenance and repair as required. The attenuated runoff from each detention pond will be conveyed via storm sewer west to the base of the plateau. An energy dissipator may be necessary at the end of each pipe daylight to be constructed prior to existing the property downstream.

2. Offsite Runoff conveyance

Three offsite sub-basins are identified on the Preliminary Drainage Plan, Sub-basins O-1, O-2 and O-3. It is planned to convey offsite basins O-1 and O-2 through the street and storm sewer facilities to the proposed respective onsite detention ponds.

Runoff from offsite Sub-basin O-3 will be conveyed along its historic course through Basin C.

3. Drainage Criteria

General: Except where specified elsewhere in this report, the procedures, criteria and standards as set forth in the "Urban Storm Drainage Criteria Manual," (USD), and the "The Town of Castle Rock Storm Drainage Design and Technical Criteria Manual" are utilized to determine the adequacy of this storm Drainage Plan. Technical data used by Town of Castle Rock, as it applies to this analysis.

Hydrologic Criteria: Since the Basin study area is less than 90 acres, an analysis and determination of the amounts of flows at various predetermined design points have been made using the "Rational Method". The runoff analysis is based on the proposed land use and topographic features of the project area. The average land slopes are used for computing runoff. The drainage facilities are designed such that increased flows and velocities will not cause erosion damage.

Design Storm Frequencies: The initial and the major design storm runoff drainage has been analyzed in this report. The initial design storm drainage system, based on a 5-year storm return frequency is evaluated to provide protection against regularly recurring damage, reduce roadway maintenance costs, provide an orderly drainage system and offer convenience to the customers, general public and employees. The major design storm drainage system, based on a 100-year storm frequency, is defined as "not to cause major

property damage or loss of life from major storm runoff."

Time of Concentration: The time of concentration (when maximum discharge of the drainage area is reached) is the time required for runoff from the most remote point of the drainage area to arrive at the design point. The "most remote point" is that point from which the time of flow to the design point is the greatest and not necessarily the greatest linear distance.

Detention : Three onsite detention/water quality ponds "A", "B" and "C" will be constructed to provide water quality, and detention for the Full Spectrum storm event. The UD Detention Spreadsheet program Version 4.02 is used to determine required detention volume for the 10 and 100 year storm + 0.5 WQCV events. A release rate for the 100 year storm event is 1.00 cfs per acre or the Historic rate.

4. Anticipated Conveyance Problems

None

5. Ownership and Maintenance

The three detention ponds proposed in Basins A, B and C will be owned and maintained by the Founders Village Metropolitan District. Historic Basin D, proposed Detention ponds B and C, and surrounding open space are planned to be Park land use open to the public and Town as required for access.

B. Proposed Stormwater Storage Facilities

1. Detention

The Preliminary Drainage Plan depicts three onsite detention ponds "A", "B" and "C" will attenuate developed runoff for the Full Spectrum storm events. The UD Detention Spreadsheet program Version 3.07 is used to determine required detention volume. Each Detention pond will contain sufficient volume for the 100 year storm event plus half of the required water quality capture volume. The release rate for the 100 year storm event for the detention ponds is 1.0 cfs/acre. The Urban Drainage Criteria Manual is used to determine water quality volume and design of water quality release structures.

Developed runoff from Type B, Walk Out and Garden lots proposed along the respective downstream perimeter of Sub-basins C-4 and D will sheet flow down the cliff embankment undetained. The amount of runoff from the perimeter lots will be less than historic flow rate and will have less erosion potential than historic to the rocky incline. Release rates for detention ponds B and C will be reduced to compensate for the undetained flowrate.

2. Outlet Structure Design

Dual Chamber Outlet structures are proposed to attenuate developed runoff for the Full Spectrum storm events. The outer wall entrance will orifices to attenuate developed runoff for the EURV storm event and water quality. Runoff in excess of the 100-year storm event will spill through the top of the second chamber into the second chamber before being released downstream. In the event that the outlet structure plugs, or does not function as intended, an overflow weir will be constructed in the detention pond embankment to continue conveyance downstream along its respective historic course

3. Anticipated Storage Problems and Maintenance

It will be the responsibility of the Founders Village Metropolitan District to visually inspect the condition of the drainage facilities after any major storm event which may have sufficient force to result in sediment deposits or erosion to landscape drainage ways. If erosion or damage occurs frequently, the metropolitan district may attempt to stabilize the soil with additional riprap, or consult with an engineer to rectify the problem.

VI. WATER QUALITY ENHANCEMENT

1. Reducing Runoff Volume

Runoff from Sub-basin C-3 which abut the open space located in Basin D will be conveyed via grass lined swale to Detention pond C to reduce velocity, increase time of concentration, and reduce flows tributary to proposed detention pond B.

Basin D and the Detention ponds and surrounding open space within sub-basins B-3 and C-3 are planned to be Park land use open to the public. Natural vegetation and topography will be utilized with moderate grading and compaction improvements to allow higher infiltration while providing a natural environment for public enjoyment.

Soft trail material will be used for the pedestrian paths around the open space are to maintain near zero percent impervious.

2. Providing Water Quality and Flood Control

The Urban Drainage Criteria Manual is used to determine water quality volume and design of water quality release structures. Both ponds will have 4:1 side slopes with flat bottom configuration to optimize settlement and infiltration. The urban EURV and WQCV provided in detention ponds A and B will drain within a 72-hour time frame to allow optimum time for pollutants and sediments to settle within the respective ponds before continuing conveyance downstream.

3. Stream Stabilization Techniques

Energy dissipator may be necessary to be constructed prior to exiting the property downstream to reduce runoff velocity and disperse flows. Storm sewer from detention ponds B and C are proposed to daylight at the base of the steeper slopes. Rip Rap lined Stilling Basins will be constructed to reduce flow velocity and disperse concentrated flow exiting the pipe before continuing conveyance downstream.

4. Undertaking source control

Potential pollutant material brought onsite would be fuel for earth moving and trenching equipment, as well as daily vehicle refueling. The detention pond shall be utilized to contain fuel spillage. The Fire Protection District is equipped for spill cleanup. Any contaminated materials shall be properly disposed of.

Other potential pollutant material includes concrete wash water. This shall be done in areas designed by the developer's construction manager and protected from runoff and, after hydration, buried in designated construction zones.

Building materials are expensive and shall be protected by storage outside of runoff areas. This shall be performed by the materials owner to protect the inherent value and no additional measures will be taken.

Waste building materials shall be collected by a reputable waste management company and transported to a legal waste disposal facility. Site inspections shall be performed by the owner/representative weekly to assure onsite collection. No dedicated concrete or asphalt batch plants are proposed on the site.

Variance from Criteria :

None.

VII. FLOODPLAIN MODIFICATIONS

N/A

VIII. MASTER PLAN RECOMMENDATIONS

N/A

IX. POTENTIAL PERMITTING REQUIREMENTS

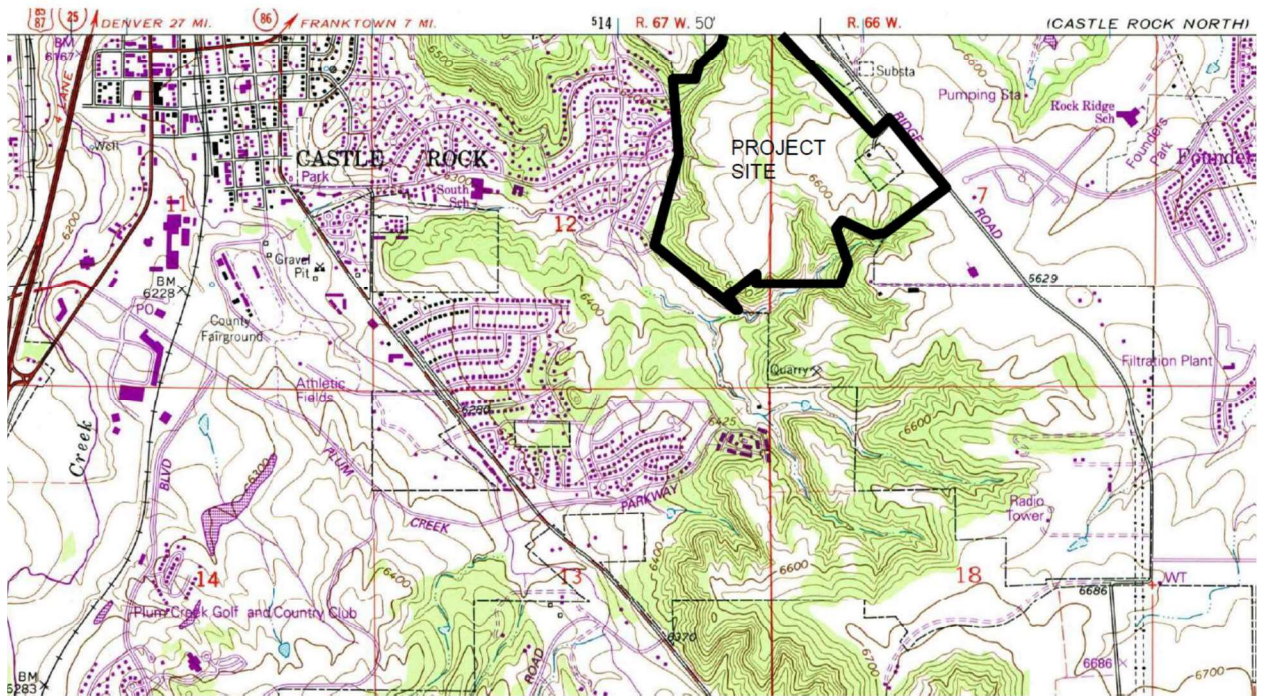
N/A

X. REFERENCES

The drainage facilities for Founders Vista were designed in accordance with the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual and the Urban Drainage Criteria Manual (USDCM, 2018).

1. "Urban Storm Drainage Criteria Manual", prepared by Wright McLaughline Engineers for Urban Drainage and Flood Control District, March 1969.
2. "Town of Castle Rock Storm Drainage Design and Technical Criteria Manual", prepared by Utilities Department, Revised June 2019.

XI APPENDICES



VICINITY QUADRANGLE MAP

A-1

National Flood Hazard Layer FIRMette



Legend

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

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
- With BFE or Depth Zone A-E, X, Y, Z, AP
- 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

- Area of Minimal Flood Hazard Zone X
- Effective LOMs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES

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

OTHER FEATURES

- Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transact
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transact 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.

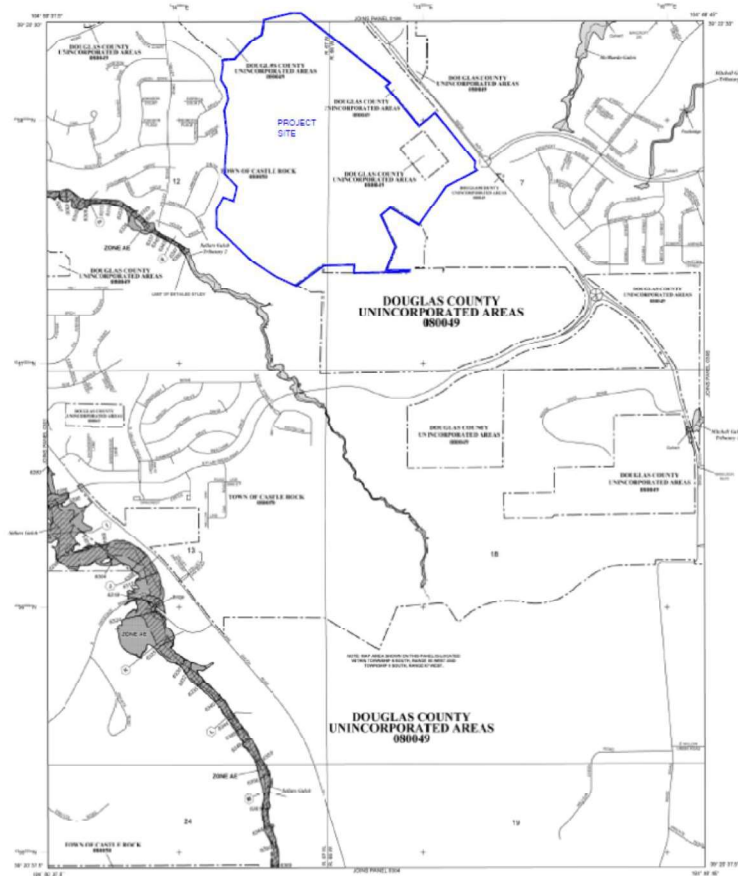
This map complies with FEMA's standards for the use of digital flood maps. If it is not valid as described below, the basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **6/30/2019 at 7:50:14 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.

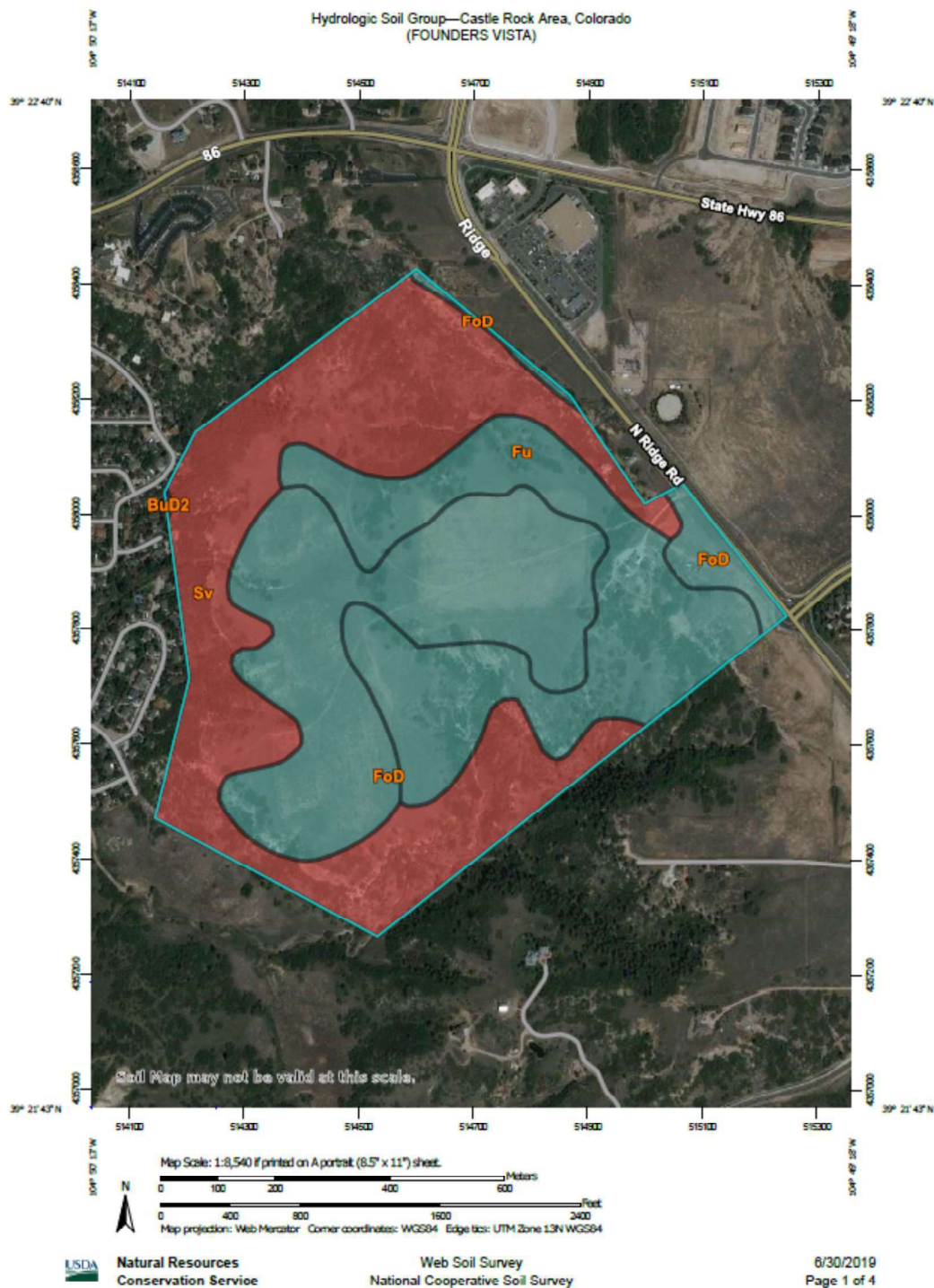
This map image is valid if the one or more of the following map elements do not appear: base map imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel numbers, and FIRM effective date. Map images for unmapped and unmodified areas cannot be used for regulatory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

(SEE PAGE A-3 FOR FULL MAP)

A-2

[illegible]

FLOOD INSURANCE RATE MAP



A-4

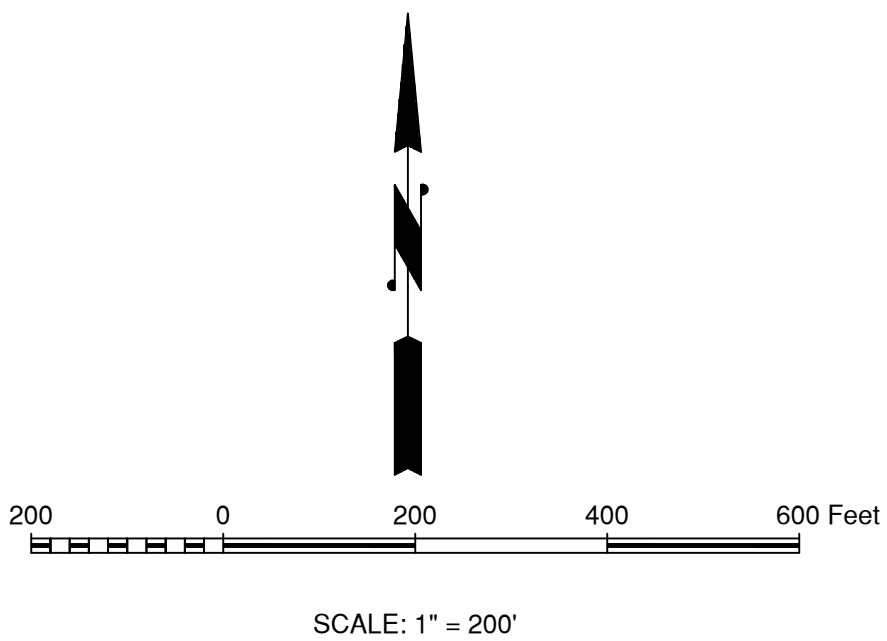
Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BuD2	Bresser and Truckton soils, 3 to 12 percent slopes, eroded	B	0.1	0.0%
FoD	Fondis clay loam, 3 to 9 percent slopes	C	60.4	32.1%
Fu	Fondis-Kutch association	C	50.4	26.8%
Sv	Stony steep land	D	77.0	41.0%
Totals for Area of Interest			187.9	100.0%

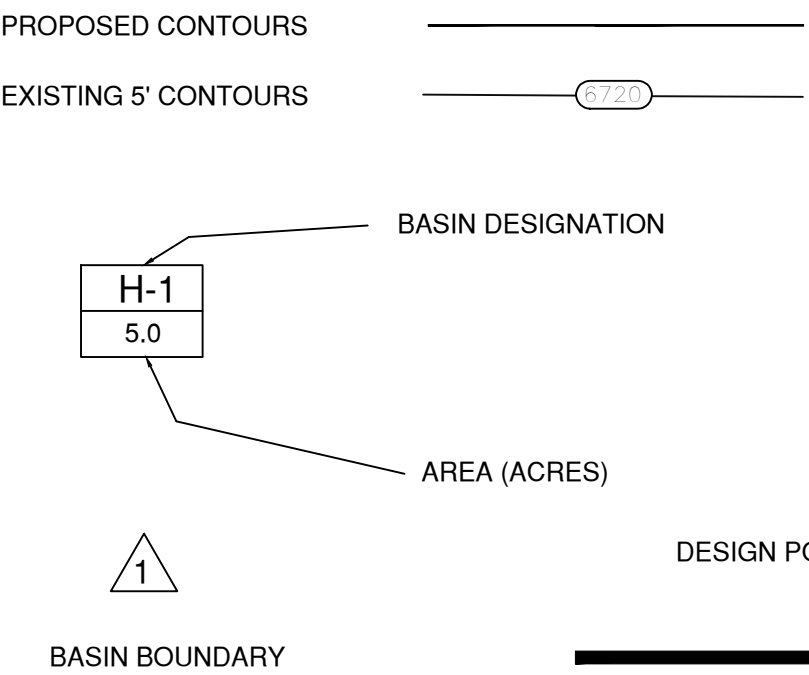
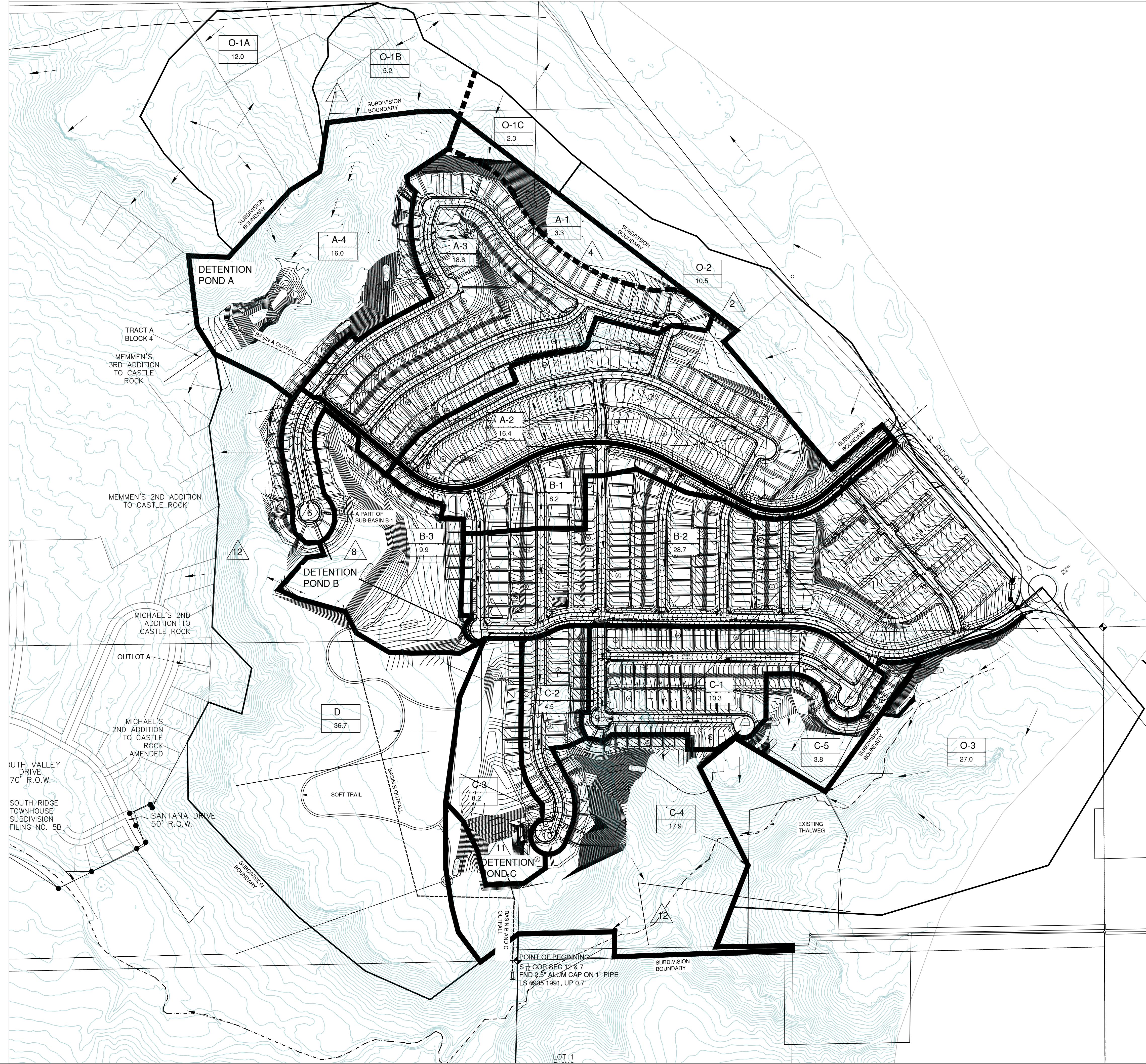
FOUNDERS VILLAGE – MEMMEN

PRELIMINARY DRAINAGE PLAN

A PART OF THE WEST HALF OF SECTION 7,
TOWNSHIP 08 SOUTH, RANGE 66 WEST 6th PRINCIPAL MERIDIAN,
AND THE EAST HALF OF SECTION 12,
TOWNSHIP 08 SOUTH, RANGE 67 WEST 6th PRINCIPAL MERIDIAN,
TOWN OF CASTLEROCK, COUNTY OF DOUGLAS, STATE OF COLORADO.



LEGEND



PRELIMINARY DRAINAGE PLAN

HL **HIGHLINE**
ENGINEERING & SURVEYING

ENGINEERING CONSULTANTS

PO BOX 1295
PARKER, COLORADO 80134

Tel. No. (303) 889-0044
Fax. No.(303) 380-3320

JOB NO. FOUNDERS VISTA

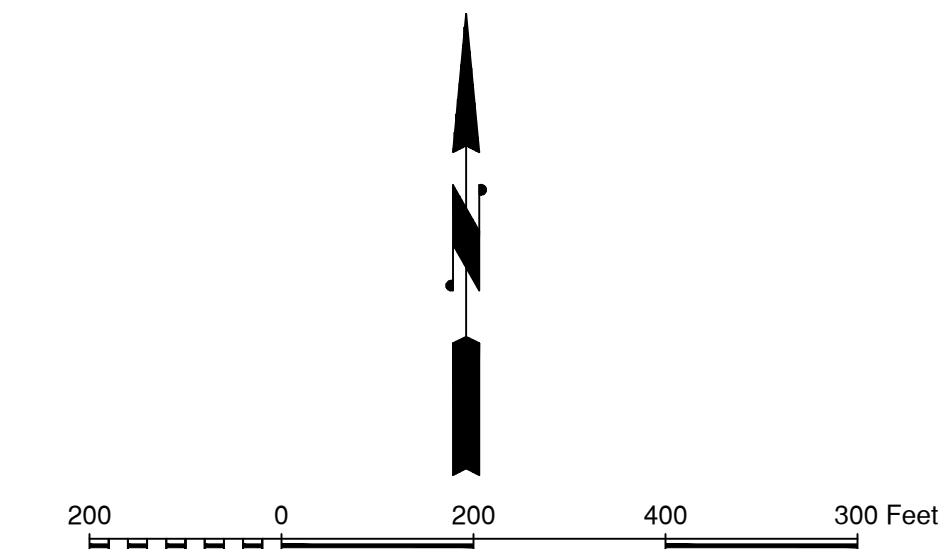
DATE: 4/1/20

SHEET 1 OF 2

FOUNDERS VILLAGE – MEMMEN

PRELIMINARY DRAINAGE PLAN

A PART OF THE WEST HALF OF SECTION 7,
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TOWN OF CASTLEROCK, COUNTY OF DOUGLAS, STATE OF COLORADO.



LEGEND

- DESIGN POINT
- BASIN BOUNDARY
- BASIN DESIGNATION
- AREA (ACRES)
- ADJACENT PROPERTY LINES AND RIGHT-OF-WAY

HISTORIC DRAINAGE MAP

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SHEET 2 OF 2