



**CANYONS FAR SOUTH SDP**  
**PRELIMINARY FLOODPLAIN MODIFICATION STUDY**

**TOWN OF CASTLE ROCK PROJECT NO. SDP23-0041**

**AUGUST 2025**

**For:**

**HT Canyons South Development LP  
1144 15<sup>th</sup> Street, Suite 3675  
Denver, CO 80202**

**Prepared By:**

**Cover 3 Engineering  
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**ENGINEER'S STATEMENT:**

I affirm that this report and plan for the Floodplain Modification Study of Canyons Far South SDP was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Castle Rock Drainage Design and Technical Criteria for the owners thereof. I understand that the Town of Castle Rock does not and will not assume liability for drainage facilities designed by others.

Signature: \_\_\_\_\_

Brian K. Moss

Registered Professional Engineer

State of Colorado No. 37702

For and on behalf of Cover 3 Engineering



**DEVELOPER'S STATEMENT:**

HT Canyons South Development LP hereby certifies that the drainage facilities for Canyons Far South SDP shall be constructed according to the design presented in this report. I understand that the Town of Castle Rock does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the Town of Castle Rock reviews drainage plans pursuant to the Municipal Code; but cannot, on behalf of(Canyons Far South SDP, guarantee that final drainage design review will absolve HT Canyons South Development LP and/or their successors and/or assigns of future liability for improper design.

**HT CANYONS SOUTH DEVELOPMENT LP**

By: HT Canyons South Development LLC, its general partner

By: HT Canyons South LP, its sole member

By: Hines Canyons South LLC, its general partner

By: Hines Canyons South Associates LP, its sole member

By: Hines Investment Management Holdings Limited  
Partnership,  
its general partner

By: \_\_\_\_\_

Name: Chad Murphy

Title: Managing Director

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## **I. SCOPE**

The purpose of this report is to verify that the drainage plan for the Canyons Far South Site Development Plan is in general accordance with the *Town of Castle Rock Storm Drainage Design and Technical Criteria (TOCR SDDTC)*, *Town of Castle Rock Municipal Code Title 18 Floodplain Regulations*, and Mile High Flood District (MHFD) where applicable. This study will review impacts to FEMA FIRM floodplains and major drainageway floodplains, and any necessary improvements and modifications will be evaluated.

## **II. GENERAL LOCATION AND DESCRIPTION**

### **A. Site Location**

- See the Vicinity Map in Appendix D of the Phase II Drainage Report.
- The Canyons Far South SDP project site is in the following areas:
  - NW Section 31, Township 7 South, Range 66 West of the 6<sup>th</sup> Principal Meridian
  - In Town of Castle Rock, Douglas County, CO.
  - The site is located south of Crowfoot Valley Road, north and west of Castle Oaks Drive, and east of Founders Parkway.
- The Castle Oaks Terrain development (zoned planned development, single family adjacent to the site) is south and southeast of the site and the Macanta (also known as Canyons South) development (zoned planned development, single family adjacent to the site) in Douglas County is north of the site.



**Site Location**

**B. Description of Property**

- Canyons Far South SDP will cover approximately 361± acres.
- The site is covered with native grasses, areas of scrub oak with a few pine trees mixed in. The topography is shallow canyons with slopes ranging from 0% to 30%.
- The Natural Resources Conservation Service (NRCS) Soils Classification Map indicates soil types present on the site are predominately classified as HSG C and D. See Appendix D of the Phase II Drainage Report for Soil Maps.
- This site outfalls to the east to McMurdo Gulch, which drains east to Cherry Creek. Tributary B and Tributary 3 of McMurdo Gulch are located within the property and have been analyzed by this project. There are no improvements directly to McMurdo Gulch anticipated for this project, but there are utility crossing that will be discussed within this study.
- McMurdo Gulch Tributary 3 contains flood zone within the property, at the extreme eastern edge of the site. These can be seen in the FEMA FIRM map 08035C0189G located in Appendix D of the Phase II Drainage Report. No impacts to this floodplain are anticipated by this project.
- The McMurdo Gulch Tributary B and Tributary 3 watersheds within the project site contain more than 130 acres and are considered a major drainageway.
- There are no irrigation canals or irrigation ditches on the property.
- Canyons Far South SDP has no significant geologic or topographic features.
- Canyons Far South SDP has cultural resources on the site including earthen dams and stone check dams/drop structures constructed by the Civilian Conservation Corp (CCC). The CCC structures will be preserved and may contribute, to the extent possible, to stabilizing and managing the drainageways. These structures are present along both McMurdo Gulch Tributary B and Tributary 3 on site. Most are in good condition and will be maintained as-is. Calculations have been included to ensure the maximum flow for these structures is not exceeded in the developed condition.
  - There are two locations where the CCC structures are planned to be removed. There is one location along Tributary B that will be removed due to be within the alignment of Edgerock Boulevard, as approved with the Planned Development Plan (PDP) and Annexation documents for this project. One structure along Tributary 3 is in poor condition that will be removed due to the wall failing. No additional clearances were determined to be necessary as required by the PDP or Annexation documents.
  - McMurdo Gulch Tributary B and Tributary 3 have been reviewed by the Army Corps of Engineers and determined to be Non-Jurisdictional per NWO-2021-00560-DEN.
  - Due to these channels being Non-Jurisdictional, this project will work with the Town to document and memorialize the CCC structures that are to be removed.
- Canyons Far South SDP will tie-in to the existing infrastructure along Founders Parkway to the west, Castle Oaks Drive to the south, and Macanta Boulevard in Douglas County to the north.
- Canyons Far South SDP includes five (5) proposed Planning Areas. The Planning Areas will be composed of 439 single-family detached lots, 76 single-family attached lots, future commercial, parks, and preserved natural open space.

### **III. DRAINAGE BASINS AND SUB-BASINS**

#### **A. Major Drainage Basins**

- Major drainage basins in the area include McMurdo Gulch Tributary B and Tributary 3 which covers the entirety of the project site. The tributary drainage basins flow generally to the east to McMurdo Gulch and then northeast before it joins Cherry Creek. Within the project site, the reaches of these tributaries have fairly well defined low-flow channels and moderately steep slopes (0.4-5.0%). In the existing condition, these tributaries have velocities up to 14 feet/second.
- The bulk of McMurdo Gulch Tributary B and Tributary 3 is undeveloped in the existing condition. A small amount of the existing Castle Oaks Terrain development to the south drains to the north into Tributary 3. The Macanta (also known as Canyons South) development in Douglas County is currently under construction, and a portion drains to the south into Tributary B. Undeveloped land west of Founders Parkway drains to the east to both Tributary B and Tributary 3. The existing conditions and future filings of Macanta have been taken into consideration in the drainage design of Canyons Far South SDP.
- In the proposed condition, Canyons Far South SDP proposes five (5) Planning Areas. The Planning Areas will be composed of 439 single-family detached lots, 76 single-family attached lots, future commercial, parks, and preserved natural open space. Both existing and proposed conditions have been analyzed by this project.
- Referenced documents for McMurdo Gulch include:
  - *McMurdo Gulch Flood Hazard Area Delineation*, CH2MHill, Amended February 2012
  - *Canyons South Filing No. 1 – Phase III Drainage Report*, Calibre Engineering Inc., August 12, 2019.
  - *Canyons South – Filing 2 Phase III Drainage Report*, Calibre Engineering Inc., July 2021

#### **B. Minor Drainage Basins**

- Existing major drainage basins have been subdivided with this project along Tributary B and Tributary 3 to calculate flows along the channel reaches. These drainage basins are consistent with the proposed basins, to ensure the flows in the channel can be accurately accounted for along each channel reach. See the Phase II Drainage Report for more information about each sub-basin.

#### **C. Channel Reaches**

- Eight channel reaches have been defined along Tributary B of McMurdo Gulch. Flows have been calculated in both the existing and proposed condition with the Phase II Drainage Report. This will be the basis of design for the future Final Floodplain Modification Studies to improve the existing channel. Note that these channel reaches are not within the FEMA FIRM floodplain (except for the extreme eastern edge of the site), and are not a part of the major channel that was analyzed with the *McMurdo Gulch Flood Hazard Area Delineation*. No modification to the FEMA FIRM floodplain is anticipated. This channel does have a tributary area greater than 130 acres and is considered a major drainageway with local floodplain requirements. This floodplain has been

modeled in the existing and proposed conditions. There are impacts to the major drainageway floodplain as described within this study. See the Phase II Drainage Report for calculations and preliminary flow summary along the channel.

- Five channel reaches have been defined along Tributary 3 of McMurdo Gulch. Flows have been calculated in both the existing and proposed condition with the Phase II Drainage Report. This will be the basis of design for future filings that may be required to propose improvements to the existing channel. Note that these channel reaches are not within the floodplain (except for the extreme eastern edge of the site) and are not a part of the major channel that was analyzed with the *McMurdo Gulch Flood Hazard Area Delineation*. No modification to the FEMA FIRM floodplain is anticipated. This channel does have a tributary area greater than 130 acres and is considered a major drainageway with local floodplain requirements. This floodplain has been modeled in the existing and proposed conditions. There are impacts to the major drainageway floodplain as described within this study. See the Phase II Drainage Report for calculations and preliminary flow summary along the channel.
- Canyons Far South SDP has cultural resources on the site including earthen dams and stone check dams/drop structures constructed by the Civilian Conservation Corp (CCC). The CCC structures will be preserved and may contribute, to the extent possible, to stabilizing and managing the drainageways. These structures are present along both McMurdo Gulch Tributary B and Tributary 3 on site. Most are in good condition and will be maintained as-is. Calculations have been included to ensure the maximum flow for these structures is not exceeded in the developed condition.
  - There are two locations where the CCC structures are planned to be removed. There is one location along Tributary B that will be removed due to be within the alignment of Edgerock Boulevard, as approved with the Planned Development Plan (PDP) and Annexation documents for this project. One structure along Tributary 3 is in poor condition that will be removed due to the wall failing. No additional clearances were determined to be necessary as required by the PDP or Annexation documents.
  - McMurdo Gulch Tributary B and Tributary 3 have been reviewed by the Army Corps of Engineers and determined to be Non-Jurisdictional per NWO-2021-00560-DEN.
  - Due to these channels being Non-Jurisdictional, this project will work with the Town to document and memorialize the CCC structures that are to be removed.

## **IV. DRAINAGE DESIGN CRITERIA**

### **A. Regulations**

- The Canyons Far South SDP project will be designed using the *Town of Castle Rock Storm Drainage Design and Technical Criteria* and the *Town of Castle Rock Municipal Code Title 18 Floodplain Regulations* when applicable.
- The Canyons Far South SDP project will be designed using the *Urban Storm Drainage Criteria Manual* by the Mile High Flood District (MHFD) when applicable.

**B. Drainage Studies, Outfall Systems Plans, Site Constraints**

- There are no improvements anticipated directly to McMurdo Gulch as part of the Canyons Far South SDP project. Tributary B and Tributary 3 of McMurdo Gulch are located within the property and have been analyzed by this project. Improvements include grade control structures, plunge pools, reinforcing, minor stabilization, and buried riprap along these tributary channel reaches. All improvements will be included with the construction drawings of future filings. This Preliminary Floodplain Modification Study will guide the Final Floodplain Modification Study to recommend improvements.
- This Canyons Far South SDP Floodplain Modification Study will define the outfall plan for the overall site. Existing and proposed onsite and offsite flows are to follow historic drainage patterns and be routed to existing drainage channels within Tributary B and Tributary 3. These tributary channels will be improved as necessary within future filings to convey all runoff to proposed ponds.
- Outfalls from the ponds will follow historic rates. By ensuring all runoff exiting the site is at or below historic rates, consistent with the *McMurdo Gulch Flood Hazard Area Delineation*, will ensure that there is no adverse impact to existing floodplain of McMurdo Gulch.

**C. Hydrology**

- The Rational Method will be used for calculating runoff for the site. All basins are less than 160 acres. Runoff coefficients are from MHFD DCM Vol 1. This Preliminary Floodplain Modification Study has been updated to follow the revised criteria adopted by MHFD in March 2024. Conservative values were assumed to ensure adequate design for all future filings.
- A CUHP-SWMM model will be prepared with future Phase III Drainage Reports to confirm routing and release rates for this project. Information has been included within the SDP for reference only. CUHP-SWMM models and results will be provided with the Final Floodplain Modification Study.
- The 5-year storm will be used as the minor storm event and the 100-year storm will be used for the major storm event. The 2-year storm event has been included for the proposed condition to be able to preliminarily size a low-flow channel.
- The design rainfall depths to be used are from 6.1.1 of the *Town of Castle Rock Storm Drainage Design and Technical Criteria*.
- The *McMurdo Gulch Flood Hazard Area Delineation* used CUHP and SWMM to calculate and route flows along McMurdo Gulch. This included a basin for the site area to Tributary B and Tributary 3, but did not include any routing through the site. As such, CUHP and SWMM has not been utilized for the Canyons Far South project. Project areas and percent impervious are consistent, but the Canyons Far South SDP has calculated a percent impervious less than the McMurdo FHAD to ensure this project is in compliance.
- As previously discussed, the rational method has been used instead of CUHP and SWMM. The rational method is more conservative as it will generate a higher flow value that will be added up along the channel reaches. CUHP and SWMM generate a smaller flow value because it accounts for the time of the routing to reduce the



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flow. A CUHP-SWMM model will be prepared with future Phase III Drainage Reports to confirm routing and release rates for this project.

| RELEASE RATE SUMMARY TABLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |                    |            |                           |                    |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------|------------|---------------------------|--------------------|------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | McMurdo Gulch Tributary B |                    |            | McMurdo Gulch Tributary 3 |                    |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Area (acres)              | Percent Impervious | Flow (CFS) | Area (acres)              | Percent Impervious | Flow (CFS) |
| McMurdo Gulch FHAD (2012)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 485.76                    | 10.4%              | 577        | 343.04                    | 13.7%              | 423        |
| Canyons Far South Existing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 409.09                    | 5.0%               | 529        | 303.83                    | 5.0%               | 439        |
| Canyons Far South Proposed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 409.09                    | 22.1%              | 407.27     | 303.83                    | 34.7%              | 332.99     |
| <p>- All existing release rates are per the existing CUHP of the existing condition of the Major Basins from Canyons Far South Filing No. 1 or 2, included in the SDP for reference only.</p> <p>- All proposed release rates are per the CUHP-SWMM model for the ultimate condition of the Major Basins from Canyons Far South Filing No. 1 or 2, included in the SDP for reference only.</p> <p>- McMurdo Gulch FHAD basin CC_MCG20 corresponds with flows from Tributary B to McMurdo Gulch.</p> <p>- McMurdo Gulch FHAD basin CC_MCG22 corresponds with flows from Tributary 3 to McMurdo Gulch.</p> |                           |                    |            |                           |                    |            |

| EXISTING vs PROPOSED SUMMARY TABLE |                           |                    |                           |                    |
|------------------------------------|---------------------------|--------------------|---------------------------|--------------------|
|                                    | McMurdo Gulch Tributary B |                    | McMurdo Gulch Tributary 3 |                    |
|                                    | Area (acres)              | Percent Impervious | Area (acres)              | Percent Impervious |
| Canyons Far South SDP - Existing   | 385.84                    | 7.9%               | 282.43                    | 8.2%               |
| Canyons Far South SDP - Proposed   | 381.15                    | 19.9%              | 288.23                    | 26.4%              |

- No modification to the FEMA FIRM floodplain is anticipated. Therefore, no CLOMR/LOMR for this project is necessary.
- There are modifications to the major drainageway floodplains as described within this report.

#### **D. Hydraulics**

- Improvements are to be implemented to the major drainageways of Tributary B and Tributary 3 of McMurdo Gulch located within the property. Improvements include grade control structures, plunge pools, reinforcing, minor stabilization, and buried riprap along these tributary channel reaches.
- The major drainageway of Tributary B starts within Channel Reach B4.



- The major drainageway of Tributary 3 starts within Channel Reach 3C.
- The Canyons Far South SDP has accounted for the ultimate build-out condition of all upstream, untreated tributary areas as necessary. All values within the SDP are conservative to serve as master plan for the development.
- HEC-RAS has been utilized for the Canyons Far South project. Preliminary floodplains for the effective existing and proposed 100-year major drainageway floodplains are provided on drainage maps. The tributary channels are outside the FEMA FIRM floodplain (except for the extreme eastern edge of the site) and were not included within the *McMurdo Gulch Flood Hazard Area Delineation*. HEC-RAS models and results will be provided with the Final Floodplain Modification Study.
- Additional swale calculations have been provided to analyze the conveyance channels along Tributary B, and Tributary 3, as requested by Town of Castle Rock. Since a regional detention and water quality pond is utilized for this site the channel between the site and regional facility must be stabilized prior to discharging developed flows from the site. Stabilization, for the purposes of this section, can be defined as a channel that has adjusted its channel slope, depth, and width to accommodate the basin geology, hydrology (discharge of water and sediment), dimensions (slope, width, depth), and vegetation. By this specific definition, this project will determine what is necessary for the channel to be stabilized.
- The existing channel has been analyzed in the existing condition with existing and proposed flows to determine the velocities. The existing velocity along Tributary B is up to 13.8 feet/second, and the proposed velocity along Tributary B is up to 6.2 feet/second. The existing velocity along Tributary 3 is up to 5.4 feet/second, and the proposed velocity along Tributary 3 is up to 5.0 feet/second. See summary table below. All flows have been confirmed to be non-erosive to ensure release rate flows are stabilized prior to discharging offsite.

| Major Drainageway Analysis      |                     |                          |                     |                          |
|---------------------------------|---------------------|--------------------------|---------------------|--------------------------|
| Major Drainageway Section       | Existing Flow (cfs) | Existing Velocity (ft/s) | Ultimate Flow (cfs) | Ultimate Velocity (ft/s) |
| Trib B - Top Reach B4 (G3.1)    | 200.67              | 8.45                     | 281.07              | 5.33                     |
| Trib B - Bottom Reach B4 (G3.2) | 367.03              | 13.78                    | 532.02              | 6.21                     |
| Trib B - Top Reach B3 (G2.1)    | 367.03              | 11.16                    | 546.25              | 6.24                     |
| Trib B - Bottom Reach B3 (G2.2) | 465.48              | 9.74                     | 637.99              | 5.79                     |
| Trib B - Top Reach B2 (G1.1)    | 465.48              | 7.23                     | 637.99              | 5.14                     |
| Trib B - Bottom Reach B2 (G1.2) | 619.49              | 9.21                     | 931.48              | 5.89                     |
| Trib 3 - Reach 3C               | 228.98              | 3.98                     | 228.76              | 3.97                     |
| Trib 3 - Reach 3A               | 439.00              | 3.22                     | 332.99              | 5.03                     |
| Trib 3 - Reach 3A2              | 439.00              | 4.58                     | 332.99              | 4.27                     |
| Trib 3 - Reach 3A3              | 439.00              | 5.41                     | 332.99              | 4.09                     |

- With these hydraulic calculations, the Canyons Far South SDP is able to better determine where improvements will be necessary along Tributary B. Tributary 3 operates within allowable tolerances in both the existing and proposed condition. The locations identified that will be further studied with future Phase III Drainage Report(s).
  - The Tributary B channel, from Channel Reach B4 to Pond G at Channel Reach B1.
  - The Tributary B channel within Channel Reach 1B is improved to be Pond G.
  - The Tributary B channel, from Pond G outfall to the east property line.
  - Several pipes have been extended to major drainageway of Tributary B from upstream developed flow.
  - The Tributary 3 channel major drainageway is captured in a culvert at Channel Reach 3C.
  - The Tributary 3 channel within Channel Reach 3B is improved to be Pond J and Pond H.
  - The Tributary 3 channel, from Pond H outfall to the east property line.
- Improvements are anticipated to include grade control structures, including cutoff walls with a low flow depression and riprap lined riffle drops with plunge pools. This will ensure that the channel reaches an appropriate equilibrium and is properly designed for the proposed condition. This meets the intent of the *Storm Drainage Design and Technical Criteria* and earlier studies along McMurdo Gulch, see the *Pond G and Tributary B Memo* in Appendix D.
  - The cutoff wall grade control structures are preferred in order to minimize the impacts along the channels, to ensure existing vegetation and trees are maintained. An exhibit is included in Appendix B to show the amount of trees along the existing channel that this project is intending to protect.
  - As agreed with TOCR, a combination of cutoff walls and riffle drops are proposed along the channel reaches.
  - These channel improvements will be further discussed and demonstrated in future Final Floodplain Modification Studies.
  - Tributary 3 Reach 3A to be fully stabilized to ultimate stabilization conditions without cutoff walls, except adjacent to the property line. This is anticipated to include reinforced plunge pool at Pond H outfall, to grade control structures of riffle drops, boulder drops, and scour pools with riprap and coir mats as necessary. These channel improvements will be further discussed and demonstrated in future Final Floodplain Modification Studies.
- If grade control structures are not feasible, then improvements may include additional storm pipe as conveyance to the channel as an alternative to minimize the impacts to the channel.

- Bank stabilization and void-filled riprap protection at outfalls may be included as well where necessary. Future Final Floodplain Modification Studies will determine the required improvements in each area.
- The 2-year storm event has been calculated to be able to determine the appropriate low flow design along each channel. This will be included with the Final Floodplain Modification Studies to ensure that the channel reaches an appropriate equilibrium and is properly designed for the proposed condition. Preliminary low flow channels are included in Appendix B.
- See Appendix B for more information.

## **V. STORMWATER MANGEMENT FACILITY DESIGN**

### **A. Stormwater Conveyance Facilities**

- The general design of the stormwater conveyance facilities will utilize existing drainage tributaries and channels where possible. The outfalls for local development locations will include low tailwater basins and grade control structures in the main stem of the tributary drainage basins as necessary per Final Floodplain Modification Study . The McMurdo Gulch tributaries will be used to convey the collected discharge to detention facilities, which will be included with future Phase III Drainage Report(s), before outfalling to McMurdo Gulch, and eventually draining to Cherry Creek.
- Tributary B and Tributary 3 of McMurdo Gulch convey runoff through the site to the east.
- The general design of the stormwater conveyance facilities will utilize existing drainage tributaries and channels where possible. Streets, inlets, pipes, and manholes will be used to convey flow from developed areas to existing swales for discharge. The outfalls for these locations will likely include low tailwater basins and grade control structures may be needed in the main channels of Tributary B and Tributary 3. Final design will be included with future Final Floodplain Modification Studies.
- Three ponds have been located along Tributary B and Tributary 3 to reduce the total number of ponds, improve long term maintenance, and provide better open space for the residential lots.
- See the *Pond G and Tributary B Memo* in Appendix D, that was shared with Town of Castle Rock in October 2024, for further explanation of the design intent of Pond G and Tributary B.
- Appendix D in the Phase II Report includes the Vicinity Map, FEMA Firm Maps, Soils Map, and the proposed Drainage Maps.

### **B. Floodplain Modification**

- No FEMA floodplain modifications will be required because of the Canyons Far South SDP development.

- There are major drainageway floodplain impacts due to the Canyons Far South development; but are not affecting any building structures within the floodplain. These impacts will be mitigated through the use of the aforementioned grade control structures.
- Two sanitary sewer outfalls and one waterline connection may be required to cross the major channel of McMurdo Gulch offsite southeast of the property. While there may be construction near or adjacent to the floodplain, no modifications are expected. No fill is anticipated, so that would generate no-rise to the floodplain. Zero net impact is expected to the McMurdo Gulch floodplain. Future Final Floodplain Modification will confirm at time of construction documents of these utility connections that there is no floodplain modification.

**C. Additional Permitting**

- No additional or special permits are required for the Canyons Far South SDP project.
- 404 permitting and clearances is not applicable for this project – there are no wetlands or Waters of the United States being impacted.
  - McMurdo Gulch Tributary B and Tributary 3 have been reviewed by the Army Corps of Engineers and determined to be Non-Jurisdictional per NWO-2021-00560-DEN.
  - Project ID NWO-2021-00560 from the EPA have confirmed that there are no wetlands or Waters of the United States onsite.

**VI. CONCLUSIONS**

- The proposed drainage system for the Canyons Far South Site Development Plan will provide a sustainable drainage system for the development. Onsite flows will be conveyed to existing drainage channels before being treated by one of four ponds and will eventually discharge into McMurdo Gulch. The development of Canyons Far South should not adversely impact downstream properties.

## **VII. REFERENCES**

1. *Town of Castle Rock Storm Drainage Design and Technical Criteria*, Castle Rock, CO, latest version
2. *Town of Castle Rock Public Works Regulations*, Castle Rock, CO, latest version
3. *Urban Storm Drainage Criteria Manual*, Mile High Flood District, latest version
4. *McMurdo Gulch Flood Hazard Area Delineation*, CH2MHill, Amended February 2012
5. *Canyons South Filing No. 1 – Phase III Drainage Report*, Calibre Engineering Inc., August 12, 2019.
6. *Canyons South – Filing 2 Phase III Drainage Report*, Calibre Engineering Inc., July 2021



## **APPENDIX B**

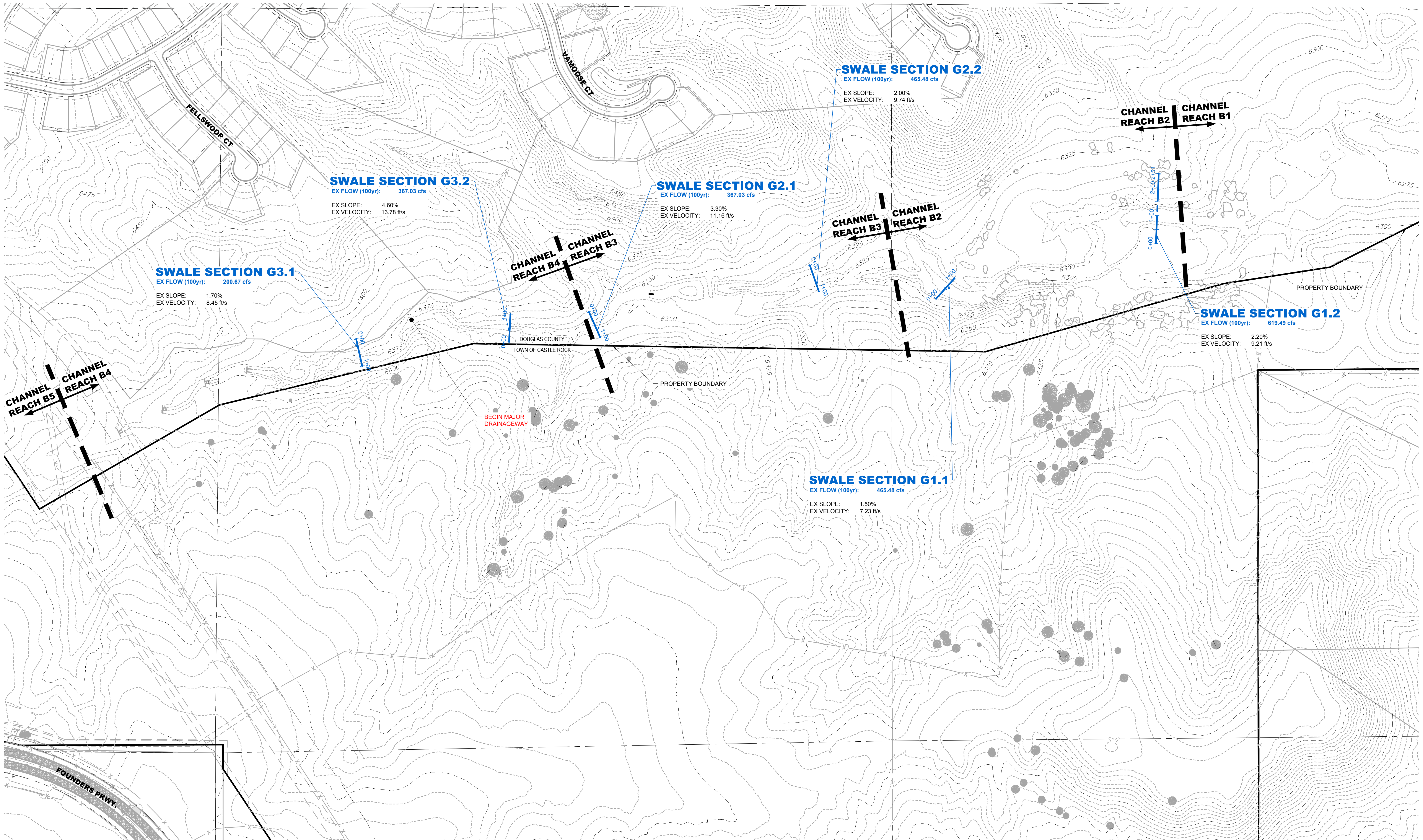
### **HYDRAULIC CALCULATIONS**

|                  |                       |
|------------------|-----------------------|
| Project:         | Canyons Far South SDP |
| Location:        | Castle Rock, CO       |
| Designer:        | CJG                   |
| Date:            | May 2025              |
| Latest Revision: | July 2025             |



| Major Drainageway Analysis      |                        |                             |                        |                             |
|---------------------------------|------------------------|-----------------------------|------------------------|-----------------------------|
| Major Drainageway Section       | Existing Flow<br>(cfs) | Existing Velocity<br>(ft/s) | Ultimate Flow<br>(cfs) | Ultimate Velocity<br>(ft/s) |
| Trib B - Top Reach B4 (G3.1)    | 200.67                 | 8.45                        | 281.07                 | 5.33                        |
| Trib B - Bottom Reach B4 (G3.2) | 367.03                 | 13.78                       | 532.02                 | 6.21                        |
| Trib B - Top Reach B3 (G2.1)    | 367.03                 | 11.16                       | 546.25                 | 6.24                        |
| Trib B - Bottom Reach B3 (G2.2) | 465.48                 | 9.74                        | 637.99                 | 5.79                        |
| Trib B - Top Reach B2 (G1.1)    | 465.48                 | 7.23                        | 637.99                 | 5.14                        |
| Trib B - Bottom Reach B2 (G1.2) | 619.49                 | 9.21                        | 931.48                 | 5.89                        |
| Trib 3 - Reach 3C               | 228.98                 | 3.98                        | 228.76                 | 3.97                        |
| Trib 3 - Reach 3A               | 439.00                 | 3.22                        | 332.99                 | 5.03                        |
| Trib 3 - Reach 3A2              | 439.00                 | 4.58                        | 332.99                 | 4.27                        |
| Trib 3 - Reach 3A3              | 439.00                 | 5.41                        | 332.99                 | 4.09                        |





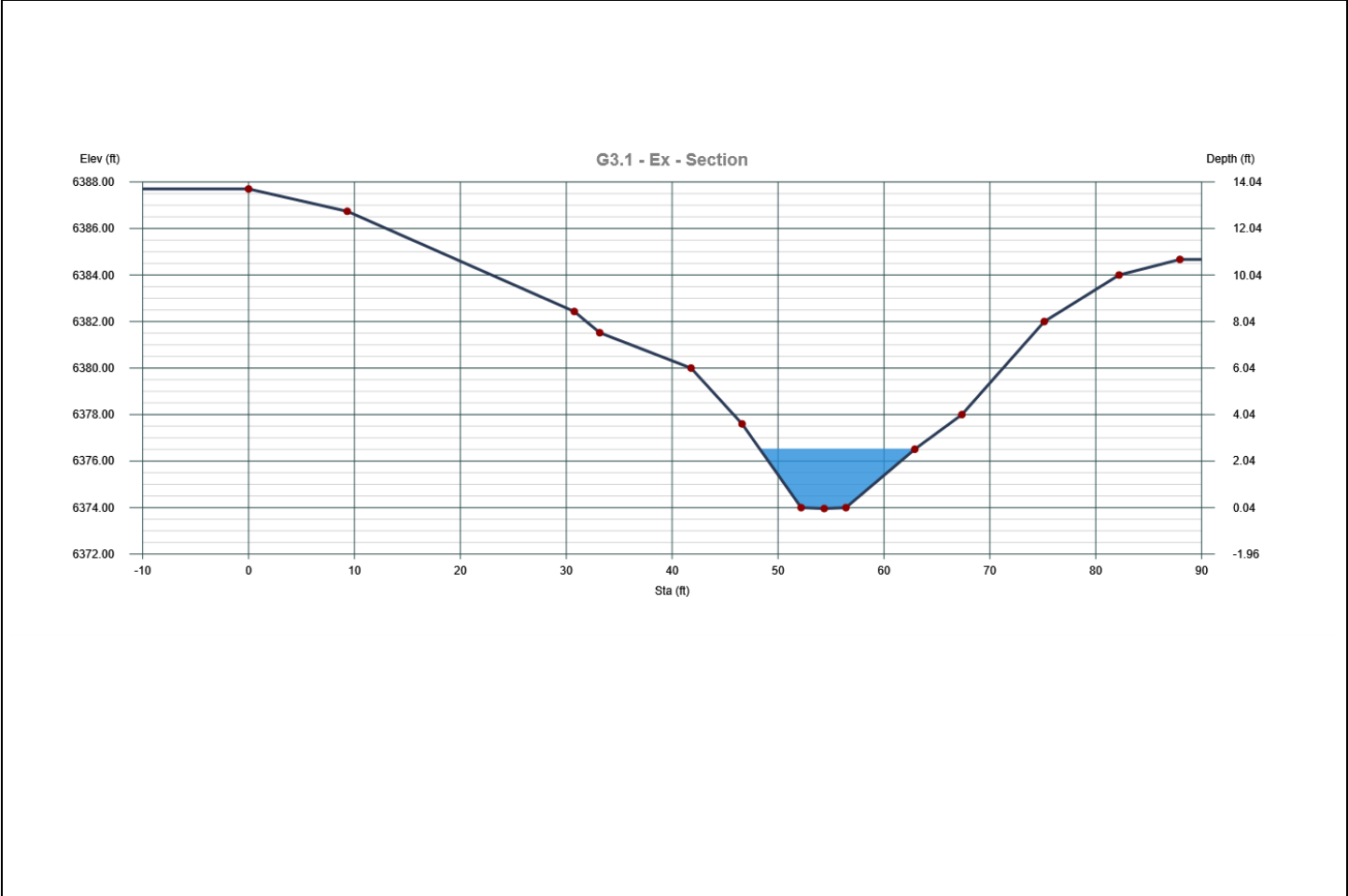


G3.1 - Ex

Channel 1

| USER-DEFINED     |              | DISCHARGE |              |
|------------------|--------------|-----------|--------------|
| Total Depth      | = 13.74 ft   | Method    | = Known Q    |
| Invert Elevation | = 6373.96 ft | Known Q   | = 200.67 cfs |
| Channel Slope    | = 1.700 %    |           |              |
| Manning's n      | = Composite  |           |              |

| CALCULATION SAMPLE |       |        |          |       |           |            |         |         |           |           |
|--------------------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| Flow               | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
| (cfs)              | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 200.67             | 2.55  | 23.74  | 8.45     | 15.83 | 0.030     | 2.77       | 6376.51 | 6377.62 | 2.71      | 14.62     |



G3.2 - Ex

Channel 3

USER-DEFINED

Total Depth

= 13.94 ft

Invert Elevation

= 6355.00 ft

Channel Slope

= 4.600 %

Manning's n

= Composite

DISCHARGE

Method

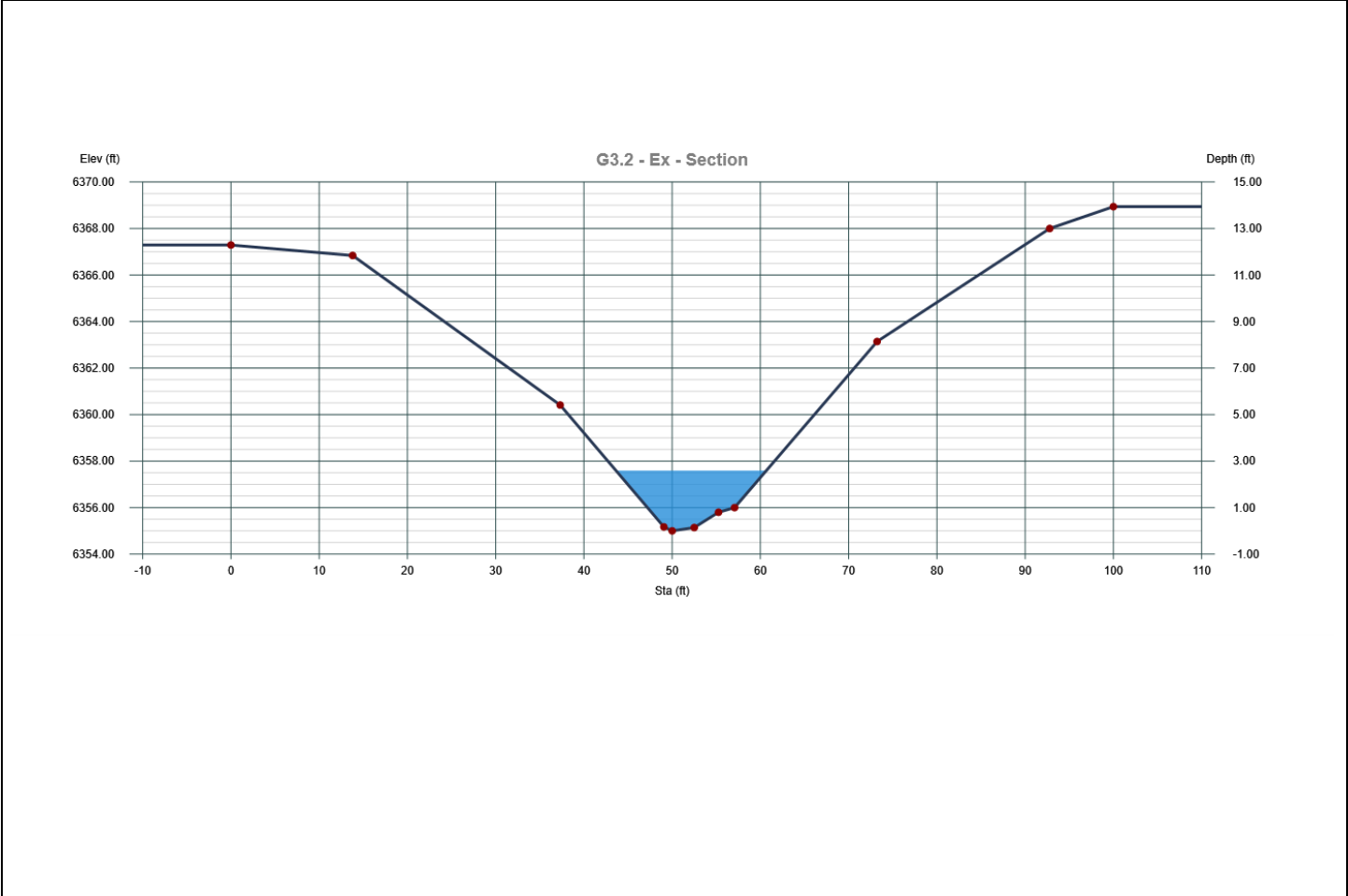
= Known Q

Known Q

= 367.03 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 367.03 | 2.57  | 26.64  | 13.78    | 17.89 | 0.030     | 3.52       | 6357.57 | 6360.52 | 7.38      | 16.94     |

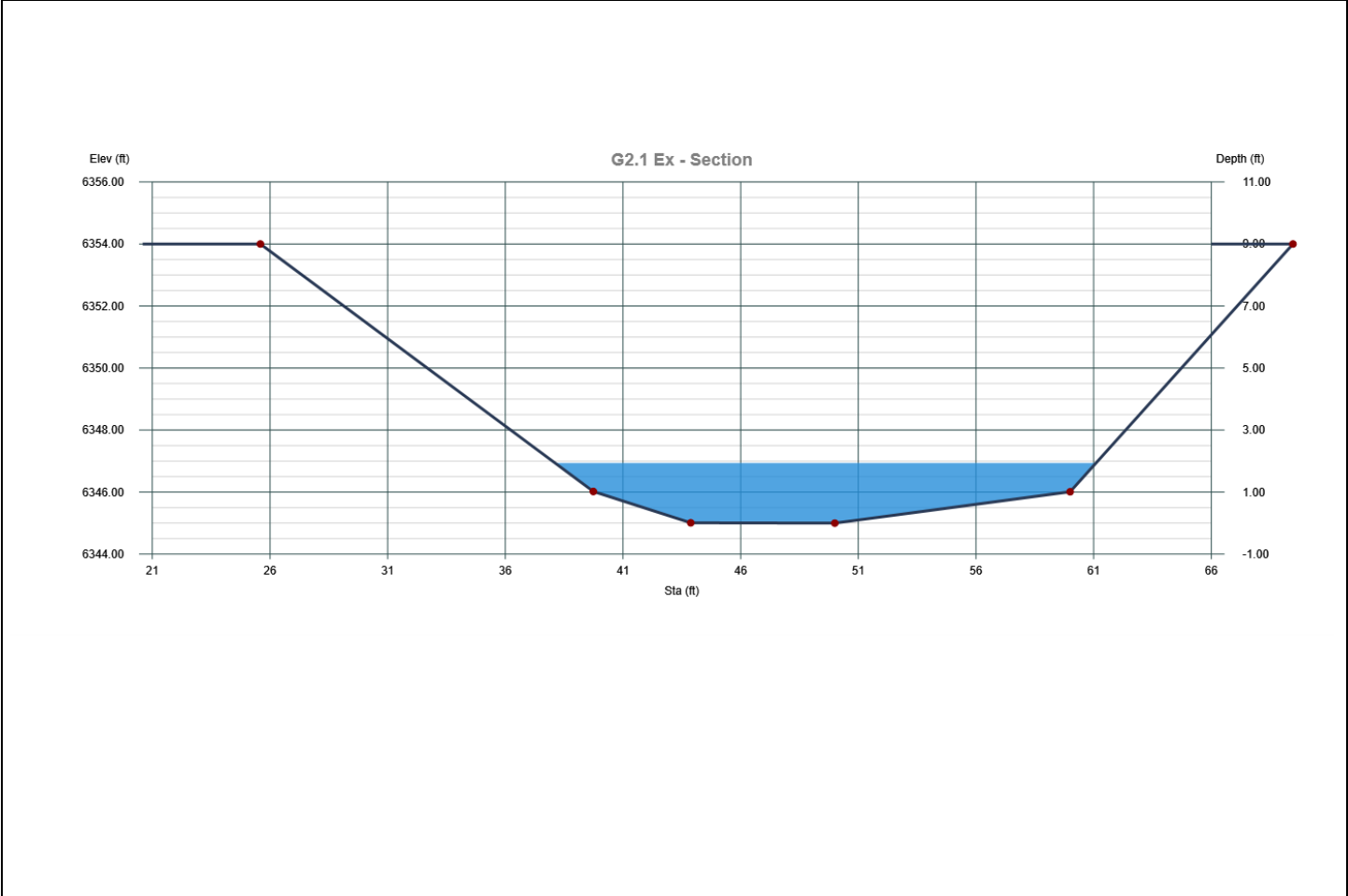


G2.1 Ex

Channel 1

| USER-DEFINED     |              | DISCHARGE |              |
|------------------|--------------|-----------|--------------|
| Total Depth      | = 9.00 ft    | Method    | = Known Q    |
| Invert Elevation | = 6345.00 ft | Known Q   | = 367.03 cfs |
| Channel Slope    | = 3.300 %    |           |              |
| Manning's n      | = Composite  |           |              |

| CALCULATION SAMPLE |       |        |          |       |           |            |         |         |           |           |
|--------------------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| Flow               | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
| (cfs)              | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 367.03             | 1.92  | 32.90  | 11.16    | 23.68 | 0.030     | 2.51       | 6346.92 | 6348.86 | 3.95      | 22.93     |



G2.2 Ex

Channel 3

USER-DEFINED

Total Depth

= 12.79 ft

Invert Elevation

= 6321.25 ft

Channel Slope

= 2.000 %

Manning's n

= Composite

DISCHARGE

Method

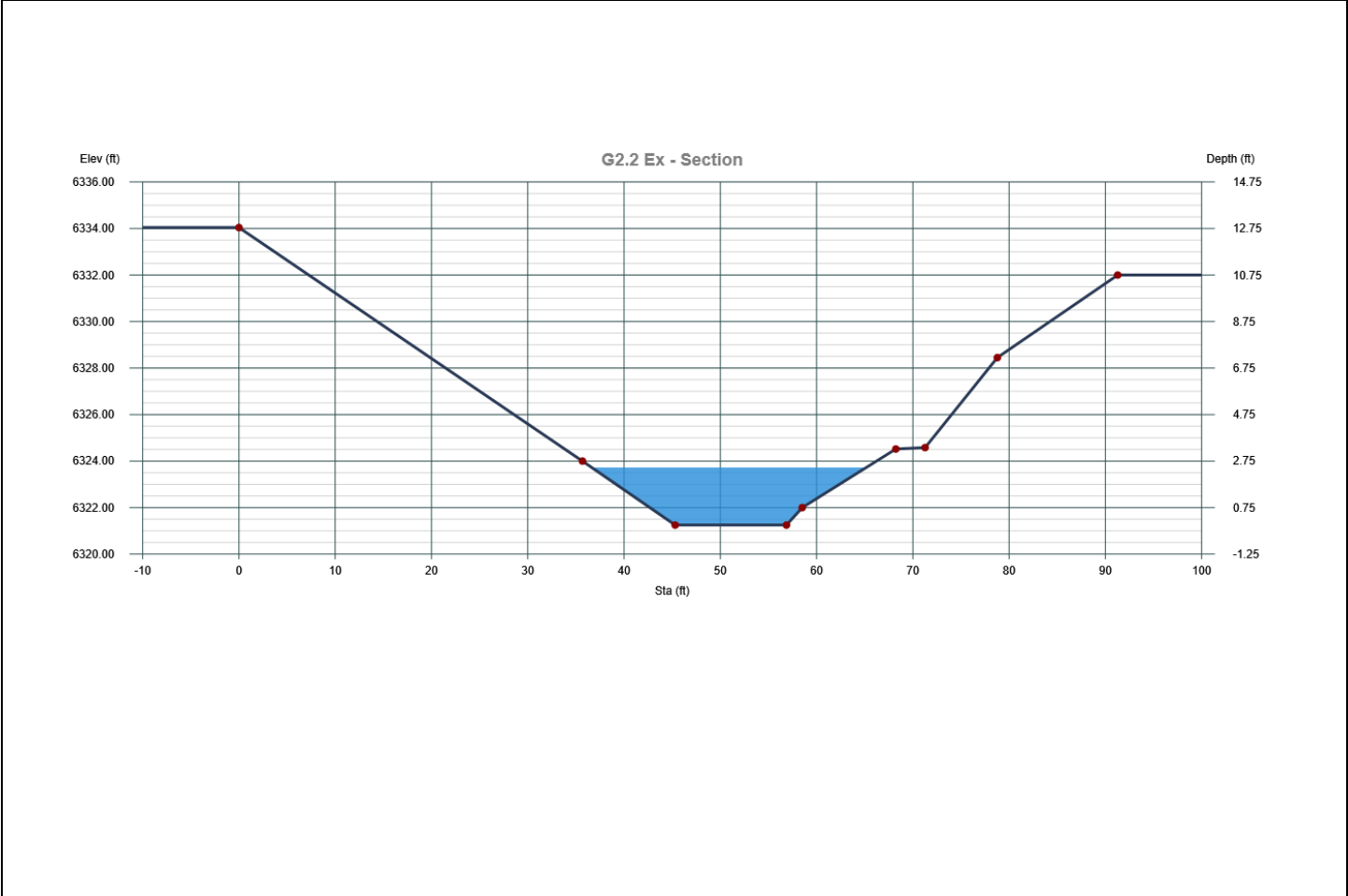
= Known Q

Known Q

= 465.48 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 465.48 | 2.45  | 47.81  | 9.74     | 29.06 | 0.030     | 2.85       | 6323.70 | 6325.17 | 3.06      | 28.34     |



G1.1 Ex

Channel 1

USER-DEFINED

Total Depth

= 12.00 ft

Invert Elevation

= 6308.00 ft

Channel Slope

= 1.500 %

Manning's n

= Composite

DISCHARGE

Method

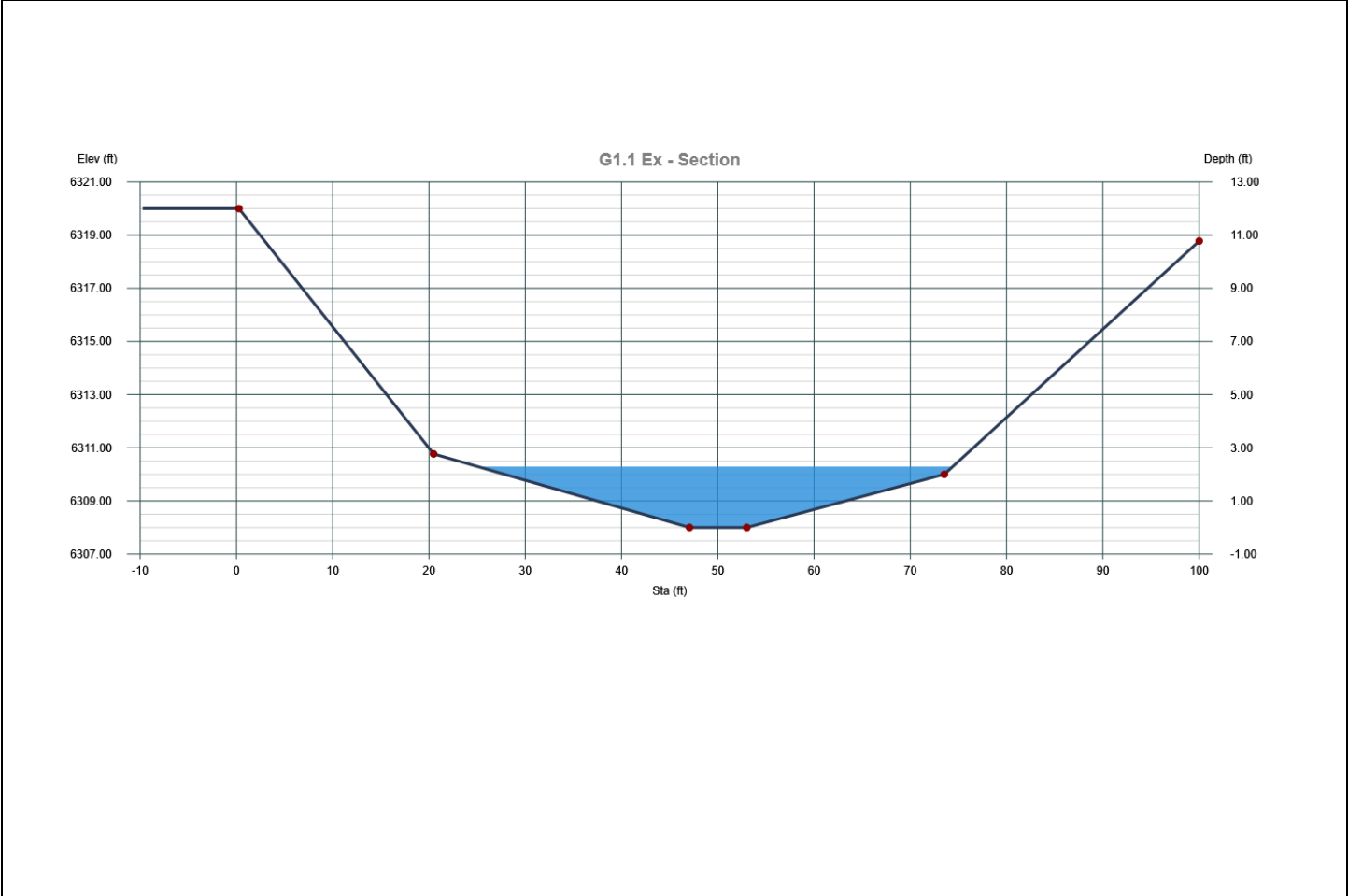
= Known Q

Known Q

= 465.48 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 465.48 | 2.27  | 64.39  | 7.23     | 49.32 | 0.030     | 2.38       | 6310.27 | 6311.08 | 2.12      | 49.06     |





G1.2 Ex

Channel 3

USER-DEFINED

Total Depth

= 29.52 ft

Invert Elevation

= 6287.47 ft

Channel Slope

= 2.200 %

Manning's n

= Composite

DISCHARGE

Method

= Known Q

Known Q

= 619.49 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 619.49 | 1.72  | 67.26  | 9.21     | 47.40 | 0.030     | 2.07       | 6289.19 | 6290.51 | 2.36      | 46.99     |

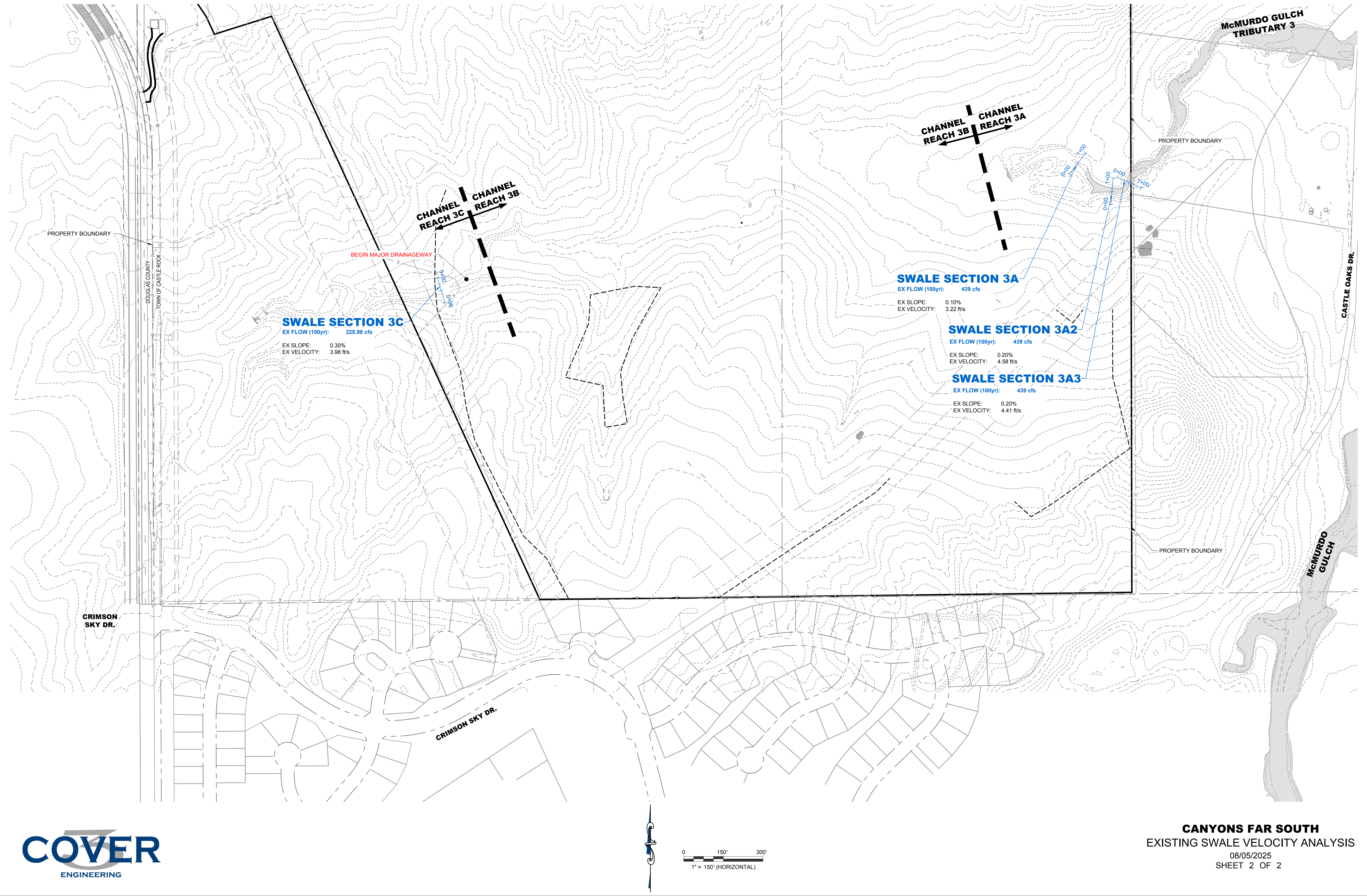
G1.2 Ex - Section

The graph displays the cross-section of the channel. The x-axis represents stationing (Sta) in feet, ranging from 7 to 232. The left y-axis represents elevation (Elev) in feet, ranging from 6286.00 to 6321.00. The right y-axis represents depth in feet, ranging from -1.47 to 33.53. The channel bed is shown as a blue-shaded area, and the water surface is indicated by a red line. The water depth is 1.72 ft at station 32 and 28.53 ft at station 232.

| Station (Sta) | Elevation (ft) | Depth (ft) |
|---------------|----------------|------------|
| 32            | 6290.51        | 1.72       |
| 82            | 6287.47        | -          |
| 107           | 6287.47        | -          |
| 232           | 6290.51        | 28.53      |



FILE PATH: E:\PROJECTS\230200 - CANYONS FAR SOUTH - CASTLE ROCK CO\03 - DRAWINGS\11 - SDP - DRAINAGE\230200 - SWALE SECTIONS



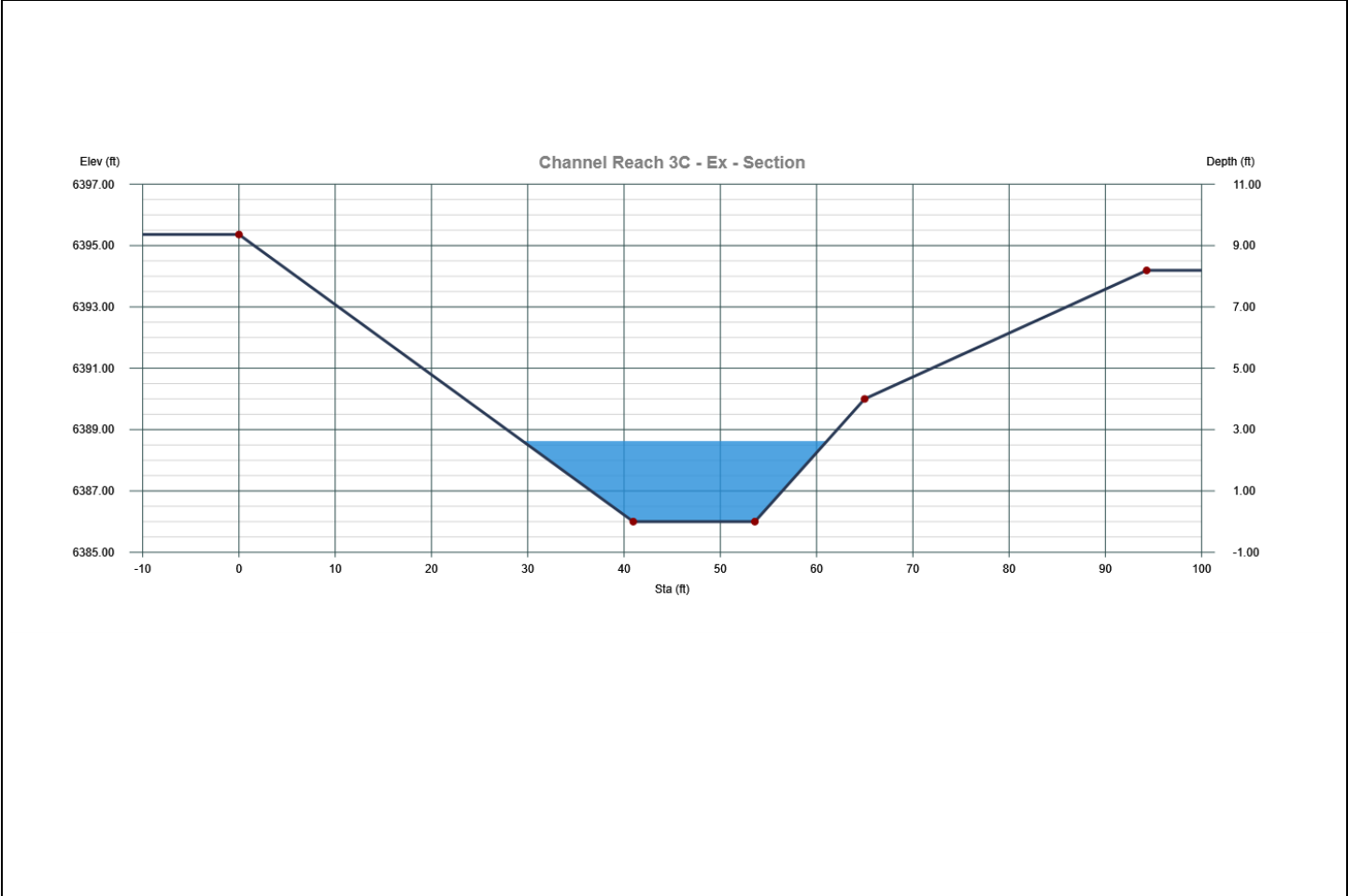


Channel Reach 3C - Ex

Channel 1

| USER-DEFINED     |              | DISCHARGE |              |
|------------------|--------------|-----------|--------------|
| Total Depth      | = 9.36 ft    | Method    | = Known Q    |
| Invert Elevation | = 6386.00 ft | Known Q   | = 228.98 cfs |
| Channel Slope    | = 0.300 %    |           |              |
| Manning's n      | = Composite  |           |              |

| CALCULATION SAMPLE |       |        |          |       |           |            |         |         |           |           |
|--------------------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| Flow               | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
| (cfs)              | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 228.98             | 2.61  | 57.57  | 3.98     | 32.23 | 0.030     | 1.82       | 6388.61 | 6388.86 | 0.49      | 31.49     |



Channel Reach 3A - Ex

Channel 3

USER-DEFINED

Total Depth

= 14.00 ft

Invert Elevation

= 6312.00 ft

Channel Slope

= 0.100 %

Manning's n

= Composite

DISCHARGE

Method

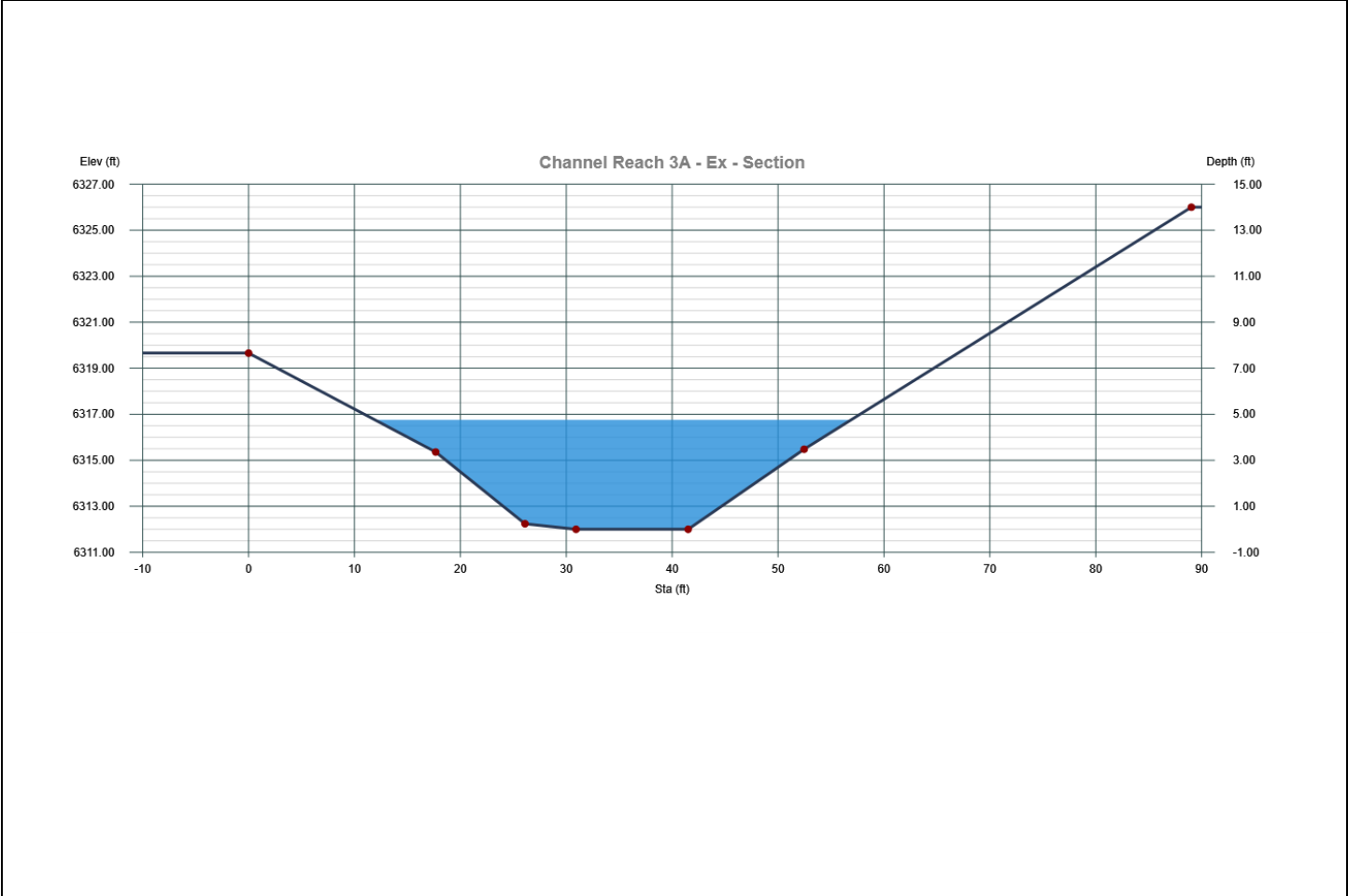
= Known Q

Known Q

= 439.00 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 439.00 | 4.73  | 136.32 | 3.22     | 46.21 | 0.030     | 2.56       | 6316.73 | 6316.89 | 0.30      | 44.77     |



Channel Reach 3A2 - Ex

Channel 5

USER-DEFINED

Total Depth

= 19.20 ft

Invert Elevation

= 6312.00 ft

Channel Slope

= 0.200 %

Manning's n

= Composite

DISCHARGE

Method

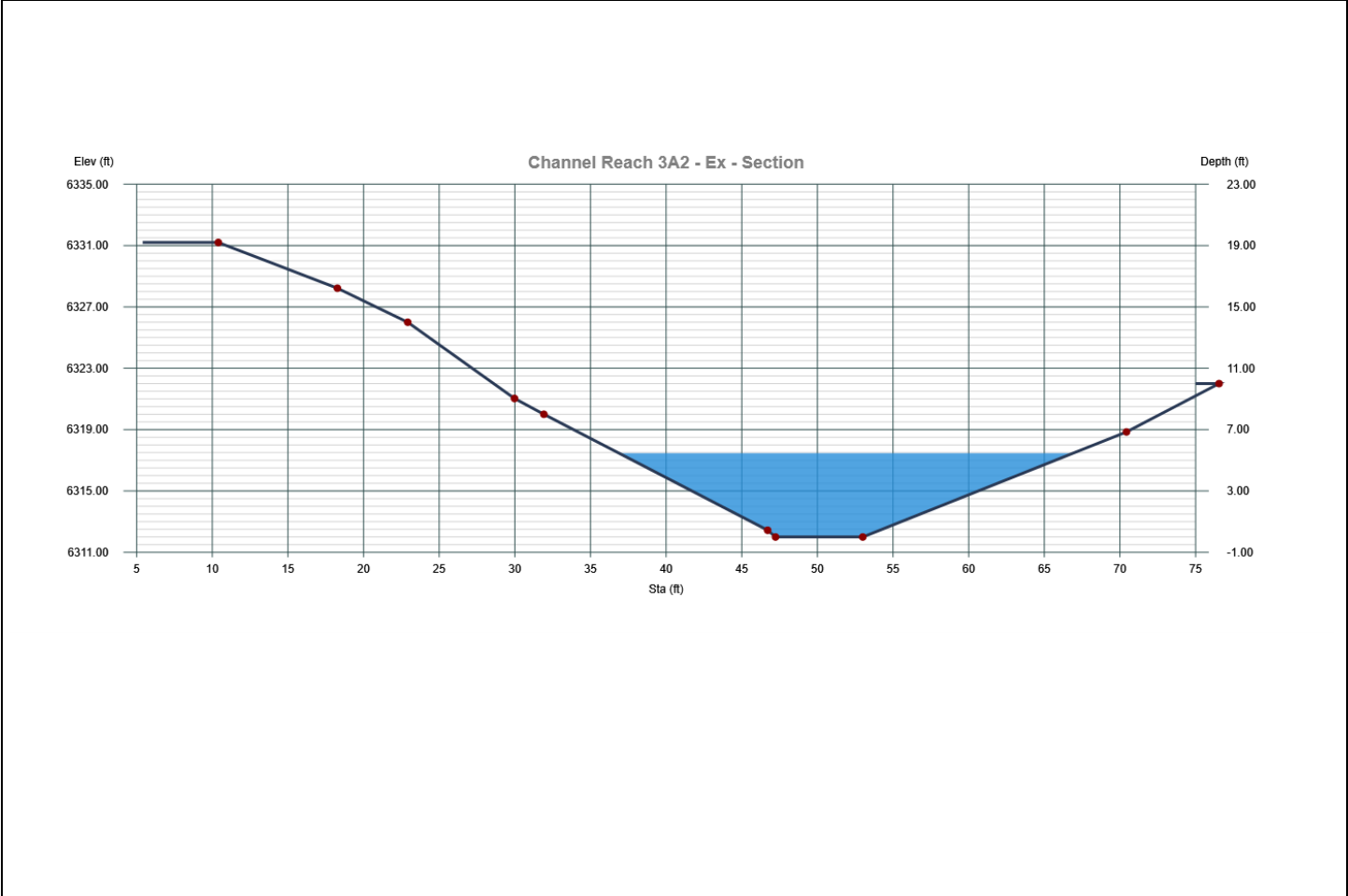
= Known Q

Known Q

= 439.00 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 439.00 | 5.43  | 95.91  | 4.58     | 32.26 | 0.030     | 3.70       | 6317.43 | 6317.76 | 0.68      | 29.87     |

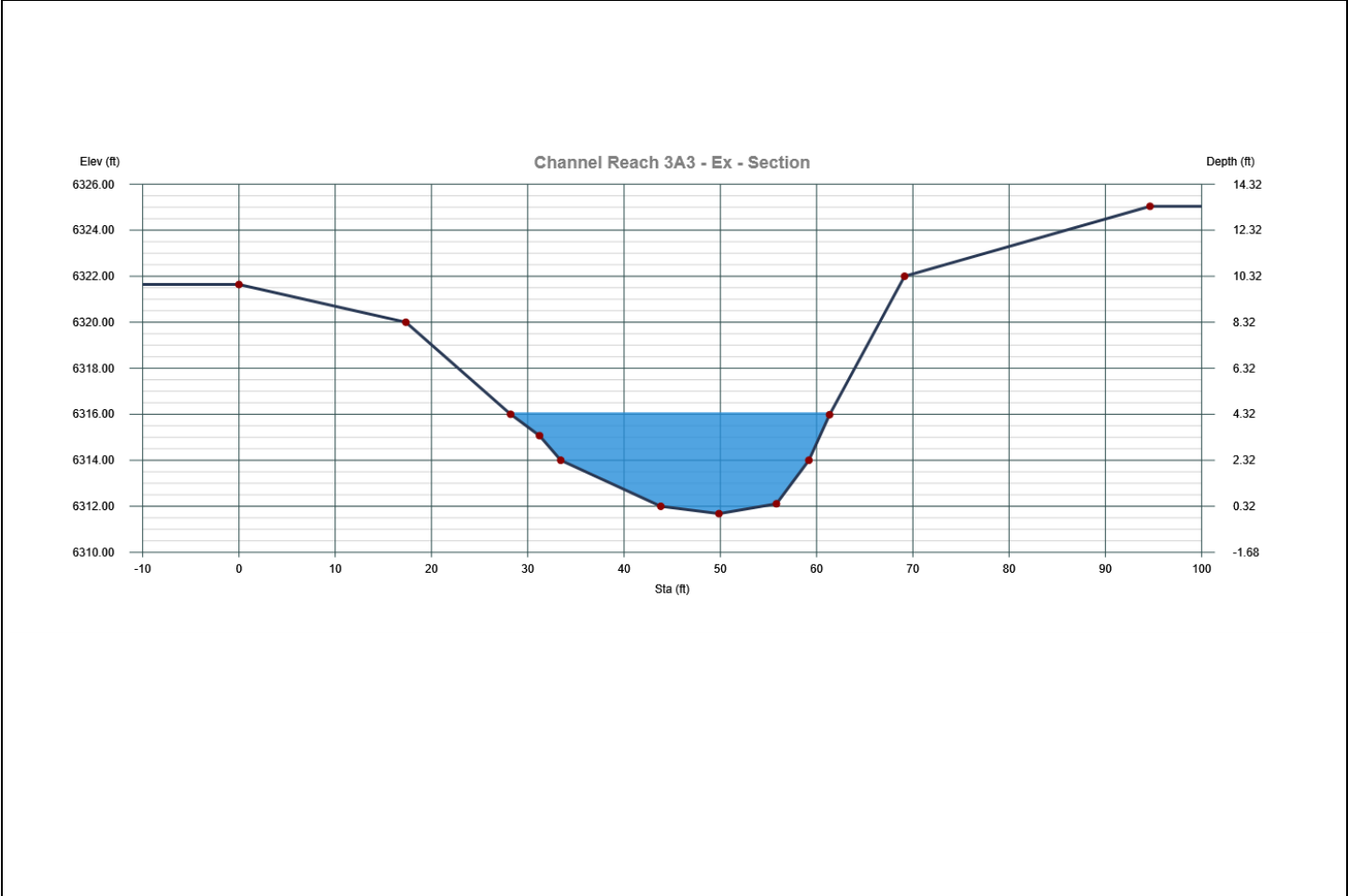


Channel Reach 3A3 - Ex

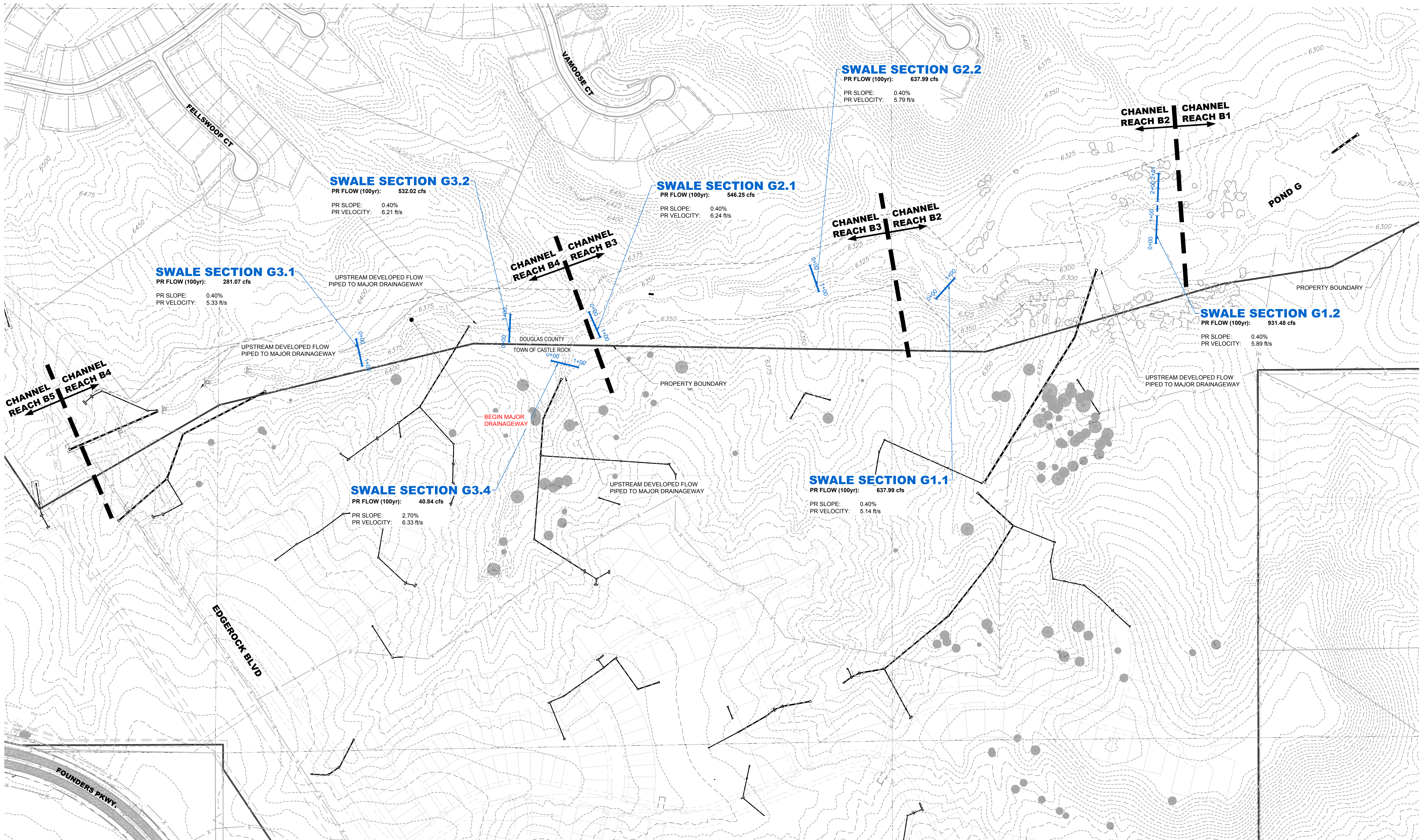
Channel 7

| USER-DEFINED     |              | DISCHARGE |              |
|------------------|--------------|-----------|--------------|
| Total Depth      | = 13.36 ft   | Method    | = Known Q    |
| Invert Elevation | = 6311.68 ft | Known Q   | = 439.00 cfs |
| Channel Slope    | = 0.200 %    |           |              |
| Manning's n      | = Composite  |           |              |

| CALCULATION SAMPLE |       |        |          |       |           |            |         |         |           |           |
|--------------------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| Flow               | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
| (cfs)              | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 439.00             | 4.38  | 99.53  | 4.41     | 35.30 | 0.030     | 2.91       | 6316.06 | 6316.36 | 0.55      | 33.40     |









G3.1 - Pr Slope

Channel 2

USER-DEFINED

Total Depth

= 13.74 ft

Invert Elevation

= 6373.96 ft

Channel Slope

= 0.400 %

Manning's n

= Composite

DISCHARGE

Method

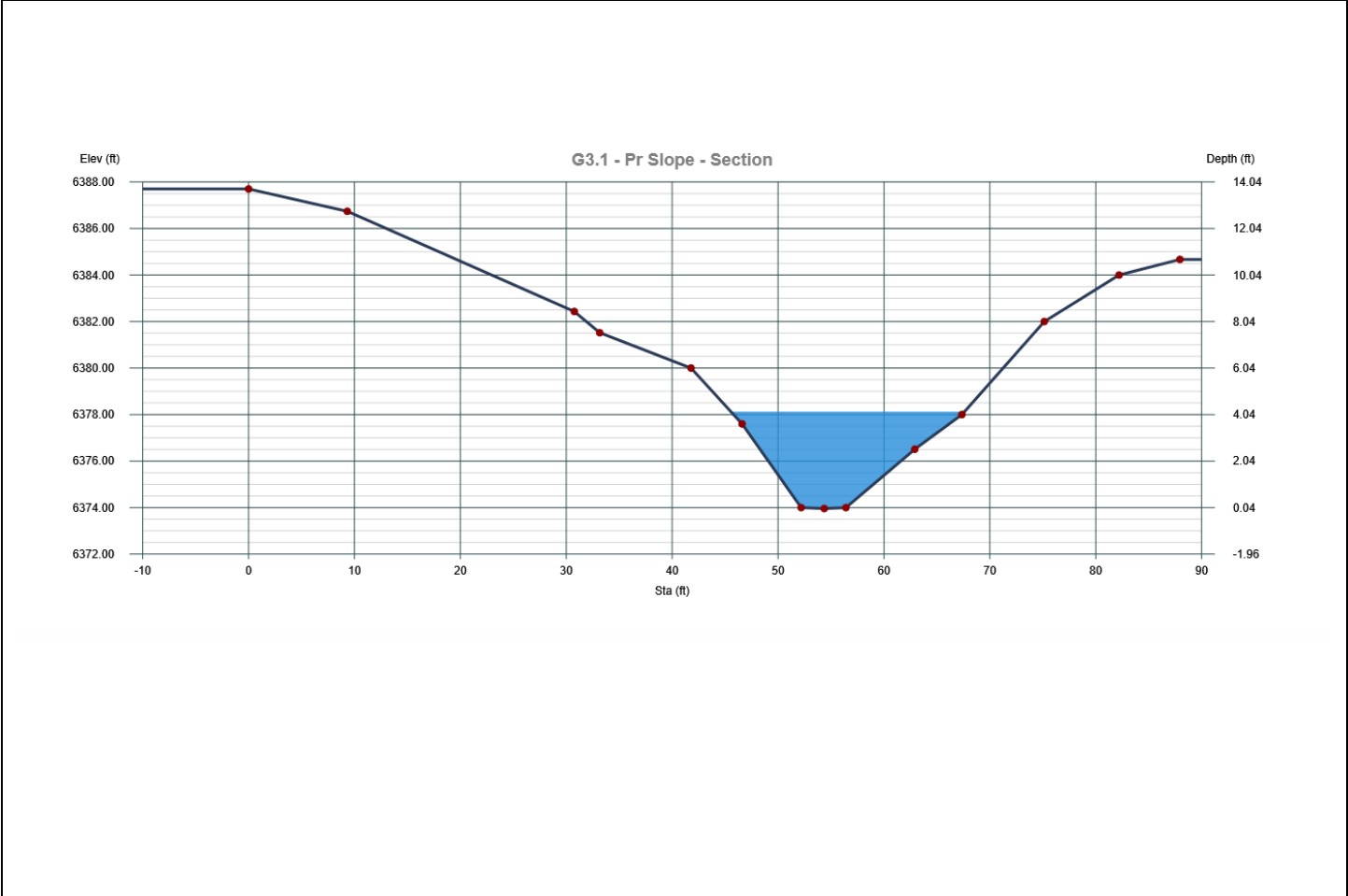
= Known Q

Known Q

= 281.07 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 281.07 | 4.14  | 52.78  | 5.33     | 23.87 | 0.030     | 3.26       | 6378.10 | 6378.54 | 1.03      | 21.96     |



G3.2 - Pr Slope

Channel 4

USER-DEFINED

Total Depth

= 13.94 ft

Invert Elevation

= 6355.00 ft

Channel Slope

= 0.400 %

Manning's n

= Composite

DISCHARGE

Method

= Known Q

Known Q

= 532.02 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 532.02 | 5.16  | 85.64  | 6.21     | 30.66 | 0.030     | 4.18       | 6360.16 | 6360.76 | 1.29      | 28.61     |

G3.2 - Pr Slope - Section

The graph displays a cross-section of a channel. The x-axis represents stationing (Sta) in feet, ranging from -10 to 110. The left y-axis represents elevation (Elev) in feet, ranging from 6354.00 to 6370.00. The right y-axis represents depth in feet, ranging from -1.00 to 15.00. A blue-filled area represents the channel's cross-section, which is symmetrical and reaches its maximum depth of approximately 5.16 feet at station 50. The channel walls slope upwards from station 50 to station 0 on the left and station 100 on the right. The top of the channel is at an elevation of approximately 6360.76 feet.

G3.4 - Pr

Channel 7

USER-DEFINED

Total Depth

= 12.37 ft

Invert Elevation

= 6353.84 ft

Channel Slope

= 2.700 %

Manning's n

= Composite

DISCHARGE

Method

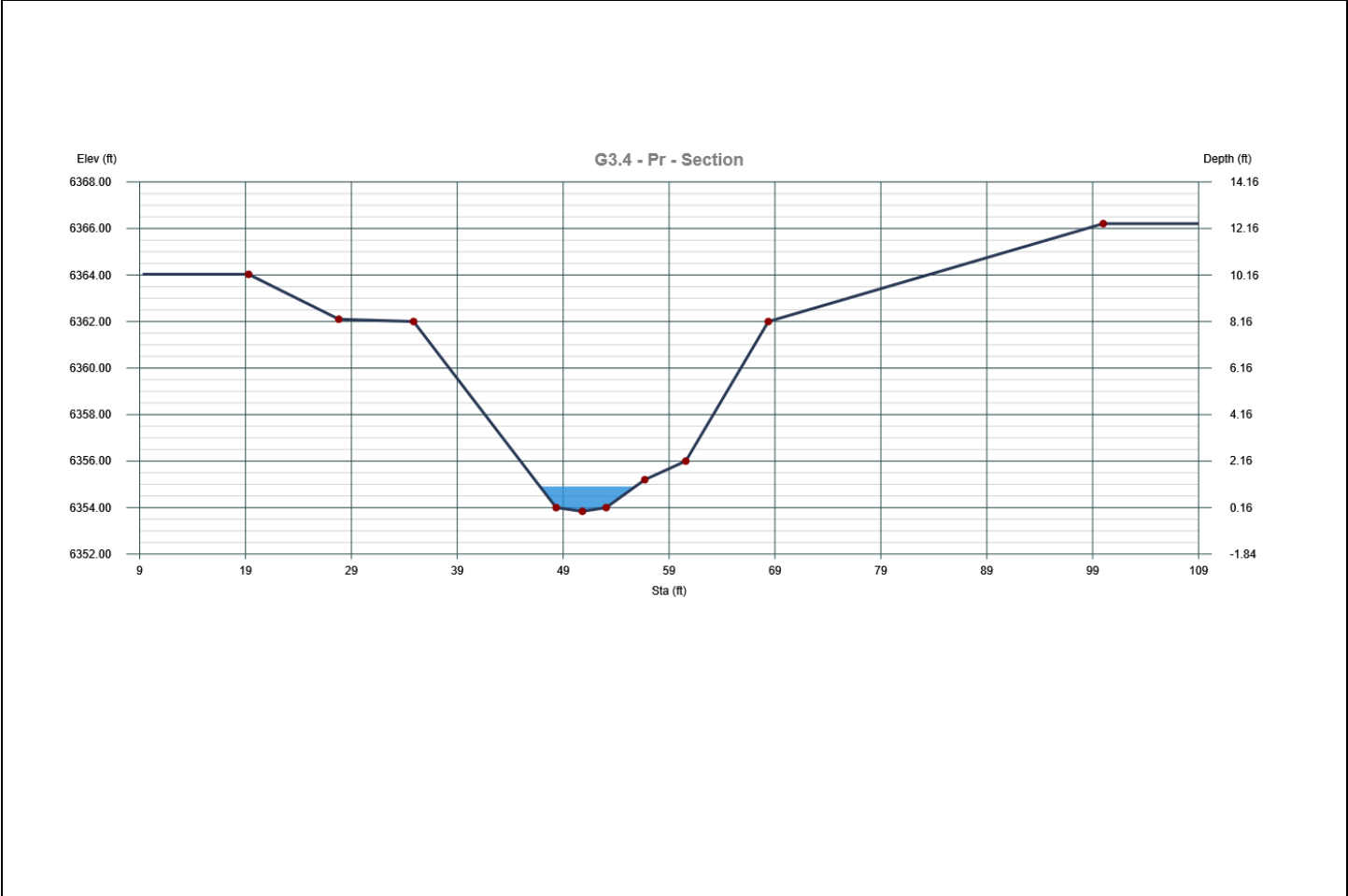
= Known Q

Known Q

= 40.84 cfs

CALCULATION SAMPLE

| Flow  | Depth | Area   | Velocity | WP   | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|-------|-------|--------|----------|------|-----------|------------|---------|---------|-----------|-----------|
| (cfs) | (ft)  | (sqft) | (ft/s)   | (ft) | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 40.84 | 1.05  | 6.45   | 6.33     | 9.32 | 0.030     | 1.22       | 6354.89 | 6355.51 | 1.77      | 8.92      |

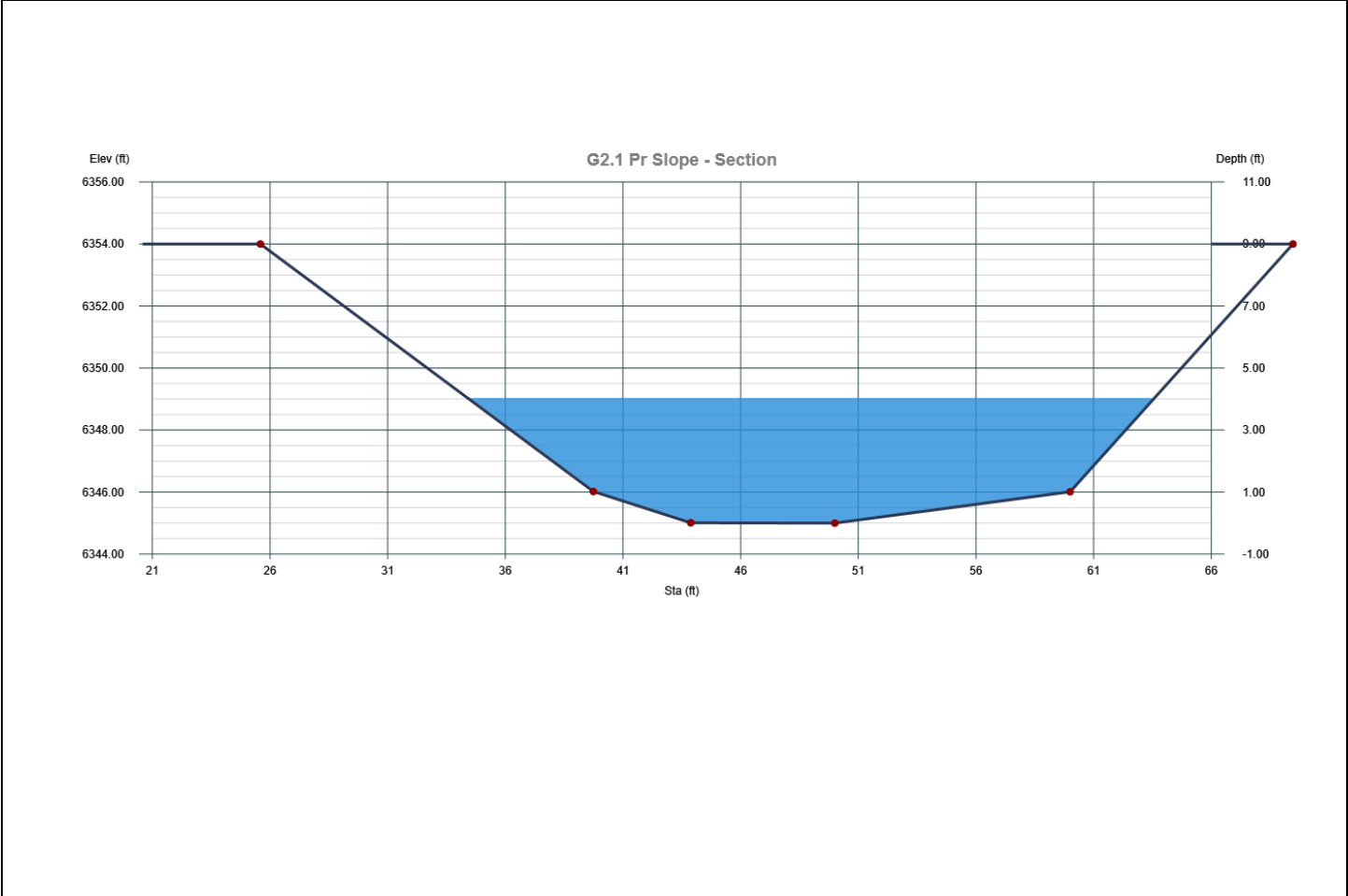


G2.1 Pr Slope

Channel 2

| USER-DEFINED     |              | DISCHARGE |              |
|------------------|--------------|-----------|--------------|
| Total Depth      | = 9.00 ft    | Method    | = Known Q    |
| Invert Elevation | = 6345.00 ft | Known Q   | = 546.25 cfs |
| Channel Slope    | = 0.400 %    |           |              |
| Manning's n      | = Composite  |           |              |

| CALCULATION SAMPLE |       |        |          |       |           |            |         |         |           |           |
|--------------------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| Flow               | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
| (cfs)              | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 546.25             | 4.02  | 87.58  | 6.24     | 31.21 | 0.030     | 3.13       | 6349.02 | 6349.63 | 1.00      | 29.15     |





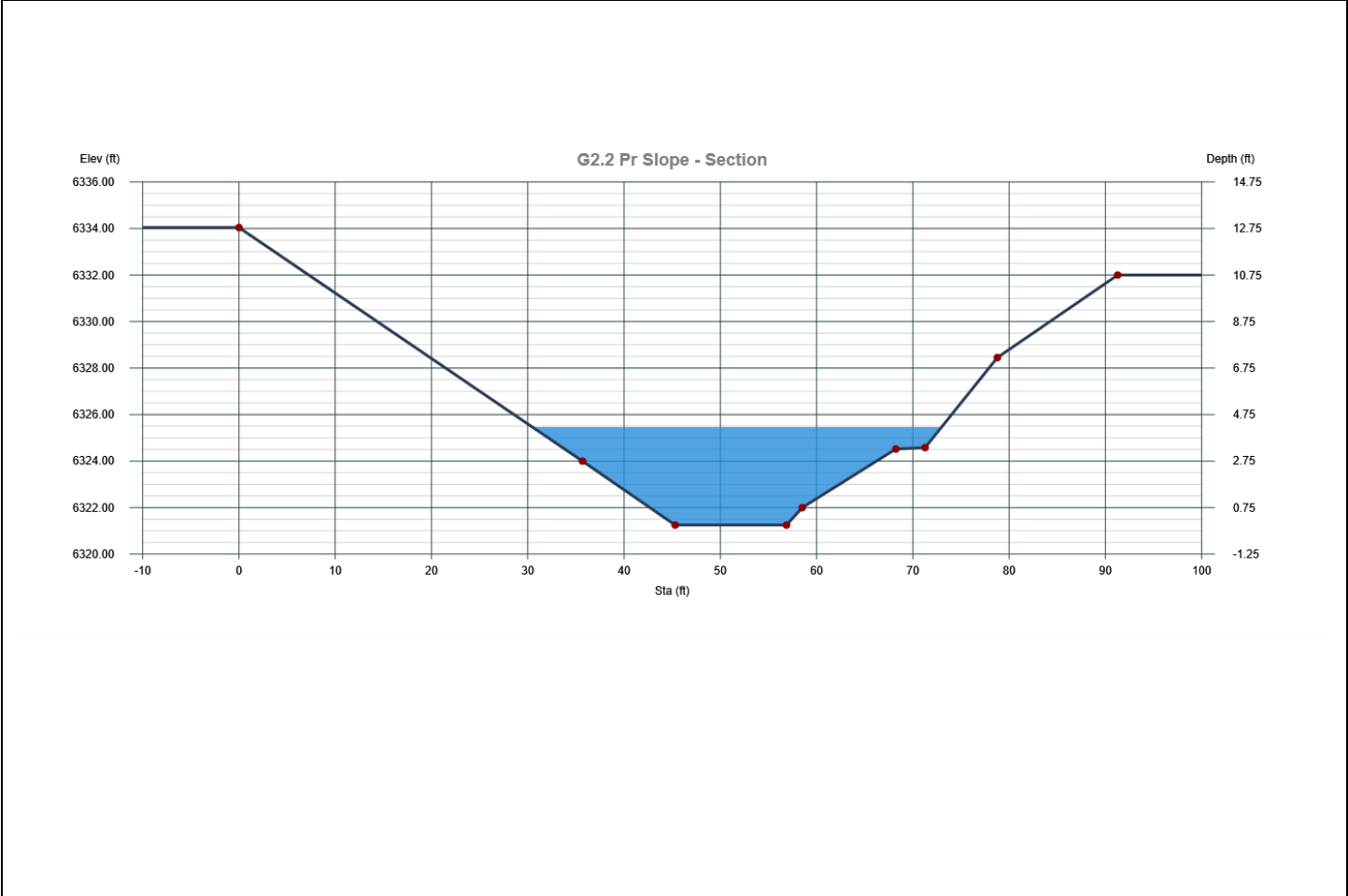
G2.2 Pr Slope

Channel 4

| USER-DEFINED     |              | DISCHARGE |              |
|------------------|--------------|-----------|--------------|
| Total Depth      | = 12.79 ft   | Method    | = Known Q    |
| Invert Elevation | = 6321.25 ft | Known Q   | = 637.99 cfs |
| Channel Slope    | = 0.400 %    |           |              |
| Manning's n      | = Composite  |           |              |

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 637.99 | 4.19  | 110.10 | 5.79     | 43.65 | 0.030     | 3.41       | 6325.44 | 6325.96 | 1.05      | 42.38     |



G1.1 Pr Slope

Channel 2

USER-DEFINED

Total Depth

= 12.00 ft

Invert Elevation

= 6308.00 ft

Channel Slope

= 0.400 %

Manning's n

= Composite

DISCHARGE

Method

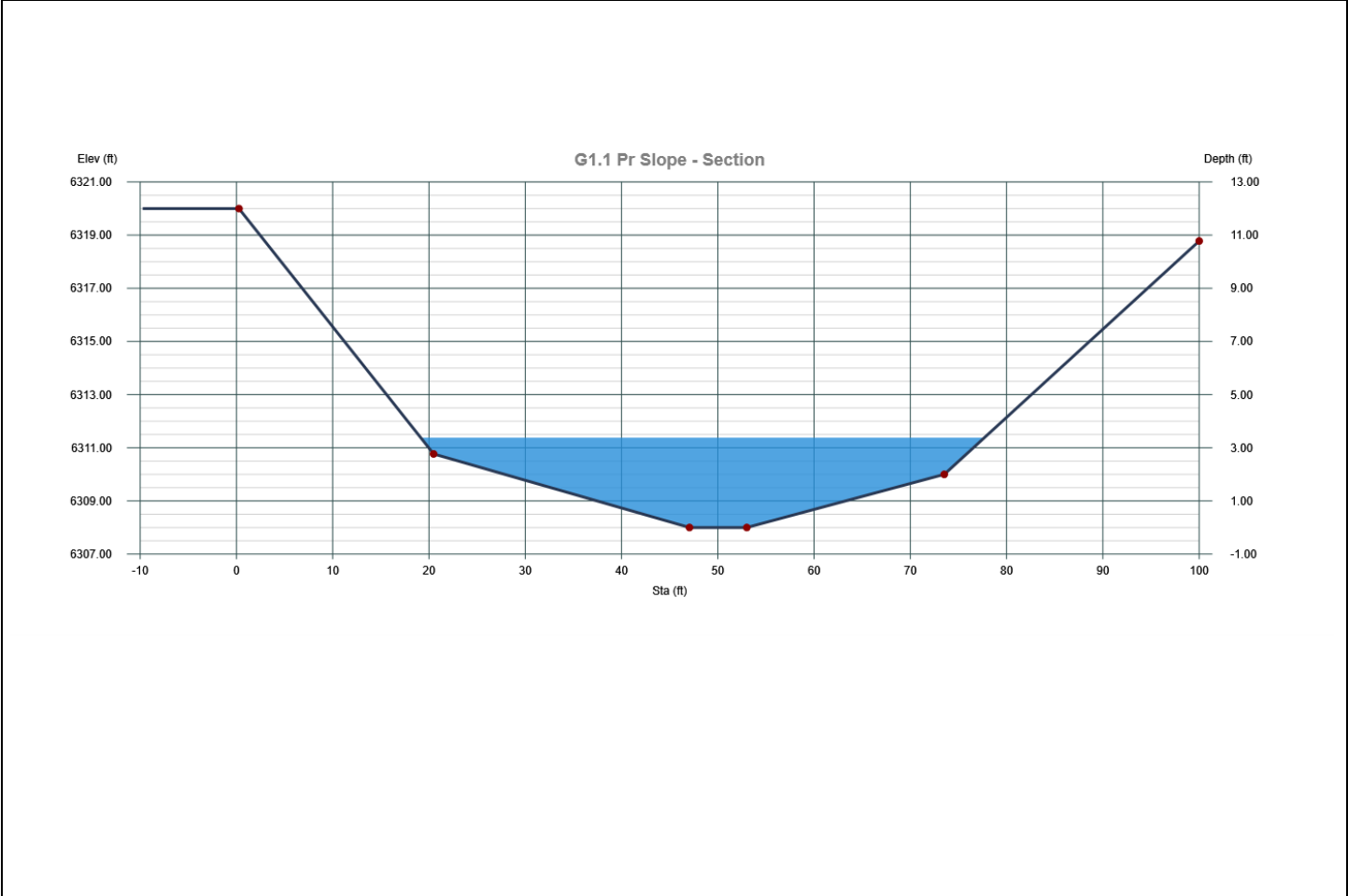
= Known Q

Known Q

= 637.99 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 637.99 | 3.36  | 124.05 | 5.14     | 59.02 | 0.030     | 2.74       | 6311.36 | 6311.77 | 0.84      | 58.43     |



# Channel Report

Project filename: Pr Flow - Swale Sections - 1.0.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-22-2025

## G1.2 Pr Slope

## Channel 4

## USER-DEFINED

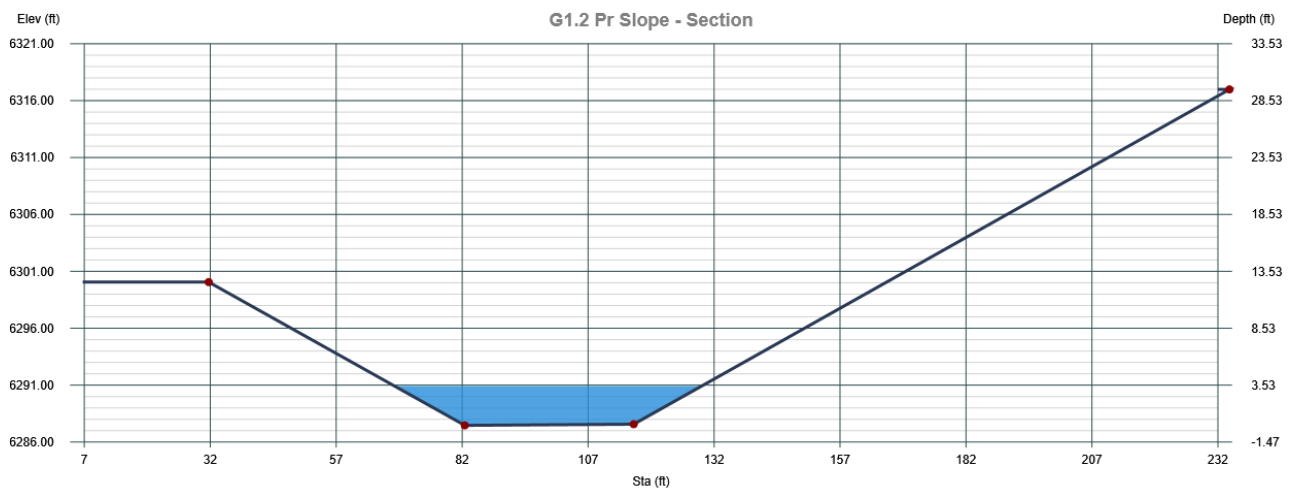
|                  |              |
|------------------|--------------|
| Total Depth      | = 29.52 ft   |
| Invert Elevation | = 6287.47 ft |
| Channel Slope    | = 0.400 %    |
| Manning's n      | = Composite  |

## DISCHARGE

Method = Known Q  
Known Q = 931.48 cfs

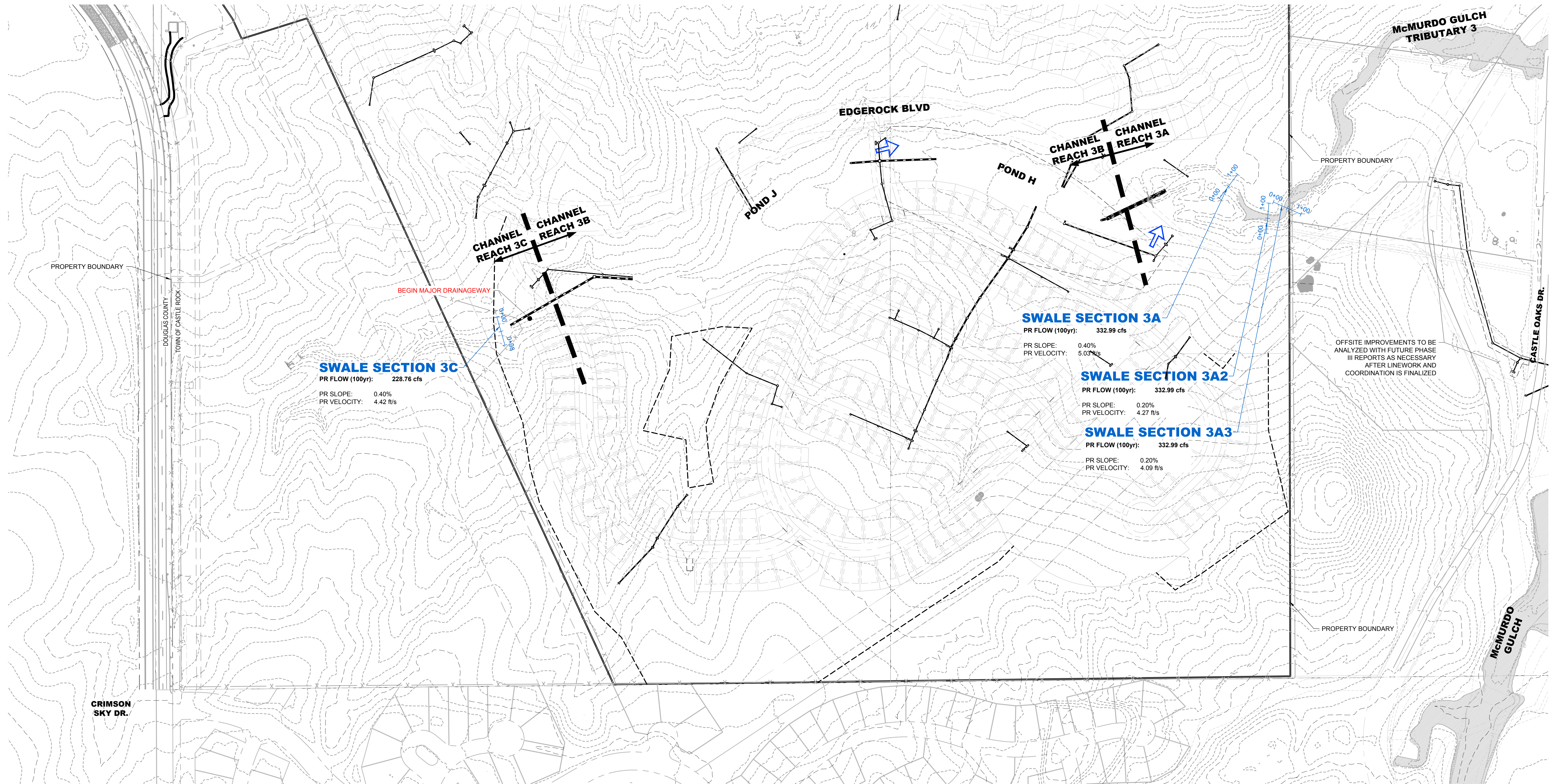
## CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 931.48 | 3.41  | 158.17 | 5.89     | 61.42 | 0.030     | 2.64       | 6290.88 | 6291.42 | 0.85      | 60.60     |





FILE PATH: E:\PROJECTS\230200 - CANYONS FAR SOUTH - CASTLE ROCK CO\03 - DRAWINGS\11 - SDP - DRAINAGE\230200 - SWALE SECTIONS



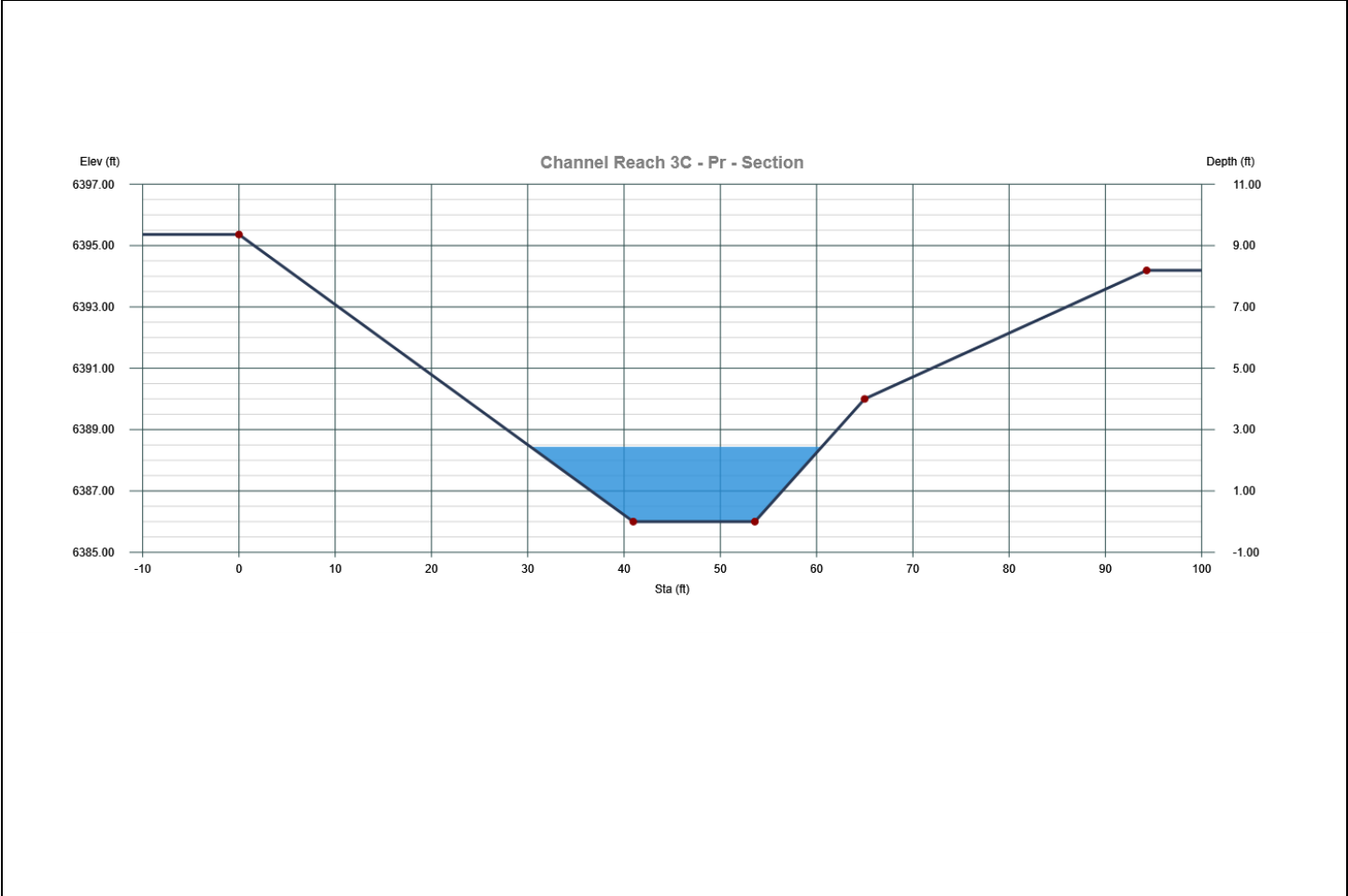


Channel Reach 3C - Pr

Channel 2

| USER-DEFINED     |              | DISCHARGE |              |
|------------------|--------------|-----------|--------------|
| Total Depth      | = 9.36 ft    | Method    | = Known Q    |
| Invert Elevation | = 6386.00 ft | Known Q   | = 228.76 cfs |
| Channel Slope    | = 0.400 %    |           |              |
| Manning's n      | = Composite  |           |              |

| CALCULATION SAMPLE |       |        |          |       |           |            |         |         |           |           |
|--------------------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| Flow               | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
| (cfs)              | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 228.76             | 2.42  | 51.72  | 4.42     | 30.80 | 0.030     | 1.82       | 6388.42 | 6388.72 | 0.60      | 30.12     |



Channel Reach 3A - Pr

Channel 4

USER-DEFINED

Total Depth

= 14.00 ft

Invert Elevation

= 6312.00 ft

Channel Slope

= 0.400 %

Manning's n

= Composite

DISCHARGE

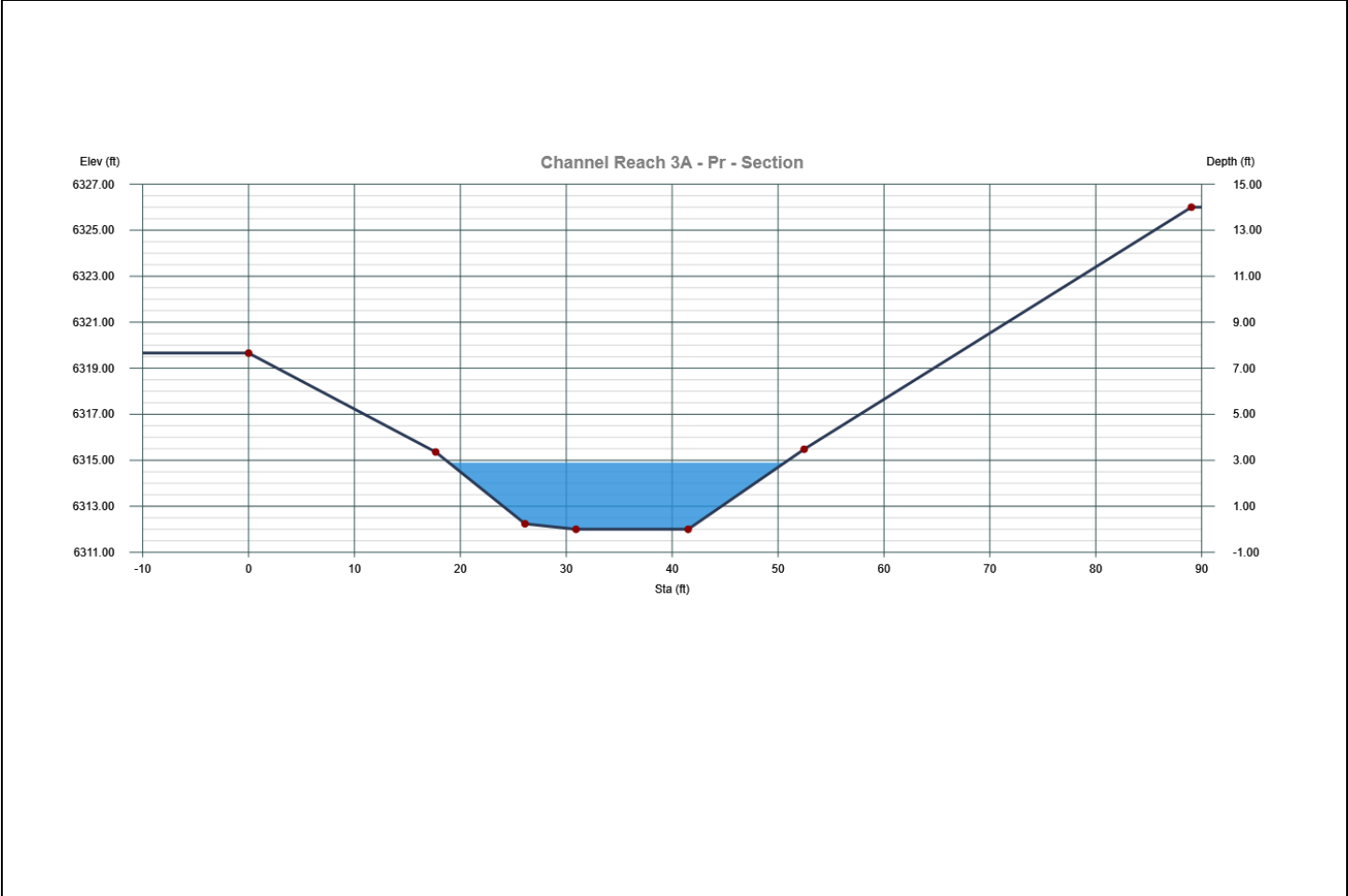
Method

= Known Q

Known Q

= 332.99 cfs

| CALCULATION SAMPLE |       |        |          |       |           |            |         |         |           |           |
|--------------------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| Flow               | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
| (cfs)              | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 332.99             | 2.88  | 66.26  | 5.03     | 32.53 | 0.030     | 2.19       | 6314.88 | 6315.27 | 0.72      | 31.60     |



Channel Reach 3A2 - Pr

Channel 6

USER-DEFINED

Total Depth

= 19.20 ft

Invert Elevation

= 6312.00 ft

Channel Slope

= 0.200 %

Manning's n

= Composite

DISCHARGE

Method

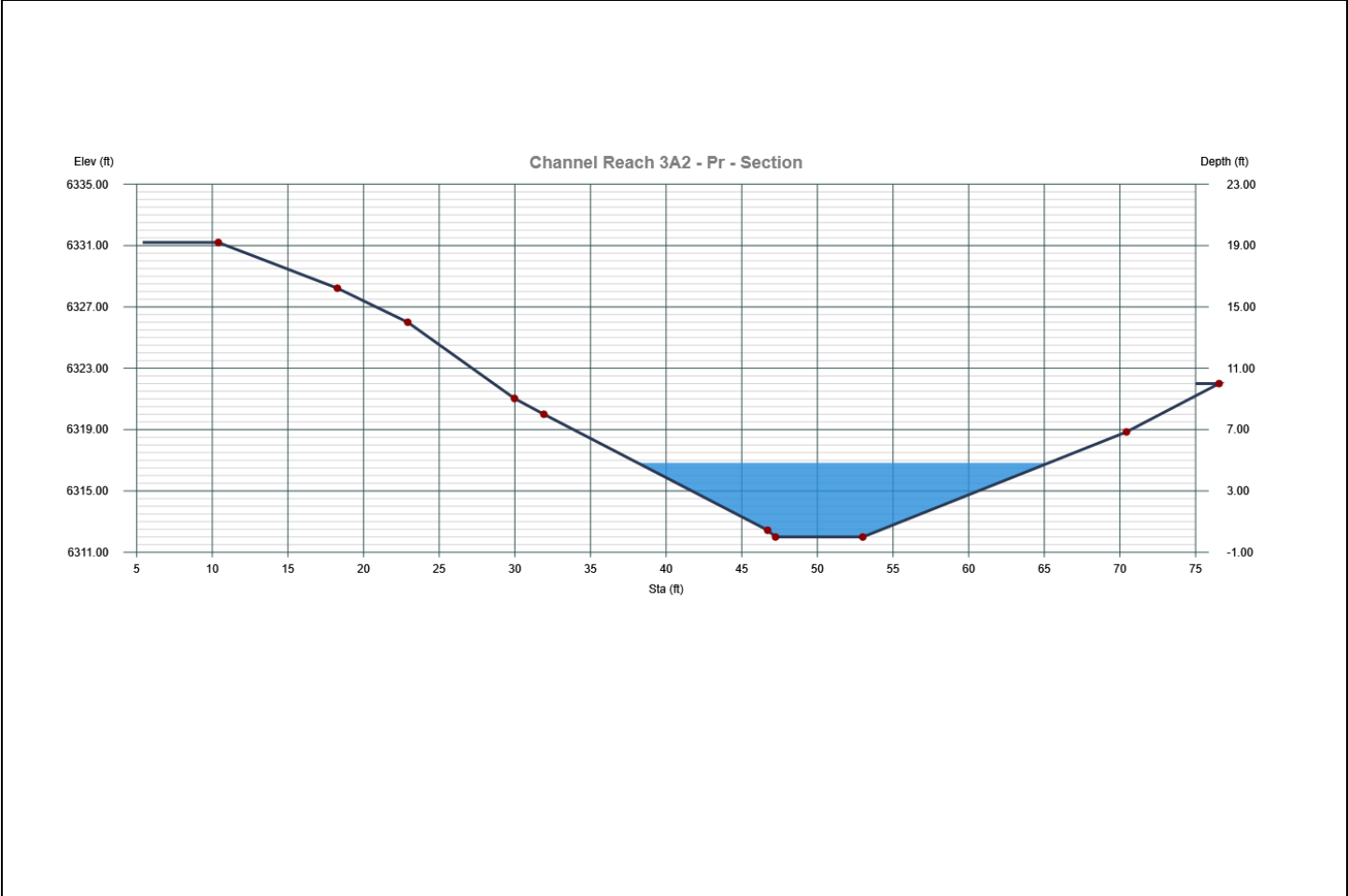
= Known Q

Known Q

= 332.99 cfs

CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
|--------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 332.99 | 4.80  | 77.98  | 4.27     | 29.15 | 0.030     | 3.23       | 6316.80 | 6317.08 | 0.60      | 27.03     |





Channel Reach 3A3 - Pr

Channel 8

USER-DEFINED

Total Depth

= 13.36 ft

Invert Elevation

= 6311.68 ft

Channel Slope

= 0.200 %

Manning's n

= Composite

DISCHARGE

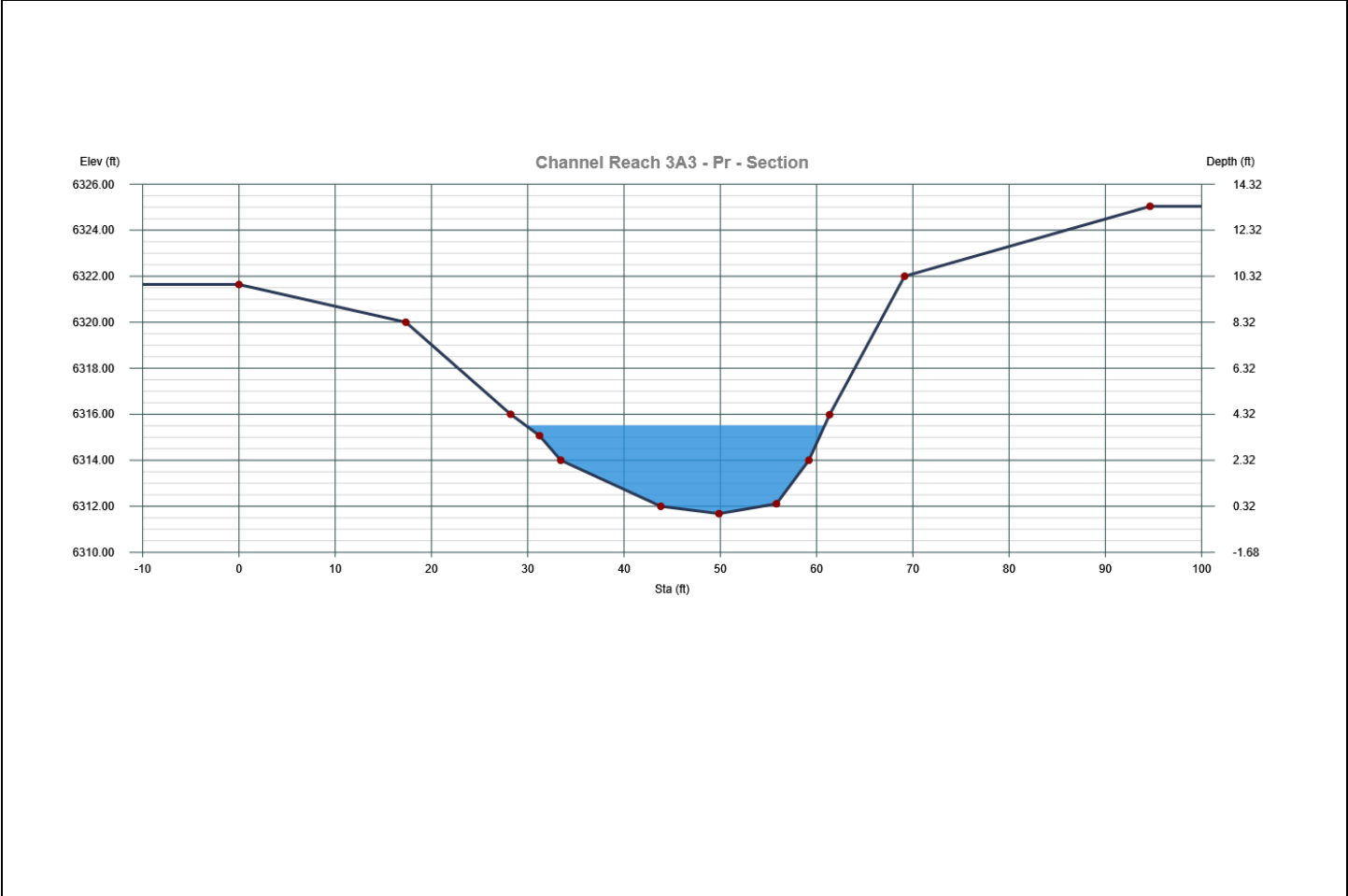
Method

= Known Q

Known Q

= 332.99 cfs

| CALCULATION SAMPLE |       |        |          |       |           |            |         |         |           |           |
|--------------------|-------|--------|----------|-------|-----------|------------|---------|---------|-----------|-----------|
| Flow               | Depth | Area   | Velocity | WP    | n-value   | Crit Depth | HGL     | EGL     | Max Shear | Top Width |
| (cfs)              | (ft)  | (sqft) | (ft/s)   | (ft)  | Composite | (ft)       | (ft)    | (ft)    | (lb/sqft) | (ft)      |
| 332.99             | 3.82  | 81.50  | 4.09     | 32.60 | 0.030     | 2.55       | 6315.50 | 6315.76 | 0.48      | 31.00     |



# Channel Report

Project filename: Trib B - Prelim Low Flow.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-11-2025

## Trib B Low Flow #4 - CR B4 to B3 - Rundown - 2yr Storm

## Channel 1

### TRAPEZOIDAL

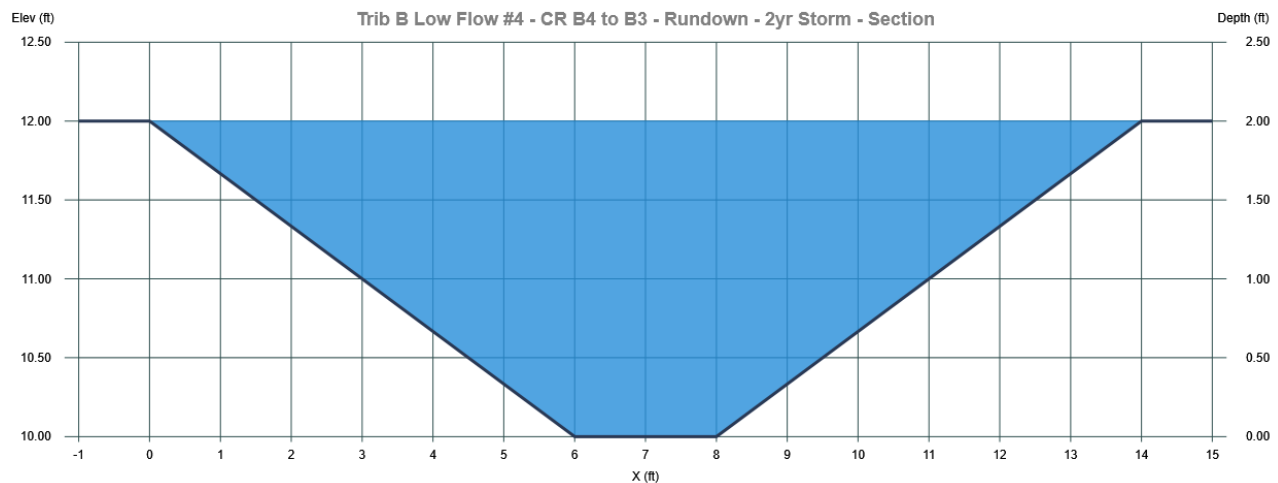
Bottom Width = 2.00 ft  
Side Slope Left, z:1 = 3.00  
Side Slope Right, z:1 = 3.00  
Total Depth = 2.00 ft  
Invert Elevation = 10.00 ft  
Channel Slope = 3.000 %  
Manning's n = 0.030

### DISCHARGE

Method = Known Depth  
known Depth = 2.00 ft

### CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value | Crit Depth | HGL   | EGL   | Max Shear | Top Width |
|--------|-------|--------|----------|-------|---------|------------|-------|-------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  |         | (ft)       | (ft)  | (ft)  | (lb/sqft) | (ft)      |
| 145.59 | 2.00  | 16.00  | 9.10     | 14.65 | 0.030   | 2.00       | 12.00 | 13.29 | 3.74      | 14.00     |



# Channel Report

Project filename: Trib B - Prelim Low Flow.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-11-2025

## Trib B Low Flow #4 - CR B4 to B3 - Grade Control - 2yr Storm

## Channel 2

### TRAPEZOIDAL

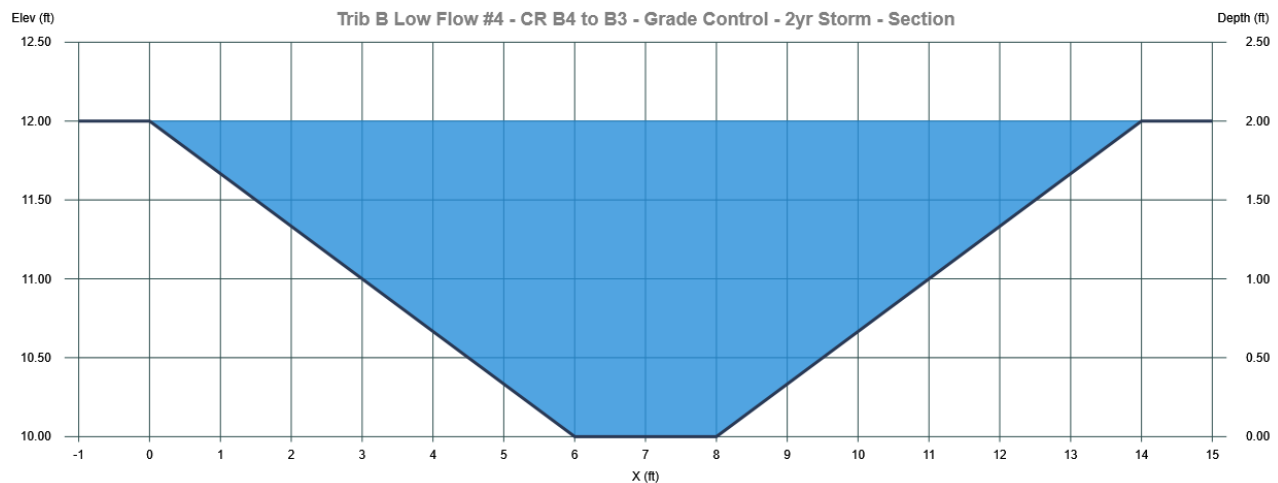
Bottom Width = 2.00 ft  
Side Slope Left, z:1 = 3.00  
Side Slope Right, z:1 = 3.00  
Total Depth = 2.00 ft  
Invert Elevation = 10.00 ft  
Channel Slope = 0.400 %  
Manning's n = 0.030

### DISCHARGE

Method = Known Depth  
known Depth = 2.00 ft

### CALCULATION SAMPLE

| Flow  | Depth | Area   | Velocity | WP    | n-value | Crit Depth | HGL   | EGL   | Max Shear | Top Width |
|-------|-------|--------|----------|-------|---------|------------|-------|-------|-----------|-----------|
| (cfs) | (ft)  | (sqft) | (ft/s)   | (ft)  |         | (ft)       | (ft)  | (ft)  | (lb/sqft) | (ft)      |
| 53.16 | 2.00  | 16.00  | 3.32     | 14.65 | 0.030   | 1.52       | 12.00 | 12.17 | 0.50      | 14.00     |



# Channel Report

Project filename: Trib B - Prelim Low Flow.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-11-2025

## Trib B Low Flow #3 - CR B3 to B1 - Rundown - 2yr Storm

## Channel 3

### TRAPEZOIDAL

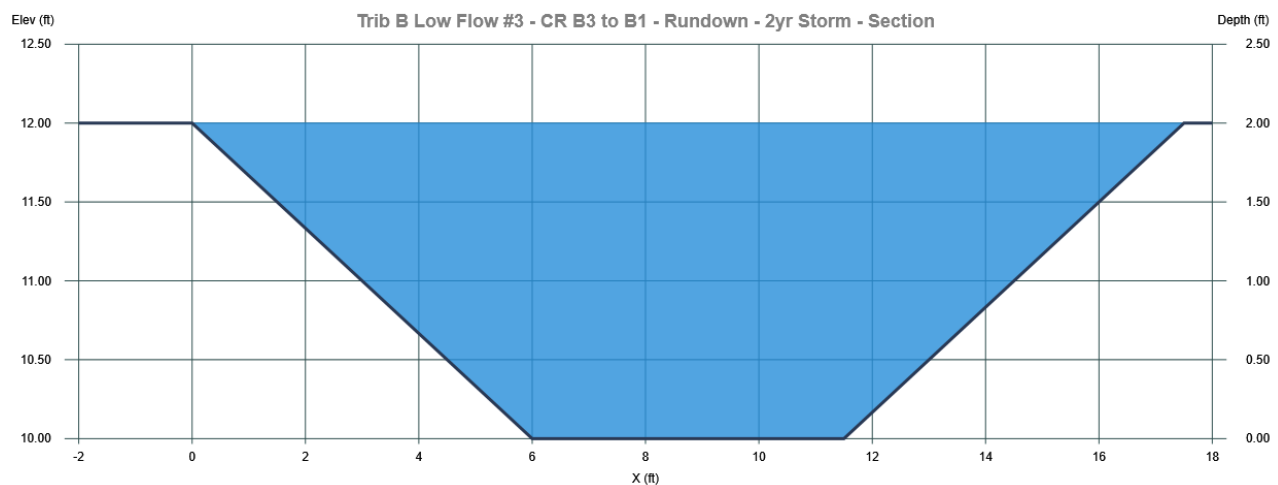
Bottom Width = 5.50 ft  
Side Slope Left, z:1 = 3.00  
Side Slope Right, z:1 = 3.00  
Total Depth = 2.00 ft  
Invert Elevation = 10.00 ft  
Channel Slope = 3.000 %  
Manning's n = 0.030

### DISCHARGE

Method = Known Depth  
known Depth = 2.00 ft

### CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | WP    | n-value | Crit Depth | HGL   | EGL   | Max Shear | Top Width |
|--------|-------|--------|----------|-------|---------|------------|-------|-------|-----------|-----------|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)  |         | (ft)       | (ft)  | (ft)  | (lb/sqft) | (ft)      |
| 231.10 | 2.00  | 23.00  | 10.05    | 18.15 | 0.030   | 2.00       | 12.00 | 13.57 | 3.74      | 17.50     |





# Channel Report

Project filename: Trib B - Prelim Low Flow.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-11-2025

## Trib B Low Flow #2 - CR B3 to B1 - Grade Control - 2yr Storm

## Channel 4

### TRAPEZOIDAL

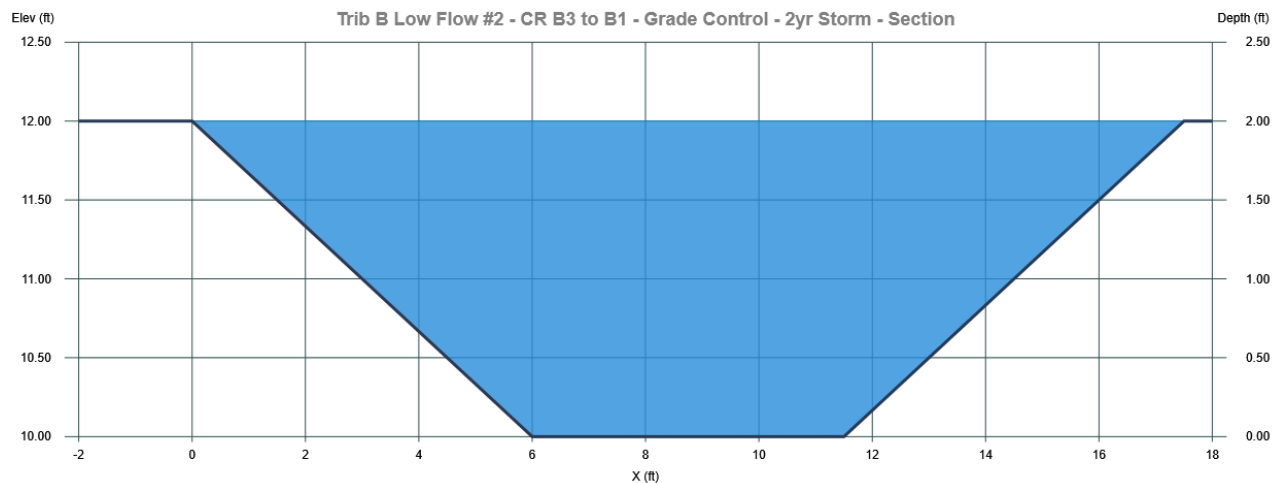
Bottom Width = 5.50 ft  
Side Slope Left, z:1 = 3.00  
Side Slope Right, z:1 = 3.00  
Total Depth = 2.00 ft  
Invert Elevation = 10.00 ft  
Channel Slope = 0.400 %  
Manning's n = 0.030

### DISCHARGE

Method = Known Depth  
known Depth = 2.00 ft

### CALCULATION SAMPLE

| Flow  | Depth | Area   | Velocity | WP    | n-value | Crit Depth | HGL   | EGL   | Max Shear | Top Width |
|-------|-------|--------|----------|-------|---------|------------|-------|-------|-----------|-----------|
| (cfs) | (ft)  | (sqft) | (ft/s)   | (ft)  |         | (ft)       | (ft)  | (ft)  | (lb/sqft) | (ft)      |
| 84.39 | 2.00  | 23.00  | 3.67     | 18.15 | 0.030   | 1.49       | 12.00 | 12.21 | 0.50      | 17.50     |



# Channel Report

Project filename: Trib B - Prelim Low Flow.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-11-2025

## Trib B Low Flow #1 - CR B0 - Rundown - 2yr Storm

## Channel 5

### TRAPEZOIDAL

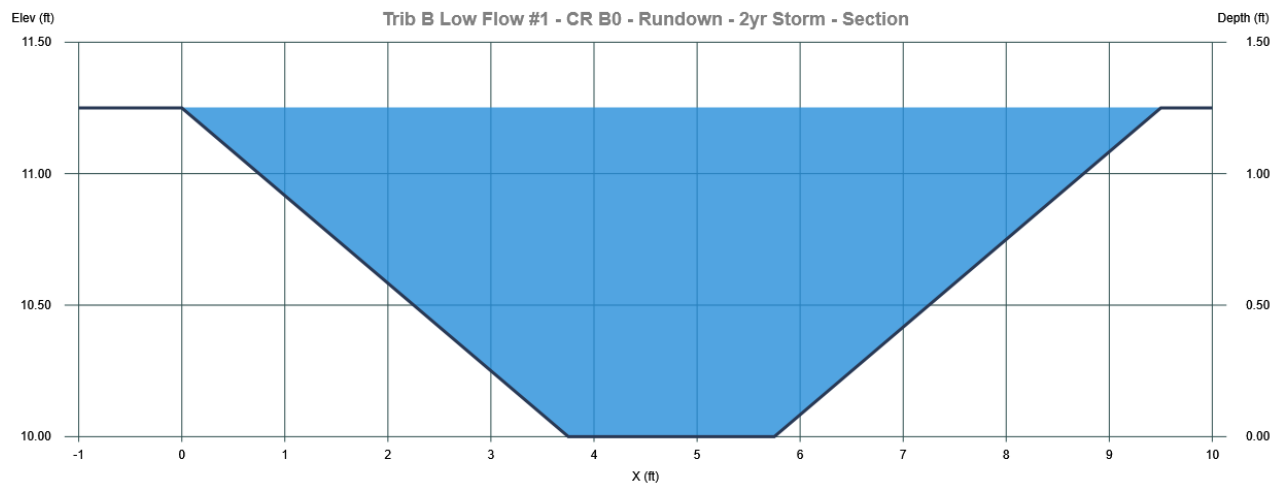
Bottom Width = 2.00 ft  
Side Slope Left, z:1 = 3.00  
Side Slope Right, z:1 = 3.00  
Total Depth = 1.25 ft  
Invert Elevation = 10.00 ft  
Channel Slope = 3.000 %  
Manning's n = 0.030

### DISCHARGE

Method = Known Depth  
known Depth = 1.25 ft

### CALCULATION SAMPLE

| Flow  | Depth | Area   | Velocity | WP   | n-value | Crit Depth | HGL   | EGL   | Max Shear | Top Width |
|-------|-------|--------|----------|------|---------|------------|-------|-------|-----------|-----------|
| (cfs) | (ft)  | (sqft) | (ft/s)   | (ft) |         | (ft)       | (ft)  | (ft)  | (lb/sqft) | (ft)      |
| 49.79 | 1.25  | 7.19   | 6.93     | 9.91 | 0.030   | 1.25       | 11.25 | 12.00 | 2.34      | 9.50      |



# Channel Report

Project filename: Trib B - Prelim Low Flow.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-11-2025

## Trib B Low Flow #1 - CR B0 - Grade Control - 2yr Storm

## Channel 6

### TRAPEZOIDAL

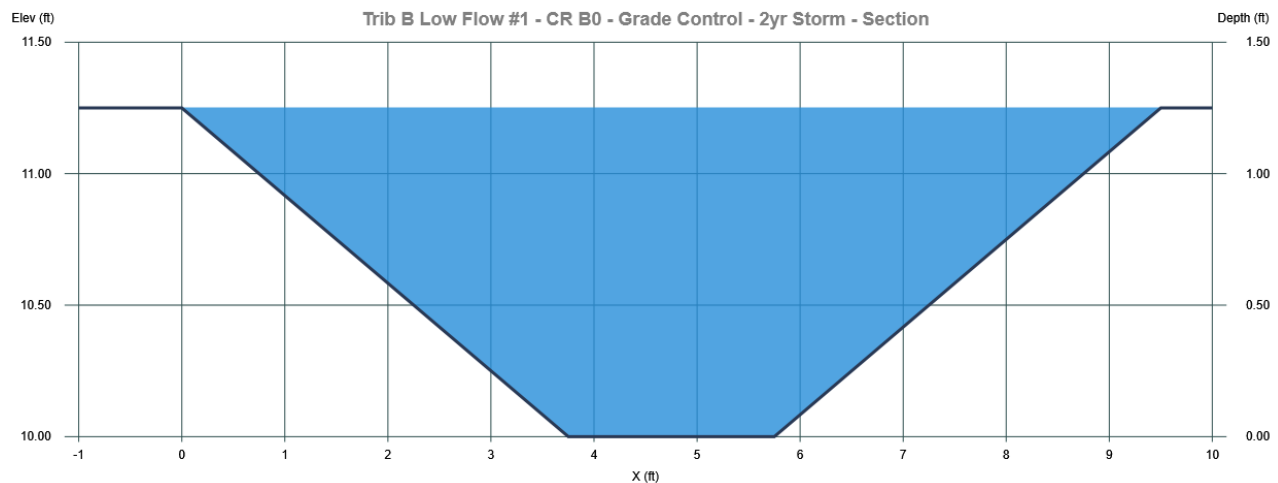
Bottom Width = 2.00 ft  
Side Slope Left, z:1 = 3.00  
Side Slope Right, z:1 = 3.00  
Total Depth = 1.25 ft  
Invert Elevation = 10.00 ft  
Channel Slope = 0.400 %  
Manning's n = 0.030

### DISCHARGE

Method = Known Depth  
known Depth = 1.25 ft

### CALCULATION SAMPLE

| Flow  | Depth | Area   | Velocity | WP   | n-value | Crit Depth | HGL   | EGL   | Max Shear | Top Width |
|-------|-------|--------|----------|------|---------|------------|-------|-------|-----------|-----------|
| (cfs) | (ft)  | (sqft) | (ft/s)   | (ft) |         | (ft)       | (ft)  | (ft)  | (lb/sqft) | (ft)      |
| 18.18 | 1.25  | 7.19   | 2.53     | 9.91 | 0.030   | 0.91       | 11.25 | 11.35 | 0.31      | 9.50      |



# Channel Report

Project filename: Trib B - Prelim Low Flow.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-11-2025

## Trib 3 Low Flow #1 - CR 3A - Rundown - 2yr Storm

## Channel 7

### TRAPEZOIDAL

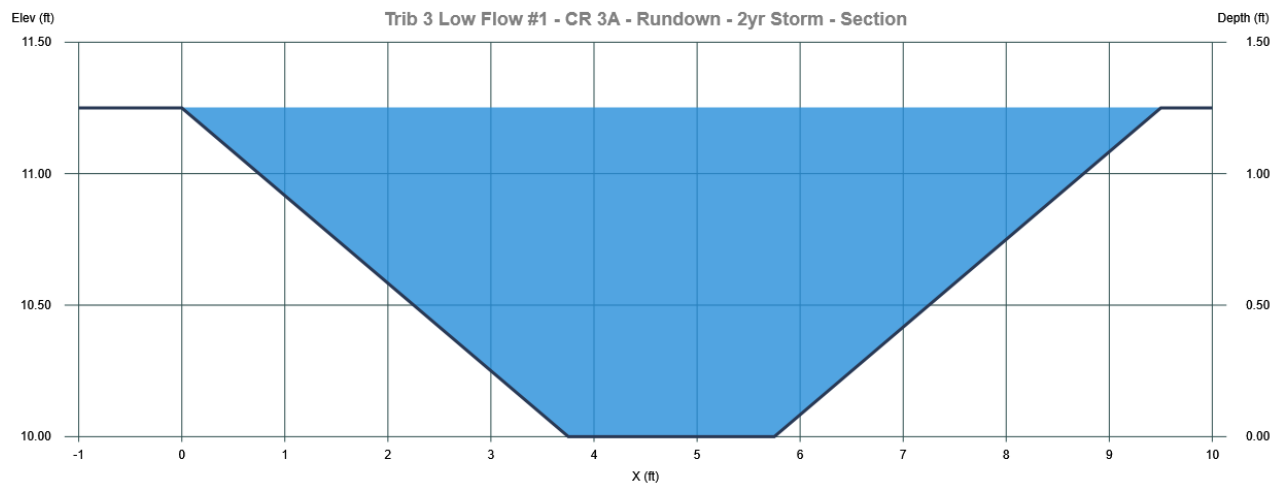
Bottom Width = 2.00 ft  
Side Slope Left, z:1 = 3.00  
Side Slope Right, z:1 = 3.00  
Total Depth = 1.25 ft  
Invert Elevation = 10.00 ft  
Channel Slope = 3.000 %  
Manning's n = 0.030

### DISCHARGE

Method = Known Depth  
known Depth = 1.25 ft

### CALCULATION SAMPLE

| Flow  | Depth | Area   | Velocity | WP   | n-value | Crit Depth | HGL   | EGL   | Max Shear | Top Width |
|-------|-------|--------|----------|------|---------|------------|-------|-------|-----------|-----------|
| (cfs) | (ft)  | (sqft) | (ft/s)   | (ft) |         | (ft)       | (ft)  | (ft)  | (lb/sqft) | (ft)      |
| 49.79 | 1.25  | 7.19   | 6.93     | 9.91 | 0.030   | 1.25       | 11.25 | 12.00 | 2.34      | 9.50      |





# Channel Report

Project filename: Trib B - Prelim Low Flow.stx

Studio Express by Hydrology Studio v 1.0.0.18

07-11-2025

## Trib 3 Low Flow #1 - CR 3A - Grade Control - 2yr Storm

## Channel 8

### TRAPEZOIDAL

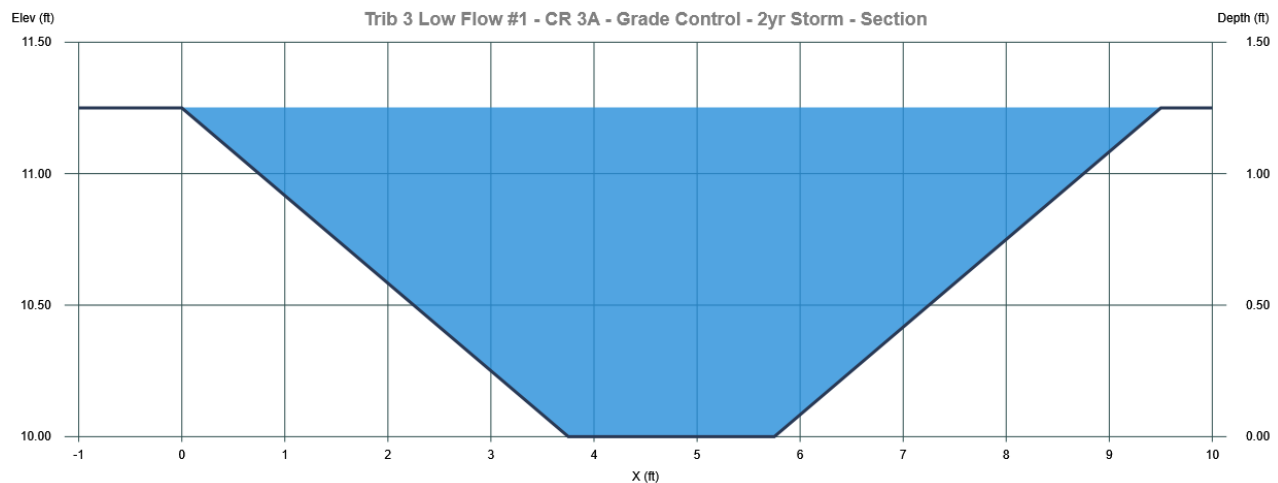
Bottom Width = 2.00 ft  
Side Slope Left, z:1 = 3.00  
Side Slope Right, z:1 = 3.00  
Total Depth = 1.25 ft  
Invert Elevation = 10.00 ft  
Channel Slope = 0.400 %  
Manning's n = 0.030

### DISCHARGE

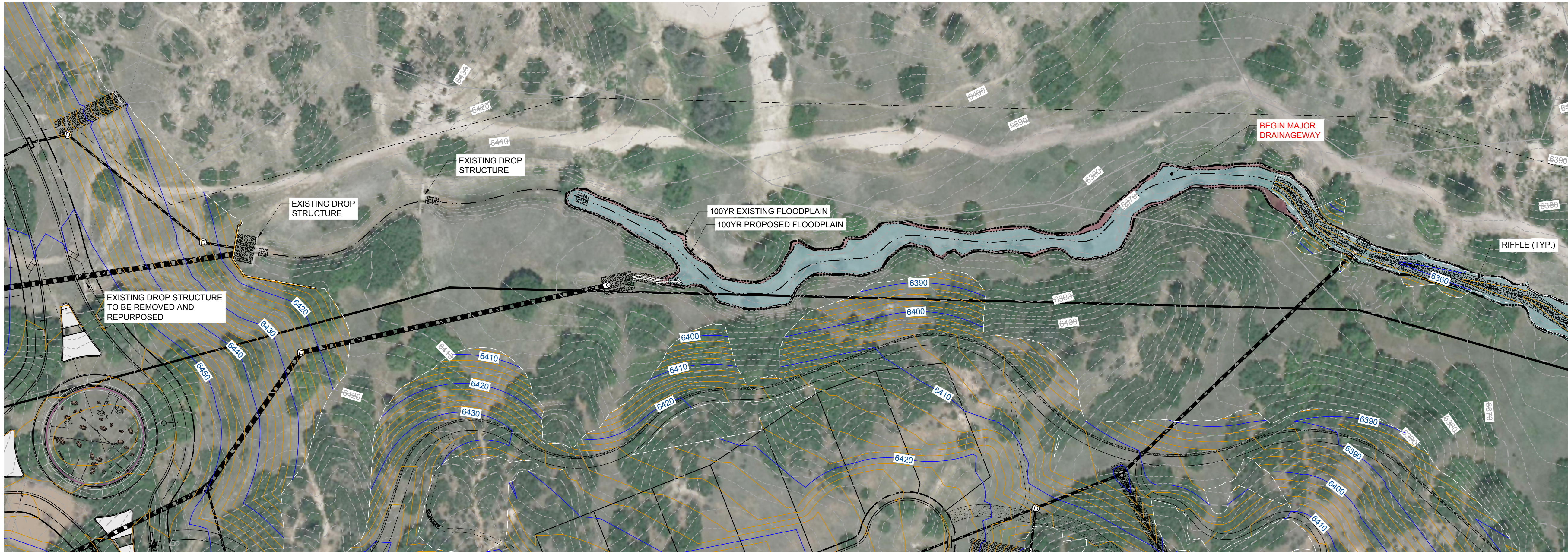
Method = Known Depth  
known Depth = 1.25 ft

### CALCULATION SAMPLE

| Flow  | Depth | Area   | Velocity | WP   | n-value | Crit Depth | HGL   | EGL   | Max Shear | Top Width |
|-------|-------|--------|----------|------|---------|------------|-------|-------|-----------|-----------|
| (cfs) | (ft)  | (sqft) | (ft/s)   | (ft) |         | (ft)       | (ft)  | (ft)  | (lb/sqft) | (ft)      |
| 18.18 | 1.25  | 7.19   | 2.53     | 9.91 | 0.030   | 0.91       | 11.25 | 11.35 | 0.31      | 9.50      |



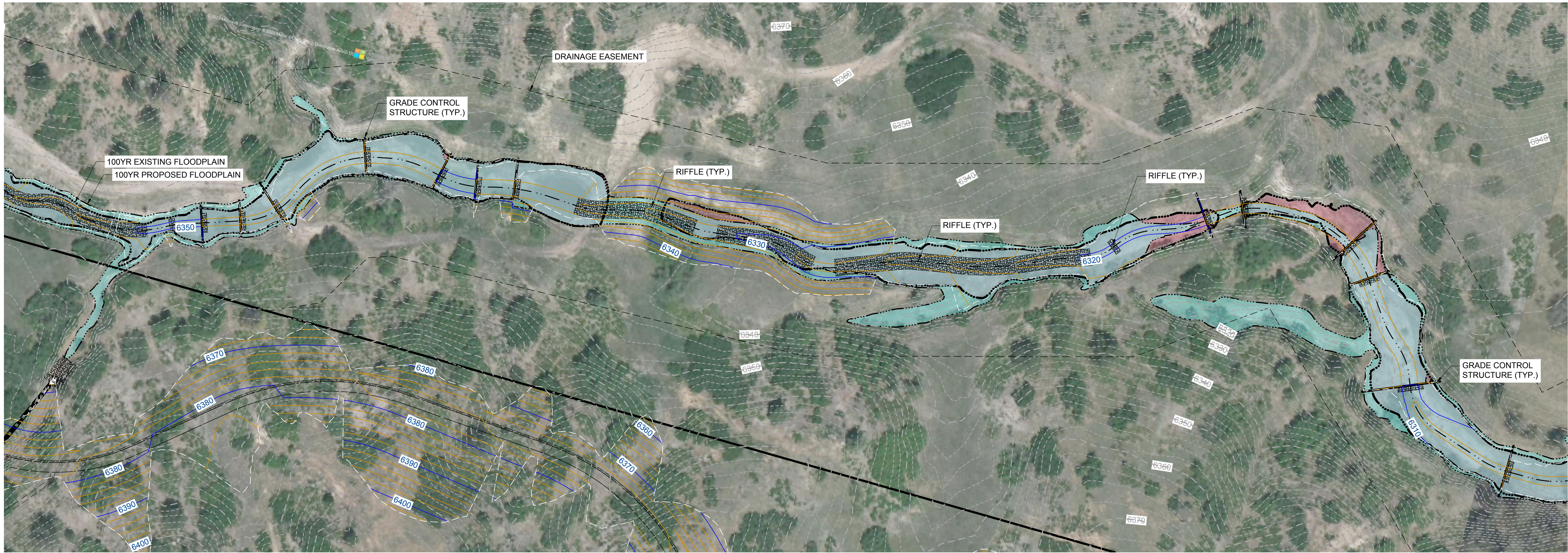




- PROPOSED 100YR FLOODPLAIN
- EFFECTIVE EXISTING 100YR FLOODPLAIN
- OVERLAPPING 100YR FLOODPLAIN
- FEMA FIRM EXISTING FLOODPLAIN

SEE BELOW LEFT

TRIBUTARY B



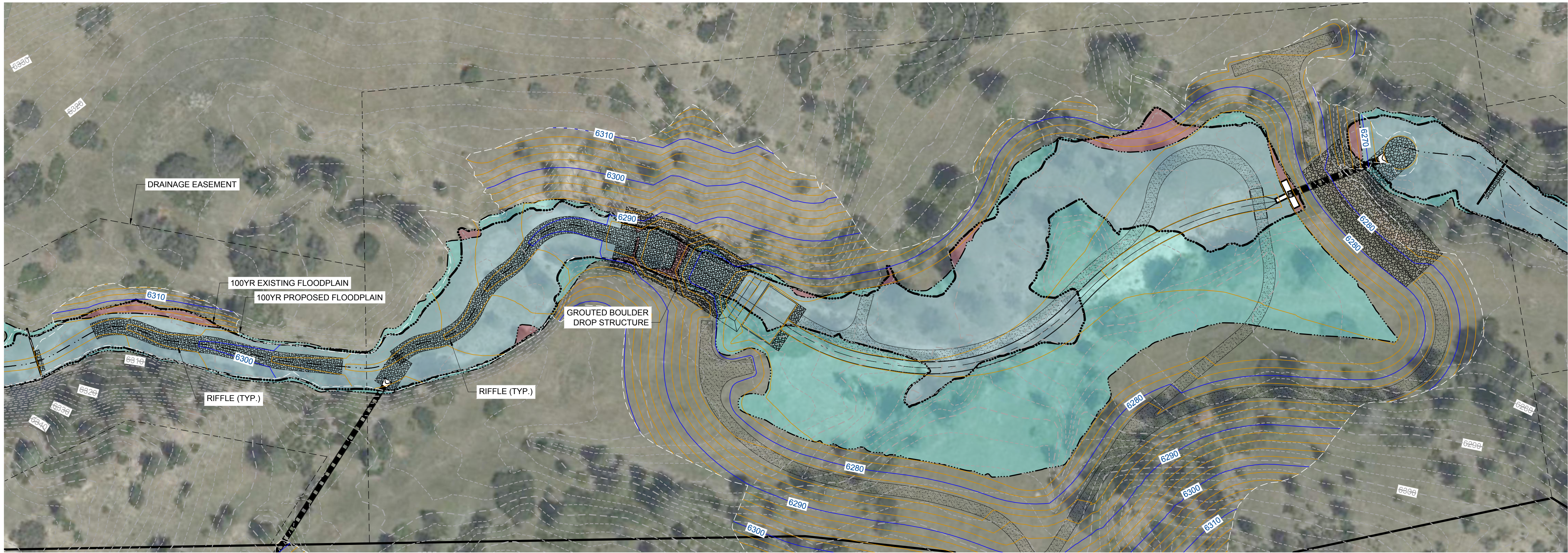
FLOODPLAIN WORKMAP TRIBUTARY B

SEE SHEET X2

TRIBUTARY B



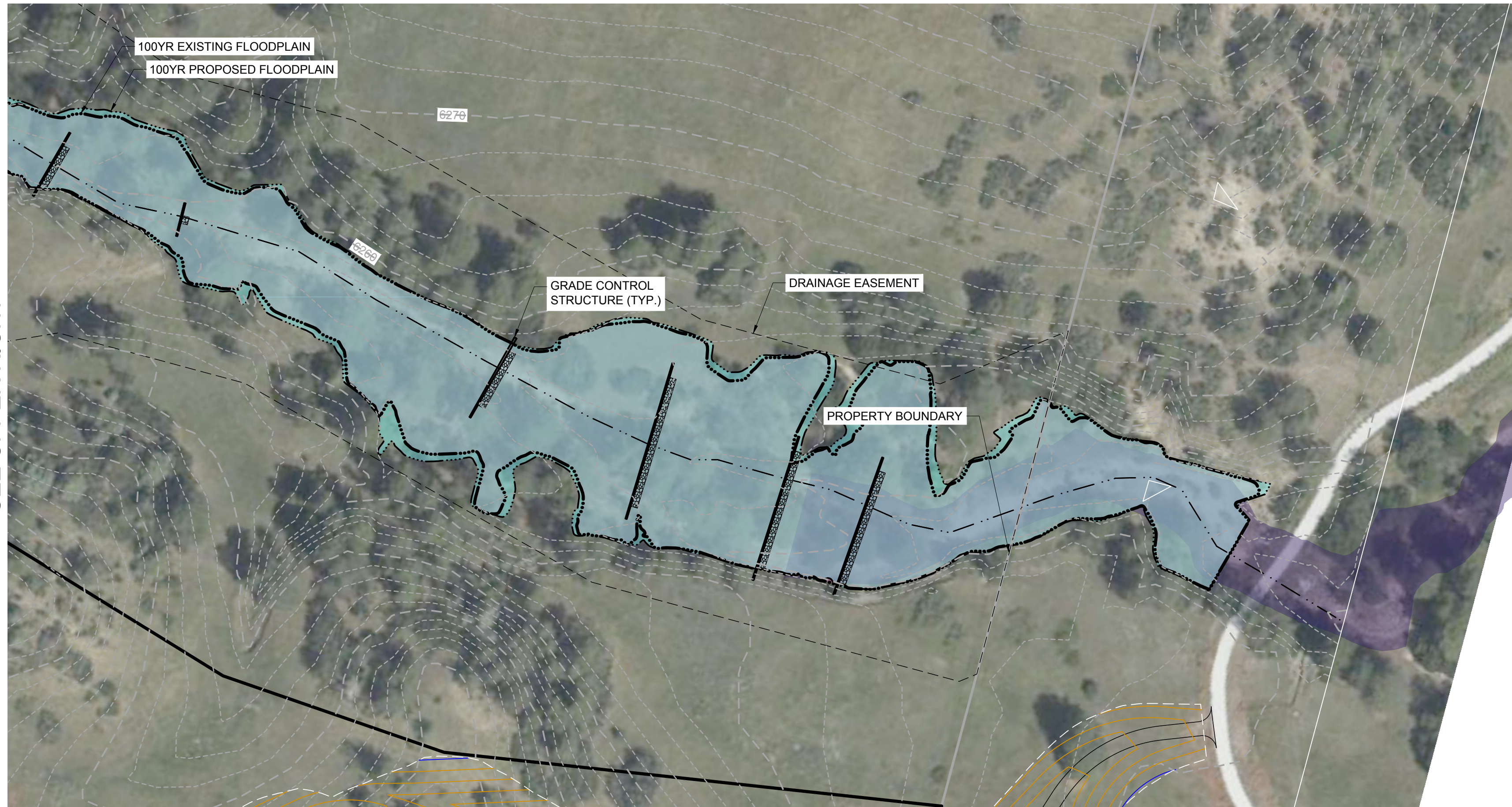
SEE SHEET X1



TRIBUTARY B

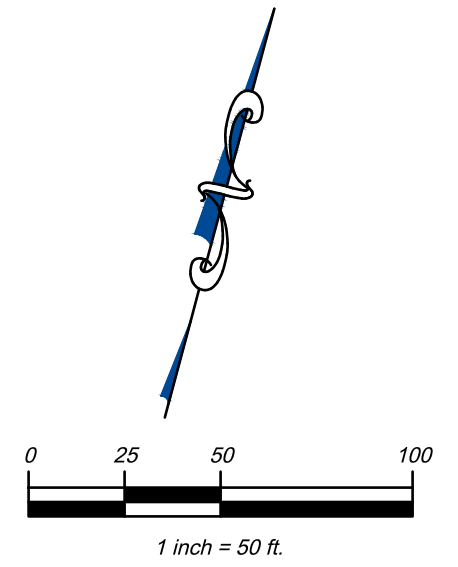
SEE BELOW LEFT

SEE UPPER RIGHT

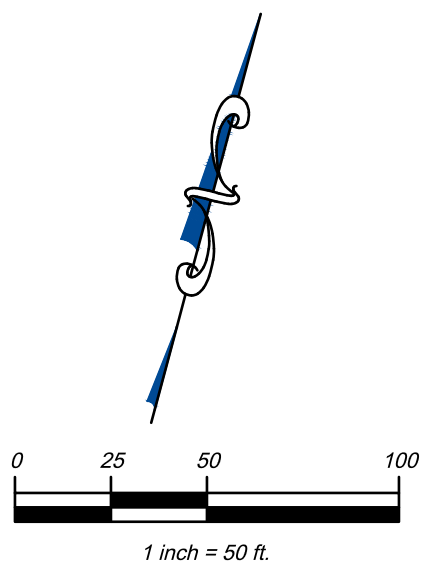


TRIBUTARY B

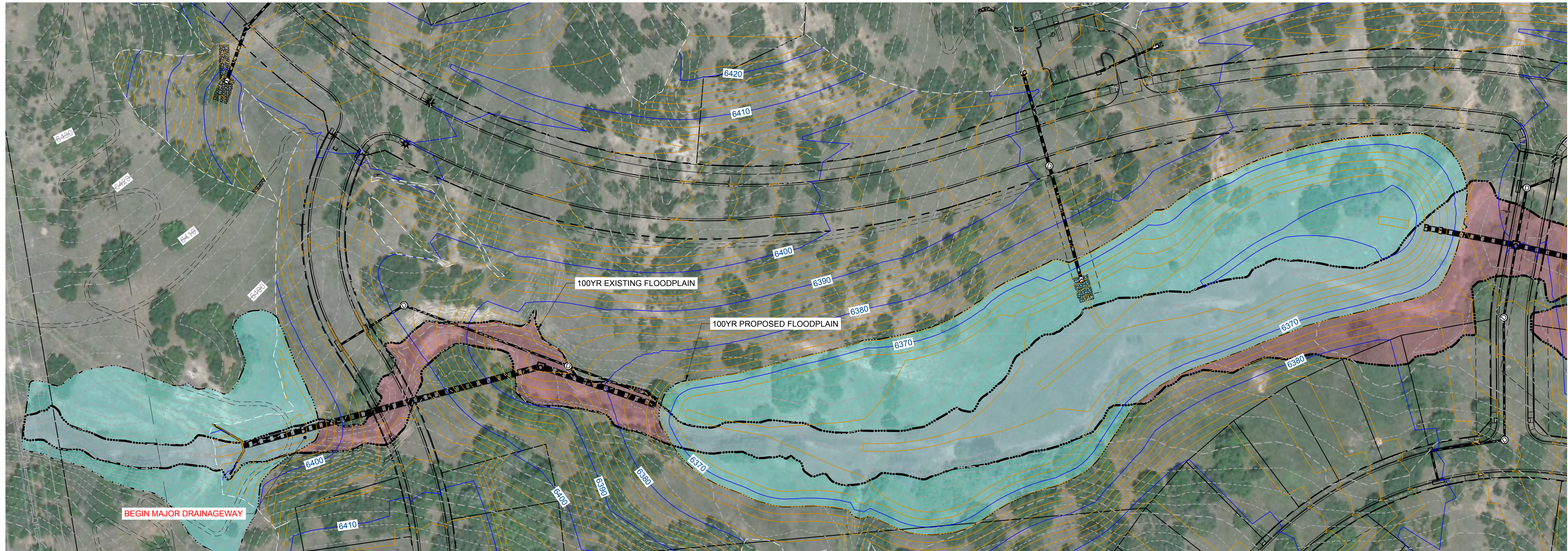
- PROPOSED 100YR FLOODPLAIN
- EFFECTIVE EXISTING 100YR FLOODPLAIN
- OVERLAPING 100YR FLOODPLAIN
- FEMA FIRM EXISTING FLOODPLAIN



FLOODPLAIN  
WORKMAP  
TRIBUTARY B

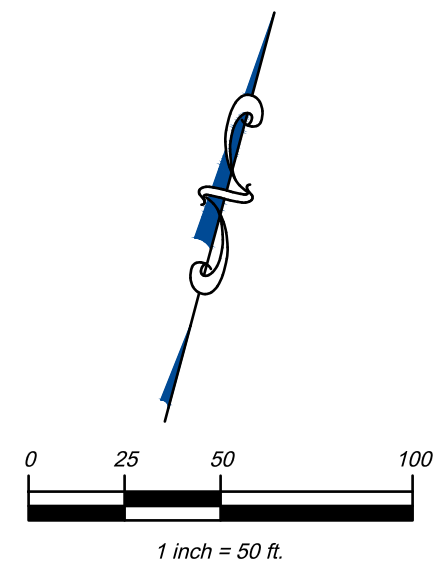




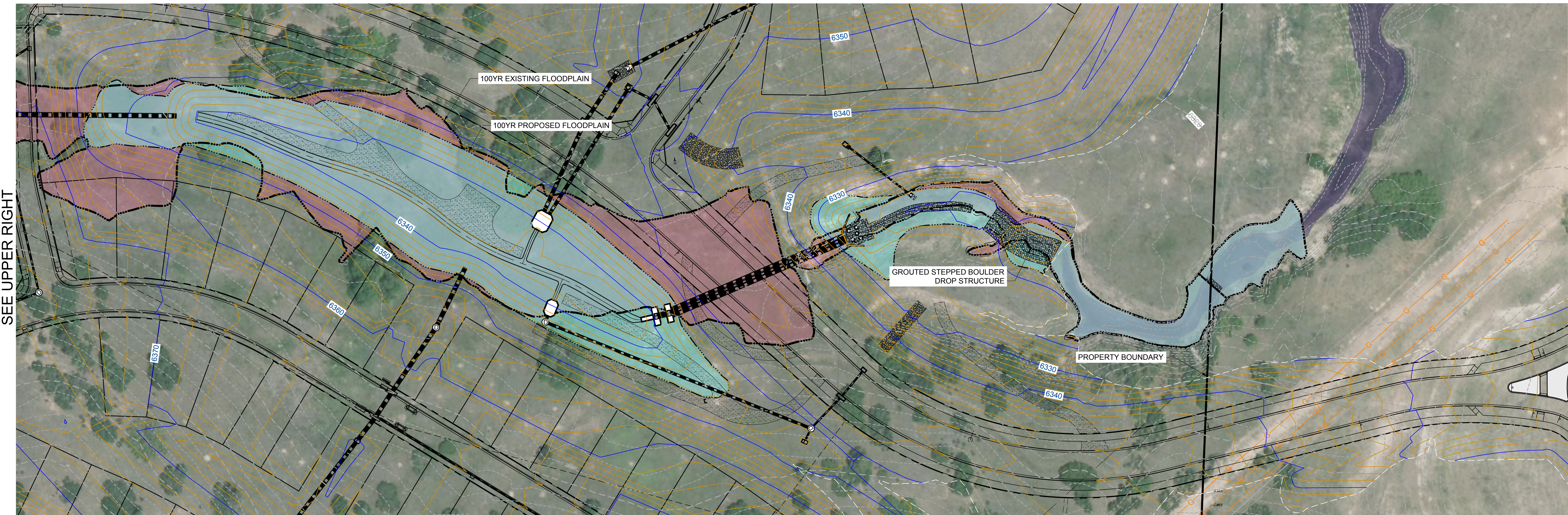


SEE BELOW LEFT

- PROPOSED 100YR FLOODPLAIN
- EFFECTIVE EXISTING 100YR FLOODPLAIN
- OVERLAPPING 100YR FLOODPLAIN
- FEMA FIRM EXISTING FLOODPLAIN

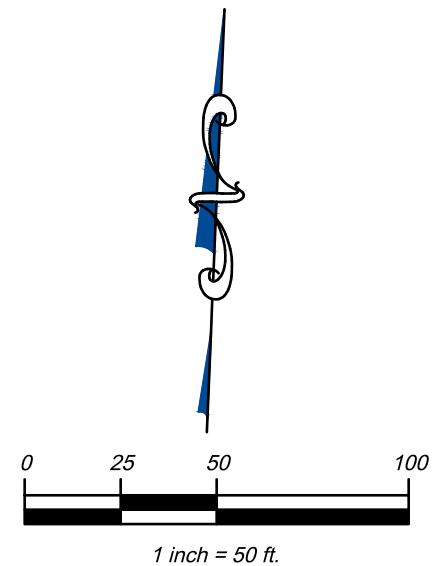


TRIBUTARY 3



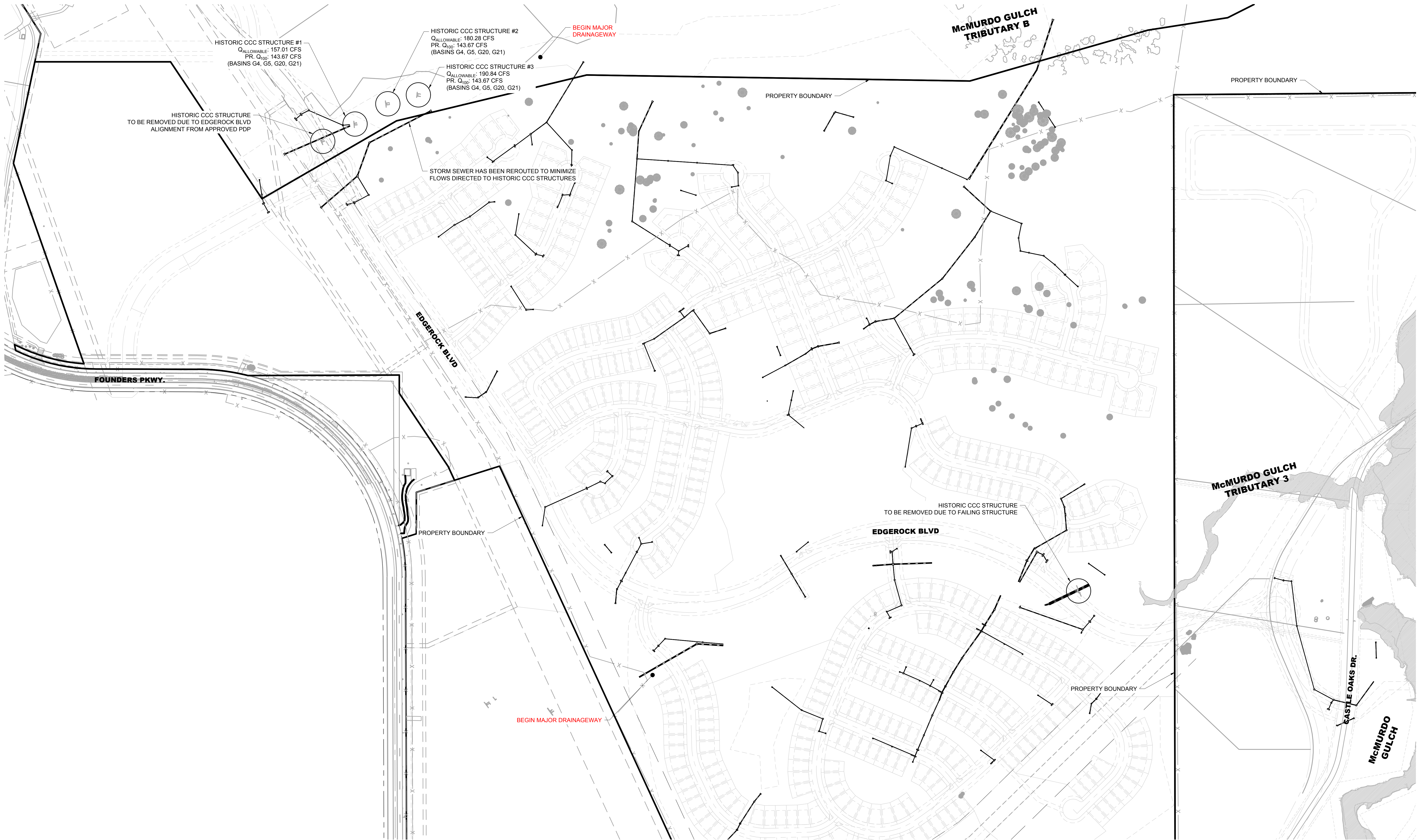
SEE UPPER RIGHT

FLOODPLAIN WORKMAP TRIBUTARY 3



TRIBUTARY 3







# Weir Report

Project filename: Historic CCC Structures.stx

Studio Express by Hydrology Studio v 1.0.0.18

08-12-2025

## CCC #1

## Weir 1

### RECTANGULAR - Broad

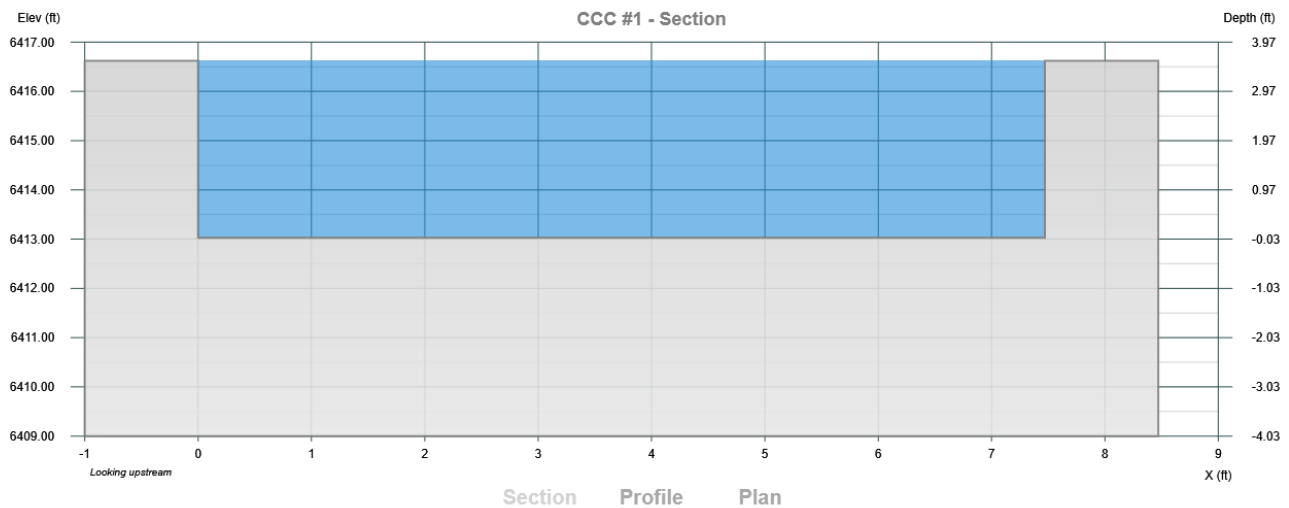
Crest Length = 7.47 ft  
Total Depth = 3.59 ft  
Crest Elevation = 6413.03 ft  
Weir Coefficient,  $C_w$  = 3.09

### DISCHARGE

Method = Known Depth  
known Depth = 3.59 ft

### CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | Top Width | HGL     | EGL     | Crit Depth |  |  |
|--------|-------|--------|----------|-----------|---------|---------|------------|--|--|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)      | (ft)    | (ft)    | (ft)       |  |  |
| 157.01 | 3.59  | 26.82  | 5.85     | 7.47      | 6416.62 | 6417.15 | 2.39       |  |  |





# Weir Report

Project filename: Historic CCC Structures.stx

Studio Express by Hydrology Studio v 1.0.0.18

08-12-2025

## CCC #2

## Weir 2

### RECTANGULAR - Broad

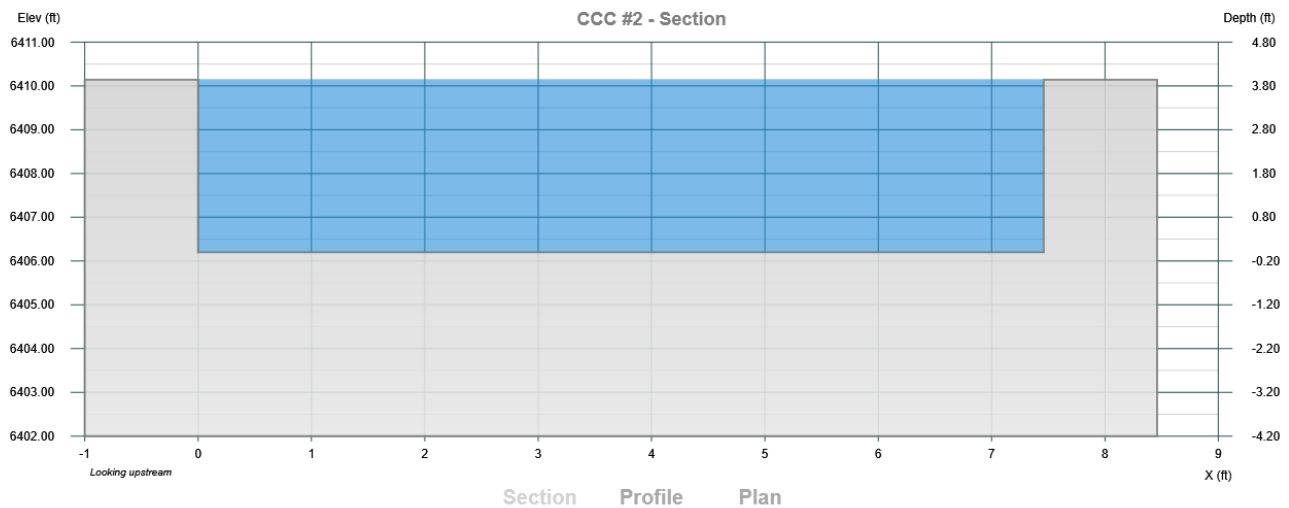
Crest Length = 7.46 ft  
Total Depth = 3.94 ft  
Crest Elevation = 6406.20 ft  
Weir Coefficient,  $C_w$  = 3.09

### DISCHARGE

Method = Known Depth  
known Depth = 3.94 ft

### CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | Top Width | HGL     | EGL     | Crit Depth |  |  |
|--------|-------|--------|----------|-----------|---------|---------|------------|--|--|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)      | (ft)    | (ft)    | (ft)       |  |  |
| 180.28 | 3.94  | 29.39  | 6.13     | 7.46      | 6410.14 | 6410.73 | 2.63       |  |  |



# Weir Report

Project filename: Historic CCC Structures.stx

Studio Express by Hydrology Studio v 1.0.0.18

08-12-2025

## CCC #3

## Weir 3

### RECTANGULAR - Broad

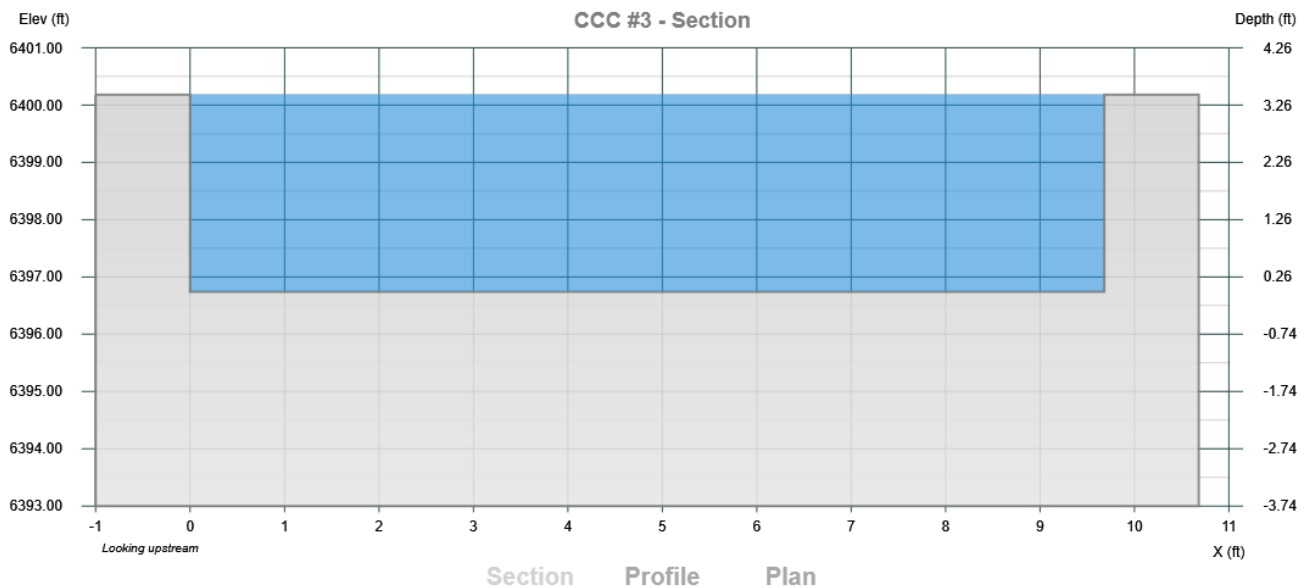
Crest Length = 9.68 ft  
Total Depth = 3.44 ft  
Crest Elevation = 6396.74 ft  
Weir Coefficient,  $C_w$  = 3.09

### DISCHARGE

Method = Known Depth  
known Depth = 3.44 ft

### CALCULATION SAMPLE

| Flow   | Depth | Area   | Velocity | Top Width | HGL     | EGL     | Crit Depth |  |  |
|--------|-------|--------|----------|-----------|---------|---------|------------|--|--|
| (cfs)  | (ft)  | (sqft) | (ft/s)   | (ft)      | (ft)    | (ft)    | (ft)       |  |  |
| 190.84 | 3.44  | 33.30  | 5.73     | 9.68      | 6400.18 | 6400.69 | 2.29       |  |  |







## **APPENDIX D**

### **REFERENCED INFORMATION**



**CANYONS FAR SOUTH  
POND G AND TRIBUTARY B MEMO**

**OCTOBER 2024**



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## **I. SCOPE**

The purpose of this memo is to confirm the drainage intent of Pond G and the Tributary B channel for the Canyons Far South development after conversations with the Town of Castle Rock and Douglas County.

## **II. SUMMARY**

### **A. Overview**

- Canyons Far South will cover approximately 361± acres.
  - The site is located south of Crowfoot Valley Road, north and west of Castle Oaks Drive, and east of Founders Parkway.
  - In Town of Castle Rock, Douglas County, CO.



### **Site Location**

- Canyons Far South will tie-in to the existing infrastructure along Founders Parkway to the west, Castle Oaks Drive to the south, and Macanta Boulevard in Douglas County to the north.
- Canyons Far South includes five (5) proposed Planning Areas. The Planning Areas will be composed of single-family lots, future commercial, parks, and preserved natural open space.
- This site outfalls to the east to McMurdo Gulch, which drains northeast to Cherry Creek.
- Tributary 3 of McMurdo Gulch is located within the property in Town of Castle Rock.



**CANYONS FAR SOUTH**  
**POND G AND TRIBUTARY B MEMO**  
**PAGE 4 OF 9**

- Tributary B (also known as Tributary 2) is located offsite to the north in Douglas County. The north half of the property outfalls to Tributary B. The same developer owns the property where Tributary B is located.
- There are no improvements directly to McMurdo Gulch anticipated for this project.
- McMurdo Gulch Tributary 3 contains flood zone within the property, at the extreme eastern edge of the site. These can be seen in the FEMA FIRM map 08035C0189G located in Appendix D. No impacts to this floodplain are anticipated by this project.

**B. Initial Submissions**

- Canyons South Planned Development Plan (PDP) was submitted by Dig Studio, Inc. and CORE Consultants, Inc. in October 2022.
  - This plan had assumed the property would be under one ownership and have nine individual ponds located along the property line. This showed seven ponds along the north adjacent to Tributary B.
  - The total area of the ponds as shown on the plan were not sized for the ultimate development conditions. With conservative assumptions (10' pond depth along the perimeter of the pond shape of the PDP) it can be assumed that as drawn, the PDP only accounted for 12.56 acre-feet of pond storage (9.77 acre-feet along Tributary B).
  - The PDP was intended to be conceptual and subject to change.
- Canyons Far South Site Development Plan (SDP) was submitted by Cover 3 Engineering (Cover 3) in October 2023.
  - Pond G was located in the Phase II Drainage Report along Tributary B (offsite to the north in Douglas County) to treat runoff from Canyons Far South, and offsite drainage from the north.
  - Pond G was located to minimize impacts to the property and Tributary B. This would also ensure all runoff would be captured and treated before releasing to McMurdo Gulch. This allowed for the seven individual ponds from the PDP to be removed.
  - Pond G was calculated to require a volume of 18.3 acre-feet.
- Canyons Far South SDP submission 2, Filing 1 submission 1, and Filing 2 submission 1 were submitted in May 2024. These have not been reviewed by the Town of Castle Rock yet.
  - Pond G was moved further downstream away from residential lots and to further minimize impacts to Tributary B. The Pond is now located along an existing stock pond which preserves more trees.
  - Additional Pond G details were added with Filing 1 including a drop structure into the pond and outfall riprap.
  - Channel stabilization was added with Filing 1 with check structures along Tributary B upstream of Pond G. This is due to channel runoff and velocities anticipated to be increased due to development.
  - Channel grading was included with Filing 1 to reduce steep side slopes along the channel where needed. A stock pond upstream of Pond G was also regraded to be removed.

- From May 2024 through October 2024, Cover 3 has discussed this project's lot configuration, open space, and drainage design with the Town of Castle Rock and Douglas County.
  - An analysis was performed and an exhibit was prepared to consider the impacts if seven ponds were to be constructed within the Town of Castle Rock property (as shown on PDP). This would reduce the total volume from 18.3 acre-feet to 11.5 acre-feet (still larger than the PDP's conservatively assumed volume of 9.77 acre-feet, though).
  - With less volume, there would still be significant grading impacts. A large amount of trees and open space would be disturbed with this option. The design team does not think this seven pond option is the best configuration.

### **III. DRAINAGE DESIGN**

#### **A. Existing Conditions and Site Visits**

- There have been multiple visits to the site prior to the initiation of design. Existing conditions have also been reviewed through the ALTA Survey and by examining Google Earth.
- This helped the design team to be able to review the existing channels and conditions of the structures along the channels. With this information, the best location for drainage facilities to serve the Canyons Far South development were determined. This also ensured that the existing channel along Tributary B and Tributary 3 would be preserved and enhanced where necessary.
- Images below are from site visits in August 2023.



**Tributary B**





**Tributary B**



**Tributary 3**

**B. Regulations and Existing Reports**

- Canyons Far South has been designed in general accordance with the *Town of Castle Rock Storm Drainage Design and Technical Criteria*, *Town of Castle Rock Public Works Regulations*, and Mile High Flood District (MHFD) where applicable.
- Snips from the *Castle Rock SDDTC* are included below. Highlights are included for emphasis that influenced the design up to this point.

**12.0.3 Vision for Drainageways.** Drainageway modification is intended to reflect a natural stream character, attained by preserving and restoring existing natural drainageways and, when necessary, creating new drainageways with natural features. Natural planform and cross-sectional geometry, riparian vegetation, and natural grade control features are to be emulated wherever possible.

The vision is to go beyond just stabilizing a channel against erosion (which technically could be accomplished by lining the channel with concrete), and to implement *enhanced stream stabilization*. Enhanced stream stabilization has the goal of creating natural streams and well-vegetated floodplains that are physically and biologically healthy, with all of the attributes shown in Figure 12-1. This goal is just as important as improving the water quality of runoff flowing off a development site and into a receiving stream.

**12.1 Drainageway Preservation and Stabilization**

**12.1.1 Preservation of Natural Drainageways.** Natural drainageways and floodplains shall be preserved wherever possible. Initial site planning documents shall accurately identify all existing drainageways, floodplains, and other site features that may be considered to have a high resource value. The features that are proposed to be left in place and preserved or restored shall be clearly shown on the initial site planning documents. Areas shown to be protected will be subject to the review and acceptance of the Town.

Although a development project can preserve additional areas, drainageways that have one or more of the following features or characteristics, generally defined as major drainageways, shall be protected and preserved.

- Presence of protected habitat for threatened and endangered or other protected species.
- Presence of jurisdictional wetlands.
- Presence of riparian vegetation such as cottonwood or willow trees, shrub willows, and wetland or transitional grasses.



**12.1.2 Stabilization of Natural Drainageways.** Because the increased runoff from urbanization typically leads to channel erosion (with all the associated impacts described in Section 12.0.2), it is not acceptable to simply "leave a stream alone", even when preserving drainageways as discussed in Section 12.1.1. Detention facilities do not fully mitigate impacts to the drainageways, as the adverse impacts are also related to increased runoff volumes and frequency of runoff events. Therefore, natural drainageways shall be stabilized using one of the three approaches described below:

1. **Preserving Streams Not Yet Impacted.** Drainageways that have not yet experienced degradation from increased urban runoff or other forms of erosion shall be preserved by implementing the following improvements:
  - Grade control structures to limit degradation in the low flow channel, stabilize any existing headcutting and to establish a flatter equilibrium slope than may have existed previously.
  - Bank stabilization at select locations where existing instability or the potential for future instability is evident.
  - The planting of supplemental vegetation to provide for the transition to species suited for "wetter" urban hydrology. Additional moisture can sustain wetland and riparian vegetation. These grasses, sedges and rushes, shrubs, and trees can help to stabilize the channel and provide a diverse habitat for wildlife.
2. **Restoring Impacted Streams.** Drainageways that have already experienced significant erosion and downcutting are to be addressed differently than streams that are not degraded. Restoration of these types of drainageways require the following improvements:
  - Eroded, incised channels, if possible, shall not be stabilized in a manner that retains the incised geometry with steep side banks, but shall be restored by raising the channel invert up to its historic condition and

### **13.2 Regional, Sub-regional, and On-site Detention Facilities**

There are three basic approaches for configuring detention facilities, as described below.

**13.2.1 Regional Detention.** Regional detention, as recognized by Town of Castle Rock, refers to online facilities located on a major drainageway, with an upstream watershed area generally ranging from about 130-acres to one-square mile. The definition of a major drainageway is discussed in Section 12.0.4. Figure 13-2 provides a generalized illustration of a regional detention approach.

Regional detention facilities may be constructed by a public entity such as a municipality or special district to serve several landowners in the upstream watershed. It may also be possible for a single landowner to construct a regional facility if the upstream watershed lies within the area controlled by the owner. Even if the upper part of the watershed is owned by others, it may be possible for a single landowner to construct a regional facility if the conditions below are satisfied and the Town approves the concept.

Compared to on-site facilities, regional detention facilities are typically more reliable, require less land area, and are more cost effective to construct and maintain. Regional facilities, being larger, can generally provide more favorable riparian habitat and offer greater opportunities for achieving multi-use objectives, such as combining with park and open space resources and connecting to trail systems. Because of these benefits, Town of Castle Rock requires that new development implement regional or sub-regional detention at a subdivision level in lieu of on-site detention at the time each lot is developed. For large subdivisions, the Town requires that regional or sub-regional detention be implemented by the first sub-divider rather than passing on the responsibility for detention to owners of individual filings. The Town encourages sub-regional detention to be the first option evaluated prior to regional detention. Regional detention will be approved by the Town on a case-by-case basis.

- The design team has also reviewed the McMurdo Gulch Assessments from 2011 and 2017 that were provided by Castle Rock.
  - The conceptual plan of improvements only proposed structures along the main channel of McMurdo Gulch. The Canyons Far South property is not located along the main channel of McMurdo Gulch. There are no improvements directly to McMurdo Gulch anticipated for this project.
  - The design intent of both McMurdo Gulch Assessments recommended softer approaches to maintain more natural approaches along the watershed. Canyons Far South has implemented this with the design intent thus far.
  - Further, full-spectrum detention facilities have been designed to release runoff close to historic. Canyons Far South agrees that this is the best approach.
- Additional referenced documents for Canyons Far South include:
  - *McMurdo Gulch Flood Hazard Area Delineation*, CH2MHill, Amended February 2012
  - *Canyons South Filing No. 1 – Phase III Drainage Report*, Calibre Engineering Inc., August 12, 2019.
  - *Canyons South – Filing 2 Phase III Drainage Report*, Calibre Engineering Inc., July 2021

#### **C. Design Intent**

- The design team has determined that based on all existing information, site visits, regulations and reports reviewed up to this point, conversations with the Town of Castle Rock and Douglas County, and previous design experience that the one pond option is the best option.
  - This design will ensure McMurdo Gulch Tributary B and McMurdo Gulch downstream are not adversely impacted.
  - Additional open space and mature trees will be preserved with this one pond. It will improve the neighborhood and offsite neighbors in Douglas County.
  - It will ensure long term maintenance is minimized as well with one pond.

## **IV. CONCLUSIONS**

- The previously discussed drainage design for Canyons Far South is the best path forward. Pond G is located along Tributary B as one pond to serve the entire development and offsite areas. Onsite flows will be conveyed to existing Tributary B before being treated by Pond G. The channel will be stabilized and grading modified as necessary. All flows will be captured and released at historic rates to ensure no negative impacts downstream.
- Confirmation from the Town of Castle Rock would be appreciated prior to advancing the design forward.





# **MCMURDO GULCH ASSESSMENTS**

## **EXCERPTS FROM TOWN OF CASTLE ROCK**

Memorandum

## McMurdo Gulch Reclamation Template

To: David Van Dellen / Town of Castle Rock  
Bill Ruzzo / Cherry Creek Basin Water Quality Authority (CCBWQA)

From: Jim Watt / Muller Engineering Company  
Joe Juergensen / Muller Engineering Company  
Jim Wulliman / Muller Engineering Company

Date: September 6, 2011

### Purpose

A reclamation plan for McMurdo Gulch, a major tributary to Cherry Creek in the upper watershed, was developed in 2010 and implemented in 2011 under the sponsorship of the Cherry Creek Basin Water Quality Authority and the Town of Castle Rock. Although relatively undeveloped at the time of the study, there are significant plans for further build-out in the McMurdo Gulch watershed, making the timing of the reclamation plan advantageous to implement a proactive approach to protect the gulch and reduce sediment and nutrient loads into Cherry Creek in advance of increased stormwater runoff and degradation. It is believed that implementing measures to protect the gulch *before* the onset of severe erosion will be more cost effective and more favorable to downstream water quality than reacting *after* increased runoff has a chance to degrade the gulch.

This memorandum documents the unique design process undertaken for the reclamation of McMurdo Gulch in the three mile study reach to serve as a guide, or “template” for the reclamation of similar tributary streams in the upper Cherry Creek watershed.



*The proactive reclamation plan for McMurdo Gulch is intended to preserve and protect the stream’s environmental value prior to significant development in the watershed.*



## Elements of Reclamation Template

The primary elements of the McMurdo Gulch reclamation template are summarized below.

**1. Start the process early.** The reclamation process is intended to be proactive, best started prior to the onset of significant development and resulting stream erosion in the watershed. The objective of the approach is to implement improvements at the appropriate pace, in the appropriate locations, and of the appropriate type to stay ahead of problems while still stretching out capital expenditures over time.

**2. Examine land use in the watershed.** Obtain current aerial photography of the watershed to evaluate the locations and densities of existing developments. Examine planning documents and development plans that show projected land use and note the extents, representative imperviousness, and anticipated timing of development projects in the watershed. The larger the development, higher the average imperviousness, and quicker the anticipated build-out, the more the potential impact on downstream drainageways. Examine the information on soils, imperviousness, hydrology, hydraulics, and improvement recommendations in any existing master plans conducted for the watershed.

**3. Inventory the stream.** Undertake a field reconnaissance of the mainstem drainageway and major tributaries. Observe signs of instability (headcuts, bed degradation/ aggradation, bank erosion, constricted channel sections) and stability (lack of erosion, favorable cross sectional geometry, dense vegetation), presence of baseflows, soil conditions, stream bed material and sediment transport, longitudinal slope, vegetation characteristics, and any existing hydraulic structures such as dams, ponds, detention facilities, storm sewer outfalls, or grade control structures. Document conditions with field notes and photos. Locations of infrastructure such as roadway crossings and utilities should also be noted and any prior stream stabilization evaluations in existing master plans should be reviewed.

**4. Develop plan to implement full-spectrum detention.** Develop a plan to control peak discharges from developed areas to levels similar to or less than pre-development conditions over the whole spectrum of storm events -- from frequent small events to large flood-producing storms. At the least, it is anticipated that implementing full-spectrum detention in the watershed (and retrofitting existing detention facilities) to control runoff will reduce the level of improvements required for stream stabilization and will slow the pace of degradation such that funding resources can keep up with the required improvements. At best, it may be found that watershed-wide full-spectrum detention may eliminate the need for capital improvements in some stream reaches.

**5. Develop proactive stream reclamation plan.** Develop a plan to reinforce erosion “hot-spots” – the points along the stream that are weakest and most at risk for unraveling the stability of the whole system. Weak spots are determined both from observations of instability made during the field reconnaissance (Step 2) and from an evaluation of imposed and resisted shear stress from flood flow events. The goal of the first package of improvements is to address the areas of greatest concern and preserve the most stable stream features to reduce the level of risk for an entire reach at a far lower cost than undertaking an ultimate, conventional 100-year design. This is seen as a better long-term investment than, for the same dollars, applying a conventional design to just a portion of the stream length, perhaps over-securing one small section while leaving the remainder of the reach unprotected and vulnerable.

**6. Conduct stream and watershed inventories annually.** Track the developed area and imperviousness for each tributary subwatershed and the overall watershed on an annual basis. Inventory any planned or constructed developments in the watershed and assess the functionality of detention facilities in maintaining runoff rates at or below historic levels. Conduct annual stream inventories, assessing how the initial reinforcement improvements are functioning, how revegetation establishment is progressing, whether any signs of additional instability are noticed in reaches not addressed in the initial improvements, and the presence and magnitude of base flows. Prepare a brief report to document findings and present any recommendations for further improvements. Follow up on recommendations through design, funding, and implementation.

Each of these steps was applied to the McMurdo Gulch project, as discussed in the following sections.

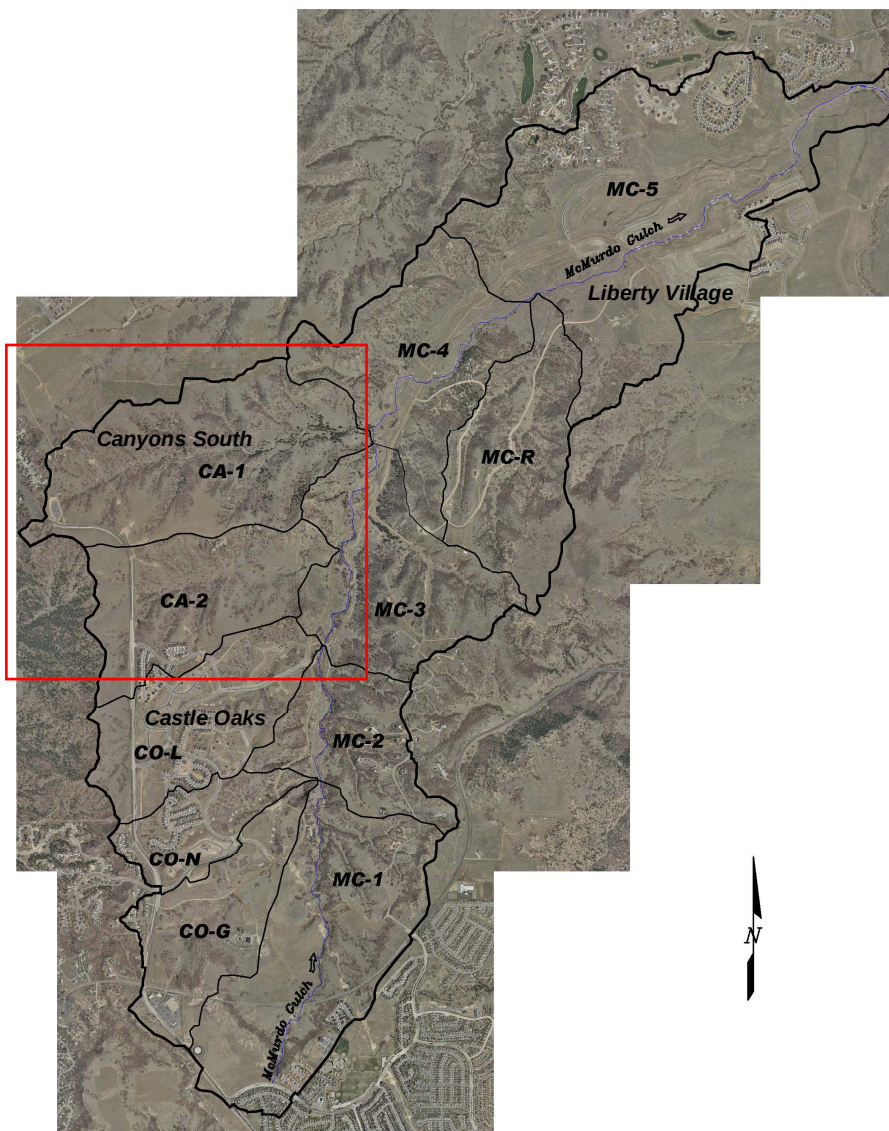
### Step 1. Start the Process Early

The concept of implementing a proactive stream stabilization approach on McMurdo Gulch was a collaborative idea of staff at the Town of Castle Rock and the Cherry Creek Basin Water Quality Authority. Pieter Van Ry with the Castle Rock Utilities Department and Bill Ruzzo, Technical Manager for the Authority, envisioned a study in the McMurdo Gulch watershed that would explore the benefits of assessing water quality issues and implementing improvements early enough to stay ahead of problems. Such a study, they reasoned, would be a good follow-up to the 2006 McMurdo Gulch Major Drainage-way Master Plan and could serve as an example, or template, for proactive water quality implementation in the upper Cherry Creek watershed. The study was approved and begun in the summer of 2009.

### Step 2. Examine Land Use in the Watershed

McMurdo Gulch is a western tributary to Cherry Creek that has a watershed area of 6.5 square miles.

The McMurdo Gulch channel flows northward approximately 6.7 miles long from its southern headwaters to the confluence with Cherry Creek. Current aerial photography of the watershed was obtained and reviewed to determine the locations and densities of existing developments. Figure 1 shows the aerial coverage and identifies watershed and sub-watershed boundaries. At the time of the McMurdo Gulch study, only about one half square mile of the 6.5 square mile watershed was developed with any significant density. A small amount of commercial land use existed along Highway 86 in the southern, upstream end and two residential communities were being developed in the central and lower ends of the watershed. Castle Oaks is located on several tributary drainages that flow into McMurdo Gulch from the west in the central portion of the watershed and Liberty Village is located adjacent to mainstem McMurdo Gulch at the downstream end of the watershed. Canyons South is another large subdivision in the west-central portion of the watershed that is currently in the planning stages.



**Figure 1.** Recent aerial photography of McMurdo Gulch watershed showing the beginning stages of development.



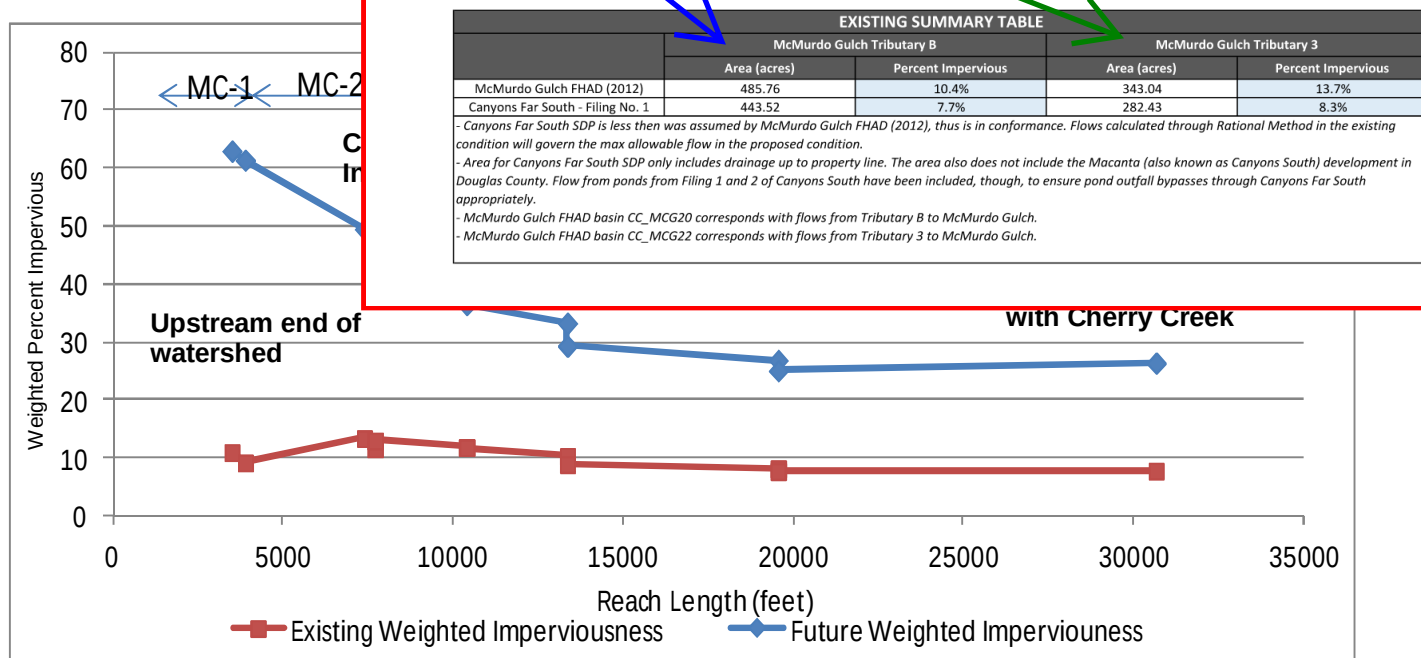
## McMurdo Gulch Reclamation Template

The aerial photography was evaluated to break existing land uses up into various categories, such as commercial uses, medium and high density residential, paved and gravel roadways, and open space. Representative imperviousness values were associated with these land uses and an overall estimate

| Subwatershed   | Area (acres) | Existing Imperviousness | Future Imperviousness |
|----------------|--------------|-------------------------|-----------------------|
| MC-1           | 503          | 9%                      | 61%                   |
| MC-2           | 218          | 4%                      | 33%                   |
| MC-3           | 360          | 3%                      | 18%                   |
| MC-4           | 379          | 3%                      | 10%                   |
| MC-5           | 893          | 8%                      | 31%                   |
| MCR            | 312          | 3%                      | 8%                    |
| CO-G           | 249          | 16%                     | 34%                   |
| CO-L           | 298          | 18%                     | 34%                   |
| CO-N           | 138          | 24%                     | 34%                   |
| CA-1           | 489          | 3%                      | 13%                   |
| CA-2           | 315          | 7%                      | 18%                   |
| <b>Overall</b> | <b>4154</b>  | <b>8%</b>               | <b>27%</b>            |

**Table 1.** Existing and future development imperviousness by sub-watershed.

of imperviousness was made. The existing area-weighted impervious of the watershed is approximately 8 percent, as shown in Table 1. The future area-weighted imperviousness is approximately 27 percent that has been assessed under the watershed Protection, 2003) percent. Figure 2 shows



**Figure 2.** Cumulative imperviousness draining into McMurdo Gulch for existing and future development conditions.

reaches a high of 13 percent downstream of where Castle Oaks drains into the Gulch. This suggests that the timing of the McMurdo Gulch study, though proactive, is certainly not premature, since a portion of the Gulch already exceeds the 10 percent threshold of impacts. In future studies in other watersheds, it is recommended that similar “template” evaluations get started prior to reaching an imperviousness of 5 percent

watersheds to McMurdo Gulch. The light blue and dark blue bars (with and without offsite ponds) show that the combined outflows for the proposed retrofit plan are less than those for the current ponds and less than pre-developed conditions for all events, including the smaller, more frequent storms such as the 2-year. Although additional flow reductions would be possible by providing additional detention storage volume through raised spillways or excavation, based on the modeling completed these more extensive retrofit measures are not necessary to reduce discharges below pre-developed levels.

In addition to these recommended retrofit improvements, it is essential that future detention ponds implemented as part of new development be designed as full-spectrum detention facilities and modeled to ensure that runoff levels remain close to historic. Initial coordination between the Town of Castle Rock, Douglas County, and CCBWQA took place during the design process to define a common requirement of implementing full-spectrum detention for all future development within the basin.

### Step 5. Develop Proactive Stream Reclamation Plan

A reclamation plan was developed to address the portions of McMurdo Gulch most susceptible to erosion. The improvements are located over a three mile reach adjacent to and downstream of the Castle Oaks tributaries where the existing watershed imperviousness exceeds 10 percent, as indicated in Figure 2. This is the portion of the gulch most at risk from stresses imposed by increased stormwater runoff and shows signs of weakness in a number of spots.



*Boulder cascade drops being constructed at critical locations to protect the Gulch against major erosion while preserving existing riparian vegetation.*



## **MEMORANDUM**

**CANYONS FAR SOUTH OCTOBER 2024 NOTE:**

**RED BOXES HAVE BEEN INCLUDED AS A PART OF THIS MEMO.**

**Project:** 2016 McMurdo Gulch Reach Assessment

**To:** David Van Dellen, Town of Castle Rock  
Barbara Horton, Town of Castle Rock  
Jim Swanson, JRS Engineering

**From:** Joe Juergensen, Muller Engineering  
John Yager, Muller Engineering  
Spencer Wells, Muller Engineering

**Date:** January 31, 2017

**Subject:** McMurdo Gulch 2016 Reach Assessment Report

---

### **INTRODUCTION AND PROJECT BACKGROUND**

Muller Engineering Company has completed a stream assessment of McMurdo Gulch to identify existing areas of potential instability and to prioritize these areas based on the level of severity. This assessment was completed in accordance with the *McMurdo Gulch Reclamation Template* completed by Muller, dated September 6, 2011. The template was completed as an initial phase of work and established a protocol for implementing a proactive management plan for stream preservation/restoration in developing watersheds.

Development has been increasing in the McMurdo Gulch basin and the goal is to implement timely channel stabilization within the study reach in order to mitigate increased flows experienced by the channel, while preserving the natural characteristics of the corridor. In addition to the stream assessment, conceptual design improvements and costs were proposed to address areas of instability that were identified as part of the stream assessment. This effort supplements the 2006 Master Plan completed by PBS&J and will serve as a 5 to 10-year road map to assist the Town of Castle Rock with budgeting of funds within the McMurdo Gulch watershed.

### **PROJECT LOCATION**

The McMurdo Gulch Reclamation project is located in the northeastern corner of Section 6, Township 8 South, the eastern half of Section 31, and the western half of Section 29, Township 7 South, Range 66 West of the 6th Principal Meridian, in Douglas County, Colorado. More specifically, the project runs parallel to Castle Oaks Drive with the downstream limit being the lower crossing of Castle Oaks Drive and the upstream limit approximately 2,000 feet South of State Highway 86, station 90+00 to 350+00 (master plan stationing), including five tributaries at stations 172+00, 206+00, 271+00 (two at this location), and 282+00. A vicinity map showing the project location is presented in Appendix A as part of the McMurdo Gulch Reach Assessment.

- Areas of the channel with little to no erosion (but appear to have erosion potential with future development) can be improved by using purely vegetative approaches. These approaches can help transition the existing, more upland dominated plant species to a more riparian dominated plant species as development activities continue to increase base flows in McMurdo Gulch.
- Rock lining is proposed in areas of steeper slopes, and where the channel is slightly degraded.
- Drop structures and bioengineered bank protection are proposed to raise the channel invert and reconnect the channel to the floodplain in areas where steep slopes and head cuts are forming.

The recommended conceptual level improvements provided in this assessment utilize a different approach to channel stabilization than what was assumed during the development of the McMurdo Gulch Master Plan. The recommended conceptual level improvements are intended to be a softer approach to channel stabilization by taking advantage of existing healthy floodplain benches and banks, minimizing drop structure footprints, and limiting the use of grout and concrete. The softer approach incorporates vegetation and loose rock improvements to the maximum amount practicable. Harder improvements, consisting grouted boulder grade control structures, are recommended only in select locations where the channel geometry creates extreme hydraulic conditions. The overall approach is intended to provide stabilization up to the 100-year event with a final product that appears natural and requires less disturbance.

This assessment did not evaluate the need or costs associated with updating the existing roadway crossings of McMurdo Gulch; however, the size and structure type assumed in the master plan was noted on the reach assessment drawings.

The conceptual improvements discussed above were overlaid on LiDAR topographic mapping (1ft contours, 2014) and aerial imagery. These conceptual plans are presented in Appendix A.

## PREVIOUS MASTER PLAN CHANNEL IMPROVEMENTS

Muller Engineering also completed a review of the 2006 McMurdo Gulch Master Plan completed by PBS&J, which identified channel stabilization improvements for the entire length of McMurdo Gulch. In general, the Master Plan recommends taller grouted boulder drop structures with larger footprints to contain the 100-year event along with several stretches of bank protection, and channel grading. Improvements to existing roadway bridge structures and tributary channels that enter McMurdo Gulch were also recommended in the Master Plan.

Master Plan stabilization improvements along McMurdo Gulch that have not already been constructed or are not proposed for stabilization as a result of Muller's recent site visit have been incorporated into the conceptual plans presented in Appendix A. The Master Plan improvements shown on the conceptual plans were updated to reflect stabilization techniques that are consistent with the remainder of this study. The scope of the improvements, including length of channel improvements, quantity and height of grade control structures/rock lining/bank protection, were not re-vamped by Muller, but instead were taken directly from the Master Plan. Master Plan improvements associated with roadway bridges and tributaries were not incorporated into the conceptual plans.



**Table 1: Summary by Reach and Priority**

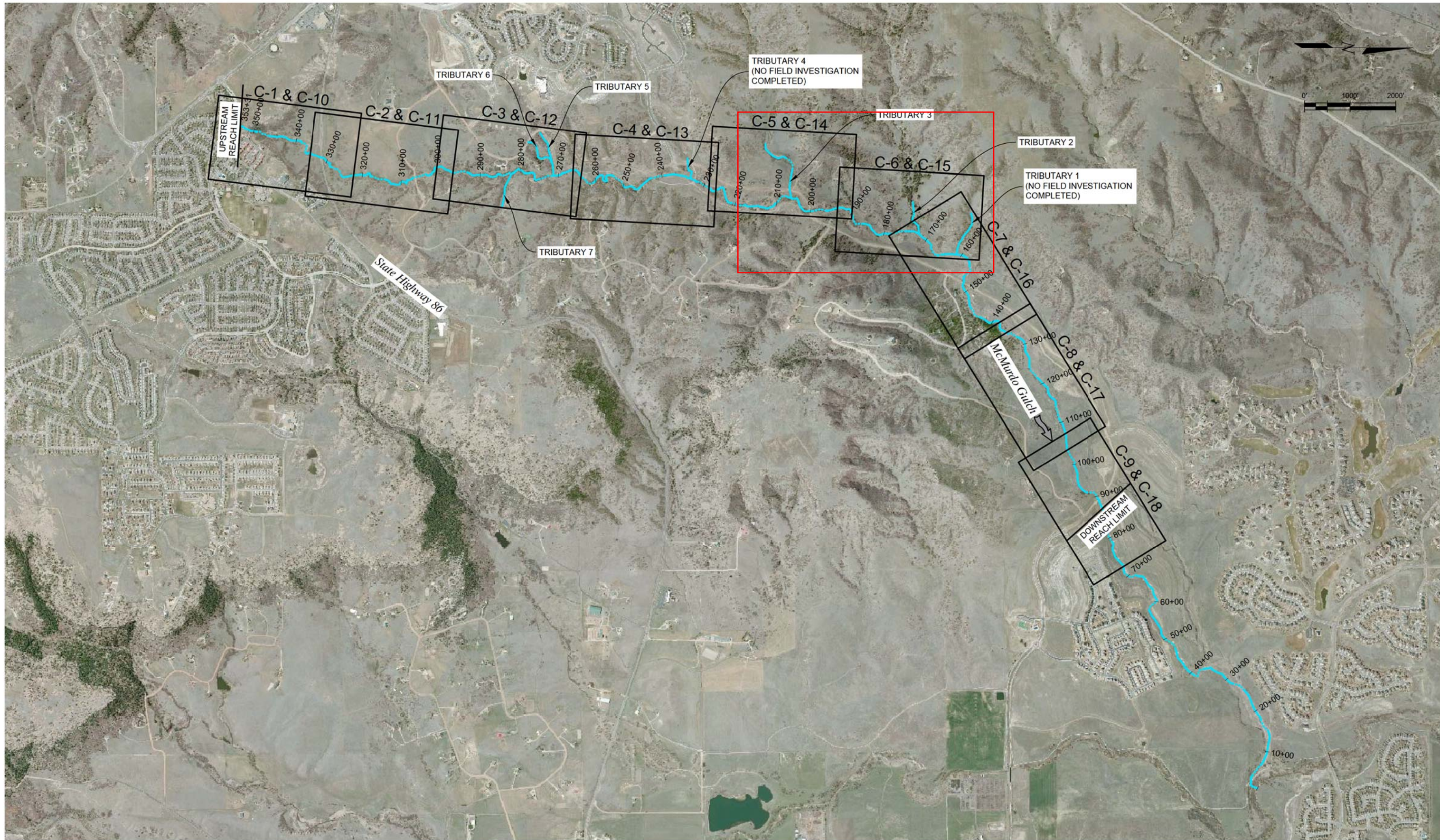
| Site                                    | Higher Priority Costs |                    | Lower Priority Costs | Potential Remaining Master Plan Improvements** |
|-----------------------------------------|-----------------------|--------------------|----------------------|------------------------------------------------|
|                                         | First \$1.5M          | Second \$1.5M      |                      |                                                |
| STA 125+00 TO STA 132+00                |                       | \$367,550          |                      |                                                |
| STA 137+00 TO STA 140+00                |                       | \$201,163          |                      |                                                |
| MP STA 139+00 TO STA 141+00             |                       |                    |                      | \$54,873                                       |
| STA 152+00 TO STA 165+00                |                       | \$315,069          |                      |                                                |
| STA 172+00 TO STA 176+00                | \$353,587             |                    |                      |                                                |
| MP STA 181+00 TO STA 183+00             |                       |                    |                      | \$144,983                                      |
| STA 191+00 TO STA 194+00                |                       |                    | \$208,667            |                                                |
| STA 200+00 TO STA 203+00                |                       |                    | \$226,462            |                                                |
| MP STA 203+00 TO STA 205+00             |                       |                    |                      | \$138,904                                      |
| STA 207+00 TO STA 214+00                | \$437,620             |                    |                      |                                                |
| MP STA 232+00 TO STA 262+00             |                       |                    |                      | \$639,040                                      |
| STA 255+00 TO STA 260+00                | \$19,139              |                    |                      |                                                |
| STA 274+00 TO STA 278+00                | \$330,117             |                    |                      |                                                |
| MP STA 280+00 TO STA 298+00             |                       |                    |                      | \$783,332                                      |
| STA 317+00 TO STA 330+00                |                       |                    | \$582,659            |                                                |
| STA 340+00 TO STA 348+00                |                       |                    | \$740,044            |                                                |
| TRIBUTARY 3                             |                       |                    | \$97,141             |                                                |
| TRIBUTARY 5&6 HIGHER PRIORITY           |                       | \$229,253          |                      |                                                |
| TRIBUTARY 5&6 LOWER PRIORITY            |                       |                    | \$1,228,707          |                                                |
| <b>Total Construction Cost*</b>         | <b>\$1,140,463</b>    | <b>\$1,113,034</b> | <b>\$3,083,679</b>   | <b>\$1,761,132</b>                             |
| 10% Design                              | \$114,046             | \$111,303          | \$308,368            | \$176,113                                      |
| 5% CLOMR and Permitting                 | \$57,023              | \$55,652           | \$154,184            | \$88,057                                       |
| 10% Construction Services               | \$114,046             | \$111,303          | \$308,368            | \$176,113                                      |
| 5% LOMR and Monitoring                  | \$57,023              | \$55,652           | \$154,184            | \$88,057                                       |
| <b>Total Design and Permitting Cost</b> | <b>\$342,139</b>      | <b>\$333,910</b>   | <b>\$925,104</b>     | <b>\$528,340</b>                               |
| <b>Priority Total</b>                   | <b>\$1,482,602</b>    | <b>\$1,446,944</b> | <b>\$4,008,783</b>   | <b>\$2,289,472</b>                             |
| <b>Project Total</b>                    |                       |                    | <b>\$6,938,329</b>   | <b>\$9,227,801</b>                             |

\*Includes 9% Mobilization/Survey and 15% Contingency Costs.

\*\*Master plan improvement costs only contain remaining master plan improvements on the main stem.  
Tributaries 2,3,4 and 7 master plan improvements are not included.



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|                                   |
|-----------------------------------|
| PREPARED UNDER THE SUPERVISION OF |
| DESIGNED: SDW                     |
| DRAWN: MAB                        |
| CHECKED: JAY                      |

# CONCEPTUAL DESIGN

PROJECT NO. 07012.21

| SHEET REVISIONS |      |             |    |
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| NO.             | DATE | DESCRIPTION | BY |
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|                 |      |             |    |



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 (720) 733-6029  
 CONTACT: DAVID VAN DELLEN



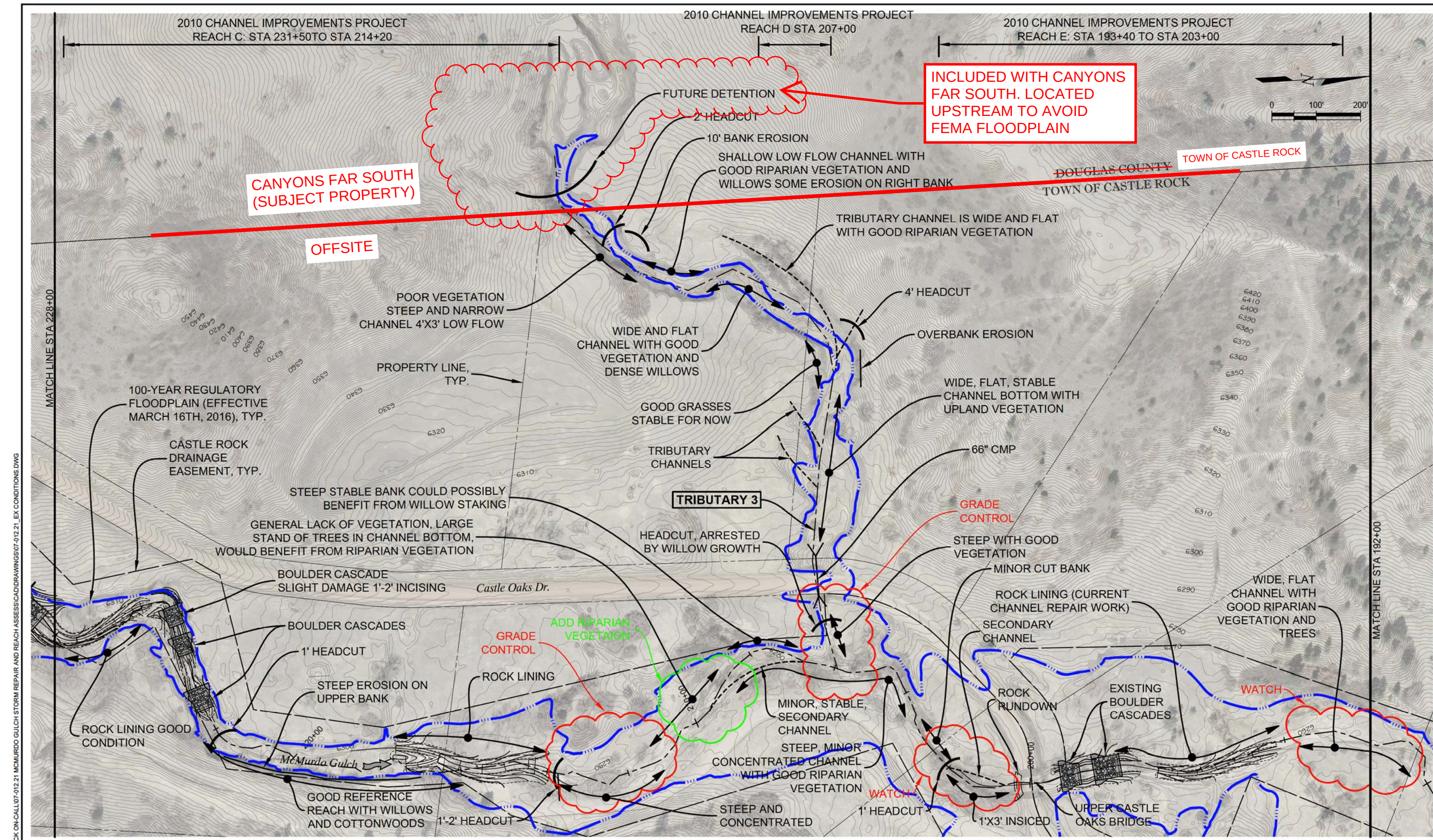
2016 MCMURDO GULCH REACH ASSESSMENT

KEY MAP

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| DATE        | 1/2017  |
| DRAWING NO. | G-2     |
| SHEET NO.   | 2 OF 23 |





PREPARED UNDER THE SUPERVISION OF

DESIGNED: SDW

DRAWN: MAB

CHECKED: JAY

CONCEPTUAL DESIGN

PROJECT NO. 07012.21

| SHEET REVISIONS |      |             |    |
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**MULLER**  
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2016 MCMURDO GULCH REACH ASSESSMENT

EXISTING CONDITIONS PLAN

STA. 228+00 TO STA. 192+00

Page 20 of 43

DATE 1/2017

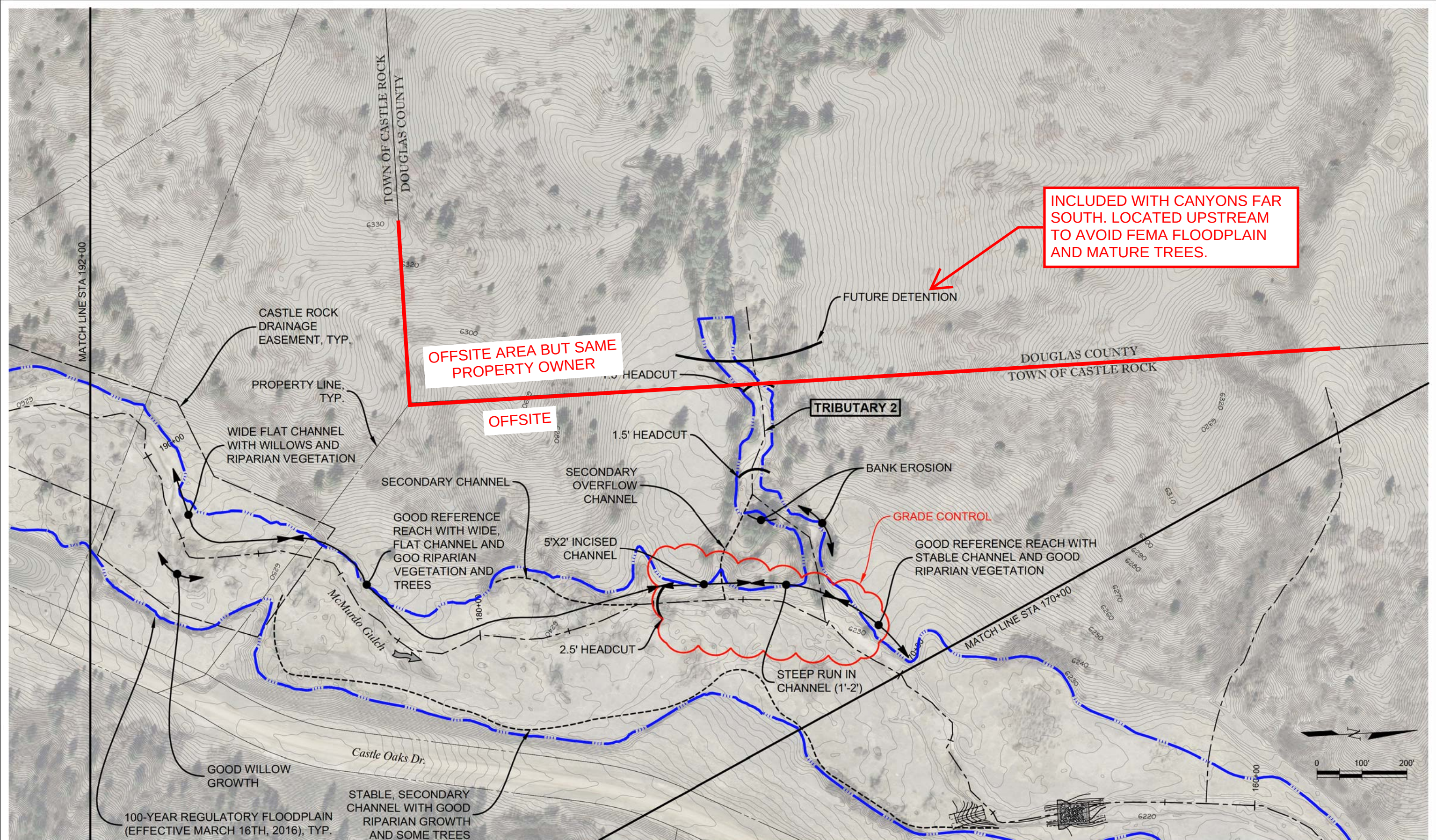
DRAWING NO. C-5

SHEET NO. 7 OF 23

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NAME: P:\07-012.01 CASTLE ROCK ON-CALL\07-012.21 MCMURDO GULCH STORM REPAIR AND REACH ASSESSMENT\DRAWINGS\07-012.21\_EX CONDITIONS.DWG

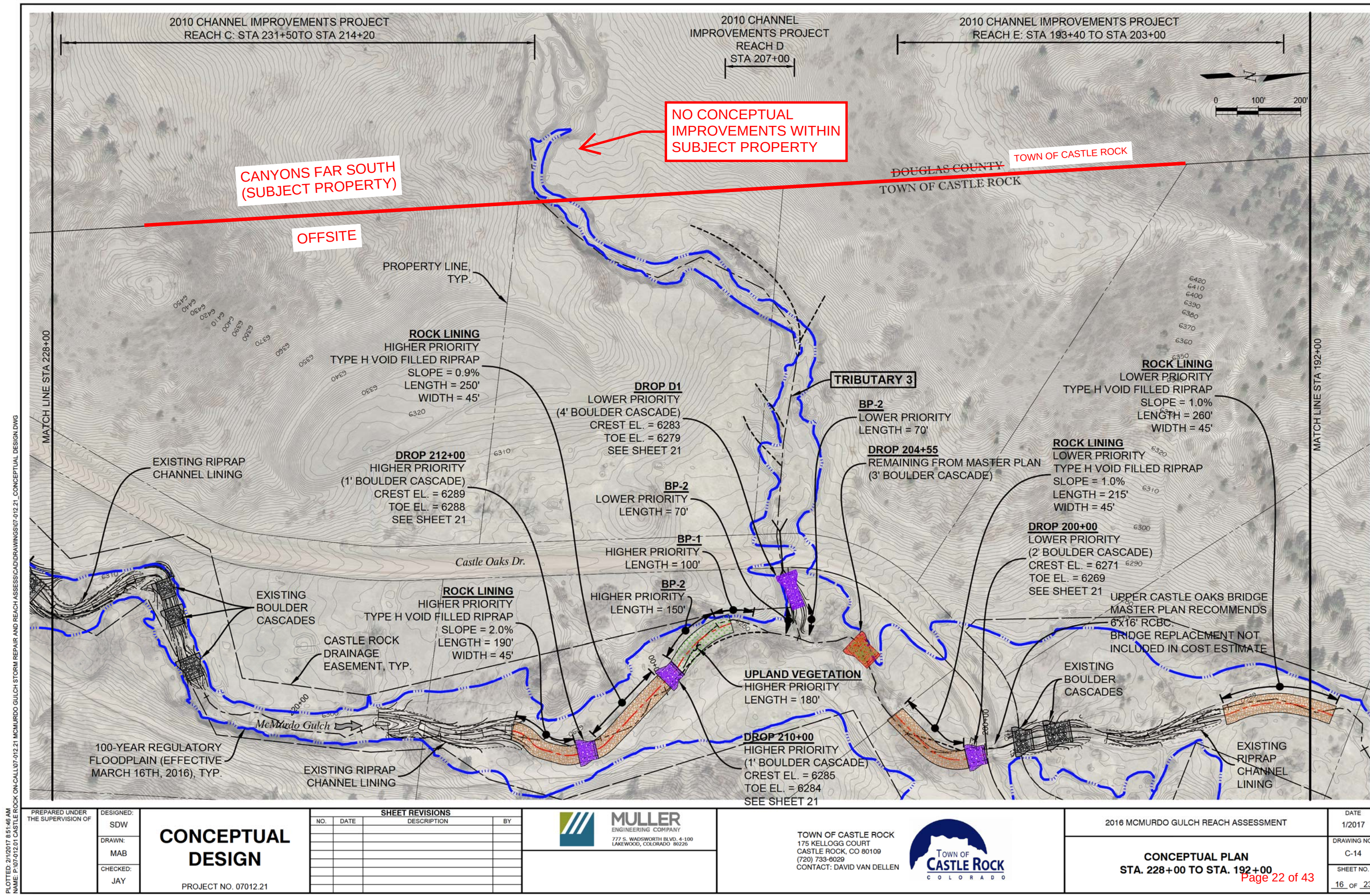


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| PREPARED UNDER THE SUPERVISION OF<br>DESIGNED: SDW<br>DRAWN: MAB<br>CHECKED: JAY | <h1>CONCEPTUAL DESIGN</h1> <p>PROJECT NO. 07012.21</p> | <table border="1"> <thead> <tr> <th colspan="4">SHEET REVISIONS</th> </tr> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> |      |             | SHEET REVISIONS |  |  |  | NO. | DATE | DESCRIPTION | BY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | <br>777 S. WADSWORTH BLVD. 4-100<br>LAKEWOOD, COLORADO 80226 | TOWN OF CASTLE ROCK<br>175 KELLOGG COURT<br>CASTLE ROCK, CO 80109<br>(720) 733-6029<br>CONTACT: DAVID VAN DELLEN |  | 2016 MCMURDO GULCH REACH ASSESSMENT | DATE<br>1/2017 |
|----------------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|-----------------|--|--|--|-----|------|-------------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--|-------------------------------------|----------------|
|                                                                                  |                                                        | SHEET REVISIONS                                                                                                                                                                                                                                                                                                                                                                                                                                |      |             |                 |  |  |  |     |      |             |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                              |                                                                                                                  |  |                                     |                |
|                                                                                  |                                                        | NO.                                                                                                                                                                                                                                                                                                                                                                                                                                            | DATE | DESCRIPTION | BY              |  |  |  |     |      |             |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                              |                                                                                                                  |  |                                     |                |
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| EXISTING CONDITIONS PLAN<br>STA. 192+00 TO STA. 170+00                           |                                                        | DRAWING NO.<br>C-6                                                                                                                                                                                                                                                                                                                                                                                                                             |      |             |                 |  |  |  |     |      |             |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                              |                                                                                                                  |  |                                     |                |
| Page 21 of 43                                                                    |                                                        | SHEET NO.<br>8 OF 23                                                                                                                                                                                                                                                                                                                                                                                                                           |      |             |                 |  |  |  |     |      |             |    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                              |                                                                                                                  |  |                                     |                |





2010 CHANNEL IMPROVEMENTS PROJECT REACH C: STA 231+50 TO STA 214+20

2010 CHANNEL IMPROVEMENTS PROJECT REACH D: STA 207+00

2010 CHANNEL IMPROVEMENTS PROJECT REACH E: STA 193+40 TO STA 203+00

NO CONCEPTUAL IMPROVEMENTS WITHIN SUBJECT PROPERTY

CANYONS FAR SOUTH (SUBJECT PROPERTY)

OFFSITE

PROPERTY LINE, TYP.

ROCK LINING HIGHER PRIORITY TYPE H VOID FILLED RIPRAP SLOPE = 0.9% LENGTH = 250' WIDTH = 45'

DROP 212+00 HIGHER PRIORITY (1' BOULDER CASCADE) CREST EL. = 6289 TOE EL. = 6288 SEE SHEET 21

ROCK LINING HIGHER PRIORITY TYPE H VOID FILLED RIPRAP SLOPE = 2.0% LENGTH = 190' WIDTH = 45'

CASTLE ROCK DRAINAGE EASEMENT, TYP.

EXISTING BOULDER CASCADES

EXISTING RIPRAP CHANNEL LINING

100-YEAR REGULATORY FLOODPLAIN (EFFECTIVE MARCH 16TH, 2016), TYP.

McMurdo Gulch

Castle Oaks Dr.

TRIBUTARY 3

BP-2 LOWER PRIORITY LENGTH = 70'

DROP 204+55 REMAINING FROM MASTER PLAN (3' BOULDER CASCADE)

ROCK LINING LOWER PRIORITY TYPE H VOID FILLED RIPRAP SLOPE = 1.0% LENGTH = 260' WIDTH = 45'

ROCK LINING LOWER PRIORITY TYPE H VOID FILLED RIPRAP SLOPE = 1.0% LENGTH = 215' WIDTH = 45'

DROP 200+00 LOWER PRIORITY (2' BOULDER CASCADE) CREST EL. = 6271 TOE EL. = 6269 SEE SHEET 21

UPPER CASTLE OAKS BRIDGE MASTER PLAN RECOMMENDS 6'x16' RCBC. BRIDGE REPLACEMENT NOT INCLUDED IN COST ESTIMATE

EXISTING BOULDER CASCADES

EXISTING RIPRAP CHANNEL LINING

UPLAND VEGETATION HIGHER PRIORITY LENGTH = 180'

DROP 210+00 HIGHER PRIORITY (1' BOULDER CASCADE) CREST EL. = 6285 TOE EL. = 6284 SEE SHEET 21

MATCH LINE STA 228+00

MATCH LINE STA 192+00

0 100' 200'

1/2017

2016 MCMURDO GULCH REACH ASSESSMENT

CONCEPTUAL PLAN STA. 228+00 TO STA. 192+00

Page 22 of 43

16 OF 23

PREPARED UNDER THE SUPERVISION OF

DESIGNED: SDW

DRAWN: MAB

CHECKED: JAY

CONCEPTUAL DESIGN

PROJECT NO. 07012.21

SHEET REVISIONS

| NO. | DATE | DESCRIPTION | BY |
|-----|------|-------------|----|
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MULLER ENGINEERING COMPANY

777 S. WADSWORTH BLVD. 4-100 LAKEWOOD, COLORADO 80226

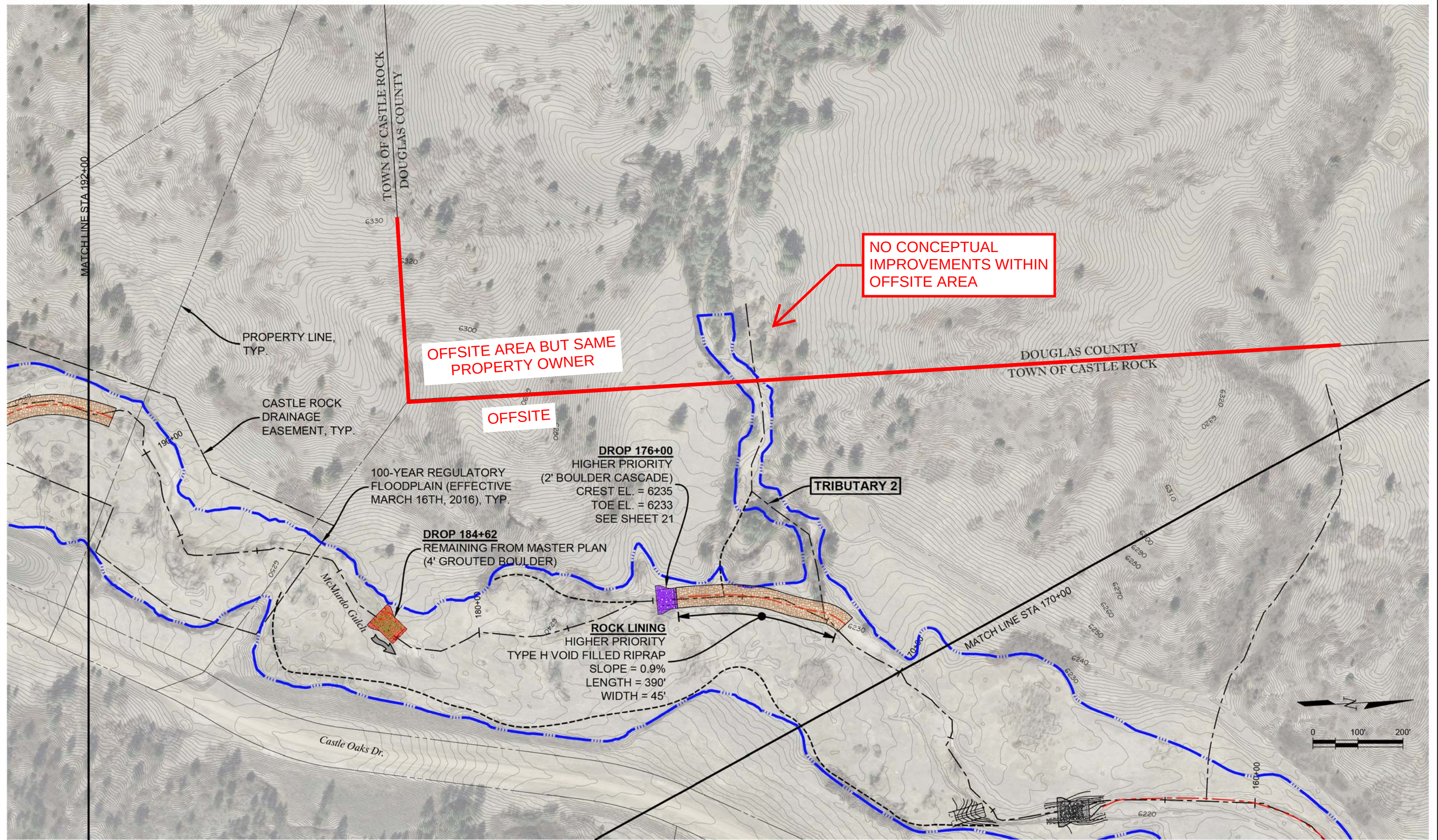
TOWN OF CASTLE ROCK

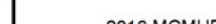
175 KELLOGG COURT CASTLE ROCK, CO 80109 (720) 733-6029 CONTACT: DAVID VAN DELLEN

TOWN OF CASTLE ROCK COLORADO



PLOTTED: 2/1/2017 8:53:05 AM  
 NAME: P:\07-012.01 CASTLE ROCK ON-CALL\07-012.21 MCMURDO GULCH STORM REPAIR AND REACH ASSESSMENT\DRAWINGS\07-012.21\_CONCEPTUAL DESIGN.DWG



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|--------------------------------------|------------------|----------------------|-----------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------|----------------|----------------------------|-----------------------|
| PREPARED UNDER<br>THE SUPERVISION OF | DESIGNED:<br>SDW | CONCEPTUAL<br>DESIGN | SHEET REVISIONS |  |  |  | <br>MULLER<br>ENGINEERING COMPANY<br>777 S. WADSWORTH BLVD. 4-100<br>LAKEWOOD, COLORADO 80226 | TOWN OF CASTLE ROCK<br>175 KELLOGG COURT<br>CASTLE ROCK, CO 80109<br>(720) 733-6029<br>CONTACT: DAVID VAN DELLEN |  | 2016 MCMURDO GULCH REACH ASSESSMENT | DATE<br>1/2017 |                            |                       |
|                                      | DRAWN:<br>MAB    |                      |                 |  |  |  |                                                                                                                                                                                    |                                                                                                                  |                                                                                       |                                     |                | CONCEPTUAL PLAN            | DRAWING NO.<br>C-15   |
|                                      | CHECKED:<br>JAY  |                      |                 |  |  |  |                                                                                                                                                                                    |                                                                                                                  |                                                                                       |                                     |                | STA. 192+00 TO STA. 170+00 | SHEET NO.<br>17 OF 23 |
| PROJECT NO. 07012.21                 |                  |                      |                 |  |  |  |                                                                                                                                                                                    |                                                                                                                  |                                                                                       | Page 23 of 43                       |                |                            |                       |





# **CANYONS SOUTH PDP**

## **POND VOLUME REVIEW**



PDP STANDARD NOTES

- MINERAL RIGHTS ASSOCIATED WITH THIS DEVELOPMENT HAVE NOT BEEN SEVERED. NOTIFICATION OF DEVELOPMENT HEARINGS BEFORE PLANNING COMMISSION AND TOWN COUNCIL SHALL BE PROVIDED TO OWNERS OF MINERAL ESTATES PURSUANT TO ARTICLE 65.5 OF TITLE 24, C.R.S.
- A PORTION OF THIS SITE LIES WITHIN FEMA FLOOD ZONE X & A PER MAP DATED March 16, 2016. NO STRUCTURES SHALL BE PERMITTED IN THE APPROVED 100-YEAR FLOOD PLAIN.
- THIS DEVELOPMENT PLAN IS NOT IMPACTED BY THE TOWN OF CASTLE ROCK SKYLINE/RIDGELINE PROTECTION REGULATIONS.
- THIS SITE IS WITHIN THE TOWN OF CASTLE ROCK PURPLE & RED WATER PRESSURE ZONE.
- ALL-WEATHER (CONCRETE OR ASPHALT) SURFACED ACCESS ROADS CAPABLE OF WITHSTANDING THE IMPOSED LOADS OF FIRE APPARATUS (75,000 LBS.) AND ALL REQUIRED FIRE HYDRANTS SHALL BE INSTALLED AND MADE SERVICEABLE PRIOR TO AND DURING ALL CONSTRUCTION.
- RIGHT-OF-WAY INGRESS AND EGRESS ACCESS FOR EMERGENCY VEHICLES AND PERSONAL IS GRANTED OVER, ACROSS, ON AND THROUGH ANY AND ALL PRIVATE ROADS, DRIVES, TRAILS AND WALKWAYS.
- A WILDLAND/URBAN INTERFACE WILDFIRE VEGETATION MANAGEMENT PLAN (PLAN), OR COMPLIANCE LETTER, IS REQUIRED TO BE SUBMITTED FOR EACH PHASE OF THE PLANNED DEVELOPMENT, WITH THE FIRST SITE DEVELOPMENT PLAN OR CONSTRUCTION DRAWINGS FOR EVALUATION AND APPROVAL BY THE TOWN OF CASTLE ROCK FIRE DEPARTMENT. THE PLAN SHALL BE DEVELOPMENT BY A DESIGN PROFESSIONAL FAMILIAR WITH WILDFIRE MITIGATION TECHNIQUES AND STANDARDS. REFER TO THE TOWN OF CASTLE ROCK COMMUNITY WILDFIRE PROTECTION PLAN.
- MONUMENTS, ORNAMENTAL COLUMNS, WINDOW WELLS, COUNTERFORTS, PATIOS, DECKS, RETAINING WALLS, AND THEIR COMPONENTS ARE NOT PERMITTED TO ENCROACH INTO UTILITY EASEMENTS.

| UTILIZATION TABLE                              |             |                          |                    |
|------------------------------------------------|-------------|--------------------------|--------------------|
|                                                | Site Totals | Private Open Space Areas | Percentage of Site |
| Acreage                                        | 409 ac      |                          | 100.0%             |
| Planning Areas                                 | 165.1ac     |                          | 40.4%              |
| Open Space Private (OSP)                       |             | +/- 8.5ac                | 2.1% (part of PA)  |
| Open Space Dedicated (PL-2)                    | 217.6 ac    |                          | 53.2%              |
| Public Land Dedicated (PL-1)                   | 13.8ac      |                          | 3.4%               |
| Right-of-Way*                                  | 12.5 ac     |                          | 3.1%               |
| * Actual acreage To Be Determined at Site Plan |             |                          |                    |

LEGAL DESCRIPTION

A PARCEL OF LAND BEING TRACTS V & X, CANYONS SOUTH FILING NO. 1A, 3RD AMENDMENT, A SUBDIVISION PLAT RECORDED AT RECEPTION NO. 2021023312, IN THE RECORDS OF THE DOUGLAS COUNTY CLERK AND RECORDER'S OFFICE AND PORTIONS OF THE SOUTH HALF OF SECTION 30 AND THE NORTH HALF OF SECTION 31, TOWNSHIP 7 SOUTH, RANGE 66 WEST & THE SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF DOUGLAS, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

THE BEARINGS FOR THIS DESCRIPTION ARE BASED ON THE EAST LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 30, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH P.M., AS SHOWN ON SAID PLAT OF CANYONS SOUTH FILING NO.1A, 3RD AMENDMENT TO BEAR S 00°03'56" E, FROM THE EAST QUARTER CORNER OF SAID SECTION 30, BEING MONUMENTED BY A REBAR WITH A 2 INCH ALUMINUM CAP STAMPED "PLS 23515" TO THE SOUTH SIXTEENTH CORNER OF SECTIONS 29/30, BEING MONUMENTED BY A REBAR WITH A 1-1/2 INCH ALUMINUM CAP, STAMPED "PLS 23515", WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO.

COMMENCING AT THE EAST QUARTER CORNER OF SAID SECTION 30, THENCE S 00°03'56" E, ALONG THE EAST LINE OF SAID CANYONS SOUTH FILING NO. 1A, 3RD AMENDMENT AND ALONG THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 30, A DISTANCE OF 798.31 FEET TO THE NORTHEAST CORNER OF SAID TRACT X AND THE POINT OF BEGINNING;

THENCE S 00°03'56" E, CONTINUING ALONG SAID EAST LINES, A DISTANCE OF 525.32 FEET TO THE SOUTH SIXTEENTH CORNER OF SECTIONS 29/30, ALSO BEING A POINT ON THE NORTH LINE OF CASTLE OAKS, A SUBDIVISION PLAT RECORDED AT RECEPTION NO. 150556, SAID DOUGLAS COUNTY RECORDS; THENCE ALONG THE NORTH AND EAST LINES OF SAID CASTLE OAKS PLAT, THE FOLLOWING THREE (3) COURSES:

- S 89°49'31" W, A DISTANCE OF 1319.43 FEET TO THE SOUTHEAST SIXTEENTH CORNER OF SAID SECTION 30;
- S 00°04'19" E, ALONG THE WEST LINE OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 30, A DISTANCE OF 1331.29 FEET TO THE EAST SIXTEENTH CORNER OF SAID SECTIONS 30/31;
- S 00°07'26" E, ALONG THE EAST LINE OF THE WEST HALF OF THE NORTHEAST QUARTER OF SAID SECTION 31, A DISTANCE OF 2643.38 FEET TO A POINT ON THE NORTH LINE OF CASTLE OAKS ESTATES FILING NO. 1, 9TH AMENDMENT, A SUBDIVISION PLAT RECORDED AT RECEPTION NO. 2033082860 AND A POINT ON THE NORTH LINE OF THAT BOUNDARY LINE AGREEMENT RECORDED AT RECEPTION NO. 2007016736, BOTH OF SAID DOUGLAS COUNTY RECORDS;

THENCE S 89°18'28" W, ALONG THE NORTH LINE OF SAID BOUNDARY LINE AGREEMENT AND ALONG THE NORTH LINES OF SAID CASTLE OAKS ESTATES FILING NO. 1, 9TH AMENDMENT, CASTLE OAKS ESTATES FILING NO. 1, AMENDMENT NO. 2, RECORDED AT RECEPTION NO. 2006078876 AND CASTLE OAKS ESTATES FILING NO. 1, RECORDED AT RECEPTION NO. 2003181990, A DISTANCE OF 3675.98 FEET TO THE SOUTHEAST CORNER OF THAT PARCEL OF LAND DESCRIBED IN THAT DEED RECORDED AT RECEPTION NO. 2009029995, SAID DOUGLAS COUNTY RECORDS;

THENCE ALONG THE EAST AND NORTH LINES OF SAID PARCEL OF LAND THE FOLLOWING TWO (2) COURSES:

- N 00°13'51" W, A DISTANCE OF 245.55 FEET;
- N 47°08'24" W, A DISTANCE OF 34.12 FEET TO A POINT ON THE EAST LINE OF THE FOUNDER'S PARKWAY RIGHT-OF-WAY, ORIGINALLY DEDICATED AS MILLER BOULEVARD, BY THE MILLER BOULEVARD FILING NO. 2 FINAL PLAT, A SUBDIVISION PLAT RECORDED AT RECEPTION NO. 8603133, SAID DOUGLAS COUNTY RECORDS;

THENCE ALONG SAID EAST LINE, THE FOLLOWING TWO COURSES:

- N 00°12'47" W, A DISTANCE OF 1420.37 FEET TO A POINT OF CURVATURE;
- ALONG THE ARC OF A CURVE TO THE LEFT HAVING A RADIUS OF 1005.00 FEET, A CENTRAL ANGLE OF 10°42'21" AND AN ARC LENGTH OF 187.79 FEET TO THE SOUTHWEST CORNER OF THAT PARCEL OF LAND DESCRIBED IN THAT DEED RECORDED AT RECEPTION NO. 2009099312;

THENCE ALONG THE SOUTH AND EAST LINES OF SAID PARCEL OF LAND THE FOLLOWING FIVE (5) COURSES:

- N 72°31'31" E, A DISTANCE OF 73.36 FEET;
- N 00°01'17" E, A DISTANCE OF 200.00 FEET;
- N 72°31'31" E, A DISTANCE OF 192.84 FEET;
- N 24°42'07" W, A DISTANCE OF 72.63 FEET;

CANYONS FAR SOUTH

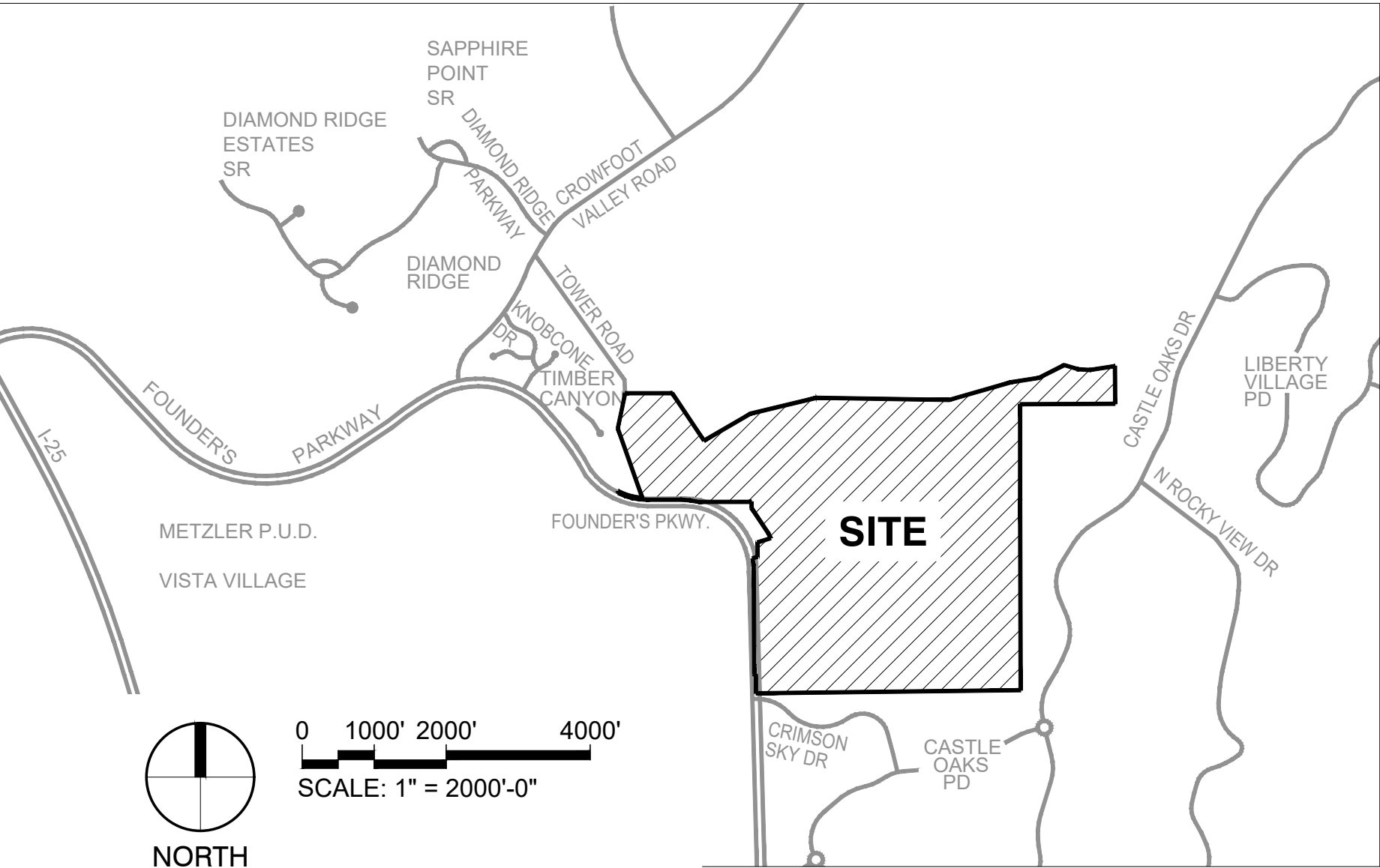
PLANNED DEVELOPMENT PLAN

PORTIONS OF NORTH HALF OF SECTION 31 & SOUTH HALF OF SECTION 30, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, PORTION SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS, STATE OF COLORADO

SHEET INDEX

- COVER SHEET
- SITE CHARTS AND NOTES
- PDP SITE PLAN
- PHASING PLAN
- GRADING AND DRAINAGE
- ROAD SECTION
- PARKS, OPEN SPACE AND TRAILS PLAN
- NATURAL FEATURES
- PDP ZONING REGULATIONS
- PDP ZONING REGULATIONS
- PDP DESIGN GUIDELINES
- COMMERCIAL AREA AND SOUTHERN BUFFER CHARACTER

VICINITY MAP



PROJECT BENCHMARK

PROJECT BENCHMARK IS A REBAR WITH A 2.5" ALUMINUM CAP STAMPED "DOUGLAS COUNTY SECONDARY CONTROL 4.004007". SET FLUSH TO THE GROUND. LOCATED ON THE SOUTH SIDE OF CASTLE OAKS DRIVE, APPROXIMATELY 700 FEET NORTHEAST FROM THE INTERSECTION OF CASTLE OAKS DRIVE AND AUTUMN SAGE DRIVE. CASTLE ROCK, COLORADO. PUBLISHED ELEVATION = 1979.760 METERS (6495.20 FEET) NAVD88.

BASIS OF BEARING

THE BEARINGS FOR THIS DESCRIPTION ARE BASED ON THE EAST LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 30, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH P.M., AS SHOWN ON SAID PLAT OF CANYONS SOUTH FILING NO.1A, 3RD AMENDMENT TO BEAR S 00°03'56" E, FROM THE EAST QUARTER CORNER OF SAID SECTION 30, BEING MONUMENTED BY A REBAR WITH A 2 INCH ALUMINUM CAP STAMPED "PLS 23515" TO THE SOUTH SIXTEENTH CORNER OF SECTIONS 29/30, BEING MONUMENTED BY A REBAR WITH A 1-1/2 INCH ALUMINUM CAP, STAMPED "PLS 23515".

VESTING STATEMENT

THIS CANYONS FAR SOUTH PLANNED DEVELOPMENT PLAN AND ZONING REGULATIONS CONSTITUTES A SITE SPECIFIC DEVELOPMENT PLAN PURSUANT TO CHAPTER 17.08 OF THE CASTLE ROCK MUNICIPAL CODE AND SECTION 24-68-101, ET SEQ., C.R.S., AND ESTABLISHES VESTED PROPERTY RIGHTS FOR 15 YEARS FROM ITS EFFECTIVE DATE TO UNDERTAKE AND COMPLETE THE DEVELOPMENT AND USE OF THE PROPERTY IN ACCORDANCE WITH THIS PLAN.

CERTIFICATION OF OWNERSHIP

THE UNDERSIGNED ARE ALL OF THE OWNERS OF THE ABOVE DESCRIBED PROPERTY IN THE TOWN OF CASTLE ROCK.

CANYONS SOUTH, LLC, A DELAWARE LIMITED LIABILITY COMPANY

SIGNED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_

COUNTY OF \_\_\_\_\_  
STATE OF \_\_\_\_\_

NOTARY BLOCK

SUBSCRIBED AND SWORN TO BEFORE ME THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_

BY \_\_\_\_\_ AS \_\_\_\_\_ OF CANYONS SOUTH, LLC.

WITNESS MY HAND AND OFFICIAL SEAL

NOTARY PUBLIC

MY COMMISSION EXPIRES: \_\_\_\_\_

CONTACTS

APPLICANT:

**LOWIE**  
LOWE, INC.  
11777 SAN VICENTE BLVD #900  
LOS ANGELES, CA 90049  
310.820.6661  
LOWE-RE.COM  
CONTACT: ERIK CLORE

ENGINEERING:

**CORE**  
CORE CONSULTANTS, INC.  
3473 S. BROADWAY  
ENGLEWOOD, CO 80113  
303.703.4444  
LIVEYOURCORE.COM  
CONTACT: KEVIN ROHBBOUGH

PLANNER/LANDSCAPE ARCHITECT:

**Dig Studio**  
DIG STUDIO, INC.  
1521 15TH ST  
DENVER, CO 80202  
720.328.1986  
DIGSTUDIO.COM  
CONTACT: BILL VITEK

TITLE CERTIFICATION

I, \_\_\_\_\_, AN AUTHORIZED REPRESENTATIVE OF \_\_\_\_\_, A TITLE INSURANCE COMPANY LICENSED TO DO BUSINESS IN THE STATE OF COLORADO, HAVE MADE AN EXAMINATION OF THE PUBLIC RECORDS AND STATE THAT ALL OWNERS, MORTGAGES AND LIENHOLDERS OF THE PROPERTY ARE LISTED IN THE CERTIFICATE OF OWNERSHIP AND LIENHOLDER SUBORDINATION CERTIFICATE. 20\_\_\_\_, SIGNED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_.

AUTHORIZED REPRESENTATIVE

TITLE INSURANCE COMPANY

COUNTY OF \_\_\_\_\_  
STATE OF \_\_\_\_\_

NOTARY BLOCK

SUBSCRIBED AND SWORN TO BEFORE ME THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_

BY \_\_\_\_\_ AS AUTHORIZED REPRESENTATIVE OF \_\_\_\_\_.

WITNESS MY HAND AND OFFICIAL SEAL

NOTARY PUBLIC

MY COMMISSION EXPIRES: \_\_\_\_\_

SURVEYOR'S CERTIFICATION

I, \_\_\_\_\_, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY ATTEST THAT THE LEGAL DESCRIPTION AS DESCRIBED HEREON WAS MADE UNDER MY DIRECT SUPERVISION.

MILES M. SMALL  
PROFESSIONAL LAND SURVEYOR  
COLORADO PLS NO. 38534  
FOR AND BEHALF OF CORE CONSULTANT, INC.

DATE

PLANNING COMMISSION RECOMMENDATION

THIS PLANNED DEVELOPMENT PLAN WAS RECOMMENDED FOR APPROVAL BY THE PLANNING COMMISSION OF THE TOWN OF CASTLE ROCK, COLORADO, ON THE \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_.

CHAIR

DATE

ATTEST:

DIRECTOR OF DEVELOPMENT SERVICES

DATE

TOWN COUNCIL APPROVAL

THIS PLANNED DEVELOPMENT PLAN WAS APPROVED BY THE TOWN COUNCIL OF THE TOWN OF CASTLE ROCK, COLORADO, ON THE \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_.

MAYOR

DATE

ATTEST:

TOWN CLERK

DATE

DOUGLAS COUNTY CLERK AND RECORDER'S CERTIFICATE

THIS PLANNED DEVELOPMENT PLAN WAS FILED FOR RECORD IN THE OFFICE OF THE COUNTY CLERK AND RECORDER OF DOUGLAS COUNTY AT \_\_\_\_\_ ON THE \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_ AT RECEPTION NO. \_\_\_\_\_.

DOUGLAS COUNTY CLERK AND RECORDER

BY:

DEPUTY

DATE

**LOWIE**

CORE CONSULTANTS, INC.  
3473 S. BROADWAY  
ENGLEWOOD, CO 80113  
303.703.4444  
LIVEYOURCORE.COM

**CORE**

DIG STUDIO, INC.  
1521 15TH ST  
DENVER, CO 80202  
720.328.1986  
DIGSTUDIO.COM

**Dig Studio**

CANYONS FAR SOUTH  
CASTLE ROCK, COLORADO  
PLANNED DEVELOPMENT PLAN (PDP)  
COVER SHEET

NOT FOR CONSTRUCTION

DESIGNED BY: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_

JOB NO.  
20-245

SHEET  
1 of 13

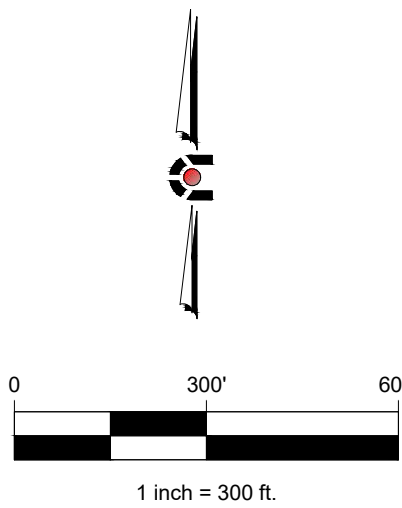
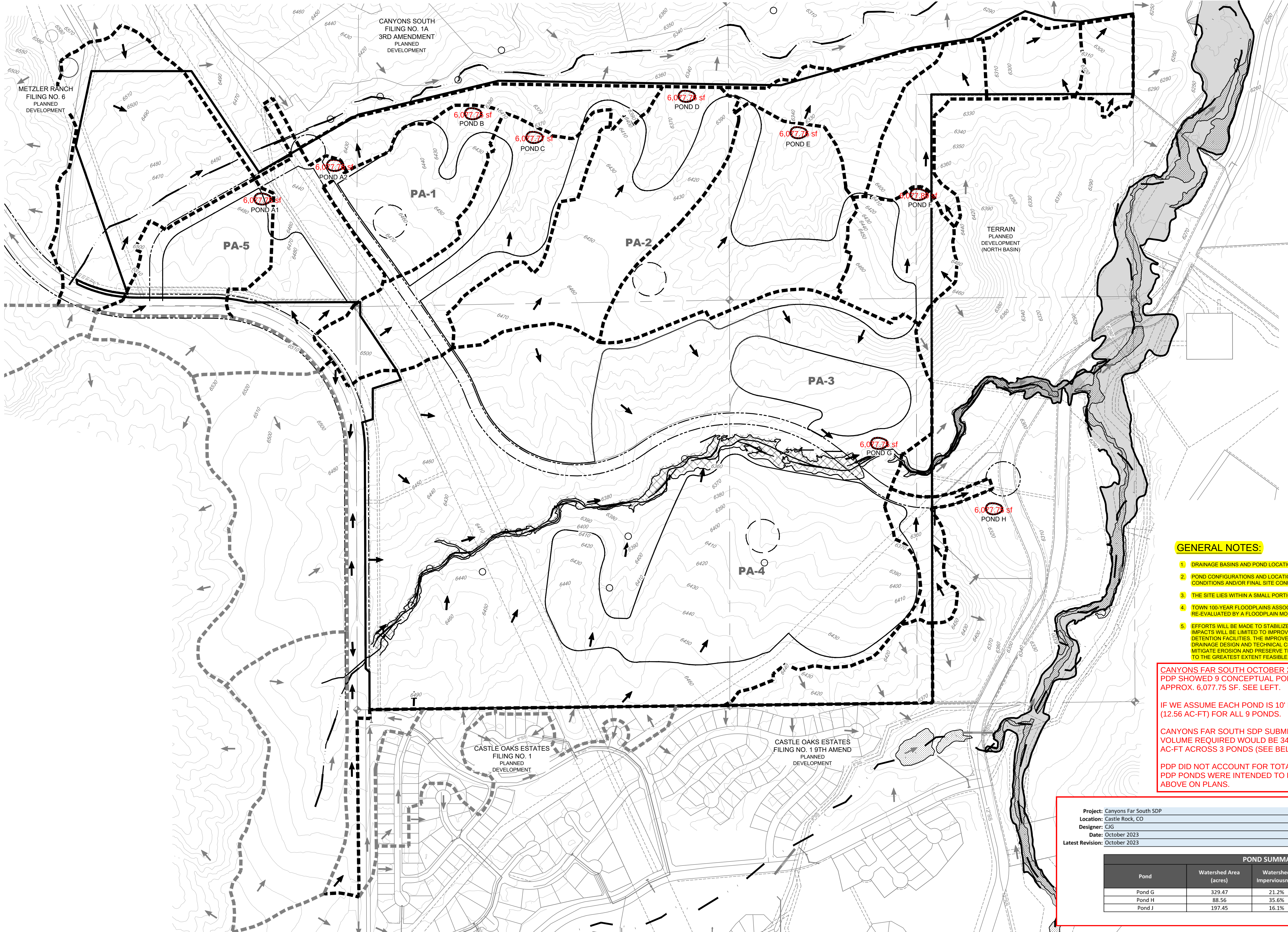


10/25/2022 11:40 AM X:\20-245 CANYONS SOUTH\CAD\PLANS\_OVERALL\UPRIMG\_CANYONS SOUTH.DWG

# CANYONS SOUTH

## PLANNED DEVELOPMENT PLAN

PORTIONS OF NORTH HALF OF SECTION 31 & SOUTH HALF OF SECTION 30,  
TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,  
PORTION SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 7 SOUTH,  
RANGE 67 WEST OF THE SIXTH PRINCIPAL MERIDIAN  
TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS, STATE OF COLORADO



### LEGEND

- PHASE BOUNDARY
- PLANNING AREA BOUNDARY
- DIRECTIONAL FLOW ARROW
- PROPOSED DRAINAGE BASIN
- EXISTING DRAINAGE BASIN
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EX DRAINAGE WAY
- SECTION LINES
- EXISTING EASEMENT
- EX-100 YEAR FLOODPLAIN FEMA
- EX-100 YEAR FLOODPLAIN TOWN
- WETLANDS
- CONCEPTUAL POND LOCATION
- EXISTING CHECK DAM STRUCTURES

### ABBREVIATIONS:

- D.E. DRAINAGE EASEMENT
- DRNG DRAINAGE
- ESMT EASEMENT
- FM SEWER FORCE MAIN
- OSD OPEN SPACE DEVELOPMENT
- OSP OPEN SPACE PLANNING
- PA PLANNING AREA
- PH PHASE
- PLD PUBLIC LAND DEDICATION
- R.O.W. RIGHT OF WAY
- SS SANITARY SEWER
- U.E. UTILITY EASEMENT
- W WATER

### GENERAL NOTES:

- DRAINAGE BASINS AND POND LOCATIONS ARE APPROXIMATE.
- POND CONFIGURATIONS AND LOCATIONS ARE CONCEPTUAL AND MAY CHANGE DUE TO FIELD CONDITIONS AND/OR FINAL SITE CONFIGURATIONS.
- THE SITE LIES WITHIN A SMALL PORTION OF ZONE A OF THE FEMA 100-YEAR FLOODPLAIN.
- TOWN 100-YEAR FLOODPLAINS ASSOCIATED WITH THE MCJURDO GULCH TRIBUTARY 3 WILL BE RE-EVALUATED BY A FLOODPLAIN MODIFICATION STUDY.
- EFFORTS WILL BE MADE TO STABILIZE, PROTECT, AND PRESERVE THE MAJOR DRAINAGEWAYS ON-SITE. IMPACTS WILL BE LIMITED TO IMPROVEMENTS IN THE AREAS OF DISCHARGES FROM THE PROPOSED DETENTION FACILITIES. THE IMPROVEMENTS WILL CONFORM TO THE TOWN OF CASTLE ROCK STORM DRAINAGE DESIGN AND TECHNICAL CRITERIA MANUAL. THESE IMPROVEMENTS WILL BE DESIGNED TO MITIGATE EROSION AND PRESERVE THE NATURAL CHARACTER AND HISTORICAL DRAINAGE PATTERNS TO THE GREATEST EXTENT FEASIBLE.

CANYONS FAR SOUTH OCTOBER 2024 NOTE:  
PDP SHOWED 9 CONCEPTUAL PONDS. ALL POND HAVE THE SAME AREA OF APPROX. 6,077.75 SF. SEE LEFT.

IF WE ASSUME EACH POND IS 10' DEEP, THAT IS TOTAL VOLUME OF 547,200 CF (12.56 AC-FT) FOR ALL 9 PONDS.

CANYONS FAR SOUTH SDP SUBMISSION 1 (OCT. 2023) ASSUMED TOTAL VOLUME REQUIRED WOULD BE 34.32 AC-FT AND PROVIDED WOULD BE 35.8 AC-FT ACROSS 3 PONDS (SEE BELOW).

PDP DID NOT ACCOUNT FOR TOTAL VOLUME NECESSARY FOR DEVELOPMENT. PDP PONDS WERE INTENDED TO BE CONCEPTUAL ONLY AS NOTED IN YELLOW ABOVE ON PLANS.

Project: Canyons Far South SDP  
Location: Castle Rock, CO  
Designer: CJG  
Date: October 2023  
Latest Revision: October 2023



| POND SUMMARY TABLE |                        |                          |                                                |                                                |
|--------------------|------------------------|--------------------------|------------------------------------------------|------------------------------------------------|
| Pond               | Watershed Area (acres) | Watershed Imperviousness | Approximate 100-yr Volume Required (acre-feet) | Approximate 100-yr Volume Provided (acre-feet) |
| Pond G             | 329.47                 | 21.2%                    | 18.24                                          | 18.3                                           |
| Pond H             | 88.56                  | 35.6%                    | 6.62                                           | 7.9                                            |
| Pond J             | 197.45                 | 16.1%                    | 9.46                                           | 9.6                                            |

LOWE

CORE CONSULTANTS, INC.  
3473 S. BROADWAY  
DENVER, CO 80113  
303.703.4444  
LIVEYOURCORE.COM

CORE

DIG STUDIO, INC.  
1521 15TH ST  
DENVER, CO 80202  
720.328.1986  
DIGSTUDIO.COM

Dig Studio

CANYONS SOUTH  
CASTLE ROCK, COLORADO  
PLANNED DEVELOPMENT PLAN (PDP)  
GRADING & DRAINAGE

NOT FOR CONSTRUCTION

DESIGNED BY: CGV  
DRAWN BY: CGV  
CHECKED BY: KJR

JOB NO.  
20-245

SHEET  
5 OF 12

Page 20 of 40

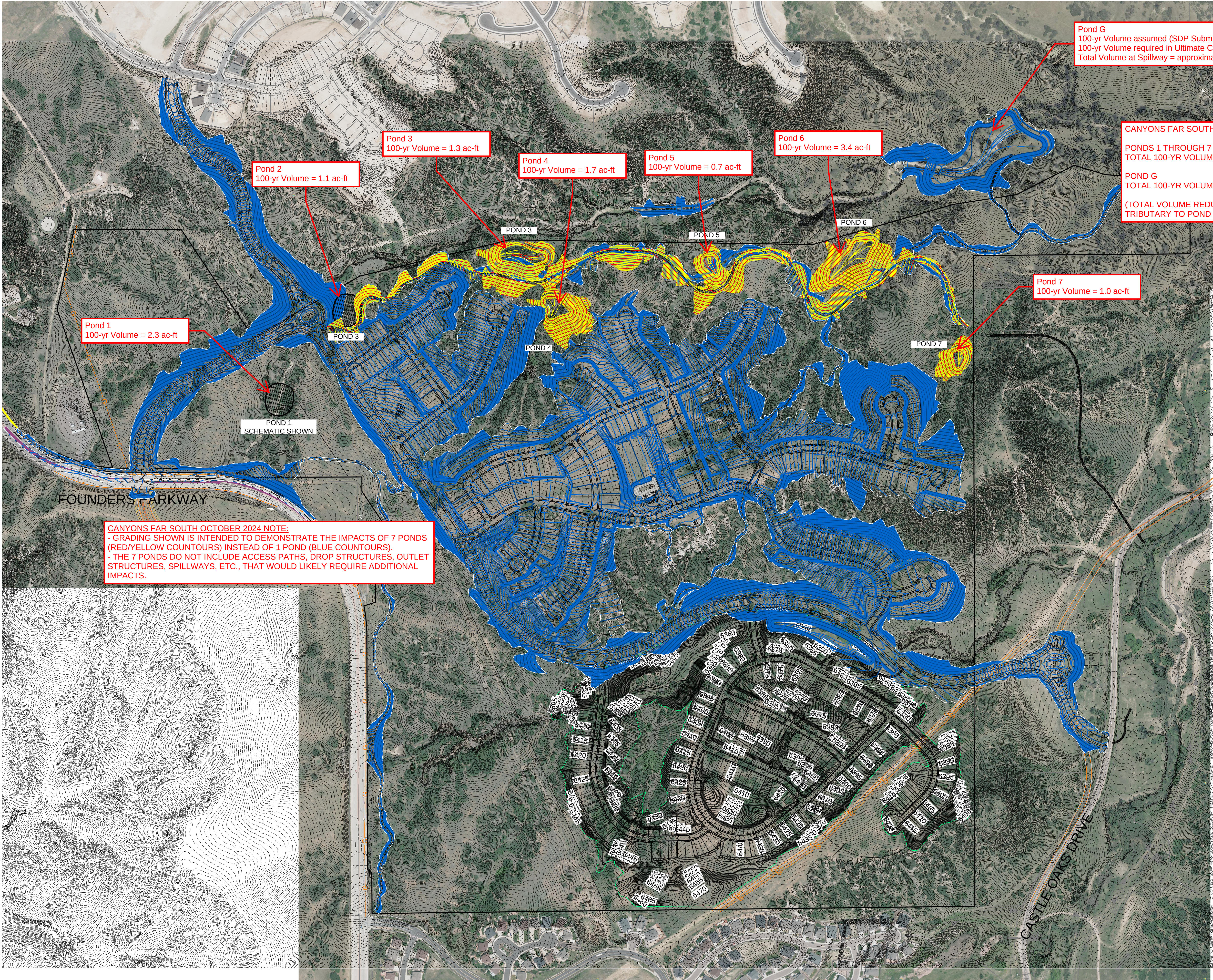




# **CANYONS FAR SOUTH**

## **1 POND VS 7 POND EXHIBIT**





Pond 1  
100-yr Volume = 2.3 ac-ft

Pond 2  
100-yr Volume = 1.1 ac-ft

Pond 3  
100-yr Volume = 1.3 ac-ft

Pond 4  
100-yr Volume = 1.7 ac-ft

Pond 5  
100-yr Volume = 0.7 ac-ft

Pond 6  
100-yr Volume = 3.4 ac-ft

Pond 7  
100-yr Volume = 1.0 ac-ft

Pond G  
100-yr Volume assumed (SDP Submission 1, Oct. 2023) = 18.3 ac-ft  
100-yr Volume required in Ultimate Condition (as drawn with Filing 1, May 2024) = 18.6 ac-ft  
Total Volume at Spillway = approximately 19.4 ac-ft

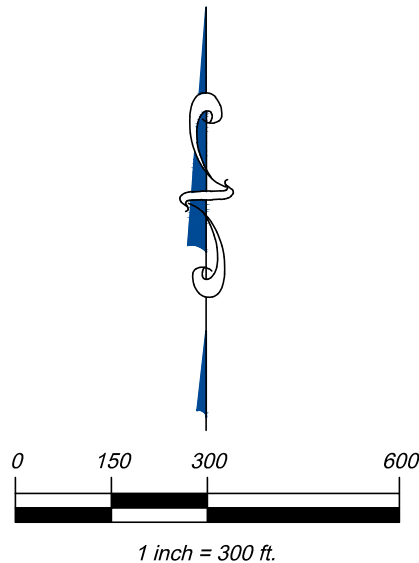
CANYONS FAR SOUTH OCTOBER 2024 NOTE:

PONDS 1 THROUGH 7  
TOTAL 100-YR VOLUME = 11.5 AC-FT

POND G  
TOTAL 100-YR VOLUME= 19.4 AC-FT

(TOTAL VOLUME REDUCED FOR PONDS 1 THROUGH 7 DUE TO OFFSITE AREA  
TRIBUTARY TO POND G BEING REDUCED)

CANYONS FAR SOUTH OCTOBER 2024 NOTE:  
- GRADING SHOWN IS INTENDED TO DEMONSTRATE THE IMPACTS OF 7 PONDS  
(RED/YELLOW COUNTOURS) INSTEAD OF 1 POND (BLUE COUNTOURS).  
- THE 7 PONDS DO NOT INCLUDE ACCESS PATHS, DROP STRUCTURES, OUTLET  
STRUCTURES, SPILLWAYS, ETC., THAT WOULD LIKELY REQUIRE ADDITIONAL  
IMPACTS.



**COVER**  
engineering



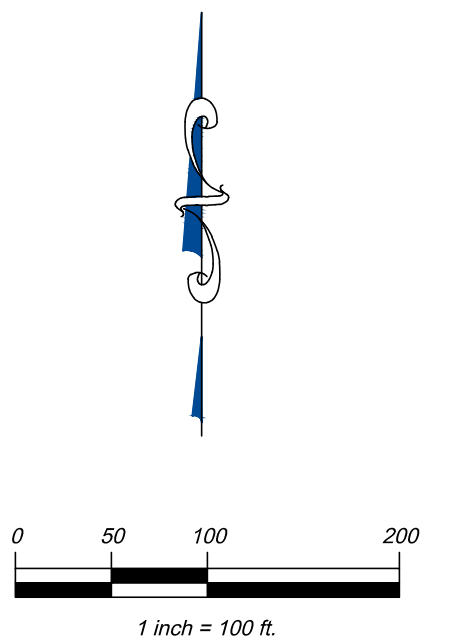


# **CANYONS FAR SOUTH**

## **POND G SUMMARY**



ORIGINAL POND G LOCATION AS SHOWN ON CANYONS FAR SOUTH SDP  
SUBMISSION 1 IN OCTOBER 2023



Page 30 of 43



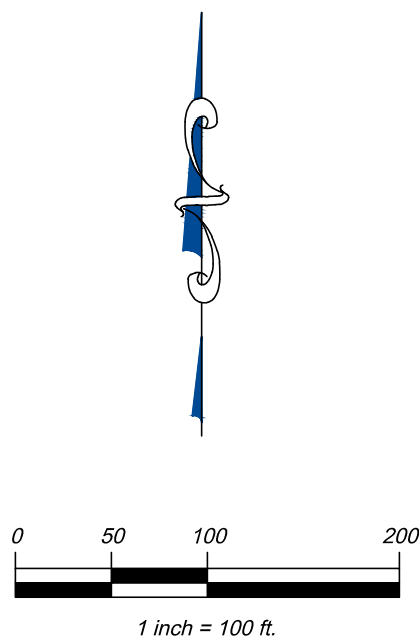
CANYONS FAR SOUTH OCTOBER 2024 NOTE:  
POND G UPDATED IN MARCH 2024 TO SHIFT FURTHER DOWNSTREAM TO THE EAST. THE BERM WAS ALIGNED WITH EXISTING STOCK POND. THE LOCATION IS ALSO FURTHER AWAY FROM RESIDENTIAL LOTS AND IS ABLE TO PRESERVE MORE TREES ALONG TRIBUTARY B.

IF POND IS SHIFTED FURTHER DOWNSTREAM, LARGE STAND OF MATURE TREES WOULD BE REMOVED

POND GRADING UPDATED TO FOLLOW EXISTING CONTOURS TO MINIMIZE IMPACTS. POND LOCATED WITHIN EXISTING STOCK POND, TO MINIMIZE TREES TO BE REMOVED.

PROPERTY LINE

DOUGLAS COUNTY  
CASTLE ROCK



**COVER**  
engineering





**EXCERPT FROM CANYONS FAR SOUTH**  
**SDP SUBMISSION 1 (OCTOBER 2023)**



CANYONS FAR SOUTH OCTOBER 2024 NOTE:  
CANYONS FAR SOUTH SDP SUBMISSION 1 FROM OCTOBER 2023

SEE RIGHT

EX. POND C3  
Q100 OUTFLOW= 1.5 CFS  
TO BYPASS SITE

EX. POND C2  
Q100 OUTFLOW= 3.7 CFS  
TO BYPASS SITE

SEE LEFT

FEMA FIRM FLOODPLAIN  
**McMURDO GULCH  
TRIBUTARY B**  
DOUGLAS COUNTY  
TOWN OF CASTLE ROCK  
PROPERTY BOUNDARY  
CHANNEL REACH B1

KEYMAP

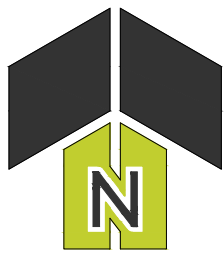
LEGEND

- PROPOSED MAJOR CONTOUR (10') —5250—
- PROPOSED MINOR CONTOUR (2') ———
- EXISTING MAJOR CONTOUR (25') - - - - -5250- - - - -
- EXISTING MINOR CONTOUR (5') - - - - -
- PROPOSED STORM DRAIN PIPE ———
- PROPOSED STORM DRAIN INLET □
- PROPOSED LOW TAILWATER BASIN ▨
- PROPOSED SWALE . . . . .
- PROPERTY LINE ———
- 100-YR WSEL - - - - -
- DIRECTIONAL FLOW ARROW ←
- EMERGENCY OVERFLOW ARROW ↙
- EXISTING BASIN LINE ———
- PROPOSED MAJOR BASIN LINE ———

DESIGN POINT △  
PROPOSED BASIN LABEL

B2 BASIN DESIGNATION  
AREA (AC.) 1.00 .40 .60  
MINOR RUNOFF COEF.  
MAJOR RUNOFF COEF.

**811** UNCC  
CALL BEFORE  
YOU DIG  
**811**  
OR  
**1-800-922-1987**  
Utility Notification  
Center of Colorado



0 300' 600.0001"  
1" = 300' (HORIZONTAL)

**COVER**  
ENGINEERING  
**OVERALL PROPOSED  
DRAINAGE MAP  
SHEET 3**

| POND SUMMARY TABLE |                        |                          |                                                |                                                |
|--------------------|------------------------|--------------------------|------------------------------------------------|------------------------------------------------|
| Pond               | Watershed Area (acres) | Watershed Imperviousness | Approximate 100-yr Volume Required (acre-feet) | Approximate 100-yr Volume Provided (acre-feet) |
| Pond G             | 329.47                 | 21.2%                    | 18.24                                          | 18.3                                           |
| Pond H             | 88.56                  | 35.6%                    | 6.62                                           | 7.9                                            |
| Pond J             | 197.45                 | 16.1%                    | 9.46                                           | 9.6                                            |

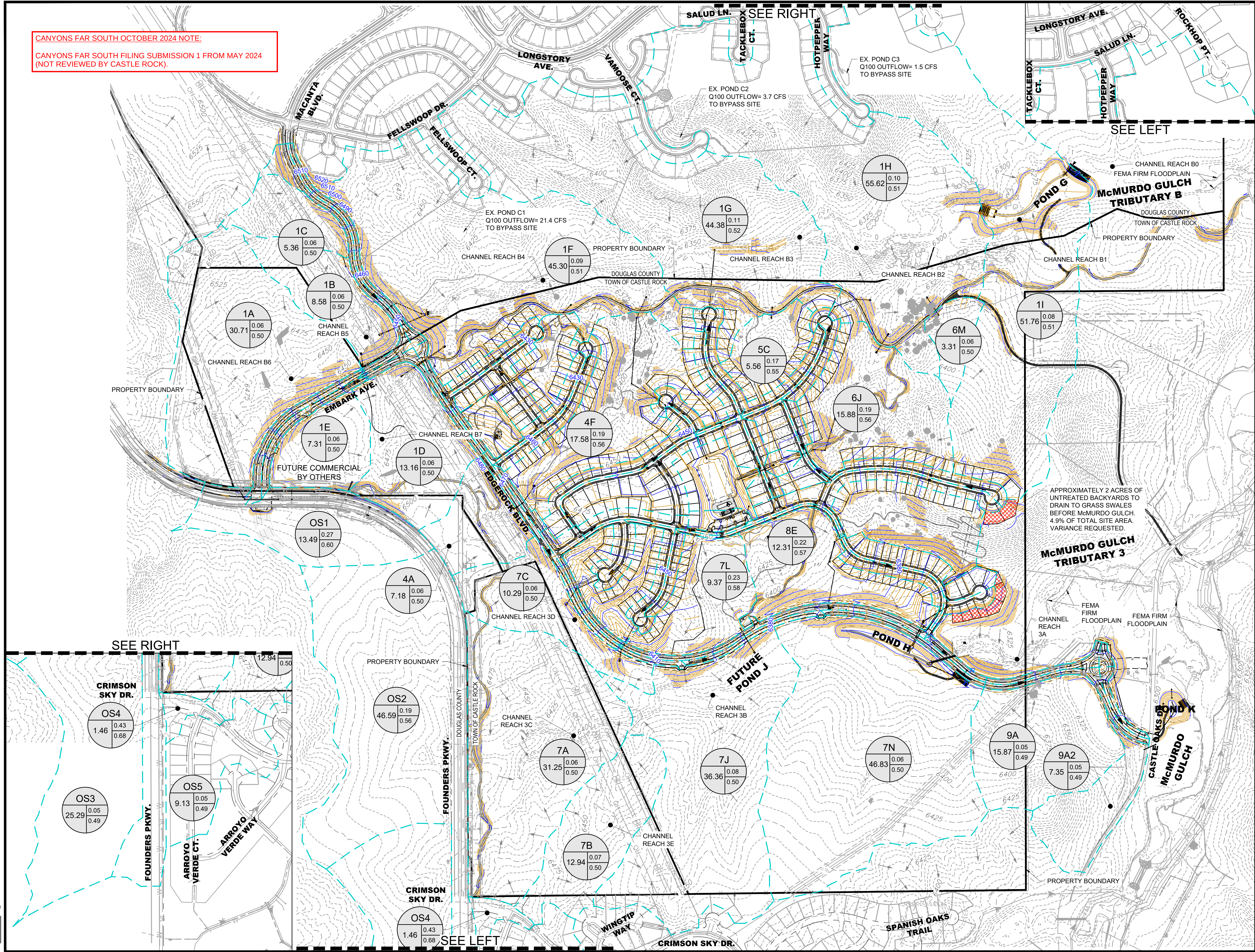




**EXCERPTS FROM CANYONS FAR SOUTH**  
**FILING 1 (MAY 2024)**  
**NOT REVIEWED BY TOWN OF CASTLE ROCK**



CANYONS FAR SOUTH OCTOBER 2024 NOTE:  
CANYONS FAR SOUTH FILING SUBMISSION 1 FROM MAY 2024  
(NOT REVIEWED BY CASTLE ROCK).



#### KEYMAP

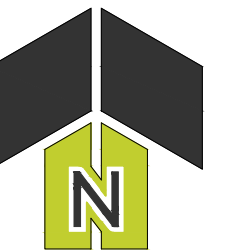
#### LEGEND

- PROPOSED MAJOR CONTOUR (10') — 5250 —
- PROPOSED MINOR CONTOUR (2') — 5250 —
- EXISTING MAJOR CONTOUR (25') — 5250 —
- EXISTING MINOR CONTOUR (5') — 5250 —
- PROPOSED STORM DRAIN PIPE — —
- PROPOSED STORM DRAIN INLET —
- PROPOSED LOW TAILWATER BASIN —
- PROPOSED SWALE — — — —
- PROPERTY LINE — — — —
- 100-YR WSEL — — — —
- DIRECTIONAL FLOW ARROW — — — —
- EMERGENCY OVERFLOW ARROW — — — —
- EXISTING BASIN LINE — — — —
- PROPOSED MAJOR BASIN LINE — — — —
- DESIGN POINT —
- PROPOSED BASIN LABEL —

| B2         |      | BASIN DESIGNATION  |
|------------|------|--------------------|
| AREA (AC.) | 1.00 | MINOR RUNOFF COEF. |
|            | 0.40 | MAJOR RUNOFF COEF. |
|            | 0.60 |                    |



UNCC  
CALL BEFORE  
YOU DIG  
811  
OR  
1-800-922-1987  
Utility Notification  
Center of Colorado



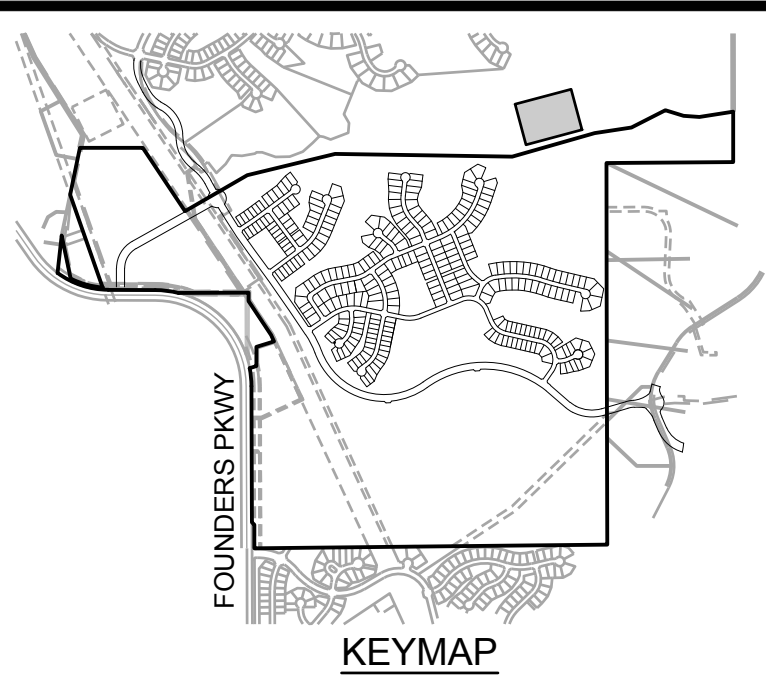
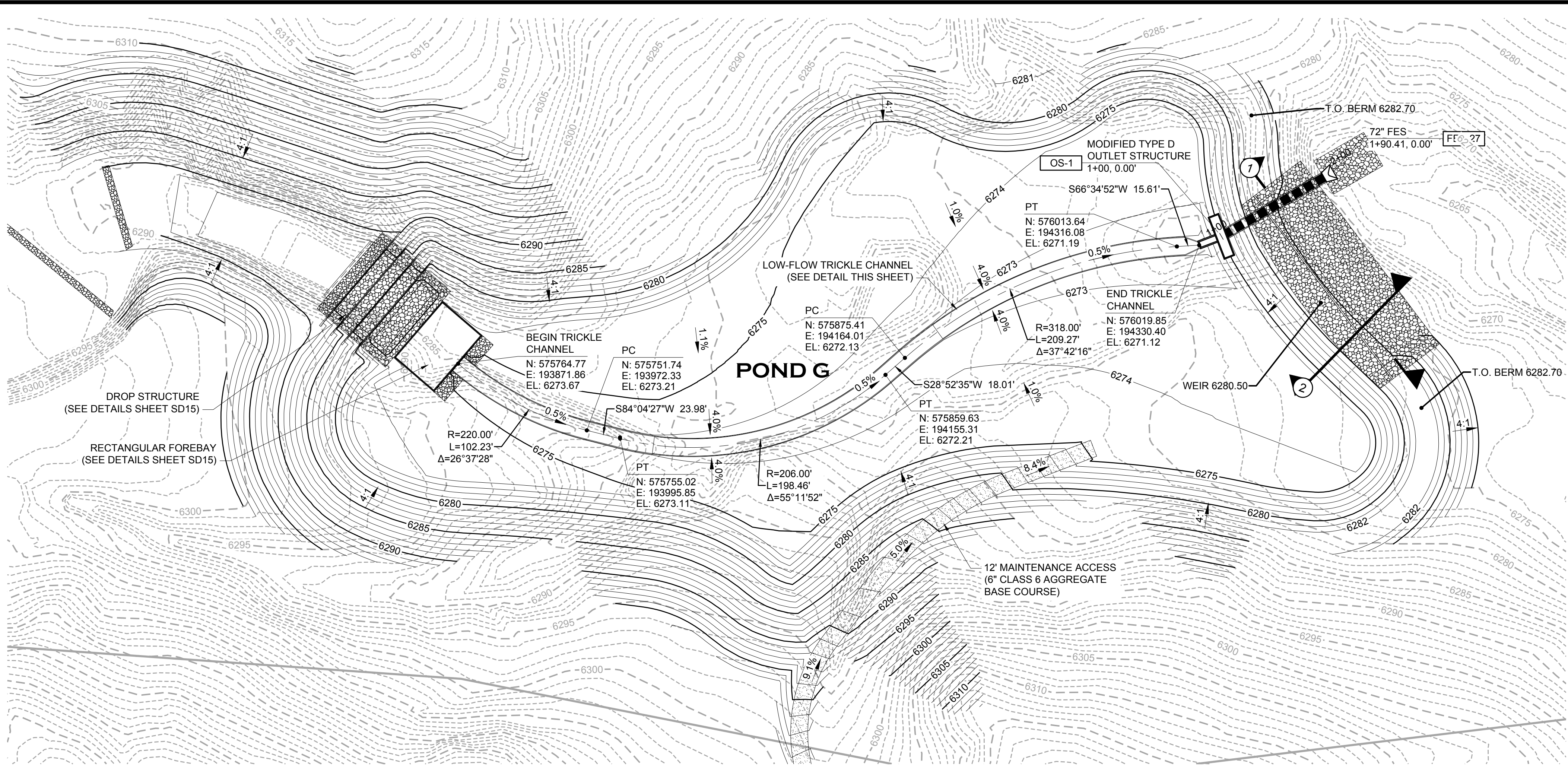
0 300' 600'  
1" = 300' (HORIZONTAL)

**COVER**

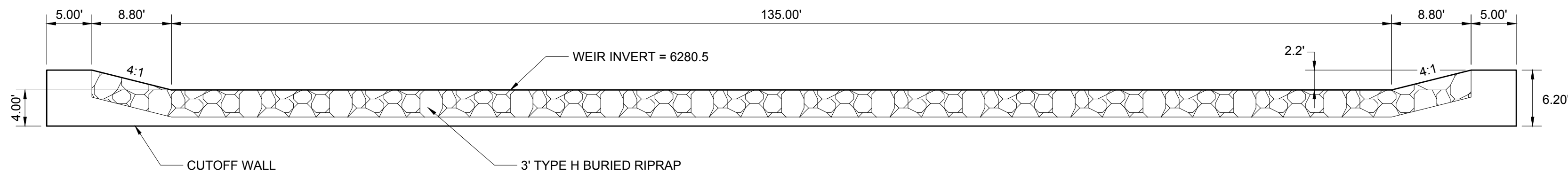
ENGINEERING  
CANYONS FAR SOUTH  
FILING NO. 1

PROPOSED OVERALL DRAINAGE MAP  
SHEET 3



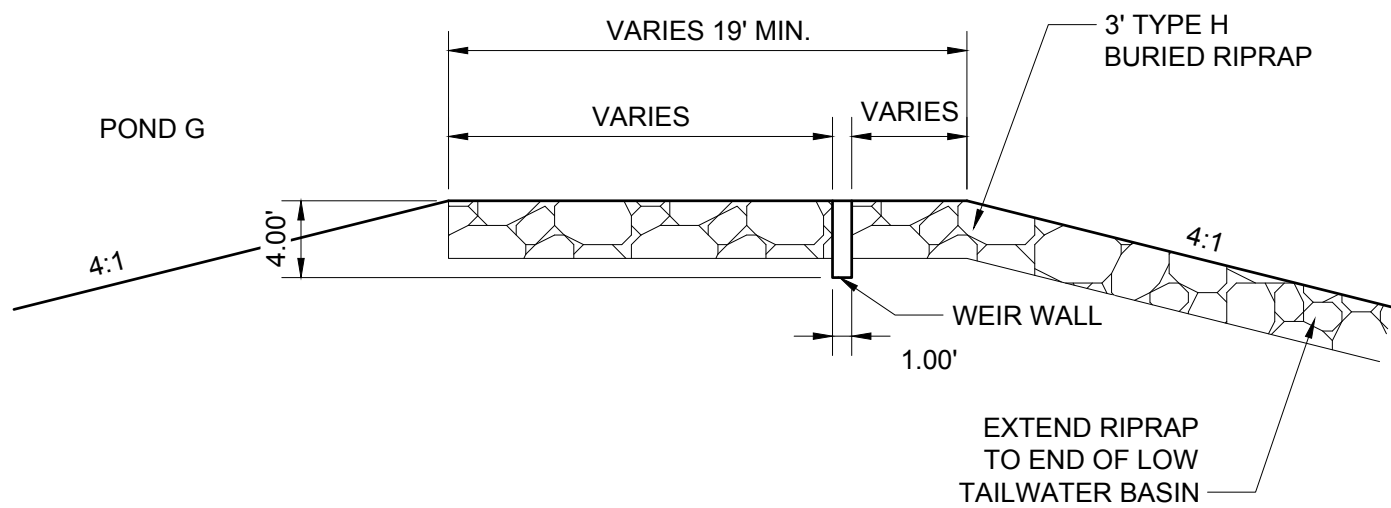


- GENERAL NOTES:**
- ALL STORM LOCATED WITHIN THE RIGHT-OF-WAY IS PUBLIC AND ALL STORM SEWER OUTSIDE OF RIGHT-OF-WAY IS PRIVATE. ALL PRIVATE STORM SEWER WILL BE OWNED AND MAINTAINED BY THE METROPOLITAN DISTRICT.
  - ALL STORM IS SIZED FOR THE 100-YEAR EVENT UNLESS OTHERWISE NOTED.
  - ALL DRAINAGE CHANNELS AND SWALES ARE PRIVATE AND SIZED FOR THE 100-YEAR EVENT UNLESS OTHERWISE NOTED.
  - THE METROPOLITAN DISTRICT WILL BE RESPONSIBLE FOR MAINTAINING ALL CHANNEL IMPROVEMENTS (RIPRAP, ETC.).
  - IN ALL LOCATIONS WHERE STORM SEWER CROSSES WATER, ABOVE OR BELOW, EACH STORM SEWER JOINT WITHIN THE TRENCH WIDTH OF THE CROSSING SHALL BE ENCASED IN A 6" THICK CONCRETE COLLAR EXTENDING 6" BEYOND BOTH SIDES OF THE JOINT.
  - WHERE DOUBLE CDOT TYPE R INLETS ARE UTILIZED, A PIPE SHALL BE PLACED BETWEEN THE 2 INLETS. FLOW WILL BE PASSED BETWEEN THE INLETS VIA A 18" RCP.
- ① INDICATES UTILITY CROSSING NUMBER (SEE CROSSING TABLE LEFT COLUMN)



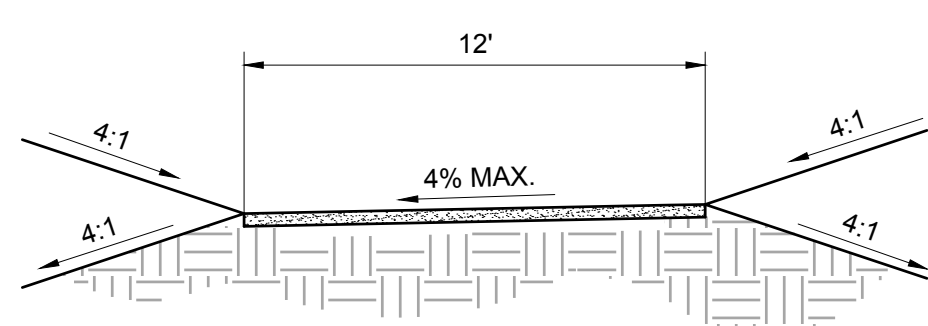
**POND G OVERFLOW WEIR SECTION 1**

SCALE 1"=10'



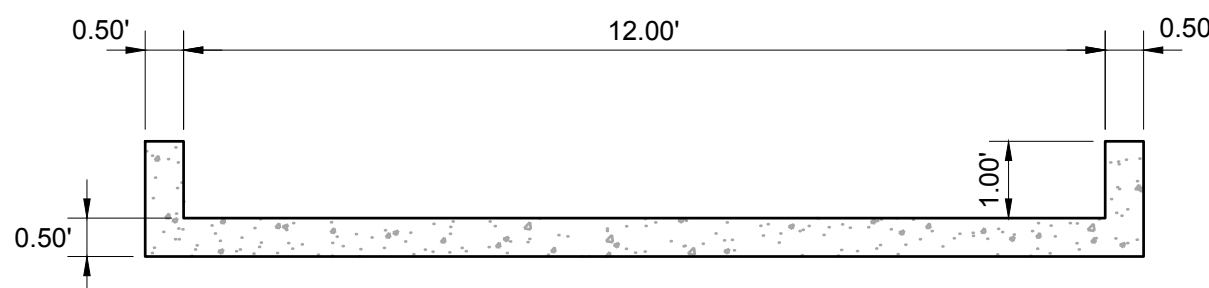
**POND G OVERFLOW WEIR SECTION 2**

SCALE 1"=10'



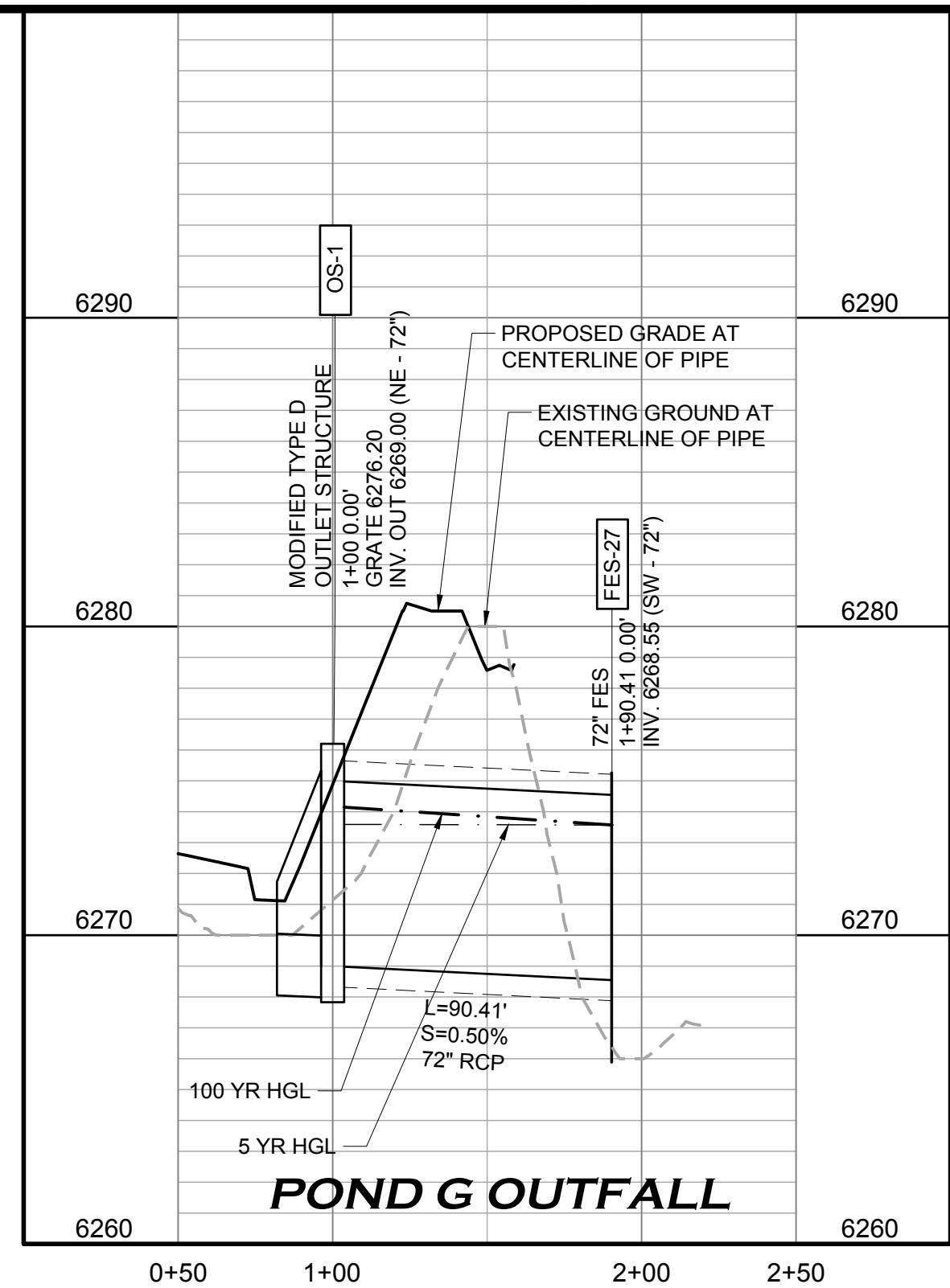
**POND MAINTENANCE PATH DETAIL**

N.T.S.



**POND G TRICKLE CHANNEL SECTION**

N.T.S.



**BASIS OF BEARINGS**

PROJECT BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 30, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH P.M., BEARING SOUTH 00°03'56" EAST, FROM THE EAST QUARTER CORNER OF SECTION 30, BEING MONUMENTED BY A REBAR WITH A 2 INCH ALUMINUM CAP STAMPED "PLS 23515" TO THE SOUTH SIXTEENTH CORNER OF SECTIONS 29/30, BEING MONUMENTED BY A REBAR WITH A 1-1/2 INCH ALUMINUM CAP, STAMPED "PLS 23515".

**PROFESSIONAL ENGINEER CERTIFICATION**

I HEREBY AFFIRM THAT THESE FINAL CONSTRUCTION PLANS WERE PREPARED UNDER MY DIRECT SUPERVISION, IN ACCORDANCE WITH ALL APPLICABLE TOWN OF CASTLE ROCK AND STATE OF COLORADO STANDARDS AND STATUTES, RESPECTIVELY, AND THAT I AM FULLY RESPONSIBLE FOR ALL DESIGN AND REVISIONS RELATIVE TO SAID PLANS.

BRIAN K. MOSS  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF COLORADO NO. 37702

**TOWN APPROVAL BLOCK**

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY:

DEVELOPMENT SERVICES DATE

TOCR PROJECT NO: CD24-0011

PATH: K:\HINES\PCAD\CIVIL\32 FILING 1 CD\32SD14-SD15.DWG  
PLOT BY: RSGMON PLOT DATE: 5/14/2024 10:22 PM  
XREFS:

| DATE | REVISION DESCRIPTION |
|------|----------------------|
|      |                      |
|      |                      |
|      |                      |
|      |                      |

|            |          |
|------------|----------|
| Job Number | HINES LP |
| Chk        | BKM      |
| Dnw        | RLS      |
| Des        | RLS      |

|                                                                                      |
|--------------------------------------------------------------------------------------|
|  |
| <p>1 inch = 50 ft. HORIZ.<br/>1 inch = 5 ft. VERT.</p>                               |
| Drawing Name                                                                         |

32SD14-SD15.dwg

|                                                                                          |
|------------------------------------------------------------------------------------------|
| PROJECT BENCHMARK                                                                        |
| (AZTEC #401)<br>DOUGLAS COUNTY<br>BENCHMARK TT17A<br>(NAVD88 DATUM)<br>ELEVATION=6483.68 |

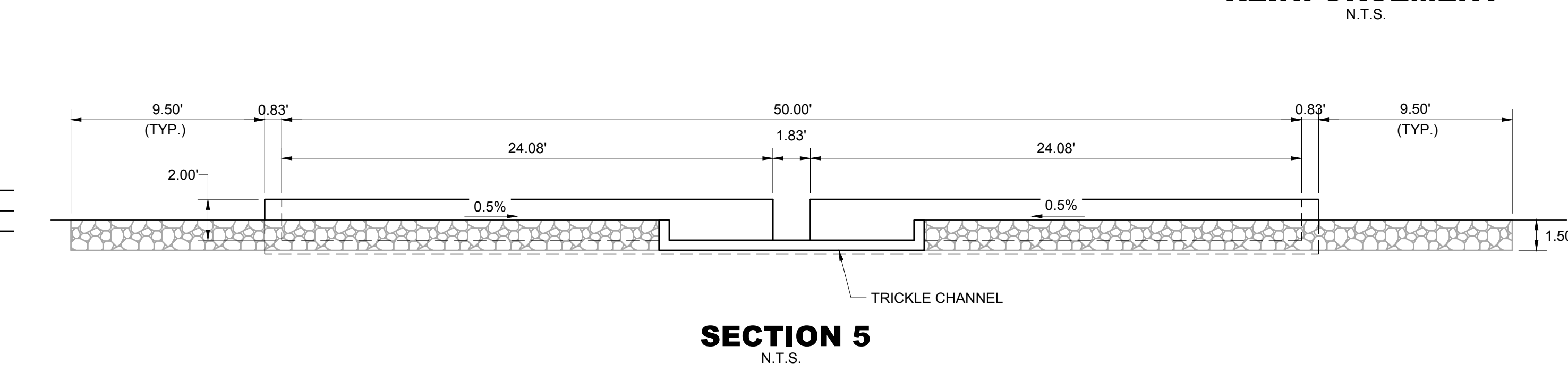
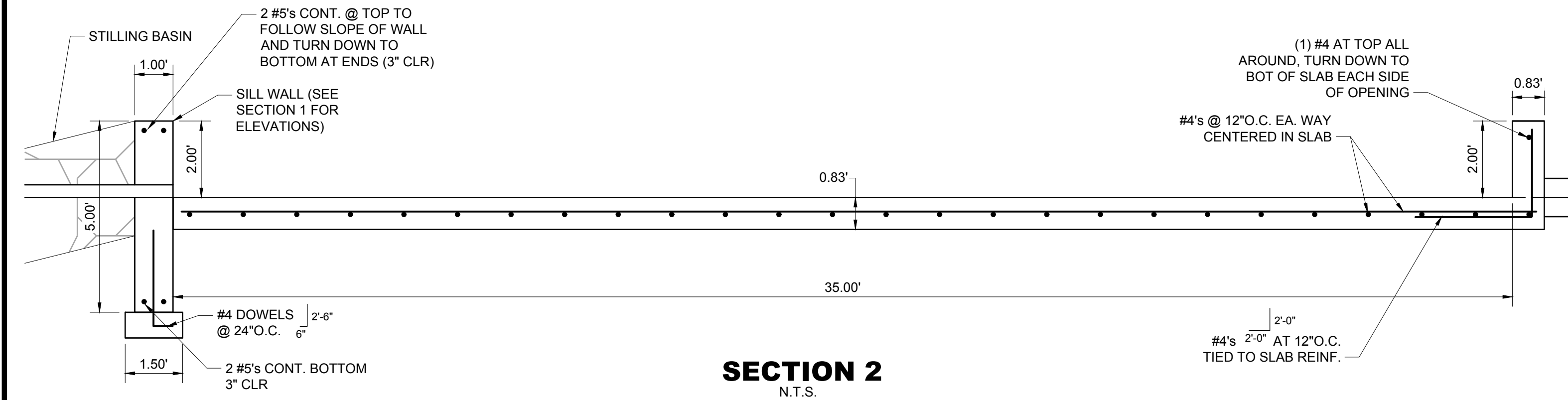
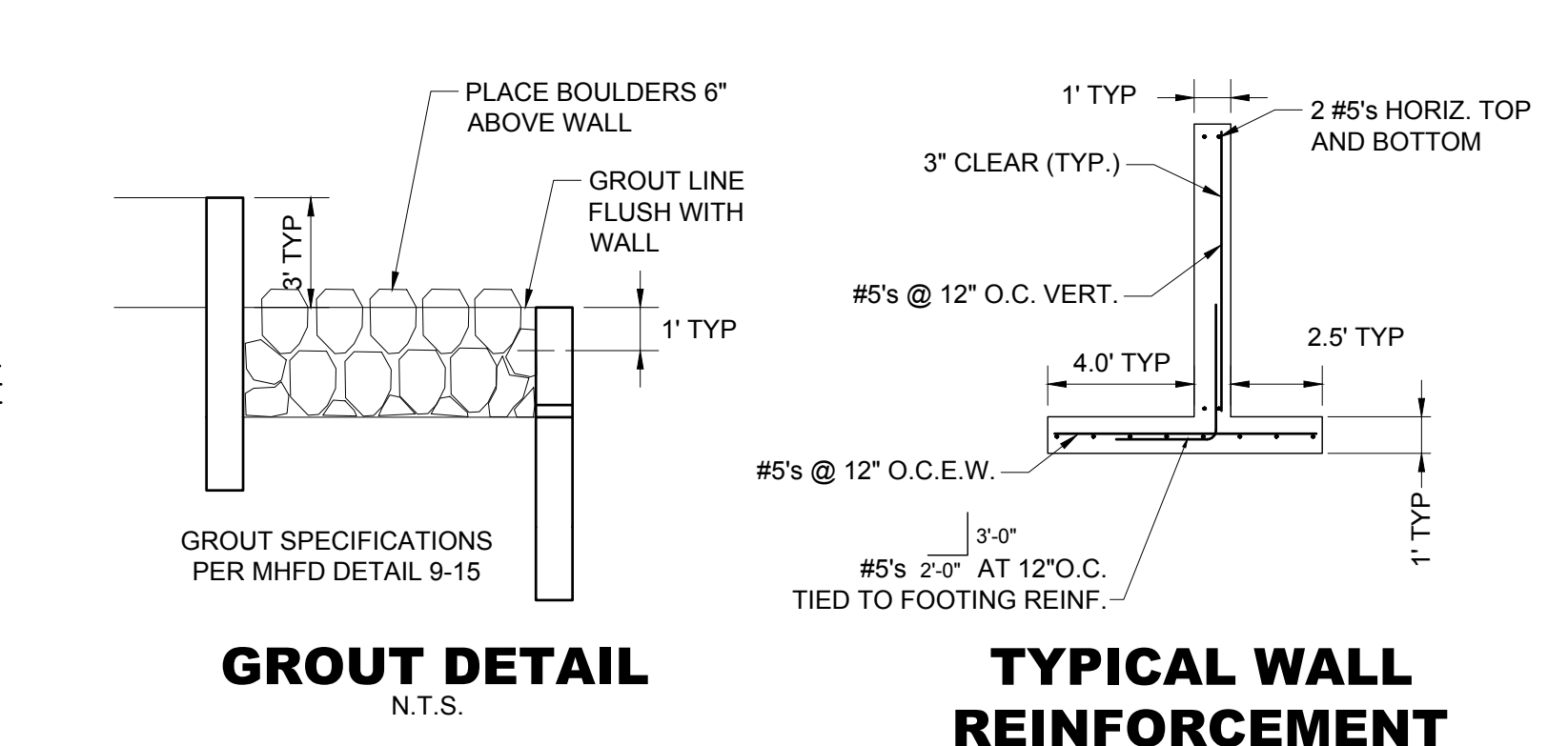
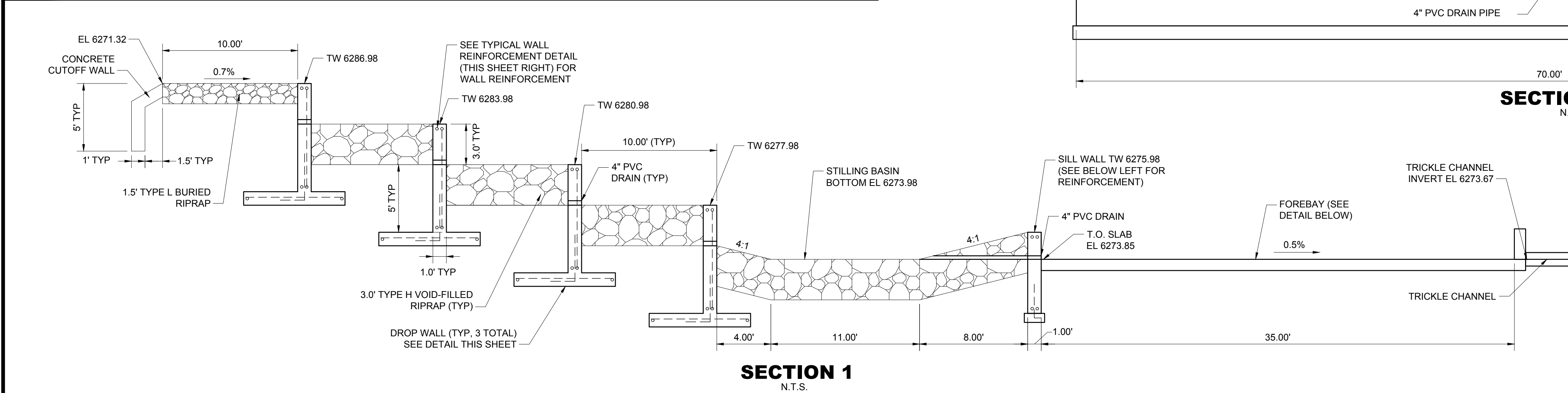
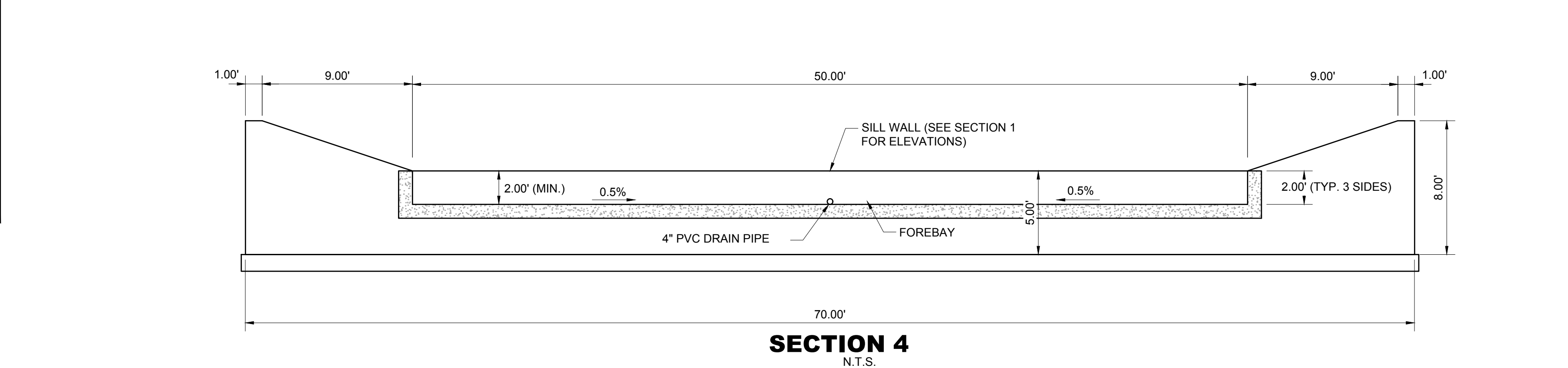
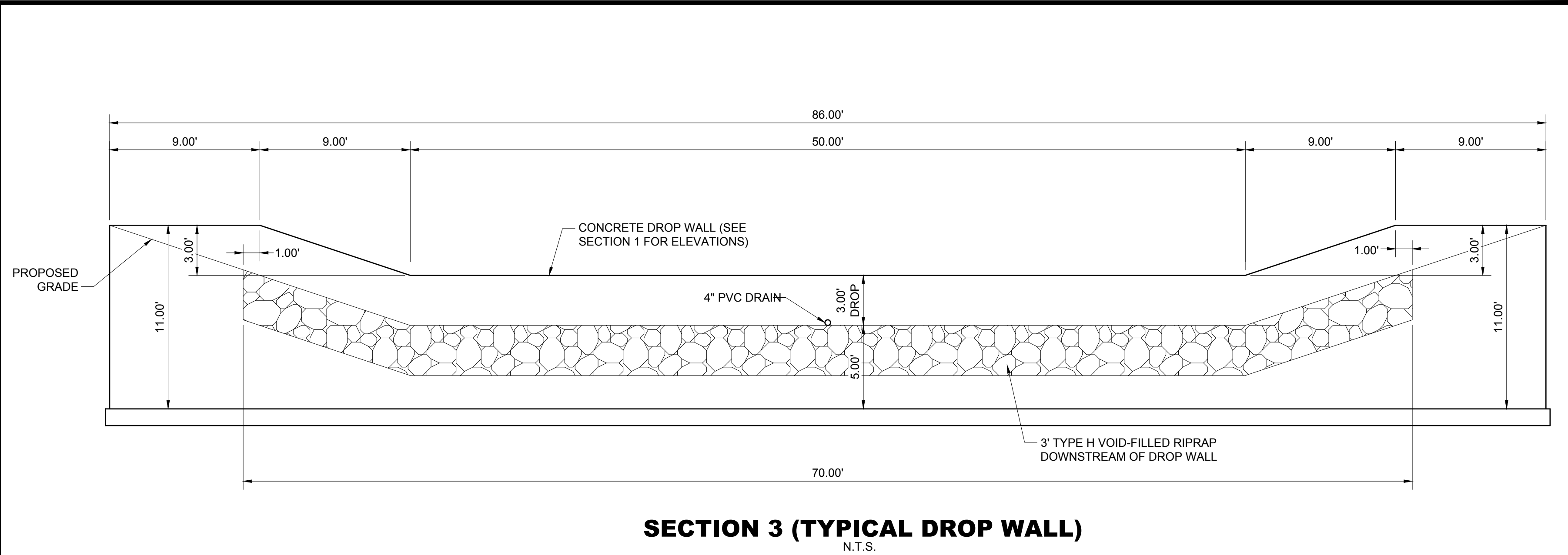
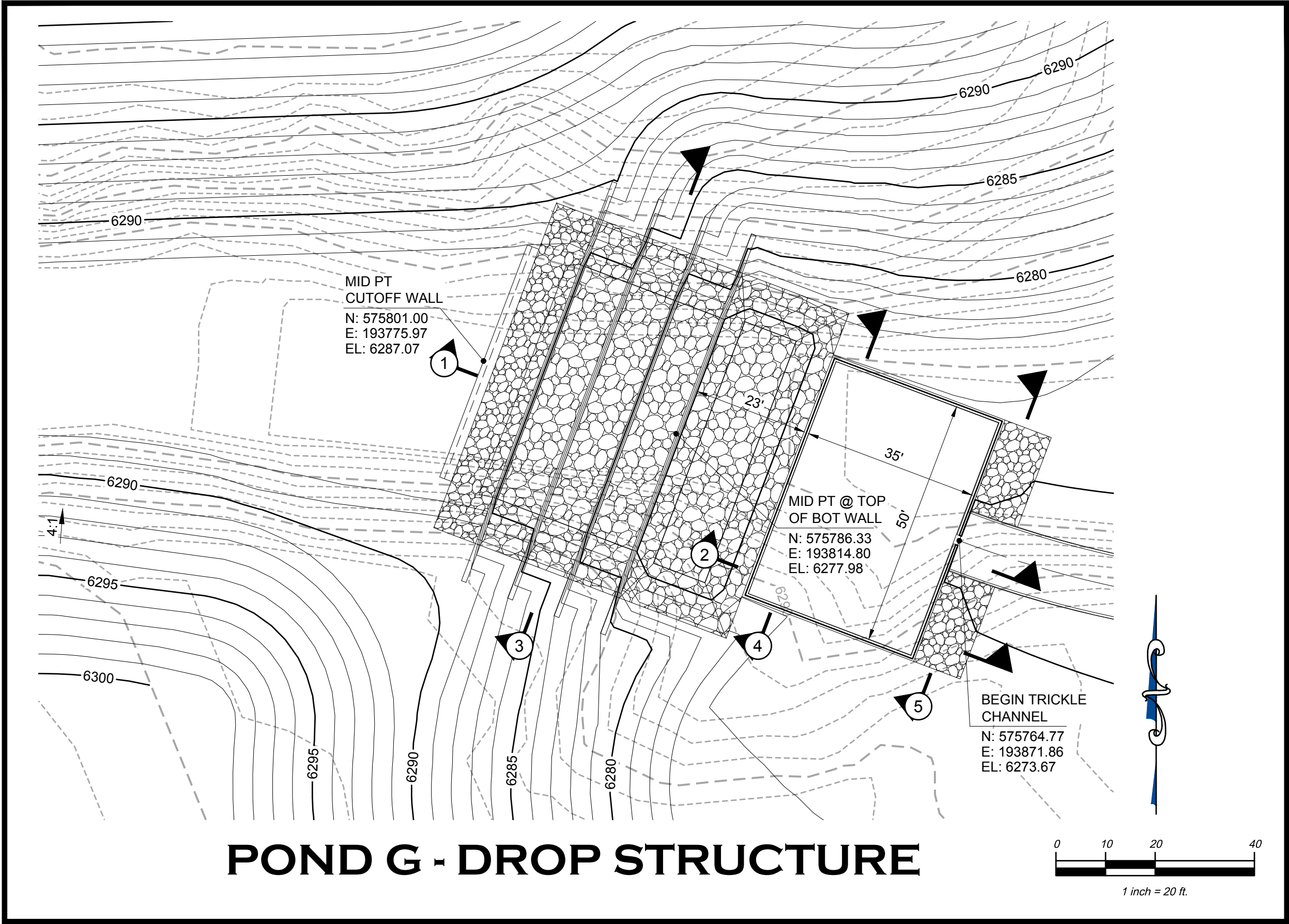
Hines

COVER  
ENGINEERING

CANYONS FAR SOUTH FILING 1  
GRADING, ROADWAY, & UTILITY PLANS  
POND G - DETAILS

|       |              |
|-------|--------------|
| Sheet | 109          |
| SD14  | of 185       |
| Date  | MAY 15, 2024 |



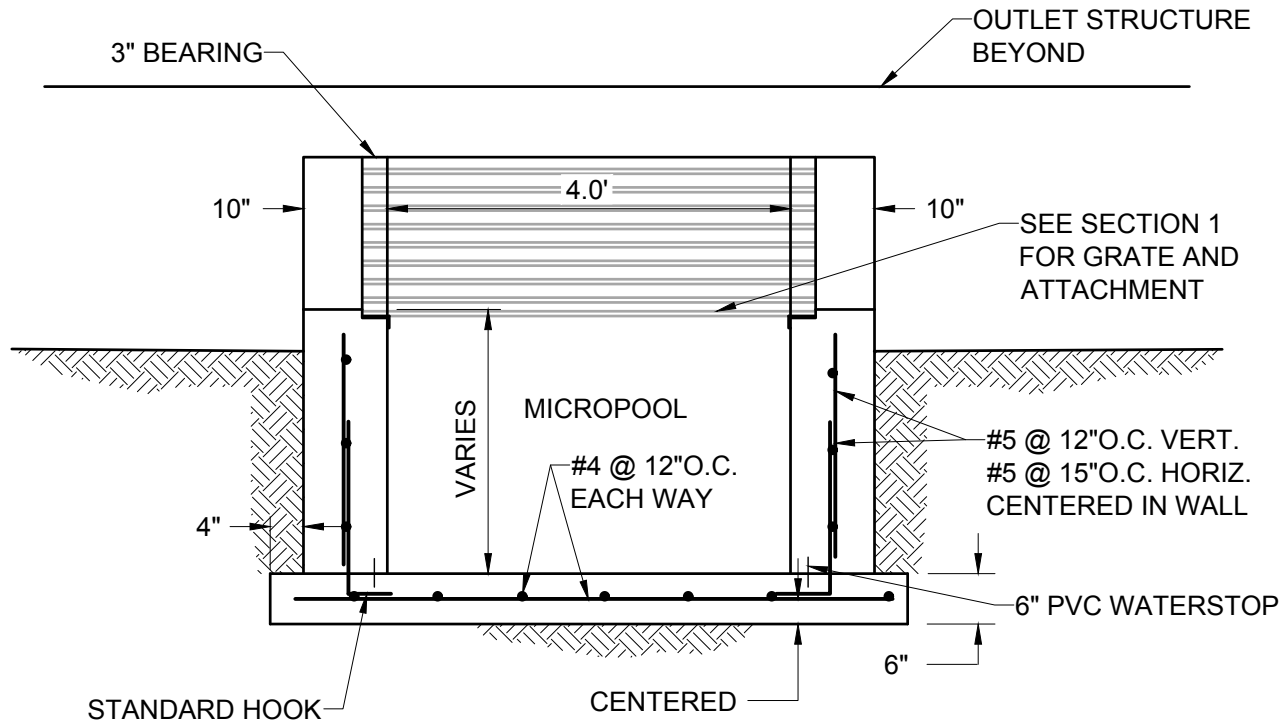


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PLOT DATE: 5/14/2024 10:23 PM  
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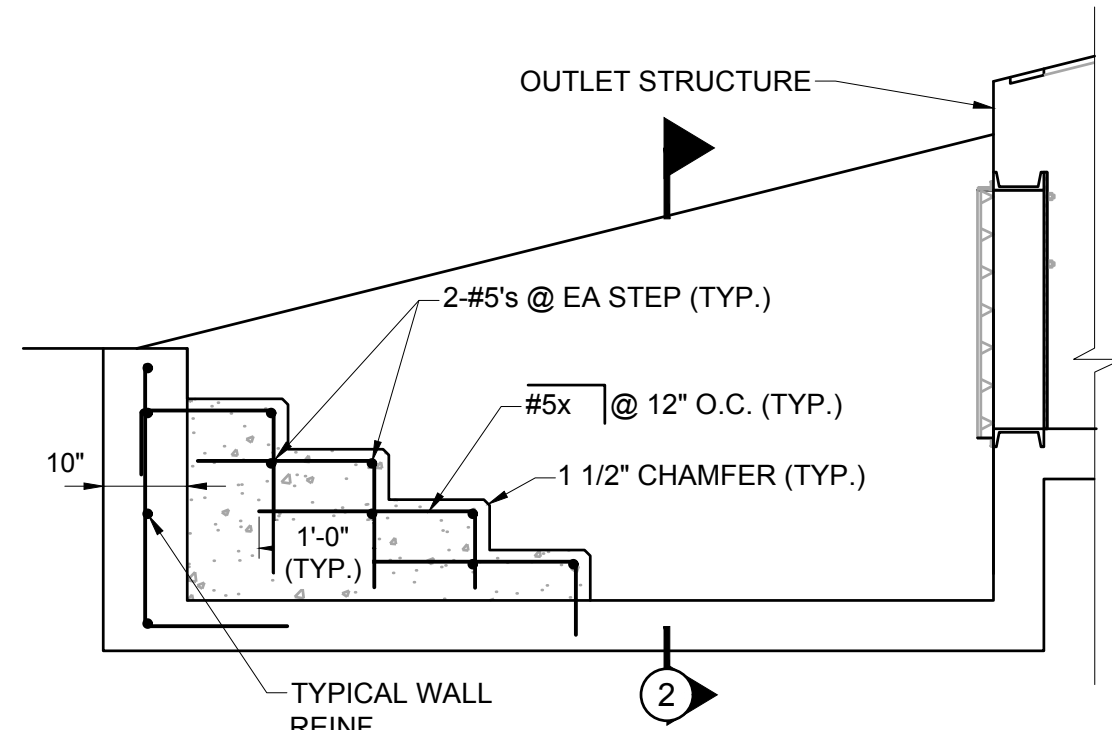
| DATE | REVISION DESCRIPTION | Job Number | PROJECT BENCHMARK                                                                        | Hines   | COVER ENGINEERING             | CANYONS FAR SOUTH FILING 1<br>GRADING, ROADWAY, & UTILITY PLANS<br>POND G - DETAILS | Sheet<br>SD15<br>Date<br>MAY 15, 2024 | 110<br>of<br>185 |
|------|----------------------|------------|------------------------------------------------------------------------------------------|---------|-------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|------------------|
|      |                      | HINES LP   | (AZTEC #401)<br>DOUGLAS COUNTY<br>BENCHMARK TT17A<br>(NAVD88 DATUM)<br>ELEVATION=6483.68 |         |                               |                                                                                     |                                       |                  |
|      |                      | Chk BKM    | Dnw RLS                                                                                  | Des RLS | Drawing Name: 32SD14-SD15.dwg |                                                                                     |                                       |                  |



PATH: K:\HINES\LP\CADD\CIVIL\32 FILING 1 CD\32SD16.DWG  
PLOT DATE: 5/14/2024 10:23 PM  
PLOT BY: RSG/MON  
XREFS:



**SECTION 2**  
N.T.S.



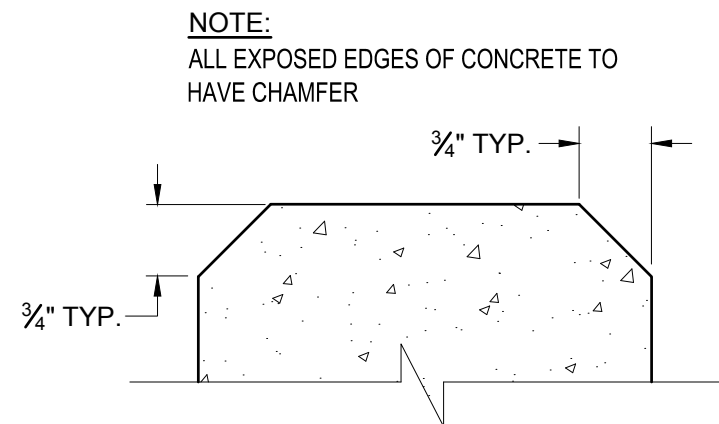
**TYPICAL MICROPOOL REINF.**  
N.T.S.

### REINFORCING STEEL

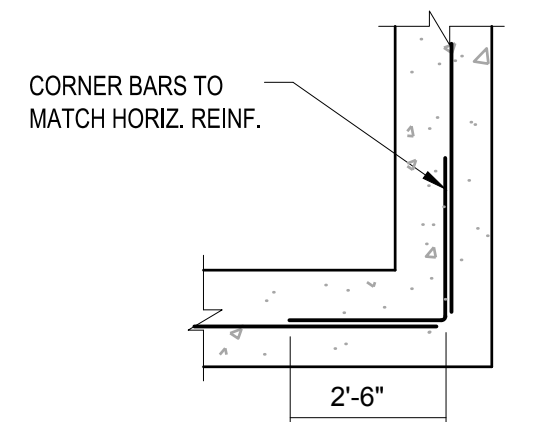
- FABRICATE AND PLACE REINFORCING BARS IN ACCORDANCE WITH CRSI "MANUAL OF STANDARD PRACTICE" AND CRSI "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS".
- REINFORCING STEEL TO COMPLY WITH ASTM A615, GRADE 60.
- LAP REINFORCING STEEL IN CONCRETE 2'-6" MINIMUM.
- PROVIDE REINFORCING STEEL WITH PROTECTIVE COVERING OF CONCRETE AS NOTED IN SECTIONS. DO NOT USE BRICK OR POROUS MATERIAL TO SUPPORT FOOTING STEEL OFF THE GROUND.
- SUBMIT SHOP DRAWINGS.
- WHERE SINGLE CURTAIN OF REINFORCEMENT SHOWN, CENTER BARS IN WALL.
- REFER TO DETAIL THIS SHEET FOR CORNER BARS.

### CONCRETE

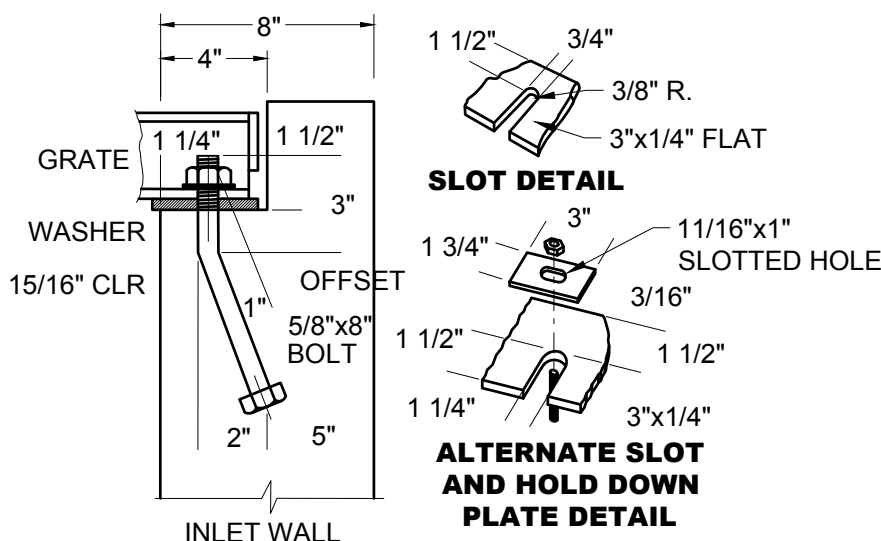
- ALL CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF ACI 301 "SPECIFICATIONS FOR STRUCTURAL BUILDINGS," EXCEPT AS MODIFIED BY THE SUPPLEMENTAL REQUIREMENTS CONTAINED HEREIN OR SHOWN ON THE DRAWINGS, AND AS SPECIFIED IN SECTION 03000.
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS 4,500 PSI.
- CEMENT SHALL CONFORM TO ASTM C 150, TYPE III; CONTRACTOR SHALL SUBSTITUTE 20% OF CLASS F FLYASH FOR CEMENT.
- AGGREGATES ASTM C 33.
- CONCRETE SHALL CONTAIN 6% AIR ENTRAINMENT, ±1%.
- PROVIDE 3/4" CHAMFER ON ALL EXPOSED EDGES PER DETAIL ABOVE.
- WATER CEMENT RATIO SHALL BE 0.45 MAX.
- MAXIMUM WATER SOLUBLE CHLORIDE ION CONTENT = 0.3%.



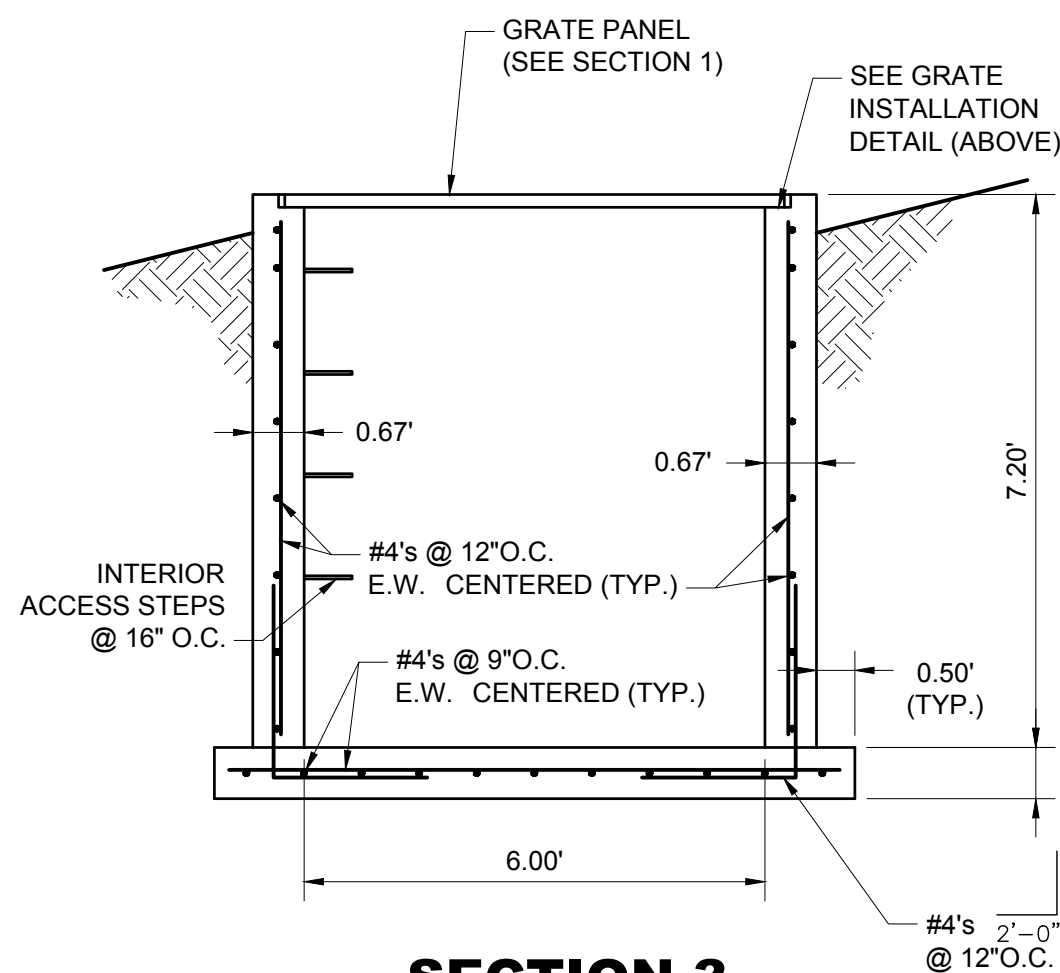
**CONCRETE CHAMFER DETAIL**  
N.T.S.



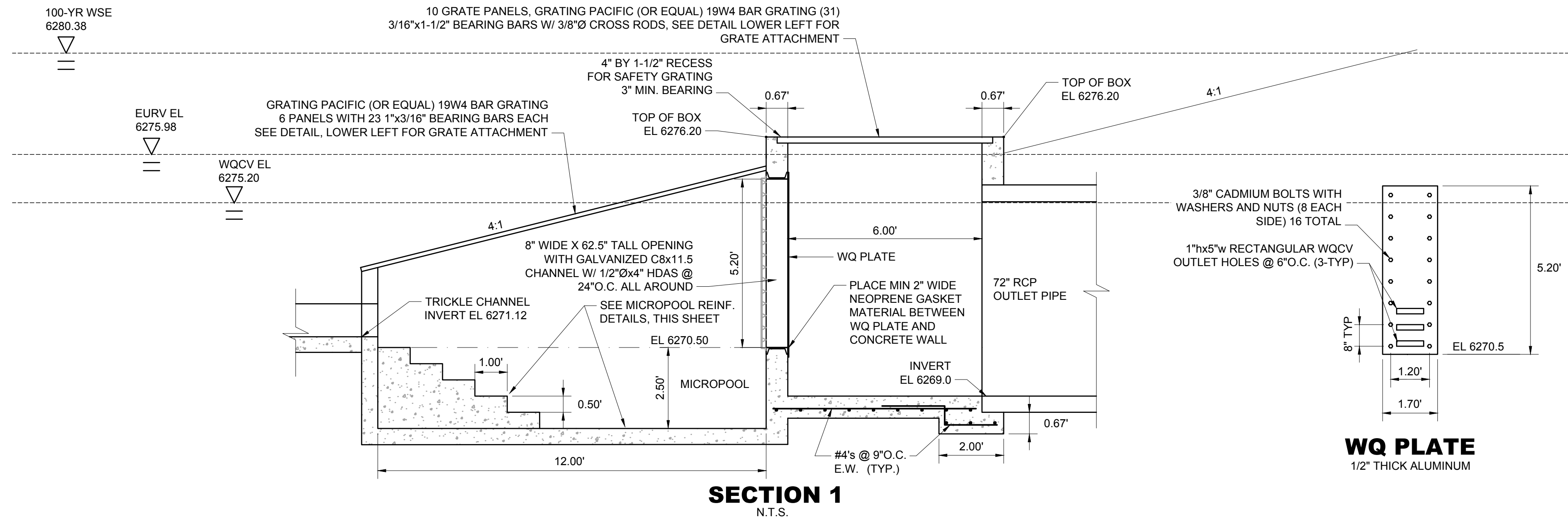
**TYPICAL CORNER REINFORCING DETAIL**  
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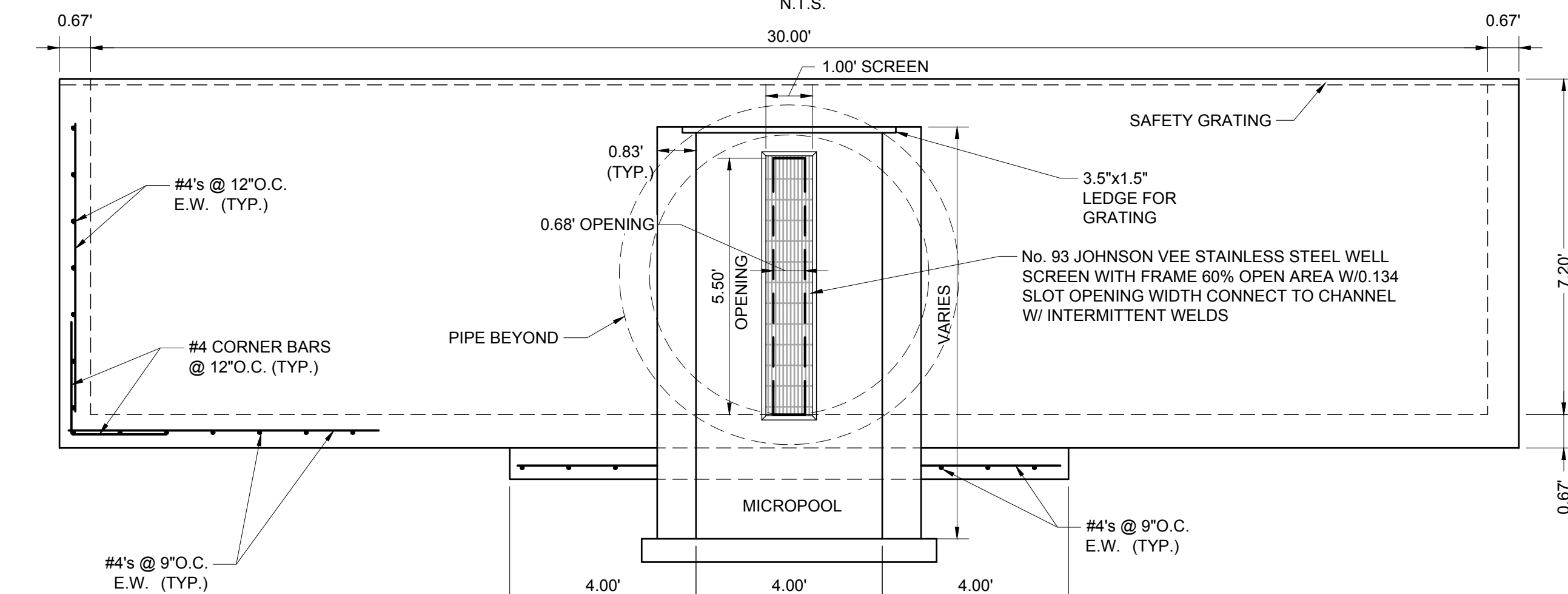
**GRATE INSTALLATION DETAIL**



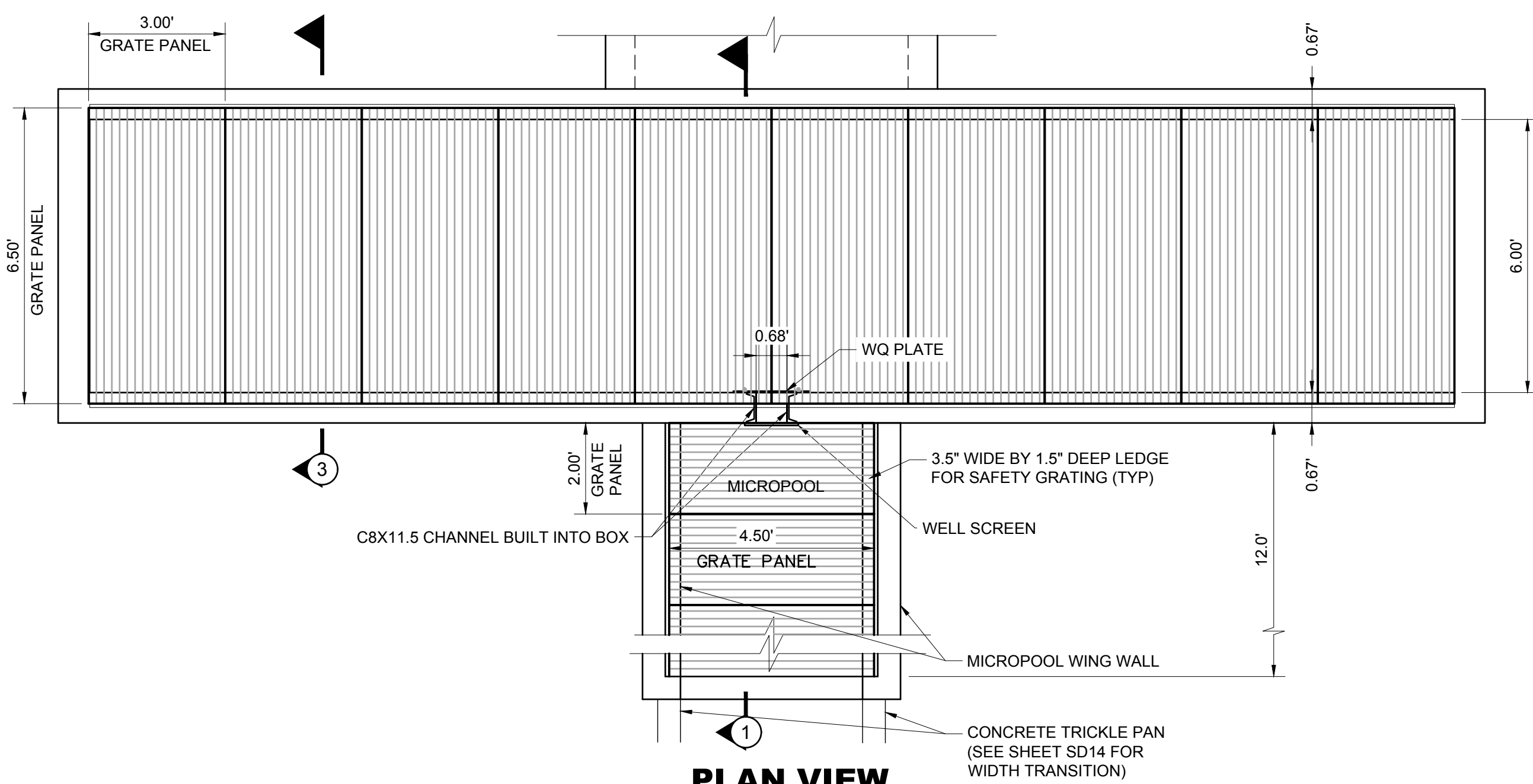
**SECTION 3**  
N.T.S.



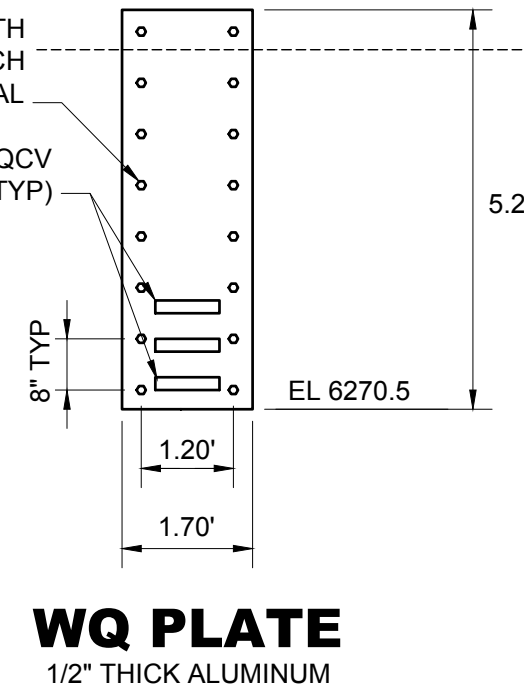
**SECTION 1**  
N.T.S.



**FRONT VIEW**



**PLAN VIEW**



**WQ PLATE**  
1/2" THICK ALUMINUM

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| Job Number<br><b>HINES LP</b>     |                   |                   |
| Chk<br><b>BKM</b>                 | Drw<br><b>RLS</b> | Des<br><b>RLS</b> |
| Drawing Name<br><b>32SD16.dwg</b> |                   |                   |

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| <b>PROJECT BENCHMARK</b>                          |
| (AZTEC #401)<br>DOUGLAS COUNTY<br>BENCHMARK TT17A |
| (NAVD88 DATUM)<br>ELEVATION=6483.68               |

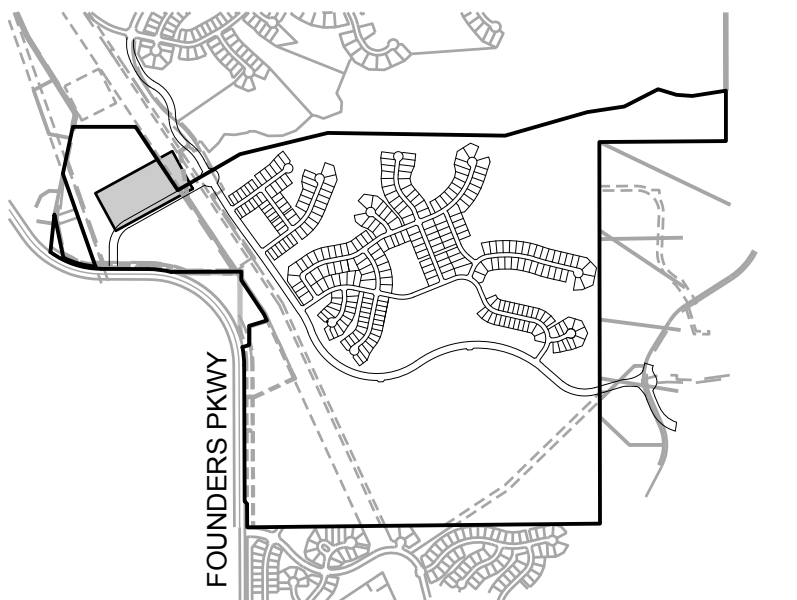
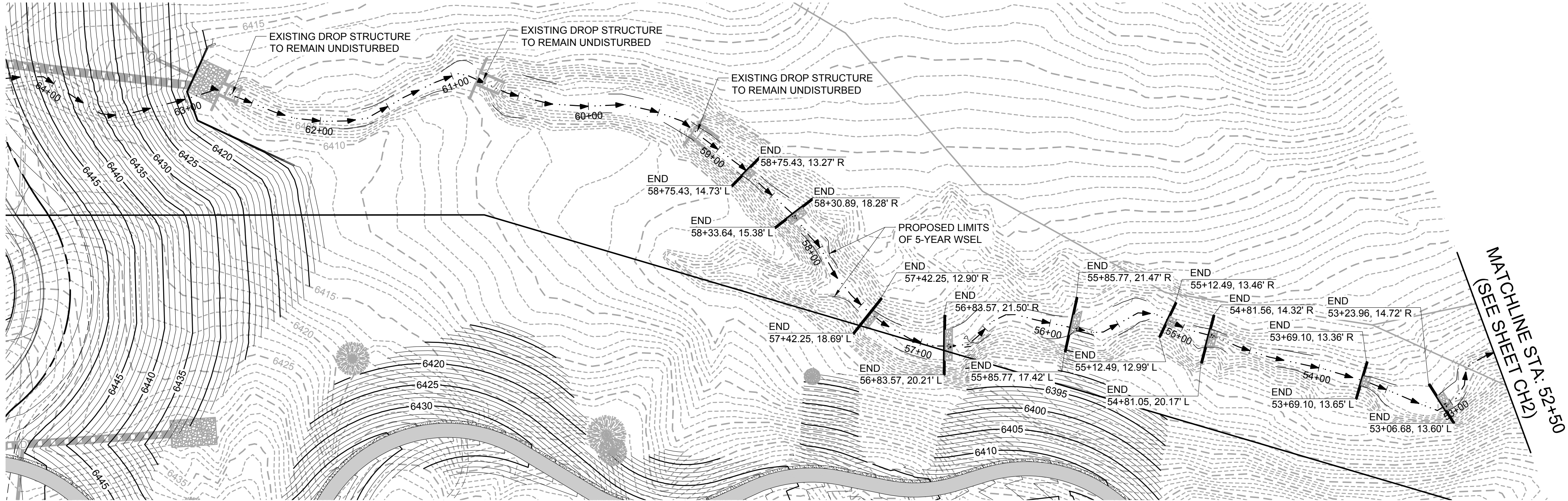
**CANYONS FAR SOUTH FILING 1**  
GRADING, ROADWAY, & UTILITY PLANS  
**POND G - DETAILS**

TOCR PROJECT NO: CD24-0011

Sheet  
**SD16**  
Date  
**MAY 15, 2024**

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of  
185





KEYMAP

CONSTRUCTION NOTES:

- SEE TESC PLANS FOR EROSION CONTROL MEASURES.
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LEGEND:

- 6425 PROPOSED MAJOR CONTOURS
- 6424 PROPOSED MINOR CONTOURS
- 6425 EXISTING MAJOR CONTOURS
- 6424 EXISTING MINOR CONTOURS
- Ⓢ PROPOSED STORM DRAIN MANHOLE
- ▬ PROPOSED STORM DRAIN PIPE
- ▭ PROPOSED STORM DRAIN INLET
- FLOW ARROW
- 5-YEAR WSEL
- ▨ PROPOSED RIPRAP

BASIS OF BEARINGS

PROJECT BEARINGS ARE BASED ON THE EAST LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 30, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH P.M., BEARING SOUTH 00°03'56" EAST, FROM THE EAST QUARTER CORNER OF SECTION 30, BEING MONUMENTED BY A REBAR WITH A 2 INCH ALUMINUM CAP STAMPED "PLS 23515" TO THE SOUTH SIXTEENTH CORNER OF SECTIONS 29/30, BEING MONUMENTED BY A REBAR WITH A 1-1/2 INCH ALUMINUM CAP, STAMPED "PLS 23515".

PROFESSIONAL ENGINEER CERTIFICATION

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BRIAN K. MOSS  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF COLORADO NO. 37702

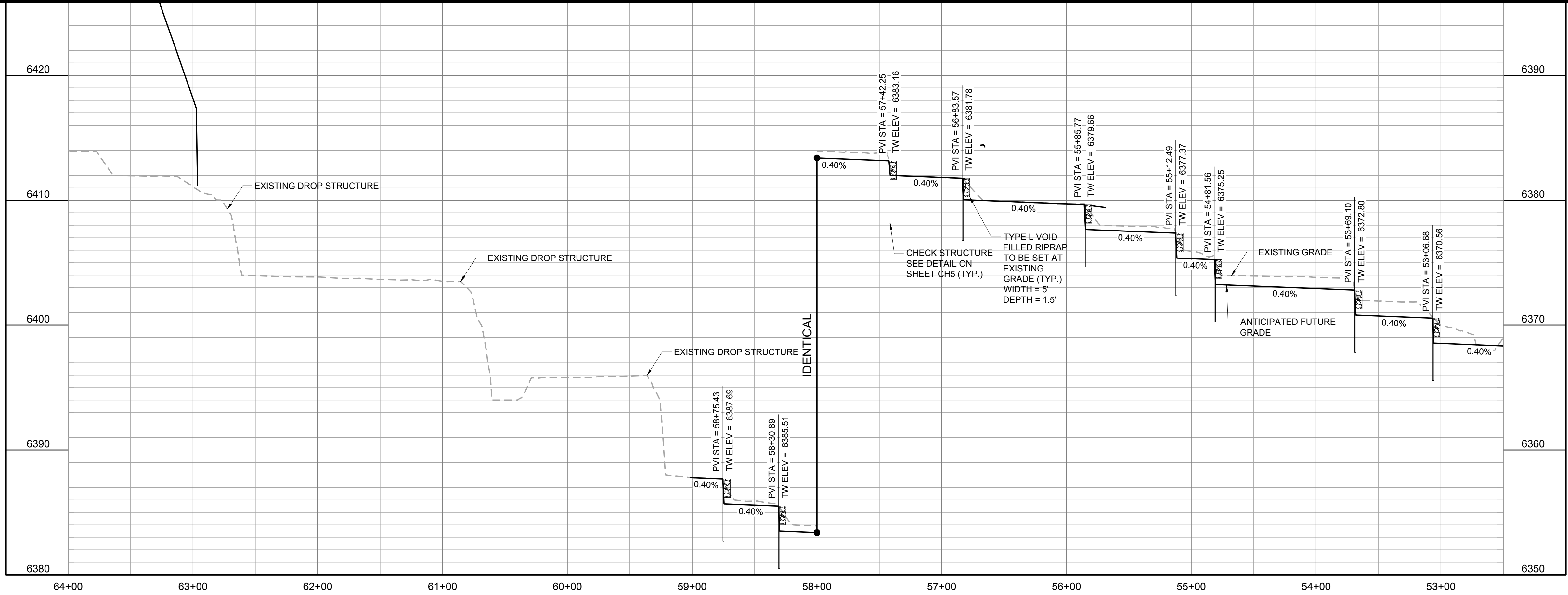
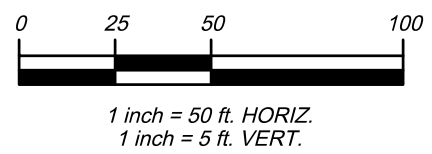
TOWN APPROVAL BLOCK

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY:

DEVELOPMENT SERVICES  
TOCR PROJECT NO: CD24-0011

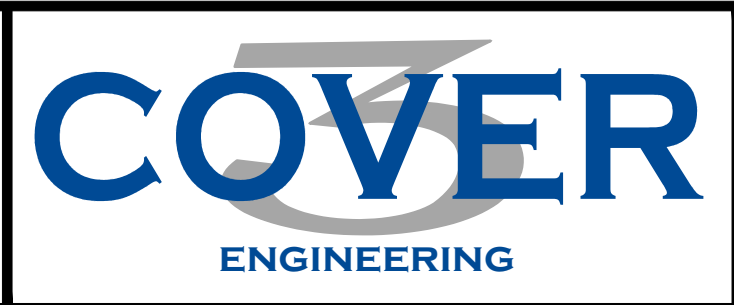
CHANNEL IMPROVMENTS



| DATE | REVISION DESCRIPTION |
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| Job Number<br><b>HINES LP</b>         |                   |                   |
| Chk<br><b>BKM</b>                     | Drw<br><b>RLS</b> | Des<br><b>RLS</b> |
| Drawing Name:<br><b>32CH1-CH5.dwg</b> |                   |                   |

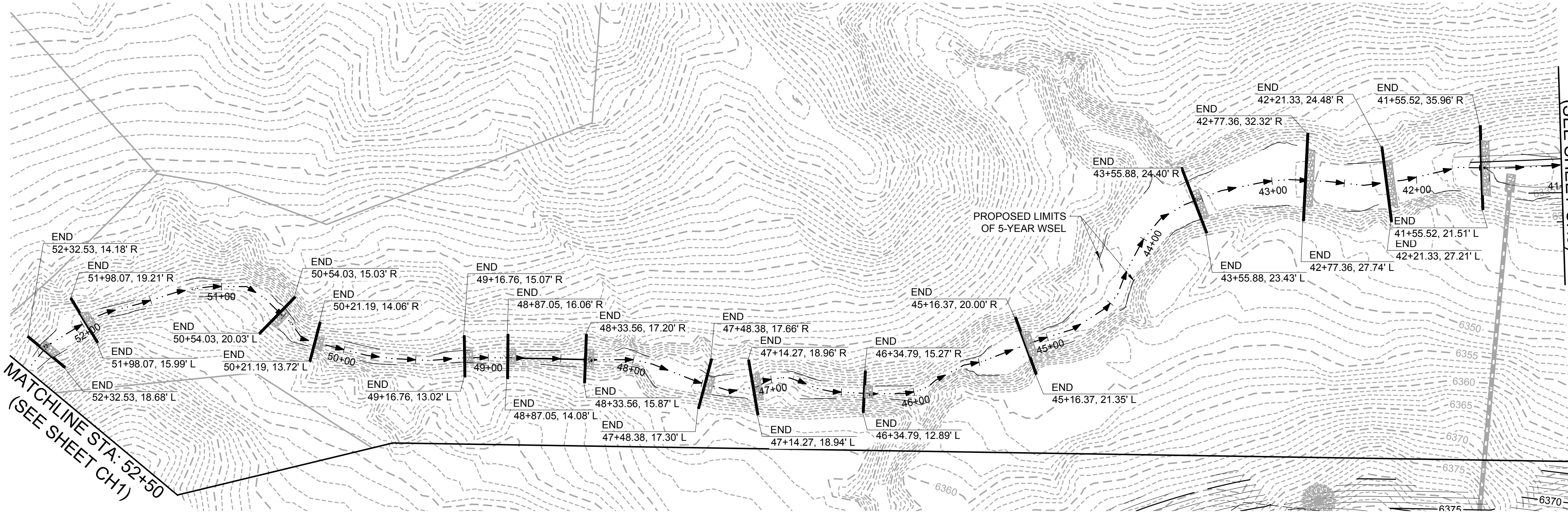
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| <b>PROJECT BENCHMARK</b><br>(AZTEC #401)<br>DOUGLAS COUNTY<br>BENCHMARK TT17A<br>(NAVD88 DATUM)<br>ELEVATION=6483.68 |
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**CANYONS FAR SOUTH FILING 1**  
GRADING, ROADWAY, & UTILITY PLANS  
**CHANNEL PLAN AND PROFILE**

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| Sheet<br><b>CH1</b>         | 118<br>of<br>185 |
| Date<br><b>MAY 15, 2024</b> |                  |

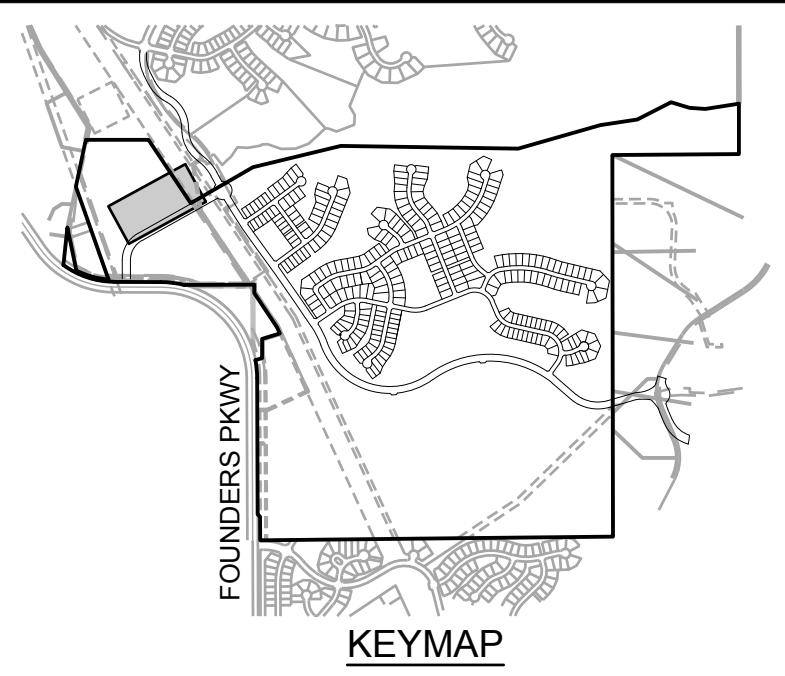
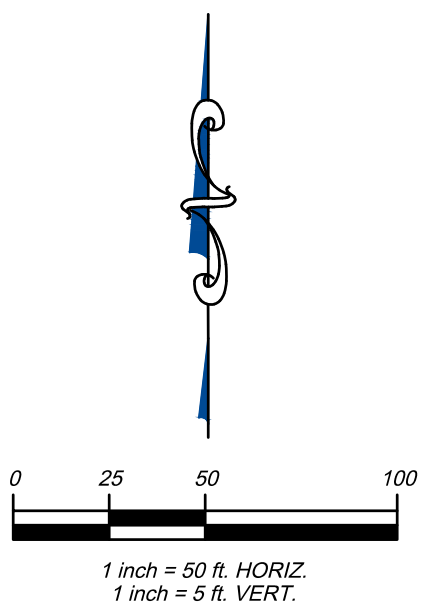




MATCHLINE STA: 52+50  
(SEE SHEET CH1)

MATCHLINE STA: 41+00  
(SEE SHEET CH3)

# CHANNEL IMPROVMENTS



- ### CONSTRUCTION NOTES:
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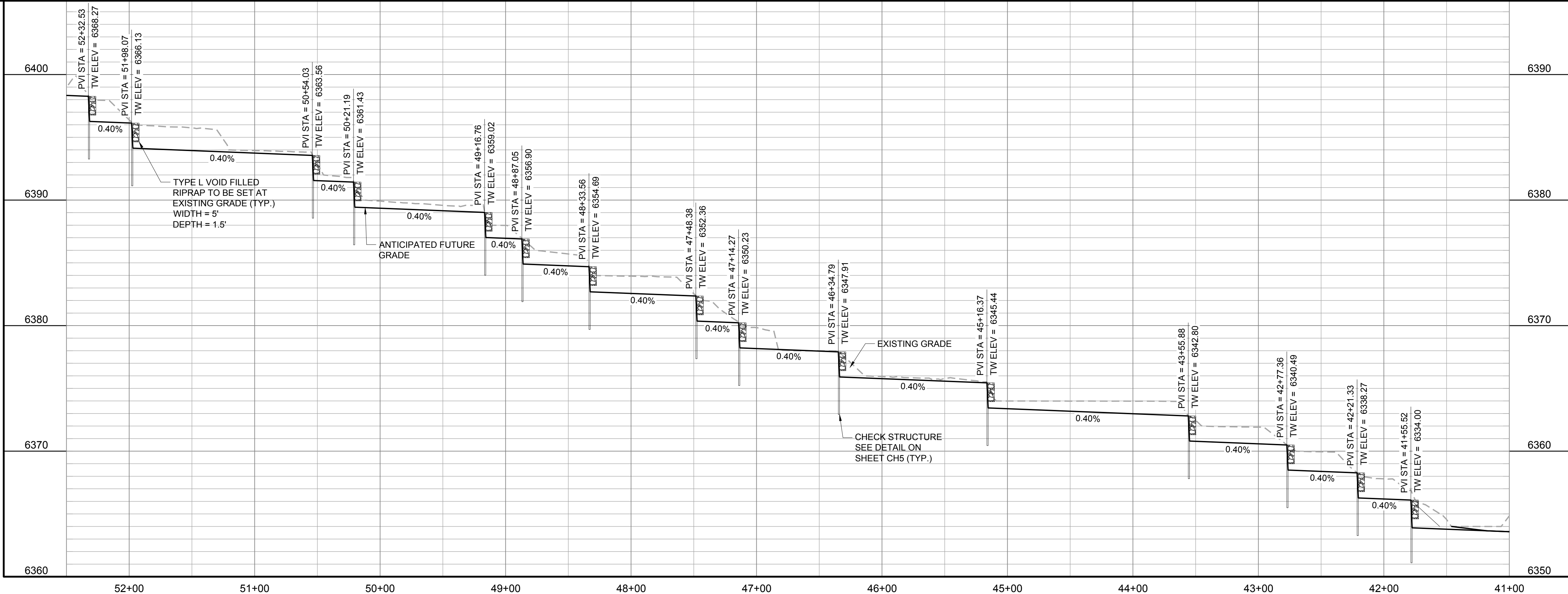
BRIAN K. MOSS  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF COLORADO NO. 37702

**TOWN APPROVAL BLOCK**

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY: \_\_\_\_\_

DEVELOPMENT SERVICES \_\_\_\_\_ DATE \_\_\_\_\_  
TOCR PROJECT NO: CD24-0011



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| Chk                           | Drw | Des |
| BKM                           | RLS |     |

**PROJECT BENCHMARK**  
(AZTEC #401)  
DOUGLAS COUNTY  
BENCHMARK TT17A  
(NAVD88 DATUM)  
ELEVATION=6483.68

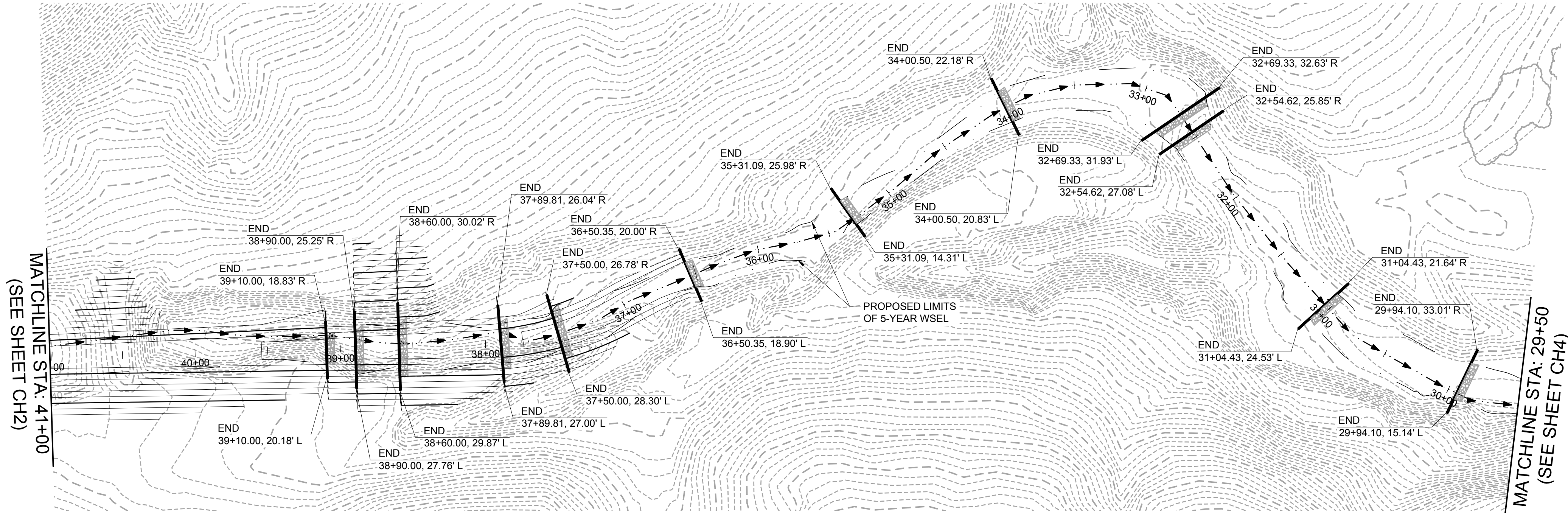
**CANYONS FAR SOUTH FILING 1**  
GRADING, ROADWAY, & UTILITY PLANS  
**CHANNEL PLAN AND PROFILE**

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of  
185  
Date  
**MAY 15, 2024**

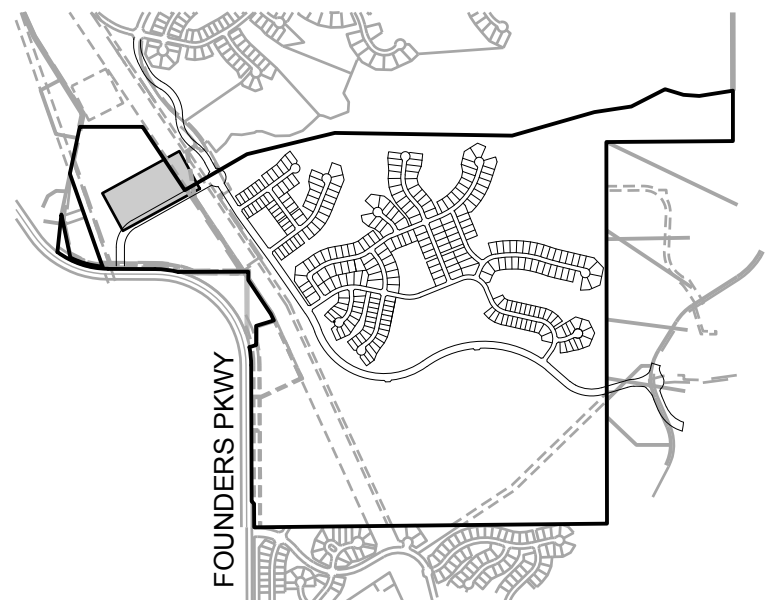
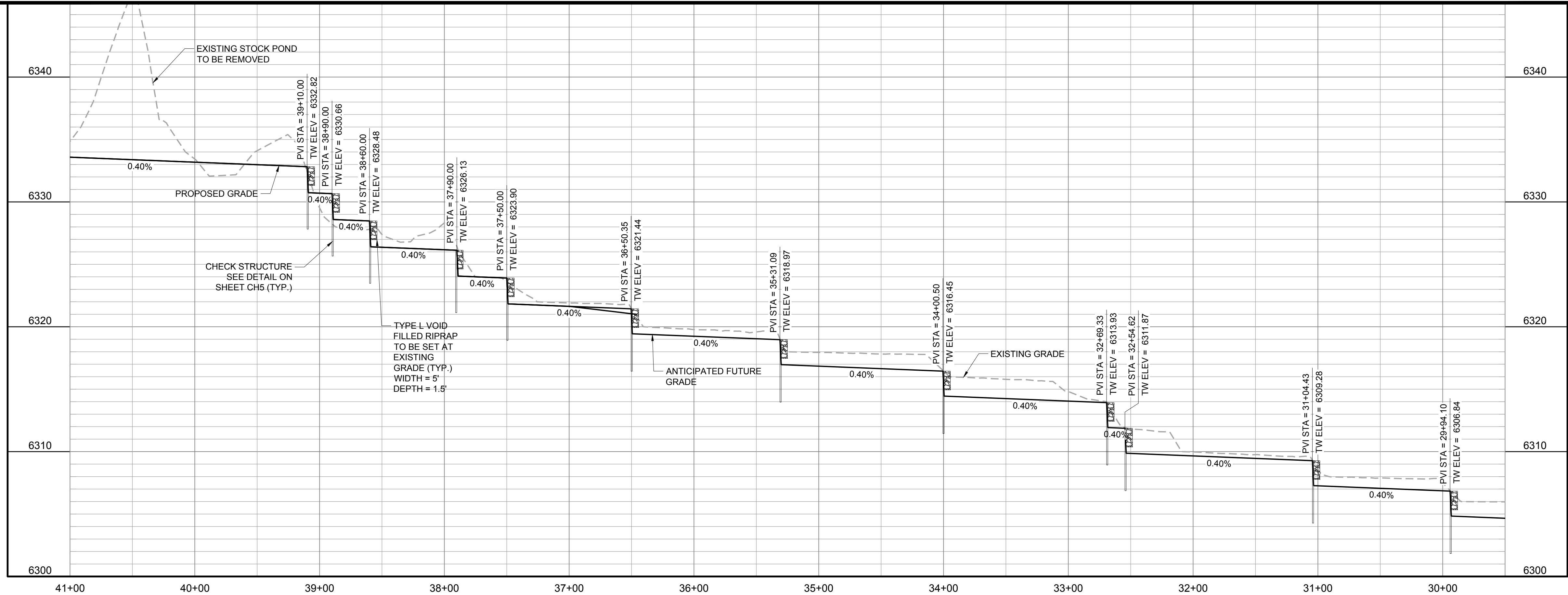
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## CHANNEL IMPROVMENTS



KEYMAP

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BRIAN K. MOSS  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF COLORADO NO. 37702

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TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY:

DEVELOPMENT SERVICES  
TOCR PROJECT NO: CD24-0011

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| Job Number<br><b>HINES LP</b>        |     |     |
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| BKM                                  | RLS |     |
| Drawing Name<br><b>32CH1-CH5.dwg</b> |     |     |

**PROJECT BENCHMARK**  
(AZTEC #401)  
DOUGLAS COUNTY  
BENCHMARK TT17A  
(NAVD88 DATUM)  
ELEVATION=6483.68

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ENGINEERING

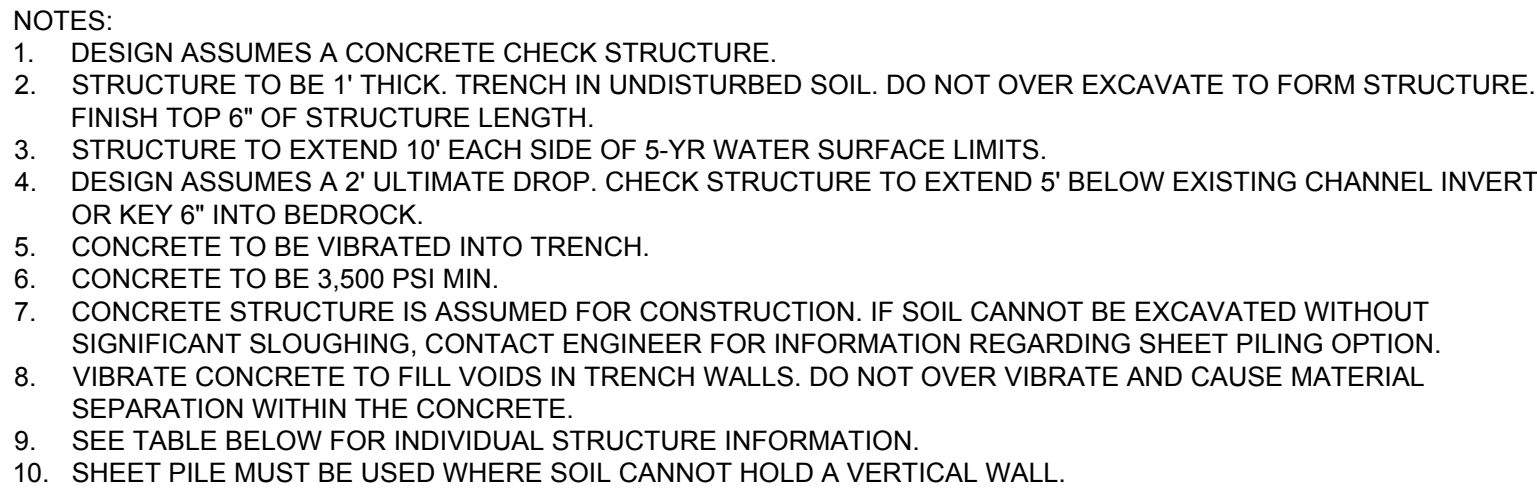
**CANYONS FAR SOUTH FILING 1**  
GRADING, ROADWAY, & UTILITY PLANS  
**CHANNEL PLAN AND PROFILE**

Sheet  
**CH3**  
of  
185  
Date  
**MAY 15, 2024**









NOT TO SCALE

| STATION  | APPROXIMATE<br>THALWEG EL | 5-YR WSEL | 5-YR FLOW<br>DEPTH (FT) | 5-YR WSEL<br>WIDTH (FT) | TOTAL STRUCTURE<br>WIDTH (FT) |
|----------|---------------------------|-----------|-------------------------|-------------------------|-------------------------------|
| 58+75.43 | 6387.67                   | 6388.15   | 0.48                    | 8                       | 28                            |
| 58+30.89 | 6385.52                   | 6386.54   | 1.02                    | 14                      | 34                            |
| 57+42.25 | 6383.17                   | 6383.54   | 0.37                    | 12                      | 32                            |
| 56+83.57 | 6381.77                   | 6382.13   | 0.36                    | 22                      | 42                            |
| 55+85.77 | 6379.72                   | 6380.00   | 0.28                    | 19                      | 39                            |
| 55+12.49 | 6377.49                   | 6377.80   | 0.31                    | 6                       | 26                            |
| 54+81.56 | 6375.00                   | 6376.25   | 1.25                    | 14                      | 34                            |
| 53+69.10 | 6372.90                   | 6373.78   | 0.88                    | 7                       | 27                            |
| 53+06.68 | 6370.65                   | 6371.25   | 0.60                    | 12                      | 32                            |
| 52+32.53 | 6368.15                   | 6368.88   | 0.73                    | 13                      | 33                            |
| 51+98.07 | 6366.21                   | 6367.69   | 1.48                    | 15                      | 35                            |
| 50+54.03 | 6363.62                   | 6364.49   | 0.87                    | 15                      | 35                            |
| 50+21.19 | 6361.32                   | 6362.76   | 1.44                    | 8                       | 28                            |
| 49+16.76 | 6359.08                   | 6359.82   | 0.74                    | 8                       | 28                            |
| 48+87.05 | 6356.82                   | 6358.87   | 2.05                    | 10                      | 30                            |
| 48+33.56 | 6354.80                   | 6356.80   | 2.00                    | 13                      | 33                            |
| 47+48.38 | 6352.43                   | 6353.58   | 1.15                    | 15                      | 35                            |
| 47+14.27 | 6350.27                   | 6351.91   | 1.64                    | 18                      | 38                            |
| 46+34.79 | 6347.86                   | 6348.90   | 1.04                    | 8                       | 28                            |
| 45+16.37 | 6345.50                   | 6345.92   | 0.42                    | 21                      | 41                            |
| 43+55.68 | 6342.80                   | 6343.75   | 0.95                    | 28                      | 48                            |
| 42+77.36 | 6340.53                   | 6341.61   | 1.08                    | 40                      | 60                            |
| 42+21.33 | 6338.30                   | 6339.40   | 1.10                    | 32                      | 52                            |
| 41+55.52 | 6334.40                   | 6337.15   | 2.75                    | 37                      | 57                            |
| 39+10.00 | 6332.82                   | 6333.88   | 1.06                    | 19                      | 39                            |
| 38+90.00 | 6330.66                   | 6332.00   | 1.34                    | 33                      | 53                            |
| 38+60.00 | 6328.47                   | 6330.61   | 2.14                    | 40                      | 60                            |
| 37+90.00 | 6326.13                   | 6327.72   | 1.59                    | 33                      | 53                            |
| 37+50.00 | 6323.90                   | 6326.07   | 2.17                    | 35                      | 55                            |
| 36+50.35 | 6321.05                   | 6321.88   | 0.83                    | 19                      | 39                            |
| 35+31.09 | 6318.61                   | 6319.68   | 1.07                    | 20                      | 40                            |
| 34+00.50 | 6316.54                   | 6317.58   | 1.04                    | 23                      | 43                            |
| 32+69.33 | 6313.70                   | 6315.17   | 1.47                    | 45                      | 65                            |
| 32+54.62 | 6311.91                   | 6313.90   | 1.99                    | 33                      | 53                            |
| 31+04.43 | 6309.42                   | 6309.90   | 0.48                    | 26                      | 46                            |
| 29+94.10 | 6306.90                   | 6307.95   | 1.05                    | 28                      | 48                            |
| 28+84.37 | 6304.53                   | 6306.14   | 1.61                    | 36                      | 56                            |
| 27+77.78 | 6302.00                   | 6303.30   | 1.30                    | 38                      | 58                            |
| 26+61.26 | 6299.56                   | 6300.50   | 0.94                    | 40                      | 60                            |
| 25+43.24 | 6297.00                   | 6298.00   | 1.00                    | 34                      | 54                            |
| 24+14.43 | 6294.56                   | 6295.25   | 0.69                    | 70                      | 90                            |
| 23+30.25 | 6292.23                   | 6292.42   | 0.19                    | 102                     | 122                           |
| 22+65.50 | 6289.96                   | 6290.20   | 0.24                    | 62                      | 82                            |

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| Chk                           | Dwg<br>BKM | Des<br>RLS | Drawing Name<br>RLS 32CH1-CH5.dwg |

**PROJECT BENCHMARK**  
(AZTEC #401)  
DOUGLAS COUNTY  
BENCHMARK TT17A  
  
(NAVD88 DATUM)  
ELEVATION=6483.68



**COVER**  
ENGINEERING

# CANYONS FAR SOUTH FILING 1

## GRADING, ROADWAY, & UTILITY PLANS

### CHANNEL PLAN AND PROFILE

Sheet  
**CH5**  
Date  
MAY 15, 2024



December 22, 2017

Mr. Aaron Eilers  
Denver Regulatory Office  
U.S. Army Corps of Engineers  
9307 S. Wadsworth Blvd.  
Littleton, CO 80128-6901

RE: Request for Approved Jurisdictional Determination for The Canyons South  
Development Site, Douglas County, Colorado

Dear Mr. Eilers:

On behalf of Lowe Enterprises (Lowe), ERO Resources Corporation (ERO) is requesting an approved Jurisdictional Determination (JD) for the wetlands and other waters associated with two drainages on the Canyons South property (property) located east of the intersection at Founders Parkway and Crowfoot Valley Road in Castle Rock, Douglas County, Colorado (project area; Figure 1). In 2005, the Corps issued a JD for multiple drainages on the property and found them to be nonjurisdictional and not regulated under Section 404 of the Clean Water Act (File No. 200580638). On November 30, December 1, and December 8, 2017, ERO assessed the project area for potential wetlands and waters of the U.S. (2017 site visits).

The property is a roughly 1,600-acre parcel within an undeveloped portion of Castle Rock. The legal description of the project area is Sections 17 through 20, 30, and 31, Township 7 South, Range 66 West and Sections 14 and 15, Township 7 South, Range 67 West of the 6th Principal Meridian in Douglas County, Colorado (Figure 1). The UTM coordinates of the approximate center of the project area are NAD 83; 515558mE, 4363401mN, Zone 13N. The latitude/longitude of the project area is 39.419996°N/104.819251°W. The elevation of the project area is approximately 6,400 feet above sea level. Photos of the project area are attached.

The project area consists primarily of upland grasslands and Gambel oak (*Quercus gambelii*) woodlands (Figures 2a through 2c). During the 2017 site visits, the dominant vegetation in the upland understory consisted of smooth brome (*Bromus inermis*), cheatgrass (*Bromus tectorum*), blue grama (*Bouteloua gracilis*), purple threeawn (*Aristida purpurea*), and western wheatgrass (*Pascopyrum smithii*). The property is actively grazed by livestock.

The property is bounded by residential development and undeveloped lands on the north and west, the Pradera Golf Course and residential community on the northeast, and undeveloped lands and limited residential development on the south and southeast (Figures 2a through 2d).

Several drainages (Scott Gulch, Drainage 1, Drainage 2, and Drainage 3) traverse the property, generally trending from southwest to northeast toward Cherry Creek. Lowe retained ERO to

Denver  
1842 Clarkson St.  
Denver, CO 80218  
303.830.1188

Durango  
1015 ½ Main Avenue  
Durango, CO 81301  
970.422.2136

Hotchkiss  
P.O. Box 932  
161 South 2<sup>nd</sup> St.  
Hotchkiss, CO 81419  
970.872.3020

Idaho  
4001 East Main Street  
Emmett, ID 83617  
208.365.7684

[www.eroresources.com](http://www.eroresources.com)

Consultants in  
Natural Resources  
and the Environment



document the conditions of three of the drainages – Scott Gulch, Drainage 1, and Drainage 3 – with the intention of determining their jurisdictional status as potential waters of the U.S. Drainage 2, which is located on the southern portion of the property was excluded from the field survey and the property owner is not seeking a jurisdictional determination of this feature. A discussion of the drainages of interest is provided below.

## Scott Gulch

Scott Gulch (Gulch) traverses the center of the project area and is shown as an intermittent stream on the U.S. Geological Survey (USGS) Castle Rock North quadrangle. The headwaters of the Gulch originate in the west corner of the project area (Figure 2b). During the 2017 site visits, sporadic wetlands were identified along and within the Gulch channel, as well as short sections of upland inclusions/swales that lacked characteristics of a defined bed and bank. Review of historic imagery on Google Earth (years 1937, 1956, and 1999) (Google Earth Pro 2017) appear to indicate that historically the Gulch was a continuous feature that reached Cherry Creek. Subsequently, development activities in the vicinity of the Gulch contributed to notable alterations of the drainage channel within the project area and downstream. In 2003, construction of the Pradera community was in the initial phases, which directly and indirectly affected downstream flows within the Gulch. In 2004, an irrigation pond was constructed on the Gulch channel (see 2005 Google Earth image). During 2013, flooding contributed to excessive bank erosion and instability and incision along the Gulch, which was evident during the 2017 site visits (Photo 1).

The wetlands associated with the Gulch occur intermittently within and along the margin of the channel and consist predominantly of foxtail barley (*Hordeum jubatum*), meadow foxtail (*Alopecurus pratensis*), redtop (*Agrostis gigantea*), Baltic rush (*Juncus balticus*), and Nebraska sedge (*Carex nebrascensis*) (Photos 2 and 3; Figure 2b). The upstream section of the Gulch is a narrow and shallow channel, ranging in width from 2 to 4 feet with a rough depth of 0.5 to 1 foot. Short sections of upland swales/inclusions occur in the upper portion of the Gulch, which were defined by the loss of channel characteristics (bed and bank) and dominance of upland vegetation species (Photos 4, 5, and 6).

A large stock pond is situated approximately halfway down the Gulch in the project area. The stock pond exhibits evidence of recent ponding, including surface cracks and limited vegetation cover (Photo 7; Figure 2b). An upland berm separates the stock pond from the downstream Gulch channel, at which point the Gulch channel is headcut and incised (Photo 8). The width of the Gulch channel increases to approximately 25 to 30 feet with an approximate depth of 10 to 15 feet. According to the current landowner, following the 2013 flooding events, this section of the Gulch degraded. Along this reach, wetlands occur within the Gulch channel bed and ponded water was noted in areas (Photo 9). Sections of the channel are also devoid of vegetation and several segments support upland vegetation species. A datapoint (DP1) conducted on the downstream end of the Gulch channel



documented nonwetland conditions, including dominance by upland species and a lack of hydric soils and hydrology indicators (Photo 10; Figure 2b).

The Gulch continues from the property onto adjacent open space lands before entering the Pradera Golf Course property (Figure 2c). This section of the Gulch is a sandy bottom channel that mostly lacks vegetation within the Gulch channel (Photo 11). The drainage meets a culvert that passes under Raintree Drive and continues downstream before connecting with an irrigation pond on the Pradera Golf Course. This section of the Gulch channel supports cattail wetlands and may be augmented by stormwater runoff from Raintree Drive (Photo 12). According to the acting maintenance superintendent of the Pradera Golf Course, the irrigation pond, which was constructed on the Gulch in 2004, is primarily filled using potable water sourced by Pinery Water. Outflow from the irrigation pond occurs only during peak storm events, such as the 2013 event (Boyd, pers. comm. 2017). Two overflow weirs are located downgradient of the irrigation pond and across the golf course greens (Figure 2a); the downstream weir was constructed above an outlet culvert that diverts stormwater runoff and overflow waters from the irrigation pond. A cattail and willow scrub-shrub wetland occurs directly downstream of the weir (Photo 13; Figure 2a, DP2]). The scrub-shrub wetland transitions into an upland swale that is dominated by upland grasses (blue gramma [*Bouteloua gracilis*], cheatgrass [*Bromus tectorum*], smooth brome [*Bromus intermis*]) and upland forbs (Photo 14; DP3 and DP4). The upland swale continues for roughly 1,000 feet (Photo 15) before reaching a rock weir and culvert that continues under Pradera Parkway. A detention pond located southeast of the Gulch and Pradera Parkway also feeds into the weir/culvert associated with Pradera Parkway (Photo 16). The drainage continues downstream and north of Pradera Parkway before meeting Cherry Creek, a jurisdictional water of the U.S., roughly 1-mile northeast of the Pradera residential community. This section of the Gulch is likely fed primarily by stormwater runoff and from the detention pond south of Pradera Parkway; the Gulch channel within this section supports a dense cattail wetland (Photo 17).

## Drainage 1

The unnamed Drainage 1 occurs on the southern section of the project area (Figure 2c). Drainage 1 is shown as an intermittent stream on the USGS quadrangle and is a tributary to McMurdo Gulch. Review of historic imagery indicates that the drainage was historically present with a continuous channel along its current alignment (Google Earth 1937, 1955). A large upland inclusion on the downstream end of the drainage is visible on the 1993 imagery, which was consistent with field observations during the 2017 site visits.

The very downstream portion of the drainage before the confluence with McMurdo Gulch is a sandy swale that lacks defined banks (Photo 18). Sporadic pine tree saplings occur within the drainage (Photo 19). The upland inclusion visible on Google Earth (2017) lacks a defined bed and bank and supports a dominance of mature ponderosa pine (*Pinus ponderosa*) trees (Photo 20). No wetlands were observed within the downstream portion of the drainage.



## Drainage 3

The unnamed Drainage 3 occurs on the north end of the property (Figure 2d). Drainage 3 is shown as an intermittent stream on the USGS quadrangle. The upstream end of the drainage begins on the northern portion of the property. The upstream end of the drainage is an upland swale with no characteristics of a channel bed and bank. The drainage continues as an upland swale northeast across the property and onto the adjacent property (Photos 21 and 22). The drainage remains an upland feature for the remainder of its length; the drainage terminates on the southeast corner of the Pradera Golf Course where it meets the golf greens and a small irrigation pond. Review of historic imagery in Google Earth shows a drainage feature present in the location of Drainage 3 during 1937 and 1999. In 2004, the Pradera Golf Course was constructed and a small irrigation pond was created on the downstream end of Drainage 3 (Google Earth image 2004).

## Summary

Based on the 2017 site visits and review of historic Google Earth aerial imagery, Scott Gulch, Drainage 1, and Drainage 3 do not appear to have continuous hydrologic connections to any other potential or known waters of the U.S. Scott Gulch is a sandy channel with intermittent sections of upland swales/breaks upstream of the large stock pond. Below the stock pond, wetlands are contained within the channel and may be primarily supported by groundwater, a result of the degraded channel invert, and intermittent storm flows. The wetlands transition into a channel with a sandy bed for most of the reach to Raintree Drive. Construction of the Pradera Golf Course irrigation pond on the drainage created a barrier that prevents conveyance of downstream flows except during major storm events. The upland swale downstream of the lower overflow weir suggests that flows from the irrigation pond overflow rarely reach the culvert below Pradera Parkway. Based on these observations, ERO believes that flows within Scott Gulch south of Pradera Parkway do not reach Cherry Creek and that flows below the irrigation pond occur only during major storm events.

Drainage 1 contains a significant upland swale on the downstream end of the drainage and does not show evidence of intermittent flows. ERO believes that Drainage 1 does not have a surface connection with McMurdo Gulch or other waters of the U.S.

Drainage 3 is an upland swale and does not show evidence of intermittent flows. ERO believes that Drainage 3 does not have a surface connection with a downstream water of the U.S.

On behalf of Lowe, ERO requests an approved JD of Scott Gulch and Drainage 1 as described above. Please let us know if you need additional information to make this determination.



Please contact me with any questions at [ecrumb@eroresources.com](mailto:ecrumb@eroresources.com).

Sincerely,



Esa Crumb  
Biologist

cc: Erik Clore, Lowe Enterprises

Attachments: Photo log; Google Earth Image log; Figures 1, 2a, 2b, 2c, 2d; datasheets

## References

Google Earth Pro. 2017. Historical imagery from 1937 to 2017. Last accessed December 12, 2017.

Boyd, M. 2017. Personal communication with Pradera Golf Course Superintendent. December 15.



# REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT

The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced below. **Note:** Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

CORPS USE ONLY:  
DATE RECEIVED:

PROJECT NO.:

## 1. PROPERTY LOCATION:

Street Address:

City/Township/Parish: Castle Rock

County: Douglas State: CO

Acreage of Parcel/Review Area for JD: 1600 acres

Section: 17-20,30,31 Township: 7S Range: 66W

Latitude: 39.419996°N Longitude: 104.819251°W

(For linear projects, please include the center point of the proposed alignment.)

## 2. REQUESTOR CONTACT INFORMATION:

Typed or printed name: Erik Lowe

Company name: Lowe Enterprises

Street Address: 7979 East Tufts Avenue

City: Denver State: CO Zip: 80237

Daytime phone no.: 303-850-2406

Email address: eclore@lowe-re.com

## 3. MAP: Please attach a survey/plat map and vicinity map identifying location and review area for the JD.

## 4. REASON FOR REQUEST (check as many as applicable):

- ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
- ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
- ☐ I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
- ☐ A Corps JD is required in order to obtain my local/state authorization.
- ☐ I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
- ☐ I believe that the site may be comprised entirely of dry land/upland.
- ☒ Other: the property may be sold and the potential buyer wishes to know the jurisdictional status of the aquatic resources

## 5. TYPE OF DETERMINATION BEING REQUESTED:

- ☒ I am requesting an approved JD
- ☐ I am requesting a preliminary JD
- ☐ I am requesting a "no permit required" letter as I believe my proposed activity is not regulated.
- ☐ I am unclear as to which JD I would like to request and require additional information.

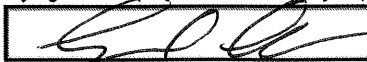
## 6. OWNERSHIP DETAILS:

- ☒ I currently own this property.
- ☐ I plan to purchase this property.
- ☐ I am an agent/consultant acting on behalf of the requestor.
- ☐ Other (please explain):

**\*Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332. **Uses:** This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.

By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

Signature:



Date:

12/21/17



## Canyon South Property

Sections 17-20 and 30-31, T7S, R66W; Sections 14 and 15, T7S, R67W; 6th PM

UTM NAD 83: Zone 13N; 515558mE, 4363401mN

Latitude, Longitude: 39.419996°N, 104.819251°W

USGS Castle Rock North, CO Quadrangle

Douglas County, Colorado

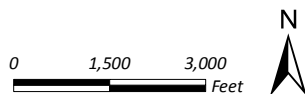


Figure 1  
Vicinity Map

Prepared for: Lowe Enterprises  
File: 7076 Figure 1.mxd (GS)  
December 19, 2017







Canyon South Property

- Data Point
- ➔ Photo Point
- Channel
- Potential Wetland
- Upland Swale
- Wetland
- Weir
- Lake/Pond
- Property Boundary

Image Source: Google Earth©, June 2017

0 225 450 Feet



Figure 2a  
Scott Gulch  
Jurisdictional Determination

Prepared for: Lowe Enterprises  
File: 7076 Figures 2a-2d.mxd (GS)  
December 21, 2017







Canyon South Property

- |               |                     |                     |
|---------------|---------------------|---------------------|
| ● Data Point  | — Potential Wetland | □ Weir              |
| ➔ Photo Point | — Upland Swale      | ☁ Lake/Pond         |
| — Channel     | — Wetland           | □ Property Boundary |

Image Source: Google Earth©, June 2017

0 225 450  
Feet



Figure 2b  
Scott Gulch  
Jurisdictional Determination

Prepared for: Lowe Enterprises  
File: 7076 Figures 2a-2d.mxd (GS)  
December 21, 2017







Canyon South Property

- |               |                     |                     |
|---------------|---------------------|---------------------|
| ● Data Point  | — Potential Wetland | □ Weir              |
| ➔ Photo Point | — Upland Swale      | ☁ Lake/Pond         |
| — Channel     | — Wetland           | □ Property Boundary |

Image Source: Google Earth®, June 2017

0 225 450 Feet



Figure 2c  
Drainage 1  
Jurisdictional Determination

Prepared for: Lowe Enterprises  
File: 7076 Figures 2a-2d.mxd (GS)  
December 21, 2017







Canyon South Property

- |               |                     |                     |
|---------------|---------------------|---------------------|
| ● Data Point  | — Potential Wetland | □ Weir              |
| ➔ Photo Point | — Upland Swale      | ■ Lake/Pond         |
| — Channel     | — Wetland           | □ Property Boundary |

Image Source: Google Earth©, June 2017

0 225 450 Feet



Figure 2d  
Drainage 3  
Jurisdictional Determination

Prepared for: Lowe Enterprises  
File: 7076 Figures 2a-2d.mxd (GS)  
December 21, 2017





PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 1** - View of extreme channel degradation on Scott Gulch following the 2013 floods. View is to the northeast..



**Photo 2** - The upstream end of the Scott Gulch channel with in-channel wetland vegetation. View is to the northeast.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 3** - Channel section on upstream end of Scott Gulch supporting some wetland vegetation; headcutting is visible downstream. View is to the northeast.



**Photo 4** - Upland swale/channel break near the upstream end of Scott Gulch. View is to the northeast.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 5** - Channel segment on upstream end of Scott Gulch lacking wetland vegetation. View is to the northeast.



**Photo 6** - Narrow channel on Scott Gulch lacking wetland vegetation and upstream of fallen cottonwood tree. View is to the northeast.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 7** - A large stock pond located on Scott Gulch near the center of the project area. View is to the east.



**Photo 8** - Wetlands in the Scott Gulch channel viewed below a large cutbank downstream of the stock pond. View is to the southeast.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 9** - A section of Scott Gulch showing channel and bank degradation following the 2013 floods. View is to the east.



**Photo 10** - A section of a sandy bottom channel near the downstream end of the gulch near DP1. View is to the northeast.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 11** - A section of the channel on the adjacent property, located between the project area and the Pradera Golf community. Not shown on the figures. View is to the north.



**Photo 12** - The Scott Gulch channel downstream of Raintree Drive and upstream of the large irrigation pond on the Pradera Golf Course. View is to the northeast.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 13** - A willow-dominated wetland located downstream of the lower overflow weir below the Pradera Golf Course greens. View is to the southwest.



**Photo 14** - An upland break located downstream of the willow wetland, located near DP3. View is to the northeast.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 15** - The remnant Scott Gulch channel downstream of the overflow weir, which consists of an upland swale. View is to the south.



**Photo 16** - An upland inclusion above the weir and culvert that pass under Pradera Parkway. View is to the northeast.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 17** - The Scott Gulch channel downstream of Pradera Parkway. View is to the northeast.



**Photo 18** - A section of Drainage 1 showing a lack of defined channel. View is to the west.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



**Photo 19** - A section of Drainage 1 showing sporadic evergreen tree saplings growing in the drainage bed. View is to the southwest.



**Photo 20** - A large upland inclusion located near the downstream end of Drainage 1. View is to the west.



PHOTO LOG  
CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION  
DOUGLAS COUNTY, COLORADO  
NOVEMBER 22, DECEMBER 1 AND 8, 2017



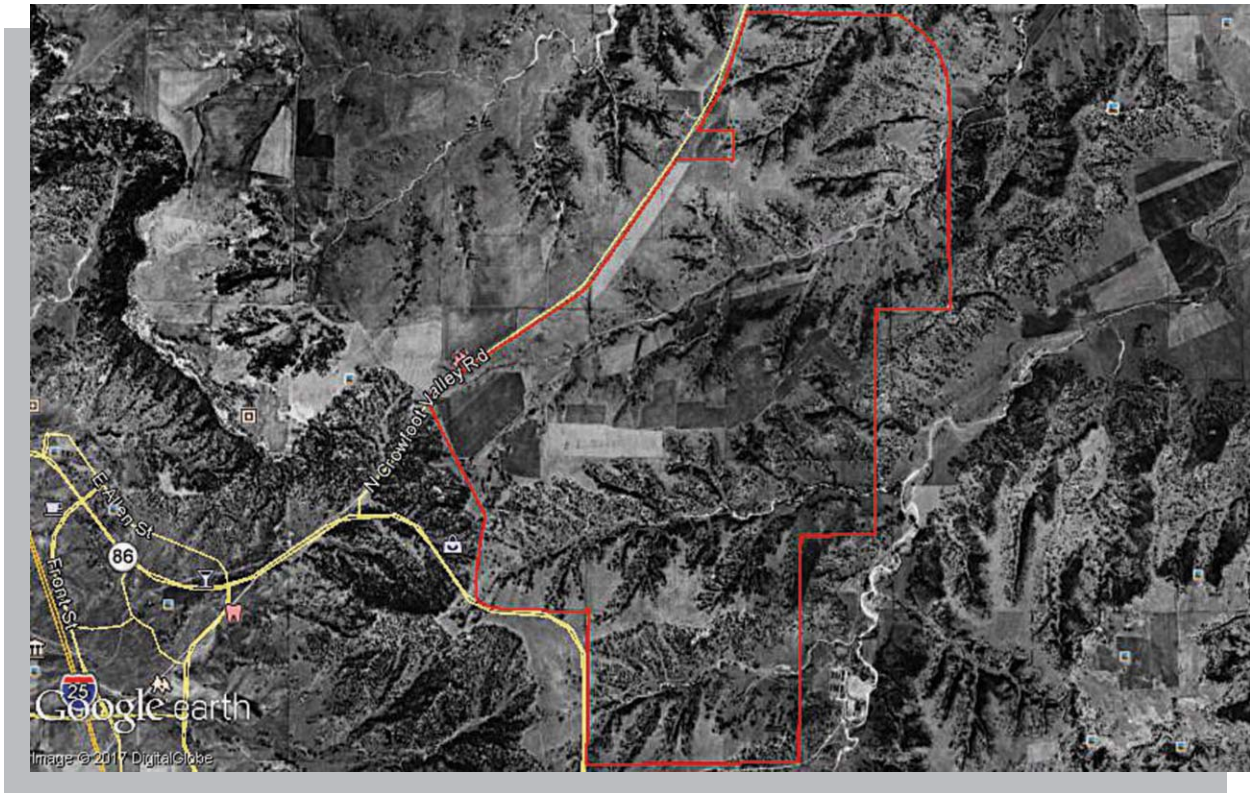
**Photo 21** – Downstream section of Drainage 3, upstream of Pradera Golf course, showing a channel with upland vegetation. View is to the northeast.



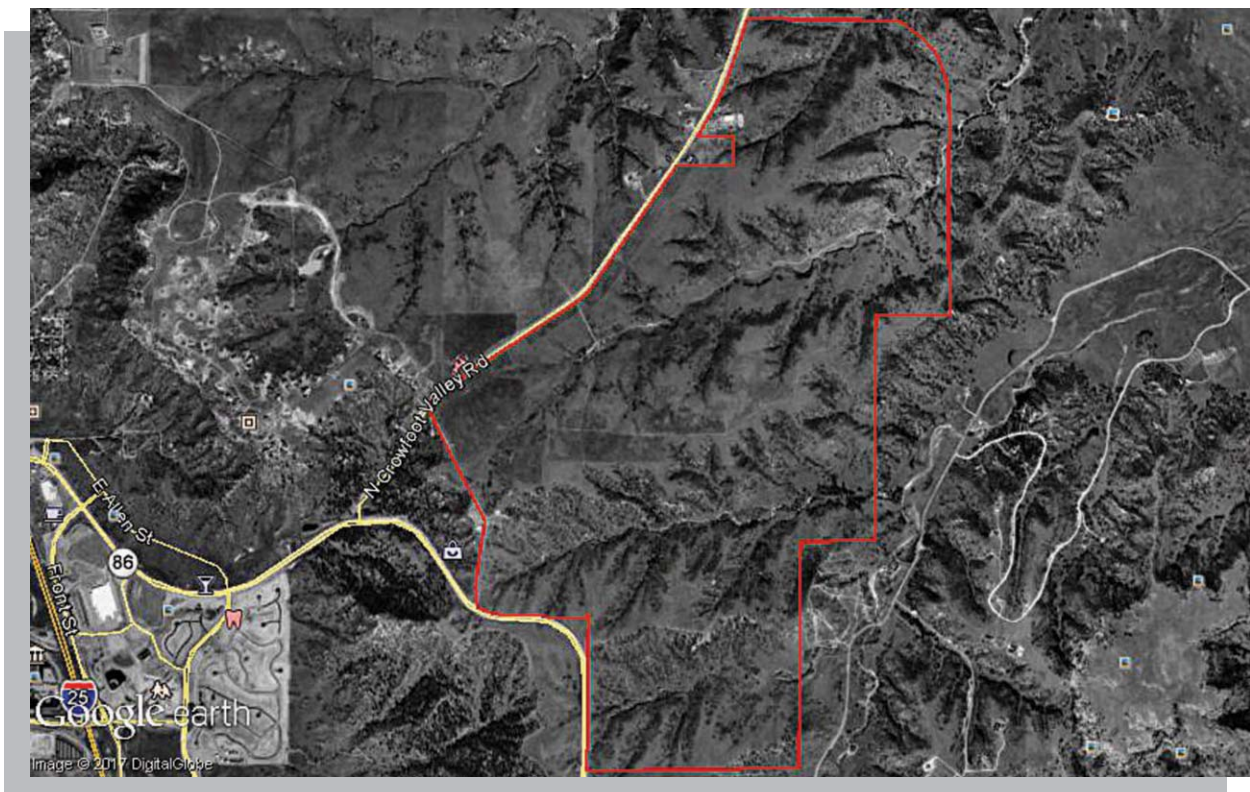
**Photo 22** – Downstream section of Drainage 3 looking upstream, channel with upland vegetation. View is to the southwest.



CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION REQUEST  
HISTORICAL IMAGERY LOG



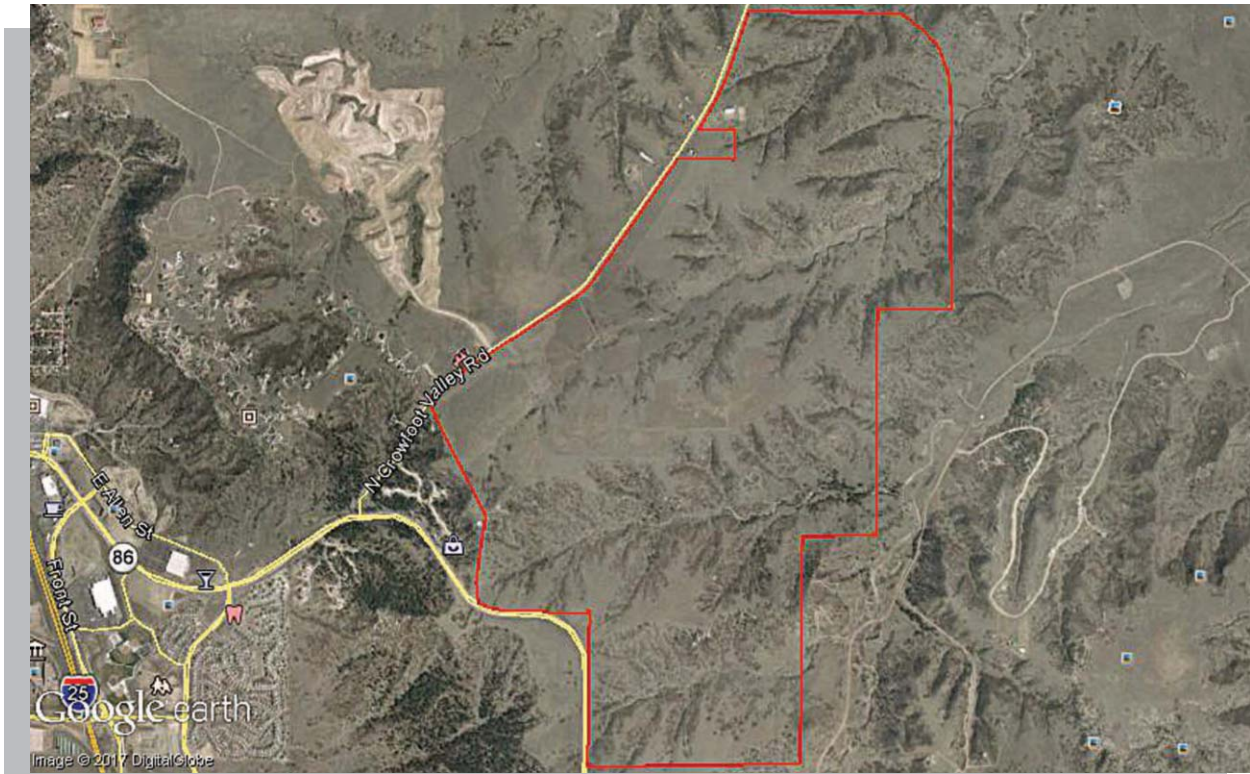
**Photo 1** - 1937 imagery showing a continuous drainage in the location of Scott Gulch from the headwaters to the current location of the Pradera community and a continuous drainage at the location of Drainage 1.



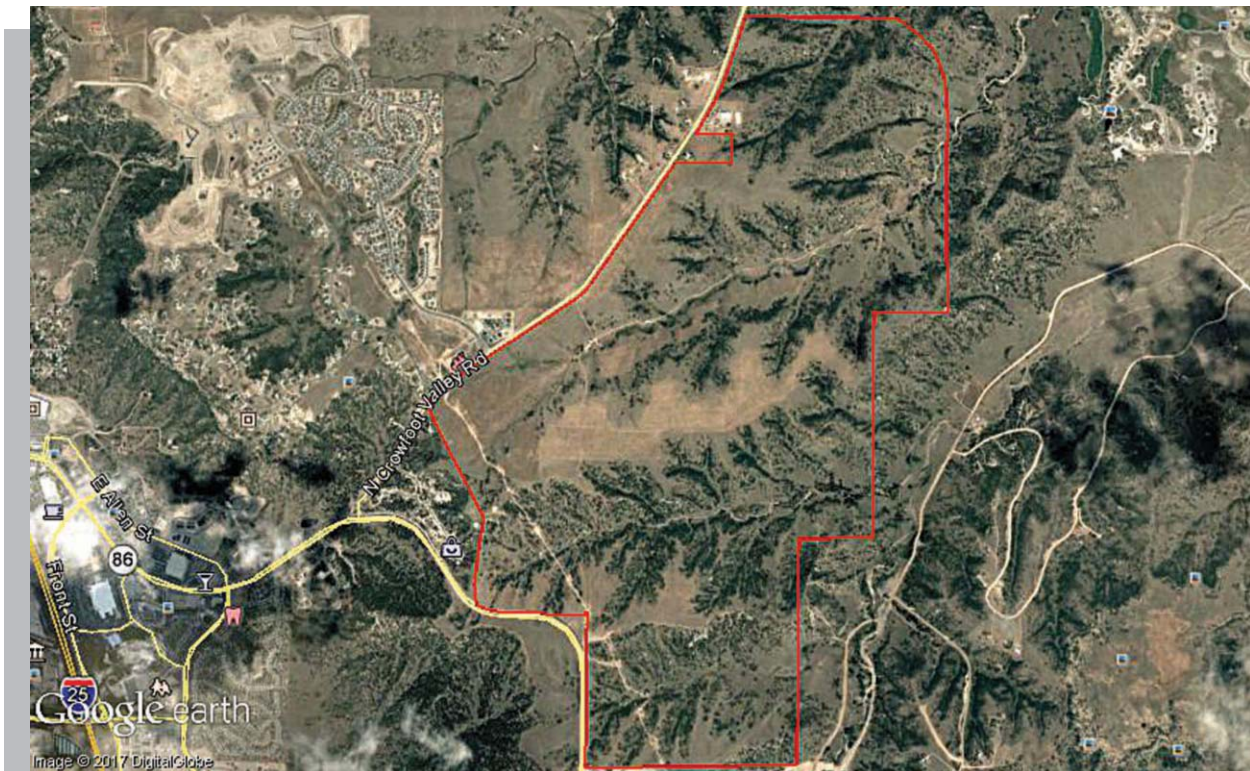
**Photo 2** - 1999 imagery showing continuous drainage in the location of Scott Gulch and development activity west of the project area.



CANYONS SOUTH PROPERTY JURISDICTIONAL DETERMINATION REQUEST  
HISTORICAL IMAGERY LOG



**Photo 3** - 2003 imagery shows that the Scott Gulch drainage is continuous up to the Pradera community locations and development is expanding to the northeast and west of the property.

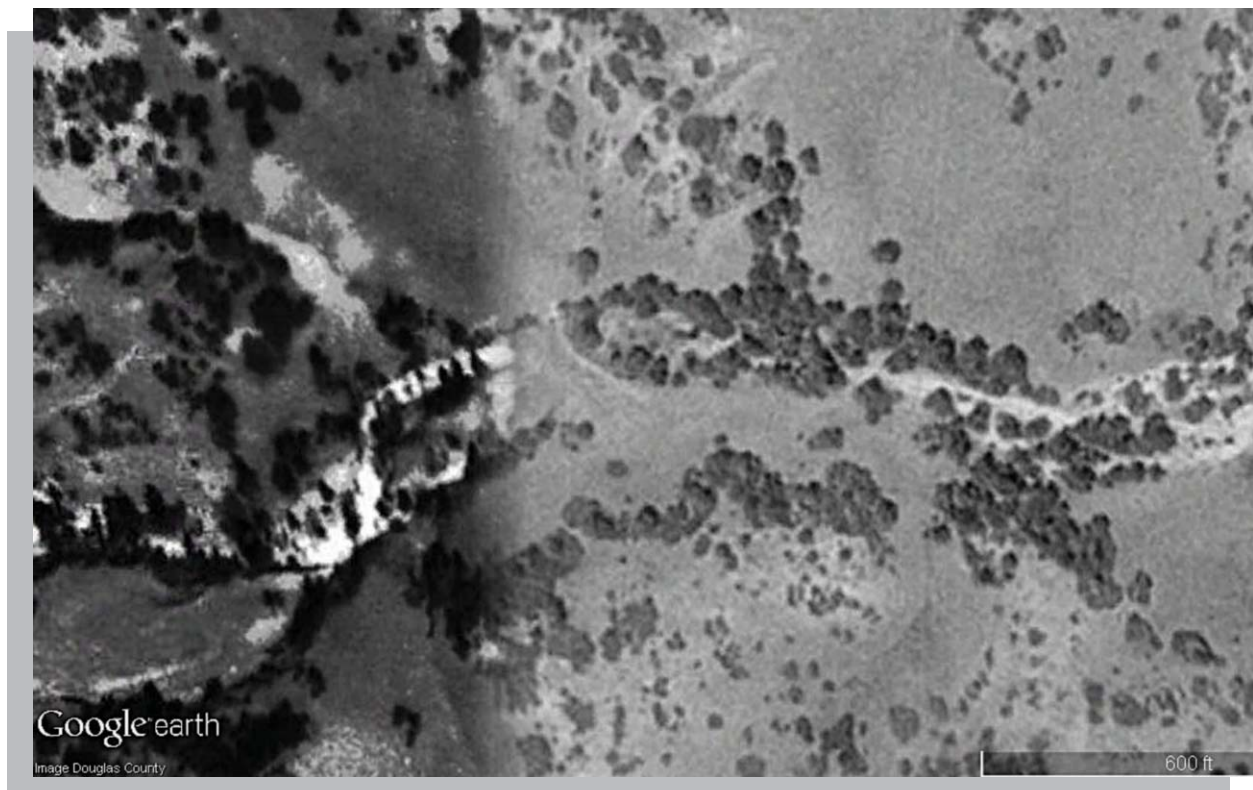


**Photo 4** - 2005 imagery shows that the irrigation pond has been constructed on Scott Gulch and the Pradera Golf Course was developed.





**Photo 5** - 1955 imagery showing a continuous channel along Drainage 1 at the location of the existing upland inclusion.



**Photo 6** - 1993 imagery shows the upland inclusion on Drainage 1.





**Photo 7** - 2017 imagery shows the current extent of the upland inclusion on Drainage 1.



**Image 8** - 1937 imagery showing evidence of a drainage feature in the location of Drainage 3.





**Image 9** - 1999 imagery showing Drainage 3 present in a similar location and condition as 1937.



**Image 10** - 1993 imagery shows the construction of an irrigation pond and adjacent greens on the downstream end of Drainage 3.



# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Canyons South Property City/County: Douglas Sampling Date: Dec 1 2017  
 Applicant/Owner: Lowe Enterprises State: Co Sampling Point: DP-02  
 Investigator(s): E. Crumb Section, Township, Range: Sec 17-20, 30, 31, Tnship 7S, Range 66W  
 Landform (hillslope, terrace, etc.): swale/basin Local relief (concave, convex, none): none Slope (%): 0  
 Subregion (LRR): G Lat: 39.419996°N Long: 104.819251°W Datum: NAD83  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                     |                                                                                         |                                                                                                |                                                                                                           |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | Hydic Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| Remarks:<br><br>Wetland below overflow weir on Scott Gulch                                          |                                                                                         |                                                                                                |                                                                                                           |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: _____)                 | Absolute % Cover     | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>2</u> (A)<br>Total Number of Dominant Species Across All Strata: <u>2</u> (B)<br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)                                                                                                                                                                 |
|-------------------------------------------------|----------------------|-------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <input type="text"/> = Total Cover              |                      |                   |                  | <b>Prevalence Index worksheet:</b><br>Total % Cover of: _____ Multiply by: _____<br>OBL species <input type="text"/> x 1 = _____<br>FACW species <input type="text"/> x 2 = _____<br>FAC species <input type="text"/> x 3 = _____<br>FACU species <input type="text"/> x 4 = _____<br>UPL species <input type="text"/> x 5 = _____<br>Column Totals: <input type="text"/> (A) <input type="text"/> (B)<br>Prevalence Index = B/A = _____ |
| <b>Sapling/Shrub Stratum</b> (Plot size: _____) |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1. <u>Salix exigua</u>                          | <u>25</u>            | Y                 | FACW             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 5. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <input type="text"/> = Total Cover              |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Herb Stratum</b> (Plot size: <u>5X5</u> )    |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1. <u>Carex nebrascensis</u>                    | <u>80</u>            | Y                 | OBL              |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 5. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 6. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 7. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 8. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 9. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 10. _____                                       | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <input type="text"/> = Total Cover              |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Woody Vine Stratum</b> (Plot size: _____)    |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2. _____                                        | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <input type="text"/> = Total Cover              |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| % Bare Ground in Herb Stratum <u>20</u>         |                      |                   |                  | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                               |

Remarks:



# SOIL

Sampling Point: Dp-02

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   |                  | Texture                                      | Remarks     |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|----------------------------------------------|-------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> | Loc <sup>2</sup> |                                              |             |
| 0-4               | 10YR 3/1      | 100 |                |   |                   |                  | Clayloam                                     |             |
| 4-9               | 7.5YR 3/2     | 97  | 2.5YR4/6       | 3 | C                 | PL/M             | Sandloam <input checked="" type="checkbox"/> | faint redox |
|                   |               |     |                |   |                   |                  |                                              |             |
|                   |               |     |                |   |                   |                  |                                              |             |
|                   |               |     |                |   |                   |                  |                                              |             |
|                   |               |     |                |   |                   |                  |                                              |             |
|                   |               |     |                |   |                   |                  |                                              |             |
|                   |               |     |                |   |                   |                  |                                              |             |
|                   |               |     |                |   |                   |                  |                                              |             |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                                    |                                                             |
|--------------------------------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                             | <input type="checkbox"/> Sandy Gleyed Matrix (S4)           |
| <input type="checkbox"/> Histic Epipedon (A2)                      | <input type="checkbox"/> Sandy Redox (S5)                   |
| <input type="checkbox"/> Black Histic (A3)                         | <input type="checkbox"/> Stripped Matrix (S6)               |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1)           |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F)            | <input type="checkbox"/> Loamy Gleyed Matrix (F2)           |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)              | <input type="checkbox"/> Depleted Matrix (F3)               |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)         | <input checked="" type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12)                  | <input type="checkbox"/> Depleted Dark Surface (F7)         |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)                  | <input type="checkbox"/> Redox Depressions (F8)             |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16)      |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)      | (MLRA 72 & 73 of LRR H)                                     |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                                |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Salt Crust (B11)                                      |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Aquatic Invertebrates (B13)                           |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                            |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Dry-Season Water Table (C2)                           |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3)                       | (where not tilled)                                                             |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input checked="" type="checkbox"/> Presence of Reduced Iron (C4)              |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Thin Muck Surface (C7)                                |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks)                            |
| <input type="checkbox"/> Water-Stained Leaves (B9)                 |                                                                                |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

**Field Observations:**

Surface Water Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Canyons South Property City/County: Douglas Sampling Date: Dec 1 2017  
 Applicant/Owner: Lowe Enterprises State: Co Sampling Point: DP-03  
 Investigator(s): E. Crumb Section, Township, Range: Sec 17-20, 30, 31, Tnship 7S, Range 66W  
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0  
 Subregion (LRR): G Lat: 39.419996°N Long: 104.819251°W Datum: NAD83  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                     |                                                                                                           |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>            |                                                                                                           |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>      |                                                                                                           |
| Remarks:<br><br>Wetland below overflow weir on Scott Gulch                                          |                                                                                                           |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: _____)                 | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A)<br>Total Number of Dominant Species Across All Strata: <u>1</u> (B)<br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------|------------------|-------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  | <b>Prevalence Index worksheet:</b><br>Total % Cover of: _____ Multiply by: _____<br>OBL species <u>        </u> x 1 = _____<br>FACW species <u>        </u> x 2 = _____<br>FAC species <u>        </u> x 3 = _____<br>FACU species <u>        </u> x 4 = _____<br>UPL species <u>        </u> x 5 = _____<br>Column Totals: <u>        </u> (A) <u>        </u> (B)<br>Prevalence Index = B/A = _____                                                                                                                                                                                                                                                                                                         |
| = Total Cover                                   |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Sapling/Shrub Stratum</b> (Plot size: _____) |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| = Total Cover                                   |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Herb Stratum</b> (Plot size: <u>5X5</u> )    |                  |                   |                  | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation<br><input type="checkbox"/> 2 - Dominance Test is >50%<br><input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.<br><br><b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| 1. <u>Bromus tectorum</u>                       | <u>60</u>        | <u>Y</u>          | <u>FACU</u>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2. <u>Herb unknown (dead)</u>                   |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 5. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 6. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 7. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 8. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 9. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 10. _____                                       |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| = Total Cover                                   |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Woody Vine Stratum</b> (Plot size: _____)    |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2. _____                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                 |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| = Total Cover                                   |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| % Bare Ground in Herb Stratum <u>40</u>         |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Remarks:                                        |                  |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



# SOIL

Sampling Point: Dp-03

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   |                  | Texture  | Remarks |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|----------|---------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> | Loc <sup>2</sup> |          |         |
| 0-6               | 10YR 3/1      | 100 |                |   |                   |                  | Clayloam |         |
| 6-12              | 7.5YR 4/3     | 100 |                |   |                   |                  | sands/gr |         |
|                   |               |     |                |   |                   |                  |          |         |
|                   |               |     |                |   |                   |                  |          |         |
|                   |               |     |                |   |                   |                  |          |         |
|                   |               |     |                |   |                   |                  |          |         |
|                   |               |     |                |   |                   |                  |          |         |
|                   |               |     |                |   |                   |                  |          |         |
|                   |               |     |                |   |                   |                  |          |         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                                    |                                                        |
|--------------------------------------------------------------------|--------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                             | <input type="checkbox"/> Sandy Gleyed Matrix (S4)      |
| <input type="checkbox"/> Histic Epipedon (A2)                      | <input type="checkbox"/> Sandy Redox (S5)              |
| <input type="checkbox"/> Black Histic (A3)                         | <input type="checkbox"/> Stripped Matrix (S6)          |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1)      |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F)            | <input type="checkbox"/> Loamy Gleyed Matrix (F2)      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)              | <input type="checkbox"/> Depleted Matrix (F3)          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)         | <input type="checkbox"/> Redox Dark Surface (F6)       |
| <input type="checkbox"/> Thick Dark Surface (A12)                  | <input type="checkbox"/> Depleted Dark Surface (F7)    |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)                  | <input type="checkbox"/> Redox Depressions (F8)        |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)      |                                                        |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☐ No ☒

Remarks:

# HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                     |
|--------------------------------------------------------------------|---------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Salt Crust (B11)                           |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Aquatic Invertebrates (B13)                |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                 |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Dry-Season Water Table (C2)                |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3)                       | <b>(where not tilled)</b>                                           |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Presence of Reduced Iron (C4)              |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Thin Muck Surface (C7)                     |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks)                 |
| <input type="checkbox"/> Water-Stained Leaves (B9)                 |                                                                     |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

**Field Observations:**

Surface Water Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Canyons South Property City/County: Douglas Sampling Date: Dec 1 2017  
 Applicant/Owner: Lowe Enterprises State: Co Sampling Point: DP-04  
 Investigator(s): E. Crumb Section, Township, Range: Sec 17-20, 30, 31, Tnship 7S, Range 66W  
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0  
 Subregion (LRR): G Lat: 39.419996°N Long: 104.819251°W Datum: NAD83  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                                                                                     |                                                                                                           |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>            |                                                                                                           |
| Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>      |                                                                                                           |
| Remarks:<br><br>upland swale/remnant channel                                                        |                                                                                                           |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: _____)                                                                                                                                                                                                                                                                                                     | Absolute % Cover     | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A)<br>Total Number of Dominant Species Across All Strata: <u>1</u> (B)<br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. _____                                                                                                                                                                                                                                                                                                                            | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2. _____                                                                                                                                                                                                                                                                                                                            | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3. _____                                                                                                                                                                                                                                                                                                                            | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4. _____                                                                                                                                                                                                                                                                                                                            | <input type="text"/> | _____             | _____            |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <u>        </u> = Total Cover                                                                                                                                                                                                                                                                                                       |                      |                   |                  | <b>Prevalence Index worksheet:</b><br>Total % Cover of: _____ Multiply by: _____<br>OBL species <input type="text"/> x 1 = _____<br>FACW species <input type="text"/> x 2 = _____<br>FAC species <input type="text"/> x 3 = _____<br>FACU species <input type="text"/> x 4 = _____<br>UPL species <input type="text"/> x 5 = _____<br>Column Totals: <input type="text"/> (A) <input type="text"/> (B)<br>Prevalence Index = B/A = _____ |
| <b>Sapling/Shrub Stratum (Plot size: _____)</b><br>1. _____<br>2. _____<br>3. _____<br>4. _____<br>5. _____<br><u>        </u> = Total Cover                                                                                                                                                                                        |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Herb Stratum (Plot size: <u>5X5</u>)</b><br>1. <u>Bromus inermis</u> <u>35</u> Y FACU<br>2. <u>Elymus trachycalus</u> <u>5</u> FACU<br>3. <u>Thlaspi arvense</u> <u>4</u> FACU<br>4. <u>Elymus canadensis</u> <u>10</u> FACU<br>5. _____<br>6. _____<br>7. _____<br>8. _____<br>9. _____<br>10. _____<br><u>54</u> = Total Cover |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Woody Vine Stratum (Plot size: _____)</b><br>1. _____<br>2. _____<br><u>        </u> = Total Cover                                                                                                                                                                                                                               |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| % Bare Ground in Herb Stratum <u>46</u>                                                                                                                                                                                                                                                                                             |                      |                   |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Hydrophytic Vegetation Indicators:**  
☐ 1 - Rapid Test for Hydrophytic Vegetation  
☐ 2 - Dominance Test is >50%  
☐ 3 - Prevalence Index is ≤3.0<sup>1</sup>  
☐ 4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)  
☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ☐ No ☒

Remarks:



## SOIL

Sampling Point: Dp-04

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:** (Applicable to all LRRs, unless otherwise noted.)

- |                                                                             |                                                        |
|-----------------------------------------------------------------------------|--------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                                      | <input type="checkbox"/> Sandy Gleyed Matrix (S4)      |
| <input type="checkbox"/> Histic Epipedon (A2)                               | <input type="checkbox"/> Sandy Redox (S5)              |
| <input type="checkbox"/> Black Histic (A3)                                  | <input type="checkbox"/> Stripped Matrix (S6)          |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                              | <input type="checkbox"/> Loamy Mucky Mineral (F1)      |
| <input type="checkbox"/> Stratified Layers (A5) ( <b>LRR F</b> )            | <input type="checkbox"/> Loamy Gleyed Matrix (F2)      |
| <input type="checkbox"/> 1 cm Muck (A9) ( <b>LRR F, G, H</b> )              | <input type="checkbox"/> Depleted Matrix (F3)          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)                  | <input type="checkbox"/> Redox Dark Surface (F6)       |
| <input type="checkbox"/> Thick Dark Surface (A12)                           | <input type="checkbox"/> Depleted Dark Surface (F7)    |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)                           | <input type="checkbox"/> Redox Depressions (F8)        |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) ( <b>LRR G, H</b> ) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) ( <b>LRR F</b> )      |                                                        |
- (MLRA 72 & 73 of LRR H)**

### Indicators for Problematic Hydric Soils<sup>3</sup>:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if present):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☐ No ☒

Remarks:

## HYDROLOGY

### Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                     |
|--------------------------------------------------------------------|---------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Salt Crust (B11)                           |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Aquatic Invertebrates (B13)                |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                 |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Dry-Season Water Table (C2)                |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3)                       | <b>(where not tilled)</b>                                           |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Presence of Reduced Iron (C4)              |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Thin Muck Surface (C7)                     |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks)                 |
| <input type="checkbox"/> Water-Stained Leaves (B9)                 |                                                                     |

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)  
(where tilled)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

**Field Observations:**

Surface Water Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present?** Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Canyons South Property City/County: Douglas Sampling Date: Dec 1 2017  
 Applicant/Owner: Lowe Enterprises State: Co Sampling Point: DP-01  
 Investigator(s): E. Crumb Section, Township, Range: Sec 17-20, 30, 31, Tnship 7S, Range 66W  
 Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): none Slope (%): 0  
 Subregion (LRR): G Lat: 39.419996°N Long: 104.819251°W Datum: NAD83  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                 |                                                                     |                                          |                                                                     |
|---------------------------------|---------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------|
| Hydrophytic Vegetation Present? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Is the Sampled Area<br>within a Wetland? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Hydric Soil Present?            | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                          |                                                                     |
| Wetland Hydrology Present?      | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                          |                                                                     |
| Remarks:<br><br>Channel bed     |                                                                     |                                          |                                                                     |

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: _____)                                                                                                                                                                                                                                                               | Absolute<br>% Cover | Dominant<br>Species? | Indicator<br>Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A)<br>Total Number of Dominant Species Across All Strata: <u>2</u> (B)<br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. _____                                                                                                                                                                                                                                                                                      |                     |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2. _____                                                                                                                                                                                                                                                                                      |                     |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3. _____                                                                                                                                                                                                                                                                                      |                     |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4. _____                                                                                                                                                                                                                                                                                      |                     |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                               |                     | = Total Cover        |                     | <b>Prevalence Index worksheet:</b><br>Total % Cover of: _____ Multiply by: _____<br>OBL species <input type="checkbox"/> x 1 = _____<br>FACW species <input type="checkbox"/> x 2 = _____<br>FAC species <input type="checkbox"/> x 3 = _____<br>FACU species <input type="checkbox"/> x 4 = _____<br>UPL species <input type="checkbox"/> x 5 = _____<br>Column Totals: <input type="checkbox"/> (A) _____ (B) _____<br>Prevalence Index = B/A = _____                                                                                                                                                                                                                                                       |
| <b>Sapling/Shrub Stratum (Plot size: _____)</b><br>1. _____<br>2. _____<br>3. _____<br>4. _____<br>5. _____<br>_____ = Total Cover                                                                                                                                                            |                     |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Herb Stratum (Plot size: 5X5)</b><br>1. <u>Agrostis gigantea</u> <u>35</u> Y FACW<br>2. <u>Festuca pratensis</u> <u>25</u> Y FACU<br>3. <u>Elymus canadensis</u> <u>5</u> FACU<br>4. _____<br>5. _____<br>6. _____<br>7. _____<br>8. _____<br>9. _____<br>10. _____<br>_____ = Total Cover |                     |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Woody Vine Stratum (Plot size: _____)</b><br>1. _____<br>2. _____<br>_____ = Total Cover                                                                                                                                                                                                   |                     |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| % Bare Ground in Herb Stratum <u>35</u>                                                                                                                                                                                                                                                       |                     |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Remarks:                                                                                                                                                                                                                                                                                      |                     |                      |                     | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation<br><input type="checkbox"/> 2 - Dominance Test is >50%<br><input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.<br><br><b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |



# SOIL

Sampling Point: Dp-01

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   | Texture   | Remarks          |
|-------------------|---------------|-----|----------------|---|-------------------|-----------|------------------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> |           |                  |
| 0-4               | 10YR 6/2      | 98  | 2.5YR 4/8      | 2 | C                 | PL        | Sand relic redox |
| 4-14              | 2.4YR 4/2     | 100 |                |   |                   | Clay/Loam |                  |
|                   |               |     |                |   |                   |           |                  |
|                   |               |     |                |   |                   |           |                  |
|                   |               |     |                |   |                   |           |                  |
|                   |               |     |                |   |                   |           |                  |
|                   |               |     |                |   |                   |           |                  |
|                   |               |     |                |   |                   |           |                  |
|                   |               |     |                |   |                   |           |                  |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |                                                                    |                                                        |
|--------------------------------------------------------------------|--------------------------------------------------------|
| <input type="checkbox"/> Histosol (A1)                             | <input type="checkbox"/> Sandy Gleyed Matrix (S4)      |
| <input type="checkbox"/> Histic Epipedon (A2)                      | <input type="checkbox"/> Sandy Redox (S5)              |
| <input type="checkbox"/> Black Histic (A3)                         | <input type="checkbox"/> Stripped Matrix (S6)          |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1)      |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F)            | <input type="checkbox"/> Loamy Gleyed Matrix (F2)      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)              | <input type="checkbox"/> Depleted Matrix (F3)          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)         | <input type="checkbox"/> Redox Dark Surface (F6)       |
| <input type="checkbox"/> Thick Dark Surface (A12)                  | <input type="checkbox"/> Depleted Dark Surface (F7)    |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)                  | <input type="checkbox"/> Redox Depressions (F8)        |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)      | (MLRA 72 & 73 of LRR H)                                |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coast Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16)
- (LRR H outside of MLRA 72 & 73)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☐ No ☒

Remarks:

# HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |                                                                    |                                                                     |
|--------------------------------------------------------------------|---------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Salt Crust (B11)                           |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Aquatic Invertebrates (B13)                |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                 |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Dry-Season Water Table (C2)                |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3)                       | (where not tilled)                                                  |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Presence of Reduced Iron (C4)              |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Thin Muck Surface (C7)                     |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks)                 |
| <input type="checkbox"/> Water-Stained Leaves (B9)                 |                                                                     |

Secondary Indicators (minimum of two required)

- ☒ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- (where tilled)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (LRR F)

**Field Observations:**

Surface Water Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_  
Water Table Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_  
Saturation Present? Yes ☐ No ☐ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:





**DEPARTMENT OF THE ARMY**  
CORPS OF ENGINEERS, OMAHA DISTRICT  
DENVER REGULATORY OFFICE, 9307 SOUTH WADSWORTH BOULEVARD  
LITTLETON, COLORADO 80128-6901

April 28, 2021

**SUBJECT: Approved Jurisdictional Determination – Corps File No. NWO-2021-00560-DEN, Canyons South Property Parcel, Douglas County, Colorado**

Erik Clore  
Lowe Enterprises  
5299 DTC Blvd., Ste 1260  
Greenwood Village, CO 80111

Dear Mr. Clore:

This letter is in reference to the property located at approximate latitude 39.402243, longitude -104.823604, in Douglas County, Colorado. The submittal dated February 24, 2021 and received March 23, 2021, consists of a request for an Approved Jurisdictional Determination for the above project site. The delineated area located on the subject property has been reviewed in accordance with Section 404 of the Clean Water Act (Section 404) under which the U.S. Army Corps of Engineers regulates the discharge of dredged and fill material, and any excavation activity associated with a dredge and fill project in waters of the United States.

At your request, an Approved Jurisdictional Determination (JD) has been prepared for the approximate 340-acre review area. Based on the April 5, 2021 site visit and a review of available information, we have determined that the review area contains an ephemeral stream and in-channel wetlands. The ephemeral stream and its in-channel wetlands are excluded waters or features. Therefore, the review area does not contain waters of the United States. The discharge of fill material onto this project site does not require a Department of the Army permit under Section 404.

The JD is attached to this letter. If you are not in agreement with the JD decision, you may request an administrative appeal under regulation 33 CFR 331, by using the attached Appeal Form and Administrative Appeal Process form. The request for appeal must be received within 60 days from the date of this letter. It is not necessary to submit a Request for Appeal if you do not object to the JD.

This JD is valid for a period of five years from the date of this letter, unless new information warrants revisions of the JDs before the expiration date, or unless the Corps has identified, after a possible public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.



If there are any questions please feel free to contact Celena Cui at (303) 979-4120 or by e-mail at [Celena.H.Cui@usace.army.mil](mailto:Celena.H.Cui@usace.army.mil), and reference **Corps File No. NWO-2021-00560-DEN**.

Sincerely,

A handwritten signature in black ink, appearing to read 'K. Downing', with a stylized flourish at the end.

Kiel Downing  
Chief, Denver Regulatory Office

Enclosure(s)

cc: Justin Apfel, Great Ecology





**U.S. ARMY CORPS OF ENGINEERS  
REGULATORY PROGRAM  
APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)  
NAVIGABLE WATERS PROTECTION RULE**

**I. ADMINISTRATIVE INFORMATION**

Completion Date of Approved Jurisdictional Determination (AJD): 4/28/2021

ORM Number: Omaha District, Denver Regulatory Office, NWO-2021-00560-DEN, Canyon South

Associated JDs: N/A

Review Area Location<sup>1</sup>: State/Territory: Colorado City: Castle Rock County/Parish/Borough: Douglas County

Center Coordinates of Review Area: Latitude 39.402489 Longitude -104.822882

**II. FINDINGS**

**A. Summary:** Check all that apply. At least one box from the following list MUST be selected. Complete the corresponding sections/tables and summarize data sources.

- ☐ The review area is comprised entirely of dry land (i.e., there are no waters or water features, including wetlands, of any kind in the entire review area). Rationale: N/A or describe rationale.
- ☐ There are "navigable waters of the United States" within Rivers and Harbors Act jurisdiction within the review area (complete table in Section II.B).
- ☐ There are "waters of the United States" within Clean Water Act jurisdiction within the review area (complete appropriate tables in Section II.C).
- ☒ There are waters or water features excluded from Clean Water Act jurisdiction within the review area (complete table in Section II.D).

**B. Rivers and Harbors Act of 1899 Section 10 (§ 10)<sup>2</sup>**

| § 10 Name | § 10 Size | § 10 Criteria | Rationale for § 10 Determination |
|-----------|-----------|---------------|----------------------------------|
| N/A.      | N/A.      | N/A.          | N/A.                             |

**C. Clean Water Act Section 404**

| Territorial Seas and Traditional Navigable Waters ((a)(1) waters): <sup>3</sup> |             |                 |                                    |  |
|---------------------------------------------------------------------------------|-------------|-----------------|------------------------------------|--|
| (a)(1) Name                                                                     | (a)(1) Size | (a)(1) Criteria | Rationale for (a)(1) Determination |  |
| N/A.                                                                            | N/A.        | N/A.            | N/A.                               |  |

| Tributaries ((a)(2) waters): |             |                 |                                    |  |
|------------------------------|-------------|-----------------|------------------------------------|--|
| (a)(2) Name                  | (a)(2) Size | (a)(2) Criteria | Rationale for (a)(2) Determination |  |
| N/A.                         | N/A.        | N/A.            | N/A.                               |  |

| Lakes and ponds, and impoundments of jurisdictional waters ((a)(3) waters): |             |                 |                                    |  |
|-----------------------------------------------------------------------------|-------------|-----------------|------------------------------------|--|
| (a)(3) Name                                                                 | (a)(3) Size | (a)(3) Criteria | Rationale for (a)(3) Determination |  |
| N/A.                                                                        | N/A.        | N/A.            | N/A.                               |  |

| Adjacent wetlands ((a)(4) waters): |             |                 |                                    |  |
|------------------------------------|-------------|-----------------|------------------------------------|--|
| (a)(4) Name                        | (a)(4) Size | (a)(4) Criteria | Rationale for (a)(4) Determination |  |
| N/A.                               | N/A.        | N/A.            | N/A.                               |  |

<sup>1</sup> Map(s)/figure(s) are attached to the AJD provided to the requestor.

<sup>2</sup> If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Rivers and Harbors Act Section 10 navigable waters list, do NOT use this document to make the determination. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Rivers and Harbors Act Section 10 navigability determination.

<sup>3</sup> A stand-alone TNW determination is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where upstream or downstream limits or lake borders are established. A stand-alone TNW determination should be completed following applicable guidance and should NOT be documented on the AJD Form.





**U.S. ARMY CORPS OF ENGINEERS  
REGULATORY PROGRAM  
APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)  
NAVIGABLE WATERS PROTECTION RULE**

**D. Excluded Waters or Features**

| Excluded waters ((b)(1) – (b)(12)): <sup>4</sup> |                |             |                                                                                       |                                                                                                                                                                                                                                                                              |
|--------------------------------------------------|----------------|-------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exclusion Name                                   | Exclusion Size |             | Exclusion <sup>5</sup>                                                                | Rationale for Exclusion Determination                                                                                                                                                                                                                                        |
| Ephemeral Stream                                 | Approx. 5,000  | linear feet | (b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool. | The stream has a discontinuous ordinary high water mark and is best characterized as an ephemeral stream within the project reach. During the site visit, the stream contained areas with pooling water or no water. No water was observed at the Castle Oaks Drive culvert. |
| Channel Wetlands                                 | N/A.           | N/A.        | (b)(1) Non-adjacent wetland.                                                          | The wetlands are located within the channel bottom of the ephemeral stream. Therefore, the wetlands are not adjacent to a tributary that has perennial or intermittent flow. In addition, the wetlands are separated from McMurdo Gulch by an upland swale.                  |

**III. SUPPORTING INFORMATION**

**A. Select/enter all resources** that were used to aid in this determination and attach data/maps to this document and/or references/citations in the administrative record, as appropriate.

☒ Information submitted by, or on behalf of, the applicant/consultant: [April 2021 Delineation and Data Sheet](#)

This information [is](#) sufficient for purposes of this AJD.

Rationale: [N/A](#)

☐ Data sheets prepared by the Corps: [Title\(s\) and/or date\(s\)](#).

☒ Photographs: [Aerial: Google Earth Image, 6 October 2019](#)

☒ Corps site visit(s) conducted on: [4/5/2021](#)

☐ Previous Jurisdictional Determinations (AJDs or PJDs): [ORM Number\(s\) and date\(s\)](#).

☒ Antecedent Precipitation Tool: [provide detailed discussion in Section III.B.](#)

☐ USDA NRCS Soil Survey: [Title\(s\) and/or date\(s\)](#).

☐ USFWS NWI maps: [Title\(s\) and/or date\(s\)](#).

☒ USGS topographic maps: [1965 Castle Rock North, 1: 24,000](#)

**Other data sources used to aid in this determination:**

| Data Source (select)                       | Name and/or date and other relevant information |
|--------------------------------------------|-------------------------------------------------|
| <a href="#">USGS Sources</a>               | <a href="#">N/A.</a>                            |
| <a href="#">USDA Sources</a>               | <a href="#">N/A.</a>                            |
| <a href="#">NOAA Sources</a>               | <a href="#">N/A.</a>                            |
| <a href="#">USACE Sources</a>              | <a href="#">N/A.</a>                            |
| <a href="#">State/Local/Tribal Sources</a> | <a href="#">N/A.</a>                            |
| <a href="#">Other Sources</a>              | <a href="#">N/A.</a>                            |

<sup>4</sup> Some excluded waters, such as (b)(2) and (b)(4), may not be specifically identified on the AJD form unless a requestor specifically asks a Corps district to do so. Corps districts may, in case-by-case instances, choose to identify some or all of these waters within the review area.

<sup>5</sup> Because of the broad nature of the (b)(1) exclusion and in an effort to collect data on specific types of waters that would be covered by the (b)(1) exclusion, four sub-categories of (b)(1) exclusions were administratively created for the purposes of the AJD Form. These four sub-categories are not new exclusions, but are simply administrative distinctions and remain (b)(1) exclusions as defined by the NWPR.





**U.S. ARMY CORPS OF ENGINEERS  
REGULATORY PROGRAM  
APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)  
NAVIGABLE WATERS PROTECTION RULE**

- B. Typical year assessment(s):** Site visit was performed during the wet season with the three months prior indicating normal conditions.
- C. Additional comments to support AJD:** N/A or provide additional discussion as appropriate.