

November 1, 2019

El Paso County Development Services Department  
Attn: Ms. Kari Parsons  
2880 International Circle  
Colorado Springs, CO 80910

**SUBJECT: Comment Response Letter – Bent Grass Residential Filing No. 2 (SF-19-014)**

Dear Ms. Parsons,

Please see the following responses in ***bold and italics*** for the 1<sup>st</sup> review of Bent Grass Residential Filing No. 2.

General

1. Note: As discussed September 19, 2019, Staff's understanding is that:
  - a. The final plat will be revised to include the drainage, open space and undeveloped tracts to the west.  
***Response: Revised as requested. The area platted now includes the parcel to the west of the proposed filing no. 2***
  - b. Drainage design will be updated to account for ECM updates related to MS4 requirements and "Waters of the State". Additional infiltration area permanent BMPs appear to be required.  
***Response: WQCV detention ponds are now provided to meet MS4 requirements.***
  - c. The MDDP will be updated to include the sub-basin to the east that flows to Bent Grass Meadows Drive and Meridian Road.  
***Response: The MDDP and FDR is updated to include the sub-basin to the east.***
2. Deviation requests may be required from ECM Section I.7.1.C.4 and C.5 addressing the proposal to discharge untreated un-detained stormwater into the channels to the west of the Filing 2 area.  
***Response: A deviation is no longer required because we are providing WQCV ponds.***
3. A deviation request from ECM Section I.7.1.B is required addressing all urban lot and road areas not provided with a standard WQCV control measure/BMP.  
***Response: A deviation is no longer required because we are providing WQCV ponds.***
4. Provide a complete wetland mitigation plan or a determination document addressing any wetland areas proposed to be disturbed.  
***Response: See riparian analysis report.***
5. See Letter of Intent redlines. It needs to be clarified that the offsite FSD/Stormwater Quality pond (Pond WU) (or other WQCV facility) will need to be operational before site construction.  
***Response: Updated the Letter of Intent and SMWP. Temporary sediment basins will be provided to contain the 2 year storm before site construction.***

6. Address any proposed street lighting in the Letter of Intent. A license agreement will be required if street lights are proposed within County rights-of-way.

***Response: Added a section for proposed street lighting in the letter of intent.***

#### Final Plat

1. If there will be underdrains add a plat note stating the entity responsible for maintenance.

***Response: Revised as requested.***

2. Provide easements through lots 34, 44 & 53 to convey offsite drainage as proposed in the drainage report.

***Response: Revised as requested.***

3. Add a plat note stating that lots 34, 44 & 53 accept drainage from upstream areas and purchasers of these lots are responsible for constructing side-lot drainage swales to accommodate the runoff (if the design is not revised).

***Response: Revised as requested.***

4. Regarding the necessary (redlined) temporary cul-de-sac easements (if not proposed as ROW), the template of the Non-Exclusive Permanent Easement can be provided electronically upon request.

***Response: See response in Final Plat PDF.***

5. Provide closure sheets for all lots and tracts.

***Response: Provided as requested.***

6. See final plat redlines for additional comments.

***Response: Revised as requested.***

#### Transportation / Traffic Impact Study

1. See TIS redlines.

***Response: Revised as requested.***

2. Provide all information required by ECM Appendix B, sections B.2.3.B and B.2.4.B. including accident analysis, pedestrian and bicycle traffic... Applicable warrant study may be placed in the Appendix

***Response: Revised as requested.***

#### MDDP

*Note: this review is cursory due to the need for additional information and analysis as described in the comments below.*

1. There appear to be several diversions upstream of the site. These need to be addressed; is flow split or different from what the DBPS shows?

***Response: Revised as requested. See revised MDDP.***



2. Address any differences in the proposed design from the DBPS, including the DBPS regional pond that is identified on this site but proposed not to be constructed. Changes may require a DBPS addendum and drainage board approval.

***Response: Revised as requested. See revised MDDP.***

3. Provide an Existing Drainage Plan.

***Response: Revised as requested. See revised MDDP.***

4. See MDDP redlines.

***Response: Revised as requested. See revised MDDP.***

#### Final Drainage Report / Drainage Plans

*Note: this review is cursory due to the need for additional information and analysis as described in the MDDP comments and comments below.*

1. See FDR redlines.

***Response: Revised as requested. See revised FDR.***

2. Regarding the adjacent Falcon West Tributary channel:

- a. Address how re-routing of flows to one(?) specific outfall on the west tributary channel will affect the channel flow, velocities and localized outfall conditions.

***Response: Revised as requested. See revised FDR.***

- b. Address channel velocities and any stabilization necessary above that called for in the DBPS.

***Response: Revised as requested. See revised FDR.***

- c. Details, including preliminary design, sizing, and modeling (to verify depths and velocities) are required, including the offsite area (MDDP area). The entire reach through and adjacent to this development needs to be addressed. Final drainage reports need to provide a comprehensive plan for improvements.

***Response: Revised as requested. See revised FDR.***

3. Regarding the channel:

- a. Provide a complete channel plan and profile.

***Response: Revised as requested. See revised FDR.***

- b. Provide maintenance access to the channel and box culvert.

***Response: Revised as requested. See revised FDR.***

- c. If the channel is proposed to be County-maintained rather than metro district-maintained, improvements according to the DBPS need to be provided; address completely in the FDR. Additional improvements to those proposed in the DBPS may be needed to qualify for reimbursement and maintenance eligibility. If the developer desires reimbursement for the construction costs and for the County to maintain the improvements, the process in the DCM needs to be followed (reference DCM Sections 1.7 and 3.3).

***Response: Revised as requested. See revised FDR.***

- d. Verify culvert outlet protection design. It appears that a low tailwater basin/plunge pool may be necessary (DCM10.8.3/UDFCD 9.3.2.2).  
***Response: Revised as requested. See revised FDR.***
  - e. Complete channel stabilization improvements need to be provided adjacent to/around the proposed outfalls to protect the outfall and to protect the area impacted by the outfalls.  
***Response: Revised as requested. See revised FDR.***
  - f. Specifically address geotechnical hazards and any wetlands mitigation in the FDR see redlines.  
***Response: Revised as requested. See revised FDR.***
  - g. An O&M manual for onsite and downstream channel maintenance will need to be provided; the template for this document will be provided to you when available.  
***Response: Provided as requested. See revised FDR.***
4. Regarding ditch protection calculations, long-term stability of native vegetation needs to be shown. Long runs of channel (over 200 feet) needing permanent long-term protection need a long-term design, such as ditch checks, drop structures or riprap. Address as appropriate.  
***Response: Revised as requested. See revised FDR.***
5. Provide discussion of maintenance access and aspects of the preliminary design. Show access roads for permanent BMPs and channels on the drainage plans. Reference ECM 3.3.3.K.  
***Response: Revised as requested. See revised FDR.***
6. Provide a PDB/BMP Maintenance Agreement and Easement for district maintenance of PBMPs. The latest template for the agreement can be e-mailed upon request.  
***Response: Revised as requested. See revised FDR.***
7. Provide the new PBMP Applicability Form, which can be found at:  
<https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/PBMP-Applicability-Form.docx>.  
***Response: Provided as requested.***
8. Regarding the BMP O&M/I&M Plan, ensure that all stormwater control measures/BMPs are addressed and maintenance procedures provided corresponding to the final design.  
***Response: Revised as requested. See revised FDR.***
9. Note: Any proposed urban lot areas draining directly offsite require an easement or other documentation from the adjoining owner(s) that the proposed developed condition is acceptable.  
***Response: Noted.***

Construction Plans / Geotechnical Issues / Grading and Erosion Control Plan / SWMP

1. Provide Construction plans for the offsite "Pond WU" proposed construction.  
***Response: Construction plans for offsite Pond WU improvements are provided.***
2. Clearly show and label all required drainage easements and offsite easements. Provide permission/easement documentation or reception numbers.  
***Response: Revised as requested.***
3. Revise pipe size/slope or provide a deviation request with adequate justification and specifications for watertight pressure pipe (ECM 3.3.1.D - exceeding short runs with a pressure head) where applicable.  
***Response: Revised as requested.***
4. Assess the need for signage at the entrances and ends of the cul-de-sacs (W14-1/W14-2 and Type 4 object markers?).  
***Response: Revised as requested.***
5. Show and label all maintenance access roads and the trail on the plans.  
***Response: Revised as requested.***
6. Geotechnical issues:
  - a. Provide the necessary additional geotechnical study for final road and drainage design.  
***Response: Provided as requested.***
  - b. Address channel improvements and pond embankment.  
***Response: Revised as requested.***
7. If there will be USPS mail kiosk/cluster(s) in this subdivision provide location(s) and details.  
***Response: No USPS mail Kiosk/cluster will provided in this filing.***
8. Submit a SWMP in compliance with the 2019 Engineering Criteria Manual changes.  
***Response: Provided as requested.***
9. As noted at the beginning of these comments, updated checklists are required to be provided by the design engineer. Provide with the next submittal. Instructions are provided below the list of attachments. Checklists can be found at:  
[https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/Copy-of-GEC-SWMP\\_Checklists.xlsx](https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/Copy-of-GEC-SWMP_Checklists.xlsx).  
***Response: Provided as requested.***
10. An updated ESQCP form is required as part of ECM updates; provide with the next submittal. The form can be found at <https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/Erosion-and-Stormwater-Quality-Control-Permitrev.2019.docx>.  
***Response: Provided as requested.***
11. See CD/GEC Plan redlines for additional comments and clarification of these comments.  
***Response: Revised additional comments.***

Forms / SIA / Surety Estimate Form

1. Provide the updated FAE form. Note: FAE quantities and costs will be reviewed in detail with the next submittal.

***Response: Provided the updated FAE form.***

2. See attached Engineering Final Submittal Checklist for reference.

***Response: Noted.***

Attachments/Electronic Files

1. Comment Responses – LOI
2. Comment Responses – MDDP
3. Comment Responses – FDR
4. Comment Responses – Final Plat
5. Comment Responses – CD's
6. Comment Responses – FAE
7. Comment Responses – Subdivision Summary Form
8. Comment Responses – GEC
9. Comment Responses – ESQCP

## COMMENT RESPONSES – LOI



178 Lots proposed. Ensured that all submittal documents match and also adjusted the lot numbering

The water wastewater comt is for 121 lots. 177 as indicated in the application form, the LOI states 181 lots; The plat numbering is so confusing - its unknown how many lots are proposed

## Letter of Intent

### Bent Grass Residential Filing No 2

September 03, 2019

#### Property Owner / Applicant:

Challenger Homes Inc  
8605 Explorer Dr.  
Colorado Springs, CO 80920

address policy plan, small area plan, water master plan and final plat criteria

Updated the Letter of Intent and used the Letter of Intent criteria in the Final Plat application to address necessary plans and topics.

#### Subdivision Name

The Bent Grass Residential Filing No. 2 project site is in the West half of Section 1, Township 13 South, Range 65 West of the 6<sup>th</sup> Principle Meridian, County of El Paso, State of Colorado. The project site is bounded East by Bent Grass Residential Filing No. 1, North by The Meadows Filing No. 2, West, by The Meadows Filing No. 3, and South by Latigo Business Center Filing No. 1.

#### Request

This is the request to plat X single family nits , X tracts comprised of X acres, X acres in ROW

Revised as requested

How many Lots? tracts? Acreage in ROW? Water sufficecny? any deviations requested?

This request is for Bent Grass Residential Filing No. 2 Final Plat.

#### Zoning / Land Use

The site is zoned PUD and the final plat conforms to this zone. The proposed land use is Residential Single Family.

#### Total Size of Requested Area

Bent Grass Residential Filing 2 comprises 50.8 acres.

Does this plat met the 10percent open space requirement? Of that 25% of the 10% is usable?

See updated letter of intent. The 10 percent open space requirement is addressed using referenced code.

#### Residential Units

Bent Grass Residential Filing 2 comprises 181 Single Family Residential Dwelling Units on 50.8 acres (3.5 Du/Acre).

#### Industrial / Commercial Sites

None.

#### Mobile Home Units

None.



## Utility Service Providers

Water and Wastewater service will be provided by the Woodmen Hills Metropolitan District (WHMD). WHMD issued a "Will Serve Letter" for both water and wastewater. A payment of \$1.3Mil was made by Challenger Homes, Inc. to WHMD.

Electric service will be provided by Mountain View Electric. Gas service will be provided by Colorado Springs Utilities. "Will Serve Letters" have been received from both utilities. Filing No. 2.

Revised. Rerouted the channel (RWT202 Per Matrix DBPS) to combine with RWT204 and flow from North to South. The channels are outside the platted area and therefore do not need easements.

## Drainage

On site drainage will flow into two channels that run through the site. The two channels come together near the southern end of the site and release stormwater direction to the West Tributary channel designated RWT204. This channel flows offsite into an existing regional detention pond designated WU. Pond WU has an existing embankment failure. Additionally, Pond WU does not provide Water Quality treatment.

There are two channels within this plat area?? please place in drainage easements if that is the case

As part of the Bent Grass Filing 2 development, Challenger Homes has agreed to repair the existing embankment failures and reconstruct the existing pond outfall structure. Repairs to the existing pond will allow it to function properly. Constructing the existing pond outfall structure will allow the pond to provide Water Quality treatment.

where is this located? The PC and BoCC have no idea what and where pond WU is

Pond WU is located south of the project site, see updated Letter of Intent.

## Access

The site will be connected along Bent Grass Meadows Drive which terminates at Meridian Road on the east and Woodmen Frontage Road on the west. The Bent Grass Metropolitan District is responsible for improvements to the Meridian Road and Bent Grass Meadows Drive intersection. These improvements are anticipated to be completed by the summer of 2020.

verify it is the off site improvements for the this drainage report since you are not putting a pond within plat

Revised as requested

## Waiver

There are no waivers requested.

deviation water quality?

We are now providing water quality for the proposed development. No deviation required.

## COMMENT RESPONSES – MDDP





# MASTER DEVELOPMENT DRAINAGE PLAN

## BENT GRASS RESIDENTIAL SUBDIVISION

El Paso County, Colorado

Cursory redlines Steve  
Kuehster 9/25/2019

Galloway response in red.

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PREPARED FOR:  
**Challenger Homes**  
8605 Explorer Dr., Suite 250  
Colorado Springs, CO 80920

PREPARED BY:  
**Galloway & Company, Inc.**  
1755 Telstar Drive, Suite 107  
Colorado Springs, CO 80920

DATE:  
**May 2019**



**ENGINEER'S STATEMENT**

*The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the Drainage Criteria Manual for the City of Colorado Springs and El Paso County. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.*

\_\_\_\_\_  
Scott Brown, PE 45900  
For and on behalf of Galloway & Company, Inc.

\_\_\_\_\_  
Date

**DEVELOPER'S CERTIFICATION**

*I, The developer, have read and will comply with all of the requirements specified in this drainage report and plan.*

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

\_\_\_\_\_  
Date

Address: Challenger Homes  
8605 Explorer Dr., Suite 250  
Colorado Springs, CO 80920

**DEVELOPER'S CERTIFICATION**

*Filed in accordance with Section 51.1 of the El Paso Land Development Code, as amended.*

\_\_\_\_\_  
For El Paso County Engineer/Director

\_\_\_\_\_  
Date

Conditions:

See final drainage report  
comments for signature  
blocks.

Revised per FDR  
comments.

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- B. Hydrologic Computations
- C. Preliminary Channel HEC-RAS Models
- D. Preliminary Pond Calculations
- E. Drainage Map

Add a section "4 Step Process".  
Provide a full discussion in the report.

Revised as requested.

a portion of the cutoff wall as sheet piles. This will be through the area of the embankment that is still existing to avoid reconstructing the entire embankment. In the area where the washout occurred and where the pipe will be passing through the cutoff wall it is proposed to do a concrete cutoff wall. The concrete wall should be cast around the sheet pipe wall on both ends to prevent flows cutting between the walls and creating a failure.

## IX. Construction Phasing

The existing phasing of the development is unknown at this time. The first phase is known and will lie within Basins A-1 and A-3 east of the RWT204 channel. It is also known that Bent Grass Meadows Parkway will be installed in its entirety with the first phase of the development. This forces the installation of the culverts under the roadway prior to needing the remainder of the channel improvements completed. The final drainage reports for the individual phases will revisit the need for channel improvements as the site develops.

The main purpose of the MDDP is to identify and schedule the improvements needed. The channel below the crossing needs to be constructed with the first phase because it is impacted by the phase 1 development.

## X. Maintenance

The proposed channels are to be public facilities. After completion of construction and upon the Board of County Commissioners acceptance the channels will be owned and maintained by El Paso County along with all drainage facilities within the public Right-of-Way.

## XI. Wetlands Mitigation

No wetlands are located on site.

There has been further discussion with the county on the channel design and which improvements will occur when. This is reflected in the revised design. Since phasing is not known at this time, the exact order in which improvements will occur is not known. But, more description has been added as to which improvements need to occur relative to each of the areas that will develop.

## XII. Floodplain Statement

A portion of the project site lies within Zone AE Special Flood Hazard Area as defined by the FIRM Map number 08041C0553G effective December 7, 2018. A copy of the FIRM Panel is included in the appendix.

The portion of channel that has a floodplain designation is only the RWT210 and RWT204 portions of the channel. It is unknown why the western channel, RWT202 is unmapped since it is the larger contributor regarding flow rates. The proposed improvements to RWT204 will likely require a CLOMR and LOMR. At this time it is unknown exactly what was mapped through this section as the FIS does not have detailed enough information contained within it. HEC-RAS models have been requested from FEMA for the channel. The effective models will help identify what flow rates were utilized in establishing the floodplain. More information will be provided as the project progresses and more information can be obtained.

Identify in more detail how this site will develop and the schedule for the CLOMR LOMR process. To support the phasing.

## XIII. Drainage Credits/Reimburse

Per the Drainage Basin Fee Addendum – Ch will be applicable to this development for con specific credits/reimbursements will be better defined in the final drainage reports and site construction drawings.

Phasing of development is unknown. More description has been added to the Construction Phasing section. No-rise certifications will be completed with each phase as necessary and a LOMR may be necessary after all channel improvements are completed. Added to text.

Provide a plan with costs for the improvements needed for this area. This needs to be the channel improvements, detention pond(s), etc. Specifically identify a plan that shows what each phase builds so that all the improvements are not delayed until the last phase of development.

Cost estimate added.

The first phase will need to build more than 1/2 the improvements since they have impacts caused by their outfalls.

## XIV. Conclusion

The Bent Grass Residential Subdivision lies within the West Tributary of the Falcon Area Watershed. Recommendations are made within this report to establish and stabilize multiple drainageways through the project site. Detention for the site is provided in a regional pond that will be modified to provide water quality for the entire tributary area. Recommendations are also given for re-establishing the inlet to the regional pond. All drainage facilities within this report were sized according to the Drainage Criteria Manuals. All of the channel corridors will be publicly owned and maintained and shall be the responsibility of El Paso County. Upon development of the individual parcels within the Bent Grass Residential Subdivision, separate Final Drainage Reports will be required to be submitted and approved by El Paso County.

## XV. References

1. *City of Colorado Springs/County of El Paso Drainage Criteria Manual*, October 1991.
2. *Drainage Criteria Manual, Volume 2*, City of Colorado Springs, November 2002.
3. *Urban Storm Drainage Criteria Manual*, Urban Drainage and Flood Control District, January 2016 (with current revisions).
4. *Falcon Drainage Basin Planning Study*, by Matrix Design Group, September 2015.
5. *Master Development Drainage Plan and Preliminary Drainage Plan – Bent Grass Subdivision*, by Kiowa Engineering Corporation, December 2006.
6. *Final Drainage Report for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2014.
7. *Final Drainage Report Addendum for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2015.
8. *Master Development Drainage Plan for The Ranch*, by Classic Consulting Engineers & Surveyors, LLC, November 2018.
9. *Falcon Highlands Master Development Drainage Plan & Preliminary Drainage Report & Final Drainage Report for Filing 1*, by URS, January 2005.
10. *Final Drainage Report and Erosion Control Plan – Latigo Business Center Filing No. 1 A Re-subdivision of a Portion of Latigo Business and Research Center Filing No. 1*, by Kiowa Engineering Corporation, November 2004.

Call out what accommodations/permissions have been made for the downstream property owners that will receive un-detained developed flows. ( considering the removal of the planned detention facility SR 4 )

Added to discussion in Section VII. Proposed Drainage Conditions.

## **APPENDIX C**

### **Preliminary Channel HEC-RAS Models**

Provide plan/map showing channel  
cross-section locations.

Added as requested.

## APPENDIX D

### Drainage Map

Provide an existing conditions Plan/map that does not show the proposed housing development. The map needs to clearly identify the actual basins that impact this site. Additionally the plan needs to show all (DBPS, Matrix study, FEMA, etc. channel flows) show upstream contours to confirm the Galloway design.

Plan/map, calculations, and discussion in text have been added.







## COMMENT RESPONSES – FDR



## FINAL DRAINAGE REPORT

### **BENT GRASS RESIDENTIAL SUBDIVISION FILING NO. 2**

El Paso County, Colorado

SF-19-014

Added to cover sheet.

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PREPARED FOR:  
**Challenger Homes**  
8605 Explorer Dr., Suite 250  
Colorado Springs, CO 80920

PREPARED BY:  
**Galloway & Company, Inc.**  
1755 Telstar Drive, Suite 107  
Colorado Springs, CO 80920

DATE:  
**July 2019**

Cursory redlines Steve  
Kuehster 9/25/2019



**ENGINEER'S STATEMENT**

*The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the Drainage Criteria Manual for the City of Colorado Springs and El Paso County. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.*

\_\_\_\_\_  
Scott Brown, PE 45900  
For and on behalf of Galloway & Company, Inc.

\_\_\_\_\_  
Date

**DEVELOPER'S CERTIFICATION**

*I, The developer, have read and will comply with all of the requirements specified in this drainage report and plan.*

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

\_\_\_\_\_  
Date

Address: Challenger Homes  
8605 Explorer Dr., Suite 250  
Colorado Springs, CO 80920

**DEVELOPER'S CERTIFICATION**

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

*Filed in accordance with Section 51.1 of the El Paso Land Development Code, as amended.*

Revised as requested.

\_\_\_\_\_  
For El Paso County Engineer/Director

\_\_\_\_\_  
Date

Conditions:

Jennifer Irvine, P.E.  
County Engineer / ECM Administrator

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- A. Exhibits and Figures
- B. Hydrologic Computations
- C. Hydraulic Computations
- D. Channel HEC-RAS Models
- E. Pond Calculations
- F. Drainage Map

Provide a section in the Table of contents labeled "4 step process"  
Discuss the 4 steps in the report. used for the drainage design.

Added as requested.

The UD-Detention spreadsheet was utilized for sizing the water quality orifices on the proposed water quality portion of the regional detention pond.

HEC-HMS will be utilized to analyze the hydrology of the overall basin and verify that no changes in release rates have occurred to the regional detention pond with it's addition of water quality.

UD-Inlet was utilized to calculate both the street capacities and the inlet capacities.

StormCAD was utilized to size the storm sewer systems. It was also utilized to analyze the culvert for RWT204 due to the minor losses caused by the inlets on the culvert. HEC-RAS will no model minor losses through a culvert well. Therefore, the HEC-RAS model for that reach is broken at the culvert. StormCAD was utilized to identify the headwater on the culvert which was then subsequently used as a downstream boundary condition on the model upstream of Bent Grass Meadows Parkway.

## V. Existing Drainage Conditions

The site is contained fully within one major drainage basin; the West Falcon Tributary. The site does border the Middle Falcon Tributary along the eastern edge of the property. The site generally drains from north to south with an average slope of 2% outside of the channel. The rational method was used to analyze the individual basins within the site because their size permits it. Excerpts from the DBPS are included in the appendix.

In addition to the DBPS The Ranch MDDP to the north and west of the site has revisited their existing conditions as well as existing conditions from the site directly to the north of them. Several detention ponds have been created within the Paint Brush Hills Subdivision and which revise the offsite flow entering the site within the major drainageway. This is taken into account with The Ranch MDDP. While The Ranch is still in design stage they are proposing detention ponds within their site to release at historic rates. This will revise the flow rates in their designed section of the channel to below the rates that are identified within the DBPS. A HEC-HMS model will be prepared with subsequent submittals updating the existing flow rates within the channel (as well as the proposed flow rates).

Per the DBPS the site lies within the basins, WT200, WT210, and WT220. These basins connect to channel reaches RWT202, RWT204, and RWT210. Both the RWT204 and RWT210 sections of channel currently exist and appear as a drainageway when visiting the site. Reach RWT202 appears to be a shallow overland flow through the project site. It is nearly unrecognizable through the site from a visual standpoint.

The existing channels have been visually inspected via a site walk and all appear in really good condition. There are no signs of scour within the bottoms of the channel. There are small areas that are incised or sloughing at the top of bank of the channel. These areas are less than 12" in height.

There is a small depression at the north end of the site, it appears to be the remnants of an old stock pond. It provides no detention or water quality for the upstream area. It will be removed with the development of this site.

All the existing condition  
basins need to be  
discussed in this report.

Existing map, calculations,  
and basin discussion in  
text added.

## VI. Proposed Drainage Conditions

There has been very minor change to the overall Falcon Area Basin delineation with the proposed condition. A small portion of the site that previously went to the Middle Tributary has been revised to

Basins have been added  
for this area and discussed  
in the revised text.

The basin directly to the East of this site needs  
to be discussed. Including recent  
modifications made with the construction of  
the Bentgrass Residential Filing Number 1.

come into the site and a small portion of the site that was previously within the West Tributary has been designed to drain into the Middle Tributary. This will be discussed with the individual basins. All necessary calculations can be found within the appendices of the report.

There are two channels that run through the site. As was discussed within the Existing Conditions portion of the report both the RWT202 and RWT204 run through the site. The proposed development will drain to the RWT204 channel. The two channels come together near the southern end of the site and become RWT210. Because Bent Grass Meadows Parkway is being constructed the culvert for both the RWT202 and RWT204 will be installed with this project. They will be installed at their ultimate locations.

The DBPS alternative that was approved shows a small sub regional pond (SR3) to provide EURV for a portion of the tributary area. The basin analysis provided in the DBPS shows no decrease in either the 2-year or the 100-year events through this point. It has been discussed with El Paso County to not construct this pond, but in lieu of that revise the existing detention pond WU South to provide water quality for the entire tributary area. This modification will be discussed later in the report.

The site will release undetained directly into the West Tributary channel RWT204.

As has been mentioned previously the site is **Revised to provide water quality prior to discharging into the channel.** The site has been designed to provide a large lot buffer between the existing large lots to the north and west of the site and the proposed site. Beyond this buffer the majority of the site is smaller approximately 1/8 acre lots.

**Basin OS-1** (10.35 AC, Q5 = 4.5 cfs, Q100 = 21.8 cfs): a basin that is associated with The Meadows Filing No. 3 lots 14, 15, 16, and 17. Runoff from this basin sheet flows south to the northern property line of the site. This runoff from the basin will be routed through Basin A-1 to **DP-1**. It is anticipated that with the plot plans for the lots adjacent to the northern property line they will provide swales around the proposed house directing runoff from Basin OS-1 into the proposed streets of Basin A-1.

**Basin A-1** (2.96 AC, Q5 = 3.6 cfs, Q100 = 9.5 cfs): a basin that is in the northeast corner of the site. It encompasses single-family residential lots (Type A and B) along Ansley Court. Runoff will flow from each lot onto Ansley Court where proposed mountable curb and gutter will convey flows to **DP-1**. Flows will then be conveyed West by mountable curb and gutter to DP-2.

**Basin OS-2** (1.60 AC, Q5 = 1.2 cfs, Q100 = 2.1 cfs): a basin that is associated with The Meadows Filing No. 3 lot 14. Runoff from this basin sheet flows south to the northern property line of the site. This runoff from the basin will be routed through Basin A-2 to **DP-2**. It is anticipated that with the plot plans for the lots adjacent to the northern property line they will provide swales around the proposed house directing run off from Basin OS-2 into the proposed streets of Basin A-2.

**Basin A-2** (1.37 AC, Q5 = 1.7 cfs, Q100 = 4.7 cfs): a basin that is in the northeast area of the site. It encompasses single-family residential lots (Type A) along Berwyn Court. Runoff will flow from each lot onto Berwyn Court where proposed mountable curb and gutter will convey flows to **DP- 2**. Flows will then be conveyed South by mountable curb and gutter to DP-3.

**Basin A-3** (1.57 AC, Q5 = 2.0 cfs, Q100 = 5.0 cfs): a basin that is in the northeast area of the site. It encompasses single-family residential lots (Type A and B) along Niebrara Drive and Berwyn Court. Runoff will flow from each lot onto Niebrara Drive and Berwyn Court where proposed mountable curb and gutter will convey flows to **DP-3**. Flows will then be conveyed West by a proposed cross pan to DP-4.

**Basin OS-3** (1.08 AC, Q5 = 0.4 cfs, Q100 = 2.4 cfs): a basin that is associated with The Meadows Filing No. 3 lot 14. Runoff from this basin sheet flows south to the northern property line of the site. This runoff from the basin will be routed through Basin A-4 to **DP-4**. It is anticipated that with the plot plans for the lots adjacent to the northern property line they will provide swales around the proposed house directing run off from Basin OS-3 into Berwyn Court of Basin A-4.

**Basin A-4** (2.43 AC, Q5 = 3.0 cfs, Q100 = 7.9 cfs): a basin that is in the northeast area of the site. It encompasses single-family residential lots (Type A and B) along Berwyn Court and a small portion of Willmore Drive. Runoff will flow from each lot onto Berwyn Court where proposed mountable curb and gutter will convey flows to **DP-4**. Flows will then be conveyed West along Bent Grass Meadows Drive by curb and gutter to DP-8.

**Basin E-1** (1.69 AC, Q5 = 3.5 cfs, Q100 = 7.4 cfs): a basin that is in the center of the site and encompasses a portion of Bent Grass Meadows Drive. A high point on the far East of the basin forces water to flow to a low point at **DP-8**, which represents a 20' CDOT Type R sump inlet, which conveys stormwater via proposed 54" RCP storm sewer to DP-9. Emergency overflow will spill over the crown of the road and enter into a proposed 20' CDOT Type R sump inlet represented by DP-9.

**Basin OS-7** (2.25 AC, Q5 = 0.8 cfs, Q100 = 4.8 cfs): a basin that is associated with The Meadows Filing No. 3 lots 4 and 5. Runoff from this basin sheet flows south to the northern property line of the site. This runoff from the basin will be routed through Basin D-2 to **DP-5**.

**Basin D-2** (3.52 AC, Q5 = 4.2 cfs, Q100 = 10.7 cfs): a basin that is in the northwest area of the site. It is undeveloped and covered in native grasses, weeds, rock, and shrubs. Runoff from this basin sheet flows from North to South along grades between 2.5 and 6.5 percent. Small portions of the basin will flow directly into RWT202. Most of this basin sheet flows from north to south and collects at **DP-5**. Flows will then be conveyed East by a proposed cross pan to DP-6.

Tabulate the areas that do not get treated. No more than 20 % or one acre.

**Basin OS-6** (7.52 AC, Q5 = 4.6 cfs, Q100 = 18.5 cfs): a basin that is associated with The Meadows Filing No. 3 lots 4 and 5. Runoff from this basin sheet flows south to the northern property line of the site. This runoff from the basin will be routed through Basin D-1 to **DP-6**.

Areas that don't get treated have been minimized to less than one acre.

**Basin D-1** (14.44 AC, Q5 = 15.3 cfs, Q100 = 41.1 cfs): a basin that is in the northwest area of the site. It is undeveloped and covered in native grasses, weeds, rock, and shrubs. Runoff from this basin sheet flows from North to South along grades between 2.5 and 6.5 percent. Small portions of the basin will flow directly into RWT204. Most of this basin sheet flows from north to south and collects at **DP-6**. Flows will then be conveyed East along Bent Grass Meadows Drive by curb and gutter to DP-8.

**Basin E-2** (0.63 AC, Q5 = 2.2 cfs, Q100 = 4.2 cfs): a basin that is in the center of the site and encompasses a portion of Bent Grass Meadows Drive. A high point on the far West of the basin forces water to flow to a low point at **DP-8**, which represents a 20' CDOT Type R sump inlet, which conveys stormwater via a proposed 54" RCP storm sewer to DP-9. Emergency overflow will spill over the crown of the road and enter into a proposed 20' CDOT Type R sump inlet represented by DP-9.

**Basin E-3** (0.78 AC, Q5 = 2.9 cfs, Q100 = 5.3 cfs): a basin that is in the center of the site and encompasses a portion of Bent Grass Meadows Drive. A high point on the far West of the basin forces water to flow to a low point at **DP-9**, which represents a 20' CDOT Type R sump inlet, which conveys

will be captured by a CDOT Type D area inlet. Flows will then be conveyed by a 36" RCP storm drain piped underneath Bent Grass Meadows Drive out-falling into a proposed swale that will route flows South to DP-24 and then ultimately East into RWT210.

**Basin D-4** (9.65 AC, Q5 = 7.2 cfs, Q100 = 23.5 cfs): a basin that is in the West area of the site. Runoff from this basin sheet flows from the Northwest to the Southeast. The runoff be intercepted by a proposed swale on the southern property line of the site. Collected flows will then be routed East to **DP-21** where 5 yr. and 100 yr. flows will be captured by a CDOT Type D area inlet. Flows will then be conveyed by a 36" RCP storm drain piped underneath Bent Grass Meadows Drive out-falling into a proposed swale that will route flows South to DP-24 and then ultimately East into RWT210.

**Basin D-3** (9.16 AC, Q5 = 9.4 cfs, Q100 = 26.2 cfs): a basin that is in the West area of the site. Runoff from this basin sheet flows from the Northwest to the Southeast. A large portion of the runoff will be intercepted by a proposed swale on the southern property line of the site. Collected flows in the swale will then be routed East to **DP-21** where 5 yr. and 100 yr. flows will be captured by a CDOT Type D area inlet. Flows will then be conveyed by a 36" RCP storm drain piped underneath Bent Grass Meadows Drive out-falling into a proposed swale that will route flows South to DP-24 and then ultimately East into RWT210. The rest of flow from the basin sheet flow onto Bent Grass Meadows Drive where proposed curb and gutter will convey flows South where the 5 yr. and 100 yr. flows will be captured by a proposed 25' CDOT Type R on-grade inlet, **DP-22**. Captured flow will be routed by a 24" RCP storm drain piped to DP-23.

**Basin E-4** (0.91 AC, Q5 = 3.0 cfs, Q100 = 5.7 cfs): a basin that is in the Southwest area of the site and encompasses a portion of Bent Grass Meadows Drive. Runoff from this basin is almost immediately captured by proposed curb and gutter and then routed South where the 5 yr. and 100 yr. flows will be captured by a proposed 25' CDOT Type R on-grade inlet, **DP-22**. Captured flow will be routed by a 24" RCP storm drain piped to DP-23.

**Basin E-5** (0.89 AC, Q5 = 3.3 cfs, Q100 = 6.1 cfs): a basin that is in the Southwest area of the site and encompasses a portion of Bent Grass Meadows Drive. Runoff from this basin is almost immediately captured by proposed curb and gutter and then routed South where the 5 yr. and 100 yr. flows will be captured by a proposed 25' CDOT Type R on-grade inlet, **DP-23**. Captured flow will be routed by a 24" RCP storm drain piped to an outfall at DP-24. Flows will then be routed East by a proposed swale until out-falling into RWT210.

**Basin F-1** (0.46 AC, Q5 = 0.6 cfs, Q100 = 1.7 cfs): a basin that is in the Northeast corner of the site. It encompasses the rears of single-family residential Type B lots. Runoff from the basin will follow historical patterns East onto a future school site.

**Basin F-2** (0.62 AC, Q5 = 1.8 cfs, Q100 = 3.7 cfs): a basin that is in the east side of the site. It encompasses a portion of Bent Grass Meadows Parkway. There is a high point in the road causing a portion of the road to drain east into the existing roadway. Bent Grass Residential Filing No. 1 had two basins accounting for this condition (Basins A and B with a total area of 0.38 acres). The anticipated flow rate from these two basins was 1.3 cfs in the 5-year event and 2.6 cfs in the 100-year event. The proposed runoff from the proposed slightly exceeds the anticipated runoff in the Filing No. 1 Report.

**Basin G-1** (3.01 AC, Q5 = 3.1 cfs, Q100 = 9.5 cfs): a basin that is in the South-east corner of the site. It encompasses the rears of single-family residential Type B lots. Runoff will follow historical patterns and sheet flow South off-site.



**Basin H-1** (0.31 AC, Q5 = 1.1 cfs, Q100 = 2.1 cfs): a basin that is associated with Latigo Business Center Filing No. 1 lot 1. It encompasses a portion of Bent Grass Meadows Parkway South of the proposed (2) 25' CDOT Type R Inlets on site.

## VII. Proposed Channel Improvements

As can be seen in the drainage maps the proposed Filing No. 2 does not encroach into the existing channel for the RWT204 reach. It is desired to leave the channel in its existing condition if the channel can be proven to be stable. In the future when the remainder of the site is developed the RWT204 channel will be consolidated into a smaller designed cross section and will be relocated to within a tract. It will be realigned off of its current alignment. The low point of Bent Grass Meadows Parkway has been designed such that it aligns with the proposed channel alignment. The culvert for RWT204 will double as a storm sewer system at this crossing. Because of this it was modeled with StormCAD.

The future channel and the existing channel do not align at this location. Therefore, a small amount of grading is proposed to direct runoff from the existing channel to the proposed culvert location. After outfalling to the south of Bent Grass Meadows Parkway there is another small section of grading to direct flows back to the existing channel. The radii of these bends were designed such that super elevation/increased velocities are not expected.

The future channel design is anticipated to have a series of Grouted Sloping Boulder Drops within it. One of these drops was placed specifically at the outfall of the proposed culvert. This was done so that the drop could be utilized as energy dissipation from the culvert.

Reviewing the HEC-RAS model prepared for the conditions proposed by this report it can be seen that the existing and proposed conditions have similar velocities and Froude numbers. Given that the channel is stable in its current state it is proposed to not provide improvements to the channel at this time.

Riprap protection will be provided at the individual outfalls from the site into the channel to prevent scouring from the point discharges.

Future filings will need to review the channel for necessary improvements if the ultimate channel is not constructed at such time.

At this time no development other than Bent Grass Meadows Parkway is being constructed west of the RWT204. There is no need to improve or construct the RWT202 reach. However, because the roadway is being constructed the crossing will need to be installed. It is proposed to install the box culverts under the road along with the future drops on the up and downstream ends of the culverts. From the top of the upstream drop the grading will be daylighted at 4:1. From the toe of the downstream drop the grading has been designed to allow the culverts to drain if water were to enter them. It is not anticipated that the culverts would be utilized in a large storm event.

The MDDP identifies the use of check structures for the RWT210 channel downstream of the site. Again due to the existing stability of the channel and the minor increase in flows velocities and Froude numbers have only slightly changed. For the purposes of this Filing it is proposed to leave the channel as is and install the proposed improvements with subsequent filings.

Water quality ponds will now be provided prior to discharging into the channel. This will decrease the release rates into the channel.  
The revised proposed channel design is discussed in the report and is also discussed in further detail in the revised MDDP.

Address whether the added base flow due to residential development will cause erosion of the existing channels.  
Also address a plan for channel improvements that is more definite than "wait and see".

Soil Rip Rap - Type VH	18	CY	\$	90.00	\$	1,620.00
Cutoff Walls - Concrete	3.9	CY	\$	600.00	\$	2,340.00
Cutoff Walls - Steel Reinforcement	160	LBS	\$	0.90	\$	144.00
Subtotal						\$ 244,374.00
Culvert 1 (Circular Pipe) (Public)						
54" RCP Storm Drain (Public)	117	LF	\$	210.00	\$	24,570.00
24" Grouted Boulders	46	SY	\$	170.00	\$	7,820.00
Rip Rap - Type M Soil	9	CY	\$	70.00	\$	630.00
Headwalls - Concrete	3	CY	\$	600.00	\$	1,800.00
Wingwalls - Concrete	35	CY	\$	600.00	\$	21,000.00
Headwalls - Steel Reinforcement	209	LBS	\$	0.90	\$	188.10
Wingwalls - Steel Reinforcement	1300	LBS	\$	0.90	\$	1,170.00
Subtotal						\$ 57,178.10
Culvert 2 (Concrete Box Culvert) (Public)						
5' x 12' Concrete Box Culvert	266	LF	\$	1,600.00	\$	425,600.00
30" Grouted Boulders	164	SY	\$	190.00	\$	31,160.00
Soil Rip Rap - Type M	52.44	CY	\$	70.00	\$	3,670.80
Headwalls - Concrete	35	CY	\$	600.00	\$	21,000.00
Wingwalls - Concrete	60	CY	\$	600.00	\$	36,000.00
Headwalls - Steel Reinforcement	1300	LBS	\$	0.90	\$	1,170.00
Wingwalls - Steel Reinforcement	4430	LBS	\$	0.90	\$	3,987.00
Subtotal						\$ 522,587.80
Regional Pond Improvements (Public)						
18" RCP Storm Drain (Public)	126	LF	\$	54.00	\$	6,804.00
18" FES	2	EA	\$	920.00	\$	1,840.00
3' Concrete Headwall	2	CY	\$	600.00	\$	1,200.00
13' Cutoff Wall - Concrete	60	CY	\$	600.00	\$	36,000.00
13' Cutoff Wall - Steel Reinforcement	6380	LBS	\$	0.90	\$	5,742.00
13' Sheet Pile Cutoff Wall	155	LF	\$	620.00	\$	96,100.00
Rip Rap - Type VH	2260	CY	\$	85.00	\$	192,100.00
Pond Modification to Full Spectrum	1	LS	\$	60,000.00	\$	60,000.00
Subtotal						\$ 399,786.00
Total (Public)						\$ 1,223,925.90
Contingency	10%					\$ 122,392.59
Grand Total (Public)						\$ 1,346,318.49

Channel improvements need to be identified. There are impacts to the channels to the east caused by this development.

The channel design has been changed and is described in the revised report.

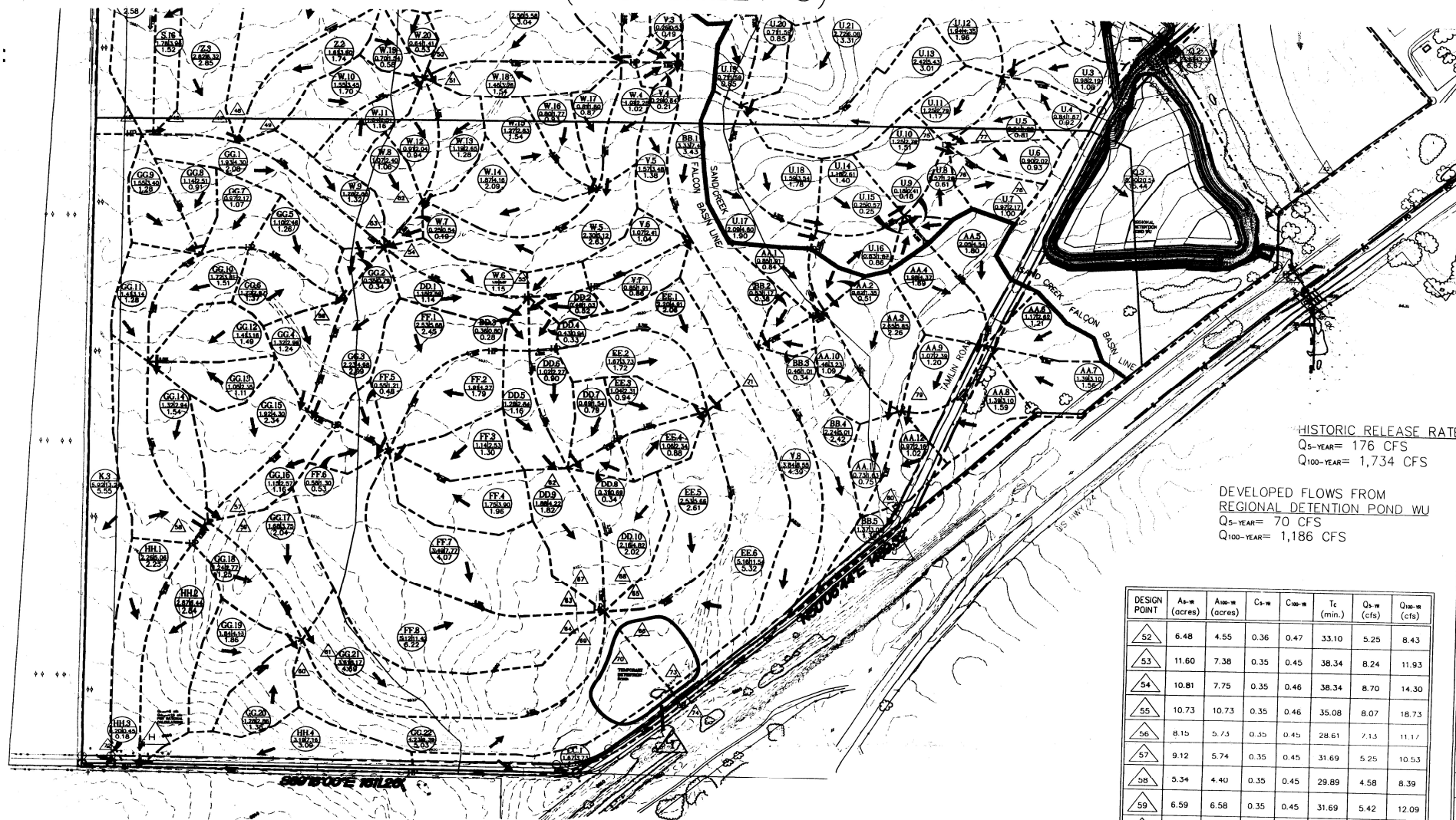
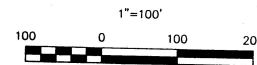
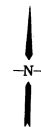
Reimbursable costs are limited to those shown in the DBPS. Provide a separate table for those (the pond above and the channel improvements).

Additional table added.

# FINAL DRAINAGE FALCON HIGHL

SHEET 4 OF 4

(SEE SHEET 3)



HISTORIC RELEASE RATES  
Q<sub>5-YEAR</sub> = 176 CFS  
Q<sub>100-YEAR</sub> = 1,734 CFS

DEVELOPED FLOWS FROM  
REGIONAL DETENTION POND WU  
Q<sub>5-YEAR</sub> = 70 CFS  
Q<sub>100-YEAR</sub> = 1,186 CFS

DESIGN POINT	A <sub>u-m</sub> (acres)	A <sub>u-m</sub> (acres)	C <sub>u-m</sub>	C <sub>u-m</sub>	T <sub>c</sub> (min.)	Q <sub>5-YEAR</sub> (cfs)	Q <sub>100-YEAR</sub> (cfs)
52	6.48	4.55	0.36	0.47	33.10	5.25	8.43
53	11.60	7.38	0.35	0.45	38.34	8.24	11.93
54	10.81	7.75	0.35	0.46	38.34	8.70	14.30
55	10.73	10.73	0.35	0.46	35.08	8.07	18.73
56	8.15	5.73	0.35	0.45	28.61	7.15	11.17
57	9.12	5.74	0.35	0.45	31.69	5.25	10.53
58	5.34	4.40	0.35	0.45	29.89	4.58	8.39
59	6.59	6.58	0.35	0.45	31.69	5.42	12.09
60	6.67	6.57	0.35	0.45	33.52	5.25	11.64
61	6.46	6.37	0.35	0.45	33.52	5.09	11.64
62	6.14	3.97	0.35	0.46	28.11	6.08	9.01
63	6.58	6.58	0.35	0.45	32.94	5.30	11.87
64	6.58	6.58	0.35	0.45	32.94	5.30	11.87
65	4.91	3.11	0.35	0.45	24.03	4.66	6.59
66	4.80	3.07	0.35	0.45	24.03	4.53	6.51

DESIGN POINT	A <sub>u-m</sub> (acres)	A <sub>u-m</sub> (acres)
67	5.30	5.24
68	5.24	5.24
69	16.51	16.51
70	16.51	16.51
71	7.99	5.79
72	8.34	8.34
73	21.57	21.57
74	21.57	21.57
75	17.68	17.63
76	6.11	6.19
77	6.11	6.19
78	7.39	7.39
79	7.30	7.30
80	8.23	8.23

Scan did not include the whole sheet.

DEVELOPED FLOWS FROM  
TEMP. DETENTION POND  
Q<sub>5-YEAR</sub> = 49.70 CFS  
Q<sub>100-YEAR</sub> = 126.74 CFS

HISTORIC RELEASE RATES  
Q<sub>5-YEAR</sub> = 64.50 CFS  
Q<sub>100-YEAR</sub> = 159.70 CFS

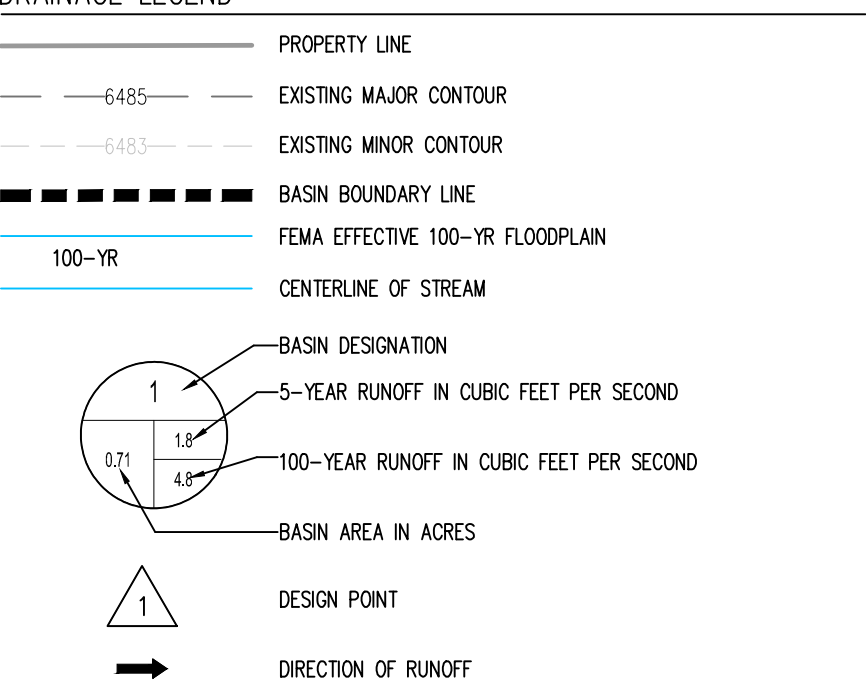
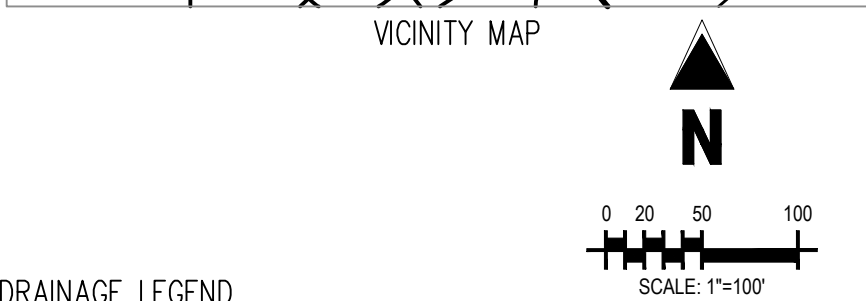
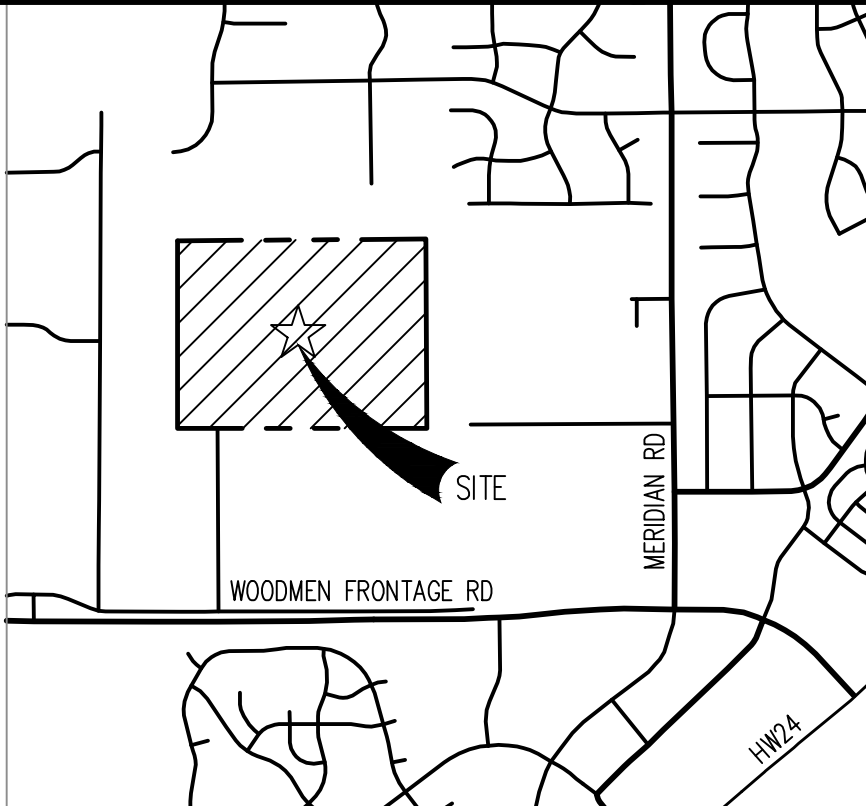
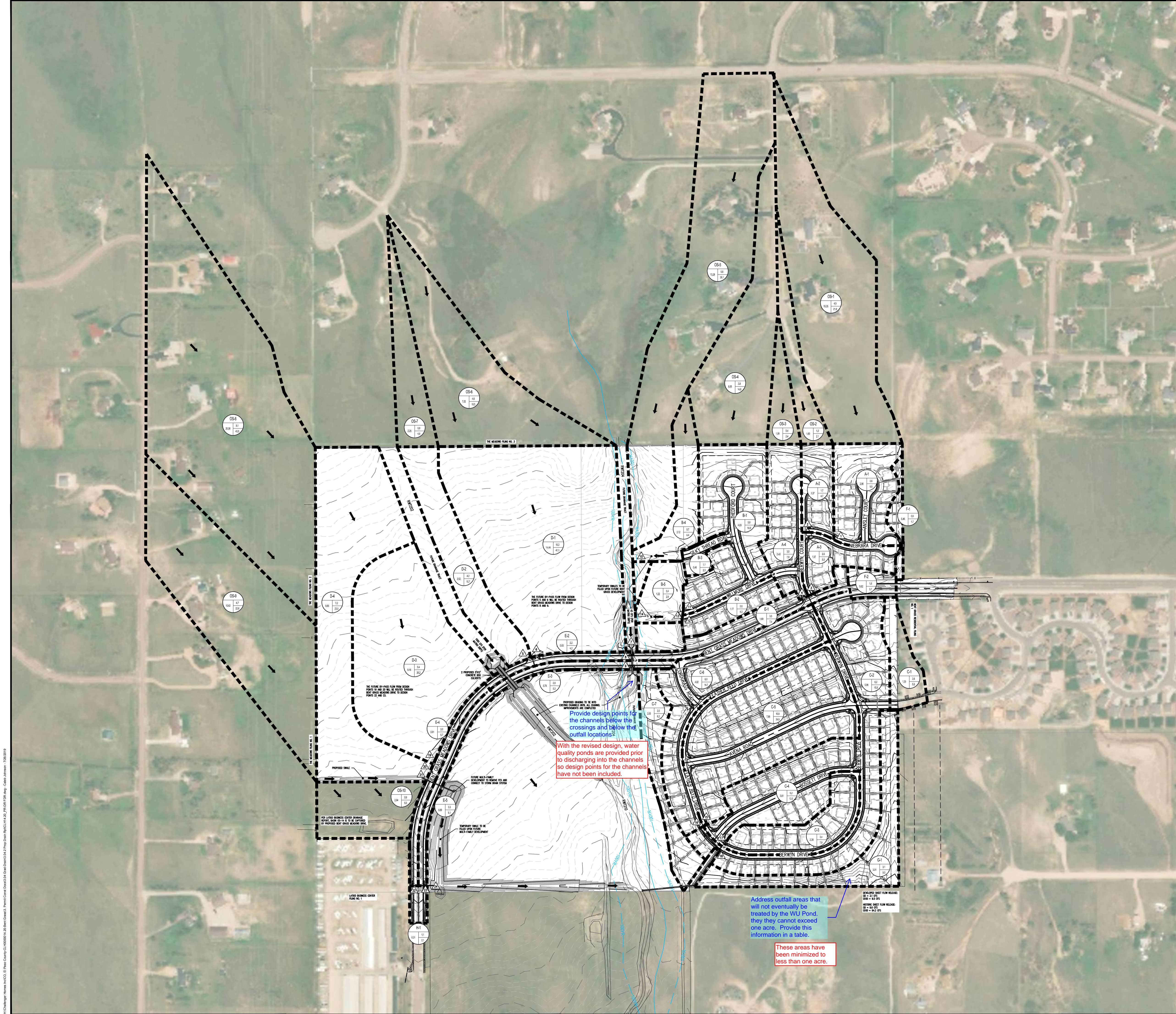
## **APPENDIX F**

### **Drainage Map**

Provide an existing  
conditions drainage  
plan/map.

Existing plan/map,  
calculations, and  
basin descriptions in  
text added.





**DESIGN POINT SUMMARY TABLE**

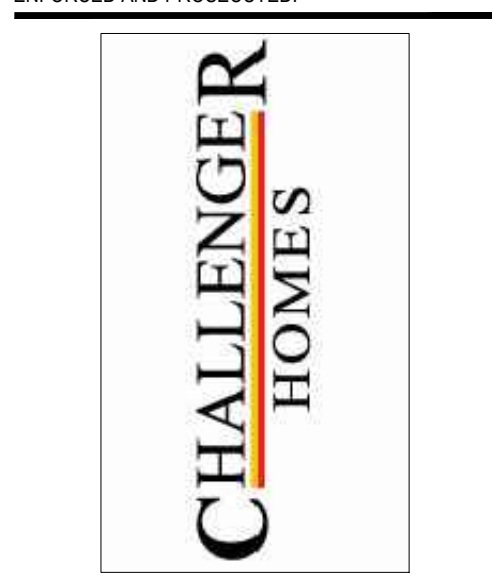
Design Point	Qs (cfs)	Q100 (cfs)
1	6.8	26.8
2	8.7	30.8
3	9.8	33.2
4	12.1	40.1
5	4.2	25.8
6	15.3	25.8
7	4.0	43.0
8	18.3	70.4
9	21.2	97.7
10	1.4	6.0
11	8.0	24.6
12	2.0	4.3
13	9.5	27.8
14	9.5	29.2
15	10.9	24.9
16	15.1	24.0
17	9.0	27.4
18	31.2	74.0
19	9.4	35.3
20	19.0	46.4
21	22.7	63.9
22	2.4	17.1
23	4.0	34.0
24	25.5	91.6

**RUNOFF SUMMARY TABLE**

Basin ID	Qs (cfs)	Q100 (cfs)
A-1	3.6	9.5
A-2	1.7	4.7
A-3	2.0	5.0
A-4	3.0	7.9
B-1	5.8	14.9
B-2	2.0	4.3
B-3	1.1	2.3
B-4	0.7	4.4
B-5	0.4	2.9
C-1	2.6	5.8
C-2	6.2	15.9
C-3	3.4	7.9
C-4	5.2	12.0
C-5	10.9	24.9
C-6	6.0	14.7
C-7	2.0	6.2
D-1	15.3	41.1
D-2	4.2	10.7
D-3	9.4	26.2
D-4	7.2	23.5
E-1	3.5	7.4
E-2	2.2	4.2
E-3	2.9	5.3
E-4	3.0	5.7
E-5	3.3	6.1
F-1	0.6	1.7
F-2	1.8	3.7
G-1	3.1	9.5
H-1	1.1	2.1
OS-1	4.5	21.8
OS-2	1.2	2.1
OS-3	0.4	2.4
OS-4	3.8	14.8
OS-5	5.8	26.1
OS-6	4.6	18.5
OS-7	0.8	4.8
OS-8	9.1	43.5
OS-9	4.7	22.6
OS-10	0.9	6.0

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**BENT GRASS RESIDENTIAL FILING NO. 2 DRAINAGE PLAN**

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Project No:	CLH000014.20
Drawn By:	CMWJ
Checked By:	SMB
Date:	JUNE 2019

OVERALL BASIN PLAN - FDR



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CONSTRUCTION

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Include a inlet and pipe routing summary table

Summary tables added.

BENT GRASS RESIDENTIAL FILING NO. 2

BENT GRASS MEADOWS DRIVE  
COLORADO SPRINGS, COLORADO

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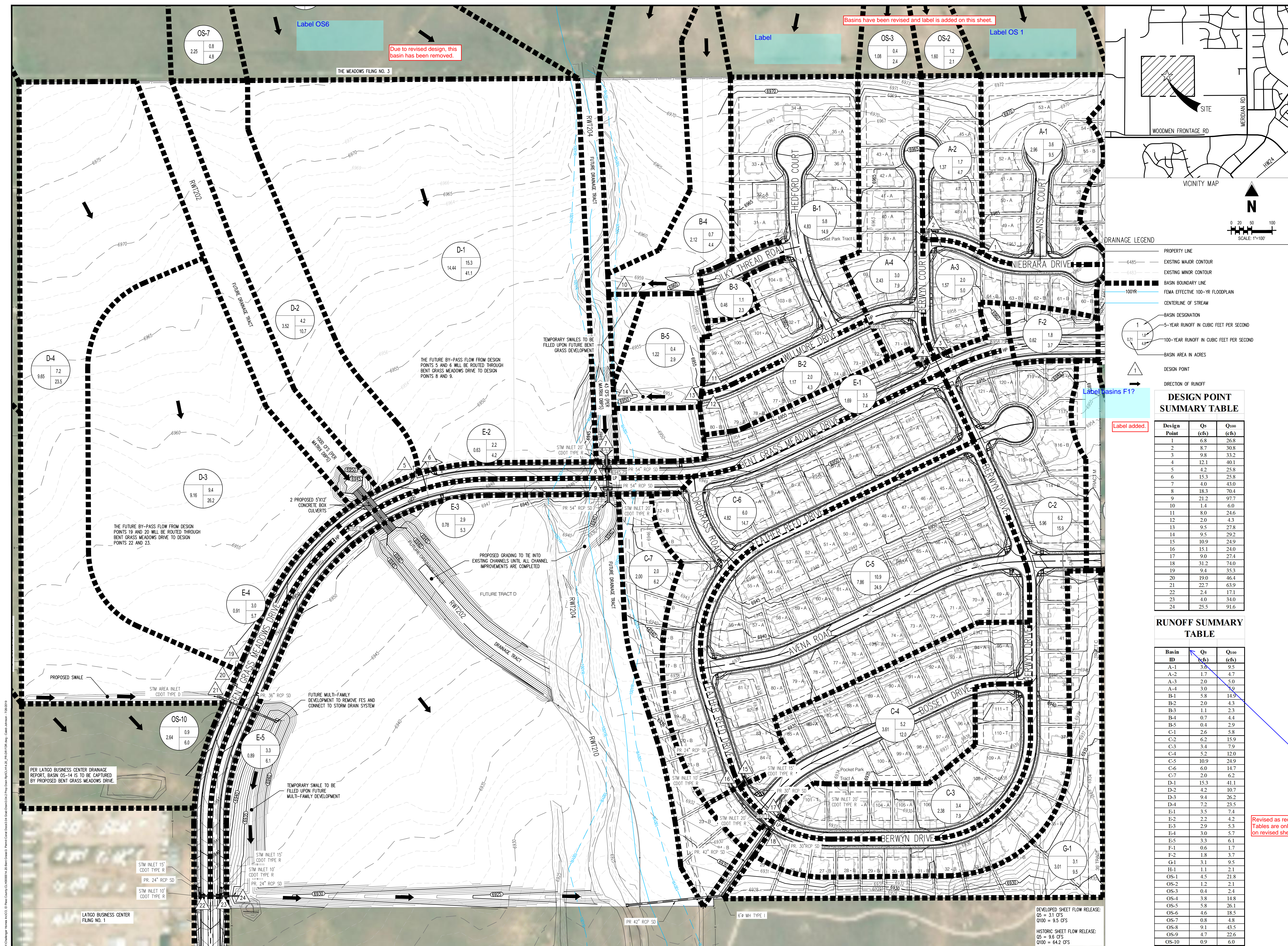
Include acreage of each basin in this table

No:	CLH000014.20
Drawn By:	CMWJ
Checked By:	SMB
Date:	JUNE 2019

PROPOSED DRAINAGE MAP - FDR

DR-2

Sheet 2 of 2





## COMMENT RESPONSES – FINAL PLAT



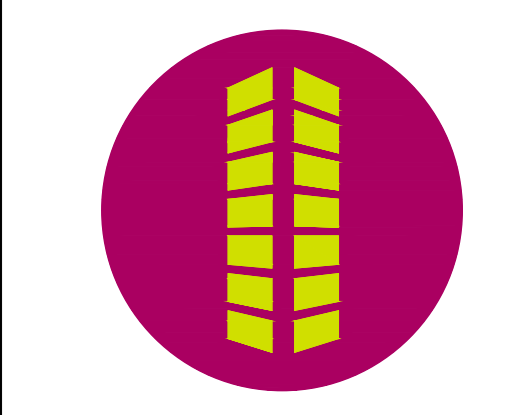
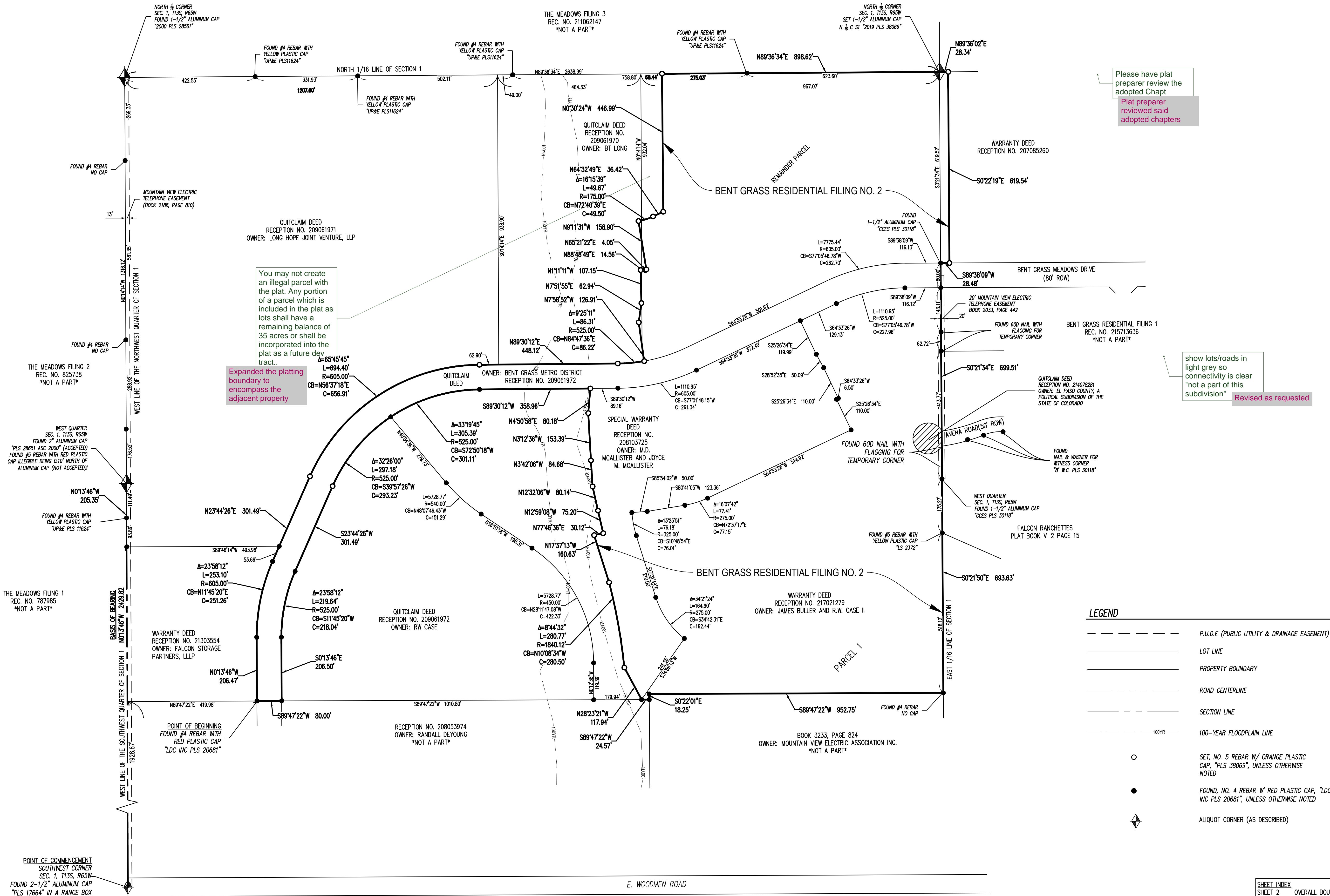




BENT GRASS RESIDENTIAL FILING NO. 2

LOCATED IN THE NORTHWEST QUARTER AND SOUTHWEST QUARTER OF  
SECTION 1 T13S R65W OF THE 6TH PRINCIPAL MERIDIAN  
COUNTY OF EL PASO, STATE OF COLORADO

OVERALL BOUNDARY & EASEMENTS MAP



FINAL PLAT  
BENT GRASS RESIDENTIAL FILING NO. 2  
LOCATED IN THE NORTHWEST QUARTER AND SOUTHWEST QUARTER OF  
SECTION 1 T13S R65W OF THE 6TH PRINCIPAL MERIDIAN  
COUNTY OF EL PASO, STATE OF COLORADO

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Project No:	CLH014.20
Drawn By:	AAY
Checked By:	BJD
	5/14/2019

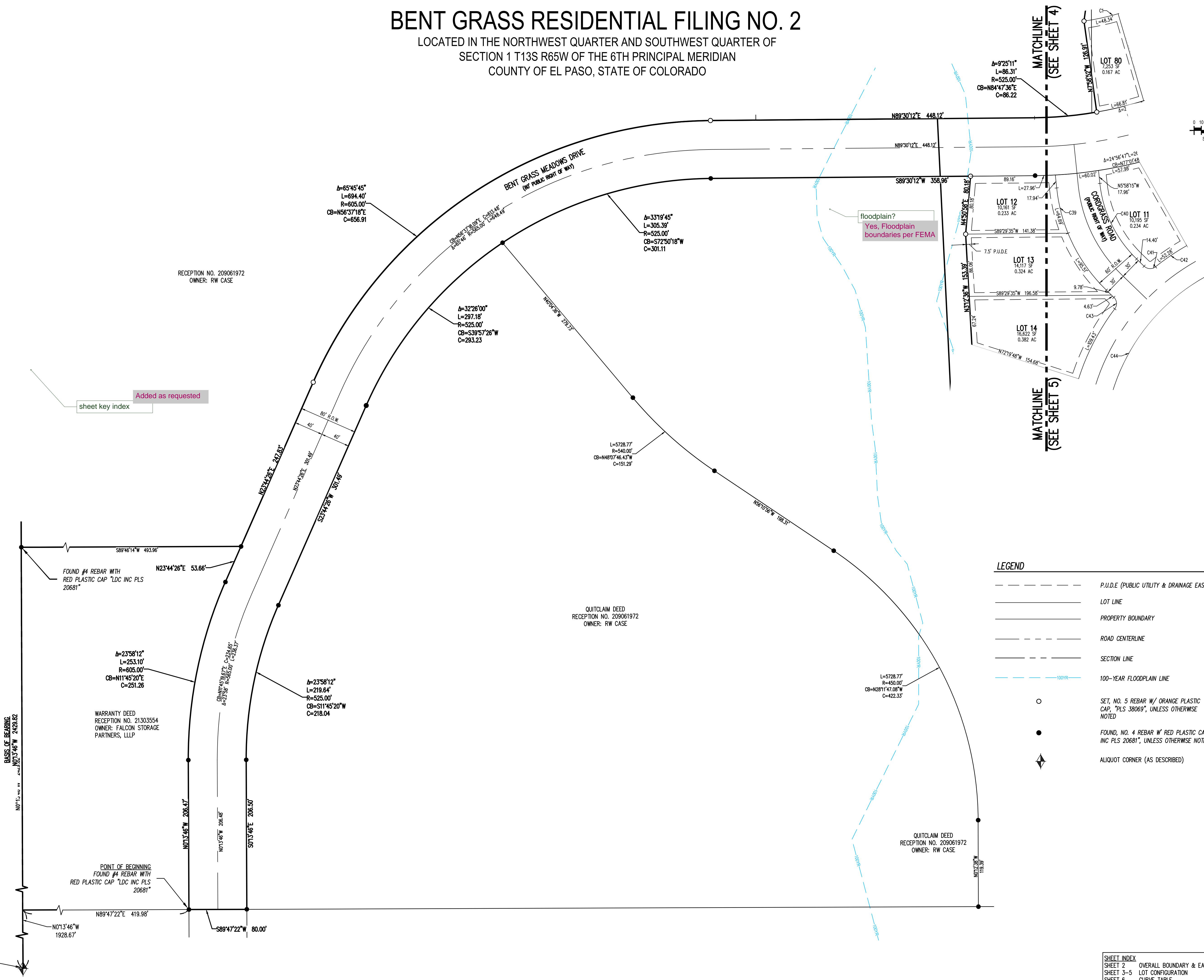
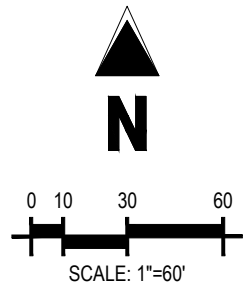


BENT GRASS RESIDENTIAL FILING NO. 2

LOCATED IN THE NORTHWEST QUARTER AND SOUTHWEST QUARTER OF  
SECTION 1 T13S R65W OF THE 6TH PRINCIPAL MERIDIAN  
COUNTY OF EL PASO, STATE OF COLORADO

Galloway

1755 Teletar Drive, Suite 107  
Colorado Springs, CO 80920  
719.900.7220  
gallowayus.com



LEGEND

- P.U.D.E. (PUBLIC UTILITY & DRAINAGE EASEMENT)
- LOT LINE
- PROPERTY BOUNDARY
- ROAD CENTERLINE
- SECTION LINE
- 100-YEAR FLOODPLAIN LINE
- SET, NO. 5 REBAR W/ ORANGE PLASTIC CAP, \*PLS 38069\*, UNLESS OTHERWISE NOTED
- FOUND, NO. 4 REBAR W/ RED PLASTIC CAP, \*LDC INC PLS 20681\*, UNLESS OTHERWISE NOTED
- ◆ ALIQUOT CORNER (AS DESCRIBED)

SHEET INDEX

- SHEET 2 OVERALL BOUNDARY & EASEMENTS MAP
- SHEET 3-5 LOT CONFIGURATION
- SHEET 6 CURVE TABLE

FINAL PLAT

BENT GRASS RESIDENTIAL FILING NO. 2  
LOCATED IN THE NORTHWEST QUARTER AND SOUTHWEST QUARTER OF  
SECTION 1 T13S R65W OF THE 6TH PRINCIPAL MERIDIAN  
COUNTY OF EL PASO, STATE OF COLORADO

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Project No:	CLH014.20
Drawn By:	AAV
Checked By:	BJD
Date:	5/14/2019



# BENT GRASS RESIDENTIAL FILING NO. 2

LOCATED IN THE NORTHWEST QUARTER AND SOUTHWEST QUARTER OF  
SECTION 1 T13S R65W OF THE 6TH PRINCIPAL MERIDIAN  
COUNTY OF EL PASO, STATE OF COLORADO



**FINAL PLAT**  
**BENT GRASS RESIDENTIAL FILING NO. 2**  
LOCATED IN THE NORTHWEST QUARTER AND SOUTHWEST QUARTER OF  
SECTION 1 T13S R65W OF THE 6TH PRINCIPAL MERIDIAN  
COUNTY OF EL PASO, STATE OF COLORADO

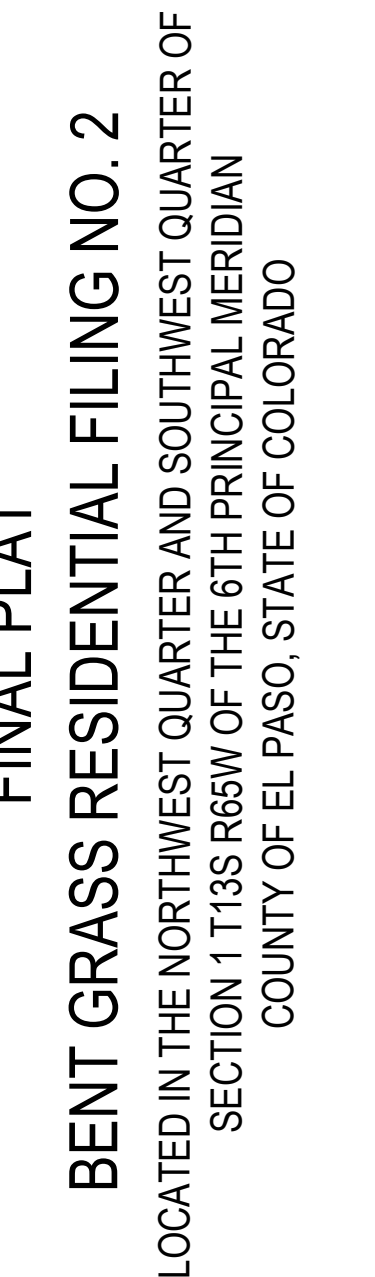
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Drawn By: AAY  
Checked By: BJD  
Date: 5/14/2019



LOCATED IN THE NORTHWEST QUARTER AND SOUTHWEST QUARTER OF  
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COUNTY OF EL PASO, STATE OF COLORADO

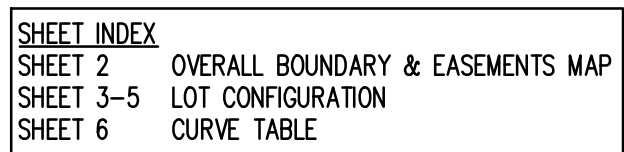
755 Telstar Drive, Suite 107  
Colorado Springs, CO 80920  
19.900.7220  
[allowayUS.com](http://allowayUS.com)



**FINAL PLAINT**  
**BENT GRASS RESIDENTIAL FILING NO. 2**  
LOCATED IN THE NORTHWEST QUARTER AND SOUTHWEST QUARTER  
SECTION 1 T13S R6SW OF THE 6TH PRINCIPAL MERIDIAN  
COUNTY OF EL PASO, STATE OF COLORADO

Project No:	CLH014.20
Drawn By:	AAY
Checked By:	BJD
Date:	5/14/2019

5  
Sheet 5 of 6





## COMMENT RESPONSES – CD’S













AVENA ROAD (PUBLIC)  
(50' R.O.W.)  
DESIGN SPEED - 25 MPH RESIDENTIAL

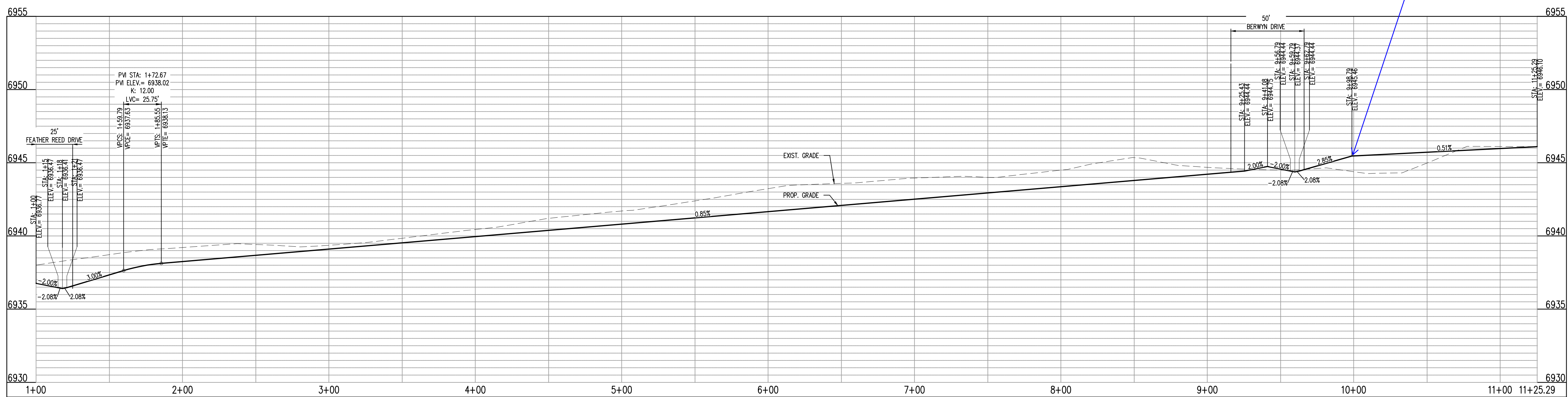
KEY NOTE: A

ROAD NAME

STREET NAME (D-3)

STOP

STOP SIGN (R1-1)



AVENA RD - CL - 50' ROW  
STA: 1+00 - 11+25.29  
SCALE: H: 1"=40' V: 1"=10'

# Galloway

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Colorado Springs, CO 80920  
719.900.7220  
gallowayus.com

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CONSTRUCTION PLANS  
BENT GRASS RESIDENTIAL FILING NO. 2

BENT GRASS MEADOWS DRIVE  
FALCON, CO 80831 EL PASO COUNTY

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Project No: CLH-14-20

Drawn By: JDP

Checked By: RGD

Date: 7/29/2019

AVENA ROAD  
STREET IMPROVEMENT PLAN

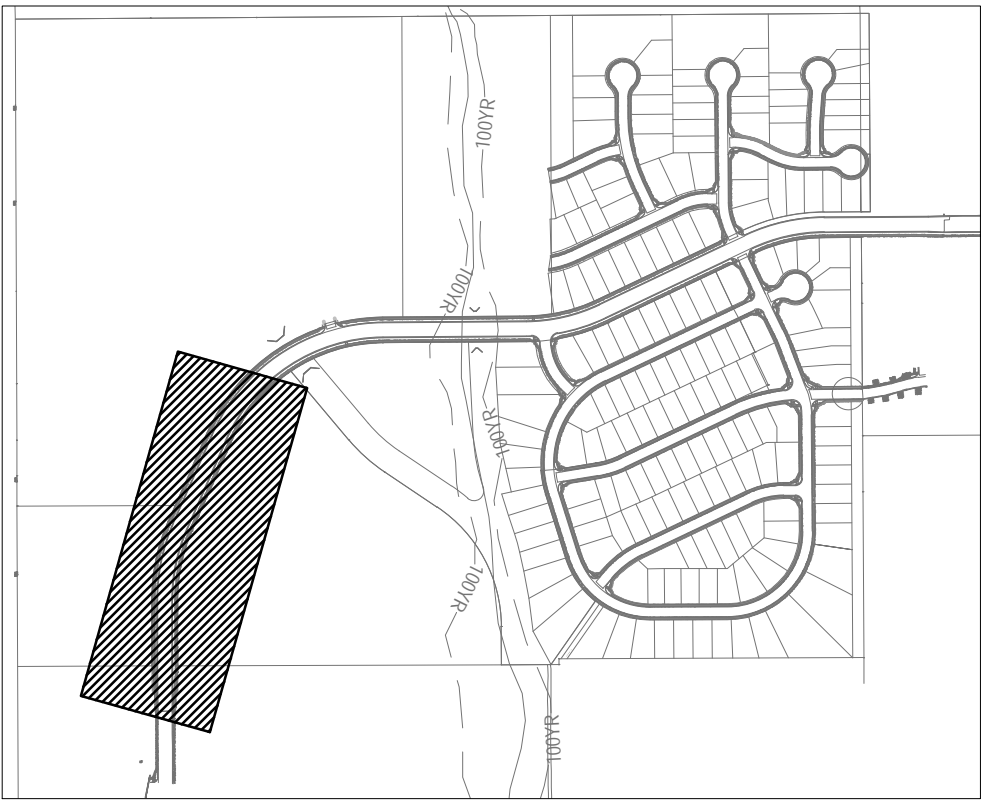
C3.00

Sheet 3 of 38



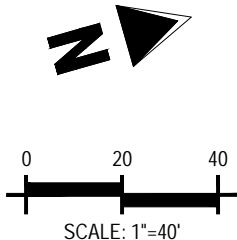
SIGNING AND STRIPING NOTES

1. ALL SIGNS AND PAVEMENT MARKINGS SHALL BE IN COMPLIANCE WITH THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. REMOVAL OF EXISTING PAVEMENT MARKINGS SHALL BE ACCOMPLISHED BY A METHOD THAT DOES NOT MATERIALLY DAMAGE THE PAVEMENT. THE PAVEMENT MARKINGS SHALL BE REMOVED TO THE EXTENT THAT THEY WILL NOT BE VISIBLE UNDER DAY OR NIGHT CONDITIONS. AT NO TIME WILL IT BE ACCEPTABLE TO PAINT OVER EXISTING PAVEMENT MARKINGS.
3. ANY DEVIATION FROM THE STRIPING AND SIGNING PLAN SHALL BE APPROVED BY EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT.
4. ALL SIGNS SHOWN ON THE SIGNING AND STRIPING PLAN SHALL BE NEW SIGNS. EXISTING SIGNS MAY REMAIN OR BE REUSED IF THEY MEET CURRENT EL PASO COUNTY AND MUTCD STANDARDS.
5. STREET NAME AND REGULATORY STOP SIGNS SHALL BE ON THE SAME POST AT INTERSECTIONS.
6. ALL REMOVED SIGNS SHALL BE DISPOSED OF IN A PROPER MANNER BY THE CONTRACTOR.
7. ALL STREET NAME SIGNS SHALL HAVE 12" SERIES LETTERS, WITH LOCAL ROADWAY SIGNS BEING 4" UPPER-LOWER CASE LETTERING ON 8" BLANK AND NON-LOCAL ROADWAY SIGNS BEING 6" LETTERING, UPPER-LOWER CASE, ON 12" BLANK, WITH A WHITE BORDER THAT IS NOT RECESSED. MULTI-LANE ROADWAYS WITH SPEED LIMITS OF 40MPH OR HIGHER SHALL HAVE 8" UPPER-LOWER CASE LETTERING ON 18" BLANK WITH A WHITE BORDER THAT IS NOT RECESSED. THE WIDTH OF THE NON-RECESSED WHITE BORDERS SHALL MATCH PAGE 255 OF THE 2012 MUTCD "STANDARD HIGHWAY SIGNS".
8. ALL TRAFFIC SIGNS SHALL HAVE A MINIMUM HIGH INTENSITY PRISMATIC GRADE SHEETING.
9. ALL LOCAL RESIDENTIAL STREET SIGNS SHALL BE MOUNTED ON A 1.75' X 1.75' SQUARE TUBE SIGN POST AND STUB POST BASE. FOR OTHER APPLICATIONS, REFER TO THE CDOT STANDARD S-614.8 REGARDING USE OF THE P2 TUBULAR STEEL POST SUBBASE DESIGN.
10. ALL SIGNS SHALL BE SINGLE SHEET ALUMINUM WITH 0.010" MINIMUM THICKNESS.
11. ALL LIMIT LINES, STOP LINES, CROSSWALK LINES, PAVEMENT LEGENDS AND ARROWS SHALL BE A MINIMUM 125 MIL THICKNESS PREFORMED THERMOPLASTIC PAVEMENT MARKINGS WITH TAPERED LEADING EDGES PER CDOT STANDARD S-627.1. WORD AND SYMBOL MARKINGS SHALL BE THE NARROW TYPE. STOP BARS SHALL BE 24" IN WIDTH. CROSSWALK LINES SHALL BE 12" WIDE AND 8' LONG PER CDOT S-627.1.
12. ALL LONGITUDINAL LINES SHALL BE A MINIMUM 150 MIL THICKNESS EPOXY PAINT. ALL NON-LOCAL RESIDENTIAL ROADWAYS SHALL INCLUDE BOTH RIGHT AND LEFT EDGE LINE STRIPING AND ANY ADDITIONAL STRIPING AS REQUIRED BY CDOT S-627.1.
13. THE CONTRACTOR SHALL NOTIFY EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT (719) 520-6819 PRIOR TO AND UPON COMPLETION OF SIGNING AND STRIPING.
14. THE CONTRACTOR SHALL OBTAIN A WORK IN THE RIGHT OF WAY PERMIT FROM THE EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS (DPW) PRIOR TO ANY SIGNAGE OR STRIPING WORK WITHIN AN EXISTING EL PASO COUNTY ROADWAY.



LOCATION MAP

SCALE: 1"=600'

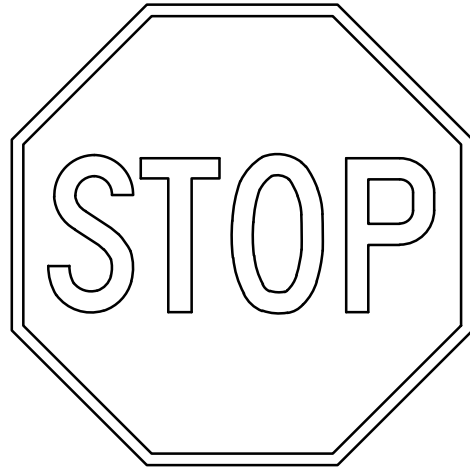


SCALE: 1"=40'

KEY NOTE: A



STREET NAME (D-3)



STOP SIGN (R1-1)

KEY NOTE: B



SPEED LIMIT SIGN (R2-1)

NOTE TO CONTRACTOR

ALL 4", 8" SOLID OR SKIP PAVEMENT MARKING SHALL BE EPOXY.

SIGNS AND POLE SHALL BE PER CDOT STANDARDS S-614.2, S-614.3, AND S-614.6, LATEST REVISION.

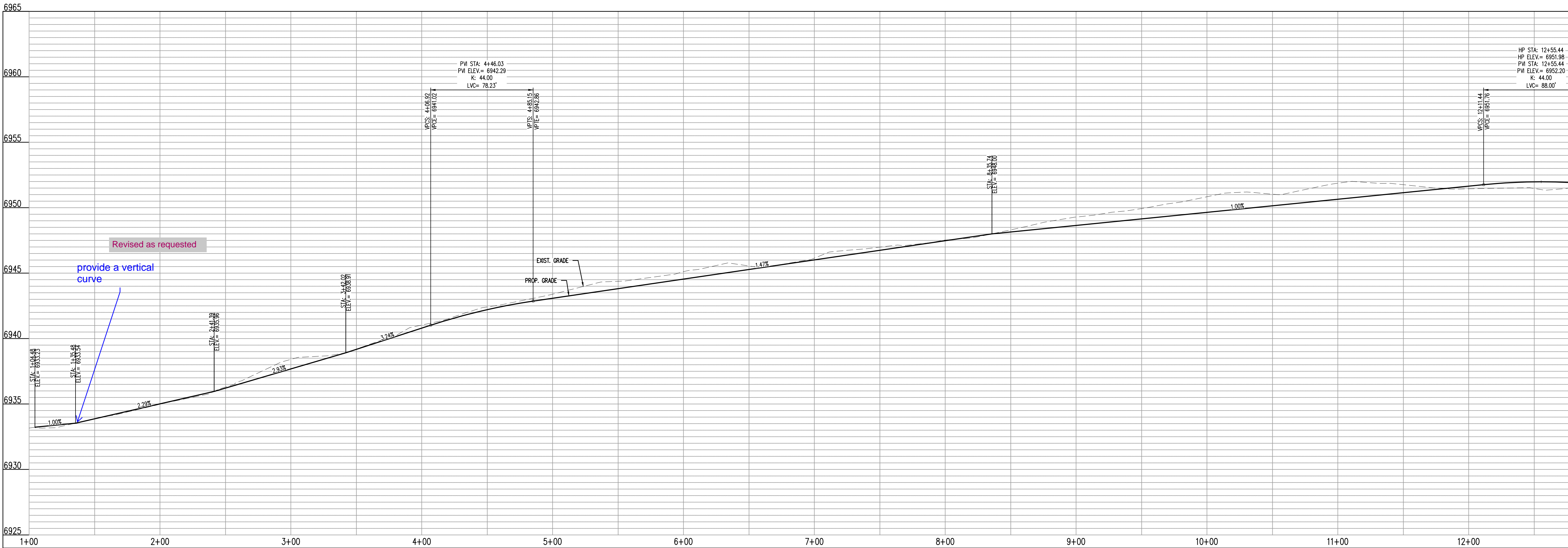
ALL SIGNAGE INSTALLATION SHALL BE IN COMPLIANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

STRIPING LEGEND

STRIPE	PAVEMENT MARKINGS	MARKING DESCRIPTION
1	CENTER LANE STRIPING	4" WHITE, 10' - 30' SKIP
2	LANE LINE	6" WHITE

BENT GRASS MEADOWS DRIVE (PUBLIC)  
(80' R.O.W.)

DESIGN SPEED - 40 MPH RESIDENTIAL (COLLECTOR)



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CONSTRUCTION PLANS

BENT GRASS RESIDENTIAL FILING NO. 2

BENT GRASS MEADOWS DRIVE  
FALCON, CO 80831 EL PASO COUNTY

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Project No:	CLH-14-20
Drawn By:	JDP
Checked By:	RGD
Date:	7/29/2019

BENT GRASS MEADOWS DRIVE  
STREET IMPROVEMENT PLAN

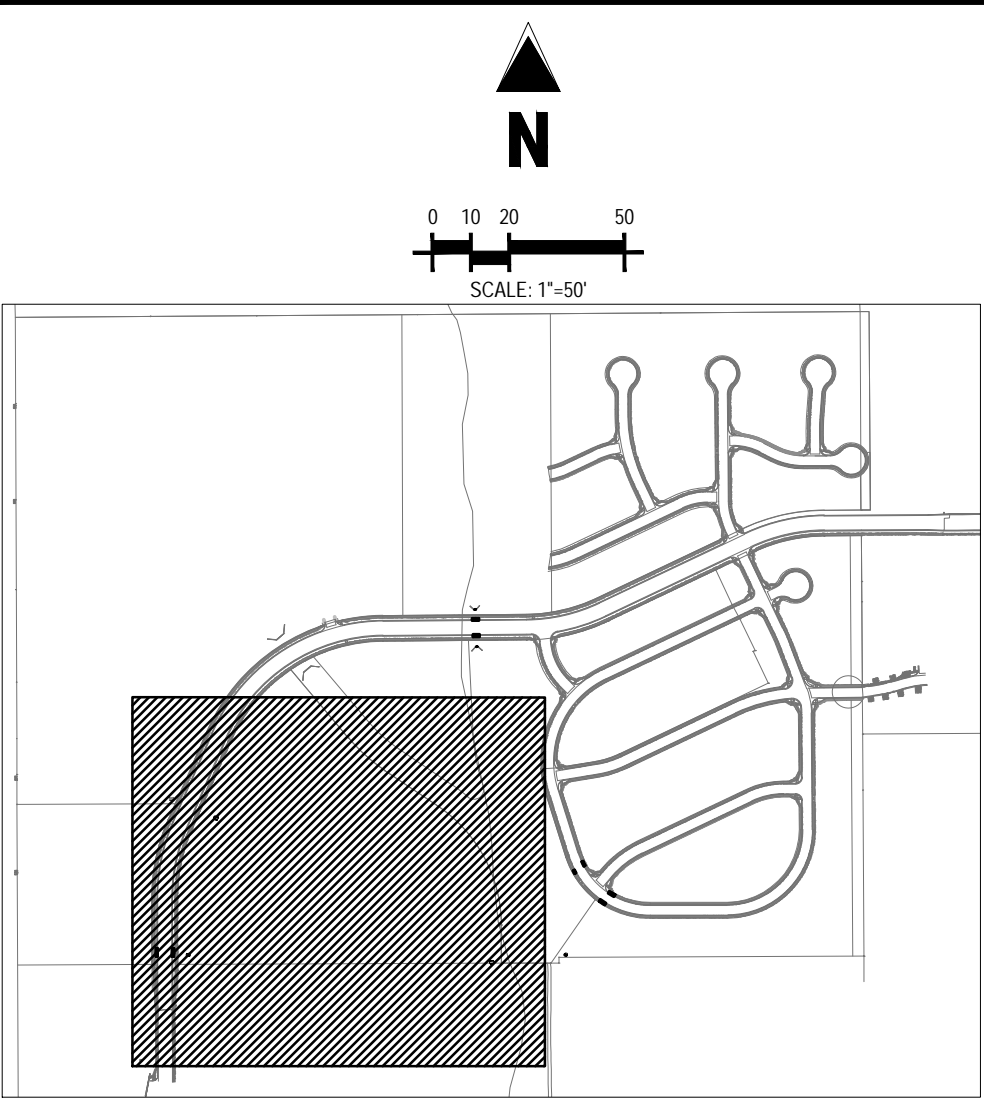
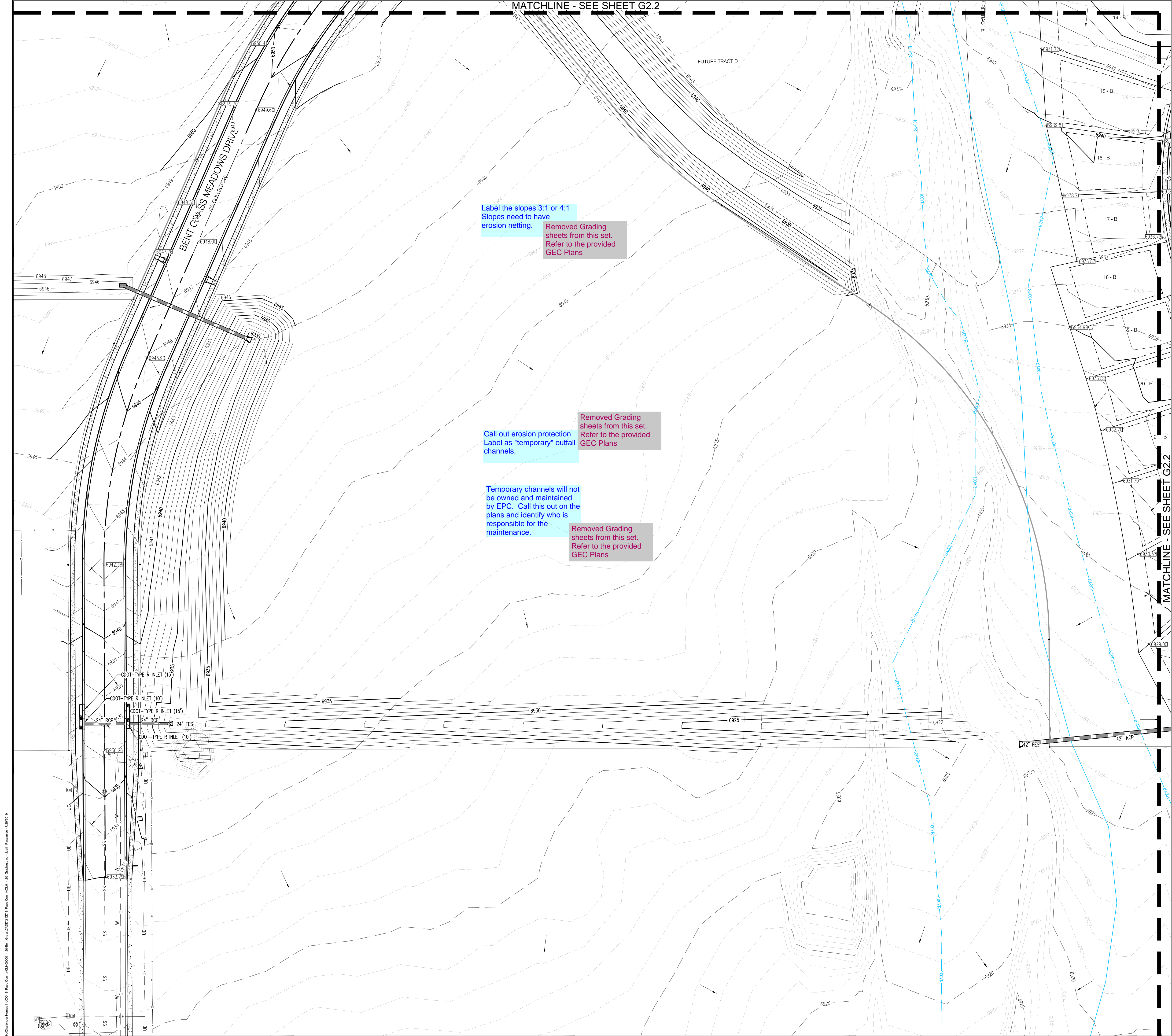
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Sheet 5 of 38









SCALE: 1"=400'

GRADING LEGEND	
	EXISTING MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	PROPOSED MAJOR CONTOUR
	PROPERTY BOUNDARY
	EXISTING STORM SEWER
	PROPOSED STORM SEWER
	EXISTING FLOW
	PROPOSED FLOW
	PROPOSED SPOT ELEVATION

CAUTION - NOTICE TO CONTRACTOR

- ALL UTILITY LOCATIONS SHOWN ARE BASED ON MAPS PROVIDED BY THE APPROPRIATE UTILITY COMPANY AND FIELD SURFACE EVIDENCE AT THE TIME OF SURVEY AND IS TO BE CONSIDERED AN APPROXIMATE LOCATION ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION OF ALL UTILITIES, PUBLIC OR PRIVATE, WHETHER SHOWN ON THE PLANS OR NOT, PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO CONSTRUCTION.
- WHERE A PROPOSED UTILITY CROSSES AN EXISTING UTILITY, IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF SUCH EXISTING UTILITY, EITHER THROUGH POT-HOLING OR ALTERNATIVE METHOD. REPORT INFORMATION TO THE ENGINEER PRIOR TO CONSTRUCTION.



Know what's below.  
Call before you dig.



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Project No:	CLH-14-20
Drawn By:	JDP
Checked By:	RGD
Date:	7/29/2019

GRADING PLAN









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Show the outfall,  
Rip rap dissipater?  
Property lines?  
Where the bottom of the  
channel is?  
etc. ?  
Easements?  
Public or private &  
maintenance entity?

Added detail to this sheet and other storm plan sheets. Also see GEC Plans for Rip Rap Dissipater (Storm Pipe Outfall)

CONSTRUCTION PLANS  
BENT GRASS RESIDENTIAL FILING NO. 2

BENT GRASS MEADOWS DRIVE  
FALCON, CO 80831 EL PASO COUNTY

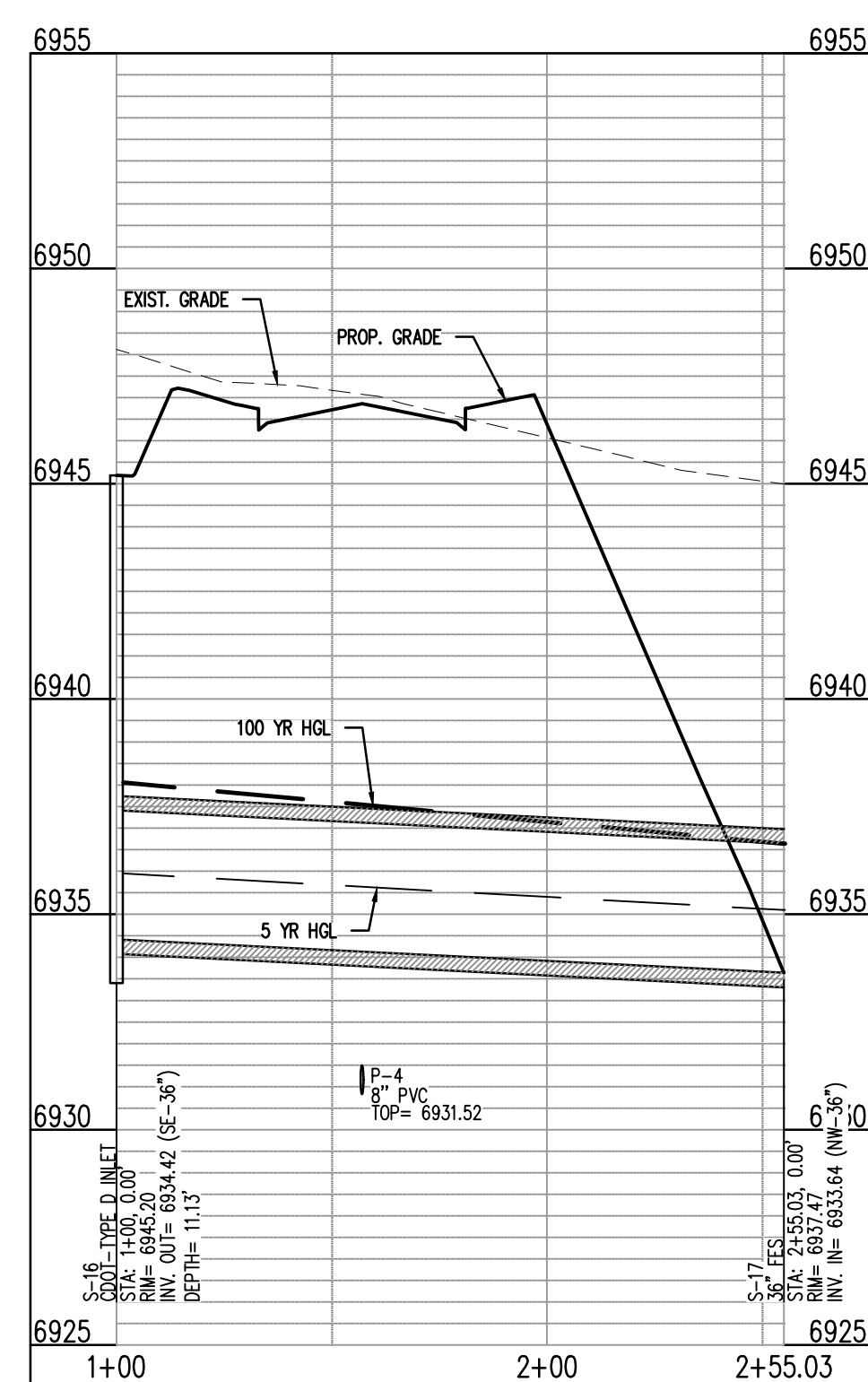
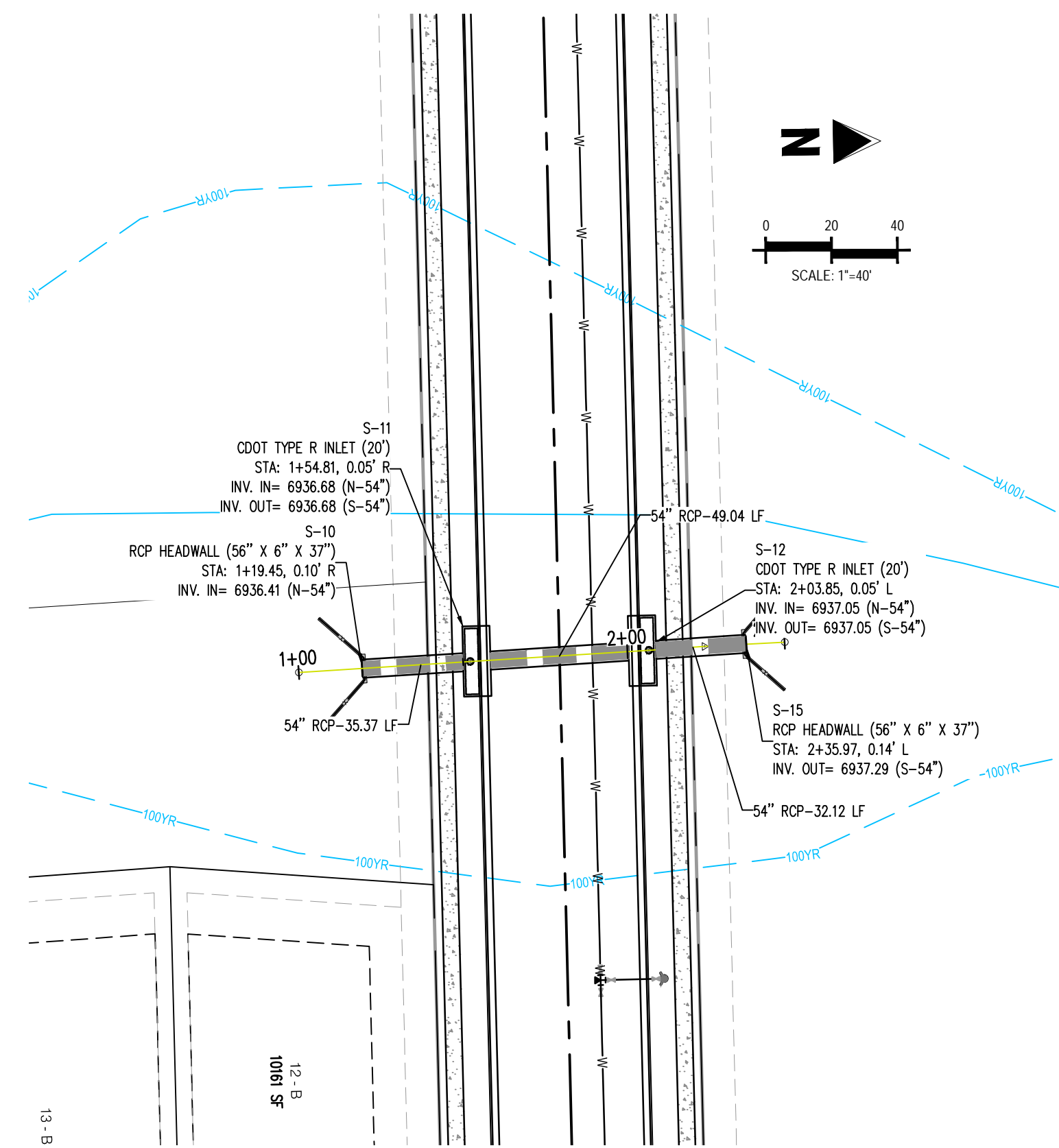
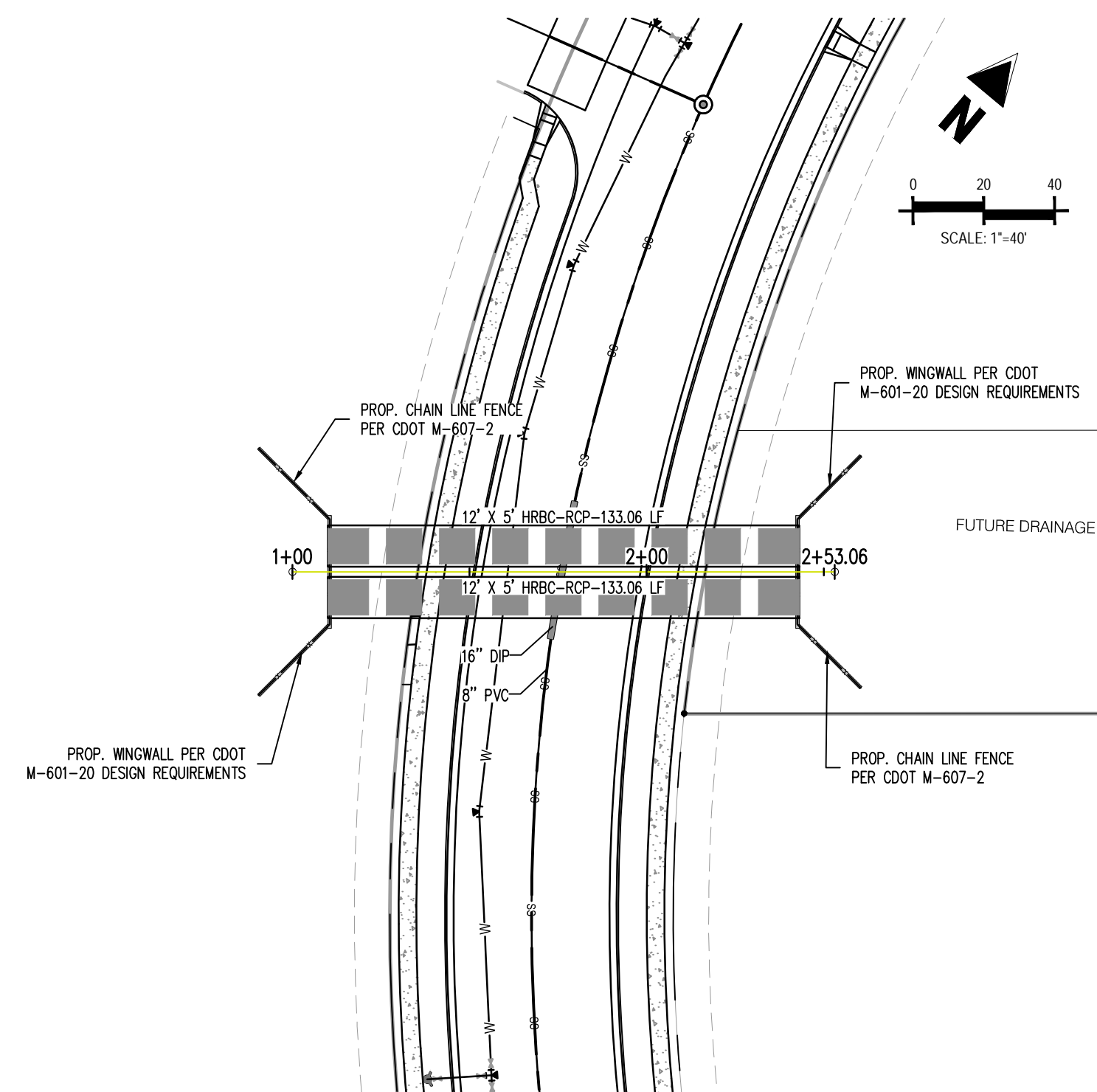
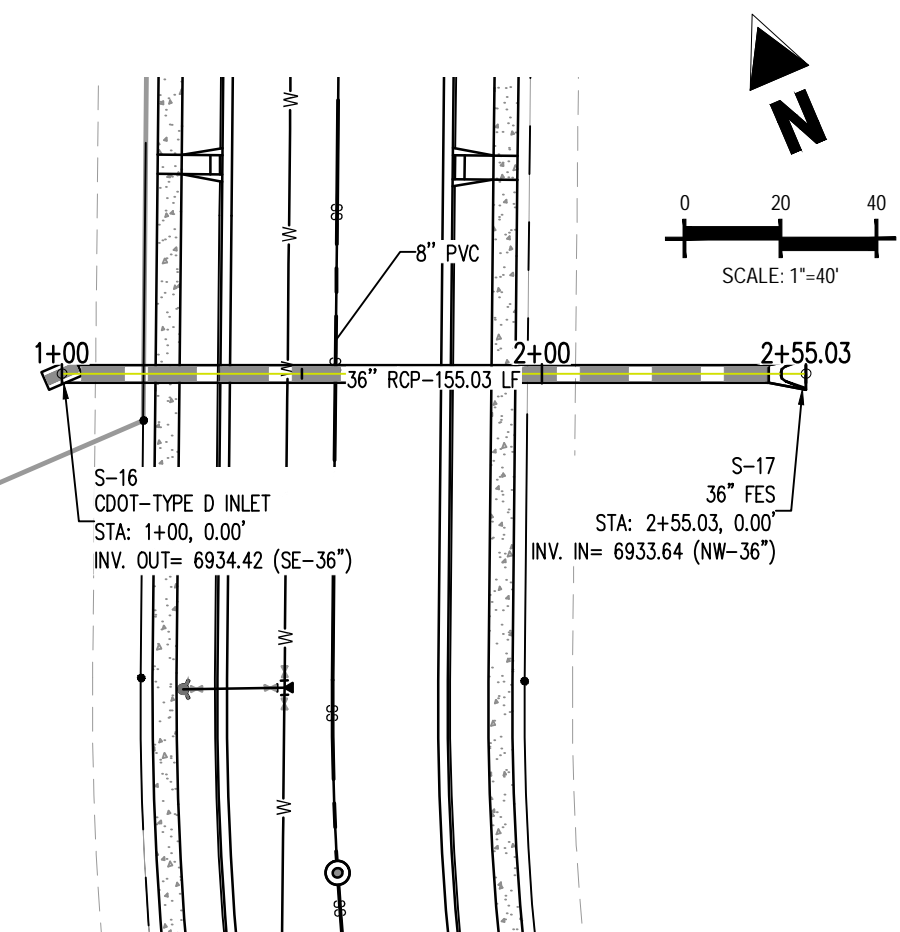
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Project No:	CLH-14.20
Drawn By:	JDP
Checked By:	RGD
Date:	7/29/2019

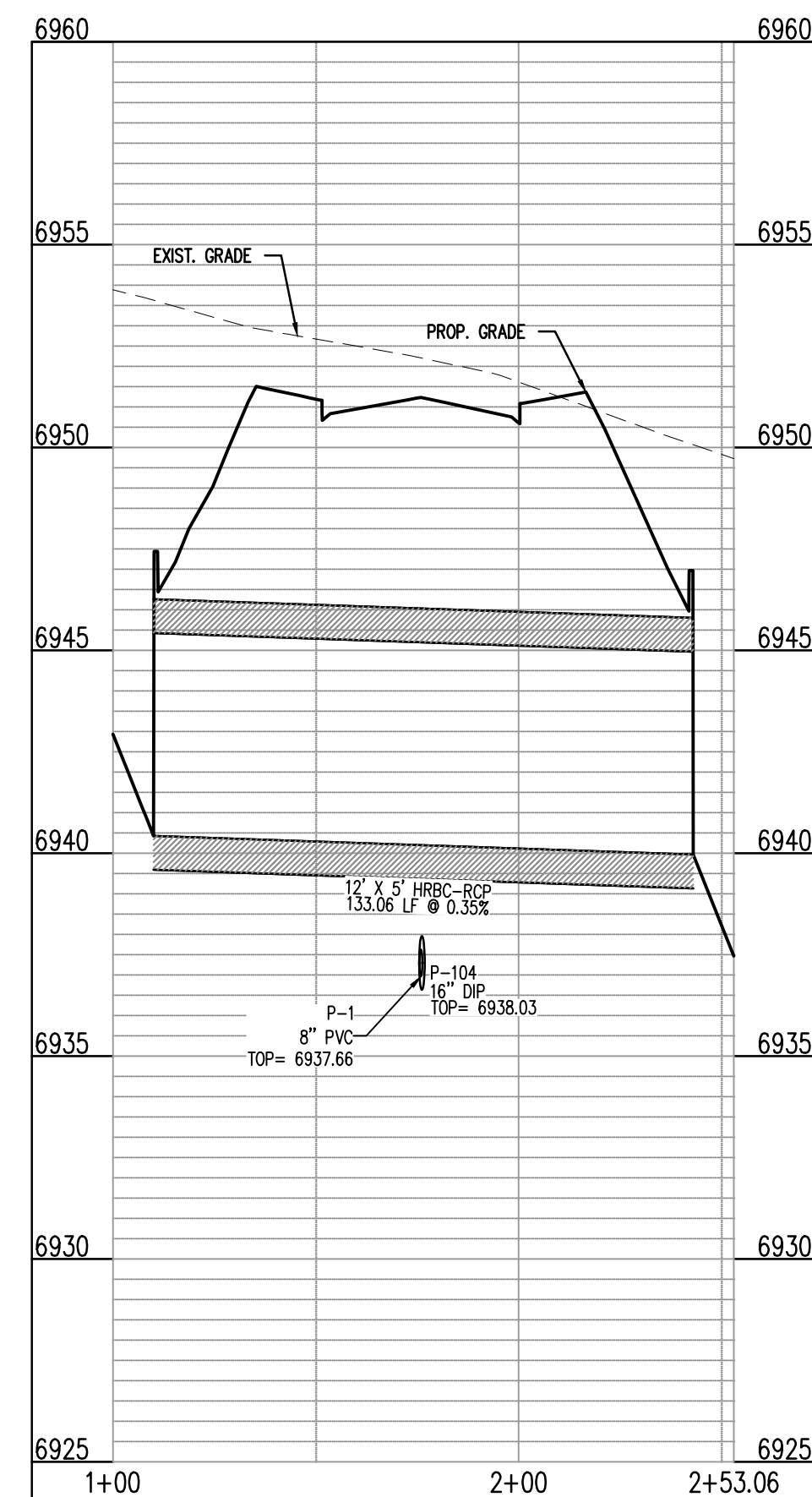
## BENT GRASS MEADOWS DRIVE STORM PLAN & PROFILE

## C6.01

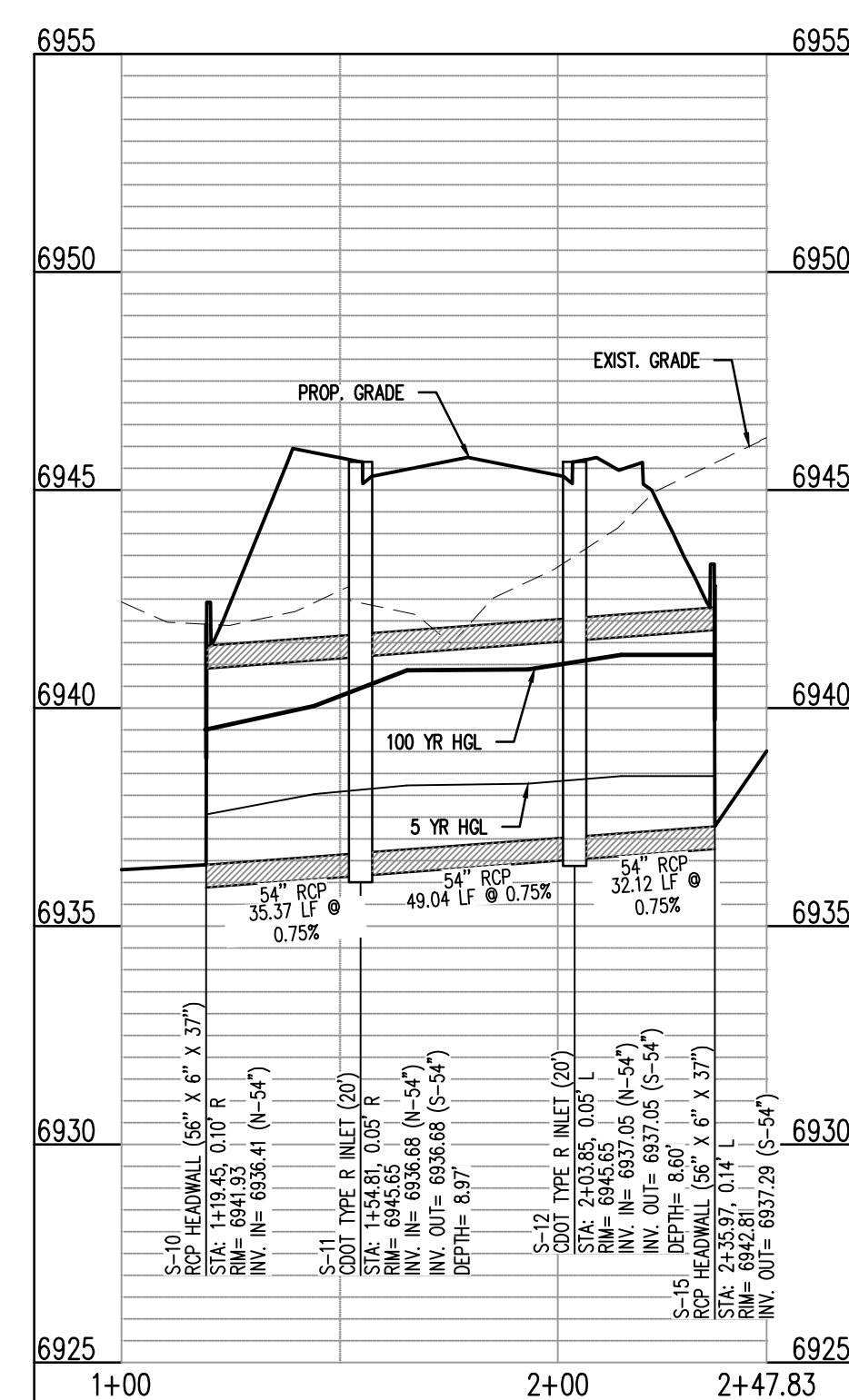
Sheet 28 of 38



ON-SITE STORM - 5  
STA: 1+00 - 2+55.03  
SCALE: H: 1"=40' V: 1"=10'

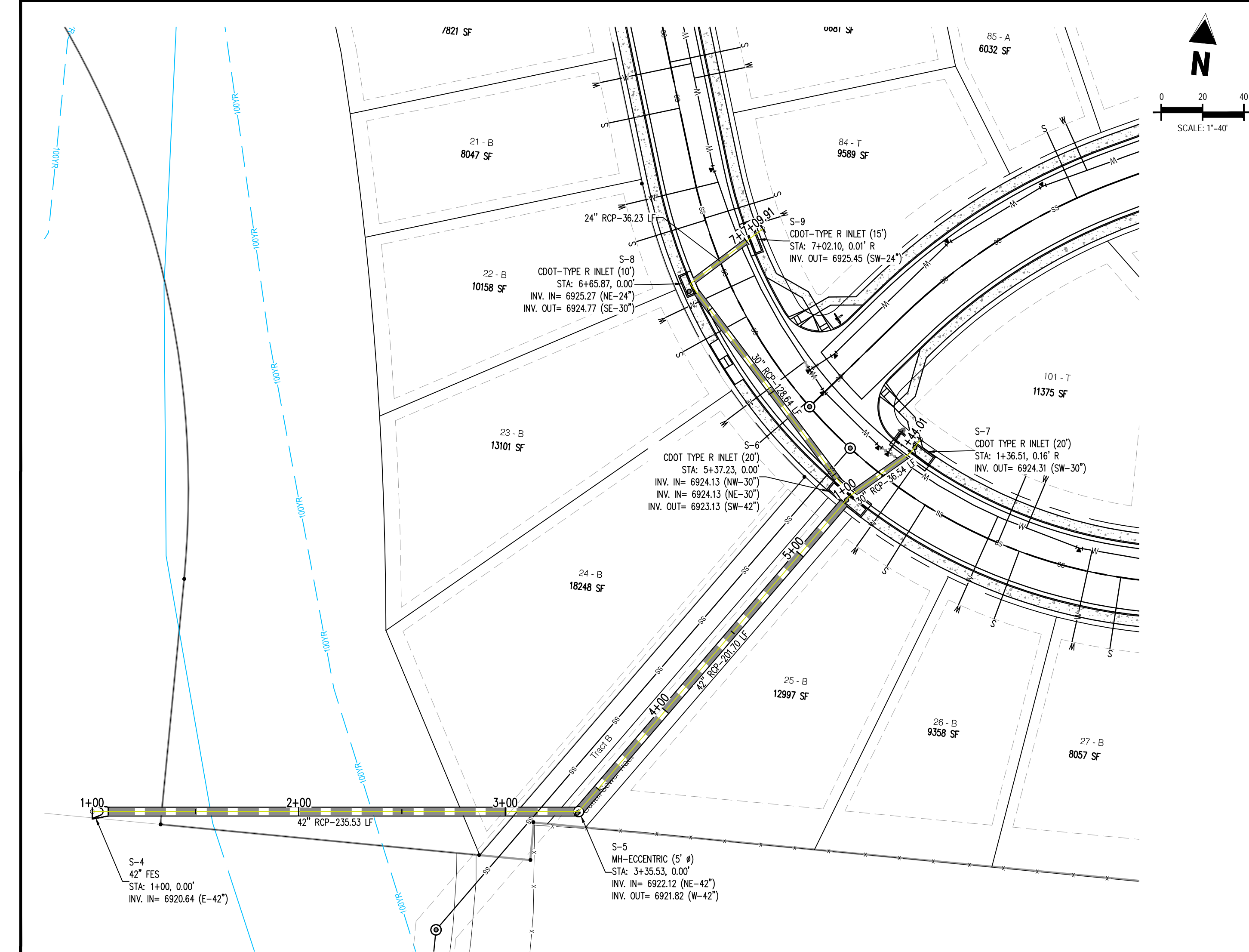


ON-SITE STORM - 6  
STA: 1+00 - 2+53.06  
SCALE: H: 1"=40' V: 1"=10'



ON-SITE STORM - 4  
STA: 1+00 - 2+47.83  
SCALE: H: 1"=40' V: 1"=10'

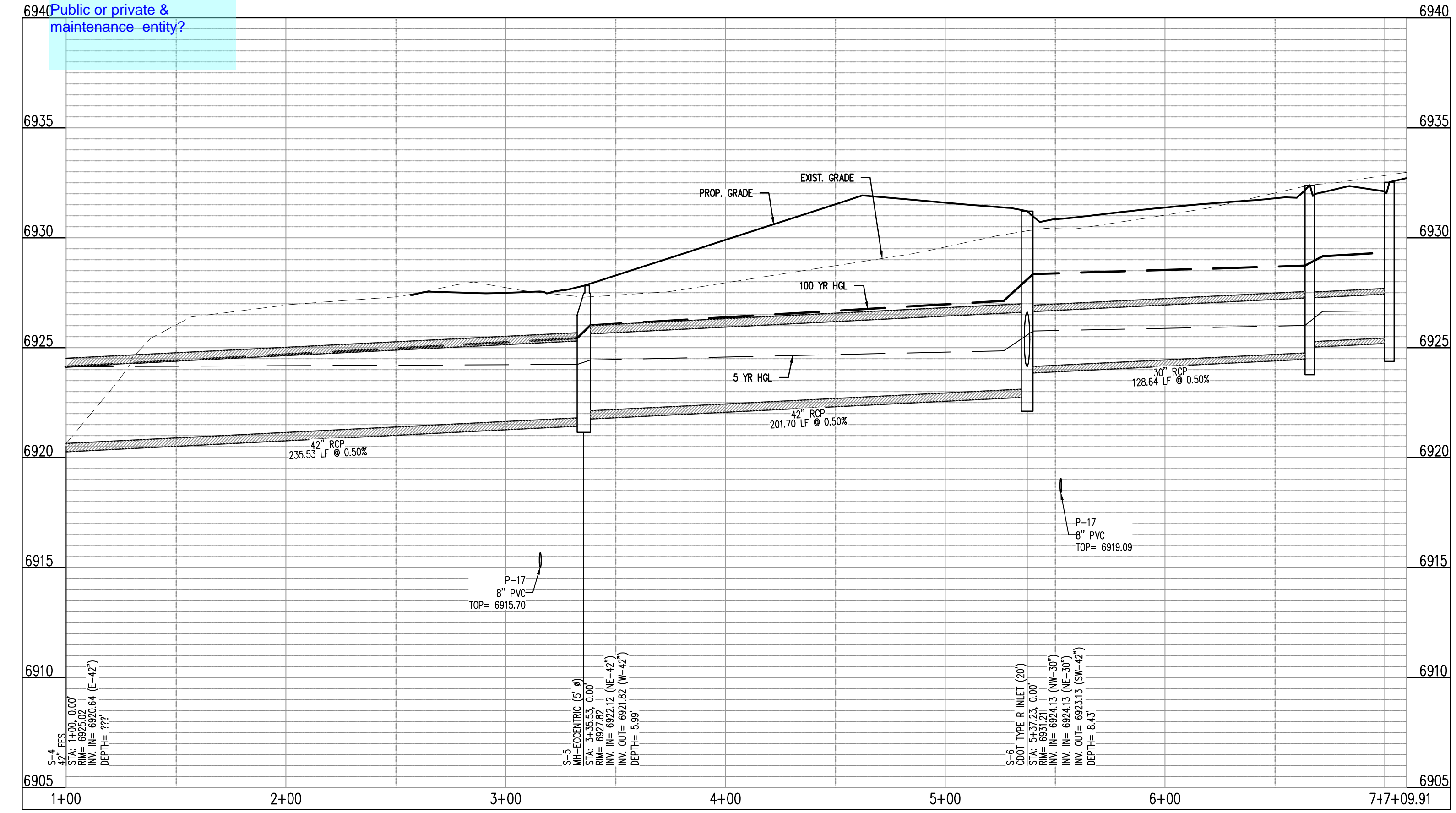




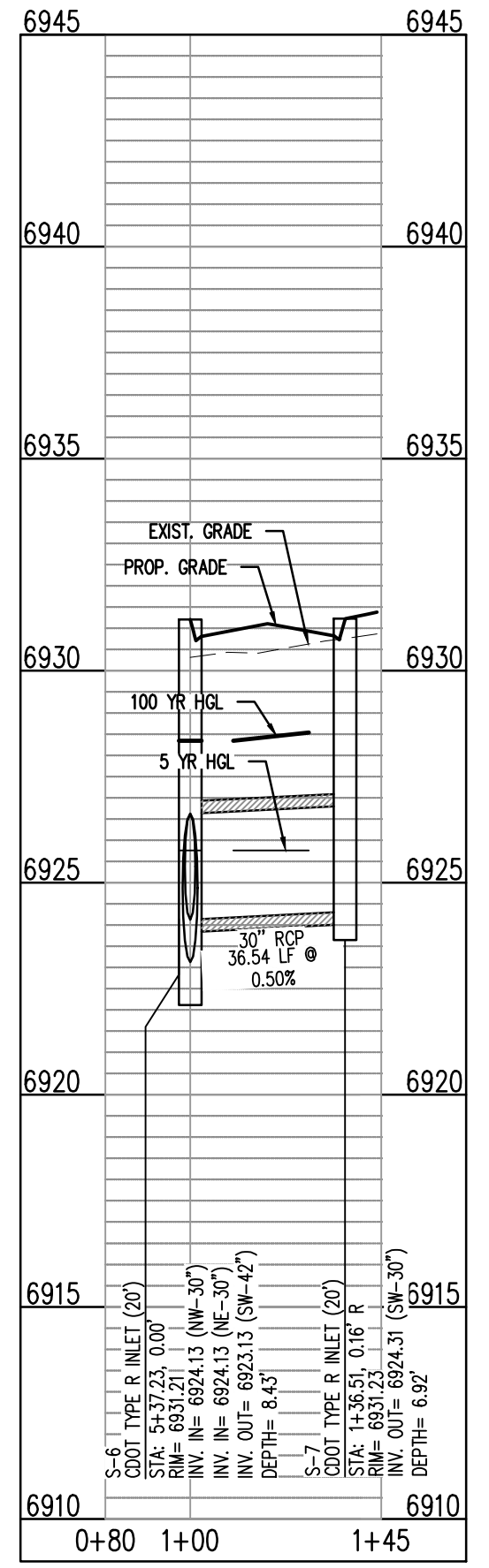
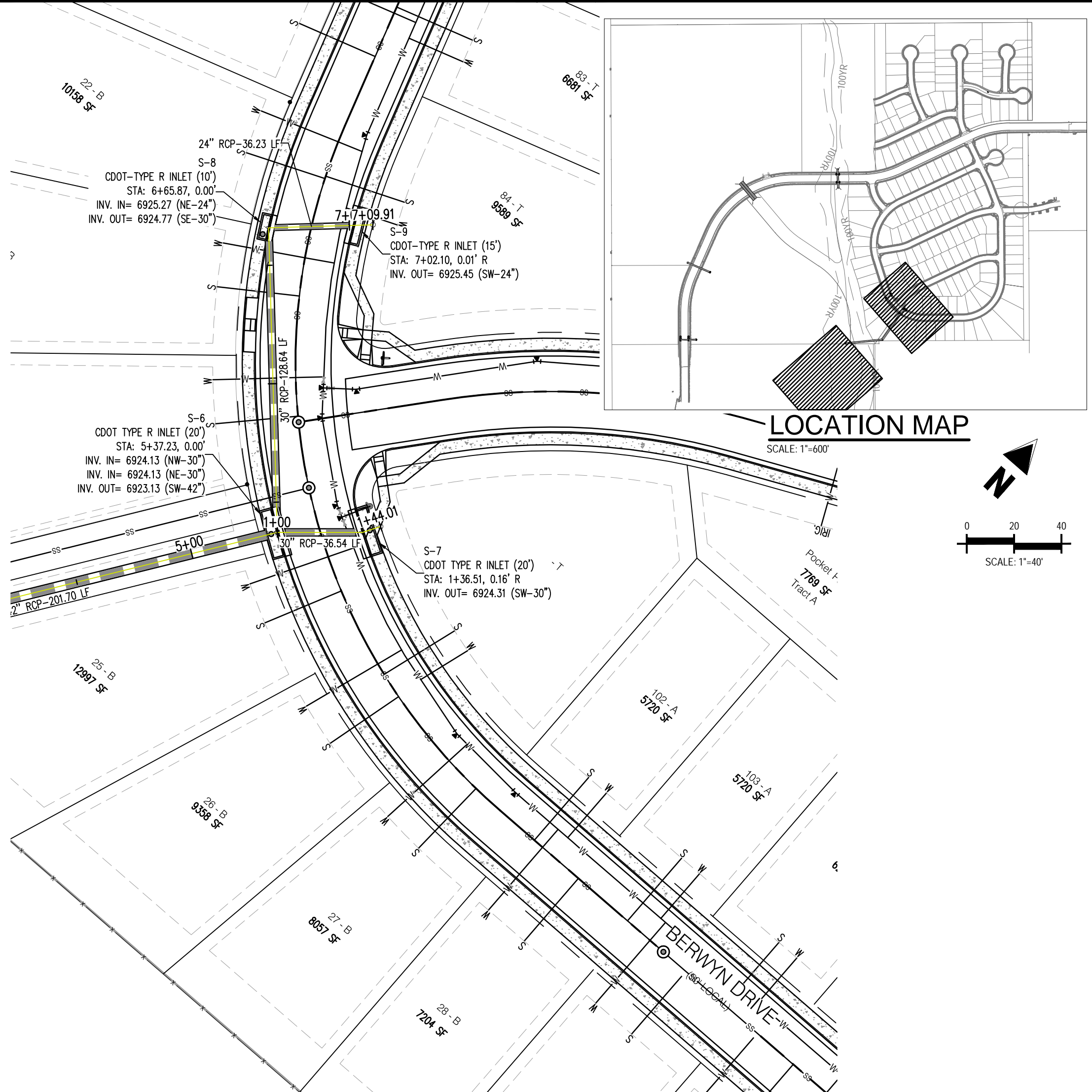
Below is a general comment about all the outfalls into the channel.

Show the outfall, Rip rap dissipater? Property lines? Where the bottom of the channel is? etc. ? Easements? Public or private & maintenance entity?

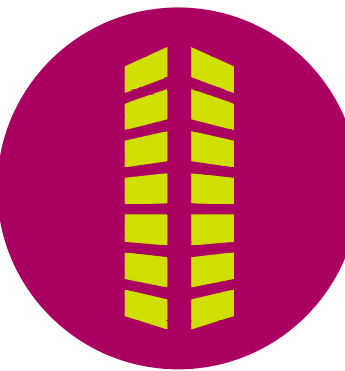
Added detail to this sheet and other storm plan sheets. Also see GEC Plans for Rip Rap Dissipater (Storm Pipe Outfall)



ON-SITE STORM - 2  
STA: 1+00 - 7+09.91  
SCALE: H: 1"=40' V: 1"=10'



ON-SITE STORM - 3  
STA: 0+80 - 1+45  
SCALE: H: 1"=40' V: 1"=10'

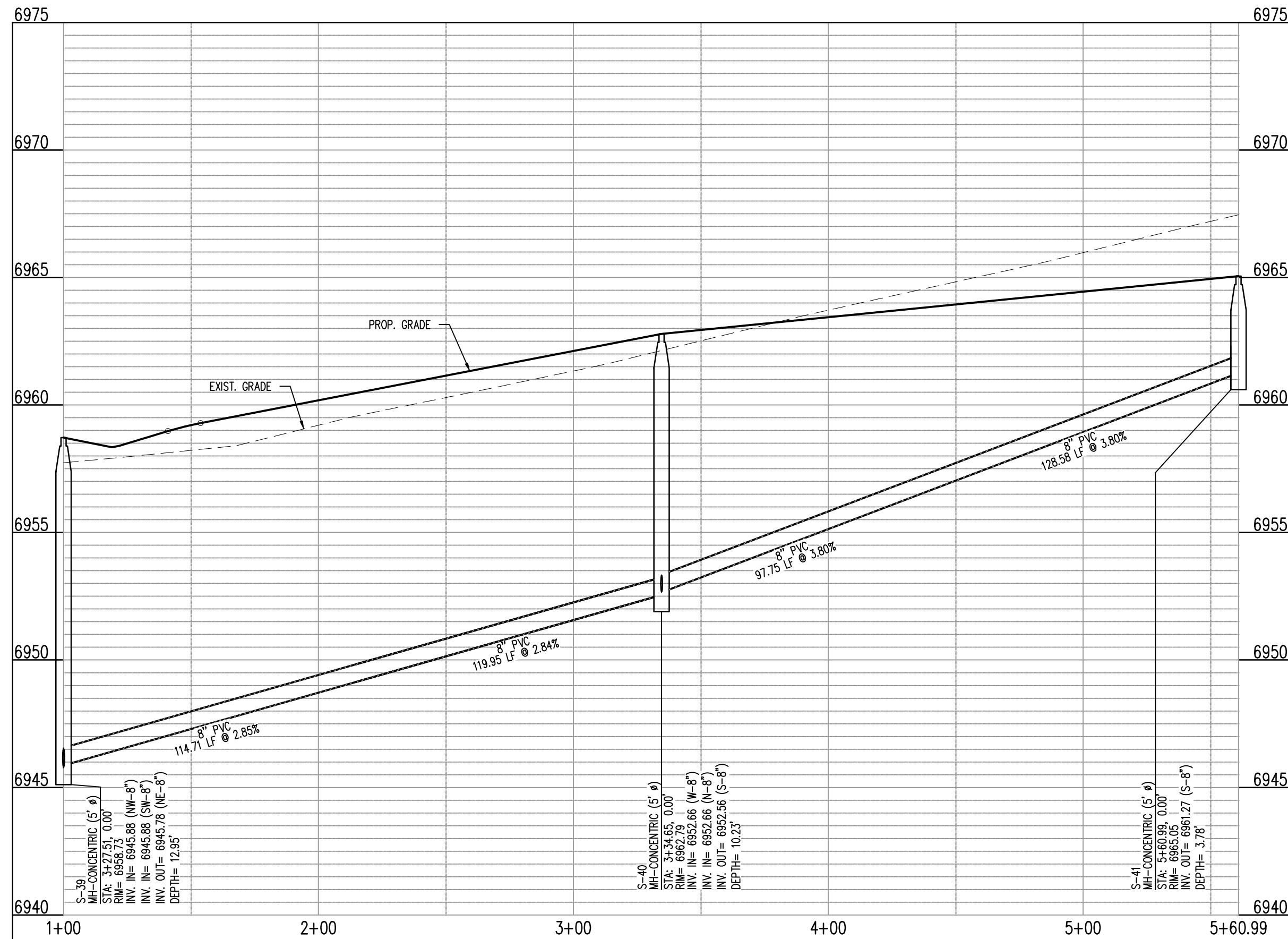
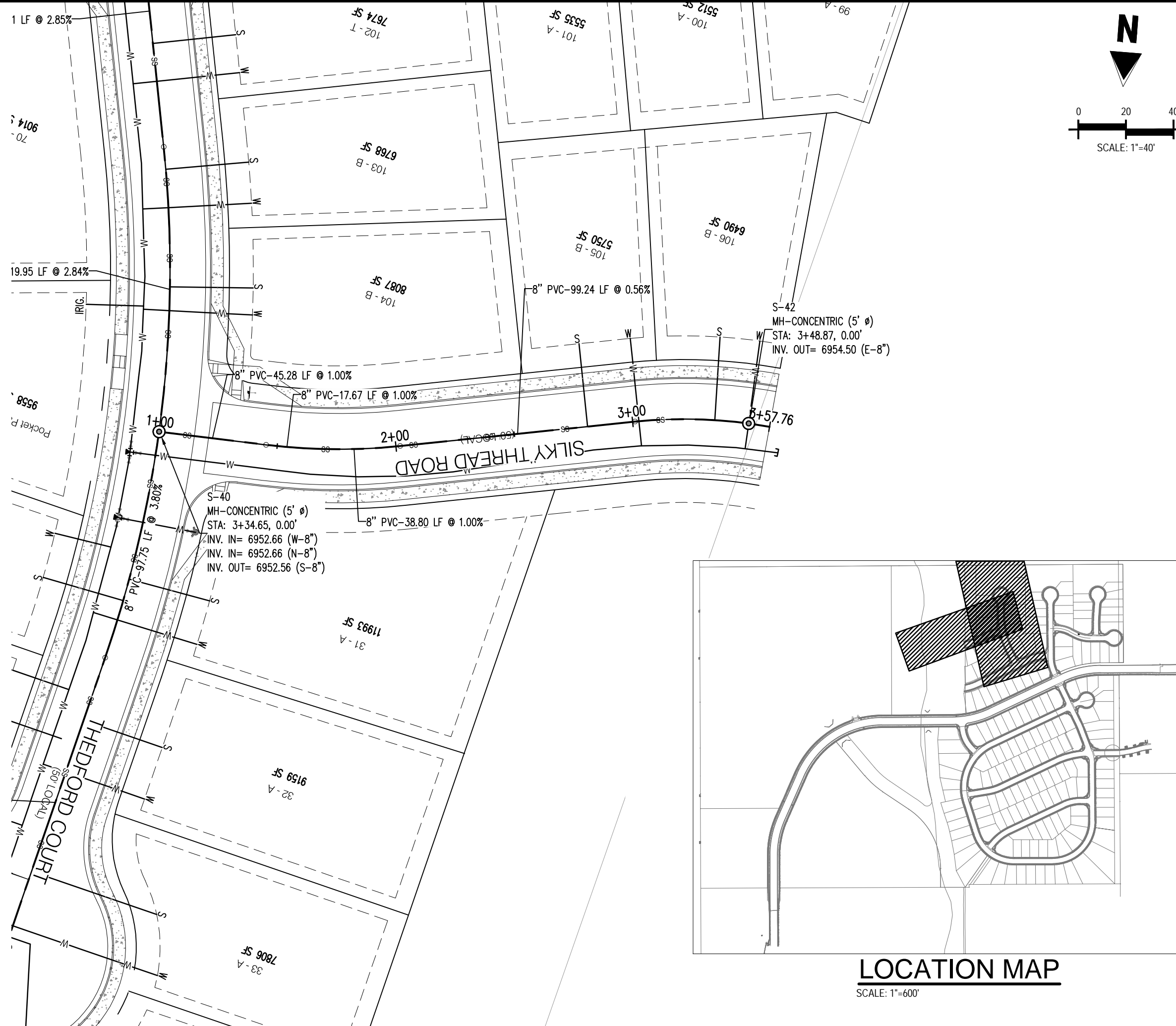
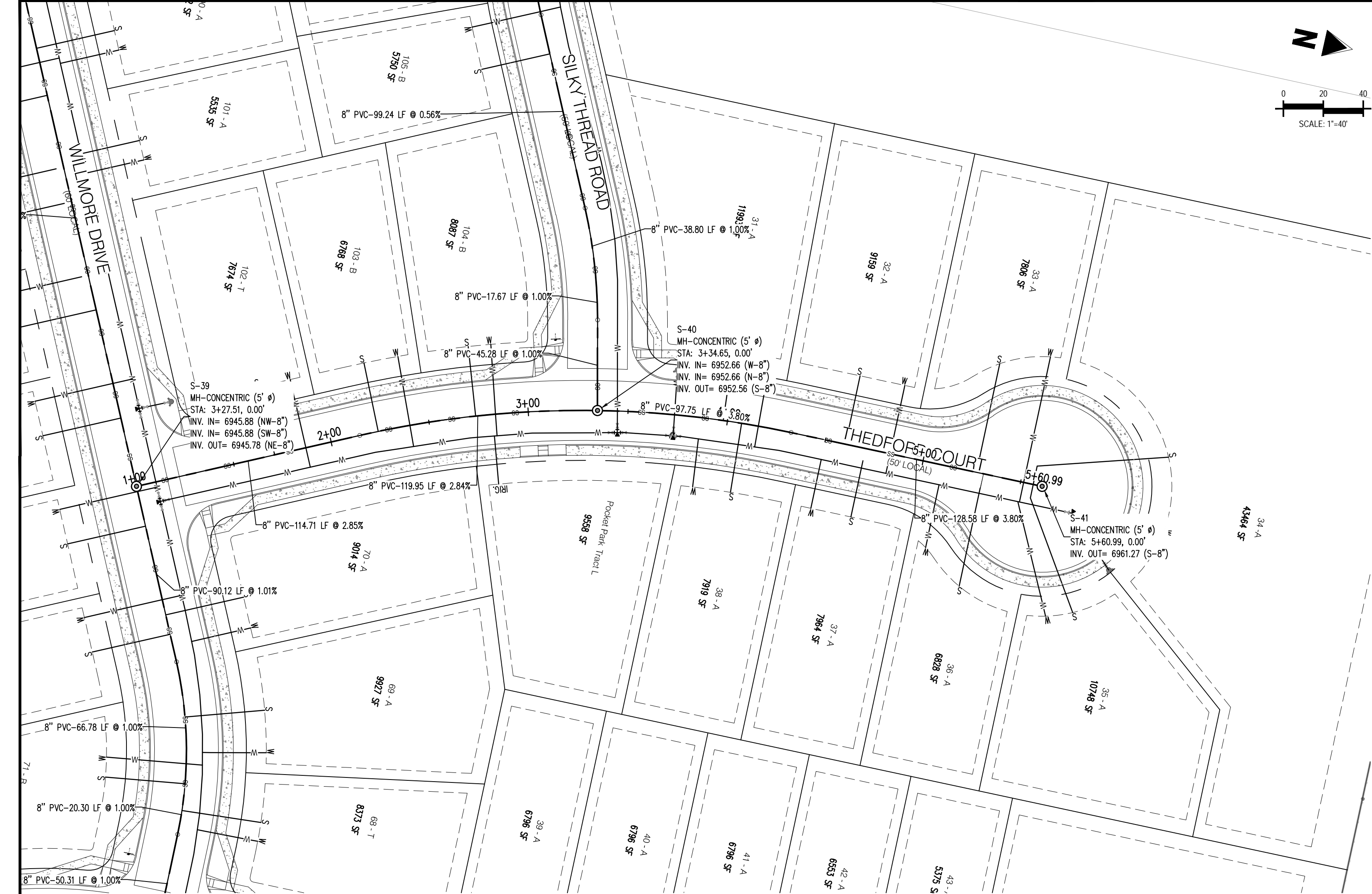


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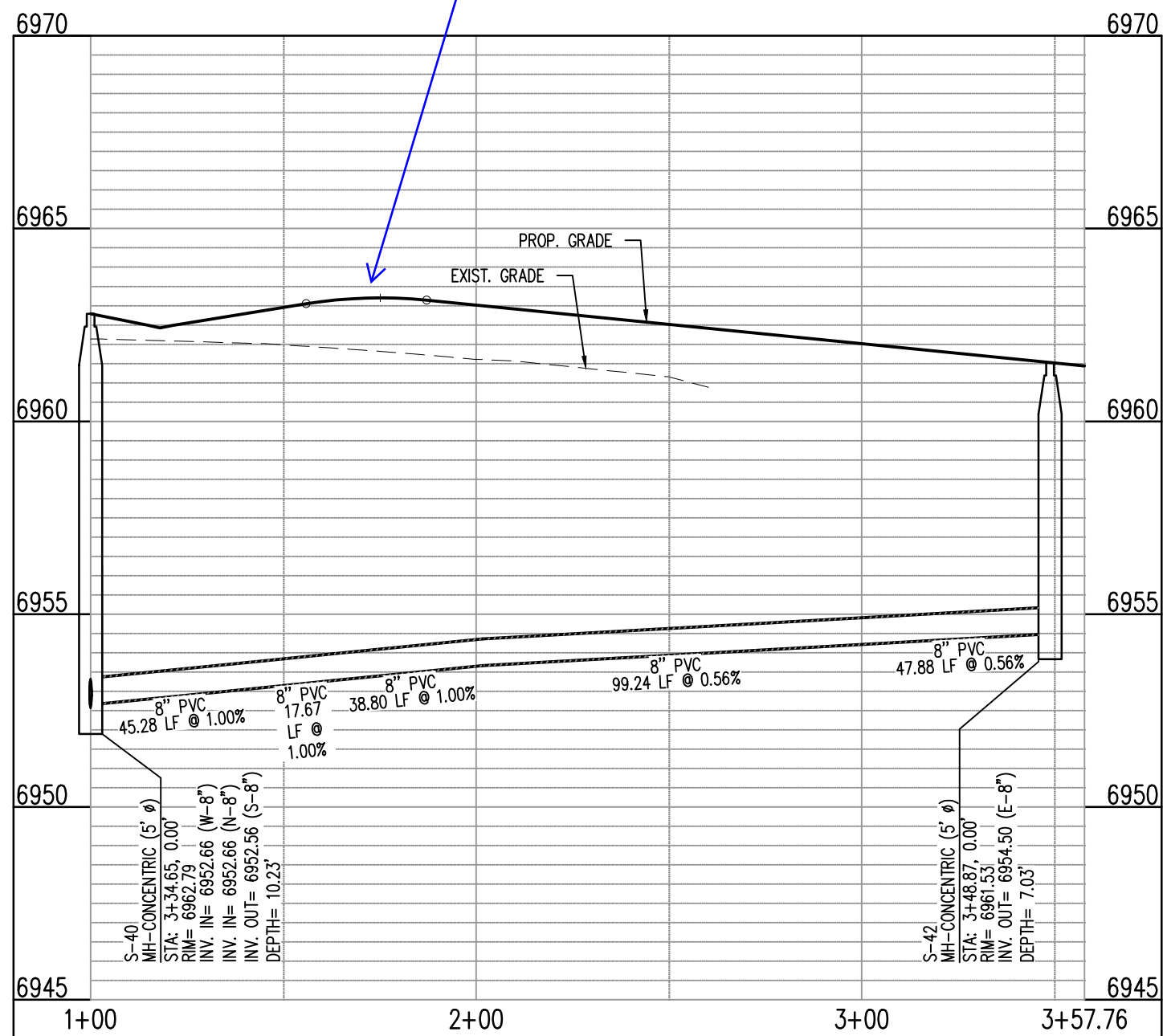
Project No:	CLH-14-20
Drawn By:	JDP
Checked By:	RGD
Date:	7/29/2019

BERWYN DRIVE  
STORM PLAN & PROFILE





THE FORD CT - CL - 50' ROW  
STA: 1+00 - 5+60.99  
SCALE: H: 1"=40' V: 1"=10'



SIKY THRED RD EAST - CL - 50' ROW  
STA: 1+00 - 3+57.76  
SCALE: H: 1"=40' V: 1"=10'

general comment for  
all profiles call out  
vertical curve  
information on the  
profile including K  
value.  
Revised as requested

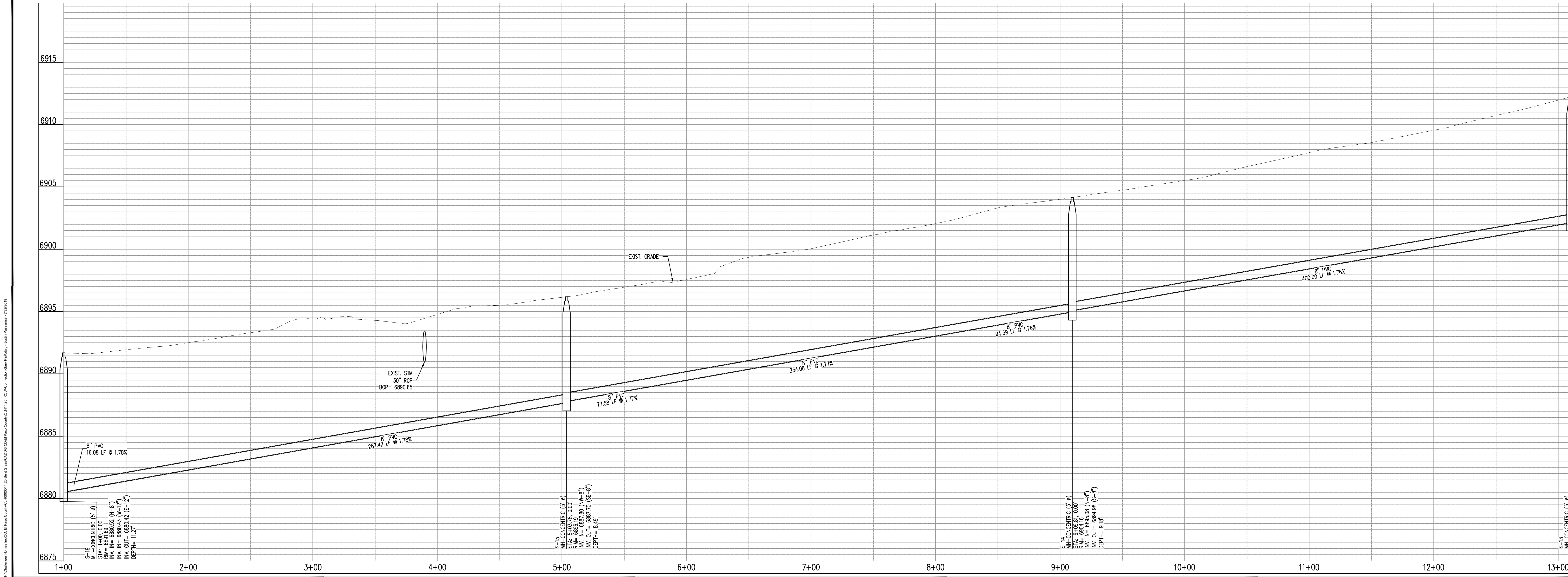
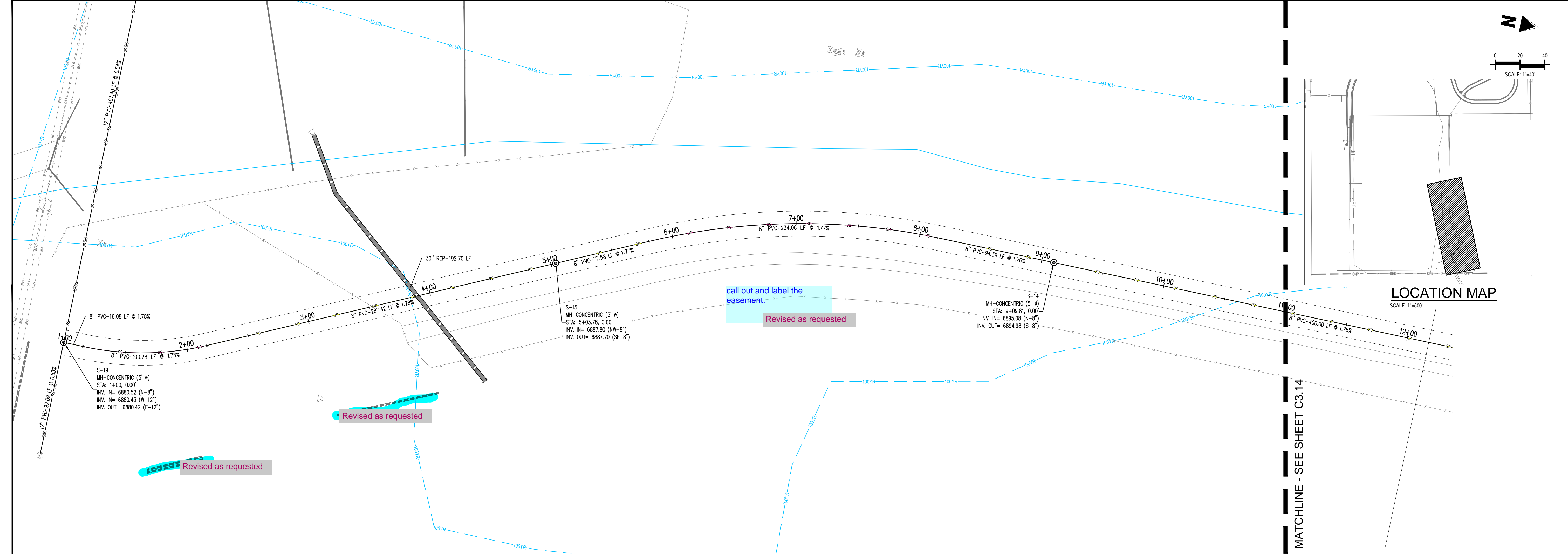


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Project No:	CLH-14-20
Drawn By:	JDP
Checked By:	RGD
Date:	7/29/2019

THE FORD COURT &  
SIKY THREAD ROAD  
SANITARY PLAN & PROFILE







1755 Teletar Drive, Suite 107  
Colorado Springs, CO 80920  
719.900.7220  
gallowayus.com

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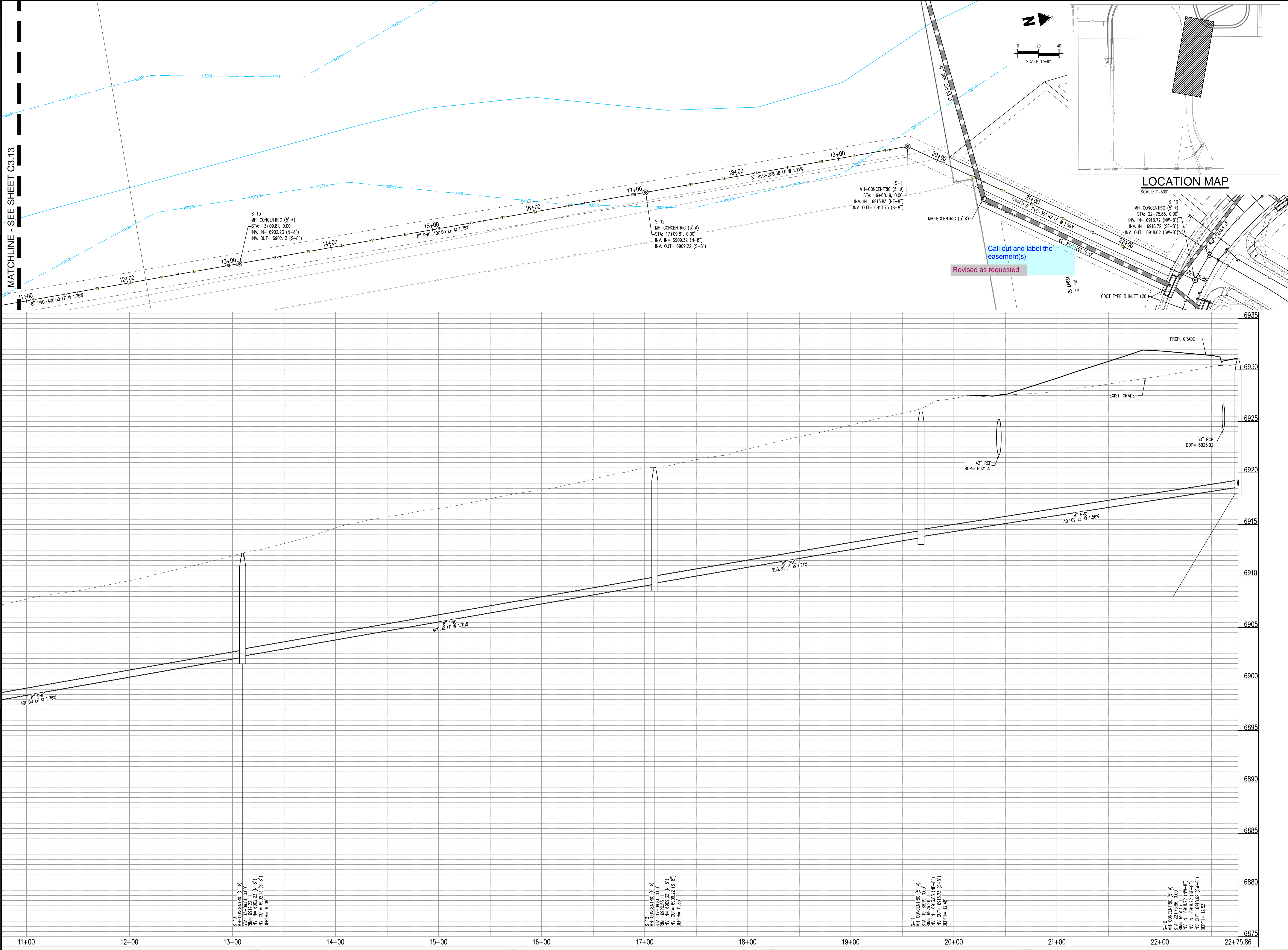


CONSTRUCTION PLANS  
BENT GRASS RESIDENTIAL FILING NO. 2

BENT GRASS MEADOWS DRIVE  
FALCON, CO 80831 EL PASO COUNTY

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## COMMENT RESPONSES – FAE

# 2015 Financial Assurance - Exhibit A: Bent Grass Residential Filing No. 2 & GEC Estimate Form (with pre-plat construction)

Please note this form has changed; it can be found on the EPC website for Planning and community development.

Noted. The re-submittal now contains the updated FAE Form

**Project Information**

**Bent Grass Residential Filing No. 2**

Project Name

Cursory redlines Steve Kuehster 9/25/2019

Section 1 - Grading and Erosion Control BMPs	Quantity	Units		Price		% Complete	Remaining
Earthwork*	4,051.00	CY	@	\$ \$5	= \$ 20,255.00		\$ 20,255.00 *
Permanent Seeding* (inc. noxious weed mgmnt.)		AC	@	\$ \$582	= \$		\$ - *
Mulching*		AC	@	\$ \$507	= \$		\$ - *
Permanent Erosion Control Blanket*		SY	@	\$ \$6	= \$		\$ - *
Temporary Erosion Control Blanket		SY	@	\$ \$3	= \$		\$ -
Vehicle Tracking Control	2.00	EA	@	\$ \$1,625	= \$ 3,250.00		\$ 3,250.00
Safety Fence (For Culverts)	260.00	LF	@	\$ \$3	= \$ 780.00		\$ 780.00
Silt Fence	14,553.00	LF	@	\$ \$4	= \$ 58,212.00		\$ 58,212.00
Temporary Seeding		AC	@	\$ \$485	= \$		\$ -
Temporary Mulch		AC	@	\$ \$507	= \$		\$ -
Erosion Bales		EA	@	\$ \$21	= \$		\$ -
Erosion Logs		LF	@	\$ \$6	= \$		\$ -
Rock Ditch Checks		EA	@	\$	= \$		\$ -
Inlet Protection	11.00	EA	@	\$ \$153	= \$ 1,683.00		\$ 1,683.00
Sediment Basin		EA	@	\$ \$1,625	= \$		\$ -
Concrete Washout Basin		EA	@	\$ \$776	= \$		\$ -
			@	\$	= \$		\$ -
* Subject to defect warranty financial assurance. DO NOT ENTER MORE THAN 80% COMPLETE. A minimum of 20% to be retained up to final acceptance process.							
Section 1 Subtotal					= \$ 84,180.00		\$ 84,180.00

See GEC plans and add more features to control erosion during construction.

Section 2 - Public Improvements**	Quantity	Units		Price		% Complete	Remaining
<b>- Roadway Improvements</b>							
Construction Traffic Control	1.00	LS	@	\$ 5,000	= \$ 5,000.00		
Aggregate Base Course - 8"	11,800.00	Tons	@	\$ \$18	= \$ 212,400.00		
Asphalt Pavement - 4"	10,500.00	Tons	@	\$ \$65	= \$ 682,500.00		\$ 682,500.00 *
Raised Median, Paved		SF	@	\$ \$7	= \$		\$ - *
Electrical Conduit, Size =		LF	@	\$ \$14	= \$		\$ - *
Traffic Signal, complete intersection		EA	@	\$ \$250,000	= \$		\$ - *
Regulatory Sign	15.00	EA	@	\$ \$100	= \$ 1,500.00		\$ 1,500.00 *
Advisory Sign		EA	@	\$ \$100	= \$		\$ - *
Guide/Street Name Sign	15.00	EA	@	\$ \$100	= \$ 1,500.00		\$ 1,500.00 *
Epoxy Pavement Marking		SF	@	\$ \$12	= \$		\$ - *
Thermoplastic Pavement Marking		SF	@	\$ \$22	= \$		\$ - *
Barricade - Type 3		EA	@	\$ \$115	= \$		\$ - *
Delineator (Type I)		EA	@	\$ \$21	= \$		\$ - *
Curb and Gutter, Type C (Ramp)	14,841.00	LF	@	\$ \$21	= \$ 311,661.00		\$ 311,661.00 *
Curb and Gutter, Type A (6" Vertical)		LF	@	\$ \$16	= \$		\$ - *
Curb and Gutter, Type B (Median)		LF	@	\$ \$13	= \$		\$ - *
Concrete Sidewalk, 4"		SY	@	\$ \$38	= \$		\$ - *
Concrete Sidewalk, 5"		SY	@	\$ \$48	= \$		\$ - *
Concrete Sidewalk, 6"	6,596.00	SY	@	\$ \$57	= \$ 375,972.00		\$ 375,972.00 *
Pedestrian Ramp	328.00	SY	@	\$ \$108	= \$ 35,424.00		\$ 35,424.00 *

Updated GEC plans and added more control measures for erosion

Call out type C optional C&G (see new form). Also some type A C&G is needed for the transitions.

Updated curb and gutter for transitions on inlets and ramps

## COMMENT RESPONSES – SUBDIVISION SUMMARY FORM



The water wastewater comt is for 121 lots. 177 as indicated in the application form, the LOI states 181 lots; The plat numbering is so confusing - its unknown how many lots are proposed

Type of Submittal:

Request for Exemption \_\_\_\_\_

178 lots are proposed.  
Ensured all documents  
match

SUBDIVIDER(S) NAME Same As Owner

Board of County Commissioners

Approval \_\_\_\_\_ Date \_\_\_\_\_

Disapproval \_\_\_\_\_

Exemption under C.R.S. 30-28-101 (10) (d) \_\_\_\_\_

Remarks (if exemption, state reason): \_\_\_\_\_

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Note: This form is required by C.R.S. 30-28-136 (4), but is not a part of the regulations of El Paso County, Colorado.

## COMMENT RESPONSES – GEC









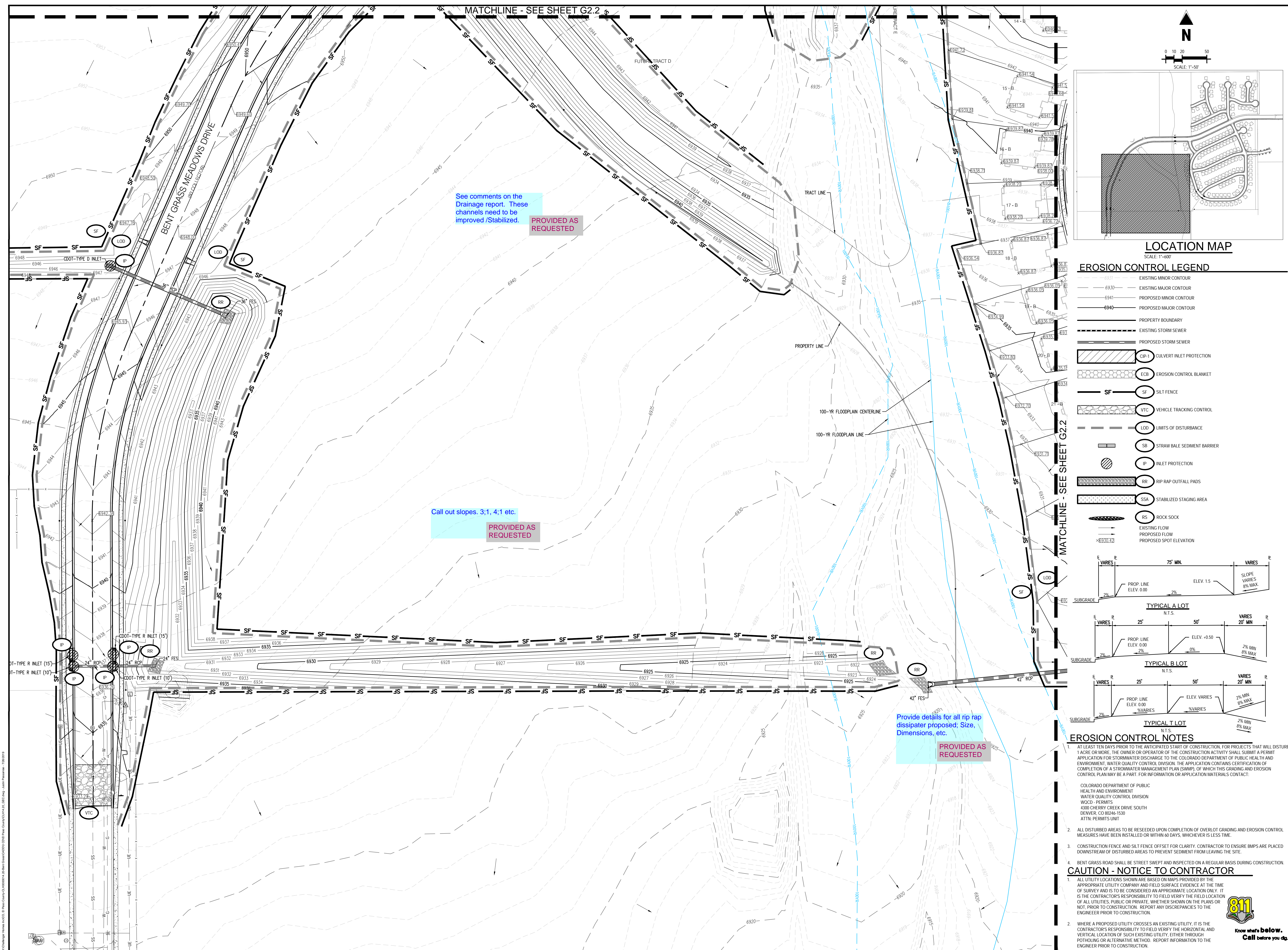
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Project No:	CLH-14.20
Drawn By:	JDP
Checked By:	RGD
Date:	7/26/2019

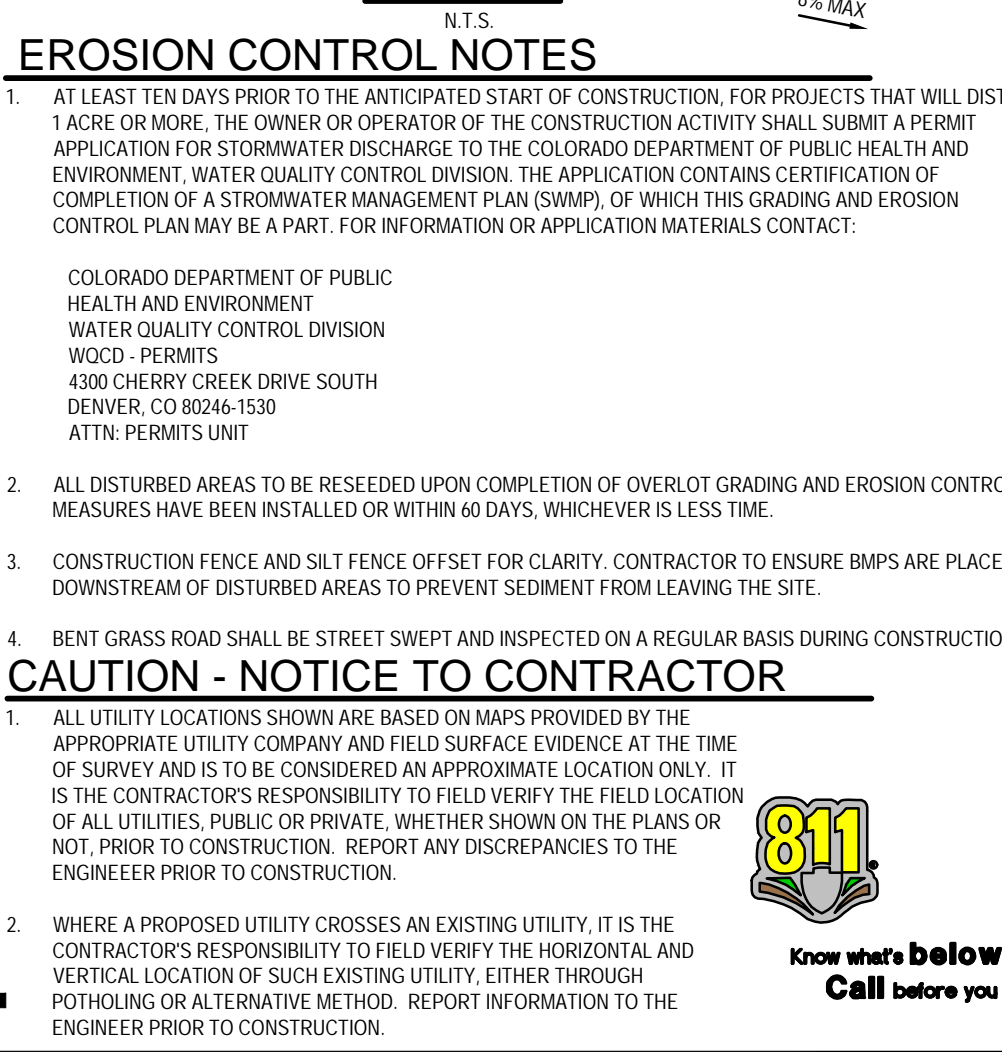
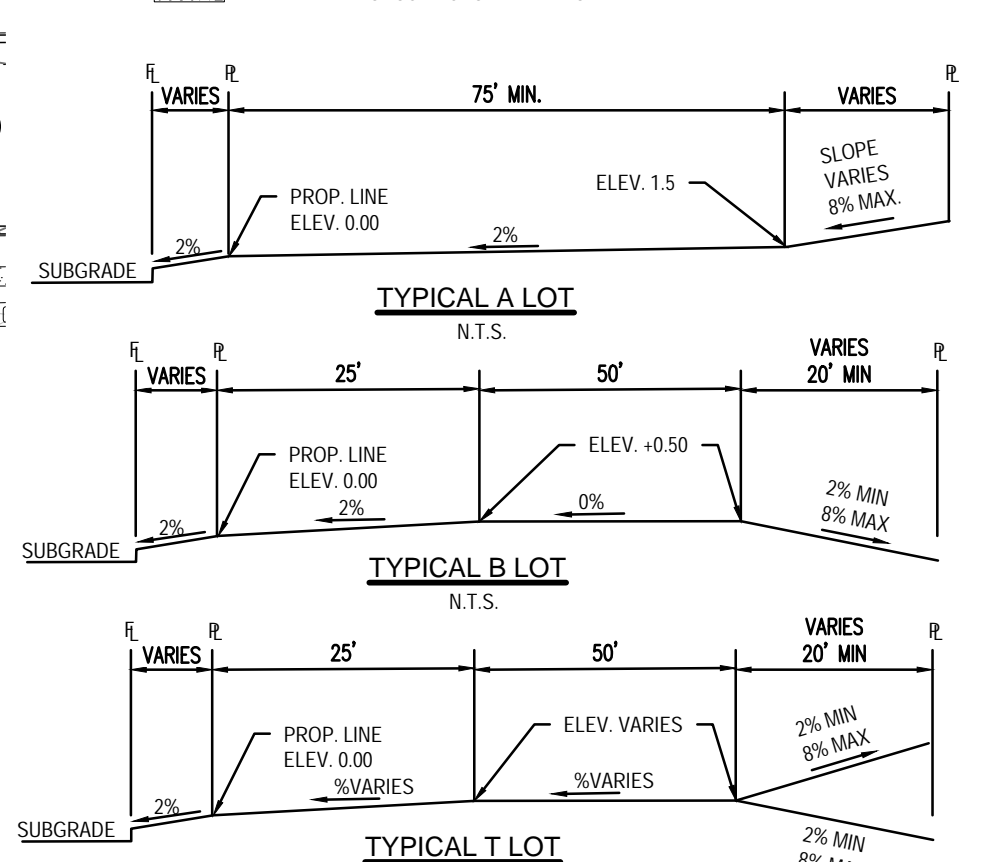
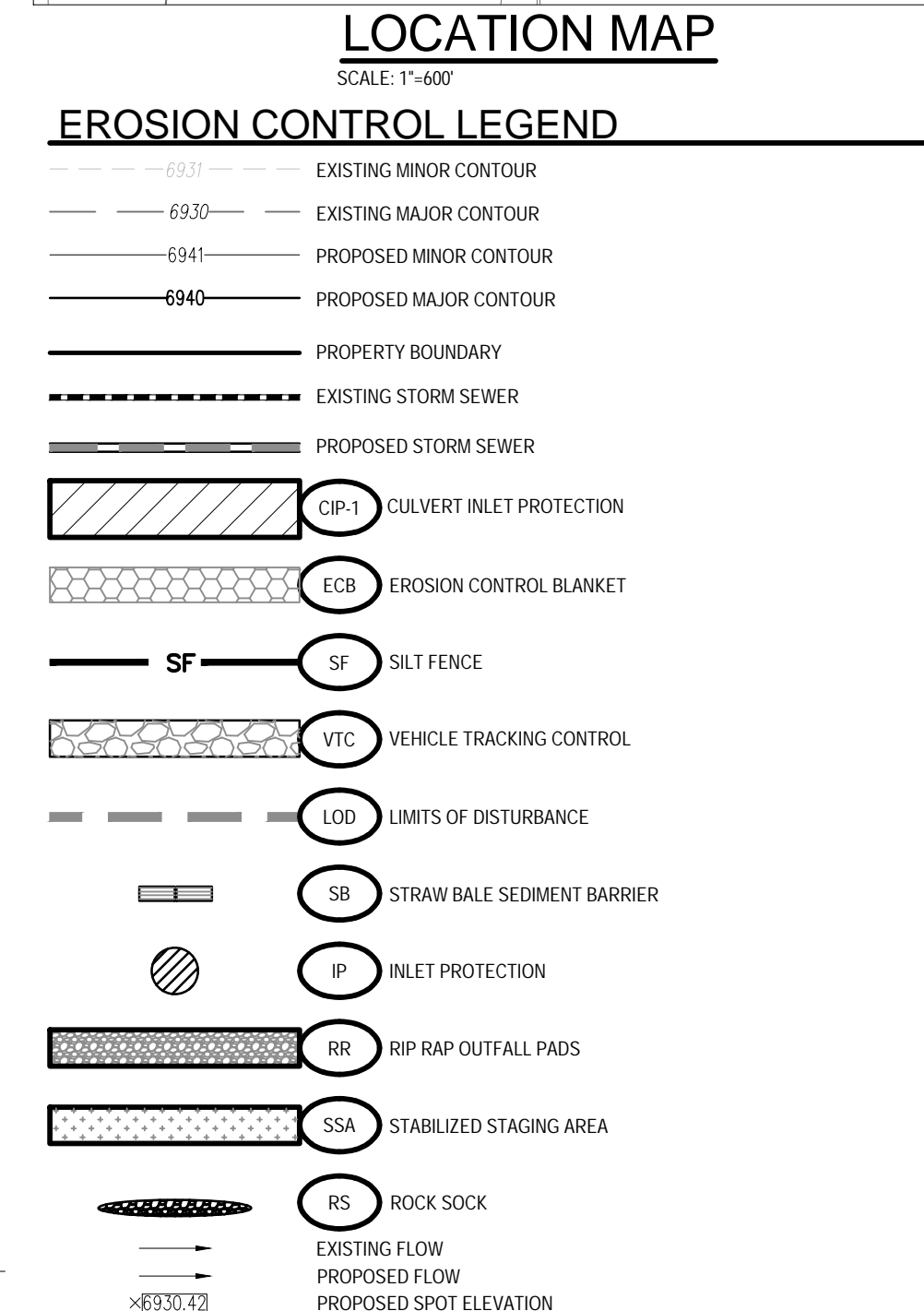
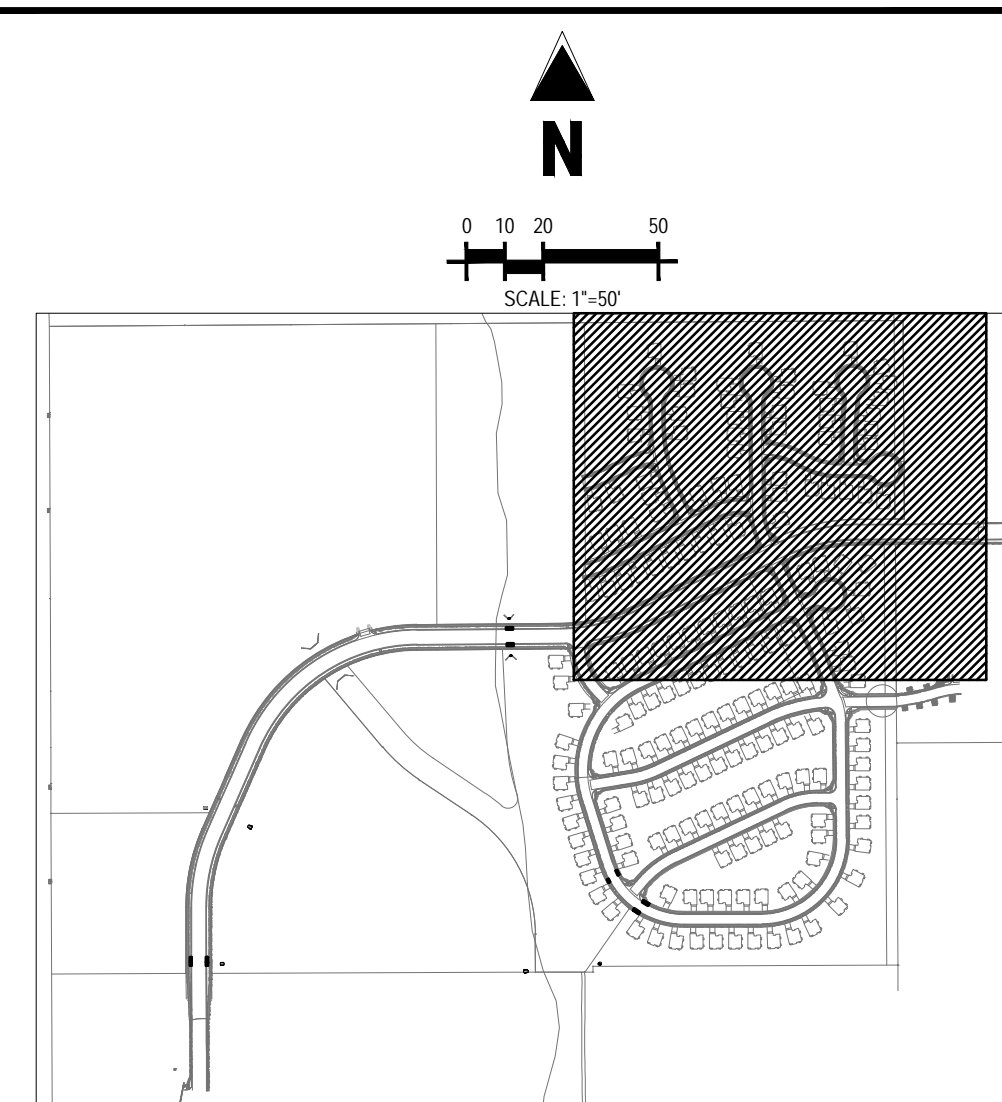
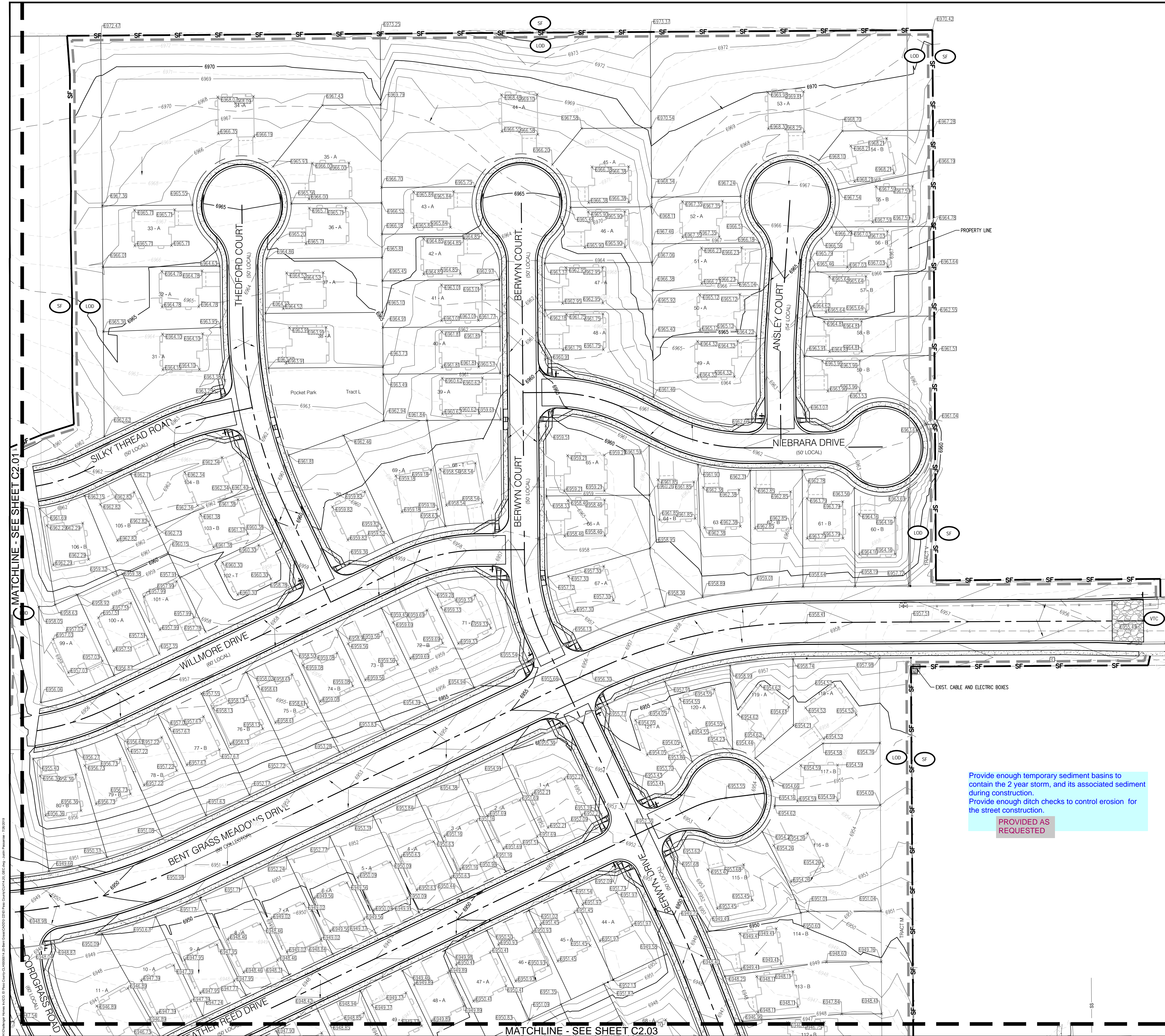
GRADING & EROSION  
CONTROL PLAN

C2.00

Sheet 2 of 38







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**CONSTRUCTION PLANS**  
**BENT GRASS RESIDENTIAL FILING NO. 2**

**BENT GRASS MEADOWS DRIVE**  
**FALCON, CO 80831 EL PASO COUNTY**

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**GRADING & EROSION CONTROL PLAN**

**C2.02**  
Sheet 4 of 38



## COMMENT RESPONSES - ESQCP

## EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) EL PASO COUNTY APPLICATION AND PERMIT

PERMIT NUMBER \_\_\_\_\_

### APPLICANT INFORMATION

Applicant Contact Information	
Owner	Challenger Homes Inc
Name (person of responsibility)	Jim Byers, PLA
Company/Agency	Challenger Homes
Position of Applicant	VP of Community Development
Address (physical address, not PO Box)	8605 Explorer Drive, Suite 250
City	Colorado Springs
State	CO
Zip Code	80920
Mailing address, if different from above	
Telephone	719-598-5192
FAX number	
Email Address	Jim@ChallengerHomes.com
Cellular Phone number	719-440-0592

### CONTRACTOR INFORMATION

Contractor	
Name (person of responsibility)	TBD
Company	
Address (physical address, not PO Box)	
City	
State	
Zip Code	
Mailing address, if different from above	
Telephone	
FAX number	
Email Address	
Cellular Phone number	
Erosion Control Supervisor (ECS)*	
ECS Phone number*	
ECS Cellular Phone number*	

\*Required for all applicants. May be provided at later date pending securing a contract when applicable.



**PROJECT INFORMATION**

Project Specifications	
Project Name	Bent Grass Residential Filing 2
Legal Description	West Half of Section 1, Township 13 South, Range 65 West, of the 6th Principal meridian, County of El Paso, State of Colorado
Address (or nearest major cross streets)	Northwest of intersection of Meridian Road and E Woodmen Road
Acreage (total and disturbed)	Total: acres 50.8 acres Disturbed: acres 19.8 acres
Schedule	Start of Construction: August 2019 Completion of Construction: September 2020 Final Stabilization: October 2020
Project Purpose	Residential Property Development
Description of Project	This project is a new residential subdivision including 181 lots.
Tax Schedule Number	5301000021, 5301000020, 5301000019, 5301000037, 5301000036

**FOR OFFICE USE ONLY**

The following signature from the ECM Administrator signifies the approval of this ESQCP. All work shall be performed in accordance with the permit, the El Paso County Engineering Criteria Manual (ECM) Standards, City of Colorado Springs Drainage Criteria Manual, Volume 2 (DCM2) as adopted by El Paso County Addendum, approved plans, and any attached conditions. The approved plans are an enforceable part of the ESQCP. Construction activity, except for the installation of initial construction BMPs is not permitted until issuance of a Construction permit and Notice to Proceed.

Signature of ECM Administrator: \_\_\_\_\_ Date \_\_\_\_\_

## 1.1 REQUIRED SUBMISSIONS

In addition to this completed and signed application, the following items must be submitted to obtain an ESQCP:

- Permit fees
- Stormwater Management Plan (SWMP) meeting the requirements of DCM2 and ECM either as part of the plan set or as a separate document;
- Cost estimates of construction and maintenance of construction and permanent stormwater control measures (Cost estimates shall be provided on a unit cost basis for all stormwater BMPs);
- Financial surety in an amount agreeable to the ECM Administrator based on the cost estimates of the stormwater quality protection measures provided. The financial surety shall be provided in the form of a Letter of Credit, Surety with a Bonding Company, or other forms acceptable to El Paso County;
- Operation and Maintenance Plan for any proposed permanent BMPs; and
- Signed Private Detention Basin/Stormwater Quality Best Management Practice Maintenance Agreement and Easement, if any permanent Best Management Practices are to be located on site.

## 1.2 RESPONSIBILITY FOR DAMAGE

The County and its officers and employees, including but not limited to the ECM Administrator, shall not be answerable or accountable in any manner, for injury to or death of any person, including but not limited to a permit holder, persons employed by the permit holder, persons acting in behalf of the permit holder, or for damage to property resulting from any activities undertaken by a permit holder or under the direction of a permit holder. The permit holder shall be responsible for any liability imposed by law and for injuries to or death of any person, including but not limited to the permit holder, persons employed by the permit holder, persons acting in behalf of the permit holder, or damage to property arising out of work or other activity permitted and done by the permit holder under a permit, or arising out of the failure on the permit holder's part to perform the obligations under any permit in respect to maintenance or any other obligations, or resulting from defects or obstructions, or from any cause whatsoever during the progress of the work, or other activity, or at any subsequent time work or other activity is being performed under the obligations provided by and contemplated by the permit.

To the extent allowed by law, the permit holder shall indemnify, save, and hold harmless the County and its officers and employees, including but not limited to the BOCC and ECM Administrator, from all claims, suits or actions of every name, kind and description brought for or on account of injuries to or death of any person, including but not limited to the permit holder, persons employed by the permit holder, persons acting in behalf of the permit holder and the public, or damage to property resulting from the performance of work or other activity under the permit, or arising out of the failure on the permit holder's part to perform his obligations under any permit in respect to maintenance or any other obligations, or resulting from defects or obstructions, or from any cause whatsoever during the progress of the work, or other activity or at any subsequent time work or other activity is being performed under the obligations provided by and contemplated by the permit, except as otherwise provided by state law. The permit holder waives any and all rights to any type of expressed or implied indemnity against the County, its officers or employees.



### 1.3 APPLICATION CERTIFICATION

I, as the Applicant or the representative of the Applicant, hereby certify that this application is correct and complete as per the requirements presented in this application and the El Paso County Engineering Criteria Manual and Drainage Criteria Manual, Volume 2 and El Paso County Addendum.

I, as the Applicant or the representative of the Applicant, have read and will comply with all of the requirements of the specified Stormwater Management Plan and any other documents specifying stormwater best management practices to be used on the site including permit conditions that may be required by the ECM Administrator. I understand that the Best Management Practices are to be maintained on the site and revised as necessary to protect stormwater quality as the project progresses. I further understand that a Construction Permit must be obtained and all necessary stormwater quality control BMPs are to be installed in accordance with the SWMP and the El Paso County Engineering Criteria Manual and Drainage Criteria Manual, Volume 2 and El Paso County Addendum before land disturbance begins and that failure to comply will result in a Stop Work Order and may result in other penalties as allowed by law. I further understand and agree to indemnify, save, and hold harmless the County and its officers and employees, including but not limited to the BOCC and ECM Administrator, from all claims, suits or actions of every name, kind and description as outlined in Section 1.2 Responsibility for Damage.

  
Signature of Applicant or Representative

Date: 6/26/19

JAMES BYERS

Print Name of Applicant or Representative

Permit Fee \$ \_\_\_\_\_

Surcharge \$ \_\_\_\_\_

Financial Surety \$ \_\_\_\_\_

Type of Surety \_\_\_\_\_

Total \$ \_\_\_\_\_



# STORM WATER MANAGEMENT PLAN

## BENT GRASS RESIDENTIAL FILING NO. 2

---

PREPARED FOR:

**Challenger Homes Inc**  
**8605 Explorer Drive, Suite 250**  
**Colorado Springs, CO 80920**

PREPARED BY:

**Galloway & Company, Inc.**  
**1755 Telstar Drive, Suite 107**  
**Colorado Springs, CO 80918**

DATE:

**June 11, 2019**





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Appendices:

- A. Vicinity Map
- B. GESC Plan
- C. BMP Details

## **I. PROJECT DESCRIPTION**

The Bent Grass Residential Filing 2 will consist of 181 single family residential lots and the associated sidewalks, parking, open space and landscaping on approximately 50.8 ac.

## **II. EXISTING SITE CONDITIONS**

### **LOCATION**

The Bent Grass Residential Filing No. 2 project site is in the West half of Section 1, Township 13 South, Range 65 West of the 6th Principle Meridian, County of El Paso, State of Colorado. The project site is bounded East by Bent Grass Residential Filing No. 1, North by The Meadows Filing No. 2, West, by The Meadows Filing No. 3, and South by Latigo Business Center Filing No. 1.

### **DESCRIPTION OF PROPERTY**

Bent Grass Residential Filing 2 is approximately 50.8 acres and is comprised of undeveloped land covered mostly by native grasses and weeds. This site is a portion of the larger 180-acre Bent Grass Development. The Bent Grass Residential Filing No. 2 plat will create 177 lots.

## **III. RECEIVING WATERS**

The project site is located within the Falcon Drainage Basin. Stormwater from this site drains to an existing unnamed tributary to Black Squirrel Creek No. 2 that routes to a regional detention pond designated as Detention Pond WU South. The detention pond outfalls back into the unnamed tributary to Black Squirrel Creek No. 2 that then continues to flow into Black Squirrel Creek.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Number 08041C0553G, effective date March 17, 1997, revised December 7, 2018, the project area lies outside of the 100-year floodplain, however the future development site contains an area that is within the 100-year floodplain.



#### IV. SOILS

Soil data for Bent Grass Residential was obtained from the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey. Soils within the site are Blakeland loamy sand with soil classification A, Blakeland-Fluvaquentic Haplaquolls (A) and Columbine gravelly sandy loam (A).

#### V. DESCRIPTION OF POTENTIAL POLLUTANTS

There are no industrial or chemical uses planned for the site. The potential pollutants during construction are listed below along with how they will be managed by BMPs

Pollution	Control Measure (BMP's)
Sediments	Silt Fence/Rock Socks
Concrete/Masonry Wash	Concrete Washout Area
Solvents	Silt Fence/Rock Socks
Paints	Materials Handling and Spill Cleanup Kits
Saw Cutting	Silt Fence/Rock Socks
Fertilizers	Silt Fence/Rock Socks
Fire Fighting	Perimeter Control
Vehicle Tracking	Vehicle Tracking Device
Vehicle Washing	Vehicle Tracking Device/Concrete Washout Area
Stored Soils	Temporary Stabilization/Stockpile Areas with Silt Fence

There are no major potential pollutants anticipated to be used on the site.

## **VI. AREAS AND VOLUMES**

The site consists of 50.8 acres. 19.8 acres are expected to be disturbed.

The unadjusted cut and fill quantities as of the writing of this report are listed below:

Cut Volume = 83,838 Cubic Yards

Fill Volume = 87,889 Cubic Yards

Total Volume = 4,051 Cubic Yards (Fill)

## **VII. APPROPRIATE CONTROLS AND MEASURES**

Initially, construction fence and silt fence will be installed around the perimeter of the site. The silt fence will be installed on the downslopes to keep sediment runoff on the site. Rock socks will be installed periodically throughout the site, specifically at curb cut locations to prevent sediments from leaving the site. Silt fence will specifically be used at the perimeter of the disturbed area to control localized sediment loading.

There will be one vehicle tracking device installed and utilized at the main entry point into the site from the east on Bent Grass Meadows Dr. Vehicle tracking will be utilized to prevent tracking mud, and other soils, onto Bent Grass Meadows Dr. and the other surrounding roadways. The vehicle tracking device will remain in place until the drive aisle has been graded, and asphalt placement is to commence.

One concrete washout area will be installed to the south of the vehicle tracking device. This concrete washout area will be used to clean and wash out concrete trucks before they exit the site. This area will prevent spillage from the back of concrete trucks onto the roadways. The concrete washout area will be installed prior to placement of concrete and will be left in place until placement of concrete is complete.

A stabilized staging area will be installed to the north of the vehicle tracking device. This area will be used to store construction materials, as well as provides vehicle and onsite construction parking. The stabilized staging area should be installed prior to other construction activities beginning on site.

All clearing and grubbing shall occur at the beginning of the site, after perimeter control measures have been installed. Utilities and storm sewers shall be installed after the site has been rough graded.

Once Storm sewer lines with associated inlets have been installed, Inlet Protection shall be installed around each inlet to prevent sediment associated with construction to enter and clog the system.

Final grading will commence once all utilities have been installed. When construction is complete on roads, sidewalks and landscape areas, all temporary BMPs shall be removed.

No batch plants are used for this project.

All BMPs shall be installed and maintained in accordance with the most recent Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual.

## **VIII. MATERIALS HANDLING AND SPILL PREVENTION**

All potential pollutants other than sediment will be handled and disposed of in a manner that does not cause contamination of storm water. Non-sediment pollutants that may be present during construction activities include petroleum products including fuel, lubricants, hydraulic fluids, and form oils, concrete, paints, and fertilizers. These materials, and other materials used during construction with the potential to impact storm water, will be stored, managed, used, and disposed of in a manner that minimizes the potential for releases to the environment and especially into storm water. Specific materials handling shall follow the guidelines outlined below:

- All pollutants, including waste materials and demolition debris, that occur on-site during construction will be handled in a way that does not contaminate storm water.
- All chemicals including liquid products, petroleum products, water treatment chemicals, and wastes stored on site will be covered and contained and protected from vandalism.
- Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants, will be conducted



under cover during wet weather and on an impervious surface surrounded by impervious berms to prevent the release of contaminants onto the ground. Where this is not possible, use pads designed to contain the pollutants which may leak or spill during maintenance operations. Impervious pads are particularly important on sandy and other coarse soils where spilled materials can easily leach into the groundwater.

- Materials spilled during maintenance operations will be cleaned up immediately and properly disposed of.
- Potential pollutants will be stored and used in a manner consistent with the manufacturer's instructions in a secure location. To the extent practicable, material storage areas should not be located near storm drain inlets and should be equipped with covers, roofs, or secondary containment as needed to prevent storm water from contacting stored materials. Chemicals that are not compatible (such as sodium bicarbonate and hydrochloric acid) shall be stored in segregated areas so that spilled materials cannot combine and react.
- Materials disposal will be in accordance with the manufacturer's instructions and applicable local, state, and federal regulations.
- Materials no longer required for construction will be removed from the site as soon as practicable.
- Adequate garbage, construction waste, and sanitary waste handling and disposal facilities will be provided to the extent necessary to keep the site clear of obstruction and BMPs clear and functional.

## **IX. TIMING/PHASING SCHEDULE**

Construction for the development of this project is currently projected to begin in or around August of 2019. The initial/interim stage will include the installation of initial BMPs, clearing and grubbing the site, rough grading the site, site construction and site revegetation. The final stage will include the final stabilization of the site and removing the initial BMPs such as vehicle tracking, construction and silt fence, stabilized staging area, rock socks, and concrete washout area. It is estimated that construction activities will be completed by September 2020. Refer to GESC plans for location of all BMPs.

## **X. FINAL STABILIZATION**

Final site stabilization will be achieved when all final landscaping and paving is complete and when vegetation density is greater than 70 percent of pre-disturbance density over its entire area. The remainder of the site will consist of hardscape (drives and walks) or be a part of the building footprint. All final stabilization on the site will be of a permanent nature. All BMPs will be removed upon completion of construction. It is the responsibility of the contractor to remove all dirt and garbage from the site.

## **XI. OWNER INSPECTION AND MAINTENANCE OF CONTRUCTION BMP'S**

The project is subject to inspections by the Colorado Division of Public Health and Environment (CDPHE), the Environmental Protection Agency (EPA), and El Paso County at any time.

Inspection of the stormwater management system shall be performed, by the SWMP Administrator, at least every 14 calendar days and after the occurrence of precipitation or snow melt event that may cause noticeable erosion or run-off. Time span greater than 14 calendar days is a violation of the CDPS permit.

### **SWMP Administrator**

The individual(s), position, or title responsible for developing, implementing, maintaining, and revising the SWMP is to be determined upon award of the project. The individual listed as the Erosion Control Supervisor shall fill out the information below and place in the on-site copy before beginning installation of the BMPs for this site and notify the County of the appropriate contact information.

SWMP Administrator Name:

Cell Phone:

Office Phone:

Email:

### **Inspection Schedules**

Inspections of the stormwater management system are required at least every 14 calendar days and within 24 hours after any precipitation or snowmelt event that causes surface runoff. A more frequent inspection schedule may be necessary to ensure that BMPs continue to operate as designed.

Differences or modifications in the field from the approved SWMP are required to be made within 72 hours site changes are observed. The SWMP shall be onsite at all times when onsite construction activity is occurring.

### **Inspection Scope**

The construction site perimeter, all disturbed areas, material and/or waste storage areas that are exposed to precipitation, discharge locations, and locations where vehicles access the site shall be inspected for evidence of, or the potential for pollutants leaving the construction site boundaries or discharging to State Waters. All erosion and sediment control practices identified in the SWMP shall be evaluated to ensure that they are maintained and operating correctly.

### **Inspection Report**

A thorough record of inspection shall be maintained and identify any incidents of non-compliance with the SWMP. Inspection records shall be retained for three years from expiration or inactivation of permit coverage. Federal, State, local authority reserves the right to request that a copy of the inspection reports be submitted. At a minimum, the inspection report shall include the following:

- a. Inspection date
- b. Name(s) and title(s) of personnel making the inspection
- c. Location(s) of discharges of sediment or other pollutants from the site
- d. Location(s) of BMPs that need to be maintained
- e. Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location
- f. Location(s) where additional BMPs are needed or were not in place at the time of inspection
- g. Deviations from the minimum inspection schedule



- h. Description of corrective action for items c, d, e and f above, dates corrective action(s) taken, and measures taken to prevent future violations, including requisite changes to the SWMP, as necessary
- i. After adequate corrective action(s) have been taken, or where a report does not identify any incidents requiring corrective action, the report shall contain a signed statement indicating the site is in compliance with the permit to the best of the signer's knowledge and belief
- j. The date and amount of storm or snowmelt events that cause erosion.

### **BMP Maintenance/Replacement and Failed BMPs**

Adequate site assessment shall be performed as part of comprehensive Inspection and Maintenance procedures to assess the adequacy of BMPs at the site and to evaluate the necessity of changes to those BMPs to ensure continued effective performance. Where site assessment results in the determination that new or replacement BMPs are necessary, the BMPs shall be installed to ensure ongoing implementation. Failed BMPs must be addressed as soon as possible, in most cases immediately, to ensure continued performance and minimize the likelihood of pollutant discharge. The SWMP shall be updated once new BMPs are installed or failed BMPs replaced. A specific timeline for implementing maintenance procedures is not included in the State Permit because BMP maintenance is expected to be proactive, not responsive. Observations resulting in BMP maintenance activities can be made during a site inspection, or during general observations of site conditions. BMPs shall be maintained per DCM2 criteria and ECM criteria. Please refer to Appendix C for specific maintenance required for each BMP.

### **Plan Review and Revisions**

- a. The plan must be signed in accordance with the general permit.
- b. The plan must be made available, upon request, to CDPHE, United States Environmental Protection Agency, or operator of the local municipal storm sewer system, if applicable.
- c. The plan must be amended whenever there is a change in design, construction, operation or maintenance that could have a significant effect on the potential for the

discharge of pollutants to State Waters. It also must be amended if it is found to be ineffective in controlling pollutants present in stormwater.

### **Record Keeping and Documenting of Inspections**

The permittee shall retain a copy of the SWMP required by this permit (including a copy of the permit language) at the construction site (or other local location accessible to the Director; a State or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site) from the date of project initiation to the date of final stabilization. Permittees with day-to-day operational control over SWMP implementation shall have a copy of the SWMP available at a central location on-site for the use of all operators and those identified as having responsibilities under the SWMP whenever they are on the construction site. If minor modifications to the SWMP are required, they shall be recorded on the owner's copy of the SWMP and be available during inspections. Whenever a significant change is made to the SWMP (including changes to design, construction, operation or maintenance), an amended SWMP shall be submitted for review and approval. The following documents must be kept in a field office, trailer, shed or vehicle that is onsite during normal working hours:

- a. A completed and signed copy of the Notice of Intent
- b. The permit coverage letter from the Colorado Department of Public Health and Environment (CDPHE)
- c. The Stormwater Management Plan
- d. Site Inspection Records
- e. A copy of the Colorado General Permit for Stormwater Discharges from Construction Activities

If a reasonable onsite location is not available, then the documents may be retained at a readily available alternative location, preferably with the SWMP plan contact. If the site is inactive, then the documents may be stored at a local office.



All records and information must be kept for at least three years or longer if requested by the Colorado Department of Public Health and Environment or United States Environmental Protection Agency.

### **Record Keeping**

The SWMP is a "living document" that is continuously reviewed and modified. The ECS shall make changes to the SWMP, including but not limited to: additions, deletions, changing locations of BMP's shall be marked in the plans, dated and initialed at time of occurrence.

All inspection and maintenance activities or other repairs will be documented by the ECS and the records kept on the project site.

Records of spill, leaks or overflows that result in the discharge of pollutants will be documented and maintained. The following Information will be recorded for all occurrences:

- a. Time and date
- b. Weather conditions
- c. Reasons for spill
- d. A release of any chemical, oil, petroleum product, sewage, etc., which may enter state waters must be reported.

At 14-day inspections incidents of noncompliance, such as uncontrolled releases of pollutants including mud, muddy water or measurable quantities of sediment found off-site shall be noted, along with a brief explanation as to measures taken to prevent future violations and measures taken to clean up sediment that has left the site.

After measures have been taken to correct any problems and recorded, or where a report does not identify incidents of noncompliance, the report shall contain a signed certification indicating the site is in compliance.

**Signature Page:**

**Engineer's Statement:**

The Erosion and Stormwater Quality Control/Grading Plan was prepared under my direction and supervision and is correct to the best of my knowledge and belief. If such work is performed in accordance with the grading and erosion control plan, the work will not become a hazard to life and limb, endanger property, or adversely affect the safety, use, or stability of public way, drainage channel, or other property.

  
Grant Dennis

Registered Professional Engineer  
State of Colorado No. 51622

  
Date

**Developer's Statement:**

The owner will comply with the requirements of the Erosion and Stormwater Quality Control Plan including temporary BMP inspection requirements and final stabilization requirements. I acknowledge the responsibility to determine whether the construction activities on these plans require Colorado Discharge Permit System (CDPS) permitting for Stormwater discharges associated with Construction Activity.

Developer/ Owner Signature: 

Name of Developer/ Owner: Challenger Communities

DBA: \_\_\_\_\_ Phone: \_\_\_\_\_

Title: \_\_\_\_\_ Email: \_\_\_\_\_

Address: \_\_\_\_\_ Fax: \_\_\_\_\_