

C:\12220\Civil\_3D\Production Drawings\Mass Grading\Lee's Summit\1222000100.dwg Layout: 1 Title Sheet -- Wednesday, March 11, 2020, 8:52am -- Copyright 2020, George Butler Associates, Inc. Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059

# STORM SEWER IMPROVEMENTS AND MASS GRADING FOR PARAGON STAR DEVELOPMENT

Sections 33 & 34-Township 48-Range 32  
City of Lee's Summit  
Jackson County, Missouri

RELEASE FOR  
CONSTRUCTION  
AS NOTED ON PLANS REVIEW  
DEVELOPMENT SERVICES  
LEE'S SUMMIT, MISSOURI

04/10/2020

## SUMMARY OF QUANTITIES

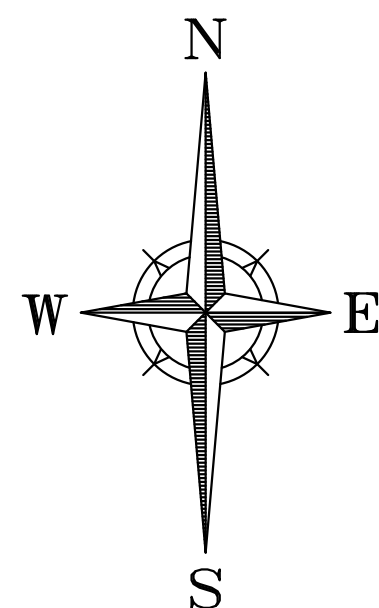
No.	DESCRIPTION	UNIT	QUANTITY
1	Mobilization	LS	1
2	Fill	Ac.	N/A
3	Fill (Unadjusted)	C.Y.	459,133*
4	Cut (Unadjusted)	C.Y.	72,314
5	Sediment Fence	L.F.	5,895
6	Rock Check Dam	EA.	7
7	Straw Wattle	L.F.	2,713
8	Erosion Control Blanket (SC150)	S.Y.	15,691
9	Temporary Construction Entrance	EA.	3
10	5'x4' Curb Inlet	EA.	2
11	7'x4' Curb Inlet	EA.	1
12	8'x4' Curb Inlet	EA.	1
13	9'x4' Curb Inlet	EA.	1
14	7'x4' Junction Box	EA.	1
15	8'x4' Junction Box	EA.	1
16	30" RCP	L.F.	119.24
17	42" RCP	L.F.	102.95
18	48" RCP	L.F.	117.11
19	60" RCP	L.F.	212.54
20	72" RCP	L.F.	204.00
21	8'x8'x166' RCB	Ea.	1
22	30" RCP End Section w/ Conc. Toewall	Ea.	1
23	30" RCP Headwall w/ Conc. Toewall and Flapgate	Ea.	1
24	48" RCP End Section w/ Conc. Toewall	Ea.	1
25	60" RCP End Section w/ Conc. Toewall	Ea.	1
26	60" RCP Headwall w/ Conc. Toewall and Flapgate	Ea.	1
27	72" RCP End Section w/ Conc. Toewall	Ea.	2
28	Caged Reinforced Concrete Encasement	L.F.	110
29	Adjust Existing Sanitary Sewer Manhole	Ea.	5
30	Riprap (D50=12")	S.Y.	284
31	Riprap (Structure 300)	S.Y.	83
32	Riprap (Structure 500)	S.Y.	90
33	Seeding (Temporary)	LS	1
34	Seeding (Permanent)	Ac.	8.2
35	Retaining Wall	S.F.	1,225
36	12'x12'x134' RCB	Ea.	1

\*Base Earthwork

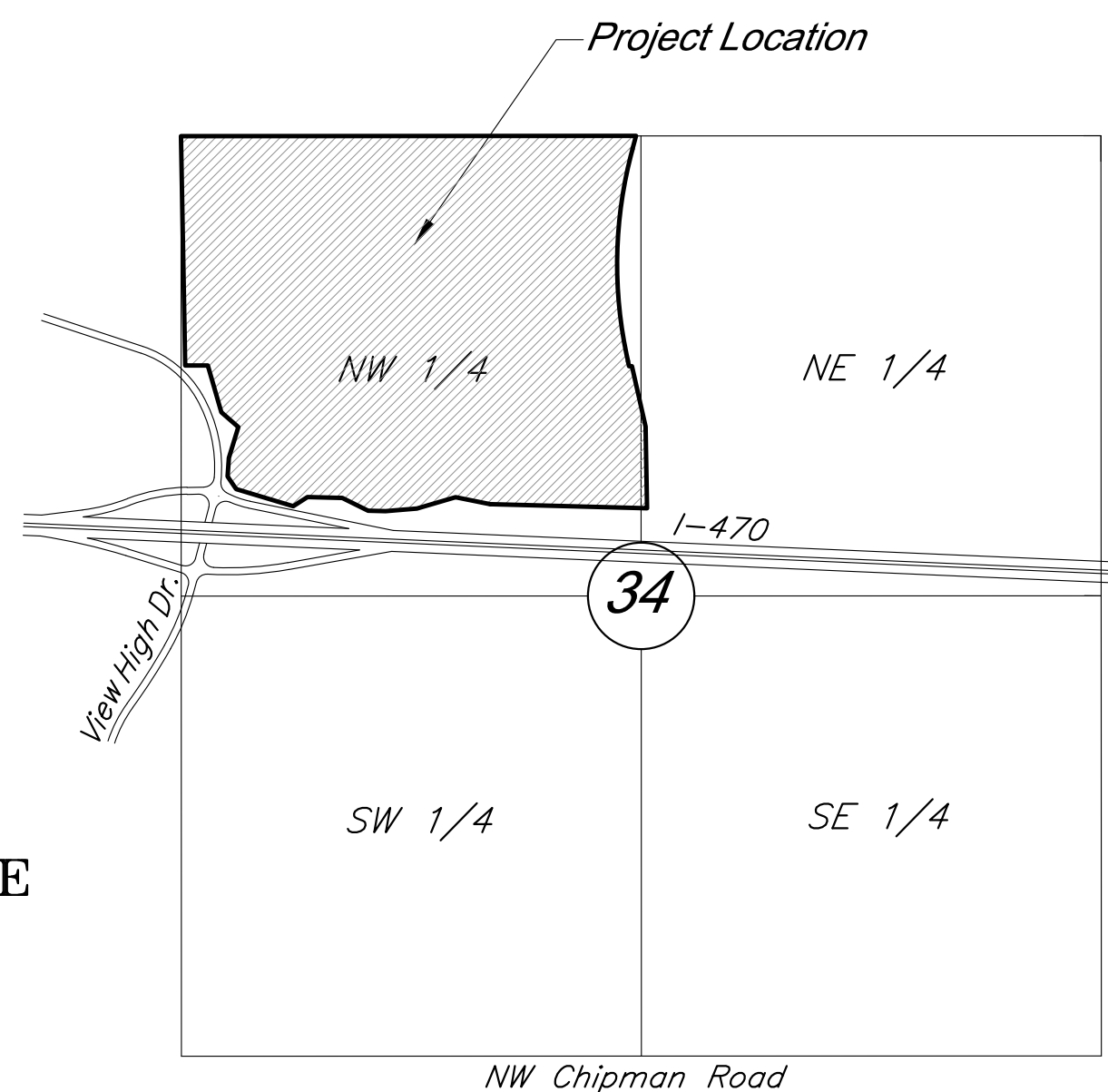
459,133 CY Fill, 72,314 CY Cut

Topsoil Removed by Clearing Plan: 46,500 CY Fill

Total Fill Required: 340,319 CY



Scale: 1"=1000'



## VICINITY MAP

Section 33 & 34-T48N-R32W

## INDEX OF SHEETS

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## UTILITY CONTACTS

Sanitary Sewers	Mr. Jeff Thorn, PE City of Lee's Summit Water Utilities 1200 SE Hamblen Road Lee's Summit, MO 64063 (816) 969-1922 email: jeff.thorn@cityofLS.net	Gas	Mr. Donnie Richards Missouri Gas Energy 7500 E 35th Terrace Kansas City, MO 64129 (816) 472-9464 Fax (816) 472-3488 email: donnie.richards@sug.com
	Mr. Jeff Shook Little Blue Valley Sewer District 21101 East 78 Highway Independence, MO 64057 (816) 285-1522 email: jshook@lbvwd.net	Cable Television	Mr. Greg Thomas Time Warner Cable 8221 W. 119th Street Overland Park, KS 66213 (913) 643-1950 email: greg.thomas@twcable.com
	Kansas City, MO Public Works Department (816) 513-2600	Telephone	Ms. Glenda Charles AT&T 1425 Oak Street Kansas City, MO 64106 (816) 365-1669 Fax (816) 275-1109 email: gc6954@att.com
Water	Mr. Jeff Thorn, PE City of Lee's Summit Water Utilities 1200 SE Hamblen Road Lee's Summit, MO 64063 (816) 969-1922 email: jeff.thorn@cityofLS.net	Electric Service	Mr. Nathan Michael Kansas City Power & Light P.O. Box 418679 Kansas City, MO 64141 (816) 220-5210 Fax (816) 245-3623 email: Nathan.Michael@kcpl.com
Missouri One Call System	1-800-344-7483 (DIG-RITE)		

## PROJECT BENCHMARK:

BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of I470 bridge  
spanning View High Drive.  
EL=833.80

DEVELOPED AND OWNED BY:  
PARAGON STAR LLC  
801 NORTHWEST COMMERCE CENTER  
LEE'S SUMMIT, MISSOURI 64086  
PHONE: (816) 802-6801  
CONTACT: Mr. Flip Short  
EMAIL: fshort@legacytouch.com

PREPARED & SUBMITTED BY:  
GEORGE BUTLER ASSOCIATES, INC.  
9801 RENNER BOULEVARD  
LENEXA, KANSAS 66219  
PHONE: 913-492-0400  
FAX: 913-577-8312  
CONTACT: BRAD BURTON P.E.  
EMAIL: BBURTON@GBATEAM.COM

PROJECT ENGINEER:

DATE:

APPROVED:

CITY ENGINEER:

DATE:



**GBA**  
architects  
engineers

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Lenexa, Kansas 66219  
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City Comments	3/10/20
Temporary River Crossing Repair	4/15/19
Temporary River Crossing Repair	4/11/19
Structure 700 removed from floodway	4/9/19
RFI 1	4/4/19
	11/29/18
Removed Floodway Grading	10/10/18
City Comments	9/14/18
City Comments	8/28/18
City Comments	8/7/18
Revised Field Elevations	5/15/18
	1/10/17

C:\12720\Civil\_3D\Production Drawings\Mass Grading\Lee's Summit\1272000200.dwg  
Layout: 2 General Notes  
--- Tuesday, March 10, 2020, 1:37pm --- Copyright 2020, George Butler Associates, Inc.  
Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059

## EROSION AND SEDIMENT CONTROL NOTES

The layout of erosion control best management practices (BMPs) shown on the engineering plans is intended to control erosion and minimize, if not eliminate, the transport of sediment from the disturbed areas. The Contractor shall be responsible for the evaluation of existing surface drainage patterns and for making adjustments to the BMP locations to best control erosion and minimize, if not eliminate, the transport of sediment from the disturbed areas. The following are measures to achieve the control of erosion and sediment.

1. **Stabilization Practices** – Stabilization practices are very effective at preventing erosion by shielding the soil surface from the impact of rain, slowing the velocity of runoff, holding soils in place, and increasing infiltration of runoff and allowing the soil to absorb more rainfall.

- a. **Temporary Seeding Stabilization** – During acceptable growing periods (see Table 1 below); temporary seeding of annual vegetation with a straw mulch cover shall be used as a temporary cover until permanent vegetation is established. If there is a possibility that a vegetative cover will be required to control erosion for more than 1 year, then consider the addition of a perennial/permanent grass species as part of a seeding mixture.

Table 1. Temporary Seeding Dates and Minimum Application Rates

Seeding Dates	Temporary Seed Species	Minimum Application Rates (pure live seed lbs. per acre)	Straw Mulch (tons per acre)
Jan. 1 – Jan. 31	None	Not Applicable	2.5
Feb. 1 – May 31	Annual Ryegrass	120	1.5
June 1 – Aug.4	None	Not Applicable	2.5
Aug. 15 – Nov. 15	Cereal/Winter Rye	120	1.5
Nov. 16 – Dec. 31	None	Not Applicable	2.5

**Seedbed Preparation** – For broadcast seeding or drilling, loosen soil to depth of 3 inches. For no till drilling, loosen soil if it is compacted. Loosen compacted, hard or crusted soil surfaces with a disk, ripper, chisel, harrow or other tillage equipment. Avoid preparing the seedbed under excessively wet conditions. For establishment and long-term growth, apply a complete fertilizer at rates recommended by soil tests or as specified in plans and specifications. If soil pH is less than 6.0, apply lime according to soil tests. Incorporate necessary lime and fertilizer to a depth of 3 to 6 inches of soil.

**Installation** – For the best results use certified seed. Apply seed uniformly using a cyclone seeder, drop-type spreader, drill, cultipacker seeder or hydroseeder. When using a drill seeder, plant rye or other grains about 1 inch deep and plant grasses no more than ½ inch. A vegetative straw mulch cover shall be applied over the seed mixture to help germinate and establish plant cover, control weeds, and protect seed mixture against temperature extremes. Follow straw mulch preparation and application procedures described herein.

- b. **Temporary Mulch Stabilization** – During non-growing periods, a straw mulch cover shall be applied in unseeded areas to protect against erosion until temporary or permanent vegetation is established.

**Site Preparation** – Divert runoff water from areas above the site that will be mulched. Remove stumps, roots and other debris from the construction area. Grade area as needed to permit the use of equipment for seeding, mulching and maintenance. Shape area so that it is relatively smooth.

**Application** – Spread straw mulch uniformly over the area with a power blower, hydroseeder, or by hand. No more than 25% of the ground surface should be visible after spreading. Apply straw mulch at a rate of 1.5 tons per acre as a seed cover or 2.5 tons per acre as a stand alone cover. The straw should be dry, unchopped, unweathered; free of weed seeds and rot. In areas of steep slopes or high winds, or in critical areas such as swales, mulching may need to be secured to the ground with a binder, netting, or tacking.

- c. **Permanent Seeding Stabilization** – All disturbed areas shall be permanently seeded with a cool season grass mixture as specified in the Standards and Specifications of the City of Lee's Summit, Missouri..

**Seedbed Preparation** – loosen soil to depth of 3 inches. For no till drilling, loosen soil if it is compacted. Loosen compacted, hard or crusted soil surfaces with a disk, ripper, chisel, harrow or other tillage equipment. Avoid preparing the seedbed under excessively wet conditions. For establishment and long-term growth, apply a complete fertilizer at rates recommended by soil tests or as specified in plans and specifications. If soil pH is less than 6.0, apply lime according to soil tests. Incorporate necessary lime and fertilizer to a depth of 3 to 6 inches of soil.

**Installation** – For the best results use certified seed. Apply seed uniformly using a hydroseeder. A vegetative straw mulch cover shall be applied over the seed mixture to help germinate and establish plant cover, control weeds, and protect seed mixture against temperature extremes. Follow straw mulch preparation and application procedures described in the Standards and Specifications of the City of Lee's Summit, Missouri.

### 2. Structural Practices

- a. **Silt Fence** – A temporary sediment barrier consisting of a geotextile fabric shall be installed as shown on the attached engineering plans and details. Silt fencing shall be installed to maintain sediment onsite.

Minimum Requirements:

**Location** – Fence should be built on a nearly level grade and at least 10 feet from the toe of the slope to provide a broad shallow sediment pool. Install on the contour, where fence can intercept runoff as a sheet flow; not located crossing channels, waterways or other concentrated flow paths; not attached to existing trees.

**Spacing of Support Posts** – 10 feet maximum for fence supported by wire; 6 feet maximum for high strength fabric without supportive wire backing. Support posts should be driven into the ground a minimum of 10 inches deep.

**Trench** – Bottom 1 foot of fence must be buried minimum of 4 inches deep.

- b. **Inlet Protection** – When installation of the storm drainage system is complete, gravel curb inlet sediment traps will be placed at the drainage system inlets. Construction shall be in accordance with attached engineering plans and details.
- c. **Stockpiles** – The toe of stockpiles shall be placed a minimum of 10 feet from erosion control measures. If stockpiles are to remain for more than 14 days, they shall be temporarily stabilized with vegetative mulch and temporary seeding.

3. **Maintenance** – The contractor shall repair all erosion control measures or re-seed areas that are disturbed or damaged as a result of weather or other situations, within 2 days after the occurrence. This will include all areas bare of vegetation.

## EROSION CONTROL GENERAL NOTES

1. The Contractor is responsible for erosion control during construction and until the Owner and City accepts the work as complete. The erosion control measures shown on this plan are a typical minimum installation. The Contractor shall be responsible for adjusting or adding to these measures as necessary during the phasing of the construction to assure adequate control.
2. Clearing and grubbing within 50' of a defined drainage course should be avoided when possible. Where changes to a defined drainage course occur, work should be delayed until all materials and equipment necessary to protect and complete the drainage change are on site. Changes shall be completed as quickly as possible once the work has been initiated. The area impacted by the construction activities shall be revegetated or protected from erosion as soon as possible, areas within 50' of a defined drainage ways should be recontoured as needed or otherwise protected within five (5) working days after grading has ceased.
3. Where soil disturbing activities cease in an area for more than 14 days, the disturbed areas shall be protected from erosion by stabilizing the area with mulch or other similarly effective erosion control measures. If the slope of the area is greater than 3:1 or if the slope is greater than 3% and greater than 150 feet in length, then the disturbed areas shall be protected from erosion by stabilizing the area with mulch or other similarly effective erosion control measures if activities cease for more than seven (7) days.

4. Existing vegetation shall be preserved to the extent and where practical. In no case shall disturbed areas remain without vegetative ground cover for a period in excess of 60 days.

5. Additional site management practices which shall be adhered to during the construction process shall include:

–Solid and hazardous waste management including providing trash containers and regular site clean up for proper disposal of solid waste such as building and construction material, product/material shipping waste, food containers and cups, and providing containers for the proper disposal of waste paints solvents, and cleaning compounds.

–Provisions of portable toilets for proper disposal of sanitary sewage.

–Storage of construction materials away from drainage courses and low areas.

–Installation of containment berms and use of drip pans at petroleum product and liquid storage tanks and containers.

6. All disturbed areas shall be seeded, fertilized and mulched, or sodded, in accordance with the Standards and Specifications adopted by the City of Lee's Summit, Missouri and good engineering

practices. This shall be completed within fourteen (14) days after completing the work, in any area. If this is outside of the seeding period, silt barriers or other similarly effective measures shall be provided until such time that the areas can be seeded.

7. All erosion control measures, temporary or permanent, require maintenance to preserve their effectiveness. All erosion control devices shall be inspected immediately after each heavy rainstorm and at least daily during prolonged rainfall. Any required repairs should be made immediately. All costs associated with the repair work including related incidentals will be the contractor's responsibility and shall be included in the Contractor's bid for the proposed work. Only after the project is complete and accepted can the erosion control be removed.

8. Seeding shall be done before the proposed seedbed becomes eroded, crusted over, or dried out and shall not be done when the ground is frozen, or covered with snow. The seed shall comply with requirements of the Missouri Seed Law and the Federal Seed Act. Also, it shall contain no seed of any plant on the Federal Noxious Weed List. Other weed seed shall not exceed one percent by weight of mix.

9. During the dates Dec. 15 through May 30 ALL lime, fertilizer, seed, and mulch shall be applied to finished slopes of disturbed areas. During the months of June, July, October, and November 1st through December 15th, lime, fertilizer, seed, and mulch shall be applied at the following rates:

Lime – 100% of the specified quantity  
Fertilizer – 75% of the specified quantity  
Seed – 50% of the specified quantity  
Mulch – 100% of the specified quantity

10. Mulch shall be Vegetative type, cereal straw form stalks of oats, rye, or barley, or approved equal. The straw shall be free of prohibited weed seed and relatively free of all other noxious and undesirable seed. Apply straw mulch at a rate of 1.5 tons per acre as a seed cover or 2.5 tons per acre as a stand alone cover. Mulch shall be embedded by a mulch anchoring tool or disk type roller having flat serrated disks spaced not more than 10 inches apart and cleaning scrapers shall be provided.

### General Notes:

1. All Construction shall conform to the City of Lee's Summit Technical Specifications in effect at the time of the City's approval date shown on the approved plans and incorporated herein by reference.
2. All traffic control shall be the responsibility of the Contractor and shall be in conformance with the Manual of Uniform Traffic Control Devices (MUTCD).
3. Property Corners and/or Section corners disturbed or damaged by construction activities shall be reset by a Registered Land Surveyor licensed in the state of Missouri, at the Contractor's expense.
4. The Contractor shall be responsible for the restoration of the Right-of-Way and for damaged improvements such as curbs, driveways, sidewalks, street light and traffic signal junction boxes, traffic signal equipment, irrigation systems, etc. Damaged improvements shall be repaired in conformance with the latest City standards and to the City's satisfaction.
5. All work shall be confined within easements and/or construction limits as shown on the plans.
6. The Contractor shall, prior to the commencement of work, investigate surface and subsurface conditions to be encountered across the site and notify the Engineer if any discrepancies or changed conditions are noted.
7. All trash and debris identified on site shall be properly handled and disposed of in accordance with state of Missouri regulations.
8. All measurements on these plans are horizontal distances, not slope distances.
9. This project will include numerous activities occurring on site including storm sewer, sanitary sewer, grading, erosion control, etc. Contractor shall coordinate his work with other contractors on site.
10. Initial construction staking will be performed by GBA – Refer to Bid Documents.
10. All concrete shall be KCMMB 4,000 psi.

### Permitting:

11. Contractor is responsible for obtaining all required permits, paying all fees, and for otherwise complying with all applicable regulations governing the work.
12. No work shall be completed within the existing floodway until the CLOMR has been issued.
13. No work shall be completed within the delineated wetland or regulatory stream channels until the U.S. Corps of Engineers Section 404 permit is issued. All work shall adhere to the terms and conditions of this permit.
14. All work within KCMO city limits shall adhere to KCMO Site disturbance requirements.

### Erosion Control:

15. The Contractor is responsible for providing erosion and sediment control BMP's to prevent sediment from reaching paved areas, storm sewer systems, drainage courses, and adjacent properties. In the event the prevention measures are not effective, the contractor shall remove any debris, silt, or mud and restore the Right-Of-Way, or adjacent properties to original or better condition.
16. Contractor shall ensure that all construction shall conform to the requirements of the Stormwater Pollution Prevention Plan (SWPPP) a copy of which shall be maintained and updated on site by the Contractor.
17. The Contractor shall sod all disturbed areas within the Public Street Right-of-Way unless otherwise noted in the plans.
18. No trees shall be damaged or removed without prior authorization from owner unless otherwise shown on this plan.

### Earthwork:

19. Slopes shall be constructed to a maximum slope of 3:1 (Horiz:Vert) unless specifically noted otherwise in the referenced Geotechnical reports.
20. Refer to "Geotechnical Engineering Report – Paragon Star Roadways and Borrow Site" Dated December 8, 2016 – along with Addendum #1 dated 1/4/17, and "Geotechnical Engineering Report – Soccer Fields" Dated July 27, 2016 prepared by Terracon Consultants, Inc. for grading recommendations and boring logs. All earthwork shall conform to the recommendations of the Reports.
21. Unless otherwise noted, all spot elevations and contours are shown to "finish" grade surface.
22. All temporary slopes and excavations should conform to Occupational Safety and Health Administration (OSHA) standards for the Construction Industry (29 CFR part 1026, subpart P).
23. Existing contours depicted on plans do not reflect topsoil root zone stripping completed under tree clearing scope. Existing grade will be approximately 4.5" average depth lower than shown. Refer to "Tree Clearing Plans for Paragon Star Development" for details.
24. Earthwork Quantities shown on plans do not account for stripped topsoil from previously issued Tree Clearing Plans.
25. Earthwork for this phase of development is intended to balance. Contractor to cut only enough fill material from the borrow source at the north end of the project as required to accomplish the fills shown on this plan set.
26. All Permanent seeded shall be dressed with 12" topsoil and permanent seed. All other disturbed areas shall be seeded with the temporary seed mix.
27. Shale fill shall be capped with a minimum of 24" of clay material.
28. All Soccer fields shall be provided with a minimum 24" of clay above shale or 3" minus material.
29. Final tolerance for graded areas shall be +/- 0.2'.
30. The west borrow area at the NW portion of the site is considered the primary borrow area and shall be cut and graded to the contours shown. Cuts shown in this area must be performed to completion before utilizing the eastern borrow area for the balance of fill required on the project.
31. Earthwork quantities shown on the plans assume 15% shrinkage for all fill material. The Contractor shall perform the fill to achieve the grades shown on the drawings. The determination of the actual adjustment of fill required due to shrink/swell of various materials shall be the responsibility of the Contractor.

### Utility:

32. All Manholes, Catch Basins, Utility Valves, Meter Pits, and other utility equipment shall be adjusted or rebuilt to grade as required.
33. Prior to beginning work, the Contractor shall notify all utility companies who have facilities in the vicinity of the project area of the work to be performed.

### Storm Sewer:

34. All RCP shall be Class III.
35. Pipe Lengths are called out from center of structure to center of structure.
36. Drainage across the project site during construction shall be the Contractor's responsibility. Surface drainage shall be controlled to reduce or prevent the flow of surface water onto adjacent grounds. Contractor shall control downstream erosion and silting during construction. Flexibility is given to the Contractor to make minor grading revisions along roads or between building pads to improve drainage during construction, with prior approval of the engineer.
37. Prior to ordering precast storm sewer structures, Contractor shall provide shop drawings to the Engineer for review and approval.

## General Notes

RELEASE FOR

CONSTRUCTION

AS NOTED ON PLANS REVIEW

DEVELOPMENT SERVICES

LEE'S SUMMIT, MISSOURI

DATE:

DESIGN BY:

DRAWN BY:

PROJECT NO.:

SHEET NO.

TOTAL SHEETS

2

43



**GBA**  
architects  
engineers

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Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
	8/28/18	City Comments		
	9/14/18	City Comments		
	10/10/18	Removed Floodway Grading		
	11/29/18			
	4/11/19	Temporary River Crossing Repair		
	4/15/19	Temporary River Crossing Repair		
	3/10/20	City Comments		

Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
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PROJECT BENCHMARK:

BM #11 – Chiseled “L” on top  
Northeast corner of concrete guardrail  
at the Northeast corner of I-470 bridge  
spanning View High Drive.  
EL=833.80

STATE OF MISSOURI

BRADLEY D. BURTON

NUMBER E-25862

REGISTERED PROFESSIONAL ENGINEER

3/10/20

Bradley D. Burton

Professional Engineer

License No. 25862

DATE: 04/10/2020

DESIGN BY: CEL

DRAWN BY: DRI

PROJECT NO.: 12720

SHEET NO. 3

TOTAL SHEETS 43

Storm Sewer Improvements and Mass Grading

Paragon Star Development

Lee's Summit, Missouri

REVISIONS

BY

APPROVED

NO.	DATE	
5/15/18		Revised Field Elevations
8/7/18		City Comments
8/28/18		City Comments
9/14/18		City Comments
10/10/18		Removed Floodway Grading
11/29/18		
4/11/19		Temporary River Crossing Repair
4/15/19		Temporary River Crossing Repair
3/10/20		City Comments

Boundary Description:

All that part of the Northwest Quarter of Section 34, Township 48 North, Range 32 West, of the 5th P.M., and all of GRAHAM COMMERCIAL CENTER, a subdivision in the in the City of Lee's Summit, Jackson County, Missouri, being more particularly described as follows:

BEGINNING at the Northwest corner of said Northwest Quarter of Section 34; thence South 86°33'45" East, along the North line of said Northwest Quarter, a distance of 2611.91 feet, to a point on the Westerly Right-of-Way line of Union Pacific Railroad, as now established; thence South 18°46'13" West, departing said North line, along said Westerly Right-of-Way line, a distance of 76.95 feet, to a point of curvature; thence Southwesterly and Southeasterly, continuing along said Westerly Right-of-Way line, along a curve to the left, having a radius of 2508.01 feet, and a central angle of 28°06'45", a distance of 1230.57 feet, to a point of tangency; thence South 09°20'32" East, continuing along said Westerly Right-of-Way line, a distance of 30.31 feet, to a point on the South line of the North half of said Northwest Quarter; thence South 86°26'21" East, continuing along said Westerly Right-of-Way line, and along said South line of the North half of the Northwest Quarter, a distance of 16.41 feet; thence South 09°20'32" East, departing said South line of the North half of the Northwest Quarter, continuing along said Westerly Right-of-Way line, a distance of 354.98 feet, to a point on the East line of said Northwest Quarter; thence South 02°29'17" West, continuing along said Westerly Right-of-Way line, and along said East line of the Northwest Quarter, a distance of 468.48 feet, to a point on the North Right-of-Way line of Interstate 470, as now established; thence North 85°05'37" West, departing said Westerly Right-of-Way line, along said North Right-of-Way line of Interstate 470, a distance of 899.87 feet; thence North 75°10'03" West, continuing along said North Right-of-Way line, a distance of 203.04 feet; thence South 77°15'22" West, continuing along said North Right-of-Way line, a distance of 228.93 feet, to a point on the East line of the Southwest Quarter of said Northwest Quarter, said point also being the Southeast corner of said GRAHAM COMMERCIAL CENTER; thence continuing South 77°15'22" West, continuing along said North Right-of-Way line, and along the South line of said subdivision, a distance of 1.94 feet; thence South 88°33'58" West, continuing along said North Right-of-Way line, and along said South line of said subdivision, a distance of 181.11 feet; thence North 85°01'31" West, continuing along said North Right-of-Way line, and said South line of said subdivision, a distance of 100.18 feet; thence North 60°06'43" West, continuing along said North Right-of-Way line, and said South line of said subdivision, a distance of 165.44 feet; thence North 85°08'16" West, continuing along said North Right-of-Way line, and said South line of said subdivision, a distance of 199.96 feet; thence South 60°28'02" West, continuing along said North Right-of-Way line, and said South line of said subdivision, a distance of 97.23 feet; thence North 69°50'05" West, continuing along said North Right-of-Way line, and said South line of said subdivision, a distance of 342.03 feet, to the Southwest corner of said subdivision; thence North 30°28'52" West, continuing along said North Right-of-Way line, and along the West line of said subdivision, a distance of 87.88 feet; thence North 07°21'08" East, continuing along said North Right-of-Way line and it's transition to the East Right-of-Way line of View High Drive, as now established, and said West line of said subdivision, a distance of 106.53 feet; thence North 20°25'39" East, departing said West line of said subdivision, continuing along said East Right-of-Way line of View High Drive, a distance of 185.39 feet; thence North 45°30'34" West, continuing along said East Right-of-Way line, a distance of 129.40 feet; thence North 12°40'32" West, continuing along said East Right-of-Way line, a distance of 278.96 feet, to a point on said South line of the North half of the Northwest Quarter; thence North 86°26'21" West, continuing along said East Right-of-Way line, and along said South line of the North half of the Northwest Quarter, a distance of 130.00 feet, to the Southwest corner of said North half of the Northwest Quarter; thence North 02°25'47" East, along the West line of said Northwest Quarter, a distance of 1316.45 feet, to the POINT OF BEGINNING, containing 5,217,462.56 square feet or 119.78 acres, more or less.

FLOODPLAIN NOTE:

According to FEMA Flood Insurance Rate Map (FIRM) Community Panel No. 29095C0404G, effective Date 1/20/17, the tract lies partially within an area designated as Special Flood Hazard Areas. Special Flood Hazard Areas defined on portions of the site include regulatory floodway, Zone AE (with depths identified on site from 810 to 811), and 0.2% Annual Chance Flood Hazard Areas. Existing Floodway/Floodplain refers to lines established on 1/20/2017 maps, proposed Floodway/Floodplain refers to lines established by the FEMA CLOMR dated 2/14/2020, Case No. 20-70-0520R.

Total Disturbed Area:

61.10 Ac.

General Layout

Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
G:\12720\Civil\_3D\Production Drawings\Mass Grading\Lee's Summit\12720-4000.dwg Layout: 4 Grading Plan -- Tuesday March 10, 2020, 1:40pm -- Copyright 2020, George Butler Associates, Inc.

PROJECT BENCHMARK:

BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of I470 bridge  
spanning View High Drive.  
EL=833.80

Legend

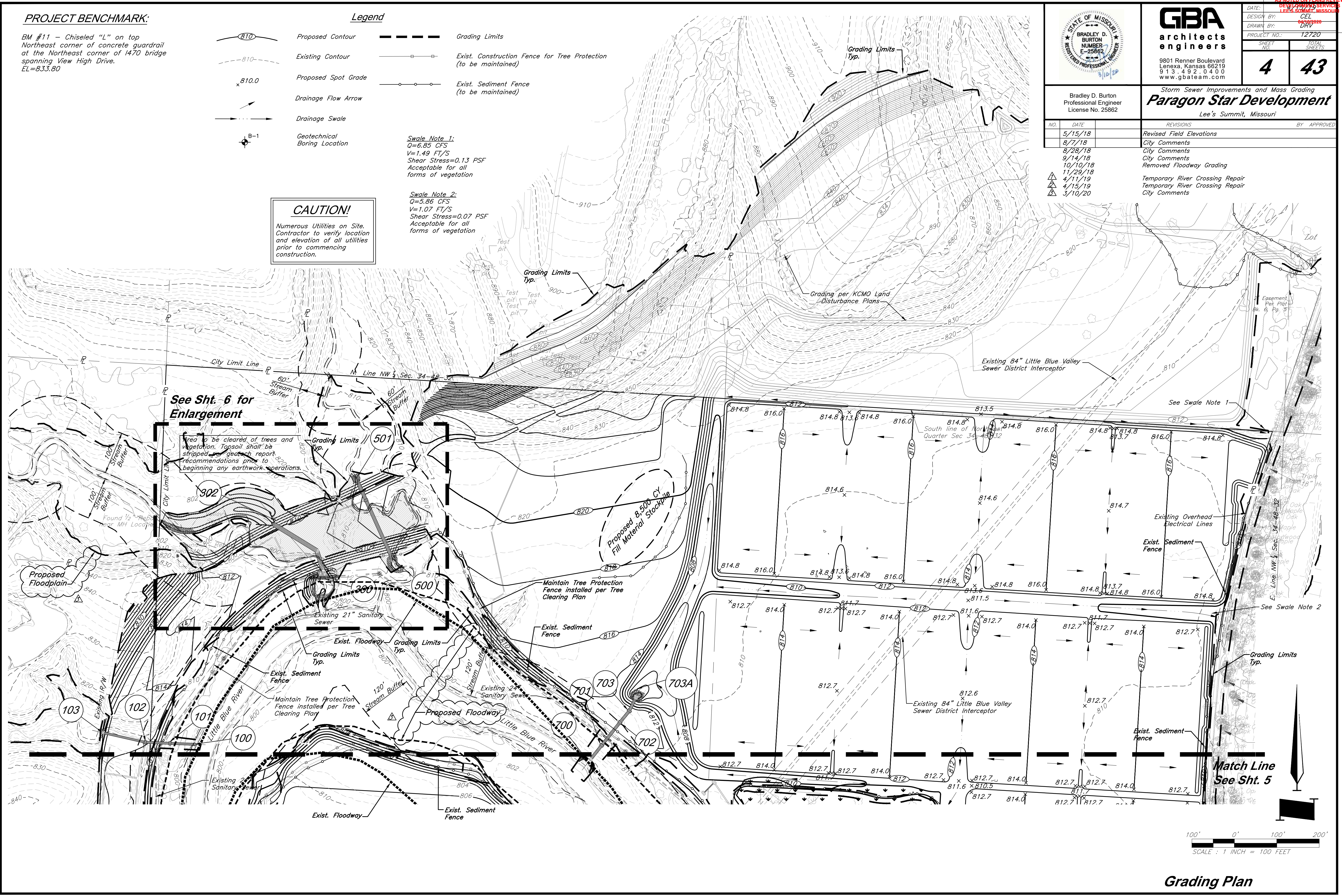
- Proposed Contour
- Existing Contour
- Proposed Spot Grade
- Drainage Flow Arrow
- Drainage Swale
- Geotechnical Boring Location
- Grading Limits
- Exist. Construction Fence for Tree Protection (to be maintained)
- Exist. Sediment Fence (to be maintained)

Swale Note 1:  
Q=6.85 CFS  
V=1.49 FT/S  
Shear Stress=0.13 PSF  
Acceptable for all  
forms of vegetation

Swale Note 2:  
Q=5.86 CFS  
V=1.07 FT/S  
Shear Stress=0.07 PSF  
Acceptable for all  
forms of vegetation

CAUTION!

Numerous Utilities on Site.  
Contractor to verify location  
and elevation of all utilities  
prior to commencing  
construction.

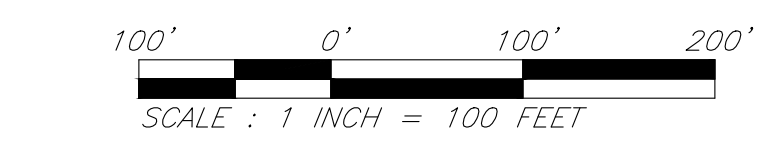


DATE:	CEL
DESIGN BY:	CEL
DRAWN BY:	CEL
PROJECT NO.:	12720
SHEET NO.:	4
TOTAL SHEETS:	43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	5/15/18	Revised Field Elevations		
2	8/7/18	City Comments		
3	8/28/18	City Comments		
4	9/14/18	City Comments		
5	10/10/18	City Comments		
6	11/29/18	Removed Floodway Grading		
7	4/11/19	Temporary River Crossing Repair		
8	4/15/19	Temporary River Crossing Repair		
9	3/10/20	City Comments		

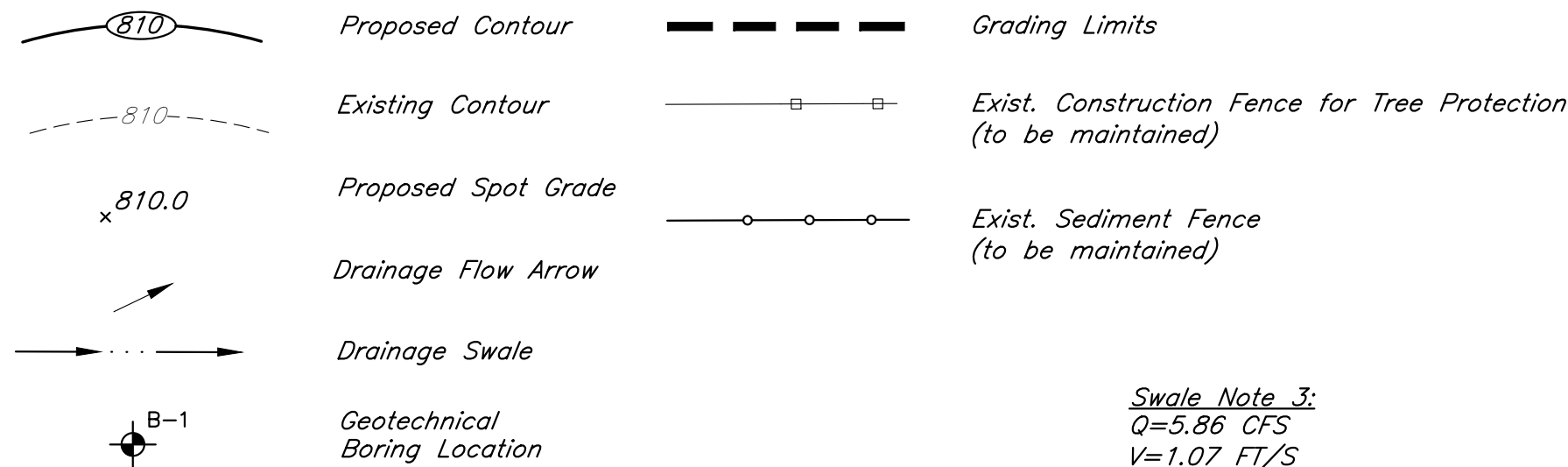


Grading Plan

PROJECT BENCHMARK:

BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of 1470 bridge  
spanning View High Drive.  
EL=833.80

Legend



NOTE:  
No fill may be placed within the  
existing floodway until storm line  
4100 is complete.

CAUTION!

Numerous Utilities on Site.  
Contractor to verify location  
and elevation of all utilities  
prior to commencing  
construction.

Swale Note 3:  
Q=5.86 CFS  
V=1.07 FT/S  
Shear Stress=0.07 PSF  
Acceptable for all  
forms of vegetation

Area to be cleared of trees and  
vegetation. Topsoil shall be  
stripped per geotech report  
recommendations prior to  
beginning any earthwork operations.

Temporary Stream Crossing  
Location (if required). Upon  
removal of the crossing, disturbed  
area to be seeded/stabilized.

Area to be cleared of trees and  
vegetation. Topsoil shall be  
stripped per geotech report  
recommendations prior to  
beginning any earthwork operations.

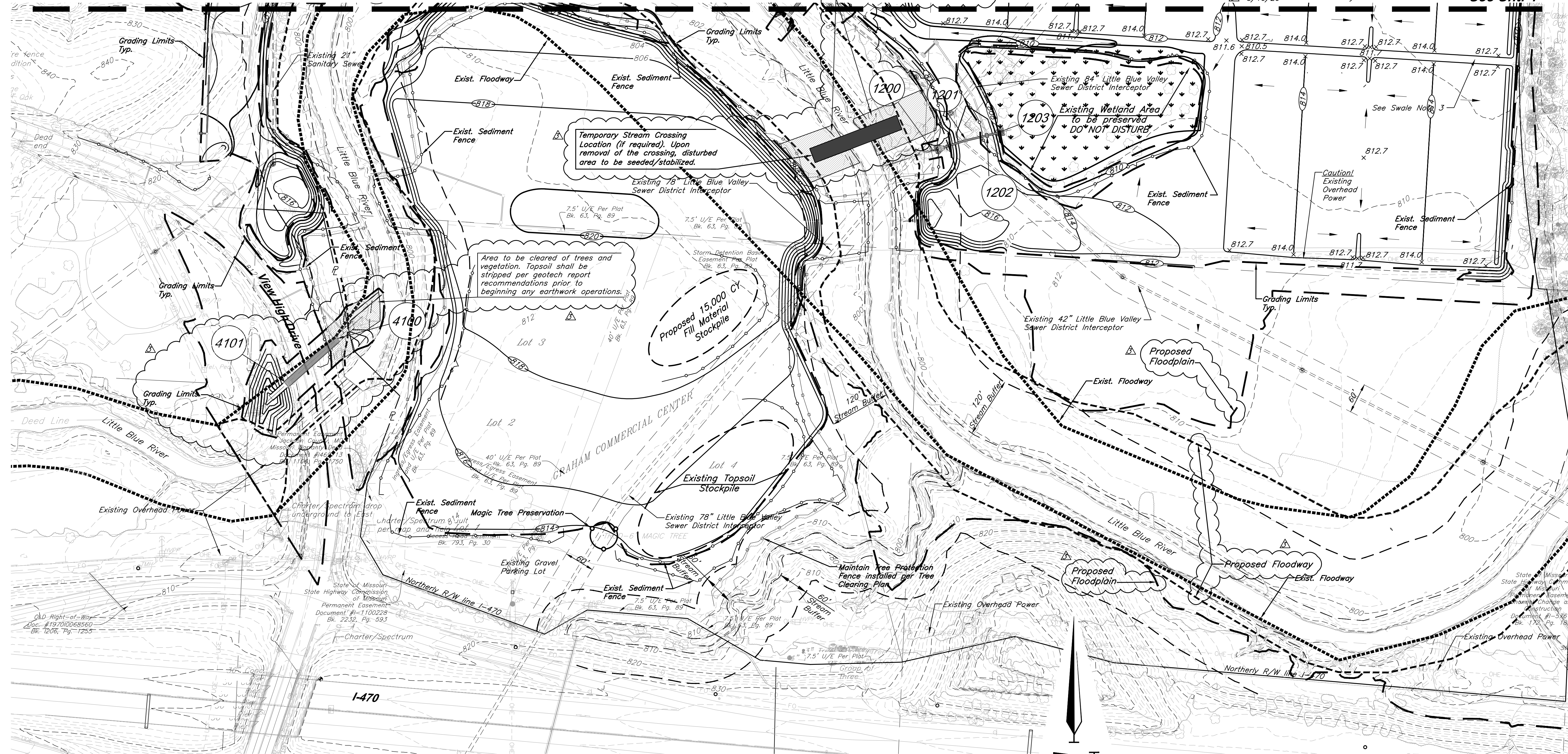
Proposed 15,000 CY  
Fill Material  
Stockpile

Proposed Floodplain

Proposed Floodway

Proposed Floodplain

Proposed Floodway



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engineers  
9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
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DATE:	CEL
DESIGN BY:	DR
DRAWN BY:	04/15/2020
PROJECT NO.:	12720
SHEET NO.	TOTAL SHEETS
5	43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	5/15/18	Revised Field Elevations		
2	8/7/18	City Comments		
3	8/28/18	City Comments		
4	9/14/18	City Comments		
5	10/10/18	Removed Floodway Grading		
6	11/29/18	Temporary River Crossing Repair		
7	4/11/19	Temporary River Crossing Repair		
8	4/15/19	City Comments		
9	3/10/20			

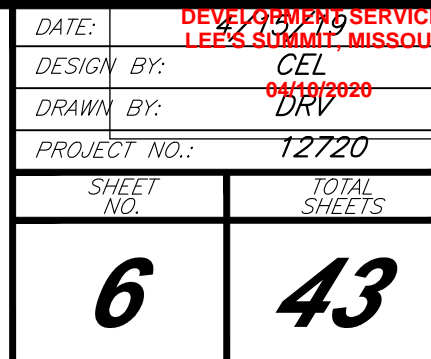
Match Line  
See Sht. 4

Grading Plan

BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of 1470 bridge  
spanning View High Drive.  
EL=833.80

The legend defines the symbols used in the site plan:

- Proposed Contour**: Represented by a solid line with a small circle and the number 810 inside it.
- Existing Contour**: Represented by a dashed line with the number 810.
- Proposed Spot Grade**: Represented by a small 'x' followed by the number 810.0.
- Drainage Flow Arrow**: Represented by a solid arrow pointing in the direction of flow.
- Drainage Swale**: Represented by a line with three dots in the middle.
- Geotechnical Boring Location**: Represented by a circle with a cross inside, labeled B-1.
- Grading Limits**: Represented by a thick, solid black line.
- Exist. Construction Fence for Tree Protection (to be maintained)**: Represented by a line with open squares at intervals.
- Exist. Sediment Fence (to be maintained)**: Represented by a line with open circles at intervals.



Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

[illegible]

### ***Grading Plan***

G:\12220\Civil 3D Production Drawings\Mass Grading\Lee's Summit\12220C2500.dwg Layout: 14 Drainage Map -- Tuesday, March 10, 2020, 1:43pm -- Copyright 2020, George Butler Associates, Inc. Architect 00212, Professional Engineer 000133, Landscape Architect 000025, Professional Land Surveyor 000059

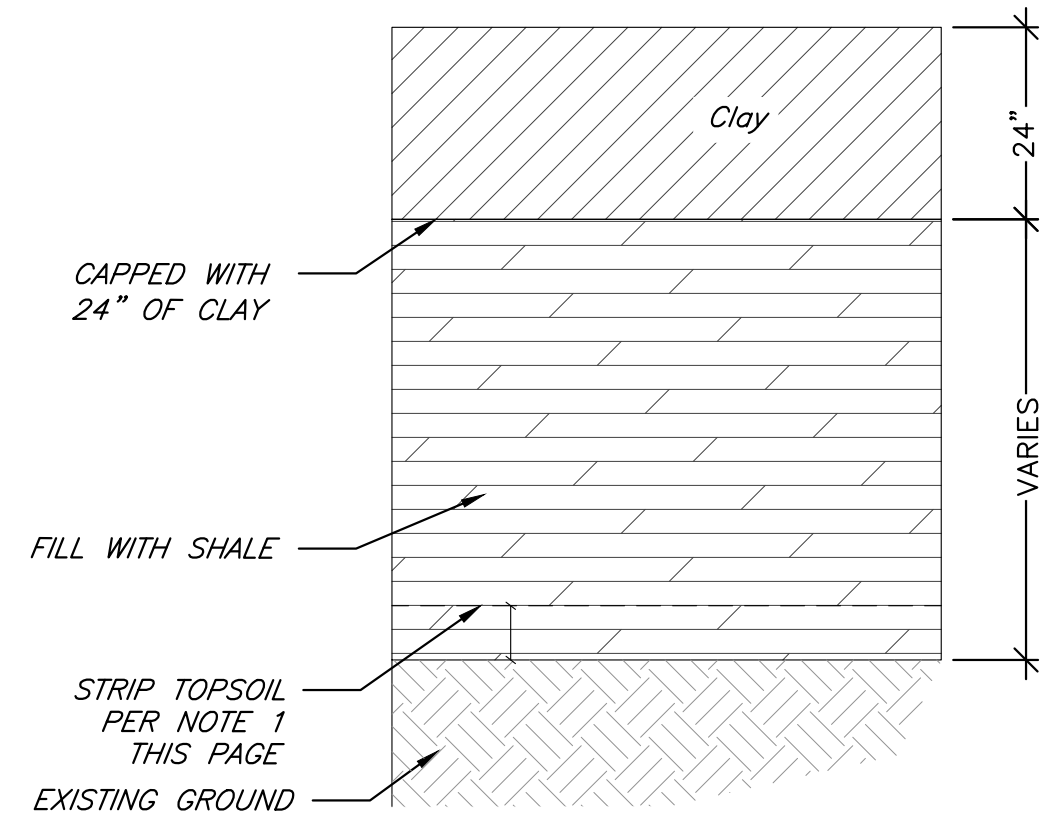
Notes:

1. All areas shall be stripped of topsoil and proofrolled prior to any fill placement.
2. Rock fill shall contain sufficient clay and finer material to completely fill voids in rock fragments.
3. Rock fill shall contain no fragments grater then 2'.
4. Rock fill shall be capped with min 12" depth of limestone screenings. Rock fill areas outside fields may be capped with 12" depth, MODOT Type 5, or 3" minus material.
5. Depth of screenings on shall be ajusted at the edge of the fields if the depth of the trenches for the drains installed in the field exceeds 12". Clarkson and the field installer should verify.
6. Limestone screenings capping rock fill should not contain shall or clay.
7. Subgrade consisting of limestone screenings shall be graded to drain. Any areas ponding water shall be addressed immediately.
8. No construction traffic shall be allowed on subgrades constructed of limestone screenings until time of pavement or turf construction.
9. Subgrade shall be proofrolled within 48 hours prior to pavement or field construction. Subgrades to be re-evaluated is weather affects subgrades prior to construction.
10. Information shown on this sheet is based on Geotechnical reports provided by Terracon and Olsson Engineering.

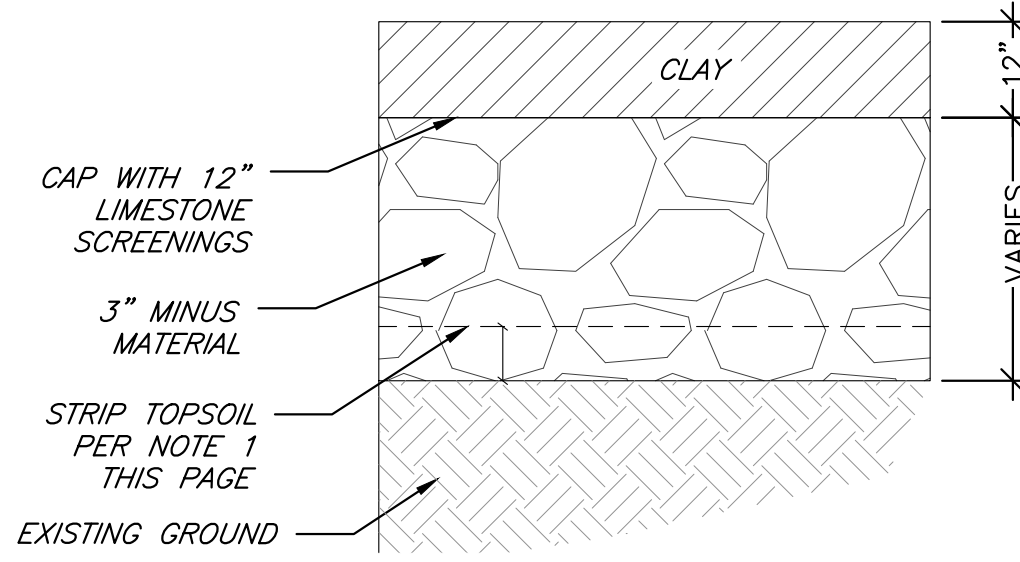
Legend

- Areas of Future Pavement
- Areas of Clear Zone
- Athletic Field Area
- Areas of Future Building

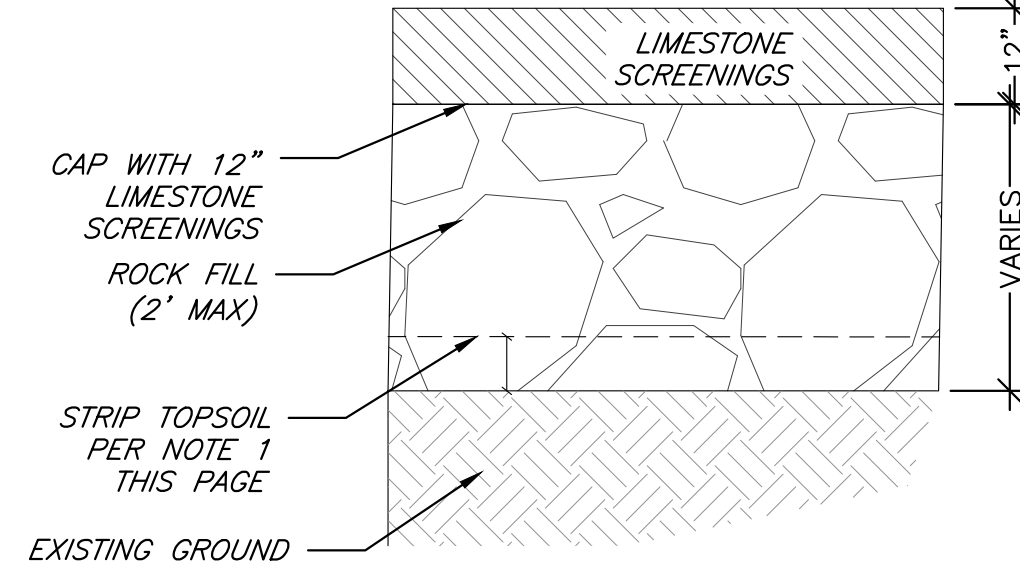
NOTE:  
No fill may be placed within the existing floodway until storm line 4100 is complete.



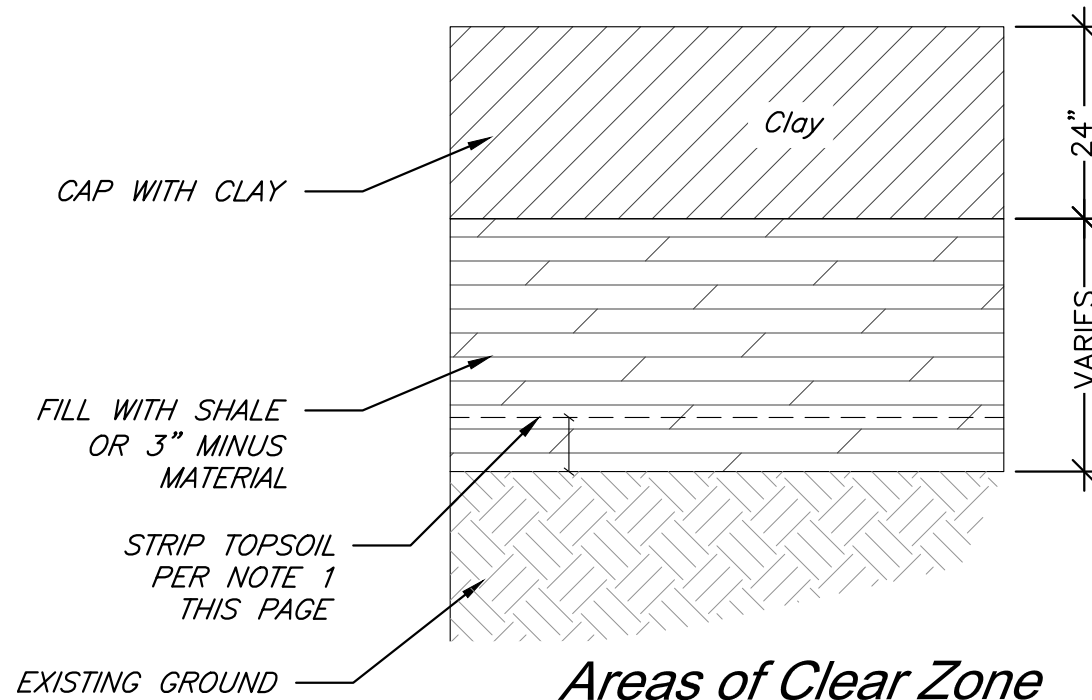
Areas of Future Pavement  
Typical Fill Section  
Not to scale



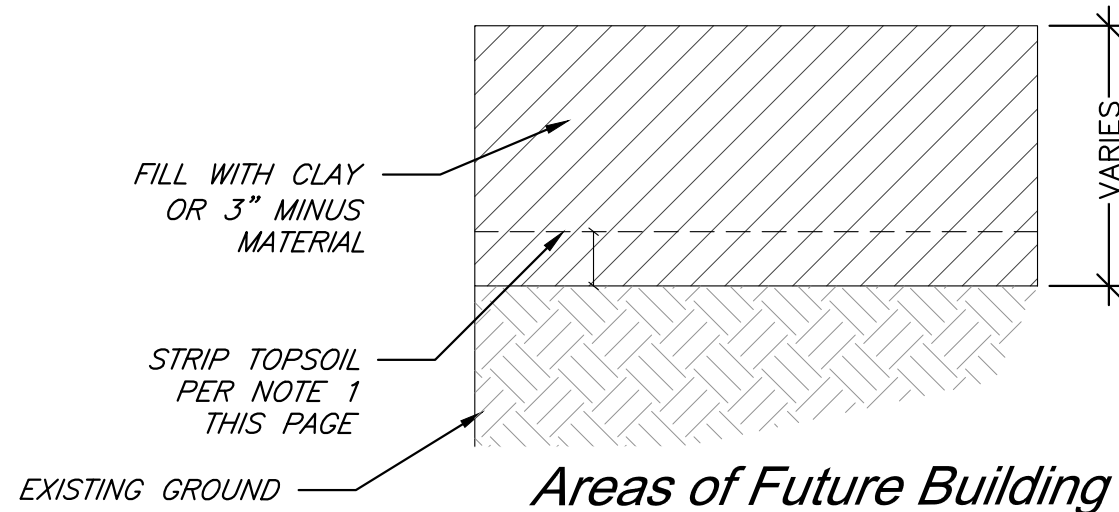
Areas of Future Pavement  
Typical Fill Section  
Not to scale



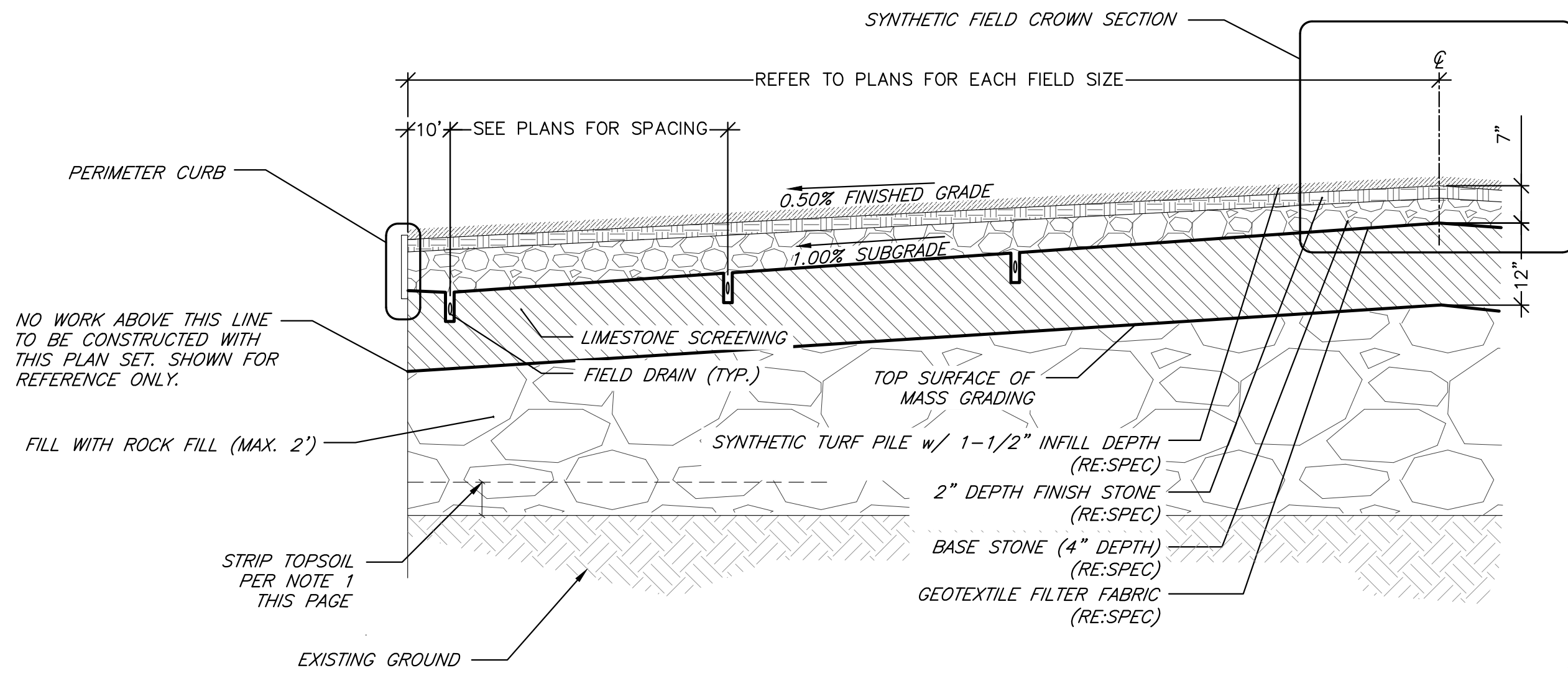
Areas of Future Pavement  
Typical Fill Section  
Not to scale



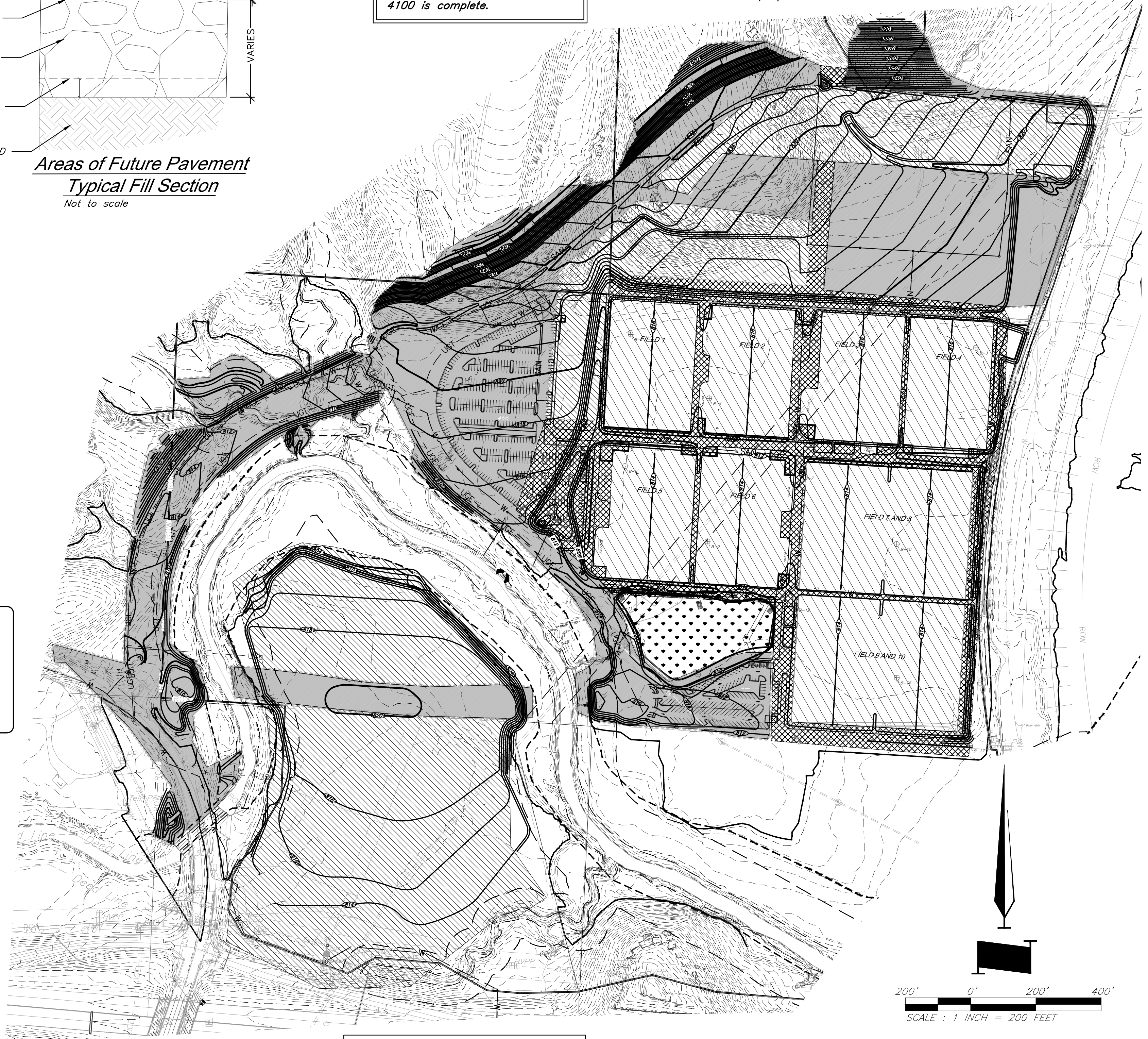
Areas of Clear Zone  
Typical Fill Section  
Not to scale



Areas of Future Building  
Typical Fill Section  
Not to scale



Athletic Field Area - Typical Fill Section  
Not to scale



FOR INFORMATION ONLY

Typical Fill Sections

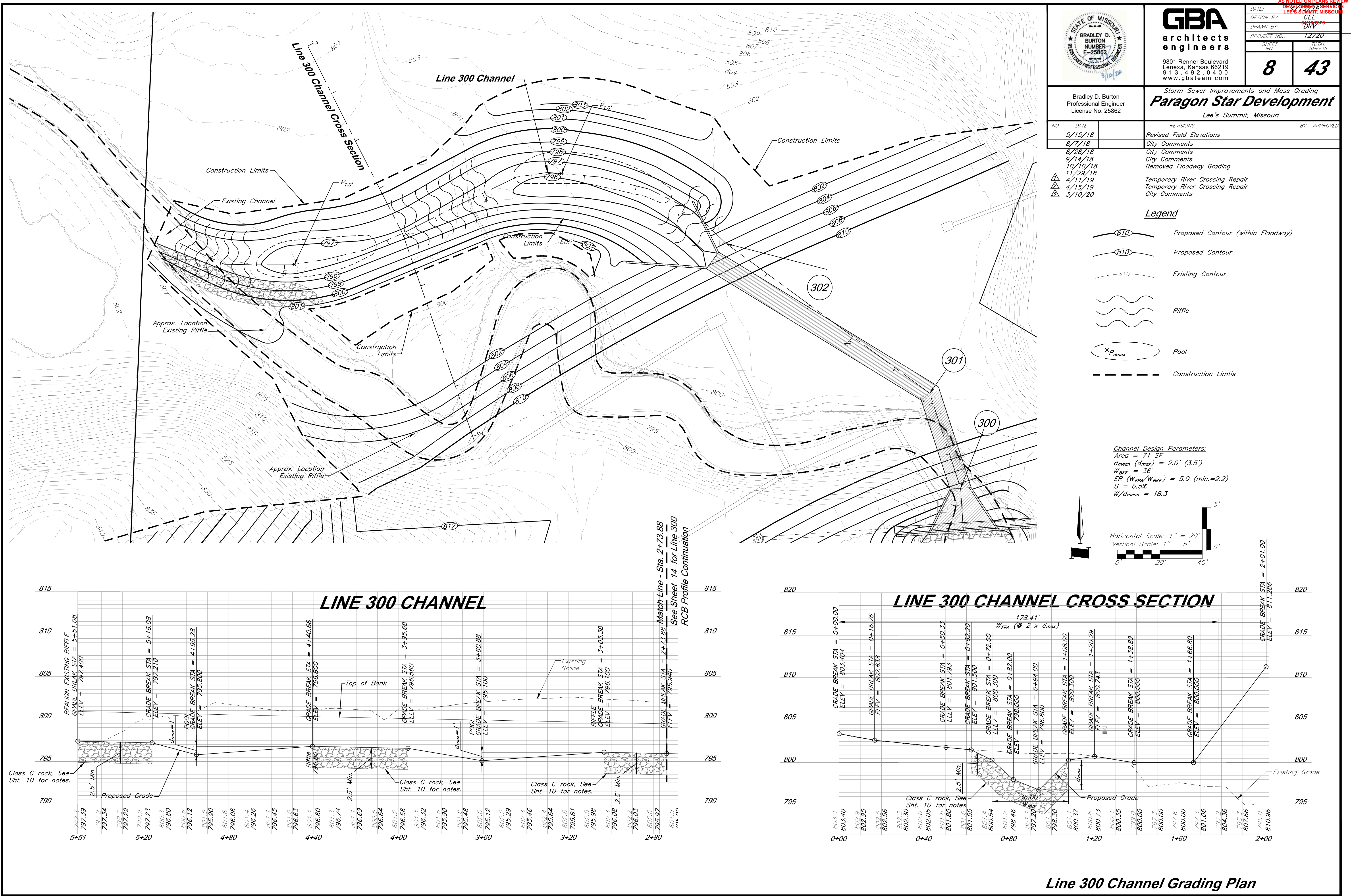
200' 0' 200' 400'  
SCALE : 1" = 200 FEET

**GBA**  
architects  
engineers  
9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

DATE: 5/15/18  
DESIGN BY: CEL  
DRAWN BY: JRP  
PROJECT NO.: 12720  
SHEET NO.: 7  
TOTAL SHEETS: 43

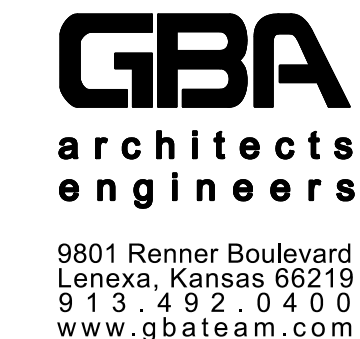
Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.		DATE	REVISIONS	BY	APPROVED
5/15/18			Revised Field Elevations		
8/7/18			City Comments		
8/28/18			City Comments		
9/14/18			City Comments		
10/10/18			Removed Floodway Grading		
11/29/18			Temporary River Crossing Repair		
4/11/19			Temporary River Crossing Repair		
4/15/19			City Comments		
3/10/20					



Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
G:\12220\Civil\_3D\Production Drawings\Mass Grading\Lee's Summit\122200090.dwg Layout: 9 Utility Plan -- Thursday, March 12, 2020, 1:24pm -- Copyright 2020, George Butler Associates, Inc.

RELEASE FOR  
CONSTRUCTION  
AS NOTED ON PLANS REVIEW  
DEVELOPMENT SERVICES  
LEE'S SUMMIT, MISSOURI



DATE:	CEL
DESIGN BY:	CEL
DRAWN BY:	DRV
PROJECT NO.:	12720
SHEET NO.:	9
TOTAL SHEETS:	43

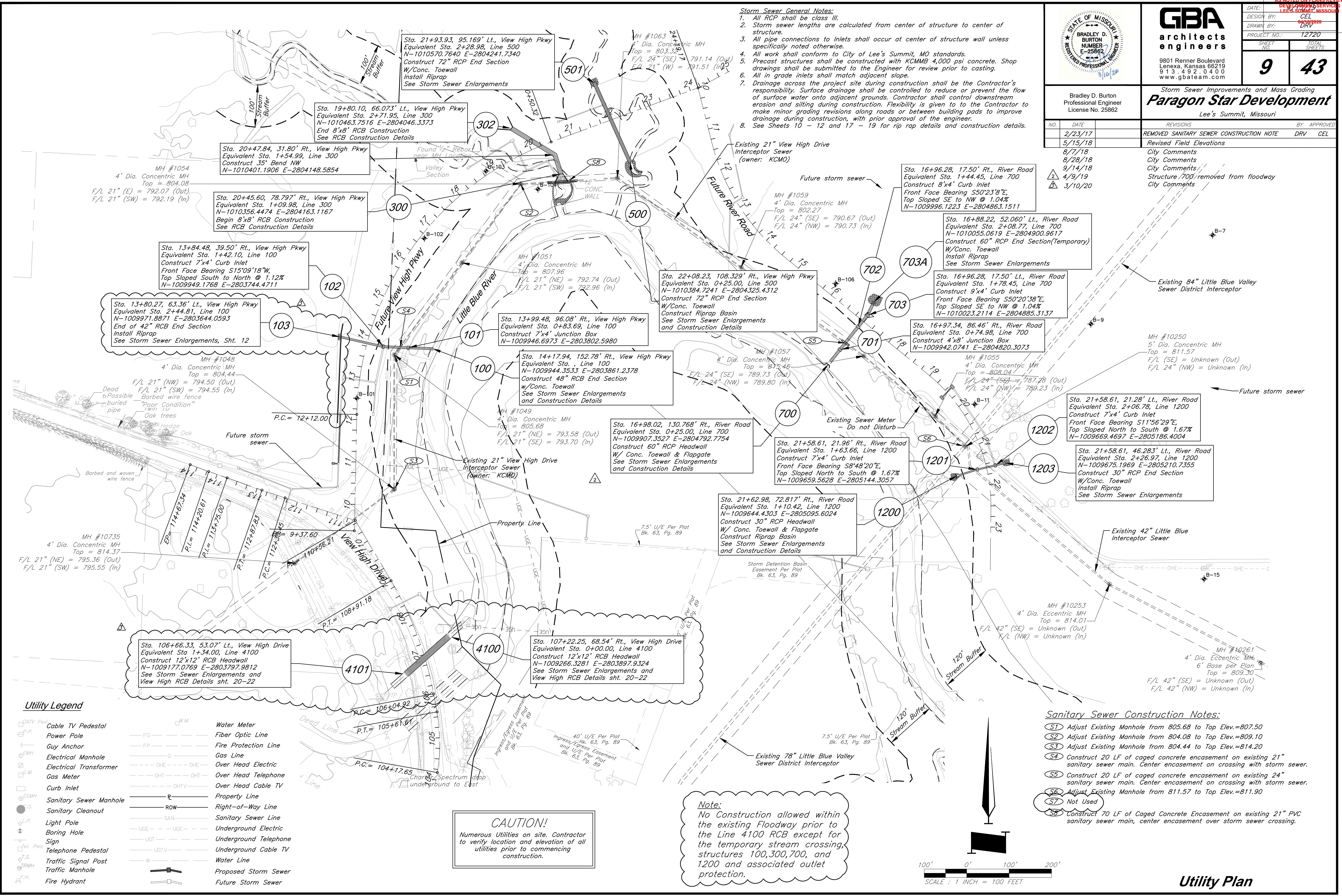
Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/23/17	REMOVED SANITARY SEWER CONSTRUCTION NOTE	DRV	CEL
2	5/15/18	Revised Field Elevations		

8/7/18	City Comments
8/28/18	City Comments
9/14/18	City Comments
4/9/19	Structure 700 removed from floodway
3/10/20	City Comments

- Storm Sewer General Notes:**
- All RCP shall be class III.
  - Storm sewer lengths are calculated from center of structure to center of structure.
  - All pipe connections to inlets shall occur at center of structure wall unless specifically noted otherwise.
  - All work shall conform to City of Lee's Summit, MO standards.
  - Precast structures shall be constructed with KCMMB 4,000 psi concrete. Shop drawings shall be submitted to the Engineer for review prior to casting.
  - All in grade inlets shall match adjacent slope.
  - Drainage across the project site during construction shall be the Contractor's responsibility. Surface drainage shall be controlled to reduce or prevent the flow of surface water onto adjacent grounds. Contractor shall control downstream erosion and silting during construction. Flexibility is given to the Contractor to make minor grading revisions along roads or between building pads to improve drainage during construction, with prior approval of the engineer.
  - See Sheets 10 - 12 and 17 - 19 for rip rap details and construction details.



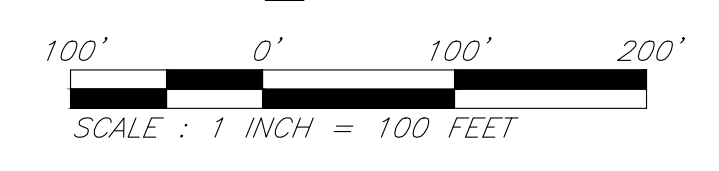
**Utility Legend**

	Cable TV Pedestal		Water Meter
	Power Pole		Fiber Optic Line
	Guy Anchor		Fire Protection Line
	Electrical Manhole		Gas Line
	Electrical Transformer		Over Head Electric
	Gas Meter		Over Head Telephone
	Curb Inlet		Over Head Cable TV
	Sanitary Sewer Manhole		Property Line
	Sanitary Cleanout		Right-of-Way Line
	Light Pole		Sanitary Sewer Line
	Boring Hole		Underground Electric
	Sign		Underground Telephone
	Telephone Pedestal		Underground Cable TV
	Traffic Signal Post		Water Line
	Traffic Manhole		Proposed Storm Sewer
	Fire Hydrant		Future Storm Sewer

**Sanitary Sewer Construction Notes:**

- S1 Adjust Existing Manhole from 805.68 to Top Elev.=807.50
- S2 Adjust Existing Manhole from 804.08 to Top Elev.=809.10
- S3 Adjust Existing Manhole from 804.44 to Top Elev.=814.20
- S4 Construct 20 LF of caged concrete encasement on existing 21" sanitary sewer main. Center encasement on crossing with storm sewer.
- S5 Construct 20 LF of caged concrete encasement on existing 24" sanitary sewer main. Center encasement on crossing with storm sewer.
- S6 Adjust Existing Manhole from 811.57 to Top Elev.=811.90
- S7 Not Used
- S8 Construct 70 LF of Caged Concrete Encasement on existing 21" PVC sanitary sewer main, center encasement over storm sewer crossing.

**Note:**  
No Construction allowed within the existing Floodway prior to the temporary stream crossing, structures 100,300,700, and 1200 and associated outlet protection.



**Utility Plan**

Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
G:\12720\Civil 3D Production Drawings\Mass Grading\Lee's Summit\1272000901.dwg Layout: 10 Storm Sewer Enlargements --- Tuesday, March 10, 2020, 1:52pm --- Copyright 2020, George Butler Associates, Inc.

RELEASE FOR  
CONSTRUCTION  
AS NOTED ON PLANS REVIEW  
DATE: 04/15/2020  
BY: CEL  
DRAWN BY: DRV  
PROJECT NO.: 12720  
SHEET NO.: 10  
TOTAL SHEETS: 43



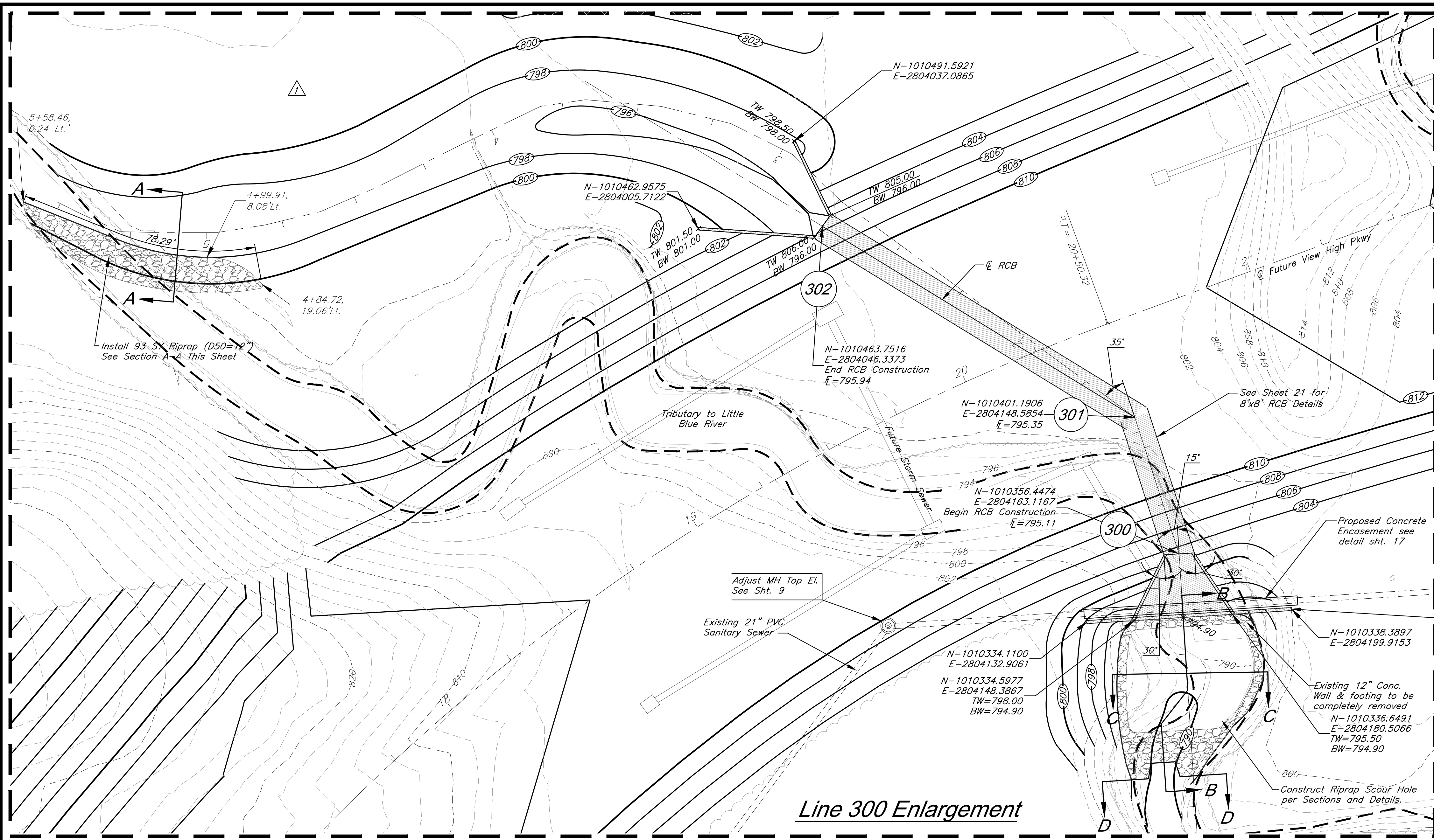
Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

Bradley D. Burton  
Professional Engineer  
License No. 25862

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
	8/28/18	City Comments		
	9/14/18	City Comments		
	10/10/18	City Comments		
	11/29/18	Removed Floodway Grading		
	4/11/19	Temporary River Crossing Repair		
	4/4/19	RFI 1		
	4/15/19	Temporary River Crossing Repair		
	3/10/20	City Comments		

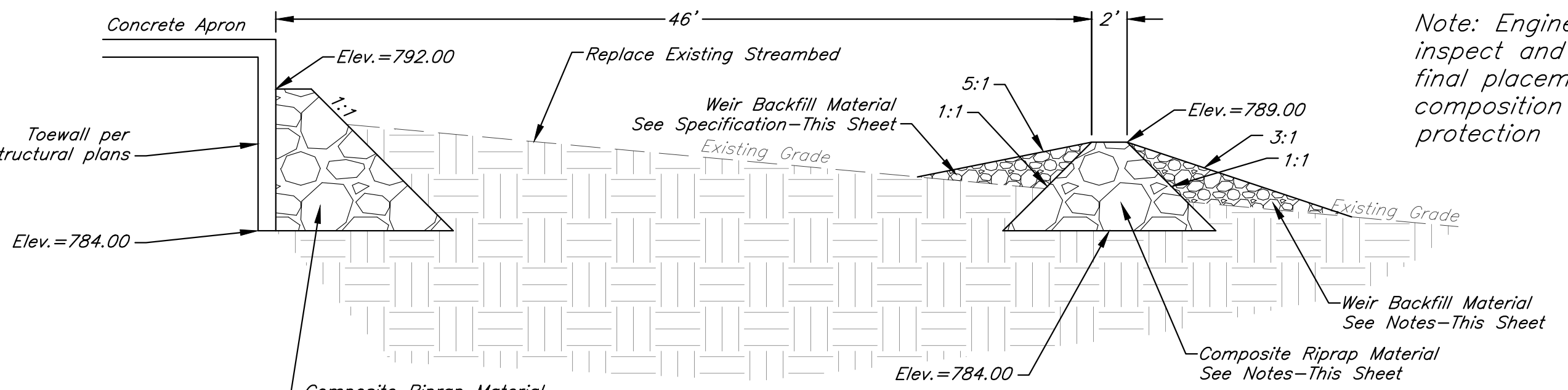
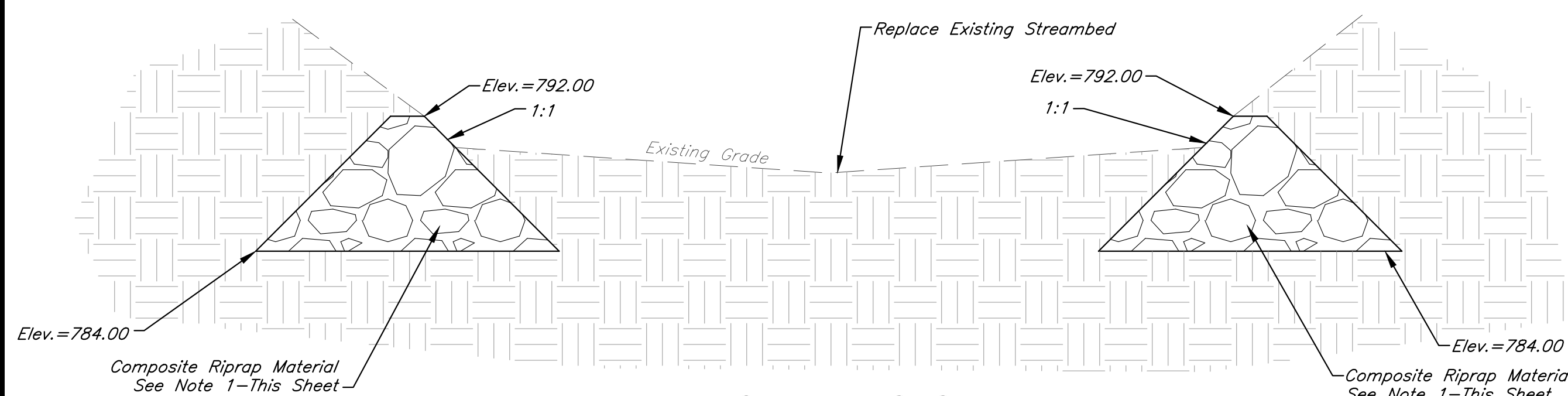
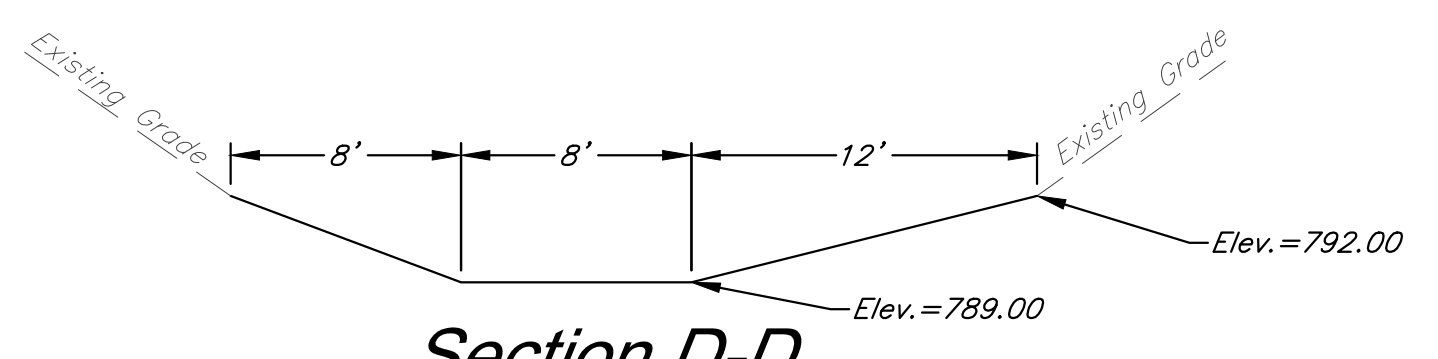
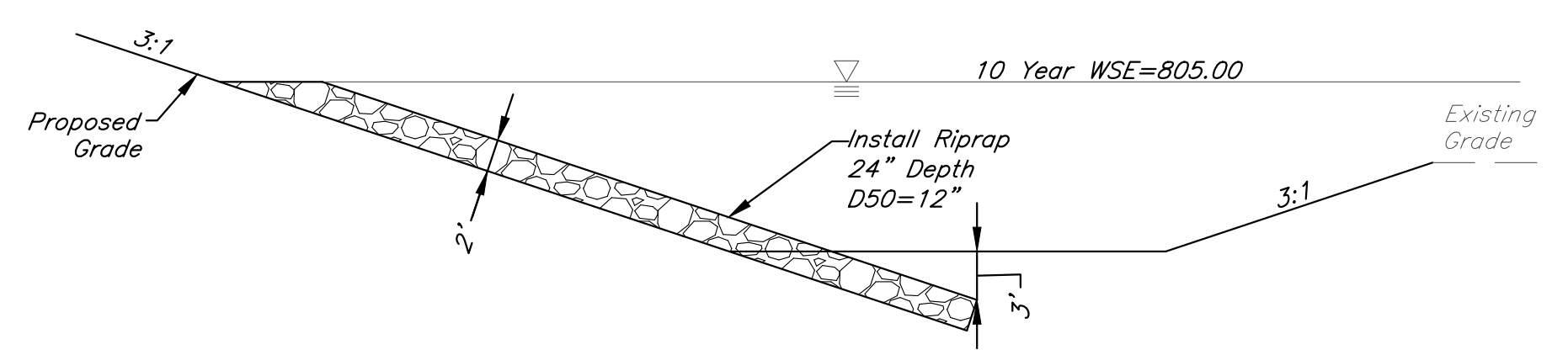
Legend

	Cable TV Pedestal		Fire Hydrant
	Power Pole		Water Meter
	Guy Anchor		Fiber Optic Line
	Electrical Manhole		Fire Protection Line
	Electrical Transformer		Gas Line
	Gas Meter		Over Head Electric
	Curb Inlet		Over Head Telephone
	Sanitary Sewer Manhole		Over Head Cable TV
	Sanitary Cleanout		Property Line
	Light Pole		Right-of-Way Line
	Boring Hole		Sanitary Sewer Line
	Sign		Underground Electric
	Telephone Pedestal		Underground Telephone
	Traffic Signal Post		Underground Cable TV
	Traffic Manhole		Water Line
	Proposed Storm Sewer		Proposed Contours
	Future Storm Sewer		Existing Contour

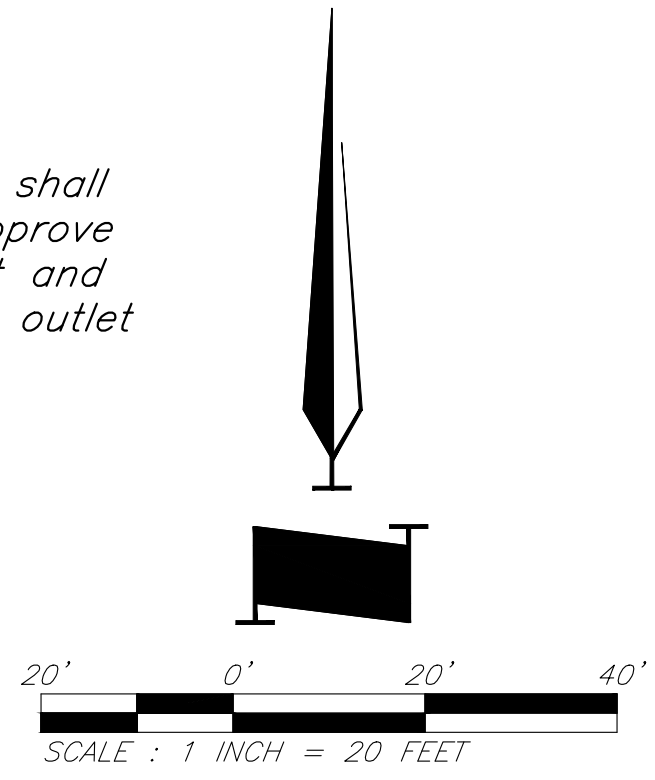


- Riprap Material Notes:**
- Line 300 Composite Riprap Materials shall consist of the following properties:  
75% Boulders with D50=2' and D100=3'  
20% Class B Rock  
5% Class C Rock
  - Weir Backfill Materials shall consist of the following properties:  
65% Class B Rock  
35% Class C Rock

Class B Gradation	Class C Gradation
Size Rock Spec	Size Rock Spec
14" D100	8" D100
9" D85	3" D85
7" D60	2" D65
6" D50	1.5" D50
3" D15	1/4" D15
2.5" D10	1/8" D10

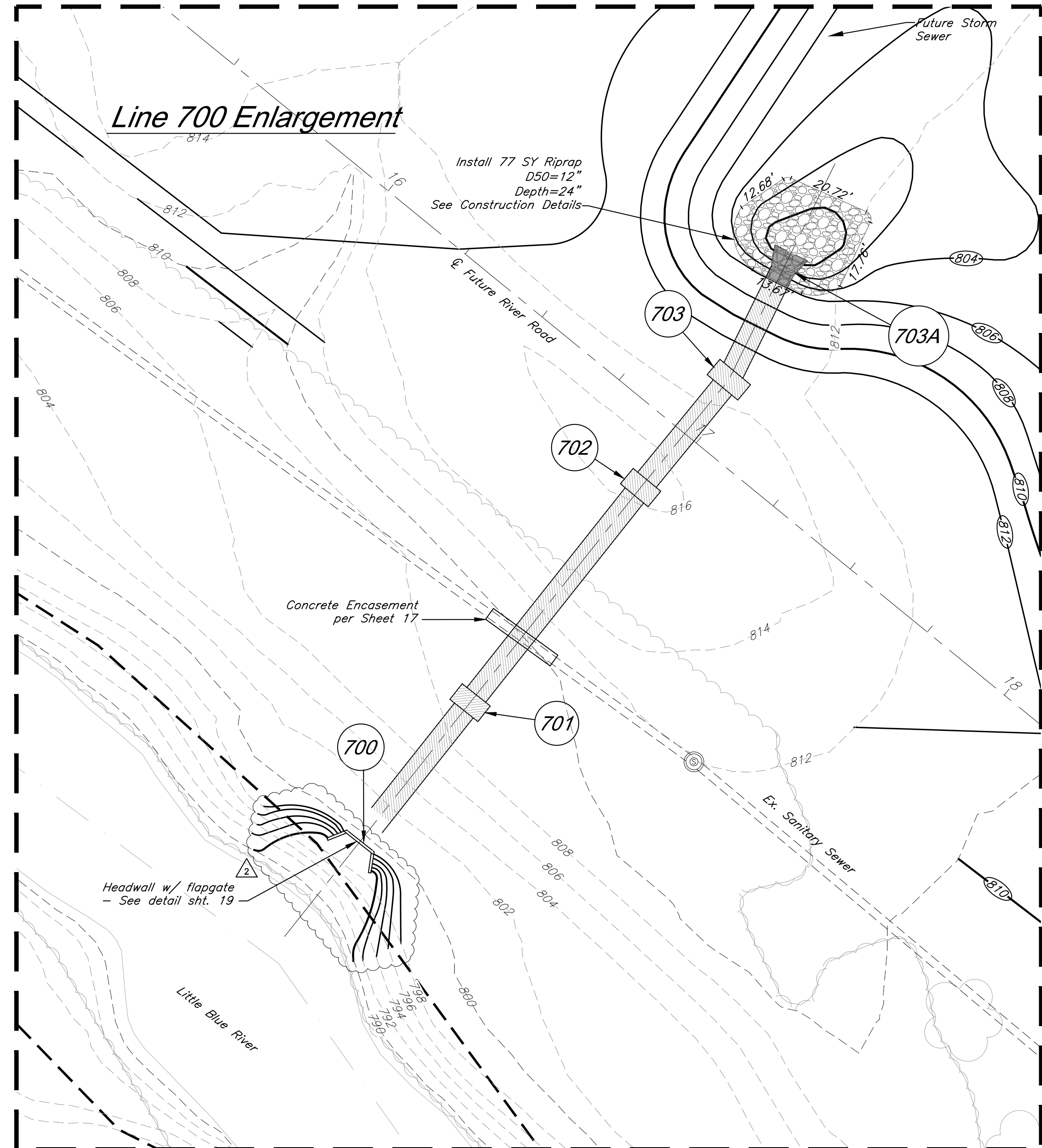
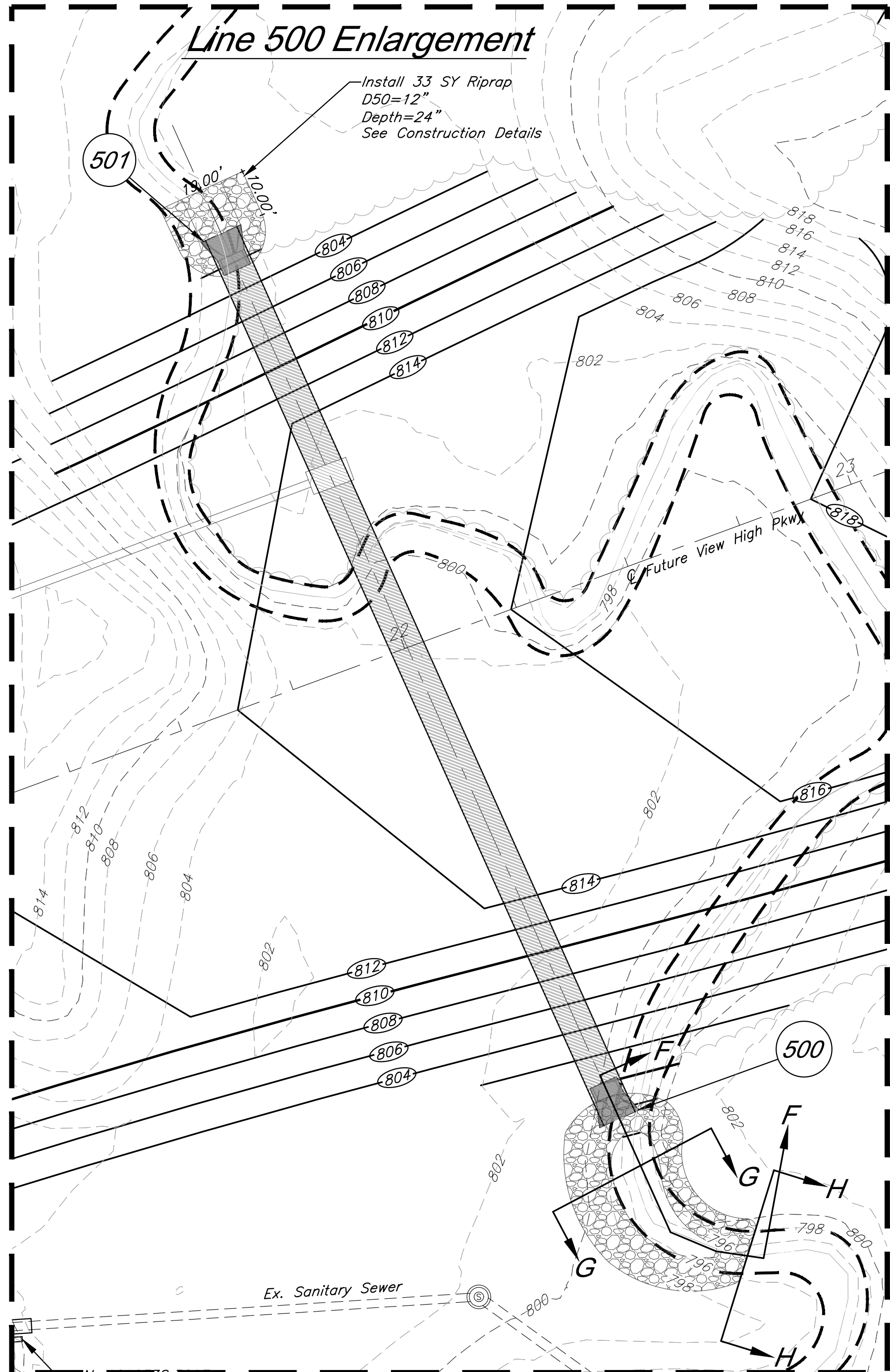


Note: Engineer shall inspect and approve final placement and composition of outlet protection



Storm Sewer Enlargements

Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
G:\12720\Civil\_3D\Production Drawings\Mass Grading\Lee's Summit\1272000901.dwg Layout: 11 Storm Sewer Enlargements --- Tuesday, March 10, 2020, 1:54pm --- Copyright 2020, George Butler Associates, Inc.



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Professional Engineer  
License No. 25862

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architects  
engineers

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DATE: 04/15/2020  
DESIGN BY: CEL  
DRAWN BY: DRI  
PROJECT NO.: 12720  
SHEET NO.: 11  
TOTAL SHEETS: 43

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	5/15/18	Revised Field Elevations		
2	8/7/18	City Comments		
3	8/28/18	City Comments		
4	9/14/18	City Comments		
5	10/10/18	City Comments		
6	11/29/18	Removed Floodway Grading		
7	4/9/19	Structure 700 removed from floodway		
8	4/11/19	Temporary River Crossing Repair		
9	4/15/19	Temporary River Crossing Repair		
10	3/10/20	City Comments		

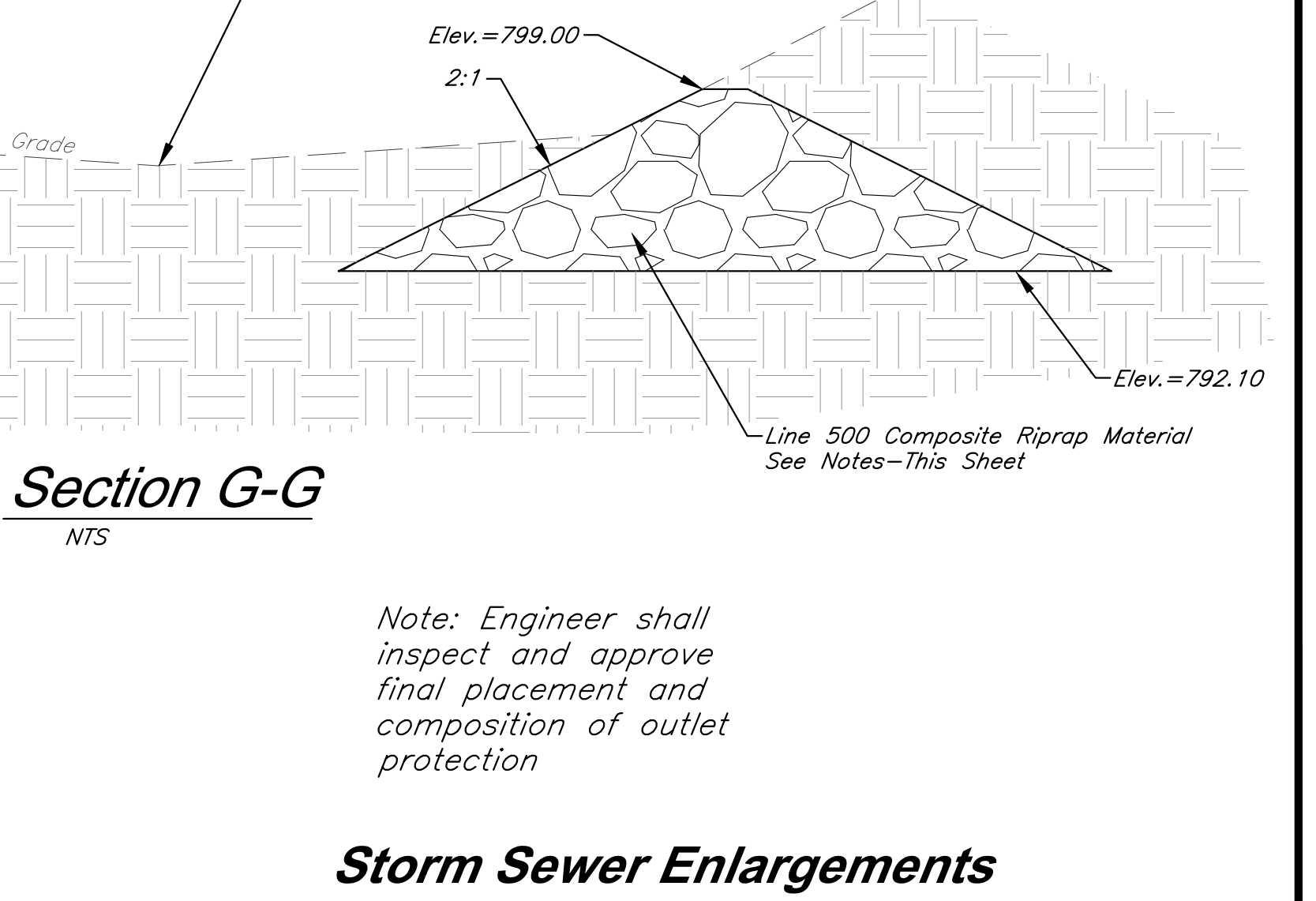
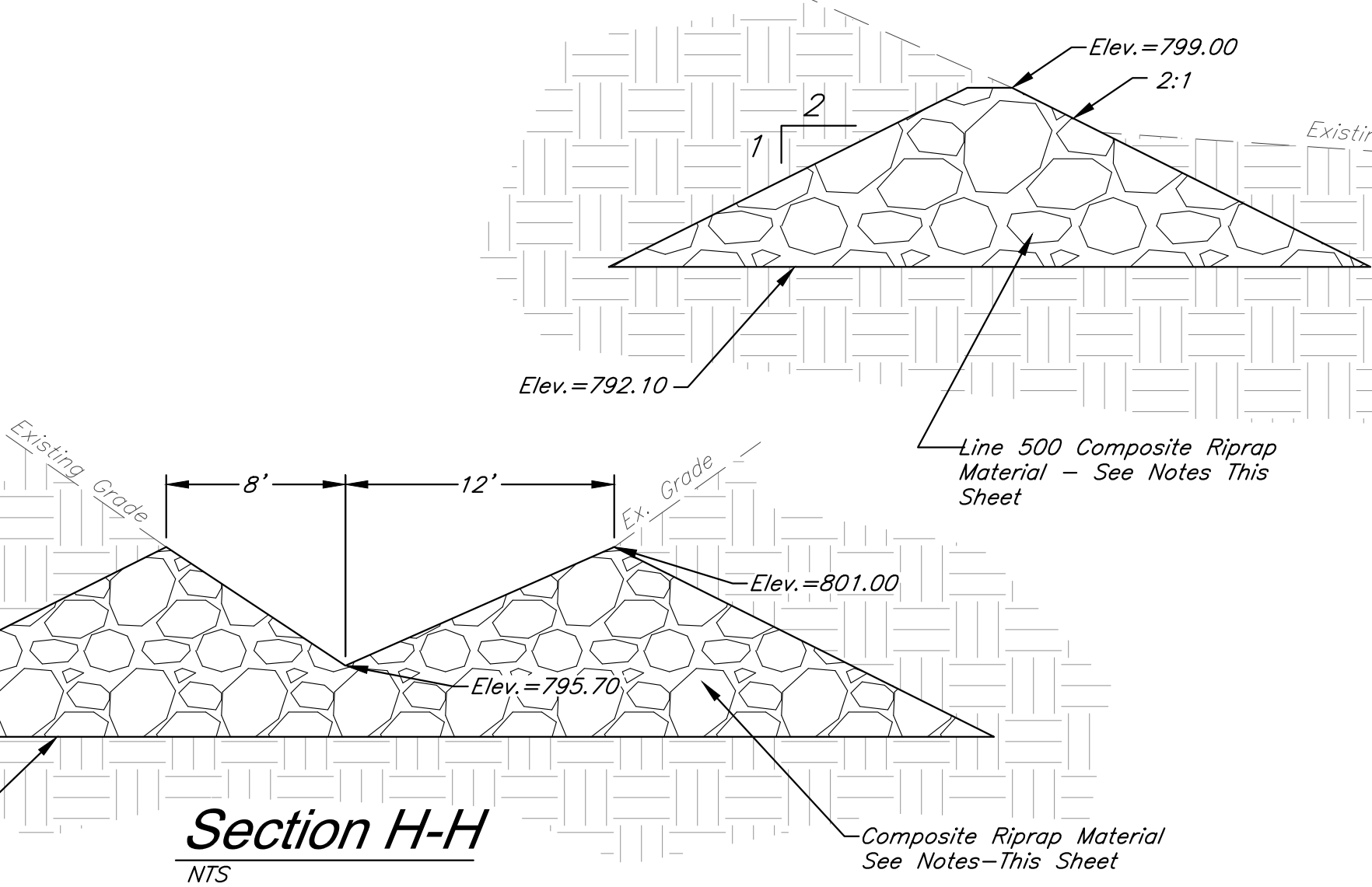
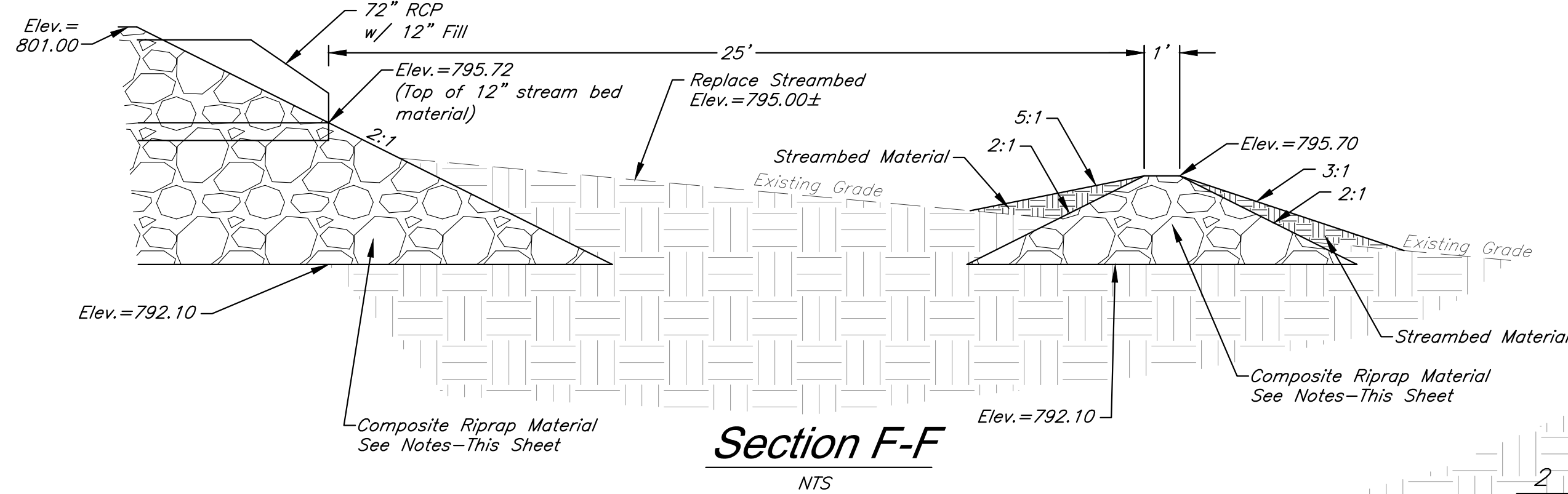
**Legend**

	Cable TV Pedestal		Fire Hydrant
	Power Pole		Water Meter
	Guy Anchor		Fiber Optic Line
	Electrical Manhole		Fire Protection Line
	Electrical Transformer		Gas Line
	Gas Meter		Over Head Electric
	Curb Inlet		Over Head Telephone
	Sanitary Sewer Manhole		Over Head Cable TV
	Sanitary Cleanout		Property Line
	Light Pole		Right-of-Way Line
	Boring Hole		Sanitary Sewer Line
	Sign		Underground Electric
	Telephone Pedestal		Underground Telephone
	Traffic Signal Post		Underground Cable TV
	Traffic Manhole		Water Line
	Proposed Storm Sewer		Proposed Contours
	Future Storm Sewer		Existing Contour

**Class A Gradation**

Size	Rock Spec
20"	D100
16"	D85
13"	D65
12"	D50
5"	D15
4"	D10

SCALE : 1 INCH = 20 FEET



**Storm Sewer Enlargements**



Legend

- CATV Ped

P.P.

EMH

G.M.

SSMH

S.O.

L.P.

Boring Hole

Sign

Telephone Pedestal

Traffic Signal Post

Traffic Manhole

Proposed Storm Sewer

Future Storm Sewer

Cable TV Pedestal

Power Pole

Guy Anchor

Electrical Manhole

Electrical Transformer

Gas Meter

Curb Inlet

Sanitary Sewer Manhole

Sanitary Cleanout

Light Pole

Boring Hole

Sign

Telephone Pedestal

Traffic Signal Post

Traffic Manhole

Proposed Storm Sewer

Future Storm Sewer
- F.H.

N.M.

FO

FP

G

OHE

OHT

OHTV

ROW

SAN

UGE

UGT

UGTV

W

800

800
- Water Meter

Fiber Optic Line

Fire Protection Line

Gas Line

Over Head Electric

Over Head Telephone

Over Head Cable TV

Property Line

Right-of-Way Line

Sanitary Sewer Line

Underground Electric

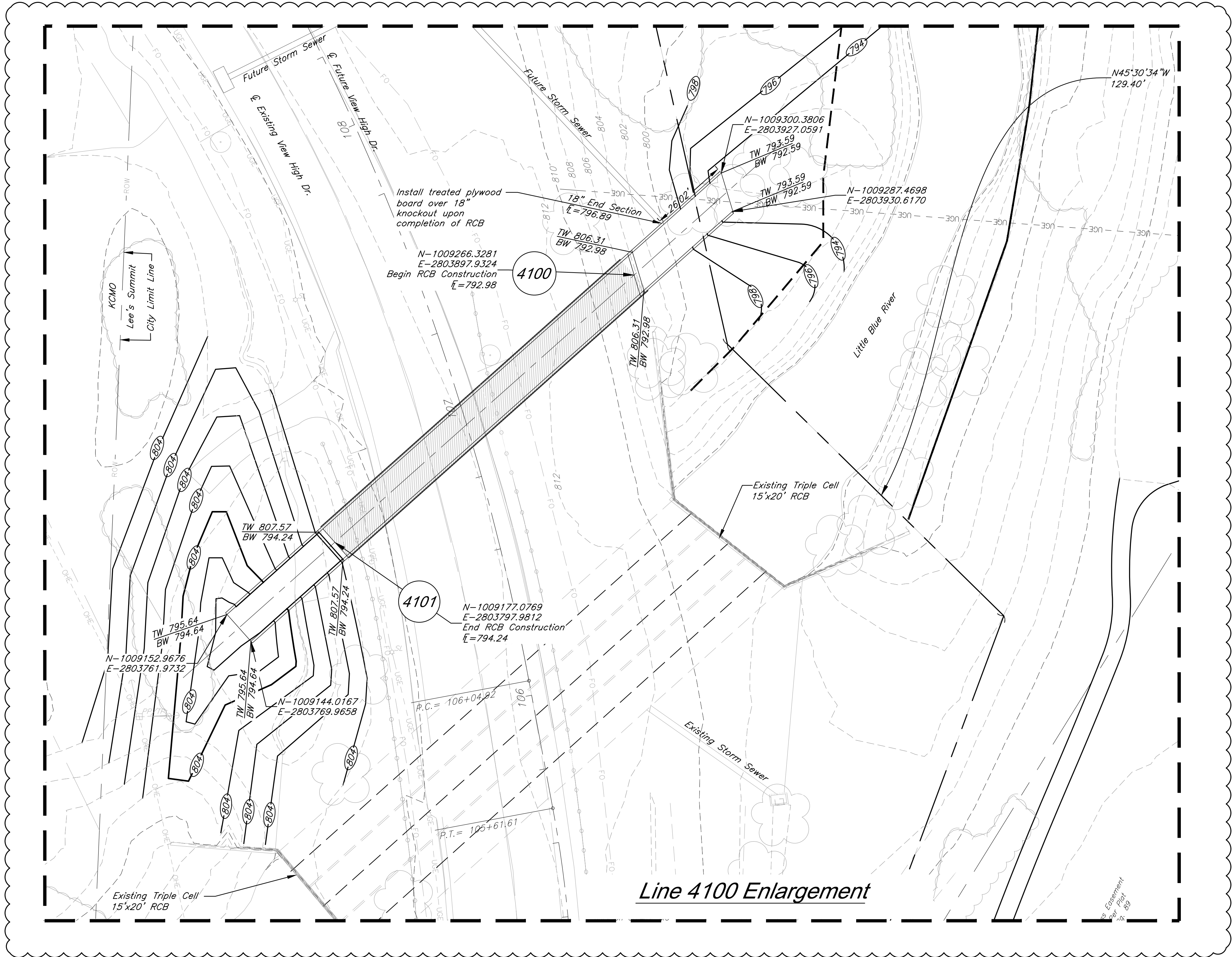
Underground Telephone

Underground Cable TV

Water Line

Proposed Contours

Existing Contour



STATE OF MISSOURI  
BRADLEY D. BURTON  
NUMBER E-25862  
REGISTERED PROFESSIONAL ENGINEER  
3/10/20

GBA

architects  
engineers

9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

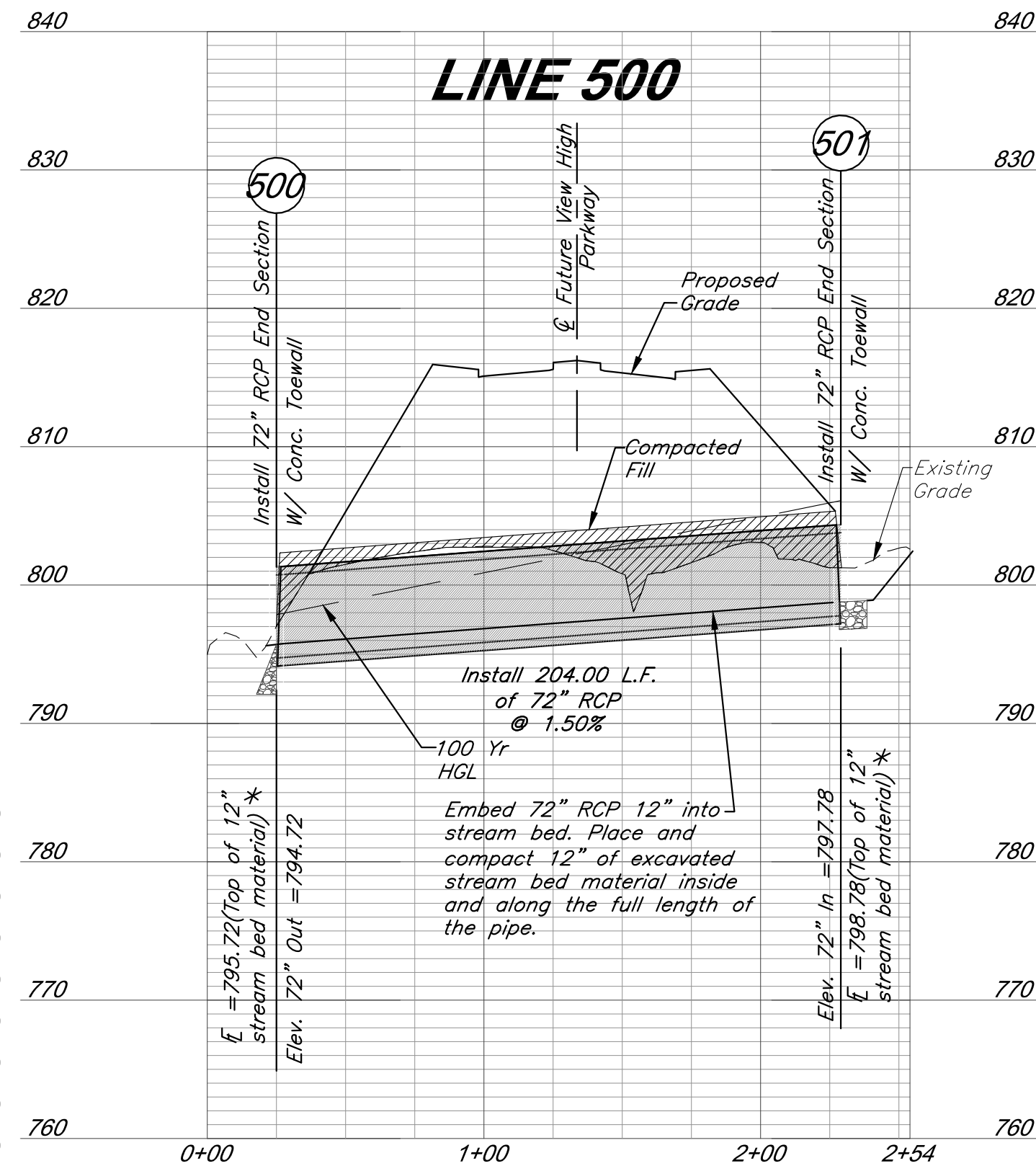
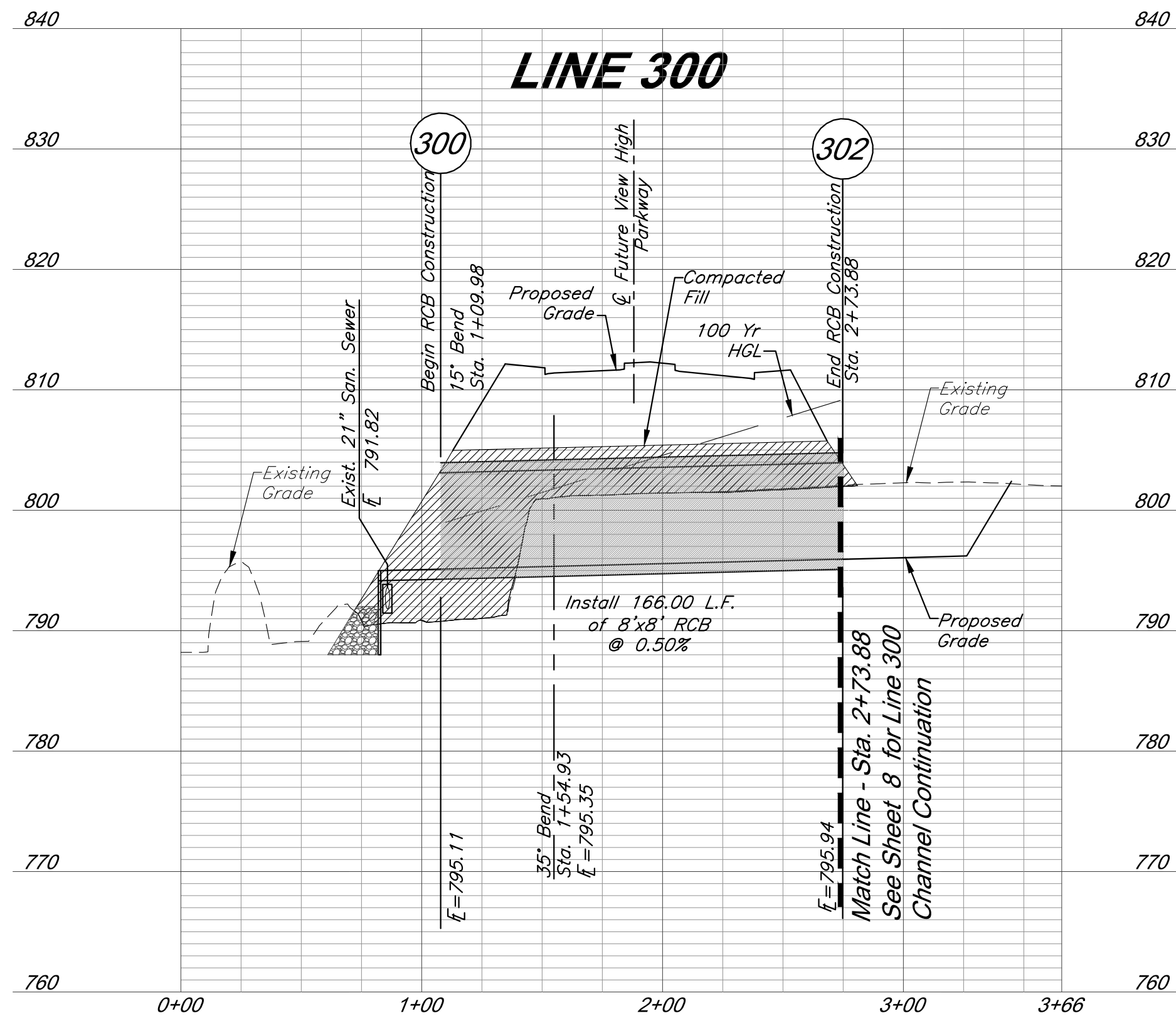
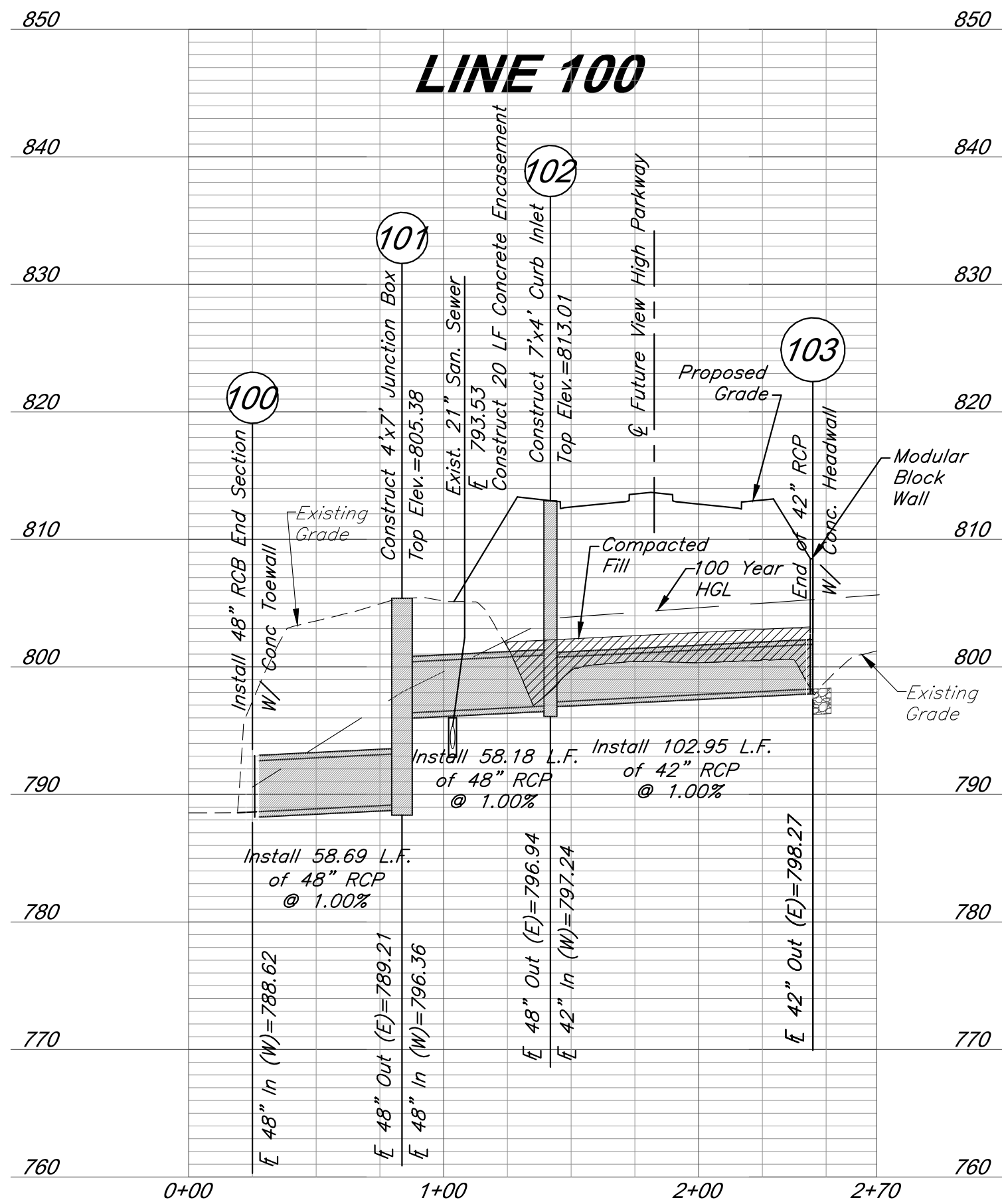
DATE: 04/10/2020  
DESIGN BY: CEL  
DRAWN BY: DRI  
PROJECT NO.: 12720  
SHEET NO. 13  
TOTAL SHEETS 43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	5/15/18	Revised Field Elevations		
2	8/7/18	City Comments		
3	8/28/18	City Comments		
4	9/14/18	City Comments		
5	10/10/18	City Comments		
6	11/29/18	Removed Floodway Grading		
7	4/11/19	Temporary River Crossing Repair		
8	4/15/19	Temporary River Crossing Repair		
9	3/10/20	City Comments		

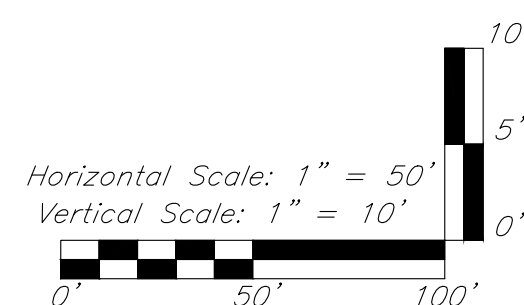
Storm Sewer Enlargements



**Legend**

Compacted Fill to be placed prior to excavation

\* See "Riprap Material Notes" on Sheet 11.



**Storm Sewer Profiles**

Bradley D. Burton  
Professional Engineer  
License No. 25862

**GBA**  
architects  
engineers

9801 Renner Boulevard  
Lenexa, Kansas 66219  
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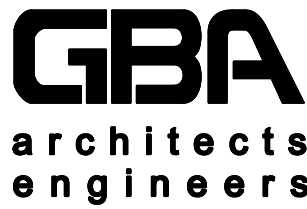
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DRAWN BY: DRI  
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TOTAL SHEETS: 43

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
	8/28/18	City Comments		
	9/14/18	City Comments		
	10/10/18	City Comments		
	11/29/18	Removed Floodway Grading		
	4/9/19	Structure 700 removed from floodway		
	4/11/19	Temporary River Crossing Repair		
	4/15/19	Temporary River Crossing Repair		
	3/10/20	City Comments		



Note: Shaded storm sewer lines are shown for reference only, they will be part of a future plan set. Calculations are based on future storm water system and are shown for reference only.



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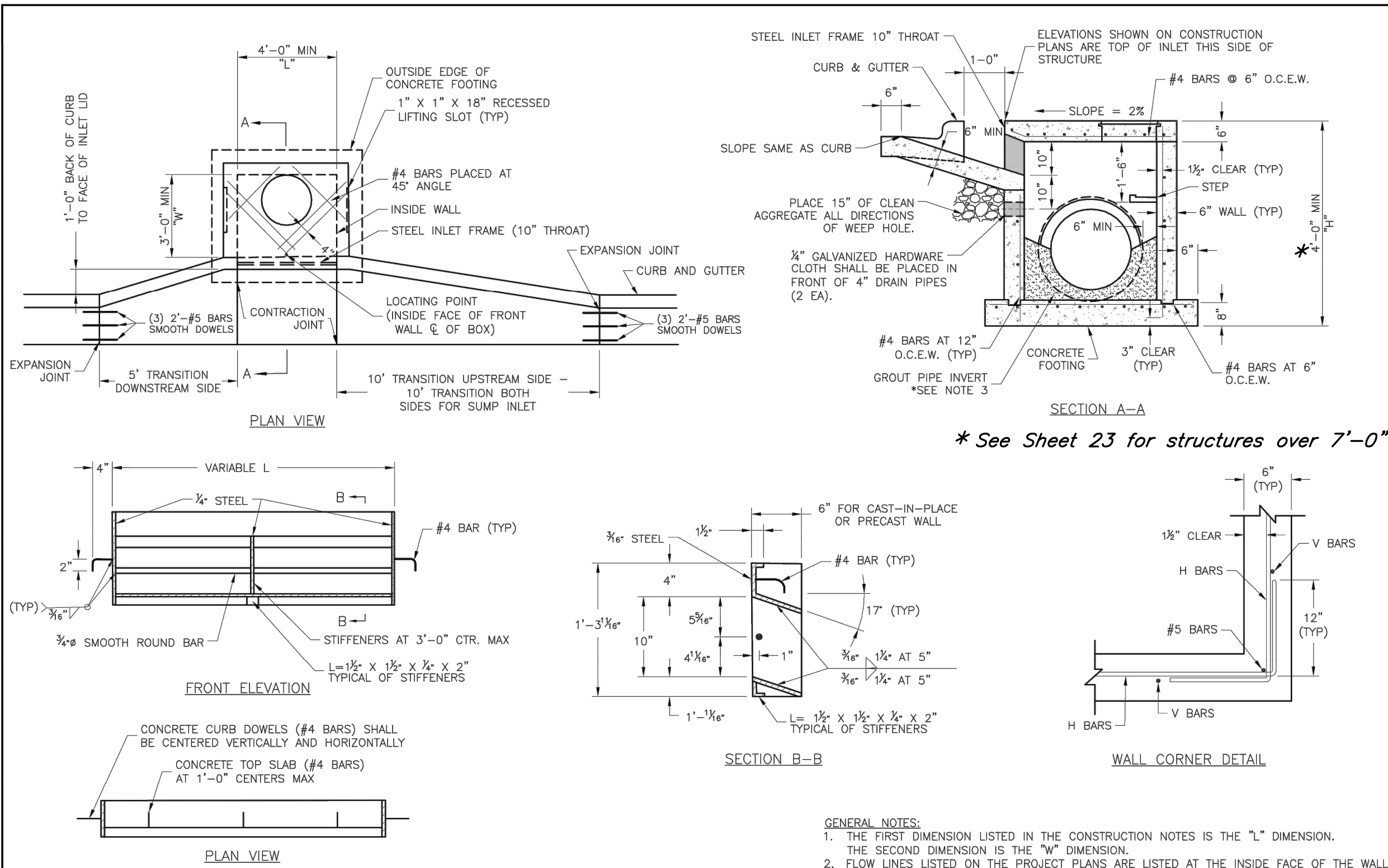
DATE: 04/29/2020	
DESIGN BY: CEL	
DRAWN BY: JKH	
PROJECT NO.: 12720	
SHEET NO.	TOTAL SHEETS
16	43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.		DATE	REVISIONS	BY	APPROVED
		5/15/18	Revised Field Elevations		
		8/7/18	City Comments		
		8/28/18	City Comments		
		9/14/18	City Comments		
		10/10/18	Removed Floodway Grading		
		11/29/18			
		4/11/19	Temporary River Crossing Repair		
		4/15/19	Temporary River Crossing Repair		
		3/10/20	City Comments		

10 Year Storm Preliminary - Subject to Change Upon Final Design										Culverts have been designed to the 100 year Storm										Indicates Future Storm Sewer										Design Checks											
Structures		Runoff Calculations										Pipe Design										Design Checks																			
From	To	Direct Area (acre)	Line In (acre)	Total Area (acre)	C	K	Tc (min)	Flow Time (min)	Intensity (in/hr)	Design Q (cfs)	Q Inlet (cfs)	Gutter Spread (ft.)	Street Slope (ft./ft.)	Q Captured (cfs)	Q Bypass (cfs)	Description	Pipe length (lin ft)	Pipe Slope Slope, %	Pipe dia (in)	Manning's n Value	Q full (cfs)	Pipe Area, sf	V full f/s	Design V f/s	Hw/D	outlet head, H	HW, Inlet Control, (ft)	HW, Outlet Control, (ft)	Inlet Top Elevation	upstream flowline	downstream flowline	Invert Drop (ft)	Downstream water elevation	Hydraulic Grade Elev. (Calculated)	Hydraulic Grade (allowable)	Comments					
Line 100 (100 Yr)	103	102	16.70		0.40	1.25	5.90		9.96	83.2						End Section																			803.85	813.50					
	102	101	0.26	2.40	0.90	1.25	5.90	0.18	9.96	2.9	2.880	11.427	0.011	2.18	0.697	Curb Inlet	129.01	1.00	42	0.013	100.88	9.62	10.49	11.83	1.5	3.34	803.85	798.21		798.53	797.24		794.87	802.62	811.18	Tie in from Line 200					
	101		0.00		19.36	0.46	1.25	6.08	0.07	9.89	109.0					RCP	58.18	1.00	48	0.013	144.03	12.57	11.46	12.95	1.4	2.14	802.62	790.14		796.94	796.36	0.3	788.00								
		100			19.36	0.46	1.25	5.16	0.08	9.86	108.7						Junction Box	58.69	1.00	48	0.013	144.03	12.57	11.46	12.77	1.4	2.14	794.87	790.14		805.38	788.21	788.62	7.15	788.00	794.87	804.05				
Line 200	207	206	0.21		0.41	1.00	6.00		7.06	0.6						Flared End Section																			834.08	834.75					
	206	205	0.26		0.41	1.00	5.00	0.08	7.35	0.6	0.752	5.375	0.075	0.587	0.165	HDPE	37.02	20.00	15	0.01	37.66	1.23	30.69	7.29	0.7	0.01	834.08	823.86		833.23	825.83		823.85	830.60							
	205	204	0.43		0.41	1.00	5.00	0.42	7.35	1.4						Curb Inlet	185.17	3.99	15	0.01	16.82	1.23	13.71	7.29	0.7	0.22	823.85	809.00		822.96	815.57	2.87	808.78			823.85	830.60				
	204	203	0.43		0.43	1.00	5.00		7.35	1.4	1.5248	8.373	0.043	1.141	0.384	Curb Inlet	81.84	2.00	18	0.01	19.36	1.77	10.96	8.67	0.7	0.17	807.86	808.78		820.70	806.76	805.12	8.81	808.62			808.78	816.87			
	203	202	0.00		0.55	1.00	5.00		7.35	0.0						Manhole	132.75	1.00	18	0.01	13.69	1.77	7.75	8.67	0.7	0.24	805.72	808.86		815.00	804.62	803.29	0.5	808.62			808.62	813.67			
	203	202	0.84		0.55	1.00	5.00		7.35	3.4	3.7852	11.249	0.010	2.843	0.942	Curb Inlet	85.12	1.00	18	0.01	13.69	1.77	7.75	6.76	1.0	0.84	804.26	808.62		812.91	802.79	801.94	0.5	807.78			808.62	811.08			
	202	201	0.82		0.90	1.00	5.58	0.21	7.18	6.0						Curb Inlet	79.00	2.62	18	0.013	17.05	1.77	9.65	9.25	1.4	1.84	803.52	807.78		812.48	801.44	799.37	0.5	805.94			807.78	810.65			
	201	102	0.20	0.48	2.40	0.90	1.00	5.00		7.35	1.3	2.78	11.092	L.P.	2.784	0.000	Curb Inlet	86.79	1.88	24	0.013	31.10	3.14	9.90	9.92	1.0	1.02	800.94	805.94		812.48	798.87	797.24	0.5	804.92			805.94	810.65		
					0.90	1.00	5.93	0.15	7.08	13.5							RCP																				Tie in from Line 3900 Connect to Line 100				
Line 300 (100 Yr)	302	301	221.20		0.40	1.25	17.10		6.94	767.3						RCB Headwall																				809.03	811.00				
	301	300	0.00		0.40	1.25	17.10	0.13	6.94	767.3						RCB	118.95	0.50	8x8 RCB	0.013	767.31	49.00	24.73	15.50	1.8	4.49	810.58	813.52		795.94	795.35		809.03	809.03	811.00	35 degree bend South					
		300			221.20	0.40	1.25	17.23	0.05	6.91	764.7						RCB	47.05	0.50	8x8 RCB	0.013	767.31	49.00	24.73	15.50	1.8	4.49	809.92	793.82		795.35	795.11		789.33	789.33			809.03	811.00		
Line 400	403	402	0.67		0.75	1.00	5.00		7.35	3.7	4.58	10.808	0.014	3.346	1.236	Curb Inlet																				808.29	810.55				
	402	401	0.25		0.67	1.00	5.00	0.19	7.35	3.7	3.17	10.415	L.P.	3.166	0.000	HDPE	122.00	1.00	18	0.01	13.69	1.77	7.75	10.73	0.8	0.41	808.29	806.70		811.40	807.11	805.89		806.28	806.28	809.57					
	401	400	0.48	0.45	0.92	0.80	1.00	5.00	0.12	7.35	5.4					RCP	79.00	2.96	24	0.013	39.03	3.14	12.42	10.73	0.7	0.16	806.28	800.02		804.82	802.48		799.86	799.86	809.57	Tie in from Line 3700					
		400			1.85	0.85	1.00	5.12	0.10	7.32	11.5						Curb Inlet	71.73	4.02	24	0.01	59.12	3.14	18.82	11.78	0.9	0.66	799.86	795.76		811.40	797.98	795.10	4.5	795.10			799.86	809.57		
Line 500 (100 Yr)	501	500	80.40	1.04	0.40	1.25	25.00		5.71	229.7						End Section																				804.52	815.50	Tie in from Line 3800			
		500			81.44	0.40	1.25	25.00	0.18	5.71	233.5						RCP	204.00	1.50	72	0.013	520.09	28.27	18.39	18.90	1.1	2.64	804.52	800.36		797.78	794.72		797.72			804.52	815.50			
Line 600	605	604	0.62		0.45	1.00	6.43		6.94	1.9	3.35	11.185	0.016	2.466	0.887	Curb Inlet																				813.76	821.94				
		604	0.16		0.62	0.45	1.00	25.00	0.08	4.00	1.1					RCP	46.76	1.00	12	0.013	3.57	0.79	4.55	9.58	0.8	0.14	813.90	813.90		823.27					813.76	822.04					
	603	603	0.00		0.78	0.50	1.00	6.43	0.31	6.94	2.7					HDPE	177.25	1.00	12	0.01	4.64	0.79	5.91	9.58	1.1	2.43	813.31	813.76		823.37	812.18	810.41	0.3	811.33	813.76	822.04					
	602	602	0.42		0.78	0.50	1.00	6.43	0.27	6.94	2.7					Man Hole																				809.17	816.93				
	602	601	0.42		0.67	1.00	6.43		6.94	2.0	2.26	8.946	0.010	1.764	0.499	Curb Inlet	155.82	1.00	12	0.01	4.64	0.79	5.91	9.58	1.1	2.16	811.24	811.33		810.11	808.55		809.17	809.17	816.93						
		601			1.20	0.58	1.00	6.43	0.06	6.94	4.6					RCP	35.39	1.95	18	0.013	14.71	1.77	8.32	9.58	0.9	0.28	805.17	805.41		807.89	807.20		806.13	806.13	816.92						
	601		0.25		0.67	1.00	6.24		6.99	1.2	1.17	5.881	0.010	0.935	0.235	Curb Inlet																				806.13	816.92				
		600			1.45	0.58	1.00	6.49	0.13	6.92	5.8						HDPE	117.31	5.07	18	0.01	30.83	1.77	17.45	14.67	1.0	0.98	806.13	799.73		812.25	804.70	798.75	2.5	798.75			806.13	816.92		
Line 700 (100 Yr)	708	707	17.12		0.51	1.25	18.92		6.61	72.2						End Section																				820.30	828.00				
	707	706	0.43		0.51	1.25	18.92	0.15	6.61	72.2						HDPE	121.26	1.55	48	0.01	233.11	12.57	18.55	13.74	1.0	1.29	820.30	820.05		828.30	816.31	814.43		818.76	818.76	826.47					
	706	706	0.21		17.55	0.52	125	19.07	0.06	6.59	74.7					RCP	38.10	1.00	48	0.013	144.03	12.57	11.48	10.90	1.0	0.89	818.22	818.76		828.30	814.13	813.75		817.88	817.88	826.47					
	705	705			0.80	1.25	6.21		9.84	2.1	2.07					Curb Inlet																					817.88	826.47			
	705	704	16.96		17.76	0.52	125	19.13	0.64	6.58	76.0					HDPE	416.22	3.15	48	0.01	332.32	12.57	26.44	10.90	1.0	3.25	817.59	817.88		817.62	813.45	800.34		814.62	814.62	816.29					
	704	704	2.39		34.72	0.86	1.25	19.76	0.41	6.47	242.5					RCP	289.40	1.00	66	0.01	437.73	23.76	18.42	11.68	1.4	5.27	807.87	814.62		812	800.04	797.14	0.30	809.35	809.35	810.67					
	704	703																																							



\* See Sheet 23 for structures over 7'-0"

- STEEL FRAME NOTES:
1. ALL WELDS SHALL BE PERFORMED IN ACCORDANCE WITH APPROPRIATE AWS SPECIFICATIONS AND PROCEDURES.
  2. ALL WELDS ON EXPOSED SURFACES SHALL BE DRESSED SO AS TO PROVIDE A PLEASING FINISHED APPEARANCE.
  3. THE ENTIRE FRAME SHALL BE PAINTED A SINGLE COAT OF CHEM-PRIME #37H-78 PRIMER (GRAY) OR EQUAL.

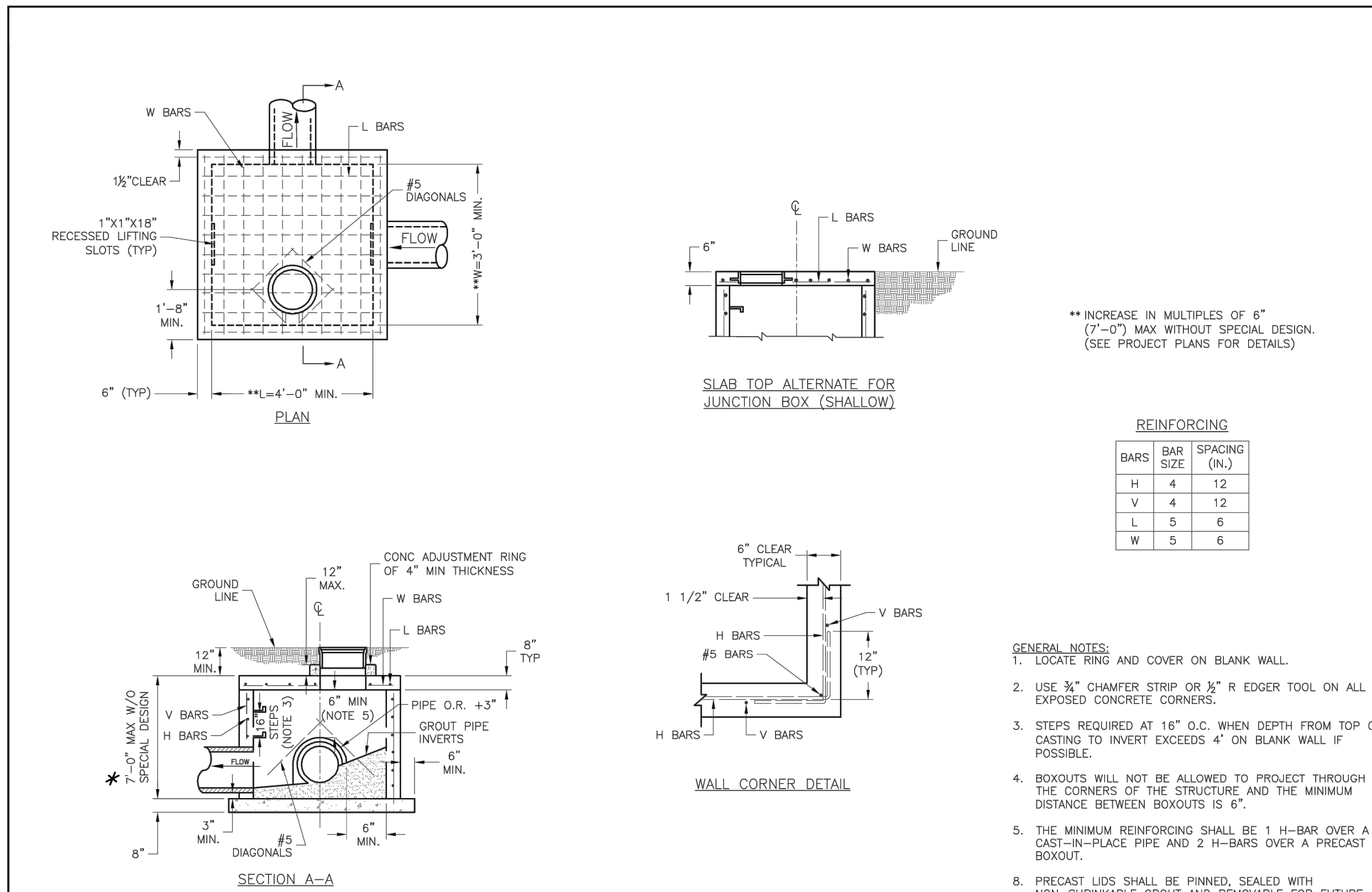
- GENERAL NOTES:
1. THE FIRST DIMENSION LISTED IN THE CONSTRUCTION NOTES IS THE "L" DIMENSION. THE SECOND DIMENSION IS THE "W" DIMENSION.
  2. FLOW LINES LISTED ON THE PROJECT PLANS ARE LISTED AT THE INSIDE FACE OF THE WALL.
  3. FLOOR OF INLET GROUDED AND SHAPED TO MATCH PIPE INVERT TO PROVIDE SMOOTH FLOW.
  4. LOCATE MH RING AND COVER ON BLANK WALL IF POSSIBLE.
  5. STEPS SHALL BE SPACED AT 1'-4" O.C. VERTICALLY ON BLANK WALL IF POSSIBLE.
  6. BEVEL ALL EXPOSED EDGES WITH 3/4" CHAMFER OR 1/2" TOOLED EDGE.
  7. ON-GRADE INLETS SHALL CONFORM TO THE STREET GRADE AND SUMP INLETS SHALL BE LEVEL.
  8. PRECAST LIDS SHALL BE PINNED, SEALED WITH NON-SHRINKABLE GROUT AND REMOVABLE FOR FUTURE MAINTENANCE.
  9. LIFTING RINGS SHALL BE REMOVED AND SEALED WITH NON-SHRINKABLE GROUT
  10. FOR RING AND COVER SEE THE STORMWATER APPROVED PRODUCT LIST.

LEE'S SUMMIT MISSOURI  
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

STANDARD DETAILS  
CITY OF LEE'S SUMMIT, MO  
LEE'S SUMMIT, JACKSON COUNTY, MO  
Curb Inlet Detail

Drawn By: MIF  
Checked By: DL  
Date: 04/17  
Proj. #

STM-1



\* See Sheet 23 for structures over 7'-0"

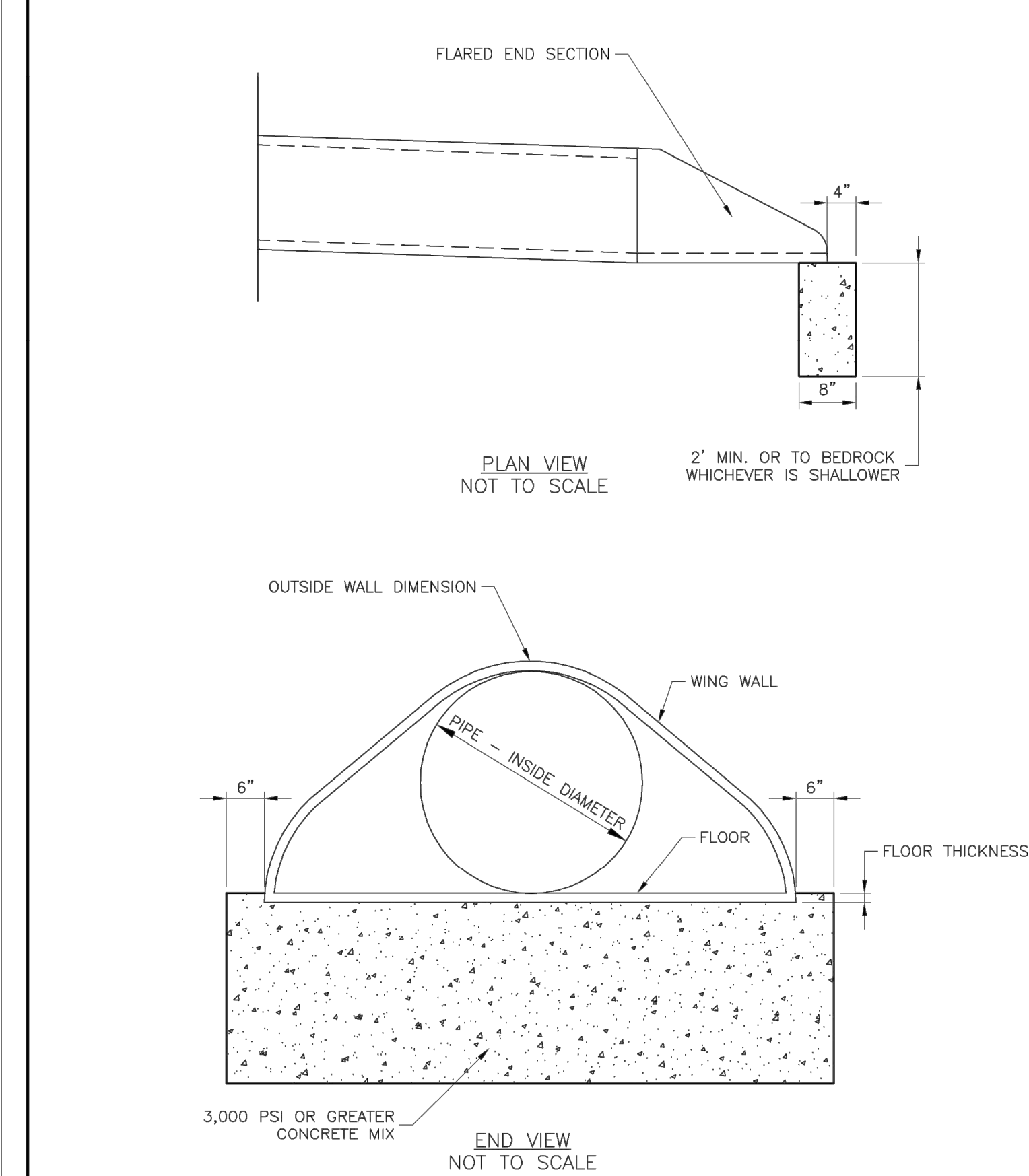
- REINFORCING
- | BAR | BAR SIZE | SPACING (IN.) |
|-----|----------|---------------|
| H   | 4        | 12            |
| V   | 4        | 12            |
| L   | 5        | 6             |
| W   | 5        | 6             |
- GENERAL NOTES:
1. LOCATE RING AND COVER ON BLANK WALL.
  2. USE 3/4" CHAMFER STRIP OR 1/2" R EDGER TOOL ON ALL EXPOSED CONCRETE CORNERS.
  3. STEPS REQUIRED AT 16" O.C. WHEN DEPTH FROM TOP OF CASTING TO INVERT EXCEEDS 4' ON BLANK WALL IF POSSIBLE.
  4. BOXOUTS WILL NOT BE ALLOWED TO PROJECT THROUGH THE CORNERS OF THE STRUCTURE AND THE MINIMUM DISTANCE BETWEEN BOXOUTS IS 6".
  5. THE MINIMUM REINFORCING SHALL BE 1 H-BAR OVER A CAST-IN-PLACE PIPE AND 2 H-BARS OVER A PRECAST BOXOUT.
  6. PRECAST LIDS SHALL BE PINNED, SEALED WITH NON-SHRINKABLE GROUT AND REMOVABLE FOR FUTURE MAINTENANCE.
  7. REINFORCING OF COVERS IN STREETS REQUIRE SPECIAL DESIGN.
  8. FOR RING AND COVER SEE THE STORMWATER APPROVED PRODUCT LIST.

LEE'S SUMMIT MISSOURI  
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063

STANDARD DETAILS  
CITY OF LEE'S SUMMIT, MO  
LEE'S SUMMIT, JACKSON COUNTY, MO  
Junction Box Detail

Drawn By: MIF  
Checked By: DL  
Date: 04/17  
Proj. #

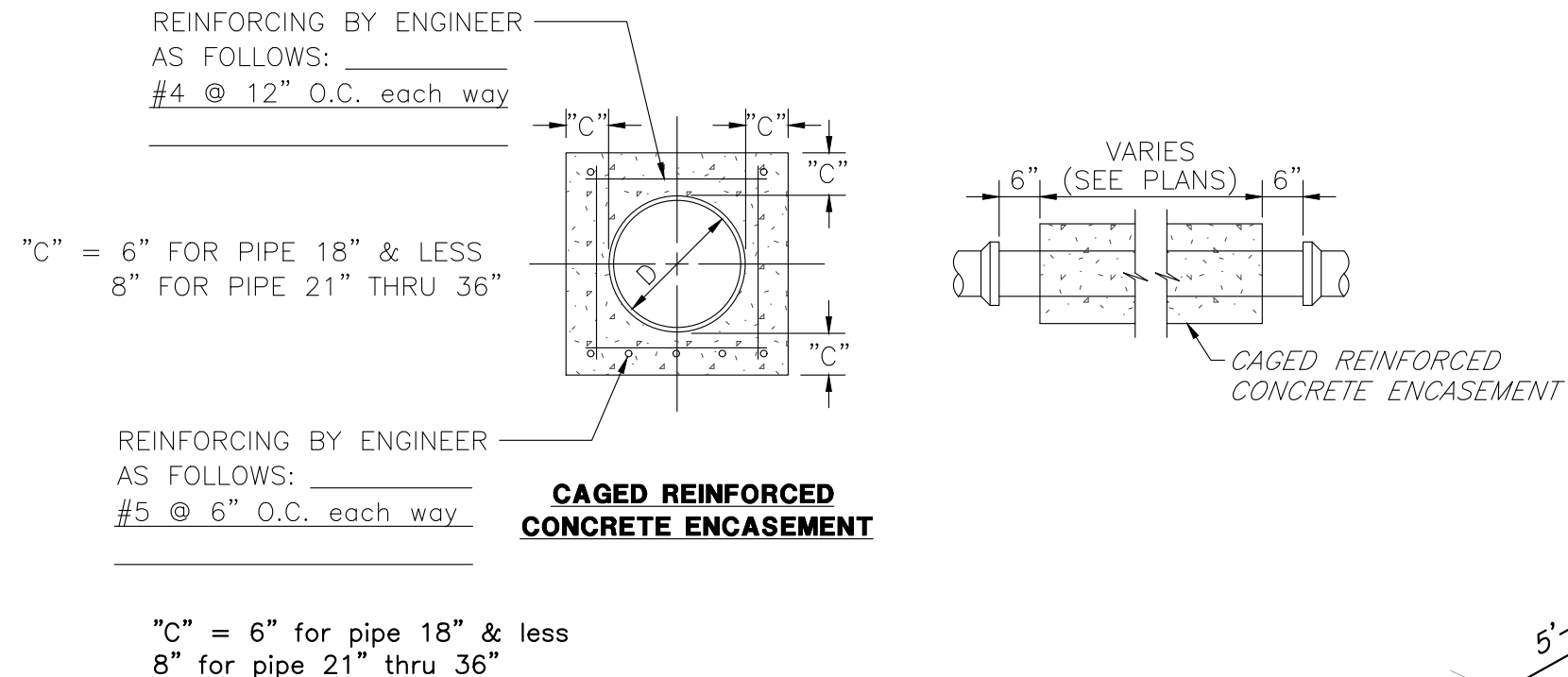
STM-3



LEE'S SUMMIT MISSOURI  
PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063  
FLARED END SECTION SUPPORT DETAIL

Date: 04/17  
Drawn By: MIF  
Checked By: DL

STM-5



"C" = 6" for pipe 18" & less  
8" for pipe 21" thru 36"

- Notes:
1. All encasements shall be centered on the crossing.
  2. All concrete shall be KCMMB 4K

CAGED REINFORCED CONCRETE ENCASEMENT

Not to Scale

STATE OF MISSOURI  
BRADLEY D. BURTON  
NUMBER E-25862  
REGISTERED PROFESSIONAL ENGINEER  
3/10/20

GBA architects engineers

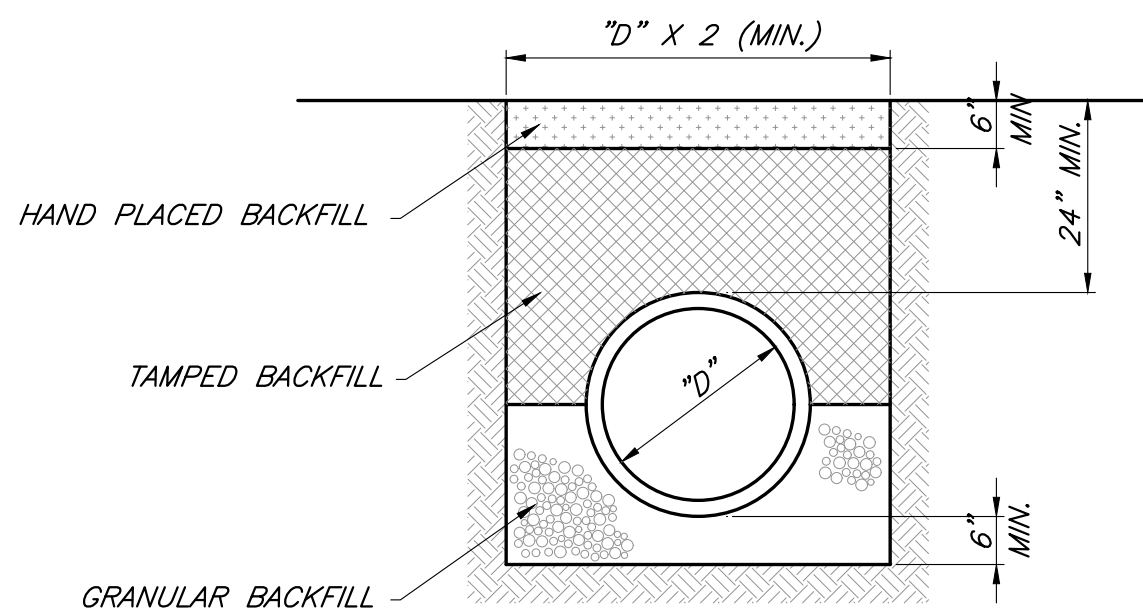
9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

DATE: 04/17/2020  
DESIGN BY: CEL  
DRAWN BY: DL  
PROJECT NO.: 12720  
SHEET NO. 17  
TOTAL SHEETS 43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
5/15/18		Revised Field Elevations		
8/7/18		City Comments		
8/28/18		City Comments		
9/14/18		City Comments		
10/10/18		Removed Floodway Grading		
3/10/20		City Comments		



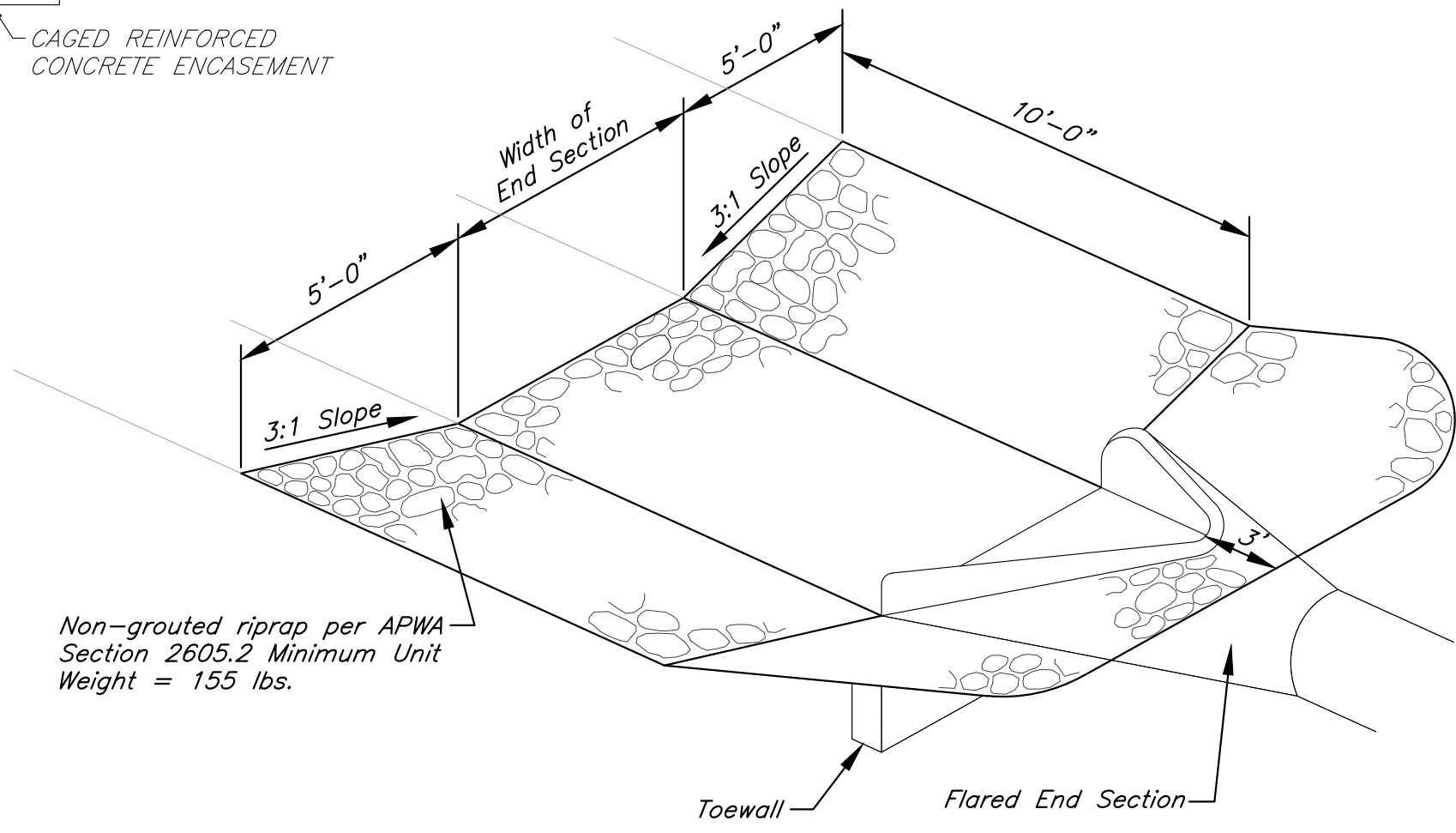
FIRST CLASS BEDDING (RCP)

NOTES:

1. GRANULAR FILL SHALL BE 1/2" CLEAN ROCK, PLACED IN 6" LIFTS AND COMPACTED BY SLICING WITH A SHOVEL.
2. TAMPED FILL SHALL BE FINELY DIVIDED, JOB EXCAVATED MATERIAL FREE OF DEBRIS, ORGANIC MATERIAL, AND STONES, COMPACTED TO TYPE AA MR-5 COMPACTION.
3. HAND PLACED FILL SHALL BE FINELY DIVIDED MATERIAL, FREE OF DEBRIS AND STONES, COMPACTED TO TYPE AA MR-5 COMPACTION.
4. ALL PIPE SHALL BE INSPECTED PRIOR TO BACKFILL. ALL PIPE COVERED PRIOR TO INSPECTION SHALL BE UNCOVERED AT THE CONTRACTORS EXPENSE.

PIPE BEDDING DETAILS

Not to Scale



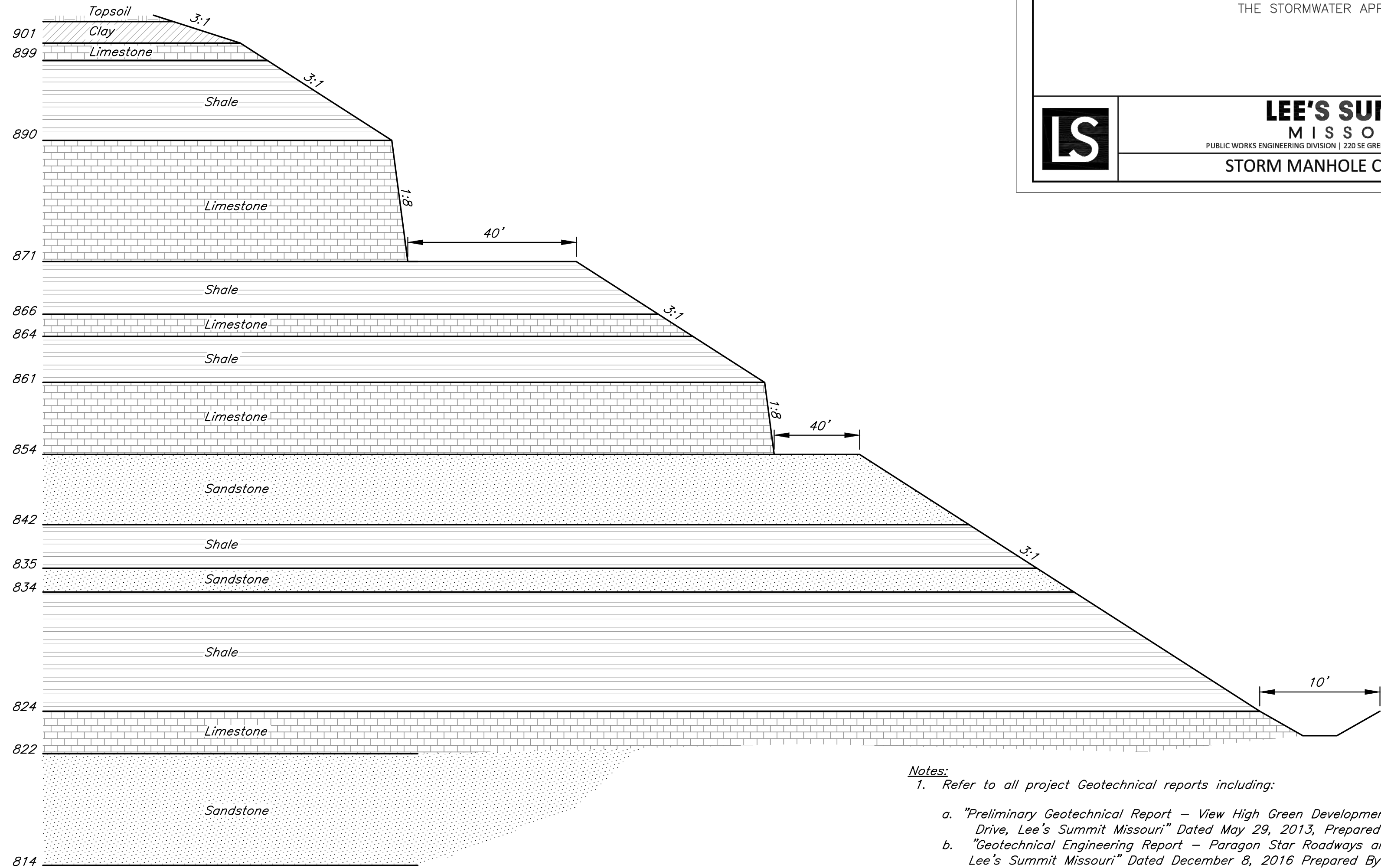
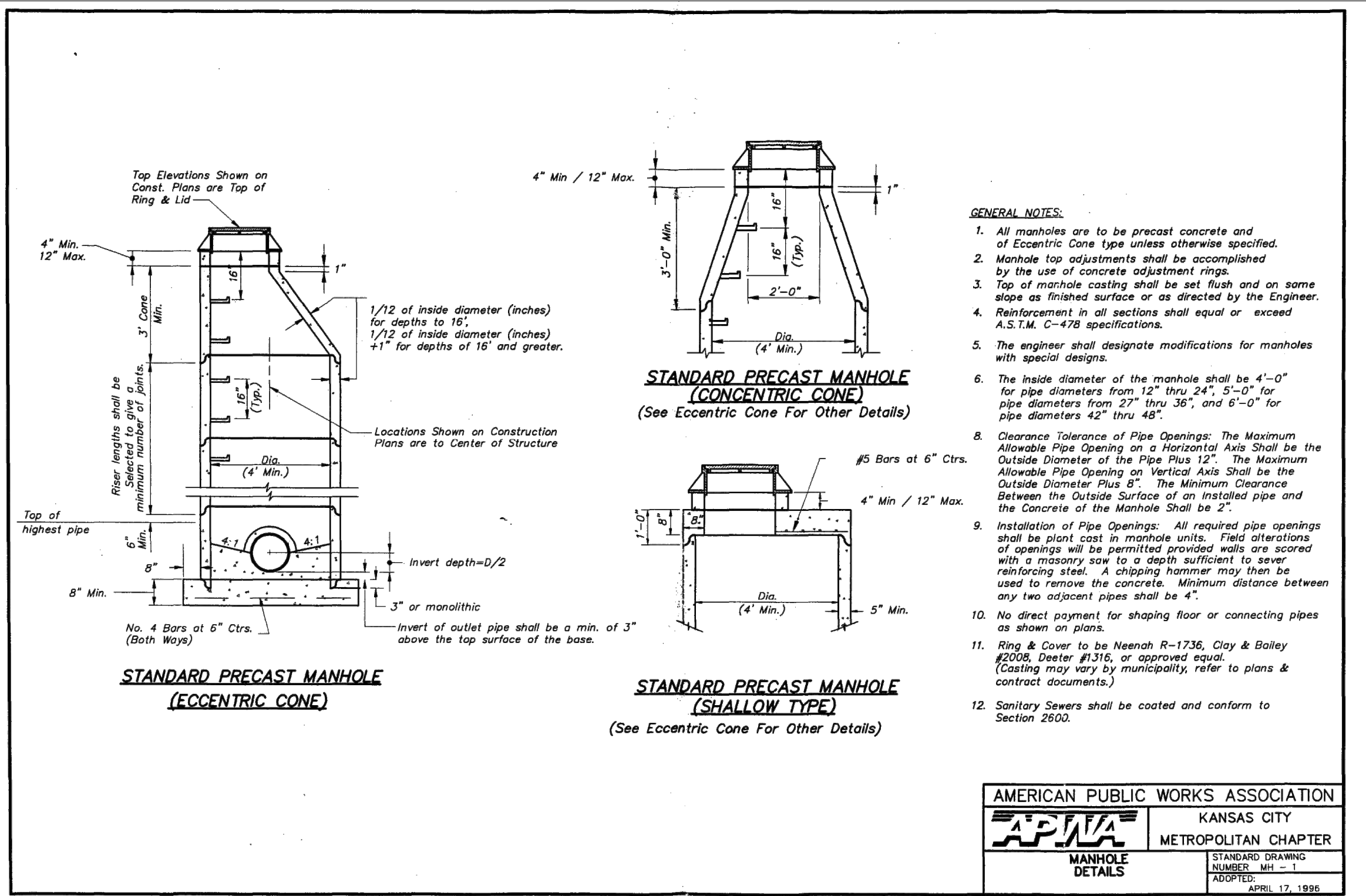
Non-grouted riprap per APWA Section 2605.2 Minimum Unit Weight = 155 lbs.

ENTRANCE EROSION PROTECTION - RIPRAP

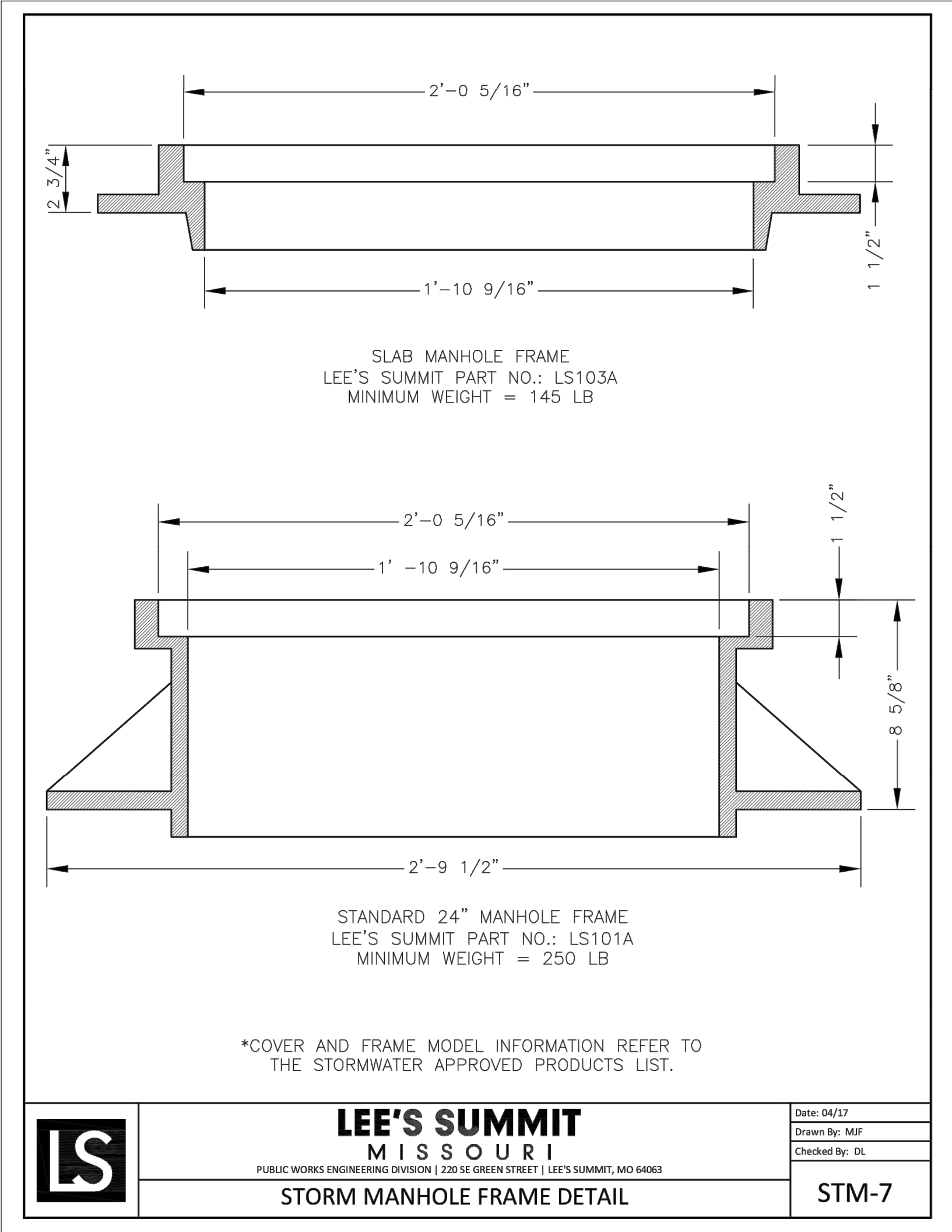
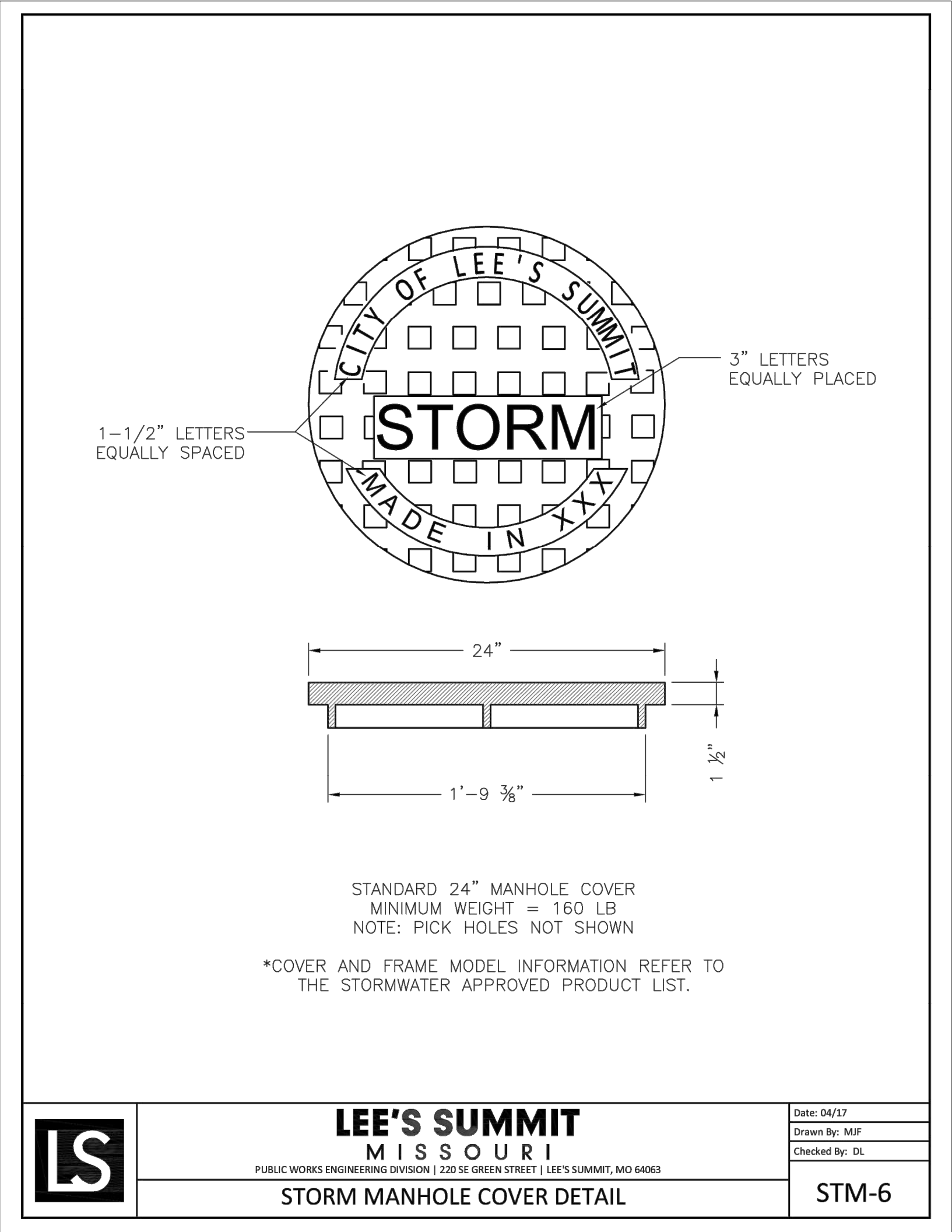
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Construction Details

G:\12720\Civil 3D\Production Drawings\Mass Grading\Lee's Summit\12720C4600.dwg Layout: 1:8 Construction Details -- Tuesday March 10, 2020, 2:03pm -- Copyright 2020, George Buller Associates, Inc. Architect 00212, Professional Engineer 000133, Landscape Architect 000025, Professional Land Surveyor 000059

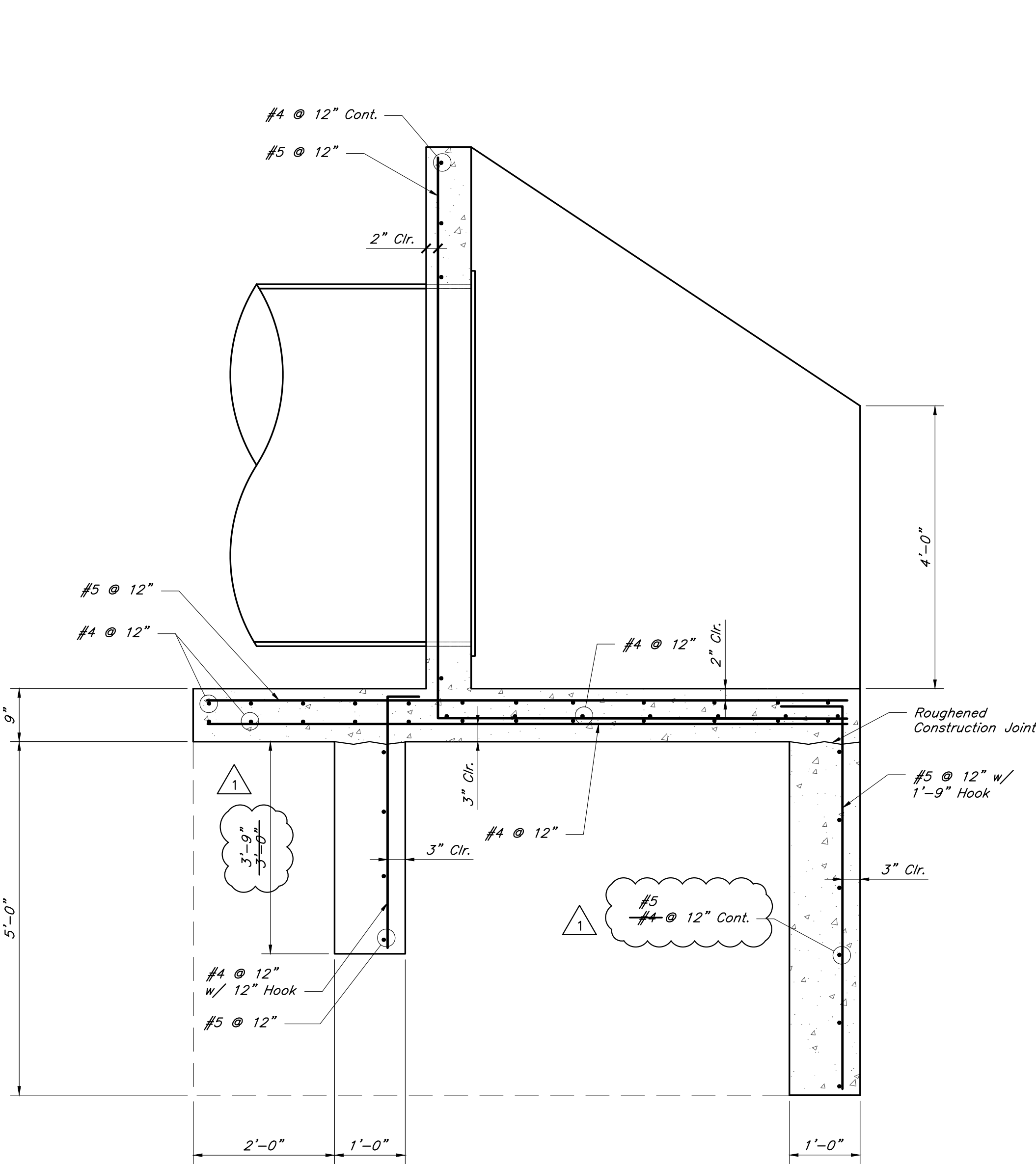


- Notes:**
- Refer to all project Geotechnical reports including:
    - "Preliminary Geotechnical Report - View High Green Development, I-470 & View high Drive, Lee's Summit Missouri" Dated May 29, 2013, Prepared By Terracon Consultants, Inc.
    - "Geotechnical Engineering Report - Paragon Star Roadways and Borrow Source, Lee's Summit Missouri" Dated December 8, 2016 Prepared By Terracon Consultants, Inc.
    - "Geotechnical Engineering Report Addendum #1 Paragon Star Roadways and Borrow Source - Rock Slopes" Dated January 4, 2017 Prepared By Terracon Consultants, Inc.
  - Section Based off of Boring B-109, Actual elevations of each geological strata may vary on site.
  - On-Site Geotechnical Engineer will identify limits of each strata, and resulting slope recommendations.

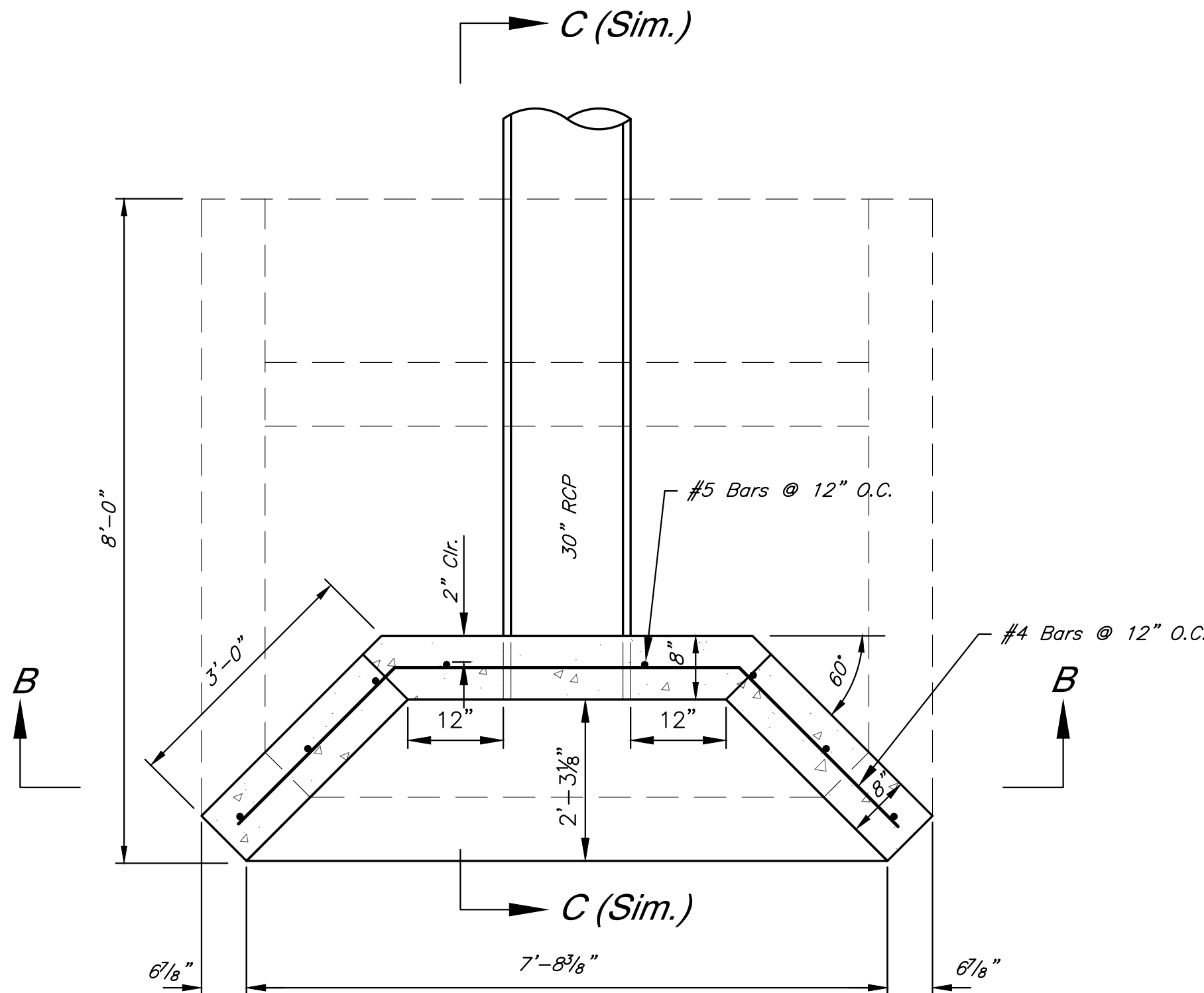


		<b>GBA</b> architects engineers 9801 Renner Boulevard Lenexa, Kansas 66219 913.492.0400 www.gbateam.com	
		DATE:	04/15/2020
		DESIGN BY:	CEL
		DRAWN BY:	DL
Bradley D. Burton Professional Engineer License No. 25862		PROJECT NO.:	12720
		SHEET NO.	18
		TOTAL SHEETS	43
		Storm Sewer Improvements and Mass Grading <b>Paragon Star Development</b> Lee's Summit, Missouri	
NO.		DATE	REVISIONS
		5/15/18	Revised Field Elevations
		8/7/18	City Comments
		8/28/18	City Comments
		9/14/18	City Comments
		10/10/18	Removed Floodway Grading
		3/10/20	City Comments

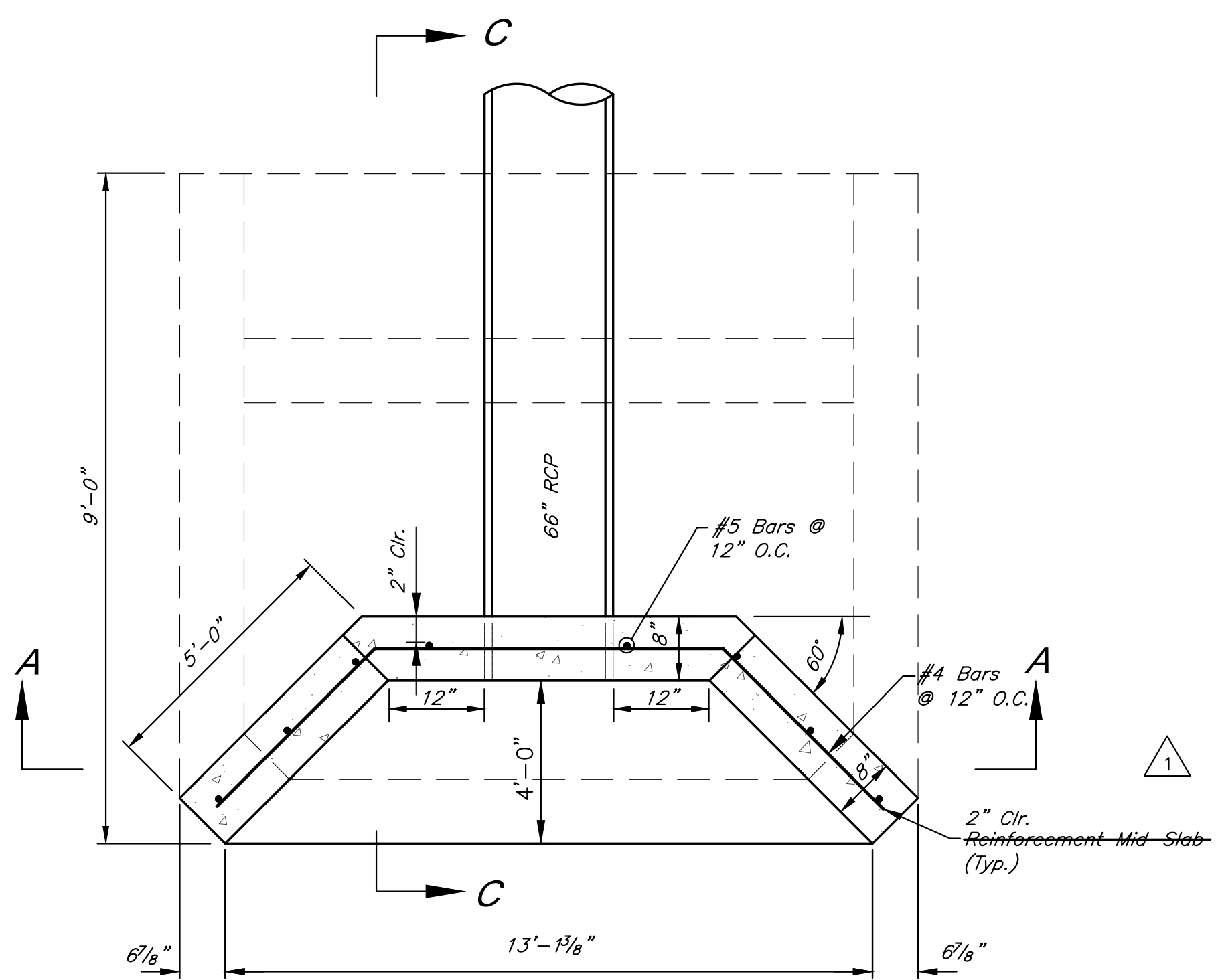
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**SECTION C-C - STRUCTURE 700**  
Not to Scale



**HEADWALL DETAIL - STRUCTURE 1200**  
Not to Scale



**HEADWALL DETAIL - STRUCTURE 700**  
Not to Scale

Headwall Details

BRADLEY D. BURTON  
NUMBER  
E-25862  
REGISTERED PROFESSIONAL ENGINEER  
3/10/20

**GBA**  
architects  
engineers

9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
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DATE:	
DESIGN BY:	CEL
DRAWN BY:	DRV
PROJECT NO.:	12720
SHEET NO.	TOTAL SHEETS
19	43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/23/17	KEYWAY DEPTH AND REINFORCEMENT	RJF	EWB
2	5/15/18	Revised Field Elevations		
3	8/7/18	City Comments		
4	8/28/18	City Comments		
5	9/14/18	City Comments		
6	10/10/18	Removed Floodway Grading		
7	4/9/19	Structure 700 removed from floodway		
8	3/10/20	City Comments		

RELEASE FOR  
CONSTRUCTION  
AS NOTED ON PLANS REVIEW  
DEVELOPER'S SERVICES  
LEE'S SUMMIT, MISSOURI

GENERAL NOTES – STRUCTURAL

DESIGN SPECIFICATIONS:                    ACI 318R–11, AISC 14TH EDITION

GENERAL:

1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY OBSERVED DISCREPANCIES IN DIMENSIONS, DETAILING, OR OTHER ITEMS AS SHOWN ON THE PLANS OR SPECIFIED PRIOR TO PROCEEDING WITH WORK RELATING TO SAID DISCREPANCIES.
2. THE CONTRACTOR SHALL NOT ALTER OR MODIFY WORK SHOWN ON THE STRUCTURAL DRAWINGS WITHOUT RECEIVING WRITTEN APPROVAL FROM THE ENGINEER.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING SHOP DRAWINGS REINFORCING STEEL, HANDRAILS AND POST–INSTALLED ANCHORS. SHOP DRAWINGS MUST BE REVIEWED FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION, AND SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO, ALL OF WHICH ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR, AND SHALL BE STAMPED "APPROVED" BY THE CONTRACTOR PRIOR TO SUBMITTAL. SHOP DRAWINGS SUBMITTED WITHOUT THE CONTRACTOR’S STAMPED APPROVAL WILL BE RETURNED REJECTED. ALL SHOP DRAWINGS SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO CONSTRUCTION.
4. THE STRUCTURAL SYSTEMS SHOWN ON THESE DOCUMENTS HAVE BEEN DESIGNED FOR THE FINAL IN PLACE USAGE OF THE STRUCTURE BASED ON THE INTENDED OCCUPANCY AND CODE REQUIREMENTS. WHILE GENERAL CONSTRUCTABILITY HAS BEEN CONSIDERED, THE STRUCTURAL SYSTEMS HAVE NOT BEEN DESIGNED TO ACCOMMODATE SPECIFIC CONSTRUCTION MEANS AND METHODS THAT MIGHT BE UTILIZED BY THE CONTRACTOR.
5. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE, AND EXCEPT WHERE SPECIFICALLY SHOWN, DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, PROCEDURES, TECHNIQUES, SEQUENCE, AND SAFETY PRECAUTIONS AND PROGRAMS. THE ENGINEER WILL NOT BE RESPONSIBLE FOR THE ACTS OR OMISSION OF THE CONTRACTOR, SUBCONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. PERIODIC SITE OBSERVATION BY FIELD REPRESENTATIVES OF GBA, IF PROVIDED, IS SOLELY FOR THE PURPOSE OF DETERMINING IF THE WORK OF THE CONTRACTOR IS PROCEEDING IN GENERAL ACCORDANCE WITH THE STRUCTURAL CONTRACT DOCUMENTS. THIS LIMITED SITE OBSERVATION SHOULD NOT BE CONSTRUED AS EXHAUSTIVE OR CONTINUOUS TO CHECK THE QUALITY OR QUANTITY OF THE WORK, BUT RATHER PERIODIC IN AN EFFORT TO GUARD THE OWNER AGAINST DEFECTS OR DEFICIENCIES IN THE WORK OF THE CONTRACTOR.
7. MDT SPECIFICATIONS SHALL APPLY TO ALL ITEMS NOT SPECIFICALLY ADDRESSED IN THESE PLANS.

FOUNDATIONS:

1. FOUNDATIONS FOR THIS PROJECT HAVE BEEN DESIGNED IN ACCORDANCE WITH REQUIREMENTS SET FORTH IN A SOILS REPORT PREPARED BY TERRACON CONSULTANTS, INC. DEC. 8, 2016 (TERRACON PROJ. NO. 02165208). WALLS HAVE BEEN DESIGNED FOR AN ALLOWABLE SOIL BEARING VALUE OF 1500 PSF. THE CONTRACTOR SHALL REFER TO SOIL REPORT FOR ALL REQUIREMENTS AND RECOMMENDATIONS PERTINENT TO THIS PROJECT.

CONCRETE AND REINFORCING STEEL:

1. CONCRETE MIX DESIGNS SHALL MEET THE FOLLOWING REQUIREMENTS: (TAKEN FROM ACI 211.1)

MINIMUM COMPRESSIVE STRENGTH (psi)	MAXIMUM AGGREGATE SIZE (IN.)	MIN. CEMENT (LBS.)	MAXIMUM WATER/CEMENT RATIO	MAXIMUM SLUMP (IN.)	AIR ENTRAINMENT PERCENT (%)
4000	¾	611	.48	4	6±1

NOTE: DO NOT ADD WATER TO CONCRETE DURING DELIVERY, AT PROJECT SITE, OR DURING PLACEMENT. THE INTENT OF THESE SPECIFICATIONS IS THAT THE CONTRACTOR SUPPLY CONCRETE MIXES WITH A MINIMUM AMOUNT OF MIX WATER IN ORDER TO LIMIT PLASTIC SHRINKAGE CRACKING. IT IS EXPECTED THAT WORKABILITY FOR CONCRETE MIXES WILL REQUIRE THE ADDITION OF WATER–REDUCING AND/OR SUPER–PLASTICIZING ADMIXTURES.

2. LAP SPlice LENGTHS FOR HORIZONTAL #4 AND #5 BARS ARE 2’–0” AND 2’–6” RESPECTIVELY.
3. ALL CONCRETE IS REINFORCED UNLESS SPECIFICALLY CALLED OUT AS UN–REINFORCED. REINFORCE ALL CONCRETE NOT OTHERWISE SHOWN WITH SAME STEEL AS IN SIMILAR SECTIONS OR AREAS.
4. NO ALUMINUM ITEMS SHALL BE EMBEDDED IN ANY CONCRETE OR PLACED IN CONTACT WITH CONCRETE.
5. CAST–IN–PLACE CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST AMERICAN CONCRETE INSTITUTE DOCUMENTS. ACI301, 305, 306, 315, 318, AND 347 UNLESS OTHERWISE NOTED IN THESE CONTRACT DOCUMENTS.
6. PRIOR TO PLACING CONCRETE IN ANY LOCATION, IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO HAVE THOROUGHLY CHECKED AND COORDINATED ALL DIMENSIONS, ELEVATIONS, OPENINGS, RECESSES, AND BLOCKOUTS SHOWN ON THE ARCHITECTURAL, STRUCTURAL AND MECHANICAL/ELECTRICAL/PLUMBING DRAWINGS. IN THE EVENT ERRORS, CONFLICTS, OR OMISSIONS EXIST, IT SHALL BE THE CONTRACTOR’S RESPONSIBILITY TO CONTACT THE ARCHITECT OR ENGINEER FOR NECESSARY CORRECTIVE ACTION.
7. REINFORCING BARS #4 AND LARGER (EXCEPT TIES AND STIRRUPS) SHALL MEET ASTM A615 WITH SUPPLEMENTARY REQUIREMENTS (S1), GRADE 60. SMALLER BARS SHALL BE GRADE 40.
8. CONCRETE COVERAGE OF REINFORCEMENT SHALL HAVE THE FOLLOWING CLEAR DISTANCES UNLESS NOTED OTHERWISE ON THE DRAWINGS:
- CAST AGAINST EARTH \_\_\_\_\_3”

FORMED CONCRETE EXPOSED  
TO EARTH OR WEATHER \_\_\_\_\_2”

NOT EXPOSED TO EARTH  
OR WEATHER \_\_\_\_\_1” SLABS, 1–½” BEAMS AND COLUMNS
9. EMBEDDED AND ALL REINFORCING BARS MARKED CONTINUOUS SHALL BE EMBEDDED TO DEVELOP THE FULL TENSION CAPACITY OF THE BAR. LAPS SHALL BE CLASS B TENSION LAPS UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS.
10. ALL BARS ARE TO BE SUPPORTED IN FORMS AND SPACED WITH WIRE BAR SUPPORTS PER ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING CONCRETE STRUCTURES" (LATEST EDITION). BARS SHALL BE SECURELY WIRED PER LATEST EDITION OF CRSI’S "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS." ACCESSORIES FOR EXPOSED CONCRETE SHALL BE PLASTIC OR HAVE PLASTIC–TIPPED FEET.
11. CONCRETE PLACED DURING COLD WEATHER SHALL CONFORM TO THE REQUIREMENTS OF ACI 306R–88. COLD WEATHER IS DEFINED AS A PERIOD WHEN, FOR MORE THAN 3 SUCCESSIVE DAYS, THE MEAN DAILY TEMPERATURE DROPS BELOW 40°F.
12. CONCRETE PLACED DURING HOT WEATHER SHALL CONFORM TO THE REQUIREMENTS OF ACI 305R–99. HOT WEATHER IS DEFINED AS THAT COMBINATION OF AIR TEMPERATURE, RELATIVE HUMIDITY AND WIND SPEED THAT WILL CAUSE A RATE OF EVAPORATION OF 0.2 LB/SQ.FT./HR. OR MORE AS DEFINED BY FIGURE 2.1.5 OF ACI 305R–99.
13. CHAMFER ALL EXPOSED CORNERS OF CONCRETE SLABS, WALLS, BEAMS AND COLUMNS ¾”, UNLESS NOTED OTHERWISE ON DETAILS.

POST–INSTALLED ANCHORS AND REBAR:

1. POST–INSTALLED ANCHORS AND REBAR SHALL BE INSTALLED USING AN ADHESIVE UNLESS SPECIFICALLY NOTED OTHERWISE. ANCHORS SHALL CONSIST OF THE FOLLOWING ANCHOR TYPES, AS PROVIDED BY HILTI, INC.:
- a) ANCHORAGE TO CONCRETE

(1) HILTI HIT–HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT (TE–CD OR TE–YD)

(2) STEEL ANCHOR ELEMENT SHALL BE HILTI HAS–E THREADED ROD PER ICC ESR–3187.
- b) REBAR DOWELING INTO CONCRETE

(1) HILTI HIT–HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT (TE–CD OR TE–YD) AND CONTINUOUSLY DEFORMED REBAR PER ICC ESR–3187.
2. CONTACT HILTI AT (800) 879–8000 FOR PRODUCT RELATED QUESTIONS.
3. IF THE CONTRACTOR CHOOSES TO SUBMIT A SUBSTITUTION FOR APPROVAL, THEY MUST ATTACH CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE JURISDICTION WHERE THE PROJECT IS LOCATED SHOWING THAT THE SUBSTITUTION IS "EQUAL". THE ICC–ES EVALUATION REPORT FOR THE "EQUAL" PRODUCT MUST ALSO BE SUBMITTED FOR REVIEW. THE CONTRACTOR SHALL NOTE THAT THE ICC–REPORT MAY INDICATE ADDITIONAL SPECIAL INSPECTION REQUIREMENTS. ANY ADDITIONAL SPECIAL INSPECTION REQUIREMENTS MUST BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.
4. INSTALL ANCHORS PER THE MANUFACTURER INSTRUCTIONS, AS INCLUDED IN THE ANCHOR PACKAGING.
5. THE CONTRACTOR SHALL ARRANGE AN ANCHOR MANUFACTURER’S REPRESENTATIVE TO PROVIDE ONSITE INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCTS SPECIFIED. THE STRUCTURAL ENGINEER OF RECORD MUST RECEIVE DOCUMENTED CONFIRMATION THAT ALL OF THE CONTRACTOR’S PERSONNEL WHO INSTALL ANCHORS ARE TRAINED PRIOR TO THE COMMENCEMENT OF INSTALLING ANCHORS.
6. OVERHEAD ADHESIVE ANCHORS MUST BE INSTALLED USING THE HILTI PROFI SYSTEM.
7. ANCHOR CAPACITY IS DEPENDANT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGE OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS.
8. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURE MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. UNLESS NOTED ON THE DRAWINGS THAT THE BARS CAN BE CUT, THE CONTRACTOR SHALL REVIEW THE EXISTING STRUCTURAL DRAWINGS AND SHALL UNDERTAKE MEASURES TO LOCATE THE POSITION OF THE EXISTING REINFORCING BARS AT THE LOCATIONS OF THE CONCRETE ANCHORS, BY HILTI FERROSCAN, GPR, X–RAY, OR OTHER MEANS.

STATE OF MISSOURI  
BRADLEY D. BURTON  
NUMBER  
E–25862  
REGISTERED PROFESSIONAL ENGINEER  
3/10/20

GBA  
architects  
engineers

9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

DATE:  
DESIGN BY:  
DRAWN BY:  
PROJECT NO.:  
SHEET NO.  
TOTAL SHEETS

CEL  
04/15/2020  
DRL  
12720

2043

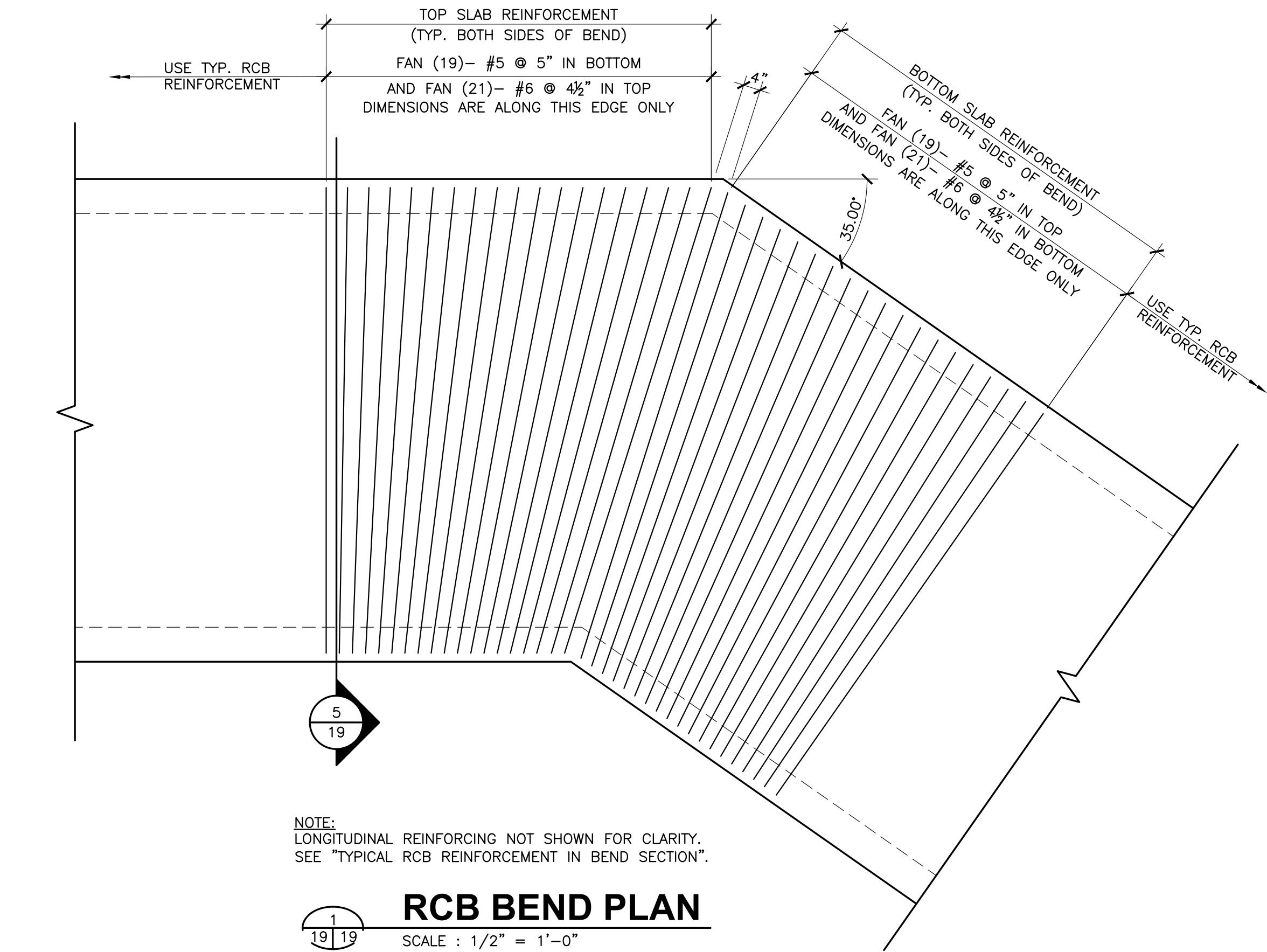
Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
	8/28/18	City Comments		
	9/14/18	City Comments		
	10/10/18	Removed Floodway Grading		
	11/29/18			
△	4/11/19	Temporary River Crossing Repair		
△	4/15/19	Temporary River Crossing Repair		
△	3/10/20	City Comments		

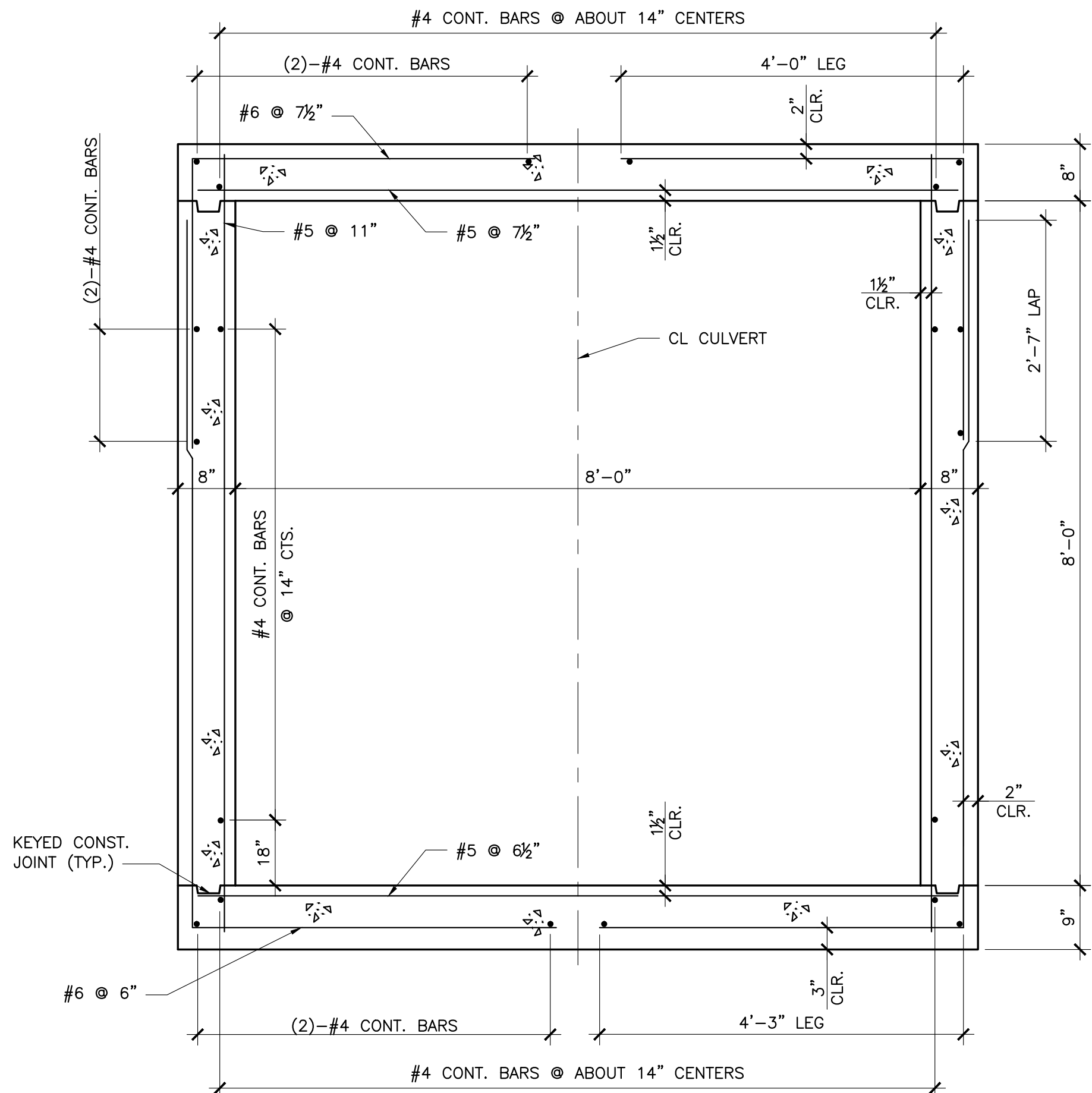
Structural General Notes

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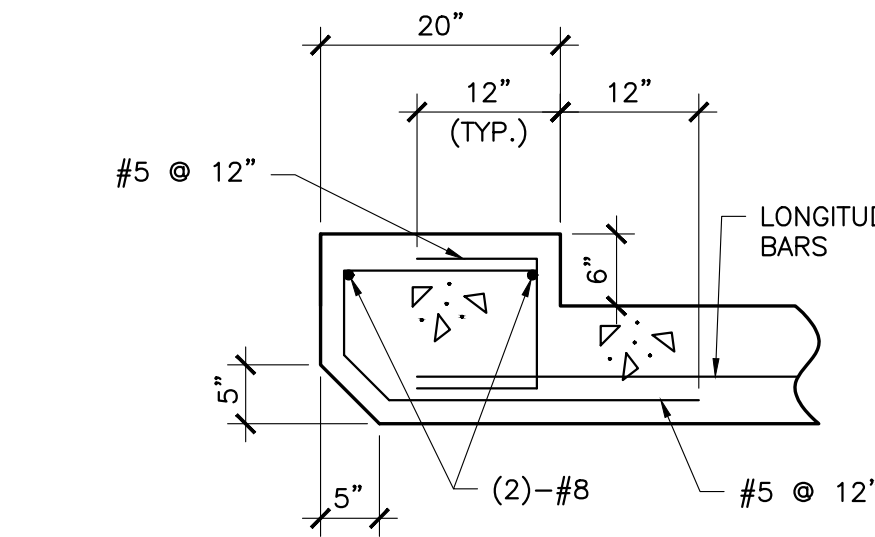
### RCB BEND PLAN

SCALE : 1/2" = 1'-0"



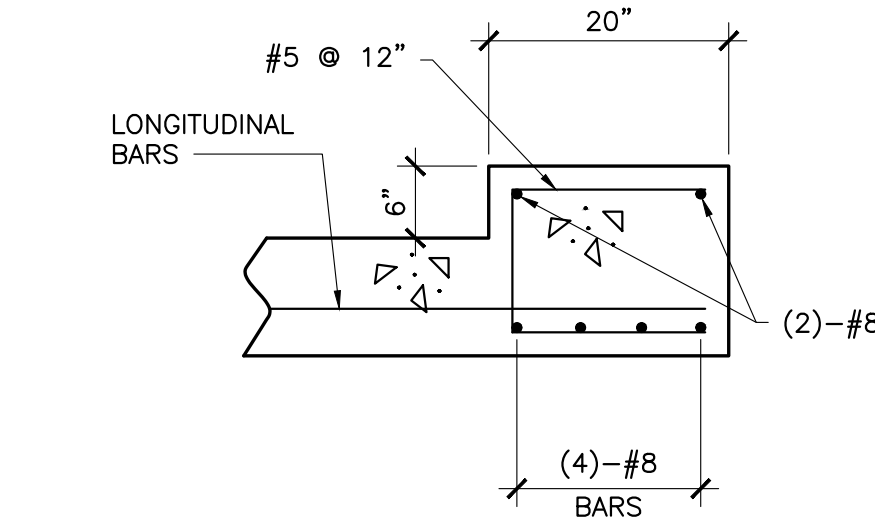
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SCALE : 3/4" = 1'-0"



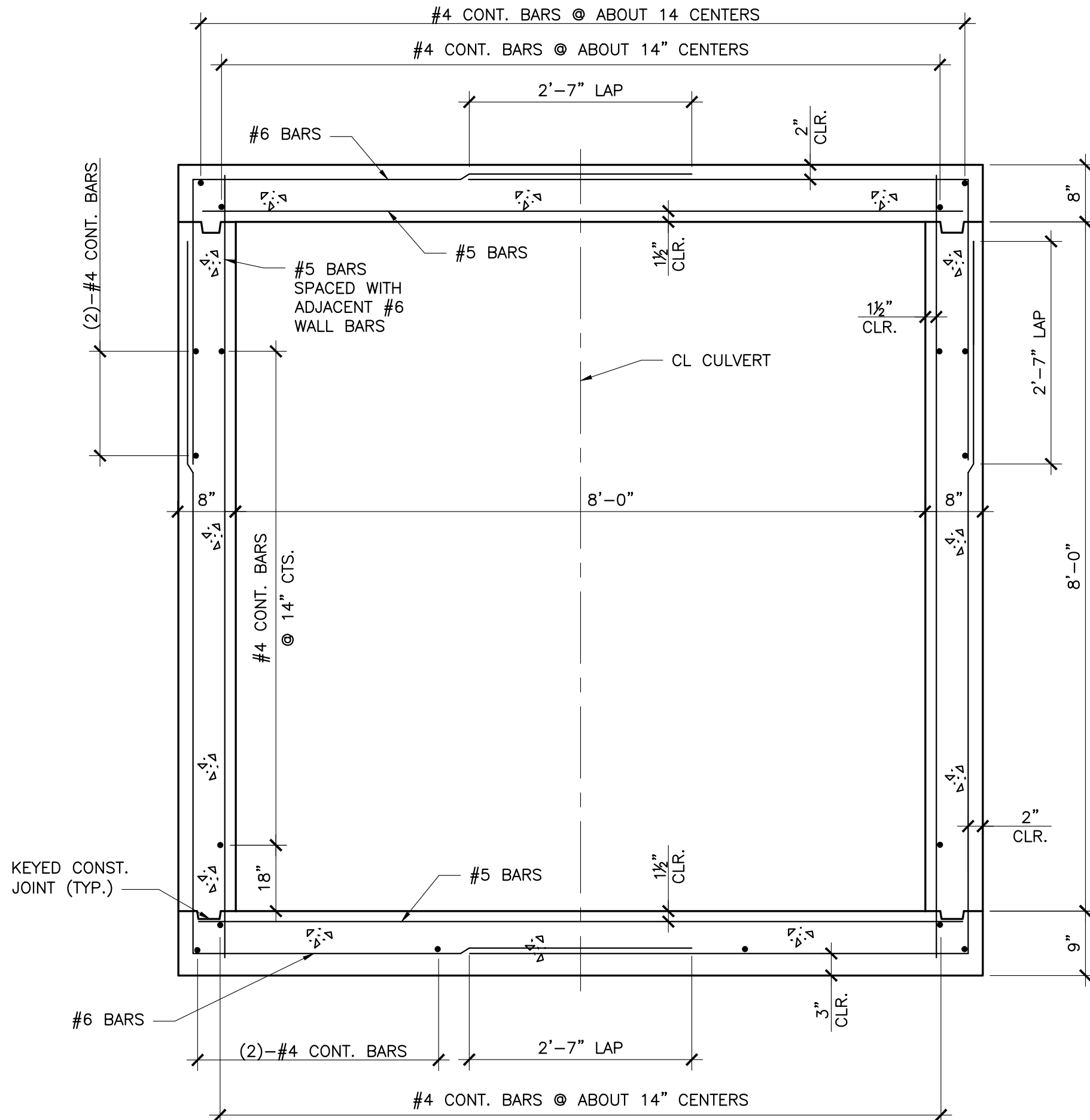
### UPSTREAM HEADWALL REINFORCEMENT

SCALE : 3/4" = 1'-0"



### DOWNSTREAM HEADWALL REINFORCEMENT

SCALE : 3/4" = 1'-0"



### TYPICAL RCB REINFORCEMENT IN BEND SECTION

SCALE : 3/4" = 1'-0"

STATE OF MISSOURI

BRADLEY D. BURTON

NUMBER E-25862

REGISTERED PROFESSIONAL ENGINEER

3/10/20

GBA

architects

engineers

9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

DATE: 04/10/2020

DESIGN BY: CEL

DRAWN BY: DRI

PROJECT NO.: 12720

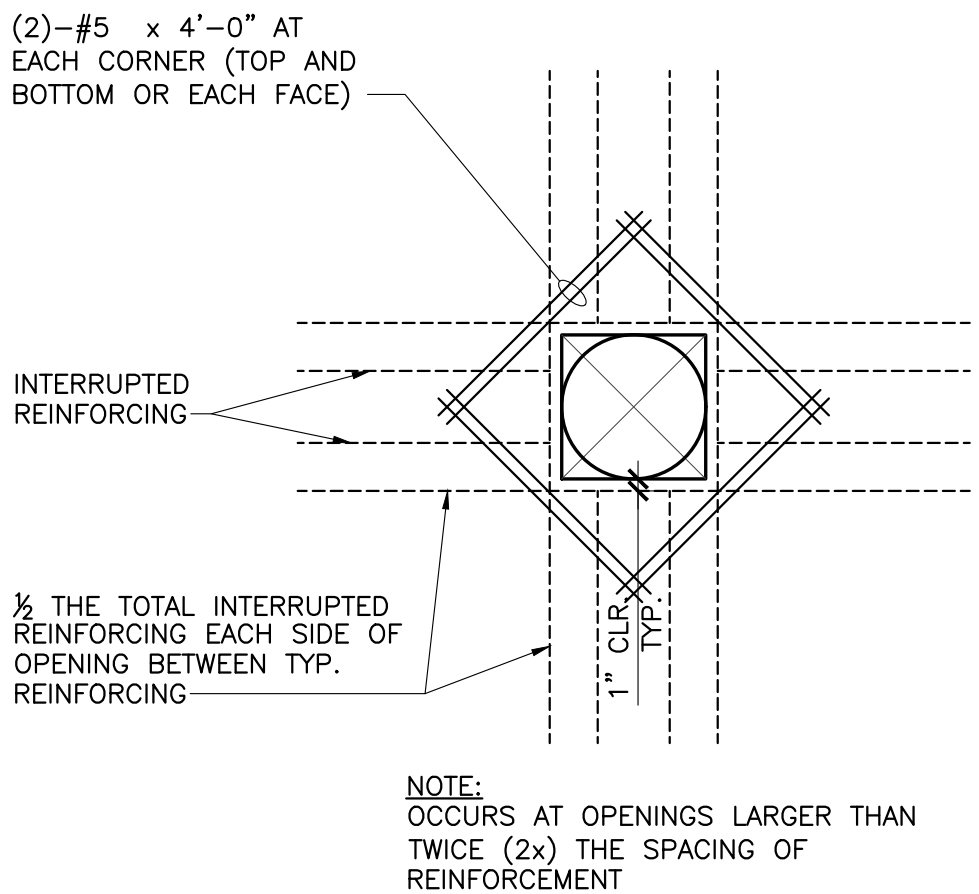
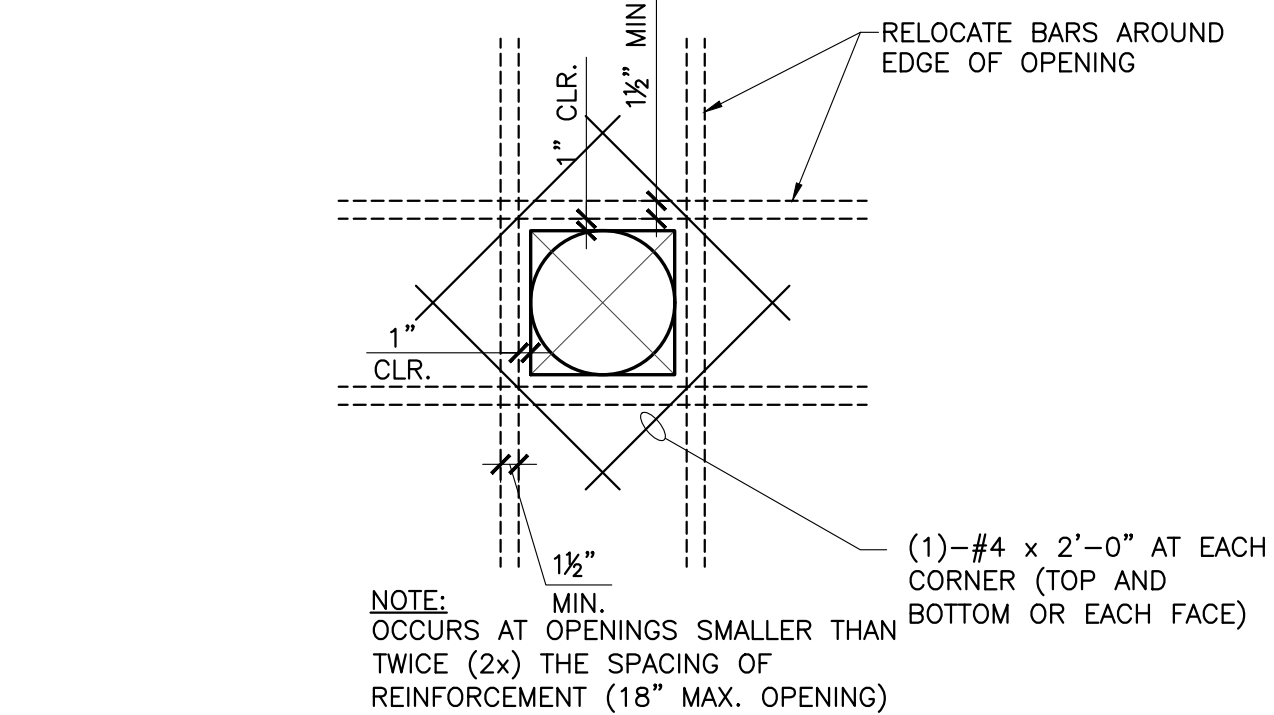
SHEET NO. 21

TOTAL SHEETS 43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
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	3/10/20	City Comments		



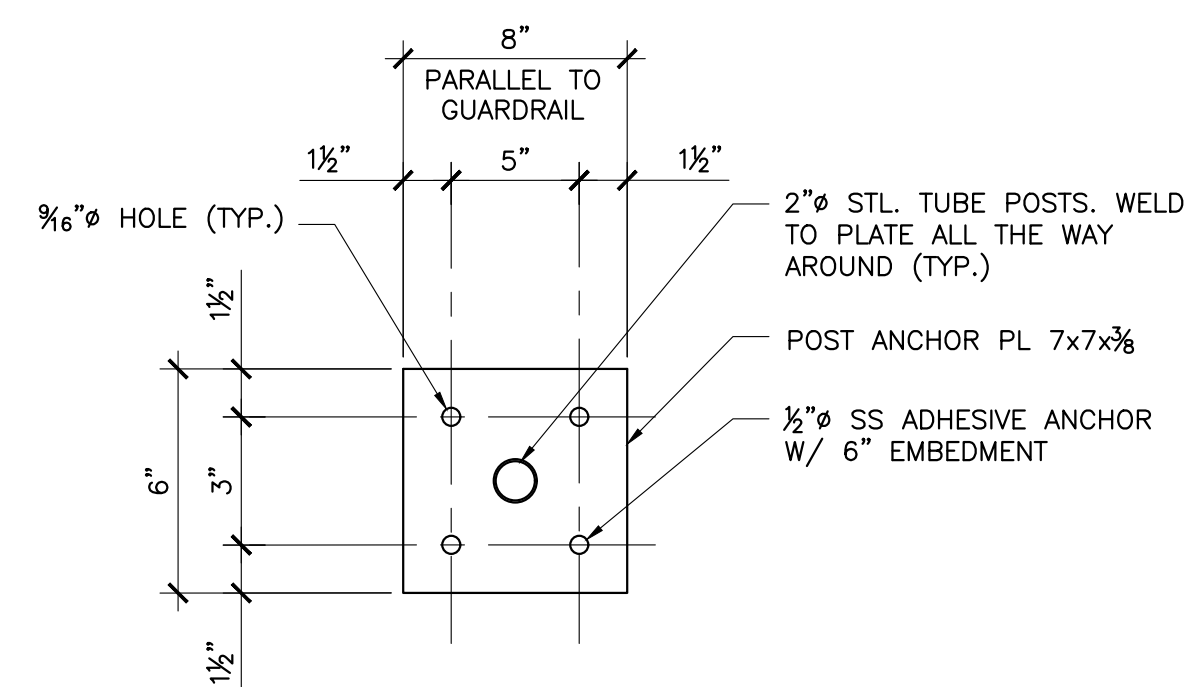
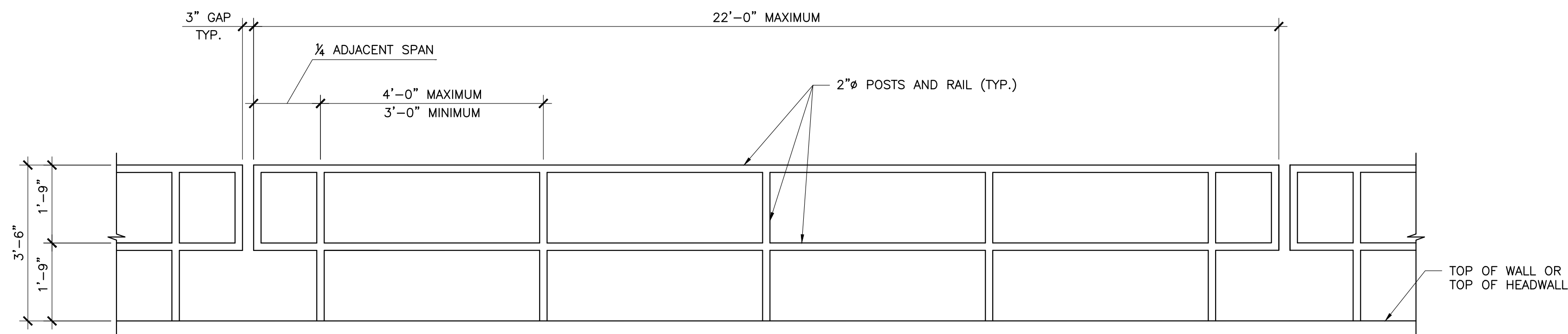
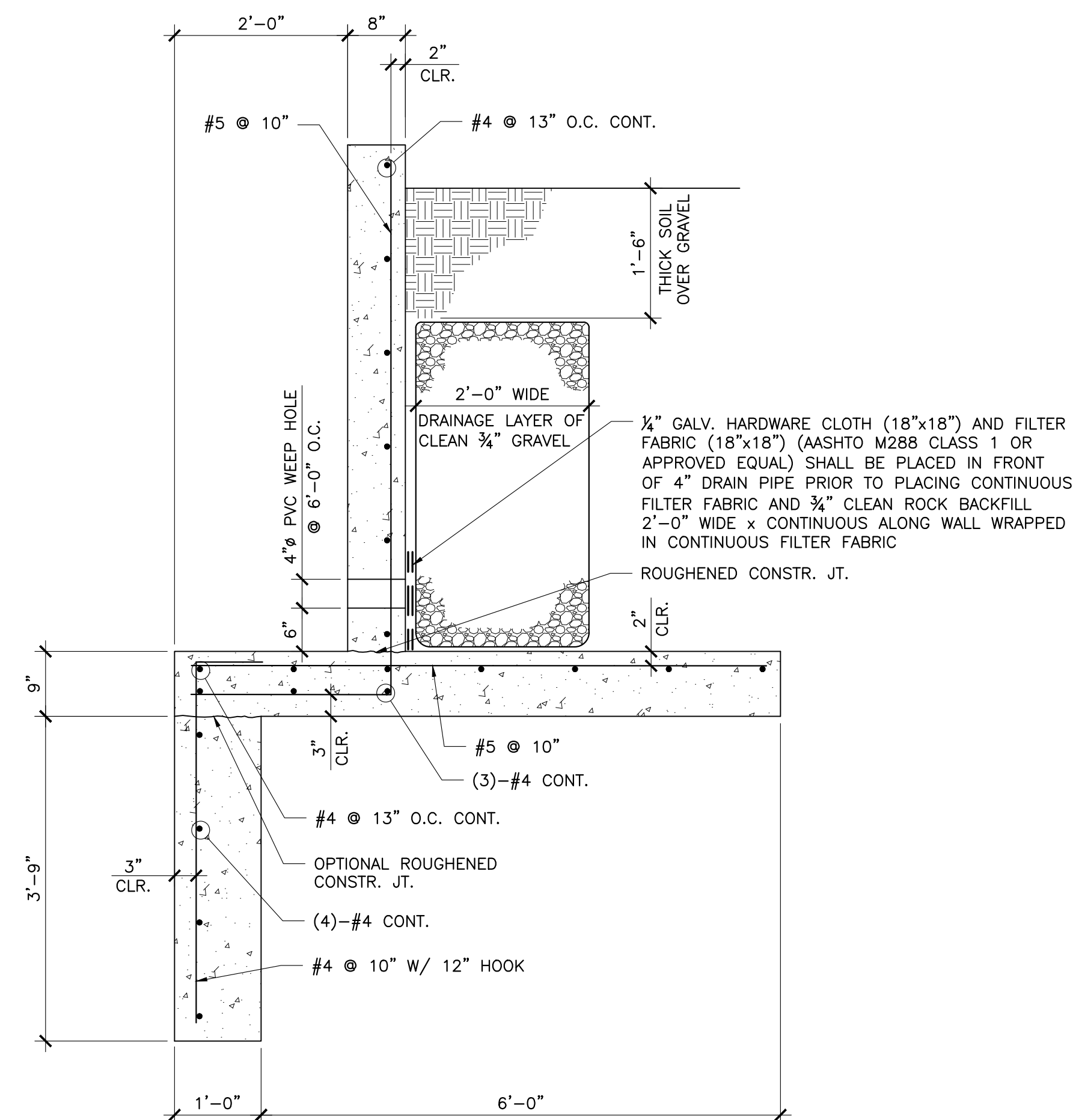
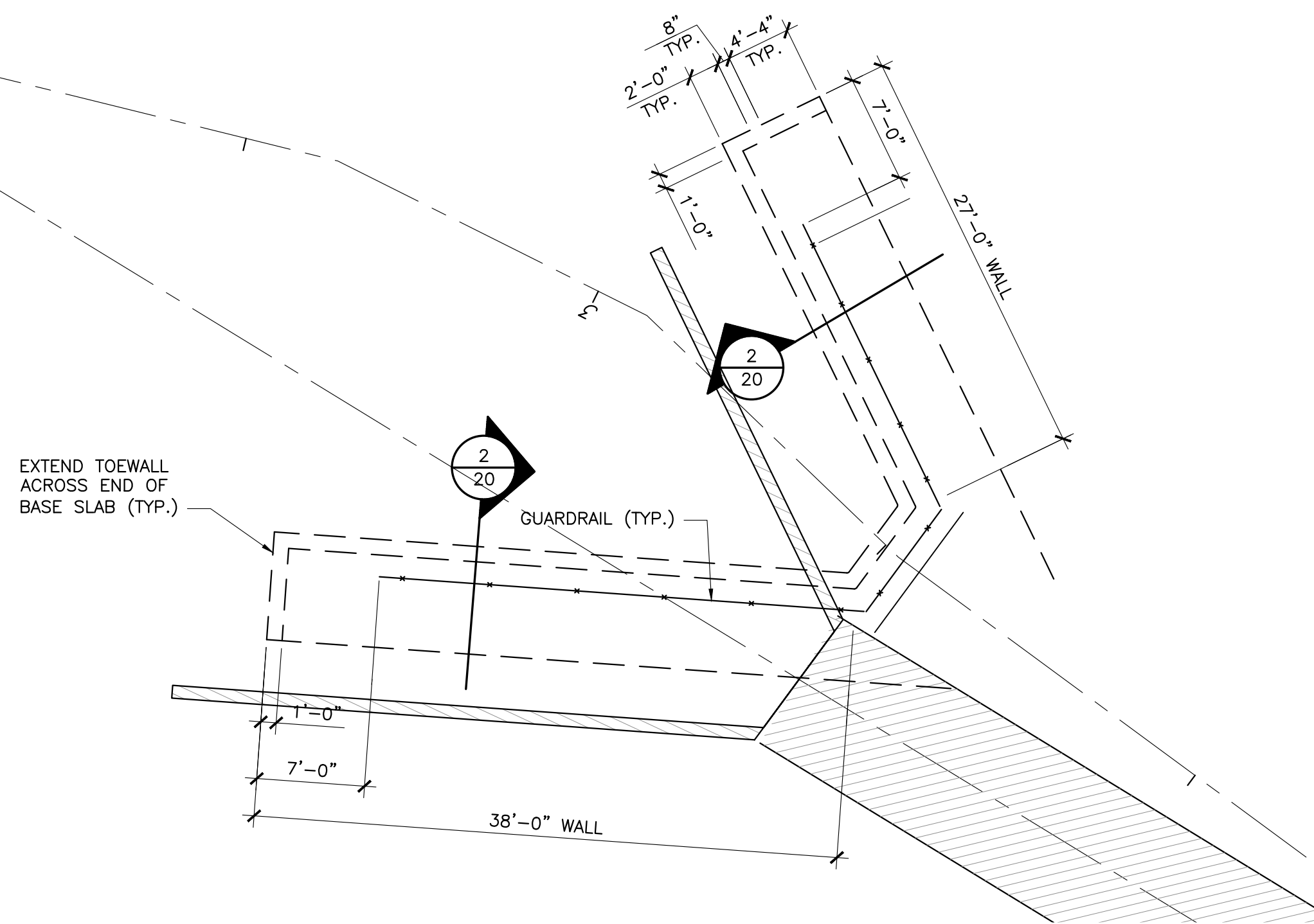
### ADDITIONAL REINF. AT OPENINGS IN WALLS AND SLABS

SCALE : N.T.S.

### GENERAL NOTES:

- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1/2".
- MODOT SPECIFICATIONS SHALL APPLY TO ALL ITEMS NOT SPECIFICALLY ADDRESSED IN THESE PLANS.
- SPLICE LENGTHS FOR #4 BARS SHALL BE 2'-0", UNLESS SPECIFICALLY SHOWN OTHERWISE.
- CULVERT IS DESIGNED FOR HL-93 LOADING

RCB Details

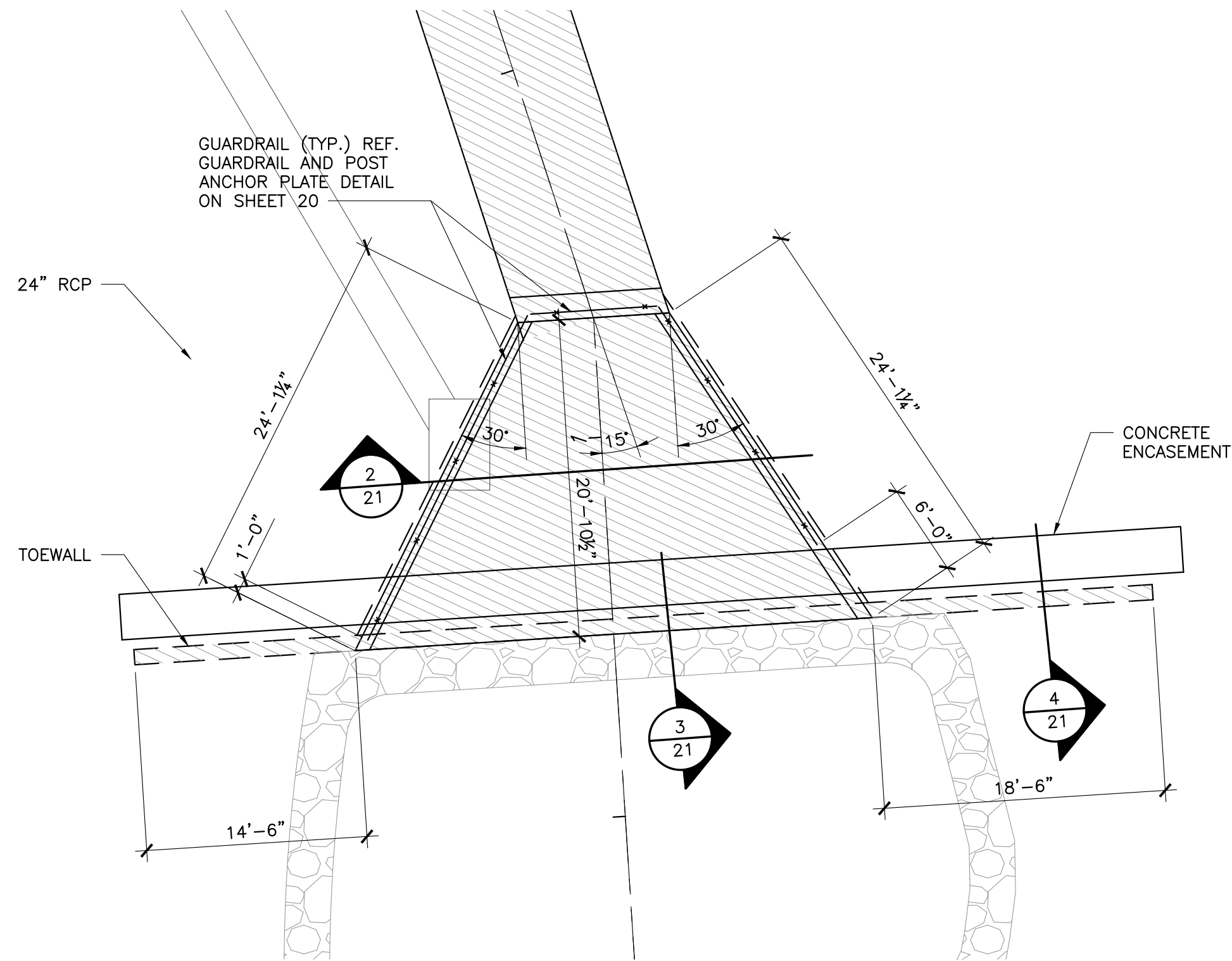


	 <p>9801 Renner Boulevard Lenexa, Kansas 66219 913.499.0400 www.gbateam.com</p>	DEVELOPER'S SERVICE LEES SUMMIT, MISSOURI	
		DATE: <u>04/12/2020</u>	
		DESIGN BY: <u>DRK</u>	
		DRAWN BY: <u>DRK</u>	
		PROJECT NO.: <u>12720</u>	
		SHEET NO. <u>22</u>	TOTAL SHEETS <u>43</u>

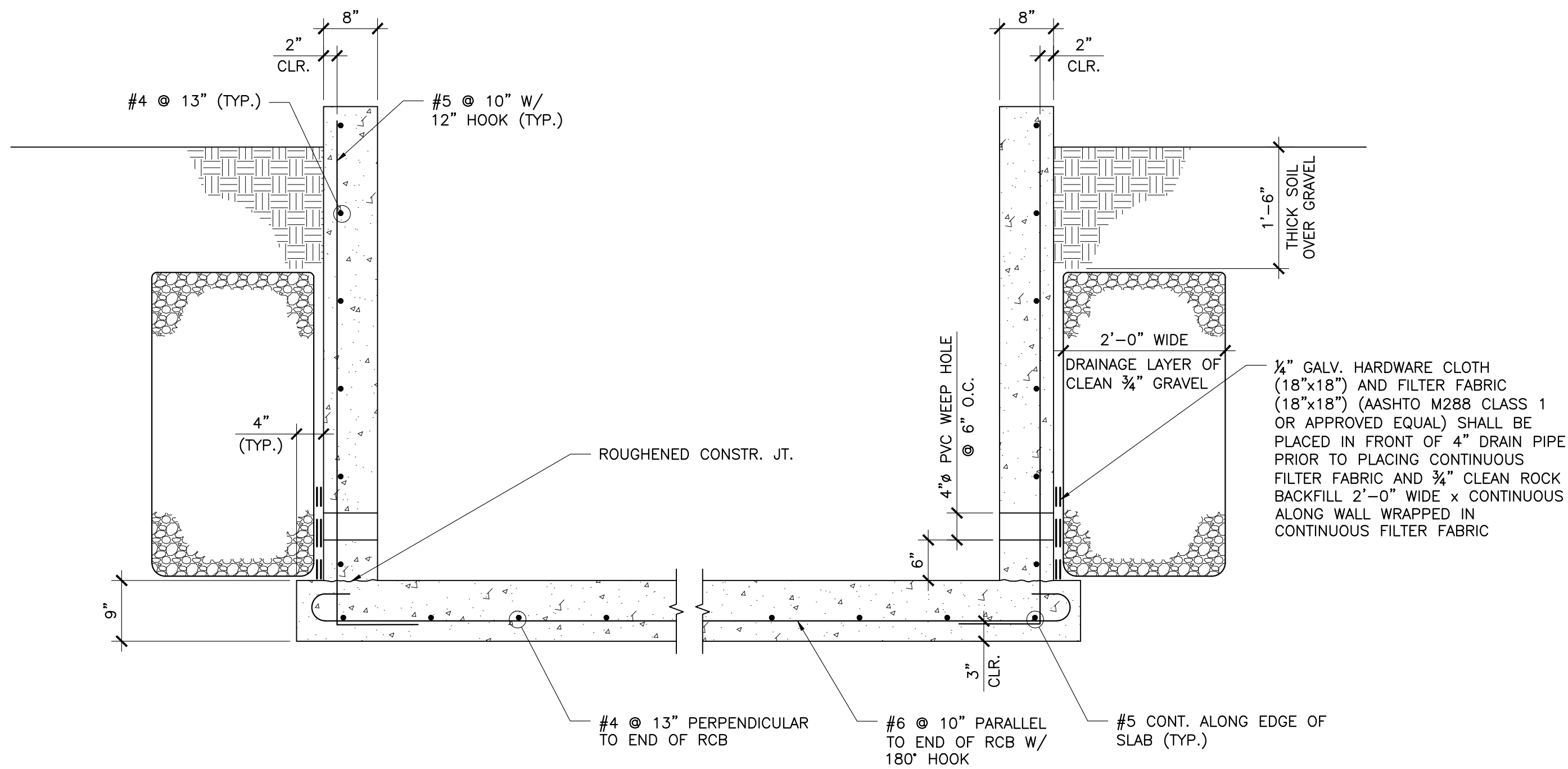
Bradley D. Burton Professional Engineer License No. 25862		<i>Storm Sewer Improvements and Mass Grading</i> <b><i>Paragon Star Development</i></b> <i>Lee's Summit, Missouri</i>	
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②	4/15/19	Temporary River Crossing Repair	
③	3/10/20	City Comments	

LAP LENGTH TABLE	
<i>Bar Size</i>	<i>Length</i>
HORIZ. #4	24"
VERT. #4	17"

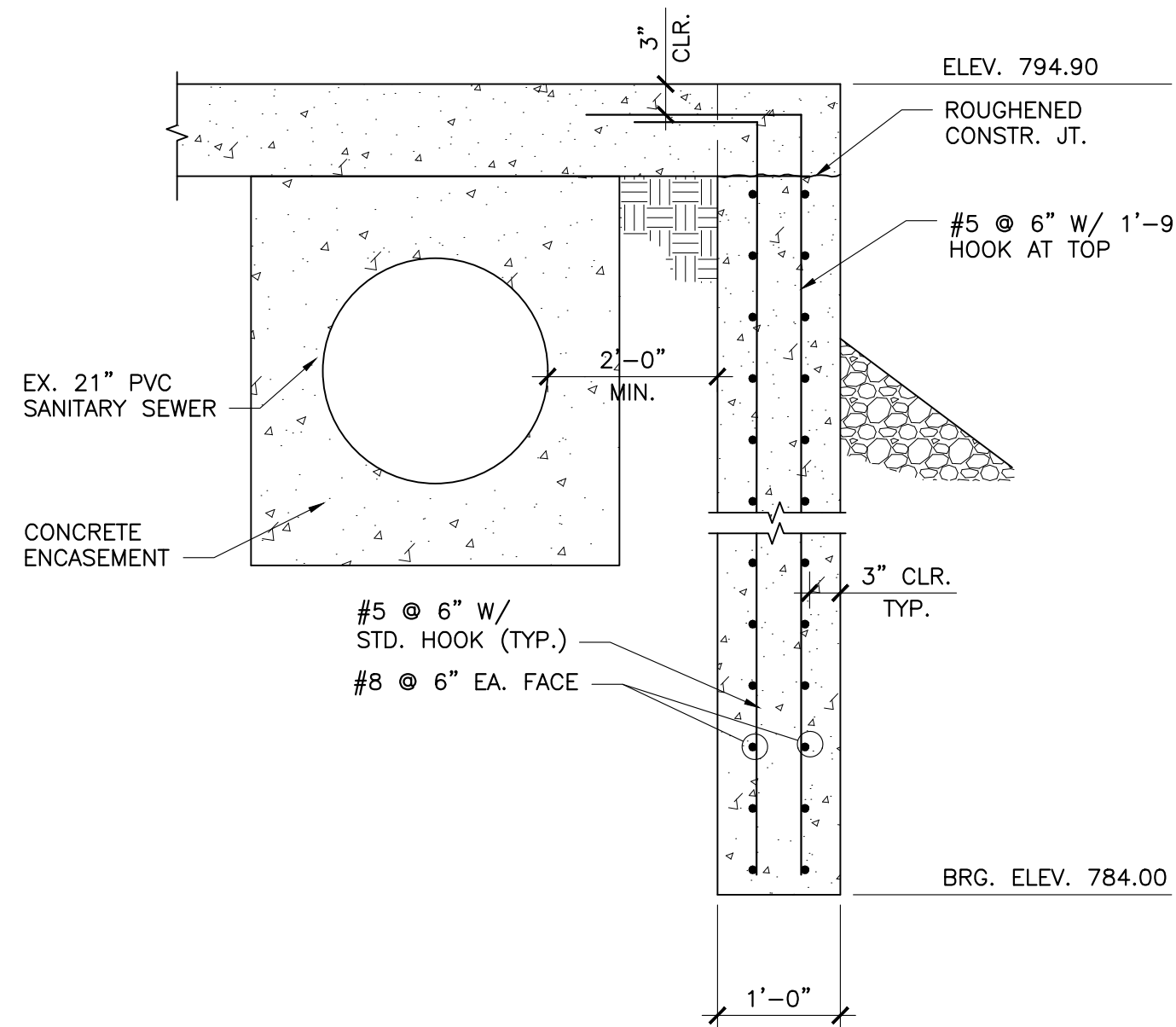
Architect 00212, Professional Engineer 000133, Landscape Architect 000025, Professional Land Surveyor 000059  
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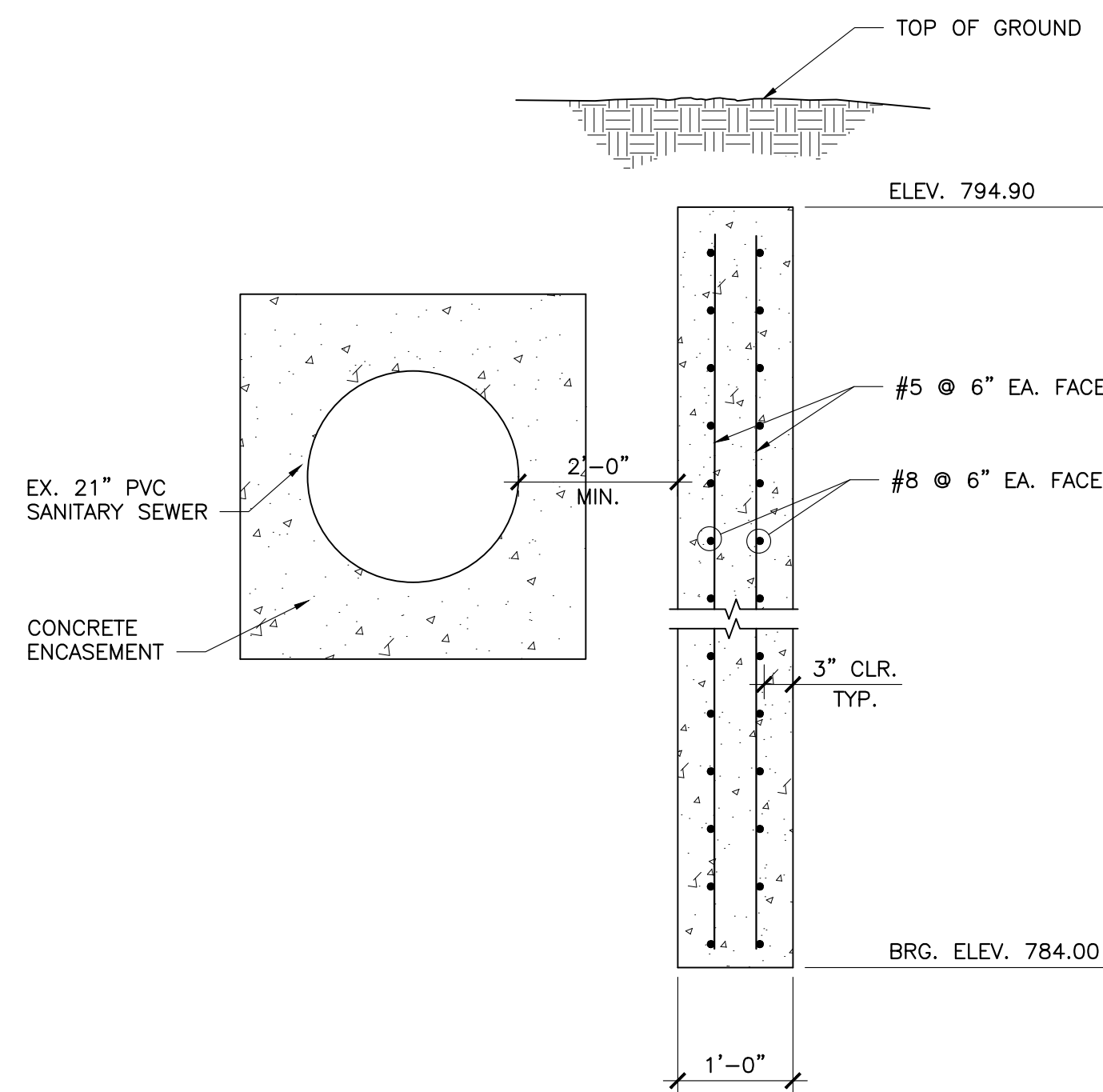
**PLAN OF DOWNSTREAM WINGWALLS**  
SCALE : 1/8" = 1'-0"



**SECTION**  
SCALE : 3/4" = 1'-0"



**SECTION**  
SCALE : 3/4" = 1'-0"



**SECTION**  
SCALE : 3/4" = 1'-0"

**RCB Details**

STATE OF MISSOURI  
BRADLEY D. BURTON  
LICENSED PROFESSIONAL ENGINEER  
E-25862  
3/10/20

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engineers

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Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

DATE: **CEL**  
DESIGN BY: **CEL**  
DRAWN BY: **DR**  
PROJECT NO.: **12720**  
SHEET NO.: **23**  
TOTAL SHEETS: **43**

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
	8/28/18	City Comments		
	9/14/18	City Comments		
	10/10/18	Removed Floodway Grading		
	11/29/18			
	4/11/19	Temporary River Crossing Repair		
	4/15/19	Temporary River Crossing Repair		
	3/10/20	City Comments		



Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
G:\12720\Civil\_3D\Production Drawings\Mass Grading\Lee's Summit\12720-4050.dwg    Tuesday March 10, 2020, 2:09pm    --    Layout: 25 Pre-Construction    --    Copyright 2020, George Butler Associates, Inc.


PROJECT BENCHMARK:

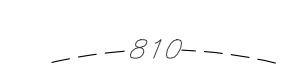
BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of 1470 bridge  
spanning View High Drive.  
EL=833.80


CAUTION!

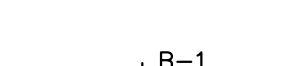
Numerous Utilities on Site.  
Contractor to verify location  
and elevation of all utilities  
prior to commencing  
construction.


Legend


- 


Proposed Contour
- 


Existing Contour
- 

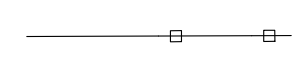
Drainage Swale
- 


Geotechnical Boring Location
- 


Erosion Control Blanket
- 


BMP Plan Reference Number
- 


Straw Wattles
- 

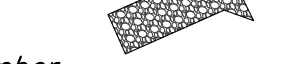
Grading Limits
- 

Exist. Construction Fence for Tree Protection  
(to be maintained)
- 

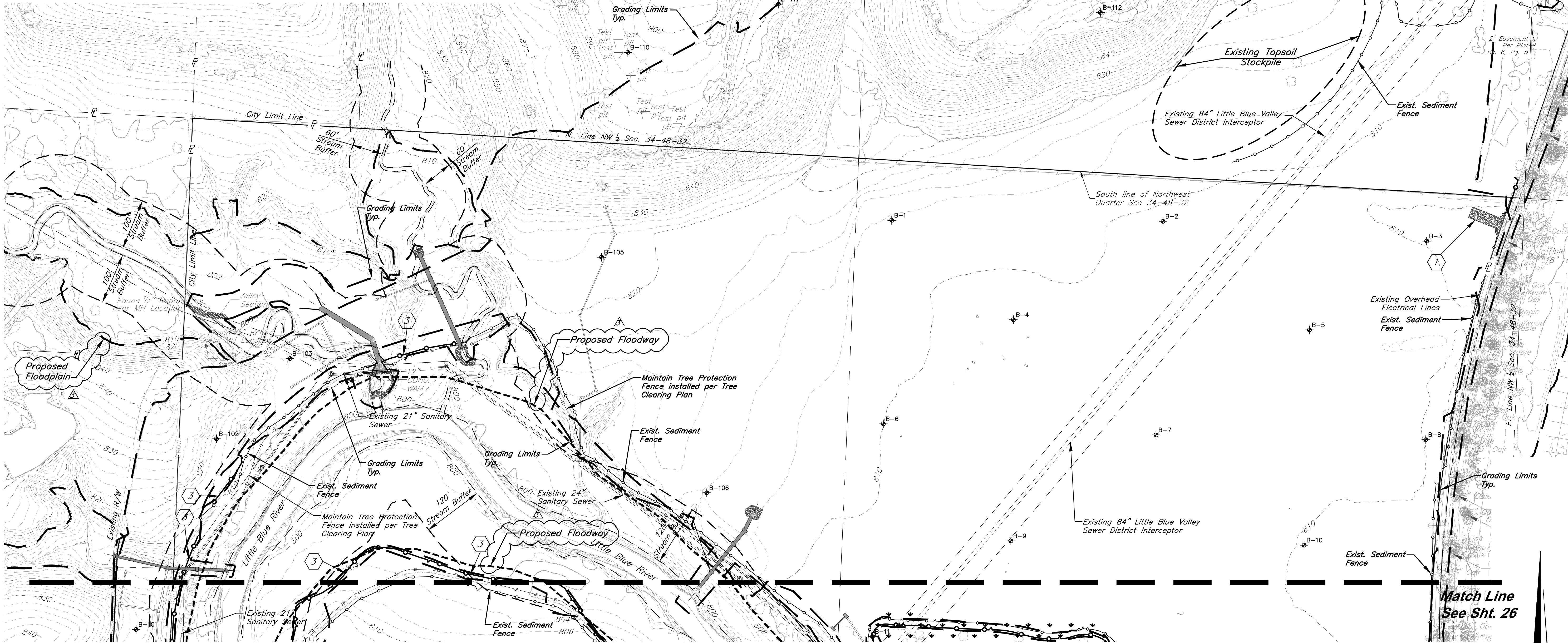
Tree to be saved
- 

Sediment Fence
- 

Exist. Sediment Fence  
(to be maintained)
- 

Temporary Construction Entrance
- 

Rock Check Dam



EROSION & SEDIMENT CONTROL STAGING CHART (See Sheets 25 thru 30)

Project Stage	BMP Plan Ref. No.	BMP Description	May Remove after Stage	Notes
A. Prior to Mass Grading	1	Const. Entrance & Staging Area	C	
	2	Install Orange Construction Fence	C	
	3	Perimeter Silt Fence	C	
B. Mass Grading	4	Silt Fence	C	
	5	Ditch Check	C	
	6	Straw Wattles	C	Wattles to be kept on hand for perimeter control where needed.
C. Permanent Stabilization*	7	Seed & Mulch or Blanket or Sod		Erosion control blanket to be installed w/ seed. Check approved seeding dates and install temporary stabilization if out of seeding season. Install blanket according to manufacturer's instructions and stapling pattern.

\* Permanent Stabilization will be considered stabilized when 100% of disturbed area is established with perennial vegetation with a density of 70%.

Pre-Construction Erosion Control-Phase 1



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Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	5/15/18	Revised Field Elevations		
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6	11/29/18	Temporary River Crossing Repair		
7	4/11/19	Temporary River Crossing Repair		
8	4/15/19	City Comments		
9	3/10/20			

Existing Topsoil Stockpile

Existing 84" Little Blue Valley  
Sewer District Interceptor

Exist. Sediment  
Fence

Existing Overhead  
Electrical Lines

Exist. Sediment  
Fence

Existing 84" Little Blue Valley  
Sewer District Interceptor

Exist. Sediment  
Fence

Match Line  
See Sht. 26

100' 0' 100' 200'  
SCALE : 1 INCH = 100 FEET

PROJECT BENCHMARK:

BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of 1470 bridge  
spanning View High Drive.  
EL=833.80

CAUTION!

Numerous Utilities on Site.  
Contractor to verify location  
and elevation of all utilities  
prior to commencing  
construction.

Legend

- Proposed Contour  
Existing Contour  
Drainage Swale  
Geotechnical Boring Location  
Erosion Control Blanket  
BMP Plan Reference Number  
Straw Wattles  
Grading Limits  
Exist. Construction Fence for Tree Protection (to be maintained)  
Tree to be saved  
Sediment Fence  
Exist. Sediment Fence (to be maintained)  
Temporary Construction Entrance  
Rock Check Dam



**GBA**  
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engineers

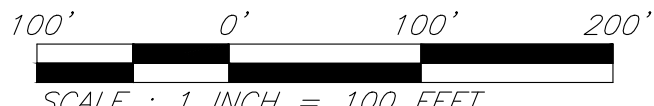
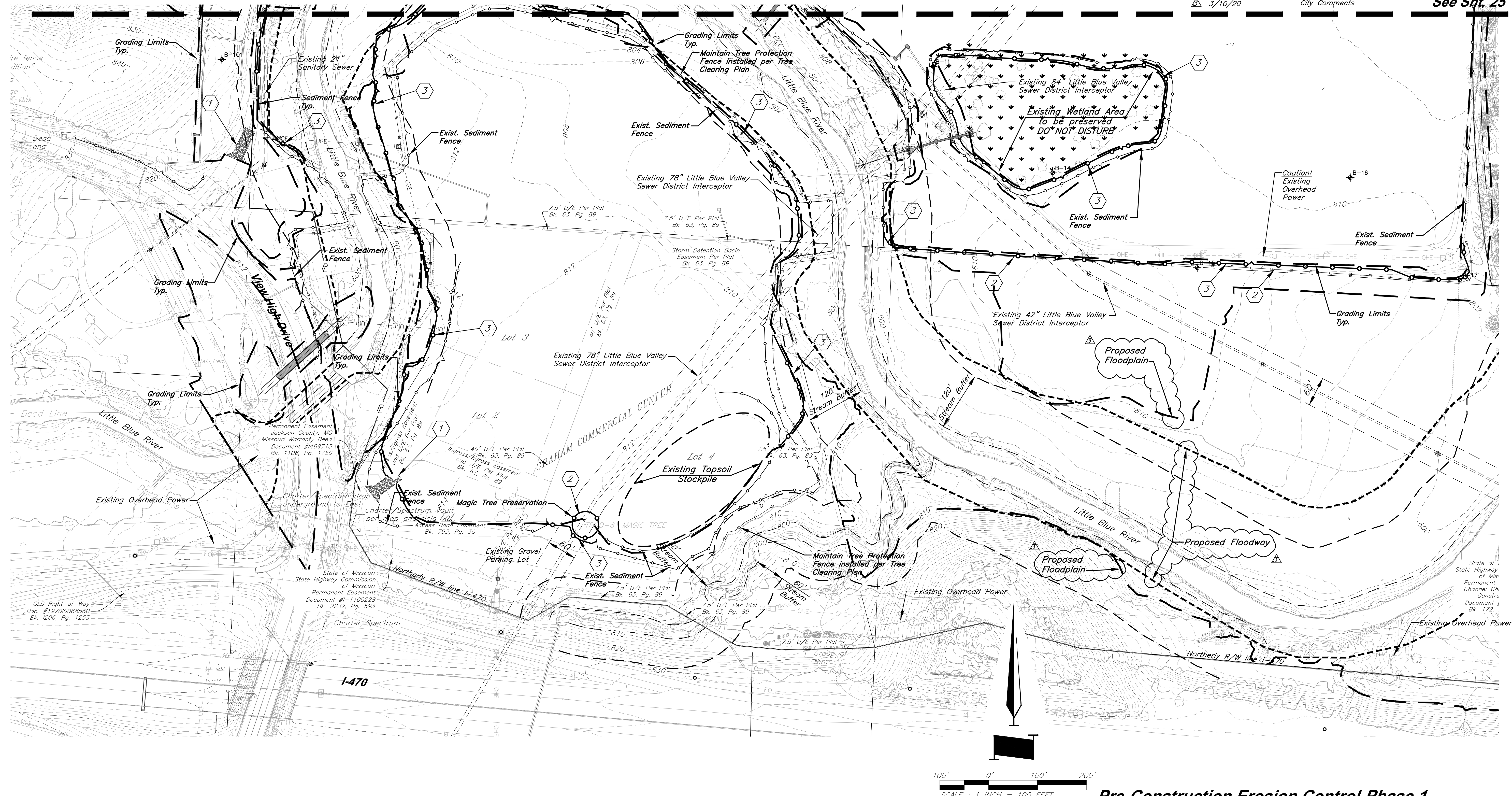
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Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

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	10/10/18	Removed Floodway Grading		
	11/29/18	Temporary River Crossing Repair		
	4/11/19	Temporary River Crossing Repair		
	4/15/19	City Comments		
	3/10/20	City Comments		

Match Line  
See Sht. 25



Pre-Construction Erosion Control-Phase 1

Architect 00212, Professional Engineer 000133, Landscape Architect 000025, Professional Land Surveyor 000059  
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PROJECT BENCHMARK:

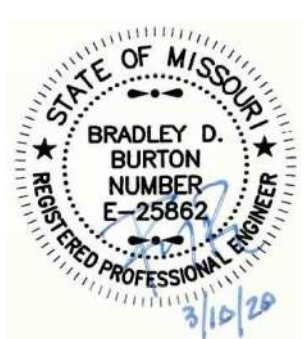
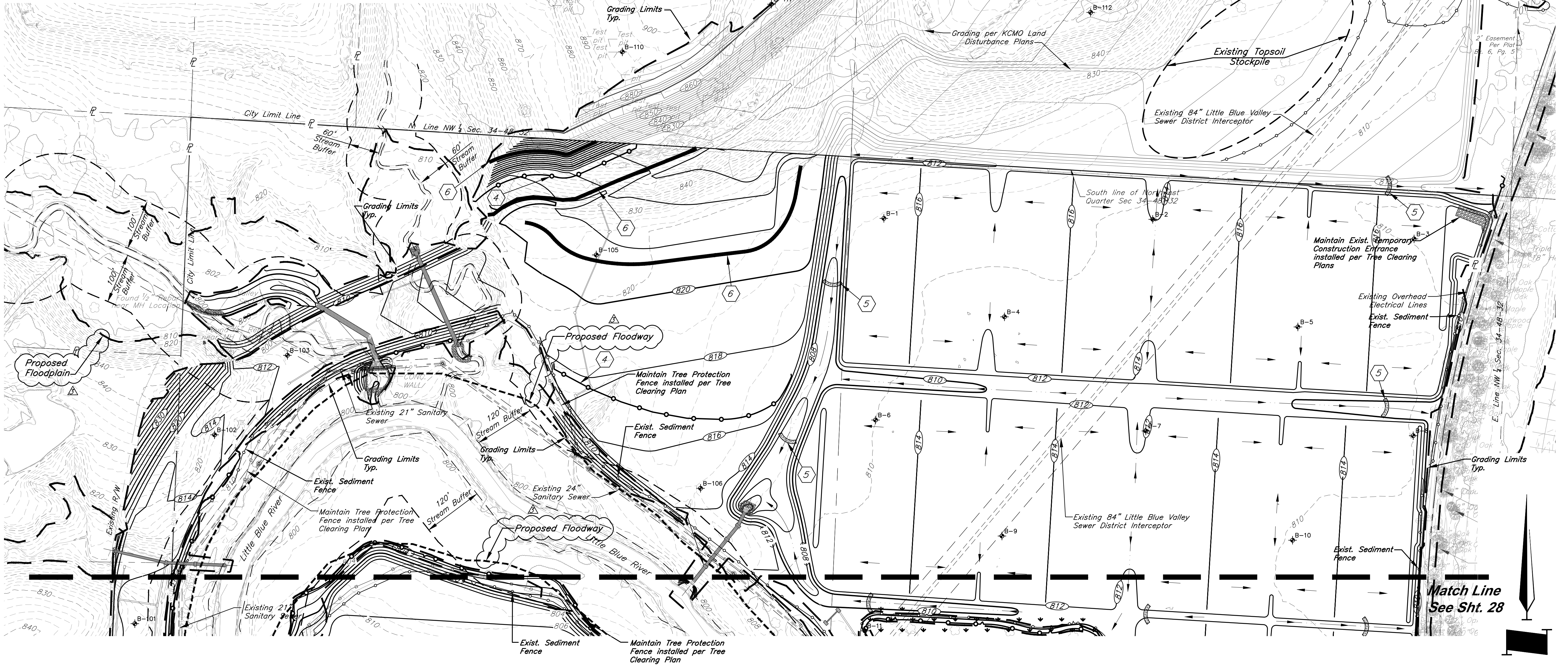
BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of 1470 bridge  
spanning View High Drive.  
EL=833.80

Legend

- |  |                              |  |   |
|--|------------------------------|--|---|
|  | Proposed Contour             |  | Grading Limits  |
|  | Existing Contour             |  | Exist. Construction Fence for Tree Protection<br>(to be maintained) |
|  | Drainage Swale               |  | Tree to be saved  |
|  | Geotechnical Boring Location |  | Sediment Fence  |
|  | Erosion Control Blanket      |  | Exist. Sediment Fence<br>(to be maintained)                         |
|  | BMP Plan Reference Number    |  | Temporary Construction Entrance                                     |
|  | Straw Wattles                |  | Rock Check Dam  |

CAUTION!

Numerous Utilities on Site.  
Contractor to verify location  
and elevation of all utilities  
prior to commencing  
construction.



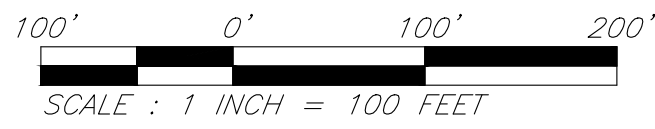
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DATE:	CEL
DESIGN BY:	CEL
DRAWN BY:	CEL
PROJECT NO.:	12720
SHEET NO.:	27
TOTAL SHEETS:	43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	5/15/18	Revised Field Elevations		
2	8/7/18	City Comments		
3	8/28/18	City Comments		
4	9/14/18	City Comments		
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6	11/29/18	Temporary River Crossing Repair		
7	4/11/19	Temporary River Crossing Repair		
8	4/15/19	City Comments		
9	3/10/20			



Erosion Control-Phase 2

PROJECT BENCHMARK:

BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of 1470 bridge  
spanning View High Drive.  
EL=833.80

Legend

- Proposed Contour  
Existing Contour  
Drainage Swale  
Geotechnical Boring Location  
Erosion Control Blanket  
BMP Plan Reference Number  
Straw Wattles  
Grading Limits  
Exist. Construction Fence for Tree Protection (to be maintained)  
Tree to be saved  
Sediment Fence  
Exist. Sediment Fence (to be maintained)  
Temporary Construction Entrance  
Rock Check Dam

CAUTION!

Numerous Utilities on Site.  
Contractor to verify location  
and elevation of all utilities  
prior to commencing  
construction.

NOTE:  
No fill may be placed within the  
existing floodway until storm line  
4100 is complete.

STATE OF MISSOURI  
BRADLEY D. BURTON  
NUMBER  
E-25862  
REGISTERED PROFESSIONAL ENGINEER  
3/10/20

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DATE: 04/15/2020  
DESIGN BY: CEL  
DRAWN BY: DRI  
PROJECT NO.: 12720  
SHEET NO. 28  
TOTAL SHEETS 43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
5/15/18		Revised Field Elevations		
8/7/18		City Comments		
8/28/18		City Comments		
9/14/18		City Comments		
10/10/18		Removed Floodway Grading		
11/29/18		Temporary River Crossing Repair		
4/11/19		Temporary River Crossing Repair		
4/15/19		City Comments		
3/10/20				

Match Line  
See Sht. 27



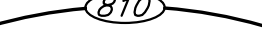
Erosion Control-Phase 2


Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
G:\12720\Civil 3D\Production Drawings\Mass Grading\Lee's Summit\12720-4050.dwg Layout: 29 Erosion Control --- Tuesday, March 10, 2020, 2:12pm --- Copyright 2020, George Butler Associates, Inc.

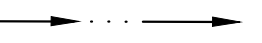
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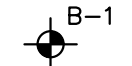
BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of I470 bridge  
spanning View High Drive.  
EL=833.80

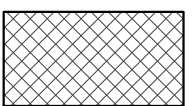
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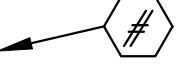
- 


Proposed Contour
- 


Existing Contour
- 

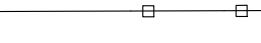
Drainage Swale
- 


Geotechnical Boring Location
- 

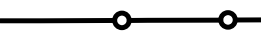
Erosion Control Blanket
- 

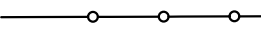
BMP Plan Reference Number
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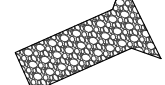
Straw Wattles
- 


Grading Limits
- 

Exist. Construction Fence for Tree Protection  
(to be maintained)
- 

Tree to be saved
- 

Sediment Fence
- 

Exist. Sediment Fence  
(to be maintained)
- 

Temporary Construction Entrance
- 

Rock Check Dam

CAUTION!

Numerous Utilities on Site.  
Contractor to verify location  
and elevation of all utilities  
prior to commencing  
construction.

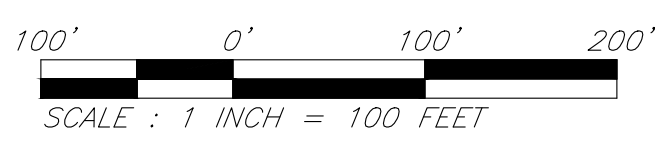


DATE:	CEL
DESIGN BY:	CEL
DRAWN BY:	CEL
PROJECT NO.:	12720
SHEET NO.:	29
TOTAL SHEETS:	43

Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	5/15/18	Revised Field Elevations		
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7	4/11/19	Temporary River Crossing Repair		
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9	3/10/20			



Erosion Control-Phase 3

PROJECT BENCHMARK:

BM #11 - Chiseled "L" on top  
Northeast corner of concrete guardrail  
at the Northeast corner of I470 bridge  
spanning View High Drive.  
EL=833.80

CAUTION!

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construction.

NOTE:  
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existing floodway until storm line  
4100 is complete.

Legend

	Proposed Contour		Grading Limits
	Existing Contour		Exist. Construction Fence for Tree Protection (to be maintained)
	Drainage Swale		Tree to be saved
	Geotechnical Boring Location		Sediment Fence
	Erosion Control Blanket		Exist. Sediment Fence (to be maintained)
	BMP Plan Reference Number		Temporary Construction Entrance
	Straw Wattles		Rock Check Dam



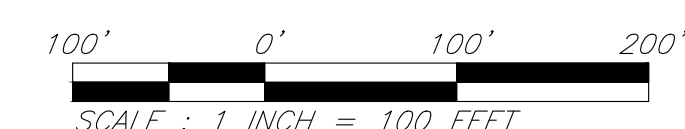
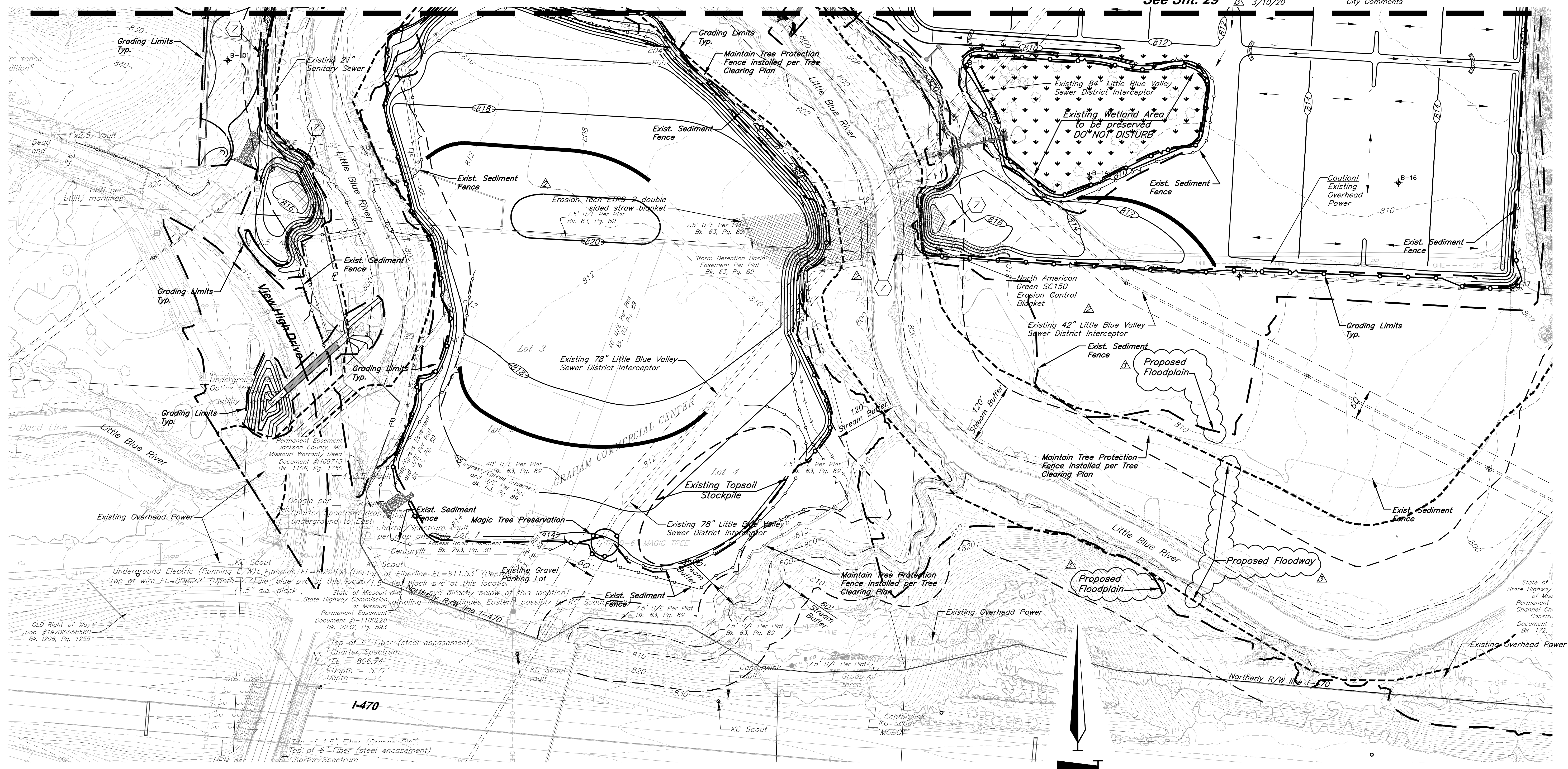
**GBA**  
architects  
engineers  
9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
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DATE:	CEL
DESIGN BY:	CEL
DRAWN BY:	CEL
PROJECT NO.:	12720
SHEET NO.	TOTAL SHEETS
30	43

Bradley D. Burton  
Professional Engineer  
License No. 25862

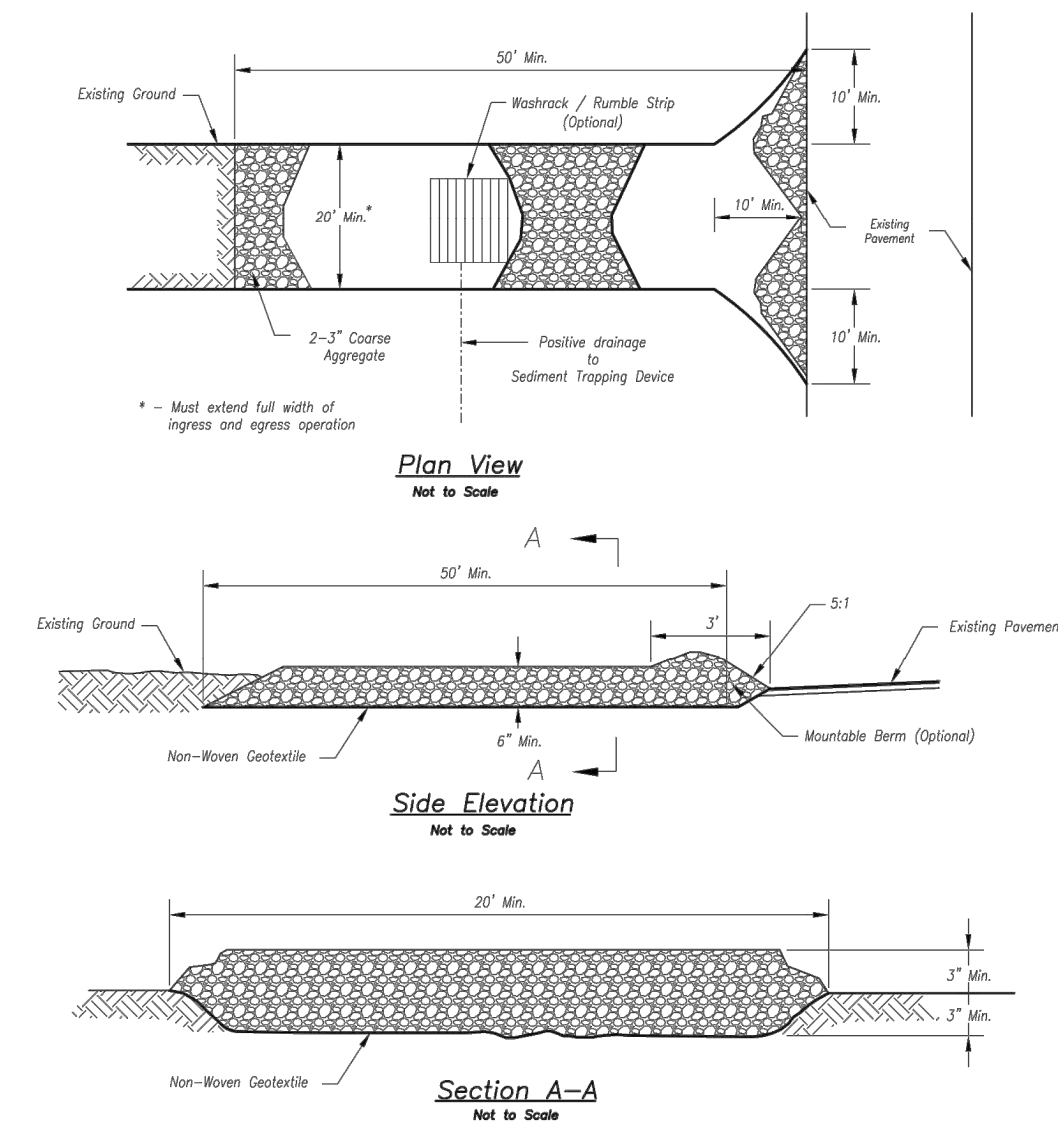
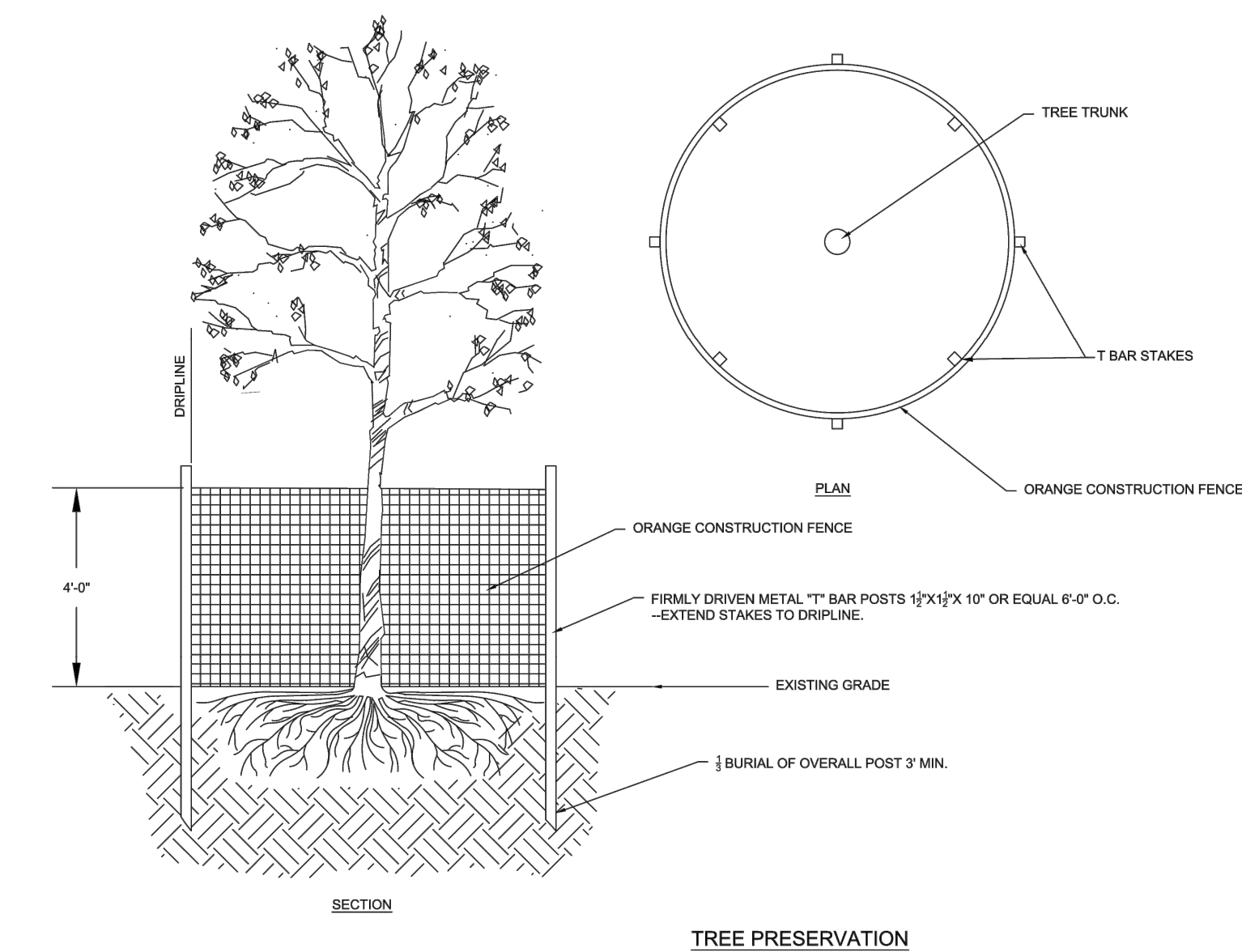
Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
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11/29/18		Temporary River Crossing Repair		
4/11/19		Temporary River Crossing Repair		
4/15/19		City Comments		
3/10/20				



Erosion Control-Phase 3

Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
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Layout: 30 Erosion Control --

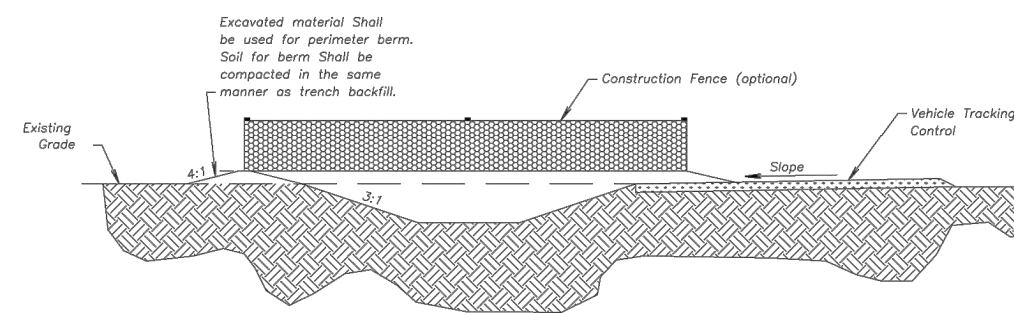


- Notes for Concrete Washout:

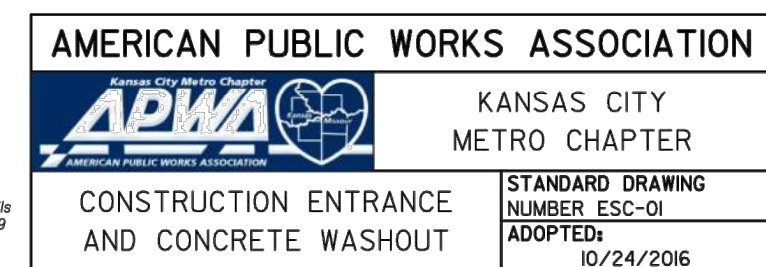
1. Concrete washout areas shall be installed prior to any concrete placement on site.
2. Concrete washout area shall include a flat subsurface pit sized relative to the amount of concrete to be placed on site. The slopes of the flat subsurface pit shall be 3:1. The vehicle tracking pad shall be sloped towards the concrete washout area.
3. Vehicle tracking control is required at the access point to all concrete washout areas.
4. Signs shall be placed at the construction site entrance, washout area and elsewhere as necessary to clearly indicate the location(s) of the concrete washout area(s) to operators of concrete truck and pump rigs.
5. A one-piece impervious liner may be required along the bottom on sides of the subsurface pit in sandy or gravelly soils.

- Maintenance for Concrete Washout:

1. Concrete wastewater materials shall be removed once the materials have filled the washout to approximately 75% full.
2. Concrete washout areas shall be enlarged as necessary to maintain capacity for wasted concrete.
3. Concrete washout water, wasted pieces of concrete and all other debris in the subsurface pit shall be transported from the job site in a water-tight container and disposed of properly.
4. Concrete washout areas shall remain in place until all concrete for the project is placed.
5. When concrete placed areas are removed, excavations shall be filled with suitable compacted bedding and topsoil, any disturbed area associated with the installation, maintenance, and/or removal of the concrete washout areas shall be stabilized.



CONCRETE WASHOUT



Construction Entrance modified from 2015 Overland Park Standard Detail for Erosion and Sediment Control; Concrete Washout modified from 2009 City of Great Bend Standard Drawings.

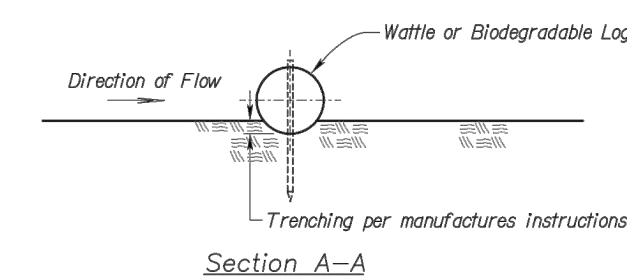
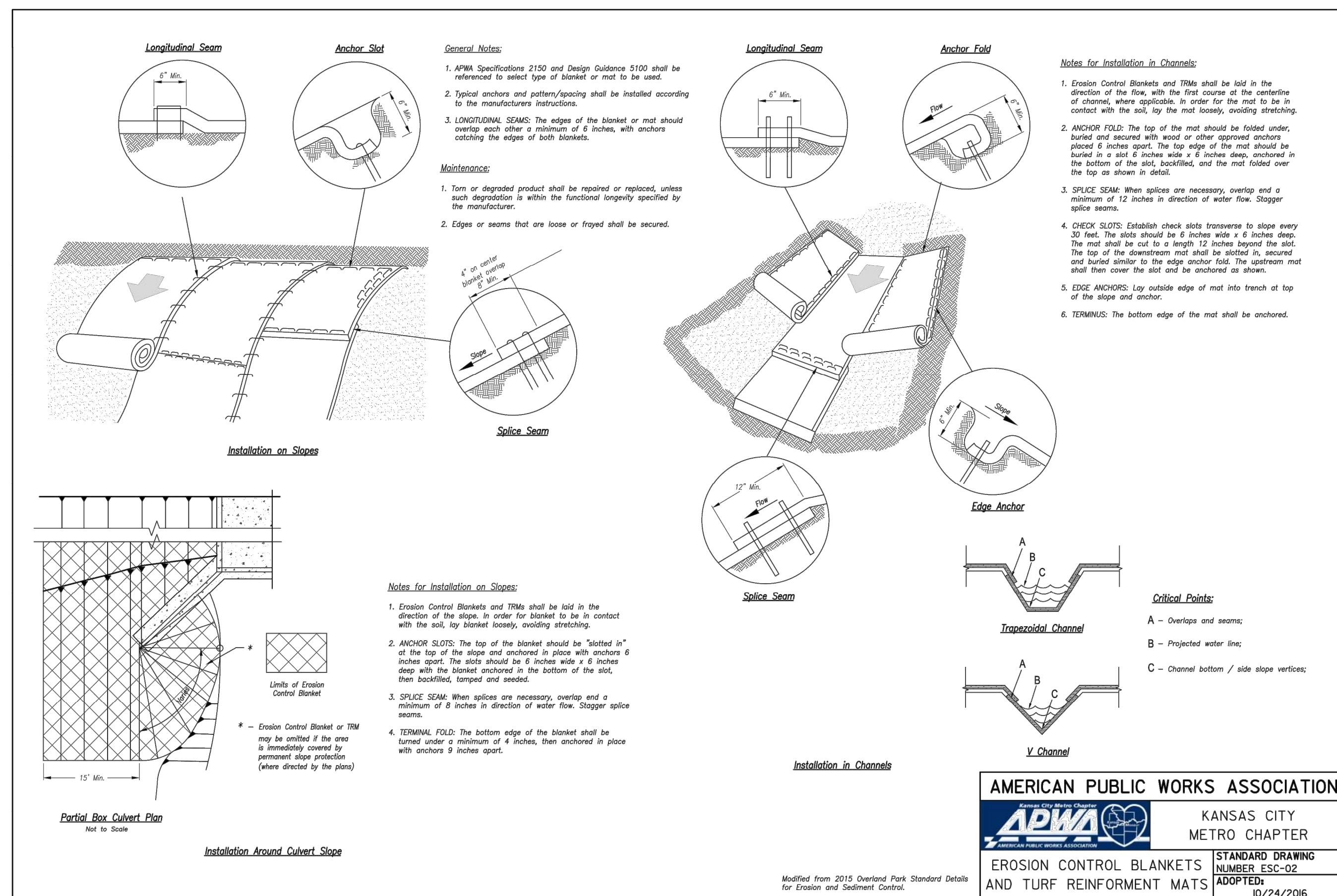
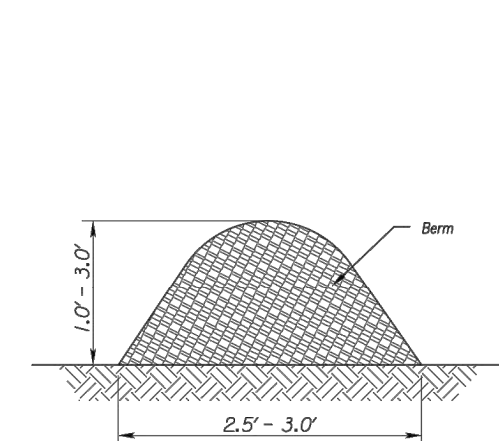
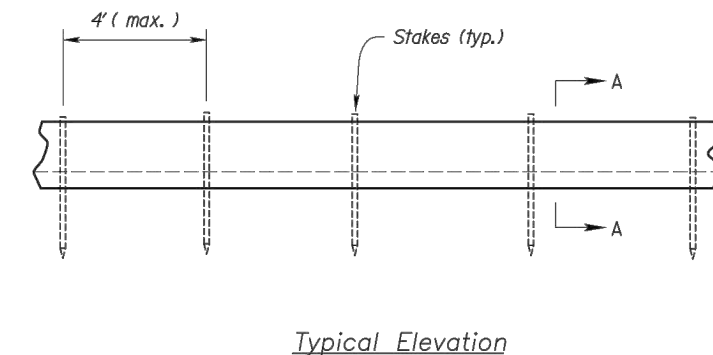
WATTLES AND BIODEGRADABLE LOG

Figure 1  
(Perimeter Control)



Typical Elevation

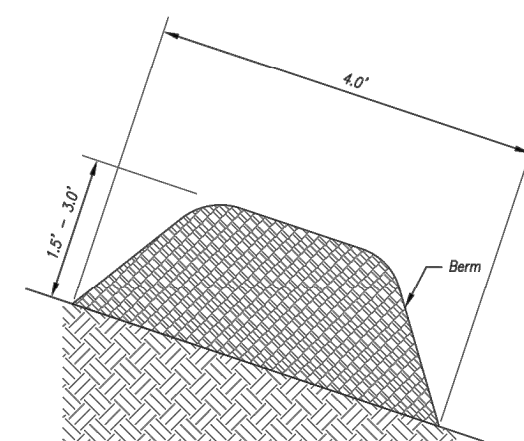


Figure 2  
(Steep Slopes)

MULCH OR COMPOST FILTER BERMS



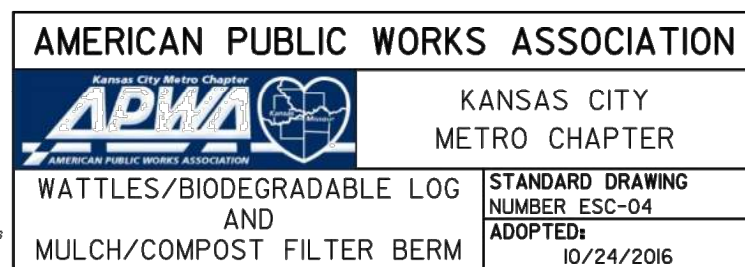
1. The Slope barriers shall be placed along contour lines, with a short section turned upstate at each end of the barrier. The maximum length of the slope barrier shall not exceed 250 feet, and the barrier ends need to be staggered.
2. Install wattles and biodegradable logs per manufacturer's instructions.
3. Spacing of stakes per manufacturer's instructions with 4' max. spacing. Length of stakes shall be a minimum of 2 times the diameter of the log with minimum of 24'.

Notes for Mulch and Compost Filter Beam:

1. The sediment control berm shall be placed **uncompacted** in a **window** at locations shown on the plans or as directed by the engineer.
2. Parallel to the base of the slope, or around the perimeter of the site, the grass, compost berm shall be **1 to 3 feet high** by **2.5 to 3 foot wide** (see Figure 1). For maximum water treatment ability (or for steep slopes), the berm shall be **1 to 3 foot high** by **2 to 3 foot wide** (see Figure 2). A **minimum of 4 feet wide** at the base (see Figure 2).
3. In extreme conditions, or where specified by the engineer, sediment shall be placed **on top** of the berm. The top of the berm. Engineer will specify berm requirements.
4. If berm is to be left as permanent or part of the natural landscape, the compost berm may be seeded during application for permanent vegetation.
5. Do not use compost or wood mulch berms in any runoff channels or concentrated flow areas.
6. Wood mulch that consist of tree and shrub debris and/or organic material shall be **spread** by the mechanical means such as a chipper, hammermill, blower/grinder or other approved method.
7. Mulch shall be applied with a maximum width of 2" and a maximum length of 10".

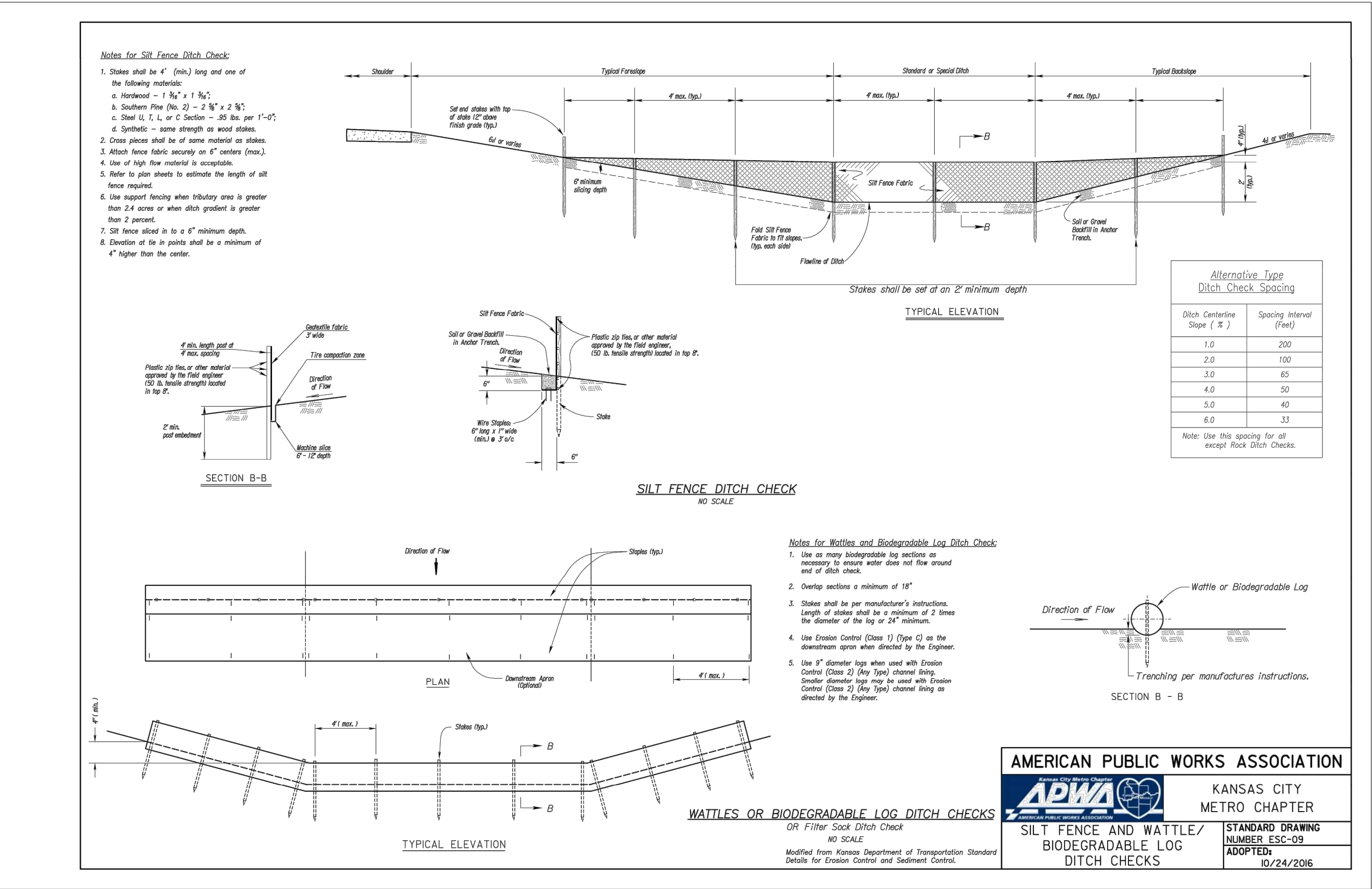
Maintenance for Mulch and Compost Filter Beam:

1. Berm shall be reshaped and material added as necessary to maintain function and dimensions.
2. Breaches in the berm shall be repaired promptly.



Modified from 2015 Overland Park Standard Details  
for Erosion and Sediment Control.

### ***Erosion Control Details***



STATE OF MISSOURI  
BRADLEY D. BURTON  
NUMBER E-25862  
REGISTERED PROFESSIONAL ENGINEER  
3/10/20

GBA  
architects  
engineers  
9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

DATE:  
DESIGN BY:  
DRAWN BY:  
PROJECT NO.:  
SHEET NO.  
TOTAL SHEETS

CEL  
DR  
04/10/2020  
12720  
32  
43

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO. DATE

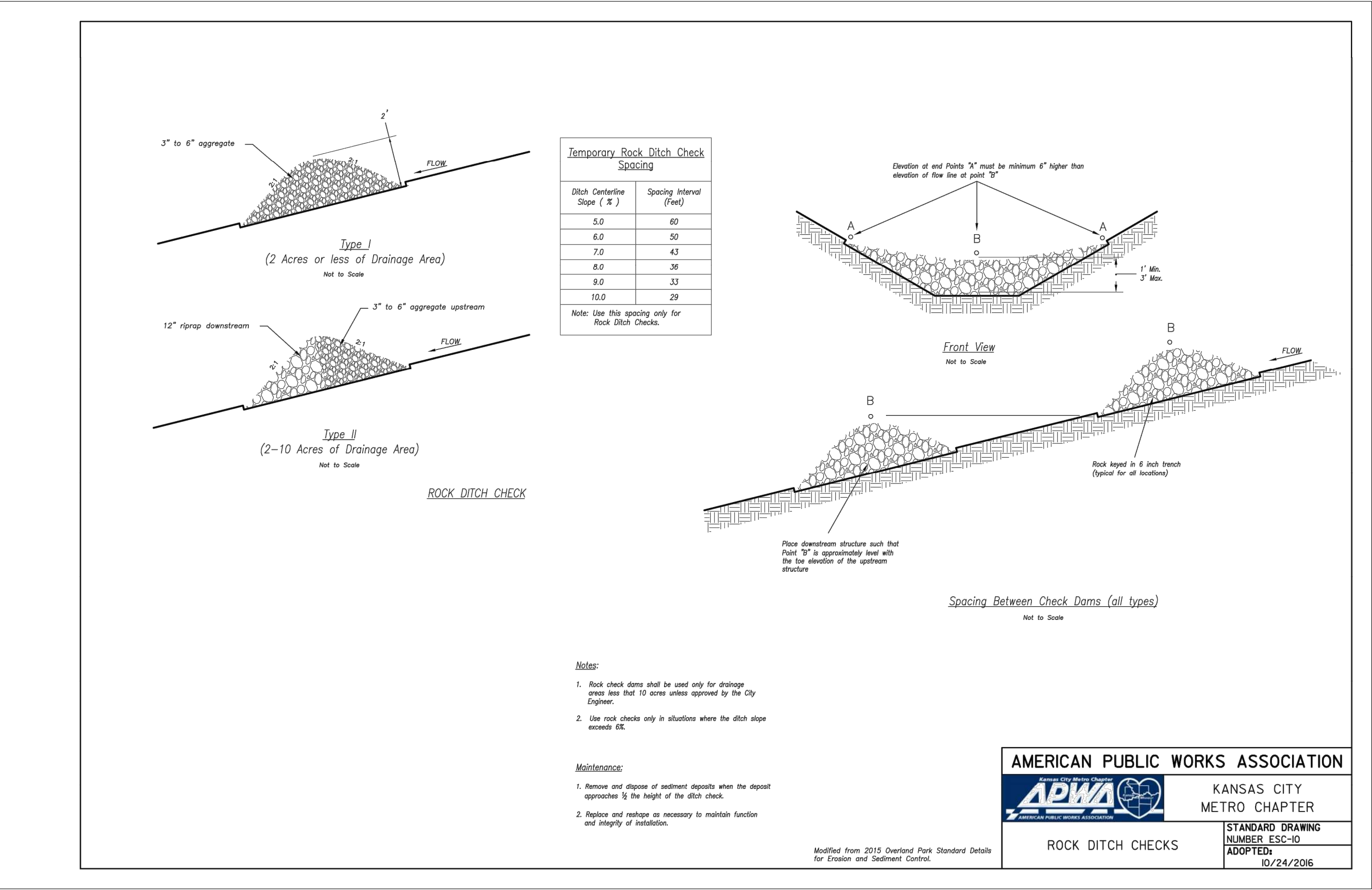
5/15/18  
8/7/18  
8/28/18  
9/14/18  
10/10/18  
3/10/20

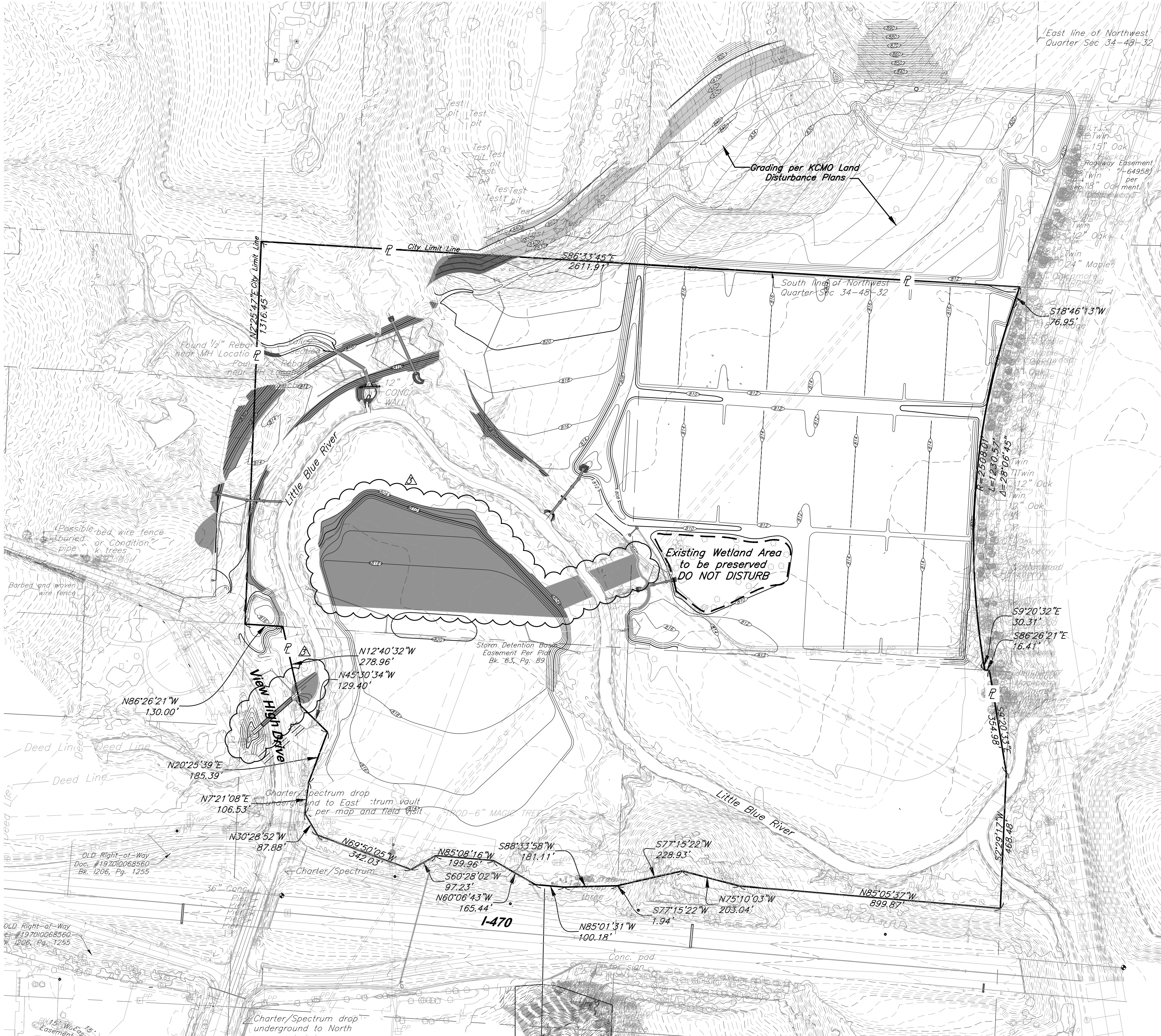
REVISIONS

Revised Field Elevations  
City Comments  
City Comments  
City Comments  
City Comments  
City Comments  
City Comments

BY APPROVED

AMERICAN PUBLIC WORKS ASSOCIATION  
KANSAS CITY METRO CHAPTER  
STANDARD DRAWING NUMBER ESC-10  
ADOPTED: 10/24/2016





STATE OF MISSOURI

BRADLEY D. BURTON

NUMBER E-25862

REGISTERED PROFESSIONAL ENGINEER

3/10/20

GBA

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Lenexa, Kansas 66219  
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DATE: 04/10/2020

DESIGN BY: CEL

DRAWN BY: DRI

PROJECT NO.: 12720

SHEET NO. 33

TOTAL SHEETS 43

Bradley D. Burton  
Professional Engineer  
License No. 25862

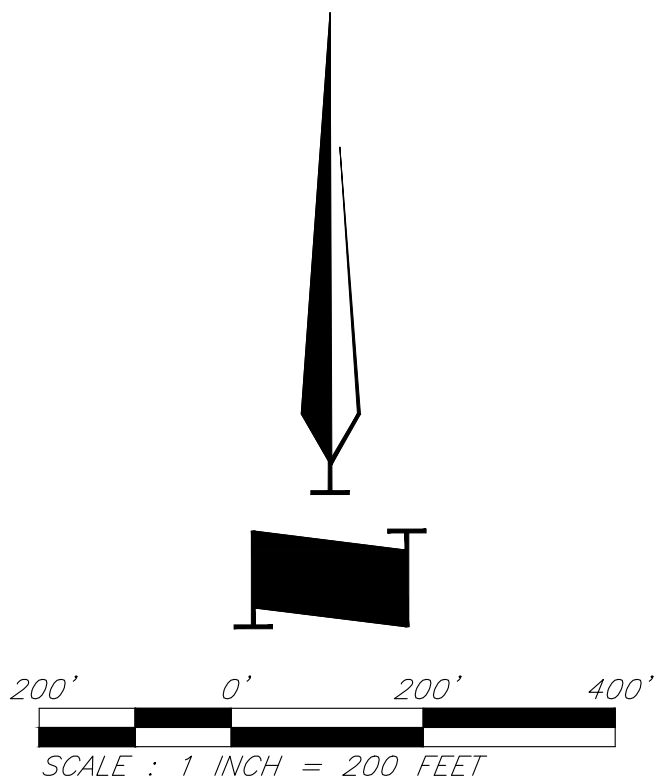
Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
	8/28/18	City Comments		
	9/14/18	City Comments		
	10/10/18	Removed Floodway Grading		
	11/29/18	Temporary River Crossing Repair		
	4/11/19	Temporary River Crossing Repair		
	4/15/19	City Comments		
	3/10/20			

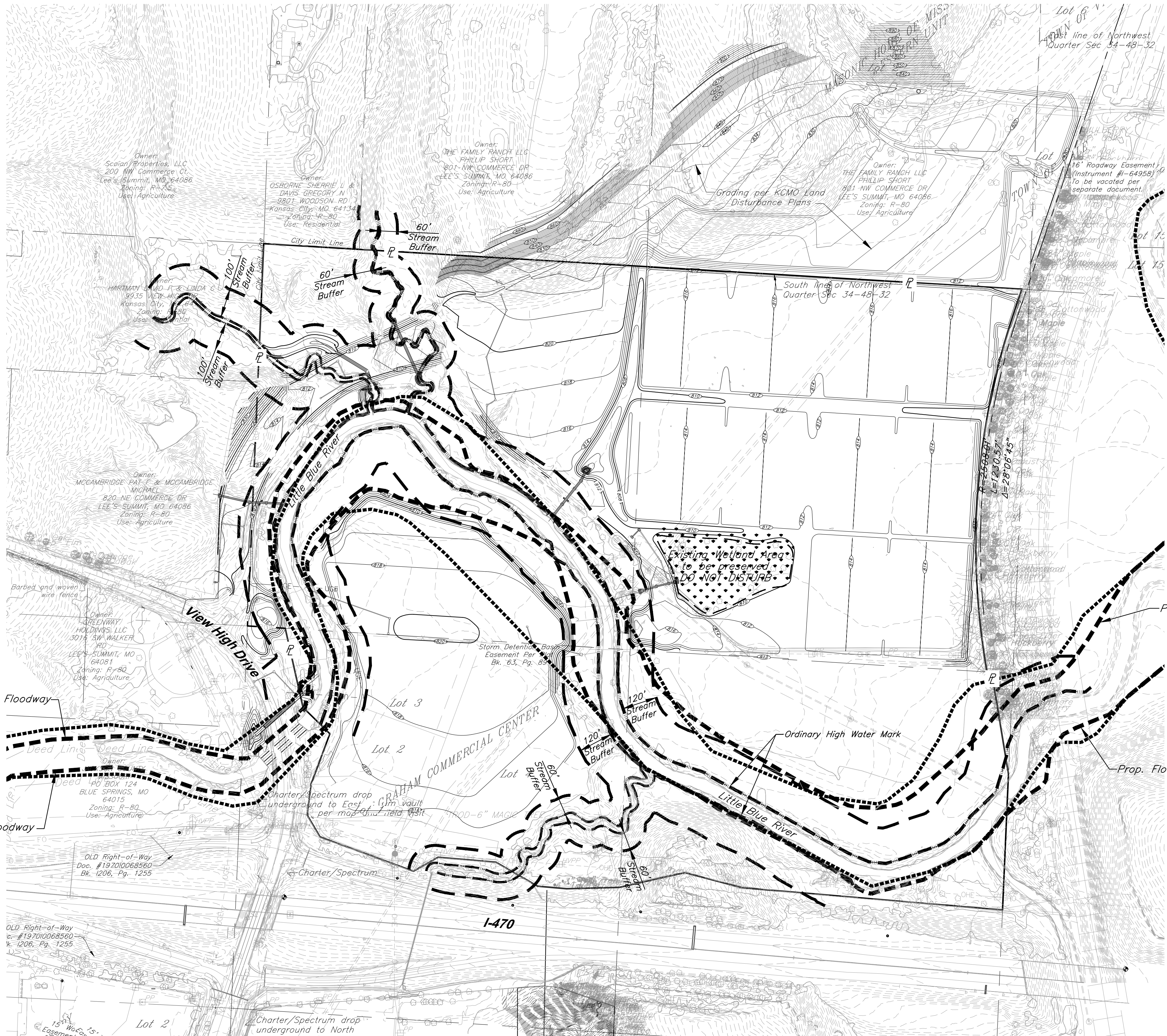
Legend

Denotes 12" of Topsoil with Permanent Seeding

NOTE:  
All other disturbed areas to be temporary seeded.



Seeding Plan



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DATE: 04/10/2020	
DESIGN BY: CEL	
DRAWN BY: DRI	
PROJECT NO.: 12720	
SHEET NO.	TOTAL SHEETS
34	43

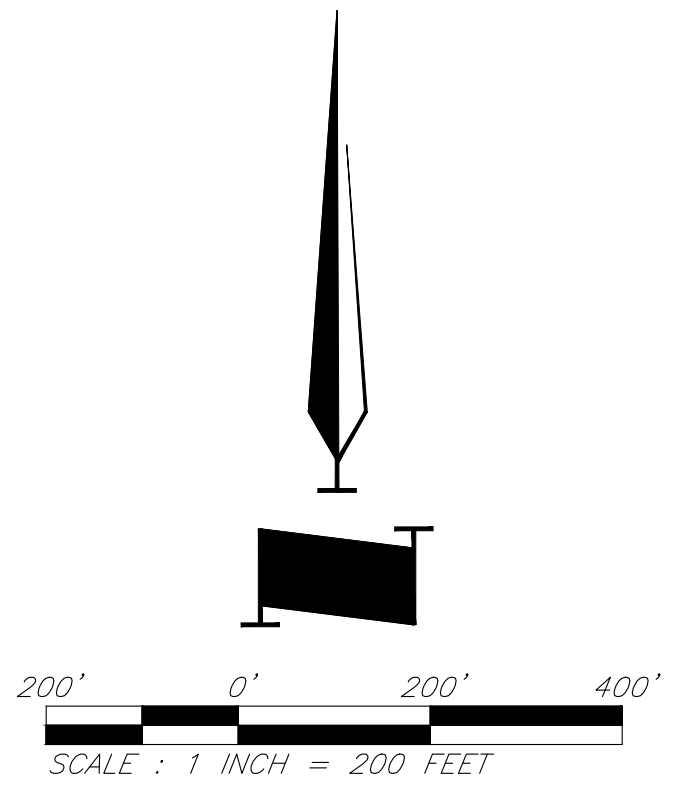
Bradley D. Burton  
Professional Engineer  
License No. 25862

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
	8/28/18	City Comments		
	9/14/18	City Comments		
	10/10/18	Removed Floodway Grading		
	11/29/18			
△	4/11/19	Temporary River Crossing Repair		
△	4/15/19	Temporary River Crossing Repair		
△	3/10/20	City Comments		

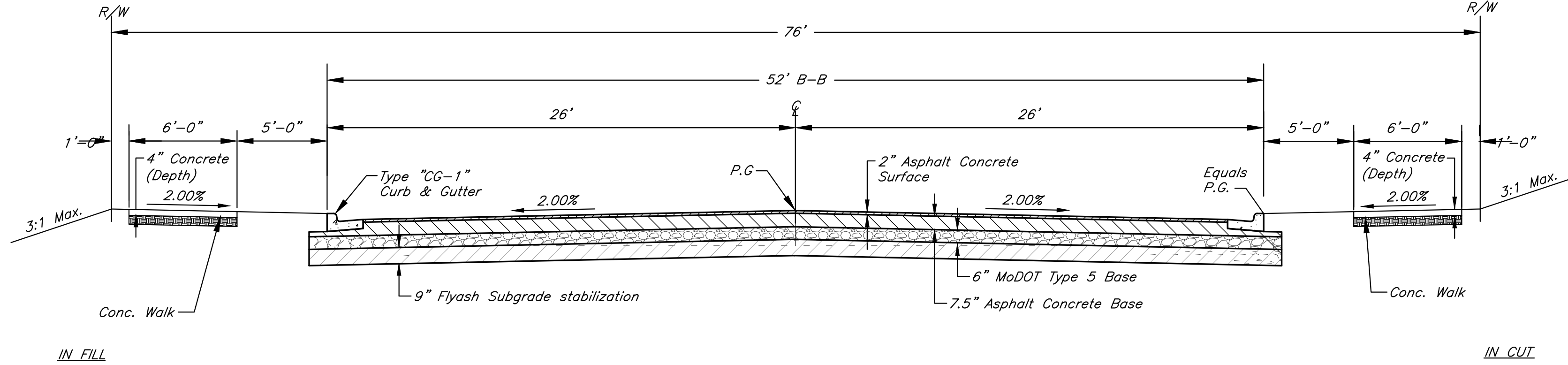
**Legend**

- Stream Buffer
- Existing Floodway
- Proposed Floodway
- Ordinary High Water Mark

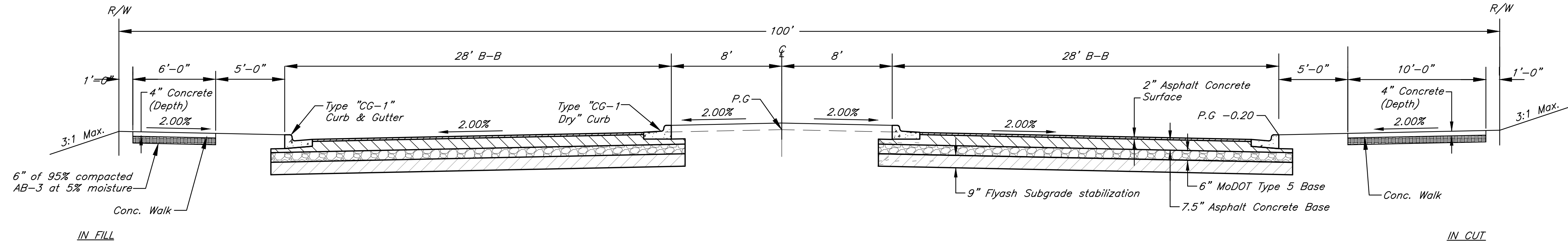


**Stream Buffer**

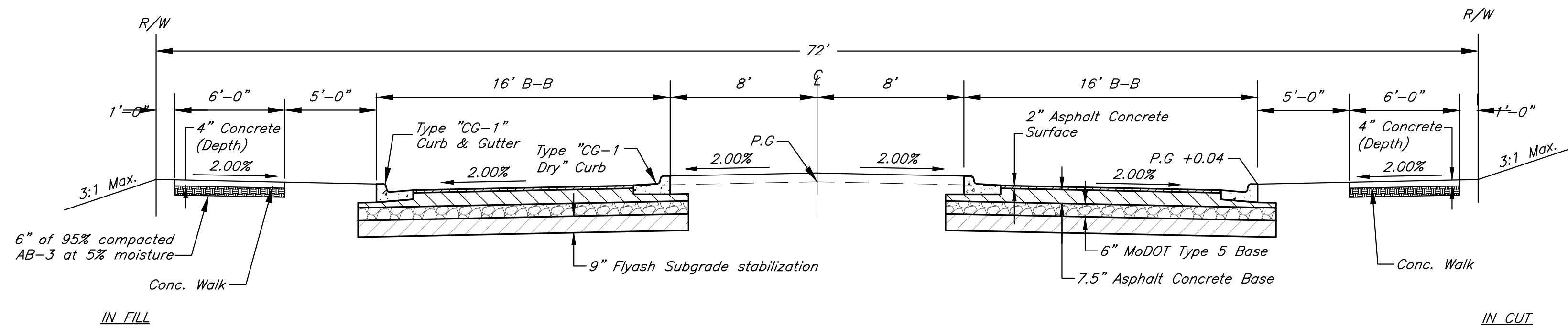
Architect: 00212, Professional Engineer: 000133, Landscape Architect: 000025, Professional Land Surveyor: 000059  
G:\12720\Civil 3D\Production Drawings\Mass Grading\Lee's Summit\1272000300.dwg Layout: 35 Typical Sections (for reference only) --- Tuesday March 10, 2020, 2:17pm --- Copyright 2020, George Butler Associates, Inc.



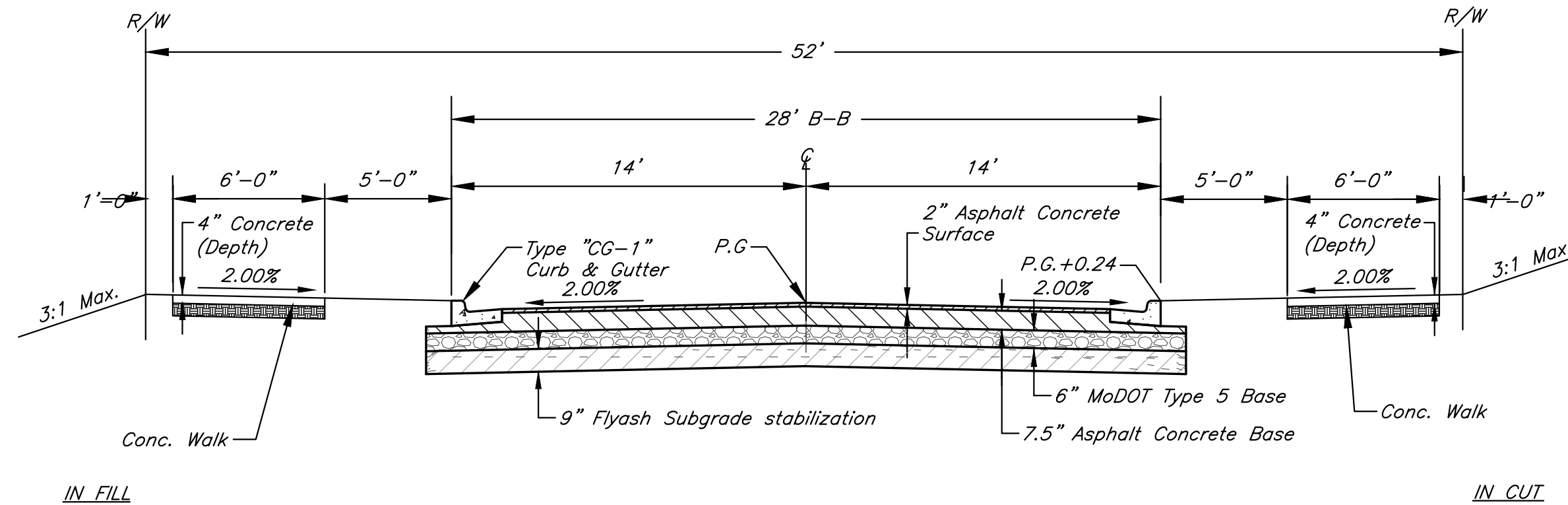
**TYPICAL SECTION  
VIEW HIGH DRIVE**  
Scale: 1" = 5'



**TYPICAL SECTION  
VIEW HIGH PARKWAY**  
Scale: 1" = 5'



**TYPICAL SECTION  
PARAGON PARKWAY**  
Scale: 1" = 5'



**TYPICAL SECTION  
RIVER DRIVE**  
Scale: 1" = 5'

These sections provided for reference only, no street construction is proposed with this plan set

NOTE:  
Road Sections shall adhere to all City of Lee's Summit, Missouri Specifications.

**Typical Sections (for reference only)**

BRADLEY D. BURTON  
NUMBER E-25862  
3/10/20

**GBA**  
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engineers

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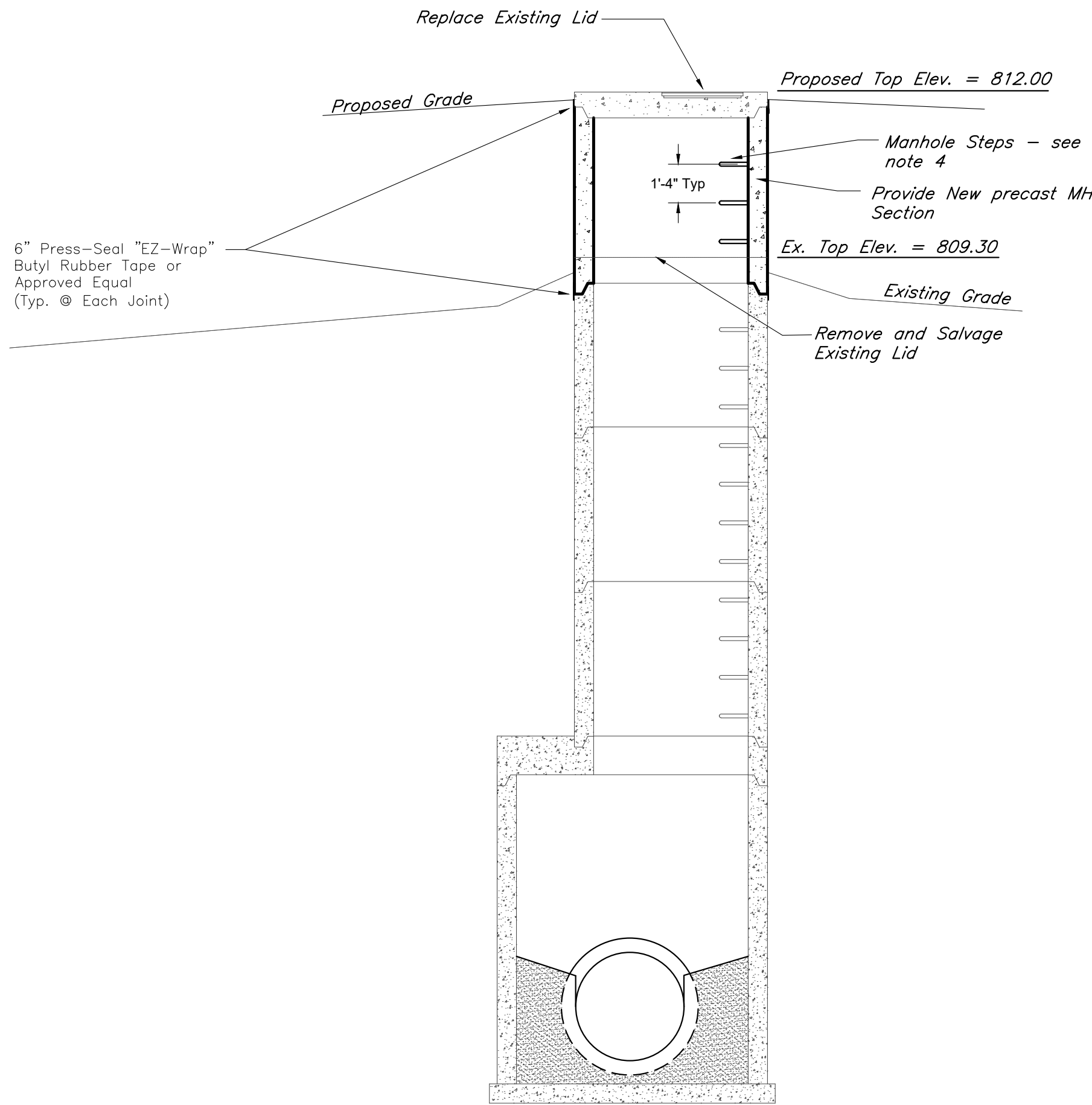
DATE:	CEL
DESIGN BY:	CEL
DRAWN BY:	DR
PROJECT NO.:	12720
SHEET NO.	TOTAL SHEETS
35	43

Bradley D. Burton Professional Engineer License No. 25862	Storm Sewer Improvements and Mass Grading <b>Paragon Star Development</b> Lee's Summit, Missouri			
NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
	8/28/18	City Comments		
	9/14/18	City Comments		
	10/10/18	Removed Floodway Grading		
	11/29/18			
	4/11/19	Temporary River Crossing Repair		
	4/15/19	Temporary River Crossing Repair		
	3/10/20	City Comments		

G:\12720\Civil\_3D\Production Drawings\Mass Grading\Lee's Summit\12720\_C2300.dwg Layout: 36 Sanitary Sewer Details -- Tuesday, March 10, 2020, 2:18pm -- Copyright 2020, George Buller Associates, Inc. Architect 00212, Professional Engineer 000133, Landscape Architect 000025, Professional Land Surveyor 000059

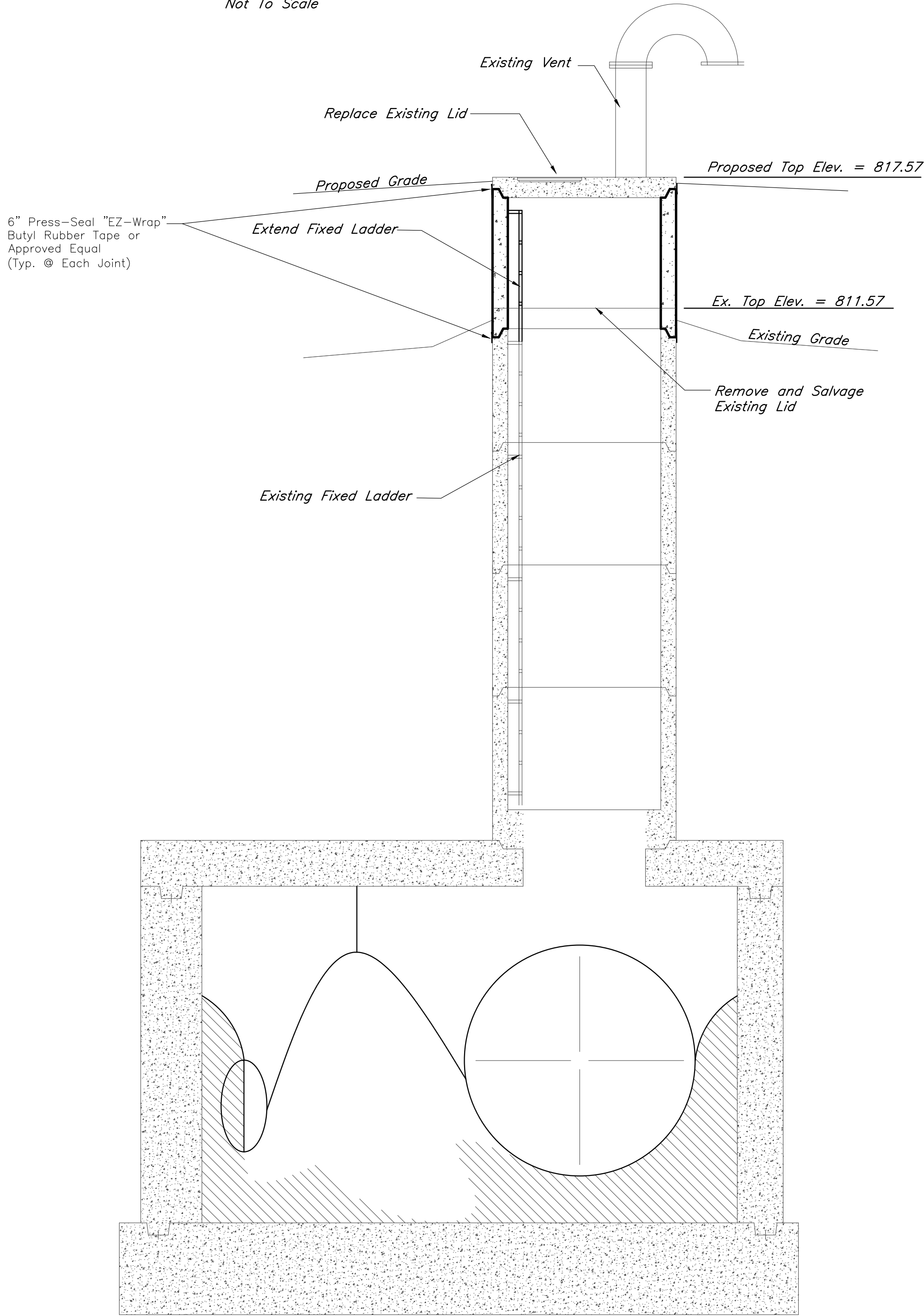
ADJUSTMENT TO EXISTING TYPE II MANHOLE (S7)

Not To Scale




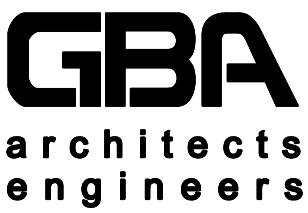
ADJUSTMENT TO EXISTING JUNCTION STRUCTURE (S6)

Not To Scale

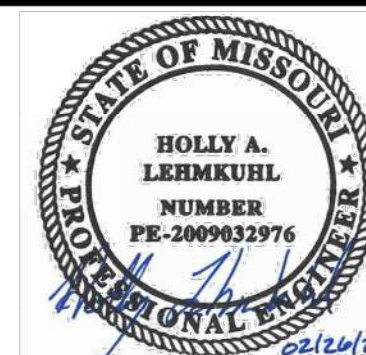


MANHOLE GENERAL NOTES:

1. All manhole rings shall be set in a minimum of two (2) rows of 3/4 to 1 inch pre-formed butyl joint sealer.
2. All manhole bases (pre-cast or poured-in-place) shall have No. 5 reinforcing bars placed on 6" centers both ways.
3. All standard manhole rings and covers to be Deeter 1315-jcs, Neenah NF-15360009/B (frame) and NF-15360010/B (cover), or approved equal. All manhole rings and covers shown in plans to be "bolt-down" to be Clay & Bailey Manufacturing Co. No. 20140R, Neenah R-1915-F2 or approved equal. An extra payment for furnishing "bolt-down" ring and cover as shown in plans will not be made, but shall be considered as subsidiary to the item, "Standard Manhole".
4. Standard manhole steps to be steel core, plastic coated steps (M.A. Ind., Inc. No. PS1- PF, PS2-PF, or approved equal).
5. Maximum grade adjustment allowable is 8". Minimum allowable thickness for precast concrete grade adjustment ring is 4".
6. Reinforcement in all precast sections shall equal or exceed A.S.T.M. C-478 specifications.
7. Butyl material to be used at all precast sections joints. O-Rings may be used for joints below the cone section, but the cone section itself shall not have O-ring joints.
8. Concrete shall be KCMMB 4K.

	 9801 Renner Boulevard Lenexa, Kansas 66219 913.492.0400 www.gbateam.com	DATE:	
		DESIGN BY:	CEL
		DRAWN BY:	DRV
		PROJECT NO.:	12720
		SHEET NO.	TOTAL SHEETS
		36	43
Bradley D. Burton Professional Engineer License No. 25862		Storm Sewer Improvements and Mass Grading <b>Paragon Star Development</b> Lee's Summit, Missouri	
NO.		DATE	REVISIONS
5/15/18			Revised Field Elevations
8/7/18			City Comments
8/28/18			City Comments
9/14/18			City Comments
10/10/18			Removed Floodway Grading
11/29/18			
4/11/19			Temporary River Crossing Repair
4/15/19			Temporary River Crossing Repair
3/10/20			City Comments

**RELEASE FOR  
CONSTRUCTION**  
AS NOTED ON PLANS REVIEW  
DEVELOPMENT SERVICES  
LEE'S SUMMIT, MISSOURI



**GBA**  
architects  
engineers

9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.qbateam.com

DATE:	DEVELOPMENT SERVICE LEE'S SUMMIT, MISSOURI	
DESIGN BY:	HAL	
DRAWN BY:	04/10/2020 GMH	
PROJECT NO.:	12720	
SHEET NO.	TOTAL SHEETS	

37 43

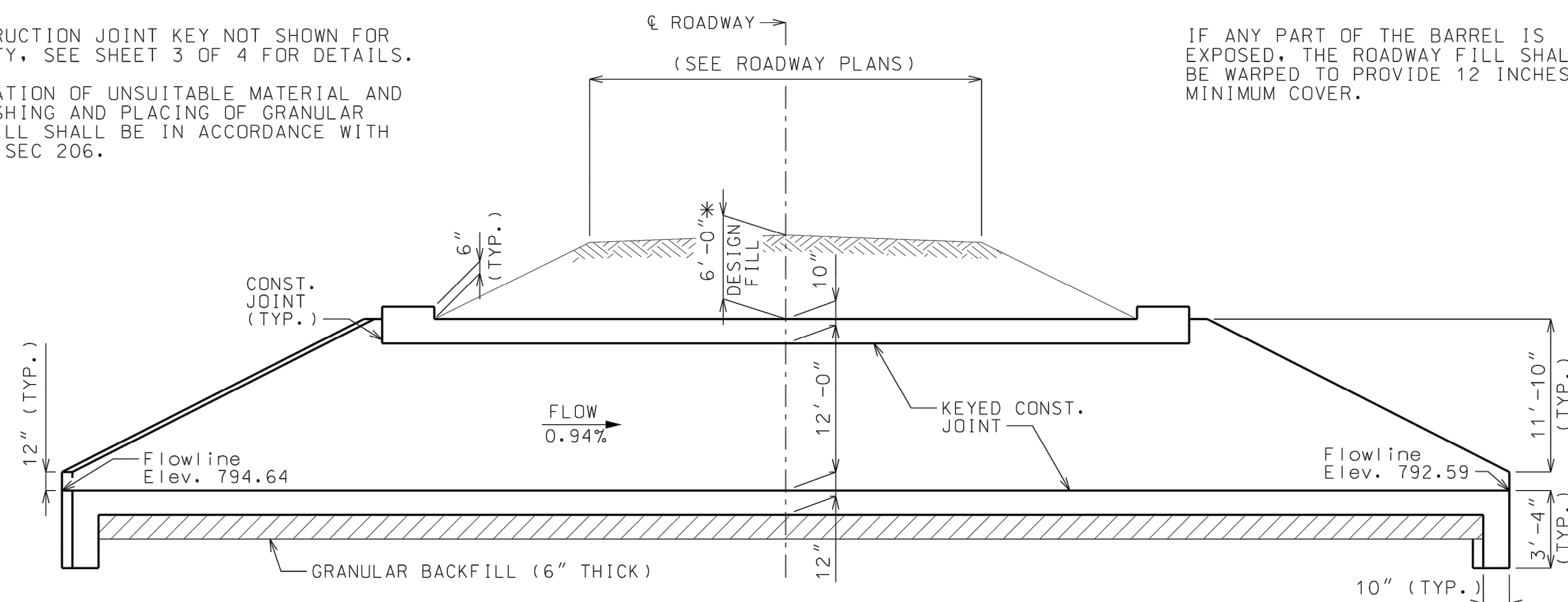
Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
 Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 4 FOR DETAILS.

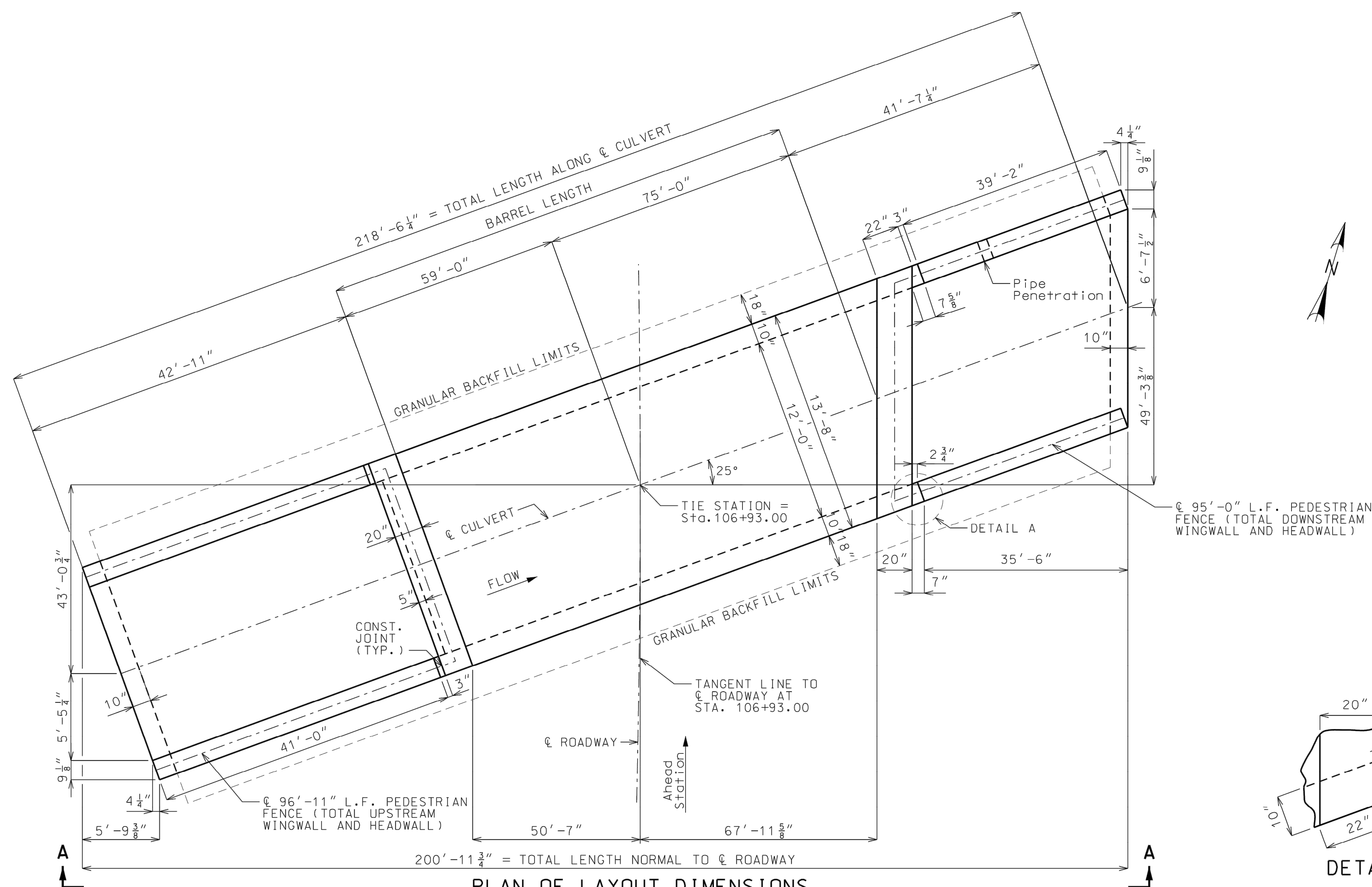
EXCAVATION OF UNSUITABLE MATERIAL AND  
FURNISHING AND PLACING OF GRANULAR  
BACKFILL SHALL BE IN ACCORDANCE WITH  
MODOT SEC. 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

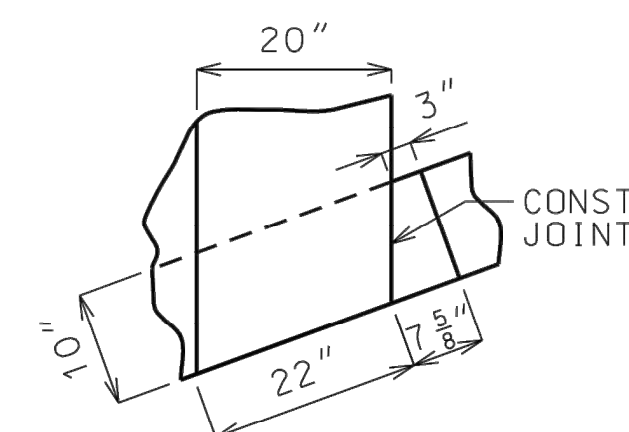
CHANNEL BOTTOM SHALL BE GRADED FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS.  
CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



## PLAN OF LAYOUT DIMENSIONS

Note: This drawing is not to scale. Follow dimensions.

\* BOX CULVERT DESIGNED FOR 6'-0" DESIGN  
FILL FOR EXISTING GRADE AND 8'-0"  
DESIGN FILL FOR FINAL GRADE.



DETAIL A

CONCRETE SINGLE 12'X12'  
BOX CULVERT

SHEET 1 OF 4

GENERAL NOTES:

SEE MODOT SPECIFICATIONS AND STANDARD PLANS FOR  
ADDITIONAL INFORMATION.

DESIGN SPECIFICATIONS:

DESIGN SPECIFICATIONS:  
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM  
REVISIONS

## DESIGN LOADING:

VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF  
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

## DESIGN UNIT STRESSES:

CLASS B-1 CONCRETE (BOX CULVERT)  $f'_c = 4,000$  PSI  
REINFORCING STEEL (GRADE 60)  $f_y = 60,000$  PSI

MISCELLANEOUS:

FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 4. FOR SECTION  
DETAILS AND PIPE PENETRATION DETAILS, SEE SHEET 3 OF 4.  
FOR ADDITIONAL DETAILS NOT SHOWN, SEE MODOT STANDARD PLANS  
703.10J AND 703.14J.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

ALL MATERIAL, LABOR, EXCAVATION, GRANULAR BACKFILL AND EQUIPMENT  
REQUIRED TO CONSTRUCT THE RCB AND PEDESTRIAN FENCE SHALL BE  
SUBSIDIARY TO THE BID ITEM "12'x12' CONCRETE BOX CULVERT",  
LINEAR FOOT.




CONCRETE SINGLE 12'X12'  
BOX CULVERT  
SHEET 2 OF 4

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

Note: This drawing is not to scale. Follow dimensions.

C:\12720\Civil 3D\Production Drawings\Mass Grading\Lee's Summit\12720C6900.dwg Layout: 39 RCB(3) -- Tuesday, March 10, 2020, 2:19pm -- Copyright 2020, George Butler Associates, Inc. Architect 00212, Professional Engineer 000133, Professional Land Surveyor 000059



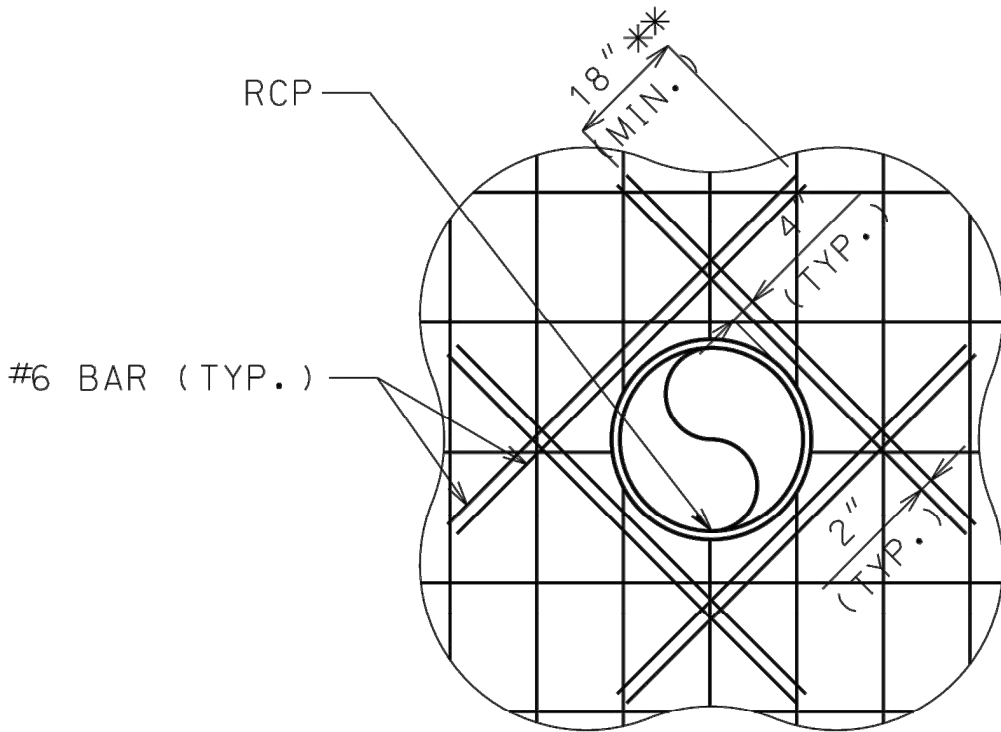
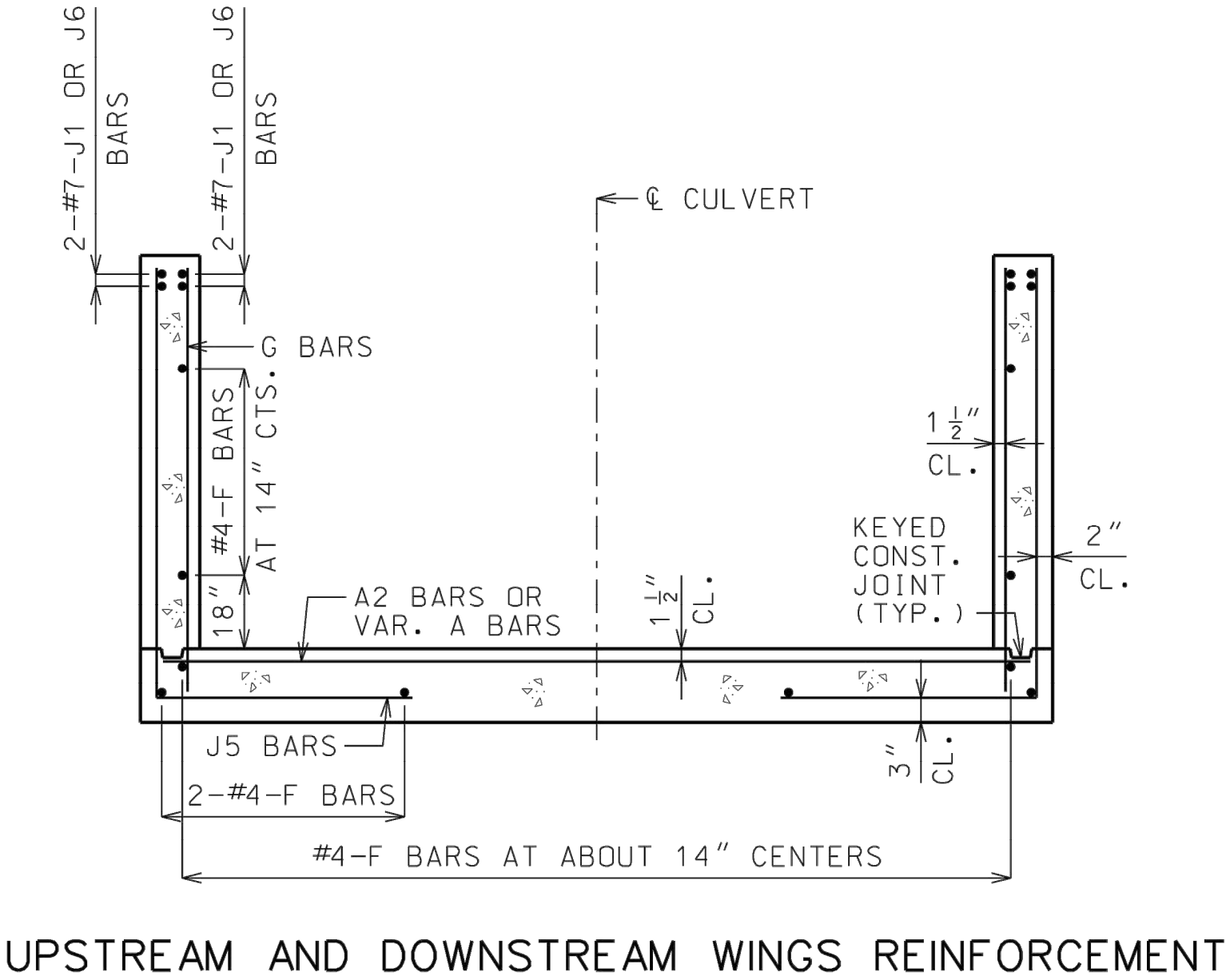
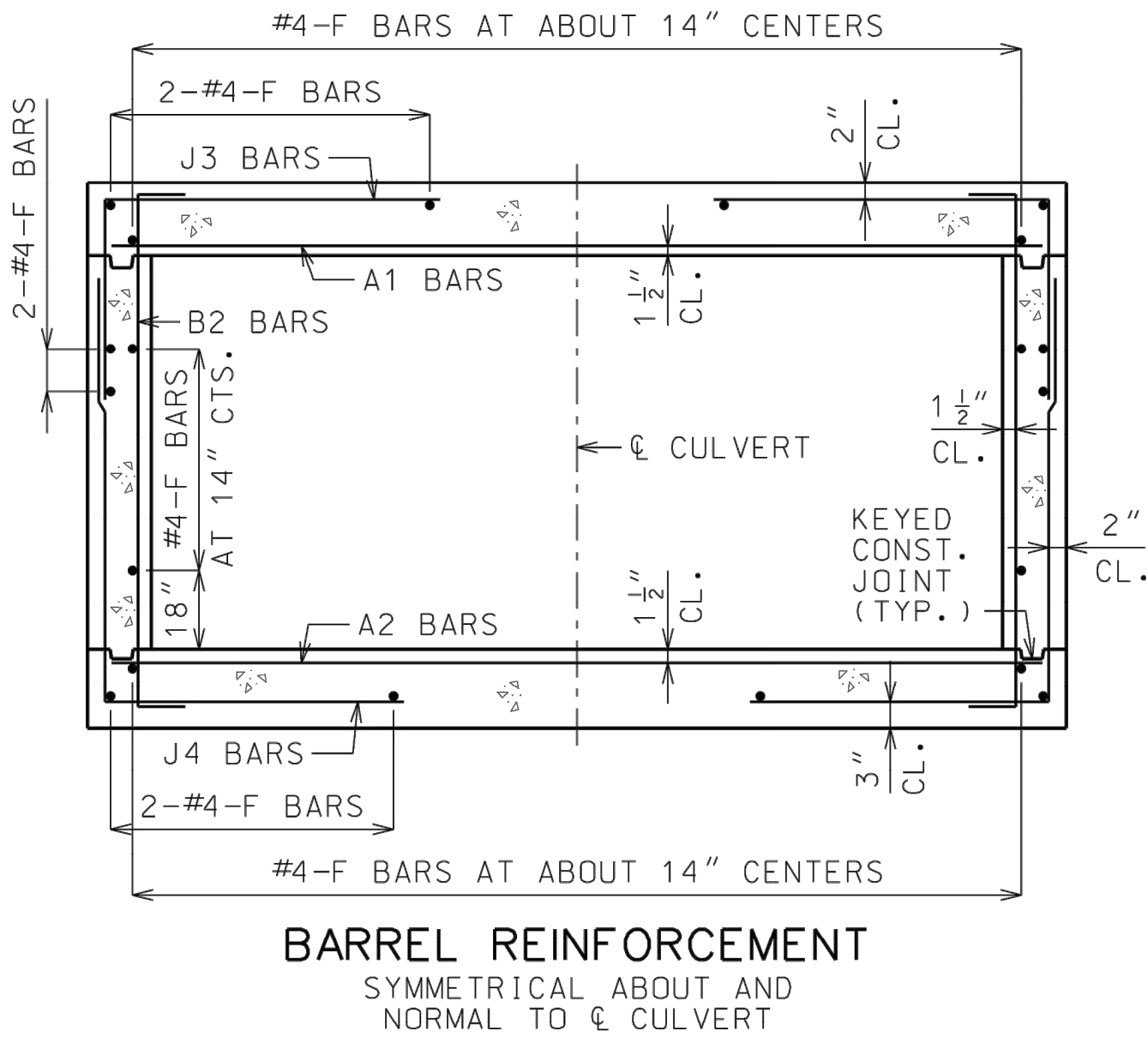
**GBA**  
architects  
engineers  
  
9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
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DATE: 04/19/2020  
DESIGN BY: HAL  
DRAWN BY: CMH  
PROJECT NO.: 12720  
SHEET NO. 39  
TOTAL SHEETS 43

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

Holly A. Lehmkuhl  
Professional Engineer  
License No. 200932976

NO. DATE REVISIONS BY APPROVED



**ADDITIONAL REINFORCING  
FOR PIPE PENETRATIONS  
INTO RCB WINGWALL**

Note:  
CUT HORIZ. & VERT. REINF. TO ALLOW FOR  
PIPE OPENING.

INSTALL TREATED PLYWOOD BOARD OVER 18"  
END SECTION UPON COMPLETION OF RCB  
CONSTRUCTION.

※ FIELD BEND AS NECESSARY TO MAINTAIN 1 1/2"  
CLEAR.

PIPE PENETRATION LOCATION	
STATION	107+34.41
FLOWLINE	E1. 798.5
OFFSET	82.93' Rt.
PIPE SIZE	18"

**GENERAL NOTES:**

J5 BARS ARE #6 @ 6"

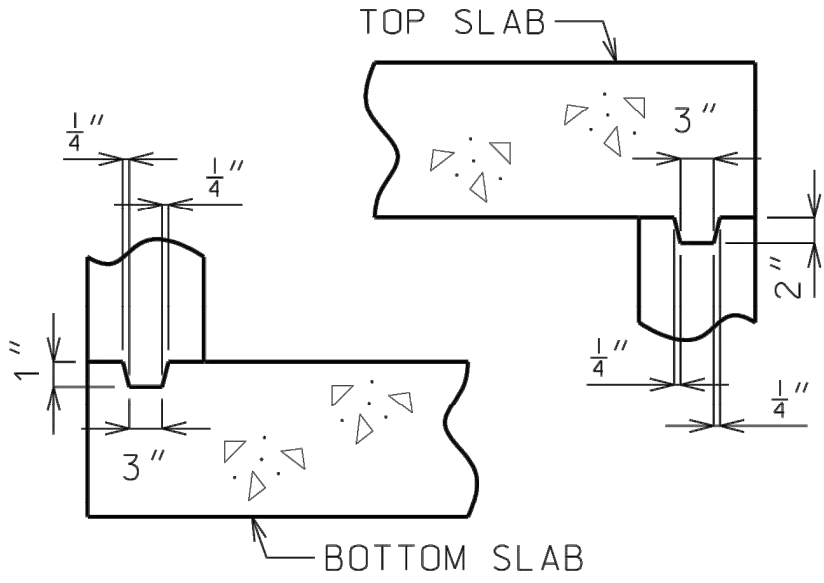
BARREL AND WINGS SECTIONS ARE  
SYMMETRICAL ABOUT AND NORMAL TO  
CULVERT, EXCEPT AS SHOWN.  
HEADWALL SECTIONS ARE NORMAL TO  
LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW  
DIMENSIONS.

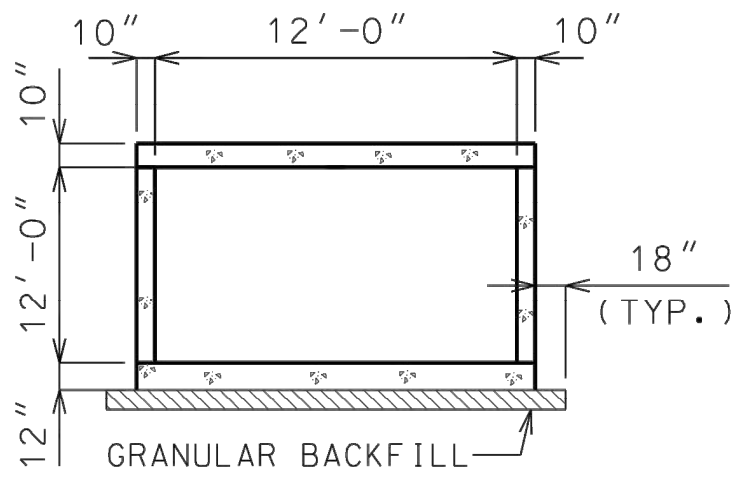
MINIMUM CLEARANCE TO REINFORCING  
STEEL SHALL BE 1 1/2".

SEE MODOT STANDARD PLAN 703.17  
FOR REINFORCEMENT LENGTHS USING  
12'X12' BOX CULVERT DIMENSIONS  
WITH A DESIGN FILL OF 6'-0".

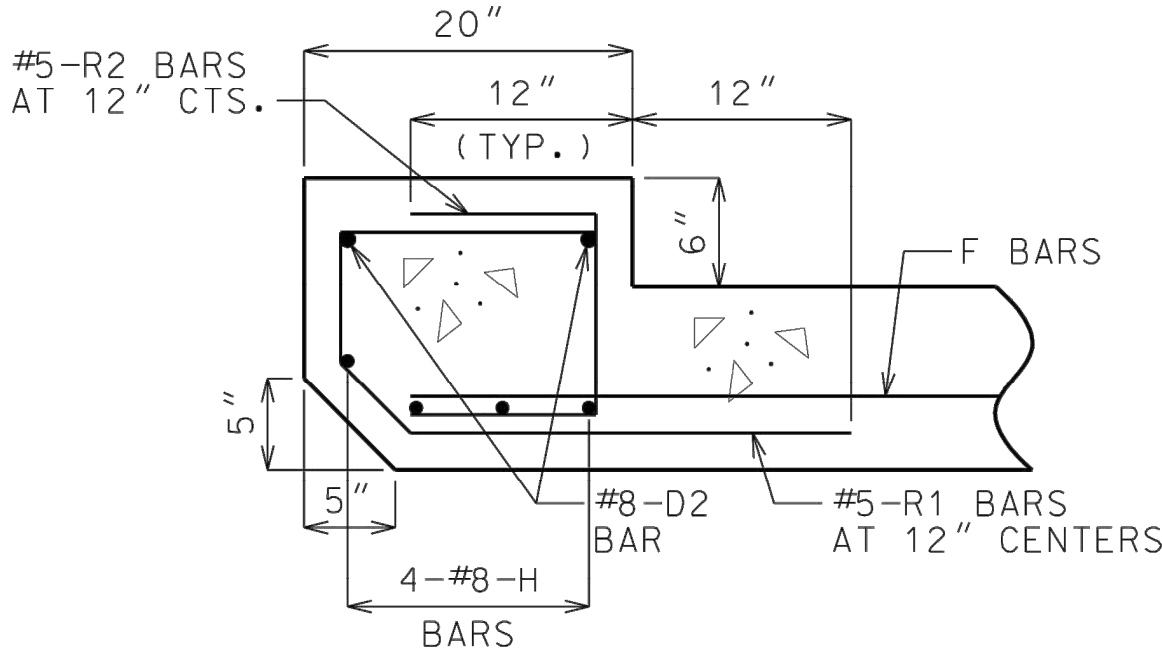
ALL MATERIAL, LABOR, EXCAVATION  
AND EQUIPMENT REQUIRED TO  
CONSTRUCT THE PIPE PENETRATION  
SHALL BE SUBSIDIARY TO THE BID  
ITEM "12'X12' CONCRETE BOX  
CULVERT", LINEAR FOOT.



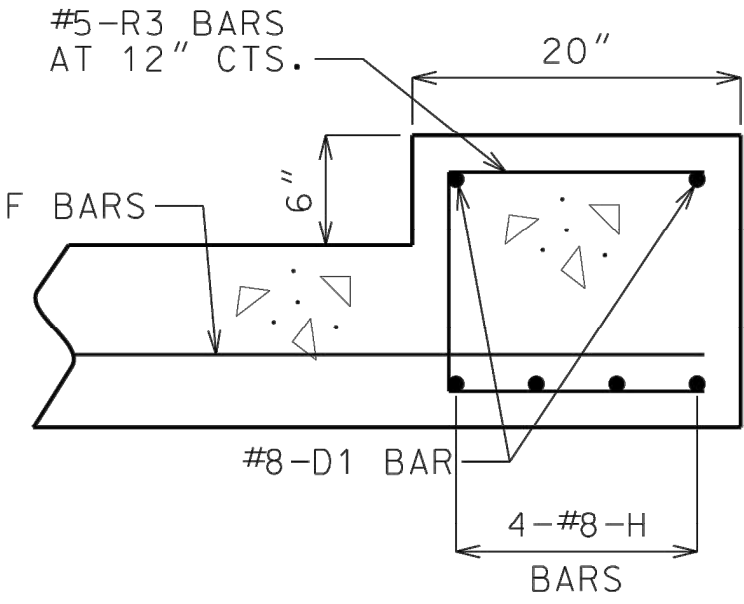
**KEYED CONSTRUCTION JOINT**



**GRANULAR BACKFILL LIMITS  
AND MEMBER DIMENSIONS**



**UPSTREAM HEADWALL  
REINFORCEMENT**

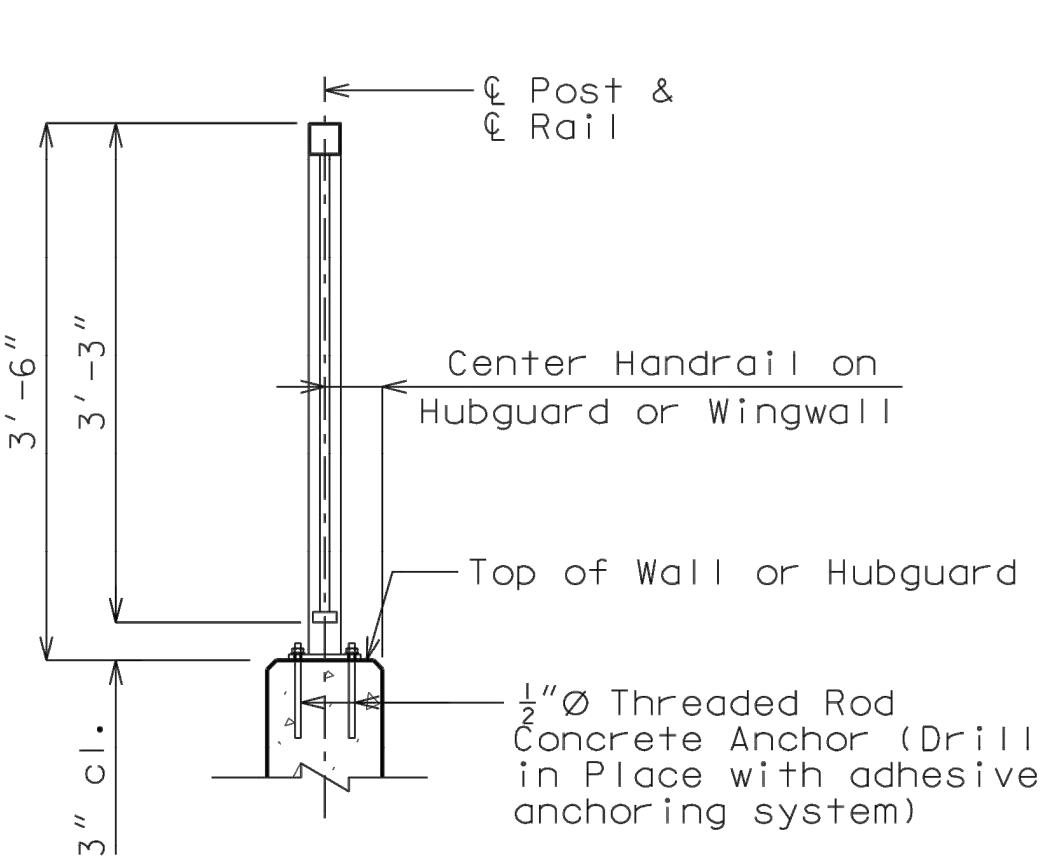


**DOWNSTREAM HEADWALL  
REINFORCEMENT**

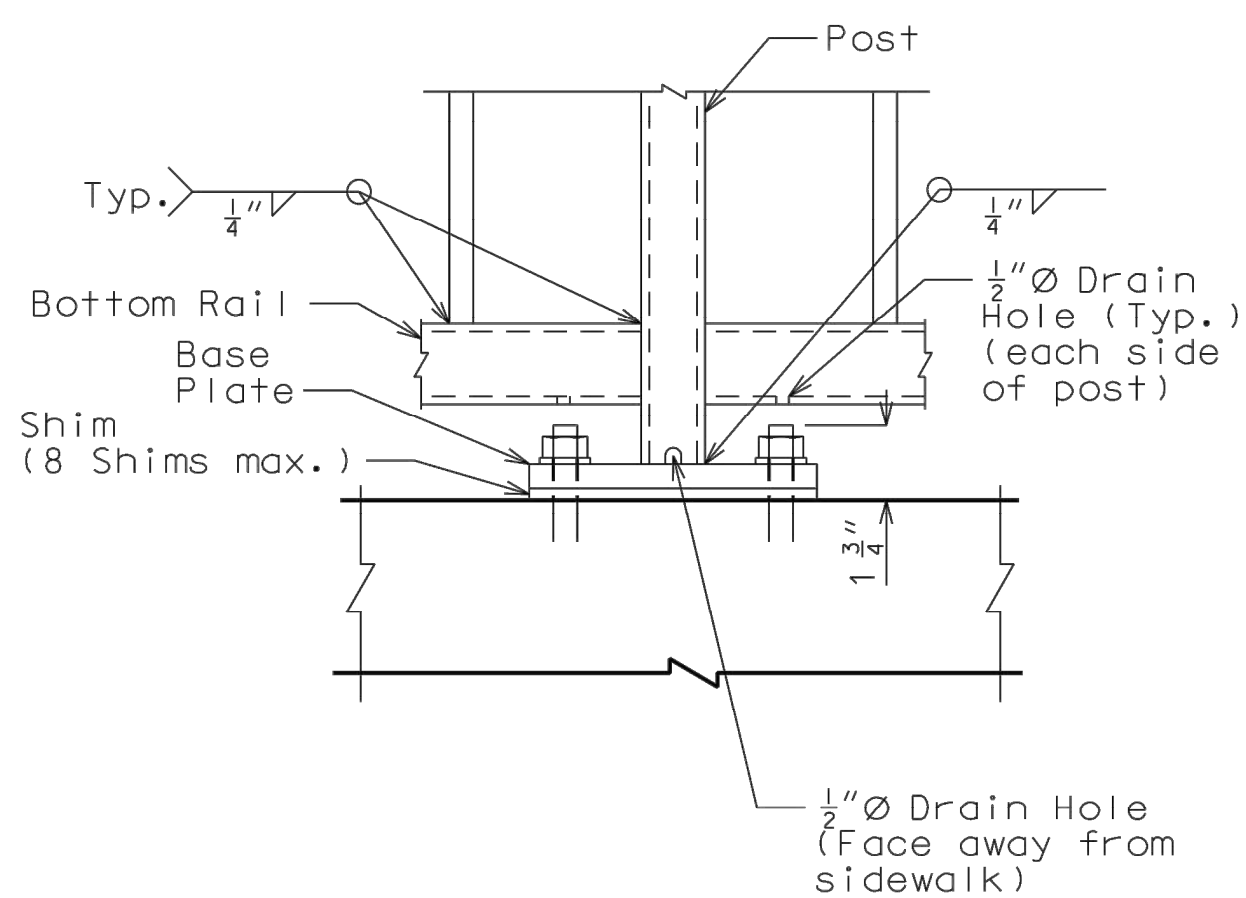
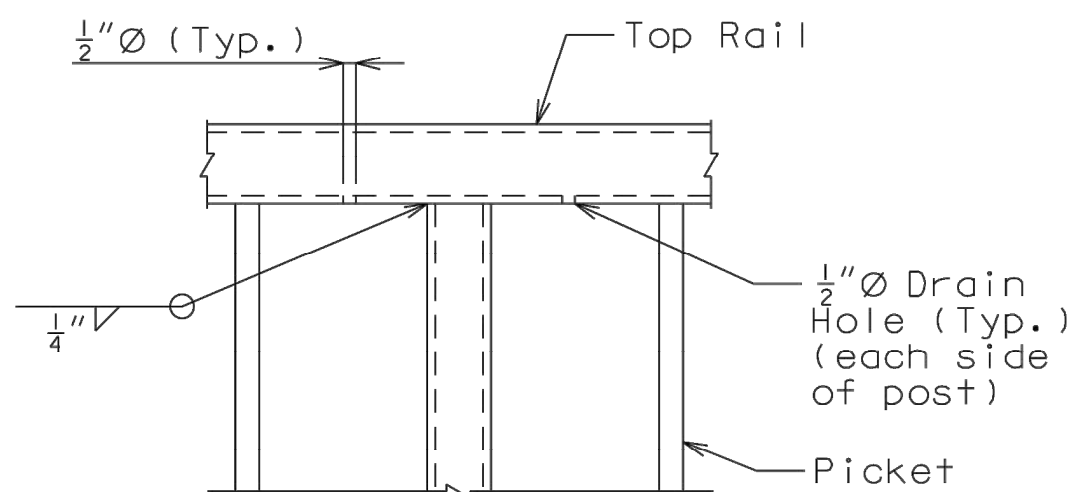
**CONCRETE SINGLE 12'X12'  
BOX CULVERT**  
SHEET 3 OF 4

Note: This drawing is not to scale. Follow dimensions.

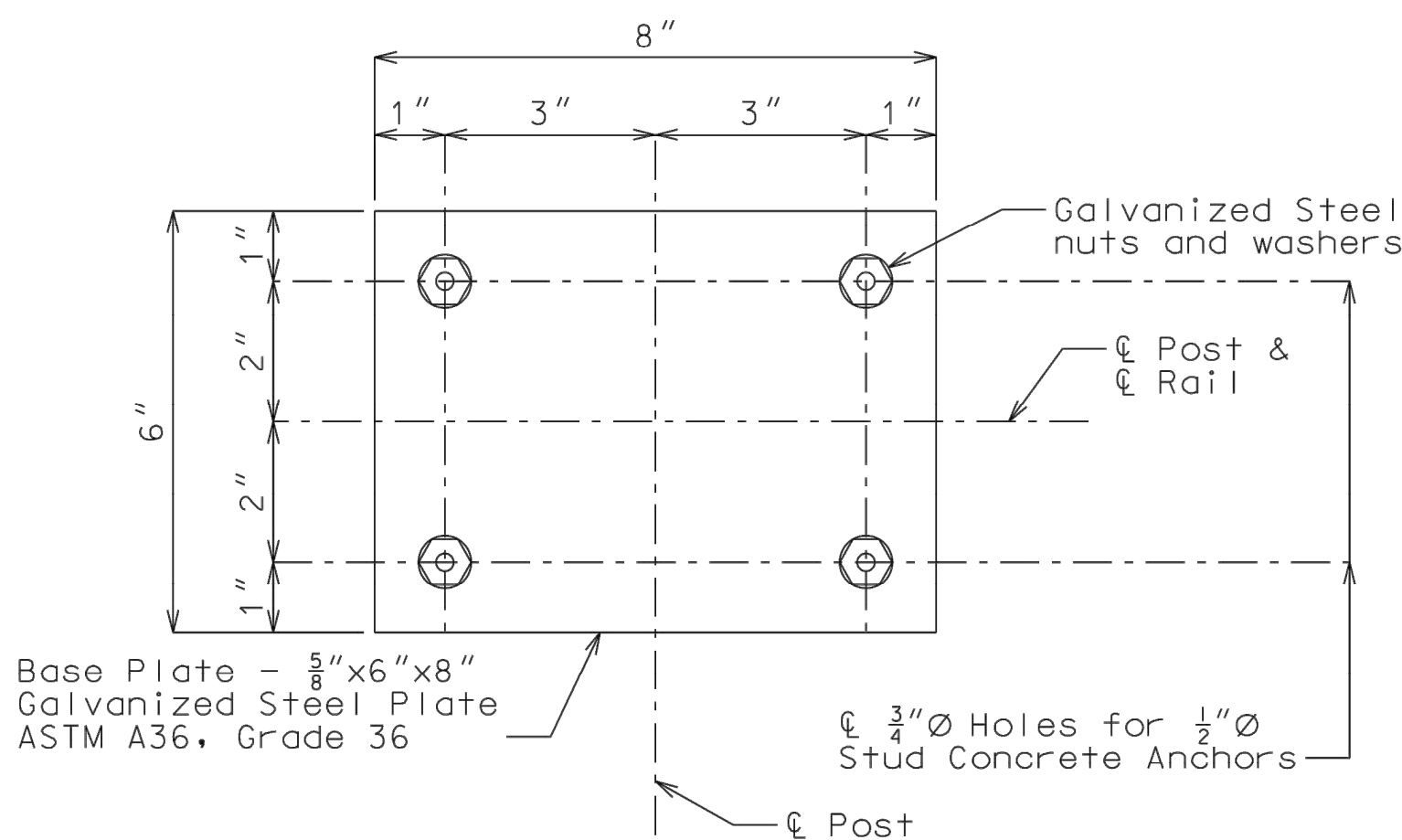
C:\12720\Civil 3D\Production Drawings\Mass Grading\Lee's Summit\12720C6900.dwg Layout: 40 RCB(4) -- Tuesday, March 10, 2020, 2:19pm -- Copyright 2020, George Butler Associates, Inc., Architect 00212, Professional Engineer 000133, Professional Land Surveyor 000039



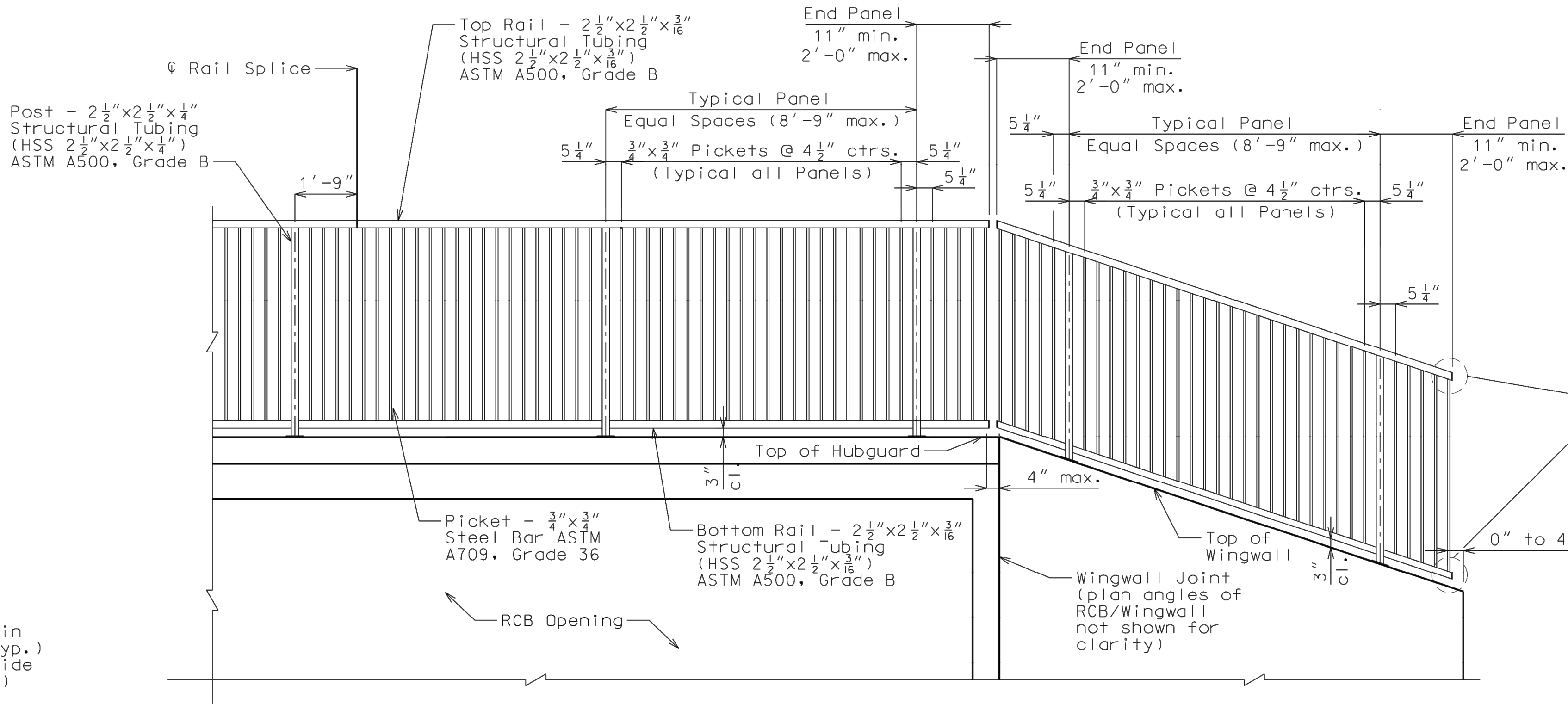
SECTION THRU RAIL



POST DETAIL

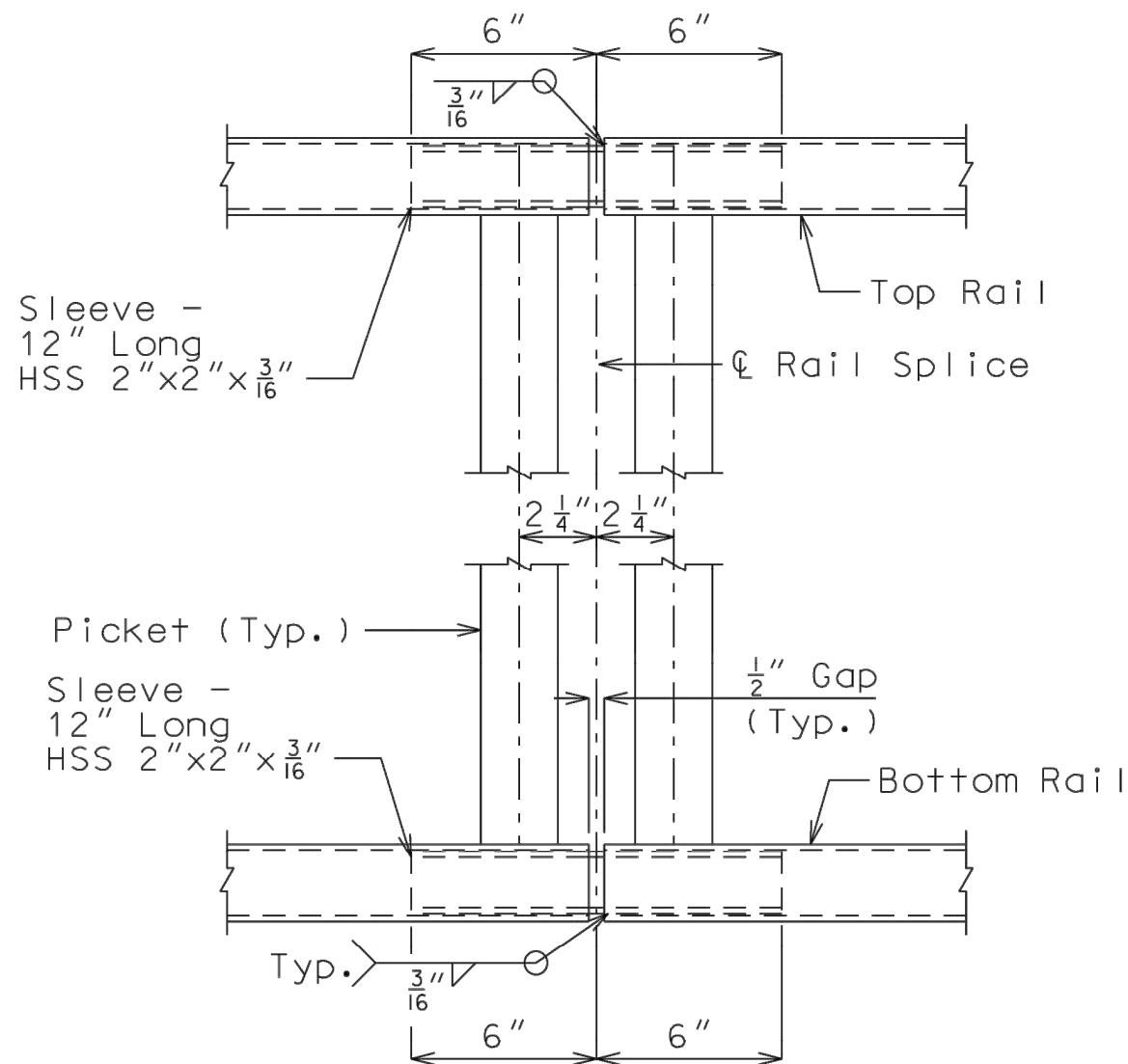


BASE PLATE DETAIL

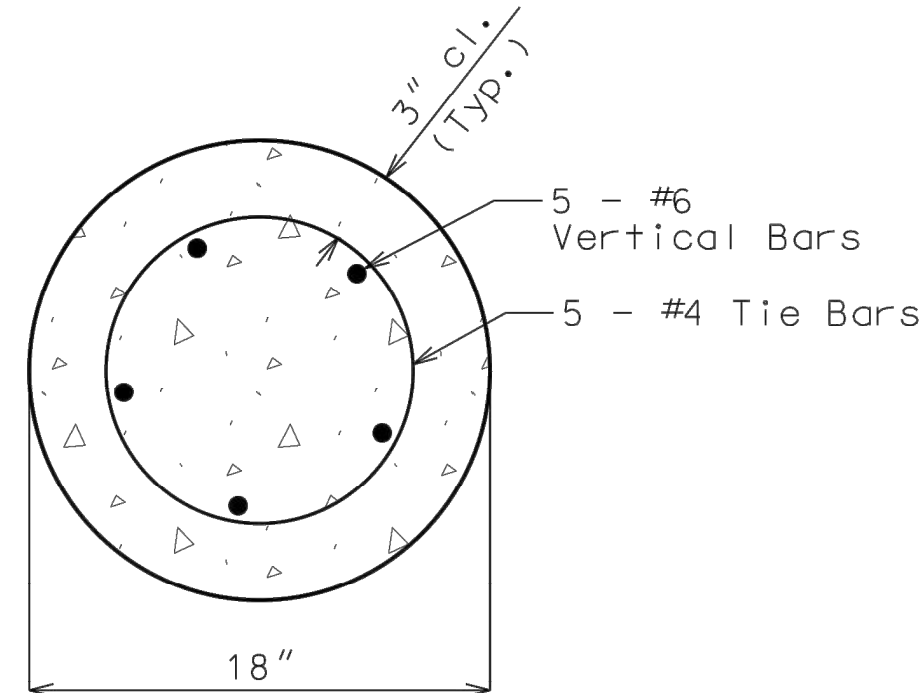


TYPICAL METAL HANDRAIL ELEVATION ON RCB HUBGUARD & WINGWALL

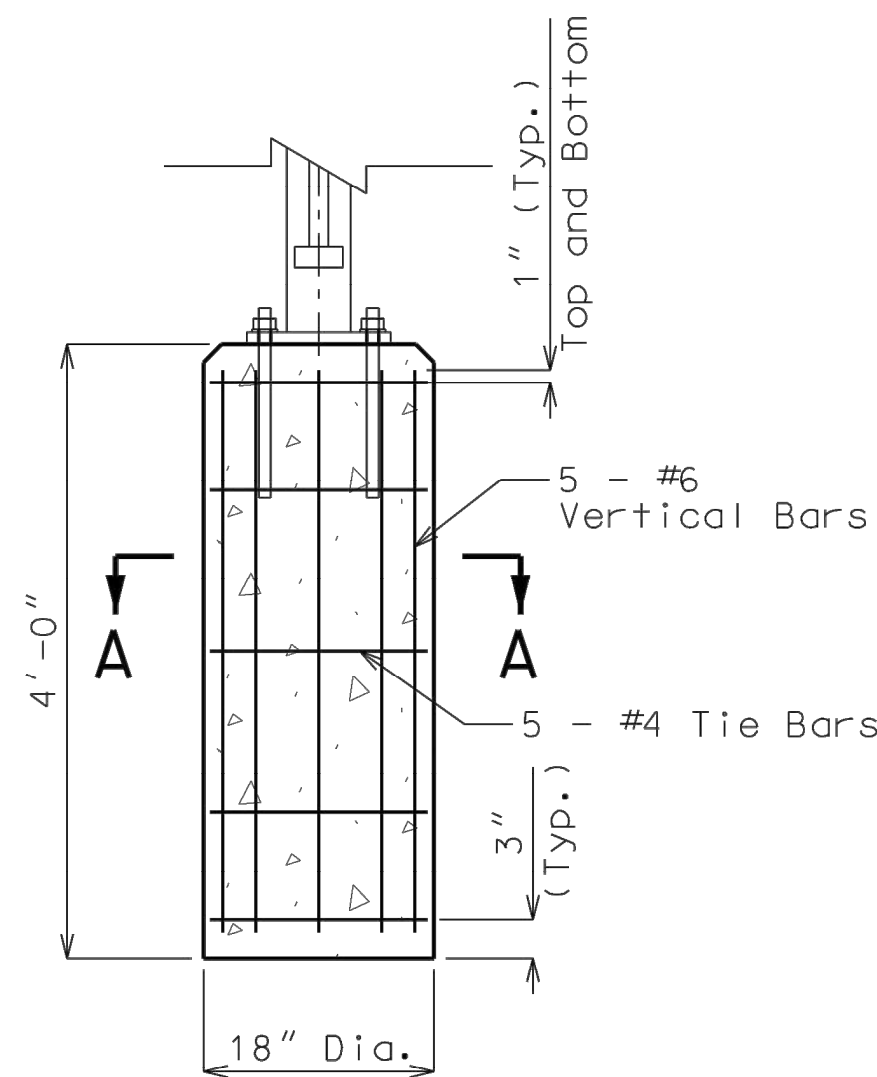
Not to Scale



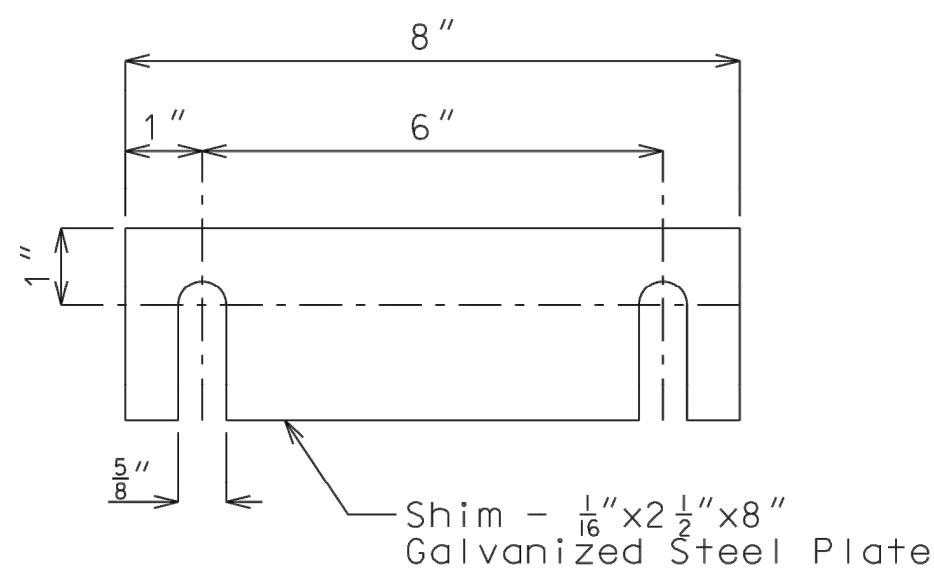
TYPICAL SPLICE DETAIL



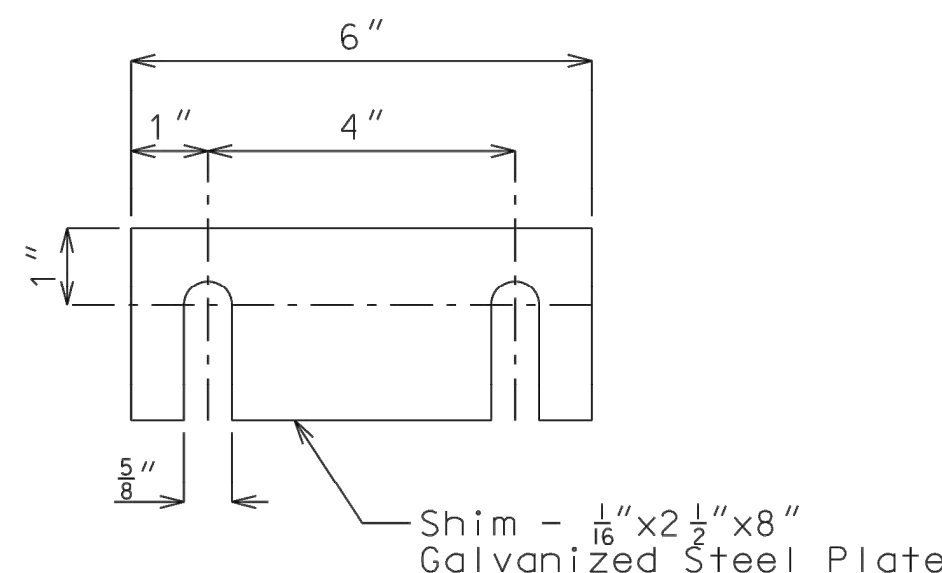
SECTION A-A



POST FOUNDATION DETAIL



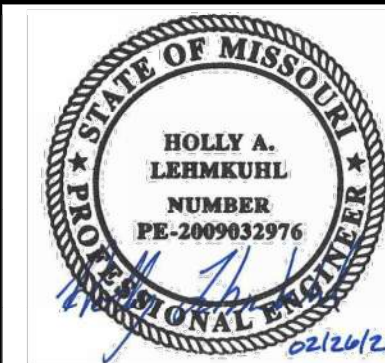
8 inch SHIM DETAIL



6 inch SHIM DETAIL

## PEDESTRIAN FENCE DETAILS

Note: This drawing is not to scale. Follow dimensions.



**GBA**  
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engineers  
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Holly A. Lehmkuhl  
Professional Engineer  
License No. 200932976

Storm Sewer Improvements and Mass Grading  
**Paragon Star Development**  
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED

DATE:	04/19/2020
DESIGN BY:	HAL
DRAWN BY:	CMF
PROJECT NO.:	12720
SHEET NO.	TOTAL SHEETS
40	43

**CONCRETE SINGLE 12'X12'  
BOX CULVERT**  
SHEET 4 OF 4

*GENERAL NOTES:*

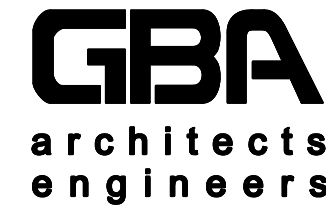
*All traffic control devices shall be designed and installed according to the requirements specified in the Manual for Uniform Traffic Control Devices.*

*All existing signs that conflict with the proposed traffic control plan shall be covered, no direct pay.*

*All R11-2 and R11-3a signs shall be mounted on type III barricades.*



### ***Traffic Control Details***



9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

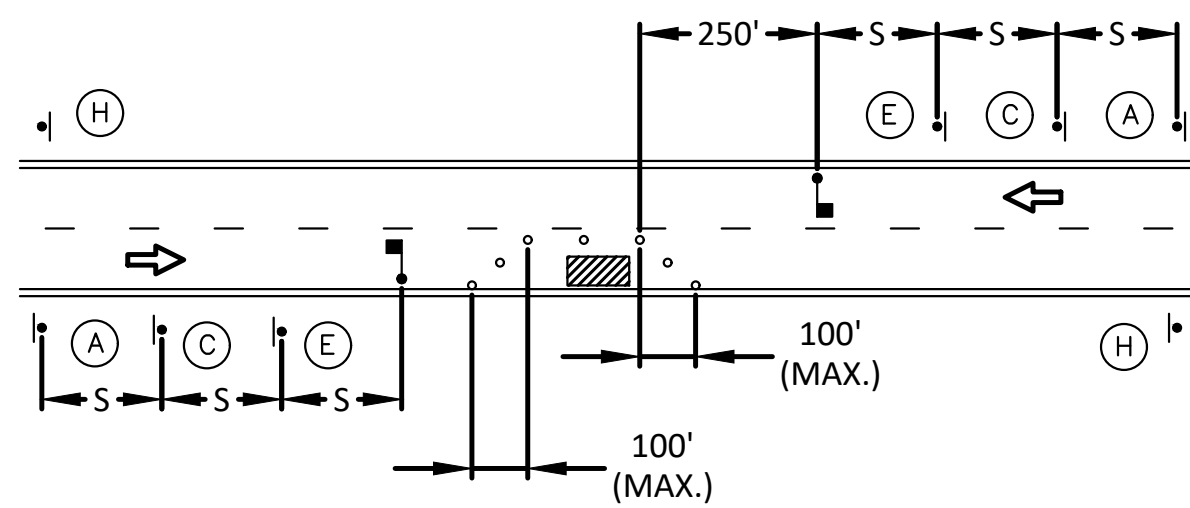
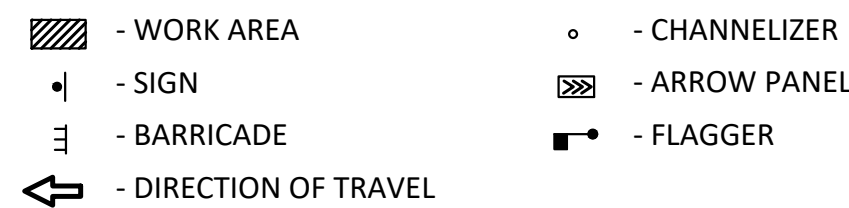
DATE:	DEVELOPMENT SERVICE LEES SUMMIT, MISSOURI	
DESIGN BY:	CMN	
DRAWN BY:	04/18/2020 CMN	
PROJECT NO.:	12720	
SHEET NO.		TOTAL SHEETS
42		43

Bradley D. Burton  
Professional Engineer  
License No. 25862

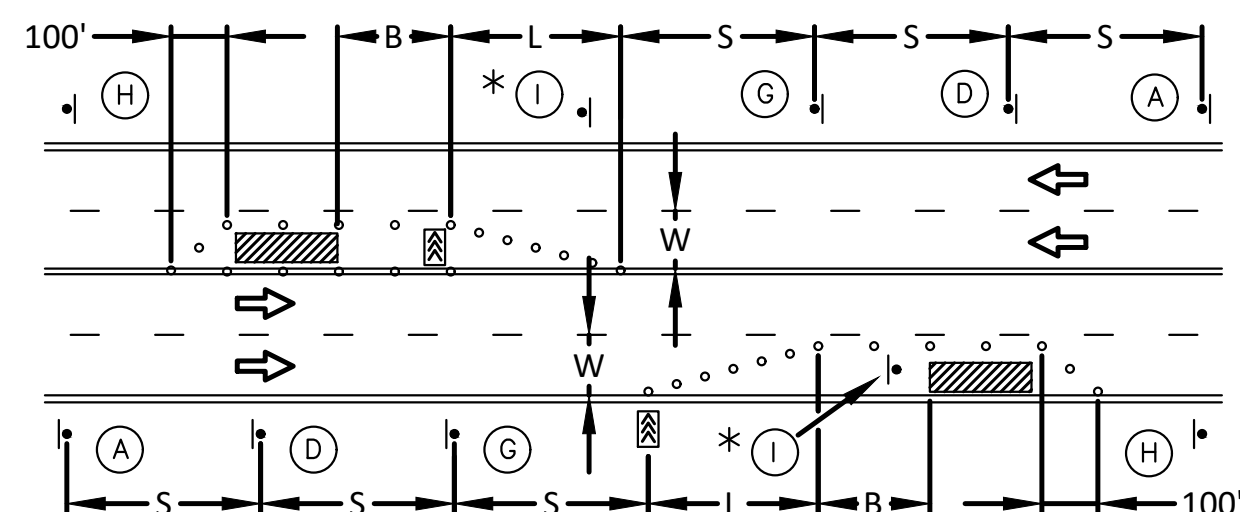
*Storm Sewer Improvements and Mass Grading*  
***Paragon Star Development***  
*Lee's Summit, Missouri*

NO.		DATE	REVISIONS	BY	APPROVED
		5/15/18	Revised Field Elevations		
		8/7/18	City Comments		
		8/28/18	City Comments		
		9/14/18	City Comments		
		10/10/18	Removed Floodway Grading		
		11/29/18			
		4/11/19	Temporary River Crossing Repair		
		4/15/19	Temporary River Crossing Repair		
		3/10/20	City Comments		

### SYMBOL LEGEND

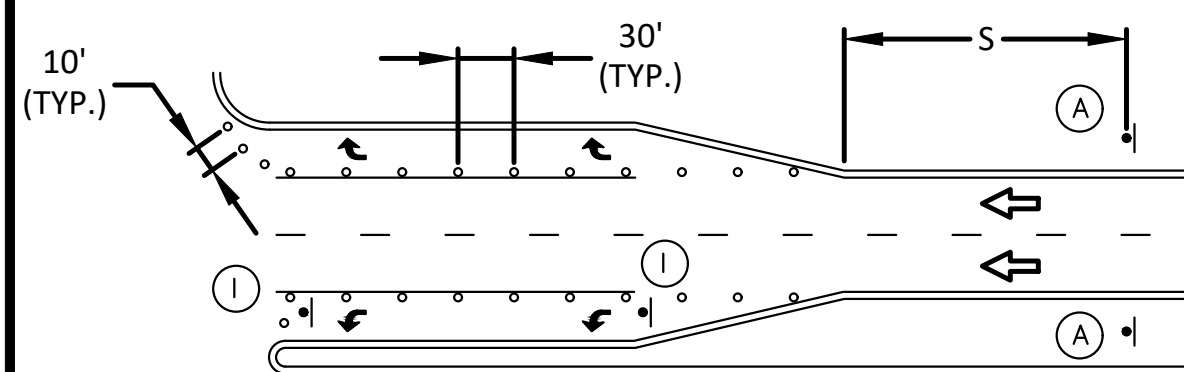


## LANE CLOSURE - TWO LANE STREET



## LANE CLOSURE - FOUR LANE STREET

\* INSTALL SIGNS EVERY 200 FEET THROUGHOUT THE CLOSED LANE OR AS NEEDED



## TURN LANE CLOSURE

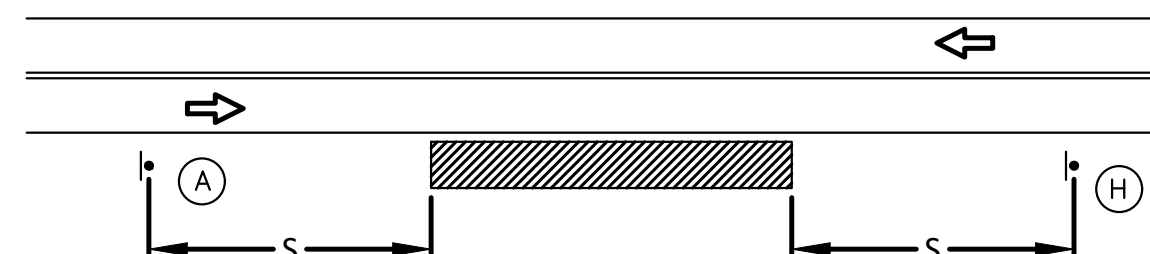
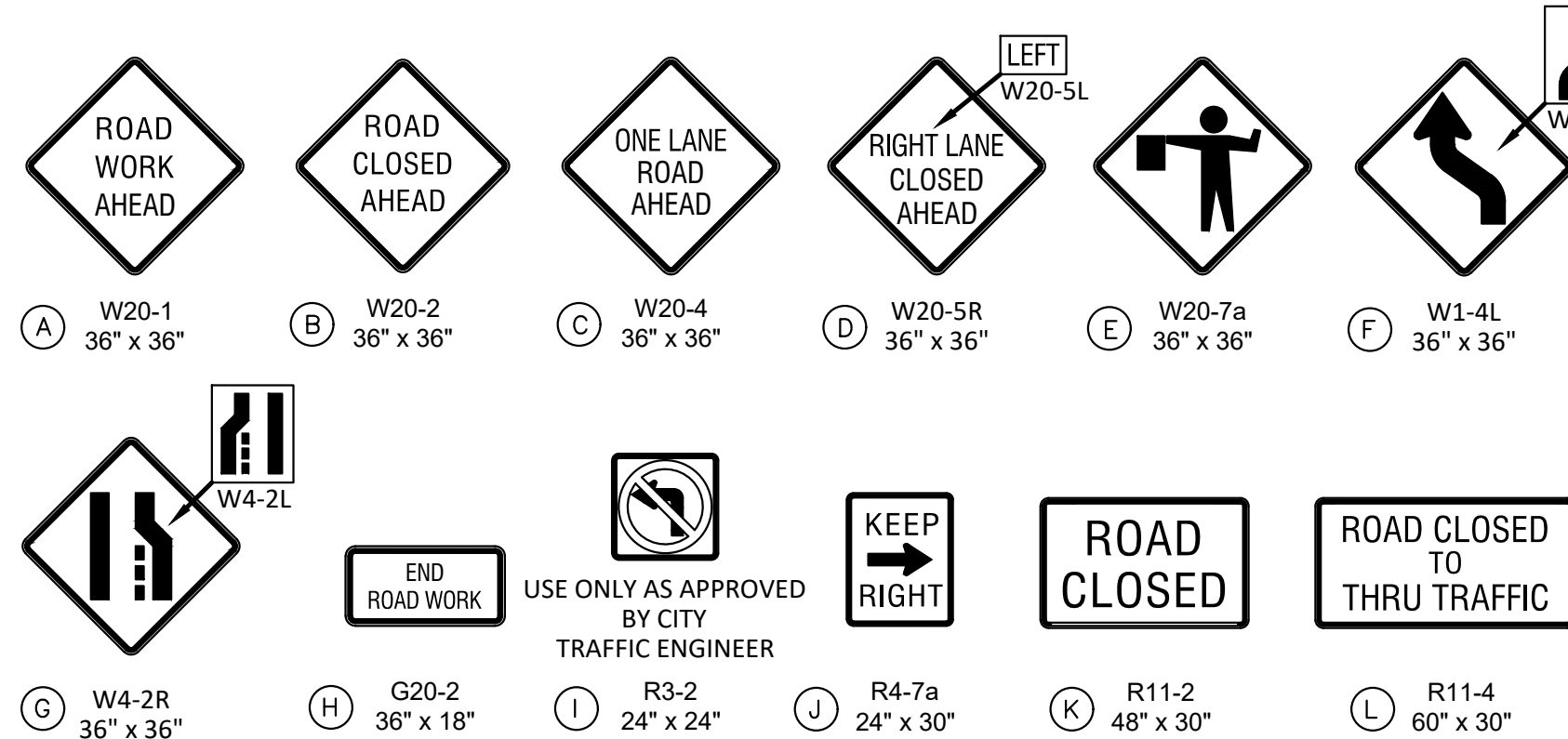
SIGN SPACING "S"	
SPEED LIMIT (MPH)	SPACING (FEET)
25	100
30-35	250
≥ 40	350

TAPER DIMENSIONS (FEET)				
SPEED LIMIT (MPH)	MINIMUM TAPER LENGTH "L", PER LANE WIDTH "W"			MINIMUM NUMBER OF CHANNELIZERS
	10	11	12	
25	105	115	125	6
30	150	165	180	7
35	205	225	245	8
40	270	295	320	9
45	450	495	540	13

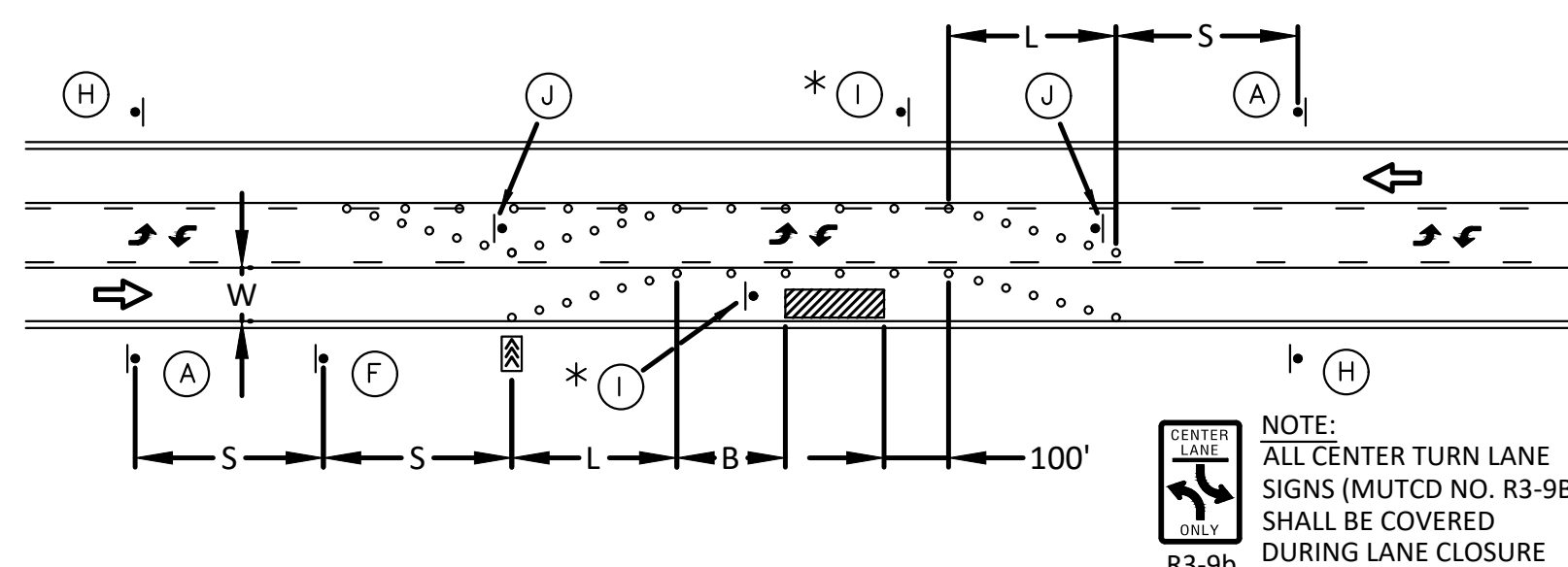
GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE "B"	
SPEED LIMIT (MPH)	LENGTH (FEET)
25	35
30	55
35	85
40	120
45	170

MAXIMUM CHANNELIZER SPACING		
SPEED LIMIT (MPH)	WITHIN TAPER (FEET)	OUTSIDE TAPER (FEET)
25	25	50
30	30	60
35	35	70
40	40	80
45	45	90

### SIGN LEGEND

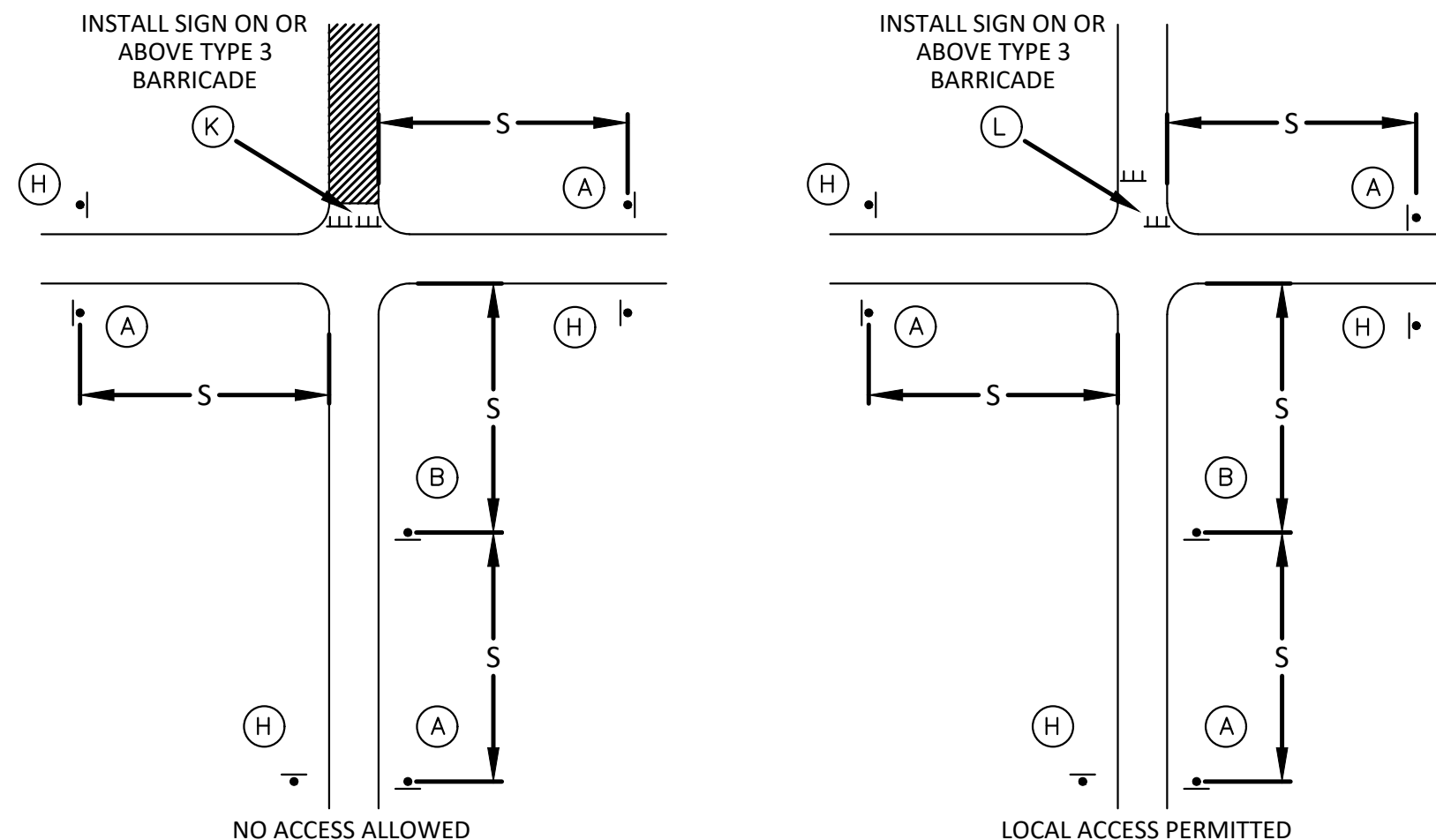


## TYPICAL SIGNING FOR WORK ADJACENT TO THE STREET



## LANE CLOSURE - THREE LANE STREET

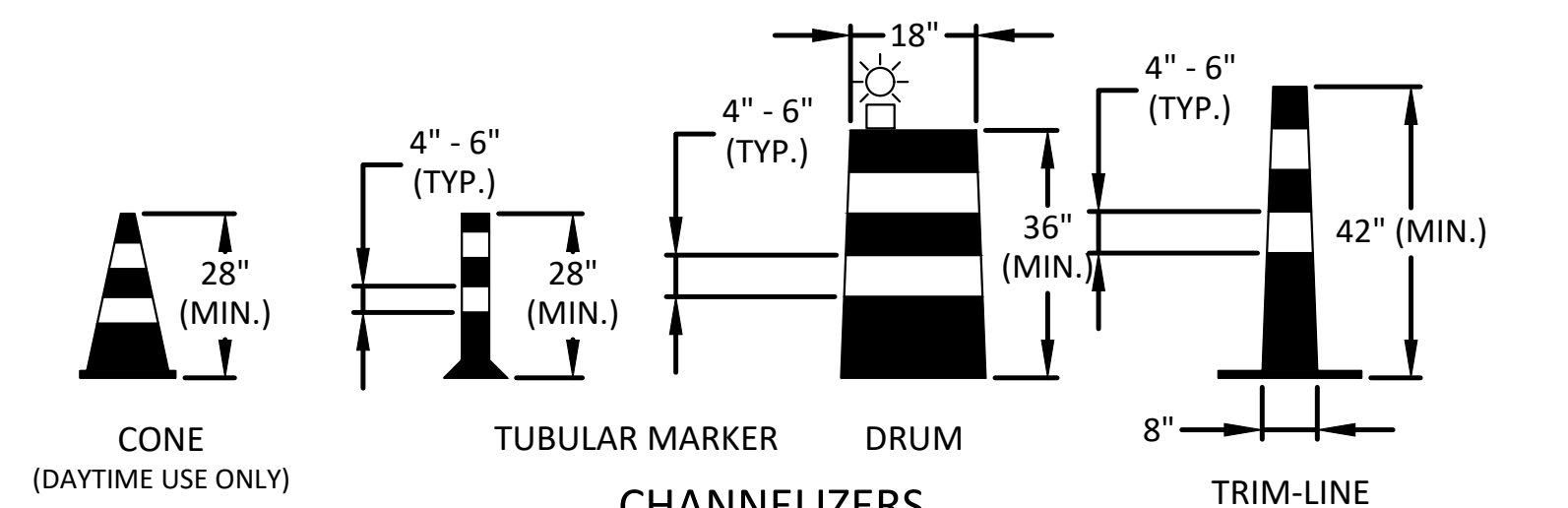
\* INSTALL SIGNS EVERY 200 FEET THROUGHOUT THE CLOSED LANE OR AS NEEDED



## TYPICAL STREET CLOSURE

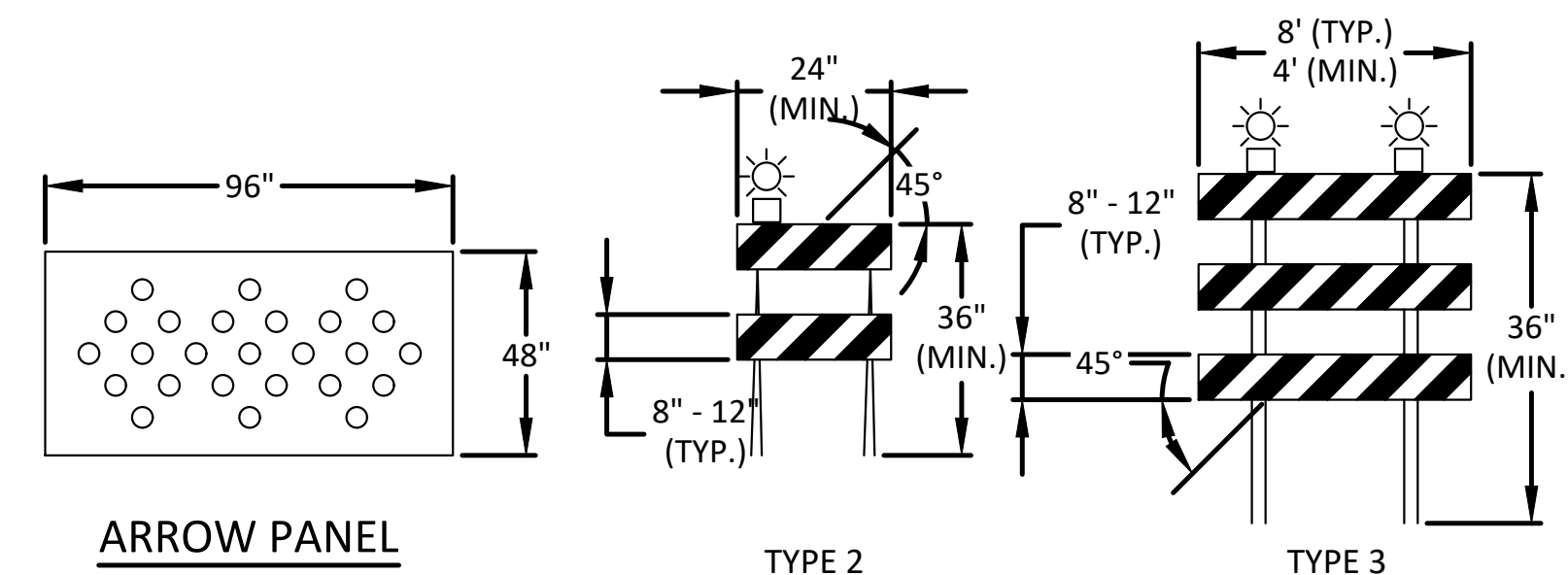
GENERAL NOTES:

1. ALL SIGNS, BARRICADES, CHANNELIZERS, MARKINGS AND OTHER TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES [MUTCD].
2. ALL TRAFFIC CONTROL DEVICES SHALL BE STANDARD IN SIZE, SHAPE, COLOR, AND MESSAGE, IN GOOD CONDITION, AND RETRO-REFLECTORIZED. ALL SIGNS SHALL BE SECURELY MOUNTED WITH HEIGHT AND LATERAL LOCATION AS DESCRIBED IN THE MUTCD.
3. WARNING LIGHTS SHALL BE USED ON BARRICADES IN PLACE AT NIGHT AND ON WARNING SIGNS WHICH ALERT DRIVERS ABOUT A CHANGE IN ALIGNMENT, TRAFFIC CONTROL, LANE CLOSURE, OR ROAD CLOSURE.
4. FLAGGERS SHALL BE USED WHERE INDICATED ON THE PLANS, WHERE CONSTRUCTION VEHICLES INTERACT WITH NORMAL TRAFFIC, OR WHERE CONSTRUCTION ACTIVITIES IMPOSE A RESTRICTION ON TRAFFIC, AS DIRECTED BY THE CITY TRAFFIC ENGINEER. WHERE FLAGGERS ARE USED, ADVANCE SIGNING SHALL BE ERCTED AS SHOWN IN THE DETAILS OR AS SPECIFIED IN THE MUTCD. FLAGGERS SHALL MEET THE REQUIREMENTS IN THE MUTCD IN REGARD TO CHARACTER, TRAINING, ATTIRE, AND BEHAVIOR.
5. TRIM-LINES ARE THE CITY'S PREFERRED CHANNELIZING DEVICE. CONES MAY NOT BE USED AT NIGHTTIME.
6. TRAFFIC CONTROL DEVICES NOT IN USE OR NOT APPLICABLE SHALL BE EITHER COVERED OR REMOVED FROM THE WORK AREA.
7. THE CONTRACTOR SHALL USE BARRICADES, STREET PLATES, OR FENCING AS NEEDED TO EFFECTIVELY SHIELD PEDESTRIAN AND VEHICULAR TRAFFIC FROM EXPOSED OBJECTS, EXCAVATIONS, AND CONSTRUCTION ACTIVITIES.
8. ACCESS SHALL BE MAINTAINED TO ALL DRIVEWAYS AND SIDE STREETS UNLESS NOTED OTHERWISE ON THE PLANS.
9. NO STREET SHALL BE CLOSED WITHOUT THE APPROVAL OF THE CITY TRAFFIC ENGINEER. THE CONTRACTOR SHALL NOTIFY THE CITY TRAFFIC ENGINEER AT LEAST 7 DAYS IN ADVANCE OF ANY STREET CLOSURE. IF A DETOUR ROUTE AROUND THE CLOSURE IS TO BE PROVIDED, ALL DETOUR SIGNING SHALL BE AS SHOWN ON A PLAN APPROVED BY THE CITY TRAFFIC ENGINEER.
10. CONSTRUCTION VEHICLES PARKED ALONG STREETS SHALL BE LOCATED WITHIN THE WORK AREA (TRAFFIC CONTROL) OR WHERE OTHERWISE NORMALLY PERMITTED. CONSTRUCTION MATERIALS, INCLUDING TRAFFIC CONTROL AND VEHICLES SHALL NOT RESTRICT SIGHT DISTANCE FOR VEHICLES EXITING AT STREETS OR DRIVES.
11. CONSTRUCTION MATERIALS SHALL BE KEPT OFF OF SIDEWALKS, CONSOLIDATED IN ONE LOCATION WITHIN CITY RIGHT-OF-WAY, AND REMOVED DAILY UNLESS OTHERWISE APPROVED BY THE INSPECTOR. DIRT, MUD, AND OTHER CONSTRUCTION DEBRIS ON STREETS AND SIDEWALKS SHALL BE REMOVED IMMEDIATELY.
12. THE CONTRACTOR SHALL NOT PERFORM ANY WORK THAT WILL RESTRICT VEHICULAR TRAFFIC IN ANY WAY DURING THE HOURS OF 7:00 A.M. AND 9:00 A.M. OR 4:00 P.M. AND 6:00 P.M. MONDAY THROUGH FRIDAY UNLESS OTHERWISE INDICATED IN THE SPECIFICATIONS.
13. ALL TRAVEL LANES SHOULD BE AT LEAST 11 FEET WIDE UNLESS OTHERWISE AUTHORIZED BY THE CITY TRAFFIC ENGINEER. A "NARROW LANES" SIGN SHALL BE INSTALLED IN ADVANCE OF A LANE WIDTH REDUCTION TO LESS THAN 11 FEET.
14. ALL EDGE DROP-OFFS OF MORE THAN 2 INCHES AND LESS THAN 4 INCHES SHOULD BE PROTECTED BY A WEDGE OR BARRIER AND ALL EDGE DROP-OFFS GREATER THAN 4 INCHES SHALL HAVE EDGE PROTECTION (SEE TRAFFIC CONTROL SPECIFICATIONS FOR EDGE TREATMENT REQUIREMENTS).
15. THE "WORKERS" SYMBOLIC SIGN (MUTCD NO. W21-1A) MAY BE USED INSTEAD OF THE "ROAD WORK AHEAD" SIGN FOR WORK WITH A DURATION OF 12 HOURS OR LESS. THE "END ROAD WORK" SIGN IS NOT REQUIRED TO BE INSTALLED AFTER THE "WORKERS" SIGN.
16. NO TRAFFIC SIGNAL SHALL BE ALTERED OR MODIFIED IN ANY WAY WITHOUT A PLAN APPROVED BY THE CITY TRAFFIC ENGINEER.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TRAFFIC CONTROL DEVICES ON AN AROUND-THE-CLOCK BASIS, WHETHER OR NOT WORK IS ACTIVELY BEING PURSUED AND ANY DEFICIENCIES NOTED SHALL BE CORRECTED IMMEDIATELY.
18. THE TRAFFIC CONTROL REQUIREMENTS SHOWN ON THESE PLANS ARE MINIMUM REQUIREMENTS ONLY AND DO NOT ATTEMPT TO ADDRESS IN DEPTH THE VARIETY OF SITUATIONS THAT MAY OCCUR ONCE CONSTRUCTION HAS STARTED. IN NO WAY DO THE REQUIREMENTS SHOWN ON THESE PLANS RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR SELECTING THE PROPER TRAFFIC CONTROL DEVICES AND IMPLEMENTATION PROCEDURES THAT WILL ASSURE THE SAFETY OF DRIVERS, PEDESTRIANS, AND WORKERS AT ALL TIMES.
19. SHOULD THE CONTRACTOR FAIL TO ENFORCE THE TRAFFIC CONTROL PLAN OR FAIL TO CLEAN, REPLACE OR OTHERWISE MAINTAIN THE TRAFFIC CONTROL DEVICES WHEN DIRECTED TO DO SO BY THE CITY TRAFFIC ENGINEER OR REPRESENTATIVE, THE CITY MAY TAKE ONE OR MORE OF THE FOLLOWING ACTIONS:
  - A. EMPLOY ANOTHER AGENCY TO CORRECT DEFICIENCIES IN TRAFFIC CONTROL DEVICES AND DEDUCT THE COST FROM THE CONTRACTOR'S PAY ESTIMATE.
  - B. STOP THE WORK UNTIL DEFICIENCIES ARE CORRECTED.
  - C. SUSPEND ALL PAY ESTIMATES UNTIL DEFICIENCIES ARE CORRECTED, OR
  - D. PLACE THE CONTRACTOR IN DEFAULT.



## CHANNELIZERS

**NOTE:**  
WHITE BANDS ON BARRICADES AND CHANNELIZERS SHALL BE  
MADE FROM HIGH INTENSITY SHEETING MATERIAL.



## BARRICADES

Project: TRAFFIC STANDARD DETAILS  
CITY OF LEE'S SUMMIT, MO  
CITY OF LEE'S SUMMIT, JACKSON CO

Sheet Name: TRF-1 TRAFFIC CONTROL DETAILS

Drawn By: TWS
Checked By: .
Date: 6/2016
Proj. #: .

# TRF-1

### ***Traffic Control Details***



**GBA**  
architects  
engineers

9801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.0400  
www.gbateam.com

DATE:	DEVELOPMENT SERVICE LEE'S SUMMIT, MISSOURI	
DESIGN BY:	CMN	
DRAWN BY:	CMN	
PROJECT NO.:		12720
SHEET NO.		TOTAL SHEETS
43		43

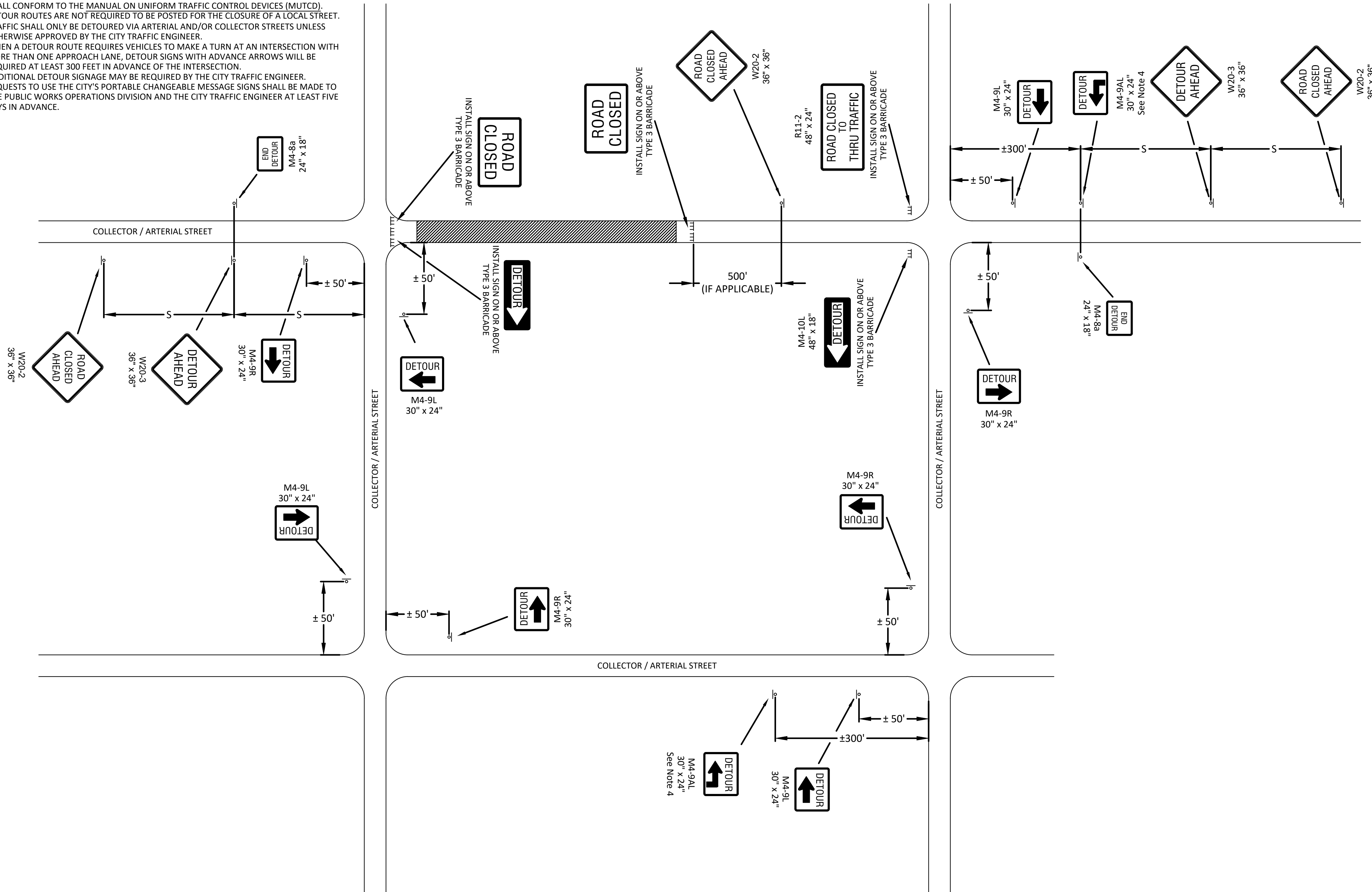
Bradley D. Burton  
Professional Engineer  
License No. 25862

*Storm Sewer Improvements and Mass Grading*  
***Paragon Star Development***  
*Lee's Summit, Missouri*

NO.	DATE	REVISIONS	BY	APPROVED
	5/15/18	Revised Field Elevations		
	8/7/18	City Comments		
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	10/10/18	Removed Floodway Grading		
	11/29/18			
①	4/11/19	Temporary River Crossing Repair		
②	4/15/19	Temporary River Crossing Repair		
③	3/10/20	City Comments		

DETOUR GENERAL NOTES:

1. ALL SIGNS, BARRICADES, CHANNELIZERS, MARKINGS AND OTHER TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. DETOUR ROUTES ARE NOT REQUIRED TO BE POSTED FOR THE CLOSURE OF A LOCAL STREET.
3. TRAFFIC SHALL ONLY BE DETOURED VIA ARTERIAL AND/OR COLLECTOR STREETS UNLESS OTHERWISE APPROVED BY THE CITY TRAFFIC ENGINEER.
4. WHEN A DETOUR ROUTE REQUIRES VEHICLES TO MAKE A TURN AT AN INTERSECTION WITH MORE THAN ONE APPROACH LANE, DETOUR SIGNS WITH ADVANCE ARROWS WILL BE REQUIRED AT LEAST 300 FEET IN ADVANCE OF THE INTERSECTION.
5. ADDITIONAL DETOUR SIGNAGE MAY BE REQUIRED BY THE CITY TRAFFIC ENGINEER.
6. REQUESTS TO USE THE CITY'S PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE MADE TO THE PUBLIC WORKS OPERATIONS DIVISION AND THE CITY TRAFFIC ENGINEER AT LEAST FIVE DAYS IN ADVANCE.



**LS**  
**LEE'S SUMMIT**  
**MISSOURI**

**PUBLIC WORKS ENGINEERING DIVISION | 220 SE GREEN STREET | LEE'S SUMMIT, MO 64063**

Project: TRAFFIC STANDARD DETAILS  
CITY OF LEE'S SUMMIT, MO

Sheet Name: *TRF-2 TYPICAL DETOUR DETAIL*

Drawn By: TWS
Checked By: .
Date: 6/2016
Proj. #: .

## TRF-2