

G:\12720\Civil 3D\Production Drawings\Water Main Plans\Lee's Summit\1272000100.dwg Layout: 1 Title Sheet -- Monday, July 06, 2020, 1:56pm -- Copyright 2020, George Butler Associates, Inc\Architect 00212, Professional Engineer 000133, Landscape Architect 000025, Professional Land Surveyor 000059

WATER MAIN EXTENSION PLANS
FOR
PARAGON STAR DEVELOPMENT
Sections 34–Township 48–Range 32
City of Lee’s Summit
Jackson County, Missouri

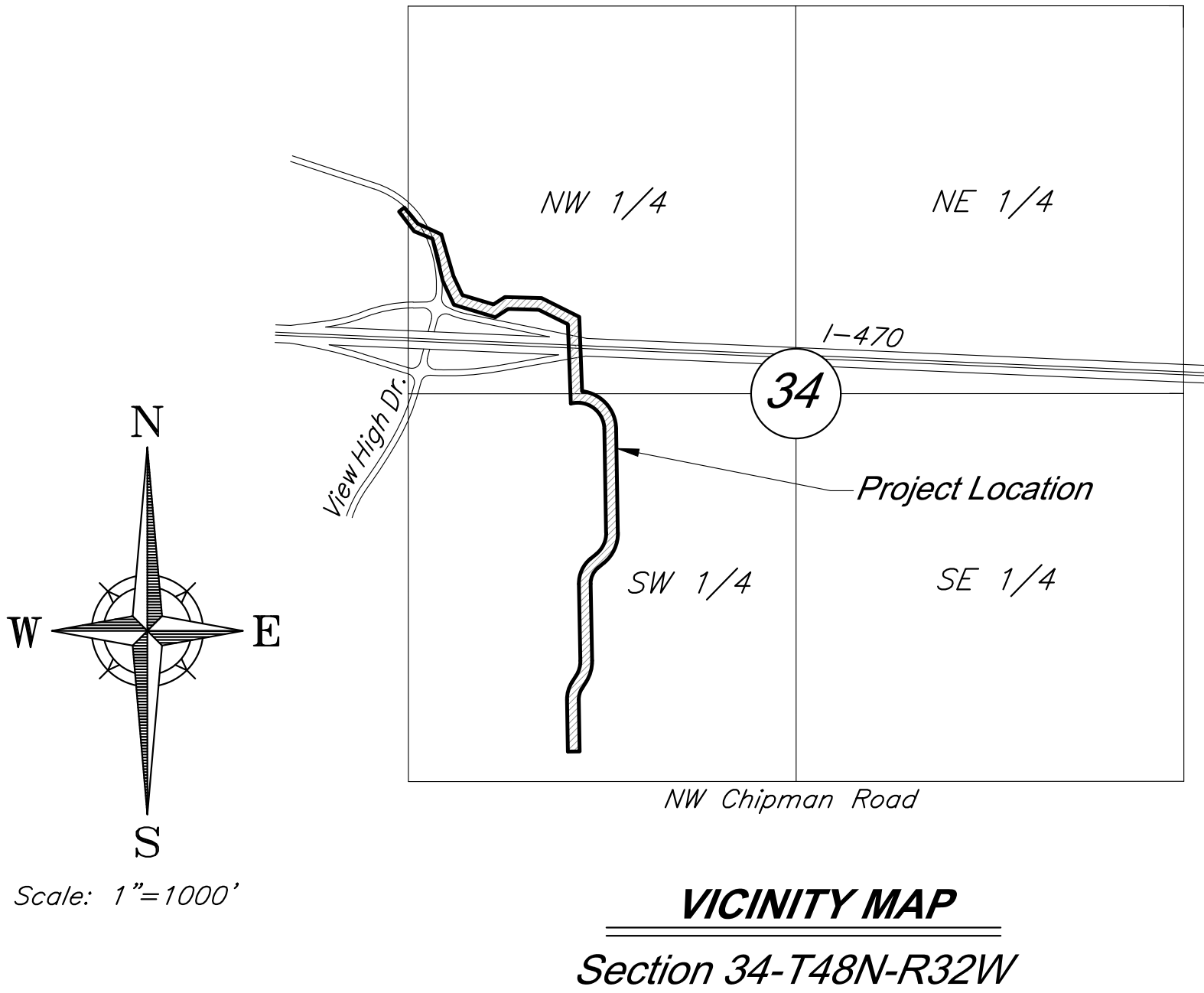
SUMMARY OF QUANTITES

Item No.	Description	Unit	Approx. Unit Quantity
1	12" C900, Class 235 PVC	LF	2,500
2	12" C900, Class 305 PVC	LF	2,722
3	8" C900, Class 235 PVC	LF	275
4	Fire Hydrant Assembly	EA	11
5	Straddle Block	EA	6
6	Air Release Valve	EA	3
7	12" Butterfly Valve	EA	13
8	8" Gate Valve	EA	2
9	Tees	EA	8
10	Plugs	EA	5
11	Horizontal Bends	EA	30
12	Vertical Bends	EA	24
13	Reducers	EA	4
14	Connections to Existing Waterlines	EA	4
15	Backflow Preventer Vault	EA	1
16	20" Steel Casing Pipe	LF	400
17	Chipman Rd Patching	LS	1
18	Cedar Creek Ln Patching	LS	1
19	18" HDPE Pipe	LF	71
20	18" End Section w/Toewall	EA	2
21	Riprap	SY	34
22	Restoration	AC	5
23	Cut	CY	69
24	Fill	CY	217
25	Gravel	SY	3,000
26	Erosion Control	LS	1

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@lbvsd.net		Cable Television
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	Telephone	Ms. Glenda Charles AT&T 1425 Oak Street Kansas City, MO 64106 (816) 365-1669 Fax (816) 275-1109 email: gc6954@att.com
	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		
Electric Service			

Missouri One Call System 1-800-344-7483 (DIG-RITE)



VICINITY MAP
Section 34-T48N-R32W

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

INDEX OF SHEETS

Sht. No.	Description
1	Title Sheet
2	General Layout
3-7	Water Main Plan & Profile - Line A
8	Water Main Plan & Profile - Line B
9-10	Water Main Details
11-13	Grading and Erosion Control Plan
14-15	Construction Details

APPROVED BY:
STATE OF MISSOURI
DEPARTMENT OF HEALTH & ENVIRONMENT
DIVISION OF ENVIRONMENT

ENGINEER: DATE:

PROJECT ENGINEER: DATE:

APPROVED: DATE:

CITY ENGINEER: DATE:

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

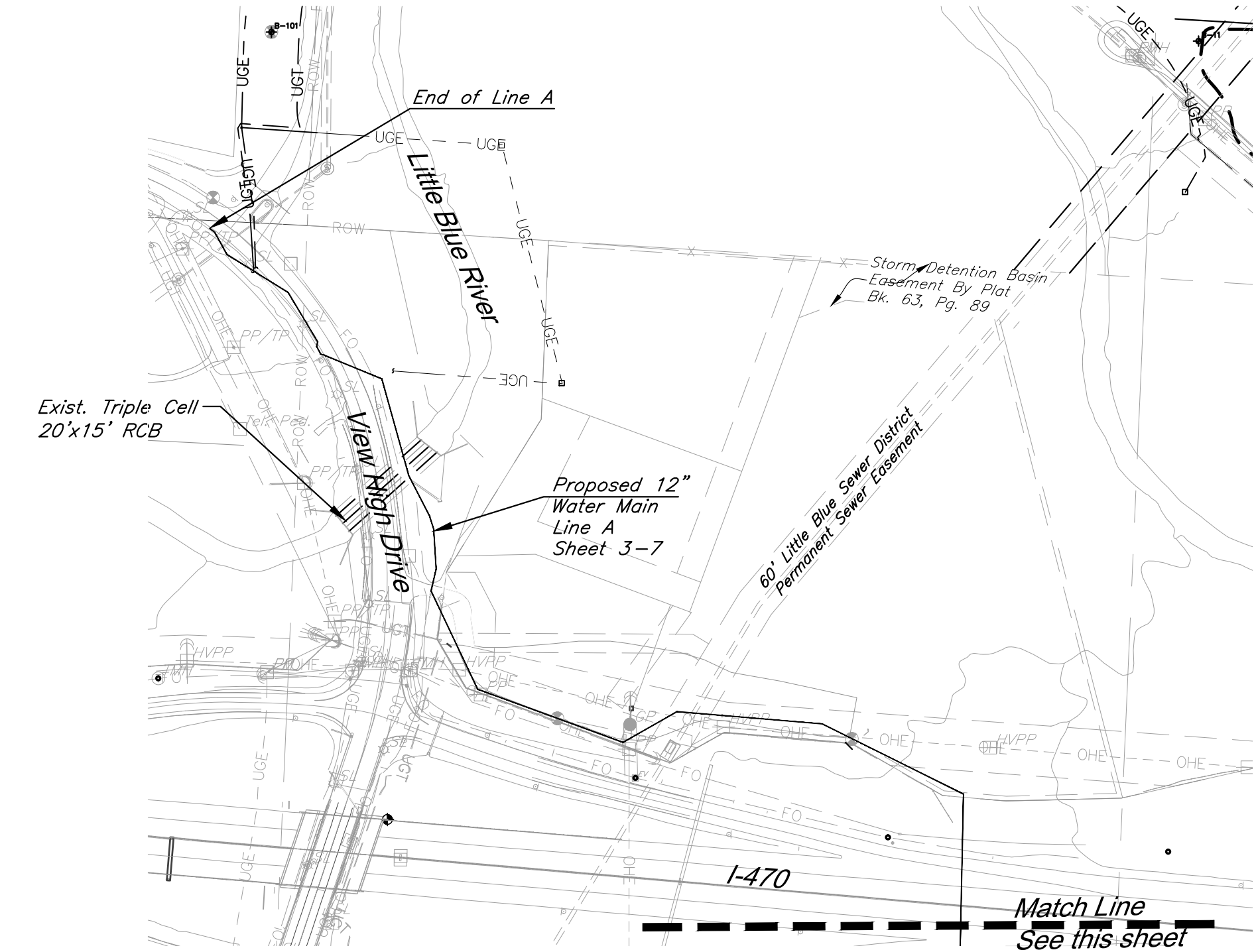
PREPARED & SUBMITTED BY:
GEORGE BUTLER ASSOCIATES, INC.
9801 RENNER BOULEVARD
LENEXA, KANSAS 66219
PHONE: 913-492-0400
FAX: 913-577-8312
CONTACT: CLINT LOUMASTER P.E.
EMAIL: CLOUMASTER@GBATEAM.COM

GBA
architects
engineers

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

7-6-20
6-11-20
5-15-20
4-16-20
7-26-19

G:\12720\Civil 3D\Production Drawings\Water Main Plans\Lee's Summit\12720002000.dwg, Layout: 2 General Layout -- Monday July 06, 2020, 1:57pm -- Copyright 2020, George Butler Associates\detected 00212, Professional Engineer 000133, Landscape Architect 000025, Professional Land Surveyor 0000259



General Notes:

1. All traffic control shall be the responsibility of the Contractor and shall be in conformance with the Manual of Uniform Traffic Control Devices (MUTCD).
2. 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.
3. Construction Staking shall be the responsibility of the General Contractor.
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. Items not listed separately in the Summary of Quantities are subsidiary to other items.
10. All site concrete shall be KCMMB - 4,000 PSI unless otherwise noted.

Permitting:

11. Excavation for Utility work within the Right of Way requires a Right of Way work permit from the Public Works Department, in addition to all other permits.
12. Contractor is responsible for obtaining all required permits, paying all fees, and for otherwise complying with all applicable regulations governing the work.

Erosion Control:

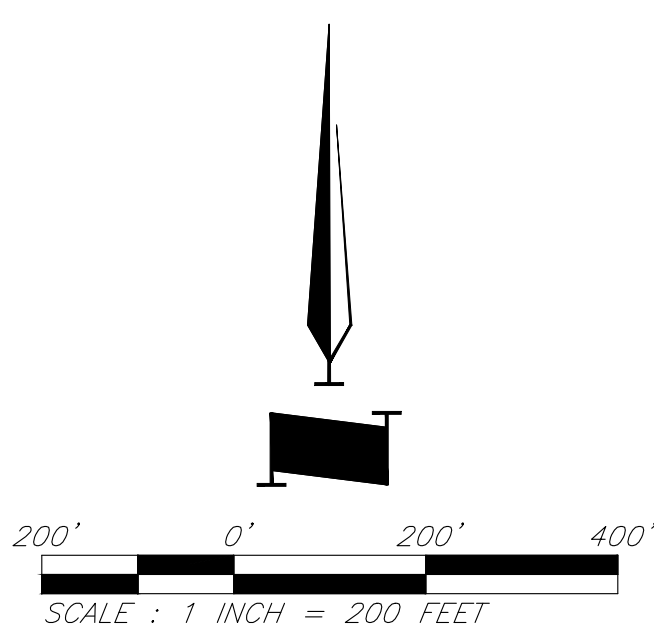
13. The Contractor is responsible for providing erosion and sediment control BMP's to prevent sediment from reaching paved areas, storm sewer systems, drainage courses, and adjacent properties. In the event the prevention measures are not effective, the contractor shall remove any debris, silt, or mud and restore the Right-Of-Way, or adjacent properties to original or better condition.
14. 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.
15. The Contractor shall sod all disturbed areas within the Public Street Right-of-Way unless otherwise noted in the plans.

Earthwork:

16. The Contractor shall be responsible for removing and disposing of grass and vegetation that is found on site. Contractor shall strip site of organic material to a depth acceptable to the Geotechnical Engineer and prior to the placement of fill. Disposal of all debris shall be performed by the contractor in strict accordance with all applicable codes and ordinances. All clearing and grubbing, stripping, tree removal, and grading operations shall be performed in accordance with the recommendations as found in the Geotechnical Report, and erosion control and grading plans for this site.
17. Slopes shall be constructed to a maximum slope of 3:1 (Horiz:Vert).
18. Refer to "Geotechnical Engineering Report" Dated 4/30/2020 prepared by Terracon Consultants, inc. for grading and pavement recommendations and boring logs. All earthwork shall conform to the recommendations of the Report.
19. Unless otherwise noted, all spot elevations and contours are shown to "finish" grade surface. Contractor shall adjust for any overcut required in paving, parking, landscape, or building pad areas as defined in the Geotechnical Report, these plans, or the project specifications.
20. 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).

Utility:

21. All Manholes, Catch Basins, Utility Valves, Meter Pits, and other utility equipment shall be adjusted or rebuilt to grade as required.
22. 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.
23. All Utility extensions and construction shall conform to the Standards and Specifications of the applicable Utility Companies.
24. Contractor shall immediately repair any utility service lines damaged during construction.



NOTES:

D.E. = Drainage Easement
U.E. = Utility Easement
P = Property Line
R/W = Right-of-Way

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!

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

GENERAL NOTES:

1. All work shall be done in accordance with the most recent version of the Design and Construction Manual of Lee's Summit, Missouri.
2. The Contractor shall furnish and install all fittings required to provide proper horizontal and vertical alignment for new water mains, connections to existing water mains, and installation of fire hydrants at the proper location and elevation, whether or not the proper fittings, location or elevations are called out on these drawings, including modification of existing infrastructure required to make all of the work conform to current Lee's Summit Design and Construction Manual.
3. The Contractor shall furnish and install all temporary blow-off assemblies, fittings, thrust blocking, and restraining devices required for temporary connections for flushing, pressure testing, chlorination, and de-chlorination of the new water mains. Prior to placing new mains in service the Contractor shall remove and corporation cocks used for testing or chlorination and replace them with tapered brass plugs.
4. The Contractor shall install polyethylene encasement on all water mains, valves, fittings, and other appurtenances for the full length of the project in accordance with the Design and Construction Manual of the city of Lee's Summit, Missouri.
5. Contractor to provide water main testing plan meeting City requirements that will test each pipe class independently. Testing pressures must meet City requirements, and not exceed pipe manufacturer recommendations.
6. Scheduling of water main shuts and connections to existing mains shall be at the discretion of the Water Utilities Department.
7. All fire hydrant branches shall be restrained using approved restraining devices. Hydrants shall be installed so that the centerline of the outlet nozzle is between eighteen and twenty-one inches (18"-21") above grade, and so that there is a minimum clear area of 5' in each direction to allow operation of the hydrant.
8. Sections of water main requiring multiple bends, such as cul-de-sacs, shall be restrained with approved joint restraining devices and straddle blocks in lieu of backing blocks.
9. The locations of existing utilities, as shown, are approximate. It shall be the responsibility of the Contractor to verify the locations and elevations of all existing utilities.
10. The Contractor shall comply with state law requiring any person or firm doing excavation on the public right-of-way to do so only after giving notice to and obtaining information from utility companies.
11. Streets and parking areas are to be to grade and curbs in place prior to construction of water mains. Water mains shall be installed with a minimum ground cover of 42 inches below finished grade. Sixteen (16)-inch and larger water mains shall be installed with a minimum ground cover of 60 inches below finished grade.
12. Water mains shall be laid at least 10 feet, horizontally from any sewer. When local considerations prevent a horizontal separation of 10 feet, a water main may be laid closer than 10 feet to a sewer, provided that the water main is laid in a separate trench, or on an undisturbed earth shelf located on one side of the sewer, at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer. Water mains shall be laid such that there is a minimum of 18 inches clearance between the pipe wall and the exterior of any manhole and/or inlet on the sewer line.
- Whenever a water main must cross above a sewer, a vertical separation of 18 inches between the bottom of the water main and the top of the sewer shall be maintained. Whenever a water main must cross under a sewer, a vertical separation of 18 inches between the bottom of the sewer and the top of the water main shall be maintained. A full length of water main pipe shall be centered on the sewer to be crossed so that the joints will be equally distant from the sewer and as far away as possible. The 18 inch vertical separation shall be maintained for that portion of the water main located within 10 feet horizontally, of any sewer it crosses.
- When it is impossible to obtain proper horizontal separation as stipulated above, or when a water main must cross under a sewer, the sewer must be reconstructed of ductile iron pipe meeting the requirements of Section 3901C of the Design and Construction Manual; Pre-stressed concrete cylinder pipe meeting the requirements of Section 3901E; or PVC pressure pipe conforming to Section 3901D, and shall be pressure tested to assure water tightness before backfilling, the required length of sewer to be replaced or constructed of pressure pipe will be the length necessary to achieve 10 feet horizontal separation.
- Where these conditions cannot be met, the Water Utilities Department shall be consulted as to the precautions to be taken to protect the public water supply.
13. An excavation permit must be obtained from the City Engineer prior to commencing construction within the public right-of-way. Contact the Public Works Department permit counter at City Hall.
14. A street closure permit may be required for this work. Contact the Street and Traffic Division at City Hall.
15. Proposed fire hydrants shall be installed at the station and offset locations as shown on the plans. Fire hydrant connection to the main shall be constructed per construction detail on sheet 9.

NOTES:

All Water Mains shall be PVC C900, Class 235 Unless otherwise indicated. All Valves and fittings shall be Ductile Iron unless otherwise noted.

Certification that all butterfly valves have passed a 192.5 psi test must be provided to the Field Engineering Inspector upon completion of work.

Seeding Notes:

1. All disturbed areas shall be seeded in accordance with the specifications.
2. Contractor shall uniformly spread the topsoil over disturbed areas. Seed and straw mulch shall be placed as soon as practicable.
3. Between November 1 and March 15, temporary stabilization shall include a straw mulch cover at 2.25 tons/acre.
4. Between March 15 and May 31, drill or hydroseed all disturbed areas with K-31 fescue at 90 lbs PLS per acre and rye grass at 50 lbs PLS per acre. Reapply straw mulch cover at 1.5 tons per acre.
5. Immediately water after seeding and continue to water as necessary to establish permanent vegetation.

General Layout

CLINT LOUMASTER
PROFESSIONAL ENGINEER
LICENSE NO. 2011009651
STATE OF MISSOURI
NUMBER PE-2011009651
EXPIRATION DATE 6/1/2026

GBA
architects
engineers

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

DATE: 7-26-19
DESIGN BY: CEL
DRAWN BY: DRW/DGL
PROJECT NO.: 12720
SHEET NO. 2
TOTAL SHEETS 15

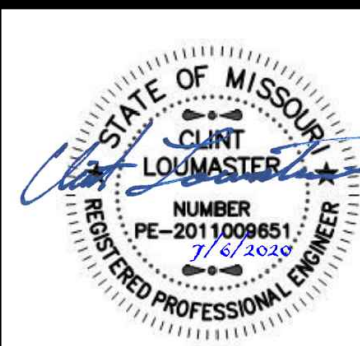
Clint Loumaster
Professional Engineer
License No. 2011009651

Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		



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



GBA
architects
engineers

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

DATE: 7-26-19	
DESIGN BY: CEL	
DRAWN BY: DRV/DGL	
PROJECT NO.: 12720	
SHEET NO.	TOTAL SHEETS
3	15

Clint Loumaster
Professional Engineer
License No. 201100965

Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

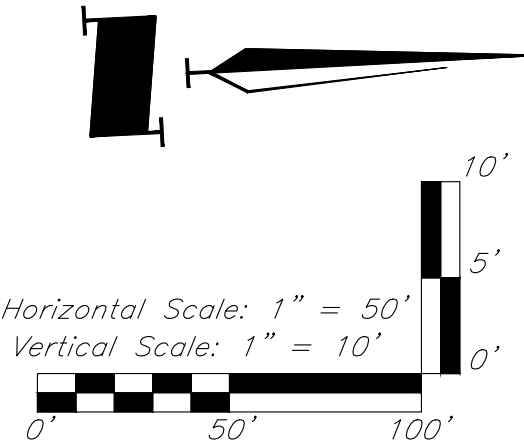
NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		

Note:

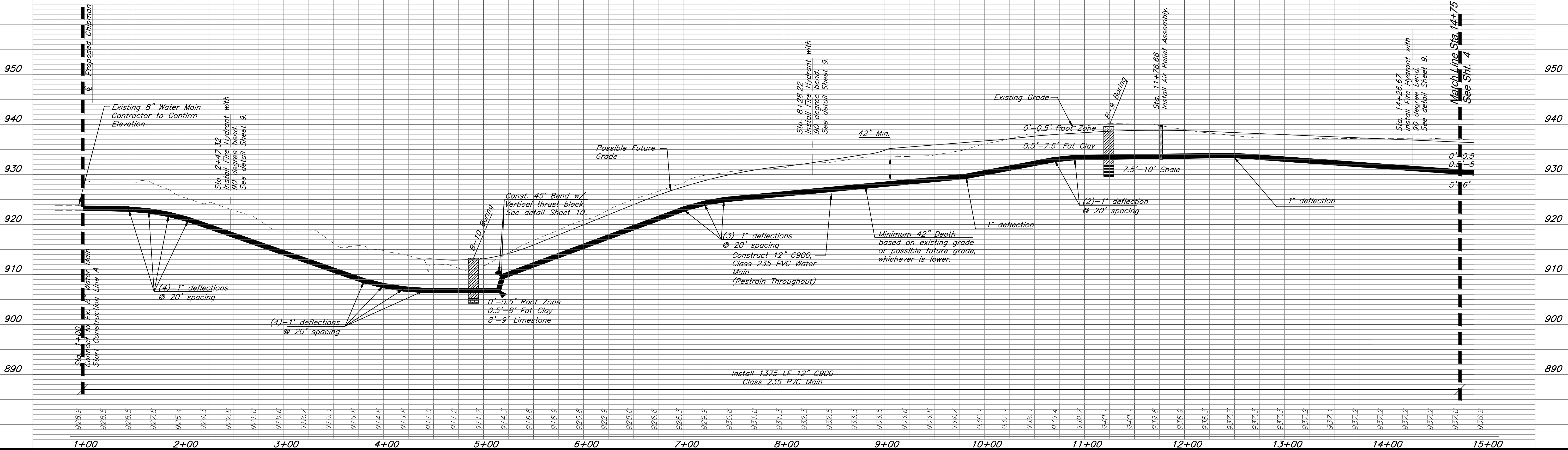
- 1. Contractor shall be responsible for all traffic control required to complete construction.*
- 2. Contractor to patch roadway and driveway with matching pavement section.*

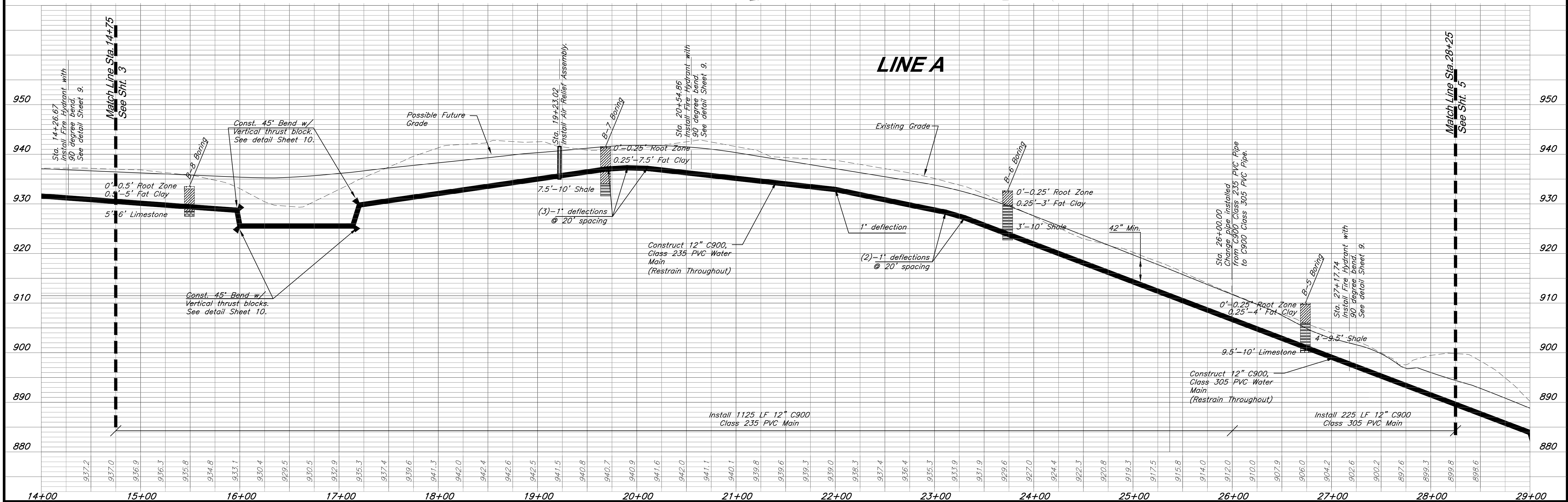
BENCHMARK:
BM #11 - Chiseled "L" on top
Northeast corner of concrete guardrail
at the Northeast corner of I470 bridge
spanning View High Drive.
EL=833.80

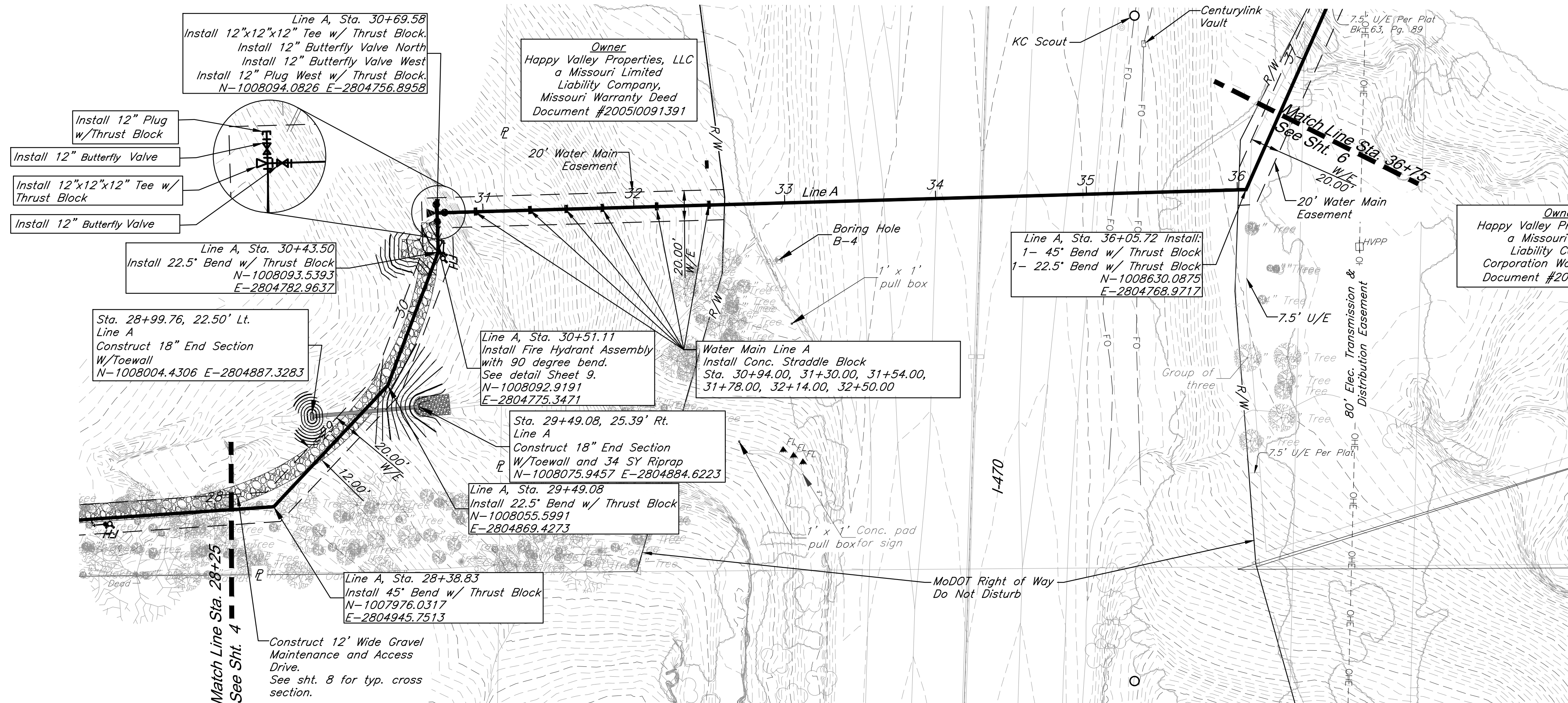
NOTES:
D.E. = Drainage Easement
U.E. = Utility Easement
R = Property Line
R/W = Right-of-Way
FG = Finished Grade
TP = Top of Pipe



LINE A







CAUTION!

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

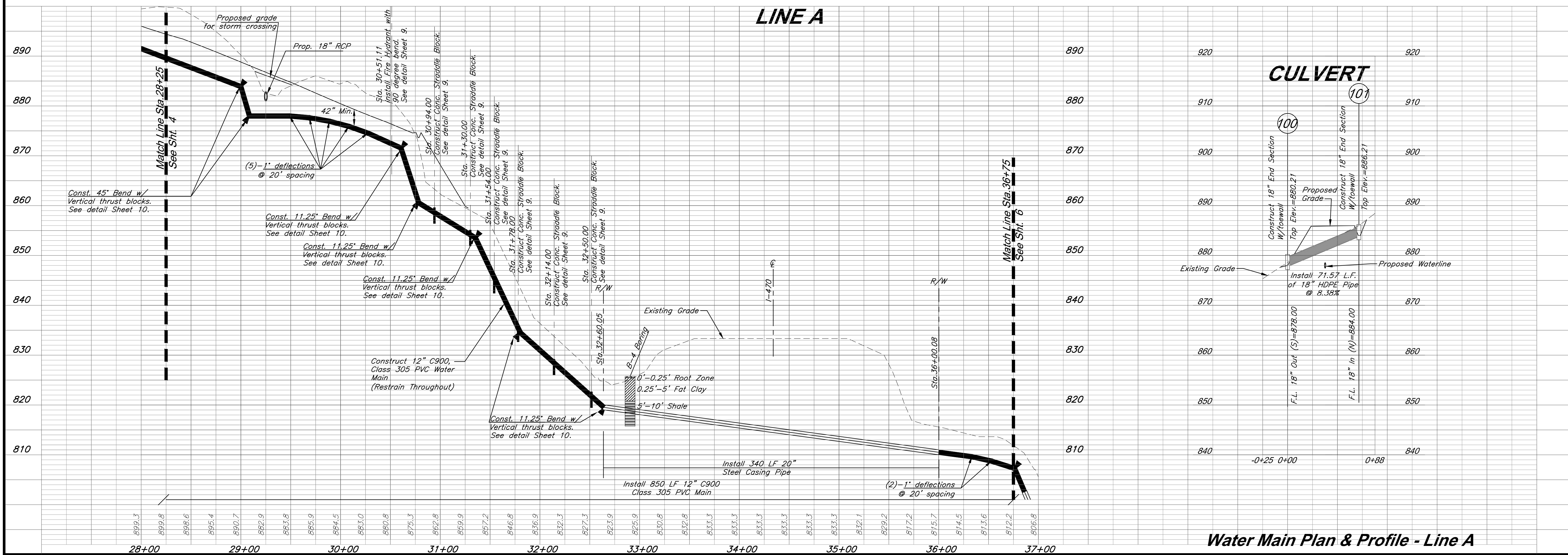
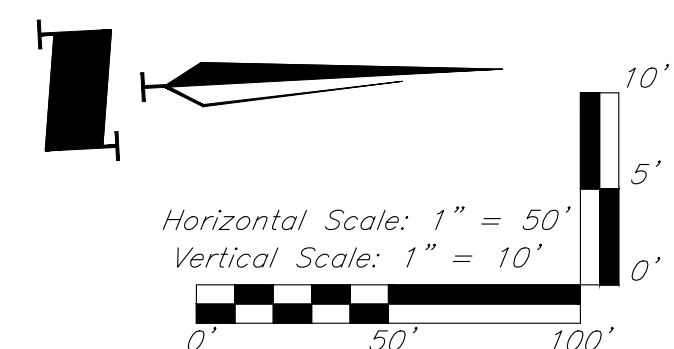
NOTES:

D.E. = Drainage Easement
U.E. = Utility Easement
P = Property Line
R/W = Right-of-Way
FG = Finished Grade
TP = Top of Pipe
W/E = Water Main Easement

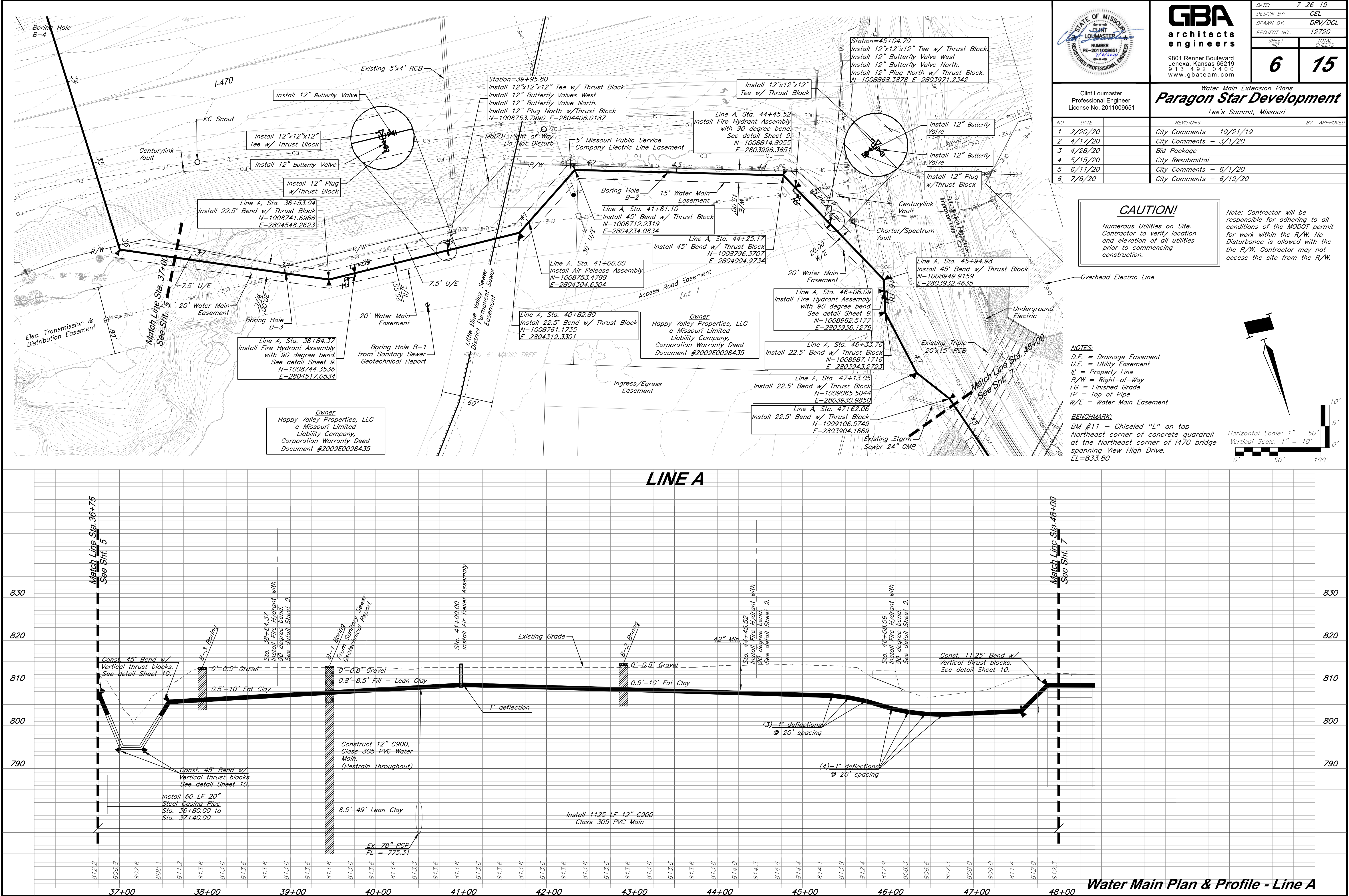
BENCHMARK:

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

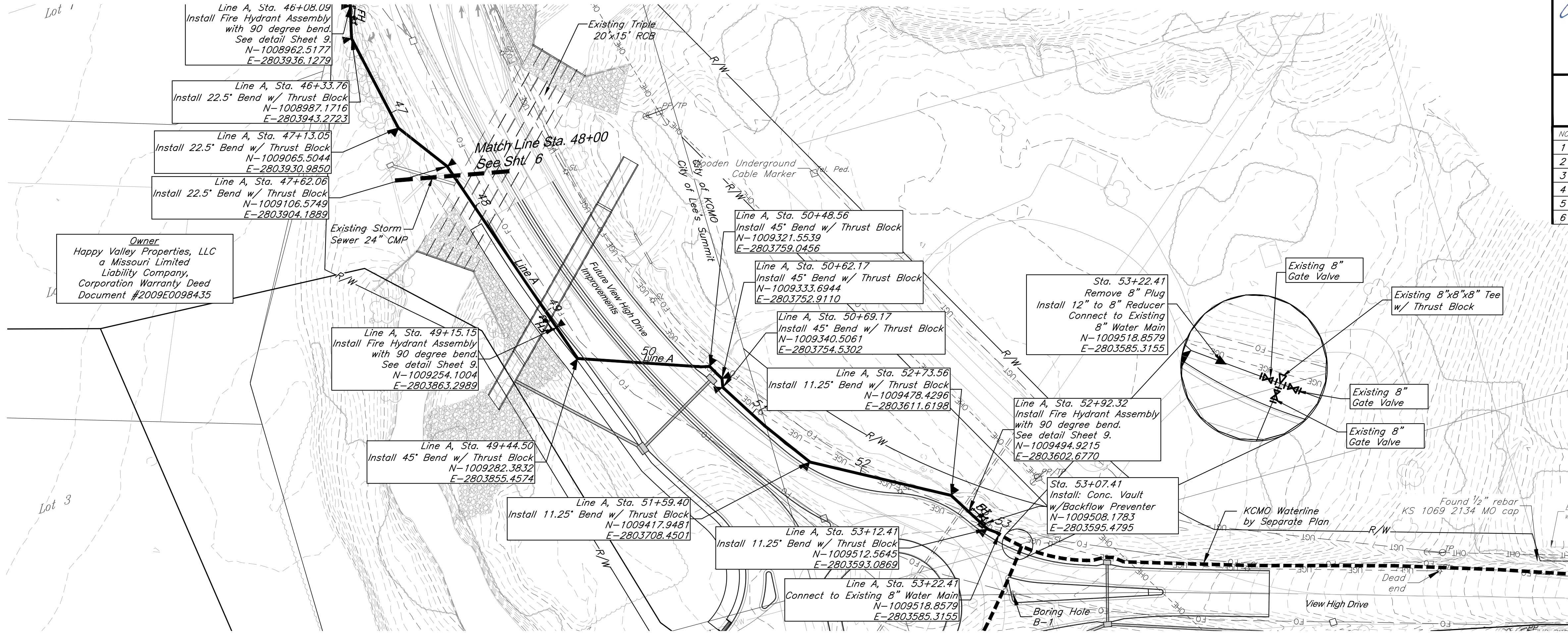
Note: Contractor will be responsible for adhering to all conditions of the MODOT permit for work within the R/W. No Disturbance is allowed with the the R/W. Contractor may not access the site from the R/W.



C:\12720\1272001600.dwg Layout: 6 Water Main Plan & Profile - Line A -- Monday July 06, 2020, 2:01pm -- Copyright 2020, George Loumaster, Professional Engineer, 000225, Landscape Architect, 000225, Professional Land Surveyor, 000229



G:\12720\Civil 3D\Production Drawings\Water Main Plans\Lee's Summit\12720C1600.dwg Layout: 7 Water Main Plan & Profile - Line A -- Monday July 06, 2020, 2:02pm -- Copyright 2020, George Loumaster, Professional Engineer, 000133, Landscape Architect, 000025, Professional Land Surveyor, 000039





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

DATE: 7-26-19
DESIGN BY: CEL
DRAWN BY: DRW/DGL
PROJECT NO.: 12720
SHEET NO. 7
TOTAL SHEETS 15

Clint Loumaster
Professional Engineer
License No. 2011009651

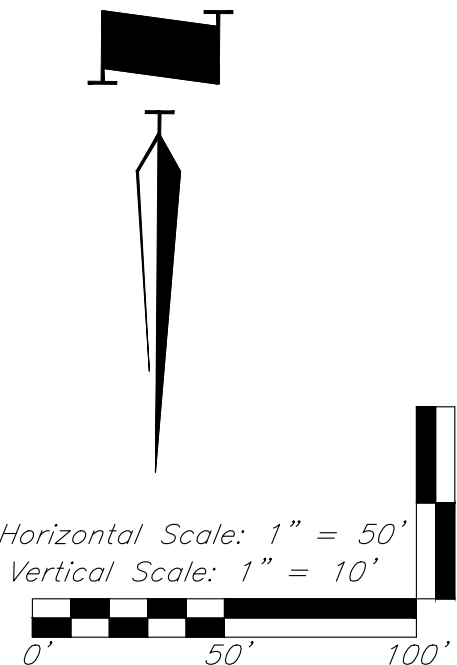
Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		

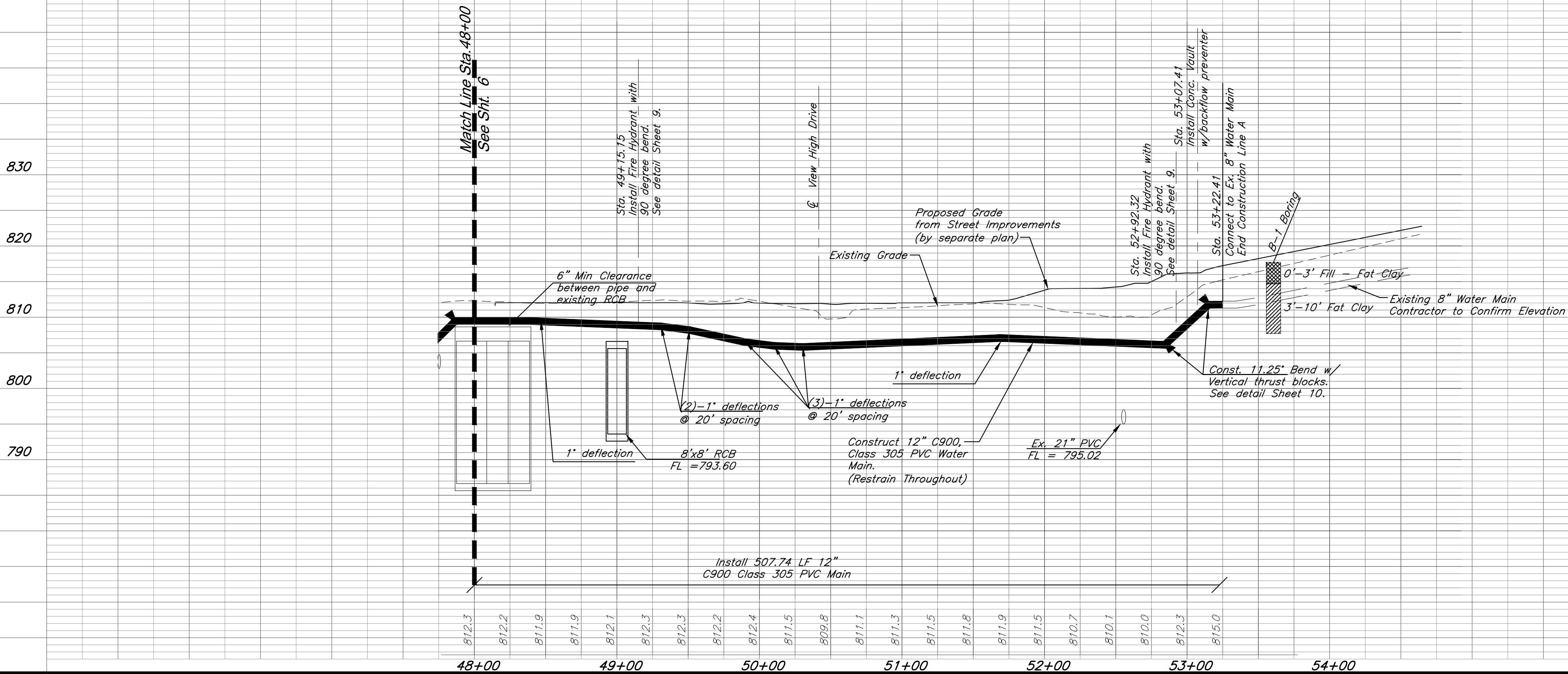
CAUTION!
Numerous Utilities on Site.
Contractor to verify location
and elevation of all utilities
prior to commencing
construction.

NOTES:
D.E. = Drainage Easement
U.E. = Utility Easement
P. = Property Line
R/W = Right-of-Way
FG = Finished Grade
TP = Top of Pipe
W/E = Water Main Easement

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



LINE A



Water Main Plan & Profile - Line A

C:\12720\Civil 3D\Production Drawings\Water Main Plans\Lee's Summit\12720C1600.dwg Layout: 8 Water Main Plan & Profile - Line B -- Monday July 06, 2020, 2:03pm -- Copyright 2020, Clint Loumaster, Professional Engineer, 000133, Landscape Architect, 000025, Professional Land Surveyor, 000039

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



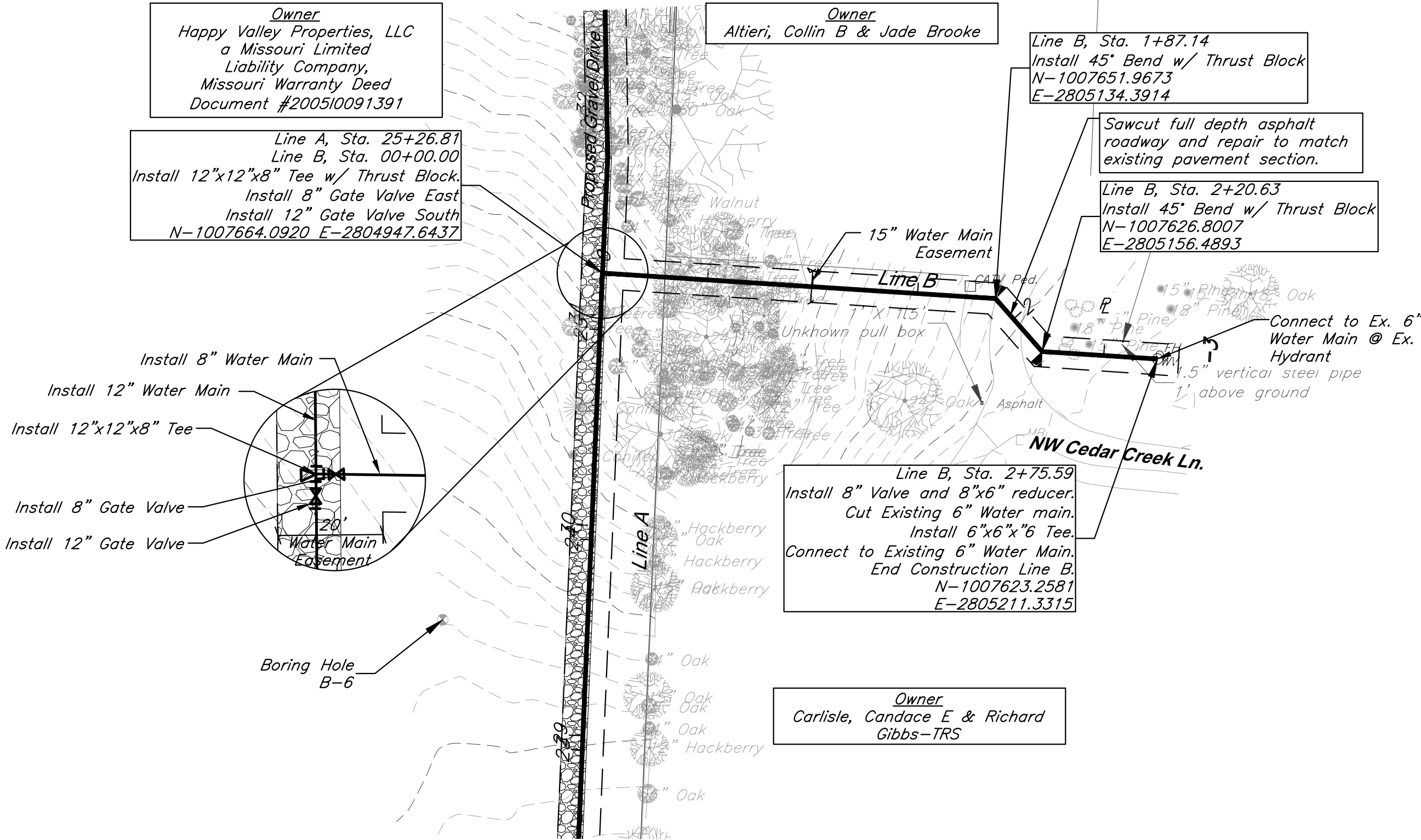
GBA
architects
engineers
9801 Renner Boulevard
Lenexa, Kansas 66219
913.492.0400
www.gbateam.com

DATE: 7-26-19	
DESIGN BY: CEL	
DRAWN BY: DRW/DGL	
PROJECT NO.: 12720	
SHEET NO.	TOTAL SHEETS
8	15

Clint Loumaster
Professional Engineer
License No. 2011009651

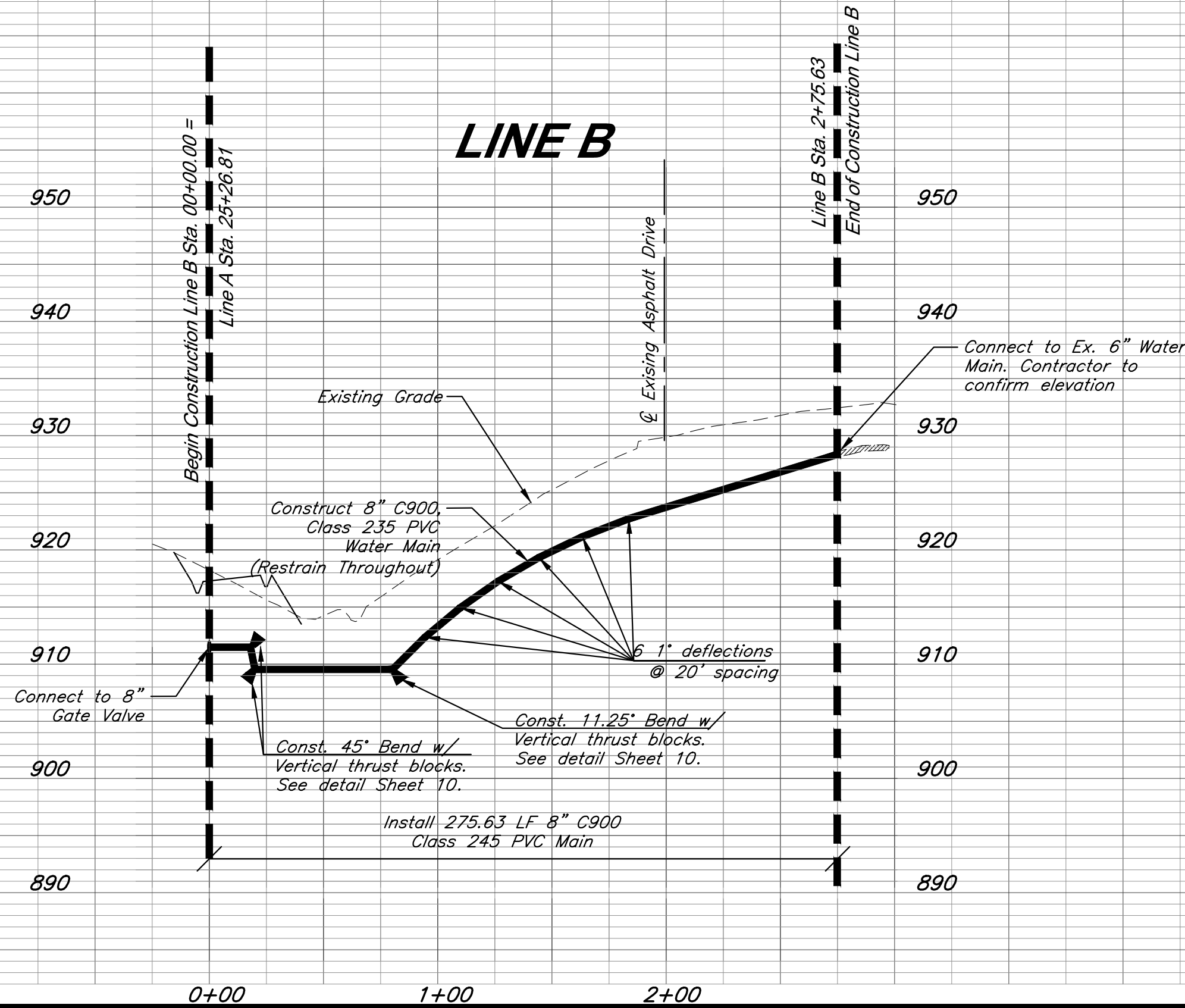
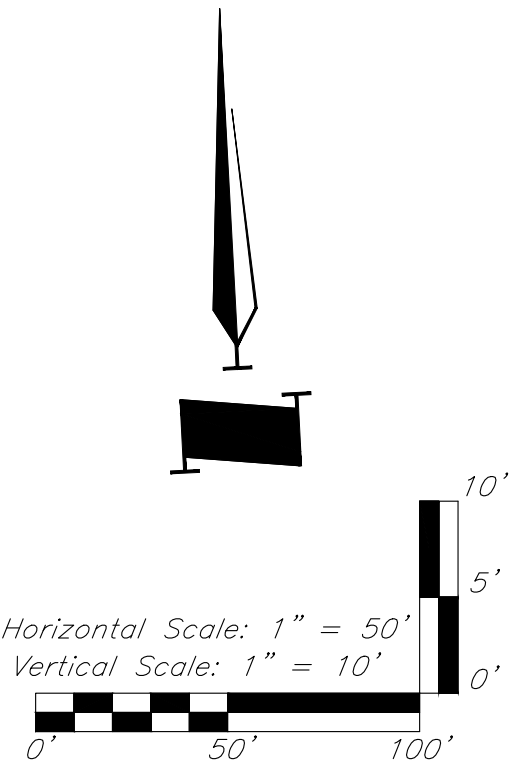
Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		

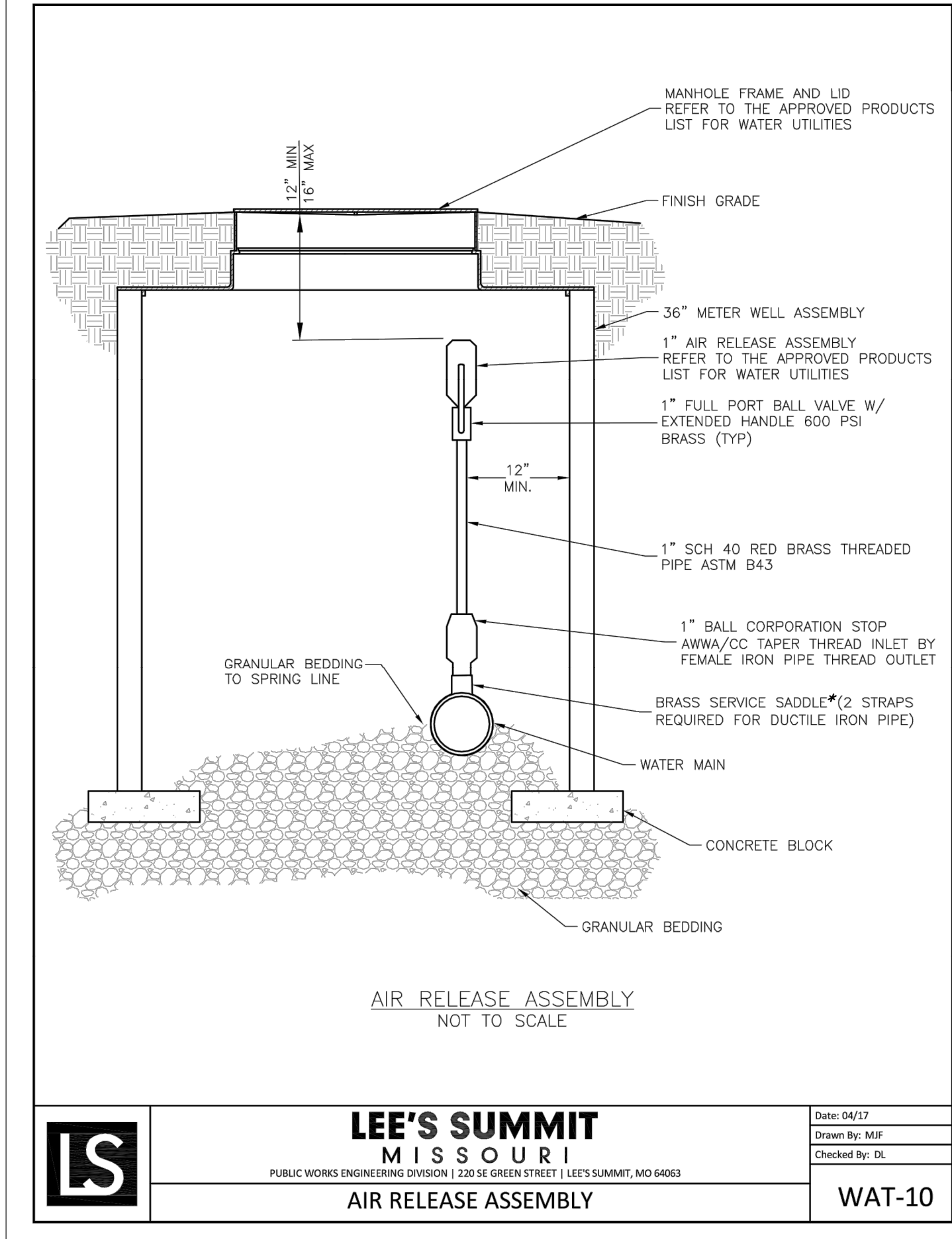
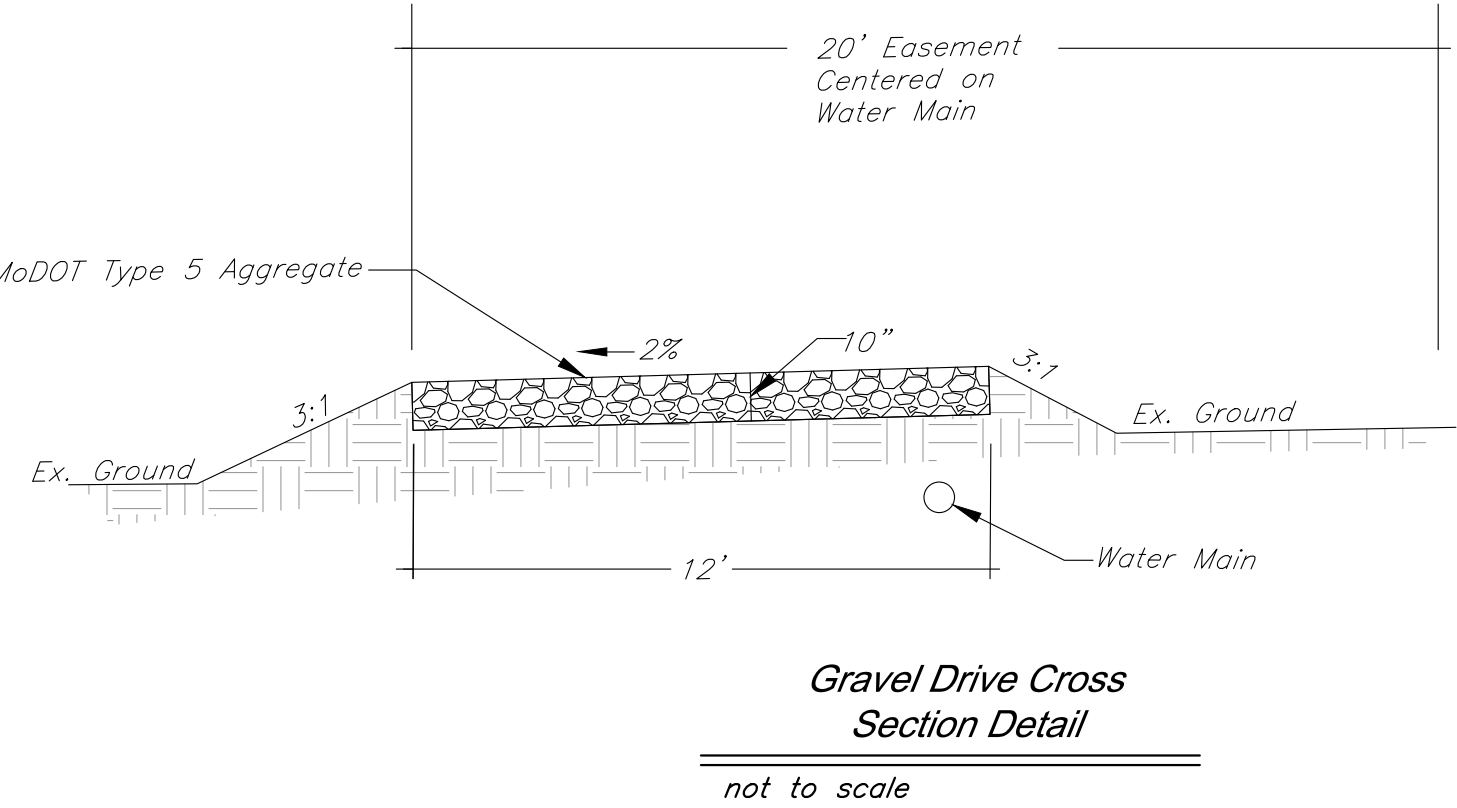


NOTES:
D.E. = Drainage Easement
U.E. = Utility Easement
P = Property Line
R/W = Right-of-Way
FG = Finished Grade
TP = Top of Pipe
W/E = Water Main Easement

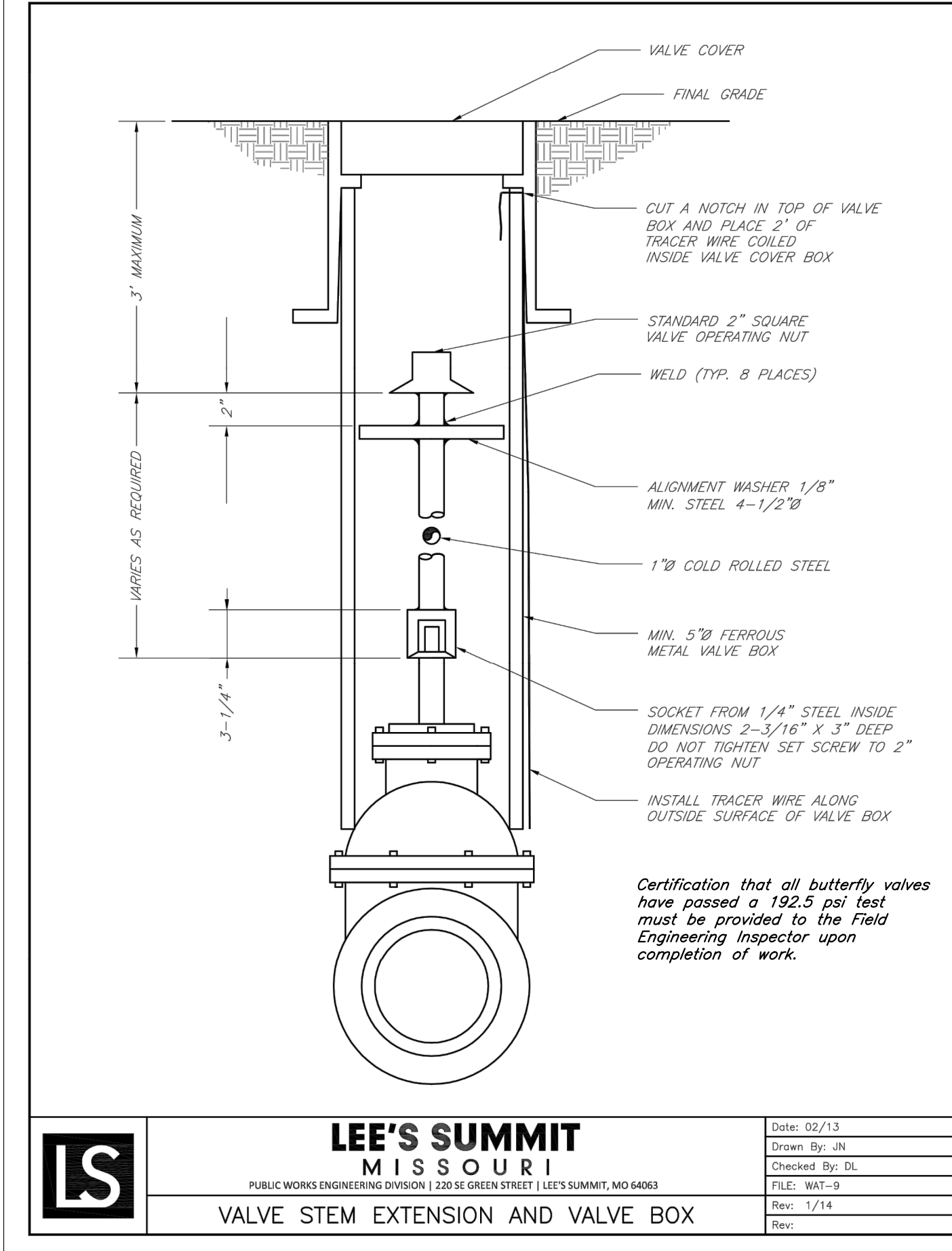
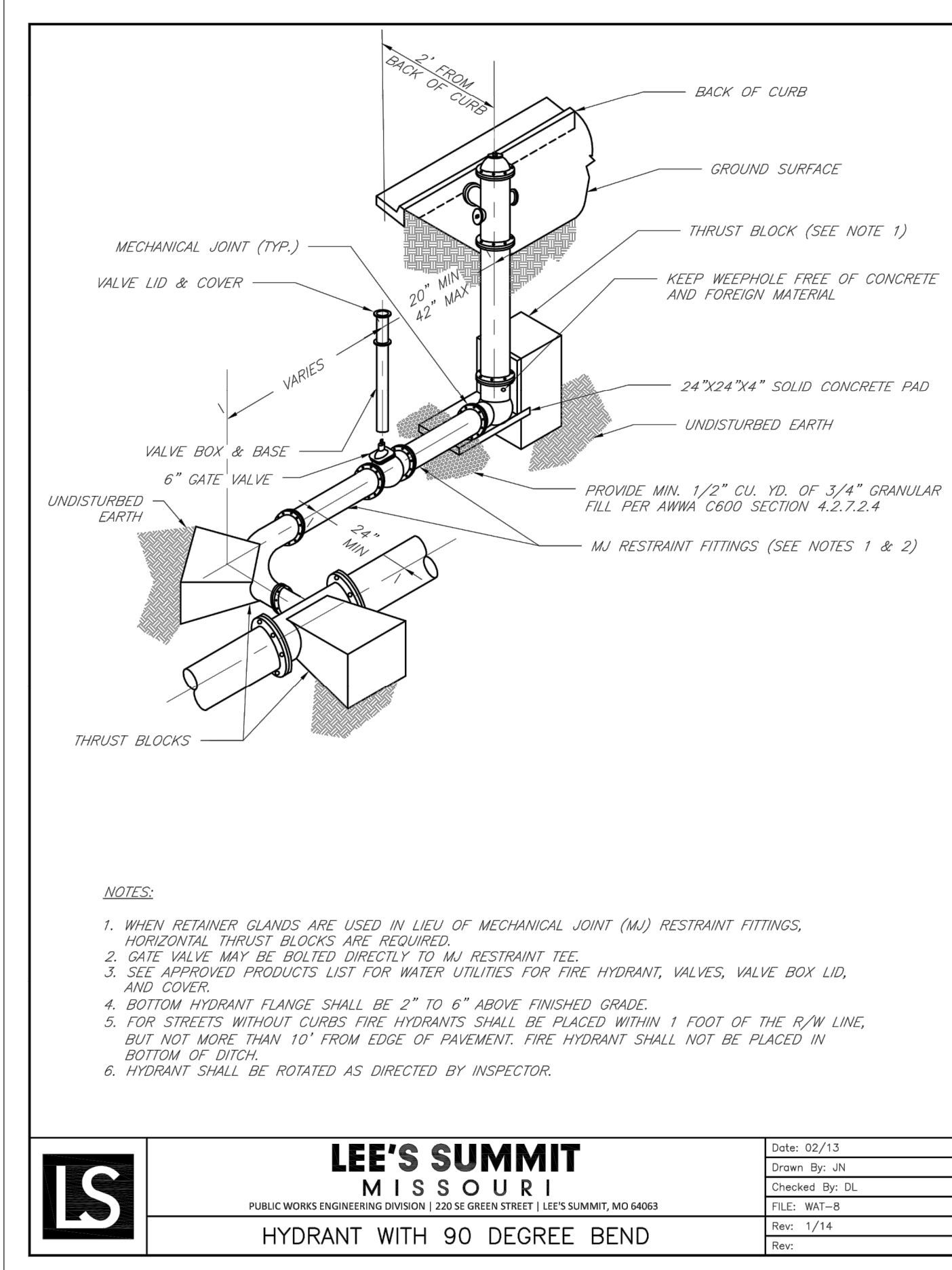
BENCHMARK:
BM #11 - Chiseled "L" on top
Northeast corner of concrete guardrail
at the Northeast corner of 1470 bridge
spanning View High Drive.
EL=833.80



Water Main Plan & Profile - Line B



* Air Release Assembly at Sta. 41+00.00 must use Steel Saddle specified below or approved equivalent due to pressure.



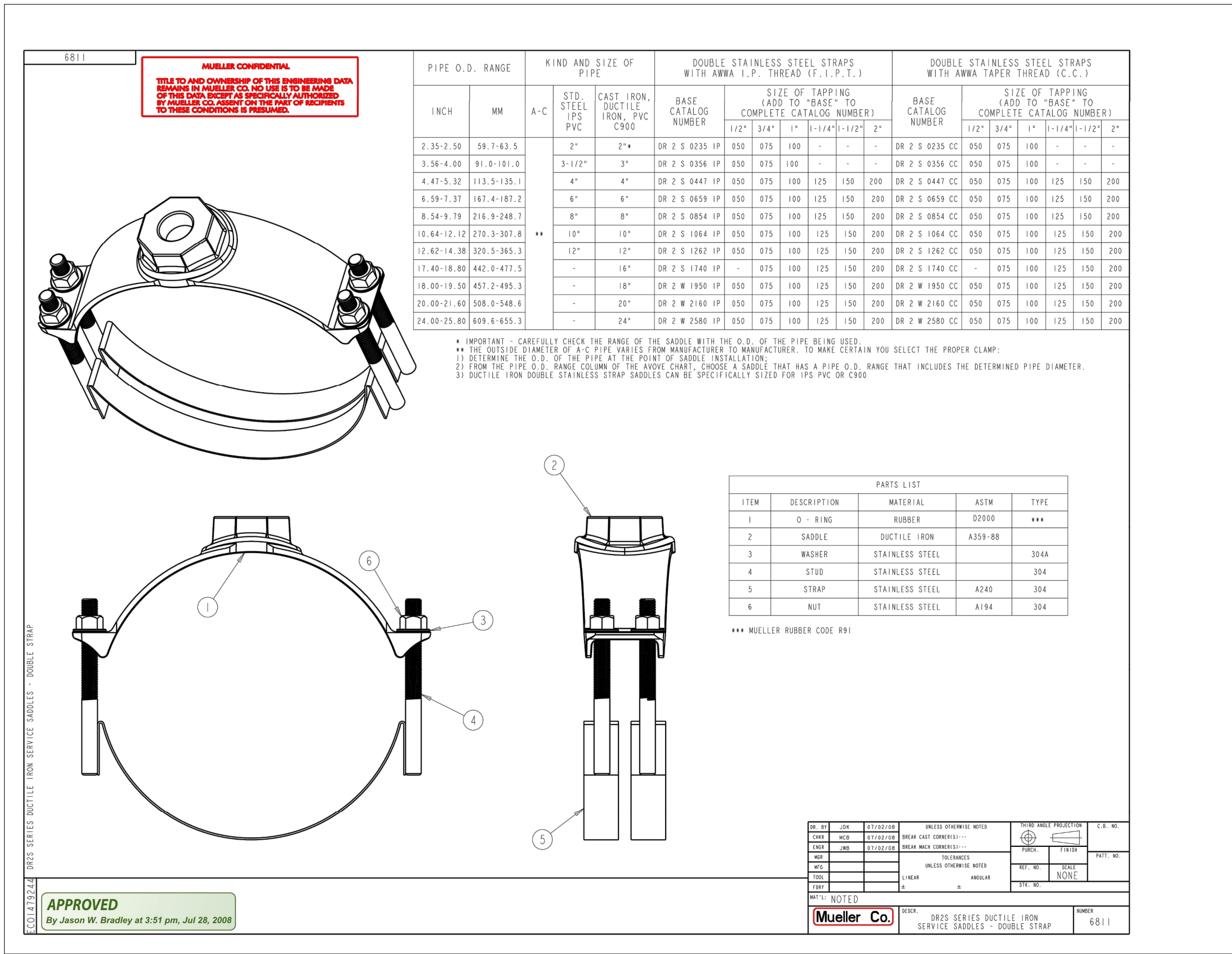
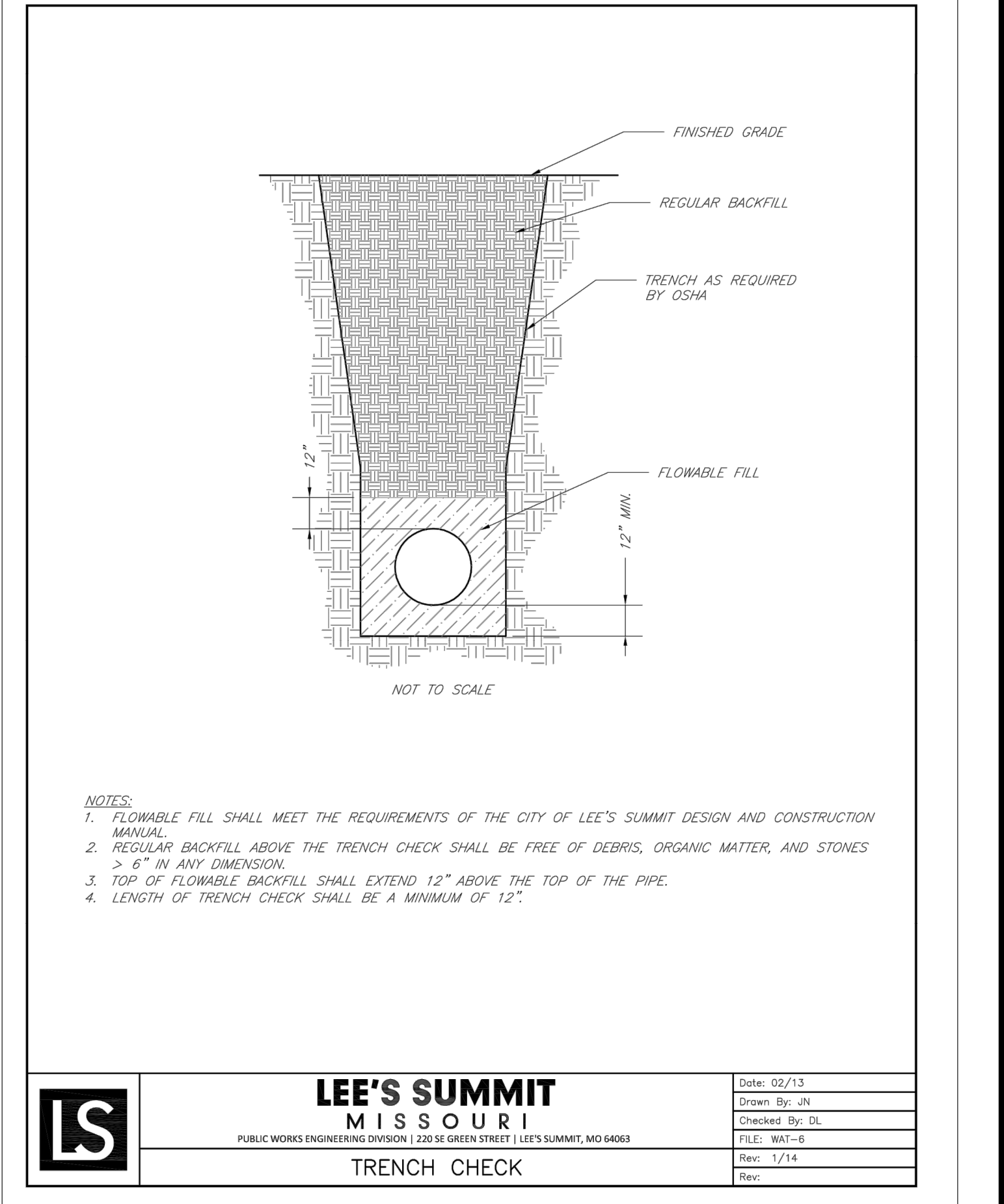
GBA
architects
engineers
9801 Renner Boulevard
Lenexa, Kansas 66219
913.492.0400
www.gbateam.com

DATE: 7-26-19
DESIGN BY: CEL
DRAWN BY: DRW/DGL
PROJECT NO.: 12720
SHEET NO.: 9
TOTAL SHEETS: 15

Clint Loumaster
Professional Engineer
License No. 2011009651

Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		



G:\12720\Civil 3D\Production Drawings\Water Main Plans\Lee's Summit\12720C2400.dwg Layout: 10 Water Main Details -- Monday, July 06, 2020, 2:03pm -- Copyright 2020, George Butler Associates-00212, Professional Engineer 000025, Landscape Architect 000025, Professional Land Surveyor 000029

NOT TO SCALE

NOTES:
1. REFER TO SPECIFICATION SECTION 3900 FOR ADDITIONAL INFORMATION.
2. LENGTH, DIAMETER, AND WALL THICKNESS TO BE SHOWN ON CONSTRUCTION PLANS.

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

Date: 02/13
Drawn By: JN
Checked By: DL
FILE: WAT-5
Rev: 1/14
Rev:

WATER CASING PIPE DETAIL

NOTES:
1. INTERMEDIATE BELLS SHALL BE ENCASED.
2. REINFORCING STEEL SHALL BE #4 @ 12" O.C. EACH WAY WITH A MINIMUM REBAR LAP OF 12".
3. THIS DETAIL IS FOR PIPES 12" AND SMALLER.

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

Date: 02/13
Drawn By: JN
Checked By: DL
FILE: WAT-4
Rev: 1/14
Rev:

WATER PIPE ENCASEMENT

REQUIRED CONCRETE VOLUME (CUBIC FEET - CF)

NOM. DIA. (INCHES)	TEE, PLUG	90 BEND	45 BEND	22.5 BEND	11.25 BEND
6	50.5	71.4	38.6	19.7	9.9
8	80.8	126.9	68.7	35.0	17.6
10	140.2	198.3	107.3	54.7	27.5
12	202.0	281.1	154.6	78.8	39.6
14	267.0	366.0	200.4	107.3	53.9
16	335.0	453.0	240.1	140.1	70.4
18	405.0	543.0	281.1	177.3	89.1
20	477.0	636.0	323.0	218.0	110.0
24	612.0	828.0	416.0	288.0	158.4

NOTES:
1. ALL BENDS WITHOUT RESTRAINED JOINTS SHALL HAVE CONCRETE THRUST BLOCKS INSTALLED FOR RESTRAINT.
2. MEGA LUGS MAY BE USED ONLY IN CONJUNCTION WITH CONCRETE THRUST BLOCKING.
3. BEARING MUST BE AGAINST UNDISTURBED SOIL.
4. DO NOT COVER JOINTS OR BOLTS (WHERE APPLICABLE) WITH CONCRETE.

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

Date: 02/13
Drawn By: JN
Checked By: DL
FILE: WAT-2
Rev: 1/14
Rev:

VERTICAL THRUST BLOCKS

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

DATE: 7-26-19
DESIGN BY: CEL
DRAWN BY: DRW/DGL
PROJECT NO.: 12720
SHEET NO. 10
TOTAL SHEETS 15

Clint Loumaster
Professional Engineer
License No. 2011009651

Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		

REQUIRED CONCRETE BEARING AREA (SQUARE FEET - SF)

NOM. DIA. (INCHES)	TEE, PLUG	90 BEND	45 BEND	22.5 BEND	11.25 BEND
6	4.7	6.7	4.0	4.0	4.0
8	8.4	11.8	6.4	4.0	4.0
10	13.1	18.5	10.0	5.1	4.0
12	18.8	26.7	14.4	7.4	4.0
14	25.7	36.3	19.6	10.0	5.0
16	33.5	47.4	25.6	13.1	6.6
18	42.4	59.8	32.5	16.5	8.3
20	51.3	73.5	40.1	20.4	10.3
24	65.0	91.8	50.0	25.4	14.8

NOTES:
1. ALL BENDS WITHOUT RESTRAINED JOINTS SHALL HAVE CONCRETE THRUST BLOCKS INSTALLED FOR RESTRAINT.
2. MEGA LUGS MAY BE USED ONLY IN CONJUNCTION WITH CONCRETE THRUST BLOCKING.
3. BEARING AREA MUST BE AGAINST UNDISTURBED SOIL.
4. DO NOT COVER JOINTS OR BOLTS (WHERE APPLICABLE) WITH CONCRETE.

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

Date: 02/13
Drawn By: JN
Checked By: DL
FILE: WAT-1
Rev: 1/14
Rev:

HORIZONTAL THRUST BLOCKS

GENERAL NOTES:
1. METER VAULT WALLS TO BE POURED OR PRECAST CONCRETE. METER VAULT ROOF TO BE REINFORCED CONCRETE WITH OPENING CENTERED OVER DETECTOR METER. REINFORCED WALLS AND SLABS ARE TO BE DESIGNED BY THE OWNER'S ENGINEER OR PRECAST ENGINEER.
2. METER VAULT TO BE LOCATED, WHEN POSSIBLE, OUTSIDE TRAFFIC AREA AND WHERE SURFACE WATER WILL NOT DRAIN INTO IT. PROVIDE CONCRETE SUMP TO DRAIN TO AN ABOVE GROUND DISCHARGE POINT.
3. ALL PIPE AND FITTINGS FROM THE CITY WATER MAIN THROUGH THE VAULT SHALL BE PROVIDED WITH RESTRAINED JOINT FITTINGS.
4. ALL FITTINGS FOR THE DETECTOR METER TO BE BRASS.
5. STEPS SHALL BE IN ACCORDANCE WITH THE APPROVED PRODUCTS LIST FOR WATER UTILITIES AND SHALL BE ON 16" CENTERS.
6. ALL VALVES SHALL HAVE RISING STEMS.
7. MANHOLE COVER SHALL BE A BILCO K-1 MODEL UNLESS IN A VEHICLE TRAFFIC AREA. SEE THE APPROVED PRODUCTS LIST FOR WATER UTILITIES FOR TRAFFIC CONDITIONS. THE COVER SHALL HAVE A 1-3/4" Ø HOLE DRILLED FOR A TOUCH/READ DEVICE.
8. A MINIMUM OF 18" CLEARANCE SHALL BE PROVIDED AROUND ALL PIPING, VALVES, APPURTENANCES, ETC.
9. CONTACT PUBLIC WORKS ENGINEERING FOR VAULTS THAT INCLUDE A FIRE DEPARTMENT CONNECTION OR A 3" OR LARGER METER.

**CITY OF LEE'S SUMMIT, MO
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION**
LEE'S SUMMIT, MO 64063

Project: STANDARD DRAWINGS
Drawn By: JS
Checked By: DL
Date: 1/14
Rev: 1/14
or
WAT-12

NOTE:
THIS DETAIL NOT TO BE USED FOR PIPE GREATER THAN 12"

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

Date: 02/13
Drawn By: JN
Checked By: DL
FILE: WAT-3
Rev: 1/14
Rev:

STRADDLE BLOCK

G:\12720\Civil 3D\Production Drawings\Water Main Plans\Lee's Summit\12720C4000.dwg Monday, July 06, 2020, 2:04pm -- Copyright 2020, George Butler Associates, Inc. 000133, Landscape Architect 000025, Professional Engineer 000025, Professional Land Surveyor 000029

End of Line A

Chilman Road

Silt Fence (typ)

Boring Hole B-10

Silt Fence (typ)

Boring Hole B-9

Proposed Gravel Drive

Match Line Sta. 18+00.00
See this sheet

Match Line Sta. 18+00
See this sheet

Hole B-9

Boring Hole B-8

Silt Fence (typ)

Proposed Gravel Drive

Boring Hole B-7

Boring Hole B-6

Match Line Sta. 30+00
See sheet 12

Silt Fence (typ)

Grading and Erosion Control Plan



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

DATE:	7-26-19
DESIGN BY:	CEL
DRAWN BY:	DRV/DGL
PROJECT NO.:	12720
SHEET NO.	TOTAL SHEETS
11	15

Clint Loumaster
Professional Engineer
License No. 2011009651

Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		

Note:
Contractor shall strip vegetation, including trees, along the water main alignment and dispose of off site. Entire disturbed area shall be re-vegetated per seeding notes below.

EROSION CONTROL LEGEND

- Gravel Inlet Protection
 - Silt Fence
 - Rock Ditch Check
- Note: All disturbed area to be seeded.

Seeding Notes:

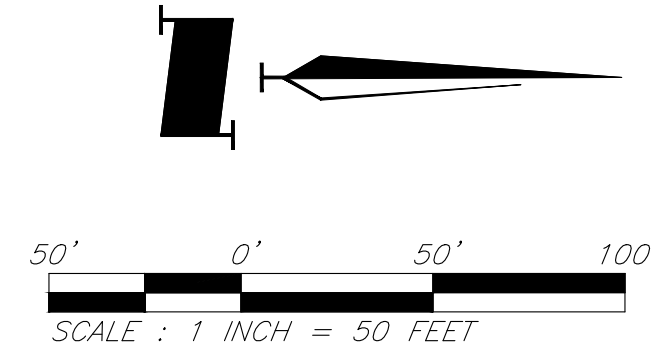
- Contractor shall uniformly spread the topsoil over disturbed area. Seed and straw mulch shall be placed as soon as practicable.
- Between November 1 and March 15, temporary stabilization shall include a straw mulch cover at 2.25 tons/acre.
- Between March 15 and May 31, drill or hydroseed all disturbed areas with K-31 fescue at 90 lbs PLS per acre and rye grass at 50 lbs PLS per acre. Reapply straw mulch cover at 1.5 tons per acre.
- Immediately water after seeding and continue to water as necessary to establish permanent vegetation.

Earthwork

Cut = 69 CY
Fill* = 217 CY
Net = 148 CY Fill
*Fill factor of 1.15

CAUTION!

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



G:\12720\Civil 3D\Production Drawings\Water Main Plans\Lee's Summit\12720C4000.dwg Monday, July 06, 2020, 2:04pm -- Copyright 2020, George Butler Associates, Inc. 000213, Landscape Architect 000025, Professional Engineer 000212, Professional Engineer 000213, Professional Land Surveyor 000029



GBA
architects
engineers

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

DATE: 7-26-19
DESIGN BY: CEL
DRAWN BY: DRW/DGL
PROJECT NO.: 12720
SHEET NO.: 12
TOTAL SHEETS: 15

Clint Loumaster
Professional Engineer
License No. 2011009651

Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		

Note:
Contractor shall strip vegetation, including trees, along the water main alignment and dispose of off site. Entire disturbed area shall be re-vegetated per seeding notes below.

EROSION CONTROL LEGEND

- Gravel Inlet Protection
- Silt Fence
- Rock Ditch Check

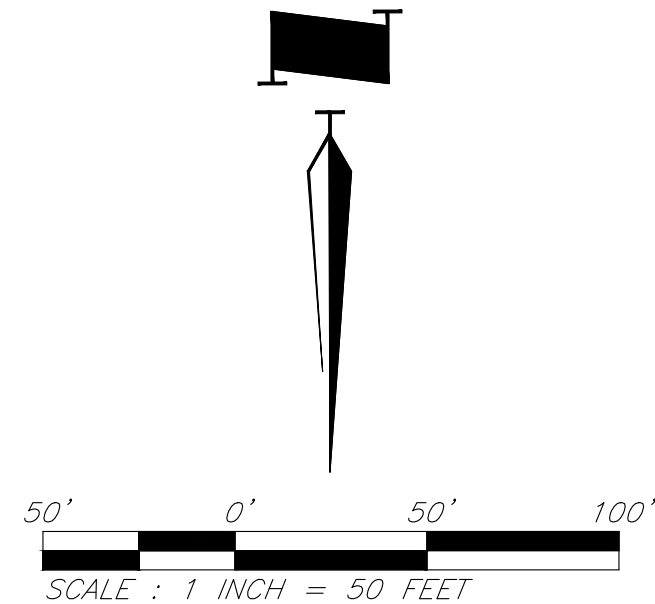
Note: All disturbed area to be seeded.

Seeding Notes:

- Contractor shall uniformly spread the topsoil over disturbed area. Seed and straw mulch shall be placed as soon as practicable.
- Between November 1 and March 15, temporary stabilization shall include a straw mulch cover at 2.25 tons/acre.
- Between March 15 and May 31, drill or hydroseed all disturbed areas with K-31 fescue at 90 lbs PLS per acre and rye grass at 50 lbs PLS per acre. Reapply straw mulch cover at 1.5 tons per acre.
- Immediately water after seeding and continue to water as necessary to establish permanent vegetation.

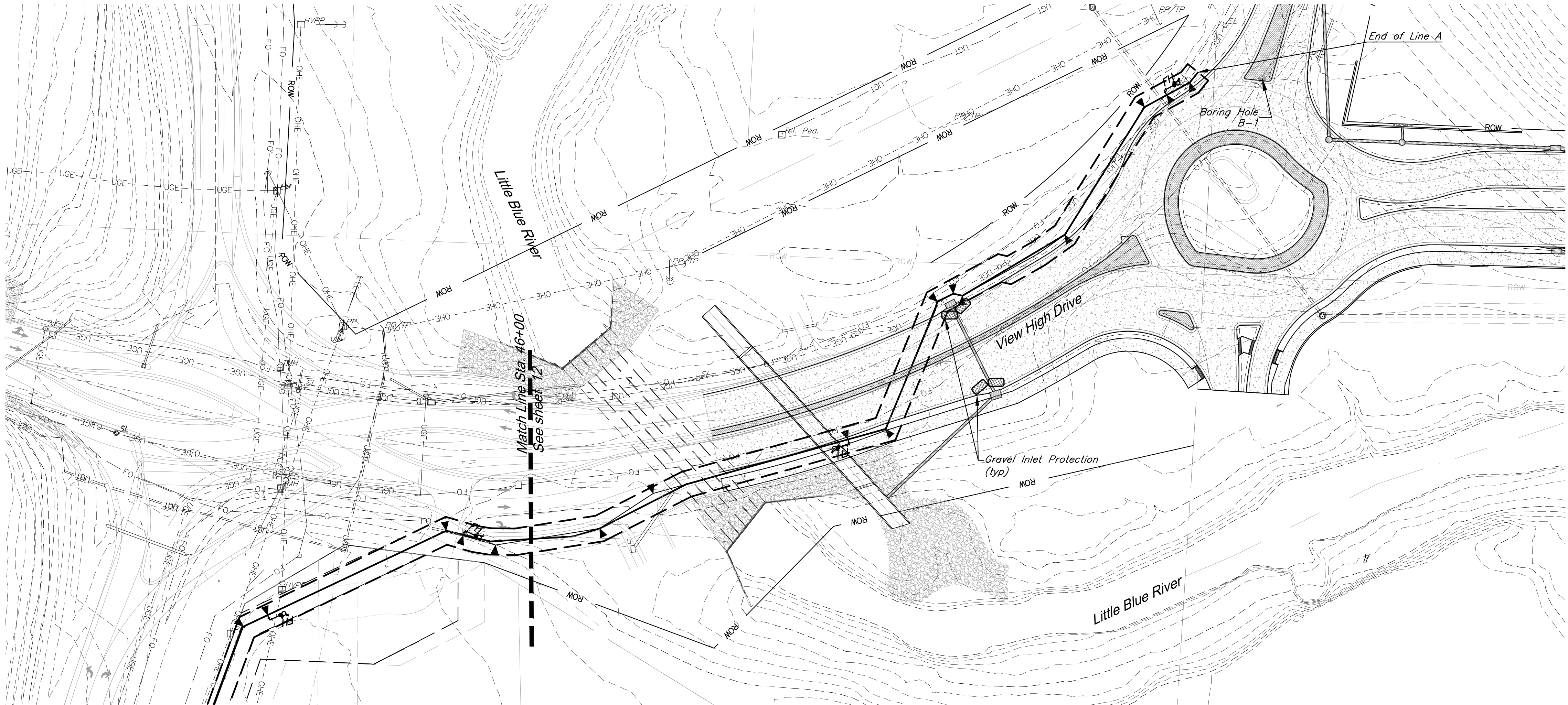
CAUTION!

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



Grading and Erosion Control Plan

C:\12720\Civil 3D\Production Drawings\Water Main Plans\Lee's Summit\12720C4000.dwg Layout: 16 Erosion Control Plan -- Monday, July 06, 2020, 2:05pm -- Copyright 2020, George Butler Associates, Inc. 000213, Landscape Architect 000025, Professional Engineer 0000259



	DATE:	7-26-19		
	DESIGN BY:	CEL		
	DRAWN BY:	DRW/DGL		
	PROJECT NO.:	12720		
SHEET NO.	TOTAL SHEETS			
	13	15		
Clint Loumaster Professional Engineer License No. 2011009651		Water Main Extension Plans Paragon Star Development Lee's Summit, Missouri		
NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		

Note:
Contractor shall strip vegetation, including trees, along the water main alignment and dispose of off site. Entire disturbed area shall be re-vegetated per seeding notes below.

EROSION CONTROL LEGEND

- Gravel Inlet Protection
- Silt Fence

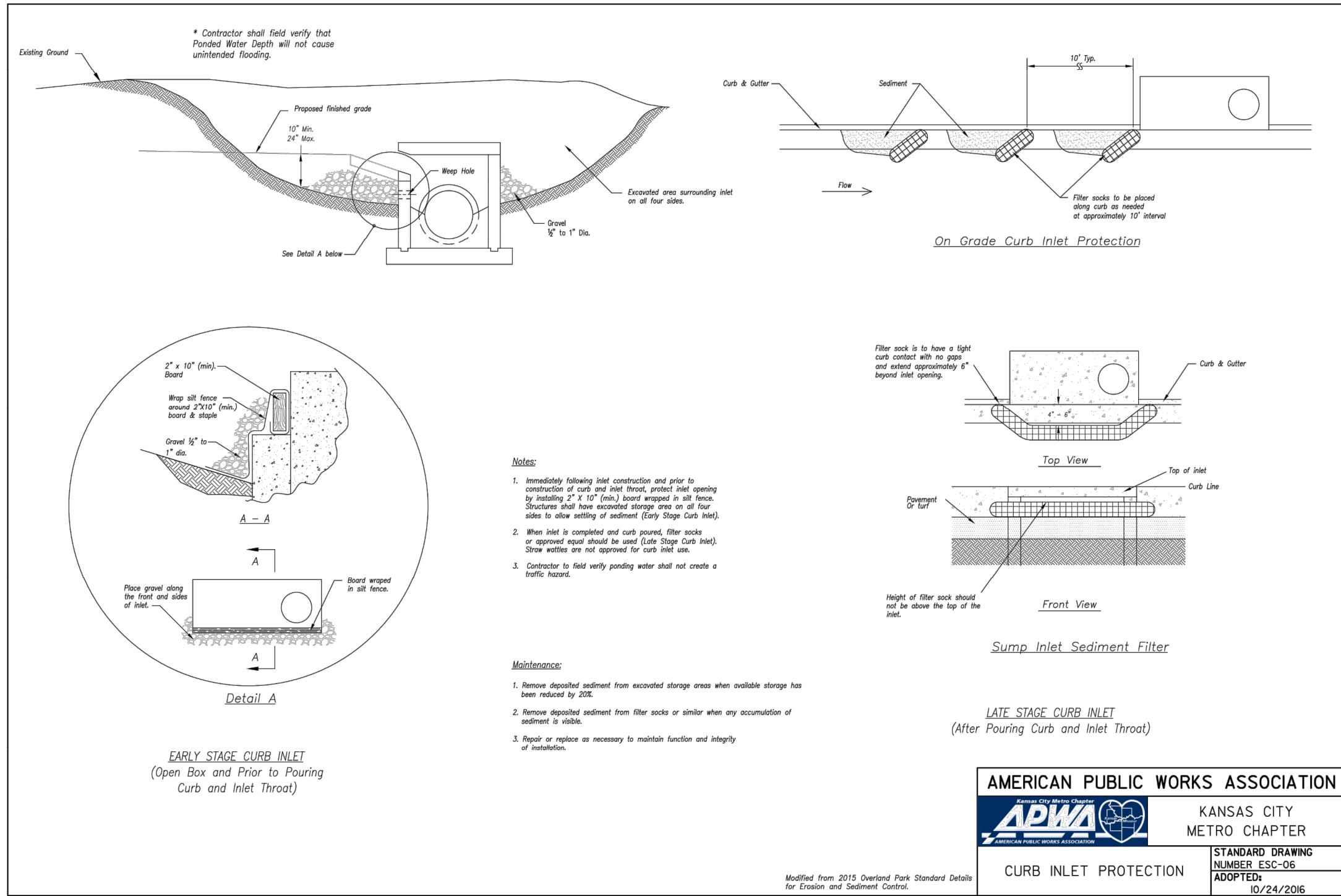
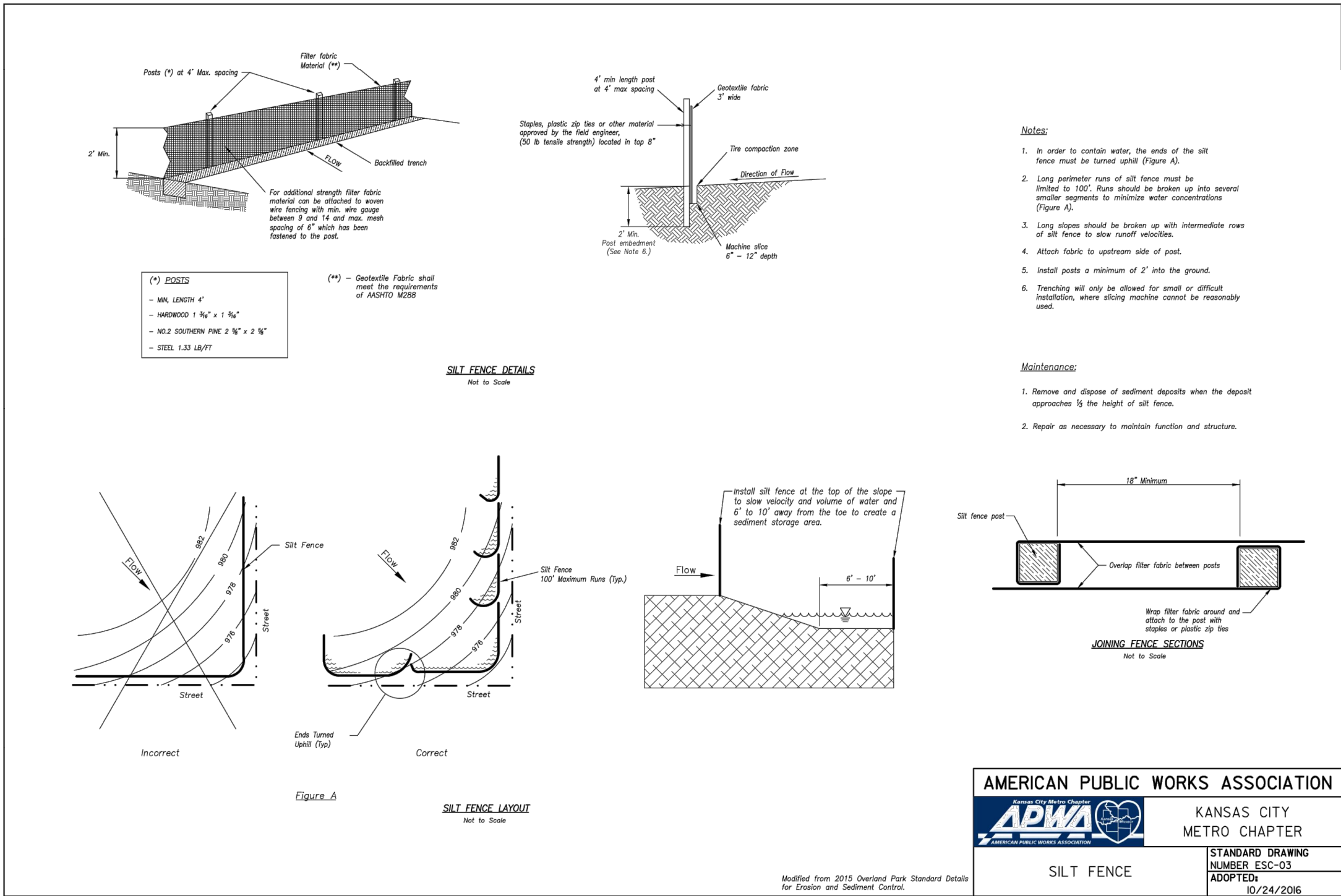
Note: All disturbed area to be seeded.

Seeding Notes:

- Contractor shall uniformly spread the topsoil over disturbed area. Seed and straw mulch shall be placed as soon as practicable.
- Between November 1 and March 15, temporary stabilization shall include a straw mulch cover at 2.25 tons/acre.
- Between March 15 and May 31, drill or hydroseed all disturbed areas with K-31 fescue at 90 lbs PLS per acre and rye grass at 50 lbs PLS per acre. Reapply straw mulch cover at 1.5 tons per acre.
- Immediately water after seeding and continue to water as necessary to establish permanent vegetation.

CAUTION!

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

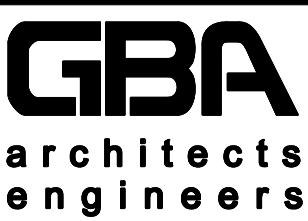




CLINT LOUMASTER

Professional Engineer

License No. 2011009651



8801 Renner Boulevard
Lenexa, Kansas 66219
913.492.0400
www.gbateam.com

DATE: 7-26-19

DESIGN BY: CEL

DRAWN BY: DRV/DGL

PROJECT NO.: 12720

SHEET NO.

15

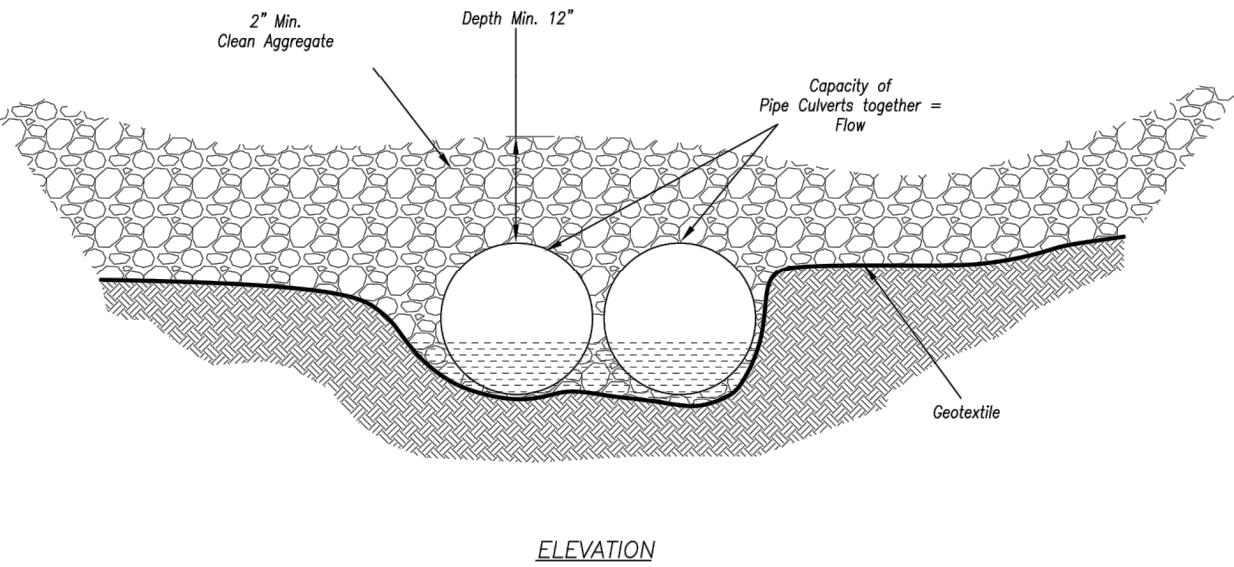
TOTAL SHEETS

15

Clint Loumaster
Professional Engineer
License No. 2011009651

Water Main Extension Plans
Paragon Star Development
Lee's Summit, Missouri

NO.	DATE	REVISIONS	BY	APPROVED
1	2/20/20	City Comments - 10/21/19		
2	4/17/20	City Comments - 3/1/20		
3	4/28/20	Bid Package		
4	5/15/20	City Resubmittal		
5	6/11/20	City Comments - 6/1/20		
6	7/6/20	City Comments - 6/19/20		



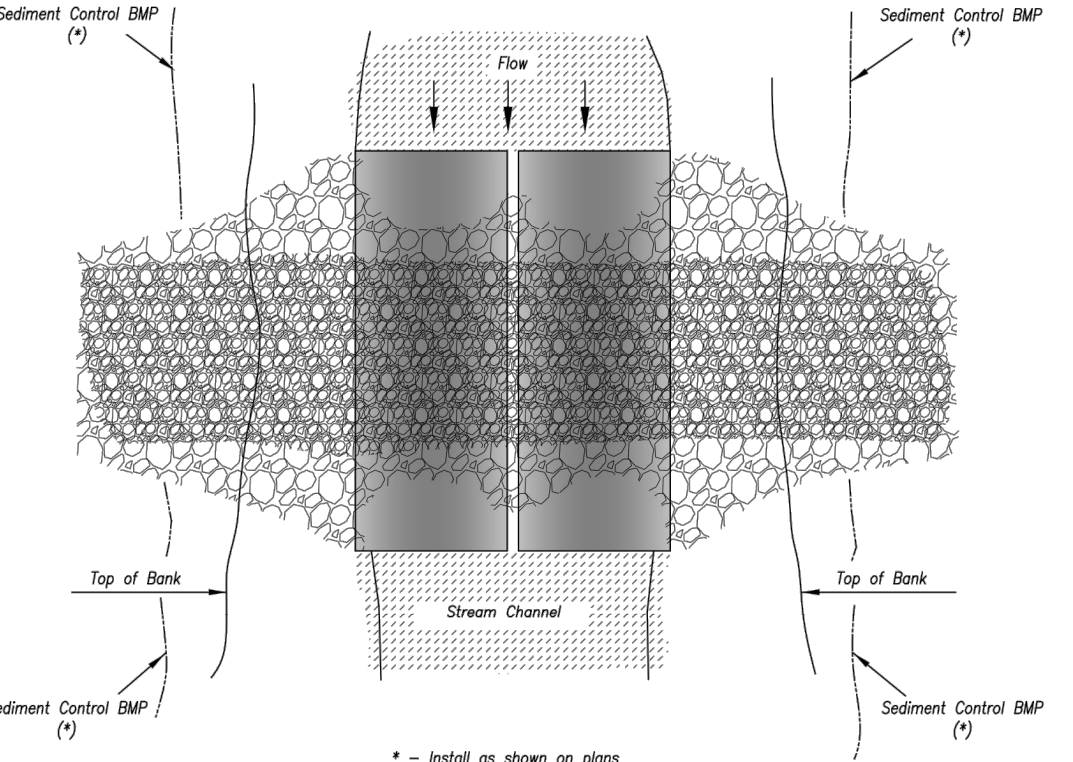
ELEVATION

Maintenance:

1. Repair stream bank erosion by stabilizing with erosion control BMPs such as erosion control blankets.
2. For in-stream degradation, armor the culvert outlet(s) with riprap to dissipate energy.
3. If sediment or debris is accumulating upstream of the crossing, remove as needed to maintain the functionality of the crossing.
4. If a temporary crossing is requiring excessive maintenance, replacement with a larger culvert or alternate design may be necessary.

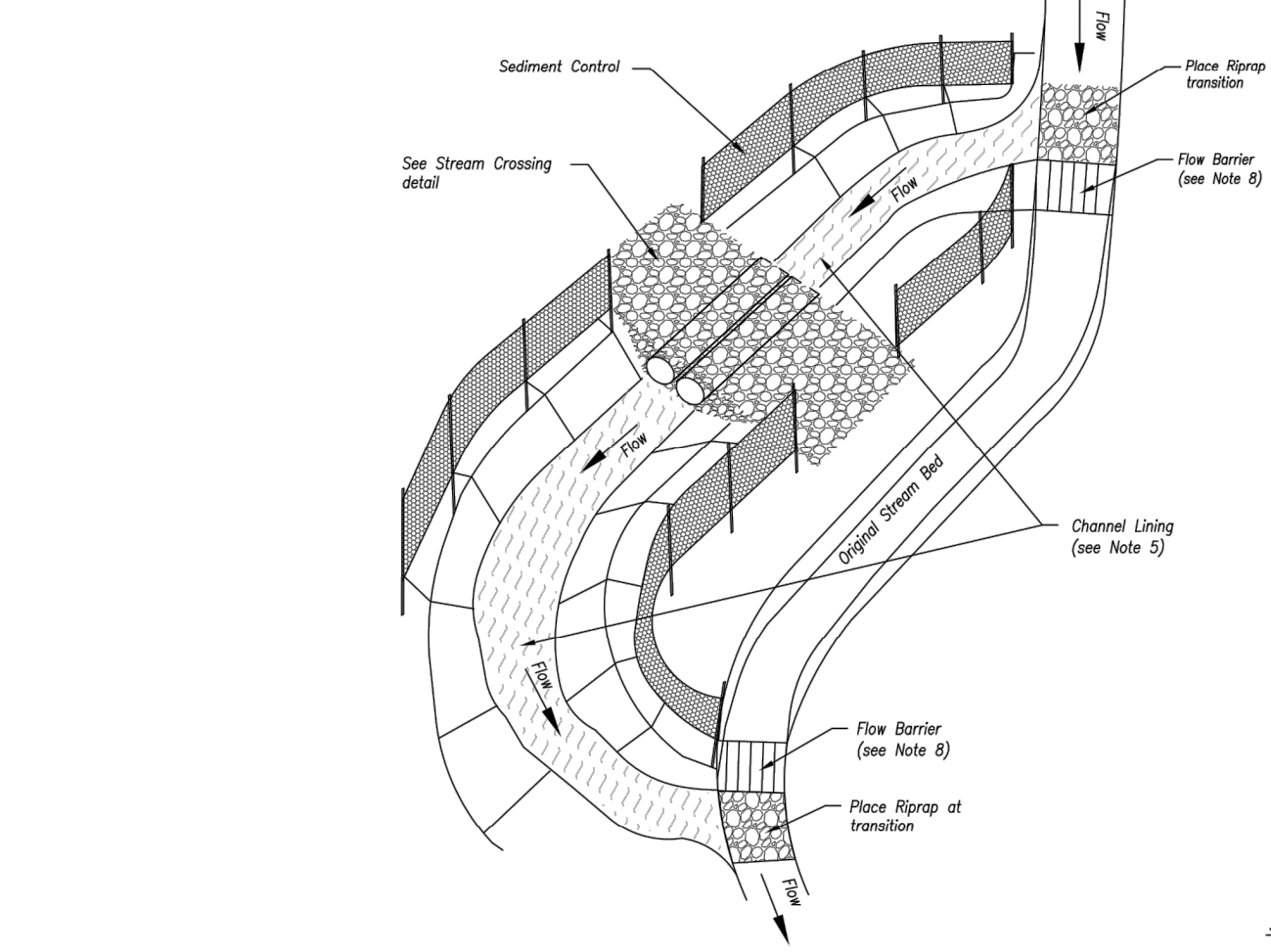
Notes for Temporary Stream Crossing:

1. Clearing and excavation of the stream bed and banks shall be kept to a minimum.
2. Place one pipe, buried 6" into the stream bottom, at the lowest point of the channel to allow the passage of aquatic organisms. Additional pipes shall be placed along the remainder of the stream channel bottom such that ordinary high water (OHW) flows designated in the Contract Documents shall flow through the pipes without overlapping the crossing. (See Specification for more information).
3. Geotextile shall be placed on the streambed and streambanks prior to placement of the pipe culvert and aggregate. The geotextile shall cover the streambed and extend a minimum of 6 inches and a maximum of 1 foot beyond the end of culvert and bedding material. Filter cloth reduces settlement and improves crossing stability.
4. The culvert shall extend a minimum of 1 foot beyond the upstream and downstream toe of the aggregate placed around the culvert. In no case shall the culvert exceed 40 feet in length.
5. The culvert shall be covered with a minimum of 1 foot of aggregate. If multiple culverts are used, they shall be separated by at least 12" of compacted aggregate fill.
6. As soon as crossing no longer needed, all structures including culverts, bedding and geotextile materials shall be removed. Removal of the structure and clean-up of the area shall be accomplished without construction equipment working in the channel.
7. Upon removal of the structure, the stream and banks shall immediately be shaped to its original cross-section and properly stabilized. Take care to minimize the amount of sediment lost into the stream.



PLAN VIEW

* -- install as shown on plans



STREAM DIVERSION CHANNEL

Notes for Temporary Diversion Channel:

1. The diversion channel crossing must be operational before work is done in the stream. Construction will be performed in the dry.
2. Minimum width of bottom shall be 6 feet or equal to bottom width of existing streambed, whichever is less.
3. Maximum steepness of side slopes shall be 2H:1V. Depth and grade may be variable, dependent on site conditions, but shall be sufficient to ensure continuous flow of water in diversion.
4. Channel must be lined with riprap or turf reinforcement mat depending on the expected velocity and shear stress in the channel.
5. Stream diversion liners shall be secured at the upstream and downstream sides with non-erodible weights such as riprap. These weights shall allow normal flow of the stream. Soil shall not be mixed with stream diversion weights. Weights may also be needed along the diversion's length to secure liner.
6. Stream diversion liners shall be entrenched at the top of slopes along with a sediment control BMP.
7. Non-erodible materials such as riprap, Jersey barriers, sand bags, plywood, or sheet piling shall be used as flow barriers to divert the stream away from its original channel and prevent or reduce water backup into the construction area.
8. Stream should be re-diverted only after backfilling and re-stabilization of original streambed and banks is completed.



AMERICAN PUBLIC WORKS ASSOCIATION
KANSAS CITY
METRO CHAPTER

STREAM CROSSINGS AND
DIVERSION CHANNELS

STANDARD DRAWING
NUMBER ESC-13
ADOPTED:
10/24/2016

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