

# WOODLAND OAKS

Lots 1 thru 42

## STREET AND STORM SEWER CONSTRUCTION PLANS

Section 27, Township 48 North, Range 31 West  
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

### OIL - GAS WELLS

ACCORDING TO EDWARD ALTON MAY JR'S ENVIRONMENTAL IMPACT STUDY OF ABANDONED OIL AND GAS WELLS IN LEE'S SUMMIT, MISSOURI IN 1995, THERE ARE NOT OIL AND GAS WELLS WITHIN 185 FEET OF THE PROPERTY AS SURVEYED HEREON.

### FLOOD INFORMATION:

THE SUBJECT PROPERTY SURVEYED LIES WITHIN A FLOOD ZONE DESIGNATED ZONE (X), AREAS LOCATED OUTSIDE THE 100 YEAR FLOOD PLAIN, PER F.E.M.A. MAP, COMMUNITY PANEL NO. 29095C0416G EFFECTIVE DATE: JANUARY 20, 2017.

### CONSTRUCTION AND DESIGN NOTES:

#### STREET & STORM SEWERS:

1 ~ STREET PAVEMENT SHALL CONSIST OF TYPE CG-2 CURBS WITH PAVEMENT PER TABLE LS-2 OF THE LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL

#### RESIDENTIAL LOCAL STREET - SEE BELOW FOR TYPICAL SECTION.

- OPTION 1) 4" TYPE 5 ASPHALT BASE AND 2" TYPE 5 OR 6 ASPHALT SURFACE OVER A 6" MODOT TYPE 5 BASE AND A SUBGRADE MIXTURE OF 6" FLY ASH STABILIZED SUBGRADE IN ACCORDANCE WITH THE CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL.
- OPTION 2) 4" TYPE 5 ASPHALT BASE AND 2" TYPE 5 OR 6 ASPHALT SURFACE OVER 10" MODOT TYPE 5 BASE OVERTOP A BIAXIAL GEOGRID PER THE CITY'S APPROVED PRODUCT LIST.

2 ~ STORM SEWER PIPE SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) AS APPROVED BY CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL.

3 ~ JUNCTION BOXES SHALL BE PER CITY OF LEE'S SUMMIT STANDARD DRAWING NO. STM-3. FIELD INLETS SHALL BE PER CITY OF LEE'S SUMMIT STANDARD DRAWING STM-2. TOEWALLS SHALL BE PER CITY OF LEE'S SUMMIT DRAWING NO. STM-5. JUNCTION BOXES SHALL BE PER CITY OF LEE'S SUMMIT STM-3. ROCK LINING AND RIP RAP SHALL BE PER CITY OF LEE'S SUMMIT.

#### GENERAL NOTES:

1 ~ ALL CONSTRUCTION SHALL CONFORM TO THE CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL AS ADOPTED BY ORDINANCE 5813.

2 ~ ALL REQUIRED EASEMENTS WITHIN THE BOUNDARY OF THIS PROJECT SHALL BE PROVIDED FOR ON THE FINAL PLAT.

3 ~ ANY REQUIRED EASEMENT LOCATED OUTSIDE OF THE BOUNDARY OF THIS PROJECT SHALL BE PROVIDED FOR BY SEPARATE INSTRUMENT PRIOR TO ISSUANCE OF CONSTRUCTION PERMITS.

4 ~ THE CONTRACTOR SHALL CONTACT THE CITY'S DEVELOPMENT SERVICES ENGINEERING INSPECTION TO SCHEDULE A PRE-CONSTRUCTION MEETING WITH A FIELD ENGINEERING INSPECTOR PRIOR TO ANY LAND DISTURBANCE WORK AT (816) 969-1200.

5 ~ THE CONTRACTOR SHALL NOTIFY ENGINEERING SOLUTIONS AT 816.623.9888 OF ANY CONFLICT WITH THE IMPROVEMENTS PROPOSED BY THESE PLANS AND SITE CONDITIONS.

6 ~ THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AND OBTAIN THE APPROPRIATE BLASTING PERMITS FOR A REQUIRED BLASTING. IF BLASTING IS ALLOWED, ALL BLASTING SHALL CONFORM TO STATE REGULATIONS AND LOCAL ORDINANCES.

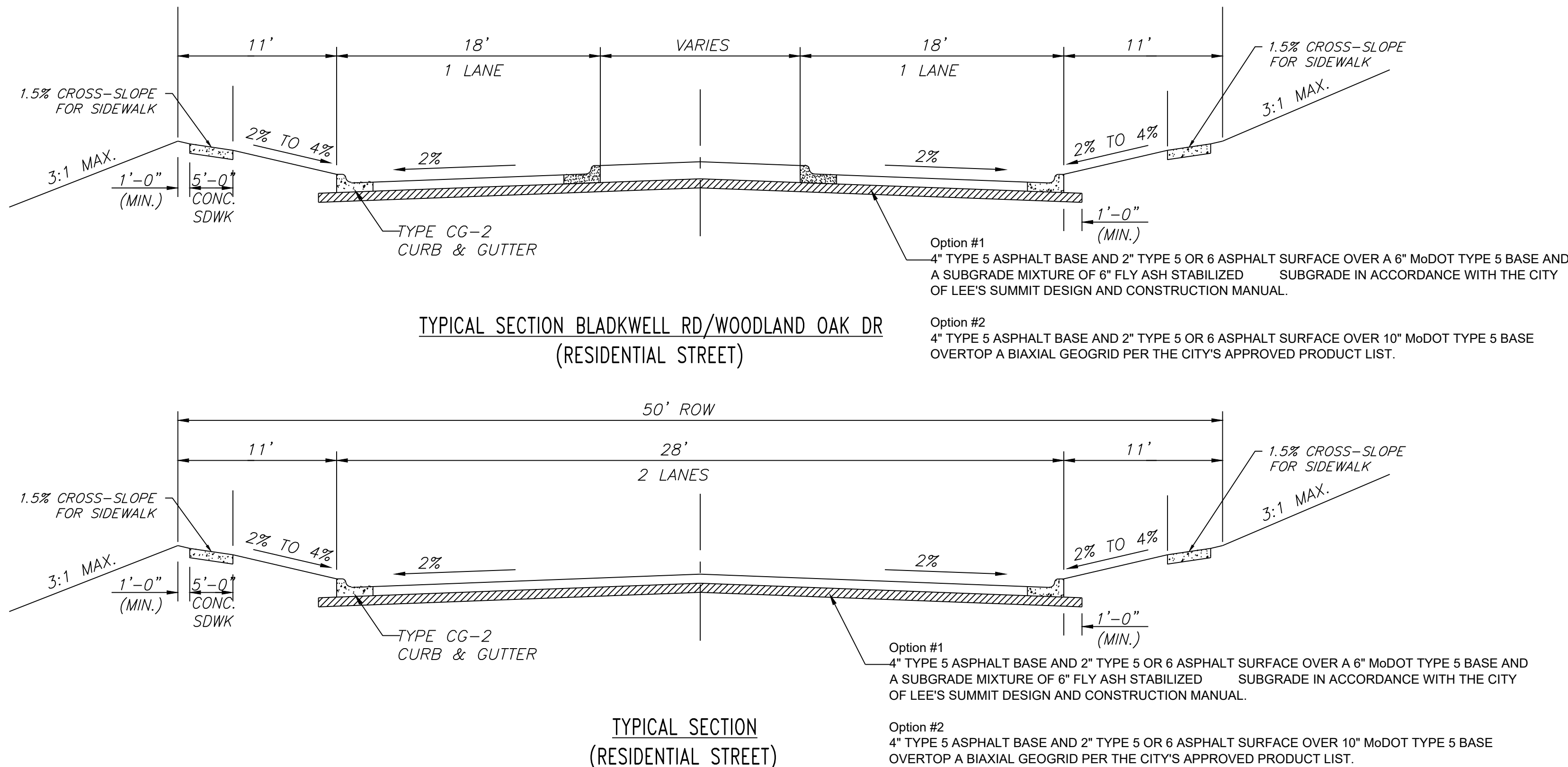
#### UTILITY COMPANIES:

THE FOLLOWING LIST OF UTILITY COMPANIES IS PROVIDED FOR INFORMATION ONLY. WE DO NOT OFFER ANY GUARANTEE OR WARRANTY THAT THIS LIST IS COMPLETE OR ACCURATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES THAT MAY BE AFFECTED BY THE PROPOSED CONSTRUCTION AND VERIFYING THE ACTUAL LOCATION OF EACH UTILITY LINE. THE CONTRACTOR SHALL NOTIFY ENGINEERING SOLUTIONS AT 816.623.9888 OF ANY CONFLICT WITH PROPOSED IMPROVEMENTS.

EVERGY ~ 298-1196  
MISSOURI GAS ENERGY ~ 756-5261  
SOUTHWESTERN BELL TELEPHONE ~ 761-5011  
COMCAST CABLE ~ 795-1100  
WILLIAMS PIPELINE ~ 422-6300  
CITY OF LEE'S SUMMIT PUBLIC WORKS ~ 969-1800  
CITY OF LEE'S SUMMIT PUBLIC WORKS INSPECTIONS ~ 969-1800  
CITY OF LEE'S SUMMIT WATER UTILITIES ~ 969-1900  
MISSOURI ONE CALL (DIG RITE) ~ 1-800-344-7483



### SITE LOCATION MAP



#### Summary of Quantities:

| ITEM AND DESCRIPTION            | UNIT | ESTIMATED QUANTITY |
|---------------------------------|------|--------------------|
| ASPHALT PAVING                  | S.Y. | 7,187.12           |
| CURBING                         | FT   | 4643.65            |
| MoDOT Type 5 Base               | S.Y. | 7,689.66           |
| GEOGRID                         | S.Y. | 7,689.66           |
| CLEARING, GRADING & GRUBBING    | LS   | 1.00               |
| SILT FENCE                      | FT   | 12,550.00          |
| INLET PROTECTION                | UNIT | 81.00              |
| SEEDING / MULCHING/ FERTILIZING | AC   | 19.51              |
| CONST. ENTRANCE                 | UNIT | 1.00               |
| RIP RAP W/ FABRIC               | S.Y. | 142.05             |
| SEDIMENT TRAP ROCK              | C.Y. | 19.00              |
| FAIRCLOTH SKIMMER ASSEMBLY      | UNIT | 1.00               |
| 5' SIDEWALK                     | S.F. | 9,524              |
| STREET SIGNAGE                  | UNIT | 4                  |
| ADA SIDEWALK RAMP               | UNIT | 11                 |
| STORM                           |      |                    |
| 15" HDPE                        | FT   | 1598.78            |
| 18" HDPE                        | FT   | 829.84             |
| 24" HDPE                        | FT   | 307.87             |
| 30" HDPE                        | FT   | 51.00              |
| 15" HDPE END SECTION / TOE WALL | LS   | 3.00               |
| 18" HDPE END SECTION / TOE WALL | LS   | 1.00               |
| 24" HDPE END SECTION / TOE WALL | LS   | 4.00               |
| 30" HDPE END SECTION / TOE WALL | LS   | 1.00               |
| 4' x 4' STORM FIELD INLET       | EA   | 10.00              |
| 5' x 5' JUNCTION BOX            | EA   | 2.00               |
| 5' x 4' STORM CURB INLET        | EA   | 14.00              |
| 5' x 5' CONTROL STRUCTURE       | EA   | 1.00               |
| 5' x 4' CONTROL STRUCTURE       | EA   | 1.00               |

## Record Drawing

Gene Williams

Digitally signed by Gene Williams  
DN: cn=Gene Williams, ou=Development, ou=LS Users,  
o=Engineering Solutions, email=Gene Williams, c=US  
Date: 2024.02.16 09:34:41 -0500

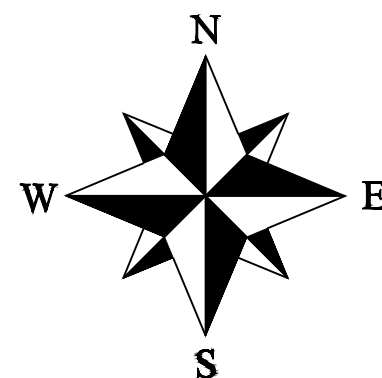
#### INDEX OF SHEETS:

- C.001 ~ STREET & STORM COVER SHEET  
C.050 ~ ESC PHASE 1 - PRE CLEARING PLAN  
C.051 ~ ESC PHASE 2 - INITIAL AREA STABILIZATION PLAN  
C.052 ~ ESC PHASE 3 - FINAL RESTORATION PLAN  
C.053 ~ ESC - STANDARD DETAILS  
C.054 ~ ESC - STANDARD DETAILS  
C.100 ~ SITE PLAN  
C.200 ~ MASTER DRAINAGE PLAN SHEET 1 OF 3 GRADING PLAN - SWPPP  
C.201 ~ MASTER DRAINAGE PLAN SHEET 2 OF 3 SPOT ELEVATIONS  
C.202 ~ MASTER DRAINAGE PLAN SHEET 3 OF 3 DRAINAGE AREA MAP  
C.203 ~ STREET PLAN & PROFILE  
C.204 ~ STREET PLAN & PROFILE  
C.205 ~ SIDEWALK AND INTERSECTION PLAN  
C.206 ~ DETENTION BASIN PLAN  
C.207 ~ BYPASS CHANNEL PLAN  
C.208 ~ STREET SIGNAGE PLAN  
C.300 ~ STORM SEWER GENERAL LAYOUT  
C.301 ~ STORM SEWER PLAN & PROFILE  
C.302 ~ STORM SEWER PLAN & PROFILE  
C.303 ~ STORM SEWER PLAN & PROFILE  
C.304 ~ STORM SEWER PLAN & PROFILE  
C.305 ~ STORM SEWER TABLES - 10 YEAR  
C.306 ~ STORM SEWER TABLES - 100 YEAR  
C.600 ~ CONSTRUCTION DETAILS  
C.601 ~ CONSTRUCTION DETAILS

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CITY OF LEE'S SUMMIT WATER UTILITIES ~ 969-1900  
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- LEGEND:
- B/L - BUILDING SET-BACK
  - C/A - COMMON AREA
  - D/E - DRAINAGE EASEMENT
  - FND. - FOUND
  - L/E - LANDSCAPE EASEMENT
  - L.N.A. - LIMITS OF NO ACCESS
  - R/W - RIGHT OF WAY
  - SAN - SANITARY SEWER LINE
  - S/W - SIDEWALK
  - U/E - UTILITY EASEMENT
  - W - WATER LINE
  - ST - STORM SEWER LINE

#### ENGINEER'S CERTIFICATION:

I HEREBY CERTIFY THAT THIS PROJECT HAS BEEN DESIGNED AND THESE PLANS PREPARED IN ACCORDANCE WITH THE CURRENT DESIGN CRITERIA OF THE CITY OF LEE'S SUMMIT, MISSOURI AND THE STATE OF MISSOURI. I FURTHER CERTIFY THAT THESE PLANS WERE DESIGNED IN ACCORDANCE TO AASHTO STANDARDS.

Street, Stormwater, Master Drainage Plan, and Erosion and Sediment Control

RECORD DRAWING  
The information provided on this drawing conforms to construction records; it is not intended for construction, implementation or recording purposes; and it is solely based on information obtained by my firm.

"100-00 100.10", "4-00% 1.15% slope", or "8-inch HDPE-PVC pipe" are all typical examples of revisions that indicate that design data has been replaced with "as-built" information. All other data is as designed and has not been field verified.

Date: 1/18/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions

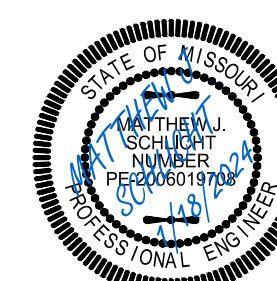


Professional Registration  
Missouri  
Engineering 2005002186-D  
Surveying 2005008319-D  
Kansas  
Engineering E-1685  
Surveying LS-218  
Oklahoma  
Engineering 6254  
Nebraska  
Engineering CA2821

Part of the Southeast 1  
Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project:  
WOODLAND OAKS  
LSMO  
Issue Date:  
January 18, 2024

Street & Storm Cover Sheet  
Construction Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri

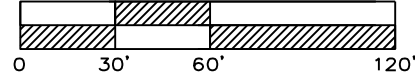
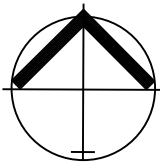


Matthew J. Schlicht  
MO PE 2006019708  
KS PE 19071  
OK PE 25226  
NE PE E-14335

REVISIONS  
1/18/2024 As-Built



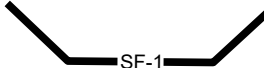
## Record Drawing



PRE CL

SCALE: 1" = 60'

NOTES: The Land Disturbance Plans indicates the Final placement of erosion control devices. The contractor(s) may proceed with construction prior to the final placement of these devices by providing additional devices to control erosion on their items of work. These devices shall be maintained until the final devices are in place.



SILT FENCE PROTECTION  
TO BE MAINTAINED BY CONTRACTOR

## LEGEND

### PHASE 1 SILT FENCE

PHASE 2 SILT FENCE

## INLET PROTECTION

DURING ALL PHASES OF CONSTRUCTION,  
INACTIVE AREA STABILIZATION METHODS AS  
DESCRIBED IN APWA SECTION 5111.3 SHALL BE  
USED TO CONTROL EROSION AND SILTATION.

Perimeter Silt Fence  
Must Be Installed Prior  
Any Land Disturbance Activity  
Per APWA Detail ESC-11. (Type)

Perimeter Silt Fence  
Must Be Installed Prior  
Any Land Disturbance Activity  
Per APWA Detail ESC-11. (Type)

Perimeter Silt Fence  
Must Be Installed Prior to  
Any Land Disturbance Activity  
Per APWA Detail ESC-11. (Type)

Temporary Construction Entrance  
Must Be Installed Prior to  
Any Land Disturbance Activities  
- Per APWA Detail ESC-01.

## RECORD DRAWING

The information provided on this drawing conforms to construction records; it is not intended for construction, implementation or recording purposes; and it is solely based on information obtained by my firm.

"400.00 100.10", "4.00% 1.15% slope", or "8-inch HDPE-PVC pipe" are all typical examples of revisions that indicate that design data has been replaced with "as-built" information. All other data is as designed and has not been field verified.

**Date:** 1/18/2024

Certified by: Matthew J. Schlicht

Title: Engineer  
Firm: Engineering Solutions

## ESC PHASE 1 - Pre Clearing Plan

Construction Plans for:

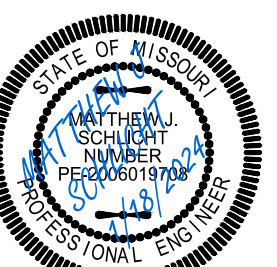
Lee's Summit, Jackson County, Missouri

Project: WOODLAND OAKS

Issue Date:

Part of the Southeast  $\frac{1}{4}$   
 Section 27, Township 48 North, Range 31 West  
 Lee's Summit Jackson County, Missouri

**Professional Registration**  
Missouri  
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*Surveying 20050008319-D*  
Kansas  
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*Surveying LS-218*  
Oklahoma  
*Engineering 6254*  
Nebraska  
*Engineering CA2821*



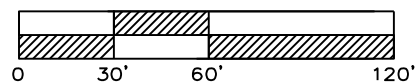
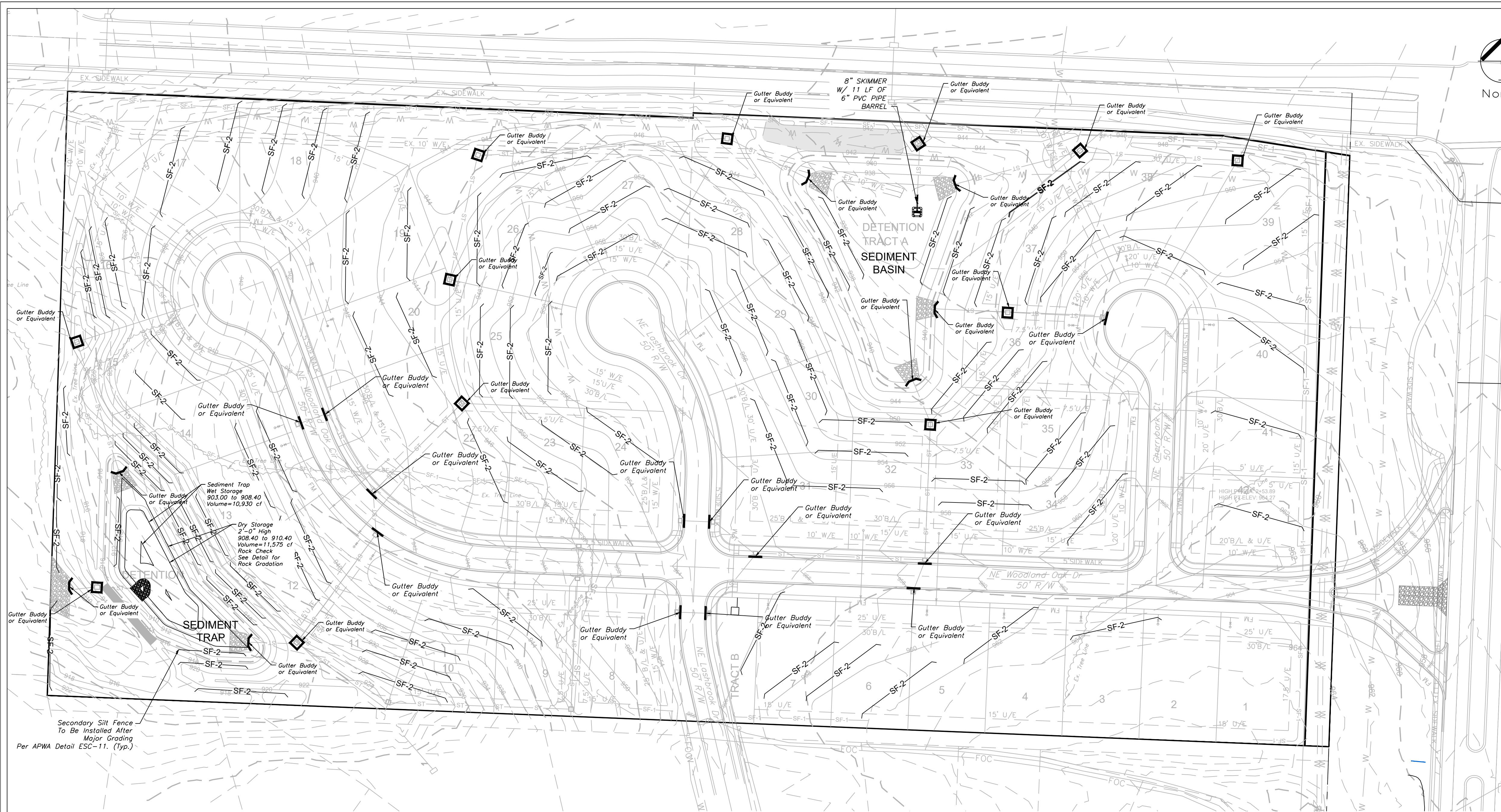
Matthew J. Schlicht  
MO PE 2006019708  
KS PE 19071  
OK PE 25226  
NE PE F-14335

## REVISIONS

1/18/2024 As-Built

C.050





## INACTIVE AREA STABILIZATION PLAN

SCALE: 1" = 60'

NOTES: The Land Disturbance Plans indicates the Final placement of erosion control devices. The contractor(s) may proceed with construction prior to the final placement of these devices by providing additional devices to control erosion on their items of work. These devices shall be maintained until the final devices are in place.

SILT FENCE PROTECTION  
TO BE MAINTAINED BY CONTRACTOR

### LEGEND

PHASE 1 SILT FENCE

SF-1

PHASE 2 SILT FENCE

SF-2

INLET PROTECTION  
GUTTER BUDDY OR EQUIVALENT

SF-1

NOTES: The Land Disturbance Plans indicates the Final placement of erosion control devices. The contractor(s) may proceed with construction prior to the final placement of these devices by providing additional devices to control erosion on their items of work. These devices shall be maintained until the final devices are in place.

DURING ALL PHASES OF CONSTRUCTION,  
INACTIVE AREA STABILIZATION METHODS AS  
DESCRIBED IN APWA SECTION 511.3 SHALL BE  
USED TO CONTROL EROSION AND SILTATION.

Record Drawing

**MAINTENANCE:**  
TO MAINTAIN THE EROSION AND SEDIMENT CONTROLS, THE FOLLOWING PROCEDURES WILL BE PERFORMED:  
**SEDIMENT CAPTURE DEVICES:** SEDIMENT WILL BE REMOVED FROM THE UPSTREAM OR UPSLOPE SIDE OF THE FILTER FABRIC FENCES, WHEN THE DEPTH OF ACCUMULATED SEDIMENT REACHES ABOUT ONE-THIRD THE HEIGHT OF THE STRUCTURE.  
**STORM SEWER INLETS:** ANY SEDIMENT IN THE STORM SEWER INLETS WILL BE REMOVED AND DISPOSED OF PROPERLY.  
**TEMPORARY CONTROLS:** ALL TEMPORARY CONTROLS WILL BE REMOVED AFTER THE DISTURBED AREAS HAVE BEEN STABILIZED.

**INSPECTION PROCEDURES:**  
INSPECTIONS WILL BE DONE BY THE RESPONSIBLE PERSON(S) AT LEAST ONCE EVERY WEEK AND WITHIN 24 HOURS EACH STORM EVENT PRODUCING ANY AMOUNT OF RAINFALL. AREAS THAT HAVE BEEN RESEEDED WILL BE INSPECTED REGULARLY AFTER SEED GERMINATION TO ENSURE COMPLETE COVERAGE OF EXPOSED AREAS. DISTURBED AREAS THAT HAVE NOT BEEN FINALLY STABILIZED SHALL HAVE ALL POLLUTION CONTROL MEASURES INSPECTED FOR PROPER INSTALLATION, OPERATION AND MAINTENANCE. LOCATIONS WHERE STORM WATER LEAVES THE SITE SHALL BE INSPECTED FOR EVIDENCE OF EROSION OR SEDIMENT DEPOSITION. ANY DEFICIENCIES SHALL BE NOTED IN A REPORT OF THE INSPECTION AND CORRECTED WITHIN SEVEN CALENDAR DAYS OF THE INSPECTION. THE PERMITTEE SHALL PROMPTLY NOTIFY THE SITE CONTRACTORS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF POLLUTION CONTROL DEVICES OF DEFICIENCIES.

IF THE EXISTING GROUND COVER IS NATURAL GRASS, DISTURBED AREAS SHALL BE TEMPORARILY SEEDED WITH WHEAT/RYE AT A RATE OF 1.5 POUNDS PER 1000 SQUARE FEET. PERMANENT SEEDING SHALL CONSIST OF 90% IN THREE EQUAL PARTS OF THIN BLADE, TURF-TYPE, TALL FESCUE AND 10% BLUEGRASS SEED AT A RATE OF 10 POUNDS PER 1000 SQUARE FEET. BOTH TEMPORARY AND PERMANENT SEEDED AREAS SHALL BE MULCHED AND WATERED TO MAINTAIN THE PROPER MOISTURE LEVEL OF THE SOIL TO ESTABLISH GRASS. NEW GRASS SHALL BE WATERED AND MAINTAINED UNTIL IT REACHES A HEIGHT OF 3 INCHES. ANY BARE AREAS SHALL BE RESEED.

ALL EROSION CONTROL DEVICES SHALL BE REMOVED BY GENERAL CONTRACTOR AFTER SITE STABILIZATION IS COMPLETE AND APPROVED BY ENGINEER.

THE DEVELOPER WILL DESIGNATE A QUALIFIED PERSON OR PERSONS TO PERFORM THE FOLLOWING INSPECTIONS:  
**STABILIZATION MEASURES:** DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION WILL BE INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM. AFTER A PORTION OF THE SITE IS FINALLY STABILIZED, INSPECTIONS WILL BE CONDUCTED AT LEAST ONCE EVERY MONTH THROUGHOUT THE LIFE OF THE PROJECT. CONTRACTOR CAN CONTACT ENGINEERING SOLUTIONS FOR COPIES OF THE INSPECTION FORM TO BE USED FOR STABILIZATION MEASURES.

**STRUCTURAL CONTROLS:** FILTER FABRIC FENCES AND ALL OTHER EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN WILL BE INSPECTED REGULARLY FOR PROPER POSITIONING, ANCHORING, AND EFFECTIVENESS IN TRAPPING SEDIMENTS. SEDIMENT WILL BE REMOVED FROM THE UPSTREAM OR UPSLOPE SIDE OF THE FILTER FABRIC. CONTRACTOR CAN CONTACT ENGINEERING SOLUTIONS FOR COPIES OF THE INSPECTION FORM TO BE USED FOR STABILIZATION MEASURES.

**DISCHARGE POINTS:** DISCHARGE POINTS OR LOCATIONS WILL BE INSPECTED TO DETERMINE WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT AMOUNTS OF POLLUTANTS FROM ENTERING RECEIVING WATERS.

**CONSTRUCTION ENTRANCE:** LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE WILL BE INSPECTED FOR EVIDENCE OF OFF-SITE SEDIMENT TRACKING.

A LOG OF EACH INSPECTION SHALL BE KEPT. THE INSPECTION REPORT IS TO INCLUDE THE FOLLOWING MINIMUM INFORMATION: INSPECTOR'S NAME, DATE OF INSPECTION, OBSERVATIONS RELATIVE TO THE EFFECTIVENESS OF THE POLLUTION CONTROL DEVICES, ACTIONS TAKEN OR NECESSARY TO CORRECT DEFICIENCIES, AND LISTING OF AREAS WHERE LAND DISTURBANCE OPERATIONS HAVE PERMANENTLY OR TEMPORARILY STOPPED. THE INSPECTION REPORT SHALL BE SIGNED BY THE PERMITTEE OR BY THE PERSON PERFORMING THE INSPECTION IF DULY AUTHORIZED TO DO SO.

**EROSION CONTROL DESCRIPTION:**  
1) SILT FENCE SHALL BE PLACED AT THE PERIMETER OF THE GRADING AND AT INTERMEDIATE AREAS THROUGHOUT THE SITE AS SHOWN ON THE PLAN.  
2) INLET SEDIMENT TRAPS SHALL BE PLACED SURROUNDING ALL STORM INLETS.  
3) INSTALL TEMPORARY CONSTRUCTION ENTRANCE AS SHOWN ON PLAN.  
4) INITIAL SEDIMENT BASINS AND/OR TRAPS AS EARLY AS POSSIBLE DURING PHASE 2 INITIAL AREA STABILIZATION MASS GRADING AS SHOWN ON PLAN. SEDIMENT TRAPS TO BE INCORPORATED INTO PERMANENT DETENTION BASIN.

**EROSION CONTROL PROCEDURE:**  
1) SILT FENCE AND TEMPORARY CONSTRUCTION ENTRANCE SHALL BE INSTALLED AT THE PERIMETER OF THE GRADED AREAS PRIOR TO BEGINNING OF CLEARING OR DEMOLITION OPERATIONS. THE CONTRACTOR SHALL INSTALL SILT FENCE AS SHOWN ON PLANS AS GRADING PROGRESSES.  
2) SEDIMENT BASINS AND/OR TRAPS SHALL BE CLEANED OUT WHEN THE SEDIMENT CAPACITY HAS BEEN REDUCED BY 20% OF ITS ORIGINAL DESIGN VOLUME. REMOVE SEDIMENT BASINS AND/OR TRAPS DURING PHASE 3 INACTIVE AREA STABILIZATION AS THE FINAL STEP IN MASS GRADING ACTIVITIES. IF A SEDIMENTATION BASIN IS EMPLOYED THE SKIMMER SHALL REMAIN IN SERVICE UNTIL ALL AREAS CONTRIBUTING RUNOFF HAVE BEEN STABILIZED WITH THE ESTABLISHMENT OF VEGETATION 90% MINIMUM.

### TEMPORARY CONSTRUCTION ENTRANCE NOTES:

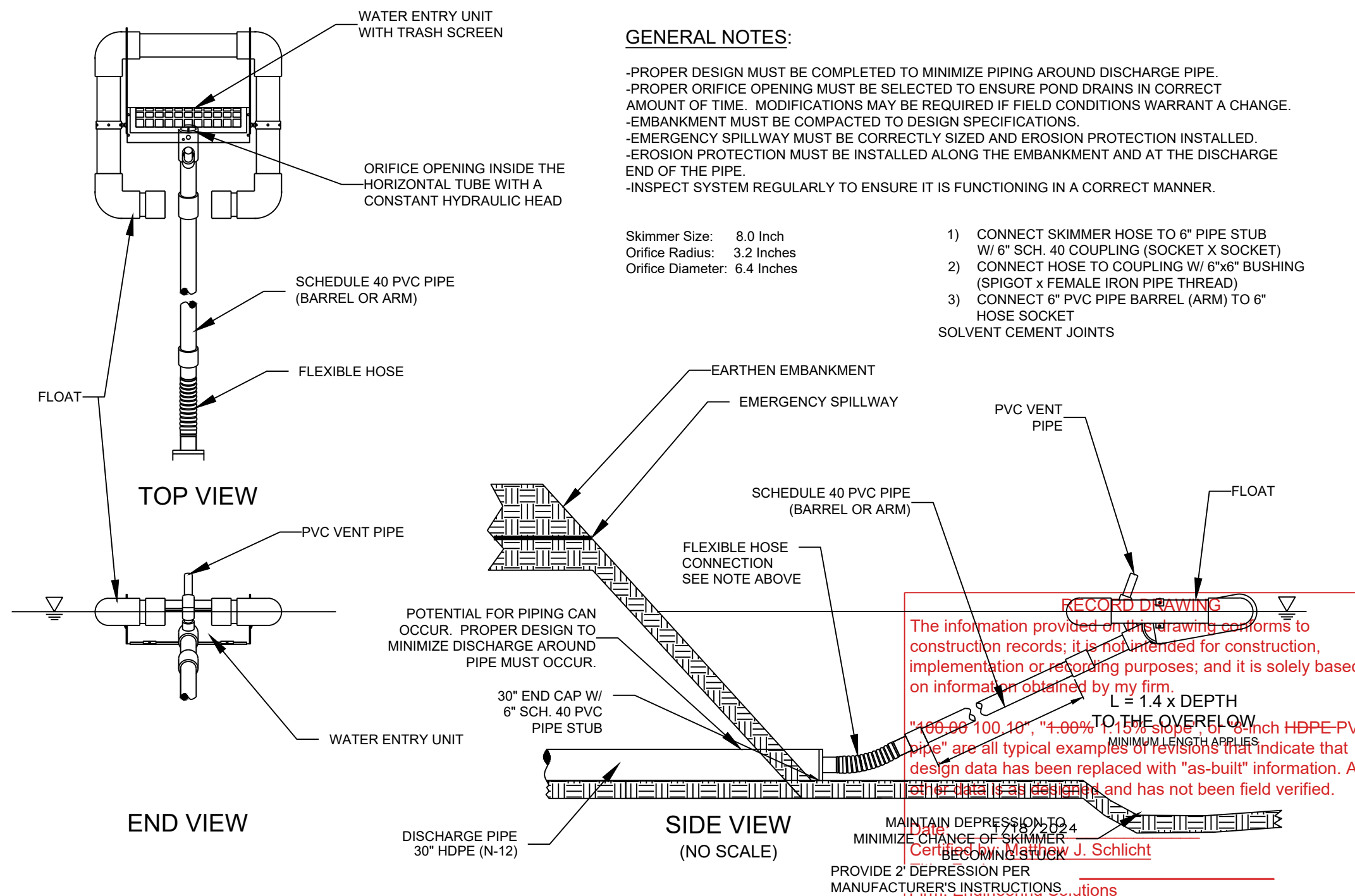
- A) INSTALLATION
- 1) AVOID LOCATING ON STEEP SLOPES OR AT CURVES ON PUBLIC STREETS. IF POSSIBLE, LOCATE WHERE PERMANENT ROADS WILL EVENTUALLY BE CONSTRUCTED.
  - 2) REMOVE ALL VEGETATION AND OTHER UNSUITABLE MATERIAL FROM THE FOUNDATION AREA, GRADE AND CROWN FOR POSITIVE DRAINAGE.
  - 3) IF SLOPE TOWARDS THE PUBLIC ROAD EXCEEDS 2%, CONSTRUCT A 6 TO 8 INCH HIGH RIDGE WITH 3H: 1V SIDE SLOPES ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE EDGE OF THE PUBLIC ROAD TO DIVERT RUNOFF AWAY FROM IT.
  - 4) INSTALL PIPE UNDER THE ENTRANCE IF NEEDED TO MAINTAIN DRAINAGE DITCHES ALONG PUBLIC ROADS.
  - 5) PLACE STONE TO DIMENSIONS AND GRADES AS SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPED FOR DRAINAGE.
  - 6) DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE ENTRANCE TO A SEDIMENT CONTROL DEVICE.
  - 7) IF WET CONDITIONS ARE ANTICIPATED PLACE GEOTEXTILE FABRIC ON THE GRADED FOUNDATION TO IMPROVE STABILITY.

### TEMPORARY CONSTRUCTION ENTRANCE NOTES (CONT'D):

- B) TROUBLESHOOTING
- 1) CONSULT WITH A QUALIFIED DESIGN PROFESSIONAL IF ANY OF THE FOLLOWING OCCUR:
    - INADEQUATE RUNOFF CONTROLS TO THE EXTENT THAT SEDIMENT WASHES ONTO PUBLIC ROADS
    - INSTALL DIVERSIONS OR OTHER RUNOFF CONTROL MEASURES
    - SMALL STONE, THIN PAD, OR ABSENCE OF GEOTEXTILE FABRIC RESULTS IN RUTS AND MUDDY CONDITIONS AS STONE IS PRESSED INTO SOIL
    - INCREASE STONE SIZE OR PAD THICKNESS OR ADD GEOTEXTILE FABRIC
    - PAD TOO SHORT FOR HEAVY CONSTRUCTION TRAFFIC - EXTEND PAD BEYOND THE MINIMUM 50 FOOT LENGTH AS NECESSARY
- C) INSPECTION AND MAINTENANCE
- 1) INSPECT STONE PAD AND SEDIMENT DISPOSAL AREA WEEKLY AND AFTER ANY RAIN EVENT
  - 2) REPAIR PAD AS NEEDED FOR PROPER DRAINAGE AND RUNOFF CONTROL
  - 3) TOP DRESS WITH CLEAN 2 AND 3 INCH STONE AS NEEDED
  - 4) IMMEDIATELY REMOVE MUD OR SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROADWAY. REPAIR ANY BROKEN ROAD PAVEMENT IMMEDIATELY
  - 5) REMOVE ALL TEMPORARY ROAD MATERIALS FROM AREAS WHERE PERMANENT VEGETATION WILL BE ESTABLISHED

### TEMPORARY SEDIMENT TRAP CALCULATIONS: (AREA D1)

1. TRIBUTARY AREA = 6.00 ac
2. REQUIRED WET VOLUME OF TRAP = 67 cy/ac  
= 6.00 X 67 = 402 cy = 10,854 cf
3. REQUIRED DRY VOLUME OF TRAP = 67 cy/ac  
= 6.00 X 67 = 402 cy = 10,854 cf
4. WET VOLUME OF PROPOSED TRAP = 10,930 cf
4. DRY VOLUME OF PROPOSED TRAP = 11,585 cf



**TEMPORARY SEDIMENT BASIN CALCULATIONS:**  
1. TOTAL AREA DRAINING TO BASIN = 11.0 ac  
2. REQUIRED VOLUME OF TRAP = 3,600cft PER acre  
= 11.0 X 3,600 = 39,600 cft  
3. VOLUME OF PROPOSED TRAP = 129,219 cft

### GENERAL NOTES:

- PROPER DESIGN MUST BE COMPLETED TO MINIMIZE PIPING AROUND DISCHARGE PIPE.
- PROPER ORIFICE OPENING MUST BE SELECTED TO ENSURE POND DRAINS IN CORRECT AMOUNT OF TIME. MODIFICATIONS MAY BE REQUIRED IF FIELD CONDITIONS WARRANT A CHANGE.
- EMBANKMENT MUST BE COMPACTED TO DESIGN SPECIFICATIONS.
- EMERGENCY SPILLWAY MUST BE CORRECTLY SIZED AND EROSION PROTECTION INSTALLED.
- EROSION PROTECTION MUST BE INSTALLED ALONG THE EMBANKMENT AND AT THE DISCHARGE END OF THE PIPE.
- INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER.

Skimmer Size: 8.0 Inch  
Orifice Radius: 3.2 Inches  
Orifice Diameter: 6.4 Inches

- 1) CONNECT SKIMMER HOSE TO 6\"/>

RECORD DRAWING  
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Engineering 6254  
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Engineering CA2821

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Lee's Summit, Jackson County, Missouri

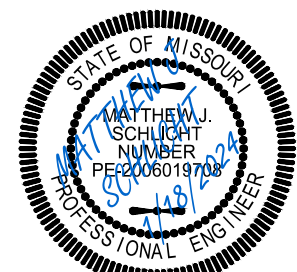
Project: WOODLAND OAKS  
LSMO  
Issue Date: January 18, 2024

ESC PHASE 2 - Inactive Area Stabilization Plan

Construction Plans for:  
WOODLAND OAKS

Lots 1 thru 42

Lee's Summit, Jackson County, Missouri

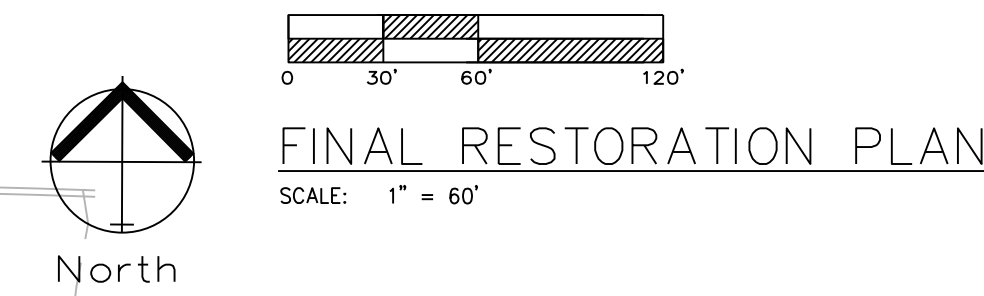
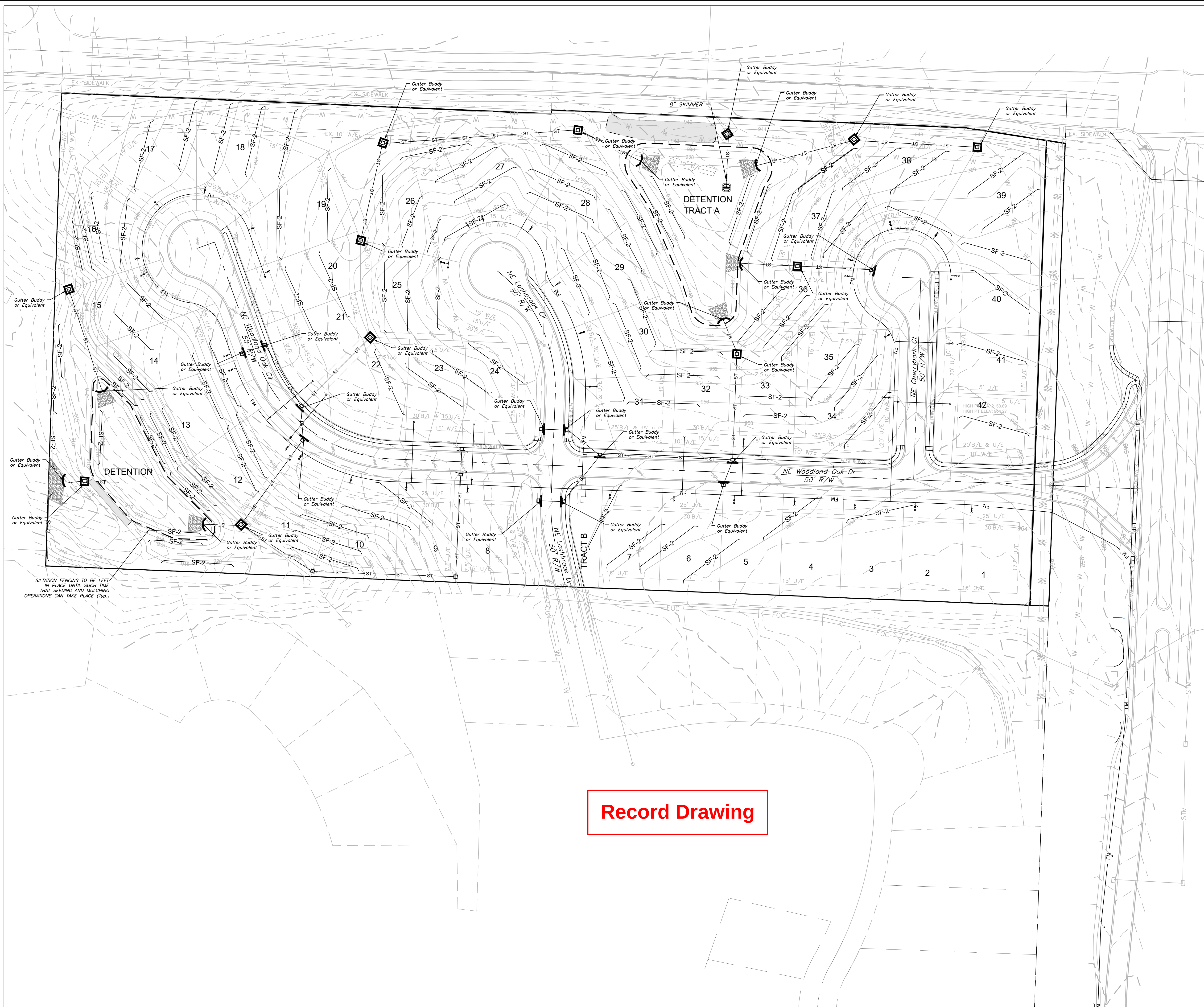


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REVISIONS

1/18/2024 As-Built





- LEGEND**
- PHASE 1 SILT FENCE ——— SF-1 ——— SF-1
- PHASE 2 SILT FENCE ——— SF-2 ——— SF-2
- INLET PROTECTION  
GUTTER BUDDY OR EQUIVALENT ———

**DURING ALL PHASES OF CONSTRUCTION, INACTIVE AREA STABILIZATION METHODS AS DESCRIBED IN APWA SECTION 5111.3 SHALL BE USED TO CONTROL EROSION AND SILTATION.**

NOTES: The Land Disturbance Plans indicates the Final placement of erosion control devices. The contractor(s) may proceed with construction prior to the final placement of these devices by providing additional devices to control erosion on their items of work. These devices shall be maintained until the final devices are in place.

**SEED AND MULCH NOTES:**

All areas disturbed by construction activities shall be seeded and mulched. 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 the 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 seeds shall not exceed one percent by weight of mix.

**Seed and Fertilizer Rate:**

Mix I - Rye Grass / Blue Grass ..... 100 lbs. per Acre  
Mix II - Tall Fescue / Blue Grass ..... 195 lbs. per Acre  
Lime ..... 2000 lbs per Acre (50 lbs. per 1000 sq. ft.)  
Fertilizer ..... 800 to 1200 lbs per Acre (25 lbs per 1000 sq. ft.)

During the dates December 15th through May 31 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 specified quantity  
Fertilizer - 75% of the specified quantity  
Seed - 50% of the specified quantity  
Mulch - 100% of the specified quantity

Mulch shall be Vegetative type, cereal straw from 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. Mulch shall be applied at the rate of 2 tons per acre, (70 to 90 lbs per 1000 sq. ft.). 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

**ONCE SITE IS 90% VEGETATED ALL ESC DEVICES SHALL BE REMOVED AND ANY DISTURBED AREAS SHALL BE RESTORED**

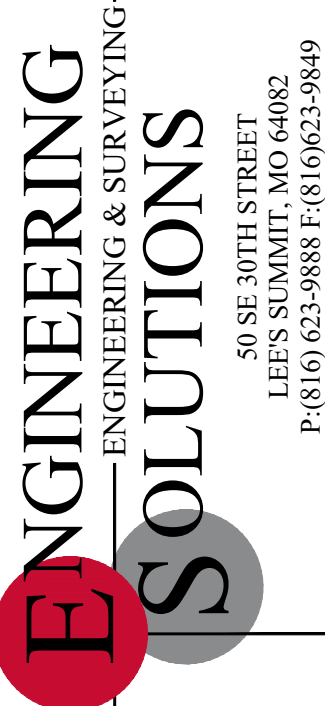
**Record Drawing**

**RECORD DRAWING**

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Date: 1/18/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions

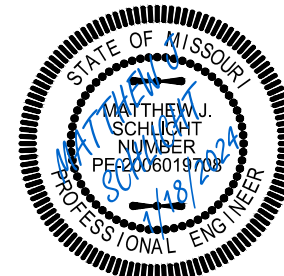


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Missouri  
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Surveying LS-218  
Oklahoma  
Engineering 6254  
Nebraska  
Engineering CA2821

Part of the Southeast 1  
Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project:  
WOODLAND OAKS  
LSMO  
Issue Date:  
January 18, 2024

ESC PHASE 3 - Final Restoration Plan  
Construction Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri



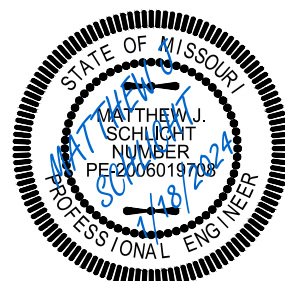
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MO PE 2006019708  
KS PE 19071  
OK PE 25226  
NE PE E-14335

REVISIONS  
1/18/2024 As-Built





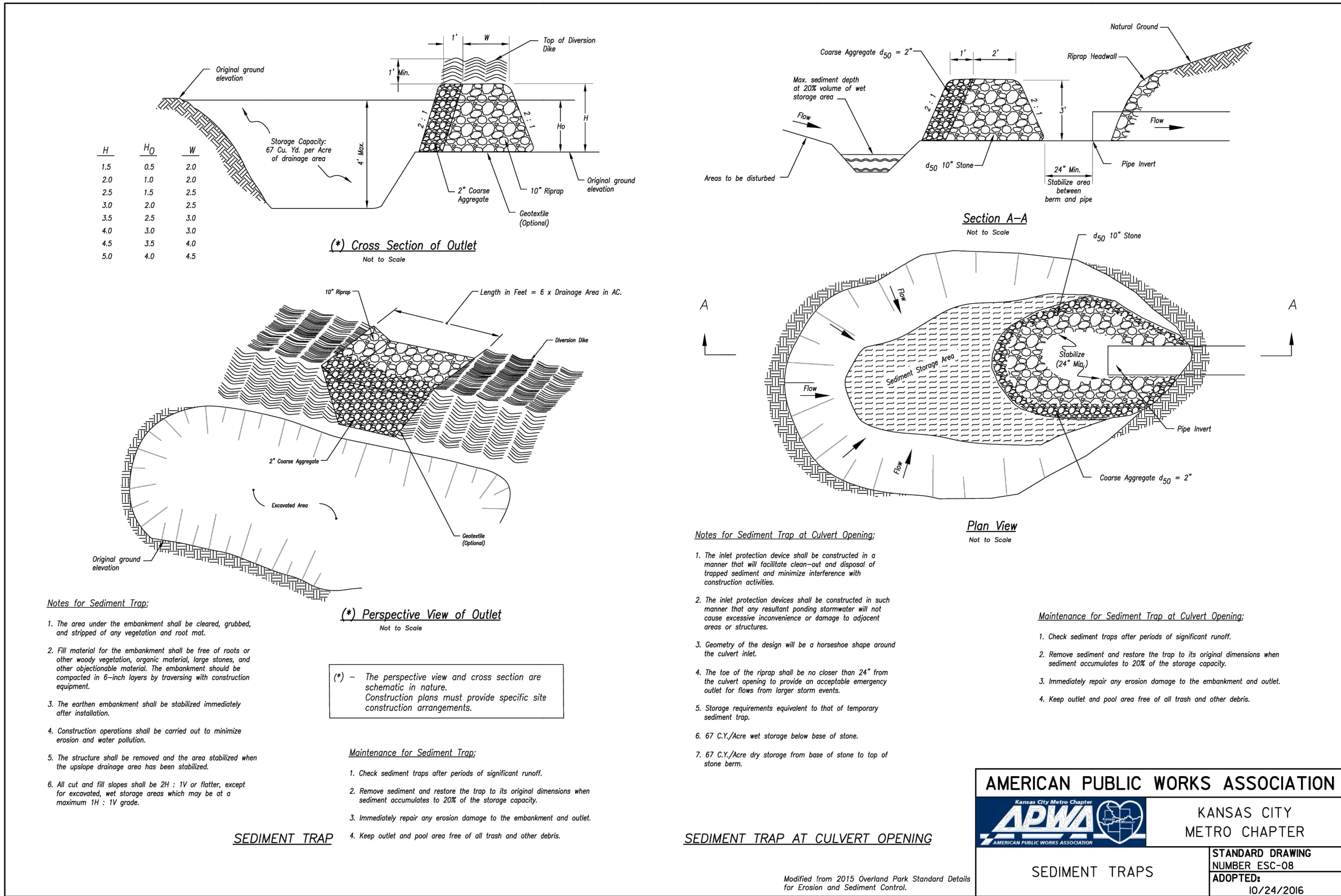




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KS PE 19071  
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REVISIONS

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RECORD DRAWING  
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Date: 1/18/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions





**RECORD DRAWING**

The information provided on this drawing conforms to construction record drawing (it is not intended for construction, implementation or recording purposes); and it is solely based on information obtained by my firm.

"100-00 100.1%, "4-00% 1.15% slope", or "8-inch HDPE-PVC pipe" are all typical examples of revisions that indicate that design data has been replaced with "as-built" information. All other data is as designed and has not been field verified.

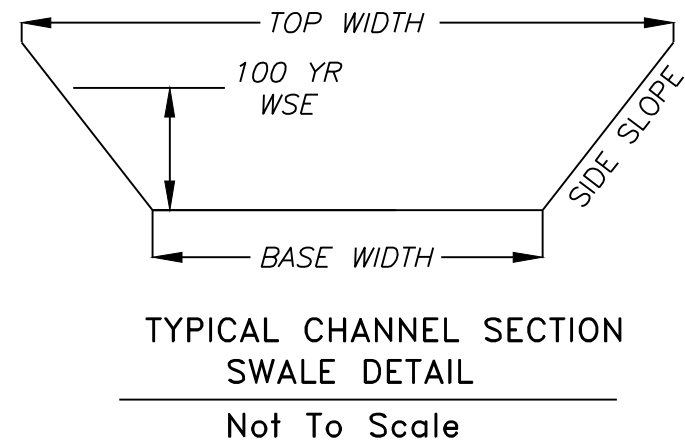
Date: 1/18/2024

Certified by: Matthew J. Schlicht

Title: Engineer

Firm: Engineering Solutions

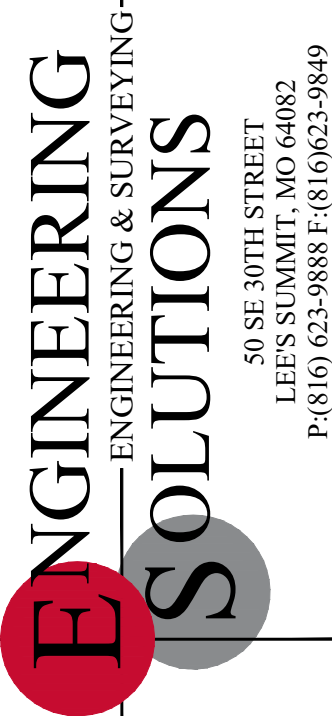
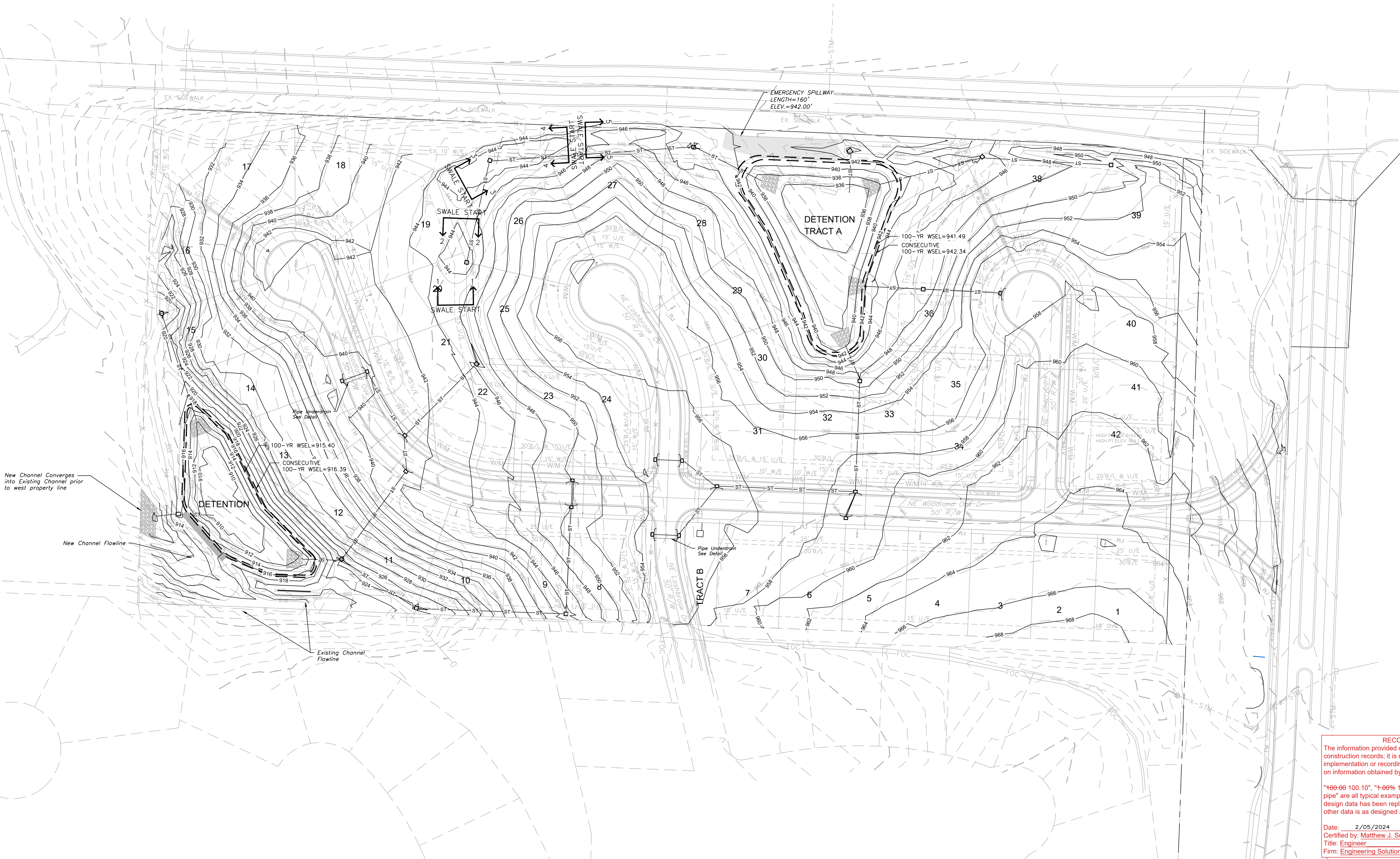
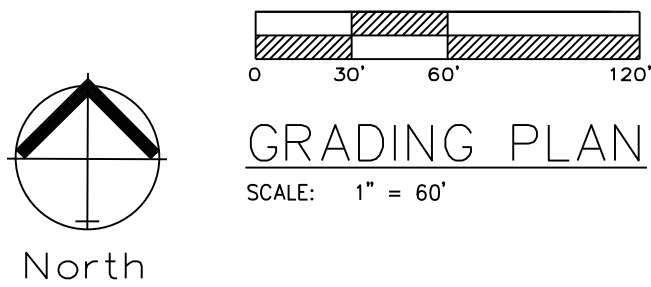




NOTE: Swale sections extend the entire length between upstream and downstream structures with the exception of a transition at each structure.

| 100 YEAR OVERFLOW SWALE SECTIONS |                         |               |                 |                  |                 |                |                          |                       |                       |  |
|----------------------------------|-------------------------|---------------|-----------------|------------------|-----------------|----------------|--------------------------|-----------------------|-----------------------|--|
| Section                          | 100 Yr. Runoff (c.f.s.) | Bed Slope (%) | Base Width (ft) | Side Slope (1:V) | 100 Yr WSE (ft) | Sectional Area | Velocity 100Yr. (f.p.s.) | Hydraulic Radius (ft) | Shear Stress (p.s.f.) |  |
| 1-1                              | 1.42                    | 2.32          | 5               | 6                | 0.14            | 0.82           | 1.73                     | 0.12                  | 0.18                  |  |
| 2-2                              | 1.42                    | 2.19          | 5               | 6                | 0.14            | 0.82           | 1.73                     | 0.12                  | 0.17                  |  |
| 3-3                              | 0.96                    | 2.00          | 5               | 6                | 0.12            | 0.69           | 1.39                     | 0.11                  | 0.13                  |  |
| 4-4                              | 2.87                    | 2.00          | 5               | 6                | 0.22            | 1.39           | 2.06                     | 0.18                  | 0.23                  |  |
| 5-5                              | 1.25                    | 2.00          | 5               | 6                | 0.14            | 0.82           | 1.52                     | 0.12                  | 0.15                  |  |

NOTE: Swale should be lined with "Straw with Net" turf reinforcement (Curlex Blanket or Eqv.). Per Table 5607-1 in APWA Manual

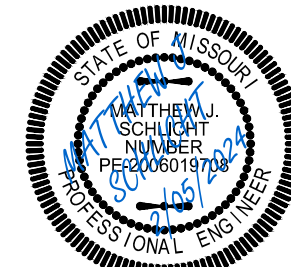


Professional Registration  
Missouri  
Engineering 2005002186-D  
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Kansas  
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Part of the Southeast 1/4  
Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project:  
WOODLAND OAKS  
LSMO  
Issue Date:  
January 18, 2024

MASTER DRAINAGE PLAN SHEET 1 OF 3  
GRADING PLAN - SWPPP  
Construction Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri



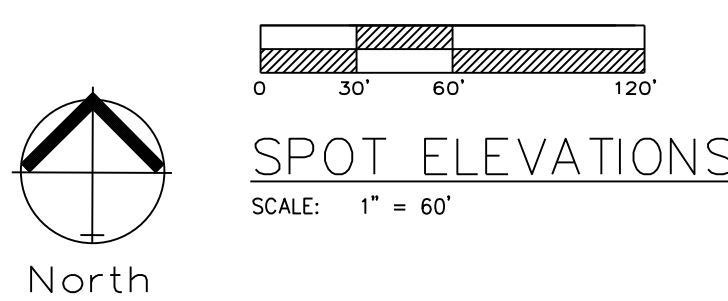
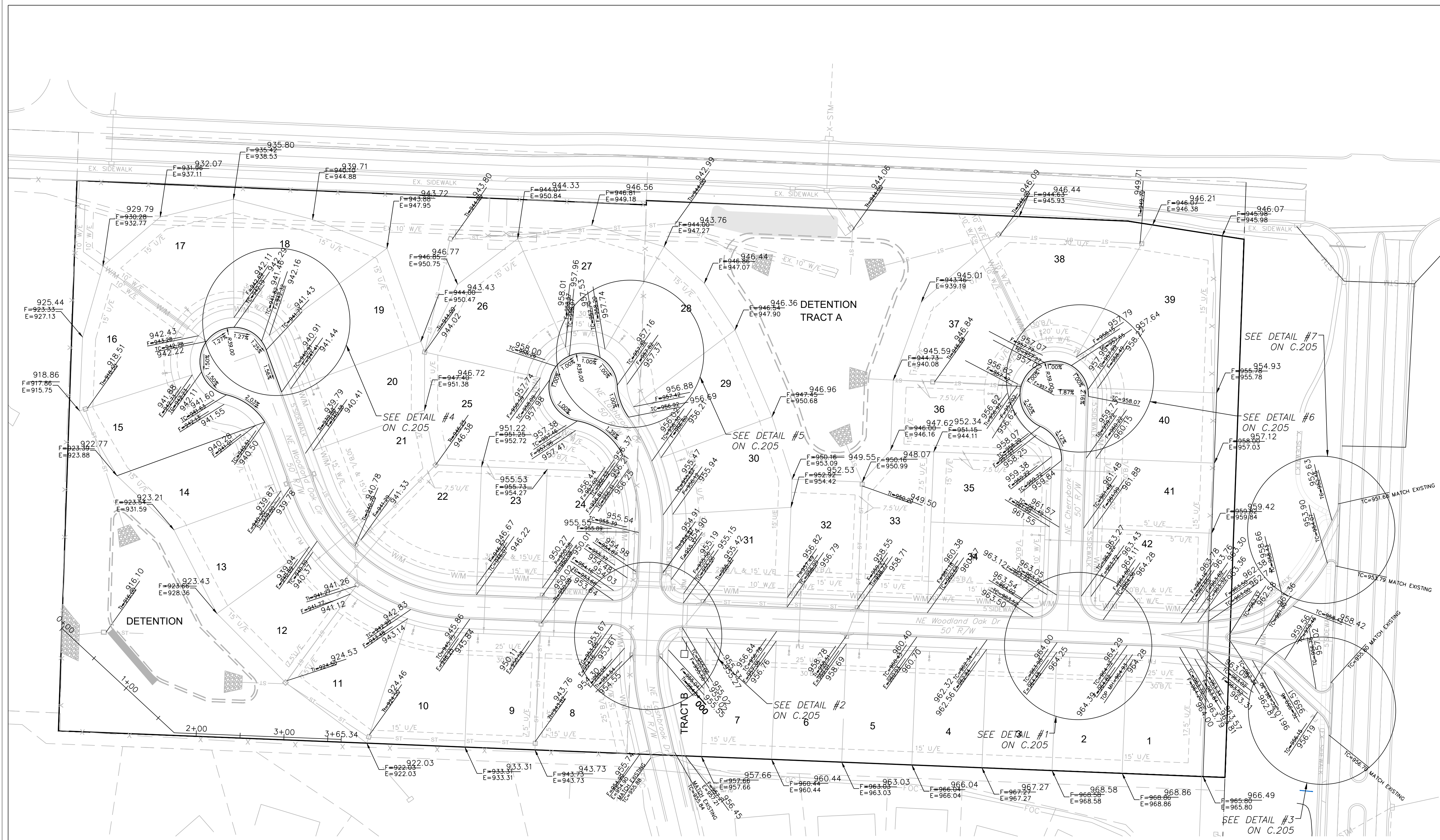
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REVISIONS  
1/18/2024 As-Built  
2/05/2024 As-Built

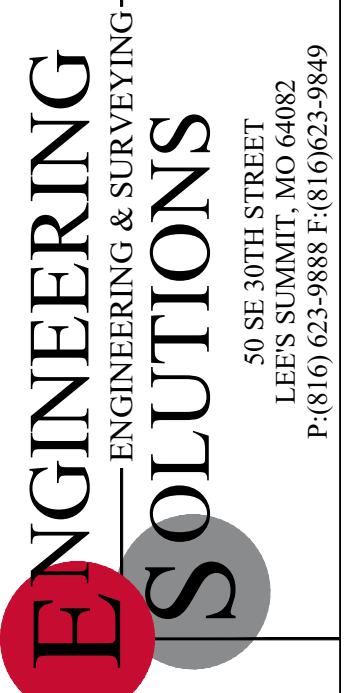
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Date: 2/05/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions





| Lot Number | Basement Type | MBOE   |
|------------|---------------|--------|
| 1          | Standard      |        |
| 2          | Standard      |        |
| 3          | Standard      |        |
| 4          | Standard      |        |
| 5          | Standard      |        |
| 6          | Standard      |        |
| 7          | Standard      |        |
| 8          | Walkout       | 945.58 |
| 9          | Walkout       | 945.58 |
| 10         | Walkout       | 925.86 |
| 11         | Walkout       | 925.65 |
| 12         | Walkout       | 925.65 |
| 13         | Walkout       | 917.4  |
| 14         | Walkout       | 917.4  |
| 15         | Walkout       | 919.77 |
| 16         | Daylight      | 919.77 |
| 17         | Standard      |        |
| 18         | Standard      |        |
| 19         | Standard      | 945.15 |
| 20         | Standard      | 945.14 |
| 21         | Standard      | 947.42 |
| 22         | Standard      | 947.42 |
| 23         | Standard      |        |
| 24         | Standard      |        |
| 25         | Walkout       | 945.14 |
| 26         | Walkout       | 945.15 |
| 27         | Walkout       | 945.12 |
| 28         | Walkout       | 943.49 |
| 29         | Walkout       | 943.49 |
| 30         | Daylight      | 943.49 |
| 31         | Standard      |        |
| 32         | Walkout       | 943.49 |
| 33         | Walkout       | 943.49 |
| 34         | Daylight      |        |
| 35         | Daylight      |        |
| 36         | Walkout       | 943.49 |
| 37         | Walkout       | 943.49 |
| 38         | Daylight      | 947.17 |
| 39         | Daylight      | 950.93 |
| 40         | Daylight      |        |
| 41         | Daylight      |        |
| 42         | Standard      |        |



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Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project:  
WOODLAND OAKS  
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Issue Date:  
January 18, 2024

MASTER DRAINAGE PLAN SHEET 2 OF 3  
SPOT ELEVATIONS  
Construction Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri



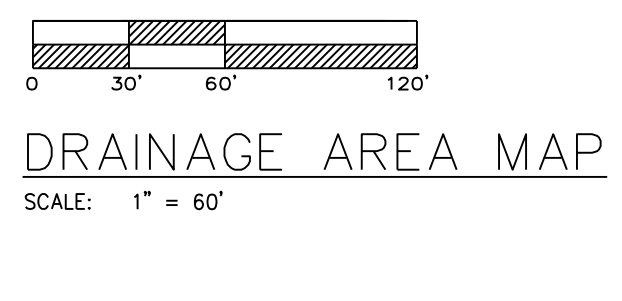
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REVISIONS  
1/18/2024 As-Built

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Title: Engineer  
Firm: Engineering Solutions





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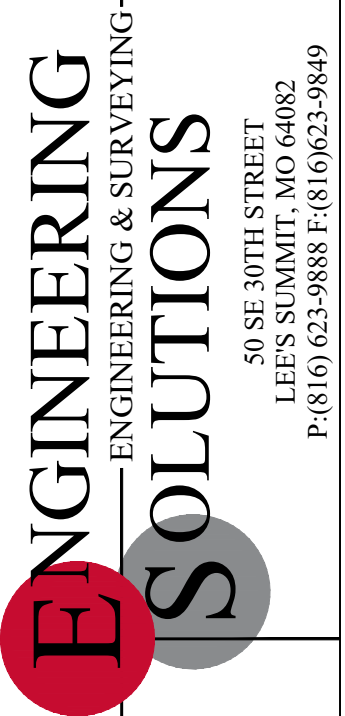
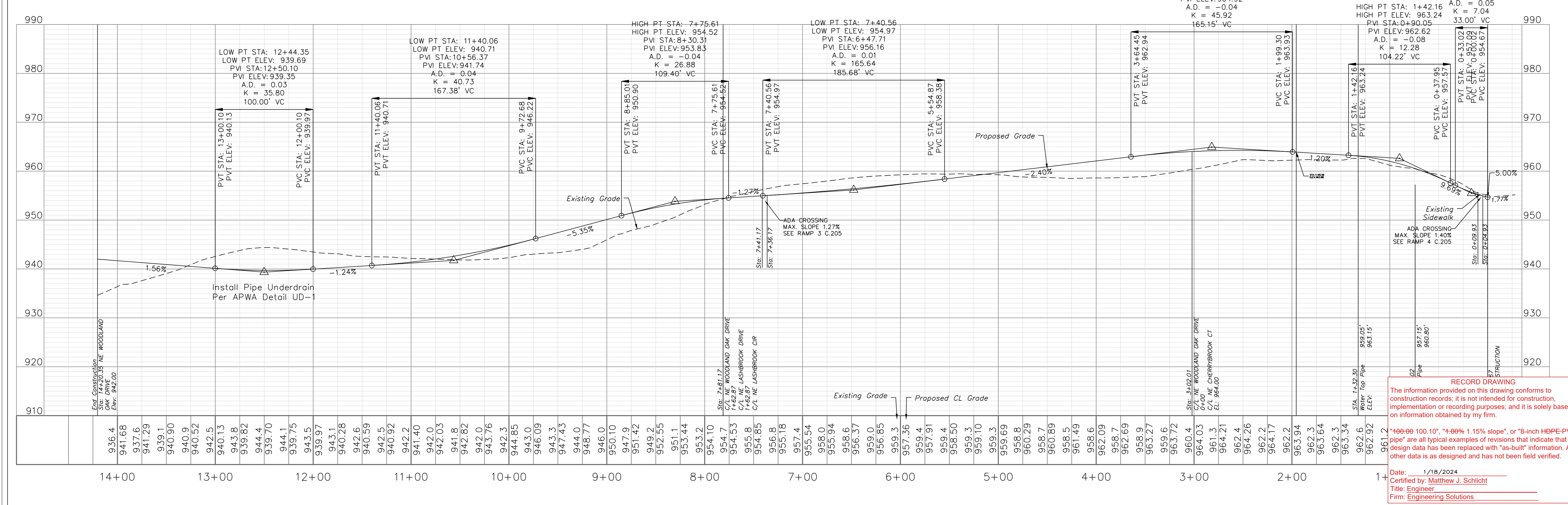
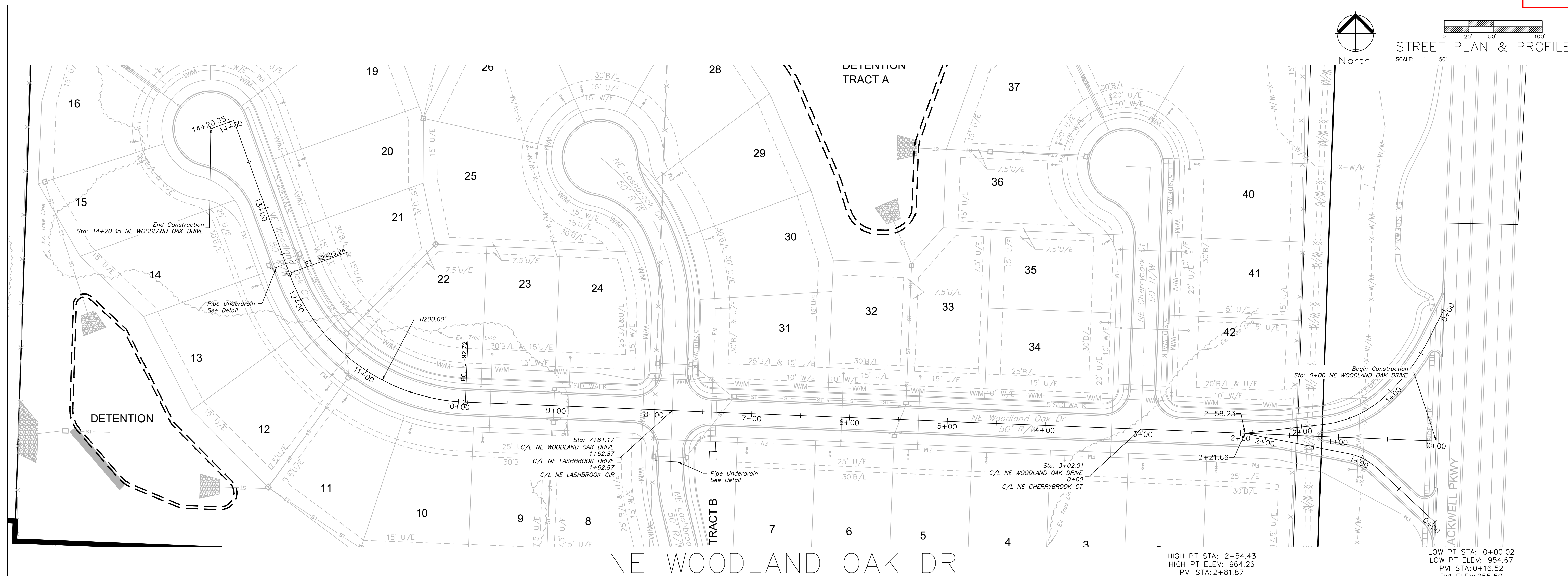
Date: 1/18/2024

Certified by: Matthew J. Schlicht

Title: Engineer

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Engineering 5254  
Nebraska  
Engineering CA2821

Part of the Southeast 1/4  
Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project: WOODLAND OAKS  
LSMO  
Issue Date: January 18, 2024

Street Plan and Profile  
Construction Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri

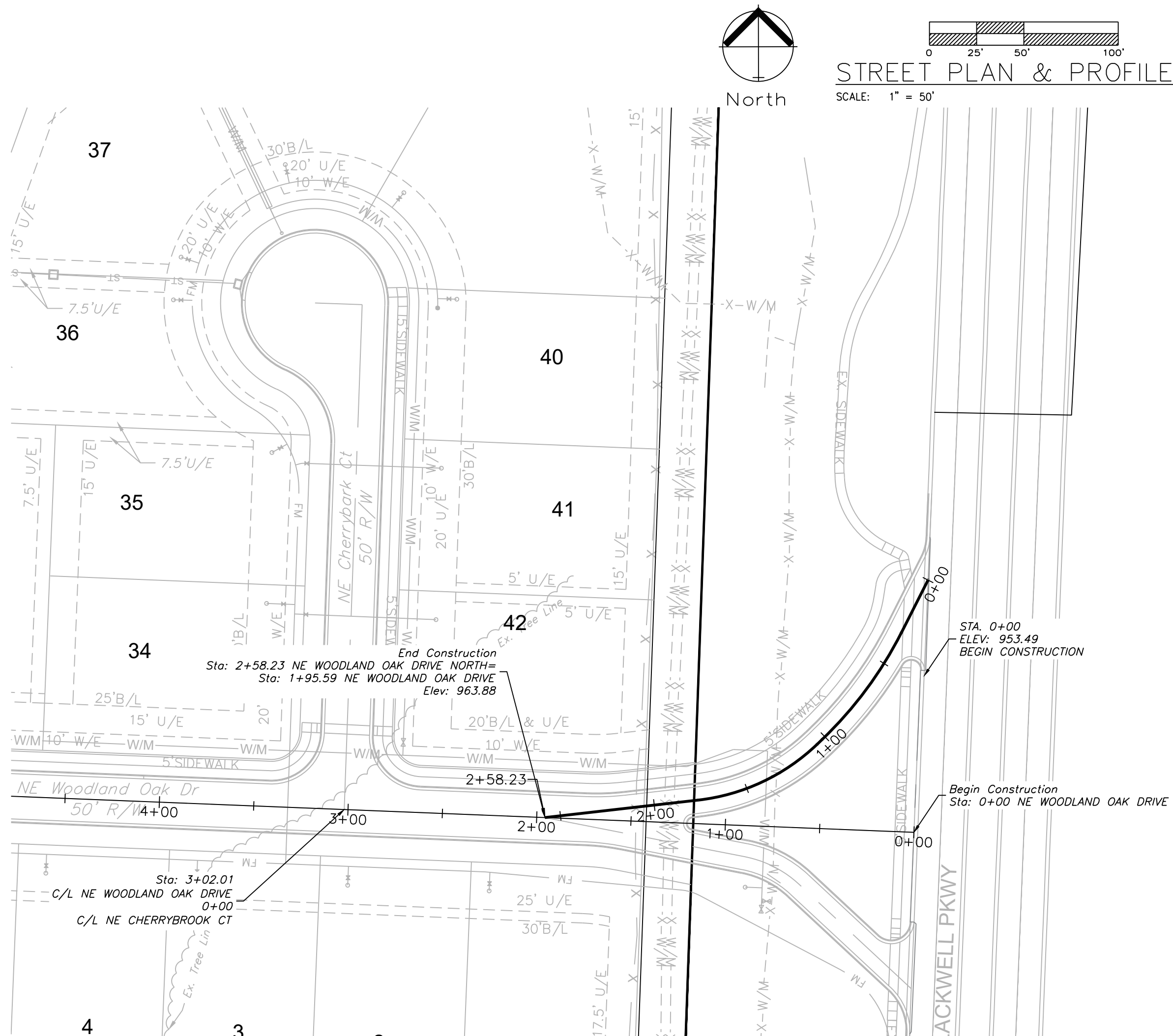


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MO PE 2006019708  
KS PE 19071  
OK PE 25226  
NE PE E-14335

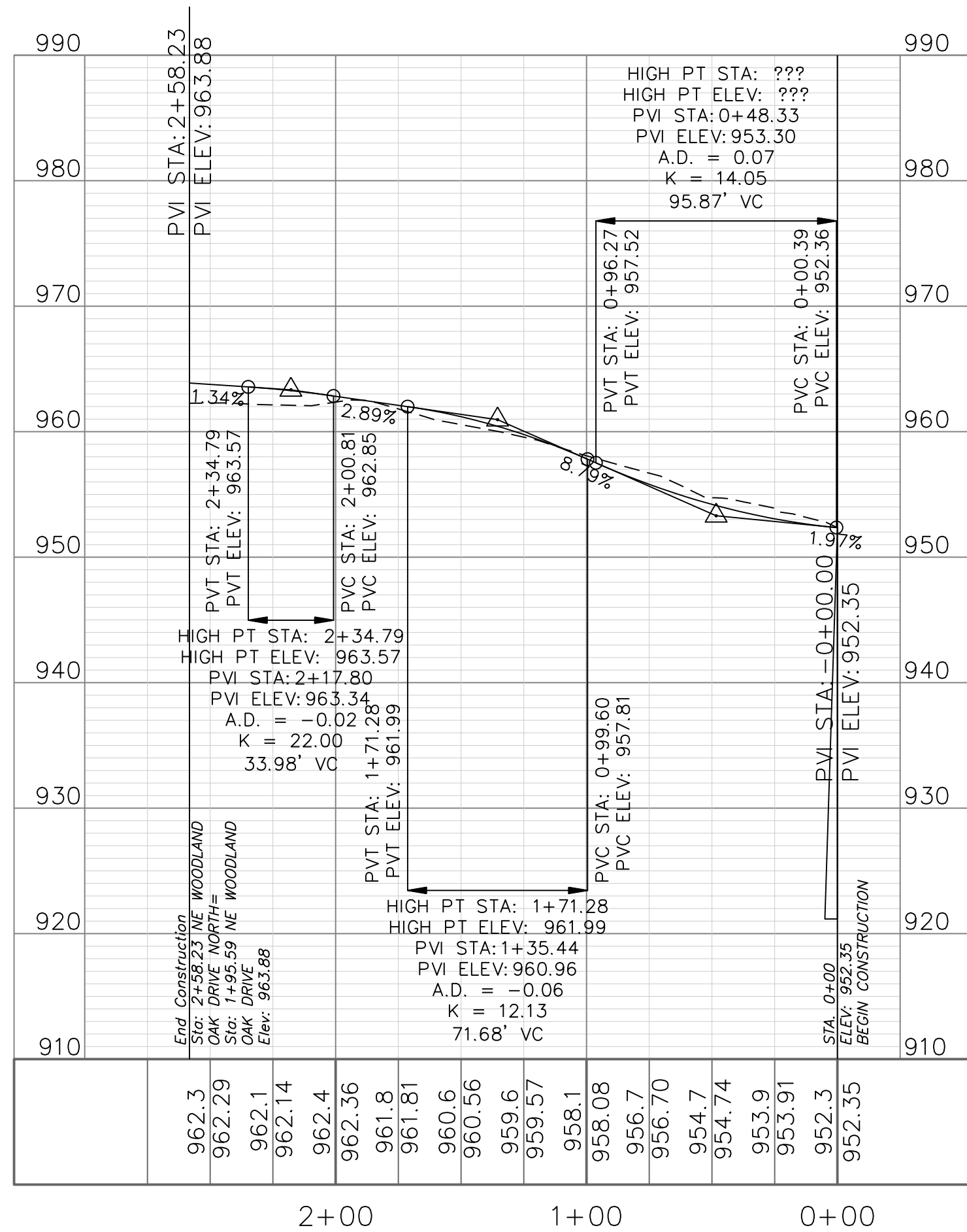
REVISIONS

1/18/2024 As-Built

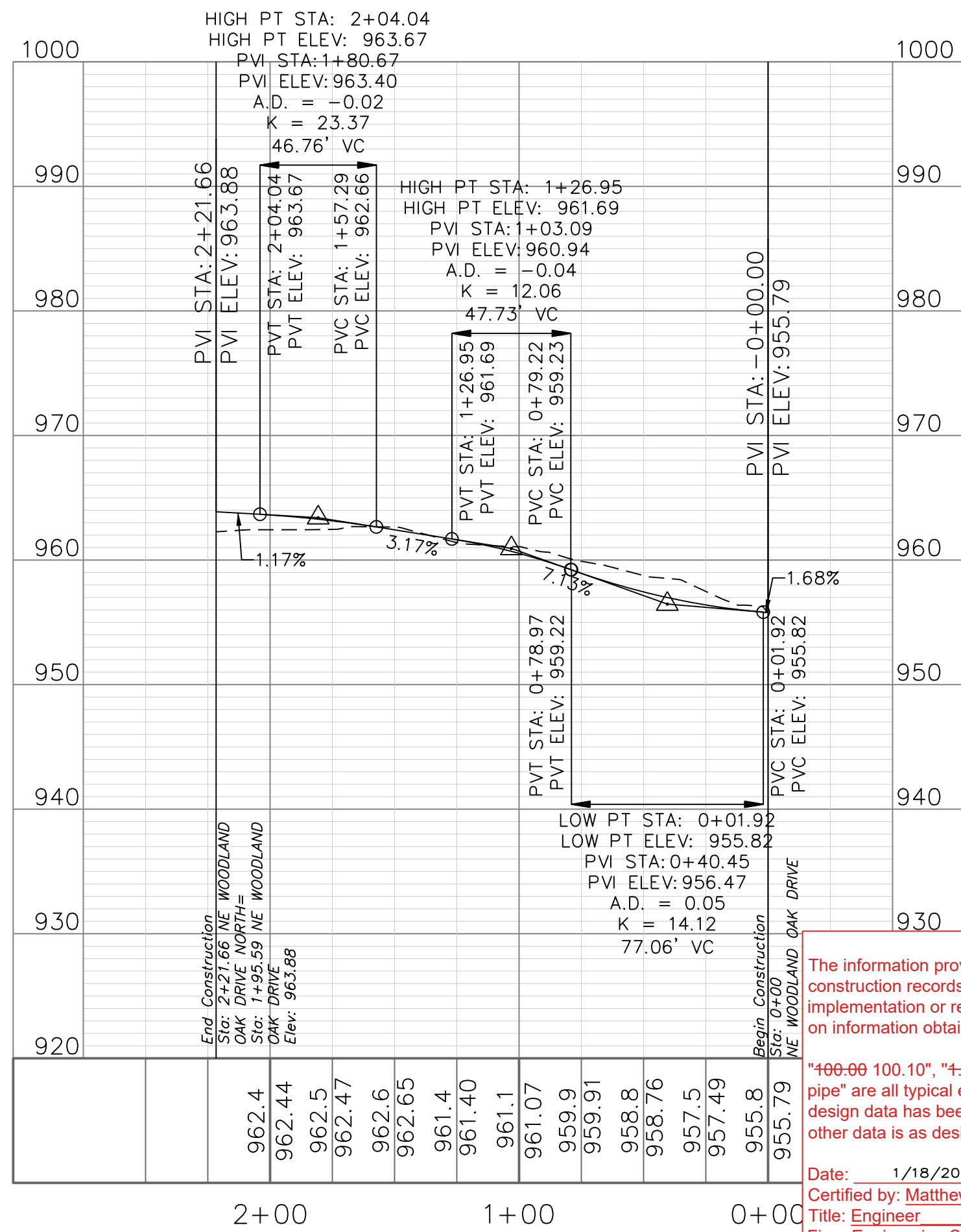




NE WOODLAND OAK DR NORTH



NE WOODLAND OAK DR SOUTH



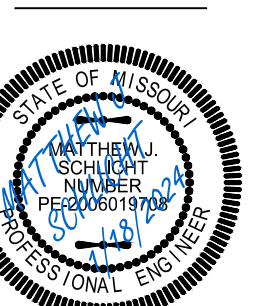
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Missouri  
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Part of the Southeast 1  
Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project:  
WOODLAND OAKS  
LSMO  
Issue Date:  
January 18, 2024

Street Plan and Profile

Construction Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri



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1/18/2024 As-Built

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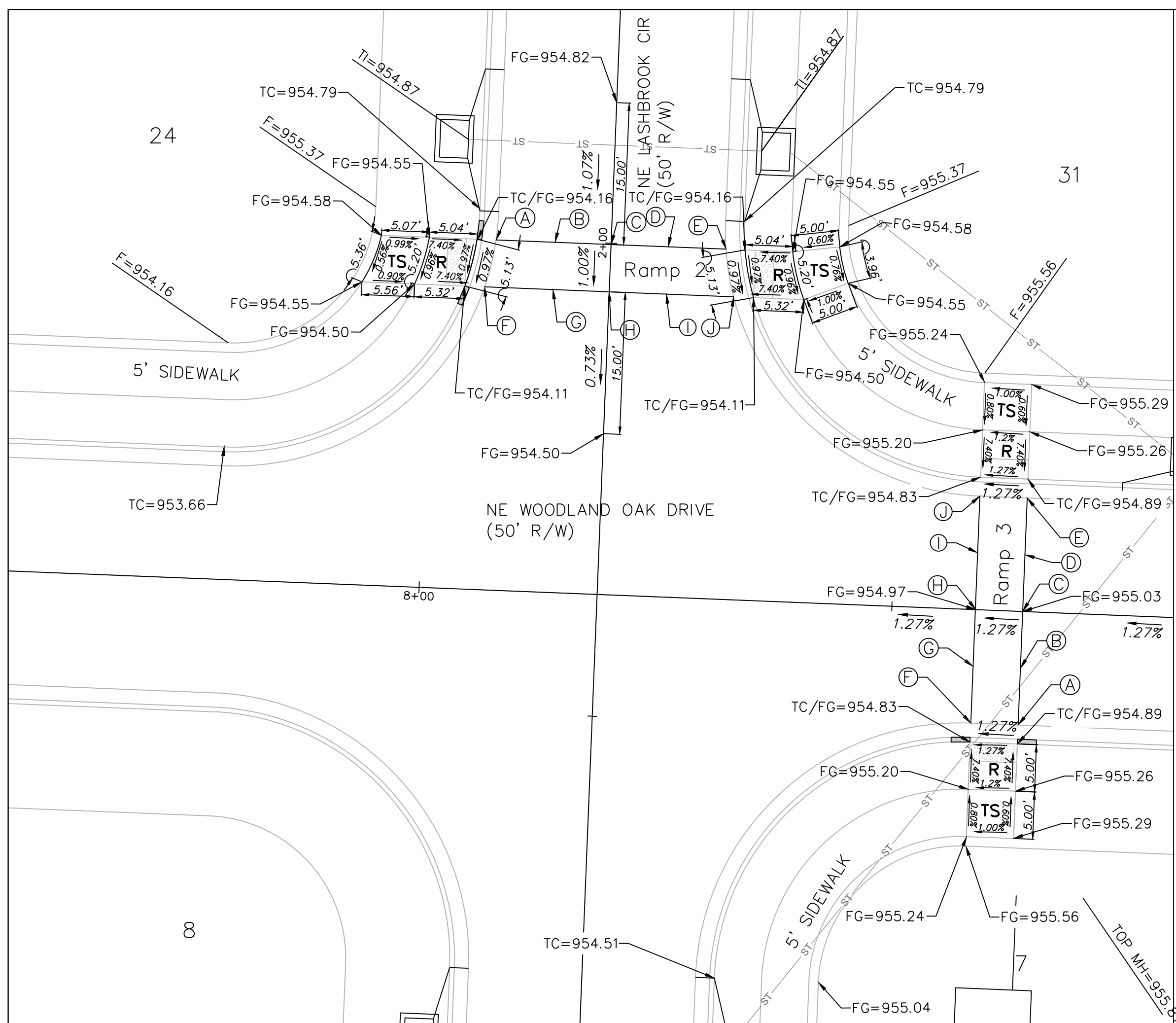
Date: 1/18/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions

C. 203A

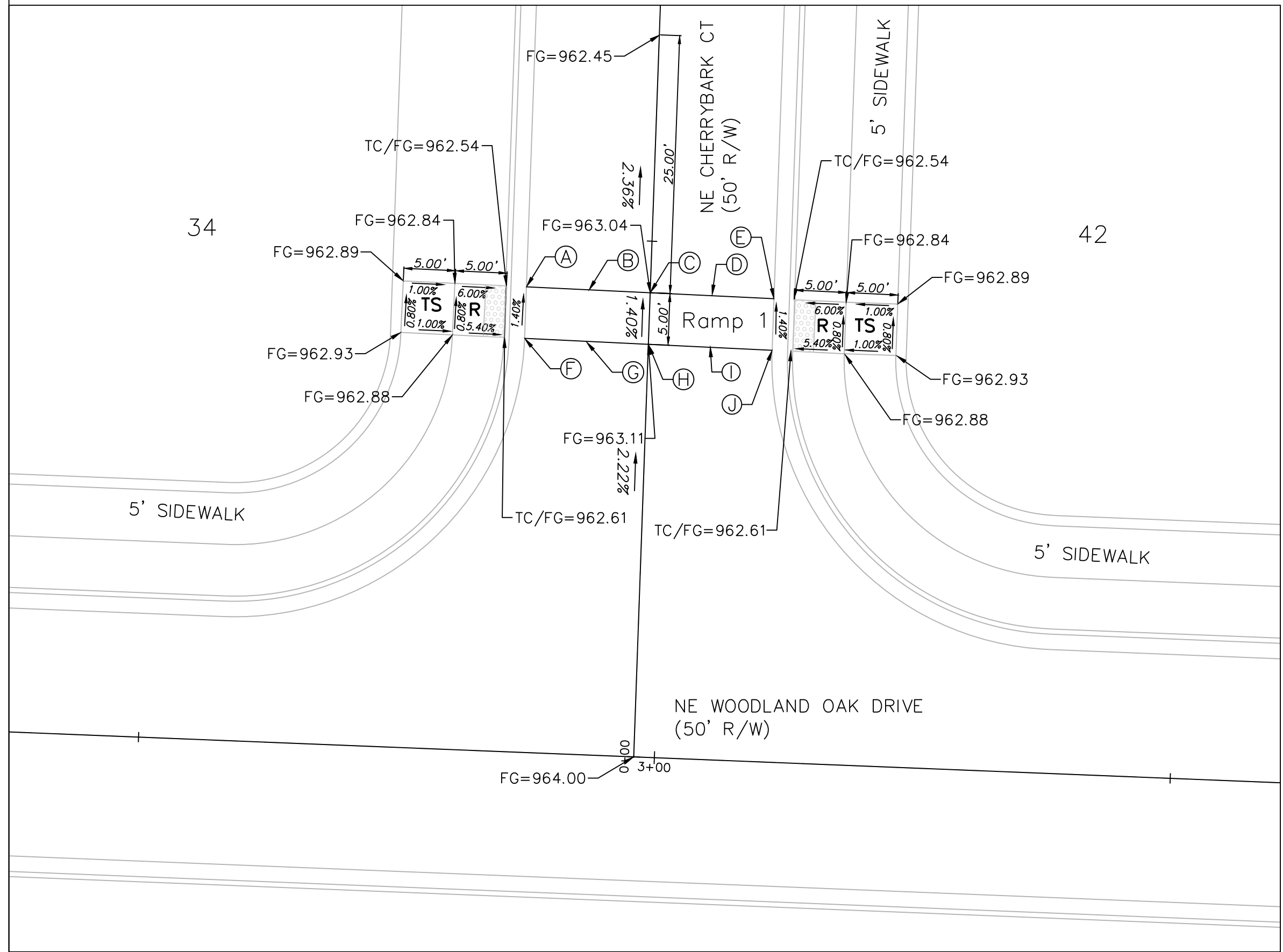




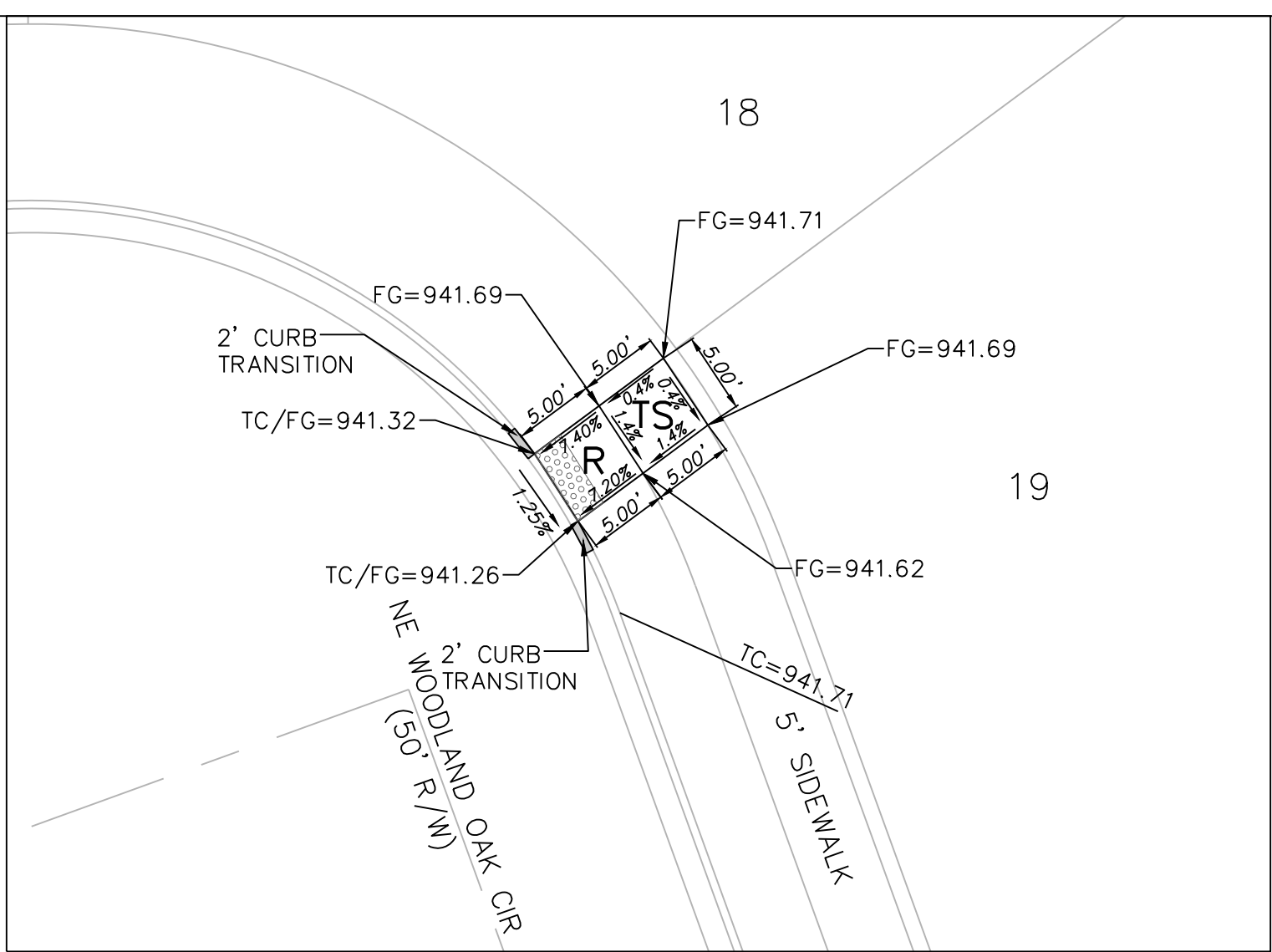




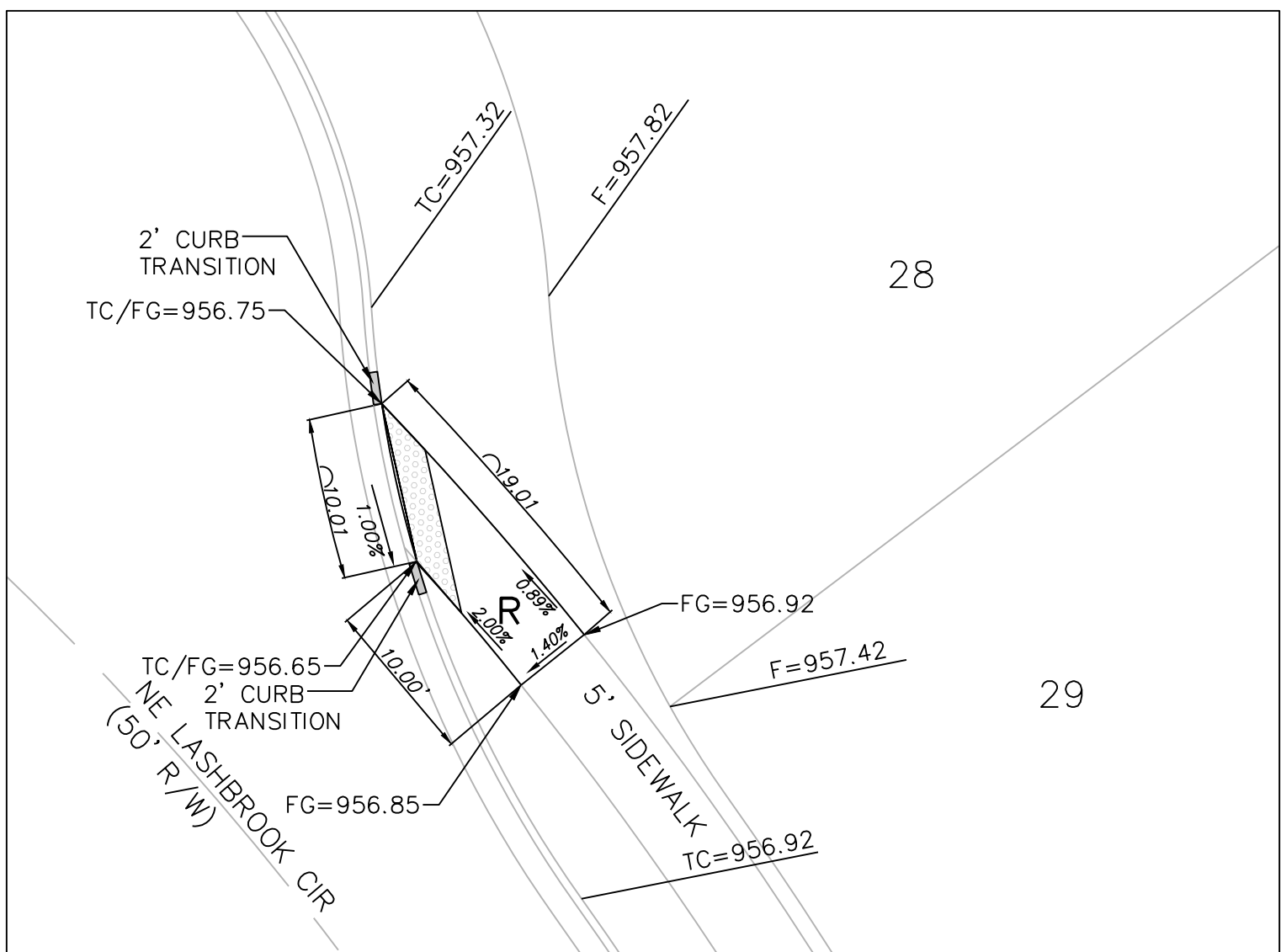
DETAIL 2



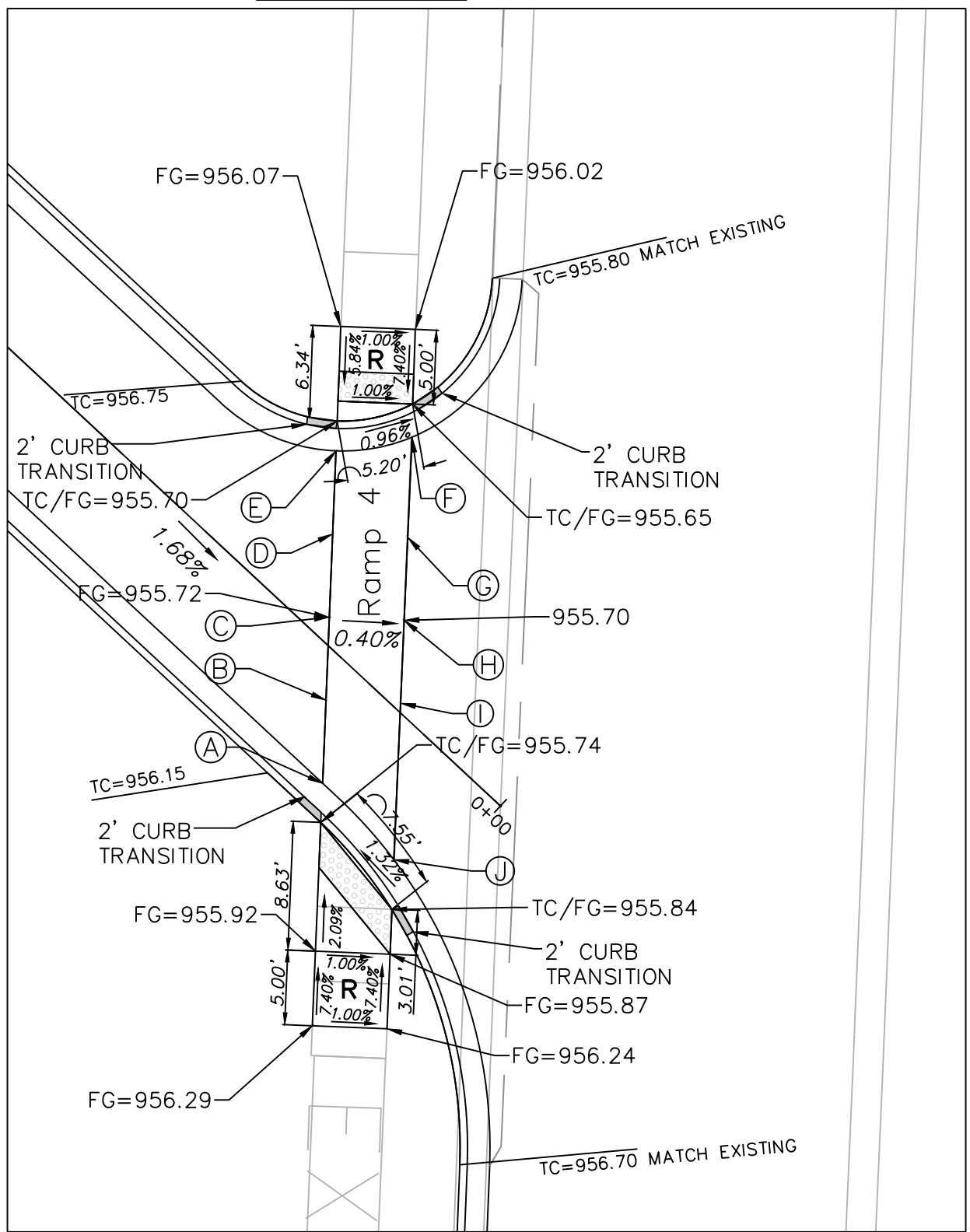
DETAIL 1



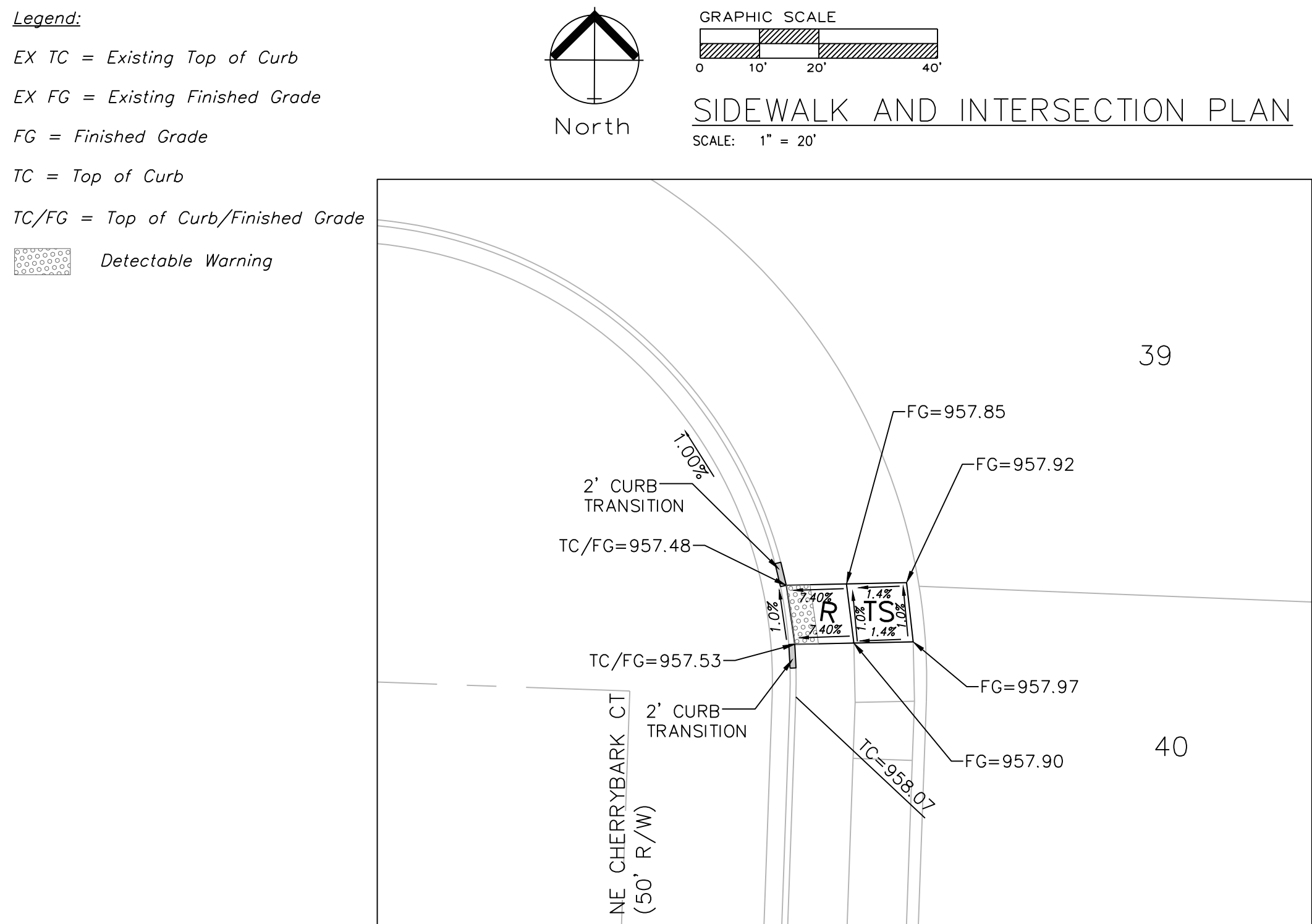
DETAIL 4



DETAIL 5

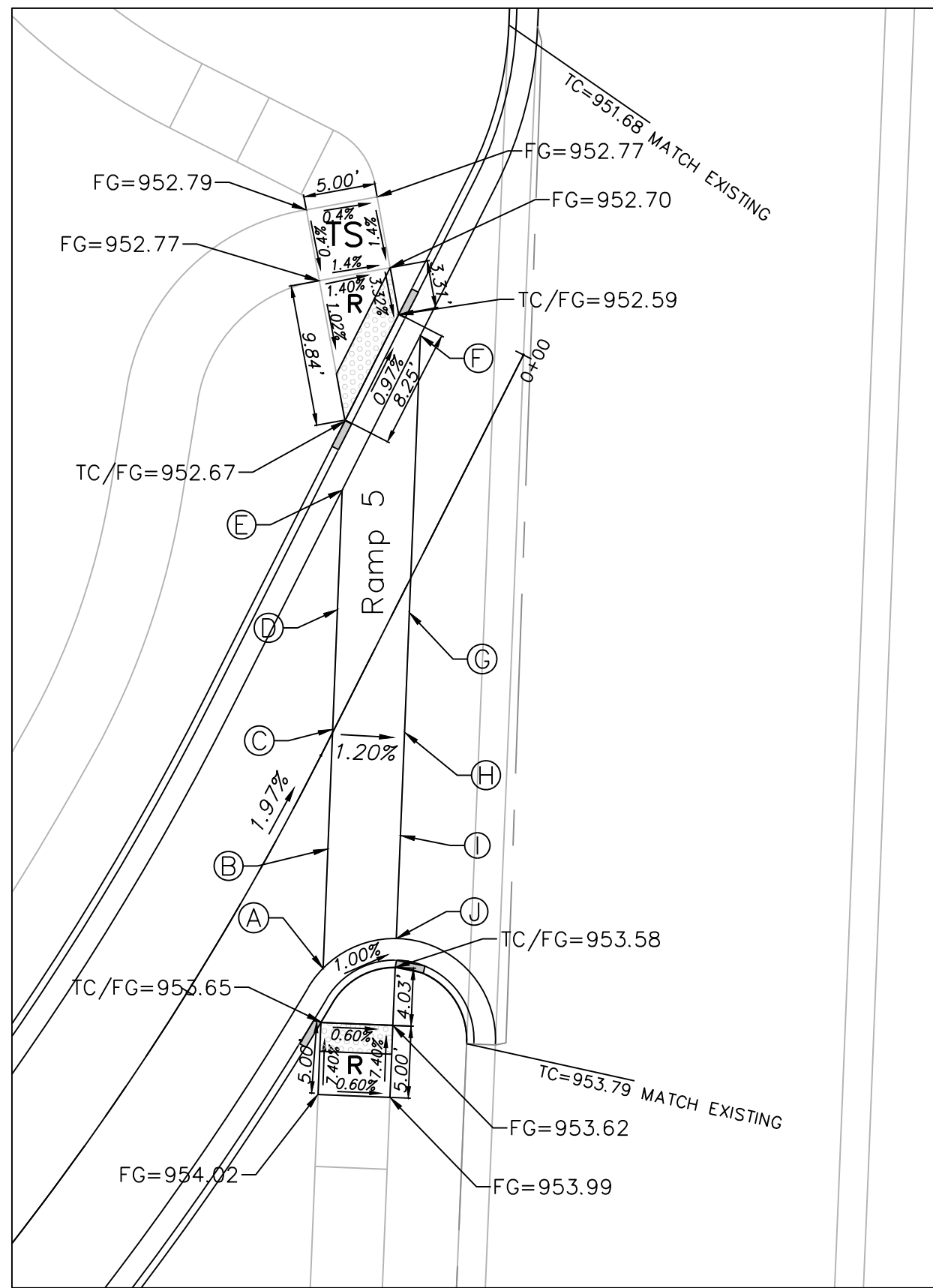


DETAIL 3



DETAL 6

| SPOT ELEVATION TABLE |        |        |        |        |        |
|----------------------|--------|--------|--------|--------|--------|
| Spot                 | Ramp 1 | Ramp 2 | Ramp 3 | Ramp 4 | Ramp 5 |
| A                    | 962.54 | 954.16 | 954.89 | 955.74 | 953.65 |
| B                    | 962.92 | 954.54 | 954.91 | 955.73 | 953.44 |
| C                    | 963.04 | 954.66 | 955.03 | 955.72 | 953.23 |
| D                    | 962.92 | 954.54 | 954.91 | 955.71 | 953.11 |
| E                    | 962.54 | 954.16 | 954.89 | 955.70 | 952.67 |
| F                    | 962.61 | 954.11 | 954.83 | 955.65 | 952.59 |
| G                    | 962.99 | 954.49 | 954.85 | 955.68 | 953.05 |
| H                    | 963.11 | 954.61 | 954.97 | 955.70 | 953.17 |
| I                    | 962.99 | 954.49 | 954.85 | 955.75 | 953.38 |
| J                    | 962.61 | 954.11 | 954.83 | 955.84 | 953.58 |



DETAIL 7

RECORD DRAWING  
The information provided on this drawing conforms to construction records; it is not intended for construction, implementation or recording purposes; and it is solely based on information obtained by my firm.

Date: 1/18/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions

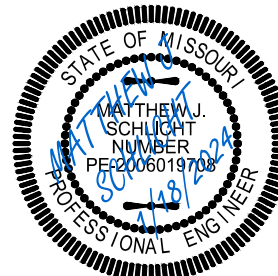


Professional Registration  
Missouri  
Engineering 2005002186-D  
Surveying 2005008319-D  
Kansas  
Engineering E-1685  
Surveying LS-218  
Oklahoma  
Engineering 6254  
Nebraska  
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Part of the Southeast 1  
Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project:  
WOODLAND OAKS  
LSMO  
Issue Date:  
January 18, 2024

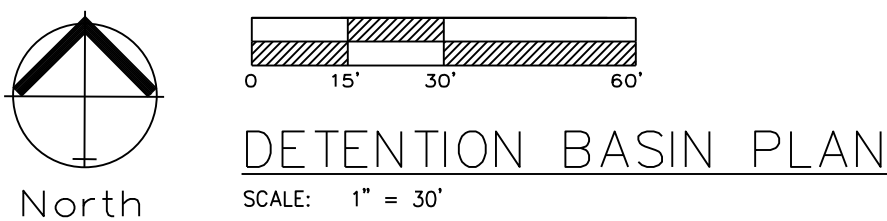
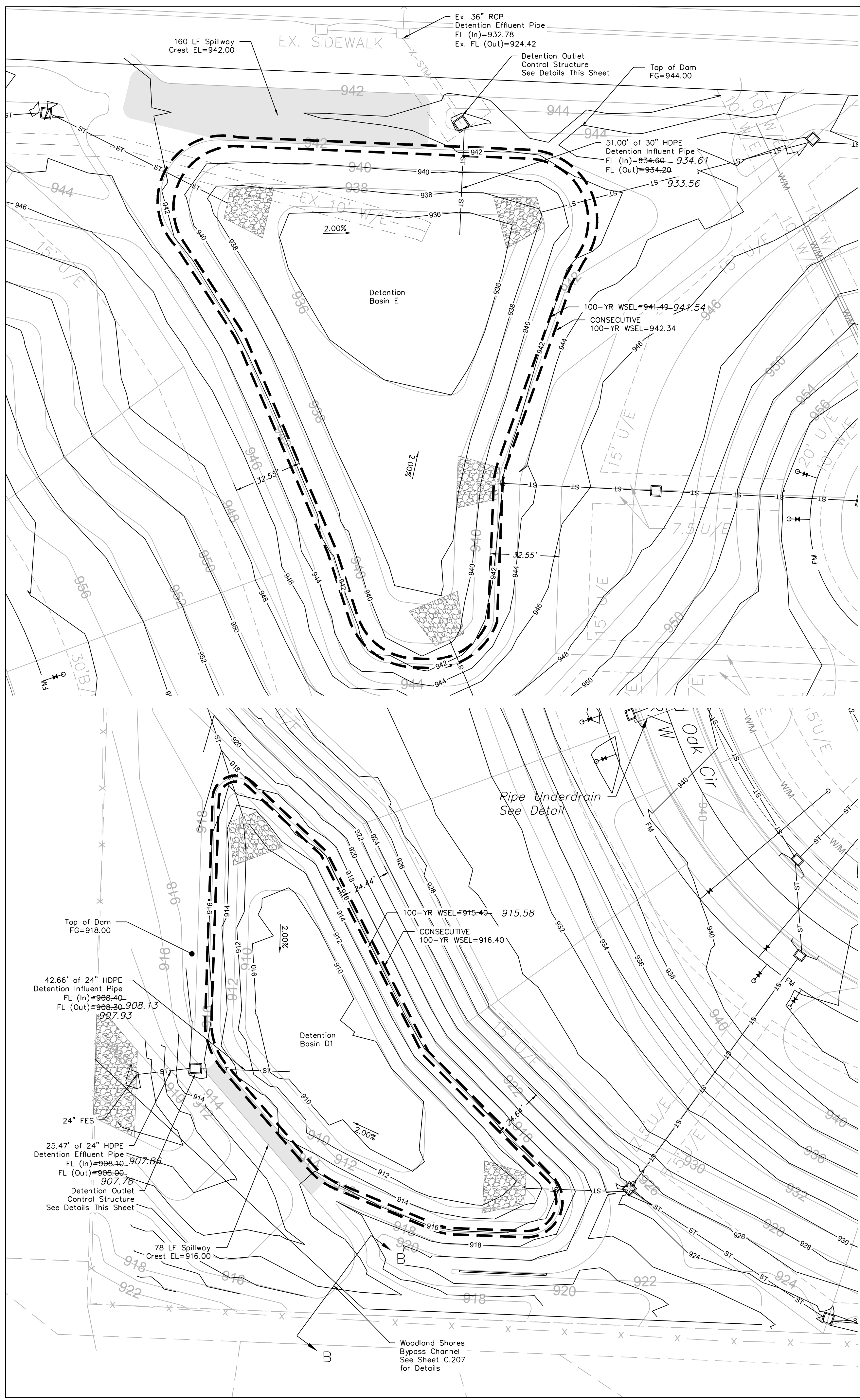
Sidewalk and  
Intersection Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri



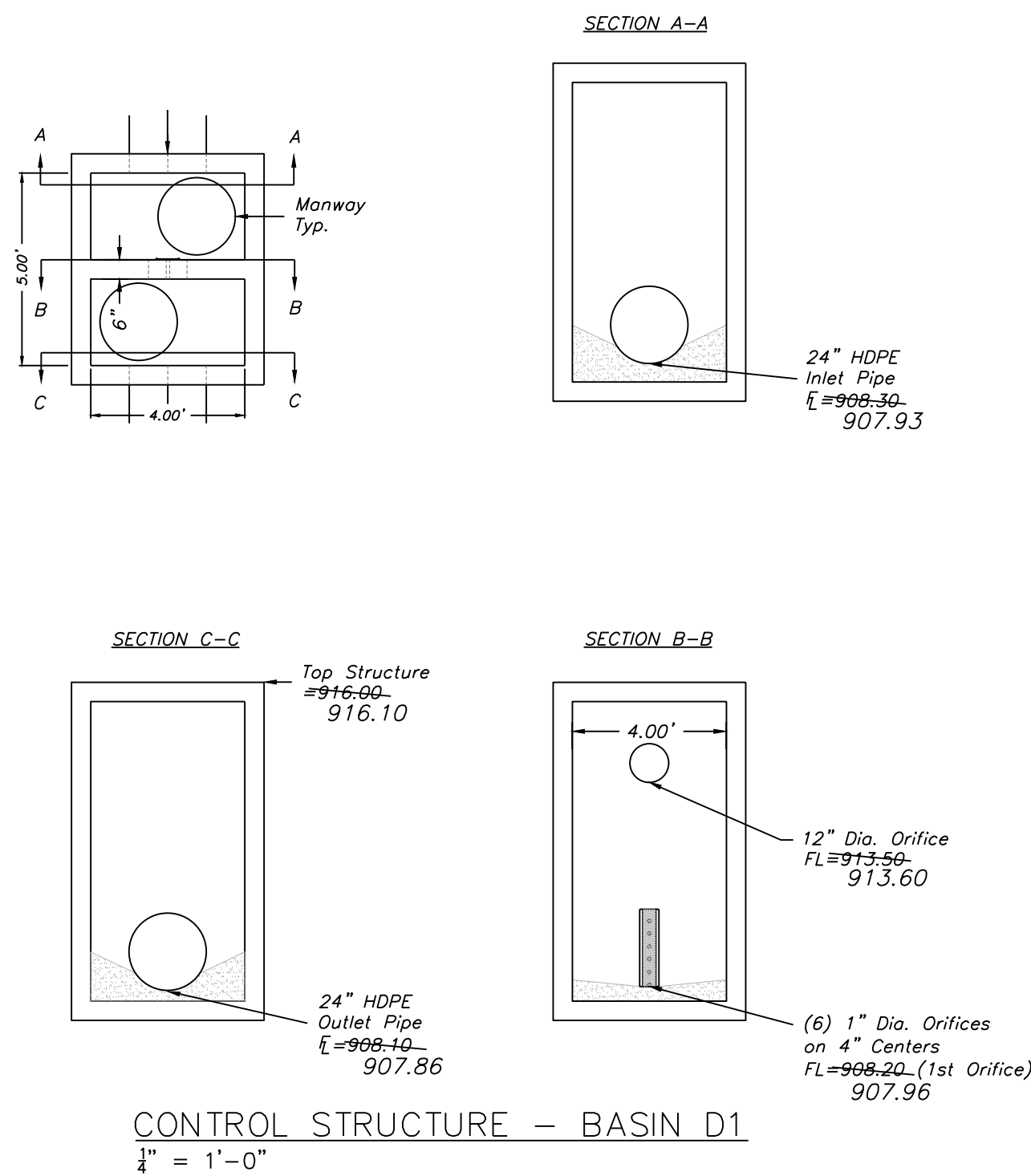
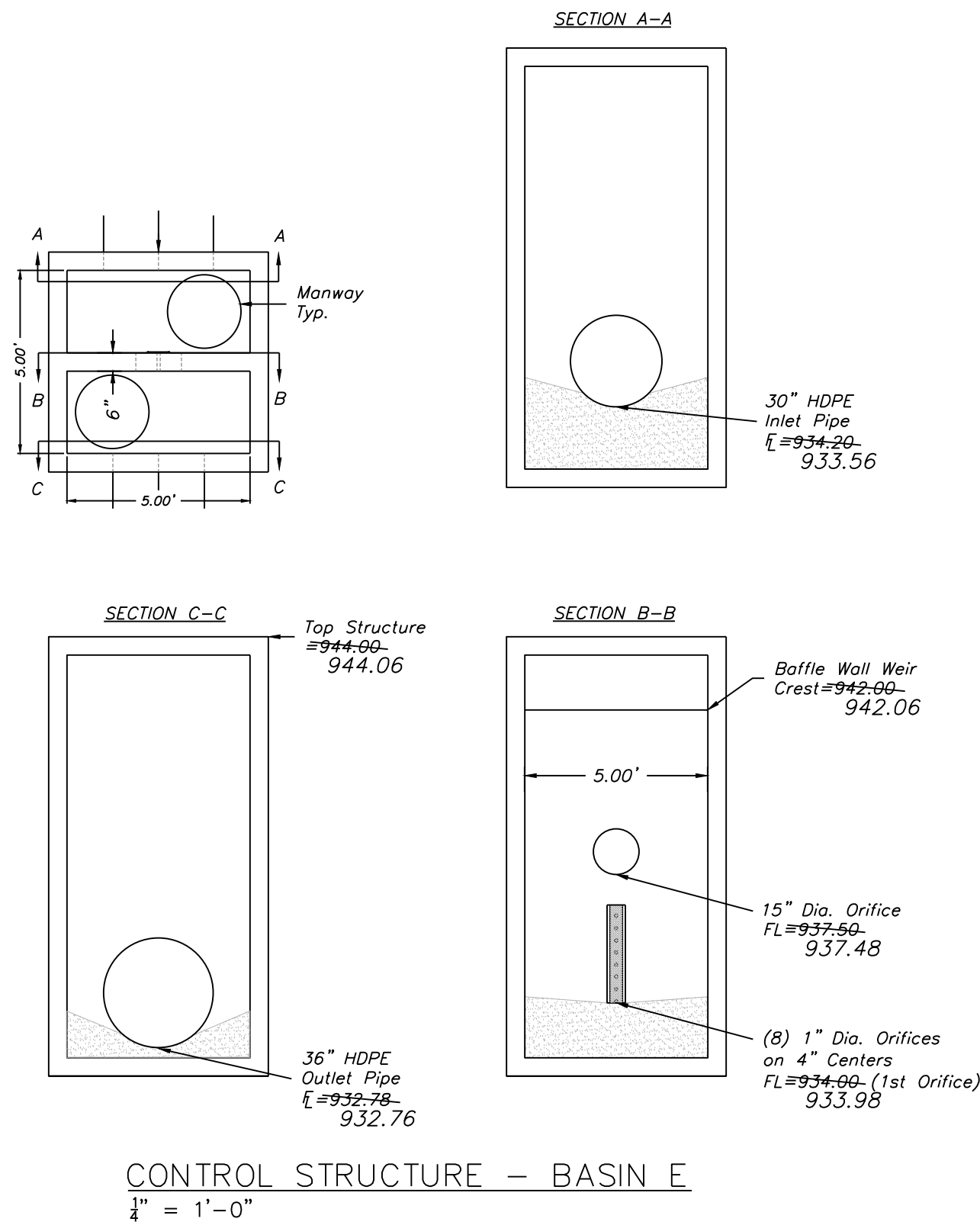
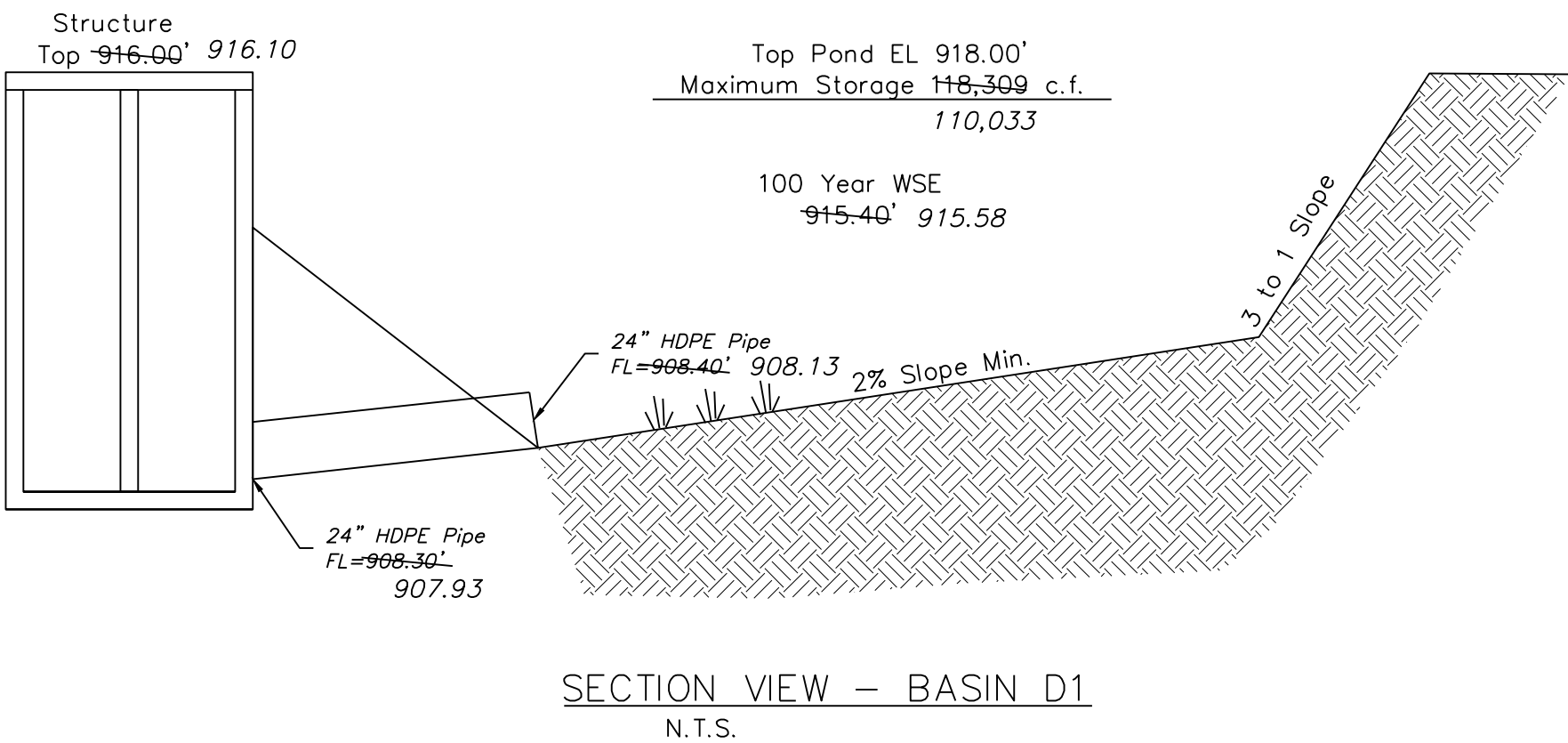
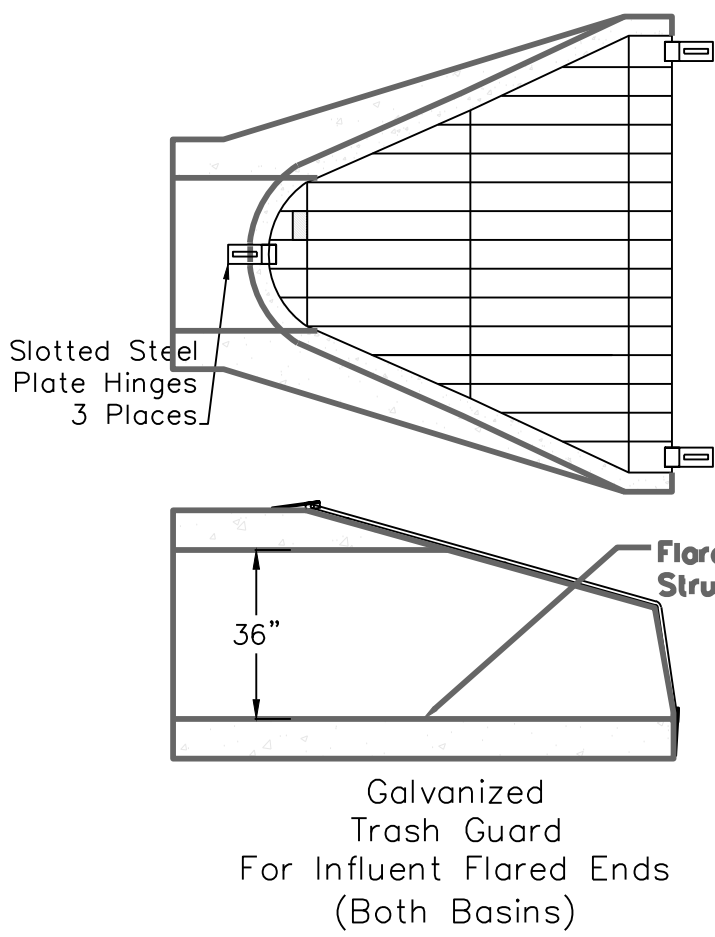
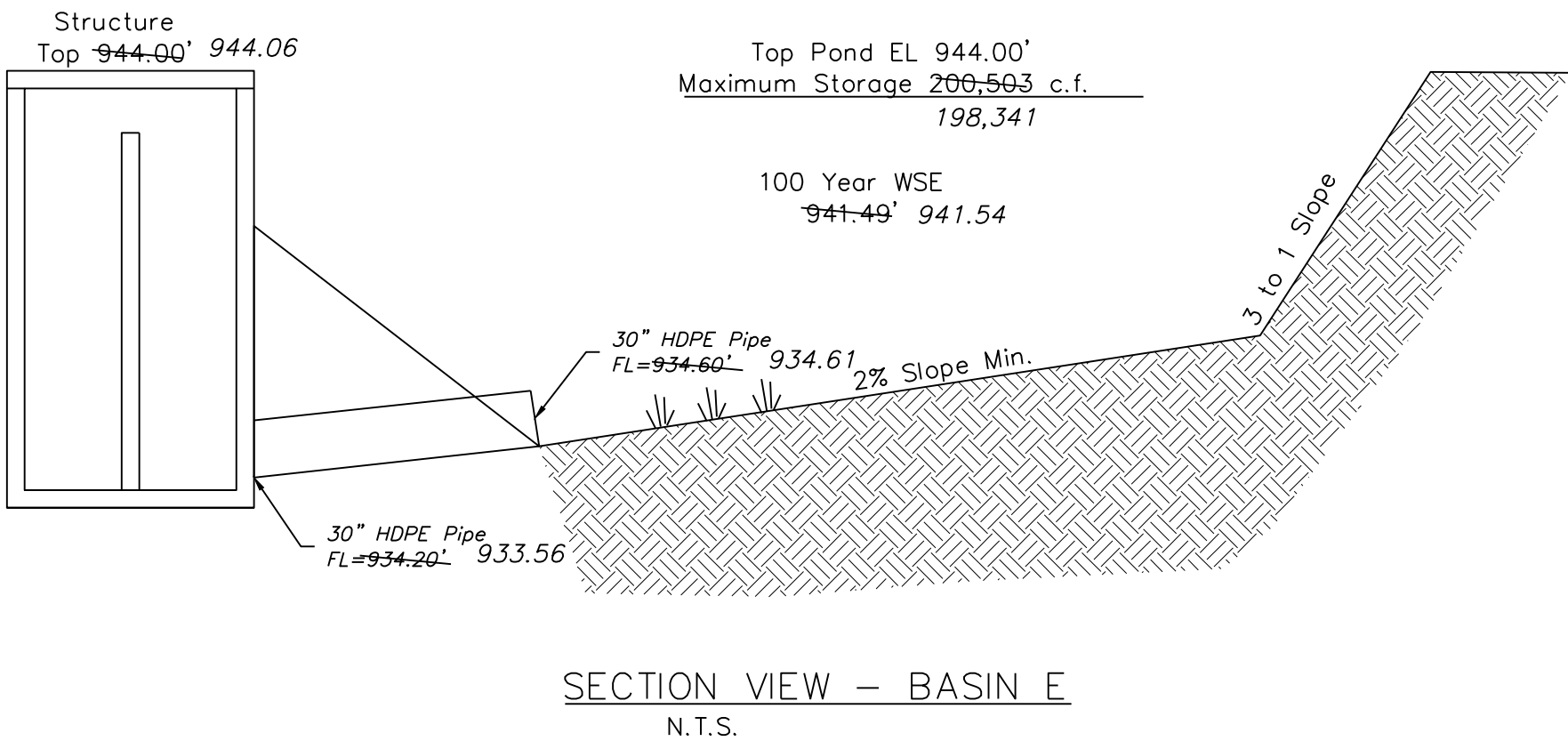
Matthew J. Schlicht  
MO PE 2006019708  
KS PE 19071  
OK PE 25226  
NE PE E-14335

REVISIONS  
1/18/2024 As-Built





- NOTES:
1. BOTH BASINS SHALL BE CONSTRUCTED WITH THE EROSION AND SEDIMENT CONTROL MEASURES.
  2. AN AS-BUILT DETENTION BASIN PLAN SHALL BE SUBMITTED AND ACCEPTED PRIOR TO ISSUANCE OF A CERTIFICATE OF SUBSTANTIAL COMPLETION, WITH AS-BUILT VERSUS PROPOSED STORAGE.

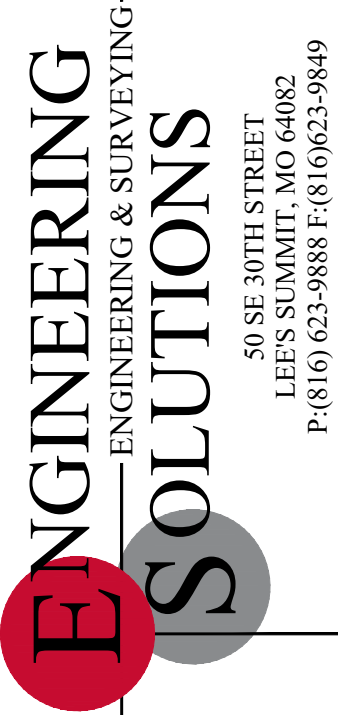


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Date: 2/05/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions





Professional Registration  
Missouri  
Engineering 2005002186-D  
Surveying 2005008319-D  
Kansas  
Engineering E-1685  
Surveying LS-218  
Oklahoma  
Engineering 6254  
Nebraska  
Engineering CA2821

Part of the Southeast 1  
Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project:  
WOODLAND OAKS  
LSMO  
Issue Date:  
January 18, 2024

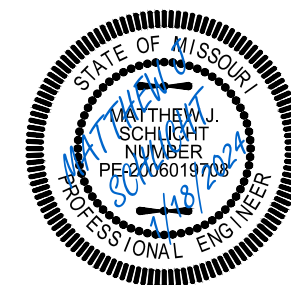
Bypass Channel Plan

Construction Plans for:

WOODLAND OAKS

Lot 1 thru 42

Lee's Summit, Jackson County, Missouri

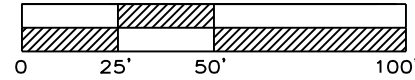


Matthew J. Schlicht  
MO PE 2006019708  
KS PE 19071  
OK PE 25226  
NE PE E-14335

REVISIONS

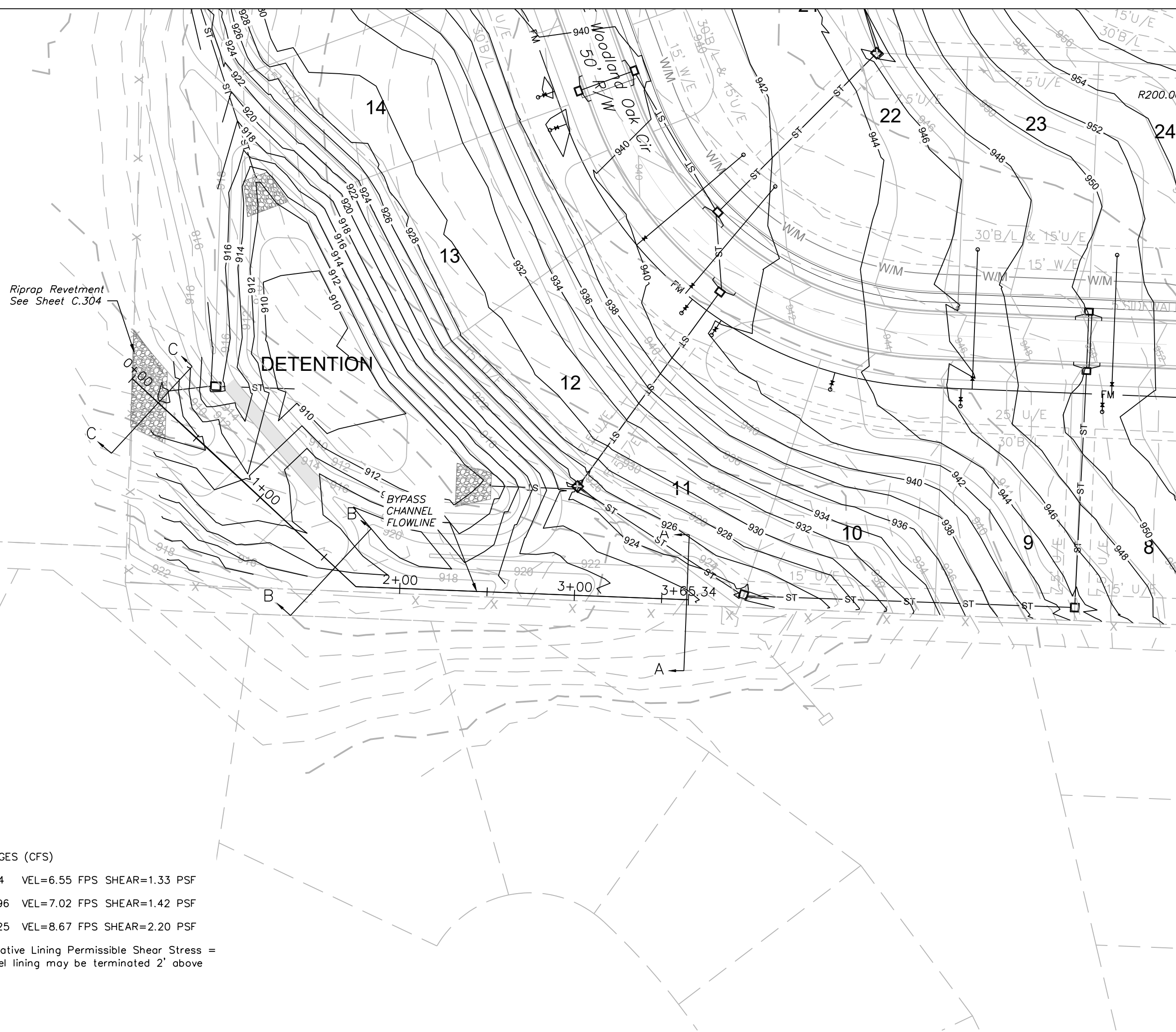
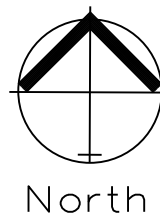
1/18/2024 As-Built

C. 207



BYPASS CHANNEL PLAN

SCALE: 1" = 50'



BYPASS CHANNEL 100-YR PEAK DISCHARGES (CFS)

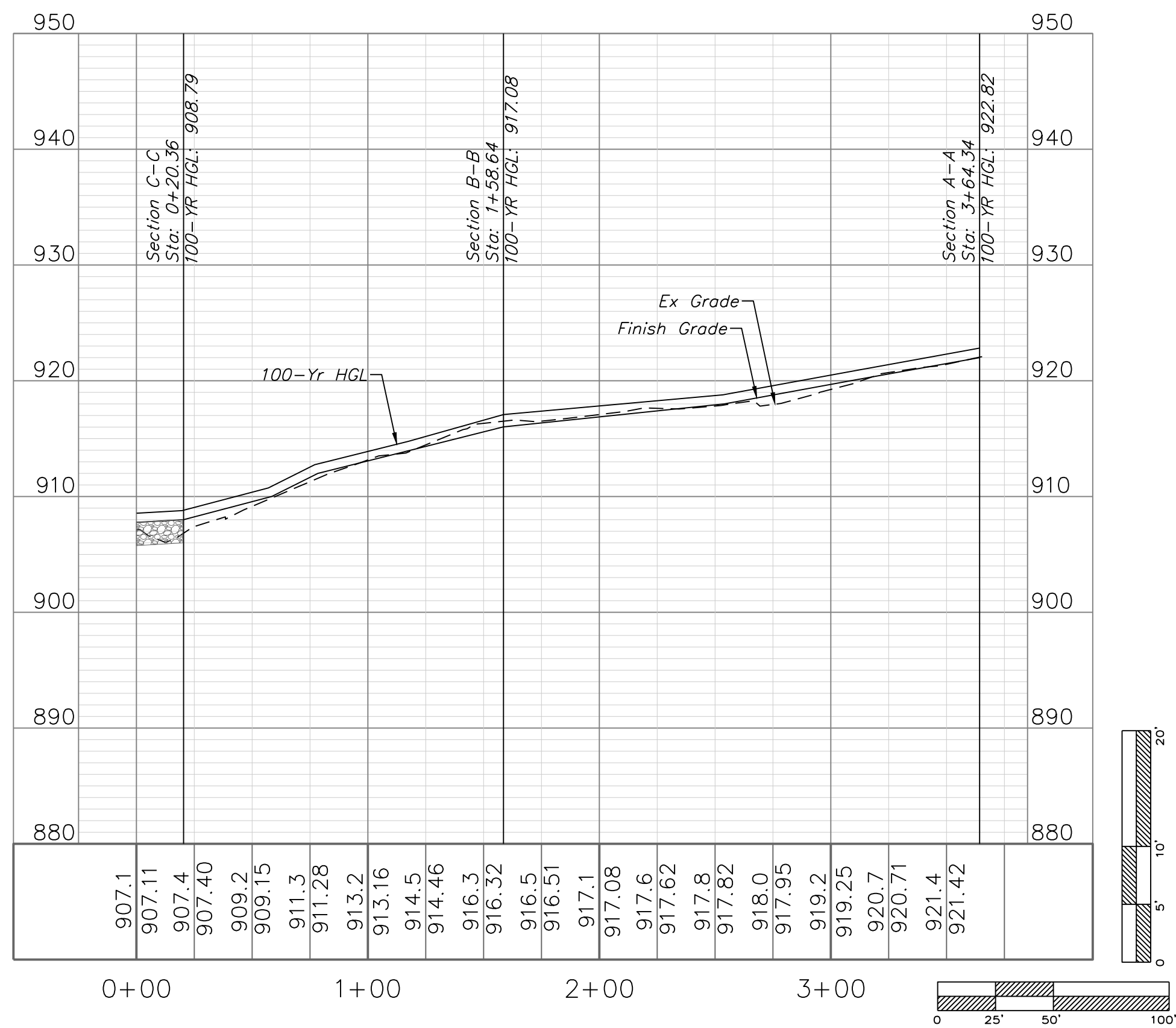
SEC. A-A EX=121.04 PROP=99.64 VEL=6.55 FPS SHEAR=1.33 PSF

SEC B-B EX=159.00 PROP=128.96 VEL=7.02 FPS SHEAR=1.42 PSF

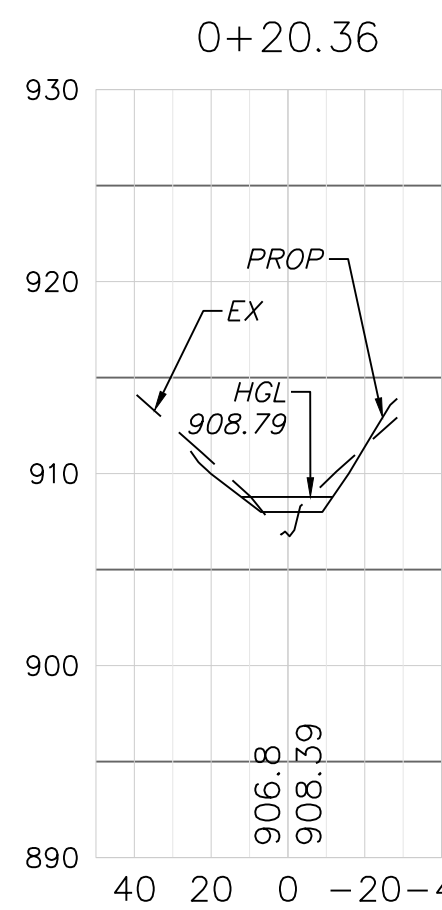
SEC C-C EX=165.35 PROP=132.25 VEL=8.67 FPS SHEAR=2.20 PSF

Channel shall be lined with Class A Vegetative Lining Permissible Shear Stress = 3.70 psf per APWA Table 5607-2. Channel lining may be terminated 2' above channel flowline.

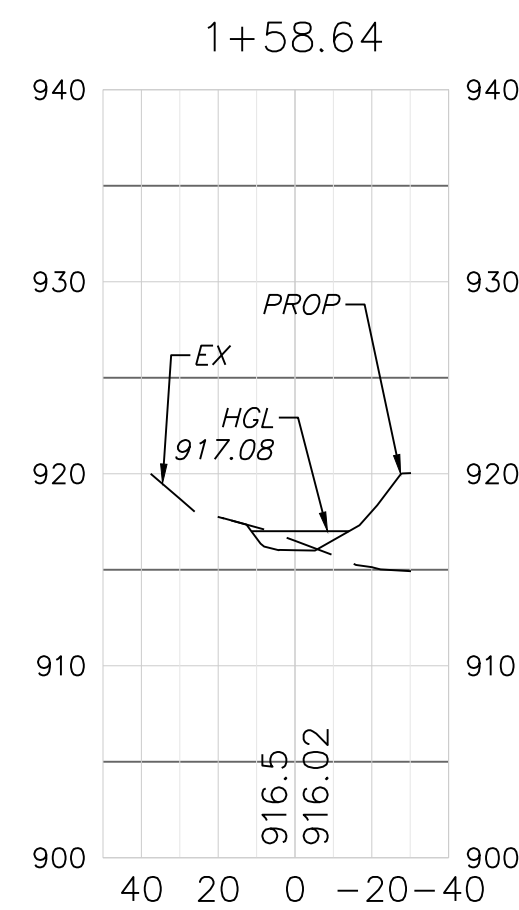
## BYPASS CHANNEL FLOWLINE



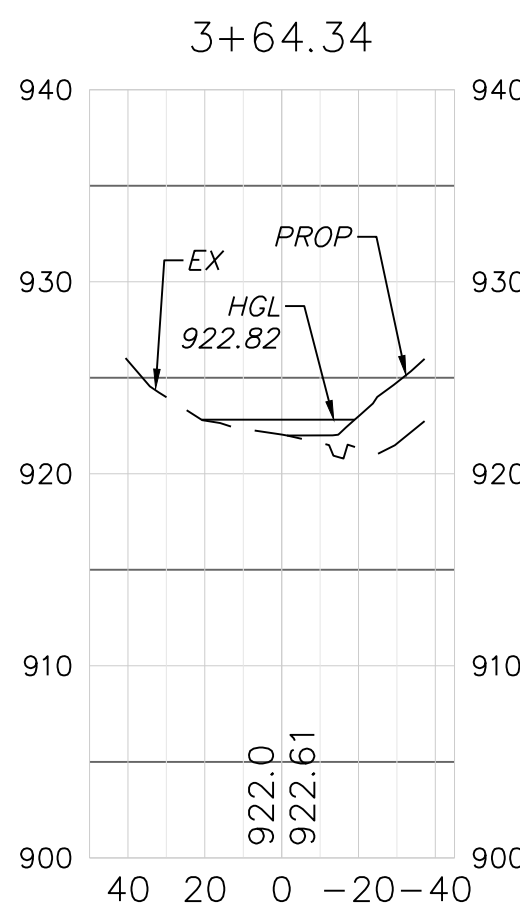
SECTION C-C



SECTION B-B



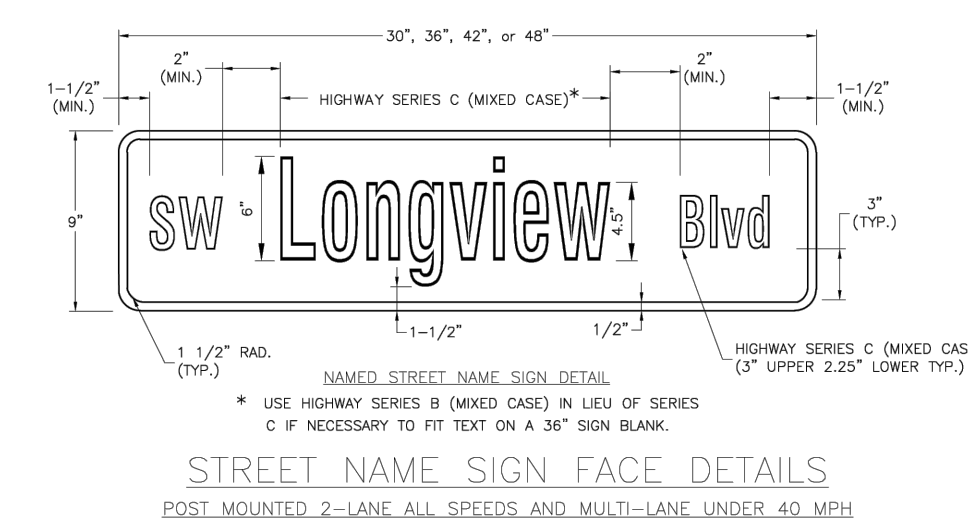
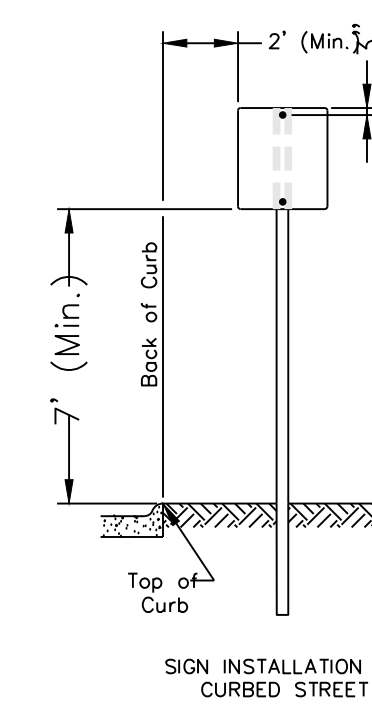
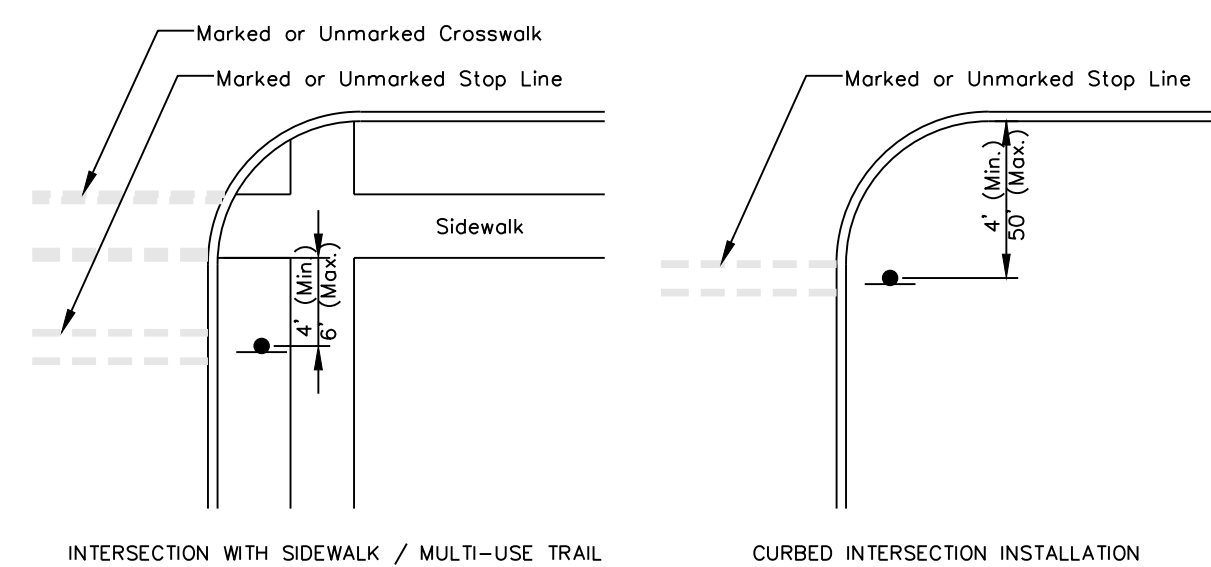
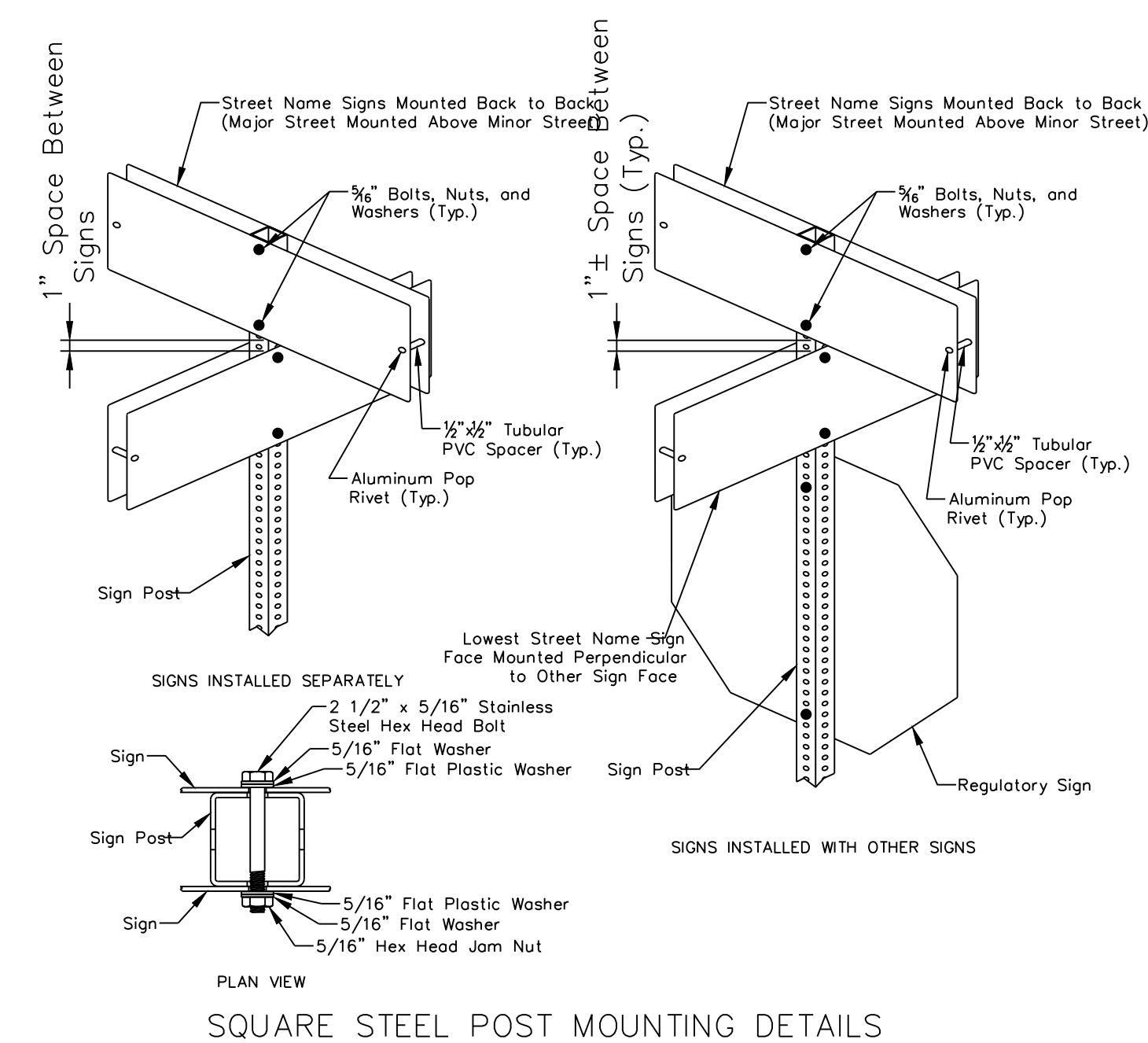
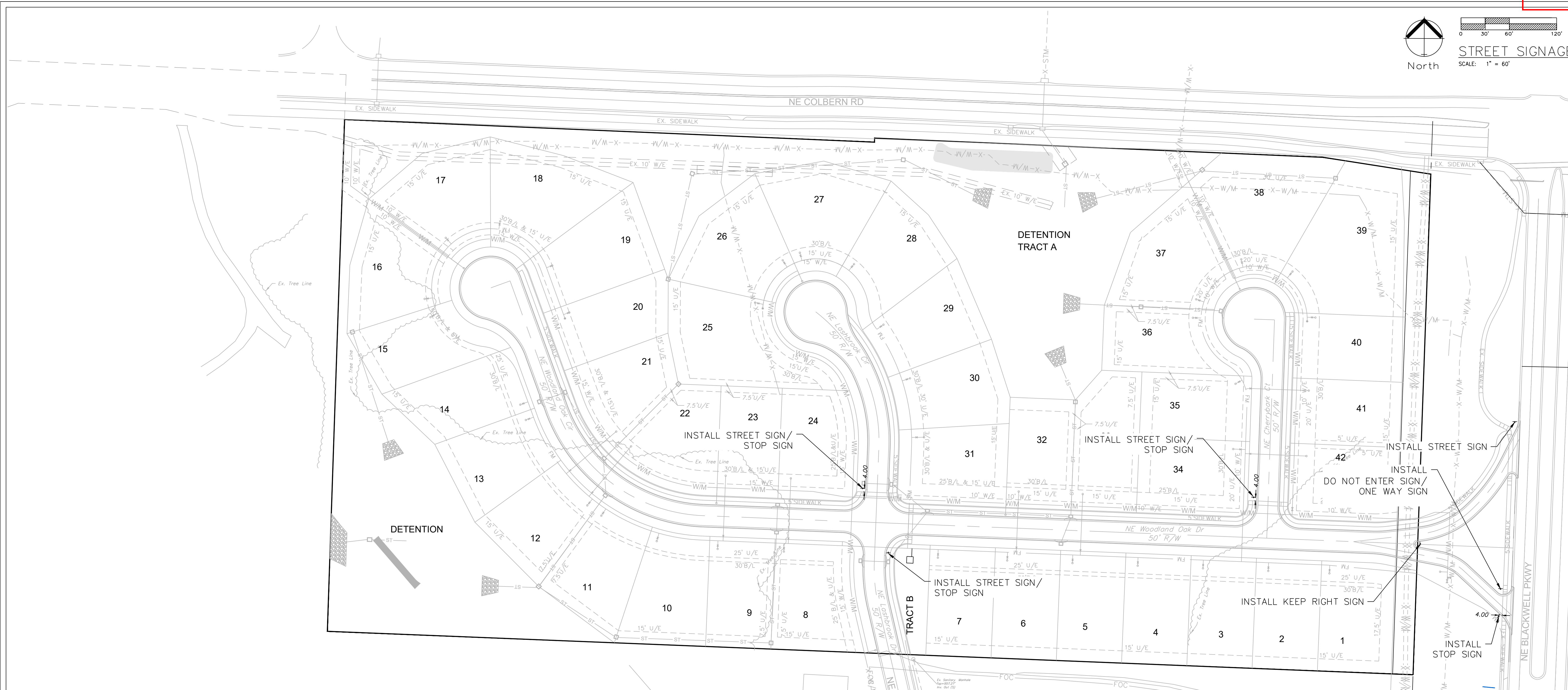
SECTION A-A



HGL = 100 YEAR  
SEE MACRO DRAINAGE STUDY FOR COMPLETE  
HYDRAULIC DATA FOR EACH CROSS SECTION.

**RECORD DRAWING**  
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Date: 1/18/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions





**RECORD DRAWING**

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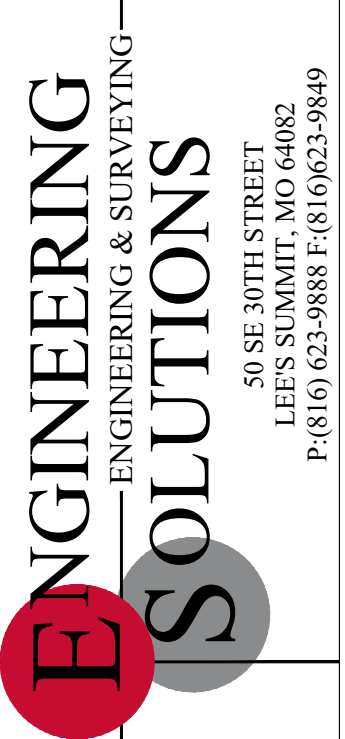
Title: Engineer

Firm: Engineering Solutions





STORM SEWER GENERAL LAYOUT  
SCALE: 1" = 50'

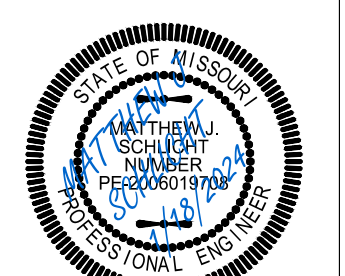


Professional Registration  
Missouri  
Engineering 2005002186-D  
Surveying 2005008319-D  
Kansas  
Engineering E-1695  
Surveying LS-218  
Oklahoma  
Engineering 6254  
Nebraska  
Engineering CA2821

Part of the Southeast 1  
Section 27, Township 48 North, Range 31 West  
Lee's Summit, Jackson County, Missouri

Project: WOODLAND OAKS  
LSMO  
Issue Date: January 18, 2024

Storm Sewer General Layout  
Construction Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri

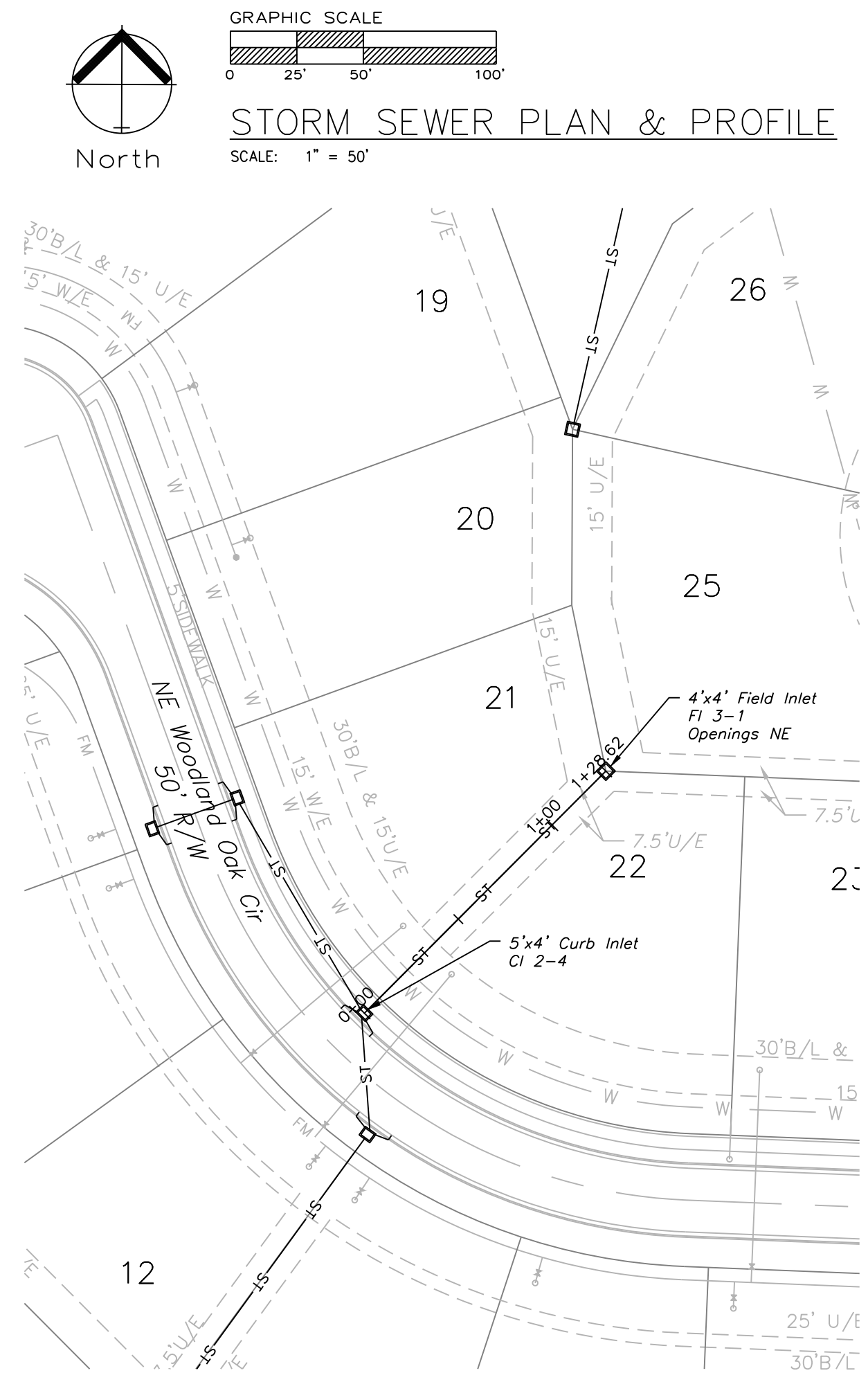
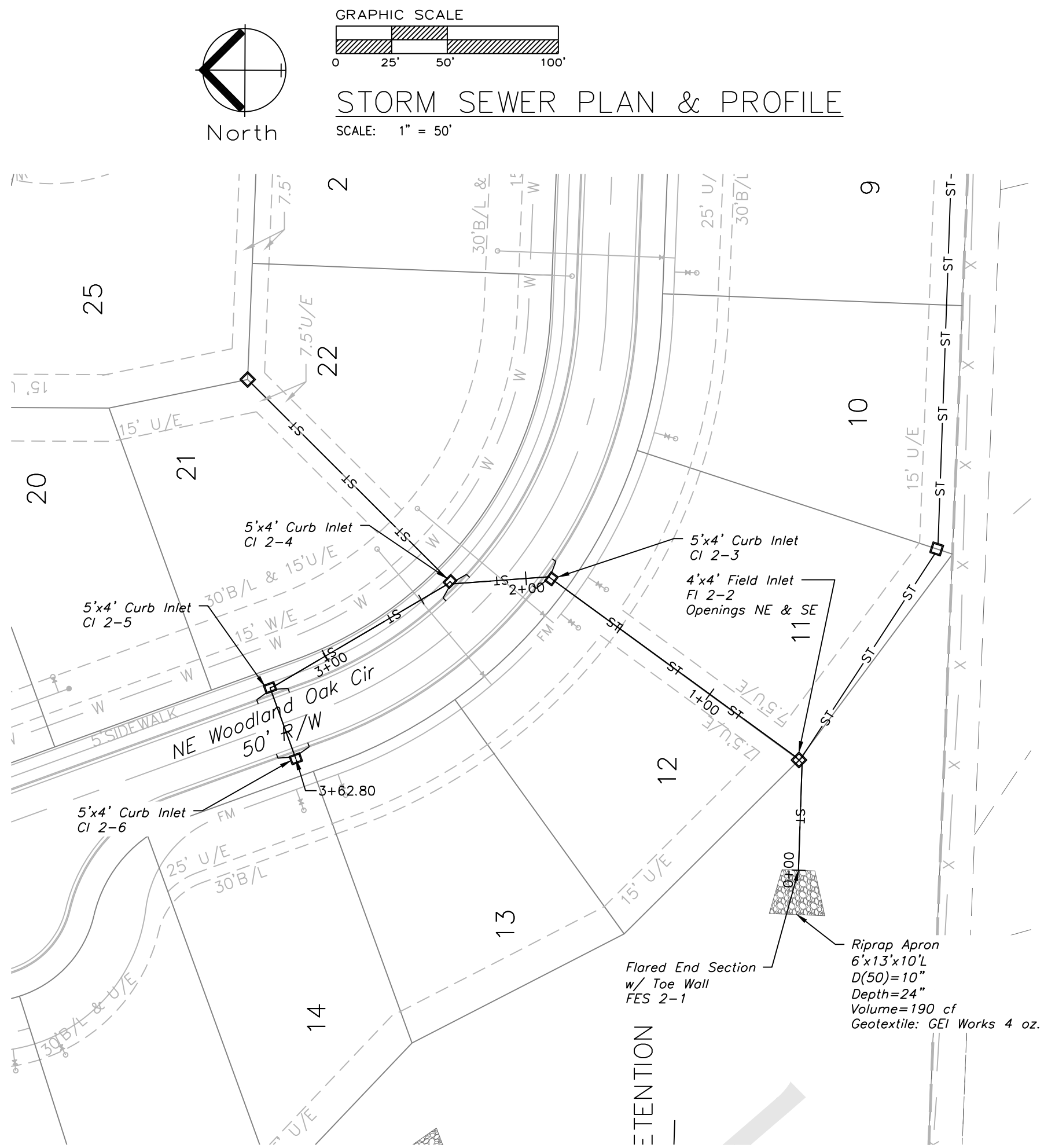
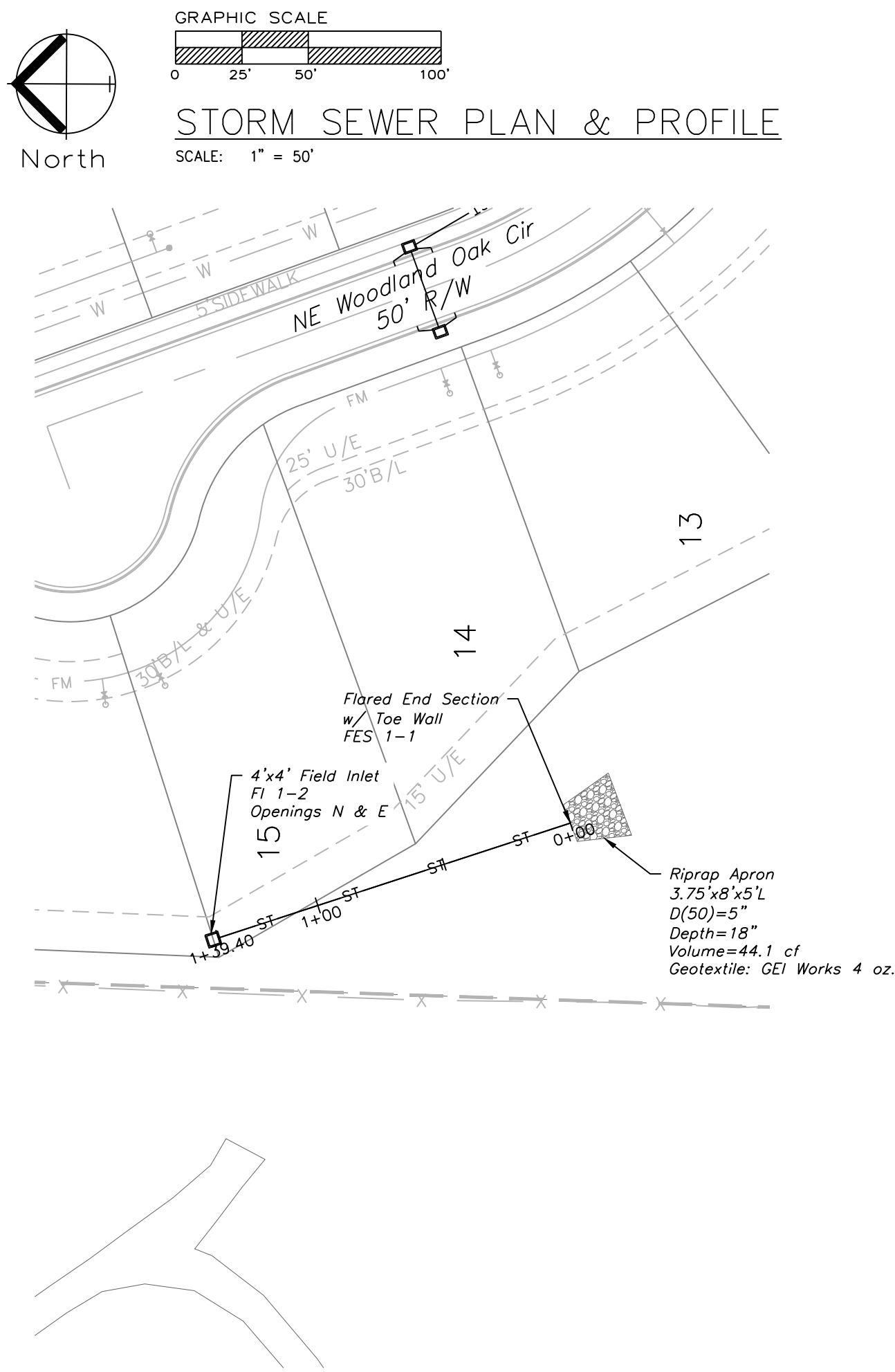


Matthew J. Schlicht  
MO PE 2006019708  
KS PE 19071  
OK PE 25226  
NE PE E-14335

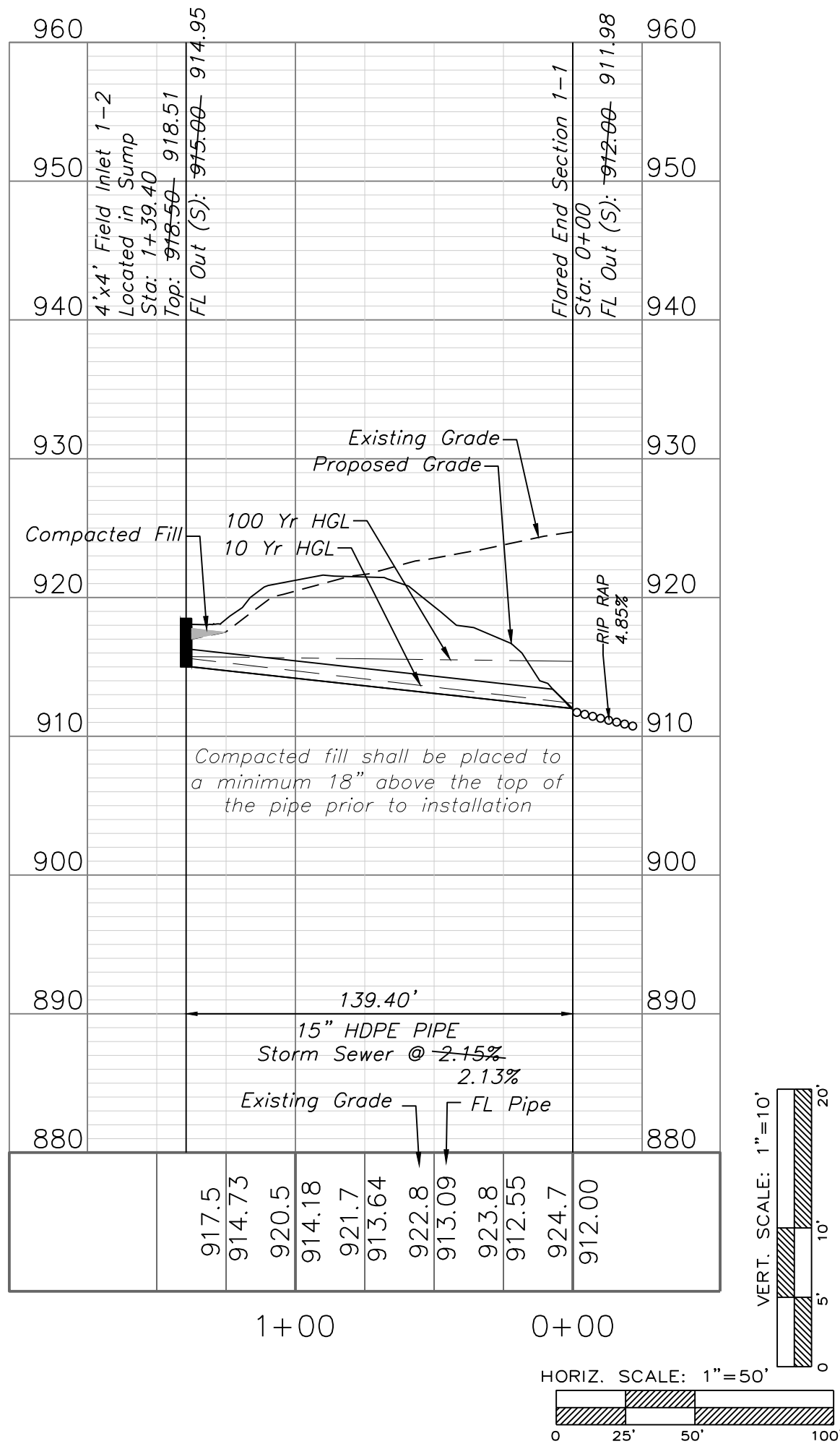
| REVISIONS |          |
|-----------|----------|
| 1/18/2024 | As-Built |
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|           |          |

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Firm: Engineering Solutions

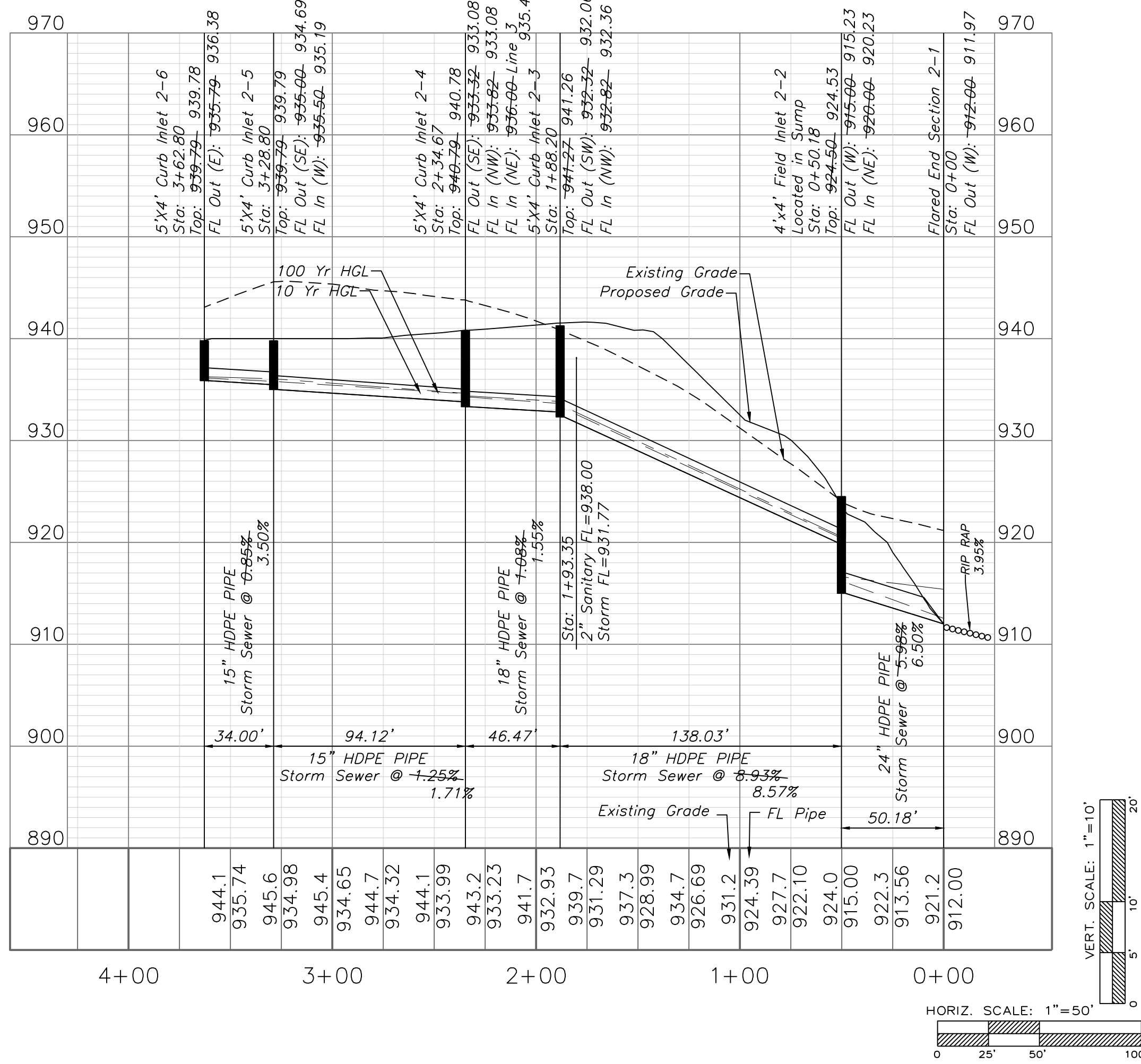




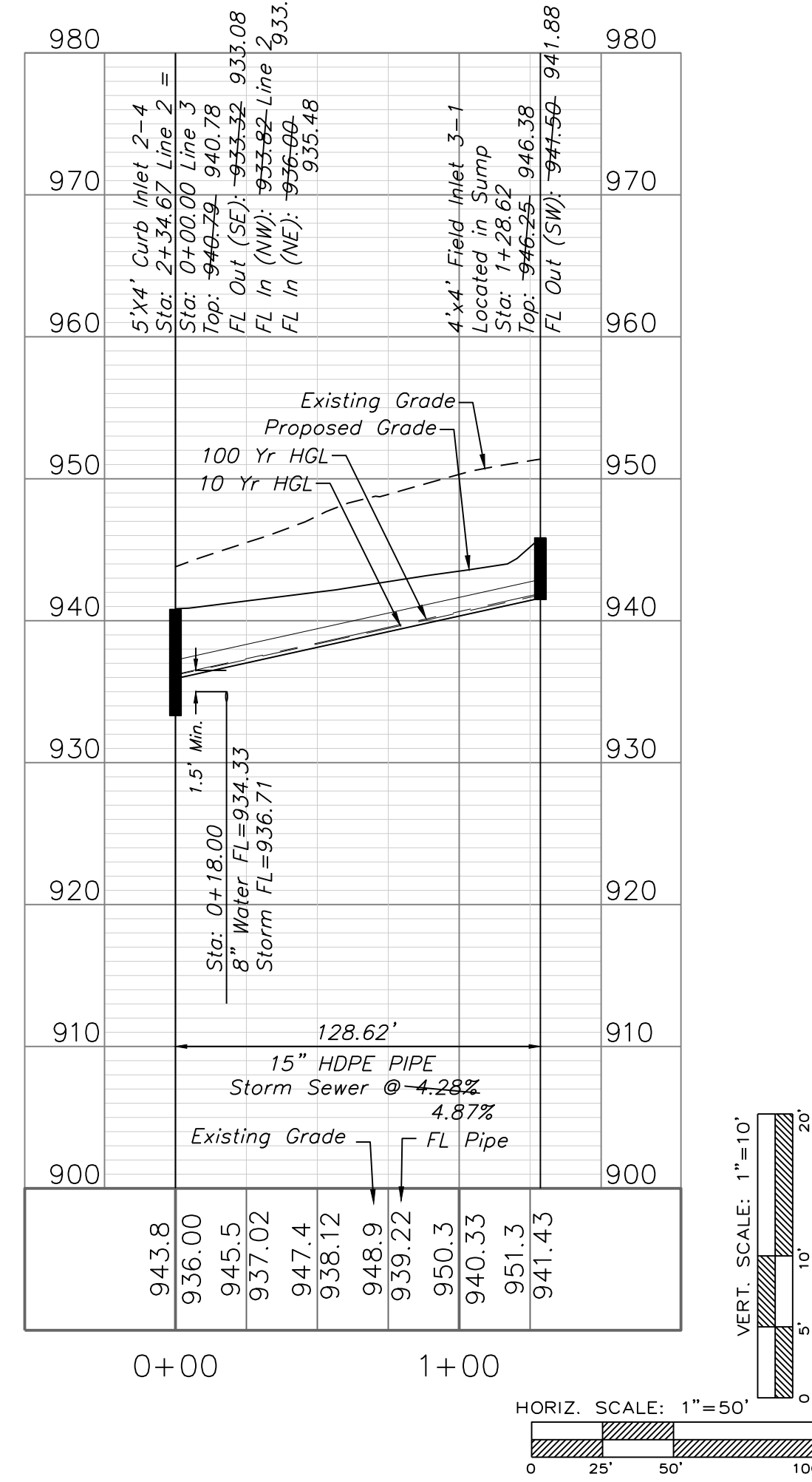
STORM LINE 1



STORM LINE 2



STORM LINE 3



RECORD DRAWING

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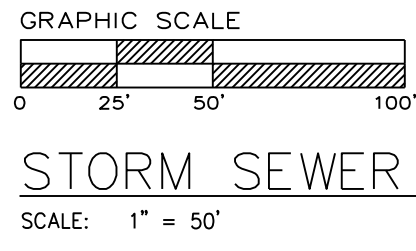
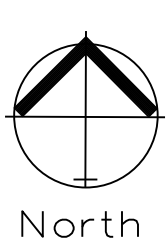
Date: 1/18/2024

Certified by: Matthew J. Schlicht

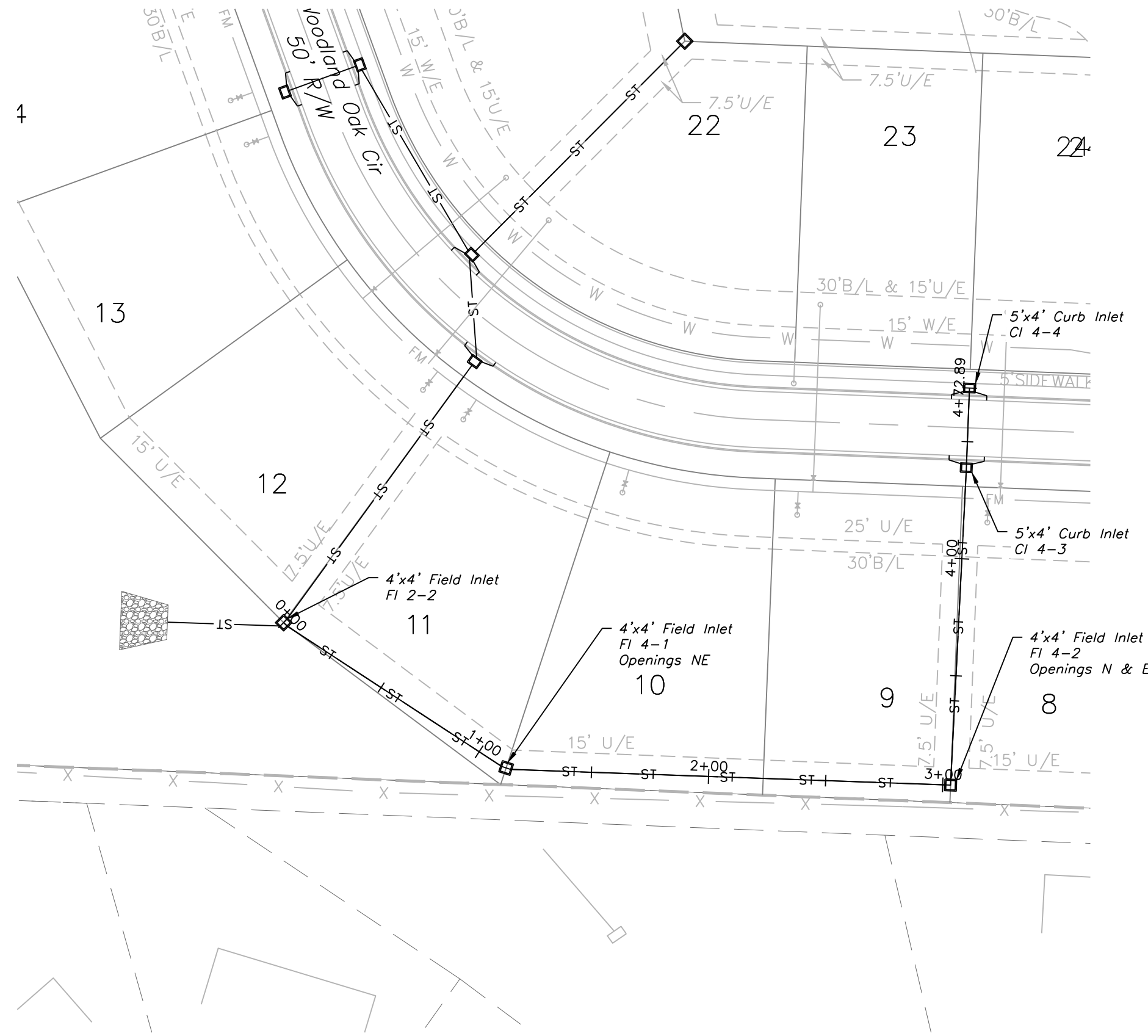
Title: Engineer

Firm: Engineering Solutions

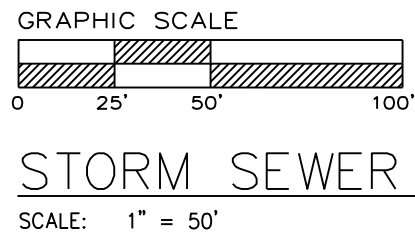
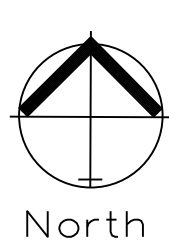
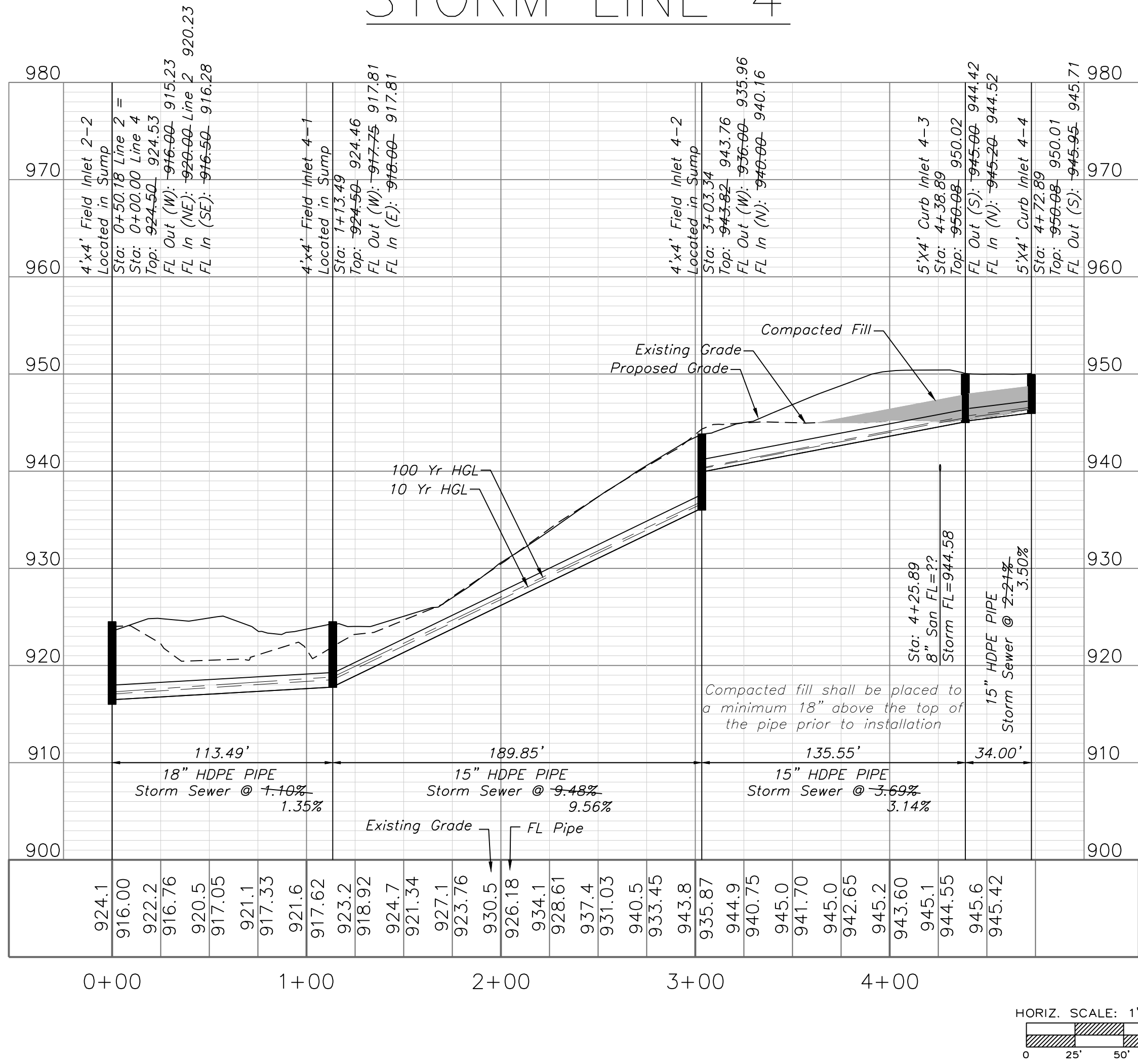




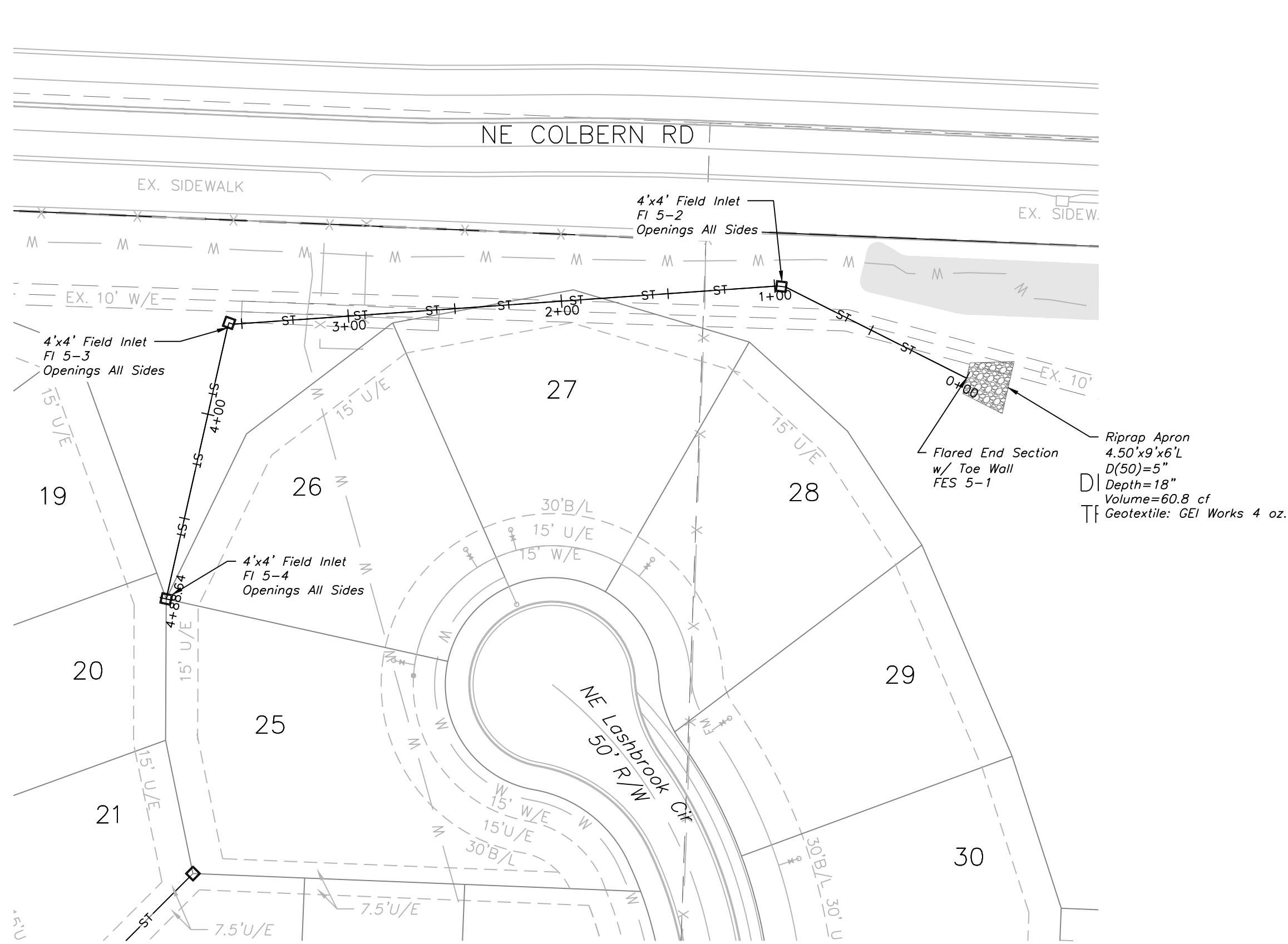
STORM SEWER PLAN & PROFILE



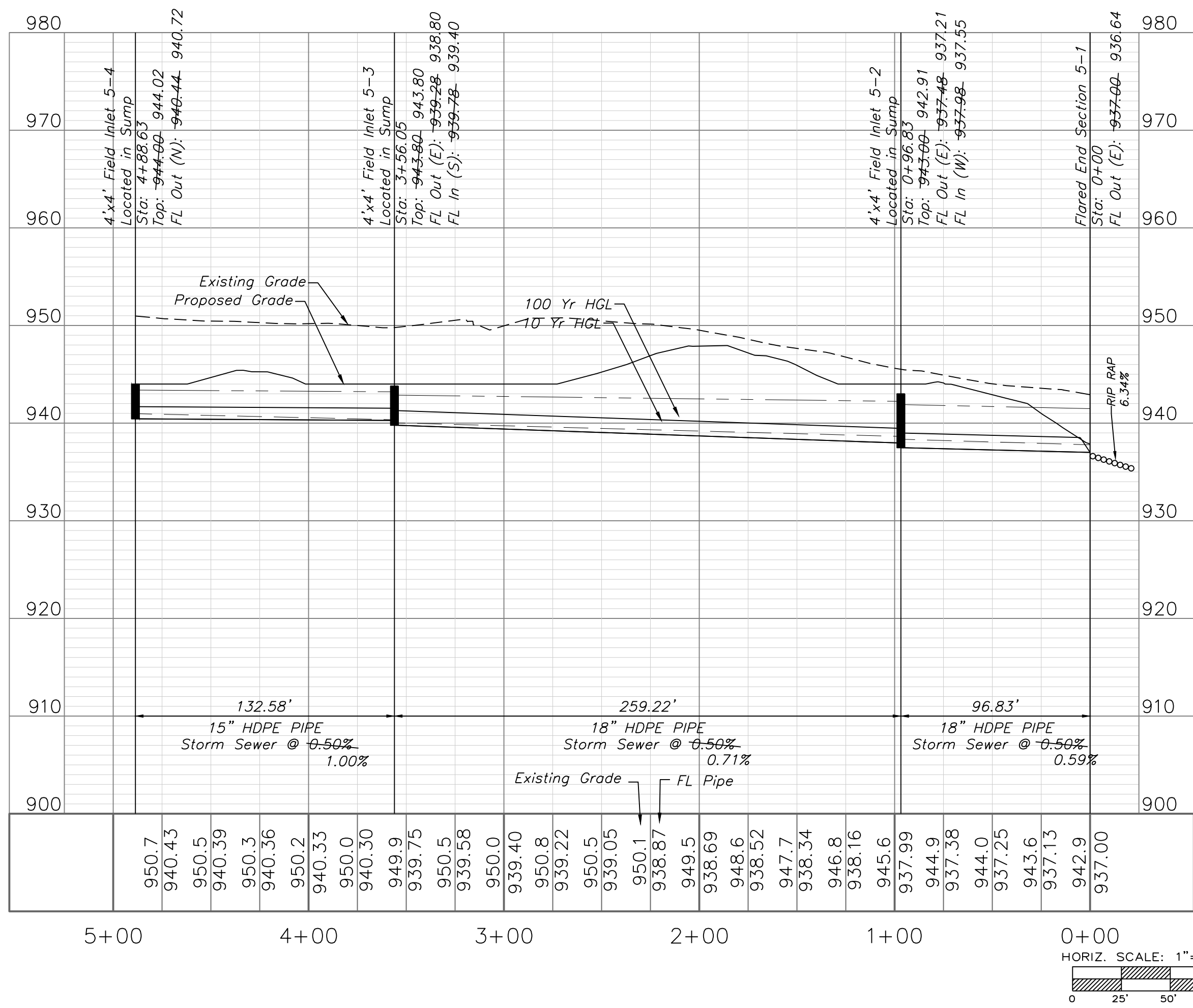
STORM LINE 4



STORM SEWER PLAN & PROFILE



STORM LINE 5



**RECORD DRAWING**  
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Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions

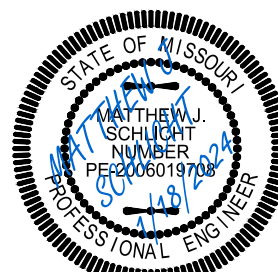


Professional Registration  
Missouri  
Engineering 2005002186-D  
Surveying 2005008319-D  
Kansas  
Engineering E-1685  
Surveying LS-218  
Oklahoma  
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Part of the Southeast 1  
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Lee's Summit, Jackson County, Missouri

Project:  
WOODLAND OAKS  
LSMO  
Issue Date:  
January 18, 2024

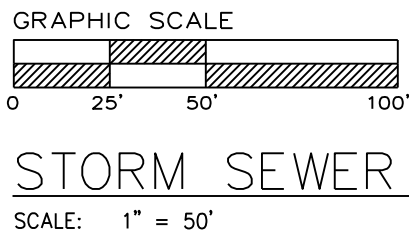
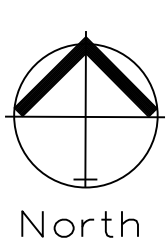
Storm Sewer Plan & Profile  
Construction Plans for:  
WOODLAND OAKS  
Lots 1 thru 42  
Lee's Summit, Jackson County, Missouri



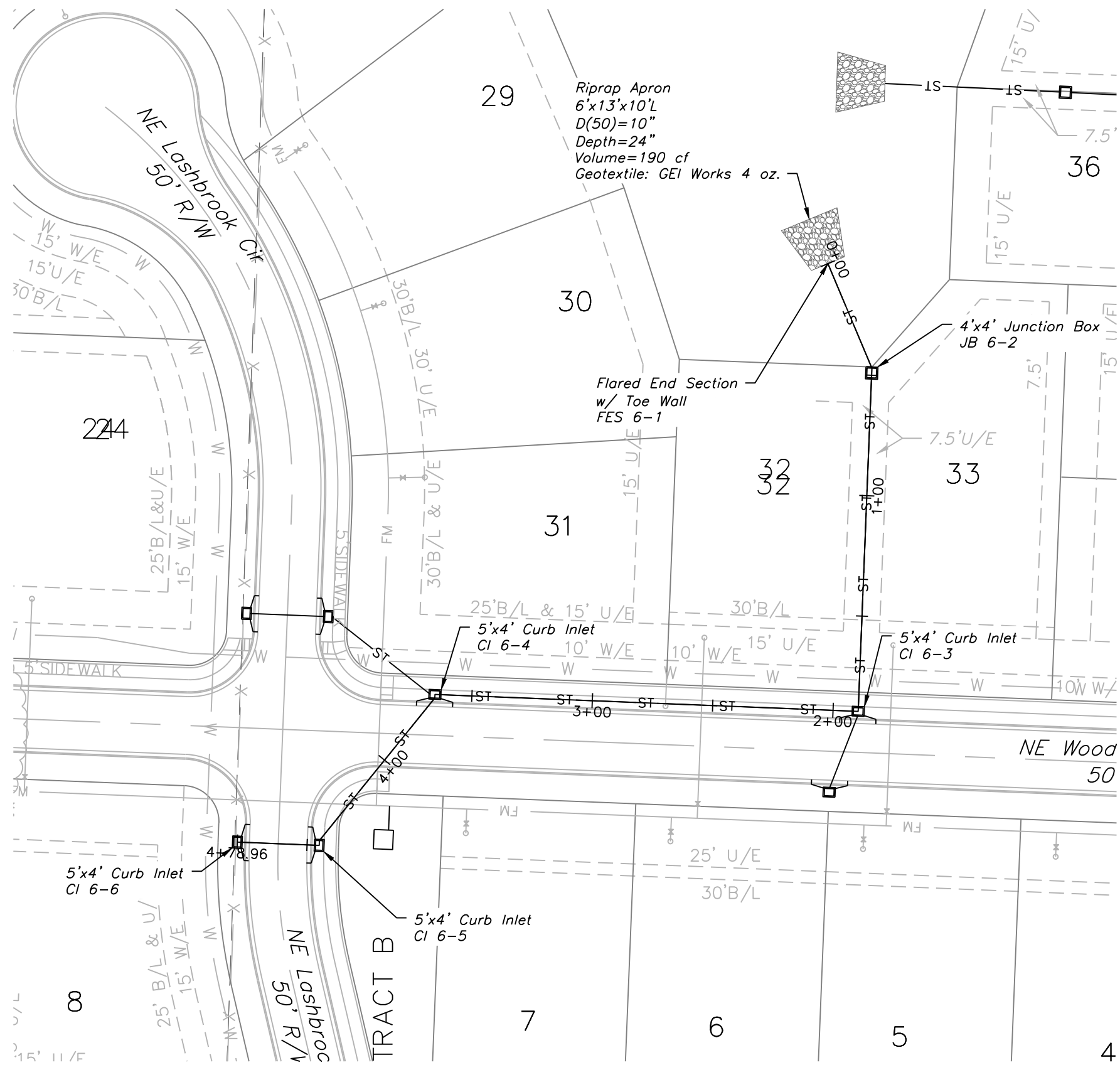
Matthew J. Schlicht  
MO PE 2006019708  
KS PE 19071  
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NE PE E-14335

REVISIONS  
1/18/2024 As-Built

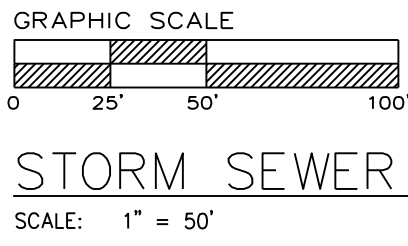
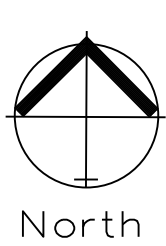
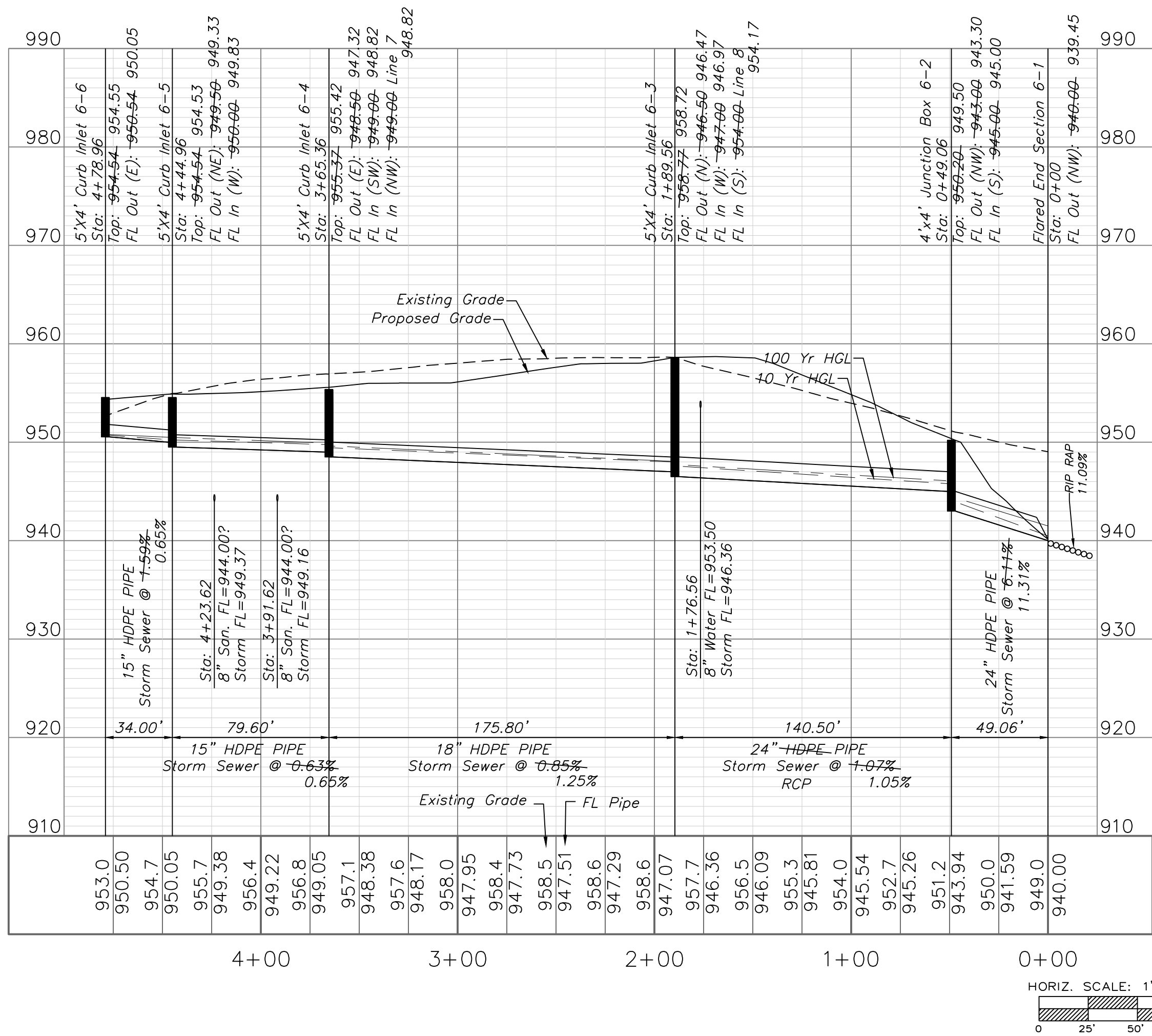




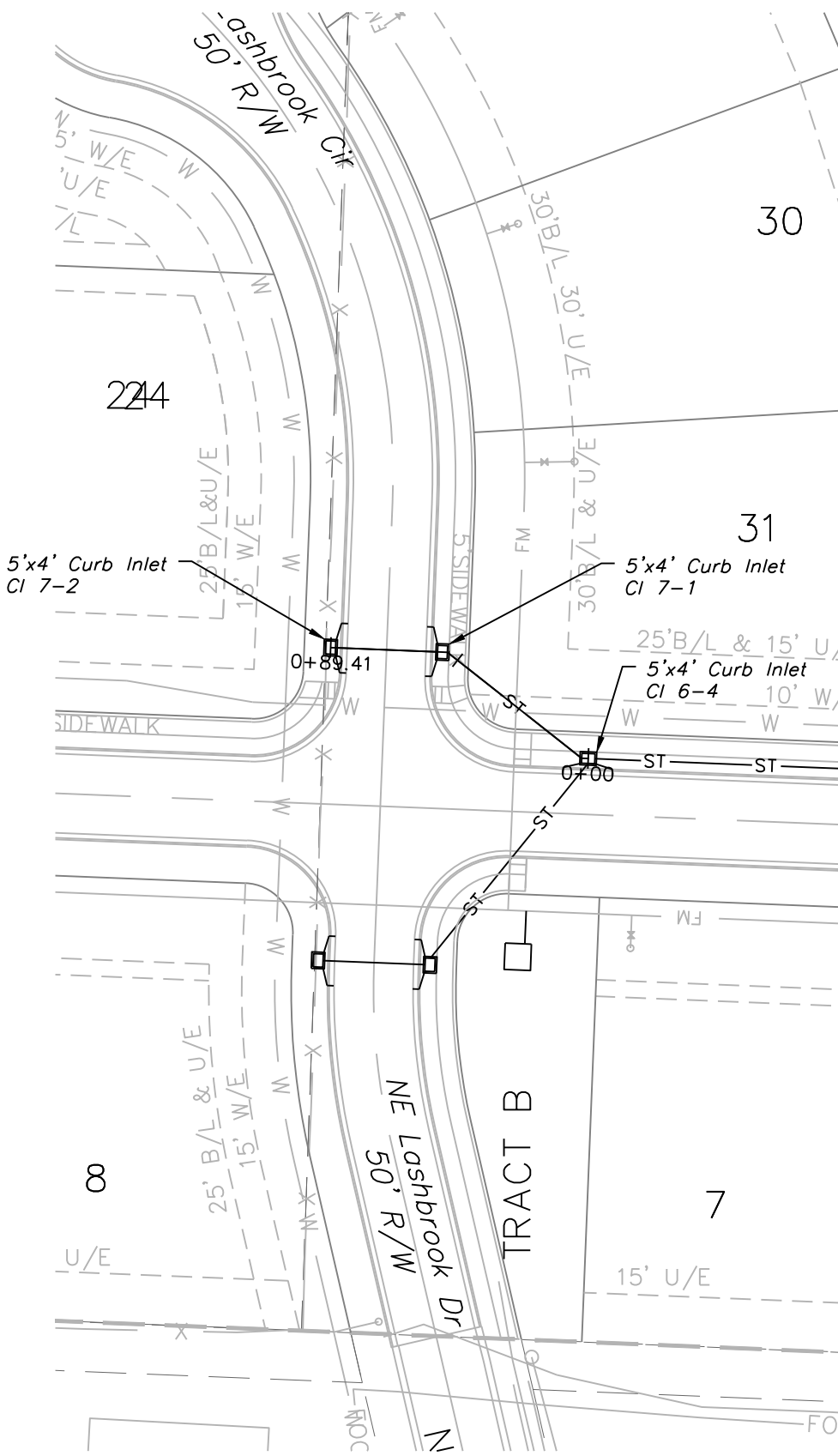
STORM SEWER PLAN & PROFILE



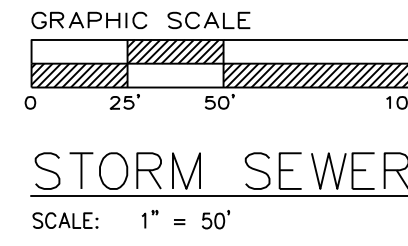
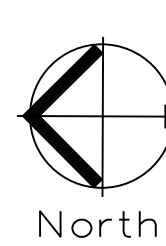
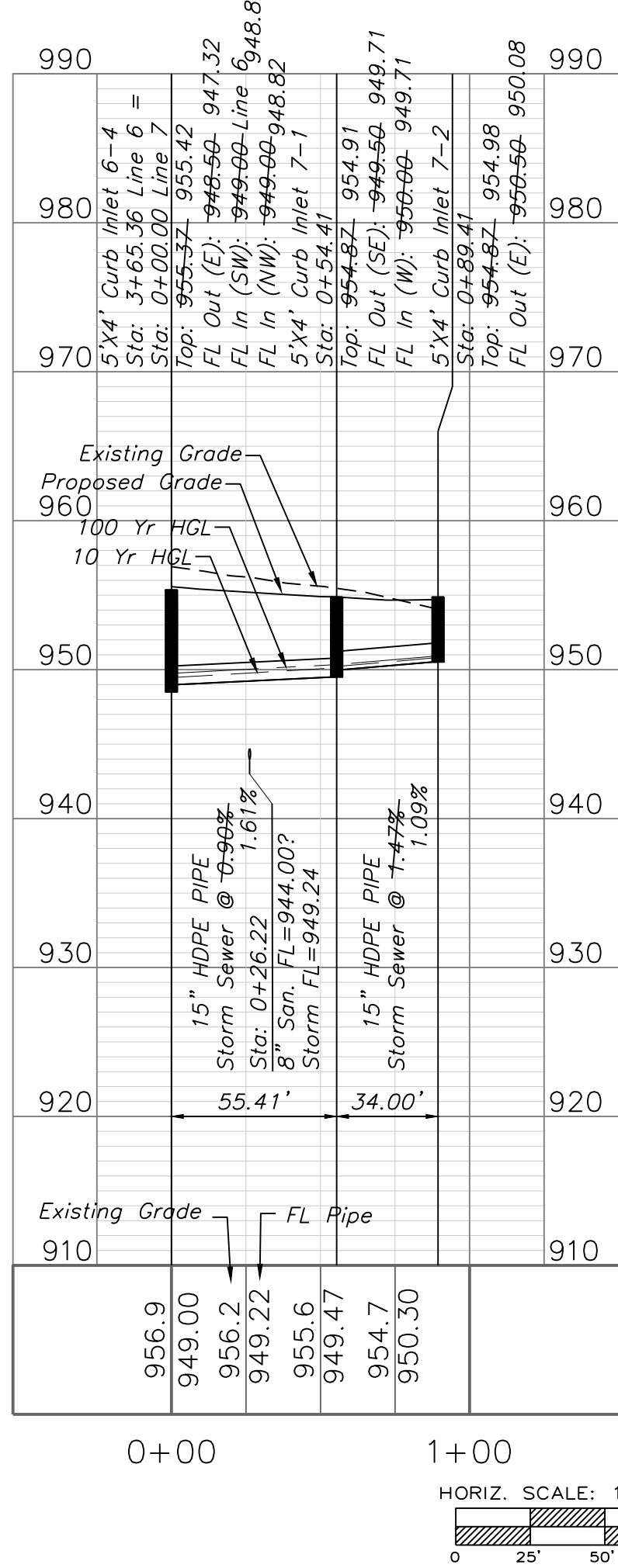
STORM LINE 6



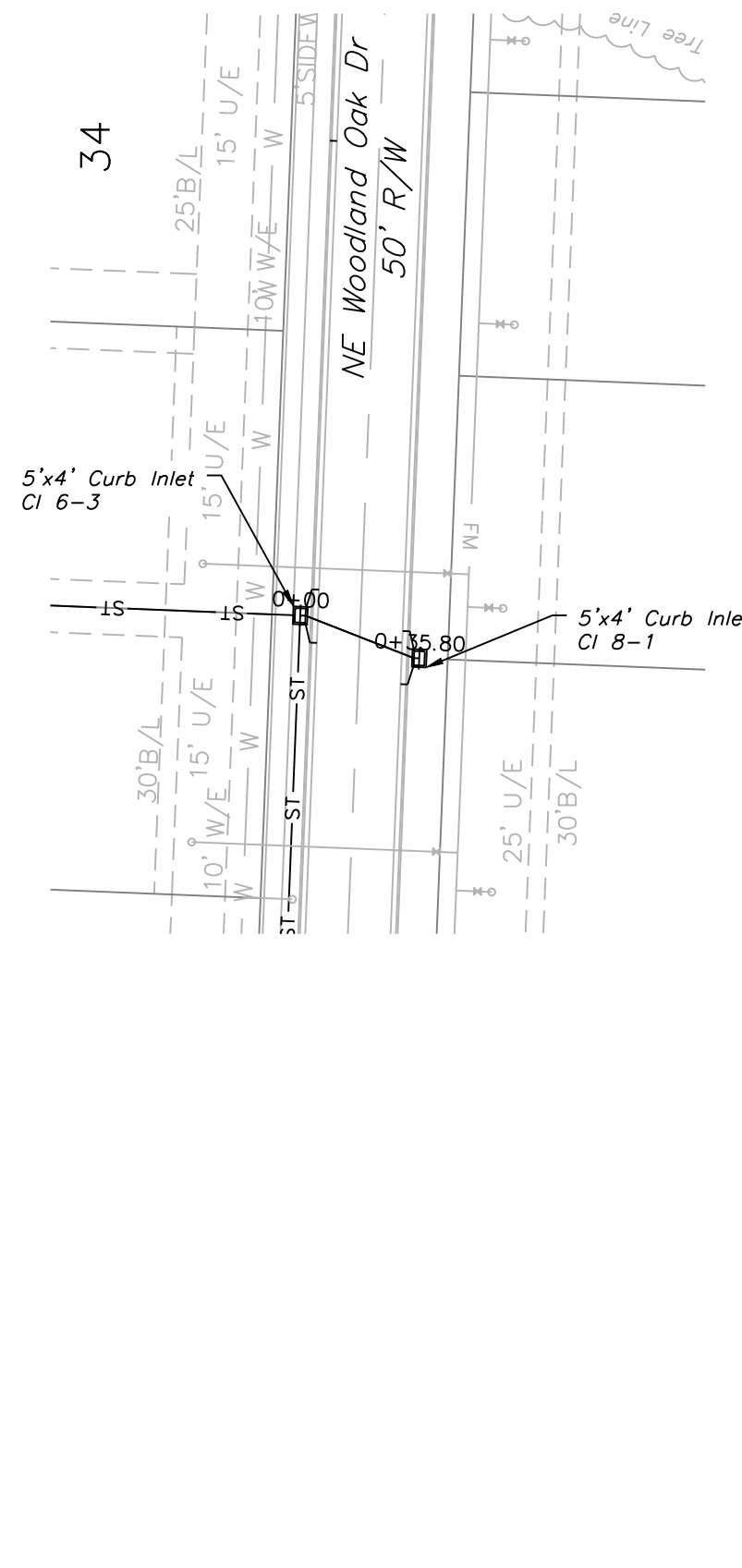
STORM SEWER PLAN & PROFILE



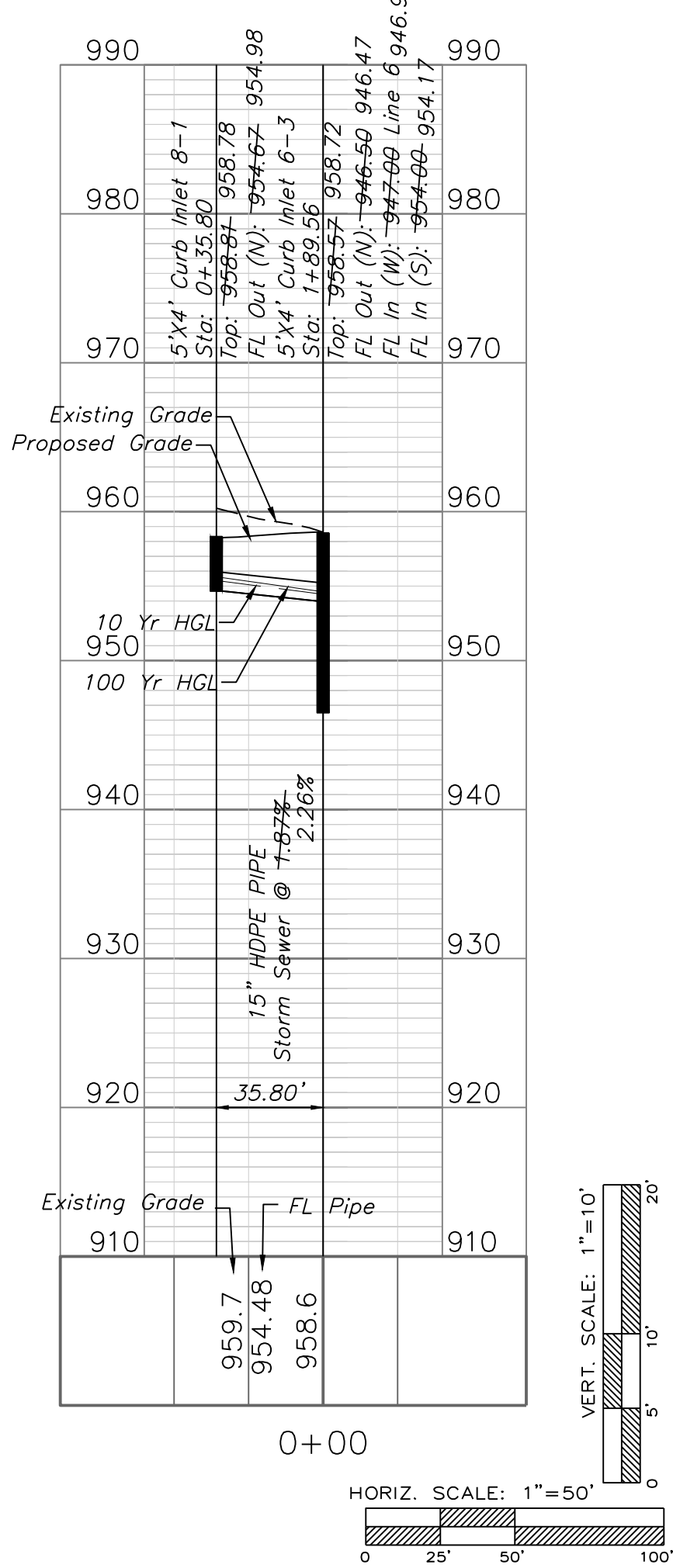
STORM LINE 7



STORM SEWER PLAN & PROFILE



STORM LINE 8



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Date: 1/18/2024  
Certified by: Matthew J. Schlicht  
Title: Engineer  
Firm: Engineering Solutions







| 10-YEAR INLET |          |              |                    |                 |                     |                 |                       |                    |                    |           |                    |                    |                        |                     |                           |                           |                    |                     |                      |                     |                      |             |
|---------------|----------|--------------|--------------------|-----------------|---------------------|-----------------|-----------------------|--------------------|--------------------|-----------|--------------------|--------------------|------------------------|---------------------|---------------------------|---------------------------|--------------------|---------------------|----------------------|---------------------|----------------------|-------------|
| D.S. Str.     | Str. No. | Area<br>(ac) | InletTime<br>(min) | Int.<br>(in/hr) | RunoffCoeff.<br>(C) | Q =CIA<br>(cfs) | Q Carry-over<br>(cfs) | QCaptured<br>(cfs) | QBypassed<br>(cfs) | JunctType | CurbHeight<br>(in) | CurbLength<br>(ft) | GutterSlope<br>(ft/ft) | GutterWidth<br>(ft) | CrossSlope, Sw<br>(ft/ft) | CrossSlope, Sx<br>(ft/ft) | InletDepth<br>(ft) | BypassDepth<br>(ft) | BypassSpread<br>(ft) | GutterDepth<br>(ft) | GutterSpread<br>(ft) | Bypass Str. |
| 1-1           | 1-2      | 0.77         | 8.8                | 6.37            | 0.51                | 2.5             | 0                     | 2.5                | 0                  | Dp-Curb   | 6                  | 8                  | Sag                    | .....               | 0.02                      | 0.02                      | 0.22               | n/a                 | n/a                  | 0.22                | 11.06                | Sag         |
| 2-1           | 2-2      | 0.28         | 5.3                | 7.26            | 0.51                | 1.04            | 0                     | 1.04               | 0                  | Dp-Curb   | 6                  | 8                  | Sag                    | .....               | 0.02                      | 0.02                      | 0.12               | n/a                 | n/a                  | 0.12                | 6.15                 | Sag         |
| 2-2           | 2-3      | 0.12         | 5.9                | 7.08            | 0.51                | 0.43            | 0.12                  | 0.3                | 0.26               | Curb      | 10                 | 5                  | 0.038                  | 2                   | 0.05                      | 0.02                      | 0.12               | 0.09                | 1.77                 | 0.12                | 2.87                 | 2-6         |
| 2-3           | 2-4      | 0.6          | 6.2                | 7               | 0.51                | 2.14            | 1.91                  | 0.89               | 3.16               | Curb      | 10                 | 5                  | 0.038                  | 2                   | 0.05                      | 0.02                      | 0.22               | 0.21                | 7.35                 | 0.22                | 8.19                 | 2-5         |
| 2-4           | 2-5R     | 0.4          | 6.4                | 6.95            | 0.51                | 1.42            | 3.16                  | 4.58               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.44               | n/a                 | n/a                  | 0.44                | 18.84                | Sag         |
| 2-4           | 2-5L     | 0.55         | 8.1                | 6.53            | 0.51                | 1.83            | 0                     | 1.83               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.26               | n/a                 | n/a                  | 0.26                | 10.22                | Sag         |
| 2-5           | 2-6R     | 0.16         | 6.5                | 6.92            | 0.51                | 0.56            | 0.26                  | 0.82               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.18               | n/a                 | n/a                  | 0.18                | 6.01                 | Sag         |
| 2-5           | 2-6L     | 0.08         | 6.2                | 7               | 0.51                | 0.29            | 0                     | 0.29               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.12               | n/a                 | n/a                  | 0.12                | 2.96                 | Sag         |
| 2-4           | 3-1      | 0.19         | 8.8                | 6.37            | 0.51                | 0.62            | 0                     | 0.62               | 0                  | Dp-Curb   | 6                  | 4                  | Sag                    | .....               | 0.02                      | 0.02                      | 0.14               | n/a                 | n/a                  | 0.14                | 6.91                 | Sag         |
| 2-2           | 4-1      | 0.54         | 6.8                | 6.84            | 0.51                | 1.88            | 0                     | 1.88               | 0                  | Dp-Curb   | 6                  | 4                  | Sag                    | .....               | 0.02                      | 0.02                      | 0.29               | n/a                 | n/a                  | 0.29                | 14.55                | Sag         |
| 4-1           | 4-2      | 0.32         | 7.6                | 6.65            | 0.51                | 1.08            | 0                     | 1.08               | 0                  | Dp-Curb   | 6                  | 4                  | Sag                    | .....               | 0.02                      | 0.02                      | 0.2                | n/a                 | n/a                  | 0.2                 | 10.06                | Sag         |
| 4-2           | 4-3      | 0.08         | 5.6                | 7.17            | 0.51                | 0.29            | 0.03                  | 0.19               | 0.12               | Curb      | 10                 | 5                  | 0.05                   | 2                   | 0.05                      | 0.02                      | 0.09               | 0.06                | 1.27                 | 0.09                | 1.81                 | 2-3         |
| 4-3           | 4-4      | 0.37         | 7                  | 6.79            | 0.51                | 1.28            | 1.28                  | 0.66               | 1.91               | Curb      | 10                 | 5                  | 0.05                   | 2                   | 0.05                      | 0.02                      | 0.19               | 0.17                | 5.45                 | 0.19                | 6.28                 | 2-4         |
| 5-1           | 5-2      | 0.4          | 6.1                | 7.03            | 0.51                | 1.43            | 0                     | 1.43               | 0                  | Dp-Curb   | 6                  | 16                 | Sag                    | .....               | 0.02                      | 0.02                      | 0.1                | n/a                 | n/a                  | 0.1                 | 4.81                 | Sag         |
| 5-2           | 5-3      | 0.61         | 6.3                | 6.98            | 0.51                | 2.17            | 0                     | 2.17               | 0                  | Dp-Curb   | 6                  | 16                 | Sag                    | .....               | 0.02                      | 0.02                      | 0.13               | n/a                 | n/a                  | 0.13                | 6.34                 | Sag         |
| 5-3           | 5-4      | 0.5          | 6.3                | 6.98            | 0.51                | 1.78            | 0                     | 1.78               | 0                  | Dp-Curb   | 6                  | 16                 | Sag                    | .....               | 0.02                      | 0.02                      | 0.11               | n/a                 | n/a                  | 0.11                | 5.55                 | Sag         |
| 6-1           | 6-2      | 0            | 0                  | 0               | 0.51                | 0               | .....                 | .....              | .....              | MH        | .....              | .....              | .....                  | .....               | .....                     | .....                     | .....              | .....               | .....                | .....               | .....                | Sag         |
| 6-2           | 6-3      | 0.13         | 6.4                | 6.95            | 0.51                | 0.46            | 0                     | 0.3                | 0.16               | Curb      | 10                 | 5                  | 0.02                   | 2                   | 0.05                      | 0.02                      | 0.12               | 0.08                | 1.65                 | 0.12                | 3.14                 | 6-4         |
| 6-3           | 6-4      | 0.1          | 6.1                | 7.03            | 0.51                | 0.36            | 0.16                  | 0.33               | 0.19               | Curb      | 10                 | 5                  | 0.02                   | 2                   | 0.05                      | 0.02                      | 0.13               | 0.09                | 1.76                 | 0.13                | 3.38                 | 4-4         |
| 6-4           | 6-5R     | 0.7          | 7.6                | 6.65            | 0.51                | 2.37            | 2.26                  | 4.63               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.44               | n/a                 | n/a                  | 0.44                | 18.99                | Sag         |
| 6-4           | 6-5L     | 0.21         | 7                  | 6.79            | 0.51                | 0.73            | 0                     | 0.73               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.17               | n/a                 | n/a                  | 0.17                | 5.52                 | Sag         |
| 6-5           | 6-6      | 0.07         | 5.8                | 7.11            | 0.51                | 0.25            | 0                     | 0.23               | 0.03               | Curb      | 10                 | 5                  | 0.01                   | 2                   | 0.05                      | 0.02                      | 0.11               | 0.05                | 0.95                 | 0.11                | 2.62                 | 4-3         |
| 6-4           | 7-1R     | 0.17         | 8.2                | 6.5             | 0.51                | 0.56            | 0                     | 0.37               | 0.19               | Curb      | 10                 | 5                  | 0.014                  | 2                   | 0.05                      | 0.02                      | 0.14               | 0.09                | 1.9                  | 0.14                | 3.99                 | 4-4         |
| 6-4           | 7-1L     | 0.37         | 7.3                | 6.72            | 0.51                | 1.27            | 0                     | 0.6                | 0.66               | Curb      | 10                 | 5                  | 0.014                  | 2                   | 0.05                      | 0.02                      | 0.18               | 0.15                | 4.38                 | 0.18                | 6.08                 | 4-4         |
| 7-1           | 7-2      | 0.19         | 7.3                | 6.72            | 0.51                | 0.65            | 0                     | 0.41               | 0.24               | Curb      | 10                 | 5                  | 0.014                  | 2                   | 0.05                      | 0.02                      | 0.15               | 0.1                 | 2.19                 | 0.15                | 4.33                 | 4-4         |
| 6-3           | 8-1      | 0.97         | 8.6                | 6.41            | 0.51                | 3.17            | 0                     | 0.91               | 2.26               | Curb      | 10                 | 5                  | 0.02                   | 2                   | 0.05                      | 0.02                      | 0.23               | 0.21                | 7.3                  | 0.23                | 8.46                 | 6-5         |
| 9-1           | 9-2      | 0            | 0                  | 0               | 0.51                | 0               | .....                 | .....              | .....              | MH        | .....              | .....              | .....                  | .....               | .....                     | .....                     | .....              | .....               | .....                | .....               | .....                | Sag         |
| 9-2           | 9-3R     | 0.25         | 7.5                | 6.67            | 0.51                | 0.85            | 0                     | 0.85               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.18               | n/a                 | n/a                  | 0.18                | 6.13                 | Sag         |
| 9-2           | 9-3L     | 0.19         | 6.7                | 6.87            | 0.51                | 0.67            | 0                     | 0.67               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.16               | n/a                 | n/a                  | 0.16                | 5.21                 | Sag         |
| 10-1          | 10-2     | 0.35         | 6.3                | 6.98            | 0.51                | 1.25            | 0                     | 1.25               | 0                  | Dp-Curb   | 6                  | 8                  | Sag                    | .....               | 0.02                      | 0.02                      | 0.14               | n/a                 | n/a                  | 0.14                | 6.95                 | Sag         |
| 10-2          | 10-3     | 1.26         | 9.7                | 6.18            | 0.51                | 3.97            | 0                     | 3.97               | 0                  | Dp-Curb   | 6                  | 16                 | Sag                    | .....               | 0.02                      | 0.02                      | 0.19               | n/a                 | n/a                  | 0.19                | 9.48                 | Sag         |

EX. RIPRAP APRON CALCULATIONS

Field End Section #

1-1

Q =

3.4

cfs

D =

1.25

ft

Tw =

0.5

ft

g =

32.2

ft/s^2

D<sub>50</sub> =

1.80

inches

S =

0.0231

ft/ft

n =

0.01

Qcap =

12.71

ft^3/s

Q/Qcap =

0.27

d/D =

0.35

d =

0.44

ft

Vcap =

10.36

ft^2/s

V/Vcap =

0.8430

V =

8.73

ft/s

Fr =

2.33

Flow =

Supercritical

D' =

0.84

ft

yn =

0.44

ft

D<sub>50</sub> =

3.04

inches

Classify

3.04

inches

D<sub>50</sub> = riprap size, m(ft)

D = design discharge, m^3/s (ft^3/s)

D = culvert diameter (circular), m(ft)

Tw = tailwater depth, m(ft), if unknown use 0.4\*D

g = acceleration due to gravity, 9.81 m/s^2 (32.2 ft/s^2)

Subcritical Flow

S = pipe slope, m(m)/ft(ft)

n = manning's roughness coefficient, unitless

Qcap = full pipe capacity, m^3/s(ft^3/s)

Q/Qcap = design discharge/full pipe capacity, unitless

d/D = water depth/pipe diameter, unitless

d = depth of flow, m(ft)

Velocity Full m^2/2s(ft^2/s)

V/Vcap = design velocity/full pipe velocity, unitless

V = velocity of flow segment, m^2/s(ft^2/s)

Fr > 1 Supercritical, Fr = 1 Critical, Fr < 1 Subcritical

If flow is Supercritical adjust culvert diameter

D' = culvert diameter adjustment, m(ft)

yn = normal (supercritical) depth in culvert, m(ft)

Class 1

Use D<sub>50</sub> = 5

Apron Length =

4 \* D

5.00

ft

Use

5.00

ft

Apron Depth =

3.5 \* D<sub>50</sub>

17.50

inches

Use

18.00

inches

Apron Width =

3\*D+(2/3)L

7.08

ft

Use

8.00

ft

| 10-YEAR PIPE |           |                    |                   |                   |                     |           |            |                    |                   |                     |                      |                    |                    |                 |                  |                  |                    |                    |               |               |                    |                    |
|--------------|-----------|--------------------|-------------------|-------------------|---------------------|-----------|------------|--------------------|-------------------|---------------------|----------------------|--------------------|--------------------|-----------------|------------------|------------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|
| D.S. Str.    | U.S. Str. | LineLength<br>(ft) | Incr.Area<br>(ac) | TotalArea<br>(ac) | RunoffCoeff.<br>(C) | IncrC x A | TotalC x A | InletTime<br>(min) | TimeConc<br>(min) | RnfalInt<br>(in/hr) | TotalRunoff<br>(cfs) | TotalFlow<br>(cfs) | CapacFull<br>(cfs) | Veloc<br>(ft/s) | PipeSize<br>(in) | PipeSlope<br>(%) | Inv ElevDn<br>(ft) | Inv ElevUp<br>(ft) | HGLDn<br>(ft) | HGLUp<br>(ft) | Grnd/RimDn<br>(ft) | Grnd/RimUp<br>(ft) |
| 1-1          | 1-2       | 139.4              | 0.77              | 0.77              | 0.51                | 0.39      | 0.39       | 8.8                | 8.8               | 6.4                 | 2.5                  | 2.5                | 12.32              | 5.94            | 15               | 2.15             | 912                | 915                | 912.38        | 915.63        | 0                  | 918.5              |
| 2-1          | 2-2       | 50.18              | 0.28              | 3.69              | 0.51                | 0.14      | 1.88       | 5.3                | 9.6               | 6.2                 | 11.67                | 11.67              | 71.89              | 11.31           | 24               | 5.98             | 912                | 915                | 912.55        | 916.23        | 0                  | 924.5              |
| 2-2          | 2-3       | 138.03             | 0.12              | 2.1               | 0.51                | 0.06      | 1.07       | 5.9                | 9.4               | 6.2                 | 6.69                 | 6.69               | 40.78              | 11.18           | 18               | 8.93             | 920                | 932.32             | 920.41        | 933.32        | 924.5              | 941.27             |
| 2-3          | 2-4       | 46.47              | 0.6               | 1.98              | 0.51                | 0.31      | 1.01       | 6.2                | 9.3               | 6.3                 | 6.33                 | 6.33               | 14.16              | 6.51            | 18               | 1.08             | 932.82             | 933.32             | 932.51        | 934.29        | 941.27             | 940.79             |
| 2-4          | 2-5R      | 94.12              | 0.4               | 1.19              | 0.51                | 0.2       | 0.61       | 6.4                | 8.1               | 6.5                 | 3.96                 | 3.96               | 9.4                | 6.04            | 15               | 1.25             | 933.82             | 935                | 934.39        | 935.8         | 940.79             | 939.79             |
| 2-4          | 2-5L      | 1                  | 0.55              | 0.55              | 0.51                | 0.28      | 0.28       | 8.1                | 8.1               | 6.5                 | 1.83                 | 1.83               | 26.54              | 2.91            | 15               | 10               | 935                | 935.1              | 935.8         | 935.64        | 939.79             | 939.79             |
| 2-5          | 2-6R      | 34                 | 0.16              | 0.24              | 0.51                | 0.08      | 0.12       | 6.5                | 6.5               | 6.9                 | 0.85                 | 0.85               | 7.75               | 3.28            | 15               | 0.85             | 935.5              | 935.79             | 935.8         | 936.15        | 939.79             | 939.79             |
| 2-5          | 2-6L      | 1                  | 0.08              | 0.08              | 0.51                | 0.04      | 0.04       | 6.2                | 6.2               | 7                   | 0.29                 | 0.29               | 26.55              | 1.56            | 15               | 10               | 935.79             | 935.89             | 936.15        | 936.1         | 939.79             | 939.79             |
| 2-4          | 3-1       | 128.62             | 0.19              | 0.19              | 0.51                | 0.1       | 0.1        | 8.8                | 8.8               | 6.4                 | 0.62                 | 0.62               | 17.36              | 4.65            | 15               | 4.28             | 936                | 941.5              | 936.16        | 941.81        | 940.79             | 946.25             |
| 2-2          | 4-1       | 113.49             | 0.54              | 1.31              | 0.51                | 0.28      | 0.67       | 6.8                | 8.3               | 6.5                 | 4.33                 | 4.33               | 14.33              | 5.82            | 18               | 1.1              | 916.5              | 917.75             | 917.07        | 918.55        | 924.5              | 924.5              |
| 4-1          | 4-2       | 189.85             | 0.32              | 0.77              | 0.51                | 0.16      | 0.39       | 7.6                | 7.6               | 6.6                 | 2.61                 | 2.61               | 25.85              | 4.56            | 15               | 9.48             | 918                | 936                | 918.55        | 936.65        | 924.5              | 944.33             |
| 4-2          | 4-3       | 135.55             | 0.08              | 0.45              | 0.51                | 0.04      | 0.23       | 5.6                | 7.1               | 6.8                 | 1.55                 | 1.55               | 16.12              | 5.87            | 15               | 3.69             | 940                | 945                | 940.26        | 945.49        | 944.33             | 950.08             |
| 4-3          | 4-4       | 34                 | 0.37              | 0.37              | 0.51                | 0.19      | 0.19       | 7                  | 7                 | 6.8                 | 1.28                 | 1.28               | 12.47              | 4.55            | 15               | 2.21             | 945.2              | 945.95             | 945.49        | 946.4         | 950.08             | 950.08             |
| 5-1          | 5-2       | 96.83              | 0.4               | 1.51              | 0.51                | 0.2       | 0.77       | 6.1                | 7.8               | 6.6                 | 5.09                 | 5.09               | 9.61               | 5.16            | 18               | 0.5              | 937                | 937.48             | 937.78        | 938.35        | 0                  | 944                |
| 5-2          | 5-3       | 259.22             | 0.61              | 1.11              | 0.51                | 0.31      | 0.57       | 6.3                | 6.9               | 6.8                 | 3.87                 | 3.87               | 9.67               | 4.76            | 18               | 0.5              | 937.98             | 939.28             | 938.64        | 940.03        | 944                | 944                |
| 5-3          | 5-4       | 132.58             | 0.5               | 0.5               | 0.51                | 0.26      | 0.26       | 6.3                | 6.3               | 7                   | 1.78                 | 1.78               | 5.92               | 3.91            | 15               | 0.5              | 939.78             | 940.44             | 940.25        | 940.97        | 944                | 944                |
| 6-1          | 6-2       | 49.06              | 0                 | 2.91              | 0.51                | 0         | 1.48       | 0                  | 9.2               | 6.3                 | 9.33                 | 9.33               | 72.71              | 10.62           | 24               | 6.11             | 940                | 943                | 940.48        | 944.09        | 0                  | 950.2              |
| 6-2          | 6-3       | 140.5              | 0.13              | 2.91              | 0.51                | 0.07      | 1.48       | 6.4                | 8.9               | 6.4                 | 9.44                 | 9.44               | 30.38              | 6.94            | 24               | 1.07             | 945                | 946.5              | 945.77        | 947.6         | 950.2              | 958.57             |
| 6-3          | 6-4       | 175.8              | 0.1               | 1.81              | 0.51                | 0.05      | 0.92       | 6.1                | 8.4               | 6.5                 | 5.97                 | 5.97               | 12.61              | 6.07            | 18               | 0.85             | 947                | 948.5              | 947.73        | 949.44        | 958.57             | 955.36             |
| 6-4          | 6-5R      | 79.6               | 0.7               | 0.98              | 0.51                | 0.36      | 0.5        | 7.6                | 7.6               | 6.6                 | 3.32                 | 3.32               | 6.65               | 4.93            | 15               | 0.63             | 949                | 949.5              | 949.62        | 950.23        | 955.36             | 954.54             |
| 6-4          | 6-5L      | 1                  | 0.21              | 0.21              | 0.51                | 0.11      | 0.11       | 7                  | 7                 | 6.8                 | 0.73                 | 0.73               | 26.54              | 1.87            | 15               | 10               | 949.5              | 949.6              | 950.23        | 949.93        | 954.54             | 954.54             |
| 6-5          | 6-6       | 34                 | 0.07              | 0.07              | 0.51                | 0.04      | 0.04       | 5.8                | 5.8               | 5.8                 | 1.01                 | 1.01               | 10.58              | 1.84            | 15               | 1.59             | 950                | 950.54             | 950.23        | 950.73        | 954.54             | 954.54             |
| 6-4          | 7-1R      | 50                 | 0.17              | 0.73              | 0.51                | 0.09      | 0.37       | 8.2                | 8.2               | 6.5                 | 2.42                 | 2.42               | 8.39               | 4.94            | 15               | 1                | 949                | 949.5              | 949.46        | 950.12        | 955.36             | 954.87             |
| 6-4          | 7-1L      | 1                  | 0.37              | 0.56              | 0.51                | 0.19      | 0.29       | 7.3                | 7.5               | 6.7                 | 1.91                 | 1.91               | 26.54              | 3.4             | 15               | 10               | 949.5              | 949.6              | 950.12        | 950.54        | 954.87             | 954.87             |
| 7-1          | 7-2       | 34                 | 0.19              | 0.19              | 0.51                | 0.1       | 0.1        | 7.3                | 7.3               | 6.7                 | 0.65                 | 0.65               | 10.18              | 3.67            | 15               | 1.47             | 950                | 950.5              | 950.21        | 950.81        | 954.87             | 954.87             |
| 6-3          | 8-1       | 35.8               | 0.97              | 0.97              | 0.51                | 0.49      | 0.49       | 8.6                | 8.6               | 6.4                 | 3.17                 | 3.17               | 11.48              | 6.18            | 15               | 1.87             | 954                | 954.67             | 954.45        | 955.39        | 958.57             | 958.33             |
| 9-1          | 9-2       | 75                 | 0                 | 0.44              | 0.51                | 0         | 0.22       | 0                  | 7.8               | 6.6                 | 1.48                 | 1.48               | 8.67               | 4.34            | 15               | 1.07             | 942                | 942.8              | 942.35        | 943.28        | 0                  | 950.86             |
| 9-2          | 9-3R      | 96.85              | 0.25              | 0.44              | 0.51                | 0.13      | 0.22       | 7.5                | 7.5               | 6.7                 | 1.5                  | 1.5                | 24.13              | 5.33            | 15               | 8.26             | 943                | 951                | 943.28        | 951.48        | 950.86             | 956.92             |
| 9-2          | 9-3L      | 1                  | 0.19              | 0.19              | 0.51                | 0.1       | 0.1        | 6.7                | 6.7               | 6.9                 | 0.67                 | 0.67               | 26.54              | 5.93            | 15               | 10               | 952                | 952.1              | 952.14        | 952.42        | 956.92             | 956.92             |
| 10-1         | 10-2      | 134.78             | 0.35              | 1.61              | 0.51                | 0.18      | 0.82       | 6.3                | 10.2              | 6.1                 | 4.98                 | 4.98               | 14.46              | 7.97            | 15               | 2.97             | 938                | 942                | 938.51        | 942.9         | 0                  | 946                |
| 10-2         | 10-3      | 165.22             | 1.26              | 1.26              | 0.51                | 0.64      | 0.64       | 9.7                | 9.7               | 6.2                 | 3.97                 | 3.97               | 12.22              | 5.16            | 15               | 2.12             | 942.2              | 942.8              | 942.9         | 946.51        | 946                | 949.7              |



| 100-YEAR INLET |          |              |                    |                 |                     |                |                       |                    |                    |           |                    |                    |                        |                     |                           |                           |                    |                     |                      |                     |                      |             |
|----------------|----------|--------------|--------------------|-----------------|---------------------|----------------|-----------------------|--------------------|--------------------|-----------|--------------------|--------------------|------------------------|---------------------|---------------------------|---------------------------|--------------------|---------------------|----------------------|---------------------|----------------------|-------------|
| D.S. Str.      | Str. No. | Area<br>(ac) | InletTime<br>(min) | Int.<br>(in/hr) | RunoffCoeff.<br>(C) | Q=CIA<br>(cfs) | Q Carry-over<br>(cfs) | QCaptured<br>(cfs) | QBypassed<br>(cfs) | JunctType | CurbHeight<br>(in) | CurbLength<br>(ft) | GutterSlope<br>(ft/ft) | GutterWidth<br>(ft) | CrossSlope, Sw<br>(ft/ft) | CrossSlope, Sx<br>(ft/ft) | InletDepth<br>(ft) | BypassDepth<br>(ft) | BypassSpread<br>(ft) | GutterDepth<br>(ft) | GutterSpread<br>(ft) | Bypass Str. |
| 1-1            | 1-2      | 0.77         | 8.8                | 11.31           | 0.51                | 4.44           | 0                     | 4.44               | 0                  | Dp-Curb   | 6                  | 8                  | Sag                    | ....                | 0.02                      | 0.02                      | 0.32               | n/a                 | n/a                  | 0.32                | 16.22                | Sag         |
| 2-1            | 2-2      | 0.28         | 5.3                | 12.75           | 0.51                | 1.82           | 0                     | 1.82               | 0                  | Dp-Curb   | 6                  | 8                  | Sag                    | ....                | 0.02                      | 0.02                      | 0.18               | n/a                 | n/a                  | 0.18                | 8.95                 | Sag         |
| 2-2            | 2-3      | 0.12         | 5.9                | 12.48           | 0.51                | 0.76           | 0.32                  | 0.44               | 0.64               | Curb      | 10                 | 5                  | 0.038                  | 2                   | 0.05                      | 0.02                      | 0.15               | 0.12                | 3.17                 | 0.15                | 4.36                 | 7           |
| 2-3            | 2-4      | 0.6          | 6.2                | 12.34           | 0.51                | 3.78           | 4.31                  | 1.27               | 6.82               | Curb      | 10                 | 5                  | 0.038                  | 2                   | 0.05                      | 0.02                      | 0.28               | 0.26                | 10.19                | 0.28                | 10.92                | 5           |
| 2-4            | 2-5R     | 0.4          | 6.4                | 12.26           | 0.51                | 2.5            | 6.82                  | 9.32               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.67               | n/a                 | n/a                  | 0.67                | 30.26                | Sag         |
| 2-4            | 2-5L     | 0.55         | 8.1                | 11.57           | 0.51                | 3.24           | 0                     | 3.24               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.36               | n/a                 | n/a                  | 0.36                | 14.97                | Sag         |
| 2-5            | 2-6R     | 0.16         | 6.5                | 12.21           | 0.51                | 1              | 0.64                  | 1.64               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.25               | n/a                 | n/a                  | 0.25                | 9.5                  | Sag         |
| 2-5            | 2-6L     | 0.08         | 6.2                | 12.34           | 0.51                | 0.5            | 0                     | 0.5                | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.15               | n/a                 | n/a                  | 0.15                | 4.32                 | Sag         |
| 2-4            | 3-1      | 0.19         | 8.8                | 11.31           | 0.51                | 1.1            | 0                     | 1.1                | 0                  | Dp-Curb   | 6                  | 4                  | Sag                    | ....                | 0.02                      | 0.02                      | 0.2                | n/a                 | n/a                  | 0.2                 | 10.13                | Sag         |
| 2-2            | 4-1      | 0.54         | 6.8                | 12.08           | 0.51                | 3.33           | 0                     | 3.33               | 0                  | Dp-Curb   | 6                  | 4                  | Sag                    | ....                | 0.02                      | 0.02                      | 0.43               | n/a                 | n/a                  | 0.43                | 21.26                | Sag         |
| 4-1            | 4-2      | 0.32         | 7.6                | 11.76           | 0.51                | 1.92           | 0                     | 1.92               | 0                  | Dp-Curb   | 6                  | 4                  | Sag                    | ....                | 0.02                      | 0.02                      | 0.29               | n/a                 | n/a                  | 0.29                | 14.72                | Sag         |
| 4-2            | 4-3      | 0.08         | 5.6                | 12.61           | 0.51                | 0.51           | 0.1                   | 0.3                | 0.32               | Curb      | 10                 | 5                  | 0.05                   | 2                   | 0.05                      | 0.02                      | 0.12               | 0.09                | 1.82                 | 0.12                | 2.8                  | 3           |
| 4-3            | 4-4      | 0.37         | 7                  | 12              | 0.51                | 2.26           | 2.99                  | 0.95               | 4.31               | Curb      | 10                 | 5                  | 0.05                   | 2                   | 0.05                      | 0.02                      | 0.23               | 0.22                | 7.92                 | 0.23                | 8.63                 | 4           |
| 5-1            | 5-2      | 0.4          | 6.1                | 12.39           | 0.51                | 2.53           | 0                     | 2.53               | 0                  | Dp-Curb   | 6                  | 16                 | Sag                    | ....                | 0.02                      | 0.02                      | 0.14               | n/a                 | n/a                  | 0.14                | 7.02                 | Sag         |
| 5-2            | 5-3      | 0.61         | 6.3                | 12.3            | 0.51                | 3.83           | 0                     | 3.83               | 0                  | Dp-Curb   | 6                  | 16                 | Sag                    | ....                | 0.02                      | 0.02                      | 0.19               | n/a                 | n/a                  | 0.19                | 9.25                 | Sag         |
| 5-3            | 5-4      | 0.5          | 6.3                | 12.3            | 0.51                | 3.14           | 0                     | 3.14               | 0                  | Dp-Curb   | 6                  | 16                 | Sag                    | ....                | 0.02                      | 0.02                      | 0.16               | n/a                 | n/a                  | 0.16                | 8.1                  | Sag         |
| 6-1            | 6-2      | 0            | 0                  | 0               | 0.51                | 0              | ....                  | ....               | ....               | MH        | ....               | ....               | ....                   | ....                | ....                      | ....                      | ....               | ....                | ....                 | ....                | ....                 | ....        |
| 6-2            | 6-3      | 0.13         | 6.4                | 12.26           | 0.51                | 0.81           | 0                     | 0.43               | 0.38               | Curb      | 10                 | 5                  | 0.02                   | 2                   | 0.05                      | 0.02                      | 0.15               | 0.11                | 2.74                 | 0.15                | 4.44                 | 19          |
| 6-3            | 6-4      | 0.1          | 6.1                | 12.39           | 0.51                | 0.63           | 0.38                  | 0.49               | 0.52               | Curb      | 10                 | 5                  | 0.02                   | 2                   | 0.05                      | 0.02                      | 0.16               | 0.13                | 3.41                 | 0.16                | 4.98                 | 13          |
| 6-4            | 6-5R     | 0.7          | 7.6                | 11.76           | 0.51                | 4.2            | 4.4                   | 8.6                | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.63               | n/a                 | n/a                  | 0.63                | 28.69                | Sag         |
| 6-4            | 6-5L     | 0.21         | 7                  | 12              | 0.51                | 1.29           | 0                     | 1.29               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.22               | n/a                 | n/a                  | 0.22                | 8.07                 | Sag         |
| 6-5            | 6-6      | 0.07         | 5.8                | 12.52           | 0.51                | 0.45           | 0                     | 0.34               | 0.1                | Curb      | 10                 | 5                  | 0.01                   | 2                   | 0.05                      | 0.02                      | 0.14               | 0.08                | 1.61                 | 0.14                | 3.84                 | 12          |
| 6-4            | 7-1R     | 0.17         | 8.2                | 11.53           | 0.51                | 1              | 0                     | 0.53               | 0.47               | Curb      | 10                 | 5                  | 0.014                  | 2                   | 0.05                      | 0.02                      | 0.17               | 0.13                | 3.59                 | 0.17                | 5.42                 | 13          |
| 6-4            | 7-1L     | 0.37         | 7.3                | 11.88           | 0.51                | 2.24           | 0                     | 0.82               | 1.42               | Curb      | 10                 | 5                  | 0.014                  | 2                   | 0.05                      | 0.02                      | 0.22               | 0.19                | 6.41                 | 0.22                | 7.87                 | 13          |
| 7-1            | 7-2      | 0.19         | 7.3                | 11.88           | 0.51                | 1.15           | 0                     | 0.57               | 0.58               | Curb      | 10                 | 5                  | 0.014                  | 2                   | 0.05                      | 0.02                      | 0.18               | 0.14                | 4.06                 | 0.18                | 5.81                 | 13          |
| 6-3            | 8-1      | 0.97         | 8.6                | 11.38           | 0.51                | 5.63           | 0                     | 1.23               | 4.4                | Curb      | 10                 | 5                  | 0.02                   | 2                   | 0.05                      | 0.02                      | 0.27               | 0.25                | 9.71                 | 0.27                | 10.74                | 20          |
| 9-1            | 9-2      | 0            | 0                  | 0               | 0.51                | 0              | ....                  | ....               | ....               | MH        | ....               | ....               | ....                   | ....                | ....                      | ....                      | ....               | ....                | ....                 | ....                | ....                 | ....        |
| 9-2            | 9-3R     | 0.25         | 7.5                | 11.8            | 0.51                | 1.5            | 0                     | 1.5                | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.24               | n/a                 | n/a                  | 0.24                | 8.97                 | Sag         |
| 9-2            | 9-3L     | 0.19         | 6.7                | 12.13           | 0.51                | 1.18           | 0                     | 1.18               | 0                  | Curb      | 10                 | 5                  | Sag                    | 2                   | 0.05                      | 0.02                      | 0.21               | n/a                 | n/a                  | 0.21                | 7.61                 | Sag         |
| 10-1           | 10-2     | 0.35         | 6.3                | 12.3            | 0.51                | 2.2            | 0                     | 2.2                | 0                  | Dp-Curb   | 6                  | 8                  | Sag                    | ....                | 0.02                      | 0.02                      | 0.2                | n/a                 | n/a                  | 0.2                 | 10.14                | Sag         |
| 10-2           | 10-3     | 1.26         | 9.7                | 10.99           | 0.51                | 7.06           | 0                     | 7.06               | 0                  | Dp-Curb   | 6                  | 16                 | Sag                    | ....                | 0.02                      | 0.02                      | 0.28               | n/a                 | n/a                  | 0.28                | 13.93                | Sag         |

| 100-YEAR PIPE |           |                    |                   |                   |                     |           |            |                    |                   |                     |                      |                    |                    |                 |                  |                  |                    |                    |               |               |                    |                    |
|---------------|-----------|--------------------|-------------------|-------------------|---------------------|-----------|------------|--------------------|-------------------|---------------------|----------------------|--------------------|--------------------|-----------------|------------------|------------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|
| D.S. Str.     | U.S. Str. | LineLength<br>(ft) | Incr.Area<br>(ac) | TotalArea<br>(ac) | RunoffCoeff.<br>(C) | IncrC x A | TotalC x A | InletTime<br>(min) | TimeConc<br>(min) | RnfalInt<br>(in/hr) | TotalRunoff<br>(cfs) | TotalFlow<br>(cfs) | CapacFull<br>(cfs) | Veloc<br>(ft/s) | PipeSize<br>(in) | PipeSlope<br>(%) | Inv ElevDn<br>(ft) | Inv ElevUp<br>(ft) | HGLDn<br>(ft) | HGLUp<br>(ft) | Grnd/RimDn<br>(ft) | Grnd/RimUp<br>(ft) |
| 1-1           | 1-2       | 139.4              | 0.77              | 0.77              | 0.51                | 0.39      | 0.39       | 8.8                | 8.8               | 11.3                | 4.44                 | 4.44               | 12.32              | 4.3             | 15               | 2.15             | 912                | 915                | 915.4         | 915.85        | 0                  | 918.5              |
| 2-1           | 2-2       | 50.18              | 0.28              | 3.69              | 0.51                | 0.14      | 1.88       | 5.3                | 9.5               | 11.1                | 20.84                | 20.84              | 71.89              | 7.11            | 24               | 5.98             | 912                | 915                | 915.4         | 916.63        | 0                  | 924.5              |
| 2-2           | 2-3       | 138.03             | 0.12              | 2.1               | 0.51                | 0.06      | 1.07       | 5.9                | 9.3               | 11.1                | 11.92                | 11.92              | 40.78              | 13.65           | 18               | 8.93             | 920                | 932.32             | 920.56        | 933.63        | 924.5              | 941.27             |
| 2-3           | 2-4       | 46.47              | 0.6               | 1.98              | 0.51                | 0.31      | 1.01       | 6.2                | 9.2               | 11.2                | 11.28                | 11.28              | 14.16              | 7.95            | 18               | 1.08             | 932.82             | 933.32             | 933.83        | 934.6         | 941.27             | 940.79             |
| 2-4           | 2-5R      | 94.12              | 0.4               | 1.19              | 0.51                | 0.2       | 0.61       | 6.4                | 8.1               | 11.6                | 7.02                 | 7.02               | 9.4                | 7.36            | 15               | 1.25             | 933.82             | 935                | 934.63        | 936.06        | 940.79             | 939.79             |
| 2-4           | 2-5L      | 1                  | 0.55              | 0.55              | 0.51                | 0.28      | 0.28       | 8.1                | 8.1               | 11.6                | 3.24                 | 3.24               | 26.54              | 3.66            | 15               | 10               | 935                | 935.1              | 936.06        | 935.83        | 939.79             | 939.79             |
| 2-5           | 2-6R      | 34                 | 0.16              | 0.24              | 0.51                | 0.08      | 0.12       | 6.5                | 6.5               | 12.2                | 1.49                 | 1.49               | 7.75               | 3.11            | 15               | 0.85             | 935.5              | 935.79             | 936.06        | 936.27        | 939.79             | 939.79             |
| 2-5           | 2-6L      | 1                  | 0.08              | 0.08              | 0.51                | 0.04      | 0.04       | 6.2                | 6.2               | 12.3                | 0.5                  | 0.5                | 26.55              | 1.83            | 15               | 10               | 935.79             | 935.89             | 936.27        | 936.17        | 939.79             | 939.79             |
| 2-4           | 3-1       | 128.62             | 0.19              | 0.19              | 0.51                | 0.1       | 0.1        | 8.8                | 8.8               | 11.3                | 1.1                  | 1.1                | 17.36              | 5.5             | 15               | 4.28             | 936                | 941.5              | 936.21        | 941.91        | 940.79             | 946.25             |
| 2-2           | 4-1       | 113.49             | 0.54              | 1.31              | 0.51                | 0.28      | 0.67       | 6.8                | 8.2               | 11.5                | 7.7                  | 7.7                | 14.33              | 6.97            | 18               | 1.1              | 916.5              | 917.75             | 917.28        | 918.82        | 924.5              | 924.5              |
| 4-1           | 4-2       | 189.85             | 0.32              | 0.77              | 0.51                | 0.16      | 0.39       | 7.6                | 7.6               | 11.8                | 4.62                 | 4.62               | 25.85              | 5.22            | 15               | 9.48             | 918                | 936                | 918.82        | 936.87        | 924.5              | 944.33             |
| 4-2           | 4-3       | 135.55             | 0.08              | 0.45              | 0.51                | 0.04      | 0.23       | 5.6                | 7.1               | 12                  | 2.74                 | 2.74               | 16.12              | 6.96            | 15               | 3.69             | 940                | 945                | 940.35        | 945.66        | 944.33             | 950.08             |
| 4-3           | 4-4       | 34                 | 0.37              | 0.37              | 0.51                | 0.19      | 0.19       | 7                  | 7                 | 12                  | 2.26                 | 2.26               | 12.47              | 4.67            | 15               | 2.21             | 945.2              | 945.95             | 945.66        | 946.55        | 950.08             | 950.08             |
| 5-1           | 5-2       | 96.83              | 0.4               | 1.51              | 0.51                | 0.2       | 0.77       | 6.1                | 8.3               | 11.5                | 8.85                 | 8.85               | 9.61               | 5.01            | 18               | 0.5              | 937                | 937.48             | 941.49        | 941.9         | 0                  | 944                |
| 5-2           | 5-3       | 259.22             | 0.61              | 1.11              | 0.51                | 0.31      | 0.57       | 6.3                | 7.2               | 11.9                | 6.76                 | 6.76               | 9.67               | 3.82            | 18               | 0.5              | 937.98             | 939.28             | 942.23        | 942.87        | 944                | 944                |
| 5-3           | 5-4       | 132.58             | 0.5               | 0.5               | 0.51                | 0.26      | 0.26       | 6.3                | 6.3               | 12.3                | 3.14                 | 3.14               | 5.92               | 2.56            | 15               | 0.5              | 939.78             | 940.44             | 943.21        | 943.39        | 944                | 944                |
| 6-1           | 6-2       | 49.06              | 0                 | 2.91              | 0.51                | 0         | 1.48       | 0                  | 9                 | 11.2                | 16.65                | 16.65              | 72.71              | 6.68            | 24               | 6.11             | 940                | 943                | 941.49        | 944.47        | 0                  | 950.2              |
| 6-2           | 6-3       | 140.5              | 0.13              | 2.91              | 0.51                | 0.07      | 1.48       | 6.4                | 8.8               | 11.3                | 16.8                 | 16.8               | 30.38              | 8.34            | 24               | 1.07             | 945                | 946.5              | 946.06        | 947.98        | 950.2              | 958.57             |
| 6-3           | 6-4       | 175.8              | 0.1               | 1.81              | 0.51                | 0.05      | 0.92       | 6.1                | 8.4               | 11.5                | 10.59                | 10.59              | 12.61              | 7.36            | 18               | 0.85             | 947                | 948.5              | 948.05        | 949.75        | 958.57             | 955.36             |
| 6-4           | 6-5R      | 79.6               | 0.7               | 0.98              | 0.51                | 0.36      | 0.5        | 7.6                | 7.6               | 11.8                | 5.88                 | 5.88               | 6.65               | 5.91            | 15               | 0.63             | 949                | 949.5              | 949.91        | 950.48        | 955.36             | 954.54             |
| 6-4           | 6-5L      | 1                  | 0.21              | 0.21              | 0.51                | 0.11      | 0.11       | 7                  | 7                 | 12                  | 1.29                 | 1.29               | 26.54              | 2.25            | 15               | 10               | 949.5              | 949.6              | 950.48        | 950.05        | 954.54             | 954.54             |
| 6-5           | 6-6       | 34                 | 0.07              | 0.07              | 0.51                | 0.04      | 0.04       | 5.8                | 5.8               | 12.5                | 0.45                 | 0.45               | 10.58              | 1.73            | 15               | 1.59             | 950                | 950.54             | 950.48        | 950.8         | 954.54             | 954.54             |
| 6-4           | 7-1R      | 50                 | 0.17              | 0.73              | 0.51                | 0.09      | 0.37       | 8.2                | 8.2               | 11.5                | 4.29                 | 4.29               | 8.39               | 5.25            | 15               | 1                | 949                | 949.5              | 949.75        | 950.34        | 955.36             | 954.87             |
| 6-4           | 7-1L      | 1                  | 0.37              | 0.56              | 0.51                | 0.19      | 0.29       | 7.3                | 7.5               | 11.8                | 3.38                 | 3.38               | 26.54              | 4.16            | 15               | 10               | 949.5              | 949.6              | 950.34        | 950.34        | 954.87             | 954.87             |
| 7-1           | 7-2       | 34                 | 0.19              | 0.19              | 0.51                | 0.1       | 0.1        | 7.3                | 7.3               | 11.9                | 1.15                 | 1.15               | 10.18              | 3.71            | 15               | 1.47             | 950                | 950.5              | 950.34        | 950.92        | 954.87             | 954.87             |
| 6-3           | 8-1       | 35.8               | 0.97              | 0.97              | 0.51                | 0.49      | 0.49       | 8.6                | 8.6               | 11.4                | 5.63                 | 5.63               | 11.48              | 7.44            | 15               | 1.87             | 954                | 954.67             | 954.62        | 955.63        | 958.57             | 958.33             |
| 9-1           | 9-2       | 75                 | 0                 | 0.44              | 0.51                | 0         | 0.22       | 0                  | 7.8               | 11.7                | 2.62                 | 2.62               | 8.67               | 5.13            | 15               | 1.07             | 942                | 942.8              | 942.47        | 943.45        | 0                  | 950.86             |
| 9-2           | 9-3R      | 96.85              | 0.25              | 0.44              | 0.51                | 0.13      | 0.22       | 7.5                | 7.5               | 11.8                | 2.65                 | 2.65               | 24.13              | 5.39            | 15               | 8.26             | 943                | 951                | 943.45        | 951.65        | 950.86             | 956.92             |
| 9-2           | 9-3L      | 1                  | 0.19              | 0.19              | 0.51                | 0.1       | 0.1        | 6.7                | 6.7               | 12.1                | 1.18                 | 1.18               | 26.54              | 7.02            | 15               | 10               | 952                | 952.1              | 952.18        | 952.53        | 956.92             | 956.92             |
| 10-1          | 10-2      | 134.78             | 0.35              | 1.61              | 0.51                | 0.18      | 0.82       | 6.3                | 10.1              | 10.9                | 8.91                 | 8.91               | 14.46              | 7.4             | 15               | 2.97             | 938                | 942                | 941.49        | 943.15        | 0                  | 946                |
| 10-2          | 10-3      | 165.22             | 1.26              | 1.26              | 0.51                | 0.64      | 0.64       | 9.7                | 9.7               | 11                  | 7.06                 | 7.06               | 12.22              | 6.7             | 15               | 2.12             | 942.2              | 945.7              | 943.15        | 946.76        | 946                | 949.7              |



