

LOCATION MAP

STATE OF OHIO, DELAWARE COUNTY  
DELAWARE COUNTY ENGINEER

INDEX OF SHEETS

**ENGLISH #346**  
**DRAINAGE IMPROVEMENT PROJECT**

DELAWARE COUNTY  
BROWN & BERLIN TOWNSHIPS

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ESTIMATED QUANTITIES - MAIN			
Item	Description	Quantity	Unit
NRCS 326	Clearing & Snagging	1	LUMP
NRCS 468	Rock Lined Channel	60	Lineal Feet
NRCS 582	Open Channel Restoration	300	Lineal Feet
ODOT 202	Culvert Removal & Disposal	1	Each
ODOT 659	Seeding & Mulching	2000	Square Yards

ESTIMATED QUANTITIES - LATERAL A WEST			
Item	Description	Quantity	Unit
NRCS 382	Fence Gate Installation	2	Each
NRCS 410	Grade Stabilization Structure	1	Each
NRCS 606	12" Pipe (ODOT 707.33), perforated	770	Lineal Feet
NRCS 606	12" Pipe (ODOT 707.33), non-perforated	425	Lineal Feet
NRCS 606	Tile Main Breathers	6	Each
ODOT 202 Sup.	Tile Destruction in Place	1200	Lineal Feet
ODOT 202	Fence Removal for Reuse	150	Lineal Feet
ODOT 659	Seeding & Mulching	1500	Square Yards

ESTIMATED QUANTITIES - LATERAL A EAST			
Item	Description	Quantity	Unit
NRCS 606	8" Tile Stub	100	Lineal Feet
NRCS 606	Tile Main Breathers	4	Each
NRCS 608	Surface Drain - Swale	1755	Lineal Feet
To be included on Drainage Maintenance, no construction required			
NRCS 606	10" Pipe	1100	Lineal Feet

ESTIMATED QUANTITIES - LATERAL B			
Item	Description	Quantity	Unit
NRCS 326	Clearing & Snagging	1	Lump
NRCS 606	18" Pipe (ODOT 707.33), non-perforated	1110	Lineal Feet
NRCS 606	Tile Main Breathers	6	Each
ODOT 659	Seeding & Mulching	500	Square Yards

PROJECT DESCRIPTION

This project will consist of the improvement of surface drainage, the installation of subsurface drains, the destruction of existing subsurface drain tile, and the creation of permanent and temporary easements.

This project/improvement is being done pursuant to Ohio Revised Code Sections 6131 and 6137.

2019 SPECIFICATIONS

The standard specifications of the State of Ohio, Department of Transportation, including changes and supplemental specifications listed in the proposal shall govern this improvement. English units shall govern. Where noted, specifications of the USDA Natural Resources Conservation Service shall supplement the ODOT specifications.

BENCHMARK DESCRIPTION

BM# 1  
The station is top of upper gate hinge on SW pasture fence corner.

Elevation: 942.36'  
Northing: 228430.5980'  
Easting: 1821690.9580'

(Coordinates are NAD1983 Ohio State Plane North)

**UNDERGROUND UTILITIES**  
TWO WORKING DAYS  
**BEFORE YOU DIG**  
CALL 1-800-362-2764 (TOLL FREE)  
OHIO UTILITIES PROTECTION SERVICE  
NON-MEMBERS  
MUST BE CALLED DIRECTLY

PLAN JOINTLY PREPARED BY:

DELAWARE SOIL AND WATER  
CONSERVATION DISTRICT  
557A SUNBURY RD  
DELAWARE, OHIO 43015

PHONE: (740)368-1921 EXT.4 FAX: (740)369-8321

DELAWARE COUNTY ENGINEER'S OFFICE  
50 CHANNING STREET  
DELAWARE, OHIO 43015  
PHONE:(740) 833-2400 FAX: (740)833-2399

CONSTRUCTION & MATERIAL SPECIFICATIONS				SUPPLEMENTAL SPECIFICATIONS
OHIO DEPARTMENT OF TRANSPORTATION		USDA NATURAL RESOURCES CONSERVATION SERVICE		
DELAWARE COUNTY ENGINEER		CONSTRUCTION		
202 Supplemental	Tile Destruction in Place	326	Clearing & Snagging	
202	Tile Removal	410	Grade Stabilization Structure	
611	Pipe Culverts, Sewers, Drains, & Drainage Structures	484	Mulching	SPECIAL PROVISIONS
659	Seeding & Mulching	582	Open Channel Construction	Tile Connection
707	Steel, Aluminum, and Plastic Pipe	606	Subsurface Drain	
		640 608	Surface Drain	

English #346  
DRAINAGE IMPROVEMENT PROJECT  
DELAWARE COUNTY ENGINEER  
DELAWARE COUNTY, OH

APPROVED Chris Barron  
DATE 11-17-21 COUNTY ENGINEER

APPROVED Ray Mead  
DATE 6-6-22 COUNTY COMMISSIONER

APPROVED Jeff Benton  
DATE 6-6-22 COUNTY COMMISSIONER

APPROVED \_\_\_\_\_  
DATE \_\_\_\_\_ COUNTY COMMISSIONER

DESIGNED: DJB 5/21 CHECKED: \_\_\_\_\_  
DRAWN: DJB 5/21 REVIEWED: \_\_\_\_\_  
CONSTRUCTION PROJECT NO.: \_\_\_\_\_  
RAILROAD INVOLVEMENT: NONE  
ENGLISH # 346  
1/8



# DETAILS & NOTES

## GENERAL CONSTRUCTION NOTES

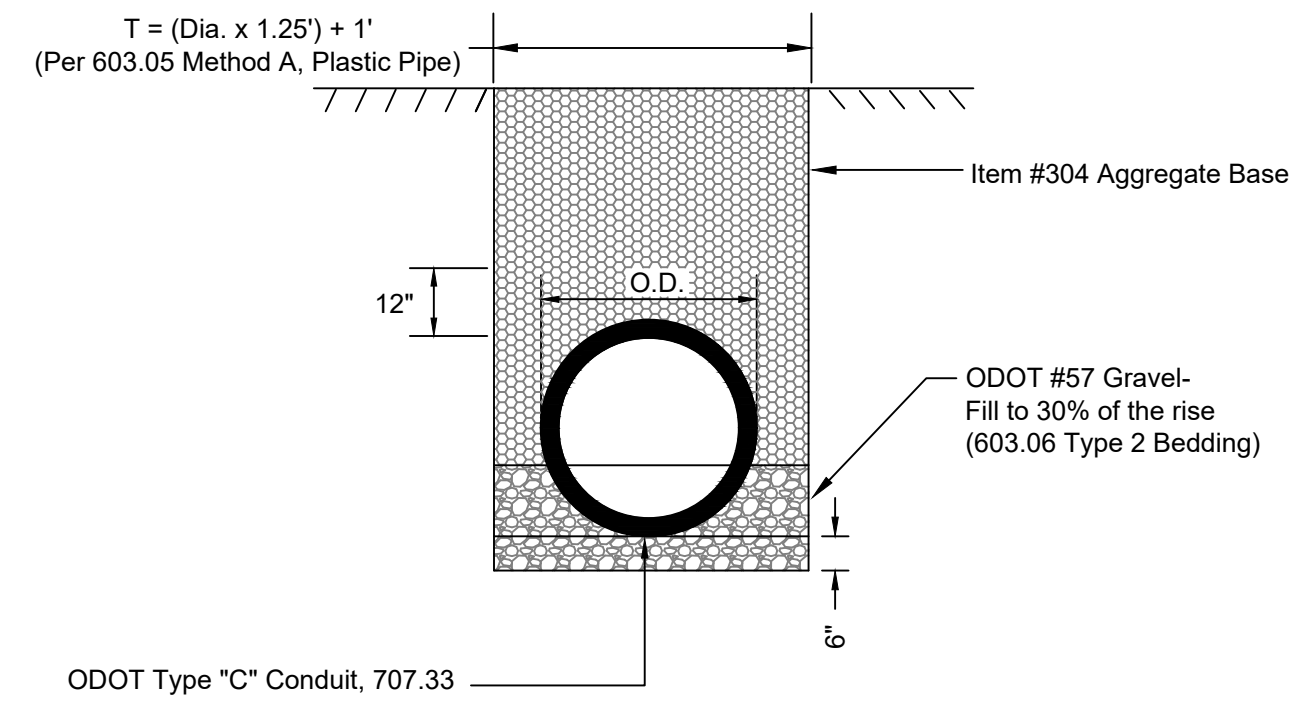
- The construction right-of-way for this project will be 75' right and left of the project centerline unless otherwise marked by the Construction Inspector. Certain items of work may require an extended right-of-way in order to properly complete them. This work should not be done without prior consent of the construction inspector, and any consent given will be specific to a particular item of work. Additional right-of-way for construction access may be identified and approved by the construction inspector as deemed necessary for the completion of the project. All areas disturbed by the construction activities which are outside of the critical path including but not limited to area used for staging, stockpiling of materials, and access will be cleaned and returned to its pre-construction state at the sole responsibility of the contractor as per the requirements of ODOT CMS 104.04.
- The contractor will be responsible for ensuring that all relevant OSHA regulations are met prior to beginning any construction activities.
- Temporary easements for construction access may be identified and approved by the construction inspector as deemed necessary for the completion of the project. Any access easement not connected to the work limits of the project will be returned to its pre-construction state at the sole responsibility of the contractor.
- All ground disturbed by excavation shall be returned to its pre-construction vegetative state and grade unless otherwise directed by the plans and/or the construction inspector.
- Spoil from excavation of the surface drain (NRCS #608) and open channel (NRCS #582) construction shall be exported from the site at the expense of the contractor. Payment for spoil and debris disposal will be considered as included in payment for NRCS #608 and NRCS #582 items. The contractor is free to negotiate with landowners to dispose of spoil and debris materials on-site provided that any disposal site is outside of the work limits for this project. Delaware County will not be considered party to any such agreements made between the contractor and landowners.
- Unless otherwise noted on these plans or instructed by the construction inspector, debris from clearing and snagging within the typical cross sections is to be disposed of off-site by the contractor unless permission to place brush and logs adjacent to the construction right-of-way is granted by the landowners. Payment for hauling and disposal shall be considered part of payment for NRCS #326-Clearing and Snagging. For the purposes of on-site disposal, a log will be defined as "a section of a tree bole (the main trunk of the tree) at least 8 feet long, not containing a fork, sufficiently straight and sound enough to yield at least an 8-foot board. Anything not considered a log by the above definition will be considered brush.
- Pipe quantities listed on the Plan and Profile views represent cumulative quantities for both perforated and non-perforated pipe. The quantity table shall be the reference for the specific amount of perforated and non-perforated pipe. The applicable specification and the instructions of the construction inspector will govern the placement of each type of pipe. All linear quantities of pipe shall be considered to be inclusive of all necessary elbows, couplers, and other fittings unless otherwise stated by these plans and/or the bid documents.
- All lateral tile cut by the installation of the new tile shall be reconnected to the new tile at the point where they are cut or collected with a submain (size to be determined) and outletted into the new tile at the next downstream breather as specified by the construction inspector and per the requirements of NRCS #606-Subsurface Drain. Any connections made to any tile included on the Drainage Maintenance Program after completion of the project will require the approval of the Drainage Maintenance Department.
- Seeding and Mulching will be done as per the specifications of ODOT #659 with the following stipulations/exceptions:
  - Seed mixture to be used will be Class-Type #1.
  - Soil testing will not be required.
  - Liming will not be required.
  - Compost will not be required.
  - The use of straw mulch will be acceptable for the entire project.
  - Watering will not be required.
  - Mulch anchoring will not be required except where specified.
- Linear alignments of all surface and subsurface features may be modified to fit site specific conditions at the discretion of the construction inspector.
- The contractor shall contact the Delaware County Engineer's Office a minimum of seven (7) working days prior to beginning any work within the road right-of-way. It will be the sole responsibility of the contractor to secure any permits necessary for work within the road right-of-way.
- All trees to be saved will be marked prior to the start of construction by the construction inspector. Markings will be done in the manner requested by the contractor. Unless specifically designated as "Save" or "Do not disturb" in the plans or by the construction inspector, remove all trees and stumps within the cross section under the lump sum bid for NRCS Item #326-Clearing and Snagging. Trees marked to be saved shall be protected with protective cover such as filter fabric or other suitable material. Replacement of any tree damaged or removed that was otherwise marked to be saved will be the responsibility of the contractor.
- Scale bars as shown on the Plan Views shall be considered to be accurate for surveyed features including, but not necessarily limited to, project centerline, tile lines, and benchmark locations. Property lines, drive centerlines, building footprints, and road centerlines as shown on the Plan Views were derived from other sources and are shown for general reference only and should not be used to scale the location of any constructed feature.
- Excavation will may be required to verify design elevations including, but not limited to, existing subsurface drain inverts. These excavations will be considered incidental to the overall construction of the project per ODOT CMS 105.02.

## Temporary & Permanent Easements

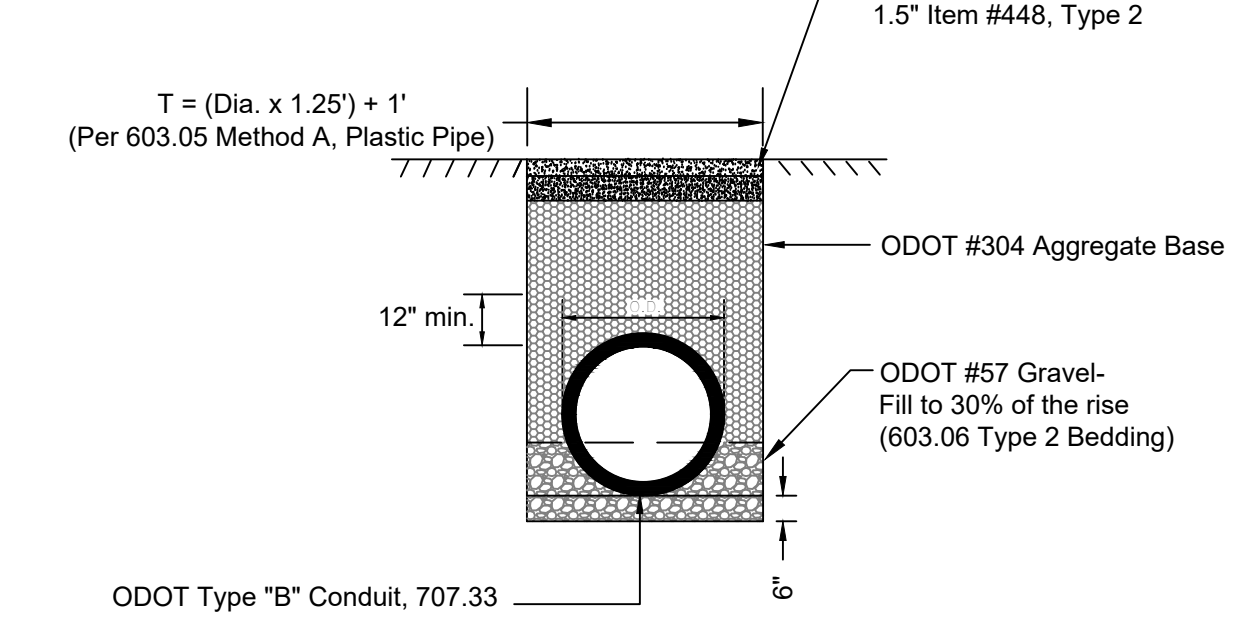
- The width of the temporary easement for construction shall be seventy-five feet as measured from the top of bank of the open channel, seventy-five feet as measured from the top of bank of the surface drain, and seventy-five feet as measured from the centerline of the subsurface drain where no surface drain cross-section is specified.
- A permanent easement will be established for maintenance and cleaning of the constructed improvement per ORC 6137.12. The width of the permanent easement will be based on the type of improvement constructed. For Open Channel and Surface Drain Swales, the permanent easement will be twenty-five feet from the top of bank on both sides of the channel, measured at right angles thereto. For closed ditches (subsurface drain installation only), the permanent easement shall be a maximum of eighty feet centered on the centerline of the improvement. The permanent easement for access shall be a maximum width of thirty feet and length as necessary to connect to the improvement as shown on these drawings.

## SUBSURFACE DRAIN (NRCS #606)

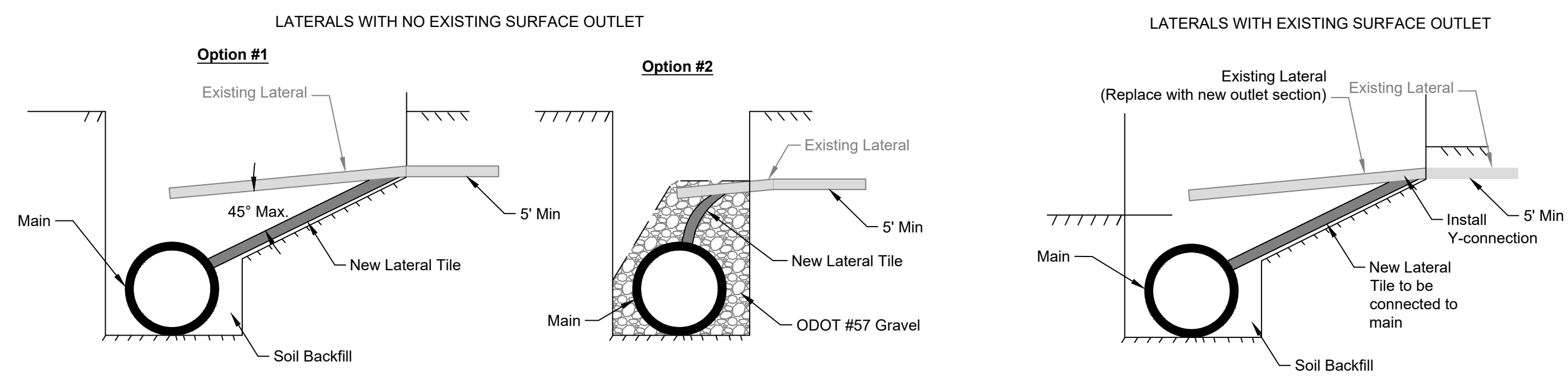
### STONE DRIVE, SINGLE PIPE ODOT 611, TYPE "B" GRAVEL DRIVE, 707.33 INSTALLATION



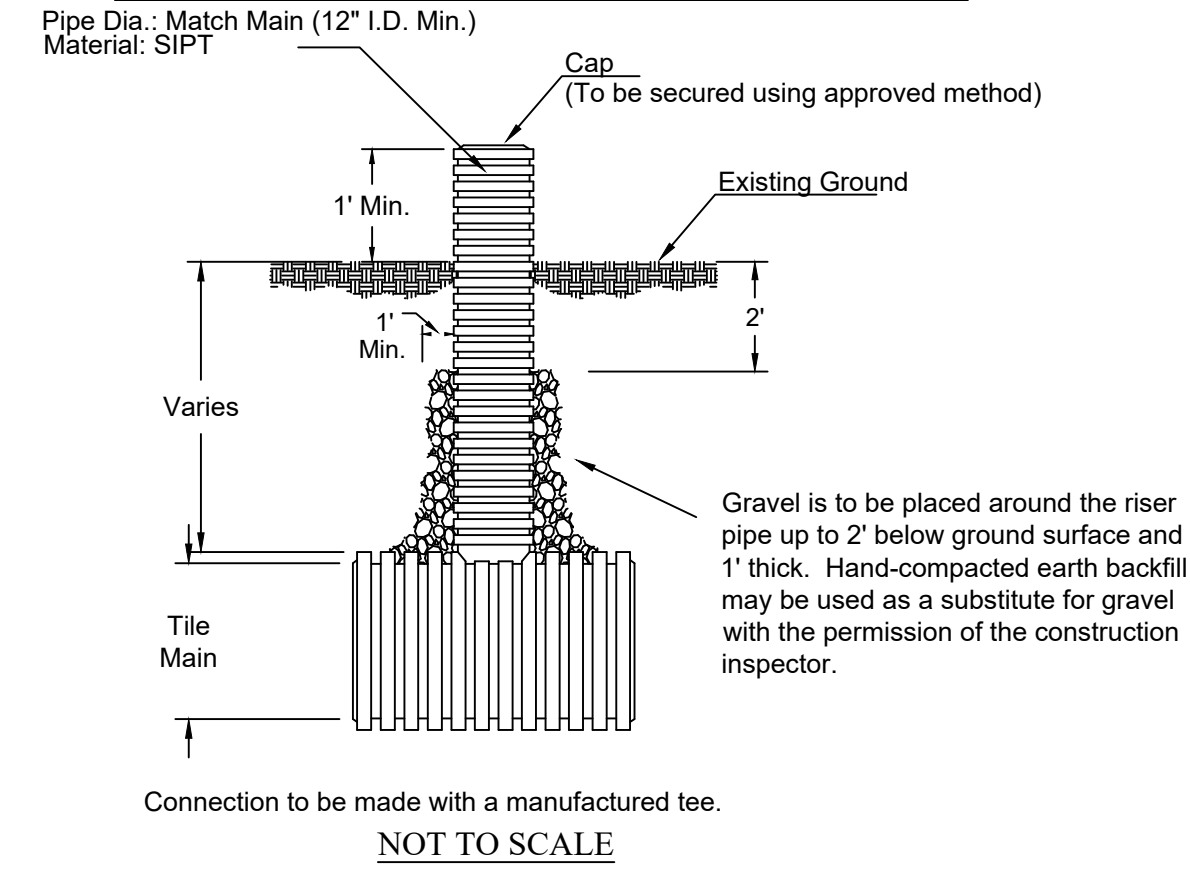
### DRIVE CUT INSTALLATION DETAIL ODOT 611, TYPE "B", 707.33 INSTALLATION



### TYPICAL SUBSURFACE DRAIN LATERAL CONNECTION DETAILS (NRCS #606)

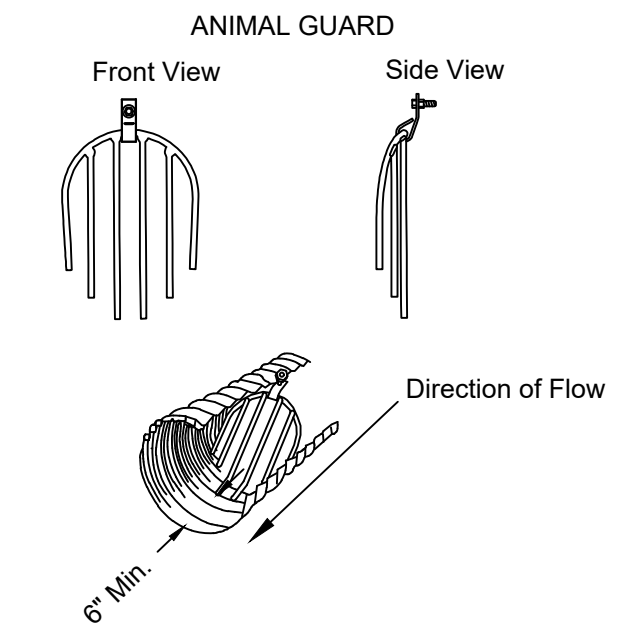


## INSPECTION WELL DETAIL



ENGLISH #346  
DRAINAGE IMPROVEMENT PROJECT  
ENGINEERING DRAWINGS

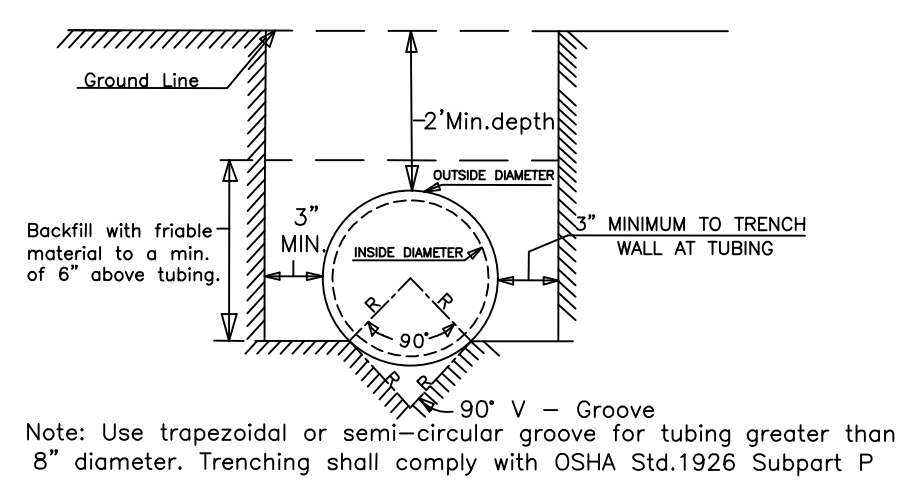
2  
8



- NOTES**
- All tile shall be placed according to the Typical Subsurface Drain Installation Detail and the requirements of NRCS Specification #606.
  - Removal of residual lateral tile regardless of size and/or material shall be considered part of the payment for this item.
  - All connections shall be done using manufactured connectors.
  - Any quantity of gravel used to make connections utilizing Option #2 shall be considered part of the payment for this item. Determining the quantity of gravel needed for making connections using this option shall be the sole responsibility of the contractor. Cleanup of gravel stockpile areas shall be as per the requirements of ODOT CMS 104.04.
  - The contractor shall note on a dedicated copy of the plans, as provided by the construction inspector, the station, size, material, and connection option used to make all lateral connections.
  - Lateral types regarding having or not having a surface outlet will be marked by the construction inspector.

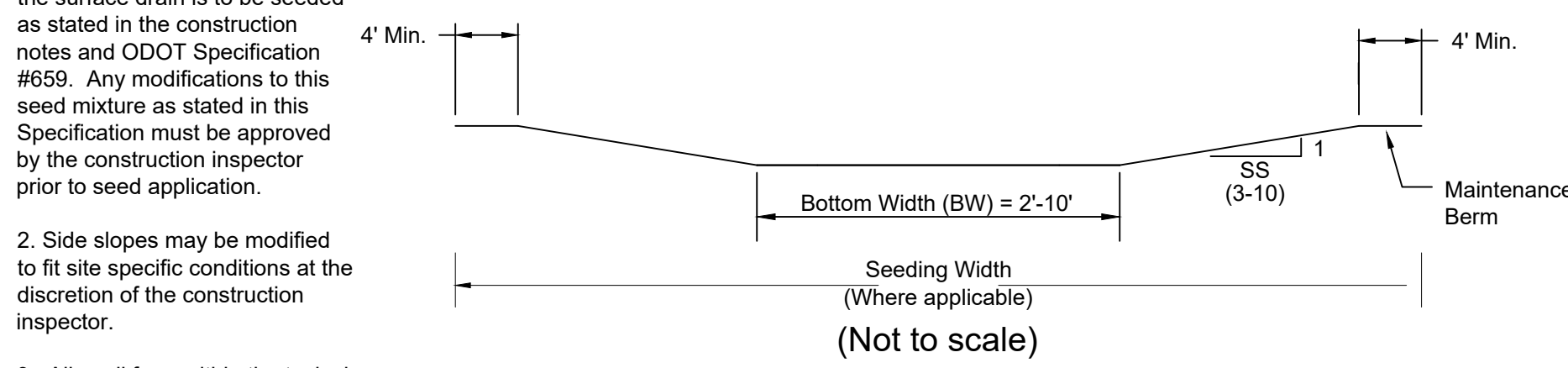
**Note:**  
Tile Main Breather shall have 20 evenly spaced 1 inch perforations per foot in the riser section. The surrounding ground will be graded to drain to the structure as per the instructions of the Construction Supervisor.

### NRCS 606 PIPE INSTALLATION DETAIL



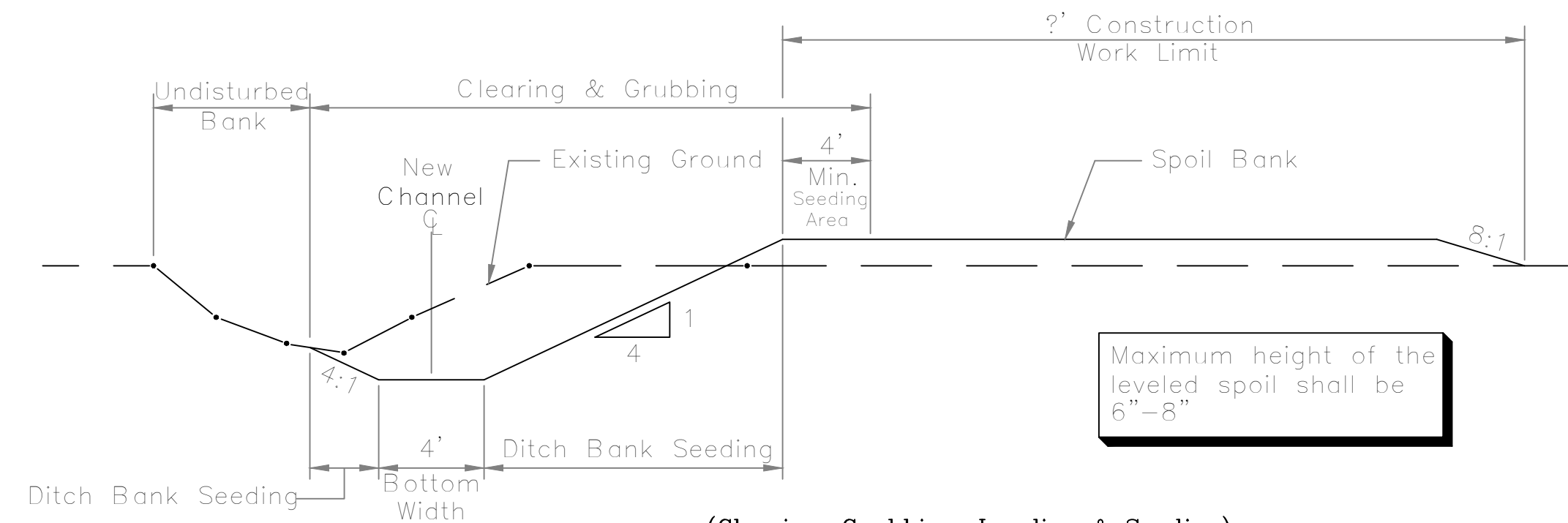
## Surface Drain (NRCS #608)

### TYPICAL SURFACE DRAIN SWALE CROSS SECTION



- NOTES:**
- Where specified on the plans, the surface drain is to be seeded as stated in the construction notes and ODOT Specification #659. Any modifications to this seed mixture as stated in this Specification must be approved by the construction inspector prior to seed application.
  - Side slopes may be modified to fit site specific conditions at the discretion of the construction inspector.
  - All spoil from within the typical surface drain cross section shall be disposed of according to the specifications of NRCS #608 - Surface Drainage Main.

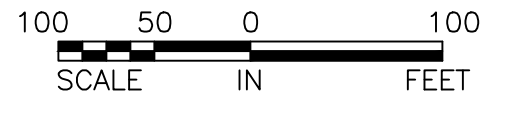
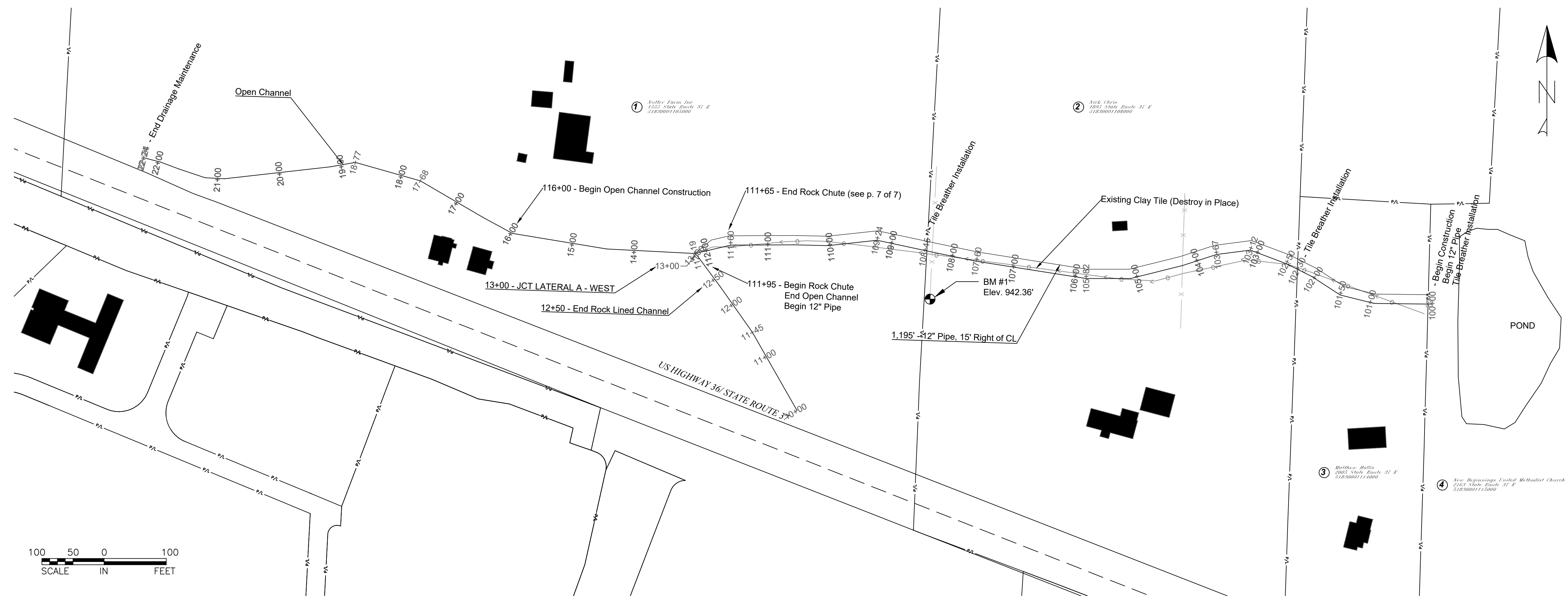
## Open Channel (NRCS #582)



(Clearing, Grubbing, Leveling & Seeding)  
**Typical One-Sided Construction Cross Section**  
Not to Scale

Maximum height of the leveled spoil shall be 6\"/>

MAIN & LATERAL A WEST PLAN VIEW



- CONSTRUCTION NOTES**
- All General Construction Notes on P. 2 of 8 shall apply.
  - Clearing and snagging will be performed within the limits of the swale construction as per the instructions in the General Construction Notes.
  - Details to be referenced on p. 2 of 8:  
 Typical Open Channel Construction  
 Typical Surface Drain Cross Section  
 Typical Subsurface Drain Installation  
 Typical Subsurface Drain Lateral Connection  
 Rock Pad Installation  
 Inspection Well Installation

**ESTIMATED QUANTITIES - MAIN**

Item	Description	Quantity	Unit
NRCS 326	Clearing & Snagging	1	LUMP
NRCS 468	Rock Lined Channel	60	Lineal Feet
NRCS 582	Open Channel Restoration	300	Lineal Feet
ODOT 202	Culvert Removal & Disposal	1	Each
ODOT 659	Seeding & Mulching	2000	Square Yards

**ESTIMATED QUANTITIES - LATERAL A WEST**

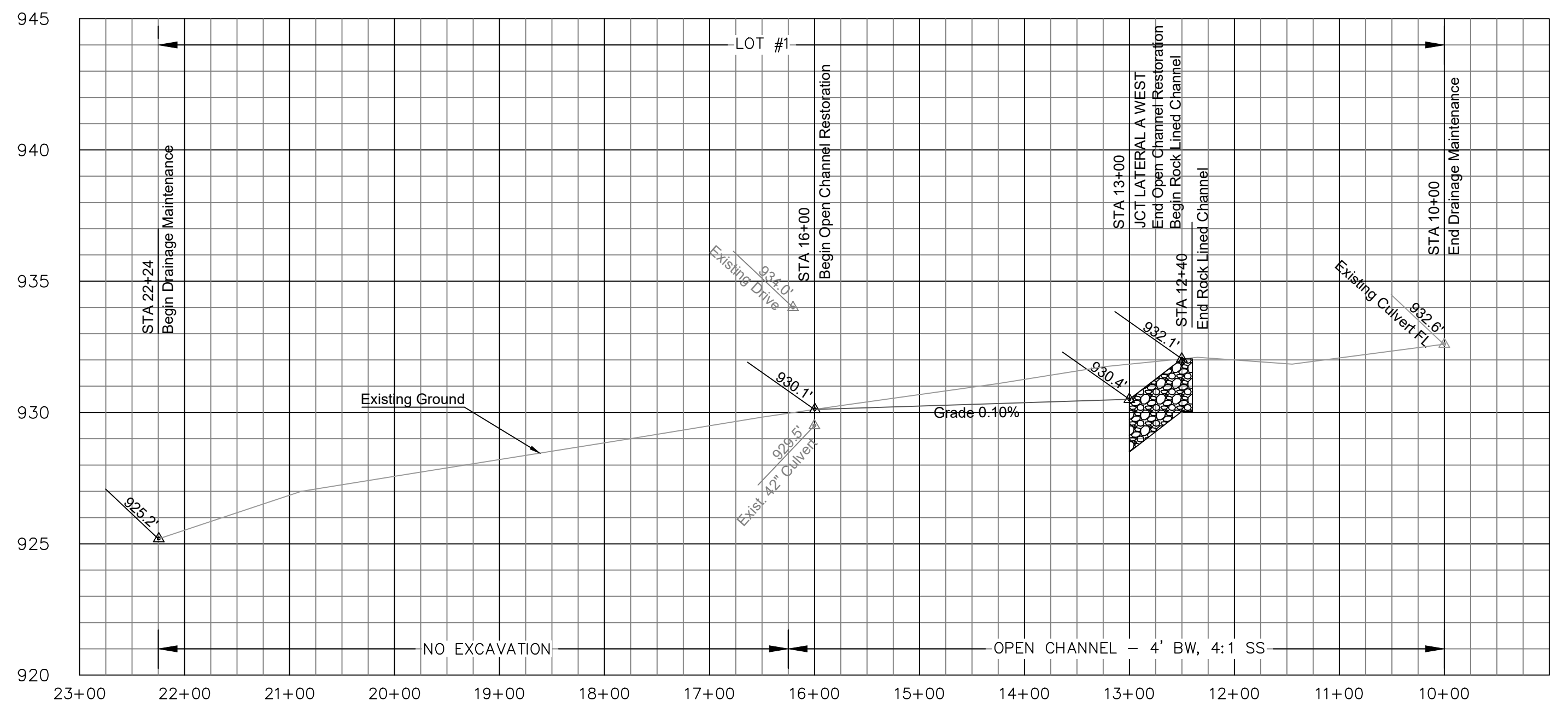
Item	Description	Quantity	Unit
NRCS 382	Fence Gate Installation	2	Each
NRCS 410	Grade Stabilization Structure	1	Each
NRCS 606	12" Pipe (ODOT 707.33), perforated	770	Lineal Feet
NRCS 606	12" Pipe (ODOT 707.33), non-perforated	425	Lineal Feet
NRCS 606	Tile Main Breathers	6	Each
ODOT 202 Sup.	Tile Destruction in Place	1200	Lineal Feet
ODOT 202	Fence Removal for Reuse	150	Lineal Feet
ODOT 659	Seeding & Mulching	1500	Square Yards

**BENCHMARK DESCRIPTIONS:**  
 BM #1 - TOP OF TOP GATE HINGE ON PASTURE FENCE CORNER  
 ELEVATION - 942.36'

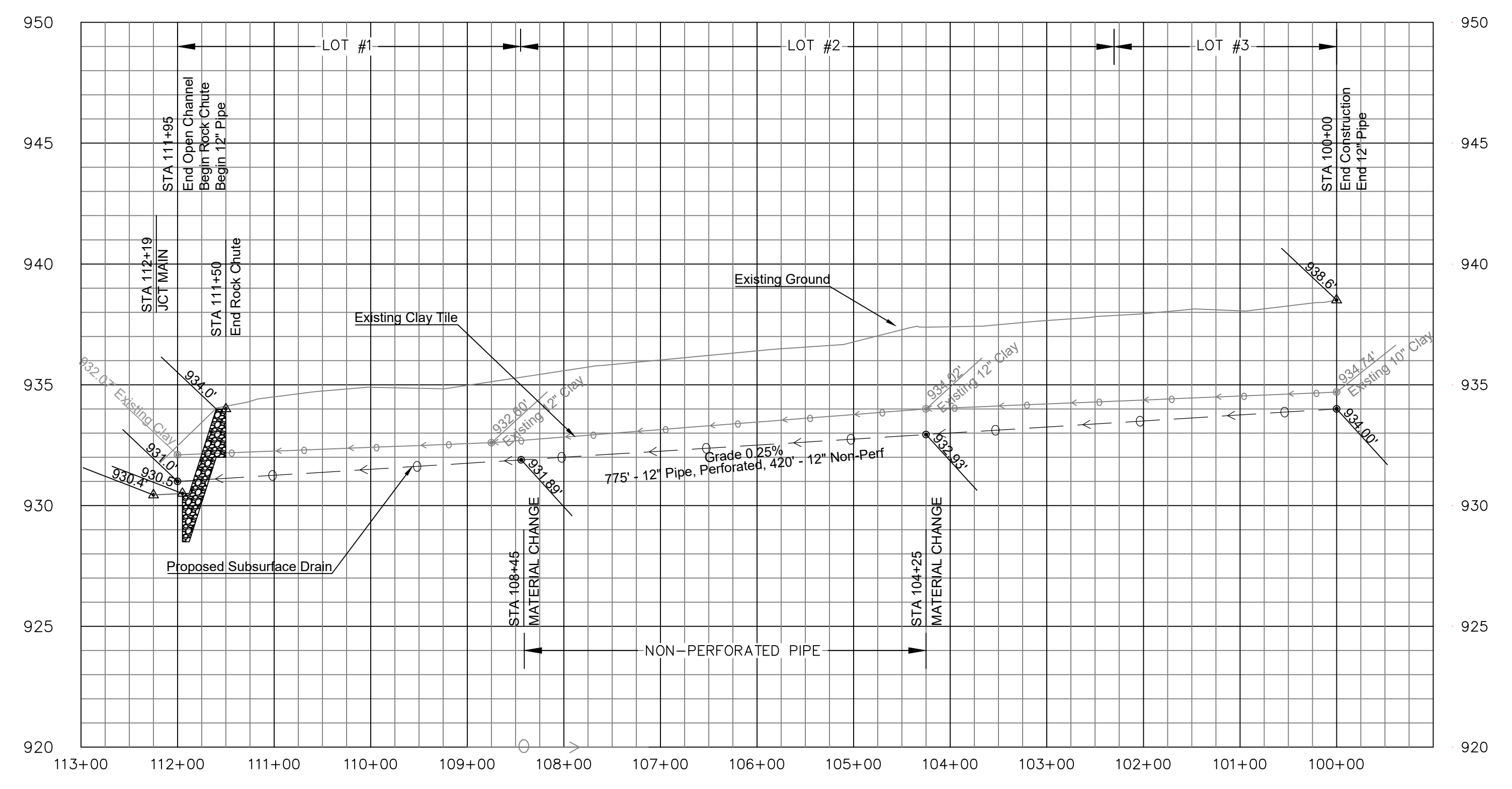
**LEGEND**

- Existing SSD
- Proposed Mains
- Surface Drain
- Property Line
- Fence
- Road
- Driveway
- Benchmark

MAIN PROFILE

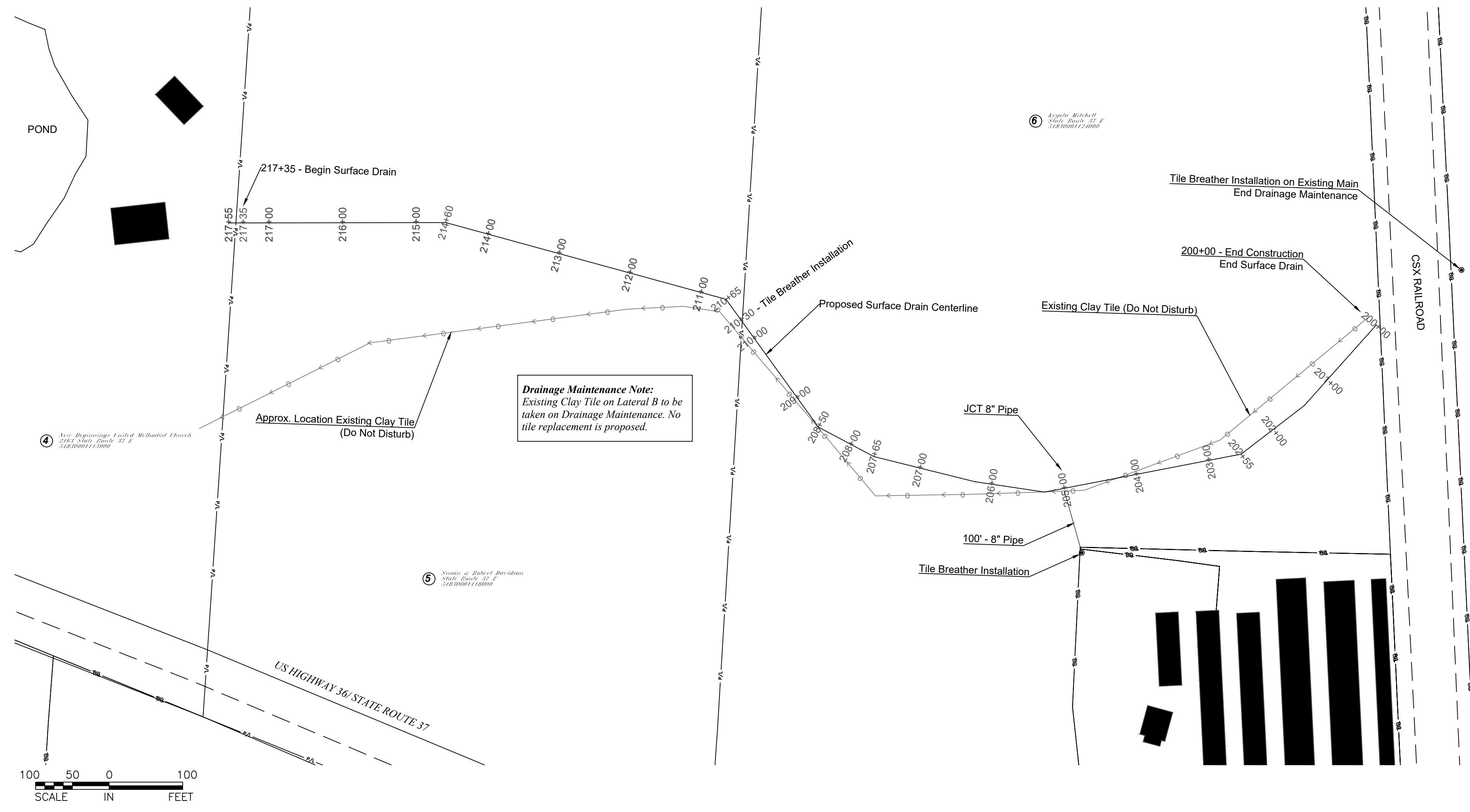


LATERAL A - WEST PROFILE



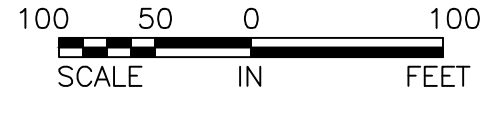


# LATERAL A EAST PLAN VIEW



**Drainage Maintenance Note:**  
Drainage Maintenance will extend through the CSX Railroad to Parcel #51830001089000

**Drainage Maintenance Note:**  
Existing Clay Tile on Lateral B to be taken on Drainage Maintenance. No tile replacement is proposed.



- CONSTRUCTION NOTES**
- All General Construction Notes on P. 2 of 8 shall apply.
  - Details to be referenced on p. 2 of 8:  
 Typical Surface Drain Cross Section  
 Typical Subsurface Drain Installation  
 Typical Subsurface Drain Lateral Connection  
 Rock Pad Installation  
 Inspection Well Installation
  - Install 8" Tile Stub at STA 205+00. Tile shall be installed from the connection to the existing tile using a manufactured connection, and shall be installed on a 0.1% grade.

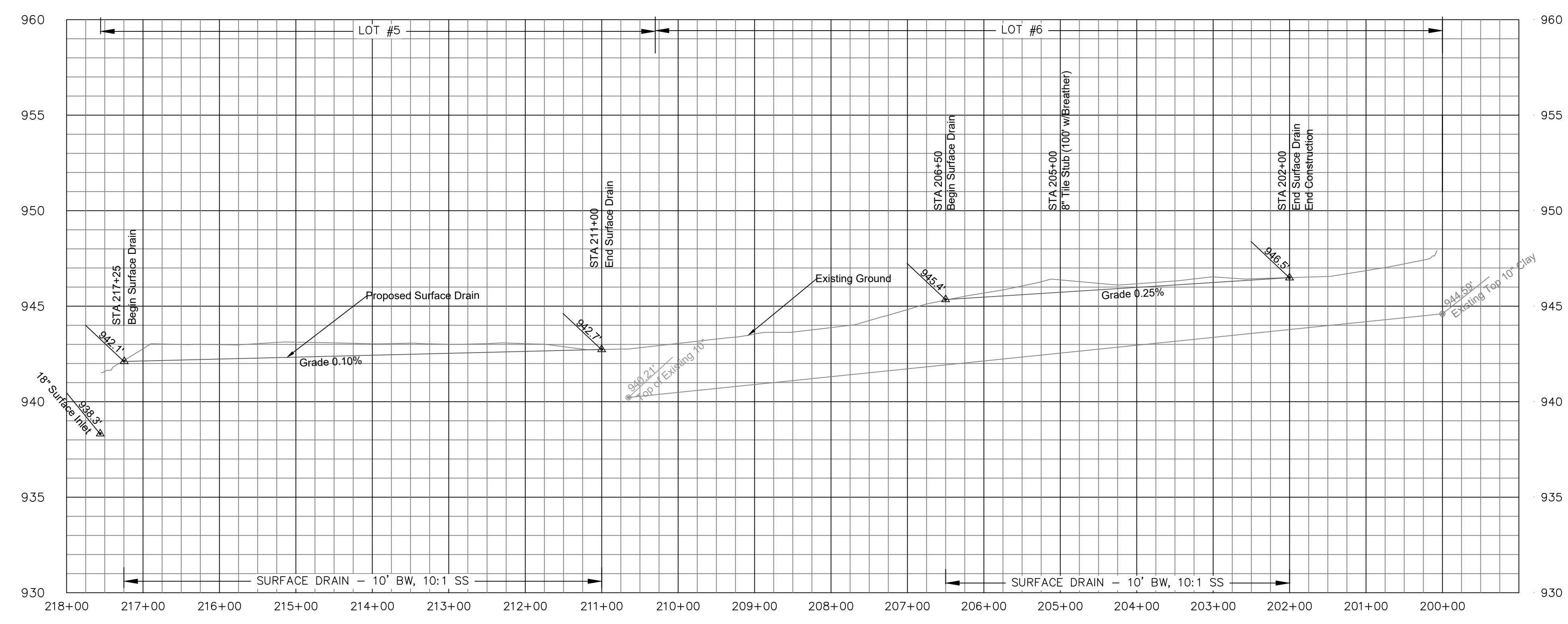
**ESTIMATED QUANTITIES - LATERAL A EAST**

Item	Description	Quantity	Unit
NRCS 606	8" Tile Stub	100	Lineal Feet
NRCS 606	Tile Main Breathers	4	Each
NRCS 608	Surface Drain - Swale	1755	Lineal Feet
<b>To be included on Drainage Maintenance, no construction required</b>			
NRCS 606	10" Pipe	1100	Lineal Feet

**LEGEND**

Existing SSD	—○—○—○—
Proposed Mains	—○—○—○—
Surface Drain	—○—○—○—
Property Line	—m—m—m—
Fence	—x—x—x—
Road	====
Driveway	—x—x—x—
Benchmark	⊙

# PROFILE



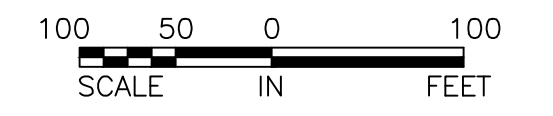
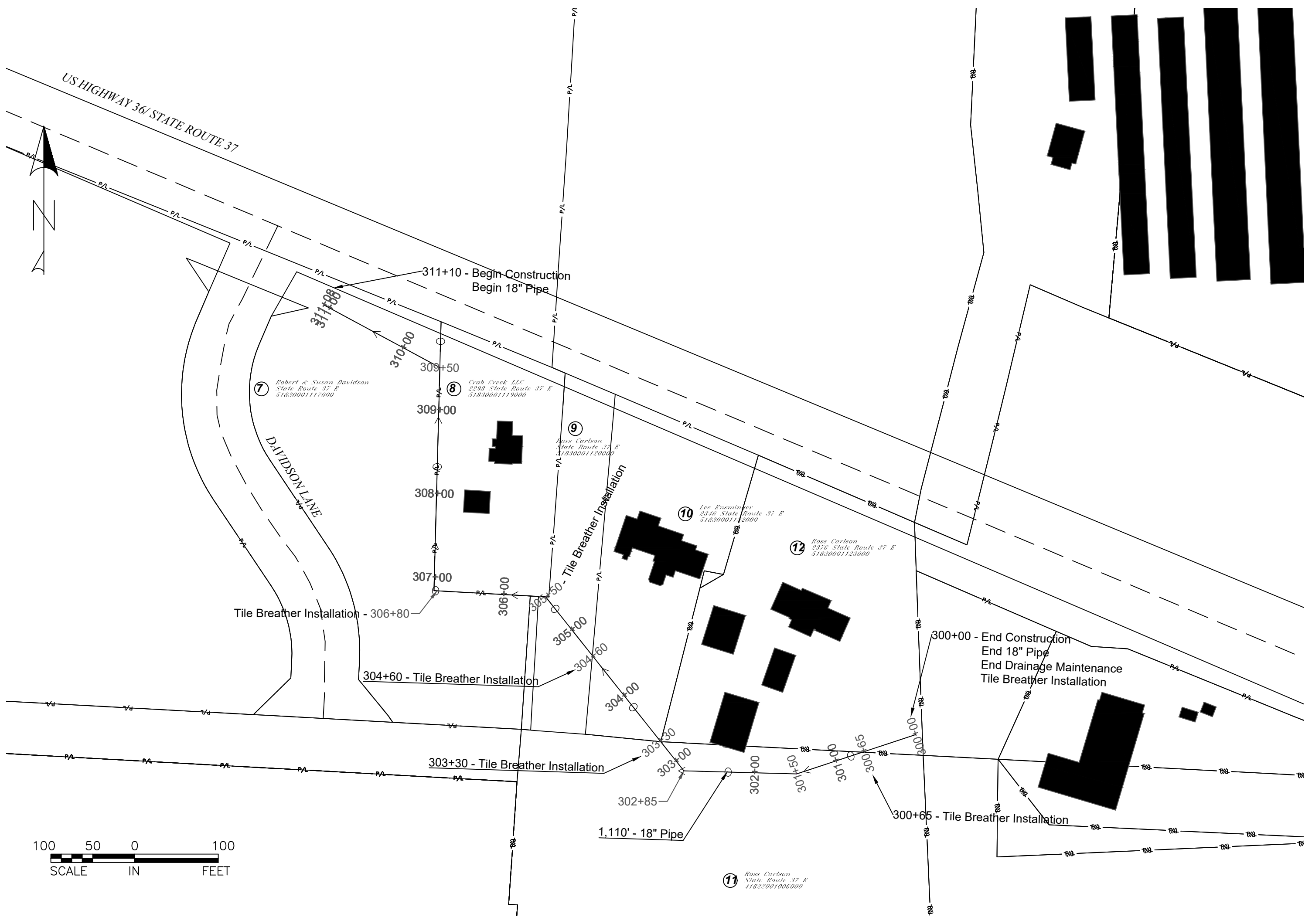


*LATERAL B PLAN VIEW*

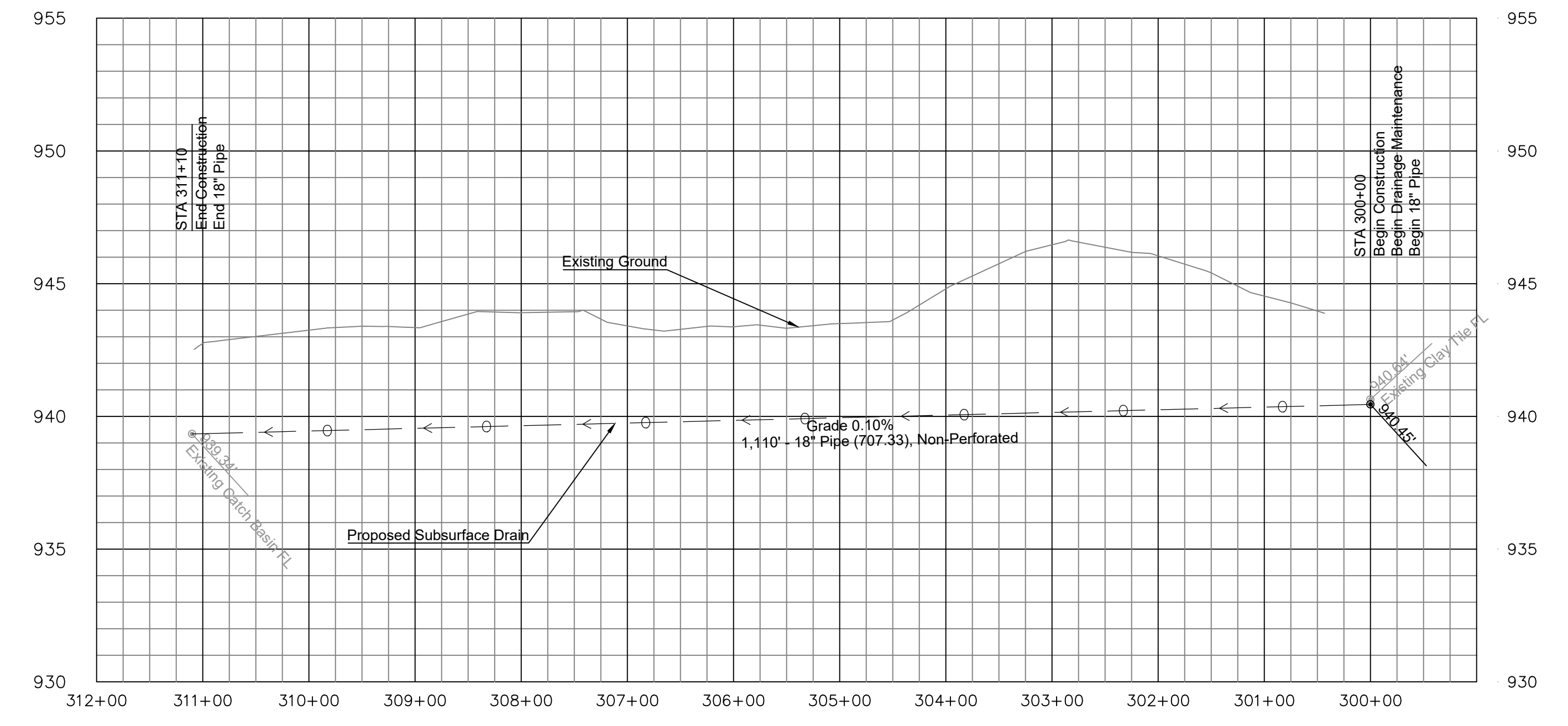
**CONSTRUCTION NOTES**  
 1. All General Construction Notes on P. 2 of 8 shall apply.  
 2. Details to be referenced on p. 2 of 8:  
 Typical Subsurface Drain Installation  
 Typical Subsurface Drain Lateral Connection  
 Inspection Well Installation

**ESTIMATED QUANTITIES - LATERAL B**

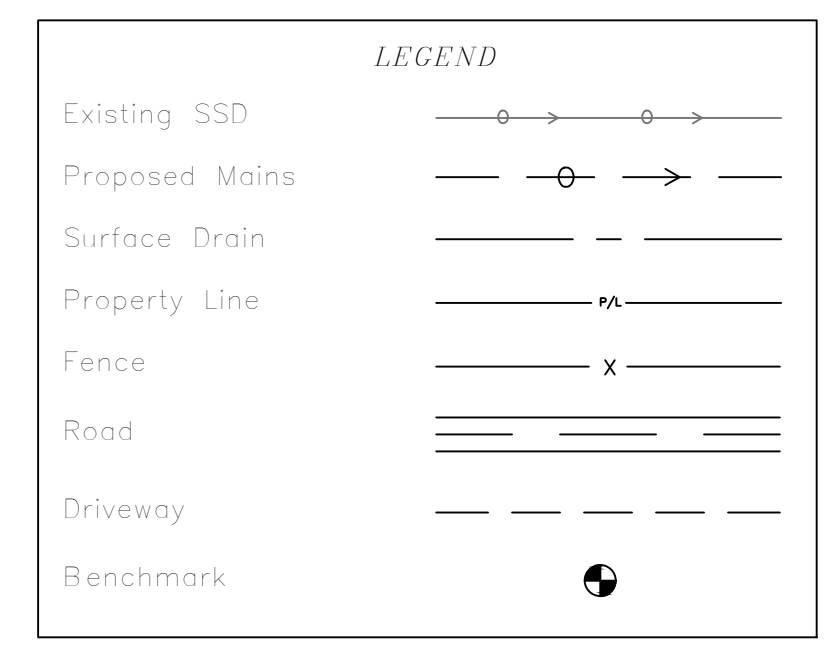
Item	Description	Quantity	Unit
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ODOT 659	Seeding & Mulching	500	Square Yards



*PROFILE*

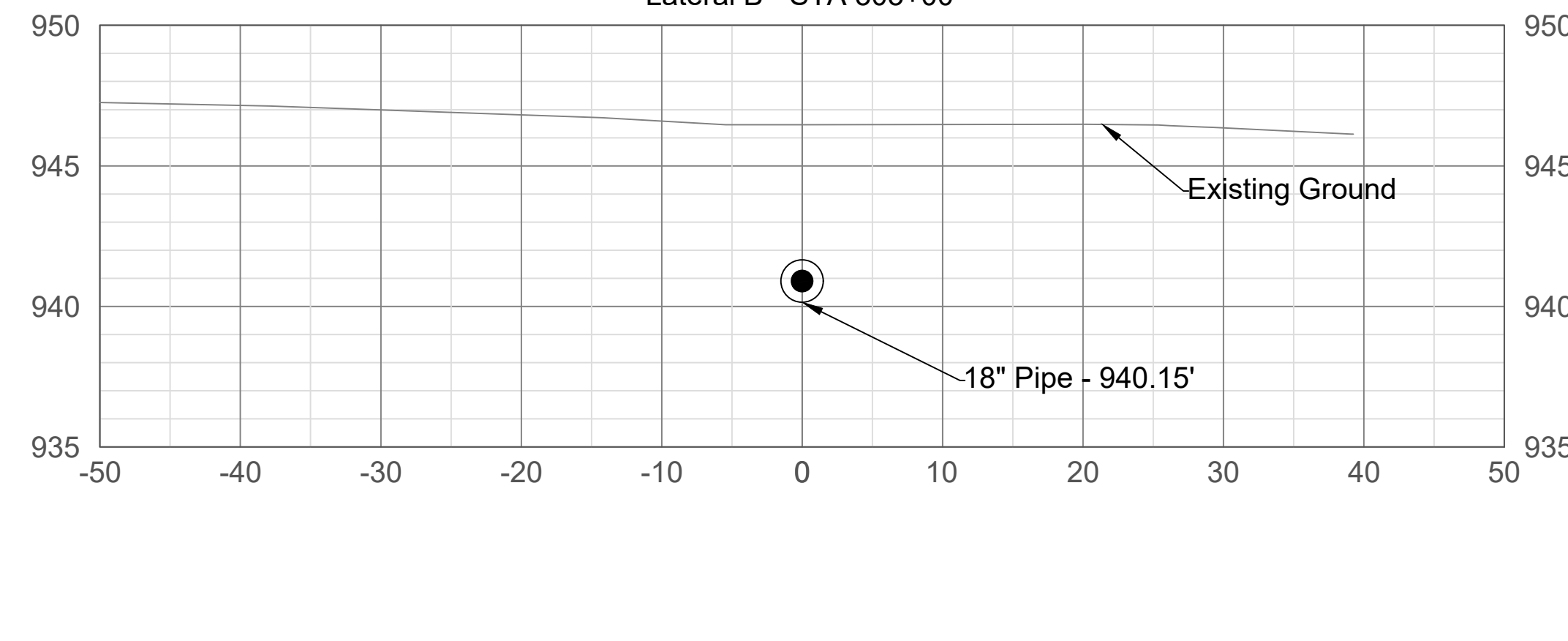
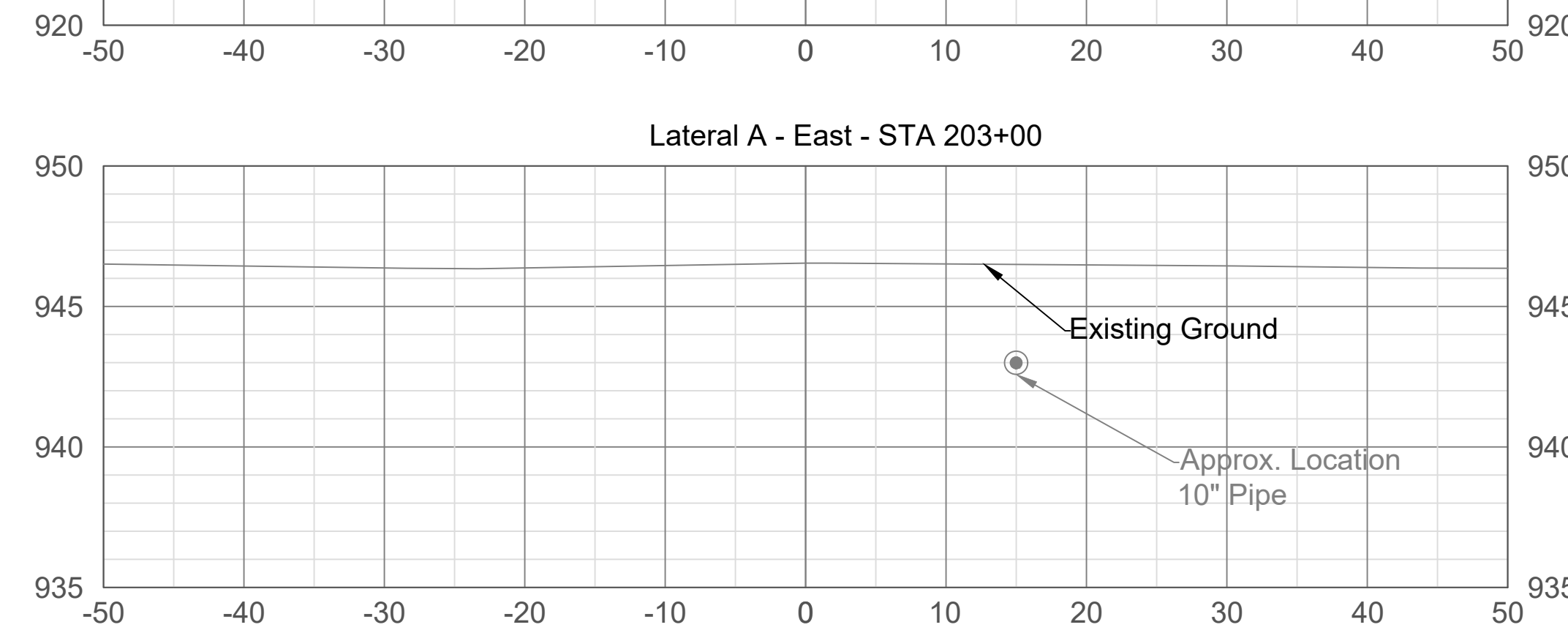
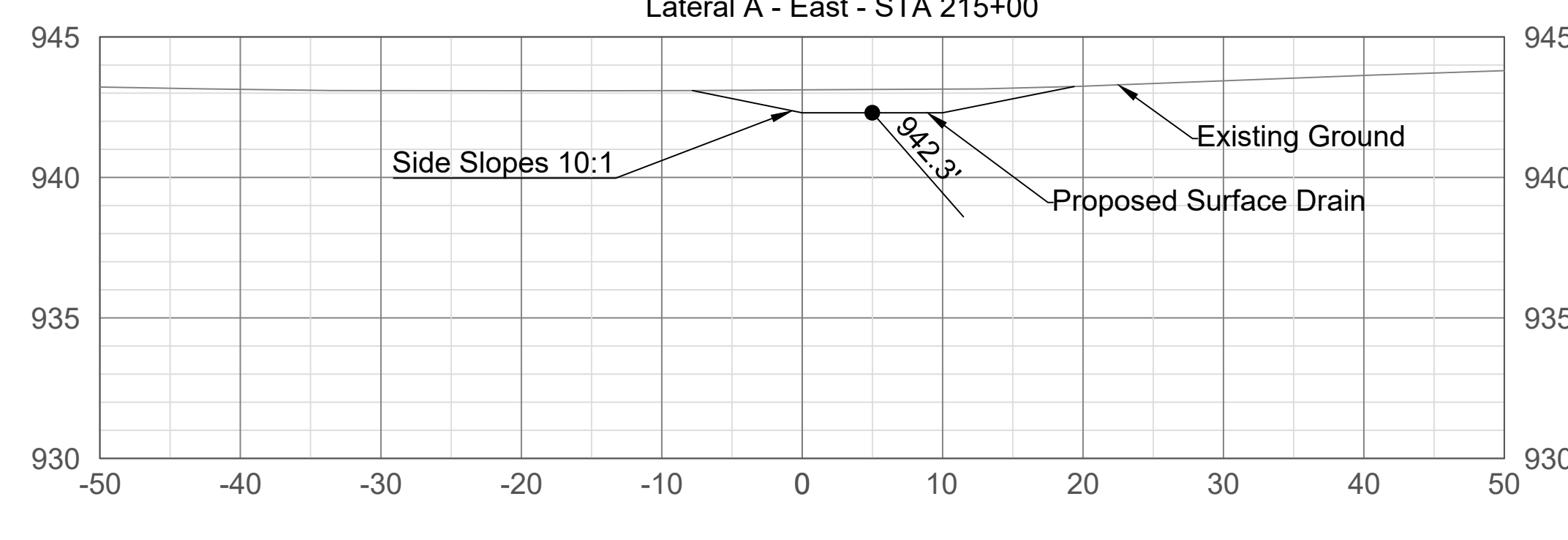
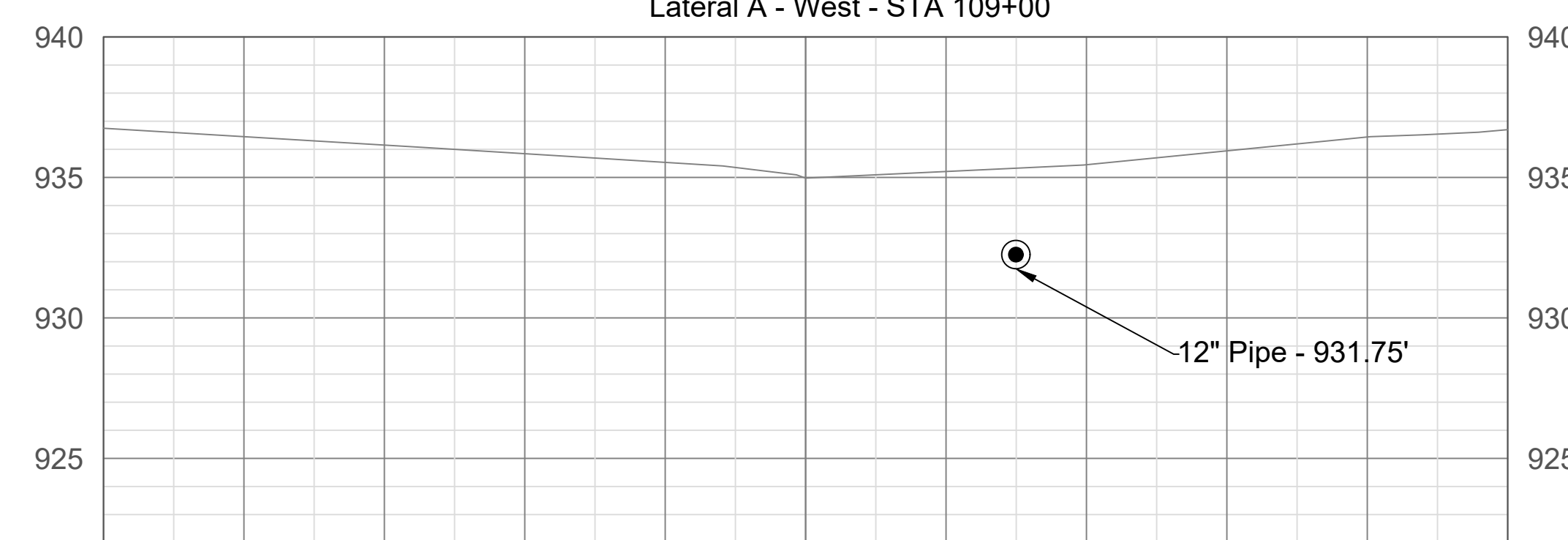
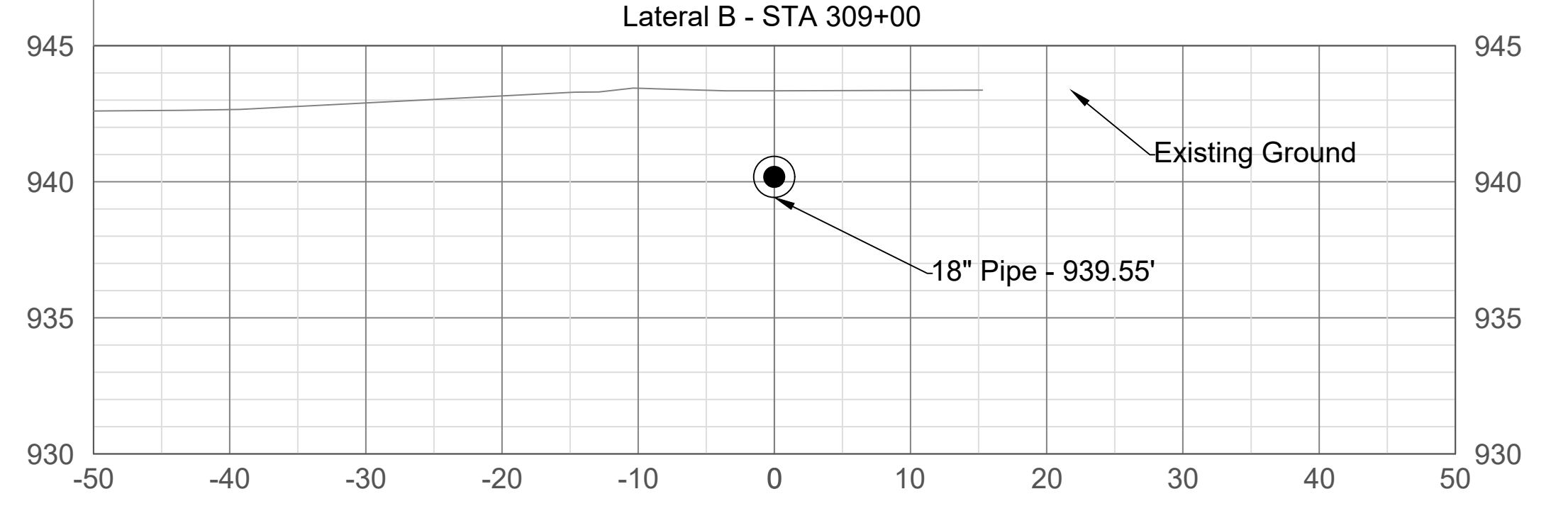
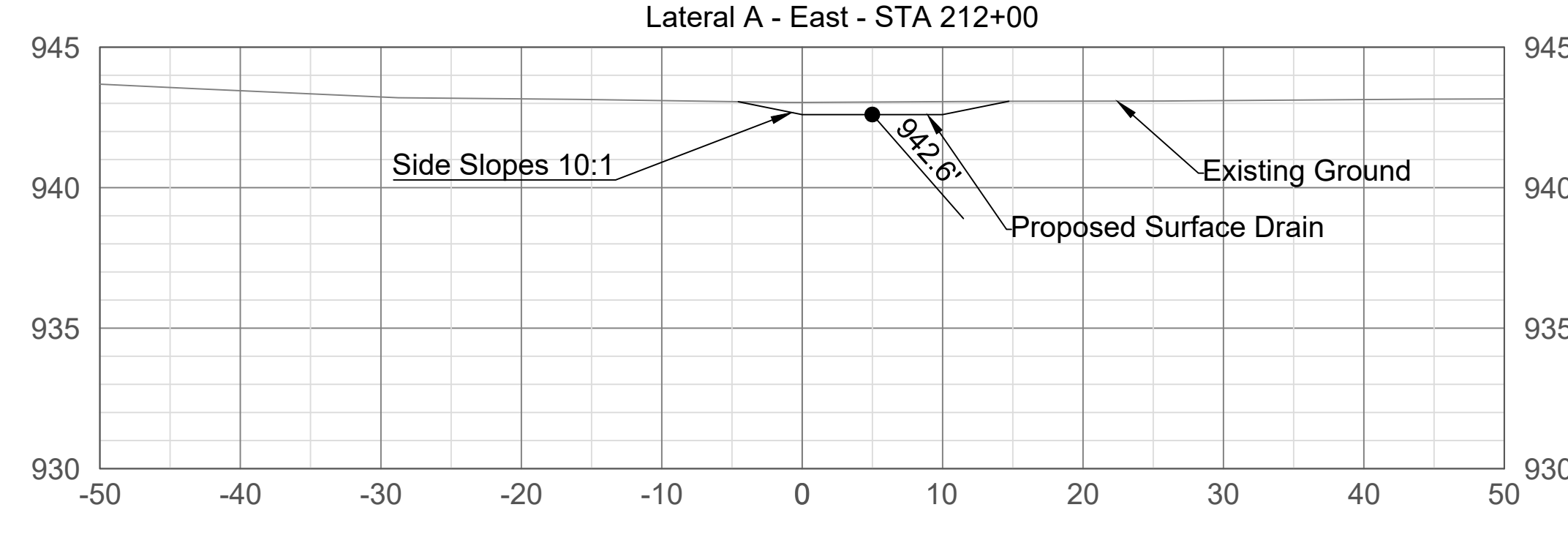
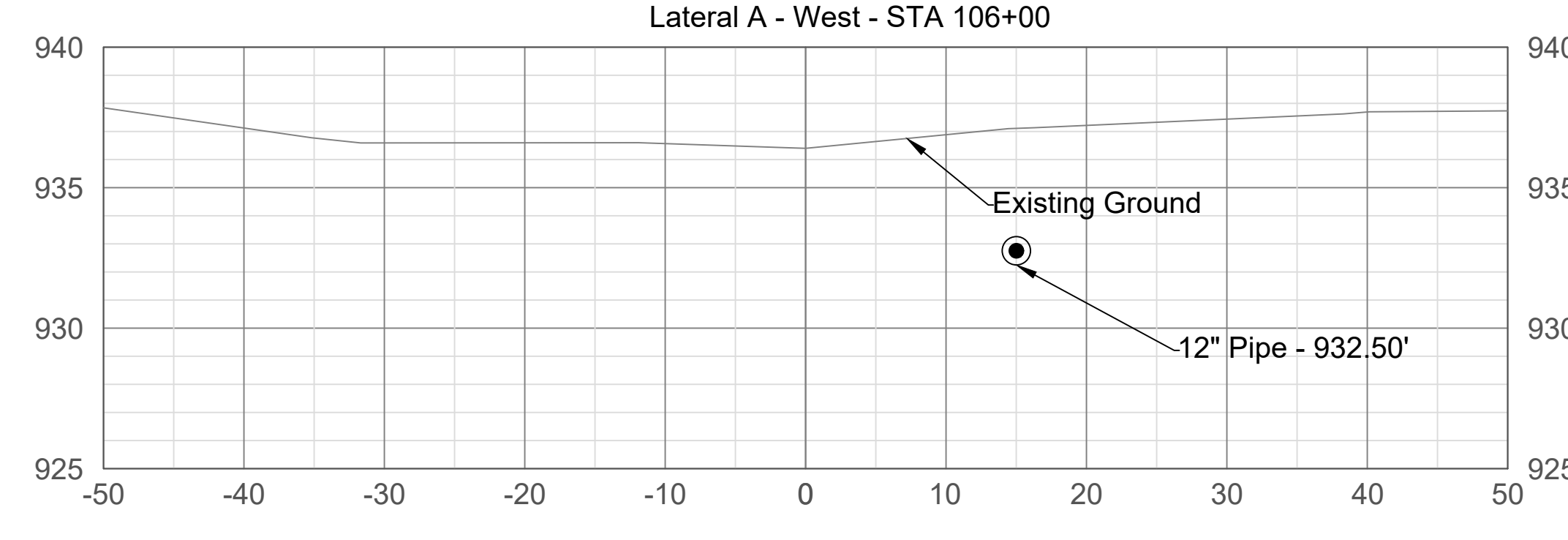
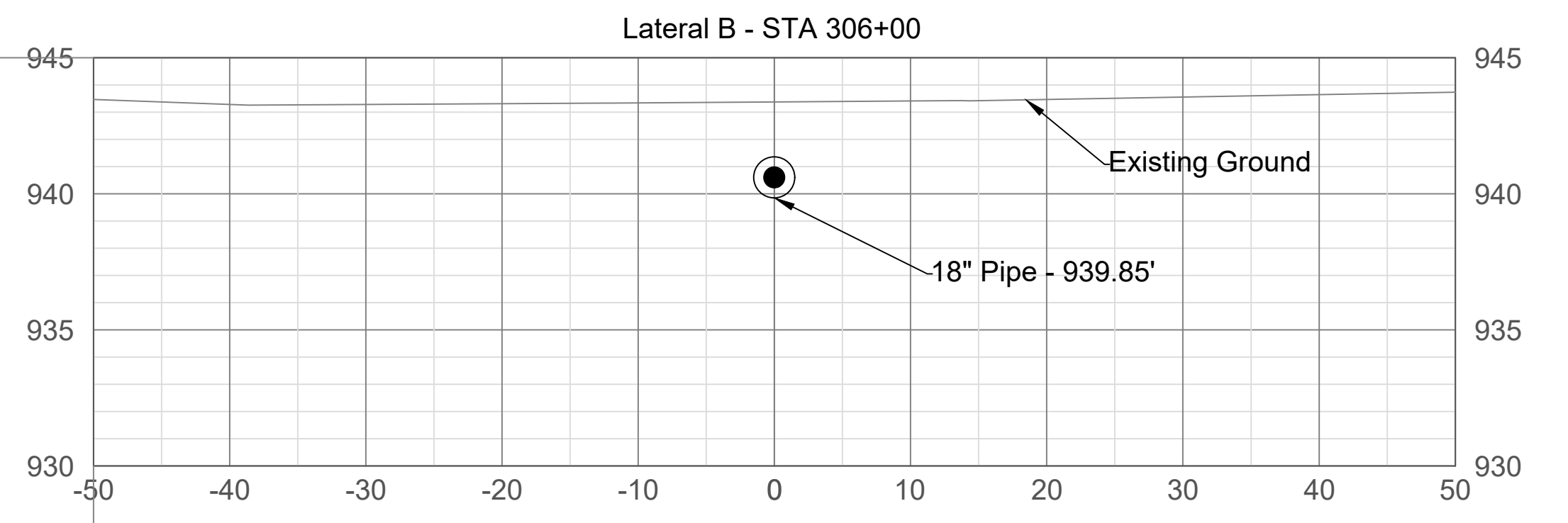
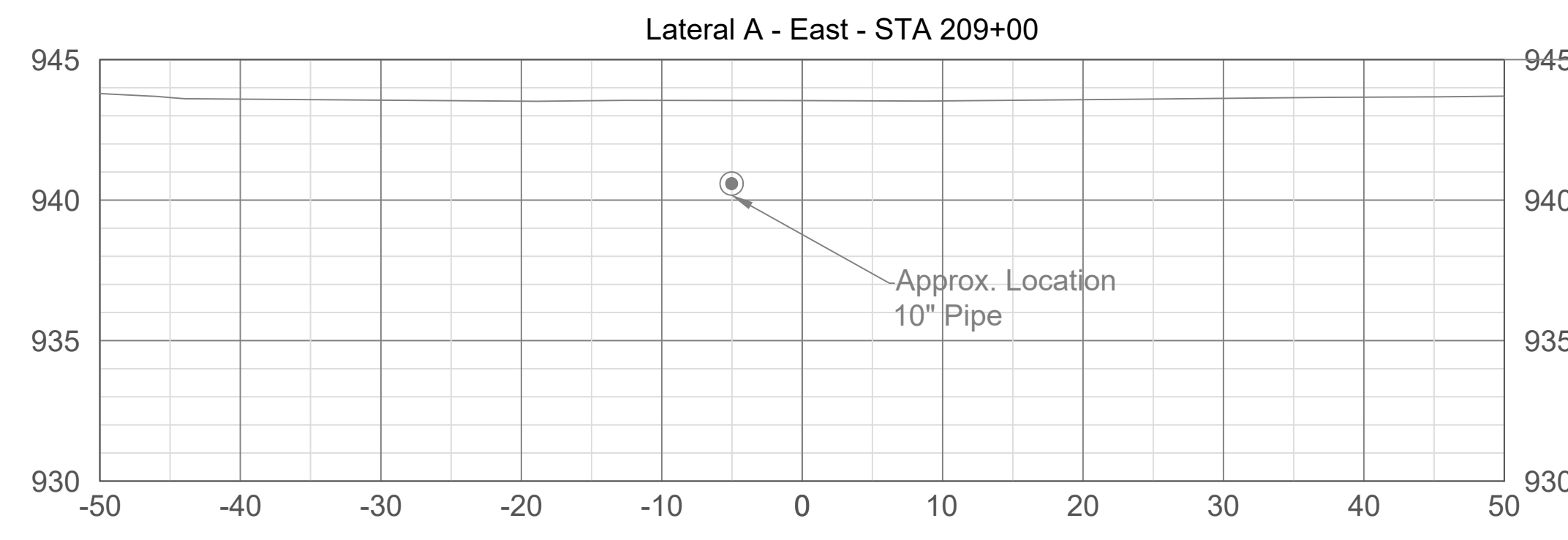
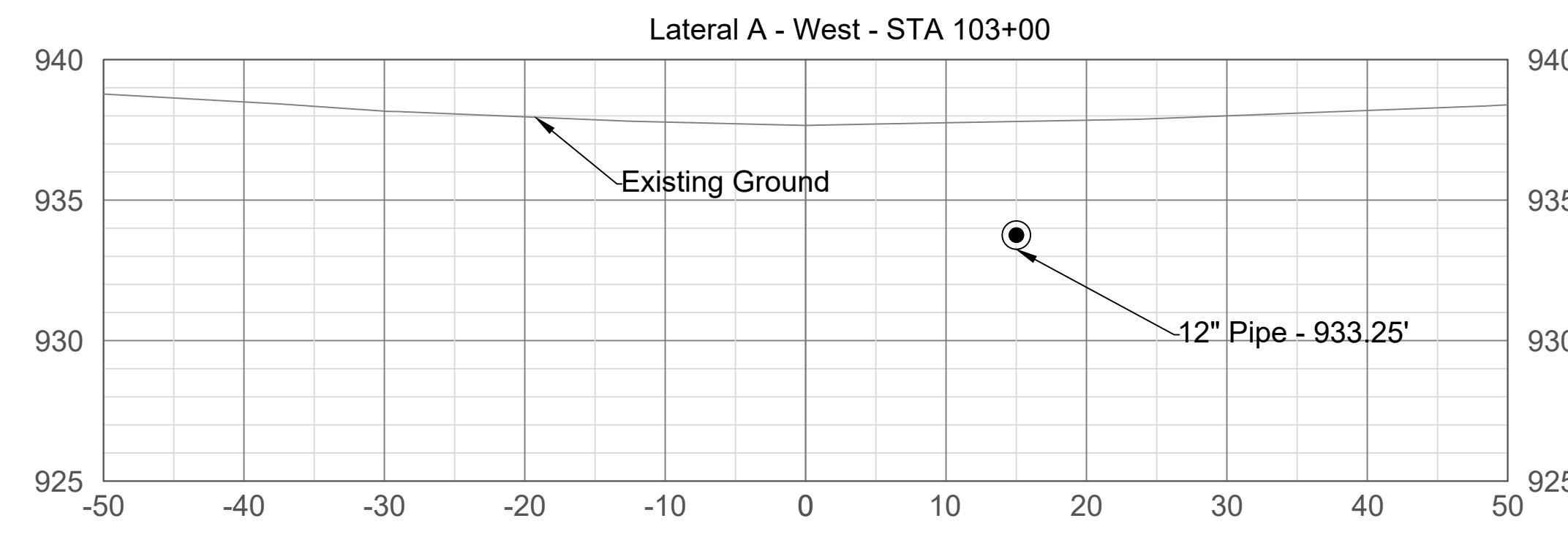
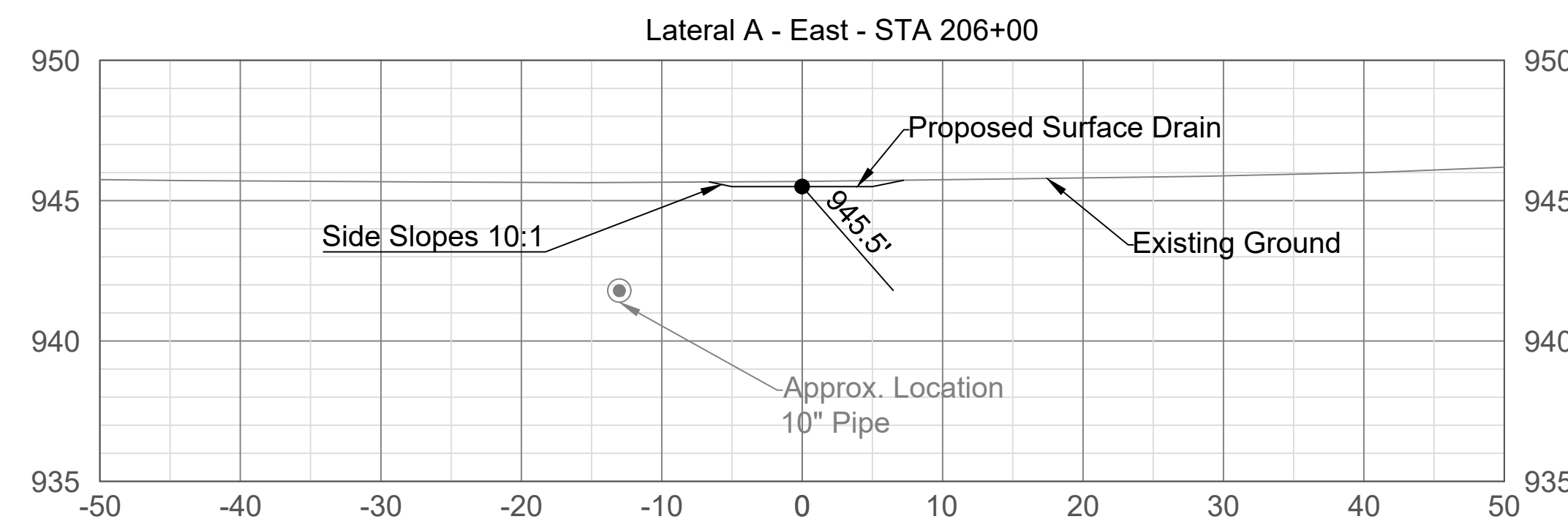
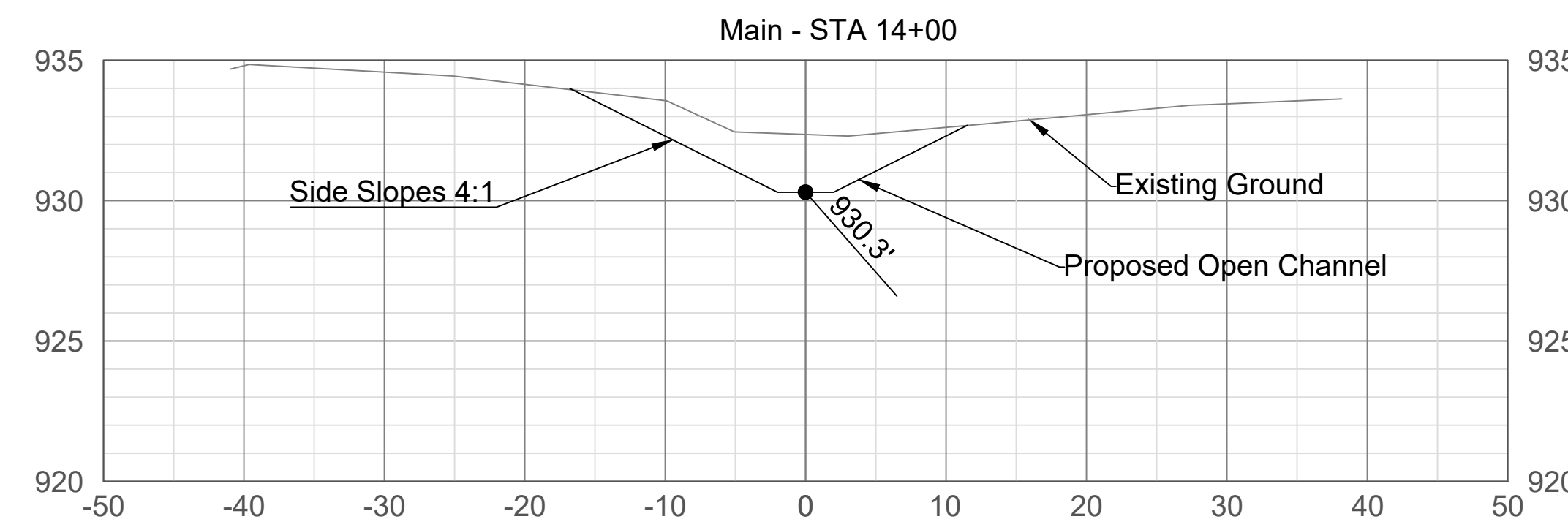


**BENCHMARK DESCRIPTIONS:**  
 BM #1 - BRASS TABLET SET IN CONCRETE AND STAMPED "97-162", LOCATED ON BEAN-OLLER RD 0.8 MILES WEST OF LIBERTY ROAD AND 11' NORTH OF EDGE OF PAVEMENT OF BEAN-OLLER ROAD  
 ELEVATION - 939.97'

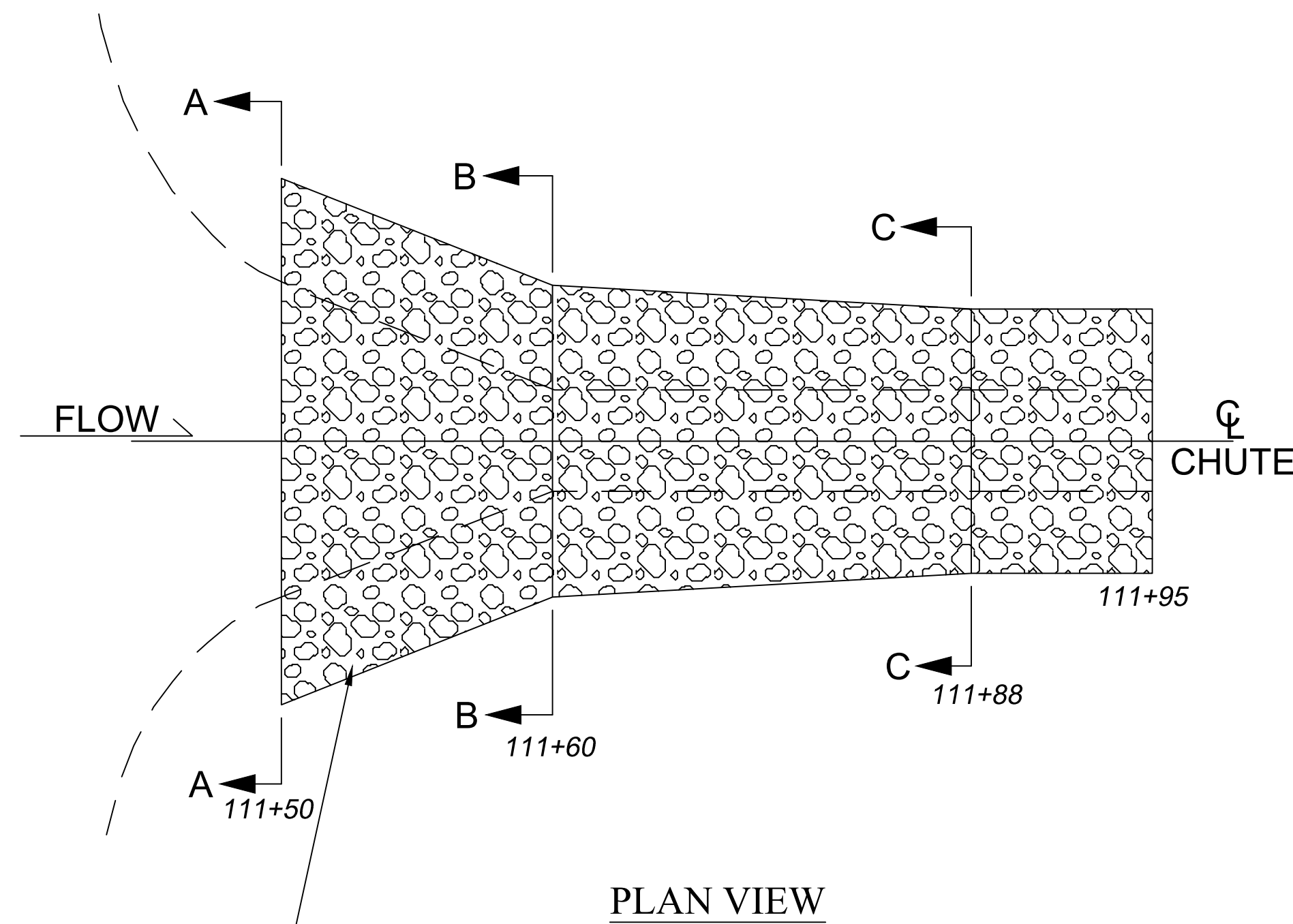




*CROSS-SECTIONS*

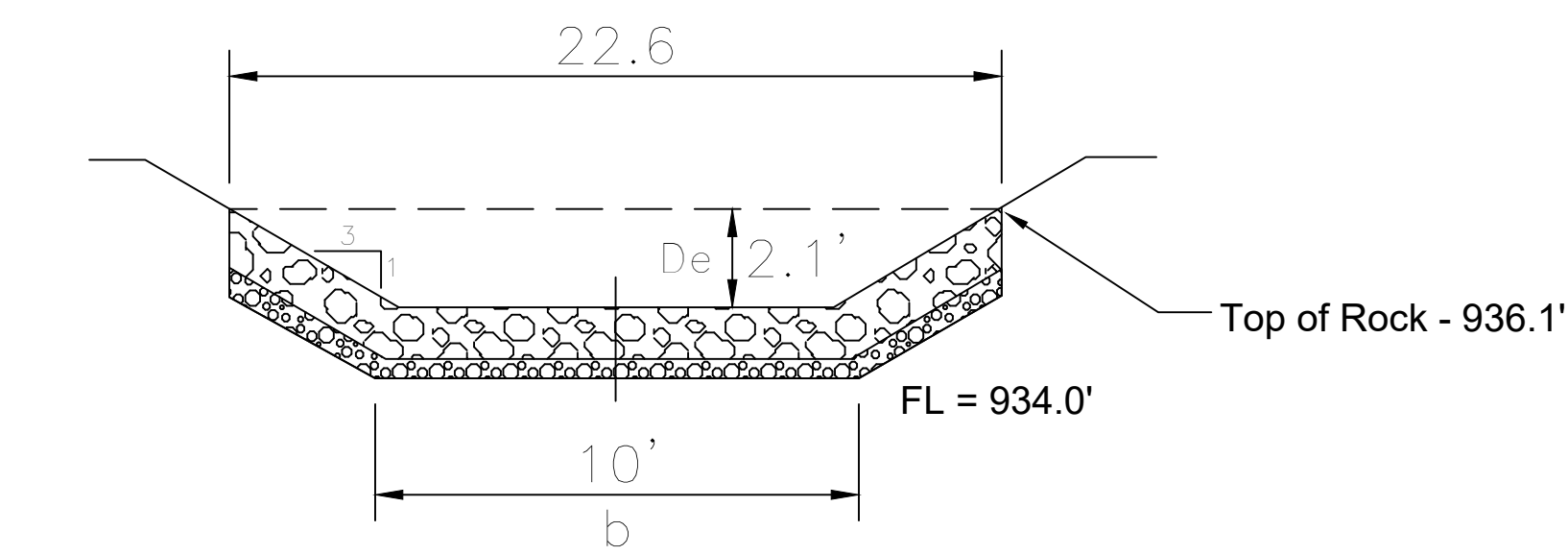




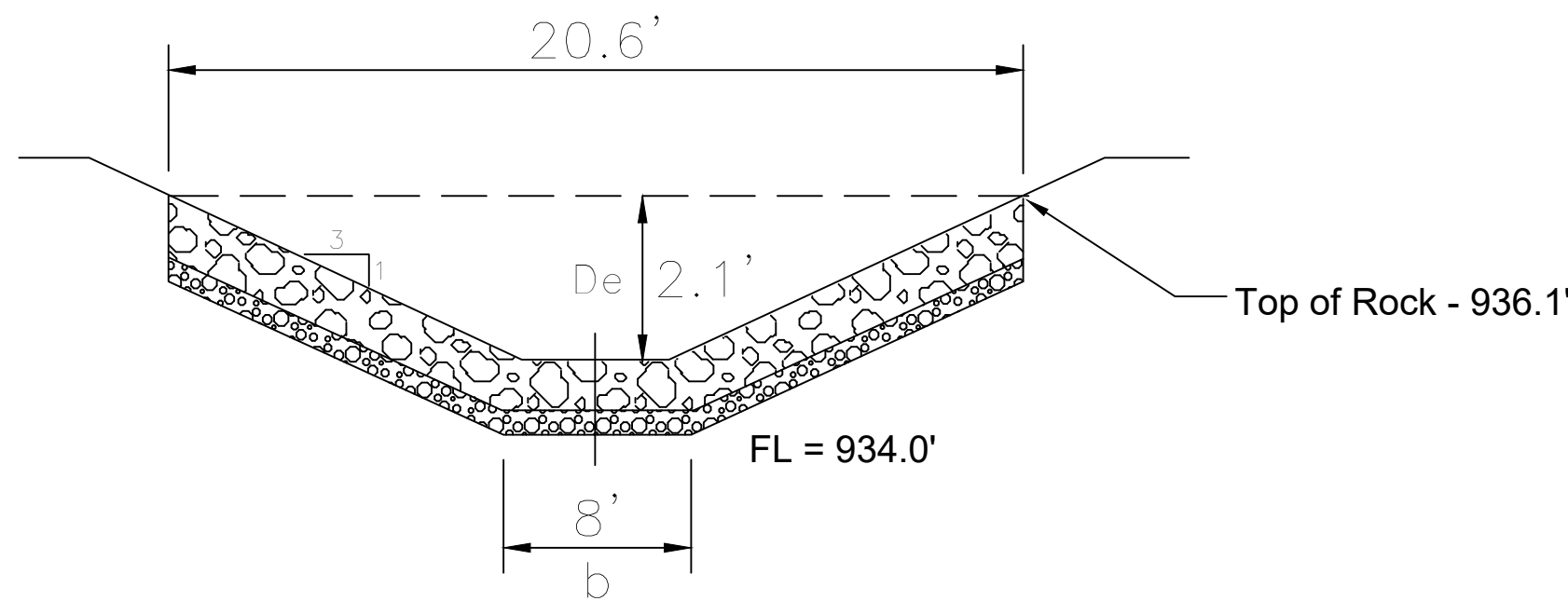


PLAN VIEW

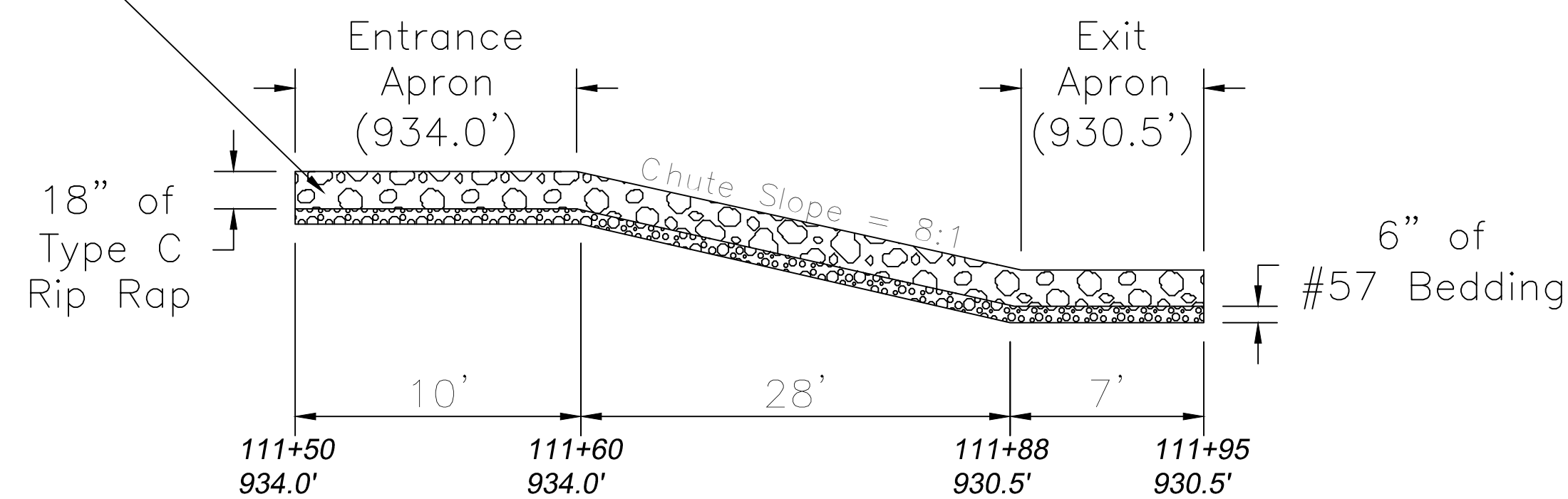
Type C shall consist of sizes such that at least 85 percent of the total material by weight shall be larger than an 6 inch (150 mm) but less than a 18 inch (0.5 m) square opening. At least 50 percent of the total material by weight shall be larger than a 12 inch (0.3 m) square opening. The material smaller than a 6 inch (150 mm) square opening shall consist predominantly of rock spalls and rock fines and shall be free of soil.



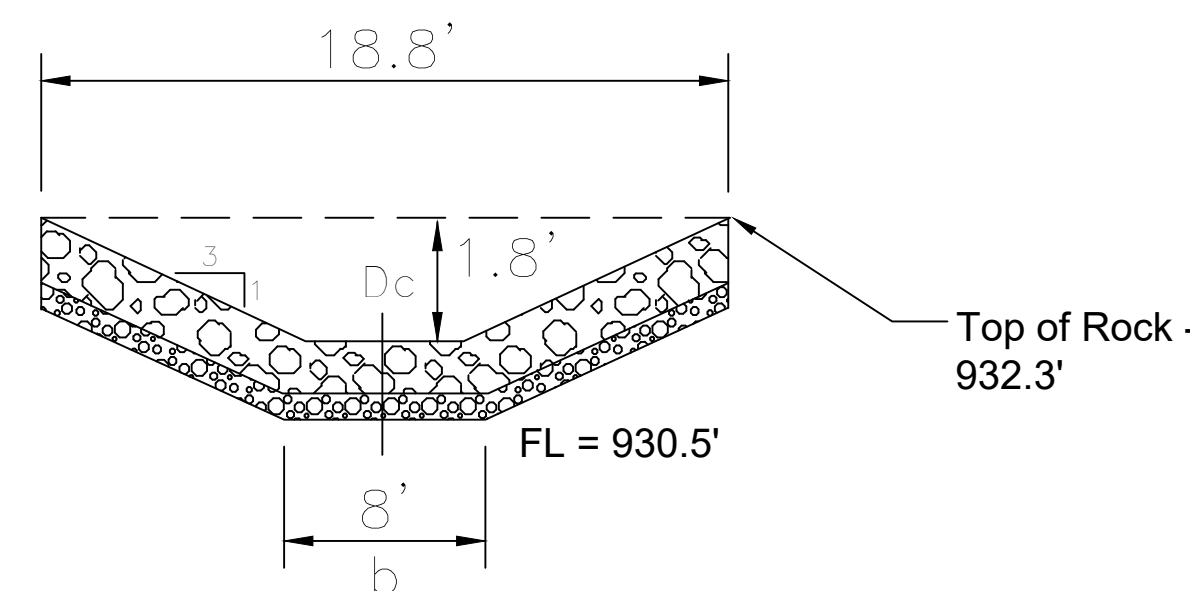
SECTION A-A



SECTION B-B



PROFILE ALONG C OF ROCK CHUTE



SECTION C-C

MATERIAL GRADATIONS	
RIPRAP	
WEIGHT OF INDIVIDUAL PIECES (LBS)	PERCENT OF NUMBER OF PIECES
150-200	4
100-150	6
50-100	20
10-50	30
0-10	40
GRAVEL BEDDING(EQUIVALENT TO NO.57)	
SIZE-(INCHES)	PERCENT PASSING
1 1/2	100
1	95-100
1/2	25-60
NO. 4	0-10
NO. 8	0-5

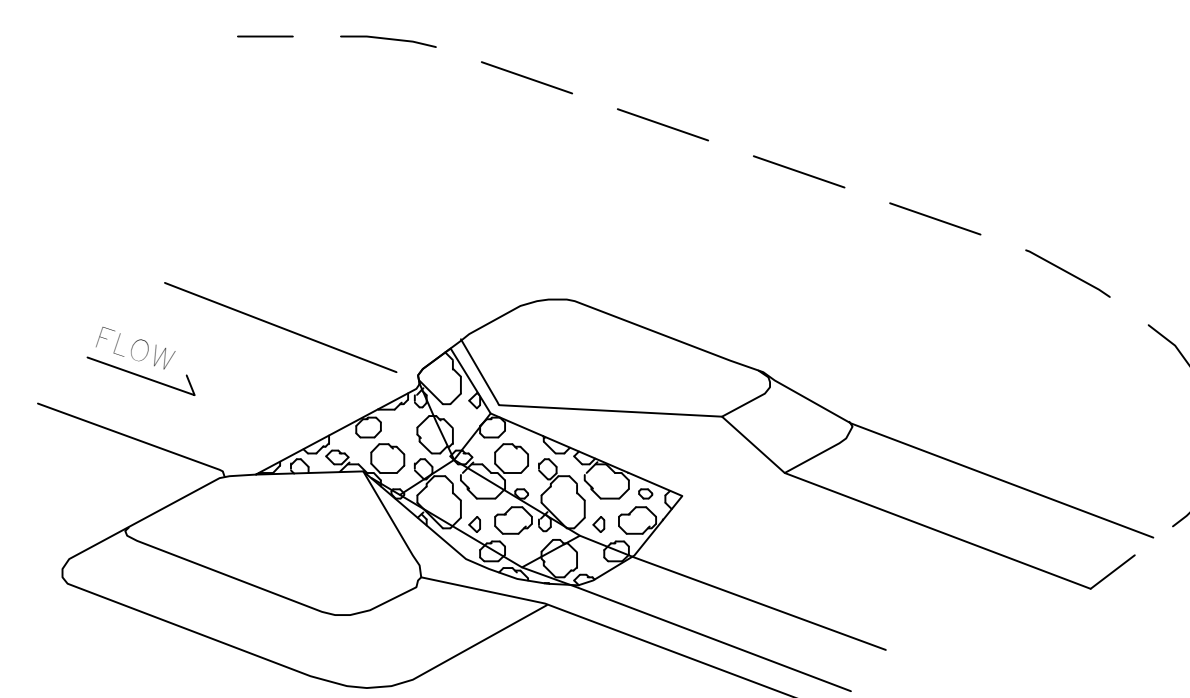
NOTES:

- ALL FILL SHALL BE COMPACTED IN 12" LAYERS WITH TWO PASSES OF WHEELED HEAVY EQUIPMENT OVER ALL THE SURFACE OF THE LAYER.
- BEDDING AND RIPRAP SHALL BE DENSE, DURABLE, ANGULAR ROCK. BEDDING SHALL BE PLACED AND INSPECTED BEFORE PLACING RIPRAP. RIPRAP SHALL BE PLACED TO A UNIFORM DEPTH.

EQUIVALENT ROCK SIZES (165 pcf)		
WEIGHT (LBS)	TYPICAL DIMENSIONS (INCHES)	COMMON SIZE (INCHES)
200	8 X 15 X 18	15
150	8 X 12 X 16	12
100	7 X 10 X 14	10
50	6 X 8 X 11	8
10	3 X 6 X 6	6

Design Data

Acres Drained	66
Chute Slope	8:1
Bottom Width (b) Varies	8'
Side Slopes	3:1
De	2.1
Dc	1.8
V	9.8 FPS
Entrance Elevation	934.0'
Exit Apron Elevation	930.5'
Overfall	3.5'
Entrance Apron Length	10'
Exit Apron Length	7'
Type "C" Stone (Tons)	81.5
#57 Gravel Bedding (Tons)	27.2



ISOMETRIC VIEW



