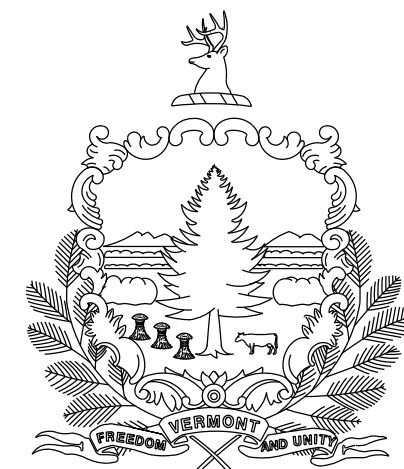


STATE OF VERMONT AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT BRIDGE PROJECT TOWN OF ESSEX COUNTY OF CHITTENDEN VT ROUTE 15 BRIDGE 2 (PRINCIPAL ARTERIAL) (NHS)

PROJECT LOCATION: IN THE TOWN OF ESSEX ON VT ROUTE 15 APPROXIMATELY 0.3 MILES
SOUTHWEST OF THE INTERSECTION WITH VT ROUTE 289.

PROJECT DESCRIPTION: FULL REPLACEMENT OF CULVERT OVER INDIAN BROOK WITH FULL DEPTH ROADWAY
RECONSTRUCTION, AND OTHER HIGHWAY RELATED ITEMS AND CHANNEL WORK.

LENGTH OF CHANNEL: 223.00 FEET
LENGTH OF ROADWAY: 262.00 FEET
LENGTH OF PROJECT: 112.00 FEET

BEGIN CHANNEL WORK
STA. 10+20.00

END APPROACH
STA. 189+07.00
(MM. 3.581)

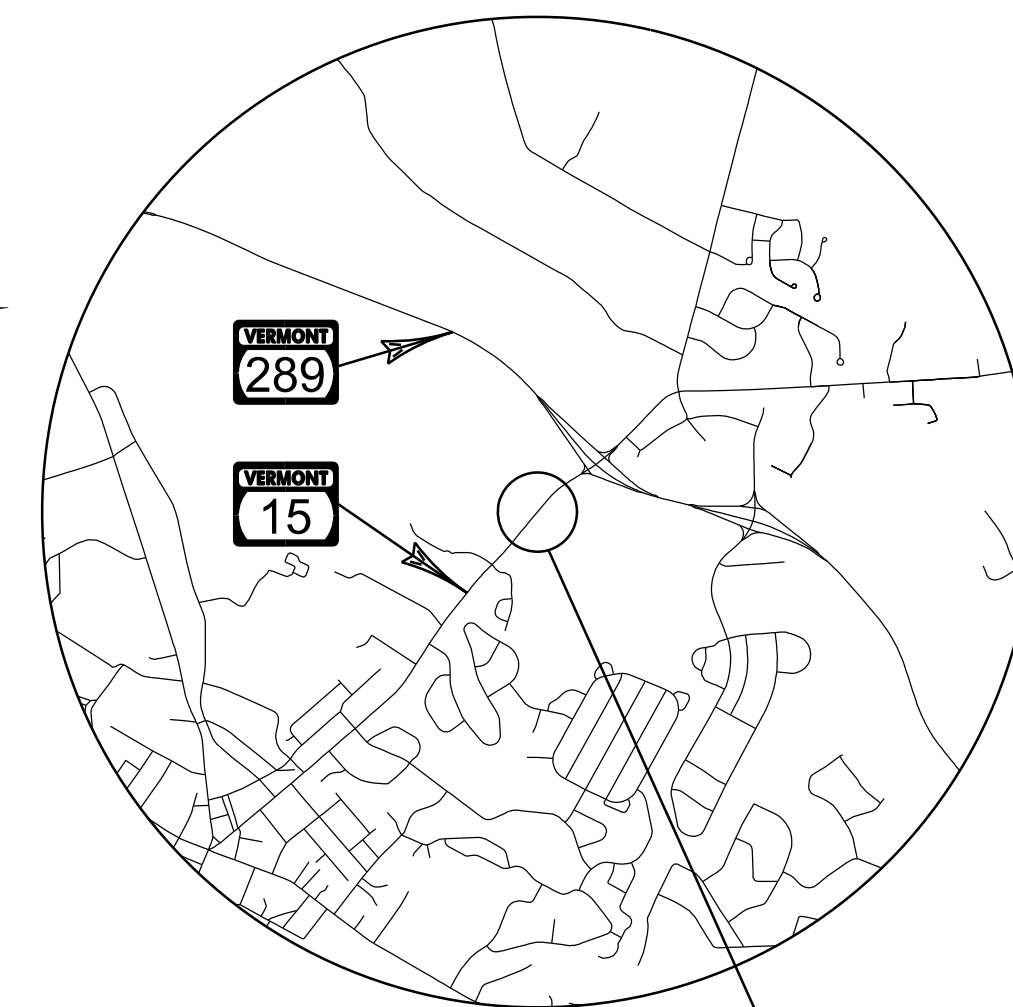
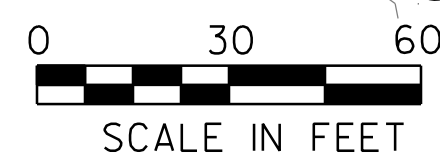
BEGIN APPROACH
STA. 186+45.00
(MM. 3.531)

BEGIN PROJECT
STA. 187+20.00
(MM. 3.545)

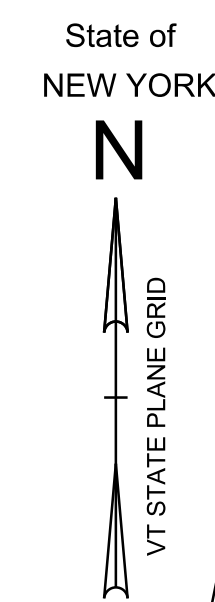
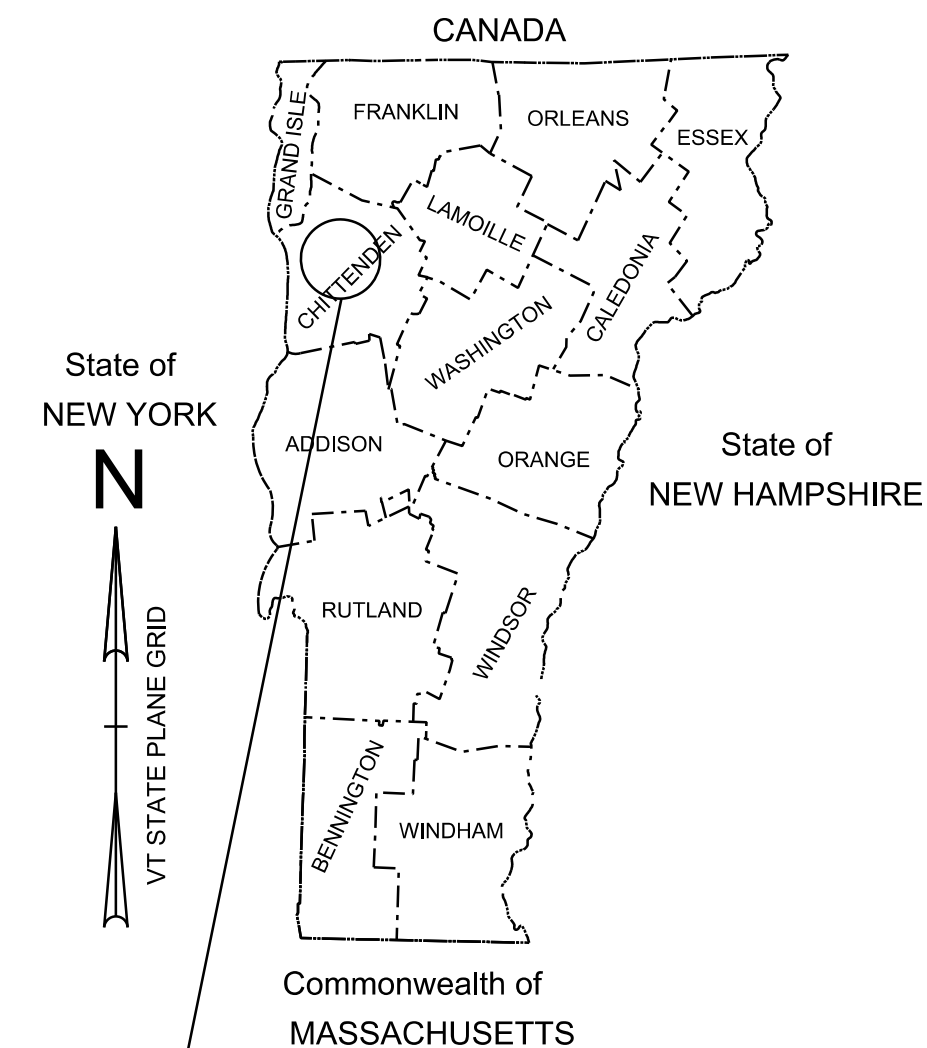
BRIDGE NO. 2
VT ROUTE 15 STA. 187+76.00 =
INDIAN BROOK 11+00.00

END PROJECT
STA. 188+32.00
(MM. 3.567)

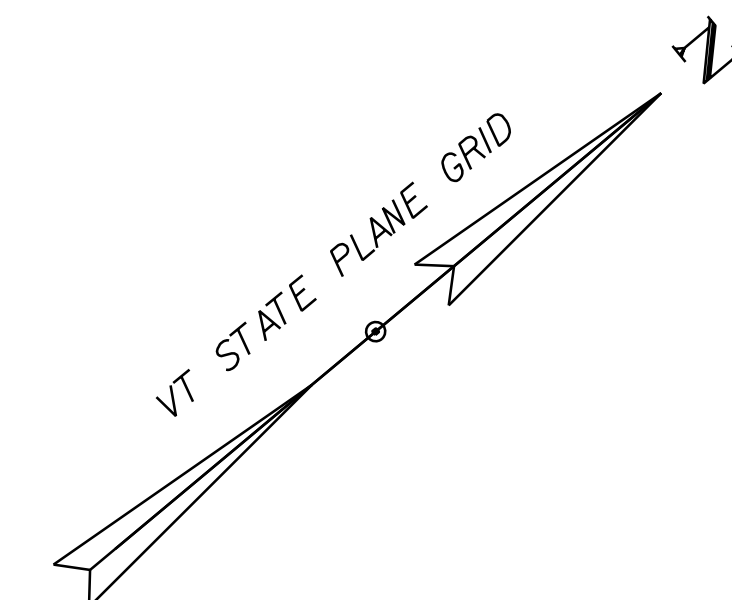
END CHANNEL WORK
STA. 12+43.00



NOT TO SCALE



ESSEX
STP CULV (149)
VT-15 BRIDGE 2



CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2024, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JUNE 27, 2023 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

QUALITY ASSURANCE PROGRAM : LEVEL 1	
SURVEYED BY : VT SURVEY & ENGINEERING	
SURVEYED DATE : 07/25/2022	
DATUM	
VERTICAL	NAVD88
HORIZONTAL	NAD83(2011)

**FINAL PLANS
NOVEMBER 20, 2025**

HIGHWAY DIVISION, CHIEF ENGINEER	
APPROVED _____	DATE _____
PROJECT MANAGER : MAHENDRA THILLIYAR, P.E.	
PROJECT NAME :	ESSEX
PROJECT NUMBER :	STP CULV(149)
SHEET 1 OF 37 SHEETS	



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FINAL HYDRAULIC REPORT

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7-9	QUANTITY SHEETS
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11	EARTHWORK SHEET
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HSD-621.07F	MIDWEST GUARDRAIL SYSTEM TRANSITION SECTION	1/4/2021

SUPERPAVE BITUMINOUS CONCRETE PAVEMENT MIXTURE DESIGN CRITERIA	
DESIGN LIFE ESAL (DESIGN LANE)	1,913,500
DESIGN NUMBER OF GYRATIONS	65
PERFORMANCE GRADED ASPHALT BINDER - PAVER PLACED	58E-28
PERFORMANCE GRADED ASPHALT BINDER - NON-PAVER PLACED	58S-28

TRAFFIC DATA					
YEAR	AADT	DHV	%D	%T	ADTT
2027	10,657	1,298	50	2.5	529
2047	11,692	1,467	50	3.5	806

20 year ESAL for flexible pavement from 2027 to 2047 : 3,827,000
40 year ESAL for flexible pavement from 2027 to 2067 : 8,628,000
Design Speed: 30 MPH

HYDROLOGIC DATA

Date: _____
 DRAINAGE AREA : 3.6 sq. mi.
 CHARACTER OF TERRAIN : Rolling Hills
 STREAM CHARACTERISTICS : Straight and Wide
 NATURE OF STREAMBED : Some larger stones and soil
 PEAK FLOW DATA - ANNUAL EXCEEDANCE PROBABILITY (AEP)
 43% = _____ 2% = _____
 10% = _____ 1% = _____
 4% = _____ 0.2% = _____
 DATE OF FLOOD OF RECORD : -
 ESTIMATED DISCHARGE : -
 WATER SURFACE ELEV. : -
 NATURAL STREAM VELOCITY : -
 ICE CONDITIONS : -
 DEBRIS : -
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? -
 IS ORDINARY RISE RAPID? -
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? -
 IF YES, DESCRIBE: _____

WATERSHED STORAGE: 3.63 sq mi HEADWATERS: _____
 UNIFORM: _____
 IMMEDIATELY ABOVE SITE: _____

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: REINFORCED CONCRETE BOX CULVERT
 YEAR BUILT: Unknown
 CLEAR SPAN(NORMAL TO STREAM): 8'-0"
 VERTICAL CLEARANCE ABOVE STREAMBED: 6'-0"
 WATERWAY OF FULL OPENING: 48 SF
 DISPOSITION OF STRUCTURE: Replacement
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: See borings

WATER SURFACE ELEVATIONS AT:
 43% AEP = * VELOCITY = *
 10% AEP = * " "
 4% AEP = * " "
 2% AEP = 5.5 FT " "
 1% AEP = 6.3 FT " "

LONG TERM STREAMBED CHANGES: _____
 IS THE ROADWAY OVERTOPPED BELOW 1% AEP: *
 FREQUENCY: *
 RELIEF ELEVATION: *
 DISCHARGE OVER ROAD @ 1% AEP: *

UPSTREAM STRUCTURE

TOWN: - DISTANCE: -
 HIGHWAY #: - STRUCTURE #: -
 CLEAR SPAN: - CLEAR HEIGHT: -
 YEAR BUILT: - FULL WATERWAY: -
 STRUCTURE TYPE: -

DOWNSTREAM STRUCTURE

TOWN: - DISTANCE: -
 HIGHWAY #: - STRUCTURE #: -
 CLEAR SPAN: - CLEAR HEIGHT: -
 YEAR BUILT: - FULL WATERWAY: -
 STRUCTURE TYPE: -

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A STR.	4A STR.	5A SEM
TONNAGE							
INVENTORY	1.82	1.32					
POSTING							
OPERATING	2.36	1.71					

COMMENTS: _____

PROPOSED STRUCTURE

STRUCTURE TYPE: THREE SIDED REINFORCED CONCRETE CULVERT
 CLEAR SPAN(NORMAL TO STREAM): 12'-0"
 VERTICAL CLEARANCE ABOVE STREAMBED: 6'-0"
 WATERWAY OF FULL OPENING: 72 SF

WATER SURFACE ELEVATIONS AT:
 43% AEP = - VELOCITY = -
 10% AEP = - " "
 4% AEP = - " "
 2% AEP = 4.7 FT " "
 1% AEP = 5.3 FT " "

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: -
 FREQUENCY: -
 RELIEF ELEVATION: -
 DISCHARGE OVER ROAD @ 1% AEP: -

BRIDGE LOW CHORD ELEVATION: -
 FREEBOARD: -

SCOUR: -

REQUIRED CHANNEL PROTECTION: -

PERMIT INFORMATION

AVERAGE DAILY FLOW: - DEPTH OR ELEVATION:
 ORDINARY LOW WATER: -
 ORDINARY HIGH WATER: -

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: _____
 CLEAR SPAN (NORMAL TO STREAM): _____
 VERTICAL CLEARANCE ABOVE STREAMBED: _____
 WATERWAY AREA OF FULL OPENING: _____

ADDITIONAL INFORMATION

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY.

DESIGN VALUES

1. DESIGN LIVE LOAD HL-93
2. FUTURE PAVEMENT d_p : _____
3. DESIGN SPAN L : _____
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS) Δ : ---
5. PRESTRESSING STRAND f_y : ---
6. PRESTRESSED CONCRETE STRENGTH f'_c : ---
7. PRESTRESSED CONCRETE RELEASE STRENGTH f'_{ci} : ---
8. HIGH PERFORMANCE CONCRETE, CLASS PCD f'_c : ---
9. HIGH PERFORMANCE CONCRETE, CLASS PCS f'_c : ---
10. CONCRETE HIGH PERFORMANCE, CLASS SCC f'_c : ---
11. CONCRETE, CLASS C f'_c : ---
12. REINFORCING STEEL f_y : _____
13. STRUCTURAL STEEL AASHTO M270 (WEATHERING) f_y : _____
14. NOMINAL BEARING RESISTANCE OF SOIL q_n : ---
15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD) ϕ : ---
16. NOMINAL BEARING RESISTANCE OF ROCK q_n : ---
17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD) ϕ : ---
18. PILE RESISTANCE FACTOR ϕ : ---
19. LATERAL PILE DEFLECTION Δ : ---
20. BASIC WIND SPEED V_{33} : ---
21. MINIMUM GROUND SNOW LOAD p_g : ---
22. SEISMIC DATA PGA : --- S_s : --- S_1 : ---
23. _____

PROJECT NAME: ESSEX
 PROJECT NUMBER: STP CULV(I49)
 FILE NAME: z23b689forms.dgn PLOT DATE: 11/20/2025
 PROJECT LEADER: D. VERTIYEV DRAWN BY: C. WEBSTER
 DESIGNED BY: E. NOONAN CHECKED BY: A. TSOUKALAS
 PRELIMINARY INFORMATION SHEET SHEET 2 OF 37



GENERAL INFORMATION

SYMBOLGY LEGEND NOTE

THE SYMBOLGY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLGY. THE SYMBOLGY IS USED FOR EXISTING & PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROJECT ANNOTATION, AS NOTED ON PROJECT PLAN SHEETS. THIS LEGEND SHEET COVERS THE BASICS. SYMBOLGY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

R.O.W. ABBREVIATIONS (CODES) & SYMBOLS

POINT CODE	DESCRIPTION
BF	BARRIER FENCE
CH	CHANNEL EASEMENT
CONST	CONSTRUCTION EASEMENT
CUL	CULVERT EASEMENT
D&C	DISCONNECT & CONNECT
DIT	DITCH EASEMENT
DR	DRAINAGE EASEMENT
DRIVE	DRIVEWAY EASEMENT
EC	EROSION CONTROL
HWY	HIGHWAY EASEMENT
I&M	INSTALL & MAINTAIN EASEMENT
LAND	LANDSCAPE EASEMENT
PDF	PROJECT DEMARCATION FENCE
R&RES	REMOVE & RESET
R&REP	REMOVE & REPLACE
R.T.& I.	RIGHT, TITLE, AND INTEREST
SR	SLOPE RIGHT
UE	UTILITY EASEMENT
(P)	PERMANENT EASEMENT
(T)	TEMPORARY EASEMENT
■	BNDNS BOUND SET
□	BNDNS BOUND TO BE SET
⊙	IPNF IRON PIN FOUND
●	IPNS IRON PIN TO BE SET
⊗	CALC EXISTING ROW POINT
○	PROW PROPOSED ROW POINT
[LENGTH]	LENGTH CARRIED ON NEXT SHEET

COMMON TOPOGRAPHIC POINT SYMBOLS

POINT CODE	DESCRIPTION
⊕	APL BOUND APPARENT LOCATION
□	BM BENCHMARK
□	BND BOUND
⊠	CB CATCH BASIN
⊕	COMB COMBINATION POLE
⊠	DITHR DROP INLET THROATED DNC
⊕	EL ELECTRIC POWER POLE
○	FPOLE FLAGPOLE
○	GASFIL GAS FILLER
○	GP GUIDE POST
×	GSO GAS SHUT OFF
○	GUY GUY POLE
○	GUYW GUY WIRE
×	GV GATE VALVE
⊕	H TREE HARDWOOD
△	HCTRL CONTROL HORIZONTAL
△	HVCTRL CONTROL HORIZ. & VERTICAL
◇	HYD HYDRANT
○	IP IRON PIN
○	IPIPE IRON PIPE
□	LI LIGHT - STREET OR YARD
⊕	MB MAILBOX
○	MH MANHOLE (MH)
⊕	MM MILE MARKER
⊕	PM PARKING METER
⊕	PMK PROJECT MARKER
⊕	POST POST STONE/WOOD
⊕	RRSIG RAILROAD SIGNAL
⊕	RRSL RAILROAD SWITCH LEVER
⊕	S TREE SOFTWOOD
⊕	SAT SATELLITE DISH
⊕	SHRUB SHRUB
⊕	SIGN SIGN
⊕	STUMP STUMP
⊕	TEL TELEPHONE POLE
○	TIE TIE
⊕	TSIGN SIGN W/DOUBLE POST
⊕	VCTRL CONTROL VERTICAL
○	WELL WELL
×	WSO WATER SHUT OFF

THESE ARE COMMON VAOT SURVEY POINT SYMBOLS FOR EXISTING FEATURES, ALSO USED FOR PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROPOSED ANNOTATION.

PROPOSED GEOMETRY CODES

CODE	DESCRIPTION
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
CC	CENTER OF CURVE
PT	POINT OF TANGENCY
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
POB	POINT OF BEGINNING
POE	POINT OF ENDING
STA	STATION PREFIX
AH	AHEAD STATION SUFFIX
BK	BACK STATION SUFFIX
D	CURVE DEGREE OF (100FT)
R	CURVE RADIUS OF
T	CURVE TANGENT LENGTH
L	CURVE LENGTH OF
E	CURVE EXTERNAL DISTANCE
CB	CHORD BEARING

UTILITY SYMBOLGY

UNDERGROUND UTILITIES

— UGU —	UTILITY (GENERIC-UNKNOWN)
— UT —	TELEPHONE
— UE —	ELECTRIC
— UC —	CABLE (TV)
— UEC —	ELECTRIC+CABLE
— UET —	ELECTRIC+TELEPHONE
— UCT —	CABLE+TELEPHONE
— UECT —	ELECTRIC+CABLE+TELEPHONE
— G —	GAS LINE
— W —	WATER LINE
— S —	SANITARY SEWER (SEPTIC)

ABOVE GROUND UTILITIES (AERIAL)

— AGU —	UTILITY (GENERIC-UNKNOWN)
— T —	TELEPHONE
— E —	ELECTRIC
— C —	CABLE (TV)
— EC —	ELECTRIC+CABLE
— ET —	ELECTRIC+TELEPHONE
— AER E&T —	ELECTRIC+TELEPHONE
— CT —	CABLE+TELEPHONE
— ECT —	ELECTRIC+CABLE+TELEPHONE
—	UTILITY POLE GUY WIRE

PROJECT CONSTRUCTION SYMBOLGY

PROJECT DESIGN & LAYOUT SYMBOLGY

— — — CZ — — —	CLEAR ZONE
—————	PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

▲ —▲ —▲ —▲ —▲	TOP OF CUT SLOPE
○ —○ —○ —○ —○	TOE OF FILL SLOPE
⊗ ⊗ ⊗ ⊗ ⊗	STONE FILL
-----	BOTTOM OF DITCH
-----	CULVERT PROPOSED
-----	STRUCTURE SUBSURFACE
PDF — PDF —	PROJECT DEMARCATION FENCE
BF — BF —	BARRIER FENCE
XXXXXXXXXXXXXXXXXXXX	TREE PROTECTION ZONE (TPZ)
//////	STRIPING LINE REMOVAL
~~~~~	SHEET PILES

**CONVENTIONAL BOUNDARY SYMBOLGY**

**BOUNDARY LINES**

—————	TOWN BOUNDARY LINE
—————	COUNTY BOUNDARY LINE
—————	STATE BOUNDARY LINE
———	PROPOSED STATE R.O.W. (LIMITED ACCESS)
———	PROPOSED STATE R.O.W.
———	STATE ROW (LIMITED ACCESS)
———	STATE ROW
———	TOWN ROW
-----	PERMANENT EASEMENT LINE (P)
-----	TEMPORARY EASEMENT LINE (T)
-----	SURVEY LINE
— P — P —	PROPERTY LINE (P/L)
— L — L —	PROPERTY LINE (P/L)
▲ — SR — SR — SR —	SLOPE RIGHTS
6f — 6f —	6F PROPERTY BOUNDARY
4f — 4f —	4F PROPERTY BOUNDARY
HAZ — HAZ —	HAZARDOUS WASTE

**EPSC LAYOUT PLAN SYMBOLGY**

**EPSC MEASURES**

ONNOONNOONNO	FILTER CURTAIN
— — — — —	SILT FENCE
— X — X — X — X —	SILT FENCE WOVEN WIRE
— — — — —	CHECK DAM
□	DISTURBED AREAS REQUIRING RE-VEGETATION
⊗	EROSION MATTING

SEE EPSC DETAIL SHEETS FOR ADDITIONAL SYMBOLGY

**ENVIRONMENTAL RESOURCES**

—————	WETLAND BOUNDARY
-----	RIPARIAN BUFFER ZONE
-----	WETLAND BUFFER ZONE
-----	SOIL TYPE BOUNDARY
— T&E —	THREATENED & ENDANGERED SPECIES
— HAZ — HAZ —	HAZARDOUS WASTE AREA
— AG —	AGRICULTURAL LAND
— HABITAT —	FISH & WILDLIFE HABITAT
— FLOOD PLAIN —	FLOOD PLAIN
— OHW —	ORDINARY HIGH WATER (OHW)
— — — — —	STORM WATER
— — — — —	USDA FOREST SERVICE LANDS
— — — — —	WILDLIFE HABITAT SUIT/CONN

**ARCHEOLOGICAL & HISTORIC**

— ARCH —	ARCHEOLOGICAL BOUNDARY
— HISTORIC DIST —	HISTORIC DISTRICT BOUNDARY
— HISTORIC —	HISTORIC AREA
(H)	HISTORIC STRUCTURE

**CONVENTIONAL TOPOGRAPHIC SYMBOLGY**

**EXISTING FEATURES**

-----	ROAD EDGE PAVEMENT
-----	ROAD EDGE GRAVEL
-----	DRIVEWAY EDGE
-----	DITCH
-----	FOUNDATION
— X — X — X — X —	FENCE (EXISTING)
— □ — □ — □ — □ —	FENCE WOOD POST
— ○ — ○ — ○ — ○ —	FENCE STEEL POST
~~~~~	GARDEN
— — — — —	ROAD GUARDRAIL
	RAILROAD TRACKS
-----	CULVERT (EXISTING)
-----	STONE WALL
-----	WALL
~~~~~	WOOD LINE
~~~~~	BRUSH LINE
~~~~~	HEDGE
-----	BODY OF WATER EDGE
-----	LEDGE EXPOSED

PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689legend.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
LEGEND SHEET

PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 3 OF 37



**GENERAL:**

1. ITEM 201.1000, CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS, SHALL CONSIST OF CUTTING AND DISPOSING OF ALL TREES, STUMPS, DOWN TIMBER, BRUSH BUSHES, AND DEBRIS FROM ALL AREAS EXTENDING FROM THE ROADWAY CENTERLINE TO THE CONSTRUCTION LIMITS.
2. ALL PAVEMENT MARKING PLACEMENTS SHALL MATCH INTO EXISTING AT THE LIMITS OF THE ROADWAY APPROACHES.
3. THE CONTRACTOR SHALL PROVIDE A SITE-SPECIFIC EROSION PREVENTION AND SEDIMENT CONTROL PLAN IN ACCORDANCE WITH SECTION 653 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION. ESTIMATED QUANTITIES FOR EPSC WORK HAVE BEEN INCLUDED IN THE CONTRACT FOR BIDDING PURPOSES. IF THE CONTRACTOR'S EPSC PLAN REQUIRES ITEMS OF WORK THAT ARE NOT INCLUDED IN THE PLANS IT SHALL BE PAID FOR AS PART OF ITEM 653.0300 MAINTENANCE OF EPSC PLAN (N.A.B.I.).
4. PRIOR TO PLACING MATERIALS IN CHANNELS, PREPARE SLOPE AND SUBGRADE AS FOLLOWS:
  - A. CUT OFF TREES AND EXISTING STUMPS TO GROUND LEVEL. LEAVE STUMPS & ROOTS BELOW GRADE IN PLACE WHEN POSSIBLE AND AS APPROVED BY THE ENGINEER.
  - B. EXCAVATE VEGETATION AND ORGANIC SOILS FROM SURFACE OF SLOPE.
  - C. COMPACT SURFACE OF SLOPE (COMPACTION WITH EXCAVATOR BUCKET ACCEPTABLE).
  - D. PLACE MATERIALS AS SHOWN ON THE DETAILS.
  - E. THE COST FOR SLOPE PREPARATION WILL BE CONSIDERED INCIDENTAL TO ITS RESPECTIVE EXCAVATION ITEM.

**UTILITIES:**

5. ALL EXISTING UTILITIES NOTED ON THE PLANS TO BE RETAINED SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
6. CHAMPLAIN WATER DISTRICT (CWD) IS NOT A MEMBER OF DIG SAFE AND MUST BE CONTACTED SEPARATELY. THE CONTRACTOR SHALL PROVIDE CWD A MINIMUM OF TWO (2) WEEKS NOTICE PRIOR TO BEGINNING THE PROJECT, AND A MINIMUM OF FIVE (5) CALENDAR DAYS NOTICE PRIOR TO EXCAVATING WITHIN 10 FEET OF CWD INFRASTRUCTURE. THE CONTRACTOR SHALL NOT COMMENCE EXCAVATION WORK WITHIN 10 FEET OF CWD INFRASTRUCTURE UNLESS CWD PERSONNEL ARE ONSITE.
7. ONLY CWD PERSONNEL SHALL OPERATE CWD OWNED WATER VALVES.
8. ALL CWD MARKER POSTS WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND RESET BY CWD. THE CONTRACTOR SHALL NOTIFY CWD PRIOR TO THE START OF CONSTRUCTION TO LINE UP THIS WORK. THE CONTRACTOR SHALL DIRECT CWD REGARDING WHICH UTILITY MARKER POSTS NEED TO BE REMOVED AND RESET.
9. ANY BEDROCK THAT NEEDS TO BE REMOVED SHALL BE REMOVED VIA MECHANICAL MEANS ONLY. NO BLASTING SHALL OCCUR WITHOUT PRIOR AUTHORIZATION AND COORDINATION WITH CWD.
10. THE CONTRACTOR SHALL MAKE EVERY EFFORT TO REUSE EXISTING PIPE. ANY ADDITIONAL PIPE, NEW GASKETS, COUPLINGS, INSULATION, AND OTHER NECESSARY APPURTENANCES TO REINSTALL THE PIPE WILL BE SUPPLIED BY CWD.
11. THE CONTRACTOR WILL BE REQUIRED TO BE FULLY PREPARED AND STAGED FOR UTILITY WORK PRIOR TO THE ROAD CLOSURE.

**TRAFFIC CONTROL:**

12. PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL BE FULLY OPERATIONAL FOR A MINIMUM OF TWO WEEKS PRIOR TO ANY MODIFICATIONS TO NORMAL TRAFFIC OPERATIONS. WHEN IN OPERATING MODE, THE BOTTOM OF THE PCMS MESSAGE PANEL SHALL BE FULLY EXTENDED TO 7 FEET ABOVE THE ROADWAY.
13. PAYMENT FOR ALL TEMPORARY TRAFFIC DEVICES REQUIRED FOR IMPLEMENTING THE DETOUR, INCLUDING BUT NOT LIMITED TO SIGNS AND BARRICADES SHALL BE INCLUDED FOR PAYMENT UNDER ITEM 641.1100 TRAFFIC CONTROL, ALL-INCLUSIVE. PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE INCLUDED FOR PAYMENT UNDER ITEM 641.1500 PORTABLE CHANGEABLE MESSAGE SIGN.

14. THE UPSTREAM LOCATION FOR THE PCMS FROM THE DECISION POINT DEPENDS ON WHAT TYPE OF ACTION IS REQUIRED OF THE MOTORIST. AN EXAMPLE OF A MINOR ACTION IS A LANE CHANGE BY THE MOTORIST. A MAJOR ACTION WOULD BE THE MOTORIST HAVING TO MAKE A DETOUR FROM THE CURRENT ROAD. FOR A MINOR ACTION, THE PCMS SHOULD BE PLACED FROM 500 FT TO 1,000 FT UPSTREAM OF THE DECISION POINT, REGARDLESS OF SPEED. FOR A MAJOR ACTION, IF THE SPEED IS LESS THAN OR EQUAL 40 MILES PER HOUR (MPH), THE PCMS SHOULD BE PLACED AT LEAST 1,000 FT UPSTREAM OF THE DECISION POINT. IF THE SPEED IS GREATER THAN OR EQUAL TO 45 MPH, THEN THE PCMS SHOULD BE PLACED AT LEAST 1 MILE UPSTREAM OF THE DECISION POINT. THERE SHOULD BE A MINIMUM SPACING OF AT LEAST 1,000 FT BETWEEN PCMS UNITS OR A PCMS AND AN ARROW PANEL. MULTIPLE PCMS UNITS SHOULD BE PLACED ON THE SAME SIDE OF THE ROADWAY.
15. PCMS MESSAGES SHALL BE REVISED AS NECESSARY AS CHANGES IN ACTIVITIES WARRANT. ANY CHANGES TO THE MESSAGE TO BE DISPLAYED, AND THEIR PROPOSED LOCATIONS, SHALL BE SUBMITTED TO THE RESIDENT ENGINEER IN ADVANCE FOR APPROVAL. TURN OFF OR REMOVE PCMS IF MESSAGES DO NOT CONVEY ANY MORE INFORMATION THAN STATIC SIGNS - COORDINATE WITH RESIDENT ENGINEER PRIOR TO TURNING OFF. AVOID DISPLAYING OVERLY SIMPLISTIC MESSAGES THAT ADD LITTLE VALUE TO OTHER SIGNS OR DEVICES USED IN THE WORK ZONE. "USE CAUTION", "SLOW", EVEN "ROAD WORK AHEAD" ON A PCMS QUICKLY BECOME IGNORED BY DRIVERS, FORCING PCMS TO LOSE THEIR EFFECTIVENESS IN CHANGING DRIVER BEHAVIOR. PROVIDE DRIVERS WITH CLEAR REASONS FOR FOCUSING THEIR ATTENTION AND CHANGING THEIR DRIVING BEHAVIORS AS THEY ENTER AND DRIVE THROUGH THE WORK ZONE - E.G., "WORKERS IN ROAD" OR "LANE NARROWS".

**PRECAST CONCRETE:**

16. PRECAST CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 540 AND WILL BE PAID FOR UNDER CONTRACT ITEM 540.1000 PRECAST CONCRETE STRUCTURE.
17. WATER REPELLENT, SILANE SHALL BE FURNISHED IN ACCORDANCE WITH SECTION 514 AND SHALL BE FIELD APPLIED TO ALL EXPOSED SURFACES OF THE PRECAST CONCRETE STRUCTURES. PAYMENT FOR WATER REPELLENT, SILANE APPLIED TO EXPOSED SURFACES OF THE PRECAST WINGWALLS WILL BE PAID UNDER ITEM 514.1000 WATER REPELLENT, SILANE.
18. PAYMENT FOR JOINT WRAP AT THE BOTTOM OF THE CULVERT WILL BE CONSIDERED INCIDENTAL TO ITEM 540.1000 PRECAST CONCRETE STRUCTURE.
19. DESIGN CRITERIA PRECAST CONCRETE STRUCTURE
  - A. GRANULAR BACKFILL FOR STRUCTURES = 120 PCF
  - B. DESIGN LIVE LOAD = HL-93
  - C. NOMINAL BEARING RESISTANCE OF ROCK = 8.10 KSF
  - D. BEARING RESISTANCE FACTOR = 0.45
  - E. DESIGN FILL OVER BOX = 7+/- FEET
  - F. AT-REST EARTH PRESSURE (Ko) = 0.47 FOR GRANULAR BORROW AND 0.44 FOR GRANULAR BACKFILL FOR STRUCTURES
  - G. CONCRETE COMPRESSIVE STRENGTH = SEE SUBSECTION 540.05(e)
20. THE PRECAST CULVERT SECTION IS SHOWN FOR REFERENCE ONLY. THE ACTUAL DIMENSIONS WILL BE DEPENDENT ON THE FABRICATOR. THE MINIMUM INSIDE DIMENSIONS SHALL BE 6'-0" RISE AND 12'-0" IN SPAN. THE EXPOSED ENDS OF THE FIRST AND LAST UNITS SHALL BE VERTICAL.
21. ALL LIFTING HOLES AND BOLT POCKETS SHALL BE FILLED WITH MORTAR TYPE IV AFTER BEING SET IN THEIR FINAL POSITION. THIS WORK WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 540.10 PRECAST CONCRETE STRUCTURE. FILLING THE JOINTS BETWEEN BOX SEGMENTS WITH GROUTING NOT REQUIRED.
22. NO ADDITIONAL WORK (I.E. BACKFILLING OR MEMBRANE) IS ALLOWED UNTIL THE GROUT HAS REACHED A STRENGTH OF 2000 PSI OR 30% OF MAXIMUM. GROUT WILL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS.
23. A TWO (2) FOOT WIDE STRIP OF SHEET MEMBRANE WATERPROOFING SHALL BE PLACED OVER EACH JOINT. THE SHEET MEMBRANE WATERPROOFING SHALL BE CENTERED ON THE JOINT AND COVER THE FULL LENGTH OF THE SIDES AND TOP. THE SIDES SHALL BE COVERED PRIOR TO THE TOP. ANY OVERLAPPING OF THE MEMBRANE SHALL BE DONE IN A SHINGLE TYPE STYLE TO SHED WATER AND SHALL OVERLAP A MINIMUM OF ONE FOOT. A SECOND LAYER OF SHEET MEMBRANE WATERPROOFING SHALL THEN BE PLACED OVER THE ENTIRE TOP AND BOTH SIDES OF THE CULVERT. PAYMENT FOR SHEET MEMBRANE WATERPROOFING WILL BE CONSIDERED INCIDENTAL TO CONTRACT ITEM 540.10 PRECAST CONCRETE STRUCTURE.

**CAST-IN-PLACE CONCRETE:**

24. ALL CAST-IN-PLACE CONCRETE (HEADWALLS AND WINGWALLS) SHALL BE PERFORMANCE-BASED CONCRETE CLASS PCS UNLESS NOTED OTHERWISE.
25. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" X 1" UNLESS NOTED OTHERWISE.

26. WATER REPELLENT, SILANE SHALL BE FURNISHED IN ACCORDANCE WITH SECTION 514 AND SHALL BE FIELD APPLIED TO ALL EXPOSED SURFACES OF THE CAST-IN-PLACE CONCRETE STRUCTURES. PAYMENT FOR WATER REPELLENT, SILANE APPLIED TO EXPOSED SURFACES OF THE PRECAST WINGWALLS WILL BE PAID UNDER ITEM 514.1000 WATER REPELLENT, SILANE.
27. JOINTS AND SCORE MARKS IN CONCRETE SHALL BE CONSTRUCTED AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

**REINFORCING STEEL:**

28. MINIMUM COVER FOR REINFORCING STEEL CAST AGAINST EARTH SHALL BE 2 INCHES ALONG OUTSIDE FACES OF WALLS AGAINST EARTH, AND 3 INCHES ELSEWHERE.
29. ALL REINFORCING STEEL SHALL BE ITEM 507.1200, REINFORCING STEEL, LEVEL II.

**LAYOUT NOTES:**

30. PROPOSED CULVERT SHALL BE LAID OUT BASED ON THE DIMENSIONS GIVEN ON THE BRIDGE LAYOUT SHEET.
31. CHANNEL BASELINE SHALL BE ESTABLISHED AS INDICATED ON THE PLANS. OFFSETS TO THE CENTERLINE ARE MEASURED TO THE TOP OF THE SLAB AT EACH END.

**TEMPORARY RELOCATION OF STREAM:**

32. IT IS ANTICIPATED THAT THE MAJORITY OF THE CULVERT INSTALLATION WORK CAN BE PERFORMED WHILE MAINTAINING FLOWS THROUGH THE EXISTING CULVERT. WHEN WORK AT THE UPSTREAM END CONFLICTS WITH THE FLOWS, THE CONTRACTOR SHALL RELOCATE THE STREAM BY A METHOD APPROVED BY THE ENGINEER.
33. SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM) DETAIL IS SCHEMATIC ONLY. ACTUAL LOCATIONS OF EQUIPMENT REQUIRED TO COMPLETE THE TEMPORARY STREAM RELOCATION SHALL BE ADJUSTED TO MATCH FIELD CONDITIONS AS DESIGNED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. THE DESIGN AND PLANS SHALL BE STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF VERMONT AND SHALL BE APPROVED BY VTRANS. ALL WORK AND EQUIPMENT SHALL BE PERFORMED AND PLACED WITHIN THE PROJECT SLOPE LIMITS. SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
34. THE WORK WITHIN THE STREAM SHALL BE PERFORMED DURING THE SEASONAL LOW FLOW PERIOD (JULY 1 TO OCTOBER 1). THE DESIGN OF THE SITE SPECIFIC PLANS SHALL BE CAPABLE OF HANDLING AT LEAST TWICE THE FLOWS ASSOCIATED WITH THE AVERAGE DAILY FLOW AS NOTED ON SHEET 2. THE WORK RELATED TO THE CONSTRUCTION OF THE CULVERT SHALL BE PLANNED ACCORDING TO THE WEATHER AND SHOULD NOT BE PERFORMED DURING A PERIOD IN WHICH THE ENGINEER DETERMINES THAT A BAD WEATHER EVENT IS FORECAST.
35. PAYMENT FOR ITEM 900.645 SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM) SHALL INCLUDE PREPARATION OF THE SITE SPECIFIC TEMPORARY RELOCATION PLANS, THE DAM FOR CONTROL OF WATER, TEMPORARY STONE CHECK DAM, TYPE 1, BY-PASS PUMP(S), BY-PASS PIPE, TEMPORARY CHANNEL WORK AND ALL OTHER INCIDENTAL ITEMS REQUIRED TO CONSTRUCT THE CULVERT AND RESTORE THE STREAM BED IN THE DRY.

PROJECT NAME: ESSEX  
 PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689notes.dgn PLOT DATE: 11/20/2025  
 PROJECT LEADER: D. VERTIYEV DRAWN BY: C. WEBSTER  
 DESIGNED BY: E. NOONAN CHECKED BY: A. TSOUKALAS  
 GENERAL NOTES SHEET SHEET 4 OF 37

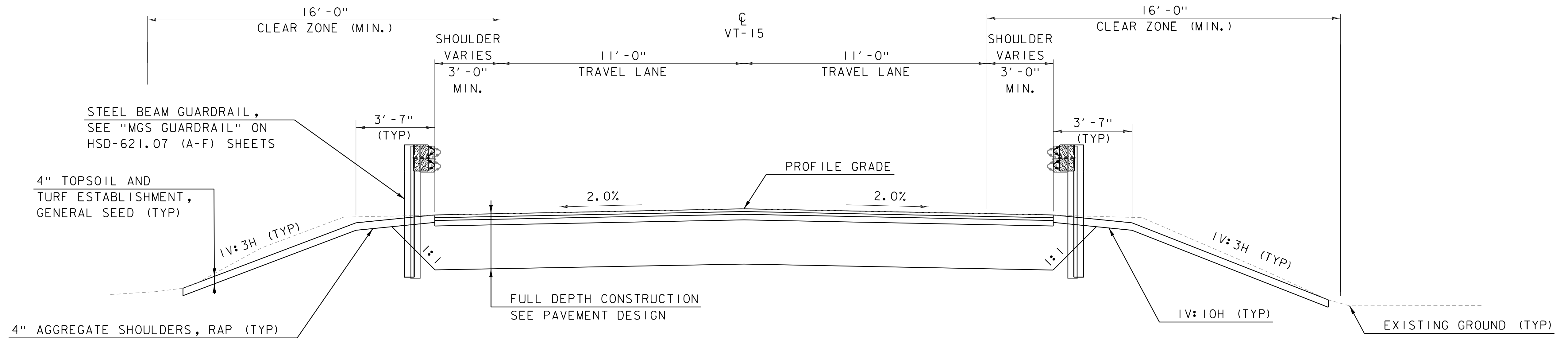


**MATERIAL TOLERANCES**

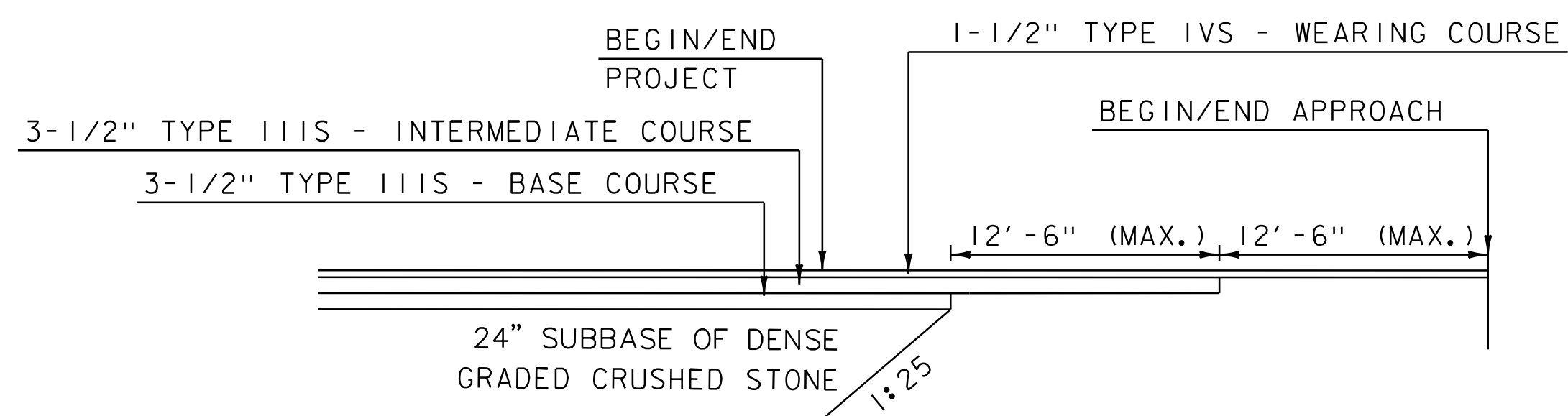
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROWS	+/- 1"

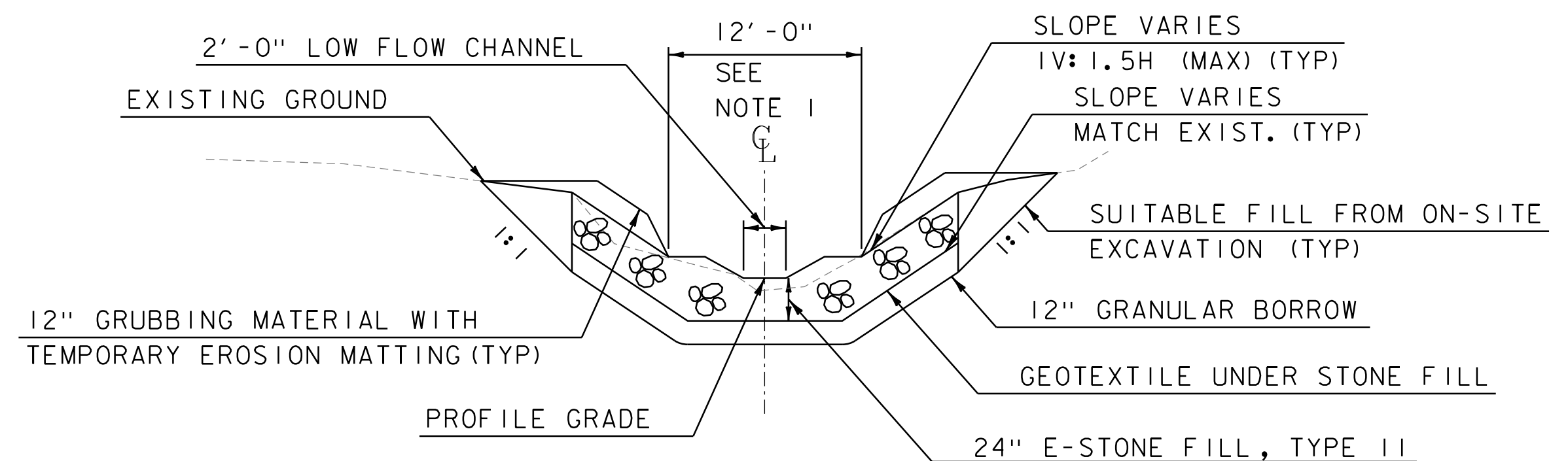
VT ROUTE 15 BRIDGE 2: STA. 186+45.00 - STA. 189+07.00  
 1 1/2" TYPE IVS, QA TIER III - WEARING COURSE  
 3 1/2" TYPE IIIS, TIER III - INTERMEDIATE COURSE  
 3 1/2" TYPE IIIS, TIER III - BASE COURSE  
 24" SUBBASE OF DENSE GRADED CRUSHED STONE



VT ROUTE 15 BRIDGE 2 - TYPICAL SECTION  
 STA. 187+20.00 - STA. 188+32.00  
 SCALE 3/8" = 1'-0"



VT ROUTE 15 FULL DEPTH RECONSTRUCTION  
 MATERIAL TRANSITION DETAIL  
 NOT TO SCALE



TYPICAL STREAM SECTION  
 NOT TO SCALE

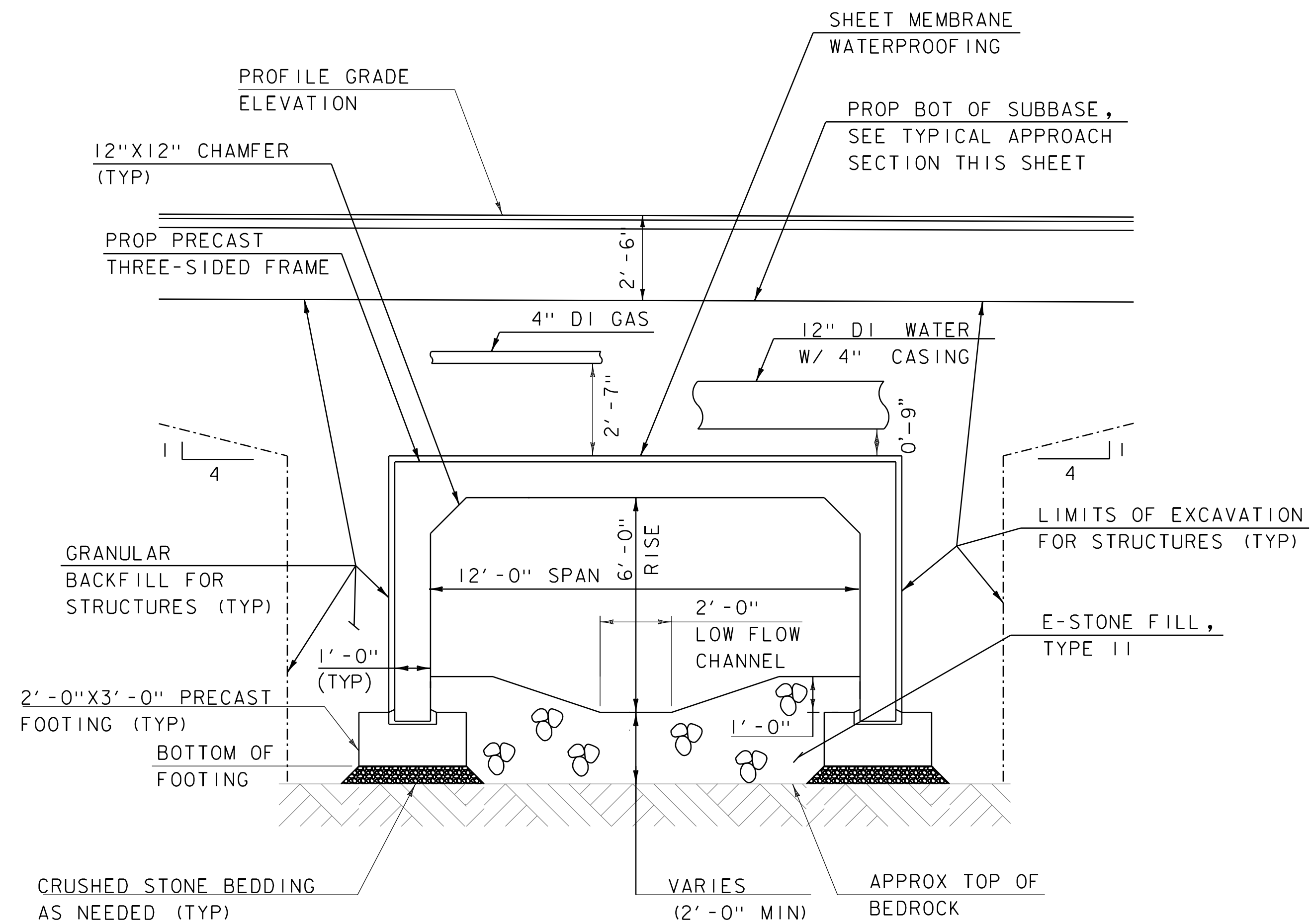
**NOTE:**  
 1. STREAM BOTTOM WIDTH SHALL MATCH CULVERT WIDTH. CHANNEL WIDTH CAN BE WIDER TO MATCH EXISTING TOPOGRAPHY.



PROJECT NAME: ESSEX  
 PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689typ.dgn  
 PROJECT LEADER: D VERTIYEV  
 DESIGNED BY: S. BIBINSKI  
 TYPICAL SECTION SHEET 1

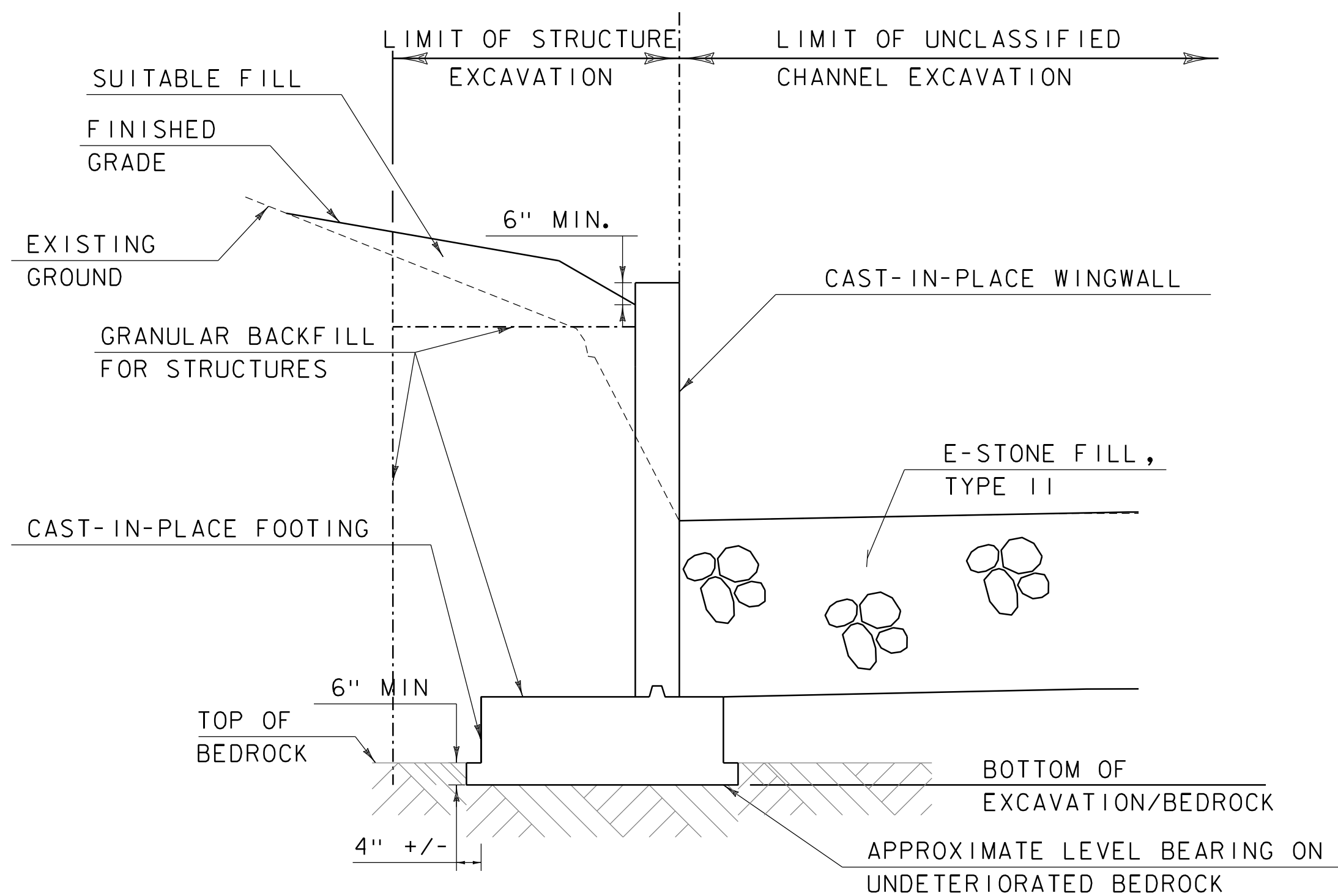
PLOT DATE: 11/20/2025  
 DRAWN BY: J. JENNINGS  
 CHECKED BY: T. CARD  
 SHEET 5 OF 37



NOTE: UTILITIES SHOWN ARE NOT IN THE SAME LOCATION. SHEET 25 SHOWS UTILITIES IN PLAN VIEW AND WHERE EACH CROSSES THE PROPOSED CULVERT.

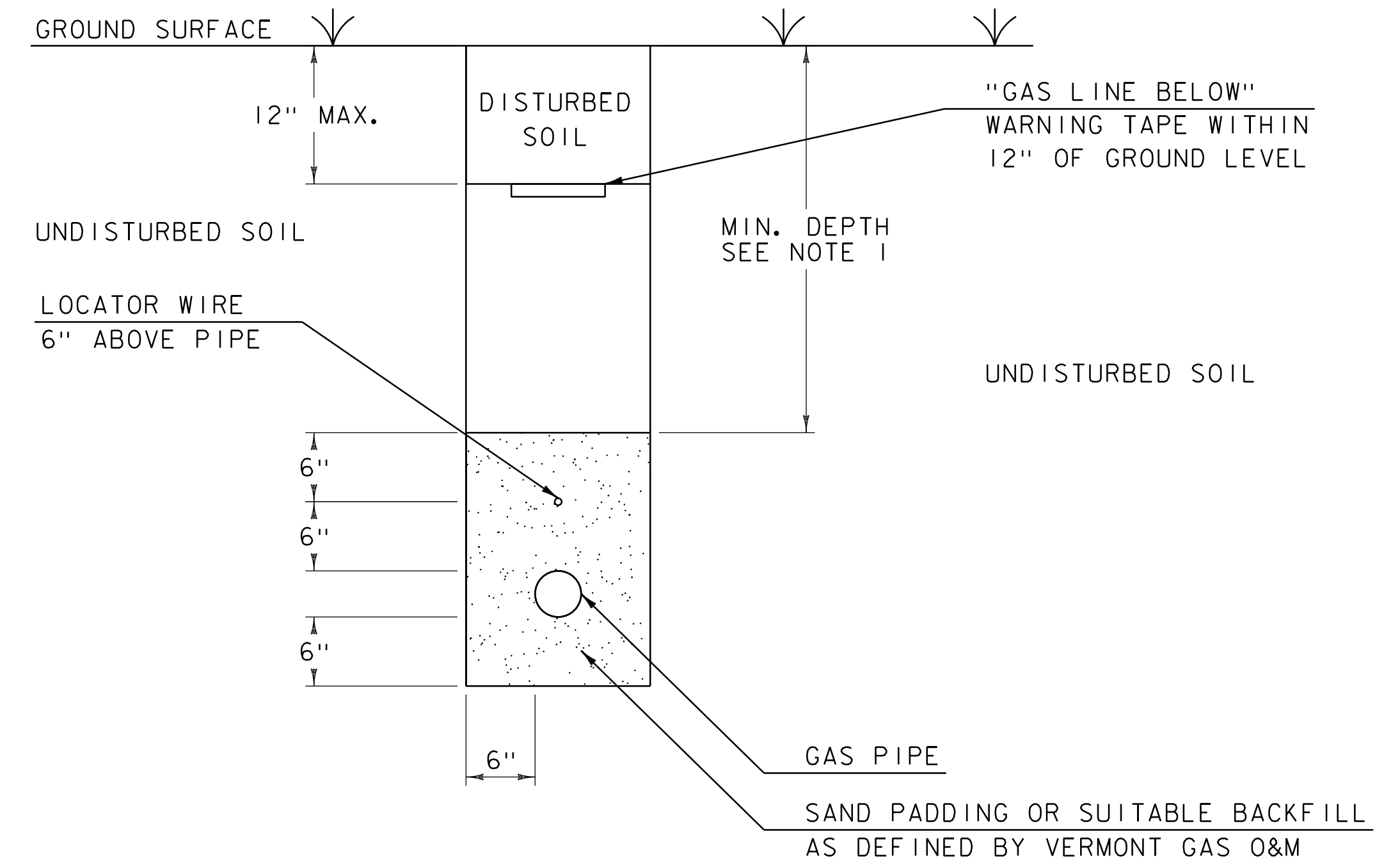
**BRIDGE 2 TYPICAL SECTION**

SCALE 3/8" = 1'-0"



**EARTHWORK SECTION AT WINGWALLS**

SCALE 3/8" = 1'-0"



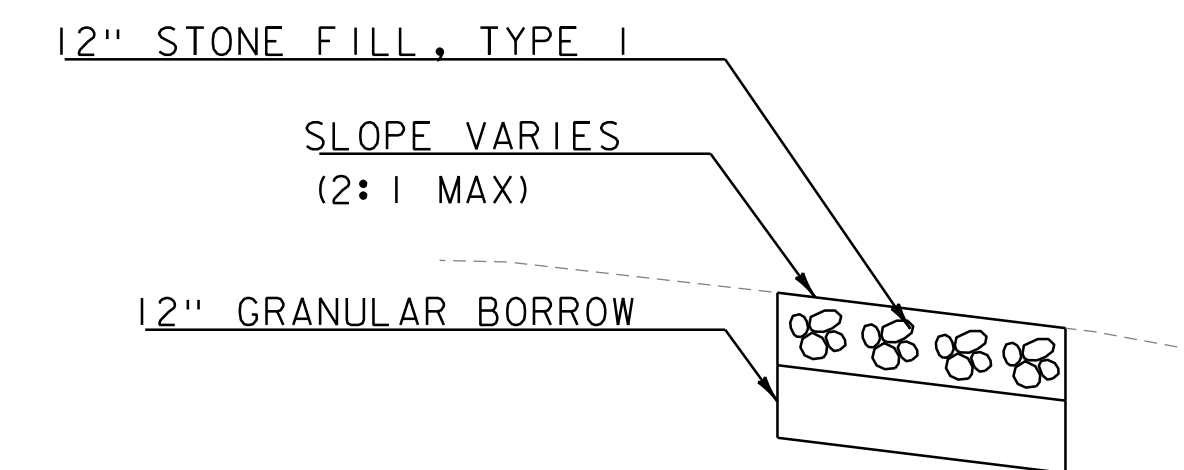
**TYPICAL TRENCH DETAIL**

NOT TO SCALE

**NOTES:**

1. MINIMUM DEPTH SHALL BE PER VERMONT GAS SYSTEMS, INC. OPERATIONS AND MAINTENANCE STANDARDS,
  - 1.1 MAINTAIN MINIMUM OF 36" FOR DISTRIBUTION MAINS
  - 1.2 MAINTAIN MINIMUM DEPTH OF 24" FOR SERVICES, EXCEPT UNDER ROADS WHERE 36" OF COVER IS REQUIRED
2. TRENCH EXCAVATION, BACKFILLING, AND COMPACTING SHALL BE PERFORMED BY THE CONTRACTOR.
3. REINSTALLING THE GAS PIPE, SAND PADDING, LOCATOR WIRE, AND WARNING TAPE SHALL BE PERFORMED BY VGS.

*SERVICE PIPE INSTALLED BY TRENCHLESS METHODS SHALL MEET MINIMUM DEPTH STANDARDS, LOCATOR WIRE TO BE INSTALLED IN 1/2" PE SLEEVE, SEE OPERATION AND MAINTENANCE MANUAL*



**TYPICAL STONE APRON DETAIL**

NOT TO SCALE

**NOTES:**

1. SEE PLAN SHEET FOR LENGTHS, WIDTHS, AND LOCATIONS.



PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689typ.dgn  
PROJECT LEADER: D VERTIYEV  
DESIGNED BY: S. BIBINSKI  
TYPICAL SECTION SHEET 2

PLOT DATE: 11/20/2025  
DRAWN BY: J. JENNINGS  
CHECKED BY: T. CARD  
SHEET 6 OF 37

# QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES											TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
					1011 - ROADWAY	1013 - ROADWAY (NO FEDERAL/STAT)	1051 - EROSION CONTROL	1211 - BRIDGE NO. 1	1999 - FULL C.E. ITEMS	OPTION	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
					1						1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.1000	-			BITUMINOUS CONCRETE PAVEMENT, TYPE IIIS, QA TIER III
					375						375		CY	COMMON EXCAVATION	203.1500	16			168 TON BASE
					60						60		CY	SOLID ROCK EXCAVATION	203.1600	4			174 TON INTERMEDIATE
					374						374		CY	CHANNEL EXCAVATION OF EARTH	203.2500	18			18 TON ROUNDING
					40						40		CY	CHANNEL EXCAVATION OF ROCK	203.2600	4			360 TON TOTAL
							180				180		CY	GRANULAR BORROW	203.3200	7			
					30						30		CY	TRENCH EXCAVATION OF EARTH	204.2000	2			BITUMINOUS CONCRETE PAVEMENT, TYPE IVS, QA TIER III
					1						1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.2200	-			77 TON WEARING
								1030			1030		CY	STRUCTURE EXCAVATION	204.2500	7			3 TON ROUNDING
								900			900		CY	GRANULAR BACKFILL FOR STRUCTURES	204.3000	12			
					170						170		SY	COARSE-MILLING, BITUMINOUS PAVEMENT	210.1000	5			
					390						390		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.3500	22			
					20						20		TON	AGGREGATE SHOULDERS, RAP	402.1300	2			
					9						9		CWT	TACK COAT, EMULSIFIED ASPHALT	404.1100	1			
					360						360		TON	BITUMINOUS CONCRETE PAVEMENT, TYPE IIIS, QA TIER III	406.0330	18			
					80						80		TON	BITUMINOUS CONCRETE PAVEMENT, TYPE IVS, QA TIER III	406.0430	3			
					1						1		DL	PAY ADJUSTMENT, BCP, MIXTURE PROPERTIES (N.A.B.I.)	406.9100	-			
					1						1		DL	PAY ADJUSTMENT, BCP, MAT DENSITY (N.A.B.I.)	406.9200	-			
								100			100		EACH	MECHANICAL BAR CONNECTOR	507.1900	8			
								7			7		GAL	WATER REPELLENT, SILANE	514.1000	-			
								1			1		EACH	REMOVAL OF STRUCTURE	529.1500	-			
								1			1		LS	PRECAST CONCRETE STRUCTURE	540.1000	-			
					30						30		MGAL	DUST CONTROL WITH WATER	609.1000	2			
							420				420		CY	E-STONE FILL, TYPE II	613.0602	17			
							15				15		CY	STONE FILL, TYPE I	613.1001	5			
							63				63		CY	STONE FILL, TYPE II	613.1002	4			
								1			1		EACH	TEMPORARY RELOCATION OF STREAM	614.1000	-			
								1			1		LS	IN-WATER SEDIMENT ISOLATION MEASURES	614.2000	-			
					490						490		LF	REMOVAL OF GUARDRAIL	621.0100	23			
					630						630		LF	STEEL BEAM GUARDRAIL	621.1060	30			
					3						3		EACH	ANCHOR FOR STEEL BEAM GUARDRAIL, MGS	621.1530	-			
					50						50		LF	TEMPORARY TRAFFIC BARRIER	621.2400	10			
					1						1		EACH	MTS, MGS, TANGENT, TL-2	621.3020	-			
						120					120		LF	DUCTILE IRON WATER PIPE, CEMENT-LINED, ALL-INCLUSIVE, 12 IN.	629.1748	19			
					1785						1785		HR	UNIFORMED TRAFFIC OFFICERS	630.1000	EST.			
					4625						4625		HR	FLAGGERS	630.1500	EST.			
									1		1		LS	FIELD OFFICE, ENGINEER'S	631.1000	-			
									1		1		LS	TESTING EQUIPMENT, CONCRETE	631.1600	-			
									1		1		LS	TESTING EQUIPMENT, BITUMINOUS	631.1700	-			
									1		1		LS	TESTING EQUIPMENT, GROUT	631.1900	-			

PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689qty.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
QUANTITY SHEET 1

PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 7 OF 37



# QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
					1011 - ROADWAY	1013 - ROADWAY (NO FEDERAL/STAT)	1051 - EROSION CONTROL	1211 - BRIDGE NO. 1	1999 - FULL C.E. ITEMS	OPTION	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
									3000		3000		DL	FIELD OFFICE COMMUNICATIONS (N.A.B.I.)	631.2600	-			
					9						9		EACH	CPM SCHEDULE	633.1000	-			
					1						1		LS	MOBILIZATION/DEMOBILIZATION	635.1100	-			
					1						1		LS	TRAFFIC CONTROL, ALL-INCLUSIVE	641.1100	-			
					5						5		EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.1500	-			
					540						540		LF	DURABLE 4 INCH WHITE LINE, POLYUREA	646.4040	30			
					540						540		LF	DURABLE 4 INCH YELLOW LINE, POLYUREA	646.4140	30			
					1080						1080		LF	TEMPORARY 4 INCH WHITE LINE	646.6000	EST.			
					1080						1080		LF	TEMPORARY 4 INCH YELLOW LINE	646.6100	EST.			
					108						108		EACH	LINE STRIPING TARGETS	646.7600	6			
							1100				1100		SY	GEOTEXTILE UNDER STONE FILL	649.3100	25			
							1800				1800		SY	TURF ESTABLISHMENT, GENERAL SEED	651.1500	50			
							1500				1500		SY	TURF ESTABLISHMENT, SPECIALTY SEED	651.1600	82			
							310				310		CY	TOPSOIL	651.3500	2			
							230				230		SY	GRUBBING MATERIAL	651.4000	9			
							1				1		LS	EPSC PLAN	653.0100	-			
							64				64		HR	MONITORING EPSC PLAN	653.0200	EST.			
							4000				4000		DL	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	653.0300	-			
							2				2		TON	HAY MULCH	653.1000	0.03			
							230				230		SY	ROLLED EROSION CONTROL PRODUCT, TYPE I	653.2001	9			
							32				32		CY	STABILIZED CONSTRUCTION ENTRANCE	653.3500	2			
							1				1		EACH	FILTER BAG	653.4500	-			
							640				640		LF	SILT FENCE, TYPE I	653.4701	25			
							735				735		LF	BARRIER FENCE	653.5000	35			
							340				340		LF	PROJECT DEMARCATION FENCE	653.5500	10			
							28				28		EACH	DECIDUOUS TREES, MEDIUM	656.3002	-			
							196				196		EACH	DECIDUOUS SHRUBS	656.3500	-			
							34				34		MGAL	LANDSCAPE WATERING	656.6500	1			
							52				52		CY	LANDSCAPE BACKFILL, TRUCK MEASUREMENT	656.8000	2			
					15						15		SF	TRAFFIC SIGN, FLAT SHEET ALUMINUM	675.2000	0.67			
					50						50		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.3410	-			
					5						5		EACH	SIGN REMOVAL, FLAT SHEET ALUMINUM	675.5000	-			
					4						4		EACH	DELINEATOR WITH STEEL POST	676.1000	-			
					1						1		DL	PRICE ADJUSTMENT, ASPHALT (N.A.B.I.)	690.0300	-			

PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689qty.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
QUANTITY SHEET 2

PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 8 OF 37



# QUANTITY SHEET 3

SUMMARY OF ESTIMATED QUANTITIES											TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
					1011 - ROADWAY	1013 - ROADWAY (NO FEDERAL/STAT)	1051 - EROSION CONTROL	1211 - BRIDGE NO. 1	1999 - FULL C.E. ITEMS	OPTION	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
														BEGIN OPTION WINGWALL 1 THROUGH 4 OPTION					
										1	1		LS	PRECAST CONCRETE STRUCTURE (WW1)	540.1000	-			
										1	1		LS	PRECAST CONCRETE STRUCTURE (WW2)	540.1000	-			
										1	1		LS	PRECAST CONCRETE STRUCTURE (WW3)	540.1000	-			
										1	1		LS	PRECAST CONCRETE STRUCTURE (WW4)	540.1000	-			
										1	1		LS	SS-PLACEHOLDER-LS (CAST-IN-PLACE WINGWALL)(WW 1)	SS013	-			
										1	1		LS	SS-PLACEHOLDER-LS (CAST-IN-PLACE WINGWALL)(WW 2)	SS013	-			
										1	1		LS	SS-PLACEHOLDER-LS (CAST-IN-PLACE WINGWALL)(WW 3)	SS013	-			
										1	1		LS	SS-PLACEHOLDER-LS (CAST-IN-PLACE WINGWALL)(WW 4)	SS013	-			
														END OPTION WINGWALL 1 THROUGH 4 OPTION					
														BEGIN OPTION HEADWALL 1 AND 2 OPTION					
										1	1		LS	PRECAST CONCRETE STRUCTURE (HW 1)	540.1000	-			
										1	1		LS	PRECAST CONCRETE STRUCTURE (HW 2)	540.1000	-			
										1	1		LS	SS-PLACEHOLDER-LS (CAST-IN-PLACE HEADWALL)(HW 1)	SS013	-			
										1	1		LS	SS-PLACEHOLDER-LS (CAST-IN-PLACE HEADWALL)(HW 2)	SS013	-			
														END OPTION HEADWALL 1 AND 2 OPTION		-			
																-			

PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689qty.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
QUANTITY SHEET 3

PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 9 OF 37



# ITEM DETAIL SHEET

LOCATION			GUARDRAIL					REMARKS
STA.	STA.	POSITION	621.0100	621.1060	621.1530	621.3020	676.1000	
			REMOVAL OF GUARDRAIL	STEEL BEAM GUARDRAIL	ANCHOR FOR STEEL BEAM RAIL, MGS	MTS, MGS, TANGENT, TL- 2	DELINEATOR WITH STEEL POST	
			LF	LF	EACH	EACH	EACH	
186+25.0	189+24.6	RT		300.0	1	1	2	INSTALL IN ACCORDANCE WITH STD. G-19
186+43.9	188+92.9	RT	251.9					AS DIRECTED BY THE ENGINEER
186+80.7	188+92.1	LT	214.6					AS DIRECTED BY THE ENGINEER
186+87.4	189+85.4	LT		300.0	2		2	INSTALL IN ACCORDANCE WITH STD. G1-D
ROUNDING			23	30	0	0	0	
<b>PROJECT TOTAL</b>			<b>490</b>	<b>630</b>	<b>3</b>	<b>1</b>	<b>4</b>	



PROJECT NAME: ESSEX	PLOT DATE: 11/20/2025
PROJECT NUMBER: STP CULV(149)	DRAWN BY: C. WEBSTER
FILE NAME: z23b689itemdet.dgn	CHECKED BY: A. TSOUKALAS
PROJECT LEADER: D. VERTIYEV	SHEET 10 OF 37
DESIGNED BY: E. NOONAN	
ITEM DETAIL SHEET	



PRIMARY CONTROL

HVCTRL #1=EVANS  
 NORTH = 733124.9200  
 EAST = 1486286.3600  
 ELEV. = 482.3100

GENERAL LOCATION, ESSEX, VT.  
 TO REACH FROM THE VT ROUTE 15 BRIDGE OVER VT ROUTE 289, GO NORTHWEST ALONG VT ROUTE 289 FOR 0.2 MI (0.3 KM) TO THE INTERSECTION OF VT ROUTE 289 AND THE NORTHWEST END OF THE NORTHBOUND ON-RAMP AND PARK VEHICLE. WALK NORTHEAST UP THE EMBANKMENT TO THE SITE OF THE MARK JUST BEYOND THE RIGHT-OF-WAY FENCE.

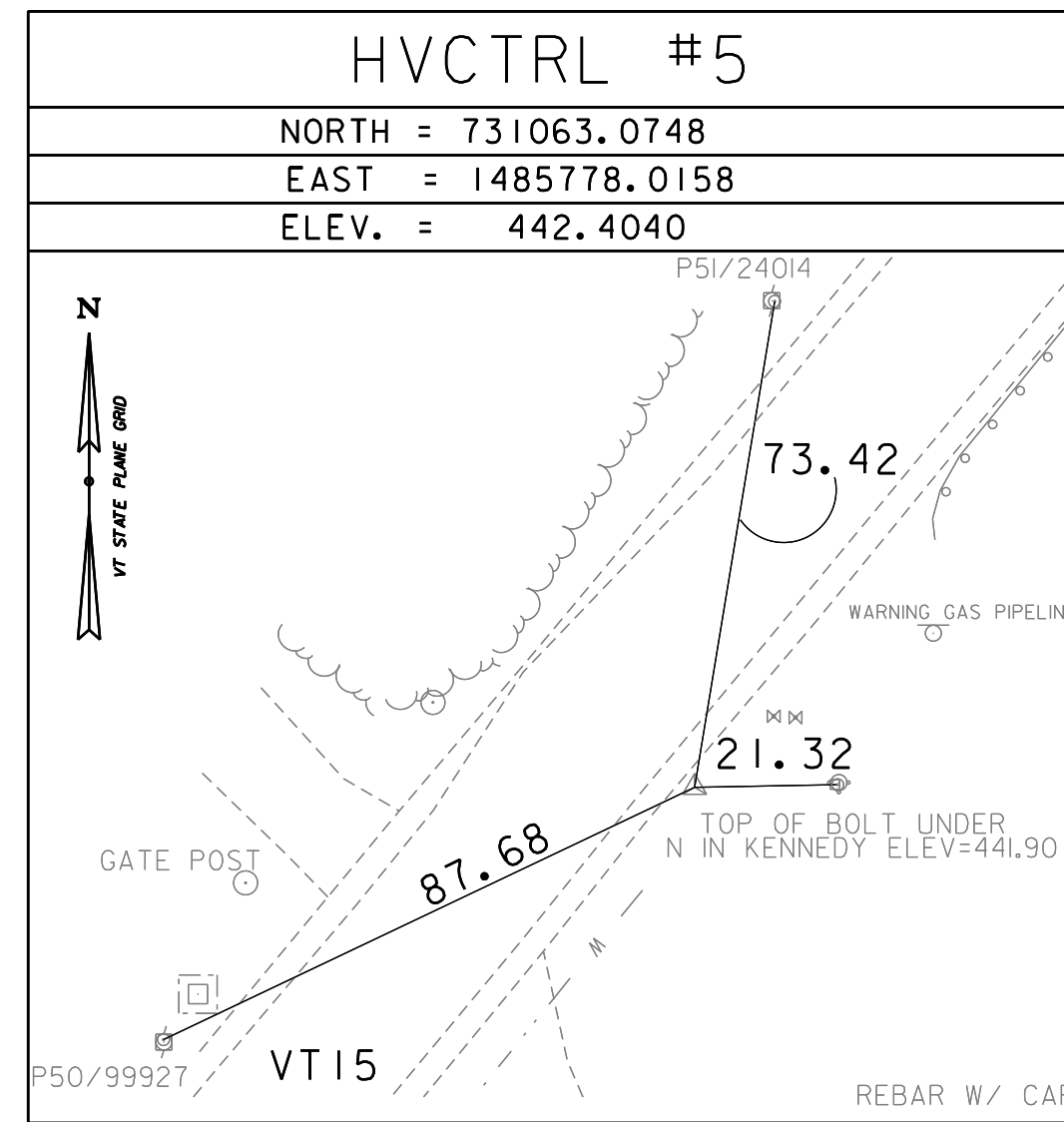
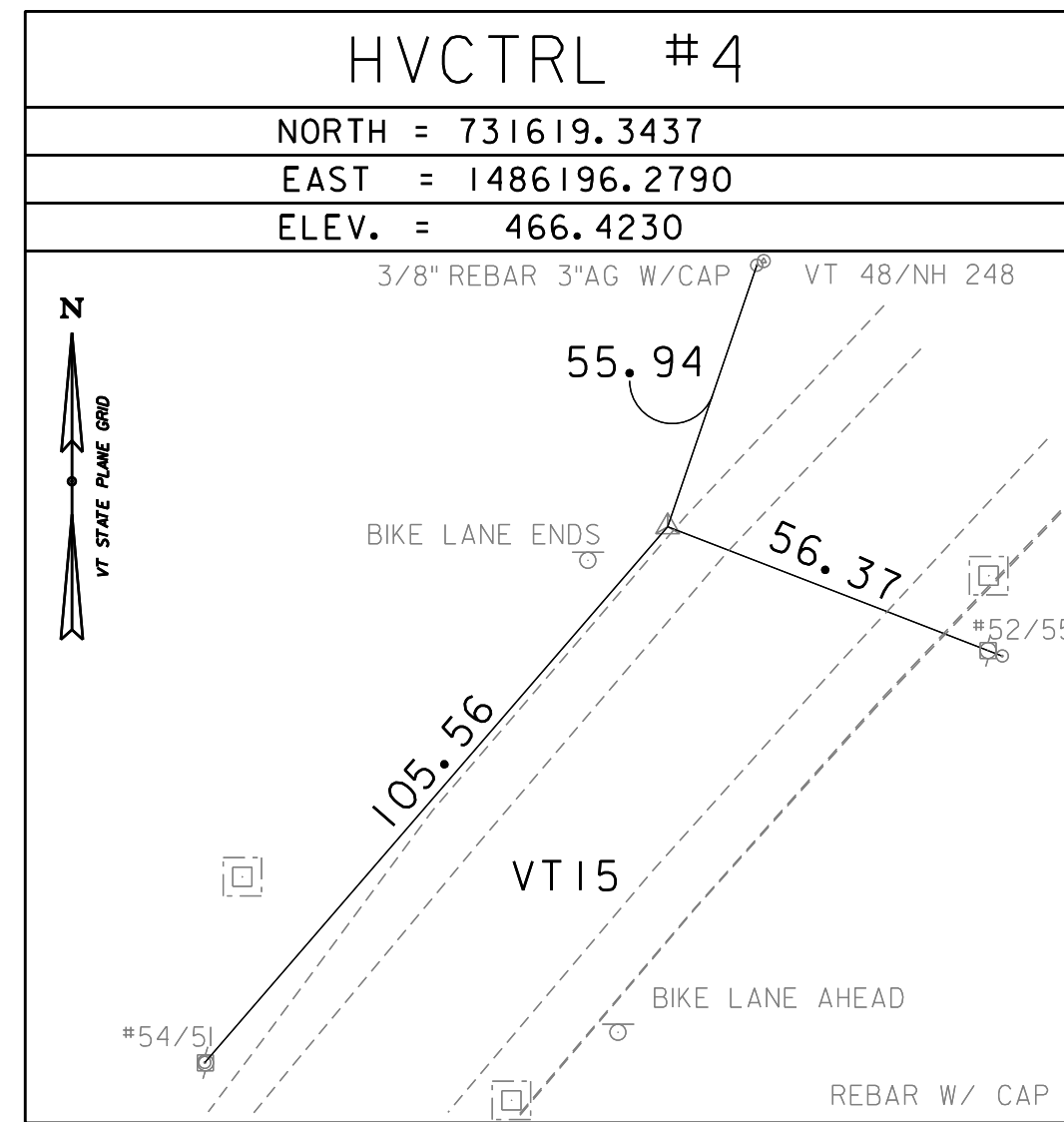
THE MARK IS SET ON THE EDGE OF A FIELD 10 CM (4 INCHES) BELOW GROUND SURFACE IN THE TOP OF A ROCK OUTCROP.

IT IS 56.0 M (183.7 FT) NORTHEAST OF AND ABOUT 7 M (23.0 FT) HIGHER THAN THE CENTERLINE OF VT ROUTE 289, 8.4 M (27.6 FT) WEST OF A 25 CM (10 INCH) CHERRY AT THE CORNER OF A BRUSH LINE, 18.7 M (61.4 FT) NORTHWEST OF A 4 CM (2 INCH) SPRUCE AND 1.2 M (3.9 FT) NORTHEAST OF A FIBERGLASS WITNESS POST AND THE RIGHT-OF-WAY FENCE.

HVCTRL #2=LANG  
 NORTH = 731743.2100  
 EAST = 1486466.6000  
 ELEV. = 492.6300

GENERAL LOCATION, ESSEX, VT., 1.5 MI (2.4 KM) NORTHEAST OF ESSEX JUNCTION. TO REACH FROM THE 5-CORNERS INTERSECTION OF VT ROUTES 15, 117, AND 2A IN ESSEX JUNCTION GO NORTHEAST ALONG VT ROUTE 15 FOR 1.5 MI (2.4 KM) TO THE MARK ON THE RIGHT, SET IN THE TOP OF THE EAST END OF A LEDGE CUT. IT IS 0.1 MI (0.2 KM) WEST OF THE VT ROUTE 15 BRIDGE OVER ROUTE 289. THE MARK IS 18.6 M (61.0 FT) SOUTH OF AND ABOUT 5 M (16.4 FT) HIGHER THAN THE CENTERLINE OF VT ROUTE 15, 17.8 M (58.4 FT) WEST-NORTHWEST OF THE NORTHWEST CORNER OF A ONE STORY HOUSE, 5.1 M (16.7 FT) SOUTH OF THE NORTH EDGE OF THE LEDGE CUT, 8.3 M (27.2 FT) SOUTH-SOUTHEAST OF POLE NO. 57/54, AND 8.3 M (27.2 FT) WEST OF A FIBERGLASS WITNESS POST AND POLE NO. 57-01/53A.

SECONDARY CONTROL



NORTH =  
 EAST =  
 ELEV. =

NORTH =  
 EAST =  
 ELEV. =

NORTH =  
 EAST =  
 ELEV. =

*TRAVERSE COMPLETED ON 7/13/2022 BY R.GILMAN R.GAUVIN

ALIGNMENT TIES

NORTH =  
 EAST =  
 ELEV. =

NORTH =  
 EAST =  
 ELEV. =

NORTH =  
 EAST =  
 ELEV. =

NORTH =  
 EAST =  
 ELEV. =

NORTH =  
 EAST =  
 ELEV. =

DATUM  
 VERTICAL NAVD 88  
 HORIZONTAL NAD83 (2011)  
 ADJUSTMENT COMPASS



PROJECT NAME: ESSEX  
 PROJECT NUMBER: STP CULV(I49)

FILE NAME: X23B689TI.DGN  
 PROJECT LEADER: L. STONE  
 DESIGNED BY: VTRANS  
 TIE SHEET

PLOT DATE: 11/20/2025  
 DRAWN BY: H.MCGOWAN  
 CHECKED BY: R. GILMAN  
 SHEET 12 OF 37

**SOIL CLASSIFICATION**

**AASHTO**

A1	Gravel and Sand
A3	Fine Sand
A2	Silty or Clayey Gravel and Sand
A4	Silty Soil - Low Compressibility
A5	Silty Soil - Highly Compressible
A6	Clayey Soil - Low Compressibility
A7	Clayey Soil - Highly Compressible

**ROCK QUALITY DESIGNATION**

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

**SHEAR STRENGTH**

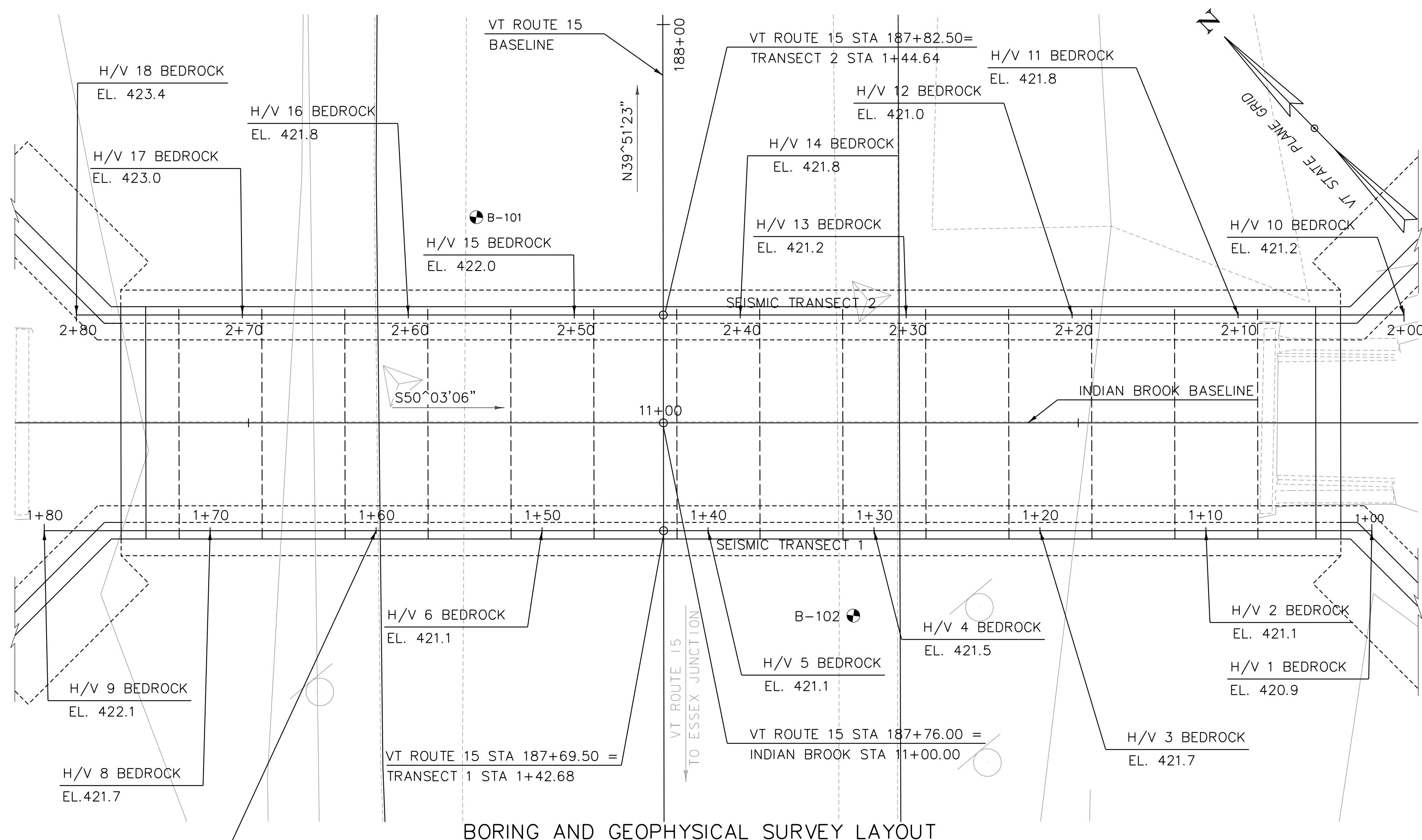
UNDRAINED SHEAR STRENGTH IN kPa	CONSISTENCY
<12	Very Soft
12-24	Soft
24-48	Med. Stiff
48-96	Stiff
96-192	Very Stiff
>192	Hard

**CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY**

DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

**COMMONLY USED SYMBOLS**

▼	Water Elevation		
⊕	Standard Penetration Boring		
⊕	Auger Boring		
⊙	Rod Sounding		
S	Sample		
N	Standard Penetration Test		
	Blow Count Per 300 mm For:		
	50.8 mm O.D. Sampler		
	35.0 mm I.D. Sampler		
	Hammer Weight Of 63.5 kg.		
	Hammer Fall Of 762 mm		
VS	Field Vane Shear Test		
US	Undisturbed Soil Sample		
B	Blast		
DC	Diamond Core		
MD	Mud Drill		
WA	Wash Ahead		
HSA	Hollow Stem Auger		
AX	Core Size 30.1mm		
BX	Core Size 42.0 mm		
NX	Core Size 54.7 mm		
M	Double Tube Core Barrel Used		
LL	Liquid Limit		
PL	Plastic Limit		
PI	Plasticity Index		
NP	Non Plastic		
w	Moisture Content (Dry Wgt. Basis)		
D	Dry		
M	Moist		
MTW	Moist To Wet		
W	Wet		
Sat	Saturated		
Bo	Boulder		
Gr	Gravel		
Sa	Sand		
Si	Silt		
Cl	Clay		
HP	Hardpan		
Le	Ledge		
NLTD	No Ledge To Depth		
CNPF	Can Not Penetrate Further		
TLOB	To Ledge Or Boulder		
NR	No Recovery		
Rec.	Recovery		
%Rec.	Percent Recovery		
ROD	Rock Quality Designation		
CBR	California Bearing Ratio		
<	Less Than		
>	Greater Than		
R	Refusal (N > 100)		
OW	Indicates a temporary observation well installed		
<b>COLOR</b>			
blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		



**BORING CHART**

HOLE NO.	STATION	OFFSET (FT)	NORTHING (FT)	EASTING (FT)	APPROX. GROUND SURFACE ELEV.(FT)
B-101	187+88.39	10.5 LT	731231.30	1485882.00	437.0
B-102	187+64.38	11.5 RT	731198.80	1485884.00	436.8

**DEFINITIONS (AASHTO)**

<b>BEDROCK (LEDGE)</b> - Rock in its native location of indefinite thickness.	<b>VARVED</b> - Alternate layers of silt and clay.
<b>BOULDER</b> - A rock fragment with an average dimension > 304.8 mm.	<b>HARDPAN</b> - Extremely dense soil, cemented layer, not softened when wet.
<b>COBBLE</b> - Rock fragments with an average dimension between 76.2 and 304.8 mm.	<b>MUCK</b> - Soft organic soil (containing > 10% organic material).
<b>GRAVEL</b> - Rounded particles of rock < 76.2 mm and > 2 mm (#10 sieve).	<b>MOISTURE CONTENT</b> - Weight of water divided by dry weight of soil.
<b>SAND</b> - Particles of rock < 2 mm (#10 sieve) and > 75 μm (#200 sieve).	<b>FLOWING SAND</b> - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.
<b>SILT</b> - Soil < 75 μm (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.	<b>STRIKE</b> - Angle from magnetic north to line of intersection of bed with a horizontal plane.
<b>CLAY</b> - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.	<b>DIP</b> - Inclination of bed with a horizontal plane.

**GENERAL NOTES**

- The subsurface explorations shown herein were made on 9/14/2022 and 9/15/2022 by VTrans.
- Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
- Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
- Engineering judgement was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgement by the Contractor.
- Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
- Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.
- Geophysical survey was performed on 06/17/2025 by Hager Richter, and approximate top of bedrock elevations from this survey are shown on this sheet. Please note the provided elevations have a tolerance of X+/-.
- Borings and geophysical survey indicated on the plans have been made for design purposes only.



PROJECT NAME: **ESSEX**  
 PROJECT NUMBER: **STP CULV(I49)**  
 FILE NAME: z23b689boring.dgn  
 PROJECT LEADER: D. VERTIYEV  
 DESIGNED BY: S. BIBINSKI  
 BORING PLAN

PLOT DATE: 11/20/2025  
 DRAWN BY: J. JENNINGS  
 CHECKED BY: T. CARD  
 SHEET 13 OF 37

VTTrans		STATE OF VERMONT AGENCY OF TRANSPORTATION CONSTRUCTION AND MATERIALS BUREAU CENTRAL LABORATORY		BORING LOG		Boring No.: <b>B-101 (Br. 2)</b>				
				Statewide-Northwest STP CULV(90) Essex Br. 2, VT Route 15		Page No.: 1 of 1 Pin No.: 22b044 Checked By: AJA				
Boring Crew: McGinley, Aubut, Zottola		Casing Sampler		Groundwater Observations						
Date Started: 9/14/22 Date Finished: 9/14/22		Type: WB SS		Date	Depth (ft)	Notes				
VTSPG NAD83: N 731231.30 ft E 1485882.00 ft		I.D.: 4 in 1.5 in		09/14/22	7.6	WT After Drilling				
Station: N.A. Offset: 10.5' WB		Hammer Wt: N.A. 140 lb.								
Ground Elevation: 437.0 ft		Hammer Fall: N.A. 30 in.								
		Hammer/Rod Type: Auto/AWJ								
		Rig: CME 45C SKID C _E = 1.56								
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate (min/ft)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Field Note, Asphalt 0.0'-0.8'								
		A-1-a, SaGr w/ broken rock, Dark brown, MTD, Rec. = 1.0 ft				5-6-9-9 (15)	7.0	60.8	32.0	7.2
		A-1-b, SaGr, brn, Moist, Rec. = 0.5 ft, Lab Note: Asphalt within sample				8-4-7-9 (11)	13.8	54.4	26.5	19.1
5		Field Note, Rec. = 0.0 ft, No Recovery				4-4-4-5 (8)				
		Field Note, Rec. = 0.0 ft, No Recovery				4-3-3-3 (6)				
10		A-4, Si, brn, Moist, Rec. = 0.3 ft, Field Note: Rollercone Cleanout 13.0'-15.0'				3-2-4-4 (6)	30.8	18.1	19.7	62.2
15		Visual Description: GrSa w/ broken and weathered rock, gray, Moist, Rec. = 0.4 ft				29-R (R)				
20		17.0 ft - 22.0 ft, Gray & light green, quartz-chlorite-biotite, PHYLLITE with quartz veins. Fine grained. Some discoloration on open joints. Close joint spacing and slightly smooth. Medium hardness. Slight weathering. Poor rock, NX, RMR=32	R-1 (55)	70 (7)	5	Top of Bedrock @ 17.0 ft				
25		22.0 ft - 27.0 ft, Gray & light green, quartz-chlorite-biotite, PHYLLITE with quartz veins. Fine grained. Some discoloration on open joints. Close joint spacing and slightly smooth. Medium hardness. Slight weathering. Poor rock, NX, RMR=32	R-2 (45)	100 (8)	5					
30		Hole stopped @ 27.0 ft								
		Remarks: Hole Collapsed at 17.3'								
Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. C _E is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.										

BOTTOM OF FOOTING  
ELEV = 421.8' +/-  
(VARIES ALONG  
CULVERT LENGTH)

BORING LOG ESSEX VT 15 BRIDGE 2.GPJ VERMONT AOT.GDT 10/26/22

VTTrans		STATE OF VERMONT AGENCY OF TRANSPORTATION CONSTRUCTION AND MATERIALS BUREAU CENTRAL LABORATORY		BORING LOG		Boring No.: <b>B-102 (Br. 2)</b>				
				Statewide-Northwest STP CULV(90) Essex Br. 2, VT Route 15		Page No.: 1 of 1 Pin No.: 22b044 Checked By: AJA				
Boring Crew: McGinley, Aubut, Zottola		Casing Sampler		Groundwater Observations						
Date Started: 9/15/22 Date Finished: 9/15/22		Type: WB SS		Date	Depth (ft)	Notes				
VTSPG NAD83: N 731198.80 ft E 1485884.00 ft		I.D.: 4 in 1.5 in		09/15/22	8.1	WT After Drilling				
Station: N.A. Offset: 11.5' EB		Hammer Wt: N.A. 140 lb.								
Ground Elevation: 436.8 ft		Hammer Fall: N.A. 30 in.								
		Hammer/Rod Type: Auto/AWJ								
		Rig: CME 45C SKID C _E = 1.56								
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate (min/ft)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Field Note, Asphalt 0.0'-1.3'								
		Visual Description: GrSa, Dark brown, MTD, Rec. = 1.0 ft				7-6-6-15 (12)				
5		A-4, SaSi, brn, MTD, Rec. = 1.5 ft				5-4-3-4 (7)	21.8	11.4	27.4	61.2
		Visual Description: SaSi, brn, MTD, Rec. = 1.2 ft				3-3-3-4 (6)				
10		A-4, Si, brn, Moist, Rec. = 2.0 ft				4-3-4-3 (7)	30.1	1.6	13.0	85.4
		A-4, GrSi, brn, Moist, Rec. = 1.5 ft, Lab Note: Clay in sample, tested non plastic				4-2-6-4 (8)	23.0	22.2	18.2	59.6
15		15.0 ft - 20.0 ft, Gray & light green, quartz-chlorite-biotite, PHYLLITE with quartz veins. Fine grained. Some discoloration on open joints. Close joint spacing and slightly smooth. Medium hardness. Slight weathering. Poor rock, NX, RMR=32	R-1 (30)	100 (0)	7	Top of Bedrock @ 15.0 ft				
20		20.0 ft - 25.0 ft, Gray & light green, quartz-chlorite-biotite, PHYLLITE with quartz veins. Fine grained. Some discoloration on open joints. Close joint spacing and slightly smooth. Medium hardness. Slight weathering. Poor rock, NX, RMR=32	R-2 (35)	100 (0)	3					
25		Hole stopped @ 25.0 ft								
30		Remarks: Hole Collapsed @ 14.3'								
Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. C _E is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.										

BOTTOM OF FOOTING  
ELEV = 421.0' +/-  
(VARIES ALONG  
CULVERT LENGTH)

BORING LOG ESSEX VT 15 BRIDGE 2.GPJ VERMONT AOT.GDT 10/26/22

PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689borlog.dgn PLOT DATE: 11/20/2025  
PROJECT LEADER: D. VERTIYEV DRAWN BY: J. JENNINGS  
DESIGNED BY: S. BIBINSKI CHECKED BY: T. CARD  
BORING LOGS SHEET 14 OF 37



Element	Point Type	Station	Northing	Easting
<b>Mainline</b>				
Tangent	POB	185+50.00	731041.072	1485737.850
	BEGIN APPROACH	186+45.00	731113.999	1485798.732
	BEGIN PROJECT	187+20.00	731171.573	1485846.797
	END PROJECT	188+32.00	731257.550	1485918.574
	END APPROACH	189+07.00	731315.124	1485966.639
	POE	190+16.00	731398.798	1486036.494
<b>Channel</b>				
Tangent	POB	9+75.00	731294.822	1485786.857
	PT	11+93.25	731154.683	1485954.174
	PT	12+43.25	731152.319	1486004.118
	PT	12+76.65	731135.006	1486032.674
	POE	13+00.00	731111.655	1486033.082

PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689horizalg.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
HORIZONTAL ALIGNMENT TABLE

PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 15 OF 37



CLEARING & GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS  
 STA. 186+45 - STA. 189+07 LT  
 STA. 186+45 - STA. 189+07 RT

AGGREGATE SHOULDERS, RAP  
 STA. 187+20 - STA. 188+32 LT  
 STA. 187+20 - STA. 188+32 RT

E-STONE FILL, TYPE II  
 STA. 10+20 - STA. 10+67 RT/LT  
 STA. 11+41 - STA. 12+43 RT/LT

STONE FILL, TYPE I  
 STA. 187+80 - STA. 187+90 RT  
 STA. 187+80 - STA. 187+90 LT

STONE FILL, TYPE II  
 STA. 187+43 - STA. 188+23 RT

REMOVAL OF GUARDRAIL  
 STA. 186+43.9 - STA. 188+92.9 RT  
 STA. 186+80.7 - STA. 188+92.1 LT

STEEL BEAM GUARDRAIL  
 STA. 186+25.0 - STA. 189+25.0 RT  
 STA. 186+87.4 - STA. 189+85.4 LT

ANCHOR FOR STEEL BEAM GUARDRAIL, MGS  
 STA. 186+87.2 LT  
 STA. 189+18.1 RT  
 STA. 189+81.6 LT

MTS, MGS, TANGENT, TL-2  
 STA. 185+75.0 - STA. 186+25.0 RT

DURABLE 4 INCH WHITE LINE, POLYUREA  
 STA. 186+45 - STA. 189+07 LT  
 STA. 186+45 - STA. 189+07 RT

DURABLE 4 INCH YELLOW LINE, POLYUREA  
 STA. 186+45 - STA. 189+07 LT  
 STA. 186+45 - STA. 189+07 RT

PROPOSED PRECAST HEADWALL (TYP)  
PROPOSED PRECAST WINGWALL ON SPREAD FOOTING (TYP)

STA. 187+62 LT

GRAND ARMY OF THE REPUBLIC HIGHWAY

STA. 187+59 LT

GRAND ARMY OF THE REPUBLIC HIGHWAY

BEGIN CHANNEL WORK  
 STA. 10+20.00

STA. 188+01 LT

BRIDGE 2 VT-15

STA. 188+01 LT

BRIDGE 2 VT-15

END PROJECT STP CULV (I49)  
 STA. 188+32.00 (MM 3.567)

TURF ESTABLISHMENT, GENERAL SEED  
 STA. 186+45 - STA. 189+96 LT  
 STA. 186+45 - STA. 189+29 RT

TOPSOIL  
 STA. 186+45 - STA. 189+96 LT  
 STA. 186+45 - STA. 189+29 RT

SIGN REMOVAL, FLAT SHEET ALUMINUM AS SHOWN - 5 EA

DELINEATOR WITH STEEL POST  
 STA. 185+25 RT  
 STA. 186+87 LT  
 STA. 189+25 RT  
 STA. 189+85 LT

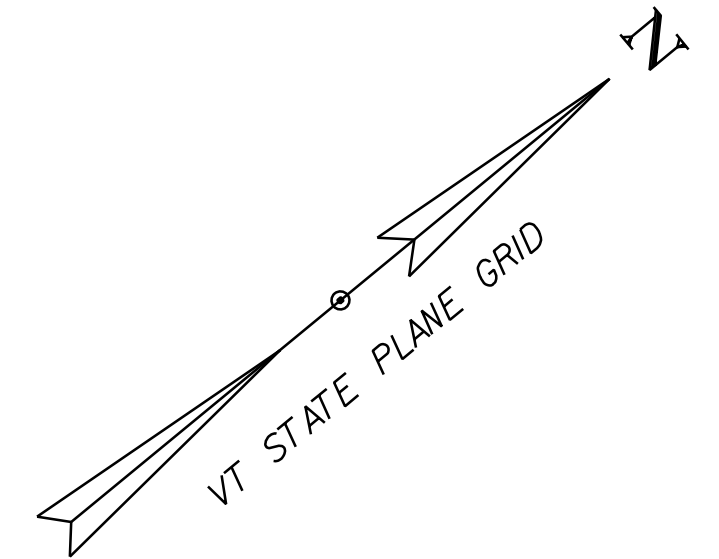
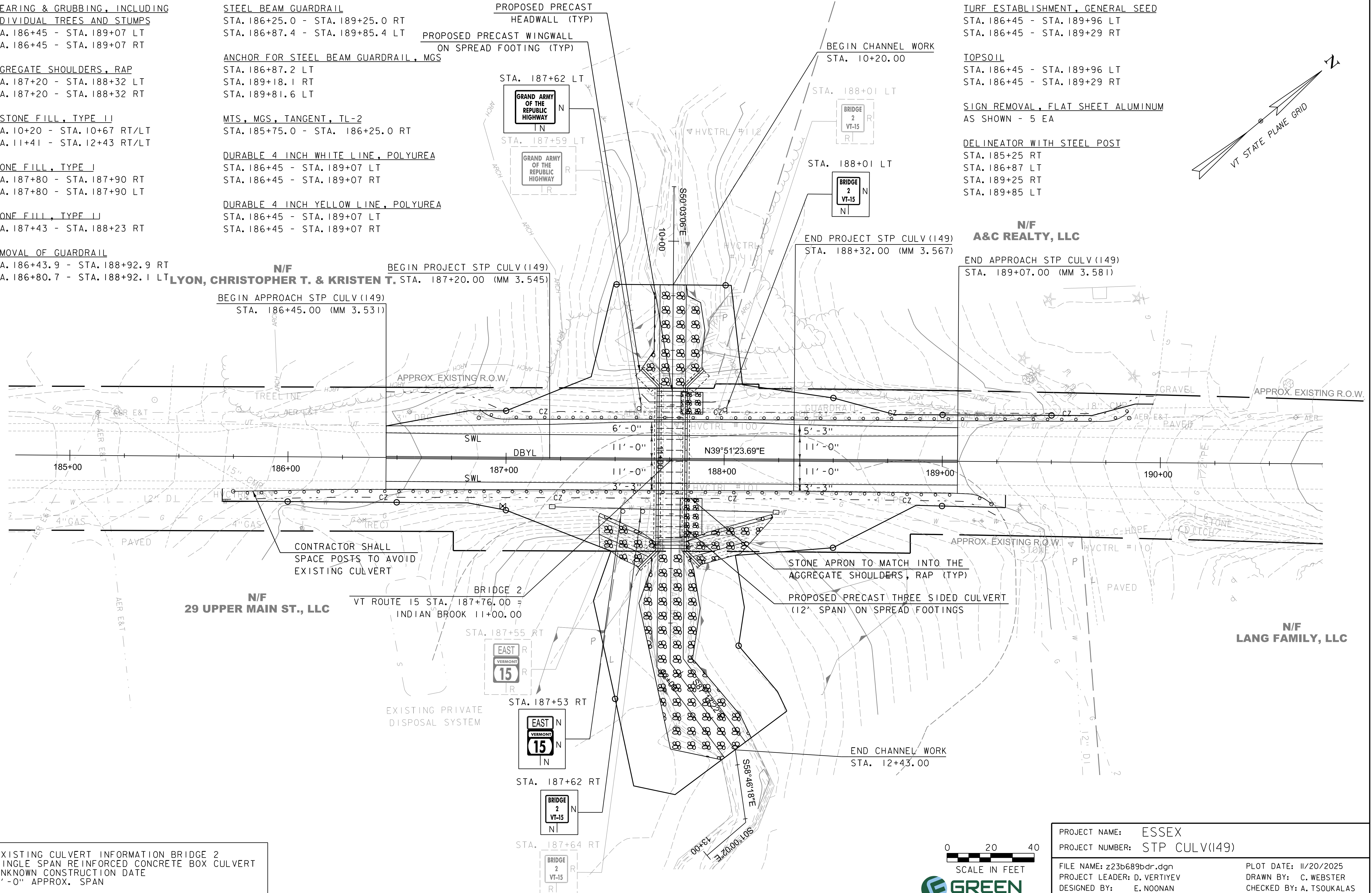
N/F  
**A&C REALTY, LLC**

END APPROACH STP CULV (I49)  
 STA. 189+07.00 (MM 3.581)

N/F  
**LYON, CHRISTOPHER T. & KRISTEN T.**

BEGIN APPROACH STP CULV (I49)  
 STA. 186+45.00 (MM 3.531)

BEGIN PROJECT STP CULV (I49)  
 STA. 187+20.00 (MM 3.545)



EXISTING CULVERT INFORMATION BRIDGE 2  
 SINGLE SPAN REINFORCED CONCRETE BOX CULVERT  
 UNKNOWN CONSTRUCTION DATE  
 8'-0" APPROX. SPAN

0 20 40  
 SCALE IN FEET

PROJECT NAME:	ESSEX	PLOT DATE:	11/20/2025
PROJECT NUMBER:	STP CULV(I49)	DRAWN BY:	C. WEBSTER
FILE NAME:	z23b689bdr.dgn	CHECKED BY:	A. TSOUKALAS
PROJECT LEADER:	D. VERTIYEV	SHEET	16 OF 37
DESIGNED BY:	E. NOONAN		
PLAN SHEET			

**NOTES:**

1. THE CONTRACTOR SHOULD MAKE EVERY EFFORT TO REUSE (REMOVE AND RESET) EXISTING WATER PIPE. ANY ADDITIONAL PIPE, NEW GASKETS, COUPLINGS, INSULATION AND OTHER NECESSARY APPURTENANCES TO INSTALL THE WATER PIPE SHALL BE SUPPLIED BY THE CHAMPLAIN WATER DISTRICT. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION AND TESTING AND SHALL BE PAID UNDER ITEM 629.1748 DUCTILE IRON WATER PIPE, CEMENT-LINED, ALL INCLUSIVE 12 IN.
2. SWAB DISINFECTION, FLUSHING THROUGH THE EXISTING HYDRANT, A SUMMER SHUTDOWN, AND VISUAL PRESSURE TEST IS ACCEPTABLE. THE WORKING PRESSURE IS 78 PSI.
3. THE CONTRACTOR SHALL SUBMIT SHOP DRAWING FOR TEMPORARY WATER BYPASS FOR STATE, TOWN, AND ENGINEER REVIEW.
4. DIRECT BURIED CABLE WILL BE PROTECTED AND SUPPORTED IN PLACE DURING CONSTRUCTION. THE CONTRACTOR WILL BE REQUIRED TO BE FULLY PREPARED AND STAGED FOR THIS UTILITY WORK PRIOR TO CLOSURE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 540.1000 PRECAST CONCRETE STRUCTURE.

**EXISTING DRAINAGE**  
 □ STA. 11+00 LT-RT  
 EXISTING BOX CULVERT AND HEADWALL  
 - REMOVE AND DISPOSE

**PROPOSED DRAINAGE**  
 (P) STA. 11+00 LT-RT  
 NEW 73.5' LF PRECAST 12' SPAN THREE SIDED CULVERT  
 INV IN: 424.60 INV OUT: 421.95

REMOVE AND DISPOSE  
 OF EXISTING BOX CULVERT

PROTECT AND RETAIN  
 EXISTING 3" DIRECT  
 BURIED CABLE  
 OVERHEAD WIRES SHALL BE DEENERGIZED FOR  
 THE DURATION OF CONSTRUCTION - (BY OTHERS)

BEGIN PROJECT STP CULV (I49)  
 STA. 187+20.00 (MM 3.545)

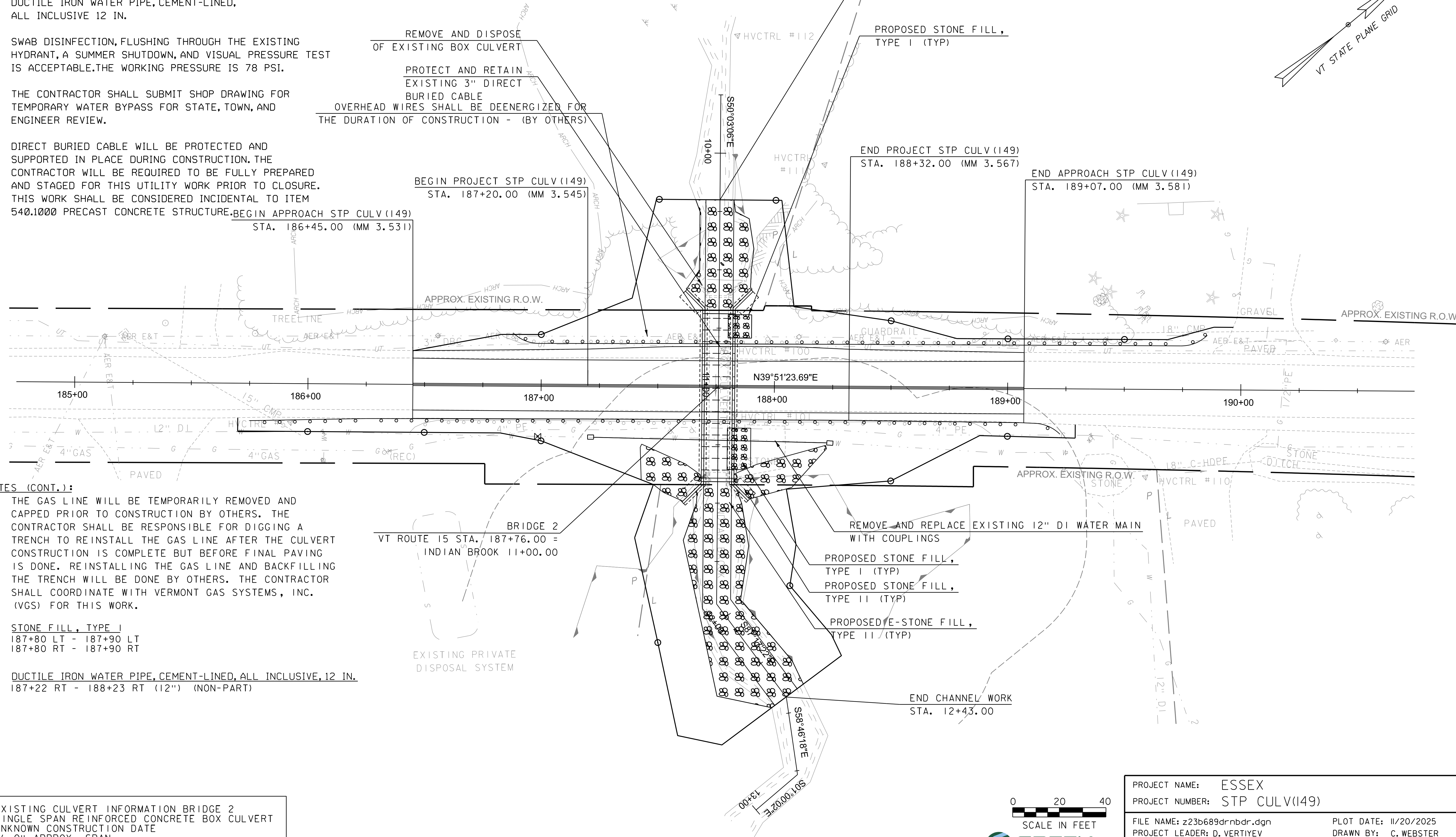
BEGIN APPROACH STP CULV (I49)  
 STA. 186+45.00 (MM 3.531)

BEGIN CHANNEL WORK  
 STA. 10+20.00

PROPOSED STONE FILL,  
 TYPE I (TYP)

END PROJECT STP CULV (I49)  
 STA. 188+32.00 (MM 3.567)

END APPROACH STP CULV (I49)  
 STA. 189+07.00 (MM 3.581)



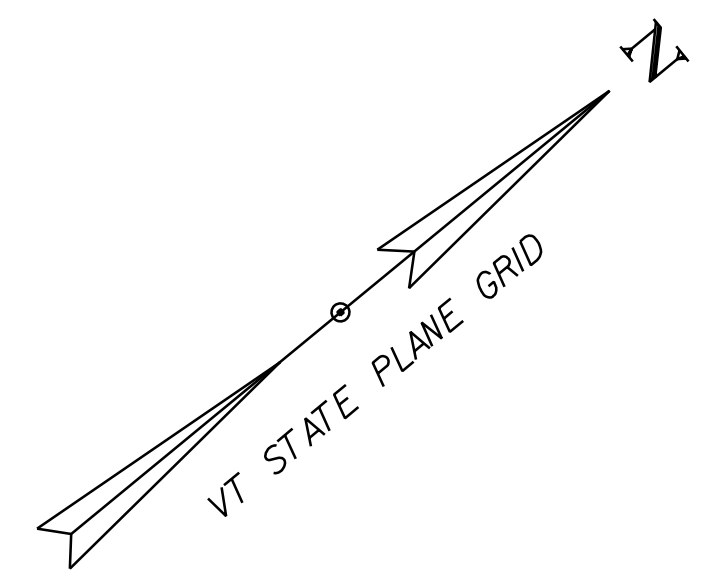
**NOTES (CONT.):**

5. THE GAS LINE WILL BE TEMPORARILY REMOVED AND CAPPED PRIOR TO CONSTRUCTION BY OTHERS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DIGGING A TRENCH TO REINSTALL THE GAS LINE AFTER THE CULVERT CONSTRUCTION IS COMPLETE BUT BEFORE FINAL PAVING IS DONE. REINSTALLING THE GAS LINE AND BACKFILLING THE TRENCH WILL BE DONE BY OTHERS. THE CONTRACTOR SHALL COORDINATE WITH VERMONT GAS SYSTEMS, INC. (VGS) FOR THIS WORK.

**STONE FILL, TYPE I**  
 187+80 LT - 187+90 LT  
 187+80 RT - 187+90 RT


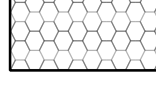
**DUCTILE IRON WATER PIPE, CEMENT-LINED, ALL INCLUSIVE, 12 IN.**  
 187+22 RT - 188+23 RT (12") (NON-PART)

EXISTING CULVERT INFORMATION BRIDGE 2  
 SINGLE SPAN REINFORCED CONCRETE BOX CULVERT  
 UNKNOWN CONSTRUCTION DATE  
 8'-0" APPROX. SPAN



PROJECT NAME: ESSEX	PLOT DATE: 11/20/2025
PROJECT NUMBER: STP CULV(I49)	DRAWN BY: C. WEBSTER
FILE NAME: z23b689drnbnr.dgn	CHECKED BY: A. TSOUKALAS
PROJECT LEADER: D. VERTIYEV	SHEET 17 OF 37
DESIGNED BY: E. NOONAN	
DRAINAGE AND UTILITY SHEET	

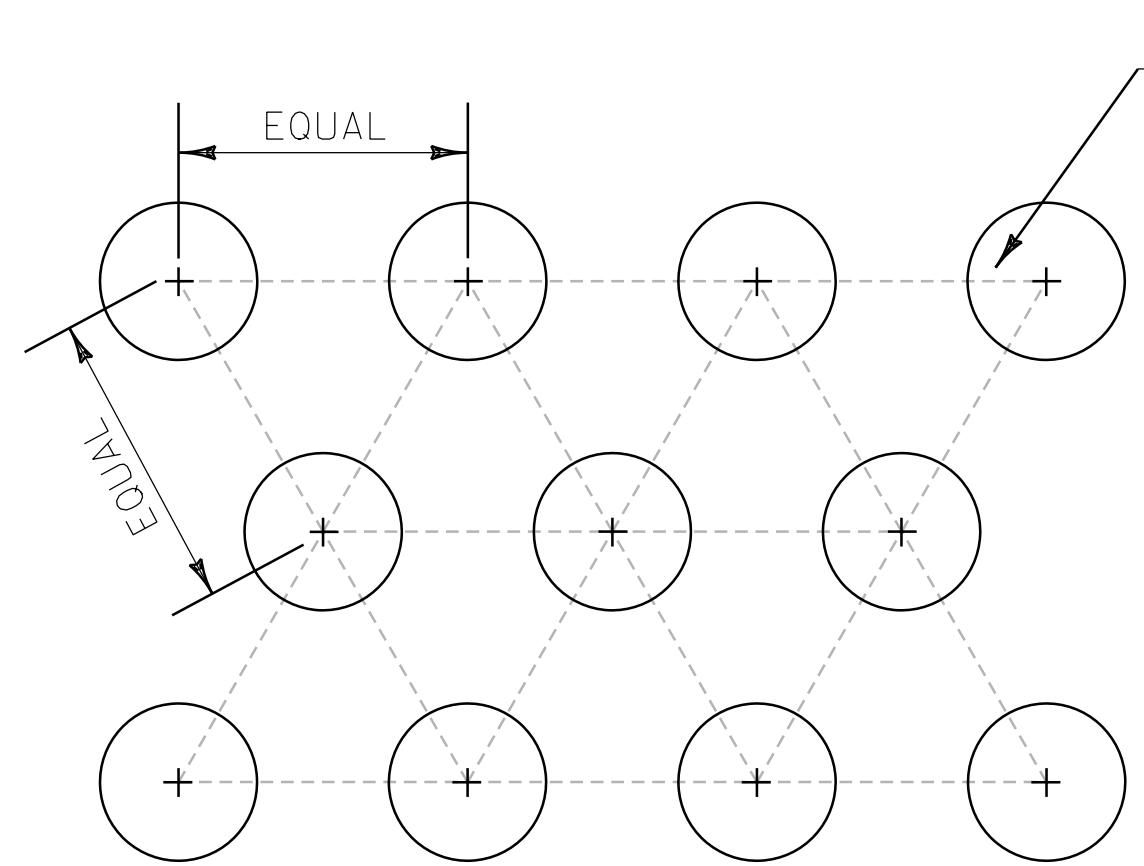
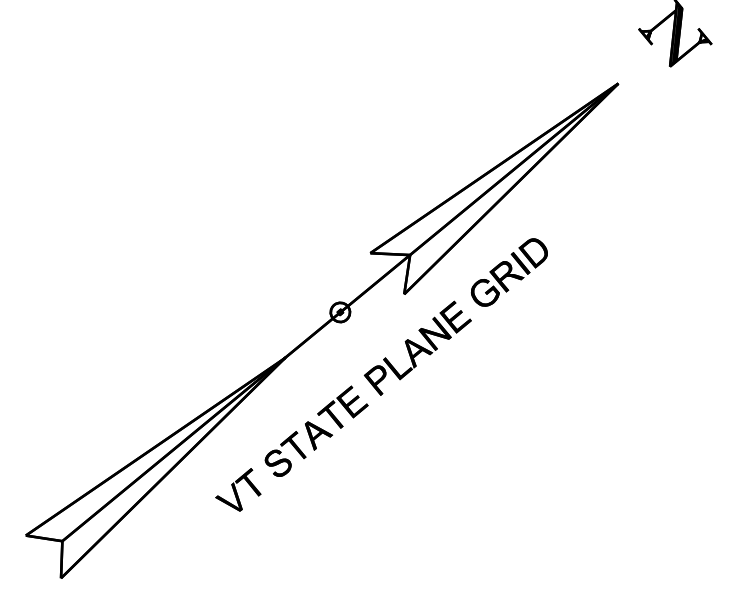
**LEGEND:**

-  VAOT NATURALIZED AREA TYPE 1
-  SMALL CONTAINER TREES AND SHRUBS W/ WET AREA SEED

KEY	QUANTITY	SCIENTIFIC NAME	COMMON NAME	SIZE	CONTAINER	SPACING (ON CENTER)	NOTES
<b>TREES - DECIDUOUS</b>							
AR	28	<i>Acer rubrum</i>	Red Maple	4-5' height	CONT.	6' O.C.	Straight species only. No cultivars.
<b>SHRUBS - DECIDUOUS</b>							
AL	28	<i>Alnus rugosa</i>	Speckled Alder	1-2 GAL	CONT.	6' O.C.	Straight species only. No cultivars.
CS	28	<i>Cornus sericea</i>	Red twig dogwood	1-2 GAL	CONT.	6' O.C.	Straight species only. No cultivars.
RT	28	<i>Rhus typhina</i>	Staghorn sumac	1-2 GAL	CONT.	6' O.C.	Straight species only. No cultivars.
SD	28	<i>Salix discolor</i>	Common pussy willow	1-2 GAL	CONT.	6' O.C.	Straight species only. No cultivars.
SE	28	<i>Salix ericephala</i>	Wooly headed willow	1-2 GAL	CONT.	6' O.C.	Straight species only. No cultivars.
SL	28	<i>Salix lucida</i>	Shining willow	1-2 GAL	CONT.	6' O.C.	Straight species only. No cultivars.
SS	28	<i>Salix sericea</i>	Silky willow	1-2 GAL	CONT.	6' O.C.	Straight species only. No cultivars.

**NOTES:**

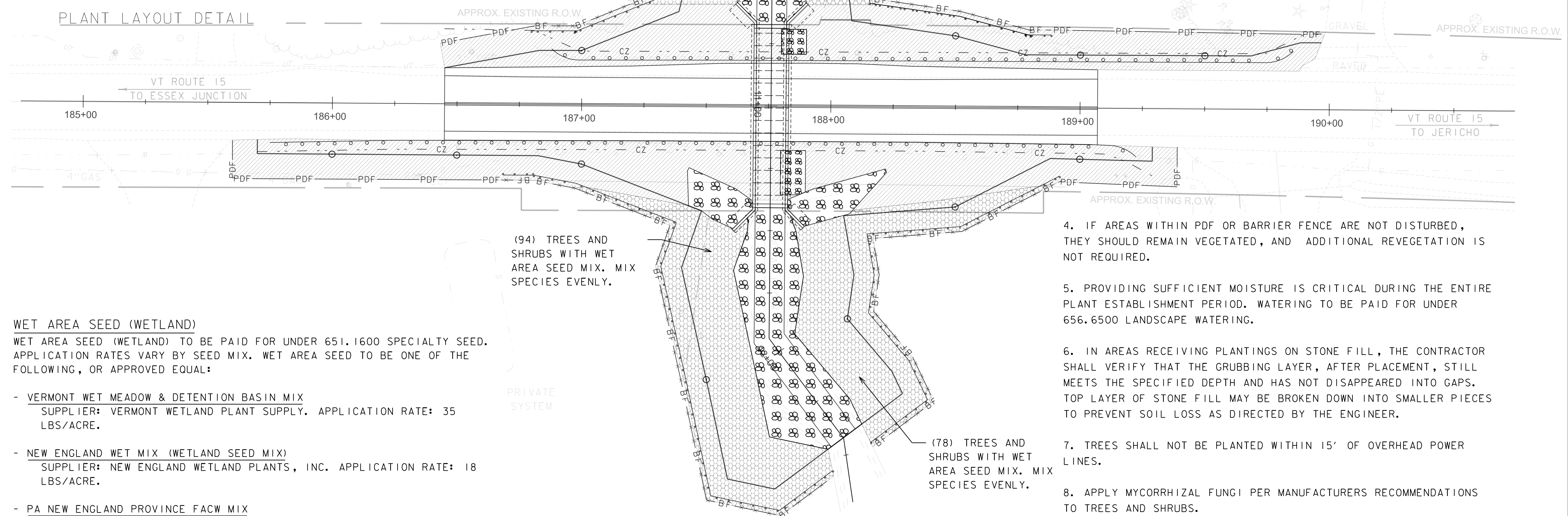
1. A LANDSCAPE-SPECIFIC COORDINATION MEETING WILL BE HELD AT LEAST 30 CALENDAR DAYS PRIOR TO LANDSCAPE INSTALLATION WITH THE LANDSCAPE SUBCONTRACTOR, PRIME CONTRACTOR, ENGINEER, AOT CONSTRUCTION ENVIRONMENTAL ENGINEER, AND EITHER THE AOT LANDSCAPE ARCHITECT OR THE CONSTRUCTION LANDSCAPE INSPECTOR
2. THE AOT LANDSCAPE ARCHITECT OR CONSTRUCTION LANDSCAPE INSPECTOR SHALL BE ON SITE TO CONFIRM PLANT SPECIES AND HEALTH, APPROVE PLANT LAYOUT, AND OBSERVE INSTALLATION. NOTIFY THE AOT LANDSCAPE ARCHITECT OR CONSTRUCTION LANDSCAPE INSPECTOR AT LEAST 7 CALENDAR DAYS PRIOR TO INSTALLATION. FAILURE TO INCLUDE THE AOT LANDSCAPE ARCHITECT OR CONSTRUCTION LANDSCAPE INSPECTOR MAY RESULT IN THE REJECTION OF PLANT MATERIAL AFTER INSTALLATION. NOTE: THE ENGINEER MAY EXERCISE THEIR AUTHORITY TO SUSPEND PLANT INSTALLATION UNTIL THE AOT LANDSCAPE ARCHITECT OR CONSTRUCTION LANDSCAPE INSPECTOR IS PRESENT, PER SUBSECTION 105.01 (B).
3. SEEDED AREAS SHALL BE PROTECTED IN ACCORDANCE WITH SPECIFICATION SUBSECTION 651.07 PROTECTION. WHERE WETLANDS OR WETLAND BUFFERS ARE PRESENT, STRAW MULCH SHALL BE USE INSTEAD OF HAY MULCH.



LAYOUT TO BE ALTERNATING ROWS, EQUALLY SPACED. SEE PLANT SCHEDULE FOR SPACING.

(23) TREES AND SHRUBS WITH WET AREA SEED MIX. MIX SPECIES EVENLY.

(29) TREES AND SHRUBS WITH WET AREA SEED MIX. MIX SPECIES EVENLY.



(94) TREES AND SHRUBS WITH WET AREA SEED MIX. MIX SPECIES EVENLY.

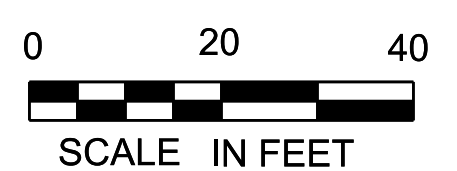
(78) TREES AND SHRUBS WITH WET AREA SEED MIX. MIX SPECIES EVENLY.

4. IF AREAS WITHIN PDF OR BARRIER FENCE ARE NOT DISTURBED, THEY SHOULD REMAIN VEGETATED, AND ADDITIONAL REVEGETATION IS NOT REQUIRED.
5. PROVIDING SUFFICIENT MOISTURE IS CRITICAL DURING THE ENTIRE PLANT ESTABLISHMENT PERIOD. WATERING TO BE PAID FOR UNDER 656.6500 LANDSCAPE WATERING.
6. IN AREAS RECEIVING PLANTINGS ON STONE FILL, THE CONTRACTOR SHALL VERIFY THAT THE GRUBBING LAYER, AFTER PLACEMENT, STILL MEETS THE SPECIFIED DEPTH AND HAS NOT DISAPPEARED INTO GAPS. TOP LAYER OF STONE FILL MAY BE BROKEN DOWN INTO SMALLER PIECES TO PREVENT SOIL LOSS AS DIRECTED BY THE ENGINEER.
7. TREES SHALL NOT BE PLANTED WITHIN 15' OF OVERHEAD POWER LINES.
8. APPLY MYCORRHIZAL FUNGI PER MANUFACTURERS RECOMMENDATIONS TO TREES AND SHRUBS.

**WET AREA SEED (WETLAND)**

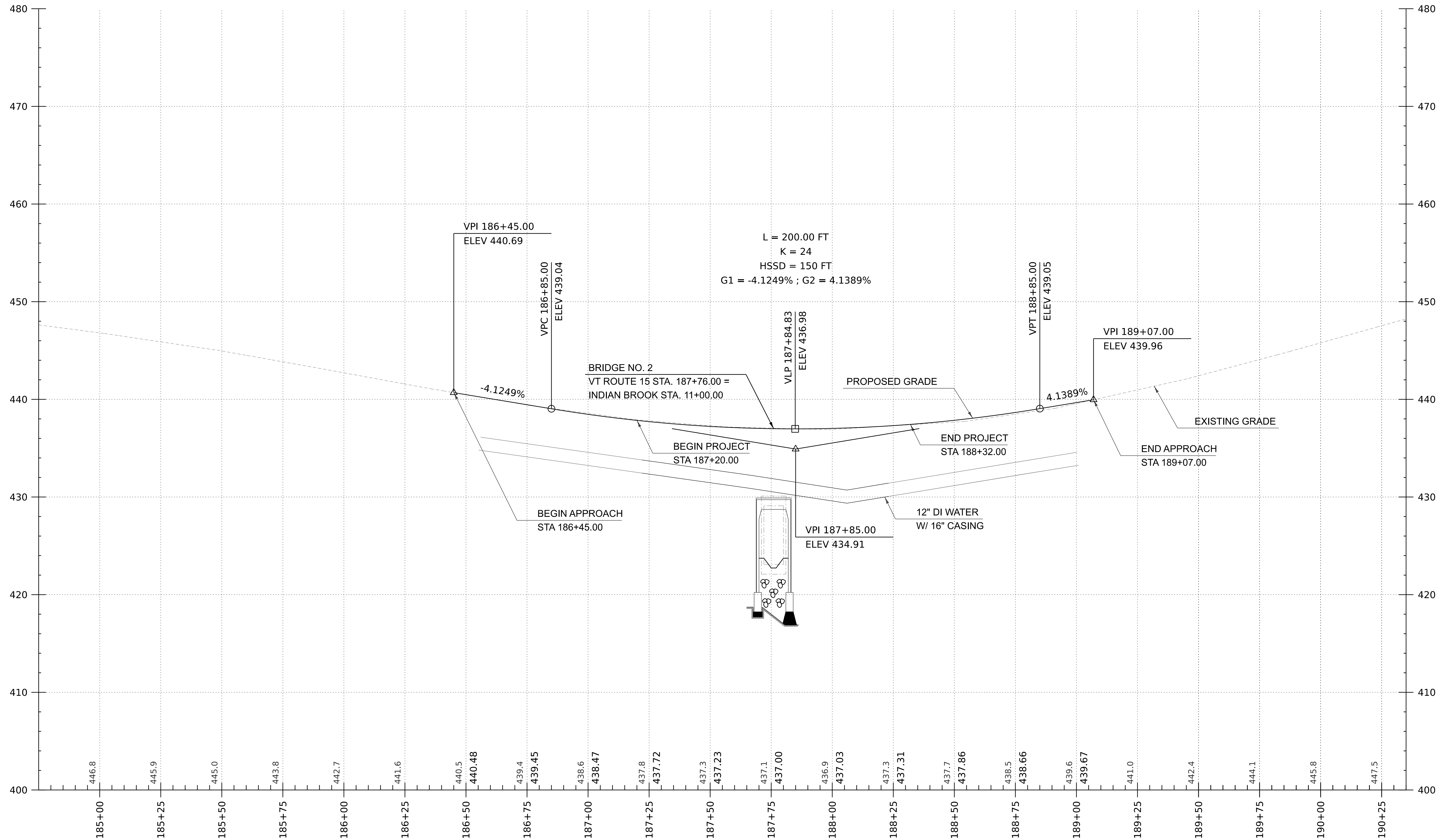
WET AREA SEED (WETLAND) TO BE PAID FOR UNDER 651.1600 SPECIALTY SEED. APPLICATION RATES VARY BY SEED MIX. WET AREA SEED TO BE ONE OF THE FOLLOWING, OR APPROVED EQUAL:

- VERMONT WET MEADOW & DETENTION BASIN MIX  
SUPPLIER: VERMONT WETLAND PLANT SUPPLY. APPLICATION RATE: 35 LBS/ACRE.
- NEW ENGLAND WET MIX (WETLAND SEED MIX)  
SUPPLIER: NEW ENGLAND WETLAND PLANTS, INC. APPLICATION RATE: 18 LBS/ACRE.
- PA NEW ENGLAND PROVINCE FACW MIX  
SUPPLIER: ERNST CONSERVATION SEEDS, INC. APPLICATION RATE: 20 LBS/ACRE WITH A COVER CROP (GRAIN RYE (1 SEP TO 30 APR; 30 LBS/ACRE). JAPANESE MILLET OR BARNYARD GRASS (1 MAY TO 31 AUG; 10 LBS/ACRE)).



PROJECT NAME:	ESSEX	PLOT DATE:	11/20/2025
PROJECT NUMBER:	STP CULV(I49)	DRAWN BY:	B. DONAHUE
FILE NAME:	w23b689bdr_lds.dgn	CHECKED BY:	-----
PROJECT LEADER:	M.	LANDSCAPE SHEET	SHEET 18 OF 37
DESIGNED BY:	B. DONAHUE		

# VT-15



THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND APPROXIMATE ELEVATIONS ALONG THE PROPOSED ALIGNMENT. THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE PROPOSED PROFILE GRADES FOR THE NEW ALIGNMENT.

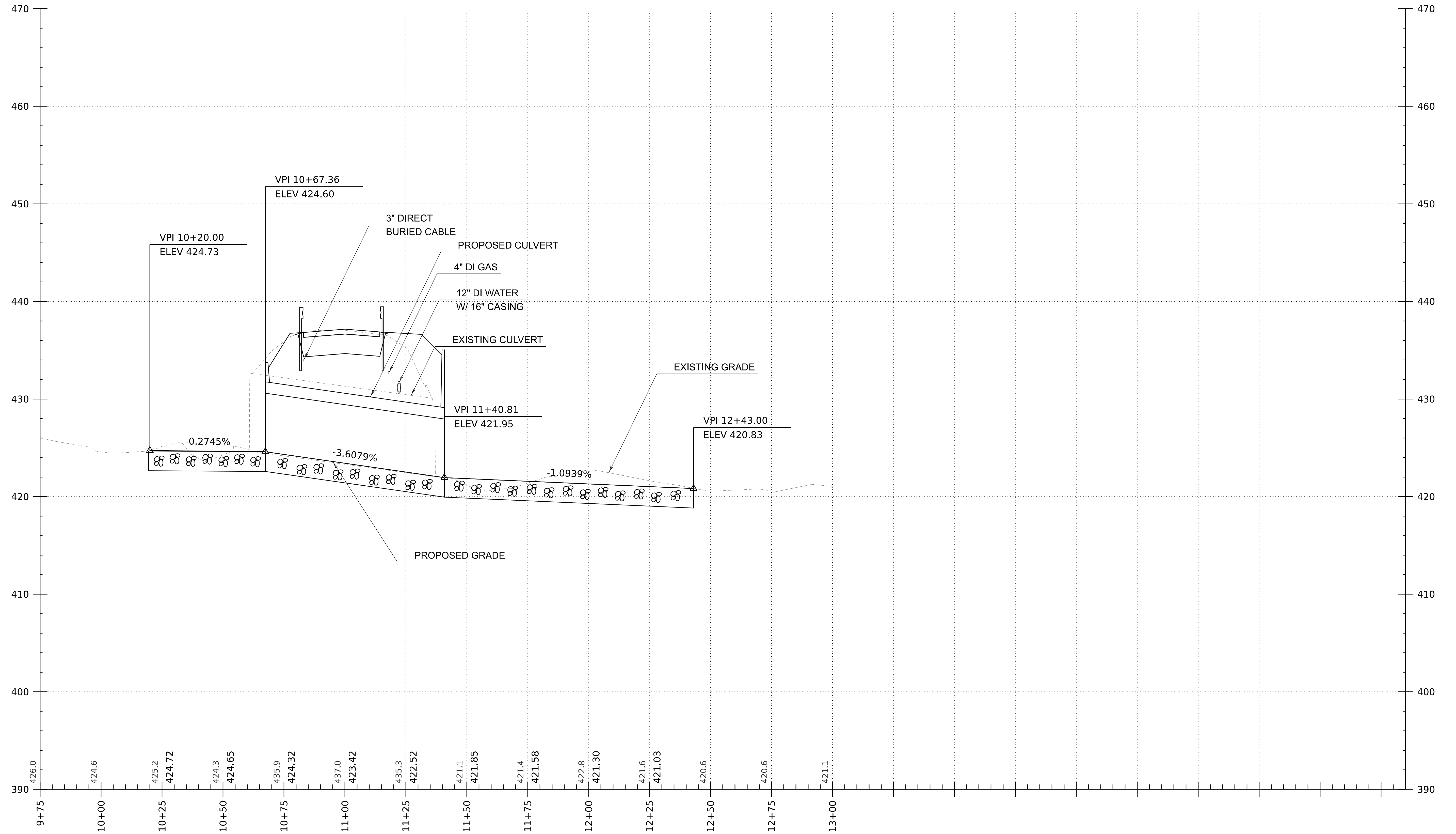
HORIZONTAL SCALE: 20 SCALE  
VERTICAL SCALE: 5 SCALE

NOTE:  
1. ALL STATIONS AND ELEVATIONS ARE SHOWN IN FEET.

PROJECT NAME: ESSEX	
PROJECT NUMBER: STP CULV (149)	
FILE NAME: z23b689prof.dgn	PLOT DATE: 11/20/2025
PROJECT LEADER: D. VERTIYEV	DRAWN BY: C. WEBSTER
DESIGNED BY: E. NOONAN	CHECKED BY: A. TSOUKALAS
PROFILE SHEET	SHEET 19 OF 37



# INDIAN BROOK



THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND APPROXIMATE ELEVATIONS ALONG THE PROPOSED ALIGNMENT. THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE PROPOSED PROFILE GRADES FOR THE NEW ALIGNMENT.

HORIZONTAL SCALE: 20 SCALE  
VERTICAL SCALE: 5 SCALE

NOTE:  
1. ALL STATIONS AND ELEVATIONS ARE SHOWN IN FEET.

PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV (149)

FILE NAME: z23b689prof.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
CHANNEL PROFILE SHEET

PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 20 OF 37

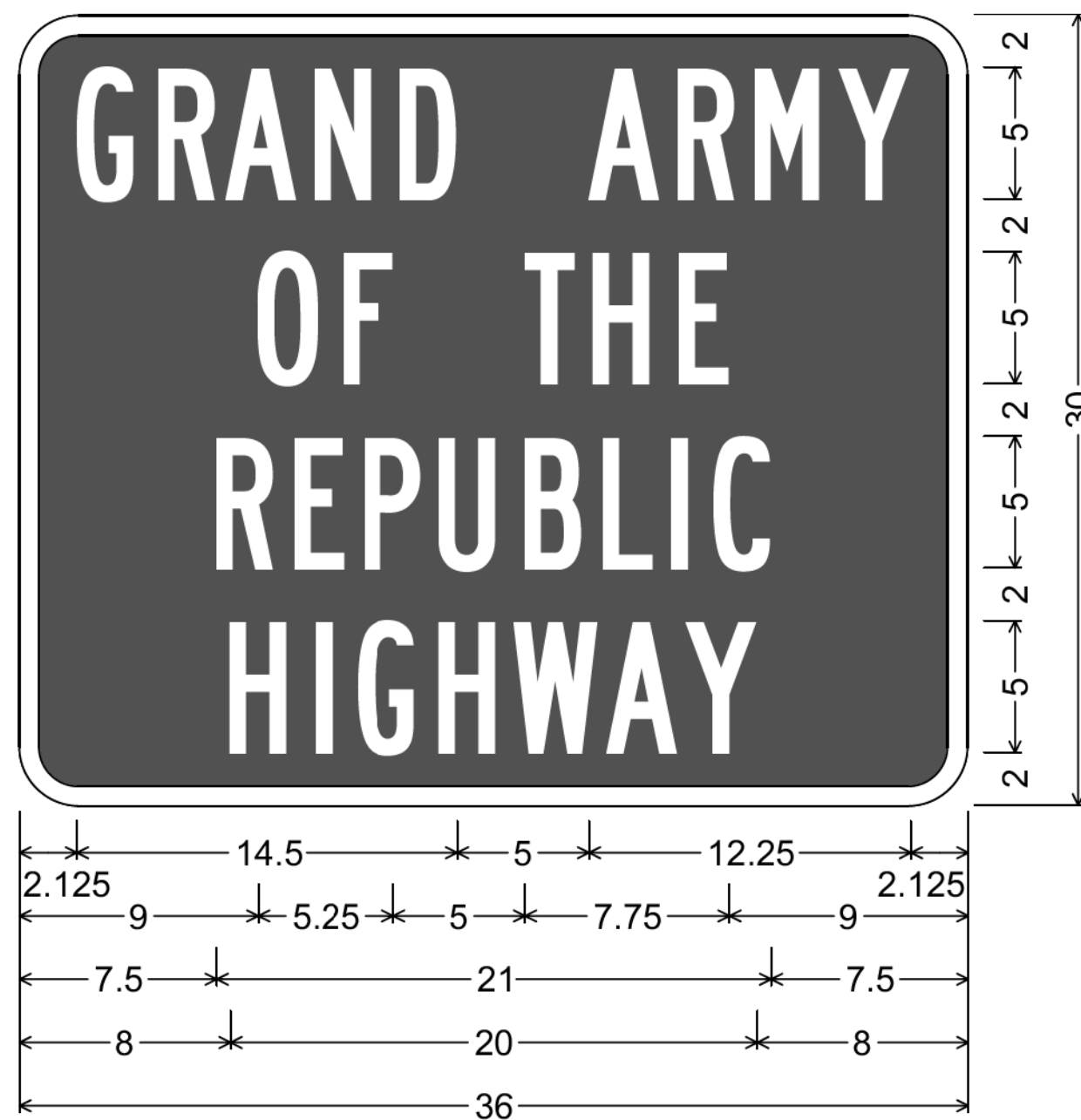


# TRAFFIC SIGN SUMMARY SHEET

MILE MARKER, STATION OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS			NEW & SALVAGED SIGNS				EXIST POST	N O.	NEW SIGN POSTS												REMARKS	SIGN DETAIL							
		EACH	WIDTH (in)	HEIGHT (in)	FLAT ALUM.	EXT. ALUM.	SALV SIGN	SALV TIS			RETAIN	SALVAGE	SQUARE STEEL (in)			TUBULAR STEEL Ø (IN)				W-SHAPE STEEL					S.H.S.M.*	DETAIL ON SHEET	STANDARD SHEET NUMBER				
													1.75	2.00	2.50	ANCHOR	SLEEVE	FOUNDATION	3.00	3.50	4.00	5.00		FTG. SIZE				WEIGHT	POST SIZE	SIGN FRAME REQUIRED	
													(LB / FT)						(LB / FT)					24"							30"
1.88	2.42	3.35				7.60	9.00	10.80	14.60																						
<b>OPTION ITEMS</b>																															
<b>BRIDGE 2</b>																															
STA. 187+53 RT		1	24.0	12.0	2.00					1		1			X									INSTALL NEW SIGN ON NEW POST GREEN LEGEND ON WHITE BACKGROUND	M3-2P						
STA 187+53 RT		1	24.0	24.0	4.00																			INSTALL NEW SIGN (SUB-MOUNT WITH PREVIOUS SIGN) VM1-5			T-136				
STA. 187+62 LT		1	36.0	30.0	7.50					1		1			X									INSTALL NEW SIGN ON NEW POST		SIGN DETAIL SHEET 1					
STA. 187+62 RT		1	6.0	10.0	0.42					1	1				X									INSTALL NEW SIGN ON NEW POST VD-701			T-42				
STA. 188+01 LT		1	6.0	10.0	0.42					1	1				X									INSTALL NEW SIGN ON NEW POST VD-701			T-42				
<p>THE TOTAL LENGTH OF EACH POST HAS BEEN ASSUMED TO BE 15 FEET, WITH THE EXCEPTION OF POSTS FOR OBJECT MARKERS AND POSTS FOR BRIDGE PLAQUES AND MILE MARKERS WHICH HAVE BEEN ASSUMED TO BE 8 FEET AND 10 FEET PER POST, RESPECTIVELY. FINAL POST LENGTHS ARE TO BE DETERMINED IN THE FIELD. POST SIZES ARE COMPUTED BASED ON INFORMATION FURNISHED ON THE STANDARD SHEETS AND THE VTRANS "SIGN POST DESIGN GUIDELINE." * STANDARD HIGHWAY SIGNS AND MARKINGS</p>																															
TOTALS					SF	SF	EA.	SF				FT	FT	FT	EA		LB	LB	LB	LB											
					14.33	.	.	.				20.	30.	.	.		.	.	.	.											
												50.					LB														

PROJECT NAME: ESSEX  
 PROJECT NUMBER: STP CULV(I49)  
 FILE NAME: z23b689tss.dgn  
 PROJECT LEADER: D. VERTIYEV  
 DESIGNED BY: H. GAO  
 TRAFFIC SIGN SUMMARY SHEET  
 PLOT DATE: 11/20/2025  
 DRAWN BY: H. GAO  
 CHECKED BY: A. TSOUKALAS  
 SHEET 21 OF 37





2.250" Radius, 0.750" Border, White on Green;  
 "GRAND ARMY", B 2K; "OF THE", B 2K;  
 "REPUBLIC", B 2K; "HIGHWAY", B 2K;

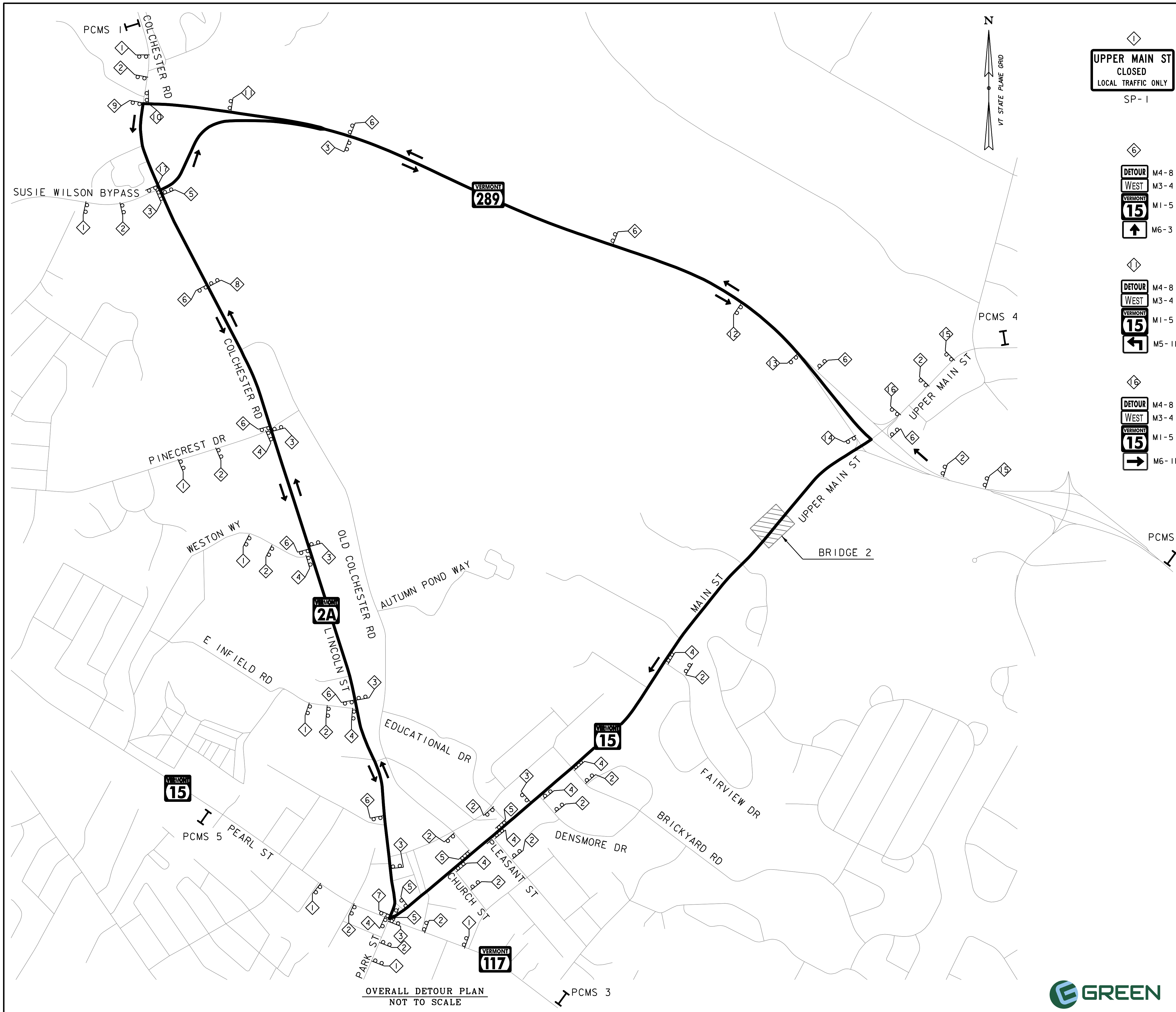
Table of distances between letter and object lefts

2.125	G	R	A	N	D	A	R	M	Y	2.125
	O	F	T	H	E					
7.500	R	E	P	U	B	L	I	C		7.500
8.000	H	I	G	H	W	A	Y			

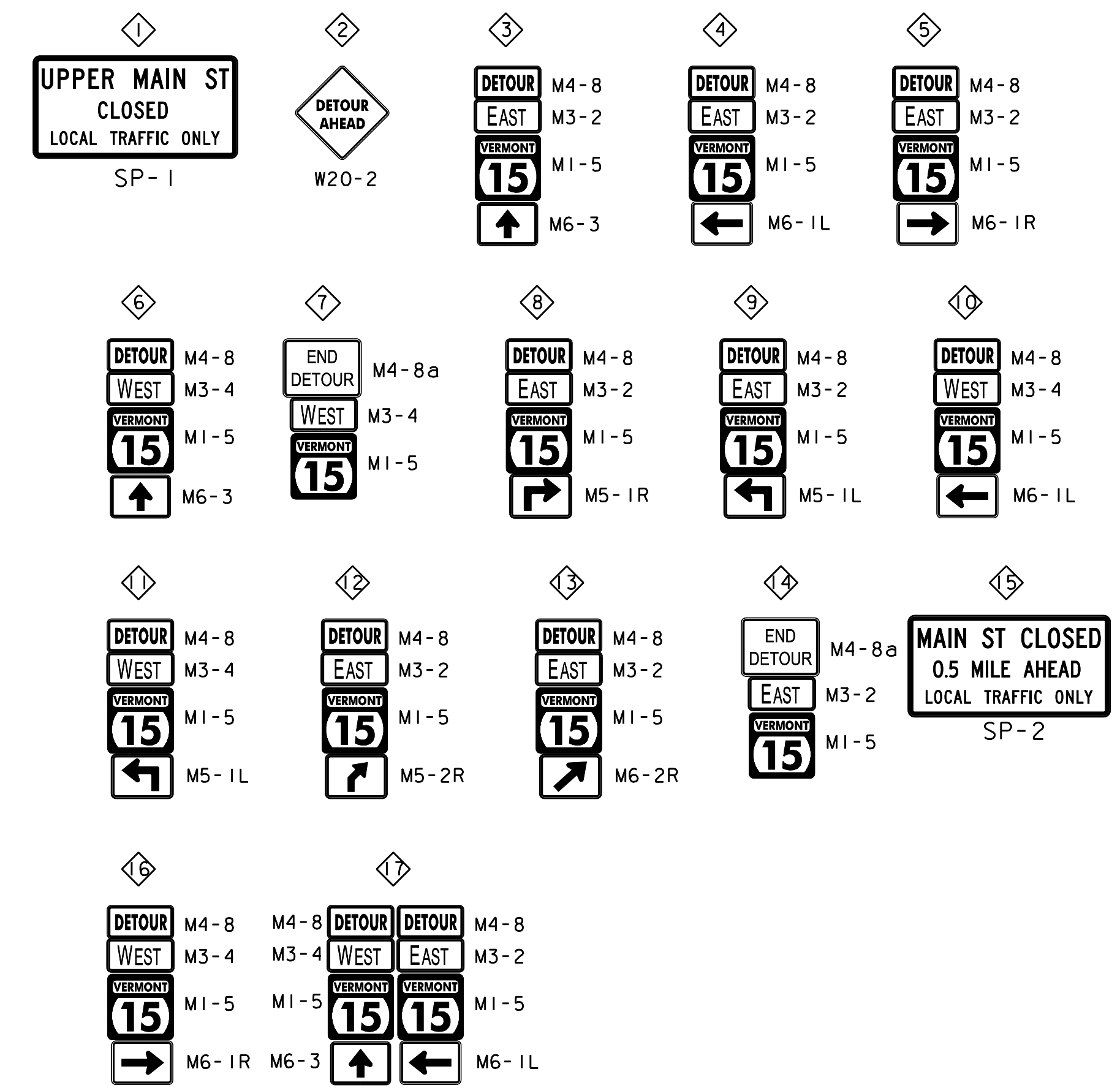
GRAND ARMY SIGN DETAIL



PROJECT NAME: ESSEX	PLOT DATE: 11/20/2025
PROJECT NUMBER: STP CULV(I49)	DRAWN BY: H. GAO
FILE NAME: z23b689tss.dgn	CHECKED BY: A. TSOUKALAS
PROJECT LEADER: D. VERTIYEV	SHEET 22 OF 37
DESIGNED BY: H. GAO	
SIGN DETAIL SHEET	



OVERALL DETOUR PLAN  
NOT TO SCALE



MESSAGES FOR THE PCMS BOARDS 1-5

ADVANCE NOTIFICATION

MESSAGE 1	MESSAGE 2
MAIN	MM DD
STREET	TO
CLOSED	MM DD

DURING CONSTRUCTION

MESSAGE 1	MESSAGE 2
MAIN	DETOUR
STREET	VIA
CLOSED	VT 289

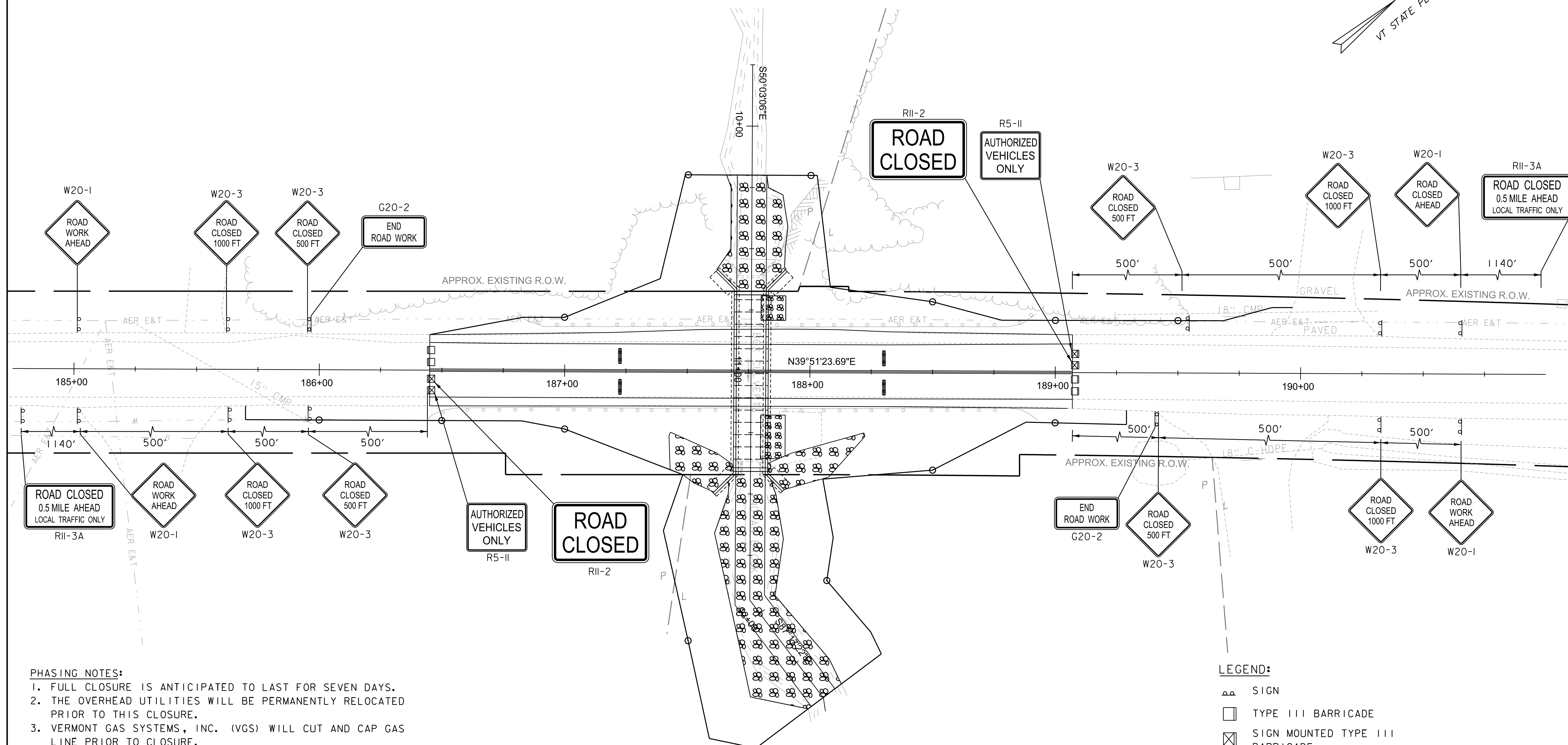
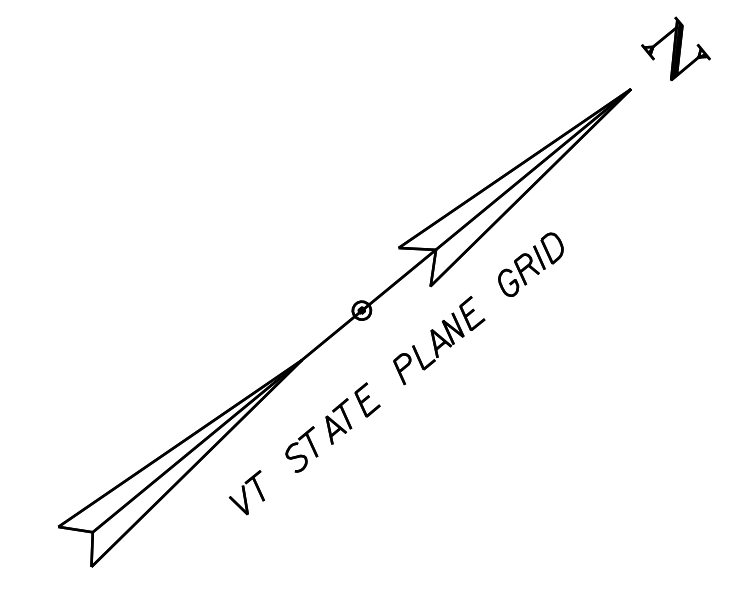
- LEGEND:
- ◇ CONSTRUCTION SIGN ASSEMBLY I.D. NUMBER
  - ▬ SIGN
  - ⊥ PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
  - ▨ WORK ZONE
  - DETOUR ROUTE

PROJECT NAME: ESSEX  
 PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689detour.dgn  
 PROJECT LEADER: D. VERTIYEV  
 DESIGNED BY: H. GAO  
 DETOUR PLAN SHEET 1

PLOT DATE: 11/20/2025  
 DRAWN BY: H. GAO  
 CHECKED BY: A. TSOUKALAS  
 SHEET 23 OF 37





- PHASING NOTES:**
1. FULL CLOSURE IS ANTICIPATED TO LAST FOR SEVEN DAYS.
  2. THE OVERHEAD UTILITIES WILL BE PERMANENTLY RELOCATED PRIOR TO THIS CLOSURE.
  3. VERMONT GAS SYSTEMS, INC. (VGS) WILL CUT AND CAP GAS LINE PRIOR TO CLOSURE.
  4. DIRECT BURIED CABLE WILL BE PROTECTED AND SUPPORTED IN PLACE DURING CONSTRUCTION. THE CONTRACTOR WILL BE REQUIRED TO BE FULLY PREPARED AND STAGED FOR THIS UTILITY WORK PRIOR TO CLOSURE. THIS WORK WILL BE PAID FOR UNDER ITEM 540.1000 PRECAST CONCRETE STRUCTURE.

**LOCAL TRAFFIC CONTROL PLAN**

SCALE 1"=20'

- LEGEND:**
- SIGN
  - TYPE III BARRICADE
  - SIGN MOUNTED TYPE III BARRICADE
  - BARRIER

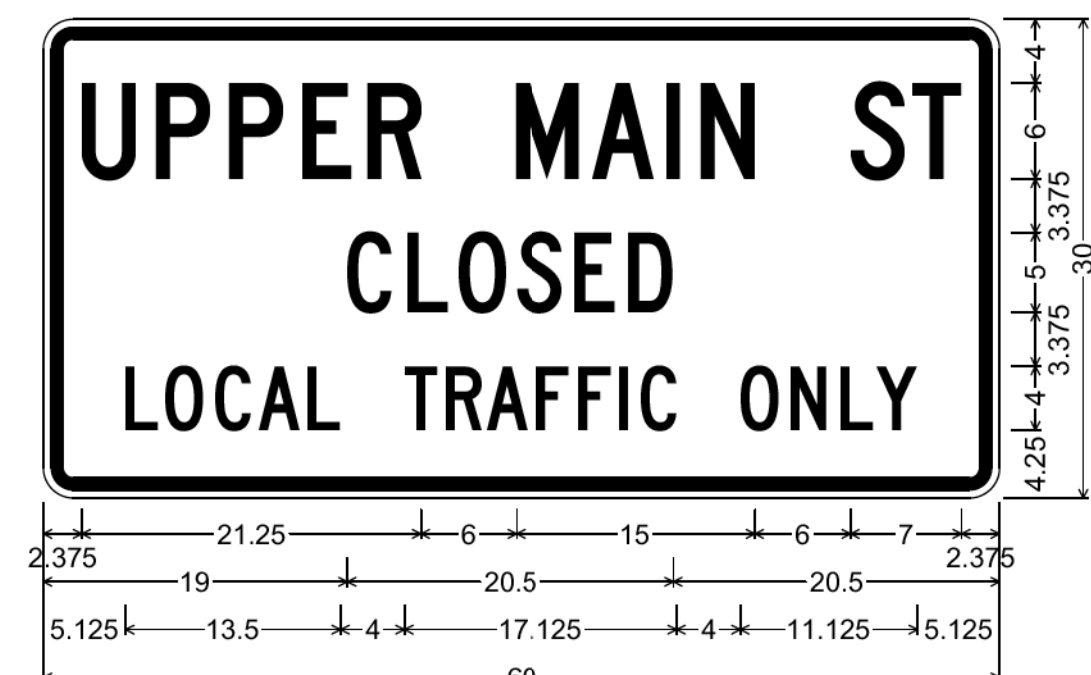
PROJECT NAME: ESSEX	
PROJECT NUMBER: STP CULV(I49)	
FILE NAME: z23b689+cp.dgn	PLOT DATE: 11/20/2025
PROJECT LEADER: D. VERTIYEV	DRAWN BY: H. GAO
DESIGNED BY: H. GAO	CHECKED BY: A. TSOUKALAS
DETOUR PLAN SHEET 2	SHEET 24 OF 37



IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	NUMBER OF SIGNS REQ'D	AREA (SF)	REMARKS	COLOR
	WIDTH (IN)	HEIGHT (IN)					
SP-1	60	30		8	100.00	DETOUR	LEGEND BLACK BACKGROUND WHITE
SP-2	60	30		2	25.00	DETOUR	LEGEND BLACK BACKGROUND WHITE
G20-2	36	18		2	9.00	TMP	LEGEND BLACK BACKGROUND WHITE
VM1-5	24	24		42	168.00	DETOUR	GREEN LEGEND ON WHITE BACKGROUND
M3-2P	24	12		28	56.00	DETOUR	GREEN LEGEND ON WHITE BACKGROUND
M3-4P	24	12		14	28.00	DETOUR	GREEN LEGEND ON WHITE BACKGROUND
M4-8	24	12		40	80.00	DETOUR	LEGEND BLACK BACKGROUND ORANGE
M4-8a	24	18		2	6.00	DETOUR	LEGEND BLACK BACKGROUND ORANGE
M5-1PL	21	15		2	4.38	DETOUR	LEGEND BLACK BACKGROUND ORANGE
M5-1PR	21	15		1	2.19	DETOUR	LEGEND BLACK BACKGROUND ORANGE
M5-2PR	21	15		1	2.19	DETOUR	LEGEND BLACK BACKGROUND ORANGE
M6-1PL	21	15		11	24.06	DETOUR	LEGEND BLACK BACKGROUND ORANGE
M6-1PR	21	15		6	13.13	DETOUR	LEGEND BLACK BACKGROUND ORANGE
M6-2PR	21	15		1	2.19	DETOUR	LEGEND BLACK BACKGROUND ORANGE
M6-3P	21	15		18	39.38	DETOUR	LEGEND BLACK BACKGROUND ORANGE
R5-11	30	24		2	10.00	TMP	LEGEND BLACK BACKGROUND WHITE
R11-2	48	30		2	20.00	TMP	LEGEND BLACK BACKGROUND WHITE
R11-3A	60	30		2	25.00	TMP	LEGEND BLACK BACKGROUND WHITE
W20-1	48	48		4	64.00	TMP	LEGEND BLACK BACKGROUND ORANGE
W20-2	48	48		17	272.00	DETOUR	LEGEND BLACK BACKGROUND ORANGE
W20-3	48	48		4	64.00	TMP	LEGEND BLACK BACKGROUND ORANGE
W20-3	48	48		4	64.00	TMP	LEGEND BLACK BACKGROUND ORANGE
				TOTAL		<b>1078.50 SF</b>	

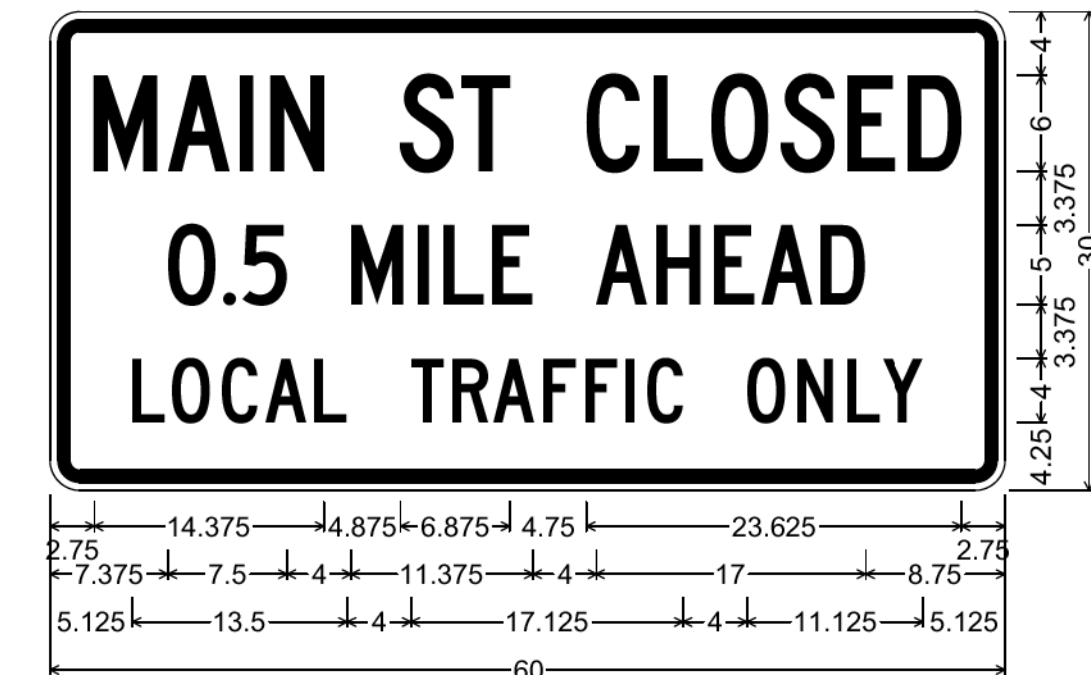
**DETOUR NOTES:**

- DETOUR SIGNING IS THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT FOR ALL TEMPORARY TRAFFIC DEVICES REQUIRED FOR IMPLEMENTING THE DETOUR, INCLUDING BUT NOT LIMITED TO SIGNS AND BARRICADES SHALL BE INCLUDED FOR PAYMENT UNDER ITEM 641.1100 TRAFFIC CONTROL, ALL-INCLUSIVE.
- DETOUR SIGNS SHALL BE PLACED ADJACENT TO EXISTING ROUTE MARKER ASSEMBLIES, WHERE APPLICABLE.
- ALL CONFLICTING SIGNAGE SHALL BE COVERED FOR THE DURATION OF THE VT-15 CLOSURE, AS DIRECTED BY THE ENGINEER.
- THE CONTRACTOR SHALL COORDINATE ALL WORK AND THE IMPLEMENTATION OF THE DETOUR WITH THE ENGINEER AND ALL OTHER CONSTRUCTION PROJECTS ALONG THE DETOUR ROUTE.
- THE CONTRACTOR SHALL PROVIDE ACCESS THROUGH THE WORK ZONE FOR EMERGENCY VEHICLES AT ALL TIMES OR COORDINATE EMERGENCY ROUTES DURING ROADWAY CLOSURE.
- ACCOMMODATIONS FOR POSTAL DELIVERIES, NEWSPAPER ROUTES, TRASH SERVICES AND/OR OTHER DELIVERY SERVICES INTERRUPTED BY THE PROJECT OR DETOUR SHALL BE COMMUNICATED WITH THE PROPER CONTACTS.
- THE 11TH EDITION OF MUTCD AND ITS LATEST REVISIONS SHALL BE THE STANDARD FOR ALL TRAFFIC CONTROL DEVICES. THE 11TH EDITION OF MUTCD AND ITS LATEST REVISIONS SHALL BE VALID UNTIL SUCH TIME AS THE TRAFFIC CONTROL DEVICES ARE REPLACED OR RECONSTRUCTED. WHEN NEW TRAFFIC CONTROL DEVICES ARE ERECTED OR PLACED, OR EXISTING TRAFFIC CONTROL DEVICES ARE REPLACED OR REPAIRED, THE EQUIPMENT, DESIGN, METHOD OF INSTALLATION, PLACEMENT OR REPAIR SHALL CONFORM WITH SUCH STANDARDS.
- PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL BE PROVIDED FOR USE ALONG THIS PROJECT. THE PLACEMENT OF THESE UNITS AS WELL AS THE MESSAGE WILL BE APPROVED BY THE ENGINEER. THESE SIGNS WILL BE PAID FOR UNDER ITEM 641.1500, PORTABLE CHANGEABLE MESSAGE SIGN. FOR THE DURATION OF THE PROJECT, THE CONTRACTOR SHALL POSITION A PCMS PRIOR TO THE BEGIN AND END PROJECT LIMITS WARNING MOTORISTS OF EXPECTED ROADWAY CONDITIONS AND REDUCED ROADWAY WIDTHS. PCMS SHALL NOT REPLACE ANY OF THE SIGNING DETAILED IN THE MUTCD AND SHALL NOT BE USED IF STANDARD TRAFFIC CONTROL DEVICES ADEQUATELY PROVIDE THE INFORMATION THE MOTORISTS NEED TO TRAVEL SAFELY. THE PCMS SHALL CONSIST OF EITHER ONE OR TWO MESSAGE PHASES. TYPICALLY, A PHASE SHALL CONSIST OF UP TO THREE LINES OF EIGHT CHARACTERS PER LINE. THE PCMS SHALL BE USED AS A SUPPLEMENT, AND NOT AS A SUBSTITUTE FOR CONVENTIONAL SIGNS AND PAVEMENT MARKINGS. THE PCMS SHALL COMMUNICATE WHAT INFORMATION MOTORISTS NEED TO KNOW. UNNECESSARY INFORMATION SHALL BE AVOIDED. MESSAGES SHALL BE UPDATED PERIODICALLY TO DESCRIBE THE WORK ACTIVITY OCCURRING SO THAT THE PCMS CONTINUES TO COMMAND THE ATTENTION OF MOTORISTS.
- THE CONTRACTOR SHALL REMOVE ALL TEMPORARY DETOUR SIGNS UPON RE-OPENING VT-15 TO TRAFFIC. WHILE THE TEMPORARY DETOUR SIGNS ARE BEING REMOVED, PCMS UNITS SHALL REMAIN IN PLACE AND BROADCAST THE POST CONSTRUCTION PCMS MESSAGE.
- THE CONTRACTOR SHALL REFER TO VERMONT STANDARDS AND THE LATEST EDITION OF MUTCD FOR TEMPORARY TRAFFIC CONTROL SIGN COLORS.
- THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL RESIDENTIAL DRIVEWAYS AND BUSINESS ACCESSES DURING CONSTRUCTION 24 HOURS A DAY. IF AN ACCESS REQUIRES CLOSURE FOR ANY PERIOD OF TIME, THE CONTRACTOR SHALL CONTACT THE RESIDENCE OR BUSINESS 48 HOURS PRIOR TO THE SCHEDULED CLOSURE AND PROVIDE AN ALTERNATIVE ACCESS FOR THE ENTIRE LENGTH OF THE CLOSURE PERIOD.



1.875" Radius, 0.750" Border, 0.500" Indent, Black on White;  
 "UPPER MAIN ST", C 2K; "CLOSED", C 2K;  
 "LOCAL TRAFFIC ONLY", C 2K;

SIGN DETAIL SP-1



1.875" Radius, 0.750" Border, 0.500" Indent, Black on White;  
 "MAIN ST CLOSED", C 2K 80% spacing;  
 "0.5 MILE AHEAD", C 2K 80% spacing;  
 "LOCAL TRAFFIC ONLY", C 2K;

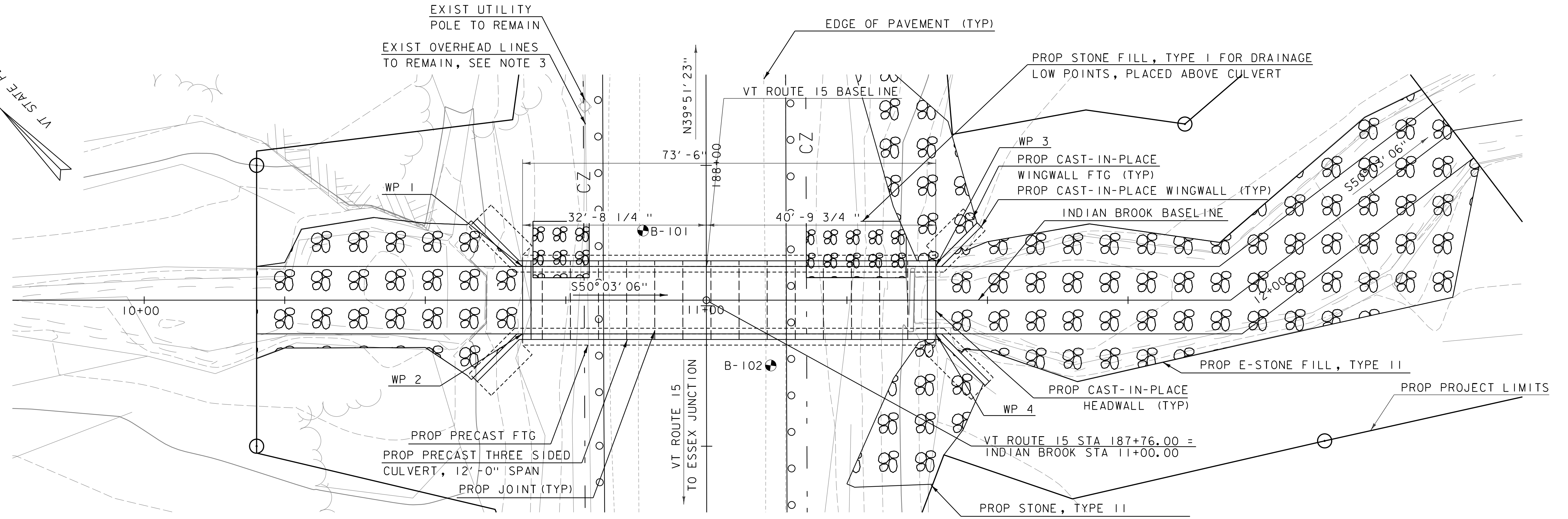
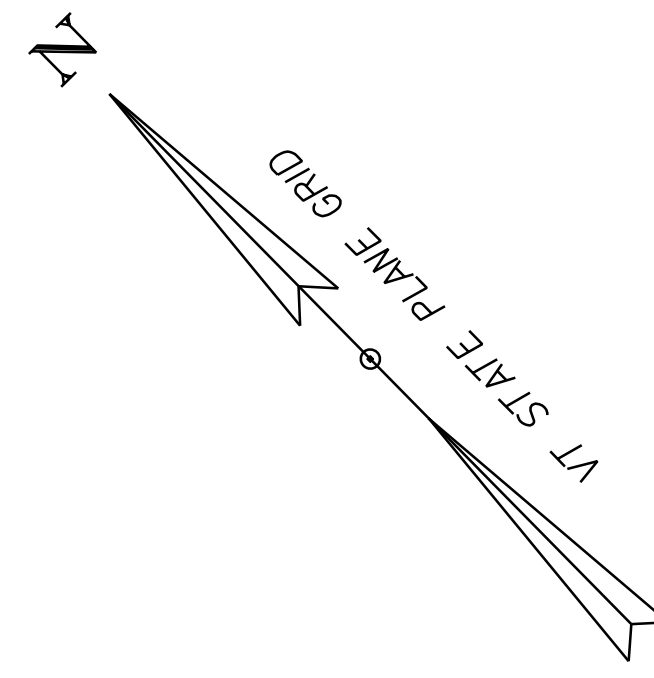
SIGN DETAIL SP-2

PROJECT NAME: ESSEX  
 PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689de+our.dgn  
 PROJECT LEADER: D. VERTIYEV  
 DESIGNED BY: H. GAO  
 DETOUR PLAN NOTES

PLOT DATE: 11/20/2025  
 DRAWN BY: H. GAO  
 CHECKED BY: A. TSOUKALAS  
 SHEET 25 OF 37

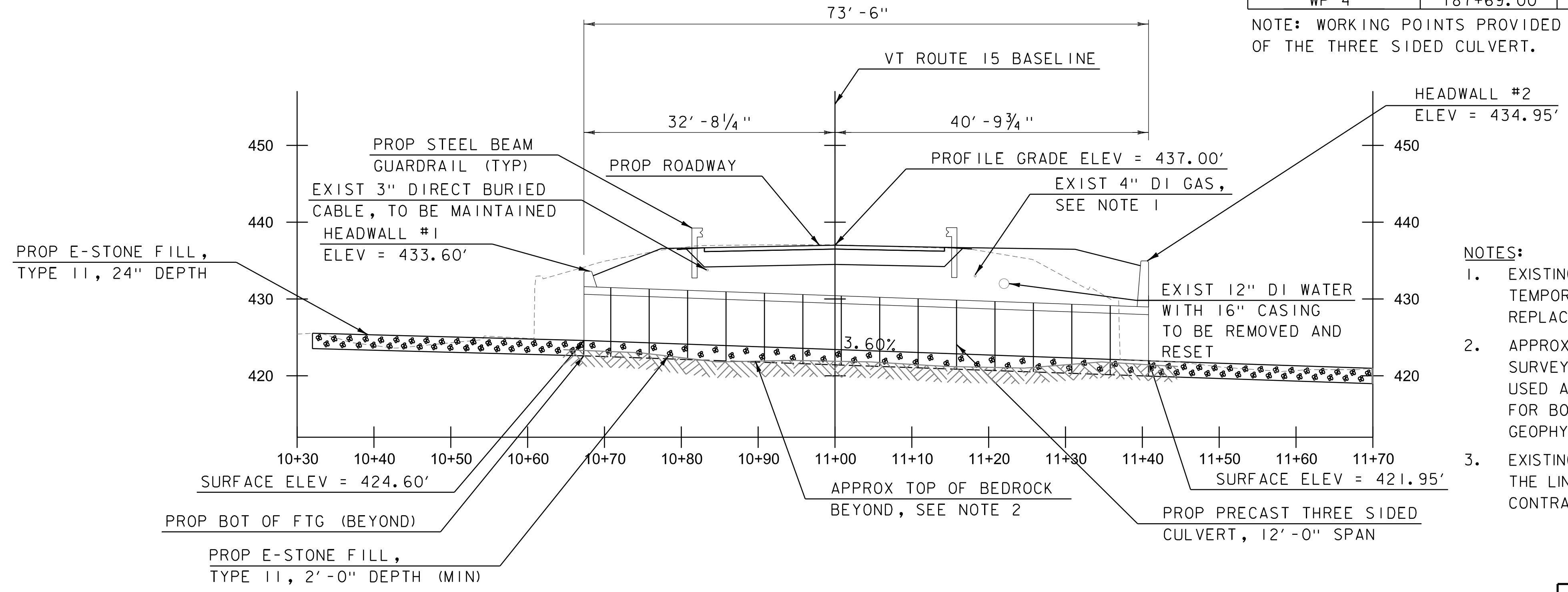




**CULVERT PLAN**  
SCALE 1" = 10'-0"

WORKING POINTS	STA	OFFSET, FT	NORTHING	EASTING
WP 1	187+83.00	32.69 RT	1485862.11	731240.92
WP 2	187+69.00	32.69 RT	1485853.14	731230.12
WP 3	187+83.00	40.81 LT	1485918.46	731193.73
WP 4	187+69.00	40.81 LT	1485909.49	731182.98

NOTE: WORKING POINTS PROVIDED TO TOP OF HEADWALL AT EACH CORNER OF THE THREE SIDED CULVERT.

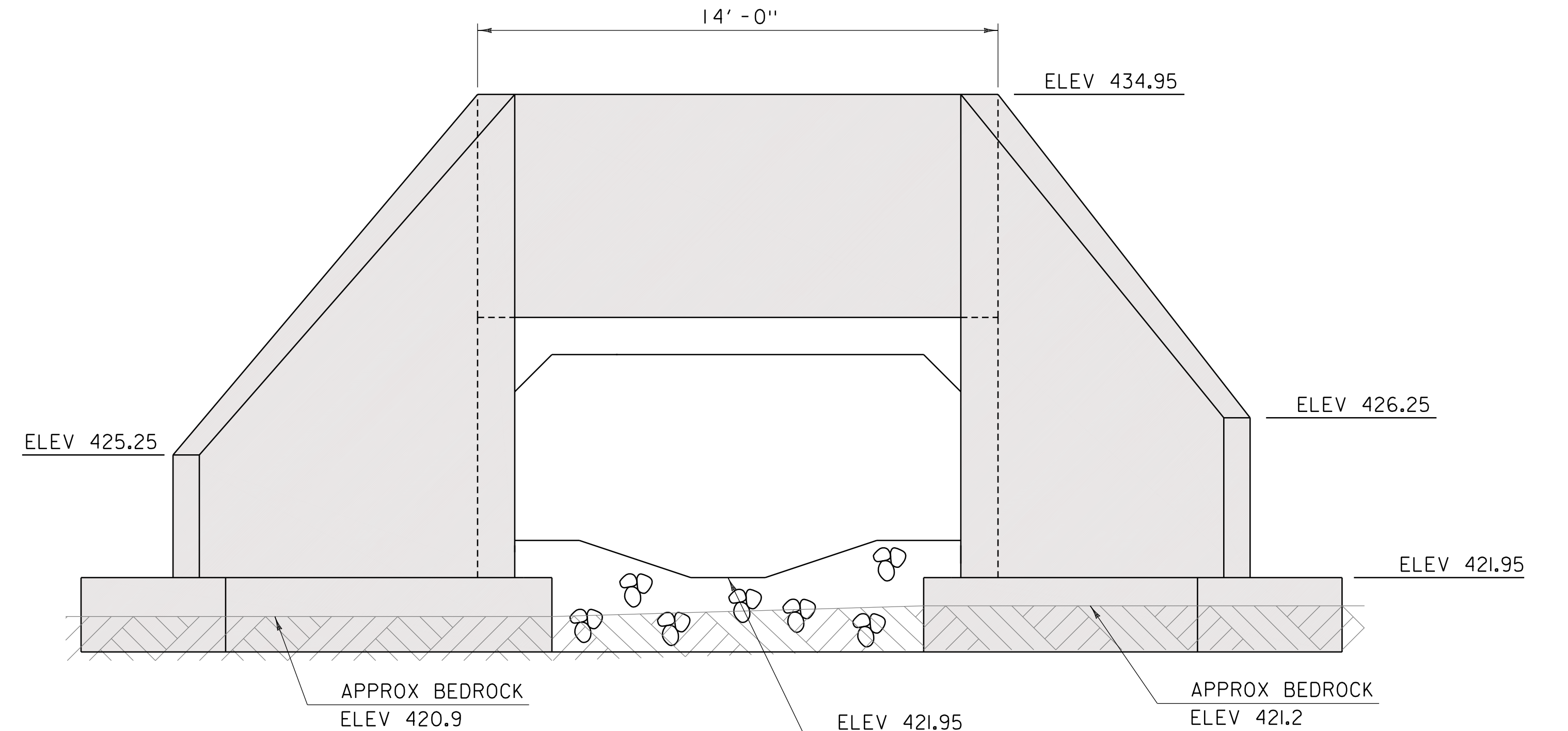
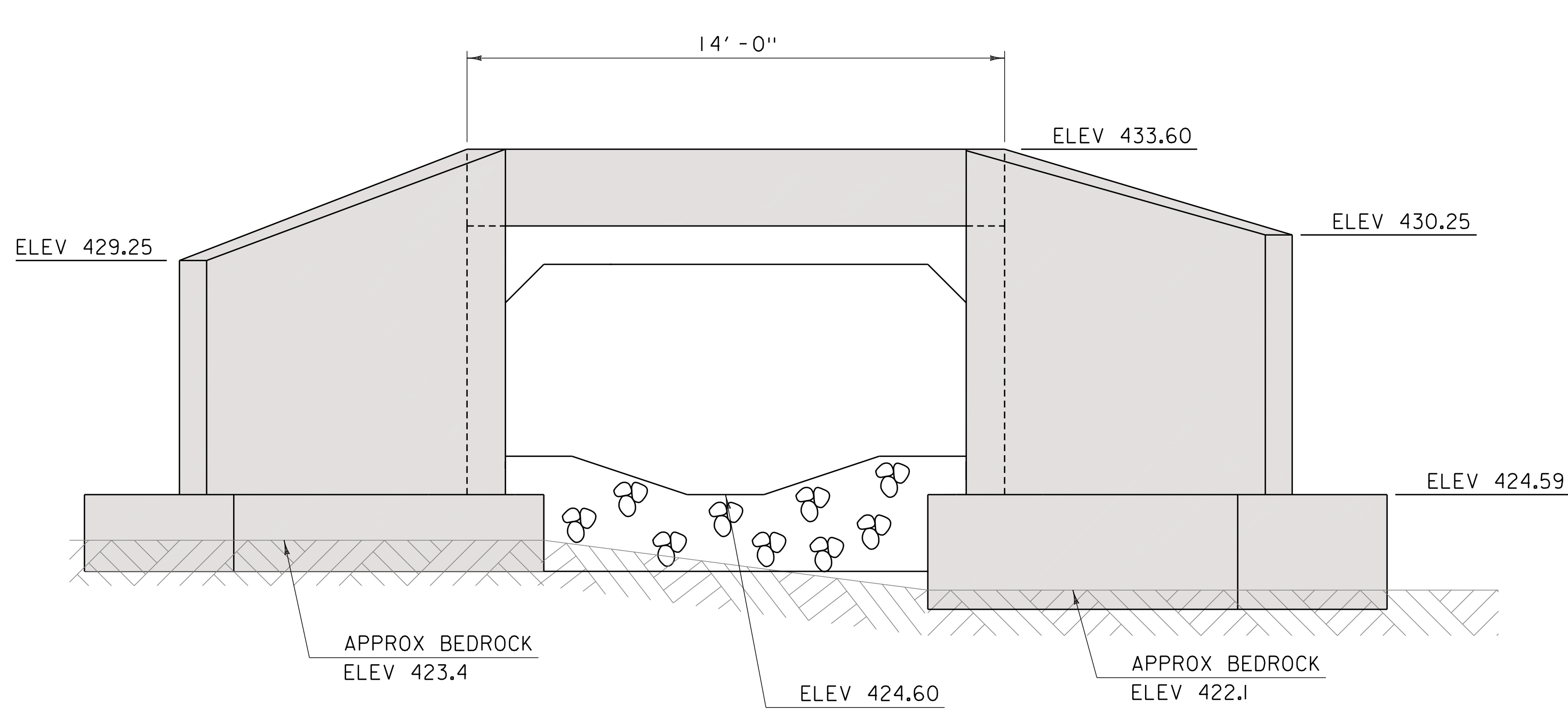
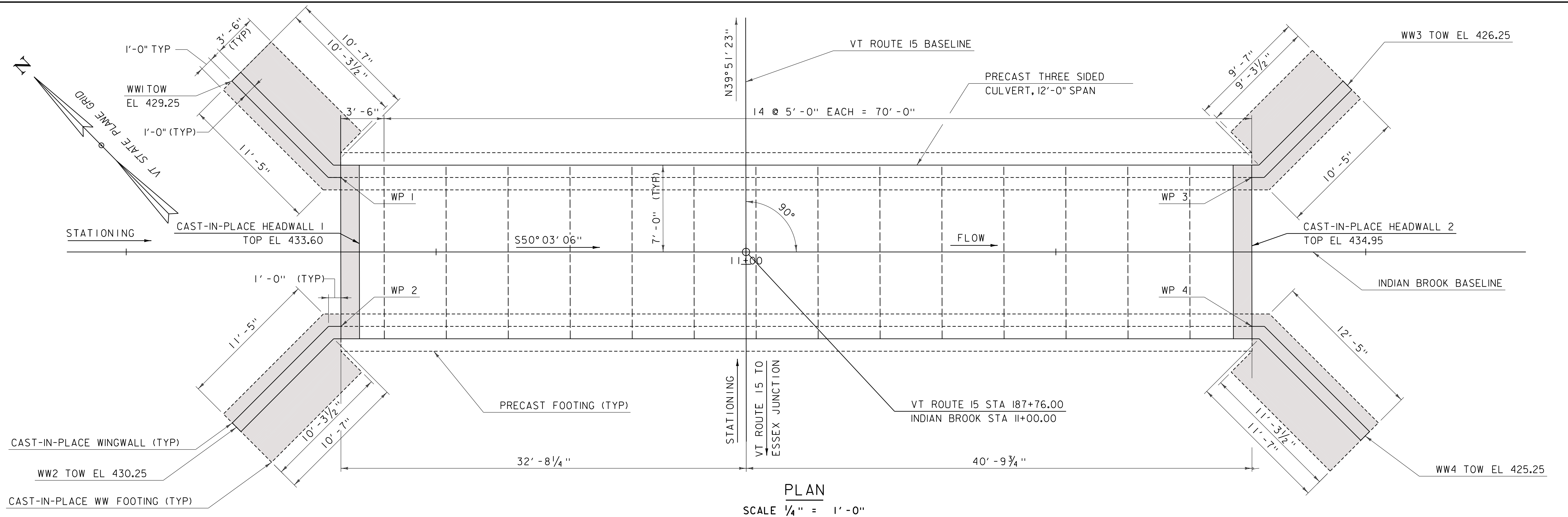


**SECTION AT CULVERT CENTERLINE**  
SCALE 1" = 10'-0"

- NOTES:**
- EXISTING GAS LINE TO HAVE SECTION OVER CULVERT LIMITS TEMPORARILY REMOVED DURING CONSTRUCTION. SECTION TO BE REPLACED AFTER CULVERT IS INSTALLED.
  - APPROXIMATE TOP OF BEDROCK SHOWN IS BASED ON GEOPHYSICAL SURVEY (NORTH TRANSECT SHOWN). CONCRETE LEVELLING PAD TO BE USED AS NEEDED FOR SETTING FOOTINGS. SEE THE BORING SHEET FOR BOTH NORTH AND SOUTH TRANSECT INFORMATION FROM THE GEOPHYSICAL SURVEY.
  - EXISTING OVERHEAD LINES TO REMAIN IN PLACE DURING CONSTRUCTION. THE LINES WILL BE DE-ENERGIZED AND PROTECTED IN PLACE BY THE CONTRACTOR DURING ALL CRANE ACTIVITIES.

PROJECT NAME:	ESSEX	FILE NAME:	z23b689pe.dgn	PLOT DATE:	11/20/2025
PROJECT NUMBER:	STP CULV(149)	PROJECT LEADER:	D. VERTIYEV	DRAWN BY:	J. JENNINGS
		DESIGNED BY:	S. BIBINSKI	CHECKED BY:	T. CARD
		PLAN AND SECTION			SHEET 26 OF 37

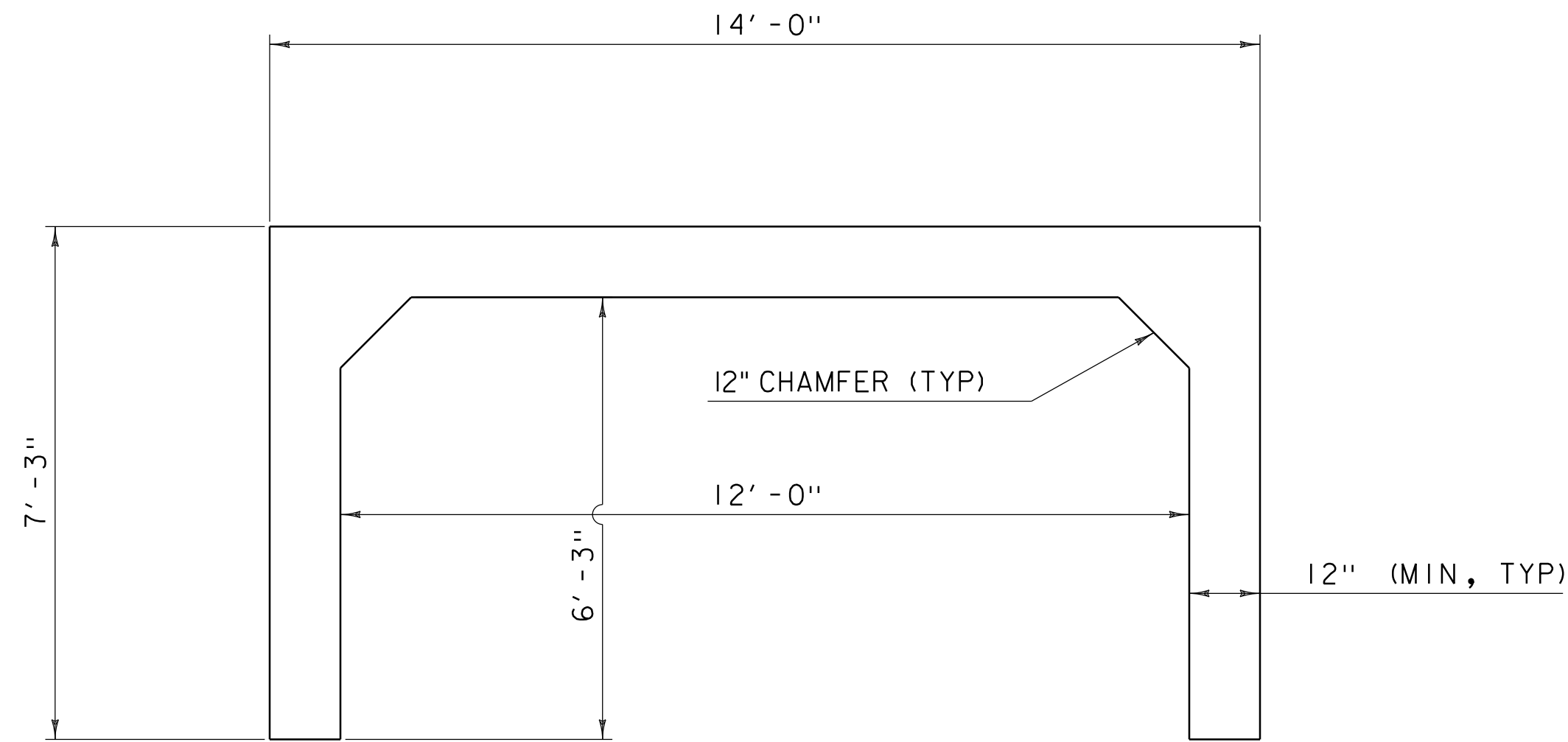




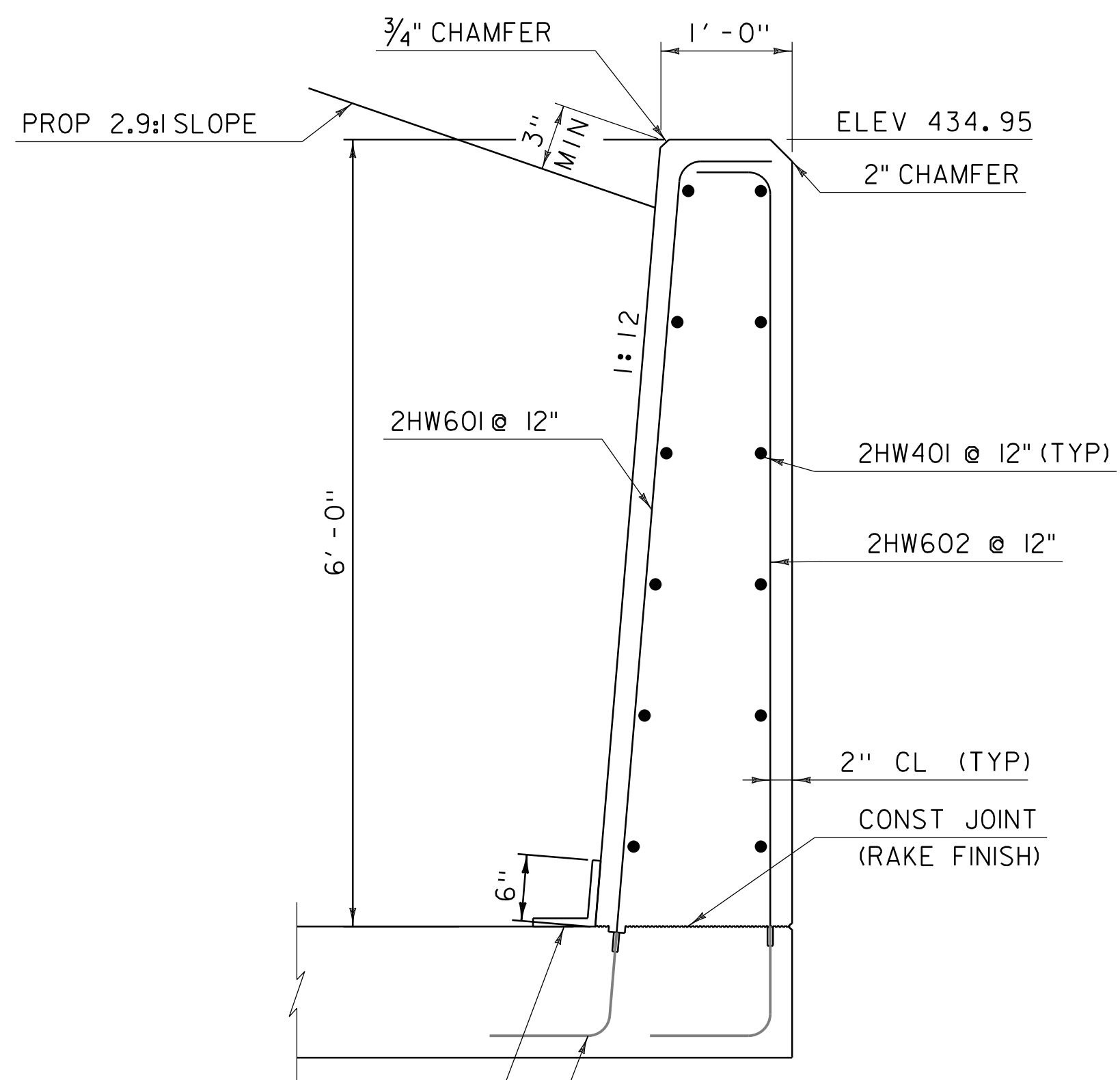
- NOTES:**
1. PROPOSED WINGWALLS, HEADWALLS, AND WINGWALL FOOTINGS SHOWN CAST-IN-PLACE, AND PRECAST FRAME AND FOOTING SHOWN AS PRECAST.
  2. ASSUMED 12" CULVERT WALL THICKNESS, PRECASTER TO DETERMINE ACTUAL THICKNESS BASED ON THEIR DESIGN.
  3. PROPOSED PRECAST FRAME SEGMENT SPACING SHOWN IS PRELIMINARY, AND MAY BE ADJUSTED AS PART OF THE PRECASTER SHOP DRAWING SUBMITTAL.



PROJECT NAME: ESSEX	
PROJECT NUMBER: STP CULV(149)	
FILE NAME: z23b689det.dgn	PLOT DATE: 11/20/2025
PROJECT LEADER: D. VERTIYEV	DRAWN BY: R. STICKLES
DESIGNED BY: S. BIBINSKI	CHECKED BY: T. CARD
BRIDGE 2 CULVERT LAYOUT AND ELEVATIONS SHEET 27 OF 37	



PRECAST THREE SIDED CULVERT TYPICAL SECTION  
SCALE 1/2" = 1'-0"



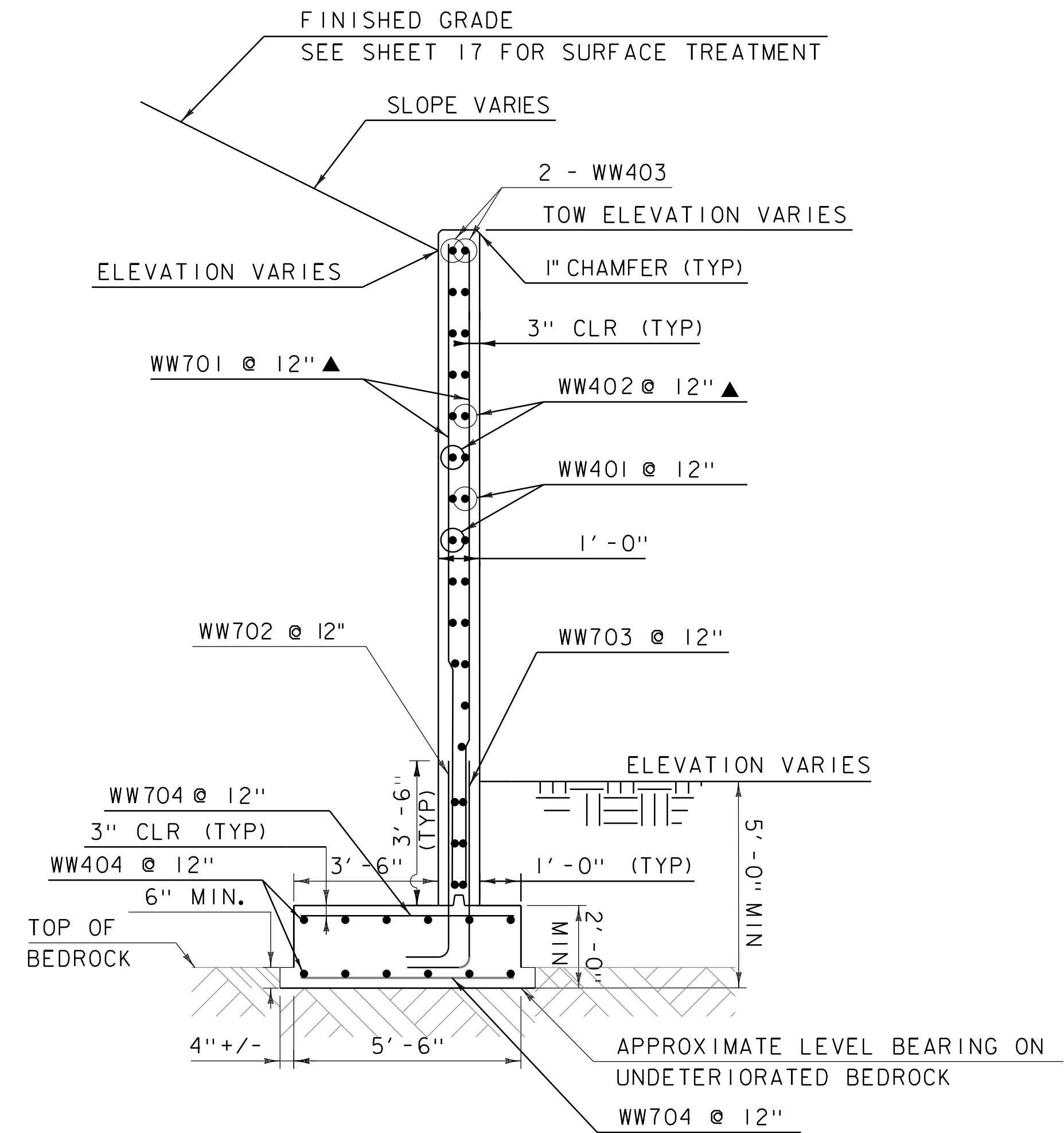
12" WIDE JOINT WRAP (ASTM C877) INSTALLED PER MANUFACTURER'S REQUIREMENTS

#6 MECHANICAL BAR CONNECTOR @ 12" (SEE NOTE 1, TYP)

CAST-IN-PLACE HEADWALL 2 DETAIL  
SCALE 1" = 1'-0"

NOTES:

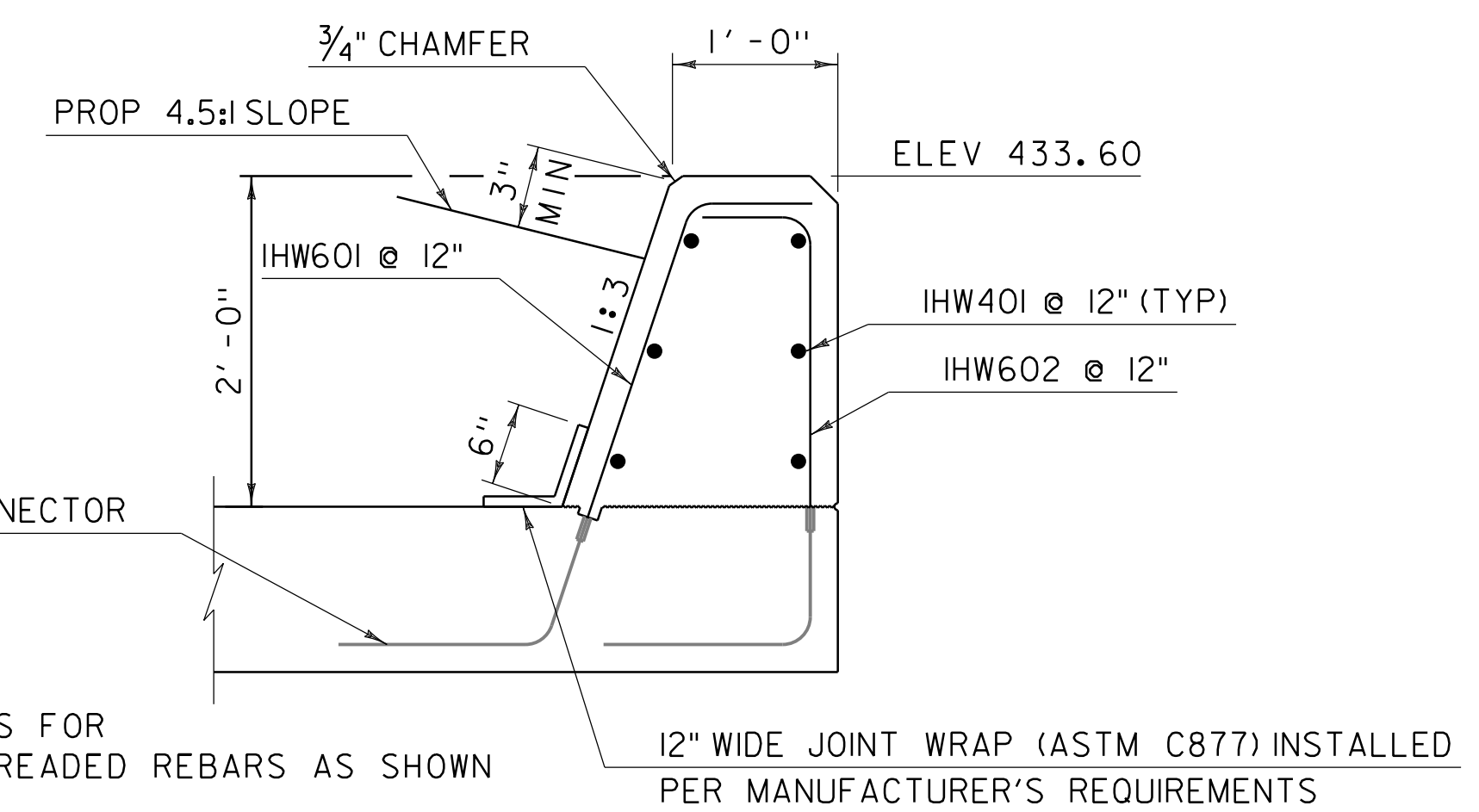
1. THE CONTRACTOR MAY SUBSTITUTE EXTENDED #6 HOOPS FOR THE MECHANICAL REINFORCING BAR SPLICERS AND THREADED REBARS AS SHOWN
2. CULVERT REINFORCEMENT NOT SHOWN FOR CLARITY



NOTE: LENGTH OF BARS TO VARY AS NEEDED TOWARDS TOP OF WINGWALL DUE TO THE TOP OF WALL SLOPE

CAST-IN-PLACE WINGWALL SECTION  
SCALE 3/8" = 1'-0"

#6 MECHANICAL BAR CONNECTOR @ 12" (SEE NOTE 1, TYP)



12" WIDE JOINT WRAP (ASTM C877) INSTALLED PER MANUFACTURER'S REQUIREMENTS

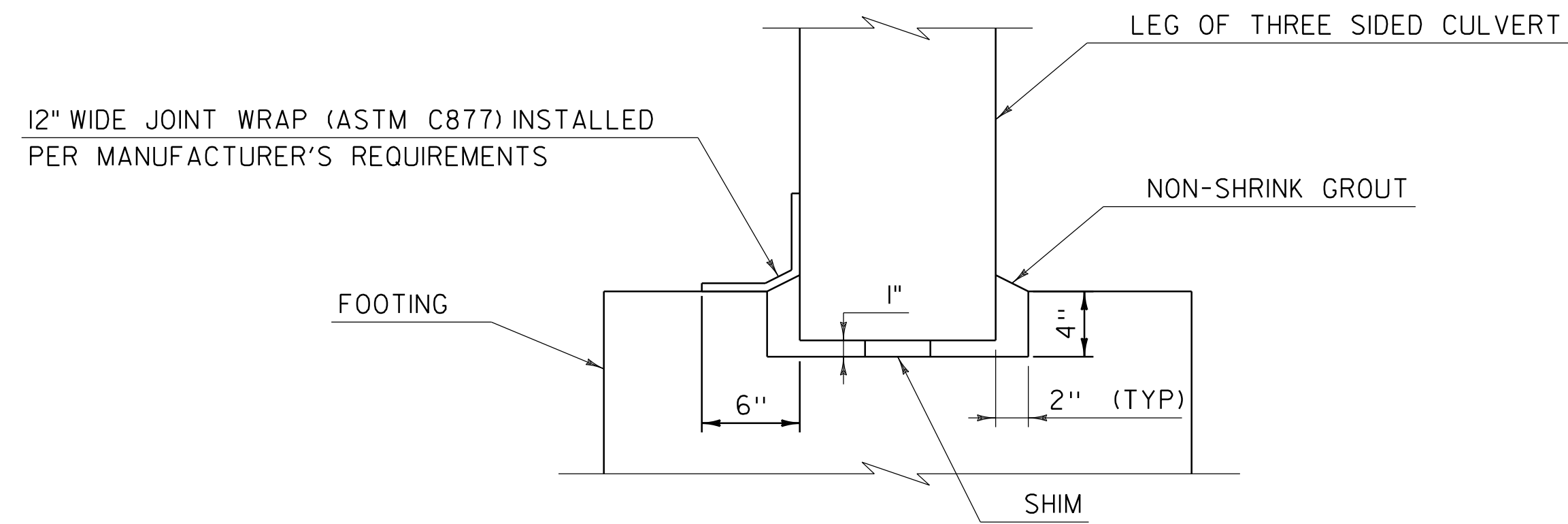
CAST-IN-PLACE HEADWALL 1 DETAIL  
SCALE 1" = 1'-0"



PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

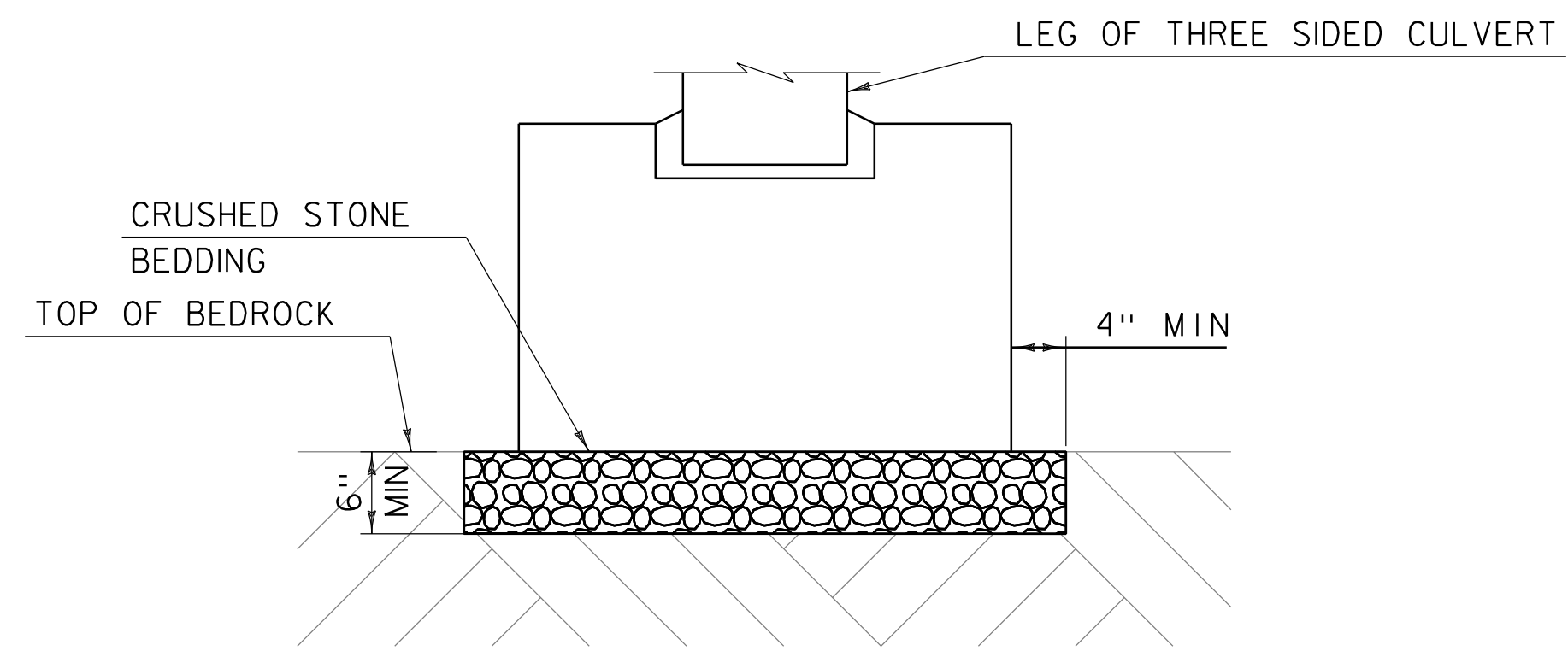
FILE NAME: z23b689det.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: S. BIBINSKI  
BRIDGE 2 CULVERT DETAILS I

PLOT DATE: 11/20/2025  
DRAWN BY: R. STICKLES  
CHECKED BY: T. CARD  
SHEET 28 OF 37

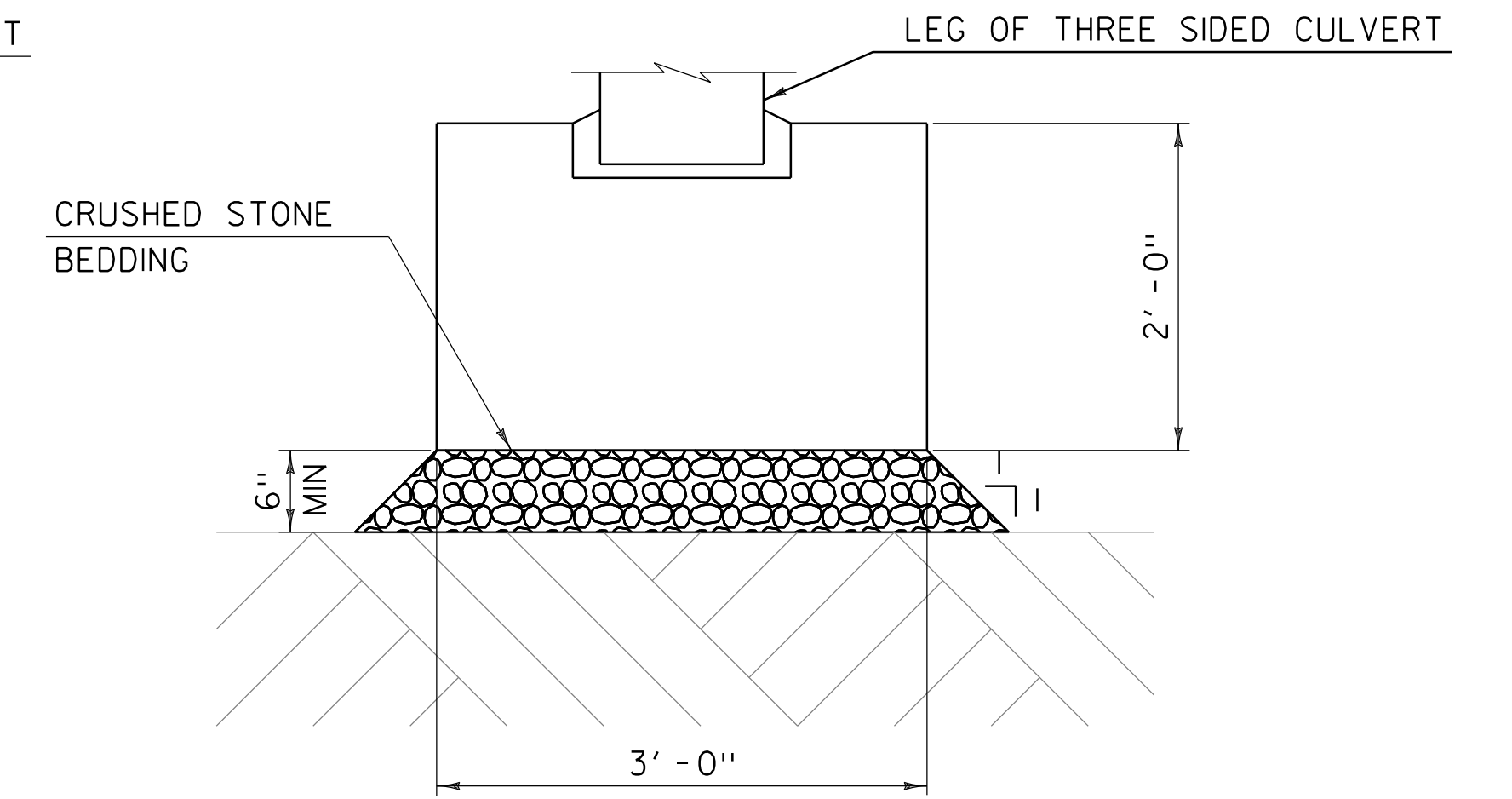


NOTE:  
 DETAILS AND DIMENSIONS ARE CONCEPTUAL AND MAY BE ALTERED BY THE FABRICATOR TO SUIT THEIR OPERATIONS, HOWEVER THE FUNCTION AND INTENT OF THE DETAIL MUST BE MET.

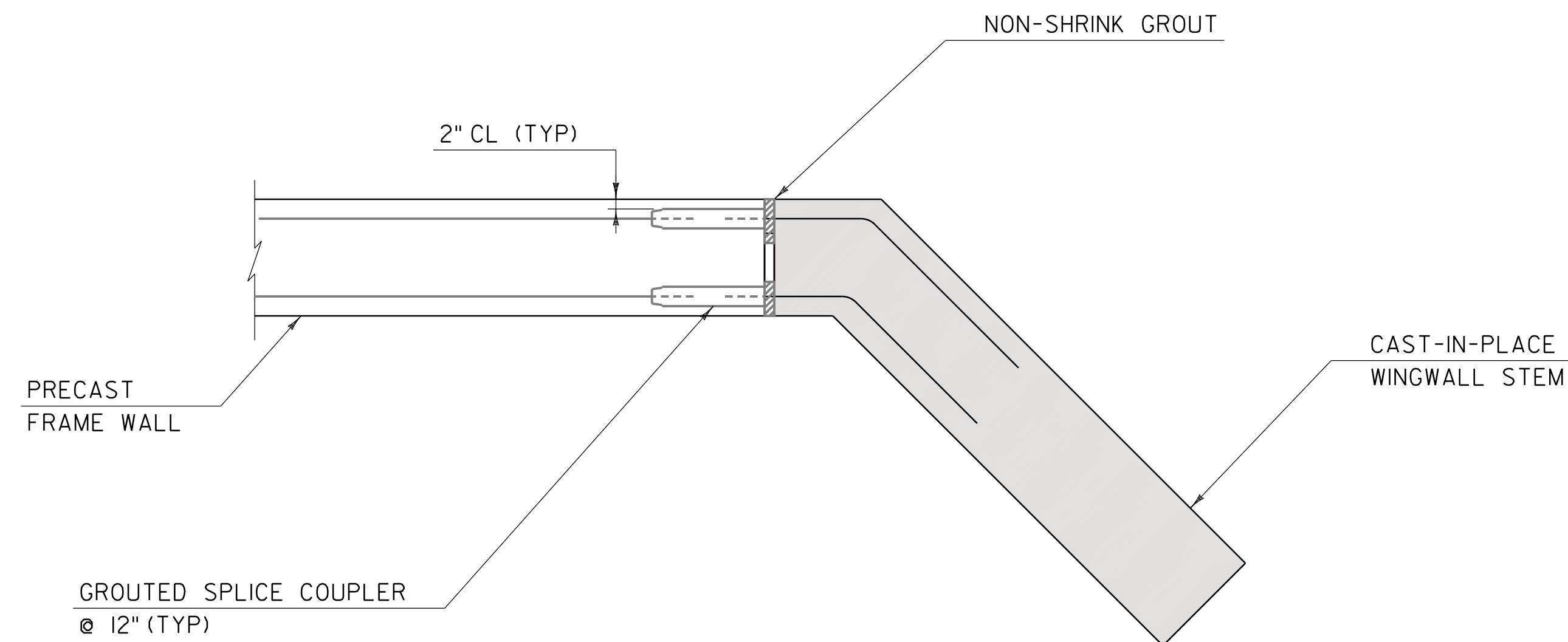
GROUTED KEYWAY  
 SCALE 1-1/2" = 1'-0"



PRECAST FOOTING WITH BEDDING  
TYPICAL CUT SECTION  
 SCALE 1" = 1'-0"



PRECAST FOOTING WITH BEDDING  
TYPICAL FILL SECTION  
 SCALE 1" = 1'-0"



NOTE:  
 DETAILS AND DIMENSIONS ARE CONCEPTUAL AND MAY BE ALTERED BY THE FABRICATOR TO SUIT THEIR OPERATIONS, HOWEVER THE FUNCTION AND INTENT OF THE DETAIL MUST BE MET.

WINGWALL CONNECTION DETAIL  
 SCALE 1" = 1'-0"



PROJECT NAME: ESSEX  
 PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689det.dgn  
 PROJECT LEADER: D. VERTIYEV  
 DESIGNED BY: S. BIBINSKI  
 BRIDGE 2 CULVERT DETAILS 2

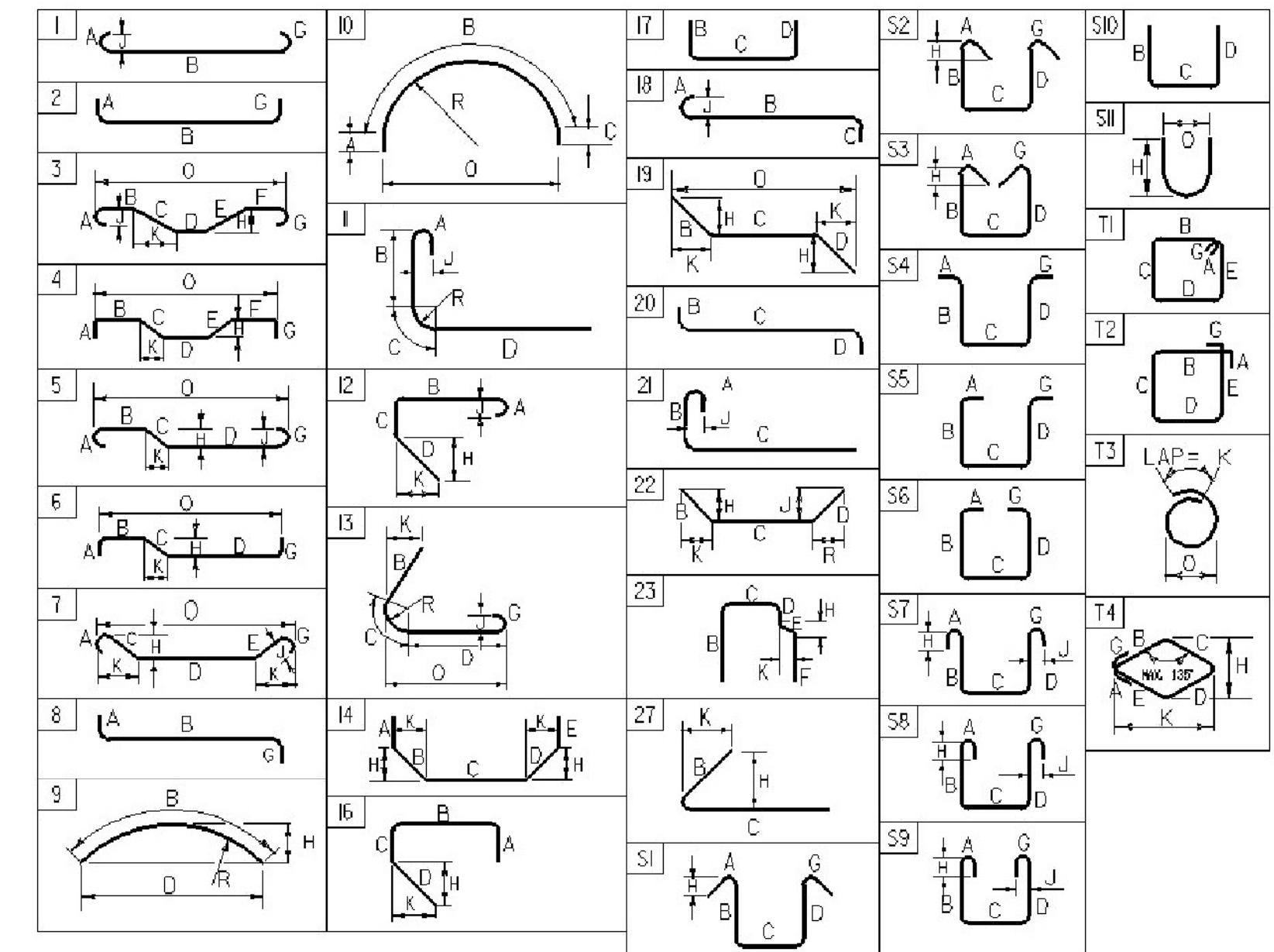
PLOT DATE: 11/20/2025  
 DRAWN BY: R. STICKLES  
 CHECKED BY: T. CARD  
 SHEET 29 OF 37

# REINFORCING STEEL SCHEDULE

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O	ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O		
<b>HEADWALL #1</b>																																					
13	6	3'-2"	1HW601	17			0'-8"	1'-10"																													
13	6	3'-4"	1HW602	20			0'-8"	2'-0"	0'-8"																												
6	4	13'-8"	1HW401	STR																																	
<b>HEADWALL #2</b>																																					
13	6	7'-2"	2HW601	17			0'-8"	5'-10"																													
13	6	7'-4"	2HW602	20			0'-8"	6'-0"	0'-8"																												
12	4	13'-8"	2HW401	STR																																	
<b>WINGWALL #1</b>																																					
▲	18	7	8'-8"	1WW701	STR																																
	9	7	5'-6"	1WW702	8	1'-0"	4'-6"																														
	9	7	6'-0"	1WW703	8	1'-0"	5'-0"																														
	18	7	5'-2"	1WW704	STR																																
	6	4	10'-3"	1WW401	STR																																
▲	10	4	10'-3"	1WW402	STR																																
	2	4	11'-2"	1WW403	STR																																
	10	4	10'-3"	1WW404	STR																																
<b>WINGWALL #2</b>																																					
▲	18	7	8'-8"	2WW701	STR																																
	9	7	5'-6"	2WW702	8	1'-0"	4'-6"																														
	9	7	6'-0"	2WW703	8	1'-0"	5'-0"																														
	18	7	5'-2"	2WW704	STR																																
	8	4	10'-3"	2WW401	STR																																
▲	8	4	10'-3"	2WW402	STR																																
	2	4	10'-9"	2WW403	STR																																
	10	4	10'-3"	2WW404	STR																																
<b>WINGWALL #3</b>																																					
▲	16	7	12'-8"	3WW701	STR																																
	9	7	5'-6"	3WW702	8	1'-0"	4'-6"																														
	9	7	6'-0"	3WW703	8	1'-0"	5'-0"																														
	16	7	5'-2"	3WW704	STR																																
	6	4	9'-3"	3WW401	STR																																
▲	18	4	9'-3"	3WW402	STR																																
	2	4	12'-9"	3WW403	STR																																
	10	4	9'-3"	3WW404	STR																																
<b>WINGWALL #4</b>																																					
▲	20	7	12'-8"	4WW701	STR																																
	9	7	5'-6"	4WW702	8	1'-0"	4'-6"																														
	9	7	6'-0"	4WW703	8	1'-0"	5'-0"																														
	20	7	5'-2"	4WW704	STR																																
	4	4	11'-3"	4WW401	STR																																
▲	20	4	11'-3"	4WW402	STR																																
	2	4	14'-10"	4WW403	STR																																
	10	4	11'-3"	4WW404	STR																																

~ NOTES ~

- UNLESS OTHERWISE DESIGNATED, ALL BAR REINFORCEMENT FOR CONCRETE IN SIZES UP TO AND INCLUDING NO. 18 SHALL CONFORM TO THE REQUIREMENTS OF THE "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", AASHTO M 31 (ASTM A 615-S1). ALL BARS SHALL BE GRADE 60, UNLESS OTHERWISE DESIGNATED.
- FOR TYPICAL BENDING DETAILS, RECOMMENDED PIN DIAMETER "D" OF BENDS AND HOOKS, AND OTHER STANDARD PRACTICE, SEE CURRENT CONCRETE REINFORCING STEEL INSTITUTE "MANUAL OF STANDARD PRACTICE".
- BARS WHICH REQUIRE MORE ACCURATE BENDING THAN STANDARD PRACTICES SHOULD HAVE LIMITS INDICATED.
- ALL DIMENSIONS ARE OUT TO OUT OF BAR EXCEPT "A" AND "G" ON STANDARD 180 DEGREE AND 135 DEGREE HOOKS.
- "J" DIMENSION ON 180 DEGREE HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE. OTHERWISE, STANDARD HOOKS ARE TO BE USED.
- "H" DIMENSION ON STIRRUPS TO BE SHOWN ONLY WHEN NECESSARY TO MAINTAIN CLEARANCES.
- WHERE SLOPE DIFFERS FROM 45 DEGREES, DIMENSIONS "H" AND "K" MUST BE SHOWN.
- ▲ DENOTES BARS TO BE CUT IN FIELD.
- * DENOTES ONE EXTRA BAR ADDED FOR TESTING PURPOSES.
- △ DENOTES TWO EXTRA BARS ADDED FOR TESTING PURPOSES.
- ALL BARS EPOXY COATED REINFORCING STEEL.
- DENOTES BARS TO BE BENT IN FIELD



ASTM STANDARD REINFORCING BARS				
BAR SIZE DESIGNATION	WEIGHT POUNDS PER FOOT	NOMINAL DIMENSIONS ROUND SECTION		
		DIAMETER INCHES	AREA INCHES ²	PERIMETER INCHES
#3	0.376	0.375	0.11	1.178
#4	0.668	0.500	0.20	1.571
#5	1.043	0.625	0.31	1.963
#6	1.502	0.750	0.44	2.356
#7	2.044	0.875	0.60	2.749
#8	2.670	1.000	0.79	3.142
#9	3.400	1.128	1.00	3.544
#10	4.303	1.270	1.27	3.990
#11	5.313	1.410	1.56	4.430
#14	7.65	1.693	2.25	5.32
#18	13.60	2.257	4.00	7.09

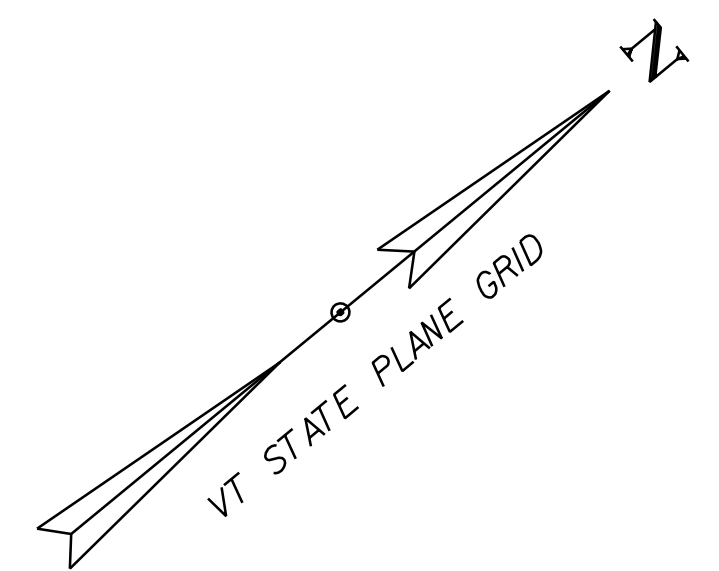
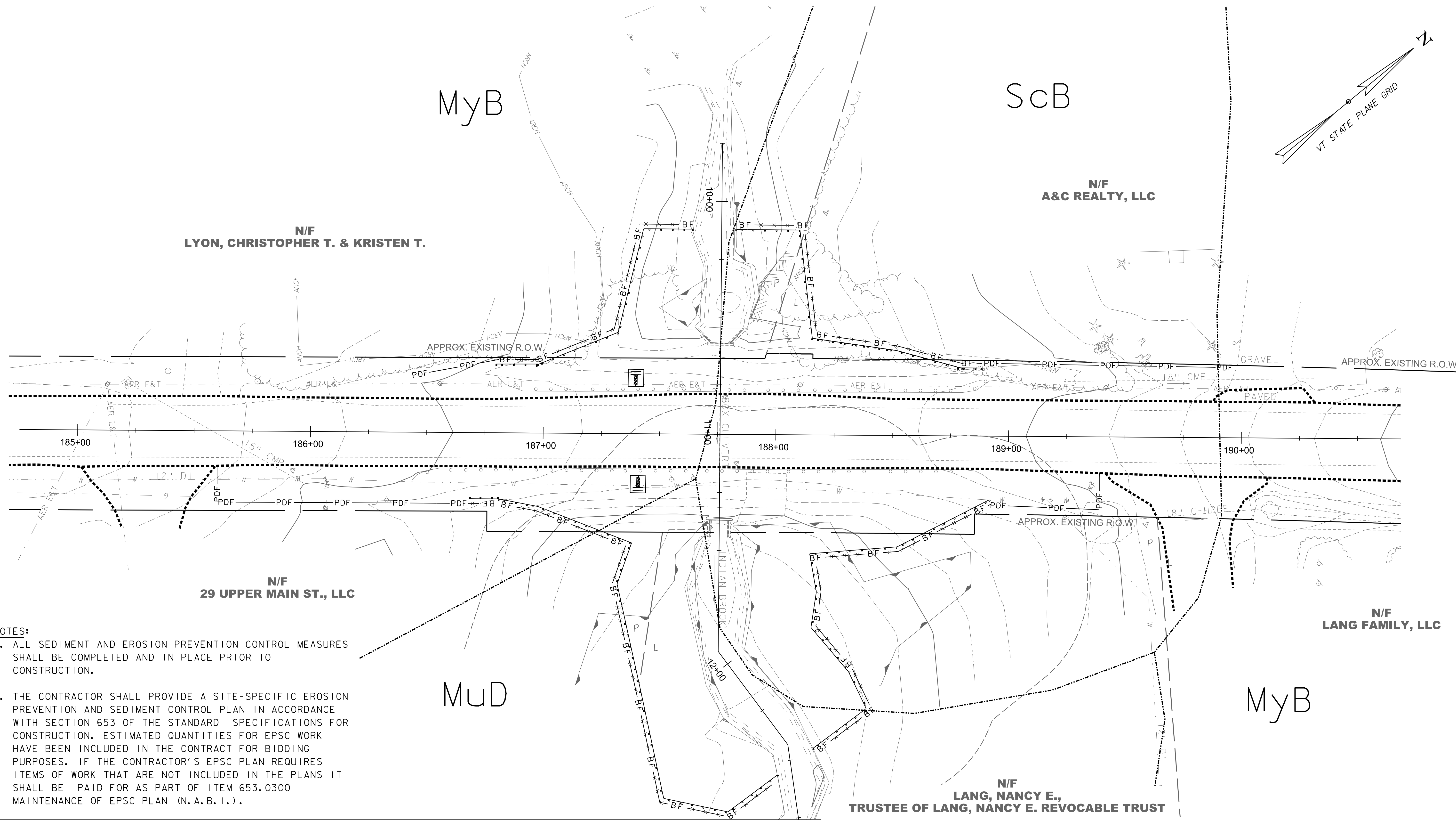
PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689r.ss.dgn  
PROJECT LEADER: T. CARD  
DESIGNED BY: S. BIBINSKI  
BRIDGE 2 REINFORCING STEEL SCHEDULE

PLOT DATE: 11/20/2025  
DRAWN BY: R. STICKLES  
CHECKED BY: S. BIBINSKI  
SHEET 30 OF 37



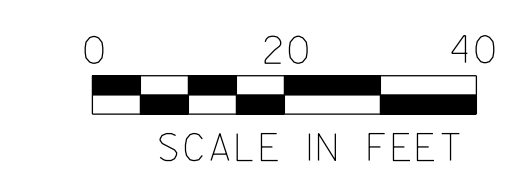
AREA OF DISTURBANCE = 0.52 ACRES



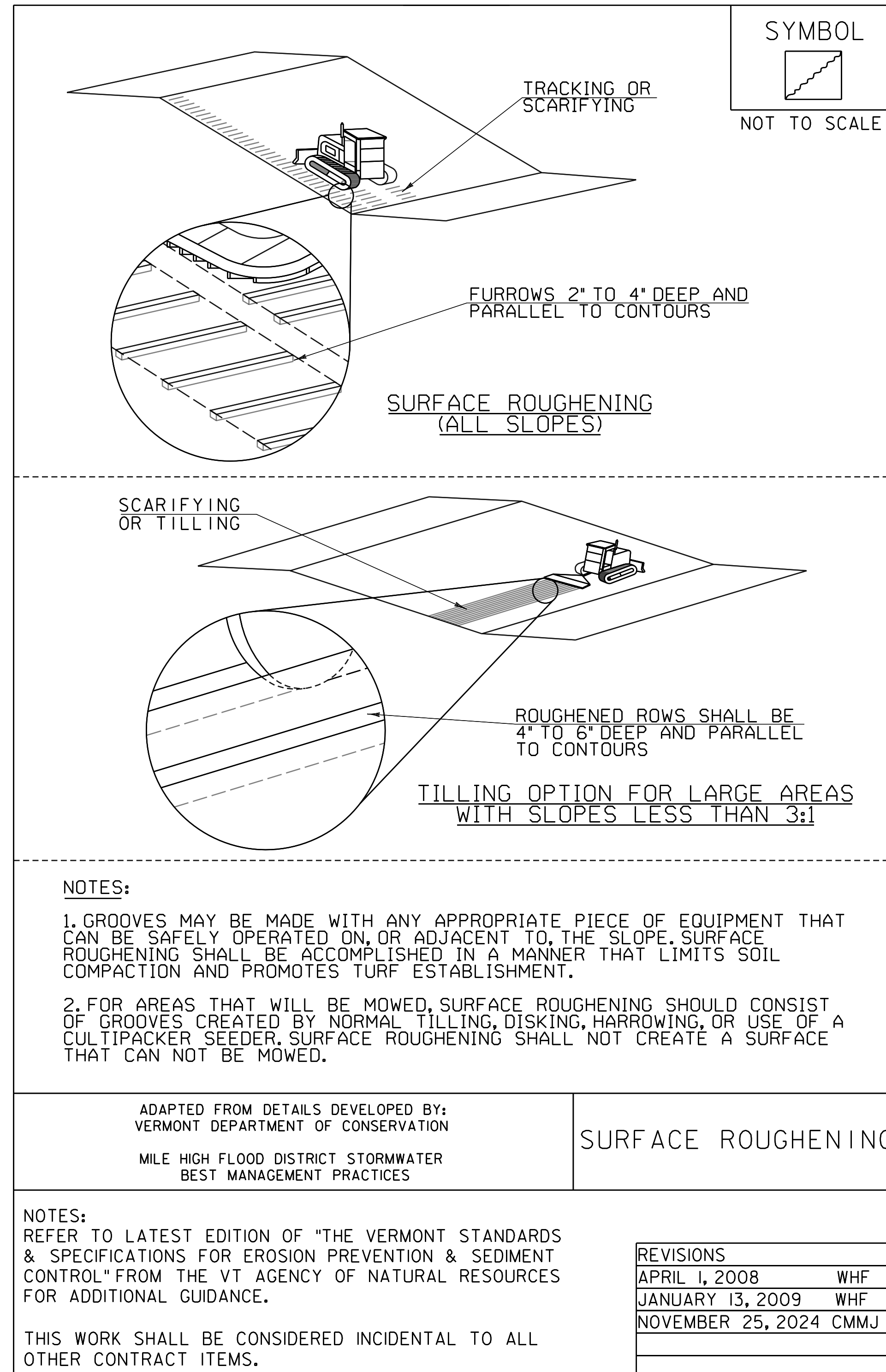
- NOTES:**
1. ALL SEDIMENT AND EROSION PREVENTION CONTROL MEASURES SHALL BE COMPLETED AND IN PLACE PRIOR TO CONSTRUCTION.
  2. THE CONTRACTOR SHALL PROVIDE A SITE-SPECIFIC EROSION PREVENTION AND SEDIMENT CONTROL PLAN IN ACCORDANCE WITH SECTION 653 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION. ESTIMATED QUANTITIES FOR EPSC WORK HAVE BEEN INCLUDED IN THE CONTRACT FOR BIDDING PURPOSES. IF THE CONTRACTOR'S EPSC PLAN REQUIRES ITEMS OF WORK THAT ARE NOT INCLUDED IN THE PLANS IT SHALL BE PAID FOR AS PART OF ITEM 653.0300 MAINTENANCE OF EPSC PLAN (N.A.B.1.).

SOIL LEGEND	
SOIL DESIGNATION	
MuD	= MUNSON AND BELGRADE SILT LOAMS, 12 TO 25 PERCENT SLOPES
MyB	= MUNSON AND RAYNHAM SILT LOAMS, 2 TO 6 PERCENT SLOPES
ScB	= SCANTIC SILT LOAM, 2 TO 6 PERCENT SLOPES

HYDROLOGIC SOIL GROUP CLASSIFICATION	SOIL ERODIBILITY COEFFICIENTS (K)
C/D	0.32
C/D	0.49
C/D	0.32



PROJECT NAME:	ESSEX	PLOT DATE:	11/20/2025
PROJECT NUMBER:	STP CULV(I49)	DRAWN BY:	C. WEBSTER
FILE NAME:	z23b689er.oex.dgn	DESIGNED BY:	E. NOONAN
PROJECT LEADER:	D. VERTIYEV	EPSC EXISTING CONDITIONS SHEET	CHECKED BY: A. TSOUKALAS
			SHEET 31 OF 37



VAOT NATURALIZED AREA TYPE I				
WEIGHT	NAME	LATIN NAME	GERM	PURITY
38%	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	90%	98%
29%	HARD FESCUE	FESTUCA LONGIFOLIA	85%	95%
15%	CHEWINGS FESCUE	FESTUCA RUBRA VAR. COMMUTATA	87%	95%
15%	ANNUAL RYEGRASS	LOLIUM MULTIFLORUM	90%	95%
3%	INERTS			
100%				

VAOT NATURALIZED AREA TYPE II				
WEIGHT	NAME	LATIN NAME	GERM	PURITY
37.5%	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	85%	98%
37.5%	TALL FESCUE	FESTUCA ARUNDINACEA	90%	95%
5.0%	RED TOP	AGROSTIS GIGANTEA	90%	95%
15.0%	WHITE FIELD CLOVER	TRIFOLIUM REPENS	85%	98%
5.0%	ANNUAL RYE GRASS	LOLIUM MULTIFLORUM	85%	95%
100%				

SEED RATE: BROADCAST: 75 LBS/ACRE  
HYDROSEED: PER MANUFACTURER'S RECOMMENDATIONS

***APPLY AMENDMENTS PER SOIL TEST RESULTS***

**FERTILIZER (755.06):**  
IF NO SOIL TEST IS PERFORMED, A SLOW OR CONTROLLED RELEASE FERTILIZER SHALL BE APPLIED AT A RATIO OF 1:1:1 (N:P:K). NITROGEN AND PHOSPHORUS SHALL BE APPLIED AT NO MORE THAN 1 LB. PER 1,000 SQ.FT.

**LIMESTONE (755.08 & 755.09):**  
IF NO SOIL TEST IS PERFORMED, APPLY LIMESTONE PER MANUFACTURER'S RECOMMENDATIONS.

**COMPOST (755.05):**  
COMPOST MAY BE APPLIED PER SOIL TEST RESULTS.

**CONSTRUCTION GUIDANCE**

1. THESE SEED MIXES SHALL BE USED IN AREAS THAT WILL NATURALIZE, RECEIVING LIMITED ANNUAL MOWING THROUGH THE GROWING SEASON.
2. USE SEED MIX AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON-WETLAND) AREAS DISTURBED BY THE CONTRACTOR. IF THE PLANS DO NOT SPECIFY A SEED TYPE, NATURALIZED AREA TYPE I OR TYPE II SHALL BE USED.
3. SEED MIXES SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. HAY MULCH TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE. ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
5. FERTILIZER SHOULD NOT BE APPLIED WITHIN 2 WEEKS OF APPLYING LIMESTONE.
6. FOR BEST ESTABLISHMENT, REAPPLY FERTILIZER 2-3 WEEKS AFTER GERMINATION.

**TURF ESTABLISHMENT**

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651 FOR SEED (PAY ITEM 651.1500 TURF ESTABLISHMENT, GENERAL SEED)

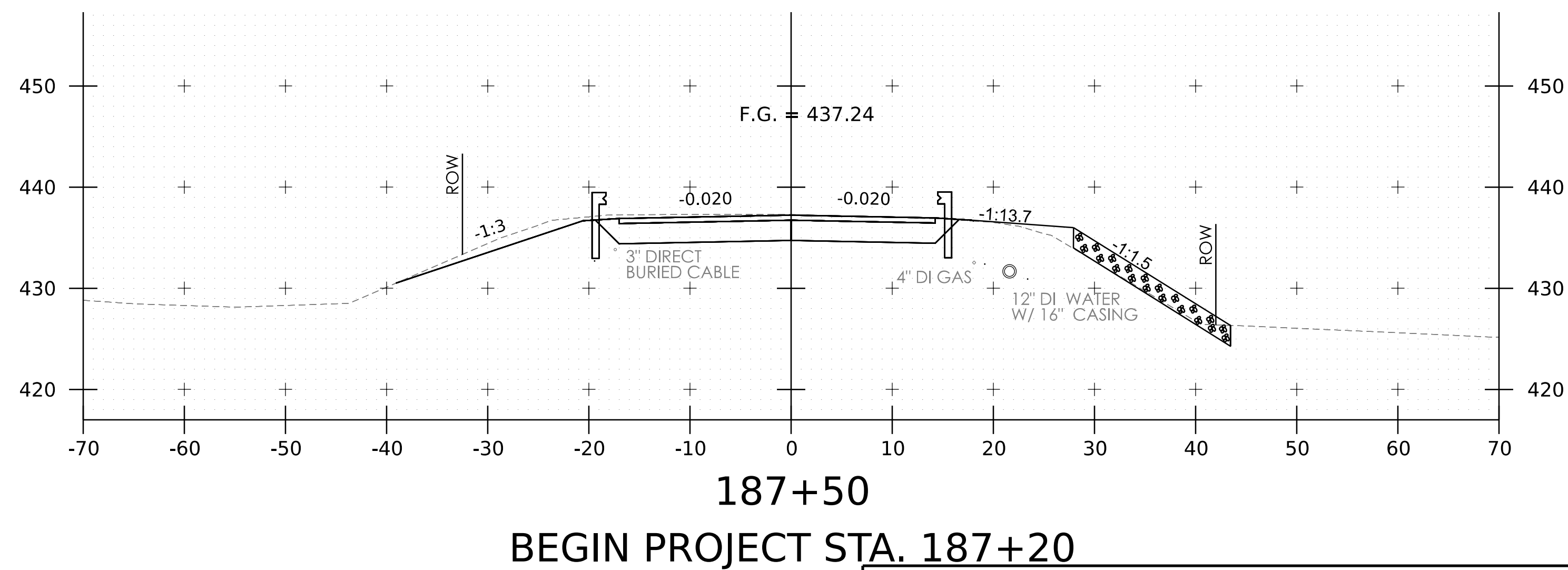
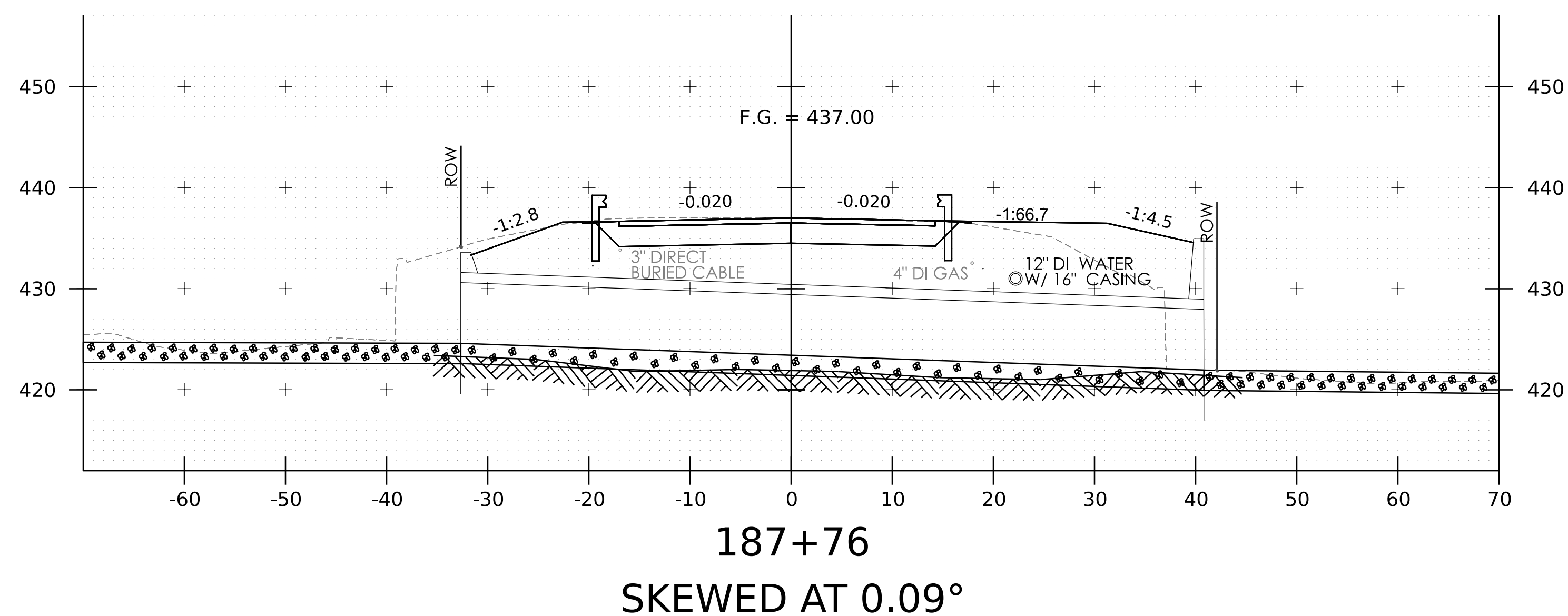
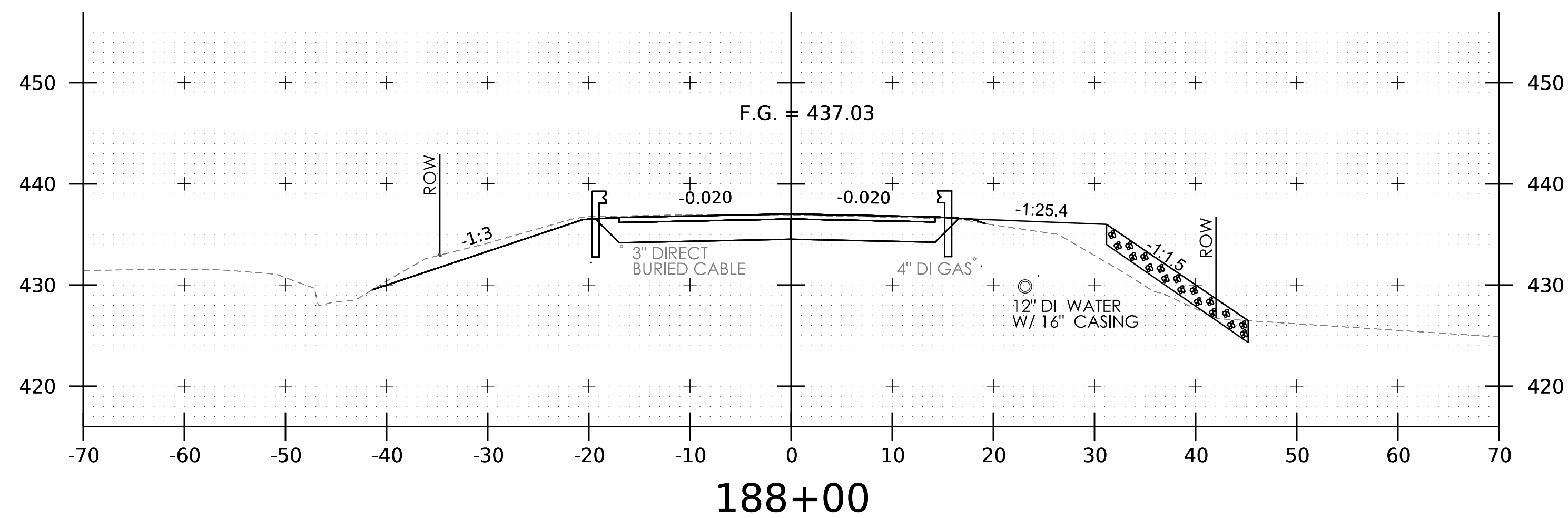
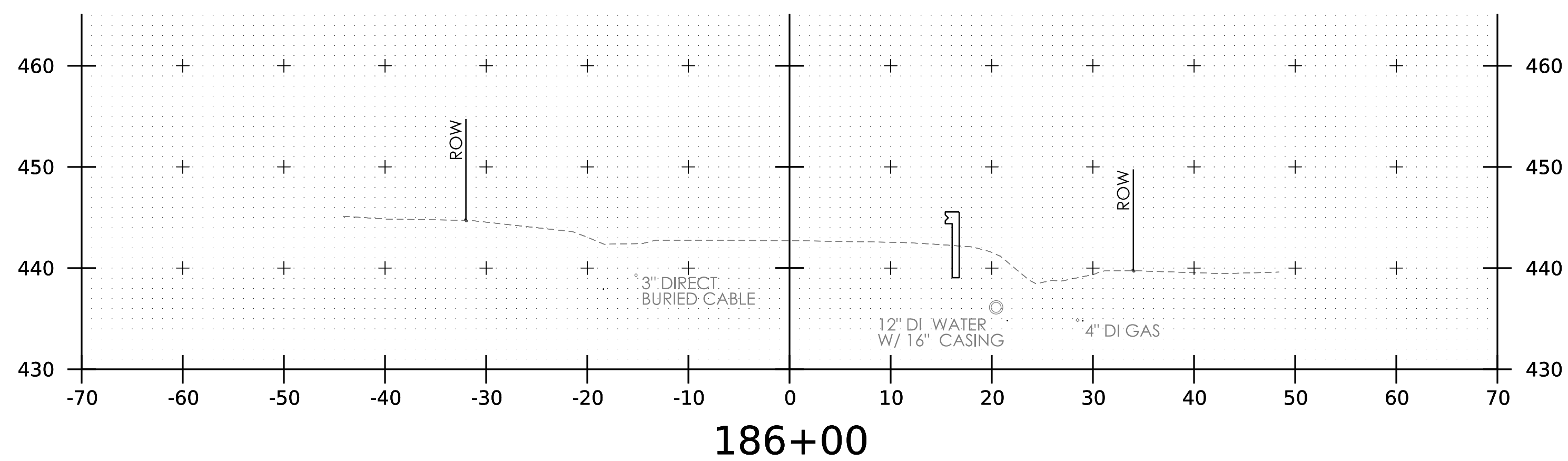
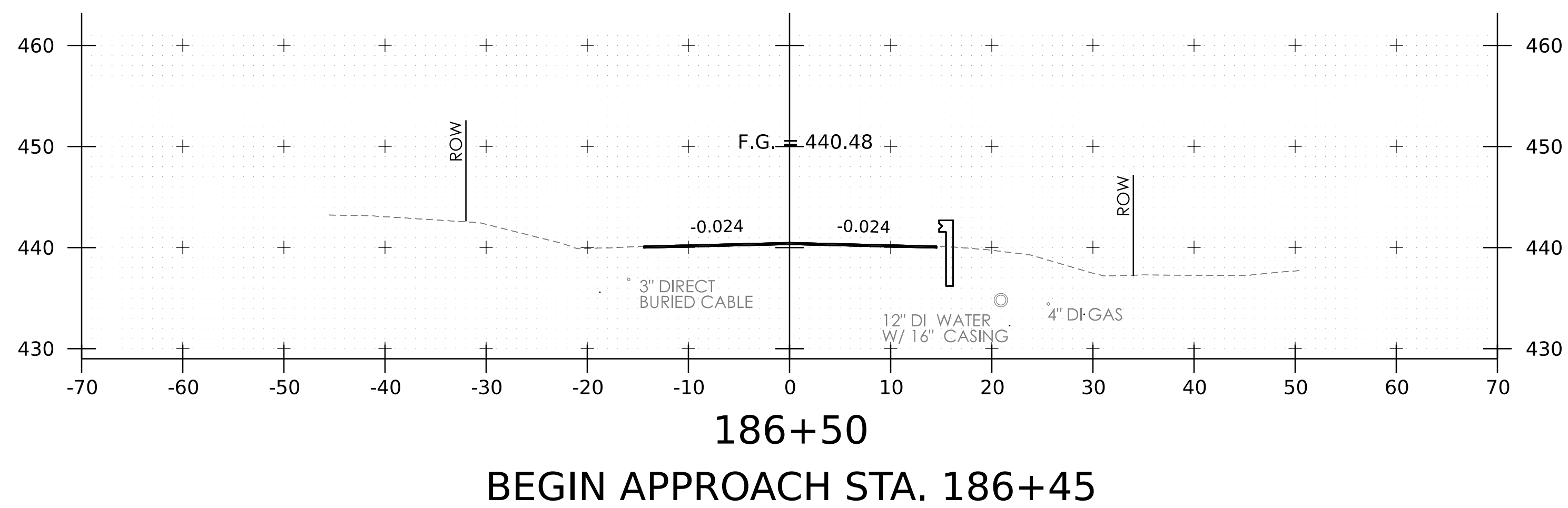
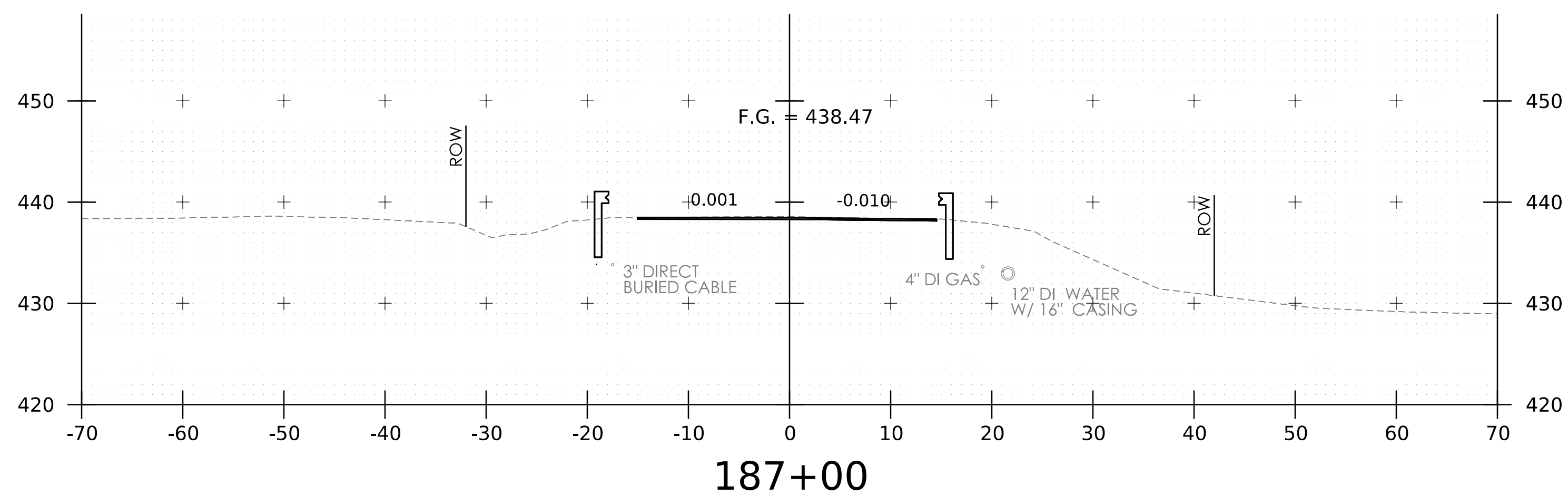
REVISIONS	
JANUARY 12, 2015	WHF
JUNE 15, 2023	BKD



PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV(I49)

FILE NAME: z23b689erode.t.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
EPSC DETAILS SHEET

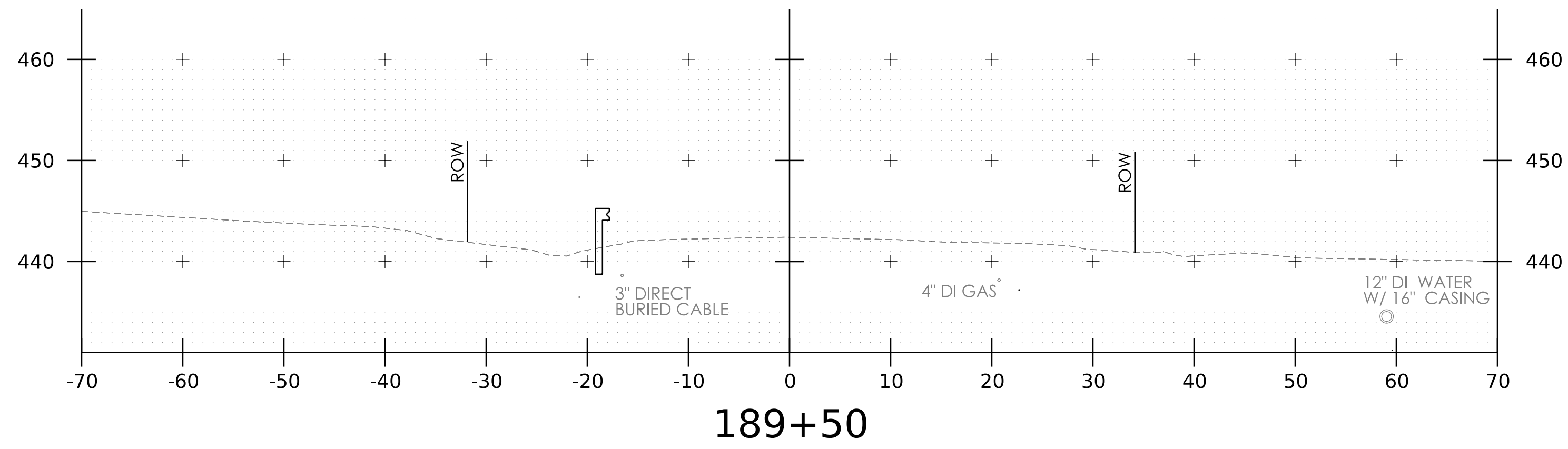
PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 32 OF 37



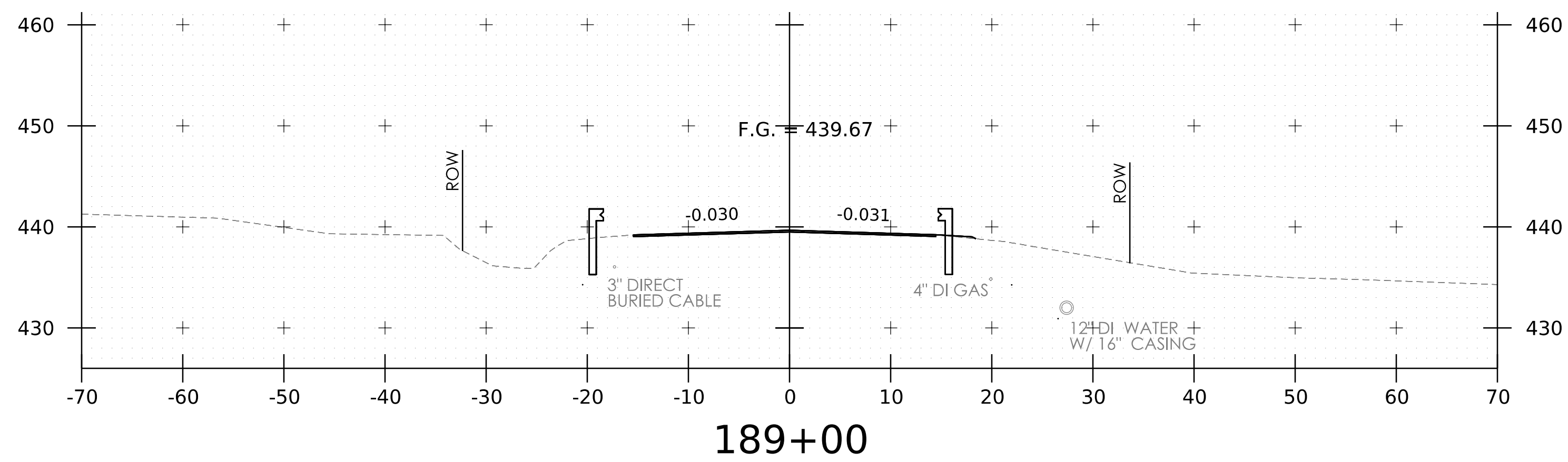
PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV (149)

FILE NAME: z23b689xsl.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
ROADWAY CROSS SECTIONS SHEET 1

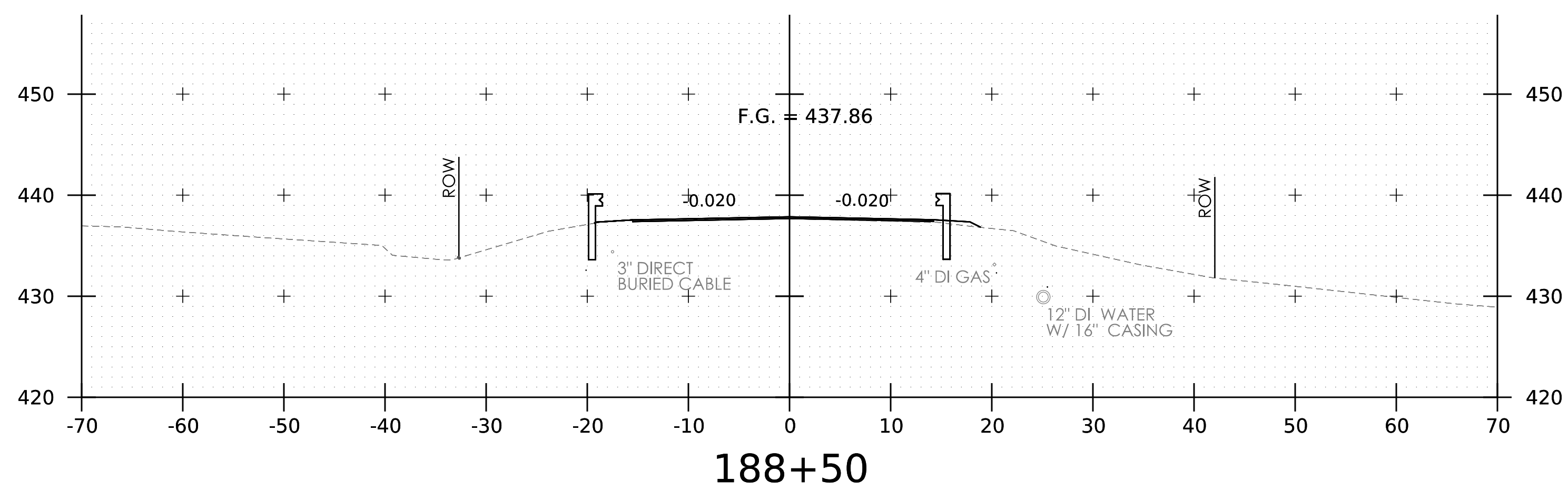
PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 33 OF 37



189+50  
END APPROACH STA. 189+07



189+00



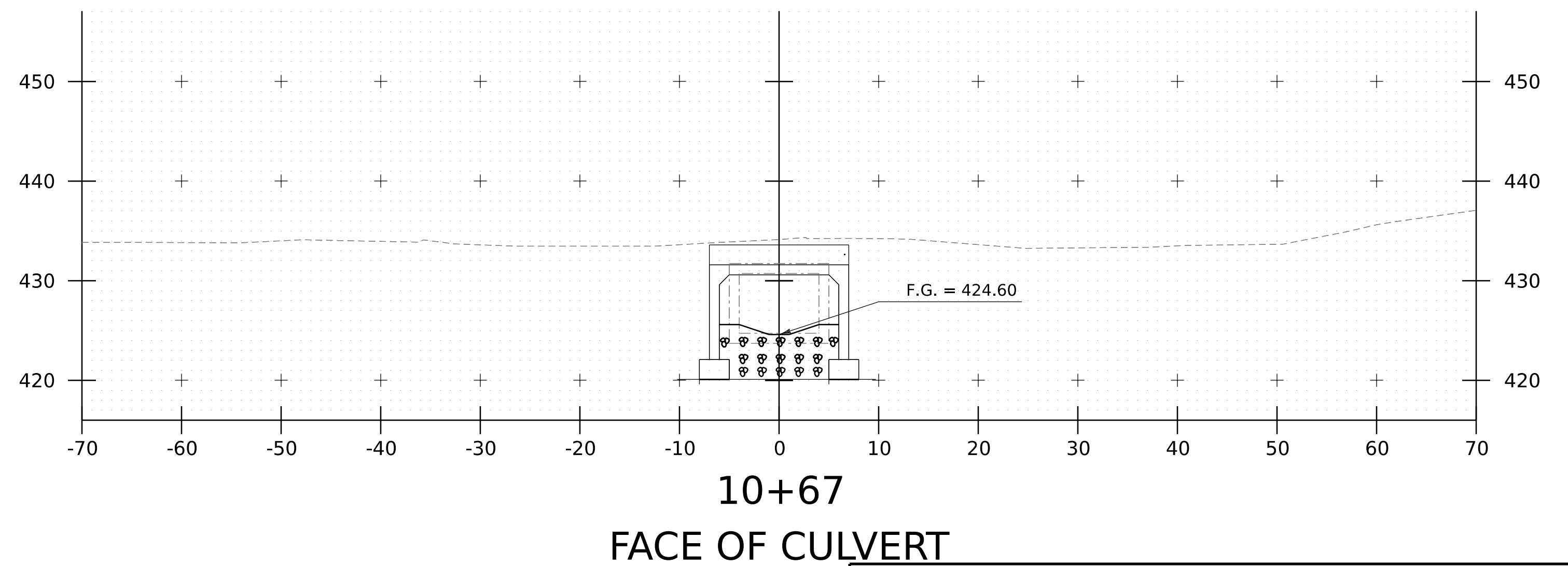
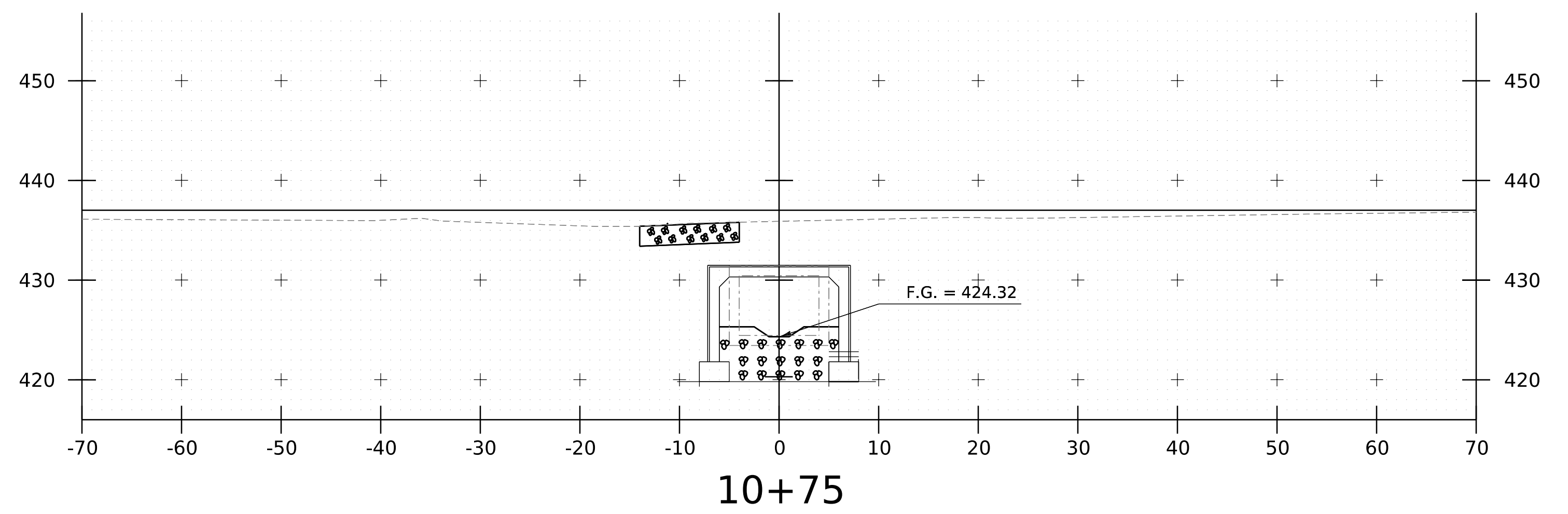
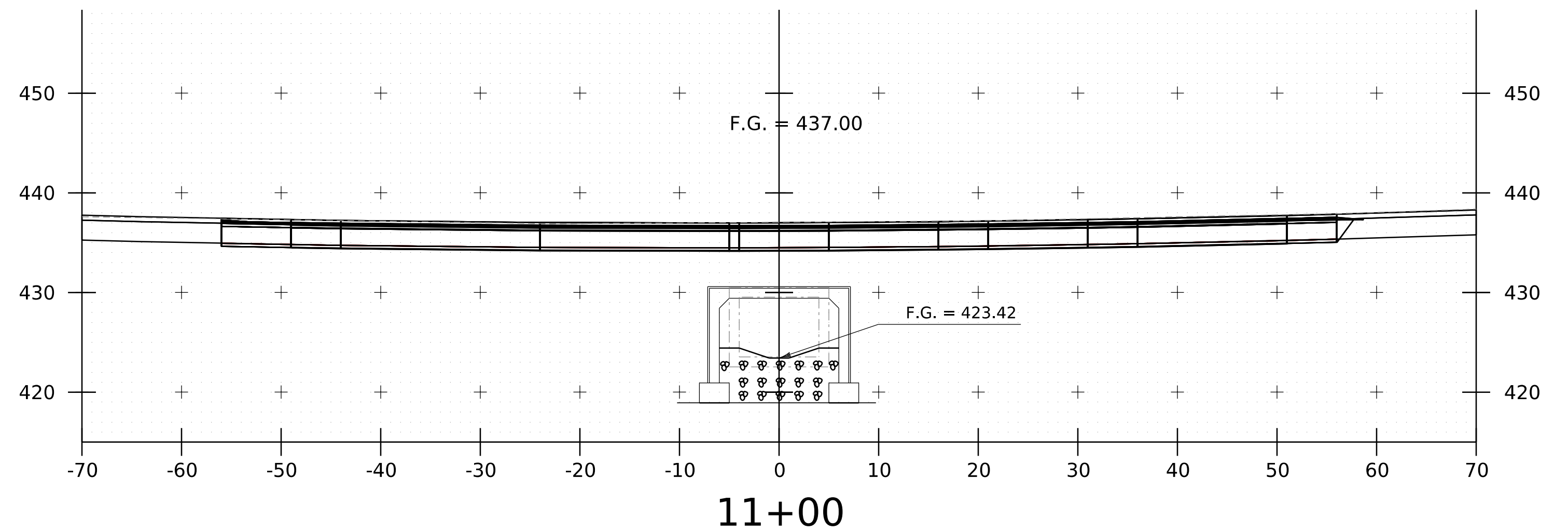
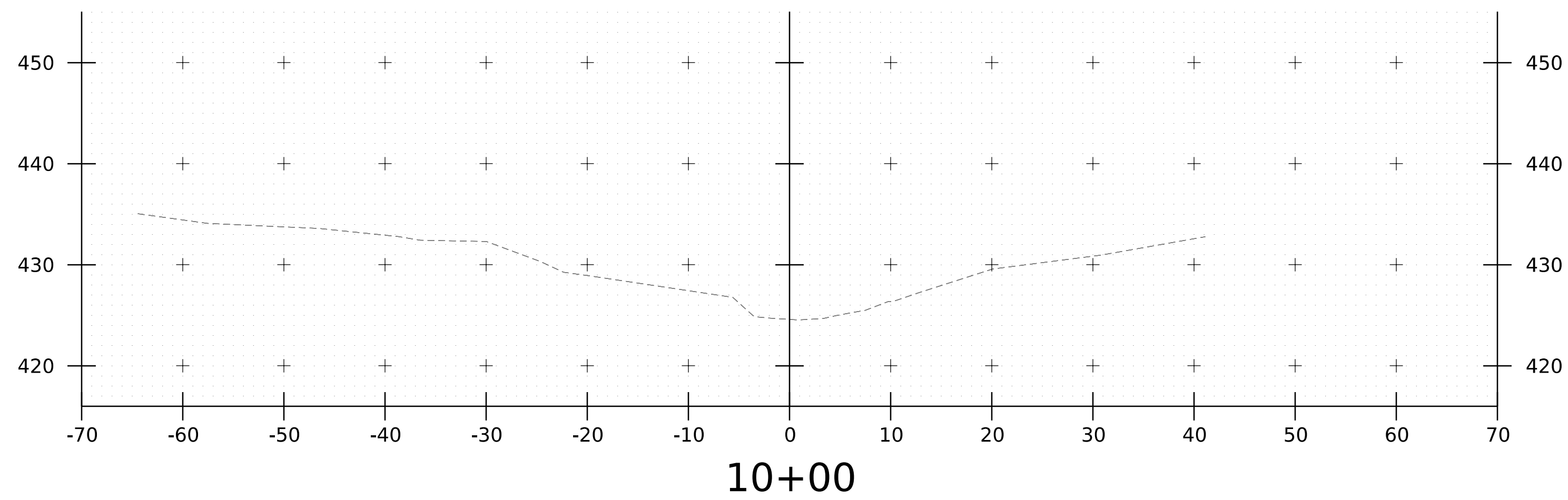
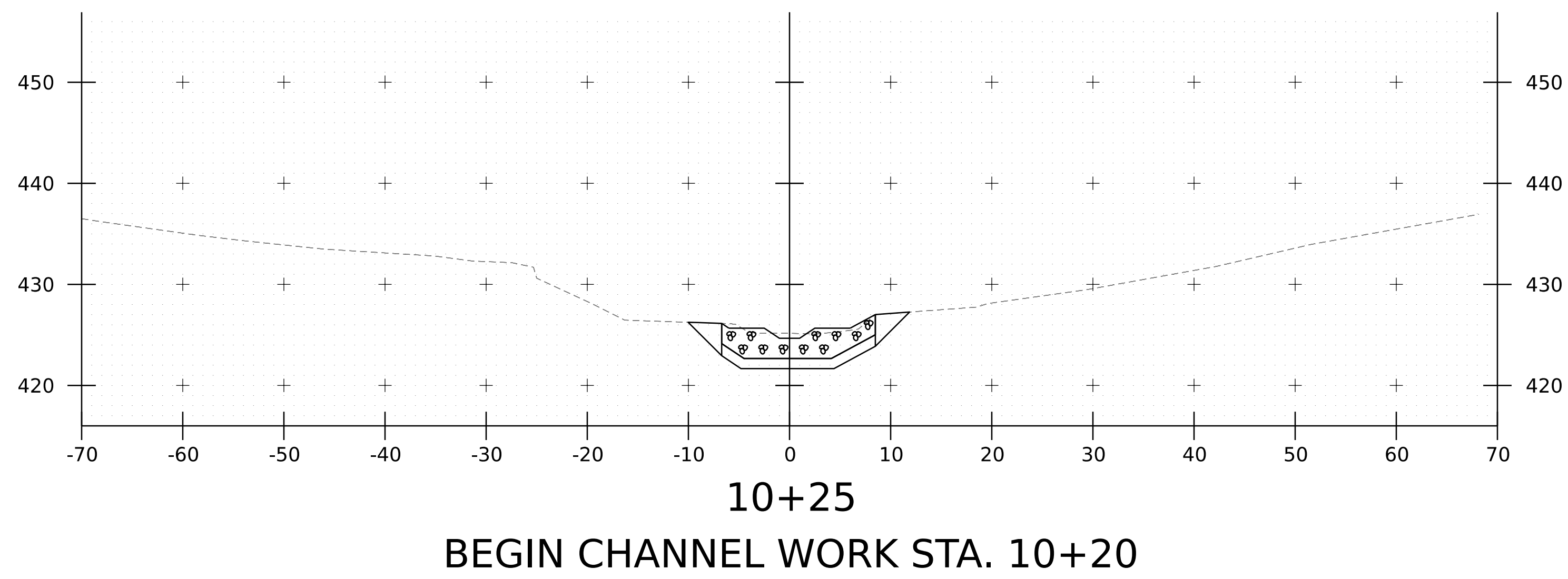
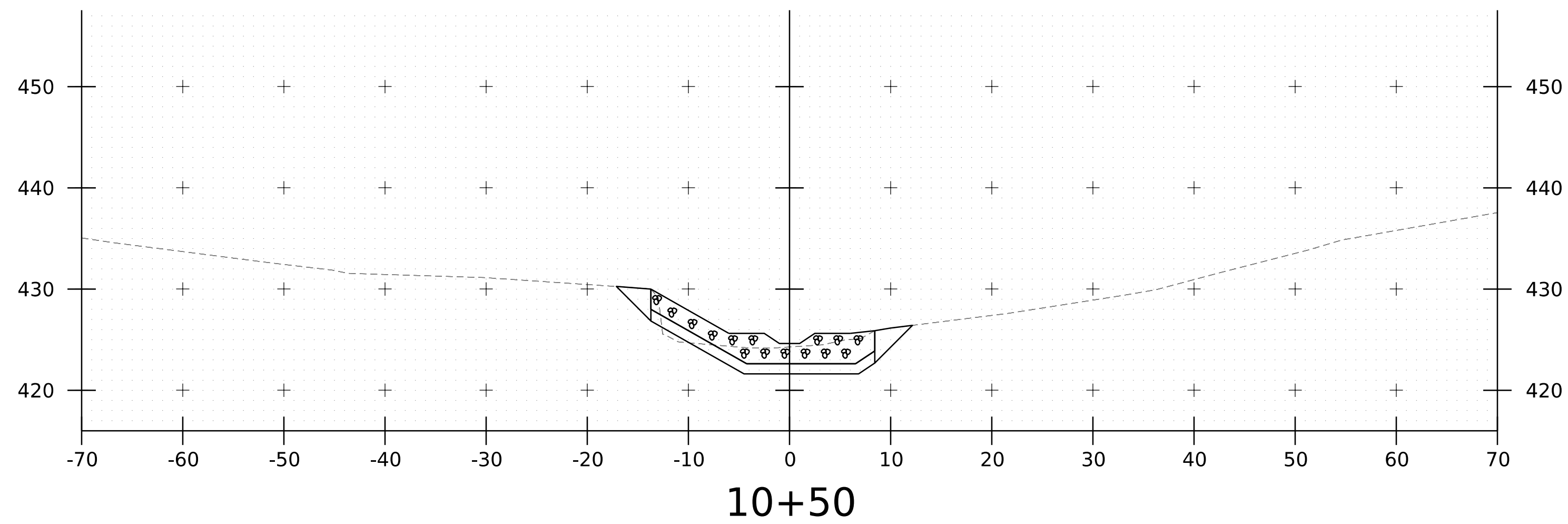
188+50  
END PROJECT STA. 188+32

PROJECT NAME: ESSEX  
PROJECT NUMBER: STP CULV (149)

FILE NAME: z23b689xsl.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
ROADWAY CROSS SECTIONS SHEET 2

PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 34 OF 37



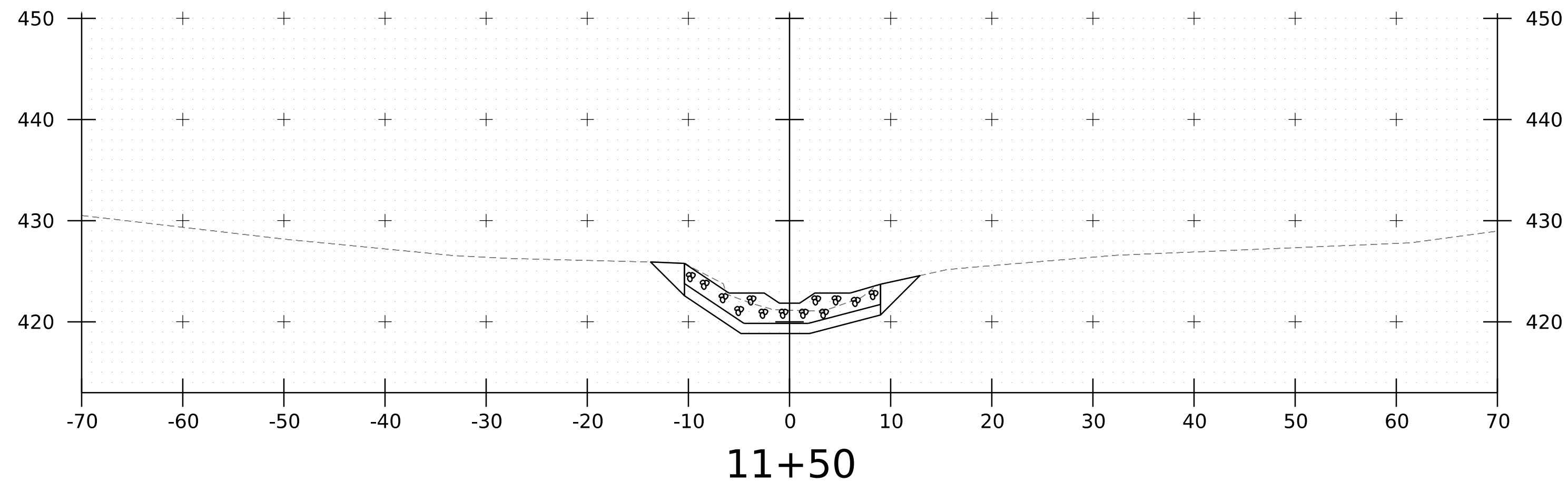


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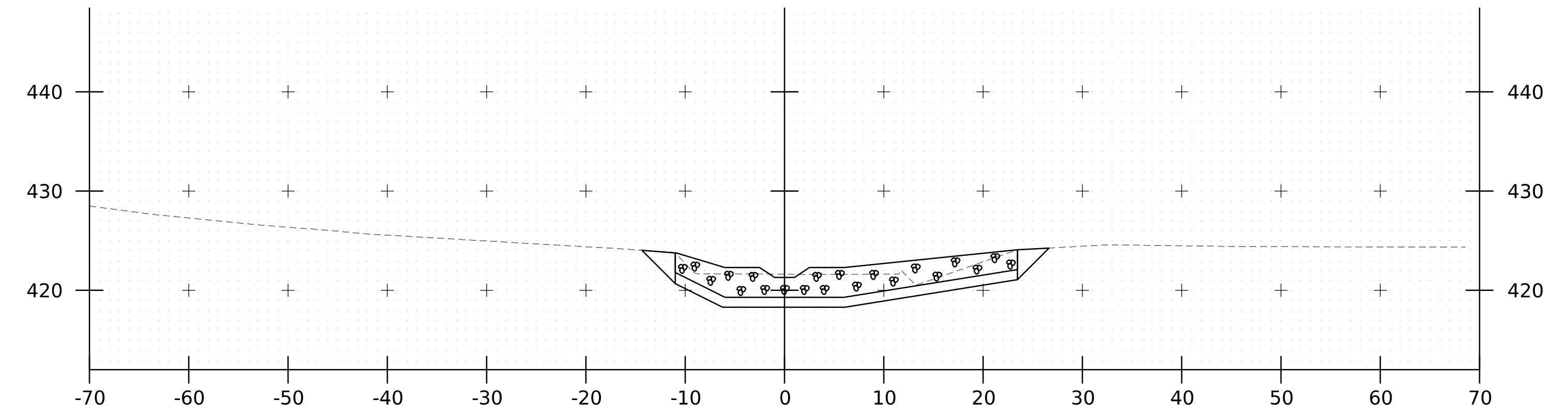
FILE NAME: z23b689xsl.dgn  
PROJECT LEADER: D. VERTIYEV  
DESIGNED BY: E. NOONAN  
CHANNEL CROSS SECTIONS SHEET I

PLOT DATE: 11/20/2025  
DRAWN BY: C. WEBSTER  
CHECKED BY: A. TSOUKALAS  
SHEET 35 OF 37

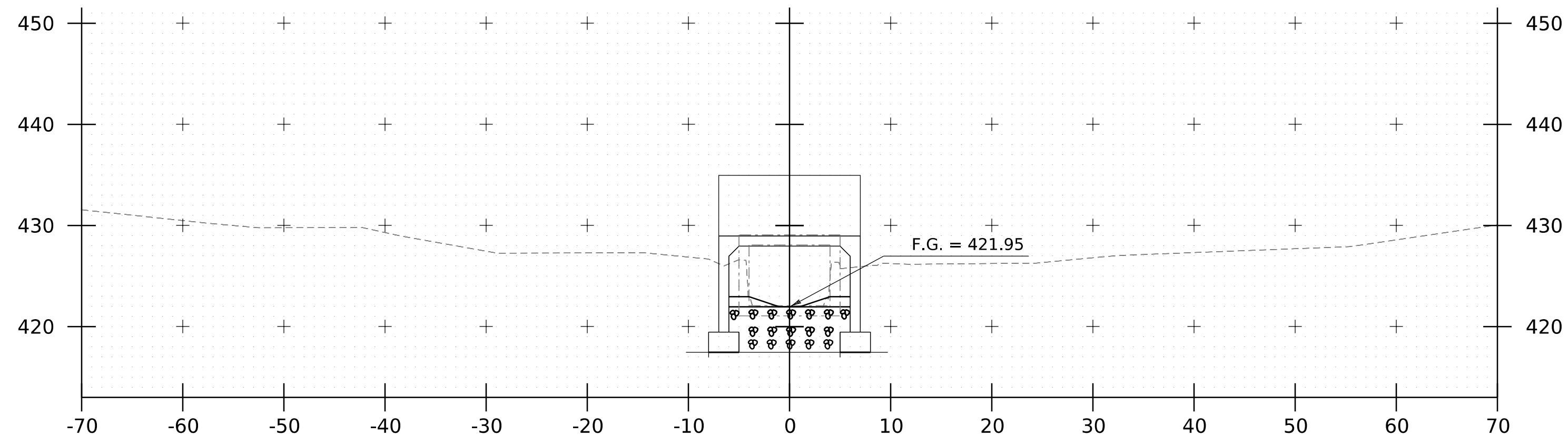




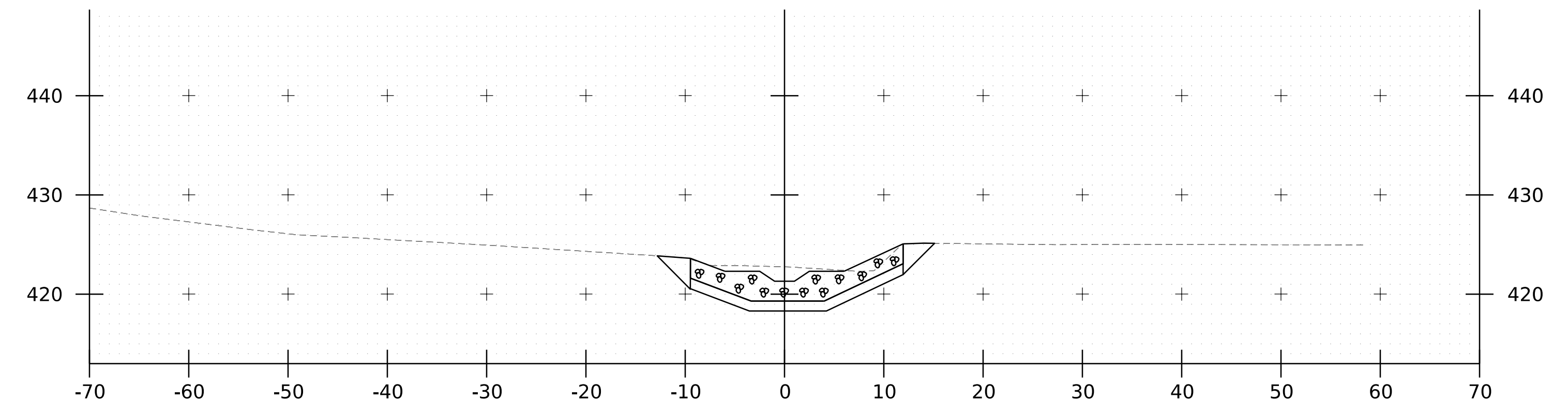
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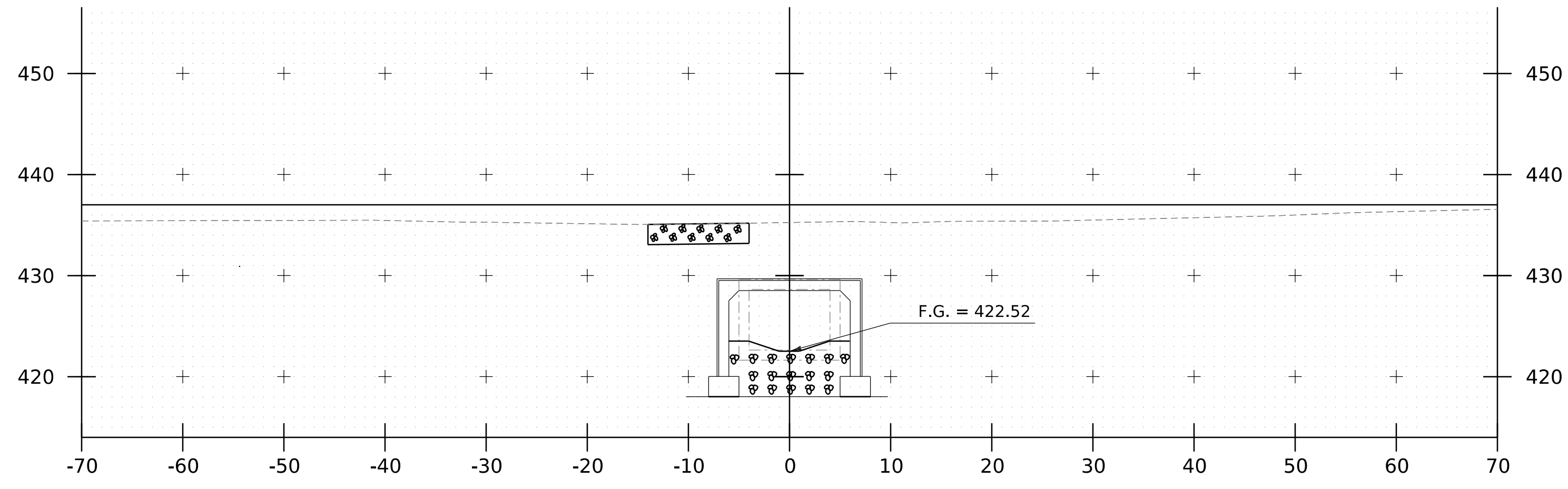
12+25



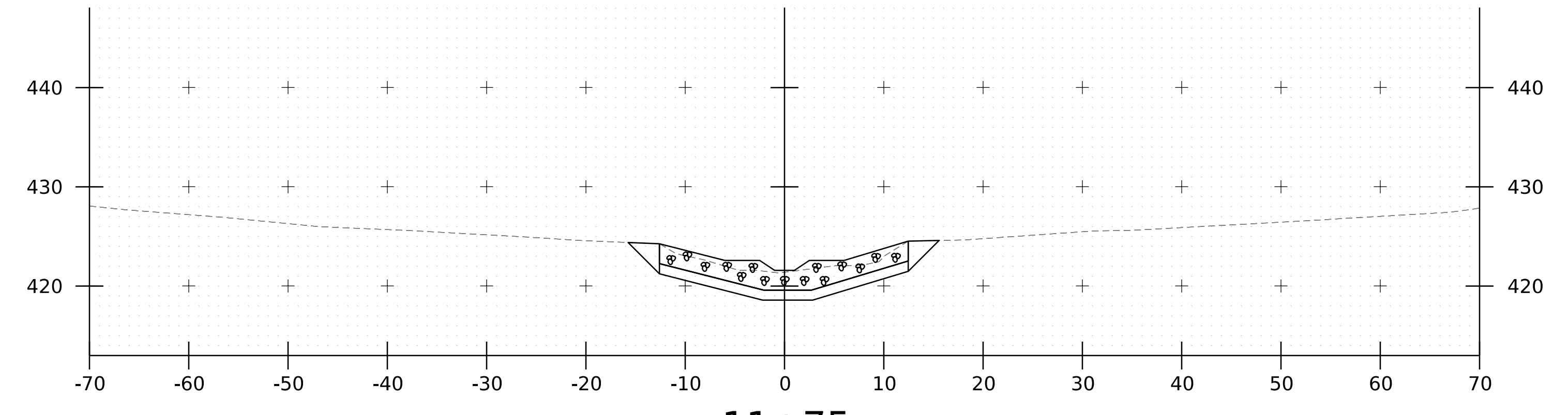
11+41  
FACE OF CULVERT



12+00



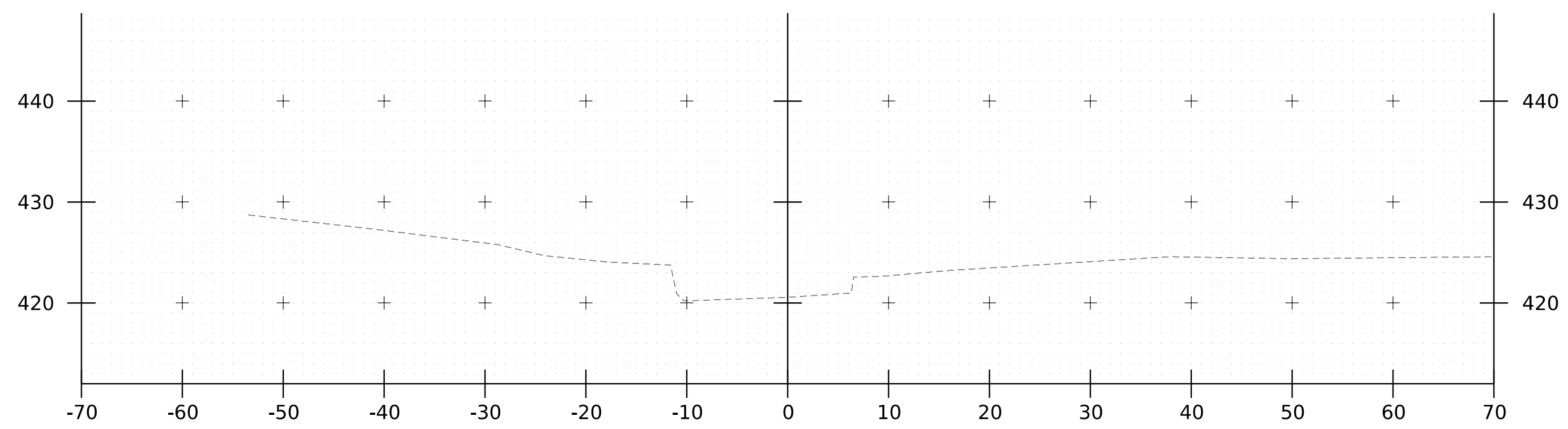
11+25



11+75

PROJECT NAME: ESSEX	
PROJECT NUMBER: STP CULV (149)	
FILE NAME: z23b689xsl.dgn	PLOT DATE: 11/20/2025
PROJECT LEADER: D. VERTIYEV	DRAWN BY: C. WEBSTER
DESIGNED BY: E. NOONAN	CHECKED BY: A. TSOUKALAS
CHANNEL CROSS SECTIONS SHEET 2	SHEET 36 OF 37





12+50

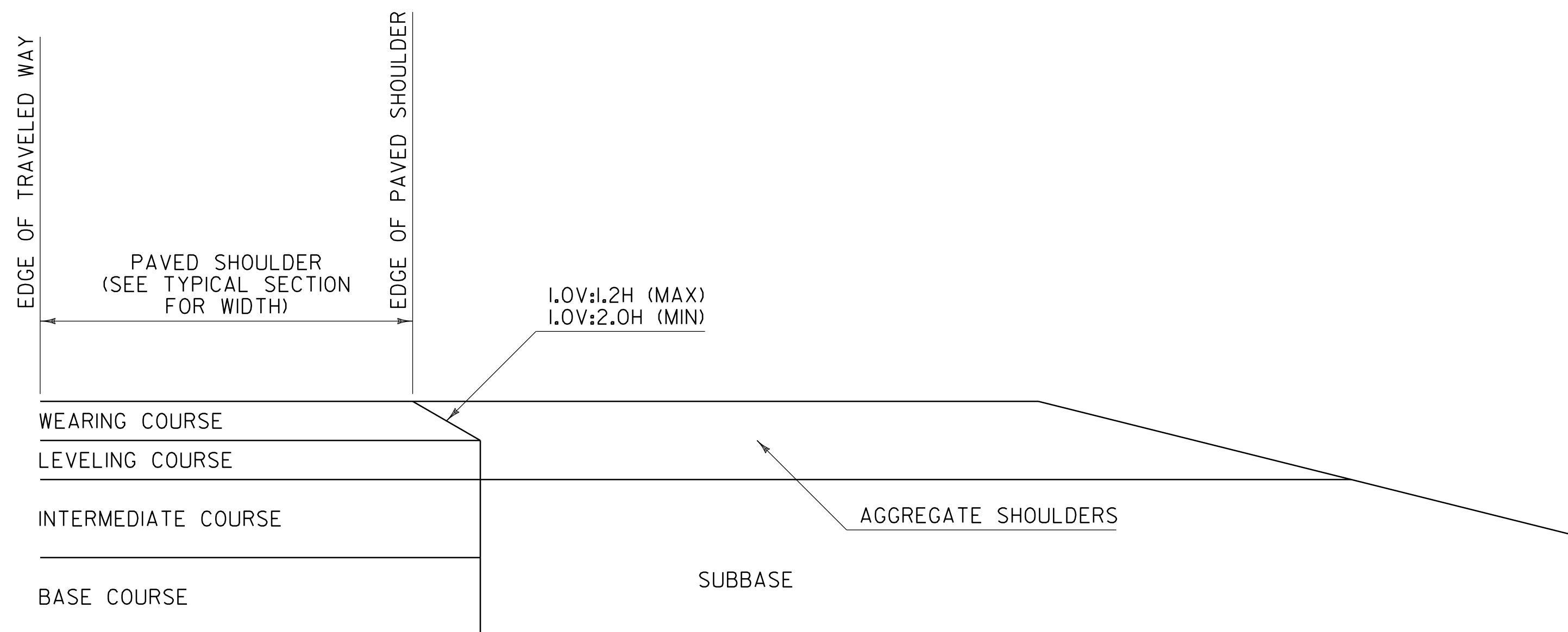
END CHANNEL WORK STA. 12+43

PROJECT NAME: ESSEX  
 PROJECT NUMBER: STP CULV (149)

FILE NAME: z23b689xsl.dgn  
 PROJECT LEADER: D. VERTIYEV  
 DESIGNED BY: E. NOONAN  
 CHANNEL CROSS SECTIONS SHEET 3

PLOT DATE: 11/20/2025  
 DRAWN BY: C. WEBSTER  
 CHECKED BY: A. TSOUKALAS  
 SHEET 37 OF 37



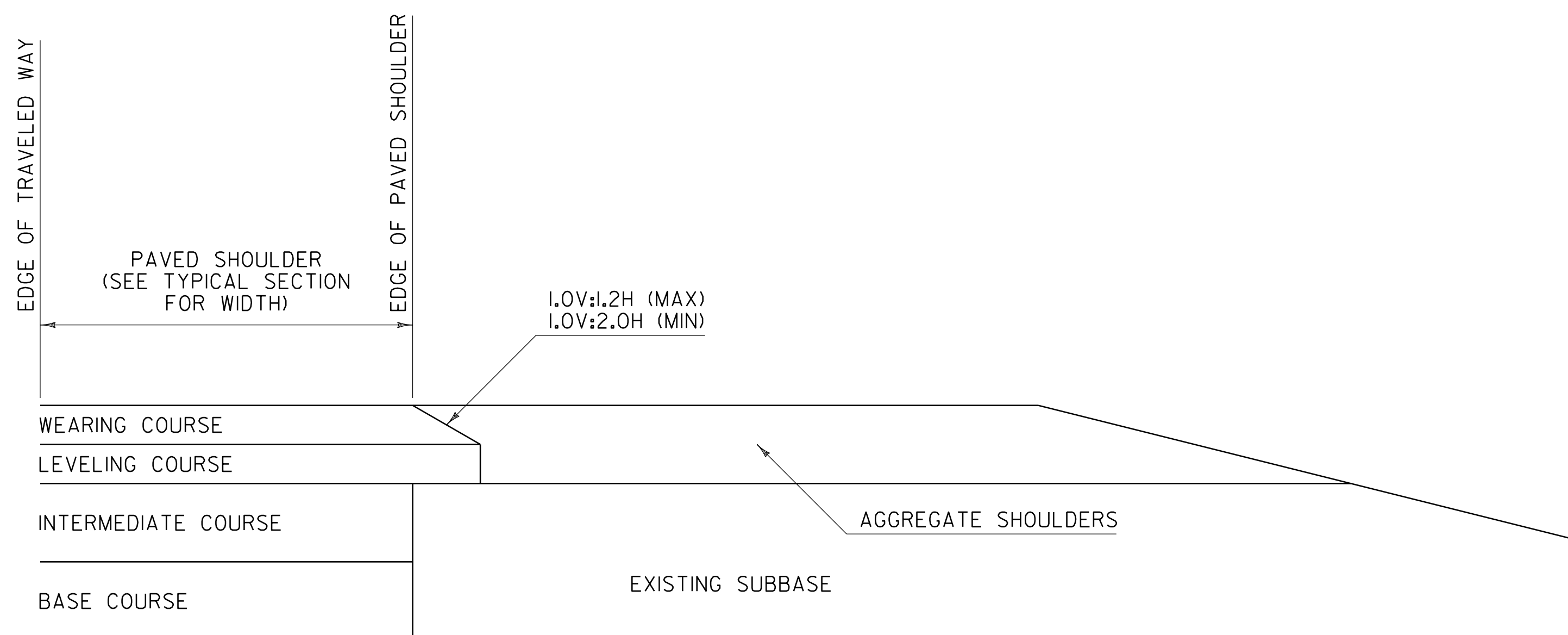


**SAFETY EDGE DETAIL  
FOR PAVING BELOW WEARING COURSE**

**NOTES:**

1. THIS DETAIL IS INTENDED FOR WHEN PAVING EXTENDS BELOW THE WEARING COURSE.
2. PRIOR TO PLACEMENT OF THE LEVELING AND/OR WEARING COURSE, THE SUBBASE LOCATED BENEATH THE AGGREGATE SHOULDERS SHALL BE PREPARED FLUSH WITH THE BOTTOM OF THE LEVELING COURSE.
3. BASE COURSE LIMITS MAY VARY, SEE TYPICAL SECTIONS FOR WIDTH.

SAFETY EDGE WIDTH BASED ON WEARING COURSE THICKNESS AND A 1V:1.6H SLOPE	
WEARING COURSE THICKNESS (INCHES)	NOMINAL SAFETY EDGE WIDTH (INCHES)
1.25	2.000
1.50	2.375
1.75	2.750
2.00	3.125
2.25	3.500
2.50	4.000



**SAFETY EDGE DETAIL  
FOR PAVING WEARING COURSE ONLY**

**NOTES:**

1. THIS DETAIL IS INTENDED FOR WHEN ONLY THE LEVELING AND/OR WEARING COURSE IS TO BE PLACED.
2. PAVEMENT COURSES MAY VARY, SEE TYPICAL SECTIONS FOR ACTUAL PAVEMENT COURSES REQUIRED.

**GENERAL NOTES:**

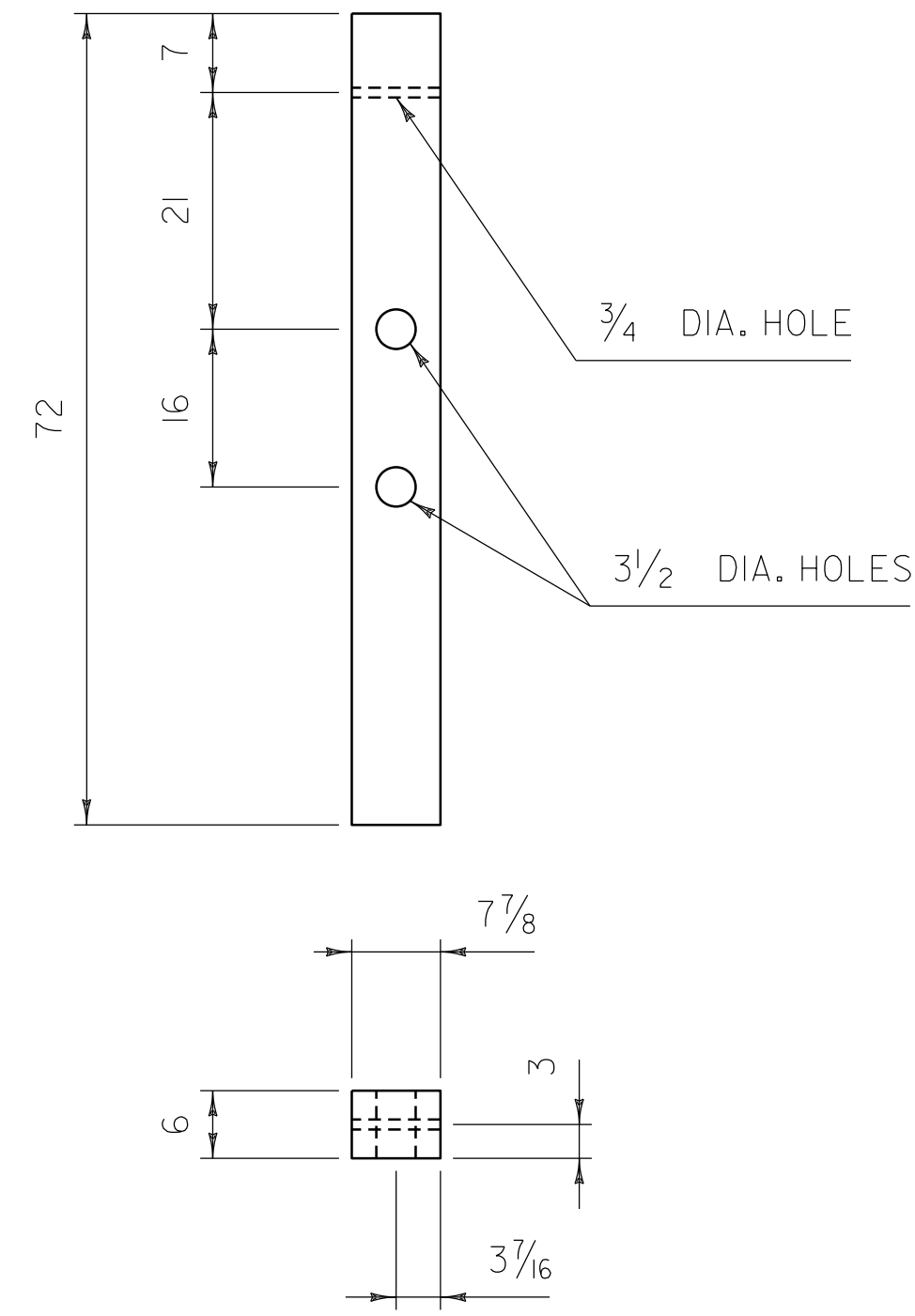
1. PLACEMENT OF THE WEARING COURSE SHALL INCLUDE THE SAFETY EDGE, UNLESS THE FOLLOWING APPLIES:
  - A. THE ADJACENT SLOPE IS STEEPER THAN THE SAFETY EDGE.
  - B. THE EDGE OF PAVEMENT BEING PLACED ABUTS BOUND MATERIAL.
  - C. VEHICLES ARE RESTRICTED FROM LEAVING THE PAVED SURFACE (EXAMPLE: GUARDRAIL).
2. THE SAFETY EDGE SHALL BE FORMED IN SUCH A WAY THAT THE BITUMINOUS CONCRETE PAVEMENT IS EXTRUDED OR COMPRESSED TO FORM THE SLOPE. DEVICES THAT SIMPLY STRIKE-OFF THE MIX WITHOUT PROVIDING ANY COMPACTIVE EFFORT WILL NOT BE ALLOWED.
3. THE SAFETY EDGE SHALL NOT BE CONSIDERED PART OF THE PAVED SHOULDER.
4. THIS WORK SHALL BE INCIDENTAL TO THE RESPECTIVE BITUMINOUS CONCRETE PAVEMENT ITEM.

**SAFETY EDGE DETAILS**

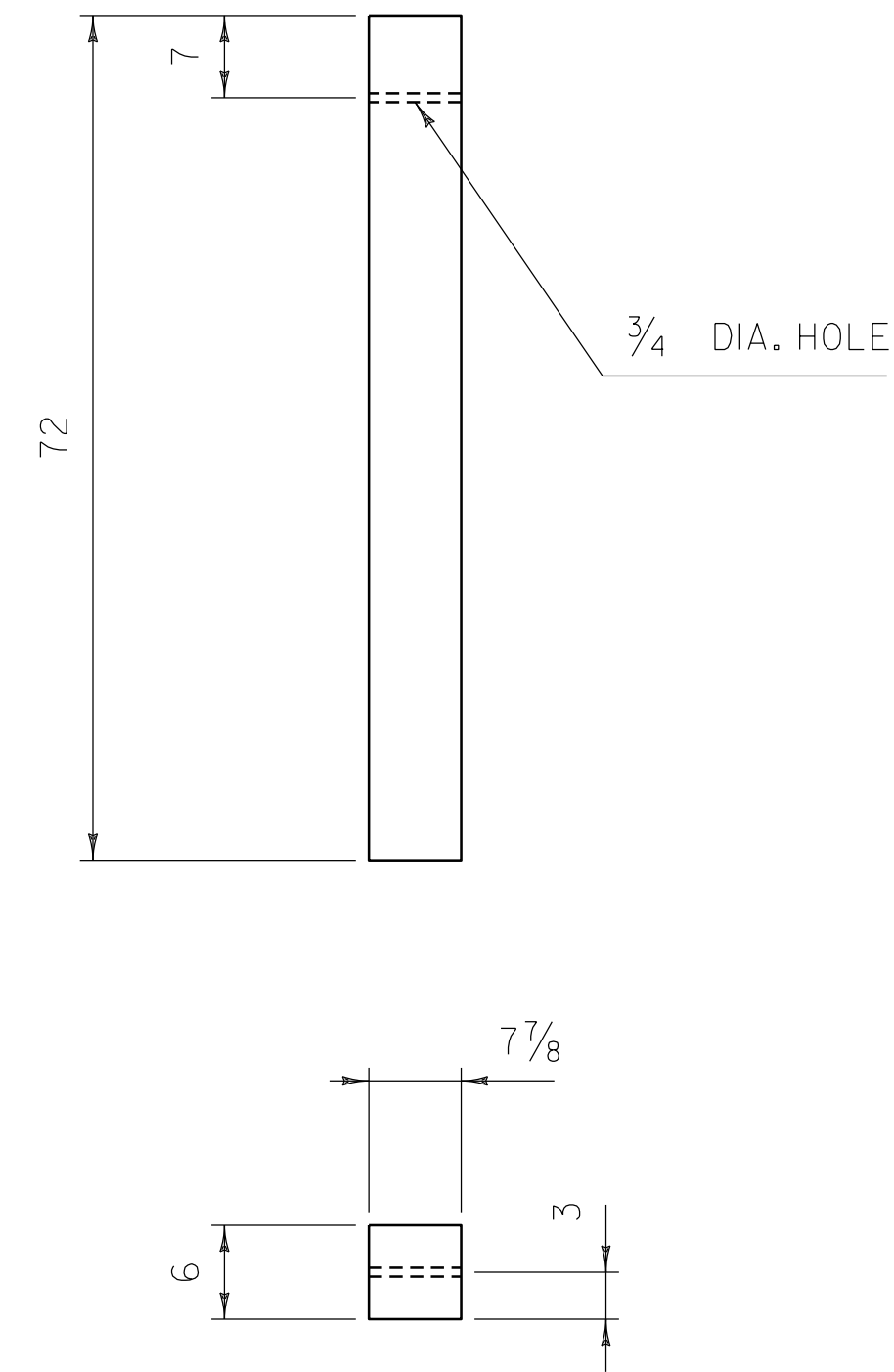
REV.	DATE	DESCRIPTION
0	MAR. 29, 2016	ORIGINAL APPROVAL
1	JAN. 5, 2018	ANNOTATION CORRECTIONS
OTHER DETAILS REQUIRED: NONE		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		



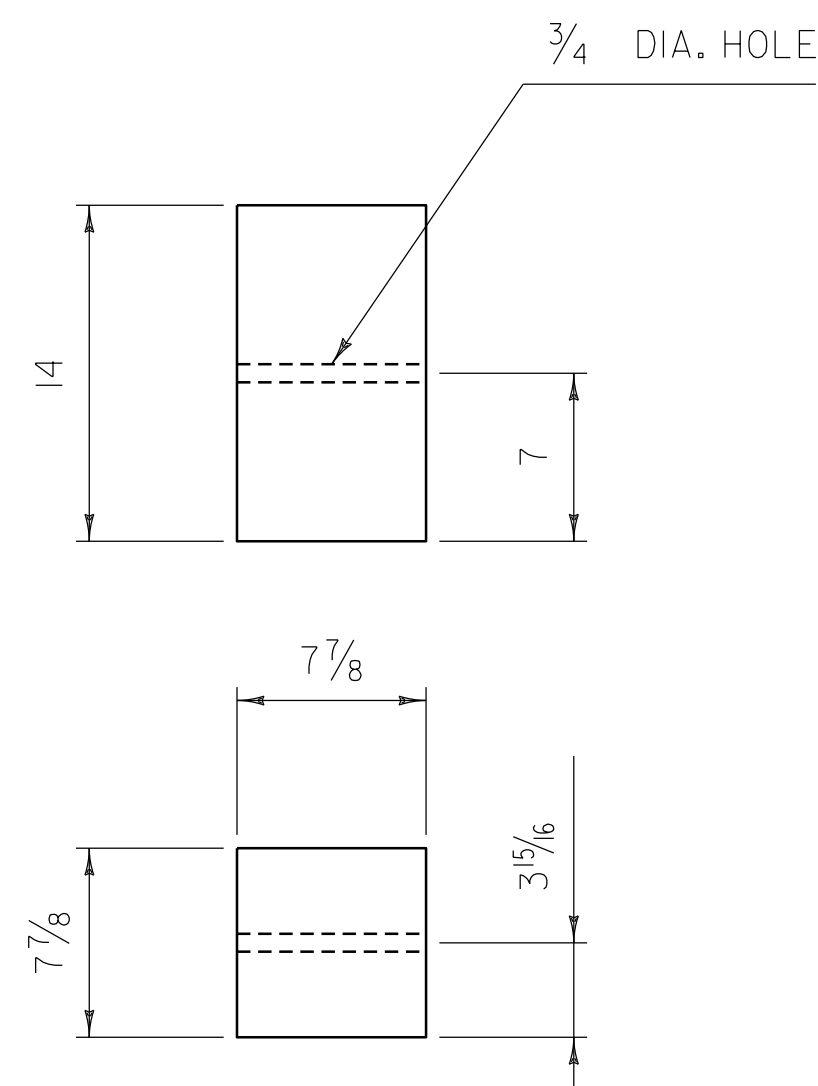
**HIGHWAY SAFETY  
& DESIGN DETAIL  
HSD-400.01**



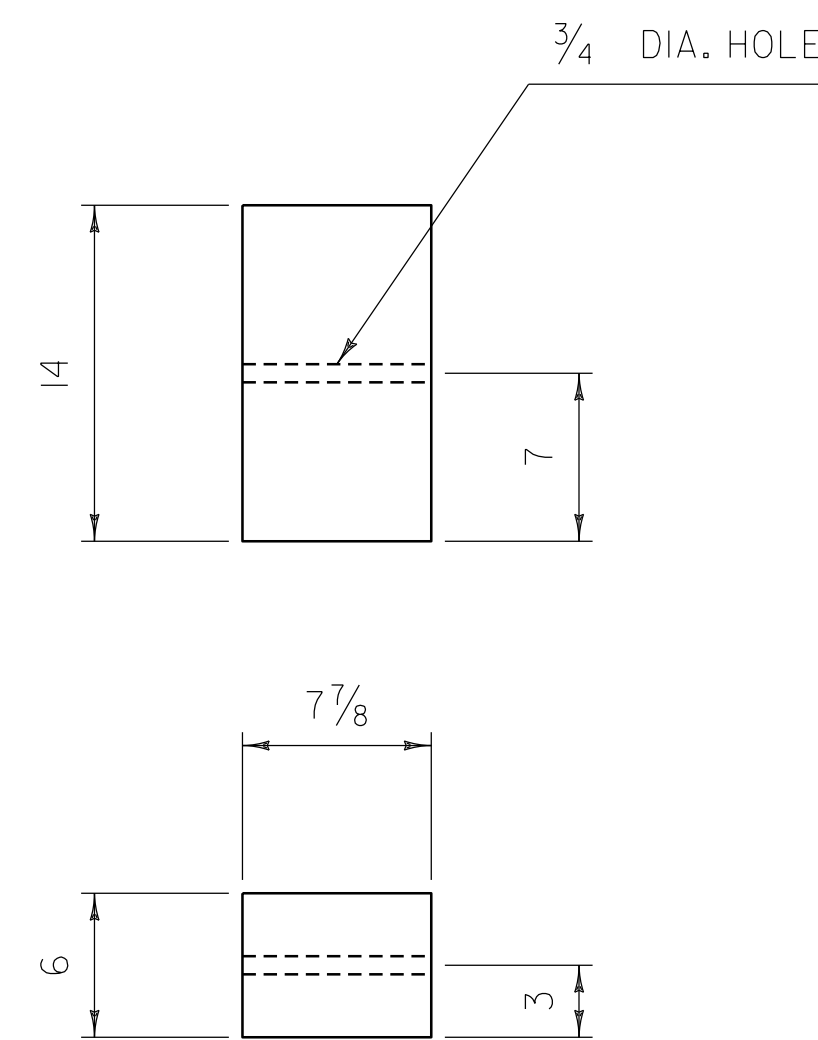
**CONTROLLED RELEASING TERMINAL  
(CRT) TIMBER POST (PDE09)**



**TIMBER GUARDRAIL POST (PDE07)**



**TRANSITION SPACER BLOCKOUTS (PDB07)**



**W-BEAM TIMBER BLOCKOUT (PDB01)**

**GENERAL NOTES:**

1. ALL MATERIAL DESIGNATIONS ARE AS IDENTIFIED IN "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" AS PUBLISHED BY THE "AMERICAN ASSOCIATION OF STATE AND HIGHWAY TRANSPORTATION OFFICIALS" (AASHTO), ASSOCIATED GENERAL CONTRACTORS OF AMERICA (AGC) AND THE AMERICAN ROAD AND TRANSPORTATION BUILDERS ASSOCIATION (ARTBA).
2. CRT TIMBER POSTS SHALL BE INSTALLED SO THAT THE CENTER OF THE TOP 3/2 INCH HOLE IS AT GROUND LEVEL.
3. ALL TIMBER SHALL RECEIVE A PRESERVATION TREATMENT IN ACCORDANCE WITH AASHTO M133 AFTER ALL HOLES ARE DRILLED AND END CUTS ARE MADE.
4. ALL DIMENSIONS IN INCHES.

REV.	DATE	DESCRIPTION
0	JUN. 9, 2015	ORIGINAL APPROVAL
OTHER DETAILS REQUIRED: NONE		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

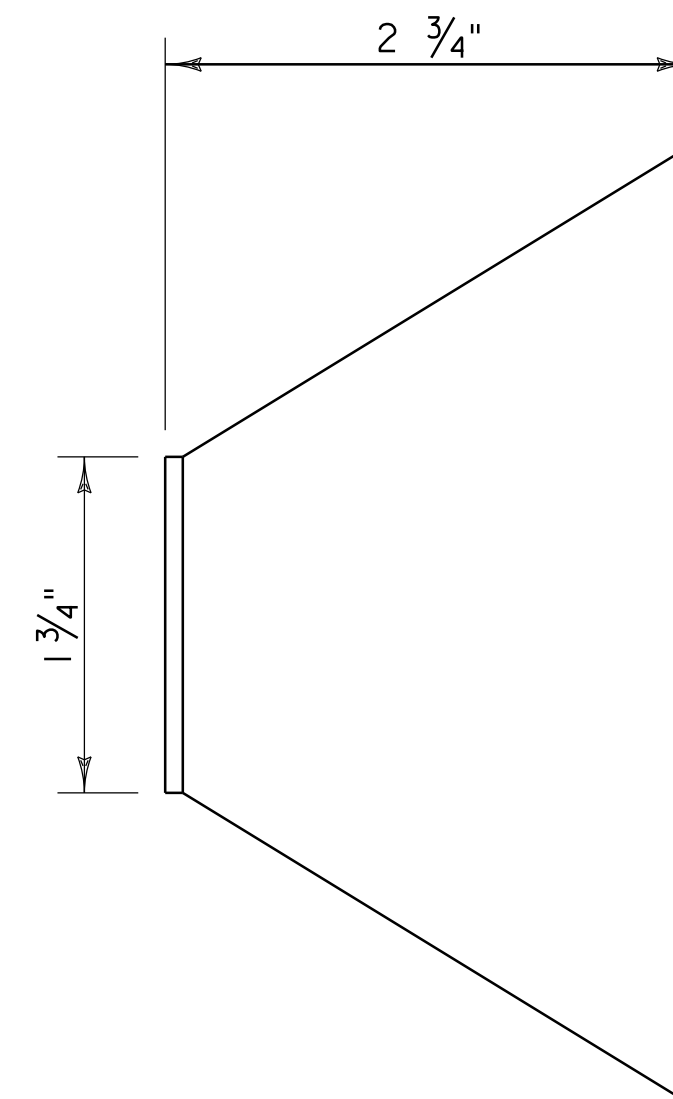
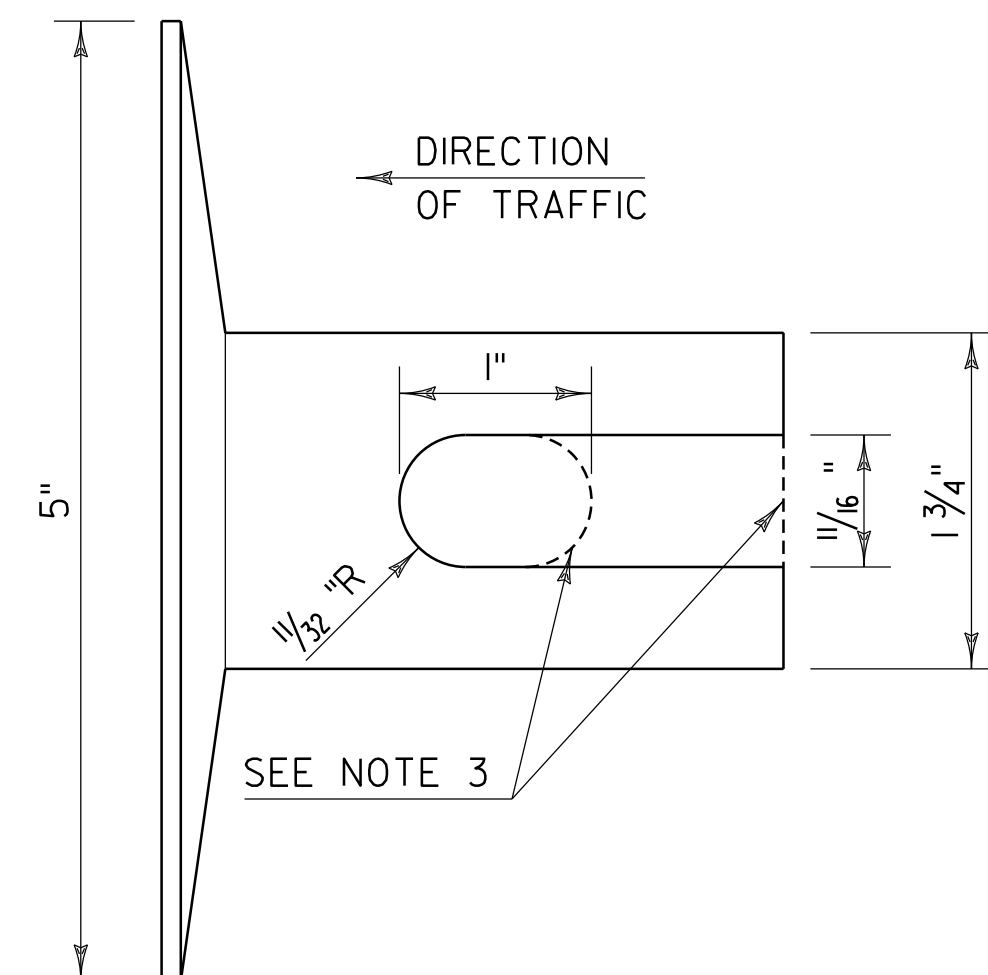
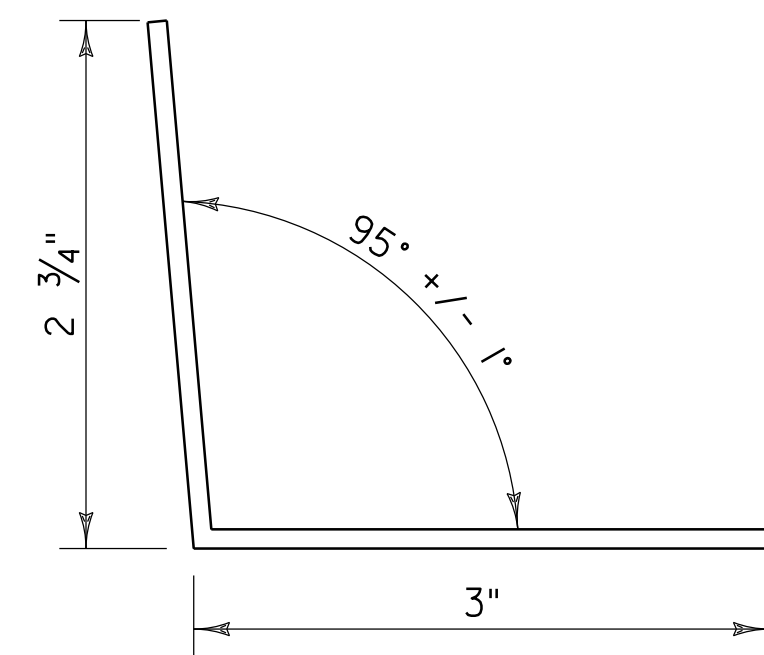
POST AND BLOCKOUT DETAILS  
FOR STEEL BEAM GUARDRAIL, GALVANIZED



HIGHWAY SAFETY  
& DESIGN DETAIL

HSD - 621.01

### GUARDRAIL DELINEATOR DETAIL



#### NOTES:

1. GUARDRAIL DELINEATOR BASE MATERIAL SHALL BE 0.10 INCH THICK ALUMINUM IN ACCORDANCE WITH SUBSECTION 728.04 DELINEATION DEVICES.
2. GUARDRAIL DELINEATORS SHALL HAVE WHITE RETROREFLECTIVE SHEETING, EQUAL TO OR EXCEEDING TYPE III IN ACCORDANCE WITH SUBSECTION 750.08(B)(3) ON THE RIGHT SIDE OF THE TRAVELED WAY AND YELLOW RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING TYPE VII IN ACCORDANCE WITH SUBSECTION 750.08(B)(7) ON THE LEFT SIDE OF THE TRAVELED WAY IN RESPECT TO APPROACHING TRAFFIC. ON ONE DIRECTIONAL ROADWAYS RETROREFLECTIVE SHEETING MAY BE OMITTED ON FACES WHERE THERE WILL BE NO APPROACHING TRAFFIC.
3. HOLE MAY BE USED IN PLACE OF SLOT.

REV.	DATE	DESCRIPTION
0	NOV. 3, 2015	ORIGINAL APPROVAL
1	FEB. 27, 2017	UPDATED NAME, MINOR CORRECTIONS AND ADDED GUARDRAIL DELINEATOR DETAIL
OTHER DETAILS REQUIRED: NONE		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

### GUARDRAIL TERMINAL LABEL DETAIL



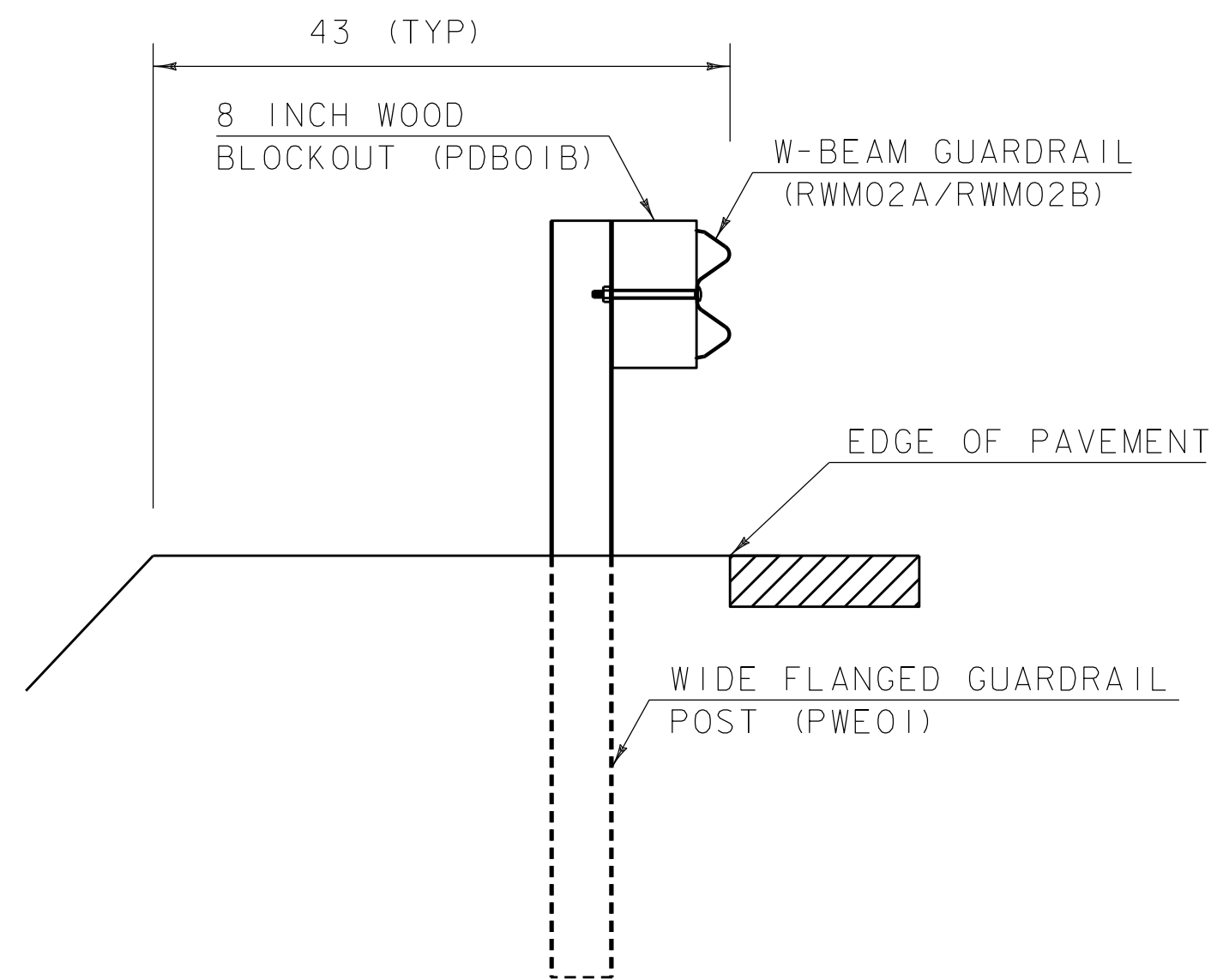
#### NOTES:

- I. LINE ONE SHALL INDICATE THE INSTALLATION YEAR (YYYY).
- II. LINE TWO SHALL INDICATE THE MODEL AS IDENTIFIED ON THE APPROVED PRODUCTS LIST. FOR GENERIC INSTALLATIONS THE STANDARD DRAWING DESIGNATION OR NAME AS IDENTIFIED IN THE FHWA ELIGIBILITY LETTER SHALL BE USED.
- III. LINE THREE SHALL INDICATE ADDITIONAL MODEL INFORMATION IF NECESSARY.
- IV. LINE FOUR SHALL INDICATE FLARED (FLRD) OR TANGENT (TANG).
1. LEGEND SHALL BE SIZE 3/4 INCH ARIEL FONT.
2. LEGEND SHALL BE BLACK ON A WHITE BACKGROUND, LEGEND AND BACKGROUND SHALL NOT BE REFLECTIVE.
3. SUITABLE MATERIAL SHALL BE USED SO AS TO NOT DETERIORATE DURING EXPOSURE TO WEATHER.
4. LABELS SHALL BE APPLIED IN SUCH A WAY THAT THEY REMAIN INTACT DURING THE LIFE OF THE TERMINAL.
5. FOR W-BEAM GUARDRAIL, LABEL SHALL BE PLACED ON THE TOP OF POST ONE FACING AWAY FROM TRAFFIC.
6. FOR BOX BEAM GUARDRAIL, LABEL SHALL BE PLACED ON THE BOX BEAM ADJACENT TO POST ONE FACING AWAY FROM TRAFFIC.
- II. PAYMENT SHALL BE INCIDENTAL TO OTHER TRAFFIC BARRIER ITEMS.

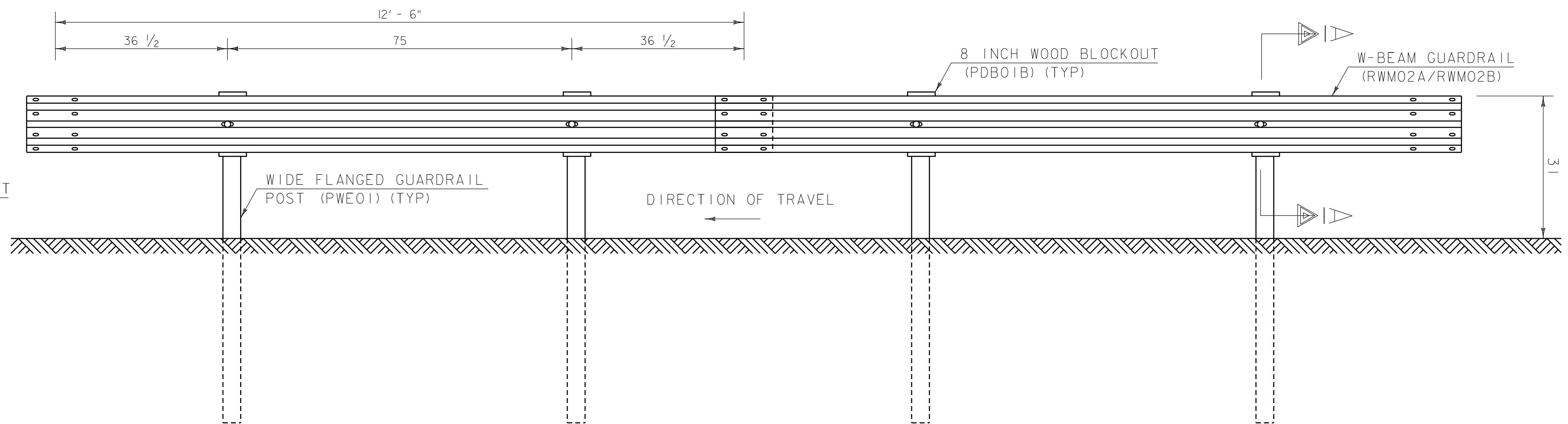
## MISCELLANEOUS GUARDRAIL DETAILS



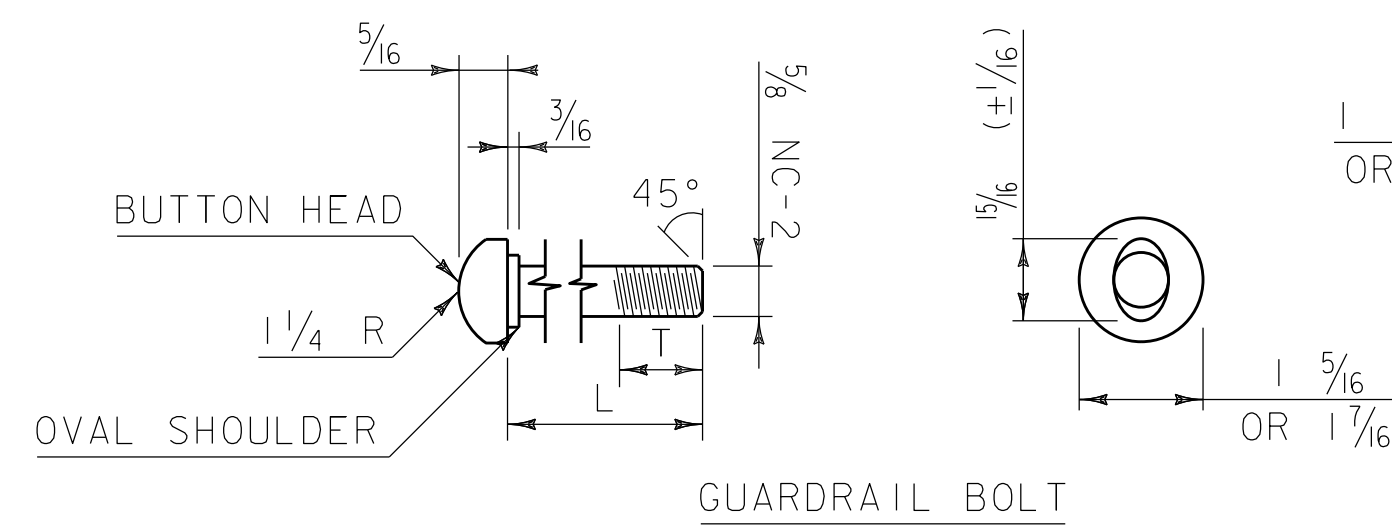
HIGHWAY SAFETY  
& DESIGN DETAIL  
HSD-621.06



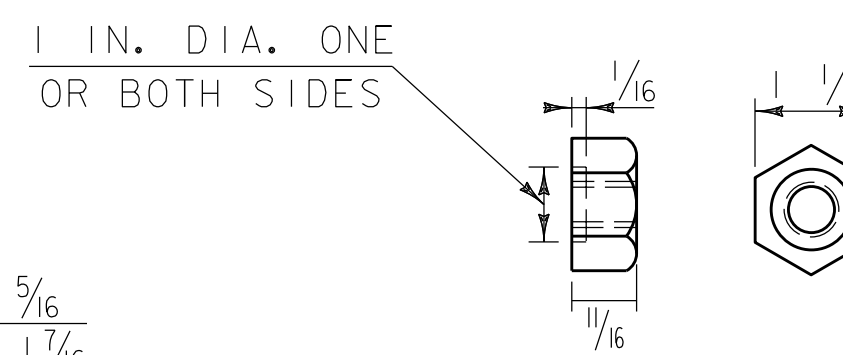
TYPICAL GUARDRAIL DETAIL  
SECTION A-A



GUARDRAIL ELEVATION

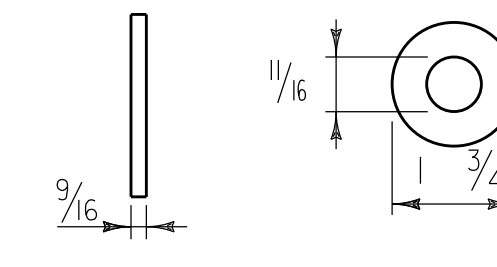


GUARDRAIL BOLT



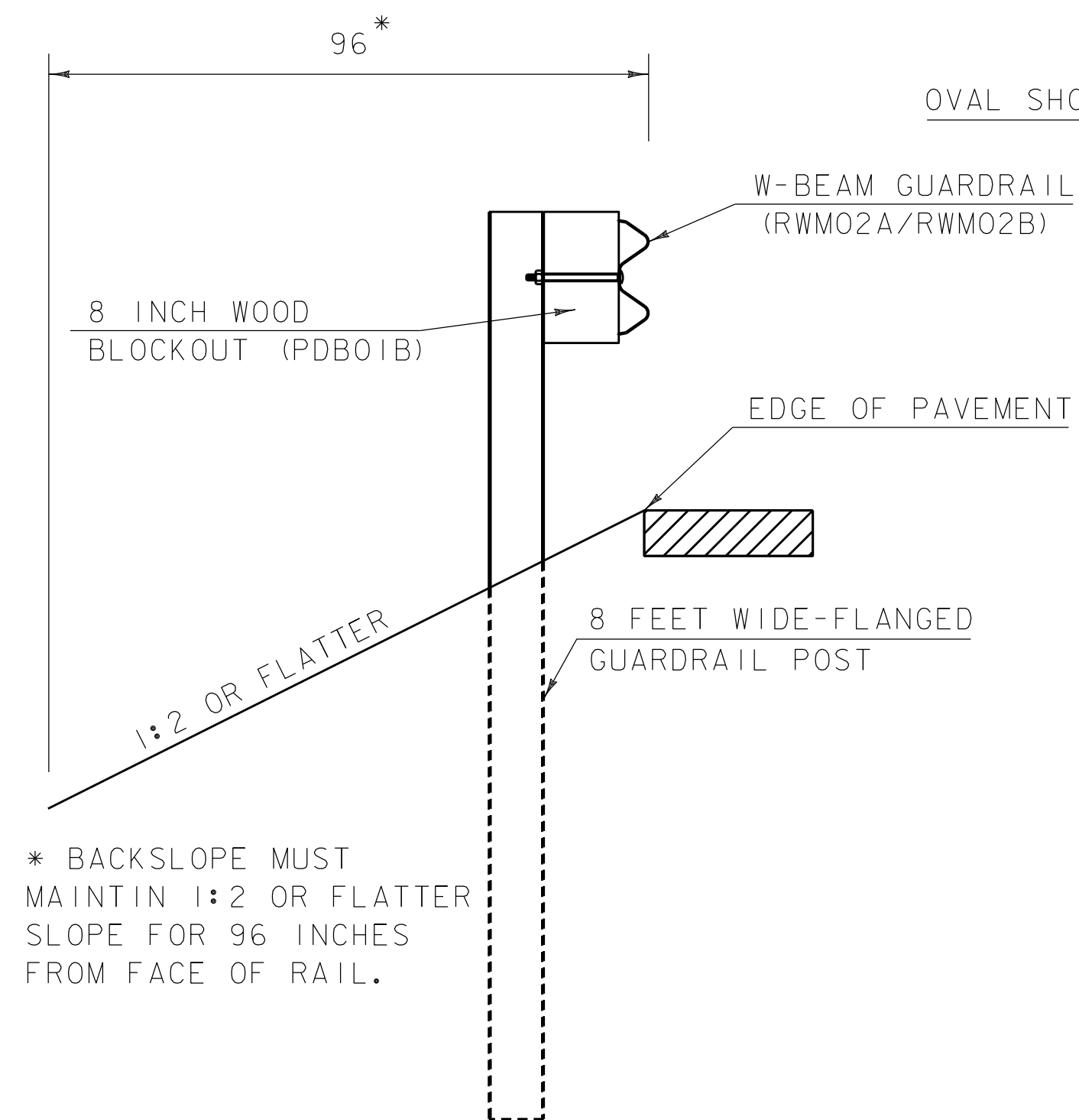
RECESSED NUT FOR GUARDRAIL BOLT

NOTE: WASHER IS USED UNDER RECESSED NUT WHERE GUARDRAIL BOLT IS USED WITH WOOD POSTS.

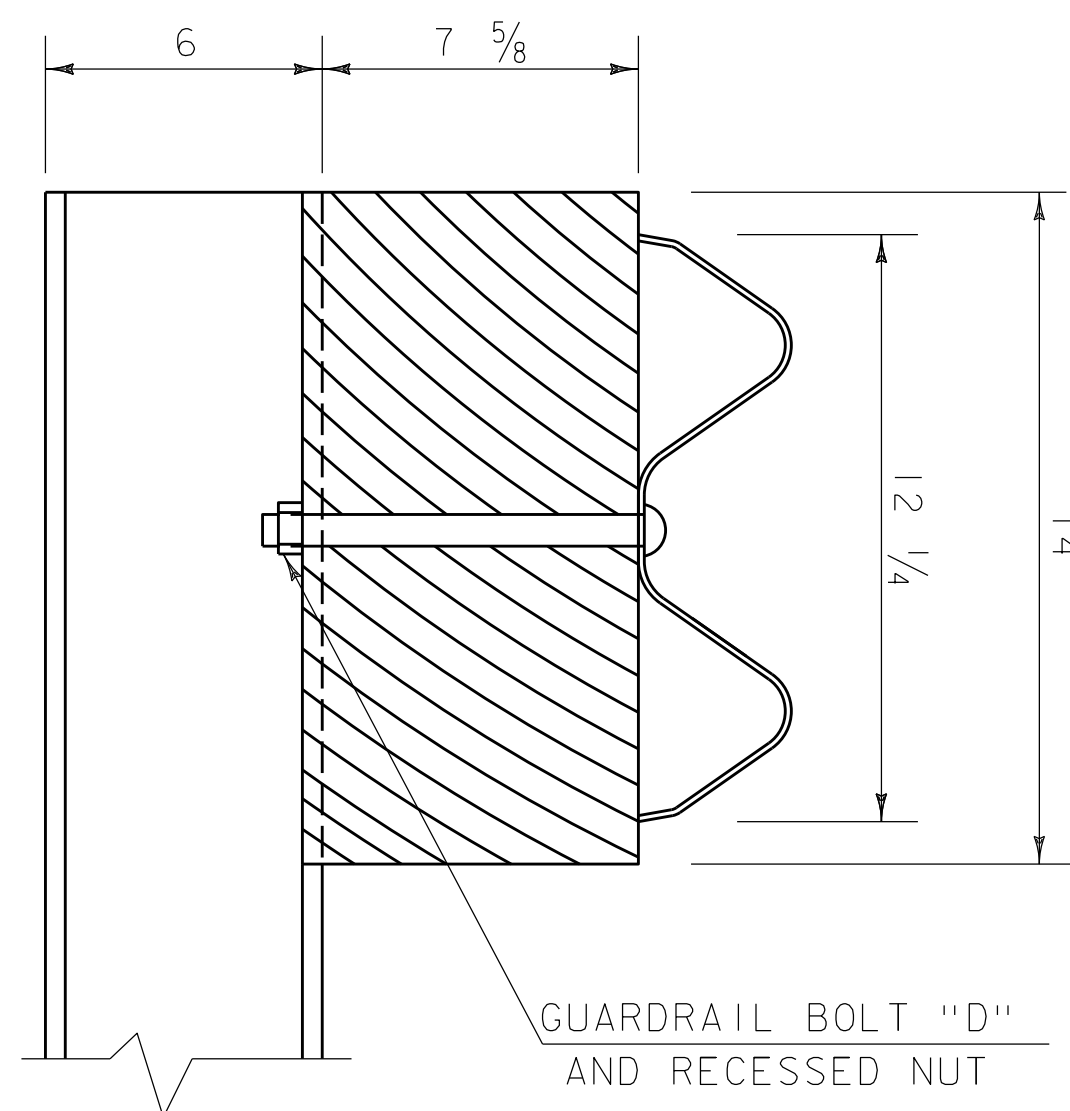


WASHER FOR 5/8" BOLTS  
ARTBA F-13-73

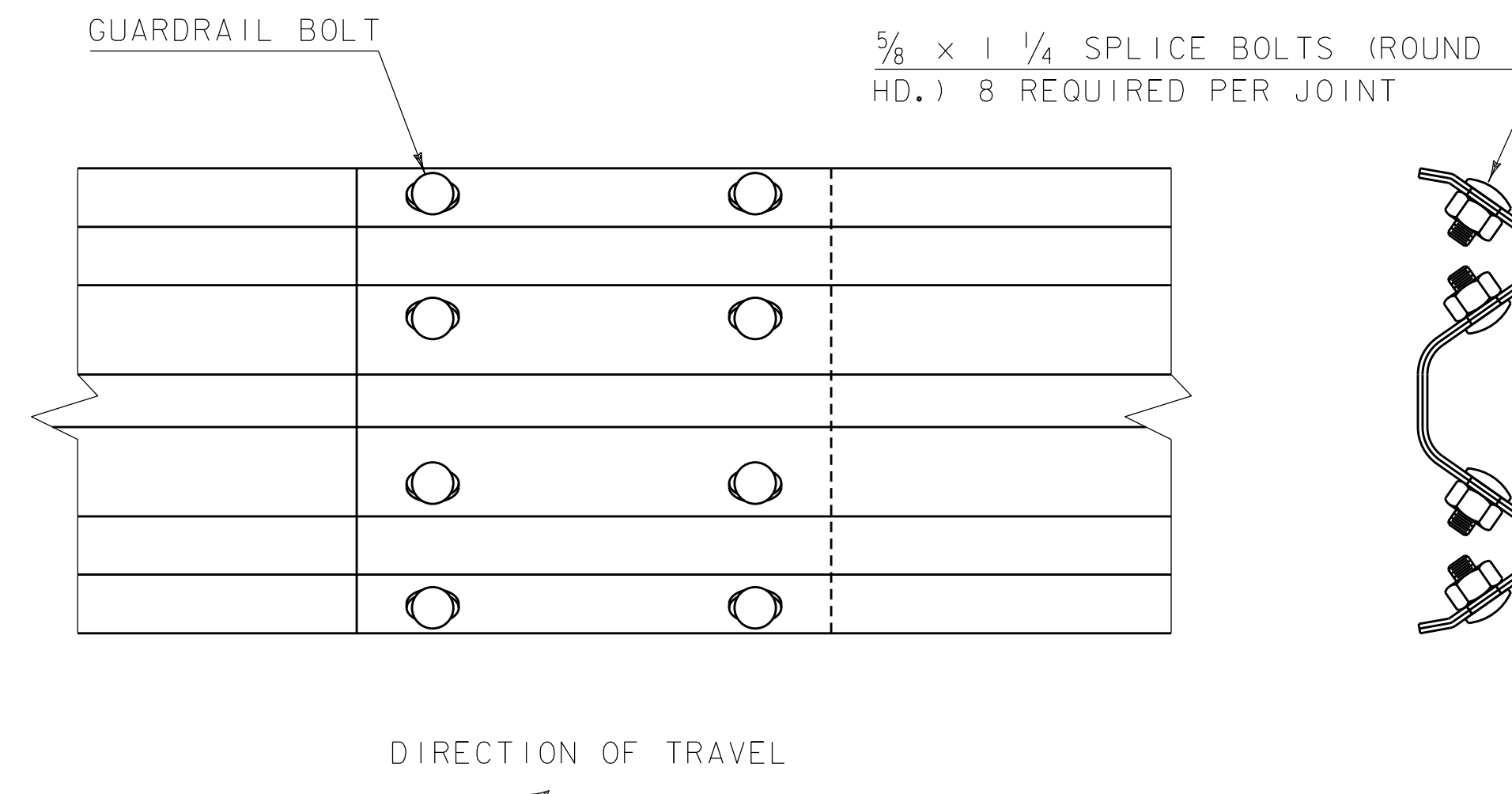
GUARDRAIL BOLTS				FASTENER USED IN	
BOLT DES.	ARTBA REF. NO.	L	T (MIN.)	STEEL POSTS	WOOD POSTS
"A"	F-3[1 1/4]-76	1 1/4"	1"	X	X
"C"	F-3[9 1/2]-76	9 1/2"	1 3/4"	X	
"D"	F-3[18]-76	18"	2 1/2"		X
"F"	F-3[25]-76	25"	2"		X



8 FEET POSTS GUARDRAIL DETAIL  
SECTION A-A



POST ATTACHMENT DETAIL



SPLICE DETAIL

GENERAL NOTES

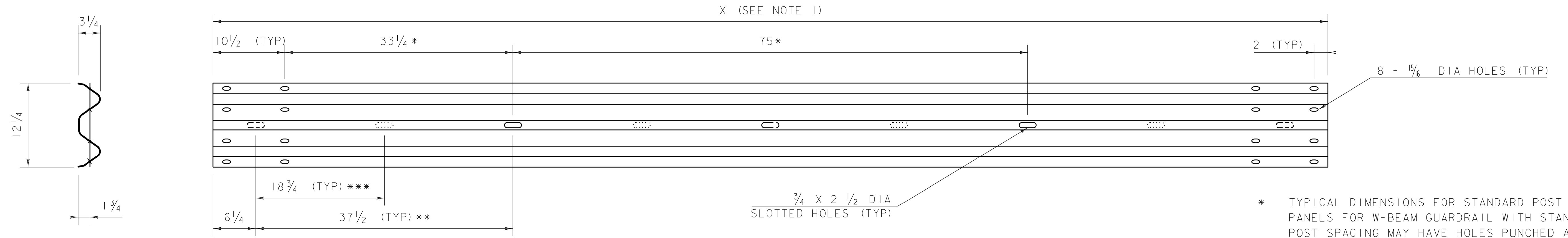
- DESIGNATIONS ARE AS IDENTIFIED IN "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" AS PUBLISHED BY THE "AMERICAN ASSOCIATION OF STATE AND HIGHWAY TRANSPORTATION OFFICIALS" (AASHTO), "ASSOCIATED GENERAL CONTRACTORS OF AMERICA" (AGC) AND THE "AMERICAN ROAD AND TRANSPORTATION BUILDERS ASSOCIATION" (ARTBA).
- MATERIALS SHALL BE IN ACCORDANCE WITH SECTION 728 OF THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION, AND ITS LATEST REVISIONS, AS APPLICABLE.
- WHEN W-BEAM GUARDRAIL, 8 FEET POSTS IS SPECIFIED ON THE PLANS, WIDE FLANGED GUARDRAIL POST (PWE01) SHALL BE INCREASED FROM 72 INCHES TO 96 INCHES, SEE DETAIL HSD-621.07B.
- THE DYNAMIC DEFLECTION DISTANCE OF 57 INCHES FOR W BEAM GUARDRAIL SHALL BE MAINTAINED CLEAR OF OBSTACLES, TO BE MEASURED FROM THE BACK OF POST.
- FOR TEST LEVEL 3 APPLICATIONS, AS APPROVED IN THE FEDERAL HIGHWAY ADMINISTRATION'S ELIGIBILITY LETTER, HSST/B-240, DATED NOVEMBER 8, 2012.
- ALL DIMENSION IN INCHES, UNLESS OTHERWISE NOTED.

REV.	DATE	DESCRIPTION
--	APR. 17, 2019	ORIGINAL APPROVAL
I	JAN. 4, 2021	CORRECTED REFERENCE IN NOTE 3
OTHER DETAILS REQUIRED:		621.07B
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

MIDWEST GUARDRAIL SYSTEM (MGS)



HIGHWAY SAFETY  
& DESIGN DETAIL  
HSD-621.07A



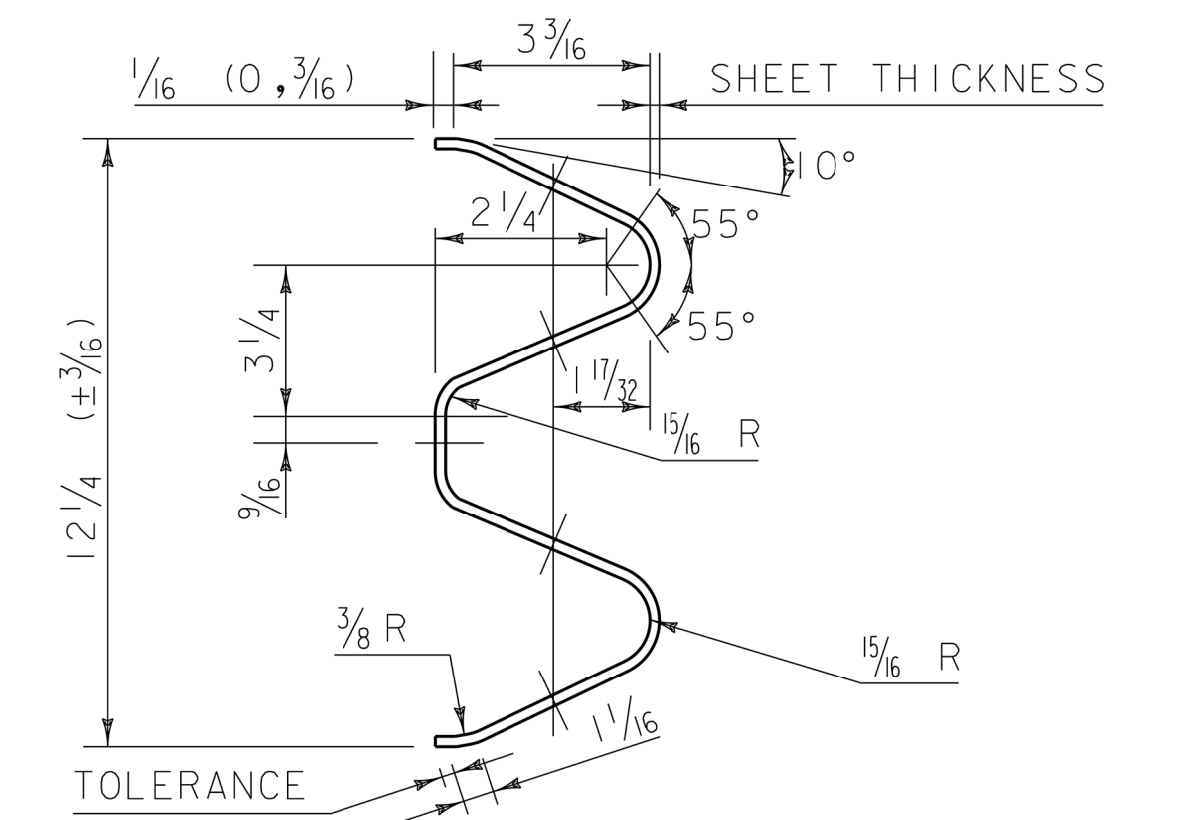
**W-BEAM GUARDRAIL**  
(RWM02A/ RWM02B)

1. TANGENT W-BEAM RAIL LENGTHS SHALL BE 13' - 6 1/2" OR 26' - 1/2", UNLESS OTHERWISE SPECIFIED.
2. W-BEAM THICKNESS SHALL BE 1/8" FOR STANDARD W-BEAM GUARDRAIL (RWM02A) AND 3/64" FOR HEAVY DUTY GUARDRAIL (RWM02B).

- * TYPICAL DIMENSIONS FOR STANDARD POST SPACING. PANELS FOR W-BEAM GUARDRAIL WITH STANDARD POST SPACING MAY HAVE HOLES PUNCHED AT ONE-HALF POST SPACING FOR INVENTORY PURPOSES.
- ** TYPICAL DIMENSION FOR ONE-HALF POST SPACING.
- *** TYPICAL DIMENSION FOR ONE-QUARTER POST SPACING.

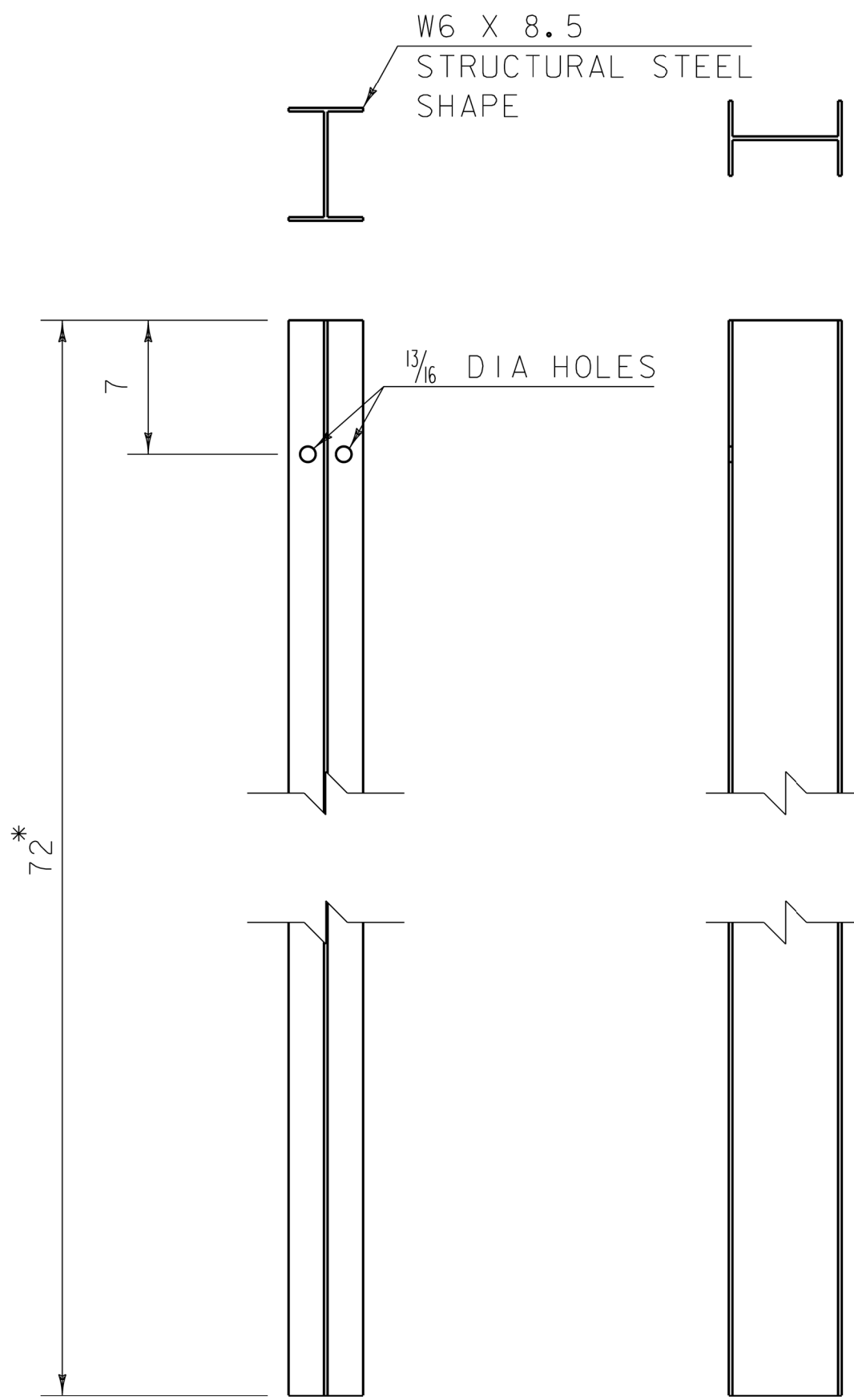
**NOTES:**

1. BLOCKS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF 1200 PSI OR MORE. TESTING SHALL BE IN ACCORDANCE WITH WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE ASSOCIATION. TIMBER FOR BLOCKS SHALL BE ROUGH SAWN (UNPLANED) WITH DIMENSIONS INDICATED. THE SIZE TOLERANCE OF ROUGH SAWN BLOCKS IN THE DIRECTION OF THE BOLT HOLES SHALL BE NOT MORE THAN +/- 1/4".
2. SUPPLY WOOD BLOCKS PER AASHTO M 168.
3. TREAT WITH PRESERVATIVE PER AASHTO M 133.
4. BLOCKOUTS MAY ALSO BE MADE OF APPROVED ALTERNATIVE MATERIAL.

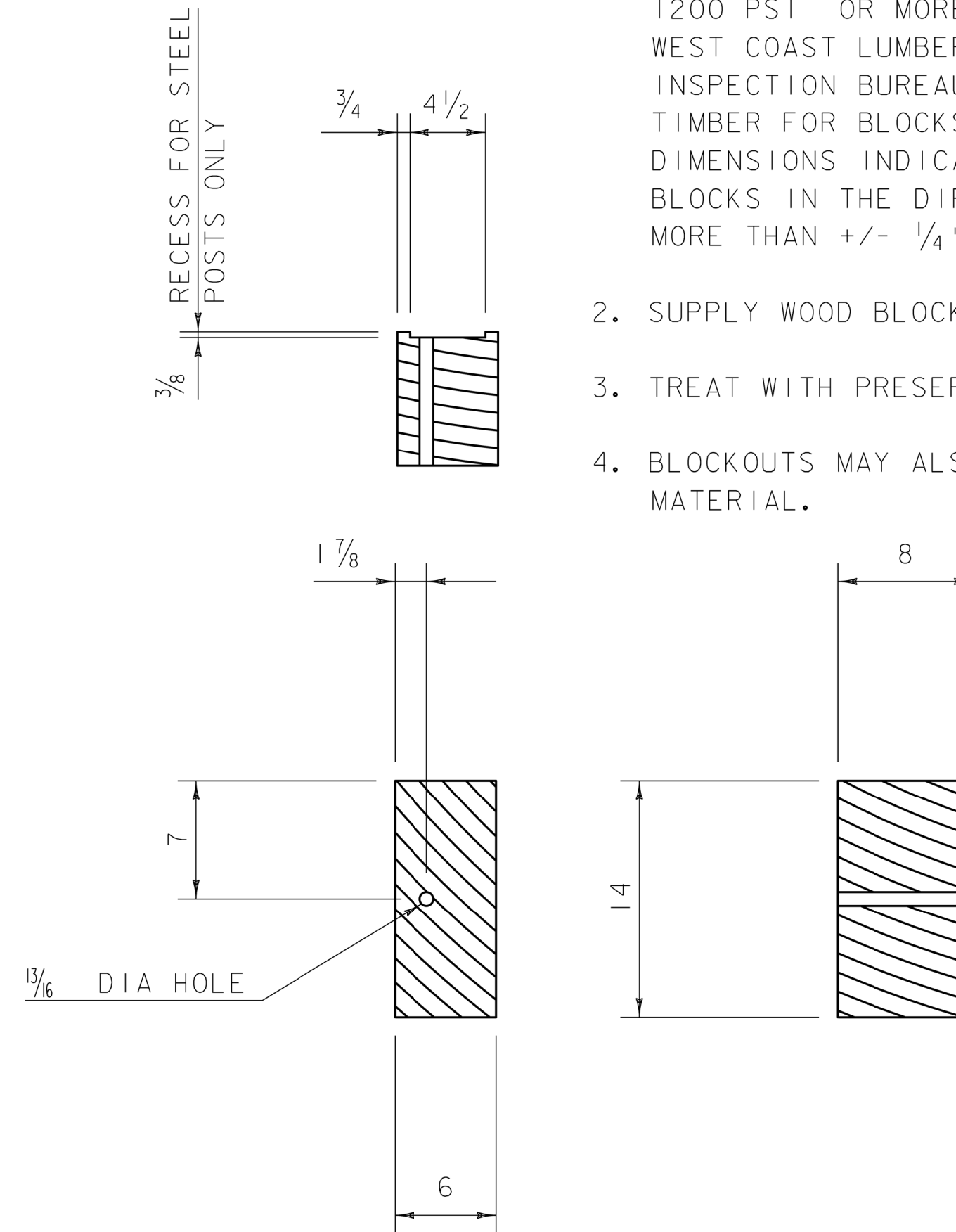


ARTBA RE-3 (2@6' - 3" = 12' - 6" CLASS A, TYPE 1) - 73

**TYPICAL GUARDRAIL SECTION**



**WIDE FLANGED GUARDRAIL POST**  
(PWE01)



**8 INCH WOOD BLOCKOUT**  
(PDB01B)

**GENERAL NOTES**

1. DESIGNATIONS ARE AS IDENTIFIED IN "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" AS PUBLISHED BY THE "AMERICAN ASSOCIATION OF STATE AND HIGHWAY TRANSPORTATION OFFICIALS" (AASHTO), "ASSOCIATED GENERAL CONTRACTORS OF AMERICA" (AGC) AND THE "AMERICAN ROAD AND TRANSPORTATION BUILDERS ASSOCIATION" (ARTBA).
2. MATERIALS SHALL BE IN ACCORDANCE WITH SECTION 728 OF THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION, AND ITS LATEST REVISIONS, AS APPLICABLE.
3. ALL DIMENSION IN INCHES, UNLESS OTHERWISE NOTED.

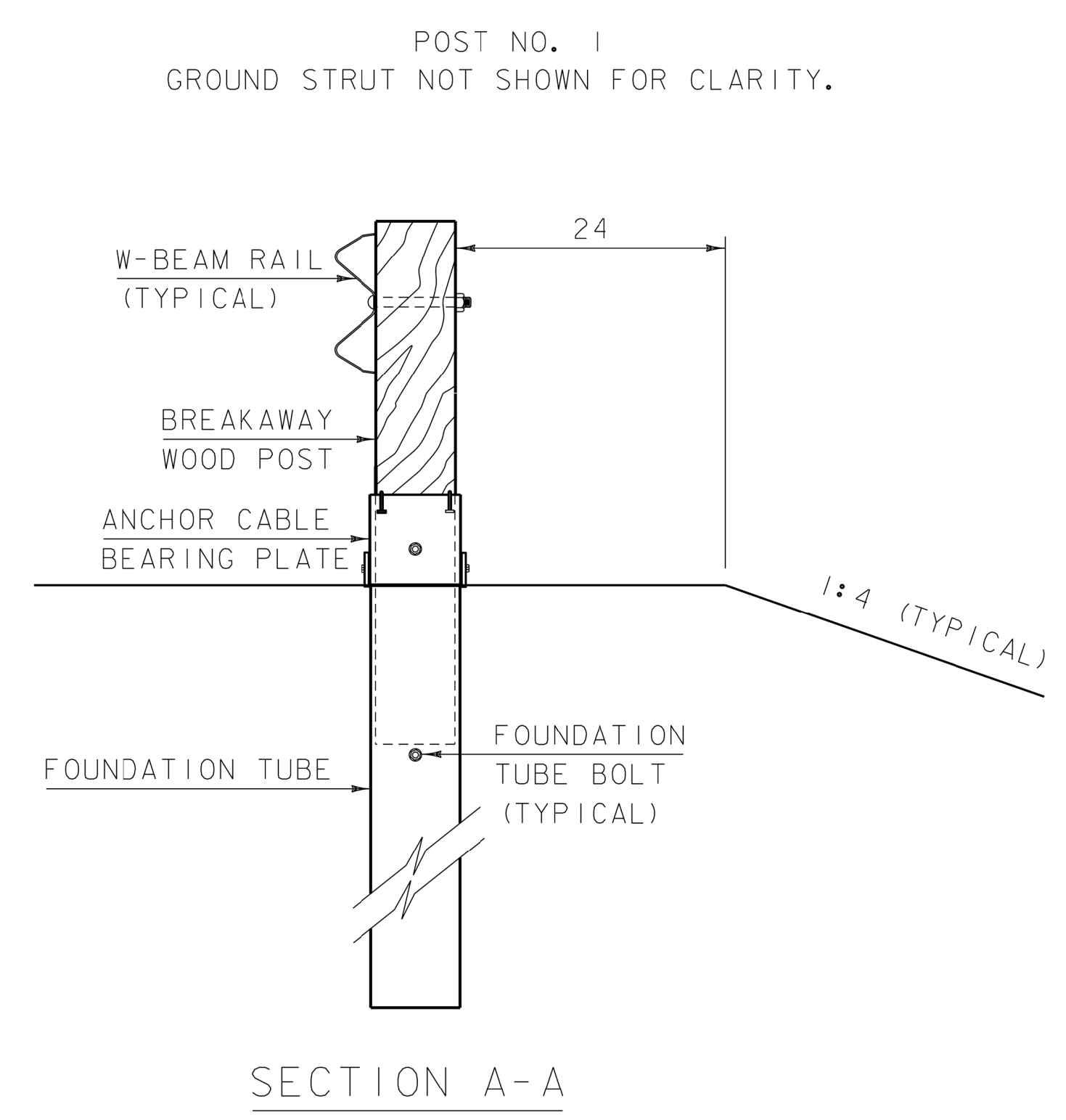
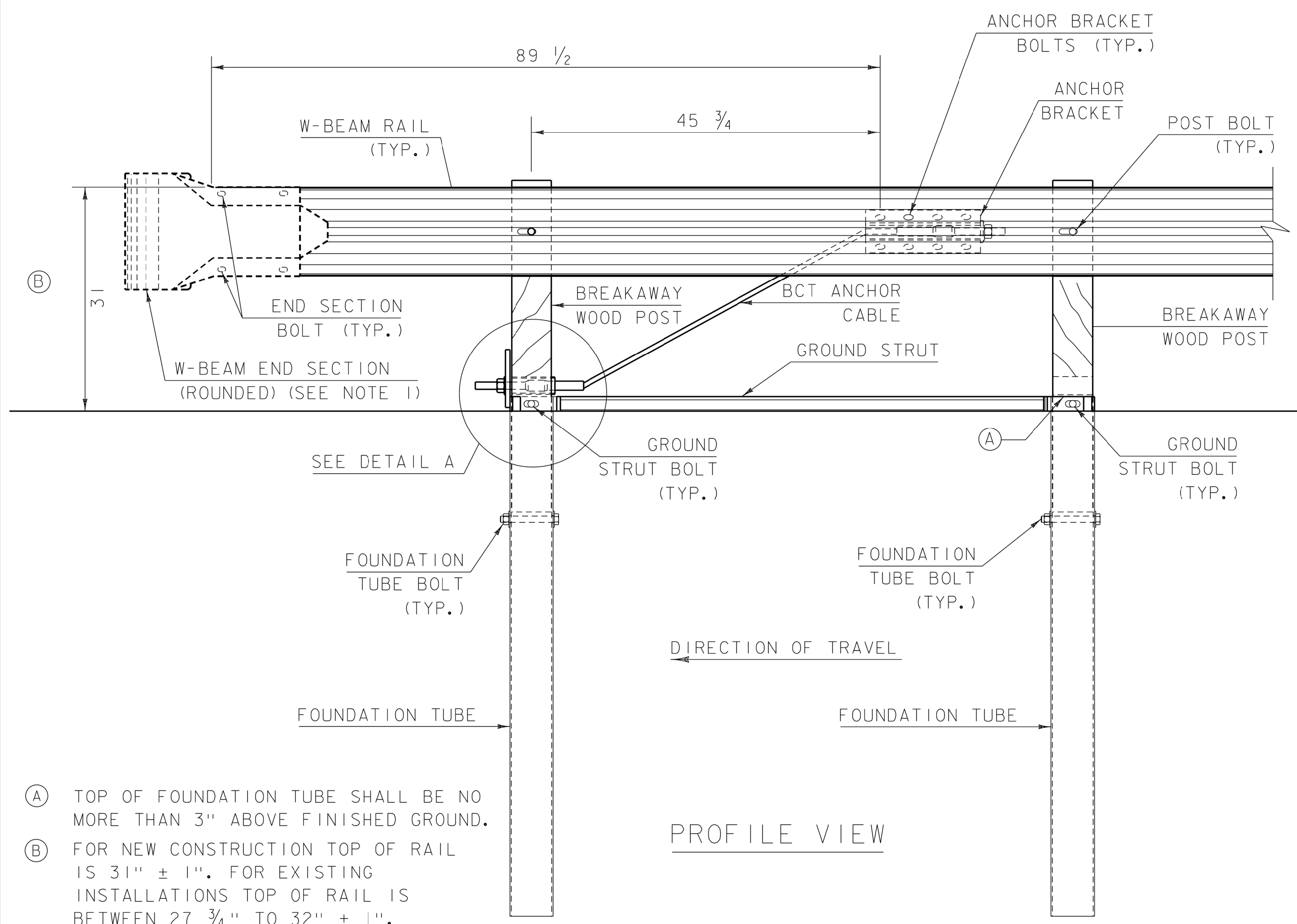
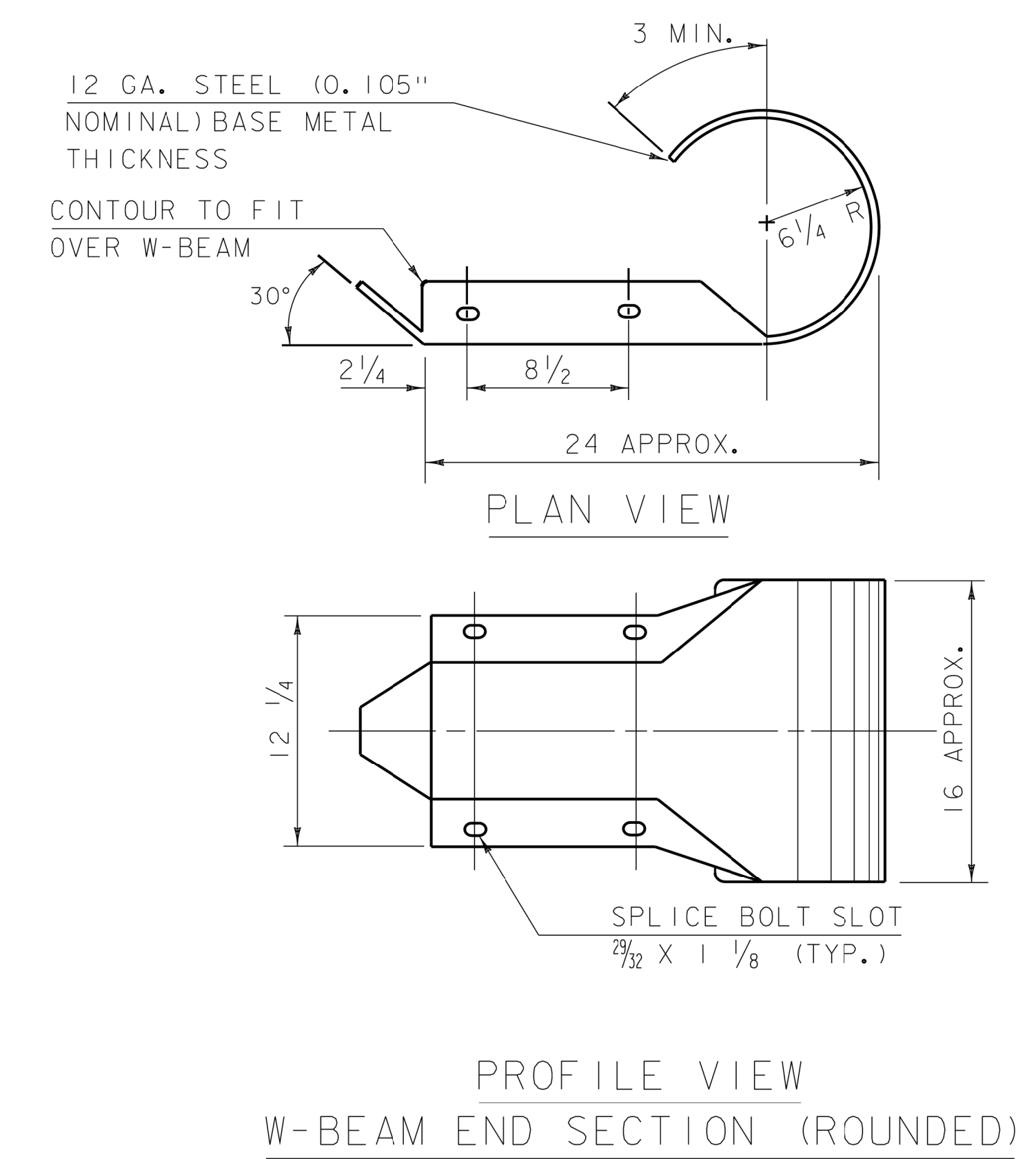
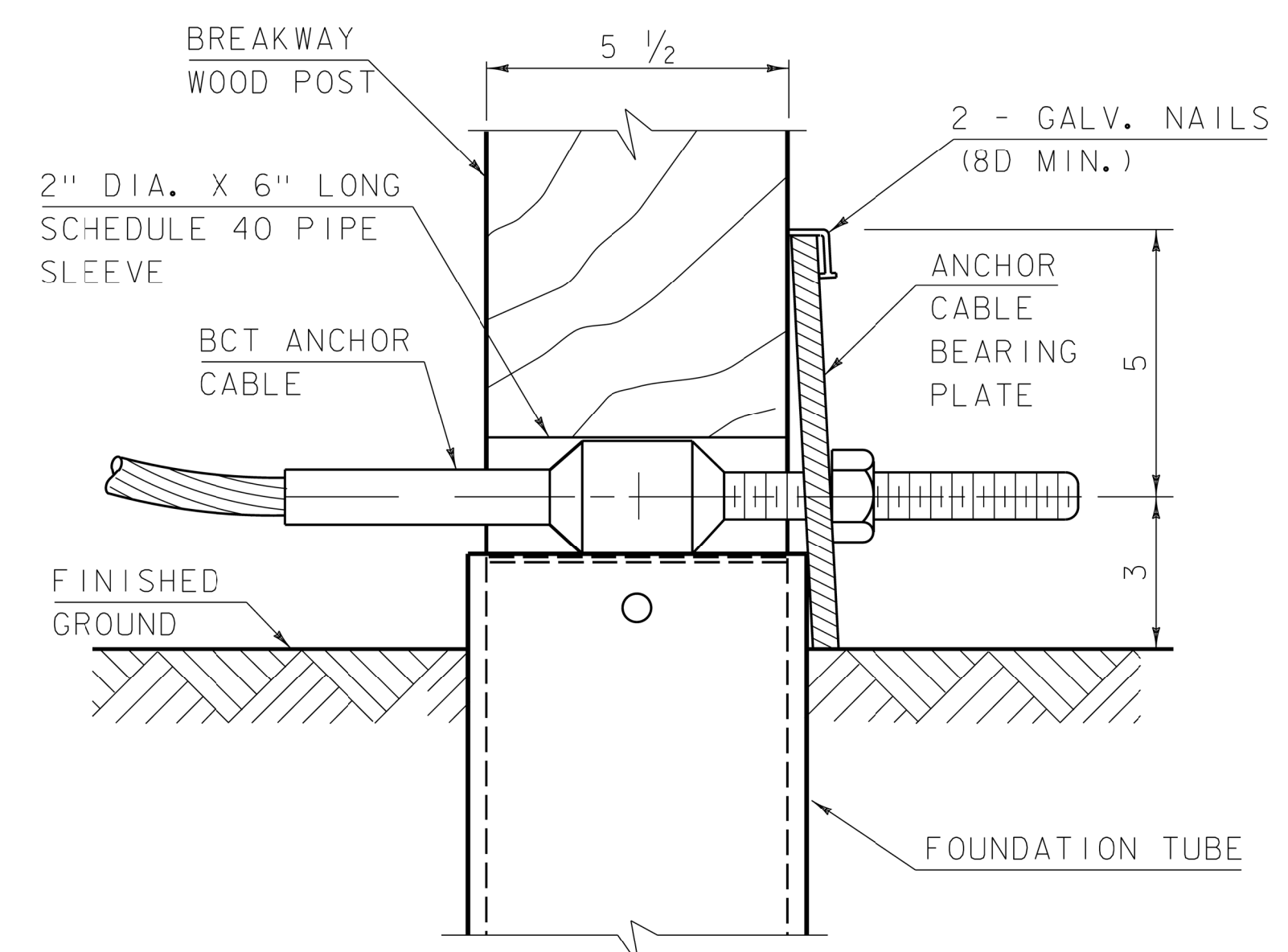
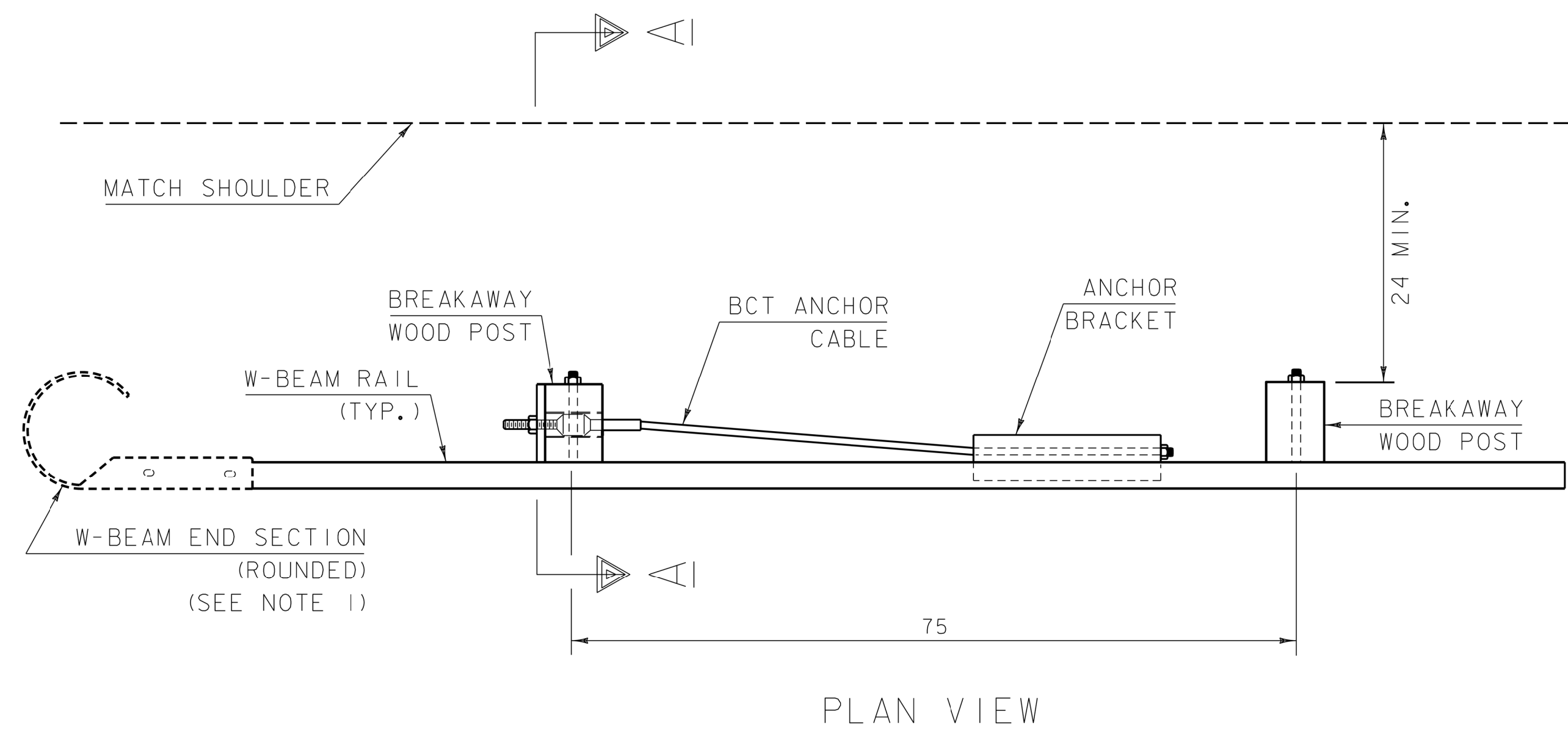
* POST LENGTH SHALL BE INCREASED TO 96 INCHES WHEN W BEAM GUARDRAIL, 8 FEET POSTS IS SPECIFIED.

REV.	DATE	DESCRIPTION
--	APR. 17, 2019	ORIGINAL APPROVAL
OTHER DETAILS REQUIRED: NONE		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

**W-BEAM GUARDRAIL COMPONENTS**



**HIGHWAY SAFETY**  
& DESIGN DETAIL  
**HSD - 621.07B**



- GENERAL NOTES**
1. WHEN AN ANCHOR IS USED IN THE MIDDLE OF A GUARDRAIL RUN A STANDARD W-BEAM MID-SPLICE CONNECTION SHALL BE UTILIZED.
  2. END SECTION SHALL ONLY BE INSTALLED AS TRAILING END ON ONE-WAY TRAFFIC ROADS.
  3. W-BEAM END SECTION ROUNDED HAS THE SAME MATERIAL PROPERTIES AS STANDARD STEEL RAIL.
  4. END SECTION BOLTS AND NUTS HAVE THE SAME MATERIAL REQUIREMENTS AS SPLICE BOLTS.
  5. FOUNDATION TUBE BOLTS ARE  $\frac{7}{8}$ " DIAMETER ASTM A307 HEX HEAD BOLT. FOUNDATION TUBE BOLTS REQUIRE ASTM A563 A NUT AND TWO ASTM F844  $\frac{7}{8}$ " DIAMETER FLAT WASHERS. INSTALL ONE WASHER UNDER BOLT HEAD AND ONE WASHER UNDER NUT.
  6. ANCHOR BRACKET AND GROUND STRUT BOLTS ARE A  $\frac{5}{8}$ " DIAMETER ASTM A307 HEX HEAD BOLT. ANCHOR BRACKET BOLTS REQUIRE ASTM A563 A NUT AND TWO ASTM F844  $\frac{5}{8}$ " DIAMETER FLAT WASHERS. INSTALL ONE WASHER UNDER BOLT HEAD AND ONE WASHER UNDER NUT.
  7. W-BEAM END SECTION (ROUNDED) AND W-BEAM RAIL SHALL BE PAID FOR UNDER ITEM 621.20 STEEL BEAM GUARDRAIL GALVANIZED. ALL OTHER COMPONENTS SHALL BE PAID FOR UNDER ITEM 621.60 ANCHOR FOR STEEL BEAM RAIL.
  8. ALL MEASUREMENTS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

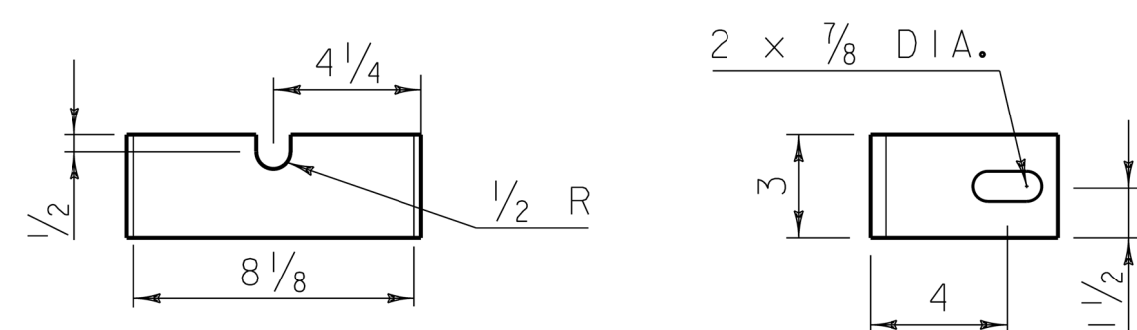
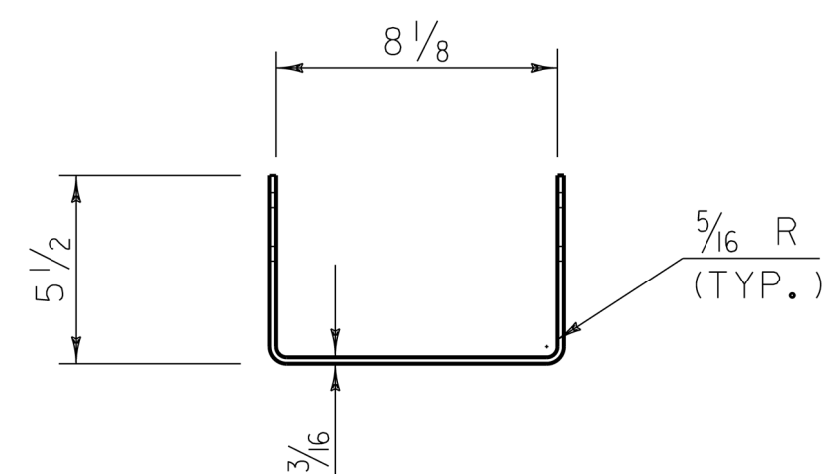
- (A) TOP OF FOUNDATION TUBE SHALL BE NO MORE THAN 3" ABOVE FINISHED GROUND.
- (B) FOR NEW CONSTRUCTION TOP OF RAIL IS  $31" \pm 1"$ . FOR EXISTING INSTALLATIONS TOP OF RAIL IS BETWEEN  $27 \frac{3}{4}"$  TO  $32" \pm 1"$ .

REV.	DATE	DESCRIPTION
--	APR. 17, 2019	ORIGINAL APPROVAL
OTHER DETAILS REQUIRED: HSD-621.07D, HSD-621.07E		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

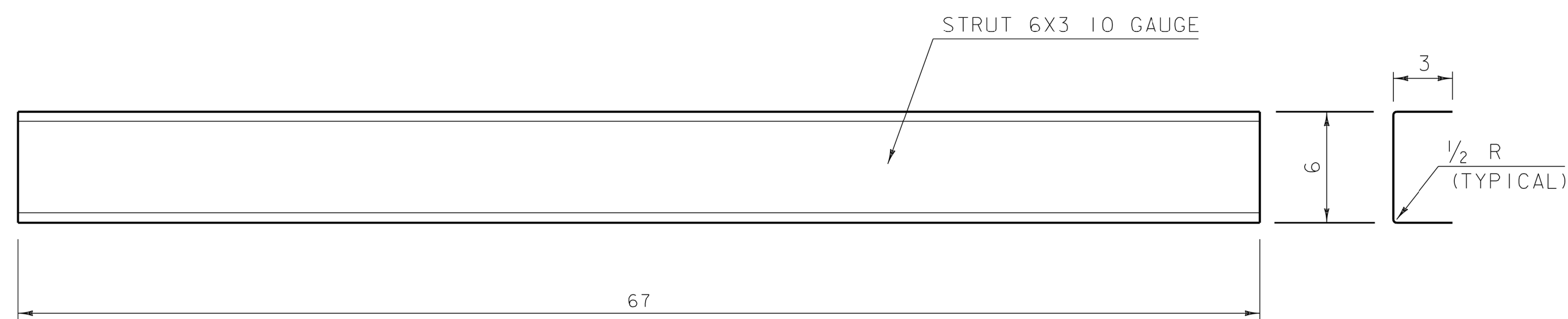
# MIDWEST GUARDRAIL SYSTEM (MGS) ANCHOR



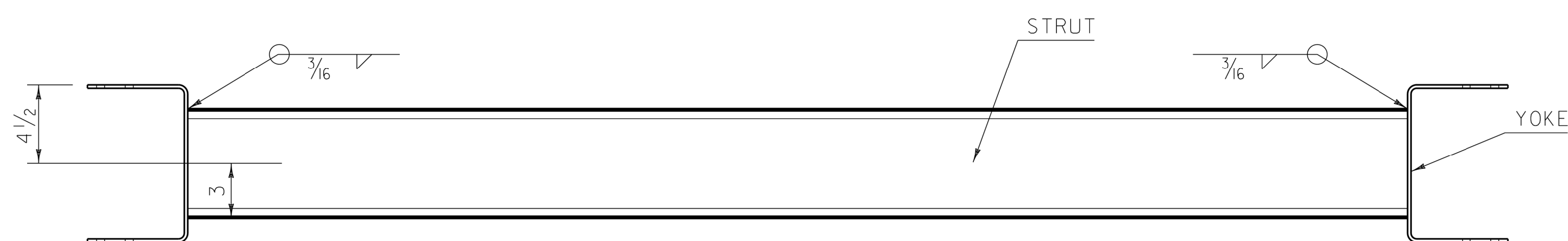
**HIGHWAY SAFETY  
& DESIGN DETAIL  
HSD-621.07C**



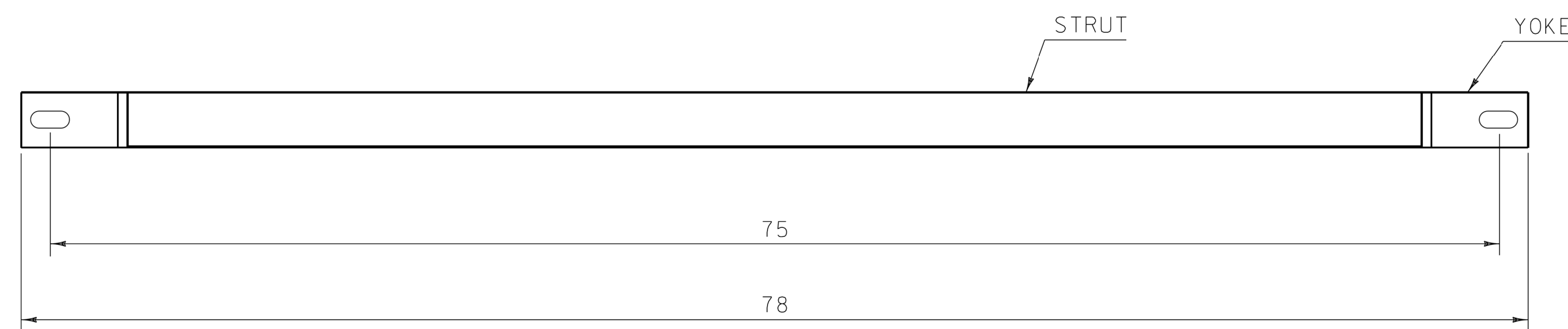
YOKE DETAIL



STRUT DETAIL

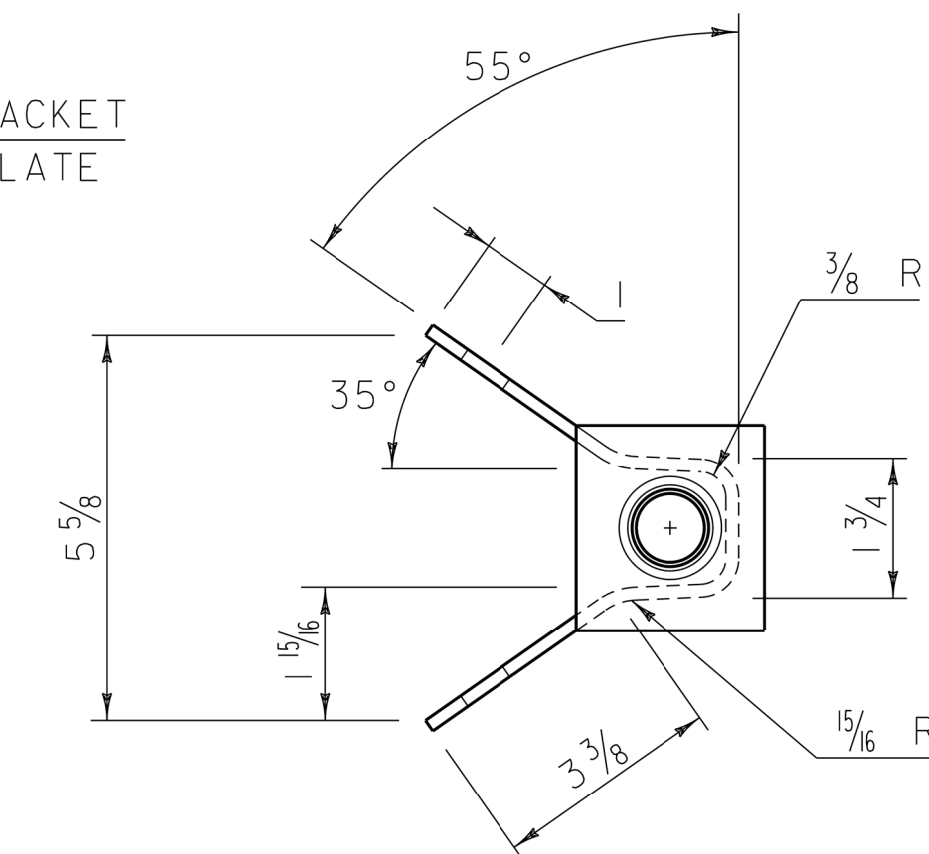
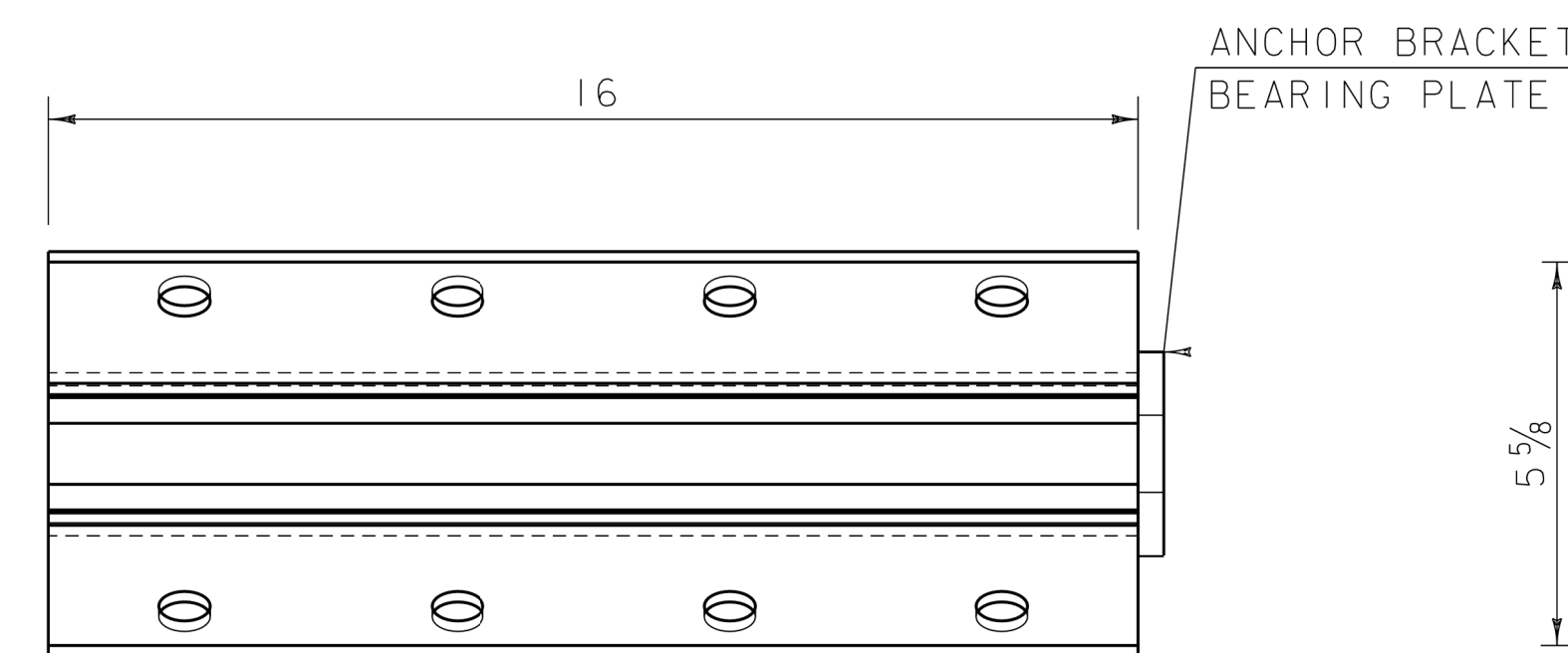
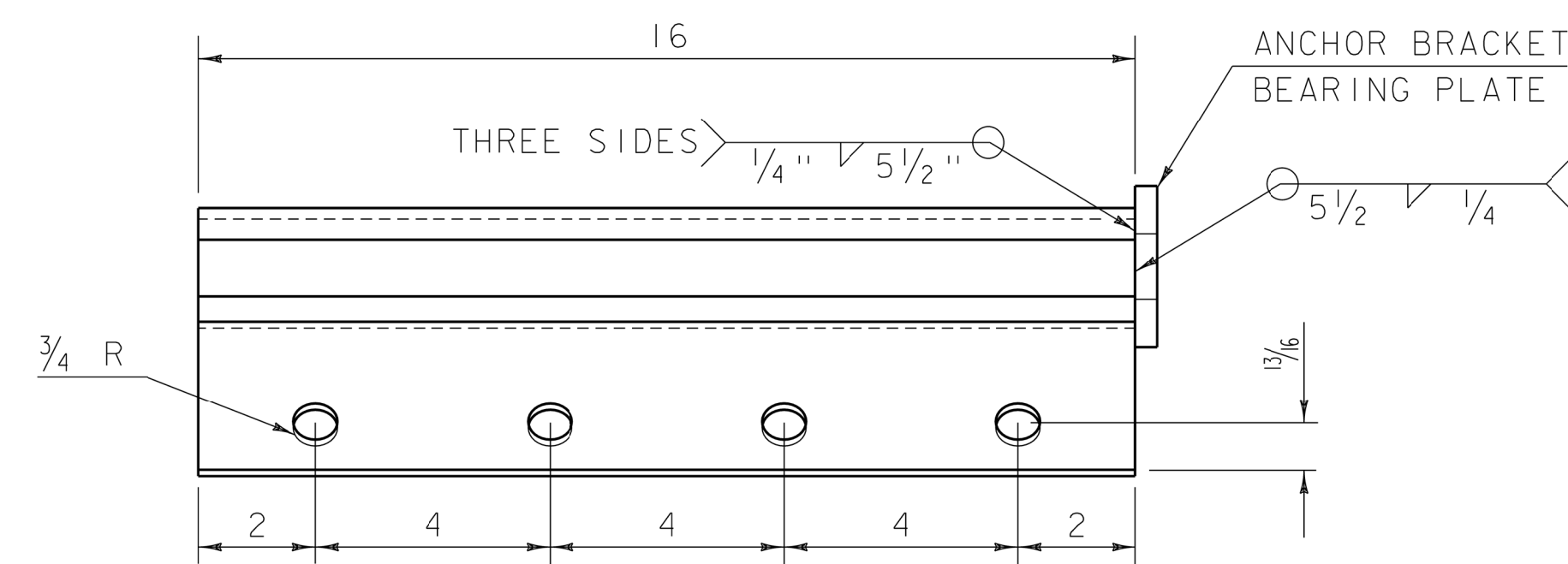


PLAN VIEW

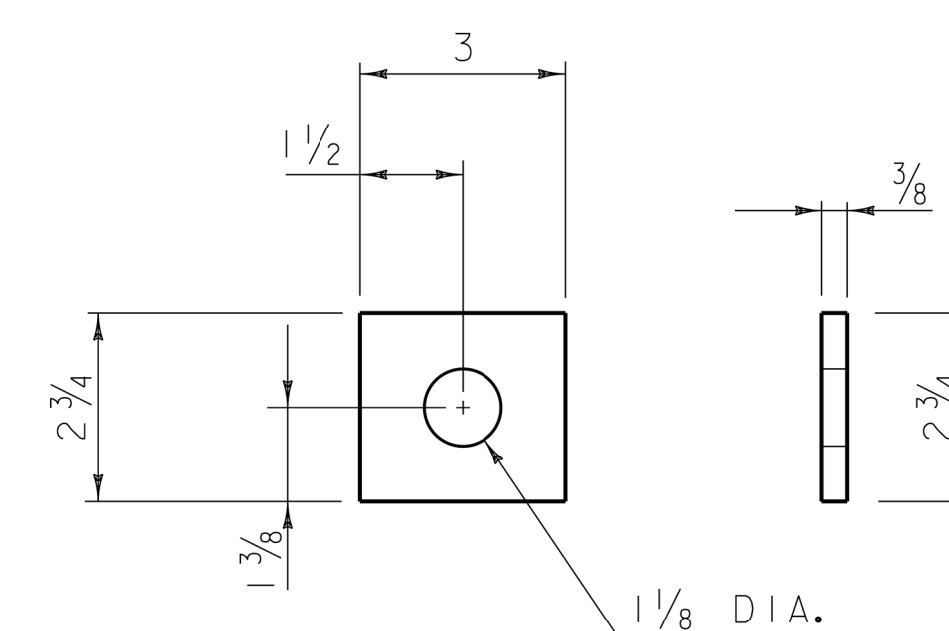


PROFILE VIEW

GROUND STRUT DETAIL



ANCHOR BRACKET



ANCHOR BRACKET BEARING PLATE

GENERAL NOTES

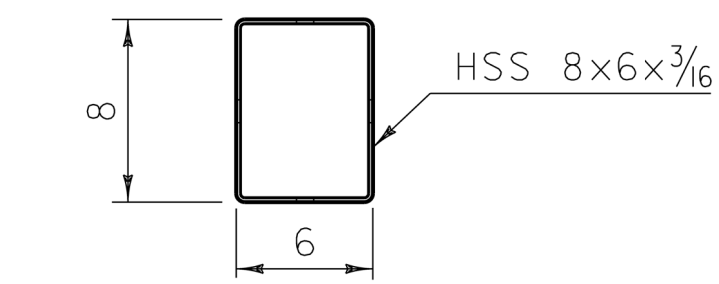
1. ALL MEASUREMENTS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

REV.	DATE	DESCRIPTION
--	APR. 17, 2019	ORIGINAL APPROVAL
OTHER DETAILS REQUIRED: HSD-621.07C, HSD-621.07E		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

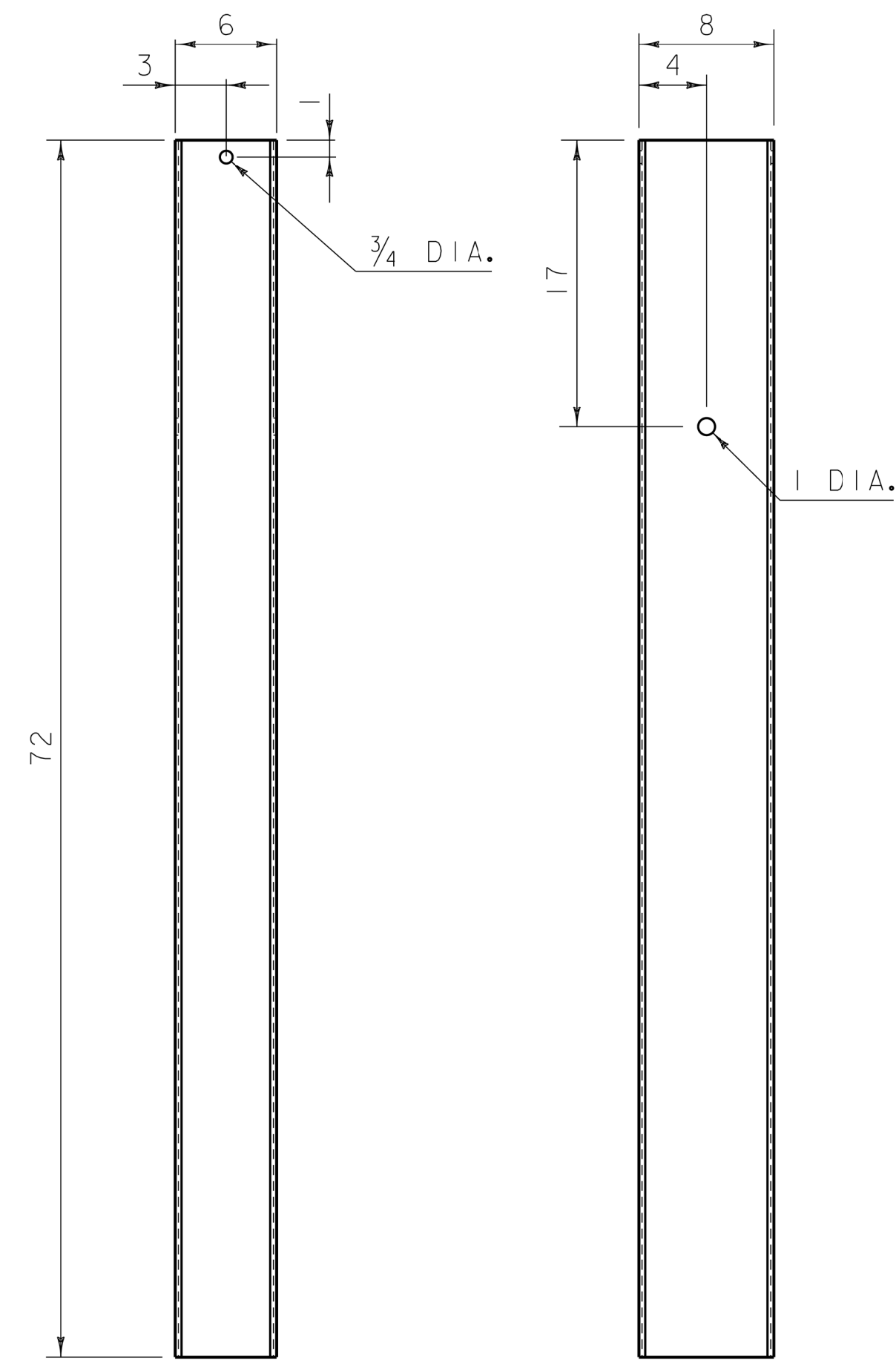
# MIDWEST GUARDRAIL SYSTEM (MGS) ANCHOR COMPONENTS



HIGHWAY SAFETY  
& DESIGN DETAIL  
HSD-621.07D



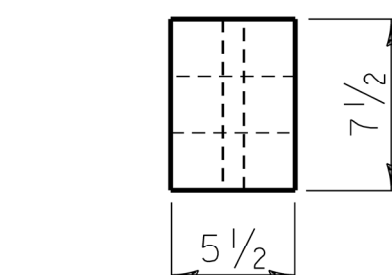
PLAN VIEW



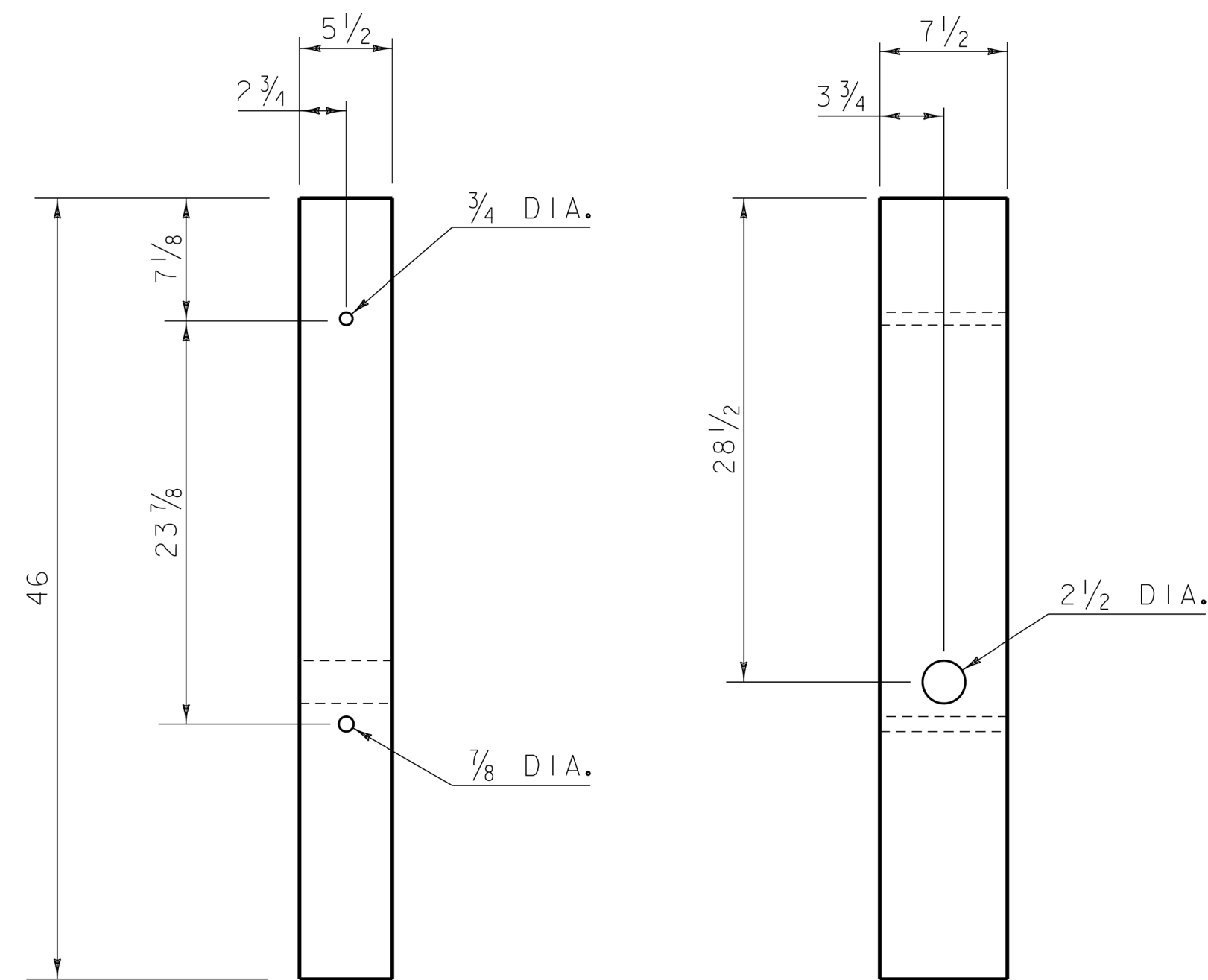
FRONT VIEW

SIDE VIEW

FOUNDATION TUBE



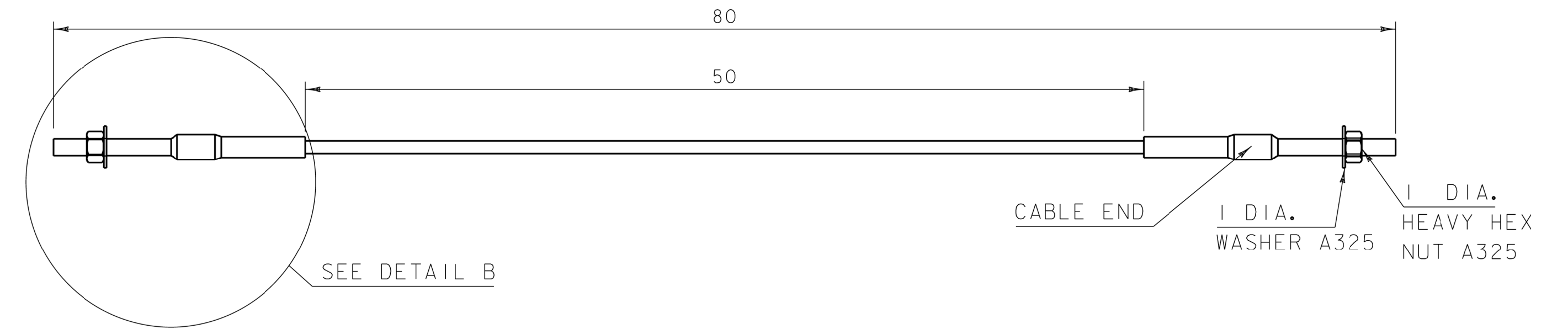
PLAN VIEW



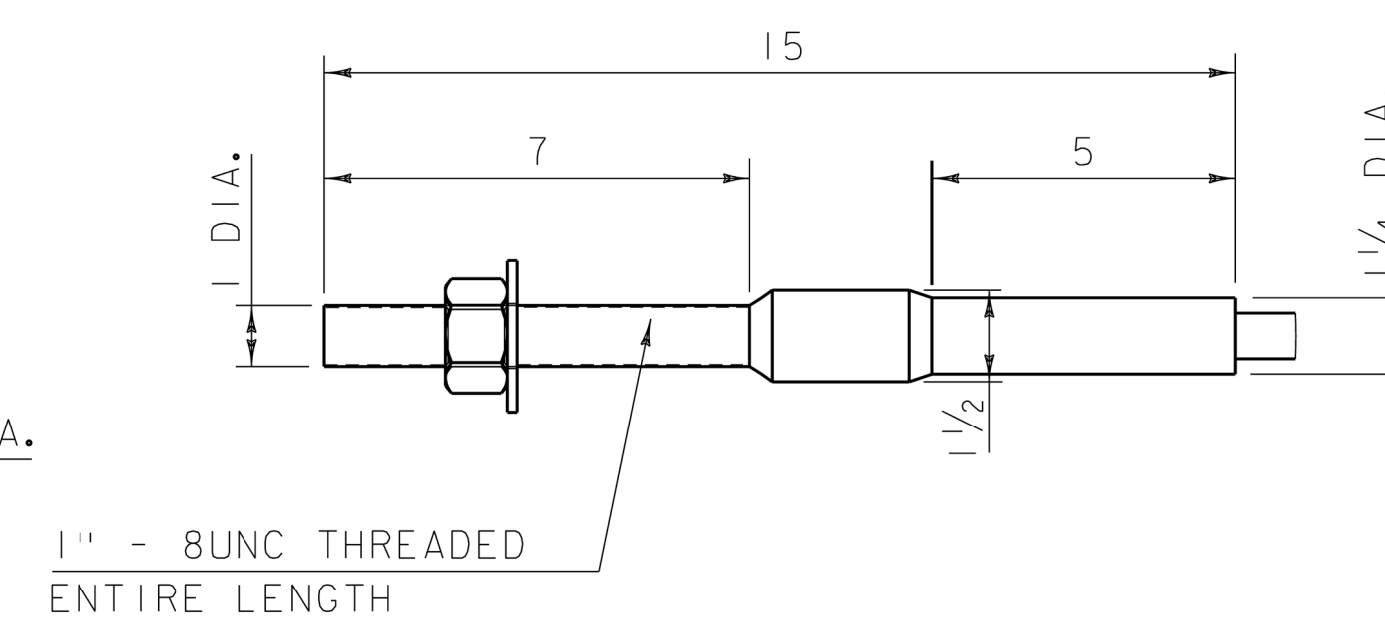
FRONT VIEW

SIDE VIEW

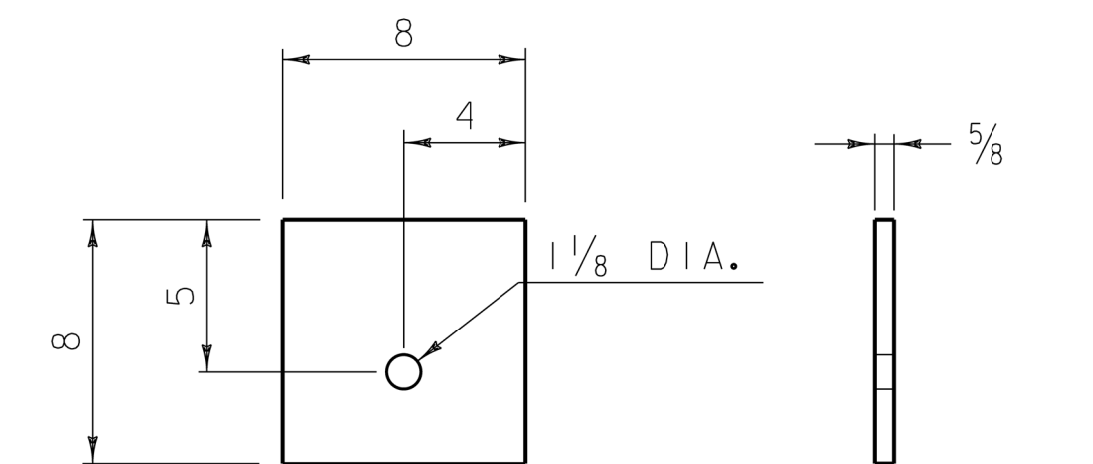
BREAKAWAY WOOD POST



BCT ANCHOR CABLE



DETAIL B



SIDE VIEW

FRONT VIEW

ANCHOR CABLE BEARING PLATE

GENERAL NOTES

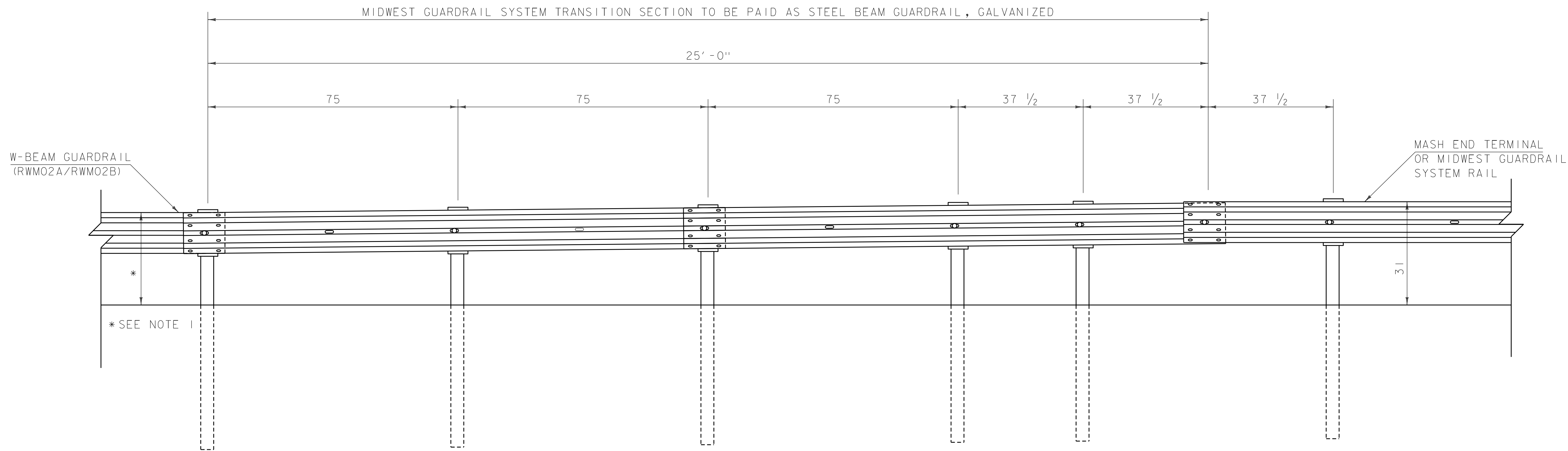
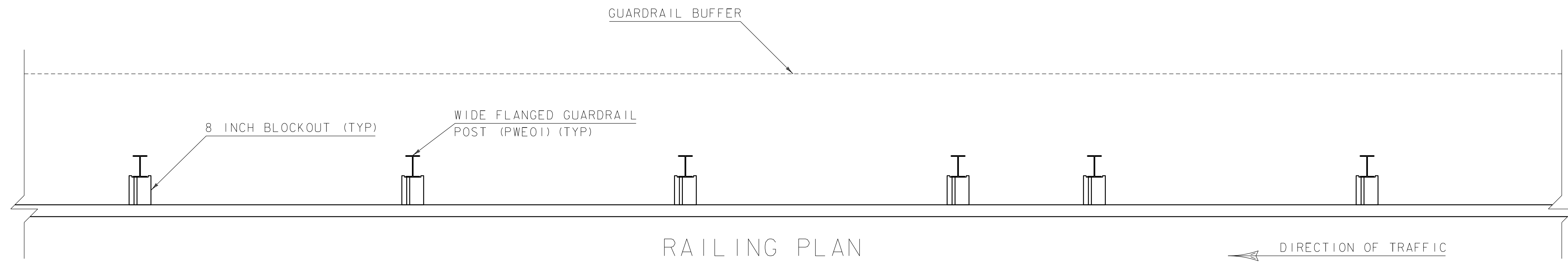
1. BCT ANCHOR CABLE IS A 3/4" DIAMETER 6X19 IWRC IPS GALVANIZED WIRE ROPE. THE SWAGED FITTINGS AND STUD ARE REQUIRED.
2. END FITTING SHALL BE MACHINED FROM HOT-ROLLED CARBON STEEL CONFORMING TO ASTM A576 GRADE 1035 AND GALVANIZED ACCORDING TO ASTM A123.
3. TREADED STUD SHALL CONFORM TO ASTM A325 OR SAE GRADE 5.
4. MINIMUM BREAKING STRENGTH OF WIRE ROPE IS 43,000 LB.
5. WIRE ROPE IS TO BE TAUT.
6. ALL MEASUREMENTS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

REV.	DATE	DESCRIPTION
--	APR. 17, 2019	ORIGINAL APPROVAL
OTHER DETAILS REQUIRED: HSD-621.07C, HSD-621.07D		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

MIDWEST GUARDRAIL SYSTEM (MGS)  
ANCHOR COMPONENTS



HIGHWAY SAFETY  
& DESIGN DETAIL  
HSD-621.07E



RAILING ELEVATION

GENERAL NOTES

1. THE HEIGHT OF RAIL AT THE END OF THIS TRANSITION SHALL MATCH THE DESIGN FOR THE APPLICABLE GUARDRAIL SYSTEM.
2. TRANSITIONS FROM 31 INCH HIGH MIDWEST GUARDRAIL SYSTEM TO OTHER RAIL SYSTEMS SHALL BE ACCOMPLISHED WITH 2 STANDARD 12 1/2 FOOT SECTIONS OF W-BEAM RAIL.
3. POSTS, BLOCKOUTS AND SPLICES SHALL BE IN ACCORDANCE WITH DETAILS HSD-621.07A AND HSD-621.07B AND LOCATED AS SHOWN IN THE DETAILS ABOVE.
4. STANDARD 6 FOOT POSTS SHALL BE USED UNLESS OTHERWISE NOTED ON PLANS.
5. END TERMINAL SHALL BE A VTRANS APPROVED PRODUCT MEETING MASH TESTING CRITERIA. ANY TERMINAL USED SHALL BE FROM THE VTRANS APPROVED PRODUCTS LIST.
6. ALL MEASURMENTS ARE IN INCHES UNLESS OTHERWISE NOTED.

REV.	DATE	DESCRIPTION
--	APR. 17, 2019	ORIGINAL APPROVAL
I	JAN. 4, 2021	CORRECTED NOTE 3 REFERENCES
OTHER DETAILS REQUIRED: HSD-621.07A, HSD-621.07B		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

## MIDWEST GUARDRAIL SYSTEM TRANSITION SECTION



HIGHWAY SAFETY  
& DESIGN DETAIL  
HSD-621.07F