MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	1	52
	PROJECT FILE NO.	609120	

TITLE SHEET & INDEX

PLAN AND PROFILE OF

PINEY LANE

(BRIDGE NO. L-16-026)

IN THE TOWN OF

LUDLOW

HAMPDEN COUNTY

FEDERAL AID PROJECT NO. STP(BR-OFF)-003S(782)X

THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

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1	TITLE SHEET & INDEX
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5-6	CONSTRUCTION PLANS
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11	PAVEMENT MARKING AND SIGNING PLAN
12	TEMPORARY TRAFFIC CONTROL PLAN
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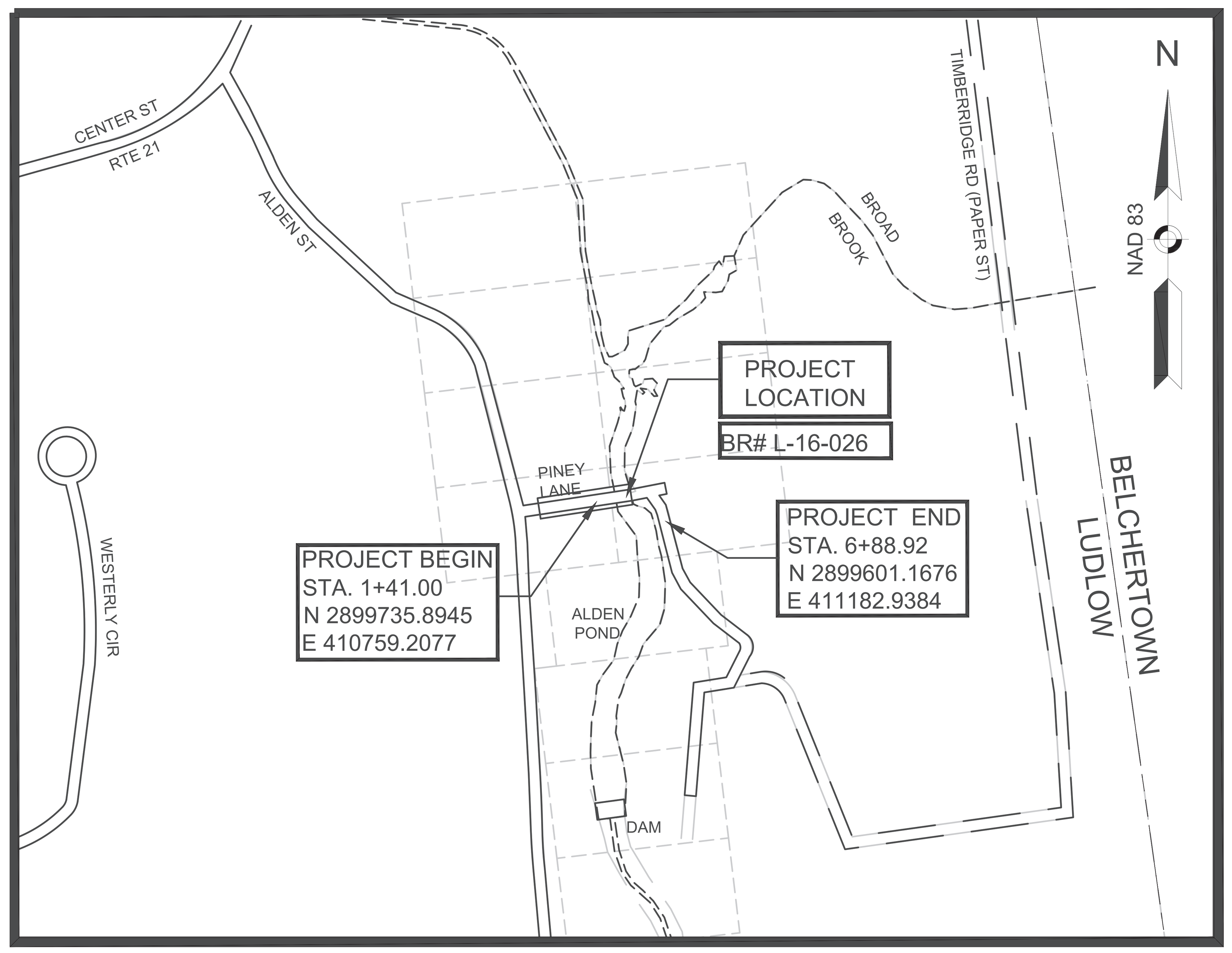
14	UTILITY PLAN
15	RESTORATION PLAN
16	PLANTING PLAN
17-19	CONSTRUCTION DETAILS (3 SHEETS)
20-47	BRIDGE PLANS (28 SHEETS)
48-52	CROSS SECTIONS (5 SHEETS)



0 400 800 1200 1600
SCALE 1" = 400'

LENGTH OF PROJECT = 547.92 FEET = 0.10 MILES

DESIGN DESIGNATION (PINEY LANE)

DESIGN SPEED	25 MPH
ADT (2022)	113
ADT (2042)	125
K	11.5%
D	50%
T (PEAK HOUR)	0%
T (AVERAGE DAY)	0%
DHV	13
DDHV	7
FUNCTIONAL CLASSIFICATION	RURAL LOCAL ROAD

DATE	DESCRIPTION	REV #
09/07/2024	ISSUED FOR CONSTRUCTION	0

COMMONWEALTH OF MASSACHUSETTS ADAM J. ZYSK CIVIL No. 39386 REGISTERED PROFESSIONAL ENGINEER

Adam Zysk Digitally signed by Adam Zysk Date: 2024.09.13 11:59:38 -04'00'

Dewberry®
99 SUMMER STREET
BOSTON, MA 02110
P: (617) 695-3400
F: (617) 695-3310

massDOT Massachusetts Department of Transportation Highway Division

APPROVED

Digitally signed by Carrie Lavallee, P.E. Date: 2024.09.16 11:30:23 -04'00'

CHIEF ENGINEER	DATE
	09/16/2024

Plotted on 10-Sep-2024 1:17 PM
609120_HD.DWG

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
Ⓒ	Ⓒ	CABLE MANHOLE
Ⓓ	Ⓓ	DRAINAGE MANHOLE
Ⓔ	Ⓔ	ELECTRIC MANHOLE
Ⓖ	Ⓖ	GAS MANHOLE
Ⓜ	Ⓜ	MISC MANHOLE
Ⓢ	Ⓢ	SEWER MANHOLE
Ⓣ	Ⓣ	TELEPHONE MANHOLE
Ⓦ	Ⓦ	WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
99 100		CONTOURS (ON-THE-GROUND SURVEY DATA)
99 100		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		GUARD RAIL - DOUBLE FACE - STEEL POSTS
		GUARD RAIL - DOUBLE FACE - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
1	1	CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
	*	EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
RRSG	RRSG	RAILROAD SIGNAL
OR		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
20'	20'	MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
	20'	MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT
		REFLECTORIZED DRUM - 10' ON CENTER SPACING
		SIGN MOUNTED ON BREAKAWAY POST
		SIGN MOUNTED ON TYPE III BARRICADE
		WORK ZONE (APPROXIMATE)
		TEMPORARY BARRIER (TL-2)

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWL	SOLID WHITE LINE
	SYL	SOLID YELLOW LINE
	BWL	BROKEN WHITE LINE
	BYL	BROKEN YELLOW LINE
	DWL	DOTTED WHITE LINE
	DYL	DOTTED YELLOW LINE
	DWLEx	DOTTED WHITE LINE EXTENSION
	DYLEx	DOTTED YELLOW LINE EXTENSION
	DBWL	DOUBLE WHITE LINE
	DBYL	DOUBLE YELLOW LINE

ABBREVIATIONS

GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWP	DETECTABLE WARNING PANEL
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LO	LAYOUT
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCR	PEDESTRIAN CURB RAMP
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	2	52
	PROJECT FILE NO. 609120		

LEGEND & ABBREVIATIONS

ABBREVIATIONS (cont.)

GENERAL

PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL ABBREVIATIONS

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

609120_HD.DWG Plotted on 12-Aug-2024 9:32 AM

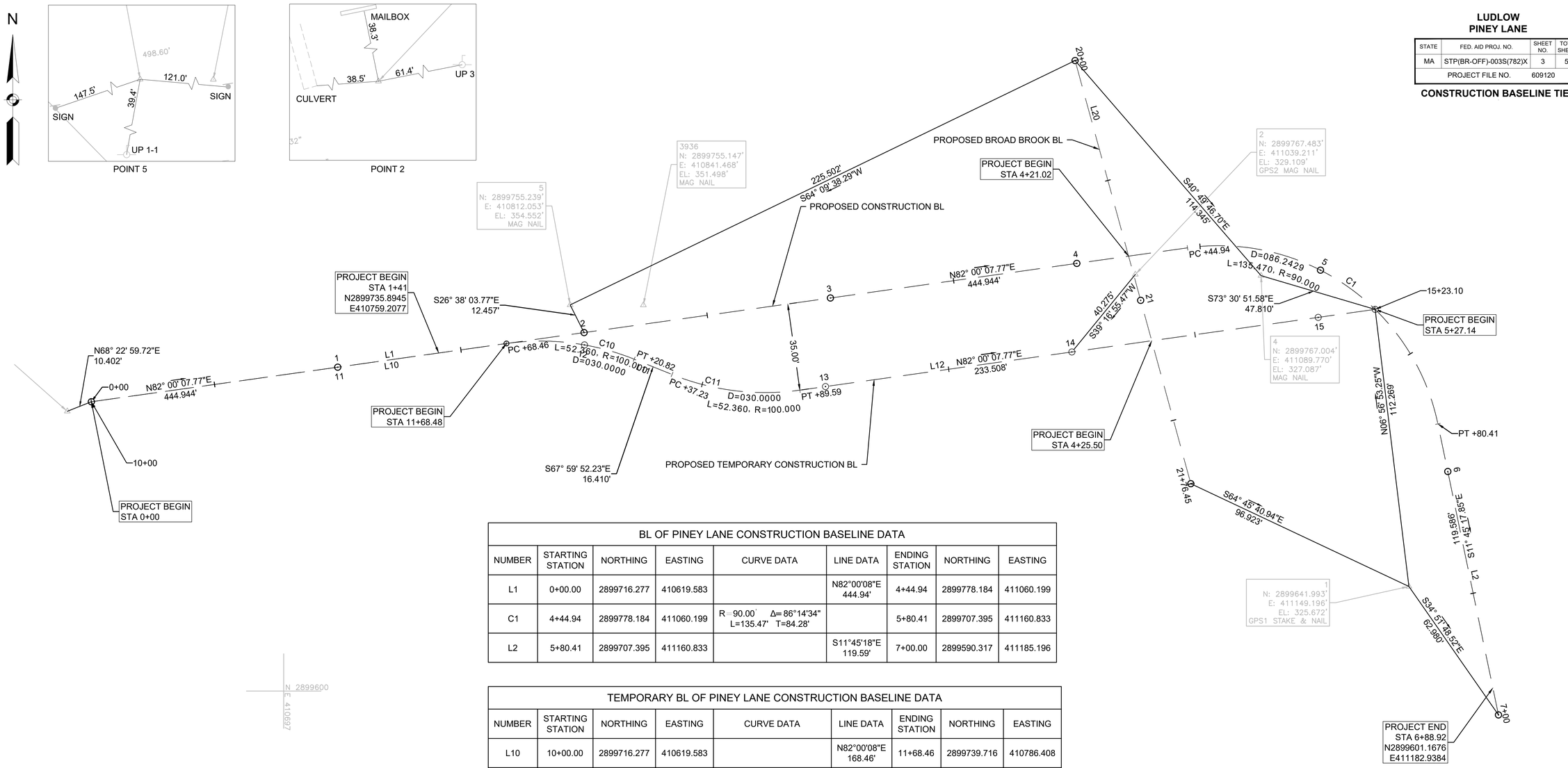
LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	3	52
PROJECT FILE NO.	609120		

CONSTRUCTION BASELINE TIES

POINT 5

POINT 2



BL OF PINEY LANE CONSTRUCTION BASELINE DATA

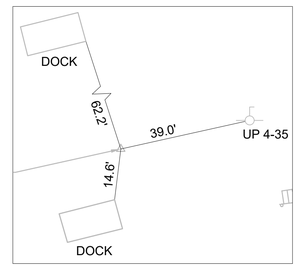
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	0+00.00	2899716.277	410619.583		N82°00'08"E 444.94'	4+44.94	2899778.184	411060.199
C1	4+44.94	2899778.184	411060.199	R=90.00' Δ=86°14'34" L=135.47' T=84.28'		5+80.41	2899707.395	411160.833
L2	5+80.41	2899707.395	411160.833		S11°45'18"E 119.59'	7+00.00	2899590.317	411185.196

TEMPORARY BL OF PINEY LANE CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L10	10+00.00	2899716.277	410619.583		N82°00'08"E 168.46'	11+68.46	2899739.716	410786.408
C10	11+68.46	2899739.716	410786.408	R=100.00' Δ=30°00'00" L=52.36' T=26.79'		12+20.82	2899733.406	410837.785
L11	12+20.82	2899733.406	410837.785		S67°59'52"E 16.41'	12+37.23	2899727.258	410853.000
C11	12+37.23	2899727.258	410853.000	R=100.00' Δ=30°00'00" L=52.36' T=26.79'		12+89.59	2899720.948	410904.378
L12	12+89.59	2899720.948	410904.378		N82°00'08"E 233.51'	15+23.10	2899753.437	411135.615

BL OF BROAD BROOK CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L20	20+00.00	2899853.524	411015.010		S15°17'07"E 176.45'	21+76.45	2899683.319	411061.525



POINT 1

SURVEY NOTES:

1. THIS PLAN IS BASED UPON AN ON THE GROUND INSTRUMENT SURVEY PERFORMED BY C&C CONSULTING ENGINEERS, LLC BETWEEN JULY 27, 2020 AND NOVEMBER 17, 2020.
2. HORIZONTAL DATUM IS BASED UPON THE NORTH AMERICAN DATUM OF 1983 (NAD83) (2011), EPOCH 2010.00, MASSACHUSETTS STATE PLANE COORDINATE SYSTEM, MAINLAND ZONE. COORDINATES ARE BASED ON CONTROL, AS PROVIDED BY MASSDOT SURVEY SECTION STATION 2611 (C&C 20) AND 2612 (C&C 21).
3. VERTICAL CONTROL IS BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AS PROVIDED BY MASSDOT SURVEY SECTION FOR STATION 2611 (C&C 20) AND 2612 (C&C 21) AND MONEL RIVET 5809 LOCATED AT THE INTERSECTION OF RT. 21 (CENTER STREET) AND ALDEN STREET.
4. 100 YEAR FLOOD ZONE, ALSO KNOWN AS BASE FLOOD ZONE PROTRACTED FROM FEMA COMMUNITY MAP PANEL 25013CO234E DATED JULY 16, 2013.
5. CONTOUR INTERVAL: 1 FOOT.
6. OWNERS ARE SHOWN ACCORDING TO CURRENT TOWN OF LUDLOW ASSESSORS' RECORDS, AND IS NOT A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN.
7. PROPERTY LINES ARE SHOWN AS APPROXIMATE AND ARE BASED UPON FIELD SURVEY, RECORD PLANS AND DEEDS.
8. PINEY LANE SIDELINE GEOMETRY BASED ON FIELD SURVEY USING BEST FIT TO EXISTING MONUMENTATION.

0 20 50 100

SCALE: 1" = 20'

609120_HD.DWG Plotted on 12-Aug-2024 9:32 AM

LUDLOW
PINEY LANE

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MA	STP(BR-OFF)-003S(782)X	4	52
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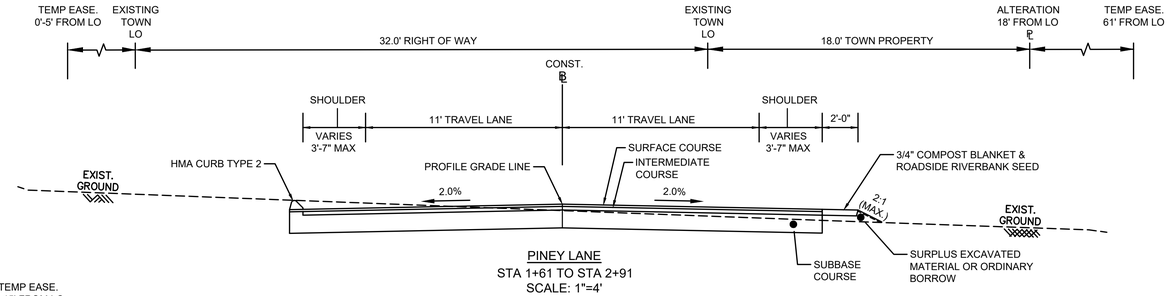
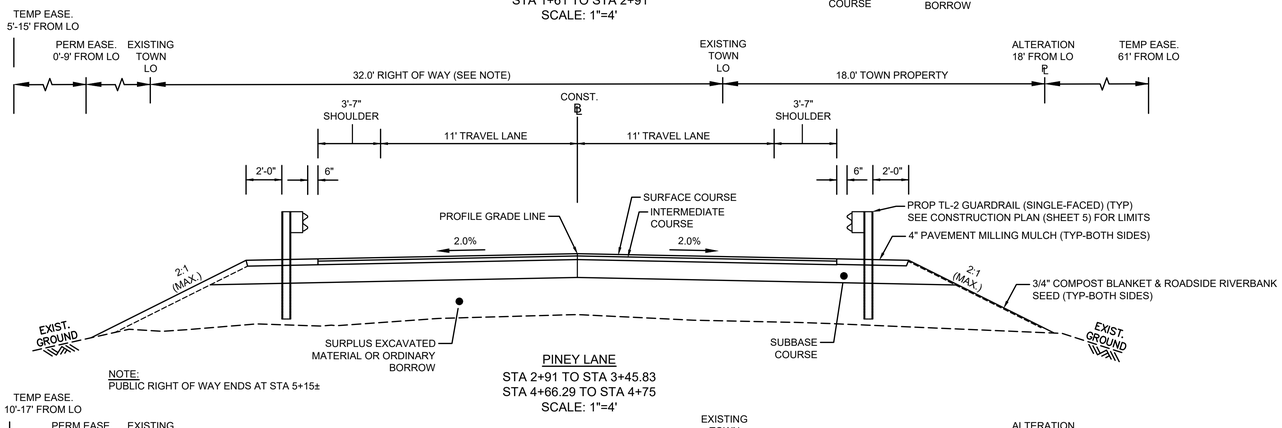
TYPICAL SECTIONS

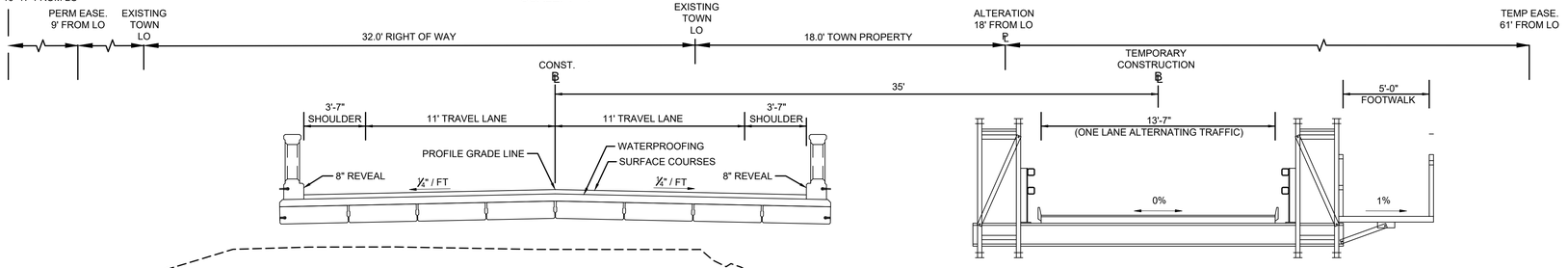


PINEY LANE
STA 1+61 TO STA 2+91
SCALE: 1"=4'



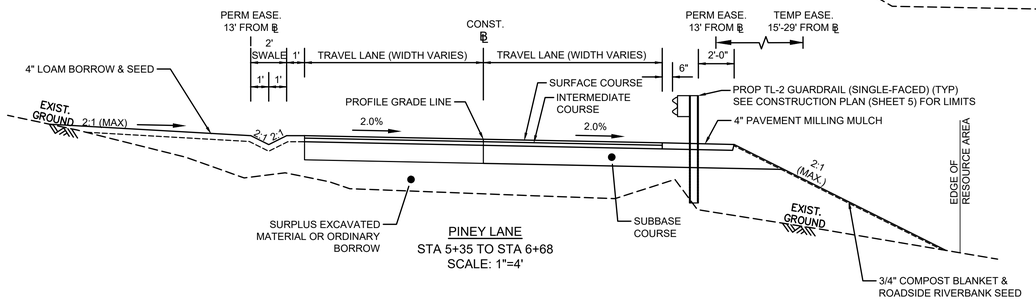
NOTE:
PUBLIC RIGHT OF WAY ENDS AT STA 5+15±

PINEY LANE
STA 2+91 TO STA 3+45.83
STA 4+66.29 TO STA 4+75
SCALE: 1"=4'



PINEY LANE BRIDGE SECTION
STA 3+45.83 TO STA 4+66.29
SCALE: 1"=4'

TEMPORARY BRIDGE SECTION
STA 13+88.53 TO STA 14+63.53
SCALE: 1"=4'



PINEY LANE
STA 5+35 TO STA 6+68
SCALE: 1"=4'

NOTE:
WATER SURFACE ELEVATION IS DAM CONTROLLED AND VARIES SEASONALLY

PAVEMENT & MATERIAL NOTES

PROPOSED FULL-DEPTH PAVEMENT

SURFACE: 1 1/2 INCHES SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5) OVER

INTERMEDIATE: 2 INCHES SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5) OVER

BASE: 4 INCHES SUPERPAVE BASE COURSE - 37.5 (SBC 37.5)

SUBBASE: 4 INCHES DENSE CRUSHED STONE FOR SUBBASE OVER 8 INCHES GRAVEL BORROW TYPE "B"

PROPOSED MICROMILLING & OVERLAY

MILLING: 1 1/2 INCHES PAVEMENT FINE MILLING

SURFACE: 1 1/2 INCHES SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5)

PROPOSED HOT MIX ASPHALT DRIVEWAY

SURFACE: 1 1/2 INCHES SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5)

INTERMEDIATE: 2 1/2 INCHES SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5)

SUBBASE: 8 INCHES GRAVEL BORROW TYPE "B"

PROPOSED BRIDGE PAVEMENT

SURFACE: 1 1/2 INCHES SUPERPAVE BRIDGE COURSE 9.5 (SSC-B-9.5) OVER
1 1/2 INCHES SUPERPAVE BRIDGE PROTECTIVE COURSE 9.5 (SPC-B-9.5) OVER
SPRAY APPLIED MEMBRANE WATERPROOFING

PROPOSED TEMPORARY PAVEMENT

SURFACE: 1 1/2 INCHES SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5) OVER

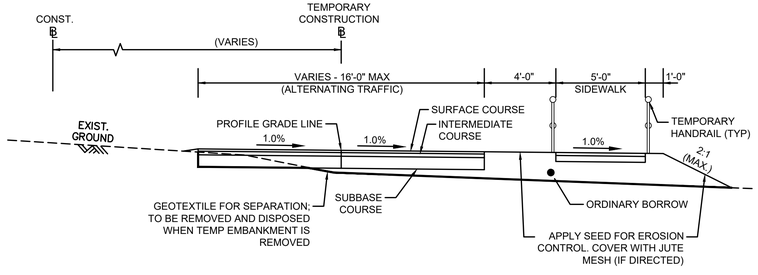
INTERMEDIATE: 2 1/2 INCHES SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5) OVER

BASE: 8 INCHES GRAVEL BORROW TYPE "B"

PROPOSED TEMPORARY SIDEWALK

SURFACE: 2 INCHES SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5) OVER

BASE: 4 INCHES GRAVEL BORROW TYPE "B"



TEMPORARY ROAD AND SIDEWALK SECTION
STA 11+68.46 TO 13+88.53
STA 14+63.53 TO STA 15+23.1
SCALE: 1"=4'

NOTE: TEMPORARY HANDRAIL PAID UNDER ITEM 660.1, TEMPORARY METAL PIPE RAIL

0 4 8 12 16
SCALE: 1" = 4'

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HIGHWAY GUARD DETAILS

STEEL W BEAM HWY GUARD TRAILING ANCHORAGE STA 2+97 LT
STEEL W BEAM HWY GUARD TRANSITION TO BRIDGE RAIL STA 3+07 LT

STEEL W BEAM HWY GUARD TANGENT END TREATMENT STA 2+95 RT
STEEL W BEAM HWY GUARD TL-2 (SINGLE FACED/STEEL POSTS) STA 3+21 TO STA 3+46 RT
STEEL W BEAM HWY GUARD TRANSITION TO BRIDGE RAIL STA 3+46 RT

STEEL W BEAM HWY GUARD TRANSITION TO BRIDGE RAIL STA 4+72 RT R=80 FT
STEEL W BEAM HWY GUARD TL-2 - CURVED (SINGLE FACED/STEEL POSTS) STA 5+06 TO STA 5+44 RT
STEEL W BEAM HWY GUARD TRAILING ANCHORAGE STA 5+44 RT

STEEL W BEAM HWY GUARD TRANSITION TO BRIDGE RAIL STA 4+61 LT R=160 FT
STEEL BEAM ROUNDED END UNIT STA 4+95 LT

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
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LUDLOW
PINEY LANE

CONSTRUCTION PLAN

Plotted on 12-Aug-2024 9:33 AM
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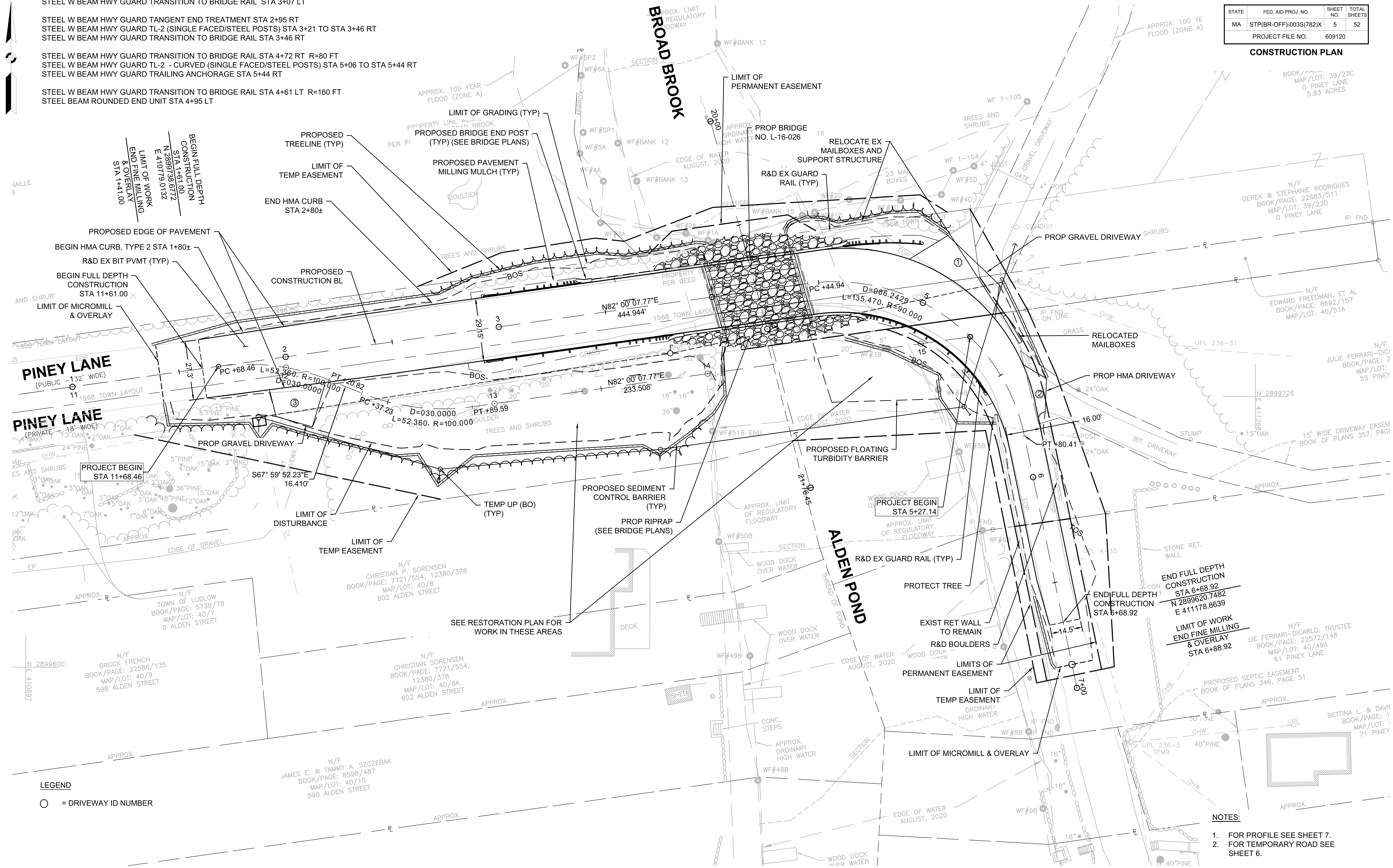


N
BROAD BROOK
ALDEN POND
PINEY LANE
(PUBLIC - 132' WIDE)
PINEY LANE
(PRIVATE - 18' WIDE)
BEGIN FULL DEPTH CONSTRUCTION STA 1+61.00 N 2899738.6772 E 410779.0132
LIMIT OF WORK END FINE MILLING & OVERLAY STA 1+41.00
PROPOSED TREELINE (TYP)
LIMIT OF TEMP EASEMENT
END HMA CURB STA 2+80±
PROPOSED EDGE OF PAVEMENT
BEGIN HMA CURB, TYPE 2 STA 1+80±
R&D EX BIT PVMT (TYP)
BEGIN FULL DEPTH CONSTRUCTION STA 11+61.00
LIMIT OF MICROMILL & OVERLAY
PROPOSED CONSTRUCTION BL
LIMIT OF GRADING (TYP)
PROPOSED BRIDGE END POST (TYP) (SEE BRIDGE PLANS)
PROPOSED PAVEMENT MILLING MULCH (TYP)
LIMIT OF PERMANENT EASEMENT
PROP BRIDGE NO. L-16-026
RELOCATE EX MAILBOXES AND SUPPORT STRUCTURE
R&D EX GUARD RAIL (TYP)
PROP GRAVEL DRIVEWAY
RELOCATED MAILBOXES
PROP HMA DRIVEWAY
N82° 00' 07.77"E 444.944'
N82° 00' 07.77"E 233.508'
PC +68.46 L=52.360, R=100.000 D=030.0000
PT +20.82
PC +37.23 D=030.0000 L=52.360, R=100.000
PT +89.59
PC +44.94 D=086.2429 L=135.470, R=90.000
PT +80.41
S67° 59' 52.23"E 16.410'
29.15'
27.3'
16.00'
14.5'
PROP GRAVEL DRIVEWAY
PROJECT BEGIN STA 11+68.46
LIMIT OF DISTURBANCE
LIMIT OF TEMP EASEMENT
TEMP UP (BO) (TYP)
PROPOSED SEDIMENT CONTROL BARRIER (TYP)
PROP RIPRAP (SEE BRIDGE PLANS)
SEE RESTORATION PLAN FOR WORK IN THESE AREAS
PROPOSED FLOATING TURBIDITY BARRIER
PROJECT BEGIN STA 5+27.14
R&D EX GUARD RAIL (TYP)
PROTECT TREE
EXIST RET WALL TO REMAIN
R&D BOULDERS
LIMITS OF PERMANENT EASEMENT
LIMIT OF TEMP EASEMENT
LIMIT OF MICROMILL & OVERLAY
END FULL DEPTH CONSTRUCTION STA 6+68.92
END FULL DEPTH CONSTRUCTION STA 6+68.92 N 2899620.7482 E 411178.8639
LIMIT OF WORK END FINE MILLING & OVERLAY STA 6+88.92
N/F DEREK & STEPHANIE RODRIGUES BOOK/PAGE: 22683/511 MAP/LOT: 39/23D 0 PINEY LANE
N/F EDWARD FREEDMAN, ET AL BOOK/PAGE: 8692/157 MAP/LOT: 40/51A
N/F CHRISTIAN P. SORENSEN BOOK/PAGE: 7721/554, 12380/378 MAP/LOT: 40/8 602 ALDEN STREET
N/F TOWN OF LUDLOW BOOK/PAGE: 5738/78 MAP/LOT: 40/7 0 ALDEN STREET
N/F BROCK FRENCH BOOK/PAGE: 22586/135 MAP/LOT: 40/9 598 ALDEN STREET
N/F CHRISTIAN SORENSEN BOOK/PAGE: 7721/554, 12380/378 MAP/LOT: 40/8A 602 ALDEN STREET
N/F JAMES E. & TAMMY A. SZCZEBAK BOOK/PAGE: 8598/487 MAP/LOT: 40/10 590 ALDEN STREET
N/F LIE FERRARI-DICARLO, TRUSTEE BOOK/PAGE: 22572/148 MAP/LOT: 40/49A 61 PINEY LANE
PROPOSED SEPTIC EASEMENT BOOK OF PLANS 346, PAGE 51
15' WIDE DRIVEWAY EASEMENT BOOK OF PLANS 357, PAGE
APPROX. 100 YEAR FLOOD (ZONE A)
APPROX. LIMIT OF REGULATORY FLOODWAY
EDGE OF WATER AUGUST, 2020
APPROX. ORDINARY HIGH WATER
WOOD DOCK OVER WATER
EDGE OF GRAVEL
DECK
SHED
CONC. STEPS
STONE RET. WALL
TREES AND SHRUBS
1968 TOWN LAYOUT
GRAVEL DRIVEWAY
BIT. DRIVEWAY

0 20 50 100
SCALE: 1" = 20'

LEGEND

○ = DRIVEWAY ID NUMBER

NOTES:

1. FOR PROFILE SEE SHEET 7.
2. FOR TEMPORARY ROAD SEE SHEET 6.

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

N

LEGEND

□ = PCR RAMP SYMBOL

○ = DRIVEWAY SYMBOL

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	6	52
PROJECT FILE NO.	609120		

CONSTRUCTION PLAN
TEMPORARY ROAD

609120_HD.DWG Plotted on 12-Aug-2024 9:33 AM

BEGIN TEMP. ROAD
STA 11+61.00
N 2899738.6772
E 410779.0132

BROAD BROOK

APPROX. LIMIT OF REGULATORY FLOODWAY

APPROX. 100 YEAR FLOOD (ZONE A)

PROPERTY LINE WESTERLY BANK OF BROAD BROOK PER PLAN BOOK 385, PAGE 11.

SECTION

APPROX. ORDINARY HIGH WATER

EDGE OF WATER AUGUST, 2020

INVERT EL=321.68

LIMIT OF PERMANENT EASEMENT

LIMIT OF TEMP EASEMENT

RELOCATE OHW AND POLES (TEMP) SEE UTILITY PLANS

PROPOSED TEMPORARY CONSTRUCTION BL

PROPOSED CONSTRUCTION BL

PROPOSED SEDIMENT CONTROL BARRIER (TYP)

TEMPORARY ATTENUATORS

PC +44.94
D=086.2429
L=135.470, R=90.000

N82° 00' 07.77"E
444.944'

N82° 00' 07.77"E
233.508'

PC +68.46 L=52.360, R=100.000
D=030.0000

PT +20.82

PC +37.23
D=030.000
L=52.360, R=100.000

PT +89.59

PT +80.41

TEMPORARY UP (BO) TYP

TEMPORARY SHORING (SEE BRIDGE PLANS)

TEMPORARY BRIDGE (SEE BRIDGE PLANS)

TEMPORARY SHORING (SEE BRIDGE PLANS)

PROJECT BEGIN STA 11+68.46

S67° 59' 52.23"E
16.410'

REMOVE EX BOULDERS

TEMPORARY HMA SIDEWALK

TEMPORARY ROAD EOP

TEMPORARY HANDRAILS

LIMIT OF TEMP EASEMENT

LIMIT OF DISTURBANCE

LIMIT OF TEMPORARY GRADING (TYP)

PROPOSED TREELINE (TYP)

PROJECT BEGIN STA 5+27.14

21+76.45

ALDEN POND

LIMITS OF PERMANENT EASEMENT

LIMIT OF TEMP EASEMENT

7+00

PINEY LANE
(PUBLIC - 132' WIDE)

PINEY LANE
(PRIVATE - 18' WIDE)

1968 TOWN LAYOUT

N/F
TOWN OF LUDLOW
BOOK/PAGE: 5738/78
MAP/LOT: 40/7
0 ALDEN STREET

N/F
BROCK FRENCH
BOOK/PAGE: 22586/135
MAP/LOT: 40/9
598 ALDEN STREET

N/F
CHRISTIAN P. SORENSEN
BOOK/PAGE: 7721/554, 12380/378
MAP/LOT: 40/8
602 ALDEN STREET

N/F
CHRISTIAN SORENSEN
BOOK/PAGE: 7721/554, 12380/378
MAP/LOT: 40/8A
602 ALDEN STREET

N/F
JAMES E. & TAMMY A. SZCZEBAK
BOOK/PAGE: 8598/487
MAP/LOT: 40/10
590 ALDEN STREET

N/F
DEREK & STEPHANIE RODRIGUES
BOOK/PAGE: 22683/511
MAP/LOT: 39/23D
0 PINEY LANE
5.83 ACRES

N/F
EDWARD FREEDMAN, ET AL
BOOK/PAGE: 8692/157
MAP/LOT: 40/51A

N/F
JULIE FERRARI–DICARLO, TRUSTEE
BOOK/PAGE: 22572/148
MAP/LOT: 40/49A
61 PINEY LANE

PROPOSED SEPTIC EASEMENT
BOOK OF PLANS 346, PAGE 51

15' WIDE DRIVEWAY EASEM
BOOK OF PLANS 357, PAGE

LEGEND

□ = PCR NUMBER

SITE PREPARATION NOTES:

1. INSTALL SEDIMENT CONTROL BARRIER AND FLOATING TURBIDITY BARRIER PRIOR TO STARTING ALL OTHER WORK.
2. CUT EXISTING TREES FLUSH WITH THE GROUND PRIOR TO PLACEMENT OF THE GEOTEXTILE. DO NOT REMOVE THE STUMPS.
3. INSTALL TEMPORARY FACILITIES INCLUDING GEOTEXTILE, EMBANKMENT, ROAD, SIDEWALK, BRIDGE, AND SLOPE STABILIZATION.

NOTES:

1. FOR PROFILE SEE SHEET 8.

0 20 50 100

SCALE: 1" = 20'

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	7	52
PROJECT FILE NO.	609120		

PROFILE

609120_HD.DWG Plotted on 12-Aug-2024 9:33 AM

PVI STA = 1+96.00
PVI ELEV = 355.30
A.D. = -3.94%
K = 19.03
75' VC
311.3' SSD

PVC: 1+58.50
ELEV: 352.32

-5.00%

PVT: 2+33.50
ELEV: 350.80

-12.00%

PVC: 2+72
ELEV: 346.18

LOW POINT ELEV = 327.81
LOW POINT STA = 5+78.20
PVI STA = 4+47.00
PVI ELEV = 325.18
A.D. = 13.72%
K = 25.52
350' VC
154.9' HSD

Control Point #2
Elevation = 329.109'
Sta. 4+22.67, 7.68' RT

Control Point #4
Elevation = 327.087'
Sta. 4+76.89, 10.21' RT

END FULL DEPTH CONSTRUCTION
STA 6+68.92

LIMIT OF WORK
END MICROMILLING & OVERLAY
STA 6+88.92

PVT: 6+22
ELEV: 328.18

1.72%

EXISTING GRADE

PROPOSED GRADE

LIMIT OF WORK
END MICROMILLING & OVERLAY
STA 1+41.00

BEGIN FULL DEPTH CONSTRUCTION
STA 1+61.00

PROPOSED BRIDGE NO. L-16-026

EXISTING PIPES TO BE REMOVED

BASE (100 YEARS)
EL. 327.23

DESIGN (10 YEARS)
EL. 324.94

OBSERVED WATER
EL. 322±

PROPOSED APPROACH SLAB (TYP)

PROPOSED ABUTMENT (TYP)

DRILLED SHAFTS (TYP)

APPROX. EXISTING BEDROCK

APPROX. BEDROCK
EL. 309 (TYP)

EL. 309±

Control Point #5
Elevation = 354.552'
Sta. 1+96.02, 11.80' LT

Control Point #1
Elevation = 325.672'
Sta. 6+42.07, 24.72' RT

EXIST. ELEVATION
PROP. ELEVATION

NAVD 88
BASE ELEV
305.00

359.0	354.6	348.8	341.9	335.0	330.4	328.1	326.7	327.1	327.8	328.7	
359.01	**354.53**	**348.82**	**342.97**	**338.01**	**334.03**	**331.03**	**329.01**	**327.96**	**327.90**	**328.66**	

2+00 3+00 4+00 5+00 6+00

STA 5+27.14 PINEY LANE (PERM)=
STA 15+23.10 PINEY LANE (TEMP)

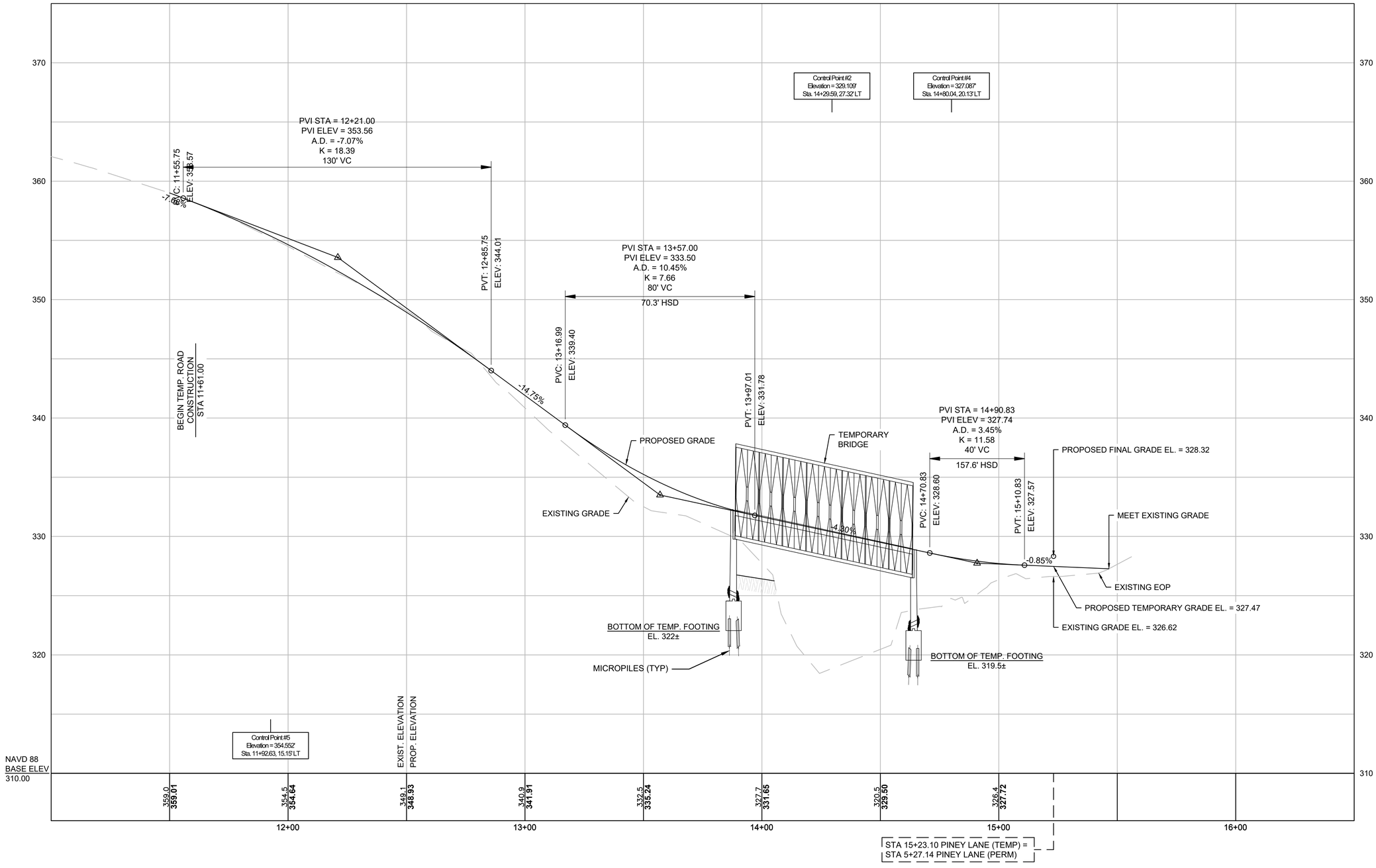
HOR. SCALE IN FEET
20 0 20 40
VER. SCALE IN FEET
4 0 4 8

FOR CONSTRUCTION PLAN:
SEE SHEET NO. 5

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	8	52
PROJECT FILE NO.	609120		

PROFILE
TEMPORARY ROAD



HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

FOR CONSTRUCTION PLAN:
SEE SHEET NO. 6

609120_HD.DWG Plotted on 12-Aug-2024 9:33 AM

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	9	52
PROJECT FILE NO.	609120		

CURB TIE & GRADING PLAN

609120_HD.DWG Plotted on 12-Aug-2024 9:33 AM

N

BROAD BROOK

ALDEN POND

PINEY LANE (PUBLIC - 32' WIDE)

PINEY LANE (PRIVATE - 18' WIDE)

BEGIN FULL DEPTH CONSTRUCTION
STA 1+61.00
N 2899738.6772
E 410779.0132

LIMIT OF WORK
END FINE MILLING & OVERLAY
STA 1+41.00

PROP SEDIMENT CONTROL BARRIERS (TYP)

PROPOSED CONSTRUCTION BL

PROJECT BEGIN
STA 11+68.46

S67° 59' 52.23"E
16,410'

LIMIT OF DISTURBANCE

REMOVE TEMP EMBANKMENT AND RETURN THIS AREA TO EXISTING GRADES FOLLOWING COMPLETION OF PERMANENT BRIDGE

PROP SEDIMENT CONTROL BARRIER (TYP)

INSTALL SEDIMENT CONTROL BARRIERS FOLLOWING REMOVAL OF TEMPORARY EMBANKMENT

PROJECT BEGIN
STA 5+27.14

END FULL DEPTH CONSTRUCTION
STA 6+68.92
N 2899620.7482
E 411178.8639

LIMIT OF WORK
END FINE MILLING & OVERLAY
STA 6+88.92

Line #/Curve #	Length	Direction/Delta	Radius	Tangent
C30	135.47	86°14'34"	90.00	84.28
C31	120.42	86°14'34"	80.00	74.92
L30	78.91	N81°15'47"E		
L31	212.01	N82°00'08"E		
L32	102.60	S11°45'18"E		
L33	78.84	S82°35'50"W		
L34	207.25	S82°00'08"W		
L36	22.06	N15°45'16"W		

0 20 50 100

SCALE: 1" = 20'

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	10	52
PROJECT FILE NO.	609120		

CURB TIE & GRADING PLAN
TEMPORARY ROAD

609120_HD.DWG Plotted on 12-Aug-2024 9:33 AM

N

BEGIN TEMP. ROAD
STA 11+61.00
N 2899738.6772
E 410779.0132

BROAD BROOK

PINEY LANE
(PUBLIC - 132' WIDE)

PINEY LANE
(PRIVATE - 18' WIDE)

PROJECT BEGIN
STA 11+68.46

PROPOSED SEDIMENT CONTROL BARRIER (TYP)

PROPOSED CONSTRUCTION BL

APPROXIMATE LIMIT OF TEMP GRADING

SEE DETAIL

N82° 00' 07.77"E
444.944'

PC +44.94

N82° 00' 07.77"E
253.508'

PC +68.46
14.00'
+68.5

PC +37.23

PT +89.59

PT +80.41

TOS

BOS

TEMPORARY SHORING
(SEE BRIDGE PLANS)

TEMPORARY BRIDGE
(SEE BRIDGE PLANS)

S67° 59' 52.23"E
16.410'

PROPOSED TEMPORARY CONSTRUCTION BL

TEMPORARY HANDRAILS (TYP)

TEMPORARY HMA SIDEWALK

LIMIT OF TEMPORARY GRADING (TYP)

PROPOSED SEDIMENT CONTROL BARRIER (TYP)

PROJECT BEGIN
STA 5+27.14

ALDEN POND

APPROX. LIMIT OF REGULATORY FLOODWAY

APPROX. 100 YEAR FLOOD (ZONE A)

APPROX. ORDINARY HIGH WATER

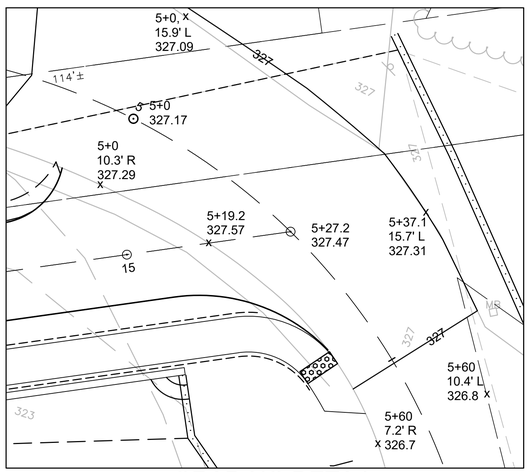
EDGE OF WATER AUGUST, 2020

EDGE OF GRAVEL

GRAVEL DRIVEWAY

CONC. STEPS

Line #/Curve #	Length	Direction/Delta	Radius	Tangent
C41	50.89	31°41'29"	92.00	26.11
C42	12.09	69°17'05"	10.00	6.91
C43	47.36	30°09'12"	90.00	24.24
C44	56.55	30°00'00"	108.00	28.94
C45	23.54	53°57'23"	25.00	12.73
L40	192.18	S82°00'08"W		
L42	3.09	S67°59'52"E		
L43	218.24	N82°00'08"E		
L44	17.63	N81°50'56"E		



GRADING DETAIL

0 20 50 100

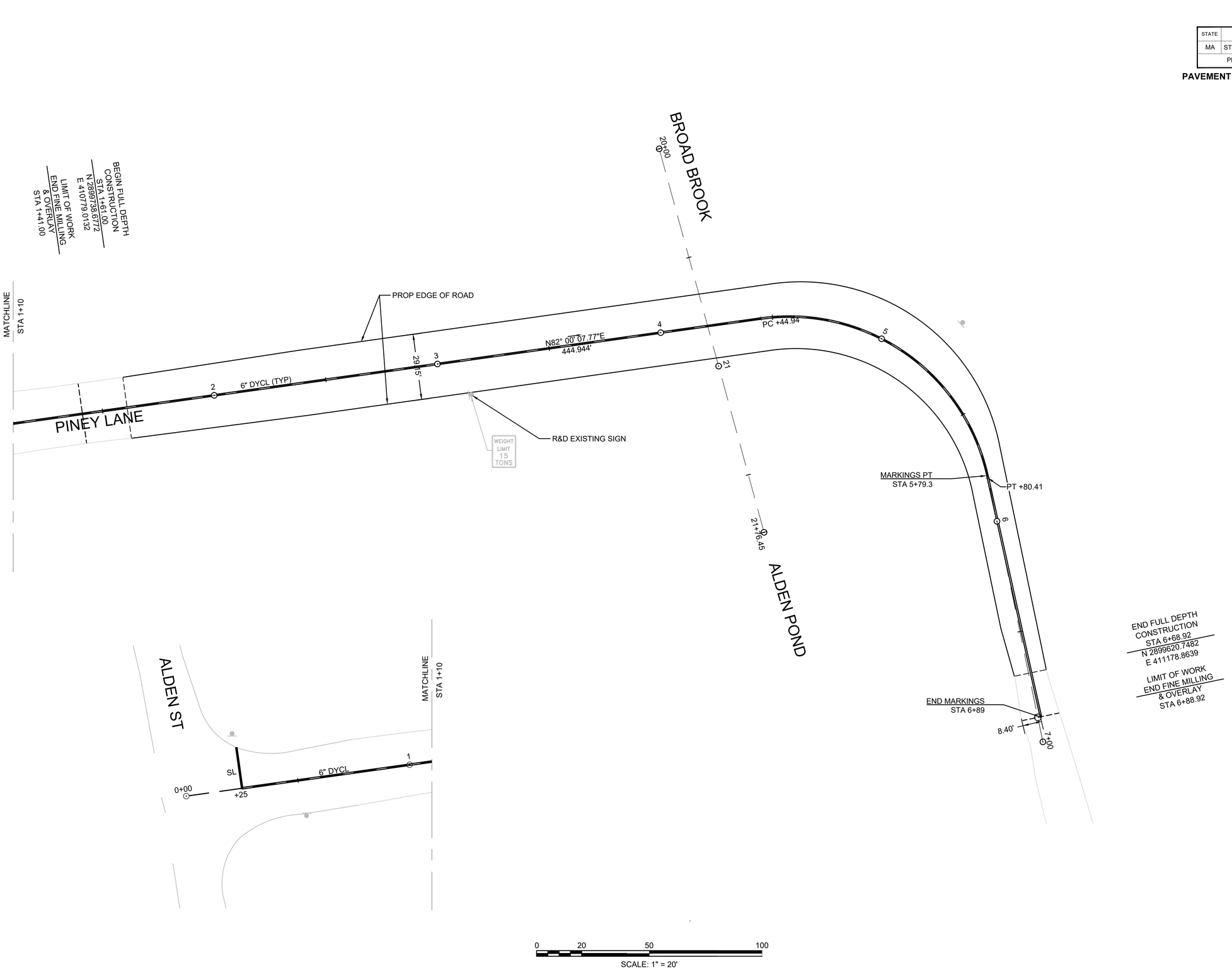
SCALE: 1" = 20'

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	11	52
PROJECT FILE NO.	609120		

PAVEMENT MARKING AND SIGNING PLAN

609120_HD.DWG Plotted on 12-Aug-2024 9:33 AM

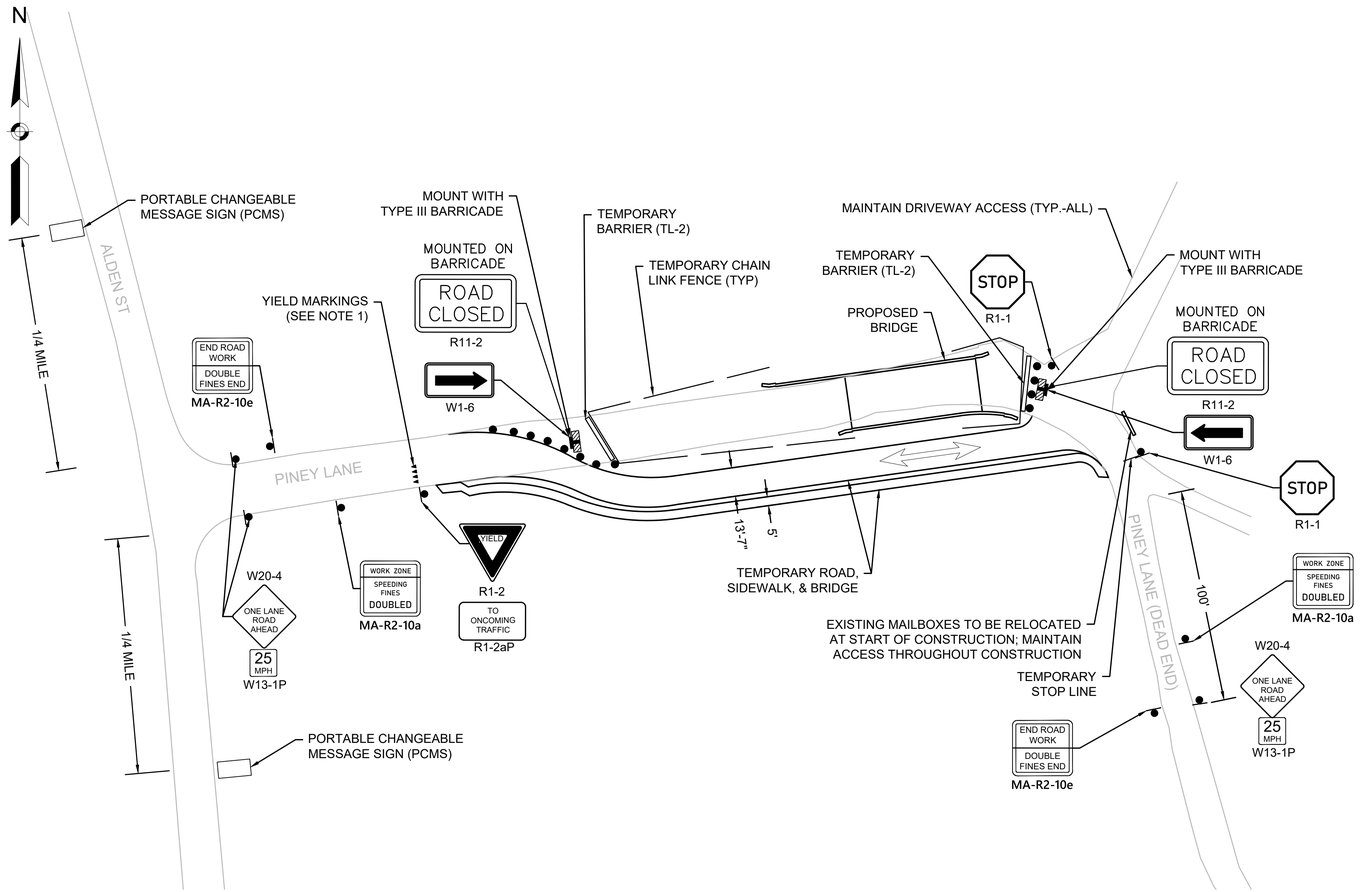


LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	12	52
PROJECT FILE NO.	609120		

TEMPORARY TRAFFIC CONTROL PLAN

609120_HD.DWG Plotted on 12-Aug-2024 9:34 AM



TRAFFIC MANAGEMENT PLAN

0 40 100 160

SCALE: 1" = 40'

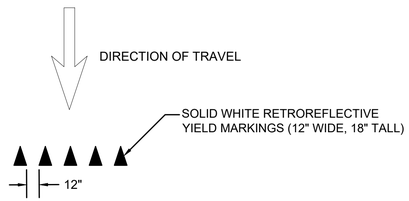
PCMS LEGEND

ADVANCE NOTIFICATIONS

BRIDGE WORK PINEY LA	STARTS XX/XX/XX
MESSAGE 1	MESSAGE 2

CONSTRUCTION NOTIFICATIONS

BRIDGE WORK PINEY LA	USE CAUTION
MESSAGE 1	MESSAGE 2



NOTES:

1. YIELD MARKINGS SHALL BE RETROREFLECTIVE AND INSTALLED PER MUTCD SECTION 3B.16. MARKING MATERIAL SHALL BE PER M7.01.05.

PAVEMENT MARKING DETAIL

N

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	13	52
PROJECT FILE NO.	609120		

TEMPORARY TRAFFIC CONTROL DETAILS

CONSTRUCTION SIGN SUMMARY TABLE

I.D. #	SIZE OF SIGN (INCHES) WIDTH	HEIGHT	TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	VERT. SPACING	ARROW RTE. MKR.	# OF SIGNS REQ'D	COLOR BACK-GROUND	TEXT	BORDER	POST SIZE & # REQ'D	UNIT AREA (SQ. FT.)	AREA IN SQUARE FEET
R1-1	30	30	STOP	PER MUTCD			2	RED	WHITE	WHITE	(1) WOOD POST PER SIGN	6.25	12.5
R1-2	36 x 36 x 36		YIELD				1	WHITE	RED	RED		4.5	4.5
R1-2aP	36	30	TO ONCOMING TRAFFIC				1	WHITE	BLACK	BLACK	MOUNT WITH R1-2	7.5	7.5
R11-2	48	30	ROAD CLOSED				2	WHITE	BLACK	BLACK	MOUNTED ON TYPE III BARRICADE	10	20
W1-6	48	24					2	FLUORE SCENT ORANGE	BLACK	BLACK	MOUNTED ON TYPE III BARRICADE	8	16
W13-1P	24	24	25 MPH				2	FLUORE SCENT ORANGE	BLACK	BLACK	MOUNT BELOW W20-4	4	8
W20-4	36	36	ONE LANE ROAD AHEAD				2	FLUORE SCENT ORANGE	BLACK	BLACK	(1) WOOD POST PER SIGN	9	18
MA-R2-10a	48	36	WORK ZONE / SPEEDING FINES DOUBLED	PER MASSDOT STANDARD			2	WHITE/ FLUORE SCENT ORANGE	BLACK	BLACK		12	24
MA-R2-10e	36	48	END ROAD WORK / DOUBLE FINES END				2	WHITE/ FLUORE SCENT ORANGE	BLACK	BLACK		12	24

NOTE: ALL CONSTRUCTION SIGN BACKGROUNDS SHALL BE RETROREFLECTIVE.

TEMPORARY TRAFFIC CONTROL NOTES

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS AND MASSDOT AMENDMENTS AS WELL AS THE LATEST EDITION OF THE MASSDOT STANDARD SIGNS MANUAL (UNLESS SUPERCEDED BY THESE PLANS).
2. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT, AND SIMILAR OPERATIONS.
7. THE FIRST TEN (10) PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL FLASHING LIGHTS.
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
11. MINIMUM LANE WIDTH IS TO BE 11 FEET (3.3m) UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS UNLESS NOTED.
13. ALL CHANNELIZING DEVICES (INCLUDING DRUMS/CONES) SHALL BE A MINIMUM HEIGHT OF 36".
14. MAINTAIN ACCESS TO ALL PROPERTIES THAT ABUT THE WORK ZONE UNLESS TEMPORARY CLOSURE IS REQUIRED. SEE NOTE 6 FOR TEMPORARY CLOSURE REQUIREMENTS.
15. PEDESTRIAN ACCESS THAT MEETS APPLICABLE REGULATIONS SHALL BE MAINTAINED AT ALL TIMES. PEDESTRIAN DETOURS OR BYPASSES SHALL INCLUDE PROPER MARKINGS, SIGNAGE, BARRICADES, RAILINGS, ETC.

609120_HD.DWG Plotted on 12-Aug-2024 9:34 AM

N

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	14	52
	PROJECT FILE NO. 609120		

UTILITY PLAN

609120_HD.DWG Plotted on 19-Sep-2024 2:56 PM

BROAD BROOK

ALDEN POND

PINEY LANE (PUBLIC - 132' WIDE)

PINEY LANE (PRIVATE - 18' WIDE)

APPROX. LIMIT OF REGULATORY FLOODWAY

APPROX. 100 YEAR FLOOD (ZONE A)

APPROX. ORDINARY HIGH WATER

BEGIN FULL DEPTH CONSTRUCTION
STA 1+61.00
N 2899738.6772
E 410779.0132

LIMIT OF WORK
END FINE MILLING & OVERLAY
STA 1+41.00

PROJECT BEGIN
STA 11+68.45

INSTALL TEMPORARY PUSH BRACE

S67° 59' 52.23"E
16.410'

TEMPORARY OH WIRE LOCATION

R&S EXISTING UP; RESET TO EXISTING LOCATION FOLLOWING CONSTRUCTION (SEE UTILITY SEQUENCE)

TEMPORARY UTILITY POLE
STA 2+64, 62' RT
W/ 15' GUY

TEMPORARY UTILITY POLE
STA 3+66.4, 67' RT

PC +68.46 L=52.360, R=100.000 D=030.0000 PT +20.82

PC +37.23 D=030.0000 L=52.360, R=100.000 PT +89.59

N82° 00' 07.77"E 444.944'

L12 N82° 00' 07.77"E 233.508'

PC +44.94 D=086.2429 L=135.470, R=90.000

TEMP 15' GUY

EXIST GUYS TO REMAIN (2)

PT +80.41

PROJECT BEGIN
STA 5+27.13

TEMPORARY UTILITY POLE
STA 5+55.0, 22' RT
W/ 15' GUY

END FULL DEPTH CONSTRUCTION
STA 6+68.92
N 2899620.7482
E 411178.8639

LIMIT OF WORK
END FINE MILLING & OVERLAY
STA 6+88.92

L2 = 7.90

OVERHEAD UTILITY SEQUENCE

1. PRIOR TO BRIDGE CLOSURE, INSTALL TEMPORARY POLES, BRACE AND GUYS.
2. TRANSFER EXISTING OH WIRES TO TEMPORARY POLES. VERIFY MINIMUM VERTICAL CLEARANCE.
3. REMOVE AND STACK EXISTING UTILITY POLE.
4. AFTER PINEY LANE IS REOPENED TO TRAFFIC, REINSTALL STACKED POLE IN PRE-CONSTRUCTION LOCATION.
5. TRANSFER OH WIRES TO PERMANENT POLE.
6. REMOVE TEMPORARY POLES, BRACE AND GUYS.

0 20 50 100

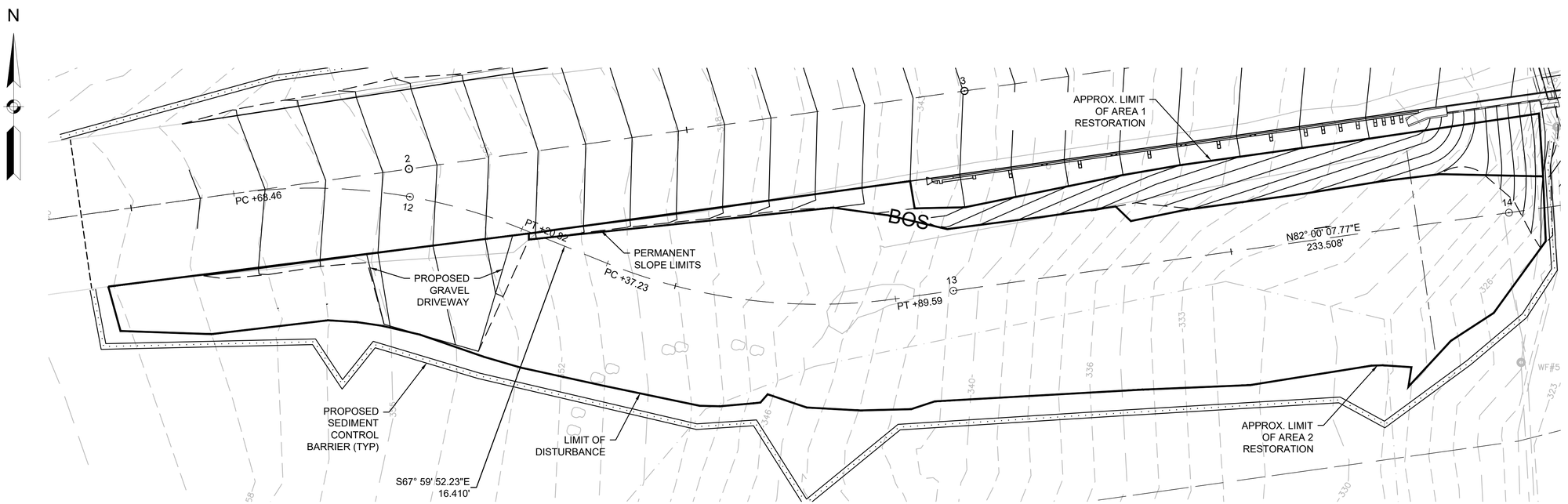
SCALE: 1" = 20'

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	15	52
PROJECT FILE NO.	609120		

RESTORATION PLAN

609120_HD.DWG Plotted on 12-Aug-2024 9:34 AM



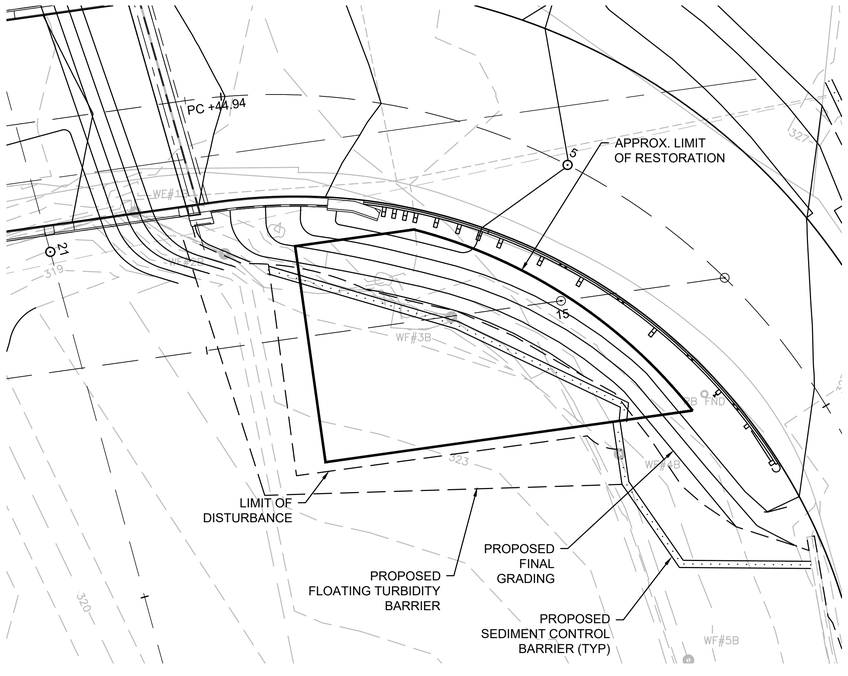
WEST SIDE

0 10 20 30 40

SCALE: 1" = 10'

WEST SIDE RESTORATION:

1. REMOVE HANDRAILS, TEMPORARY PAVEMENTS, TEMPORARY EMBANKMENT, GEOTEXTILE, TEMPORARY BRIDGE, TEMPORARY SHORING AND ACCUMULATED DEBRIS.
2. AREA 1 - FINAL GRADE SLOPES TO PERMANENT CONDITION. INSTALL SEDIMENT CONTROL BARRIERS ALONG TOP OF SEEDED SLOPE (NOT SHOWN). APPLY 4" ORDINARY BORROW, COMPOST BLANKET AND ROADSIDE RIVERBANK SEED MIX TO SLOPE AREAS.
3. AREA 2 - LOOSEN EXISTING TOP THREE INCHES (3") MINIMUM OF THE GROUND SURFACE BY RAKING, HARROWING OR OTHER ACCEPTABLE METHOD. REGRADE IF NECESSARY. APPLY COMPOST BLANKET, SEED MIX AND PLANTINGS. SEE PLANTING PLAN FOR ADDITIONAL DETAILS.



EAST SIDE

0 10 20 30 40

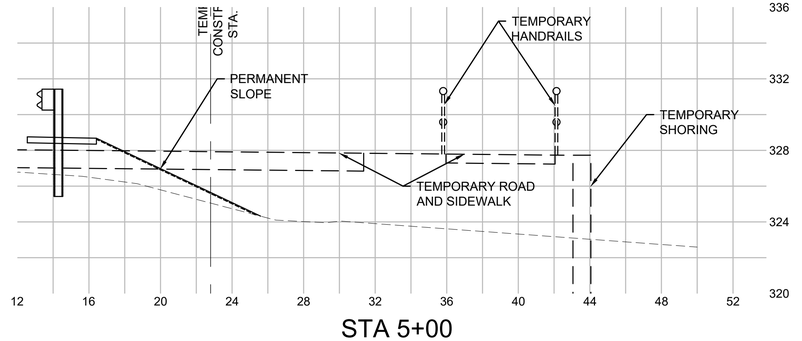
SCALE: 1" = 10'

EAST SIDE RESTORATION:

1. REMOVE TEMPORARY PAVEMENTS, TEMPORARY EMBANKMENT, HANDRAILS, GEOTEXTILE, TEMPORARY BRIDGE, TEMPORARY SHORING AND ACCUMULATED DEBRIS.
2. INSTALL SEDIMENT CONTROL BARRIER AT BASE OF SLOPE.
3. FINAL GRADE SLOPES TO PROPOSED PERMANENT CONDITION AS SHOWN ON CROSS SECTION FOR STA 5+00 (THIS SHEET). GRADE POND BOTTOM TO PRE-CONSTRUCTION CONDITION.
4. APPLY COMPOST BLANKET, SEED MIX AND PLANTINGS TO SLOPE AREAS. SEE PLANTING PLAN FOR ADDITIONAL DETAILS.
5. INSTALL SEDIMENT CONTROL BARRIER ALONG TOP OF SEEDED SLOPE (SEE PLANTING PLAN).
6. REMOVE TURBIDITY BARRIER AFTER PLANTINGS ARE ESTABLISHED AND ACCEPTED.

NOTES:

1. NOT ALL FEATURES SHOWN FOR CLARITY.
2. ALL DISTURBED AREAS SHALL RECEIVE COMPOST BLANKET AND SEED TYPE AS NOTED.
3. SEE PLANTING PLAN (SHEET 16) FOR ADDITIONAL REQUIREMENTS.



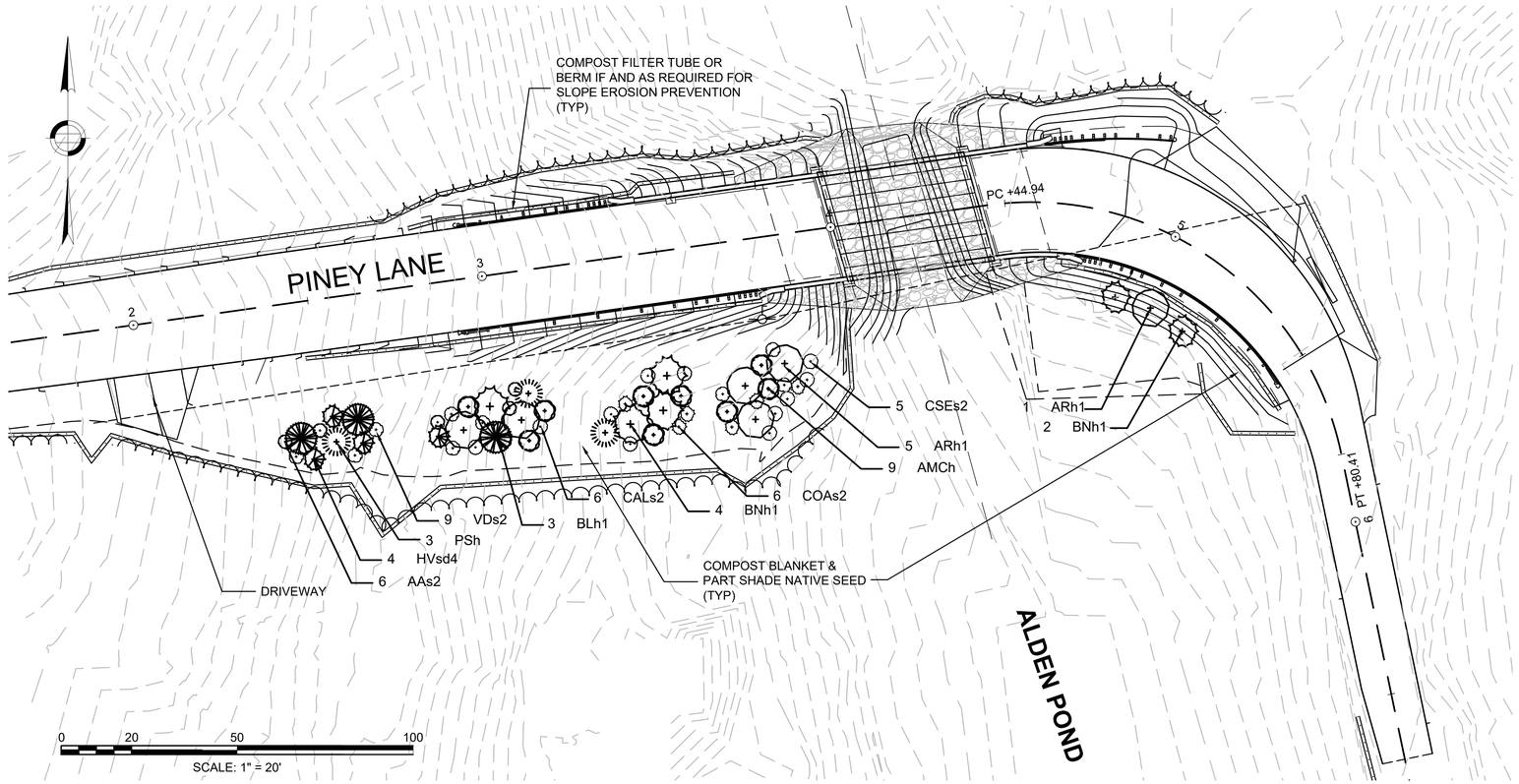
STA 5+00

HOR. SCALE IN FEET

4 0 4 8

4 0 4 8

VER. SCALE IN FEET



LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	16	52
	PROJECT FILE NO. 609120		

PLANTING PLAN

SITE PREPARATION

1. PRIOR TO ORDERING PLANTS AND PRIOR TO APPLICATION OF COMPOST AND SEED, SOIL AND SITE PREPARATION SHALL BE INSPECTED AND APPROVED BY THE ENGINEER.
2. IF REQUIRED BY THE ENGINEER, COMPOST SEDIMENT BARRIER OR COMPOST BLANKET BERM (5-6 INCHES) SHALL BE PLACED AT THE TOP OF SLOPE TO SLOW AND ABSORB FLOW FROM ROADWAY UNTIL SEED ESTABLISHES.

PLANTING NOTES

1. **PLANT LOCATIONS ARE SCHEMATIC ONLY.** PRIOR TO PLANTING, LOCATION OF ALL PLANT MATERIAL MUST BE APPROVED BY THE MASSDOT LANDSCAPE ARCHITECT.
2. ALL PLANT MATERIAL WILL HAVE TAGS INDICATING COMMON NAME, BOTANICAL NAME, CULTIVAR, & SIZE.
3. IMMEDIATELY AFTER ACCEPTANCE OF PLANTING, TAGS AND RIBBONS SHALL BE REMOVED.
4. ALL PLANTS WILL BE MULCHED PER PLANS AND SPECIFICATIONS.
5. ALL SHRUB AND PERENNIAL BEDS WILL BE WEEDED AND OTHERWISE NEATLY MAINTAINED FOR THE DURATION OF THE CONTRACT.
6. PLANTS AND PLANTING BEDS SHALL BE THOROUGHLY WATERED AS NECESSARY AND PER SPECIFICATIONS.
7. PLANTS INCLUDED IN THE CONTRACT BUT NOT SHOWN ON THE PLAN SHALL BE LOCATED AS REQUIRED BY THE MASSDOT LANDSCAPE ARCHITECT.

PLANT LIST

SYM	*QTY*	*SPECIES*	*SIZE*	*NOTES*
TREES				
ARh1	6	Maple – Red Acer rubrum	5–6 FT	
AMCh	9	Serviceberry – Shadblow Amelanchier canadensis	4–5 FT	CLUMP
BLh1	3	Birch – Cherry Betula lenta	5–6 FT	CLUMP
BNh1	6	Birch – River Betula nigra	5–6 FT	CLUMP
HVsd4	4	Witchhazel – Common Hamamelis virginiana	3–4 FT	
PSh	3	Cherry – Black Prunus serotina	4–5 FT	
AAs2	6	Red Chokeberry Aronia arbutifolia	2–2.5 FT	
CALs2	6	Summersweet Clethra alnifolia	2–2.5 FT	
COAs2	6	Dogwood – Silky Cornus amomum	2–2.5 FT	
CSEs2	5	Dogwood – Redosier Cornus redosier	2–2.5 FT	
VDs2	9	Viburnum – Arrowwood Viburnum dentatum	2–2.5 FT	

LEGEND

- ARONIA ABUTIFOLIA
- CORNUS AMOMUM
- CORNUS REDOSIER
- CLETHRA ALNIFOLIA
- VIBURNUM DENTATUM
- HAMAMELIS VIRGINIANA
- AMELANCHIER CANADENSIS
- BETULA NIGRA
- PRUNUS SEROTINA
- BETULA LENTA
- ACER RUBRUM

UPLAND NATIVE SEEDING NOTES

1. ALL DISTURBED AREAS OTHER THAN AREAS OF EXISTING LAWN SHALL BE SEEDED WITH THE MASSDOT PART SHADE MIX.
2. SEEDING SHALL BE BROADCAST METHOD ONLY (NOT HYDROSEED) UNLESS APPROVED OTHERWISE BY THE MASSDOT LANDSCAPE ARCHITECT.
3. SEEDING AND SUBMITTALS SHALL BE PER THE SPECIAL PROVISIONS.
4. SUBMITTALS FOR SEED MIXES SHALL BE APPROVED BY THE ENGINEER AND LANDSCAPE ARCHITECT PRIOR TO SEED APPLICATION.
5. SITE PREPARATION SHALL BE PER SPECIFICATIONS AND APPROVED BY THE ENGINEER PRIOR TO SEEDING.
6. WHEN SEEDING OUT OF SEASON APPLICATION RATE SHALL BE INCREASED BY 50%.

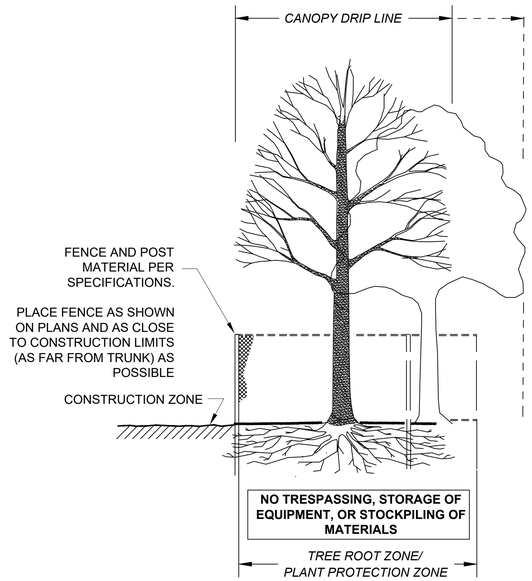
COMPOST FILTER TUBES

1. COMPOST FILTER TUBES (OR SIMILAR BARRIER APPROVED BY THE ENGINEER) SHOWN ON LANDSCAPE PLAN SHALL BE LEFT TO DEGRADE OVER TIME AND THEREFORE MUST BE COMPRISED OF 100% BIODEGRADABLE MATERIALS - BURLAP, COTTON, HEMP, ETC.
2. USE SHALL BE IF AND WHERE NEEDED AND AS APPROVED BY THE ENGINEER. PLACEMENT SHALL BE WHERE MOST EFFECTIVE TO REDUCE POTENTIAL EROSION OF SLOPES UNTIL VEGETATION ESTABLISHES.

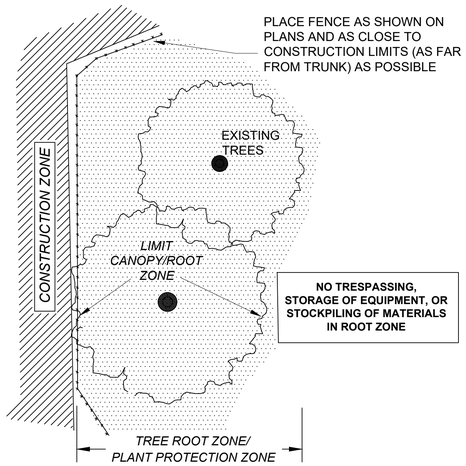
LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	17	52
PROJECT FILE NO.	609120		

CONSTRUCTION DETAILS I
(SHEET 1 OF 3)



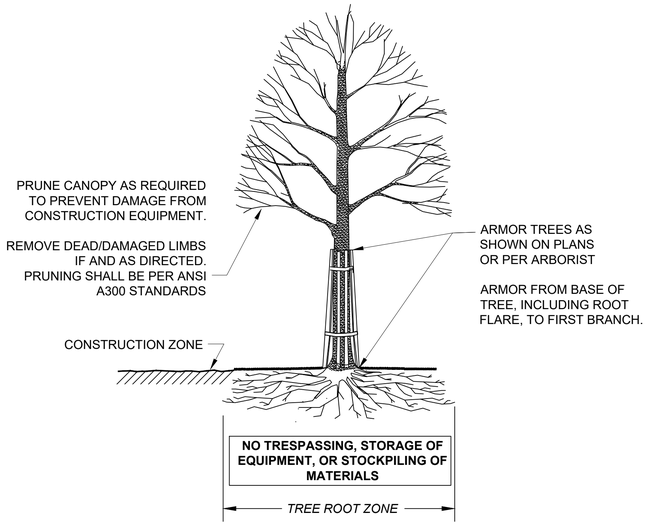
SECTION - FENCE PROTECTION OF ROOT ZONE



PLAN VIEW - FENCE PROTECTION OF ROOT ZONE

TREE PROTECTION - ROOT ZONE

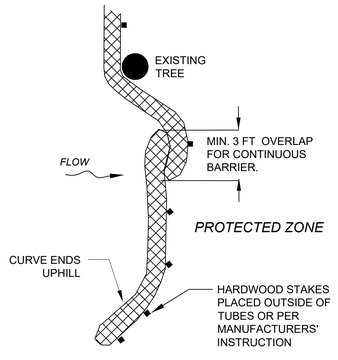
SCALE: NOT TO SCALE



SECTION - TRUNK ARMORING & PRUNING

TREE PROTECTION - TRUNK

SCALE: NOT TO SCALE



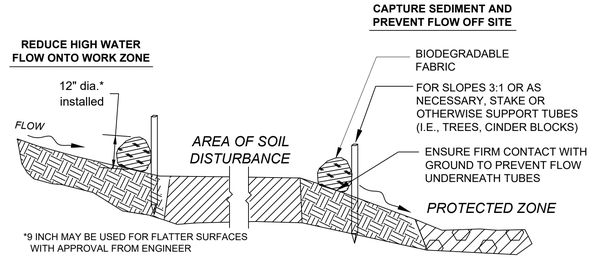
PLAN VIEW

NOTES:

1. PLACE TUBE ALONG CONTOURS AND PERPENDICULAR TO FLOW.
2. PLACE AS CLOSE TO LIMIT OF SOIL DISTURBANCE AS POSSIBLE
3. ADJUST LOCATION AS REQUIRED FOR OPTIMUM EFFECTIVENESS. DO NOT INSTALL IN WATERWAYS.
4. PLACE STAKES AS NEEDED TO SECURE TUBES IN PLACE.

COMPOST FILTER TUBE

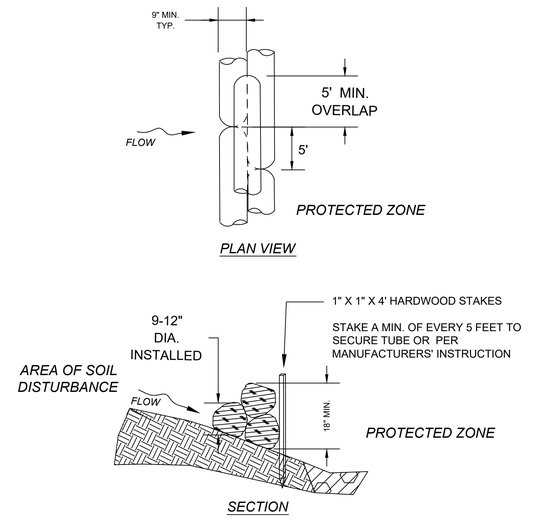
SCALE: NOT TO SCALE



SECTION

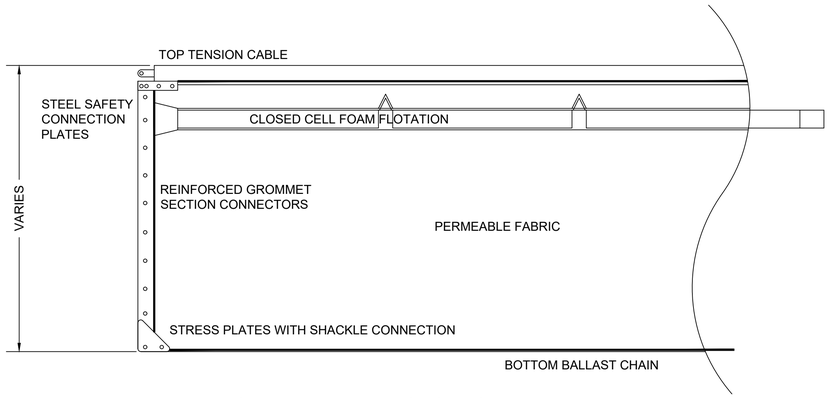
SEDIMENT BARRIER - COMPOST FILTER TUBES

SCALE: NOT TO SCALE



COMPOST FILTER TUBE BERM (SLOPES 2:1 OR STEEPER)

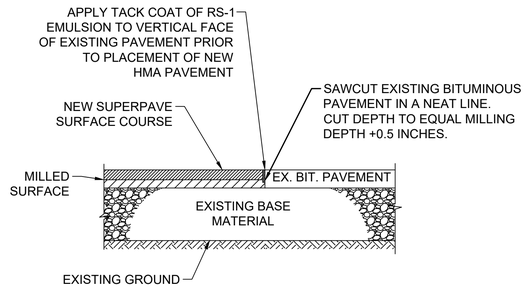
SCALE: NOT TO SCALE



NOTE: TURBIDITY BARRIER NOT TO BE USED IN MOVING WATER

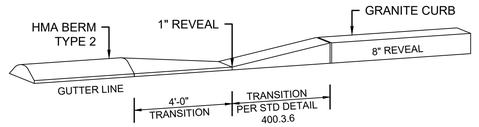
FLOATING TURBIDITY BARRIER

SCALE: NOT TO SCALE



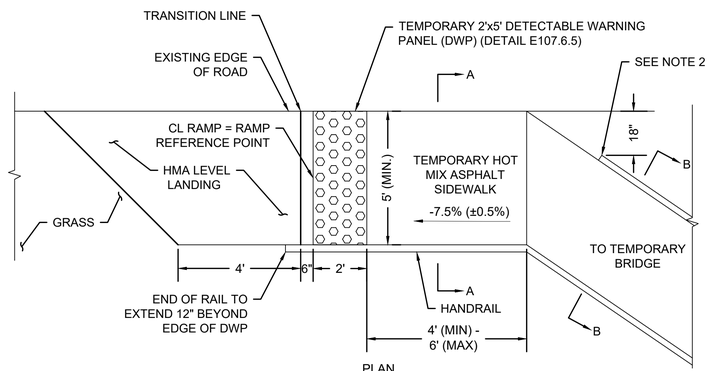
PAVEMENT MATCH/ MILLED SURFACE DETAIL

SCALE: NOT TO SCALE



HMA BERM TRANSITION TO GRANITE CURB STA. 3+23 LT

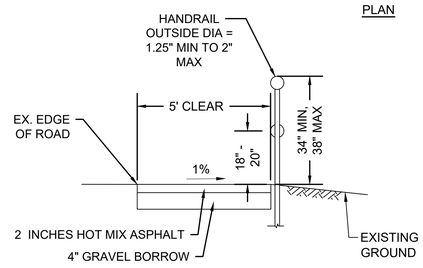
SCALE: NOT TO SCALE



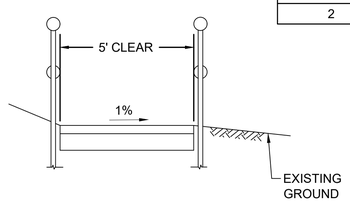
NOTES:

1. PROVIDE HANDRAILS ON BOTH SIDE OF TEMPORARY SIDEWALK.
2. BEGIN RAIL ON STREET SIDE OF SIDEWALK ONCE THE SIDEWALK TRANSITIONS AWAY FROM THE EDGE OF ROAD.
3. HAND RAIL PAID UNDER ITEM 660.1, TEMPORARY METAL PIPE RAIL.

PEDESTRIAN CURB RAMP #	RAMP REFERENCE		WIDTH OF RAMP (FT)
	STATION	OFFSET (FT)	
1	1+54	15.9	5
2	5+45	9.2	5



SECTION "A-A"



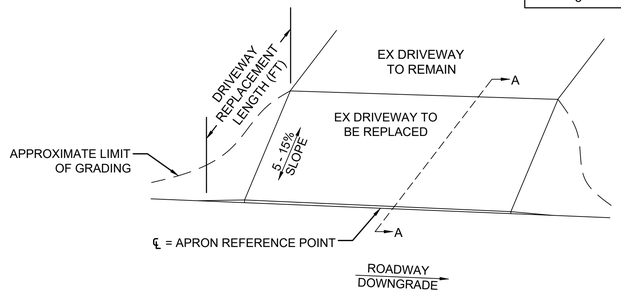
SECTION "B-B"

TEMP PEDESTRIAN BRIDGE ACCESS DETAIL

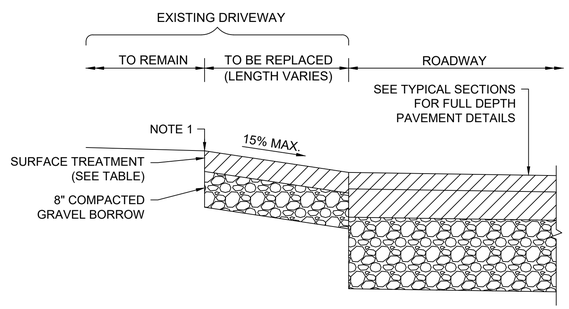
SCALE: NOT TO SCALE

DRIVEWAY DETAILS

DRIVEWAY ID	RAMP REFERENCE		DRIVEWAY TYPE	DRIVEWAY REPLACEMENT LENGTH (FT)
	STATION	OFFSET (FT)		
1	5+08	15.6 LT	HMA	13
2	5+62	9.8 LT	GRAVEL	6
3	2+03	14.0 RT	GRAVEL	16



PLAN



SECTION "A-A"

LEGEND

* = CONSTRUCTION TOLERANCE ±0.5%
HSL = HIGH SIDE TRANSITION LENGTH
CC = CEMENT CONCRETE
HMA = HOT MIX ASPHALT
□ = PCR RAMP SYMBOL
○ = DRIVEWAY SYMBOL

NOTE:

1. VERTICAL FACES OF ALL ASPHALT JOINTS SHALL RECEIVE TACK COAT.
2. SEE DRIVEWAY DETAILS CHART FOR ASSOCIATED DIMENSIONS.

ROADWAY PROFILE GRADE	HIGH SIDE TRANSITION LENGTH (HSL)
=0%	6'-6"
>0% TO 1%	7'-8"
>1% TO 2%	9'-0"
>2% TO 3%	11'-0"
>3% TO 4%	14'-0"
>4% TO 6%	15'-0" MAX.

DRIVEWAY SURFACE TREATMENT	
DRIVEWAY TYPE	MATERIALS & THICKNESS
HMA	1 1/2" HMA SURFACE COURSE OVER 2 1/2" INTERMEDIATE COURSE
GRAVEL	4" GRAVEL BORROW

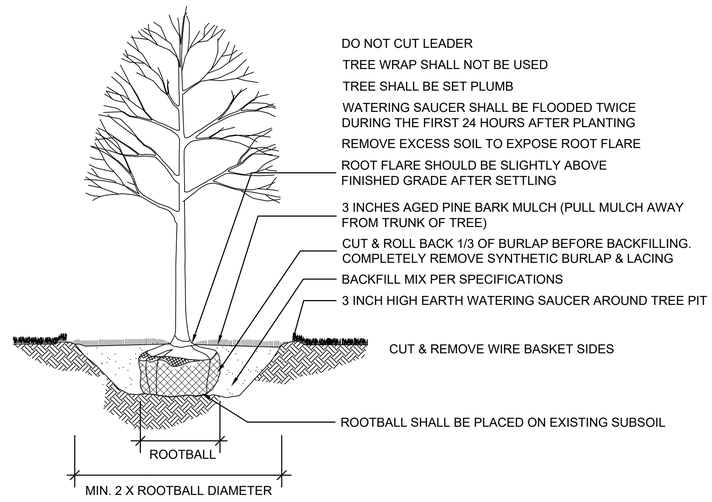
DRIVEWAY DETAILS

SCALE: NOT TO SCALE

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	19	52
PROJECT FILE NO.	609120		

CONSTRUCTION DETAILS III
(SHEET 3 OF 3)

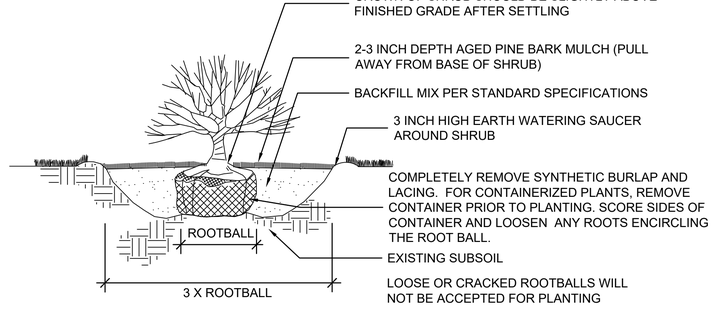


DECIDUOUS TREE PLANTING

SCALE: NOT TO SCALE

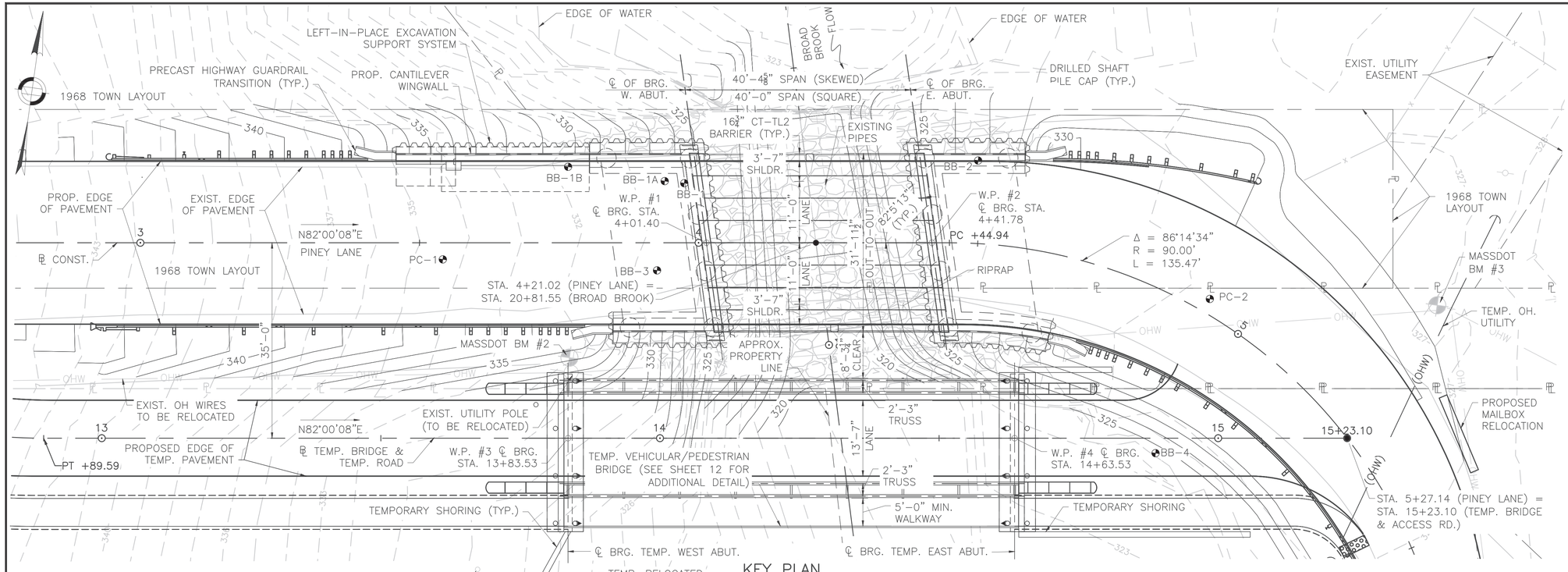
EXCAVATE TO REQUIRED DEPTH AND BACKFILL WITH PLANTING MIX

SHRUBS SHALL BE SET PLUMB

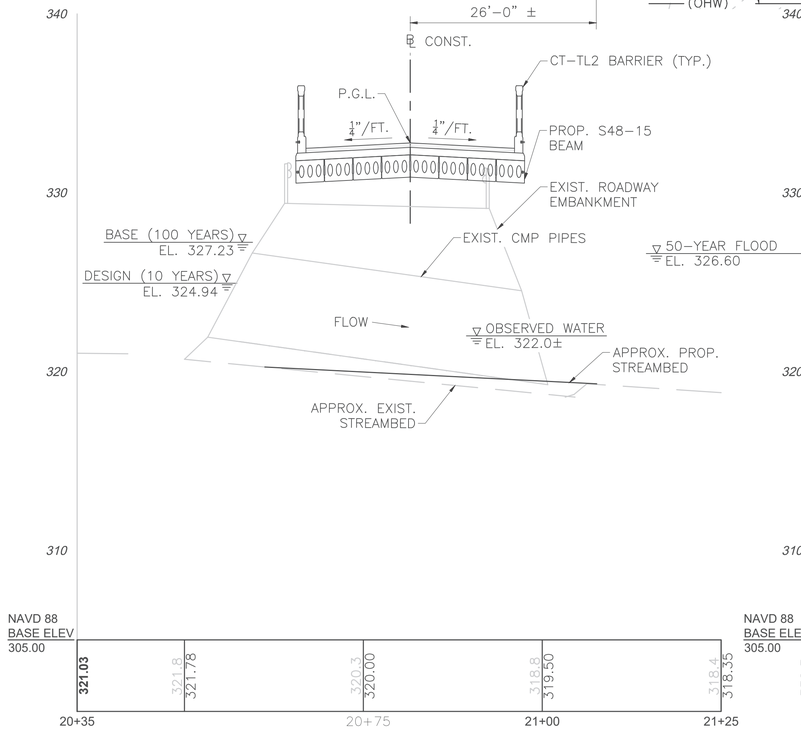


SHRUB PLANTING

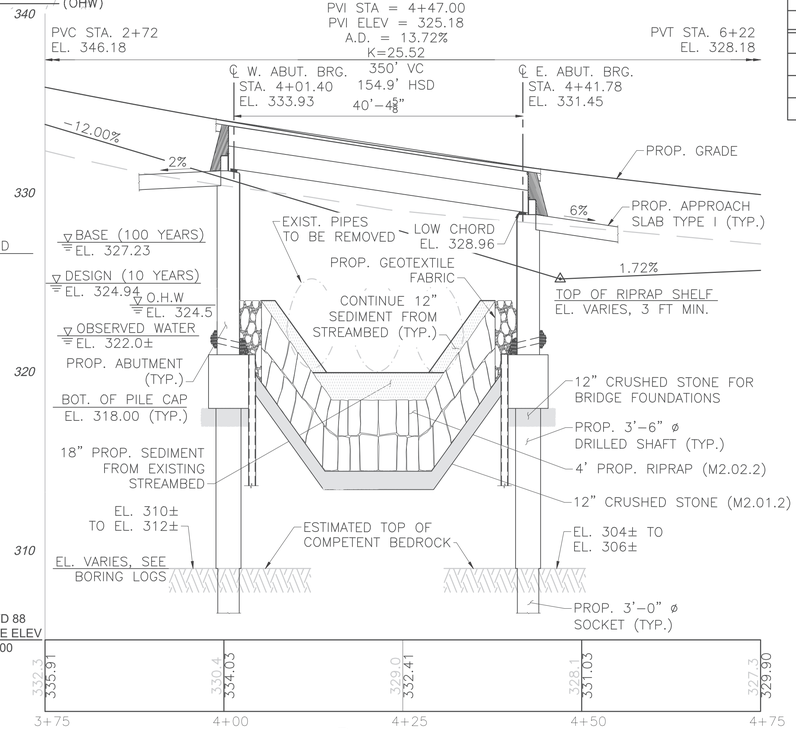
SCALE: NOT TO SCALE



KEY PLAN
SCALE: 1" = 10'



PROFILE-BROAD BROOK
HORIZONTAL SCALE: 1" = 10-0"
VERTICAL SCALE ¼" = 1'-0"



PROFILE-℄ PINEY LANE
HORIZONTAL SCALE: 1" = 10-0"
VERTICAL SCALE ¼" = 1'-0"

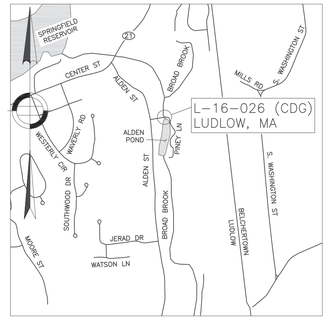
WORKING POINT COORDINATES		
DESCRIPTION	NORTHING	EASTING
W.P. #1	2899772.1257	411017.0768
W.P. #2	2899777.7447	411057.0686
W.P. #3	2899734.0168	410997.3964
W.P. #4	2899745.1477	411076.6183

BEGINNING OF PROJECT = STA. 1+41.00
END OF PROJECT = STA. 6+88.92

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	20	52
PROJECT FILE NO.	609120		

KEY PLAN, LOCUS AND PROFILES



LOCUS
SCALE: 1" = 2000'

NOTE:
1. PERMANENT CONTOURS SHOWN. FOR TEMPORARY CONTOURS, SEE SHEET 12.
2. FOR LOCATION OF TEMPORARY OVERHEAD WIRES, SEE HWY. PLANS.

INDEX OF DRAWINGS

1. KEY PLAN, LOCUS AND PROFILES
2. GENERAL NOTES AND QUANTITIES
3. BORING LOGS 1 OF 6
4. BORING LOGS 2 OF 6
5. BORING LOGS 3 OF 6
6. BORING LOGS 4 OF 6
7. BORING LOGS 5 OF 6
8. BORING LOGS 6 OF 6
9. BRIDGE PLAN AND ELEVATION
10. STAGE CONSTRUCTION 1 OF 2
11. STAGE CONSTRUCTION 2 OF 2
12. TEMPORARY BRIDGE PLAN AND ELEVATION
13. TEMPORARY BRIDGE DETAILS 1 OF 2
14. TEMPORARY BRIDGE DETAILS 2 OF 2
15. CHANNEL SECTION
16. FOUNDATION PLAN AND DRILLED SHAFT DETAILS
17. ABUTMENT PLAN AND ELEVATION 1 OF 2
18. ABUTMENT PLAN AND ELEVATION 2 OF 2
19. ABUTMENT DETAILS 1 OF 2
20. ABUTMENT DETAILS 2 OF 2
21. WINGWALL PLAN AND ELEVATION
22. WINGWALL DETAILS
23. FRAMING PLAN
24. BEAM DETAILS
25. DECK DETAILS
26. CT-TL2 BARRIER DETAILS
27. HIGHWAY GUARDRAIL TRANSITION DETAILS 1 OF 2
28. HIGHWAY GUARDRAIL TRANSITION DETAILS 2 OF 2

COMMONWEALTH OF MASSACHUSETTS
PAUL W WHITE
STRUCTURAL
NO. 47584
REGISTERED PROFESSIONAL ENGINEER

Paul White Digitally signed by Paul White Date: 2024.09.13 12:21:48 -04'00'

Dewberry®
99 SUMMER ST.,
SUITE 700
BOSTON, MA 02110
(617) 695-3400
(617) 695-3310

SEPT 07, 2024	ISSUED FOR CONSTRUCTION

MassDOT Massachusetts Department of Transportation Highway Division

PROPOSED BRIDGE REPLACEMENT
LUDLOW
PINEY LANE
OVER BROAD BROOK

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

Alexander K. Bardow, P.E. — Digitally signed by Alexander K. Bardow, P.E. Date: 2024.09.13 14:23:31 -04'00'
STATE BRIDGE ENGINEER

Carrie Lavallee, P.E. — Digitally signed by Carrie Lavallee, P.E. Date: 2024.09.16 11:34:08 -04'00'
CHIEF ENGINEER

SHEET 1 OF 28 SHEETS BRIDGE NO. L-16-026 (CDG)

609120_BR1(L16026).DWG Plotted on 10-Sep-2024 1:24 PM

FINAL BRIDGE SUBMISSION - (SF2) 07-SEPTEMBER-2024

GENERAL NOTES

DESIGN:

IN ACCORDANCE WITH THE 2020 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS FOR HL–93 LOADING.

MASSDOT BENCHMARK:

BM #1: MAG NAIL – SET UP 1FT UP IN FRONT OF ULT #1–1
N 2899718.90 E 410804.47 EL. 357.25
STA. 1+83.46, OFFSET 23.13 FT (RT)

BM #2: MAG NAIL – SET UP 1FT UP IN FRONT OF ULT #2
N 2899748.33 E 410995.63 EL. 333.49
STA. 3+76.86, OFFSET 20.58 FT (RT)

BM #3: MAG NAIL – SET UP 1FT UP IN FRONT OF ULT #3
N 2899779.25 E 411148.27 EL. 328.46
STA. 5+20.26, OFFSET 27.66 FT (LT)

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

DATE:

TO BE PLACED ON THE INSIDE FACE OF THE NORTHEAST AND SOUTHWEST HIGHWAY GUARDRAIL TRANSITIONS. A SHEET SHOWING SIZE AND CHARACTER OF NUMERALS WILL BE FURNISHED. THE DATE USED SHALL BE THE LATEST YEAR OF CONTRACT COMPLETION AS OF THE DATE THE FIRST HIGHWAY GUARDRAIL TRANSITION IS CONSTRUCTED. BOTH HIGHWAY GUARDRAIL TRANSITIONS SHALL FEATURE THE SAME DATE.

MASSDOT SURVEY NOTEBOOKS:

SURVEY PERFORMED BY C&C CONSULTING ENGINEERS, 1380 SOLDIERS FIELD ROAD BOSTON, MA 02135 BETWEEN JULY 27, 2020 AND NOVEMBER 17, 2020, AND AGAIN IN MARCH OF 2023. COPIES OF THE FILES MAY BE OBTAINED FROM THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF–SIZE PRINTS (A3).

SEISMIC GROUND SHAKING HAZARD:

SEISMIC GROUND SHAKING HAZARD IN ACCORDANCE WITH THE 2011 AASHTO GUIDE SPECIFICATIONS FOR LRFD SEISMIC BRIDGE DESIGN WITH INTERIM REVISIONS THROUGH 2015.

TEMPORARY DETOUR:

BRIDGE IS TO BE CLOSED DURING CONSTRUCTION. TEMPORARY BRIDGE SHALL BE CONSTRUCTED JUST SOUTH OF THE EXISTING CULVERT PRIOR TO THE CLOSURE. TEMPORARY ROAD SHALL BE PROVIDED WITH FOOTWALK. TRAVELWAY WILL BE ONE LANE OF ALTERNATING TRAFFIC.

EXISTING CONDITIONS:

EXISTING CONDITIONS ARE NOT GUARANTEED. THE CONTRACTOR SHALL DETERMINE AND ESTABLISH ALL DIMENSIONS AND DETAILS NECESSARY FOR COMPLETION OF ALL WORK BY FIELD MEASUREMENT AND SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ADEQUACY AND ACCURACY THEREOF AND SHALL NOT ORDER ANY MATERIAL OR COMMENCE ANY FABRICATION UNTIL HE HAS MADE THE REQUIRED MEASUREMENTS AND THE EXTENT OF THE PROPOSED WORK HAS BEEN APPROVED BY THE ENGINEER.

FOUNDATIONS:

FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.

GEOTECHNICAL REPORT:

REFER TO THE GEOTECHNICAL REPORT DATED MARCH 2022 (REVISED FEBRUARY 13, 2024) PREPARED BY GEI CONSULTANTS, 400 UNICORN PARK, WOBURN, MA, 01810. A COPY OF THE REPORT MAY BE OBTAINED FROM THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION.

UNSUITABLE MATERIAL:

ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATION OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

CONCRETE:

ALL CONCRETE SHALL BE 5000 PSI HP CONCRETE, EXCEPT AS NOTED BELOW:

THE CT–MTL2 BARRIER SHALL BE 5000 PSI ⅜ IN. HP CONCRETE.

TEMPORARY DIVERSION SYSTEMS

THIS SYSTEM IS REQUIRED FOR CHANNEL RECONSTRUCTION. SEE PLANS, AND SPECIAL PROVISIONS, ITEM NO. 950.11.

EXCAVATION SUPPORT SYSTEM:

COBBLES AND BOULDERS COULD PRESENT OBSTRUCTIONS DURING SUPPORT SYSTEM INSTALLATION. SHALLOW OBSTRUCTIONS MAY NEED TO BE REMOVED BEFORE SUPPORT SYSTEM INSTALLATION. PAYMENT IS UNDER CLASS B ROCK EXCAVATION. THIS SYSTEM SHALL BE USED IN CONJUNCTION WITH CONTROL OF WATER TO CONSTRUCT SUBSTRUCTURE ELEMENTS IN–THE–DRY, THIS SYSTEM SHALL BE REMOVED IN ITS ENTIRETY EXCEPT AS NOTED ON THE PLANS. SEE SPECIAL PROVISIONS ITEM 953.1.

REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31 GRADE 60. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS	#6 BARS
1. NONE	16"	19"	23"
2. 12 INCHES OF CONCRETE BELOW BAR	20"	25"	30"
3. EPOXY COATED BARS, COVER < $3d_b$, OR CLEAR SPACING < $6d_b$	23"	29"	34"
4. COATED BARS, ALL OTHER CASES	18"	23"	27"
5. CONDITION 2 AND 3	26"	32"	39"
6. CONDITION 2 AND 4	24"	30"	36"

ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWING.

REINFORCING BARS USED IN THE FOLLOWING ELEMENTS SHALL BE EPOXY COATED: BACKWALLS, BEAM SEATS DECK SLABS, DECK BEAMS, CT–TL2 BARRIER AND TRANSITION TOP OF THE PRECAST HIGHWAY GUARDRAIL TRANSITION.

ALL REINFORCING STEEL SHALL BE A MINIMUM 2" CLEAR FROM THE SURFACE OF THE CONCRETE UNLESS OTHERWISE NOTED.

MEMBRANE WATERPROOFING:

ALL MEMBRANE WATERPROOFING USED ON BRIDGE DECKS SHALL BE MEMBRANE WATERPROOFING FOR BRIDGE DECKS – SPRAY APPLIED.

CONSTRUCTION JOINTS:

CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER.

UTILITIES:

TEMPORARY RELOCATION OF OVERHEAD WIRES TO ALLOW FOR CONSTRUCTION OF BOTH THE PERMANENT AND TEMPORARY BRIDGES IS REQUIRED. CONTRACTOR TO COORDINATE THE UTILITY COMPANIES.

PRECAST CONCRETE ELEMENTS/TOLERANCES:

THE PROPOSED BRIDGE SHALL CONSIST OF PRECAST CONCRETE DECK BEAMS. THE CONTRACTOR SHALL SELECT A FABRICATOR THAT MEETS THE CRITERIA PER CONTRACT DOCUMENTS. SEE SPECIAL PROVISIONS ITEM 995.01

DRILLED SHAFTS:

SEE SPECIAL PROVISIONS ITEMS 945.102, 945.201, 945.302, 945.502, 945.602. SEE DRILLED SHAFT NOTES ON SHEET 16 OF 28.

MICROPILES:

SEE SPECIAL PROVISIONS ITEMS 945.10, 948.60, 948.61. SEE SHEET 14 OF 28 FOR MICROPILE NOTES.

ESTIMATED QUANTITIES (NOT GUARANTEED)

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
115.1	DEMOLITION OF CULVERT NO. L–16–026 (0QX)	1	LS
127.1	REINFORCED CONCRETE EXCAVATION	75	CY
140.	BRIDGE EXCAVATION	710	CY
143.	CHANNEL EXCAVATION	420	CY
144.	CLASS B ROCK EXCAVATION	10	CY
151.2	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	140	CY
156.	CRUSHED STONE	157	TON
156.1	CRUSHED STONE FOR BRIDGE FOUNDATIONS	59	TON
450.60	SUPERPAVE BRIDGE SURFACE COURSE – 9.5 (SSC–B–9.5–P)	13	TON
450.70	SUPERPAVE BRIDGE PROTECTIVE COURSE – 9.5 (SPC–B–9.5–P)	13	TON
482.31	SAWING & SEALING JOINTS IN ASPHALT PAVEMENT AT BRIDGES	60	FT
698.3	GEOTEXTILE FABRIC FOR SEPARATION	100	SY
945.10	DRILLED MICROPILES	360	FT
945.102	DRILLED SHAFT EXCAVATION 3.5 FOOT DIAMETER	114	FT
945.201	ROCK SOCKET EXCAVATION 3 FOOT DIAMETER	72	FT
945.302	OBSTRUCTION EXCAVATION 3.5 FOOT DIAMETER	18	FT
945.502	DRILLED SHAFT 3.5 FOOT DIAMETER	186	FT
945.602	PERMANENT CASING 3.5 FOOT DIAMETER	126	FT
945.71	CROSS HOLE SONIC TEST ACCESS PIPES	240	FT
945.72	CROSS HOLE SONIC TEST	12	EA
948.60	MICROPILE VERIFICATION LOAD TEST	1	EA
948.61	MICROPILE PROOF LOAD TEST	2	EA
950.101	TEMPORARY SHORING	150	SY
950.11	DIVERSION SYSTEM	80	SY
953.1	EXCAVATION SUPPORT SYSTEM	460	SY
983.011	NATURAL STREAMBED RESTORATION	55	CY
983.1	RIPRAP	498	TON
991.1	CONTROL OF WATER – STRUCTURE NO. L–16–026 (CDG)	1	LS
993.1	TEMPORARY BRIDGE NO. L–16–026	1	LS
993.11	TEMPORARY BRIDGE NO. L–16–026 REMOVED AND STACKED	1	LS
995.01	BRIDGE STRUCTURE, BRIDGE NO. L–16–026 (CDG)	1	LS

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	21	52
	PROJECT FILE NO. 609120		

GENERAL NOTES & QUANTITIES

TRAFFIC DATA	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2042	
AVERAGE DAILY TRAFFIC – PRESENT	113	
AVERAGE DAILY TRAFFIC – DESIGN YEAR	125	
DESIGN HOURLY VOLUME	13	
DIRECTIONAL DISTRIBUTION	50%	
TRUCK PERCENTAGE – AVERAGE DAY	0%	
TRUCK PERCENTAGE – PEAK HOUR	0%	
DESIGN SPEED	25 MPH	
DIRECTIONAL DESIGN HOURLY VOLUME	7	

SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1000
DESIGN SPECTRA	
As	0.065
SDs	0.162
SD1	0.060
SITE CLASS	C
SEISMIC DESIGN CATEGORY (SDC)	A

HYDRAULIC DESIGN DATA	
DRAINAGE AREA (SQ. MILES)	13.50
DESIGN FLOOD DISCHARGE (C.F.S.)	938
DESIGN FLOOD FREQUENCY (YEARS)	10
DESIGN FLOOD VELOCITY (F.P.S.)	6.42
DESIGN FLOOD ELEVATION (FEET, NAVD)	324.94
BASE (100–YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S.)	1959
BASE FLOOD ELEVATION (FEET, NAVD)	327.23
DESIGN AND CHECK SCOUR DATA	
DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	25
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	6.31
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	N/A
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	50
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	6.56
CHECK FLOOD PIER SCOUR DEPTH (FEET)	N/A
FLOOD OF RECORD	
DISCHARGE (C.F.S.)	N/A
FREQUENCY (IF KNOWN, YEARS)	N/A
MAXIMUM ELEVATION (FEET, NAVD)	N/A
DATE (MM/YYYY)	N/A
HISTORY OF ICE FLOES	N/A
EVIDENCE OF SCOUR AND EROSION	N/A

TEMPORARY WATER CONTROL DESIGN DATA	
DESIGN FLOOD DISCHARGE (C.F.S.)	938
DESIGN FLOOD FREQUENCY (YEARS)	10
DESIGN FLOOD VELOCITY (F.P.S.)	12.26
DESIGN FLOOD ELEVATION (FEET, NAVD)	328.97

DATE	DESCRIPTION
SEPT 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

609120_BR2(L16026).DWG Plotted on 10-Sep-2024 1:24 PM
FINAL BRIDGE SUBMISSION - (SF2) 07-SEPTEMBER-2024

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	22	52
	PROJECT FILE NO. 609120		

BORING LOGS 1 OF 6

EL. 330.5±
EXIST. GRADE

BORING INFORMATION
NORTHING: 2899782 **EASTING:** 411012 **STATION:** 3+97.5 **OFFSET:** 11' N
GROUND SURFACE EL. (ft): 330.5 **DATE START/END:** 7/7/2021 - 7/7/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling
TOTAL DEPTH (ft): 8.0 **DRILLER NAME:** Dale
LOGGED BY: A. Parry **RIG TYPE:** Mobile B-57

BORING
BB-1
PAGE 1 of 1

DRILLING INFORMATION
HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch / 4.5 inch **CORE BARREL TYPE:** NX
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** 2.15 inch / 2.96 inch
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D split spoon sampler.

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
330							FILL	0-1": ASPHALT.
		S1	0 to 2	24/16	11-10-10-12			S1 (0-4"): moist, medium dense, dark brown, FINE TO COARSE SAND and fine to medium gravel. S1 (4-11"): moist, medium dense, brown, FINE TO COARSE SAND, trace inorganic silt, trace fine to medium gravel. S1 (11-16"): moist, medium dense, brown, FINE TO MEDIUM SAND, trace fine gravel.
		S2	2 to 4	24/13	11-8-5-7			S2 (0-4"): moist, medium dense, brown, FINE TO MEDIUM SAND, some inorganic silt, trace fine gravel. S2 (4-13"): moist, medium dense, brown, FINE TO MEDIUM SAND, trace fine gravel.
	5	S3	4 to 6	24/17	5-2-1-10			S3: moist, brown, very loose, FINE TO COARSE SAND, trace fine gravel.
		S4	6 to 7.8	22/15	11-5-7-100/4"	4-inch casing from 0 to 6.5 feet. Couldn't advance 4-inch casing deeper than 6.5 feet. Casing rebounding, driller indicating casing is stuck on possible boulder.		S4 (0-6"): Similar to S3, except medium dense. S4 (6-13""): moist, medium dense, dark brown, FINE SAND AND INORGANIC SILT, trace fine to medium gravel up to 1" S4 (13-15""): moist, medium dense, dark brown, FINE TO MEDIUM GRAVEL, some fine sand and inorganic silt." S4 (6-13"): moist, medium dense, dark brown, FINE SAND AND INORGANIC SILT, trace fine to medium gravel up to 1". S4 (13-15"): moist, medium dense, dark brown, FINE TO MEDIUM GRAVEL, some fine sand and inorganic silt.
320	10							Bottom of boring at 8 feet upon refusal on possible boulder. Backfilled with soil cuttings, sand, and concrete, and topped with asphalt cold patch.

EL. 318.0
BOT. PILE CAP
DRILLED SHAFT

NOTES: Used 300-lb hammer to advance casing. Offsetted the boring ~3.5 ft west and drilled BB-1A.

PROJECT NAME: Piney Lane Bridge
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

EL. 330.5±
EXIST. GRADE

BORING INFORMATION
NORTHING: 2899782 **EASTING:** 411008 **STATION:** 3+94 **OFFSET:** 11' N
GROUND SURFACE EL. (ft): 330.5 **DATE START/END:** 7/7/2021 - 7/7/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling
TOTAL DEPTH (ft): 9.0 **DRILLER NAME:** Dale
LOGGED BY: A. Parry **RIG TYPE:** Mobile B-57

BORING
BB-1A
PAGE 1 of 1

DRILLING INFORMATION
HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch / 4.5 inch **CORE BARREL TYPE:** NX
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** 2.15 inch / 2.96 inch
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D split spoon sampler.

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
330						See BB-1 log for sample descriptions 0-8 feet.		
	5					4-inch casing from 0 to 7 ft. Hit refusal at 7 feet. Pulled casing out and drive shoe is deformed. Attempted spinning 4-inch casing back down.		
		C1	8.5 to 9	6/0		Spinning casing hits refusal at 8.5 feet. Driller indicated that casing is stuck on another possible boulder. Sent core barrel down the hole.Core time: 2.6 min/6" After coring 6 inches through the boulder, driller still unable to advance casing further than 8.5 feet. Terminate hole and relocate.		
320	10							

EL. 318.0
BOT. PILE CAP
DRILLED SHAFT

NOTES: Used 300-lb hammer to advance casing. Offsetted boring ~17.5 ft west and drilled BB-1B.

PROJECT NAME: Piney Lane Bridge
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

NOTES:

1. LOCATION OF BORINGS ARE SHOWN THUS: ◔
2. BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
3. GROUND WATER DEPTH MEASUREMENTS WERE NOT TAKEN FOR BORINGS BB–1, BB–1A, BB–1B, AND BB–2. WATER LEVELS SHOWN ON BORING LOGS BB–3 AND BB–4 WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL. GROUND WATER LEVELS MAY VARY SIGNIFICANTLY DURING OTHER TIMES AND LOCATIONS. FOR FURTHER DISCUSSION ON THE GROUND WATER, SEE THE GEOTECHNICAL REPORT.
4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1⅜" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
5. BORING SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHROP AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSDOT GEOTECHNICAL SECTION AT: 10 PARK PLAZA, BOSTON, MA.
6. BORINGS BB–1, BB–1A, BB–1B, AND BB–2 WERE MADE IN JULY, 2021. BORINGS BB–3 AND BB–4 WERE MADE IN MARCH, 2023.
7. BORINGS WERE MADE BY SEABOARD DRILLING AT 649 MEADOW ST, CHICOPEE, MA 01013.
8. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

DATE	DESCRIPTION
SEPT 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	23	52
	PROJECT FILE NO. 609120		

BORING LOGS 2 OF 6

BORING INFORMATION
NORTHING: 2899782 **EASTING:** 410991 **STATION:** 3+76.5 **OFFSET:** 14' N
GROUND SURFACE EL. (ft): 331.8 **DATE START/END:** 7/7/2021 - 7/8/2021
VERT./HORIZ. DATUMS: NAD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling
TOTAL DEPTH (ft): 29.1 **DRILLER NAME:** Dale
LOGGED BY: A. Parry **RIG TYPE:** Mobile B-57

BORING
BB-1B
PAGE 1 of 2

DRILLING INFORMATION
HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch / 4.5 inch **CORE BARREL TYPE:** NX
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** 2.15 inch / 2.96 inch
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

EL. 331.8±
EXIST. GRADE

EL. 325.0
BOT. SPREAD FOOTING

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
330	0					See boring log BB-1 for soil descriptions 0-8 ft. 4-inch casing from 0 to 6 feet.	FILL	
	5	G1				Casing hit hard resistance at 4 feet. Driller suggest they are on another boulder. Hit very hard refusal. Drillers indicated casing advanced past the first boulder and is now encountering resistance on the other side of casing. Drillers struggled to keep casing vertical. Drillers removed 4-inch casing and drove 5-inch casing to 6 feet.Grab sample from bottom of drive shoe when pulled up 4" casing Used 5-inch roller bit to clean hole to 10 feet, not very difficult drilling. Drove 4-inch casing after washing hole and gets hung up at about 6 feet. Drillers continued to drive casing and advanced it to 11.5 feet.		G1: moist, brown/gray, FINE TO COARSE SAND, some fine to medium gravel, some inorganic silt.
	10						GLACIOFLUVIAL DEPOSITS	
320		S1	11.5 to 13.5	24/14	9-26-54-67			S1 (0-12"): moist, very dense, brown, FINE TO COARSE SAND, trace inorganic silt, trace fine to medium gravel. S1 (12-14") moist, very dense, brown, FINE GRAVEL UP TO 3/8", some fine to coarse sand, some inorganic silt. [GRAIN SIZE DISTRIBUTION PERFORMED].
	15	C1	14.3 to 15.4	13/2	0	4-inch casing to 14 ft. Very difficult drilling, drillers decided to send core barrel down. Core barrel drops after 13 inches.Core time: 1.4 min/13"		C1: QUARTZ MONZODIORITE BOULDER.

NOTES: Used 300-lb hammer to advance casing.

PROJECT NAME: Piney Lane Bridge
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

GEI WOBURN STD 7-S-O-N-E-LAYER NAME PINEYLN-BORINGLOGS.GPJ 3/3/22

EL. 312.0±
ESTIMATED TOP OF COMPETENT BEDROCK

BORING INFORMATION
NORTHING: 2899782 **EASTING:** 410991 **STATION:** 3+76.5 **OFFSET:** 14' N
GROUND SURFACE EL. (ft): 331.8 **DATE START/END:** 7/7/2021 - 7/8/2021
VERT./HORIZ. DATUMS: NAD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling

BORING
BB-1B
PAGE 2 of 2

Elev. (ft)	Depth (ft)	Sample Information: Sample No.	Sample Information: Depth (ft)	Sample Information: Pen./ Rec. (in)	Sample Information: Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
						Drove 4-inch casing to 19 feet. Difficult to keep casing vertical. Hit hard resistance at 19 feet and on possible rock. Wash casing to ~19.5 feet. Core times: 7.1, 6.25, 8, 6.1, and 10.25 min/ft		
310	20	C2	19.8 to 24.8	60/60	75		BEDROCK	C2: QUARTZ MONZODIORITE, hard, fresh, massive, fine to medium grained, joints spaced at 1" to 10", dipping at 10-45 deg, light gray to dark blue (BELCHERTOWN COMPLEX).
	25	C3	24.8 to 29.1	51/35	100	Core times: 6.1, 8.15, 9.5, and 6.8, min/ft; 4.1 min/3"		C3: Similar to C2, except joints range from 10-15 deg.
300	30							Bottom of boring at 29.1 feet. Backfilled with soil cuttings, sand, and concrete, and topped with asphalt cold patch.
	35							
	40							

NOTES: Used 300-lb hammer to advance casing.

PROJECT NAME: Piney Lane Bridge
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

GEI WOBURN STD 7-S-O-N-E-LAYER NAME PINEYLN-BORINGLOGS.GPJ 3/3/22

DATE	DESCRIPTION
SEPT 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

BORING INFORMATION

NORTHING (ft): 2,899,794 **EASTING (ft):** 411,066
GROUND SURFACE EL. (ft): 327.9 **DATE START/END:** 7/6/2021 - 7/6/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling
TOTAL DEPTH (ft): 31.7 **DRILLER NAME:** Dale Griffin
LOGGED BY: A. Parry **RIG TYPE:** Mobile B-57

BORING BB-2

PAGE 1 of 2

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** 2.15 inch / 2.96 inch
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

EL. 328.0±
EXIST. GRADE

EL. 318.0
BOT. PILE CAP

DRILLED SHAFT

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
						4-inch casing from 0 to 21.7 feet.	FILL	~1" ASPHALT
		S1	1 to 3	24/15	5-5-4-4			S1: Dry, loose, brown, FINE TO COARSE SAND.
		S2	3 to 5	24/12	5-3-3-5			S2: Moist, loose, brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.
	5	S3	5 to 7	24/19	4-4-3-5			S3: Moist, loose, brown, FINE TO COARSE SAND, some fine gravel up to 3/8", trace inorganic silt. [GRAIN SIZE DISTRIBUTION PERFORMED].
		S4	7 to 9	24/19	7-8-9-22			S4 (0-17"): Moist, dark brown/gray, medium dense, FINE TO COARSE SAND, some fine to medium gravel up to 1/2". S4 (17-19"): Wet, brown, medium dense, FINE TO MEDIUM GRAVEL AND FINE TO COARSE SAND, some inorganic silt.
320		S5	9 to 11	24/12	20-16-16-17		GLACIOFLUVIAL DEPOSITS	S5 (0-8"): Wet, gray, dense, FINE TO COARSE SAND, trace inorganic silt. S5 (8-12"): Moist, gray, dense, FINE TO COARSE SAND, some inorganic silt, some fine to medium gravel up to 1/2".
	10	S6	11 to 13	24/18	6-5-7-14			S6: Moist, gray, medium dense, FINE TO COARSE SAND, trace gravel, trace inorganic silt.
		S7	13 to 15	24/12	16-21-35-27			S7 (0-8"): Moist, brown with little orange, very dense, FINE TO COARSE SAND, some gravel, some inorganic silt.
	15						GLACIAL TILL	S7 (8"-12"): Moist, brown, very dense, FINE SAND AND INORGANIC SILT, trace gravel.

NOTES: Used 300-lb hammer to advance casing.

PROJECT NAME: Piney Lane Bridge Over Broad Brook - Bridge No. L-16-026
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME PINEYLN-BORINGLOGS.GPJ 4/11/23

EL. 306.0±
ESTIMATED TOP OF COMPETENT BEDROCK

EL. 300.0
BOT. OF SHAFT/ ROCK SOCKET

NORTHING (ft): 2,899,794 **EASTING (ft):** 411,066
GROUND SURFACE EL. (ft): 327.9 **DATE START/END:** 7/6/2021 - 7/6/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling

BORING BB-2

PAGE 2 of 2

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
310								
	20	S8	20 to 20.8	10/6	100/10"		GLACIAL TILL	S8: Moist, gray, very dense, FINE TO COARSE SAND, some fine gravel up to 3/8", some inorganic silt. [GRAIN SIZE DISTRIBUTION PERFORMED].
		C1	21.7 to 26.7	60/60	62	Core times: 4.3, 4.4, 5.6, 7, 5.1 min/ft.		C1: QUARTZ MONZODIORITE, gray to dark blue, hard, fresh, massive, medium to coarse size grains, massive, generally intact with occasional joints spaced 3 to 13 inches, dipping from 10-45 degrees (BELCHERTOWN COMPLEX).
	25	C2	26.7 to 31.7	60/60	82	Core times: 5, 4, 4.5, 4.9, 5.6 min/ft.	BEDROCK	C2: QUARTZ MONZODIORITE, Similar to C1.
300								
	30							Bottom of boring at 31.7 feet Backfilled with soil cuttings, sand, and concrete, and topped with asphalt cold patch.
290	35							
	40							

NOTES: Used 300-lb hammer to advance casing.

PROJECT NAME: Piney Lane Bridge Over Broad Brook - Bridge No. L-16-026
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME PINEYLN-BORINGLOGS.GPJ 4/11/23

DATE	DESCRIPTION
SEPT 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

BORING INFORMATION
NORTHING: 2899763 **EASTING:** 410971 **STATION:** 3+53 **OFFSET:** 3' S
GROUND SURFACE EL. (ft): 334.5 **DATE START/END:** 7/7/2021 - 7/7/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling
TOTAL DEPTH (ft): 2.5 **DRILLER NAME:** Dale
LOGGED BY: A. Parry **RIG TYPE:** Mobile B-57

BORING PC-1

PAGE 1 of 1

DRILLING INFORMATION
HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch / 4.5 inch **CORE BARREL TYPE:**
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Driven casing.
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

EL. 334.5±
EXIST. GRADE

Elev. (ft)	Depth (ft)	Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		C1	0 to 0.5	6/6			FILL	C1 (0-6"): ASPHALT.
		S1	0.5 to 2.5	24/12	13-16-18-8			S1 (0-3"): moist, dense, brown, FINE TO COARSE SAND, some fine to medium gravel, trace inorganic silt. S1 (3-12"): moist, dense, brown, FINE TO COARSE SAND, some fine to medium gravel and silt.
								Bottom of boring at 2.5 feet. Backfilled with soil cuttings, sand, and concrete, and topped with asphalt cold patch.
330								
	5							
	10							
320								

NOTES:

PROJECT NAME: Piney Lane Bridge
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

GEI WOBURN STD 7-S-O-N-E-LAYER NAME PINEYLN-BORINGLOGS.GPJ 3/3/22

BORING INFORMATION
NORTHING: 2899775 **EASTING:** 411108 **STATION:** 4+93 **OFFSET:** 3' N
GROUND SURFACE EL. (ft): 326.7 **DATE START/END:** 7/6/2021 - 7/6/2021
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling
TOTAL DEPTH (ft): 2.3 **DRILLER NAME:** Dale
LOGGED BY: A. Parry **RIG TYPE:** Mobile B-57

BORING PC-2

PAGE 1 of 1

DRILLING INFORMATION
HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch / 4.5 inch **CORE BARREL TYPE:**
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** NM **CORE BARREL I.D./O.D.:** NA / NA
DRILLING METHOD: Driven casing.
WATER LEVEL DEPTHS (ft): Not measured

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
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S = Split Spoon Sample
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SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D. = Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

EL. 326.7±
EXIST. GRADE

Elev. (ft)	Depth (ft)	Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		C1	0 to 0.3	4/4			FILL	C1 (0-4"): ASPHALT.
		S1	0.3 to 2.1	22/11	11-9-7-100/4"			S1 (0-2"): moist, medium dense, brown/dark brown, FINE TO COARSE SAND, some inorganic silt, trace fine to medium gravel up to 1". S1 (2-11"): moist, medium dense, brown, FINE TO MEDIUM SAND, some inorganic silt, trace fine to medium gravel up to 1/2".
								Bottom of boring at 2.3 feet. Backfilled with soil cuttings, sand, and concrete, and topped with asphalt cold patch.
320								
	5							
	10							

NOTES:

PROJECT NAME: Piney Lane Bridge
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

GEI WOBURN STD 7-S-O-N-E-LAYER NAME PINEYLN-BORINGLOGS.GPJ 3/3/22

SEPT 07, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	26	52
PROJECT FILE NO.	609120		

BORING LOGS 5 OF 6

BORING INFORMATION

BORING
BB-3
PAGE 1 of 2

NORTHING (ft): 2,899,766 **EASTING (ft):** 411,009
GROUND SURFACE EL. (ft): 331 **DATE START/END:** 3/22/2023 - 3/23/2023
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling
TOTAL DEPTH (ft): 30.5 **DRILLER NAME:** Dale Griffin
LOGGED BY: T. Rezzani **RIG TYPE:** Mobile B-53

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** 2.15 inch / 2.96 inch
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): ▽ 9.9 3/23/2023

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
EL. 331.0± EXIST. GRADE								
330		S1	0 to 2	24/17	9-8-6-6	4-inch casing from 0 to 20.5 feet.	FILL	S1 (0-4"): Asphalt, black. S1 (4-17"): Moist, medium dense, brown, FINE TO COARSE SAND, some fine to medium gravel, trace inorganic silt.
		S2	2 to 4	24/12	3-3-2-4			S2: Moist, loose, light brown, FINE TO COARSE SAND, some fine gravel, trace inorganic silt.
	5	S3	4 to 6	24/6	3-2-2-5			S3: Dry. loose, brown, FINE TO COARSE SAND, some fine to coarse gravel, trace inorganic silt.
		S4	6 to 8	24/14	2-4-3-3			S4: Dry, loose, dark brown, FINE TO COARSE SAND, some fine gravel, some inorganic silt, trace roots/stick.
MICROPILE						Increase in resistance to casing.		
EL. 322.0 BOT. TEMP. FOOTING		S5	8 to 10	24/12	20-10-8-19		GLACIOFLUVIAL DEP.	S5: Moist, medium dense, brown, FINE TO COARSE SAND AND FINE TO COARSE GRAVEL, trace inorganic silt and wood fragments.
EL. 321.1 3/23/23	10	S6	10 to 11.3	16/14	18-14-60/4"			S6: Moist, very dense, brown to gray, FINE TO COARSE SAND, some fine to medium gravel, some inorganic silt.
320								
EL. 318.0 BOT. PILE CAP								
DRILLED SHAFT	15	S7	15 to 17	24/13	19-24-38-30		GLACIAL TILL	S7: Moist, very dense, gray, FINE TO COARSE SAND, some fine to coarse gravel, some inorganic silt.

NOTES: Used 300-lb hammer to advance casing.

PROJECT NAME: Piney Lane Bridge Over Broad Brook - Bridge No. L-16-026
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME PINEYLN-BORINGLOGS.GPJ 4/11/23

EL. 310.5± ESTIMATED TOP OF COMPETENT BEDROCK
EL. 304.5 BOT. OF SHAFT/ ROCK SOCKET
EL. 302.5 ESTIMATED BOT. MICROPILE

BORING INFORMATION

BORING
BB-3
PAGE 2 of 2

NORTHING (ft): 2,899,766 **EASTING (ft):** 411,009
GROUND SURFACE EL. (ft): 331 **DATE START/END:** 3/22/2023 - 3/23/2023
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
	20						GLACIAL TILL	
310		S8 C1	20.5 to 20.5 20.5 to 25.5	0/0 60/39	100/0" 43	Core times: 8, 8.5, 5.5, 5, and 6 min/ft.	BEDROCK	C1: QUARTZ MONZODIORITE, gray with black speckels, hard, fresh, massive, medium to coarse size grains, irregular joint/fracture at 13 inches, joints spaced 0 to 9 inches, dipping from 0-40 degrees (BELCHERTOWN COMPLEX).
	25	C2	25.5 to 30.5	60/60	92	Core times: 7, 9.5, 4, 7.5, and 13 min/ft.		C2: QUARTZ MONZODIORITE, light gray with black speckels, hard, fresh, massive, medium to coarse size grains, massive, joints spaced 1.5 to 10.5 inches, dipping from 0-45 degrees, (BELCHERTOWN COMPLEX).
	30							
300								Bottom of boring at 30.5 feet. Backfilled with soil cuttings, sand, and concrete, and topped with asphalt cold patch.
	35							
	40							

NOTES: Used 300-lb hammer to advance casing.

PROJECT NAME: Piney Lane Bridge Over Broad Brook - Bridge No. L-16-026
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263
GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME PINEYLN-BORINGLOGS.GPJ 4/11/23

DATE	DESCRIPTION
SEPT 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

BORING INFORMATION

NORTHING (ft): 2,899,746 **EASTING (ft):** 411,102
GROUND SURFACE EL. (ft): 324.5 **DATE START/END:** 3/21/2023 - 3/22/2023
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling
TOTAL DEPTH (ft): 30.5 **DRILLER NAME:** Dale Griffin
LOGGED BY: T. Rezzani **RIG TYPE:** ATV D-101

BORING BB-4

DRILLING INFORMATION

HAMMER TYPE: Automatic **CASING I.D./O.D.:** 4 inch/ 4.5 inch **CORE BARREL TYPE:** NX
AUGER I.D./O.D.: NA / NA **DRILL ROD O.D.:** 2.625 inch **CORE BARREL I.D./O.D.:** 2.15 inch / 2.96 inch
DRILLING METHOD: Driven casing and washed with rotary tooling.
WATER LEVEL DEPTHS (ft): ▽ 5.6 3/22/2023

ABBREVIATIONS:
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Rock Quality Designation = Length of Sound Cores>4 in / Pen.,%
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
U = Undisturbed Sample
SC = Sonic Core
DP = Direct Push Sample
HSA = Hollow-Stem Auger
Qp = Pocket Penetrometer Strength
Sv = Pocket Torvane Shear Strength
LL = Liquid Limit
PI = Plasticity Index
PID = Photoionization Detector
I.D./O.D.= Inside Diameter/Outside Diameter
NA, NM = Not Applicable, Not Measured
Blows per 6 in.: 140-lb hammer falling 30 inches to drive a 2-inch-O.D. split spoon sampler.

EL. 324.5±
EXIST. GRADE

MICROPILE

EL. 319.5
BOT. TEMP. FOOTING

EL. 318.9
3/22/23

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
		S1	0 to 2	24/12	2-3-3-3	4-inch casing from 0 to 20.5 feet.	FILL	S1 (0-8"): Dry, loose, brown, FINE TO MEDIUM SAND, some organic silt, dry. Roots present. TOPSOIL S1 (8-12") Dry, loose, brown, FINE TO COARSE SAND, some fine to medium gravel, trace inorganic silt.
		S2	2 to 4	24/5	2-2-2-2			S2: Dry, loose, brown, FINE TO COARSE SAND, some fine to medium gravel, trace inorganic silt.
320	5	S3	4 to 6	24/9	2-1-20-19			S3: Moist, medium dense, black, FINE SAND AND INORGANIC SILT.
		S4	6 to 7.1	13/9	16-14-100/1"	Drilled indicated possible boulders from ~6-8 feet.	GLACIOFLUVIAL DEPOSITS	S4: Wet, gray, very dense, FINE TO COARSE GRAVEL, some fine to coarse sand, trace inorganic silt.
		S5	8 to 10	24/11	10-8-26-32			S5: Wet, gray, dense, FINE TO COARSE SAND AND FINE TO COARSE GRAVEL, trace inorganic silt.
	10	S6	10 to 12	24/18	24-32-33-21		GLACIAL TILL	S6: Moist, very dense, brownish gray, FINE TO COARSE SAND, some fine to coarse gravel, some inorganic silt.
		S7	13 to 13.9	11/7	25-100/5"	Slowed roller bit from 13.5 to 20.5 feet, driller noted weathered rock fragments.		S7: Similar to S6.
310	15							

NOTES: Used 300-lb hammer to advance casing.

PROJECT NAME: Piney Lane Bridge Over Broad Brook - Bridge No. L-16-026
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME PINEYLN-BORINGLOGS.GPJ 4/11/23

NORTHING (ft): 2,899,746 **EASTING (ft):** 411,102
GROUND SURFACE EL. (ft): 324.5 **DATE START/END:** 3/21/2023 - 3/22/2023
VERT./HORIZ. DATUMS: NAVD 88/NAD 83 MA State Plane **DRILLING COMPANY:** Seaboard Drilling

BORING BB-4

EL. 304.0±
ESTIMATED TOP OF COMPETENT BEDROCK

EL. 296.0
EST. BOT.
MICROPILE

Elev. (ft)	Depth (ft)	Sample No.	Sample Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD	Drilling Remarks/ Field Test Data	Layer Name	Soil and Rock Description
	20						GLACIAL TILL	
		C1	20.5 to 25.5	60/55	92	Core times: 4.5, 3, 2.5, 3, and 3 min/ft.	BEDROCK	C1: QUARTZ MONZODIORITE, light gray with black speckels, very hard, fresh, fine to medium grained, joints spaced 6 to 23 inches, dipping from 0 to 20 degrees from horizontal (BELCHERTOWN COMPLEX).
300	25	C2	25.5 to 30.5	60/60	100	Core times: 5.5, 7.5, 6, 8, and 6.5 min/ft. Driller noted portion from C1 was recovered in C2.		C2: QUARTZ MONZODIORITE, light gray with black speckels, very hard, fresh, massive, fine to medium grained, joints spaced 5.5 to 21 inches, dipping from 0 to 60 degrees, light gray (BELCHERTOWN COMPLEX).
	30							Bottom of boring at 30.5 feet. Backfilled with soil cuttings and sand.
290	35							
	40							

NOTES: Used 300-lb hammer to advance casing.

PROJECT NAME: Piney Lane Bridge Over Broad Brook - Bridge No. L-16-026
CITY/STATE: Ludlow, Massachusetts
GEI PROJECT NUMBER: 2101263

GEI Consultants

GEI WOBURN STD 5-NORTH-EAST-LAYER NAME PINEYLN-BORINGLOGS.GPJ 4/11/23

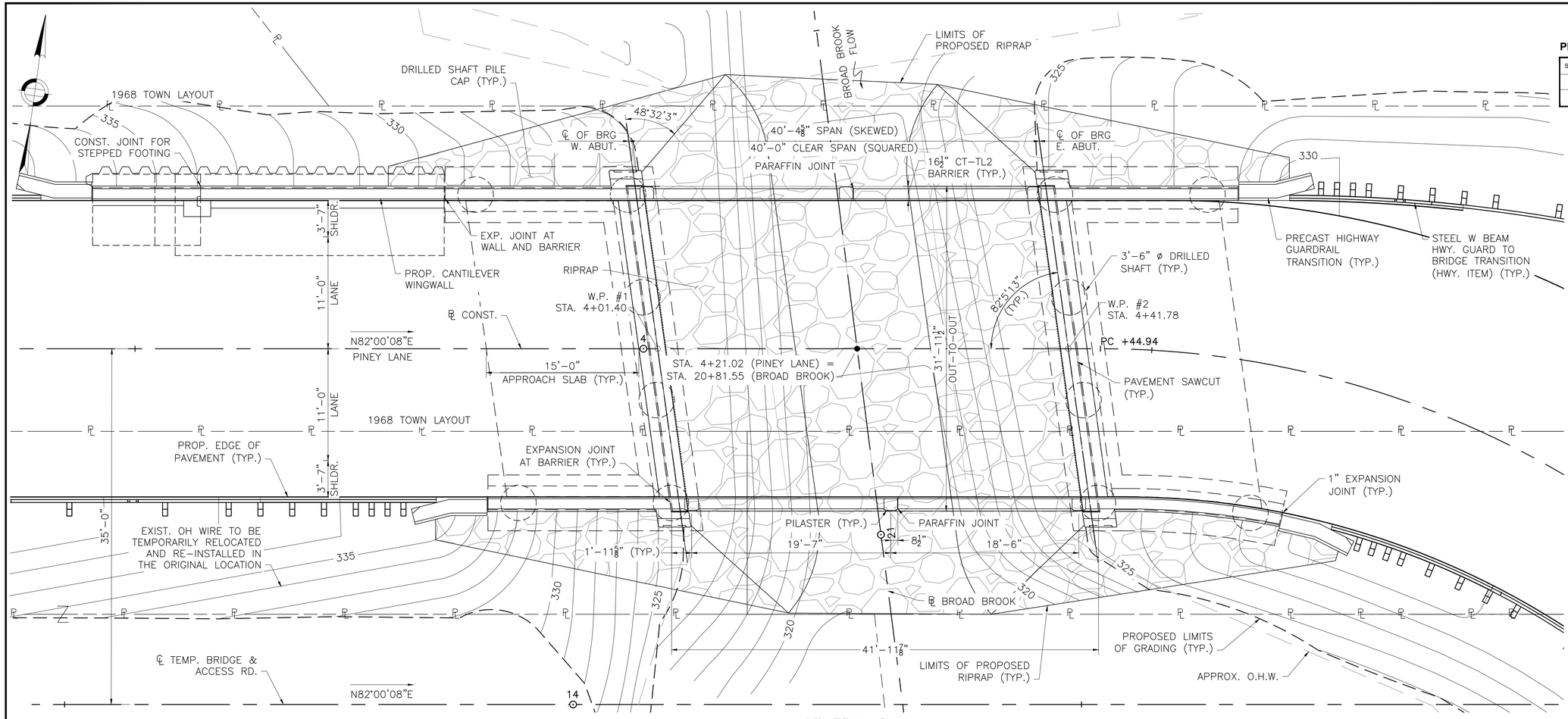
SEPT 07, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

609120_BR3-6(L16026).DWG Plotted on 18-Aug-2021 10:07 AM
FINAL BRIDGE SUBMISSION - (SF2) 07-SEPTEMBER-2024

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	28	52
PROJECT FILE NO.	609120		

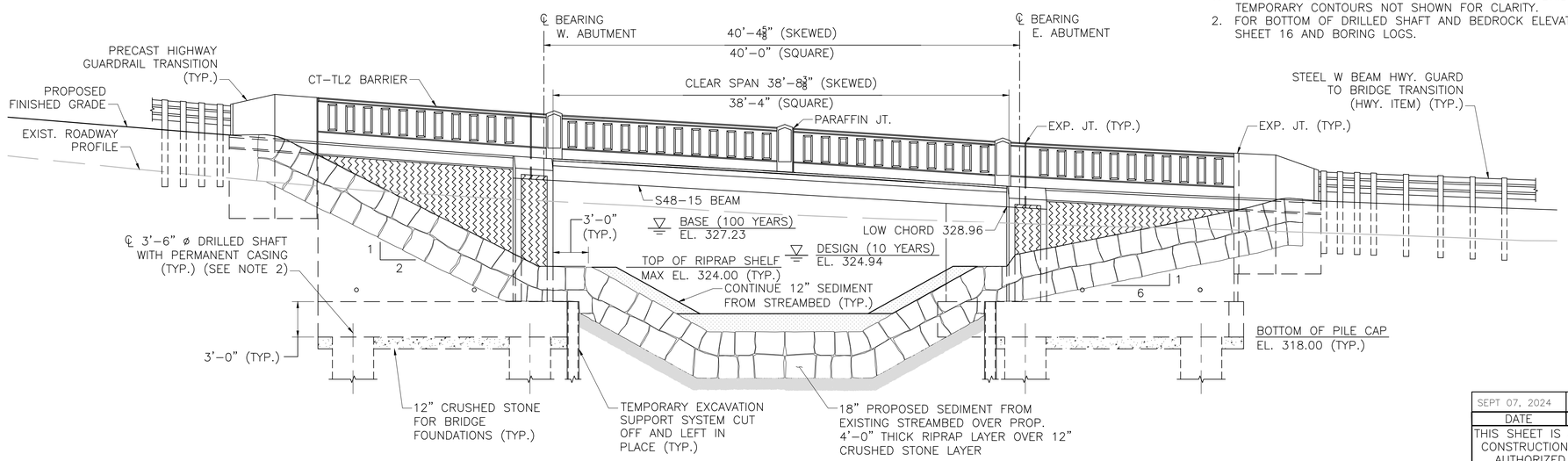
BRIDGE PLAN AND ELEVATION



GENERAL PLAN
SCALE 3/16" = 1'-0"

NOTES:

1. FINAL PROPOSED CONTOURS SHOWN. TEMPORARY BRIDGE AND TEMPORARY CONTOURS NOT SHOWN FOR CLARITY.
2. FOR BOTTOM OF DRILLED SHAFT AND BEDROCK ELEVATIONS, SEE SHEET 16 AND BORING LOGS.



SOUTH ELEVATION
SCALE 3/16" = 1'-0"

DATE	DESCRIPTION
SEPT 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	29	52
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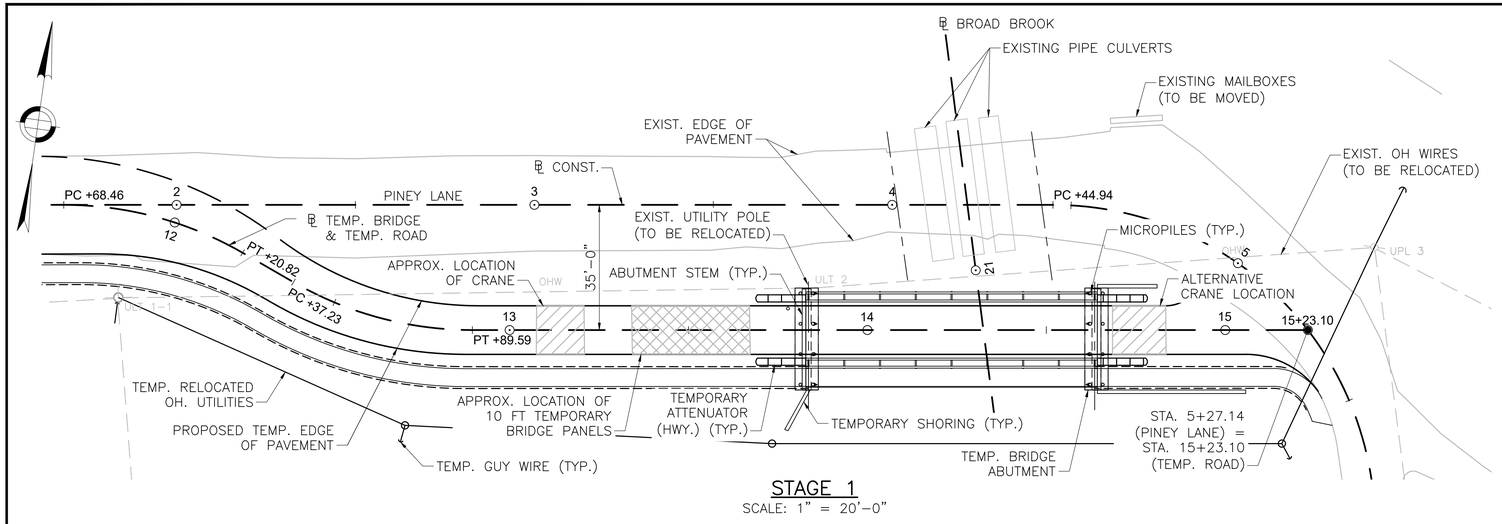
STAGE CONSTRUCTION 1 OF 2



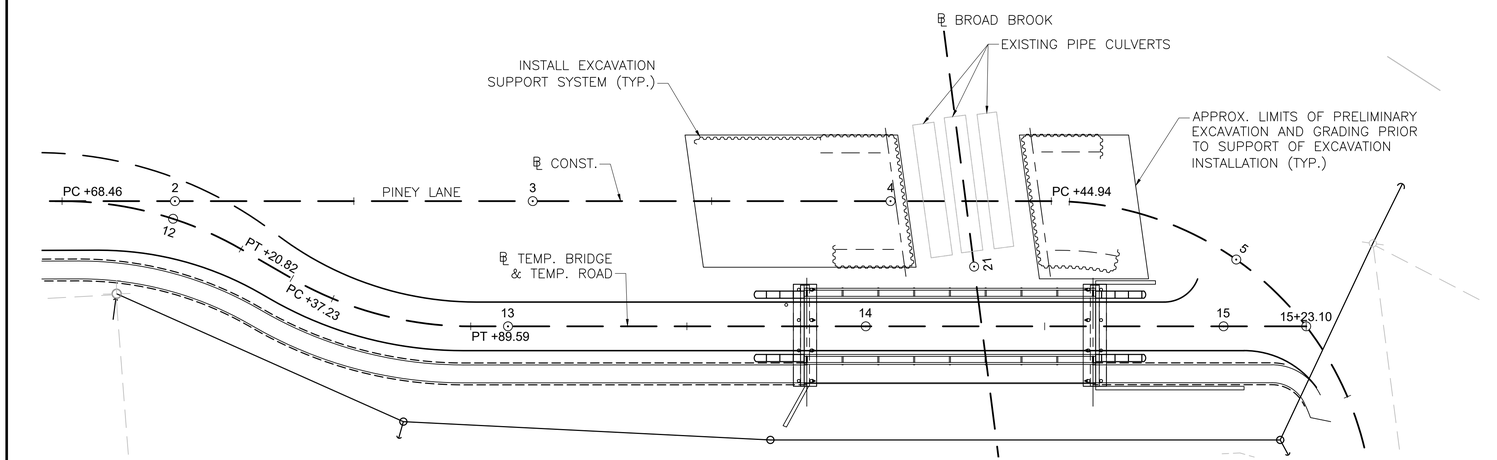
STAGE 1
SCALE: 1" = 20'-0"

STAGE 1

1. PERFORM PRELIMINARY EXCAVATION AND GRADING AS REQUIRED TO CREATE LEVEL WORK ZONE TO PERMIT EQUIPMENT ACCESS.
2. RELOCATE OVERHEAD WIRES AND UTILITY POLES.
3. CONSTRUCT TEMPORARY ROAD AND GRADE PEDESTRIAN WALKWAY.
4. INSTALL MICROPILES AND CONSTRUCT TEMPORARY FOOTINGS, ABUTMENT STEMS, AND BACKWALLS.
5. INSTALL TEMPORARY SHORING.
6. ERECT TEMPORARY BRIDGE.
7. RELOCATE MAILBOXES.

SUGGESTED SEQUENCE OF CONSTRUCTION

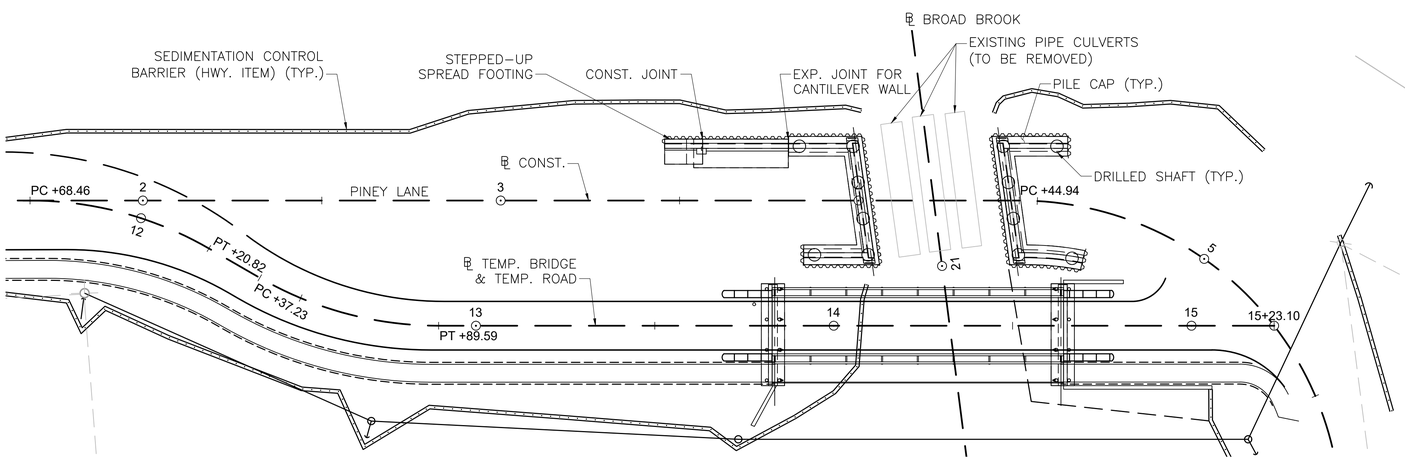
1. THE SUGGESTED SEQUENCE OF CONSTRUCTION SHOWN IS SCHEMATIC ONLY AND IS INTENDED TO SHOW MAJOR ITEMS OF WORK.
2. THE CONTRACTOR SHALL PROTECT EXISTING STRUCTURES DURING ALL STAGES OF CONSTRUCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF TEMPORARY SUPPORTS, TEMPORARY SUPPORT OF EXCAVATION AND TEMPORARY PROTECTIVE STRUCTURES AS MAY BE REQUIRED BY THE CONTRACTOR'S OWN MEANS AND METHODS.



STAGE 2
SCALE: 1" = 20'-0"

STAGE 2

1. SHIFT TRAFFIC TO TEMPORARY BRIDGE AND CLOSE PINEY LANE.
2. PRE-EXCAVATE BOULDERS DETERMINED TO EXIST FROM THE BORINGS, SEE SPECIAL PROVISIONS.
3. INSTALL EXCAVATION SUPPORT SYSTEM AND CONTROL OF WATER SYSTEM AS REQUIRED BY THE SPECIAL PROVISIONS. TOP OF EXCAVATION SUPPORT SYSTEM SHALL BE A MINIMUM OF EL. 329.0



STAGE 3
SCALE: 1" = 20'-0"

STAGE 3

1. INSTALL DRILLED SHAFTS.
2. INSTALL STEPPED-UP SPREAD FOOTING. CONSTRUCT PILE CAPS, ABUTMENT STEMS AND WINGWALL STEMS.
3. SEE RESTORATION PLAN FOR SEDIMENTATION CONTROL BARRIER LOCATION TO BE INSTALLED PRIOR TO REMOVAL OF THE PIPE CULVERTS.
4. INSTALL SEDIMENTATION CONTROLS, SEE HIGHWAY PLANS.
5. REMOVE EXISTING PIPE CULVERTS.
6. REMOVE ALL TEMPORARY SUPPORT OF EXCAVATION, EXCEPT AS NOTED, AFTER THE PILE CAPS, ABUTMENTS AND WINGWALLS HAVE BEEN CAST AND CURED. SEE SPECIAL PROVISION ITEM NO. 953.1.

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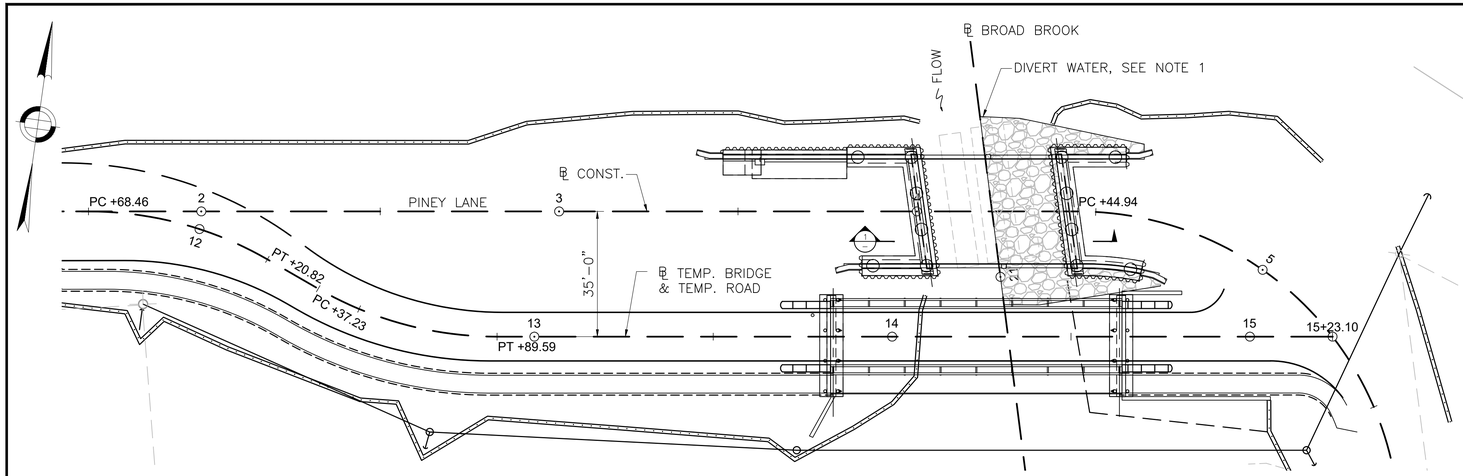
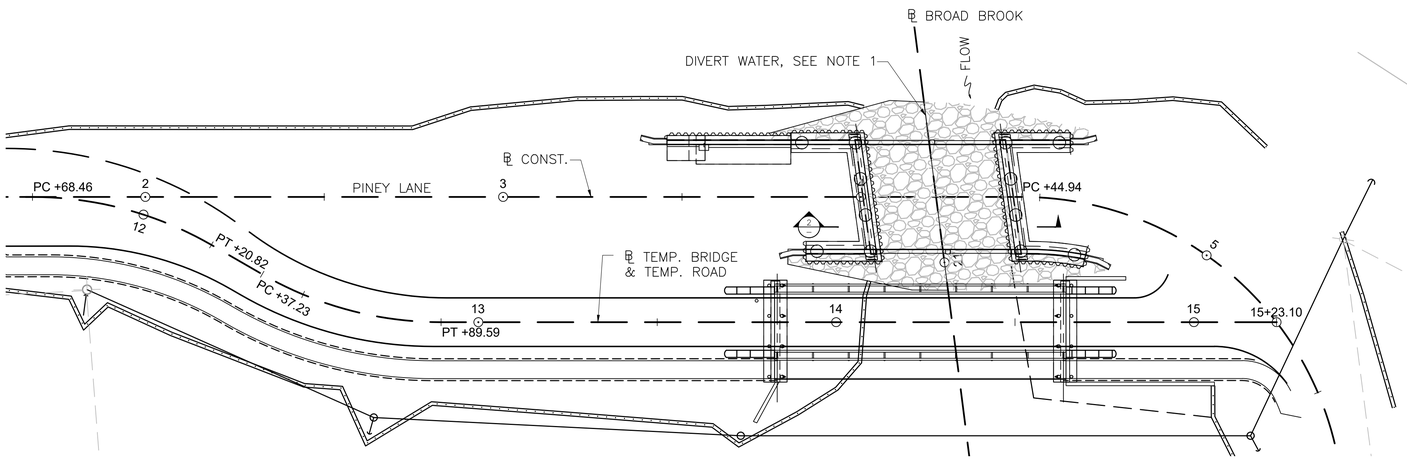
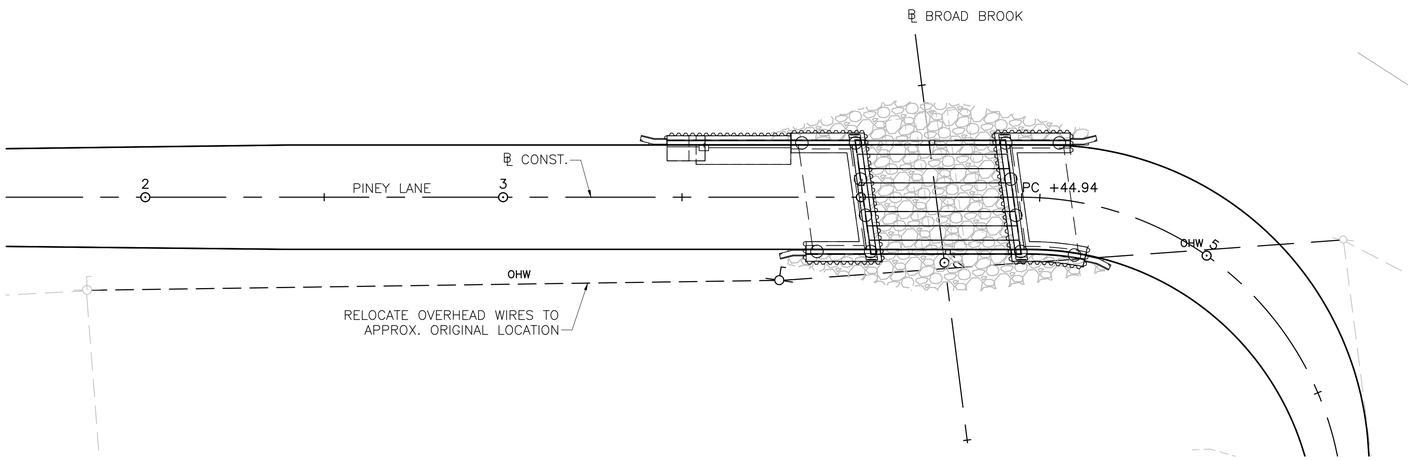


STAGE 4
SCALE: 1" = 20'-0"



STAGE 5
SCALE: 1" = 20'-0"



STAGE 6
SCALE: 1" = 20'-0"

STAGE 4

1. DIVERT WATER FROM EAST HALF OF CHANNEL TO WEST HALF USING A DIVERSION SYSTEM. SEE SPECIAL PROVISIONS ITEM 950.11.
2. EXCAVATE AND GRADE EAST HALF OF CHANNEL TO PROPOSED PROFILE, SEE SHEET 15.
3. CUT TOP OF LEFT-IN-PLACE EXCAVATION SUPPORT SYSTEM FOR WINGWALL AND ABUTMENT AT TOP OF PILE CAP.
4. INSTALL CRUSHED STONE, RIPRAP AND COVER EAST HALF OF CHANNEL WITH PROPOSED SEDIMENT FROM STOCKPILES OF EXISTING RIVER BED MATERIAL PREVIOUSLY EXCAVATED ON SITE, SEE SECTION 1.
5. INSTALL RIPRAP TO LIMITS SHOWN.

LUDLOW
PINEY LANE OVER BROAD BROOK

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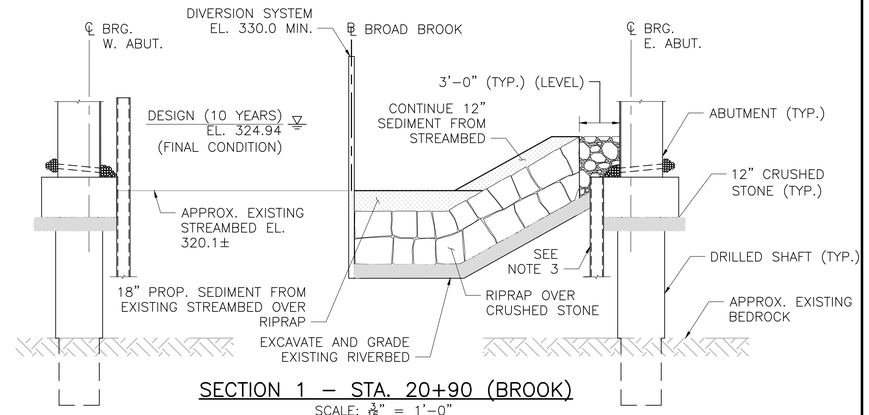
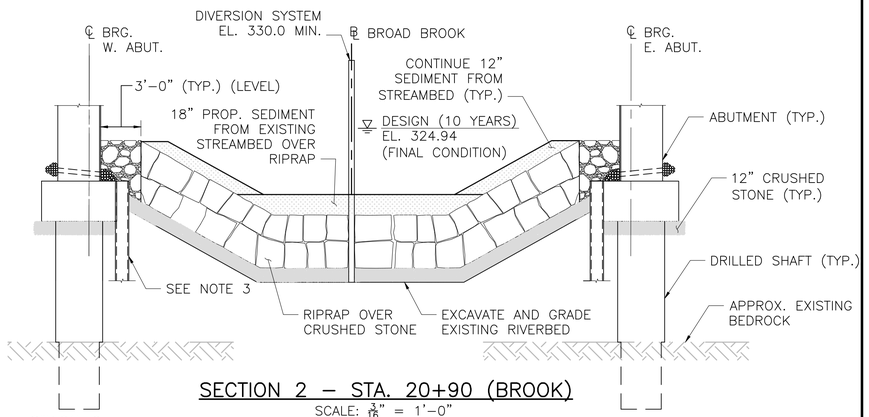
STAGE CONSTRUCTION 2 OF 2



SECTION 1 – STA. 20+90 (BROOK)
SCALE: $\frac{3}{16}$" = 1'-0"

STAGE 5

1. DIVERT WATER FROM WEST HALF OF CHANNEL TO EAST HALF.
2. EXCAVATE AND GRADE WEST HALF OF CHANNEL TO PROPOSED PROFILE, SEE SHEET 15.
3. CUT TOP OF LEFT-IN-PLACE EXCAVATION SUPPORT SYSTEM FOR WINGWALL AND ABUTMENT AT TOP OF PILE CAP.
4. INSTALL CRUSHED STONE, RIPRAP AND COVER WEST HALF OF CHANNEL WITH PROPOSED SEDIMENT FROM STOCKPILES OF EXISTING RIVER BED MATERIAL PREVIOUSLY EXCAVATED ON SITE, SEE SECTION 2.
5. COMPLETE RIPRAP INSTALLATION AS SHOWN.



SECTION 2 – STA. 20+90 (BROOK)
SCALE: $\frac{3}{16}$" = 1'-0"

STAGE 6

1. INSTALL SUPERSTRUCTURE, SAFETY CURBS, BRIDGE RAIL, AND HIGHWAY GUARDRAIL TRANSITION.
2. CONSTRUCT APPROACH SLABS.
3. INSTALL BRIDGE WATERPROOFING AND FINAL BITUMINOUS WEARING SURFACE ON BRIDGE AND APPROACHES.
4. SHIFT PEDESTRIAN AND VEHICULAR TRAFFIC TO NEW PERMANENT BRIDGE.
5. REMOVE TEMPORARY SHORING, SEE HIGHWAY PLANS.
6. DEMOLISH EXISTING TEMPORARY BRIDGE AND CUT MICROPILES 12 IN. BELOW FINISHED GRADE.
7. RELOCATE OVERHEAD WIRES TO APPROXIMATE ORIGINAL LOCATION.
8. REMOVE AND REGRADE TEMPORARY BRIDGE AND TEMPORARY ROAD AREAS, SEE HIGHWAY PLANS.

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LUDLOW
PINEY LANE OVER BROAD BROOK

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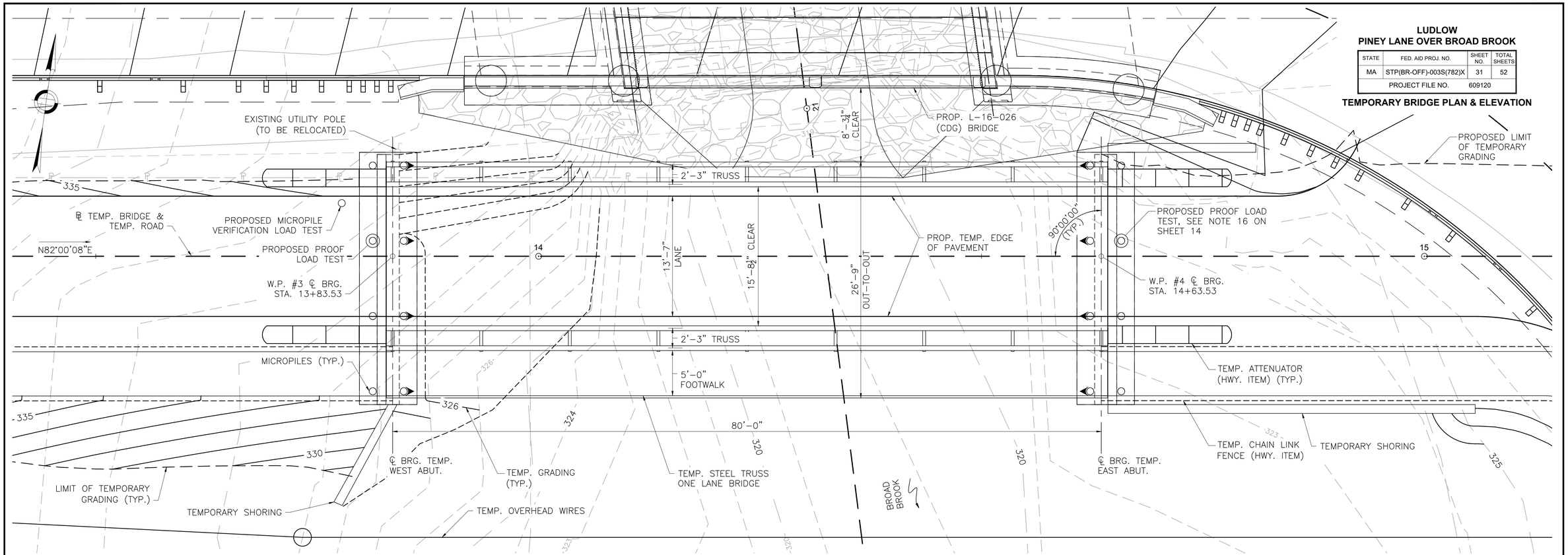
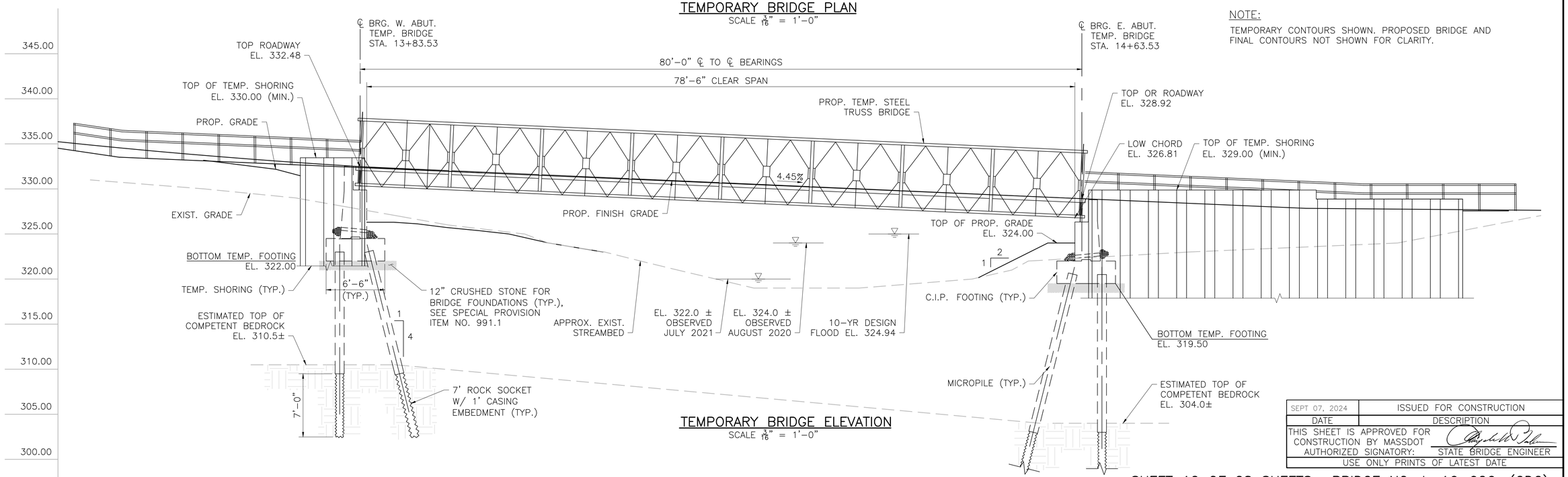
TEMPORARY BRIDGE PLAN & ELEVATION



TEMPORARY BRIDGE PLAN
SCALE 3/16" = 1'-0"



TEMPORARY BRIDGE ELEVATION
SCALE 3/16" = 1'-0"

NOTE:
TEMPORARY CONTOURS SHOWN. PROPOSED BRIDGE AND FINAL CONTOURS NOT SHOWN FOR CLARITY.

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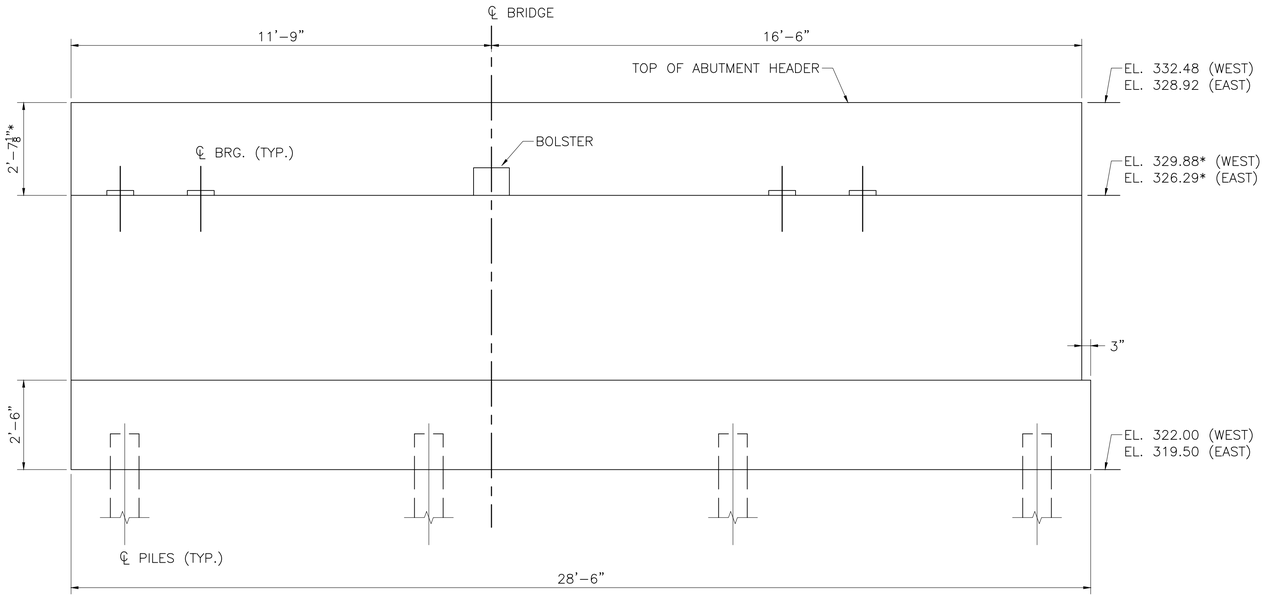
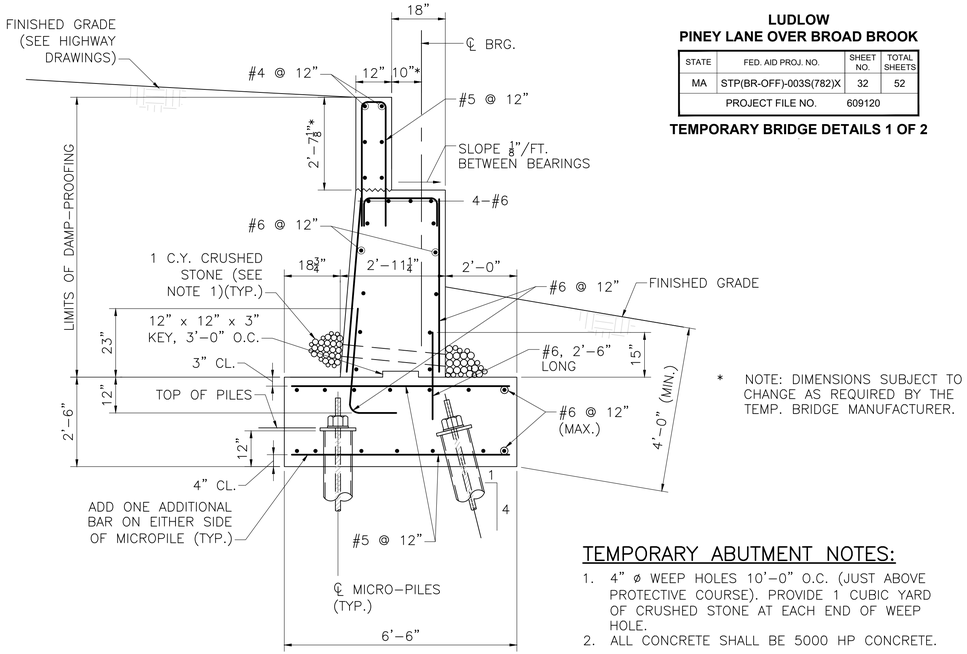
609120_BR12-14(L16026).DWG Plotted on 10-Sep-2024 1:26 PM
FINAL BRIDGE SUBMISSION - (SF2) 07-SEPTEMBER-2024



TEMPORARY BRIDGE ABUTMENT ELEVATION

SCALE: ½" = 1'–0"



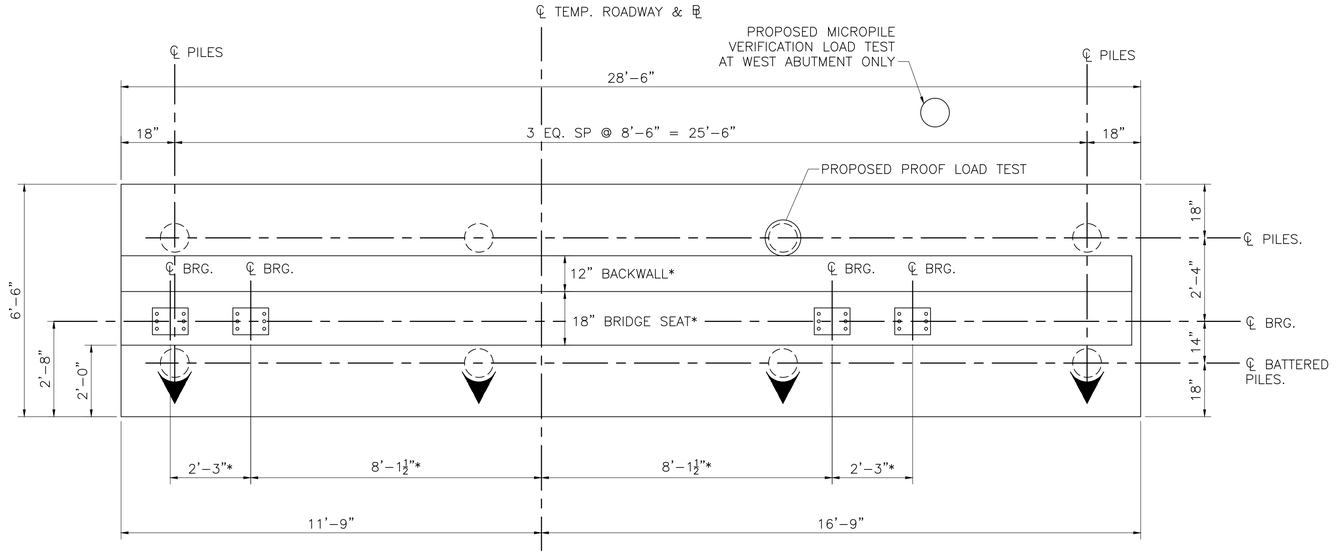
* NOTE: DIMENSIONS SUBJECT TO CHANGE AS REQUIRED BY THE TEMP. BRIDGE MANUFACTURER.

TEMPORARY BRIDGE TYPICAL ABUTMENT SECTION

SCALE: ½" = 1'–0"

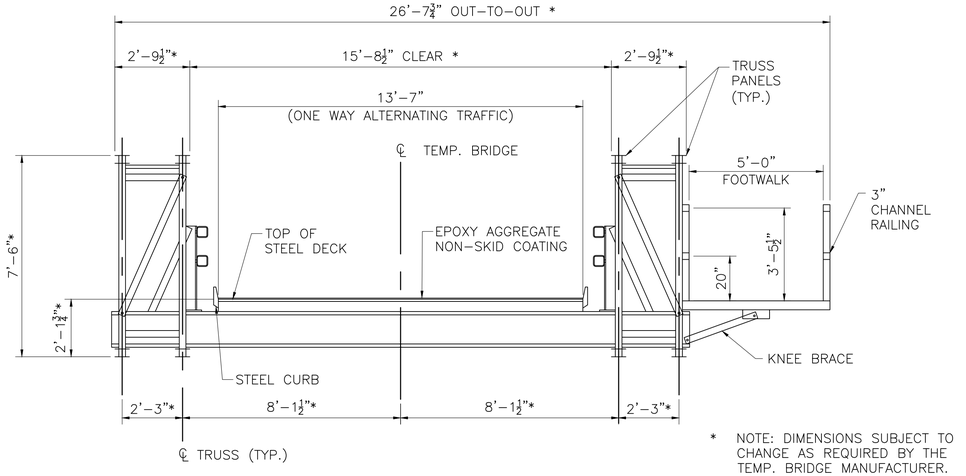
TEMPORARY ABUTMENT NOTES:

1. 4" ø WEEP HOLES 10'–0" O.C. (JUST ABOVE PROTECTIVE COURSE). PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
2. ALL CONCRETE SHALL BE 5000 HP CONCRETE.



TEMPORARY BRIDGE ABUTMENT PLAN

SCALE: ½" = 1'–0"



* NOTE: DIMENSIONS SUBJECT TO CHANGE AS REQUIRED BY THE TEMP. BRIDGE MANUFACTURER.

TEMPORARY BRIDGE CROSS SECTION

SCALE: ⅜" = 1'–0"

LUDLOW
PINEY LANE OVER BROAD BROOK

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TEMPORARY BRIDGE DETAILS 1 OF 2

DATE	DESCRIPTION
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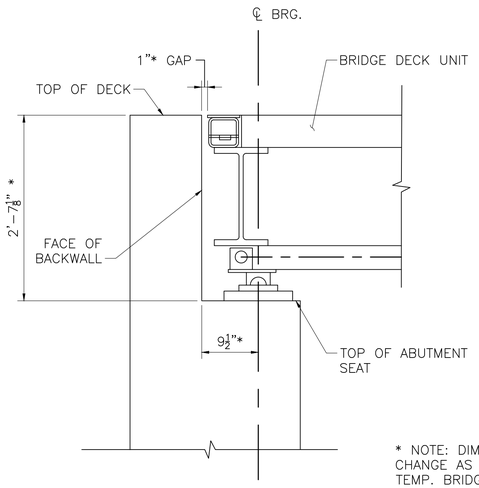
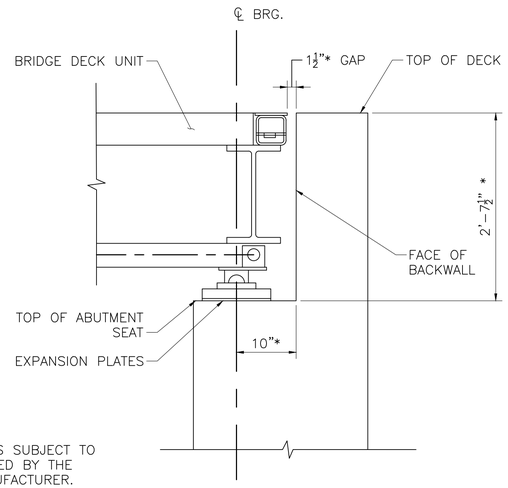


WEST ABUTMENT FIXED BEARING DETAIL

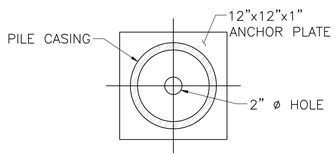
SCALE: 1" = 1'-0"



EAST ABUTMENT EXPANSION BEARING DETAIL

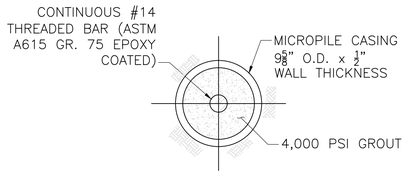
SCALE: 1" = 1'-0"

* NOTE: DIMENSIONS SUBJECT TO CHANGE AS REQUIRED BY THE TEMP. BRIDGE MANUFACTURER.



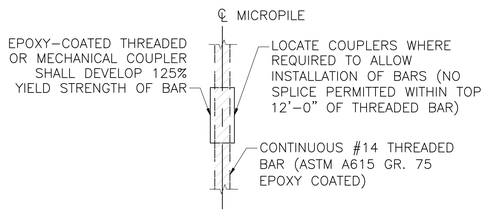
SECTION 3

SCALE: 1½" = 1'-0"



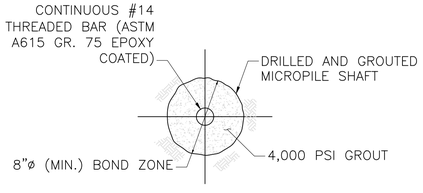
SECTION 4 – CASED ZONE

SCALE: 1½" = 1'-0"



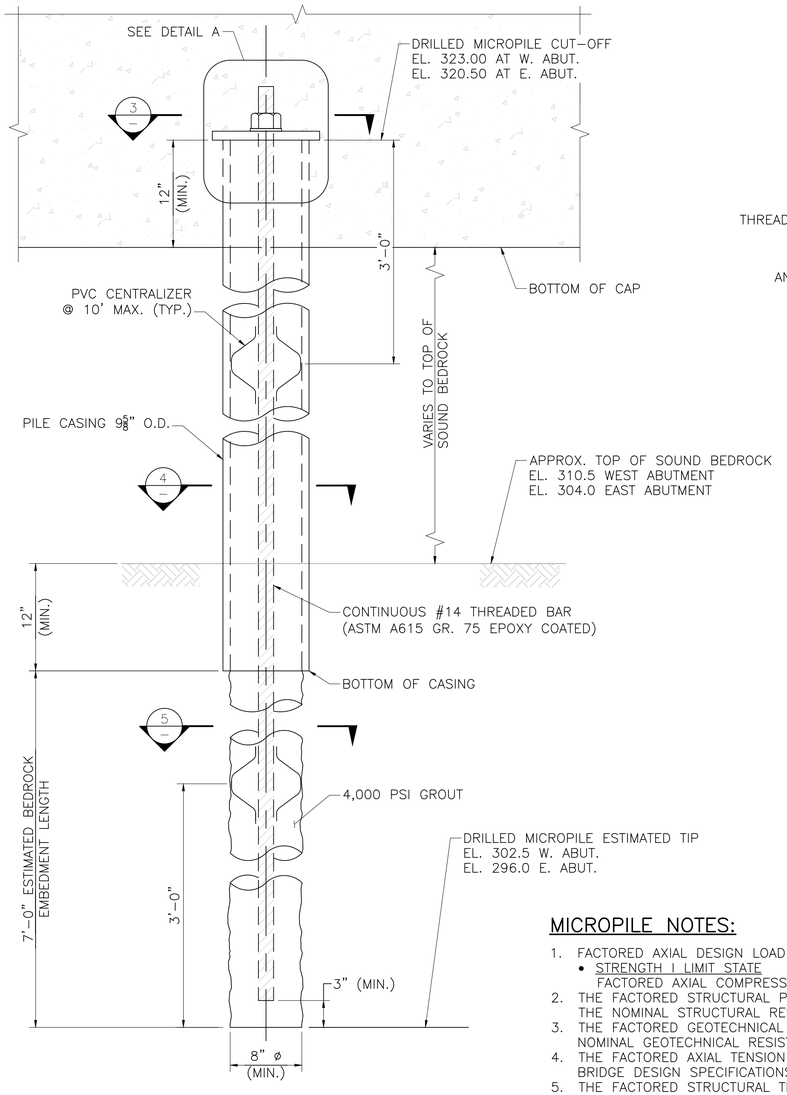
THREADED BAR SPLICE DETAIL

SCALE: 1½" = 1'-0"



SECTION 5 – BONDED ZONE

SCALE: 1½" = 1'-0"



VERTICAL SECTION THROUGH PILE

SCALE: 1½" = 1'-0"

REACTIONS PER ABUTMENT	
LOADS	UNFACTORED (KIPS)
DC	56
DW	2
1*HL-93 TRUCK	64
1*HL-93 LANE	26
PEDESTRIAN LIVE LOAD	17
WIND LOAD	12
BRAKING	11
FRICTION	6

NOTE: LIVE LOAD VALUES SHOWN DO NOT INCLUDE DYNAMIC ALLOWANCE FACTOR OR MULTIPLE PRESENCE FACTOR. ALL LOADS ARE ACTING VERTICALLY DOWNWARDS EXCEPT FOR WIND WHICH IS ACTING TRANSVERSELY TO THE BRIDGE AND BRAKING AND FRICTION WHICH ARE ACTING LONGITUDINALLY ALONG THE BRIDGE.

LUDLOW
PINEY LANE OVER BROAD BROOK

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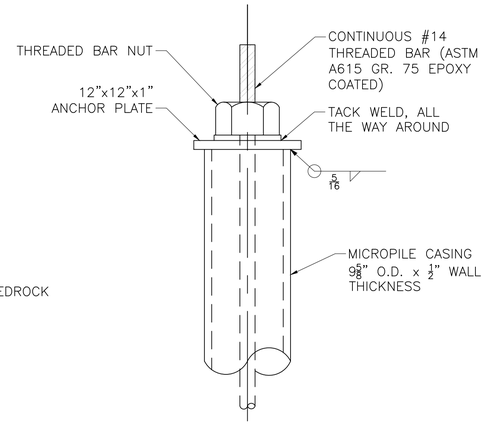
TEMPORARY BRIDGE DETAILS 2 OF 2



DETAIL A

SCALE: 1½" = 1'-0"

MICROPILE ROCK SOCKET DATA	
NOMINAL AXIAL COMPRESSIVE RESISTANCE	395.2 KIPS
FACTORED AXIAL COMPRESSIVE RESISTANCE	201.5 KIPS
MINIMUM REQUIRED STATIC TEST LOAD	230.7 KIPS

MICROPILE NOTES:

1. FACTORED AXIAL DESIGN LOAD PER PILE PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
   - STRENGTH I LIMIT STATE
     FACTORED AXIAL COMPRESSION DESIGN LOAD = 161.5 KIPS.
2. THE FACTORED STRUCTURAL PILE RESISTANCE PER PILE IS 397.9 KIPS AND IS THE PRODUCT OF THE NOMINAL STRUCTURAL RESISTANCE OF 530.6 KIPS AND A RESISTANCE FACTOR OF 0.75.
3. THE FACTORED GEOTECHNICAL PILE RESISTANCE IS 201.5 KIPS AND IS THE PRODUCT OF THE NOMINAL GEOTECHNICAL RESISTANCE OF 366.5 KIPS AND A RESISTANCE FACTOR OF 0.55.
4. THE FACTORED AXIAL TENSION DESIGN LOAD PER PILE IS 32.9 KIPS AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION.
5. THE FACTORED STRUCTURAL TENSION RESISTANCE PER PILE IS 113.6 KIPS AND IS THE PRODUCT OF THE NOMINAL STRUCTURAL RESISTANCE OF 162.3 KIPS AND A RESISTANCE FACTOR OF 0.70 FOR CONCRETE BREAKOUT, THE CONTROLLING FAILURE MODE.
6. THE ESTIMATED TIP ELEVATION SHALL BE AS SHOWN ON THE VERTICAL SECTION THROUGH PILE.
7. STEEL CASING SHALL BE PRIME STEEL AND MEET THE REQUIREMENTS OF API 5L PSL1 GRADE 52 WITH SR 15 SUPPLEMENTAL REQUIREMENTS.
8. THREADED STEEL BAR SHALL BE CONTINUOUSLY THREADED FOR THE ENTIRE BAR LENGTH CONFORMING TO AASHTO M31, HAVING A MINIMUM YIELD STRENGTH OF 75 KSI.
9. THREADED CASING JOINTS ARE NOT ALLOWED WITHIN 3'-0" OF THE PILE CAP.
10. NUT AND BAR COUPLING SHALL BE PROVIDED FROM THE SAME MANUFACTURER AS THE THREADED STEEL BAR.
11. BAR COUPLING SHALL BE FULLY ENGAGED ON THE THREADED STEEL BAR AND SHALL NOT BE LOCATED IN THE TOP THIRD OF THE MICROPILE LENGTH.
12. ANCHOR PLATE SHALL MEET THE REQUIREMENTS OF AASHTO M270 GRADE 50.
13. GROUT SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4000 PSI AND CEMENT SHALL CONFORM TO AASHTO M85 TYPE I.
14. GROUT SHALL BE PLACED USING TREMIE METHODS.
15. THE CONTRACTOR SHALL SUBMIT A MICROPILE SCHEDULE, MICROPILE INSTALLATION, AND MICROPILE TESTING PLAN FOR REVIEW AND APPROVAL BY THE ENGINEER.
16. SEE SPECIAL PROVISION ITEM 945.10 DRILLED MICROPILES, ITEM 948.60 MICROPILE VERIFICATION LOAD TEST, AND ITEM 948.61 MICROPILE PROOF LOAD TEST FOR ADDITIONAL MICROPILE SPECIFICATIONS.

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LUDLOW
PINEY LANE OVER BROAD BROOK

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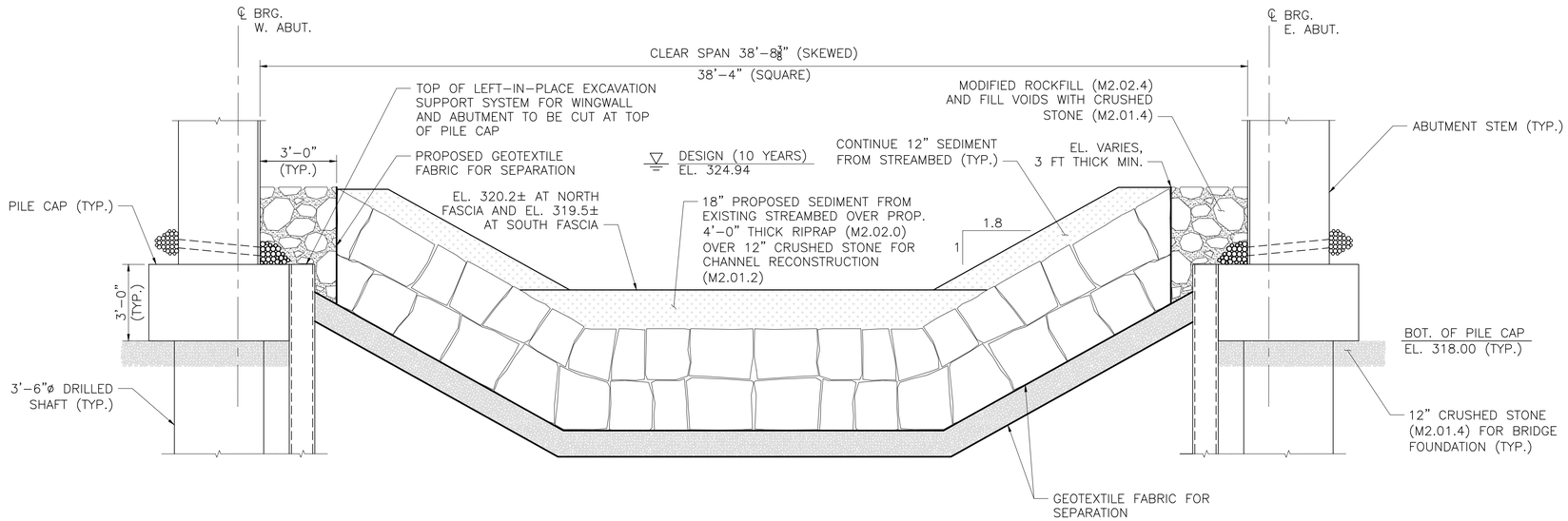
CHANNEL SECTION



SOUTH FASCIA LOOKING NORTH
(NORTH FASCIA LOOKING SOUTH SIMILAR)

SCALE: ⅜" = 1'-0"

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LUDLOW
PINEY LANE OVER BROAD BROOK

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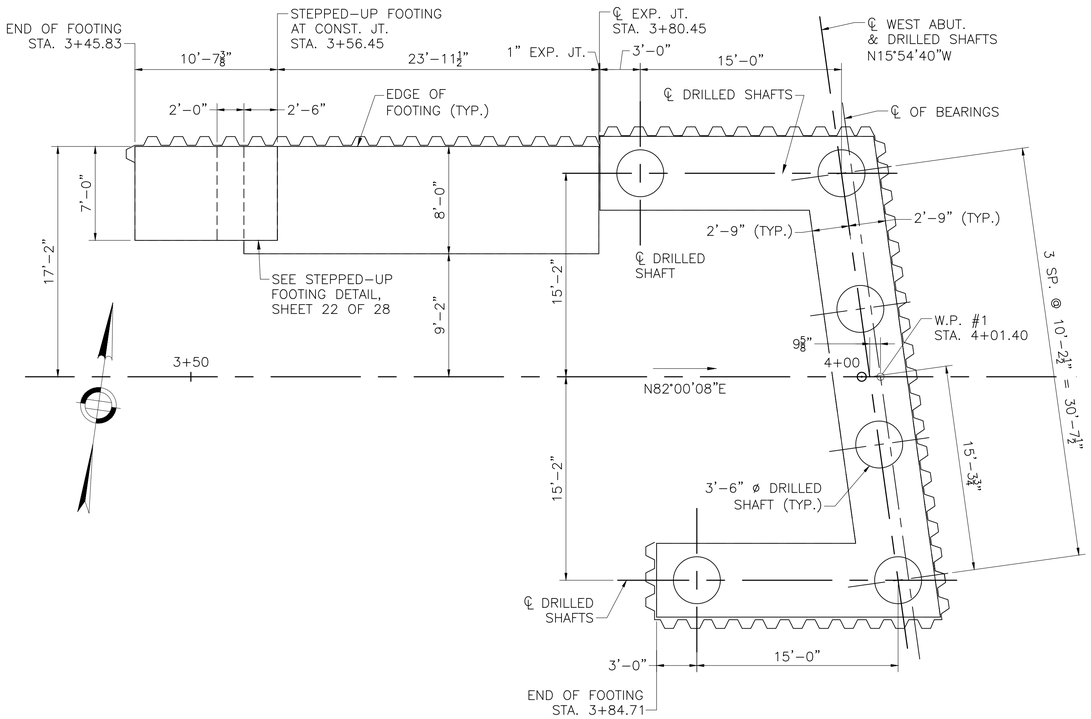
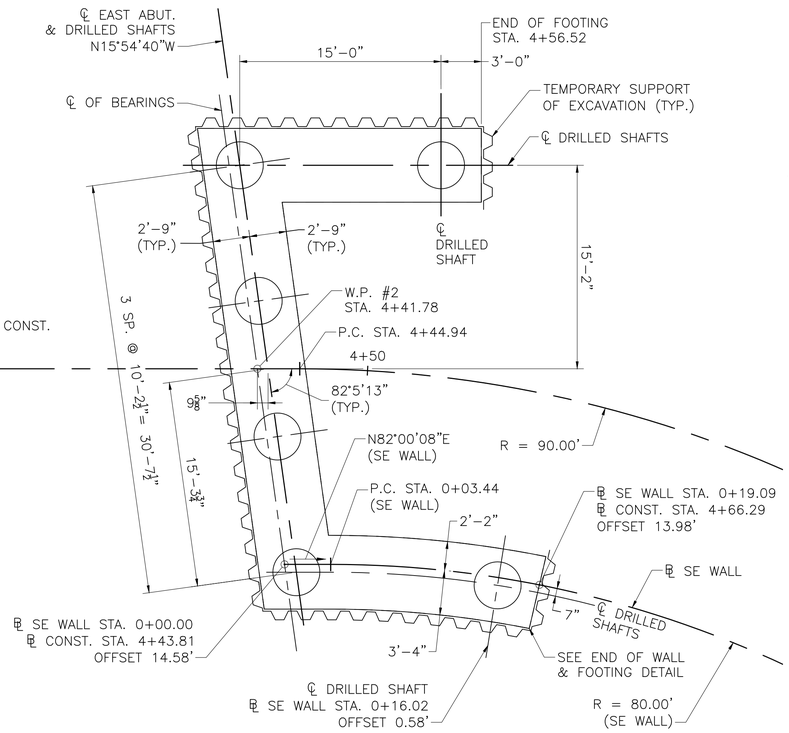
FOUNDATION PLAN & DRILLED SHAFT DETAILS



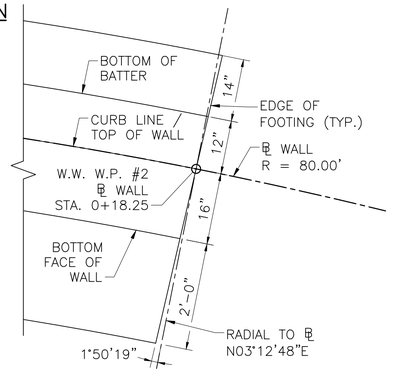


DRILLED SHAFT NOTES:

1. DRILLED SHAFT CONCRETE SHALL BE 5000 HP CONCRETE. THE CLEAR SPACING BETWEEN STEEL REINFORCEMENT BARS SHALL BE AT LEAST 1⅜".
2. THE FACTORED GEOTECHNICAL SHAFT RESISTANCE IS 648 KIPS AND IS THE PRODUCT OF THE NOMINAL GEOTECHNICAL RESISTANCE OF 1178 KIPS AND A RESISTANCE FACTOR OF 0.55. THE MAX FACTORED DESIGN AXIAL LOAD PER SHAFT IS 248 KIPS AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION. THE FACTORED STRUCTURAL SHAFT RESISTANCE IS 3050 KIPS AND IS THE PRODUCT OF THE NOMINAL STRUCTURAL RESISTANCE OF 4067 KIPS AND A RESISTANCE FACTOR OF 0.75. THE FACTORED STRUCTURAL DRILLED SHAFT DESIGN MOMENT AND SHEAR LOAD IS 936 KIP*FT AND 295 KIPS PER SHAFT RESPECTIVELY AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION. THE FACTORED STRUCTURAL SHAFT RESISTANCE IN BENDING AND SHEAR IS 1135 KIP*FT AND 419 KIPS WITH A RESISTANCE FACTOR OF 0.90 FOR BOTH CASES.
3. CENTERING DEVICES SHALL BE CONSTRUCTED OF AN APPROVED NON-METALLIC DURABLE MATERIAL.
4. THE NON-METALLIC CENTERING DEVICES SHALL BE OF ADEQUATE SIZE TO INSURE A MINIMUM 5" ANNULAR SPACE BETWEEN THE OUTSIDE OF THE REINFORCEMENT CAGE AND THE SIDES OF THE EXCAVATED HOLE OR INSIDE OF CASING.
5. THERE SHALL BE A MINIMUM OF 3 GROUPS OF NON-METALLIC CENTERING DEVICES FOR SHAFTS LESS THAN 26'-0" IN LENGTH.
6. NON-METALLIC CENTERING DEVICES SHALL BE PLACED AT A MAXIMUM SPACING OF 2'-6" AROUND THE CIRCUMFERENCE OF THE SHAFT.
7. EACH LONGITUDINAL BAR SHALL BE SUPPORTED BY A 3" HIGH BOLSTER OF APPROVED NON-METALLIC DURABLE MATERIAL.
8. SPLICES IN THE LONGITUDINAL REINFORCEMENT SHALL BE MADE WITH MECHANICAL REINFORCING BAR SPICERS AND SHALL BE STAGGERED A MINIMUM OF 2'-0".
9. IF SPLICING OF SPIRAL REINFORCEMENT IS NECESSARY, A MINIMUM OF 2" CLEARANCE SHALL BE PROVIDED BETWEEN THE OUTSIDE SURFACE OF MECHANICAL REINFORCING BAR SPLICERS AND THE DRILLED SHAFT CASING OR EXCAVATED SURFACE.
10. WELDING OF LONGITUDINAL REINFORCEMENT SHALL NOT BE PERMITTED. WELDING OF OTHER REINFORCING BARS MAY BE PERMITTED WITH THE WRITTEN APPROVAL OF THE ENGINEER.

FOUNDATION AND DRILLED SHAFT LAYOUT PLAN

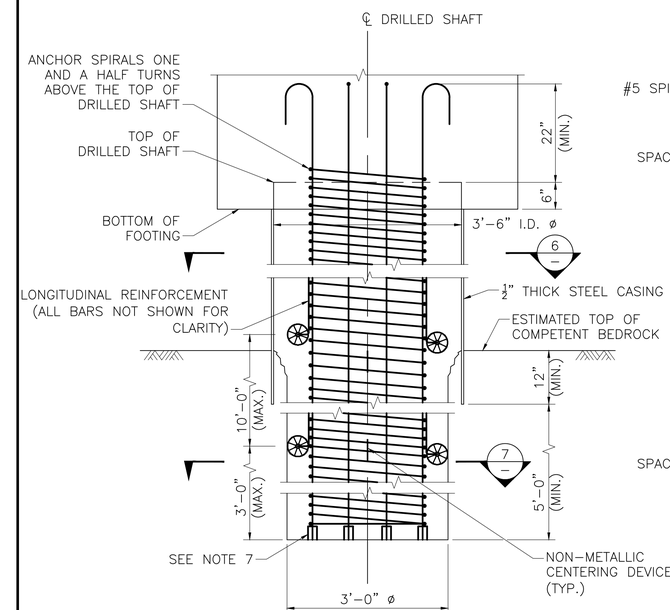
SCALE 3/16" = 1'-0"



NOTES:
1. DRILLED SHAFT, HIGHWAY GUARDRAIL TRANSITION BARRIER, AND TEMPORARY SUPPORT OF EXCAVATION NOT SHOWN FOR CLARITY.
2. ALL DIMENSIONS SHOWN RADIAL TO ℄ WALL.

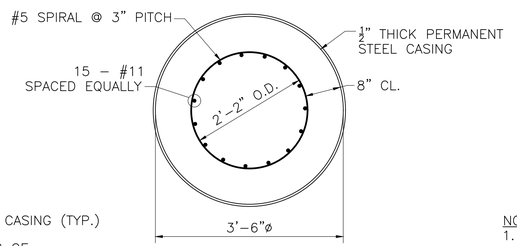
END OF SOUTHEAST WALL/FOOTING DETAIL

SCALE: ¾" = 1'-0"



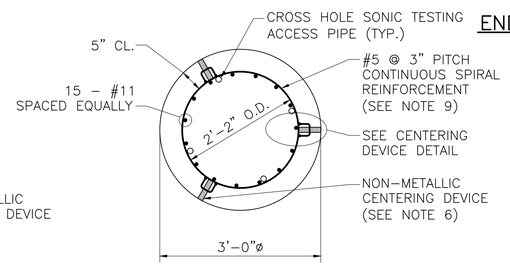
DRILLED SHAFT – VERTICAL SECTION

SCALE: ¾" = 1'-0"



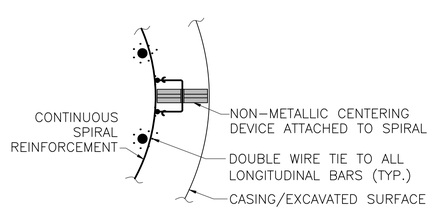
SECTION 6

SCALE: ¾" = 1'-0"



SECTION 7

SCALE: ¾" = 1'-0"



CENTERING DEVICE DETAIL

NOT TO SCALE

DRILLED SHAFT DATA

LOCATION	APPROX. BOTTOM OF ROCK SOCKET ELEV.	MINIMUM FACTORED AXIAL RESISTANCE (KIPS)	FACTORED DESIGN AXIAL LOAD COMPRESSION (KIPS)	MINIMUM FACTORED LATERAL RESISTANCE (KIPS)	FACTORED DESIGN LATERAL LOAD (KIPS)
WEST ABUTMENT	304.5	648	251	419	292
EAST ABUTMENT	300.0	648	225	419	295

SEPT 07, 2024	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
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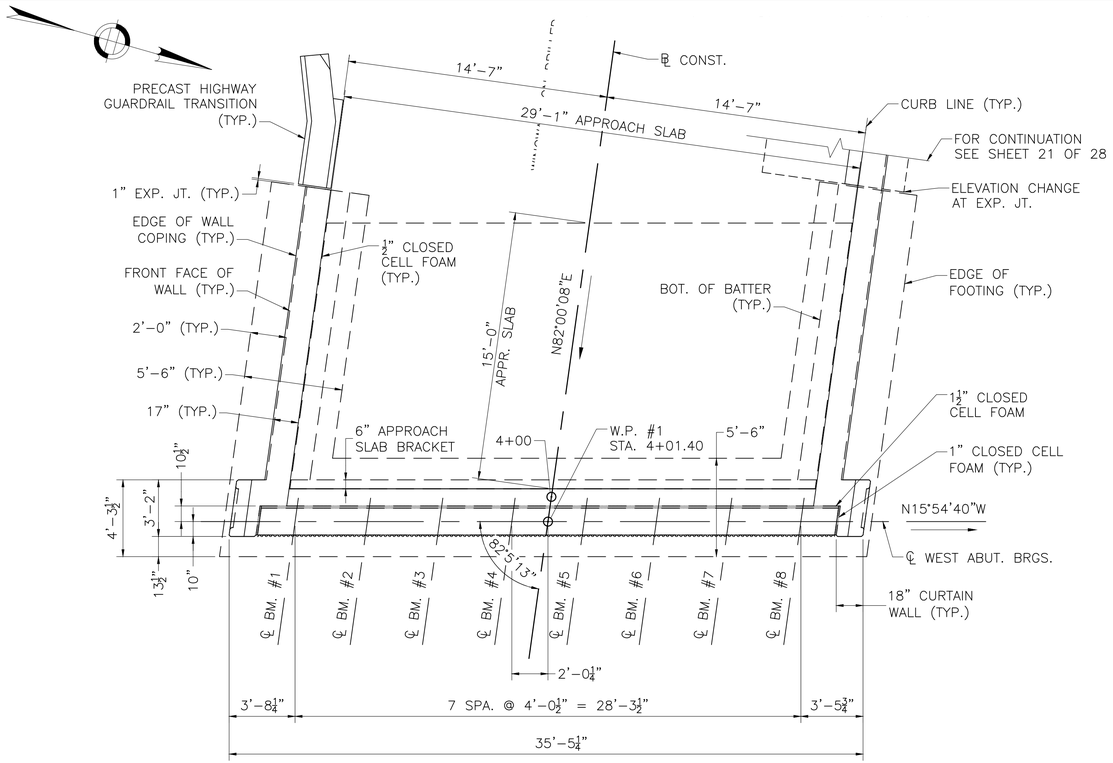
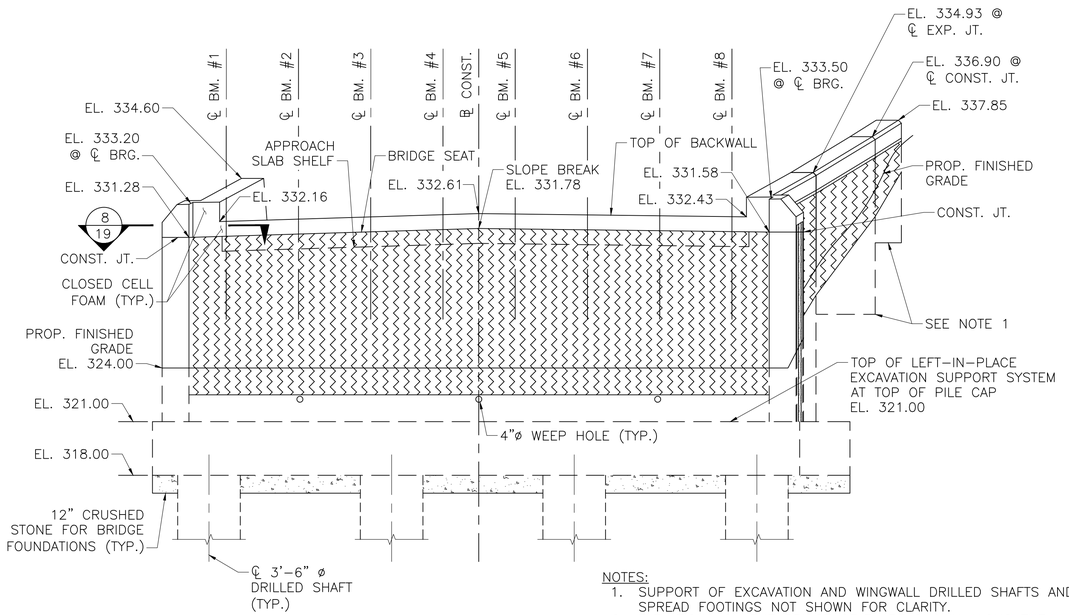


WEST ABUTMENT PLAN

SCALE ¼" = 1'-0"

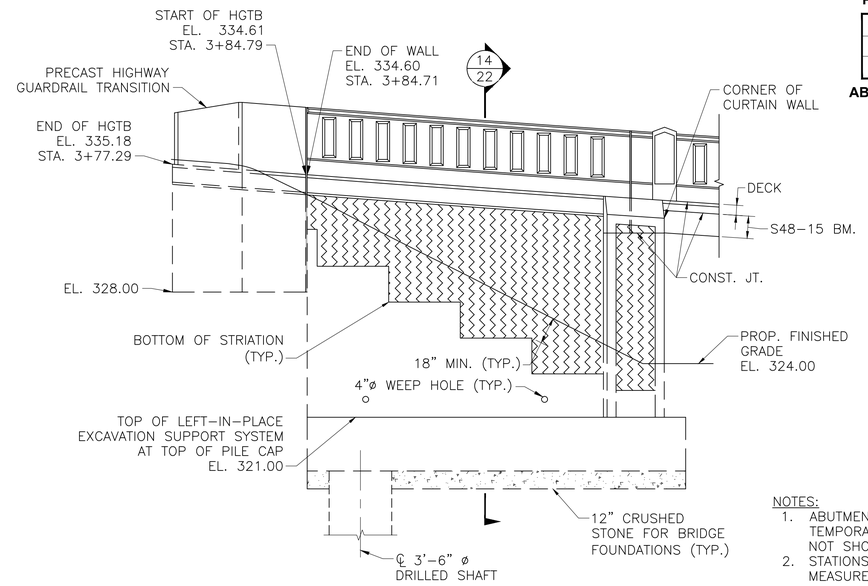
NOTES:
1. DRILLED SHAFTS NOT SHOWN IN PLAN FOR CLARITY.
2. FOR BEARING LAYOUT, SEE SHEET 23.



WEST ABUTMENT ELEVATION

SCALE ¼" = 1'-0"

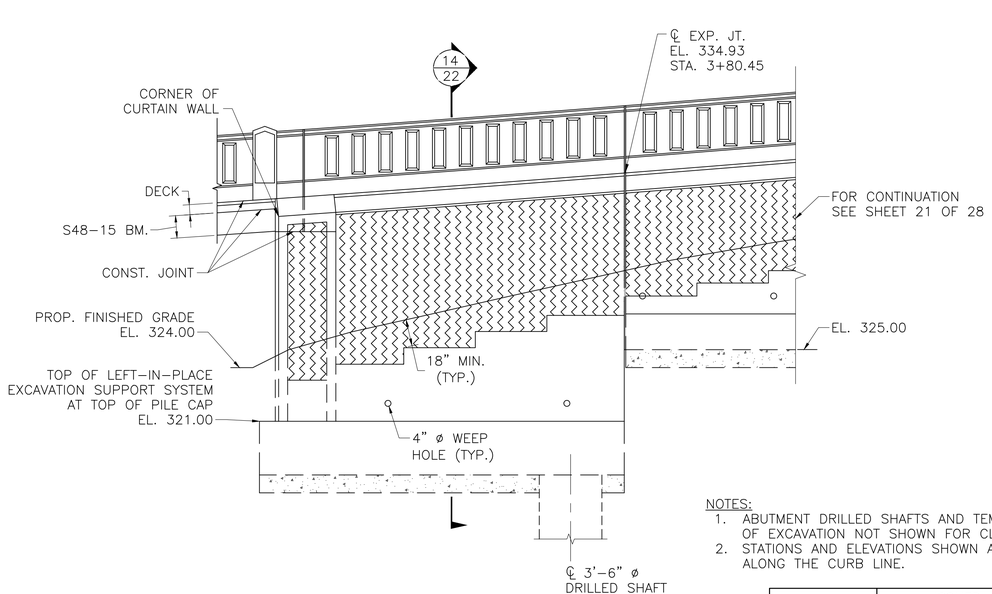
NOTES:
1. SUPPORT OF EXCAVATION AND WINGWALL DRILLED SHAFTS AND SPREAD FOOTINGS NOT SHOWN FOR CLARITY.
2. ELEVATIONS ON THE BRIDGE SEAT ARE SHOWN ALONG THE CENTERLINE OF BEARINGS.
3. FOR ADDITIONAL INFORMATION ON BEDROCK ELEVATIONS AND DRILLED SHAFTS, SEE SHEET 16 AND BORING LOGS.



SOUTHWEST ELEVATION

SCALE ¼" = 1'-0"

NOTES:
1. ABUTMENT DRILLED SHAFTS AND TEMPORARY SUPPORT OF EXCAVATION NOT SHOWN FOR CLARITY.
2. STATIONS AND ELEVATIONS SHOWN ARE MEASURED ALONG THE CURB LINE.



PARTIAL NORTHWEST ELEVATION

SCALE ¼" = 1'-0"

NOTES:
1. ABUTMENT DRILLED SHAFTS AND TEMPORARY SUPPORT OF EXCAVATION NOT SHOWN FOR CLARITY.
2. STATIONS AND ELEVATIONS SHOWN ARE MEASURED ALONG THE CURB LINE.

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	36	52
PROJECT FILE NO.	609120		

ABUTMENT PLAN & ELEVATION 1 OF 2

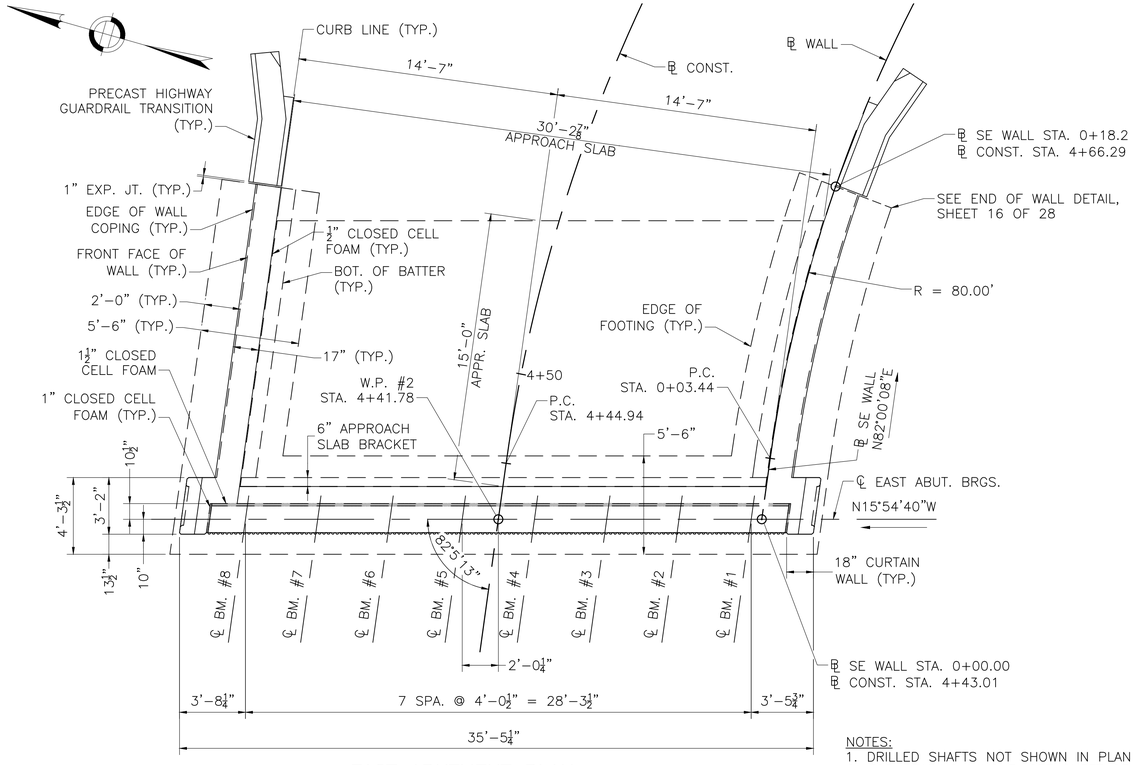
DATE	DESCRIPTION
SEPT 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	37	52
PROJECT FILE NO.	609120		

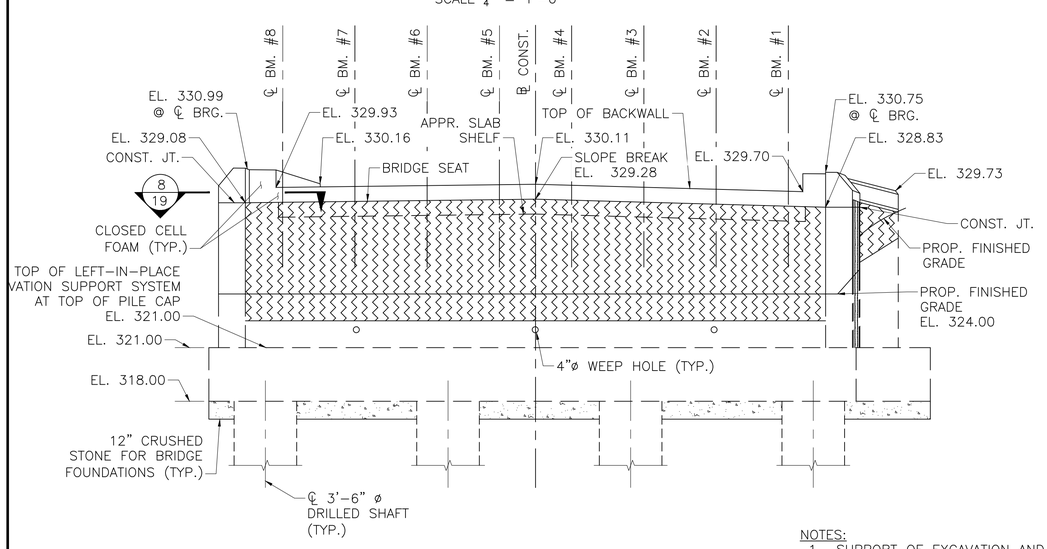
ABUTMENT PLAN & ELEVATION 2 OF 2



NOTES:
1. DRILLED SHAFTS NOT SHOWN IN PLAN FOR CLARITY.
2. FOR BEARING LAYOUT, SEE SHEET 23.

EAST ABUTMENT PLAN

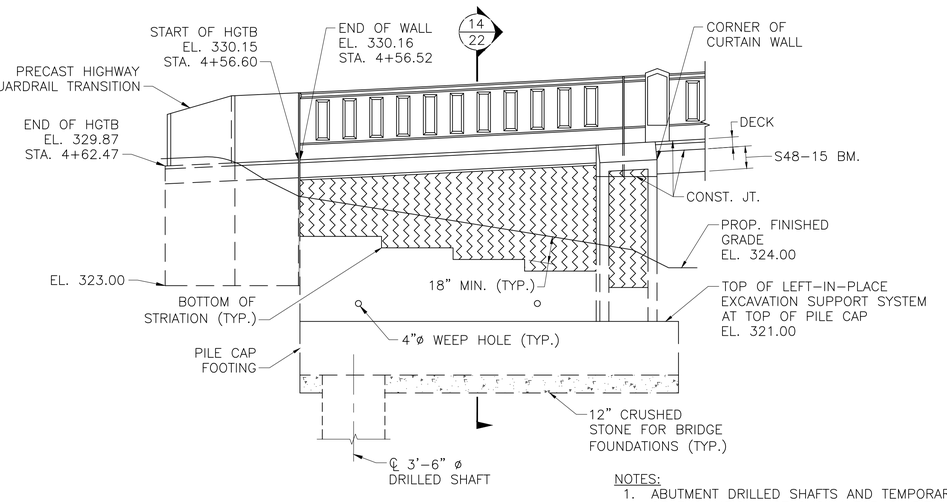
SCALE ¼" = 1'-0"



NOTES:
1. SUPPORT OF EXCAVATION AND WINGWALL DRILLED SHAFTS NOT SHOWN FOR CLARITY.
2. ELEVATIONS ON THE BRIDGE SEAT ARE SHOWN ALONG THE CENTERLINE OF BEARINGS.
3. FOR ADDITIONAL INFORMATION ON BEDROCK ELEVATIONS AND DRILLED SHAFTS, SEE SHEET 16 AND BORING LOGS.

EAST ABUTMENT ELEVATION

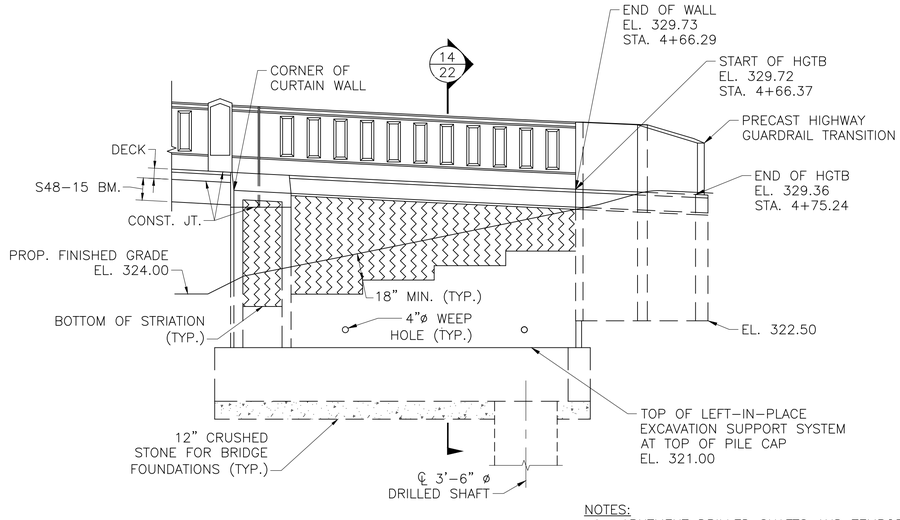
SCALE ¼" = 1'-0"



NOTES:
1. ABUTMENT DRILLED SHAFTS AND TEMPORARY SUPPORT OF EXCAVATION NOT SHOWN FOR CLARITY.
2. STATIONS AND ELEVATIONS SHOWN ARE MEASURED ALONG THE CURB LINE.

NORTHEAST ELEVATION

SCALE ¼" = 1'-0"



NOTES:
1. ABUTMENT DRILLED SHAFTS AND TEMPORARY SUPPORT OF EXCAVATION NOT SHOWN FOR CLARITY.
2. STATIONS AND ELEVATIONS SHOWN ARE MEASURED ALONG THE CURB LINE.

SOUTHEAST ELEVATION

SCALE ¼" = 1'-0"

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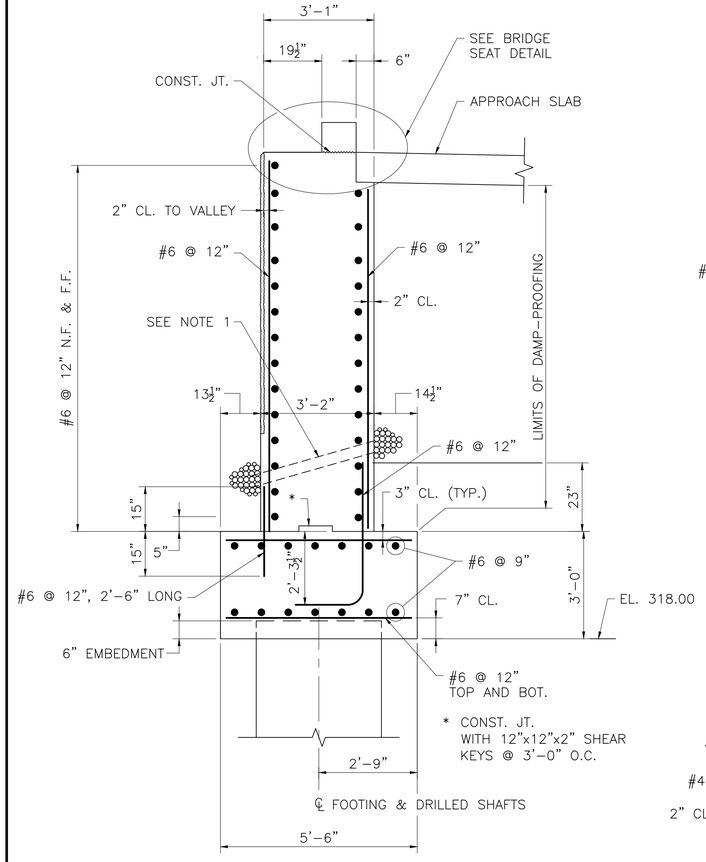
LUDLOW
PINEY LANE OVER BROAD BROOK

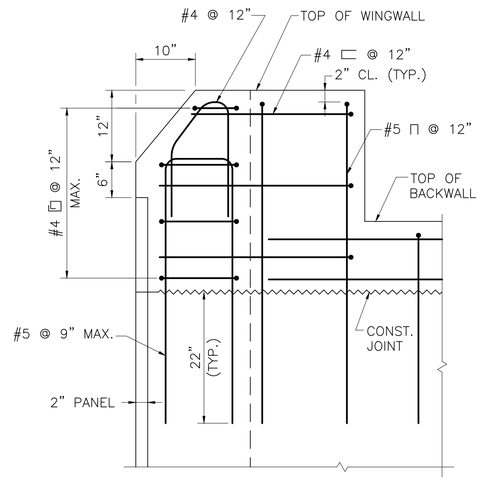
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	38	52
PROJECT FILE NO. 609120			

ABUTMENT DETAILS 1 OF 2



TYPICAL ABUTMENT SECTION

SCALE: ½" = 1'-0"

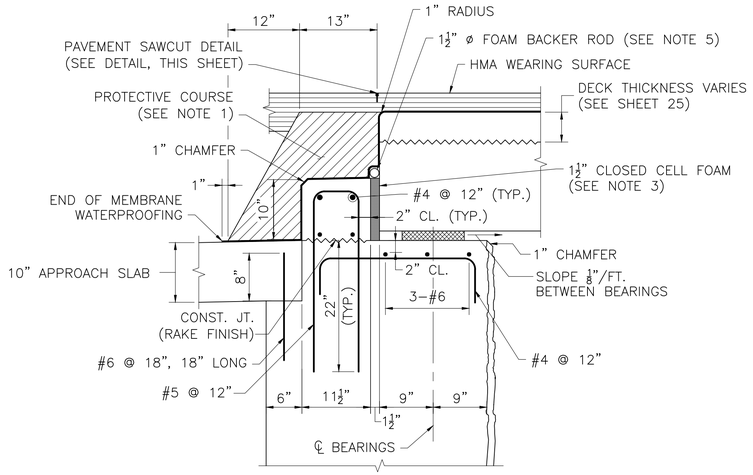


NOTE:

REINFORCEMENT BELOW CONSTRUCTION JOINT HAS BEEN OMITTED FOR CLARITY.

SECTION 9

SCALE: 1" = 1'-0"



BRIDGE SEAT DETAIL

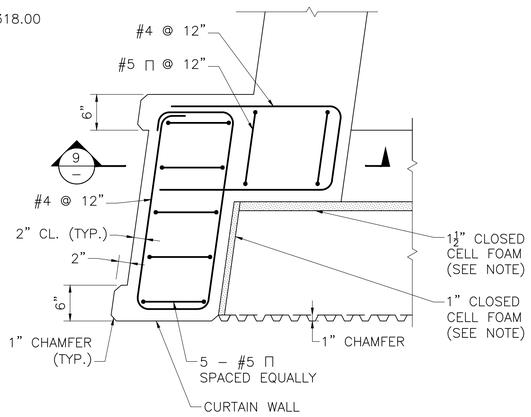
SCALE: 1" = 1'-0"

BRIDGE SEAT NOTES:

1. PROTECTIVE COURSE TO BE SUPERPAVE BRIDGE PROTECTIVE COURSE (SPC-B-12.5), PLACED IN 2" LAYERS AND COMPACTED WITH A MECHANICAL HAND-GUIDED TAMPER WITHIN 12 HOURS AFTER PLACING MEMBRANE WATERPROOFING.
2. ALL REINFORCING SHOWN IN THIS DETAIL SHALL BE COATED BARS, EXCEPT FOR APPROACH SLAB REINFORCEMENT.
3. ATTACH CLOSED CELL FOAM TO BACK OF PRECAST BEAM WITH ADHESIVE.
4. BACKWALL CONCRETE SHALL BE 5000 HP CONCRETE AND SHALL BE PLACED AFTER ALL BEAMS HAVE BEEN ERECTED.
5. DRAPE MEMBRANE WATERPROOFING OVER CLOSED CELL FOAM BACKER ROD.
6. FOR BEARING PAD LAYOUT AND DIMENSIONS, SEE SHEET 23.

ABUTMENT SECTION NOTES:

1. 4" ø WEEP HOLES 10'-0" O.C. (JUST ABOVE PROTECTIVE COURSE). PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
2. ALL CONCRETE SHALL BE 5000 HP CONCRETE.

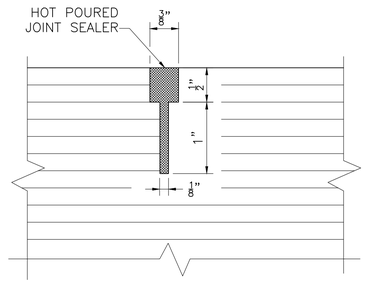


NOTE:

ATTACH CLOSED CELL FOAM TO THE BACK AND SIDE OF THE EXTERIOR PRECAST BEAM PRIOR TO PLACING THE CONCRETE FOR THE BACKWALL AND CURTAIN WALL.

SECTION 8

SCALE: 1" = 1'-0"



PAVEMENT SAWCUT DETAIL

NOT TO SCALE

SEPT 07, 2024	ISSUED FOR CONSTRUCTION
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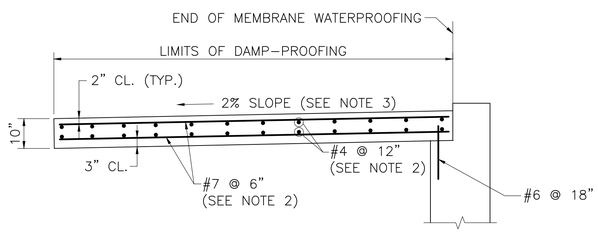
LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	39	52
PROJECT FILE NO.	609120		

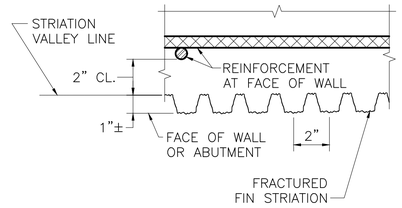
ABUTMENT DETAILS 2 OF 2



NOTES:

1. APPROACH SLAB TO BE 5000 HP CONCRETE.
2. PLACE LONGITUDINAL REINFORCEMENT PARALLEL TO ROADWAY ALIGNMENT. PLACE TRANSVERSE REINFORCEMENT PARALLEL TO ABUTMENT.
3. WEST APPROACH SLAB SHOWN. SET EAST APPROACH SLAB SLOPE AT 6%.

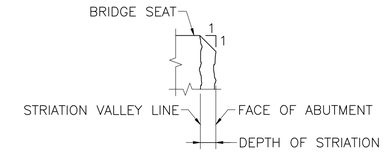
APPROACH SLAB DETAILS
SCALE: $\frac{1}{2}$" = 1'-0"



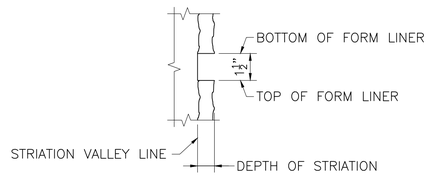
STRIATION NOTES:

1. THE CONTRACTOR SHALL MAKE SURE THAT THE STRIATION FINS ARE PLUMB AND LINED UP VERTICALLY FROM PANEL TO PANEL FOR THE FULL HEIGHT OF THE WALL.
2. THE HORIZONTAL JOINT MAY BE OMITTED IF THE CONTRACTOR CAN DEMONSTRATE THAT THE FORM LINER PANELS CAN BE INSTALLED END TO END WITHOUT CREATING A VISIBLE SEAM IN THE FINAL CAST CONCRETE.

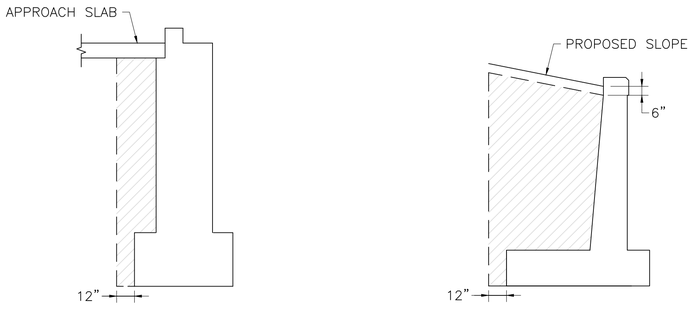
TYPICAL STRIATION DETAIL
SCALE: 3" = 1'-0"



DETAIL AT BRIDGE SEAT
SCALE: 3" = 1'-0"



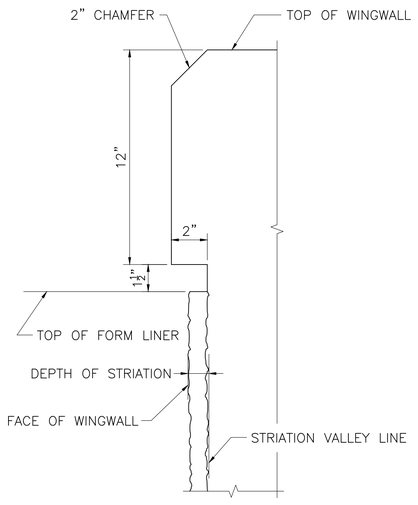
HORIZONTAL PANEL JOINT
SCALE: 3" = 1'-0"



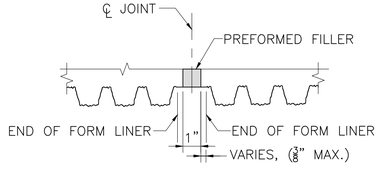
NOTE:
HATCHED AREA INDICATES LIMITS OF GRAVEL BORROW FOR BACKFILLING.

LIMITS OF GRAVEL BORROW FOR BACKFILLING AT ABUTMENT
SCALE: $\frac{1}{4}$" = 1'-0"

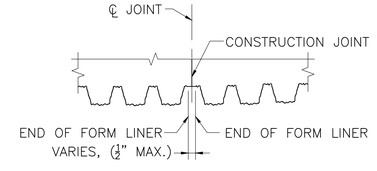
LIMITS OF GRAVEL BORROW FOR BACKFILLING AT WINGWALL
SCALE: $\frac{1}{4}$" = 1'-0"



DETAIL AT TOP OF WINGWALL
SCALE: 3" = 1'-0"



EXPANSION JOINT
SCALE: 3" = 1'-0"



CONSTRUCTION JOINT
SCALE: 3" = 1'-0"

SEPT. 07, 2024	ISSUED FOR CONSTRUCTION
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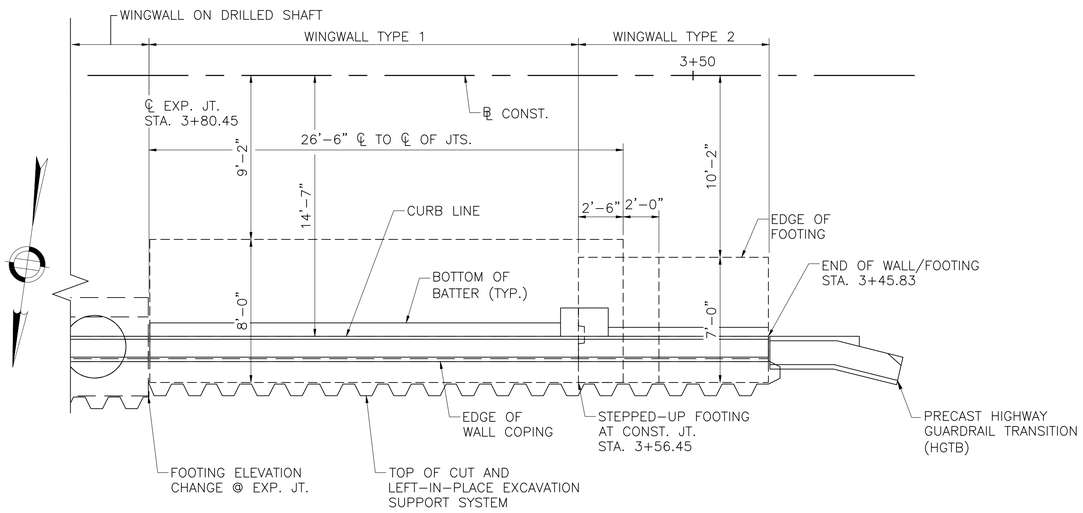
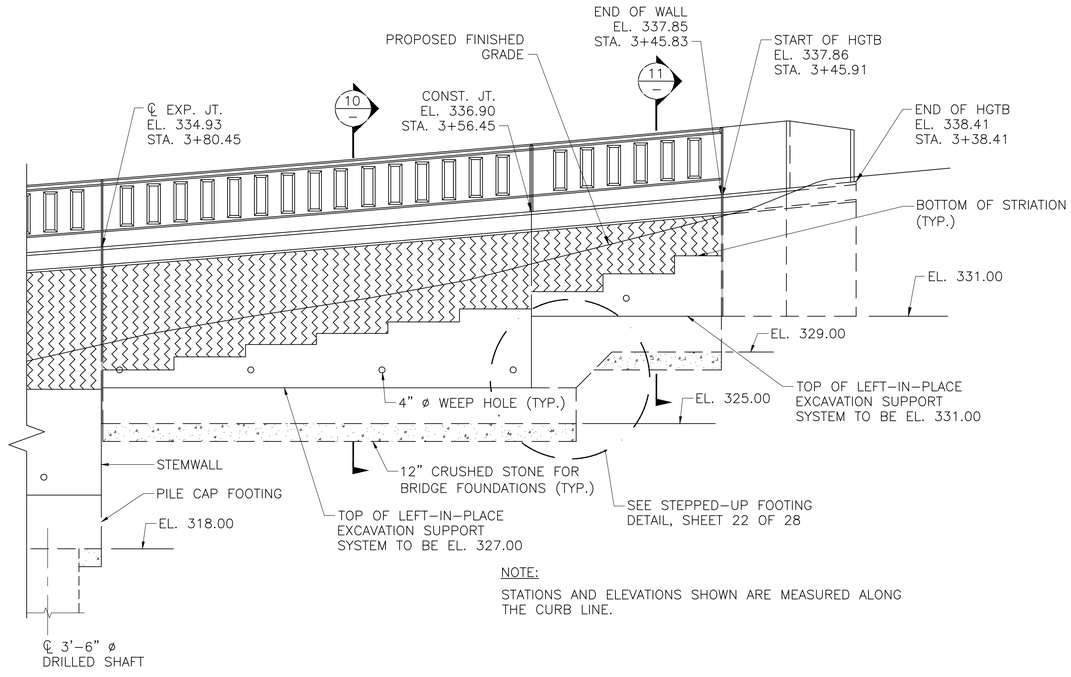


PARTIAL NORTHWEST WINGWALL PLAN

SCALE $\frac{1}{4}$" = 1'–0"

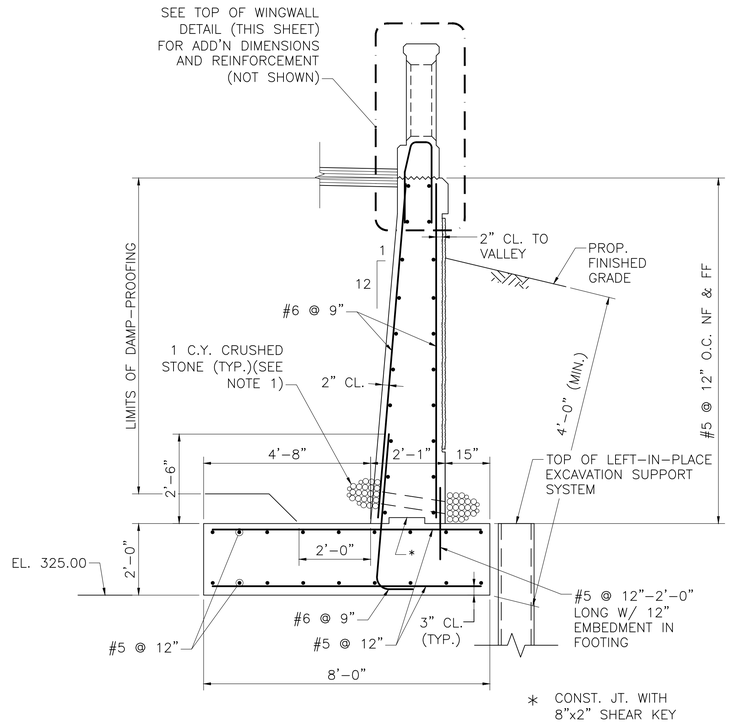


NOTE:

STATIONS AND ELEVATIONS SHOWN ARE MEASURED ALONG THE CURB LINE.

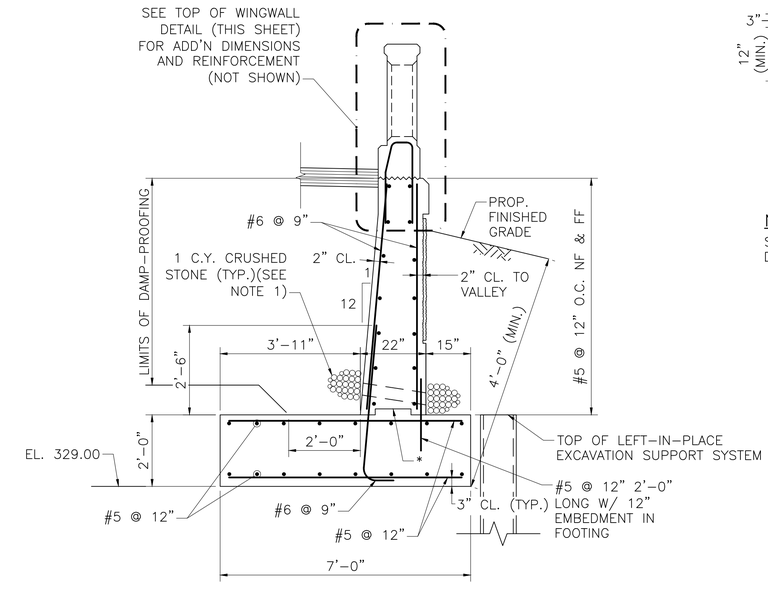
PARTIAL NORTHWEST WINGWALL ELEVATION

SCALE $\frac{1}{4}$" = 1'–0"



SECTION 10 – WINGWALL TYPE 1

SCALE: $\frac{1}{2}$" = 1'–0"



SECTION 11 – WINGWALL TYPE 2

SCALE: $\frac{1}{2}$" = 1'–0"

NOTE:

SEE SECTION THRU CT–TL2 BARRIER AT SAFETY CURB FOR DIMENSIONS AND REINFORCEMENT NOT SHOWN HERE.

TOP OF WINGWALL DETAIL

SCALE: $\frac{3}{4}$" = 1'–0"

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	40	52
	PROJECT FILE NO. 609120		

WINGWALL PLAN AND ELEVATION

WINGWALL NOTES:

1. 4" ø WEEP HOLES 10'–0" O.C LOCATED 12" ABOVE THE HEEL OF THE FOOTING SLOPING 1" PER FOOT TOWARDS THE FRONT FACE. PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
2. ALL CONCRETE FOR WINGWALLS SHALL BE 5000 HP CONCRETE.
3. THE FACTORED BEARING PRESSURE = 3.08 KSF AS PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS STRENGTH I LOAD COMBINATION, FOR WINGWALL TYPE 1.

   THE FACTORED RESISTANCE = 6.38 KSF. THE FACTORED BEARING RESISTANCE IN THE PRODUCT OF THE NOMINAL RESISTANCE AND A RESISTANCE FACTOR OF 0.55.

DATE	DESCRIPTION
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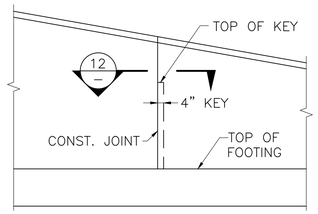
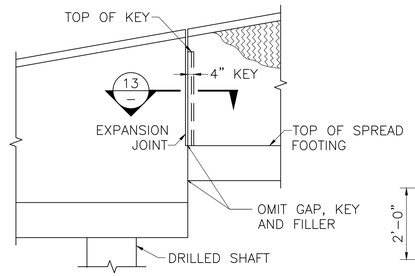
LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	41	52
	PROJECT FILE NO. 609120		

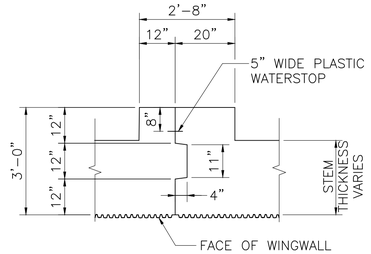
WINGWALL DETAILS



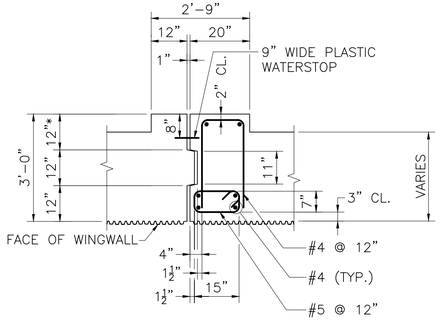
TYPICAL WINGWALL ELEVATION AT CONST. JOINT
SCALE: 1/2" = 1'-0"



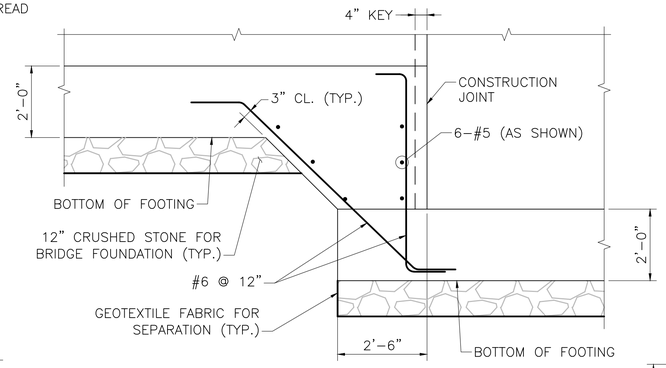
WINGWALL ELEVATION AT EXPANSION JOINT
SCALE: 1/4" = 1'-0"



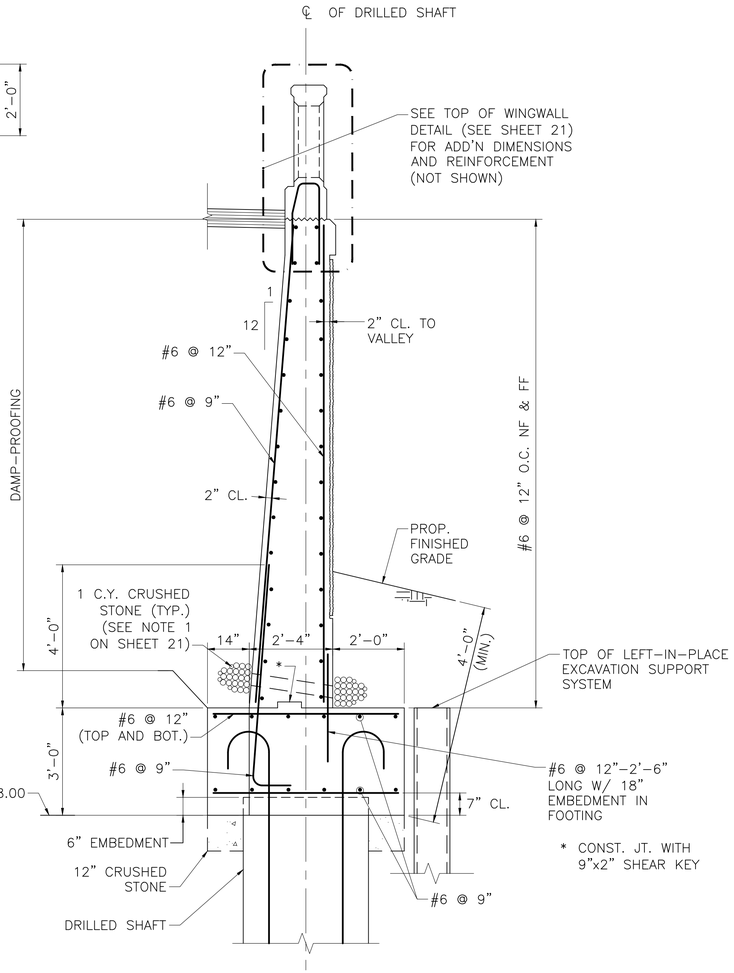
SECTION 12
SCALE: 1/2" = 1'-0"



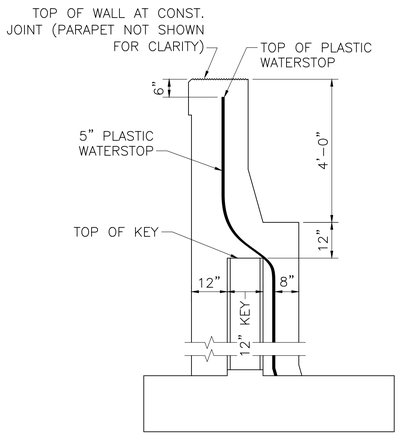
SECTION 13
SCALE: 1/2" = 1'-0"



STEPPED-UP FOOTING DETAILS
SCALE: 1/2" = 1'-0"

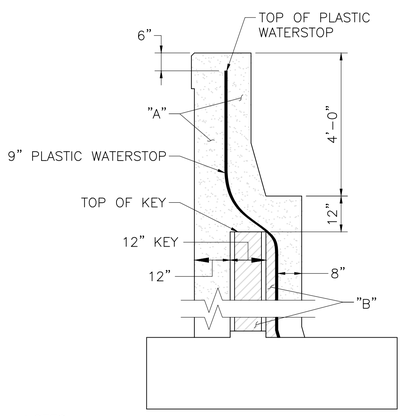


SECTION 14 TYPICAL WINGWALL ON DRILLED SHAFT
SCALE: 1/2" = 1'-0"



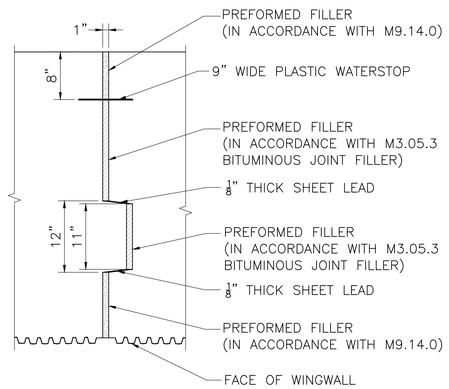
NOTE:
REINFORCEMENT SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINTS.

VERTICAL SECTION THROUGH CONSTRUCTION JOINT
SCALE: 1/2" = 1'-0"

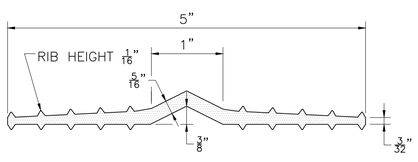


NOTES:
1. LONGITUDINAL REINFORCEMENT SHALL END 2" CLEAR OF EXPANSION JOINT.
2. "A" – PERFORMED FILLER (IN ACCORDANCE WITH M9.14.0).
   "B" – PERFORMED FILLER (IN ACCORDANCE WITH M3.05.3 BITUMINOUS JOINT FILLER).
3. FILLER MATERIAL SHALL BE FASTENED SECURELY TO ONE SIDE OF JOINT.

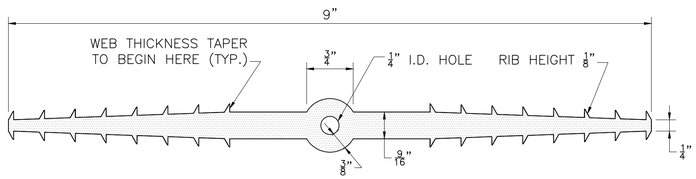
VERTICAL SECTION THROUGH EXPANSION JOINT
SCALE: 1/2" = 1'-0"



LIMITS OF PREFORMED FILLER
SCALE: 1" = 1'-0"



5" WATERSTOP
NOT TO SCALE



9" WATERSTOP
NOT TO SCALE

SEPT 07, 2024	ISSUED FOR CONSTRUCTION
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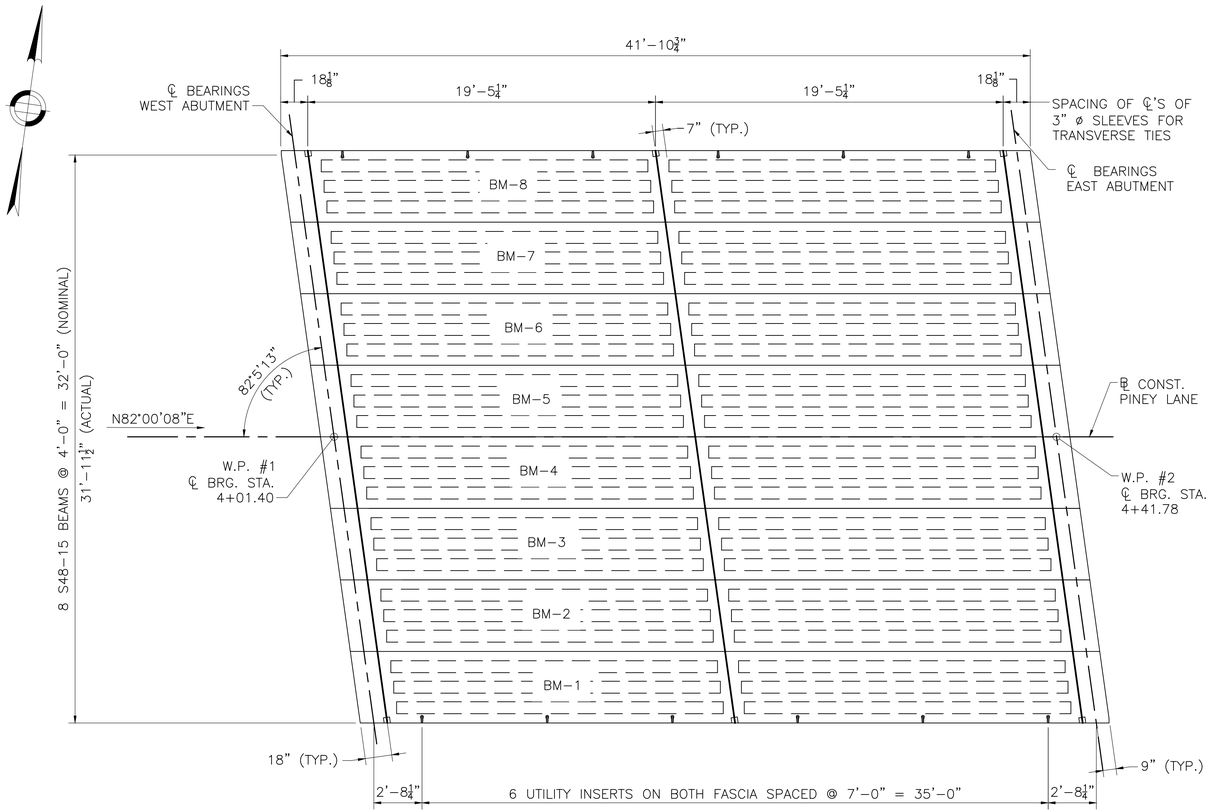
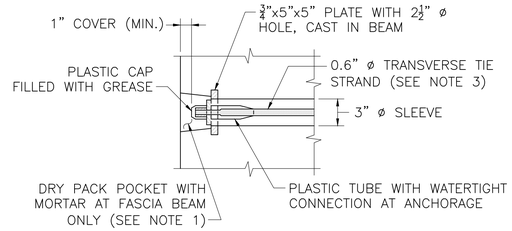
USE ONLY PRINTS OF LATEST DATE

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	42	52
PROJECT FILE NO.	609120		

FRAMING PLAN

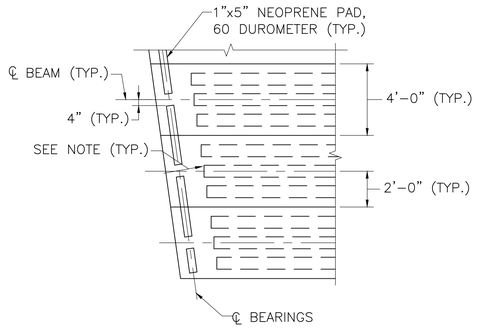




NOTES:

1. MORTAR FOR EXTERIOR POCKETS SHALL CONFORM TO M4.02.15 AND SHALL BE THE SAME COLOR AND TEXTURE AS THE BEAM CONCRETE.
2. OTHER ANCHORAGE SYSTEMS MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. ALTERNATE ANCHORAGE SYSTEMS SHALL BE WATERTIGHT AND CORROSION PROOF.
3. TRANSVERSE TIES SHALL BE COVERED BY A SEAMLESS POLYPROPYLENE SHEATH (WITH CORROSION INHIBITING GREASE BETWEEN THE STRAND AND SHEATH) FOR THE FULL LENGTH OF THE STRAND, EXCEPT AT THE ANCHORAGE LOCATION.
4. SEE SPECIAL PROVISIONS ITEM 995.01.

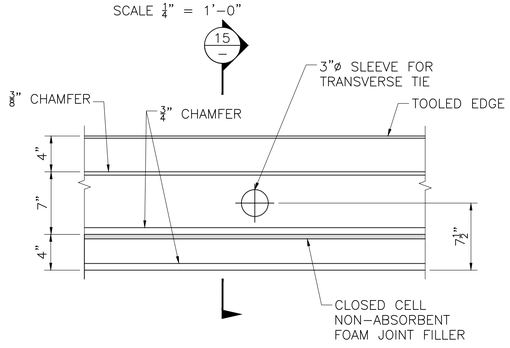
TRANSVERSE TIE ANCHORAGE
SCALE: 1½" = 1'–0"



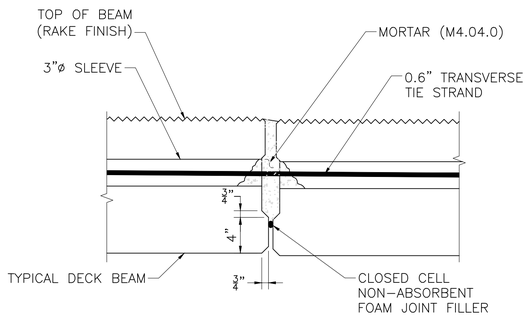
NOTE:
PROVIDE ⅛"/FT. SLOPE BETWEEN BEARINGS.

LAYOUT OF BEARINGS
SCALE: ¼" = 1'–0"

FRAMING PLAN
SCALE ¼" = 1'–0"



TYPICAL BEAM ELEVATION AT TRANSVERSE TIE LOCATIONS
SCALE: 1½" = 1'–0"



SECTION 15 – SHEAR KEY DETAIL
SCALE: 1½" = 1'–0"

CONSTRUCTION SEQUENCE NOTES:

1. AFTER ALL BEAMS HAVE BEEN ERECTED, TENSION EACH TRANSVERSE TIE TO 5 KIPS.
2. FILL ALL KEYWAYS WITH MORTAR (M4.04.0). IF THE KEYWAYS ARE NOT FILLED WITHIN FIVE (5) DAYS AFTER THE BEAMS ARE ERECTED, THE CONTRACTOR SHALL COVER AND PROTECT THE KEYWAYS FROM WEATHER AND DEBRIS UNTIL THEY ARE FILLED.
3. AFTER THE MORTAR HAS CURED (24 HOURS MINIMUM), TENSION EACH TRANSVERSE TIE TO 44 KIPS.
4. CONCRETE FOR DECK SLAB SHALL BE 5000 HP CONCRETE AND SHALL BE PLACED AFTER THE TRANSVERSE TIES HAVE BEEN FULLY TENSIONED.
5. NO TRAFFIC OR HEAVY EQUIPMENT WILL BE PERMITTED ON THE BRIDGE UNTIL ALL TRANSVERSE TIES HAVE BEEN PROPERLY TENSIONED AND THE DECK HAS BEEN CAST AND CURED PER THE STANDARD SPECIFICATIONS.

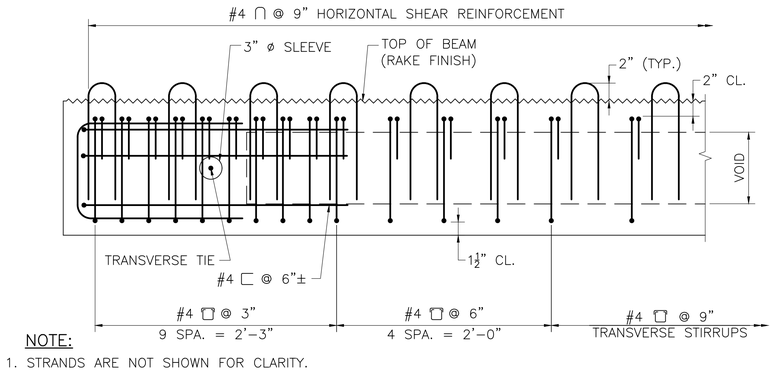
DATE	DESCRIPTION
SEPT. 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

LUDLOW
PINEY LANE OVER BROAD BROOK

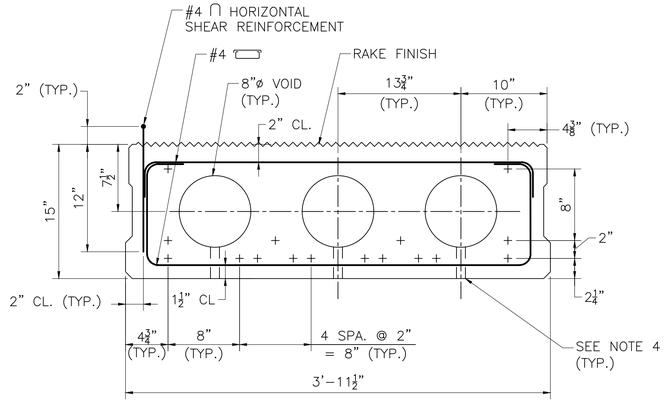
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	43	52
PROJECT FILE NO.	609120		

BEAM DETAILS

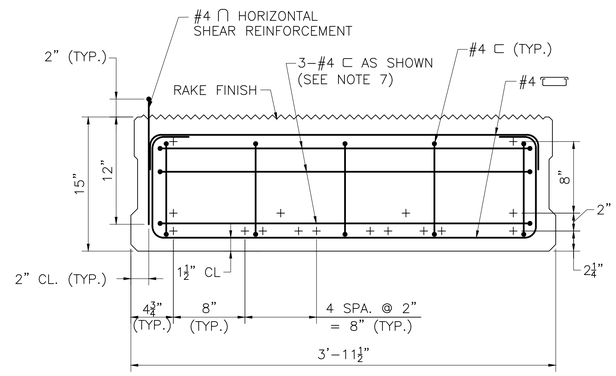


NOTE:
1. STRANDS ARE NOT SHOWN FOR CLARITY.

LONGITUDINAL SECTION
SCALE 1½" = 1'-0"



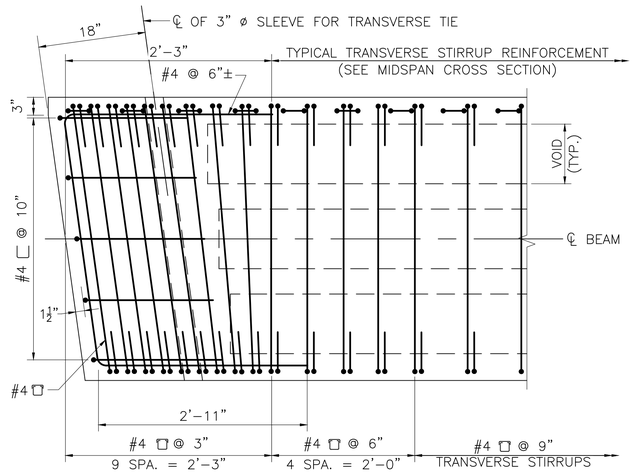
TYPICAL MIDSPAN SECTION
SCALE 1½" = 1'-0"



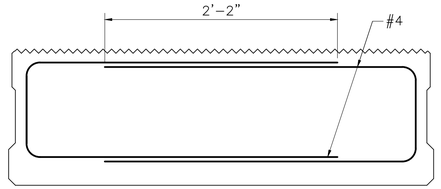
END OF BEAM SECTION
SCALE 1½" = 1'-0"

BEAM SECTION NOTES:

1. + DENOTES STRAIGHT STRANDS.
2. SEE SHEAR KEY DETAIL BELOW.
3. SEE END OF BEAM PLAN FOR STIRRUP SPACING.
4. 1" ø DRAIN, PLACED AT BOTH ENDS OF EACH VOID.
5. MAINTAIN ALL CLEARANCES AS SHOWN ON THE PLANS.
6. SECTIONS SHOWN LOOKING UP STATION.
7. ADJUST REINFORCEMENT SPACING AS NECESSARY TO AVOID CONFLICT WITH TRANSVERSE TIE.

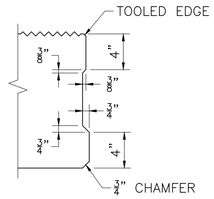


END OF BEAM PLAN
SCALE 1" = 1'-0"



NOTES:
1. CONTRACTOR MAY SUBMIT ABOVE STIRRUP PATTERN TO THE ENGINEER FOR APPROVAL PROVIDED THAT THE ABOVE CRITERIA IS MET.
2. MAINTAIN ALL CLEARANCES AS SHOWN ON THE PLANS.

ALTERNATE STIRRUP PATTERN
SCALE: 1½" = 1'-0"



SHEAR KEY DETAIL
SCALE: 1½" = 1'-0"

PRESTRESS NOTES:

1. ALL PRETENSIONING ELEMENTS SHALL BE 0.6" ø, UNCOATED, SEVEN-WIRE, LOW RELAXATION STEEL STRANDS AND SHALL CONFORM TO AASHTO M 203.
2. THE TENSILE STRENGTH OF THE PRETENSIONING STRANDS SHALL BE 270 KSI.
3. THE INITIAL TENSION PER 0.6" ø STRAND SHALL BE 44 KIPS.
4. THE MINIMUM 28 DAY COMPRESSIVE STRENGTH SHALL BE 6500 PSI.
5. NO PRESTRESS SHALL BE TRANSFERRED TO THE CONCRETE UNTIL IT HAS ATTAINED A COMPRESSIVE STRENGTH, AS SHOWN BY CYLINDER TEST, OF AT LEAST 4500 PSI.
6. THE TOP OF ALL BEAMS SHALL BE GIVEN A RAKE FINISH (¼" AMPLITUDE) ACROSS THE WIDTH (PERPENDICULAR TO THE BEAM'S AXIS).
7. THE FABRICATOR IS FULLY RESPONSIBLE FOR THE DESIGN OF THE LIFTING DEVICES WHICH SHALL BE ADEQUATE FOR THE SAFETY FACTORS REQUIRED BY THE ERECTION PROCEDURE.

SEPT 07, 2024	ISSUED FOR CONSTRUCTION
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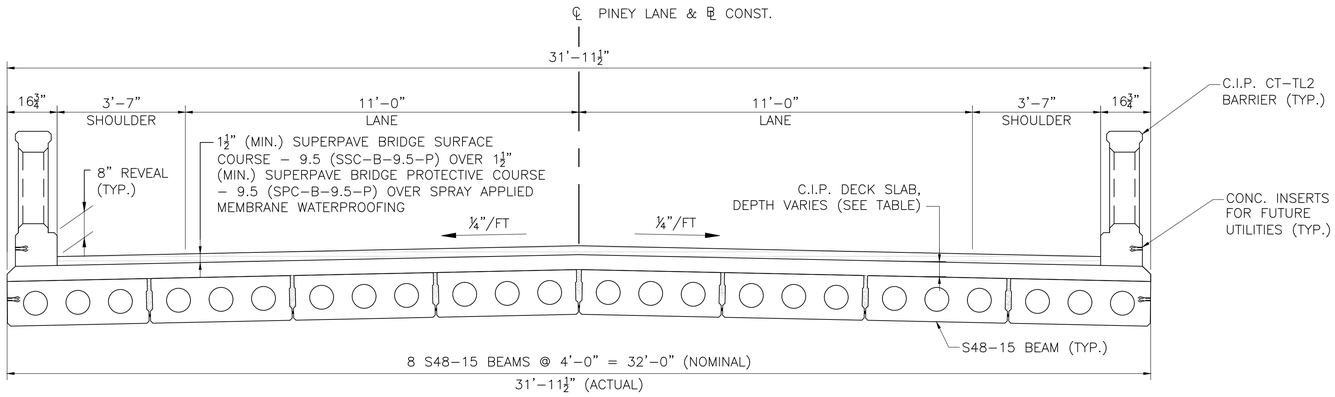
LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	44	52
PROJECT FILE NO.	609120		

DECK DETAILS



TRANSVERSE CROSS SECTION

SCALE: ½" = 1'–0"

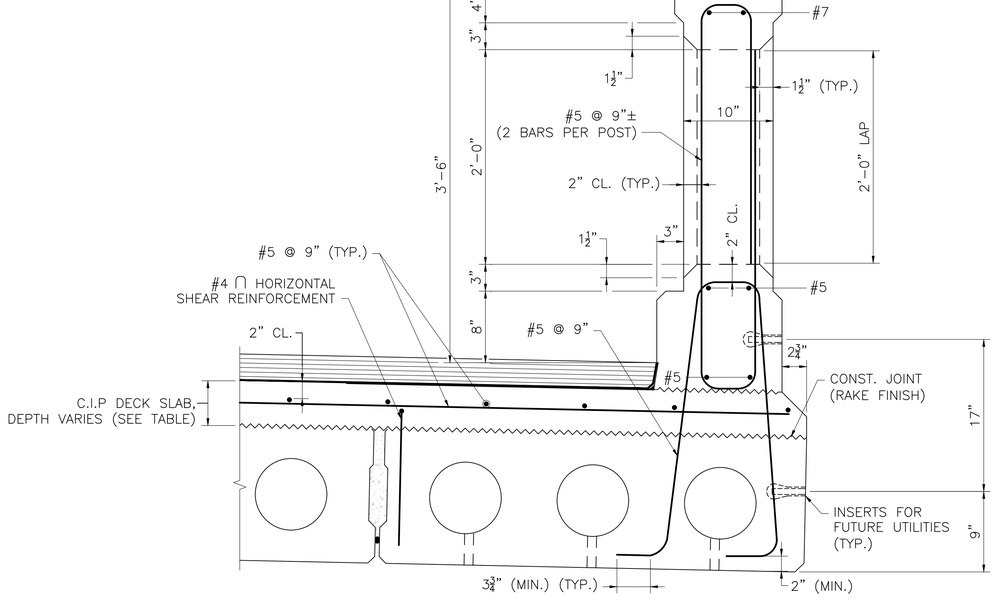
TOP OF ROADWAY ELEVATIONS					
LOCATION	℄ W. ABUT.	1/4 POINT	1/2 POINT	3/4 POINT	℄ E. ABUT.
NORTH CURBLINE	333.77	333.08	332.44	331.83	331.26
CROWN	333.93	333.25	332.62	332.02	331.46
SOUTH CURBLINE	333.49	332.82	332.19	331.60	331.05

LOCATION	LEFT EDGE OF DECK SLAB	PROFILE GRADE LINE/CROWN	RIGHT EDGE OF DECK SLAB
℄ BRGS. W ABUT.	7.11"	6.85"	7.02"
MIDSPAN	5.44"	5.35"	5.47"
℄ BRGS. E ABUT.	6.96"	7.11"	7.11"

THEORETICAL DECK SLAB THICKNESS TABLE

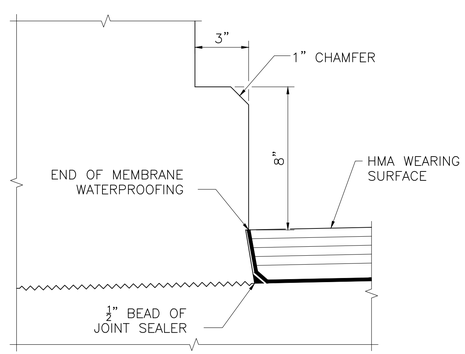
NOTES:

1. THIS TABLE INDICATES THE THEORETICAL THICKNESS OF THE DECK SLAB IN INCHES BASED UPON ASSUMED BEAM CAMBERS AT ERECTION.
2. TABLE IS PROVIDED TO ASSIST IN ESTIMATING THE REQUIRED CONCRETE VOLUME.
3. THE ACTUAL DECK THICKNESSES WILL BE AS REQUIRED TO MEET THE PROFILE GRADES.



SECTION THRU SAFETY CURB

SCALE: 1½" = 1'–0"



FACE OF SAFETY CURB DETAILS

SCALE: 3" = 1'–0"

NOTE:

1. DECK SLAB SHALL BE 5000 PSI HP CONCRETE. CONCRETE FOR CT–TL2 BARRIER SHALL BE 5000 PSI ⅜"IN, 710 HP CONCRETE. SEE SHEET 2, GENERAL NOTES.

UTILITY SUPPORT NOTES:

1. UTILITY SUPPORT THREADED INSERTS HAVE BEEN PROVIDED FOR THE INSTALLATION OF FUTURE UTILITIES. STRUCTURE HAS BEEN DESIGNED TO ACCOMMODATE AN UNFACTORED 250 PLF UTILITY LOAD ALONG EACH FASCIA.
2. THE ¾" ø THREADED INSERTS FOR ¾" ø BOLTS SHALL BE CAST INTO THE PRECAST BEAMS BY THE FABRICATOR AND SHALL PROVIDE A MINIMUM NOMINAL TENSILE RESISTANCE OF 6.0 KIPS AND A MINIMUM NOMINAL SHEAR RESISTANCE OF 6.0 KIPS IN 3000 PSI CONCRETE.

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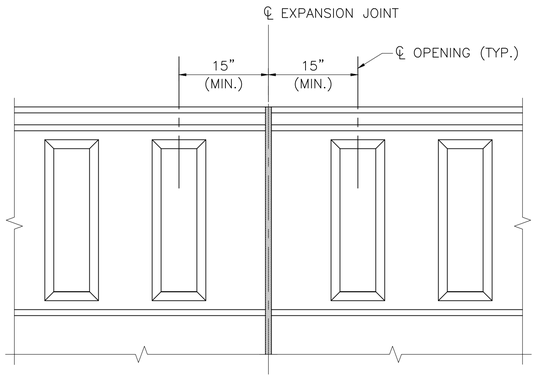
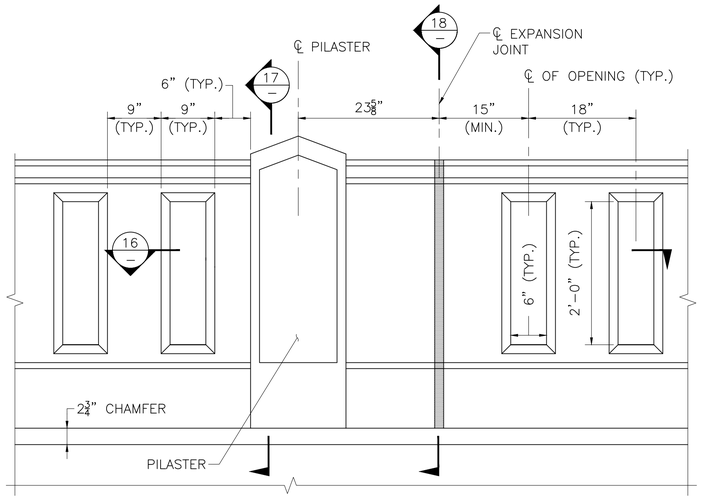
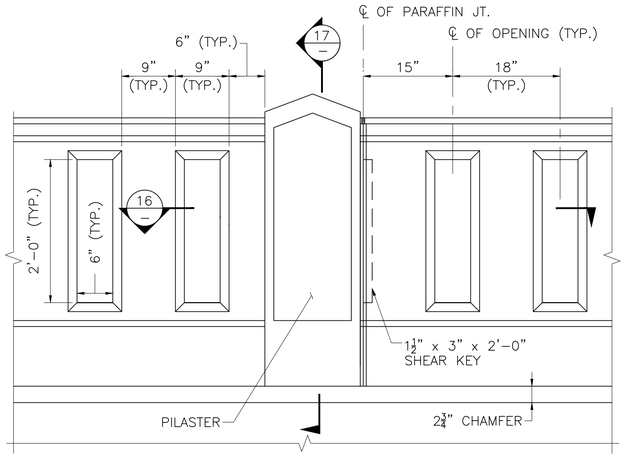


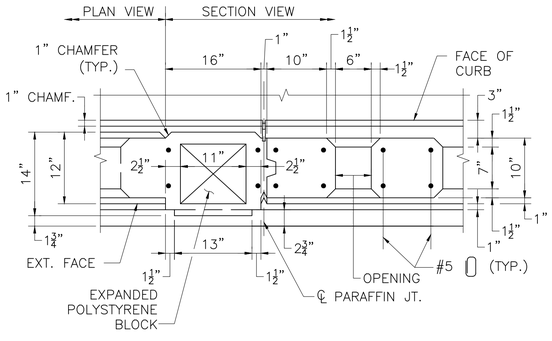
EXPANSION JOINT AT WINGWALL
SCALE: 1" = 1'–0"



EXTERIOR BARRIER ELEVATION AT EXPANSION JOINT
SCALE: 1" = 1'–0"

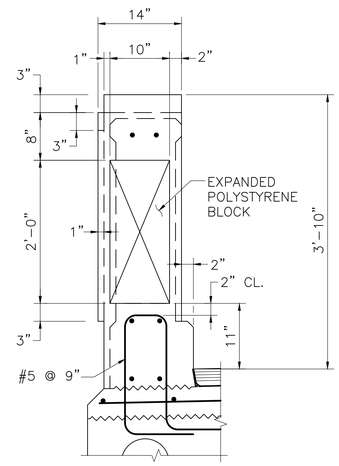


EXTERIOR BARRIER ELEVATION AT PARAFFIN JT.
SCALE: 1" = 1'–0"

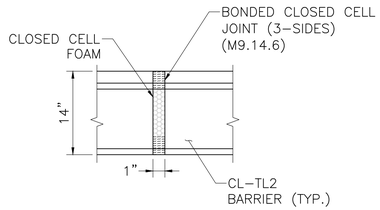


SECTION 16
SCALE: 1" = 1'–0"

NOTE:
PARAFFIN JOINT SECTION SHOWN, EXPANSION JOINT SECTION SIMILAR.

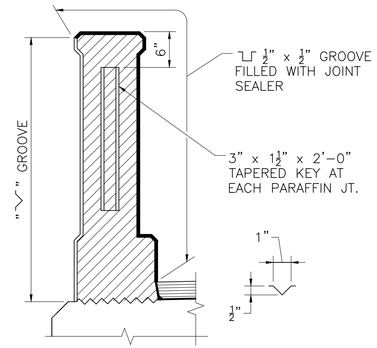


SECTION 17
SCALE: 1" = 1'–0"



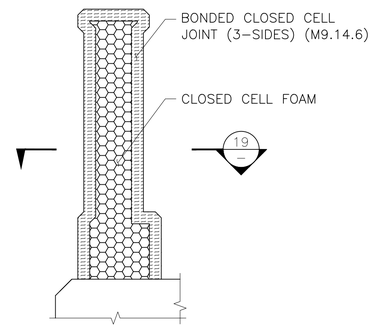
NOTE:
REINFORCEMENT NOT SHOWN FOR CLARITY.

SECTION 19
SCALE: 1" = 1'–0"



PARAFFIN JOINT DETAILS
SCALE: 1" = 1'–0"

PARAFFIN JOINT NOTES:
1. ALL CONCRETE ABOVE SLAB SHALL BE POURED IN ALTERNATING SECTIONS WITH NOT LESS THAN 3 DAYS BETWEEN POURS.
2. DO NOT CARRY LONGITUDINAL BARS THROUGH THE PARAFFIN JOINTS. END THE REINFORCEMENT 2" CLEAR OF JOINT.
3. JOINT SHALL BE SQUARE TO FACE OF CURB.



SECTION 18
SCALE: 1" = 1'–0"

LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	45	52
PROJECT FILE NO. 609120			

CT-TL2 BARRIER DETAILS

SEPT 07, 2024	ISSUED FOR CONSTRUCTION
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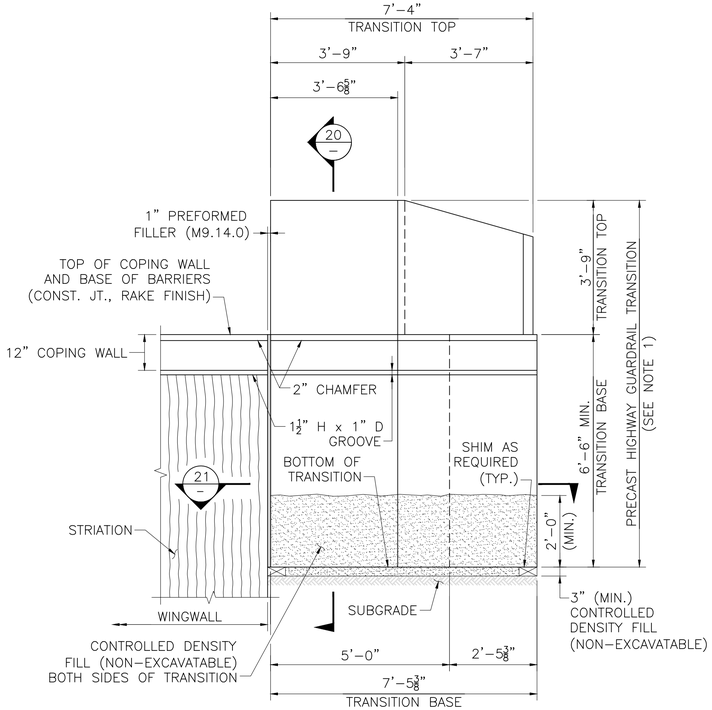
LUDLOW
PINEY LANE OVER BROAD BROOK

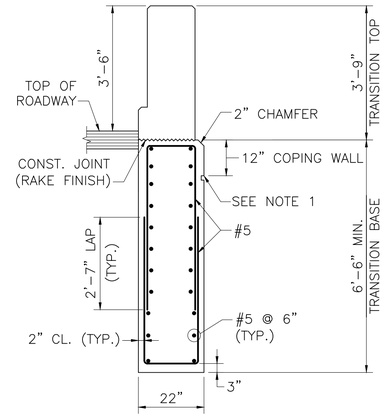
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	46	52
	PROJECT FILE NO. 609120		

HIGHWAY GUARDRAIL TRANSITION DETAILS 1 OF 2



PRECAST GUARDRAIL TRANSITION ELEVATION AT U–WINGWALL

SCALE: ½" = 1'–0"

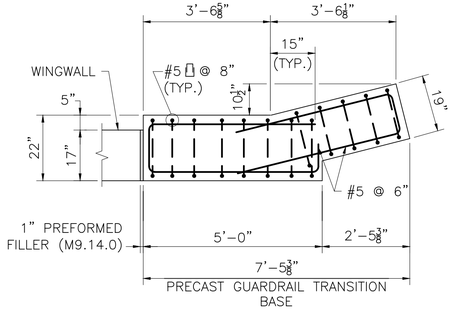


NOTES:

1. 1½" H x 1" D GROOVE. ALIGN WITH GROOVE AT TOP OF STRIATIONS.
2. REINFORCEMENT OF THE TRANSITION TOP IS NOT SHOWN FOR CLARITY.

SECTION 20

SCALE: ½" = 1'–0"

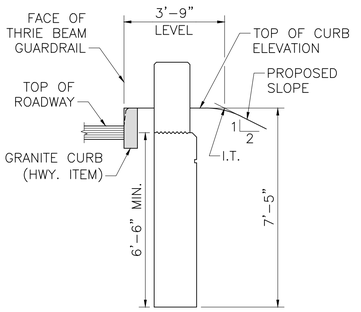


NOTE:

WINGWALL REINFORCEMENT AND STRIATIONS NOT SHOWN FOR CLARITY.

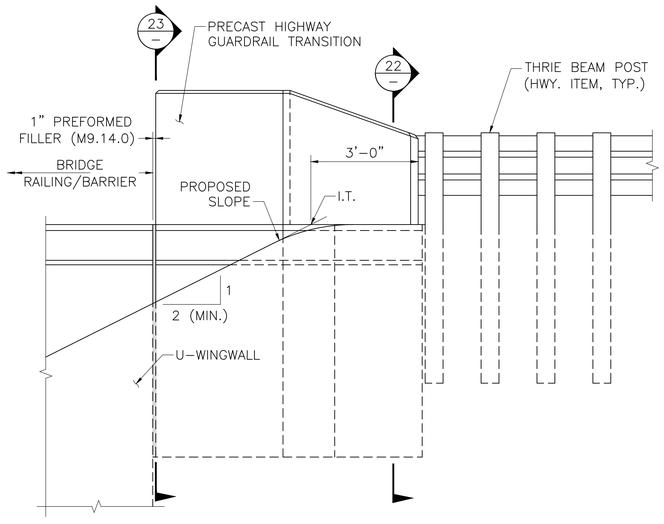
SECTION 21

SCALE: ½" = 1'–0"



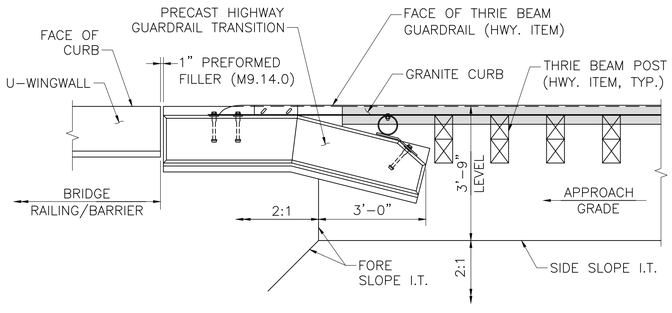
SECTION 22

SCALE: ⅜" = 1'–0"



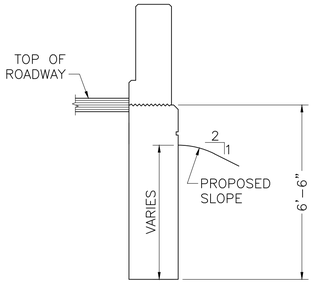
GRADING REQUIREMENTS ELEVATION

SCALE: ½" = 1'–0"



GRADING REQUIREMENTS PLAN

SCALE: ½" = 1'–0"



SECTION 23

SCALE: ⅜" = 1'–0"

PRECAST CONCRETE TRANSITION NOTES:

1. PRECAST GUARDRAIL TRANSITION SHALL BE 5000 HP CONCRETE AND PAID FOR UNDER ITEM NO. 995.01 BRIDGE LUMP SUM.
2. GRAVEL BORROW SHALL BE PLACED AND THOROUGHLY COMPACTED TO THE GRADE OF 3" (MIN.) BELOW THE INTENDED BOTTOM OF THE PRECAST GUARDRAIL TRANSITION BASE AND TO A HEIGHT OF 2'–0" (MIN.) ON ALL SIDES OF THE TRANSITION BASE TO FORM A TRENCH IN WHICH TO SET THE TRANSITION. WHERE NO GRAVEL BORROW IS REQUIRED BELOW THE BASE, IT SHALL BE PLACED ON UNDISTURBED SOIL.
3. CONTRACTOR SHALL SET THE PRECAST GUARDRAIL TRANSITION TO THE REQUIRED ELEVATION AND ALIGNMENT, AND BACKILL PRECAST GUARDRAIL TRANSITION WITH CONTROLLED DENSITY FILL (NON–EXCAVATABLE) TO THE ELEVATION SHOWN.
4. SEE ADDITIONAL HIGHWAY TRANSITION BARRIER NOTES AND DETAILS ON SHEET 28 OF 28.

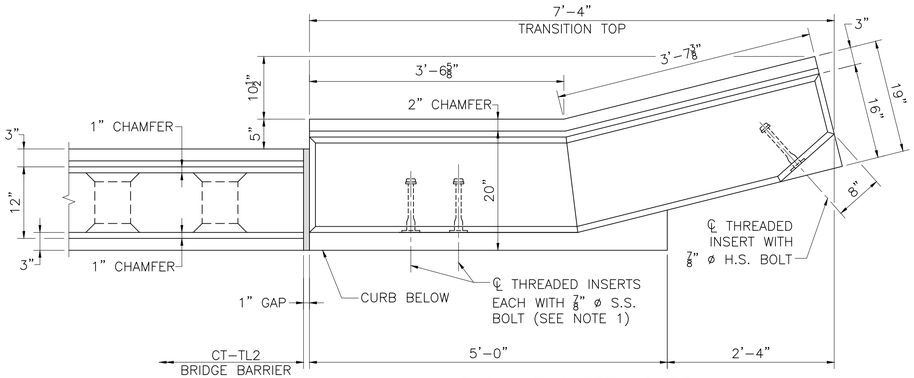
DATE	DESCRIPTION
SEPT 07, 2024	ISSUED FOR CONSTRUCTION

THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

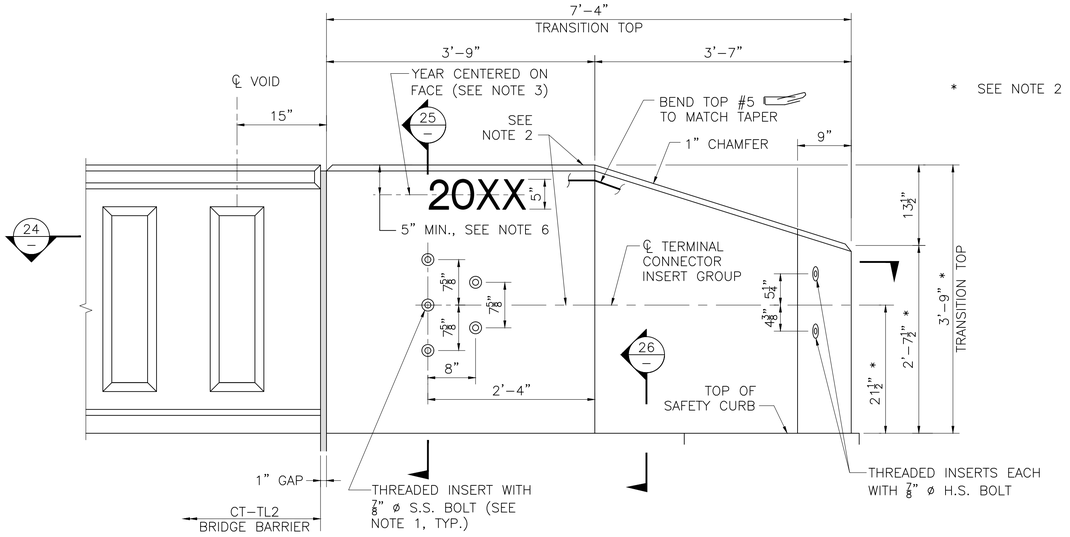
LUDLOW
PINEY LANE OVER BROAD BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	47	52
	PROJECT FILE NO. 609120		

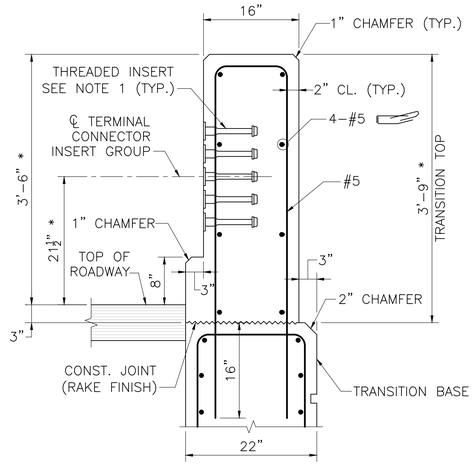
HIGHWAY GUARDRAIL TRANSITION DETAILS 2 OF 2



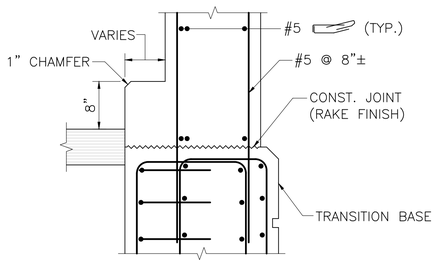
PLAN AT SAFETY CURB
SCALE: 1" = 1'–0"



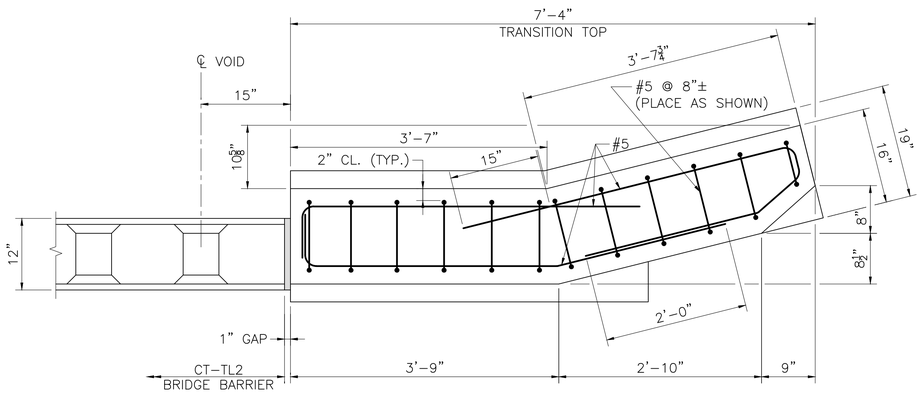
ELEVATION AT SAFETY CURB
SCALE: 1" = 1'–0"



SECTION 25 AT SAFETY CURB
SCALE: 1" = 1'–0"



SECTION 26 AT SAFETY CURB
SCALE: 1" = 1'–0"



SECTION 24
SCALE: 1" = 1'–0"

NOTES:

1. THREADED INSERTS SHALL BE PREQUALIFIED BY THE MANUFACTURER AS BEING CAPABLE OF DEVELOPING A NOMINAL SHEAR RESISTANCE OF 20 KIPS PER ⅞" ø S.S. BOLT. S.S. BOLTS SHALL BE ⅞" ø x 1½" LONG FULLY THREADED AISI TYPE 304N STAINLESS STEEL. INSERTS FOR ⅞" S.S. BOLTS SHALL BE GALVANIZED AND CAST INTO THE TRANSITION.

2. FOR AN APPROACH GRADE UP TO 3%, THE TRANSITION MAY BE CAST SQUARE AND SET PLUMB WITH THE MINIMUM EMBEDMENT DEPTH SHOWN. THE TERMINAL CONNECTOR INSERT GROUP SHALL BE SQUARE TO THE POST.

   FOR AN APPROACH GRADE IN EXCESS OF 3%, THE TRANSITION TOP AND THE TOP OF THE BRIDGE BARRIERS SHALL FOLLOW THE APPROACH GRADE. THE HEIGHT OF THE TRANSITION TOP SHALL VARY PROVIDED THAT THE MINIMUM DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS ARE MET. THE BOTTOM OF THE TRANSITION BASE SHALL BE SET LEVEL WITH THE MINIMUM EMBEDMENT DEPTH SHOWN. THE TERMINAL CONNECTOR INSERT GROUP SHALL BE SLOPED TO FOLLOW THE APPROACH GRADE.

3. USE LATEST CONTRACT COMPLETION YEAR IN EFFECT WHEN THE FIRST GUARDRAIL TRANSITION IS CAST. USE THIS YEAR FOR ALL GUARDRAIL TRANSITIONS.

4. ALL CONCRETE FOR THE PRECAST HIGHWAY GUARDRAIL TRANSITION SHALL BE 5000 HP CONCRETE.

5. LIFTING DEVICES (NOT SHOWN), INCLUDING THEIR NUMBER AND LOCATION, SHALL BE DESIGNED AND DETAILED BY THE PRECASTER. THEY SHALL BE GALVANIZED AND SHALL BE PLACED AND RECESSED IN POCKETS TO PROVIDE 1½" CLEAR COVER TO THE FACE OF THE TRANSITION CONCRETE. THESE DEVICES SHALL BE CLEARLY SHOWN ON THE SHOP DRAWINGS ALONG WITH ALL SUPPORTING CALCULATIONS AND/OR CATALOG CUTS. ONCE THE PRECAST TRANSITION IS SET IN PLACE, THE LIFTING DEVICE POCKETS SHALL BE FILLED WITH A NON–SHRINK GROUT THAT MATCHES THE COLOR OF THE TRANSITION CONCRETE WHEN CURED AND THE FILLED POCKETS SHALL BE RUBBED WITH A CORUNDUM STONE TO BLEND OUT THE JOINTS.

6. THE DATE IN THE BARRIER SHALL BE CAST LEVEL AND APPROXIMATELY 5 INCHES (MINIMUM) FROM THE TOP OF THE BARRIER.

DATE	DESCRIPTION
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AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE

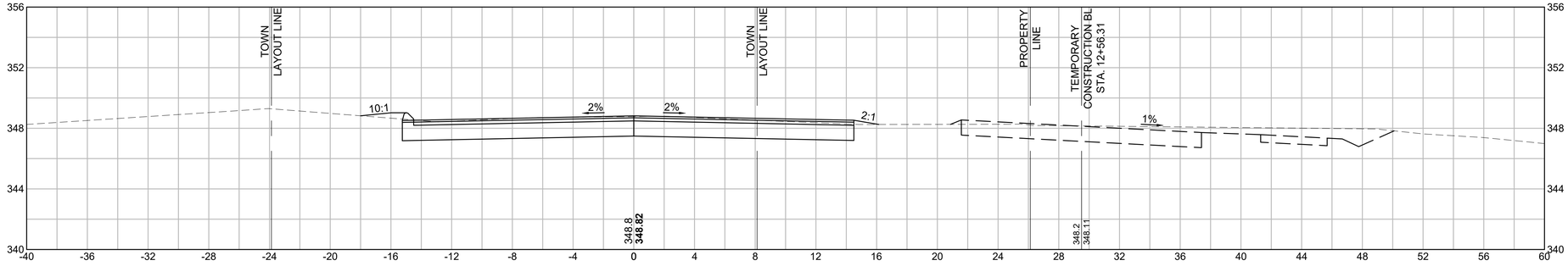
TOP OF PRECAST HIGHWAY GUARDRAIL TRANSITION FOR CT–TL2 BARRIER

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	48	52
PROJECT FILE NO. 609120			

CROSS SECTIONS

2+50

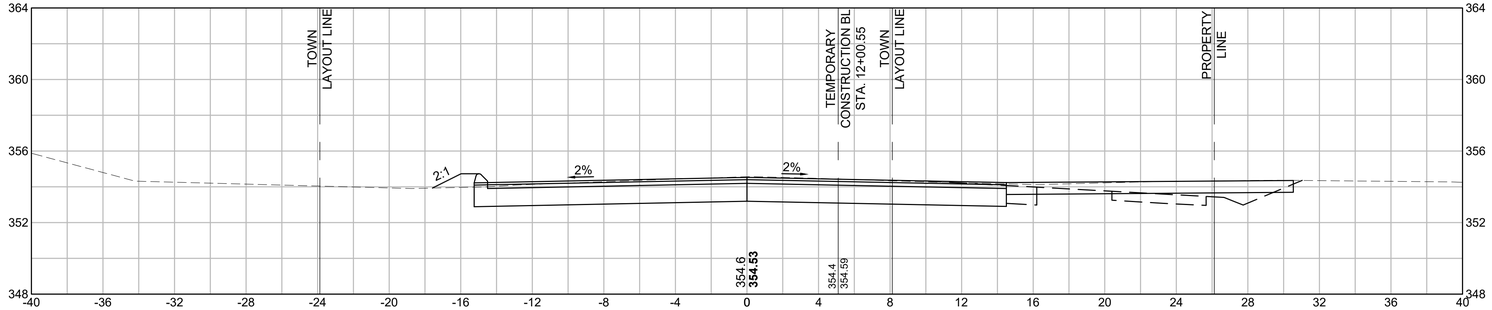


PERMANENT
CUT: 36.5 SF
FILL: 0.8 SF

REMOVAL OF TEMP ROAD
CUT: 3.0 SF

CONSTRUCTION OF TEMPORARY ROAD
CUT: 26.0 SF
FILL: 0.0 SF

2+00

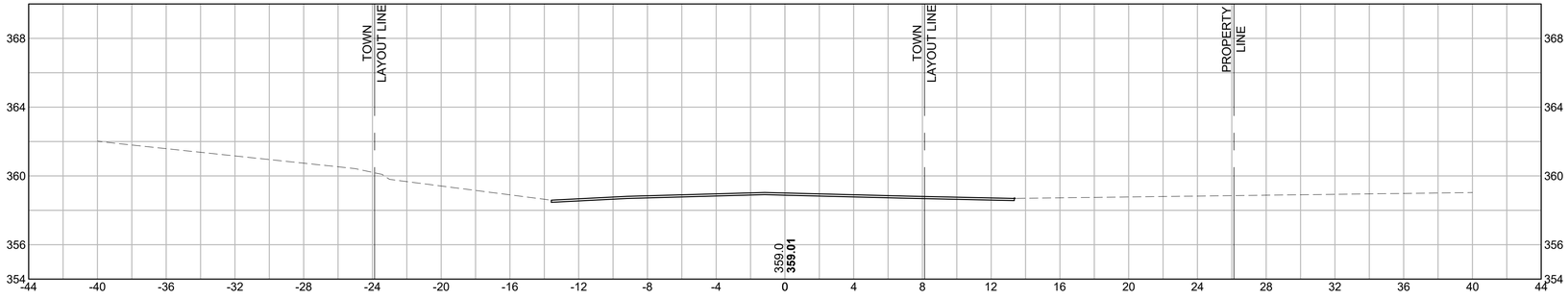


PERMANENT
CUT: 37.4 SF
FILL: 13.1 SF

REMOVAL OF TEMP ROAD
CUT: 1.2 SF

CONSTRUCTION OF TEMPORARY ROAD
CUT: 13.6 SF
FILL: 0.0 SF

1+50



PERMANENT
CUT: 0.0 SF
FILL: 0.0 SF

CONSTRUCTION OF TEMPORARY ROAD
CUT: 0.0 SF
FILL: 0.0 SF

HOR. SCALE IN FEET
4 0 4 8
4 0 4 8
VER. SCALE IN FEET

LUDLOW
PINEY LANE

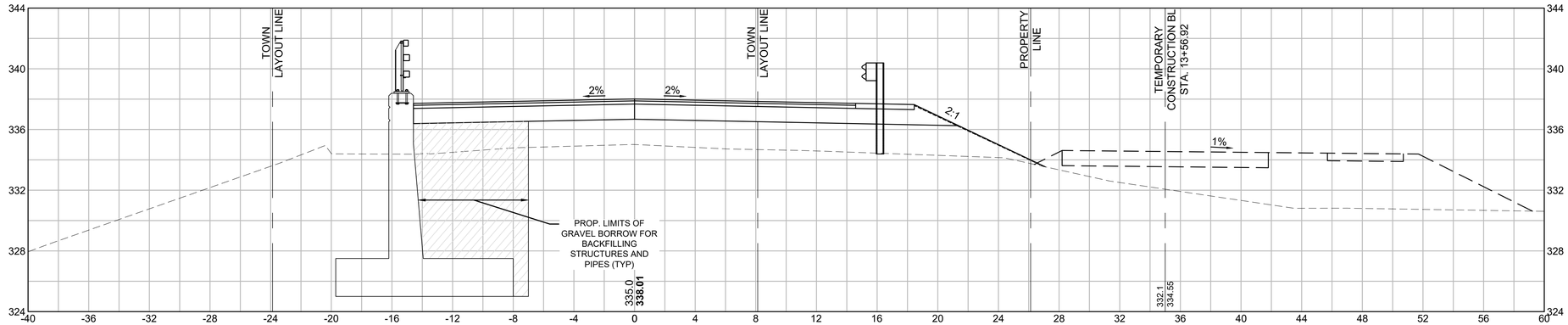
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	49	52
PROJECT FILE NO.	609120		

CROSS SECTIONS

R&S EX UP
3+77.2

TEMP UP
3+66.4

3+50

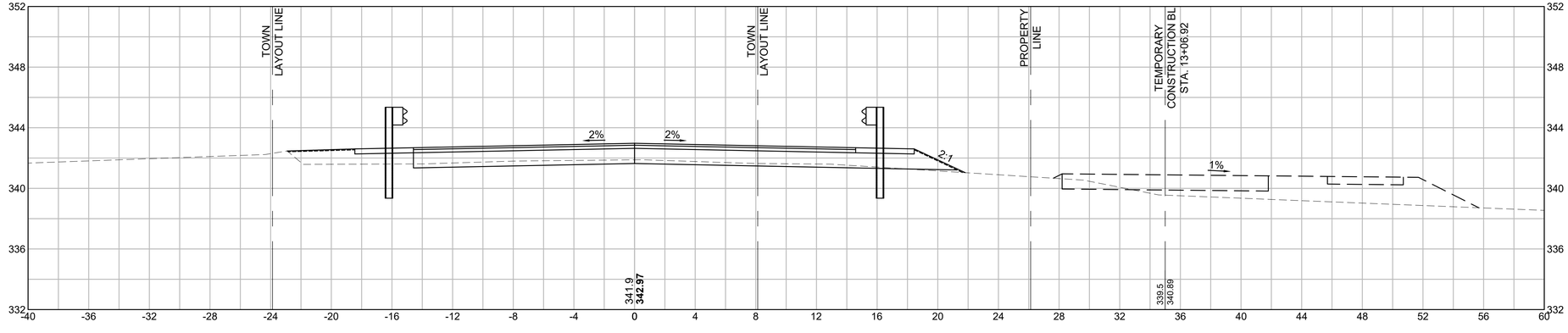


PERMANENT
CUT: 4.4 SF
FILL: 58.1 SF

REMOVAL OF TEMP ROAD
CUT: 84.5 SF

CONSTRUCTION OF TEMPORARY ROAD
CUT: 0.0 SF
FILL: 68.7 SF

3+00



PERMANENT
CUT: 7.0 SF
FILL: 5.0 SF

REMOVAL OF TEMP ROAD
CUT: 36.2 SF

CONSTRUCTION OF TEMPORARY ROAD
CUT: 2.0 SF
FILL: 21.8 SF

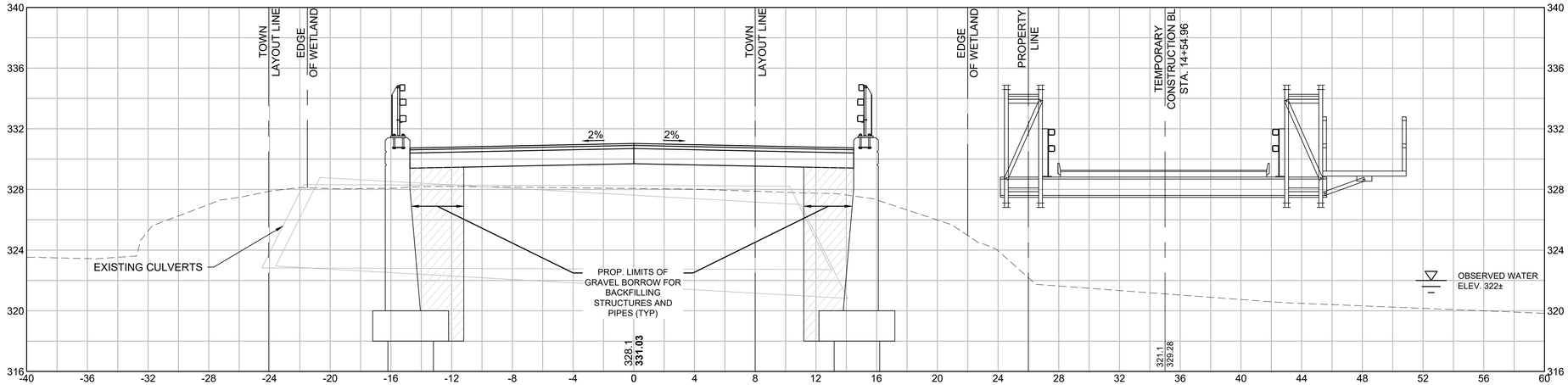
HOR. SCALE IN FEET
4 0 4 8
4 0 4 8
VER. SCALE IN FEET

LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	50	52
PROJECT FILE NO.	609120		

CROSS SECTIONS

4+50

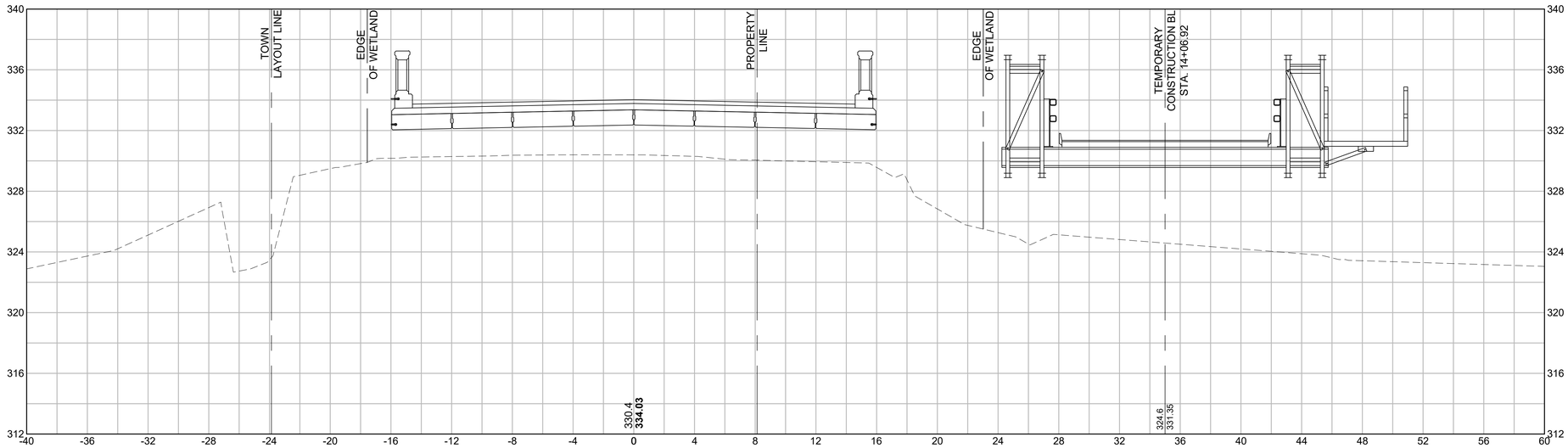


PERMANENT
CUT: 4.7 SF
FILL: 38.8 SF

REMOVAL OF TEMP ROAD
CUT: 0.0 SF

CONSTRUCTION OF TEMPORARY ROAD
CUT: 0.0 SF
FILL: 0.0 SF

4+00



PERMANENT
CUT: 0.0 SF
FILL: 0.0 SF

REMOVAL OF TEMP ROAD
CUT: 0.0 SF

CONSTRUCTION OF TEMPORARY ROAD
CUT: 0.0 SF
FILL: 0.0 SF

HOR. SCALE IN FEET
4 0 4 8
4 0 4 8
VER. SCALE IN FEET

LUDLOW
PINEY LANE

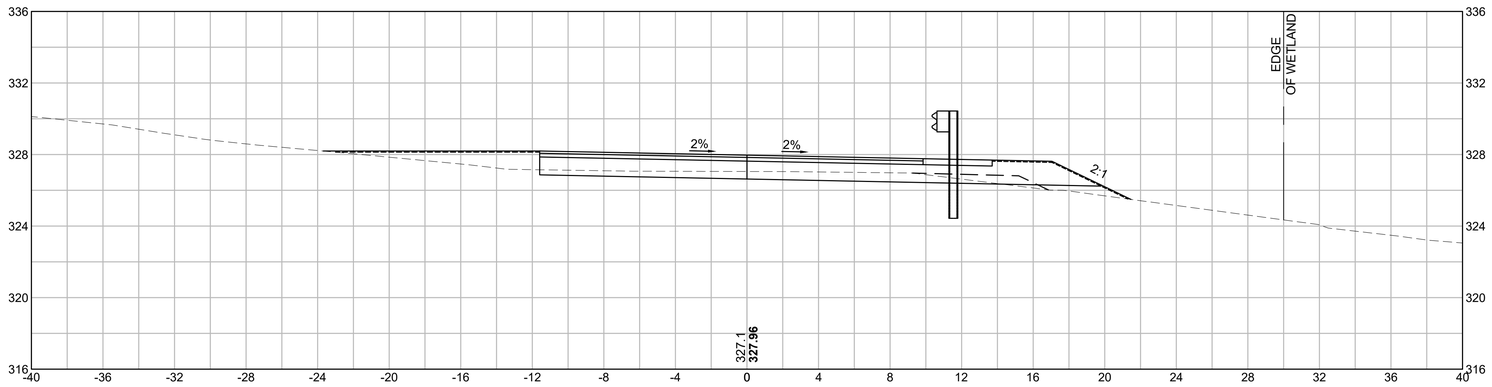
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	51	52
PROJECT FILE NO.	609120		

CROSS SECTIONS

609120_XS.DWG Plotted on 12-Aug-2024 9:35 AM

TEMP UP
5+44.3

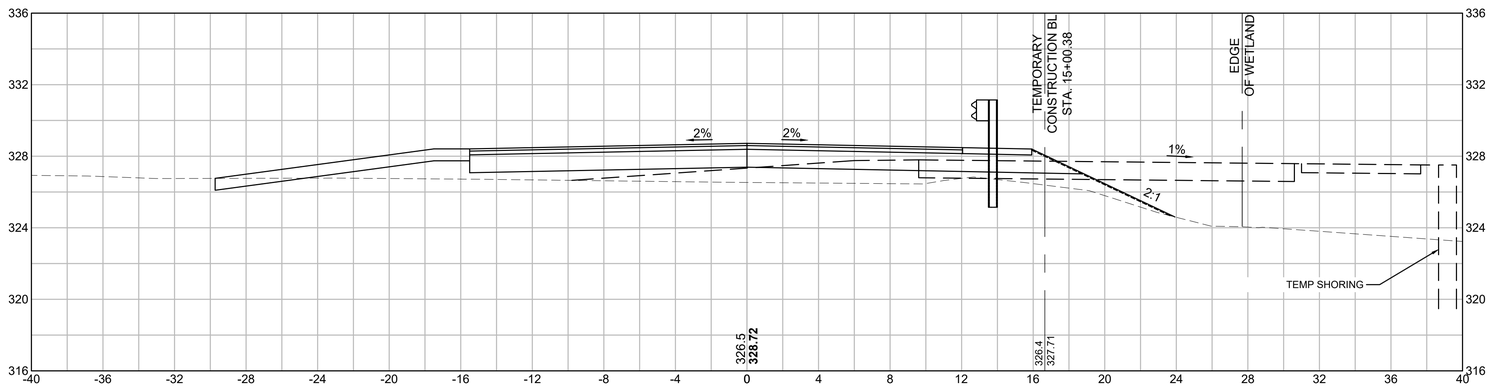
5+50



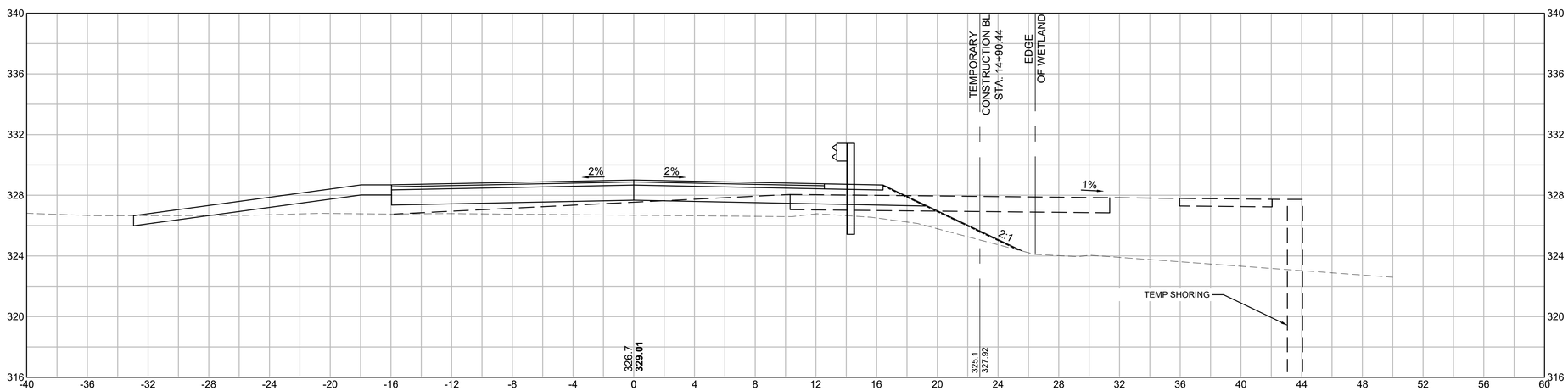
PERMANENT
CUT: 12.5 SF
FILL: 6.9 SF

REMOVAL OF TEMP ROAD
CUT: 0.0 SF
FILL: 2.7 SF

5+10



5+00



PERMANENT
CUT: 0.0 SF
FILL: 36.0 SF

REMOVAL OF TEMP ROAD
CUT: 85.7 SF

CONSTRUCTION OF TEMPORARY ROAD
CUT: 0.0 SF
FILL: 73.7 SF

HOR. SCALE IN FEET
4 0 4 8
4 0 4 8
VER. SCALE IN FEET

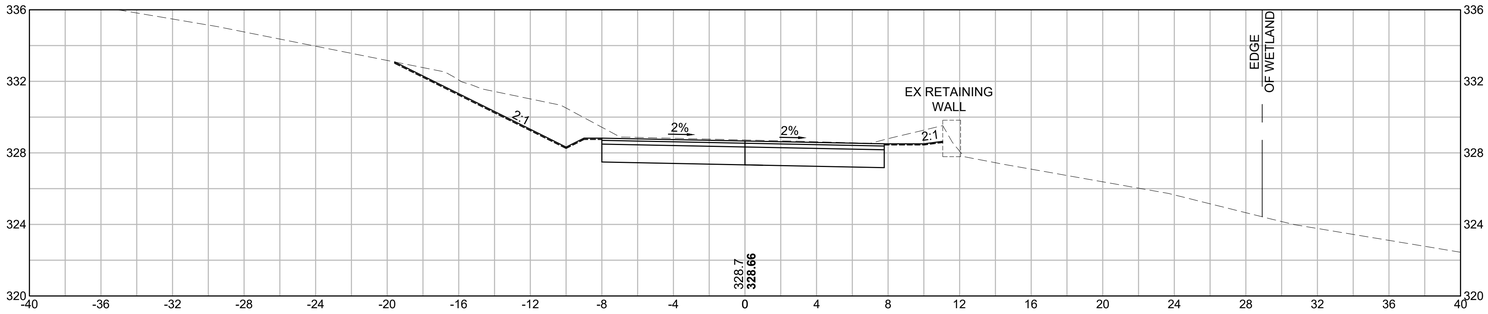
LUDLOW
PINEY LANE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	STP(BR-OFF)-003S(782)X	52	52
	PROJECT FILE NO. 609120		

CROSS SECTIONS

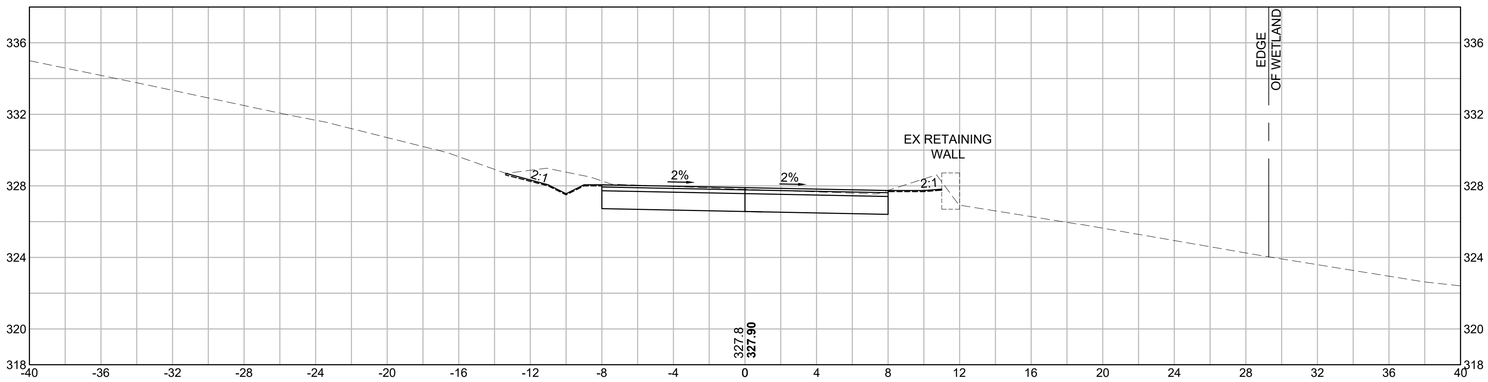
609120_XS.DWG Plotted on 12-Aug-2024 9:35 AM

6+50



CUT: 47.0 SF
FILL: 0.0 SF

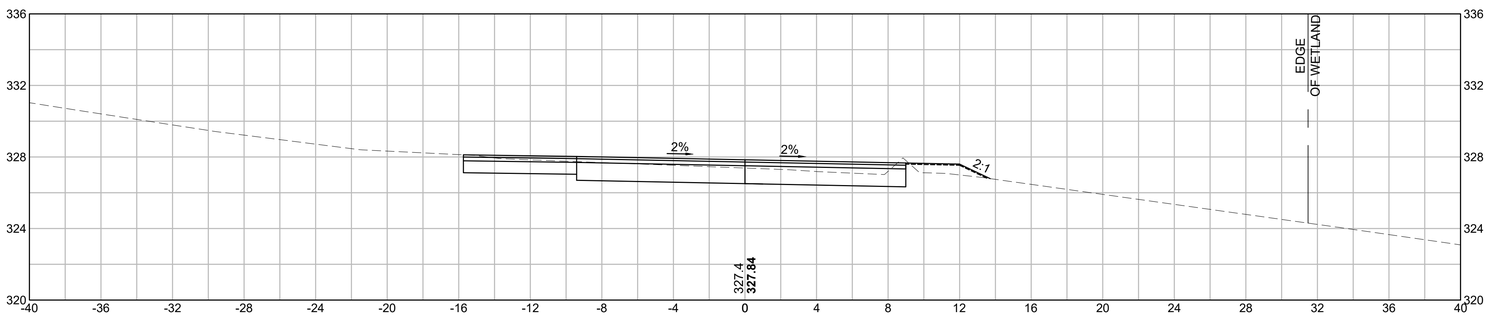
6+00



CUT: 28.0 SF
FILL: 0.0 SF

20" DIAM.
5+68.2

5+65



HOR. SCALE IN FEET
4 0 4 8
4 0 4 8
VER. SCALE IN FEET