TOWN OF NORTH ANDOVER, MASSACHUSETTS

STEVENS STREET CULVERT REHABILITATION

FINAL DESIGN ISSUED FOR BID
SEPTEMBER 2024

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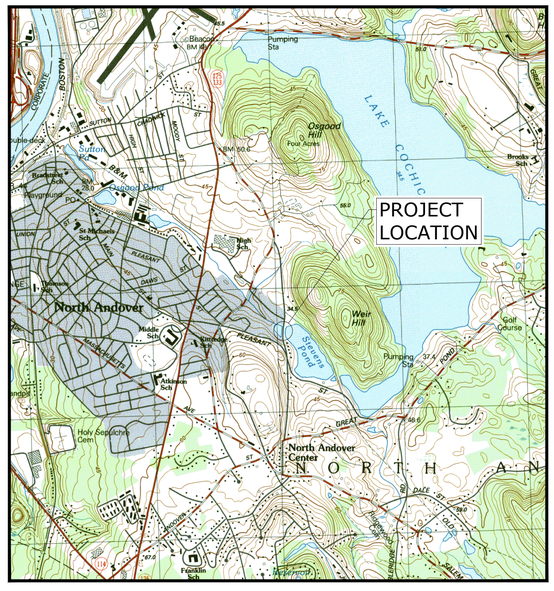
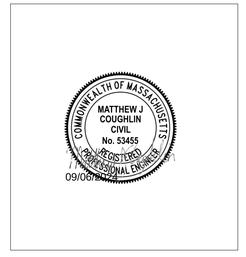


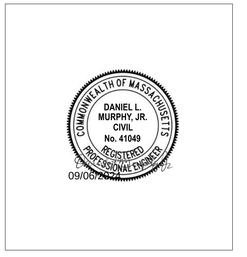
LOCATION MAP
SCALE: 1" = 2000'

PREPARED BY:

Tighe&Bond



MATTHEW COUGHLIN, P.E.



DANIEL L. MURPHY, P.E.

PREPARED FOR:
TOWN OF NORTH ANDOVER
DIVISION OF PUBLIC WORKS
JOHN BORGESI, PE

COMPLETE SET 14 SHEETS

DESIGN LOADS AND SPECIFICATIONS

1. DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN (LRFD)
2. SPECIFICATIONS: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH ED., 2020 AS AMENDED
   MASSDOT 2023 STANDARD SPECIFICATIONS AS AMENDED
3. REINFORCING STEEL: EPOXY COATED BARS AASHTO M31 (ASTM A 615)
4. THREADED TIE RODS & FACE PLATES: GRADE 316 STAINLESS STEEL
5. CONCRETE: 4000 PSI, 1½", 565 CEMENT CONCRETE

GENERAL NOTES

1. THE EXISTING CONDITIONS INFORMATION SHOWN ON THE DRAWINGS IS BASED ON SURVEY DRAWINGS PROVIDED BY WSP USA INC. TITLED "EXISTING CONDITIONS SURVEY STEVENS STREET NORTH ANDOVER, MASSACHUSETTS" AND DATED AUGUST 5, 2022.
2. CONTRACTOR SHALL BE AWARE THAT EXISTING STRUCTURE DIMENSIONS AND ELEVATIONS SHOWN IN THESE PLANS WERE TAKEN FROM THE ORIGINAL BRIDGE PLANS AND/OR SUBSEQUENT REHABILITATION PLANS AND DO NOT NECESSARILY REPRESENT "AS BUILT" DIMENSIONS AND ELEVATIONS. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS OF EXISTING STRUCTURES AND BE PREPARED TO MAKE ADJUSTMENTS REQUIRED TO PROPERLY COMPLETE THE WORK. ANY DISCREPANCIES IN DIMENSIONS, CHARACTER, OR EXTENT OF EXISTING FEATURES, SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO ADVANCING THE WORK.
3. ALL EXISTING BRONZE DISCS REPRESENTING STATE BENCHMARKS OR SURVEY TRIANGULATION POINTS MUST NOT BE DISTURBED. WHEN THE WORK CALLED FOR INVOLVES DISTURBING A BRONZE DISC THE CONTRACTOR SHALL NOTIFY THE ENGINEER SUFFICIENTLY IN ADVANCE OF THE WORK TO PERMIT THE STATE TO TEMPORARILY RELOCATE THE AFFECTED MARKER.
4. ALL WORK SHALL COMPLY WITH OSHA'S LATEST STANDARDS. ALL REQUIREMENTS OF OSHA'S EXCAVATION STANDARDS SHALL BE PROVIDED BY THE CONTRACTOR INCLUDING, BUT NOT LIMITED TO, THE PROVISION FOR A COMPETENT PERSON ON SITE AND ANY REQUIRED DOCUMENTATION THAT MAY REQUIRE CERTIFICATION BY A PROFESSIONAL ENGINEER.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN ALL UTILITIES FUNCTIONING PROPERLY IN THE AREAS UNDER CONSTRUCTION PRIOR TO COMPLETION OF THE PROJECT. ALL PIPES AND STRUCTURES WITHIN THE LIMITS OF THIS CONTRACT SHALL BE LEFT IN A CLEAN AND OPERABLE CONDITION AT THE COMPLETION OF WORK. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SAND AND SILT FROM DISTURBED AREAS FROM ENTERING THE SYSTEM. CONTRACTOR IS RESPONSIBLE FOR DAMAGE SUSTAINED TO ANY EXISTING UTILITIES AND IT IS HIS/HER RESPONSIBILITY TO MAKE REPAIRS TO THE REQUIREMENTS OF THE TOWN OR RESPECTIVE UTILITY COMPANY.
6. EXISTING PROPERTY LINES ARE APPROXIMATE AND ARE BASED ON GIS DATA FROM THE TOWN OF NORTH ANDOVER.
7. THE OWNER AND ENGINEER ASSUME NO RESPONSIBILITY FOR THE LOCATION OF EXISTING UTILITIES. THE ENGINEER AND OWNER MAKE NO GUARANTEE AS TO THE UNDERGROUND CONDITIONS THAT MAY BE ENCOUNTERED.
8. PER MASSACHUSETTS LAW, CONTRACTOR SHALL CALL 1-888-DIG-SAFE, (1-888-344-7233) PRIOR TO ANY UNDERGROUND EXCAVATION ON SITE. THE DIG-SAFE SERVICE WILL FIELD LOCATE AND MARK UNDERGROUND UTILITIES IN THE FIELD. THE DIG-SAFE VERIFICATION NUMBER SHALL BE SUBMITTED TO THE TOWN OF NORTH ANDOVER PRIOR TO ANY EXCAVATION, DEMOLITION, AND REMOVAL OR CONSTRUCTION WORK.
9. ALL EXISTING CONDITIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IF FIELD CONDITIONS ARE OBSERVED THAT VARY SIGNIFICANTLY FROM THOSE SHOWN ON THESE PLANS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING FOR RESOLUTION OF THE CONFLICTING INFORMATION.
10. ANY AND ALL DEMOLISHED BUILDING MATERIALS, SURPLUS MATERIAL, WASTE FROM CLEARING AND GRUBBING ACTIVITIES, AND SITE RUBBLE SHALL BE HANDLED/DISPOSED OF BY THE CONTRACTOR OFF-SITE AT HIS EXPENSE AND IN ACCORDANCE WITH THE TOWN OF NORTH ANDOVER ORDINANCES, AND ALL APPLICABLE STATE AND FEDERAL ENVIRONMENTAL REGULATIONS.
11. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO ENSURE THAT DEBRIS DOES NOT FALL IN THE WATER ADJACENT TO THE EXISTING STRUCTURE. ALL COSTS INCLUDING ERECTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURES OR OTHER SUCH APPROVED METHODS, SHALL BE SUBSIDIARY TO THE APPROPRIATE ITEMS OF WORK BEING PERFORMED.
12. ALL MATERIALS AND METHODS ARE TO COMPLY WITH THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, DATED 2023, AND ITS LATEST REVISIONS.
13. ALL DISTURBED AREAS SHALL BE LOAMED & SEEDED UNLESS OTHERWISE SPECIFIED. OVER EXCAVATE SAID AREAS AS REQUIRED TO MEET GRADE.
14. IF THERE ARE REVISIONS TO CONTRACTOR'S APPROVED WORK PLANS, THE CONTRACTOR SHALL SUBMIT THESE CHANGES TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
15. THE DRAWINGS ARE BASED ON THE FOLLOWING DATUMS: HORIZONTAL – NORTH AMERICAN DATUM OF 1983, MASSACHUSETTS STATE PLANE, MAINLAND ZONE, US FEET; VERTICAL – THE NORTH AMERICAN VERTICAL DATUM OF 1988.
16. ALL WORK PERFORMED BY THE CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS AND REQUIREMENTS.
17. THE CONTRACTOR SHALL REVIEW AND UNDERSTAND ALL APPLICABLE ENVIRONMENTAL PERMITS AND ENSURE THAT ALL CONSTRUCTION CONDITIONS ARE MET.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION SAFETY, AND MEANS AND METHODS TO PERFORM AND COMPLETE THE WORK.
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE TO PRIVATE OR PUBLIC PROPERTY OUTSIDE THE LIMITS OF CONSTRUCTION SHOWN ON THE PLANS CAUSED BY THE CONTRACTOR, AT THE SOLE COST TO THE CONTRACTOR.
20. THE CONTRACTOR MUST COORDINATE ALL WORK WITH THE TOWN OF NORTH ANDOVER, ALL UTILITY COMPANIES, THE ENGINEER, AND ANY AFFECTED ABUTTERS. WORK SHALL NOT PROCEED WITHOUT WRITTEN APPROVAL FROM THE TOWN OF NORTH ANDOVER.
21. THE CONTRACTOR SHALL SUBMIT LITERATURE (MANUFACTURER'S LITERATURE, CUT SHEETS, APPLICATION PROCEDURES, ETC.) FOR ALL PRODUCTS PROPOSED FOR USE ON THE PROJECT, FOR APPROVAL BY THE ENGINEER.
22. TAKE ALL NECESSARY MEASURES AND PROVIDE ALL NECESSARY CONTINUOUS BARRIERS OF SUFFICIENT TYPE, SIZE AND STRENGTH TO PREVENT ACCESS TO ALL OPEN EXCAVATIONS AT THE COMPLETION OF EACH DAY'S WORK.
23. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4", UNLESS OTHERWISE NOTED.
24. FOR TEMPORARY TRAFFIC CONTROL PLAN SEE SHEET 05.

PARTIAL STRUCTURE REMOVAL NOTES:

1. THE CONTRACTOR'S METHOD FOR PARTIAL DEMOLITION OF THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR DOCUMENTATION PRIOR TO THE COMMENCEMENT OF ANY REMOVAL OPERATIONS.
2. PARTIAL REMOVAL OF EXISTING STRUCTURE SHALL INCLUDE THE COMPLETE REMOVAL OF THE CONCRETE SLAB, LOCAL REMOVAL OF THE STONE MASONRY HEADWALLS OVER THE EXISTING CONCRETE HEADWALLS, AND EXISTING GUARDRAIL AS SHOWN ON THE DRAWINGS HEREIN.

LEGEND:

EXISTING	PROPOSED	DESCRIPTION
Ⓢ		SEWER MANHOLE
☼		BUSH
		BOULDER
100 99		CONTOURS
		UNDERGROUND SEWER MAIN
		GUARD RAIL - STEEL POSTS
		EROSION CONTROL BARRIER
		TREE LINE
		SAWCUT LINE
		EDGE OF PAVEMENT
		ORDINARY HIGH WATER
		APPROXIMATE PROPERTY LINE
		TEMPORARY CONSTRUCTION EASEMENT

ABBREVIATIONS:

APPROX.	APPROXIMATE
BL	BASELINE
BM	BENCHMARK
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
DIA	DIAMETER
DYL	DOUBLE YELLOW LINE
ELEV (or EL.)	ELEVATION
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
GRD	GUARD
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
INV	INVERT
LT	LEFT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
PC	POINT OF CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
PROP	PROPOSED
PT	POINT OF TANGENCY
PVMT	PAVEMENT
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
RET	RETAIN
ROW	RIGHT OF WAY
R&R	REMOVE AND RESET
RT	RIGHT
SHLD	SHOULDER
SMH	SEWER MANHOLE
SS	STAINLESS STEEL
ST	STREET
STA	STATION
SWL	SINGLE WHITE LINE
TEMP	TEMPORARY
TYP	TYPICAL
UP	UTILITY POLE
VERT	VERTICAL

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS
DANIEL L. MURPHY, JR.
CIVIL
No. 41049
REGISTERED PROFESSIONAL ENGINEER
09/06/2024

COMMONWEALTH OF MASSACHUSETTS
MATTHEW J COUGHLIN
CIVIL
No. 53455
REGISTERED PROFESSIONAL ENGINEER
09/06/2024

FINAL DESIGN ISSUED FOR BID

Stevens Street Culvert Rehabilitation

Town of North Andover

North Andover, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	N1093-016
DATE:	09/06/2024
FILE:	N1093-016-G.dwg
DRAWN BY:	AI
DESIGNED/CHECKED BY:	DRF
APPROVED BY:	EAO

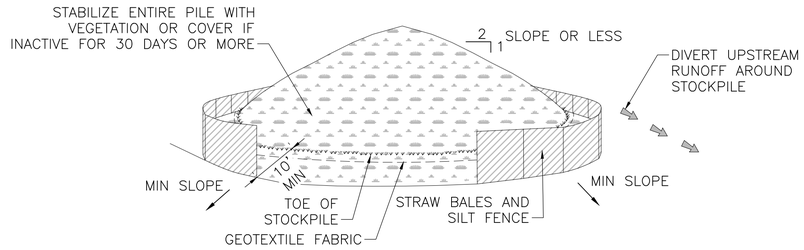
GENERAL NOTES, LEGEND, AND ABBREVIATIONS

SCALE: NO SCALE

SHEET 02 OF 14

EROSION CONTROL NOTES:

1. ALL EROSION CONTROL MEASURES SHOWN, SPECIFIED AND REQUIRED BY THE ENGINEER SHALL BE INSTALLED PRIOR TO ANY CONSTRUCTION OR IMMEDIATELY UPON REQUEST. MAINTAIN ALL SUCH CONTROL MEASURES UNTIL FINAL SURFACE TREATMENTS ARE IN PLACE AND/OR UNTIL PERMANENT VEGETATION IS ESTABLISHED.
2. MAINTAIN AN ADDITIONAL SUPPLY OF EROSION CONTROL MEASURES THROUGHOUT THE CONSTRUCTION PERIOD.
3. PRIOR TO STARTING WORK, CLEARLY STAKE WORK LIMIT LINE(S). DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE NEW LIMIT LINE. COORDINATE WITH THE ENGINEER THE LOCATIONS FOR THE TEMPORARY STOCKPILING OF TOPSOIL DURING CONSTRUCTION.
4. SIDE SLOPES, AND DISTURBED VEGETATED AREAS, SHALL BE A MAXIMUM GRADE OF 2:1 COMPACTED, STABILIZED, LOAMED AND SEEDED AS SHOWN ON DRAWINGS. SIDE SLOPES SHALL BE IMMEDIATELY FINE GRADED AND SEEDED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
5. SILT TRAPPED AT BARRIERS SHALL BE REMOVED AND DISPOSED OF IN UPLAND AREAS OUTSIDE BUFFER ZONES. MATERIALS DEPOSITED IN ANY TEMPORARY SETTLING BASIN SHALL BE REMOVED AT THE COMPLETION OF THE PROJECT. ALL DISTURBED AREAS SHALL BE RESTORED.
6. INSTALL EROSION CONTROLS AT THE EDGE OF NEW WORK. EROSION CONTROLS SHALL ACT AS LIMIT OF WORK LINE TO HELP ENSURE THAT EQUIPMENT DOES NOT DISTURB ADJACENT PROPERTIES.
7. ADDITIONAL EROSION CONTROLS MAY BE REQUIRED TO LIMIT SEDIMENTS FROM DISCHARGING TO ADJACENT PROPERTIES OR WATERWAYS.
8. PROPERLY STABILIZE AND PROTECT TEMPORARY STOCKPILES OF MATERIALS RELATED TO THE CONSTRUCTION ACTIVITIES TO LIMIT MOVEMENT OF MATERIAL ONTO ADJACENT PARCELS, OR INTO THE WATERWAY.
9. STABILIZE THE AREAS OF CONSTRUCTION ACTIVITIES AT THE CLOSE OF EACH CONSTRUCTION DAY. CHECK EROSION CONTROLS AT THIS TIME AND MAINTAIN OR REINFORCE IF NECESSARY
10. PROTECT NEW WORK FROM FLOODING. PROVIDE PROPER SLOPE GRADING IN THE AREAS SURROUNDING ALL EXCAVATIONS TO LIMIT WATER FROM RUNNING INTO THE EXCAVATED AREA OR TO ADJACENT PROPERTIES. UPON COMPLETION OF THE WORK, RESTORE ALL AREAS IN A SATISFACTORY MANNER.
11. ALL SILT–LADEN WATER MUST BE SETTLED OR FILTERED TO REMOVE ALL SEDIMENTS PRIOR TO RELEASE TO AN UPLAND AREA, IN A SEDIMENTATION OR FILTER BAG LOCATED DOWN GRADIENT.
12. DEWATER AS NECESSARY TO KEEP CONSTRUCTION AREAS FREE OF WATER, DISCHARGE WATER FROM DEWATERING TO APPROPRIATE UPLAND LOCATION AND WITHOUT SEDIMENT (SEE DEWATERING REQUIREMENTS).
13. AT THE END OF EACH WORK DAY, ANY SEDIMENT TRACKED ONTO PUBLIC RIGHTS–OF–WAY BEYOND THE PROJECT LIMITS SHALL BE SWEPT.

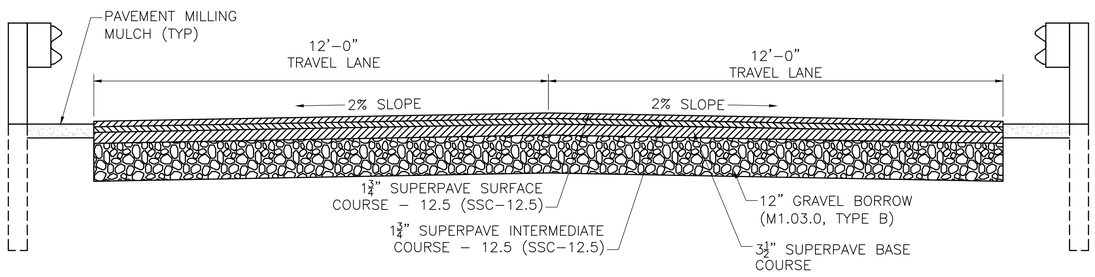


INSTALLATION NOTES:

1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 2H:1V.
3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH EITHER SILT FENCING AND STRAW BALES, THEN STABILIZED WITH VEGETATION OR COVERED.

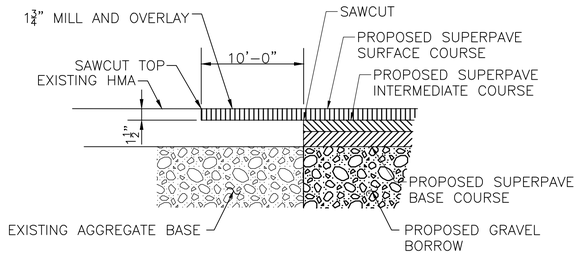
SOIL STOCKPILING

NOT TO SCALE



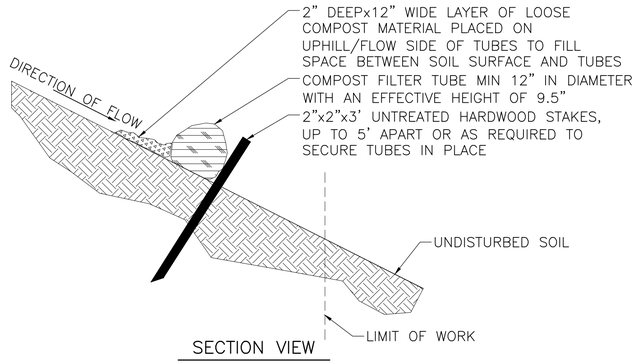
STEVENS STREET TYPICAL APPROACH SECTION

SCALE: ½" = 1'–0"

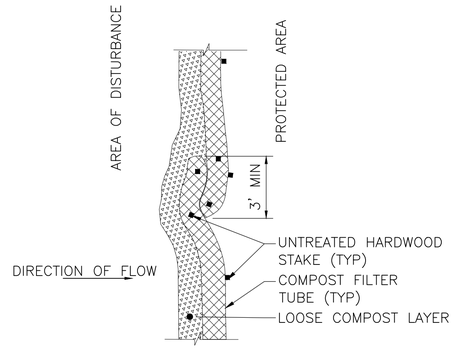


TYPICAL BUTT JOINT TO EXISTING PAVEMENT

NOT TO SCALE



SECTION VIEW



PLAN VIEW – JOINT DETAIL

COMPOST FILTER TUBES

NOT TO SCALE

COMPOST FILTER TUBE NOTES:

1. PROVIDE A MINIMUM TUBE DIAMETER OF 12" FOR SLOPES UP TO 50' IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATION WITH LONGER SLOPES OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN–OFF.
5. TUBES FOR COMPOST FILTERS SHALL BE JUTE MESH OR APPROVED BIODEGRADABLE MATERIAL. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
6. TAMP TUBES IN PLACE TO ENSURE GOOD CONTACT WITH SOIL SURFACE. IT IS NOT NECESSARY TO TRENCH TUBES INTO EXISTING GRADE.
7. WHEN STAKING IS NOT POSSIBLE, SUCH AS WHEN TUBES MUST BE PLACED ON PAVEMENT, HEAVY CONCRETE OR CINDER BLOCKS CAN BE USED BEHIND TUBES UP TO 5' APART OR AS REQUIRED TO SECURE TUBES IN PLACE.
8. PROVIDE 3' MINIMUM OVERLAP AT ENDS OF TUBES TO JOIN IN A CONTINUOUS BARRIER AND MINIMIZE UNIMPEDED FLOW.
9. STAKE JOINING TUBES SNUGLY AGAINST EACH OTHER TO PREVENT UNFILTERED FLOW BETWEEN THEM.
10. SECURE ENDS OF TUBES WITH STAKES SPACED 18" APART THROUGH TOPS OF TUBES.

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North Andover, Massachusetts

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DRAWN BY:	AI
DESIGNED/CHECKED BY:	DRF
APPROVED BY:	EAO

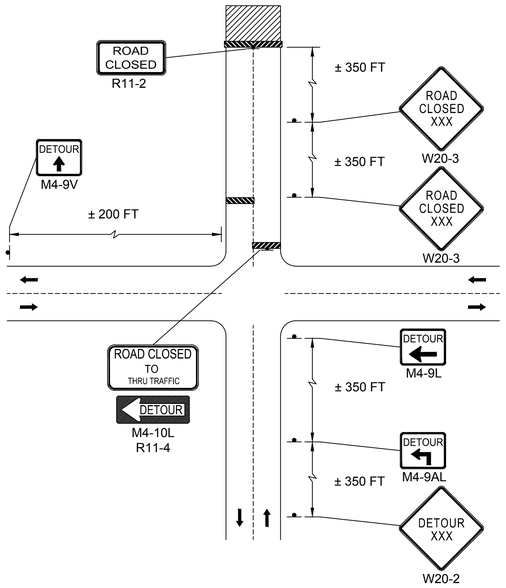
CONSTRUCTION DETAILS

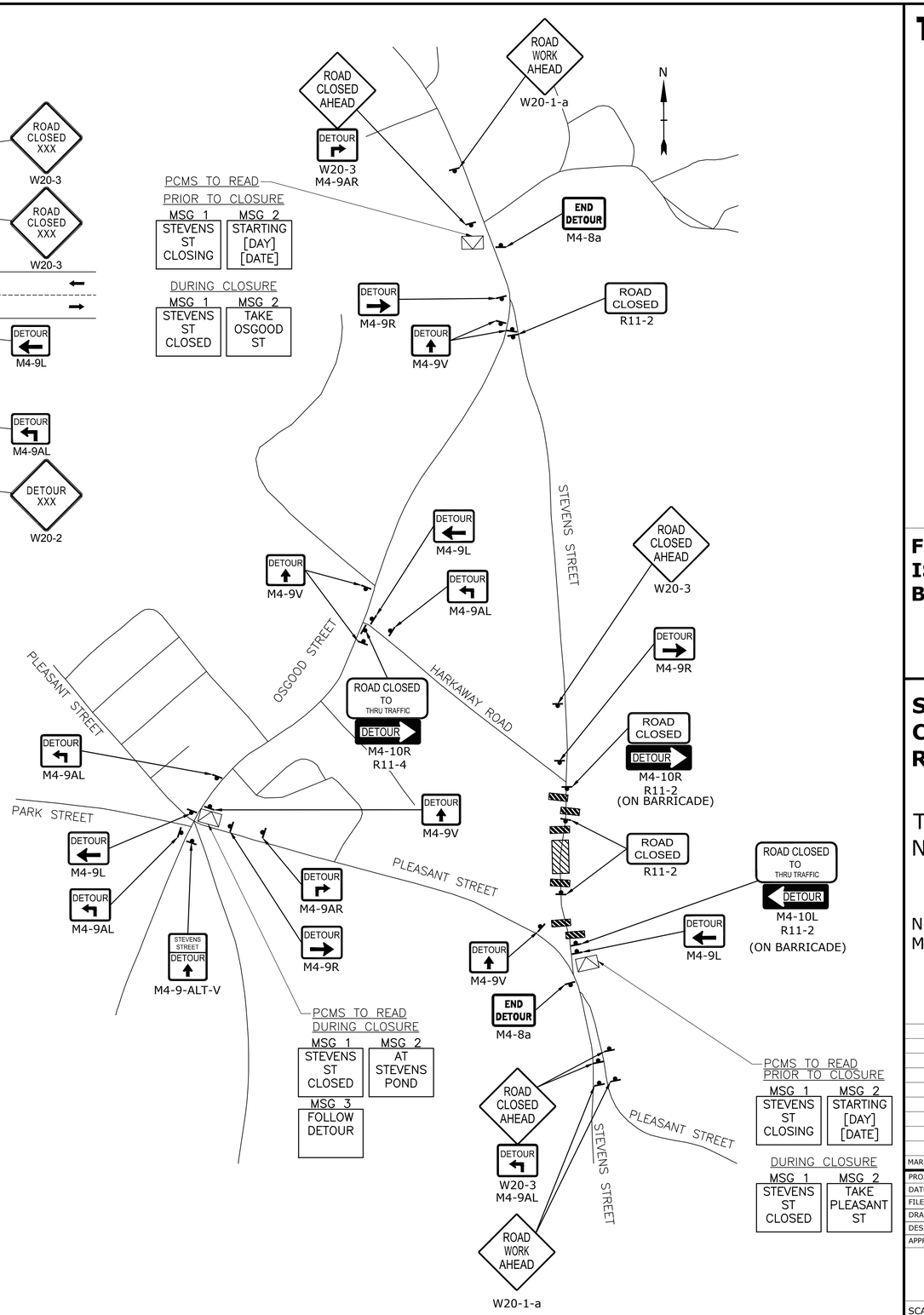
SCALE: AS SHOWN

SHEET 03 OF 14

NOTES:

1. TEMPORARY FENCING AND BARRIERS SHALL BE DEPLOYED ON SITE DURING THE ROADWAY CLOSURE TO PREVENT ACCESS TO THE CROSSING.
2. NO THRU TRAFFIC SHALL BE PERMITTED UNTIL THE HEADWALLS, GUARDRAILS, AND PAVEMENT HAVE BEEN INSTALLED.
3. PLACEMENT OF SIGNS TO BE COORDINATED WITH THE ENGINEER, DEPARTMENT OF PUBLIC WORKS, POLICE DEPARTMENT, AND FIRE DEPARTMENT (NORTH ANDOVER, MASSACHUSETTS).
4. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
5. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
6. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
7. 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.
8. 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).
9. 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.
10. PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE IN PLACE 14 DAYS PRIOR TO THE START OF ANY WORK TO PROVIDE ADVANCE NOTICE OF ROAD CLOSURE.
11. THE FIRST FIVE PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH TYPE A LIGHTS.
12. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
13. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
14. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
15. MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
16. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
17. TWO-WAY TRAFFIC SHALL BE RESTORED AT THE END OF THE PROJECT.
18. THE CONTRACTOR SHALL PROVIDE ALL SIGNAGE, BARRICADES, POLICE DETAILS AND OTHER CONTROLS AS REQUIRED FOR TRAFFIC CONTROL.





SIGN LEGEND					
CODE	DESCRIPTION	SIZE	AREA	NO.	TOTAL AREA
W20-1-a	ROAD WORK AHEAD	36"x36"	9 SF	3	27 SF
W20-3	ROAD CLOSED AHEAD	36"x36"	9 SF	4	36 SF
R11-2	ROAD CLOSED	48"x30"	10 SF	4	40 SF
R11-4	ROAD CLOSED TO THRU TRAFFIC	60"x30"	12.5 SF	2	25 SF
M4-9-ALT-V	DETOUR WITH STREET NAME	30"X36"	7.5 SF	1	7.5 SF
M4-10L	DETOUR	48"x18"	6 SF	1	6 SF
M4-10R	DETOUR	48"x18"	6 SF	2	12 SF
M4-9L	DETOUR	30"x24"	5 SF	3	15 SF
M4-9R	DETOUR	30"x24"	5 SF	3	15 SF
M4-9V	DETOUR	30"x24"	5 SF	5	25 SF
M4-9AL	DETOUR	30"x24"	5 SF	5	25 SF
M4-9AR	DETOUR	30"x24"	5 SF	2	10 SF
M4-8a	END DETOUR	30"x24"	5 SF	2	10 SF
					TOTAL = 253.5 SF

LEGEND:

- TYPE III BARRICADE
- WORK ZONE
- SIGN
- PCMS

Tighe&Bond

DANIEL L. MURPHY, JR. CIVIL No. 41049 REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
09/06/2024

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DRAWN BY:	AI
DESIGNED/CHECKED BY:	DRF
APPROVED BY:	EAO

TEMPORARY TRAFFIC CONTROL PLAN

SCALE: NO SCALE

SHEET 04 OF 14

Last Saved 5/16/2024
Printed On: Sep 06, 2024-2:41pm By: AImiolek
Tighe & Bond:\\tighebond.com\data\Data\Projects\Wn\1093 north andover nov support\016 - stevens street culvert final design\Drawings\AutoCAD\Sheet\N1093-016-C.dwg

EXISTING WATER MAIN
APPROX LOCATION SHOWN FOR
ILLUSTRATIVE PURPOSES
CONTRACTOR TO VERIFY LOCATION
PRIOR TO WORK ON SITE

EXISTING SEWER MAIN
APPROX LOCATION SHOWN FOR
ILLUSTRATIVE PURPOSES
CONTRACTOR TO VERIFY LOCATION
PRIOR TO WORK ON SITE

END R&D EXISTING GUARDRAIL
STA 1+60.17

PROPERTY LINE (TYP)

STA 1+00.00 STEVENS STREET =
STA 0+50.00 CULVERT

APPROX COFFERDAM EXTENTS (TYP)

MILL POND

EROSION CONTROL BARRIER (TYP)

BEGIN R&D EXISTING GUARDRAIL
STA 0+35.39

EXISTING BITUMINOUS CURB

RETAIN EXISTING SEWER MANHOLE

APPROX EXISTING SUBDRAIN. RET.
COORDINATE LOCATION WITH
NORTH ANDOVER DPW

BENCHMARK: A
X-CUT ON
GUARDRAIL
ELEV: 112.25'

END R&D EXISTING GUARDRAIL
STA 1+59.20

EXISTING TREELINE (TYP)

EXISTING EDGE OF PAVEMENT (TYP)

STEVENS STREET BASELINE ALIGNMENT

R&D EXISTING CONCRETE TOPPING SLAB
AND STONE MASONRY HEADWALLS

RETAIN EXISTING TWIN 48" ø RC CULVERTS

CULVERT CENTERLINE ALIGNMENT

STEVENS POND

EXISTING 30" ø CMP OVERFLOW CULVERT STRUCTURE

ORDINARY HIGH WATER MARK (TYP)

BEGIN R&D EXISTING GUARDRAIL
STA 0+34.15

RIGHT-OF-WAY (TYP)

EXISTING GUARDRAIL (TYP)

BENCHMARK: B
X-CUT ON
GUARDRAIL
ELEV: 112.71'

STEVENS STREET

PC +09.34
PT +34.54
PT +82.56
PC +33.31
+50
0+00
+90

2A-11 2A-10 2A-9 2A-8 2A-7 2A-6 2A-5 2A-4 2A-3 2A-2

1A-1 1A-2 1A-3 1A-4 1A-5 1A-6 1A-7 1A-8 1A-9 1A-10

NOTES:

1. THE ENTIRETY OF THE PROJECT AREA IS WITHIN BLSF.
THE ENTIRETY OF THE PROJECT AREA IS WITHIN LOCAL AND STATE BUFFER ZONES, INCLUDING THE 100-FOOT BUFFER ZONE, 50-FOOT NO BUILD ZONE, AND 25-FOOT NO DISTURBANCE ZONE.

0 10 20 30 40
SCALE: 1" = 10'

Tighe&Bond

DANIEL L. MURPHY, JR. CIVIL No. 41049 REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
09/06/2024

MATTHEW J COUGHLIN CIVIL No. 53455 REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
09/06/2024

FINAL DESIGN ISSUED FOR BID

Stevens Street Culvert Rehabilitation

Town of
North Andover

North Andover,
Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	N1093-016
DATE:	09/06/2024
FILE:	N1093-016-S.dwg
DRAWN BY:	AI
DESIGNED/CHECKED BY:	DRF
APPROVED BY:	EAO

EXISTING CONDITIONS
AND DEMOLITION PLAN

SCALE: 1" = 10'

SHEET 05 OF 14

Last Saved: 9/6/2024
Printed On: Sep 06, 2024 - 2:44pm By: AImiolek
Tighe & Bond: \\tighebond.com\data\Data\Projects\N\n1093 north andover nov support\016 - stevens street culvert final design\Drawings\AutoCAD\Sheet\N1093-016-S.dwg

NARROW BRIDGE
W5-2

END FULL DEPTH ROADWAY CONSTRUCTION BEGIN MILL & OVERLAY STA 1+52.50 SEE NOTE 3

TIE INTO EXISTING GUARDRAIL STA 1+60.17 LT 12.46

EROSION CONTROL BARRIER (TYP)

EDGE OF PAVEMENT (TYP)

BEGIN TRANSITION TO NCHRP 350 STA 1+25.61 LT 11.97

APPROX COFFERDAM EXTENTS (TYP) SEE NOTE 1 SEE DETAILS SHEET 10

TURBIDITY CURTAIN (TYP) SEE NOTE 4

MILL POND

PROPERTY LINE (TYP)

END TRANSITION TO NCHRP 350 STA 0+69.22 LT 11.28

TIE INTO EXISTING GUARDRAIL STA 0+35.39 LT 12.85

STEVENS STREET

STEVENS POND

BENCHMARK: A X-CUT ON GUARDRAIL ELEV: 112.25'

BENCHMARK: B X-CUT ON GUARDRAIL ELEV: 112.71'

EXISTING WATER MAIN

EXISTING SEWER MAIN

APPROX LOCATION OF DEWATERING FILTRATION BAG

TIE INTO EXISTING GUARDRAIL STA 1+59.20 RT 14.90

STEVENS STREET BASELINE ALIGNMENT

EXISTING TREELINE (TYP)

BEGIN TRANSITION TO NCHRP 350 STA 1+25.16 RT 11.86

PROPOSED LATERAL 1.125" ø S.S. TIES AT 4'-0" O.C. (TYP) SEE SHEET 11

STA 1+00.00 STEVENS STREET = STA 0+44.67 CULVERT

PROPOSED CONCRETE HEADWALL (TYP)

28-FOOT (APPROX) CIP LINING OF 48" DIA RC CULVERTS (TYP BOTH BARRELS)

CULVERT CENTERLINE ALIGNMENT

PROPOSED DYL

PROPOSED SWL (TYP)

END TRANSITION TO NCHRP 350 STA 0+69.05 RT 12.09

ORDINARY HIGH WATER MARK (TYP)

TIE INTO EXISTING GUARDRAIL STA 0+34.15 RT 12.98

END MILL & OVERLAY BEGIN FULL DEPTH ROADWAY CONSTRUCTION STA 0+38.00 SEE NOTE 3

NARROW BRIDGE
W5-2

NOTES:

1. APPROXIMATE LIMITS OF CONCEPTUAL COFFERDAM SYSTEM SHOWN FOR ILLUSTRATIVE PURPOSES. CONTRACTOR SHALL DETERMINE FINAL COFFERDAM/CONTROL OF WATER SYSTEM IN ACCORDANCE WITH NOTES AND DETAILS ON SHEET 10 AND THE SPECIAL PROVISIONS. CONTRACTOR SHALL SUBMIT A DEWATERING PLAN FOR REVIEW AND APPROVAL PRIOR TO THE START OF ANY CONSTRUCTION RELATED ACTIVITIES.
   CONTRACTOR'S SELECTED COFFERDAM SYSTEM SHALL NOT EXCEED 5000 SQUARE FEET OF IMPACT AREA TO LAND UNDER WATER.
2. THE ENTIRETY OF THE PROJECT AREA IS WITHIN BLSF.
   THE ENTIRETY OF THE PROJECT AREA IS WITHIN LOCAL AND STATE BUFFER ZONES, INCLUDING THE 100-FOOT BUFFER ZONE, 50-FOOT NO BUILD ZONE, AND 25-FOOT NO DISTURBANCE ZONE.
3. LIMITS OF MILL & OVERLAY SHALL EXTEND ALONG THE FULL WIDTH OF STEVENS STREET FROM THE INTERSECTION OF PLEASANT STREET TO THE SOUTH TO THE INTERSECTION OF HARKAWAY ROAD TO THE NORTH.
   PROPOSED LANE STRIPING AND EROSION CONTROL BARRIER SHALL EXTEND ALONG FULL LIMITS OF MILL AND OVERLAY.
4. INSTALL TURBIDITY CURTAIN PRIOR TO REMOVAL OF COFFERDAMS TO CONTAIN ANY DISTURBED SEDIMENT ASSOCIATED WITH REMOVAL OF COFFERDAMS.

0 10 20 30 40
SCALE: 1" = 10'

Tighe&Bond

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09/06/2024

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COMMONWEALTH OF MASSACHUSETTS
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DESIGNED/CHECKED BY:	DRF
APPROVED BY:	EAO

SITE PLAN

SCALE: 1" = 10'

SHEET 06 OF 14

Last Saved: 9/6/2024
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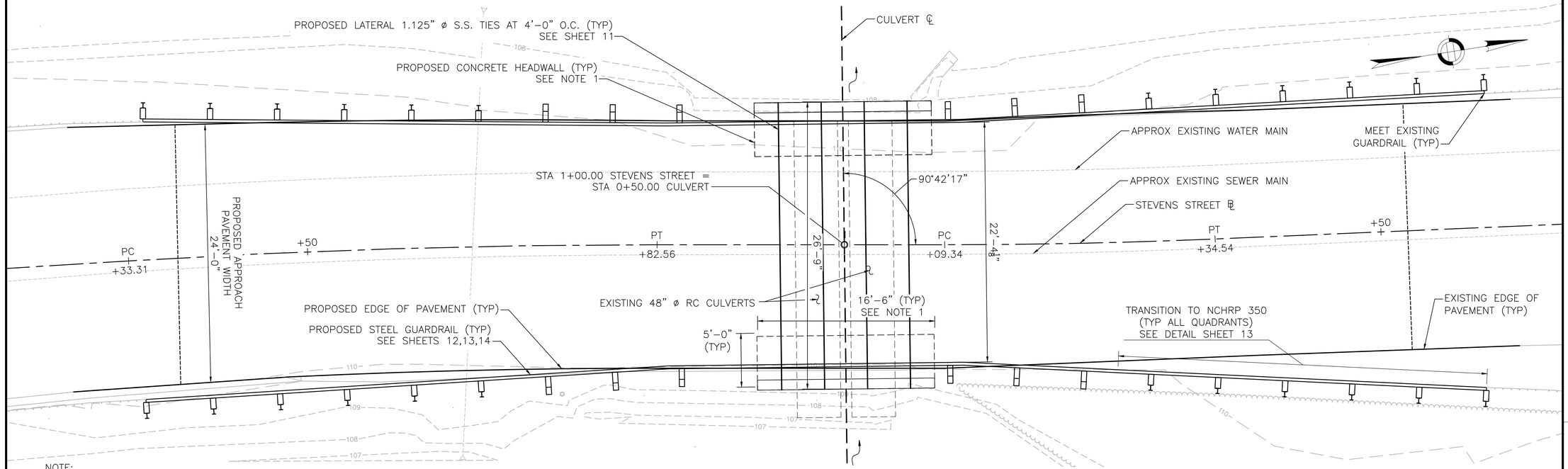
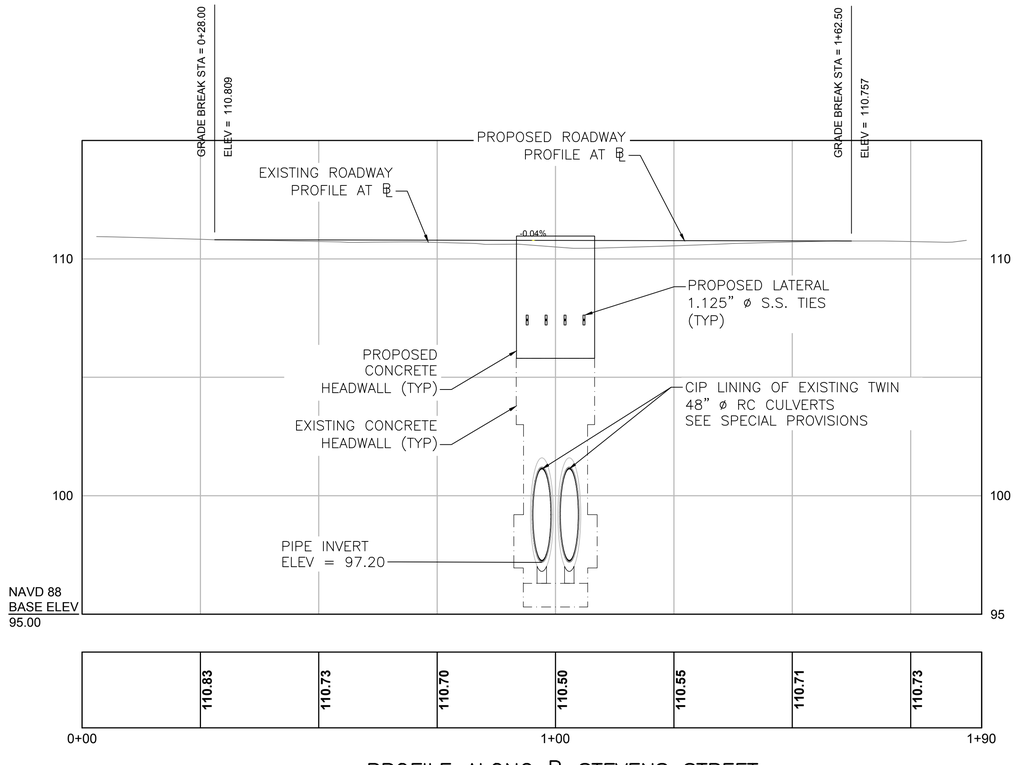


GENERAL PLAN

SCALE: 1" = 5'

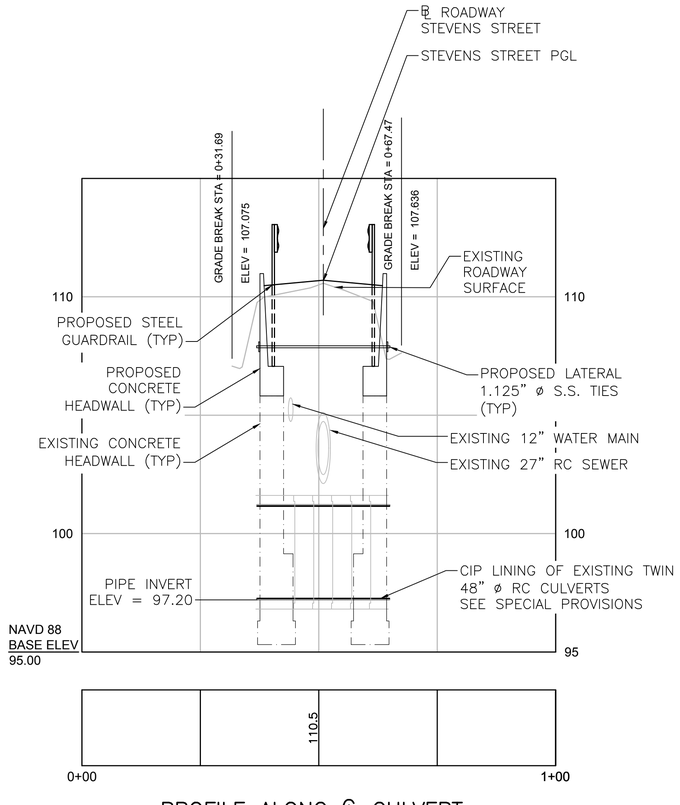
NOTE:

1. DIMENSIONS OF EXISTING CONCRETE HEADWALL ARE APPROXIMATE AND ARE BASED ON AVAILABLE RECORD DRAWINGS AND SITE INVESTIGATION. PROPOSED CONCRETE HEADWALL IS INTENDED TO EXTEND ALONG THE ENTIRE WIDTH AND LENGTH OF THE EXISTING CONCRETE HEADWALL. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD AND ADJUST DIMENSIONS AS REQUIRED.



PROFILE ALONG ℄ STEVENS STREET

HORIZ.: 1" = 20' VERT.: 1" = 4'



PROFILE ALONG ℄ CULVERT

HORIZ.: 1" = 20' VERT.: 1" = 4'

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MATTHEW J COUGHLIN CIVIL No. 53455 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS 09/06/2024

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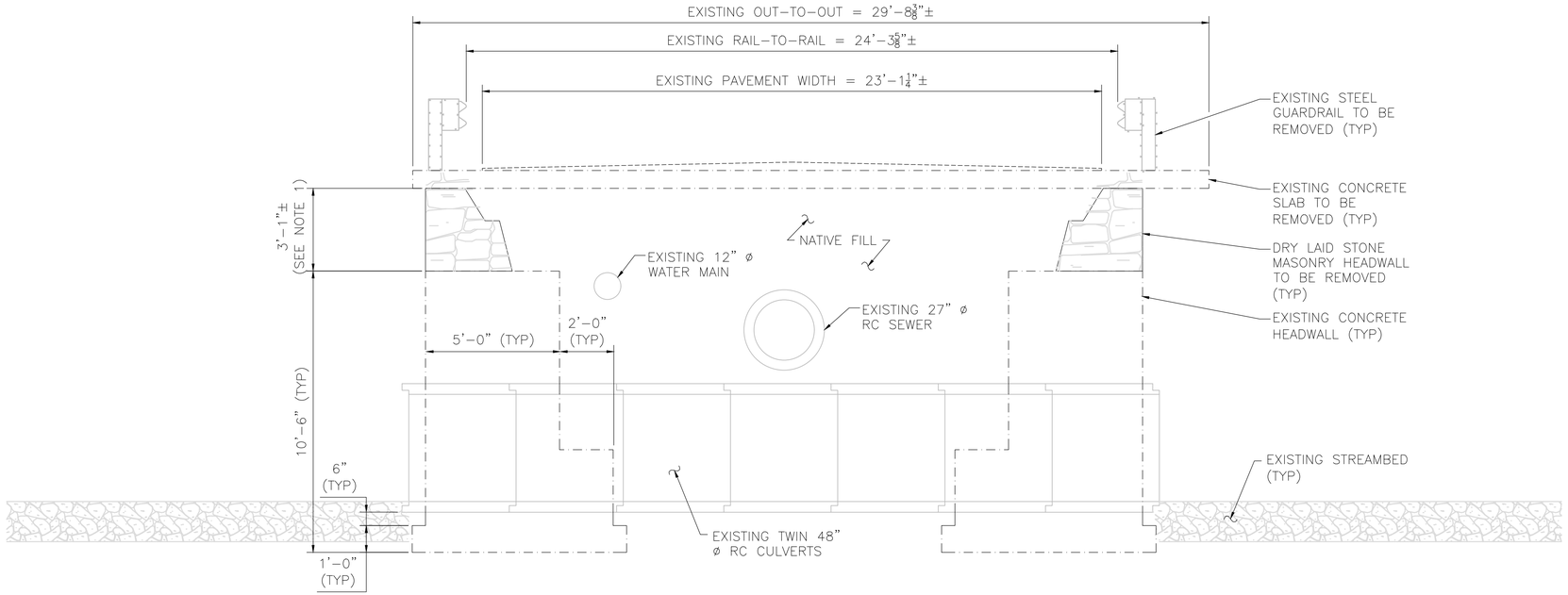
PROPOSED PLAN & PROFILES

SCALE: AS SHOWN

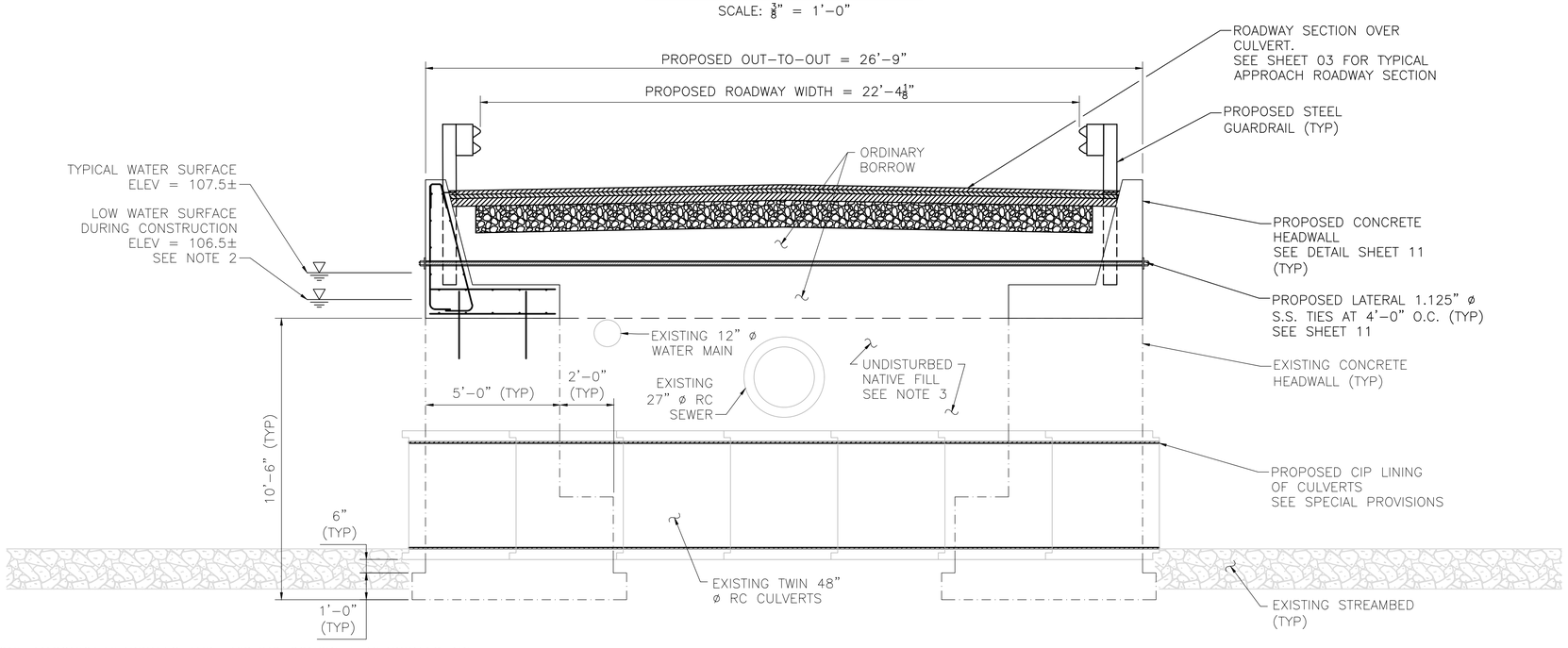
SHEET 07 OF 14

Last Saved: 9/6/2024
Plotted On: Sep 06, 2024-2:44pm By: Almiolek
Tighe & Bond: \\tighebond.com\data\Data\Projects\Wn1093 north andover nov support\016 - stevens street culvert final design\Drawings\AutoCAD\Sheet\N1093-016-S.dwg



EXISTING CULVERT SECTION
(LOOKING NORTH)

SCALE: 3/8" = 1'-0"



PROPOSED CULVERT SECTION
(LOOKING NORTH)

SCALE: 3/8" = 1'-0"

NOTES:

1. SHAPE AND THICKNESS OF STONE MASONRY HEADWALLS AND EXISTING CONCRETE HEADWALLS ARE APPROXIMATE AND BASED ON AVAILABLE RECORD DRAWINGS AND SITE INVESTIGATION. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD.
2. WATER ELEVATIONS IN STEVENS POND AND MILL POND MAY BE ABLE TO BE DRAWN DOWN TO HELP FACILITATE CONSTRUCTION. DRAW DOWN OF WATER ELEVATION IS FACILITATED BY REMOVAL OF STOP LOGS AT THE WEIR LOCATED AT THE WESTERN OUTLET OF MILL POND. COORDINATE REMOVAL OF STOP LOGS, PROPOSED WATER DRAWDOWN ELEVATION, AND OPERATION OF WEIR WITH THE TOWN.
3. LIMIT OF REMOVAL OF NATIVE FILL NOT EXPECTED TO EXTEND BELOW TOP OF EXISTING CONCRETE HEADWALL.

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09/06/2024

COMMONWEALTH OF MASSACHUSETTS
MATTHEW J COUGHLIN
CIVIL
No. 53455
REGISTERED PROFESSIONAL ENGINEER
09/06/2024

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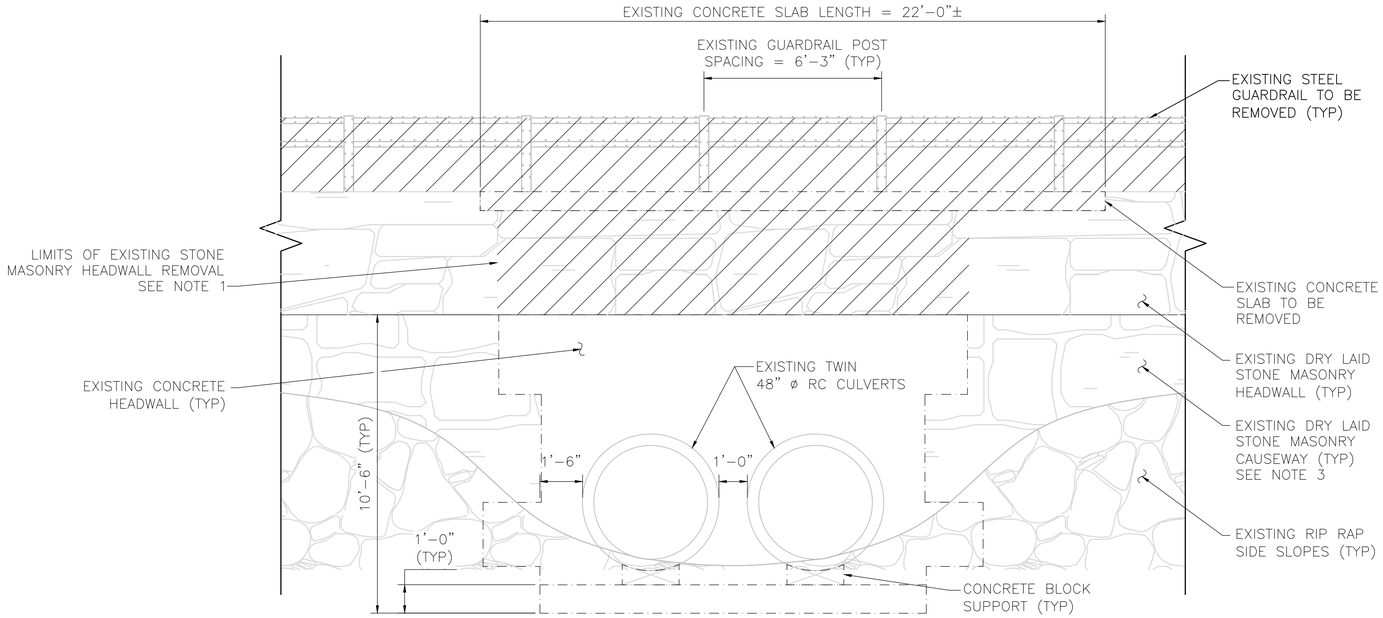
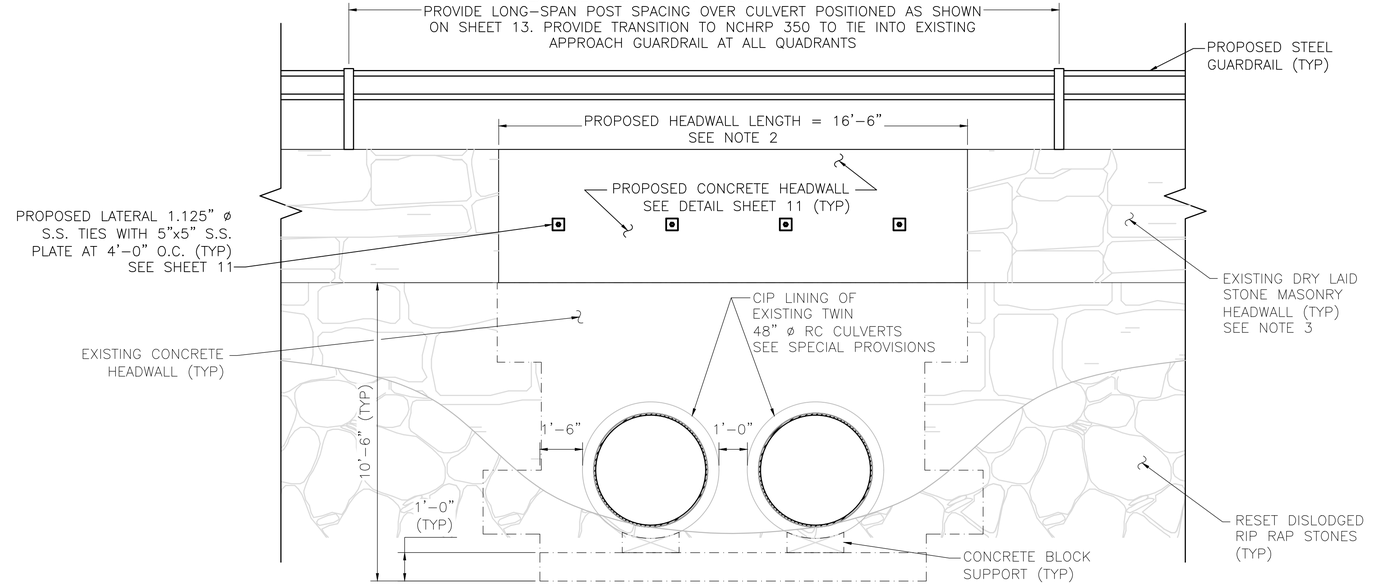
CULVERT SECTIONS

SCALE: AS SHOWN



EXISTING CULVERT ELEVATION

SCALE: $\frac{3}{8}$" = 1'-0"



PROPOSED CULVERT ELEVATION

SCALE: $\frac{3}{8}$" = 1'-0"

NOTES:

1. REMOVE DRY LAID STONE MASONRY AS REQUIRED TO FACILITATE INSTALLATION OF PROPOSED CONCRETE HEADWALL ABOVE EXISTING CONCRETE CULVERT HEADWALL. ENGINEER SHALL REVIEW THE DEMOLITION OF THE EXISTING SLAB AND STONE HEADWALLS PRIOR TO PROPOSED RECONSTRUCTION
2. DIMENSIONS OF EXISTING CONCRETE HEADWALL ARE APPROXIMATE AND ARE BASED ON AVAILABLE RECORD DRAWINGS AND SITE INVESTIGATION. PROPOSED CONCRETE HEADWALL IS INTENDED TO EXTEND ALONG THE ENTIRE LENGTH OF THE EXISTING CONCRETE HEADWALL. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD AND ADJUST DIMENSION AS REQUIRED.
3. CONTRACTOR SHALL COORDINATE WITH THE ENGINEER IN THE FIELD TO REVIEW THE EXISTING CONDITION OF ADJACENT DRY LAID STONE MASONRY HEADWALLS AND RIP RAP SIDE SLOPES. LOCAL REPAIRS TO ADJACENT STONE MASONRY HEADWALLS SHALL BE REQUIRED AS NEEDED TO STABILIZE THE HEADWALL. SEE SHEET 11 FOR TYPICAL REPAIR DETAILS.

Tighe&Bond

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09/06/2024

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COMMONWEALTH OF MASSACHUSETTS
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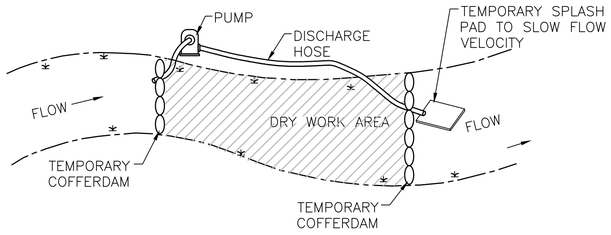
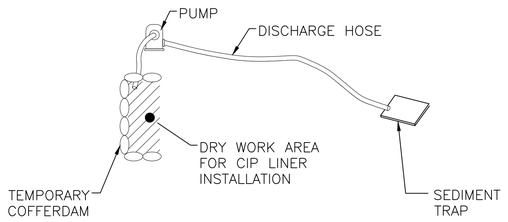
CULVERT ELEVATIONS

SCALE: AS SHOWN



POND BYPASS DETAIL (PUMPED)

NOT TO SCALE



NOTES:

1. DEWATERING EQUIPMENT SHALL REMAIN WITHIN THE PERMANENTLY IMPACTED AREAS.
2. DISCHARGE HOSE SHALL NOT CROSS THE STREAM AT ANY LOCATION

DEWATERING

NOT TO SCALE

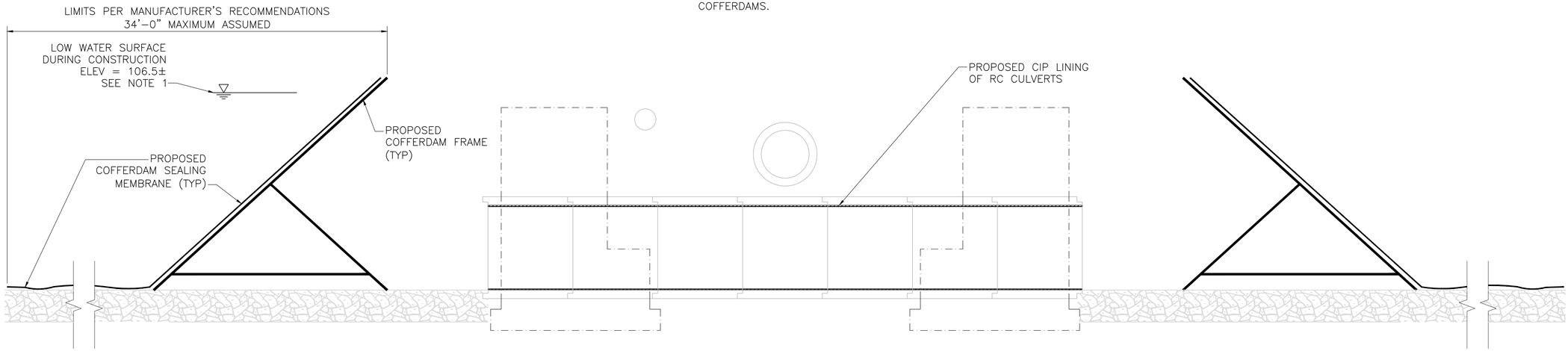
WATER CONTROL NOTES:

1. WATER ELEVATIONS IN STEVENS POND AND MILL POND MAY BE ABLE TO BE DRAWN DOWN TO HELP FACILITATE CONSTRUCTION. DRAW DOWN OF WATER ELEVATION IS FACILITATED BY REMOVAL OF STOP LOGS AT THE WEIR LOCATED AT THE WESTERN OUTLET OF MILL POND. COORDINATE REMOVAL OF STOP LOGS, PROPOSED WATER DRAWDOWN ELEVATION, AND OPERATION OF WEIR WITH THE TOWN.
2. THE ISOLATED WORK AREA WITHIN THE COFFERDAMS MAY BE DEWATERED AS NEEDED TO PERFORM WORK IN THE DRY. ALL WORK MUST BE PERFORMED IN THE DRY. ANY DEWATERING ACTIVITIES SHALL BE PERFORMED USING A DISCHARGE HOSE, FILTER BAG, AND SEDIMENT TRAP (SHOWN ON THIS SHEET).
3. PRIOR TO BEGINNING ANY CONSTRUCTION IN THE POND, SUBMIT TO THE OWNER FOR REVIEW AND APPROVAL, A DEWATERING PLAN THAT INCLUDES AT A MINIMUM THE WORK SEQUENCE INDICATING ANTICIPATED COFFERDAM LOCATIONS, OR ALTERNATE SYSTEM. WORK SHALL ONLY BE PERFORMED DURING LOW FLOW CONDITIONS.
4. THE COFFERDAM WORK MAY BE MODIFIED TO ADDRESS THE CONTRACTOR'S SEQUENCE OF CONSTRUCTION, WITH THE APPROVAL OF THE OWNER. CONTRACTOR'S SELECTED COFFERDAM SYSTEM SHALL NOT EXCEED 5000 SQUARE FEET OF IMPACT AREA TO LAND UNDER WATER.
5. TEMPORARY COFFERDAMS (PORTADAMS, SHEET PILING OR EQUIVALENT; USE OF UNCONSOLIDATED MATERIALS STRICTLY PROHIBITED) SHALL BE INSTALLED TO MAINTAIN A DRY WORK AREA DURING CONSTRUCTION ACTIVITIES AND TO LIMIT SEDIMENTATION AS A RESULT OF THE PROPOSED WORK. THE WORK AREA LOCATED WITHIN THE COFFERDAMS SHALL BE DEWATERED. THE COFFERDAMS WILL BE LOCATED WITHIN THE POND TO ALLOW INSTALLATION OF CIP LINING OF CULVERT BARRELS.
6. WATER CONTROLS SHOULD BE DESIGNED FOR A REASONABLE ELEVATION ABOVE THE ANTICIPATED DRAW–DOWN WATER ELEVATION (SEE NOTE 1).
7. THE DETAILS SHOWN ON THIS SHEET ARE AN EXAMPLE OF ACCEPTABLE METHODS TO USE DURING CONSTRUCTION OF THIS PROJECT. PRIOR TO COMMENCING WORK SUBMIT TO THE ENGINEER DRAWIINGS AND CALCULATIONS, STAMPED BY A PROFESSIONAL ENGINEER IN THE COMMONWEALTH OF MASSACHUSETTS, INDICATING THE CONTRACTOR'S METHOD FOR CONTROL OF WATER. THE SUBMITTAL SHALL INCLUDE PROPOSED IMPACT AREAS, RESTORATION METHODS, FLOW RATES, DEWATERING METHODS AND A DETAILED SCHEDULE FOR THE CONTROL OF WATER.

DEWATERING NOTES:

PREPARE A DEWATERING PLAN FOR REVIEW AND APPROVAL TO ADDRESS THE FOLLOWING CONCERNS AND ADHERE TO THE FOLLOWING REQUIREMENTS:

1. IF THE WATER TABLE IS INTERCEPTED DURING EXCAVATION, WATER COLLECTED IN THE TRENCH SHALL BE PUMPED OUT SO THAT THE WORK CAN BE PERFORMED "IN THE DRY." PROVIDE ADEQUATELY SIZED DEWATERING EQUIPMENT WITH 100% BACKUP AND SEDIMENTATION/EROSION CONTROL STRUCTURES AS DETAILED ON THE CONTRACT DRAWINGS TO ENSURE CONSTRUCTION "IN THE DRY" AND ADEQUATELY PROTECT ADJACENT WETLAND AREAS AND WATERWAYS.
2. ALL GROUNDWATER REMOVED (PUMPED) FROM THE TRENCH EXCAVATION AND DISCHARGED SHALL BE A "CLEAN DISCHARGE." PROVIDE WHATEVER DEVICES ARE REQUIRED TO ACHIEVE THE "CLEAN DISCHARGE." IF THE OWNER'S REPRESENTATIVE DETERMINES THE PUMPED DISCHARGE IS CLEAN (LESS THAN 50 NTU), THE FLOW CAN BE DIRECTED TO AN UPLAND AREA. IF THE OWNER'S REPRESENTATIVE DETERMINES THAT THE FLOW IS NOT CLEAN, DIRECT THAT FLOW TO ONE OR MORE FILTRATION DEVICES FOR THE PURPOSE OF SUBSTANTIALLY REMOVING SUSPENDED SOLIDS FROM THE WATER. THE FILTRATION DEVICES SHALL BE AS SHOWN ON THE DRAWINGS OR APPROVED ALTERNATES SUGGESTED BY THE CONTRACTOR, OR AS REQUIRED BY THE LOCAL PERMITS.
3. OBTAIN ALL NECESSARY STATE AND LOCAL PERMITS RELATING TO DEWATERING ACTIVITIES.
4. DEWATERING DISCHARGE LOCATIONS ARE TO BE REVIEWED AND APPROVED BY THE OWNER'S REPRESENTATIVE. SEE SHEET 6.
5. ANY PROPOSED DEWATERING AND SHORING PROCEDURES SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND ACCEPTANCE. THE DEWATERING/WATER CONTROL AND SHORING/TEMPORARY EARTH SUPPORT SHALL BE DESIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER IN THE COMMONWEALTH OF MASSACHUSETTS.
6. INSTALL TURBIDITY CURTAIN PRIOR TO REMOVAL OF COFFERDAMS TO CONTAIN ANY DISTURBED SEDIMENT ASSOCIATED WITH REMOVAL OF COFFERDAMS.



CONCEPTUAL COFFERDAM SECTION

SCALE: $\frac{3}{8}$" = 1'–0"

Tighe&Bond

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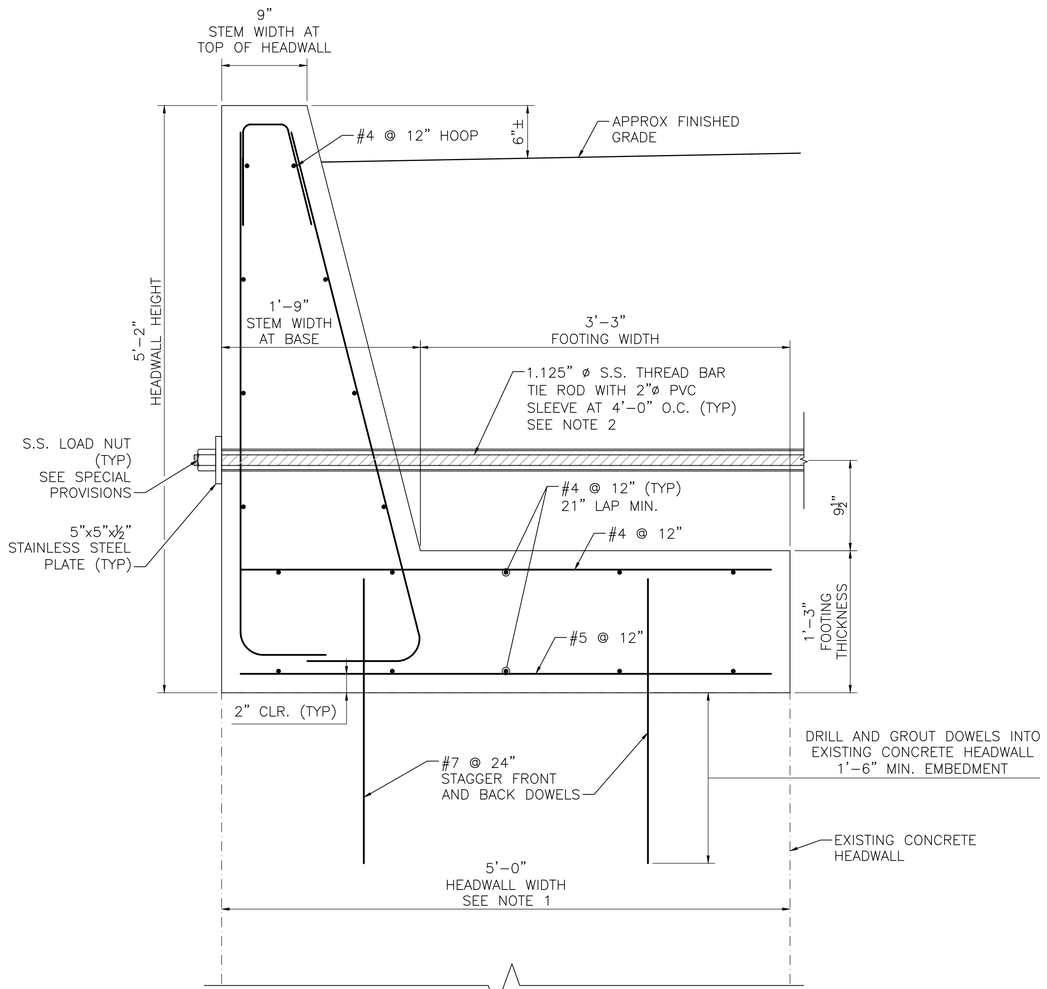
CONTROL OF WATER NOTES & DETAILS

SCALE: AS SHOWN

SHEET 10 OF 14



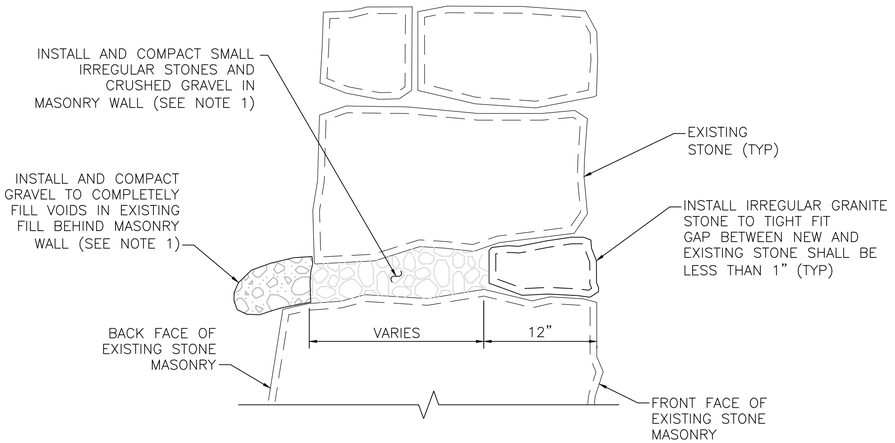
TYPICAL CONCRETE HEADWALL SECTION

SCALE: 1½" = 1'-0"

NOTE:

1. DIMENSIONS OF EXISTING CONCRETE HEADWALL ARE APPROXIMATE AND ARE BASED ON AVAILABLE RECORD DRAWINGS AND SITE INVESTIGATION. PROPOSED CONCRETE HEADWALL IS INTENDED TO EXTEND ALONG THE ENTIRE WIDTH OF THE EXISTING CONCRETE HEADWALL. CONTRACTOR TO VERIFY DIMENSIONS IN THE FIELD AND ADJUST DIMENSION AS REQUIRED.

2. TIE RODS TO PASS THROUGH PROPOSED CONCRETE HEADWALLS ALONG EITHER SIDE OF STEVENS STREET. COORDINATE INSTALLATION OF THREADED TIE RODS WITH CONSTRUCTION OF PROPOSED HEADWALLS. PROVIDE SLEEVES OR OTHER EQUIPMENT WITHIN PROPOSED CONCRETE HEADWALLS AS REQUIRED TO ALLOW FOR INSTALLATION AND TIGHTENING OF THREADED TIE RODS.



DRY LAID STONE MASONRY REPAIR DETAIL

NOT TO SCALE

NOTES:

1. COMPACT MATERIAL BEHIND AND INTO MASONRY WALL BY USING TAMPING RODS OR OTHER METHODS ACCEPTABLE TO THE ENGINEER.

2. WORK FOR CHINKING STONE MASONRY SHALL BE PERFORMED AT ALL LOCATIONS OF DETERIORATED STONE MASONRY CONSTRUCTION INCLUDING THE EXISTING STONE HEADWALLS TO REMAIN AND THE EXISTING DRY LAID STONE MASONRY CAUSEWAY.

3. CONTRACTOR SHALL COORDINATE WITH THE ENGINEER IN THE FIELD TO REVIEW THE CONDITION OF EXISTING FEATURES AND JOINTLY DETERMINE EXTENTS OF REPAIRS.

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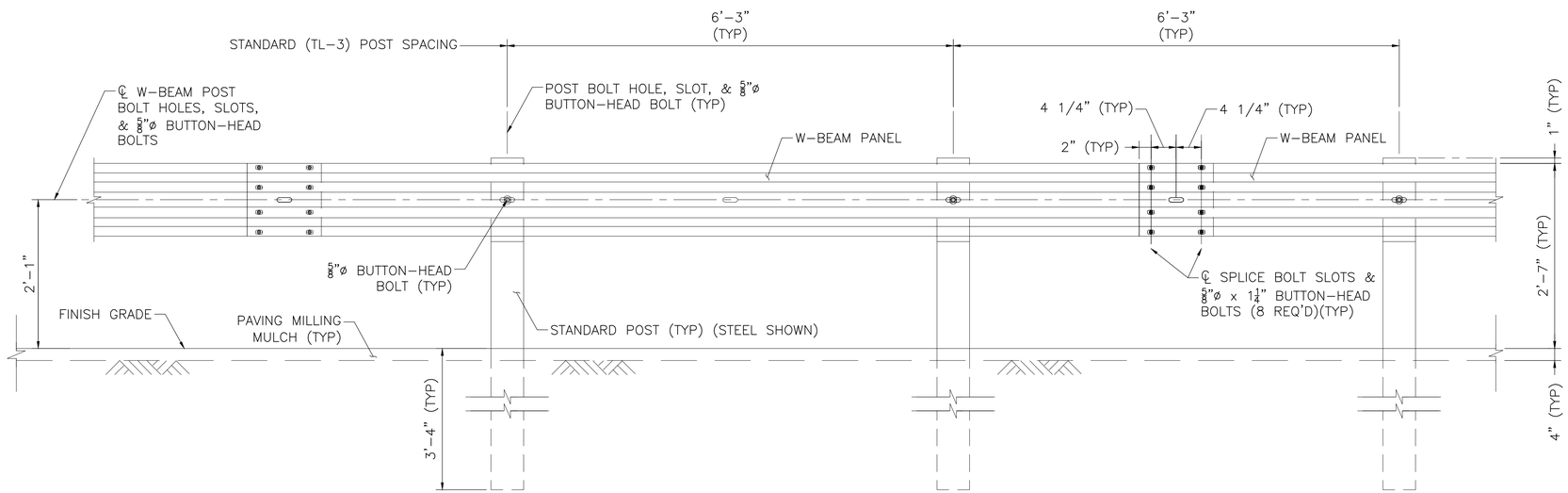
STRUCTURAL DETAILS

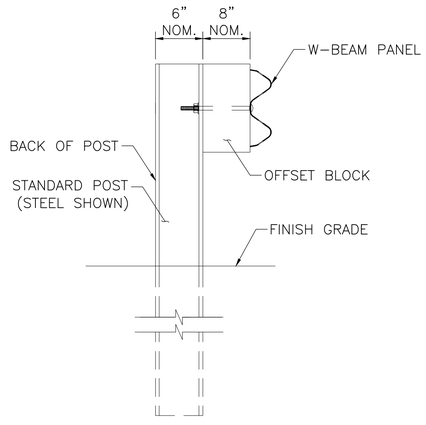
SCALE: AS SHOWN

SHEET 11 OF 14



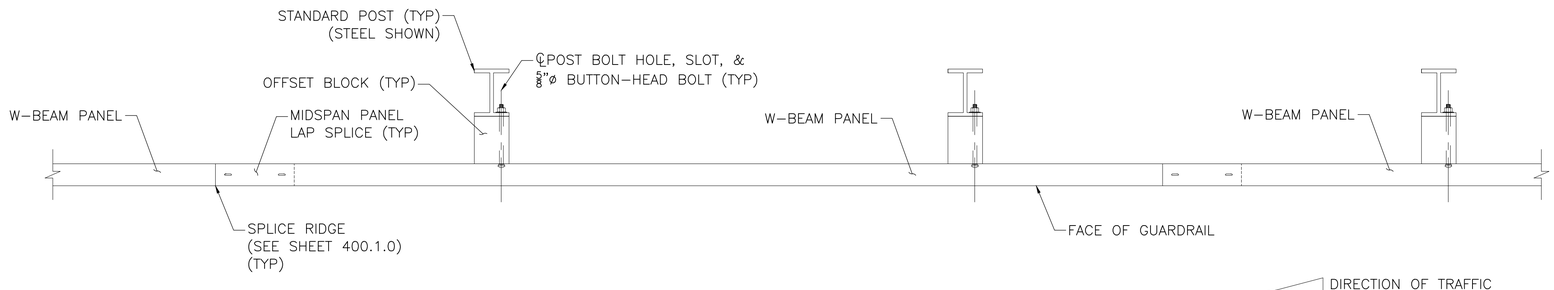
ELEVATION

SCALE: 1" = 1'-0"



SECTION

SCALE: 1" = 1'-0"



PLAN

SCALE: 1" = 1'-0"

Tighe&Bond

DANIEL L. MURPHY, JR. CIVIL No. 41049 REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
09/06/2024

MATTHEW J COUGHLIN CIVIL No. 53455 REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
09/06/2024

FINAL DESIGN ISSUED FOR BID

Stevens Street Culvert Rehabilitation

Town of North Andover

North Andover, Massachusetts

MARK	DATE	DESCRIPTION

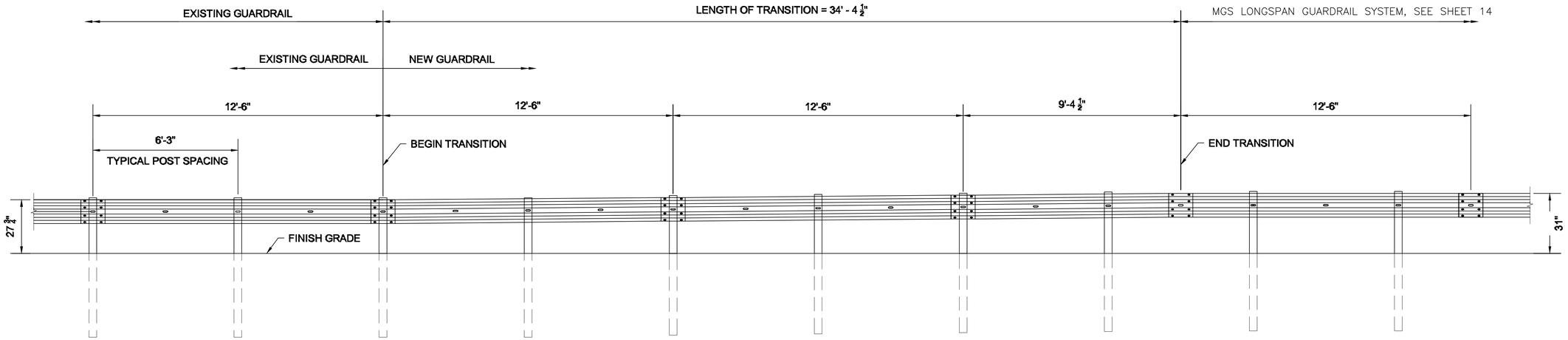
PROJECT NO:	N1093-016
DATE:	09/06/2024
FILE:	N1093-016-S.dwg
DRAWN BY:	AI
DESIGNED/CHECKED BY:	DRF
APPROVED BY:	EAO

TL-3 GUARDRAIL DETAILS

SCALE: AS SHOWN

SHEET 12 OF 14

Last Saved: 9/6/2024
Plotted On: Sep 06, 2024-2:44pm By: AImiolek
Tighe & Bond: \\tighebond.com\data\Data\Projects\N\n1093 north andover nov support\016 - stevens street culvert final design\Drawings\AutoCAD\Sheet\N1093-016-S.dwg



ELEVATION

NOT TO SCALE

NOTES:

1. MAINTAIN STANDARD 1" CLEARANCE OF POST ABOVE PANEL THROUGHOUT THE ENTIRE LENGTH OF TRANSITION.
2. A MINIMUM OF ONE (1) 12'–6" PANEL SHALL BE PLACED BETWEEN THIS TRANSITION AND THE START OF ANY END TREATMENT OR ANCHORAGE.
3. ALL NEW POSTS SHALL BE 72" IN LENGTH UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
4. ALL NEW POSTS AND OFFSET BLOCK MATERIALS SHALL MATCH EXISTING UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS
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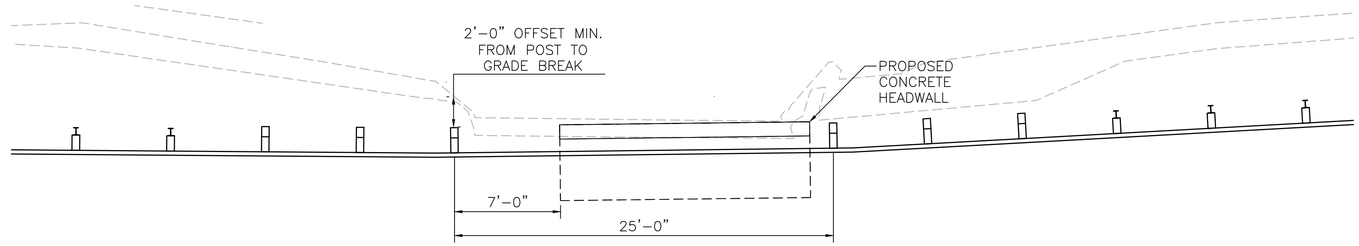
APPROVED BY:	EAO

TRANSITION TO NCHRP 350 GUARDRAIL DETAIL

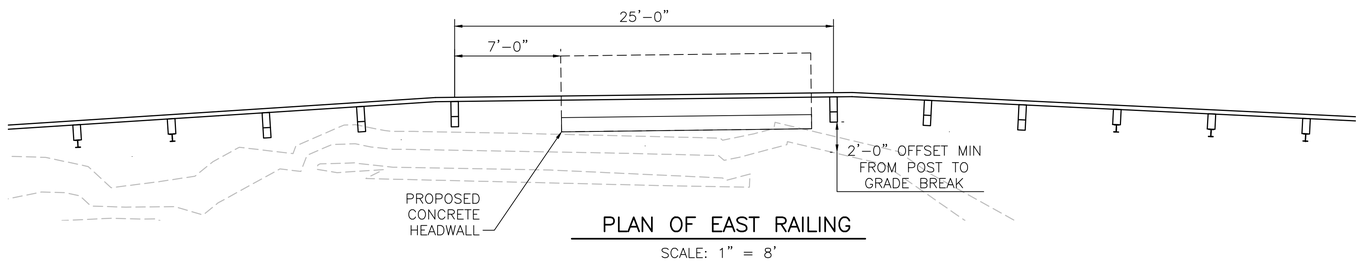
SCALE: NO SCALE

SHEET 13 OF 14



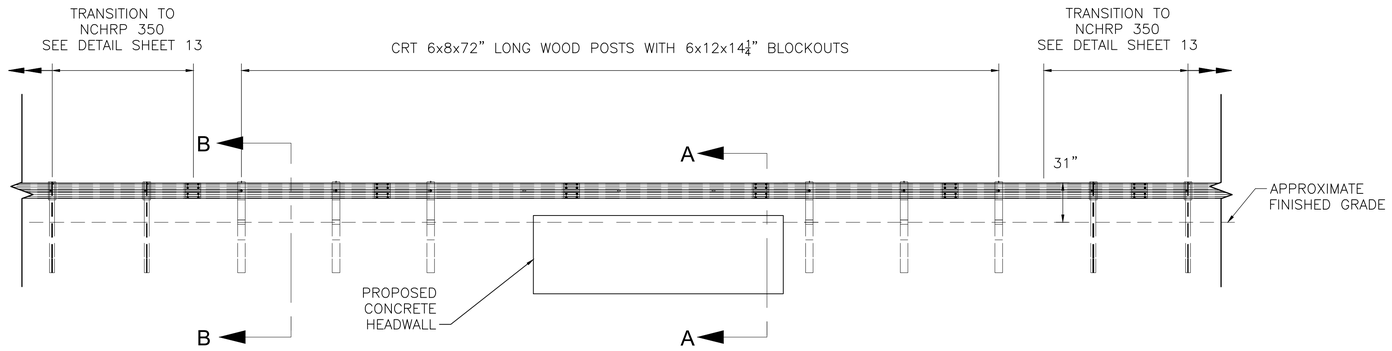
PLAN OF WEST RAILING

SCALE: 1" = 8'



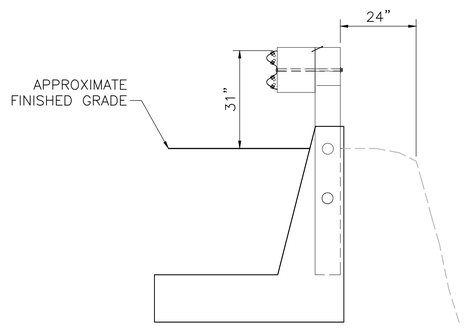
PLAN OF EAST RAILING

SCALE: 1" = 8'



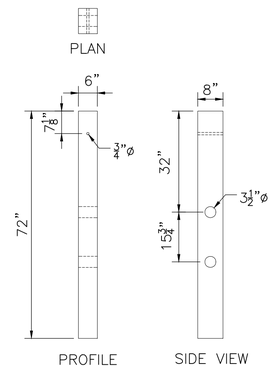
PROFILE

SCALE: 1" = 8'



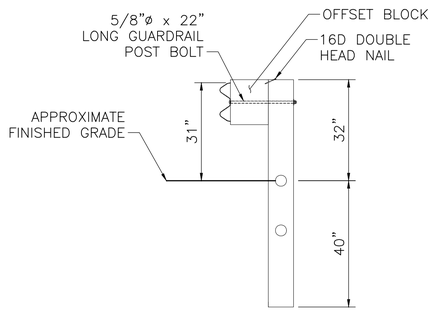
SECTION A–A

SCALE: ½" = 1'–0"



CRT WOOD POST DETAILS

SCALE: ½" = 1'–0"



SECTION B–B

SCALE: ½" = 1'–0"

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LONG-SPAN MGS DETAILS

SCALE: AS SHOWN

SHEET 14 OF 14